

WORKSHOP REPAIR MANUAL

WIRING DIAGRAMS



FOREWORD

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Ford Motor Company of Southern Africa



2008.75MY FOCUS ST C307

Workshop Manual



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GROUP

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General Information

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SECTION 100-00 General Information

VEHICLE APPLICATION: 2008.75 Focus ST C307

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DESCRIPTION AND OPERATION

About This Manual

Introduction

This manual has been written in a format that is designed to meet the needs of technicians worldwide. The objective is to use common formats and include similar content in each manual.

This manual provides general descriptions for accomplishing diagnosis and testing, service and repair work with tested, effective techniques. Following them will help assure reliability.

Special Tools

The special tool(s) table provided at the beginning of each procedure shows all special tools required to carry out a repair. Where possible, illustrations are provided to assist in identifying the special tool required.

Important Safety Instructions

Appropriate service methods and correct repair procedures are essential for the safe, reliable operation of all motor vehicles as well as the personal safety of the individual carrying out the work.

This manual cannot possibly anticipate all such variations and provide advice or cautions as to each. Anyone who departs from the instructions provided in this manual must first establish that he compromises neither his personal safety nor the vehicle integrity by his choice of methods, tools or components.

Warnings, Cautions and Notes in This Manual

WARNING: Warnings are used to indicate that failure to follow a procedure correctly may result in personal injury.

CAUTION: Cautions are used to indicate that failure to follow a procedure correctly may result in damage to the vehicle or equipment being used.

NOTE: Notes are used to provide additional essential information required to carry out a complete and satisfactory repair.

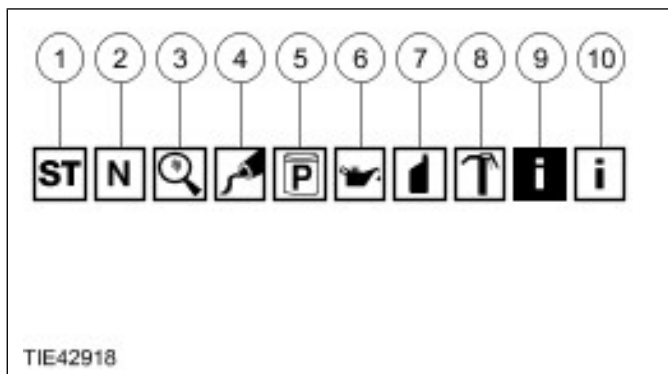
As you read through this manual, you will come across WARNINGS, CAUTIONS and NOTES.

A warning, caution or note is placed at the beginning of a series of steps if it applies to multiple steps. If the warning, caution or note only applies to one step, it is placed at the beginning of the specific step (after the step number).

Overview Procedures

Overview procedures contain an exploded view illustration(s). The numbered sequence within the illustration(s) indicate the order to be followed when removing/disassembling or when installing/assembling a component. Additional information, symbol(s) or a torque figure, may also be shown alongside the component.

There are ten symbols used to give additional information when removing/disassembling or when installing/assembling a component.



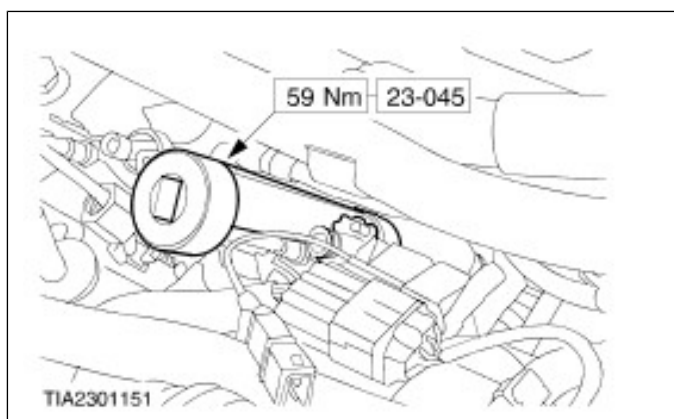
Item	Designation	Description
1	Special tool	A special tool is required for this component. There will also be a removal or installation symbol alongside the special tool symbol.
2	Install new component	Discard the old component and install a new component.
3	Inspect	Check the component for damage.

DESCRIPTION AND OPERATION

Item	Designation	Description
4	Apply sealant	Apply sealant to the component as specified in the materials table.
5	Apply petroleum jelly	Apply petroleum jelly to the component as specified in the materials table.
6	Apply oil	Apply oil to the component as specified in the materials table.
7	Apply fluid	Apply fluid to the component as specified in the materials table.
8	Apply grease	Apply grease to the component as specified in the materials table.
9	Removal or Disassembly detail	Go to the removal or disassembly detail for additional information to remove or disassemble a component
10	Installation or Assembly detail	Go to the installation or assembly detail for additional information to install or assemble a component

Special Tools and Torque Figures

Any requirement for special tools will picture the tool, showing it in use and with its tool number shown. Torque settings will be given at the relevant point in the procedure.

**Trustmark Authoring Standards (TAS) Removal and Installation Procedures**

NOTE: TAS style procedures can be identified by steps that have no accompanying step text and the magenta color of the electrical connectors and fasteners such as nuts, bolts, clamps or clips.

A TAS removal and installation procedure uses a sequence of color illustrations to indicate the order to be followed when removing/disassembling or installing/assembling a component.

Many of the TAS procedures will have the installation information within the removal steps. These procedures will have the following note at the beginning of the procedure:

NOTE: Removal steps in this procedure may contain installation details.

Items such as O-ring seals, gaskets, seals, self-locking nuts and bolts are to be discarded and new components installed unless otherwise stated within the procedure. Coated nuts or bolts are to be reused, unless damaged or otherwise stated within the procedure.

Specification procedures will contain all technical data that are not part of a repair procedure.

TAS Graphics

Colors used in the graphic are as follows:

- Blue - Indicates the target item, item to be removed/installed or disassembled/assembled
- Green and Brown - Indicates a secondary item that needs to be detached, removed/installed or disassembled/assembled prior to the target item
- Magenta - Indicates electrical connectors and fasteners such as nuts, bolts, clamps or clips
- Pale Blue - is for the special tool(s) and general equipment

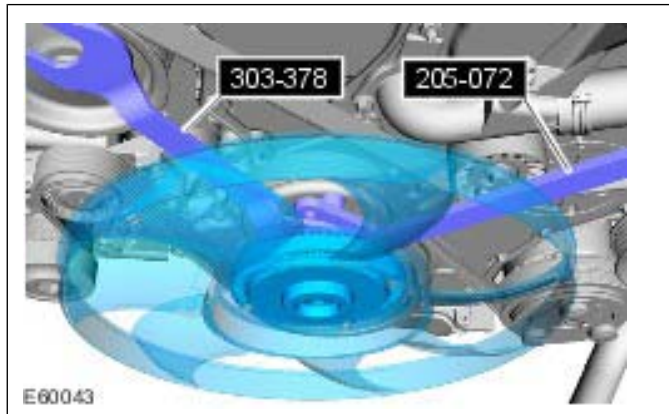
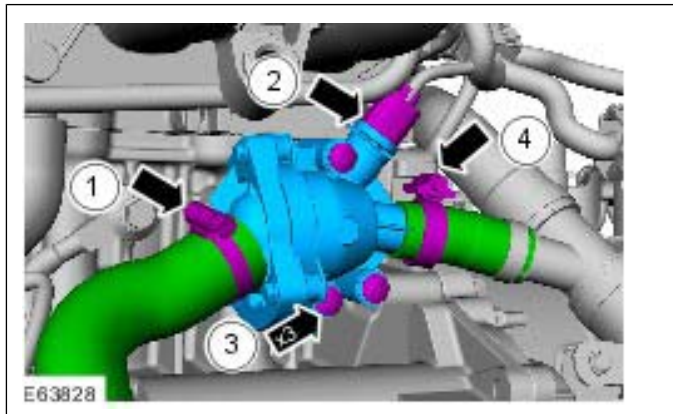
There may be multiple steps assigned to one illustration.

Numbered pointers are used to indicate the number of electrical connectors and fasteners such as nuts, bolts, clamps or clips.

Items in the illustration can be transparent or use cutouts to show hidden detail(s).



DESCRIPTION AND OPERATION



TAS Symbols

Symbols are used inside the graphics and in the text area to enhance the information display. The following paragraphs describe the various types and categories of symbols.

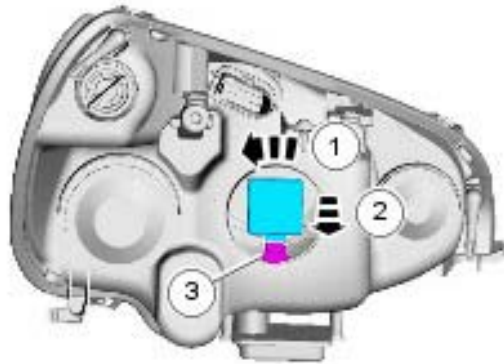
Prohibition symbols advise on prohibited actions to either avoid damage or health and safety related risks.

Health and Safety symbols recommend the use of particular protection equipment to avoid or at least reduce the risk or severity of possible injuries.





DESCRIPTION AND OPERATION

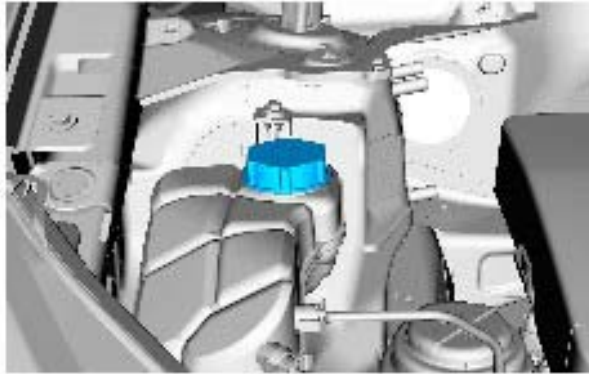


2.



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Warning symbols are used to indicate potential risks resulting from a certain component or area.



3.



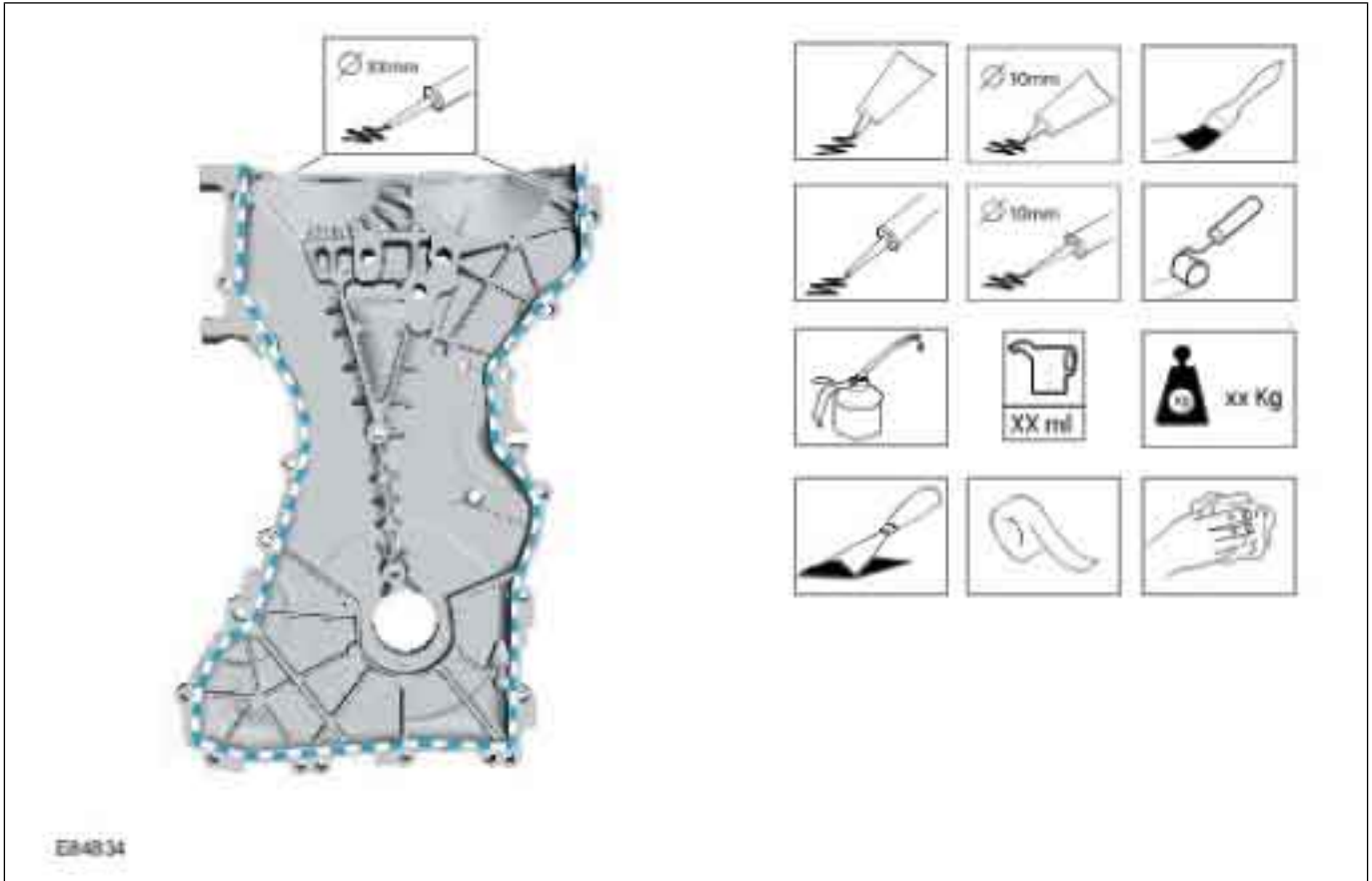
E85028





DESCRIPTION AND OPERATION

Instruction symbols are used to apply sealer, lubricant, weight, tape or cleaning detergent to a component.

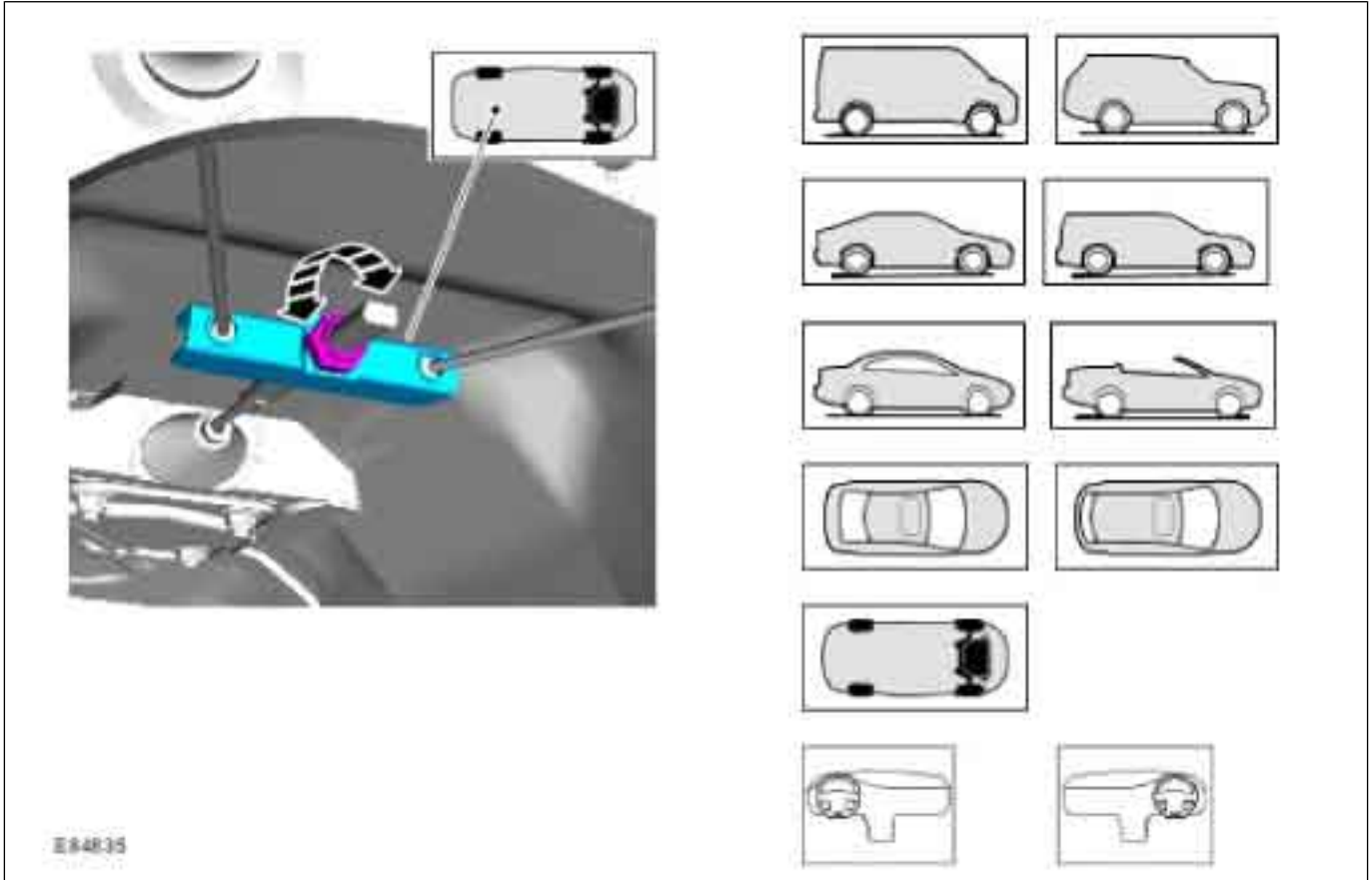


Location symbols are used to show the location of a component or system within the vehicle.





DESCRIPTION AND OPERATION

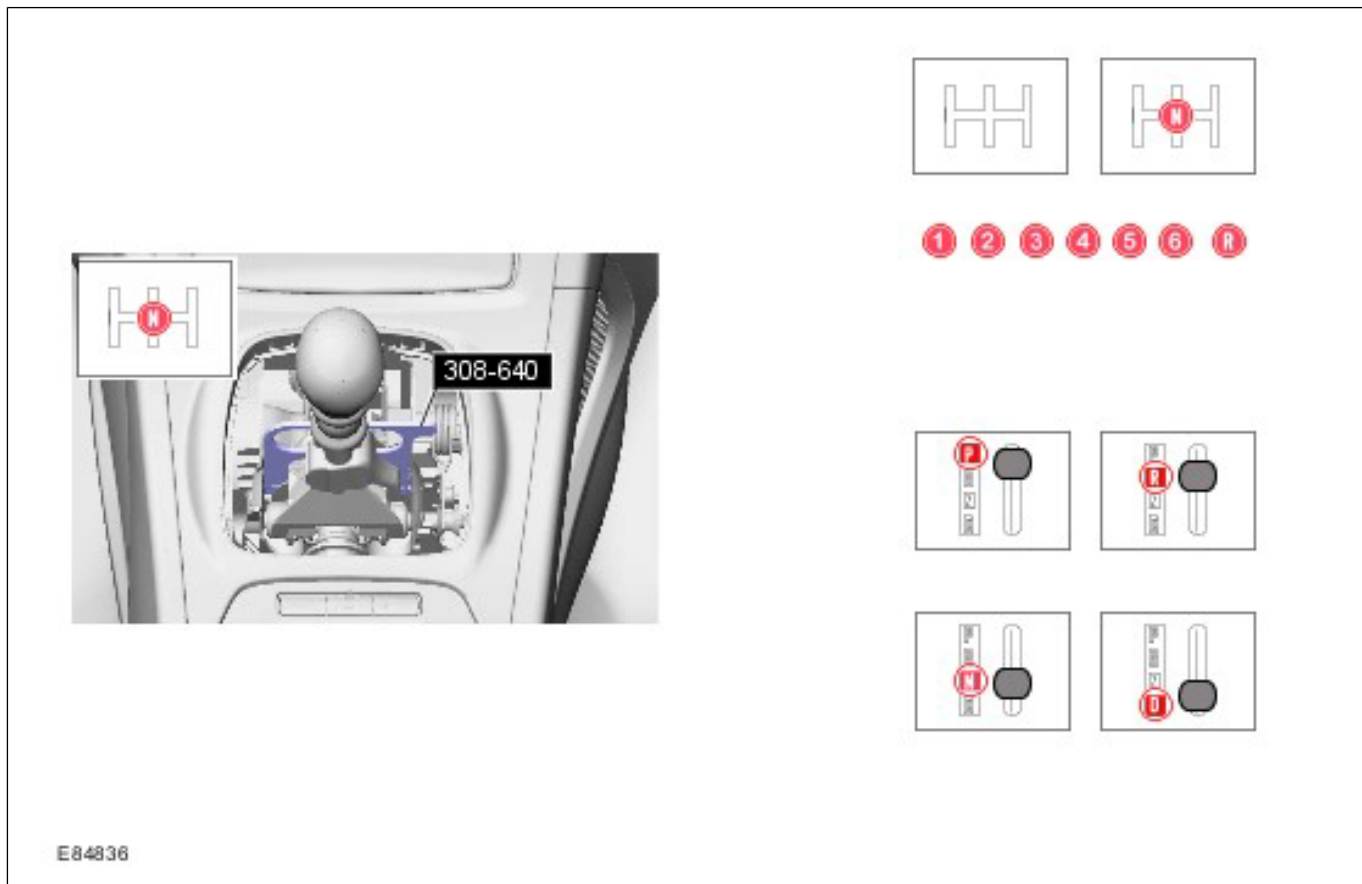


Gearshift lever or selector lever position symbols are used to show which gearshift lever or selector lever position is to be set.





DESCRIPTION AND OPERATION



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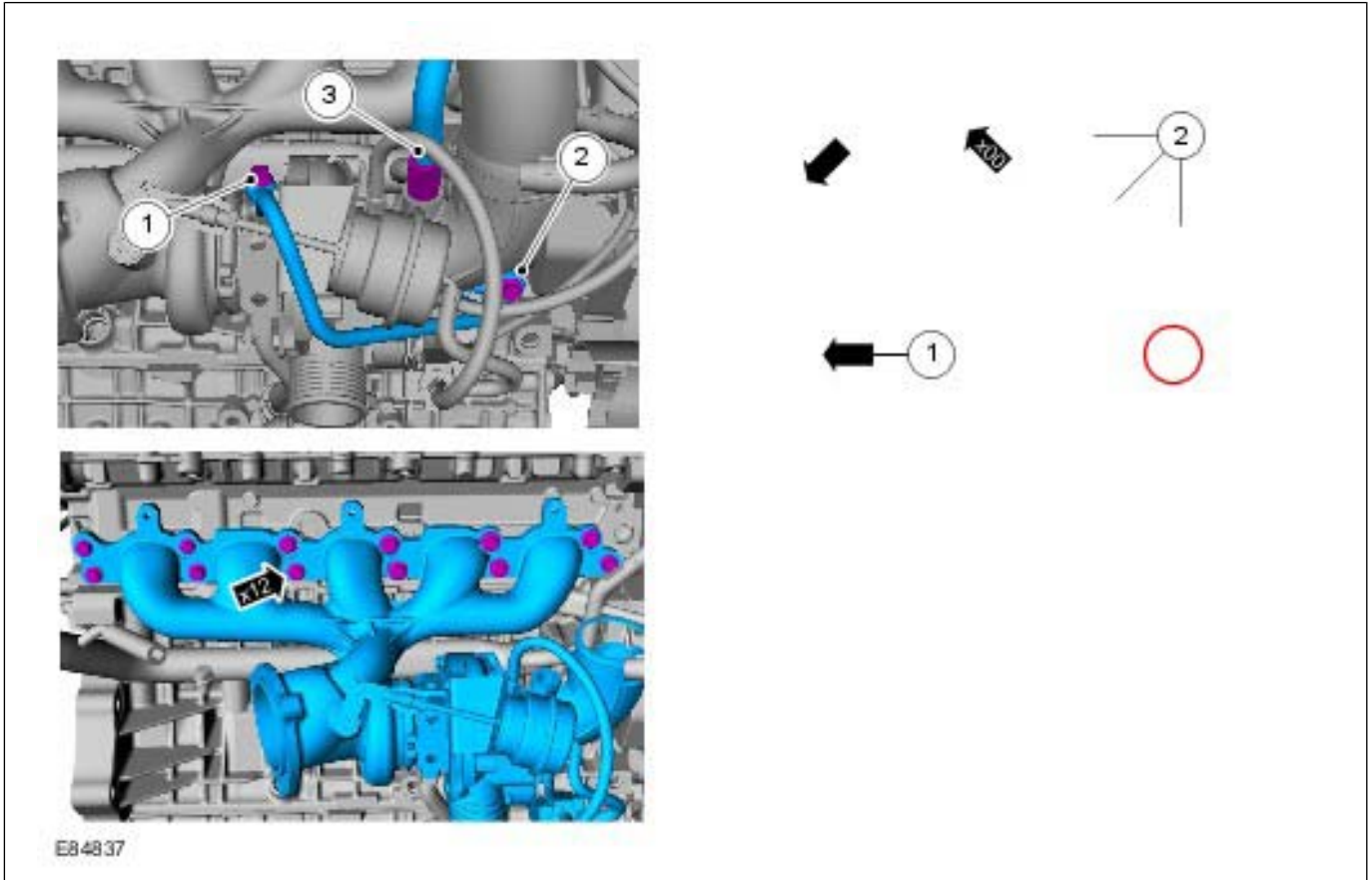
Pointer symbols are used to draw the attention to components and give special instructions such as a required sequence or number of components. The number of components is reflected by the value inside the luty arrow. A sequence number is

located inside the circle. Numbers inside circles are also used to allocate special information such as tightening torques or chemicals to a particular component.





DESCRIPTION AND OPERATION

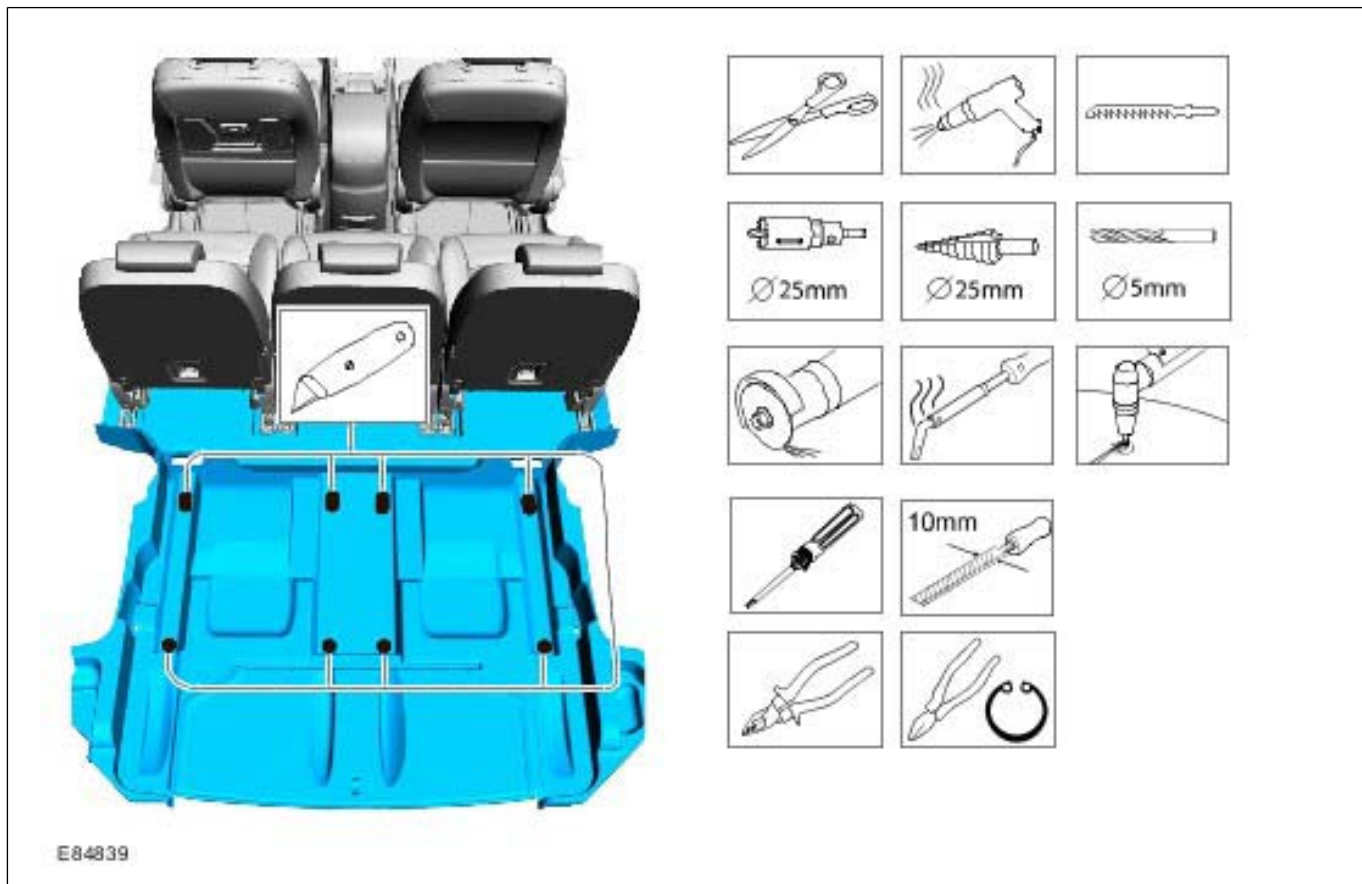


Movement arrows are used to show three dimensional or rotational movements. These movements can include specific values inside the symbol if required.





DESCRIPTION AND OPERATION

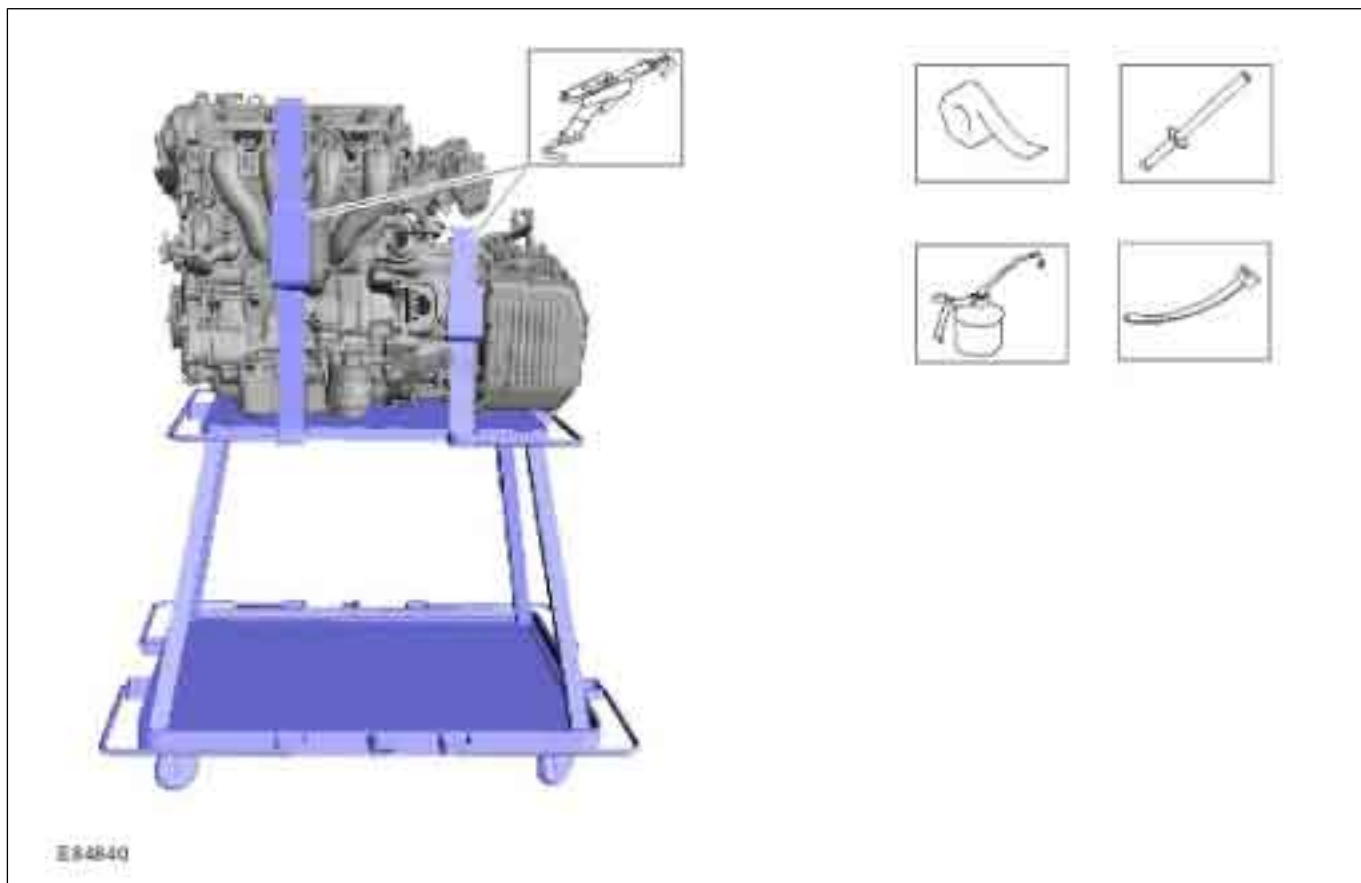


The following graphic illustrates a set of symbols that are used to provide detailed information on where to apply a material.





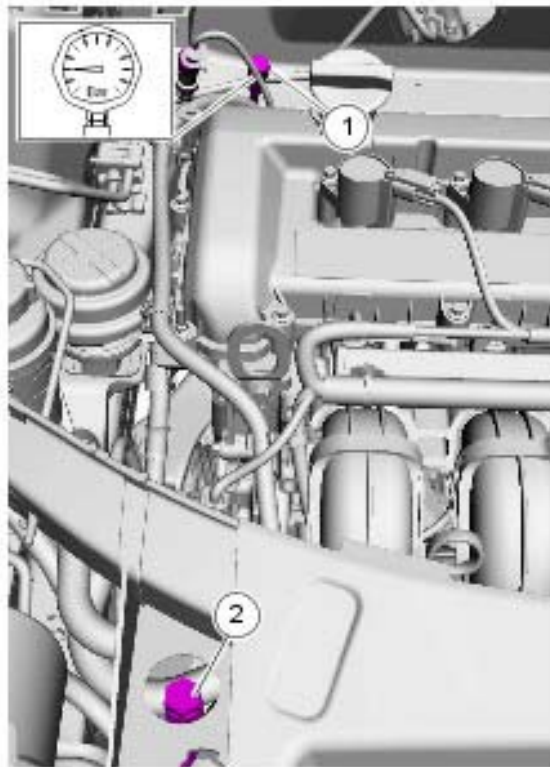
DESCRIPTION AND OPERATION



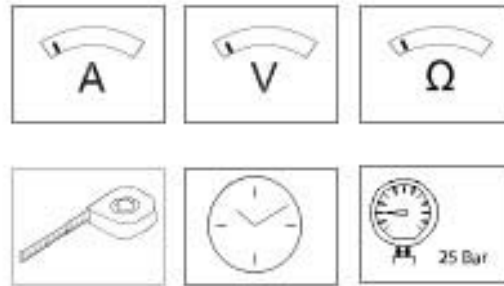
Measurement symbols provide detailed information on where to carry out a specific measurement. These symbols can include specific values if required.



DESCRIPTION AND OPERATION



E84841

**Special Tools and Torque Figure(s)**

Special tools will be shown with the tool number in the illustration. The special tool number(s), general equipment, material(s) and torque figure(s) used for the procedure step will be shown in the text column.

How to Use This Manual

This manual covers diagnosis and testing, service and repair procedures.

This manual is structured into groups and sections, with specific system sections collected together under their relevant group.

A group covers a specific portion of the vehicle. The manual is divided into five groups, General Information, Chassis, Powertrain, Electrical and Body and Paint. The number of the group is the first number of a section number.

Pages at the start of the manual list all sections available. Each section has a contents list detailing Specifications, Description and Operation, Diagnosis and Testing, In Vehicle Repairs, Disassembly and Assembly, Removal and Installation.

If components need to be removed or disassembled in sequence, the sequence will be identified numerically in a graphic and the corresponding text will be numbered accordingly.

All left and right-hand references to the vehicle are taken from a position sitting in the driver seat looking forward.

All left and right-hand references to the engine are taken from a position at the flywheel looking towards the front camshaft pulley.

Where appropriate, instructions will be given for the use of the diagnostic tool.

Inspection and Verification

Visual Inspection Charts, Symptom Charts and other information charts (such as diagnostic routines) or supplement test procedures with technical specifications will navigate the user to a specific test procedure.

Symptom Chart

The symptom chart indicates symptoms, sources and actions to address a condition.

DESCRIPTION AND OPERATION

Pinpoint Tests

For electrical systems, pinpoint test steps are used to identify the source of a concern in a logical, step-by-step manner. Pinpoint tests have two columns: CONDITIONS and DETAILS/RESULTS/ACTIONS.

The CONDITIONS column is used exclusively for graphics and icons (with or without captions) and the DETAILS/RESULTS/ACTIONS column provides direction to another test step or specific corrective actions.

The boxed numbers indicate the order in which the described action is to be performed.

Component Tests

A component test is used when a component is tested in multiple pinpoint tests, or if a procedure is too complicated to be formatted within a single page of the pinpoint test.

Graphics

Test graphics show the measurement or test to be performed in a test step.

A representative tester graphic is used for voltmeters and ohmmeters.

If multiple measurements are made in a single graphic, the test leads are drawn with a solid line until the test lead splits to indicate the multiple measurements, at which point dashed lines are used.

Breakout box-type testers are represented by a double circle test pin. Test pins are labeled with the pin number.



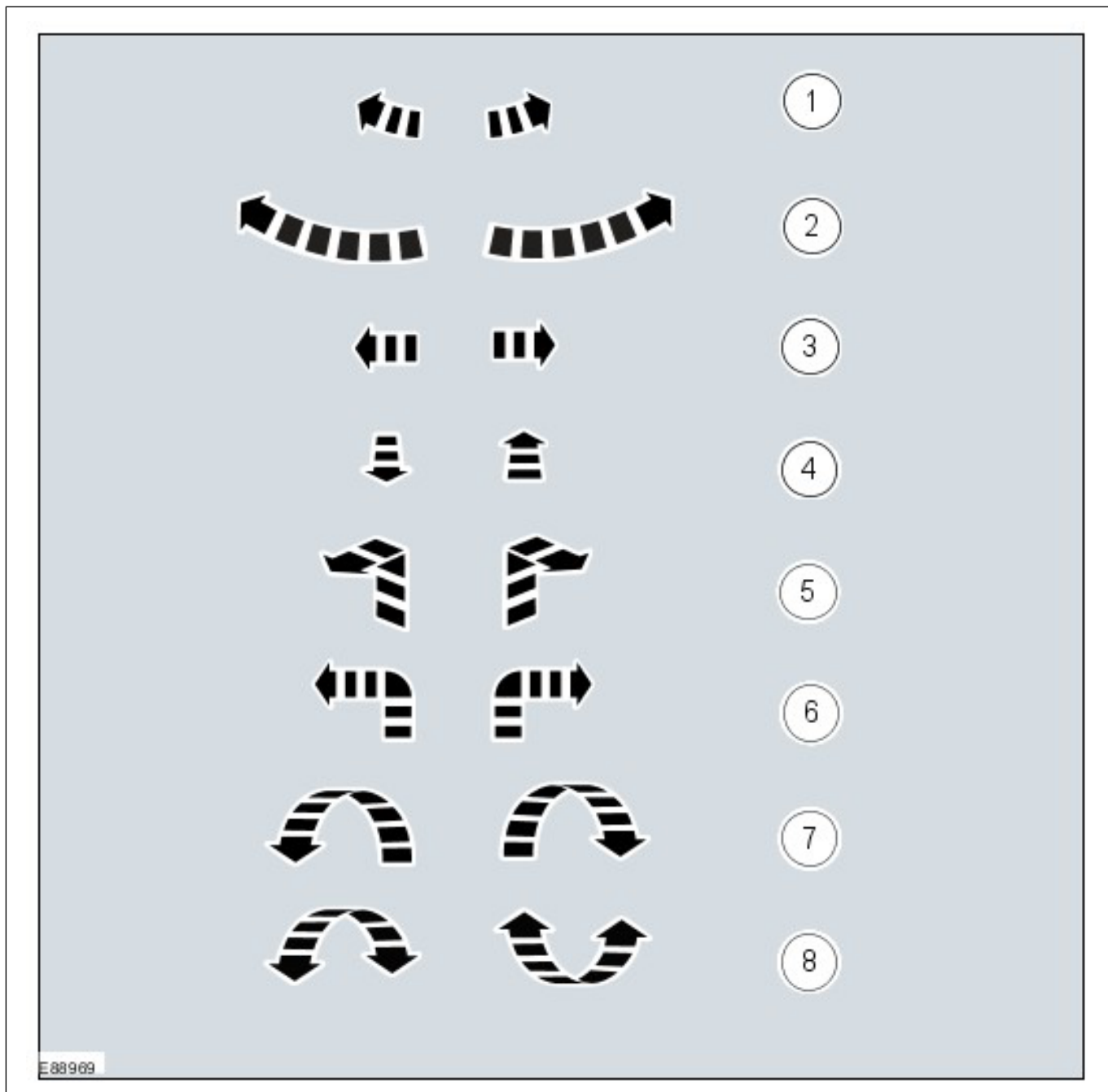
DESCRIPTION AND OPERATION

Symbols Glossary

Symbols are used inside the graphics and in the text area to enhance the information display.

Movement Symbols

Movement symbols provide detailed information to a required component movement. These component movements can be rotational or 1-3 dimensional movements.



Item	Description
1	Minor component movement clockwise/counterclockwise
2	Major component movement clockwise/counterclockwise

Item	Description
3	Component movement to the left/right/up/down
4	Component movement towards/away

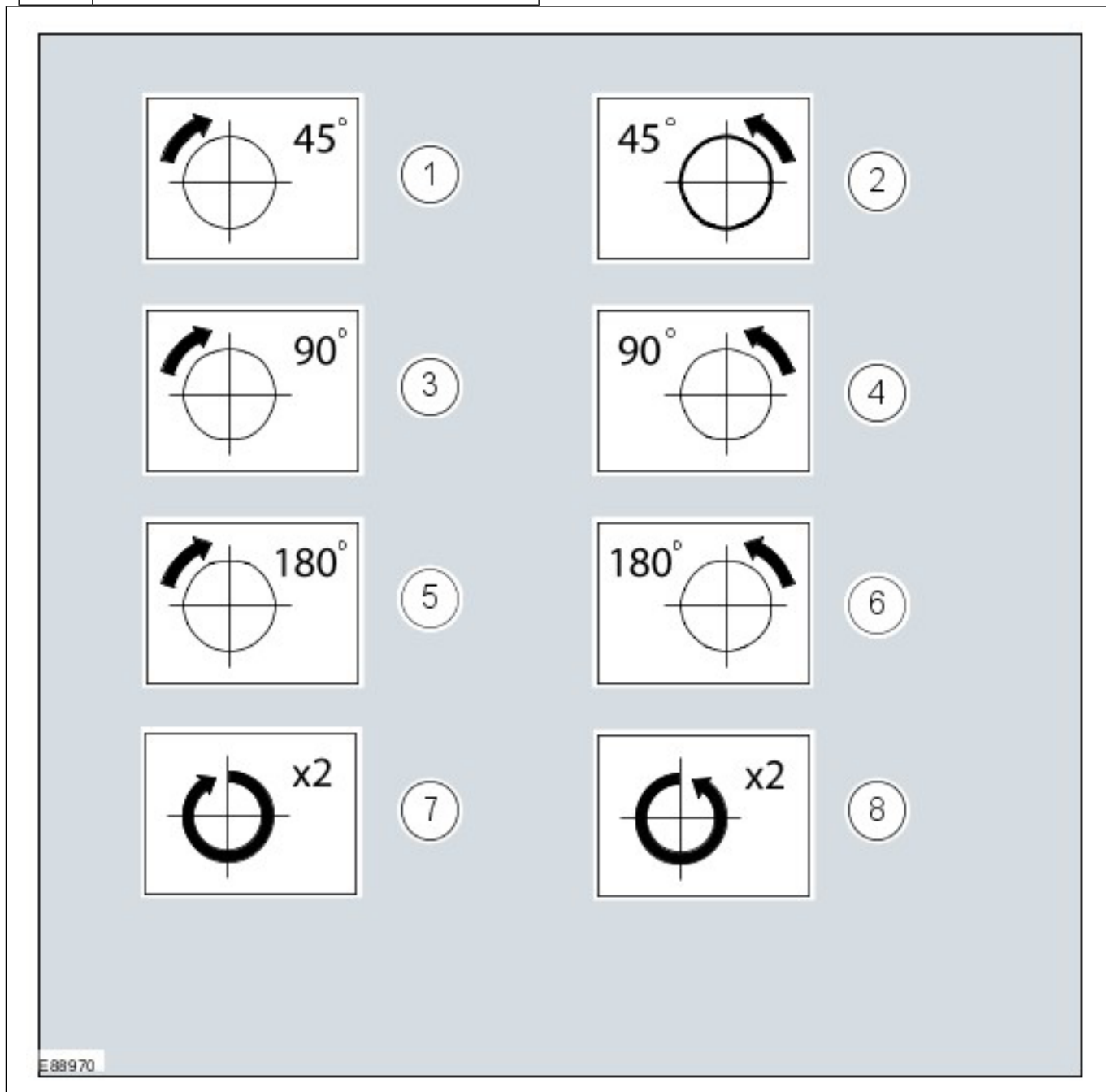


DESCRIPTION AND OPERATION

Item	Description
5	3 dimensional component movement
6	2 dimensional component movement
7	3 dimensional component rotation
8	3 dimensional component cycling

Turn Symbols

Turn symbols are used to provide further information on the direction or angle of component turns.



Item	Description
1	Turn the component clockwise through 45°
2	Turn the component counterclockwise through 45°

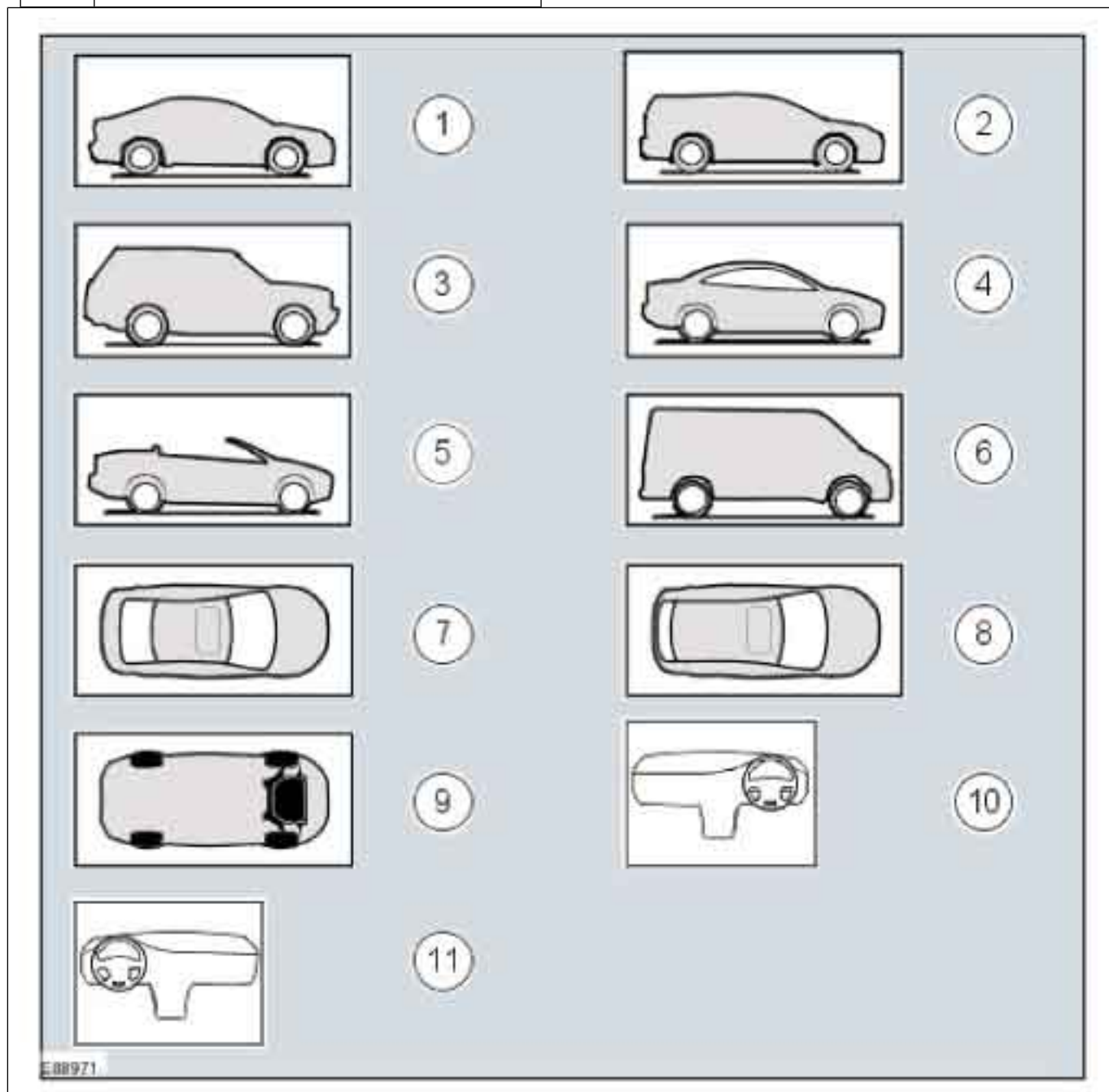
Item	Description
3	Turn the component clockwise through 90°
4	Turn the component counterclockwise through 90°

DESCRIPTION AND OPERATION

Item	Description
5	Turn the component clockwise through 180°
6	Turn the component counterclockwise through 180°
7	Turn the component clockwise through 2 complete turns
8	Turn the component counterclockwise through 2 complete turns

Vehicle Type and Vehicle Location Symbols

Vehicle type and vehicle location symbols are used to provide further information to the vehicle type and vehicle location that this information is relevant to.



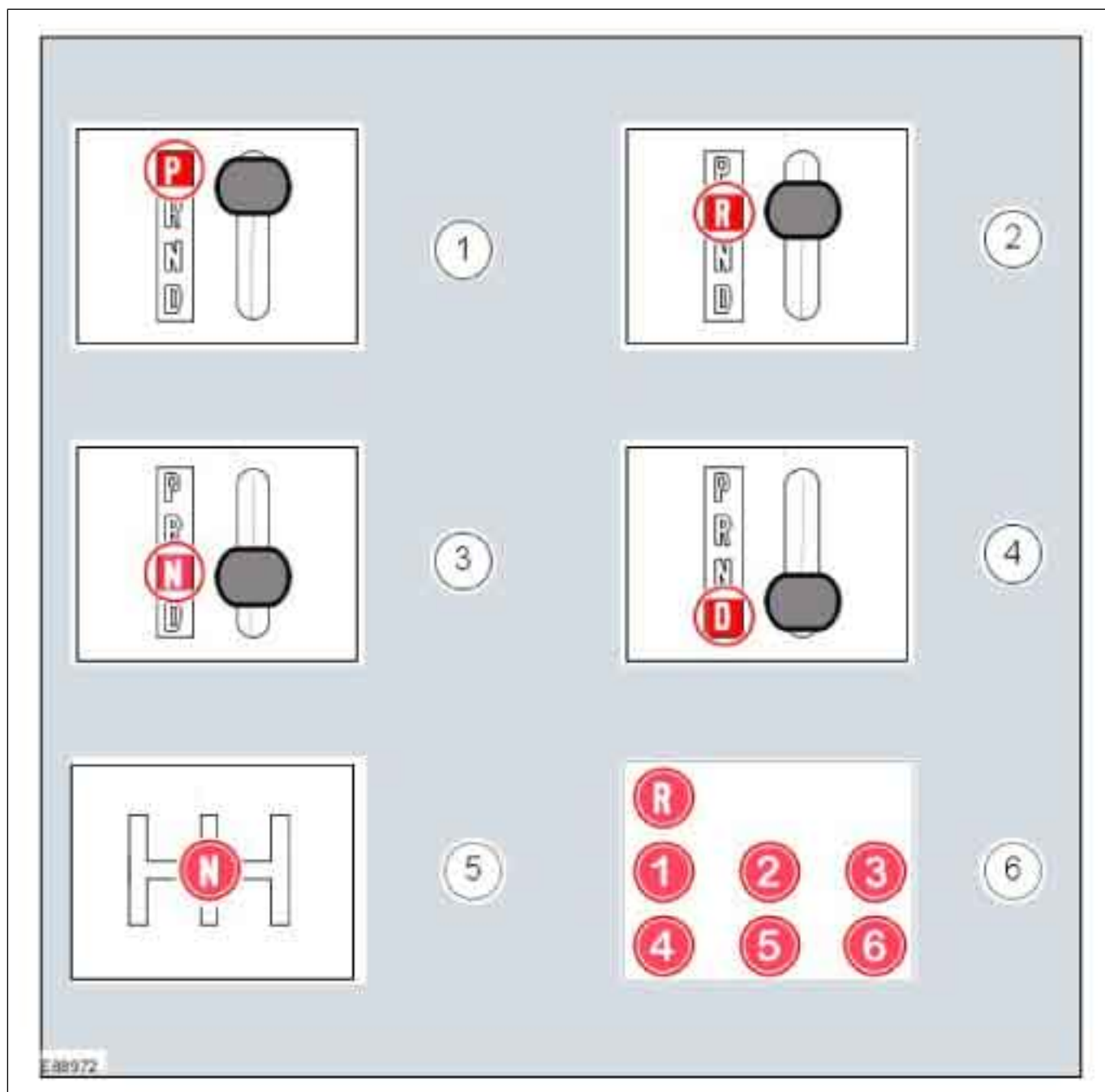
DESCRIPTION AND OPERATION

Item	Description
1	3, 4, 5-door body style
2	Wagon body style
3	Sports utility vehicle body style
4	Coupe body style
5	Convertible body style
6	Van body style
7	3, 4, 5-door body style - Top View

Item	Description
8	Wagon body style - Top View
9	Underview
10	Right-hand drive (RHD) vehicle
11	Left-hand drive (LHD) vehicle

Gearshift lever and selector lever position symbols

Gearshift lever and selector lever position symbols are used to show the lever position that is required to be selected to carry out a procedure step.



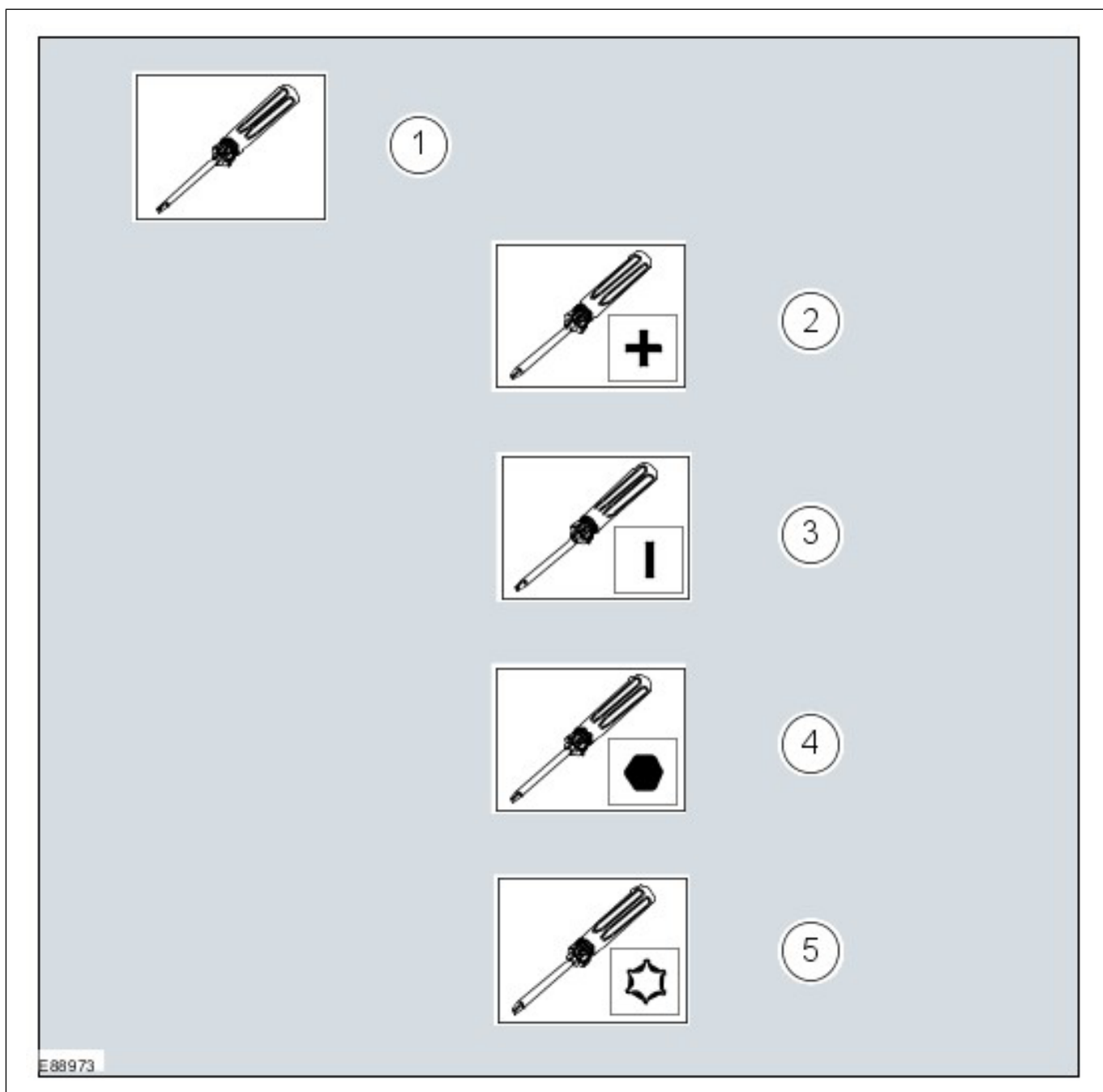
DESCRIPTION AND OPERATION

Item	Description
1	Set the selector lever to the park (P) position
2	Set the selector lever to the reverse (R) position
3	Set the selector lever to the neutral (N) position
4	Set the selector lever to the drive (D) position

Item	Description
5	Set the gearshift lever to the neutral (N) position
6	Further gearshift lever positions that may appear in illustrations

Screwdriver symbols

The screwdriver symbols are used to show which screwdriver bit is recommended to carry out a procedure step.



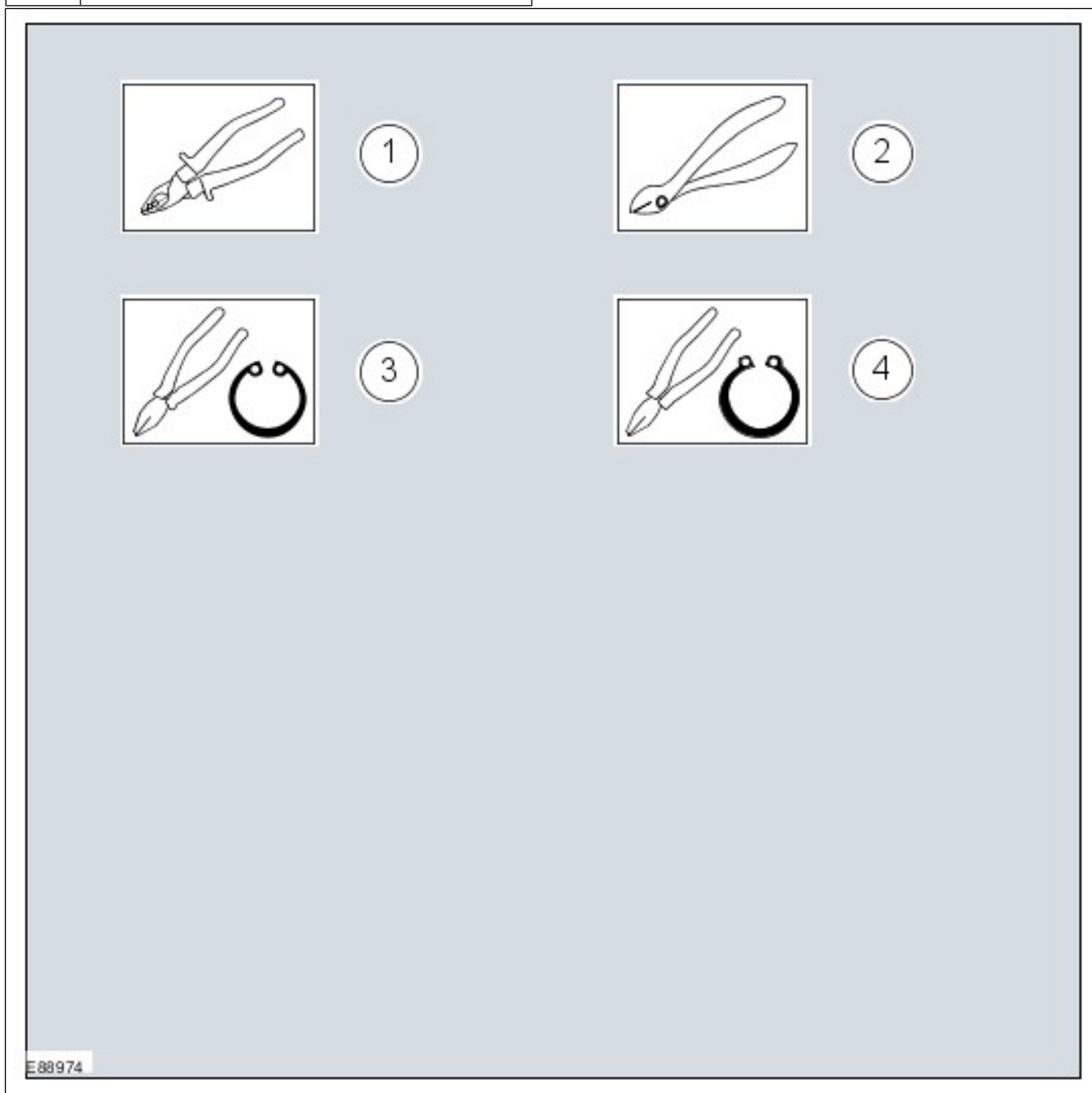


DESCRIPTION AND OPERATION

Item	Description
1	Screwdriver
2	Cross bladed screwdriver
3	Flat bladed screwdriver
4	Hexagonal screwdriver
5	TORX screwdriver

Pliers symbols

The pliers symbols are used to show which pliers is recommended to carry out a procedure step.



Item	Description
1	Combination pliers
2	Side cutter pliers

Item	Description
3	Securing ring pliers - inner
4	Securing ring pliers - outer

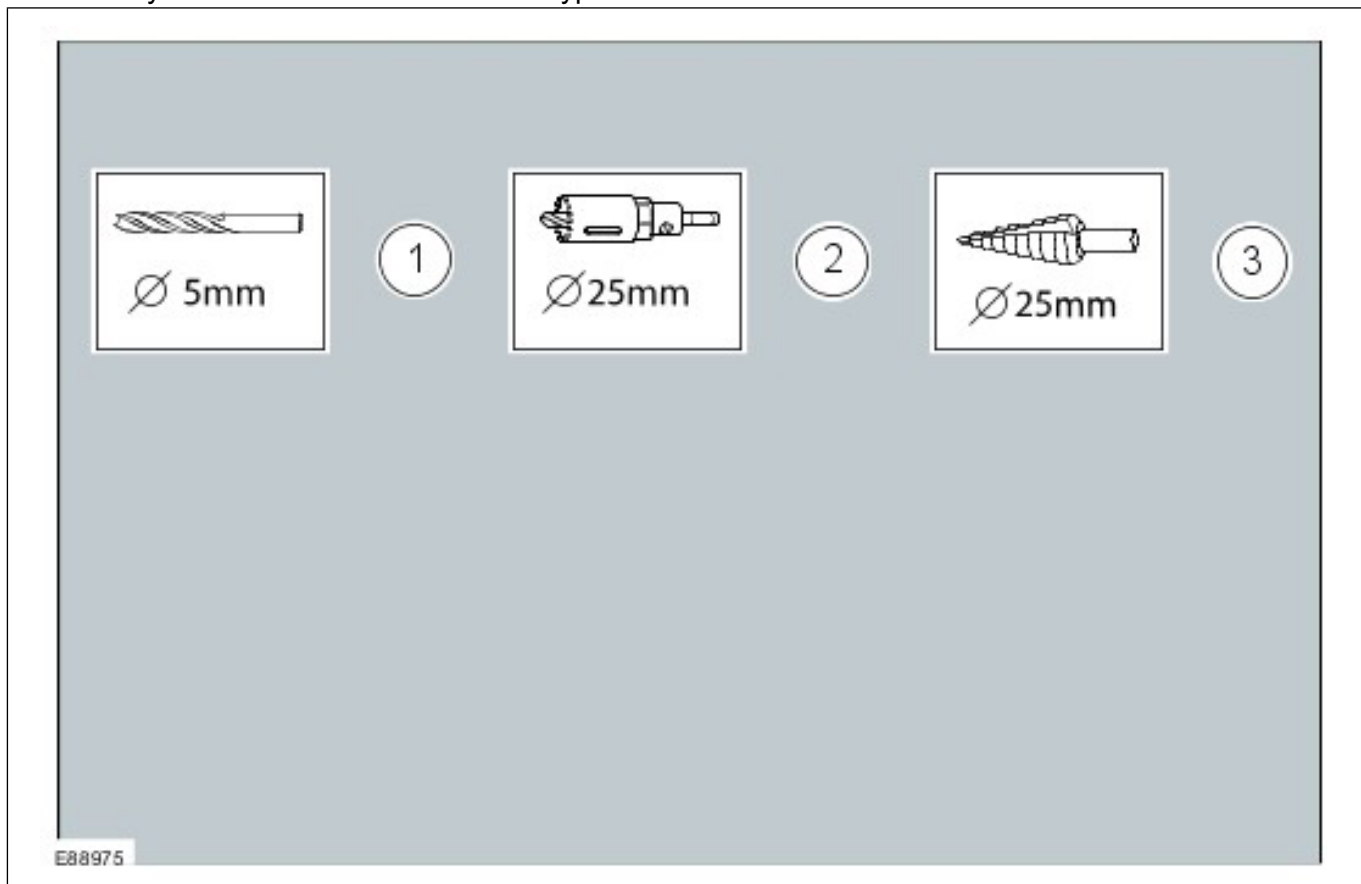


DESCRIPTION AND OPERATION

Drill symbols

The drill symbols are used to show which type and

size of drill bit is recommended to carry out a procedure step.

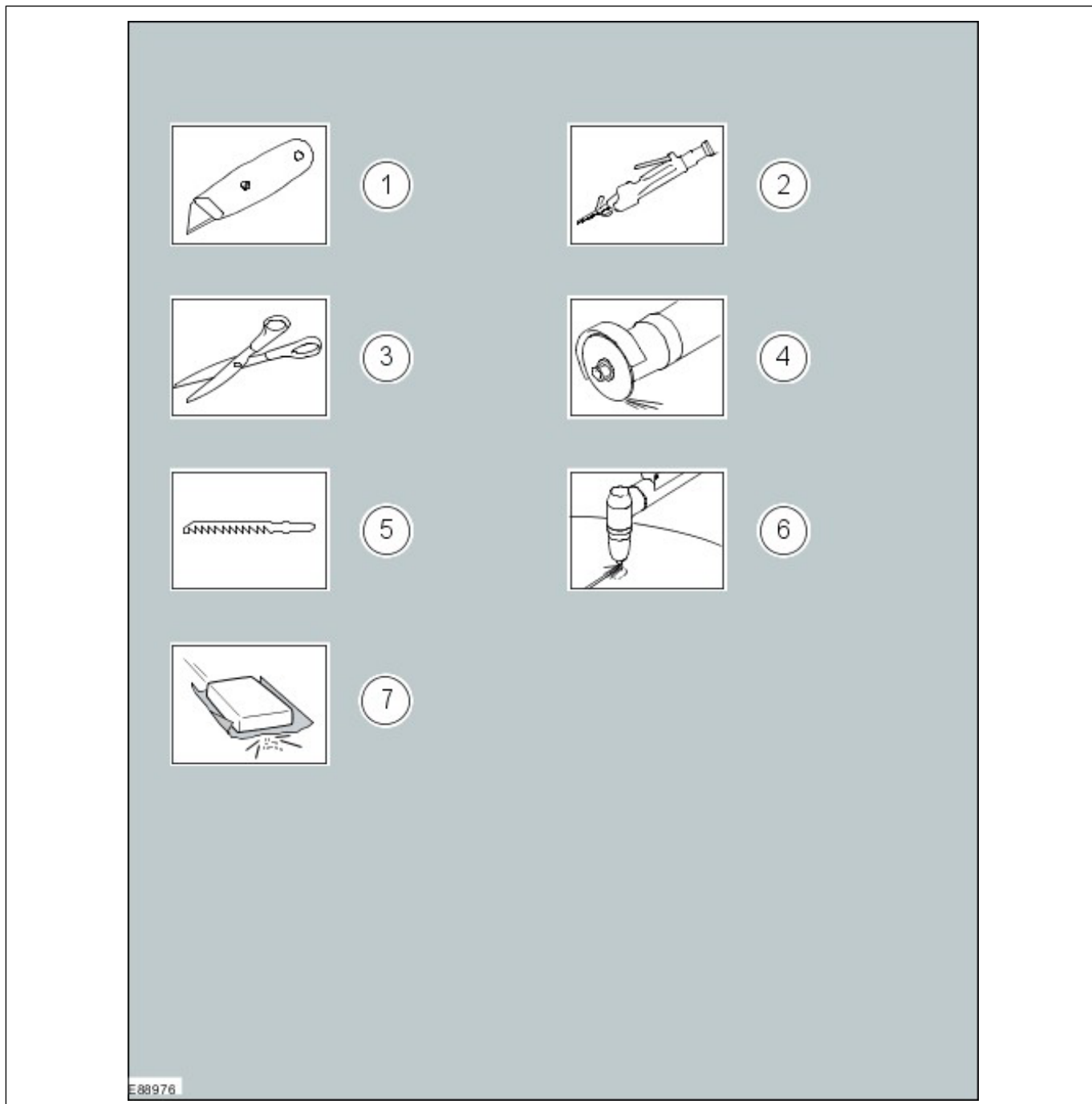


Item	Description
1	Drill bit with a specified diameter
2	Hole saw with a specified diameter
3	Stepped drill bit with a specified diameter

Cutting tool symbols

The cutting tool symbols are used to show which type of cutting tool is recommended to carry out a procedure step.

DESCRIPTION AND OPERATION



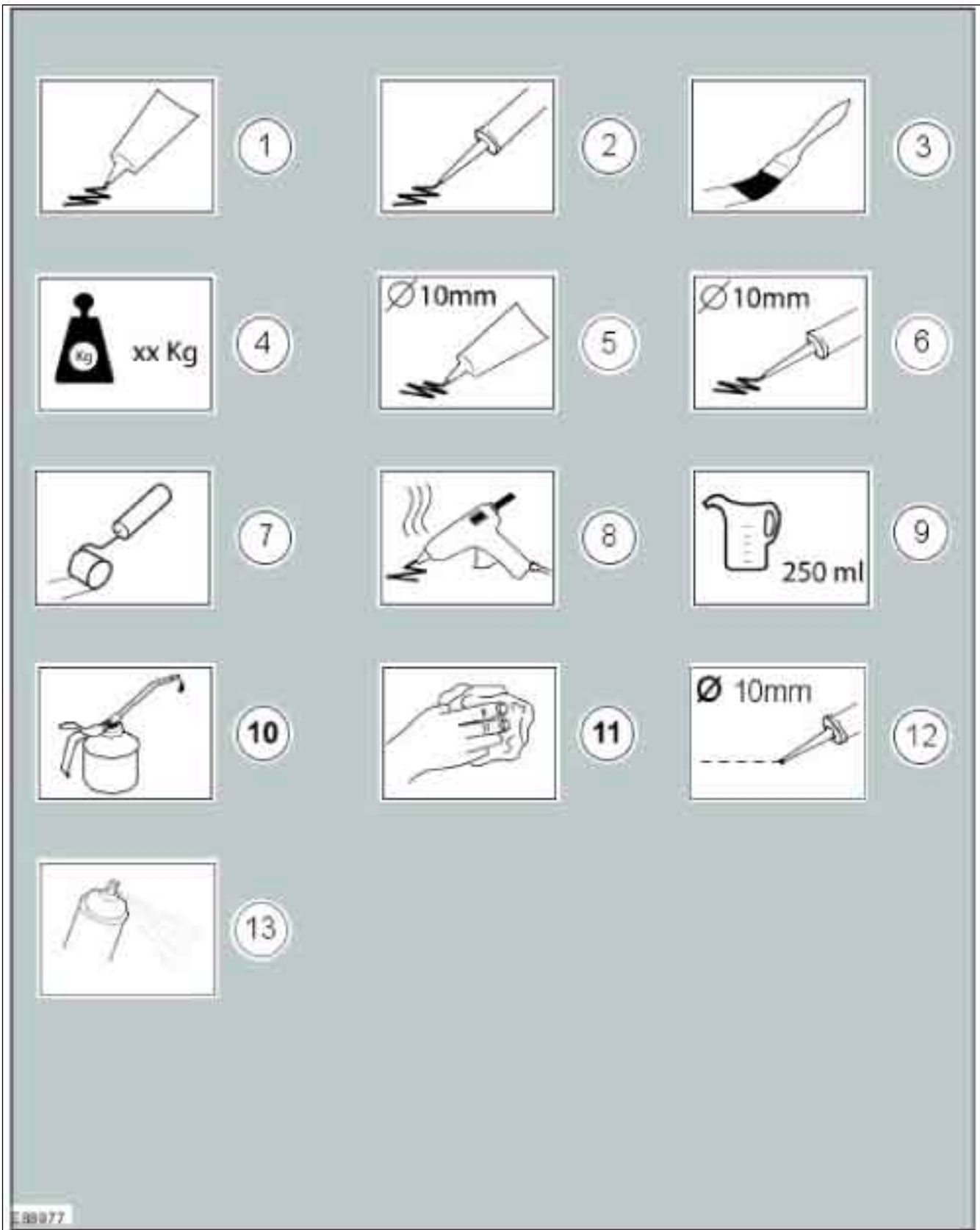
Item	Description
1	Cutting knife
2	Air body saw
3	Scissors
4	Grinder
5	Jig saw

Item	Description
6	Plasma cutter
7	Sanding Paper

Apply Chemical or load symbols

The apply chemical or load symbols are used to show where to apply which type of chemical or load to carry out a procedure step.

DESCRIPTION AND OPERATION



E.88977

Item	Description
1	Apply a bead from the specified tube
2	Apply a bead from the specified cartridge

Item	Description
3	Apply the specified chemical with a brush

DESCRIPTION AND OPERATION

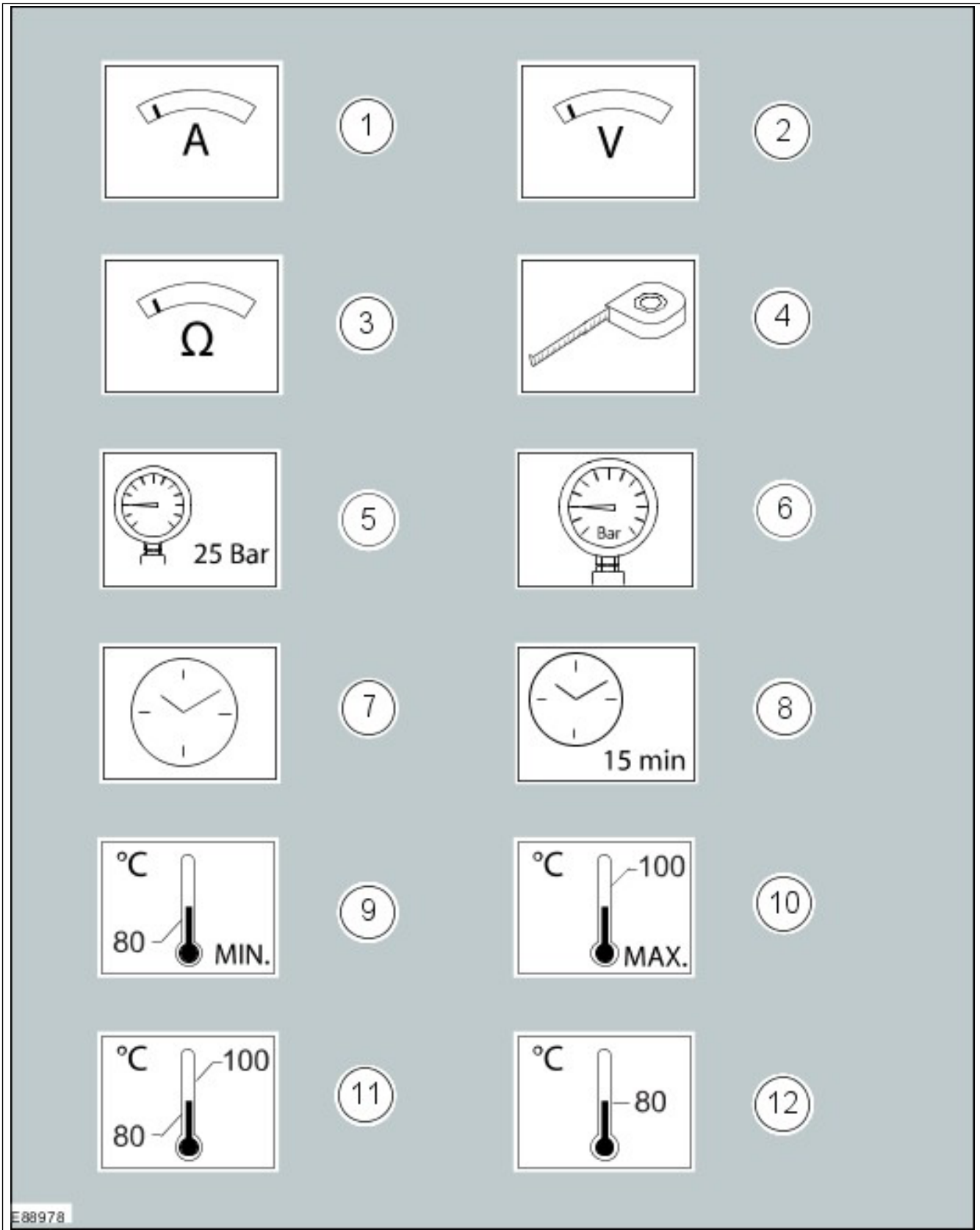
Item	Description
4	Apply the specified load to the specified component
5	Apply a bead with a specific diameter from the specified tube
6	Apply a bead with a specific diameter from the specified cartridge
7	Apply the specified chemical with a roller
8	Apply hot glue to the specified component
9	Apply the specified amount of liquid from the fluid can
10	Apply the specified lubricant to the specified component

Item	Description
11	Clean the specified component with the specified material
12	Apply a broken bead from the specified tube
13	Apply the specified chemical from a spray can

Measurement symbols

The measurement symbols are used to show where to measure which type of measurement to carry out a procedure step.

DESCRIPTION AND OPERATION



DESCRIPTION AND OPERATION

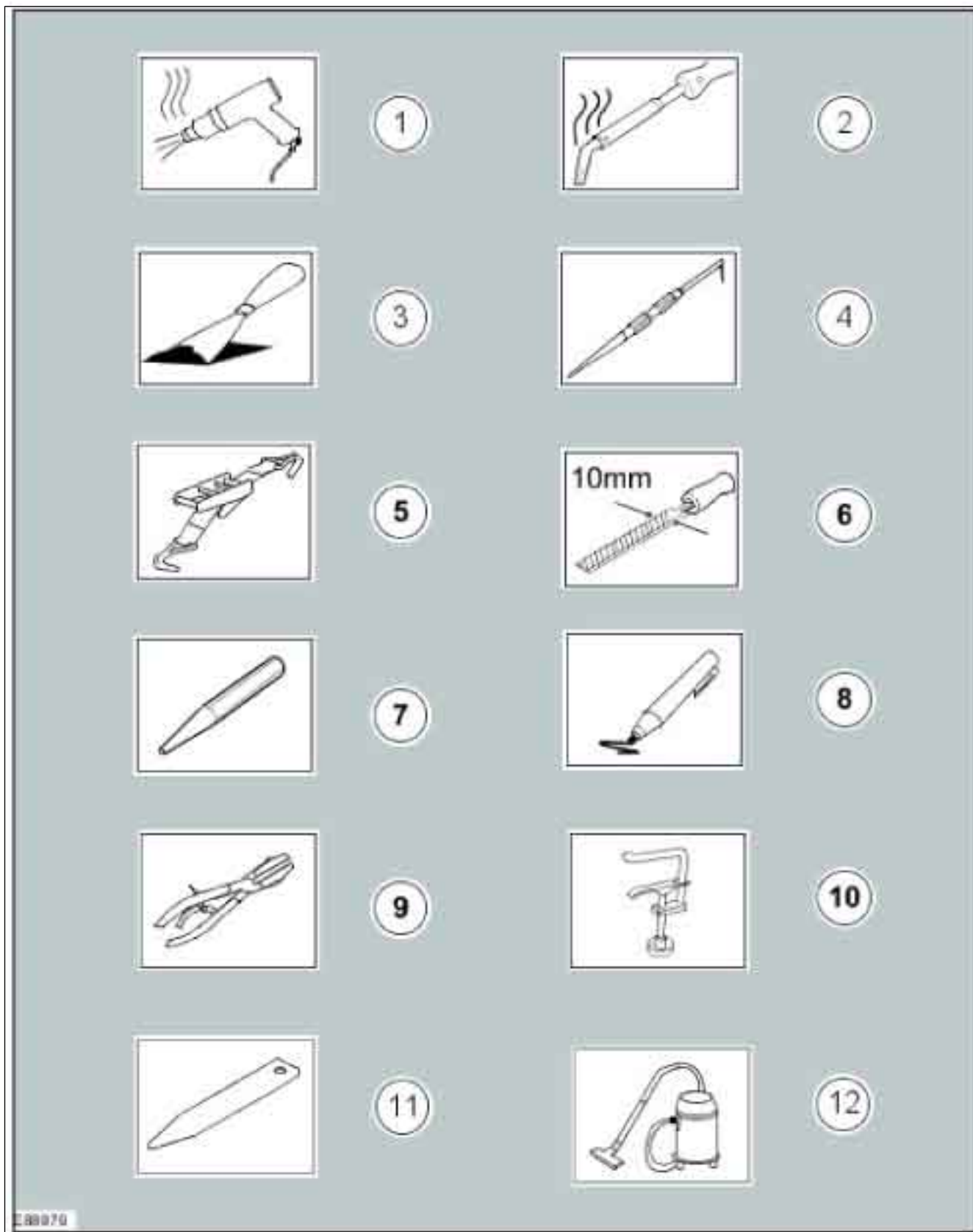
Item	Description
1	Measure the current using a digital multimeter
2	Measure the voltage using a digital multimeter
3	Measure the resistance using a digital multimeter
4	Measure the length/distance
5	Check that the specified pressure is available using a suitable pressure gauge
6	Measure the pressure at the specified port using a suitable pressure gauge
7	Measure the time using a suitable stopwatch

Item	Description
8	Wait for the specified period of time
9	The specified task requires the specified minimum temperature
10	The specified task requires the specified maximum temperature not to be exceeded
11	The specified task requires the specified temperature range
12	The specified task requires the specified temperature

General equipment symbols

The general equipment symbols are used to show where to use which type of general equipment to carry out a procedure step.

DESCRIPTION AND OPERATION



Item	Description
1	Hot air gun
2	Soldering iron

Item	Description
3	Scraper
4	Scriber



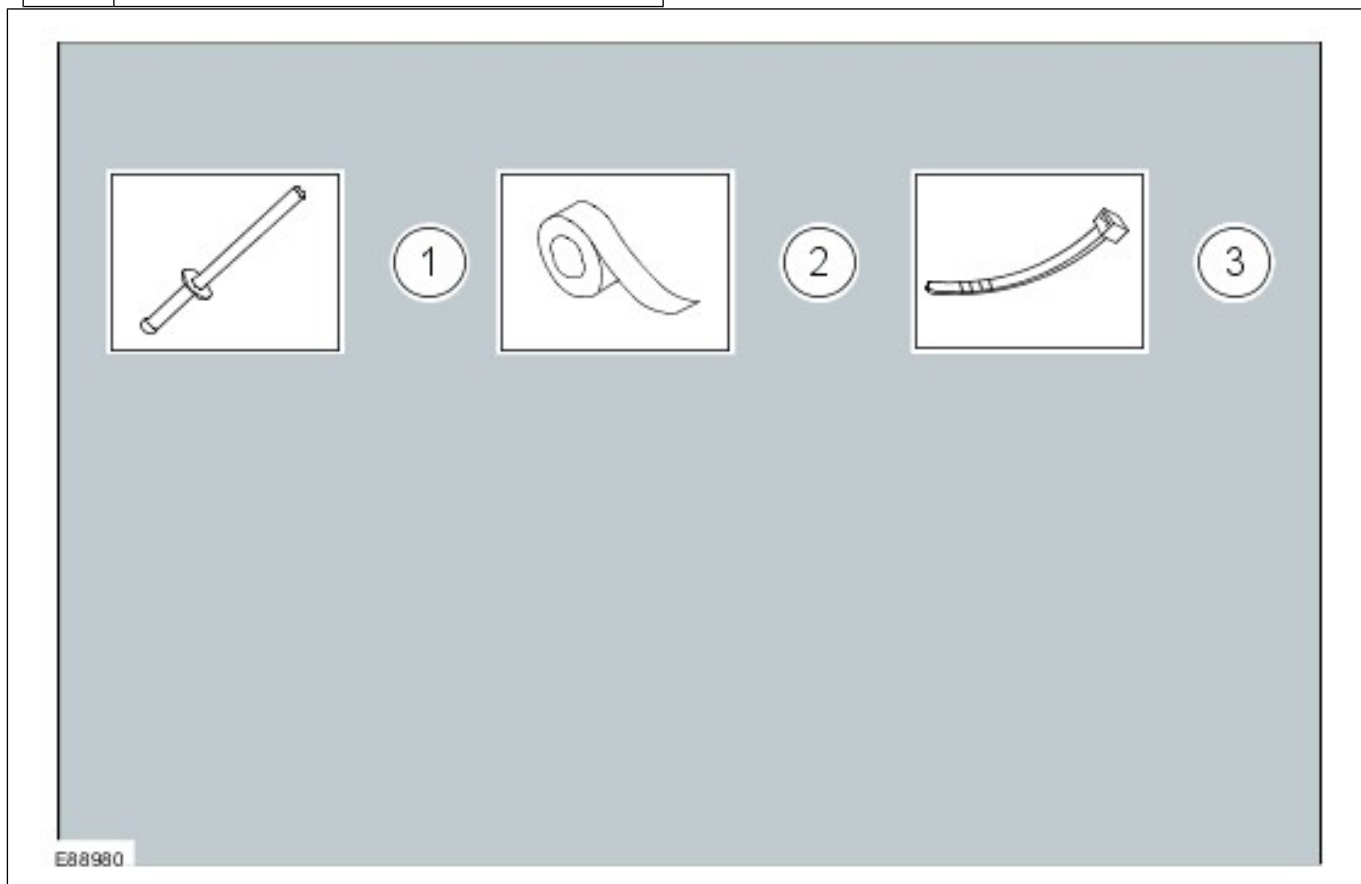
DESCRIPTION AND OPERATION

Item	Description
5	Securing strap
6	File with a specified size
7	Center punch
8	Marker
9	Hose clamp pliers
10	Hose clamp

Item	Description
11	Interior trim remover
12	Vacuum Cleaner

Material symbols

The material symbols are used to show where to use which type of material to carry out a procedure step.



Item	Description
1	Remove/Install the specified blind rivet
2	Apply tape to the specified component/area
3	Remove/Install the specified cable tie

Miscellaneous symbols

These symbols provide further information that is required to carry out a procedure step.



DESCRIPTION AND OPERATION



Item	Description
1	Set the ignition switch to the 0 position
2	Set the ignition switch to the II position

Item	Description
3	The procedure step requires the aid of the specified number of supporting technicians

100-00-30

General Information

100-00-30

DESCRIPTION AND OPERATION

Item	Description
4	Self contained breathing apparatus
5	General Prohibition
6	Do not use power tools
7	Visual check
8	Noise check
9	Dispose the specified component

Mandatory Protective equipment - Health and safety symbols

The protective equipment symbols advise to use a mandatory protective equipment to avoid or at least reduce possible health and safety risks.

Item	Description
1	Wear protective gloves
2	Wear face guard

Item	Description
3	Wear safety goggles
4	Wear ear protectors

100-00-31

General Information

100-00-31

DESCRIPTION AND OPERATION

Item	Description
5	Wear safety goggles and ear protectors
6	Wear a respirator

Prohibition - Health and safety symbols and component damage

The prohibition symbols are used to prohibit the specified actions to avoid or at least reduce possible component damage and health and safety risks.

Item	Description
1	General prohibition symbol. Used in combination with another symbol
2	No naked flames
3	No smoking

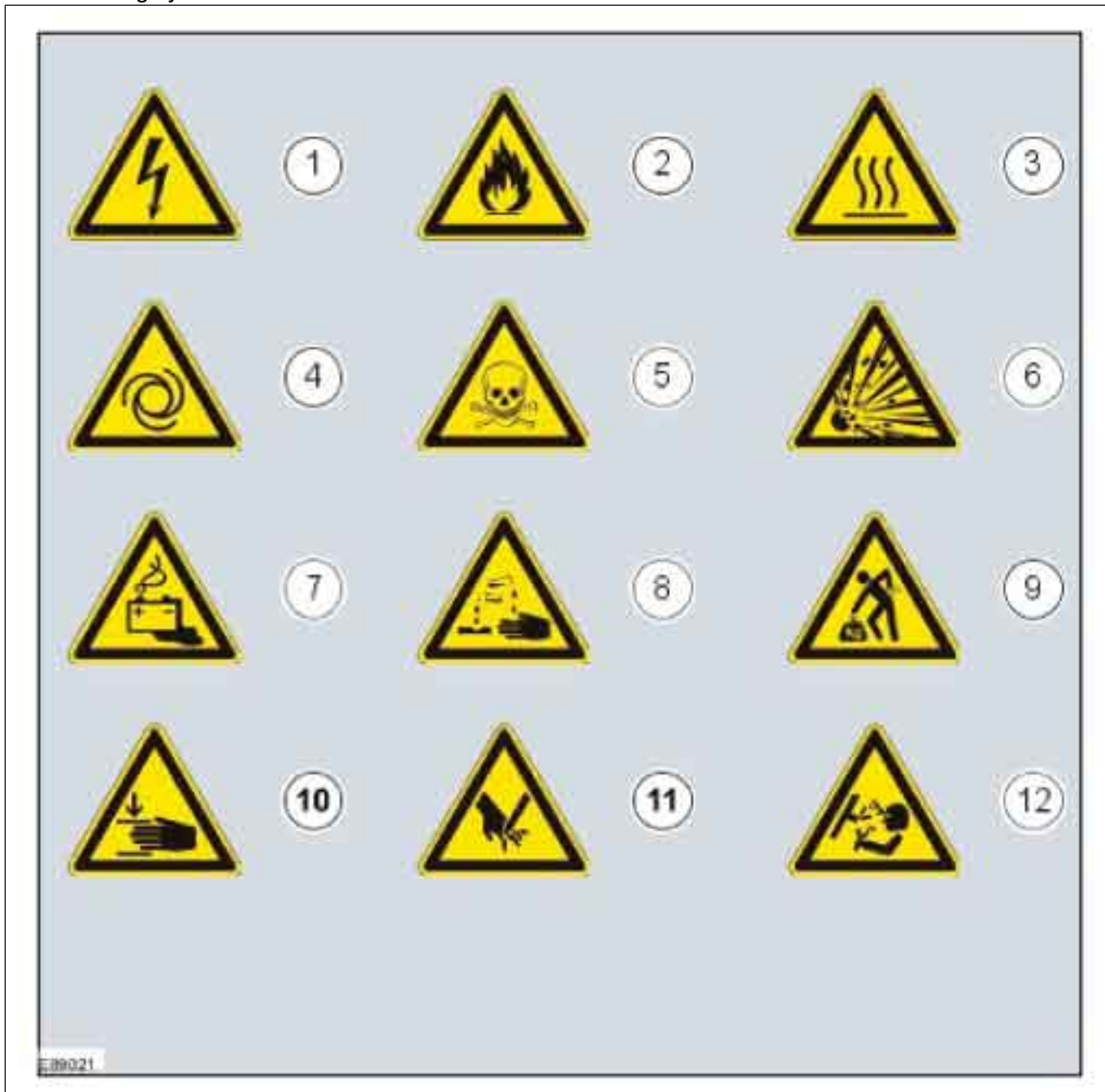
Item	Description
4	No water
5	Do not touch
6	Do not switch
7	No grinding

DESCRIPTION AND OPERATION

Warning symbols - Health and safety and component damage

hazardeous conditions to avoid or at least reduce possible component damage and health and safety risks.

The warning symbols are used to advise on



Item	Description
1	Hazardous voltage/Electrical shock/Electrocution
2	Fire Hazard/Highly flammable
3	Burn hazard/Hot surface
4	Automatic start-up
5	Toxic
6	Explosive material

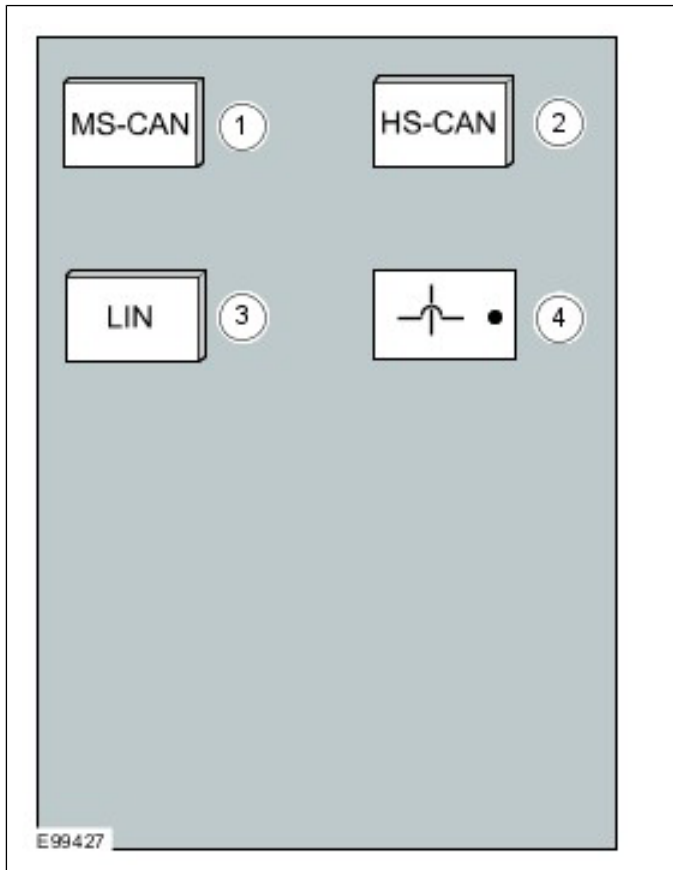
Item	Description
7	Battery hazard
8	Corrosive material
9	Lifting hazard
10	Hand crush/Force from above
11	Cutting of fingers or hand
12	Pressure hazard



DESCRIPTION AND OPERATION

Control Diagram symbols - Description and Operation procedures

These symbols provide further information on the type of connectivity, direction of flow or type of data bus of a system.



Item	Description
1	Mid-speed Controller Area Network (CAN)
2	High-speed Controller Area Network (CAN)
3	Local Interconnect Network (LIN)
4	Wires crossing not connected



DESCRIPTION AND OPERATION**Health and Safety Precautions****Introduction**

Many of the procedures associated with vehicle maintenance and repair involve physical hazards or other risks to health. This subsection lists, alphabetically, some of these hazardous operations and the materials and equipment associated with them. Precautions necessary to avoid these hazards are identified.

The list is not exhaustive and all operations and procedures, and the handling of materials, should be carried out with health and safety in mind.

Before using any product the Materials Safety Data Sheet supplied by the manufacturer or supplier should be consulted.

Acids and Alkalis

See also Battery Acids.

For example caustic soda, sulphuric acid.

Used in batteries and cleaning materials.

Irritant and corrosive to the skin, eyes, nose and throat. Cause burns. Can destroy ordinary protective clothing.

Avoid splashes to the skin, eyes and clothing. Wear suitable protective impervious apron, gloves and goggles. Do not breath mists.

Make sure access to eye wash bottles, shower and soap are readily available for splashing accidents.

Display Eye Hazard sign.

Air Bags

See also Fire, Chemical Materials.

Highly flammable, explosive – observe No Smoking policy.

Used as a safety restraint system mounted in the steering wheel and passenger side of the instrument panel.

The inflator contains a high-energetic propellant which, when ignited, produces a VERY HOT GAS (2500°C).

The gas generant used in air bags is Sodium Azide. This material is hermetically sealed in the module and is completely consumed during deployment. No attempt should be made to open an air bag

inflator as this will lead to the risk of exposure to Sodium Azide. If a gas generator is ruptured, full protective clothing should be worn when dealing with the spillage.

After normal deployment, gloves and safety goggles must be worn during the handling process.

Deployed air bags should be disposed of in a plastic bag in accordance with local regulations at an approved chemical waste site.

Following any direct contact with gas generant.

- wash affected areas thoroughly with water.
- seek medical assistance if necessary.

Air Bags - Do's

- Do store modules in an upright position.
- Do keep modules dry.
- Do carry modules with the cover side pointing away from the body.
- Do place modules with their cover side upwards.
- Do carefully inspect modules for damage.
- Do stand to one side when connecting modules.
- Do make sure all test equipment is properly calibrated and maintained.
- Do wash hands after handling deployed air bags.

Air Bags - Do Nots

- Do not store highly flammable material together with modules or gas generators.
- Do not store gas generators at temperatures exceeding 80°C.
- Do not store modules upside down.
- Do not attempt to open a gas generator housing.
- Do not expose gas generators to open flame or sources of heat.
- Do not place anything on top of a module cover.
- Do not use damaged modules.
- Do not touch a fired module or gas generator for at least 10 minutes.
- Do not use any electrical probes on the wiring circuit.

Air Conditioning Refrigerant

See also Chlorofluorocarbon, Chemical Materials

Highly flammable, combustible – observe No Smoking policy.

DESCRIPTION AND OPERATION

Skin contact may result in frostbite.

Instructions given by the manufacturer must be followed. Avoid naked lights, wear suitable protective gloves and goggles.

If refrigerant comes into contact with the skin or eyes, immediately rinse the affected areas with water. Eyes should also be rinsed with an appropriate irrigation solution and should not be rubbed. **SEEK MEDICAL ASSISTANCE IF NECESSARY.**

Air Conditioning Refrigerant - Do Not

- Do not expose refrigerant bottles to sunlight or heat.
- Do not stand refrigerant bottles upright; when filling, hold them with the valve downwards.
- Do not expose refrigerant bottles to frost.
- Do not drop refrigerant bottles.
- Do not vent refrigerant to atmosphere under any circumstance.
- Do not mix refrigerants, for example R12 (Freon) and R134a.

Adhesives and Sealers

See also Fire, Chemical Materials.

Highly flammable, flammable, combustible – observe No Smoking policy.

Generally should be stored in No Smoking areas. Cleanliness and tidiness in use should be observed, for example disposable paper covering benches; should be dispensed from applicators where possible; containers, including secondary containers, should be labeled appropriately.

Solvent-based Adhesives/Sealers - See Solvents

Follow manufacturers instructions.

Water-based Adhesives/Sealers

Those based on polymer emulsions and rubber latexes may contain small amounts of volatile toxic and harmful chemicals. Skin and eye contact should be avoided and adequate ventilation provided during use.

Hot Melt Adhesives

In the solid state, they are safe. In the molten state they may cause burns and health hazards may arise from the inhalation of toxic fumes.

Use appropriate protective clothing and a thermostatically controlled heater with a thermal cut-out and adequate extraction.

Resin-based Adhesives/Sealers, for example Epoxide and Formaldehyde Resin-based

Mixing should be carried out in well ventilated areas, as harmful or toxic volatile chemicals may be released.

Skin contact with uncured resins and hardeners can result in irritation, dermatitis, and absorption of toxic or harmful chemicals through the skin. Splashes can damage the eyes.

Provide adequate ventilation and avoid skin and eye contact.

Anaerobic, Cyanoacrylate (super-glues) and other Acrylic Adhesives

Many are irritant, sensitizing or harmful to the skin and respiratory tract. Some are eye irritants.

Skin and eye contact should be avoided and the manufacturers instructions followed.

Cyanoacrylate adhesives (super-glues) **MUST NOT** contact the skin or eyes. If skin or eye tissue is bonded, cover with a clean moist pad and **SEEK IMMEDIATE MEDICAL ATTENTION.** Do not attempt to pull tissue apart. Use in well ventilated areas as vapors can cause irritation to the nose and eyes.

For two-pack systems see Resin-based and Isocyanate Adhesives/Sealers.

Isocyanate (Polyurethane) Adhesives/Sealers

See also Resin-based Adhesives.

Individuals suffering from asthma or respiratory allergies should not work with or near these materials as sensitivity reactions can occur.

Over exposure is irritating to the eyes and respiratory system. Excessive concentrations may produce effects on the nervous system including

DESCRIPTION AND OPERATION

drowsiness. In extreme cases, loss of consciousness may result. Long term exposure to vapor concentrations may result in adverse health effects.

Prolonged contact with the skin may have a defatting effect which may lead to skin irritation and in some cases, dermatitis.

Splashes entering the eye will cause discomfort and possible damage.

Any spraying should preferably be carried out in exhaust ventilated booths, removing vapors and spray droplets from the breathing zone.

Wear appropriate gloves, eye and respiratory protection.

Antifreeze

See also Fire, Solvents.

For example isopropanol, ethylene glycol, methanol.

Highly flammable, flammable, combustible.

Used in vehicle coolant systems, brake air pressure systems, screenwash solutions.

Vapors may be given off from coolant antifreeze (glycol) when heated. Avoid breathing these vapors.

Antifreeze may be absorbed through the skin in toxic or harmful quantities. Antifreeze, if swallowed, can be fatal and **MEDICAL ATTENTION SHOULD BE SOUGHT IMMEDIATELY.**

These products must not be used in any cooling or industrial water system that is connected or linked to general, food preparation or drinking water supplies.

Asbestos

See also Warning Symbols on Vehicles at the end of this subsection.

Breathing asbestos dust may cause lung damage or, in some cases, cancer.

Used in brake and clutch linings, transmission brake bands and gaskets.

The use of drum cleaning units, vacuum cleaning or damp wiping is preferred.

Asbestos dust waste should be dampened, placed in a sealed container and marked for safe disposal. If any cutting or drilling is attempted on materials containing asbestos the item should be dampened and only hand tools or low speed power tools used.

Battery Acids

See also Acids and Alkalis.

Gases released during charging are explosive. Never use naked flames or allow sparks near charging or recently charged batteries.

Make sure there is adequate ventilation.

Brake and Clutch Linings and Pads

See Asbestos.

Brake Fluids (Polyalkylene Glycols)

See also Fire.

Splashes to the skin and eyes are slightly irritating. Avoid skin and eye contact as far as possible. Inhalation vapor hazards do not arise at ambient temperatures because of the very low vapor pressure.

Brazing

See Welding.

Chemical Materials

See also Legal Aspects.

Chemical materials such as solvents, sealers, adhesives, paints, resin foams, battery acids, antifreeze, brake fluids, fuels, oils and grease should always be used with caution and stored and handled with care. They may be toxic, harmful, corrosive, irritant or highly flammable and give rise to hazardous fumes and dusts.

The effects of excessive exposure to chemicals may be immediate or delayed; briefly experienced or permanent; cumulative; superficial; life threatening; or may reduce life expectancy.

DESCRIPTION AND OPERATION**Chemical Materials - Do's**

- Do carefully read and observe hazard and precaution warnings given on material containers (labels) and in any accompanying leaflets, posters or other instructions. Material health and safety data sheets can be obtained from manufacturers.
- Do remove chemical materials from the skin and clothing as soon as practicable after soiling. Change heavily soiled clothing and have it cleaned.
- Do organize work practices and protective clothing to avoid soiling of the skin and eyes; breathing vapors, aerosols, dusts or fumes; inadequate container labeling; fire and explosion hazards.
- Do wash before job breaks, before eating, smoking, drinking or using toilet facilities when handling chemical materials.
- Do keep work areas clean, uncluttered and free of spills.
- Do store chemical materials according to national and local regulations.
- Do keep chemical materials out of the reach of children.

Chemical Materials - Do Nots

- Do not mix chemical materials except under the manufacturers instructions; some chemicals can form other toxic or harmful chemicals, give off toxic or harmful fumes or become explosive when mixed together.
- Do not spray chemical materials, particularly those based on solvents, in confined spaces, for example when people are inside a vehicle.
- Do not apply heat or flame to chemical materials except under the manufacturers instructions. Some are highly flammable and some may release toxic or harmful fumes.
- Do not leave containers open. Fumes given off can build up to toxic, harmful or explosive concentrations. Some fumes are heavier than air and will accumulate in confined areas such as pits.
- Do not transfer chemical materials to unlabelled containers.

- Do not clean hands or clothing with chemicals. Chemicals, particularly solvents and fuels, will dry the skin and may cause irritation leading to dermatitis or be absorbed through the skin in toxic or harmful quantities.
- Do not use emptied containers for other materials except when they have been cleaned under supervised conditions.
- Do not sniff or smell chemical materials. Brief exposure to high concentrations of fumes can be toxic or harmful.

Chlorofluorocarbons (CFC)

There is concern in the scientific community that CFCs and Halons are depleting the upper ozone layer which filters out harmful ultraviolet radiation. Decreased filtration of ultraviolet radiation may result in increases in skin cancer, cataracts and immune system suppression in humans, as well as decreased productivity of crops and aquatic systems.

CFCs are used primarily as refrigerants in vehicle air conditioning systems and as aerosol propellants. Halons are used as fire extinguishants.

Clutch Fluids

See Brake fluids.

Clutch Linings and Pads

See Asbestos.

Corrosion Protection Materials

See also Solvents, Fire.

Highly flammable, flammable – observe No Smoking policy.

These materials are varied and the manufacturers instructions must be followed. They may contain solvents, resins or petroleum products. Skin and eye contact should be avoided. They should only be sprayed in conditions of adequate ventilation and not in confined spaces.

Cutting

See Welding.

DESCRIPTION AND OPERATION**Dewaxing**

See Solvents and Fuels (Kerosene).

Dusts

Powder, dusts or clouds may be irritant, harmful or toxic. Avoid breathing dusts from powdery chemical materials or those arising from dry abrasion operations. Wear respiratory protection if ventilation is inadequate.

Fine dusts of combustible material can present an explosion hazard. Avoid explosive limits and sources of ignition.

Electric Shock

Electric shock can result from the use of faulty electrical equipment or from the misuse of equipment in good condition.

Make sure that electrical equipment is maintained in good condition and frequently tested. Faulty equipment should be labeled and preferably removed from the workstation.

Make sure that flexes, cables, plugs and sockets are not frayed, kinked, cut, cracked or otherwise damaged.

Make sure that electrical equipment and flexes do not come into contact with water.

Make sure that electrical equipment is protected by the correct rated fuse.

Never misuse electrical equipment and never use equipment that is in any way faulty. The results could be fatal.

Make sure that the cables of mobile electrical equipment cannot get trapped and damaged, such as in a vehicle hoist.

Make sure that the designated electrical workers are trained in basic First Aid.

In cases of electrocution:

- switch off the power supply before approaching the victim.
- if this is not possible push or drag the victim from the source of electricity using dry non-conductive material.
- commence resuscitation if trained to do so.
- SUMMON MEDICAL ASSISTANCE.

Engine Oils

See Lubricants and Grease.

Exhaust Fumes

These contain asphyxiating, harmful and toxic chemicals and particles such as carbon oxides, nitrogen oxides, aldehydes, lead and aromatic hydrocarbons. Engines should be run only under conditions of adequate exhaust extraction or general ventilation and not in confined spaces.

Gasoline (petrol) engine

There may not be adequate warning of odor or of irritation before toxic or harmful effects arise. These may be immediate or delayed.

Diesel engine

Soot, discomfort and irritation usually give adequate warning of hazardous fume concentrations.

Fibre Insulation

See also Dusts.

Used in noise and sound insulation.

The fibrous nature of surfaces and cut edges can cause skin irritation. This is usually a physical and not a chemical effect.

Precautions should be taken to avoid excessive skin contact through careful organization of work practices and the use of gloves.

Fire

See also Welding, Foams, Legal Aspects.

Many of the materials found on or associated with the repair of vehicles are highly flammable. Some give off toxic or harmful fumes if burnt.

Observe strict fire safety when storing and handling flammable materials or solvents, particularly near electrical equipment or welding processes.

Make sure, before using electrical or welding equipment, that there is no fire hazard present.

Have a suitable fire extinguisher available when using welding or heating equipment.

DESCRIPTION AND OPERATION**First Aid**

Apart from meeting any legal requirements it is desirable for someone in the workshop to be trained in First Aid procedures.

Splashes in the eye should be flushed carefully with clean water for at least ten minutes.

Soiled skin should be washed with soap and water.

In case of cold burns, from alternative fuels, place affected area in cool to cold water.

Individuals affected by inhalation of gases and fumes should be removed to fresh air immediately. If effects persist, consult a doctor.

If liquids are swallowed inadvertently, consult a doctor giving him the information on the container or label. Do not induce vomiting unless this action is indicated on the label.

Fluoroelastomer

See Viton.

Foams - Polyurethane

See also Fire.

Used in sound and noise insulation. Cured foams used in seat and trim cushioning.

Follow manufacturers instructions.

Unreacted components are irritating and may be harmful to the skin and eyes. Wear gloves and goggles.

Individuals with chronic respiratory diseases, asthma, bronchial medical problems, or histories of allergic diseases should not work in or near uncured materials.

The components, vapors or spray mists can cause direct irritation, sensitivity reactions and may be toxic or harmful.

Vapors and spray mists must not be inhaled. These materials must be applied with adequate ventilation and respiratory protection. Do not remove the respirator immediately after spraying; wait until the vapors/mists have cleared.

Burning of the uncured components and the cured foams can generate toxic and harmful fumes. Smoking, naked flames or the use of electrical equipment during foaming operations and until vapors/mists have cleared should not be allowed. Any heat cutting of cured foams or partially cured

foams should be conducted with extraction ventilation. See also the vehicle Body Repair Manual.

Freon

See Air Conditioning Refrigerant.

Fuels

See also, Fire, Legal Aspects, Chemicals and Solvents.

Avoid skin contact with fuel where possible. Should contact occur, wash the affected skin with soap and water.

Gasoline (Petrol)

Highly flammable - observe No Smoking policy.

Swallowing can result in mouth and throat irritation and absorption from the stomach can result in drowsiness and unconsciousness. Small amounts can be fatal to children. Aspiration of liquid into the lungs, through vomiting, is a very serious hazard.

Gasoline dries the skin and can cause irritation and dermatitis on prolonged or repeated contact. Liquid in the eye causes severe smarting.

Motor gasoline may contain appreciable quantities of benzene, which is toxic upon inhalation, and the concentration of gasoline vapors must be kept very low. High concentrations will cause eye, nose and throat irritation, nausea, headache, depression and symptoms of drunkenness. Very high concentrations will result in rapid loss of consciousness.

Make sure there is adequate ventilation when handling and using gasoline. Great care must be taken to avoid the serious consequences of inhalation in the event of vapor build up arising from spillages in confined spaces.

Special precautions apply to cleaning and maintenance operations on gasoline storage tanks.

Gasoline should not be used as a cleaning agent. It must not be siphoned by mouth. See First Aid.

Gas-oil (Diesel Fuel)

Combustible.

DESCRIPTION AND OPERATION

Gross or prolonged skin contact with high boiling point gas oils may also cause serious skin disorders including skin cancer.

Kerosene (Paraffin)

Used also as heating fuel, solvent and cleaning agent.

Flammable - observe No Smoking policy.

Irritation of the mouth and throat may result from swallowing. The main hazard from swallowing arises if liquid aspiration into the lungs occurs.

Liquid contact dries the skin and can cause irritation or dermatitis. Splashes in the eye may be slightly irritating.

In normal circumstances the low volatility does not give rise to harmful vapors. Exposure to mists and vapors from kerosene at elevated temperature should be avoided (mists may arise in dewaxing). Avoid skin and eye contact and make sure there is adequate ventilation.

Alternative Fuel

Highly flammable. Observe "NO SMOKING" signs.

Make sure there is adequate ventilation when working on alternative fuelled vehicles. Great care must be taken to avoid the serious consequences of inhalation in the event of vapor build up in confined spaces.

Inhalation in high concentrations may cause dizziness, headache, nausea and loss of co-ordination. Very high concentrations may result in loss of consciousness.

Contact with liquefied petroleum gas (LPG) or compressed natural gas (CNG) to the skin may cause cold burns and frost bite.

Long sleeved cotton overalls, steel toe capped safety boots and rubber neoprene gloves should be worn during removal and installation of LPG/CNG fuel system components.

LPG/CNG fuel leaks could cause a fire and be a hazard to health that can lead to personal injury, illness or even death.

If a leak is detected, under no circumstances attempt to seal the leak by tightening the union/connection until the fuel in the system or component is depressurized. Once tightened the system should be checked for integrity following the specified procedures.

If the fuel tank is to be removed for service or repair the fuel must be evacuated using dedicated equipment and following the specified procedures.

Gas Cylinders

See also Fire.

Gases such as oxygen, acetylene, argon and propane are normally stored in cylinders at pressures of up to 138 bar (2000 psi) and great care should be taken in handling these cylinders to avoid mechanical damage to them or to the valve gear attached. The contents of each cylinder should be clearly identified by appropriate markings.

Cylinders should be stored in well-ventilated enclosures, and protected from ice and snow, or direct sunlight. Fuel gases, for example acetylene and propane, should not be stored in close proximity to oxygen cylinders.

Care should be exercised to prevent leaks from gas cylinders and lines, and to avoid sources of ignition.

Only trained personnel should undertake work involving gas cylinders.

Gases

See Gas Cylinders.

Gaskets (Fluoroelastomer)

See Viton.

General Workshop Tools and Equipment

It is essential that all tools and equipment are maintained in good condition and that the correct safety equipment is used where required.

Never use tools or equipment for any purpose other than that for which they were designed. Never overload equipment such as hoists, jacks, axle and chassis stands or lifting slings. Damage caused by overloading is not always immediately apparent and may result in a fatal failure the next time that the equipment is used.

DESCRIPTION AND OPERATION

Do not use damaged or defective tools or equipment, particularly high-speed equipment such as grinding wheels. A damaged grinding wheel can disintegrate without warning and cause serious injury.

Wear suitable eye protection when using grinding, chiseling or sand blasting equipment.

Wear a suitable breathing mask when using abrasive blasting equipment, working with asbestos-based materials or using spraying equipment.

Make sure there is adequate ventilation to control dusts, mists and fumes.

High Pressure Air, Lubrication and Oil Test Equipment

See also [Lubricants and Greases](#).

Always keep high-pressure equipment in good condition, and regularly maintained, particularly at joints and unions.

Never direct a high-pressure nozzle, for example diesel injector, at the skin as the fluid may penetrate to the underlying tissue, and cause serious injury.

Halon

See [CFCs](#).

Legal Aspects

There are many laws and regulations relating to health and safety in the use and disposal of materials and equipment in a workshop.

For a safe working environment and to avoid environmental pollution, workshops should be familiar, in detail, with the many health and safety laws and regulations within their country, published by both national and local authorities.

Lubricants and Greases

Avoid all prolonged and repeated contact with mineral oils. All lubricants and greases may be irritating to the eyes and skin.

Transmission Fluids

Safety instructions

Certain Transmission and Power Steering fluids supplied to Ford may contain additives which have the potential to cause skin disease (dermatitis) to exposed persons. The dermatitis may be irritant or allergic in nature. Risks are higher where prolonged or repeated skin contact with a fluid may occur. These fluids are used for vehicle initial fill and service purposes. This sub-section is to:

- Inform Service personnel who may come into contact with these vehicle fluids (hazard communication).
- Summarise appropriate workplace control measures and personal protective equipment requirements.
- Draw attention to the existence of Material Safety Datasheets (MSDS's) for the fluids (available from Ford Customer Service Division). These MSDS's contain detailed information on hazards and appropriate controls.

Control measures

Workplace risk assessments made under national chemical control regulations should identify operations involving the fluids as potentially hazardous and specify workplace control and worker awareness measures. In such circumstances, the relevant Material Safety Datasheet (see the details specified below) which specifies hazards and control measures in detail should be made available for guidance.

Avoid unprotected skin contact with the fluids, and in particular, avoid prolonged or repeated skin contact. Work practices should be organised so as to minimise the potential for skin contact. This may include the use of drip trays, absorbents, correct fluid handling equipment (funnels etc), and workplace housekeeping measures such as the cleaning of contaminated surfaces.

Personnel engaged in operations where skin contact could occur (such as fluid draining or filling) should wear impervious gloves made from nitrile rubber, certified to a chemical protection standard, e.g. Europe Standard EN374. This glove type is widely available from reputable suppliers of gloves for chemical protection [including the manufacturers Ansell-Admont (Solvex Range), North Safety products (North Nitrile Latex Gloves range), and

DESCRIPTION AND OPERATION

Marigold Industrial (Blue Nitrile range)]. If gloves become torn or contaminated on the inside they should be replaced. Eye protection with safety glasses is appropriate. Use of an impervious apron and arm protectors may be necessary if more extensive exposure is possible. Use of skin barrier creams suitable for work with mineral oil products may offer some supplementary protection, but such barrier creams should not be used in place of protective clothing.

If accidental skin contact occurs with the fluids, wash the area thoroughly with soap or skin cleanser and water.

Accidental eye contact should be dealt with as per normal first aid practices, by flushing the eyes with an eye wash or clean cool water for 10 minutes, after which medical attention should be obtained.

Remove and launder clothing which becomes contaminated with the fluids. Do not place rags contaminated with fluid in clothing pockets.

Wash thoroughly after completing operations where skin exposure may have occurred.

It is important that personnel do not smoke, eat or drink whilst handling the fluids or affected transmissions. These measures are designed to limit the risk from accidental ingestion.

Label any decanted fluid properly/use an equivalent label to that on original product containers.

Clean up any spills promptly using an inert absorbent and wash down contaminated surfaces with detergent and water.

Dispose of any waste fluids safely as hazardous waste.

Safety Data Sheets

Safety Data Sheets, which detail specific material handling instructions and precautions are available from the respective national sales company, and via internet www.msds.ford.com.

Used Engine Oil

Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants, which may cause skin cancer. Adequate means of skin protection and washing facilities must be provided.

Do not employ used engine oils as lubricants or for any application where appreciable skin contact is likely to occur.

Environmental Precautions

Burning used engine oil in small space heaters or boilers can be recommended only for units of approved design. If in doubt check with the appropriate local authority and manufacturer of approved appliances.

Dispose of used oil and used oil filters through authorized waste disposal contractors or licensed waste disposal sites, or to the waste oil reclamation trade. If in doubt, contact the relevant local authority for advice on disposal facilities.

It is illegal to pour used oil on to the ground, down sewers or drains, or into watercourses.

Noise

Some operations may produce high noise levels, which could, in time, damage hearing. In these cases, suitable ear protection must be worn.

Noise Insulation Materials

See [Foams, Fibre Insulation](#).

O-Rings (Fluoroelastomer)

See [Viton](#).

Paints

See also [Solvents, Chemical Materials](#).

Highly flammable, flammable - observe No Smoking policy

One Pack

Can contain harmful or toxic pigments, driers and other components as well as solvents. Spraying should be carried out only with adequate ventilation.

DESCRIPTION AND OPERATION

Two Pack

Can also contain harmful and toxic unreacted resins and resin hardening agents. The manufacturers instructions should be followed. See also Resin-based Adhesives and Isocyanate Adhesives and Sealers under Adhesives and Sealers.

Spraying should preferably be carried out in exhausted ventilated booths removing vapor and spray mists from the breathing zone. Individuals working in booths should wear appropriate respiratory protection. Those doing small-scale repair work in the open workshop should wear air-fed respirators.

Pressurized Equipment

See **High Pressure Air**, Lubrication and Oil Test Equipment.

Solder

Solders are mixtures of metals such that the melting point of the mixture is below that of the constituent metals (normally lead and tin). Solder application does not normally give rise to toxic lead fumes, provided a gas/air flame is used.

Oxy-acetylene flames should not be used, as they are much hotter and will cause lead fumes to be produced.

Some fumes may be produced by the application of any flame to surfaces coated with grease, and inhalation of these should be avoided.

Removal of excess solder should be undertaken with care, to make sure that fine lead dust is not produced, which can give toxic effects if inhaled. Respiratory protection may be necessary.

Solder spillage and filings should be collected and removed promptly to prevent general air contamination by lead.

High standards of personal hygiene are necessary in order to avoid ingestion of lead or inhalation of solder dust from clothing.

Solvents

See also Chemical Materials, Fuels (Kerosene), Fire.

For example acetone, white spirit, toluene, xylene, trichloroethane.

Used in cleaning and dewaxing materials, paints, plastics, resins and thinners.

Some may be highly flammable or flammable.

Skin contact will decrease the skin and may result in irritation and dermatitis following repeated or prolonged contact. Some can be absorbed through the skin in toxic or harmful quantities.

Splashes in the eye may cause severe irritation and could lead to loss of vision.

Brief exposure of high concentrations of vapors or mists will cause eye and throat irritation, drowsiness, dizziness, headaches and, in the worst circumstances, unconsciousness.

Repeated or prolonged exposure to excessive but lower concentrations of vapors or mists, for which there might not be adequate warning indications, can cause more serious toxic or harmful effects.

Aspiration into the lungs, for example through vomiting, is the most serious consequence of swallowing.

Avoid splashes to the skin, eyes and clothing. Wear protective gloves, goggles and clothing if necessary.

Make sure there is good ventilation when in use, avoid breathing fumes, vapors and spray mists and keep containers tightly sealed. Do not use in confined spaces.

When spraying materials containing solvents, for example paints, adhesive, coatings, use extraction ventilation or personal respiratory protection in the absence of adequate general ventilation.

Do not apply heat or flame except under specific and detailed manufacturers instructions.

Sound Insulation

See **Fibre Insulation, Foams**.

Suspended Loads

⚠ CAUTION: Never improvise lifting tackle.

There is always a danger when loads are lifted or suspended. Never work under an unsupported, suspended or raised load, for example a suspended engine.

Always make sure that lifting equipment such as jacks, hoists, axle stands and slings are adequate and suitable for the job, in good condition and regularly maintained.

DESCRIPTION AND OPERATION**Transmission Brake Bands**

See **Asbestos**.

Underseal

See **Corrosion Protection**.

Viton

In common with many other manufacturers vehicles, some components have O-rings, seals or gaskets, which contain a material known as 'Viton'.

Viton is a fluoroelastomer, that is a synthetic rubber type material, which contains Fluorine. It is commonly used for O-rings, gaskets and seals of all types. Although Viton is the most well known fluoroelastomer, there are others, including Fluorel and Tecmoflon.

When used under design conditions fluoroelastomers are perfectly safe. If, however, they are exposed to temperatures in excess of 400°C, the material will not burn, but will decompose, and one of the products formed is hydrofluoric acid.

This acid is extremely corrosive and may be absorbed directly, through contact, into the general body system.

O-rings, seals or gaskets which have been exposed to very high temperatures will appear charred or as a black sticky substance.

DO NOT; under any circumstances touch them or the attached components.

Enquiries should be made to determine whether Viton or any other fluoroelastomer has been used in the affected O-ring, seal or gasket. If they are of natural rubber or nitrile there is no hazard. If in doubt, be cautious, as the material may be Viton or any fluoroelastomer.

If Viton or any other fluoroelastomers have been used, the affected area should be decontaminated before the commencement of work.

Disposable heavy duty plastic gloves should be worn at all times, and the affected area washed down using wire wool and a limewater (calcium hydroxide) solution to neutralize the acid before disposing of the decomposed Viton residue and final cleaning of the area. After use, the plastic gloves should be discarded carefully and safely.

Welding

See also Fire, Electric Shock, Gas Cylinders.

Welding processes include Resistance Welding (Spot Welding), Arc Welding and Gas Welding.

Resistance Welding

This process may cause particles of molten metal to be emitted at a high velocity, and the eyes and skin must be protected.

Arc Welding

This process emits a high level of ultra-violet radiation, which may cause arc-eye, and skin burns to the operator and to other persons nearby. Gas-shielded welding processes are particularly hazardous in this respect. Personal protection must be worn, and screens used to shield other people.

CONTACT LENS WEARERS ARE ADVISED TO REVERT TO ORDINARY SPECTACLES WHEN ARC WELDING as the arc spectrum is believed to emit microwaves which dry out the fluid between the lens and the eye. This may result in blindness when the lens is removed from the eye.

Metal spatter will also occur, and appropriate eye and skin protection is necessary.

The heat of the welding arc will produce fumes and gases from the metals being welded, the rods and from any applied coatings or contamination on the surfaces being worked on. These gases and fumes may be toxic and inhalation of these should be avoided. The use of extraction ventilation to remove the fumes from the working area may be necessary particularly in cases where the general ventilation is poor, or where considerable welding work is anticipated. In extreme cases or confined spaces where adequate ventilation cannot be provided, air-fed respirators may be necessary.

Gas Welding (and Cutting)

Oxy-acetylene torches may be used for welding and cutting, and special care must be taken to prevent leakage of these gases, with consequent risk of fire and explosion.

The process will produce metal spatter and eye and skin protection is necessary.

DESCRIPTION AND OPERATION

The flame is bright, and eye protection should be used, but the ultra-violet emission is much less than that from arc welding, and lighter filters may be used.

The process itself produces few toxic fumes, but such fumes and gases may be produced from coatings on the work, particularly during cutting away of damaged body parts, and inhalation of the fumes should be avoided.

In brazing, toxic fumes may be produced from the metals in the brazing rod, and a severe hazard may arise if brazing rods containing cadmium are used. In this event particular care must be taken to avoid inhalation of fumes and expert advice may be required.

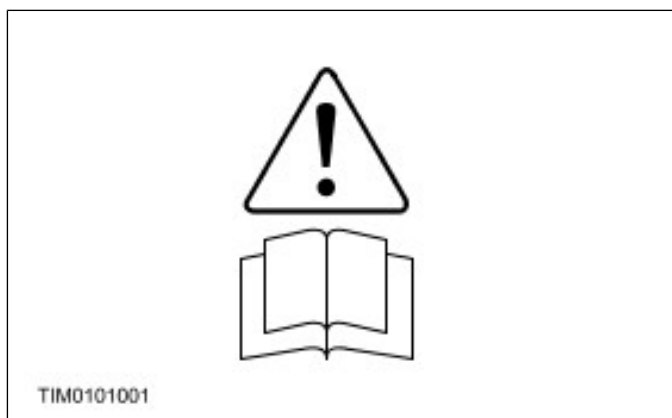
SPECIAL PRECAUTIONS MUST BE TAKEN BEFORE ANY WELDING OR CUTTING TAKES PLACE ON VESSELS, WHICH HAVE CONTAINED COMBUSTIBLE MATERIALS, FOR EXAMPLE BOILING OR STEAMING OUT OF FUEL TANKS.

Warning Symbols on Vehicles

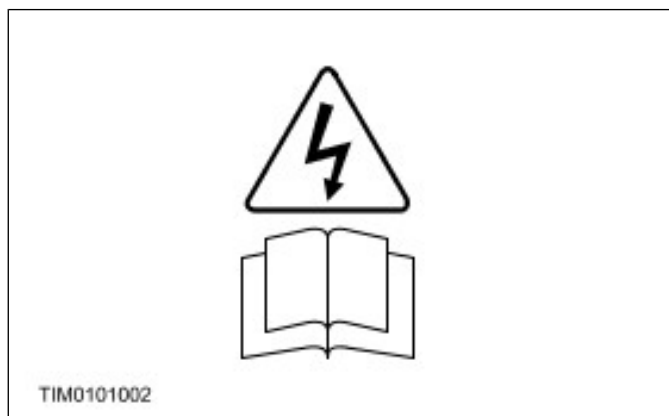
Decals showing warning symbols will be found on various vehicle components.

These decals must not be removed. The warnings are for the attention of owners/operators and persons carrying out service or repair operations on the vehicle.

The most commonly found decals are reproduced below together with an explanation of the warnings.



1. Components or assemblies displaying the caution triangle and open book symbol advise consultation of the relevant section of the owner literature before touching or attempting adjustments of any kind.



2. Components or assemblies displaying the warning triangle with the 'electrified' arrow and open book symbol give warning of inherent high voltages. Never touch these with the engine running or the ignition switched on. See Electric Shock in this subsection.



3. Vehicles and replacement components which contain asbestos are identified by this symbol. See **Asbestos** in this subsection.

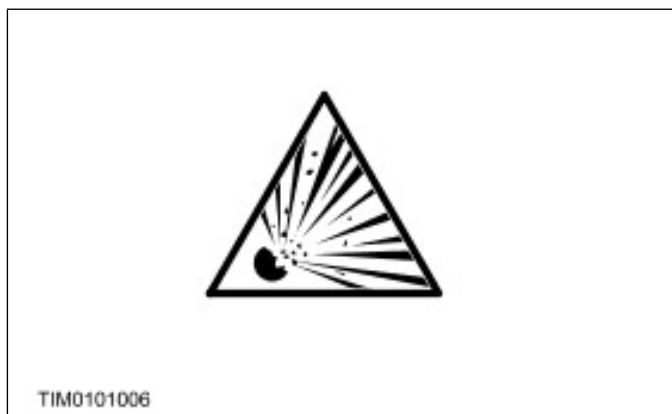


4. Components or assemblies displaying this symbol give warning that the component contains a corrosive substance. See **Acids and Alkalis** in this subsection.

DESCRIPTION AND OPERATION



5. Displaying the caution circle with a deleted lighted match symbol, caution against the use of naked lights or flames within the immediate vicinity due to the presence of highly flammable or explosive liquids or vapors. See **Fire** in this subsection.



6. Displaying this symbol (normally in conjunction with 5 above) warn of the presence of potentially explosive matter within the immediate vicinity.



7. Displaying this symbol warn that children should not be allowed in the immediate vicinity unsupervised.

White Spirit

See **Solvents**.


DESCRIPTION AND OPERATION

Standard Workshop Practices

Vehicle in Workshop


When working on a vehicle in the workshop always make sure that:

- the parking brake is applied or the wheels are securely chocked to prevent the vehicle moving forwards or backwards.
- the key is removed from key operated hood locks before any work is carried out around the front of the vehicle.
- if the engine is to be run, there is adequate ventilation, or an extraction hose to remove exhaust fumes.
- there is adequate room to raise the vehicle and remove the wheels, if necessary.
- fender covers are always fitted if any work is to be carried out in the engine compartment.
- the battery is disconnected if working on the engine, underneath the vehicle, or if the vehicle is raised.

 **CAUTION: When electric arc welding on a vehicle, always disconnect the generator wiring to prevent the possibility of a surge of current causing damage to the internal components of the generator.**

- if using welding equipment on the vehicle, a suitable fire extinguisher is readily available.

Alternative Fuel

 **WARNING: When servicing the fuel system always follow the recommended procedures. Failure to follow these instructions may result in personal injury.**

If the odor of liquefied petroleum gas (LPG) or compressed natural gas (CNG) is present in the air in the workshop, warn all persons in the area to:

- extinguish all flames and lighted tobacco.
- shut off electrical and air powered equipment.
- evacuate the area.
- ventilate the area.
- contact the fire control authorities.
- remove the vehicle to a dedicated, ventilated area.

Alternative Fuel — Do's

- Do work on the vehicle in a designated area, that is well ventilated and with access restricted to qualified personnel only.
- Install new warning labels to their original locations.
- If possible always isolate the alternative fuel tank, and run the vehicle on the alternative fuel until it automatically switches to its normal fuel prior to taking the vehicle into the workshop service area.
- Only use tested and approved components and pipes when repairing or servicing LPG and CNG systems.

Alternative Fuel — Do Nots

- Do not vent off LPG fuel.
- Do not use shop air pressure to force LPG fuel from the fuel tank.
- Do not use paint drying ovens above 40°C for any alternative fuel vehicle. LPG and CNG fuel tanks must be removed from the vehicle prior to being put into paint drying ovens above 40°C.
- Do not modify the system or install new components that are not designed for gas vehicles.
- Do not evacuate fuel tanks unless there is repair that requires the removal of the fuel tank.
- Do not work on the fuel lines or system components unless the alternative fuel has been evacuated and the pressure in the system reduced to atmospheric or less.
- Do not use anything other than the specified leak detector fluid to trace fuel leaks.

Be aware of situations that may cause the LPG or CNG fuel system to vent off fuel, such as:

- extremely hot days.
- parking by a space heater.
- hoisting a vehicle up near a ceiling heater.

Only fully trained personnel, who are conversant with local standards, are to work on alternative fuel vehicles.

DESCRIPTION AND OPERATION

Towing the Vehicle

WARNING: When the vehicle is being towed, the ignition switch must be in position II (steering lock released and warning lamps illuminated). Only then will the steering, turn signal lamps, horn and stop lamps be operational. Failure to follow these instructions may result in personal injury.

NOTE: The removable towing eye (if equipped), has a left-hand thread and must be fully tightened before towing can commence.

When towing is necessary, the vehicle towing eyes should be used. The rope must be securely fastened to the towing eyes and must also be attached to the other vehicle such that the rope will not foul the bodywork.

When a vehicle with automatic transmission is towed, the gear selector must be in position N (Neutral). Never tow a vehicle with automatic transmission at a speed greater than 30 mph (50 km/h) or for a distance greater than 30 miles (50 km). If it is necessary to tow the vehicle a greater distance, the drive wheels must be lifted clear off the ground.

Alternatively the vehicle can be transported on a low loader or a trailer.

Connecting a Slave Battery Using Jumper Cables

WARNING: If the slave battery has recently been charged and is gassing, cover the vent plugs or covers with a damp cloth to reduce the risk of explosion should arcing occur when connecting the jumper cables. Failure to follow these instructions may result in personal injury.

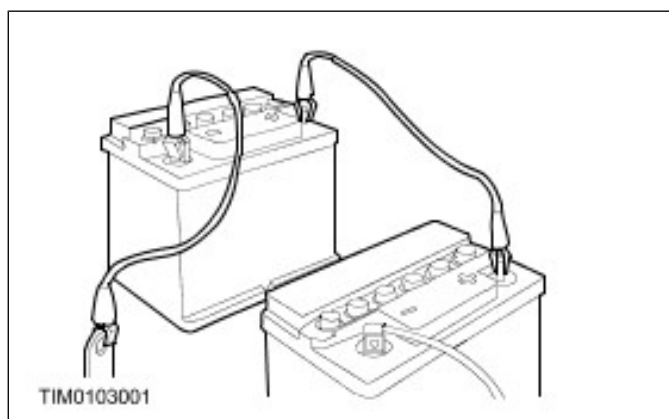
CAUTIONS:

WARNING: A discharged battery condition may have been caused by an electrical short circuit. If this condition exists there will be an apparently live circuit on the vehicle even when all normal circuits are switched off. This can cause arcing when the jumper cables are connected.

WARNING: While it is not recommended that the vehicle is jump started, it is recognized that this may occasionally be the only practical way to mobilize a vehicle. In such

an instance, the discharged battery must be recharged immediately after jump starting to avoid permanent damage.

- Always make sure that the jumper cables are adequate for the task. Heavy duty cables must be used.
- Always make sure that the slave battery is of the same voltage as the vehicle battery. The batteries must be connected in parallel.
- Always make sure that switched electric circuits are switched off before connecting jumper cables. This reduces the risk of arcing occurring when the final connection is made.



WARNING: Make sure that the ends of the jumper cables do not touch each other or ground against the vehicle body at any time while the cables are attached to the battery. A fully charged battery, if shorted through jumper cables, can discharge at a rate well above 1000 amps causing violent arcing and very rapid heating of the jumper cables and terminals, and can even cause the battery to explode. Failure to follow these instructions may result in personal injury.

Always connect the jumper cables in the following sequence:

- Slave battery positive first and then vehicle battery positive.
- Slave battery negative next and then vehicle ground at least 12 inches (300 mm) from the battery terminal, for example engine lifting eye.

Always reduce the engine speed to idle before disconnecting the jumper cables.

Before removing the jumper cables from the vehicle that had the discharged battery, switch on the heater blower (high) or the heated rear window, to reduce the voltage peak when the cables are removed.

DESCRIPTION AND OPERATION

Always disconnect the jumper cables in the reverse order to the connecting sequence and do not short the ends of the cables.

Do not rely on the generator to restore a discharged battery. For a generator to recharge a battery, it would take in excess of eight hours continuous driving with no additional loads placed on the battery.

Component Cleaning

To prevent the ingress of dirt, accumulations of loose dirt and greasy deposits should be removed before disconnecting or dismantling components or assemblies.

Components should be thoroughly cleaned before inspection prior to reassembly.

Cleaning Methods:

- Dry cleaning.
- Removal of loose dirt with soft or cable brushes.
- Scraping dirt off with a piece of metal or wood.
- Wiping off with a rag.

▲ WARNING: Wear eye protection when cleaning vehicle components with compressed air, a steam cleaner or a power washer. Failure to follow this instruction may result in personal injury.

CAUTIONS:

▲ Compressed air is sometimes 'wet' so use with caution, especially on hydraulic systems.

▲ To prevent damage to the electrical connectors in the engine compartment, do not use a steam cleaner or a power washer to clean the engine compartment.

- Blowing dirt off with compressed air.
- Removal of dry dust using vacuum equipment. This method must always be used to remove friction lining material dust (asbestos particles).
- Steam cleaning.

▲ WARNING: Most solvents require careful handling and some are harmful. Refer to Health and Safety Precautions and to the manufacturers literature for the relevant safety precautions. Failure to follow these instructions may result in personal injury.


Various solvents are available which are suitable for component cleaning. Some components, such as brake hydraulic parts and electrical assemblies should be cleaned only with recommended solvents — refer to Solvents, Sealers and Adhesives or to the section of the manual relevant to the component.


Calibration of Essential Measuring Equipment

▲ WARNING: Equipment, which requires regular calibration, must be calibrated in accordance with the manufacturers instructions. Failure to follow this instruction may result in personal injury or damage to components.

It is of fundamental importance that certain essential equipment, for example torque wrenches, multimeters, exhaust gas analyzers or rolling roads, are regularly calibrated in accordance with the manufacturers instructions.

DESCRIPTION AND OPERATION**Solvents, Sealants and Adhesives****Introduction**

 **WARNING:** Always handle all solvents, sealers and adhesives with extreme care. Some contain chemicals or give off fumes which can be dangerous to health. Always follow the manufacturers instructions. If in doubt about any substance, particularly a solvent, DO NOT use it.

 **CAUTION:** If in doubt about the suitability of any proprietary solvent or sealer for a particular application, contact the manufacturer of the product for information regarding storage, handling and application.

The Health and Safety Precautions subsection refers to some commonly used chemicals and materials, hazards associated with their use, and safety measures to be taken.

DESCRIPTION AND OPERATION

Road/Roller Testing

Road or roller testing may be carried out for various reasons and a procedure detailing pre-test checks, engine starting and stopping, pre-driving checks, on-test checks and final checks to be completed on completion of the test is given below.

Unless complete vehicle performance is being checked, the full road test procedure need not be carried out. Instead, those items particularly relevant to the system(s) being checked can be extracted.

Pre-Test Checks

▲ WARNING: If the brake system hydraulic fluid level is low, pedal travel is excessive or a hydraulic leak is found, do not attempt to road test the vehicle until the reason for the low fluid level, excessive pedal travel or hydraulic leak is found and rectified.

It is suggested that pre-test checks and functional tests of those systems and circuits which affect the safe and legal operations of the vehicle, such as brakes, lights and steering, should always be carried out before the road or roller test.

With the ignition switched off, check:

- the engine oil level.
- the engine coolant level.
- the tires, for correct pressure, compatible types and tread patterns, and wear within limits.
- that there is sufficient fuel in the tank to complete the test.
- all around the engine, transmission and under the vehicle for oil, coolant, hydraulic and fuel leaks. Make a note of any apparent leaks and wipe off the surrounding areas to make it easier to identify the extent of the leak on completion of the test.

Starting the Engine

NOTE: On initial drive away from cold and within the first 1.5 km (1 mile), do not depress the accelerator pedal beyond half travel until the vehicle has attained a minimum speed of 25 km/h (15 miles/h). Never operate at high engine speed or with the accelerator pedal at full travel whilst the engine is cold.

With the ignition switched off, check:

- that the parking brake is applied.
- that the gear lever is in the neutral position.
- that all instrument gauges (except fuel gauge) read zero.

With the ignition switched on, check:

- that the ignition controlled warning lamps are illuminated.
- that the engine temperature gauge registers a reading compatible with the engine temperature.
- that the fuel gauge registers a reading appropriate to the fuel level in the tank.
- the operation of the parking brake warning lamp and fluid level warning indicator.

Road or Roller Testing

▲ CAUTION: If road testing, check the brake operation while still traveling at low speed before continuing with the test. If the brakes pull to one side, or appear to be otherwise faulty, do not continue with the road test until the fault has been found and rectified.

During the road or roller test, check:

- that the clutch pedal operation is not stiff or heavy.
- that the initial gear engagement is smooth and there is no evidence of clutch drag.
- that the parking brake control operates smoothly and releases quickly and completely.
- that the clutch takes up the drive smoothly, without slip or judder.
- that gear changing is smooth with no abnormal noises or vibrations from the transmission.
- the engine power output is satisfactory, full power is achieved, acceleration is smooth and pedal operation is not stiff or heavy, and engine speed returns to idle correctly.
- there is no excessive or abnormally colored smoke from the engine under normal driving, heavy load or overrun conditions.
- that steering operation, including power steering (if equipped), is smooth, accurate, not excessively heavy or with excessive free play or vibration.
- that the steering does not pull to one side and self centers smoothly after cornering.

DESCRIPTION AND OPERATION

- that the speedometer, coolant temperature gauge and tachometer (if equipped) register the correct readings and operate correctly.
- that the switches and controls operate smoothly and positively, warning and indicator lamps operate correctly and the direction indicator control self cancels when the steering is returned to the straight ahead position.
- that the heating and ventilation systems operate correctly and effectively.
- the brake operation and efficiency.
- oil, coolant, hydraulic, air and fuel leaks.
- abnormal temperature of any moving components or assemblies, for example wheel hubs, transmission and axle, which might indicate over tightness or lack of lubrication.

Brake Testing

▲ WARNING: When brake testing, avoid breathing the fumes from hot brakes, this may contain asbestos dust which is hazardous to health. Failure to follow this instruction may result in personal injury.

For additional information, refer to: **Health and Safety Precautions** (100-00 General Information, Description and Operation).

CAUTIONS:

- ▲** Avoid brake testing on busy roads where it may cause inconvenience or danger to other road users.
- ▲** Brake testing which includes heavy brake applications should not be carried out with new brake pads/discs or linings/drums until the components have bedded-in. New brake friction components will not reach full efficiency until the bedding-in process is complete.

Test the brakes at several speeds within the normal operating range using both light and heavy pedal pressure. Note any tendency to snatch, pull or drag, and any undue delay in application or release.

Allow the vehicle to coast and note any tendency to pull to one side, or evidence that the brakes are binding.














After stopping the vehicle (not immediately after a period of heavy braking), carefully check the brake temperature. A brake disc or brake drum that feels hot or is appreciably hotter than the others, indicates that the brake is binding.






After completion of the test, check for:

DESCRIPTION AND OPERATION









Air Conditioning (A/C) System Health and Safety Precautions

WARNINGS:

-  Only qualified technicians are allowed to work on air conditioning (A/C) systems.
-  Air conditioning (A/C) system components can become particularly hot or cold.
-  When handling refrigerants, always wear protective goggles and gloves made of fluoroelastomer. Leather or fabric gloves are not suitable.
-  Make sure that the air conditioning (A/C) system is at ambient temperature before carrying out any repair.
-  If liquid refrigerant comes into contact with the skin, it produces severe frostbite. Immediately rinse the affected areas with water for 15 minutes. Seek medical attention.
-  If refrigerant comes into contact with the eyes, immediately rinse the eyes with plenty of water for 15 minutes. Seek medical attention.
-  If refrigerant comes into contact with naked flames or hot surfaces, it produces toxic gases (fluorine and phosgene). The toxic gases formed are readily recognizable by their pungent smell at tiny concentrations.
-  Refrigerant is flammable and explosive.
-  Make sure that the local regulations regarding work on air conditioning (A/C) systems are adhered to.
-  Make sure that refrigerant bottles are not exposed to temperatures greater than 45°C.
-  Make sure that refrigerant bottles are closed properly.
-  Toxic gases generated when refrigerant is heated are hazardous to health. The gases have an irritating smell and can cause lung damage. The symptoms can continue for a long time after having been in contact with the gases. The gases can cause lung damage even if the amount of gas in the air is too small to smell.
-  Gaseous refrigerant has a higher density than air. There is a danger of suffocation when working close to the ground or in workshop pits.

-  Provide adequate ventilation when handling refrigerant.
-  Never release refrigerant into the atmosphere.
-  Only use special tools, equipment and lubricants that are approved for the type of refrigerant being used.
-  The pressurized container in the servicing unit must never be over-filled. The refrigerant must have sufficient room to expand if the temperature rises.
-  Always follow the manufacturer's instructions for the correct servicing unit operating procedure.





CAUTIONS:

-  Do not mix refrigerant oils for different types of refrigerant.
-  Never mix different types of refrigerant or equipment intended for them.
-  Only use refrigerant in gas form when filling the system through the low-pressure connection.
-  Only use refrigerant in liquid form when filling the system through the high-pressure connection.
-  Refrigerant attacks certain plastics. Only use seals suitable for refrigerant.
-  If the air conditioning (A/C) compressor is damaged, the fixed orifice tube can become blocked with metal particles.
-  Any sort of blockage in the refrigerant circuit will damage the air conditioning (A/C) compressor irreparably.
-  If the air conditioning (A/C) system has been opened for a period greater than 2 hours, a new receiver drier must be installed and the evacuating time to be increased by a minimum of 2 hours.





NOTE: New air conditioning (A/C) compressors are delivered prefilled.

NOTE: Refrigerant oil in new air conditioning (A/C) compressors can contain Teflon, visible as white particles, which will not harm the system.










DESCRIPTION AND OPERATION**Battery and Battery Charging Health and Safety Precautions****WARNINGS:**

-  **Batteries contain sulphuric acid, avoid contact with skin, eyes or clothing. Wear safety goggles when working near the battery to protect against possible splashing of the acid solution. In cases of acid contact with the skin or eyes, flush immediately with water for a minimum of 15 minutes and seek prompt medical attention. If swallowed, seek immediate medical attention.**
-  **Batteries normally produce explosive gases. Do not allow naked flames, sparks or lighted substances to come near the battery.**
-  **When charging the battery shield your face and wear safety goggles. Provide adequate ventilation.**
-  **CAUTION: Boost charging with excessive current or voltage above 16 volts will damage the battery.**



DESCRIPTION AND OPERATION**Engine Cooling System Health and Safety Precautions****WARNINGS:**

-  **Extreme care must be exercised when handling hot fluids. Always wash off spilled fluids from exposed skin immediately.**
-  **Vapors may be given off from antifreeze when heated. Avoid breathing these vapors.**
-  **Antifreeze may be absorbed through the skin in toxic or harmful quantities. If taken internally, drink water and induce vomiting. Seek medical attention immediately.**
-  **Antifreeze must not be used in any cooling or industrial water system that is connected or linked to general water supplies.**

DESCRIPTION AND OPERATION**Petrol Fuel System Health and Safety Precautions****WARNINGS:**

-  Extreme care must be exercised when handling hot fluids. Always wash off spilled fluids from exposed skin immediately.
-  Highly flammable mixtures are always present and may ignite when working on fuel systems. Do not allow naked flames, sparks or lighted substances to come near fuel related components.
-  There may not be adequate warning of odor or of irritation before toxic or harmful effects arise. These may be immediate or delayed.
-  Swallowing can result in mouth and throat irritation and absorption from the stomach can result in drowsiness and unconsciousness. Small amounts can be fatal to children. Aspiration of liquid into the lungs, through vomiting, is a very serious hazard.
-  Gasoline dries the skin and can cause irritation and dermatitis on prolonged or repeated contact. Liquid in the eye causes severe smarting.
-  Motor gasoline may contain appreciable quantities of benzene, which is toxic upon inhalation, and the concentration of gasoline vapors must be kept very low. High concentrations will cause eye, nose and throat irritation, nausea, headache, depression and symptoms of drunkenness. Very high concentrations will result in rapid loss of consciousness.
-  Make sure there is adequate ventilation when handling and using gasoline. Great care must be taken to avoid the serious consequences of inhalation in the event of vapor build up arising from spillages in confined spaces.
-  Special procedures apply to cleaning and maintenance operations on gasoline storage tanks.
-  Gasoline should not be used as a cleaning agent. It must not be siphoned by mouth.
See First Aid.

CAUTIONS:

-  Fuel injection equipment is manufactured to very precise tolerances and fine clearances. It is essential that absolute cleanliness is observed when working with these components.
-  Make sure that the workshop area in which the vehicle is being worked on is as clean and as dust free as possible.



DESCRIPTION AND OPERATION

Supplemental Restraint System (SRS) Health and Safety Precautions

WARNINGS:

-  Undeployed pyrotechnic supplemental restraint system (SRS) components must not be deployed in the vehicle.
-  Never carry out any electrical measurement on disconnected, undeployed supplemental restraint system (SRS) pyrotechnic components.
-  Pyrotechnic components must not be disassembled.
-  Pyrotechnic components are not interchangeable between vehicles.
-  Always carry a live air bag module away from the body with the air bag or trim cover pointing upwards.
-  Live air bag modules must be placed in a suitable cage when removed from the vehicle. The air bag or trim cover must be facing upwards.




CAUTIONS:

-  Supplemental restraint system (SRS) components must not be subjected to temperatures higher than 110°C.
-  Never install aftermarket accessories to the vehicle on or adjacent to the supplemental restraint system (SRS) module.



DESCRIPTION AND OPERATION

Window Glass Health and Safety Precautions

WARNINGS:

-  Cured polyurethane (PU) adhesive can degrade if subjected to high temperatures. Isocyanide compounds can be released when grinding or welding in close proximity to cured PU adhesive.
-  Polyurethane (PU) adhesive can cause asthma like symptoms. Isocyanate vapor from primer or PU adhesive can cause allergies in the respiratory tract.
-  Wear gloves and eye protection when working with the direct glazing cutter for bonded glass as the cutting operation may produce splinters. When using the direct glazing cutter for bonded glass wear ear protectors. Failure to follow these instructions may result in personal injury.

CAUTIONS:

-  Make sure that the direct glazing for bonded glass cutting blades are changed where the cutting depth changes to avoid damage to the body and trim panels.
-  During the curing period of the PU adhesive, the door windows must be left open to avoid a build up of pressure when the doors are opened and closed.



SECTION 100-01 Identification Codes

VEHICLE APPLICATION: 2008.75 Focus ST C307

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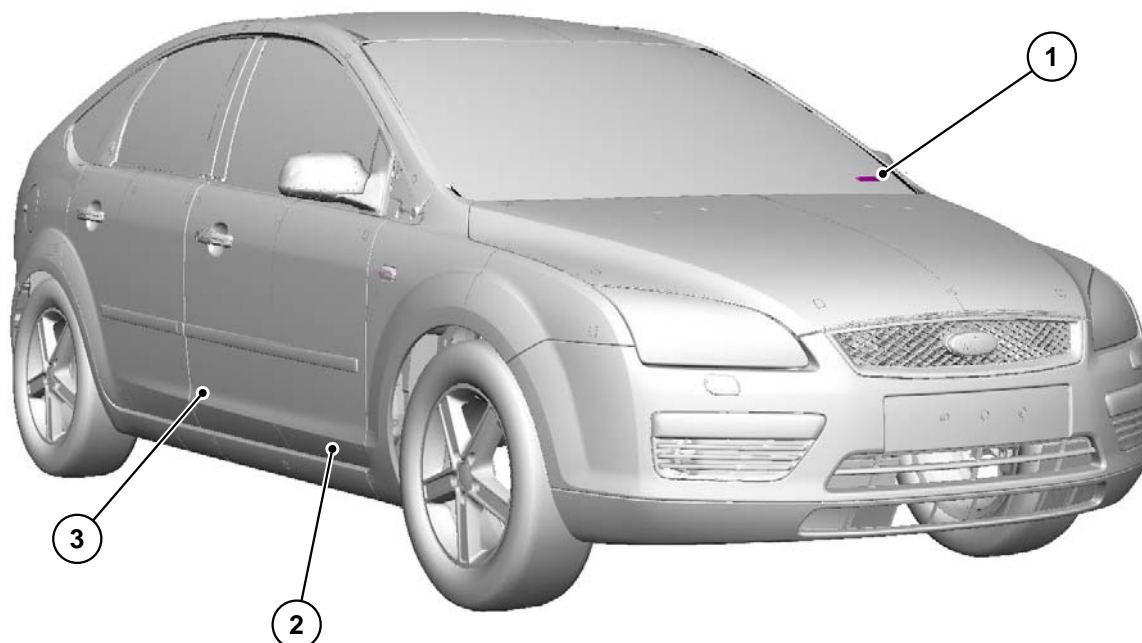
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Identification Codes

Identification Codes

The vehicle identification plate (VIN plate) is located on the right-hand B-pillar. The codes stamped or printed on the VIN plate during production enable the precise details of the vehicle

build specification to be established. The vehicle identification number (VIN) may also be viewed through the windshield or in the drivers compartment where it is stamped into the floor panel.

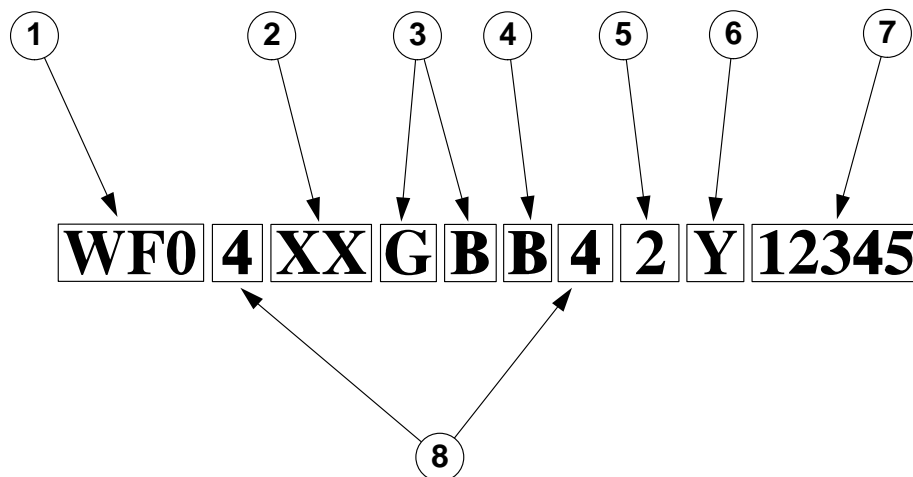


E56807

Item	Description
1	Visible VIN
2	VIN on the floor panel
3	VIN plate

DESCRIPTION AND OPERATION

VIN (an example of VIN shown)



E0025438

Item	Description
1	VIN Position 1, 2 and 3 - World manufacturer identifier
2	VIN Position 5 and 6 - Constant X
3	VIN Position 7 and 8 - Product source company and assembly plant
4	VIN Position 9 - Model

Item	Description
5	VIN Position 11 - Year of manufacture
6	VIN Position 12 - Month of manufacture
7	VIN Positions 13 to 17 - Vehicle serial number
8	VIN Position 4 and 10 - Body type

VIN Position 1, 2 and 3 - World Manufacturer Identifier

Codes	World Manufacturer
WF0	Ford-Werke AG Germany (European vehicles)

VIN Position 4 and 10 - Body Type

Code	Body Type
W	Wagon
X	Convertible
3	3-door
4	4-door
5	5-door

100-01-4

Identification Codes

100-01-4

DESCRIPTION AND OPERATION

VIN Position 5 and 6 - Constant X

VIN Position 7 and 8 - Product Source Company and Assembly Plant

Code	Product Source Company and Assembly Plant
GC	Saarlouis/Germany
LU	Turin/Italy
WP	Valencia/Spain

VIN Position 9 - Model

Code	Model
D	Focus

VIN Position 11 - Year of Manufacture

Code	Year of Manufacture
4	2004
5	2005
6	2006
7	2007
8	2008
9	2009

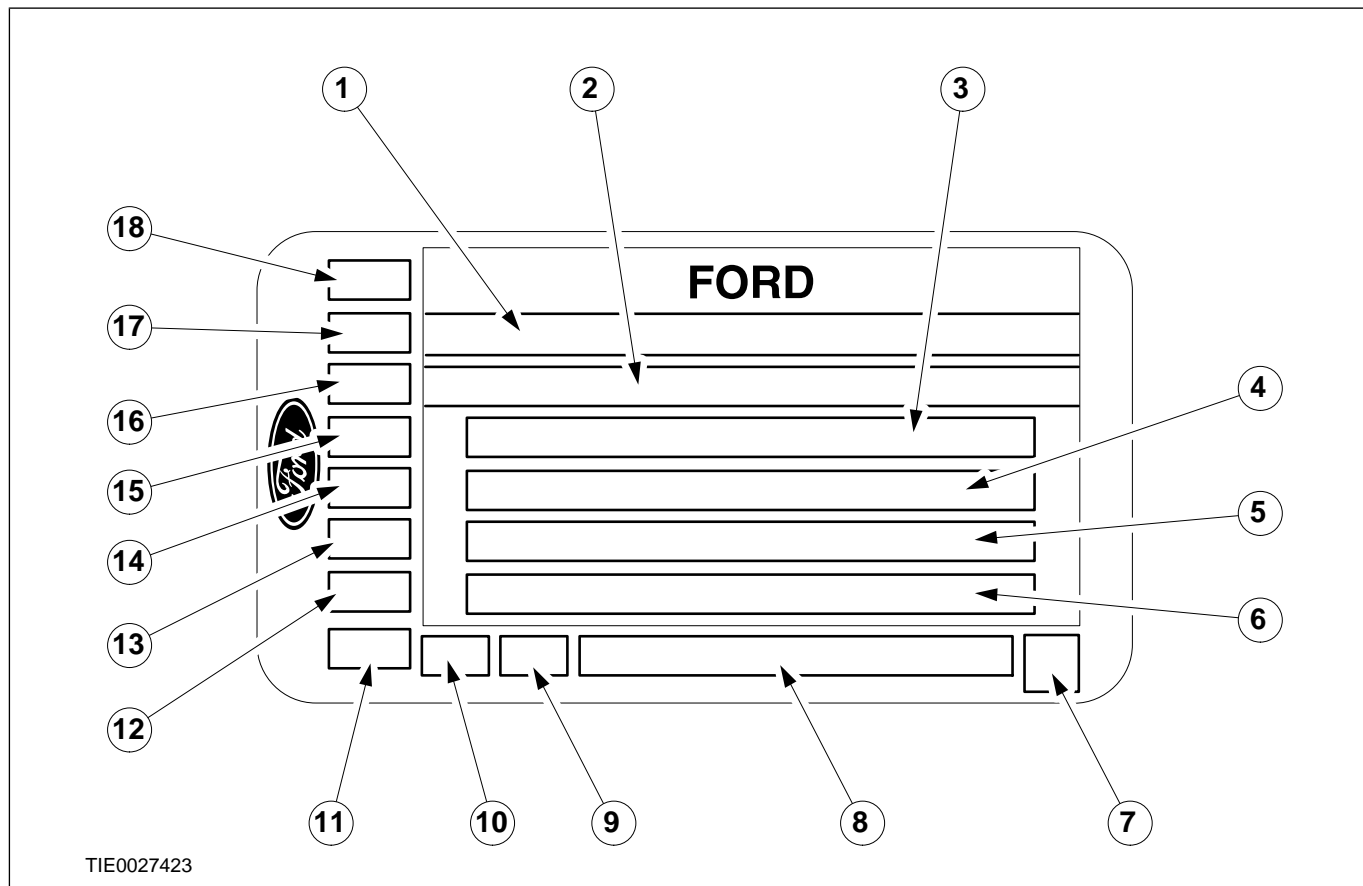
VIN Position 12 - Month of Manufacture

Month	2004	2005	2006	2007	2008	2009
January	B	J	L	C	B	J
February	R	U	Y	K	R	U
March	A	M	S	D	A	M
April	G	P	T	E	G	P
May	C	B	J	L	C	B
June	K	R	U	Y	K	R
July	D	A	M	S	D	A
August	E	G	P	T	E	G
September	L	C	B	J	L	C
October	Y	K	R	U	Y	K
November	S	D	A	M	S	D
December	T	E	G	P	T	E

VIN Positions 13 to 17 - Vehicle Serial Number
Five Digit Number

DESCRIPTION AND OPERATION

Vehicle Certification Label (Typical) or VIN Plate



TIE0027423

Item	Description
1	National or whole vehicle type approval
2	VIN
3	Gross vehicle mass (GVM)
4	Gross train mass (GTM)
5	Maximum permissible front axle mass
6	Maximum permissible rear axle mass
7	Smoke value (diesel only)
8	Model body or type codes
9	Model type code

Item	Description
10	Door combination code
11	Exhaust emission level codes
12	Body color codes
13	Interior trim codes
14	Transaxle final drive ratio codes
15	Transaxle codes
16	Engine codes
17	Hand of drive
18	Axle mounting (Transit only)

Items 1 to 6: Vehicle Certification Label

Item	Details
Item 1: National or whole vehicle type approval	A unique code required by legislation in certain territories.
Item 2: VIN	Vehicle identification number.
Item 3: GVM	Indicates the maximum legal laden mass, in territories where this is required.

DESCRIPTION AND OPERATION

Item	Details
Item 4: GTM	Indicates the maximum combined mass of vehicle and trailer or caravan.
Item 5: Maximum permissible front axle mass	Maximum permissible loading on the front wheels of the vehicle.
Item 6: Maximum permissible rear axle mass	Maximum permissible loading on the rear wheels of the vehicle.

Item 7: Smoke Value (diesel only)

Number	Smoke Value
	Per meter

Item 8: Model Body or Type Codes

Code	Model Body or Type
DA3	3-door
DB3	4-door
DA3	5-door
DA3	Wagon
DB3	2-door convertible

Item 9: Model Type Code

Code	Model Type
-	-

Item 10: Door Combination Code

Code	Door Combination
-	-

Item 11: Exhaust Emission Level Codes

Code	Exhaust Emissions
K	Stage V
S	2000 EEC (Stage III)
V	Stage IV + Diesel Particulate Filter (DPF)
7	Stage IV

Item 12: Body Color Codes

Code	Body Color
A	Tango (Orange)
B	Mandarin Orange
C	Colorado Red or Pitch Black
D	Machine Silver
F	Panther Black

100-01-7

Identification Codes

100-01-7

DESCRIPTION AND OPERATION

Code	Body Color
G	Aquarius (Blue)
H	Sea Grey or Red Hot (Bright Red)
I	Ink Blue
J	Performance Blue
K	Magnum Grey or Limoncello (Yellow)
L	Flare
N	Diamond White or Grenadine (Dark Red)
O	Moondust Silver
Q	Luna
R	Blue Di Cina Pearl (Dark Blue)
S	Iris (Purple)
U	Vitro or Argentino (Silver)
V	Deep Navy (Blue)
W	Honor Green
X	Neptune Green
Z	Tonic (Blue)
1	Sublime (Green)
2	Jeans (Blue)
3	Stirling Silver
9	Deep Rosso Red

For vehicles built in continental plants, the second digit of the paint code, on the VIN label, denotes the original model year of the color's introduction, ('0'=color introduction in 2000 model year).

Item 13: Interior Trim Codes

Code	Interior Trim
AE	Humy - Dark Flint
AF	Louis Leather - Dark Flint
AN	Rack - Dark Flint
AP	Cubical - Dark Flint
AR	Span - Dark Flint
AU	Stripy/Gene - Dark Flint
AV	Stripy - Dark Flint
BF	Louis Leather - Ebony
CL	Louis Leather - Vernon Camel
EL	Louis Leather - Vernon Ebony
ES	Span Turquoise - Mondus Ebony

100-01-8

Identification Codes

100-01-8

DESCRIPTION AND OPERATION

Code	Interior Trim
EX	Volume - Anthracite
FL	Span - Vernon Ebony
GX	Volume - Yellow
IP	Piega Iris - Iris Ebony
LF	Louis Leather - Medium Light Stone Blue
LN	Rack - Medium Light Stone Blue
LR	Span - Medium Light Stone Blue
MP	Piega Grey - Mondus Ebony
RS	Span Red - Mondus Ebony
SL	Louis Leather - Veronon Saddle
VE	Humy - Medium Light Stone
VF	Louis Leather - Medium Light Stone
VP	Cubical - Medium Light Stone
YA	Louis Leather - Vernon Camel
YB	Louis Leather - Vernon Ebony
YC	Span - Vernon Ebony
YD	Piega - Mondus Iris
YE	Piega - Mondus Generic Grey
YF	Span - Mondus Generic Red
YG	Louis Leather - Veronon Saddle
YH	Span - Mondus
YJ	Span - Mondus Generic Grey
YL	Span - Mondus Ebony
1X	Volume - Blue
2X	Volume - Blue
3X	Volume - Red
12	Blue Ditto - Blue
32	Blue Ditto - Red
51	Cuboid - Grey

Item 14: Transaxle Final Drive Ratio Codes

Code	Transaxle Final Drive Ratio
AW	4.06
BW	4.06
B2	4.203
CW	4.06

DESCRIPTION AND OPERATION

Code	Transaxle Final Drive Ratio
EQ	4.07
E2	4.203
JV	4.00
1Q	3.41
1R	4.33
2Q	3.41
4Q	4.06
36	4.071/2.85 (a)

a) The 6-speed manual transaxle (MMT6) has two output shafts. First, second, third and fourth gears have the higher final drive ratio. Fifth, sixth and reverse gears have the lower final drive ratio.

Item 15: Transaxle Codes

Code	Transaxle
Q	5-Speed Manual Transaxle (MTX-75)
R	Automatic Transaxle (CFT23)
V	6-Speed Manual Transaxle (M66)
W	5-Speed Manual Transaxle (iB5)
2	4-Speed Automatic Transaxle (4F27 E)
6	6-Speed Manual Transaxle (MMT6)

Item 16: Engine Codes

Code	Engine
A	1.4L Duratec-16V (Sigma) (75 PS)
B	1.6L Duratec-16V (Sigma) (100 PS)
C	1.6L Duratec-16V Ti-VCT (Sigma) (115 PS)
E	2.0L Duratec-HE (MI4) (145 PS)
F	1.8L Duratec-HE (MI4) - Flexible Fuel (125 PS)
H	1.8L Duratec-HE (MI4) (125 PS)
J	2.5L Duratec-ST (VI5)
1	1.6L Duratorq-TDCi (DV) Diesel (110 PS)
2	1.6L Duratorq-TDCi (DV) Diesel (90 PS)
3	2.0L Duratorq-TDCi (DW) Diesel (136 PS)
4	1.8L Duratorq-TDCi (Kent) Diesel

Item 17: Hand of Drive

Code	Drive
E	Left-hand drive

DESCRIPTION AND OPERATION

Code	Drive
F	Right-hand drive
I	Left-hand drive
J	Right-hand drive
M	Left-hand drive
N	Right-hand drive
Q	Left-hand drive
R	Right-hand drive
U	Left-hand drive
V	Right-hand drive
1	Left-hand drive
2	Right-hand drive
5	Left-hand drive
6	Right-hand drive



SECTION 100-02 Jacking and Lifting

VEHICLE APPLICATION: 2008.75 Focus ST C307

CONTENTS PAGE

DESCRIPTION AND OPERATION

Jacking.....	100-02-2
Lifting.....	100-02-3





DESCRIPTION AND OPERATION

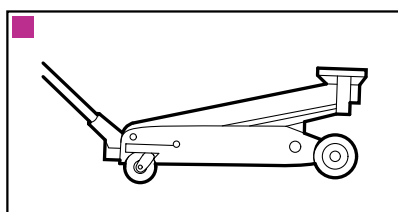
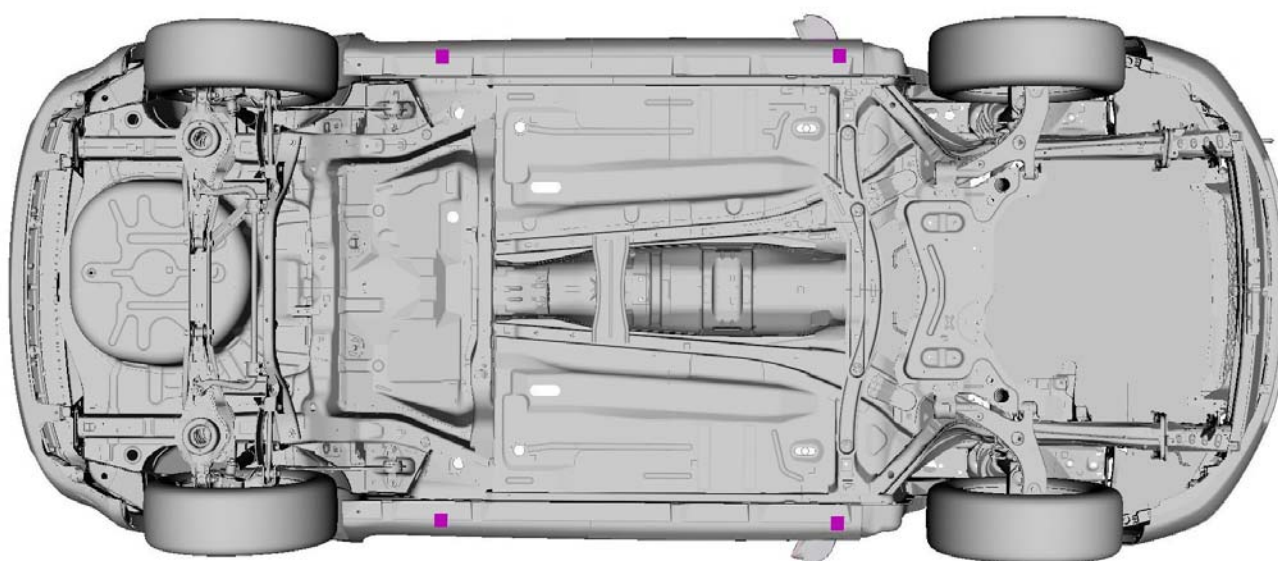
Jacking

WARNING: Always position the vehicle on a hard level surface. If the vehicle must be jacked up on a soft surface use load spreading blocks under the jack. Always chock the wheel diagonally opposite the jacking point. Failure to follow these instructions may result in personal injury.

CAUTIONS:

-  It is important that only the correct jacking and support locations are used at all times.
-  The convertible top must not be operated while the vehicle is lifted by a single jack.

NOTE: When using the vehicle jack, refer to the owner guide for correct operating instructions.



E57513

DESCRIPTION AND OPERATION

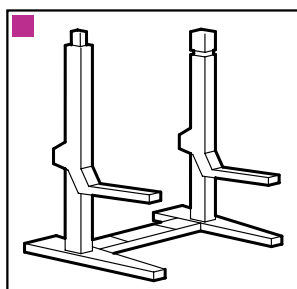
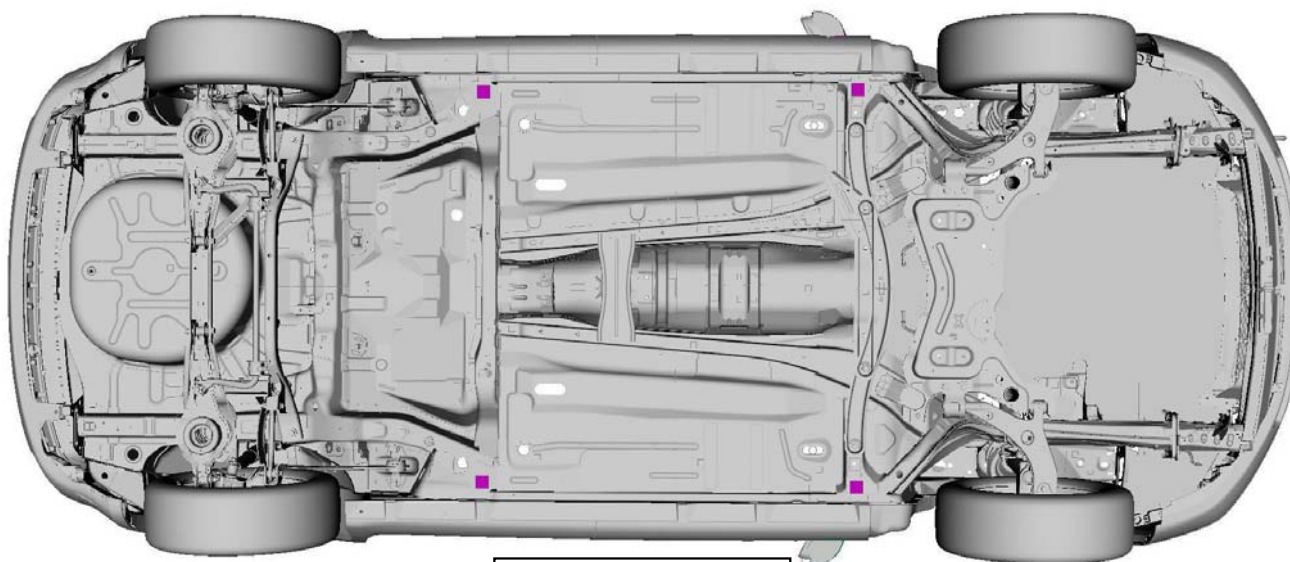
Lifting

CAUTIONS:

⚠ When lifting the vehicle with a two post lift, vehicle lift arm adapters must be used under the lifting points.

⚠ When lifting the vehicle with a two post lift, the maximum curb weight must not be exceeded.

⚠ It is important that only the correct lifting and support locations are used at all times.



E57512

SECTION 100-04 Noise, Vibration and Harshness

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Know the History of the System.....	100-04-2
Know the History of the Condition.....	100-04-2
Know the Probability of Certain Conditions Developing.....	100-04-2
Do Not Cure the Symptom and Leave the Cause.....	100-04-2
Be Positive the Cause is Found.....	100-04-2
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DESCRIPTION AND OPERATION**Noise, Vibration and Harshness (NVH)**

Noise, vibration and harshness (NVH) is becoming more important as vehicles become more sophisticated and passenger comfort levels increase. This section is designed to aid in the diagnosis and testing and repair of NVH concerns.

- Noise is defined as sounds not associated with the operation of passenger compartment equipment that interface with customer satisfaction.
- Vibration is defined as impulses felt by the customer that are not caused by road surface changes.
- Harshness is a ride quality issue where the customer feels that the vehicle response to the road surface is sharply transmitted to the customer.

Diagnostic Theory

Diagnosis is more than just following a series of interrelated steps in order to find the solution to the specific condition. It is a way of looking at systems that are not functioning the way they should and finding out why. Also it is knowing how the system should work and whether it is working correctly.

There are basic rules for diagnosis. If these rules are followed, the cause of the condition is usually found the first time through the system.

Know the System

- Know how the parts go together.
- Know how the system operates as well as its limits and what happens when the system goes wrong.
- Sometimes this means checking the system against one that is known to be working correctly.

Know the History of the System

A clue in any one of these areas may save time:

- How old or new is the system?
- What kind of treatment has it had?
- Has it been serviced in the past in such a manner that might relate to the present condition?
- What is the service history?

Know the History of the Condition

- Did it start suddenly or appear gradually?
- Was it related to some other occurrence such as a collision or previous part replacement?
- Know how the condition made itself known; it may be an important clue to the cause.

Know the Probability of Certain Conditions Developing

- Look for the simple rather than the complex.
- For example:
 - Electrical conditions usually occur at connections rather than components.
 - An engine no-start is more likely to be caused by a loose wire or small adjustment rather than a sheared-off camshaft.
- Know the difference between impossible and improbable. Certain failures in a system can be improbable but still happen.
- New parts are just that, new. It does not mean they are always good functioning parts.

Do Not Cure the Symptom and Leave the Cause

Lowering the pressure in a front tire may correct the condition of a vehicle leaning to one side, but it does not correct the original condition.

Be Positive the Cause is Found

- Double check findings.
- What caused a worn component?
- A loose transmission or engine mount could indicate that other mounts are also loose.

Diagnostic Charts

Charts are a simple way of expressing the relationship between basic logic and a physical system of components. They help discover the cause of a condition in the least time. Diagnostic charts combine many areas of diagnosis into one visual display:

DESCRIPTION AND OPERATION

- Probability of certain things occurring in a system.
- Speed of checking certain components or functions before others.
- Simplicity of performing certain tests before others.
- Elimination of checking huge portions of a system by performing simple tests.
- Certainty of narrowing down the search to a small portion before performing in-depth testing.

The fastest way to find a condition is to work with the tools that are available. This means working with proven diagnostic charts and the correct special equipment for the system.

DIAGNOSIS AND TESTING**Noise, Vibration and Harshness (NVH)****Inspection and Verification**

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.
3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the concern is not visually evident, verify the **symptom and REFER to the Symptom Chart.**

How to Use this Diagnostic Procedure Section

- Noise, vibration and harshness (NVH) concerns have become more important as vehicles have become more sensitive to these vibrations. This section is designed to aid in identifying these concerns.
- The section provides diagnostic procedures based on symptom. If the condition occurs at high speed, for instance, the most likely place to start is under Shake and Vibration While Driving.
- The road test procedure will tell how to sort the conditions into categories and how to tell a vibration from a shake.
- A series of Road Test Quick Checks are provided to make sure that a cause is either pinpointed or eliminated.
- Name the condition, proceed to the appropriate section and locate the correct diagnosis. When the condition is identified, the job is partly done.
- Follow the diagnostic procedure as outlined.
- Quick Checks are described within the step, while more involved tests and adjustments are outlined in General Procedures.
- Always follow each step exactly and make notes to recall important findings later.

Customer Interview

The road test and customer interview (if available) provide information that will help identify the concern and will provide direction to the correct starting point for diagnosis.

Identify the Condition

NVH usually occur in four areas:

- tires
- engine accessories
- suspension
- driveline

It is important, therefore, that an NVH concern be isolated into its specific area(s) as soon as possible. The easiest and quickest way to do this is to carry out the Road Test as outlined. To assist in the diagnosis and testing procedure(s), use a suitable approved NVH diagnosis tester.

Noise Diagnostic Procedure**Non-Axle Noise**

The five most common sources of non-axle noise are exhaust, tires, roof racks, trim panels and transmission.

Therefore, make sure that none of the following conditions are the cause of the noise before proceeding with a driveline teardown and diagnosis.

- In certain conditions, the pitch of the exhaust may sound very much like gear noise. At other times, it can be mistaken for a wheel bearing rumble.
- Tires, especially snow tires, can have a high pitched tread whine or roar, similar to gear noise. Radial tires may have this characteristic. Also, any non-standard tire with an unusual tread construction may emit a roar or whine noise.
- Trim panels can also cause whistling or whining noise.
- Clunk may be a metallic noise heard when the automatic transaxle is engaged in "R" (REVERSE) or "D" (DRIVE) or it may occur when the throttle is applied or released. It is caused by backlash somewhere in the driveline.
- Bearing rumble sounds like marbles being tumbled. This condition is usually caused by a damaged wheel bearing.

DIAGNOSIS AND TESTING

Noise Conditions

- Gear noise is typically a howling or whining due to gear damage or incorrect bearing preload. It can occur at various speeds and driving conditions, or it can be continuous.
- Chuckle is a particular rattling noise that sounds like a stick against the spokes of a spinning bicycle wheel. It occurs while decelerating from 64 km/h (40 mph) and can usually be heard all the way to a stop. The frequency varies with vehicle speed.
- Knock is very similar to chuckle, though it may be louder and occurs on acceleration or deceleration. The teardown will disclose what has to be corrected.

Clicking, popping or grinding noises may be caused by the following:

- worn, damaged or incorrectly installed wheel bearing, suspension or brake component.

Check and rule out tires, exhaust and trim items before disassembling the transmission to diagnose and correct gear noise.

The noises described under Road Test usually have specific causes that can be diagnosed by observation as the unit is disassembled. The initial clues are the type of noise heard on the road test and driving conditions.

Vibration Conditions

Vibration at highway speeds may be caused by the following:

- out-of-balance front or rear wheels.
- out-of-round tires.

Shudder or vibration during acceleration may be caused by the following:

- damaged powertrain/drivetrain mounts.
- excessively high constant velocity (CV) joint operating angles caused by incorrect ride height. Check ride height, verify correct spring rate and check items under inoperative conditions.

Road Test

A gear-driven unit will produce a certain amount of noise. Some noise is acceptable and may be audible at certain speeds or under various driving

conditions, as on a newly paved asphalt road. The slight noise is in no way detrimental and must be considered normal.

The road test and customer interview (if available) provide information needed to identify the condition and give direction to the correct starting point for diagnosis.

1. Make notes throughout the diagnosis routine. Make sure to write down even the smallest bit of information, because it may turn out to be the most important.
2. Do not touch anything until a road test and a thorough visual inspection of the vehicle have been carried out. Leave the tire pressures and vehicle load just where they were when the condition was first observed. Adjusting tire pressures, vehicle load or making other adjustments may reduce the condition(s) intensity to a point where it cannot be identified clearly. It may also inject something new into the system, preventing correct diagnosis.
3. Make a visual inspection as part of the preliminary diagnosis routine, writing down anything that does not look right. Note tire pressures, but do not adjust them yet. Note leaking fluids, loose nuts and bolts, or bright spots where components may be rubbing against each other. Check the load space for unusual loads.
4. Road test the vehicle and define the condition by reproducing it several times during the road test.
5. Carry out the Road Test Quick Checks as soon as the condition is reproduced. This will identify the correct diagnostic procedure. Carry out the Road Test Quick Checks more than once to verify they are providing a valid result. Remember, the Road Test Quick Checks may not tell where the concern is, but they will tell where it is not.

Road Test Quick Checks

1. 24-80 km/h (15-50 mph): with light acceleration, a moaning noise is heard and possibly a vibration felt in the front floor panel. It is usually worse at a particular engine speed and at a particular throttle setting during acceleration at that speed. It may also produce a moaning sound, depending on what component is causing it. REFER to Tip-in Moan in the Driveline Noise and Vibration Symptom Chart.

DIAGNOSIS AND TESTING

2. Acceleration/Deceleration: With slow acceleration and deceleration, a shake is sometimes noticed in the steering wheel/column, seats, front floor panel, front door trim panel or front end sheet metal. It is a low frequency vibration (around 9-15 cycles per second). It may or may not be increased by applying the brakes lightly. REFER to Idle Boom/Shake/Vibration in the Driveline Noise and Vibration Symptom Chart.
3. High Speed: A vibration is felt in the front floor panel or seats with no visible shake, but with an accompanying sound or rumble, buzz, hum, drone or booming noise. Coast with the clutch pedal depressed (manual transmission) or shift control selector lever in "N" (NEUTRAL) (automatic transmission) and engine idling. If vibration is still evident, it may be related to wheels, tires, front brake discs, wheel hubs or front wheel bearings. REFER to Shake and Vibration While Driving in the Driveline Noise and Vibration Symptom Chart.
4. Engine rpm Sensitive: A vibration is felt whenever the engine reaches a particular rpm. It will disappear in neutral coasts. The vibration can be duplicated by operating the engine at the problem rpm while the vehicle is stationary. It can be caused by any component, from the accessory drive belt to the clutch or torque converter which turns at engine speed when the vehicle is stopped. REFER to Shake and Vibration While Driving in the Driveline Noise and Vibration Symptom Chart.
5. Noise and Vibration While Turning: Clicking, popping or grinding noises may be due to the following:
 - worn, damaged or incorrectly installed front wheel bearing.
 - damaged powertrain/drivetrain mounts.

Road Conditions

An experienced technician will always establish a route that will be used for all NVH diagnosis road tests. The road selected should be reasonably smooth, level and free of undulations (unless a particular condition needs to be identified). A smooth asphalt road that allows driving over a range of speeds is best. Gravel or bumpy roads are unsuitable because of the additional road noise

produced. Once the route is established and consistently used, the road noise variable is eliminated from the test results.

NOTE: Some concerns may be apparent only on smooth asphalt roads.

If a customer complains of a noise or vibration on a particular road and only on a particular road, the source of the concern may be the road surface. If possible, try to test the vehicle on the same type of road.

Vehicle Preparation

Carry out a thorough visual inspection of the vehicle before carrying out the road test. Note anything which is unusual. Do not repair or adjust any condition until the road test is carried out, unless the vehicle is inoperative or the condition could pose a hazard to the technician. After verifying that the condition has been corrected, make sure all components removed have been installed.

Power Steering Conditions

Check for the noise in the following conditions to verify the customer concern.

- Check for the noise in several temperature conditions.
- Is the noise from when the vehicle was new?
- Can the noise be repeated constantly or is it random?
- Check the condition of the vehicle age, mileage and service record.
- Interview the customer to find the operating condition in which the noise will occur. Test the vehicle based on the detail(s) from the customer interview.
- Follow the power steering operation noise condition tables below, to find which condition the noise will occur.

Power Steering Operation Noise Check

Step 1: Check for NVH concerns from non-steering components, which may sound like noises coming from the steering system.

DIAGNOSIS AND TESTING

Power assisted steering operating condition			
Parking		Driving	
Steering central/slightly off center	Steering at a steering lock stop	Driving straight ahead	Cornering condition
REFER to NVH concerns from other components column A	REFER to NVH concerns from other components column B	REFER to NVH concerns from other components column C	REFER to NVH concerns from other components column D

NVH concerns from other components

NVH concerns from other condition (column A to D)					
Noise	Driving Condition	A	B	C	D
Pedal box knocking	Drive off, stop driving and slow cornering over uneven roads	X	X	O	X
Stabilizer bar link knocking	Drive off, driving and cornering	X	O	O	X
Engine support insulator knocking	Drive off, driving, acceleration and deceleration	X		X	
Air conditioning knocking	Engine on, activate switch for air conditioning	X	X	O	O
Suspension knocking (Subframe, Springs)	Drive off, driving, cornering, acceleration and deceleration	X		O	X
Constant velocity (CV) joint knocking	Drive off, driving, cornering, acceleration and deceleration	X	O		X
Washer bottle	Deceleration, acceleration and single impact	O		X	
Loose suspension bolts	All driving conditions	O		O	X
Instrument panel rattle/squeak	All driving conditions. Engine rpm dependant	X	X	X	X

- X = Noise will most likely occur in this operating condition.
- O = Noise can possibly occur in this operating condition.
- Blank = Noise is unlikely to occur in this operating condition.

Step 2: Check for steering system NVH concerns according to operation condition described at the customer interview.

Power assisted steering operating condition					
Parking		Driving		Vehicle stationary with engine off	
Steering central/slightly off center	Steering at a steering lock stop	Steering central/slightly off center	Steering at a steering lock stop	Steering central/slightly off centre	Steering at a steering lock stop

DIAGNOSIS AND TESTING

Power assisted steering operating condition					
Parking		Driving		Vehicle stationary with engine off	
REFER to steering system NVH concerns column A	REFER to steering system NVH concerns column B	REFER to steering system NVH concerns column C	REFER to steering system NVH concerns column D	REFER to steering system NVH concerns column E	REFER to steering system NVH concerns column F

Steering system NVH concerns

Steering System operation condition (column A to F)							
Noise	Driving condition	A	B	C	D	E	F
Moan	Parking between lock stops, at engine idle and also increased engine speed	X	O				
Whine	Driving, high engine rpm. Must be present from new	O	O	X	X		
Hiss	a) Parking between lock stops. Must be present from new	X	X	O	O		
	b) Holding steering wheel against lock stops. Must be present from new		X				
Lock stop impact knock	a) Parking at lock stop. Must be present from new		X				X
Mechanical knock (power assisted steering (PAS) off)	b) Parking between lock stops, engine OFF. Must be present from new					X	
Mechanical Knock (PAS on)	c) Parking between lock stops, engine ON (ball joint knock)	X					
Hammer knock	d) Parking into lock stop and release (vehicle with hydraulic power assisted steering (HPAS) only, not for vehicles with electro-hydraulic power assisted steering (EHPAS))		X				
Hydraulic knock (clonk)	e) Driving, cobble stones, rough road (clonk). Must be present from new			O	X		
Column knock	f) Parking, driving. cobble stones and rough roads	X	X	O	X	X	X
Column rattle	Mainly driving on rough roads	O		X	X	O	
Toc-toc	Steering left and right at high frequency. Must be present from new	X					
Grinding	When turning steering wheel	X			O	X	
Zip	At engine start, low temperatures below -10°C only	X	O				

- X = Noise will most likely occur in this operating condition.
- O = Noise can possibly occur in this operating condition.
- Blank = Noise is unlikely to occur in this operating condition.

DIAGNOSIS AND TESTING

Step 3: According to each identified operating condition (Column A, B, C, D, E, F), check each possible Steering System NVH concern with the detail symptom charts below.

Before conducting a vehicle test to identify a NVH concern carry out the following checks.

1. Check the tire pressures and adjust to specification, as necessary.
2. Make sure the steering system fluid is correct, the system is free of leaks and is operating correctly.
3. Make sure the vehicle steering system temperature is the same as described at the customer interview.
4. All evaluations must take place in a relatively quiet location.
5. The heating - air conditioning (A/C) fan and radio must be turned off during evaluations and the windows closed.

Symptom Chart

Power Steering Moan Noise

Test Condition

Listen for steering moan noise with the vehicle parked, transmission in neutral and all windows closed in the following test conditions.

1. Engine speed at idle with no steering action.
2. Engine speed at idle with slow 90 degrees per second turning of the steering wheel.
3. Engine speed at 1250 +/- 50 rpm with no steering action.
4. Engine speed at 1250 +/- 50 rpm with slow 90 degrees per second turning of the steering wheel.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
Power steering system moan noise – A continuous low pitched humming noise occurs when the steering wheel is turned and the steering system is loaded. Noise frequency changes with engine rpm changes. Particularly annoying at lower engine speed.	Power steering lines.	<ul style="list-style-type: none"> CHECK the routing of the power steering lines. CHECK the power steering line clamps are secure. CHECK the power steering lines for clearance from the vehicle body, front axle cross-member and steering gear.
	Incorrect power steering fluid.	<p>FLUSH the power steering system. REFER to: (211-00)</p> <p>Power Steering System Flushing - 1.8L Duratec-HE (M14)/1.8L Duratec-SCi (M14)/2.0L Duratec-HE (M14) (General Procedures),</p> <p>Power Steering System Flushing - 3.0L Duratec-SE (VE6)/2.5L Duratec-VE (VE6)/3.0L Duratec-ST (VE6) (General Procedures),</p> <p>Power Steering System Flushing - 2.0L Duratorq-Di/TDDi (Puma) Diesel/2.0L Duratorq-TDCi (Puma) Diesel/2.2L Duratorq-TDCi (Puma) Diesel (General Procedures).</p>
	Power steering pump.	Pressure pulses from the power steering pump. Certain amount of noise level acceptable, not a safety critical item.

Power Steering Whine Noise**Test Condition**

Listen for steering whine noise with the vehicle parked, transmission in neutral and all windows closed in the following test conditions.

1. Engine speed at 1800 +/- 50 rpm with no steering action.
2. Engine speed at 1800 +/- 50 rpm with slow 90 degrees turning of the steering wheel.
3. Engine speed at 3000 +/- 50 rpm with no steering action.
4. Engine speed at 3000 +/- 50 rpm with slow 90 degrees turning of the steering wheel.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
Power steering system whine noise – a high pitched buzzing sound like an electric motor or drill. Whine occurs at the higher engine rpm, 1500 - 5000 rpm, frequency does not change if system is loaded or not loaded.	Power steering fluid aeration.	BLEED the power steering system. REFER to: Power Steering System Bleeding - 1.6L Duratec-16V (Sigma) (211-00 Steering System - General Information, General Procedures).
	Incorrect power steering fluid.	FLUSH the power steering system. REFER to: (211-00) Power Steering System Flushing - 1.8L Duratec-HE (MI4)/1.8L Duratec-SCi (MI4)/2.0L Duratec-HE (MI4) (General Procedures), Power Steering System Flushing - 3.0L Duratec-SE (VE6)/2.5L Duratec-VE (VE6)/3.0L Duratec-ST (VE6) (General Procedures), Power Steering System Flushing - 2.0L Duratorq-Di/TDDi (Puma) Diesel/2.0L Duratorq-TDCi (Puma) Diesel/2.2L Duratorq-TDCi (Puma) Diesel (General Procedures).
	Overheated power steering fluid.	FLUSH the power steering system. REFER to: (211-00) Power Steering System Flushing - 1.8L Duratec-HE (MI4)/1.8L Duratec-SCi (MI4)/2.0L Duratec-HE (MI4) (General Procedures), Power Steering System Flushing - 3.0L Duratec-SE (VE6)/2.5L Duratec-VE (VE6)/3.0L Duratec-ST (VE6) (General Procedures), Power Steering System Flushing - 2.0L Duratorq-Di/TDDi (Puma) Diesel/2.0L Duratorq-TDCi (Puma) Diesel/2.2L Duratorq-TDCi (Puma) Diesel (General Procedures).
	Hydraulic operating condition of the power steering pump.	Certain amount of noise level acceptable, not a safety critical item.

DIAGNOSIS AND TESTING**Power Steering Hiss Noise**

Listen for steering hiss noise with the vehicle parked, transmission in neutral and all windows closed in the following test conditions.

Test Condition

Symptom	Possible Sources	Action
<p>NOTE: Engine speed at idle turning the steering wheel slowly lock to lock.</p> <p>Power steering system hiss noise – a high frequency, continuous rush or swish noise like escaping air from a balloon. Hiss occurs while turning between the steering lock stops, all steering angles. Noise does not change with engine rpm and is worse at high operating temperatures.</p>	Floor seal.	CHECK the installation and potential damage of the floor seal.
	Power steering gear valve design.	Certain amount of noise level acceptable, not a safety critical item.
	Power steering system hydraulic design.	Certain amount of noise level acceptable, not a safety critical item.
<p>NOTE: Engine speed at idle holding the steering wheel against a steering lock for three seconds. Do not hold for more than five seconds.</p> <p>Power steering system hiss noise – a continuous noise like escaping air occurs while holding the steering against a steering lock stop.</p>	Power steering pump pressure relief valve.	Certain amount of noise level acceptable, not a safety critical item.

Power Steering Lock Stop Impact Knock Noise

1. Turn the steering wheel to the left-hand and right-hand steering locks and listen for the impact noise.

Test Condition

Listen for steering knock noise with the engine speed at idle in the following test conditions (noise also apparent with engine off).

Symptom	Possible Sources	Action
Power steering system knock noise – a heavy loud sound like a knock on a door that occurs in parking condition when hitting the lock stop.	Power steering gear mechanical noise, metal to metal at end of steering travel.	Certain amount of noise level acceptable, not a safety critical item.

Power Steering Mechanical Knock Noise (PAS off)

1. Turn the steering wheel 90 degrees to the right, hold and then quickly release.
2. Turn the steering wheel 90 degrees to the left, hold and then quickly release.

Test Condition

Listen for steering knock noise with the engine off in the following test conditions (no power assist).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
Power steering system knock noise – a heavy loud repeating sound like a knock on a door that occurs in several driving and steering conditions.	Power steering system knock noise – a damped, metallic knock noise which only occurs at steering condition with engine off (very high efforts).	Certain amount of noise level acceptable, not a safety critical item.
	Tolerances in the steering gear components.	Certain amount of noise level acceptable, not a safety critical item.

Power Steering Mechanical Knock Noise (PAS on)

1. Turn the steering wheel to a steering lock and return to center quickly.
2. Turn the steering wheel 90 degrees to the left and then 90 degrees to the right quickly.

Test Condition

Listen for steering knock noise with the engine speed at idle in the following test conditions (power assist).

Symptom	Possible Sources	Action
Power steering system knock noise – clear knock noise from steering gear linkage area.	Worn tie-rod ball joints (inner and outer ball joints).	REFER to Steering System. REFER to: Steering System - 1.6L (Z6) (211-00 Steering System - General Information, Diagnosis and Testing).

Power Steering Hammer Knock (Hydraulic) Noise

1. Turn the steering wheel to a steering lock position and return quickly.

Test Condition

Listen for steering knock noise with the engine speed at idle in the following test conditions (for vehicles with hydraulic power assisted steering only, not electro-hydraulic power steering).

Symptom	Possible Sources	Action
Power steering system knock noise – loud, metallic sound if hitting the suspension cross-member with a hammer (sounds like metallic noise but is created by pressure impulse in gear and return line).	Hydraulic noise created by pressure impulses.	Certain amount of noise level acceptable, not a safety critical item.

Power Steering Hydraulic Knock/Clonk Noise

1. Drive over cobbled roads at low speed 10-30 km/h (6-20 mph) with and without turning.
2. Drive over straight tar strips road rails or 25 mm tall harshness strips at low speed 10-30 km/h (6-20 mph) both driving straight and with moderate turning.

Test Condition

Listen for steering knock/clonk noise in the following test conditions with the windows closed.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
Power steering system knock/clonk noise – sounds almost identical to column knock that occurs when driving and cornering over cobbled stones or rough roads. Noise may appear to emanate from a location closer to the floor than that for column knock (Sounds like metallic noise but is created by pressure impulse in gear and return line – similar to a sound like quickly turning off a water tap).	Power steering return lines.	Certain amount of noise level acceptable, not a safety critical item.
	High power assist gain of power steering gear valve (steering gear design - no quality issue).	Certain amount of noise level acceptable, not a safety critical item.
	High power steering pump flow rate (by design).	Certain amount of noise level acceptable, not a safety critical item.

Power Steering Column Knock Noise

Test Condition

Listen for steering knock noise in the following test conditions with windows closed.

1. Drive over cobbled stones at low speed 16-40 km/h (10-25 mph) with and without steering input carefully listening for knock sounds.
2. Drive over straight tar strips, road rails or 25 mm tall harshness strips at low speed 16-40 km/h (10-25 mph) both driving straight and with moderate cornering.

Symptom	Possible Sources	Action
Power steering system column knock noise – a loose sounding rattle or vibration coming from the column. Noticeable by hearing and touch.	Steering column or steering column shaft.	CHECK the steering column retaining bolts and attachments to the steering column and secure if necessary. REFER to: Specifications (211-04 Steering Column, Specifications).
		Check steering column and intermediate shaft for free play or loose components. REFER to: Steering System - 1.6L (Z6) (211-00 Steering System - General Information, Diagnosis and Testing).

Power Steering Toc-Toc Noise

Test Condition

Listen for steering toc-toc noise with the engine speed at idle and the vehicle parked, automatic transmission in "P" (PARK) or manual transmission in neutral and the windows closed.

1. Turn the steering wheel from left to right abruptly changing direction.
2. Drive the vehicle for low speed parking manoeuvres constantly changing steering direction.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
Power steering system toc-toc noise – a metallic noise created when changing direction of steering wheel rotation during parking manoeuvre or at stand-still.	Steering gear (design tolerance in steering rack).	Certain amount of noise level acceptable, not a safety critical item.

Power Steering Grinding Noise**Test Condition**

Listen for steering grinding noise with the engine speed at idle and the vehicle parked, automatic transmission in "P" (PARK) or manual transmission in neutral and the windows closed.

1. Slowly turn the steering wheel from lock to lock.
2. Tilt and extend the steering column in various positions and slowly turn the steering wheel from lock to lock.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
Power steering system grinding noise – an abrasive noise (like sand paper rubbing against wood) occurs between moving components such as steering wheel and the steering column shroud.	Steering wheel to shroud interference.	Certain amount of noise level acceptable, not a safety critical item.
	Steering column bearing.	Certain amount of noise level acceptable, not a safety critical item.
	Foreign material in contact with the steering column shaft.	CHECK if floor covering is obstructing the steering gear pinion.
		CHECK the installation of the floor seal.
Clockspring.	CHECK the clockspring and secure if necessary. REFER to: Clockspring (501-20 Supplemental Restraint System, Removal and Installation).	

Power Steering Zip Noise

Symptom	Possible Sources	Action
Power steering system zip noise – occurs when hydraulic fluid does not flow freely through the power steering pump supply hose from steering fluid reservoir to power steering pump causing cavitation at the pump. Zip is primarily a cold weather start-up phenomenon (below -10°C).	High viscosity of power steering fluid at low temperature.	Certain amount of noise level acceptable, not a safety critical item.
	Aeration of the power steering fluid.	BLEED the power steering system. REFER to: Power Steering System Bleeding - 1.6L Duratec-16V (Sigma) (211-00 Steering System - General Information, General Procedures).

Driveline Noise and Vibration

Symptom	Possible Sources	Action
Shake and vibration while driving	<ul style="list-style-type: none"> Wheel end vibration. Engine/transmission. 	GO to Pinpoint Test A.
Tip-in moan	<ul style="list-style-type: none"> Air cleaner. Power assisted steering. Powertrain. Powertrain/drivetrain mounts. Exhaust system. 	GO to Pinpoint Test B.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
Idle boom/shake/vibration/shudder	<ul style="list-style-type: none"> • Cable(s)/hose(s). • Powertrain/drivetrain mounts. • Exhaust system. • Belt/pulleys. 	GO to Pinpoint Test C.

Suspension Noise and Vibration

Symptom	Possible Sources	Action
Wheel end vibration analysis	<ul style="list-style-type: none"> • Suspension. • Wheel bearings. 	GO to Pinpoint Test D.
Non-axle noise	<ul style="list-style-type: none"> • Trim panels. • Air conditioning (A/C) system. • Accessories. 	GO to Pinpoint Test E.

Pinpoint Tests

NOTE: These Pinpoint Tests are designed to take the technician through a step-by-step diagnosis procedure to determine the cause of a condition. It may not always be necessary to follow the chart to its conclusion. Carry out only the pinpoint test

steps necessary to correct the condition. Then check the operation of the system to make sure the condition has been corrected.

After verifying that the condition has been corrected, make sure all components removed have been installed.

PINPOINT TEST A : SHAKE AND VIBRATION WHILE DRIVING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: NEUTRAL COAST	
	<ol style="list-style-type: none"> 1 Carry out the neutral coast test. <ul style="list-style-type: none"> • Does the vibration disappear during the neutral coast test? → Yes GO to A2. → No GO to Pinpoint Test D.
A2: CHECK THE POWERTRAIN/DRIVETRAIN MOUNTS	
	<ol style="list-style-type: none"> 1 Carry out the powertrain/drivetrain mount neutralizing procedure <ul style="list-style-type: none"> • Are the mounts OK? → Yes Vehicle condition corrected. ROAD TEST as necessary. → No INSTALL new powertrain/drivetrain mounts as necessary. ROAD TEST as necessary.

DIAGNOSIS AND TESTING

PINPOINT TEST B : TIP-IN MOAN

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK THE AIR CLEANER	
	<p>1 Check the condition of the air cleaner mounts, inlet tube, outlet tube, resonators and all other components associated with the air induction system for correct installation and tightness of all connections.</p> <ul style="list-style-type: none"> • Are the components OK? <p>→ Yes GO to B2.</p> <p>→ No REPAIR or INSTALL new components as necessary. ROAD TEST as necessary.</p>
B2: CHECK THE EXHAUST SYSTEM	
	<p>1 Carry out the exhaust system neutralizing procedure.</p> <p>REFER to: Clockspring (501-20 Supplemental Restraint System, Removal and Installation).</p> <ul style="list-style-type: none"> • Is the exhaust system OK? <p>→ Yes GO to B3.</p> <p>→ No REPAIR as necessary. ROAD TEST as necessary.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B3: CHECK THE POWER STEERING	
	<p>1 Remove the accessory drive belt and test for tip-in moan. REFER to: (303-05 Accessory Drive)</p> <p>Accessory Drive Belt - Vehicles Built Up To: 02/2008 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (Removal and Installation), Accessory Drive Belt - 3.0L Duratec-SE (VE6)/2.5L Duratec-VE (VE6)/3.0L Duratec-ST (VE6) (Removal and Installation), Accessory Drive Belt - 2.0L Duratorq-Di/TDDi (Puma) Diesel/2.0L Duratorq-TDCi (Puma) Diesel/2.2L Duratorq-TDCi (Puma) Diesel (Removal and Installation).</p> <ul style="list-style-type: none"> • Is the tip-in moan OK? <p>→ Yes REPAIR the power steering as necessary.</p> <p>REFER to: Steering System - 1.6L (Z6) (211-00 Steering System - General Information, Diagnosis and Testing).</p> <p>→ No GO to B4.</p>
B4: CHECK THE POWERTRAIN/DRIVETRAIN MOUNTS	
	<p>1 Carry out the powertrain/drivetrain mount neutralizing procedure</p> <ul style="list-style-type: none"> • Are the powertrain/drivetrain mounts OK? <p>→ Yes Vehicle condition corrected. ROAD TEST as necessary.</p> <p>→ No INSTALL new powertrain/drivetrain mounts as necessary. ROAD TEST as necessary.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST C : IDLE BOOM/SHAKE/VIBRATION/SHUDDER

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: CHECK THE CABLE/HOSES	
	<p>1 Check the engine compartment for any component that may have a touch condition between the engine and body or chassis. For example: control cable, air conditioning (A/C) hoses, acceleration cable.</p> <ul style="list-style-type: none"> • Are the components OK? <p>→ Yes GO to C2.</p> <p>→ No REPAIR or INSTALL new components as necessary. ROAD TEST as necessary.</p>
C2: CHECK THE ENGINE COOLING RADIATOR	
	<p>1 Check the engine cooling radiator mountings and bushings for security and condition. Check the radiator installation for any component that may have a touch condition.</p> <ul style="list-style-type: none"> • Is the installation and bushings OK? <p>→ Yes GO to C3.</p> <p>→ No REPAIR or INSTALL new components as necessary. ROAD TEST as necessary.</p>
C3: CHECK THE EXHAUST SYSTEM	
	<p>1 Carry out the exhaust system neutralizing procedure.</p> <p>REFER to: Clockspring (501-20 Supplemental Restraint System, Removal and Installation).</p> <ul style="list-style-type: none"> • Is the exhaust system OK? <p>→ Yes GO to C4.</p> <p>→ No REPAIR as necessary. ROAD TEST as necessary.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C4: CHECK THE POWERTRAIN/DRIVETRAIN MOUNTS	
	<p>1 Carry out the powertrain/drivetrain mount neutralizing procedure</p> <ul style="list-style-type: none"> • Are the powertrain/drivetrain mounts OK? <p>→ Yes Vehicle condition corrected. ROAD TEST as necessary.</p> <p>→ No INSTALL new powertrain/drivetrain mounts as necessary. ROAD TEST as necessary.</p>

PINPOINT TEST D : WHEEL END VIBRATION ANALYSIS

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: INSPECT THE WHEELS AND TIRES	
	<p>1 Inspect the wheels and tires.</p> <p>REFER to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).</p> <ul style="list-style-type: none"> • Are the wheels and tires OK? <p>→ Yes GO to D2.</p> <p>→ No INSTALL new wheels or tires as necessary.</p> <p>REFER to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation). ROAD TEST as necessary.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D2: INSPECT THE WHEEL BEARINGS	
	<p>1 Inspect the wheel bearings.</p> <p>REFER to: Climate Control System (412-00 Climate Control System - General Information, Diagnosis and Testing).</p> <ul style="list-style-type: none"> • Are the wheel bearings OK? <p>→ Yes GO to D3.</p> <p>→ No INSTALL new wheel bearings as necessary. REFER to:</p> <p>Wheel Bearing (204-01 Front Suspension, Removal and Installation), Wheel Bearing - 2.0L Duratorq-Di/TDDi (Puma) Diesel/2.0L Duratorq-TDCi (Puma) Diesel, Vehicles With: 5-Speed Automatic Transaxle (5F31J) (204-01 Front Suspension, Removal and Installation), Wheel Hub (204-02 Rear Suspension, Removal and Installation). ROAD TEST as necessary.</p>
D3: INSPECT THE WHEEL AND TIRE RUNOUT	
	<p>1 Inspect the wheel and tire runout.</p> <ul style="list-style-type: none"> • Is the wheel and tire runout OK? <p>→ Yes Balance the wheels and tires. Refer to the wheel balance equipment manufacturer's instructions. ROAD TEST as necessary.</p> <p>→ No INSTALL new wheels or tires as necessary. REFER to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation). ROAD TEST as necessary.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST E : NON-AXLE NOISE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: INSPECT THE VEHICLE TRIM	
	<p>1 Check the radiator grille and trim panels to see if they are the source of the noise.</p> <ul style="list-style-type: none"> Are the vehicle trim components causing the noise? <p>→ Yes INSTALL new trim components or REPAIR as necessary. ROAD TEST as necessary.</p> <p>→ No GO to E2.</p>
E2: CHECK THE AIR CONDITIONING (A/C) SYSTEM FOR NOISE	
	<p>1 Ignition switch in position III.</p> <p>2 Ignition switch in position II.</p> <p>3 Check the A/C system components for noise by turning the A/C system on and off.</p> <ul style="list-style-type: none"> Is the A/C system causing the noise? <p>→ Yes INSPECT the A/C system. REFER to: (412-00 Climate Control System - General Information)</p> <p>Climate Control System (Diagnosis and Testing), Climate Control System (Diagnosis and Testing). ROAD TEST as necessary.</p> <p>→ No GO to E3.</p>
E3: CHECK NON-FACTORY FITTED ACCESSORIES	
	<p>1 Check any non-factory installed accessories for being the source of the noise. For example: touch condition body-to-frame, antennas, deflectors and fog lights.</p> <ul style="list-style-type: none"> Are the accessories the cause of the noise? <p>→ Yes ADJUST, REPAIR, or INSTALL new accessories or fasteners as required. ROAD TEST as necessary.</p> <p>→ No VERIFY the customer concern.</p>

GENERAL PROCEDURES**Powertrain/Drivetrain Mount Neutralizing(14 001 0)**

NOTE: There is no procedure for neutralizing the powertrain/drivetrain mounts. To check the alignment of the powertrain mounts visually, proceed as follows.

1. **Loosen the rear support insulator retaining bolts (if equipped).**
2. **Loosen the powertrain/drivetrain mount retaining bolts.**
3. **NOTE: Support the powertrain/drivetrain in an approximate position and height.**

NOTE: Make sure that the right-hand mount and left-hand insulator align over the studs on the powertrain and drivetrain to allow the fixings to be assembled through the large holes in the support insulator bracket without overstraining.

Check the powertrain/drivetrain mount alignment.

4. **Tighten the powertrain/drivetrain mount to powertrain/drivetrain mount bracket retaining bolts.**
5. **Tighten the powertrain/drivetrain mount to body retaining bolts.**
6. **Tighten the rear support insulator retaining bolts (if equipped).**

GROUP

2

Chassis

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SECTION 204-00 Suspension System - General Information

VEHICLE APPLICATION:2008.75 Focus ST C307

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SPECIFICATIONS

Front Wheel Alignment (at curb weight) - 3 door, 4 door and 5 door - Vehicles with standard suspension

Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
Caster angle	Degrees and minutes	4°13' to 2°09'	3°11'	1°00'
	Decimal degrees	4.21° to 2.15°	3.18°	1.00°
Camber angle	Degrees and minutes	0°36' to -1°58'	-0°41'	1°15'
	Decimal degrees	0.60° to -1.96°	-0.68°	1.25°
Total toe	mm	0.7 Toe-in ± 1.7	0.7 Toe-in ± 1.0	-
	Degrees and minutes	0°06' Toe-in ± 0°15'	0°06' Toe-in ± 0°09'	-
	Decimal degrees	0.10° Toe-in ± 0.25°	0.10° Toe-in ± 0.15°	-

Front Wheel Alignment (at curb weight) - 3 door, 4 door and 5 door - Vehicles with sport suspension (except ST variants)

Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
Caster angle	Degrees and minutes	4°14' to 2°13'	3°14'	1°00'
	Decimal degrees	4.24° to 2.22°	3.23°	1.00°
Camber angle	Degrees and minutes	0°25' to -2°07'	-0°51'	1°15'
	Decimal degrees	0.41° to -2.11°	-0.85°	1.25°
Total toe	mm	0.7 Toe-in ± 1.7	0.7 Toe-in ± 1.0	-
	Degrees and minutes	0°06' Toe-in ± 0°15'	0°06' Toe-in ± 0°09'	-
	Decimal degrees	0.10° Toe-in ± 0.25°	0.10° Toe-in ± 0.15°	-

Front Wheel Alignment (at curb weight) - Wagon

204-00-3

Suspension System - General Information

204-00-3

SPECIFICATIONS

Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
Caster angle	Degrees and minutes	4°16' to 2°14'	3°15'	1°00'
	Decimal degrees	4.27° to 2.23°	3.25°	1.00°
Camber angle	Degrees and minutes	0°35' to -1°58'	-0°41'	1°15'
	Decimal degrees	0.58° to -1.96°	-0.69°	1.25°
Total toe	mm	0.7 Toe-in ± 1.7	0.7 Toe-in ± 1.0	-
	Degrees and minutes	0°06' Toe-in ± 0°15'	0°06' Toe-in ± 0°09'	-
	Decimal degrees	0.10° Toe-in ± 0.25°	0.10° Toe-in ± 0.15°	-

Front Wheel Alignment (at curb weight) - ST Variants

Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
Caster angle	Degrees and minutes	4°19' to 2°19'	3°19'	1°00'
	Decimal degrees	4.32° to 2.32°	3.32°	1.00°
Camber angle	Degrees and minutes	0°22' to -2°08'	-0°53'	1°15'
	Decimal degrees	0.37° to -2.13°	-0.88°	1.25°
Total toe	mm	1.6 Toe-in ± 2.0	1.6 Toe-in ± 1.2	-
	Degrees and minutes	0°12' Toe-in ± 0°15'	0°12' Toe-in ± 0°09'	-
	Decimal degrees	0.20° Toe-in ± 0.25°	0.20° Toe-in ± 0.15°	-

Front Wheel Alignment (at curb weight) - Cabriolet - Vehicles with standard suspension

Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
Caster angle	Degrees and minutes	4°29' to 2°53'	3°41'	1°00'
		4.49° to 2.89°	3.69°	1.00°

SPECIFICATIONS

Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
	Decimal degrees			
Camber angle	Degrees and minutes	0°05' to -1°23'	-0°44'	1°15'
	Decimal degrees	0.09° to -1.39°	-0.74°	1.25°
Total toe	mm	1.4 Toe-in ± 1.7	1.4 Toe-in ± 1.0	-
	Degrees and minutes	0°12' Toe-in ± 0°15'	0°12' Toe-in ± 0°09'	-
	Decimal degrees	0.20° Toe-in ± 0.25°	0.20° Toe-in ± 0.15°	-

Rear Wheel Alignment (at curb weight) - 3 door, 4 door and 5 door - Vehicles with standard suspension

Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
Camber angle	Degrees and minutes	0 to -2°35'	-1°17'	1°15'
	Decimal degrees	0 to -2.58°	-1.29°	1.25°
Total toe	mm	4.2 to 0.9	2.5 Toe-in ± 1.0	-
	Degrees and minutes	0°38' to 0°08'	0°23' Toe-in ± 0°09'	-
	Decimal degrees	0.63° to 0.13°	0.38° Toe-in ± 0.15°	-

Rear Wheel Alignment (at curb weight) - 3 door, 4 door and 5 door - Vehicles with sport suspension (except ST variants)

Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
Camber angle	Degrees and minutes	-0°08' to -2°38'	-1°23'	1°15'
	Decimal degrees	-0.14° to -2.64°	-1.39°	1.25°
Total toe	mm	4.2 to 0.9	2.5 Toe-in ± 1.0	-
	Degrees and minutes	0°38' to 0°08'	0°23' Toe-in ± 0°09'	-
		0.63° to 0.13°	0.38° Toe-in ± 0.15°	-

204-00-5

Suspension System - General Information

204-00-5

SPECIFICATIONS

Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
	Decimal degrees			

Rear Wheel Alignment (at curb weight) - Wagon with load leveling shock absorbers

Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
Camber angle	Degrees and minutes	-0°04' to -2°34'	-1°19'	1°15'
	Decimal degrees	-0.06° to -2.56°	-1.31°	1.25°
Total toe	mm	5.4 to 2.1	3.7 Toe-in ± 1.0	-
	Degrees and minutes	0°49' to 0°19'	0°34' Toe-in ± 0°09'	-
	Decimal degrees	0.81° to 0.31°	0.56° Toe-in ± 0.15°	-

Rear Wheel Alignment (at curb weight) - Wagon without load leveling shock absorbers

Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
Camber angle	Degrees and minutes	-0°04' to -2°34'	-1°19'	1°15'
	Decimal degrees	-0.06° to -2.56°	-1.31°	1.25°
Total toe	mm	4.2 to 0.9	2.5 Toe-in ± 1.0	-
	Degrees and minutes	0°38' to 0°08'	0°23' Toe-in ± 0°09'	-
	Decimal degrees	0.63° to 0.13°	0.38° Toe-in ± 0.15°	-

Rear Wheel Alignment (at curb weight) - ST Variants

Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
Camber angle	Degrees and minutes	-0°32' to -3°02'	-1°47'	1°15'
	Decimal degrees	-0.54° to -3.04°	-1.79°	1.25°
Total toe	mm	6.5 to 2.5	4.5 Toe-in ± 1.2	-
		0°49' to 0°19'	0°34' Toe-in ± 0°09'	-

SPECIFICATIONS

Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
	Degrees and minutes			
	Decimal degrees	0.81° to 0.31°	0.56° Toe-in ± 0.15°	-

Rear Wheel Alignment (at curb weight) - Cabriolet - Vehicles with standard suspension

Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
Camber angle	Degrees and minutes	-0°59' to -2°35'	-1°47'	1°15'
	Decimal degrees	-0.98° to -2.58°	-1.78°	1.25°
Total toe	mm	5.3 to 1.7	3.5 Toe-in ± 1.0	-
	Degrees and minutes	0°45' to 0°15'	0°30' Toe-in ± 0°09'	-
	Decimal degrees	0.75° to 0.25°	0.50° Toe-in ± 0.15°	-

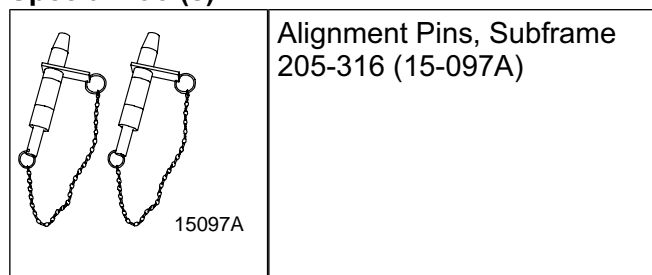
Torque Specifications

Item	Nm	lb-ft	lb-in
Tie-rod end locknut	62	46	-
Rear lower arm adjustment cam nut	90	66	-

DIAGNOSIS AND TESTING

Suspension System

Special Tool(s)



Mechanical
Wheel knuckles
Tie-rod ends
Front suspension lower arm ball joints
Front suspension lower arm bushings
Front strut and spring assemblies
Front and rear stabilizer bar and connecting links
Rear springs
Rear shock absorbers
Rear suspension lower arms

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical damage.

Visual Inspection Chart

Mechanical
Tire pressure(s)
Wheel and tires

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Symptom Chart

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • Drift left or right 	<ul style="list-style-type: none"> • Vehicle attitude incorrect (front or rear / left or right is high or low). 	<ul style="list-style-type: none"> • Vehicles without load levelling shock absorbers, CHECK for abnormal loading, spring sag or non-standard springs. • Vehicles with load levelling shock absorbers, GO to Pinpoint Test C.
	<ul style="list-style-type: none"> • Steering gear or linkage worn or damaged. 	<ul style="list-style-type: none"> • CHECK the steering system. REFER to: Steering System (211-00, Diagnosis and Testing).
	<ul style="list-style-type: none"> • Brake system. 	<ul style="list-style-type: none"> • CHECK the brake system. REFER to: Brake System (206-00, Diagnosis and Testing).
	<ul style="list-style-type: none"> • Incorrect front crossmember alignment. 	<ul style="list-style-type: none"> • Using the special tool, CHECK the front subframe alignment..
	<ul style="list-style-type: none"> • Worn front wheel bearings. 	<ul style="list-style-type: none"> • CHECK the wheel bearings.
	<ul style="list-style-type: none"> • Wheel and tires. 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Steering wheel off center 	<ul style="list-style-type: none"> Vehicle attitude incorrect (front or rear is high or low). 	<ul style="list-style-type: none"> Vehicles without load levelling shock absorbers, CHECK for abnormal loading, spring sag or non-standard springs. Vehicles with load levelling shock absorbers, GO to Pinpoint Test C.
	<ul style="list-style-type: none"> Steering gear or linkage worn or damaged. 	<ul style="list-style-type: none"> CHECK the steering system. REFER to: Steering System (211-00, Diagnosis and Testing).
	<ul style="list-style-type: none"> Suspension lower arm ball joint. 	<ul style="list-style-type: none"> CARRY OUT the Ball Joint Inspection Component Test in this procedure.
	<ul style="list-style-type: none"> Incorrect wheel alignment. 	<ul style="list-style-type: none"> ADJUST the wheel alignment. REFER to: Front Toe Adjustment (204-00, General Procedures) / Rear Toe Adjustment (204-00, General Procedures).
<ul style="list-style-type: none"> Rough ride 	<ul style="list-style-type: none"> Front strut and spring assemblies. 	<ul style="list-style-type: none"> CARRY OUT the Strut or Shock Absorber Testing component test in this procedure. CHECK and INSTALL new suspension components as necessary. REFER to: Front Strut and Spring Assembly (204-01, Disassembly and Assembly).
	<ul style="list-style-type: none"> Front or rear stabilizer bar connecting links or bushings. 	<ul style="list-style-type: none"> CHECK and INSTALL new suspension components as necessary. REFER to: Front Strut and Spring Assembly (204-01, Disassembly and Assembly), Rear Stabilizer Bar (204-02, Removal and Installation).
	<ul style="list-style-type: none"> Front suspension lower arm bushings. 	<ul style="list-style-type: none"> INSTALL a new lower arm. REFER to: Lower Arm (204-01, Removal and Installation).
	<ul style="list-style-type: none"> Rear suspension arm bushings. 	<ul style="list-style-type: none"> CHECK and INSTALL new components as necessary. REFER to: Rear Stabilizer Bar Bushing (204-02, Removal and Installation).

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Suspension System - General Information

204-00-9

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Rear shock absorbers. 	<ul style="list-style-type: none"> CARRY OUT the Strut or Shock Absorber Testing component test in this procedure. CHECK and INSTALL new suspension components as necessary.
<ul style="list-style-type: none"> Excessive noise 	<ul style="list-style-type: none"> Front strut and spring assembly or rear shock absorber and spring upper mounting bolts or nuts loose or broken. 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
	<ul style="list-style-type: none"> Shock absorbers leaking. 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
	<ul style="list-style-type: none"> Shock absorbers performance incorrect. 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
	<ul style="list-style-type: none"> Stabilizer bar components. 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
	<ul style="list-style-type: none"> Strut and spring assembly and springs. 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
	<ul style="list-style-type: none"> Springs moving on springs upper or lower seats. 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
	<ul style="list-style-type: none"> Suspension bushings. 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
	<ul style="list-style-type: none"> Lower arm ball joint. 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
	<ul style="list-style-type: none"> Worn front wheel bearings 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
	<ul style="list-style-type: none"> Wheels and tires. 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
<ul style="list-style-type: none"> Incorrect tire wear 	<ul style="list-style-type: none"> Front or rear suspension damage. 	<ul style="list-style-type: none"> CHECK and INSTALL new suspension components as necessary.
	<ul style="list-style-type: none"> Incorrect wheel alignment. 	<ul style="list-style-type: none"> ADJUST the wheel alignment. REFER to: Front Toe Adjustment (204-00, General Procedures) / Rear Toe Adjustment (204-00, General Procedures).
<ul style="list-style-type: none"> Vibration 	<ul style="list-style-type: none"> Damaged or worn front wheel bearings. 	<ul style="list-style-type: none"> CHECK the front wheel bearings.
	<ul style="list-style-type: none"> Wheels and tires. 	<ul style="list-style-type: none"> CHECK the tires. BALANCE or INSTALL new tires as necessary.
	<ul style="list-style-type: none"> Steering gear or linkage worn or damaged. 	<ul style="list-style-type: none"> CHECK the steering system. REFER to: Steering System (211-00, Diagnosis and Testing).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Front strut and spring assemblies. 	<ul style="list-style-type: none"> CARRY OUT the Strut or Shock Absorber Testing component test in this procedure. CHECK and INSTALL new suspension components as necessary. <p>REFER to: Front Strut and Spring Assembly (204-01, Removal and Installation).</p>
	<ul style="list-style-type: none"> Damaged front suspension lower arm(s). 	<ul style="list-style-type: none"> CHECK and INSTALL new suspension components as necessary. <p>REFER to: Lower Arm (204-01, Removal and Installation).</p>
<ul style="list-style-type: none"> Vehicle lean 	<ul style="list-style-type: none"> Load-levelling shock absorbers. 	<ul style="list-style-type: none"> GO to Pinpoint Test C.

Pinpoint Tests

PINPOINT TEST A : DRIFT LEFT OR RIGHT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>▲ WARNING: To avoid personal injury due to the loss of vehicle control, the inspection should be carried out by two people to maintain safe driving conditions. Adequate grip should always be maintained on the steering wheel. Failure to follow these instructions may result in personal injury.</p>	
<p>NOTE: The following conditions must be met when evaluating the vehicle.</p>	
<p>NOTE: The tire swapping procedures are for bi-directional rotating tires only.</p>	
<p>A1: SWAP THE FRONT WHEEL AND TIRE ASSEMBLIES</p>	
	<p>1 Raise and support the vehicle. REFER to: (100-02)</p> <p>Jacking (Description and Operation), Lifting (Description and Operation).</p> <ul style="list-style-type: none"> Swap the front left-hand wheel and tire assembly with the front right-hand wheel and tire assembly. Road test the vehicle. <ul style="list-style-type: none"> Does the vehicle drift? <ul style="list-style-type: none"> → Yes GO to A2. → No The concern has been corrected.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A2: SWAP THE REAR WHEEL AND TIRE ASSEMBLIES	
	<p>1 Raise and support the vehicle. REFER to: (100-02)</p> <p>Jacking (Description and Operation), Lifting (Description and Operation).</p> <ul style="list-style-type: none"> - Swap the rear left-hand wheel and tire assembly with the rear right-hand wheel and tire assembly. - Road test the vehicle. <p>• Does the vehicle drift?</p> <p>→ Yes GO to A3.</p> <p>→ No The concern has been corrected.</p>
A3: SWAP THE LEFT-HAND WHEEL AND TIRE ASSEMBLIES	
	<p>1 Raise and support the vehicle. REFER to: (100-02)</p> <p>Jacking (Description and Operation), Lifting (Description and Operation).</p> <ul style="list-style-type: none"> - Swap the front left-hand wheel and tire assembly with the rear left-hand wheel and tire assembly. - Road test the vehicle. <p>• Does the vehicle drift?</p> <p>→ Yes GO to A4.</p> <p>→ No The concern has been corrected.</p>
A4: SWAP THE RIGHT-HAND WHEEL AND TIRE ASSEMBLIES	
	<p>1 Raise and support the vehicle. REFER to: (100-02)</p> <p>Jacking (Description and Operation), Lifting (Description and Operation).</p> <ul style="list-style-type: none"> - Swap the front right-hand wheel and tire assembly with the rear right-hand wheel and tire assembly. - Road test the vehicle. <p>• Does the vehicle drift?</p> <p>→ Yes GO to A5.</p> <p>→ No The concern has been corrected.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A5: SWAP THE FRONT LEFT-HAND WHEEL AND TIRE ASSEMBLY	
	<p>1 Raise and support the vehicle. REFER to: (100-02)</p> <p>Jacking (Description and Operation), Lifting (Description and Operation).</p> <ul style="list-style-type: none"> - Swap the front left-hand wheel and tire assembly with the rear right-hand wheel and tire assembly. - Road test the vehicle. <p>• Does the vehicle drift?</p> <p>→ Yes GO to A6.</p> <p>→ No The concern has been corrected.</p>
A6: SWAP THE FRONT RIGHT-HAND WHEEL AND TIRE ASSEMBLY	
	<p>1 Raise and support the vehicle. REFER to: (100-02)</p> <p>Jacking (Description and Operation), Lifting (Description and Operation).</p> <ul style="list-style-type: none"> - Swap the front right-hand wheel and tire assembly with the rear left-hand wheel and tire assembly. - Road test the vehicle. <p>• Does the vehicle drift?</p> <p>→ Yes GO to A7.</p> <p>→ No The concern has been corrected.</p>
A7: INSTALL NEW TIRES	
NOTE: Install new tires only once.	
	<p>1 Install new tires to the four road wheels. TEST the system for normal operation.</p> <p>• Does the vehicle drift?</p> <p>→ Yes Verify possible sources, refer to the Symptom Chart.</p> <p>→ No The concern has been corrected.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST B : EXCESSIVE NOISE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: INSPECT ALL STRUT AND SPRING ASSEMBLY AND SHOCK ABSORBER MOUNTING BOLTS AND NUTS	
	<p>1 Inspect the strut and spring assembly and shock absorber mounting bolts and nuts.</p> <ul style="list-style-type: none"> • Are the mounting bolts or nuts loose or broken? <p>→ Yes TIGHTEN or INSTALL new suspension mounting bolts.</p> <p>REFER to: Specifications (204-01, Specifications).</p> <p>→ No GO to B2.</p>
B2: INSPECT THE STRUT AND SPRING ASSEMBLIES AND SHOCK ABSORBERS FOR LEAKS	
	<p>NOTE: Make sure that the oil is not from another source.</p> <p>1 Inspect the strut and spring assemblies and shock absorbers for signs of oil weepage or leaks. Refer to weepage and leakage conditions in the Strut or Shock Absorber Testing component test in this procedure.</p> <ul style="list-style-type: none"> • Are the struts or shock absorbers leaking? <p>→ Yes INSTALL new struts or shock absorbers as necessary.</p> <p>REFER to: Front Strut and Spring Assembly (204-01, Removal and Installation).</p> <p>→ No GO to B3.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B3: INSPECT THE SPRINGS AND STABILIZER BAR(S)	
	<p>1] Inspect the springs and stabilizer bar(s) for damage.</p> <ul style="list-style-type: none"> • Are the springs or stabilizer bar(s) damaged? <p>→ Yes INSTALL new springs or stabilizer bar(s). REFER to: Front Strut and Spring Assembly (204-01, Removal and Installation), Front Stabilizer Bar (204-01, Removal and Installation), Rear Stabilizer Bar Link (204-02, Removal and Installation).</p> <p>→ No GO to B4.</p>
B4: INSPECT THE SUSPENSION BUSHINGS	
	<p>1] Inspect the suspension bushings for excessive wear or damage.</p> <ul style="list-style-type: none"> • Are the bushings worn or damaged? <p>→ Yes INSTALL new components as necessary. REFER to: Lower Arm (204-01, Removal and Installation), Front Strut and Spring Assembly (204-01, Removal and Installation), Front Stabilizer Bar (204-01, Removal and Installation), Rear Stabilizer Bar Link (204-02, Removal and Installation).</p> <p>→ No GO to B5.</p>
B5: INSPECT THE SUSPENSIONS LOWER ARM BALL JOINTS	
	<p>1] Carry out the Ball Joint Inspection component test in this procedure.</p> <ul style="list-style-type: none"> • Is the lower arm ball joint or gaiter damaged? <p>→ Yes INSTALL new lower arm. REFER to: Lower Arm (204-01, Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to B6.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B6: INSPECT THE WHEEL BEARINGS	
	<p>1 Check the wheel bearings.</p> <ul style="list-style-type: none"> • Are the wheel bearings damaged? <p>→ Yes INSTALL a new wheel hub(s). REFER to: Wheel Hub (204-01, Removal and Installation).</p> <p>→ No GO to B7.</p>
B7: INSPECT THE WHEEL AND TIRES	
	<p>1 Inspect the tires for uneven wear.</p> <ul style="list-style-type: none"> • Is there uneven wear? <p>→ Yes REFER to the symptom chart.</p> <p>→ No GO to B8.</p>
B8: INSPECT THE STRUT AND SPRING ASSEMBLY AND REAR SUSPENSION SPRING INTERFACE	
	<p>1 Loosen the strut and spring assemblies and shock absorbers top and bottom mounting bolts and nuts. Tighten the mounting bolts and nuts. REFER to: Specifications (204-01, Specifications), Specifications (204-02, Specifications).</p> <ul style="list-style-type: none"> • Is the concern still evident? <p>→ Yes GO to B9.</p> <p>→ No Vehicle condition corrected.</p>
B9: INSPECT THE STRUT AND SPRING ASSEMBLIES AND SHOCK ABSORBER COMPONENTS	
	<p>1 Check that the spring is correctly located on the spring seat and has not moved.</p> <p>2 Disassemble the strut and spring and assembly and inspect the individual components. REFER to: Front Strut and Spring Assembly (204-01, Removal and Installation).</p> <p>3 Inspect the shock absorber top mount for wear or damage.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 Carry out the Strut or Shock Absorber Testing component test in this procedure.</p> <ul style="list-style-type: none"> Are any of the strut and spring assemblies or shock absorber components damaged? <p>→ Yes INSTALL new components as necessary. REFER to: Front Strut and Spring Assembly (204-01, Removal and Installation), Spring (204-02, Removal and Installation).</p> <p>→ No REINSTALL the strut and spring assemblies or shock absorbers. GO to C1.</p>

PINPOINT TEST C : VEHICLE LEAN

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: VEHICLE LEAN	
	<p>1 Detach the load levelling shock absorbers from the wheel knuckles.</p> <ul style="list-style-type: none"> Does the vehicle lean? <p>→ Yes Install new rear springs. REFER to: Spring (204-02, Removal and Installation). TEST the system for normal operation.</p> <p>→ No CARRY OUT the Load-Levelling Shock Absorber Component Test in this section.</p>

Component Tests

Raise and support the vehicle. REFER to: (100-02)

Jacking (Description and Operation),
Lifting (Description and Operation).

2. If there is any free movement install a new lower arm.

REFER to: Lower Arm (204-01, Removal and Installation).

Ball Joint Inspection

1. Firmly grasp the outer end of the suspension lower arm and try to move it up and down, watching and feeling for any movement. Free movement will usually be accompanied by an audible "click". There should be no free movement.

DIAGNOSIS AND TESTING

3. If a new lower arm is installed it will be necessary to check and adjust the front wheel alignment.

REFER to: [Front Toe Adjustment \(204-00, General Procedures\)](#)
[/ Rear Toe Adjustment \(204-00, General Procedures\)](#).

Strut or Shock Absorber Inspection

NOTE: Inspect the struts or shock absorber for signs of oil weepage or leaks. Make sure that the oil is not from another source.

Weepage:

- deposits a thin film of oil on the strut and spring assembly or shock absorber.
- is normally noticed due to a collection of dust on the strut and spring assembly or shock absorber.
- occurs during the normal running-in period of 4800 - 8050 km. After this period no new signs of oil should be visible.
- does not require new struts or shock absorbers to be installed.

Leakage:

- covers the entire strut and spring assembly or shock absorber with oil.
- will drip oil onto the surrounding suspension components.
- requires new struts or shock absorbers to be installed.

Strut or Shock Absorber Testing

NOTE: Struts or shock absorbers must be tested in the vertical position.

1. Remove both strut and spring assemblies or shock absorbers. The piston rods should extend.
 - Disassemble the strut and spring assemblies.
REFER to: [Front Strut and Spring Assembly \(204-01, Removal and Installation\)](#).
2. Compress the piston rods. Both piston rods should offer the same resistance when compressing.
3. Compress and release the piston rods. The piston rods should extent equally.
4. Compress and pull the piston rod in the vertical position. Feel if the resistance force at the point of direction change-over is perceptible without

a lag. If a lag is perceptible it is an indication of damper valve damage and new struts or shock absorbers must be installed. **REFER to:**

[Front Strut and Spring Assembly \(204-01, Removal and Installation\)](#),
[Spring \(204-02, Removal and Installation\)](#).

Load-Levelling Shock Absorber

1. With the vehicle unladen, measure and note the dimensions between the base of the wheel rim and the top of the rear fender on both sides.
 - The measurements on both sides should be approximately equal.
2. With a load of 4 average size adults and a 100 kg weight, measure and note the dimensions between the base of the wheel rim and the top of the rear fender on both sides.
3. **NOTE: Due to the internal ratchet mechanism of the suspension components, the height of the rear of the vehicle should rise during the road test.**

With a load of 4 average size adults and a 100 kg weight, drive the vehicle for 3 km on a road of normal condition.
4. With a load of 4 average size adults and a 100 kg weight, measure and note the dimensions between the base of the wheel rim and the top of the rear fender on both sides.
5. If the dimensions on both sides are no longer approximately equal, install new load levelling shock absorbers.

REFER to: [Spring \(204-02, Removal and Installation\)](#).

6. **NOTE: Due to the internal ratchet mechanism of the suspension components, the height of the rear of the vehicle should rise during the road test.**

If the dimensions are approximately equal, unload the vehicle and drive the vehicle for 3 km on a road of normal condition.

7. With the vehicle unladen, measure and note the dimensions between the base of the wheel rim and the top of the rear fender on both sides. Check the final dimensions with the original dimensions taken in the unladen condition.

DIAGNOSIS AND TESTING

8. If the final dimensions do not approximately equal the original dimensions, install new load levelling shock absorbers.

REFER to: Spring (204-02, Removal and Installation).

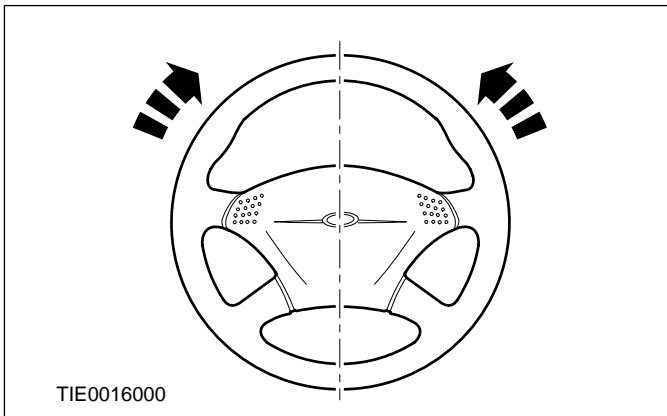
9. If the final dimensions approximately equal the original dimensions, verify the customer concern.

GENERAL PROCEDURES

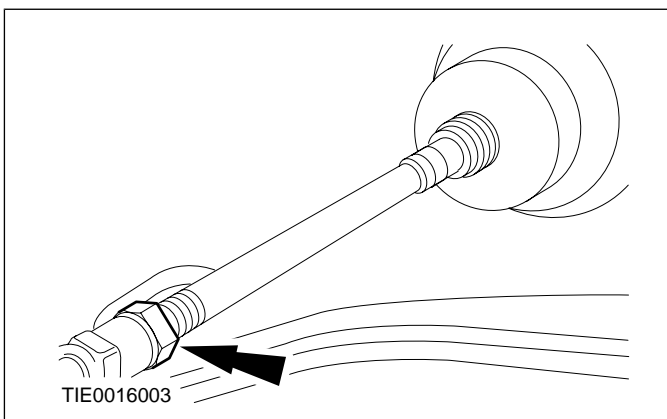
Front Toe Adjustment(14 117 3)

NOTE: Make sure that the vehicle is standing on a level surface.

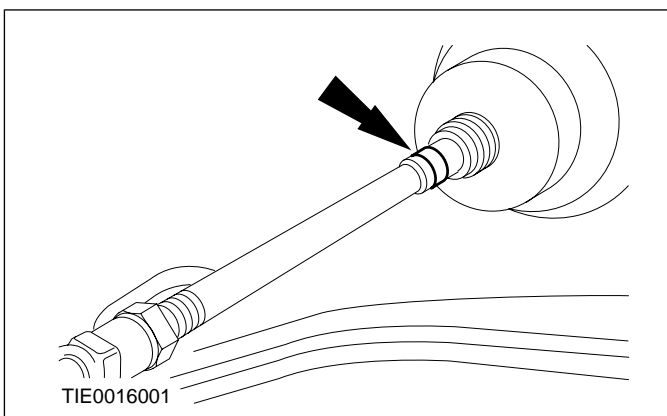
1. Centralize the steering and lock it in position.



2. Loosen the tie-rod end locknuts.



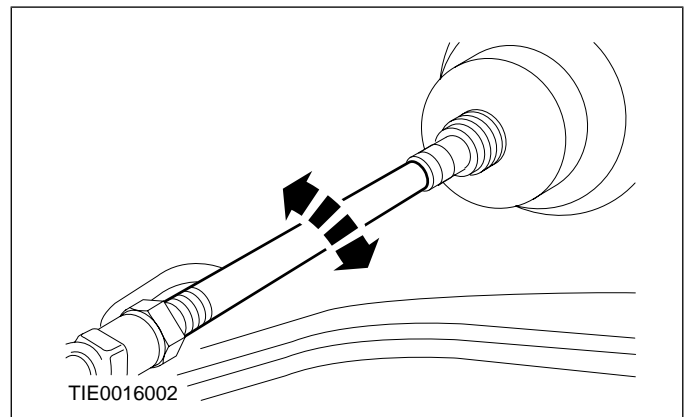
3. Remove the steering gear boot outer clamps.



4. Rotate the tie-rods an equal amount in either a clockwise or a counterclockwise direction to adjust the toe setting.

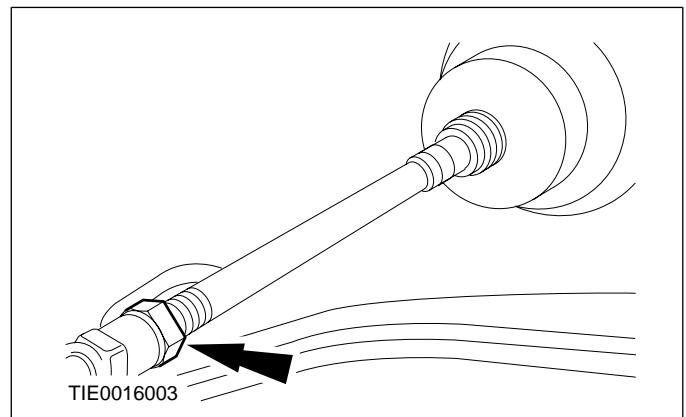
For additional information, refer to:

Specifications (204-00 Suspension System - General Information, Specifications).

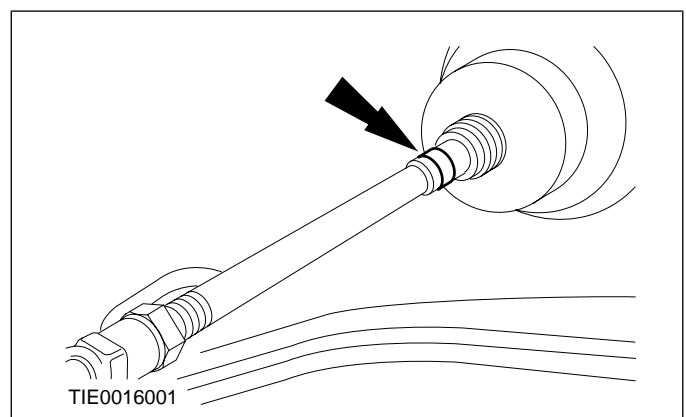


5. Tighten the tie-rod end locknuts.

For additional information, refer to: **Tie Rod End** (211-03 Steering Linkage, Removal and Installation).



6. Install the steering gear boot outer clamps.



GENERAL PROCEDURES

Rear Toe Adjustment(15 211 3)

General Equipment

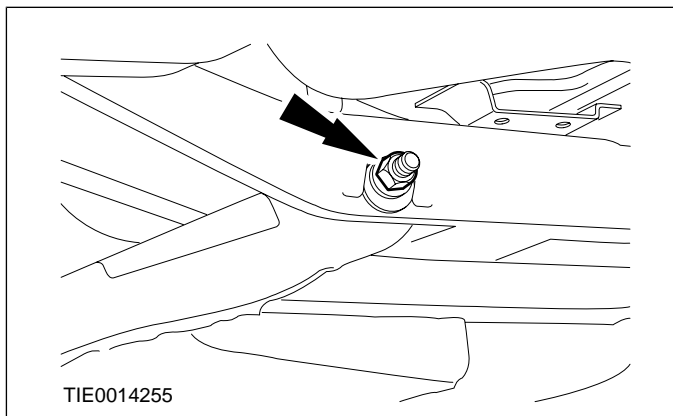
Four wheel alignment equipment

NOTE: The checking and subsequent adjustment of the rear toe setting should be carried out on a flat surface and in accordance with the manufacturers instructions for the particular wheel alignment equipment being used.

1. NOTE: Final tightening of the rear suspension components should be carried out when the vehicle weight is on the road wheels.

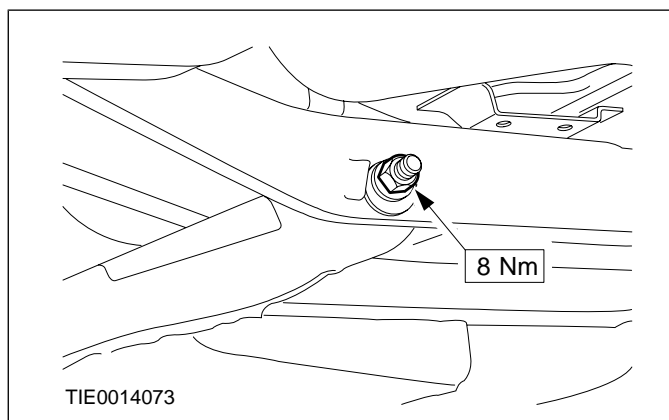
Using suitable four wheel alignment equipment, check the toe setting.

2. Check the tire pressures and adjust as necessary.
3. Make sure the vehicle is at curb weight and that the spare wheel, jack and vehicle tools are stowed in their designated positions. Additional items should be removed from the vehicle.
4. Bounce the vehicle to make sure that the suspension is in its normal resting position.
5. Loosen the rear lower arm adjustment cam nut.

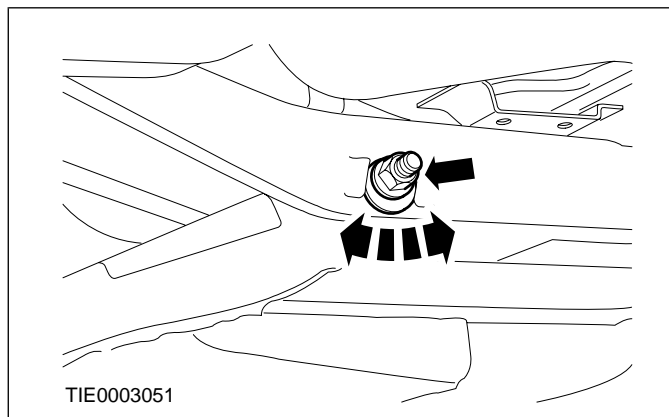


6. NOTE: Do not fully tighten the rear lower arm adjustment cam nut at this stage.

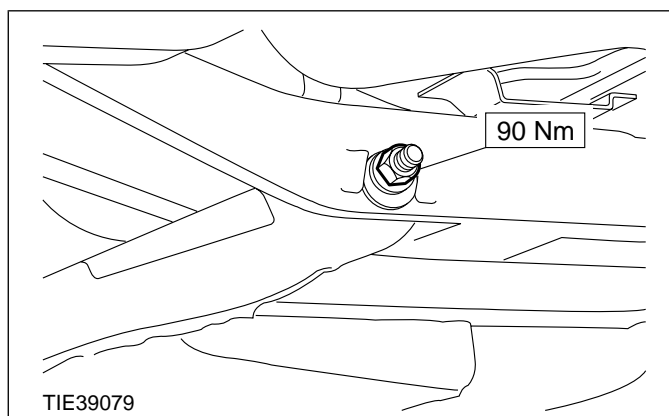
Tighten the rear lower arm adjustment cam nut.



7. Adjust the toe setting.



8. Tighten the rear lower arm adjustment cam nut.



SECTION 204-01 Front Suspension

VEHICLE APPLICATION: 2008.75 Focus ST C307

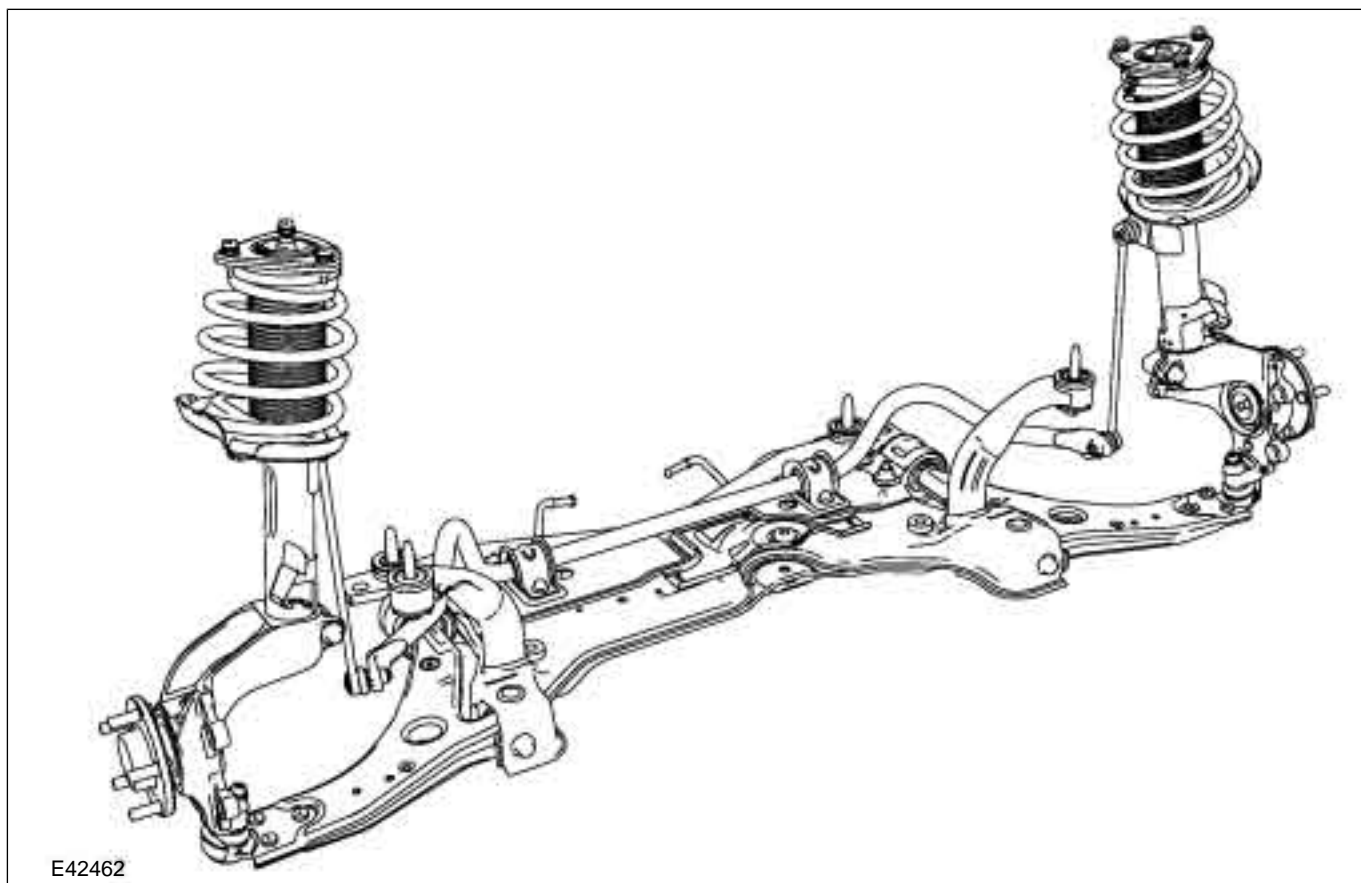
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Front Stabilizer Bar.....	204-01-11
Lower Arm Ball Joint..... (14 735 0)	204-01-20
Wheel Knuckle.....	204-01-23
Strut and Spring Assembly.....	204-01-29
DISASSEMBLY AND ASSEMBLY	
Strut and Spring Assembly.....	204-01-33

SPECIFICATIONS

Torque Specifications

Description	Nm	lb-ft	lb-in
Top mount retaining bolts	32	24	-
Top mount brace to bulkhead retaining nuts	25	18	-
Thrust bearing retaining nut	50	37	-
Stabilizer bar link retaining nuts	48	35	-
Wheel knuckle to strut and spring assembly pinch bolt	90	66	-
Headlamp leveling front sensor bracket retaining bolt	8	-	71
Lower arm ball joint heat shield retaining nut	9	-	80
Brake caliper anchor plate retaining bolts	115	85	-
Lower arm ball joint retaining nut	70	52	-
Tie-rod end retaining nut	48	35	-
Stabilizer bar to stabilizer bar link retaining nut	48	35	-
Stabilizer bar clamp retaining bolts	48	35	-
Lower arm front retaining bolt	175	129	-
Lower arm rear clamp retaining bolts	115	85	-
Lower arm ball joint to lower arm retaining bolts	70	52	-
Front axle crossmember front retaining bolts	115	85	-
Front axle crossmember rear retaining bolt	275	203	-
Front axle crossmember bracket retaining bolts	70	52	-
Wheel hub retaining bolt	a)	-	-
Catalytic converter to rear muffler flange retaining nuts - Vehicles with diesel engine	51	38	-
Catalytic converter to rear muffler flange retaining nuts - All except vehicles with diesel engine	48	35	-
Engine support insulator front retaining bolt	80	59	-
Wheel speed sensor retaining bolt	9	-	80
Steering column to steering gear pinion retaining bolt	28	21	-

a) Refer to the procedure in this section.

DESCRIPTION AND OPERATION**Front Suspension****Overview**

NOTE: The Anti-lock Brake System (ABS) sensor ring is incorporated into the wheel hub. Incorrect installation of the wheel hub would result in an ABS malfunction.

The front suspension features McPherson struts and 'L' shaped lower arms which are attached to the front axle crossmember by means of two maintenance-free bushings.

The ball joint is attached to the lower arm by means of three rivets. Bolt-on replacement ball joints are available for service operations.

The correct installation position must be observed when installing the strut and spring assembly turret support bearings. To make sure that the strut and spring assembly turret support bearings, springs and piston rods are all aligned correctly, the spring retainers and strut and spring assembly turret support bearings have alignment marks.



DIAGNOSIS AND TESTING

Front Suspension

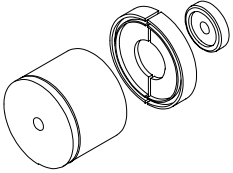
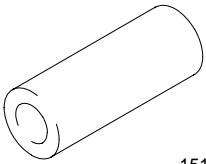
REFER to Section [204-00 \[Suspension System - General Information\]](#).



REMOVAL AND INSTALLATION

Wheel Hub(14 371 0)

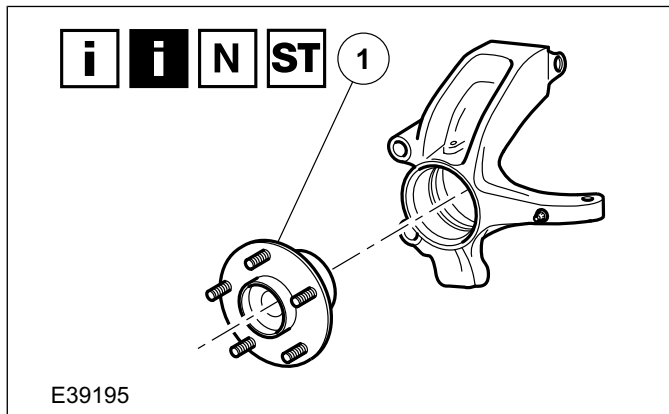
Special Tool(s)

 <p>E42977</p>	<p>Remover/Installer, Wheel Hub/Wheel Bearing 204-348</p>
 <p>15108</p>	<p>Protector, Axle Shaft 205-332</p>

1. Remove the wheel knuckle.

For additional information, refer to: **Wheel Knuckle - 3-Door** (204-01 Front Suspension, Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



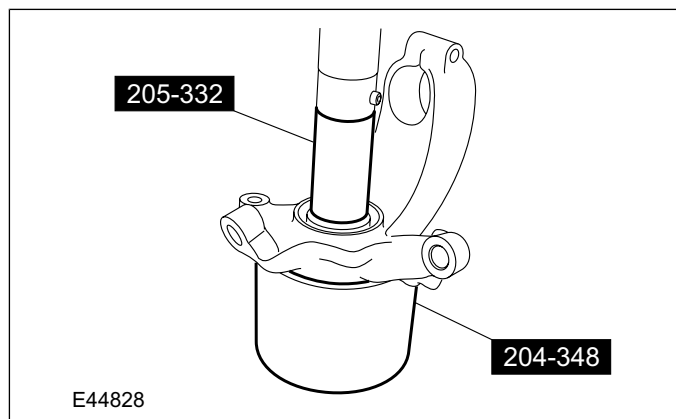
Item	Description
1	Wheel hub See Removal Detail See Installation Detail

3. To install, reverse the removal procedure.

Removal Details

Item 1 Wheel hub

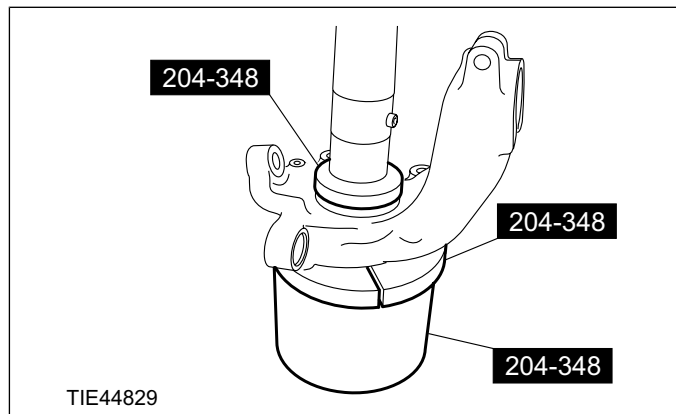
1. Using the special tools, remove the wheel hub.



Installation Details

REMOVAL AND INSTALLATION**Item 1 Wheel hub**

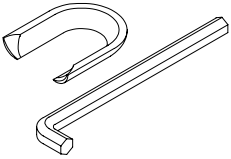
1. Using the special tool, install the wheel hub.



REMOVAL AND INSTALLATION

Lower Arm(14 706 0)

Special Tool(s)

 <p>E42949</p>	<p>Protector, Ball Joint Gaiter 204-349</p>
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General Equipment

Ball joint separator

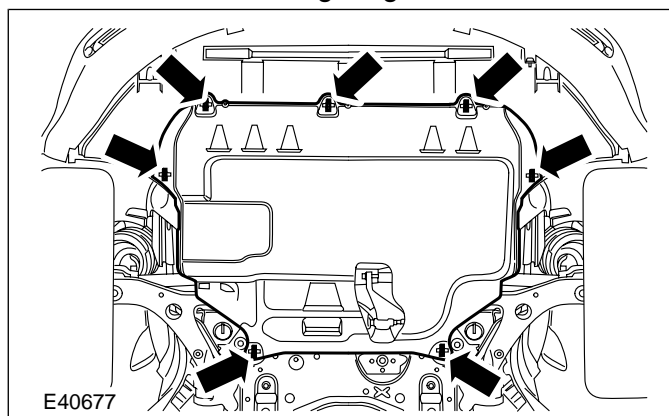
CAUTION: Make sure the strut and spring assembly does not move in a forwards or rearwards direction, to prevent damage to the top mount center cup.

1. Remove the wheel and tire.

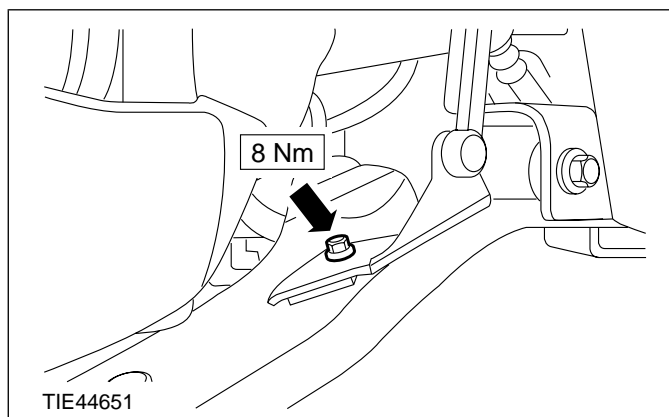
For additional information, refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).

2. Remove the engine undershield.

- Rotate the locking tangs counterclockwise.

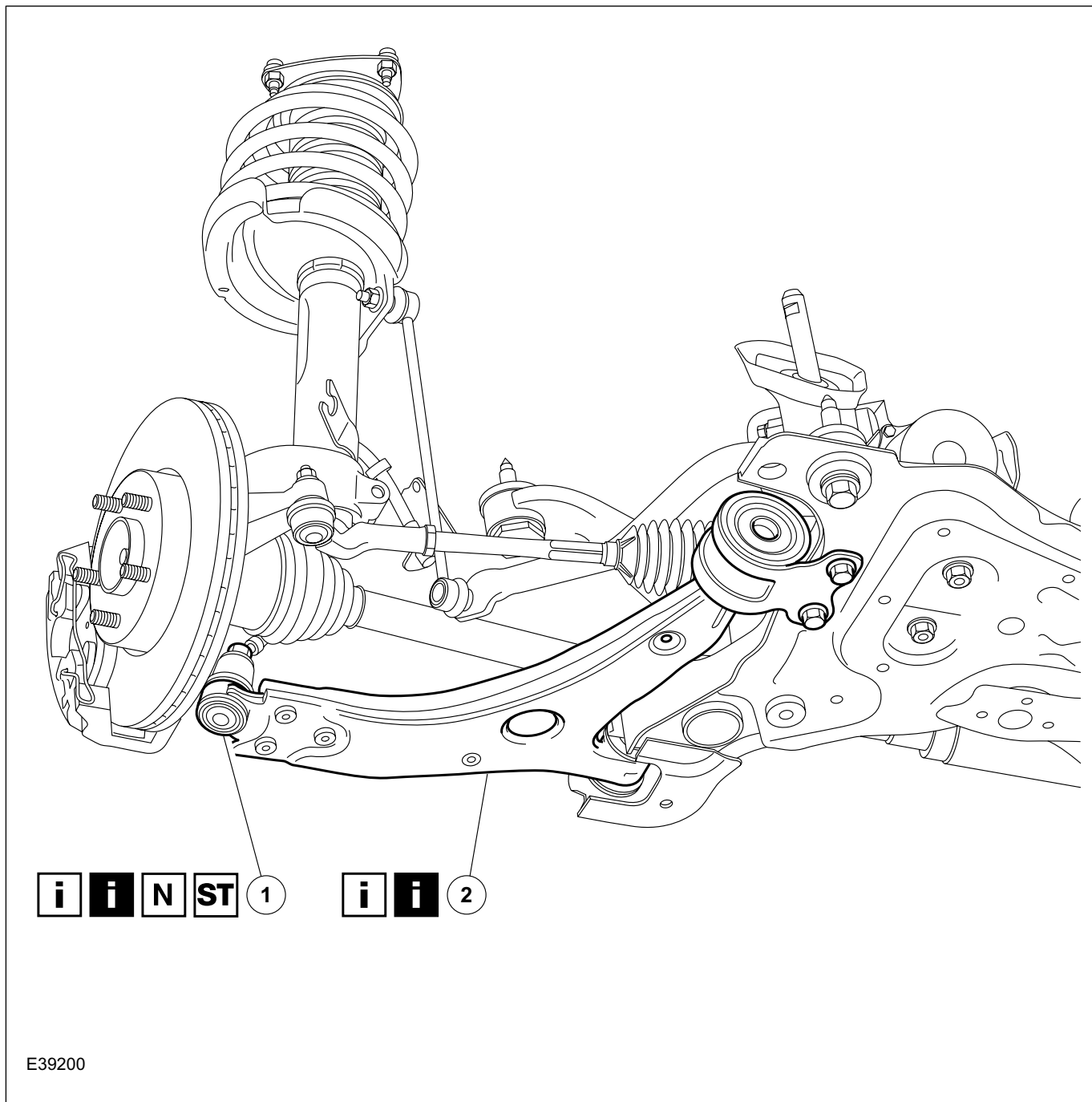


3. Detach the headlamp leveling front sensor bracket from the right-hand lower arm and secure it to one side (if equipped).



4. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



Item	Description
1	Lower arm ball joint See Removal Detail See Installation Detail
2	Lower arm See Removal Detail See Installation Detail

5. To install, reverse the removal procedure.

6. Check the toe setting and adjust as necessary.

For additional information, refer to:

Specifications - 3-Door (204-00 Suspension System - General Information, Specifications)

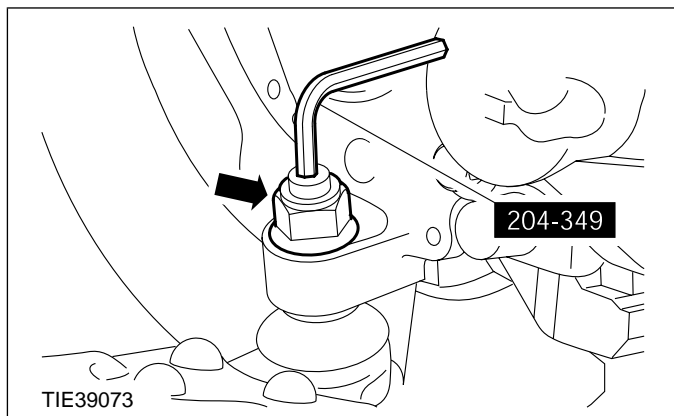
/ **Front Toe Adjustment** (204-00 Suspension System - General Information, General Procedures).

Removal Details

REMOVAL AND INSTALLATION

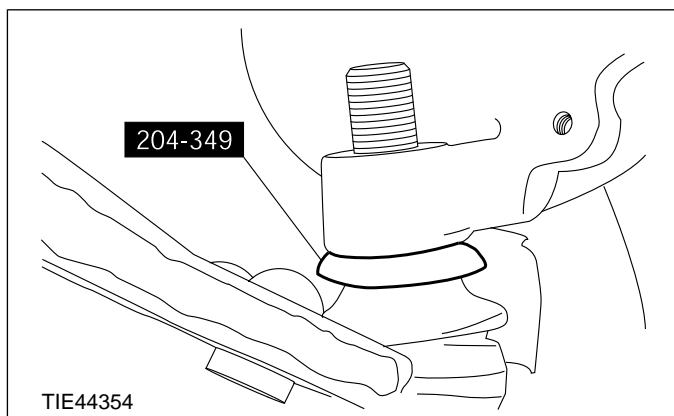
Item 1 Lower arm ball joint

1. Using the special tool to prevent the ball joint from rotating, remove and discard the lower arm ball joint retaining nut.

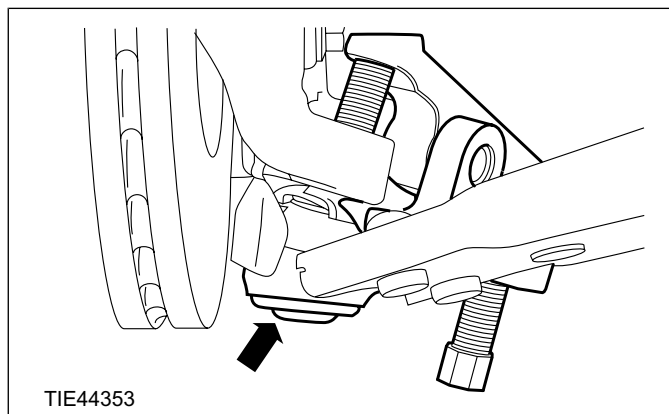


2. **CAUTION:** Make sure the special tool is installed with the curved surface facing upwards to prevent damage to the ball joint seal.

Install the special tool.

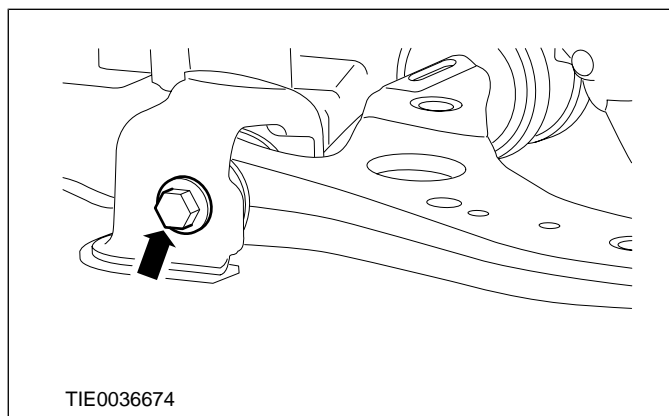


3. Using a suitable ball joint separator, detach the lower arm from the wheel knuckle.

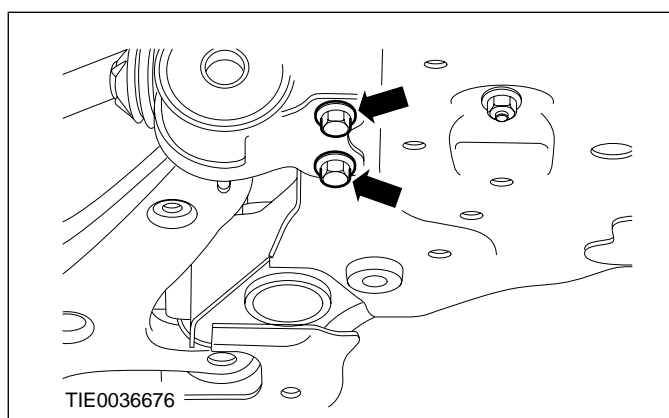


Item 2 Lower arm

1. Remove the lower arm front retaining bolt.



2. Remove the lower arm rear clamp retaining bolts.



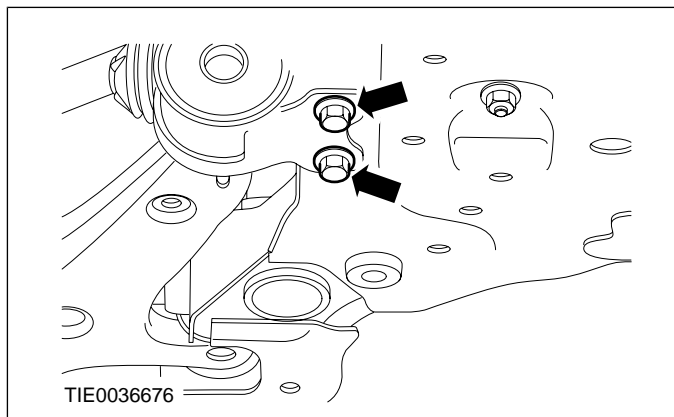
Installation Details

REMOVAL AND INSTALLATION

Item 2 Lower arm

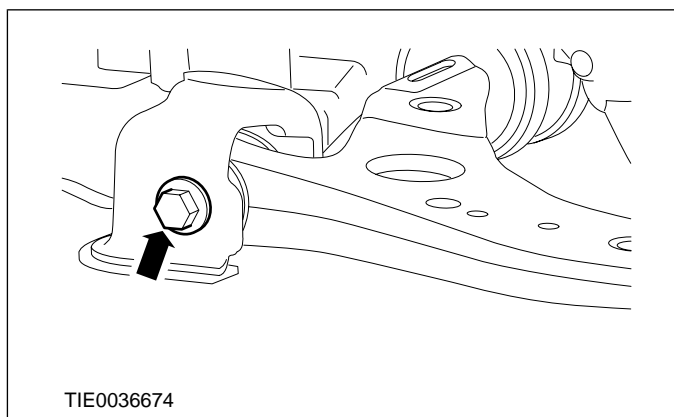
1. **NOTE:** Do not fully tighten the lower arm rear clamp retaining bolts at this stage.

Install the lower arm rear clamp retaining bolts.



2. **NOTE:** Do not fully tighten the lower arm front retaining bolt at this stage.

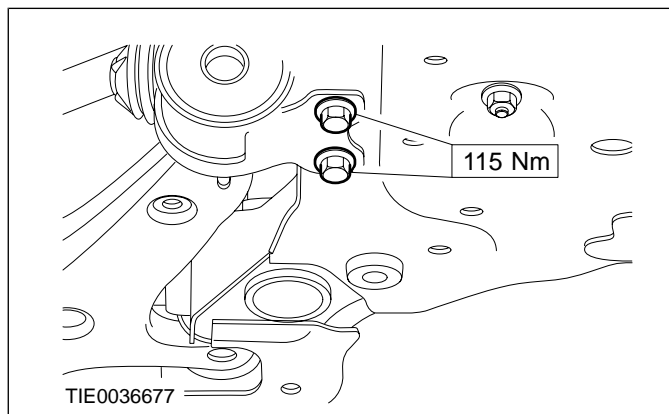
Install the lower arm front retaining bolt.



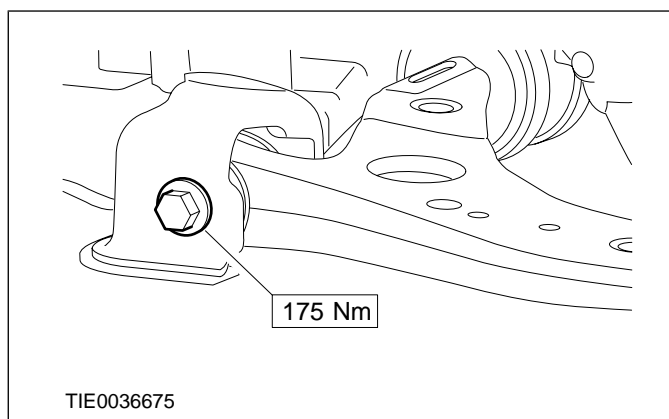
3. **⚠ CAUTION:** While tightening the rear clamp retaining bolts, make sure the lower arm does not move.

NOTE: Make sure the lower arm rear clamp and the crossmember are correctly aligned.

Tighten the lower arm rear clamp retaining bolts.



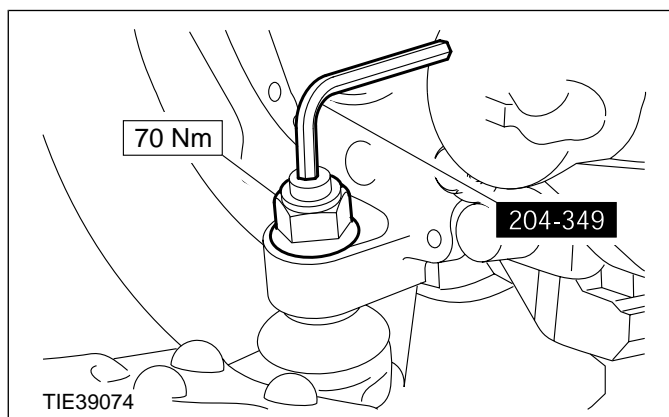
4. Tighten the lower arm front retaining bolt.



Item 1 Lower arm ball joint

1. **⚠ WARNING:** Install a new lower arm ball joint retaining nut. Failure to follow this instruction may result in personal injury.

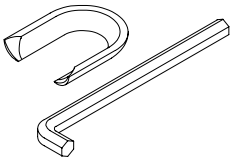
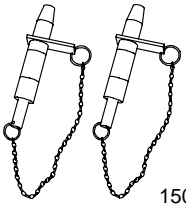
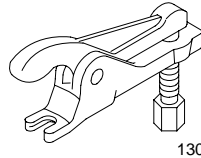
Using the special tool to prevent the ball joint from rotating, install the lower arm ball joint retaining nut.



REMOVAL AND INSTALLATION

Front Stabilizer Bar

Special Tool(s)

 <p>E42949</p>	<p>Protector, Ball Joint Gaiter 204-349</p>
 <p>15097A</p>	<p>Alignment Pins, Subframe 205-316 (15-097A)</p>
 <p>13006</p>	<p>Separator, Ball Joint 211-020</p>

General Equipment

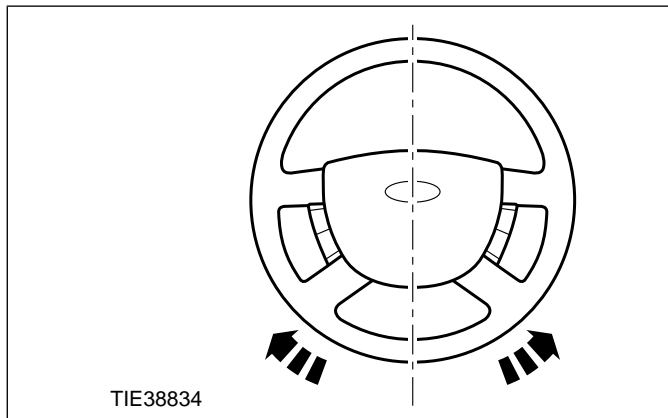
Ball joint separator
Securing strap
Transmission jack

CAUTION: Make sure the strut and spring assembly does not move in a forwards or rearwards direction, to prevent damage to the top mount center cup.

All vehicles

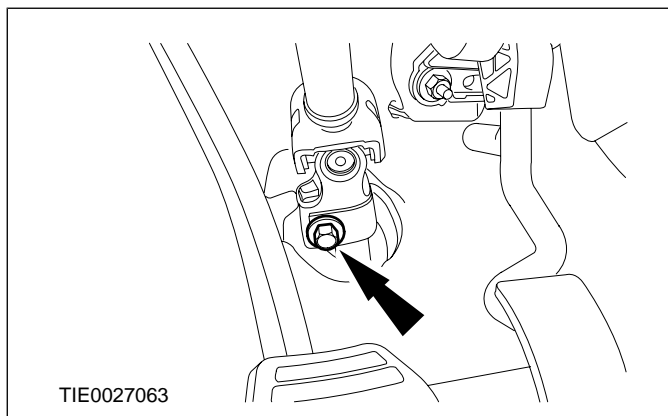
1. **NOTE:** Make sure the road wheels are in the straight ahead position.

Centralize the steering wheel and lock it in position.



2. Detach the steering column from the steering gear pinion.

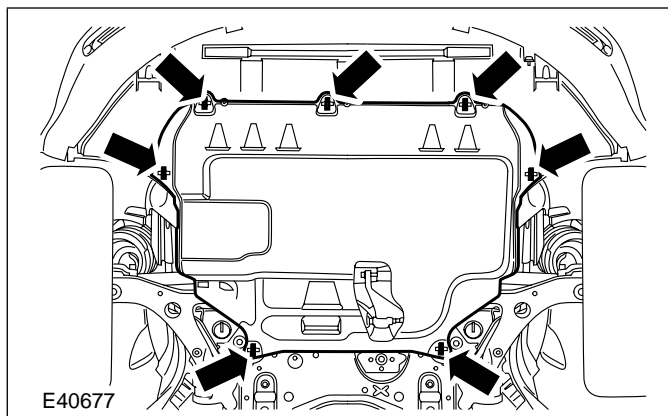
- Discard the bolt.



3. Remove the front wheels and tires.

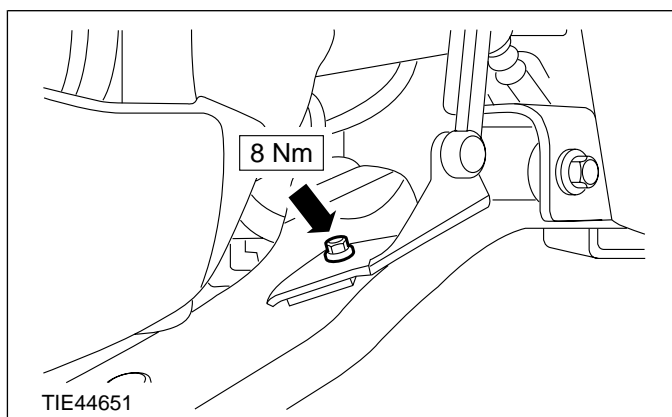
For additional information, refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).

4. Remove the engine undershield.

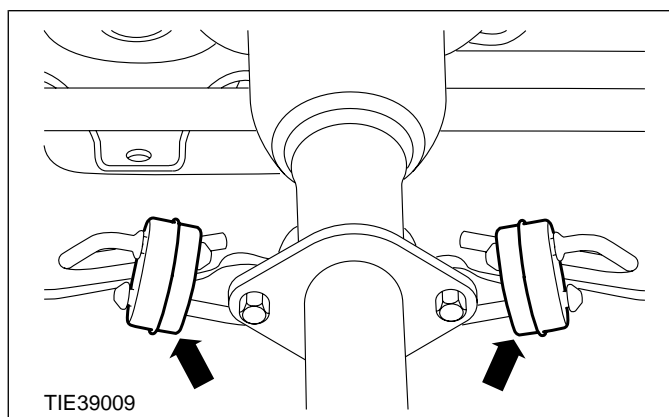


REMOVAL AND INSTALLATION

5. Detach the headlamp leveling front sensor bracket from the right-hand lower arm and secure it to one side (if equipped).

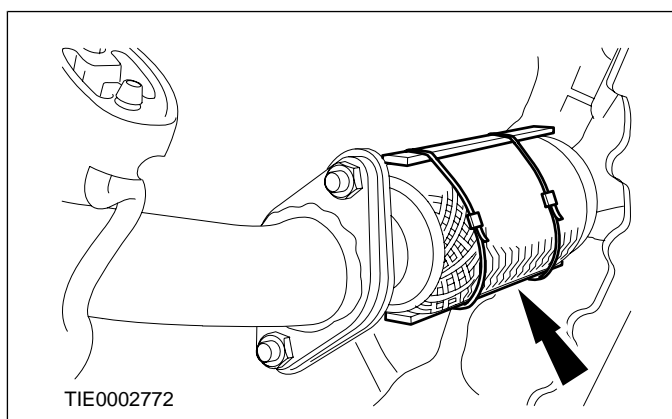


- Detach the exhaust flexible pipe from the front axle crossmember exhaust hanger insulators.



6. **⚠ CAUTION:** Over bending of the exhaust flexible pipe may cause damage resulting in failure.

Support the exhaust flexible pipe with a suitable support wrap or a suitable splint.



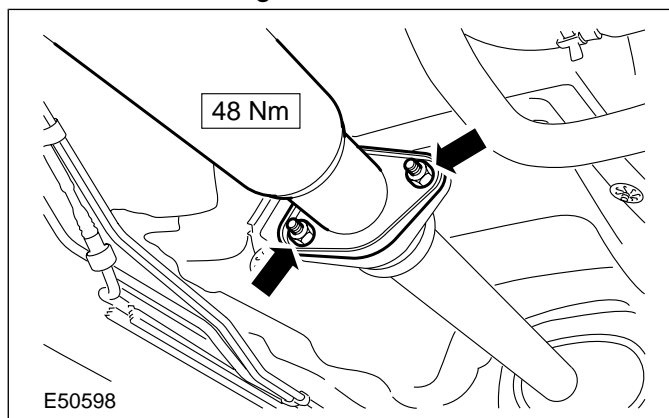
7. **⚠ CAUTION:** Take care when removing the exhaust hanger insulators to prevent damage.

All except vehicles with diesel engine

8. **⚠ CAUTION:** Using suitable cable ties, support the rear muffler and exhaust tailpipe assembly to prevent damage to the exhaust hanger insulators.

Detach the exhaust flexible pipe from the rear muffler flange.

- Discard the gasket and nuts.



Vehicles with diesel engine

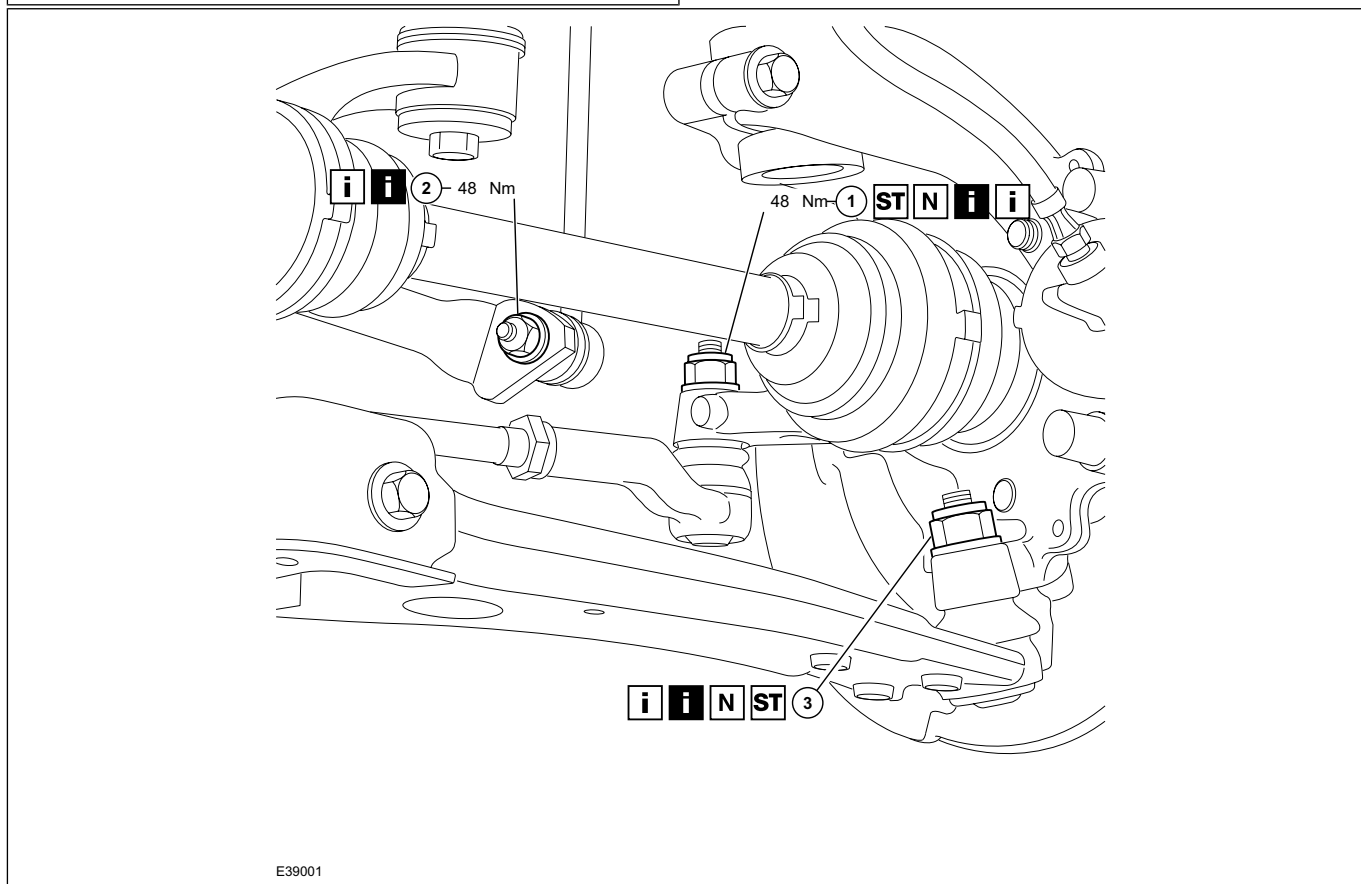
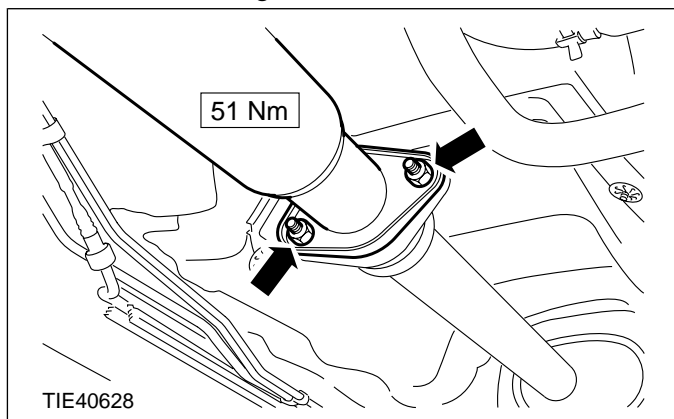
9. **⚠ CAUTION:** Using suitable cable ties, support the rear muffler and exhaust tailpipe assembly to prevent damage to the exhaust hanger insulators.

Detach the exhaust flexible pipe from the rear muffler flange (2.0L Duratorq-TDCi (DW) Diesel shown).

REMOVAL AND INSTALLATION

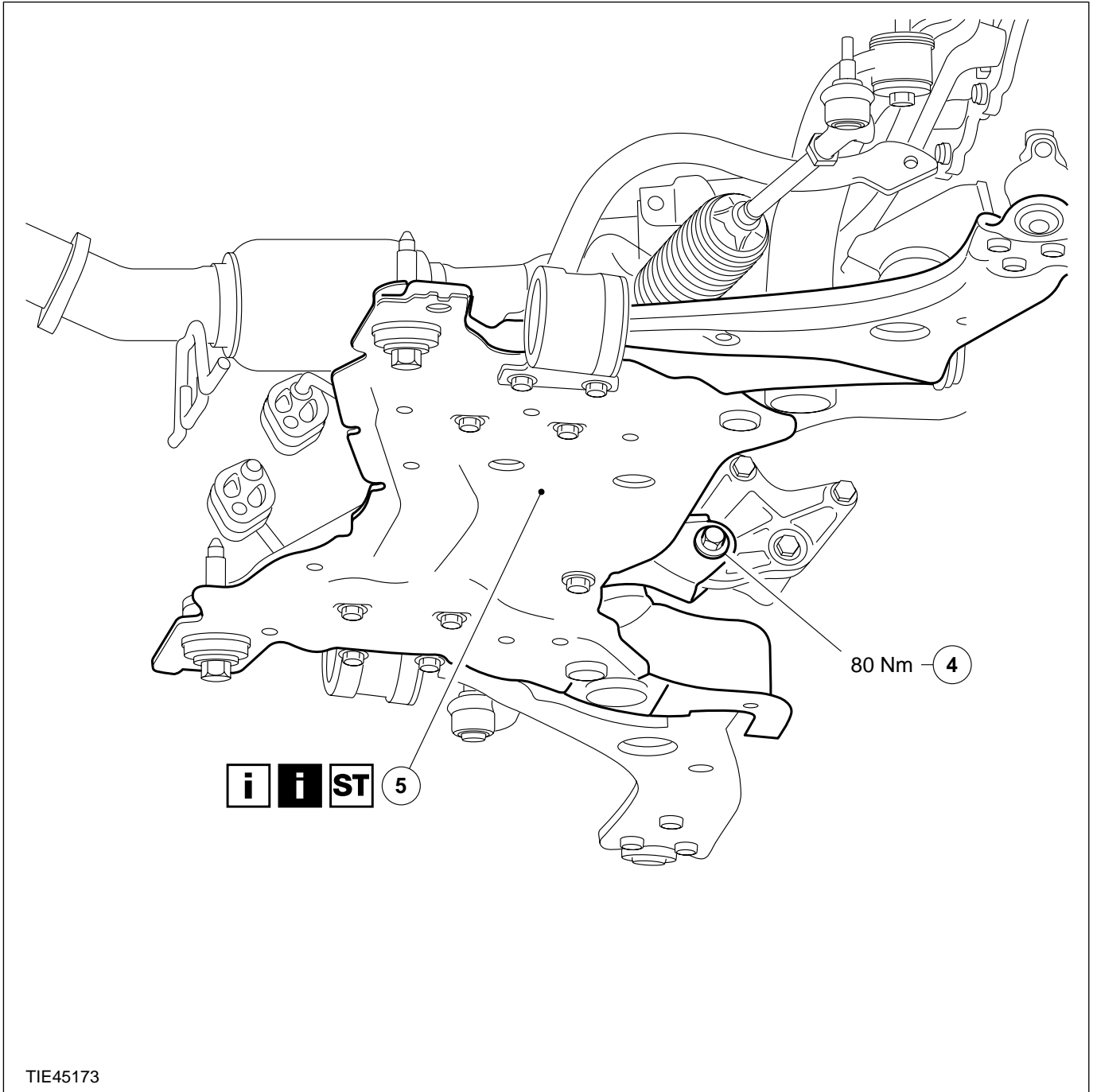
- Discard the gasket and nuts.

10. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Tie-rod end retaining nut See Removal Detail See Installation Detail
2	Stabilizer bar link retaining nut See Removal Detail See Installation Detail
3	Lower arm ball joint retaining nut See Removal Detail See Installation Detail

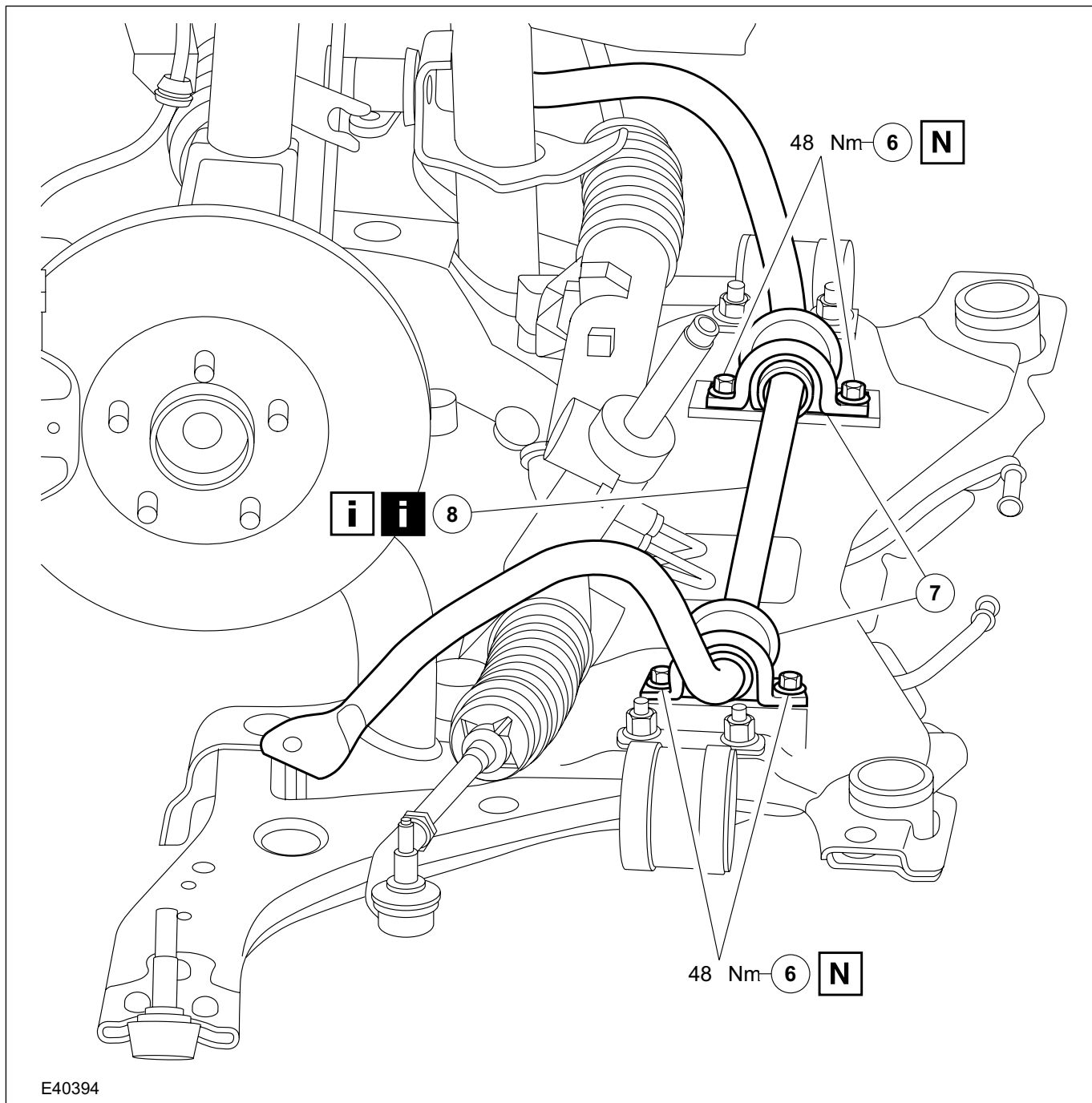
REMOVAL AND INSTALLATION



TIE45173

Item	Description
4	Engine support insulator front retaining bolt
5	Front axle crossmember See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION



Item	Description
6	Stabilizer bar clamp retaining bolts
7	Stabilizer bar clamps
8	Stabilizer bar See Removal Detail See Installation Detail

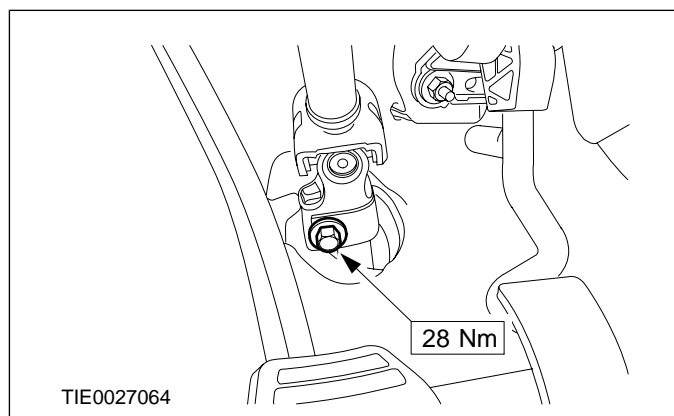
11. To install, reverse the removal procedure.

12. **▲WARNING:** Install a new steering column to steering gear pinion bolt. Failure to follow this instruction may result in personal injury.

NOTE: Make sure the road wheels are in the straight ahead position.

REMOVAL AND INSTALLATION

Attach the steering column to the steering gear pinion.



13. Check the front toe setting and adjust as necessary.

For additional information, refer to:

Specifications - 3-Door (204-00 Suspension System - General Information, Specifications)

/ Front Toe Adjustment (204-00 Suspension System - General Information, General Procedures).

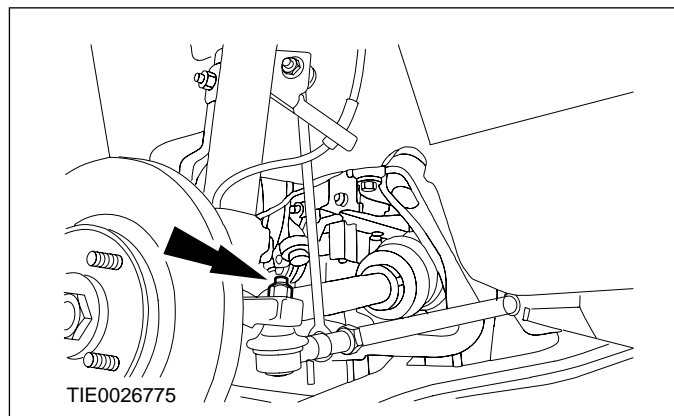
Removal Details

Item 1 Tie-rod end retaining nut

1. **CAUTION:** Leave the tie-rod end retaining nut in place to protect the ball joint stud.

NOTE: Use a 5 mm Allen key to prevent the ball joint stud from rotating.

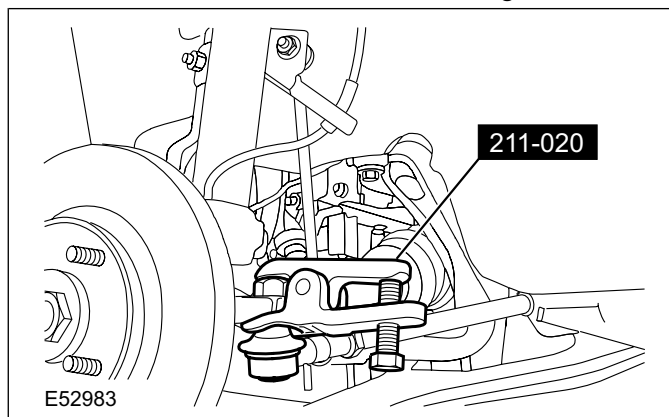
Loosen the tie-rod end retaining nut on both sides.



2. **CAUTION:** Protect the ball joint seal using a soft cloth to prevent damage.

Using the special tool, detach the tie-rod end from the wheel knuckle on both sides.

• Discard the tie-rod end retaining nut.



Item 2 Stabilizer bar link retaining nut

1. **NOTE:** Use a 5 mm Allen key to prevent the ball joint stud from rotating.

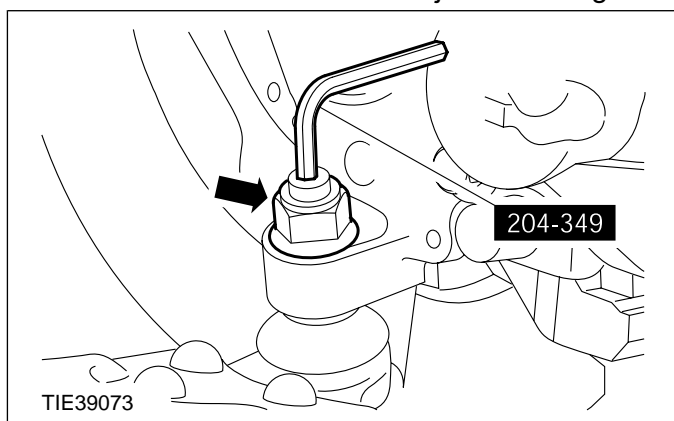
Detach the stabilizer bar link from the stabilizer bar on both sides.

Item 3 Lower arm ball joint retaining nut

1. Using the special tool to prevent the ball joint from rotating, remove the lower arm ball joint retaining nut on both sides.

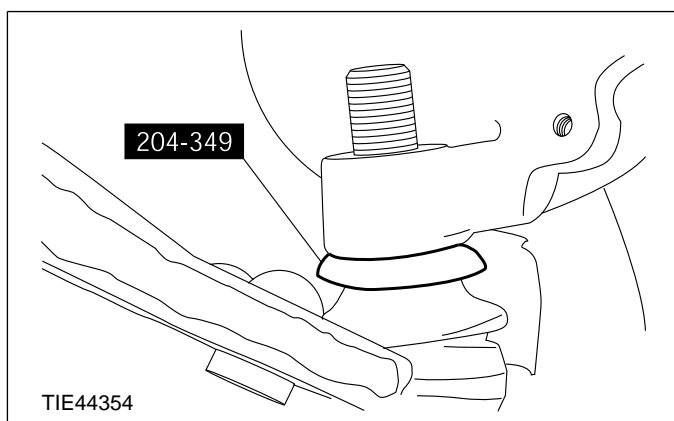
REMOVAL AND INSTALLATION

- Discard the lower arm ball joint retaining nut.

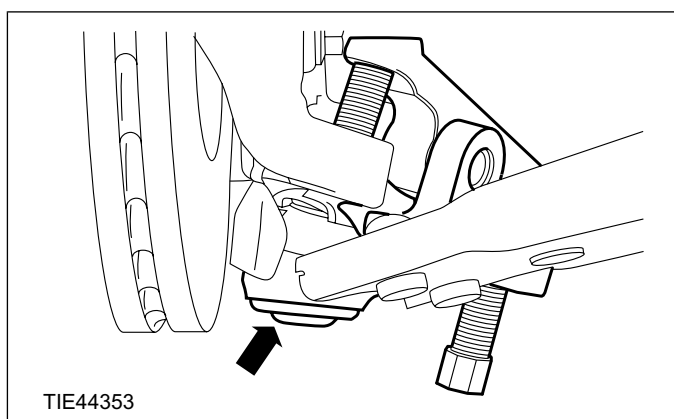


2. **⚠ CAUTION:** Make sure that the special tool is installed with the curved surface facing upwards to prevent damage to the ball joint seal.

Install the special tool.



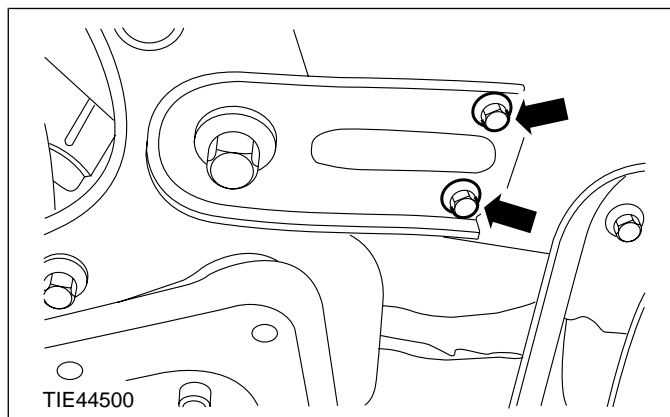
3. Using a suitable ball joint separator, detach the lower arm from the wheel knuckle on both sides.



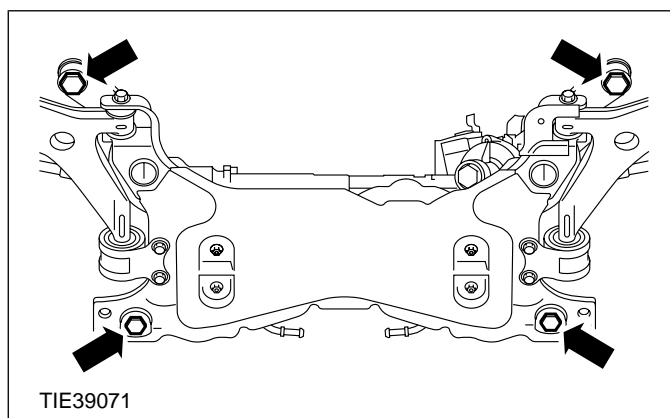
Item 5 Front axle crossmember

1. Using a transmission jack and a wooden block, support the front axle crossmember.

2. Using a suitable securing strap, secure the front axle crossmember to the transmission jack.
3. Remove the front axle crossmember bracket retaining bolts on both sides.



4. Remove the front axle crossmember retaining bolts (transmission jack shown removed for clarity).



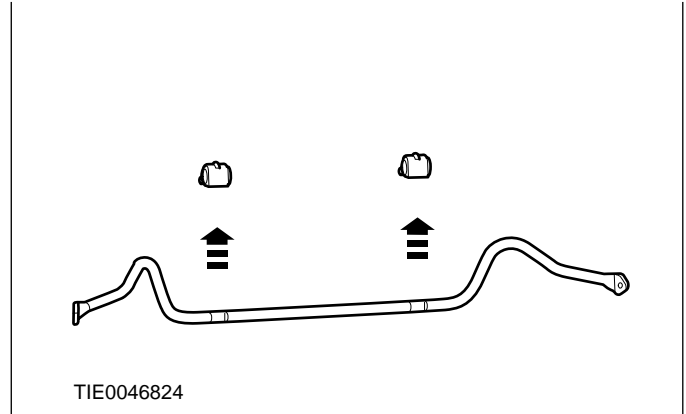
5. **⚠ CAUTION:** To prevent damage to the power steering lines, only lower the crossmember sufficiently to allow the stabilizer bar to be removed.

Lower the front axle crossmember.

REMOVAL AND INSTALLATION

Item 8 Stabilizer bar

1. Remove the stabilizer bar bushings.

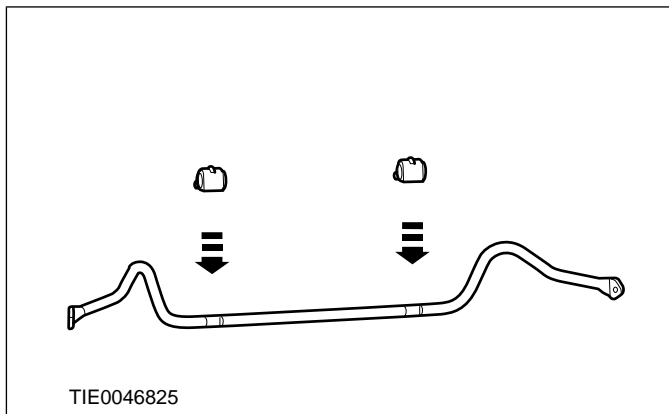


Installation Details

Item 8 Stabilizer bar

1. **CAUTION:** The stabilizer bar bushings must be located correctly on the flats of the stabilizer bar with no lubricant.

Install the stabilizer bar bushings.

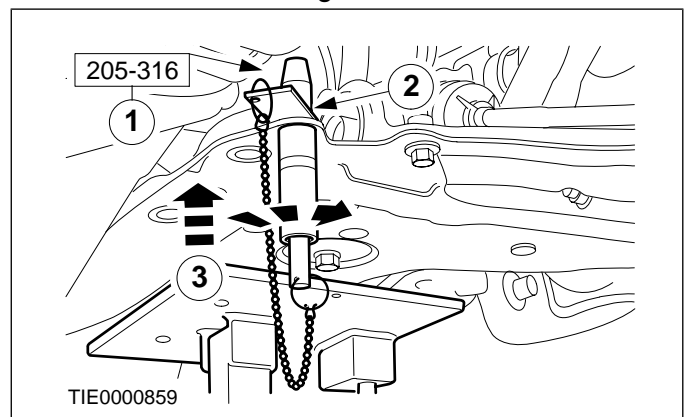


2. Position the stabilizer bar on the front axle crossmember.

Item 5 Front axle crossmember

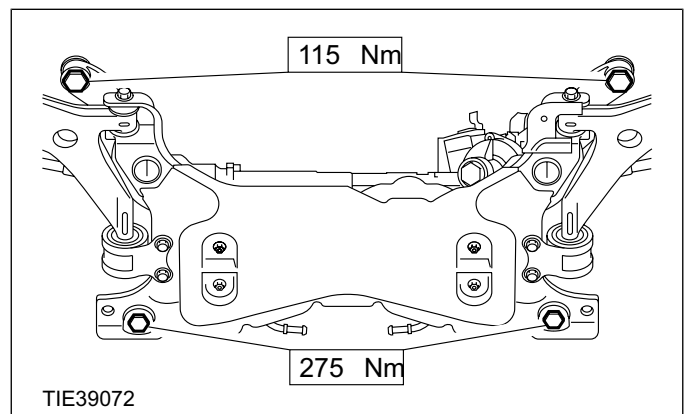
1. Using a transmission jack and the special tool, position and align the front axle crossmember.
 1. Insert the alignment pins through the front axle crossmember alignment holes.
 2. Slide the locking plates into the groove of the special tool and tighten the alignment pin sleeve.

3. Raise the front axle crossmember engaging the alignment pins into the front axle crossmember alignment holes.



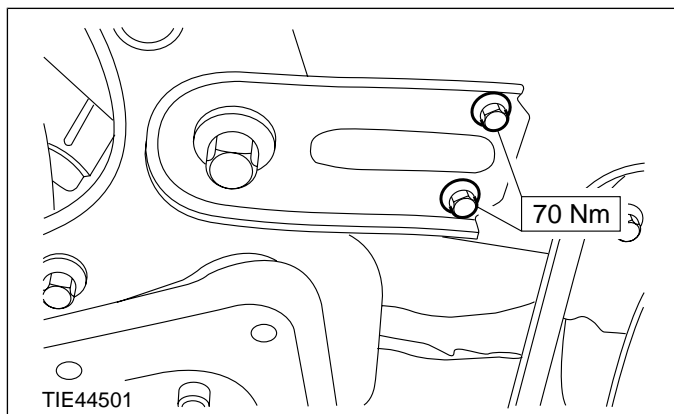
2. **CAUTION:** While tightening the front axle crossmember retaining bolts, make sure the front axle crossmember does not move.

Install the front axle crossmember retaining bolts (transmission jack shown removed for clarity).



REMOVAL AND INSTALLATION

3. Install the front axle crossmember bracket retaining bolts on both sides.

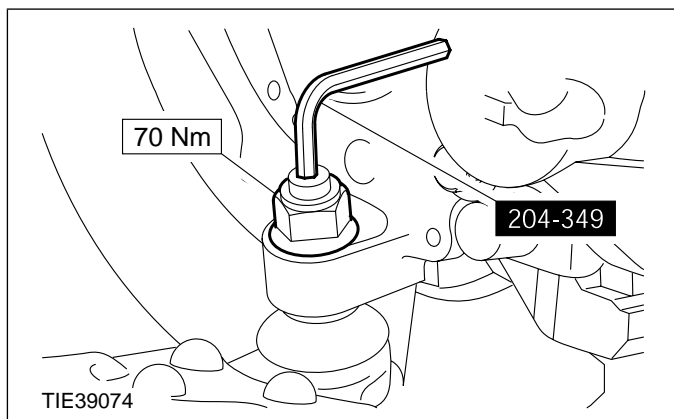


4. Remove the securing strap.
5. Lower and remove the transmission jack and the wooden block.

Item 3 Lower arm ball joint retaining nut

1. **▲WARNING:** Install a new lower arm ball joint retaining nut. Failure to follow this instruction may result in personal injury.

Using the special tool to prevent the ball joint from rotating, install the lower arm ball joint retaining nut on both sides.

**Item 2 Stabilizer bar link retaining nut**

1. **NOTE:** Use a 5 mm Allen key to prevent the ball joint stud from rotating.

Attach the stabilizer bar link to the stabilizer bar on both sides.

Item 1 Tie-rod end retaining nut

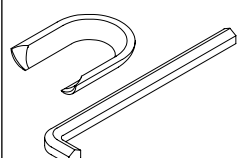
1. **NOTE:** Use a 5 mm Allen key to prevent the ball joint stud from rotating.

Attach the tie-rod end to the wheel knuckle on both sides.

REMOVAL AND INSTALLATION

Lower Arm Ball Joint(14 735 0)

Special Tool(s)

 <p>E42949</p>	<p>Protector, Ball Joint Gaiter 204-349</p>
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General Equipment

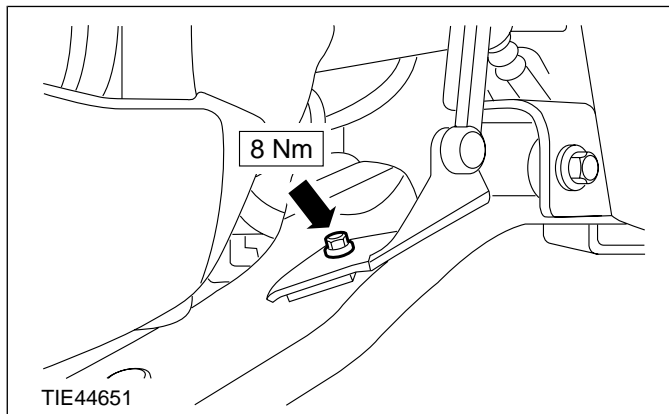
<p>Ball joint separator</p>
<p>Electric hand drill</p>

CAUTION: Make sure the strut and spring assembly does not move in a forwards or rearwards direction, to prevent damage to the top mount center cup.

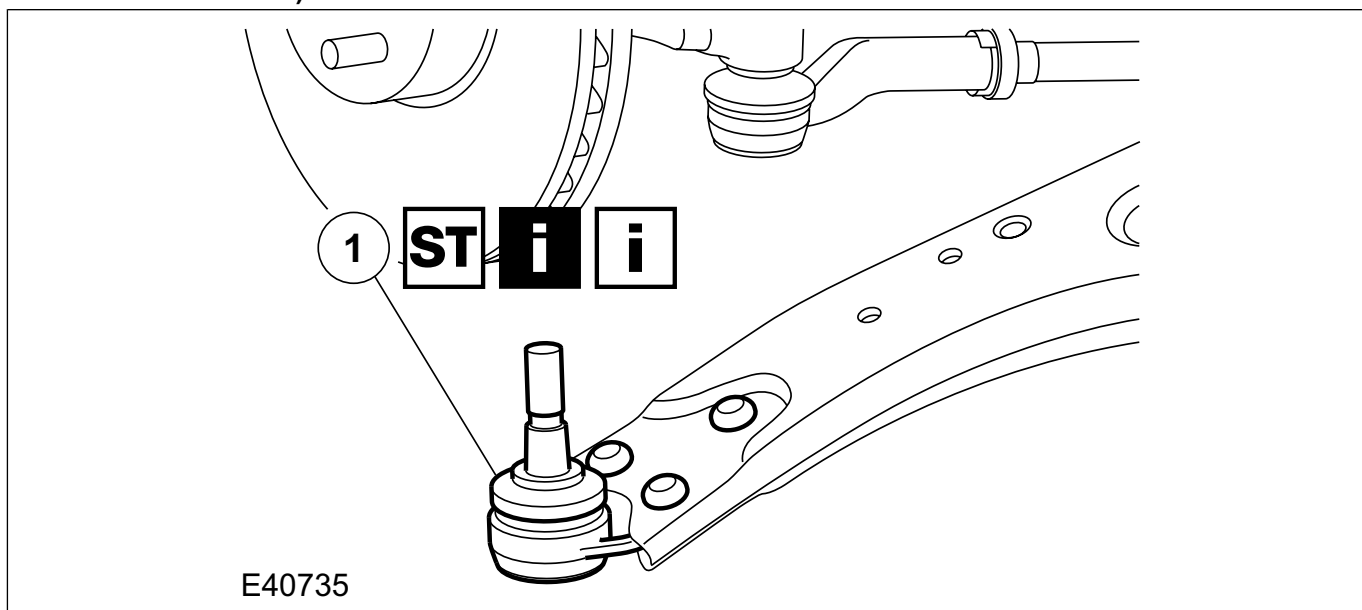
1. Remove the wheel and tire.

For additional information, refer to: **Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).**

2. Detach the headlamp leveling front sensor bracket from the right-hand lower arm and secure it to one side (if equipped).



3. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	<p>Lower arm ball joint See Removal Detail See Installation Detail</p>

4. To install, reverse the removal procedure.

5. Check the toe setting and adjust as necessary.

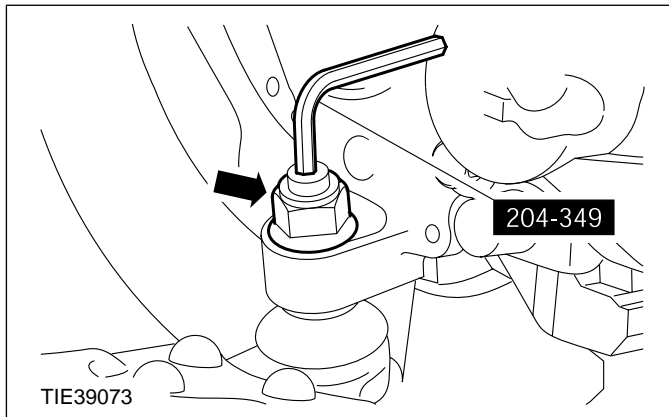
For additional information, refer to: **Specifications (204-00 Suspension System - General Information, Specifications) / Front Toe Adjustment (204-00 Suspension System - General Information, General Procedures).**

REMOVAL AND INSTALLATION

Removal Details

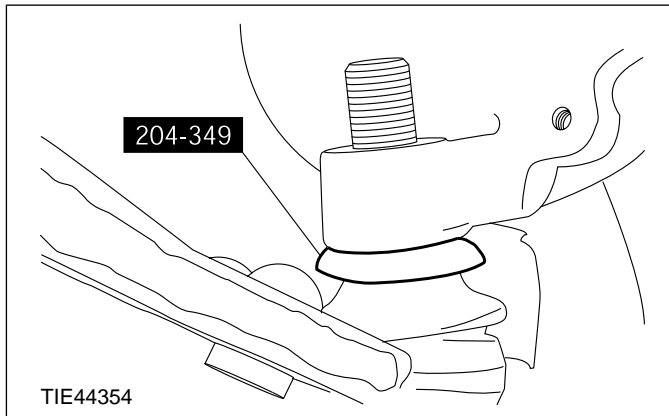
Item 1 Lower arm ball joint

1. Using the special tool to prevent the ball joint from rotating, remove and discard the lower arm ball joint retaining nut.

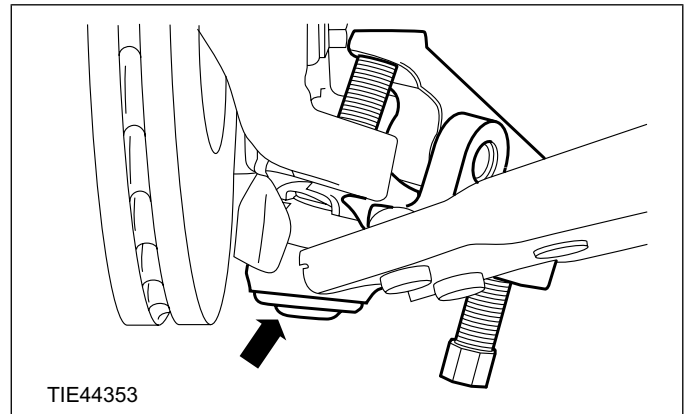


2. **CAUTION:** Make sure that the special tool is installed with the curved surface facing upwards to prevent damage to the ball joint seal.

Install the special tool.

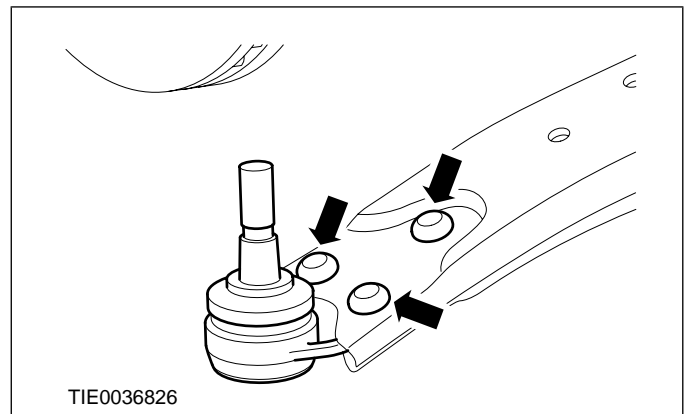


3. Using a suitable ball joint separator, detach the lower arm from the wheel knuckle.



4. Remove the lower arm ball joint.

- Using a suitable electric hand drill remove the rivets.

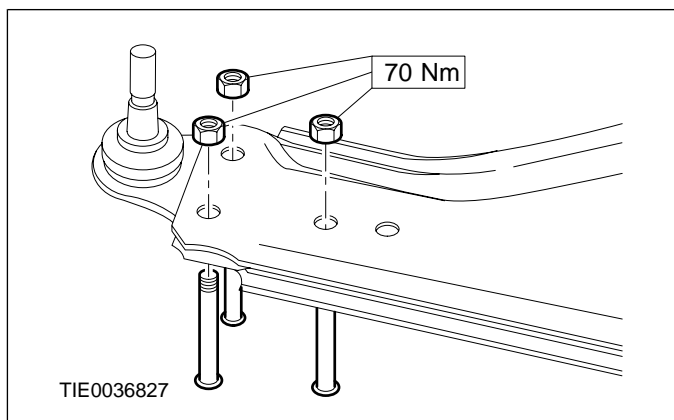


Installation Details

REMOVAL AND INSTALLATION

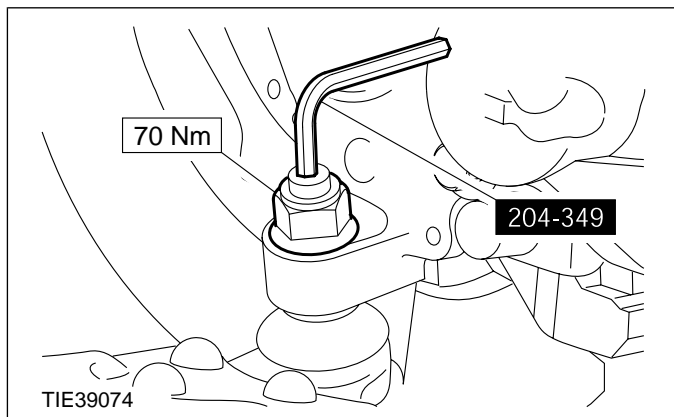
Item 1 Lower arm ball joint

1. Using suitable M10 nuts and M10 x 30 mm bolts, install a new lower arm ball joint.



2. **▲WARNING:** Install a new lower arm ball joint retaining nut. Failure to follow this instruction may result in personal injury.

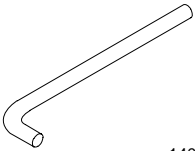
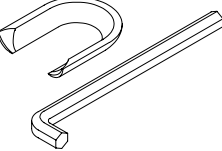
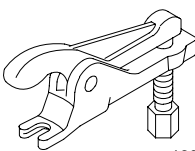
Using the special tool to prevent the ball joint from rotating, install the lower arm ball joint retaining nut.



REMOVAL AND INSTALLATION

Wheel Knuckle

Special Tool(s)

 <p>14039</p>	<p>Lever, Wheel Knuckle 204-159 (14-039)</p>
 <p>E42949</p>	<p>Protector, Ball Joint Gaiter 204-349</p>
 <p>13006</p>	<p>Separator, Ball Joint 211-020</p>

General Equipment

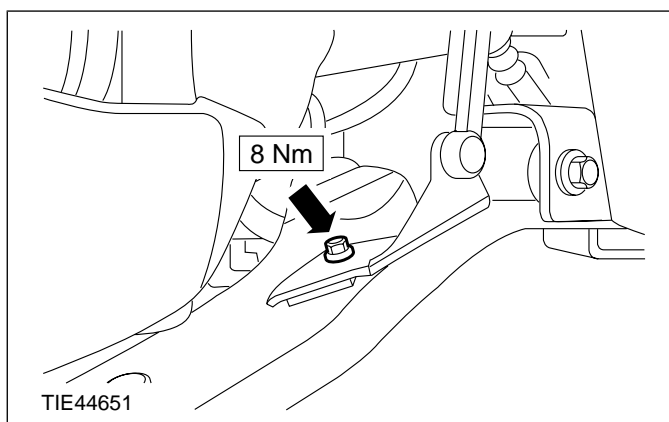
<p>Ball joint separator</p>

⚠ CAUTION: Make sure the strut and spring assembly does not move in a forwards or rearwards direction, to prevent damage to the top mount center cup.

1. Remove the wheel & tire.

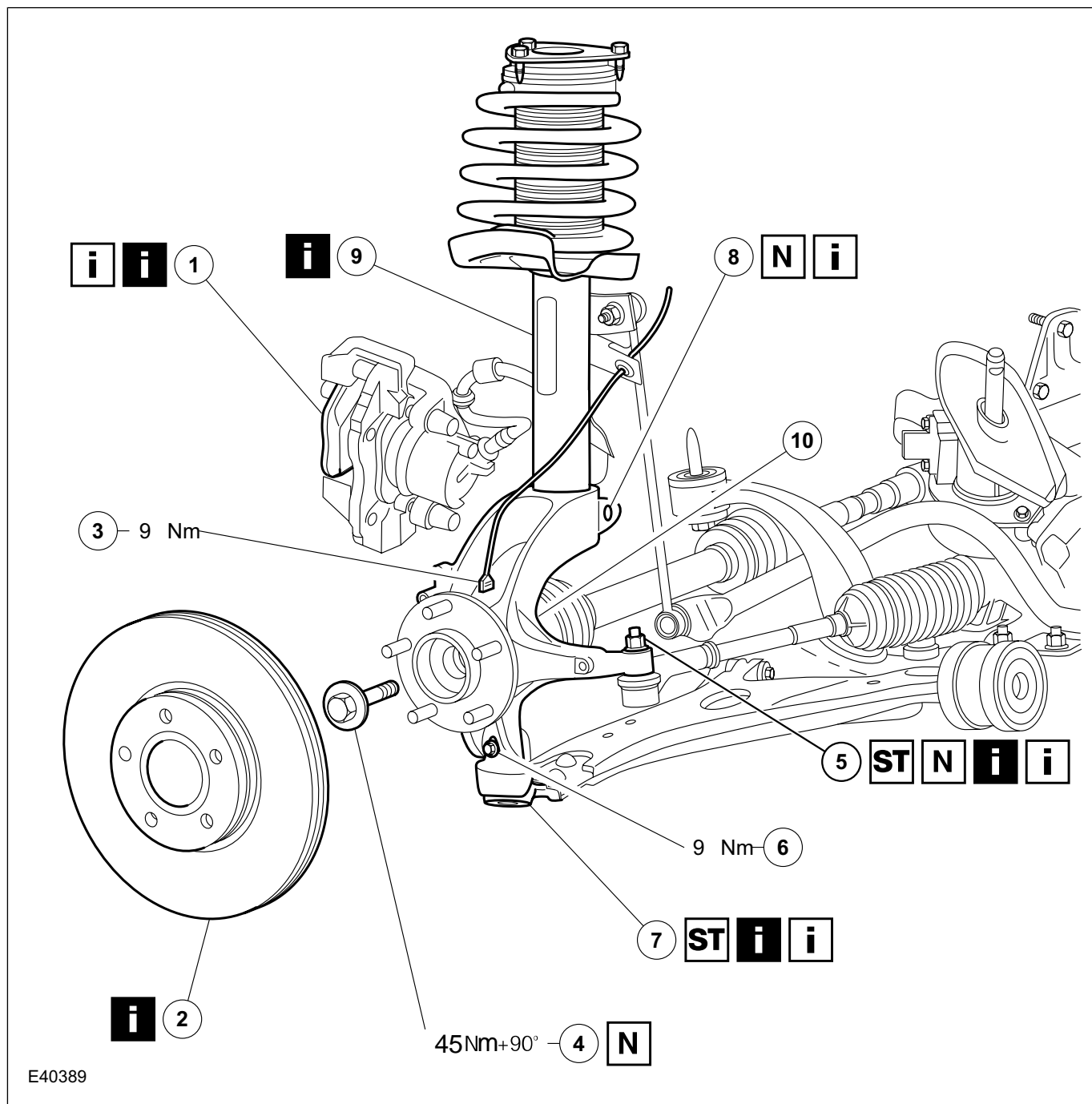
For additional information, refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).

2. Detach the headlamp leveling front sensor bracket from the right-hand lower arm and secure it to one side (if equipped).



3. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



E40389

Item	Description
1	Brake caliper and anchor plate See Removal Detail See Installation Detail
2	Brake disc See Removal Detail
3	Wheel speed sensor retaining bolt
4	Wheel hub retaining bolt
5	Tie-rod end See Removal Detail See Installation Detail

Item	Description
6	Lower arm ball joint heat shield
7	Lower arm ball joint See Removal Detail See Installation Detail
8	Wheel knuckle to strut and spring assembly pinch bolt See Installation Detail
9	Strut and spring assembly See Removal Detail
10	Wheel knuckle

REMOVAL AND INSTALLATION

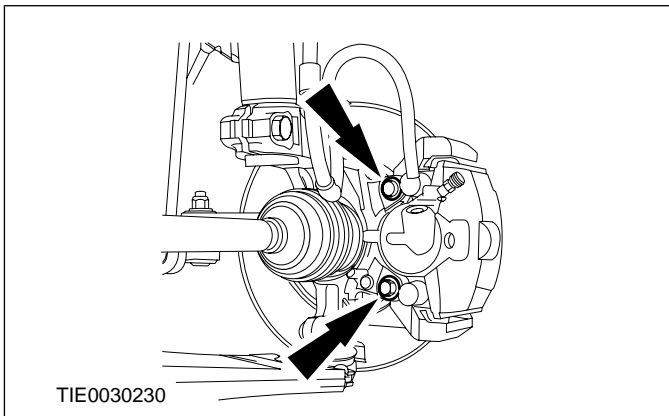
4. To install, reverse the removal procedure.

Removal Details

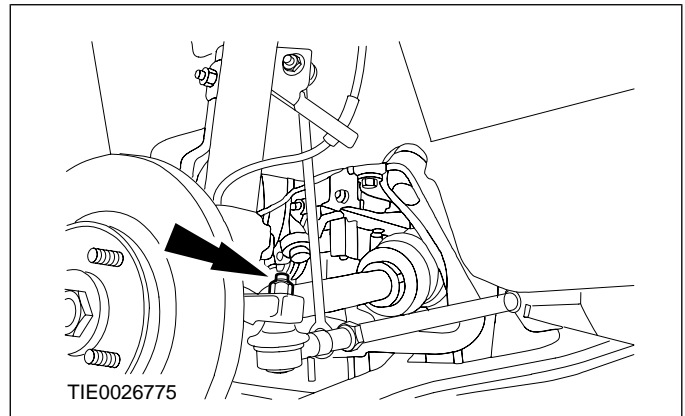
Item 1 Brake caliper and anchor plate

1. **CAUTION:** Suspend the brake caliper and anchor plate to prevent load being placed on the brake hose.

Detach the brake caliper and anchor plate assembly from the wheel knuckle.



Loosen the tie-rod end retaining nut.



2. **CAUTION:** Protect the ball joint seal using a soft cloth to prevent damage.

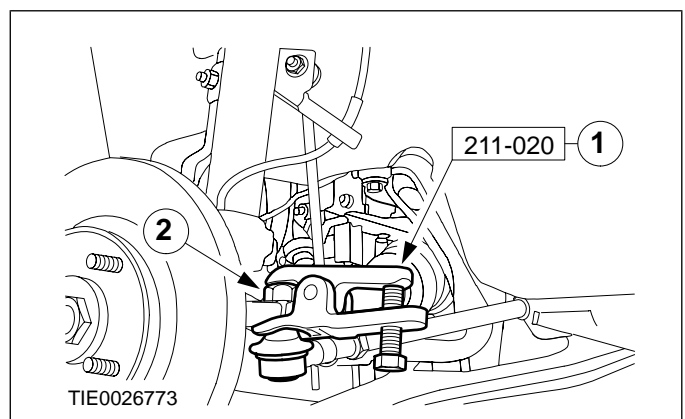
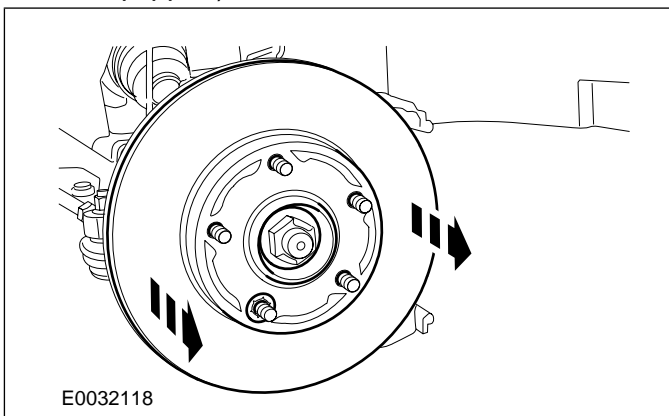
Using the special tool, detach the tie-rod end from the wheel knuckle.

1. Release the tie-rod end.
2. Remove and discard the tie-rod end retaining nut.

Item 2 Brake disc

1. Remove the brake disc.

- Remove and discard the retaining washer (if equipped)



Item 5 Tie-rod end

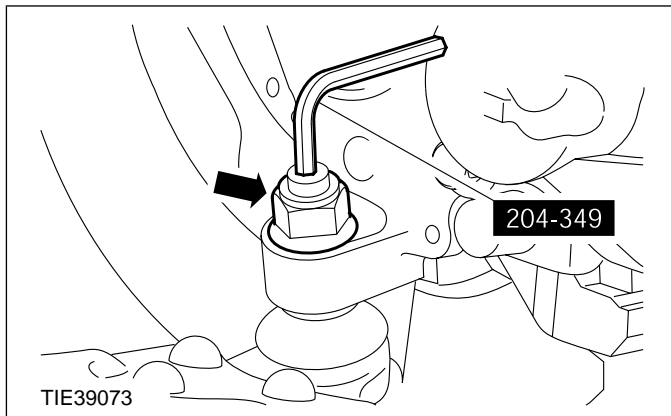
1. **CAUTION:** Leave the tie-rod end retaining nut in place to protect the ball joint stud.

NOTE: Use a 5 mm Allen key to prevent the ball joint stud from rotating.

REMOVAL AND INSTALLATION

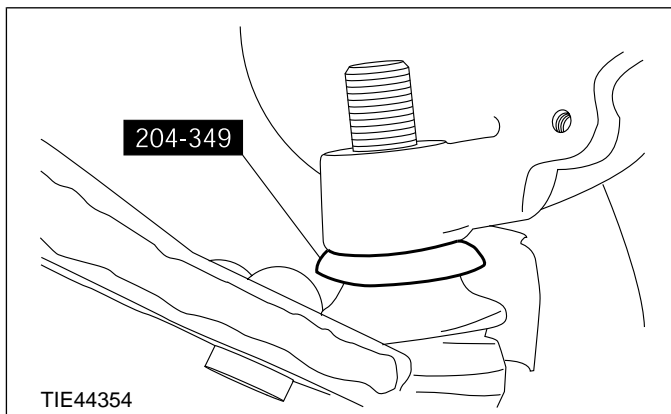
Item 7 Lower arm ball joint

1. Using the special tool to prevent the ball joint from rotating, remove and discard the lower arm ball joint retaining nut.

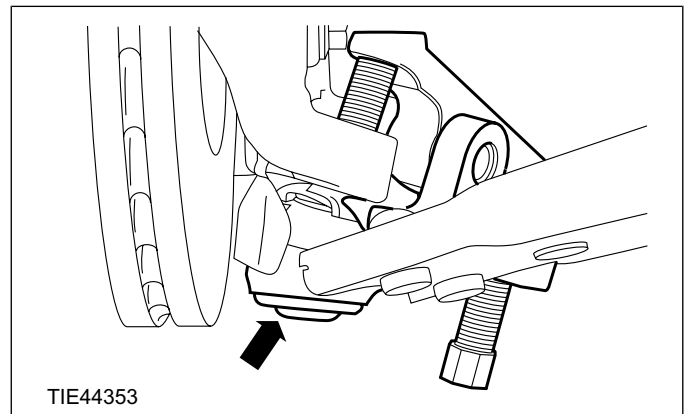


2. **CAUTION:** Make sure the special tool is installed with the curved surface facing upwards to prevent damage to the ball joint seal.

Install the special tool.



3. Using a suitable ball joint separator, detach the lower arm from the wheel knuckle.



4. CAUTIONS:

CAUTION: Support the halfshaft. The inner constant velocity (CV) joint must not be bent more than 23 degrees. The outer CV joint must not be bent more than 45 degrees.

CAUTION: Do not apply excessive force to the strut and spring assembly. Do not pull the strut and spring assembly outwards by more than 28 mm.

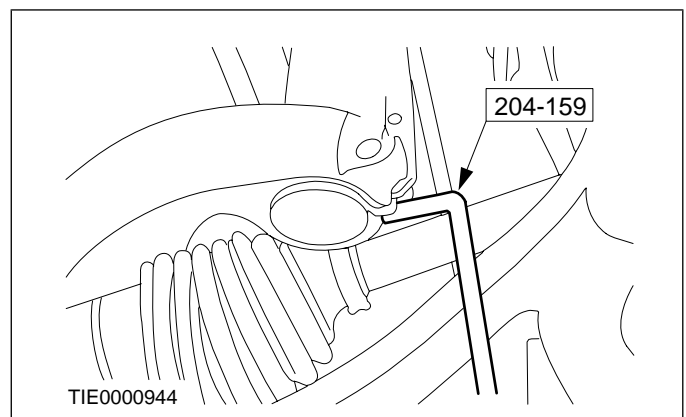
NOTE: Make sure the halfshaft is still fully engaged in the tripod housing.

Detach the halfshaft from the wheel hub.

- Pull the strut and spring assembly outwards approximately 28 mm.

Item 9 Strut and spring assembly

1. Using the special tool, detach the strut and spring assembly from the wheel knuckle.



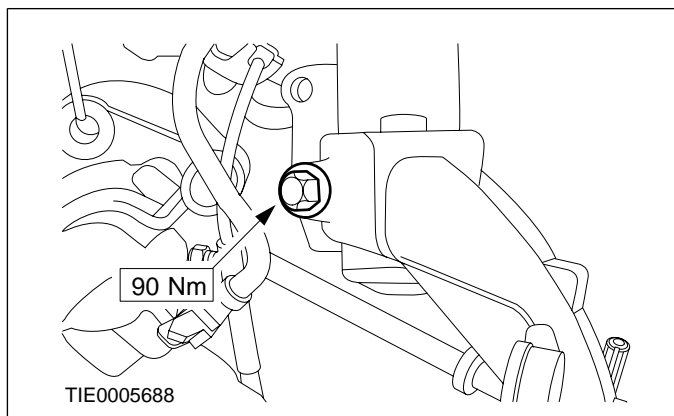
Installation Details

REMOVAL AND INSTALLATION

Item 8 Wheel knuckle to strut and spring assembly pinch bolt

1. **⚠ CAUTION:** The wheel knuckle to strut and spring assembly pinch bolt must be installed from the front of the wheel knuckle.

Attach the strut and spring assembly to the wheel knuckle.

**Item 7** Lower arm ball joint

1. CAUTIONS:

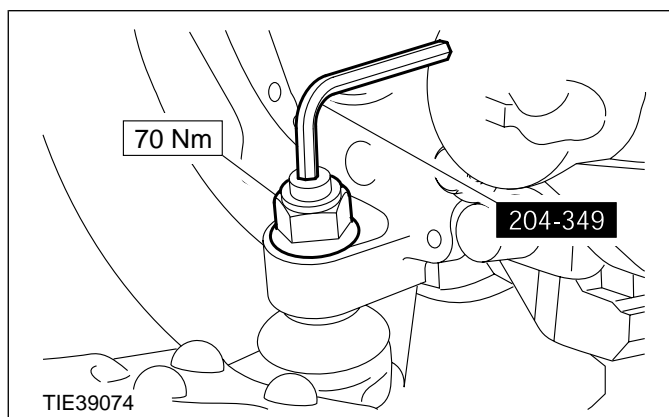
⚠ Support the halfshaft. The inner constant velocity (CV) joint must not be bent more than 23 degrees. The outer CV joint must not be bent more than 45 degrees.

⚠ Do not apply excessive force to the strut and spring assembly. Do not pull the strut and spring assembly outwards by more than 28 mm.

Attach the halfshaft to the wheel hub.

- Pull the strut and spring assembly outwards approximately 28 mm.
2. **⚠ WARNING:** Install a new lower arm ball joint retaining nut. Failure to follow this instruction may result in personal injury.

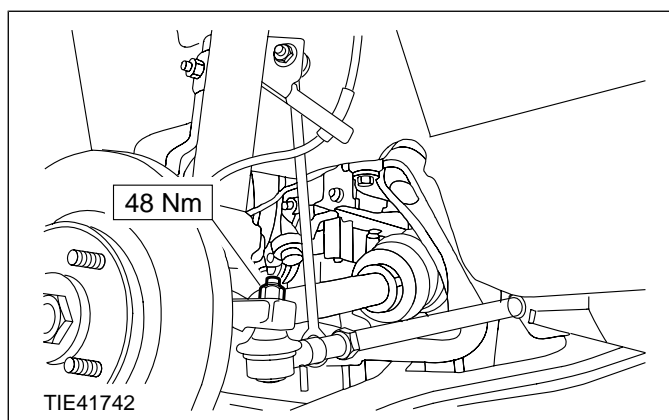
Using the special tool to prevent the ball joint from rotating, install the lower arm ball joint retaining nut.

**Item 5** Tie-rod end

1. **⚠ WARNING:** Install a new tie-rod end retaining nut. Failure to follow this instruction may result in personal injury.

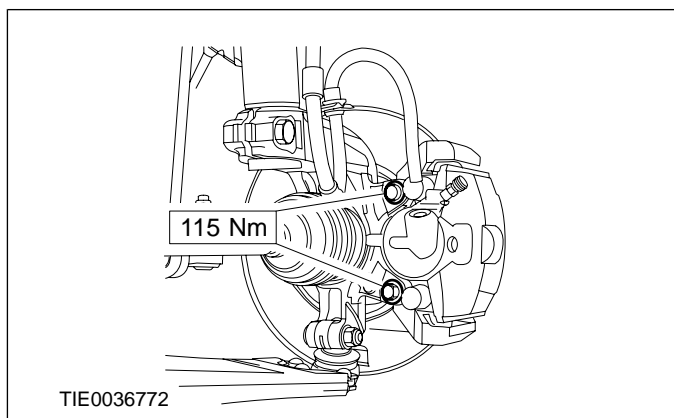
NOTE: Use a 5 mm Allen key to prevent the ball joint from rotating.

Attach the tie-rod end to the wheel knuckle.



REMOVAL AND INSTALLATION**Item 1 Brake caliper and anchor plate**

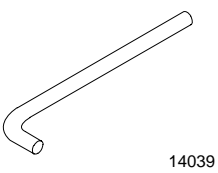
1. Attach the brake caliper and anchor plate to the wheel knuckle.



REMOVAL AND INSTALLATION

Strut and Spring Assembly

Special Tool(s)

 <p>14039</p>	<p>Lever, Wheel Knuckle 204-159</p>
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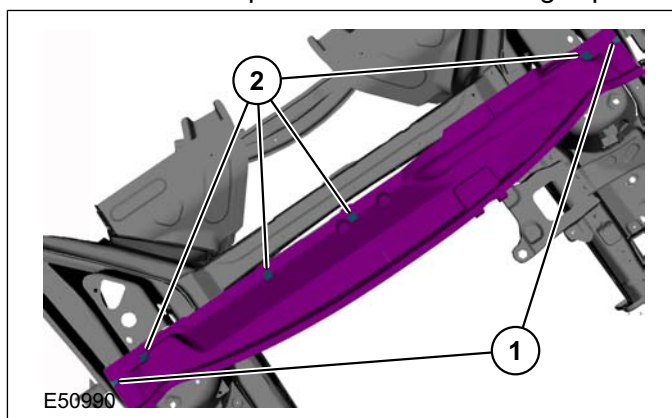
CAUTION: Make sure the strut and spring assembly does not move in a forwards or rearwards direction, to prevent damage to the top mount center cup.

1. Remove the engine upper cover.
2. Remove the cowl panel grille.

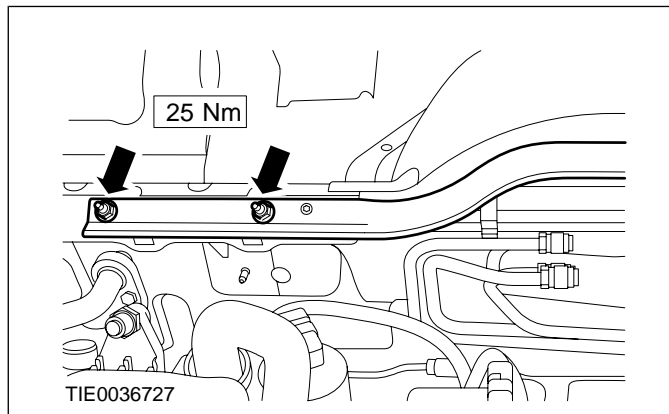
For additional information, refer to: **Cowl Panel Grille (501-02 Front End Body Panels, Removal and Installation)**.

3. Remove the bulkhead extension panel.

1. Remove the retaining screws and washers.
2. Detach the panel from the retaining clips.

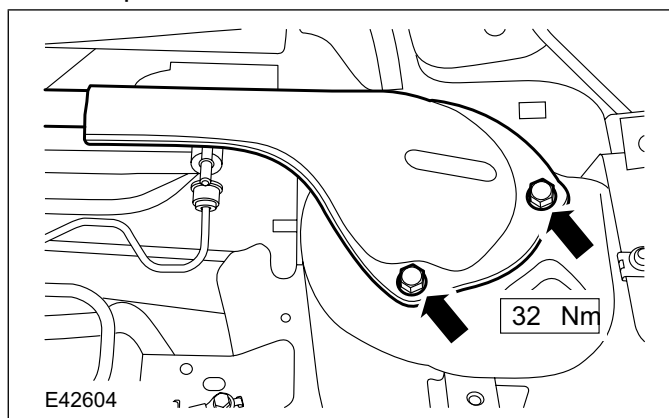


4. Detach the strut and spring assembly top mount brace from the bulkhead (left-hand side shown).



5. Remove the strut and spring assembly top mount brace (left-hand side shown).

- Loosely install the strut and spring assembly top mount bolts.

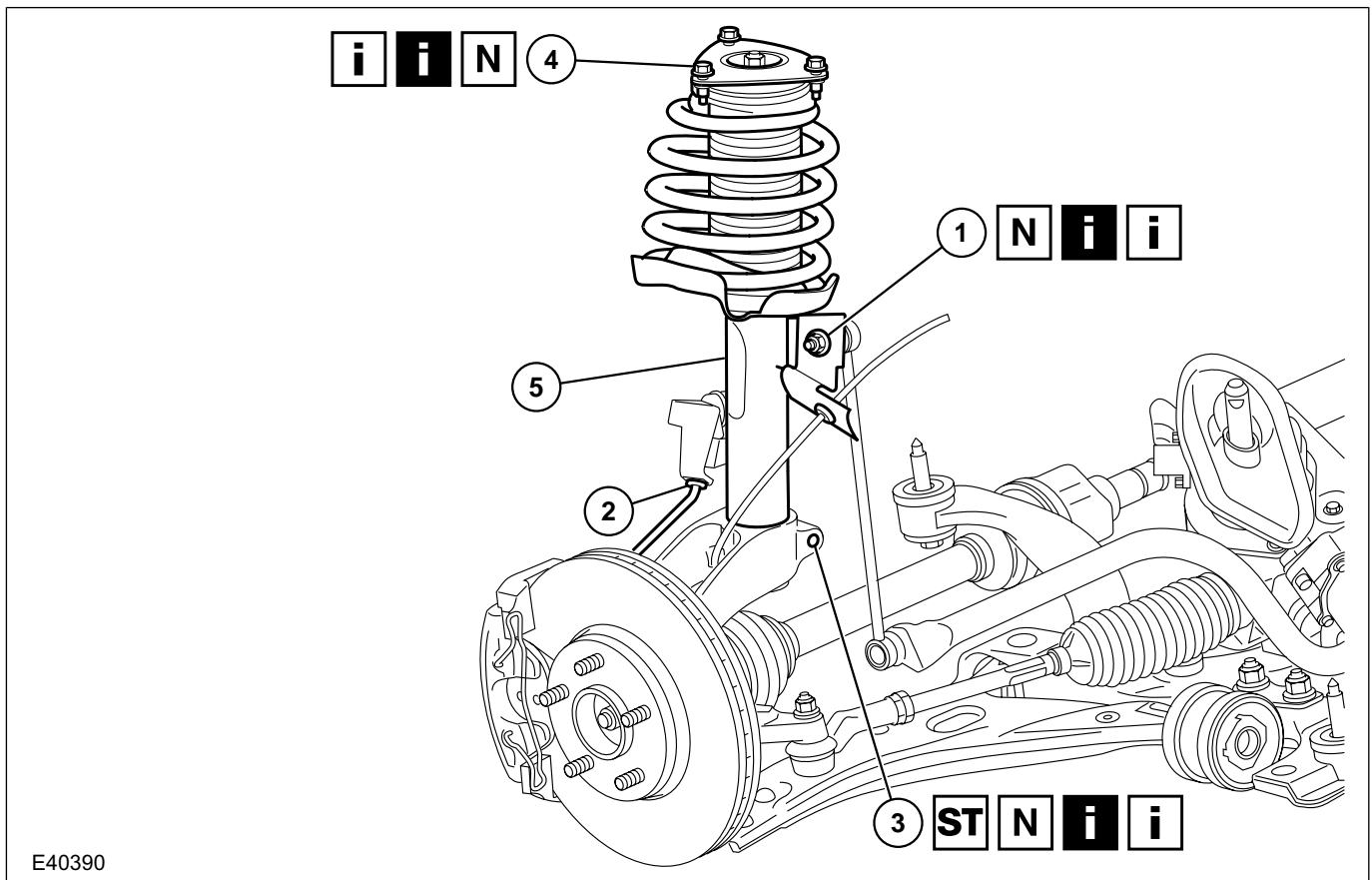


6. Remove the wheel and tire.

For additional information, refer to: **Wheel and Tire (204-04 Wheels and Tires, Removal and Installation)**.

7. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



E40390

Item	Description
1	Stabilizer bar link to strut and spring assembly retaining nut See Removal Detail See Installation Detail
2	Brake hose
3	Wheel knuckle to strut and spring assembly pinch bolt See Removal Detail See Installation Detail

Item	Description
4	Strut and spring assembly top mount retaining bolts See Removal Detail See Installation Detail
5	Strut and spring assembly

8. To install, reverse the removal procedure.

Removal Details

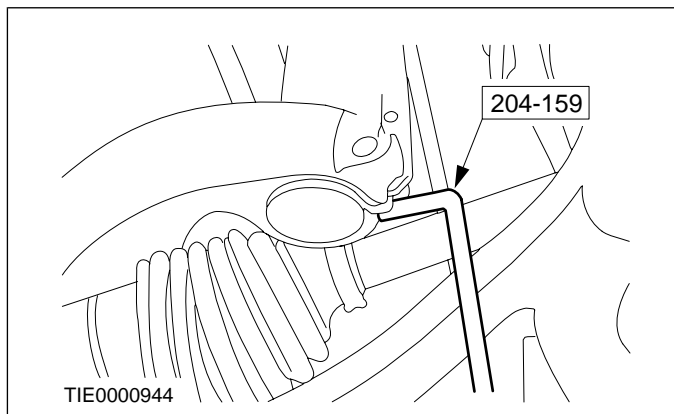
Item 1 Stabilizer bar link to strut and spring assembly retaining nut

NOTE: Use a 5 mm Allen key to prevent the ball joint from rotating.

REMOVAL AND INSTALLATION

Item 3 Wheel knuckle to strut and spring assembly pinch bolt

1. Using the special tool, detach the strut and spring assembly from the wheel knuckle.

**Item 4** Strut and spring assembly top mount retaining bolts

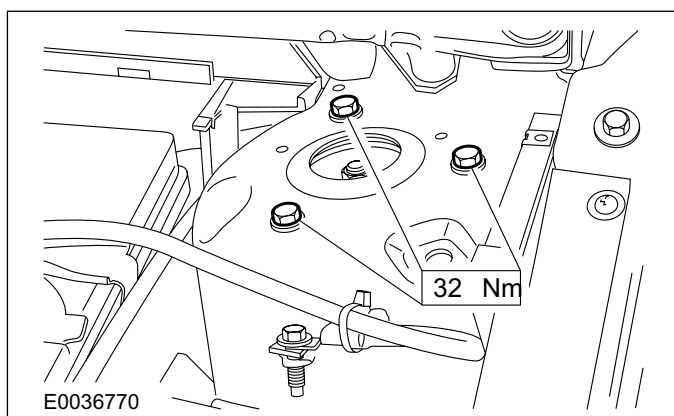
1. **CAUTION:** With the aid of another technician, support the strut and spring assembly.

Installation Details

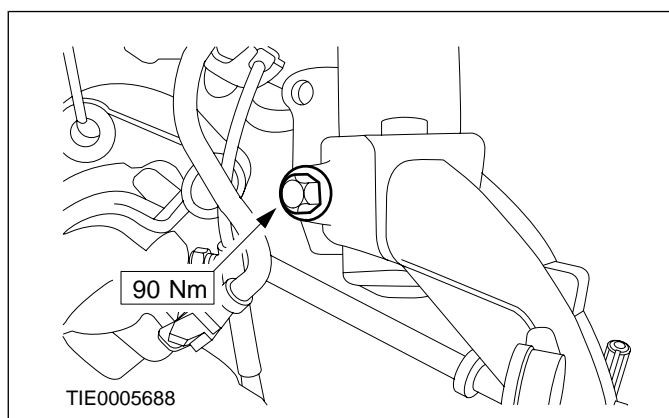
Item 4 Strut and spring assembly top mount retaining bolts

1. **CAUTION:** With the aid of another technician, support the strut and spring assembly.

Install the strut and spring assembly top mount bolts.



Attach the strut and spring assembly to the wheel knuckle.

**Item 1** Stabilizer bar link to strut and spring assembly retaining nut

1. **NOTE:** Use a 5 mm Allen key to prevent the ball joint from rotating.

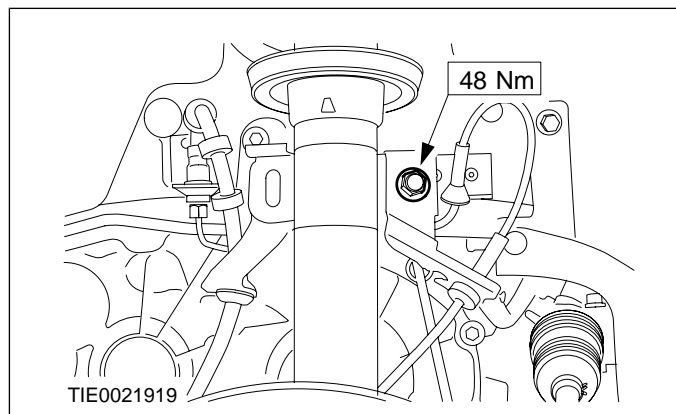
Item 3 Wheel knuckle to strut and spring assembly pinch bolt

1. **WARNING:** Install a new wheel knuckle to strut and spring assembly pinch bolt. Failure to follow this instruction may result in personal injury.

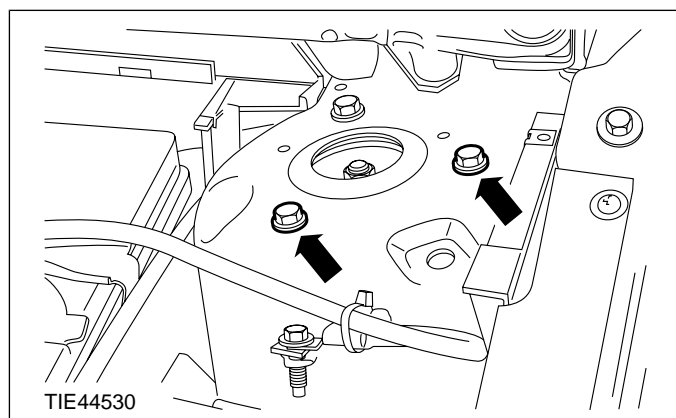
1. **CAUTION:** The wheel knuckle to strut and spring assembly pinch bolt must be installed from the front of the wheel knuckle.

REMOVAL AND INSTALLATION

Install the stabilizer bar link to strut and spring assembly retaining nut.



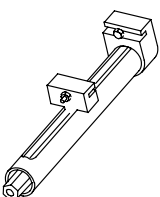
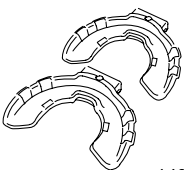
2. Remove the strut and spring assembly top mount bolts.



DISASSEMBLY AND ASSEMBLY

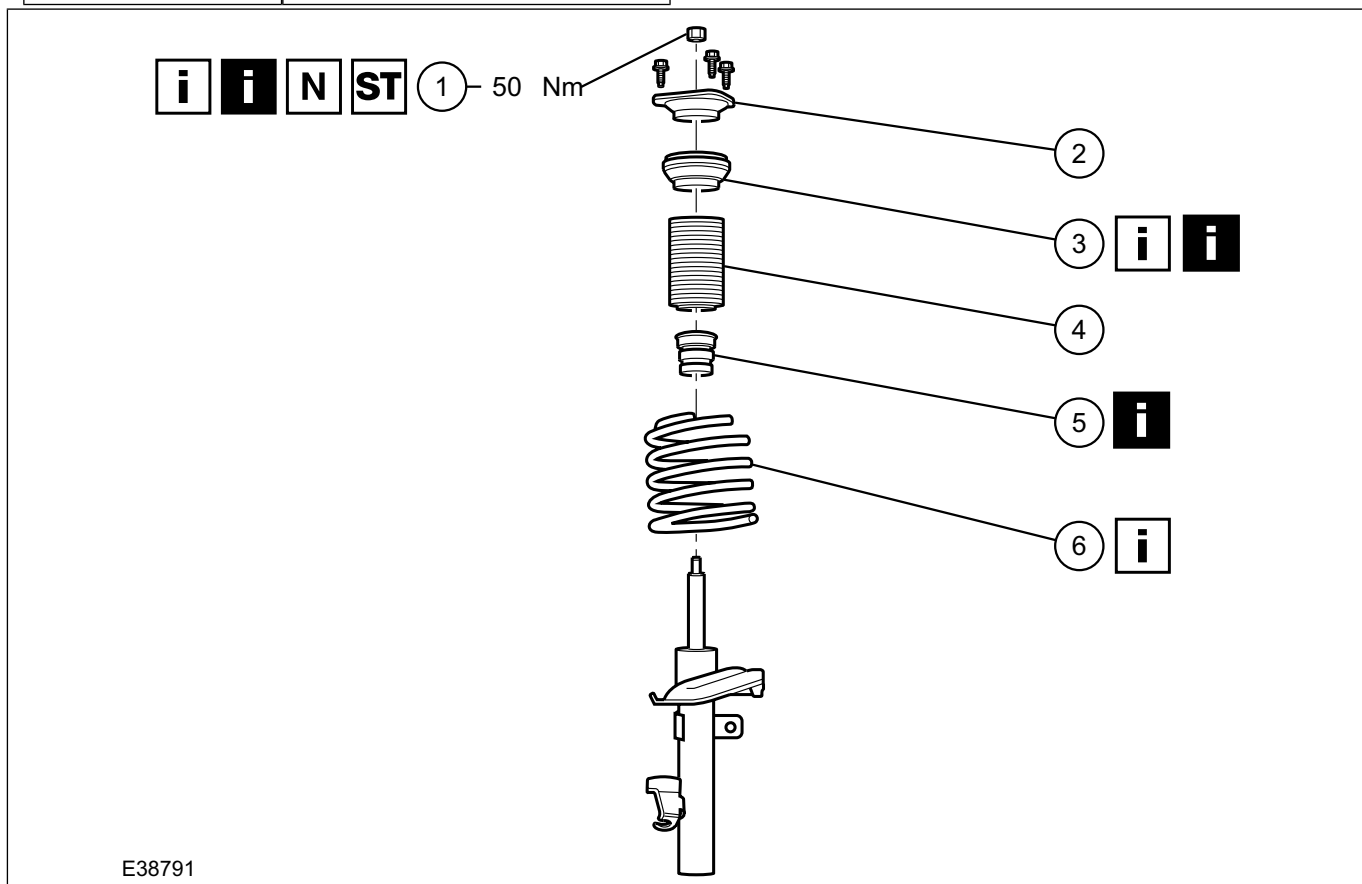
Strut and Spring Assembly

Special Tool(s)

 <p>14042</p>	<p>Compressor, Coil Spring 204-167 (14-042)</p>
 <p>1404201</p>	<p>Adapters for 204-167 204-167-01 (14-042-01)</p>

WARNING: The spring is under extreme tension; care must be taken at all times. Failure to follow this instruction may result in personal injury.

1. Disassemble the components in the order indicated in the following illustration(s) and table(s).



E38791

Item	Description
1	Thrust bearing retaining nut <i>See Disassembly Detail</i> <i>See Assembly Detail</i>
2	Top mount

Item	Description
3	Thrust bearing and spring seat assembly <i>See Disassembly Detail</i> <i>See Assembly Detail</i>
4	Boot

DISASSEMBLY AND ASSEMBLY

Item	Description
5	Bump stop
6	Spring See Assembly Detail

- To assemble, reverse the disassembly procedure.

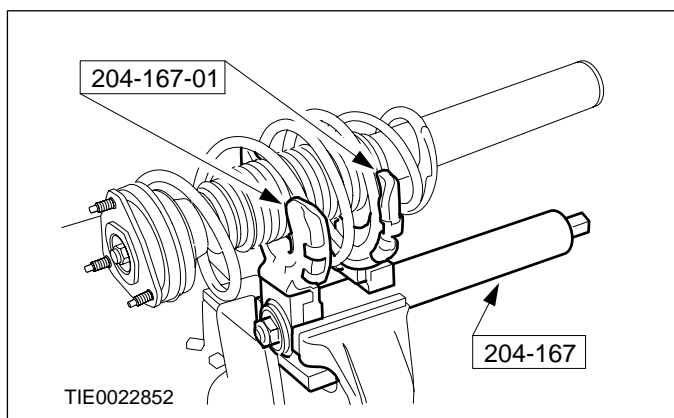
Disassembly Details

Item 1 Thrust bearing retaining nut

- WARNING:** The spring is under extreme tension; care must be taken at all times. Failure to follow this instruction may result in personal injury.

NOTE: Make a note of the position of the top mount, the top mount bearing alignment marking, the strut alignment marking and the spring seat cut out, to aid assembly.

Using the special tools, compress the spring.



- CAUTION:** Use an Allen key to prevent the piston rod from rotating. Remove the thrust bearing retaining nut.

Item 3 Thrust bearing and spring seat assembly

-

Assembly Details

Item 6 Spring

- CAUTION:** The ends of the spring must locate correctly in the spring seats.

Item 3 Thrust bearing and spring seat assembly

- CAUTION:** Make sure the thrust bearing and spring seat assembly is correctly seated onto the boot before assembly.

Item 1 Thrust bearing retaining nut

- CAUTION:** Make sure the alignment markings on the top mount and the top mount bearing are aligned with the spring seat cut out and the alignment marking on the strut.

SECTION 204-02 Rear Suspension

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Vehicles with solid stabilizer bar link 3-door and 5-door	204-02-6
Wagon.....	204-02-7
DIAGNOSIS AND TESTING	
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REMOVAL AND INSTALLATION	
Wheel Hub — Vehicles With: Rear Disc Brakes..... (15 373 0)	204-02-10
Upper Arm..... (15 701 0)	204-02-12
Front Lower Arm..... (15 690 0)	204-02-14
Rear Lower Arm — Vehicles With: Solid Stabilizer Bar Link.....	204-02-16
Rear Lower Arm — Vehicles With: Ball Joint Stabilizer Bar Link.....	204-02-19
Stabilizer Bar — Vehicles With: Solid Stabilizer Bar Link.....	204-02-22
Stabilizer Bar — Vehicles With: Ball Joint Stabilizer Bar Link.....	204-02-25
Wheel Knuckle.....	204-02-29
Spring..... (15 621 0)	204-02-36

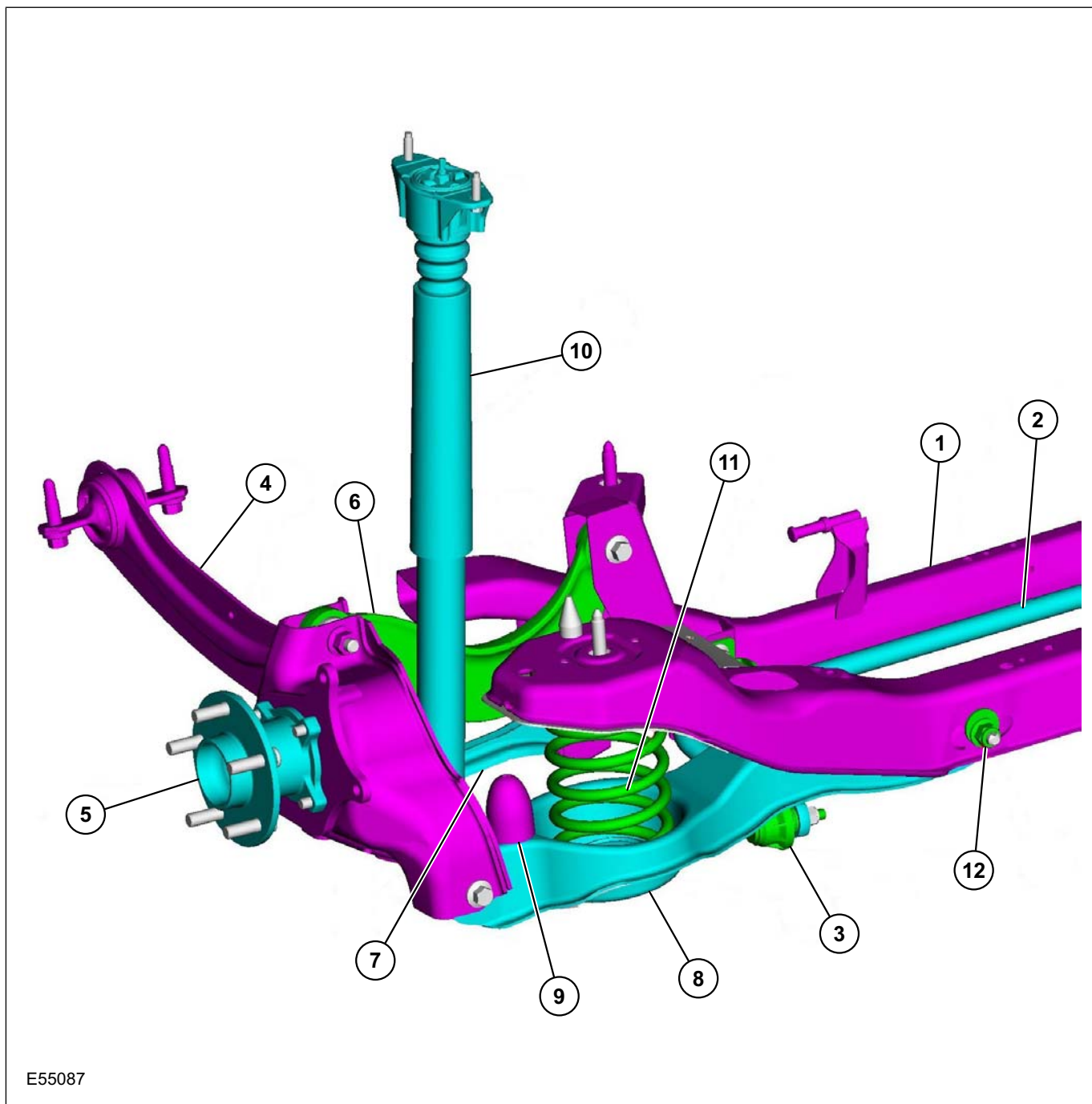
SPECIFICATIONS**Torque Specifications**

Description	Nm	lb-ft	lb-in
Stabilizer bar link to rear lower arm retaining nut – Vehicles with solid stabilizer bar link	25	18	-
Stabilizer bar link to rear lower arm retaining nut – Vehicles with ball joint stabilizer bar link	48	35	-
Stabilizer bar to stabilizer link retaining nut – Vehicles with ball joint stabilizer bar link	70	52	-
Stabilizer bar clamp retaining bolts	48	35	-
Rear axle crossmember retaining bolts	125	92	-
Upper arm retaining bolts	115	85	-
Front lower arm retaining bolts	115	85	-
Rear lower arm to wheel knuckle retaining bolt	115	85	-
Rear lower arm adjustment cam nut	90	66	-
Wheel speed sensor retaining bolt	5	-	48
Wheel hub retaining bolts	55	41	-
Wheel knuckle front retaining bolts	125	92	-
Shock absorber upper mount retaining bolt	25	18	-
Shock absorber lower mount retaining bolt	115	85	-

DESCRIPTION AND OPERATION

Rear Suspension

Vehicles with ball joint stabilizer bar link 3-door and 5-door



E55087

Item	Description
1	Crossmember
2	Stabilizer bar
3	Ball joint stabilizer bar link
4	Wheel knuckle

Item	Description
5	Wheel hub
6	Upper arm
7	Front lower arm
8	Rear lower arm

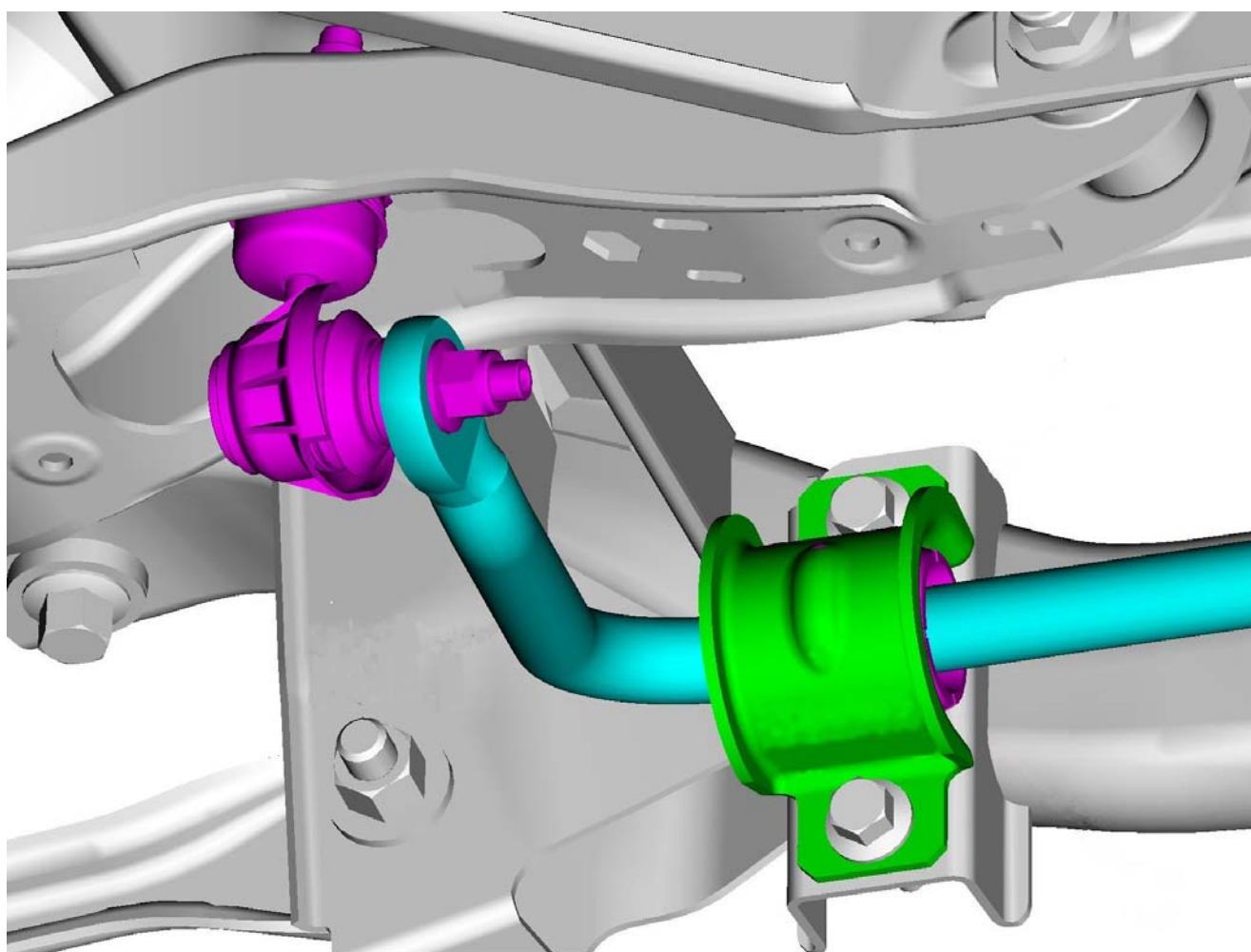
DESCRIPTION AND OPERATION

Item	Description
9	Bump stop
10	Shock absorber
11	Spring
12	Rear lower arm adjustment cam nut

Item 2 : Stabilizer Bar

The stabilizer bar is uniquely shaped with modified locating holes to accommodate the ball joint stabilizer bar link.

Item 3 : Ball Joint Stabilizer Bar Link



E55089

The ball joint stabilizer bar link has been introduced to provide a quicker response to suspension movement. This enables the stabilizer bar to

DESCRIPTION AND OPERATION

respond more directly to wheelstation movement. The ball joint stabilizer bar link is assembled between the rear lower arm and stabilizer bar with retaining nuts.

Item 4: Wheel Knuckle

The wheel knuckle provides a wider track width and attachment surface for the unique wheel hub assembly.

Item 5: Wheel Hub

The wheel hub assembly incorporates the wheel bearing, wheel speed sensor ring, wheel hub and wheel spindle as one assembly.

Item 8: Rear Lower Arm

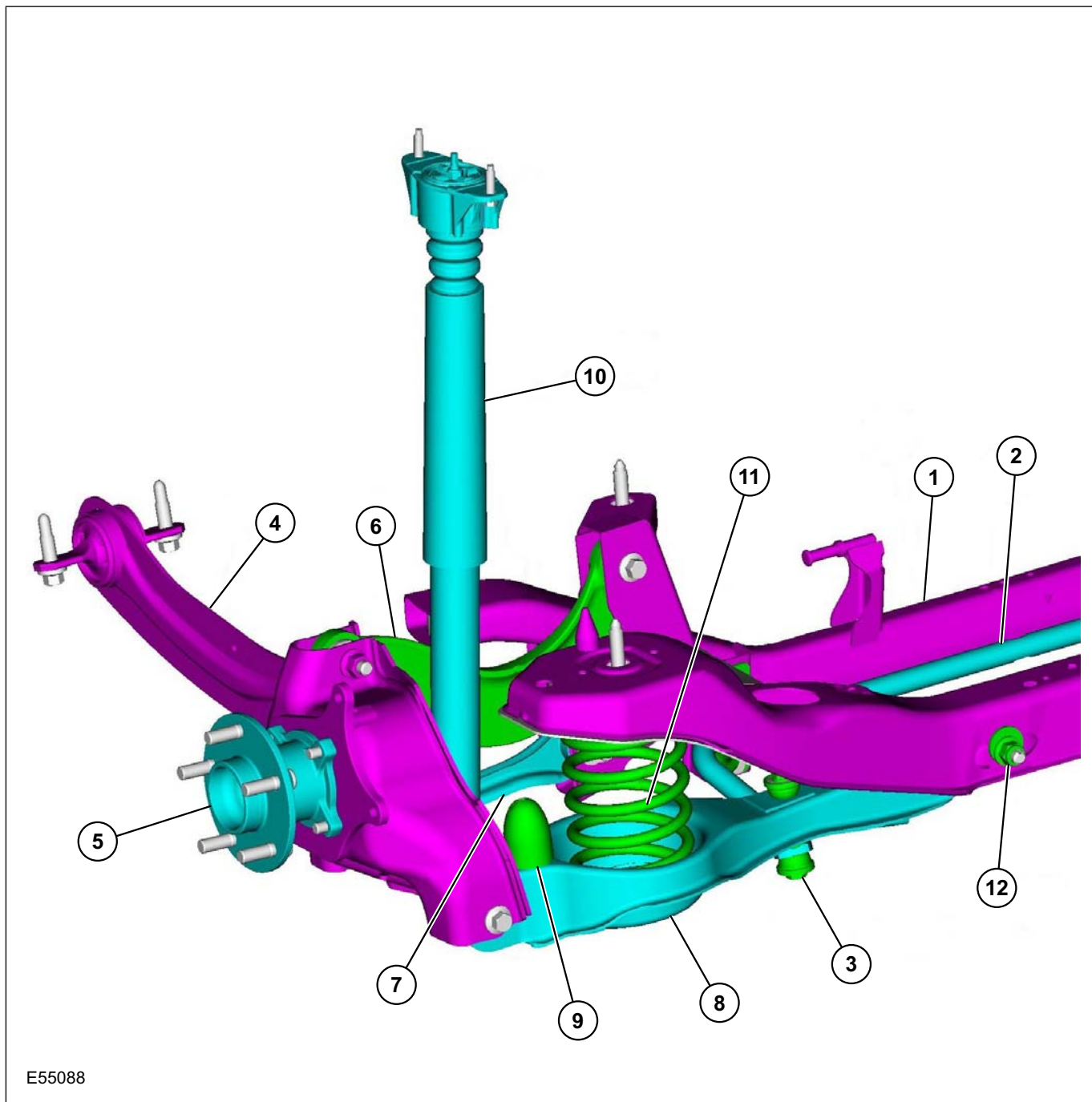
The rear lower arm has a unique shape to incorporate the ball joint stabilizer bar link.

Item 10: Shock Absorber

The shock absorber includes a unique upper mount damper to provide additional noise reduction.

DESCRIPTION AND OPERATION

Vehicles with solid stabilizer bar link 3-door and 5-door



Item	Description
1	Crossmember
2	Stabilizer bar
3	Solid stabilizer bar link
4	Wheel knuckle
5	Wheel hub
6	Upper arm

Item	Description
7	Front lower arm
8	Rear lower arm
9	Bump stop
10	Shock absorber
11	Spring
12	Rear lower arm adjustment cam

DESCRIPTION AND OPERATION

Item 4: Wheel Knuckle

The wheel knuckle provides a wider track width and attachment surface for the unique wheel hub assembly.

Item 5: Wheel Hub

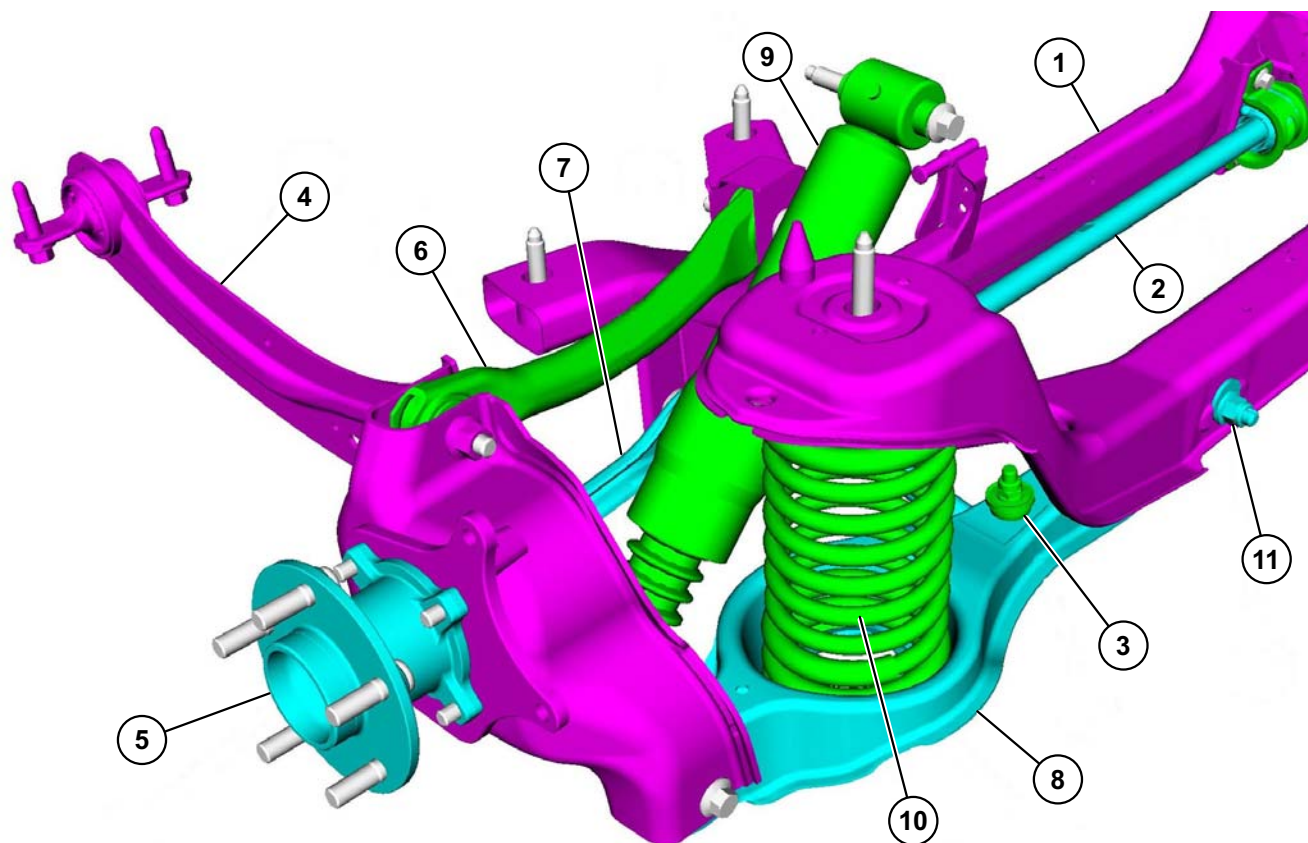
The wheel hub assembly incorporates the wheel bearing, wheel speed sensor ring, wheel hub and wheel spindle as one assembly.

Item 10: Shock Absorber

The shock absorber includes a unique upper mount damper to provide additional noise reduction.

Wagon

The wagon is only available with a solid stabilizer bar link.



E55086

DESCRIPTION AND OPERATION

Item	Description
1	Crossmember
2	Stabilizer bar
3	Solid stabilizer bar link
4	Wheel knuckle
5	Wheel hub
6	Upper arm
7	Front lower arm
8	Rear lower arm
9	Shock absorber
10	Spring
11	Rear lower arm adjustment cam

Item 4: Wheel Knuckle

The wheel knuckle provides a wider track width and attachment surface for the unique wheel hub assembly.

Item 5: Wheel Hub

The wheel hub assembly incorporates the wheel bearing, wheel speed sensor ring, wheel hub and wheel spindle as one assembly.

Item 9: Shock Absorber

Nivomat shock absorbers are available as an option to provide load leveling rear suspension.



DIAGNOSIS AND TESTING

Rear Suspension

**REFER to Section 204-00 [Suspension System -
General Information].**



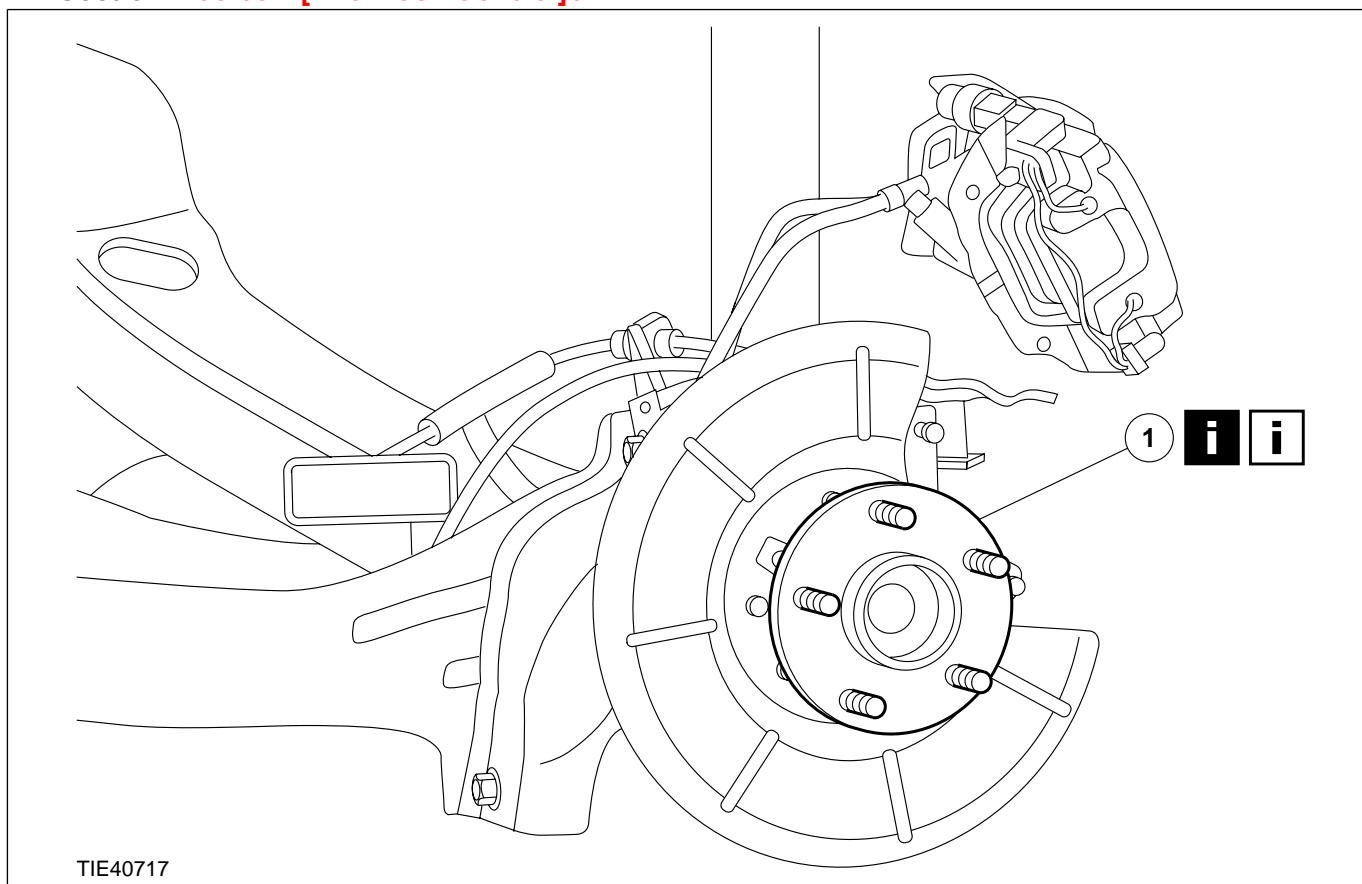
REMOVAL AND INSTALLATION

Wheel Hub — Vehicles With: Rear Disc Brakes(15 373 0)

1. Remove the brake disc. For additional information, refer to **Section 206-04 [Rear Disc Brake]**.
2. Remove the rear wheel speed sensor. For additional information, refer to **Section 206-09A [Anti-Lock Control] /**

206-09B [Anti-Lock Control - Traction Control] / 206-09C [Anti-Lock Control - Stability Assist].

3. Remove the components in the order indicated in the following illustration(s) and table(s).



TIE40717

Item	Description
1	Wheel hub See Removal Detail See Installation Detail

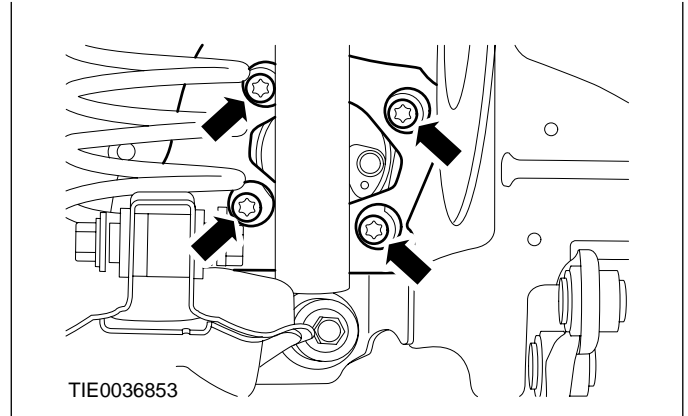
4. To install, reverse the removal procedure.

Removal Details

REMOVAL AND INSTALLATION

Item 1 Wheel hub

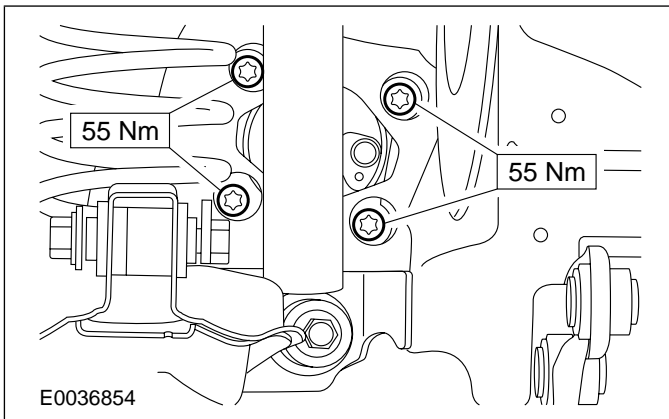
1. Remove the wheel hub.



Installation Details

Item 1 Wheel hub

1. Install the wheel hub.



REMOVAL AND INSTALLATION

Upper Arm(15 701 0)

General Equipment

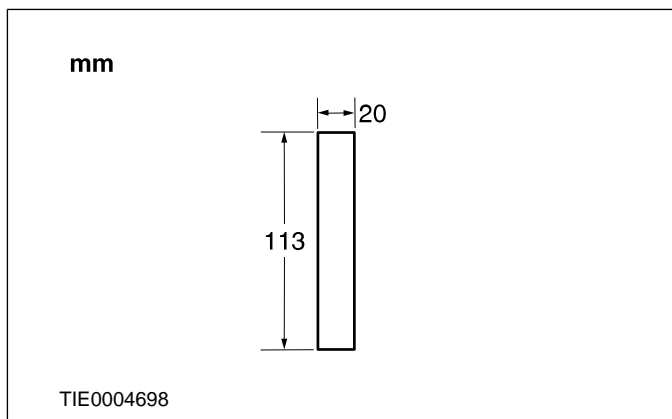
Transmission jack

Removal

1. Remove the spring. For additional information, refer to: (204-02 Rear Suspension)

Spring - Vehicles Built Up To: 07/2004
(Removal and Installation),
Spring - Vehicles Built From: 07/2004
(Removal and Installation).

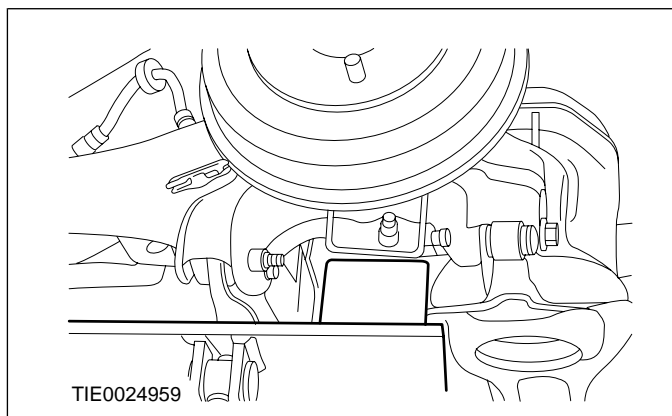
2. Fabricate a 20 mm wide by 113 mm long spacer.



3. **CAUTION:** The suspension must be set to the design height setting.

Using a transmission jack and a wooden block, raise the suspension to the design height setting.

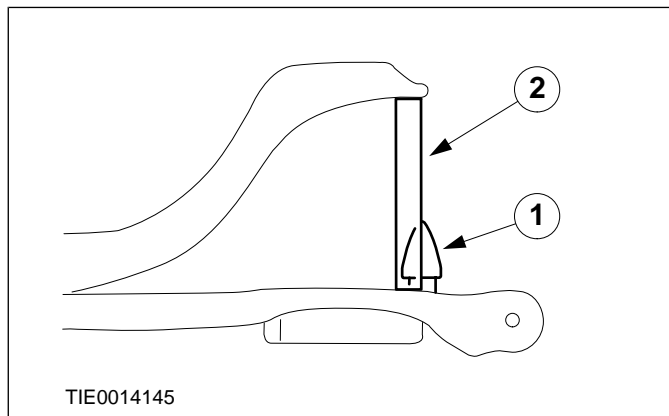
- Position the transmission jack and the wooden block as shown.



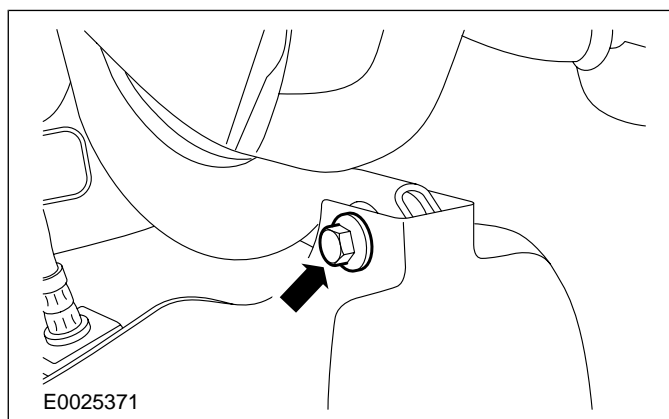
4. **NOTE:** The spacer must be positioned exactly as shown.

Install the spacer.

1. Remove the bump stop.
2. Install the spacer between the rear lower arm and the rear axle crossmember making sure that the spacer is in a vertical plane.



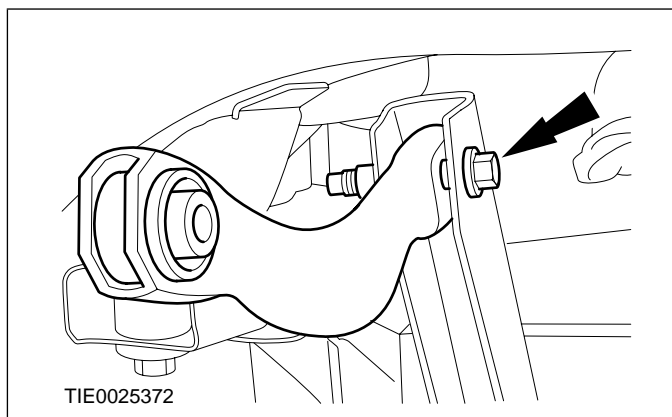
5. Detach the upper arm from the wheel knuckle.



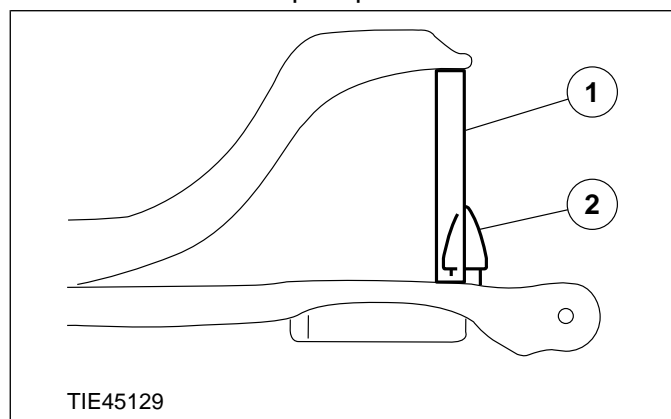
6. **NOTE:** Make a note of the position of the upper arm to aid installation.

REMOVAL AND INSTALLATION

Remove the upper arm.

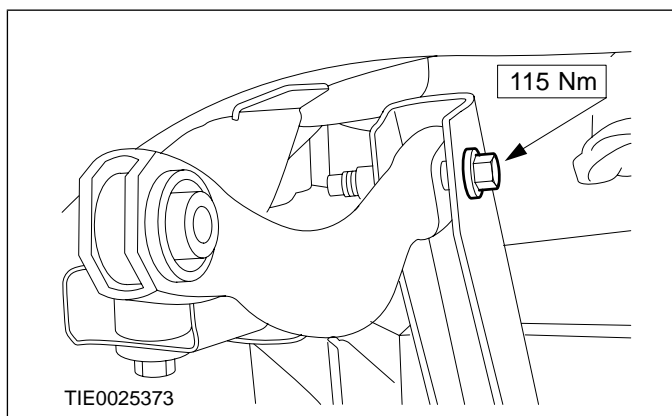


2. Install the bump stop.



Installation

1. Install the upper arm to the rear axle crossmember.

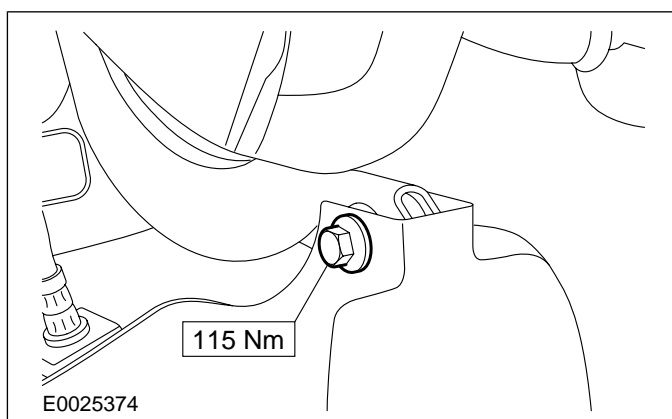


4. Install the spring. For additional information, refer to: (204-02 Rear Suspension)

Spring - Vehicles Built Up To: 07/2004
(Removal and Installation),

Spring - Vehicles Built From: 07/2004
(Removal and Installation).

2. Attach the upper arm to the wheel knuckle.



3. Lower the suspension from the design height setting.

1. Remove the spacer.

REMOVAL AND INSTALLATION

Front Lower Arm(15 690 0)

General Equipment

Transmission jack

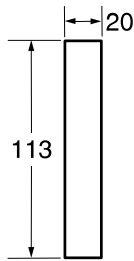
Removal

1. Remove the spring. For additional information, refer to: (204-02 Rear Suspension)

Spring (Removal and Installation),

2. Fabricate a 20 mm wide by 113 mm long spacer.

mm

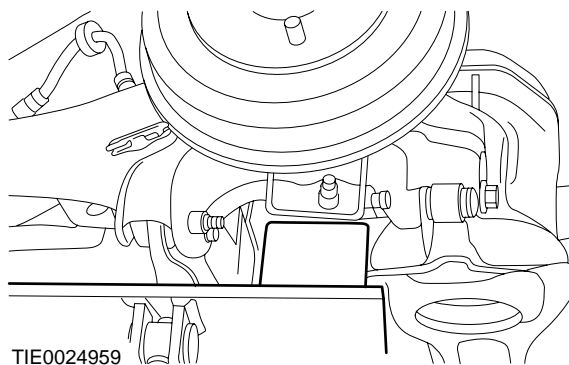


TIE0004698

3. **CAUTION:** The suspension must be set to the design height setting.

Using a transmission jack and a wooden block, raise the suspension to the design height setting.

- Position the transmission jack and the wooden block as shown.

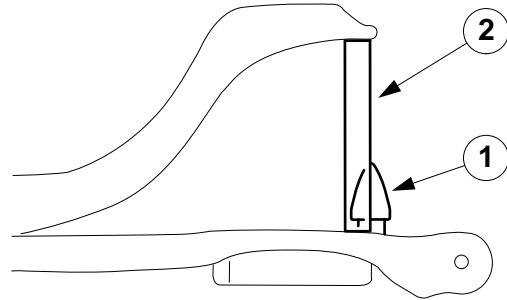


TIE0024959

4. **NOTE:** The spacer must be positioned exactly as shown.

Install the spacer.

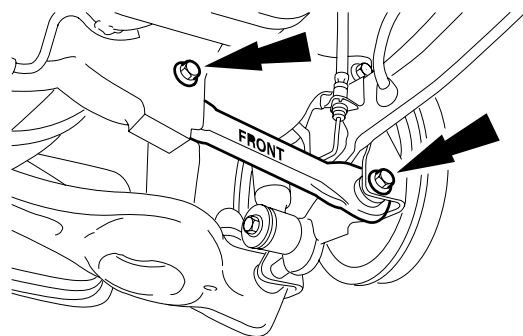
1. Remove the bump stop.
2. Install the spacer between the rear lower arm and the rear axle crossmember making sure that the spacer is in a vertical plane.



TIE0014145

5. **CAUTION:** The front lower arm is marked **FRONT**. Make a note of the position of the front lower arm to aid installation.

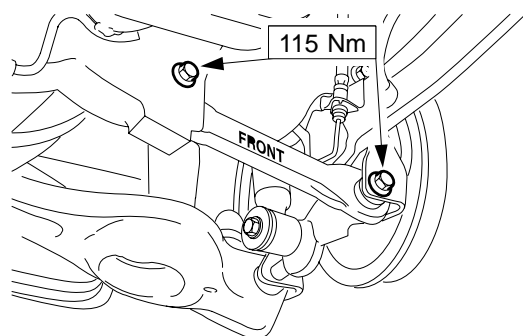
Remove the front lower arm.



TIE0024965

Installation

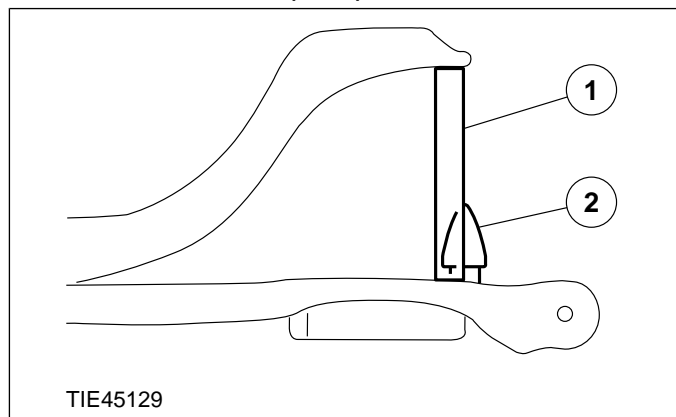
1. Install the front lower arm.



TIE0024966

REMOVAL AND INSTALLATION**2. Lower the suspension from the design height setting.**

1. Remove the spacer.
2. Install the bump stop.

**3. Install the spring. For additional information, refer to: (204-02 Rear Suspension) Spring (Removal and Installation),**

REMOVAL AND INSTALLATION

Rear Lower Arm — Vehicles With: Solid Stabilizer Bar Link

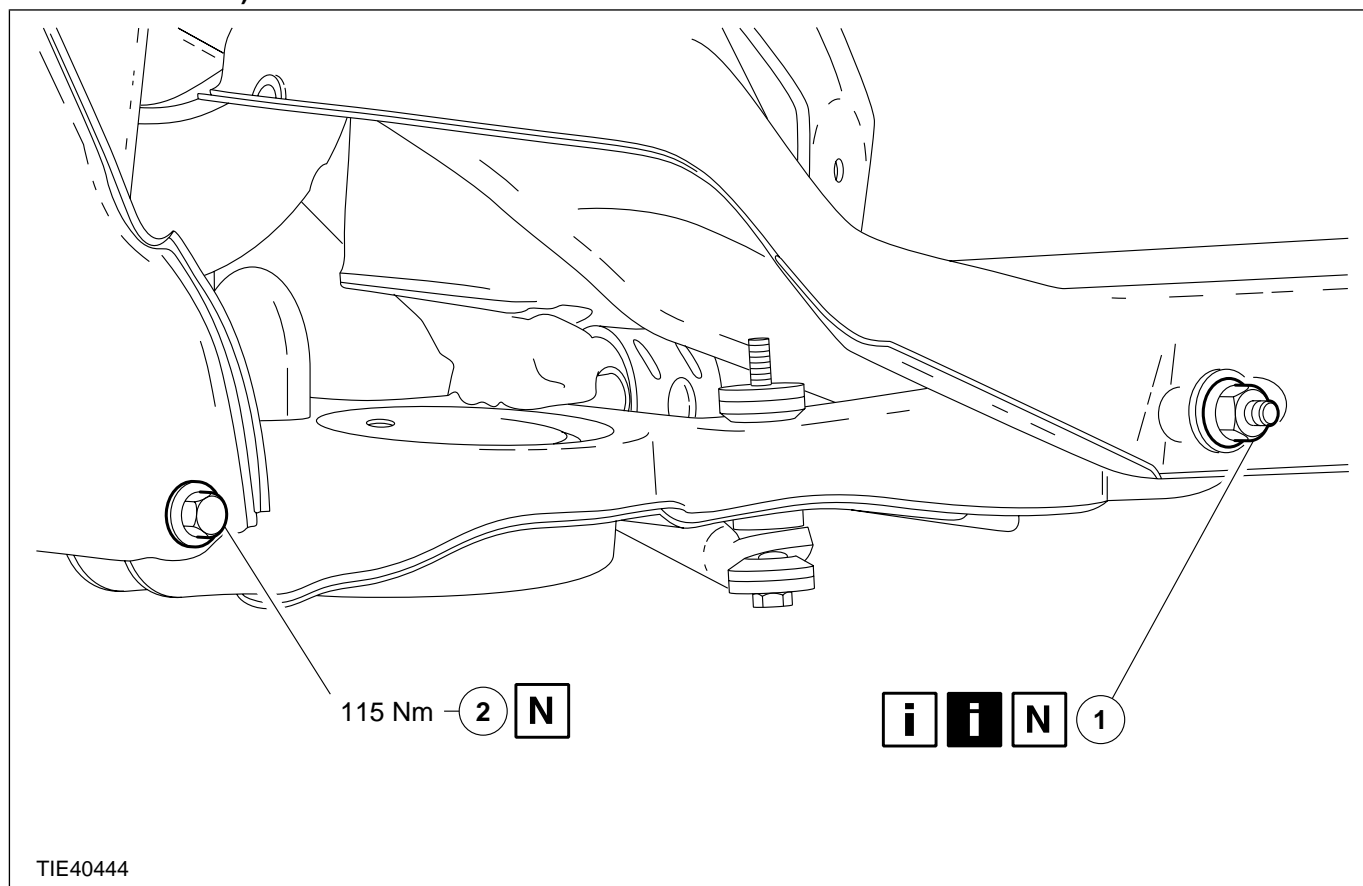
General Equipment

Transmission jack

1. Remove the spring. For additional information, refer to:

Specifications (204-00 Suspension System - General Information, Specifications),
Spring - Vehicles Built From: 07/2004 (204-02 Rear Suspension, Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Rear lower arm adjustment cam nut See Removal Detail See Installation Detail
2	Rear lower arm to wheel knuckle retaining bolt

3. To install, reverse the removal procedure.

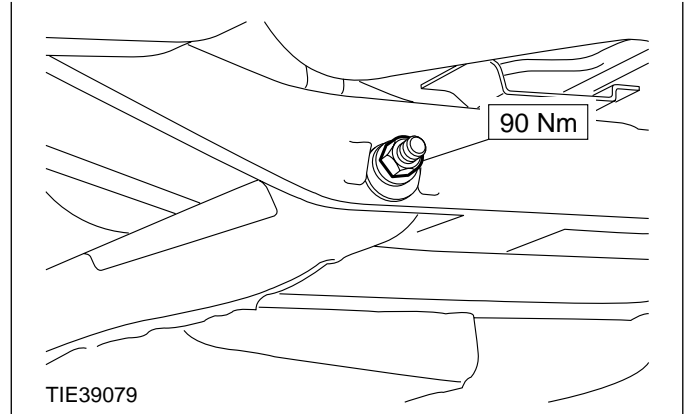
4. Check the toe setting and adjust as necessary. For additional information, refer to: (204-00 Suspension System - General Information)

Specifications (Specifications),
Rear Toe Adjustment (General Procedures).

5. NOTE: Final tightening of the rear lower arm adjustment cam nut should be carried out when the vehicle weight is on the road wheels.

REMOVAL AND INSTALLATION

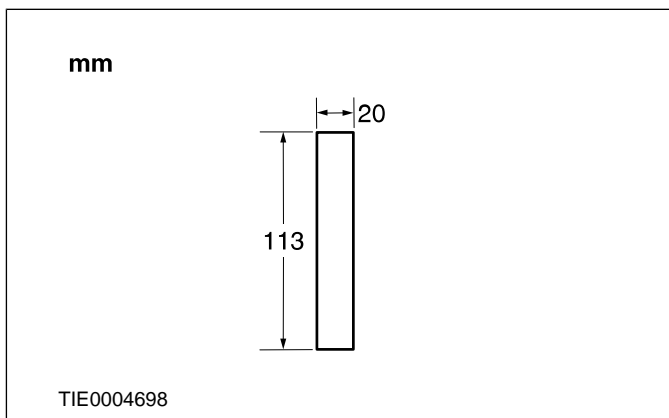
Tighten the rear lower arm adjustment cam nut.



Removal Details

Item 1 Rear lower arm adjustment cam nut

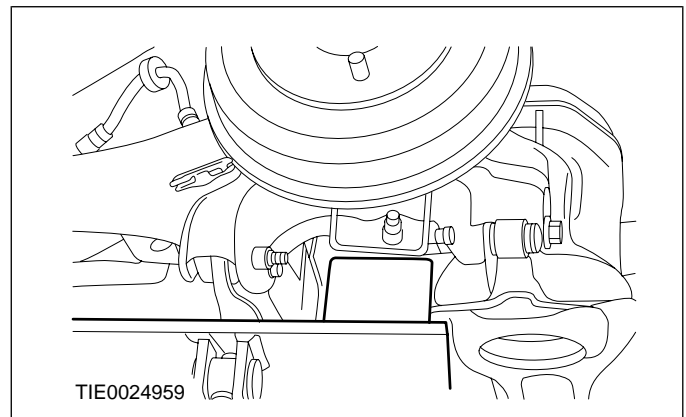
1. Fabricate a 20 mm wide by 113 mm long spacer.



2. **CAUTION:** The suspension must be set to the design height setting.

Using a transmission jack and the wooden block, raise the suspension to the design height setting.

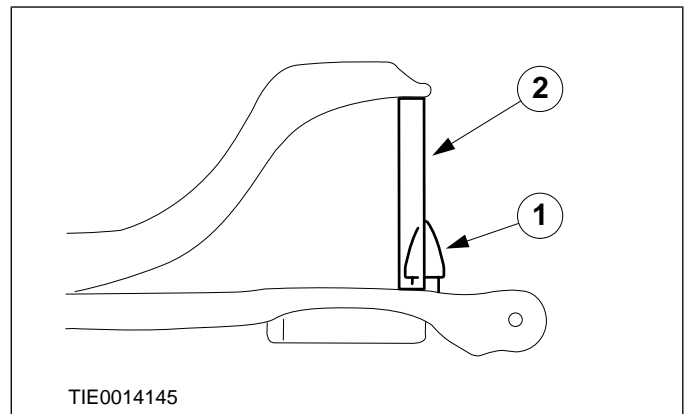
- Position the transmission jack and the wooden block as shown.



3. **NOTE:** The spacer must be positioned exactly as shown.

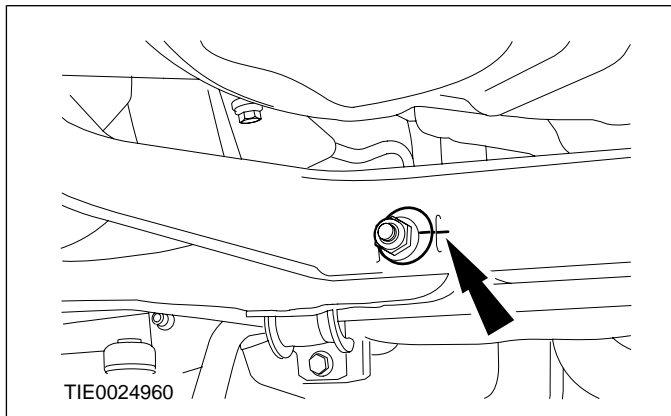
Install the spacer.

1. Remove the bump stop.
2. Install the spacer between the rear lower arm and the rear axle crossmember making sure that the spacer is in a vertical plane.



REMOVAL AND INSTALLATION

4. Using paint or typing correction fluid, mark the position of the rear lower arm adjustment cam to the rear axle crossmember.
5. Remove the rear lower arm adjustment cam nut.



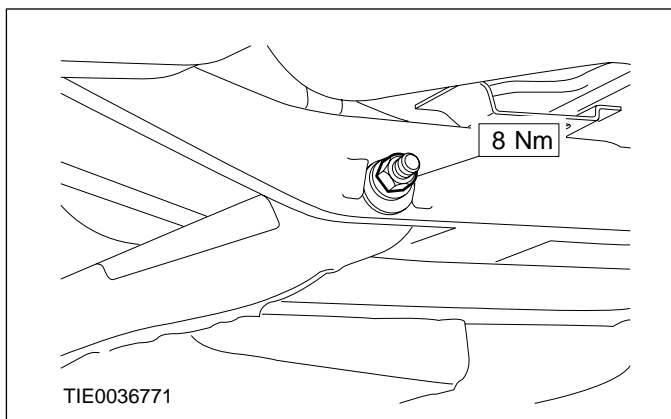
Installation Details

Item 1 Rear lower arm adjustment cam nut

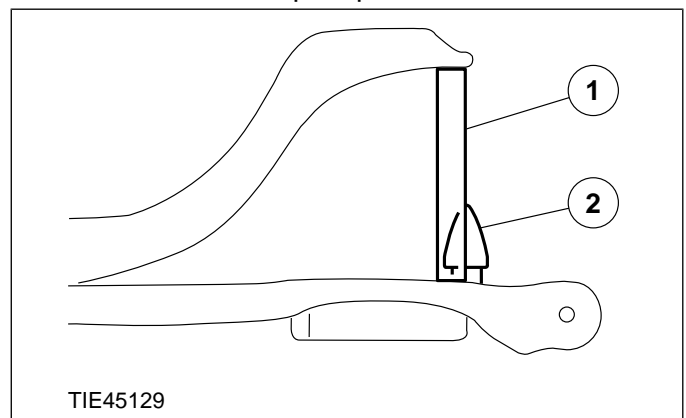
1. **NOTE: Do not fully tighten the rear lower arm adjustment cam nut at this stage.**

NOTE: Align the mark on the rear lower arm adjustment cam to the mark on the rear axle crossmember.

Install the rear lower arm adjustment cam nut.



2. Install the bump stop.



2. **Lower the suspension from the design height setting.**

1. Remove the spacer.

REMOVAL AND INSTALLATION

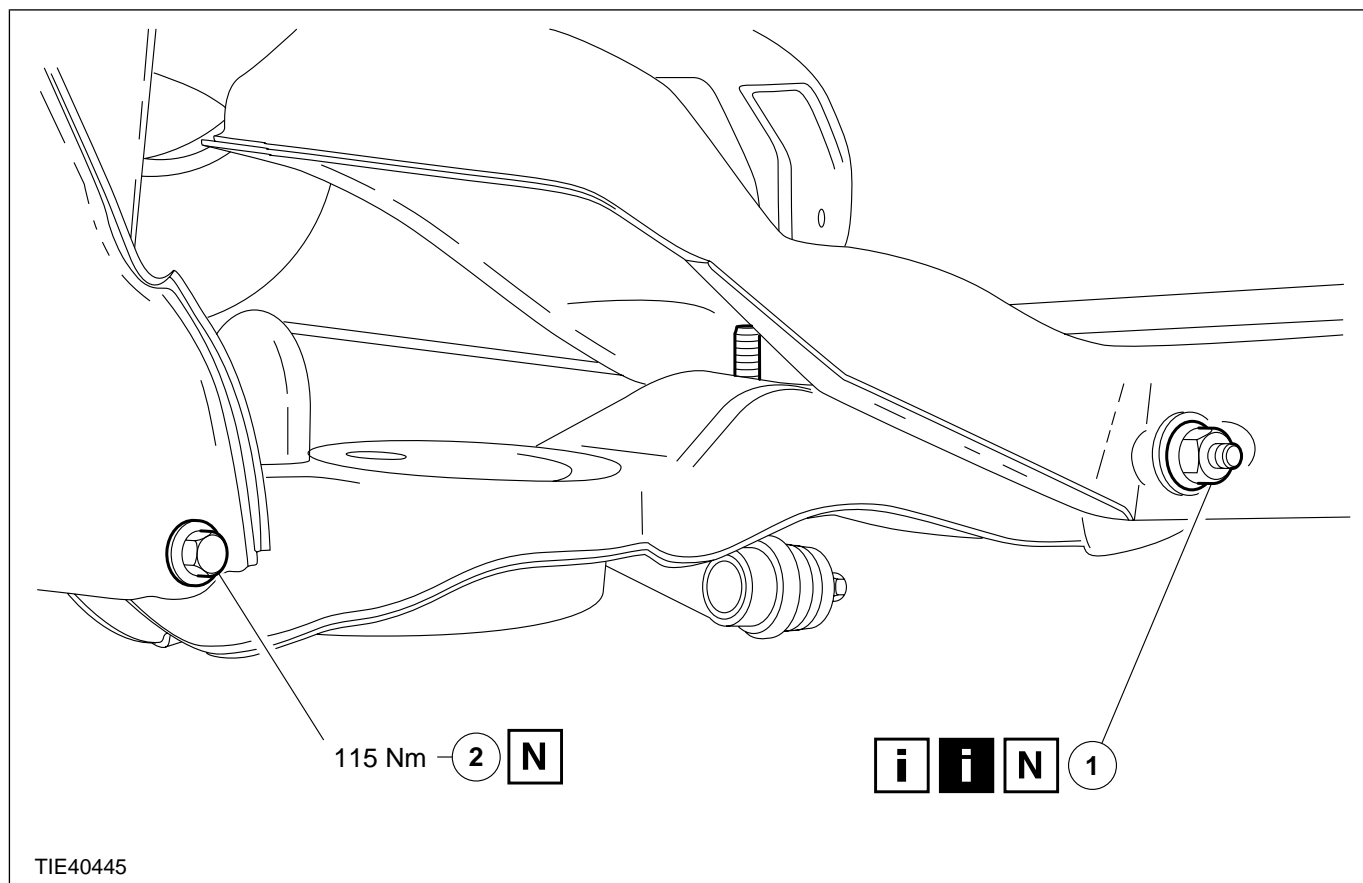
Rear Lower Arm — Vehicles With: Ball Joint Stabilizer Bar Link

General Equipment

Transmission jack

1. Remove the spring. For additional information, refer to: **(204-00 Suspension System - General Information) Specifications (Specifications),**

2. Remove the components in the order indicated in the following illustration(s) and table(s).



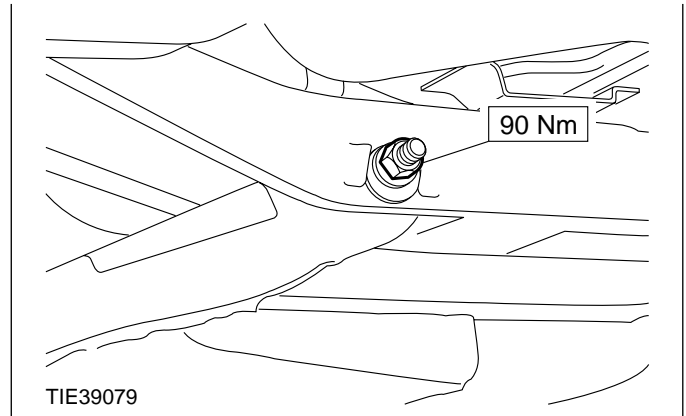
Item	Description
1	Rear lower arm adjustment cam nut See Removal Detail See Installation Detail
2	Rear lower arm to wheel knuckle retaining bolt

5. **NOTE:** Final tightening of the rear lower arm adjustment cam nut should be carried out when the vehicle weight is on the road wheels.

3. To install, reverse the removal procedure.
4. Check the toe setting and adjust as necessary. For additional information, refer to: **(204-00 Suspension System - General Information) Specifications (Specifications), Rear Toe Adjustment (General Procedures).**

REMOVAL AND INSTALLATION

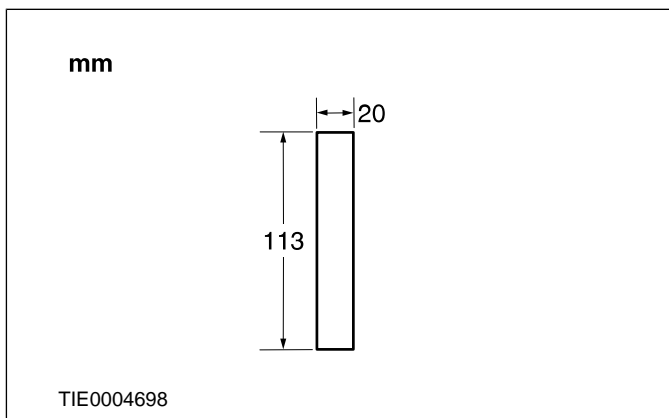
Tighten the rear lower arm adjustment cam nut.



Removal Details

Item 1 Rear lower arm adjustment cam nut

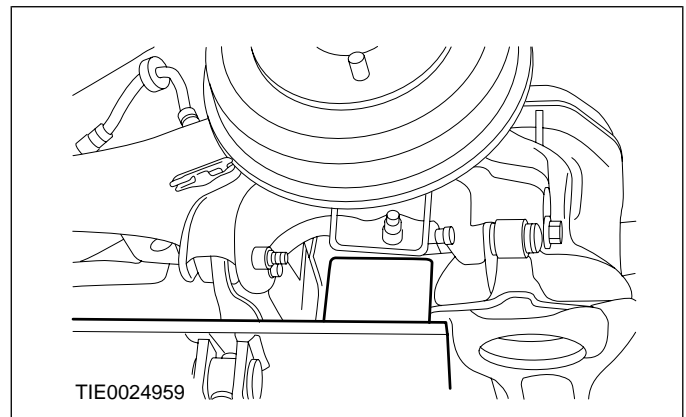
1. Fabricate a 20 mm wide by 113 mm long spacer.



2. **CAUTION:** The suspension must be set to the design height setting.

Using a transmission jack and a wooden block, raise the suspension to the design height setting.

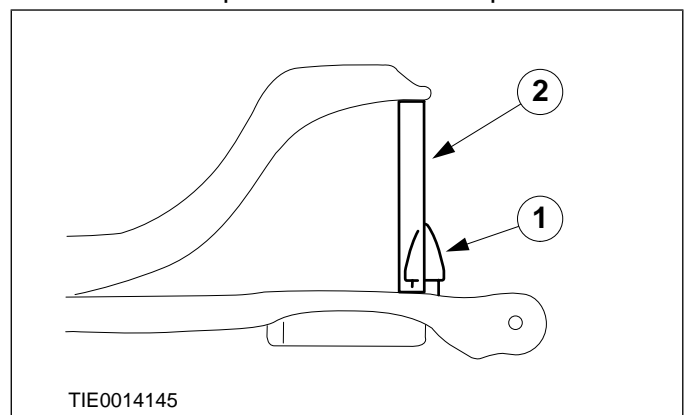
- Position the transmission jack and the wooden block as shown.



3. **NOTE:** The spacer must be positioned exactly as shown.

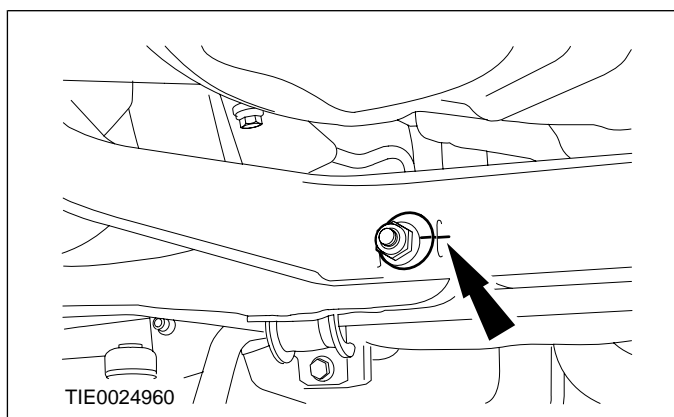
Install the spacer.

1. Remove the bump stop.
2. Install the spacer between the rear lower arm and the rear axle crossmember making sure that the spacer is in a vertical plane.



REMOVAL AND INSTALLATION

4. Using paint or typing correction fluid, mark the position of the rear lower arm adjustment cam to the rear axle crossmember.
5. Remove the rear lower arm adjustment cam nut.



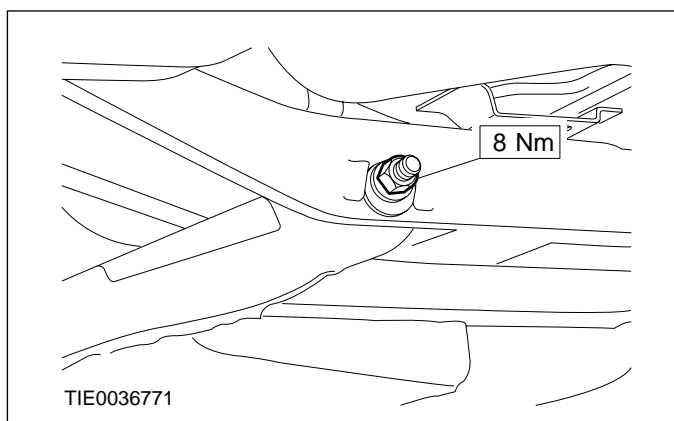
Installation Details

Item 1 Rear lower arm adjustment cam nut

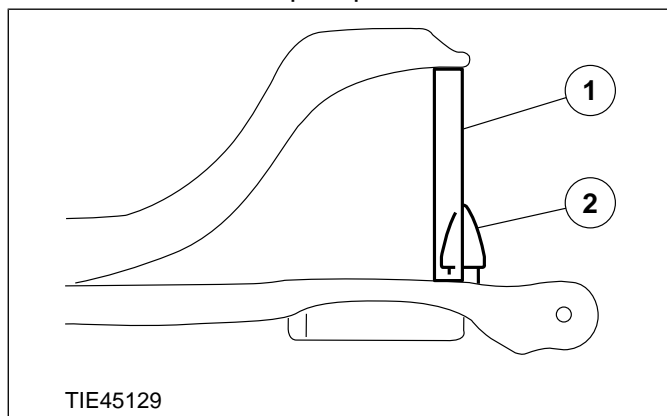
1. **NOTE: Do not fully tighten the rear lower arm adjustment cam nut at this stage.**

NOTE: Align the mark on the rear lower arm adjustment cam to the mark on the rear axle crossmember.

Install the rear lower arm adjustment cam nut.



2. Install the bump stop.



2. **Lower the suspension from the design height setting.**

1. Remove the spacer.

REMOVAL AND INSTALLATION

Stabilizer Bar — Vehicles With: Solid Stabilizer Bar Link

General Equipment

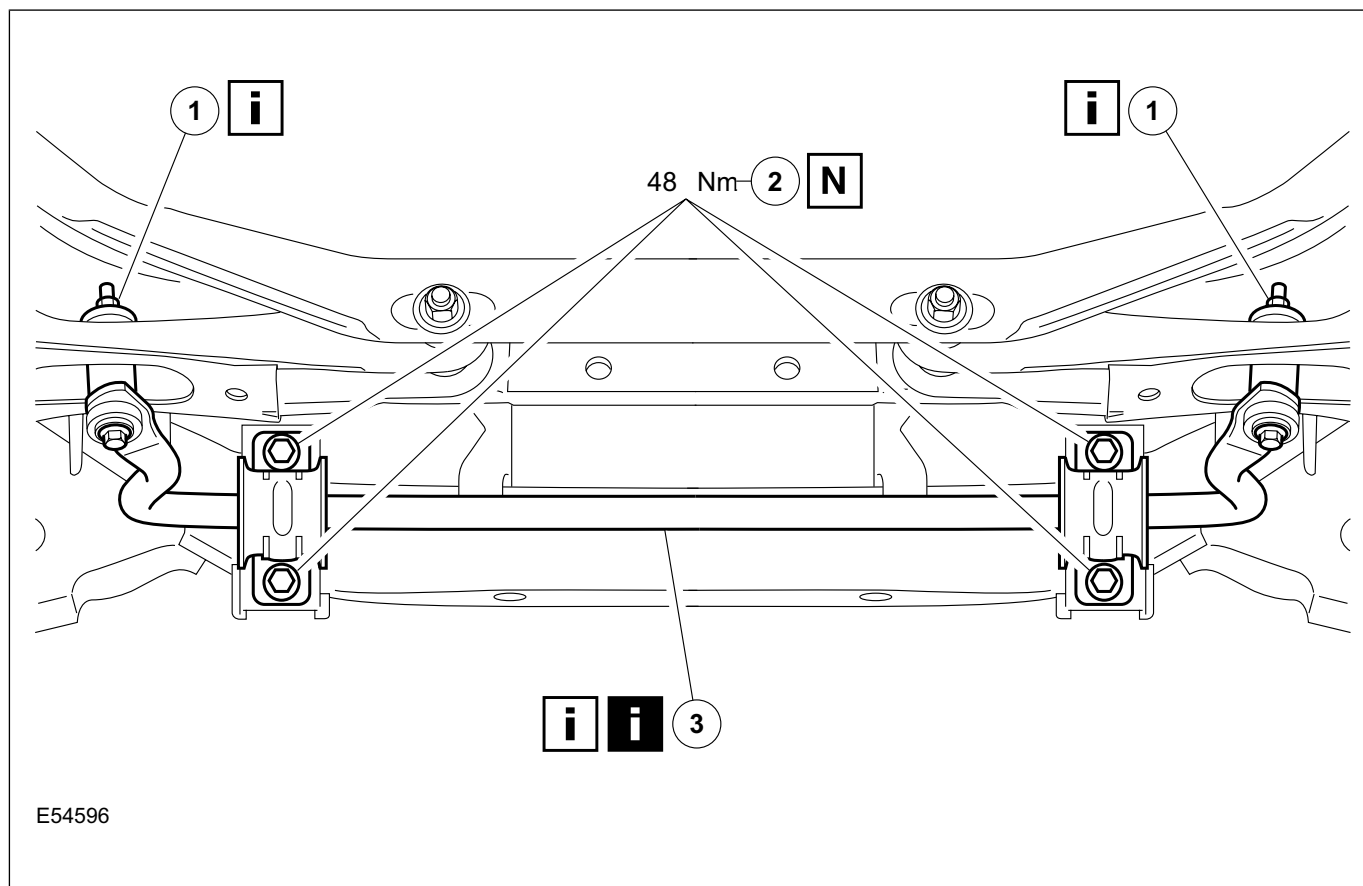
Transmission jacks
Hydraulic press

1. Remove the rear wheels and tires.

For additional information, refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).

2. Remove the spring on both sides. For additional information, refer to: (204-02 Rear Suspension) Spring (Removal and Installation),

3. Remove the components in the order indicated in the following illustration(s) and table(s).



E54596

Item	Description
1	Stabilizer bar link See Installation Detail
2	Stabilizer bar clamp retaining bolts
3	Stabilizer bar See Removal Detail See Installation Detail

4. To install, reverse the removal procedure.

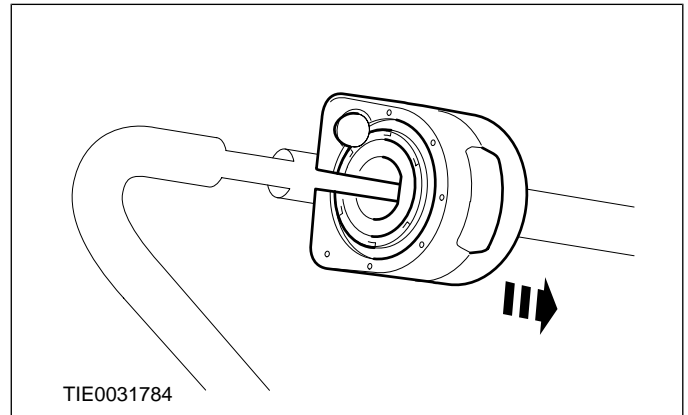
Removal Details

REMOVAL AND INSTALLATION

Item 3 Stabilizer bar

1. Remove the stabilizer bar clamp on both sides.

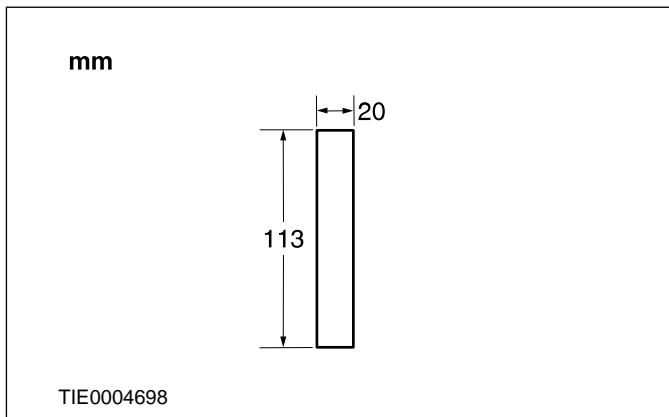
2. Remove the stabilizer bar bushing on both sides.



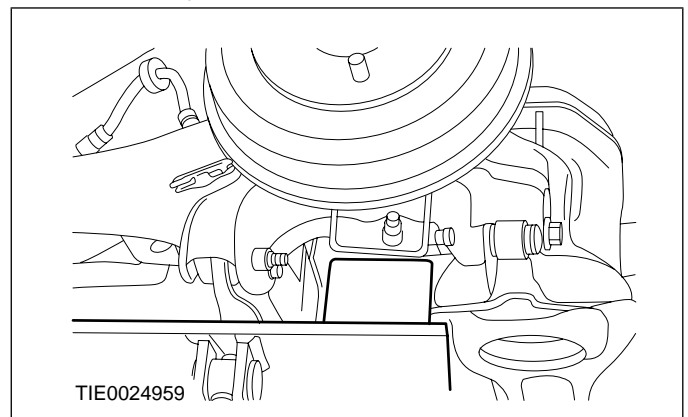
Installation Details

Item 3 Stabilizer bar

1. Fabricate two 20 mm wide by 113 mm long spacers.



- Position the transmission jack and the wooden block as shown (left-hand side shown).



2. **CAUTION:** Both sides of the suspension must be set to the design height setting.

Using 2 transmission jacks and wooden blocks, raise the suspension to the design height setting on both sides.

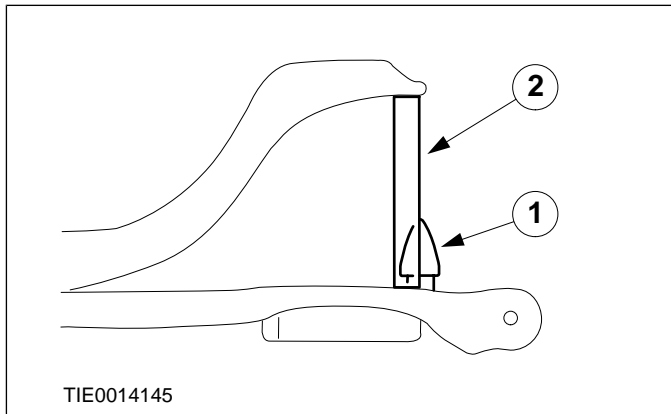
3. **NOTE:** The spacer must be positioned exactly as shown.

Install the spacer on both sides.

1. Remove the bump stop.

REMOVAL AND INSTALLATION

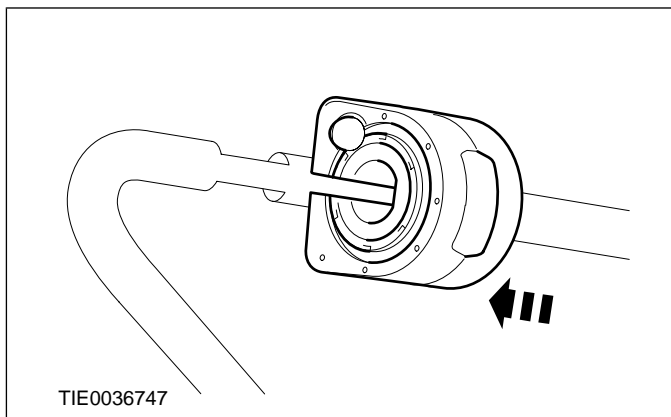
2. Install the spacer between the rear lower arm and the rear axle crossmember making sure that the spacer is in a vertical plane.



4. **CAUTION:** The stabilizer bar bushing must be located correctly on the stabilizer bar, with no lubricant.

NOTE: Make sure that the stabilizer bar bushing nipple is on the left-hand side.

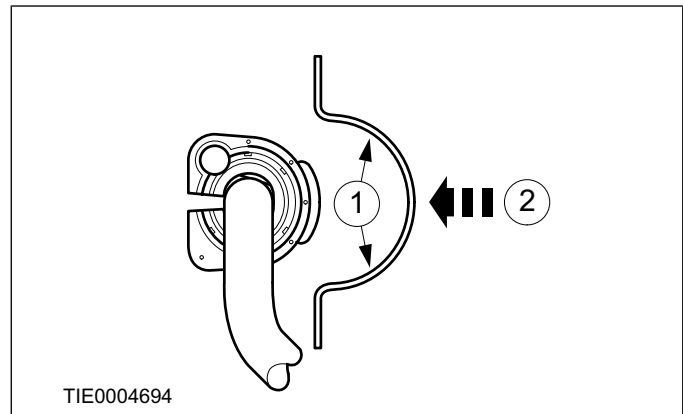
Install the stabilizer bar bushing on both sides.



5. Install the stabilizer bar clamp on both sides.

1. Apply water to the stabilizer bar clamp to assist installation.

2. Using a hydraulic press, press the stabilizer bar clamp onto the stabilizer bar bushing.



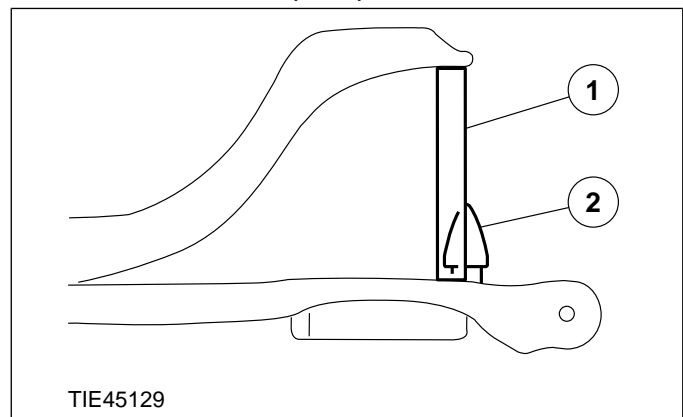
6. Position the stabilizer bar.

Item 1 Stabilizer bar link

1. **NOTE:** Make sure that the stabilizer bar link retaining nuts are tightened before lowering the suspension from the design height setting.

Lower the suspension from the design height setting on both sides.

1. Remove the spacer.
2. Install the bump stop.



REMOVAL AND INSTALLATION

Stabilizer Bar — Vehicles With: Ball Joint Stabilizer Bar Link

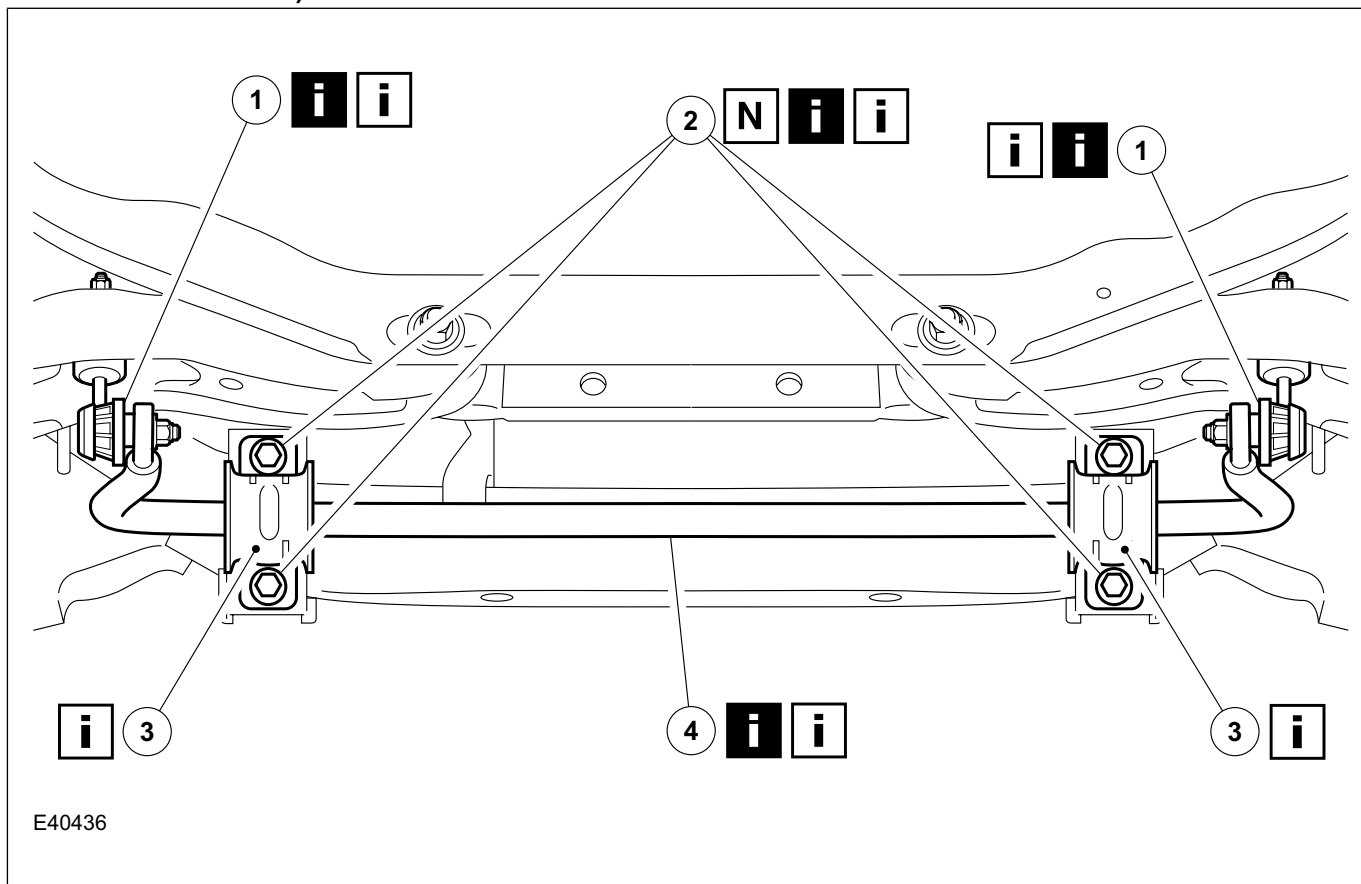
General Equipment

Hydraulic press

2. Remove the components in the order indicated in the following illustration(s) and table(s).

1. Remove the rear wheels and tires.

For additional information, refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).



E40436

Item	Description
1	Stabilizer bar link See Removal Detail See Installation Detail
2	Stabilizer bar clamp retaining bolts See Removal Detail See Installation Detail

Item	Description
3	Stabilizer bar clamp See Installation Detail
4	Stabilizer bar See Removal Detail See Installation Detail

3. To install, reverse the removal procedure.

Removal Details

204-02-26

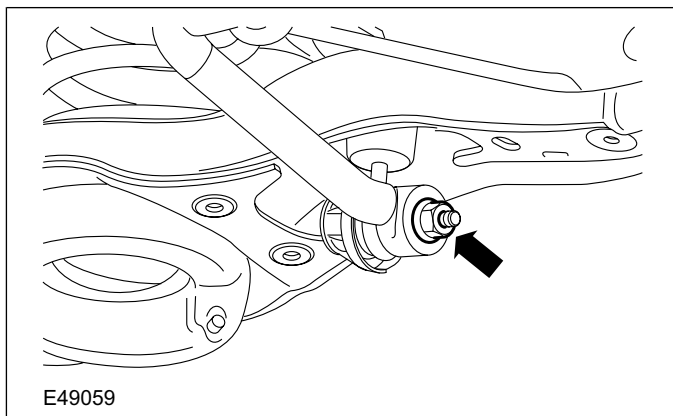
Rear Suspension

204-02-26

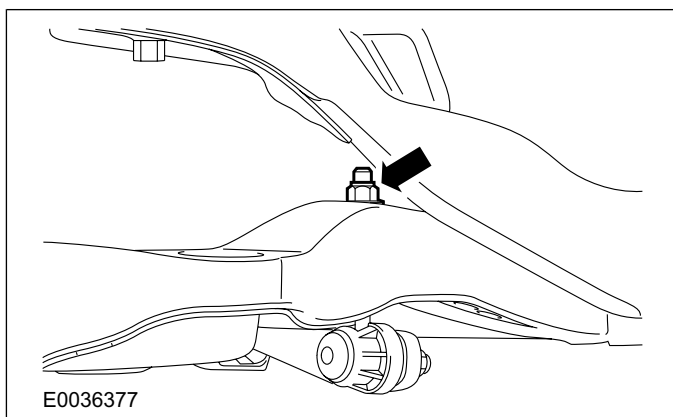
REMOVAL AND INSTALLATION

Item 1 Stabilizer bar link

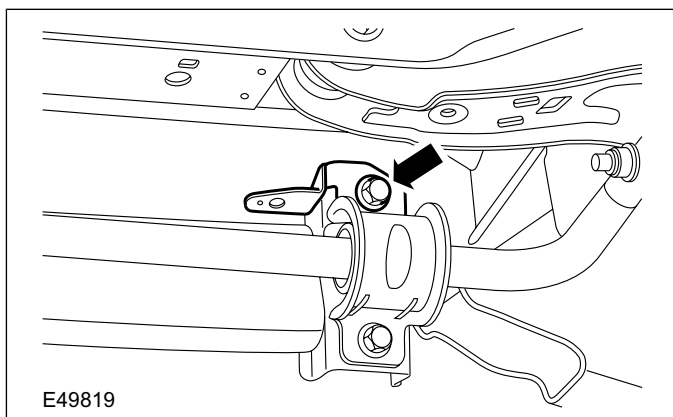
1. Loosen the stabilizer bar link to stabilizer bar retaining nut on both sides.



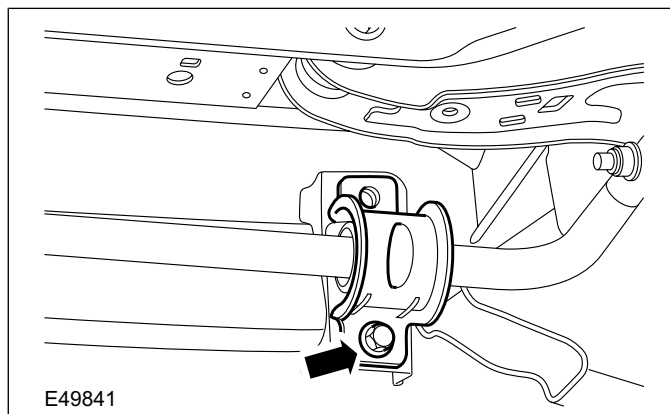
2. Detach the stabilizer bar link from rear lower arm on both sides.

**Item 2 Stabilizer bar clamp retaining bolts**

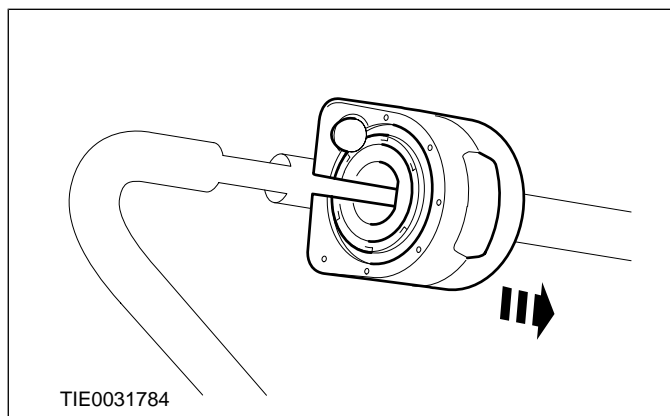
1. Remove the stabilizer bar clamp upper retaining bolt on both sides.
 - Remove the parking brake cable support bracket.



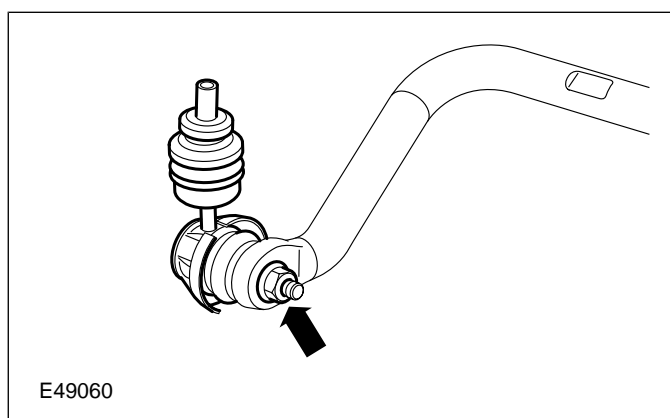
2. Remove the stabilizer bar clamp lower retaining bolt on both sides.

**Item 4 Stabilizer bar**

1. Remove the stabilizer bar bushings.



2. Remove the stabilizer bar link from the stabilizer bar on both sides.



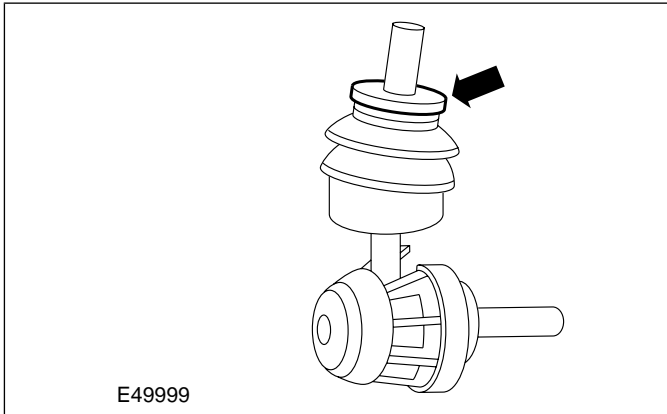
REMOVAL AND INSTALLATION

Installation Details

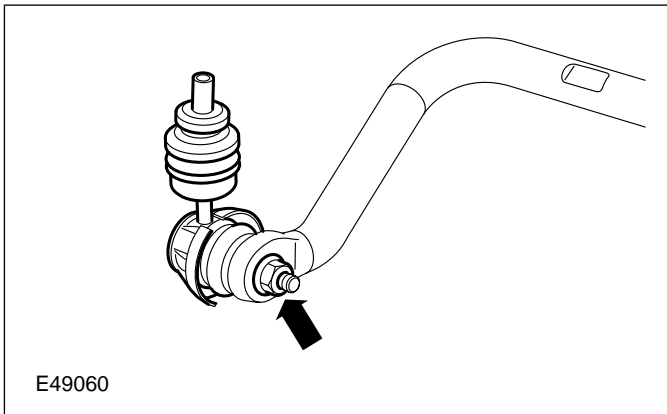
Item 4 Stabilizer bar

1. **▲WARNING:** Make sure the washer is installed to the ball joint stabilizer bar link stud. Failure to follow this instruction may result in personal injury.

Check the washer is clamped on to the ball joint stabilizer bar link stud.



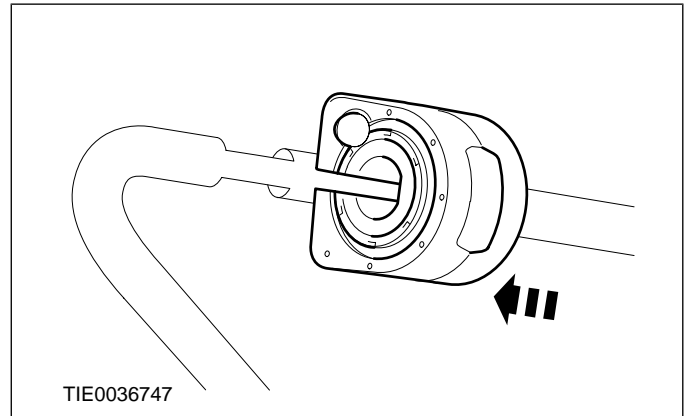
2. Loosely install the stabilizer bar link to the stabilizer bar on both sides.



3. **▲CAUTION:** The stabilizer bar bushings must be located correctly on the stabilizer bar, with no lubricant.

NOTE: Make sure the bushing nipple is on the left-hand side.

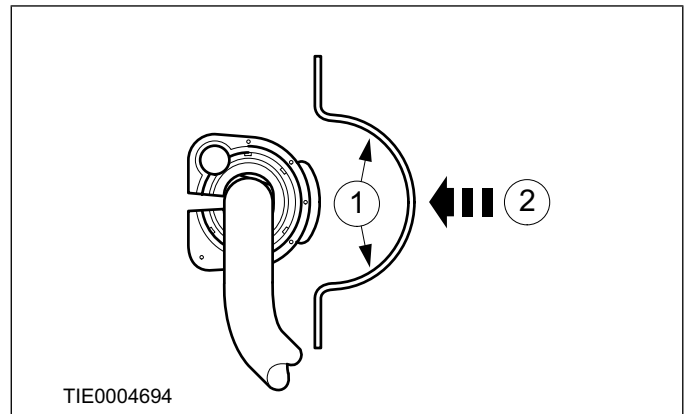
Install the stabilizer bar bushings on both sides.



Item 3 Stabilizer bar clamp

1. Install the stabilizer bar clamps.

1. Apply water to the clamps to assist installation.
2. Using a suitable hydraulic press, press the clamp onto the bushing on both sides.



Item 2 Stabilizer bar clamp retaining bolts

1. **NOTE:** Before installing the stabilizer bar clamp retaining bolts, make sure the parking brake cable support bracket is correctly located.

Install the stabilizer bar clamp upper retaining bolt on both sides.

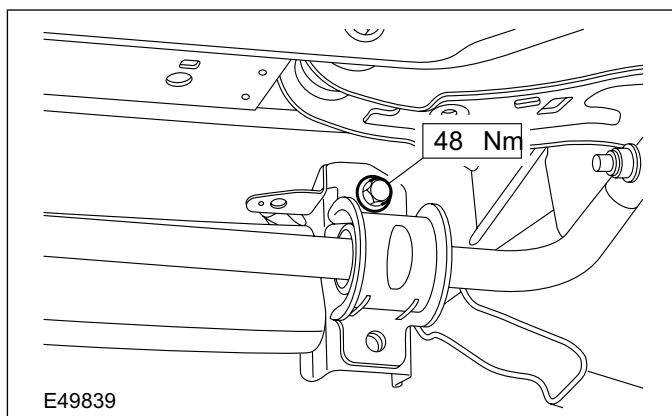
204-02-28

Rear Suspension

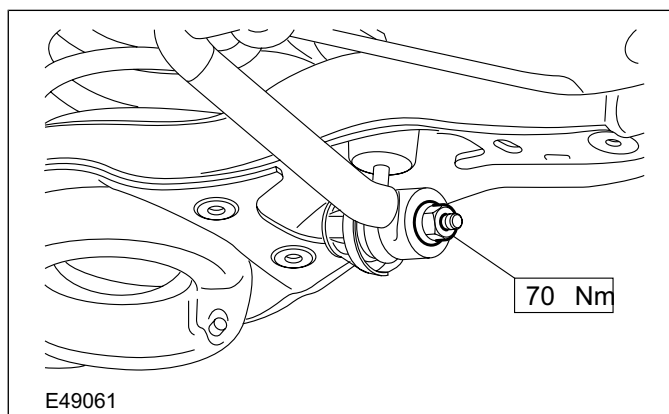
204-02-28

REMOVAL AND INSTALLATION

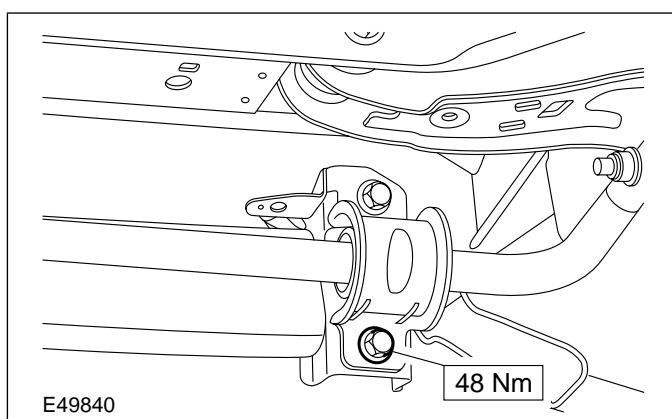
- Install the parking brake cable support bracket.



2. Tighten the stabilizer bar link to stabilizer bar retaining nut on both sides.

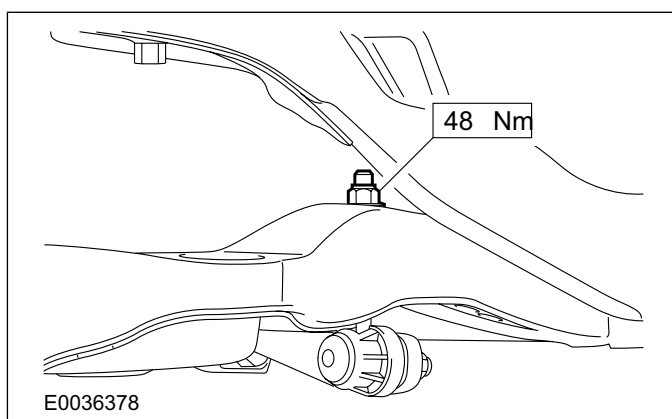


2. Install the stabilizer bar clamp lower retaining bolt on both sides.



Item 1 Stabilizer bar link

1. Attach the stabilizer bar link to the rear lower arm on both sides.



REMOVAL AND INSTALLATION

Wheel Knuckle

General Equipment

Transmission jack

Removal

Vehicles with rear disc brakes

1. Remove the brake disc shield.

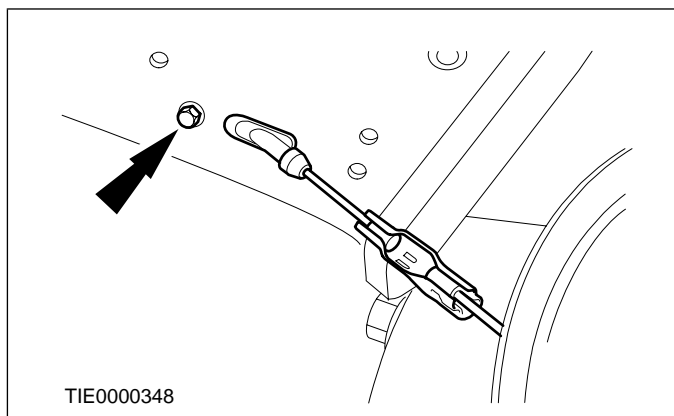
For additional information, refer to: Brake Disc Shield (206-04 Rear Disc Brake, Removal and Installation).

Vehicles with rear drum brakes

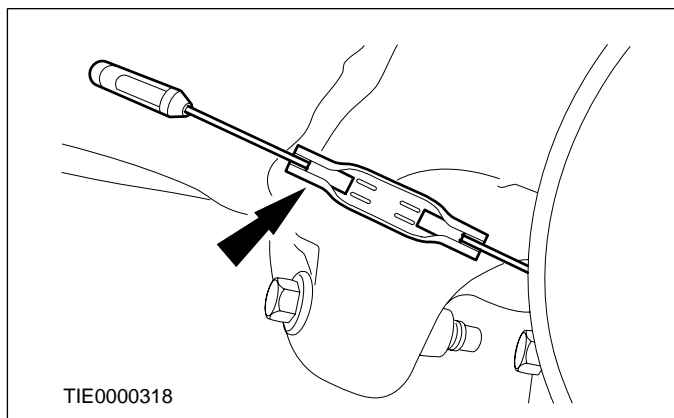
2. Remove the wheel hub.

For additional information, refer to: Wheel Hub - Vehicles With: Rear Drum Brakes (204-02 Rear Suspension, Removal and Installation).

3. Detach the parking brake cable guide from the wheel knuckle.



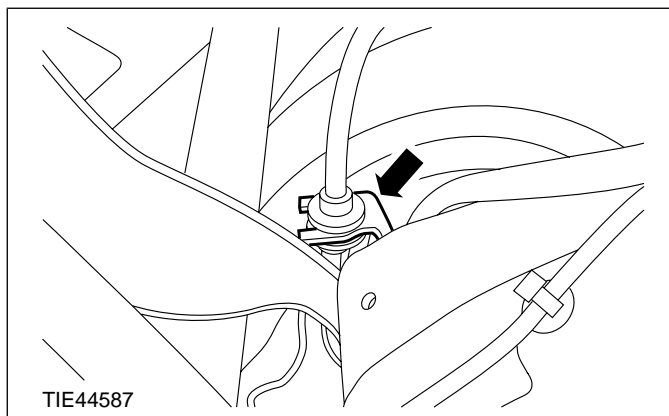
4. Disconnect the parking brake cable.



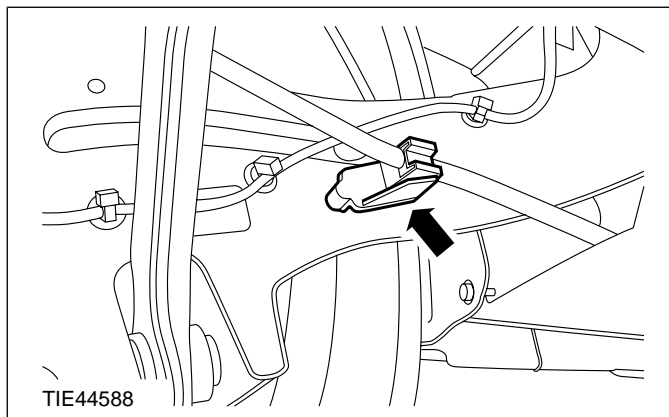
5. Pull the parking brake cable and parking brake cable guide through the wheel knuckle.

All vehicles

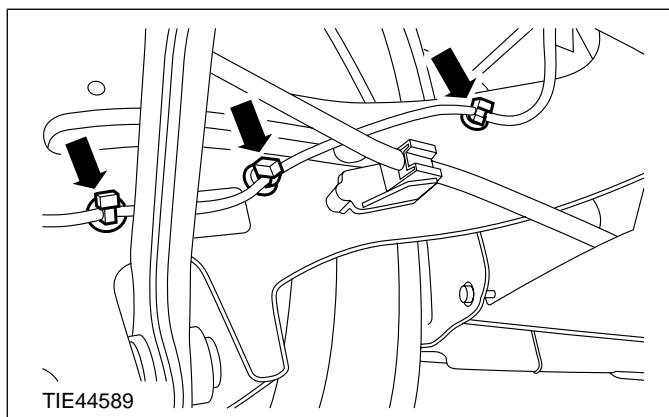
6. Detach the rear brake hose from the wheel knuckle.



7. Detach the parking brake cable from the wheel knuckle.



8. Detach the wheel speed sensor wiring harness from the wheel knuckle.



204-02-30

Rear Suspension

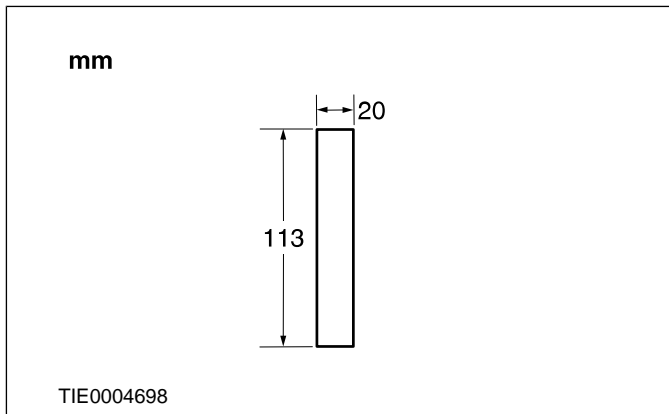
204-02-30

REMOVAL AND INSTALLATION

9. Remove the spring. For additional information, refer to:

**Spring (204-02, Removal and Installation),
Spring (204-02 Rear Suspension, Removal and Installation),
Spring - Convertible (204-02 Rear Suspension, Removal and Installation).**

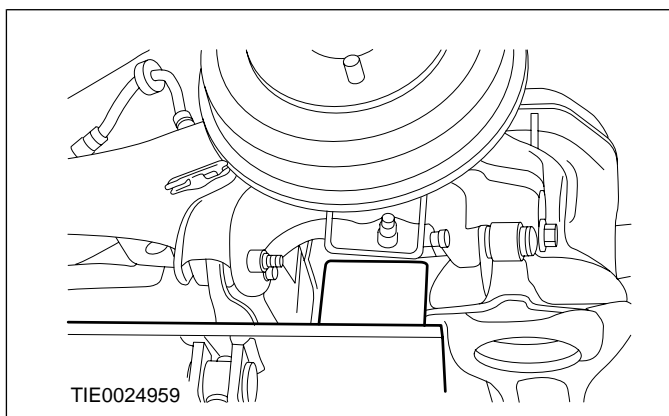
10. Fabricate a 20 mm wide by 113 mm long spacer.



11. **⚠ CAUTION:** The suspension must be set to the design height setting.

Using a transmission jack and a wooden block, raise the suspension to the design height setting.

- Position the transmission jack and the wooden block as shown.

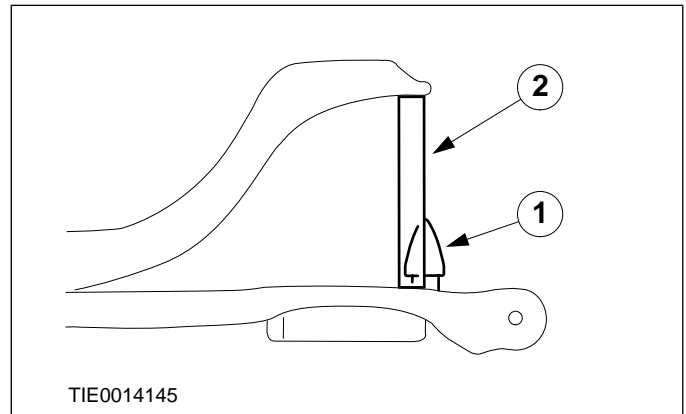


12. **NOTE:** The spacer must be positioned exactly as shown.

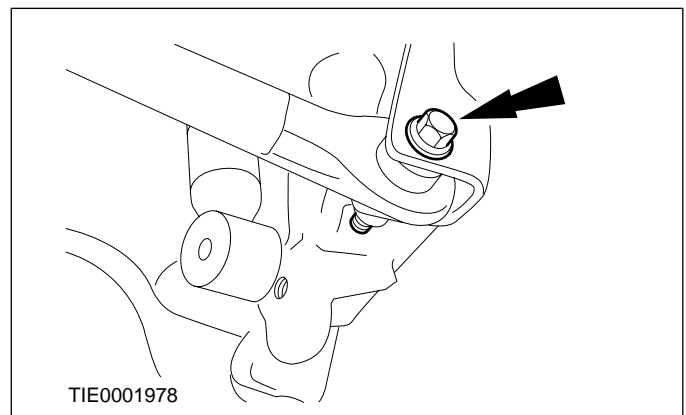
Install the spacer.

- Remove the bump stop.

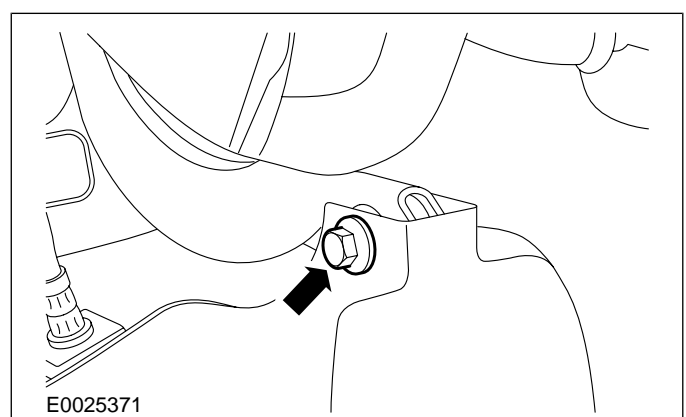
- Install the spacer between the rear lower arm and the rear axle crossmember making sure that the spacer is in the vertical plane.



13. Detach the front lower arm from the wheel knuckle.

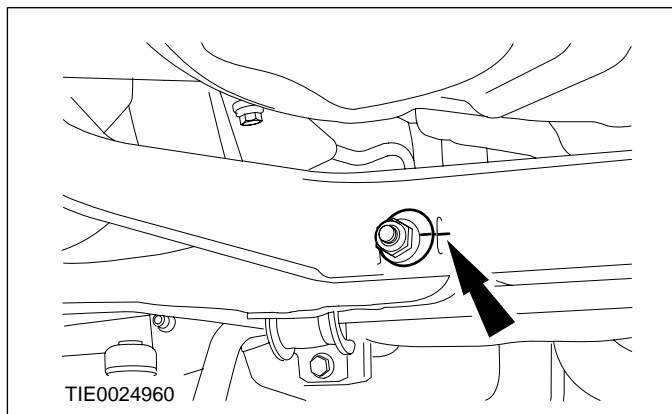


14. Detach the upper arm from the wheel knuckle.

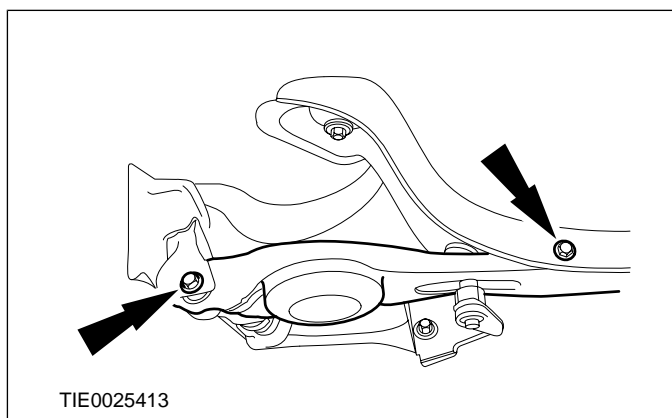


REMOVAL AND INSTALLATION

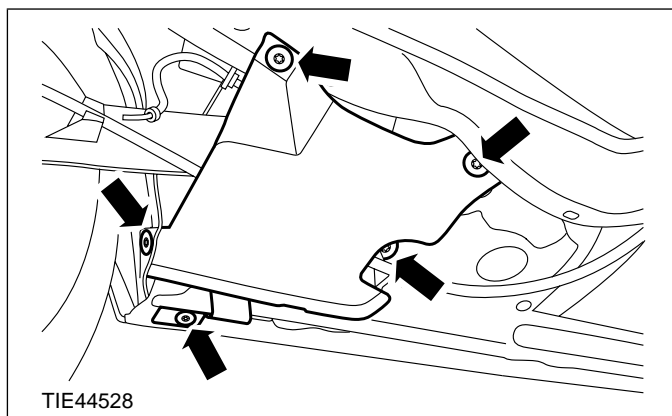
15. Mark the position of the rear lower arm adjustment cam to the rear axle crossmember.



16. Remove the rear lower arm.

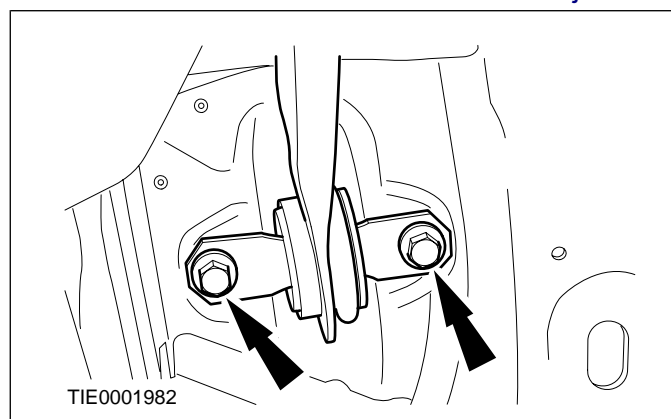


17. Remove the air deflector.



18. Remove the wheel knuckle.

- Lower and remove the transmission jack.

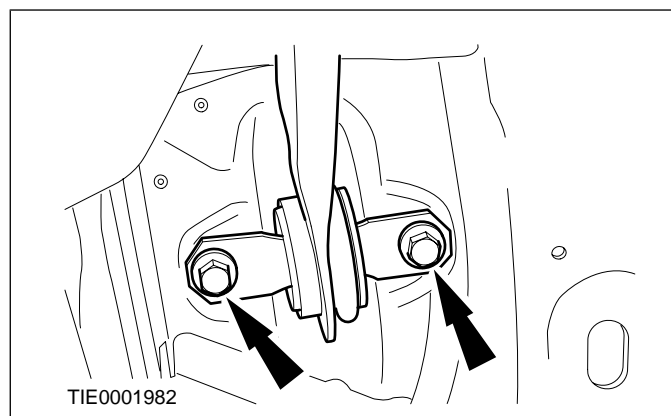


Installation

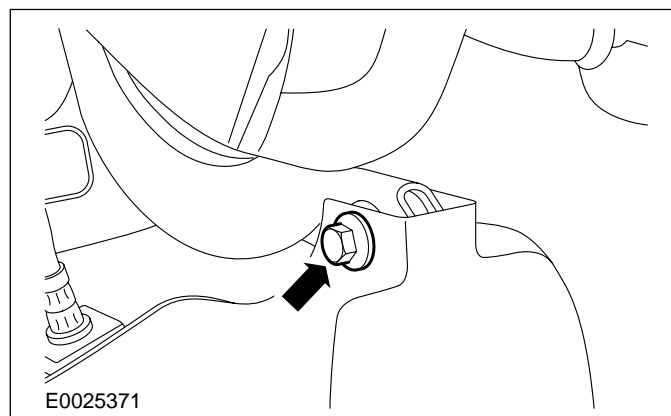
All vehicles

- Using a transmission jack, support the wheel knuckle.
- NOTE: Do not fully tighten the wheel knuckle retaining bolts at this stage.**

Install the wheel knuckle.



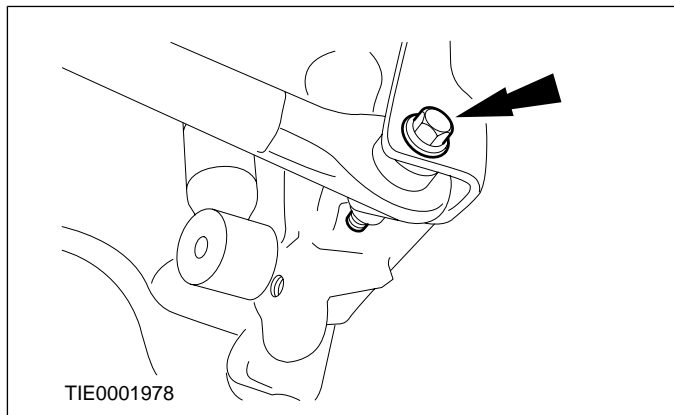
- NOTE: Do not fully tighten the upper arm to wheel knuckle retaining bolt at this stage.**
Attach the upper arm to the wheel knuckle.



REMOVAL AND INSTALLATION

4. **NOTE:** Do not fully tighten the front lower arm to wheel knuckle retaining bolt at this stage.

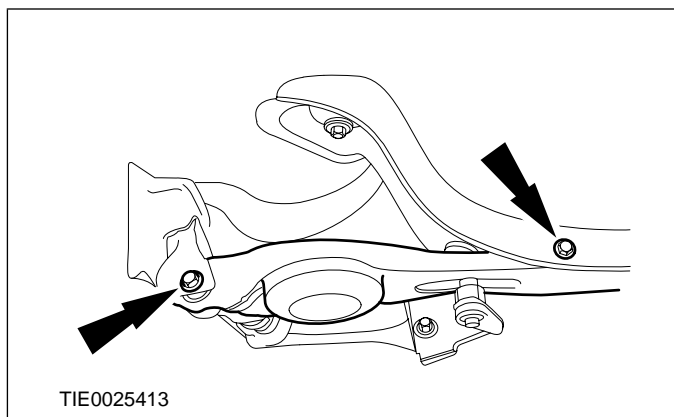
Attach the front lower arm to the wheel knuckle.



5. Lower and remove the transmission jack.

6. **NOTE:** Do not fully tighten the rear lower arm retaining bolt and the rear lower arm adjustment cam nut at this stage.

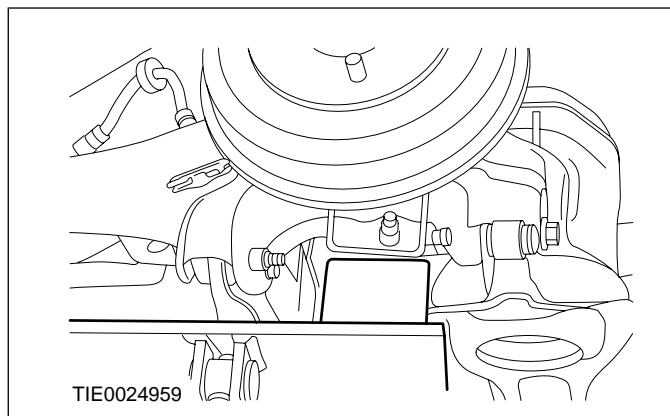
Attach the rear lower arm to the wheel knuckle and the rear axle crossmember.



7. **CAUTION:** The suspension must be set to the design height setting.

Using a transmission jack and a wooden block, raise the suspension to the design height setting.

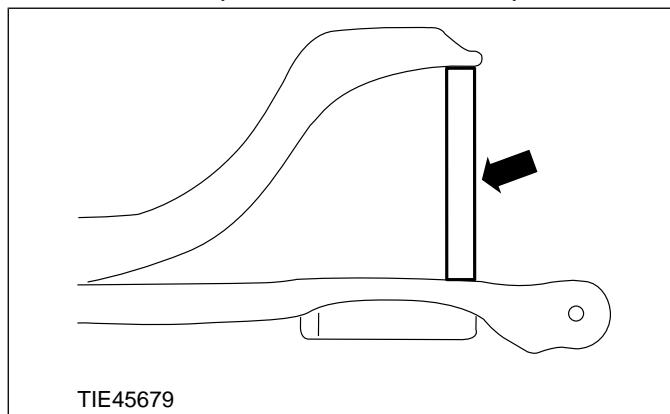
- Position the transmission jack and the wooden block as shown.



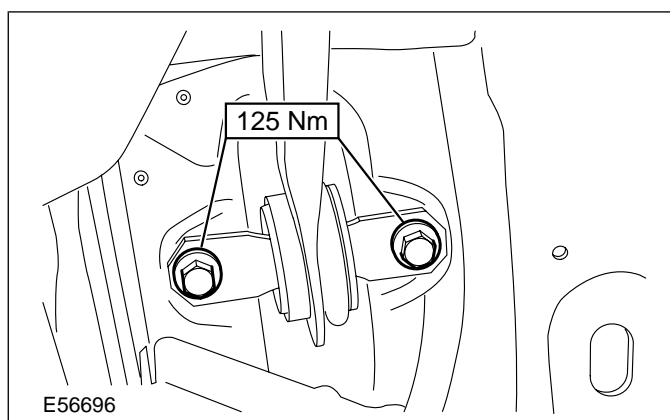
8. **NOTE:** The spacer must be positioned exactly as shown.

Install the spacer.

- Install the spacer between the rear lower arm and the rear axle crossmember making sure that the spacer is in the vertical plane.



9. Tighten the wheel knuckle retaining bolts.



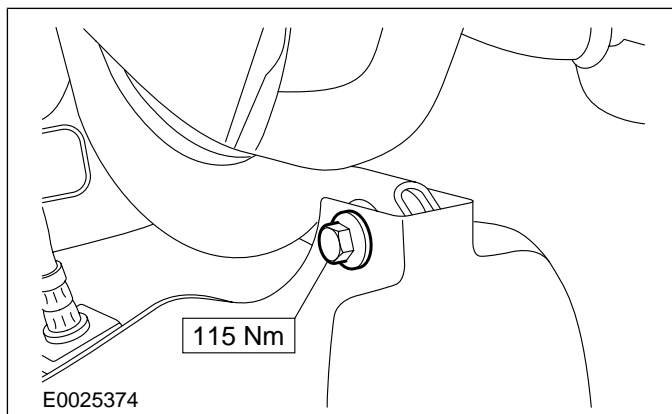
204-02-33

Rear Suspension

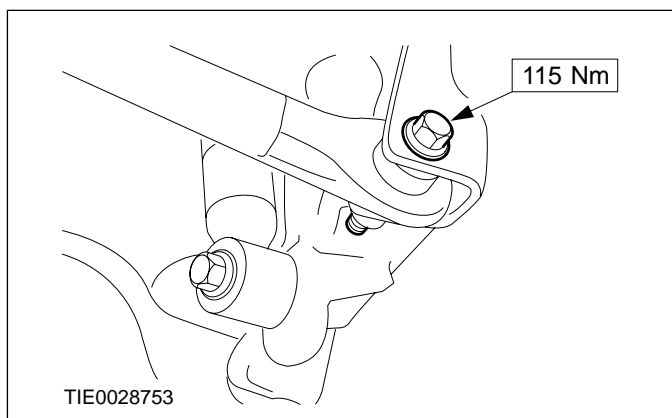
204-02-33

REMOVAL AND INSTALLATION

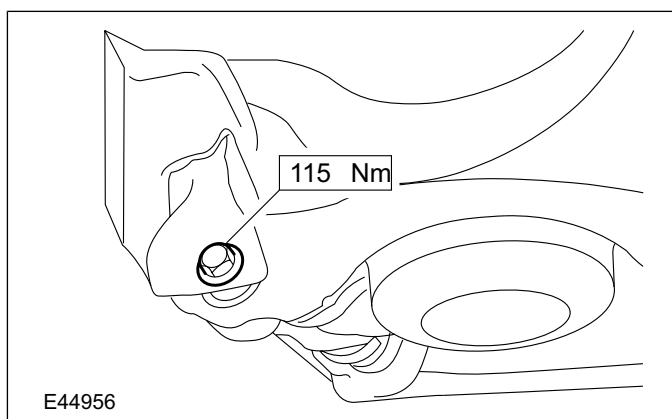
10. Tighten the upper arm to wheel knuckle retaining bolt.



11. Tighten the front lower arm to wheel knuckle retaining bolt.



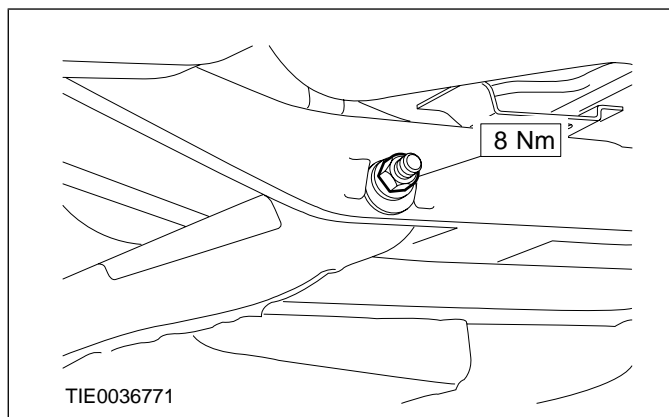
12. Tighten the rear lower arm to wheel knuckle retaining bolt.



13. **NOTE: Do not fully tighten the rear lower arm adjustment cam nut at this stage.**

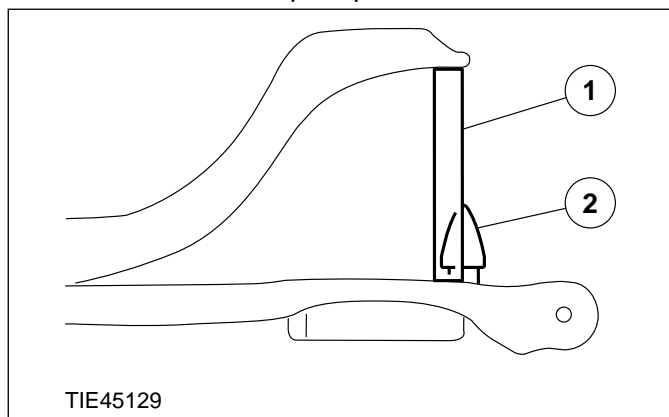
NOTE: Align the mark on the rear lower arm adjustment cam to the mark on the rear axle crossmember.

- Install the rear lower arm.

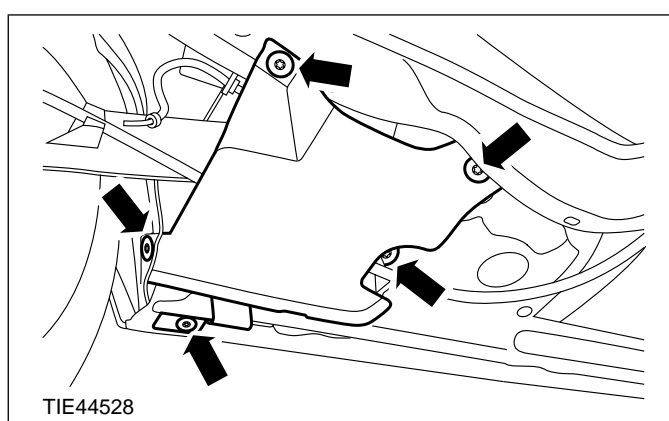


14. Lower the suspension from the design height setting.

1. Remove the spacer.
2. Install the bump stop.



15. Install the air deflector.



16. Install the spring. For additional information, refer to:

**Spring (204-02, Removal and Installation),
Spring (204-02 Rear Suspension, Removal
and Installation),
Spring - Convertible (204-02 Rear
Suspension, Removal and Installation).**

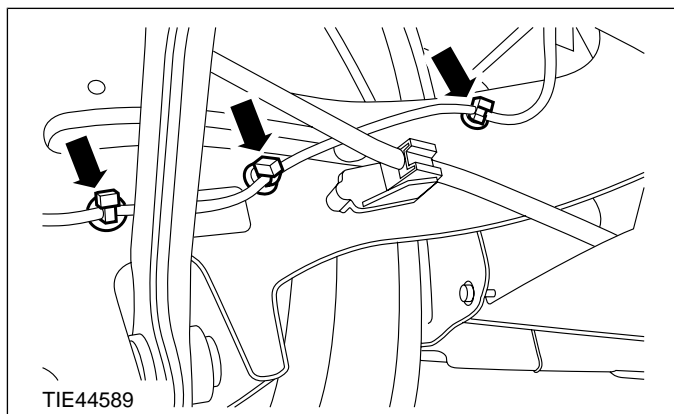
204-02-34

Rear Suspension

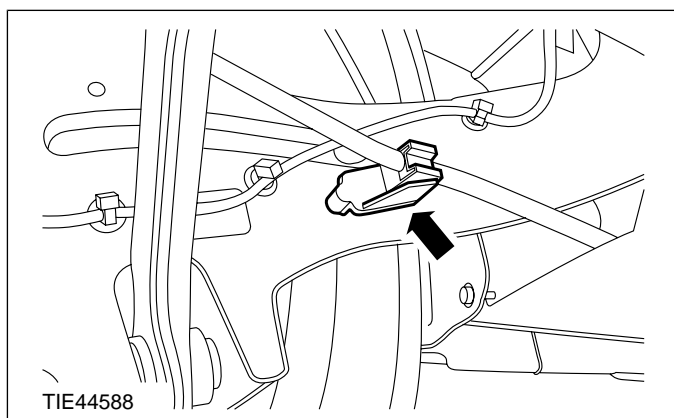
204-02-34

REMOVAL AND INSTALLATION

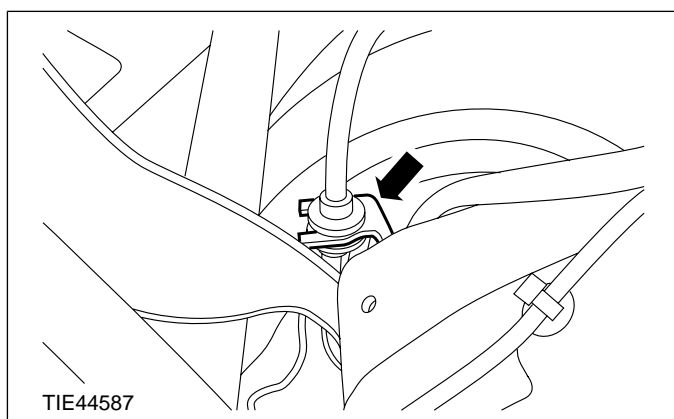
17. Attach the wheel speed sensor wiring harness to the wheel knuckle.



18. Attach the parking brake cable to the wheel knuckle.



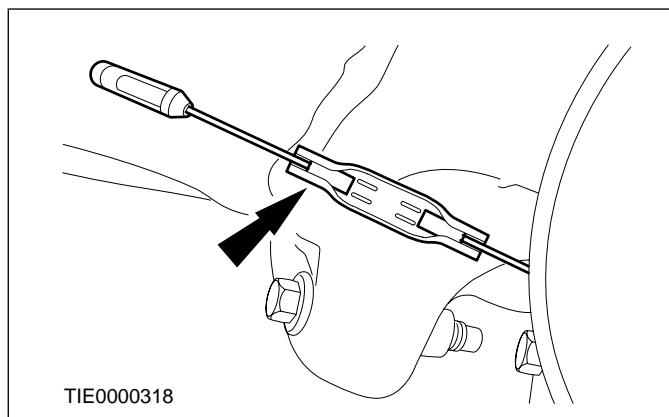
19. Attach the rear brake hose to the wheel knuckle.



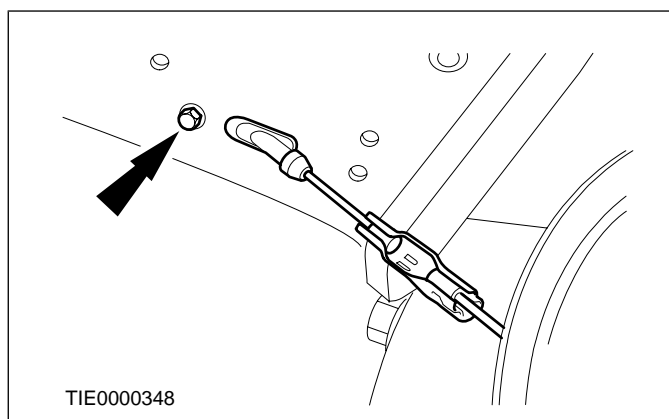
Vehicles with rear drum brakes

20. Push the parking brake cable and parking brake cable guide through the wheel knuckle.

21. Connect the parking brake cable.



22. Attach the parking brake cable guide to the wheel knuckle.



23. Install the wheel hub.

For additional information, refer to: Wheel Hub - Vehicles With: Rear Drum Brakes (204-02 Rear Suspension, Removal and Installation).

Vehicles with rear disc brakes

24. Install the brake disc shield.

For additional information, refer to: Brake Disc Shield (206-04 Rear Disc Brake, Removal and Installation).

All vehicles

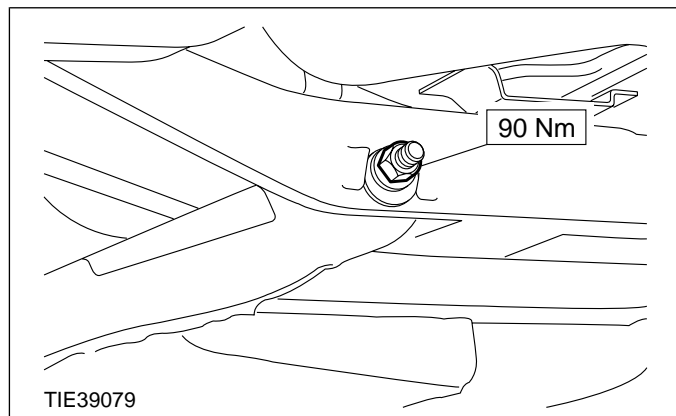
25. Check the toe setting and adjust as necessary. For additional information, refer to: (204-00 Suspension System - General Information)

Specifications (Specifications),
Rear Toe Adjustment (General Procedures).

REMOVAL AND INSTALLATION

26. **NOTE:** Final tightening of the rear lower arm adjustment cam nut must be carried out when the vehicle weight is on the road wheels.

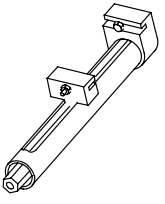
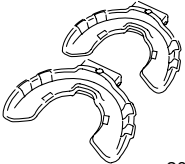
Tighten the rear lower arm adjustment cam nut.



REMOVAL AND INSTALLATION

Spring(15 621 0)

Special Tool(s)

 <p>14042</p>	Compressor, Coil Spring 204-167 (14-042)
 <p>204215</p>	Adapters for 204-167 204-215 (15-111)

General Equipment

Trolley jack

Removal

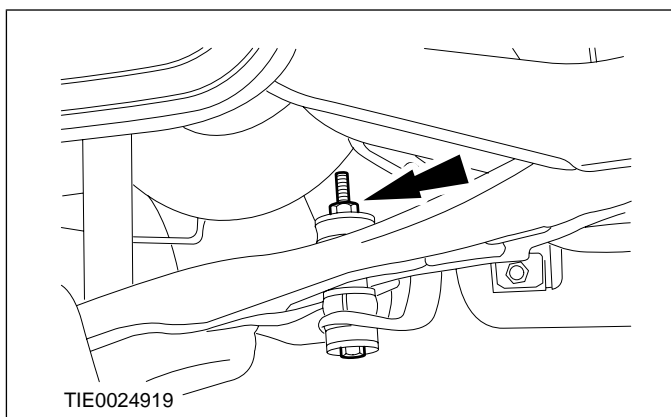
All vehicles

1. Remove the rear wheel and tire.

For additional information, refer to: **Wheel and Tire (204-04 Wheels and Tires, Removal and Installation)**.

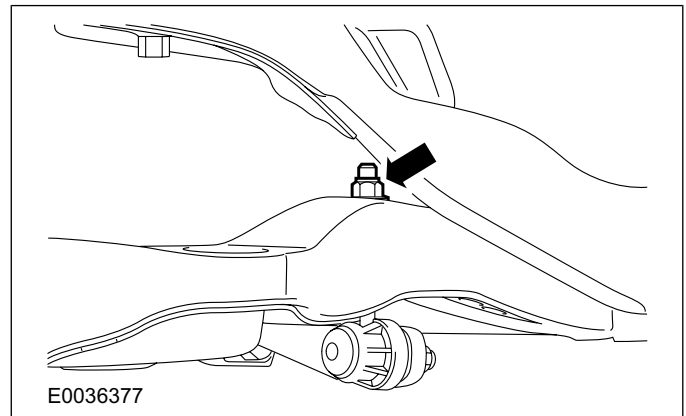
Vehicles with solid stabilizer bar link

2. Detach the stabilizer bar link from the rear lower arm on both sides.



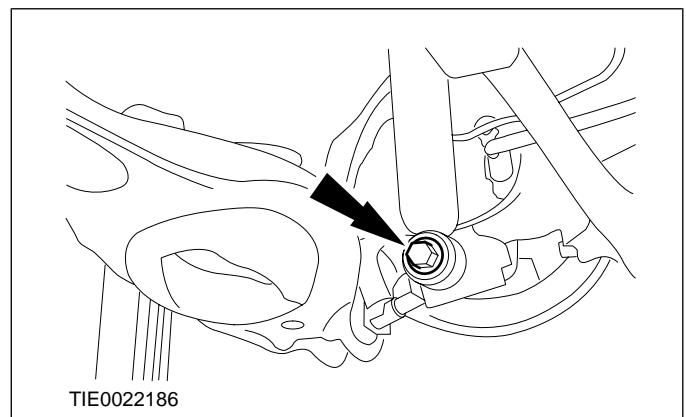
Vehicles with ball joint stabilizer bar link

3. Detach the stabilizer bar link from the rear lower arm on both sides.



All vehicles

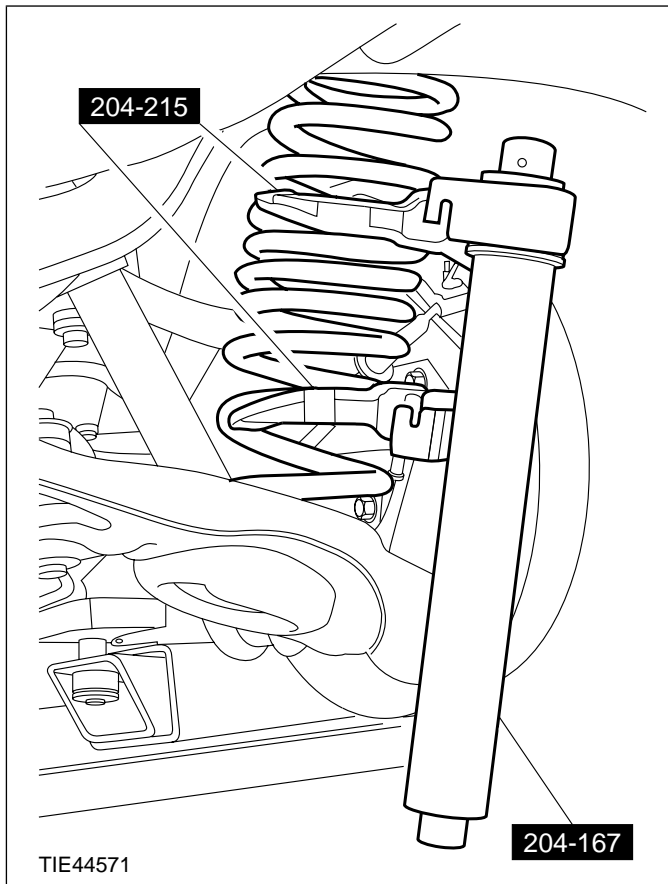
4. Using a suitable trolley jack, support the wheel knuckle.
5. Detach the shock absorber from the wheel knuckle.



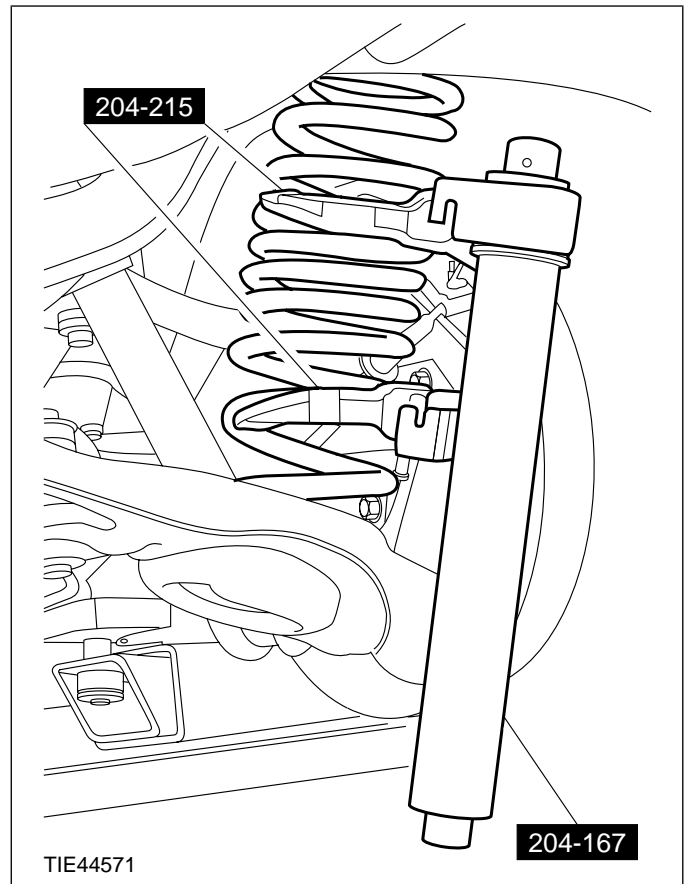
6. **⚠ WARNING:** As the spring is under extreme tension care must be taken at all times. Failure to follow this instruction may result in personal injury.

REMOVAL AND INSTALLATION

Using the special tools, compress the spring.



Using the special tools, compress the spring.



7. Remove the trolley jack.

8. **▲WARNING:** As the spring is under extreme tension care must be taken at all times. Failure to follow this instruction may result in personal injury.

With the aid of another technician, pull the rear lower arm downwards to release the spring from the spring seats and remove the spring.

Installation

All vehicles

1. Using a suitable trolley jack, support the wheel knuckle.
2. **▲WARNING:** As the spring is under extreme tension care must be taken at all times. Failure to follow this instruction may result in personal injury.

3. **▲WARNING:** As the spring is under extreme tension care must be taken at all times. Failure to follow this instruction may result in personal injury.

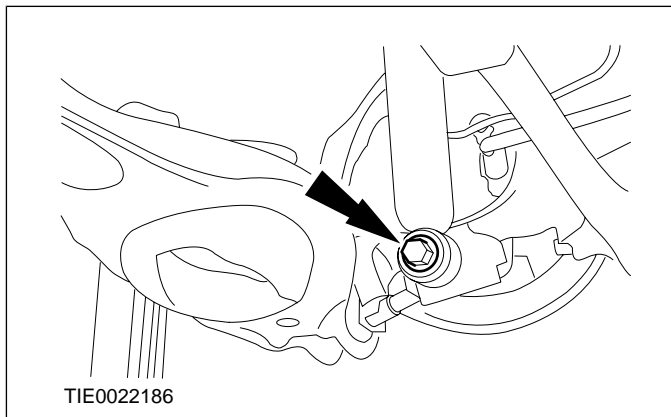
▲CAUTION: Make sure the top seat mount is installed, and the spring ends butt correctly against the upper and lower spring seats.

Install the spring.

4. Remove the special tools.
5. Using a suitable trolley jack, position and align the wheel knuckle with the shock absorber.
6. **NOTE:** Do not fully tighten the shock absorber to wheel knuckle retaining bolt at this stage.

REMOVAL AND INSTALLATION

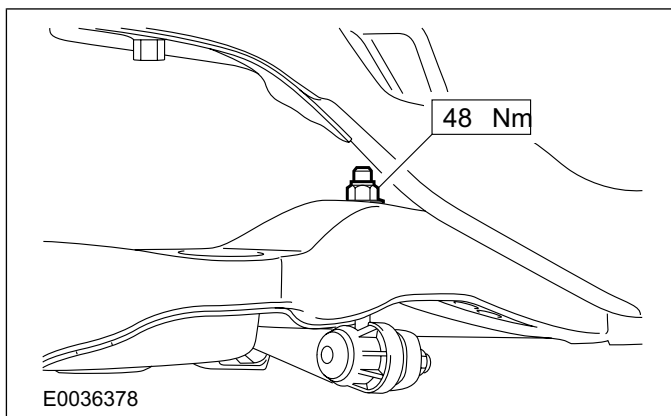
Attach the shock absorber to the wheel knuckle.



7. Remove the trolley jack.

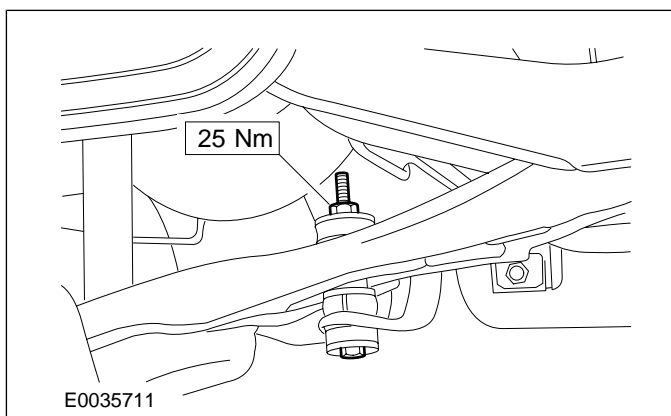
Vehicles with ball joint stabilizer bar link

8. Attach the stabilizer bar link to the rear lower arm on both sides.



Vehicles with solid stabilizer bar link

9. Attach the stabilizer bar link to the rear lower arm on both sides.



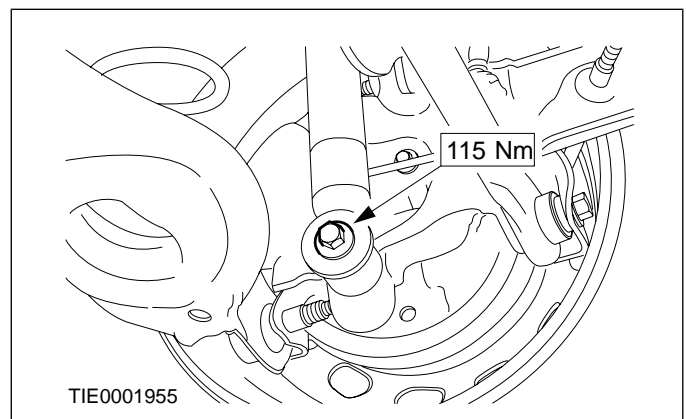
All vehicles

10. Install the rear wheel and tire.

For additional information, refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).

11. NOTE: The final tightening of the shock absorber to wheel knuckle retaining bolt should be carried out when the vehicle weight is on the road wheels.

Tighten the shock absorber to wheel knuckle retaining bolt.



SECTION 204-04 Wheels and Tires

VEHICLE APPLICATION: 2008.75 Focus ST C307

CONTENTS	PAGE
SPECIFICATIONS	
Specifications.....	204-04-2
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Tire Pressure Monitoring System (Overview).....	204-04-3
Description of operation.....	204-04-3
DIAGNOSIS AND TESTING	
Wheels and Tires.....	204-04-4
Inspection and Verification.....	204-04-4
Symptom Chart.....	204-04-5
REMOVAL AND INSTALLATION	
Wheel and Tire.....	204-04-9

SPECIFICATIONS**Torque Specifications**

Description	Nm	lb-ft	lb-in
Steel wheel nuts (gold nuts)	90	66	-
Steel wheel nuts (silver nuts)	130	96	-
Five spoke steel wheel nuts	130	96	-
Alloy wheel nuts	130	96	-
Alloy wheel locking nuts	110	81	-

Wheel and Tire Assembly Runout Specifications

Description	Alloy Wheel (mm)	Steel Wheel (mm)
Maximum lateral runout	0.3	0.6
Maximum radial runout	0.3	0.5

DESCRIPTION AND OPERATION**Tire Pressure Monitoring System – Overview****Description of operation**

The tire pressure monitoring system used in the Kuga is able to detect loss of air in a tire at an early stage and warn the driver. Because it can only compare the behavior of the tires with each other, it is not possible to draw conclusions about the absolute tire pressure. It is also not possible to monitor the spare tire pressure. In order for the system to operate correctly, the tire pressures must be regularly checked and corrected and the system subsequently initialized (see below).

The tire pressure monitoring system used here, depending on the equipment level, is built into the anti-lock braking system (ABS) as an extra function and therefore does not have its own sensors.

The ABS module determines the loss of pressure in the tires by calculation using the wheel speed sensors of the ABS system. If a tire loses pressure, its diameter decreases and the speed of the wheel therefore increases. If the ABS module detects such a loss in pressure, it sends a signal to the instrument cluster via the CAN bus and a warning message is displayed in the driver information system. The warning threshold depends among other things on the dimension of the tires being used, the vehicle operating conditions and the status at the last initialization. Since neither the absolute tire pressure nor the position of the tire is known, after a tire pressure warning the pressure of all the tires must be checked and the system re-initialized. If necessary, the cause of the loss of pressure must be investigated.

Furthermore, regular pressure checks are necessary. The system must be initialized after a tire is changed, winter or summer tires fitted, the pressures corrected or adjusted to suit the vehicle load. This can be done by the driver using the driver information system. For further information, see: Owner's Manual.

DIAGNOSIS AND TESTING**Wheels and Tires****Inspection and Verification****Visual Inspection Chart**

Mechanical
Wheel(s)
Tire(s)
Tire pressure(s) *
Wheel nuts
Wheel studs
* Vehicles equipped with a tire pressure monitoring system must be inspected for correct operation using the diagnostic tool.

To maximize tire performance, inspect the tires for signs of incorrect inflation and uneven wear which may indicate a need for balancing, rotation or suspension alignment. Tires should also be checked frequently for cuts, stone bruises, abrasions, blisters and for objects that may have become embedded in the tread. More frequent inspections are recommended when rapid or extreme temperature changes occur or when road surfaces are rough or occasionally littered with foreign material.

As a further visible check of tire condition, tread wear indicators are molded into the bottom of the tread grooves. When these indicator bands become visible, new tires must be installed.

Tire Wear Diagnosis

Uneven wear is usually caused by either excessive camber or excessive toe on tires.

Sometimes incorrect toe settings or worn struts will cause severe 'cupping' or 'scalloped' tire wear on non-driven wheels.

Severely incorrect toe settings will also cause other unusual wear patterns.

Tire Vibration Diagnosis

A tire vibration diagnostic procedure always begins with a road test. The road test and customer interview (if available) will provide much of the information needed to find the source of a vibration.

During the road test, drive the vehicle on a road that is smooth and free of undulations. If vibration is apparent, note and record the following:

- the speed at which the vibration occurs.
- what type of vibration occurs in each speed range.
 - mechanical or audible
- how the vibration is affected by changes in the following:
 - engine torque
 - vehicle speed
 - engine speed
- type of vibration - sensitivity:
 - torque sensitive
 - vehicle speed sensitive
 - engine speed sensitive

The following explanations help isolate the source of the vibration.

Torque Sensitive

This means that the condition can be improved or made worse by accelerating, decelerating, coasting, maintaining a steady vehicle speed or applying engine torque.

Vehicle Speed Sensitive

This means that the vibration always occurs at the same vehicle speed and is not affected by engine torque, engine speed or the transmission gear selected.

DIAGNOSIS AND TESTING

Engine Speed Sensitive

This means that the vibration occurs at varying vehicle speeds when a different transmission gear is selected. It can sometimes be isolated by increasing or decreasing engine speed with the transmission in NEUTRAL or by stall testing with the transmission in gear. If the condition is engine speed sensitive, the cause is probably not related to the tires.

If the road test indicates that there is tire whine, but no shake or vibration, the noise originates with the contact between the tire and the road surface.

A thumping noise usually means that the tire is flat or has soft spots making a noise as they slap the roadway. Tire whine can be distinguished from axle noise. Tire whine remains the same over a range of speeds.

A complete road test procedure is described in Section 100-04.

REFER to: Noise, Vibration and Harshness (NVH) (100-04 Noise, Vibration and Harshness, Diagnosis and Testing).

Symptom Chart

Symptom	Possible Sources	Action
• Tire(s) show excess wear on edge of tread	• Tire(s) under-inflated.	• ADJUST the tire pressure(s).
	• Vehicle overloaded.	• CORRECT as necessary.
	• Incorrect wheel alignment.	• ADJUST the wheel alignment. REFER to: (204-00 Suspension System - General Information) Specifications (Specifications), Front Toe Adjustment (General Procedures).
• Tire(s) show excess wear in center of tread	• Tire(s) over-inflated.	• ADJUST the tire pressure(s).
• Other excessive tire wear concerns	• Incorrect tire pressure(s).	• ADJUST the tire pressure(s).
	• Wheel and tire assemblies need rotating.	• ROTATE the wheel and tire assemblies.
	• Incorrect wheel alignment.	• ADJUST the wheel alignment. REFER to: (204-00 Suspension System - General Information) Specifications (Specifications), Front Toe Adjustment (General Procedures).
	• Vehicle overloaded.	• CORRECT as necessary.
	• Loose or leaking front strut and spring assembly.	• TIGHTEN or INSTALL new suspension components as necessary. REFER to: Strut and Spring Assembly (204-01 Front Suspension, Removal and Installation).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Wheel bearings worn. 	<ul style="list-style-type: none"> INSTALL new wheel bearings as necessary. REFER to: Accessory Drive Belt - Vehicles Built Up To: 02/2008 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (303-05 Accessory Drive, Removal and Installation), Rear Wheel Bearing (204-02 Rear Suspension, Removal and Installation).
	<ul style="list-style-type: none"> Suspension components, bushings and ball joints. 	<ul style="list-style-type: none"> CHECK or INSTALL new suspension components as necessary.
	<ul style="list-style-type: none"> Excessive lateral or radial runout of wheel or tire. 	<ul style="list-style-type: none"> BALANCE the wheel and tire assemblies. Using a suitable dial indicator gauge and holding fixture, CHECK lateral and radial runout of the wheel and tire assemblies. INSTALL new wheel and tire assemblies as necessary. REFER to: (204-04 Wheels and Tires) Specifications (Specifications), Wheel and Tire (Removal and Installation).
<ul style="list-style-type: none"> Wobble or shimmy affecting wheel runout 	<ul style="list-style-type: none"> Damaged wheel. 	<ul style="list-style-type: none"> INSPECT the wheel rims for damage. BALANCE the wheel and tire assemblies. Using a suitable dial indicator gauge and holding fixture, CHECK lateral and radial runout of the wheel and tire assemblies. INSTALL new wheel and tire assemblies as necessary. REFER to: (204-04 Wheels and Tires) Specifications (Specifications), Wheel and Tire (Removal and Installation).
	<ul style="list-style-type: none"> Front wheel bearing. 	<ul style="list-style-type: none"> CHECK or INSTALL new wheel bearings as necessary. REFER to: Accessory Drive Belt - Vehicles Built Up To: 02/2008 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (303-05 Accessory Drive, Removal and Installation).

204-04-7

Wheels and Tires

204-04-7

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Excessive vehicle vibration, rough steering 	<ul style="list-style-type: none"> Suspension components. 	<ul style="list-style-type: none"> CHECK or INSTALL new suspension components as necessary.
<ul style="list-style-type: none"> Vehicle vibrations from wheels and tires 	<ul style="list-style-type: none"> Incorrect tire pressure(s). 	<ul style="list-style-type: none"> ADJUST the tire pressure(s).
	<ul style="list-style-type: none"> Wheel or tire imbalance. 	<ul style="list-style-type: none"> BALANCE the wheel and tire assemblies.
	<ul style="list-style-type: none"> Uneven tire wear. 	<ul style="list-style-type: none"> INSTALL a new tire(s) as necessary. REFER to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).
	<ul style="list-style-type: none"> Brake disc imbalance. 	<ul style="list-style-type: none"> CHECK the brake disc for foreign material.
	<ul style="list-style-type: none"> Water in tire(s). 	<ul style="list-style-type: none"> REMOVE the water.
	<ul style="list-style-type: none"> Bent wheel. 	<ul style="list-style-type: none"> INSTALL a new wheel and tire assembly. REFER to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).
	<ul style="list-style-type: none"> Incorrectly seated tire bead. 	<ul style="list-style-type: none"> SPIN the wheel on the vehicle. EXAMINE the area where the tire and the wheel meet. If that section of the tire appears to waver while being rotated, the tire bead may not be correctly seated on the wheel. REMOVE the tire and CLEAN the bead seat areas on both wheel and tire.
	<ul style="list-style-type: none"> Excessive lateral or radial runout of wheel or tire. 	<ul style="list-style-type: none"> BALANCE the wheel and tire assemblies. Using a suitable dial indicator gauge and holding fixture, CHECK the lateral and radial runout of the wheel and tire assemblies. INSTALL new wheel and tire assemblies as necessary. REFER to: (204-04 Wheels and Tires) Specifications (Specifications), Wheel and Tire (Removal and Installation).
<ul style="list-style-type: none"> Foreign material between wheel mounting face and hub mounting surface. 	<ul style="list-style-type: none"> CLEAN mounting surfaces. 	

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Front wheel bearing. 	<ul style="list-style-type: none"> CHECK or INSTALL new wheel bearings as necessary. <p>REFER to: Accessory Drive Belt - Vehicles Built Up To: 02/2008 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (303-05 Accessory Drive, Removal and Installation).</p>
<ul style="list-style-type: none"> Rust streaks from the wheel stud holes in the wheel 	<ul style="list-style-type: none"> Wheel nuts. 	<ul style="list-style-type: none"> REMOVE the wheel and tire assembly. Inspect the wheel nuts and wheel and tire assembly for damage. INSTALL new wheel nuts and wheel and tire assemblies as necessary. REFER to: (204-04 Wheels and Tires) Specifications (Specifications), Wheel and Tire (Removal and Installation).
<ul style="list-style-type: none"> Seized wheel nuts 	<ul style="list-style-type: none"> Corrosion. 	<ul style="list-style-type: none"> CAUTION: Do not permit lubricant to get on cone sets of stud holes or on cone angle of wheel nuts. If corrosion is slight, wire brush away. If corrosion is excessive, INSTALL new wheel studs and nuts. REFER to: (204-04 Wheels and Tires) Specifications (Specifications), Wheel and Tire (Removal and Installation). If the condition persists, LUBRICATE the first three threads of each wheel stud with a graphite-based lubricant.
	<ul style="list-style-type: none"> Vehicle overloaded 	<ul style="list-style-type: none"> CORRECT as necessary.

REMOVAL AND INSTALLATION

Wheel and Tire

Removal

⚠ CAUTION: Do not use heat to loosen a seized wheel nut. Heat may damage the wheel and wheel hub.

1. Loosen the wheel nuts.
2. Raise and support the vehicle. For additional information, refer to: (100-02 Jacking and Lifting)

Jacking (Description and Operation),
Lifting (Description and Operation).

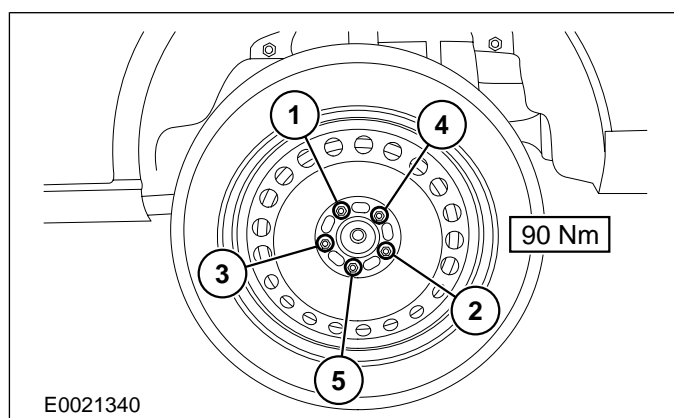
3. Remove the wheel and tire.

Installation

1. **⚠ WARNING:** Remove any corrosion or dirt from the mounting surfaces of the wheel, wheel hub or brake disc. Corrosion or dirt on the mounting surfaces may cause the wheel nuts to loosen and the wheel to come off while the vehicle is in motion. Failure to follow this instruction may result in personal injury.

Clean the wheel hub and mounting surfaces.

2. Install the wheel and tire.
3. Lower the vehicle.
4. Tighten the wheel nuts in the sequence shown.



SECTION 205-04 Front Drive Halfshafts

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS**Lubricants, Fluids, Sealers and Adhesives**

	Specifications
Constant Velocity Joint Grease	ESP-M1C 207-A

	Specifications
Silicone Grease	ESE-M1C 171-A

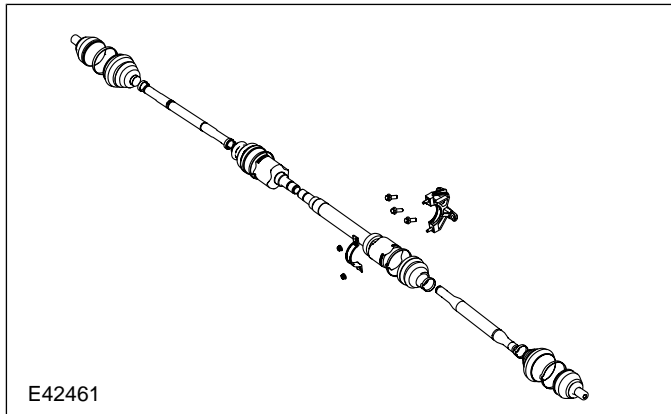
Capacity

Description	Driveshaft Joint Grease Fill Capacity	
	Inner (Grams)	Outer (Grams)
1.6L engine with manual transaxle	100	100
1.8L/2.0L engine with manual transaxle	170	100
1.6L diesel engine with manual transaxle	150	100
2.0L diesel engine with manual transaxle	170	140
Vehicles with automatic transaxle	170	100

Torque Specifications

Item	Nm	lb-ft	lb-in
Lower arm ball joint retaining nut	70	52	-
Intermediate shaft center bearing cap retaining nuts	25	18	-
Wheel hub retaining bolt	a)	-	-
Headlamp levelling sensor bracket to lower arm	8	-	71
Constant velocity joint boot clamps with special tool 204-169	21	15	-

a) Refer to the procedure in this section.

DESCRIPTION AND OPERATION**Front Drive Halfshafts****Overview**

The front axle halfshafts both have the same length as each other.

The vehicle uses improved constant velocity joints which are designed for the larger bending radii occurring in conjunction with the new transmission and the increased travel of the suspension springs.

The constant velocity joints satisfy durability requirements of 240,000 km.

A support mounting is located on the right-hand drive halfshaft. A new bearing cap and new nuts should be used when installing this support mounting.

DIAGNOSIS AND TESTING

Front Drive Halfshafts

Inspection and Verification

NOTE: New front wheel drive halfshafts should not be installed unless disassembly and inspection reveals unusual wear.

1. Inspect front wheel driveshaft joint boots for evidence of cracks, tears or splits.

NOTE: While inspecting the front wheel driveshaft CV joint boots, watch for indentations (dimples) in the boot convolutions. If an indentation is observed, it must be removed.

2. Inspect the underbody for any indication of grease splatter in the vicinity of the front wheel driveshaft CV joint boots outboard and inboard locations, which is an indication of front wheel driveshaft CV joint boot and/or front wheel driveshaft CV joint boot clamp damage.

3. Inspect for inboard CV joint stub shaft pilot bearing housing seal leakage at the front wheel driveshaft CV joint.
4. Make sure front axle wheel hub retainer is the correct prevailing torque type.
5. The silicone front wheel driveshaft CV joint boot will sweat during operation, causing a light film of grease to show on the outside of the front wheel driveshaft CV joint boot. This condition is normal.

NOTE: Halfshafts are not balanced and do not contribute to rotational vibration.

6. If the concerns remain after the inspection, determine the symptoms and go to the Symptom Chart. For additional Noise, Vibration and Harshness (NVH). REFER to Section 100-04 [Noise, Vibration and Harshness].

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Clicking, Popping or Grinding Noises While Turning 	<ul style="list-style-type: none"> Inadequate or contaminated lube in outboard/inboard front wheel driveshaft CV joint. 	<ul style="list-style-type: none"> INSPECT, CLEAN and LUBRICATE as necessary.
	<ul style="list-style-type: none"> Another component contacting driveshaft assembly. 	<ul style="list-style-type: none"> INSPECT and REPAIR as necessary.
	<ul style="list-style-type: none"> Wheel bearings, brakes, suspension or steering components. 	<ul style="list-style-type: none"> INSPECT and REPAIR as necessary. REFER to Section 204-00 [Suspension System - General Information] / 206-00 [Brake System - General Information] / 211-00 [Steering System - General Information].
<ul style="list-style-type: none"> Vibration at Highway Speeds 	<ul style="list-style-type: none"> Out of balance front wheels or tires. 	<ul style="list-style-type: none"> REPAIR or INSTALL new as necessary. REFER to Section 204-04 [Wheels and Tires].
	<ul style="list-style-type: none"> Out-of-round tires. 	<ul style="list-style-type: none"> REPAIR or INSTALL new as necessary. REFER to Section 204-04 [Wheels and Tires].
	<ul style="list-style-type: none"> Incorrectly seated outboard front wheel driveshaft CV joint in front wheel hub. 	<ul style="list-style-type: none"> REPAIR or INSTALL new as necessary. REFER to Halfshaft Disassembly and Assembly in this section.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Shudder Vibration During Acceleration. 	<ul style="list-style-type: none"> Excessively high CV joint operating angles caused by incorrect ride height. 	<ul style="list-style-type: none"> CHECK ride height, VERIFY correct spring rate and CHECK items under Halfshaft Joint Pullout. REPAIR or INSTALL new as necessary.
	<ul style="list-style-type: none"> Excessively worn or damaged inboard front wheel driveshaft joint or outboard front wheel driveshaft joint. 	<ul style="list-style-type: none"> INSPECT and INSTALL new as necessary.
<ul style="list-style-type: none"> Halfshaft Joint Pullout 	<ul style="list-style-type: none"> Inboard driveshaft bearing retainer circlip missing or not correctly seated in differential side gear. 	<ul style="list-style-type: none"> INSPECT and REPAIR or INSTALL new as necessary.
	<ul style="list-style-type: none"> Engine/transaxle assembly mispositioned. 	<ul style="list-style-type: none"> CHECK engine mounts for damage or wear. REPAIR or INSTALL new as necessary.
	<ul style="list-style-type: none"> Frame rail or strut tower out of position or damaged. 	<ul style="list-style-type: none"> CHECK underbody dimensions. REFER to REFER to Section 501-00 [Body System - General Information].
	<ul style="list-style-type: none"> Front suspension components worn or damaged. 	<ul style="list-style-type: none"> CHECK for worn bushings or bent components (front stabilizer bar, front suspension lower arm). REPAIR or INSTALL new as necessary.

REMOVAL AND INSTALLATION

Front Halfshaft LH(14 320 0)

Special Tool(s)

<p>16092</p>	<p>Remover, Halfshaft 204-226 (16-092)</p>
<p>1609201</p>	<p>Adapter for 204-226 204-226-01 (16-092-01)</p>
<p>E42949</p>	<p>Protector, Ball Joint Gaiter 204-349</p>
<p>15011</p>	<p>Slide Hammer 205-047 (15-011)</p>
<p>E47098</p>	<p>Protector, Halfshaft Seal 205-775</p>
<p>16089</p>	<p>Remover, Halfshaft 308-256 (16-089)</p>

General Equipment

<p>Ball joint separator</p>

General Equipment

<p>Tire lever</p>

Materials	
Name	Specification
Silicone Grease	ESE-M1C171-A
Transmission Fluid	WSD-M2C200-C

Removal

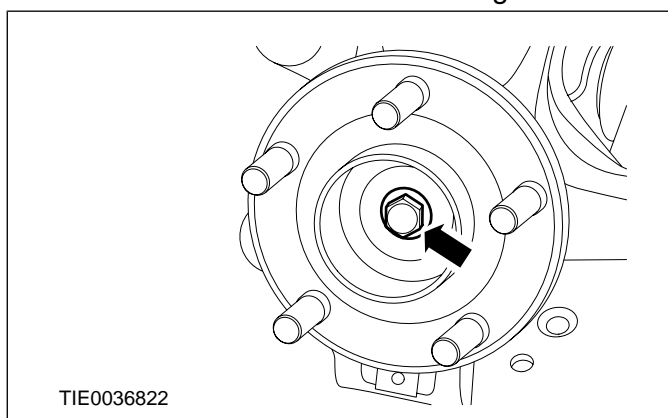
All vehicles

1. Remove the wheel and tire.

For additional information, refer to: **Wheel and Tire (204-04 Wheels and Tires, Removal and Installation)**.

2. Remove the wheel hub retaining bolt.

- Discard the wheel hub retaining bolt.

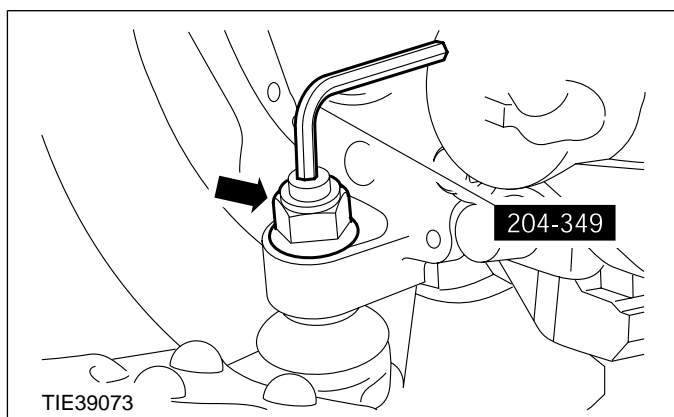


3. **NOTE:** Use a suitable brass drift if necessary.

Push the halfshaft into the tripod housing as far as the stop (approximately 20 mm).

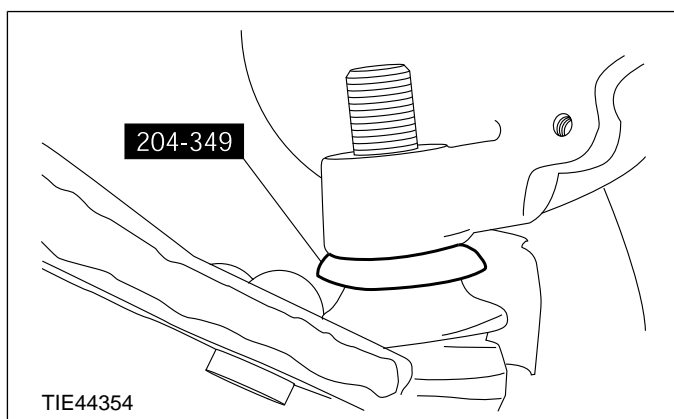
REMOVAL AND INSTALLATION

4. Using the special tool to prevent the ball joint stud from rotating, remove and discard the lower arm ball joint retaining nut.



5. **CAUTION:** Make sure the special tool is installed with the curved surface facing upwards to prevent damage to the ball joint seal.

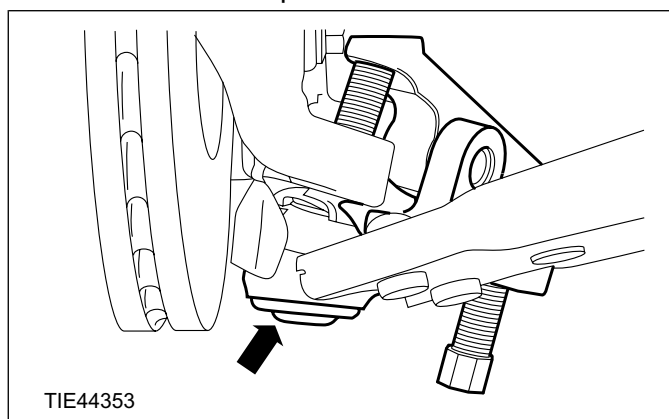
Install the special tool.



6. **CAUTION:** Make sure the strut and spring assembly does not move in a forwards or rearwards direction, to prevent damage to the top mount center cup.

Using a suitable ball joint separator, detach the lower arm from the wheel knuckle.

- Remove the special tool.



7. CAUTIONS:

CAUTION: The inner constant velocity (CV) joint must not be bent more than 23 degrees. The outer CV joint must not be bent more than 45 degrees.

CAUTION: Do not apply excessive force to the strut and spring assembly. Do not pull the strut and spring assembly outwards by more than 28 mm.

CAUTION: Make sure the strut and spring assembly does not move in a forwards or rearwards direction, to prevent damage to the top mount center cup.

NOTE: Make sure the halfshaft is still fully engaged in the tripod housing.

Detach the halfshaft from the wheel hub.

- Pull the strut and spring assembly outwards approximately 28 mm.

Vehicles with 5-speed manual transaxle (iB5)

8. CAUTIONS:

CAUTION: The inner CV joint must not be bent more than 23 degrees. The outer CV joint must not be bent more than 45 degrees.

CAUTION: Make sure the halfshaft seal is not damaged.

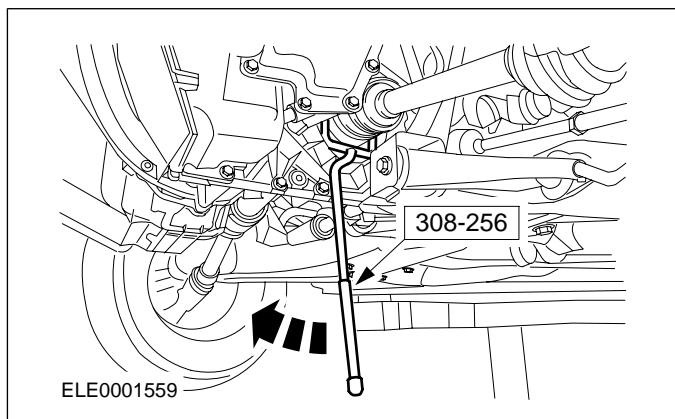
NOTE: Plug the transaxle to prevent oil loss or dirt ingress.

Using the special tool, remove the halfshaft.

- Discard the snap ring.

REMOVAL AND INSTALLATION

- Allow the oil to drain into a suitable container.



Vehicles with 4-speed automatic transaxle

9. CAUTIONS:

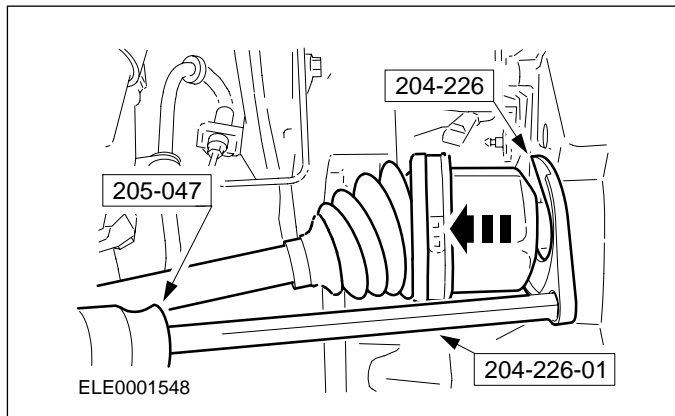
⚠ The inner CV joint must not be bent more than 23 degrees. The outer CV joint must not be bent more than 45 degrees.

⚠ Make sure that the halfshaft seal is not damaged.

⚠ Plug the transaxle to prevent oil loss or dirt ingress.

Using the special tools, remove the halfshaft.

- Discard the snap ring.
- Allow the oil to drain into a suitable container.



Vehicles with 5-speed manual transaxle (MTX75) or 6-speed manual transaxle (MMT6)

10. CAUTIONS:

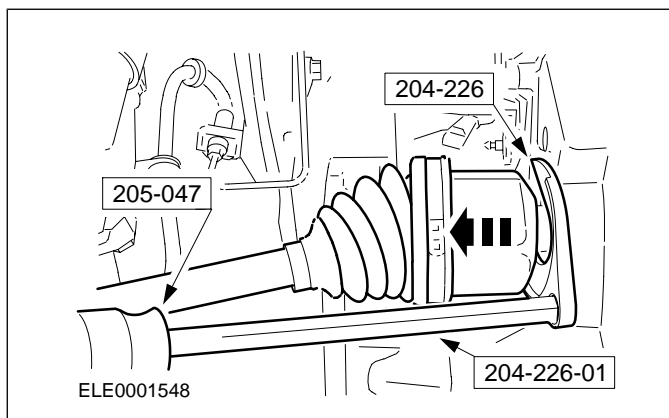
⚠ The inner CV joint must not be bent more than 23 degrees. The outer CV joint must not be bent more than 45 degrees.

⚠ Make sure that the halfshaft seal is not damaged.

⚠ Plug the transaxle to prevent oil loss or dirt ingress.

Using the special tools, remove the halfshaft.

- Discard the snap ring.
- Allow the oil to drain into a suitable container.



Vehicles with automatic transaxle (CFT23)

11. CAUTIONS:

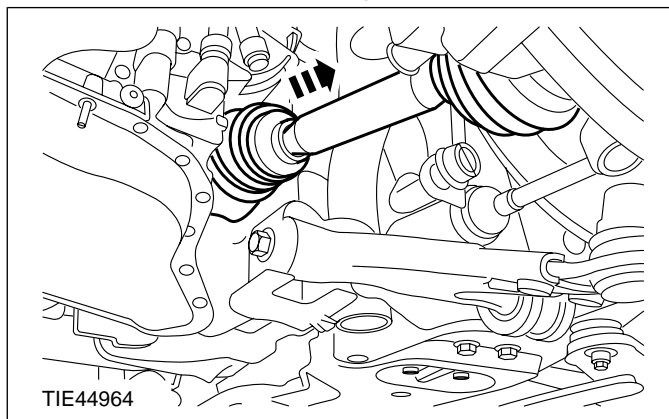
⚠ The inner CV joint must not be bent more than 23 degrees. The outer CV joint must not be bent more than 45 degrees.

⚠ Make sure that the halfshaft seal is not damaged.

⚠ Plug the transaxle to prevent dirt ingress.

Using a suitable tire lever, remove the halfshaft.

- Discard the snap ring.



Installation

Vehicles with automatic transaxle (CFT23)

1. Coat the halfshaft seal with grease.

All vehicles

2. CAUTIONS:

REMOVAL AND INSTALLATION

⚠ The inner CV joint must not be bent more than 23 degrees. The outer CV joint must not be bent more than 45 degrees.

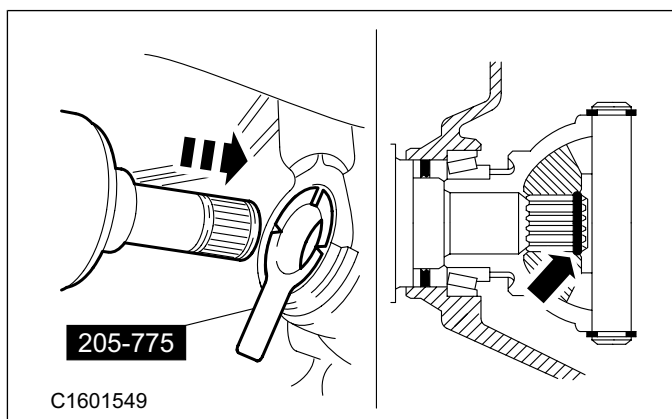
⚠ Make sure that the halfshaft seal is not damaged.

⚠ Make sure the snap ring is correctly seated.

NOTE: Install a new snap ring.

Attach the left-hand halfshaft to the transaxle.

- Remove the special tool before fully installing the halfshaft.



3. Push the halfshaft into the tripod housing as far as the stop (approximately 20 mm).

4. CAUTIONS:

⚠ The inner CV joint must not be bent more than 23 degrees. The outer CV joint must not be bent more than 45 degrees.

⚠ Do not apply excessive force to the strut and spring assembly. Do not pull the strut and spring assembly outwards by more than 28 mm.

⚠ Make sure the strut and spring assembly does not move in a forwards or rearwards direction, to prevent damage to the top mount center cup.

Attach the halfshaft to the wheel hub.

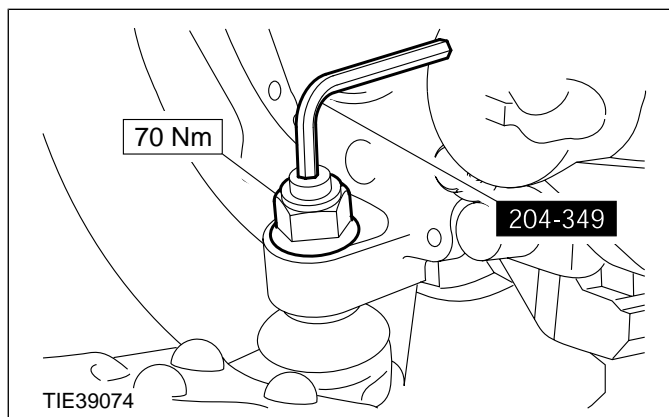
- Pull the strut and spring assembly outwards approximately 28 mm.

5. **⚠ CAUTION:** Make sure the strut and spring assembly does not move in a forwards or rearwards direction, to prevent damage to the top mount center cup.

Attach the lower arm ball joint to the wheel knuckle.

6. **⚠ WARNING:** Install a new lower arm ball joint retaining nut. Failure to follow this instruction may result in personal injury.

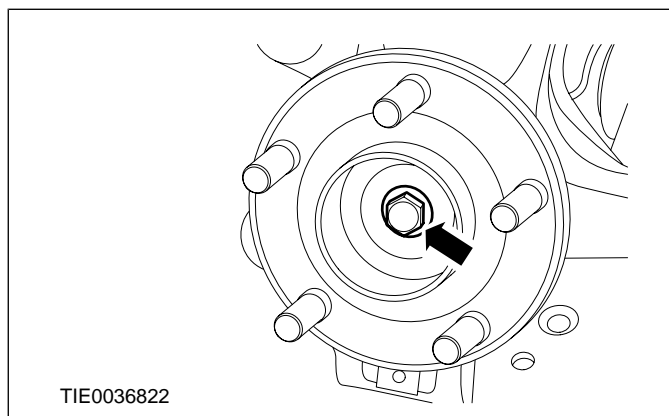
Using the special tool to prevent the ball joint from rotating, install the lower arm ball joint retaining nut.



7. **⚠ CAUTION:** Install a new wheel hub retaining bolt.

NOTE: Do not tighten the wheel hub retaining bolt at this stage.

Install the wheel hub retaining bolt.



8. Install the wheel and tire.

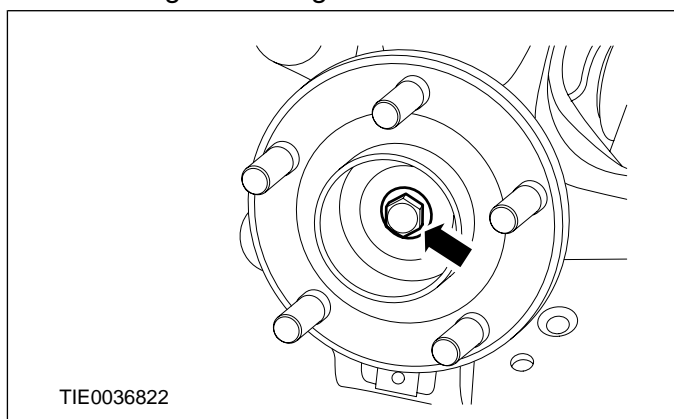
For additional information, refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).

9. Tighten the wheel hub retaining bolt (wheel and tire shown removed for clarity).

- Tighten the wheel hub retaining bolt in two stages.
 - Stage 1: 45 Nm.

REMOVAL AND INSTALLATION

- Stage 2: 90 degrees.



Vehicles with 4-speed automatic transaxle

10. With the vehicle on a level surface, check the transmission fluid level.

For additional information, refer to:
Transmission Fluid Drain and Refill
(307-01 Automatic
Transmission/Transaxle - Vehicles With:
4-Speed Automatic Transmission (4F27E),
General Procedures).

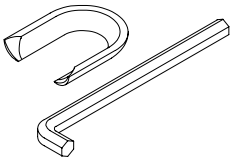
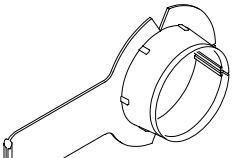
Vehicles with manual transaxle

11. With the vehicle on a level surface, check the transmission fluid level and top up with clean transmission fluid until the fluid level is 5 - 10 mm below the fluid filler plug.

REMOVAL AND INSTALLATION

Front Halfshaft RH(14 321 0)

Special Tool(s)

 <p>E42949</p>	<p>Protector, Ball Joint Gaiter 204-349</p>
 <p>E47098</p>	<p>Protector, Halfshaft Seal 205-775</p>

General Equipment

Ball joint separator

Materials	
Name	Specification
Silicone Grease	ESE-M1C171-A
Transmission Fluid	WSD-M2C200-C

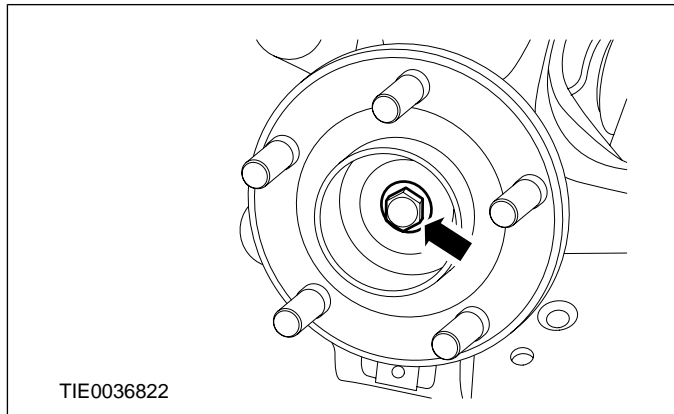
Removal

1. Remove the wheel and tire.

For additional information, refer to: **Wheel and Tire (204-04 Wheels and Tires, Removal and Installation)**.

2. Remove the wheel hub retaining bolt.

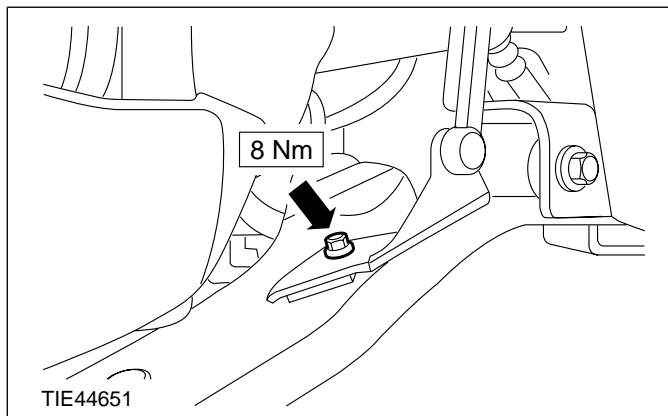
- Discard the wheel hub retaining bolt.



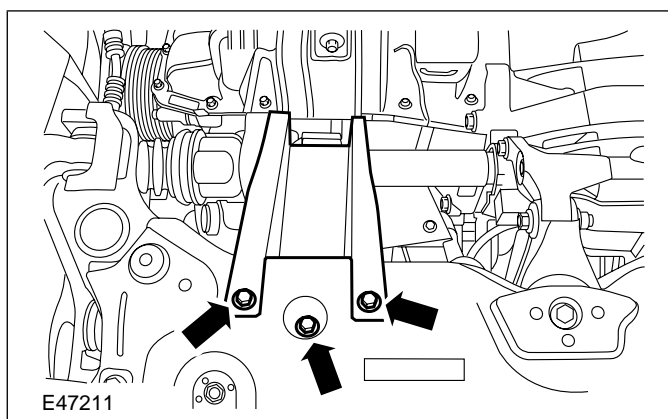
3. NOTE: Use a suitable brass drift if necessary.

Push the halfshaft into the tripod housing as far as the stop (approximately 20 mm).

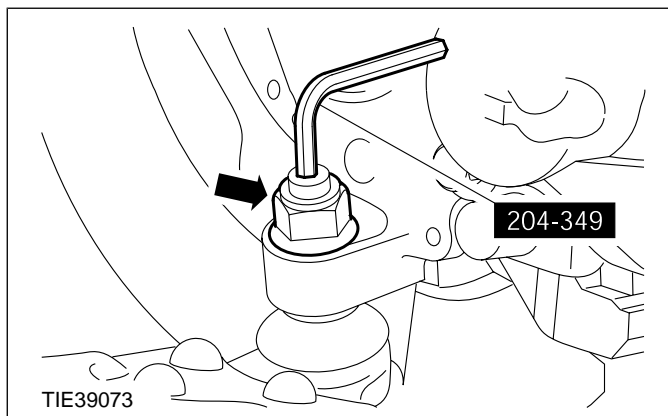
4. Detach the headlamp leveling sensor bracket from the lower arm and secure it to one side (if equipped).



5. Remove the crashbox.



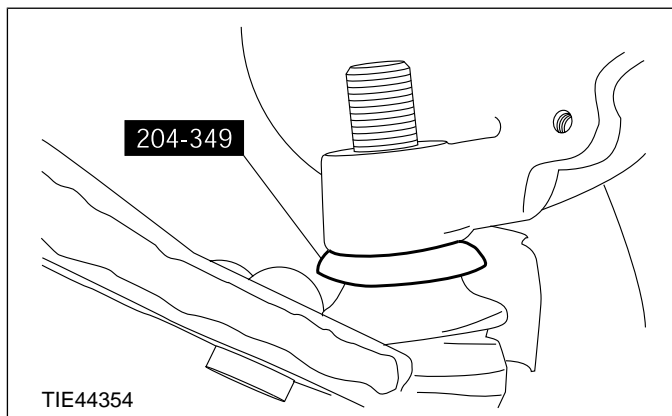
6. Using the special tool to prevent the ball joint stud from rotating, remove and discard the lower arm ball joint retaining nut.



REMOVAL AND INSTALLATION

7. **⚠ CAUTION:** Make sure the special tool is installed with the curved surface facing upwards to prevent damage to the ball joint seal.

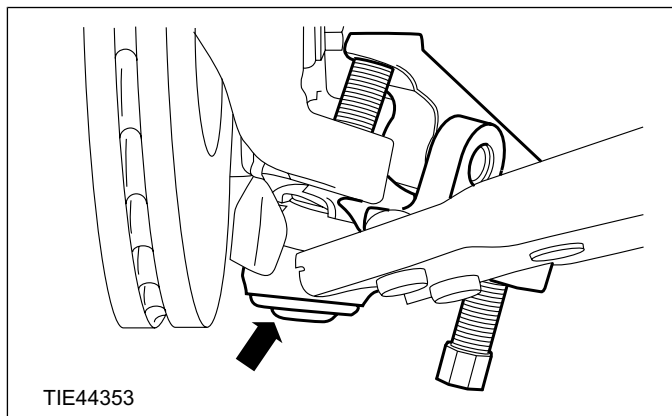
Install the special tool.



8. **⚠ CAUTION:** Make sure the strut and spring assembly does not move in a forwards or rearwards direction, to prevent damage to the top mount center cup.

Using a suitable ball joint separator, detach the lower arm from the wheel knuckle.

- Remove the special tool.



9. CAUTIONS:

⚠ The inner constant velocity (CV) joint must not be bent more than 23 degrees. The outer CV joint must not be bent more than 45 degrees.

⚠ Do not apply excessive force to the strut and spring assembly. Do not pull the strut and spring assembly outwards by more than 28 mm.

- ⚠** Make sure the strut and spring assembly does not move in a forwards or rearwards direction, to prevent damage to the top mount center cup.

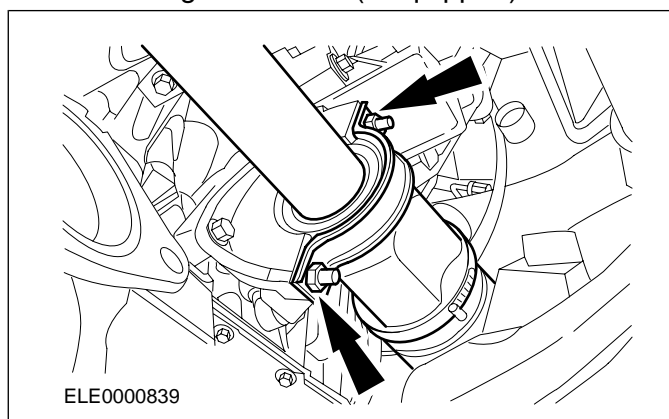
NOTE: Make sure that the halfshaft is still fully engaged in the tripod housing.

Detach the halfshaft from the wheel hub.

- Pull the strut and spring assembly outwards approximately 28 mm.

10. Remove the intermediate shaft center bearing cap.

- Discard the bearing cap and retaining nuts.
- Remove the intermediate shaft center bearing heat shield (if equipped).



11. CAUTIONS:

⚠ The inner CV joint must not be bent more than 23 degrees. The outer CV joint must not be bent more than 45 degrees.

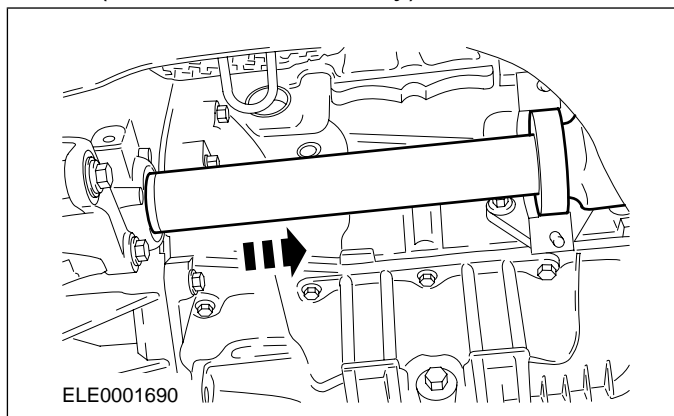
⚠ Make sure the halfshaft seal is not damaged.

⚠ Plug the transaxle to prevent oil loss or dirt ingress.

Remove the halfshaft and intermediate shaft assembly.

REMOVAL AND INSTALLATION

- Allow the oil to drain into a suitable container (manual transaxles only).



Installation

Vehicles with automatic transaxle (CFT23)

1. Coat the halfshaft seal with grease.

All vehicles

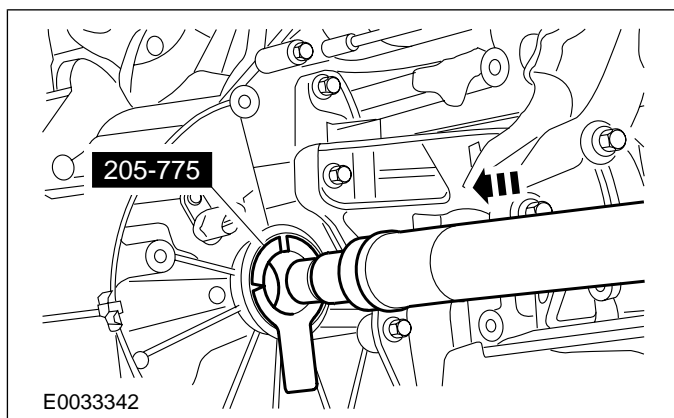
2. CAUTIONS:

⚠ The inner CV joint must not be bent more than 23 degrees. The outer CV joint must not be bent more than 45 degrees.

⚠ Make sure the halfshaft seal is not damaged.

Attach the right-hand halfshaft and intermediate shaft assembly to the transaxle.

- Remove the special tool before fully installing the halfshaft.

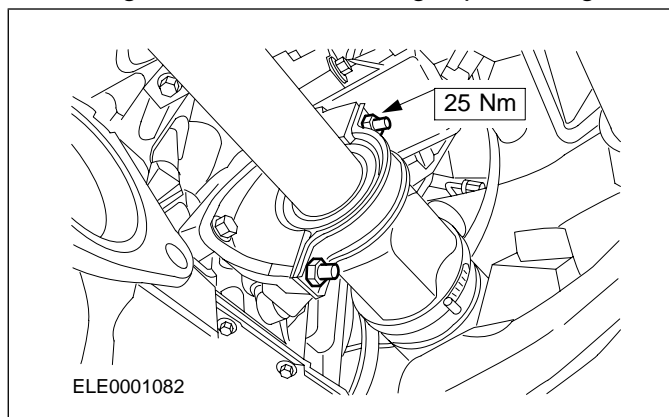


3. NOTE: Install a new intermediate shaft center bearing cap and retaining nuts.

NOTE: Make sure that the intermediate shaft center bearing is correctly positioned in the intermediate shaft center bearing retaining bracket.

Install the intermediate shaft center bearing cap.

- Position the center bearing cap.
- Position the intermediate shaft center bearing heat shield (if equipped).
- Tighten the center bearing cap retaining nuts.



4. Push the halfshaft into the tripod housing as far as the stop (approximately 20 mm).

5. CAUTIONS:

⚠ The inner CV joint must not be bent more than 23 degrees. The outer CV joint must not be bent more than 45 degrees.

⚠ Do not apply excessive force to the strut and spring assembly. Do not pull the strut and spring assembly outwards by more than 28 mm.

⚠ Make sure the strut and spring assembly does not move in a forwards or rearwards direction, to prevent damage to the top mount center cup.

Attach the halfshaft to the wheel hub.

- Pull the strut and spring assembly outwards approximately 28 mm.

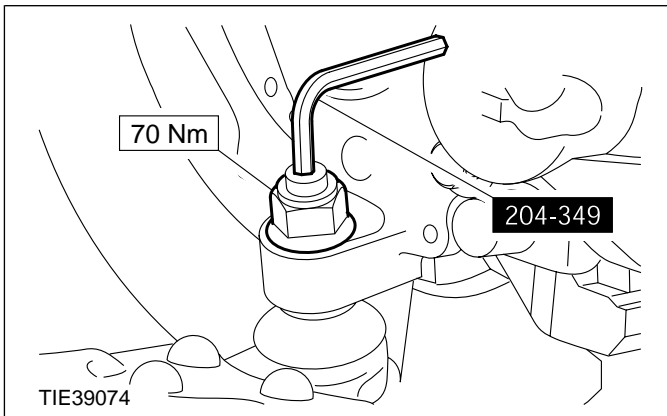
6. **⚠** CAUTION: Make sure the strut and spring assembly does not move in a forwards or rearwards direction, to prevent damage to the top mount center cup.

Attach the lower arm ball joint to the wheel knuckle.

7. **⚠** WARNING: Install a new lower arm ball joint retaining nut. Failure to follow this instruction may result in personal injury.

REMOVAL AND INSTALLATION

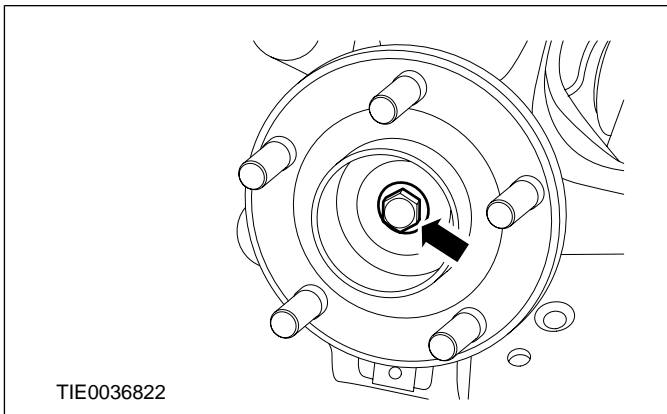
Using the special tool to prevent the ball joint from rotating, install the lower arm ball joint retaining nut.



8. **CAUTION:** Install a new wheel hub retaining bolt.

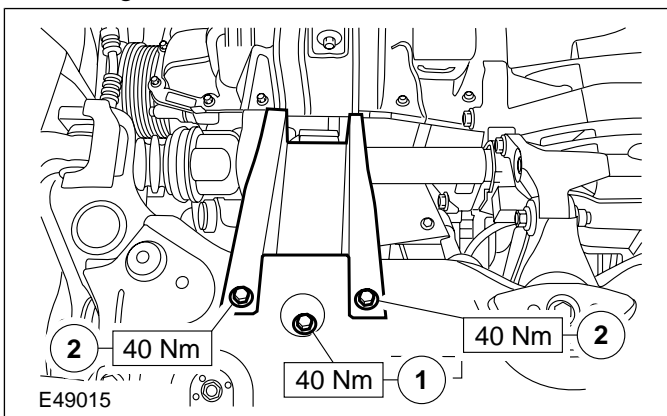
NOTE: Do not tighten the wheel hub retaining bolt at this stage.

Install the wheel hub retaining bolt.

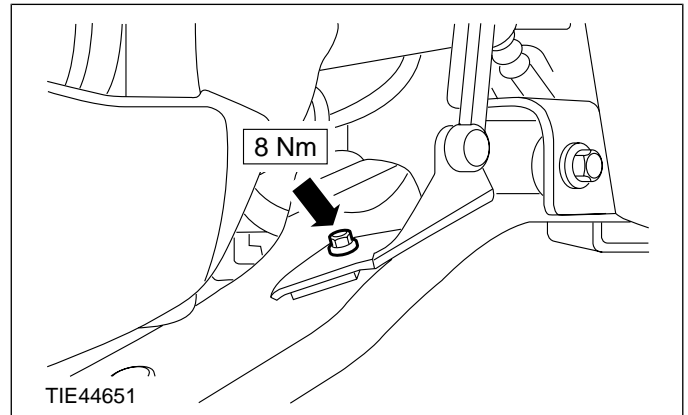


9. Install the crashbox.

1. Tighten the bolt M10 x 16.
2. Tighten the bolts M10 x 25.



10. Attach the headlamp leveling sensor bracket to the lower arm (if equipped).

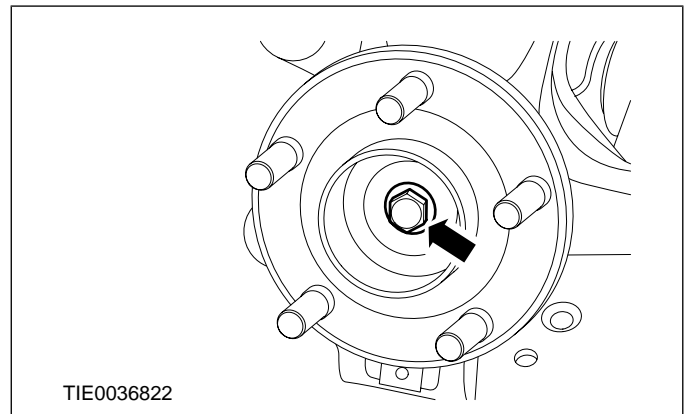


11. Install the wheel and tire.

For additional information, refer to: **Wheel and Tire (204-04 Wheels and Tires, Removal and Installation)**.

12. Tighten the wheel hub retaining bolt (wheel and tire shown removed for clarity).

- Tighten the wheel hub retaining bolt in two stages.
- Stage 1: 45 Nm.
- Stage 2: 90 degrees.



Vehicles with 4-speed automatic transaxle

13. With the vehicle on a level surface, check the transmission fluid level.

For additional information, refer to: **Transmission Fluid Drain and Refill (307-01 Automatic Transmission/Transaxle - Vehicles With: Automatic Transmission (CFT23), General Procedures)**.

 **205-04-15****Front Drive Halfshafts****205-04-15** 

REMOVAL AND INSTALLATION

Vehicles with manual transaxle

- 14. With the vehicle on a level surface, check the transmission fluid level and top up with clean transmission fluid until the fluid level is 5 - 10 mm below the fluid filler plug.**

REMOVAL AND INSTALLATION

Intermediate Shaft

Special Tool(s)

 14044	Clamping Tool, Boot Retaining Clamp 204-169 (14-044)
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Materials

Name	Specification
Constant Velocity Joint Grease	ESP-M1C207-A

Removal

1. Remove the right-hand halfshaft.

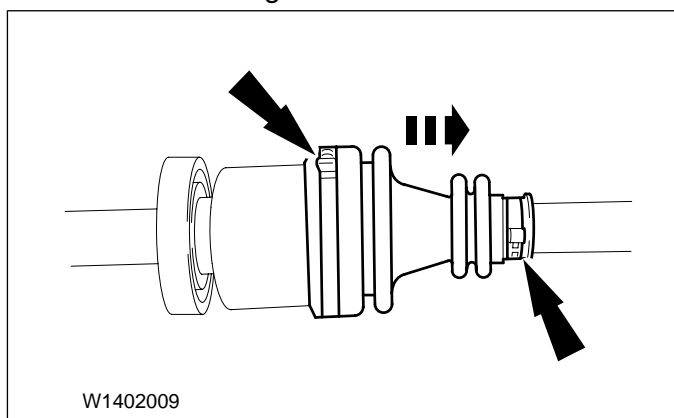
For additional information, refer to: **Front Halfshaft RH - 3-Door (205-04 Front Drive Halfshafts, Removal and Installation)**.

2. CAUTION: Use vise jaw protectors.

NOTE: Make sure the boot is not damaged.

Detach the intermediate shaft from the right-hand halfshaft.

- Remove and discard the constant velocity (CV) joint boot retaining clamps and slide back the boot.
- Detach the intermediate shaft from the halfshaft.
- Remove the grease.



Installation

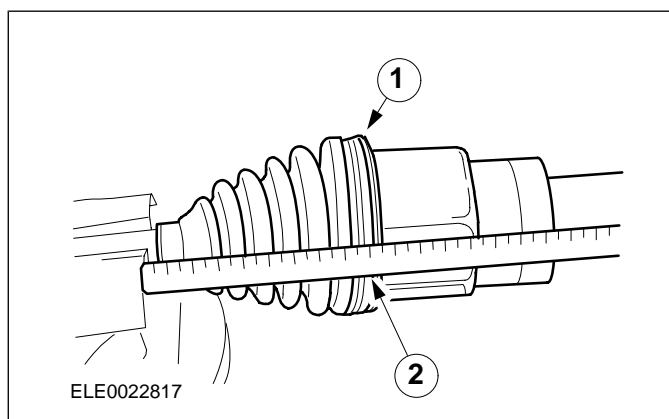
1. CAUTION: Use vise jaw protectors.

Attach the intermediate shaft to the right-hand halfshaft.

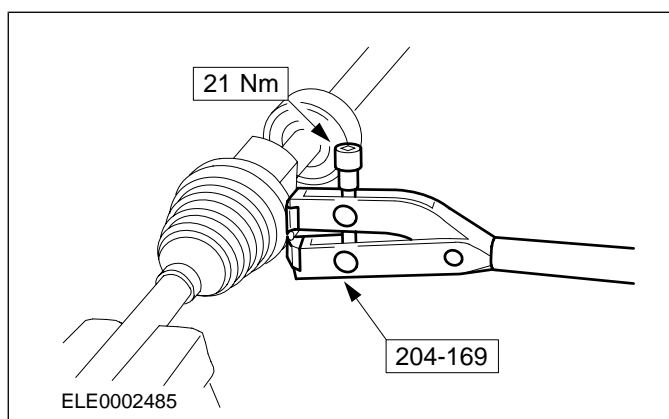
2. Pack the tripod joint with grease.

For additional information, refer to: **Specifications - 3-Door (205-04 Front Drive Halfshafts, Specifications)**.

1. Insert a small screwdriver under the boot seat to allow the air to escape.
2. Slide the tripod joint in as far as the stop, then pull it out 20 mm.
 - Remove the screwdriver.

3. **NOTE:** Install new constant velocity (CV) joint boot retaining clamps.

Locate the retaining clamp in the boot ring groove and using the special tool, tighten the CV joint boot retaining clamps.



4. Install the right-hand halfshaft.

For additional information, refer to: **Front Halfshaft RH - 3-Door (205-04 Front Drive Halfshafts, Removal and Installation)**.

REMOVAL AND INSTALLATION

Inner Constant Velocity (CV) Joint Boot(14 336 0)

Special Tool(s)

<p>14044</p>	<p>Clamping Tool, Boot Retaining Clamp 204-169 (14-044)</p>
<p>T115091</p>	<p>Remover, Bearing/Gear 205-310 (15-091)</p>
<p>15092</p>	<p>Remover, Bearing/Gear 205-311 (15-092)</p>
<p>16016</p>	<p>Installer, Extension Housing Bushing/Oil Seal 308-046 (16-016)</p>

Materials

Name	Specification
Constant velocity joint high-temperature grease	ESP-M1C207-A

Removal

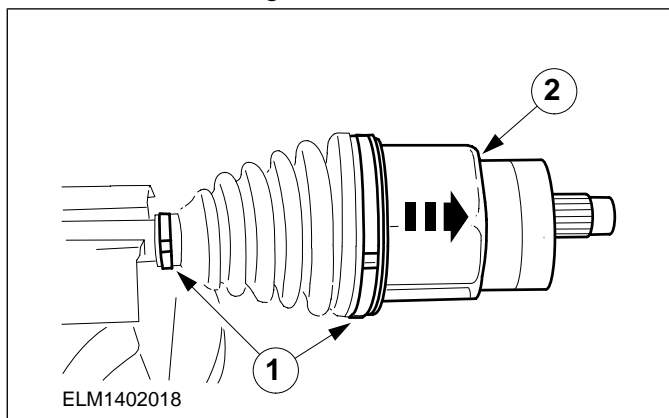
1. Remove the halfshaft.

For additional information, refer to: **Front Halfshaft LH (205-04 Front Drive Halfshafts, Removal and Installation)** / **Front Halfshaft RH - 3-Door (205-04 Front Drive Halfshafts, Removal and Installation).**

2. **CAUTION:** Use vice with soft jaw protectors.

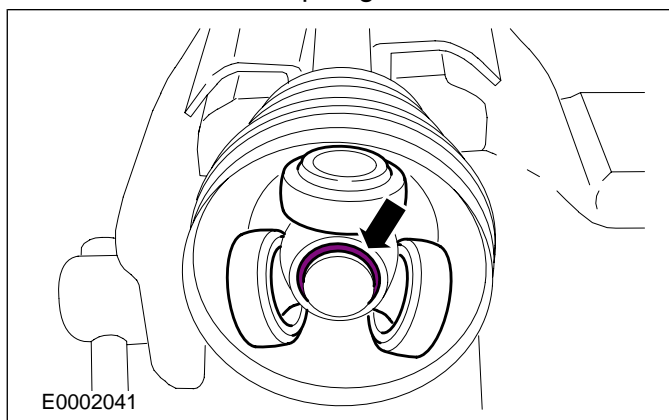
Detach the inner constant velocity joint from the front halfshaft.

- Hold the front halfshaft in a vice.
- 1. Cut and discard the boot clamps. Slide the boot back.
- 2. Remove the tripod housing.
- Remove the grease.



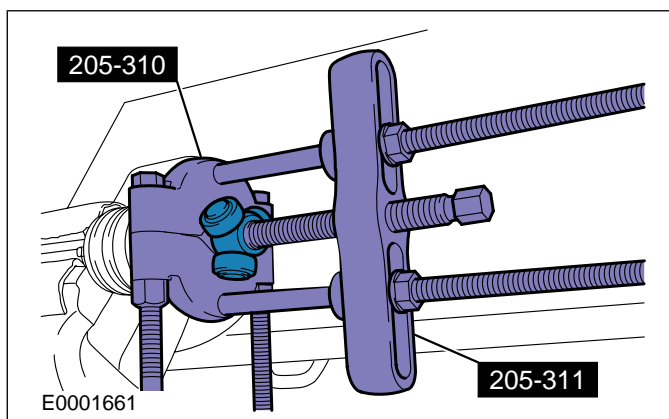
3. Remove the snap ring.

- Discard the snap ring.



4. Using the special tools detach the tripod star.

- Remove and discard the rubber boot.



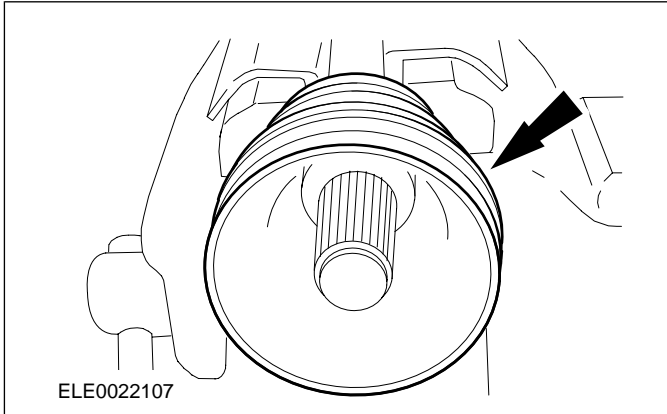
REMOVAL AND INSTALLATION

Installation

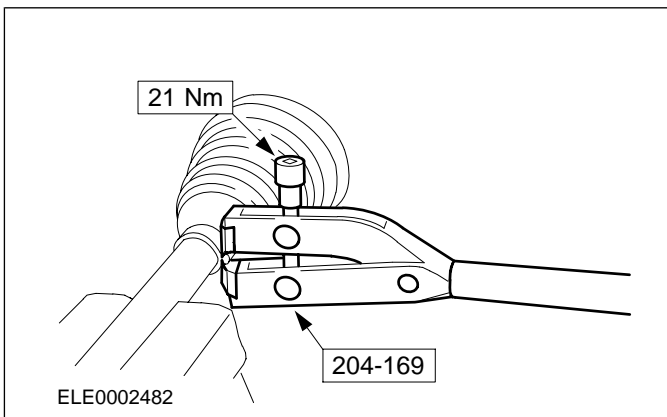
1. **NOTE:** Install a new clamping strap.

NOTE: Install a new rubber boot.

Place the clamping strap and inner CV joint rubber boot in position on the front halfshaft.



2. Insert the clamping strap in the boot ring groove and tighten with the special tool.

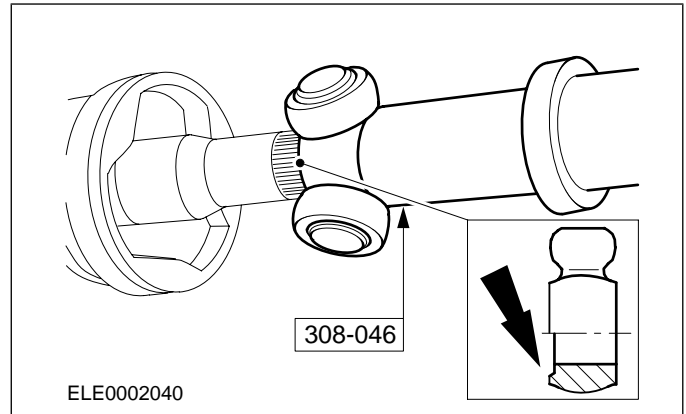


3. **CAUTION:** Do not damage the universal joint rollers.

NOTE: Chamfer points towards front halfshaft.

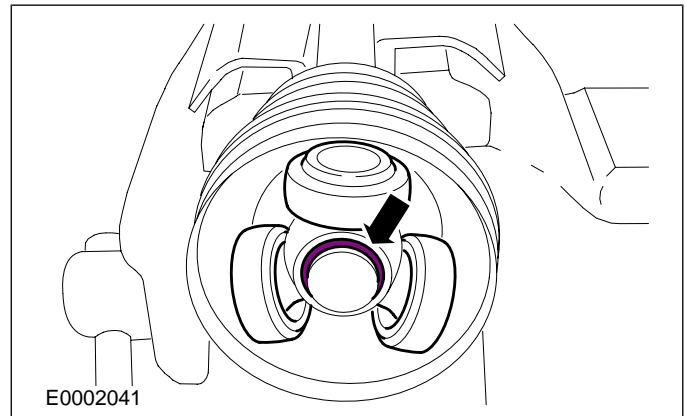
Attach the tripod star using the special tool.

- Drive the tripod star onto the front drive halfshaft as far as it will go.



4. **NOTE:** Install a new snap ring.

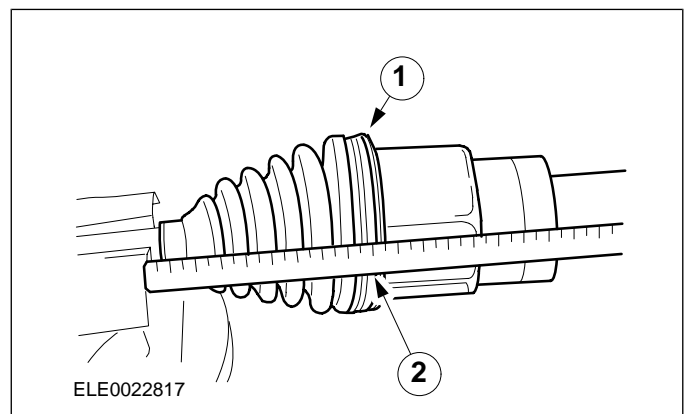
Install the snap ring.



5. Fill the constant velocity joint with grease.

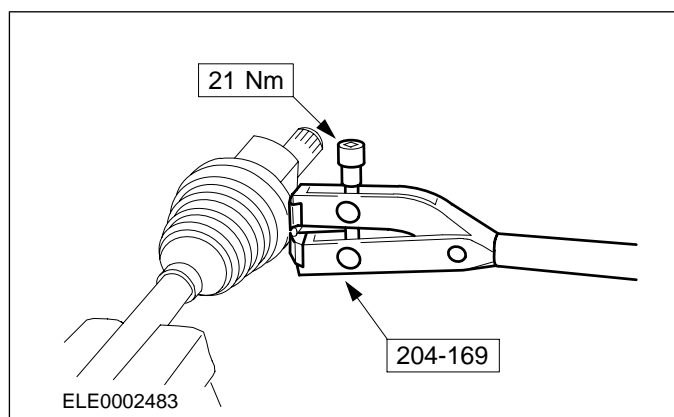
For additional information, refer to: **Specifications - 3-Door (205-04 Front Drive Halfshafts, Specifications).**

1. Insert a small screwdriver under the boot seat to allow the air to escape.
2. Push on the tripod housing to stop, then pull it back 20 mm.
 - Remove the screwdriver.



REMOVAL AND INSTALLATION**6. NOTE: Install a new clamping strap.**

Insert the clamping strap in the boot ring groove and tighten with the special tool.

**7. Install the halfshaft.**

For additional information, refer to: Front Halfshaft LH (**205-04 Front Drive Halfshafts, Removal and Installation**)

/ Front Halfshaft RH - 3-Door (**205-04 Front Drive Halfshafts, Removal and Installation**).

REMOVAL AND INSTALLATION

Outer Constant Velocity (CV) Joint Boot(14 338 0)

Special Tool(s)

<p>14044</p>	<p>Clamping Tool, Boot Retaining Clamp 204-169 (14-044)</p>
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General Equipment

Expanding pliers, snap-ring

Materials

Name	Specification
Constant velocity joint high-temperature grease	ESP-M1C207-A

Removal

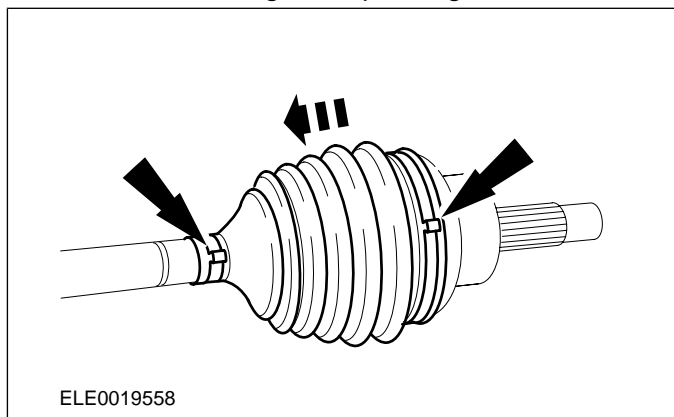
1. Remove the inner CV joint boot.

For additional information, refer to: Inner Constant Velocity (CV) Joint Boot (205-04 Front Drive Halfshafts, Removal and Installation).

2. **CAUTION:** Use a vice with protective jaw covers.

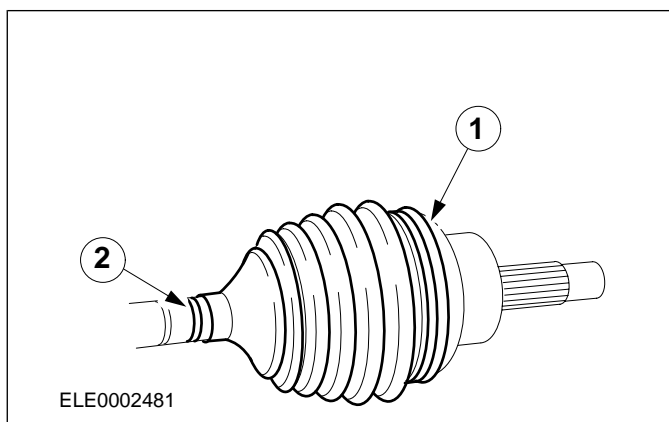
Remove the outer CV joint boot.

- Cut and discard the boot clamps.
- Remove and discard the rubber boot.
- Remove the grease packing.



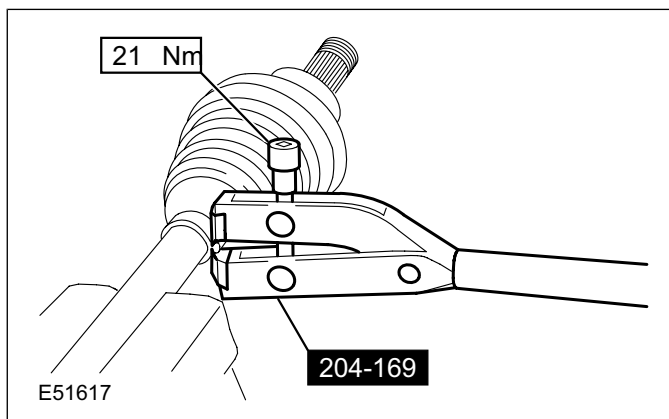
Install the outer CV joint boot.

- Pack the CV joint with grease.
- For additional information, refer to: Specifications - 3-Door (205-04 Front Drive Halfshafts, Specifications).
1. Press the rubber boot into the groove of the CV joint.
 1. Insert a small screwdriver under the boot seat to allow the air to escape.
 2. Position the rubber boot.
- Remove the screwdriver.



2. **NOTE:** Install a new clamping strap.

Insert the inner clamping strap into the ring groove of the rubber boot and tighten with the special tool.



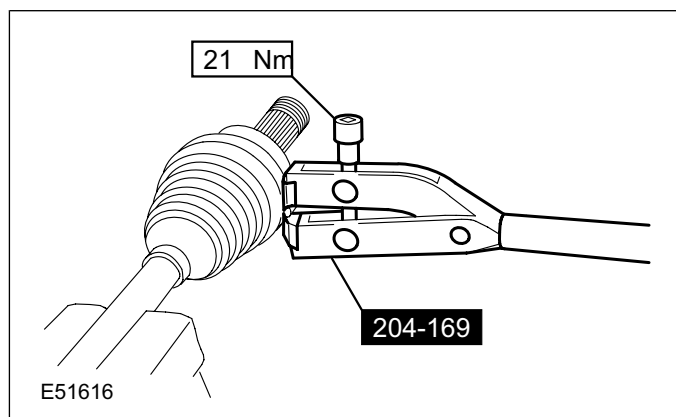
3. **NOTE:** Install a new clamping strap.

Installation

1. **NOTE:** Install a new rubber boot.

REMOVAL AND INSTALLATION

Insert the outer clamping strap into the ring groove of the rubber boot and tighten with the special tool.

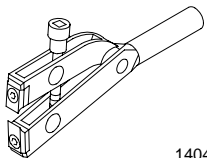
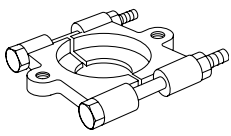
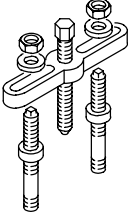
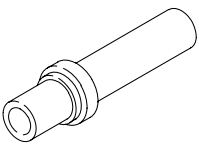
**4. Install the inner CV joint boot.**

For additional information, refer to: Inner Constant Velocity (CV) Joint Boot (205-04 Front Drive Halfshafts, Removal and Installation).

DISASSEMBLY AND ASSEMBLY

Front Halfshaft LH(14 320 8)

Special Tool(s)

 <p>14044</p>	<p>Gaiter clamp tightening tool 204-169 (14-044)</p>
 <p>TI15091</p>	<p>Separating tool, Bearing/Gear 205-310 (15-091)</p>
 <p>15092</p>	<p>Remover, Bearing/Gear 205-311 (15-092)</p>
 <p>16016</p>	<p>Installer, Extension Housing Bushing/Oil Seal 308-046 (16-016)</p>

Materials

Name	Specification
Constant velocity joint high-temperature grease	ESP-M1C207-A

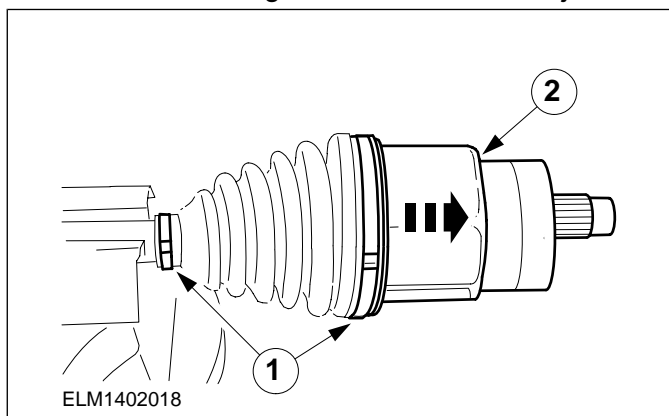
Disassembly

1. **CAUTION:** Use a vice with protective jaw covers.

Detach the inner constant velocity joint from the front halfshaft.

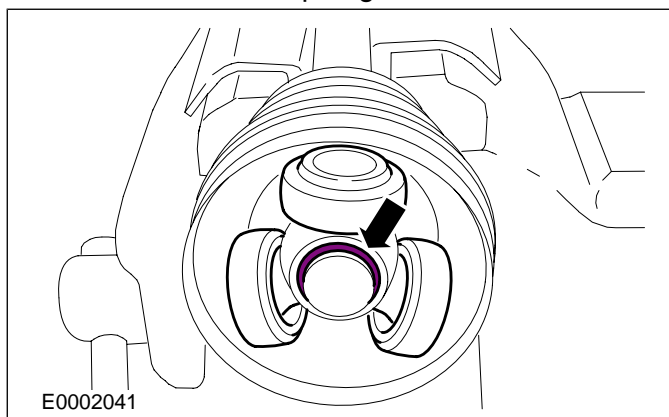
- Clamp the front halfshaft in a vice.
1. Separate and discard the clamping straps. Slide the boot back.
 2. Remove the tripod housing.

- Remove the grease from inside the joint.



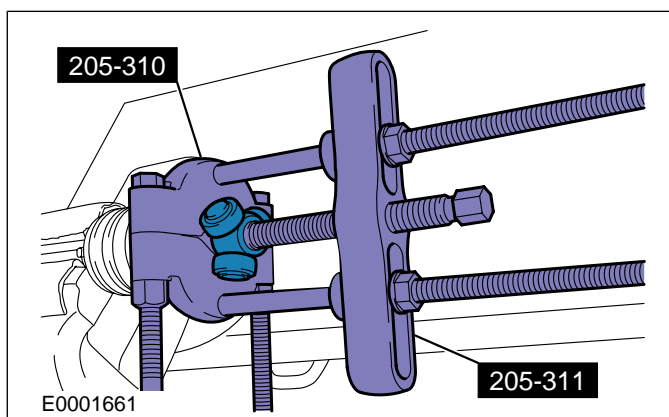
2. Detach the circlip.

- Discard the snap ring.



3. Using the special tools detach the tripod star.

- Remove and discard the rubber boot.

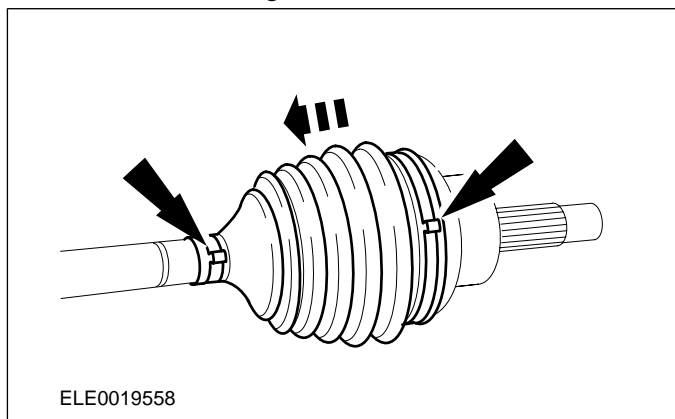


4. Detach the outer CV joint boot.

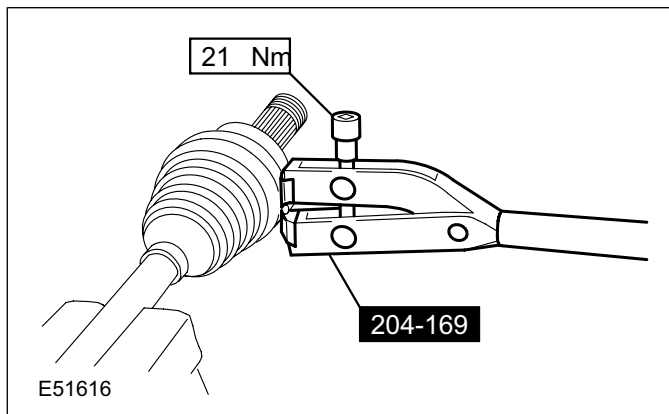
- Separate and discard the clamping straps.
- Remove and discard the rubber boot.

DISASSEMBLY AND ASSEMBLY

- Remove the grease.



2. Insert the small and large clamping straps in the boot ring grooves and tighten them with the special tool.

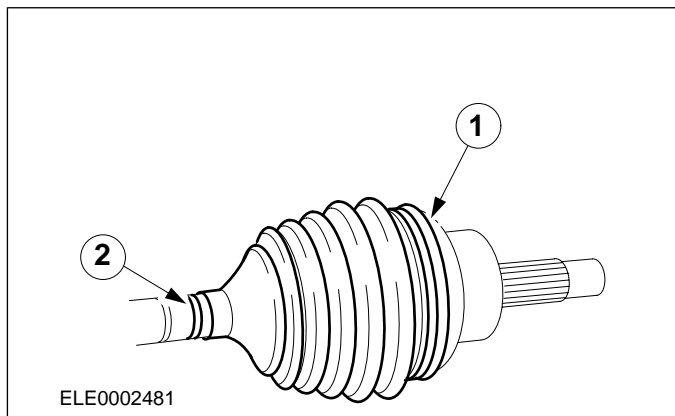


Assembly

1. **NOTE:** Install a new rubber boot.

Install the outer CV joint boot.

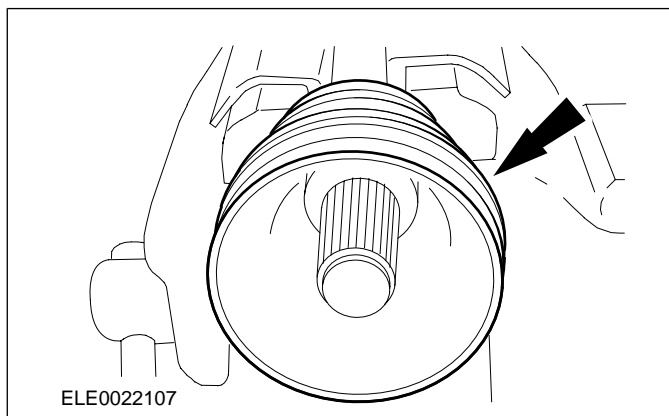
- Pack the CV joint with grease.
For additional information, refer to: **Specifications - 3-Door (205-04 Front Drive Halfshafts, Specifications).**
 - Press the rubber boot into the groove of the CV joint.
1. Insert a small screwdriver under the boot seat to allow the air to escape.
 2. Position the rubber boot.
- Remove the screwdriver.



3. **NOTE:** Install a new clamping strap.

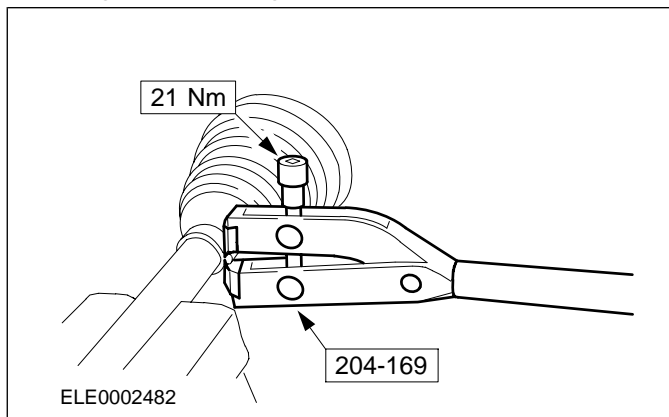
NOTE: Install a new rubber boot.

Place the clamping strap and inner CV joint rubber boot in position on the front halfshaft.



4. **Attach the inner CV joint boot.**

- Insert the clamping strap in the boot ring groove and tighten with the special tool.



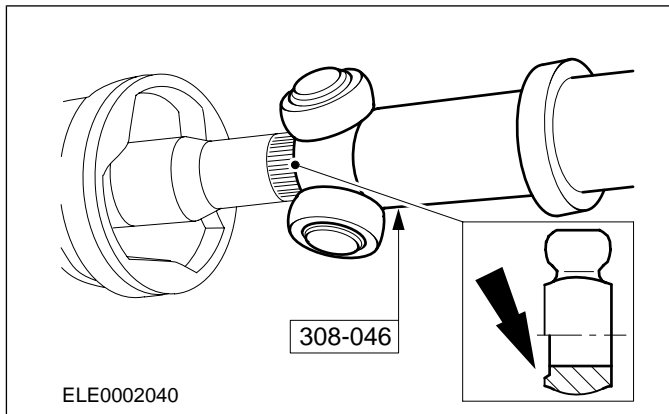
5. **CAUTION:** Do not damage the universal joint rollers.

DISASSEMBLY AND ASSEMBLY

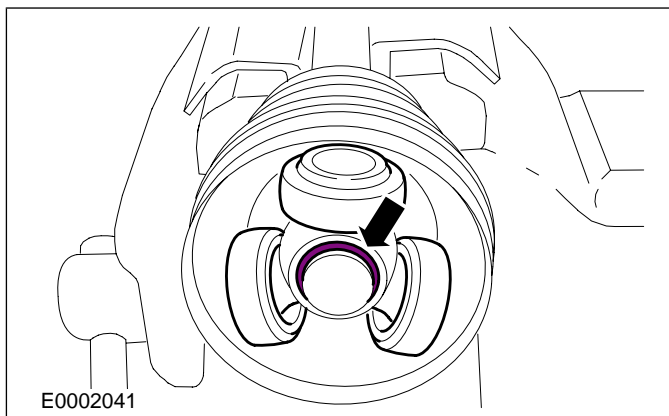
NOTE: Chamfer points towards the front halfshaft.

Install the tripod star.

- Using the special tool, push the tripod star onto the front halfshaft to the stop.



6. NOTE: Install a new snap ring.

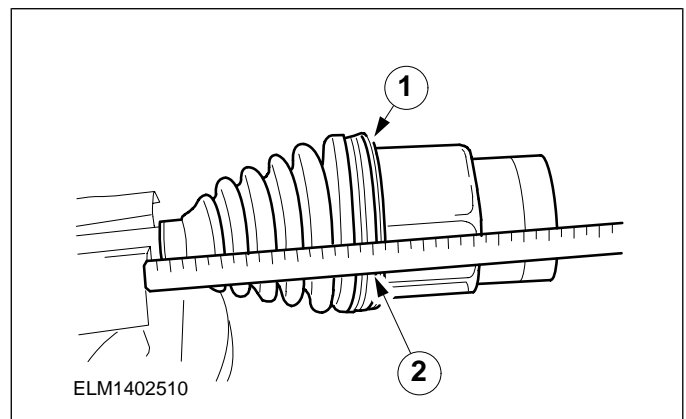
Install the snap-ring.

7. Fill the constant velocity joint with grease.

For additional information, refer to:
Specifications - 3-Door (205-04 Front Drive Halfshafts, Specifications).

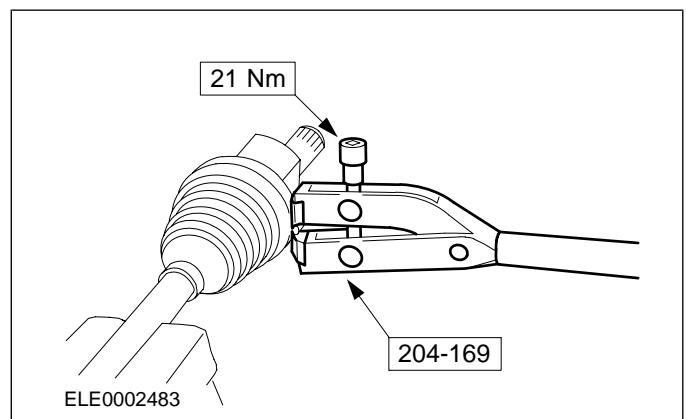
1. Insert a small screwdriver under the boot seat to allow the air to escape.
2. Push on the CV joint to stop, then pull it back 20 mm.

- Remove the screwdriver.



8. NOTE: Install a new clamping strap.

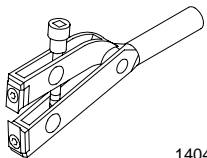
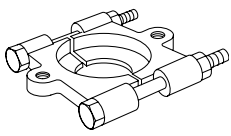
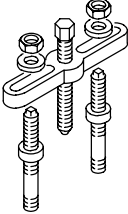
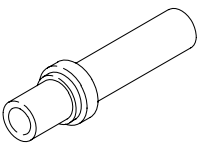
Insert the clamping strap in the boot ring groove and tighten with the special tool.



DISASSEMBLY AND ASSEMBLY

Front Halfshaft RH(14 321 8)

Special Tool(s)

 <p>14044</p>	<p>Gaiter clamp tightening tool 204-169 (14-044)</p>
 <p>TI15091</p>	<p>Separating tool, Bearing/Gear 205-310 (15-091)</p>
 <p>15092</p>	<p>Remover, Bearing/Gear 205-311 (15-092)</p>
 <p>16016</p>	<p>Installer, Extension Housing Bushing/Oil Seal 308-046 (16-016)</p>

Materials

Name	Specification
Constant velocity joint high-temperature grease	ESP-M1C207-A

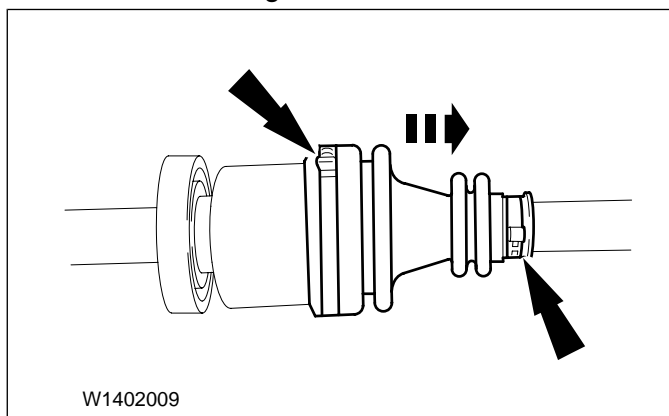
Disassembly

-  **CAUTION:** Use a vice with protective jaw covers.

Detach the intermediate shaft from the front halfshaft.

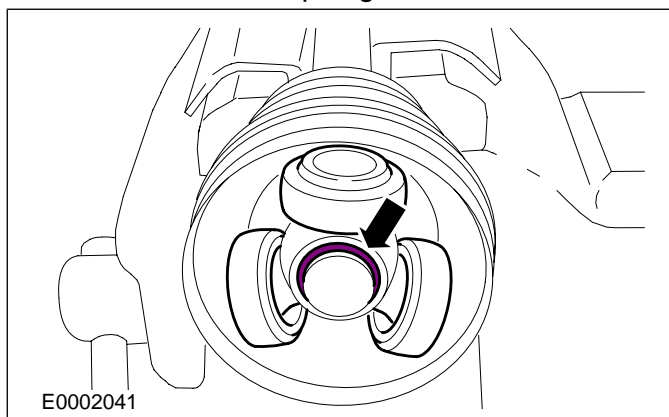
- Hold the front halfshaft in a vice.
- Separate and discard the clamping straps. Slide the boot back.
- Remove the intermediate shaft.

- Remove the grease.



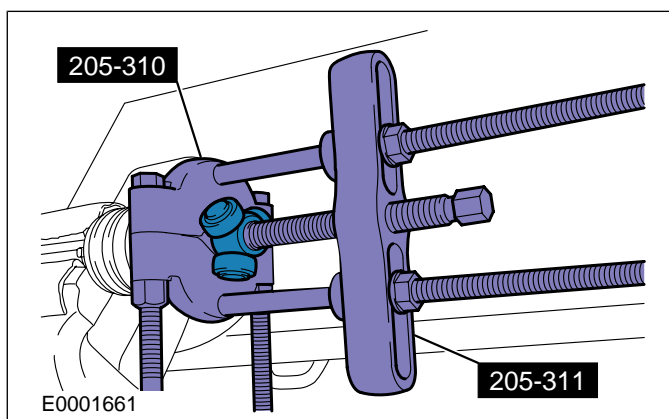
2. Remove circlip.

- Discard the snap ring.



3. Using the special tools detach the tripod star.

- Remove and discard the rubber boot.

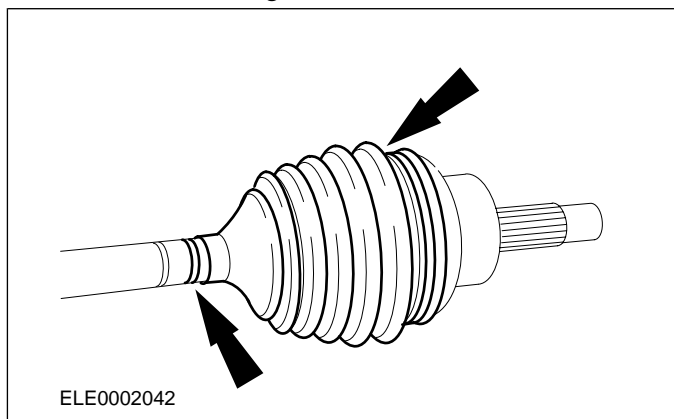


4. Detach the outer CV joint boot.

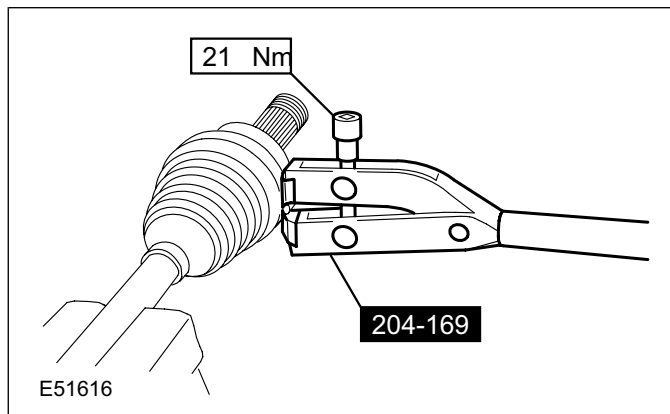
- Separate and discard the clamping straps.
- Remove and discard the rubber boot.

DISASSEMBLY AND ASSEMBLY

- Remove the grease.



Insert the small and large clamping straps in the boot ring grooves and tighten them with the special tool.

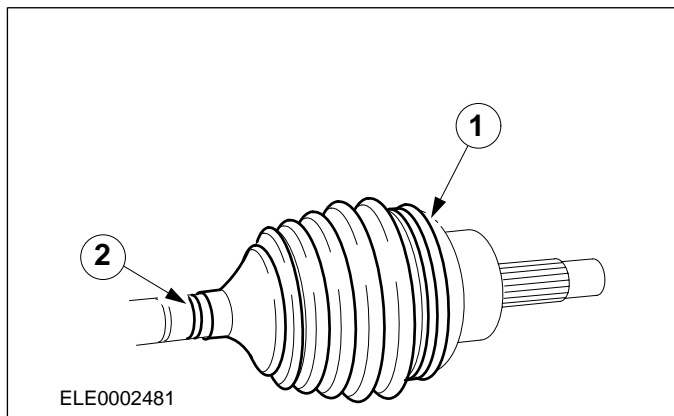


Assembly

1. NOTE: Install a new rubber boot.

Install the outer CV joint boot.

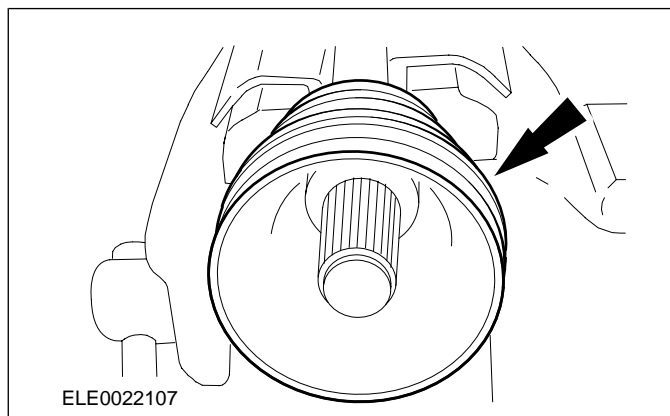
- Pack the CV joint with grease.
For additional information, refer to: Specifications - 3-Door (205-04 Front Drive Halfshafts, Specifications).
 - Press the rubber boot into the groove of the CV joint.
1. Insert a small screwdriver under the boot seat to allow the air to escape.
 2. Position the rubber boot.
- Remove the screwdriver.



3. NOTE: Install a new clamping strap.

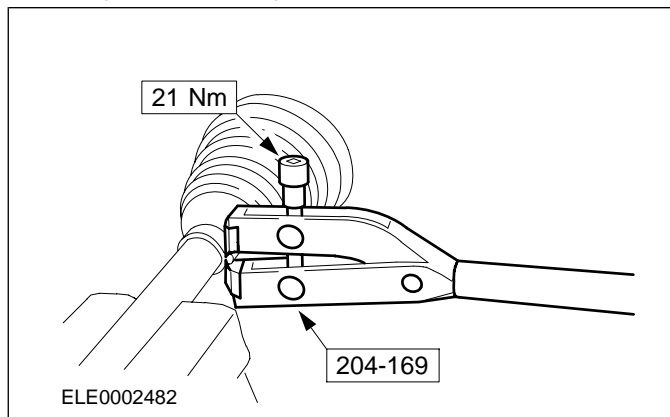
NOTE: Install a new rubber boot.

Place the clamping strap and inner CV joint rubber boot in position on the front halfshaft.



4. Attach the inner CV joint boot.

- Insert the clamping strap in the boot ring groove and tighten with the special tool.



2. NOTE: Install new clamping straps.

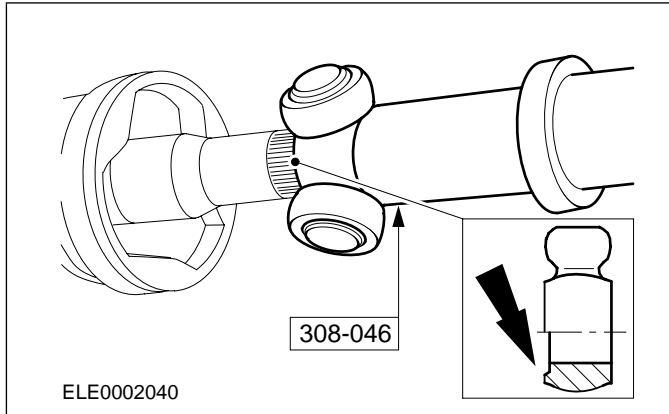
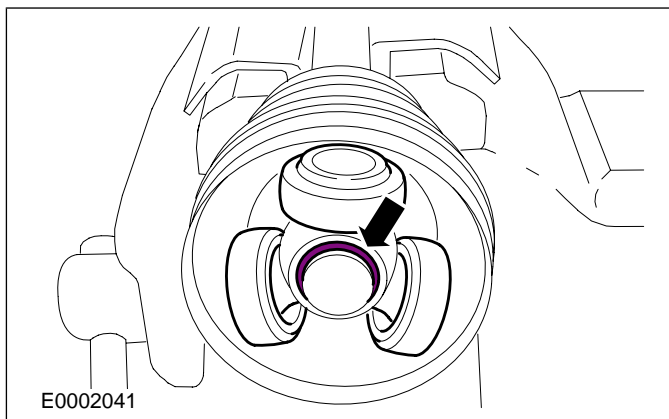
5. ⚠ CAUTION: Do not damage the universal joint rollers.

DISASSEMBLY AND ASSEMBLY

NOTE: Chamfer points towards the front halfshaft.

Install the tripod star.

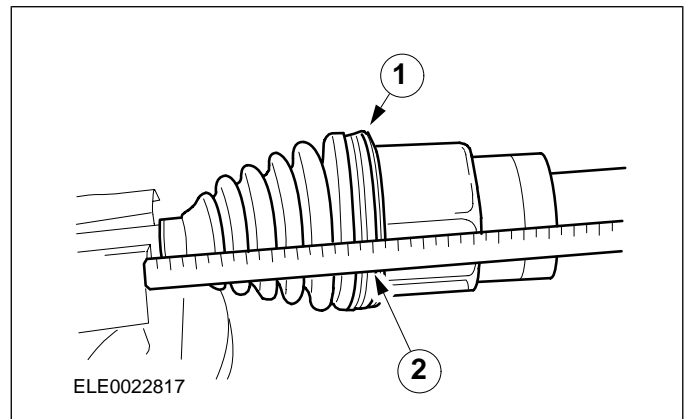
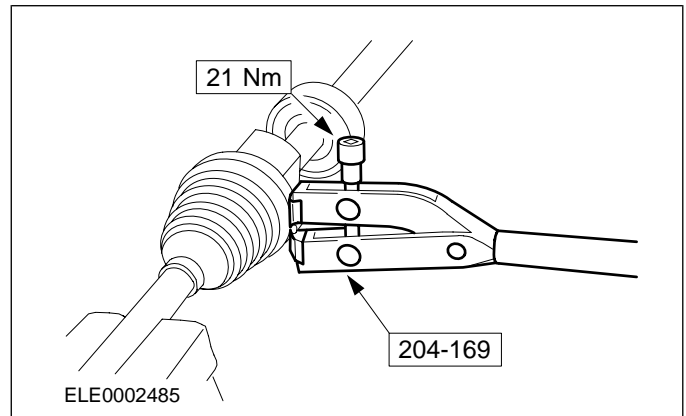
- Using the special tool, push the tripod star onto the front halfshaft to the stop.

**6. NOTE: Install a new snap ring.****Install the snap ring.****7. Fill the constant velocity joint with grease.**

For additional information, refer to:
Specifications - 3-Door (205-04 Front Drive Halfshafts, Specifications).

1. Insert a small screwdriver under the boot seat to allow the air to escape.
2. Push on the CV joint to stop, then pull it back 20 mm.

- Remove the screwdriver.

**8. Insert the clamping strap in the boot ring groove and tighten with the special tool.**

SECTION 206-00 Brake System - General Information

VEHICLE APPLICATION: 2008.75 Focus ST C307

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DIAGNOSIS AND TESTING**Brake System****General Equipment**

Pressure/vacuum gauge set
Worldwide diagnostic system (WDS)

The brake system operates by transferring effort applied to the brake pedal by the driver to the brakes at each wheel.

The braking effort is distributed to each wheel, using a hydraulic system. The system is assisted using a vacuum brake booster that reduces pedal effort and increases hydraulic pressure.

The parking brake operates on the rear wheels and is applied using a hand operated control.

Inspection and Verification

NOTE: Before carrying out any diagnosis, make sure that the brake system warning indicator is functional.

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> • Tire pressure(s) • Wheels and tires • Fluid leak(s) 	<ul style="list-style-type: none"> • Electrical connector(s) • Wiring harness(s) • Switch(es)

3. If an obvious cause for an observed or reported concern is found, correct the case (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Road Test

Carry out a road test to compare actual vehicle braking performance with the performance standards expected by the driver. The ability of the test driver to make valid comparisons and detect performance deficiencies will depend on experience.

The driver should have a thorough knowledge of the brake system operation and accepted general performance guidelines to make good comparisons and detect performance concerns.

An experienced technician will always establish a route that will be used for all brake diagnosis road tests. The road selected will be reasonably smooth and level. Gravel or bumpy roads are not suitable because the surface does not allow the tires to grip the road equally. Crowned roads should be avoided because of the large amount of weight shifted to the low set of wheels on this type of road. Once the route is established and consistently used, the road surface variable can be eliminated from the test results.

Before a road test, get a complete description of the customer concerns or suspected condition. From the description, the technician will be able to match possible causes with symptoms. Certain components will be identified as possible sources while others will be eliminated by the evidence. More importantly, the customer description can reveal unsafe conditions which should be checked or corrected before a road test. The description will also help form the basic approach to the road test by narrowing the concern to specific components, vehicle speed or conditions.

Begin the road test with a general brake performance check. Using the description of the concern, test the brakes at different vehicle speeds using both light and heavy pedal pressure. Determine if the concern is in the front or rear braking system. First use the foot brake and then the parking brake. If the condition (i.e. pull, vibration, pulsation) occurs only on operation of the parking brake, the concern is in the rear brake system. If the condition occurs when the foot brake is depressed, the concern is in the front brake system.

Avoid locking the brakes and sliding the tires. This condition will not indicate brake efficiency. A heavily braked but turning wheel will stop the vehicle in a shorter distance than locked wheels.

If the concern becomes evident during this check, make sure it fits the description given before the road test. If the concern is not evident, attempt to duplicate the condition using the information from the description.

If a concern exists, use the Brake System Symptom Chart in order to isolate it to a specific sub-system and condition description. From this description, a

DIAGNOSIS AND TESTING

list of possible sources can be used to further condition.
narrow the cause to a specific component or

Symptom Chart

Symptom	Possible Sources	Action
• Brakes pull or drift	• Worn or damaged brake shoes or brake pads and linings.	• INSTALL new brake shoes or brake pads. REFER to: Brake Shoes (206-02 Drum Brake, Removal and Installation), Brake Pads - 2.5L Duratec-ST (V15) (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-04 Rear Disc Brake, Removal and Installation).
	• Abnormal wear or distortion of front brake disc.	• INSTALL a new front brake disc. REFER to: (206-03 Front Disc Brake) Brake Disc (Removal and Installation), Brake Disc - 2.5L Duratec-ST (V15) (Removal and Installation).
	• Incorrect rear brake adjustment.	• ADJUST the parking brake cable. REFER to: Parking Brake Cable Adjustment (206-05 Parking Brake and Actuation, General Procedures).
	• Incorrect wheel alignment adjustment.	• ADJUST the wheel alignment. REFER to: (204-00 Suspension System - General Information) Front Toe Adjustment (General Procedures), Rear Toe Adjustment (General Procedures).
	• Incorrect wheel bearing preload adjustment.	• ADJUST or INSTALL a new wheel bearing. REFER to: Wheel Hub (204-01 Front Suspension, Removal and Installation).

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Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Grease or fluid on the brake shoes or brake pads; glazed linings. 	<ul style="list-style-type: none"> INSTALL new brake shoes or brake pads. REFER to: Brake Shoes (206-02 Drum Brake, Removal and Installation), Brake Pads - 2.5L Duratec-ST (V15) (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-04 Rear Disc Brake, Removal and Installation).
	<ul style="list-style-type: none"> Stuck or seized wheel cylinders or brake calipers. 	<ul style="list-style-type: none"> INSTALL a new wheel cylinder or brake caliper. REFER to: Wheel Cylinder (206-02 Drum Brake, Removal and Installation), Brake Caliper (206-03 Front Disc Brake, Removal and Installation), Brake Caliper - 2.5L Duratec-ST (V15) (206-03 Front Disc Brake, Removal and Installation), Brake Caliper (206-04 Rear Disc Brake, Removal and Installation).
<ul style="list-style-type: none"> The red brake warning indicator is always on 	<ul style="list-style-type: none"> Low brake fluid level. 	<ul style="list-style-type: none"> FILL the reservoir. CHECK the brake and clutch system for leaks including brake fluid in the brake booster.
	<ul style="list-style-type: none"> Leaking brake master cylinder primary piston cup. 	<ul style="list-style-type: none"> INSTALL a new brake master cylinder. REFER to: (206-06 Hydraulic Brake Actuation) Brake Master Cylinder - LHD (Removal and Installation), Brake Master Cylinder - RHD (Removal and Installation).
	<ul style="list-style-type: none"> Parking brake control not fully released. 	<ul style="list-style-type: none"> FREE UP and ADJUST the parking brake cable. REFER to: Parking Brake Cable Adjustment (206-05 Parking Brake and Actuation, General Procedures). INSTALL new components as necessary.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Malfunctioning anti-lock braking system (ABS). 	<ul style="list-style-type: none"> REFER to: Anti-Lock Control (206-09 Anti-Lock Control, Diagnosis and Testing).
	<ul style="list-style-type: none"> Shorted indicator circuit. 	<ul style="list-style-type: none"> REFER to: Instrument Cluster (413-01 Instrument Cluster, Diagnosis and Testing).
<ul style="list-style-type: none"> Vibration when the brakes are applied 	<ul style="list-style-type: none"> Grease or fluid on the brake shoes or brake pads; glazed linings. 	<ul style="list-style-type: none"> INSTALL new brake shoes or brake pads. REFER to: Brake Shoes (206-02 Drum Brake, Removal and Installation), Brake Pads - 2.5L Duratec-ST (V15) (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-04 Rear Disc Brake, Removal and Installation).
	<ul style="list-style-type: none"> Worn or damaged brake shoes or brake pads. 	<ul style="list-style-type: none"> INSTALL new brake shoes or brake pads. REFER to: Brake Shoes (206-02 Drum Brake, Removal and Installation), Brake Pads - 2.5L Duratec-ST (V15) (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-04 Rear Disc Brake, Removal and Installation).
	<ul style="list-style-type: none"> Loose caliper mounting bolt(s). 	<ul style="list-style-type: none"> TIGHTEN the caliper mounting bolt(s).
	<ul style="list-style-type: none"> Damaged brake drum contact surface. 	<ul style="list-style-type: none"> INSTALL a new brake drum. REFER to: Brake Drum (206-02 Drum Brake, Removal and Installation).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Excessive brake disc thickness variation or brake disc runout. 	<ul style="list-style-type: none"> REFER to: Brake Disc Runout Check (206-00 Brake System - General Information, General Procedures).
	<ul style="list-style-type: none"> Wheels and tires. 	<ul style="list-style-type: none"> CHECK the tires. BALANCE or INSTALL new tires as necessary. REFER to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).
	<ul style="list-style-type: none"> Loose or missing wheel hub bolts. 	<ul style="list-style-type: none"> TIGHTEN or INSTALL new wheel hub bolts as necessary.
	<ul style="list-style-type: none"> Worn or damaged brake drums or brake discs. 	<ul style="list-style-type: none"> INSTALL new brake drums or brake discs. REFER to: Brake Drum (206-02 Drum Brake, Removal and Installation), Brake Disc (206-03 Front Disc Brake, Removal and Installation), Brake Disc - 2.5L Duratec-ST (V15) (206-03 Front Disc Brake, Removal and Installation), Brake Disc (206-04 Rear Disc Brake, Removal and Installation).
<ul style="list-style-type: none"> Pedal goes down fast 	<ul style="list-style-type: none"> Low brake fluid level. 	<ul style="list-style-type: none"> FILL the reservoir. CHECK the brake and clutch system for leaks including brake fluid in the brake booster.
	<ul style="list-style-type: none"> Leak in the hydraulic system. 	<ul style="list-style-type: none"> REPAIR the leak. CHECK the entire hydraulic system. FILL and BLEED the brake system. REFER to: (206-00 Brake System - General Information) Brake System Bleeding (General Procedures), Brake System Pressure Bleeding (General Procedures).

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Brake System - General Information

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DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Air in the system. 	<ul style="list-style-type: none"> CHECK for leaks. BLEED the brake system. REFER to: (206-00 Brake System - General Information) Brake System Bleeding (General Procedures), Brake System Pressure Bleeding (General Procedures).
	<ul style="list-style-type: none"> Brake disc "brake knock back" (Brake pads push the brake caliper piston back into the brake caliper. Caused by excessive brake disc lateral runout or loose wheel bearings.) 	<ul style="list-style-type: none"> CARRY OUT a brake disc runout check. REFER to: Brake Disc Runout Check (206-00 Brake System - General Information, General Procedures).
	<ul style="list-style-type: none"> Worn brake shoes or brake pads. 	<ul style="list-style-type: none"> INSTALL new brake shoes or brake pads. REFER to: Brake Shoes (206-02 Drum Brake, Removal and Installation), Brake Pads - 2.5L Duratec-ST (V15) (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-04 Rear Disc Brake, Removal and Installation).
	<ul style="list-style-type: none"> Worn brake master cylinder piston cups or scored cylinder bore. 	<ul style="list-style-type: none"> GO to Pinpoint Test A.
<ul style="list-style-type: none"> Pedal eases down slowly 	<ul style="list-style-type: none"> Air in the system. 	<ul style="list-style-type: none"> BLEED the brake system. REFER to: (206-00 Brake System - General Information) Brake System Bleeding (General Procedures), Brake System Pressure Bleeding (General Procedures).
	<ul style="list-style-type: none"> Malfunctioning brake master cylinder. Low engine vacuum (stationary). 	<ul style="list-style-type: none"> GO to Pinpoint Test B.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Pedal is low or feels spongy 	<ul style="list-style-type: none"> Worn brake shoes or brake pads. 	<ul style="list-style-type: none"> INSTALL new brake shoes or brake pads. REFER to: Brake Shoes (206-02 Drum Brake, Removal and Installation), Brake Pads - 2.5L Duratec-ST (V15) (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-04 Rear Disc Brake, Removal and Installation).
	<ul style="list-style-type: none"> Air in the system. 	<ul style="list-style-type: none"> CHECK for leaks. BLEED the brake system. REFER to: (206-00 Brake System - General Information) Brake System Bleeding (General Procedures), Brake System Pressure Bleeding (General Procedures).
<ul style="list-style-type: none"> Brake lockup during light brake pedal force 	<ul style="list-style-type: none"> Glazed or worn brake shoes or brake pads. 	<ul style="list-style-type: none"> INSTALL new brake shoes or brake pads. REFER to: Brake Shoes (206-02 Drum Brake, Removal and Installation), Brake Pads - 2.5L Duratec-ST (V15) (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-04 Rear Disc Brake, Removal and Installation).
	<ul style="list-style-type: none"> Brake booster. Low engine vacuum. 	<ul style="list-style-type: none"> GO to Pinpoint Test C.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Excessive or erratic pedal travel 	<ul style="list-style-type: none"> Worn brake shoes or brake pads. 	<ul style="list-style-type: none"> INSTALL new brake shoes or brake pads. REFER to: Brake Shoes (206-02 Drum Brake, Removal and Installation), Brake Pads - 2.5L Duratec-ST (V15) (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-04 Rear Disc Brake, Removal and Installation).
	<ul style="list-style-type: none"> Wheel bearings 	<ul style="list-style-type: none"> CARRY OUT a brake disc runout check. REFER to: Brake Disc Runout Check (206-00 Brake System - General Information, General Procedures).
<ul style="list-style-type: none"> Brake drag 	<ul style="list-style-type: none"> Incorrectly adjusted parking brake. 	<ul style="list-style-type: none"> ADJUST the parking brake cable. REFER to: Parking Brake Cable Adjustment (206-05 Parking Brake and Actuation, General Procedures).
	<ul style="list-style-type: none"> Brake booster. 	<ul style="list-style-type: none"> REFER to brake booster operation check in this procedure.
	<ul style="list-style-type: none"> Seized wheel cylinder or brake caliper. 	<ul style="list-style-type: none"> INSTALL a new wheel cylinder or brake caliper. REFER to: Wheel Cylinder (206-02 Drum Brake, Removal and Installation), Brake Caliper (206-03 Front Disc Brake, Removal and Installation), Brake Caliper - 2.5L Duratec-ST (V15) (206-03 Front Disc Brake, Removal and Installation), Brake Caliper (206-04 Rear Disc Brake, Removal and Installation).

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Brake System - General Information

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DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Seized brake caliper slide pins. 	<ul style="list-style-type: none"> INSTALL a new brake caliper. REFER to: Brake Caliper (206-03 Front Disc Brake, Removal and Installation), Brake Caliper - 2.5L Duratec-ST (V15) (206-03 Front Disc Brake, Removal and Installation), Brake Caliper (206-04 Rear Disc Brake, Removal and Installation).
	<ul style="list-style-type: none"> Seized parking brake cables. 	<ul style="list-style-type: none"> INSTALL new parking brake cables. REFER to: (206-05 Parking Brake and Actuation) Parking Brake Cable - Vehicles With: Rear Drum Brakes (Removal and Installation), Parking Brake Cable - Vehicles With: Rear Disc Brakes (Removal and Installation).
<ul style="list-style-type: none"> Excessive brake pedal effort 	<ul style="list-style-type: none"> Worn or contaminated brake shoes or brake pads. 	<ul style="list-style-type: none"> INSTALL new brake shoes or brake pads. REFER to: Brake Shoes (206-02 Drum Brake, Removal and Installation), Brake Pads - 2.5L Duratec-ST (V15) (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-04 Rear Disc Brake, Removal and Installation).
	<ul style="list-style-type: none"> Malfunctioning vacuum pump (diesel). 	<ul style="list-style-type: none"> INSTALL a new brake vacuum pump.
	<ul style="list-style-type: none"> Disconnected or damaged brake booster vacuum pipe. 	<ul style="list-style-type: none"> CONNECT or INSTALL a new brake booster vacuum pipe as necessary.
	<ul style="list-style-type: none"> Brake booster. 	<ul style="list-style-type: none"> GO to Pinpoint Test D.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • Brake noise 	<ul style="list-style-type: none"> • Worn or damaged brake shoes or brake pads. 	<ul style="list-style-type: none"> • INSTALL new brake shoes or brake pads. REFER to: Brake Shoes (206-02 Drum Brake, Removal and Installation), Brake Pads - 2.5L Duratec-ST (VI5) (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-03 Front Disc Brake, Removal and Installation), Brake Pads (206-04 Rear Disc Brake, Removal and Installation).
	<ul style="list-style-type: none"> • Brake booster. 	<ul style="list-style-type: none"> • GO to Pinpoint Test E.
<ul style="list-style-type: none"> • Slow or incomplete brake pedal return 	<ul style="list-style-type: none"> • Brake booster. • Seized brake pedal pivot. 	<ul style="list-style-type: none"> • GO to Pinpoint Test F.

Pinpoint Tests

PINPOINT TEST A : PEDAL GOES DOWN FAST

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: PRESSURIZE THE SYSTEM	
	<p>1 Pump the foot brake rapidly five times.</p> <ul style="list-style-type: none"> • Does the brake pedal height build up and then hold? <p>→ Yes CHECK parking brake adjustment and ADJUST as necessary. REFER to: Parking Brake Cable Adjustment (206-05 Parking Brake and Actuation, General Procedures). If the condition still exists. BLEED the brake system. REFER to: (206-00 Brake System - General Information) Brake System Bleeding (General Procedures), Brake System Pressure Bleeding (General Procedures). TEST the system for normal operation.</p> <p>→ No GO to A2.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A2: CHECK FOR BRAKE SYSTEM LEAKS	
	<p>1 Check for external brake and clutch system leaks. Refer to Brake Master Cylinder Component Test in this procedure.</p> <ul style="list-style-type: none"> Are any leaks present? <p>→ Yes REPAIR as necessary. ADD fluid and BLEED the brake system. REFER to: (206-00 Brake System - General Information) Brake System Bleeding (General Procedures), Brake System Pressure Bleeding (General Procedures). TEST the system for normal operation.</p> <p>→ No GO to A3.</p>
A3: PERFORM A BRAKE MASTER CYLINDER BYPASS CONDITION TEST	
	<p>1 Carry out a brake master cylinder bypass Condition Test. Refer to the Brake Master Cylinder Component Test in this procedure.</p> <ul style="list-style-type: none"> Was a concern found? <p>→ Yes INSTALL a new brake master cylinder. REFER to: (206-06 Hydraulic Brake Actuation) Brake Master Cylinder - LHD (Removal and Installation), Brake Master Cylinder - RHD (Removal and Installation). TEST the system for normal operation.</p> <p>→ No VERIFY the customer concern.</p>

PINPOINT TEST B : PEDAL EASES DOWN SLOWLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK THE BRAKE PEDAL OPERATION	
	<p>1 Depress the brake pedal.</p> <ul style="list-style-type: none"> Does the pedal ease down slowly? <p>→ Yes GO to B2.</p> <p>→ No Refer to the Brake Master Cylinder Component Test in this procedure.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B2: CHECK FOR BRAKE SYSTEM LEAKS	
	<p>1 Check for external brake system leaks.</p> <ul style="list-style-type: none"> • Are any leaks present? <p>→ Yes REPAIR as necessary. ADD fluid and BLEED the brake system. REFER to: (206-00 Brake System - General Information)</p> <p>Brake System Bleeding (General Procedures), Brake System Pressure Bleeding (General Procedures). TEST the system for normal operation.</p> <p>→ No GO to B3.</p>
B3: PERFORM A BRAKE MASTER CYLINDER BYPASS CONDITION TEST	
	<p>1 Carry out a brake master cylinder bypass Condition Test. Refer to the Brake Master Cylinder Component Test in this procedure.</p> <ul style="list-style-type: none"> • Was a concern found? <p>→ Yes INSTALL a new brake master cylinder. REFER to: (206-06 Hydraulic Brake Actuation)</p> <p>Brake Master Cylinder - LHD (Removal and Installation), Brake Master Cylinder - RHD (Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to B4.</p>
B4: CHECK THE BRAKE BOOSTER CHECK VALVE	
	<p>1 Disconnect the brake booster check valve vacuum hose at the manifold.</p> <p>2 Blow into the hose attached to the brake booster check valve.</p> <ul style="list-style-type: none"> • Does air pass through the valve? <p>→ Yes INSTALL a new brake booster check valve.</p> <p>→ No GO to B5.</p>
B5: CHECK THE BRAKE BOOSTER CHECK VALVE VACUUM	
	<p>1 Run the engine at idle.</p>

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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Using a suitable vacuum gauge, check the vacuum pressure.</p> <ul style="list-style-type: none"> Is the vacuum pressure above 40.5 kPa (0.4 bar) with the brake booster non-operational? <p>→ Yes VERIFY the customer concern.</p> <p>→ No INSTALL a new brake booster check valve vacuum hose. TEST the system for normal operation.</p>

PINPOINT TEST C : BRAKE LOCK UP DURING LIGHT BRAKE PEDAL FORCE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: CHECK THE BRAKE BOOSTER	
	<p>1 Check the brake booster push rod alignment and pedal travel.</p> <ul style="list-style-type: none"> Is the push rod and pedal travel OK? <p>→ Yes TEST the brake pedal application. GO to Pinpoint Test D.</p> <p>→ No INSTALL a new brake booster. REFER to: (206-07 Power Brake Actuation) Brake Booster - LHD (Removal and Installation), Brake Booster - RHD (Removal and Installation). TEST the system for normal operation.</p>

PINPOINT TEST D : EXCESSIVE BRAKE PEDAL EFFORT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: CHECK BRAKE APPLICATION	
	<p>1 With the engine off, apply and release the brake pedal five times to deplete all vacuum from the brake booster. Apply the brake pedal, hold with light pressure. Start the engine.</p> <ul style="list-style-type: none"> Does the brake pedal hold? <p>→ Yes GO to D2.</p> <p>→ No GO to D3.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D2: CHECK THE BRAKE BOOSTER FOR LEAKS	
	<p>1 Run the engine at approximately 1000 rpm, release the accelerator pedal and turn the engine off. Wait 90 seconds and apply the brakes. Two or more brake applications should be power assisted.</p> <ul style="list-style-type: none"> • Does the brake booster work? <p>→ Yes VERIFY the customer concern.</p> <p>→ No GO to D4.</p>
D3: CHECK THE BRAKE PEDAL LINKAGE	
	<p>1 Disconnect the actuator rod from the pedal pin and fully depress the brake pedal.</p> <ul style="list-style-type: none"> • Did the pedal move freely? <p>→ Yes VERIFY the customer concern.</p> <p>→ No INSTALL new brake pedal bushings. TEST the system for normal operation.</p>
D4: CHECK THE BRAKE BOOSTER CHECK VALVE	
	<p>1 Disconnect the brake booster check valve vacuum hose at the manifold.</p> <p>2 Blow into the hose attached to the brake booster check valve.</p> <ul style="list-style-type: none"> • Does air pass through the valve? <p>→ Yes INSTALL a new brake booster check valve. REFER to: (206-07 Power Brake Actuation) Brake Booster - LHD (Removal and Installation), Brake Booster - RHD (Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to D5.</p>
D5: CHECK THE BRAKE BOOSTER CHECK VALVE VACUUM	
	<p>1 Run the engine at idle.</p>

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Brake System - General Information

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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Using a suitable vacuum gauge, check the vacuum pressure.</p> <ul style="list-style-type: none"> Is the vacuum pressure above 40.5 kPa (0.4 bar) with the brake booster non-operational? <p>→ Yes GO to D6.</p> <p>→ No INSTALL a new vacuum hose and fittings. TEST the system for normal operation.</p>
D6: CHECK THE BRAKE BOOSTER	
	<p>1 Check the brake booster. REFER to the Brake Booster Operation Check in this procedure.</p> <ul style="list-style-type: none"> Is the brake booster OK? <p>→ Yes VERIFY the customer concern.</p> <p>→ No INSTALL a new brake booster. REFER to: (206-07 Power Brake Actuation) Brake Booster - LHD (Removal and Installation), Brake Booster - RHD (Removal and Installation). TEST the system for normal operation.</p>

PINPOINT TEST E : BRAKE NOISE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: CHECK FOR PEDAL NOISE	
	<p>1 Run the engine at idle for 10 seconds or longer.</p>
	<p>2 Apply the brake pedal and listen for noise.</p>
	<p>3 Compare results with a known good system.</p> <ul style="list-style-type: none"> Was a noise present? <p>→ Yes GO to E2.</p> <p>→ No VERIFY the customer concern.</p>

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Brake System - General Information

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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E2: CHECK THE BRAKE BOOSTER	
	<ol style="list-style-type: none"> 1 Check the brake booster push rod alignment and travel. <ul style="list-style-type: none"> • Is the push rod and pedal travel OK? <ul style="list-style-type: none"> → Yes BLEED the brake system. REFER to: (206-00 Brake System - General Information) Brake System Bleeding (General Procedures), Brake System Pressure Bleeding (General Procedures). TEST the system for normal operation. → No INSTALL a new brake booster. REFER to: (206-07 Power Brake Actuation) Brake Booster - LHD (Removal and Installation), Brake Booster - RHD (Removal and Installation). TEST the system for normal operation.

PINPOINT TEST F : SLOW OR INCOMPLETE BRAKE PEDAL RETURN

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F1: CHECK FOR BRAKE PEDAL RETURN	
	<ol style="list-style-type: none"> 1 Run the engine at approximately 1200 rpm whilst making several brake applications. 2 Pull the brake pedal upwards with approximately 44.5 N (10 lbs) force. 3 Release the brake pedal and measure the distance to the floor panel and note the reading. 4 Make a hard brake application. 5 Release the brake pedal and measure the distance to the floor panel and note the reading. 6 Compare the measurements. <ul style="list-style-type: none"> • Did the brake pedal return to its original position? <ul style="list-style-type: none"> → Yes VERIFY the customer concern. → No GO to F2.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F2: CHECK FOR BRAKE PEDAL BINDING	
	<p>1 Check the brake pedal for free operation.</p> <ul style="list-style-type: none"> • Did the brake pedal operate freely? <p>→ Yes INSTALL a new brake booster. REFER to: (206-07 Power Brake Actuation) Brake Booster - LHD (Removal and Installation), Brake Booster - RHD (Removal and Installation). TEST the system for normal operation.</p> <p>→ No INSTALL new brake pedal bushings. TEST the system for normal operation.</p>

Component Tests

Hydraulic Leak Check

NOTE: There is a common clutch and brake fluid reservoir, therefore it is possible that a clutch leak can lead to reduction in the reservoir level.

It is possible that all evidence of fluid leakage may have washed off if the vehicle has been operated in rain or snow, as brake fluid is water-soluble. Refill the system, bleed then apply the brakes several times. Examine the system to verify that the reservoir fluid level is actually dropping. Locate and repair the external leak. If the fluid level drops and no external leak can be found, check for a brake master cylinder bore end seal leak.

Brake System Check

Brake Pedal Reserve Check

Where a low brake pedal or the feel of a bottomed-out condition exists, check for brake pedal reserve.

1. Operate the engine at idle with the transaxle in the NEUTRAL position.
2. Apply the brake pedal lightly three or four times.
3. Allow 15 seconds for the vacuum to replenish the brake booster.

NOTE: This increased resistance may feel like something has bottomed out.

4. Apply the brake pedal until it stops moving downward or an increased resistance to the pedal travel occurs.
5. Hold the brake pedal in the applied position and raise the engine speed to approximately 2000 rpm.

NOTE: The additional movement of the brake pedal is the result of the increased engine manifold vacuum which exerts more force on the brake booster during engine rundown. This means that additional stroke is available in the brake master cylinder and the brake system is not bottoming out.

6. Release the accelerator pedal and observe that the brake pedal moves downward as the engine returns to idle speed.

Brake Booster Functional Test

Inspect all hoses and connections. All unused vacuum connectors should be capped. Hoses and their connections should be correctly secured and in good condition with no holes and no collapsed areas. Inspect the check valve on the brake booster for damage.

Brake Booster Operation Check

1. Check the hydraulic brake system for leaks or low fluid.
2. With the transaxle in the NEUTRAL position, stop the engine and apply the parking brake. Apply the brake pedal several times to exhaust all the vacuum in the system.

DIAGNOSIS AND TESTING

3. With the engine turned off and the vacuum in the system exhausted, apply the brake pedal and hold it down. Start the engine. If the vacuum system is operating, the brake pedal will tend to move downward under constant foot pressure. If no motion is felt, the vacuum booster system is not functioning.
4. Remove the vacuum hose from the brake booster. Manifold vacuum should be available at the brake booster end of the hose with the engine at idle speed and the transaxle in the NEUTRAL position. Make sure that all unused vacuum outlets are correctly capped, hose connectors are correctly secured and vacuum hoses are in good condition. When it is established that manifold vacuum is available to the brake booster, connect the vacuum hose to the brake booster and repeat Step 3. If no downward movement of the brake pedal is felt, install a new brake booster. **REFER to: (206-07 Power Brake Actuation)**

Brake Booster - LHD (Removal and Installation),
Brake Booster - RHD (Removal and Installation).

5. Operate the the engine a minimum of 10 seconds at approximately 1200 rpm. Stop the engine and let the vehicle stand for 10 minutes. Then, apply the brake pedal with approximately 89 N (20 lb) force. The pedal feel (brake application) should be the same as that noted with the engine operating. If the brake pedal feels hard (no power assist), install a new vacuum check valve and then repeat the test. If the brake pedal still feels hard, install a new brake booster. **REFER to: (206-07 Power Brake Actuation)**

Brake Booster - LHD (Removal and Installation),
Brake Booster - RHD (Removal and Installation).
If the brake pedal movement feels spongy, bleed **the brake system**. **REFER to: (206-00 Brake System - General Information)**

Brake System Bleeding (General Procedures),
Brake System Pressure Bleeding (General Procedures).

Brake Master Cylinder

Usually, the first and strongest indicator of anything wrong with the braking system is a feeling through the brake pedal. In diagnosing the condition of the brake master cylinder, check pedal feel as evidence of a brake concern. Check for the red brake warning indicator illumination and the fluid level in the master cylinder reservoir.

Normal Conditions

The following conditions are considered normal and are not indications that the brake master cylinder is in need of service.

- Modern brake systems are not designed to produce as hard a pedal effort as in the past. Complaints of light pedal efforts should be compared to pedal efforts of another vehicle, of the same model and year.
- During normal operation of the brake pedal, the fluid level in the reservoir will rise during brake pedal application and fall during release. The net fluid level (i.e., after brake pedal application and release) will remain unchanged.
- A trace of brake fluid will exist on the brake booster shell below the master cylinder mounting flange. This results from the normal lubricating action of the master cylinder bore end seal.
- The fluid level will fall with brake shoe and lining wear.

Abnormal Conditions

NOTE: Prior to performing any diagnosis, make sure the brake system warning indicator is functional.

Changes in brake pedal feel or travel are indicators that something could be wrong with the braking system. The diagnostic procedure and techniques use brake pedal feel, warning indicator illumination and low brake fluid level as indicators in diagnosing braking system concerns. The following conditions are considered abnormal and indicate that the brake master cylinder is in need of service.

- The brake pedal goes down fast. This could be caused by an external or internal leak.
- The brake pedal eases down slowly. This could be caused by an external or internal leak.
- The brake pedal is low and or feels spongy. This condition may be caused by no fluid in the brake master cylinder reservoir, reservoir cap vent holes clogged or air in the hydraulic system.
- The brake pedal effort is excessive. This may be caused by a bind or obstruction in the pedal or linkage, clogged fluid control valve or insufficient booster vacuum.
- The rear brakes lock up during light pedal force. This may be caused by incorrect tire pressures, grease or fluid on the brake shoes and linings,

DIAGNOSIS AND TESTING

damaged brake shoes and linings, incorrectly adjusted parking brake, or damaged or contaminated brake pressure control valves.

- The brake pedal effort is erratic. This condition could be caused by a brake booster malfunction, extreme caliper piston knock back or incorrectly installed brake shoes and linings.
- The red brake warning indicator is ON. This may be caused by low fluid level, ignition wire routing too close to the fluid level indicator assembly, or float assembly damage.

Bypass Condition Test

1. Check the fluid in the brake master cylinder reservoir. Fill the brake master cylinder reservoir if low or empty.
2. Observe the fluid level in the brake master cylinder reservoir. If after several brake applications, the fluid level remains the same, measure the wheel turning torque required to rotate the wheels with the brakes applied as follows:

Place the transaxle in the NEUTRAL position. Raise and support the vehicle. **REFER to: (100-02 Jacking and Lifting)**

Jacking (Description and Operation),
Lifting (Description and Operation).

Apply the brakes with a minimum of 445 N (100 lb) and hold for approximately 15 seconds. With the brakes still applied, exert a torque on the front wheels of 10.1 Nm (75 lb ft). If either wheel rotates, install a new brake master cylinder. **REFER to: (206-06 Hydraulic Brake Actuation)**

Brake Master Cylinder - LHD (Removal and Installation),
Brake Master Cylinder - RHD (Removal and Installation).

Non-Pressure Leaks

Any empty brake master cylinder reservoir condition may be caused by two types of non-pressure external leaks.

Type 1: An external leak may occur at the brake master cylinder reservoir cap because of incorrect positioning of the gasket and cap. Reposition the cap and gasket.

Type 2: An external leak may occur at the brake master cylinder reservoir mounting seals. Service such a leak by installing new seals.

GENERAL PROCEDURES

Brake System Bleeding(12 141 0)

General Equipment

Worldwide Diagnostic System (WDS)

Bleeding

WARNING: Brake fluid contains polyglycol ethers and polyglycols. Avoid contact with the eyes. Wash hands thoroughly after handling. If brake fluid contacts the eyes, flush the eyes for 15 minutes with cold running water. Get medical attention if irritation persists. If taken internally, drink water and induce vomiting. Get medical attention immediately. Failure to follow these instructions may result in personal injury.

CAUTION: If brake fluid is spilt on the paintwork, the affected area must be immediately washed down with cold water.

NOTE: Make sure that the vehicle is standing on a level surface.

NOTE: The system consists of separate circuits for each front and diagonally opposite rear wheel. Each circuit can be bled independently.

1. **CAUTION:** The brake fluid reservoir must remain full with new, clean brake fluid at all times during bleeding.

Install the bleed tube to the bleed nipple.

2. Immerse the end of the bleed tube in a bleed jar containing a small quantity of approved brake fluid.

3. Position the bleed jar base at least 300 mm above the bleed nipple to maintain fluid pressure and prevent air leaking past the threads of the bleed nipple.

4. Loosen the bleed nipple by one-half turn.

5. Operate the brake pedal fully (pumping brake fluid and air into the bleed jar) and allow the brake pedal to return to the rest position.

6. Fill the brake fluid reservoir to the MAX mark.

7. Continue operating the brake pedal until air-free fluid is being pumped into the bleed jar.

8. With the brake pedal fully depressed tighten the bleed nipple.


9. **CAUTION:** Make sure that the bleed nipple cap is installed after bleeding the brake line(s). This will prevent corrosion to the bleed nipple. Failure to follow this instruction may result in the bleed nipple becoming seized.

Repeat the procedure for the remaining brake lines.

GENERAL PROCEDURES**Brake System Pressure Bleeding(12 141 0)****General Equipment**

Worldwide Diagnostic System (WDS)
Brake/clutch system pressure bleeder/filler

Bleeding

 **WARNING:** Brake fluid contains polyglycol ethers and polyglycols. Avoid contact with the eyes. Wash hands thoroughly after handling. If brake fluid contacts the eyes, flush the eyes for 15 minutes with cold running water. Get medical attention if irritation persists. If taken internally, drink water and induce vomiting. Get medical attention immediately. Failure to follow these instructions may result in personal injury.


 **CAUTION:** If brake fluid is spilt on the paintwork, the affected area must be immediately washed down with cold water.


NOTE: Make sure that the vehicle is standing on a level surface.

NOTE: The system consists of separate circuits for each front and diagonally opposite rear wheel. Each circuit can be bled independently.


1. Fill the brake fluid reservoir to the MAX mark.

2. CAUTIONS:

 Make sure that the pressure within the brake system does not exceed 1 bar.

 Make sure that the pressure bleeding equipment is filled with new brake fluid to the correct specification.

Using the brake/clutch system pressure bleeder/filler, pressure bleed the system in accordance with the manufacturer's instructions.

3.  CAUTION: Make sure that the bleed nipple cap is installed after bleeding the brake line(s). This will prevent corrosion to the bleed nipple. Failure to follow this instruction may result in the bleed nipple becoming seized.

Fill the brake fluid reservoir to the MAX mark as necessary.

GENERAL PROCEDURES**Brake System Leak Check****Check**

1. **NOTE:** Brake fluid is water soluble and it is possible that all evidence of fluid leakage has been washed off if the vehicle has been operated in rain or snow.

Check the brake fluid level. Add brake fluid as necessary.

2. Apply the brakes several times and make sure the pedal feel is not spongy. If necessary, bleed the brake system.

For additional information, **refer to Brake System Bleeding** in this section.

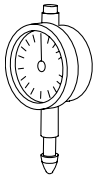
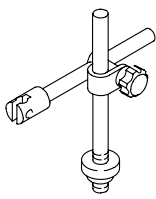
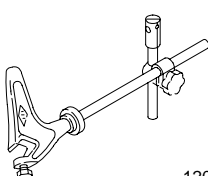
3. Check the brake fluid level and verify that the fluid level is actually dropping.
4. **NOTE:** If the brake fluid level drops and no external leak is evident, check for a brake master cylinder bore end seal leak.

Locate and correct the external leak.

GENERAL PROCEDURES

Brake Disc Runout Check(12 221 0)

Special Tool(s)

 <p>15046</p>	<p>Dial Indicator Gauge (Metric) 205-069 (15-046)</p>
 <p>15022A</p>	<p>Holding Fixture, Dial Indicator Gauge 205-070 (15-022A)</p>
 <p>12003</p>	<p>Holding Fixture, Dial Indicator Gauge (Disc Brake) 206-003 (12-003)</p>

General Equipment

Micrometer 0-125 mm

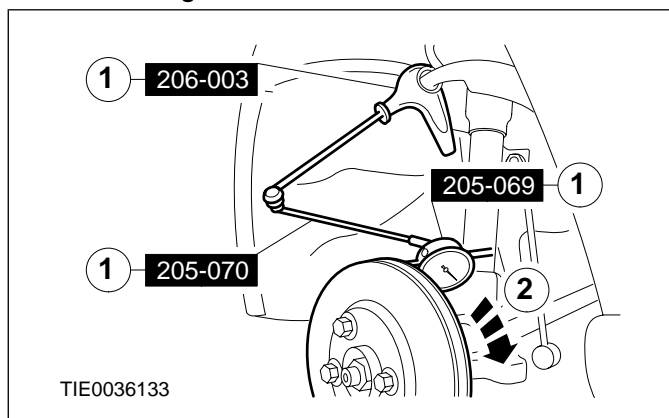
Check

- NOTE:** The total dial indicator gauge reading should not exceed 0.05 mm.

Using the special tools, measure the brake disc runout on the inner face of the brake disc (wheel and tire shown removed for clarity).

- Position the dial indicator gauge so that it contacts the brake disc approximately 10 mm from the outer edge.

- Slowly rotate the wheel and tire and note the readings.



- NOTE:** Using paint or typing correction fluid, mark the position of the wheel in relation to the wheel hub.

Remove the wheel and tire. For additional information, refer to Section **204-04 [Wheels and Tires]**.

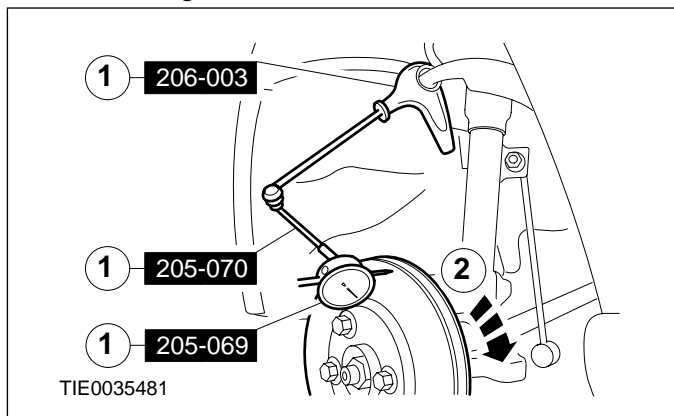
- Remove the brake pads. For additional information, refer to Section **206-03 [Front Disc Brake]** / **206-04 [Rear Disc Brake]**.
- Install the wheel nuts and tighten the wheel nuts to 10 Nm, to hold the brake disc in place.
- NOTE:** The total dial indicator gauge reading should not exceed 0.05 mm.

Using the special tools, measure the brake disc runout on the inner and outer faces of the brake disc (outer face measurement shown).

- Position the dial indicator gauge so that it contacts the brake disc approximately 10 mm from the outer edge.

GENERAL PROCEDURES

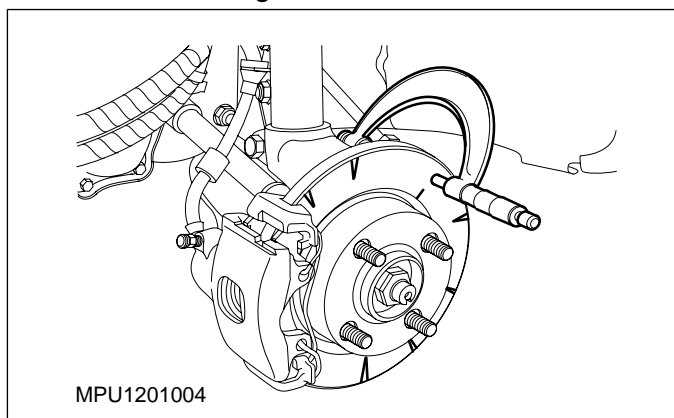
2. Slowly rotate the brake disc and note the readings.



6. **NOTE:** If any of the readings vary by more than 0.015 mm or the brake disc thickness is less than the specified minimum, a new brake disc must be installed and the brake disc runout re-checked.

Check the brake disc thickness variation.

- Using a suitable micrometer, measure the brake disc thickness at eight positions, 45 degrees apart and approximately 15 mm from the outer edge of the brake disc.



7. If all the brake disc runout measurements and the thickness variation are within the specifications, check the wheel balance.
8. If just the brake disc runout measurement with the wheel and tire fitted exceeds the specification, the wheel and tire must be rotated through 90 degrees in relation to the brake disc and the brake disc runout re-checked.
- If the brake disc runout measurement still exceeds the specification, repeat the wheel and tire rotation and checking process until the measurement is within specification.

9. If the brake disc runout measurement without the wheel and tire fitted is outside the specification, check the wheel hub face runout.

10. **NOTE:** Using paint or typing correction fluid, mark the position of the brake disc in relation to the wheel hub.

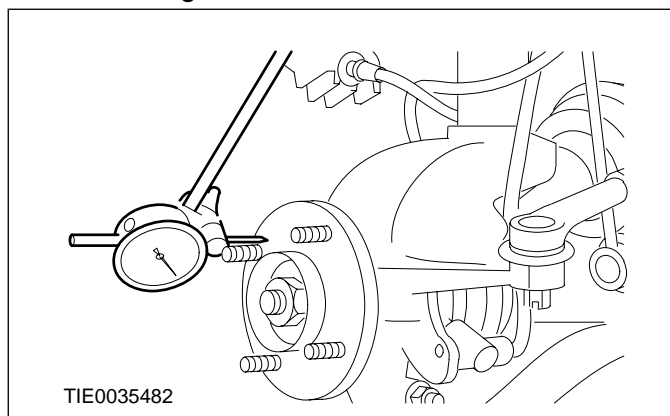
Remove the brake disc. For additional information, refer to Section **206-03 [Front Disc Brake]** / **206-04 [Rear Disc Brake]**.

11. **NOTE:** Make sure that the wheel hub face is clean and free of rust and foreign material.

NOTE: Re-position the dial indicator gauge so that it contacts the wheel hub approximately 10 mm from the outer edge of the wheel hub.

Check the wheel hub face runout.

- Slowly rotate the wheel hub and note the readings.



12. If the wheel hub runout exceeds 0.03 mm, install a new wheel hub. For additional information, refer to Section **204-01 [Front Suspension]** / **204-02 [Rear Suspension]**.

13. If the wheel hub face runout is within specification, install a new brake disc. For additional information, refer to Section **206-03 [Front Disc Brake]** / **206-04 [Rear Disc Brake]**.

SECTION 206-03 Front Disc Brake

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS**Lubricants, Fluids, Sealers and Adhesives**

	Specification
Super DOT 4 brake fluid	ESD-M6C57-A

Front Brake Disc Specification

	mm
Brake disc diameter – vehicles with 2.0L engine, 1.6L diesel or 2.0L diesel	300
Brake disc diameter – vehicles with 1.6L or 1.8L engine	278
New brake disc nominal thickness	25
Worn brake disc discard thickness *	23
Maximum brake disc thickness variation	0.025
Worn brake pad discard thickness**	1.5

* When the discard thickness has been reached, install a new brake disc and brake pads.

** When the discard thickness has been reached, install new brake pads.

Torque Specifications

Description	Nm	lb-ft	lb-in
Brake caliper anchor plate retaining bolts	120	88.5	-
Brake caliper retaining bolts	28	21	-
Brake hose to brake caliper union	18	13	-



DIAGNOSIS AND TESTING

Front Disc Brake

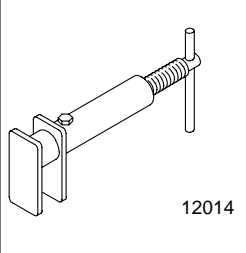
REFER to Section [206-00 \[Brake System - General Information\]](#).



REMOVAL AND INSTALLATION

Brake Pads — 2.5L Duratec-ST (VI5)(12 234 0)

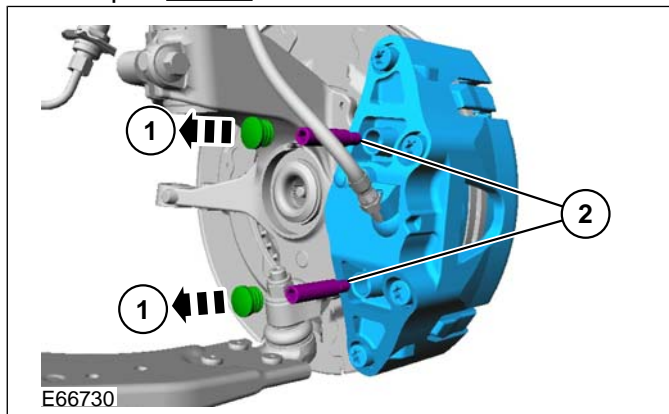
Special Tool(s)

 <p>12014</p>	<p>Retractor, Brake Caliper Piston 206-005</p>
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Materials	
Name	Specification
High-Temperature Grease	ESD-M1C220-A
Brake Fluid - Super DOT4	ESD-M6C57-A

CAUTION: Make sure that no load is placed on the brake hose.

Torque: 28 Nm



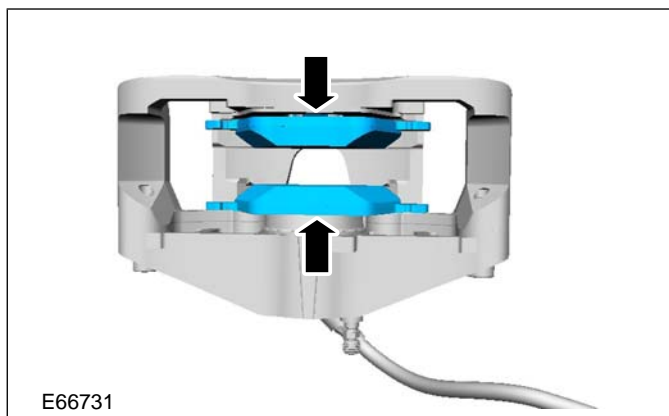
4. **NOTE:** Note the position of the brake pads to aid installation.

Removal

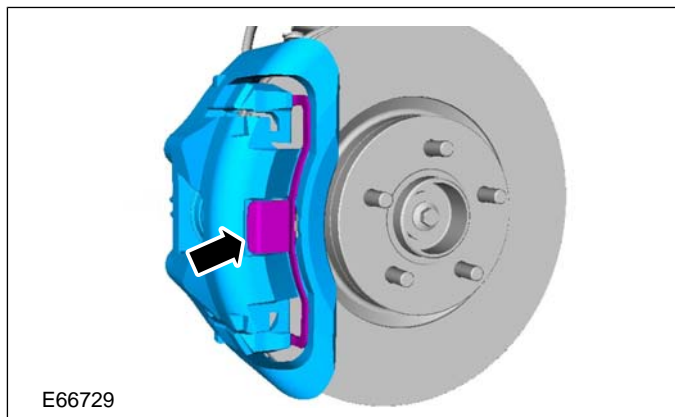
CAUTION:
Refer to: Health and Safety Precautions (100-00 General Information, Description and Operation).

NOTE: Removal steps in this procedure may contain installation details.

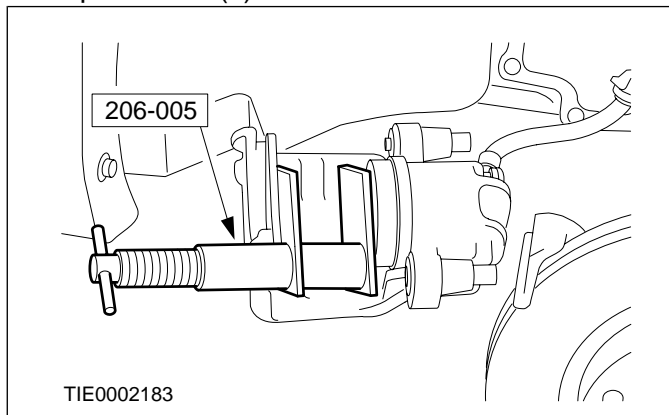
1. Remove the wheel and tire.
Refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).



2.



5. Special Tool(s): 206-005



3. **WARNING:** The brake caliper housing Torx bolts must not be removed.

Installation

NOTE: Make sure the brake pad contact points are clean and free of foreign material.

REMOVAL AND INSTALLATION

1. Apply grease to the brake pad contact points.
Material: High-Temperature Grease
2. To install, reverse the removal procedure.
3. Depress the brake pedal, check the brake fluid level in the brake fluid reservoir and top up as necessary with brake fluid.
Material: Brake Fluid - Super DOT4

REMOVAL AND INSTALLATION

Brake Caliper — 2.5L Duratec-ST (VI5)(12 243 0)

Materials	
Name	Specification
High-Temperature Grease	ESD-M1C220-A
Brake Fluid - Super DOT4	ESD-M6C57-A

General Equipment

Hose clamp(s)

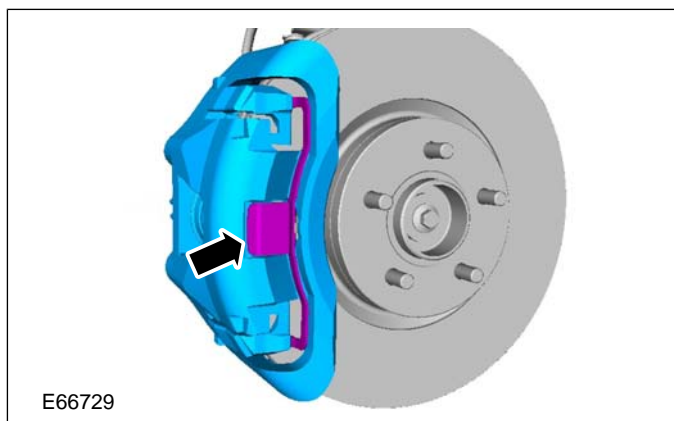
Removal

CAUTION:
Refer to: **Health and Safety Precautions (100-00 General Information, Description and Operation).**

NOTE: Removal steps in this procedure may contain installation details.

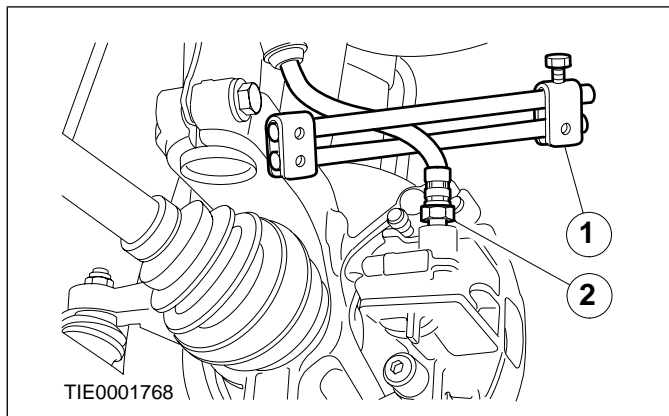
1. Remove the wheel and tire.
Refer to: **Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).**

2.



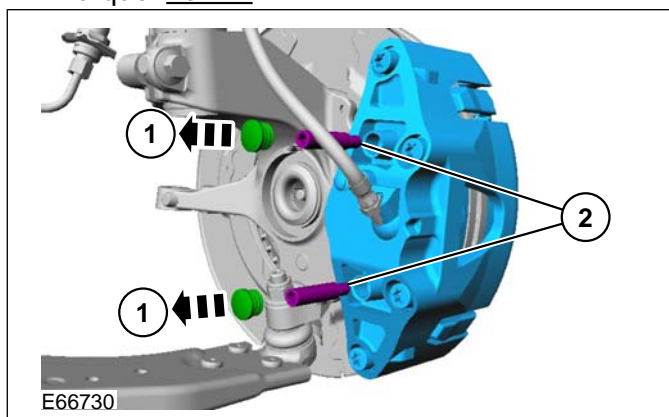
3. **CAUTION:** Make sure that all openings are sealed.

1. General Equipment: Hose clamp(s)
2. Loosen the brake hose union.
Torque: 18 Nm

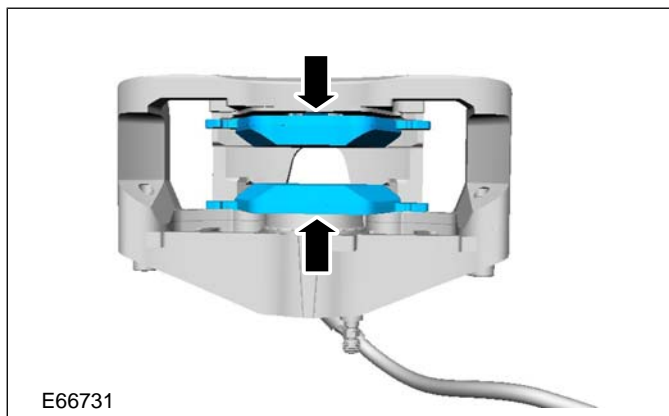


4. **WARNING:** The brake caliper housing Torx bolts must not be removed.

Torque: 28 Nm

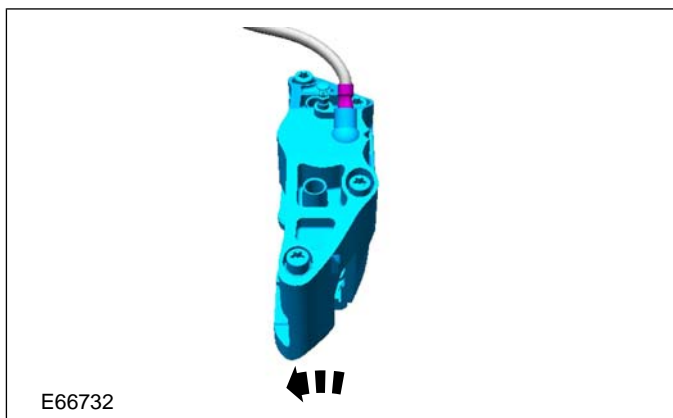


5. **NOTE:** Note the position of the brake pads to aid installation.



REMOVAL AND INSTALLATION

6.

**Installation**

- 1. NOTE:** Make sure the brake pad contact points are clean and free of foreign material.
Apply grease to the brake pad contact points.
Material: High-Temperature Grease
- 2.** To install, reverse the removal procedure.
- 3.** Depress the brake pedal, check the brake fluid level in the brake fluid reservoir and top up as necessary with brake fluid.
Material: Brake Fluid - Super DOT4

REMOVAL AND INSTALLATION**Brake Disc — 2.5L Duratec-ST (VI5)(12 223 0)****Removal**

NOTE: Removal steps in this procedure may contain installation details.

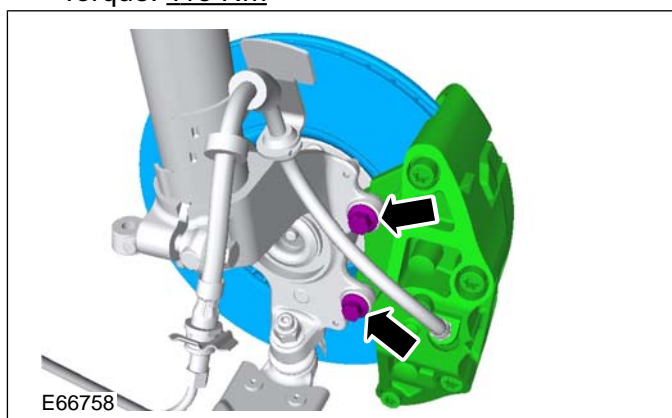
1. Remove the wheel and tire.

Refer to: [Wheel and Tire \(204-04 Wheels and Tires, Removal and Installation\)](#).

2.  **WARNING:** The brake caliper housing Torx bolts must not be removed.

 **CAUTION:** Make sure that no load is placed on the brake hose.

Torque: 115 Nm

**Installation**

1. **NOTE:** Make sure that the mating faces of the brake disc and the wheel hub are clean and free of foreign material.

To install, reverse the removal procedure.

2. If a new brake disc has been installed, install new brake pads.

Refer to: [Brake Pads - 2.5L Duratec-ST \(VI5\) \(206-03 Front Disc Brake, Removal and Installation\)](#).

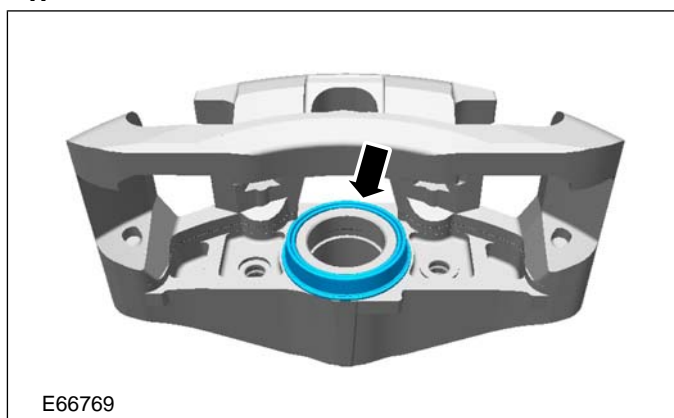
DISASSEMBLY AND ASSEMBLY

Brake Caliper — 2.5L Duratec-ST (VI5)(12 001 0)

Materials	
Name	Specification
Brake Fluid - Super DOT4	ESD-M6C57-A

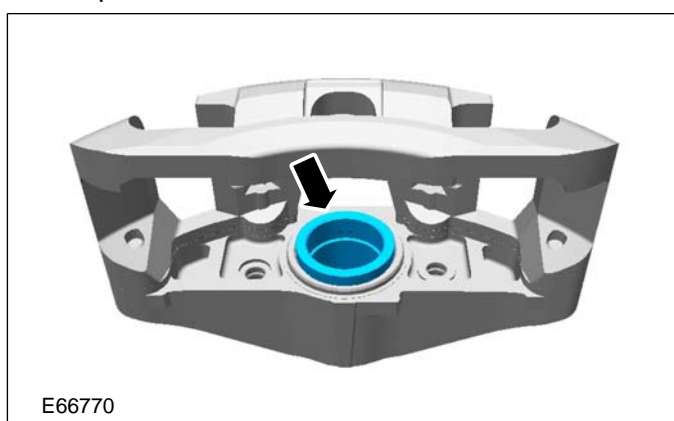
Disassembly

1.

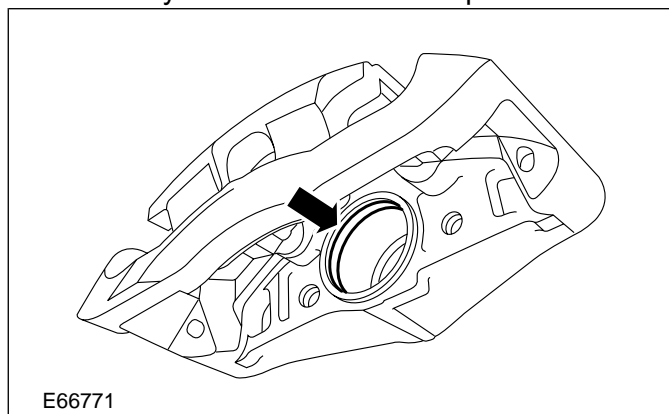


2. **▲ WARNING: Take extra care when using compressed air to remove the brake caliper piston.**

1. Place a block of wood between the body of the brake caliper and the brake caliper piston.
2. Apply compressed air through the brake hose union housing to remove the brake caliper piston.



3. Carefully remove the brake caliper seal.



Assembly

4. **▲ WARNING: Install a new brake caliper if rust, pitting or scoring are evident in the brake caliper piston bore.**

Lubricate the piston, piston bore and piston seal with super DOT 4 brake fluid prior to installation.

Material: Brake Fluid - Super DOT4

5. To assemble, reverse the disassembly procedure.

SECTION 206-04 Rear Disc Brake

VEHICLE APPLICATION: 2008.75 Focus ST C307

CONTENTS	PAGE
SPECIFICATIONS	
Specifications.....	206-04-2
Rear Disc Brake Specification.....	206-04-2
DIAGNOSIS AND TESTING	
Rear Disc Brake.....	206-04-3
REMOVAL AND INSTALLATION	
Brake Caliper.....	206-04-4
Brake Pads.....	206-04-8
Brake Disc.....	206-04-11
Brake Disc Shield.....	206-04-13

SPECIFICATIONS**Lubricants, Fluids, Sealers and Adhesives**

	Specification
Super DOT 4 brake fluid	ESD-M6C57-A

Rear Disc Brake Specification

Description	mm
Brake disc diameter – vehicles with 1.6L diesel, 1.8L diesel or 2.0L engine	280
Brake disc diameter – vehicles with 1.6L or 1.8L engine	260
New brake disc nominal thickness	11
Worn brake disc discard thickness *	9
Maximum brake disc thickness variation	0.025
Worn brake pad discard thickness **	1.5

* When the discard thickness has been reached, install a new brake disc and brake pads.

** When the discard thickness has been reached, install new brake pads.

Torque Specifications

Description	Nm	lb-ft	lb-in
Brake caliper anchor plate retaining bolts	70	52	-
Brake caliper retaining bolts	35	26	-
Brake hose to brake caliper union	18	13	-
Wheel hub retaining bolts	70	52	-



DIAGNOSIS AND TESTING

Rear Disc Brake

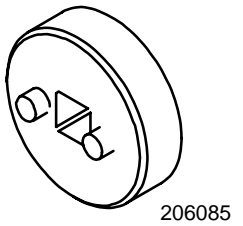
REFER to Section [206-00 \[Brake System - General Information\]](#).



REMOVAL AND INSTALLATION

Brake Caliper

Special Tool(s)

 <p>206085</p>	Retractor, Rear Brake Caliper Piston 206-085 (12-025)
---	---

General Equipment

Brake hose clamp

Materials

Name	Specification
Super DOT 4 brake fluid	ESD-M6C57-A

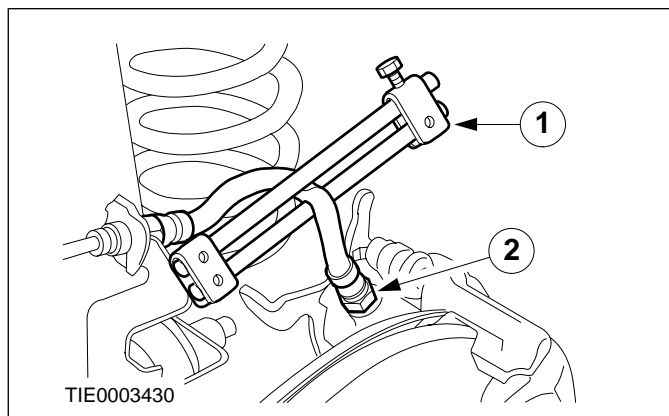
⚠ CAUTION: If brake fluid is spilled on the paintwork, the affected area must be immediately washed down with cold water.

1. Release the parking brake.
2. Remove the wheel and tire.

For additional information, refer to: **Wheel and Tire (204-04 Wheels and Tires, Removal and Installation)**.

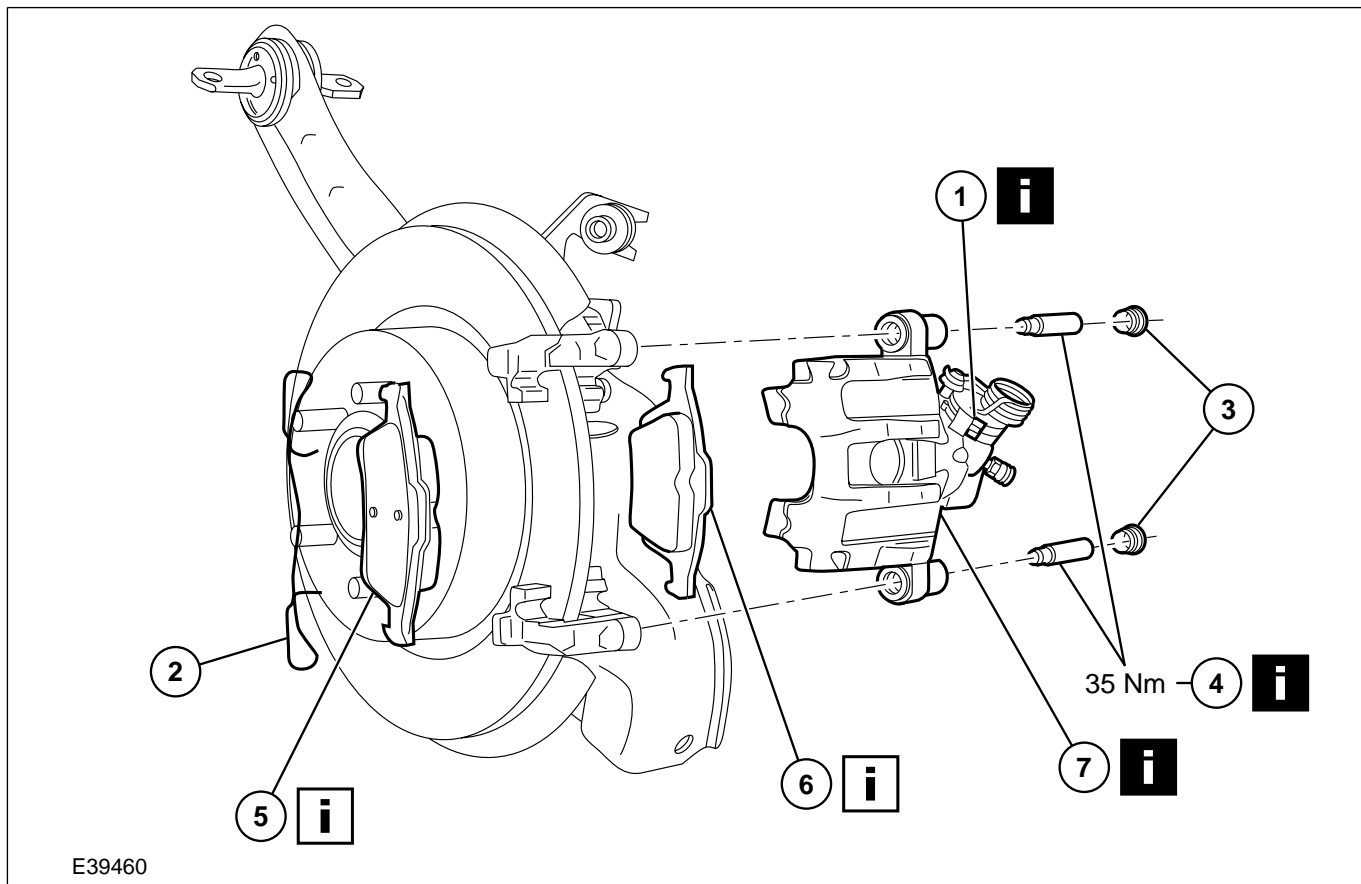
3. Loosen the brake hose to brake caliper union.

1. Using a brake hose clamp, clamp the brake hose.
2. Loosen the union.



4. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



Item	Description
1	Parking brake cable <i>See Removal Detail</i>
2	Brake caliper retaining clip
3	Brake caliper retaining bolt covers
4	Brake caliper retaining bolts <i>See Removal Detail</i>
5	Outer brake pad <i>See Installation Detail</i>

Item	Description
6	Inner brake pad <i>See Installation Detail</i>
7	Brake caliper <i>See Removal Detail</i>

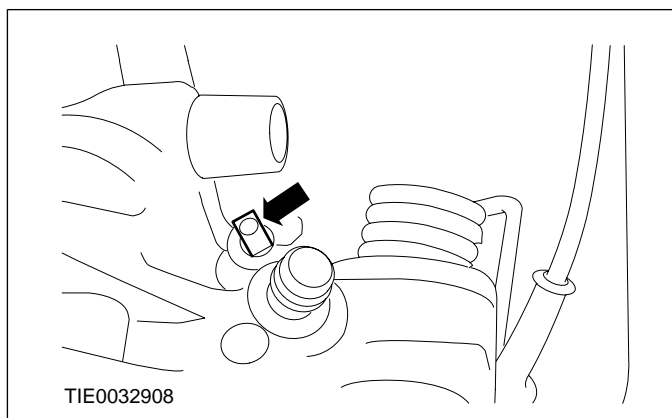
- 5. To install, reverse the removal procedure.
- 6. Bleed the brake system. For additional information, refer to: **(206-00 Brake System - General Information)**
Brake System Bleeding (General Procedures),
Brake System Pressure Bleeding (General Procedures).

Removal Details

REMOVAL AND INSTALLATION

Item 1 Parking brake cable

1. Detach the parking brake cable from the brake caliper lever.



Item 4 Brake caliper retaining bolts

1. **CAUTION:** Suspend the brake caliper to prevent load being placed on the brake hose.

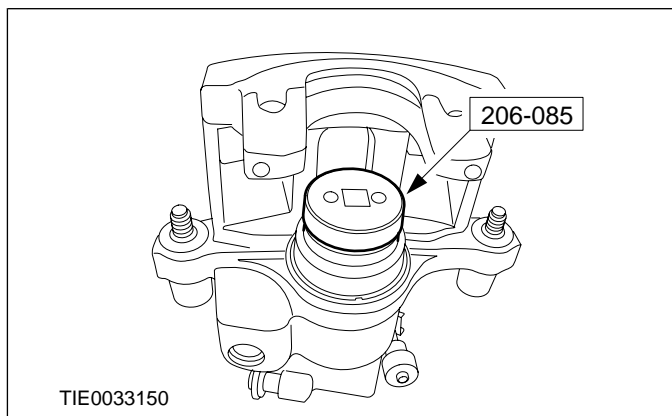
Installation Details

Item 6 Inner brake pad

1. **CAUTION:** Support the brake caliper during brake caliper piston retraction.

NOTE: To retract the brake caliper piston, apply pressure to the brake caliper piston while rotating the brake caliper piston clockwise.

Using the special tool, retract the brake caliper piston.



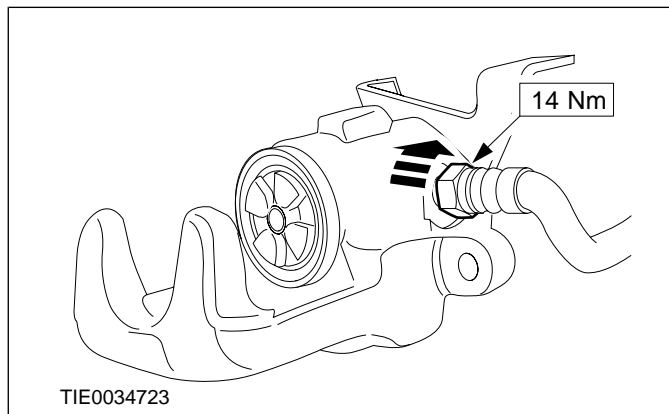
Item 7 Brake caliper

1. **CAUTION:** Cap the brake hose to prevent fluid loss or dirt ingress.

NOTE: The brake hose union has a right-handed thread.

Disconnect the brake hose from the brake caliper.

- Rotate the brake caliper clockwise when viewed as shown.

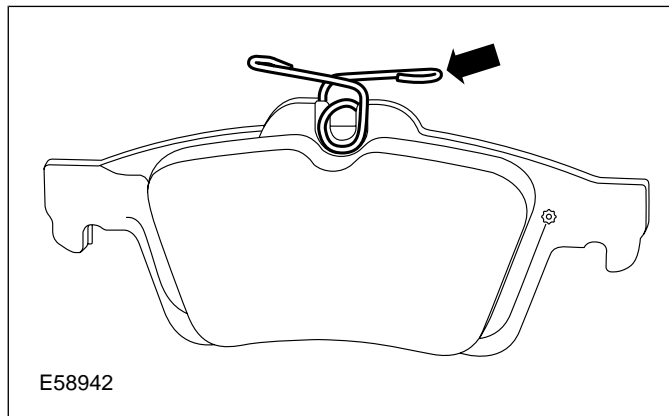


2. **CAUTION:** Do not apply grease or lubricant to the brake pad contact points or the brake caliper piston.

NOTE: The inner brake pad is equipped with an anti-rattle spring.

NOTE: Make sure that the brake pad contact points are clean and free from contamination.

Install the inner brake pad.





REMOVAL AND INSTALLATION

Item 5 Outer brake pad

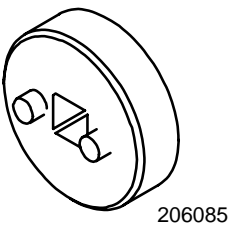
NOTE: Make sure that the brake pad contact points are clean and free from contamination.



REMOVAL AND INSTALLATION

Brake Pads

Special Tool(s)

 206085	Retractor, Rear Brake Caliper Piston 206-085 (12-025)
--	--

Materials

Name	Specification
Super DOT 4 brake fluid	ESD-M6C57-A

⚠ CAUTION: If brake fluid is spilled on the paintwork, the affected area must be immediately washed down with cold water.

NOTE: Make sure that the brake pad contact points are clean and free of foreign material.

All vehicles

1. Remove the wheel and tire.

For additional information, refer to: **Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).**

Vehicles with manual parking brake

2. Release the parking brake.

Vehicles with electronic parking brake (EPB)

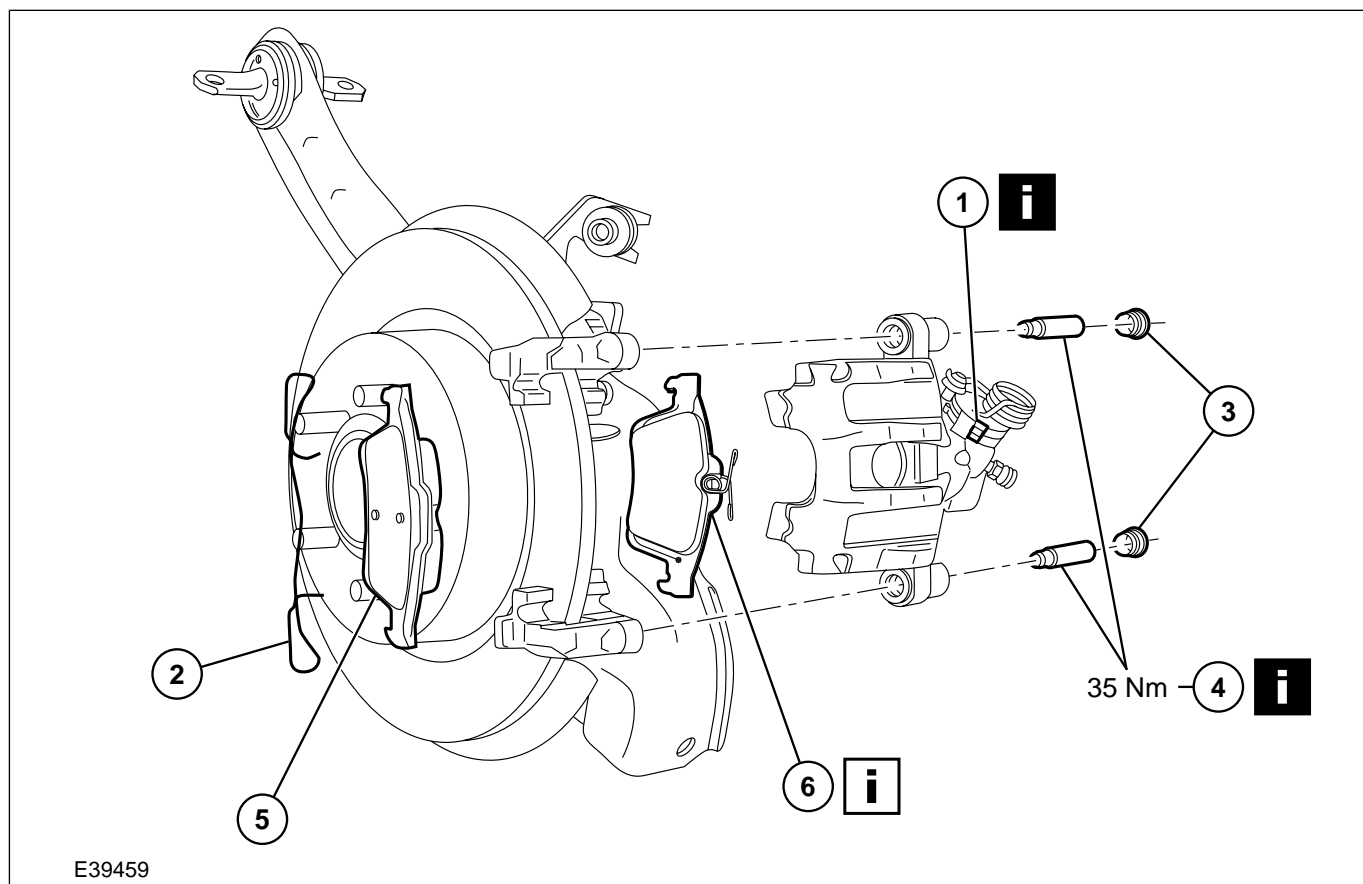
3. Release the EPB.

1. Remove the ignition key.
2. Activate the EPB switch (vehicles equipped for cold climate only).

NOTE: High forces may be required to release the cable.

3. Pull the emergency EPB release cable.

4. Remove the components in the order indicated in the following illustration(s) and table(s).



REMOVAL AND INSTALLATION

Item	Description
1	Parking brake cable See Removal Detail
2	Brake caliper retaining clip
3	Brake caliper retaining bolt covers
4	Brake caliper retaining bolts See Removal Detail
5	Outer brake pad
6	Inner brake pad See Installation Detail

5. To install, reverse the removal procedure.

All vehicles

6. Fully depress and release the brake pedal.

7. Check the fluid level in the brake fluid reservoir and top up if necessary with brake fluid.

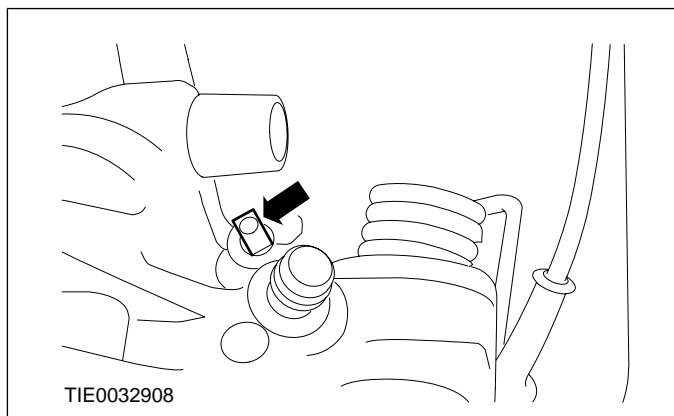
Vehicles with electronic parking brake (EPB)

8. Activate the EPB switch.

Removal Details

Item 1 Parking brake cable

1. Detach the parking brake cable from the brake caliper lever.



Item 4 Brake caliper retaining bolts

- ⚠ CAUTION:** Suspend the brake caliper to prevent load being placed on the brake hose.

Installation Details

Item 6 Inner brake pad

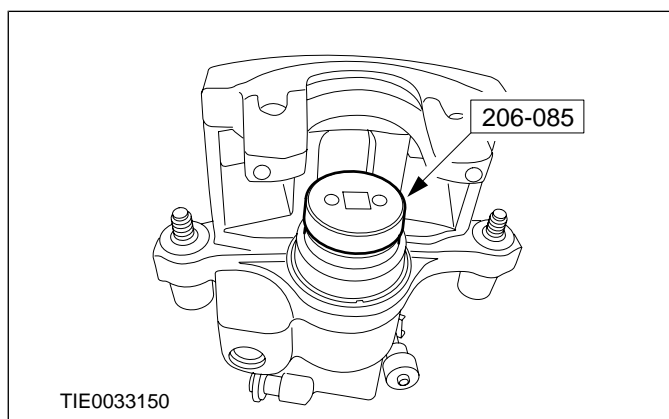
1. CAUTIONS:

⚠ When the brake caliper pistons are retracted into the piston housing, brake fluid will be displaced into the brake fluid reservoir.

⚠ Support the brake caliper during brake caliper piston retraction.

NOTE: To retract the brake caliper piston, apply pressure to the brake caliper piston while rotating the brake caliper piston clockwise.

Using the special tool, retract the brake caliper piston.

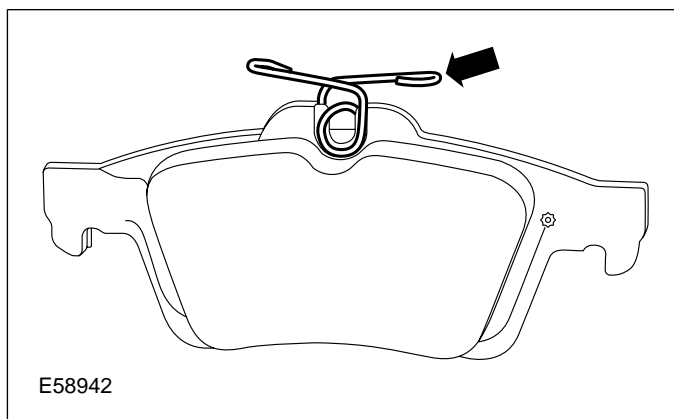


REMOVAL AND INSTALLATION

2. **⚠ CAUTION:** Do not apply grease or lubricant to the brake pad contact points or the brake caliper piston.

NOTE: The inner brake pad is equipped with an anti-rattle spring.

Install the inner brake pad.



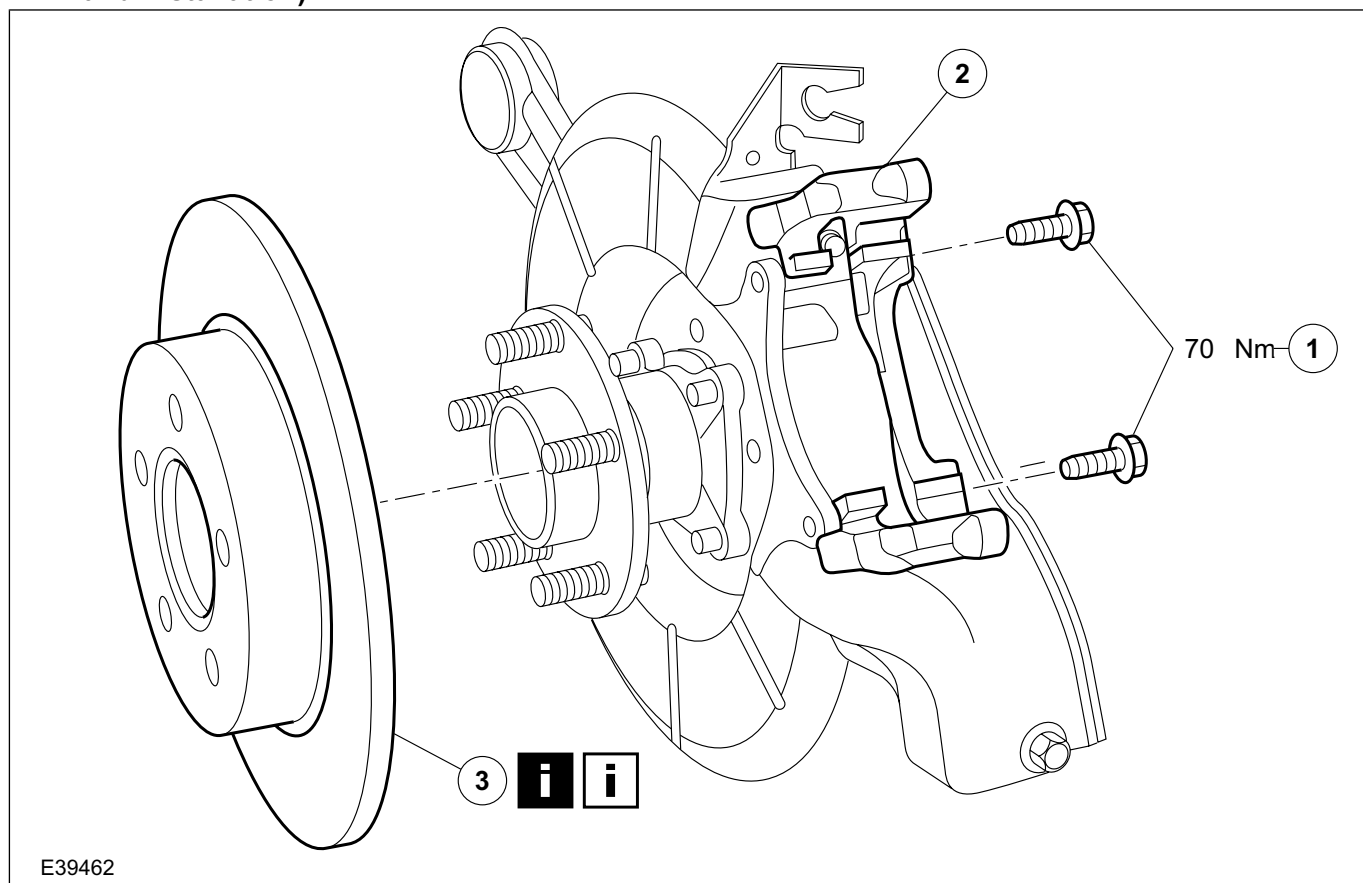
REMOVAL AND INSTALLATION

Brake Disc

1. Remove the brake pads.

For additional information, refer to: Brake Pads (206-04 Rear Disc Brake, Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Brake caliper anchor plate retaining bolts
2	Brake caliper and anchor plate
3	Brake disc See Removal Detail See Installation Detail

3. To install, reverse the removal procedure.

NOTE: Make sure the wheel hub face is clean and free of rust and foreign material.

Removal Details

Item 3 Brake disc

NOTE: Remove and discard the retaining clip (if equipped).

Installation Details



REMOVAL AND INSTALLATION

Item 3 Brake disc

1. If a new brake disc has been installed, install new brake pads.

For additional information, refer to: Brake Pads ([206-04 Rear Disc Brake, Removal and Installation](#)).



REMOVAL AND INSTALLATION

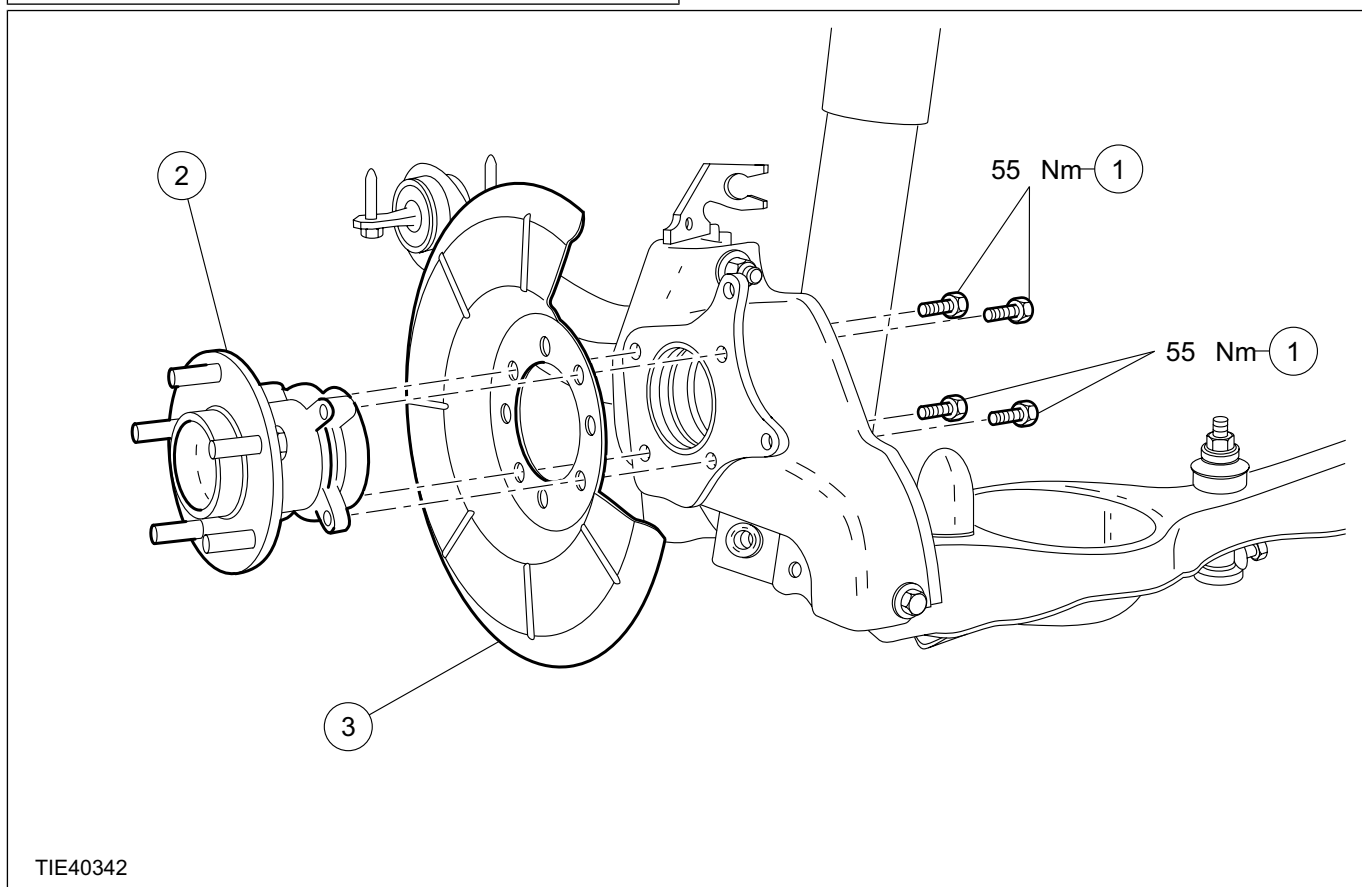
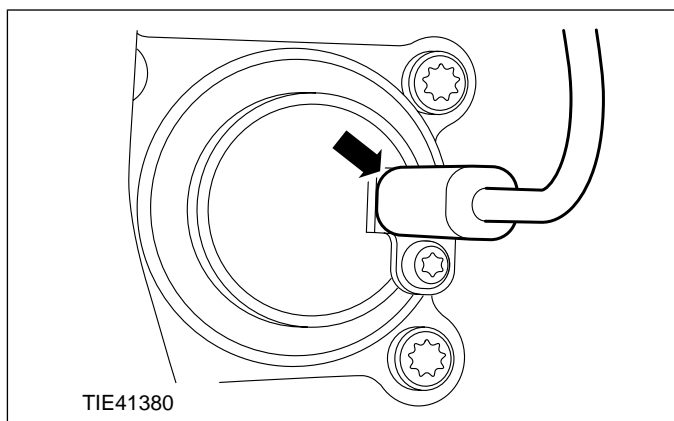
Brake Disc Shield

1. Remove the brake disc.

For additional information, refer to **Brake Disc -** in this section.

2. Disconnect the wheel speed sensor electrical connector.

3. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Wheel hub retaining bolts
2	Wheel hub
3	Brake disc shield

4. To install, reverse the removal procedure.

SECTION 206-05 Parking Brake and Actuation

VEHICLE APPLICATION: 2008.75 Focus ST C307

CONTENTS	PAGE
SPECIFICATIONS	
Specifications.....	206-05-2
DESCRIPTION AND OPERATION	
Parking Brake.....	206-05-3
Conventional parking brake.....	206-05-3
Electronic parking brake.....	206-05-3
DIAGNOSIS AND TESTING	
Parking Brake.....	206-05-6
Inspection and Verification.....	206-05-6
Symptom Chart.....	206-05-6
Pinpoint Tests.....	206-05-7
GENERAL PROCEDURES	
Parking Brake Cable Adjustment..... (12 662 0)	206-05-10
REMOVAL AND INSTALLATION	
Parking Brake Control.....	206-05-12
Parking Brake Cable — Vehicles With: Rear Disc Brakes.....	206-05-14

SPECIFICATIONS**Torque Specifications**

Description	Nm	lb-ft	lb-in
Parking brake control retaining bolts	35	26	-
Exhaust flexible pipe to exhaust muffler and tailpipe nuts	51	38	-
Electronic parking brake release actuator retaining bolts	23	17	-
Electronic parking brake module support bracket retaining nut	23	17	-
Electronic parking brake module support bracket retaining bolts	9	-	80
Electronic parking brake module retaining nuts	5	-	44

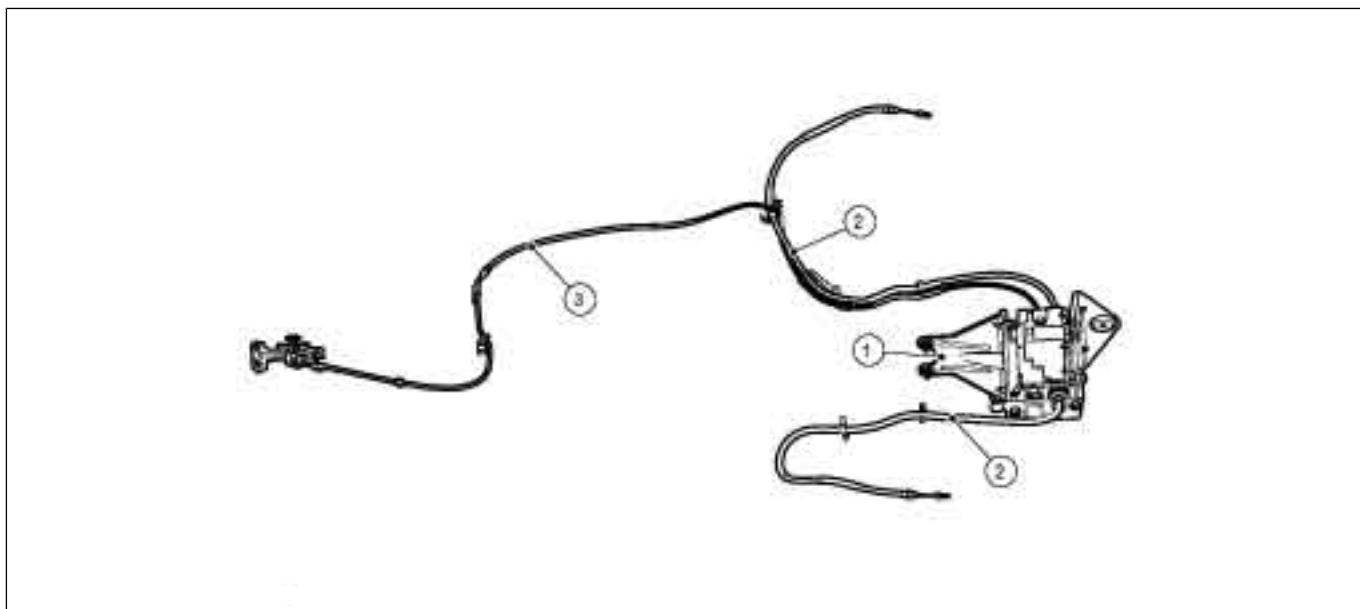
DESCRIPTION AND OPERATION

Parking Brake

Conventional parking brake

A conventional parking brake is used.

The layout and operation of the mechanical parking brake are similar to the current Focus.

Electronic parking brake

Item	Description
1	Electronic parking brake actuator
2	Handbrake cable
3	Emergency release

- Clutch pedal switch
- Electronic parking brake actuator
- Brake pedal switch

The electronic parking brake actuator can only be replaced as a complete unit.

An electronic parking brake is available as an option for the vehicle. In comparison to a conventional handbrake, the electronic parking brake offers the following advantages:

- Ease of operation, as the electronic parking brake is always applied firmly, regardless of the strength of the driver.
- Safety, as the vehicle can be slowed down with the electronic parking brake if the hydraulics of the brake system fail while driving. The system is automatically coordinated with the ABS system to prevent the braked wheels from locking up.

The system comprises the following components:

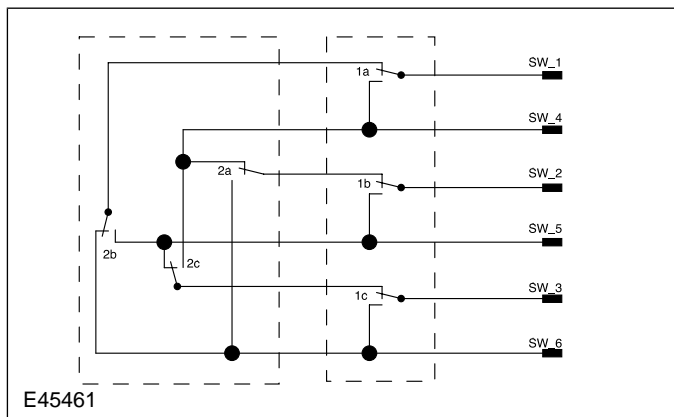
- Pushbutton for operation of the electronic parking brake
- Emergency release mechanism

Pushbutton for operation of the electronic parking brake

The pushbutton for operation of the electronic parking brake is located in the centre console. To release the electronic parking brake press the pushbutton, to engage it pull the button.

DESCRIPTION AND OPERATION

Neutral position



When the pushbutton is in the neutral position, the following pins are connected to each other:

- 1 and 6
- 4 and 2
- 5 and 3

For safety reasons six change-over contacts which switch the three circuits are integrated in the pushbutton. The system will still function if one of the circuits fails. An error message then appears on the display of the instrument cluster.

Engaged position

When the pushbutton is in the engaged position, the following pins are connected to each other:

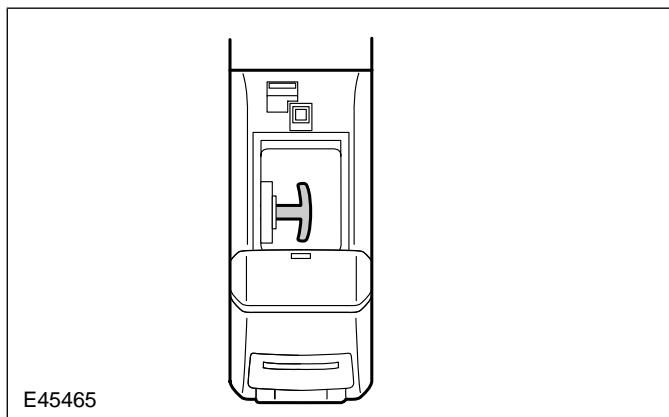
- 1 and 4
- 2 and 5
- 3 and 6

Released position

When the pushbutton is in the released position, the following pins are connected to each other:

- 1 and 5
- 4 and 3
- 2 and 6

Emergency release

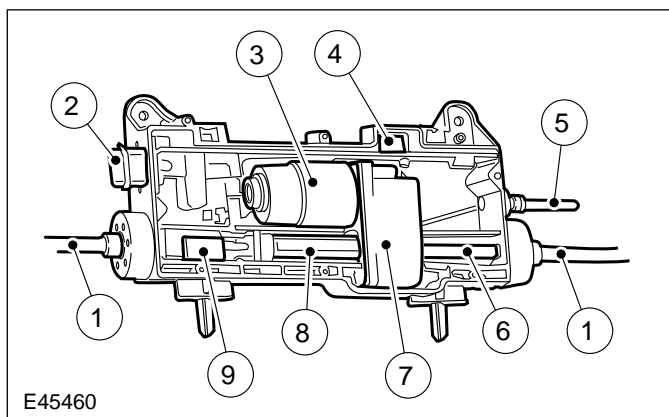


If the electronic parking brake has been released by means of the emergency release mechanism then it is necessary to release the electronic parking brake via the pushbutton after the service repairs have been carried out.

It is also possible to release the electronic parking brake manually if required. There is a rubber mat underneath the storage compartment in the centre console which needs to be removed in order to access and operate the emergency release mechanism. The electronic parking brake is then released by firmly pulling the T-shaped handle upwards until a loud noise is heard.

- The electronic parking brake reinitialises itself during its first electrical operation after an emergency release.

Electronic parking brake actuator



Item	Description
1	Handbrake cable
2	Connections
3	DC motor
4	Electronic parking brake control module

DESCRIPTION AND OPERATION

Item	Description
5	Emergency release cable
6	Splined shaft
7	Transmission
8	Hollow shaft
9	Force sensor

The electronic parking brake actuator is positioned underneath the spare wheel well. The following components are integrated in the parking brake actuator:

- Electronic parking brake control module
- DC motor
- Transmission
- Force sensor
- Hollow shaft
- Splined shaft
- Handbrake cable
- Emergency release cable

Mechanical layout

The motor/gearing unit is a floating fit in the electronic parking brake actuator.

A hollow shaft is driven via the gearing. A splined shaft engages in turn in the hollow shaft. The hollow shaft is connected to a force sensor via a link which can be released mechanically (emergency release). The parking brake cables are hooked into the force sensor and the splined shaft.

After renewing the rear brake pads, always press the brake pedal several times before operating the electronic parking brake.

Operation

When the electronic parking brake is operated the DC motor is actuated using a map stored in the electronic parking brake control module. The values stored in the map are used as reference values. The voltage signal supplied from the force sensor is compared to the reference values. If the value matches the reference value then the DC motor is no longer actuated.

Engaging the parking brake

When the electronic parking brake is engaged, a distinction is made between static and dynamic braking. If the foot brake fails the vehicle can be braked dynamically by means of the electronic parking brake.

Dynamic braking

At speeds above 4 km/h the vehicle is gradually braked if the pushbutton is lifted up. If one of the braked wheels locks up then the force under which the parking brake cables are applied is reduced. The vehicle continues to brake while the button is pulled up.

Static braking

At speeds below 4 km/h or if the vehicle is stationary the pushbutton is lifted up briefly to engage the electronic parking brake.

If the ignition key is removed within 10 minutes of turning the ignition off, then the electronic parking brake is automatically engaged. The electronic parking brake control module switches to "sleep" mode 10 minutes after the ignition is switched off. It is then no longer possible to engage the electronic parking brake.

The automatic engagement of the electronic parking brake is configured separately for each different country at the factory. The automatic engagement of the electronic parking brake is disabled in countries where the handbrake cables are prone to freezing up. The automatic engagement of the electronic parking brake is enabled in all other countries. The automatic engagement of the electronic parking brake can be activated or deactivated with WDS according to the customer's wishes.

Releasing the parking brake

In order to release the parking brake, it is necessary for the ignition to be switched on, the pushbutton to be pressed and the brake pedal or clutch pedal to be depressed.

In order to prevent automatic engagement of the electronic parking brake when the ignition key is removed from the switch, press and hold the button while switching off the ignition and removing the key.

DIAGNOSIS AND TESTING

Parking Brake

Inspection and Verification

1. Verify the customer concern by operating the parking brake system.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> - Parking brake control REFER to: Parking Brake Control (206-05 Parking Brake and Actuation, Removal and Installation). - Cable and conduit REFER to: Instrument Cluster (413-01 Instrument Cluster, Diagnosis and Testing). 	<ul style="list-style-type: none"> - Parking brake warning circuit. REFER to: Instrument Cluster (413-01 Instrument Cluster, Diagnosis and Testing).

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the concern is not visually evident, verify the symptom and refer to the Symptom Chart.

Symptom Chart

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • The parking brake will not apply 	<ul style="list-style-type: none"> • Parking brake control. • Cable and conduit. 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.
<ul style="list-style-type: none"> • The parking brake will not release 	<ul style="list-style-type: none"> • Parking brake control. • Cable and conduit. 	<ul style="list-style-type: none"> • GO to Pinpoint Test B.

DIAGNOSIS AND TESTING

Pinpoint Tests

PINPOINT TEST A : THE PARKING BRAKE WILL NOT APPLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK FOR MISADJUSTED REAR PARKING BRAKE CABLE	
	<p>1 Operate the parking brake control several times to adjust the cable.</p> <ul style="list-style-type: none"> • Does the parking brake now engage correctly? <p>→ Yes Vehicle OK</p> <p>→ No GO to A2.</p>
A2: CHECK FOR WORN BRAKE SHOES OR PADS	
	<p>1 Inspect the brake shoes or pads for excessive wear.</p> <p>REFER to: Brake Shoes (206-02 Drum Brake, Removal and Installation) / Brake Shoes (206-02 Drum Brake, Removal and Installation) / Brake Pads (206-04 Rear Disc Brake, Removal and Installation).</p> <ul style="list-style-type: none"> • Are the brake shoe linings or brake pads OK? <p>→ Yes GO to A3.</p> <p>→ No INSTALL new brake shoes or pads.</p> <p>REFER to: Brake Shoes (206-02 Drum Brake, Removal and Installation) / Brake Pads (206-04 Rear Disc Brake, Removal and Installation). TEST the system for normal operation.</p>
A3: CHECK FOR DAMAGED PARKING BRAKE CABLES	
	<p>1 Inspect the parking brake cables and conduits for damage, rust or fraying.</p> <ul style="list-style-type: none"> • Are the parking brake cables and conduits OK? <p>→ Yes CHECK for other causes such as loose parking brake control or conventional brake system components.</p> <p>→ No REPAIR or INSTALL cables and conduit as necessary. TEST the system for normal operation.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST B : THE PARKING BRAKE WILL NOT RELEASE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK PARKING BRAKE CONTROL	
	<p>1 Raise and support the vehicle on a lift with the parking brake fully applied.</p> <p>REFER to: Lifting (100-02 Jacking and Lifting, Description and Operation).</p> <ul style="list-style-type: none"> – With the aid of another technician, release the parking brake and check the operation of the brake cables and levers. <ul style="list-style-type: none"> • Did the parking brake release? <ul style="list-style-type: none"> → Yes CHECK the other causes such as conventional brake system components. REPAIR or INSTALL new components as necessary. → No GO to B2.
B2: CHECK PARKING BRAKE CABLES	
	<p>1 Loosen the parking brake cable tension.</p> <ul style="list-style-type: none"> – Rotate the rear wheels by hand. <ul style="list-style-type: none"> • Did the rear wheels turn freely? <ul style="list-style-type: none"> → Yes INSTALL a new parking brake control. REFER to: Parking Brake Control (206-05 Parking Brake and Actuation, Removal and Installation). TEST the system for normal operation. → No GO to B3.
B3: CHECK FRONT PARKING BRAKE CABLE	
	<p>1 Disconnect the parking brake front cable and conduit from the rear brake cable and conduit at the equalizer.</p> <ul style="list-style-type: none"> – Rotate the rear wheels by hand. <ul style="list-style-type: none"> • Did the rear wheels turn freely? <ul style="list-style-type: none"> → Yes INSTALL a new front parking brake cable and conduit. REFER to: Instrument Cluster (413-01 Instrument Cluster, Diagnosis and Testing). TEST the system for normal operation. → No GO to B4.

DIAGNOSIS AND TESTING

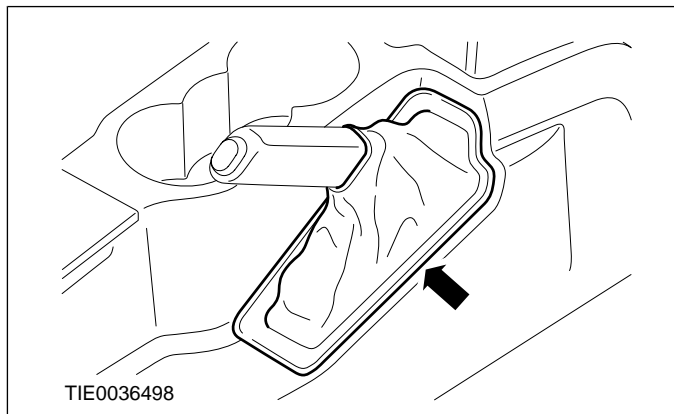
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B4: CHECK REAR PARKING BRAKE CABLES	
	<p>1 Disconnect the parking brake at the rear brakes, one at a time.</p> <ul style="list-style-type: none"> <li>– Rotate the wheel affected by the disconnected parking brake. <li>• Did the wheel turn freely? <p>→ Yes</p> <p>INSTALL a new parking brake control lever on the rear drum brakes or caliper assembly on rear disc brakes.</p> <p>REFER to: Brake Shoes (206-02 Drum Brake, Removal and Installation)</p> <p>/ Lifting (100-02 Jacking and Lifting, Description and Operation).</p> <p>TEST the system for normal operation.</p> <p>→ No</p> <p>REFER to: Brake System (206-00 Brake System - General Information, Diagnosis and Testing).</p>

GENERAL PROCEDURES

Parking Brake Cable Adjustment(12 662 0)

All vehicles

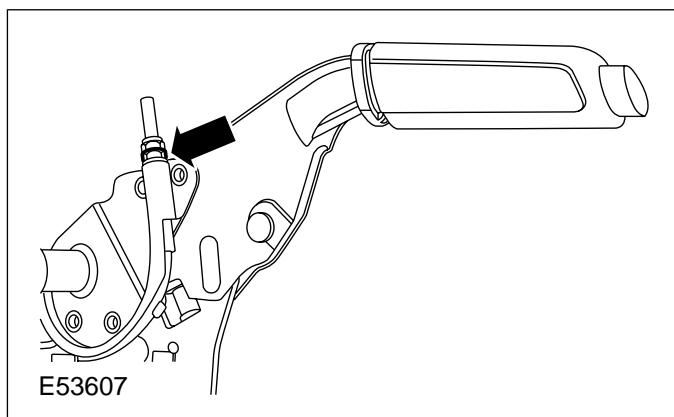
1. Remove the parking brake control boot.



2. Release the parking brake.

3. Loosen the parking brake cable adjustment nut to the end of the parking brake cable thread.

- Remove the parking brake cable adjustment nut lock nut.



4. Make sure the parking brake cable is correctly located.

5. **CAUTION:** The torque applied to the adjustment nut must not exceed 10 Nm. Failure to follow this instruction will cause damage to the parking brake cable thread.

NOTE: Make sure the parking brake control is fully released.

NOTE: Before carrying out the adjustment to a new or relocated parking brake cable, settle the parking brake system.

Settle the parking brake system in four stages.

- Stage 1: Tighten the parking brake cable adjustment nut to 2 Nm.
- Stage 2: Raise the parking brake control twelve notches.
- Stage 3: Fully release the parking brake control.
- Stage 4: Loosen the parking brake cable adjustment nut to the end of the thread.

Vehicles with rear disc brakes

6. Raise and support the vehicle.

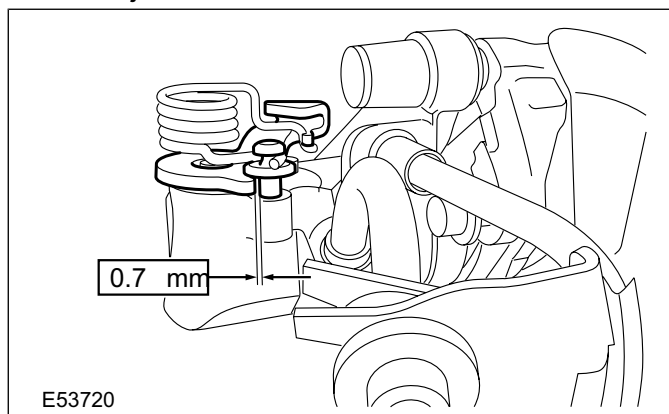
For additional information, refer to: **Jacking (100-02 Jacking and Lifting, Description and Operation)**

/ Lifting (100-02 Jacking and Lifting, Description and Operation).

7. NOTE: Make sure the parking brake control is fully released.

Adjust the parking brake cable in five stages.

- Stage 1: Insert a 0.7 mm feeler gauge between the parking brake lever and the brake caliper abutment on both sides.
- Stage 2: With the aid of another technician, tighten the parking brake cable adjustment nut until movement is observed on one of parking brake levers.
- Stage 3: Remove the feeler gauges.
- Stage 4: Rotate the rear wheels and tires and check for brake drag. If brake drag is felt, loosen the parking brake cable adjustment nut to the end of the parking brake cable thread, clean the parking brake cables and repeat the parking brake cable adjustment procedure.
- Stage 5: Install the parking brake cable adjustment nut lock nut.



GENERAL PROCEDURES

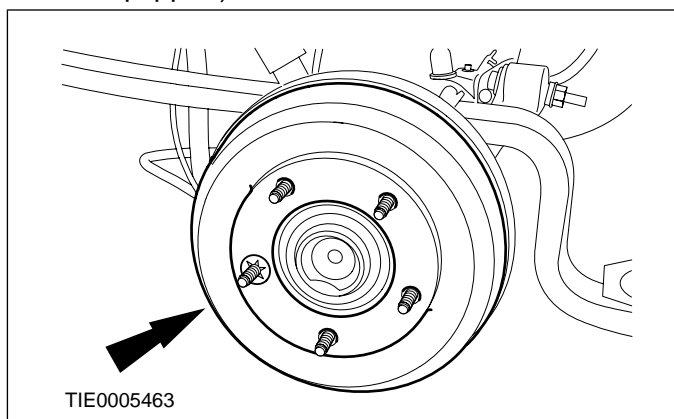
Vehicles with rear drum brakes

8. Remove the rear wheels and tires.

For additional information, refer to: **Wheel and Tire (204-04 Wheels and Tires, Removal and Installation)**.

9. Remove the brake drum.

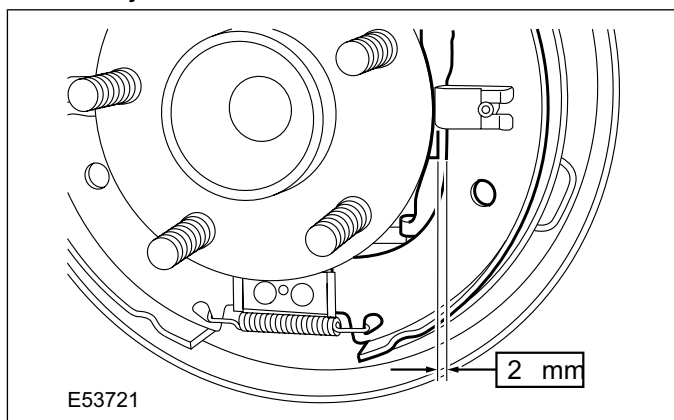
- Remove and discard the retaining washer (if equipped).



10. NOTE: Make sure the parking brake control is fully released.

Adjust the parking brake cable in four stages.

- Stage 1: Insert a 2.0 mm feeler gauge between the parking brake lever end stop and the rear brake shoe on both sides.
- Stage 2: With the aid of another technician, tighten the parking brake cable adjustment nut until movement is observed on one of parking brake levers.
- Stage 3: Remove the feeler gauges.
- Stage 4: Install the parking brake cable adjustment nut lock nut.



11. Install the brake drum.

12. Install the rear wheels and tires.

For additional information, refer to: **Wheel and Tire (204-04 Wheels and Tires, Removal and Installation)**.

13. Check the parking brake cable adjustment in two stages.

- Stage 1: Raise and release the parking brake control and check that it returns to the fully released position. If the parking brake control does not fully release, repeat the parking brake cable adjustment procedure.
- Stage 2: Rotate the rear wheels and tires and check for brake drag. If brake drag is felt, loosen the parking brake cable adjustment nut two full turns and repeat the parking brake cable adjustment procedure.

All vehicles

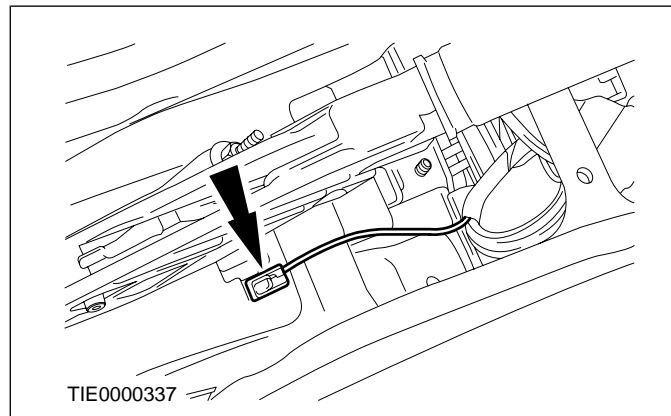
14. Install the parking brake control boot.

REMOVAL AND INSTALLATION

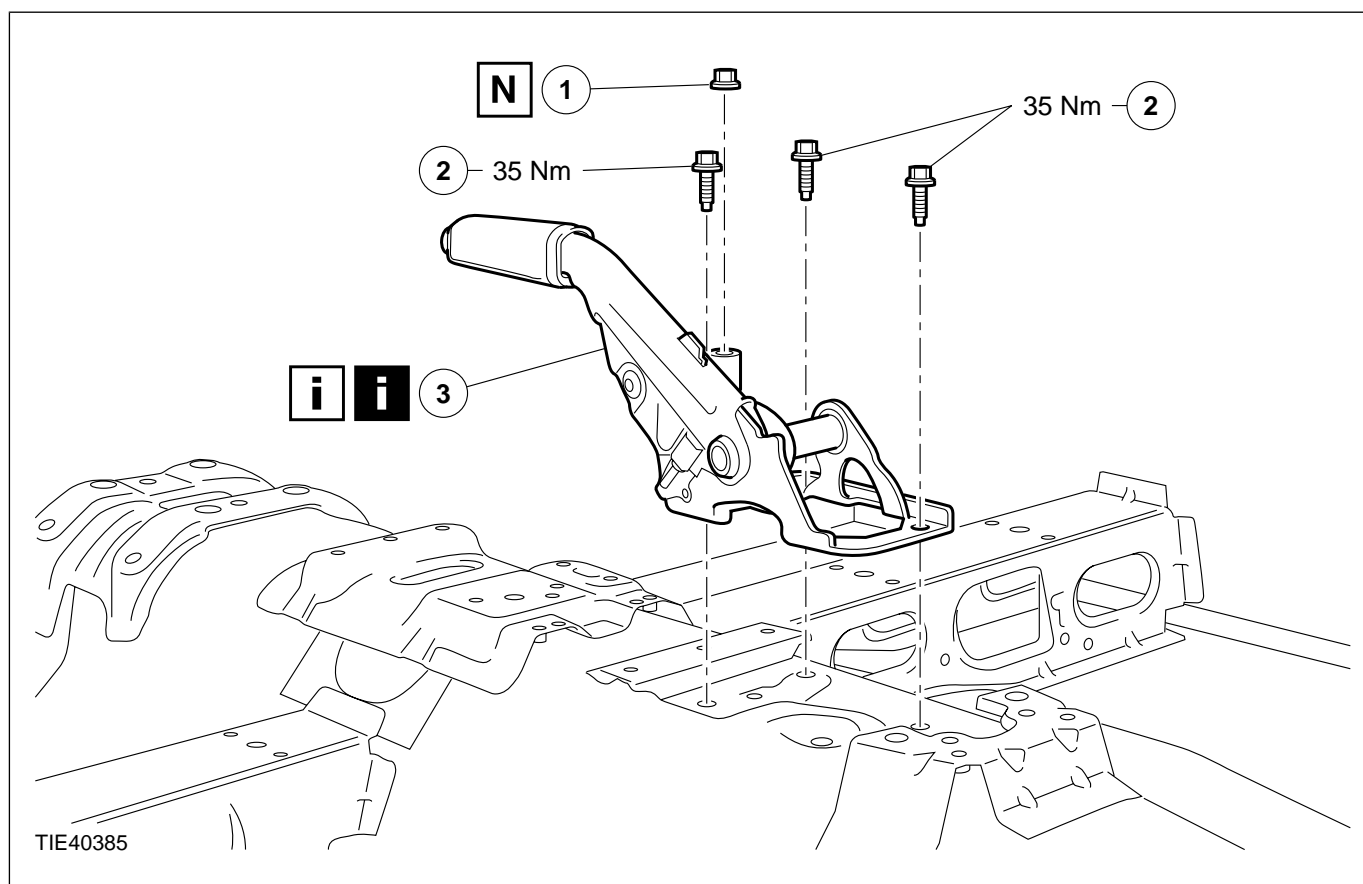
Parking Brake Control

1. Remove the floor console. For additional information, refer to **Section 501-12** [Instrument Panel and Console].
2. Release the parking brake.

3. Disconnect the parking brake control switch electrical connector.



4. Remove the components in the order indicated in the following illustration(s) and table(s).



REMOVAL AND INSTALLATION

Item	Description
1	Parking brake cable adjustment nut
2	Parking brake control retaining bolts
3	Parking brake control See Removal Detail See Installation Detail

- To install, reverse the removal procedure.
- Adjust the parking brake cable.

For additional information, refer to **Parking Brake Cable Adjustment** in this section.

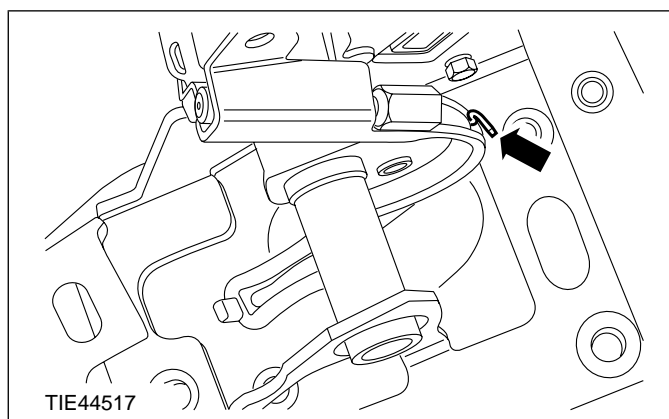
Removal Details

Item 3 Parking brake control

- NOTE:** Make a note of the position of the parking brake cable retaining tab, to aid installation.

NOTE: The parking brake cable retaining tab must be positioned away from the parking brake cable, to aid removal.

Position the parking brake cable retaining tab away from the parking brake cable.



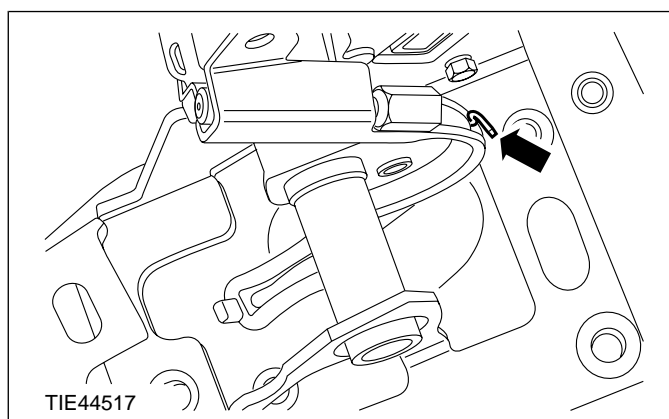
Installation Details

Item 3 Parking brake control

- CAUTION:** When repositioning the parking brake cable retaining tab, make sure that the parking brake cable retaining tab does not clamp the parking brake cable.

NOTE: Make sure that the parking brake cable is correctly located in the parking brake control.

Reposition the parking brake cable retaining tab.



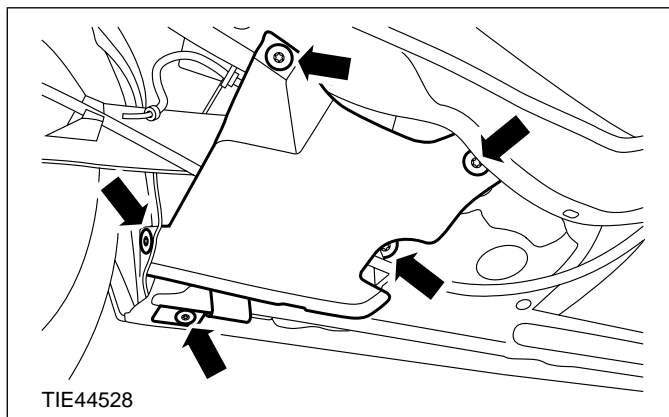
REMOVAL AND INSTALLATION

Parking Brake Cable — Vehicles With: Rear Disc Brakes

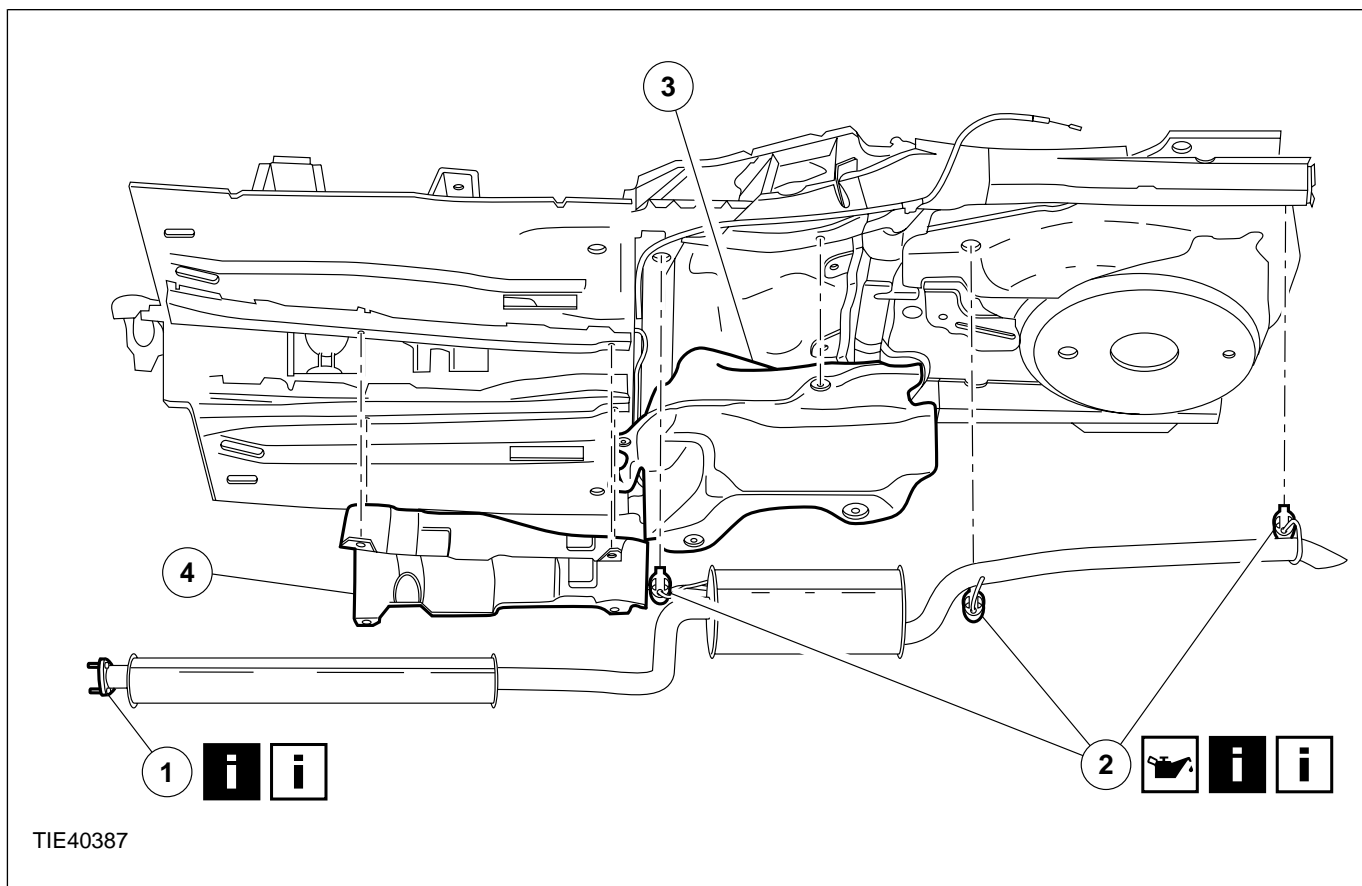
Materials	
Name	Specification
Lubricant	ESE-M99B144-B

1. Release the parking brake.
2. Raise and support the vehicle. For additional information, refer to Section 100-02 [Jacking and Lifting].

3. Remove the air deflector on both sides.



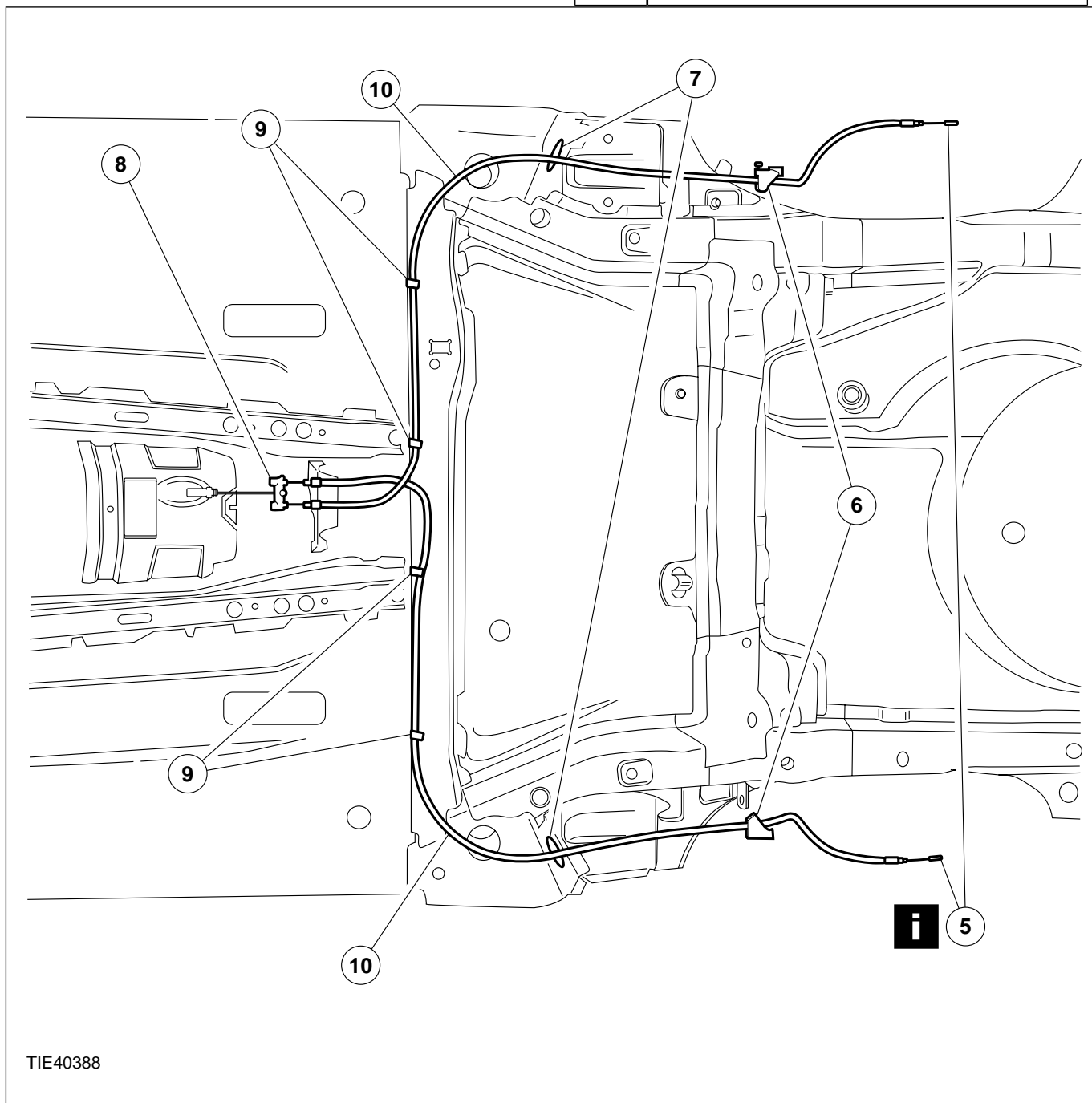
4. Remove the components in the order indicated in the following illustration(s) and table(s).



REMOVAL AND INSTALLATION

Item	Description
1	Exhaust muffler and tailpipe assembly See Removal Detail See Installation Detail
2	Exhaust hanger insulators

Item	Description
	See Removal Detail See Installation Detail
3	Exhaust system heat shield center section
4	Exhaust system heat shield front section



TIE40388

Item	Description
5	Brake caliper parking brake levers See Removal Detail
6	Parking brake cable support clips

Item	Description
7	Parking brake cable support brackets
8	Parking brake equalizer

REMOVAL AND INSTALLATION

Item	Description
9	Parking brake cable floor panel clips
10	Parking brake cables

- To install, reverse the removal procedure.
- Adjust the parking brake cable.

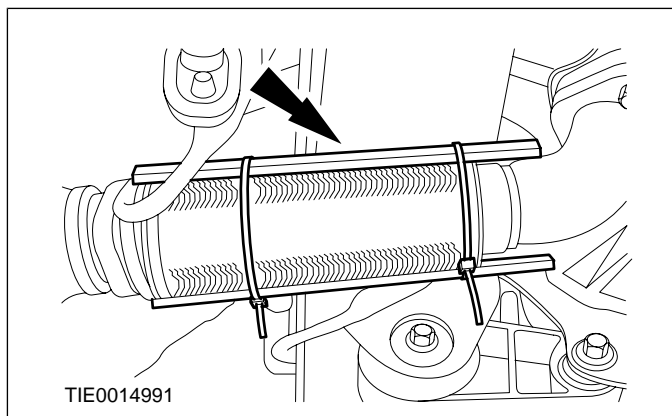
For additional information, refer to **Parking Brake Cable Adjustment** - in this section.

Removal Details

Item 1 Exhaust muffler and tailpipe assembly

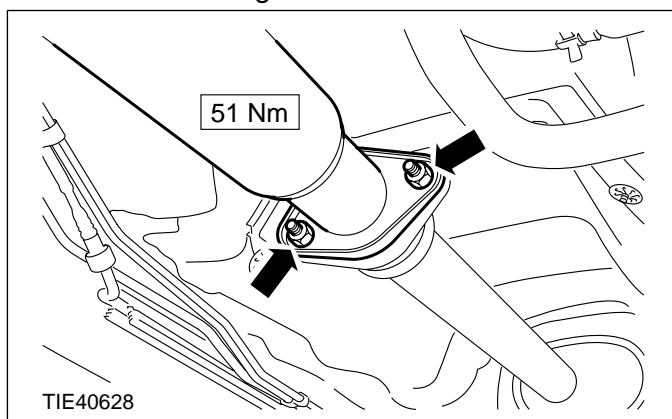
- CAUTION:** Over bending of the exhaust flexible pipe may cause damage resulting in failure.

Support the exhaust flexible pipe with a suitable support wrap or suitable splint.



- Detach the exhaust muffler and tailpipe assembly from the exhaust flexible pipe.

- Discard the gasket and nuts.



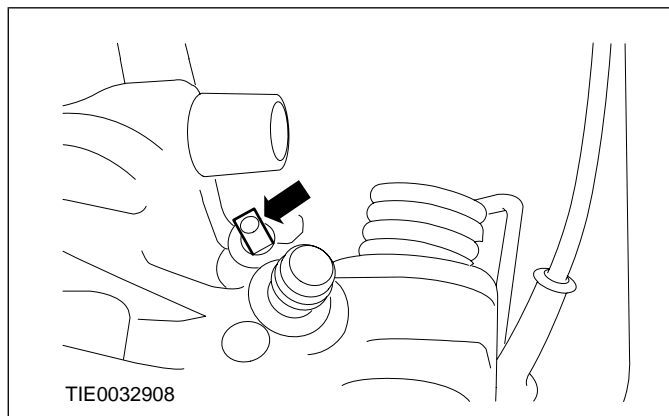
Item 2 Exhaust hanger insulators

NOTE: Support the exhaust muffler and tailpipe assembly.

Item 5 Brake caliper parking brake levers

- NOTE:** The left-hand parking brake cable has a black sleeve and the right-hand parking brake cable has a white sleeve. Note the colour of the sleeves to aid installation.

Detach the parking brake cable from the brake caliper parking brake lever on both sides.



Item 8 Parking brake equalizer

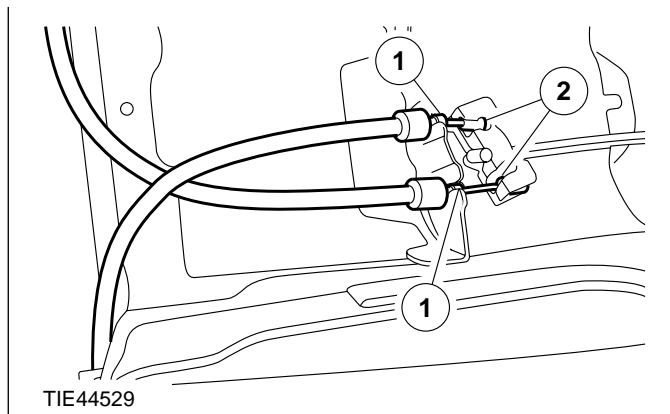
- NOTE:** The left-hand parking brake cable has a black sleeve and the right-hand parking brake cable has a white sleeve. Note the colour of the sleeves to aid installation.

Detach the parking brake cables from the parking brake equalizer.

- Detach the parking brake cables from the bracket.

REMOVAL AND INSTALLATION

2. Detach the parking brake cables from the equalizer.

**Installation Details****Item 1 Exhaust muffler and tailpipe assembly**

NOTE: Install a new exhaust flexible pipe gasket and nuts.

Item 2 Exhaust hanger insulators

NOTE: Check the exhaust hanger insulators for damage and fatigue. Install new exhaust hanger insulators as required, using a suitable lubricant.

SECTION 206-06 Hydraulic Brake Actuation

VEHICLE APPLICATION: 2008.75 Focus ST C307

CONTENTS	PAGE
SPECIFICATIONS	
Specifications.....	206-06-2
DIAGNOSIS AND TESTING	
Hydraulic Brake Actuation.....	206-06-3
REMOVAL AND INSTALLATION	
Brake Pedal and Bracket — RHD.....	206-06-4
Brake Master Cylinder — RHD.....	206-06-8
Brake Fluid Reservoir.....	206-06-11

SPECIFICATIONS**Lubricants, Fluids, Sealers and Adhesives**

	Specification
Brake fluid - Super DOT4	ESD-M6C57-A

Torque Specifications

Description	Nm	lb-ft	lb-in
Brake master cylinder retaining nuts	25	18	-
Brake tube to brake master cylinder unions	15	11	-
Brake pedal bracket retaining bolts	23	17	-
Strut and spring assembly top mount brace retaining bolts	32	24	-
Strut and spring assembly top mount brace retaining nuts	25	18	-



DIAGNOSIS AND TESTING

Hydraulic Brake Actuation

REFER to Section [206-00 \[Brake System - General Information\]](#).



REMOVAL AND INSTALLATION

Brake Pedal and Bracket — RHD

General Equipment

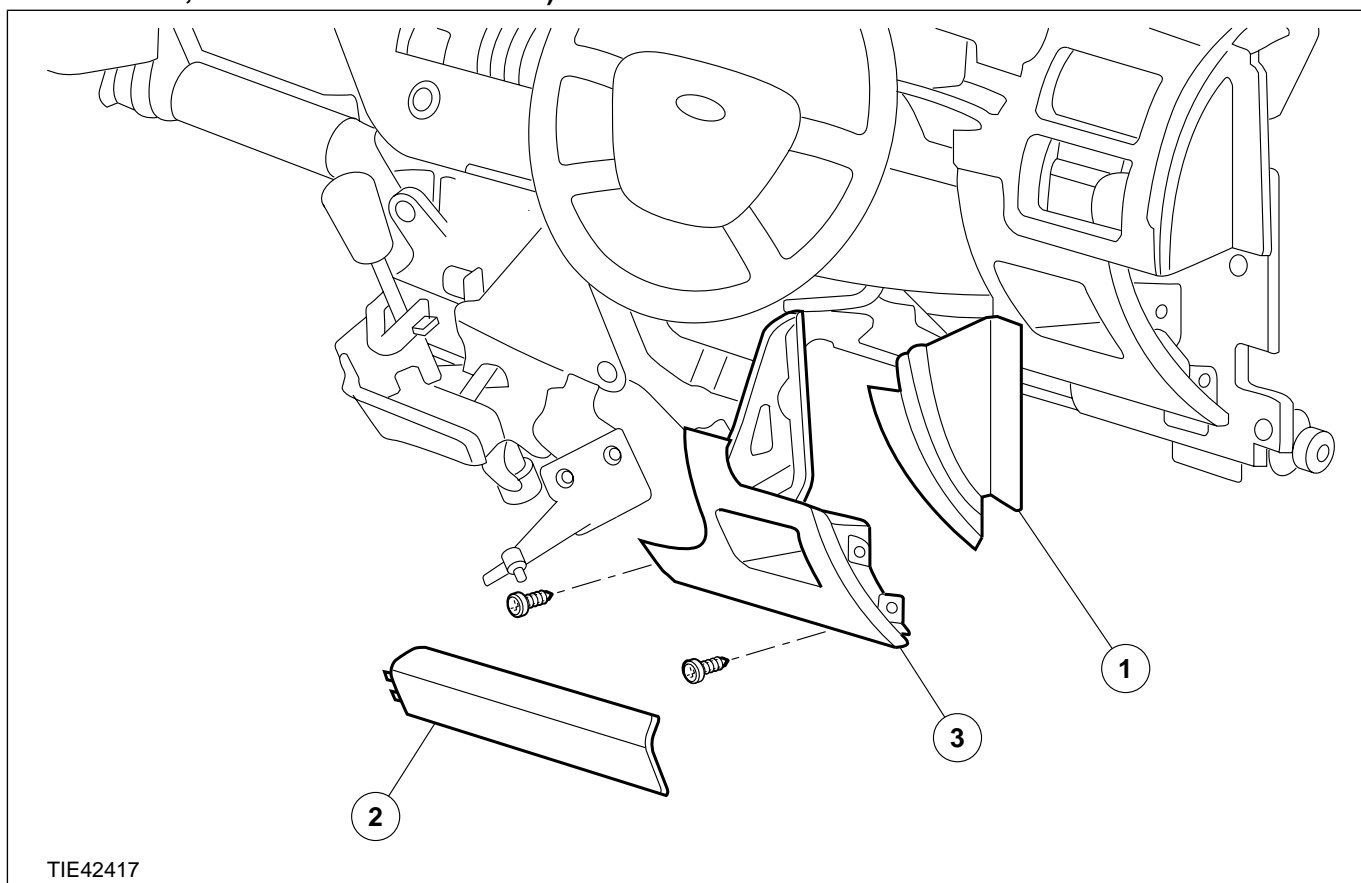
Worldwide Diagnostic System (WDS)

1. Remove the accelerator pedal.

For additional information, refer to:

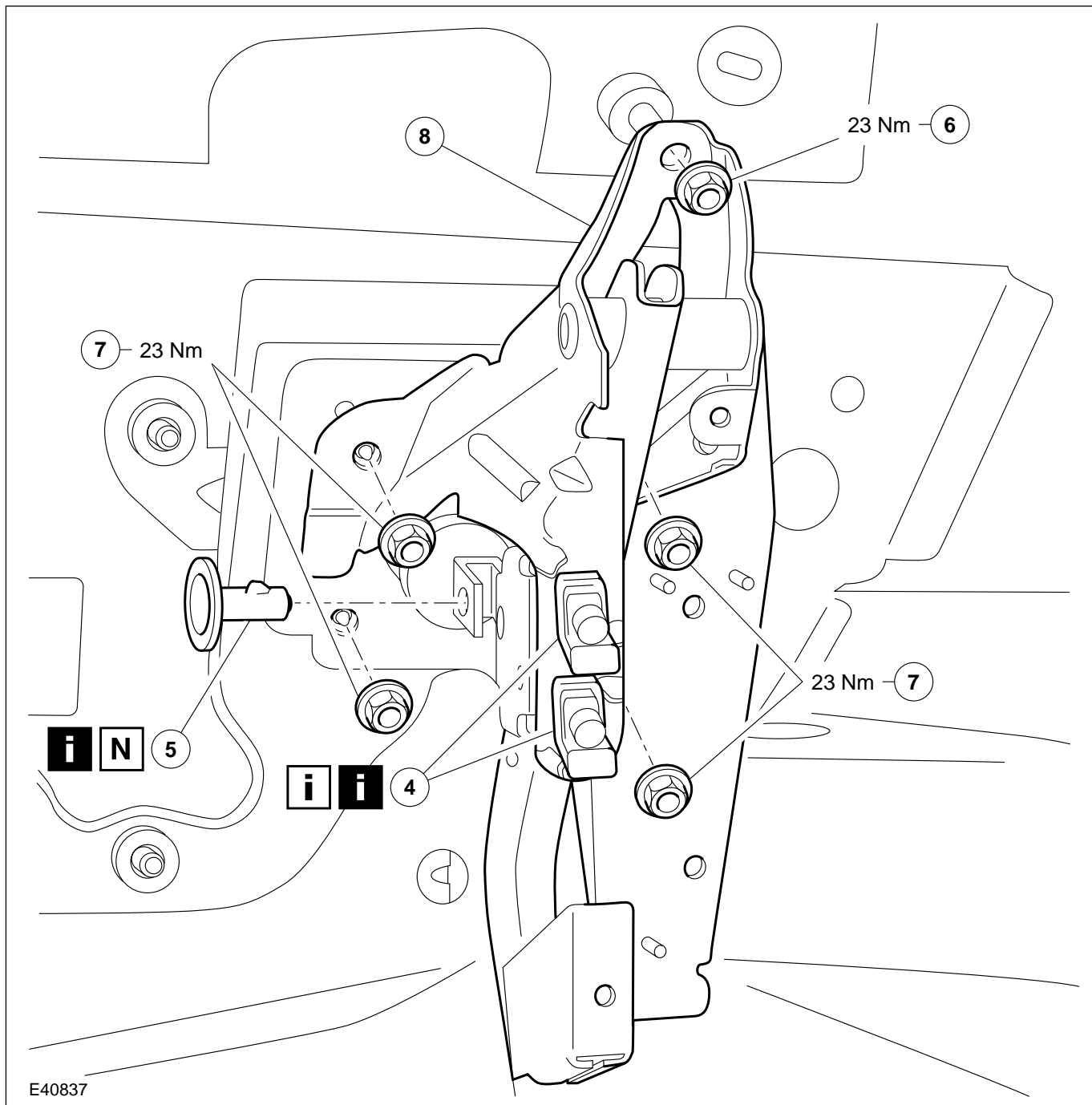
Accelerator Pedal (310-02 Acceleration Control, Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Instrument panel lower outer trim panel
2	Footwell trim panel
3	Instrument panel lower panel

REMOVAL AND INSTALLATION



E40837

Item	Description
4	Brake pedal switches <i>See Removal Detail</i> <i>See Installation Detail</i>
5	Brake booster actuating rod pin <i>See Removal Detail</i>

Item	Description
6	Brake pedal and bracket retaining nut
7	Brake booster retaining nuts
8	Brake pedal and bracket

3. To install, reverse the removal procedure.

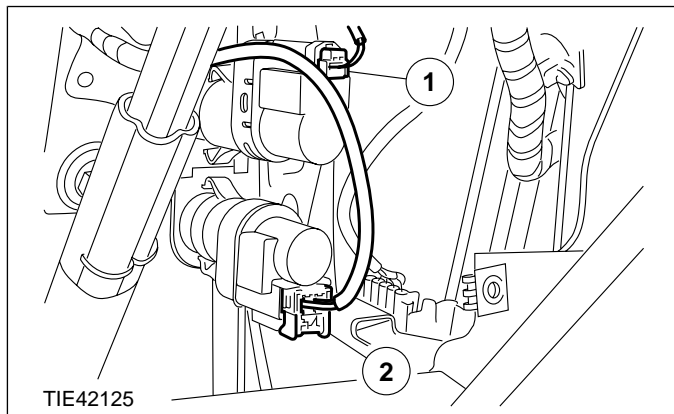
Removal Details

REMOVAL AND INSTALLATION

Item 4 Brake pedal switches

1. Disconnect the electrical connectors.

1. Brake pedal position (BPP) switch.
2. Stoplamp switch.



2. Detach the brake pedal switches wiring harness from the brake pedal bracket.

3. CAUTIONS:

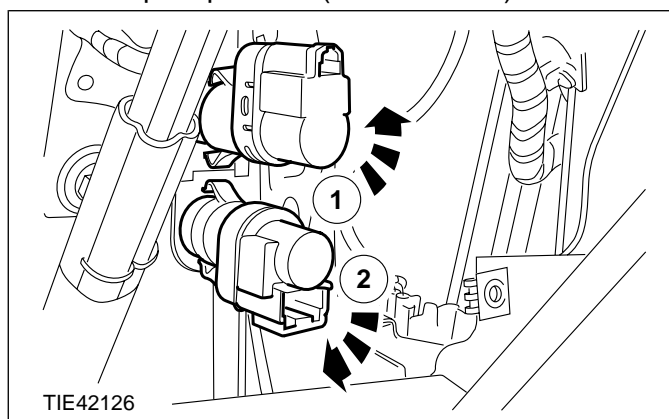
⚠ Make sure that the brake pedal is kept in the rest position and is not depressed or moved during the removal of the brake pedal switches. Failure to follow this instruction may result in damage to the switches.

⚠ When removing the brake pedal switches, the BPP switch is rotated counterclockwise and the stoplamp switch is rotated clockwise. Failure to follow this instruction may result in damage to the switches.

Remove the brake pedal switches.

1. BPP switch (colored blue and white).

2. Stoplamp switch (colored black).

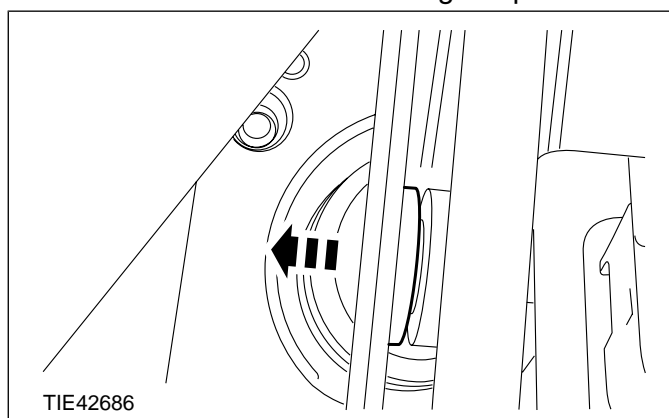


Item 5 Brake booster actuating rod pin

1. NOTE: The brake pedal actuating rod pin will be damaged during removal.

Detach the brake booster actuating rod from the brake pedal.

- Using a suitable lever, remove and discard the brake booster actuating rod pin.



Installation Details

Item 4 Brake pedal switches

1. CAUTIONS:

⚠ Make sure that the brake pedal is kept in the rest position and is not depressed or moved during installation of the brake pedal switches. Failure to follow this instruction may result in damage to the switches and engine system failures.

⚠ When installing the brake pedal switches, the BPP switch is rotated clockwise and the stoplamp switch is rotated counterclockwise.

Failure to follow this instruction will result in the switch plunger binding inside the switches.

⚠ Make sure the brake pedal switches are correctly installed.

NOTE: To prevent damage to the engine management system, the BPP switch must be installed before the stoplamp switch.

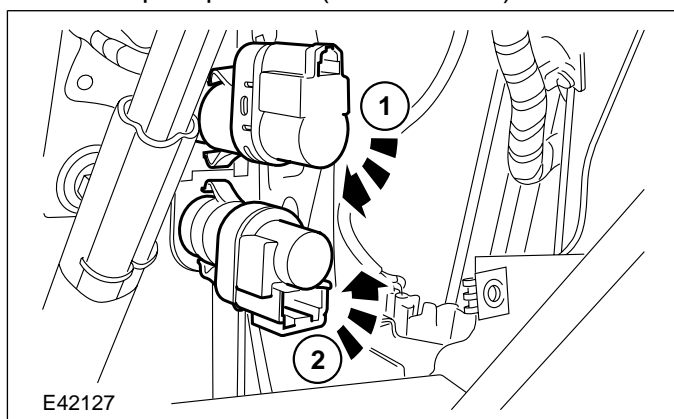
NOTE: The BPP switch and the stoplamp switch are automatically adjusted during installation.

Install the brake pedal switches.

1. BPP switch (colored blue and white).

REMOVAL AND INSTALLATION

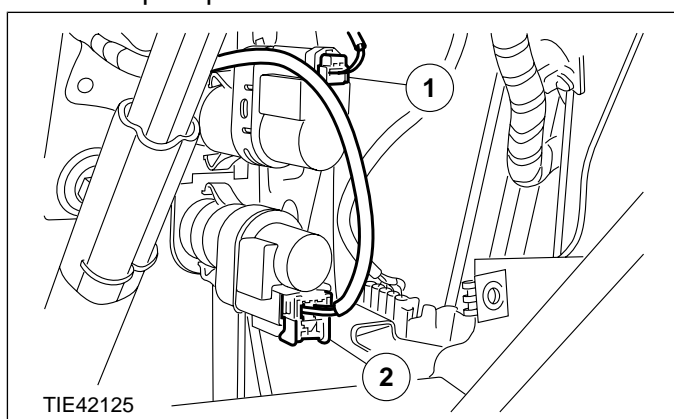
2. Stoplamp switch (colored black).



2. Attach the brake pedal switches wiring harness to the pedal bracket.

3. Connect the electrical connectors.

1. BPP switch.
2. Stoplamp switch.



4. **NOTE:** When the brake pedal switches are synchronized, the stoplamp switch status is changed before the BPP switch status.

Depress the brake pedal and check for correct synchronization of the brake pedal switches using WDS.

- If the synchronization is incorrect, remove the brake pedal switches and repeat the brake pedal switches installation.

REMOVAL AND INSTALLATION

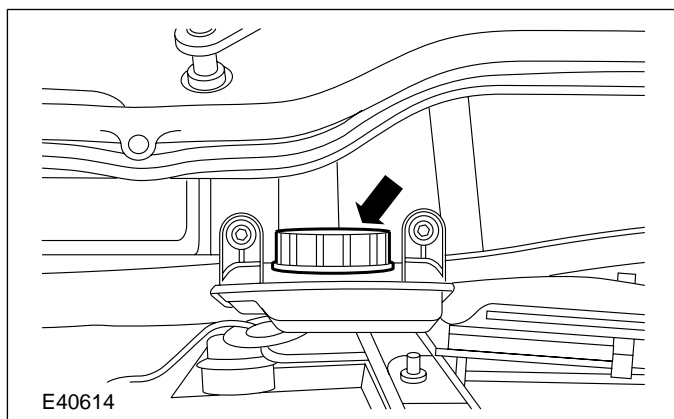
Brake Master Cylinder — RHD

Materials	
Name	Specification
Brake Fluid - Super DOT4	ESD-M6C57-A

⚠ CAUTION: If brake fluid is spilled on the paintwork, the affected area must be immediately washed down with cold water.

- ⚠ CAUTION:** The brake fluid reservoir extension cap must not become contaminated.

Remove the brake fluid reservoir extension cap.

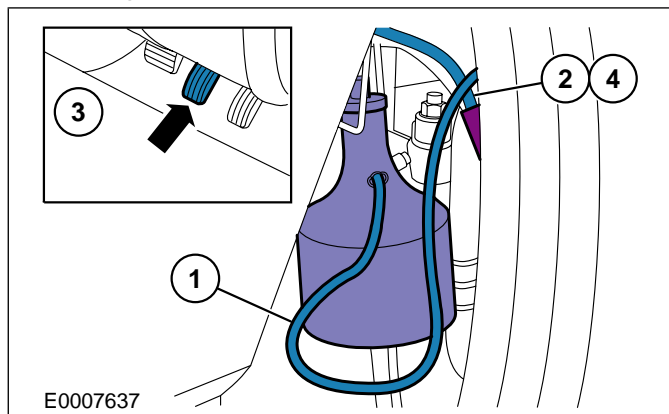


- NOTE:** It will be necessary to carry out this step on both sides in order to completely drain the brake reservoir.

Drain the brake fluid reservoir.

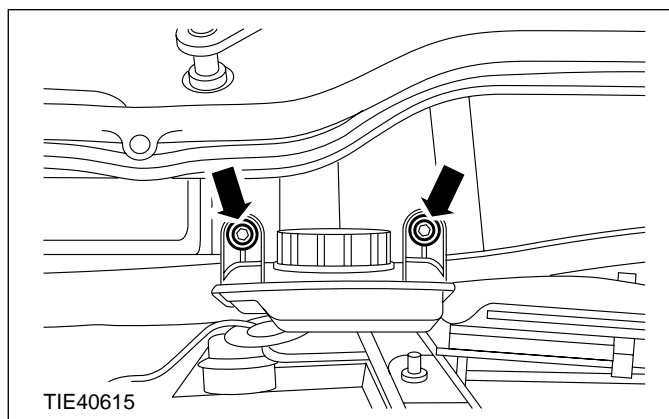
- Connect one end of a suitable piece of clear plastic pipe to the bleed nipple and place the other end into a suitable container.
- Loosen the bleed nipple.

- Depress the brake pedal until all the brake fluid is drained from the brake fluid reservoir.
- Tighten the bleed nipple.



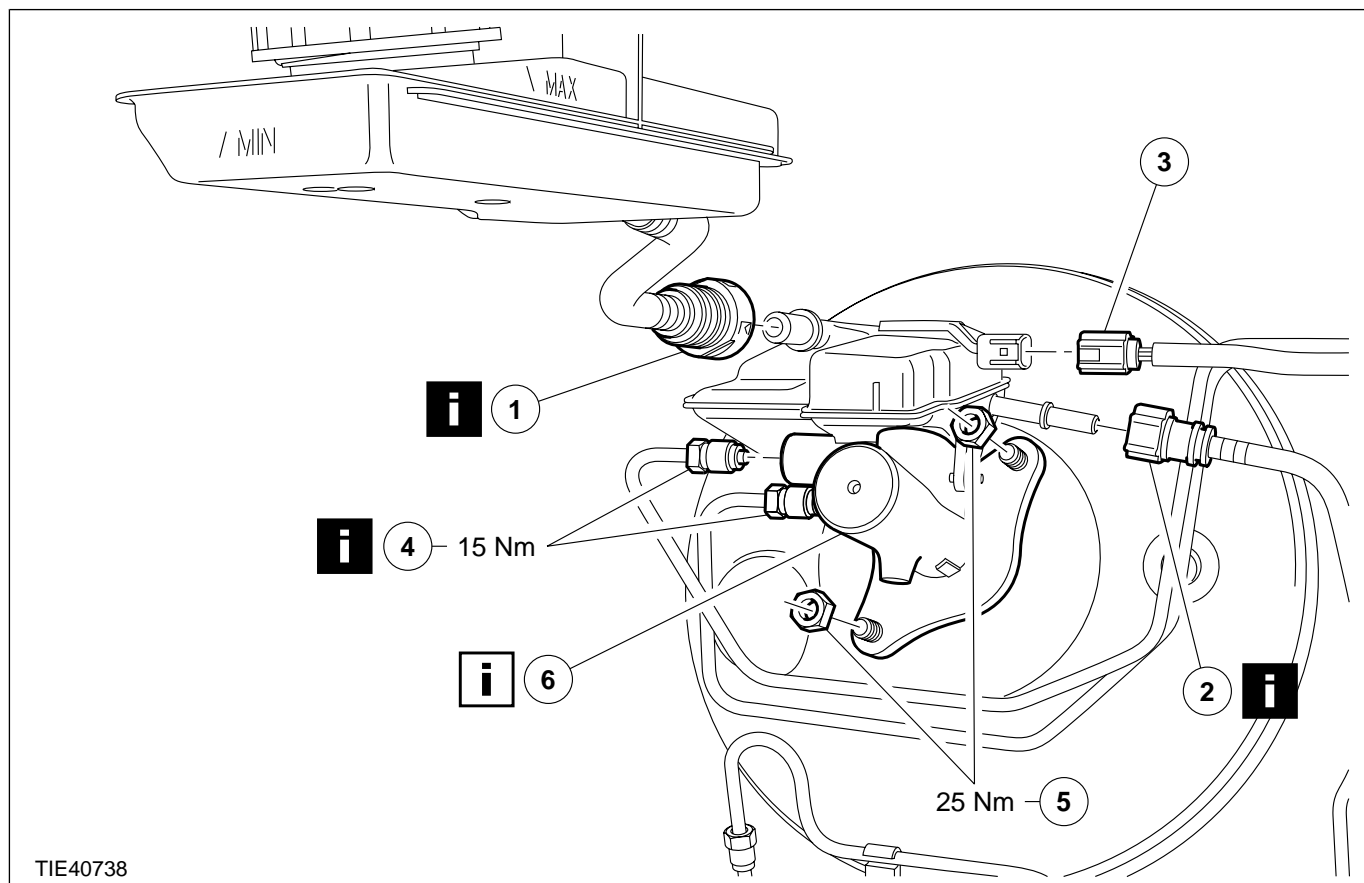
- Install the brake fluid reservoir extension cap.

- Detach the brake fluid reservoir extension from the bulkhead extension panel.



- Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



TIE40738

Item	Description
1	Brake fluid reservoir extension <i>See Removal Detail</i>
2	Clutch master cylinder supply line <i>See Removal Detail</i>
3	Low brake fluid warning indicator switch electrical connector
4	Brake tubes <i>See Removal Detail</i>

Item	Description
5	Brake master cylinder retaining nuts
6	Brake master cylinder <i>See Installation Detail</i>

6. To install, reverse the removal procedure.

7. Bleed the brake system.

For additional information, refer to: **Brake System Bleeding (206-00 Brake System - General Information, General Procedures) / Brake System Pressure Bleeding (206-00 Brake System - General Information, General Procedures).**

Removal Details

Item 1 Brake fluid reservoir extension

⚠ CAUTION: Cap the brake fluid reservoir connections to prevent fluid loss or dirt ingress.

Item 2 Clutch master cylinder supply line

1. **⚠ CAUTION:** Cap the clutch master cylinder supply line to prevent fluid loss or dirt ingress.

Disconnect the clutch master cylinder supply line from the brake fluid main reservoir.


REMOVAL AND INSTALLATION**Item 4 Brake tubes**

1.  **CAUTION:** Cap the brake tubes to prevent

fluid loss or dirt ingress.

Disconnect the brake tubes from the brake master cylinder.

Installation Details**Item 6 Brake master cylinder**

-  **CAUTION:** Make sure the brake master cylinder vacuum seal is correctly positioned before installation.

REMOVAL AND INSTALLATION

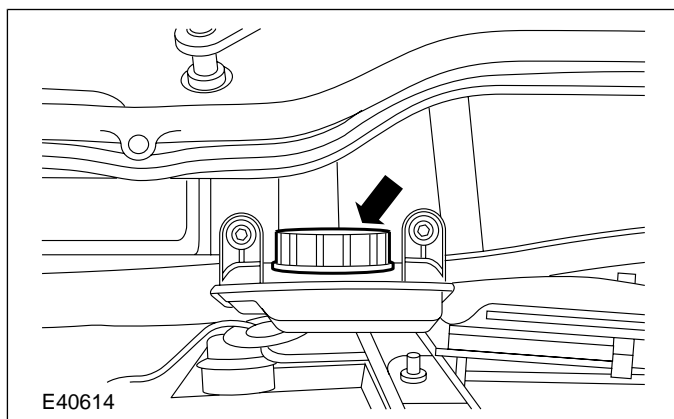
Brake Fluid Reservoir

Materials	
Name	Specification
Brake Fluid - Super DOT4	ESD-M6C57-A

⚠ CAUTION: If brake fluid is spilled on the paintwork, the affected area must be immediately washed down with cold water.

- ⚠ CAUTION:** The brake fluid reservoir extension cap must not become contaminated.

Remove the brake fluid reservoir extension cap.

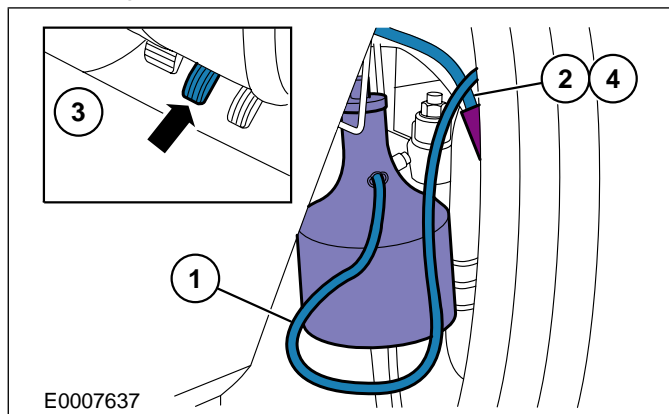


- NOTE:** It will be necessary to carry out this step on both sides in order to completely drain the brake fluid reservoir.

Drain the brake fluid reservoir.

- Connect one end of a suitable piece of clear plastic pipe to the bleed nipple and place the other end into a suitable container.
- Loosen the bleed nipple.

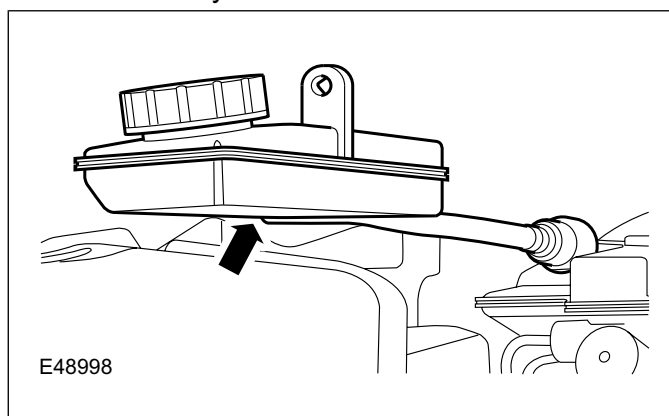
- Depress the brake pedal until all the brake fluid is drained from the brake fluid reservoir.
- Tighten the bleed nipple.



- Install the brake fluid reservoir extension cap.

- Remove the brake fluid reservoir extension.

- Disconnect the feed hose coupling from the master cylinder.



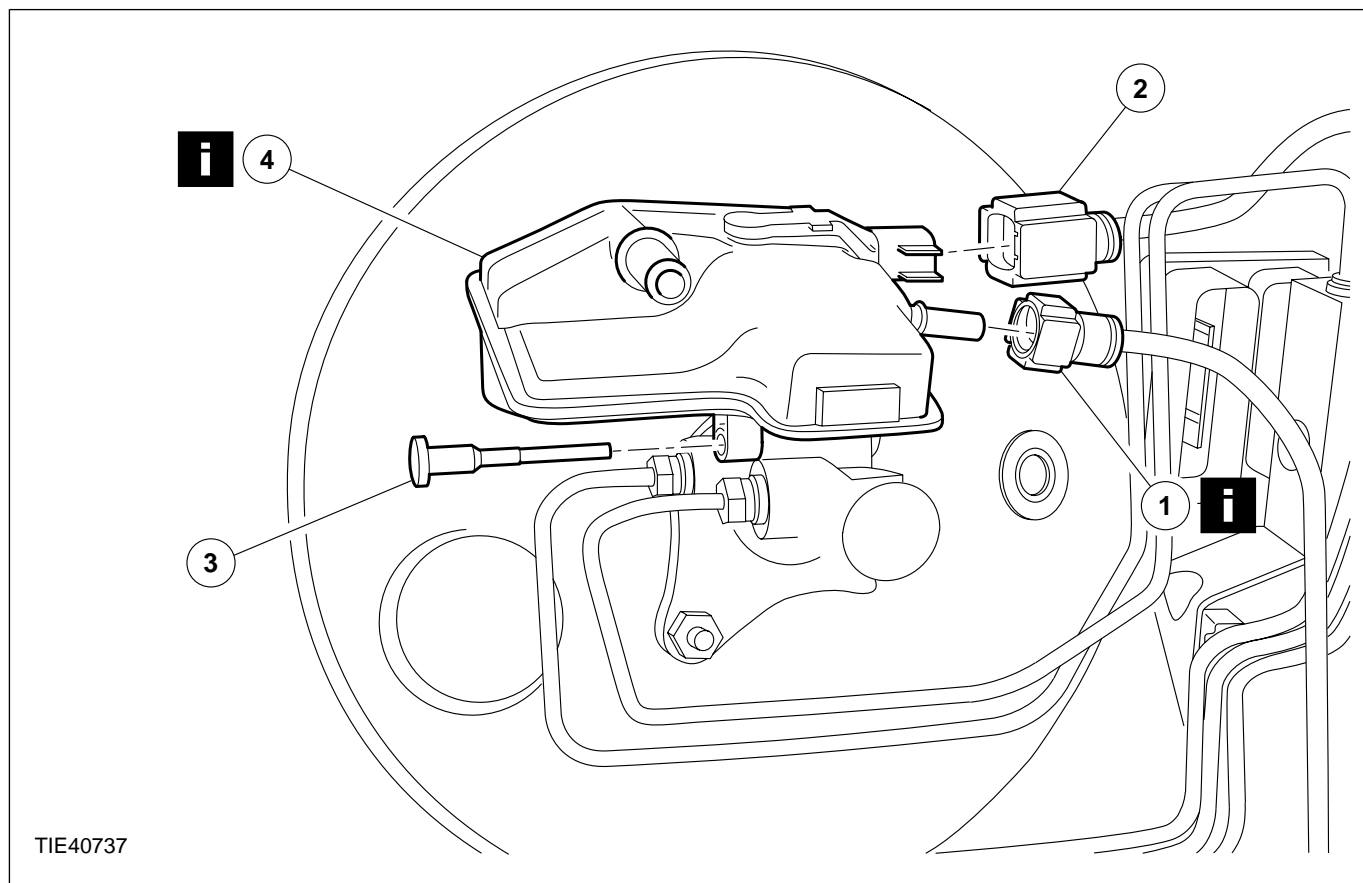
- Remove the components in the order indicated in the following illustration(s) and table(s).

206-06-12

Hydraulic Brake Actuation

206-06-12

REMOVAL AND INSTALLATION



TIE40737

Item	Description
1	Clutch master cylinder supply line <i>See Removal Detail</i>
2	Low brake fluid warning indicator switch electrical connector
3	Brake fluid main reservoir retaining pin
4	Brake fluid main reservoir <i>See Removal Detail</i>

6. To install, reverse the removal procedure.

7. Bleed the brake system.

For additional information, refer to: **Brake System Bleeding (206-00 Brake System - General Information, General Procedures)** / **Brake System Pressure Bleeding (206-00 Brake System - General Information, General Procedures)**.

Removal Details

Item 1 Clutch master cylinder supply line

1. **CAUTION:** Cap the clutch master cylinder supply line to prevent fluid loss or dirt ingress.

Disconnect the clutch master cylinder supply line from the brake fluid main reservoir.

Item 4 Brake fluid main reservoir

1. **CAUTION:** Cap the brake fluid reservoir hose connections to prevent fluid loss or dirt ingress.



SECTION 206-07 Power Brake Actuation

VEHICLE APPLICATION: 2008.75 Focus ST C307

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REMOVAL AND INSTALLATION	
Brake Booster — RHD.....	206-07-4



SPECIFICATIONS**Lubricants, Fluids, Sealers and Adhesives**

	Specification
Brake fluid - Super DOT4	ESD-M6C57-A

Torque Specifications

Description	Nm	lb-ft	lb-in
Brake master cylinder to brake booster retaining nuts	25	18	-
Brake booster retaining nuts	23	17	-
Brake tubes to hydraulic control unit (HCU) unions	18	13	-
Brake vacuum pump retaining bolts - Vehicles with 1.6L diesel engine	18	13	-
Brake vacuum pump retaining bolts - Vehicles with 2.0L diesel engine	22	16	-
Brake vacuum pump retaining nut - Vehicles with 2.0L diesel engine	22	16	-
Strut and spring assembly top mount brace retaining bolts	32	24	-
Strut and spring assembly top mount brace retaining nuts	25	18	-
Exhaust gas recirculation (EGR) valve tube support bracket retaining bolt	10	7	-
Fuel filter line bracket retaining nut	10	7	-
Fuel filter shield retaining bolts	6	-	53
Refrigerant line connectors	9	-	80



DIAGNOSIS AND TESTING

Power Brake System

REFER to Section [206-00 \[Brake System - General Information\]](#).



REMOVAL AND INSTALLATION

Brake Booster — RHD

General Equipment

Worldwide Diagnostic System (WDS)	
Materials	
Name	Specification
Refrigerant Oil	WSH-M1C231-B

⚠ CAUTION: If brake fluid is spilt on the paintwork, the affected area must be immediately washed down with cold water.

All vehicles

1. Remove the brake master cylinder.

For additional information, refer to: **Brake Master Cylinder - RHD (206-06 Hydraulic Brake Actuation, Removal and Installation)**.

Vehicles with air conditioning

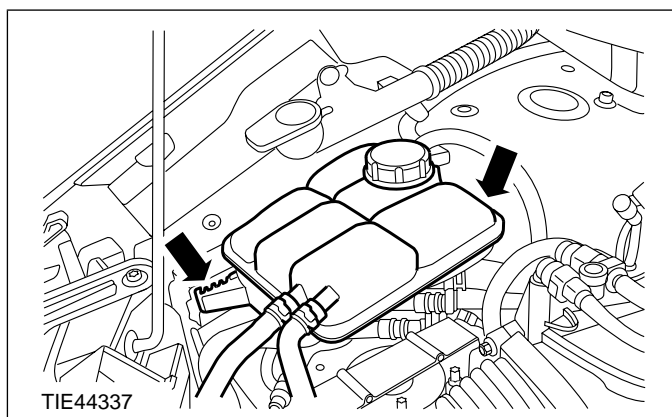
2. Evacuate the air conditioning system.

For additional information, refer to: **Air Conditioning (A/C) System Recovery, Evacuation and Charging (412-00 Climate Control System - General Information, General Procedures)**.

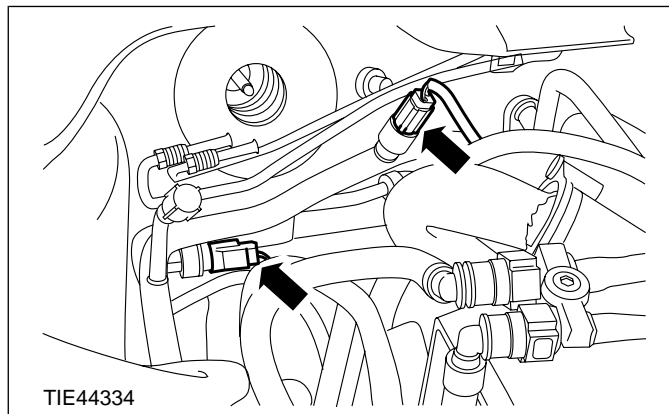
3. Remove the right-hand headlamp assembly.

For additional information, refer to: **Headlamp Assembly (417-01 Exterior Lighting, Removal and Installation)**.

4. Detach the coolant expansion tank from the wheelhouse assembly and position it to one side.



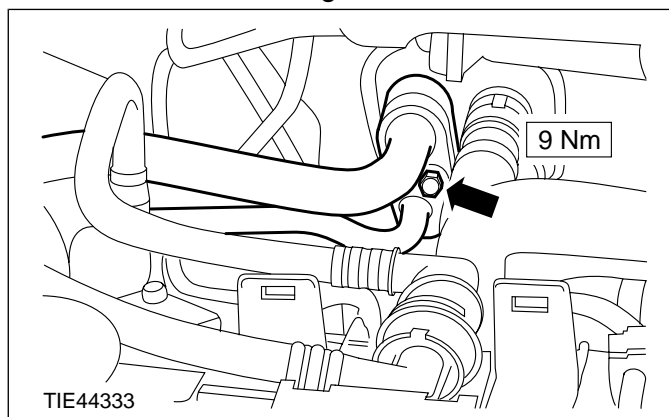
5. Disconnect the high-pressure cut-off switch and low-pressure cut-off switch electrical connectors.



6. **⚠ CAUTION:** Cap the refrigerant line connections to prevent fluid loss or dirt ingress.

Disconnect the refrigerant lines at the evaporator.

- Discard the O-rings.

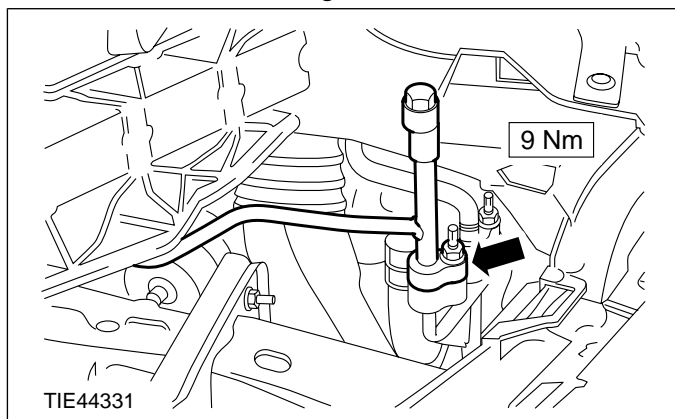


7. **⚠ CAUTION:** Cap the refrigerant line connections to prevent fluid loss or dirt ingress.

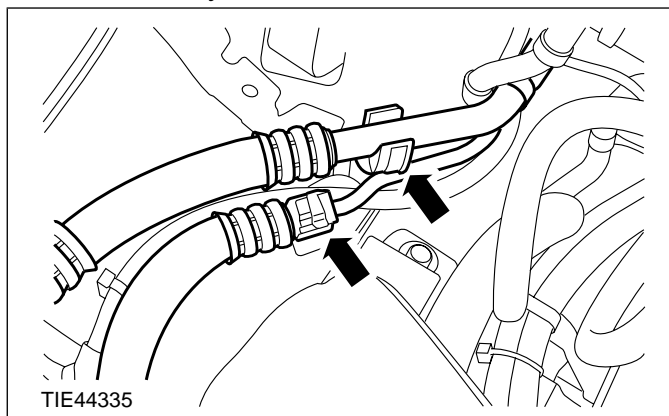
Disconnect the refrigerant line at the condenser.

REMOVAL AND INSTALLATION

- Discard the O-ring.



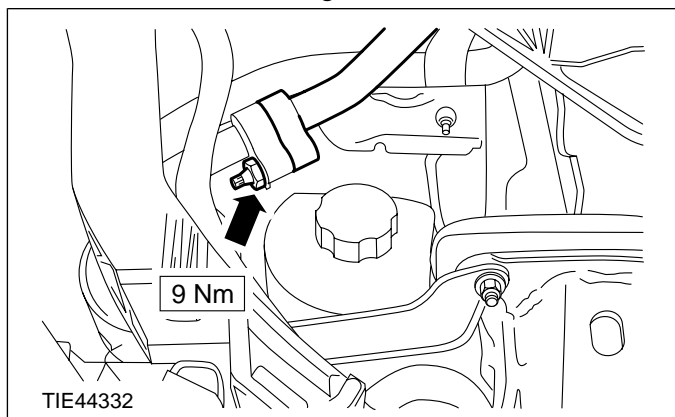
- Detach the lines from the wheelhouse assembly.



8. **⚠ CAUTION:** Cap the refrigerant line connections to prevent fluid loss or dirt ingress.

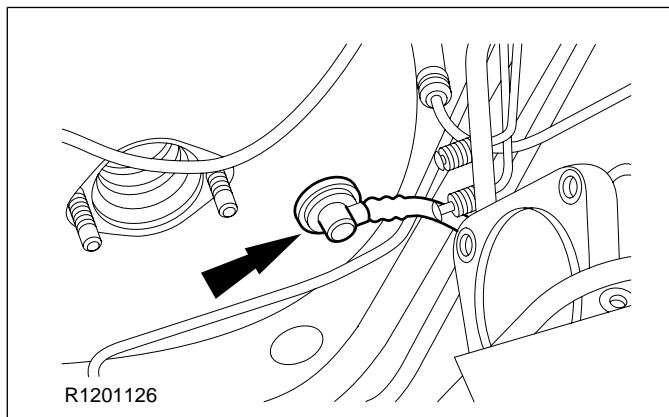
Disconnect the refrigerant line at the accumulator.

- Discard the O-ring.



All vehicles

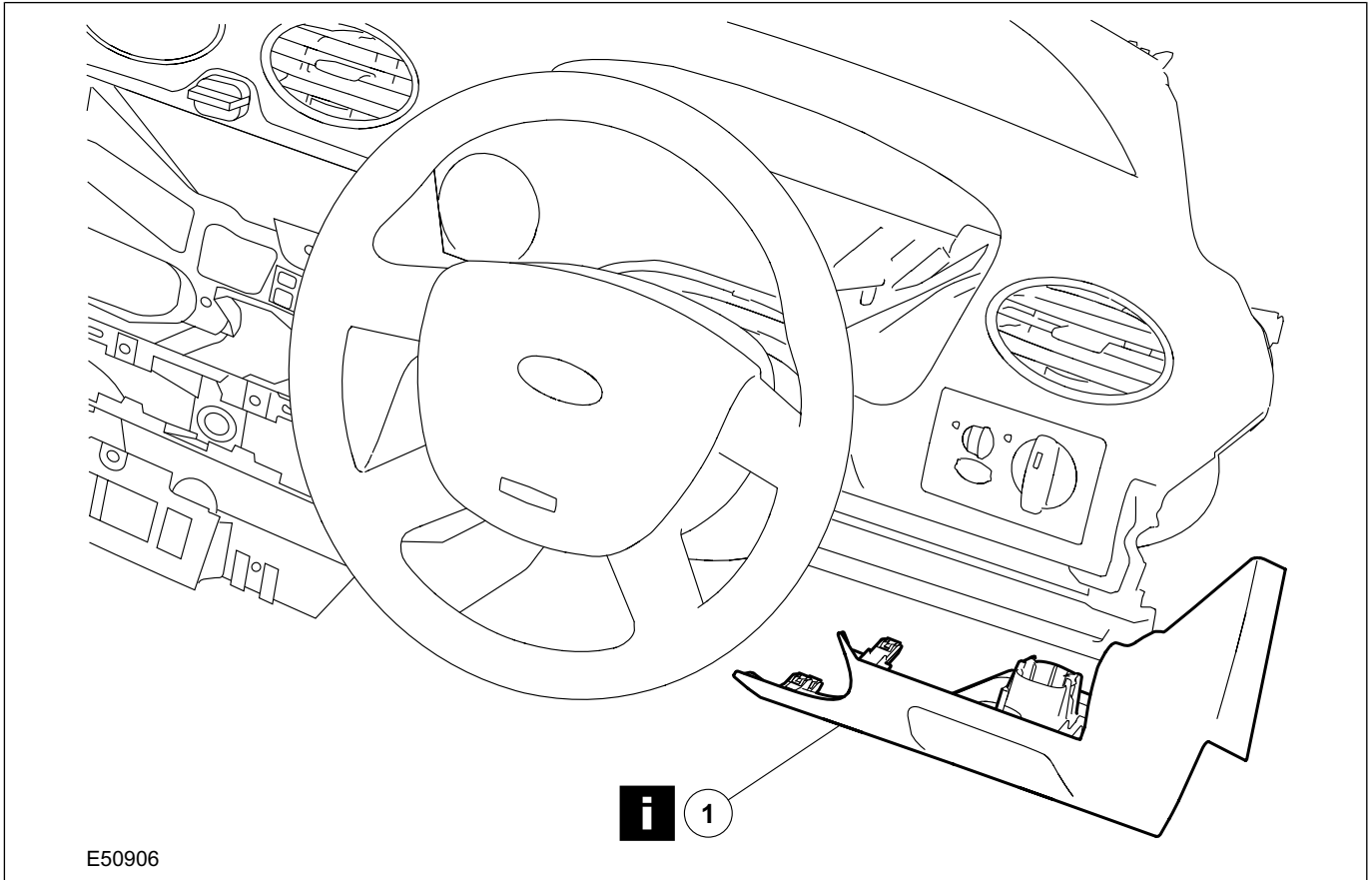
10. Disconnect the brake vacuum pipe from the brake booster.



9. Remove the refrigerant lines.

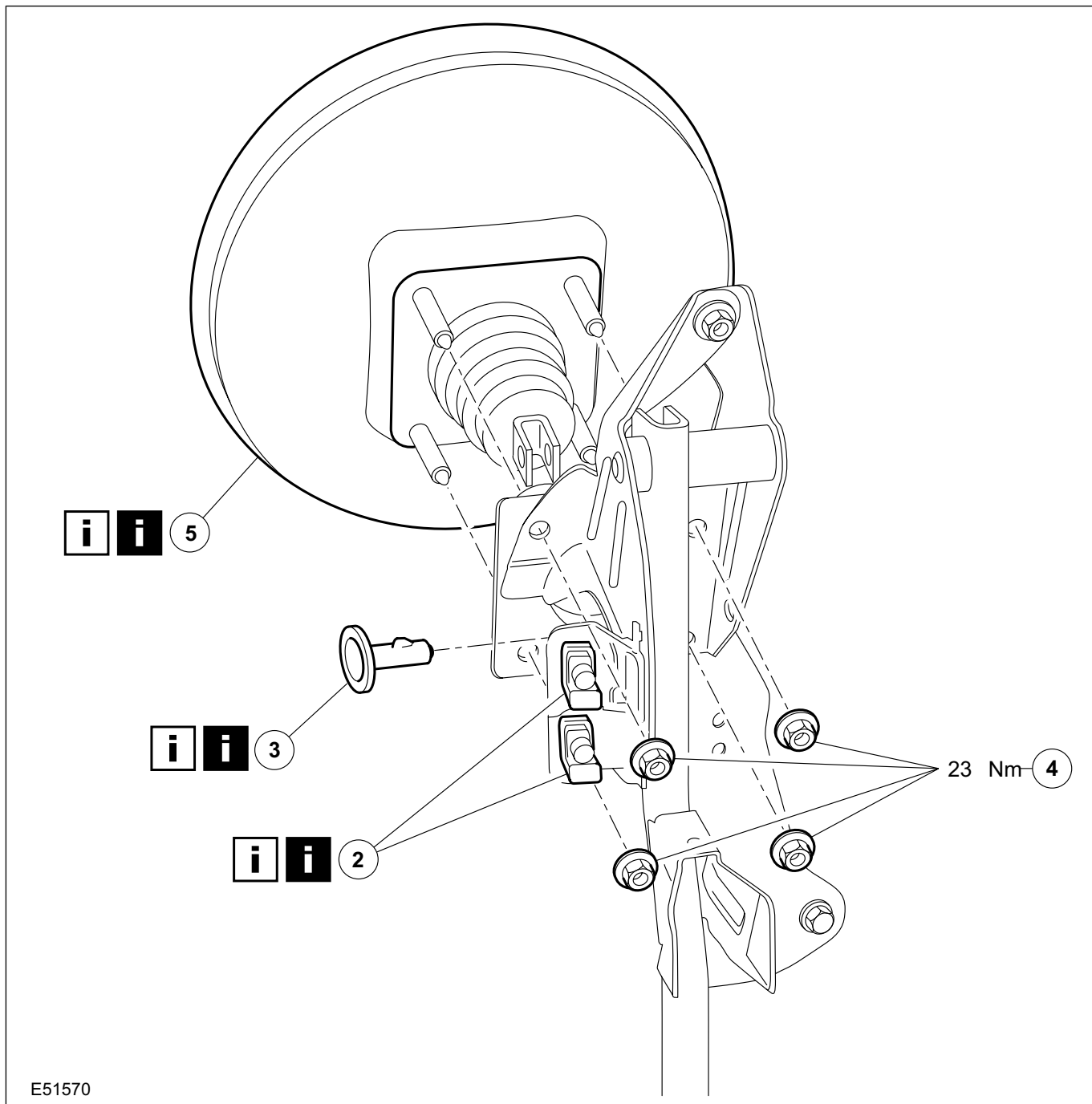
11. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



Item	Description
1	Instrument panel lower outer trim panel <i>See Removal Detail</i>

REMOVAL AND INSTALLATION



E51570

Item	Description
2	Brake pedal switches See Removal Detail See Installation Detail
3	Brake booster actuating rod pin See Removal Detail See Installation Detail
4	Brake booster retaining nuts
5	Brake booster See Removal Detail See Installation Detail

All vehicles

12. To install, reverse the removal procedure.

Vehicles with air conditioning

13. NOTE: Coat the O-rings for the refrigerant lines with refrigerant oil prior to installation.**Install new O-rings on the refrigerant lines.**

REMOVAL AND INSTALLATION

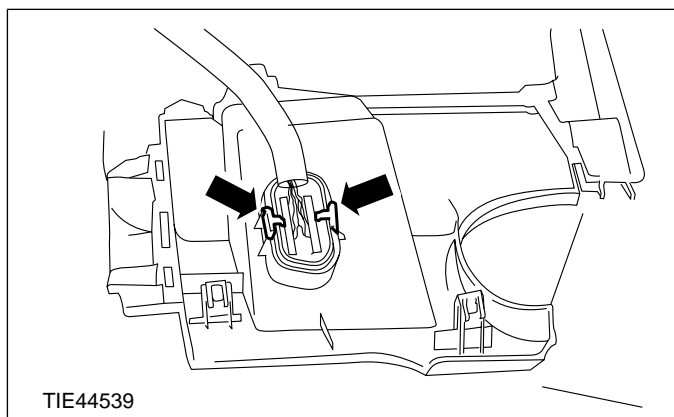
All vehicles

14. Bleed the brake system. For additional information, refer to: **(206-00 Brake System - General Information)**

Removal Details

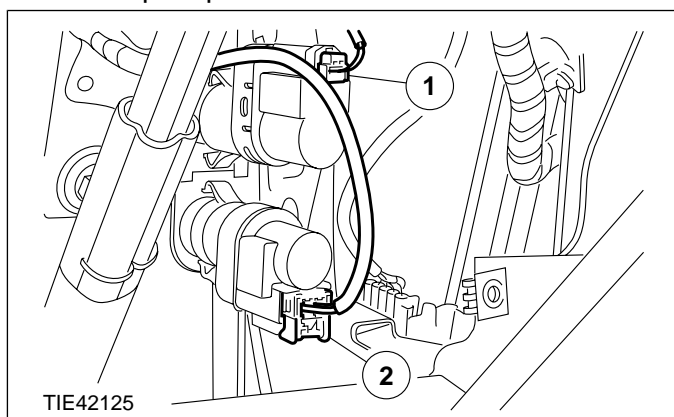
Item 1 Instrument panel lower outer trim panel

1. Detach the diagnostic link connector (DLC) from the instrument panel lower trim panel.

**Item 2** Brake pedal switches

1. Disconnect the electrical connectors.

1. Brake pedal position (BPP) switch.
2. Stoplamp switch.



2. Detach the brake pedal switches wiring harness from the brake pedal bracket.

3. CAUTIONS:

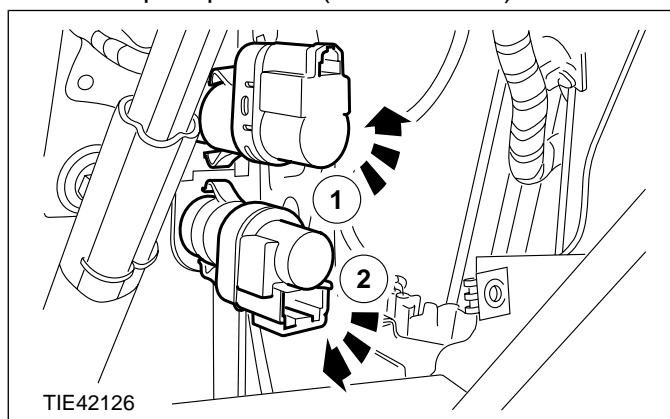
⚠ Make sure that the brake pedal is kept in the rest position and is not depressed or moved during the removal of the brake pedal switches. Failure to follow this instruction may result in damage to the switches.

**Brake System Bleeding (General Procedures),
Brake System Pressure Bleeding (General Procedures).**

⚠ When removing the brake pedal switches, the BPP switch is rotated counterclockwise and the stoplamp switch is rotated clockwise. Failure to follow this instruction may result in damage to the switches.

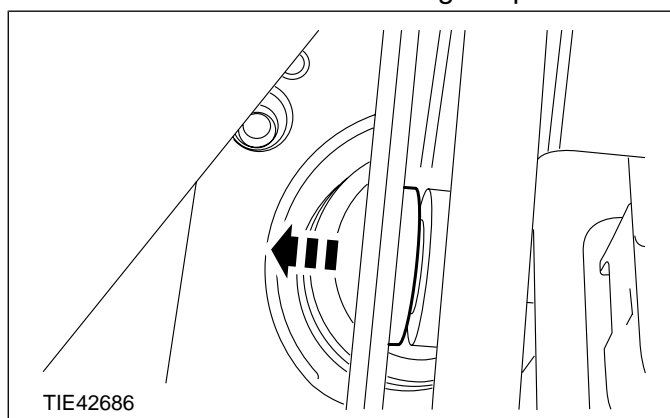
Remove the brake pedal switches.

1. BPP switch (colored blue and white).
2. Stoplamp switch (colored black).

**Item 3** Brake booster actuating rod pin

1. Detach the brake booster actuating rod from the brake pedal.

- Using a suitable lever, remove and discard the brake booster actuating rod pin.

**Item 5** Brake booster

1. Detach the brake master cylinder to hydraulic control unit (HCU) tubes from the bulkhead to aid removal.

REMOVAL AND INSTALLATION

2. Rotate the brake booster through 180 degrees to aid removal.

3. Remove the brake booster.
 - Discard the gasket.

Installation Details

Item 5 Brake booster

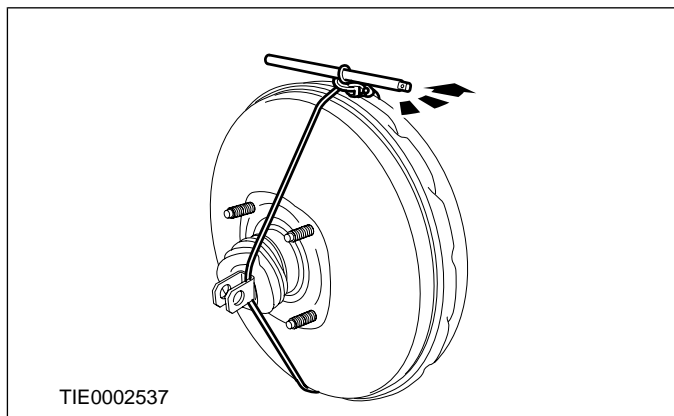
1. CAUTIONS:

⚠ Make sure that the brake booster actuating rod is correctly positioned through the bulkhead rubber boot.

⚠ Make sure that the brake booster gasket is correctly positioned on the brake booster before installation.

NOTE: Install a new brake booster gasket.

Compress the brake booster actuating rod to aid installation.



Item 3 Brake booster actuating rod pin

NOTE: Install a new brake booster actuating rod pin.

Item 2 Brake pedal switches

1. CAUTIONS:

⚠ Make sure that the brake pedal is kept in the rest position and is not depressed or moved during installation of the brake pedal switches. Failure to follow this instruction may result in damage to the switches and engine system failures.

⚠ When installing the brake pedal switches, the BPP switch is rotated clockwise and the stoplamp switch is rotated counterclockwise. Failure to follow this instruction will result in the switch plunger binding inside the switches.

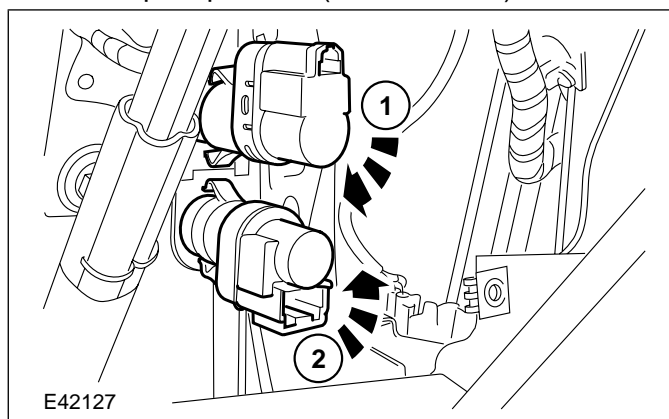
⚠ Make sure the brake pedal switches are correctly installed.

NOTE: To prevent damage to the engine management system, the BPP switch must be installed before the stoplamp switch.

NOTE: The BPP switch and the stoplamp switch are automatically adjusted during installation.

Install the brake pedal switches.

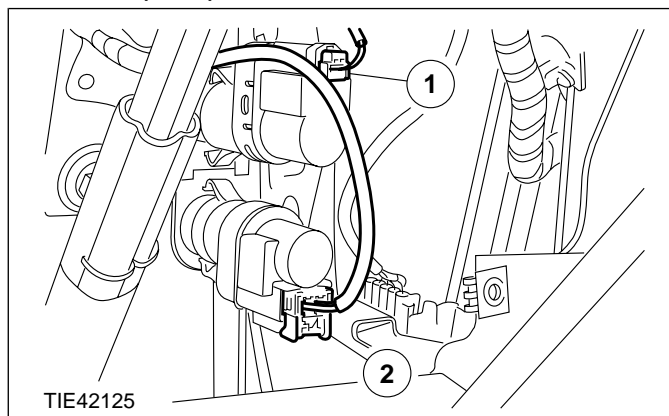
1. BPP switch (colored blue and white).
2. Stoplamp switch (colored black).



2. Attach the brake pedal switches wiring harness to the brake pedal bracket.

3. Connect the electrical connectors.

1. BPP switch.
2. Stoplamp switch.



4. **NOTE:** When the brake pedal switches are synchronized, the stoplamp switch status is changed before the BPP switch status.

REMOVAL AND INSTALLATION

Depress the brake pedal and check for correct synchronization of the brake pedal switches using WDS.

- If the synchronization is incorrect, remove the brake pedal switches and repeat the brake pedal switches installation.

SECTION 206-09A Anti-Lock Control

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Anti-Lock Control.....	206-09A-3
Inspection and Verification.....	206-09A-3
REMOVAL AND INSTALLATION	
Hydraulic Control Unit (HCU).....	206-09A-4
Rear Wheel Speed Sensor.....	206-09A-9
Anti-Lock Brake System (ABS) Module.....	206-09A-11

SPECIFICATIONS**Lubricants, Fluids, Sealers and Adhesives**

	Specifica tions
Super DOT 4 brake fluid	ESD- M6C57-A

Torque Specifications

Description	Nm	lb-ft	lb-in
Hydraulic control unit (HCU) and anti-lock brake system (ABS) module assembly to support bracket retaining bolts	9	-	80
HCU and ABS module assembly support bracket retaining bolt	9	-	80
ABS module to HCU retaining bolts	2	-	18
Brake tube to HCU unions	18	13	-
Brake tube in-line connector unions	18	13	-
Brake tube to brake master cylinder unions	15	11	-
Wheel speed sensor retaining bolts	5	-	44
Strut and spring assembly top mount brace retaining bolts	32	24	-
Strut and spring assembly top mount brace retaining nuts	25	18	-
Windshield wiper arms retaining nuts	15	11	-

DIAGNOSIS AND TESTING**Anti-Lock Control**

Refer to Wiring Diagrams Section 206-09A, for schematic and connector information.

General Equipment

Worldwide diagnostic system (WDS)

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> • Wheel speed sensor(s) • Wheel speed sensor ring(s) 	<ul style="list-style-type: none"> • Fuse(s) • Electrical connector(s) • Wiring harness(s).

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, connect the diagnostic tool to the data link connector and select the vehicle to be tested from the diagnostic tool menu.

REMOVAL AND INSTALLATION

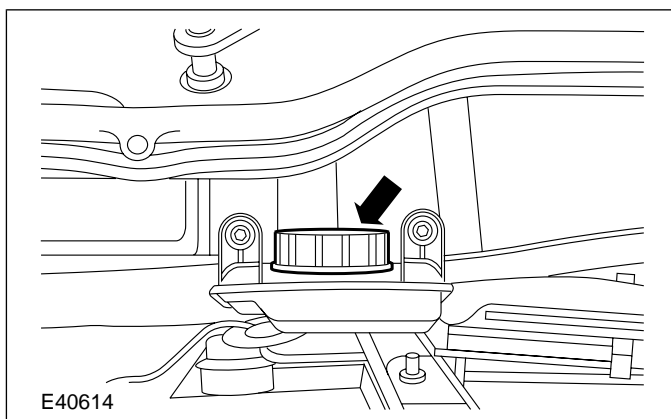
Hydraulic Control Unit (HCU)

Materials	
Name	Specification
Brake Fluid - Super DOT4	ESD-M6C57-A

⚠ CAUTION: If brake fluid is spilled on the paintwork, the affected area must be immediately washed down with cold water.

- ⚠ CAUTION:** The brake fluid reservoir cap must not become contaminated.

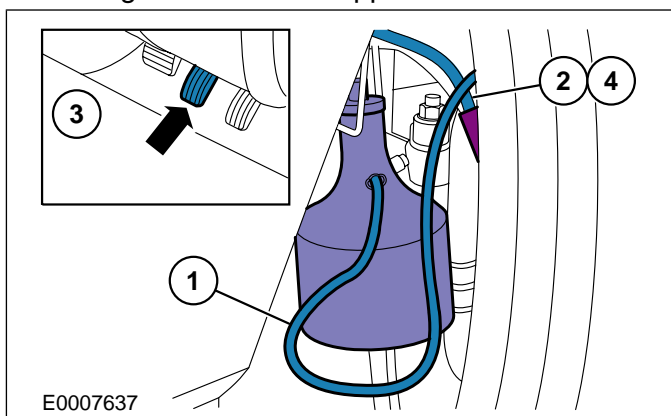
Remove the brake fluid reservoir cap.



- NOTE:** It will be necessary to carry out this step on both sides in order to completely drain the brake fluid reservoir.

Drain the brake fluid reservoir.

- Connect one end of a suitable piece of clear plastic pipe to the bleed nipple and place the other end into a suitable container.
- Loosen the bleed nipple.
- Depress the brake pedal until all the brake fluid is drained from the brake fluid reservoir.
- Tighten the bleed nipple.



- Install the brake fluid reservoir cap.

- Remove the battery tray.

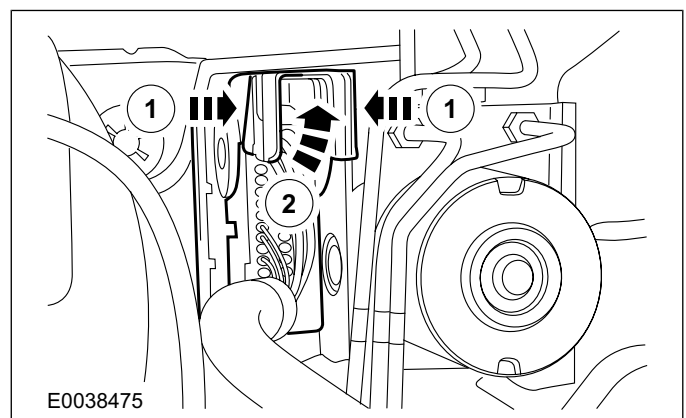
For additional information, refer to: Battery Tray - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) **(414-01 Battery, Mounting and Cables, Removal and Installation)**

/ Battery Tray - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel **(414-01 Battery, Mounting and Cables, Removal and Installation).**

- ⚠ CAUTION:** Cap the anti-lock brake system (ABS) module electrical connector and socket to prevent dirt and fluid ingress.

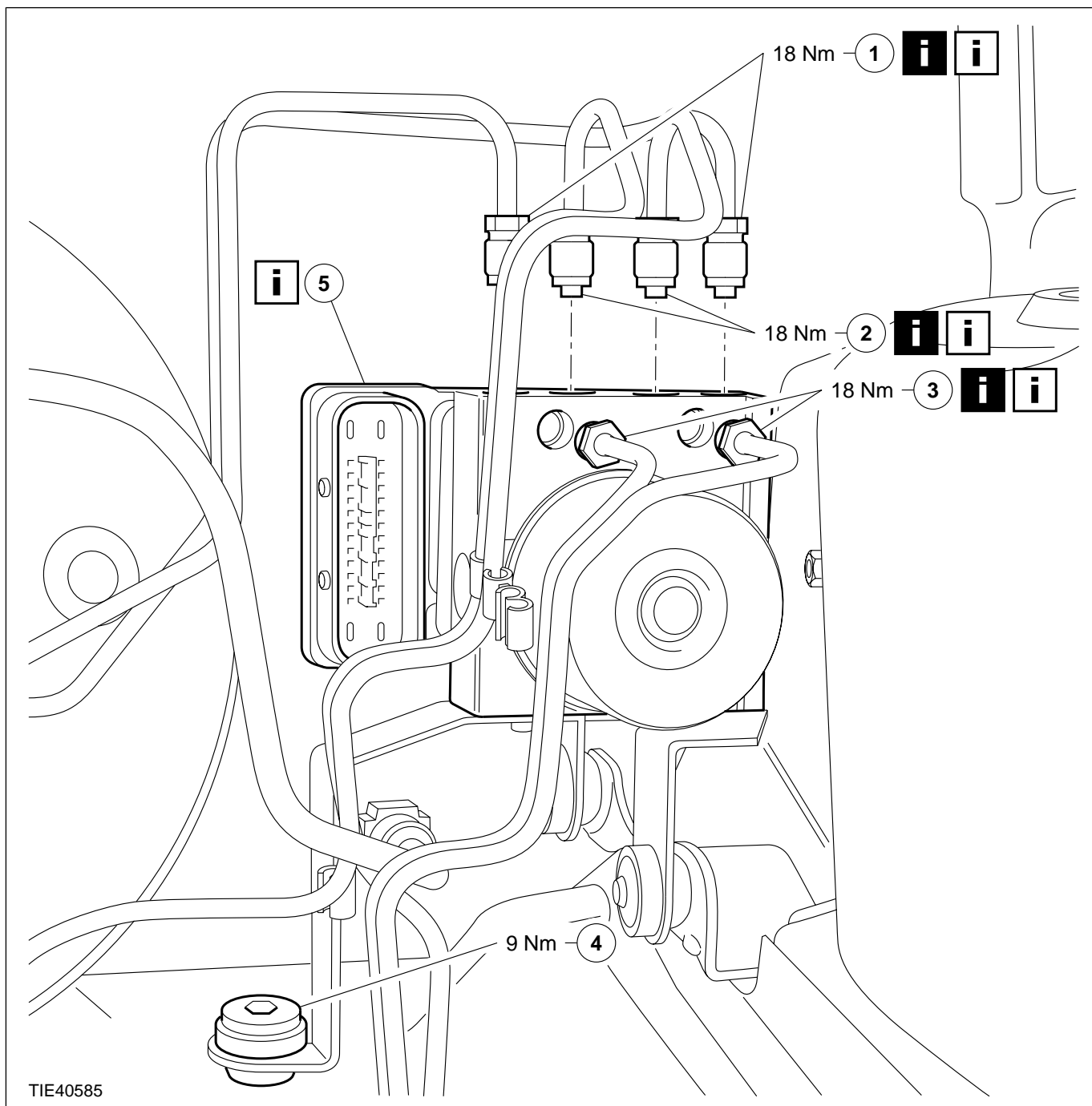
Disconnect the ABS module electrical connector.

- Depress the locking tangs.
- Release the retainer.



- Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION

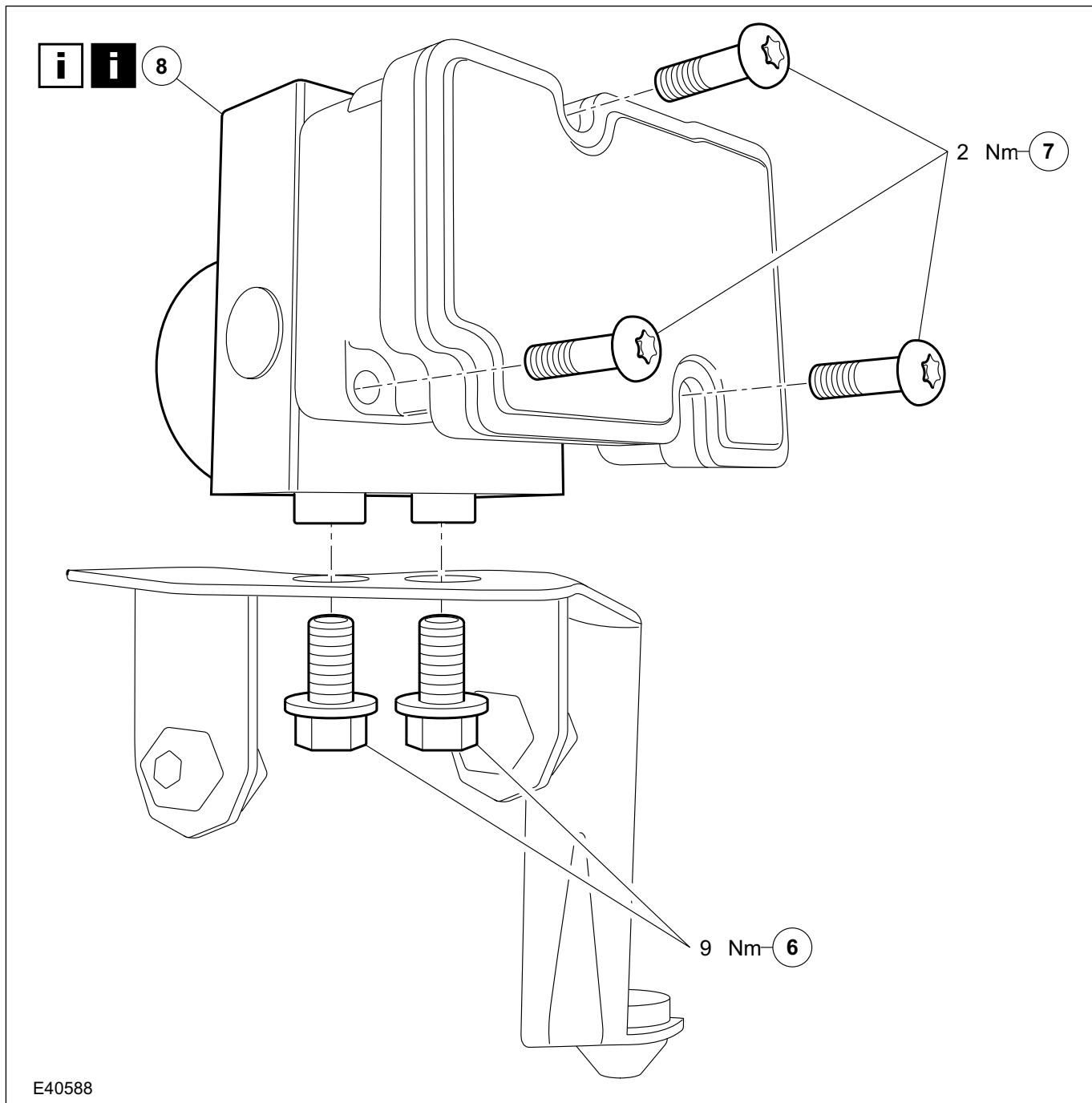


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Item	Description
1	Hydraulic control unit (HCU) to brake master cylinder brake tubes <i>See Removal Detail</i> <i>See Installation Detail</i>
2	HCU to front brake tubes <i>See Removal Detail</i> <i>See Installation Detail</i>

Item	Description
3	HCU to rear brake tubes <i>See Removal Detail</i> <i>See Installation Detail</i>
4	HCU and ABS module assembly support bracket retaining bolt
5	HCU and ABS module assembly <i>See Installation Detail</i>

REMOVAL AND INSTALLATION



E40588

Item	Description
6	HCU and ABS module assembly to support bracket retaining bolts
7	ABS module to HCU retaining bolts
8	HCU See Removal Detail See Installation Detail

7. To install, reverse the removal procedure.

8. Bleed the brake system.

For additional information, refer to: Brake System Bleeding (206-00 Brake System - General Information, General Procedures) / Brake System Pressure Bleeding (206-00 Brake System - General Information, General Procedures).

Removal Details

REMOVAL AND INSTALLATION

Item 1 Hydraulic control unit (HCU) to brake master cylinder brake tubes

1. CAUTIONS:

⚠ Cap the brake tubes to prevent fluid loss or dirt ingress.

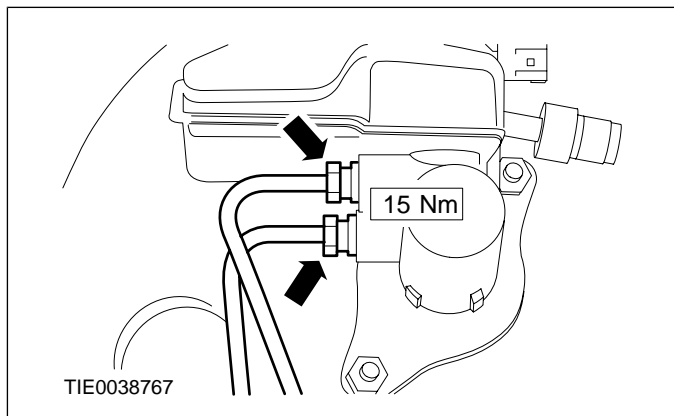
⚠ Plug the HCU ports to prevent fluid loss or dirt ingress.

NOTE: Make a note of the position of the brake tubes, to aid installation.

Disconnect the brake tubes from the HCU.

- Detach the tubes from the securing clips.

2. Remove the HCU to master cylinder brake tubes.



Item 2 HCU to front brake tubes

1. CAUTIONS:

⚠ Cap the brake tubes to prevent fluid loss or dirt ingress.

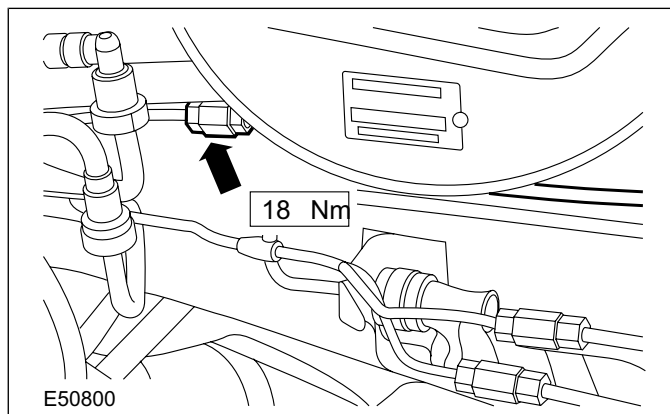
⚠ Plug the HCU ports to prevent fluid loss or dirt ingress.

NOTE: Make a note of the position of the brake tubes, to aid installation.

Disconnect the brake tubes from the HCU.

2. ⚠ CAUTION: Cap the brake tubes to prevent fluid loss or dirt ingress.

Remove the HCU to right-hand front caliper brake tube.



Item 3 HCU to rear brake tubes

1. CAUTIONS:

⚠ Cap the brake tubes to prevent fluid loss or dirt ingress.

⚠ Plug the HCU ports to prevent fluid loss or dirt ingress.

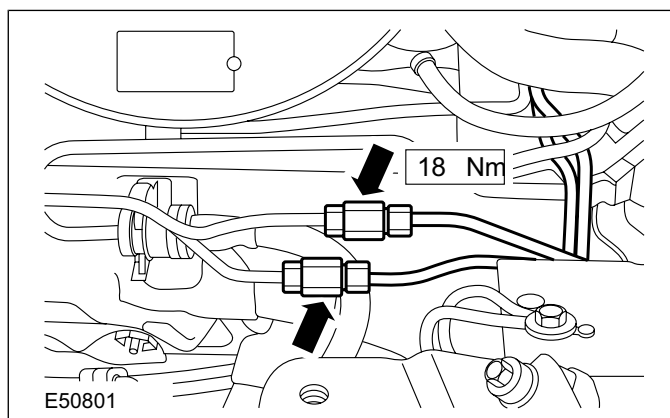
NOTE: Make a note of the position of the brake tubes, to aid installation.

Disconnect the brake tubes from the HCU.

- Detach the tubes from the securing clips.

2. ⚠ CAUTION: Cap the brake tubes to prevent fluid loss or dirt ingress.

Remove the HCU to rear brake tubes.





Item 8 HCU

⚠ **WARNING:** Do not touch the HCU or ABS module contact points as this may affect the brake system operation. Failure to follow this instruction may result in personal injury.



REMOVAL AND INSTALLATION

 **CAUTION:** Plug the ABS module ports to prevent dirt ingress.



Installation Details**Item 8 HCU****WARNINGS:**

-  Do not install a damaged HCU. Failure to follow this instruction may result in personal injury.
-  Make sure that the HCU is correctly located on the ABS module. Failure to follow this instruction may result in personal injury.


CAUTIONS:

-  Do not drop or knock the HCU. Failure to follow this instruction will cause damage to the hydraulic components.
-  Do not remove the ABS module port blanking plugs until the HCU is ready to be installed.


Item 5 HCU and ABS module assembly

-  **WARNING:** Do not install a damaged HCU and ABS module assembly. Failure to follow this instruction may result in personal injury.
-  **CAUTION:** Do not drop or knock the HCU and ABS module assembly. Failure to follow this instruction will cause damage to the electronic and hydraulic components.


Item 3 HCU to rear brake tubes

-  **CAUTION:** Do not remove the brake tube blanking caps or HCU port blanking plugs until the brake tubes are ready to be installed.

Item 2 HCU to front brake tubes

-  **CAUTION:** Do not remove the brake tube blanking caps or HCU port blanking plugs until the brake tubes are ready to be installed.

Item 1 Hydraulic control unit (HCU) to brake master cylinder brake tubes

-  **CAUTION:** Do not remove the brake tube blanking caps or HCU port blanking plugs until the brake tubes are ready to be installed.

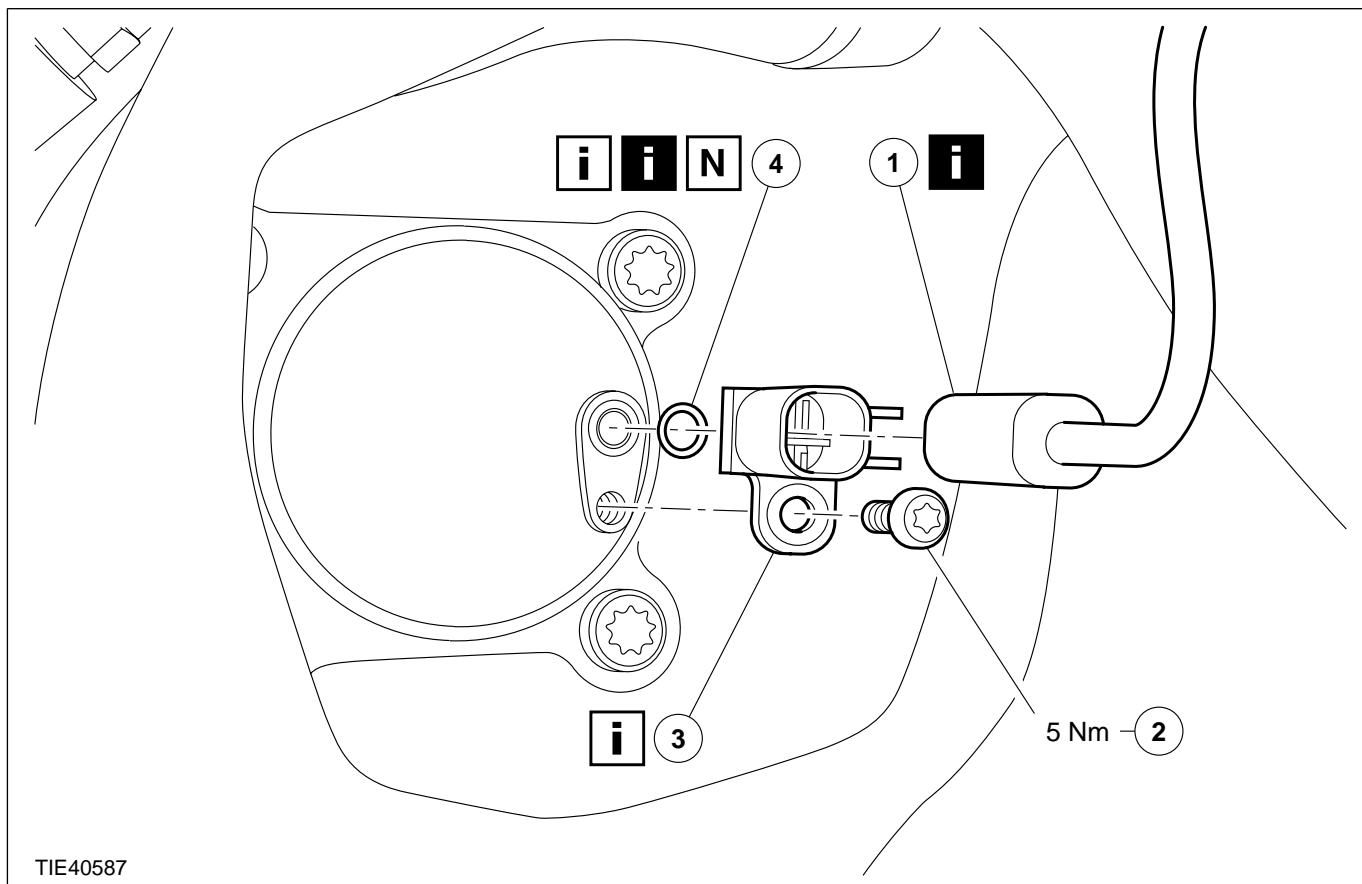
REMOVAL AND INSTALLATION

Rear Wheel Speed Sensor

1. Remove the wheel and tire. For additional information, refer to Section **204-04 [Wheels and Tires]**.
2. **CAUTION:** Make sure that the wheel speed sensor, wheel speed sensor electrical connector and the area around the wheel speed sensor are free from contamination and moisture.

Clean the wheel speed sensor, wheel speed sensor electrical connector and the area around the wheel speed sensor.

3. Remove the components in the order indicated in the following illustration(s) and table(s).



TIE40587

Item	Description
1	Wheel speed sensor electrical connector See Removal Detail
2	Wheel speed sensor retaining bolt

Item	Description
3	Wheel speed sensor See Installation Detail
4	Wheel speed sensor O-ring See Removal Detail See Installation Detail

4. To install, reverse the removal procedure.

Removal Details

Item 1 Wheel speed sensor electrical connector

1. Disconnect the wheel speed sensor electrical connector.

REMOVAL AND INSTALLATION

Item 4 Wheel speed sensor O-ring

1. Using a suitable lint-free cloth, clean the wheel speed sensor O-ring sealing groove.
2. Using a suitable lint-free cloth, clean the wheel speed sensor retaining bolt housing.

3. **CAUTION:** Plug the wheel speed sensor housing to prevent dirt ingress.
Plug the wheel speed sensor housing.

Installation Details

Item 4 Wheel speed sensor O-ring

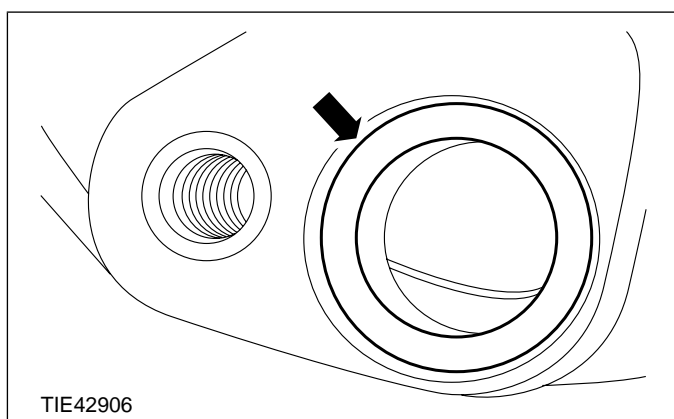
1. CAUTIONS:

CAUTION: Make sure that the wheel speed sensor housing is free from contamination and moisture.

CAUTION: Make sure that the wheel speed sensor O-ring is correctly seated.

CAUTION: Do not install the wheel speed sensor O-ring onto the wheel speed sensor.

Install the wheel speed sensor O-ring.



Item 3 Wheel speed sensor

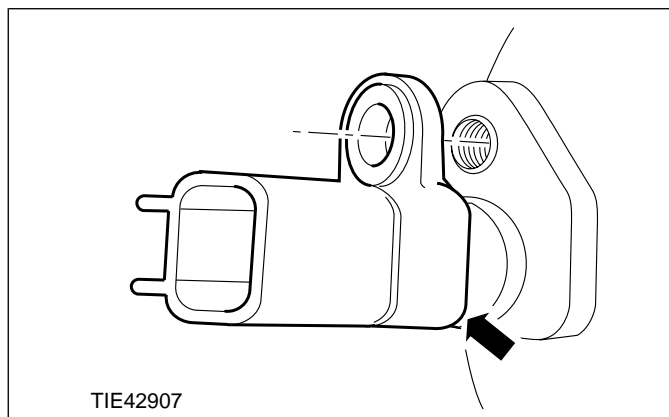
CAUTIONS:

CAUTION: Make sure that the wheel speed sensor is correctly seated.

CAUTION: Do not rotate the wheel speed sensor during installation.

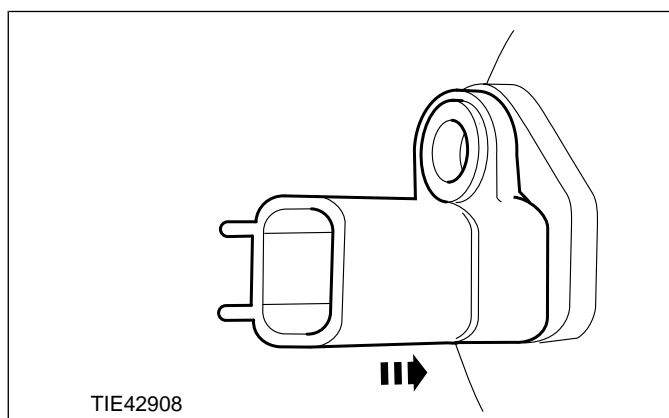
1. **CAUTION:** Make sure that the wheel speed sensor is correctly aligned with the wheel speed sensor housing.

Position the wheel speed sensor.



2. **NOTE:** A resistance should only be detected during the final 2 mm of installation of the wheel speed sensor.

Install the wheel speed sensor.



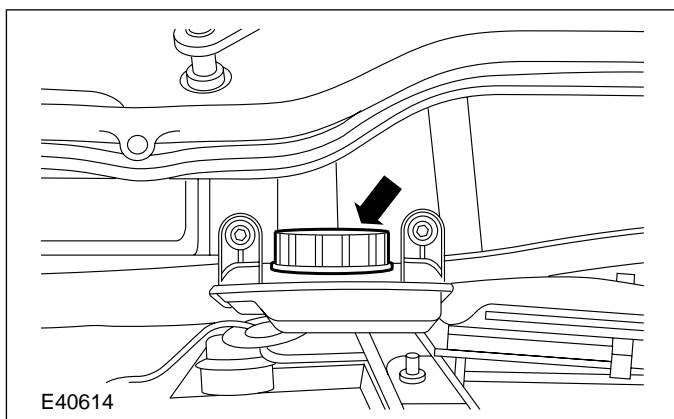
REMOVAL AND INSTALLATION

Anti-Lock Brake System (ABS) Module

Materials	
Name	Specification
Brake Fluid - Super DOT4	ESD-M6C57-A

⚠ CAUTION: If brake fluid is spilled on the paintwork, the affected area must be immediately washed down with cold water.

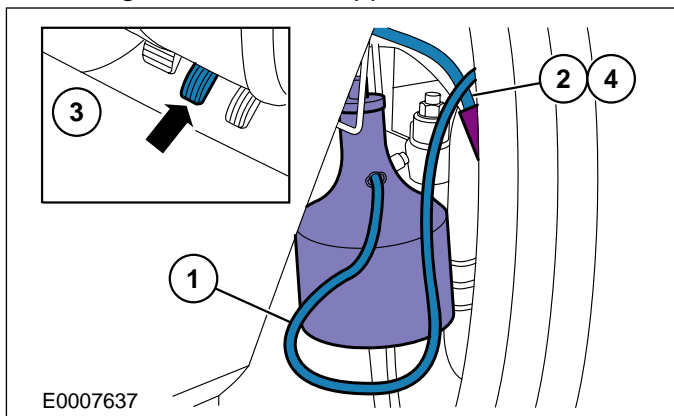
- ⚠ CAUTION:** The brake fluid reservoir cap must not become contaminated.
Remove the brake fluid reservoir cap.



- NOTE:** It will be necessary to carry out this step on both sides in order to completely drain the brake fluid reservoir.

Drain the brake fluid reservoir.

- Connect one end of a suitable piece of clear plastic pipe to the bleed nipple and place the other end into a suitable container.
- Loosen the bleed nipple.
- Depress the brake pedal until all the brake fluid is drained from the brake fluid reservoir.
- Tighten the bleed nipple.



- Install the brake fluid reservoir cap.
- Remove the battery tray.

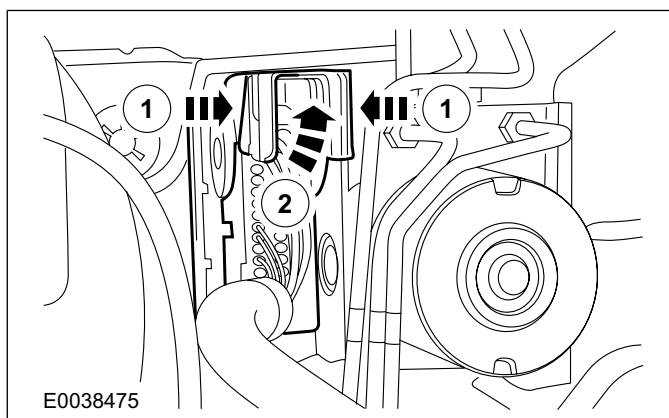
For additional information, refer to: Battery Tray - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (414-01 Battery, Mounting and Cables, Removal and Installation)

/ Battery Tray - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel (414-01 Battery, Mounting and Cables, Removal and Installation).

- ⚠ CAUTION:** Cap the anti-lock brake system (ABS) module electrical connector and socket to prevent dirt and fluid ingress.

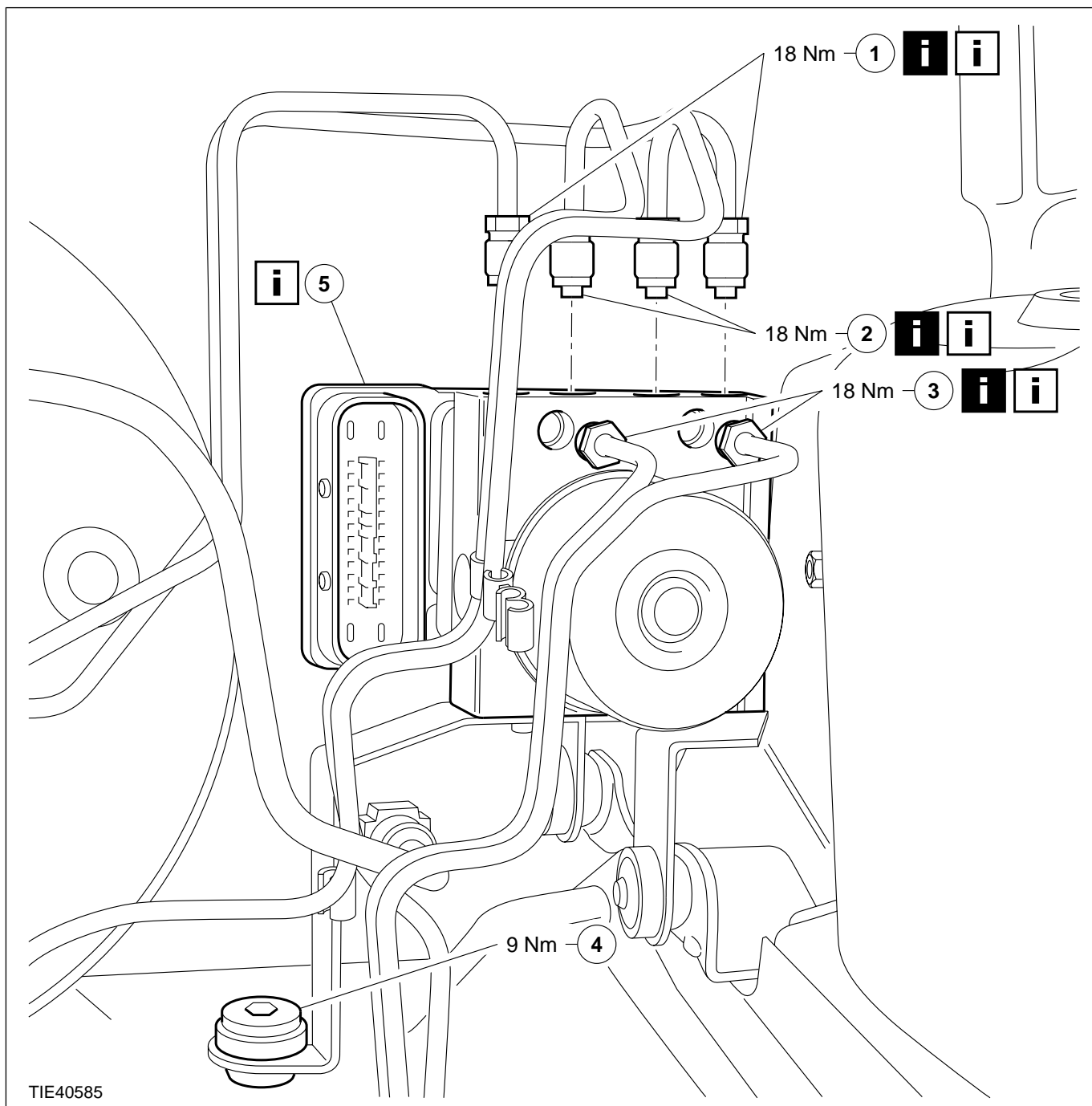
Disconnect the ABS module electrical connector.

- Depress the locking tangs.
- Release the retainer.



- Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION

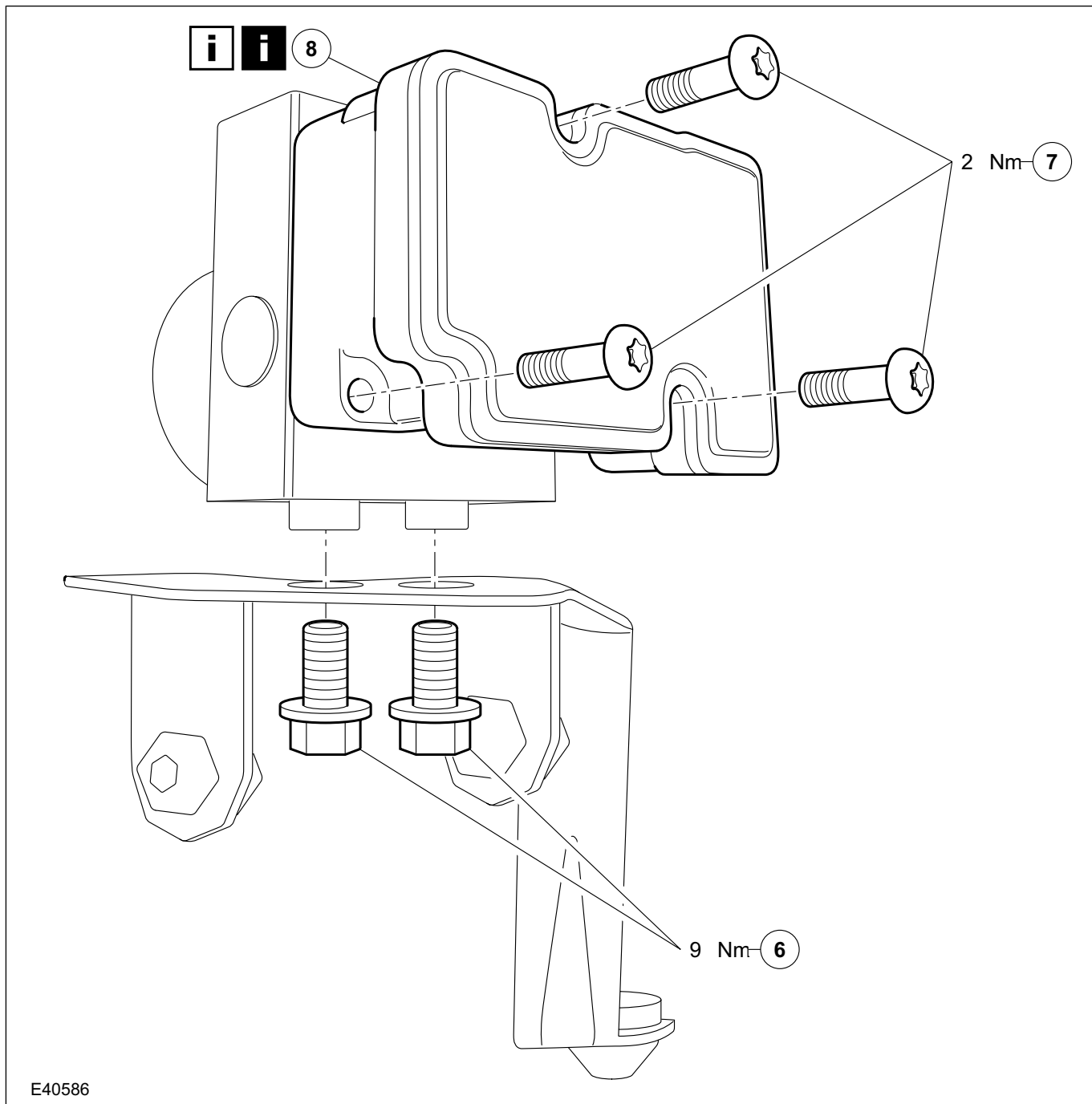


TIE40585

Item	Description
1	Hydraulic control unit (HCU) to brake master cylinder brake tubes <i>See Removal Detail</i> <i>See Installation Detail</i>
2	HCU to front brake tubes <i>See Removal Detail</i> <i>See Installation Detail</i>

Item	Description
3	HCU to rear brake tubes <i>See Removal Detail</i> <i>See Installation Detail</i>
4	HCU and ABS module assembly support bracket retaining bolt
5	HCU and ABS module assembly <i>See Installation Detail</i>

REMOVAL AND INSTALLATION



E40586

Item	Description
6	HCU and ABS module assembly to support bracket retaining bolts
7	ABS module to HCU retaining bolts
8	ABS module See Removal Detail See Installation Detail

7. To install, reverse the removal procedure.

8. Bleed the brake system.

For additional information, refer to: **Brake System Bleeding (206-00 Brake System - General Information, General Procedures)** / **Brake System Pressure Bleeding (206-00 Brake System - General Information, General Procedures)**.

Removal Details

REMOVAL AND INSTALLATION

Item 1 Hydraulic control unit (HCU) to brake master cylinder brake tubes

1. CAUTIONS:

⚠ Cap the brake tubes to prevent fluid loss or dirt ingress.

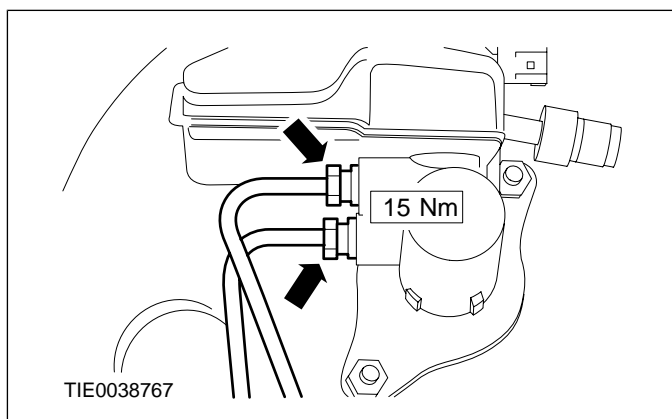
⚠ Plug the HCU ports to prevent fluid loss or dirt ingress.

NOTE: Make a note of the position of the brake tubes, to aid installation.

Disconnect the brake tubes from the HCU.

- Detach the tubes from the securing clips.

2. Remove the HCU to master cylinder brake tubes.



Item 2 HCU to front brake tubes

1. CAUTIONS:

⚠ Cap the brake tubes to prevent fluid loss or dirt ingress.

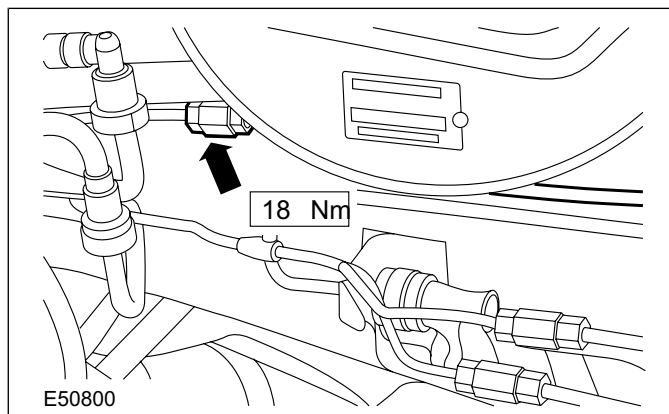
⚠ Plug the HCU ports to prevent fluid loss or dirt ingress.

NOTE: Make a note of the position of the brake tubes, to aid installation.

Disconnect the brake tubes from the HCU.

2. ⚠ CAUTION: Cap the brake tubes to prevent fluid loss or dirt ingress.

Remove the HCU to right-hand front caliper brake tube.



Item 3 HCU to rear brake tubes

1. CAUTIONS:

⚠ Cap the brake tubes to prevent fluid loss or dirt ingress.

⚠ Plug the HCU ports to prevent fluid loss or dirt ingress.

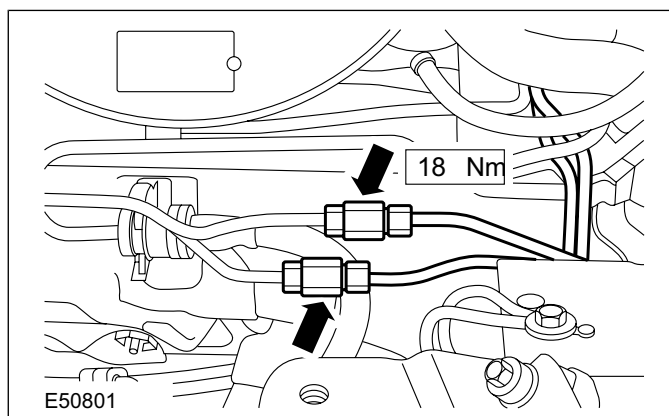
NOTE: Make a note of the position of the brake tubes, to aid installation.

Disconnect the brake tubes from the HCU.

- Detach the tubes from the securing clips.

2. ⚠ CAUTION: Cap the brake tubes to prevent fluid loss or dirt ingress.

Remove the HCU to rear brake tubes.





Item 8 ABS module

⚠ **WARNING:** Do not touch the HCU or ABS module contact points as this may affect the brake system operation. Failure to follow this instruction may result in personal injury.



REMOVAL AND INSTALLATION

 **CAUTION:** Plug the ABS module ports to prevent dirt ingress.



Installation Details**Item 8 ABS module****WARNINGS:**

-  Do not install a damaged ABS module. Failure to follow this instruction may result in personal injury.
-  Make sure that the ABS module is correctly located on the HCU. Failure to follow this instruction may result in personal injury.


CAUTIONS:

-  Do not drop or knock the ABS module. Failure to follow this instruction will cause damage to the electronic components.
-  Do not remove the ABS module port blanking plugs until the ABS module is ready to be installed.


Item 5 HCU and ABS module assembly

-  **WARNING:** Do not install a damaged HCU and ABS module assembly. Failure to follow this instruction may result in personal injury.
-  **CAUTION:** Do not drop or knock the HCU and ABS module assembly. Failure to follow this instruction will cause damage to the electronic and hydraulic components.


Item 3 HCU to rear brake tubes

-  **CAUTION:** Do not remove the brake tube blanking caps or HCU port blanking plugs until the brake tubes are ready to be installed.

Item 2 HCU to front brake tubes

-  **CAUTION:** Do not remove the brake tube blanking caps or HCU port blanking plugs until the brake tubes are ready to be installed.

Item 1 Hydraulic control unit (HCU) to brake master cylinder brake tubes

-  **CAUTION:** Do not remove the brake tube blanking caps or HCU port blanking plugs until the brake tubes are ready to be installed.

SECTION 206-09B Anti-Lock Control - Stability Assist

VEHICLE APPLICATION: 2008.75 Focus ST C307

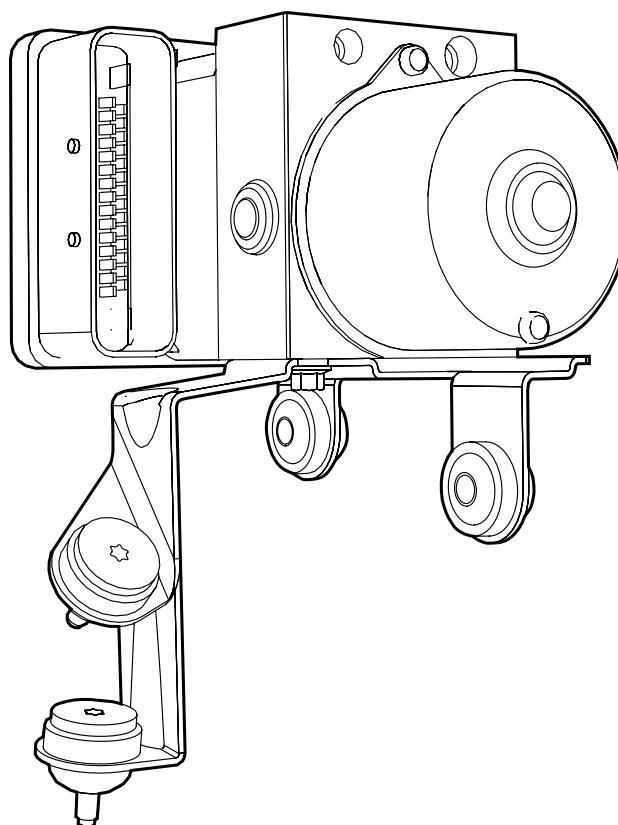
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Anti-lock Brake System (ABS) and Emergency Brake Assist (EBA).....	206-09B-3
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SPECIFICATIONS**Lubricants, Fluids, Sealers and Adhesives**

	Specifica tions
Super DOT 4 brake fluid	ESD- M6C57-A

Torque Specifications

Description	Nm	lb-ft	lb-in
Hydraulic control unit (HCU) and stability assist module assembly to support bracket retaining bolts	9	-	80
HCU and stability assist module assembly support bracket retaining bolt	9	-	80
Stability assist module to HCU retaining bolts	5.5	-	49
Brake tube to HCU unions	18	13	-
Brake tube in-line connector unions	18	13	-
Brake tube to brake master cylinder unions	15	11	-
Yaw rate sensor bracket retaining bolts	9	-	80
Yaw rate sensor retaining nuts	4	-	35
Wheel speed sensor retaining bolts	5	-	44
Steering wheel retaining bolt	48	35	-
Strut and spring assembly top mount brace retaining bolts	32	24	-
Strut and spring assembly top mount brace retaining nuts	25	18	-
Windshield wiper arms retaining nuts	15	11	-

DESCRIPTION AND OPERATION**Anti-Lock Control - Stability Assist****Anti-lock Brake System (ABS) and Emergency Brake Assist (EBA)****ABS module**

E40965

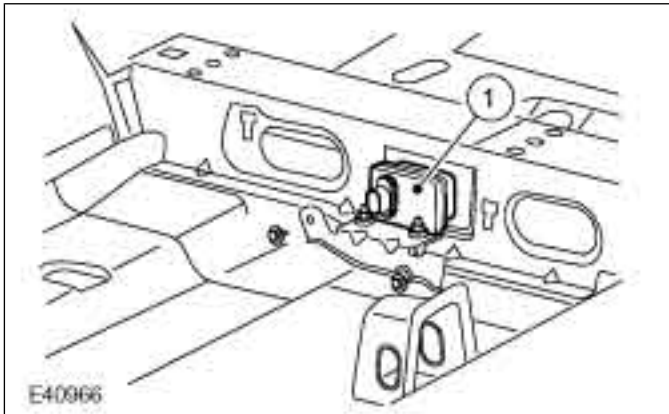
The ABS module is attached to the bulkhead on the left-hand side for all vehicle markets.

Modules pre-filled with brake fluid are available for service operations.

Diagnosis is done using WDS.

DESCRIPTION AND OPERATION

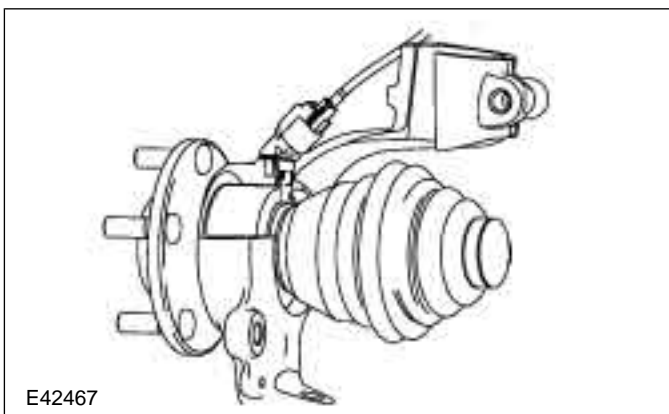
Communication with other control units is done on the high-speed CAN bus. The exception to this are the yaw rate and lateral acceleration sensor modules which communicate with the electronic stability programme module via a special CAN bus.

Combined yaw rate sensor and lateral acceleration sensor

Item	Description
1	Combined yaw rate sensor and lateral acceleration sensor

The combined yaw rate sensor and lateral acceleration sensor is similar to that on vehicles with the electronic stability programme. The sensor is attached to the floor crossmember. Its operating principle is the same.

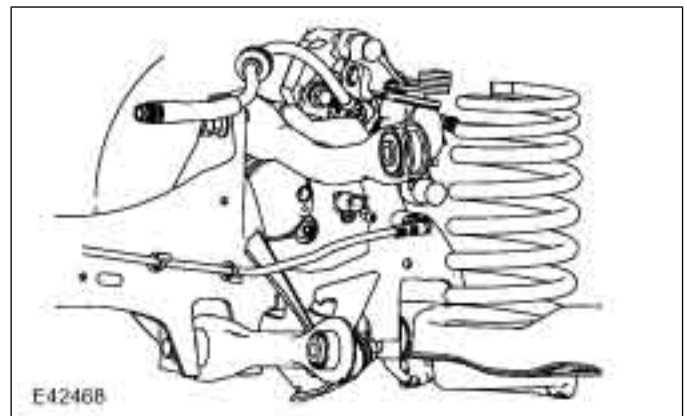
The combined yaw rate sensor and lateral acceleration sensor has its own CAN bus. As a result, the signals can be transmitted to the electronic stability programme module in a specific way.

Front wheel sensors

Active sensors are used to determine the rotational speeds of the wheels at the hub. After the ignition is switched on, the ABS module supplies the sensors with power. The sensors work in accordance with the Hall effect principle and generate a square wave output signal. The signal acts in proportion to the rotational speed of the sensor ring.

The ABS sensor rings are built into the seals in the front wheel bearings.

The wheel sensors are joined to the main wiring harness using a separate connecting cable.

Rear wheel sensors

The ABS Anti-lock Brake System sensor rings are built into the hubs of the rear axle.

When installing a replacement bearing, ensure that the new part is aligned correctly.

The sensors are joined to the main wiring harness using a separate connecting cable.

The ABS module evaluates the signals from all four sensors to calculate road speed based on all wheel rotational speeds. The road speed is transmitted on the CAN bus. The powertrain control module (PCM) uses this signal and the programmed tyre size to calculate road speed.

The calculated vehicle speed is forwarded on the CAN bus and is requested by other control units that need this input information.



DIAGNOSIS AND TESTING

Anti-Lock Control - Stability Assist

REFER to Section [206-09A \[Anti-Lock Control\]](#) /
[206-09B \[Anti-Lock Control - Traction Control\]](#) /
[206-09C \[Anti-Lock Control - Stability Assist\]](#).



REMOVAL AND INSTALLATION

Hydraulic Control Unit (HCU)

General Equipment

Worldwide diagnostic system (WDS)

⚠ CAUTION: If brake fluid is spilled on the paintwork, the affected area must be immediately washed down with cold water.

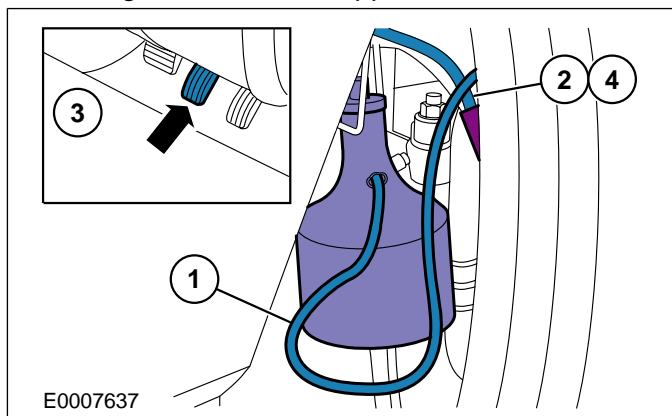
1. Obtain and record the stability assist program code using WDS.
2. **⚠ CAUTION:** The brake fluid reservoir cap must not become contaminated.

Remove the brake fluid reservoir cap.

3. **NOTE:** It will be necessary to carry out this step on both sides in order to completely drain the brake fluid reservoir.

Drain the brake fluid reservoir.

1. Connect one end of a suitable piece of clear plastic pipe to the bleed nipple and place the other end into a suitable container.
2. Loosen the bleed nipple.
3. Depress the brake pedal until all the brake fluid is drained from the brake fluid reservoir.
4. Tighten the bleed nipple.



4. Install the brake fluid reservoir cap.

5. Remove the battery tray.

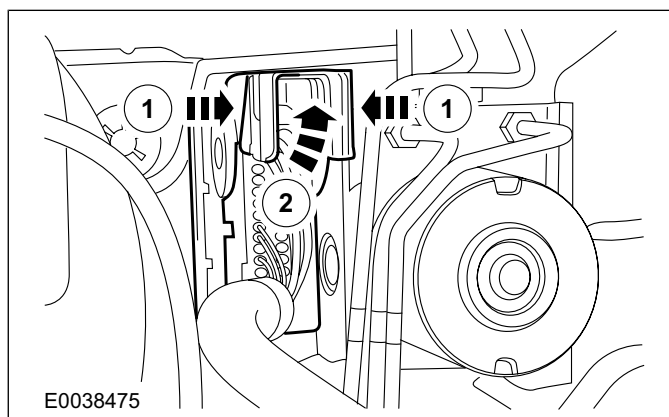
For additional information, refer to: Battery Tray - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (**414-01 Battery, Mounting and Cables, Removal and Installation**)

/ Battery Tray - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel (**414-01 Battery, Mounting and Cables, Removal and Installation**).

6. **⚠ CAUTION:** Cap the stability assist module electrical connector and socket to prevent dirt and fluid ingress.

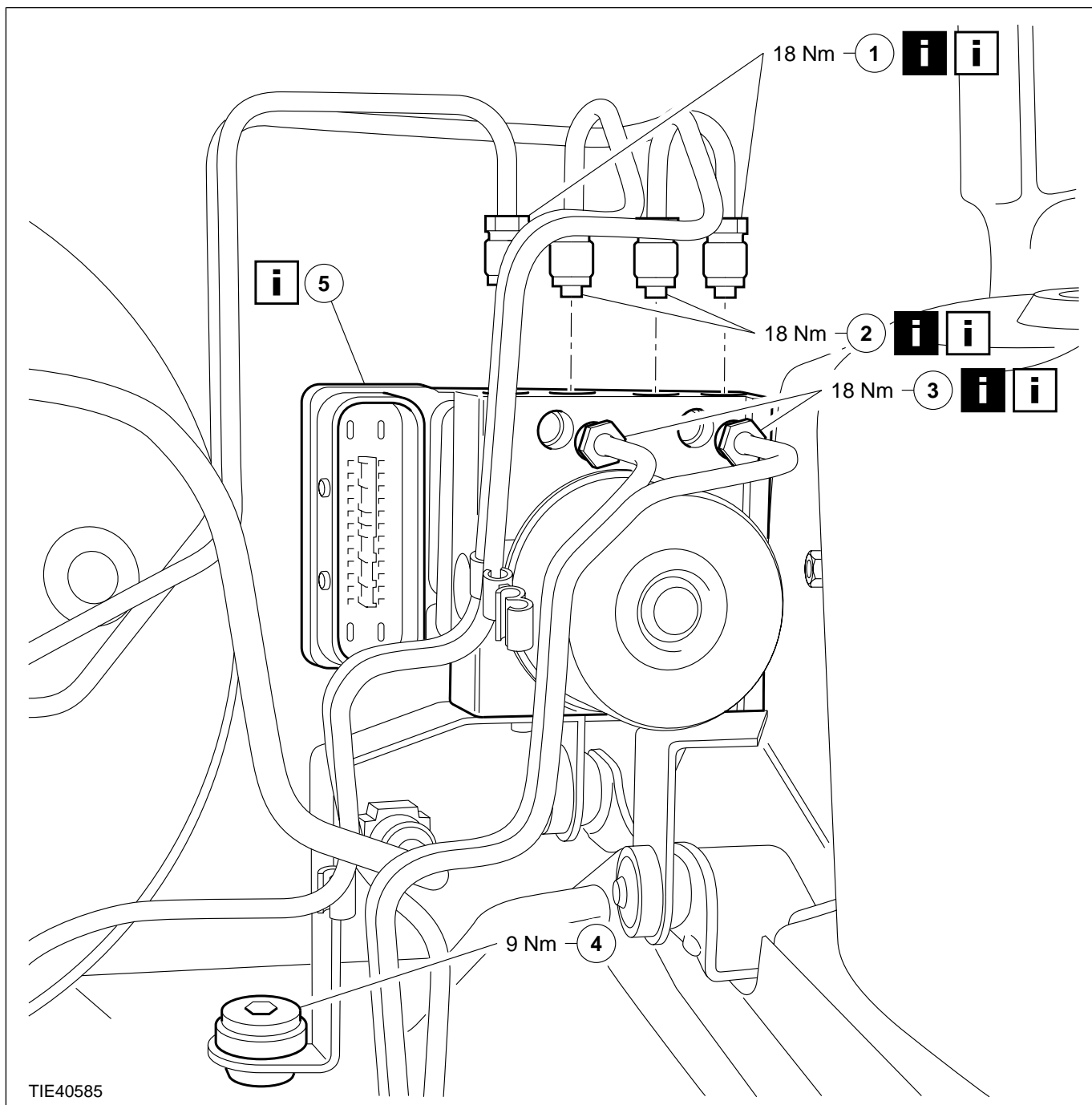
Disconnect the stability assist module electrical connector.

1. Depress the locking tangs.
2. Release the retainer.



7. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION

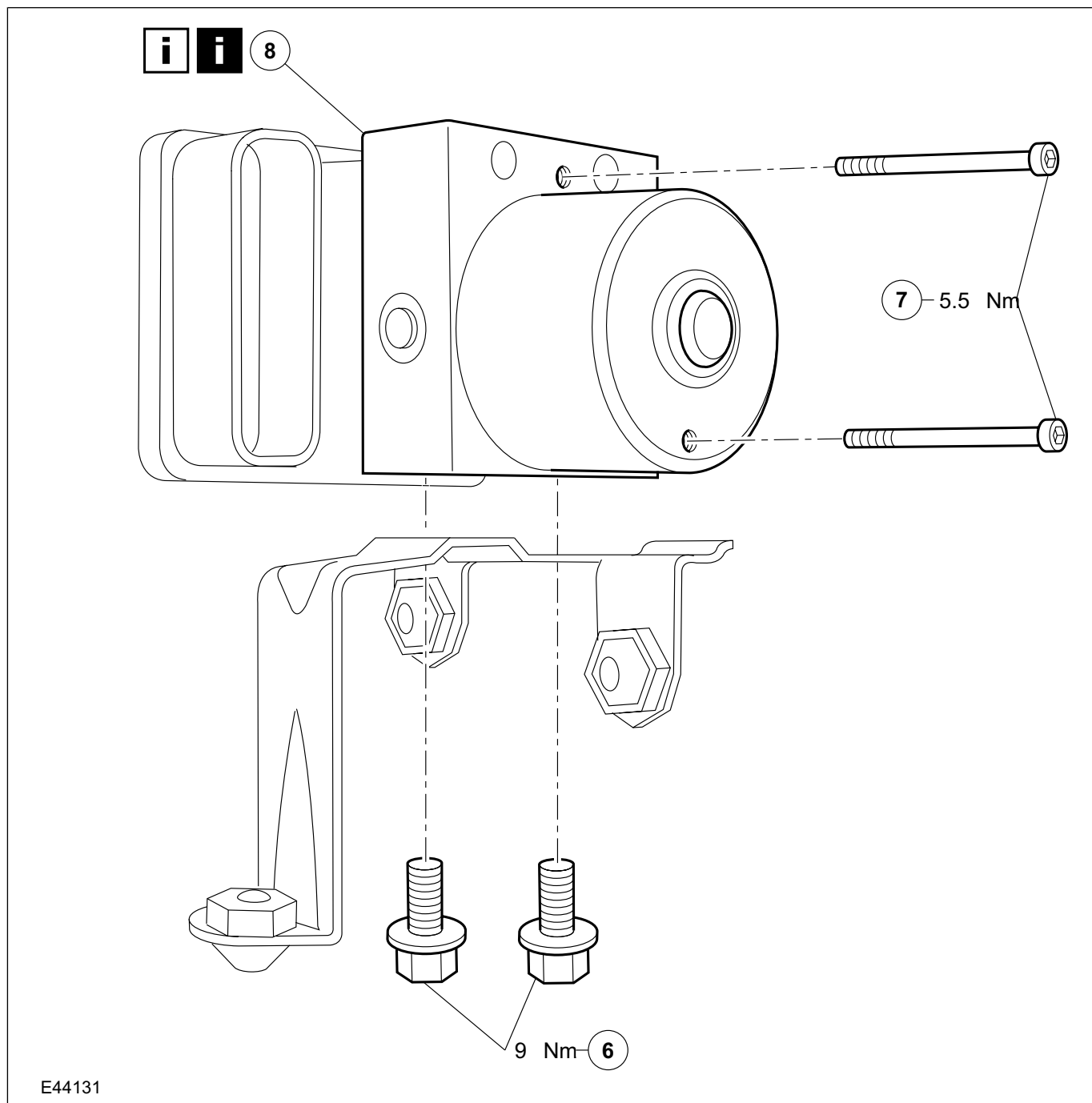


TIE40585

Item	Description
1	Hydraulic control unit (HCU) to brake master cylinder brake tubes <i>See Removal Detail</i> <i>See Installation Detail</i>
2	HCU to front brake tubes <i>See Removal Detail</i> <i>See Installation Detail</i>

Item	Description
3	HCU to rear brake tubes <i>See Removal Detail</i> <i>See Installation Detail</i>
4	HCU and stability assist module assembly support bracket retaining bolt
5	HCU and stability assist module assembly <i>See Installation Detail</i>

REMOVAL AND INSTALLATION



E44131

Item	Description
6	HCU and stability assist module assembly to support bracket retaining bolts
7	Stability assist module to HCU retaining bolts
8	HCU See Removal Detail See Installation Detail

8. To install, reverse the removal procedure.

9. Bleed the brake system.

For additional information, refer to: **Brake System Bleeding (206-00 Brake System - General Information, General Procedures) / Brake System Pressure Bleeding (206-00 Brake System - General Information, General Procedures).**

10. **WARNING:** The stability assist program must be re-configured. Failure to follow this instruction may result in personal injury.

Configure the stability assist program using **WDS**.

REMOVAL AND INSTALLATION

Removal Details

Item 1 Hydraulic control unit (HCU) to brake master cylinder brake tubes

1. CAUTIONS:

⚠ Cap the brake tubes to prevent fluid loss or dirt ingress.

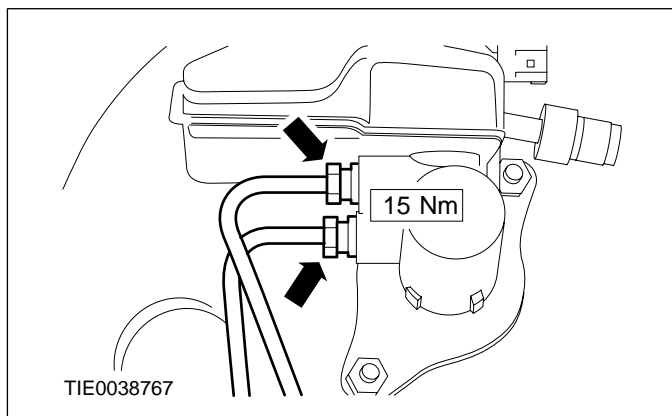
⚠ Plug the HCU ports to prevent fluid loss or dirt ingress.

NOTE: Make a note of the position of the brake tubes, to aid installation.

Disconnect the brake tubes from the HCU.

- Detach the tubes from the securing clips.

2. Remove the HCU to master cylinder brake tubes.



Item 2 HCU to front brake tubes

1. CAUTIONS:

⚠ Cap the brake tubes to prevent fluid loss or dirt ingress.

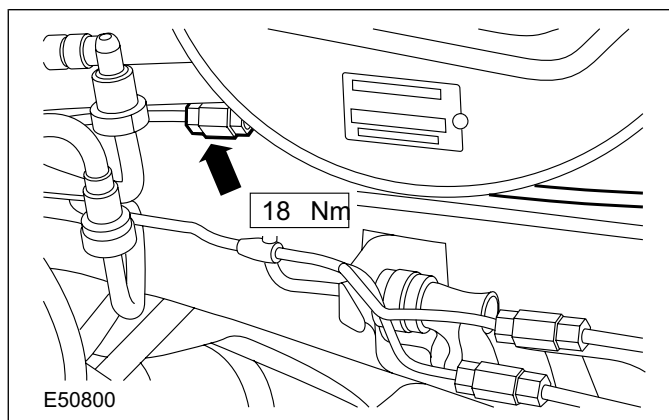
⚠ Plug the HCU ports to prevent fluid loss or dirt ingress.

NOTE: Make a note of the position of the brake tubes, to aid installation.

Disconnect the brake tubes from the HCU.

2. **⚠** CAUTION: Cap the brake tubes to prevent fluid loss or dirt ingress.

Remove the HCU to right-hand front caliper brake tube.



Item 3 HCU to rear brake tubes

1. CAUTIONS:

⚠ Cap the brake tubes to prevent fluid loss or dirt ingress.

⚠ Plug the HCU ports to prevent fluid loss or dirt ingress.

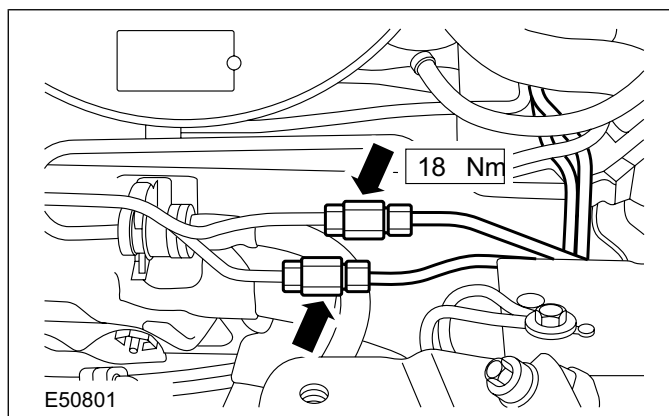
NOTE: Make a note of the position of the brake tubes, to aid installation.

Disconnect the brake tubes from the HCU.


- Detach the tubes from the securing clips.

2. **⚠** CAUTION: Cap the brake tubes to prevent fluid loss or dirt ingress.

Remove the HCU to rear brake tubes.





REMOVAL AND INSTALLATION**Item 8 HCU**

 **WARNING:** Do not touch the HCU or stability assist module contact points as this may affect the electronic program.


Failure to follow this instruction may result in personal injury.

 **CAUTION:** Plug the stability assist module ports to prevent fluid loss or dirt ingress.



Installation Details**Item 8 HCU****WARNINGS:**

-  Do not install a damaged HCU. Failure to follow this instruction may result in personal injury.
-  Make sure that the HCU is correctly located on the stability assist module. Failure to follow this instruction may result in personal injury.



Item 1 Hydraulic control unit (HCU) to brake master cylinder brake tubes

 **CAUTION:** Do not remove the brake tube blanking caps or HCU port blanking plugs until the brake tubes are ready to be installed.


CAUTIONS:

-  Do not drop or knock the HCU. Failure to follow this instruction will cause damage to the hydraulic components.
-  Do not remove the stability assist module port blanking plugs until the HCU is ready to be installed.


Item 5 HCU and stability assist module assembly

-  **WARNING:** Do not install a damaged HCU and stability assist module assembly. Failure to follow this instruction may result in personal injury.
-  **CAUTION:** Do not drop or knock the HCU and stability assist module assembly. Failure to follow this instruction will cause damage to the electronic and hydraulic components.

Item 3 HCU to rear brake tubes

 **CAUTION:** Do not remove the brake tube blanking caps or HCU port blanking plugs until the brake tubes are ready to be installed.

Item 2 HCU to front brake tubes

 **CAUTION:** Do not remove the brake tube blanking caps or HCU port blanking plugs until the brake tubes are ready to be installed.

REMOVAL AND INSTALLATION

Stability Assist Module

General Equipment

Worldwide diagnostic system (WDS)

⚠ CAUTION: If brake fluid is spilt on the paintwork, the affected area must be immediately washed down with cold water.

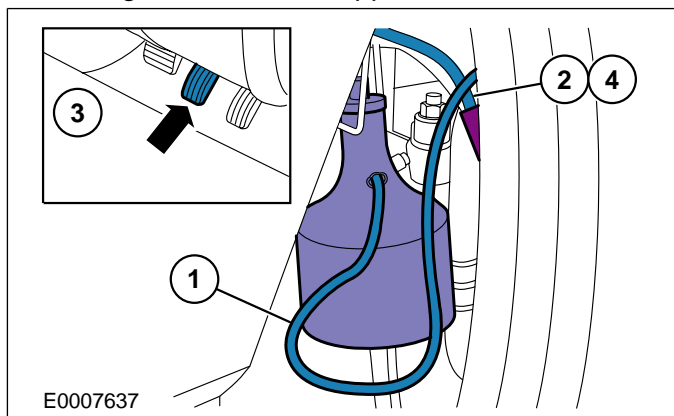
1. Obtain and record the stability assist program code using WDS.
2. **⚠ CAUTION:** The brake fluid reservoir cap must not become contaminated.

Remove the brake fluid reservoir cap.

3. **NOTE:** It will be necessary to carry out this step on both sides in order to completely drain the brake fluid reservoir.

Drain the brake fluid reservoir.

1. Connect one end of a suitable piece of clear plastic pipe to the bleed nipple and place the other end into a suitable container.
2. Loosen the bleed nipple.
3. Depress the brake pedal until all the brake fluid is drained from the brake fluid reservoir.
4. Tighten the bleed nipple.



4. Install the brake fluid reservoir cap.

5. Remove the battery tray.

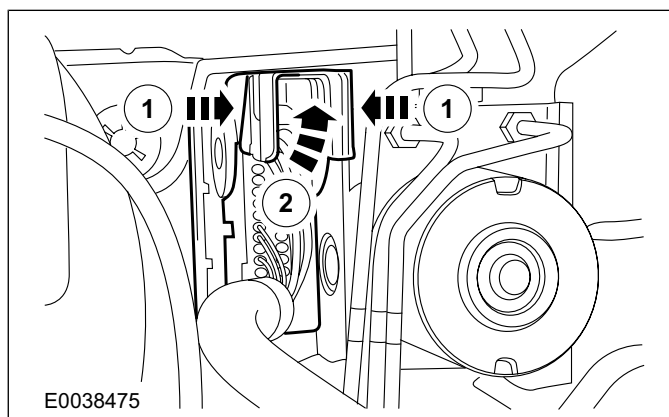
For additional information, refer to: Battery Tray - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (**414-01 Battery, Mounting and Cables, Removal and Installation**)

/ Battery Tray - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel (**414-01 Battery, Mounting and Cables, Removal and Installation**).

6. **⚠ CAUTION:** Cap the stability assist module electrical connector and socket to prevent dirt and fluid ingress.

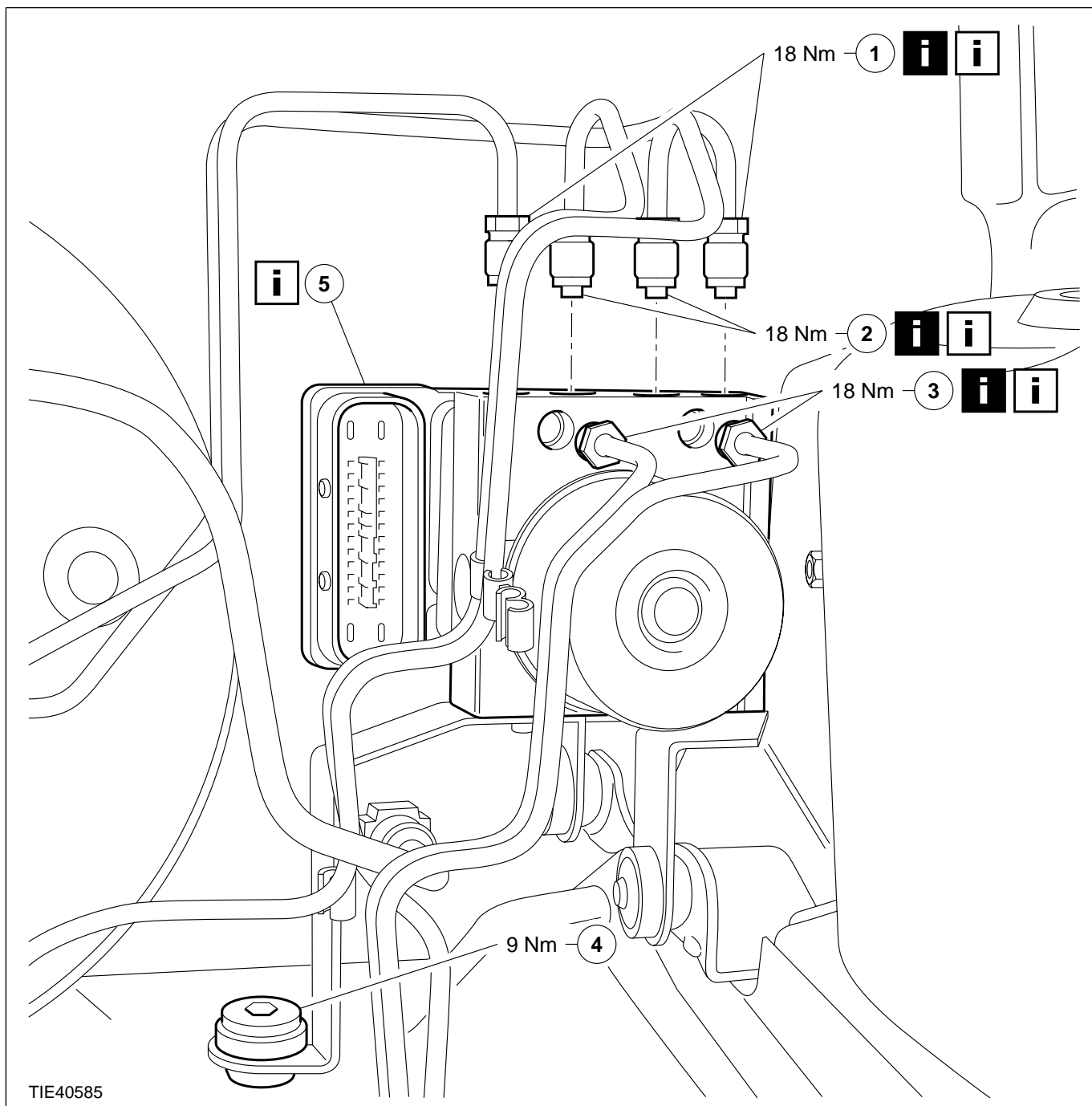
Disconnect the stability assist module electrical connector.

1. Depress the locking tangs.
2. Release the retainer.



7. Remove the components in the order indicated in the following illustration(s) and table(s).

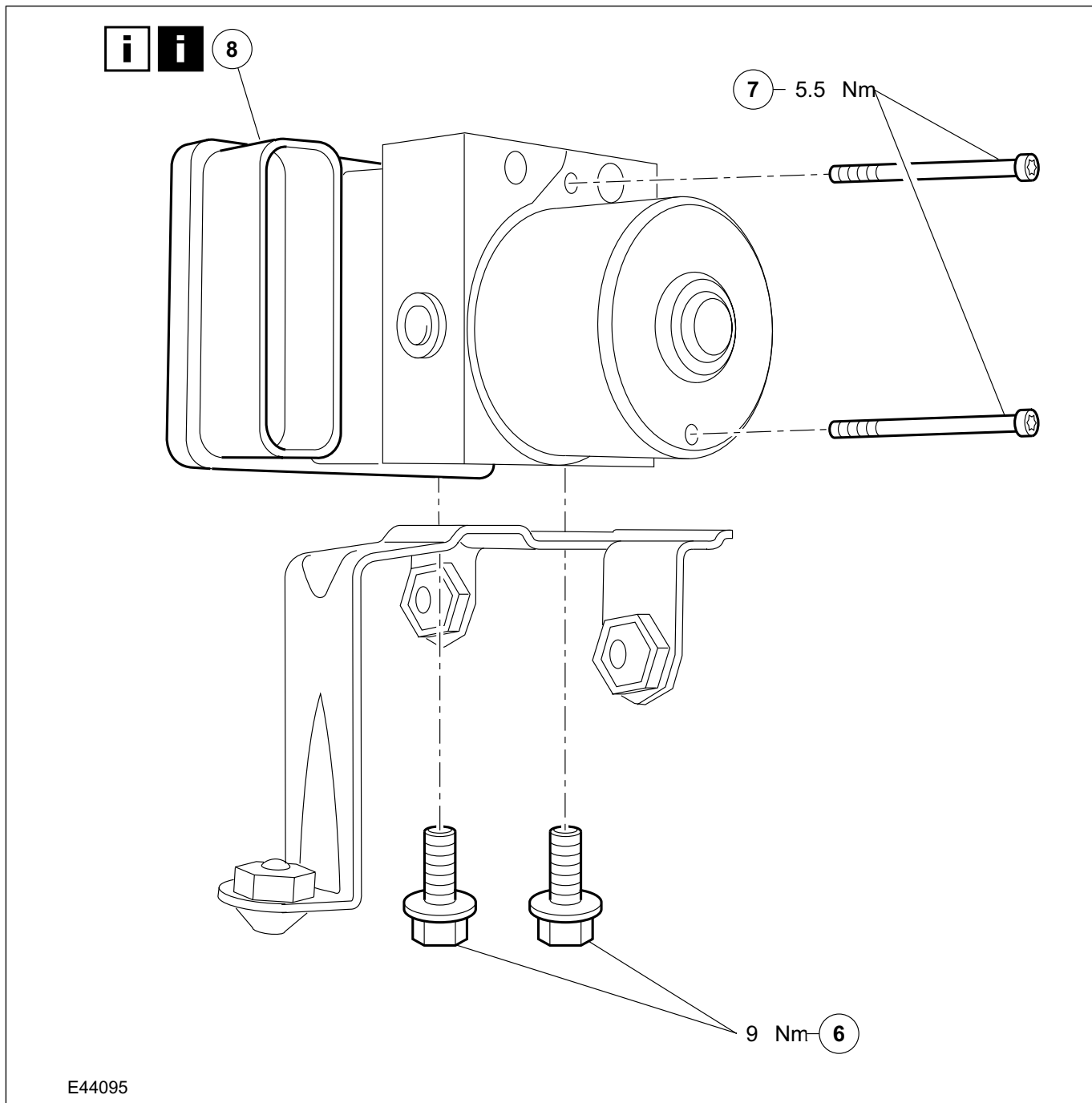
REMOVAL AND INSTALLATION



Item	Description
1	Hydraulic control unit (HCU) to brake master cylinder brake tubes <i>See Removal Detail</i> <i>See Installation Detail</i>
2	HCU to front brake tubes <i>See Removal Detail</i> <i>See Installation Detail</i>

Item	Description
3	HCU to rear brake tubes <i>See Removal Detail</i> <i>See Installation Detail</i>
4	HCU and stability assist module assembly support bracket retaining bolt
5	HCU and stability assist module assembly <i>See Installation Detail</i>

REMOVAL AND INSTALLATION



E44095

Item	Description
6	HCU and stability assist module assembly to support bracket retaining bolts
7	Stability assist module to HCU retaining bolts
8	Stability assist module See Removal Detail See Installation Detail

8. To install, reverse the removal procedure.

9. Bleed the brake system.

For additional information, refer to: **Brake System Bleeding (206-00 Brake System - General Information, General Procedures)** / **Brake System Pressure Bleeding (206-00 Brake System - General Information, General Procedures)**.

10. **WARNING:** The stability assist program must be re-configured. Failure to follow this instruction may result in personal injury.

Configure the stability assist program using WDS.

REMOVAL AND INSTALLATION

Removal Details

Item 1 Hydraulic control unit (HCU) to brake master cylinder brake tubes

1. CAUTIONS:

⚠ Cap the brake tubes to prevent fluid loss or dirt ingress.

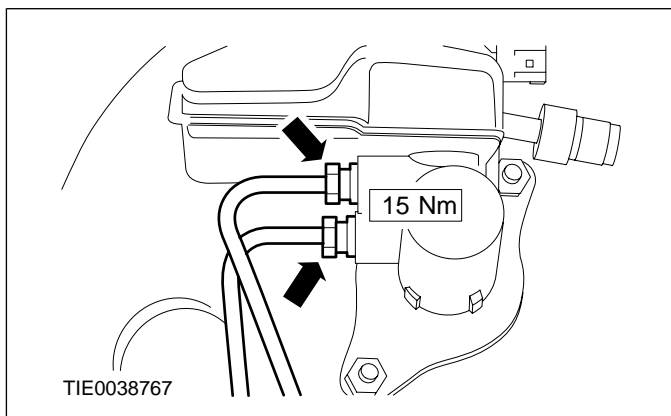
⚠ Plug the HCU ports to prevent fluid loss or dirt ingress.

NOTE: Make a note of the position of the brake tubes, to aid installation.

Disconnect the brake tubes from the HCU.

- Detach the tubes from the securing clips.

2. Remove the HCU to master cylinder brake tubes.



Item 2 HCU to front brake tubes

1. CAUTIONS:

⚠ Cap the brake tubes to prevent fluid loss or dirt ingress.

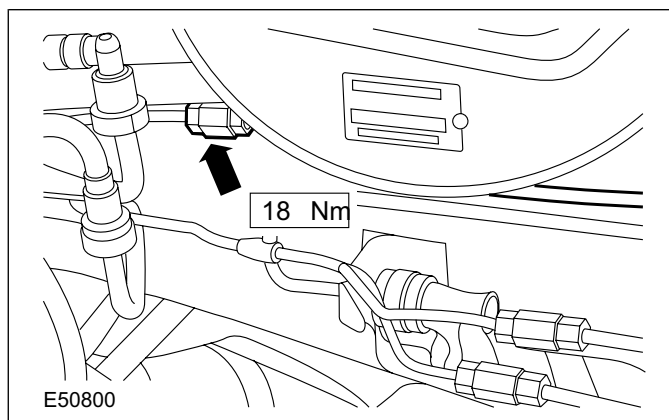
⚠ Plug the HCU ports to prevent fluid loss or dirt ingress.

NOTE: Make a note of the position of the brake tubes, to aid installation.

Disconnect the brake tubes from the HCU.

2. **⚠** CAUTION: Cap the brake tubes to prevent fluid loss or dirt ingress.

Remove the HCU to right-hand front caliper brake tube.



Item 3 HCU to rear brake tubes

1. CAUTIONS:

⚠ Cap the brake tubes to prevent fluid loss or dirt ingress.

⚠ Plug the HCU ports to prevent fluid loss or dirt ingress.

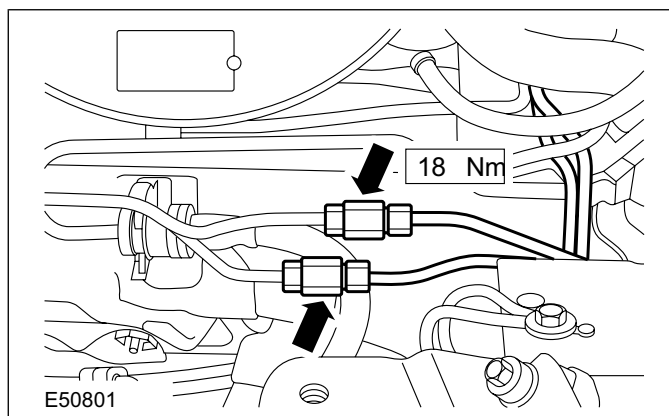
NOTE: Make a note of the position of the brake tubes, to aid installation.

Disconnect the brake tubes from the HCU.


- Detach the tubes from the securing clips.

2. **⚠** CAUTION: Cap the brake tubes to prevent fluid loss or dirt ingress.

Remove the HCU to rear brake tubes.





REMOVAL AND INSTALLATION**Item 8 Stability assist module**

 **WARNING:** Do not touch the HCU or stability assist module contact points as this may affect the electronic program.



Failure to follow this instruction may result in personal injury.

 **CAUTION:** Plug the stability assist module ports to prevent fluid loss or dirt ingress.



Installation Details**Item 8 Stability assist module****WARNINGS:**

-  Do not install a damaged stability assist module. Failure to follow this instruction may result in personal injury.
-  Make sure that the stability assist module is correctly located on the HCU. Failure to follow this instruction may result in personal injury.


CAUTIONS:

-  Do not drop or knock the stability assist module. Failure to follow this instruction will cause damage to the electronic components.
-  Do not remove the HCU port blanking plugs until the stability assist module is ready to be installed.


Item 5 HCU and stability assist module assembly

-  **WARNING:** Do not install a damaged HCU and stability assist module assembly. Failure to follow this instruction may result in personal injury.
-  **CAUTION:** Do not drop or knock the HCU and stability assist module assembly. Failure to follow this instruction will cause damage to the electronic and hydraulic components.

Item 3 HCU to rear brake tubes

-  **CAUTION:** Do not remove the brake tube blanking caps or HCU port blanking plugs until the brake tubes are ready to be installed.

Item 2 HCU to front brake tubes

-  **CAUTION:** Do not remove the brake tube blanking caps or HCU port blanking plugs until the brake tubes are ready to be installed.

REMOVAL AND INSTALLATION

Rear Wheel Speed Sensor(12 785 0)

Removal

1. For additional information, refer to **Section 206-09A [Anti-Lock Control] / 206-09B [Anti-Lock Control - Traction Control] / 206-09C [Anti-Lock Control - Stability Assist]**.

REMOVAL AND INSTALLATION

Steering Wheel Rotation Sensor

General Equipment

Worldwide diagnostic system (WDS)

WARNINGS:

- ▲ To avoid accidental deployment, the air bag control module backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the supplemental restraint system (SRS), or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.
- ▲ To minimize the possibility of premature deployment, do not use radio key code savers when working on the supplemental restraint system. Failure to follow this instruction may result in personal injury.
- ▲ Never probe the electrical connectors of air bag modules or any other supplemental restraint system component. Failure to follow this instruction may result in personal injury.

1. Disconnect the battery ground cable.

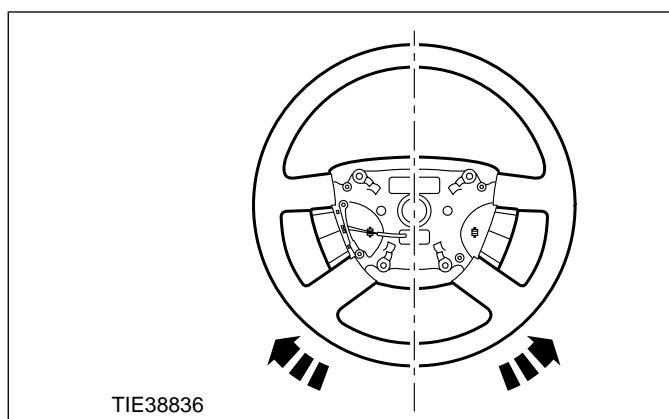
For additional information, refer to: **Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).**

2. Remove the driver air bag module.

For additional information, refer to: **Driver Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation).**

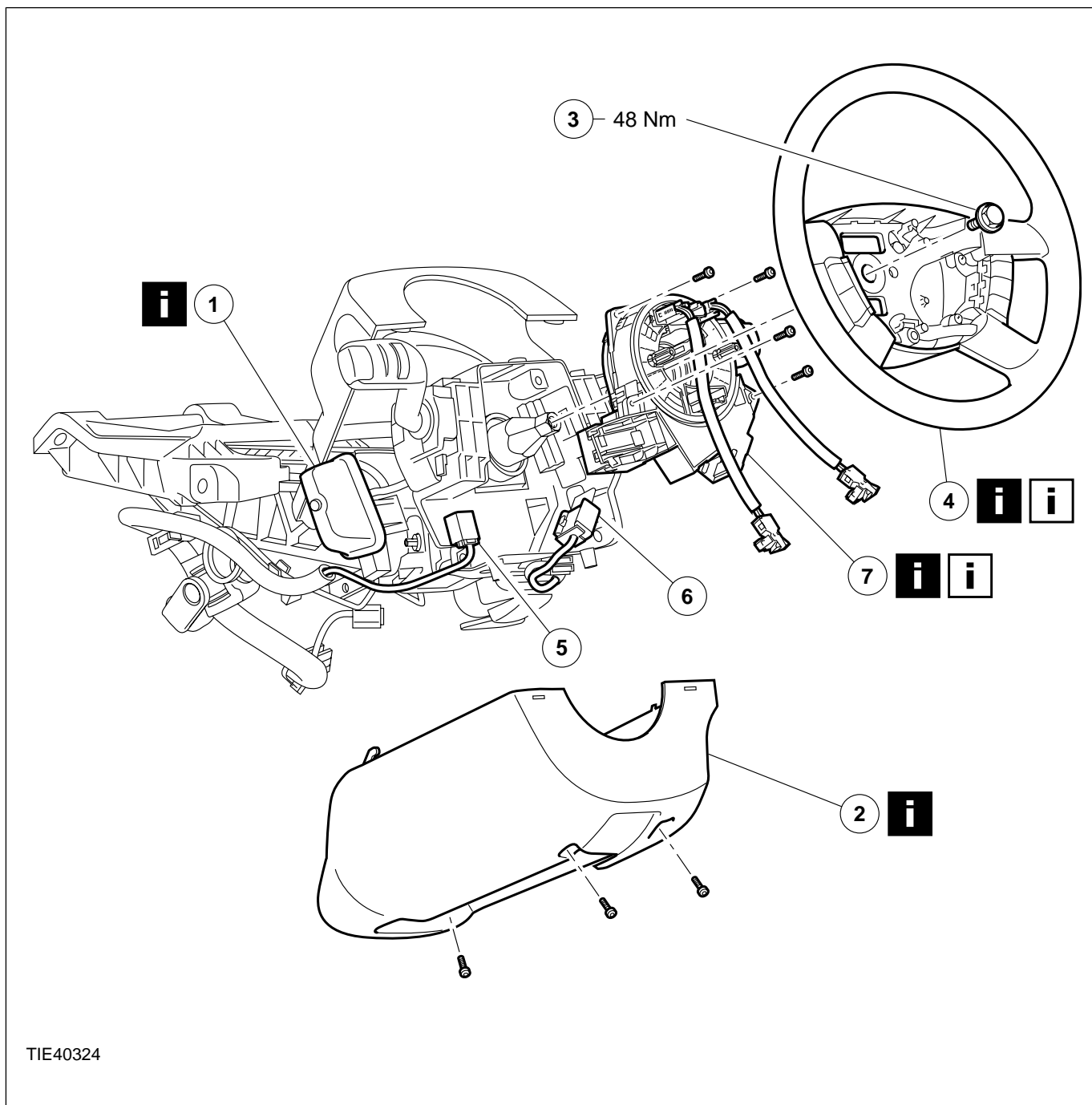
3. NOTE: Make sure the road wheels are in the straight ahead position.

Centralize the steering and lock it in position.



4. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



TIE40324

Item	Description
1	Audio control switch (if equipped) See Removal Detail
2	Steering column lower shroud See Removal Detail
3	Steering wheel retaining bolt
4	Steering wheel See Removal Detail See Installation Detail
5	Steering wheel rotation sensor electrical connector

Item	Description
6	Clockspring electrical connector
7	Clockspring and steering wheel rotation sensor assembly See Removal Detail See Installation Detail

All vehicles

5. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

6. **▲WARNING:** The electronic stability program must be re-configured. Failure to follow this instruction may result in personal injury.

Configure the electronic stability program using WDS.

Vehicles with global closing

7. Initialize the door window motors.

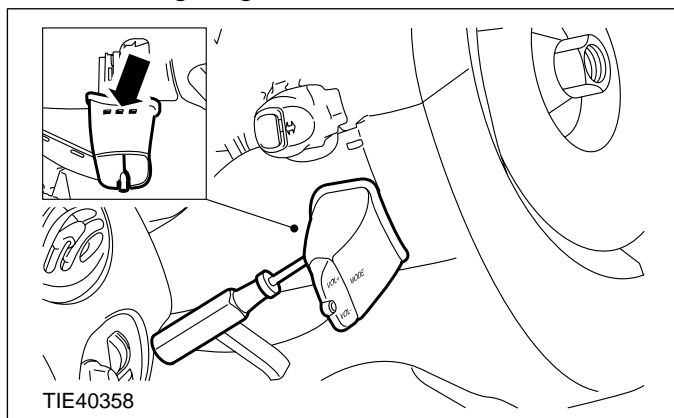
For additional information, refer to: Door Window Motor Initialization (501-11 Glass, Frames and Mechanisms, General Procedures).

Removal Details

Item 1 Audio control switch (if equipped)

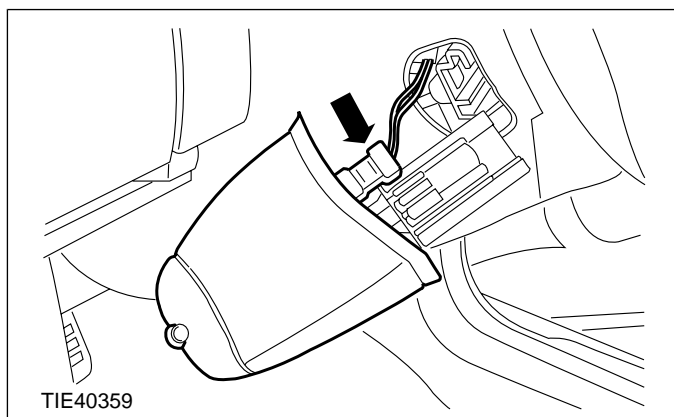
1. Detach the audio control switch from the steering column lower shroud.

- Using a thin bladed screwdriver, release the locking tang.



2. Remove the audio control switch.

- Disconnect the electrical connector.



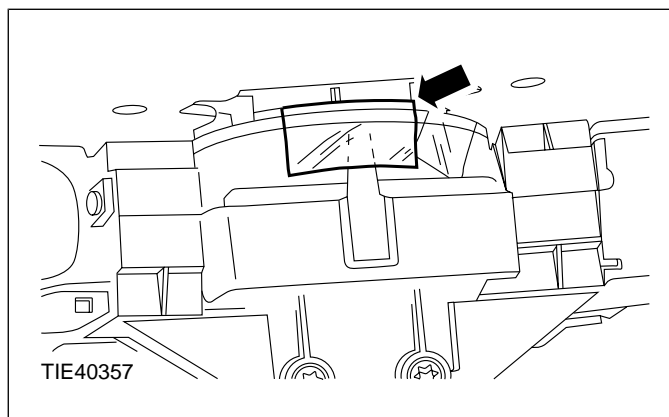
Item 2 Steering column lower shroud

1. Release the steering column locking lever to aid the removal of the steering column shroud.

Item 4 Steering wheel

1. **▲CAUTION:** Make sure the clockspring rotor is not allowed to rotate.

Using a suitable piece of tape, secure the clockspring rotor to the clockspring outer case.

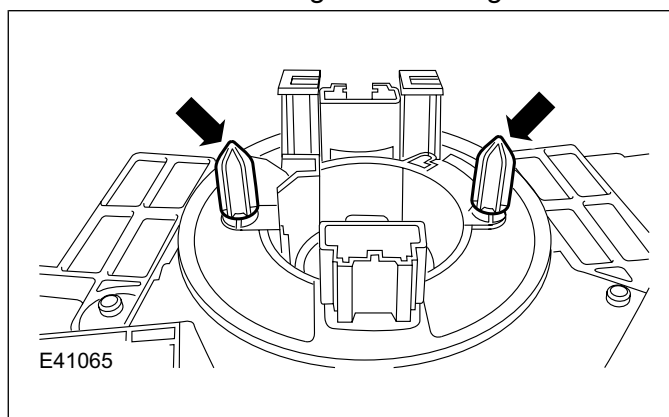


2. Disconnect the steering wheel switches electrical connector (if equipped).

3. **▲CAUTION:** Care must be taken not to damage the clockspring pins.

Remove the steering wheel.

- Feed the driver air bag module wiring harnesses through the steering wheel.



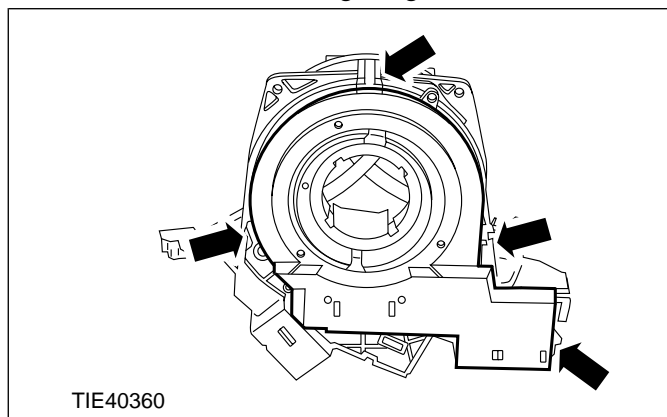
REMOVAL AND INSTALLATION

Item 7 Clockspring and steering wheel rotation sensor assembly

1. **CAUTION:** Make sure the clockspring to steering wheel rotation sensor retaining clips do not get damaged.

Remove the steering wheel rotation sensor.

- Release the locking tangs.



Installation Details

Item 7 Clockspring and steering wheel rotation sensor assembly

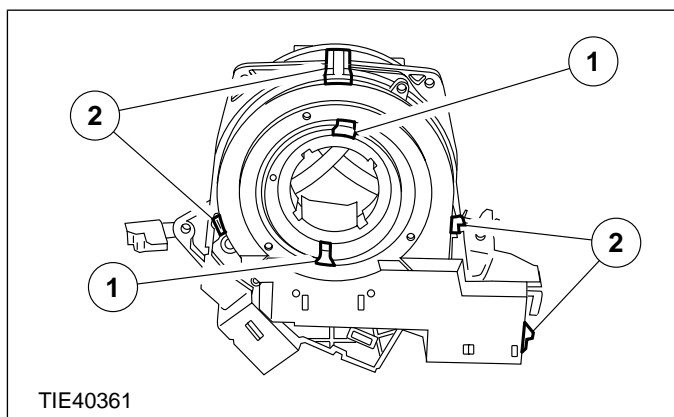
1. CAUTIONS:

CAUTION: Do not remove the tape securing the clockspring at this stage.

CAUTION: Make sure the clockspring to steering wheel rotation sensor retaining clips do not get damaged.

Install the steering wheel rotation sensor.

1. Align the steering wheel rotation sensor locating tangs to the clockspring.
2. Make sure the retaining clips lock into position on the steering wheel rotation sensor.



2. **CAUTION:** Make sure the road wheels are in the straight ahead position.

NOTE: Make sure the turn signal lamp switch is in the off position.

Install the clockspring and steering wheel rotation sensor assembly.

3. WARNINGS:

WARNING: If there is a break between installing the clockspring and steering wheel rotation sensor assembly and installing the steering wheel, or the vehicle is left unattended by the technician, the centralizing procedure **MUST** be carried out. Failure to follow this instruction may result in personal injury.

WARNING: Incorrect centralization may result in premature component failure. If in doubt when centralizing the clockspring, repeat the procedure. Failure to follow this instruction may result in personal injury.

CAUTIONS:

- CAUTION:** Do not turn the clockspring and steering wheel rotation sensor assembly in a clockwise direction more than three turns.
- CAUTION:** Make sure the road wheels are in the straight ahead position.
- CAUTION:** When carrying out the clockspring centralizing procedure, the first turns must be in the counterclockwise direction.

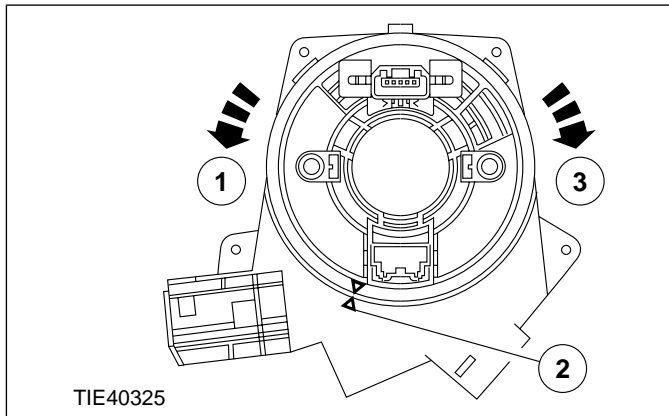
Centralize the clockspring.

1. Turn the clockspring and steering wheel rotation sensor assembly in a counterclockwise direction until a resistance is felt.
2. Turn the clockspring and steering wheel rotation sensor assembly in a clockwise direction, until the arrow marked on the rotor

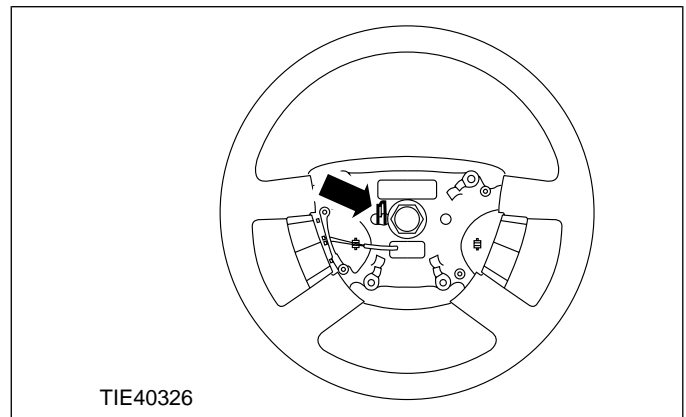
REMOVAL AND INSTALLATION

of the clockspring aligns with the raised "V" section on the outer cover of the clockspring at the 195 degrees position.

- Turn the clockspring and steering wheel rotation sensor assembly in a clockwise direction three turns.



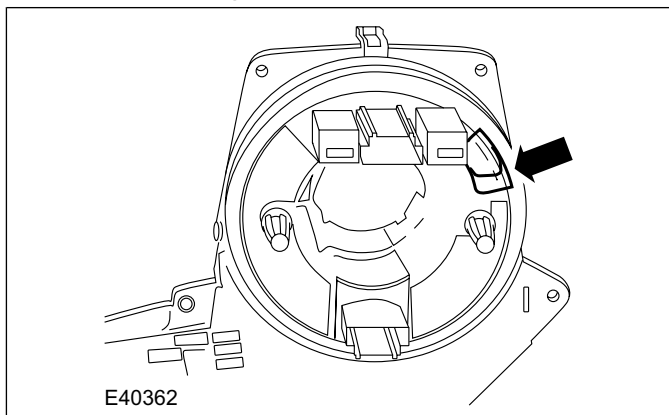
- Remove the tape securing the clockspring.



- NOTE:** When the clockspring is centralized, the U-shaped part of the flat flexible cable will be visible.

Check to see if the U-shaped part of the flat flexible cable is visible.

- Secure the clockspring rotor to the clockspring outer.



Item 4 Steering wheel

- CAUTION:** Make sure the road wheels are in the straight ahead position.

Install the steering wheel.

REMOVAL AND INSTALLATION

Yaw Rate Sensor and Accelerometer

NOTE: The yaw rate sensor and accelerometer cannot be separated.

1. Remove the right-hand front seat.

For additional information, refer to: **Front Seat (501-10 Seating, Removal and Installation)**.

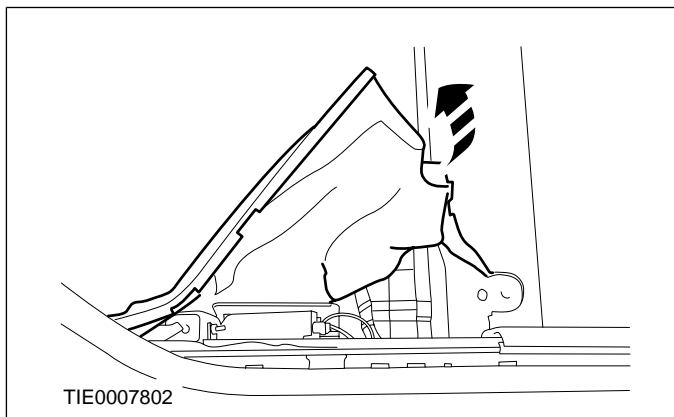
2. Remove the front scuff plate trim panel.

For additional information, refer to: **Front Scuff Plate Trim Panel (501-05 Interior Trim and Ornamentation, Removal and Installation)**.

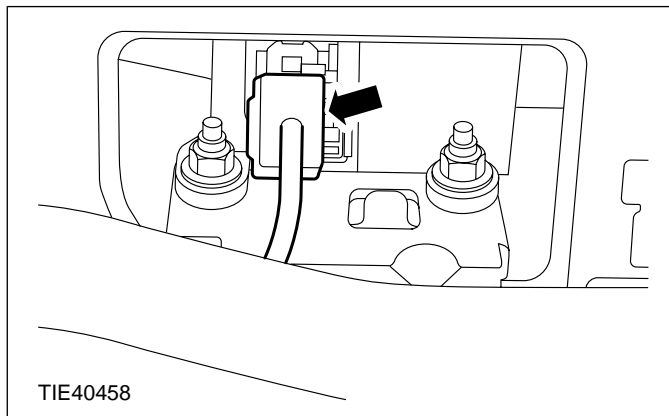
3. Remove the B-pillar trim panel.

For additional information, refer to: **B-Pillar Trim Panel (501-05 Interior Trim and Ornamentation, Removal and Installation)**.

4. Locally detach the carpet from the floor panel and crossmember.

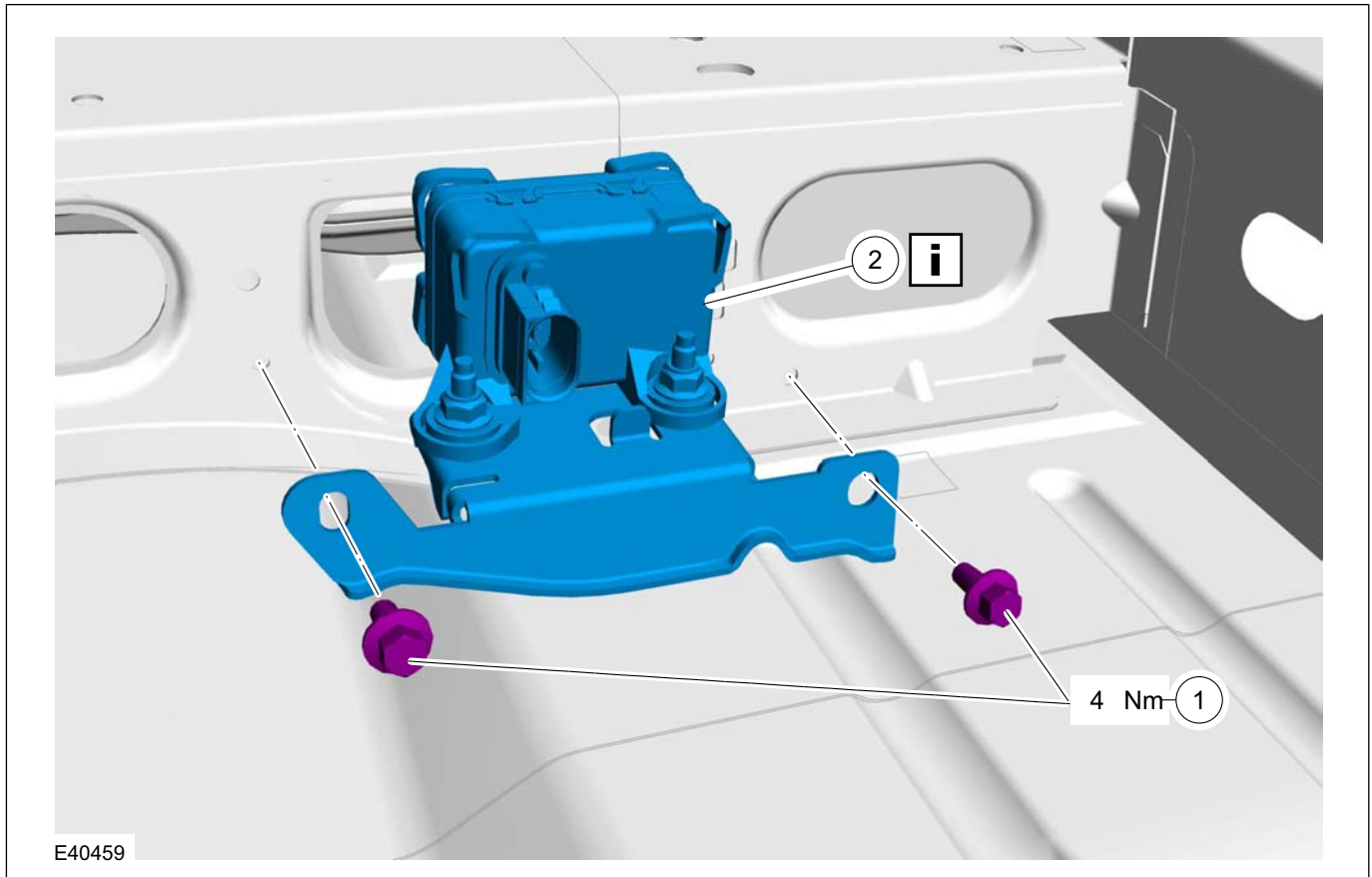


5. Disconnect the yaw rate sensor and accelerometer electrical connector and position it to one side.



6. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



Item	Description
1	Yaw rate sensor and accelerometer assembly bracket bolts
2	Yaw rate sensor and accelerometer assembly with bracket See Installation Detail

7. To install, reverse the removal procedure.

Installation Details

Item 2 Yaw rate sensor and accelerometer assembly with bracket

WARNING: Make sure the yaw rate sensor and accelerometer assembly is correctly positioned. Failure to follow this instruction may result in personal injury.

SECTION 211-00 Steering System - General Information

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS**Lubricants, Fluids, Sealers and Adhesives**

	Specifications
Grease	SA-M1C9107-A
Hydraulic Fluid	WSA-M2C195-A
Hydraulic Fluid	WSS-M2C204-A2

Steering Wheel Alignment

Description	Degrees
Maximum allowable steering wheel misalignment	+/- 3.00

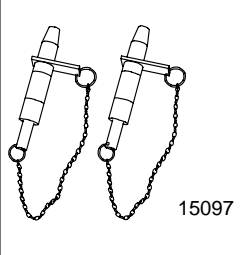
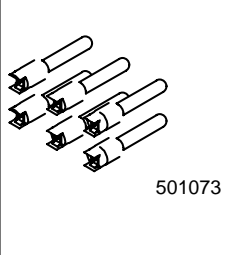
Turning Effort

Description	Nm	lb-in
Turning effort	8	71

DIAGNOSIS AND TESTING

Steering System

Special Tool(s)

 <p>15097</p>	<p>Alignment Pins, Subframe 205-316 (15-097A)</p>
 <p>501073</p>	<p>Simulator, Driver and Passenger Air Bags and Side Air Curtains 501-073 (40-016)</p>

General Equipment

<p>Worldwide Diagnostic System (WDS)</p>
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Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> • Tire pressure(s) • Loose tie-rod end(s) • Loose strut and spring assemblies or ball joints • Loose pinch bolts on steering column shaft flexible coupling • Wheels and tires • Power steering line fluid leaks • Steering gear bellows 	<ul style="list-style-type: none"> • Battery • Battery cables • Steering angle sensor electrical connector • Power steering pump control module electrical connectors • Power steering pump control module ground cable • Power steering pump control module ground cable retaining screw • Steering angle sensor warning indicator • Fuse(s)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Symptom Chart

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • Drift left or right 	<ul style="list-style-type: none"> • Vehicle attitude incorrect (front or rear is high or low). • Incorrect wheel alignment. 	<ul style="list-style-type: none"> • CHECK for abnormal loading, coil spring sag or non-standard springs. • CHECK the wheel alignment and ADJUST if necessary. REFER to: (204-00 Suspension System - General Information) Specifications (Specifications), Front Toe Adjustment (General Procedures).

211-00-4

Steering System - General Information

211-00-4

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Incorrect front axle cross-member alignment. 	<ul style="list-style-type: none"> Using the special tool, CHECK the front axle crossmember alignment.
	<ul style="list-style-type: none"> Worn front wheel bearings. 	<ul style="list-style-type: none"> CHECK and INSTALL new wheel hubs as necessary. REFER to: Wheel Hub (204-01 Front Suspension, Removal and Installation).
	<ul style="list-style-type: none"> Brake system. 	<ul style="list-style-type: none"> CHECK the brake system. REFER to: Brake System (206-00 Brake System - General Information, Diagnosis and Testing).
	<ul style="list-style-type: none"> Steering linkage. 	<ul style="list-style-type: none"> CARRY OUT the Steering Linkage Component Test. REFER to Steering Linkage Component Test in this procedure.
	<ul style="list-style-type: none"> Steering gear. 	<ul style="list-style-type: none"> CARRY OUT the Steering Linkage Component Test. REFER to Steering Linkage Component Test in this procedure.
	<ul style="list-style-type: none"> Wheels and tires. 	<ul style="list-style-type: none"> REFER to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).
<ul style="list-style-type: none"> Steering wheel off center 	<ul style="list-style-type: none"> Vehicle attitude incorrect (front or rear is high or low). 	<ul style="list-style-type: none"> CHECK for abnormal loading, coil spring sag or non-standard springs.
	<ul style="list-style-type: none"> Incorrect wheel alignment. 	<ul style="list-style-type: none"> CHECK the wheel alignment and ADJUST if necessary. REFER to: (204-00 Suspension System - General Information) Specifications (Specifications), Front Toe Adjustment (General Procedures).
	<ul style="list-style-type: none"> Suspension lower arm ball joint. 	<ul style="list-style-type: none"> CARRY OUT the Ball Joint Inspection Component Test. REFER to: Suspension System (204-00 Suspension System - General Information, Diagnosis and Testing).
	<ul style="list-style-type: none"> Steering linkage. 	<ul style="list-style-type: none"> CARRY OUT the Steering Linkage Component Test. REFER to Steering Linkage Component Test in this procedure.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Steering gear. 	<ul style="list-style-type: none"> CARRY OUT the Steering Linkage Component Test. REFER to Steering Linkage Component Test in this procedure.
<ul style="list-style-type: none"> Vibration 	<ul style="list-style-type: none"> Incorrect wheel alignment. 	<ul style="list-style-type: none"> CHECK the wheel alignment and ADJUST if necessary. REFER to: (204-00 Suspension System - General Information) Specifications (Specifications), Front Toe Adjustment (General Procedures).
	<ul style="list-style-type: none"> Wheels and tires. 	<ul style="list-style-type: none"> CHECK the wheels and tires. BALANCE or INSTALL new wheels and tires as necessary. REFER to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).
	<ul style="list-style-type: none"> Damaged or worn front wheel bearings. 	<ul style="list-style-type: none"> CHECK and INSTALL new wheel hubs as necessary. REFER to: Wheel Hub (204-01 Front Suspension, Removal and Installation).
	<ul style="list-style-type: none"> Front strut and spring assemblies. 	<ul style="list-style-type: none"> CHECK and INSTALL new suspension components as necessary. REFER to: Suspension System (204-00 Suspension System - General Information, Diagnosis and Testing).
	<ul style="list-style-type: none"> Damaged front suspension lower arm(s). 	<ul style="list-style-type: none"> CHECK and INSTALL new suspension components as necessary. REFER to: Suspension System (204-00 Suspension System - General Information, Diagnosis and Testing).
	<ul style="list-style-type: none"> Steering linkage. 	<ul style="list-style-type: none"> CARRY OUT the Steering Linkage Component Test. REFER to Steering Linkage Component Test in this procedure.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Steering effort is high/low 	<ul style="list-style-type: none"> Power steering hose restriction. 	<ul style="list-style-type: none"> CHECK the power steering hoses for damage, kinks or restrictions. INSTALL new components as necessary. REFER to: (211-02 Power Steering) Power Steering Pump to Steering Gear Pressure Line - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (Removal and Installation), Steering Gear to Power Steering Fluid Reservoir Return Line - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (Removal and Installation).
	<ul style="list-style-type: none"> Power steering fluid. 	<ul style="list-style-type: none"> CHECK the power steering fluid level.
	<ul style="list-style-type: none"> Power steering pump. 	<ul style="list-style-type: none"> REFER to WDS.
	<ul style="list-style-type: none"> Steering column. 	<ul style="list-style-type: none"> CHECK if the floor covering is obstructing the steering gear pinion. CHECK the installation of the floor seal. CARRY OUT the Steering Column Universal Joint Component Test. REFER to Steering Column Universal Joint Component Test.
	<ul style="list-style-type: none"> Steering linkage. 	<ul style="list-style-type: none"> CARRY OUT the Steering Linkage Component Test. REFER to Steering Linkage Component Test in this procedure.
<ul style="list-style-type: none"> Excessive noise 	<ul style="list-style-type: none"> Steering gear. 	<ul style="list-style-type: none"> CARRY OUT the Steering Linkage Component Test. REFER to Steering Linkage Component Test in this procedure.
	<ul style="list-style-type: none"> Power steering operation noise. 	<ul style="list-style-type: none"> CARRY OUT the Power Steering Operation Noise Check. REFER to: Noise, Vibration and Harshness (NVH) (100-04 Noise, Vibration and Harshness, Diagnosis and Testing).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Aeration of the power steering fluid. 	<ul style="list-style-type: none"> BLEED the power steering system. REFER to: Power Steering System Bleeding - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (211-00 Steering System - General Information, General Procedures).
	<ul style="list-style-type: none"> Power steering lines. 	<ul style="list-style-type: none"> CHECK that the power steering line clamps are secure. REFER to: (211-02 Power Steering) Power Steering Pump to Steering Gear Pressure Line - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (Removal and Installation), Steering Gear to Power Steering Fluid Reservoir Return Line - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (Removal and Installation). CHECK the power steering lines for clearance from the vehicle body, front axle cross-member and steering gear. CHECK the steering gear transfer lines for clearance from the steering gear.
	<ul style="list-style-type: none"> Steering gear bushings worn or perished. 	<ul style="list-style-type: none"> CHECK and INSTALL new components as necessary. REFER to: Steering Gear (211-02 Power Steering, Removal and Installation).
	<ul style="list-style-type: none"> Loose steering gear retaining bolts. 	<ul style="list-style-type: none"> CHECK and INSTALL new bolts as necessary. REFER to: Steering Gear (211-02 Power Steering, Removal and Installation).
	<ul style="list-style-type: none"> Power steering pump rubber mountings. 	<ul style="list-style-type: none"> CHECK and INSTALL new power steering pump rubber mountings as necessary.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Power steering pump. 	<ul style="list-style-type: none"> INSTALL a new power steering pump. REFER to: Power Steering Pump - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (211-02 Power Steering, Removal and Installation).
	<ul style="list-style-type: none"> Tie-rod. 	<ul style="list-style-type: none"> CARRY OUT the Tie-Rod Component Test. REFER to Tie-Rod Component Test.
<ul style="list-style-type: none"> Steering does not vary with increased wheel rotation 	<ul style="list-style-type: none"> Worn tie-rod ends. 	<ul style="list-style-type: none"> INSTALL new components as necessary. REFER to: Tie Rod End (211-03 Steering Linkage, Removal and Installation).
	<ul style="list-style-type: none"> Worn front suspension bushings. 	<ul style="list-style-type: none"> CHECK and INSTALL new components as necessary. REFER to: Suspension System (204-00 Suspension System - General Information, Diagnosis and Testing).
	<ul style="list-style-type: none"> Worn suspension ball joints. 	<ul style="list-style-type: none"> CARRY OUT the Ball Joint Inspection Component Test. REFER to: Suspension System (204-00 Suspension System - General Information, Diagnosis and Testing).
	<ul style="list-style-type: none"> Steering gear bushings worn or perished. 	<ul style="list-style-type: none"> CHECK and INSTALL new components as necessary. REFER to: Steering Gear (211-02 Power Steering, Removal and Installation).
	<ul style="list-style-type: none"> Loose steering gear retaining bolts. 	<ul style="list-style-type: none"> CHECK and INSTALL new bolts as necessary. REFER to: Specifications (211-02 Power Steering, Specifications).
	<ul style="list-style-type: none"> Loose steering column retaining bolts. 	<ul style="list-style-type: none"> CHECK and INSTALL new bolts as necessary. REFER to: Specifications (211-04 Steering Column, Specifications).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Loose steering column to steering gear pinion retaining bolt. 	<ul style="list-style-type: none"> CHECK and INSTALL a new bolt as necessary. REFER to: Steering Gear (211-02 Power Steering, Removal and Installation).
	<ul style="list-style-type: none"> Excessive steering gear backlash. 	<ul style="list-style-type: none"> CARRY OUT the Steering Linkage Component Test. REFER to Steering Linkage Component Test in this procedure.
<ul style="list-style-type: none"> Steering assist does not vary with vehicle speed 	<ul style="list-style-type: none"> Powertrain control module (PCM). 	<ul style="list-style-type: none"> REFER to WDS.
	<ul style="list-style-type: none"> Electro-hydraulic power steering (EHPS) control module. 	<ul style="list-style-type: none"> REFER to WDS.
<p>NOTE: The warning light is illuminated when the ignition is switched ON for approximately three seconds then extinguishes.</p> <ul style="list-style-type: none"> Steering system warning light stays on 	<ul style="list-style-type: none"> Ignition circuit. Electro-hydraulic power steering (EHPS) control module ground circuit. 	<ul style="list-style-type: none"> GO to Pinpoint Test A.
	<ul style="list-style-type: none"> CAN circuit. 	<ul style="list-style-type: none"> REFER to WDS.
<ul style="list-style-type: none"> DTC B1238: Over temperature fault 	<ul style="list-style-type: none"> Electro-hydraulic power steering (EHPS) control module. 	<ul style="list-style-type: none"> CLEAR the DTCs. Drive the vehicle 30km (20 miles) or until the vehicle reaches normal operating temperature. REFER to WDS. If the DTC is present, INSTALL a new power steering pump. REFER to: Power Steering Pump - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (211-02 Power Steering, Removal and Installation). REPEAT the self-test, CLEAR the DTCs.
<ul style="list-style-type: none"> DTC B1317: Battery voltage high 	<ul style="list-style-type: none"> Charging system. 	<ul style="list-style-type: none"> CHECK the charging system. REFER to: Charging System (414-00 Charging System - General Information, Diagnosis and Testing). Repeat the self-test, CLEAR the DTCs.
<ul style="list-style-type: none"> DTC B1318: Battery voltage low 	<ul style="list-style-type: none"> Battery. Charging system. Circuit(s). 	<ul style="list-style-type: none"> GO to Pinpoint Test B.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> DTC B1342: Electro-hydraulic power steering (EHPS) control module is faulty 	<ul style="list-style-type: none"> EHPS control module. 	<ul style="list-style-type: none"> GO to Pinpoint Test C.
<ul style="list-style-type: none"> DTC B2477: Module configuration failure 	<ul style="list-style-type: none"> Electro-hydraulic power steering (EHPS) control module. 	<ul style="list-style-type: none"> CONFIGURE the EHPS control module. REFER to: Module Configuration (418-01 Module Configuration, General Procedures). REPEAT the self-test, CLEAR the DTCs.
<ul style="list-style-type: none"> DTC C1099: Electronic power steering motor malfunction 	<ul style="list-style-type: none"> Electro- hydraulic power steering (EHPS) control module. 	<ul style="list-style-type: none"> CLEAR the DTCs. Drive the vehicle 30km (20 miles) or until the vehicle reaches normal operating temperature. REFER to WDS. If the DTC is present, INSTALL a new power steering pump. REFER to: Power Steering Pump - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (211-02 Power Steering, Removal and Installation). REPEAT the self-test, CLEAR the DTCs.
<ul style="list-style-type: none"> DTC C1955: Steering angle sensor circuit open 	<ul style="list-style-type: none"> Circuit(s). 	<ul style="list-style-type: none"> GO to Pinpoint Test D.
<ul style="list-style-type: none"> DTC C1956: Steering angle sensor circuit failure 	<ul style="list-style-type: none"> Circuit(s). 	<ul style="list-style-type: none"> GO to Pinpoint Test E.
<ul style="list-style-type: none"> DTC P1796: CAN controller circuit (Bus off) 	<ul style="list-style-type: none"> Circuit(s). 	<ul style="list-style-type: none"> GO to Pinpoint Test F.

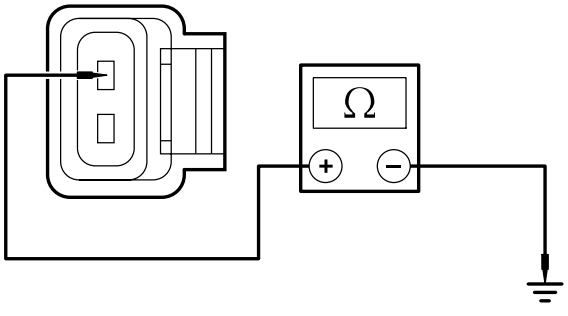
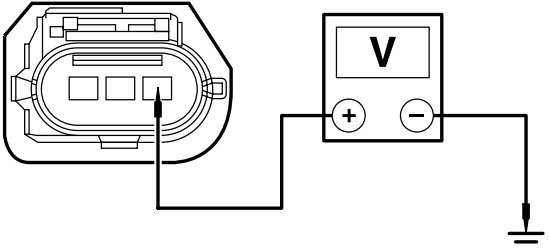
DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> DTC U1900: CAN communication bus fault 	<ul style="list-style-type: none"> Powertrain control module (PCM). 	<ul style="list-style-type: none"> Check the electronic engine controls. REFER to: (303-14 Electronic Engine Controls) Electronic Engine Controls - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (Description and Operation), Electronic Engine Controls - 1.6L Duratorq-TDCi (DV) Diesel (Description and Operation), Electronic Engine Controls - 1.8L Duratorq-TDCi (Lynx) Diesel (Description and Operation), Electronic Engine Controls - 2.0L Duratorq-TDCi (DW) Diesel (Description and Operation). REPEAT the self-test, CLEAR the DTCs.
	<ul style="list-style-type: none"> Circuit(s). 	<ul style="list-style-type: none"> CHECK the CAN bus, REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).
<ul style="list-style-type: none"> DTC U2011: Module transmitted invalid data 	<ul style="list-style-type: none"> Electro-hydraulic power steering (EHPS) control module. 	<ul style="list-style-type: none"> INSTALL a new power steering pump. REFER to: Power Steering Pump - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (211-02 Power Steering, Removal and Installation). REPEAT the self-test, CLEAR the DTCs.

PINPOINT TEST A : STEERING SYSTEM WARNING LIGHT STAYS ON

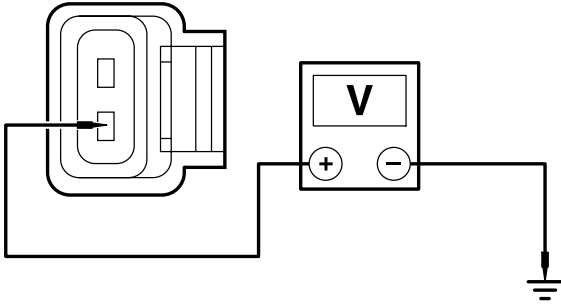
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: Use a digital multimeter for all electrical measurements.</p>	
<p>A1: CHECK THE ELECTRO-HYDRAULIC POWER STEERING (EHPS) CONTROL MODULE GROUND CIRCUIT</p>	
	<p>1 Disconnect EHPS Control Module C793.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE45521</p>	<p>2 Measure the resistance between the EHPS control module C793 pin 2, circuit 31-CE7 (BK), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes GO to A2. → No REPAIR circuit 31-CE7 (BK). TEST the system for normal operation.
A2: CHECK FOR IGNITION VOLTAGE TO THE EHPS CONTROL MODULE	
	<p>1 Disconnect EHPS Control Module C794.</p> <p>2 Ignition switch in position III.</p> <p>3 Ignition switch in position II.</p>
 <p>TIE45522</p>	<p>4 With the engine at 2000 rpm, measure the voltage between the EHPS control module C794 pin 1, circuit 15-CE7 (GN/BU), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes CHECK the CAN bus, REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing). → No GO to A3.
A3: CHECK FOR CONTINUITY BETWEEN THE BATTERY JUNCTION BOX (BJB) AND THE EHPS CONTROL MODULE	
	<p>1 Disconnect Fuse 22 (10A).</p> <p>2 Measure the resistance between the BJB fuse 22 (10A), harness side and the EHPS control module C794 pin 1, circuit 15-CE7 (GN/BU), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes REPAIR circuit 15-DC22 (GN/BU). TEST the system for normal operation. → No REPAIR circuit 15-CE7 (GN/BU). TEST the system for normal operation.

DIAGNOSIS AND TESTING

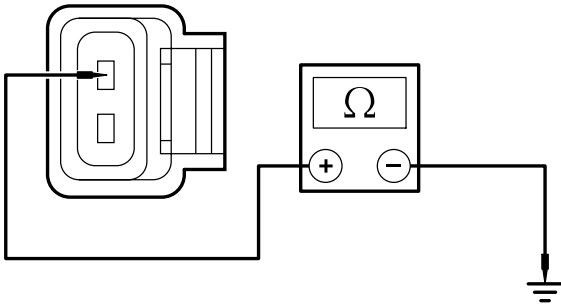
PINPOINT TEST B : DTC B1318: BATTERY VOLTAGE LOW

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: Use a digital multimeter for all electrical measurements.</p>	
<p>B1: CHECK THE BATTERY VOLTAGE</p>	
	<ol style="list-style-type: none"> 1 Ignition switch in position III. 2 Ignition switch in position II. 3 Check the battery voltage with the ignition in the ON position. <ul style="list-style-type: none"> • Is the battery voltage greater than 10 volts? → Yes GO to B2. → No CHECK the battery and charging system. REFER to: Charging System (414-00 Charging System - General Information, Diagnosis and Testing). REPEAT the self-test, CLEAR the DTCs.
<p>B2: CHECK FOR VOLTAGE TO THE ELECTRO-HYDRAULIC POWER STEERING (EHPS) CONTROL MODULE</p>	
 <p>TIE45523</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect EHPS Control Module C793. 3 Measure the voltage between the EHPS control module C793 pin 1, circuit 30-CE7 (RD), harness side and ground. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes GO to B3. → No REPAIR circuit 30-CE7 (RD). TEST the system for normal operation.
<p>B3: CHECK FOR CONTINUITY BETWEEN THE BATTERY JUNCTION BOX (BJB) AND THE EHPS CONTROL MODULE</p>	
	<ol style="list-style-type: none"> 1 Disconnect Fuse 2 (80A).

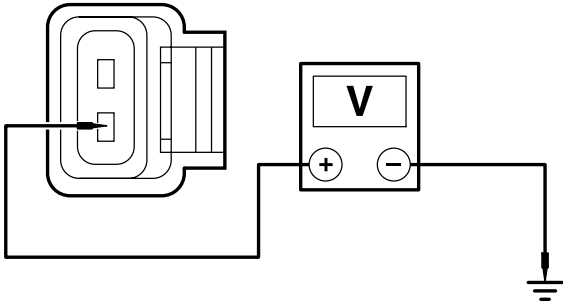
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the resistance between the BJB fuse 2 (80A), harness side and the EHPS control module C793 pin 1, circuit 30-CE7 (RD), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new power steering pump. REFER to: Power Steering Pump - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (211-02 Power Steering, Removal and Installation). REPEAT the self-test, CLEAR the DTCs.</p> <p>→ No REPAIR circuit 30-CE7 (RD). TEST the system for normal operation.</p>

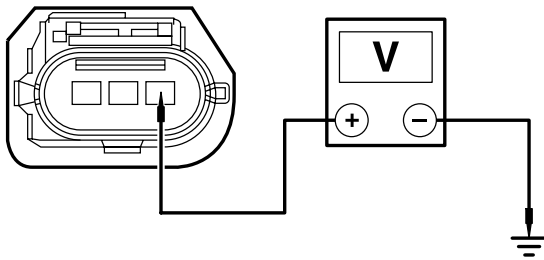
PINPOINT TEST C : DTC B1342: ELECTRO-HYDRAULIC POWER STEERING (EHPS) CONTROL MODULE IS FAULTY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: Use a digital multimeter for all electrical measurements.</p>	
<p>C1: CHECK THE EHPS CONTROL MODULE GROUND CIRCUIT</p>	
 <p>TIE45521</p>	<p>1 Disconnect EHPS Control Module C793.</p> <p>2 Short the digital multimeter probes together and make a note of the resistance.</p> <p>3 Measure and make a note of the resistance between the EHPS control module C793 pin 2, circuit 31-CE7 (BK), harness side and ground.</p>

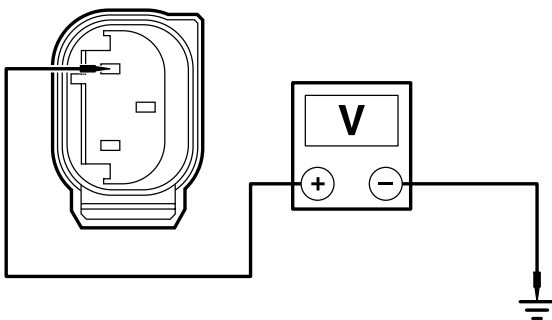
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 Calculate the real resistance value. Subtract step 2 resistance value from step 3 resistance value.</p> <ul style="list-style-type: none"> • Is the resistance less than 0.1 ohms? → Yes GO to C2. → No REPAIR circuit 31-CE7 (BK). TEST the system for normal operation.
C2: CHECK FOR VOLTAGE TO THE EHPS CONTROL MODULE	
 <p>TIE45523</p>	<p>1 Disconnect EHPS Control Module C793.</p> <p>2 Measure the voltage between the EHPS control module C793 pin 1, circuit 30-CE7 (RD), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes GO to C3. → No REPAIR circuit 30-CE7 (RD). TEST the system for normal operation.
C3: CHECK FOR IGNITION VOLTAGE TO THE EHPS CONTROL MODULE	
	<p>1 Disconnect EHPS Control Module C794.</p> <p>2 Ignition switch in position III.</p> <p>3 Ignition switch in position II.</p>

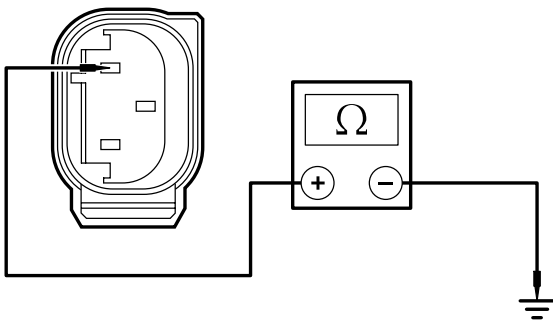
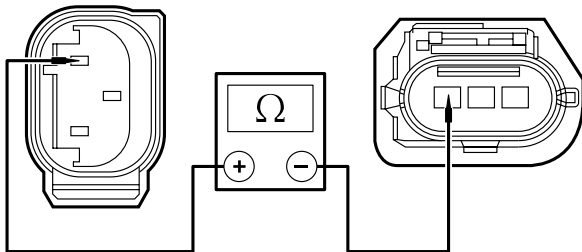
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE45522</p>	<p>4 With the engine at 2000 rpm, measure the voltage between the EHPS control module C794 pin 1, circuit 15-CE7 (GN/BU), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <p>→ Yes CLEAR the DTCs. REPEAT the self-test. If DTC B1342 remains, INSTALL a new power steering pump.</p> <p>REFER to: Power Steering Pump - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (211-02 Power Steering, Removal and Installation).</p> <p>→ No REPAIR circuit 15-CE7 (GN/BU). TEST the system for normal operation.</p>

PINPOINT TEST D : DTC C1955: STEERING ANGLE SENSOR CIRCUIT OPEN

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: Use a digital multimeter for all electrical measurements.</p>	
<p>D1: CHECK THE STEERING ANGLE SENSOR CIRCUIT FOR A SHORT TO BATTERY OR IGNITION</p>	
 <p>TIE45524</p>	<p>1 Disconnect Electro-Hydraulic Power Steering (EHPS) Control Module C792.</p> <p>2 Disconnect Steering Angle Sensor C795.</p> <p>3 Measure the voltage between the steering angle sensor C795 pin 1, circuit 8-CE10 (WH/VT), harness side and ground.</p> <ul style="list-style-type: none"> Is any voltage present? <p>→ Yes REPAIR circuit 8-CE10 (WH/VT). TEST the system for normal operation.</p> <p>→ No GO to D2.</p>

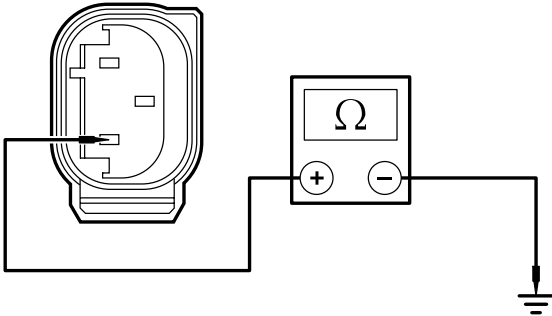
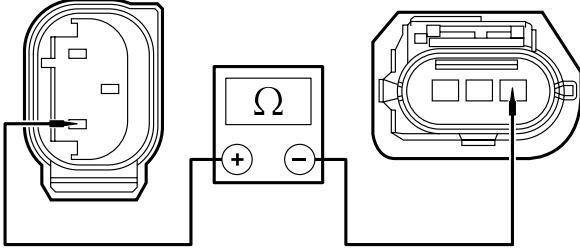
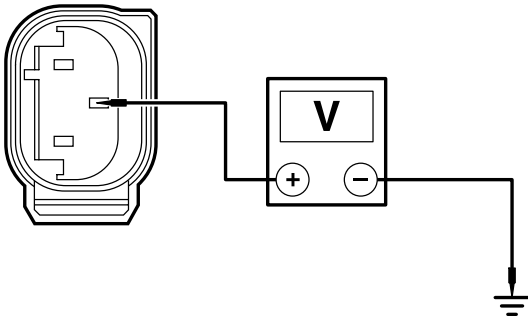
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D2: CHECK THE STEERING ANGLE SENSOR CIRCUIT FOR A SHORT TO GROUND	
 <p>TIE45525</p>	<p>1 Measure the resistance between the steering angle sensor C795 pin 1, circuit 8-CE10 (WH/VT), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? <p>→ Yes GO to D3.</p> <p>→ No REPAIR circuit 8-CE10 (WH/VT). TEST the system for normal operation.</p>
D3: CHECK FOR CONTINUITY BETWEEN THE STEERING ANGLE SENSOR AND THE EHPS CONTROL MODULE	
 <p>TIE45526</p>	<p>1 Measure the resistance between the steering angle sensor C795 pin 1, circuit 8-CE10 (WH/VT), harness side and the EHPS control module C792 pin 3, circuit 8-CE10 (WH/VT), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new steering angle sensor. REFER to: Steering Angle Sensor (211-02 Power Steering, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR circuit 8-CE10 (WH/VT). TEST the system for normal operation.</p>

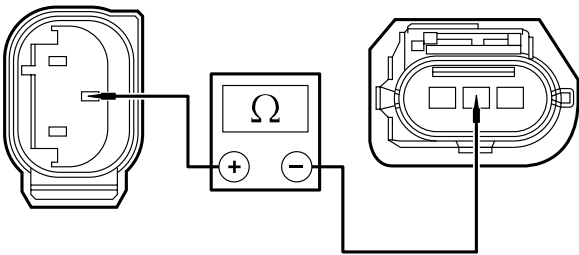
PINPOINT TEST E : DTC C1956: STEERING ANGLE SENSOR CIRCUIT FAILURE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
NOTE: Use a digital multimeter for all electrical measurements.	
E1: CHECK THE STEERING ANGLE SENSOR CIRCUIT FOR A SHORT TO GROUND	
	<p>1 Disconnect Steering Angle Sensor C795.</p> <p>2 Disconnect Electro-Hydraulic Power Steering (EHPS) Control Module C792.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE45527</p>	<p>3 Measure the resistance between the steering angle sensor C795 pin 3, circuit 7-CE10 (YE/VT), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? <p>→ Yes GO to E2.</p> <p>→ No REPAIR circuit 7-CE10 (YE/VT). TEST the system for normal operation.</p>
<p>E2: CHECK FOR CONTINUITY BETWEEN THE STEERING ANGLE SENSOR AND THE EHPS CONTROL MODULE</p>	
 <p>TIE45528</p>	<p>1 Measure the resistance between the steering angle sensor C795 pin 3, circuit 7-CE10 (YE/VT), harness side and the EHPS control module C792 pin 1, circuit 7-CE10 (YE/VT), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes GO to E3.</p> <p>→ No REPAIR circuit 7-CE10 (YE/VT). TEST the system for normal operation.</p>
<p>E3: CHECK THE STEERING ANGLE SENSOR CIRCUIT FOR A SHORT TO IGNITION</p>	
 <p>TIE45529</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the steering angle sensor C795 pin 2, circuit 9-CE10 (BN/WH), harness side and ground.</p> <ul style="list-style-type: none"> • Is any voltage present? <p>→ Yes REPAIR circuit 9-CE10 (BN/WH). TEST the system for normal operation.</p> <p>→ No GO to E4.</p>
<p>E4: CHECK FOR CONTINUITY BETWEEN THE STEERING ANGLE SENSOR AND THE EHPS CONTROL MODULE</p>	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE45530</p>	<p>2 Measure the resistance between the steering angle sensor C795 pin 2, circuit 9-CE10 (BN/WH), harness side and the EHPS control module C792 pin 2, circuit 9-CE10 (BN/WH), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes GO to E5.</p> <p>→ No REPAIR circuit 9-CE10 (BN/WH). TEST the system for normal operation.</p>
<p>E5: CHECK FOR CONTINUITY BETWEEN THE STEERING ANGLE SENSOR AND THE EHPS CONTROL MODULE</p>	
	<p>1 Disconnect Steering Angle Sensor C795.</p> <p>2 Clear the DTCs.</p> <p>3 Ignition switch in position III.</p> <p>4 Ignition switch in position II.</p> <p>5 REFER to WDS.</p> <ul style="list-style-type: none"> Is DTC C1956 present? <p>→ Yes INSTALL a new power steering pump. REFER to: Power Steering Pump - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (211-02 Power Steering, Removal and Installation). REPEAT the self-test, CLEAR the DTCs.</p> <p>→ No INSTALL a new steering angle sensor. REFER to: Steering Angle Sensor (211-02 Power Steering, Removal and Installation). REPEAT the self-test, CLEAR the DTCs.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST F : DTC P1796: CAN CONTROLLER CIRCUIT (BUS OFF)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
NOTE: Use a digital multimeter for all electrical measurements.	
F1: CHECK THE CAN BUS CIRCUIT	
	<p>1 Ignition switch in position II.</p> <ul style="list-style-type: none"> • Is WDS able to communicate with the instrument cluster? <p>→ Yes REPAIR circuit 4-EC7W (GY/RD) or circuit 5-EC7W (BU/RD). TEST the system for normal operation.</p> <p>→ No CHECK the CAN bus, REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).</p>

Components Tests

Steering Linkage

1. Grasp the steering wheel firmly and move it up and down and to the left and right without turning the steering wheel to check the steering column bearing for wear, steering column shaft for wear, steering wheel for looseness and steering column for looseness. If the steering column bearing or the steering column shaft is worn install a new steering column.

REFER to: **Steering Column** (211-04 Steering Column, Removal and Installation).

If the steering wheel or the steering column is loose, tighten the steering wheel or the steering column retaining bolts.

REFER to: **Specifications** (211-04 Steering Column, Specifications).

2. With the road wheels in the straight ahead position, gently turn the steering wheel to the left and the right to check for free play in the steering linkage.
3. There should be no excessive free play at the steering wheel rim. If there is excessive free play, CHECK the tie-rod inner and outer ball joints, REFER to Tie-Rod Component Test in this procedure. CHECK the steering column universal joint, REFER to Steering Column Universal Joint Component Test in this

procedure. If there is no free play in the tie-rod and the steering column, install a new steering gear.

REFER to: **Steering Gear** (211-02 Power Steering, Removal and Installation).

Tie-Rod

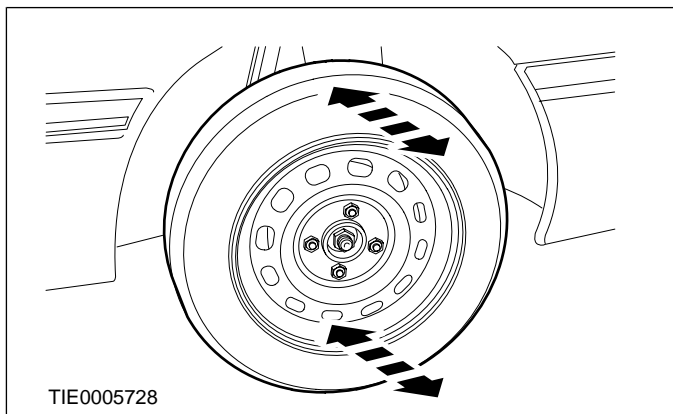
CAUTION: Steering gear boots must be handled carefully to avoid damage. Use new steering boot clamps when installing the steering gear boots.

NOTE: Noises such as knocks, which may appear to originate from the steering linkage, may also be generated by front suspension components.

REFER to: **Noise, Vibration and Harshness (NVH)** (100-04 Noise, Vibration and Harshness, Diagnosis and Testing).

1. Raise and support the vehicle. REFER to: **(100-02 Jacking and Lifting)** **Jacking** (Description and Operation), **Lifting** (Description and Operation).

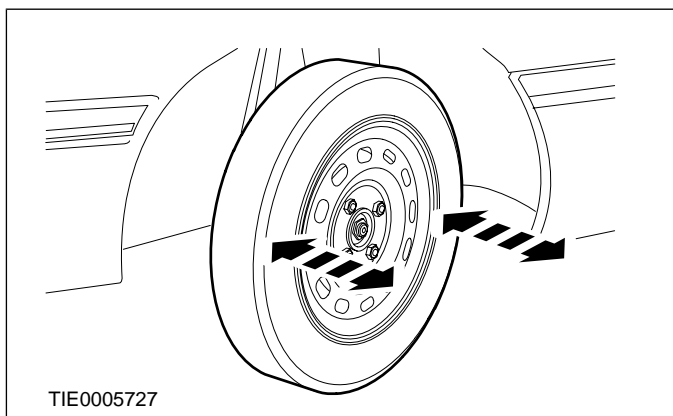
DIAGNOSIS AND TESTING



TIE0005728

2. Firmly grasp the road wheel and apply a rocking motion checking for any free play in the wheel bearing or suspension components.
3. **⚠ CAUTION:** To prevent damage to the steering linkage, turn the steering wheel to move the steering linkage to the right-hand steering lock stop.

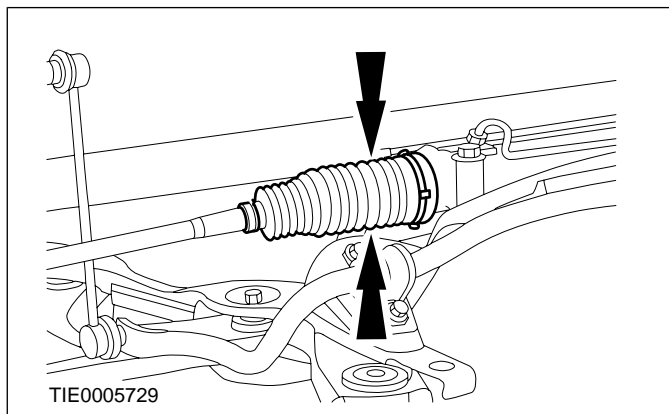
Turn the steering wheel to position the steering linkage against the right-hand steering lock stop.



TIE0005727

4. **NOTE:** To isolate the steering gear design clearance, check the right-hand steering linkage with the steering held against the right-hand steering lock stop.

With the aid of another technician holding the steering linkage against the right-hand steering lock stop, firmly grasp the road wheel and apply a rocking motion checking for any free play in the steering linkage.



TIE0005729

5. Detach the steering gear boot from the steering gear body and check for free play at the tie-rod inner ball joint.
6. If there is free play at the tie-rod inner ball joint, install a new tie-rod.

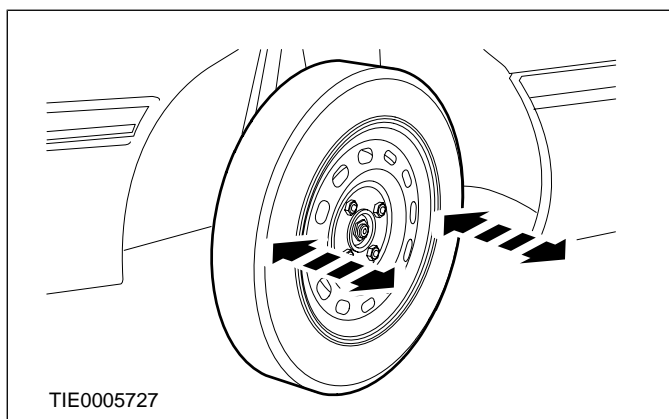
REFER to: Tie Rod (211-03 Steering Linkage, Removal and Installation).

7. Check the tie-rod end for free play. Install a new tie-rod end if necessary.

REFER to: Tie Rod End (211-03 Steering Linkage, Removal and Installation).

8. **⚠ CAUTION:** To prevent damage to the steering linkage, turn the steering wheel to move the steering linkage to the left-hand steering lock stop.

Turn the steering wheel to position the steering linkage against the left-hand steering lock stop.

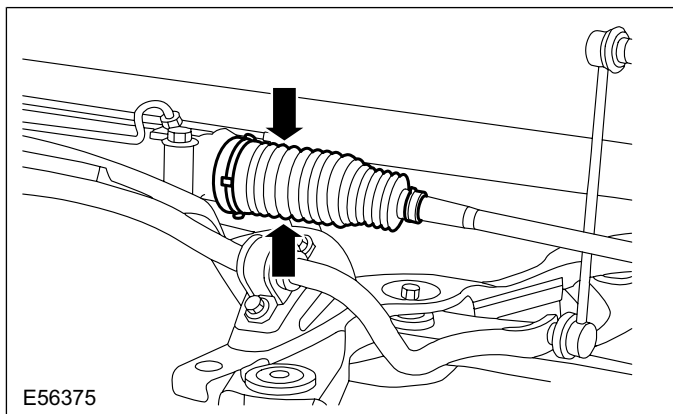


TIE0005727

9. **NOTE:** To isolate the steering gear design clearance, check the left-hand steering linkage with the steering held against the left-hand steering lock stop.

With the aid of another technician holding the steering against the left-hand steering lock stop, firmly grasp the road wheel and apply a rocking motion checking for any free play in the steering linkage.

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10. Detach the steering gear boot from the steering gear body and check for free play at the tie-rod inner ball joint.
11. If there is free play at the tie-rod inner ball joint, install a new tie-rod.

REFER to: **Tie Rod** (211-03 Steering Linkage, Removal and Installation).

12. Check the tie-rod end for free play. Install a new tie-rod end if necessary.

REFER to: **Tie Rod End** (211-03 Steering Linkage, Removal and Installation).

Turning Effort Test

NOTE: Before carrying out this test, make sure that the suspension components are serviceable.

NOTE: Before carrying out this test, make sure that the steering column is serviceable.

NOTE: Before carrying out this test, make sure that the toe adjustment and tire pressures are correct.

1. Park the vehicle on a dry, even surface and apply the parking brake.
2. Remove the driver air bag module. **REFER to:** (501-20 Supplemental Restraint System)

Driver Air Bag Module - Vehicles Built Up To: 06/2004 (Removal and Installation),

Driver Air Bag Module - Vehicles Built From: 06/2004 (Removal and Installation).

3. Connect the air bag simulators to the sub-harnesses in place of the driver air bag module at the top of the steering column.
4. Start the engine and turn the steering wheel from lock to lock several times until the power steering fluid has reached normal operating temperature.
5. Using a suitable torque wrench and socket, check the steering wheel turning effort.

6. If the steering wheel turning effort is greater than the specification, install a new steering gear. **REFER to:**

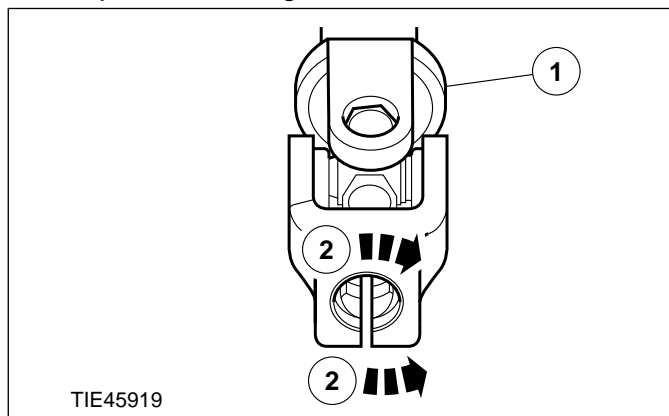
Specifications (211-00 Steering System - General Information, Specifications),
Steering Gear (211-02 Power Steering, Removal and Installation).

Steering Column Universal Joint

1. **▲WARNING:** Install a new steering column to steering gear pinion retaining bolt. Failure to follow this instruction may result in personal injury.

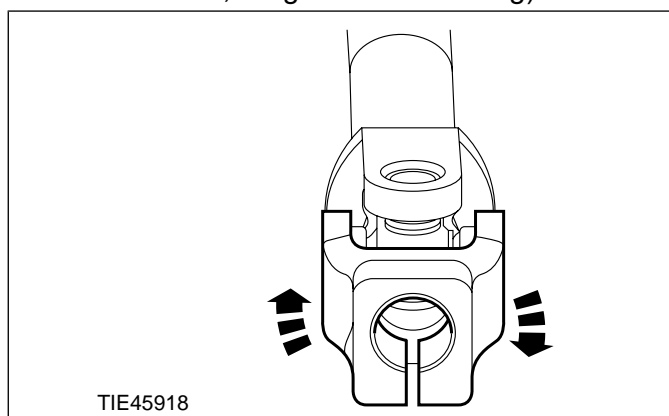
Detach the steering column from the steering gear pinion.

- Discard the steering column to steering gear pinion retaining bolt.



2. Check for smooth movement of the steering column universal joint.
 1. Hold the steering column universal joint yoke.
 2. Articulate the free yoke in a figure of eight movement.
 - If the movement is not smooth or resistance is felt, install a new steering column.

REFER to: **Steering Column** (211-04 Steering Column, Diagnosis and Testing).



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3. Hold both of the steering column universal joint yokes and twist them clockwise and counterclockwise.
 - If movement is felt, install a new steering column.

REFER to: [Steering Column](#) (211-04 Steering Column, Diagnosis and Testing).

DIAGNOSIS AND TESTING

Steering Gear Checks After a Collision

General Equipment

Feeler gauge

Straight edge

Items to be observed when checking the steering system

The following list of steering gear conditions and the methods of testing should be taken into account when carrying out checks to the steering system:

- If the steering gear has no faults after completing the following checks, do not install a new steering gear.
- Surface corrosion and marks on the tie-rod are acceptable.
- When checking for turning effort torque peaks in the steering gear, turn the steering wheel from steering lock stop to steering lock stop in approximately 15 seconds.
- A steady increase of turning effort torque from steering center to steering lock stop is acceptable.
- When checking for power steering fluid leaks, turn the steering wheel to the steering lock stop in approximately 10 seconds.
- Noises from the power steering, for example the power steering pump relief valve, are acceptable.

STEERING GEAR HOUSING

1. Raise and support the vehicle.

REFER to: [Lifting \(100-02, Description and Operation\)](#).

2. Visually inspect the steering gear housing for cracks and damage. If the steering gear housing is cracked or damaged, install a new steering gear.

REFER to: [Steering Gear](#) - Vehicles Built From: 12/2003 (211-02, Removal and Installation).

TIE-RODS

1. Using a straight edge and feeler gauge, check the tie-rods to see if they are straight. If the distance between the tie-rod and straight edge is greater than 0.5 mm, install a new steering gear.

REFER to: [Steering Gear - Vehicles Built From: 12/2003 \(211-02, Removal and Installation\)](#).

2. Check the tightening torque of the tie-rod end to wheel knuckle nut.

REFER to: [Tie Rod End](#) (211-03 Steering Linkage, Removal and Installation).

3. Check the tightening torque of the tie-rod end locking nut.

REFER to: [Tie Rod End](#) (211-03 Steering Linkage, Removal and Installation).

CHECK FOR TURNING EFFORT TORQUE PEAKS IN THE STEERING GEAR

1. Lower and support the vehicle making sure that the road wheels are just clear of the floor.
2. With the ignition switch in position I, slowly turn the steering wheel from steering lock stop to steering lock stop. If a turning effort torque peak or judder is felt while turning the steering wheel, detach the tie-rods from the wheel knuckles.
3. Slowly turn the steering wheel from steering lock stop to steering lock stop. If a turning effort torque peak or judder is felt while turning the steering wheel, install a new steering gear.

REFER to: [Steering Gear](#) - Vehicles Built From: 12/2003 (211-02, Removal and Installation).

CHECK FOR POWER STEERING FLUID LEAKS

1. Lower the vehicle.
2. Run the engine at a fast idle and slowly turn the steering wheel to the left-hand steering lock stop. Hold the steering wheel in this position for 5 seconds with a turning effort torque of 15 Nm at the steering wheel rim.
3. Turn the steering wheel away from the left-hand steering lock stop for 30 seconds.
4. Run the engine at a fast idle and slowly turn the steering wheel to the right-hand steering lock stop. Hold the steering wheel in this position for 5 seconds with a turning effort torque of 15 Nm at the steering wheel rim.

DIAGNOSIS AND TESTING

5. Turn the steering wheel away from the right-hand steering lock stop.
6. Check for power steering fluid leaks at the steering gear housing and the power steering line connections to the steering gear. If there is a power steering fluid leak at the steering gear, install a new steering gear.

REFER to: Steering Gear - Vehicles Built From: 12/2003 (211-02, Removal and Installation).

GENERAL PROCEDURES

Power Steering System Flushing — Vehicles With:
Electro-Hydraulic Power Steering (EHPS)(13 001 0)

Vehicles with 1.8L, 2.0L or diesel engine

1. Remove the headlight assembly.

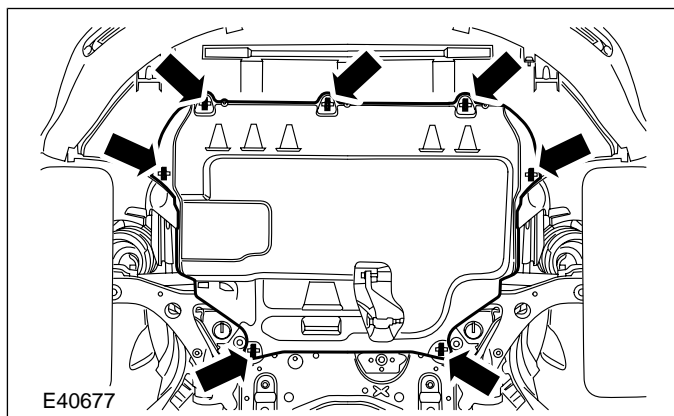
For additional information, refer to:
Headlamp Assembly (417-01 Exterior
Lighting, Removal and Installation).

All vehicles

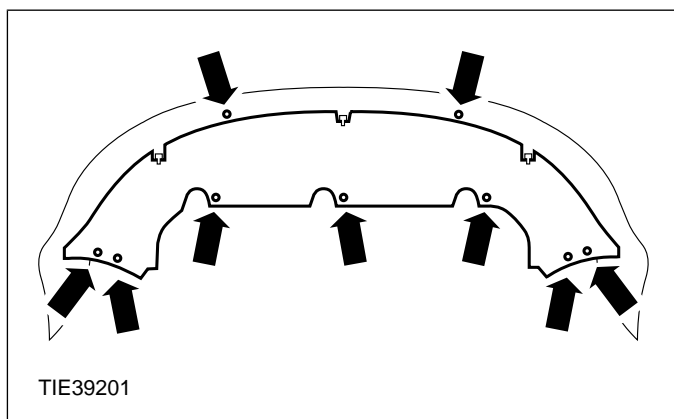
2. Raise and support the vehicle. For additional
information, refer to: (100-02 Jacking and
Lifting)

Jacking (Description and Operation),
Lifting (Description and Operation).

3. Remove the engine undershield (if equipped).

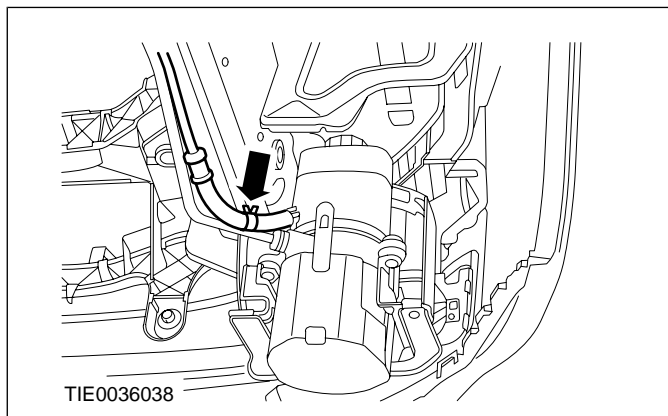


4. Remove the radiator splash shield.

5. NOTE: Using a suitable blanking cap, cap
the power steering fluid reservoir.

Disconnect the steering gear return line from
the power steering fluid reservoir.

- Allow the fluid to drain into a suitable
container.

6. Place the end of the steering gear return line
into a suitable container.7. Lower the vehicle until the wheels are clear
of the floor to allow the steering wheel to be
rotated from lock to lock.8. NOTE: When filling the power steering fluid
reservoir, make sure the fluid is clean and
not agitated prior to use. The fluid should be
poured slowly into the reservoir to minimize
the possibility of aeration. The fluid level
should be checked with the fluid cold.

Fill the power steering reservoir to the MAX
mark with the appropriate fluid.

For additional information, refer to:
Specifications (211-00 Steering System -
General Information, Specifications).

9. **CAUTION:** When flushing the power
steering system, make sure that the power
steering fluid in the reservoir does not fall
below the MIN mark.

NOTE: When filling the power steering fluid
reservoir, make sure the fluid is clean and not
agitated prior to use. The fluid should be poured
slowly into the reservoir to minimize the possibility
of aeration. The fluid level should be checked with
the fluid cold.

**Start the engine and slowly turn the steering
wheel from lock to lock.**

GENERAL PROCEDURES

- With the aid of another technician, add the appropriate fluid until the system is free of contaminated fluid.

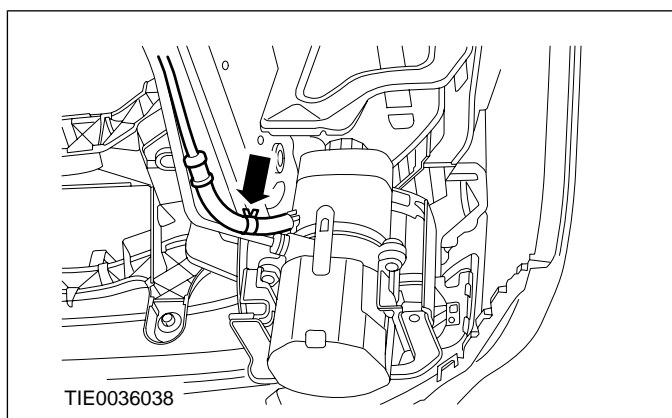
For additional information, refer to:

Specifications (211-00 Steering System - General Information, Specifications).

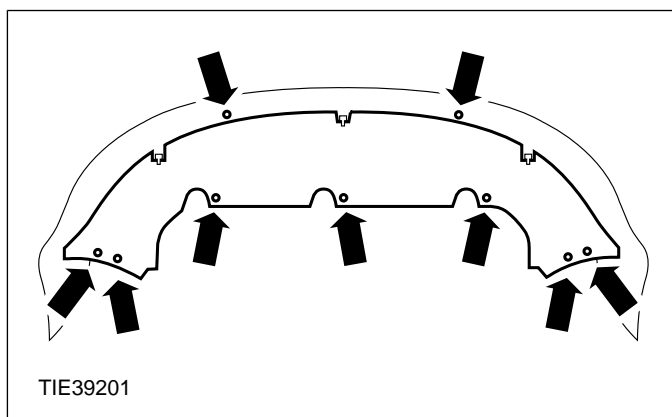
- 10. Raise and support the vehicle. For additional information, refer to: (100-02 Jacking and Lifting)**

Jacking (Description and Operation),
Lifting (Description and Operation).

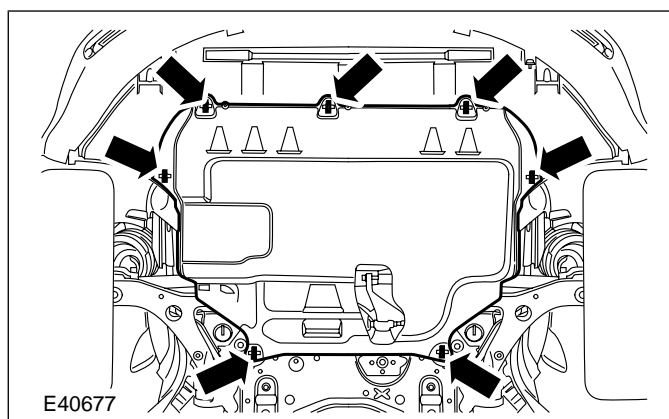
- 11. Remove the blanking cap from the power steering fluid reservoir and connect the power steering gear return line.**



- 12. Install the radiator splash shield.**



- 13. Install the engine undershield.**



- 14. Lower the vehicle.**

- 15. Fill the reservoir to the MAX mark with the appropriate fluid as necessary.**

For additional information, refer to:

Specifications (211-00 Steering System - General Information, Specifications).

Vehicles with 1.8L, 2.0L or diesel engine

- 16. Install the headlight assembly.**

For additional information, refer to:

Headlamp Assembly (417-01 Exterior Lighting, Removal and Installation).

GENERAL PROCEDURES

Power Steering System Bleeding — Vehicles With:
Electro-Hydraulic Power Steering (EHPS)(13 416 1)

Vehicles with 1.8L, 2.0L or diesel engine

1. Remove the headlamp assembly.

For additional information, refer to:
Headlamp Assembly (417-01 Exterior Lighting, Removal and Installation).

All vehicles

2. **NOTE:** When filling the power steering fluid reservoir, make sure the fluid is clean and not agitated prior to use. The fluid should be poured slowly into the reservoir to minimize the possibility of aeration. The fluid level should be checked with the fluid cold.

Fill the power steering reservoir to the MAX mark with the appropriate fluid.

For additional information, refer to:
Specifications (211-00 Steering System - General Information, Specifications).

3. Raise the vehicle until the road wheels are clear of the floor. Support the vehicle. For additional information, refer to: (100-02 Jacking and Lifting)

Jacking (Description and Operation),
Lifting (Description and Operation).

4. **NOTE:** Make sure the fluid in the reservoir does not fall below the MIN mark, as air could enter the system.

Start the engine and slowly turn the steering wheel from lock to lock until the air is expelled.

- With the aid of another technician, add the appropriate fluid until the system is free of contaminated fluid.

For additional information, refer to:
Specifications (211-00 Steering System - General Information, Specifications).

5. Switch OFF the engine and examine the hose connections, steering gear boots, valve body and pump for external leaks.

6. Check the fluid level. Fill the power steering fluid reservoir to the MAX mark with the appropriate fluid as necessary.

For additional information, refer to:
Specifications (211-00 Steering System - General Information, Specifications).

7. Start the engine, turn the steering wheel from lock to lock. If excessive noise is apparent, refer to the steering system diagnostic and testing.

For additional information, refer to: **Steering System - 1.6L (Z6)** (211-00 Steering System - General Information, Diagnosis and Testing).

8. If the noise level is still unacceptable, leave the vehicle standing overnight then start the engine and slowly turn the steering wheel from lock to lock until the air is expelled.

9. If the noise level is still unacceptable, install a new power steering pump.

For additional information, refer to: **Power Steering Pump - Vehicles With: Electro-Hydraulic Power Steering (EHPS)** (211-02 Power Steering, Removal and Installation).

10. Lower the vehicle.

Vehicles with 1.8L, 2.0L or diesel engine

11. Install the headlamp assembly.

For additional information, refer to:
Headlamp Assembly (417-01 Exterior Lighting, Removal and Installation).

GENERAL PROCEDURES

Power Steering System Filling — Vehicles With: Electro-Hydraulic Power Steering (EHPS)(13 002 0)

Vehicles with 1.8L, 2.0L or diesel engine

1. Remove the headlamp assembly.

For additional information, refer to:
Headlamp Assembly (417-01 Exterior Lighting, Removal and Installation).

All vehicles

2. **NOTE:** When filling the power steering fluid reservoir, make sure the fluid is clean and not agitated prior to use. The fluid should be poured slowly into the reservoir to minimize the possibility of aeration. The fluid level should be checked with the fluid cold.

Fill the power steering reservoir to the MAX mark with the appropriate fluid.

For additional information, refer to:
Specifications (211-00 Steering System - General Information, Specifications).

3. **NOTE:** Make sure the fluid in the reservoir does not fall below the MIN mark, as air could enter the system.

Start the engine and fill the power steering fluid reservoir to the MAX mark with the appropriate fluid as necessary.

For additional information, refer to:
Specifications (211-00 Steering System - General Information, Specifications).

4. Slowly turn the steering wheel from lock to lock five times.

5. Switch OFF the engine.

6. Fill the power steering fluid reservoir to the MAX mark with the appropriate fluid as necessary.

For additional information, refer to:
Specifications (211-00 Steering System - General Information, Specifications).

7. Start the engine and turn the steering wheel from lock to lock. If excessive noise is apparent, bleed the system.

For additional information, refer to: **Power Steering System Bleeding - Vehicles With: Electro-Hydraulic Power Steering (EHPS)** (211-00 Steering System - General Information, General Procedures).

8. Switch OFF the engine.

Vehicles with 1.8L, 2.0L or diesel engine

9. Install the headlamp assembly.

For additional information, refer to:
Headlamp Assembly (417-01 Exterior Lighting, Removal and Installation).

SECTION 211-02 Power Steering

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS**Lubricants, Fluids, Sealers and Adhesives**

	Specifications
Hydraulic fluid	WSA-M2C195-AA
Hydraulic fluid	WSS-M2C204-A2

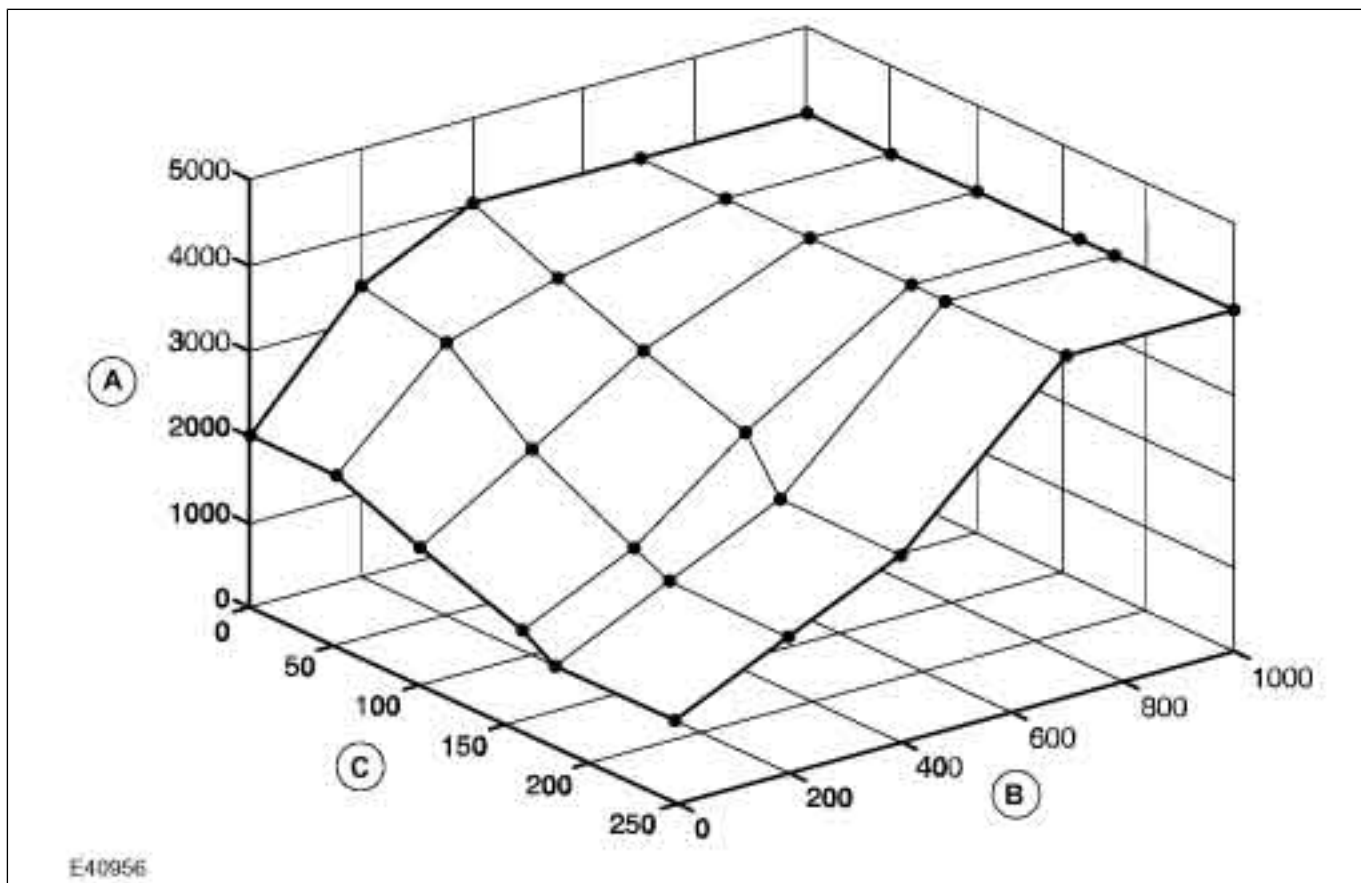
Torque Specifications

Item	Nm	lb-ft	lb-in
Steering column shaft to steering gear pinion retaining bolt	28	21	-
Steering angle sensor retaining screws	6	-	53
Power steering lines to steering gear valve body retaining screw	18	13	-
Steering gear mounting bolts	90	66	-
Tie-rod end retaining nut	48	35	-
Power steering fluid cooler retaining bolts	9	-	80
Power steering lines brackets to vehicle body retaining bolt	23	17	-
Power steering lines bracket to steering gear retaining bolt - Vehicles with 2.5L engine	4	-	35
Power steering lines front bracket to engine block retaining bolts - Vehicles with 2.5L engine	7	-	62
Power steering lines rear bracket to engine block retaining bolts - Vehicles with 2.5L engine	23	17	-
Power steering line to power steering pump union - Vehicles with 1.8L, 2.0L, 2.5L or diesel engine	30	22	-
Power steering line to power steering pump union - Vehicles with 1.4L or 1.6L engine	33	24	-
Power steering pump retaining bolts	23	17	-
Stabilizer connecting link to stabilizer bar retaining nut	48	35	-
Stabilizer bar retaining bolts	48	35	-
Engine support insulator retaining bolt	80	59	-
Front axle crossmember front retaining bolts	115	85	-
Front axle crossmember rear retaining bolts	275	203	-
Front axle crossmember bracket retaining bolts	70	52	-
Lower arm retaining nut	70	52	-
Steering gear heat shield retaining bolts	7	-	62

DESCRIPTION AND OPERATION

Power Steering

Electro-hydraulic power steering

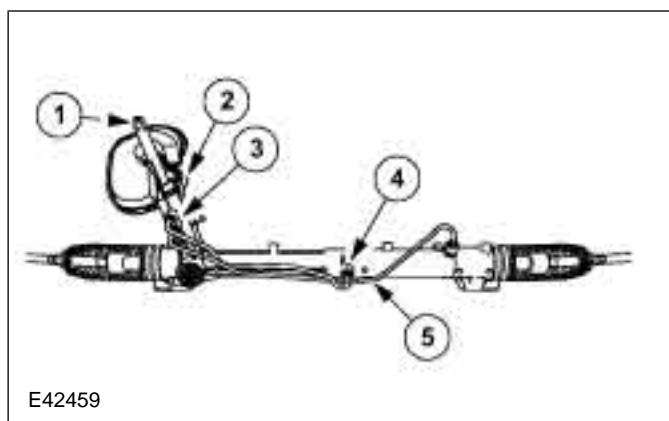


Item	Description
A	Pump speed (in rev/min)
B	Steer angle rate (in degrees/second)
C	Road speed (in km/h)

The electrohydraulic power steering system uses an electrically-driven hydraulic pump and a conventional rack and pinion steering system. This ensures precise steering operation and steering assistance with minimum energy consumption.

Under continuous monitoring of the turning speed of the steering wheel with the aid of the integrated steering angle sensor, and under evaluation of the vehicle speed input signal, the control module uses a map to adjust the rate of the pump.

Steering gear



Item	Description
1	Input shaft
2	Steering angle sensor
3	Valve body

DESCRIPTION AND OPERATION

Item	Description
4	Cylinder
5	Oil line

Conventional rack and pinion steering

Integrated steering angle sensor

Heat shield and cable grommet are part of the steering gear

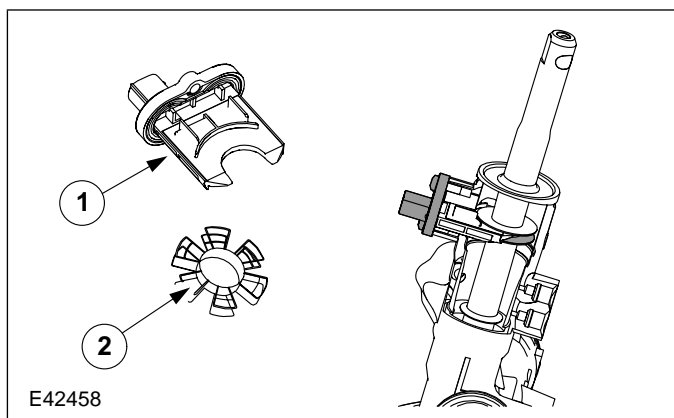
NOTE: The steering angle rotor is incorporated into the valve body of the steering gear and cannot be re-used.

Installed above the steering valve, the steering angle sensor forms an integral part of the rack and pinion steering system.

The steering angle sensor is an inductive sensor.

The steering angle sensor monitors the speed with which the steering wheel is being turned. This information is sent to the control module.

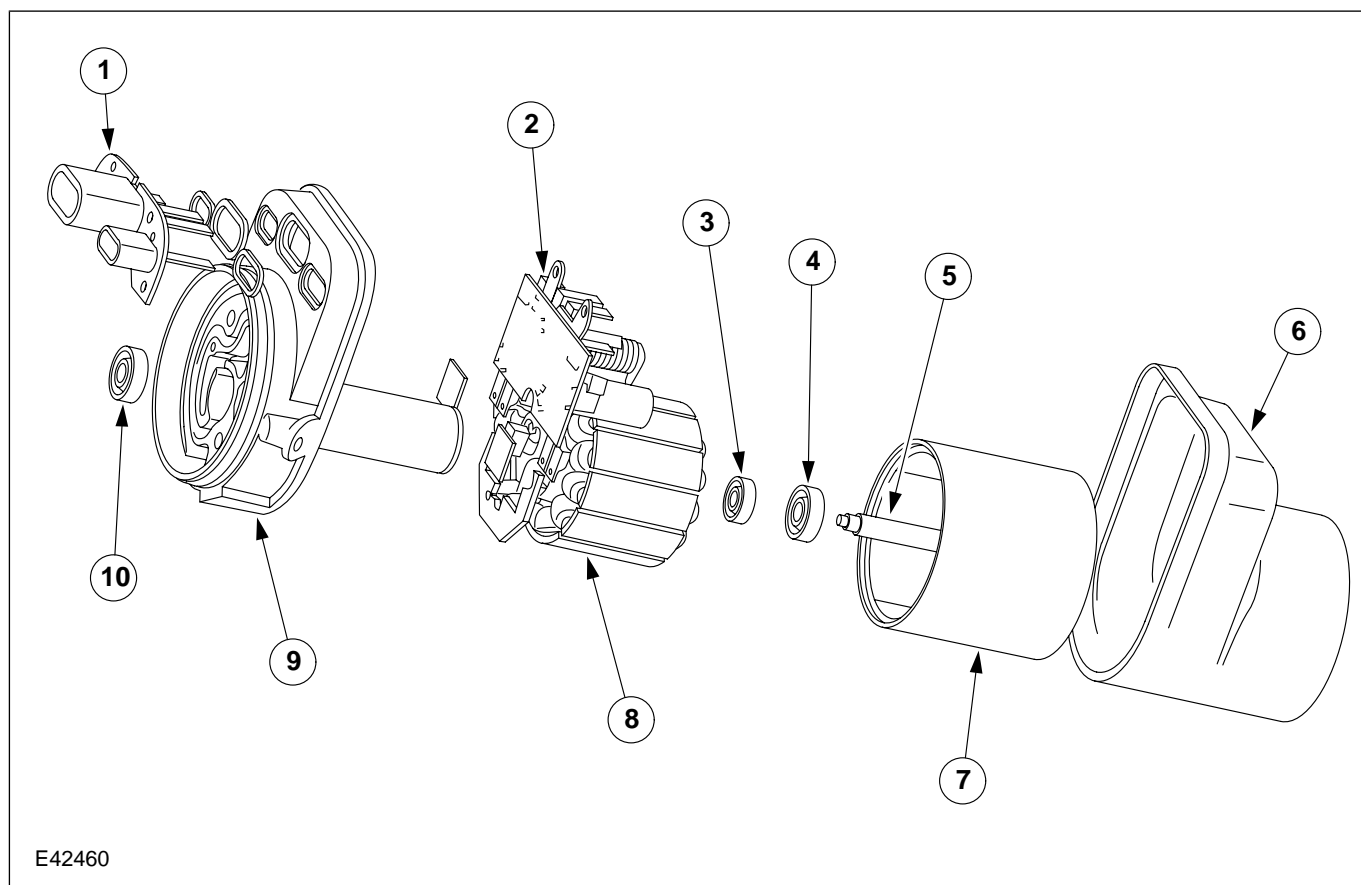
Integrated steering angle sensor



Item	Description
1	Steering angle sensor
2	Sensor wheel

DESCRIPTION AND OPERATION

Brushless direct current motor



E42460

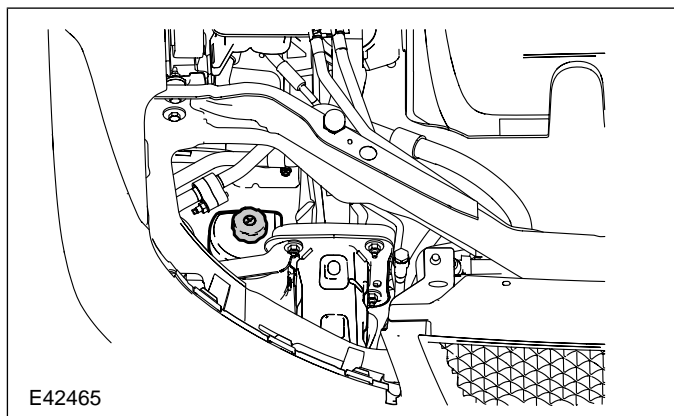
Item	Description
1	Connector
2	Control unit
3	Seal
4	Bearing
5	Shaft
6	Cover
7	Rotor with magnets
8	Stator
9	Distributor
10	Bearing

In the electrohydraulic power steering system, a brushless 12 volt direct current motor drives the hydraulic pump. Higher pumping rates are only provided when they are required for steering manoeuvres. This avoids unnecessary energy consumption in the majority of phases in a drive cycle.

Commutation in the motor is done electronically. As a result, there are no brushes to wear away. The entire system is designed for maintenance-free operation.

In more than 85% of all driving situations, the power steering pump operates at standby speed and consumes less than 4A. However, pump speed can quickly increase to full rotational speed if emergency steering manoeuvres require it.

The system has a continuously variable pump rotational speed.

DESCRIPTION AND OPERATION**Power steering pump**

NOTE: The power steering pump must be filled and vented as specified.

The power steering pump comprises an electric motor, the hydraulic pump and the reservoir for the power steering fluid.

Using a brushless motor increases reliability and prolongs service life.

The hydraulic pump is a gear pump; a resonance chamber incorporated into the pump body reduces noise emissions.

A pressure limiting valve built into the pump housing limits the hydraulic fluid pressure to a maximum of approx. 120 bar.

There is no service interval specified for the power steering fluid.



DIAGNOSIS AND TESTING

Power Steering

REFER to: Steering System - 1.6L (Z6) (211-00
Steering System - General Information, Diagnosis
and Testing).



REMOVAL AND INSTALLATION

Power Steering Pump — Vehicles With: Electro-Hydraulic Power Steering (EHPS)(13 434 0)

Special Tool(s)



General Equipment

Worldwide Diagnostic System (WDS)

Removal

All vehicles

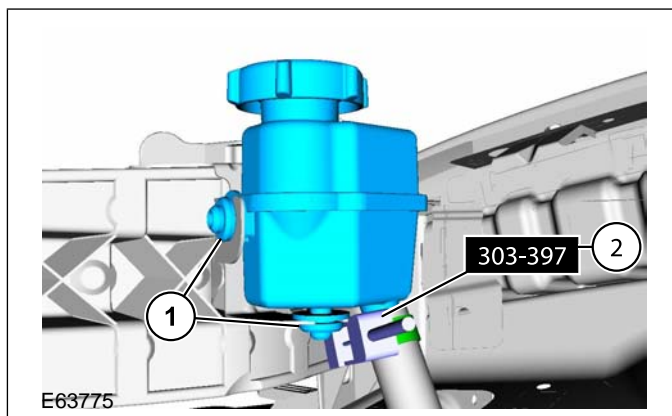
1. Obtain and record the power steering system program code using WDS.

Vehicles with 2.5L engine

2. **⚠ CAUTION:** Cap the power steering fluid reservoir extension outlet port and the power steering pump supply hose to prevent fluid loss or dirt ingress.

Remove the power steering fluid reservoir extension.

1. Detach the power steering fluid reservoir extension from the radiator grille opening panel reinforcement.
2. Using the special tool, detach the power steering pump supply hose from the power steering fluid reservoir extension.
 - Allow the fluid to drain into a suitable container.



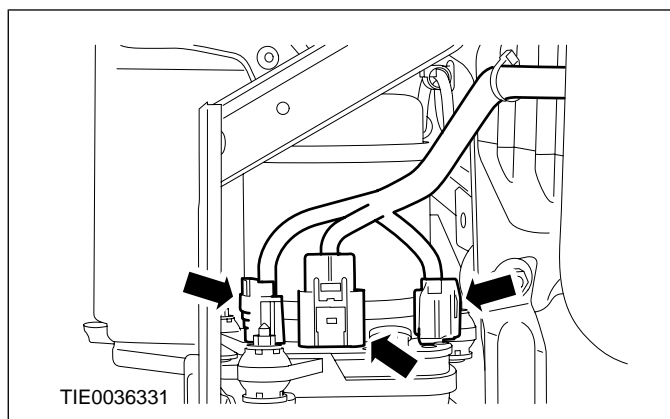
All vehicles

3. Remove the right-hand headlamp assembly.

For additional information, refer to:

Headlamp Assembly (417-01 Exterior Lighting, Removal and Installation).

4. Disconnect the power steering pump electrical connectors.

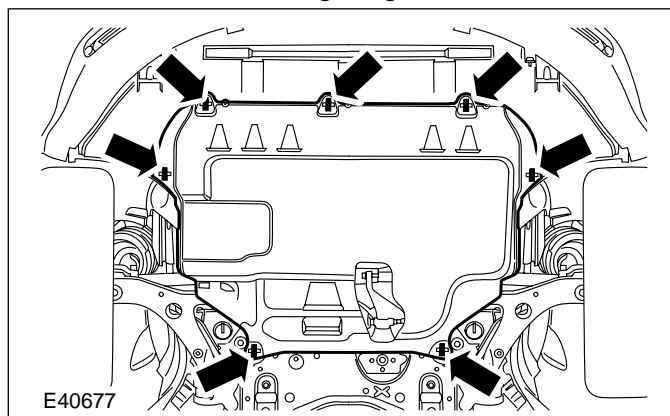


5. Remove the right-hand front wheel and tire.

For additional information, refer to: **Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).**

6. Remove the engine undershield.

- Rotate the locking tangs counterclockwise.



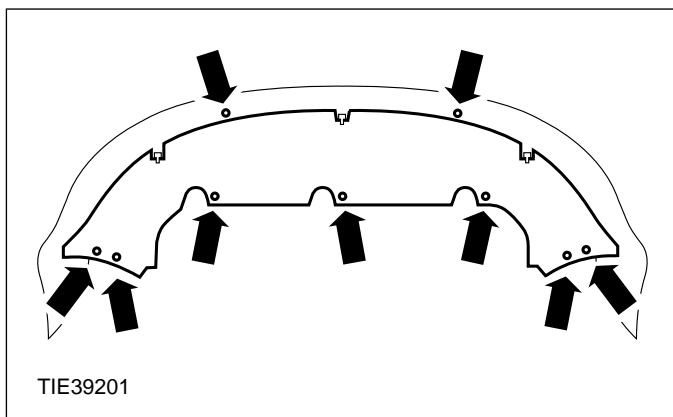
211-02-9

Power Steering

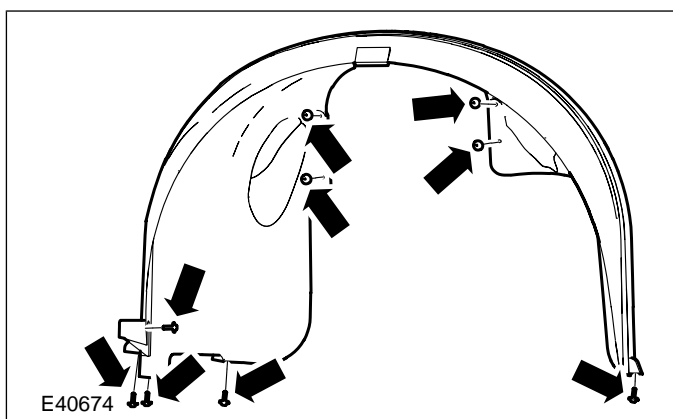
211-02-9

REMOVAL AND INSTALLATION

7. Remove the radiator splash shield.

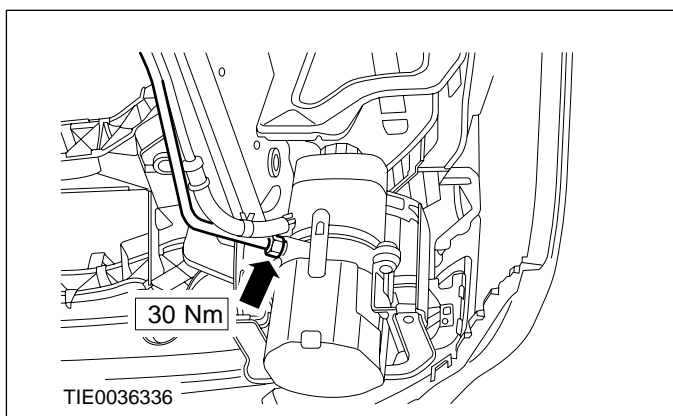


8. Remove the right-hand front fender splash shield.

9. **CAUTION:** Cap the power steering pump outlet union to prevent fluid loss or dirt ingress.

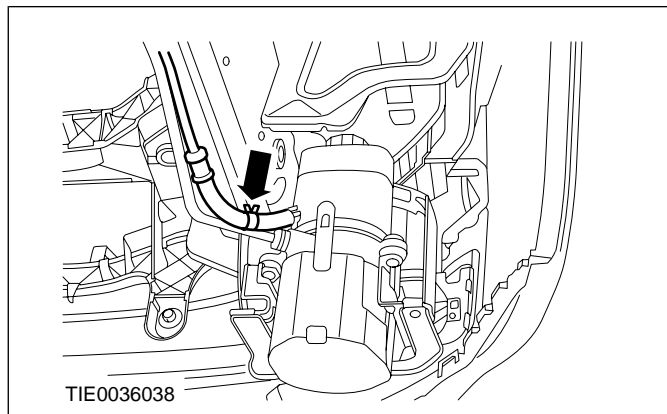
Disconnect the power steering pressure line from the power steering pump.

- Allow the fluid to drain into a suitable container.

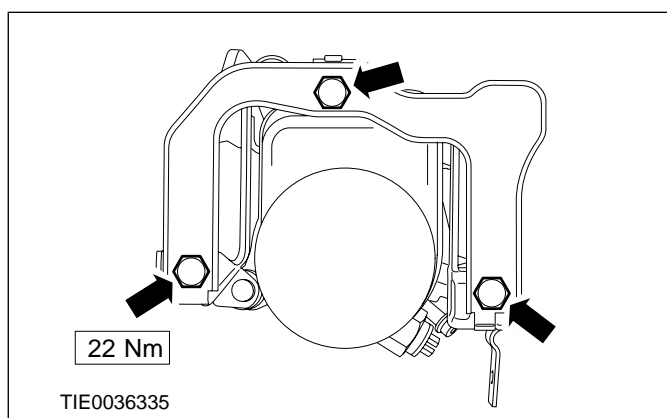
10. **CAUTION:** Cap the power steering fluid return line to prevent fluid loss or dirt ingress.

Disconnect the power steering fluid return line from the power steering pump.

- Allow the fluid to drain into a suitable container.



11. Remove the power steering pump.



Installation

- To install, reverse the removal procedure.
- Fill and bleed the power steering system. For additional information, refer to: (211-00 Steering System - General Information)

Power Steering System Filling - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (General Procedures),**Power Steering System Bleeding** - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (General Procedures).

- WARNING:** The power steering system must be re-configured. Failure to follow this instruction may result in personal injury.



REMOVAL AND INSTALLATION

Configure the EHPS control module.

For additional information, refer to: Module Configuration (**418-01 Module Configuration, General Procedures**).



REMOVAL AND INSTALLATION

Power Steering Pump to Steering Gear Pressure Line — Vehicles
With: Electro-Hydraulic Power Steering (EHPS)(13 440 0)

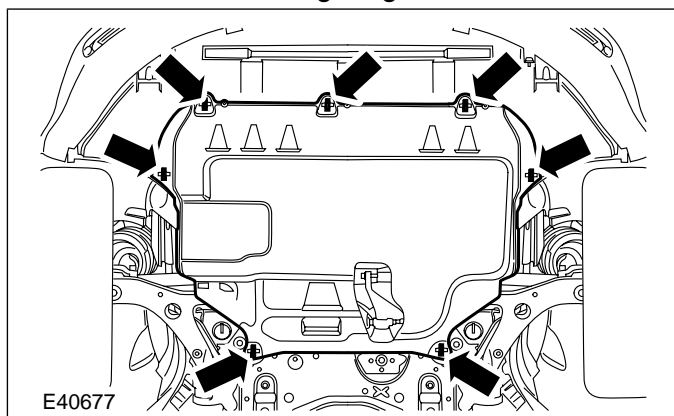
1. Raise and support the vehicle.

For additional information, refer to: **Jacking**
(100-02 Jacking and Lifting, Description
and Operation)

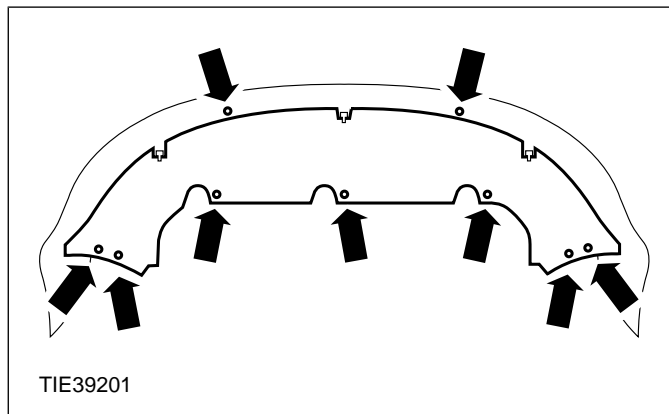
/ Lifting (100-02 Jacking and Lifting,
Description and Operation).

2. Remove the engine undershield.

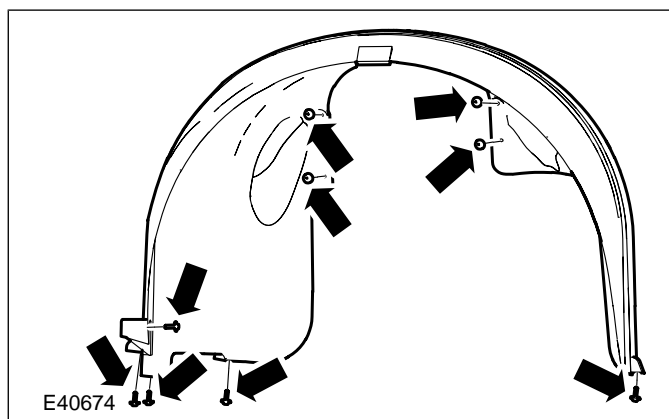
- Rotate the locking tangs counterclockwise.



3. Remove the radiator splash shield.

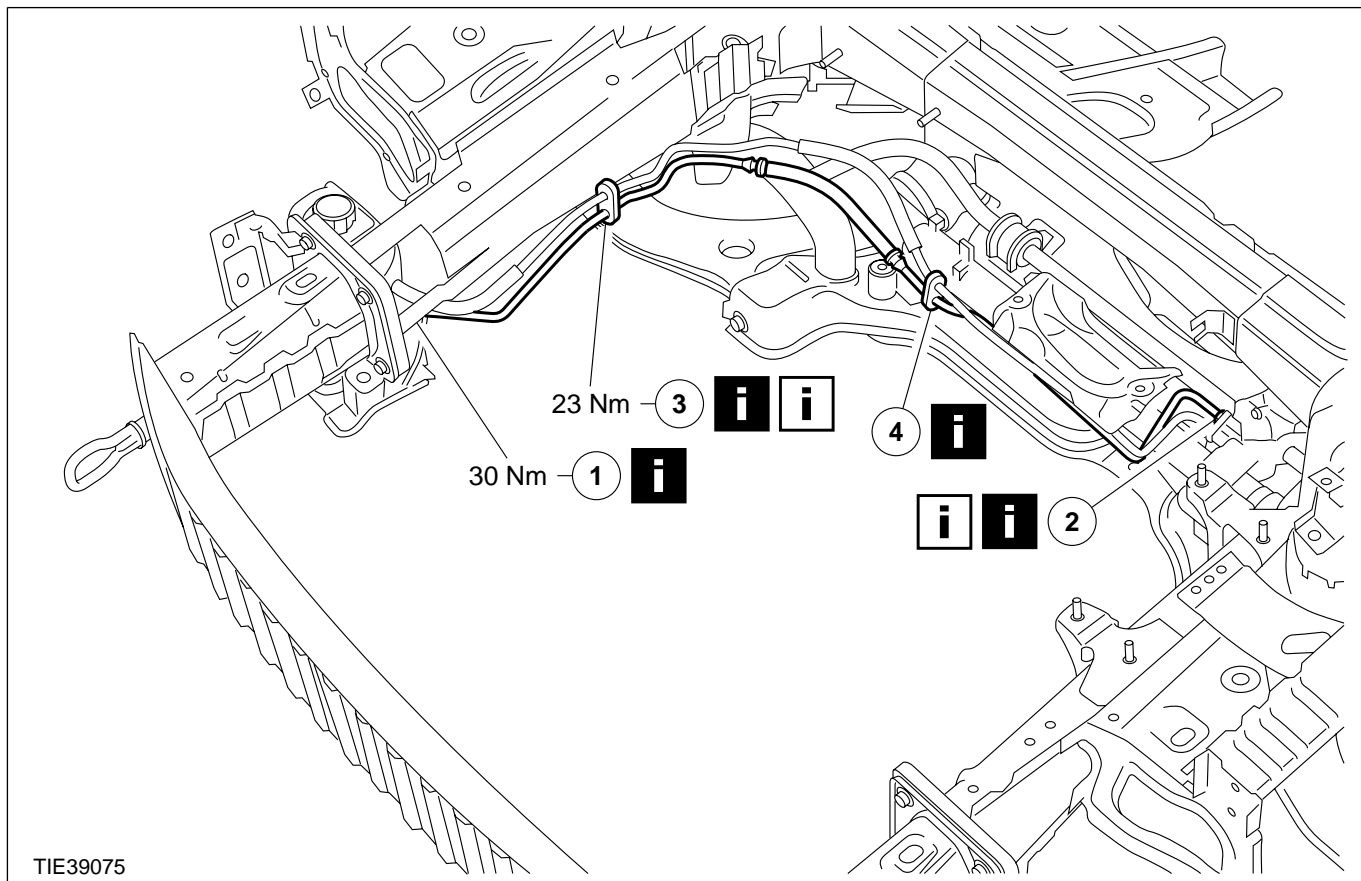


4. Remove the right-hand front fender splash shield.



5. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



TIE39075

Item	Description
1	Power steering pump union See Removal Detail
2	Power steering pump to steering gear pressure line retaining bolt See Removal Detail See Installation Detail
3	Power steering fluid lines support bracket to vehicle body See Removal Detail See Installation Detail
4	Power steering fluid lines support bracket to steering gear See Removal Detail

6. To install, reverse the removal procedure.

7. Fill and bleed the power steering system.

For additional information, refer to: **Power Steering System Flushing** - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (211-00 Steering System - General Information, General Procedures)

/ **Power Steering System Bleeding** - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (211-00 Steering System - General Information, General Procedures).

Removal Details

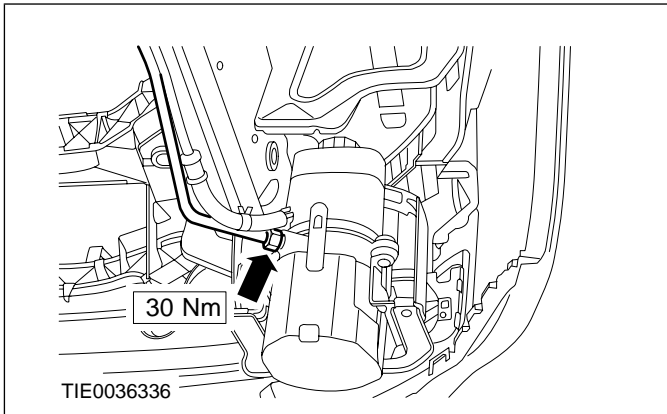
Item 1 Power steering pump union

1. **CAUTION:** Cap the power steering pump outlet union to prevent fluid loss or dirt ingress.

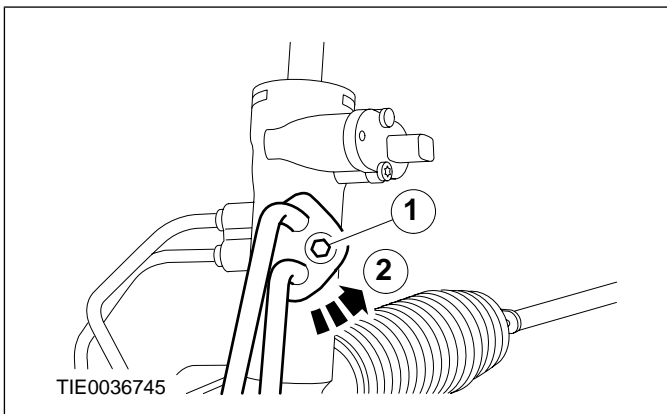
Disconnect the power steering pressure line from the power steering pump.

REMOVAL AND INSTALLATION

- Allow the fluid to drain into a suitable container.

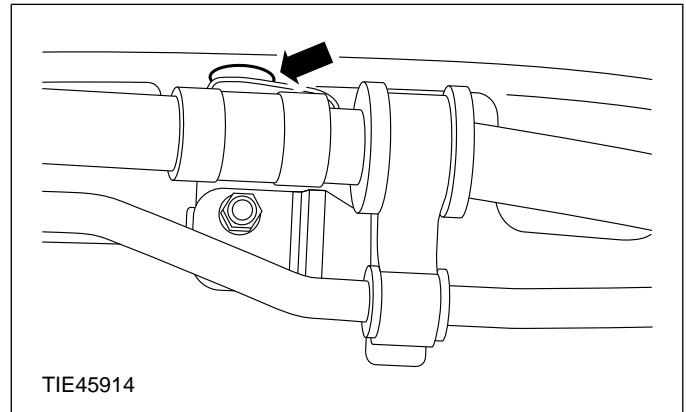
**Item 2 Power steering pump to steering gear pressure line retaining bolt****1. Disconnect the power steering lines from the steering gear valve body.**

1. Remove the retaining bolt.
 2. Rotate the clamp plate.
- Allow the fluid to drain into a suitable container.

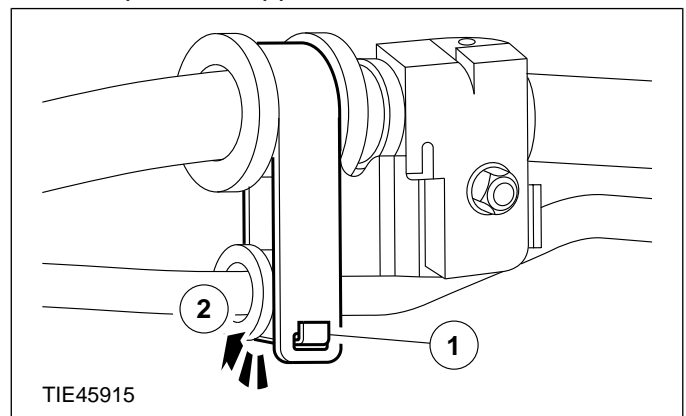
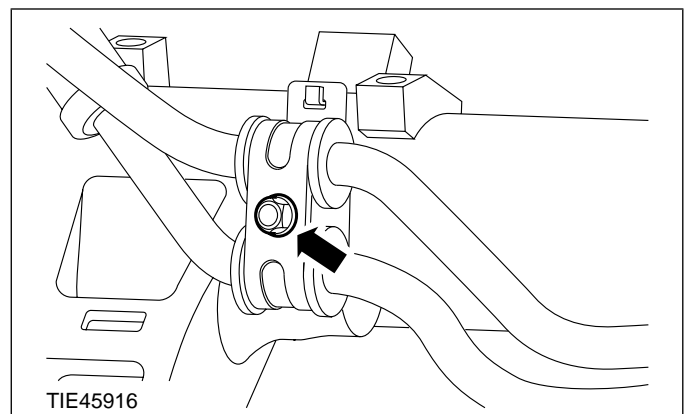
**Item 3 Power steering fluid lines support bracket to vehicle body**

1. **NOTE:** Note the position of the power steering fluid lines support bracket to aid installation.

Detach the power steering fluid lines bracket from the vehicle body.

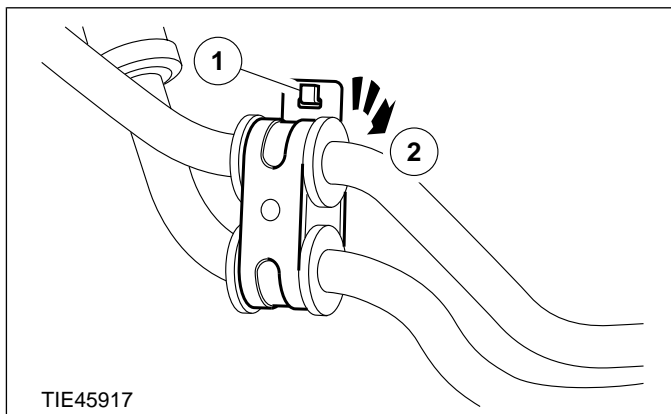
**2. Detach the power steering line to steering gear pressure line from the support bracket.**

1. Release the retaining clip.
2. Open the support bracket.

**Item 4 Power steering fluid lines support bracket to steering gear****1. Detach the power steering fluid lines support bracket from the steering gear.****2. Remove the power steering line to steering gear pressure line.**

REMOVAL AND INSTALLATION

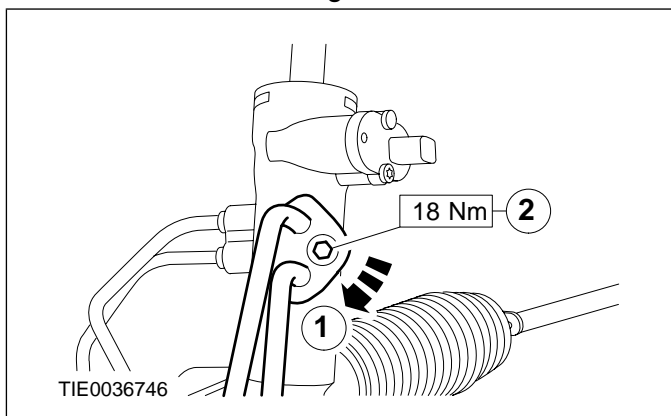
1. Release the retaining clip.
2. Open the support bracket.

**Installation Details****Item 3 Power steering fluid lines support bracket to vehicle body**

CAUTION: Make sure the power steering fluid lines are a minimum of 15 mm from the auxiliary drive belts.

Item 2 Power steering pump to steering gear pressure line retaining bolt**1. Connect the power steering lines to the steering gear valve body.**

1. Rotate the clamp plate.
2. Install the retaining bolt.



REMOVAL AND INSTALLATION

Power Steering Pressure Line and Return Line Assembly —
Vehicles With: Electro-Hydraulic Power Steering
(EHPS)(13 433 0)

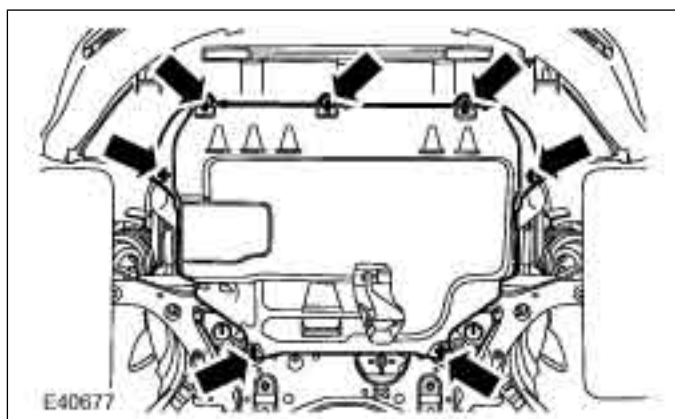
Removal

All vehicles

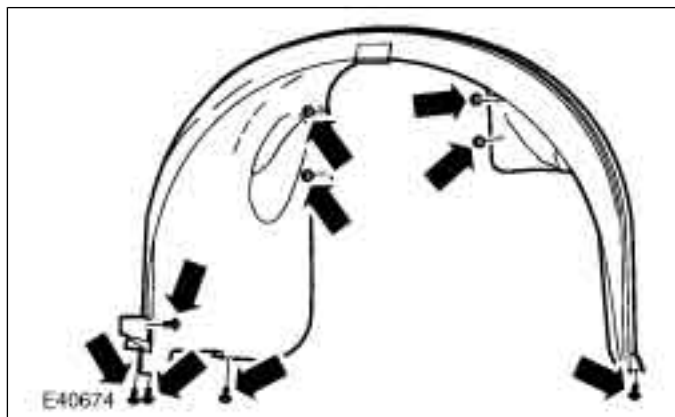
NOTE: Removal steps in this procedure may contain installation details.

1. Remove the right-hand front wheel and tire.
Refer to: **Wheel and Tire** (204-04 Wheels and Tires, Removal and Installation).

2.

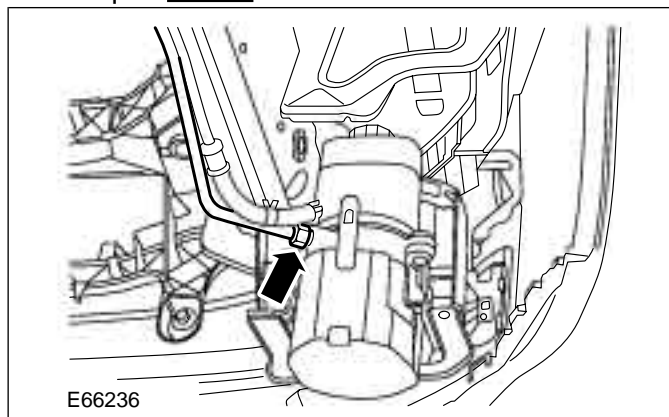


3.

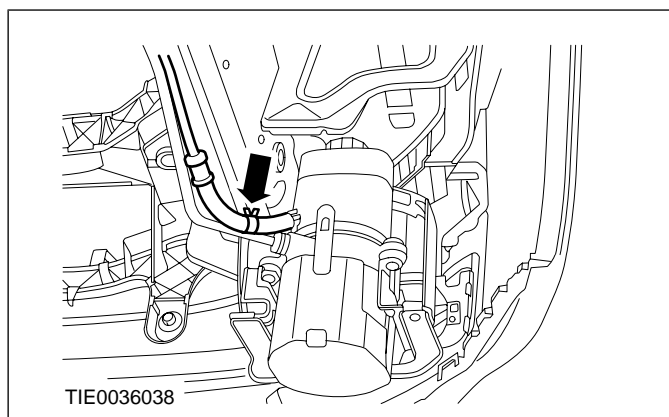


4. **CAUTION:** Make sure that all openings are sealed.

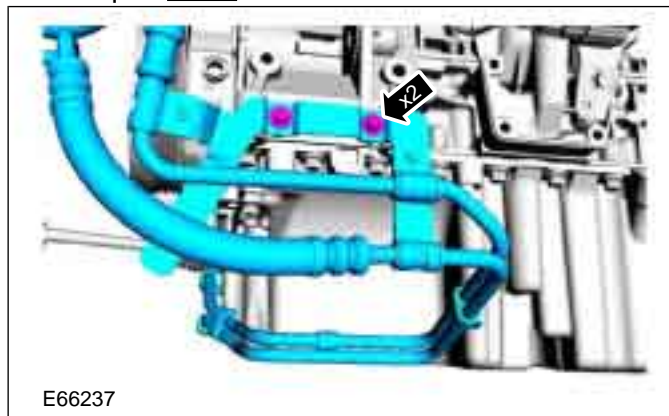
Torque: 30 Nm



5. **CAUTION:** Make sure that all openings are sealed.



6. Torque: 7 Nm

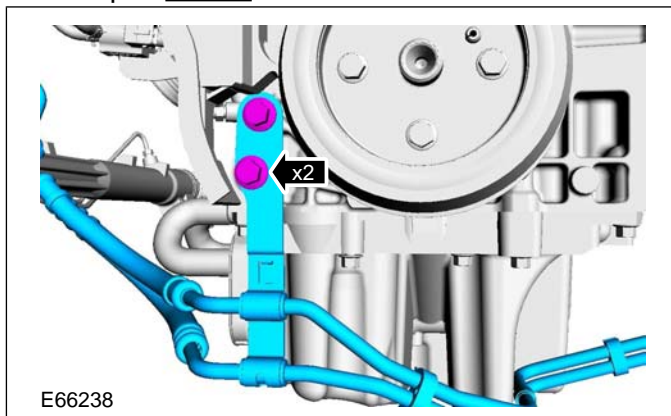
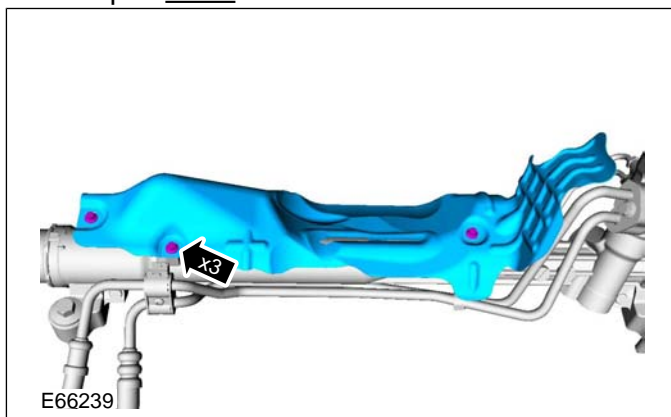


211-02-16

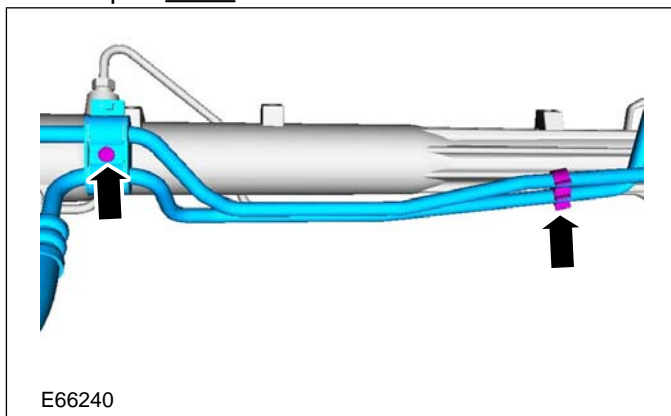
Power Steering

211-02-16

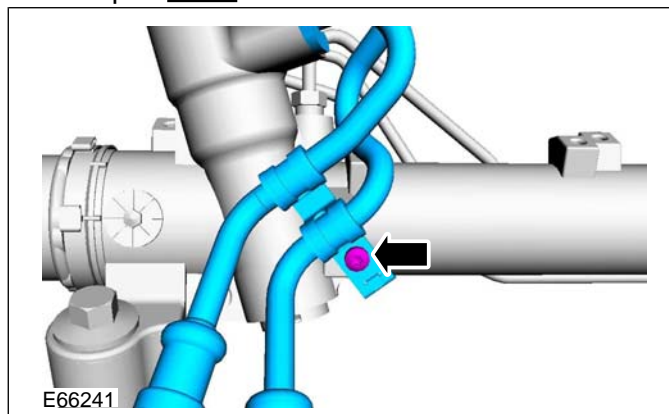
REMOVAL AND INSTALLATION

7. Torque: 23 Nm8. Torque: 7 Nm

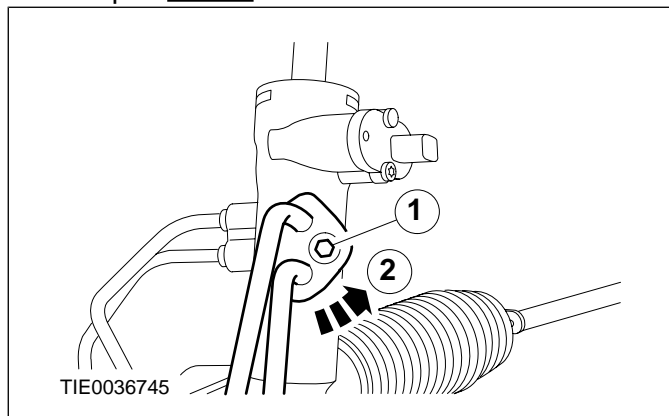
Left-hand drive vehicles

9. Torque: 4 Nm

Right-hand drive vehicles

10. Torque: 4 Nm

All vehicles

11. **⚠ CAUTION: Make sure that all openings are sealed.**Torque: 18 Nm

Installation

1. To install, reverse the removal procedure.
2. Fill the power steering system.

Refer to: **Power Steering System Filling - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (211-00 Steering System - General Information, General Procedures).**

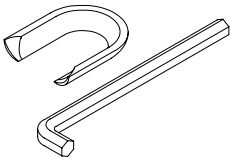
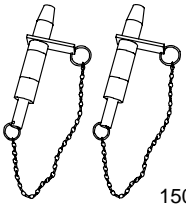
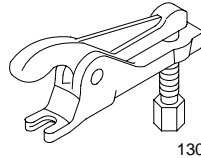
3. Bleed the power steering system.

Refer to: **Power Steering System Bleeding - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (211-00 Steering System - General Information, General Procedures).**

REMOVAL AND INSTALLATION

Steering Gear

Special Tool(s)

 <p>E42949</p>	<p>Protector, Ball Joint Gaiter 204-349</p>
 <p>15097A</p>	<p>Alignment Pins, Subframe 205-316 (15-097A)</p>
 <p>13006</p>	<p>Separator, Ball Joint 211-020 (13-006)</p>

General Equipment

Ball joint separator
Securing strap
Transmission jack

Materials

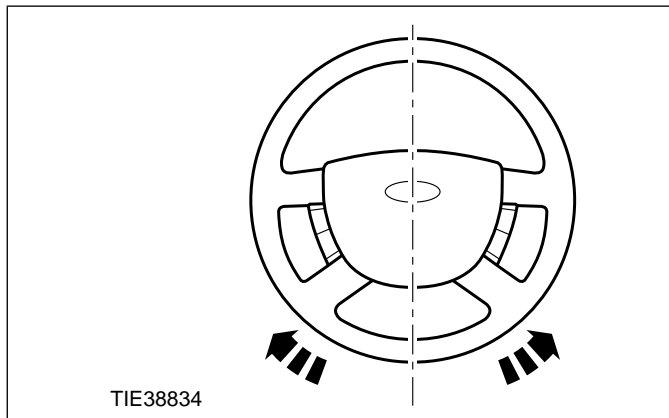
Name	Specification
Grease	SA-M1C9107-A

All vehicles

⚠ CAUTION: Make sure that the strut and spring assembly does not move in a forwards or rearwards direction, to prevent damage to the top mount center cup.

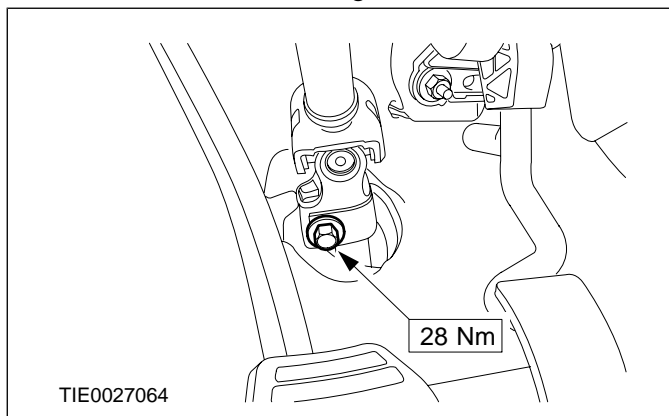
1. **NOTE:** Make sure that the road wheels are in the straight ahead position.

Centralize the steering wheel and lock it in position.



2. Detach the steering column shaft from the steering gear pinion.

- Discard the retaining bolt.

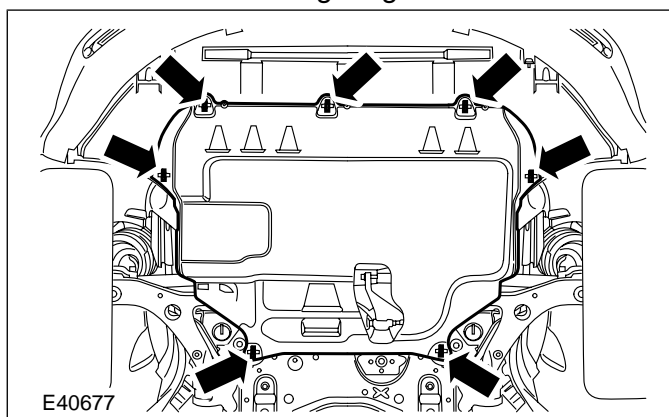


3. Remove the front wheels and tires.

For additional information, refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).

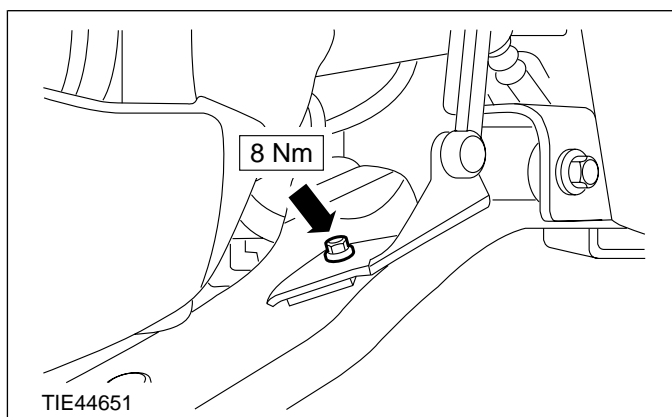
4. Remove the engine undershield (if equipped).

- Rotate the locking tangs counterclockwise.

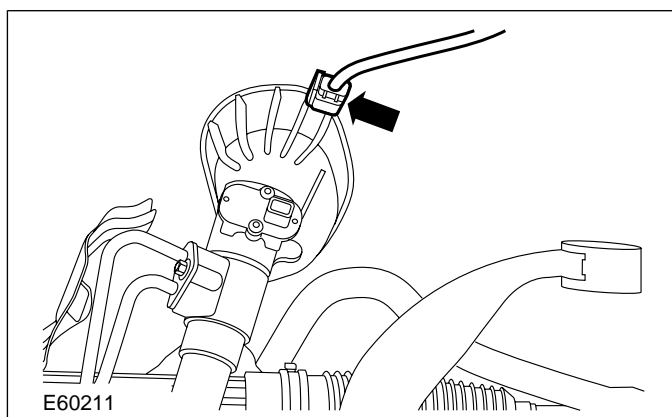


REMOVAL AND INSTALLATION

5. Detach the headlamp leveling sensor assembly from the right-hand lower arm and secure it to one side (if equipped).

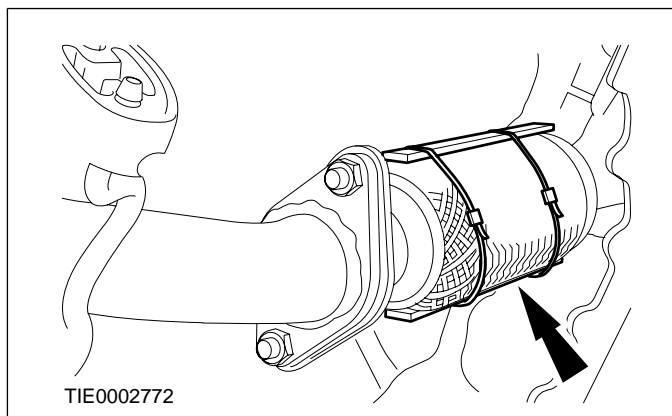


6. Disconnect the steering angle sensor electrical connector (if equipped).

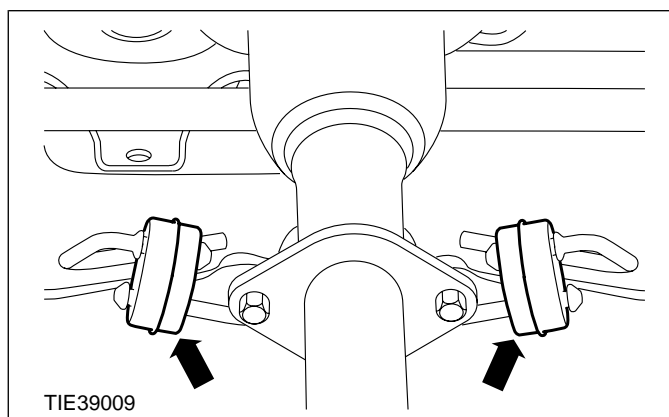


7. **CAUTION:** Over bending of the exhaust flexible pipe may cause damage resulting in failure.

Support the exhaust flexible pipe with a suitable support wrap or a suitable splint.



8. Detach the exhaust flexible pipe from the front axle crossmember exhaust hanger insulators.



All except vehicles with diesel engine

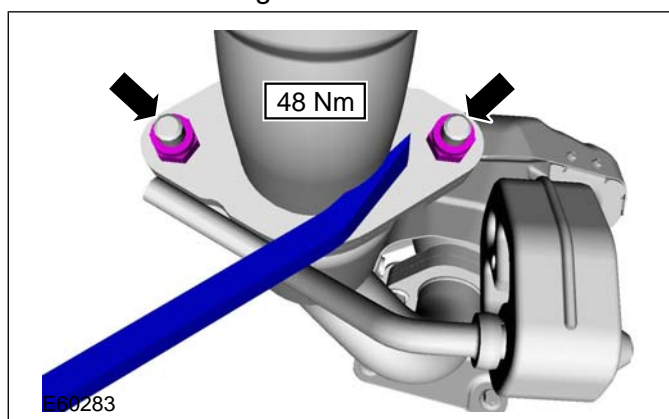
9. **WARNING:** Twisting the exhaust flexible pipe more than two degrees may cause damage resulting in failure.

CAUTION: Support the muffler and tailpipe assembly with suitable cable ties.

NOTE: Use a pry bar to prevent the exhaust flexible pipe from twisting when removing the exhaust flexible pipe to muffler and tailpipe assembly retaining nuts.

Detach the exhaust flexible pipe from the muffler and tailpipe assembly.

- Discard the gasket and nuts.



Vehicles with diesel engine

10. **WARNING:** Twisting the exhaust flexible pipe more than two degrees may cause damage resulting in failure.

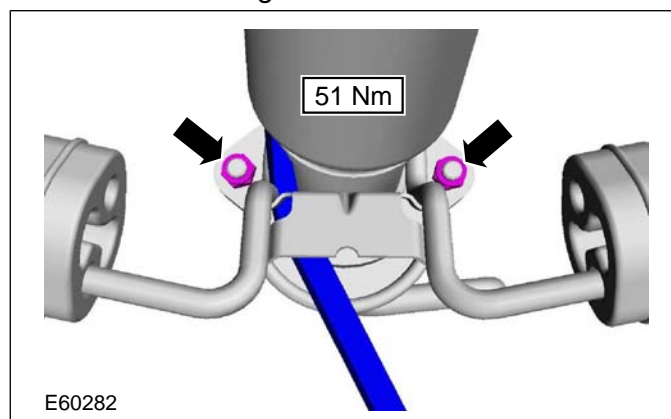
CAUTION: Support the muffler and tailpipe assembly with suitable cable ties.

REMOVAL AND INSTALLATION

NOTE: Use a pry bar to prevent the exhaust flexible pipe from twisting when removing the exhaust flexible pipe to muffler and tailpipe assembly retaining nuts.

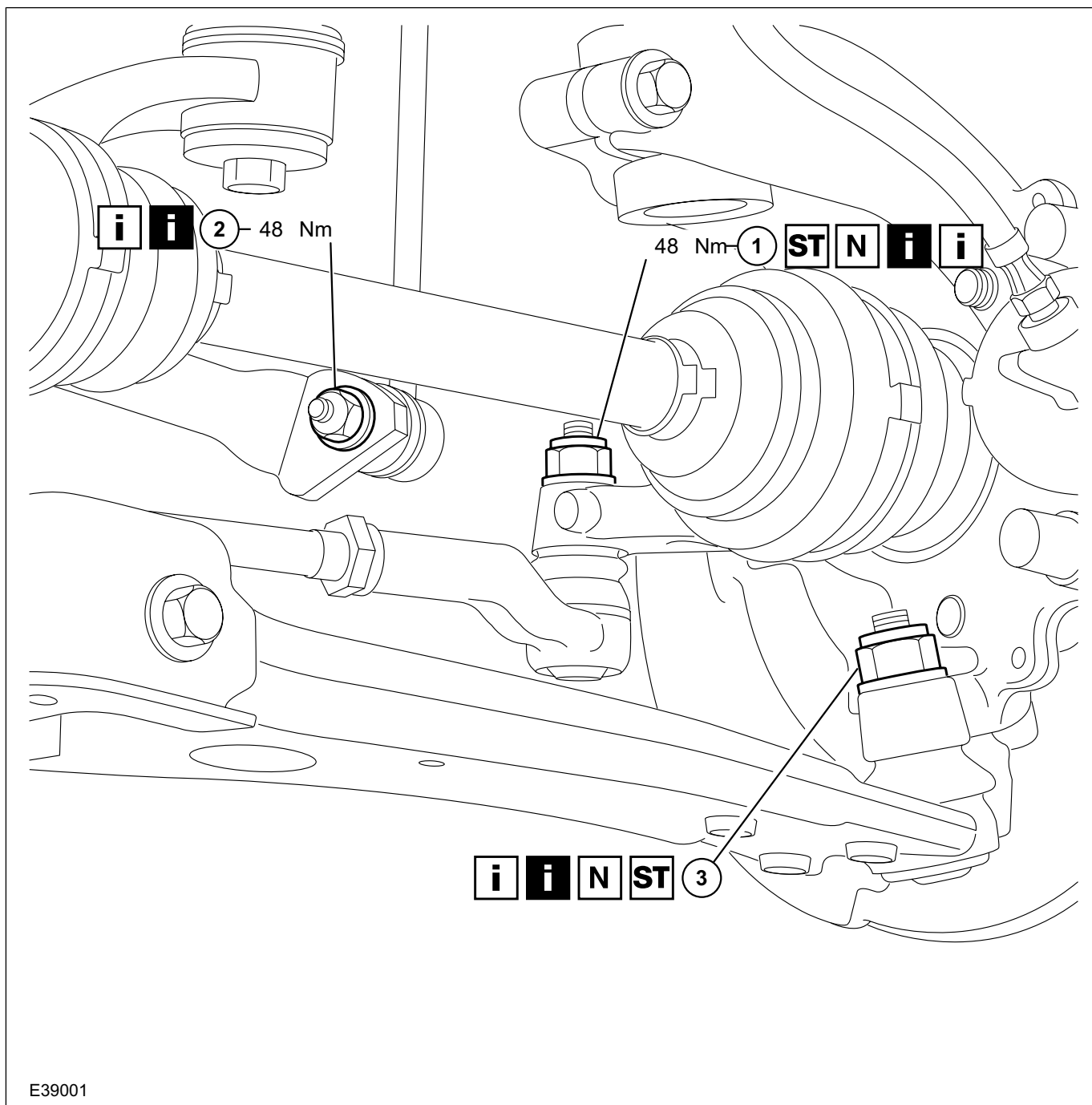
Detach the exhaust flexible pipe from the muffler and tailpipe assembly (2.0L Duratorq-TDCi (DW) Diesel shown).

- Discard the gasket and nuts.



11. Remove the components in the order indicated in the following illustration(s) and table(s).

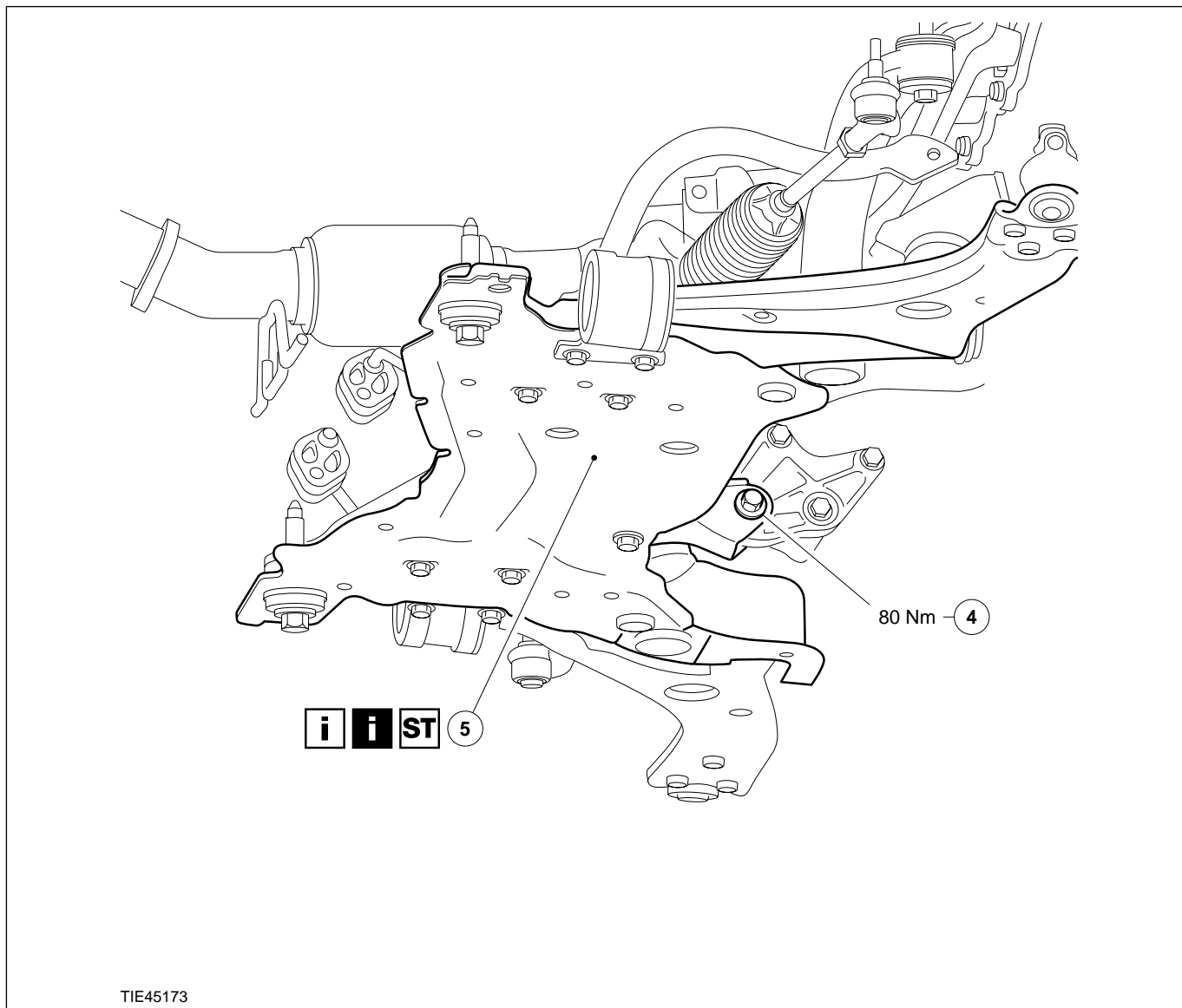
REMOVAL AND INSTALLATION



E39001

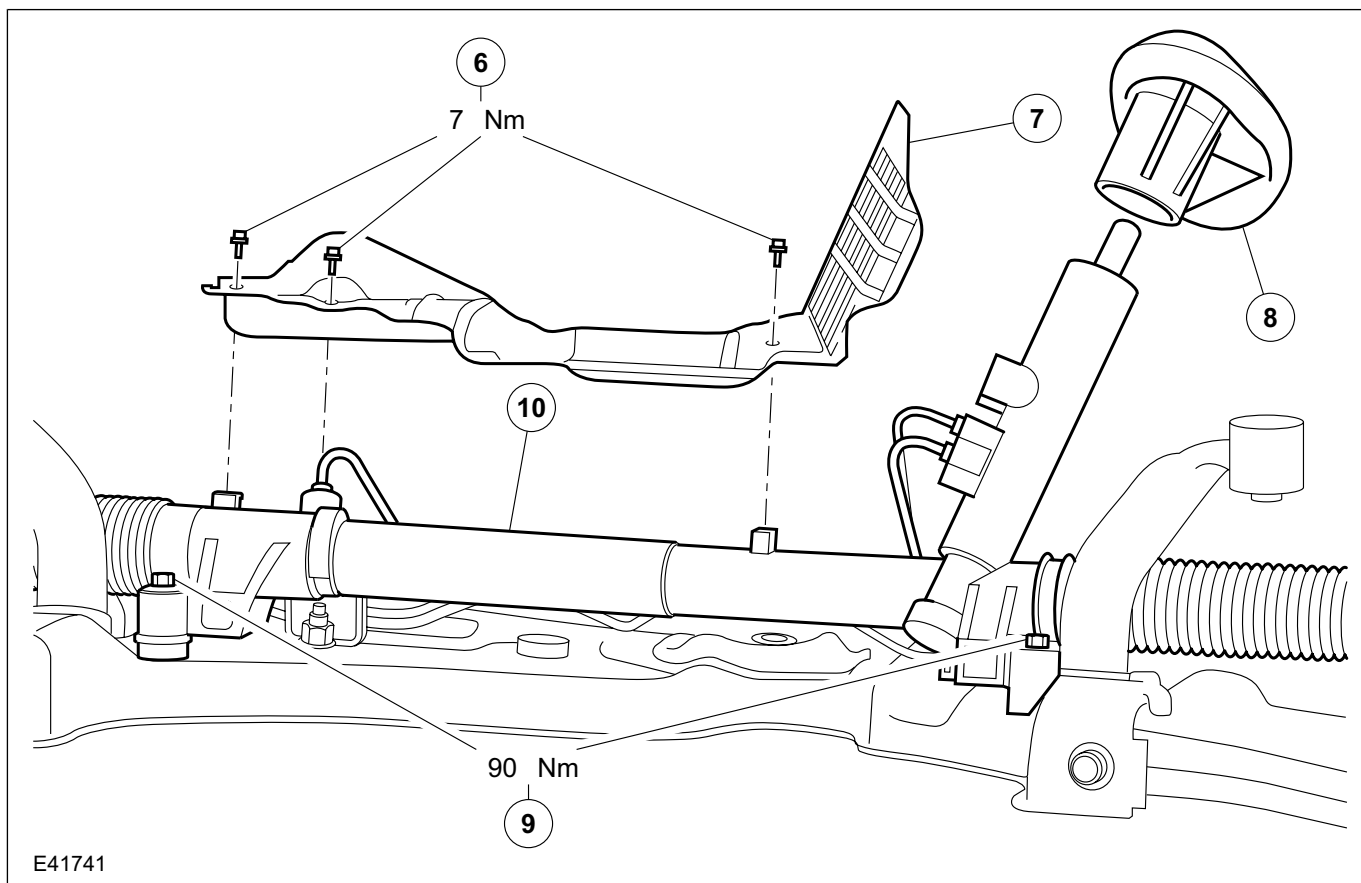
Item	Description
1	Tie-rod end See Removal Detail See Installation Detail
2	Stabilizer bar link See Removal Detail See Installation Detail
3	Lower arm ball joint See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION



Item	Description
4	Engine support insulator center retaining bolt
5	Front axle crossmember See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION



E41741

Item	Description
6	Steering gear exhaust heat shield retaining bolts
7	Steering gear exhaust heat shield
8	Bulkhead floor seal
9	Steering gear retaining bolts
10	Steering gear

12. **WARNING:** Install a new steering column to steering gear pinion bolt. Failure to follow this instruction may result in personal injury.

CAUTION: Never use jointing compound forward of the diesel particulate filter (if equipped).

NOTE: Make sure that the road wheels are in the straight ahead position.

NOTE: Coat the catalytic converter studs with anti-seize grease.

NOTE: Install new gaskets and nuts.

To install, reverse the removal procedure.

13. Fill and bleed the power steering system. For additional information, refer to: **(211-00 Steering System - General Information)**

Power Steering System Filling - 1.6L Duratec-16V (Sigma) (General Procedures), Power Steering System Filling - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (General Procedures), Power Steering System Bleeding - 1.6L Duratec-16V (Sigma) (General Procedures), Power Steering System Bleeding - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (General Procedures).

14. Check the toe setting and adjust as necessary. For additional information, refer to: **(204-00 Suspension System - General Information)**

Specifications - 3-Door (Specifications), Front Toe Adjustment (General Procedures).

Removal Details

211-02-23

Power Steering

211-02-23

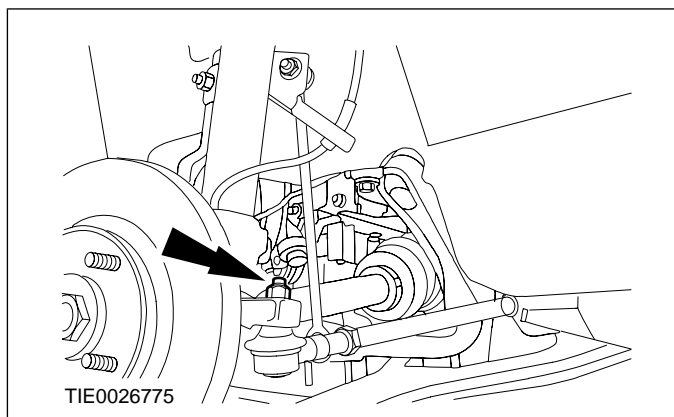
REMOVAL AND INSTALLATION

Item 1 Tie-rod end

1. **CAUTION:** Leave the tie-rod end retaining nut in place to protect the ball joint stud.

NOTE: Use a 5 mm Allen key to prevent the ball joint stud from rotating.

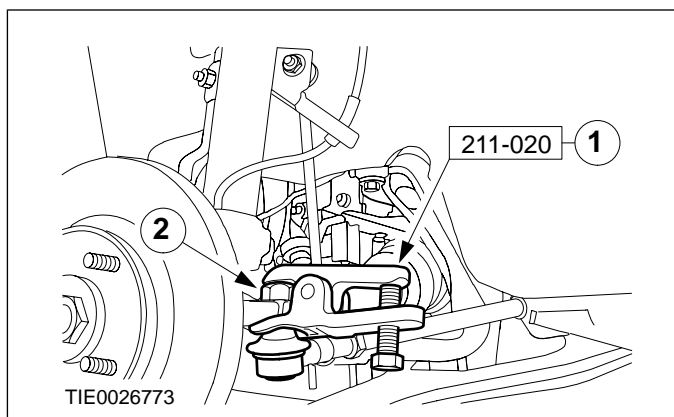
Loosen the tie-rod end retaining nut on both sides.



2. **CAUTION:** Protect the ball joint seal using a soft cloth to prevent damage.

Using the special tool, detach the tie-rod end from the wheel knuckle on both sides.

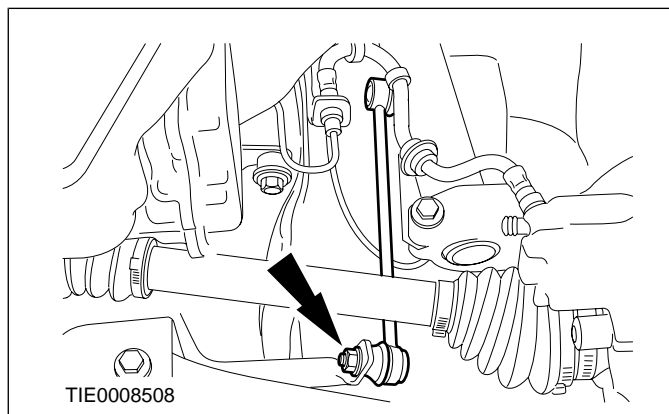
1. Release the tie-rod end.
2. Remove and discard the tie-rod end retaining nut.



Item 2 Stabilizer bar link

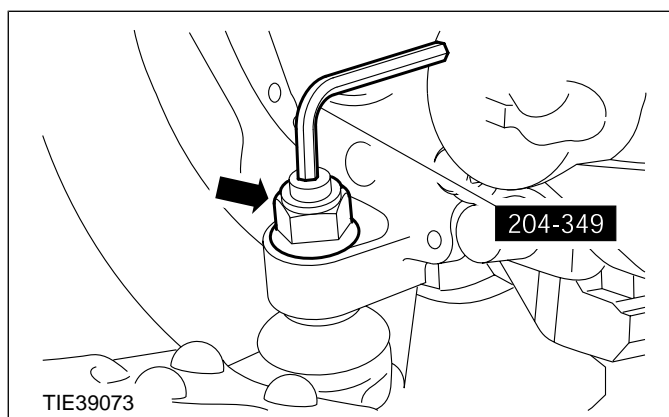
1. **NOTE:** Use a 5 mm Allen key to prevent the ball joint stud from rotating.

Detach the stabilizer bar link from the stabilizer bar on both sides.



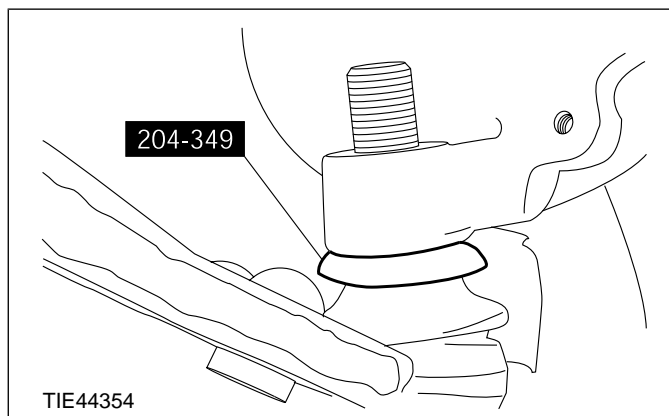
Item 3 Lower arm ball joint

1. Using the special tool to prevent the ball joint stud from rotating, remove and discard the lower arm ball joint retaining nut on both sides.



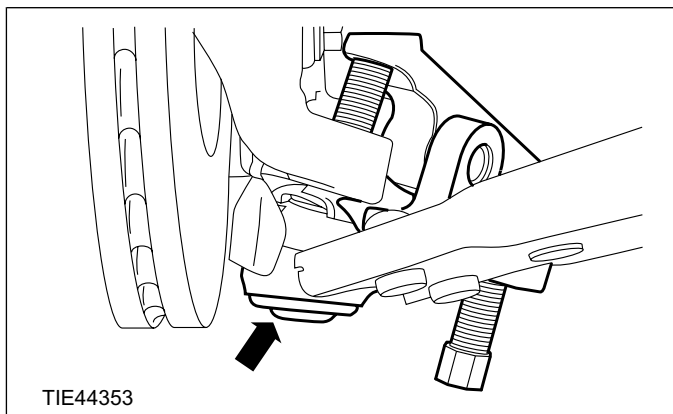
2. **CAUTION:** Make sure that the special tool is installed with the curved surface facing upwards to prevent damage to the ball joint seal.

Install the special tool.



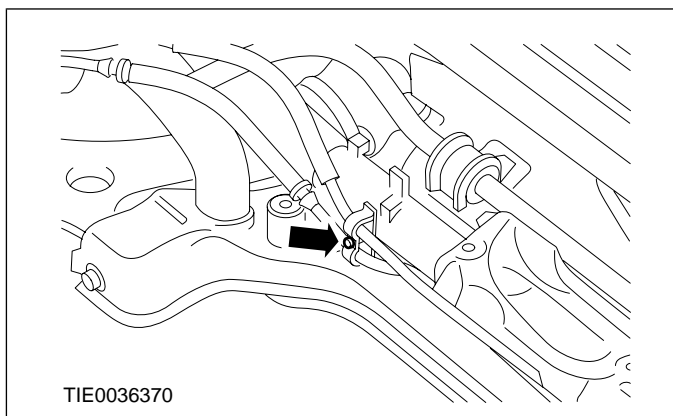
REMOVAL AND INSTALLATION

3. Using a suitable ball joint separator, detach the lower arm from the wheel knuckle on both sides.



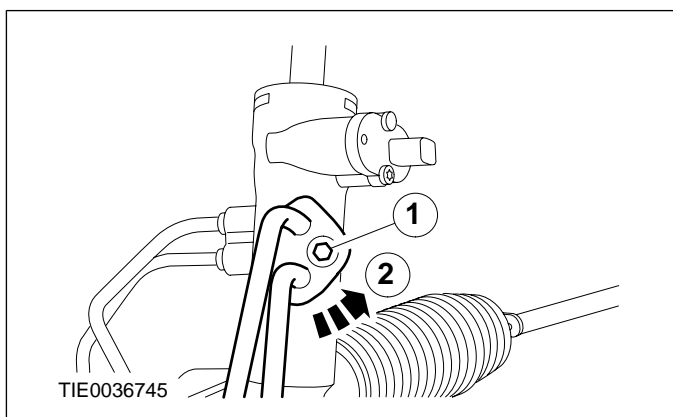
Item 5 Front axle crossmember

1. Detach the power steering lines from the steering gear.



2. Disconnect the power steering lines from the steering gear valve body.

1. Remove the retaining bolt.
 2. Rotate the clamp plate.
- Allow the fluid to drain into a suitable container.

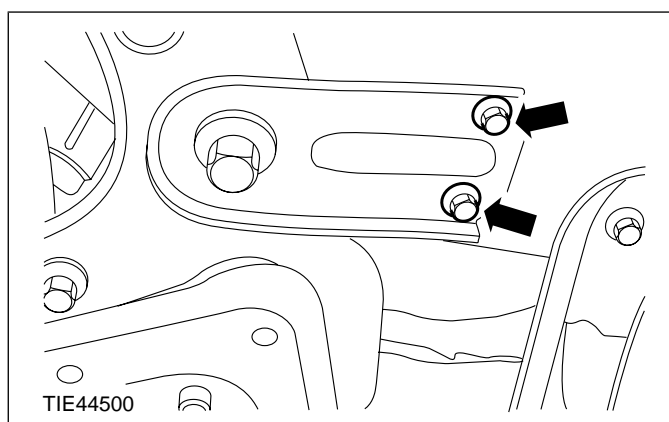


3. Using a transmission jack and wooden block, support the front axle crossmember, stabilizer bar and lower arm assembly.

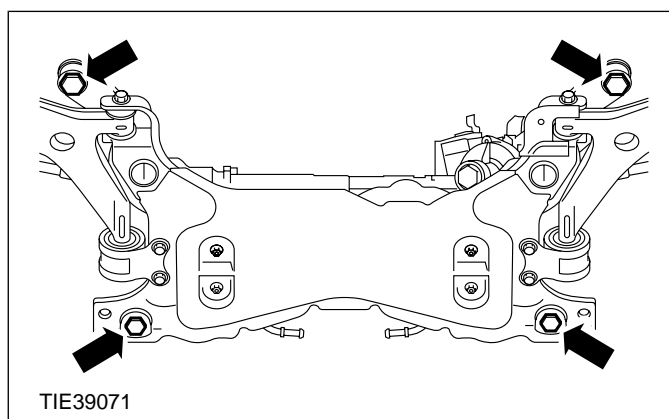
4. **▲WARNING:** Make sure that the front axle crossmember, stabilizer bar and lower arm assembly is secured to the transmission jack. Failure to follow this instruction may result in personal injury.

Using a suitable securing strap, secure the front axle crossmember, stabilizer bar and lower arm assembly to the transmission jack.

5. Remove the front axle crossmember retaining bolts on both sides.

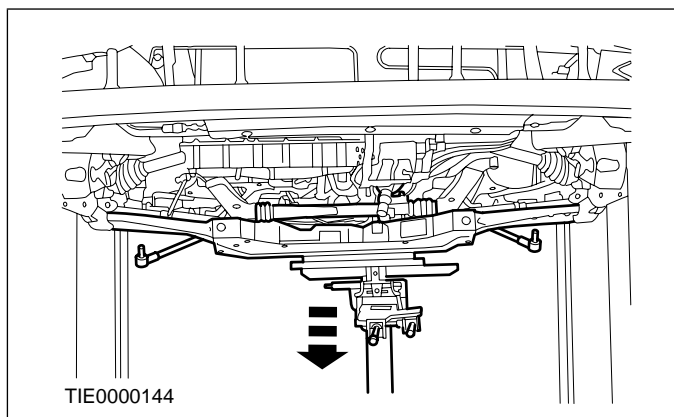


6. Remove the front axle crossmember retaining bolts (transmission jack shown removed for clarity).

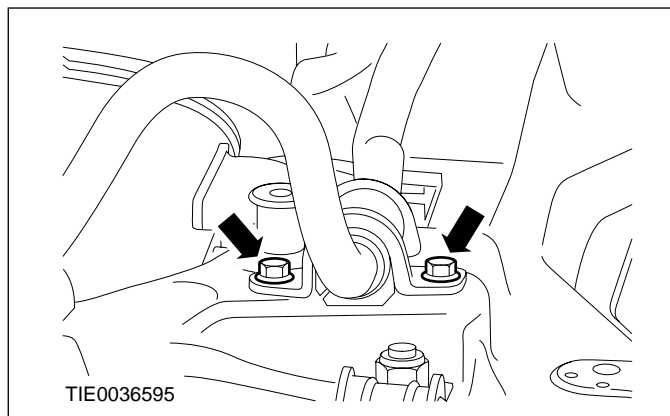


REMOVAL AND INSTALLATION

7. Remove the front axle crossmember.



- Remove the stabilizer bar clamp retaining bolts on both sides.



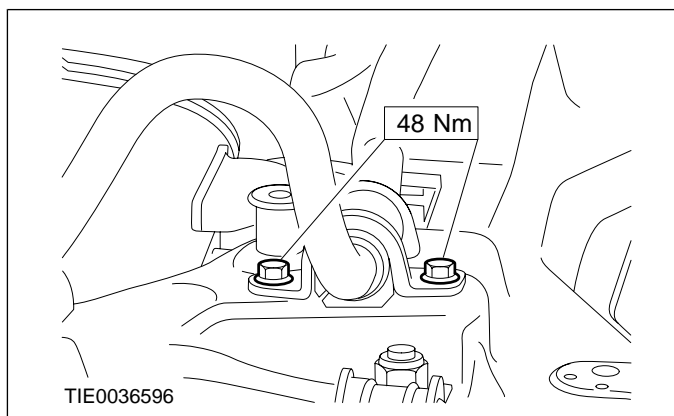
8. Remove the stabilizer bar.

Installation Details

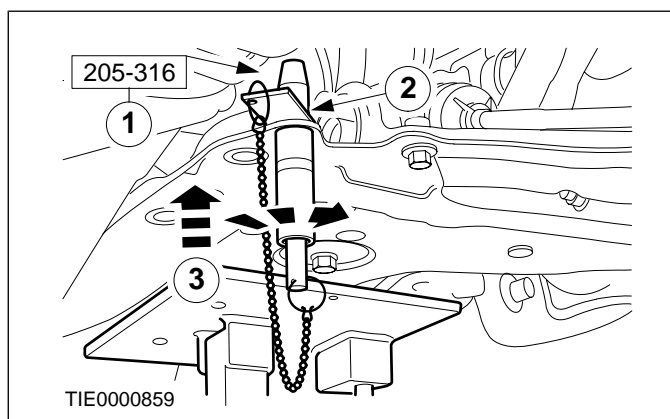
Item 5 Front axle crossmember

1. Install the stabilizer bar.

- Install the stabilizer bar clamp retaining bolts on both sides.



- Raise the front axle crossmember engaging the alignment pins into the chassis aligning holes.



- WARNING:** Make sure that the front axle crossmember, stabilizer bar and lower arm assembly is secured to the transmission jack. Failure to follow this instruction may result in personal injury.

Using the suitable transmission jack and the special tool, position and align the front axle crossmember, stabilizer bar and lower arm assembly.

- Insert the alignment pins through the front axle crossmember alignment holes.
- Slide the locking plates into the groove of the special tool and tighten the alignment pin sleeve.

- CAUTION:** Make sure that the front axle crossmember does not move while tightening the front axle crossmember retaining bolts.

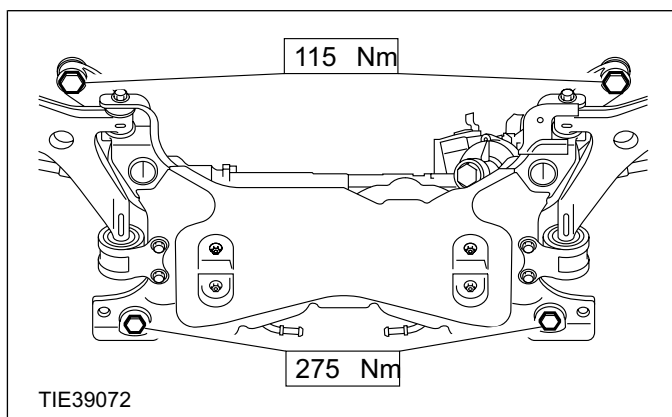
211-02-26

Power Steering

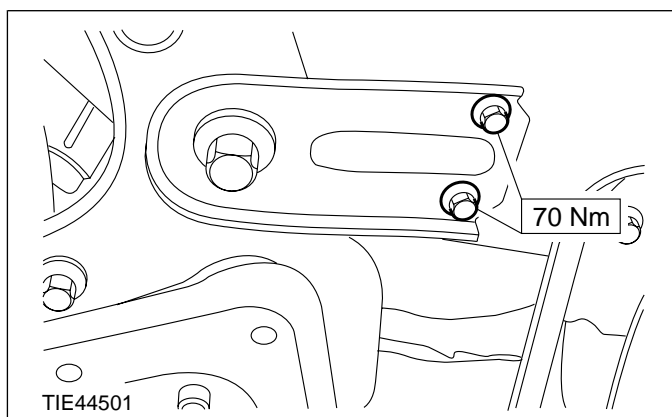
211-02-26

REMOVAL AND INSTALLATION

Install the front axle crossmember retaining bolts (transmission jack shown removed for clarity).



4. Install the front axle crossmember bracket retaining bolts on both sides.



5. Remove the special tool.

6. Remove the securing strap

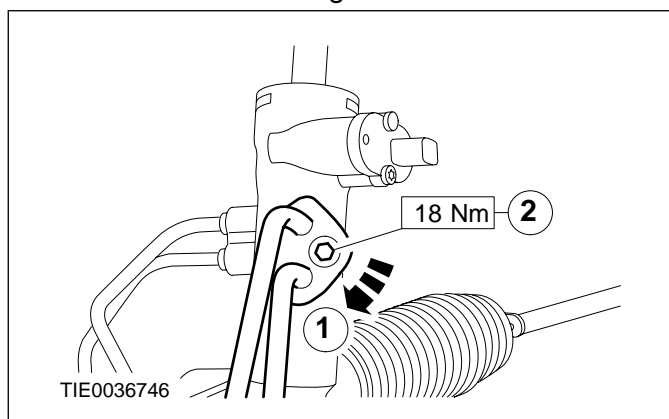
7. Lower and remove the transmission jack and wooden block.

8. **NOTE:** Check the power steering lines to steering gear valve body O-ring seals for damage or fatigue. Install new O-ring seals as required.

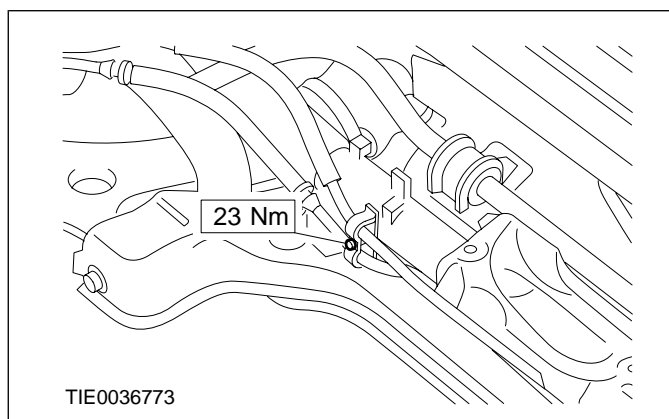
Connect the power steering lines to the steering gear valve body.

1. Rotate the clamp plate.

2. Install the retaining bolt.



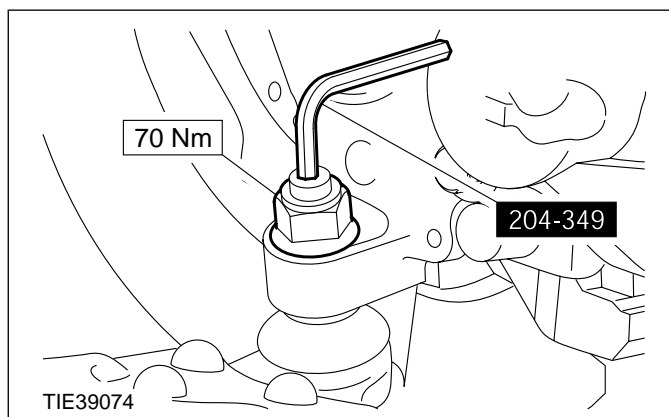
9. Attach the power steering lines to the steering gear.



Item 3 Lower arm ball joint

1. **WARNING:** Install a new lower arm ball joint retaining nut. Failure to follow this instruction may result in personal injury.

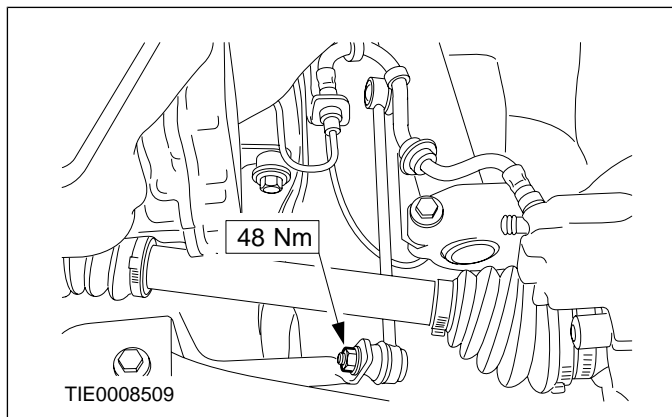
Using the special tool to prevent the ball joint stud from rotating, install the lower arm ball joint retaining nut on both sides.



REMOVAL AND INSTALLATION**Item 2 Stabilizer bar link**

1. **NOTE:** Use a 5 mm Allen key to prevent the ball joint stud from rotating.

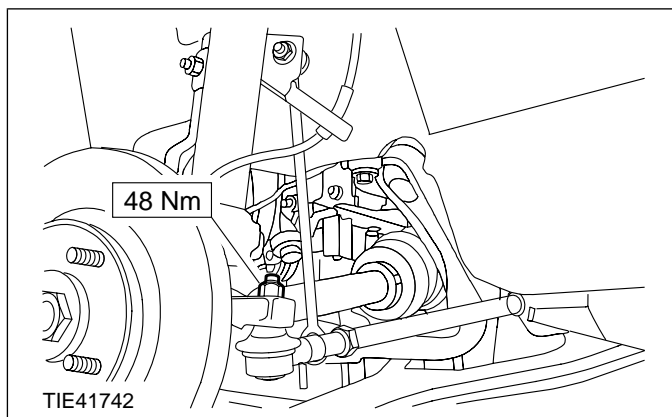
Attach the stabilizer bar link to the stabilizer bar on both sides.

**Item 1 Tie-rod end**

1. **NOTE:** Install new tie-rod end retaining nuts.

NOTE: Use a 5 mm Allen key to prevent the ball joint stud from rotating.

Attach the tie-rod end to the wheel knuckle on both sides.

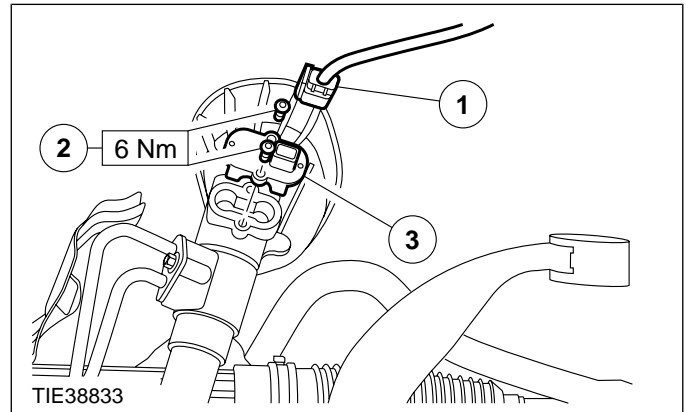
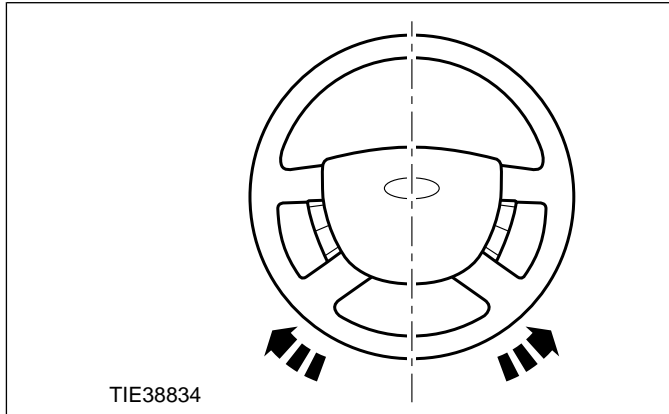


REMOVAL AND INSTALLATION

Steering Angle Sensor

1. **NOTE:** Make sure the road wheels are in the straight ahead position.

Centralize the steering and lock it in position.



Item	Description
1	Steering angle sensor electrical connector
2	Steering angle sensor retaining screws
3	Steering angle sensor

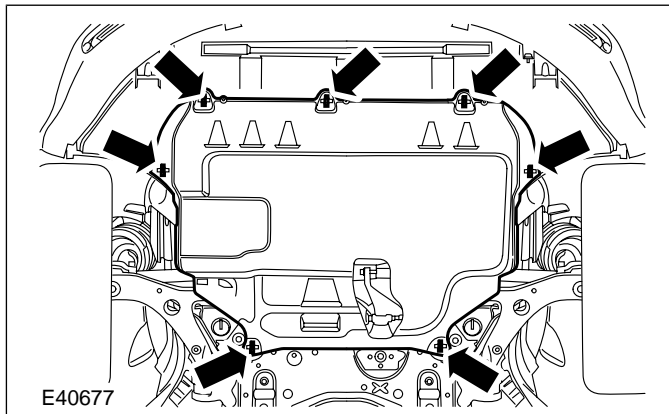
2. Raise and support the vehicle.

For additional information, refer to: **Jacking** (100-02 Jacking and Lifting, Description and Operation)

/ **Lifting** (100-02 Jacking and Lifting, Description and Operation).

3. Remove the engine undershield (if equipped).

- Rotate the locking tangs counterclockwise.



4. Remove the components in the order indicated in the following illustration(s) and table(s).

5. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Steering Gear to Power Steering Fluid Reservoir Return Line —
Vehicles With: Electro-Hydraulic Power Steering
(EHPS)(13 439 0)

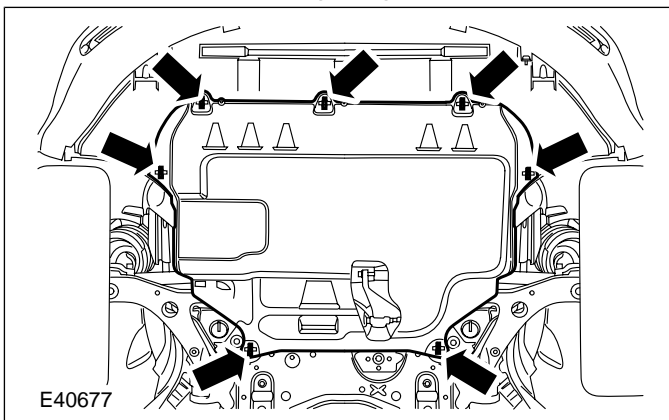
1. Raise and support the vehicle.

For additional information, refer to: **Jacking**
(100-02 Jacking and Lifting, Description
and Operation)

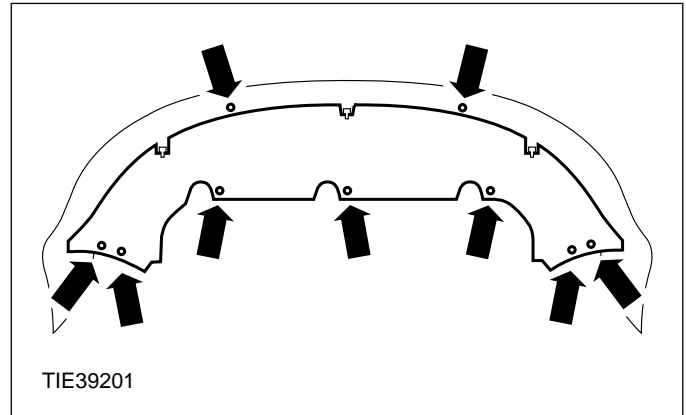
/ **Lifting** (100-02 Jacking and Lifting,
Description and Operation).

2. Remove the engine undershield.

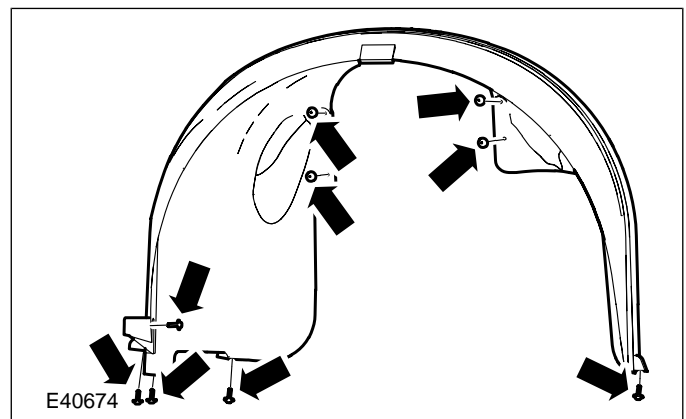
- Rotate the locking tangs counterclockwise.



3. Remove the radiator splash shield.

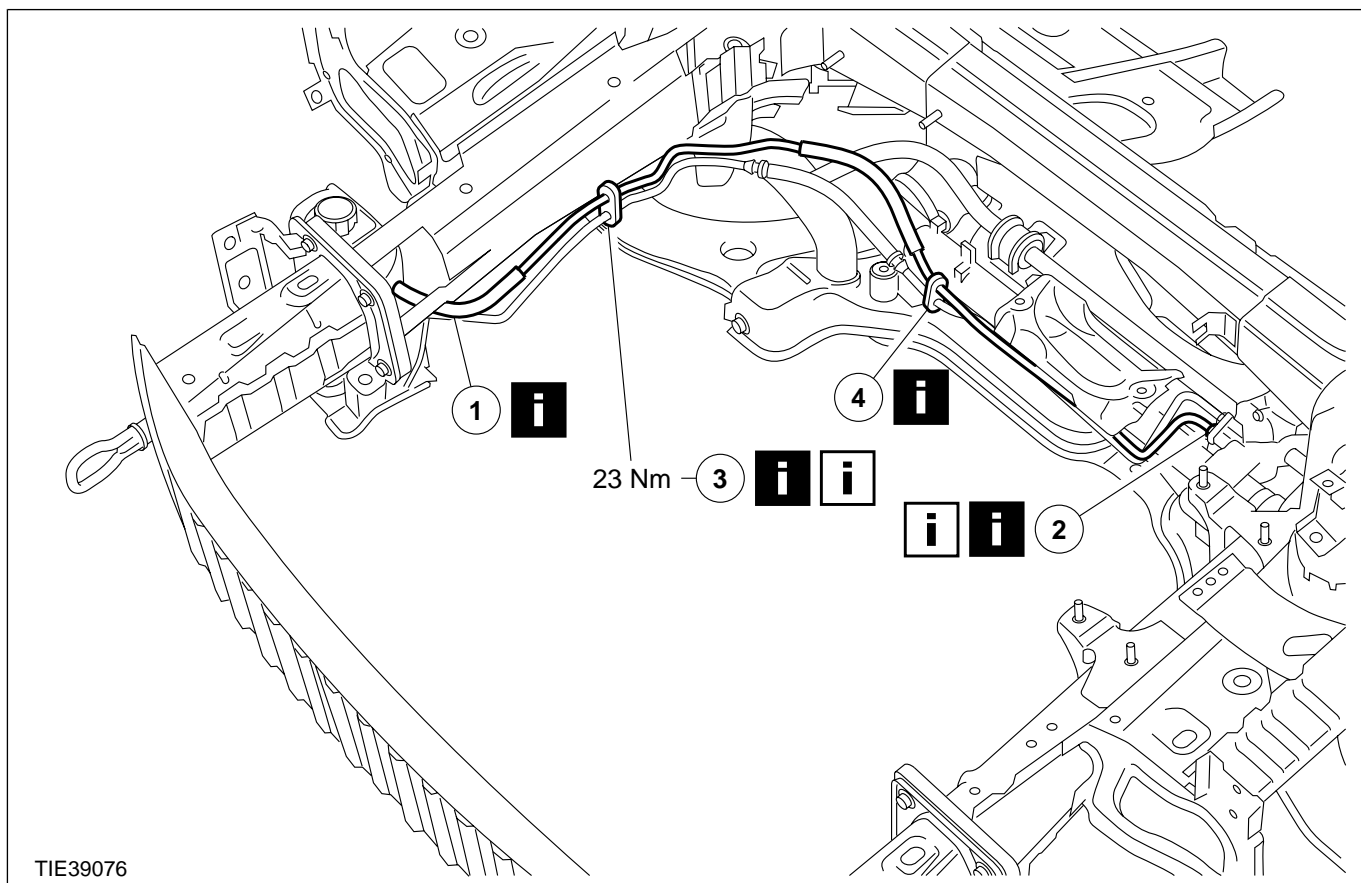


4. Remove the right-hand front fender splash shield.



5. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



TIE39076

Item	Description
1	Steering gear to power steering fluid reservoir return line See Removal Detail
2	Steering gear to power steering fluid reservoir return line retaining bolt See Removal Detail See Installation Detail
3	Power steering fluid lines support bracket to vehicle body See Removal Detail See Installation Detail
4	Power steering fluid lines support bracket to steering gear See Removal Detail

6. To install, reverse the removal procedure.

7. Fill and bleed the power steering system.

For additional information, refer to: **Power Steering System Filling - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (211-00 Steering System - General Information, General Procedures)**

/ Power Steering System Bleeding - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (211-00 Steering System - General Information, General Procedures).

Removal Details

Item 1 Steering gear to power steering fluid reservoir return line

- CAUTION:** Cap the power steering fluid return line to prevent fluid loss or dirt ingress.

Disconnect the power steering fluid return line from the power steering pump.

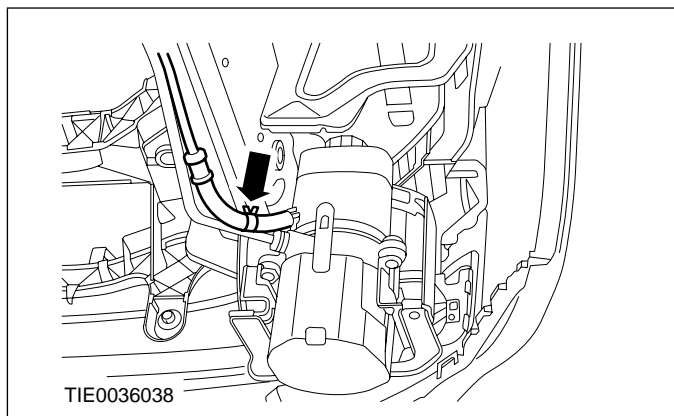
211-02-31

Power Steering

211-02-31

REMOVAL AND INSTALLATION

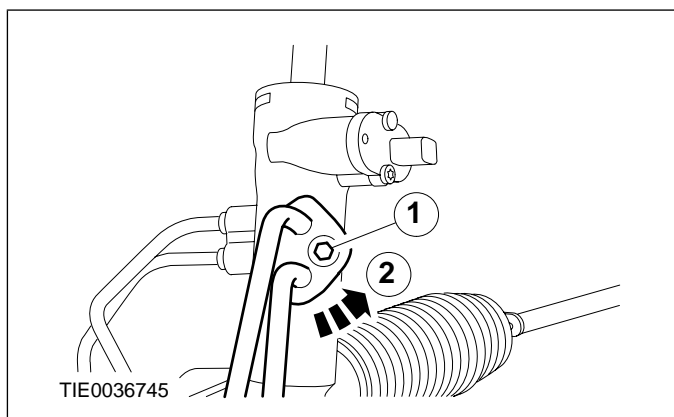
- Allow the fluid to drain into a suitable container.



Item 2 Steering gear to power steering fluid reservoir return line retaining bolt

1. Disconnect the power steering lines from the steering gear valve body.

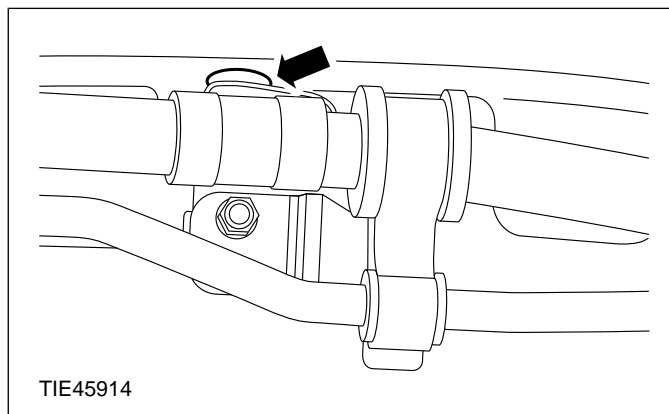
1. Remove the retaining bolt.
 2. Rotate the clamp plate.
- Allow the fluid to drain into a suitable container.



Item 3 Power steering fluid lines support bracket to vehicle body

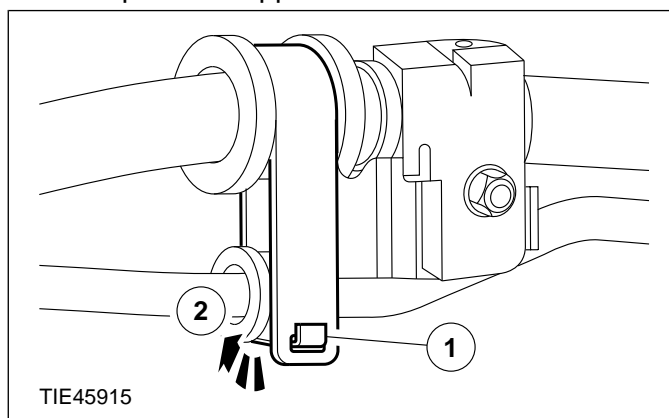
1. **NOTE:** Note the position of the power steering fluid lines support bracket to aid installation.

Detach the power steering fluid lines bracket from the vehicle body.



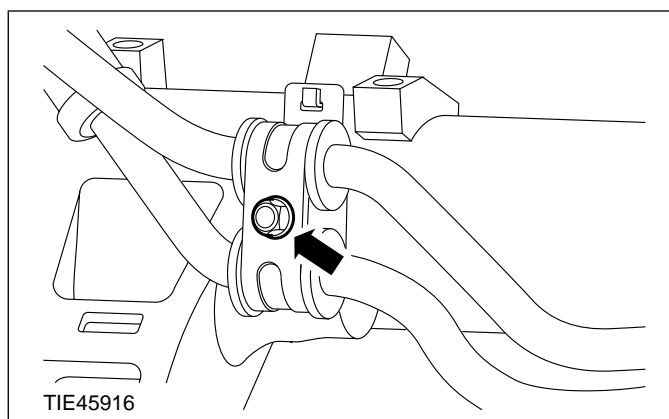
2. Detach the power steering fluid return line from the support bracket.

1. Release the retaining clip.
2. Open the support bracket.



Item 4 Power steering fluid lines support bracket to steering gear

1. Detach the power steering fluid lines support bracket from the steering gear.

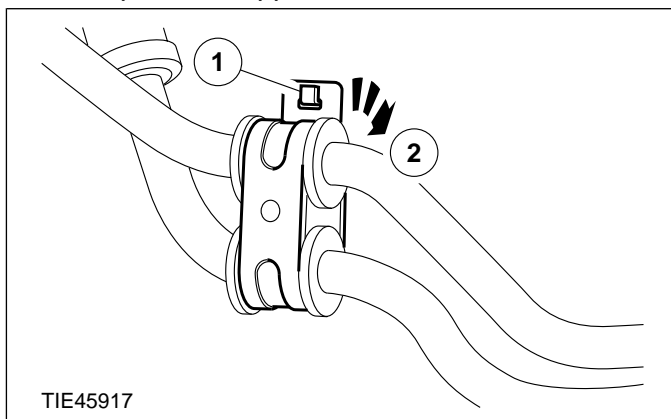


2. Remove the power steering fluid return line.

1. Release the retaining clip.

REMOVAL AND INSTALLATION

2. Open the support bracket.

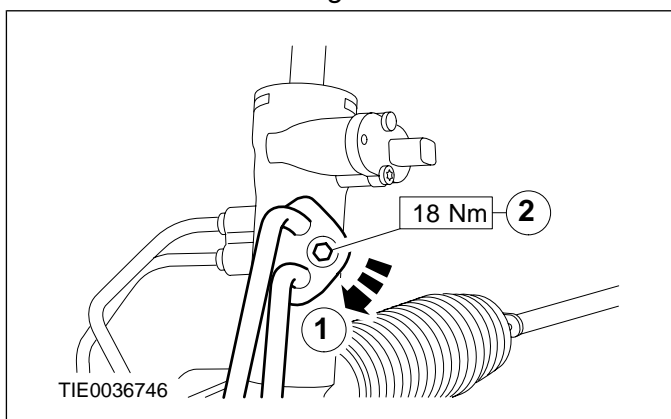
**Installation Details****Item 3 Power steering fluid lines support bracket to vehicle body**

⚠ CAUTION: Make sure the power steering fluid lines are a minimum of 15 mm from the auxiliary drive belts.

Item 2 Steering gear to power steering fluid reservoir return line retaining bolt

1. Connect the power steering lines to the steering gear valve body.

1. Rotate the clamp plate.
2. Install the retaining bolt.



SECTION 211-03 Steering Linkage

VEHICLE APPLICATION: 2008.75 Focus ST C307

CONTENTS		PAGE
SPECIFICATIONS		
Specifications.....		211-03-2
DIAGNOSIS AND TESTING		
Steering Linkage.....		211-03-3
REMOVAL AND INSTALLATION		
Tie Rod End.....	(13 273 0)	211-03-4
Steering Gear Boot.....	(13 134 0)	211-03-6
Tie Rod.....	(13 263 0)	211-03-8

SPECIFICATIONS**Torque Specifications**

Description	Nm	lb-ft	lb-in
Tie-rod to steering gear	90	66	-
Tie-rod end locknut	62	46	-
Tie-rod end retaining nut	48	35	-



DIAGNOSIS AND TESTING

Steering Linkage

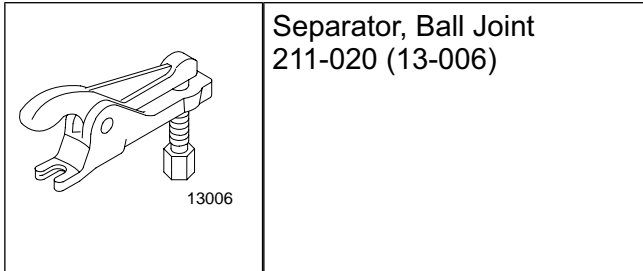
**REFER to Section 211-00 [Steering System -
General Information].**



REMOVAL AND INSTALLATION

Tie Rod End(13 273 0)

Special Tool(s)



Removal

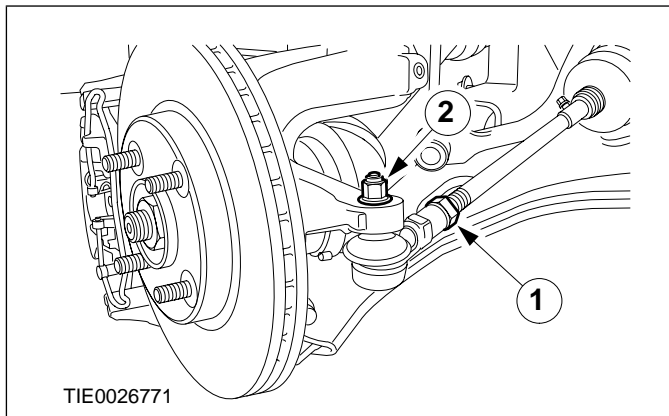
1. Remove the wheel and tire. For additional information, refer to Section 204-04 [Wheels and Tires].

2. **CAUTION:** Leave the tie-rod end retaining nut in place to protect the ball joint stud.

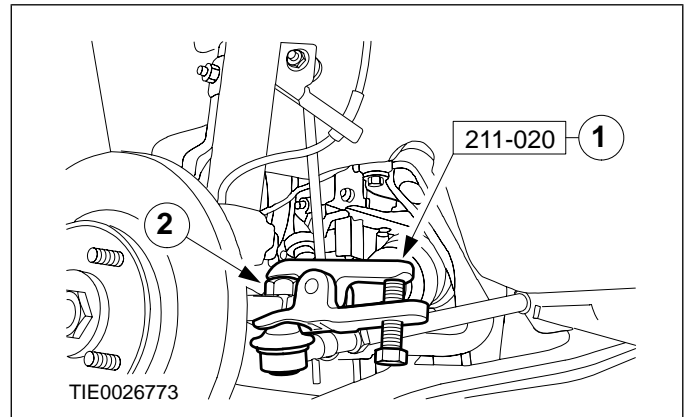
NOTE: Use a 5 mm Allen key to prevent the ball joint stud from rotating.

Loosen the tie-rod end locknut and the tie-rod end retaining nut.

1. Loosen the locknut.
2. Loosen the retaining nut.

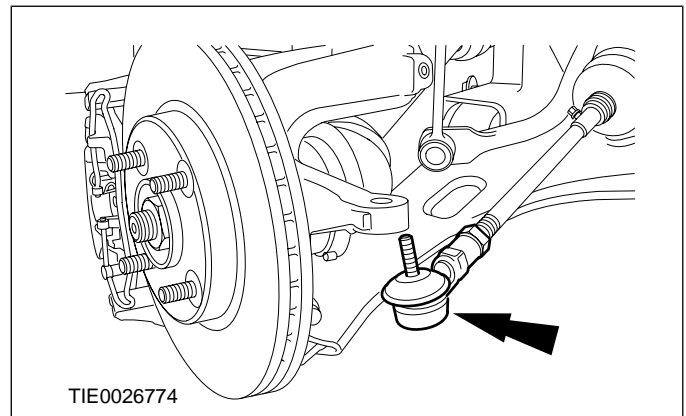


2. Remove and discard the tie-rod end retaining nut.



4. **NOTE:** Make a note of the number of turns used to remove the tie-rod end.

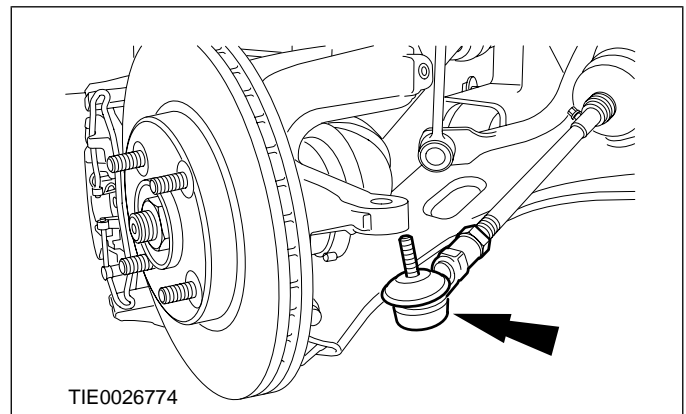
Remove the tie-rod end.



Installation

1. **NOTE:** Install the tie-rod end using the same number of turns used to remove it.

Install the tie-rod end.



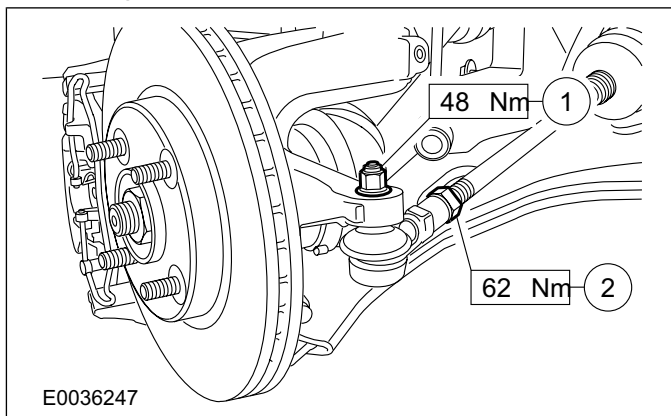
REMOVAL AND INSTALLATION

2. **▲WARNING:** Install a new tie-rod end retaining nut. Failure to follow this instruction may result in personal injury.

NOTE: Use a 5 mm Allen key to prevent the ball joint stud from rotating.

Attach the tie-rod end to the wheel knuckle.

1. Tighten the retaining nut.
2. Tighten the locknut.



3. Install the wheel and tire. For additional information, refer to Section **204-04 [Wheels and Tires]**.
4. Check the toe setting and adjust as necessary. For additional information, refer to Section **204-00 [Suspension System - General Information]**.

REMOVAL AND INSTALLATION

Steering Gear Boot(13 134 0)

General Equipment

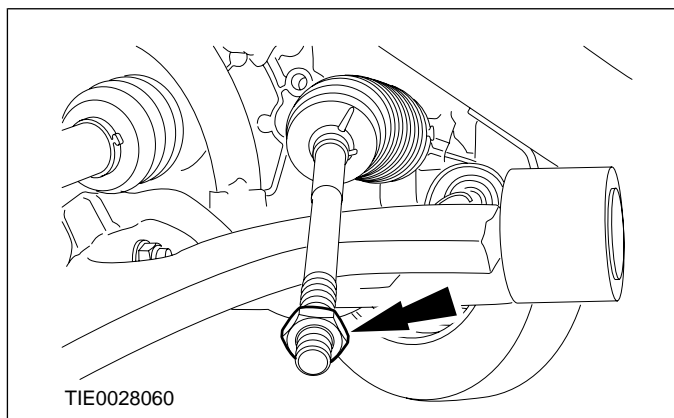
Pincers	
Materials	
Name	Specification
Grease	ESB-M1C119-B

Removal

1. Remove the tie-rod end.

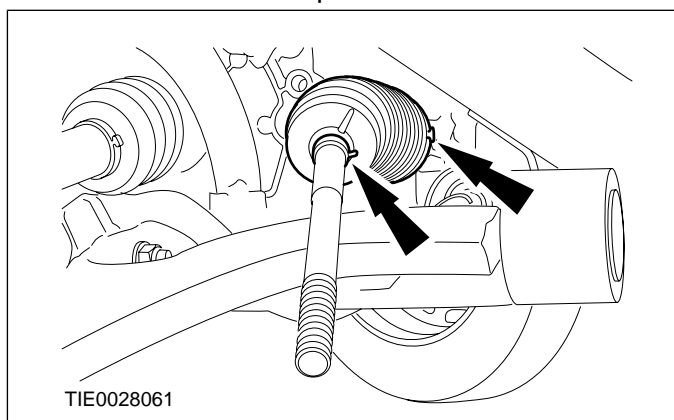
For additional information, refer to **Tie-Rod End** in this section.

2. Remove the tie-rod end locknut.

3. **NOTE:** Make sure the tie-rod is clean before removing the steering gear boot.

Remove the steering gear boot.

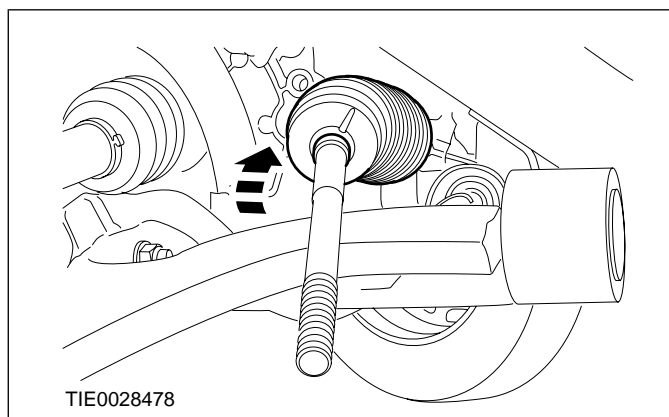
- Discard the clamps.



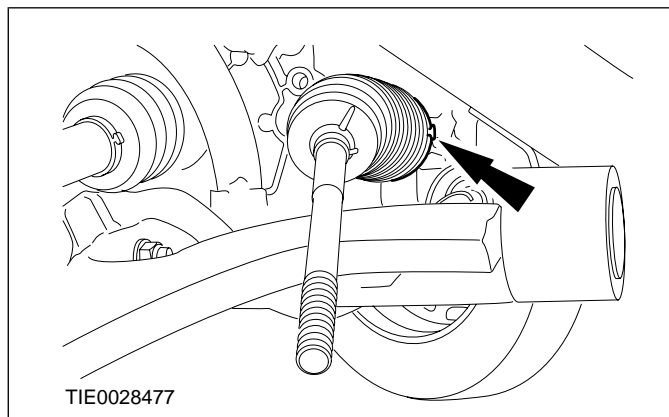
Installation

1. **NOTE:** Lubricate the steering gear boot.

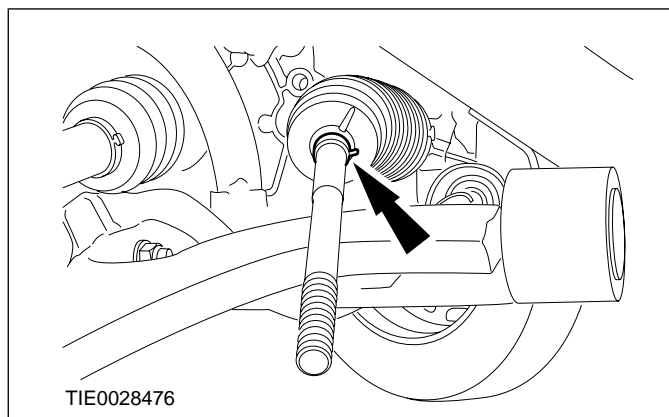
Install the steering gear boot.



2. Using a suitable pair of pincers, install a new steering gear boot inner clamp.

3. **NOTE:** Make sure the steering gear boot outer clamp is located over the recess in the tie-rod.

Using a suitable pair of pincers, install a new steering gear boot outer clamp.



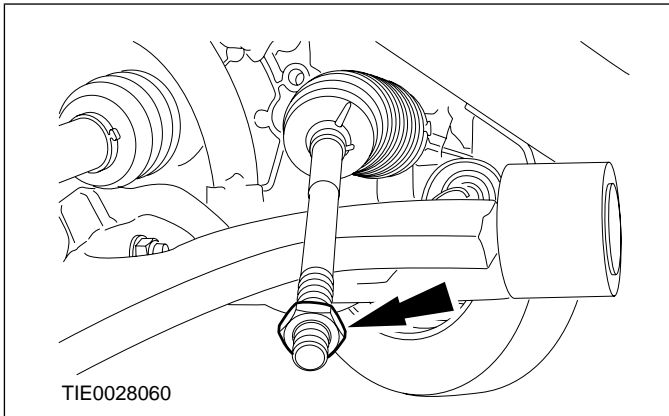
211-03-7

Steering Linkage

211-03-7

REMOVAL AND INSTALLATION

4. Install the tie-rod end locknut.



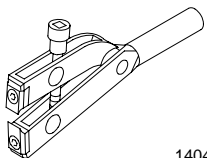
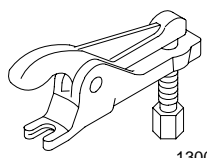
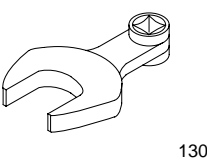
5. Install the tie-rod end.

For additional information, refer to **Tie-Rod End** in this section.

REMOVAL AND INSTALLATION

Tie Rod(13 263 0)

Special Tool(s)

 <p>14044</p>	<p>Clamping Tool, Boot Retaining Clamp 204-169</p>
 <p>13006</p>	<p>Separator, Ball Joint 211-020</p>
 <p>13025</p>	<p>Socket, Steering Gear Tie-Rod 211-245 (13-025)</p>

General Equipment

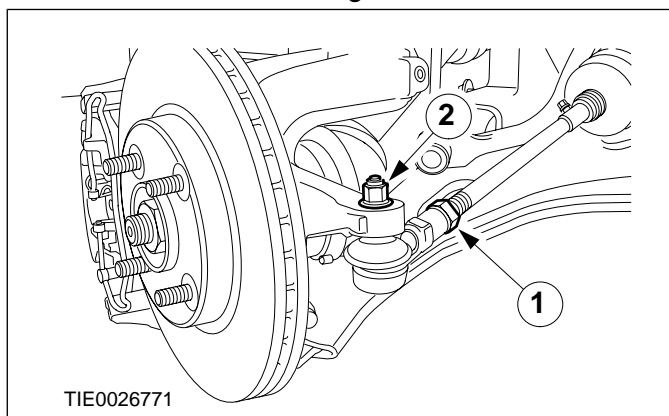
Pipe wrench
Pincers

Materials	
Name	Specification
Silicone Grease	ESE-M1C171-A

Removal

1. Remove the wheel and tire.
For additional information, refer to: **Wheel and Tire (204-04 Wheels and Tires, Removal and Installation)**.
2. **CAUTION:** Leave the tie-rod end retaining nut in place to protect the ball joint stud.
NOTE: Use a 5 mm Allen key to prevent the ball joint stud from rotating.
Loosen the tie-rod end locknut and the tie-rod end retaining nut.
 1. Loosen the locknut.

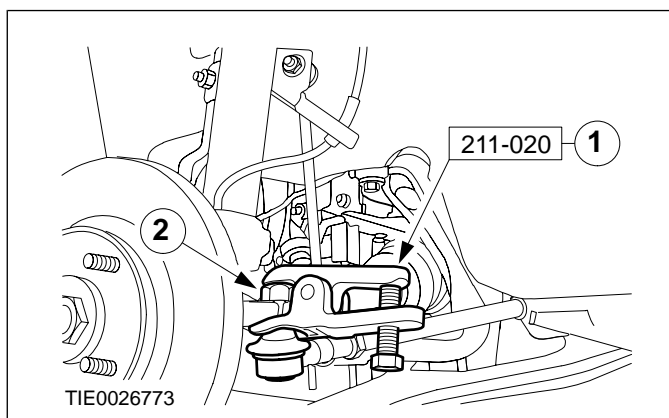
2. Loosen the retaining nut.



3. **CAUTION:** Protect the ball joint seal using a soft cloth to prevent damage.

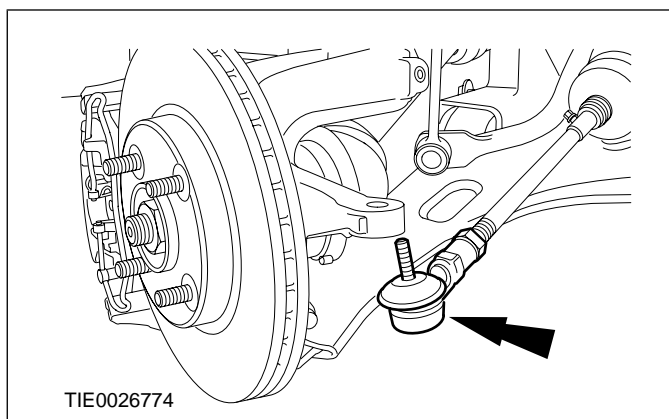
Using the special tool, detach the tie-rod end from the wheel knuckle.

1. Release the tie-rod end.
2. Remove and discard the tie-rod end retaining nut.



4. **NOTE:** Make a note of the number of turns used to remove the tie-rod end.

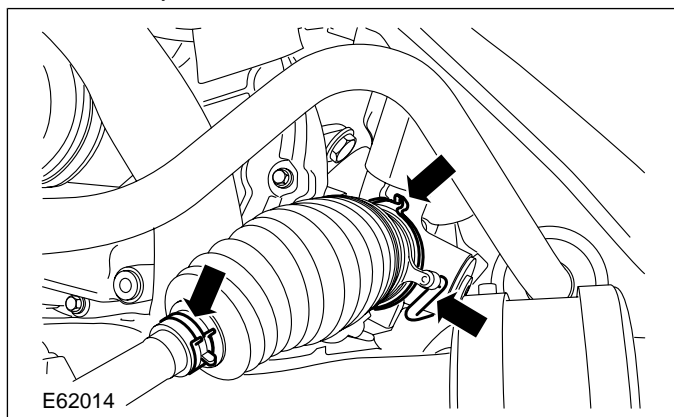
Remove the tie-rod end.



REMOVAL AND INSTALLATION

5. Remove the steering gear boot.

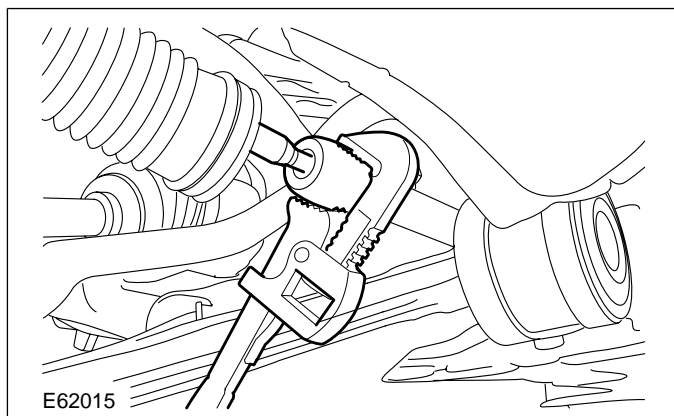
- Disconnect the steering gear vent hose.
- Remove and discard the steering gear clamps.



6. Rotate the steering wheel to gain access to the tie-rod retaining nut.

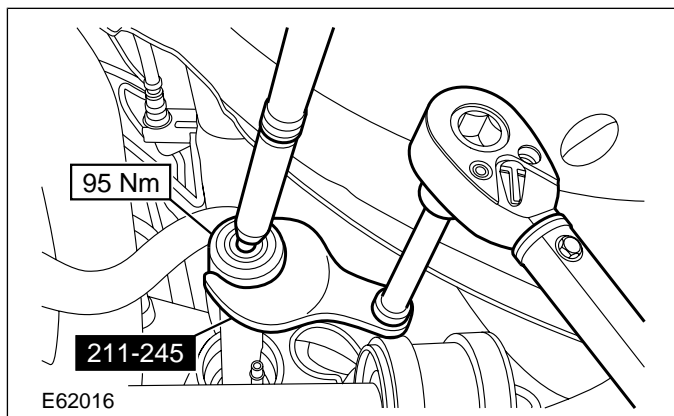
7. **CAUTION:** Do not clamp the steering rack on exposed hydraulic sealing surfaces.

Using a pipe wrench remove the tie-rod.



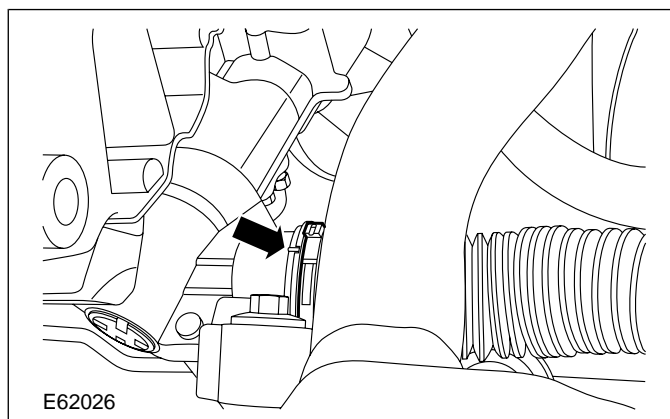
Installation

1. Using the special tool, install the tie-rod.

2. **NOTE:** Lubricate the steering gear boot sealing area on the steering gear housing and tie-rod with grease.

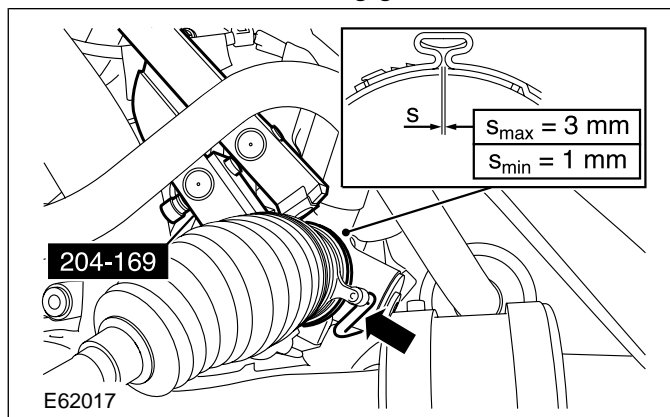
NOTE: Make sure that the alignment pin on the steering gear housing fits into the recess of the steering gear boot.

Install a new steering gear boot and a new inner clamp.



3. Using the special tool, tighten the steering gear boot inner clamp.

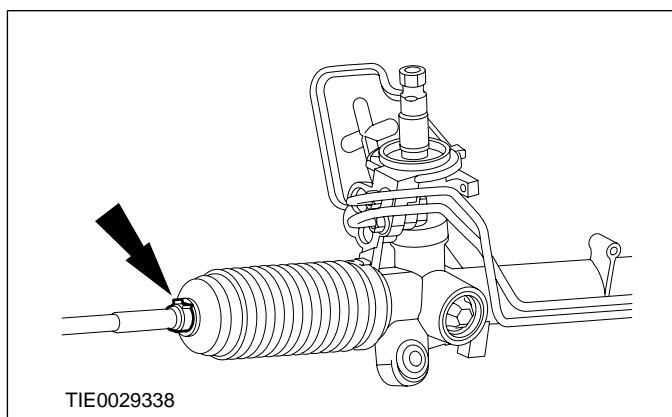
- Connect the steering gear vent hose.

4. **NOTE:** Make sure that the steering gear boot outer clamp is located over the recess in the tie-rod.

NOTE: Following installation, no radial movement of the steering gear boot is permissible.

REMOVAL AND INSTALLATION

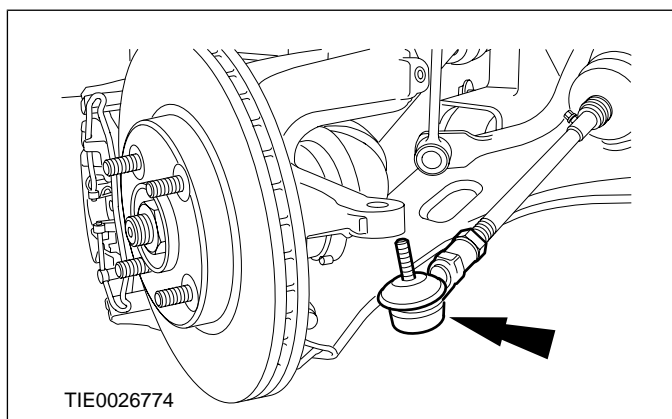
Using a suitable pair of pincers, install a new steering gear boot outer clamp (steering gear shown removed for clarity).



5. **NOTE:** Install the tie-rod end using the same number of turns used to remove it.

NOTE: Do not fully tighten the tie-rod end locknut at this stage.

Install the tie-rod end locknut and the tie-rod end.



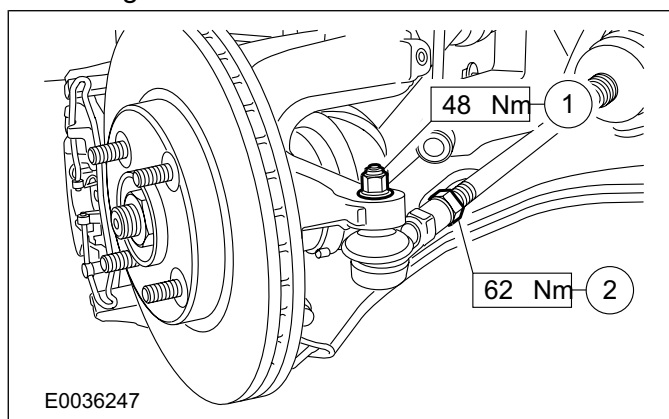
6. **▲WARNING:** Install a new tie-rod end retaining nut. Failure to follow this instruction may result in personal injury.

NOTE: Use a 5 mm Allen key to prevent the ball joint stud from rotating.

Attach the tie-rod end to the wheel knuckle.

1. Tighten the retaining nut.

2. Tighten the locknut.



7. Install the wheel and tire.

For additional information, refer to: Wheel and Tire (**204-04 Wheels and Tires**, Removal and Installation).

8. Check the toe setting and adjust as necessary. For additional information, refer to: (**204-00 Suspension System - General Information**)

Specifications (Specifications),
Front Toe Adjustment (General Procedures).

SECTION 211-04 Steering Column

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Steering Wheel..... (13 524 0)	211-04-4
Steering Column.....	211-04-7
DISASSEMBLY AND ASSEMBLY	
Steering Column.....	211-04-10

SPECIFICATIONS**Torque Specifications**

Item	Nm	lb-ft	lb-in
Steering wheel retaining bolt	48	35	-
Driver air bag module ground spring retaining screw	-	3	27
Steering column shaft to steering gear pinion retaining bolt	28	21	-
Steering column retaining bolts	25	18	-



DIAGNOSIS AND TESTING

Steering Column

**REFER to Section 211-00 [Steering System -
General Information].**



REMOVAL AND INSTALLATION

Steering Wheel(13 524 0)

Removal

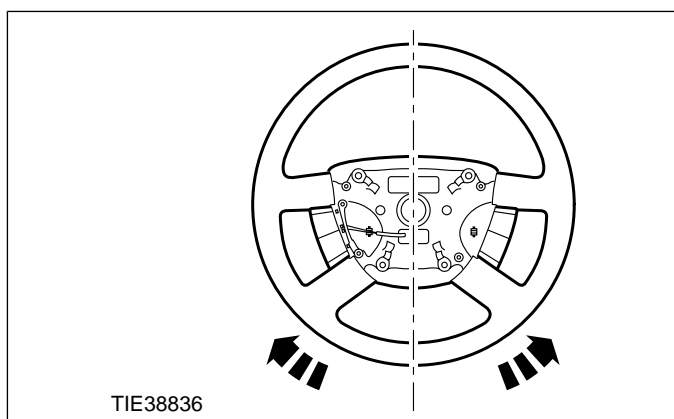
All vehicles

1. Remove the driver air bag module.

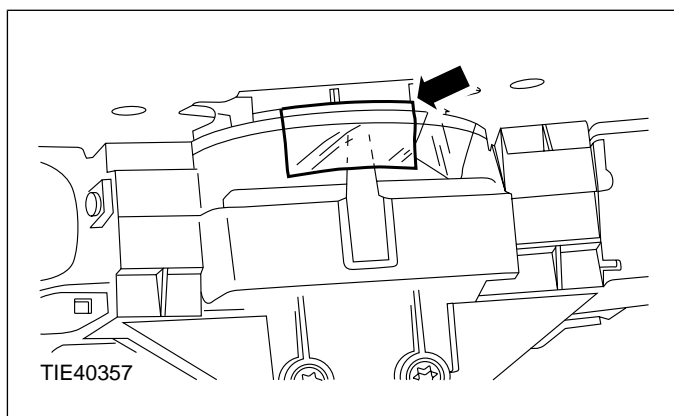
For additional information, refer to: Driver Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation).

2. NOTE: Make sure that the road wheels are in the straight ahead position.

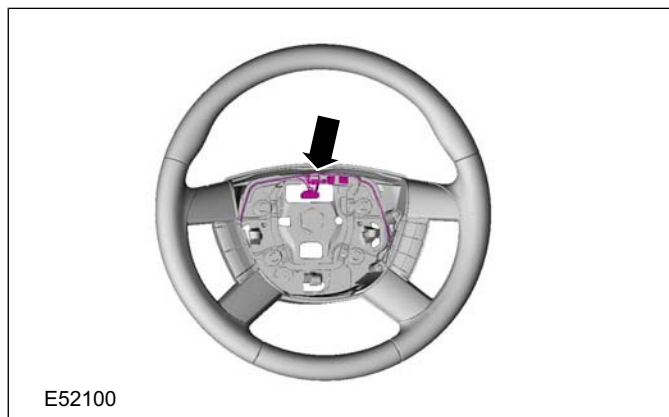
Centralize the steering and lock it in position.

3. **CAUTION:** Make sure that the clockspring rotor is not allowed to rotate. Secure in the central position with a piece of suitable tape.

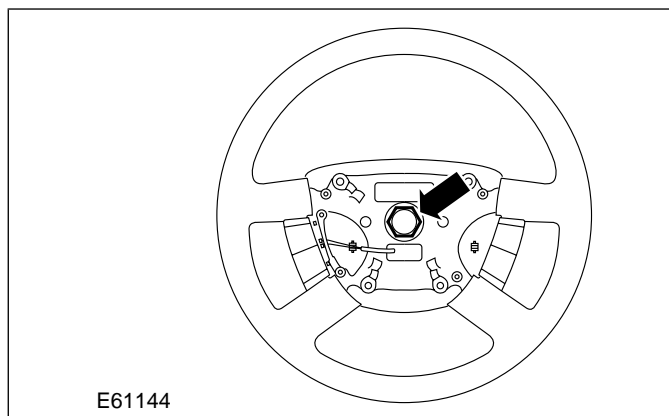
Secure the clockspring rotor to the clockspring outer.



4. Disconnect the steering wheel electrical connector (vehicles with speed control shown).

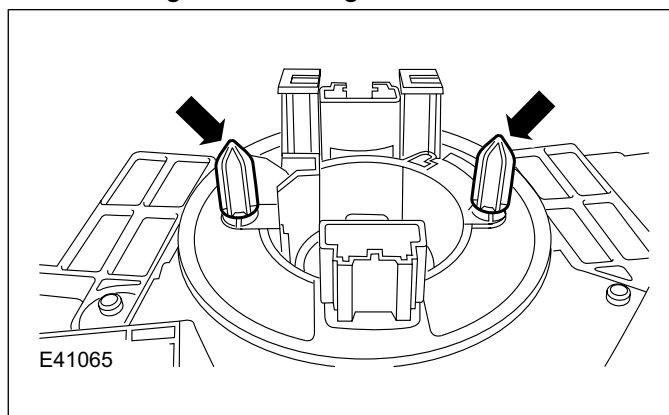


5. Remove the steering wheel retaining bolt.

6. **CAUTION:** Care must be taken not to damage the clockspring pins.

Remove the steering wheel.

- Feed the driver air bag wiring harness through the steering wheel.

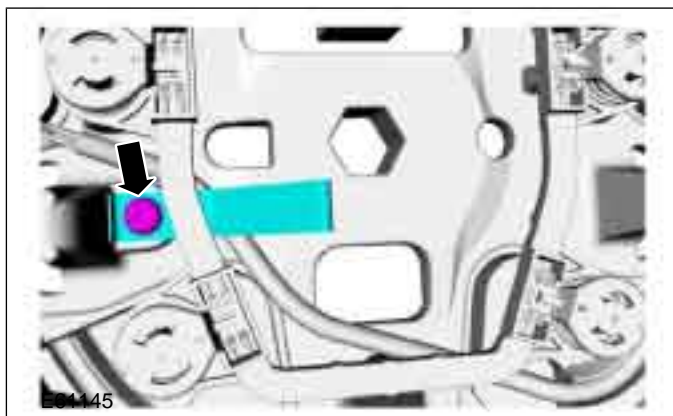


REMOVAL AND INSTALLATION

Vehicles built up to 01/2005

7. **⚠ CAUTION:** If installing a new steering wheel with the original driver air bag module, the driver air bag module ground spring must be removed.

Remove the driver air bag module ground spring.

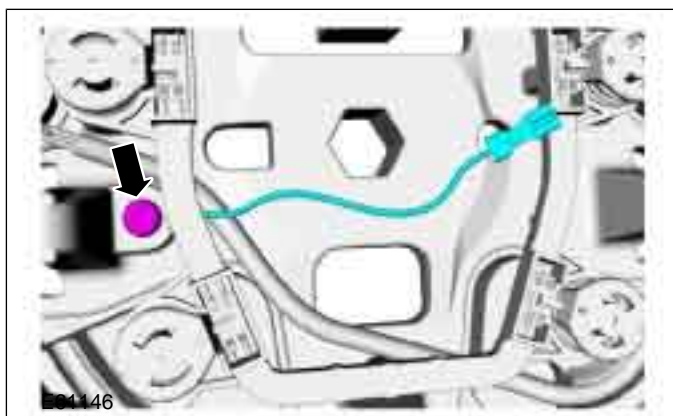


Installation

Vehicles built up to 01/2005

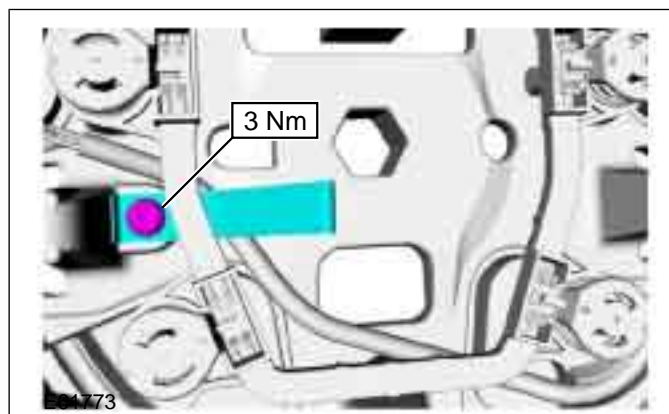
1. **⚠ CAUTION:** If installing the original driver air bag module to a new steering wheel, the driver air bag module ground cable must be removed from the new steering wheel.

Remove the driver air bag module ground cable.



2. **⚠ CAUTION:** If installing the original driver air bag module to a new steering wheel, the driver air bag module ground spring must be installed to the new steering wheel.

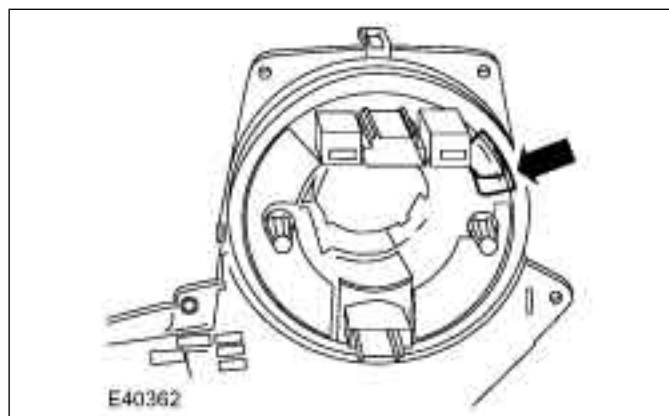
Install the driver air bag module ground spring.



All vehicles

3. **NOTE:** When the clockspring is centralized, part of the flat flexible cable will be visible and is U-shaped.

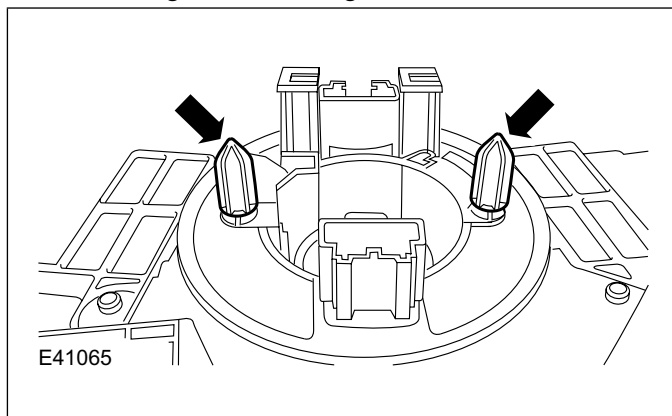
Look for the U-shaped part of the flat flexible cable to confirm the clockspring is centralized.



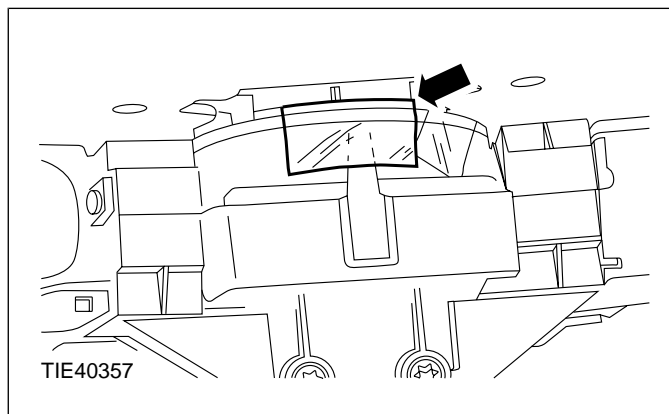
4. **⚠ CAUTION:** Care must be taken not to damage the clockspring pins.
Install the steering wheel.

REMOVAL AND INSTALLATION

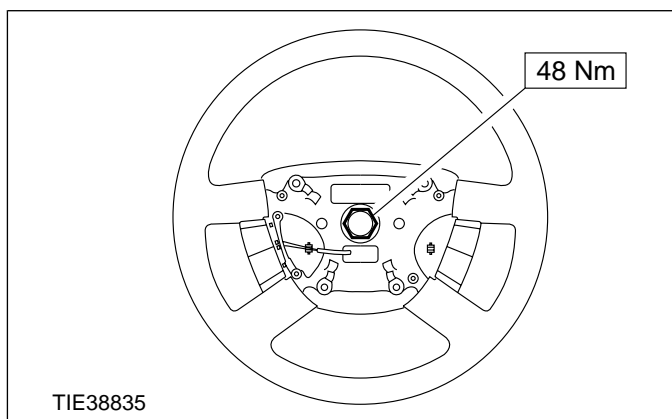
- Feed the driver air bag wiring harness through the steering wheel.



7. Remove the securing tape from the clockspring.



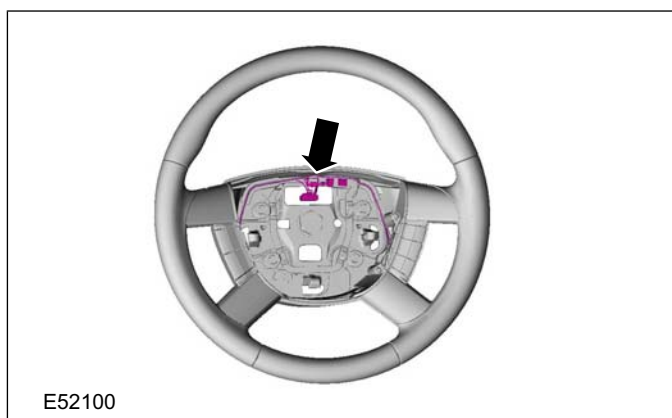
5. Install the steering wheel retaining bolt.



8. Install the driver air bag module.

For additional information, refer to: Driver Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation).

6. Connect the steering wheel electrical connector (vehicles with speed control shown).



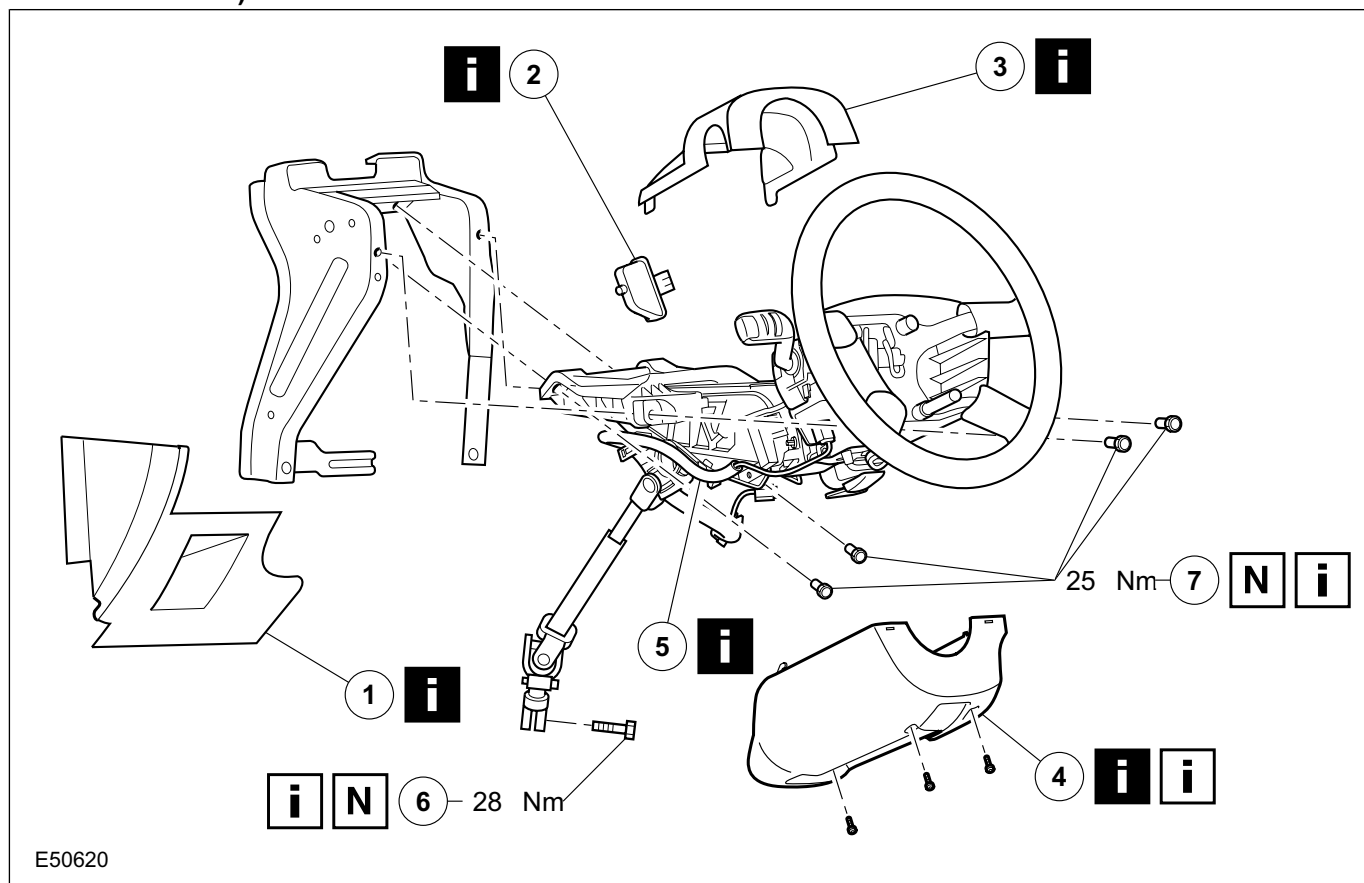
REMOVAL AND INSTALLATION

Steering Column

1. Remove the driver air bag module.

For additional information, refer to: Driver Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



E50620

Item	Description
1	Instrument panel lower outer trim panel See Removal Detail
2	Audio control switch (if equipped) See Removal Detail
3	Steering column upper shroud See Removal Detail
4	Steering column lower shroud See Removal Detail See Installation Detail

Item	Description
5	Steering column wiring harness See Removal Detail
6	Steering column shaft to steering gear pinion retaining bolt See Installation Detail
7	Steering column retaining bolts See Installation Detail

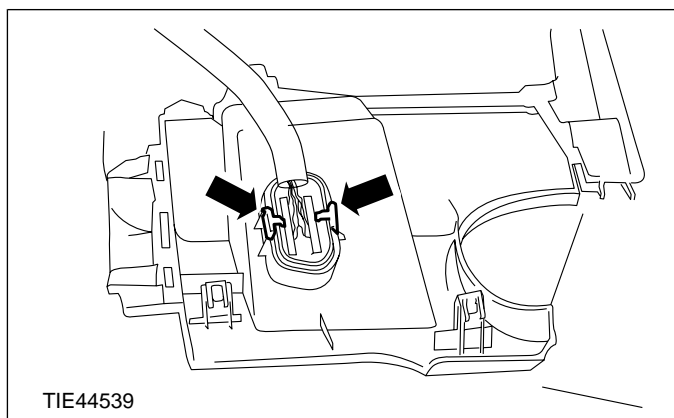
3. To install, reverse the removal procedure.

Removal Details

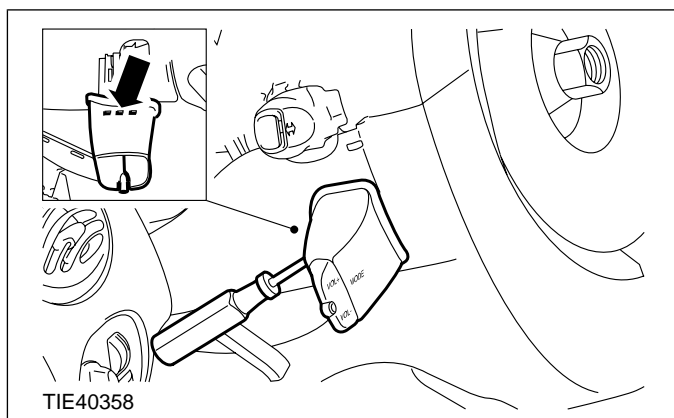
REMOVAL AND INSTALLATION

Item 1 Instrument panel lower outer trim panel

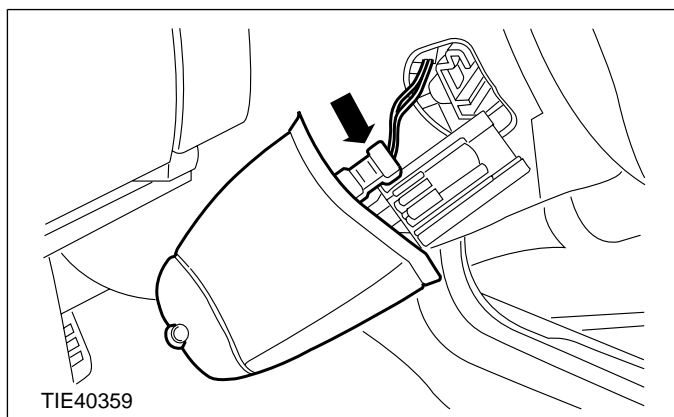
1. Detach the diagnostic link connector (DLC) from the instrument panel lower trim panel.

**Item 2 Audio control switch (if equipped)**

1. Using a thin bladed screwdriver, release the locking tang.



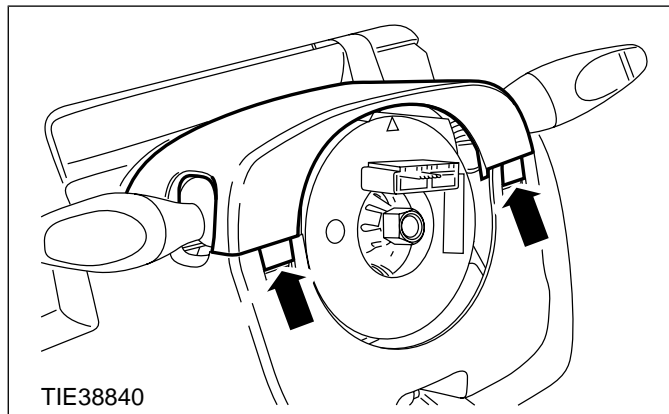
2. Disconnect the electrical connector.

**Item 3 Steering column upper shroud**

1. NOTE: Turn the steering wheel to gain access to the steering column upper shroud retaining clips.

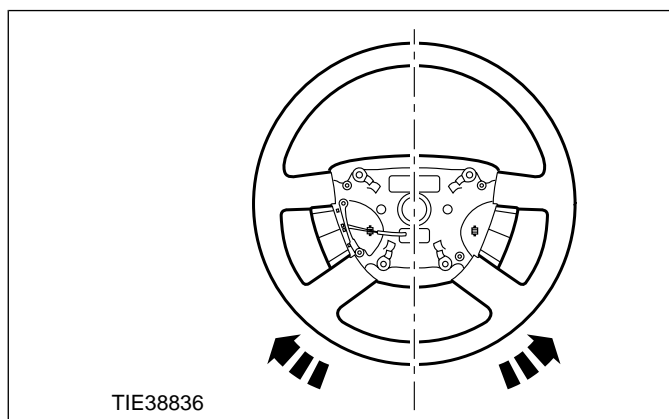
Detach the steering column upper shroud from the steering column lower shroud (steering wheel shown removed for clarity).

- Using a thin bladed screwdriver, release the retaining clips (one each side)



2. NOTE: Make sure the road wheels are in the straight ahead position.

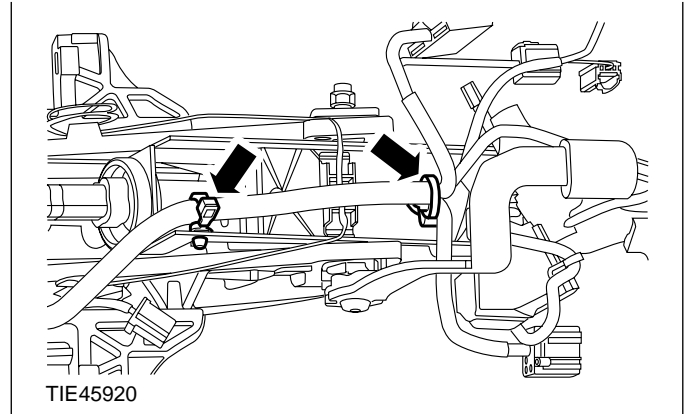
Centralize the steering and lock it in position.

**Item 4 Steering column lower shroud**

1. Release the steering column locking lever to aid the removal of the steering column lower shroud.

REMOVAL AND INSTALLATION**Item 5 Steering column wiring harness**

1. Detach the wiring harness from the steering column.

**Installation Details****Item 7 Steering column retaining bolts**

- ▲ WARNING:** Install new steering column retaining bolts. Failure to follow this instruction may result in personal injury.

Item 6 Steering column shaft to steering gear pinion retaining bolt

- ▲ WARNING:** Install a new steering column shaft to steering gear pinion retaining bolt. Failure to follow this instruction may result in personal injury.

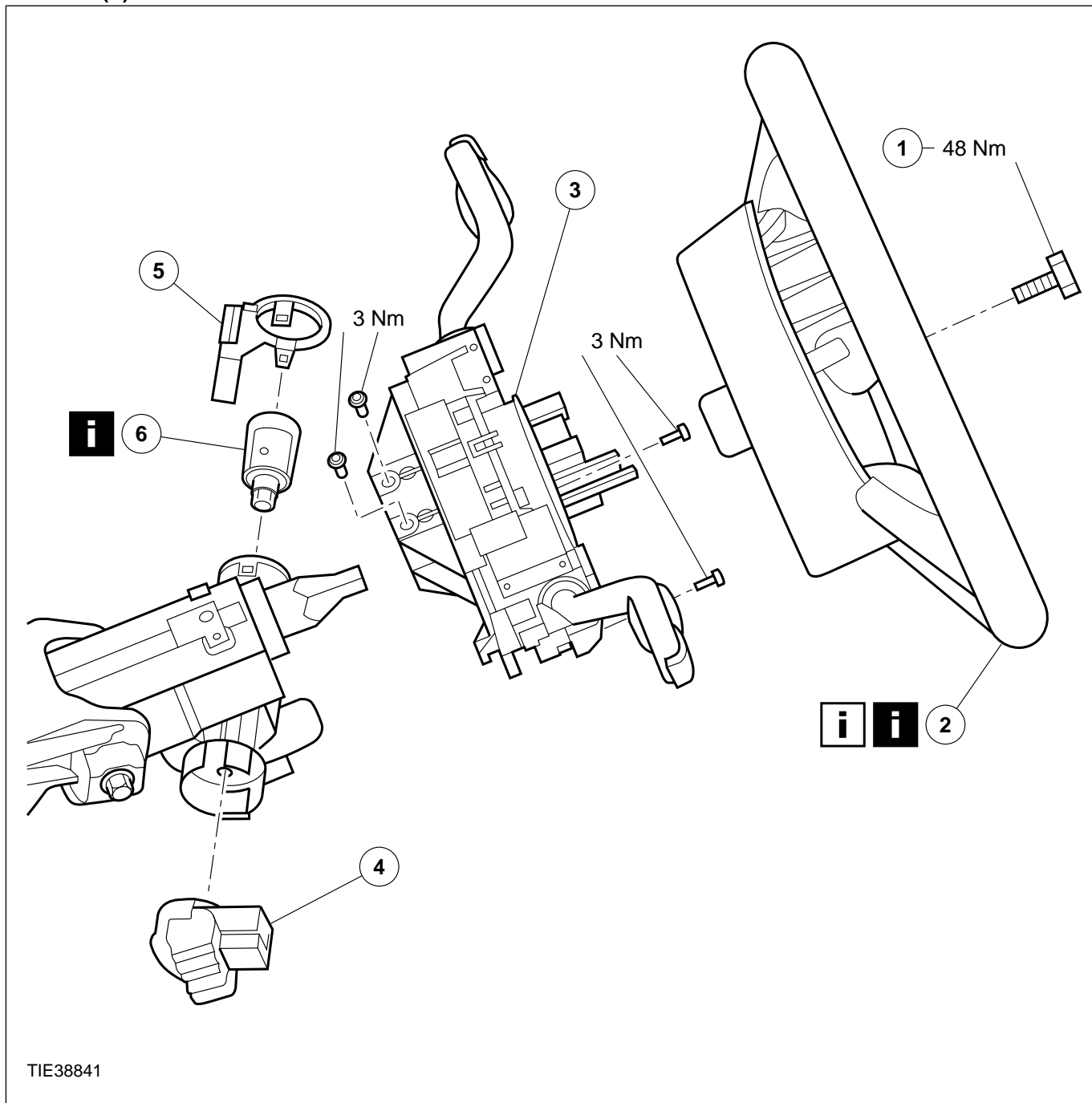
Item 4 Steering column lower shroud

1. Feed the audio control switch wiring harness through the steering column lower shroud.

DISASSEMBLY AND ASSEMBLY

Steering Column

1. Disassemble the components in the order indicated in the following illustration(s) and table(s).



TIE38841

Item	Description
1	Steering wheel retaining bolt
2	Steering wheel See Disassembly Detail See Assembly Detail
3	Multifunction switch / clockspring carrier

Item	Description
4	Ignition switch
5	Passive anti-theft system (PATS) transceiver
6	Ignition lock cylinder See Disassembly Detail

DISASSEMBLY AND ASSEMBLY

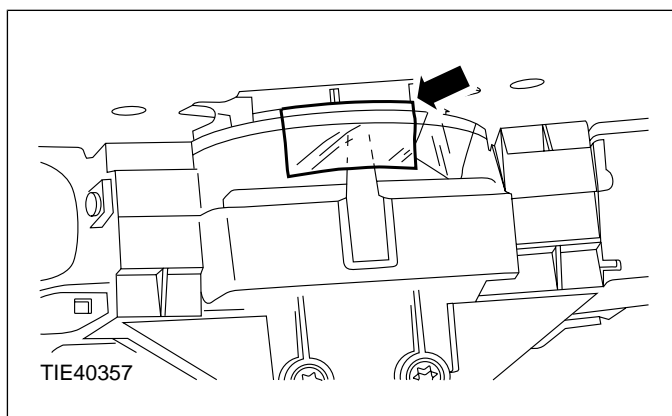
2. To assemble, reverse the disassembly procedure.

Disassembly Details

Item 2 Steering wheel

1. **CAUTION:** Make sure the clockspring is not allowed to rotate. Secure in the central position with a piece of suitable tape.

Secure the clockspring rotor to the clockspring outer.

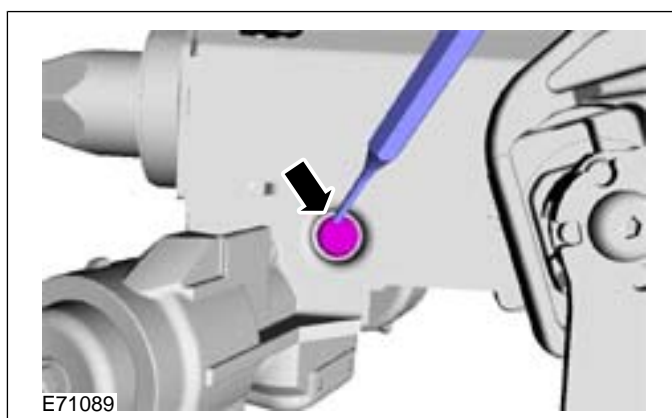


2. Disconnect the electrical connectors.

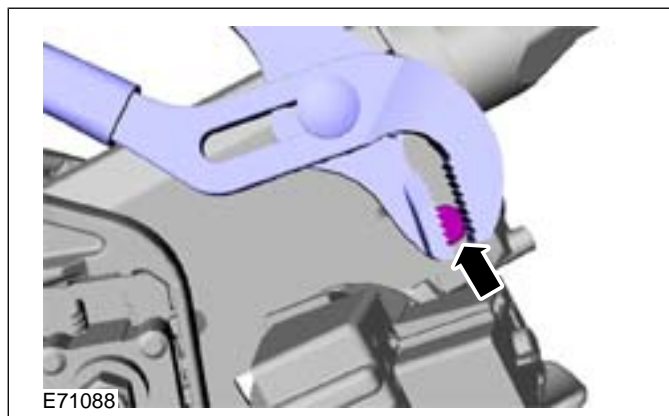
- Carefully feed the driver air bag module wiring harness through the steering wheel.

Item 6 Ignition lock cylinder

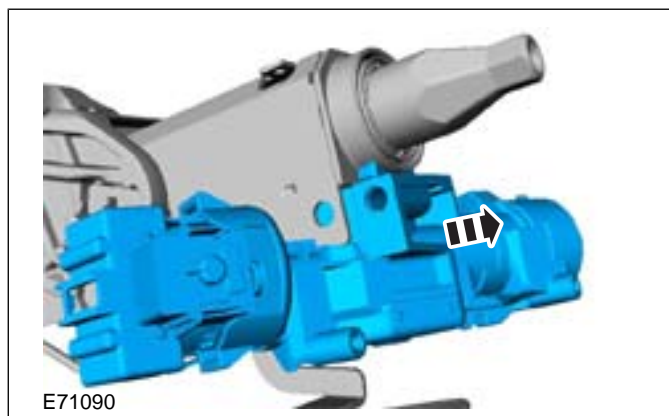
1. Using a punch, remove the right-hand screw.



2. Using a pair of grippers, remove the left-hand screw.

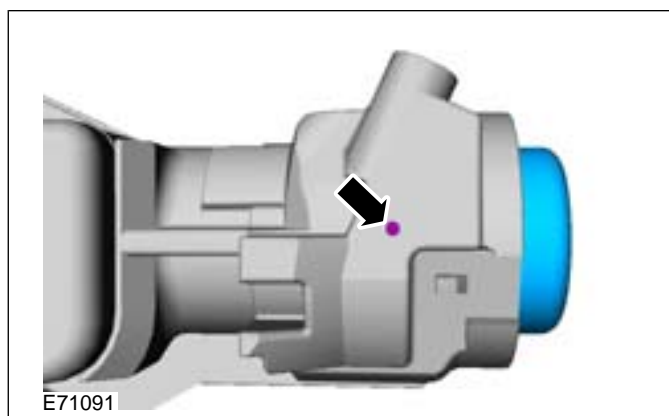


3. Detach the the ignition switch body from the steering column.



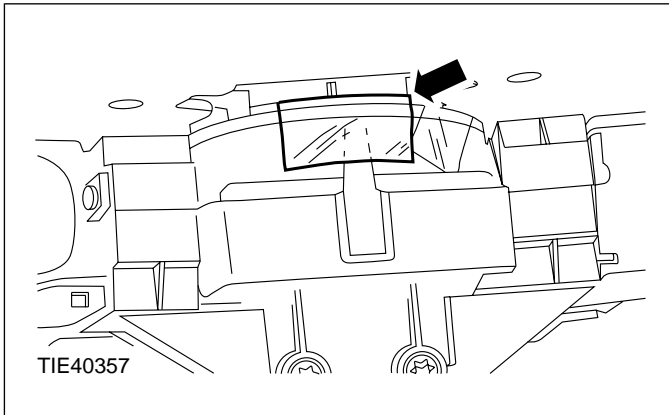
4. Turn the ignition key to position I.

5. Using a suitable tool, release the locking tang.



DISASSEMBLY AND ASSEMBLY**Assembly Details****Item 2 Steering wheel****1. Connect the electrical connectors.**

- Carefully feed the driver air bag module wiring harness through the steering wheel.

2. Remove the tape securing the clockspring.



SECTION 211-05 Steering Column Switches

VEHICLE APPLICATION: 2008.75 Focus ST C307

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REMOVAL AND INSTALLATION	
Ignition Switch.....	211-05-2



REMOVAL AND INSTALLATION

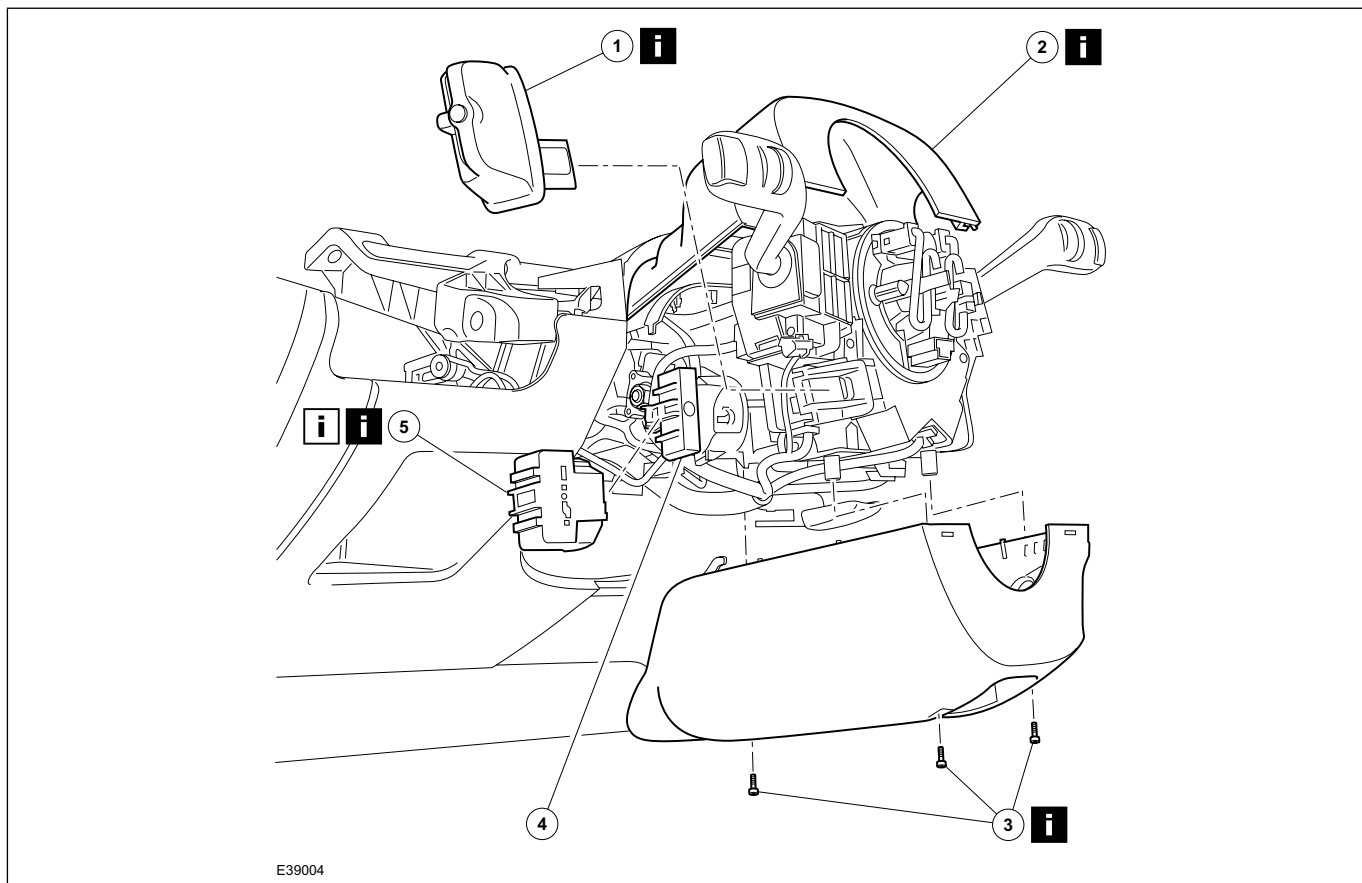
Ignition Switch

1. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).**

2. Turn the ignition key to position 1.

3. Remove the components in the order indicated in the following illustration(s) and table(s).



E39004

Item	Description
1	Remote audio control switch (if equipped) See Removal Detail
2	Steering column upper shroud See Removal Detail
3	Steering column lower shroud See Removal Detail
4	Ignition switch electrical connector
5	Ignition switch See Removal Detail See Installation Detail

All vehicles

4. To install, reverse the removal procedure.

Vehicles with global closing

5. Initialize the door window motors.

For additional information, refer to: **Door Window Motor Initialization (501-11 Glass, Frames and Mechanisms, General Procedures).**

Removal Details

211-05-3

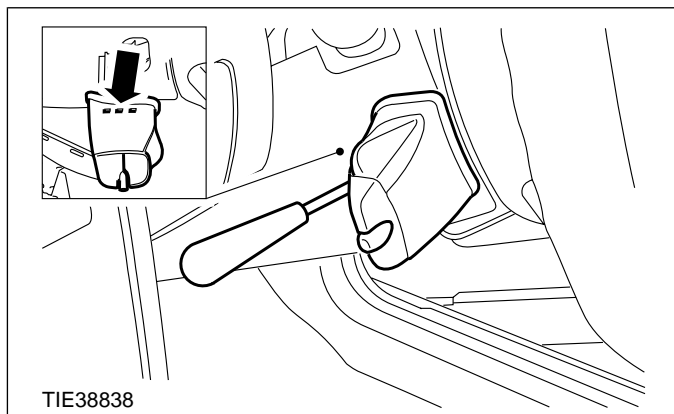
Steering Column Switches

211-05-3

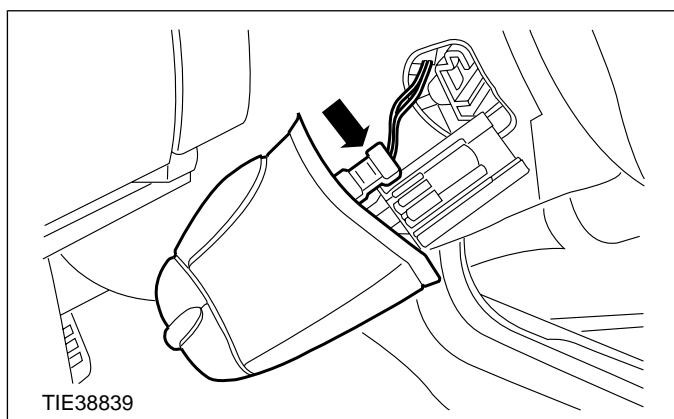
REMOVAL AND INSTALLATION

Item 1 Remote audio control switch (if equipped)

1. Using a thin bladed screwdriver, release the locking tang.



2. Disconnect the audio control electrical connector.

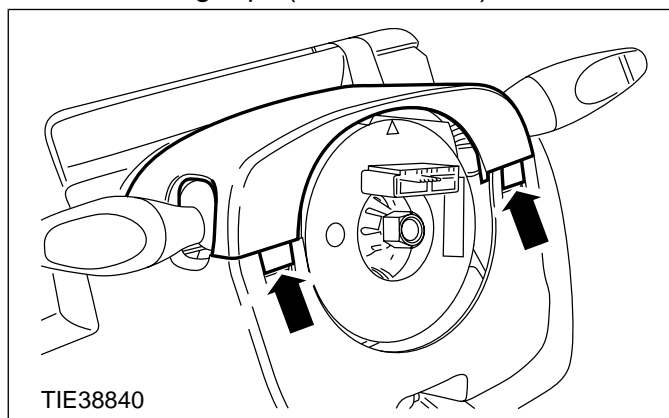


Item 2 Steering column upper shroud

1. **NOTE:** Turn the steering wheel to access the steering column upper shroud retaining clips.

Detach the steering column upper shroud from the steering column lower shroud (steering wheel shown removed for clarity).

- Using a thin bladed screwdriver, release the retaining clips (one each side).



Item 3 Steering column lower shroud

1. To aid the removal of the steering column lower shroud, release the steering column locking lever.

Item 5 Ignition switch

- ⚠ CAUTION:** Do not turn the ignition switch lock cylinder from position 1 when the ignition switch has been removed.

Installation Details

Item 5 Ignition switch

1. **⚠ CAUTION:** Do not turn the ignition switch lock cylinder from position 1 when the ignition switch has been removed.

Check and turn the ignition switch to position 1.

Powertrain

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SECTION 303-00 Engine System - General Information

VEHICLE APPLICATION: 2008.75 Focus ST C307

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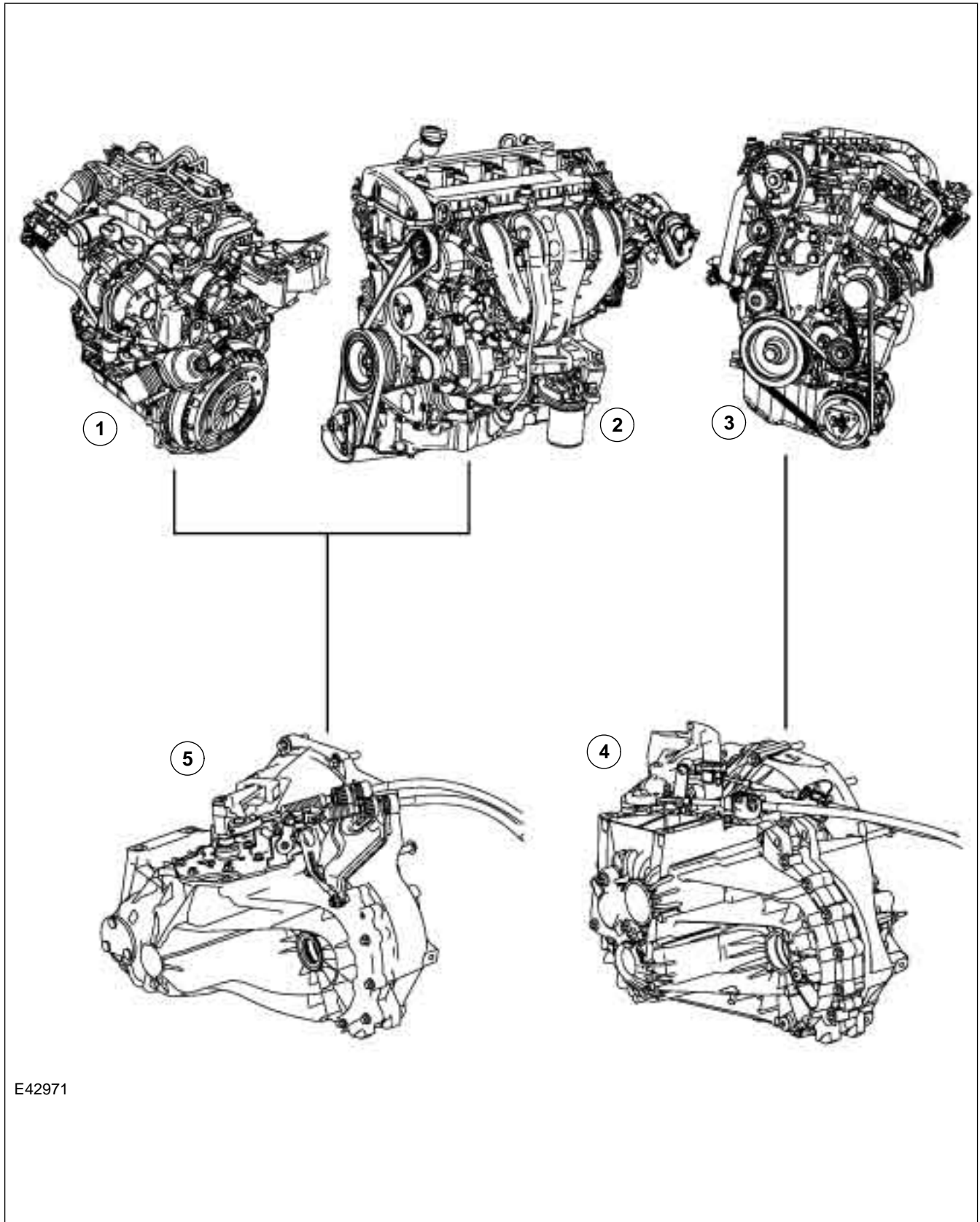
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DESCRIPTION AND OPERATION

Engine

Engine/transmission combinations

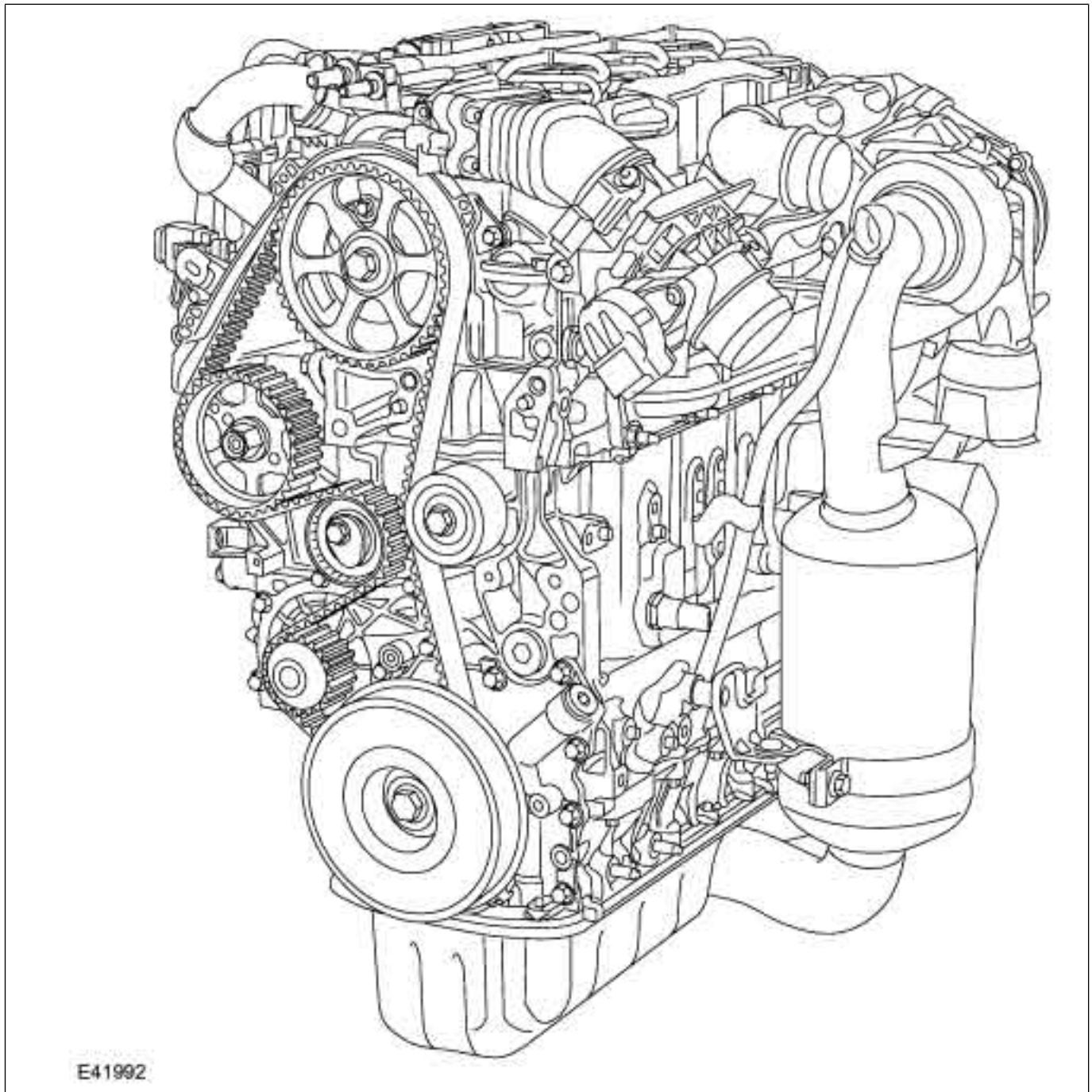


DESCRIPTION AND OPERATION

Item	Description
1	1.6L Duratorq TDCi (DV6) engine
2	1.8L Duratec HE (M14) engine
3	2.0L Duratorq TDCi (DW10) engine

Item	Description
4	MMT6
5	MTX-75

1.6L Duratorq TDCi (DV6) engine



DESCRIPTION AND OPERATION**General**

The 1.6L Duratorq TDCi (DV6) engine is a comprehensively revised version of the familiar 1.4L Duratorq TDCi (DV4) engine used in the Fiesta 2002.25.

The cylinder head has been completely re-designed. The exhaust camshaft is driven via a short timing chain with timing chain tensioner.

The intake air duct and air filter housing have also been modified. The crank drive has been adapted to the higher engine torque.

A Bosch common rail fuel injection system is used.

In addition, engine management components have been modified or added.

Technical data and specifications

Cross-mounted 4-cylinder turbodiesel engine with two overhead camshafts and 16 valves.

Light metal cylinder block with cylinder liners made of cast iron.

Cross flow cylinder head made of aluminium with two overhead camshafts and four valves per cylinder.

Intake camshaft driven via a timing belt

Valves actuated by roller cam followers with hydraulic clearance adjustment

Turbocharger with variable turbine geometry and intercooler

Power output via a dual mass flywheel

Engine management

Direct fuel injection using the common rail method

Solenoid valve controlled injector valve

Fully electronic regulation of fuel metering

Engine emission control

Exhaust Gas Recirculation (EGR)

Oxidation catalytic converter.

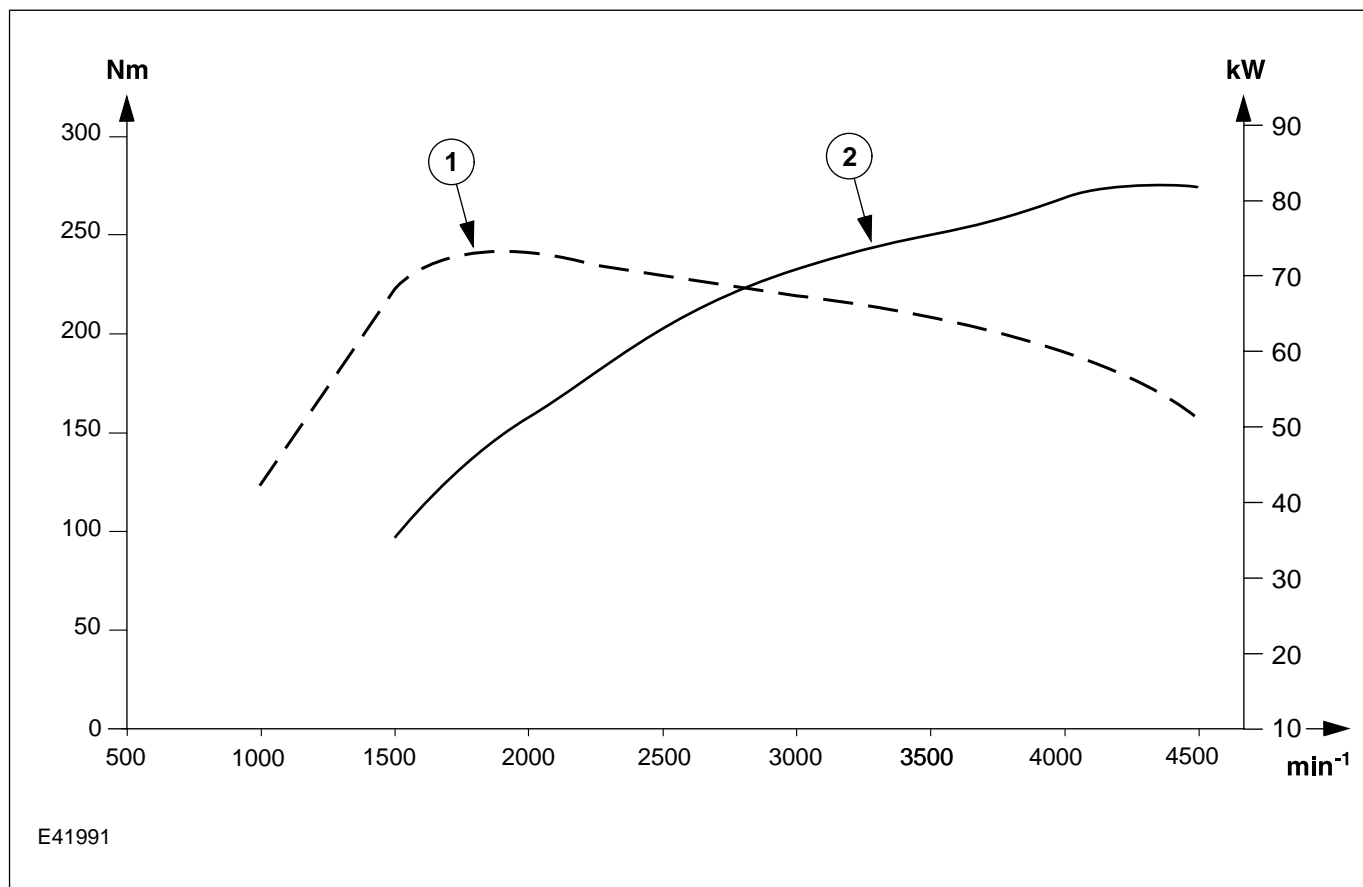
European emissions level III

Diagnostics

Diagnosis by means of WDS via the Data Link Connector (DLC)

DESCRIPTION AND OPERATION

Torque and power output



Item	Description
1	Torque curve
2	Power curve

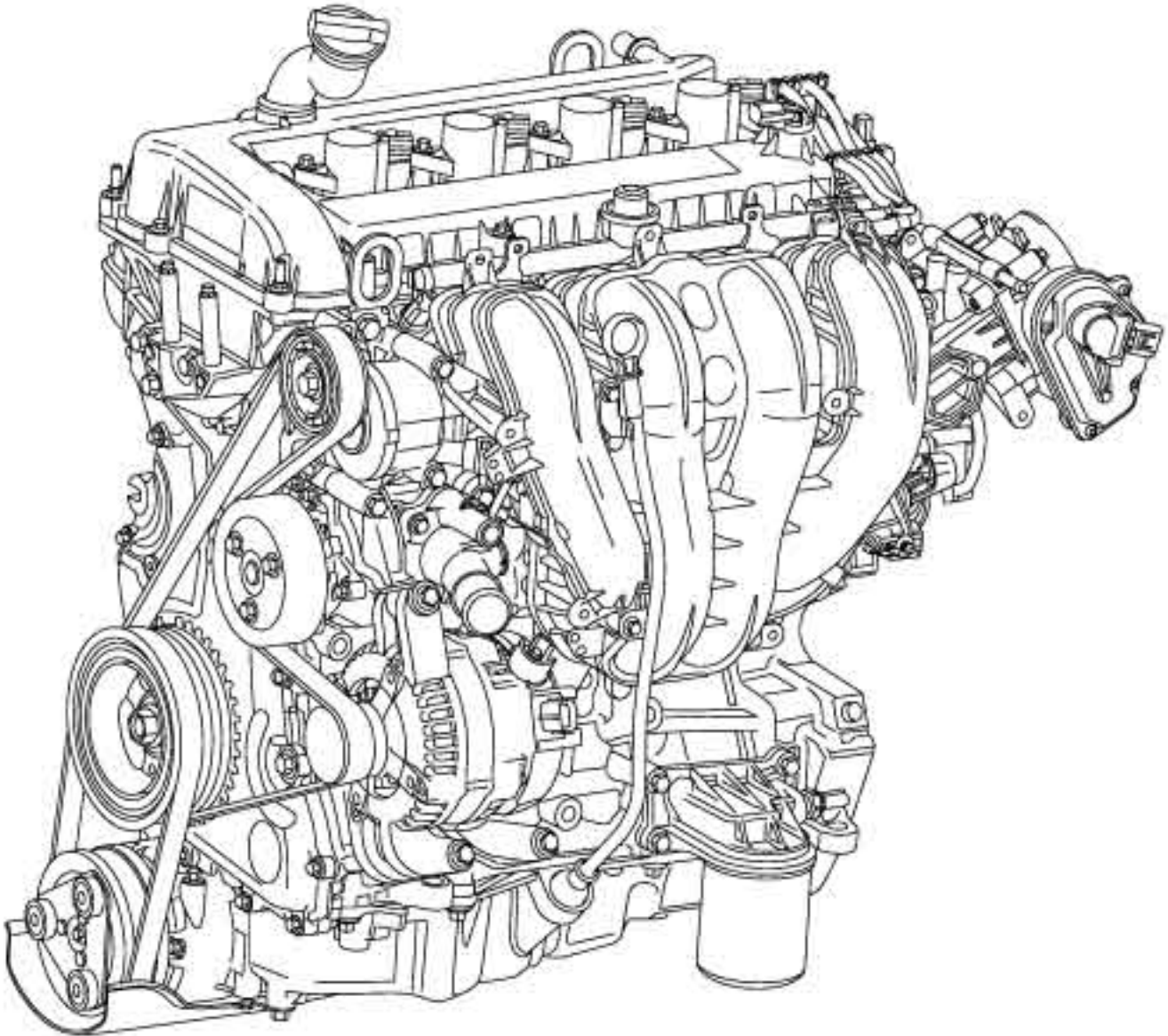
At an engine speed as low as 1750 rev/min there is already a torque of 240 Nm available.

The engine delivers a maximum power of 81 kW (110 PS) at 4000 rev/min.

The torque delivery curve has been particularly well harmonised as a result of optimised fuel induction and combustion.

DESCRIPTION AND OPERATION

1.8L Duratec HE (MI4) engine



E43046

DESCRIPTION AND OPERATION**General**

Design details of the familiar 1.8L Duratec HE (M14) engine from the Mondeo have been revised.

It is now equipped with an intake manifold switchover system with swirl valves and an ignition system with direct ignition coils.

In addition, an electric throttle valve is also used.

The Air Conditioning (A/C) compressor is located underneath the engine, and the alternator is attached to the cylinder block underneath the intake manifold (in front of the engine when looking towards the front of the vehicle).

The accessory drive system has been revised and now has an additional elastic multi-groove belt which drives the A/C compressor and does not have a separate belt tensioner.

Technical data and specifications

Cross-mounted 4-cylinder inline engine with two overhead camshafts and 16 valves.

Chain driven camshafts

Aluminium cylinder block with lower crankcase

Mechanically operated bucket tappets to operate the valves

Electronic throttle valve

Intake manifold switching system with swirl valves

Ignition system with direct ignition coils

Accessory drive system with one conventional and one elastic multi-groove belt

Engine management

Visteon Powertrain Control Module (PCM) System 7

Knock control with two knock sensors

Engine emission control

European emissions level IV

European on-board diagnosis to monitor the components relevant to exhaust emissions

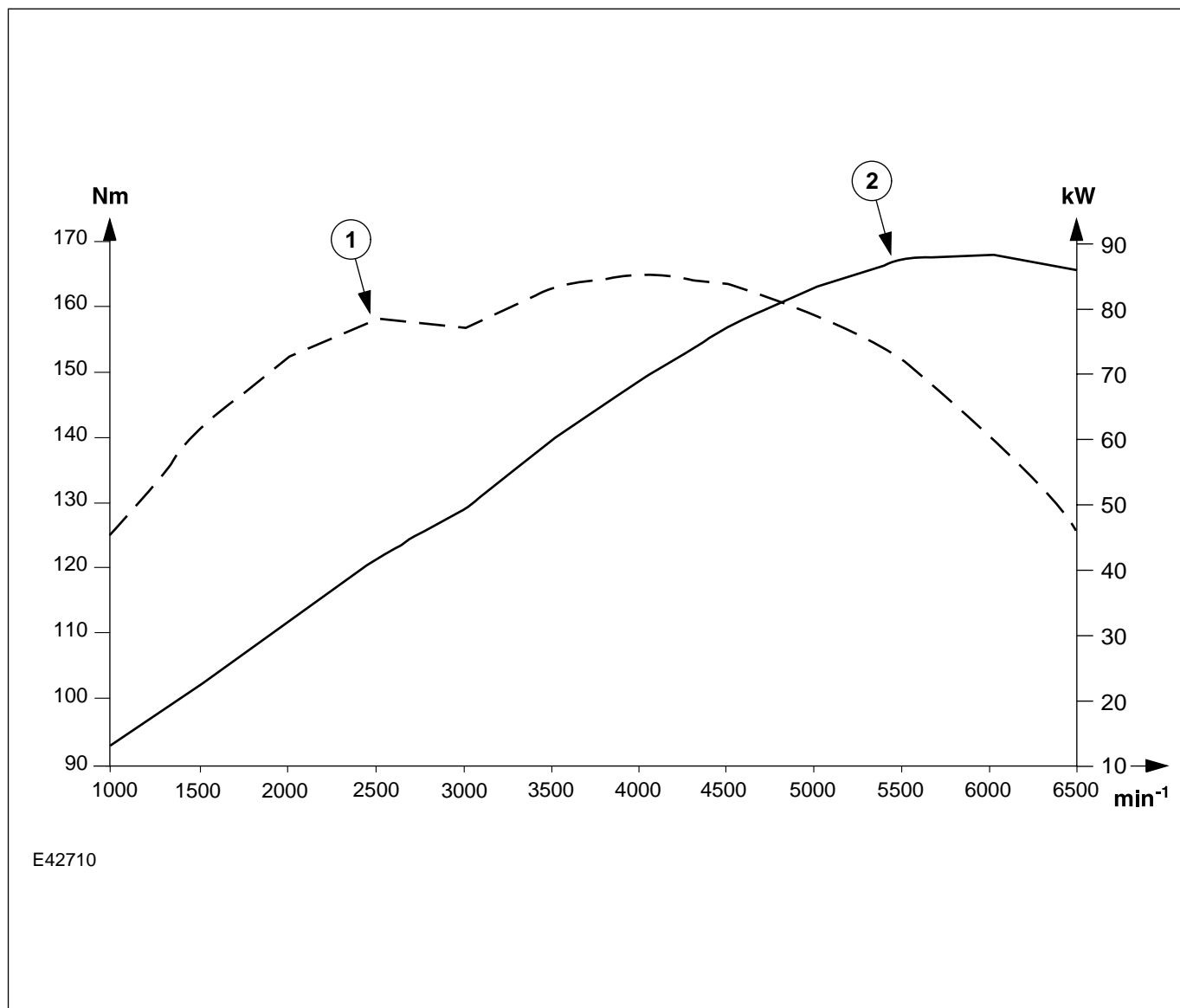
Stepper motor controlled EGR system

Diagnostics

Diagnosis with WDS via the DLC

DESCRIPTION AND OPERATION

Torque and power output



Item	Description
1	Torque curve
2	Power curve

By using an intake manifold switchover system with swirl valves, it has been possible to increase torque across the entire engine speed range, and at the same time reduce fuel consumption.

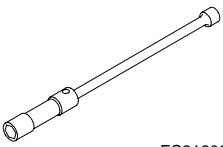
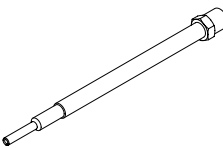
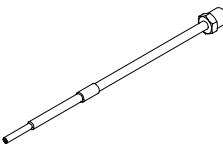
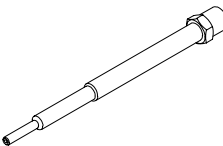
The maximum torque of 172 Nm is achieved at an engine speed of 4000 rev/min.

The engine delivers a maximum power of 88 kW (120 PS) at 6000 rev/min.

DIAGNOSIS AND TESTING

Engine

Special Tool(s)

 <p>ES21202</p>	<p>Socket, Spark Plug 303-499</p>
 <p>E62013</p>	<p>Compression Test Adapter 303-1049A</p>
 <p>E47332</p>	<p>Compression Test Adapter 303-1052</p>
 <p>E42936</p>	<p>Compression Test Adapter 303-1056</p>

General Equipment

<p>Worldwide Diagnostic System (WDS)</p>
--

<p>Materials</p>	
<p>Name</p>	<p>Specification</p>
<p>Adhesive - Loctite 243</p>	<p>WSK-M2G349-A7</p>

1. Verify the customer concern by operating the system
2. Visually inspect for obvious signs of mechanical or electrical damage.
3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Visual Inspection Chart

<p>Mechanical</p>	<p>Electrical</p>
<ul style="list-style-type: none"> - Coolant leaks - Oil leaks - Fuel system leaks - Visibly damaged or worn parts - Loose or missing nuts or bolts 	<ul style="list-style-type: none"> - Fuse(s) - Loose or corroded connector(s) - Control module - Damaged or worn switch(es)

Symptom Chart

<p>Symptom</p>	<p>Possible Sources</p>	<p>Action</p>
<ul style="list-style-type: none"> • Loss of oil 	<ul style="list-style-type: none"> • Oil leaks on components that are either coated in oil themselves or on components local to them. 	<ul style="list-style-type: none"> • CHECK for evidence of oil leaks on components. Use an ultraviolet (UV) leak tester if an oil leak is not evident. INSTALL new gaskets or components as required.
	<ul style="list-style-type: none"> • Internal or external leak at the oil cooler. 	<ul style="list-style-type: none"> • CHECK the coolant expansion tank for a film of oil on the coolant surface. INSTALL a new oil cooler or oil cooler gasket.
	<ul style="list-style-type: none"> • Leak at the crankshaft seal. 	<ul style="list-style-type: none"> • INSTALL a new crankshaft seal.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none">Leaks from oil carrying components or basic engine.	<ul style="list-style-type: none">CHECK for cracks in oil-carrying components of the basic engine by means of a UV leak test. INSTALL new components or seals as necessary.
<ul style="list-style-type: none">Oil consumption	<ul style="list-style-type: none">Use of the wrong type of engine oil.	<ul style="list-style-type: none">DETERMINE the last type of engine oil used and compare with the specification. Change the engine oil to the specification.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> • Faulty positive crankcase ventilation (PCV) system. <ul style="list-style-type: none"> - Hoses or ventilation or breather valves are blocked. This causes excessive pressure in the crankcase which causes more oil to enter the combustion chamber. - PCV oil separator is faulty and engine oil can enter the combustion chamber through the intake manifold. 	<ul style="list-style-type: none"> • CHECK if the PCV system is operating correctly and repair as necessary. Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) - REFER to: Engine Emission Control (303-08 Engine Emission Control - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma), Diagnosis and Testing). Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) - REFER to: Engine Emission Control (303-08 Engine Emission Control - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), Diagnosis and Testing). Engine - 2.5L Duratec-ST (VI5) - REFER to: Engine Emission Control (303-08 Engine Emission Control - 2.5L Duratec-ST (VI5), Diagnosis and Testing). Engine - 1.6L Duratorq-TDCi (DV) Diesel - REFER to: Engine Emission Control (303-08 Engine Emission Control - 1.6L Duratorq-TDCi (DV) Diesel, Diagnosis and Testing). Engine - 2.0L Duratorq-TDCi (DW) Diesel - REFER to: Engine Emission Control (303-08 Engine Emission Control - 2.0L Duratorq-TDCi (DW) Diesel, Diagnosis and Testing). Engine - 1.8L Duratorq-TDCi (Kent) Diesel - REFER to: Engine Emission Control (303-08 Engine Emission Control - 1.8L Duratorq-TDCi (Lynx) Diesel, Diagnosis and Testing).

303-00-13

Engine System - General Information

303-00-13

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Turbocharger seals. 	<ul style="list-style-type: none"> INSTALL a new turbocharger. Engine - 2.5L Duratec-ST (VI5) - REFER to: Turbocharger (303-04 Fuel Charging and Controls - Turbocharger - 2.5L Duratec-ST (VI5), Removal and Installation) / Turbocharger - 1.6L Duratorq-TDCi (DV) Diesel (90 PS) (303-04 Fuel Charging and Controls - Turbocharger, Removal and Installation) / Turbocharger - 1.6L Duratorq-TDCi (DV) Diesel (110 PS) (303-04 Fuel Charging and Controls - Turbocharger, Removal and Installation) / Turbocharger - 1.6L Duratorq-TDCi (DV) Diesel (110 PS), VIN Plate Emission Level Code: K (303-04 Fuel Charging and Controls - Turbocharger, Removal and Installation) / Turbocharger - 1.8L Duratorq-TDCi (Lynx) Diesel (303-04 Fuel Charging and Controls - Turbocharger, Removal and Installation) / Turbocharger - 2.0L Duratorq-TDCi (DW) Diesel (303-04 Fuel Charging and Controls - Turbocharger, Removal and Installation).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> • Damaged gaskets or mating surfaces. <ul style="list-style-type: none"> - Cylinder head gasket is damaged or mating face are warped. - Valve stem seals are worn and engine oil can enter the combustion chamber between the valve stem and the valve stem guide. 	<ul style="list-style-type: none"> • CHECK the gaskets and mating surfaces for damage. Remove the cylinder head. CHECK the mating faces, cylinder head gasket and the evenness of the cylinder head and engine block mating faces. INSTALL new valve seals. Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) - REFER to: Exhaust Gas Recirculation (EGR) Valve (303-08 Engine Emission Control - 2.0L Duratorq-TDCi (DW) Diesel, Removal and Installation). Engine - 1.6L Duratec-16V Ti-VCT REFER to: Valve Seals (303-01 Engine - 1.6L Duratec-16V Ti-VCT (Sigma), In-vehicle Repair). Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) - REFER to: Valve Seals (303-01 Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), In-vehicle Repair). Engine - 2.5L Duratec-ST (VI5) - REFER to: Valve Stem Seals (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation). Engine - 1.6L Duratorq-TDCi (DV) Diesel - REFER to: Valve Seals (303-01 Engine - 1.6L Duratorq-TDCi (DV) Diesel, In-vehicle Repair). Engine - 2.0L Duratorq-TDCi (DW) Diesel - REFER to: Valve Seals (303-01 Engine - 1.8L Duratorq-TDCi (Lynx) Diesel, In-vehicle Repair). Engine - 1.8L Duratorq-TDCi (Kent) Diesel - REFER to: Valve Seals (303-01 Engine - 2.0L Duratorq-TDCi (DW) Diesel, In-vehicle Repair).
	<ul style="list-style-type: none"> • Piston ring or cylinder liner wear. 	<ul style="list-style-type: none"> • INSTALL new components as necessary.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> • Damaged cylinder liners or excessive clearance of engine components. <ul style="list-style-type: none"> - Pistons. - Piston rings (clearance in groove and end gap). - Cylinder liners. 	<ul style="list-style-type: none"> • CHECK the running surfaces and clearances of the individual engine components. INSTALL new components as necessary. INSTALL a new cylinder block if necessary. • Check the pistons and piston rings. REFER to: (303-00 Engine System - General Information) <ul style="list-style-type: none"> Piston Inspection (General Procedures), Piston Pin to Bore Diameter (General Procedures), Piston Diameter (General Procedures), Piston Ring End Gap (General Procedures), Piston Ring-to-Groove Clearance (General Procedures), Piston Pin Diameter (General Procedures).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
• Coolant consumption	• Cooling system components.	<ul style="list-style-type: none"> • Check the cooling system components. Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) - REFER to: Engine Cooling (303-03 Engine Cooling - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma), Diagnosis and Testing). Engine - 1.6L Duratec-16V Ti-VCT - REFER to: Engine Cooling (303-03 Engine Cooling - 1.6L Duratec-16V Ti-VCT (Sigma), Diagnosis and Testing). Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) - REFER to: Engine Cooling (303-03 Engine Cooling - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), Diagnosis and Testing). Engine - 2.5L Duratec-ST (VI5) - REFER to: Engine Cooling (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), Diagnosis and Testing). Engine - 1.6L Duratorq-TDCi (DV) Diesel - REFER to: Engine Cooling (303-03 Engine Cooling - 1.6L Duratorq-TDCi (DV) Diesel, Diagnosis and Testing). Engine - 2.0L Duratorq-TDCi (DW) Diesel - REFER to: Engine Cooling (303-03 Engine Cooling - 2.0L Duratorq-TDCi (DW) Diesel, Diagnosis and Testing). Engine - 1.8L Duratorq-TDCi (Kent) Diesel - REFER to: Engine Cooling (303-03 Engine Cooling - 1.8L Duratorq-TDCi (Lynx) Diesel, Diagnosis and Testing).
	• Oil cooler.	• INSTALL a new oil cooler.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Damaged gaskets or warped mating faces. 	<ul style="list-style-type: none"> CHECK the cylinder head gasket for damage. CHECK the cylinder head for distortion.
	<ul style="list-style-type: none"> Cracks or fractures in engine components surrounded by coolant, such as cylinder liners and cylinder head combustion chamber. 	<ul style="list-style-type: none"> DETERMINE the damaged engine component(s) and install new component(s) as necessary.
<ul style="list-style-type: none"> Engine will not crank 	<ul style="list-style-type: none"> Battery or cables. 	<ul style="list-style-type: none"> CHECK the battery, bracket and cables. REFER to: Battery (414-01 Battery, Mounting and Cables, Diagnosis and Testing).
	<ul style="list-style-type: none"> Starter motor or cables. 	<ul style="list-style-type: none"> CHECK the starting system. REFER to: Starting System (303-06 Starting System, Diagnosis and Testing).
<ul style="list-style-type: none"> Engine cranks but will not start 	<ul style="list-style-type: none"> Fuel tank is empty. 	<ul style="list-style-type: none"> CHECK the fuel level.
	<ul style="list-style-type: none"> Water in fuel (only diesel engine). 	<ul style="list-style-type: none"> Drain the water from the fuel system.
	<ul style="list-style-type: none"> Fuel filter blocked. 	<ul style="list-style-type: none"> INSTALL a new fuel filter. REFER to: (310-01 Fuel Tank and Lines) Fuel Filter - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (Removal and Installation), Fuel Filter - 1.6L Duratorq-TDCi (DV) Diesel (Removal and Installation), Fuel Filter - 2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Water-in-Fuel Sensor (Removal and Installation), Fuel Filter - 2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Water-in-Fuel Sensor (Removal and Installation), Fuel Filter - 1.8L Duratorq-TDCi (Lynx) Diesel, Vehicles Without: Water-in-Fuel Sensor (Removal and Installation).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Engine intake air system. 	<ul style="list-style-type: none"> CHECK the intake air system. REFER to: Intake Air Distribution and Filtering (303-12 Intake Air Distribution and Filtering, Diagnosis and Testing).
	<ul style="list-style-type: none"> Glow plug faulty (only diesel engine). 	<ul style="list-style-type: none"> CHECK the glow plugs. INSTALL new glow plugs as necessary. REFER to: Glow Plug System (303-07 Glow Plug System - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Diagnosis and Testing).
	<ul style="list-style-type: none"> Engine management system. 	<ul style="list-style-type: none"> CHECK the engine management system. REFER to: Electronic Engine Controls (303-14 Electronic Engine Controls - 2.5L Duratec-ST (VI5), Diagnosis and Testing).
	<ul style="list-style-type: none"> Ignition system (only petrol engines). 	<ul style="list-style-type: none"> CHECK the ignition system. Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) - REFER to: Engine Ignition (303-07 Engine Ignition - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma), Diagnosis and Testing). Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) - REFER to: Engine Ignition (303-07 Engine Ignition - 2.5L Duratec-ST (VI5), Diagnosis and Testing). Engine - 2.5L Duratec-ST (VI5) - REFER to: Engine Ignition (303-07 Engine Ignition - 2.5L Duratec-ST (VI5), Diagnosis and Testing).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Incorrect valve timing. 	<ul style="list-style-type: none"> CHECK and adjust the valve timing. Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) - REFER to: Valve Clearance Adjustment (303-01 Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma), General Procedures). Engine - 1.6L Duratec-16V Ti-VCT - REFER to: Timing Belt - Vehicles Built Up To: 04/2005 (303-01 Engine - 1.6L Duratec-16V Ti-VCT (Sigma), In-vehicle Repair). Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) - REFER to: Timing Chain (303-01 Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), In-vehicle Repair). Engine - 2.5L Duratec-ST (VI5) - REFER to: Timing Belt (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation). Engine - 1.6L Duratorq-TDCi (DV) Diesel - REFER to: Timing Belt (303-01 Engine - 1.6L Duratorq-TDCi (DV) Diesel, In-vehicle Repair). Engine - 1.8L Duratorq-TDCi (Kent) Diesel - REFER to: Timing Belt (303-01 Engine - 1.8L Duratorq-TDCi (Lynx) Diesel, In-vehicle Repair). Engine - 2.0L Duratorq-TDCi (DW) Diesel - REFER to: Timing Belt (303-01 Engine - 2.0L Duratorq-TDCi (DW) Diesel, In-vehicle Repair).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Broken or damaged timing belt/timing chain or pulley/sprocket. 	<ul style="list-style-type: none"> CHECK the timing belt/timing chain and sprockets/pulleys. INSTALL new components as necessary. Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) - REFER to: Valve Clearance Adjustment (303-01 Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma), General Procedures). Engine - 1.6L Duratec-16V Ti-VCT - REFER to: Timing Belt - Vehicles Built Up To: 04/2005 (303-01 Engine - 1.6L Duratec-16V Ti-VCT (Sigma), In-vehicle Repair). Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) - REFER to: Timing Chain (303-01 Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), In-vehicle Repair). Engine - 2.5L Duratec-ST (VI5) - REFER to: Timing Belt (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation). Engine - 1.6L Duratorq-TDCi (DV) Diesel - REFER to: Timing Belt (303-01 Engine - 1.6L Duratorq-TDCi (DV) Diesel, In-vehicle Repair). Engine - 1.8L Duratorq-TDCi (Kent) Diesel - REFER to: Timing Belt (303-01 Engine - 1.8L Duratorq-TDCi (Lynx) Diesel, In-vehicle Repair). Engine - 2.0L Duratorq-TDCi (DW) Diesel - REFER to: Timing Belt (303-01 Engine - 2.0L Duratorq-TDCi (DW) Diesel, In-vehicle Repair).



DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none">• Very poor power output or fuel consumption too high or engine running rough.	<ul style="list-style-type: none">• Fuel system.	



DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
		<ul style="list-style-type: none"> • CHECK the fuel system. Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) - REFER to: Fuel Charging and Controls (303-04 Fuel Charging and Controls - 1.6L Duratec-16V Ti-VCT (Sigma), Diagnosis and Testing). Engine - 1.6L Duratec-16V Ti-VCT - REFER to: Fuel Charging and Controls (303-04 Fuel Charging and Controls - 1.6L Duratec-16V Ti-VCT (Sigma), Diagnosis and Testing). Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) - REFER to: Fuel Charging and Controls (303-04 Fuel Charging and Controls - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), Diagnosis and Testing). Engine - 2.5L Duratec-ST (VI5) - REFER to: Fuel Charging and Controls (303-04 Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Diagnosis and Testing). Engine - 1.6L Duratorq-TDCi (DV) Diesel - REFER to: Fuel Charging and Controls (303-04 Fuel Charging and Controls - 1.6L Duratorq-TDCi (DV) Diesel, Diagnosis and Testing). Engine - 2.0L Duratorq-TDCi (DW) Diesel - REFER to: Fuel Charging and Controls (303-04 Fuel Charging and Controls - 2.0L Duratorq-TDCi (DW) Diesel, Diagnosis and Testing). Engine - 1.8L Duratorq-TDCi (Kent) Diesel - REFER to: Fuel Charging and Controls - 1.8L Duratorq-TDCi (Lynx) Diesel (303-04 Fuel Charging and Controls - 1.8L Duratorq-TDCi (Lynx) Diesel, Diagnosis and

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
		Testing).
	<ul style="list-style-type: none"> Engine intake air system. 	<ul style="list-style-type: none"> CHECK the intake air system. REFER to: Intake Air Distribution and Filtering (303-12 Intake Air Distribution and Filtering, Diagnosis and Testing).
	<ul style="list-style-type: none"> Exhaust system blocked. 	<ul style="list-style-type: none"> CHECK the exhaust system. REFER to: Exhaust System (309-00 Exhaust System, Description and Operation).
	<ul style="list-style-type: none"> Engine management system. 	<ul style="list-style-type: none"> CHECK the engine management system. REFER to: Electronic Engine Controls (303-14 Electronic Engine Controls - 2.5L Duratec-ST (VI5), Diagnosis and Testing).
	<ul style="list-style-type: none"> Fault in ignition system (only petrol engines). 	<ul style="list-style-type: none"> CHECK the ignition system. Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) - REFER to: Engine Ignition (303-07 Engine Ignition - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma), Diagnosis and Testing). Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) - REFER to: Engine Ignition (303-07 Engine Ignition - 2.5L Duratec-ST (VI5), Diagnosis and Testing). Engine - 2.5L Duratec-ST (VI5) - REFER to: Engine Ignition (303-07 Engine Ignition - 2.5L Duratec-ST (VI5), Diagnosis and Testing).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> • Turbocharger. 	<ul style="list-style-type: none"> • CHECK the turbocharger. Engine - 2.5L Duratec-ST (VI5) - REFER to: Turbocharger (303-04 Fuel Charging and Controls - Turbocharger - 2.5L Duratec-ST (VI5), Removal and Installation) / Turbocharger - 1.6L Duratorq-TDCi (DV) Diesel (303-04 Fuel Charging and Controls - Turbocharger, Diagnosis and Testing) / Turbocharger - 2.0L Duratorq-TDCi (DW) Diesel (303-04 Fuel Charging and Controls - Turbocharger, Diagnosis and Testing) / Turbocharger - 1.8L Duratorq-TDCi (Lynx) Diesel (303-04 Fuel Charging and Controls - Turbocharger, Diagnosis and Testing).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Incorrect valve timing. Timing belt/timing sprocket or pulley/sprocket damaged. 	<ul style="list-style-type: none"> CHECK and adjust valve timing. INSTALL new components as necessary. Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) - REFER to: Valve Clearance Adjustment (303-01 Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma), General Procedures). Engine - 1.6L Duratec-16V Ti-VCT - REFER to: Timing Belt - Vehicles Built Up To: 04/2005 (303-01 Engine - 1.6L Duratec-16V Ti-VCT (Sigma), In-vehicle Repair). Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) - REFER to: Timing Chain (303-01 Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), In-vehicle Repair). Engine - 2.5L Duratec-ST (VI5) - REFER to: Timing Belt (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation). Engine - 1.6L Duratorq-TDCi (DV) Diesel - REFER to: Timing Belt (303-01 Engine - 1.6L Duratorq-TDCi (DV) Diesel, In-vehicle Repair). Engine - 1.8L Duratorq-TDCi (Kent) Diesel - REFER to: Timing Belt (303-01 Engine - 1.8L Duratorq-TDCi (Lynx) Diesel, In-vehicle Repair). Engine - 2.0L Duratorq-TDCi (DW) Diesel - REFER to: Timing Belt (303-01 Engine - 2.0L Duratorq-TDCi (DW) Diesel, In-vehicle Repair).

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Engine System - General Information

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DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none">Ignition timing incorrect (only petrol engines).	<ul style="list-style-type: none">CHECK the electronic engine controls. REFER to: Electronic Engine Controls (303-14 Electronic Engine Controls - 2.5L Duratec-ST (VI5), Diagnosis and Testing).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Noisy running 	<ul style="list-style-type: none"> Engine auxiliary components loose or damaged. 	<ul style="list-style-type: none"> CHECK engine auxiliary components for damage or looseness. CHECK and adjust valve timing. INSTALL new components as necessary. Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) - REFER to: Valve Clearance Adjustment (303-01 Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma), General Procedures). Engine - 1.6L Duratec-16V Ti-VCT - REFER to: Timing Belt - Vehicles Built Up To: 04/2005 (303-01 Engine - 1.6L Duratec-16V Ti-VCT (Sigma), In-vehicle Repair). Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) - REFER to: Timing Chain (303-01 Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), In-vehicle Repair). Engine - 2.5L Duratec-ST (VI5) - REFER to: Timing Belt (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation). Engine - 1.6L Duratorq-TDCi (DV) Diesel - REFER to: Timing Belt (303-01 Engine - 1.6L Duratorq-TDCi (DV) Diesel, In-vehicle Repair). Engine - 1.8L Duratorq-TDCi (Kent) Diesel - REFER to: Timing Belt (303-01 Engine - 1.8L Duratorq-TDCi (Lynx) Diesel, In-vehicle Repair). Engine - 2.0L Duratorq-TDCi (DW) Diesel - REFER to: Timing Belt (303-01 Engine - 2.0L Duratorq-TDCi (DW) Diesel, In-vehicle Repair).

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Engine System - General Information

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DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
• Noisy running, misfiring, back-firing or knocking	• Incorrect fuel	• DETERMINE which type of fuel was last put in the tank (note the country specific fuel specifications).
	• Water in fuel or fuel contaminated.	• CHECK the fuel system for water or other contamination.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Valve timing incorrect, timing belt/chain or pulley/sprocket damaged. 	<ul style="list-style-type: none"> CHECK and adjust valve timing. INSTALL new components as necessary. Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) - REFER to: Valve Clearance Adjustment (303-01 Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma), General Procedures). Engine - 1.6L Duratec-16V Ti-VCT - REFER to: Timing Belt - Vehicles Built Up To: 04/2005 (303-01 Engine - 1.6L Duratec-16V Ti-VCT (Sigma), In-vehicle Repair). Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) - REFER to: Timing Chain (303-01 Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), In-vehicle Repair). Engine - 2.5L Duratec-ST (VI5) - REFER to: Timing Belt (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation). Engine - 1.6L Duratorq-TDCi (DV) Diesel - REFER to: Timing Belt (303-01 Engine - 1.6L Duratorq-TDCi (DV) Diesel, In-vehicle Repair). Engine - 1.8L Duratorq-TDCi (Kent) Diesel - REFER to: Timing Belt (303-01 Engine - 1.8L Duratorq-TDCi (Lynx) Diesel, In-vehicle Repair). Engine - 2.0L Duratorq-TDCi (DW) Diesel - REFER to: Timing Belt (303-01 Engine - 2.0L Duratorq-TDCi (DW) Diesel, In-vehicle Repair).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Noisy running or valve train noise 	<ul style="list-style-type: none"> Valve clearance too large due to faulty valve tappets or worn valve train components. 	<ul style="list-style-type: none"> INSTALL new hydraulic lash adjusters or adjust the valve clearance. Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) - REFER to: Valve Clearance Adjustment (303-01 Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma), General Procedures). Engine - 1.6L Duratec-16V Ti-VCT - REFER to: Valve Clearance Adjustment (303-01 Engine - 1.6L Duratec-16V Ti-VCT (Sigma), General Procedures). Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) - REFER to: Valve Clearance Adjustment (303-01 Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), General Procedures). Engine - 2.5L Duratec-ST (VI5) - REFER to: Valve Clearance Adjustment (303-01 Engine - 2.5L Duratec-ST (VI5), General Procedures). Engine - 1.6L Duratorq-TDCi (DV) Diesel - REFER to: Camshaft (303-01 Engine - 1.6L Duratorq-TDCi (DV) Diesel, In-vehicle Repair). Engine - 2.0L Duratorq-TDCi (DW) Diesel - REFER to: Camshafts (303-01 Engine - 2.0L Duratorq-TDCi (DW) Diesel, In-vehicle Repair). Engine - 1.8L Duratorq-TDCi (Kent) Diesel - REFER to: Camshafts (303-01 Engine - 1.8L Duratorq-TDCi (Lynx) Diesel, In-vehicle Repair).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Timing belt or timing chain damaged. 	<ul style="list-style-type: none"> INSTALL a new timing belt or timing chain. Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) - REFER to: Valve Clearance Adjustment (303-01 Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma), General Procedures). Engine - 1.6L Duratec-16V Ti-VCT - REFER to: Timing Belt - Vehicles Built Up To: 04/2005 (303-01 Engine - 1.6L Duratec-16V Ti-VCT (Sigma), In-vehicle Repair). Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) - REFER to: Timing Chain (303-01 Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), In-vehicle Repair). Engine - 2.5L Duratec-ST (VI5) - REFER to: Timing Belt (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation). Engine - 1.6L Duratorq-TDCi (DV) Diesel - REFER to: Timing Belt (303-01 Engine - 1.6L Duratorq-TDCi (DV) Diesel, In-vehicle Repair). Engine - 1.8L Duratorq-TDCi (Kent) Diesel - REFER to: Timing Belt (303-01 Engine - 1.8L Duratorq-TDCi (Lynx) Diesel, In-vehicle Repair). Engine - 2.0L Duratorq-TDCi (DW) Diesel - REFER to: Timing Belt (303-01 Engine - 2.0L Duratorq-TDCi (DW) Diesel, In-vehicle Repair).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Timing belt or timing chain incorrectly tensioned. 	<ul style="list-style-type: none"> CHECK the timing belt tension. INSTALL a new timing belt or timing chain as necessary. Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) - REFER to: Valve Clearance Adjustment (303-01 Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma), General Procedures). Engine - 1.6L Duratec-16V Ti-VCT - REFER to: Timing Belt - Vehicles Built Up To: 04/2005 (303-01 Engine - 1.6L Duratec-16V Ti-VCT (Sigma), In-vehicle Repair). Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) - REFER to: Timing Chain (303-01 Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), In-vehicle Repair). Engine - 2.5L Duratec-ST (VI5) - REFER to: Timing Belt (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation). Engine - 1.6L Duratorq-TDCi (DV) Diesel - REFER to: Timing Belt (303-01 Engine - 1.6L Duratorq-TDCi (DV) Diesel, In-vehicle Repair). Engine - 1.8L Duratorq-TDCi (Kent) Diesel - REFER to: Timing Belt (303-01 Engine - 1.8L Duratorq-TDCi (Lynx) Diesel, In-vehicle Repair). Engine - 2.0L Duratorq-TDCi (DW) Diesel - REFER to: Timing Belt (303-01 Engine - 2.0L Duratorq-TDCi (DW) Diesel, In-vehicle Repair).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Noisy running or engine noise 	<ul style="list-style-type: none"> Engine components <ul style="list-style-type: none"> Pistons. Piston rings. Connecting rod big end, main bearing or thrust bearing journals. Connecting rods bent or damaged. 	<ul style="list-style-type: none"> CHECK the engine components for wear or damage. Make sure all components are within specification. INSTALL new components as necessary. Engine - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) - REFER to: Specifications (303-01 Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), Specifications). Engine - 1.6L Duratec-16V Ti-VCT - REFER to: Specifications (303-01 Engine - 1.6L Duratec-16V Ti-VCT (Sigma), Specifications). Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) - REFER to: Specifications (303-01 Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), Specifications). Engine - 1.6L Duratorq-TDCi (DV) Diesel - REFER to: Specifications (303-01 Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), Specifications). Engine - 1.8L Duratorq-TDCi (Kent) Diesel - REFER to: Specifications (303-01 Engine - 1.8L Duratorq-TDCi (Lynx) Diesel, Specifications). Engine - 2.0L Duratorq-TDCi (DW) Diesel - REFER to: Specifications (303-01 Engine - 2.0L Duratorq-TDCi (DW) Diesel, Specifications).

Engine - Oil Leaks

NOTE: Before installing new gaskets or oil seals, make sure that the fault is clearly established.

If the oil leak cannot be identified clearly by a visual inspection, carry out an ultraviolet (UV) test:

Ultraviolet (UV) Testing

- Clean the engine and transmission with a suitable cleaning fluid.
- Pour the UV-test fluid in accordance with the quantity specified by the manufacturer through the oil filler neck into the engine and install the oil filler cap.

DIAGNOSIS AND TESTING

▲ WARNING: Vehicles with manual transaxle, shift the transaxle into Neutral. Failure to follow this instruction may result in personal injury.

3. Start the engine and let it run for about five minutes.
4. Switch off the engine.

NOTE: If no leak can be found, road test the vehicle under various loads and check the engine for leaks again.

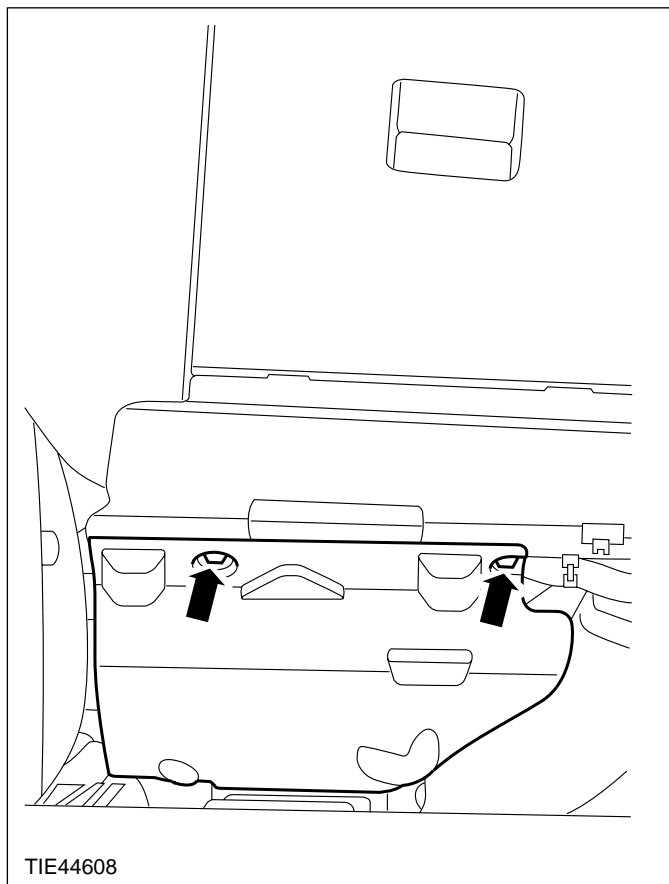
5. Check the engine for oil leaks using a suitable UV lamp.
6. Rectify any leaks found and check the engine for oil leaks.

Measure the compression pressure

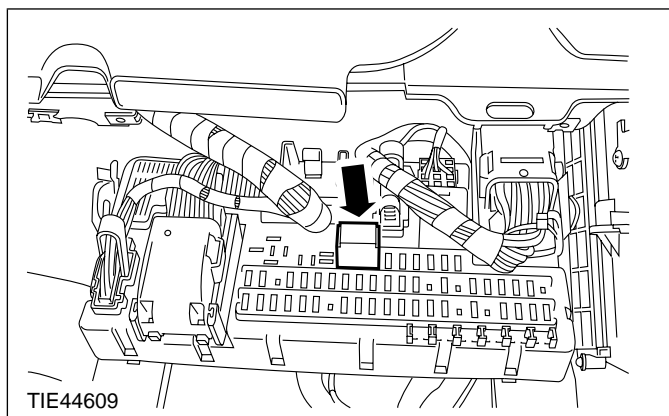
NOTE: The powertrain control module (PCM) receives an error message when the fuel pump relay is removed or electrical components are disconnected. This error message must be deleted from the fault memory using worldwide diagnostic system (WDS) after completing the compression test.

NOTE: Valve clearance must be set correctly before performing a compression test. Make sure the engine is at the normal operating temperature.

NOTE: The varying design of compression checking devices and fluctuating starter motor speeds normally only allows for a comparison to be made of the compression pressures in all cylinders.

Measure the compression pressure
(Engine - 1.6L Duratec-16V, Engine - 1.6L Duratec-16V Ti-VCT)

1. Remove the central junction box (CJB) cover.



2. Open the CJB and remove the fuel pump relay.

NOTE: The engine will start, run for a few seconds and then stop.

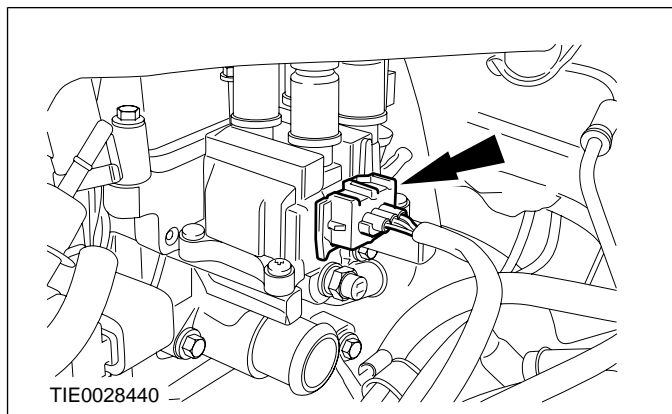
3. Start the engine.

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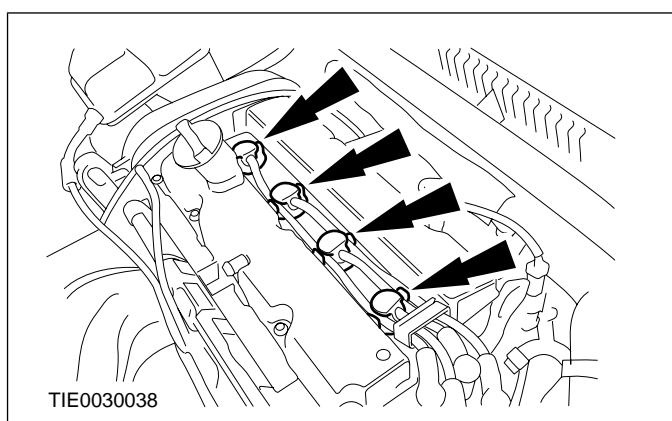
Engine System - General Information

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DIAGNOSIS AND TESTING

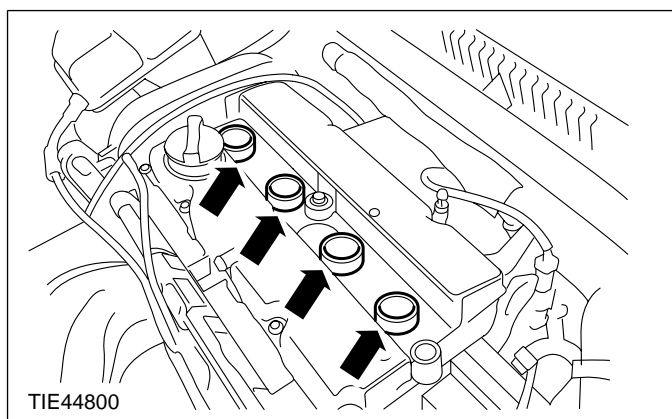


4. Disconnect the electronic ignition (EI) coil connector.

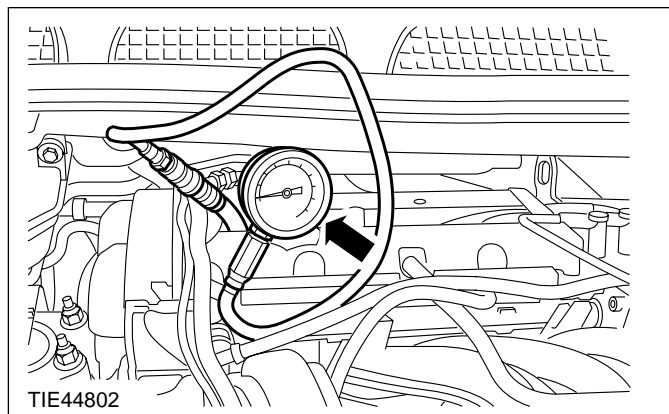


NOTE: Twist the spark plug connectors slightly before disconnecting them. Pull on the connector and not on the cable.

5. Remove the spark plug connectors.

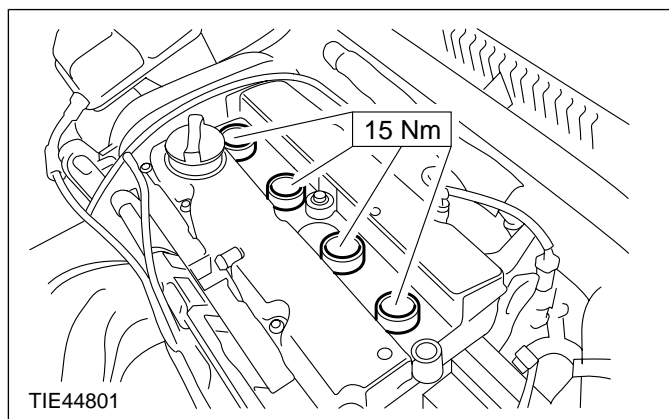


6. Remove the spark plugs.

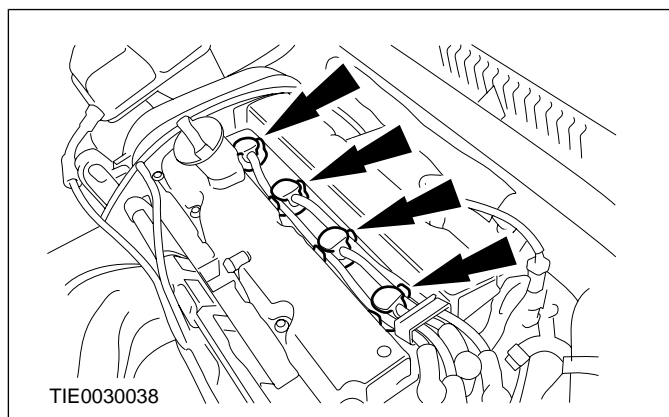


NOTE: Operate the starter motor with wide open throttle until the pointer on the measuring device stops rising.

7. Carry out the measurement in accordance with the instructions supplied with the measuring device on every cylinder using a suitable compression pressure recorder with a suitable adapter.



8. Install the spark plugs.



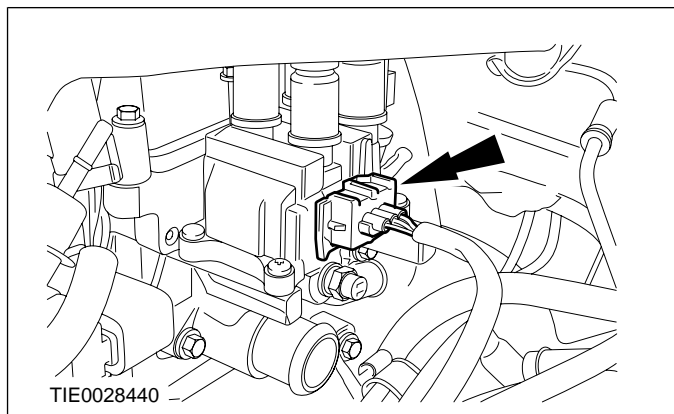
9. Install the spark plug connectors.

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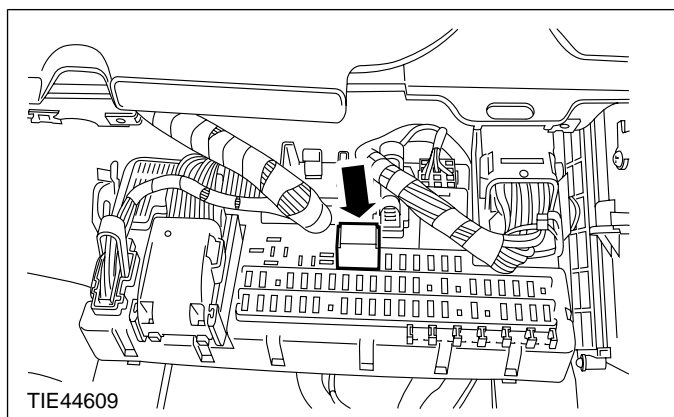
Engine System - General Information

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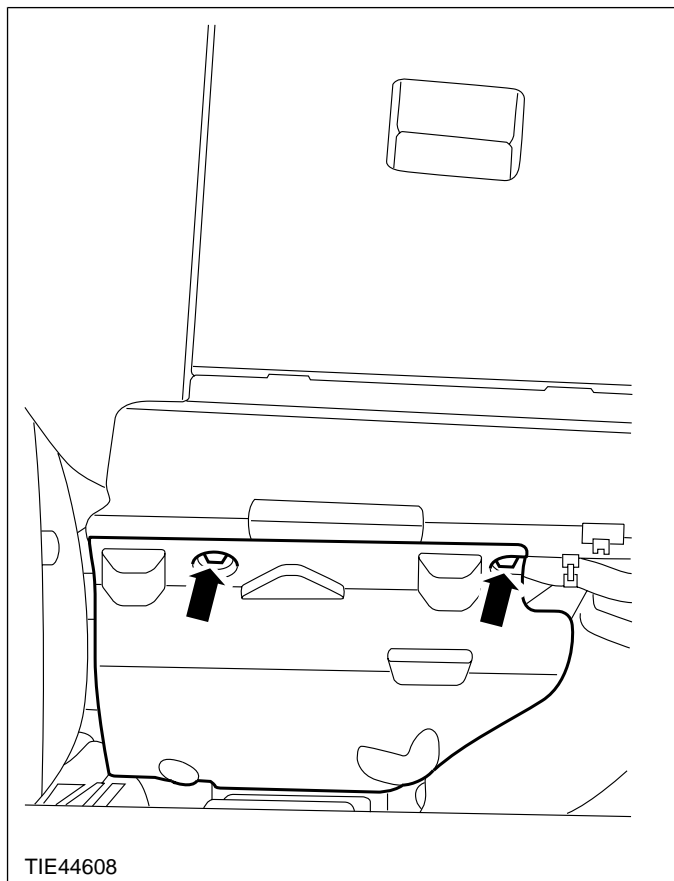
DIAGNOSIS AND TESTING



10. Connect the EI coil connector.



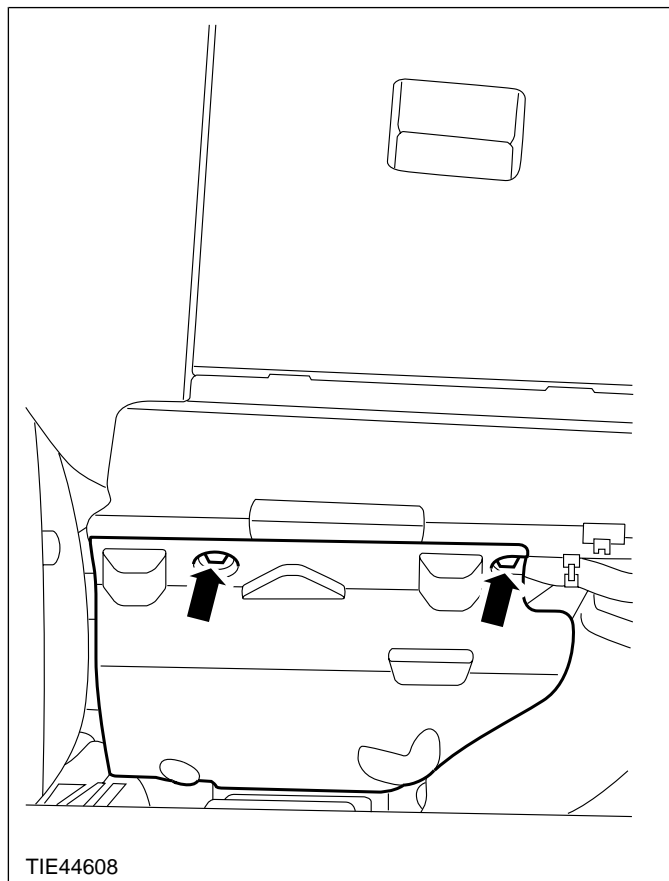
11. Install the fuel pump relay and close the CJB.



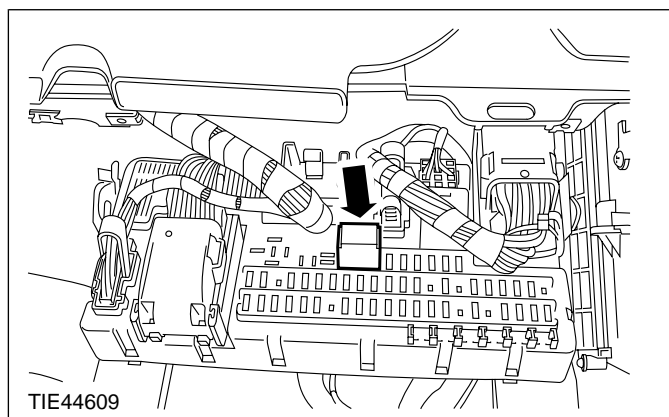
12. Install the CJB cover.

13. Using worldwide diagnostic system (WDS), clear the fault codes from the powertrain control module (PCM).

Measure the compression pressure (Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4))



1. Remove the central junction box (CJB) cover.



2. Open the CJB and remove the fuel pump relay.

NOTE: The engine will start, run for a few seconds and then stop.

3. Start the engine.

303-00-37

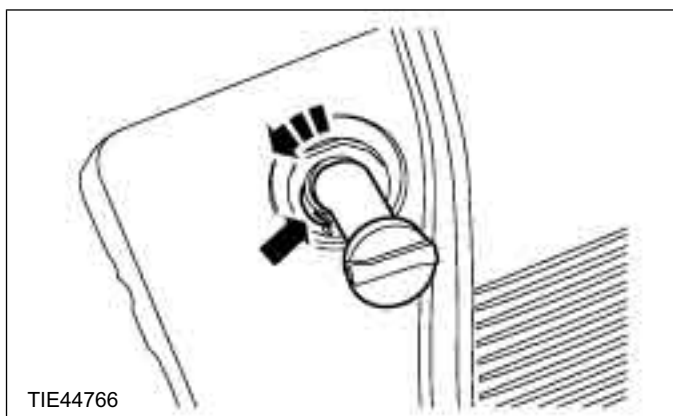
Engine System - General Information

303-00-37

DIAGNOSIS AND TESTING

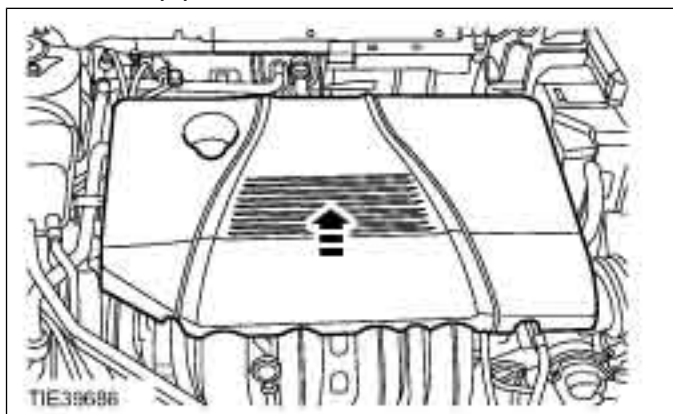
4. Remove the cowl panel grille.

REFER to: Cowl Panel Grille (501-02 Front End Body Panels, Removal and Installation).

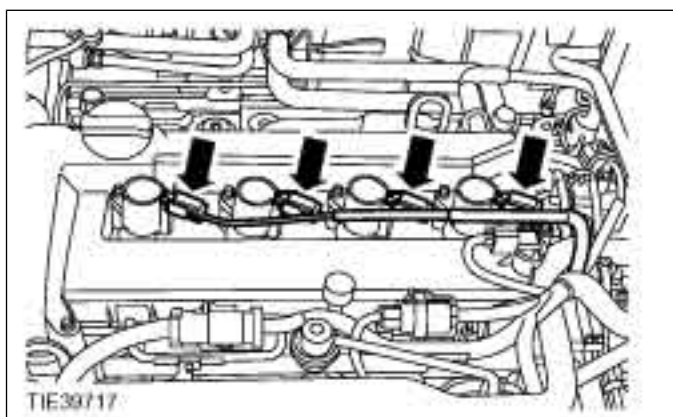


5. Remove the oil filler pipe.

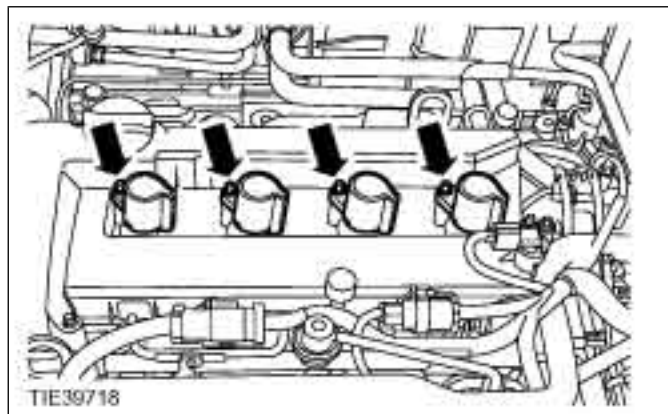
- Release the securing clip and rotate the oil filler pipe counterclockwise.



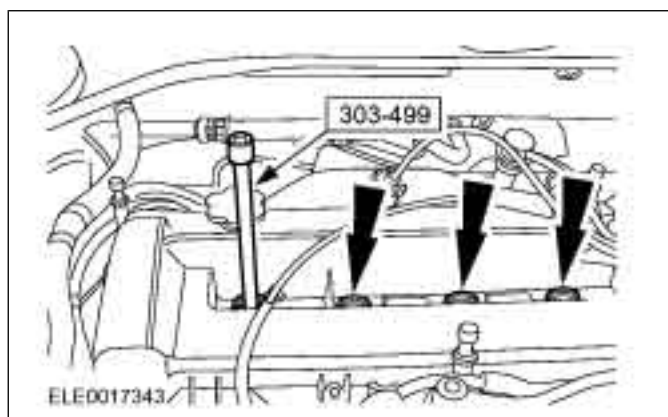
6. Remove the engine cover.



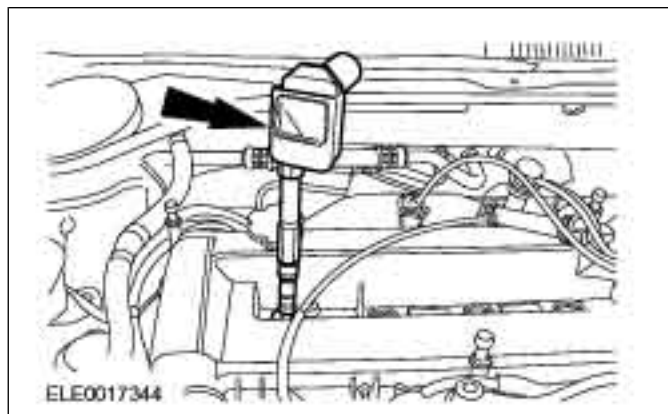
7. Disconnect the ignition coil-on-plug electrical connectors.



8. Remove the ignition coil-on-plug.



9. Using the special tool, remove the spark plugs.



NOTE: Operate the starter motor with wide open throttle until the pointer on the measuring device stops rising.

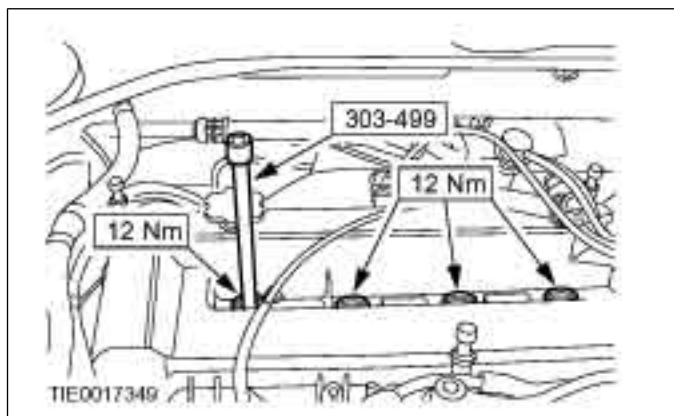
10. Carry out the measurement in accordance with the instructions supplied with the measuring device on every cylinder using a suitable compression pressure recorder with a suitable adapter.

303-00-38

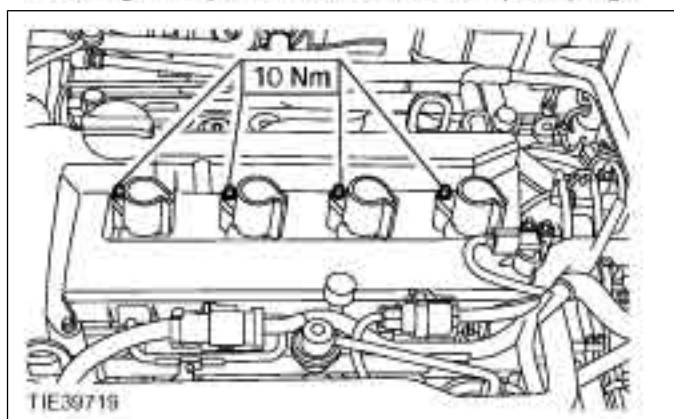
Engine System - General Information

303-00-38

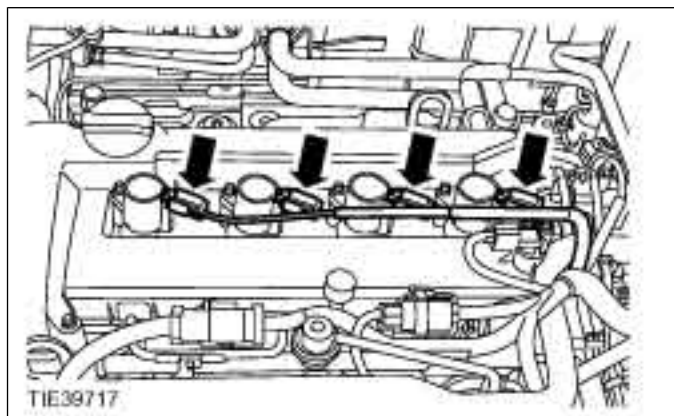
DIAGNOSIS AND TESTING



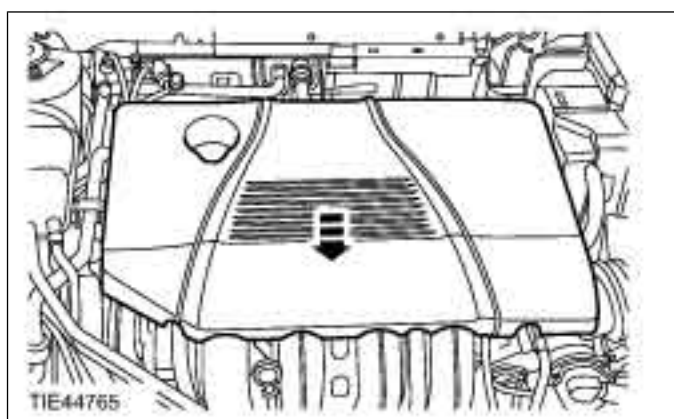
11. Using the special tool, install the spark plugs.



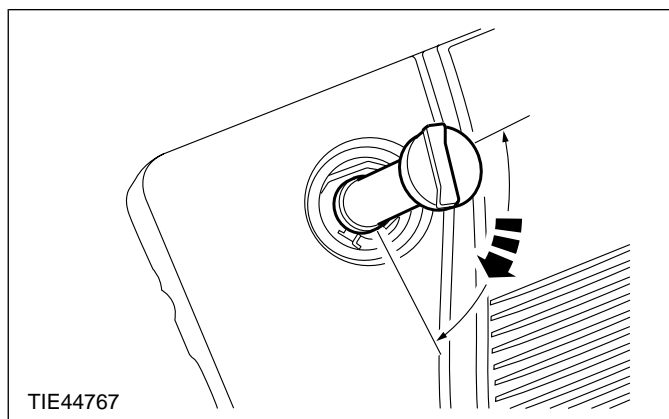
12 Install the ignition coil-on-plug.



13 Connect the ignition coil-on-plug electrical connectors.



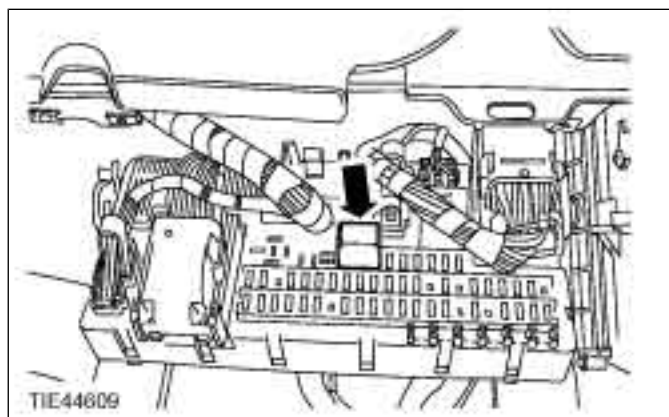
14. Install the engine cover.



15 Install the oil filler pipe.

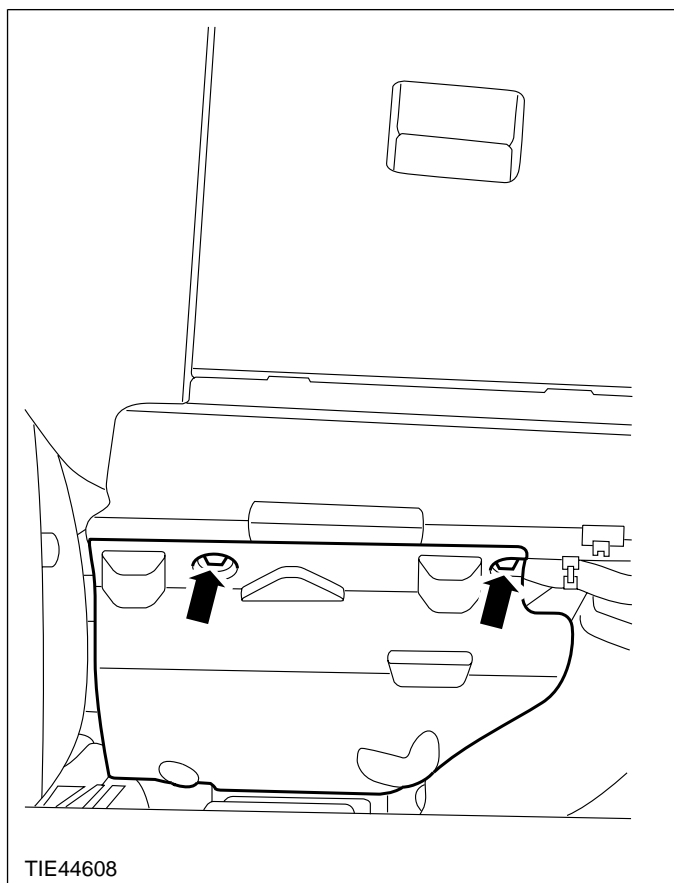
- Rotate the oil filler pipe approximately 90 degrees clockwise until the securing clip snaps into position.

16 Install the cowl panel grille.

REFER to: Cowl Panel Grille ([501-02 Front End Body Panels, Removal and Installation](#)).

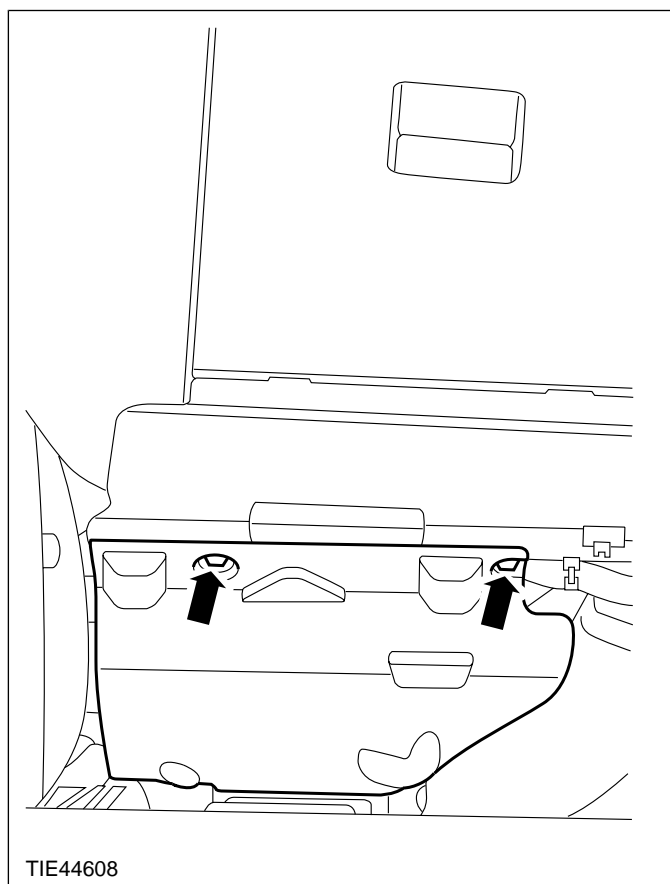
17. Install the fuel pump relay and close the CJB.

DIAGNOSIS AND TESTING

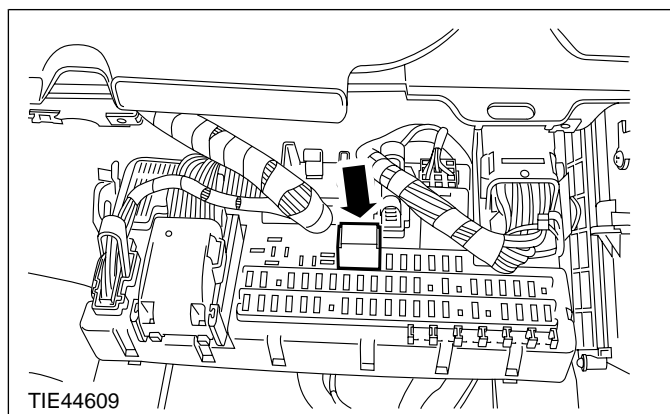


18. Install the CJB cover.
19. Reset the PCM fault memory.

Measure the compression pressure (Engine - 2.5L Duratec-ST (VI5))



1. Remove the central junction box (CJB) cover.



2. Open the CJB and remove the fuel pump relay.
3. **NOTE: The engine will start, run for a few seconds and then stop.**

Start the engine.

4. Remove the ignition coil-on-plug.

REFER to: Ignition Coil-On-Plug (303-07 Engine Ignition - 2.5L Duratec-ST (VI5), Removal and Installation).

DIAGNOSIS AND TESTING

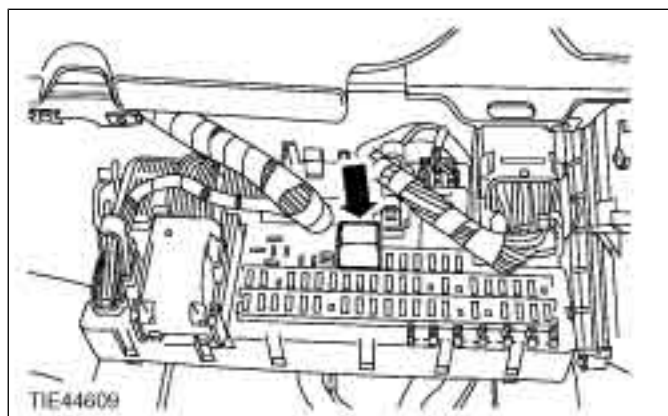
5. Connect the battery ground cable.

REFER to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).



9. Install the ignition coil-on-plug.

REFER to: Ignition Coil-On-Plug (303-07 Engine Ignition - 2.5L Duratec-ST (VI5), Removal and Installation).

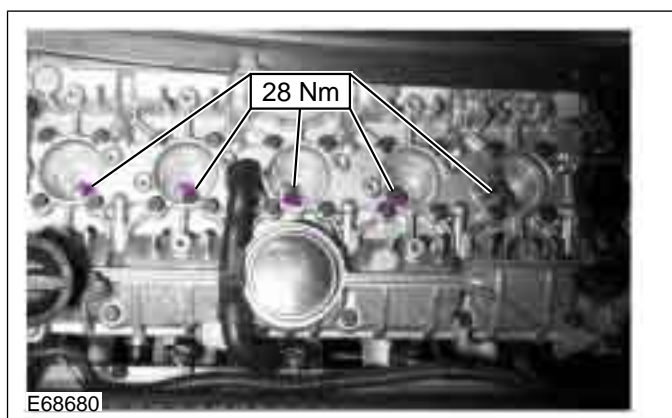


6. Remove the spark plugs.



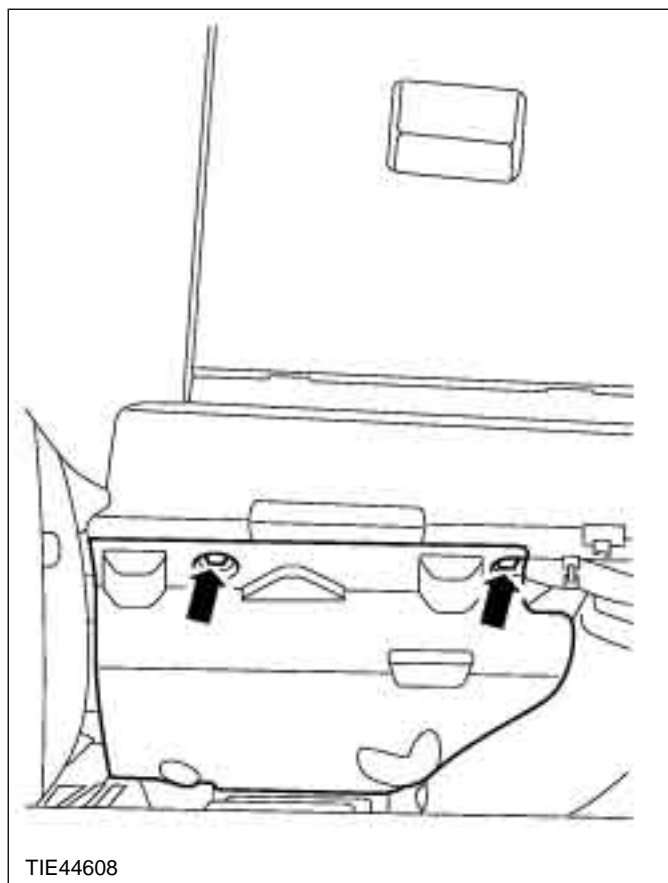
NOTE: Operate the starter motor with wide open throttle until the pointer on the measuring device stops rising.

7. Carry out the measurement in accordance with the instructions supplied with the measuring device on every cylinder using a suitable compression pressure recorder with a suitable adapter.



8. Install the spark plugs.

10. Install the fuel pump relay and close the CJB.



11. Install the CJB cover.

DIAGNOSIS AND TESTING

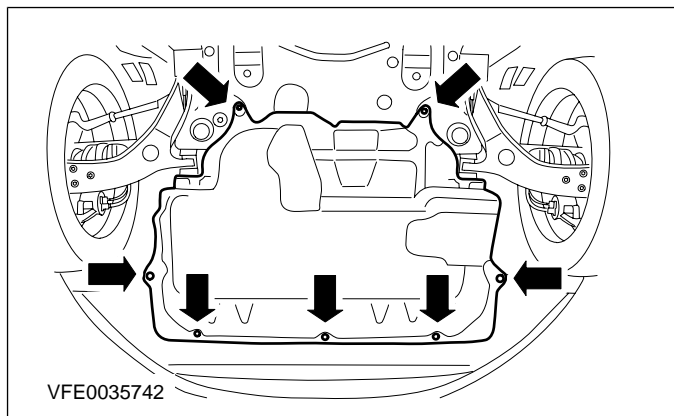
Measure the compression pressure
(Engine - 1.6L Duratorq-TDCi (DV)
Diesel)

WARNINGS:

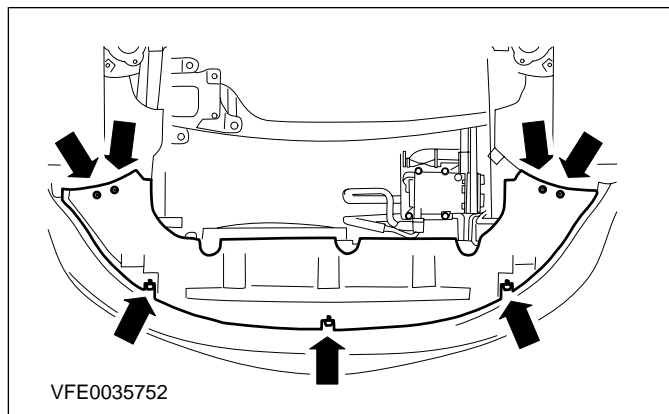
- ▲ Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable mixtures are always present and can ignite. Failure to follow these instructions may result in personal injury.
- ▲ Do not carry out any repairs to the fuel injection system without checking that the fuel pressure has dropped to zero and that the fuel temperature has either reached ambient temperature or is below 30°C, whichever is the greater. Failure to follow these instructions may result in personal injury.

1. Using datalogger in worldwide diagnostic system (WDS), check that the fuel pressure has dropped to zero and that the fuel temperature has either reached ambient temperature or is below 30°C, whichever is the greater.
2. Raise and support the vehicle. REFER to: (100-02 Jacking and Lifting)

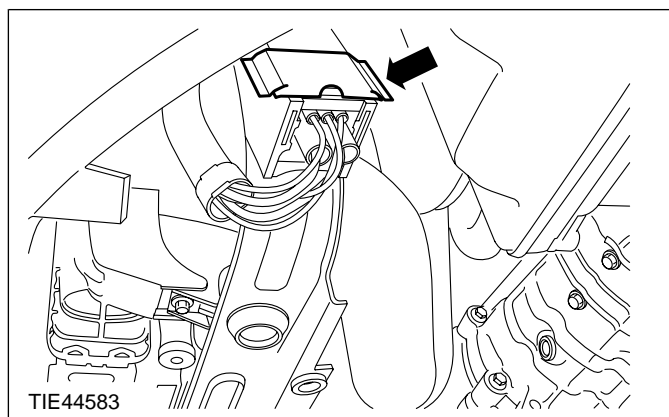
Jacking (Description and Operation),
Lifting (Description and Operation).



3. Remove the engine undershield.

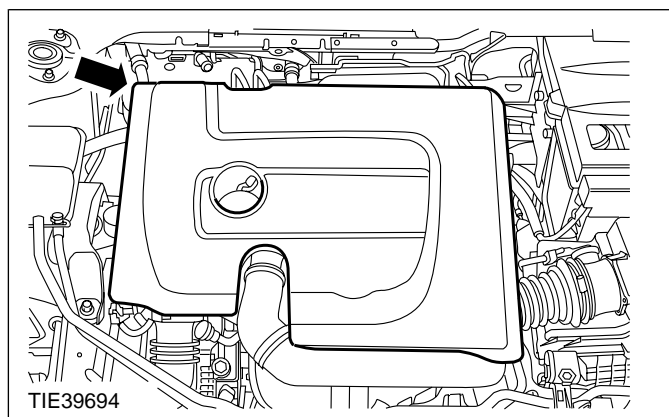


4. Remove the radiator undershield.



5. Remove the glow plug relay.
6. Lower the vehicle.
7. Remove the cowl panel grille.

REFER to: Cowl Panel Grille (**501-02 Front End Body Panels, Removal and Installation**).



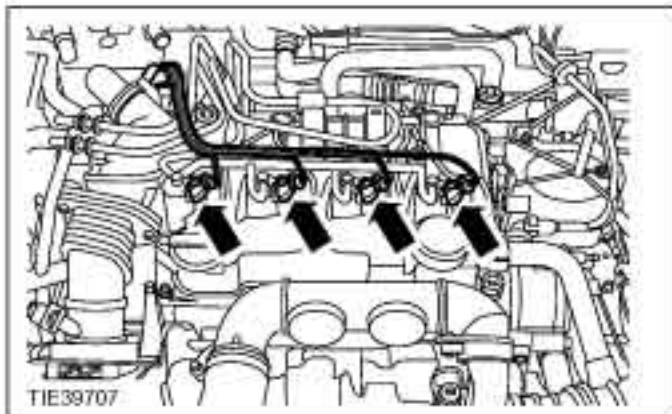
8. Remove the engine upper cover.

303-00-42

Engine System - General Information

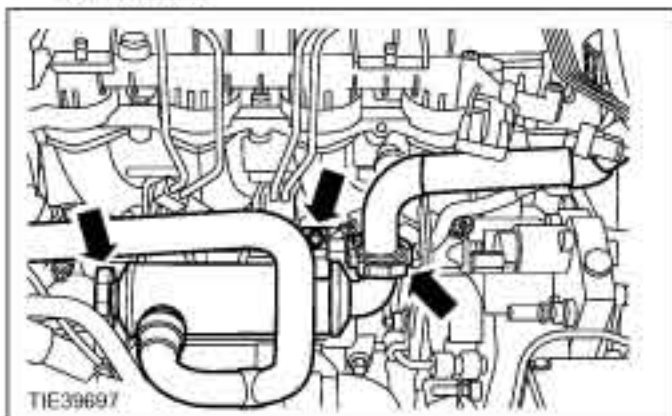
303-00-42

DIAGNOSIS AND TESTING

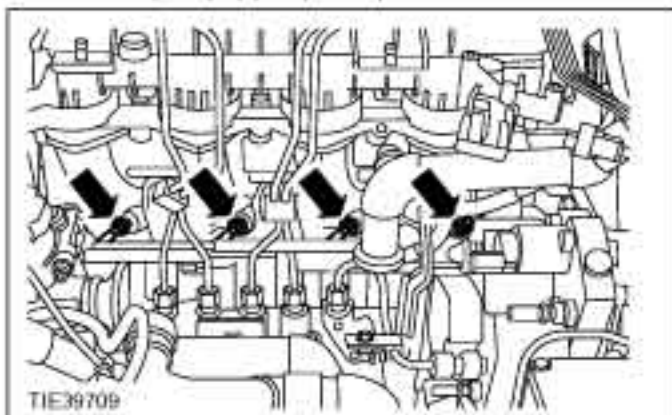


9. **CAUTION:** Do not disconnect the fuel injection pump electrical connectors and crank the engine.

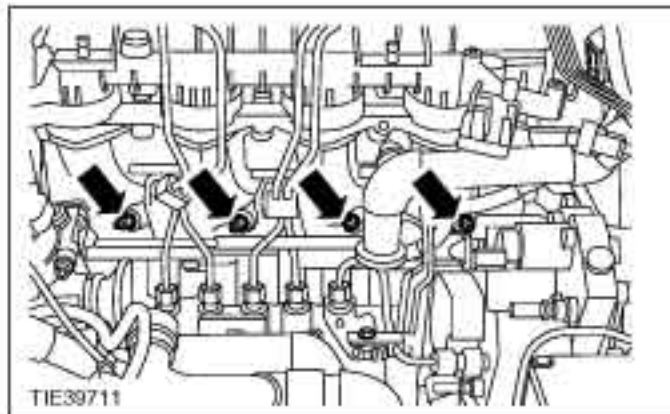
Disconnect the fuel injector electrical connectors.



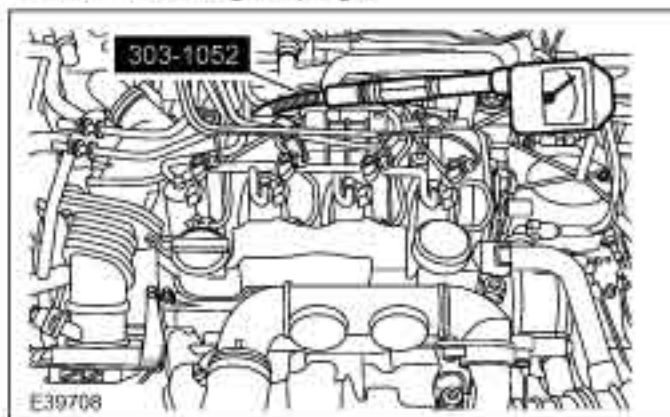
- 10 Detach the exhaust gas recirculation (EGR) cooler (if equipped) and position it to one side.



11. Remove the glow plug power supply.



- 12 Remove the glow plugs.

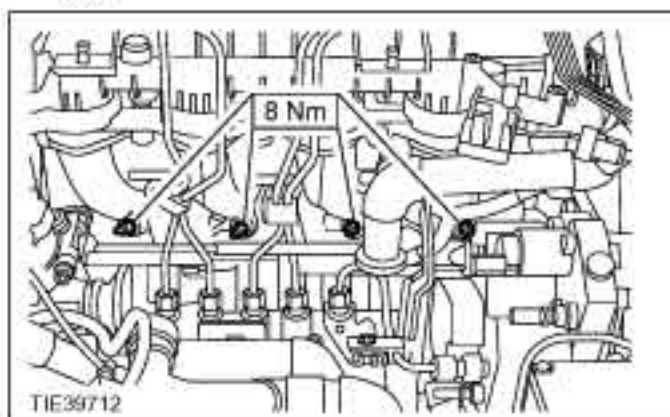


- 13 Install the special tool and a suitable compression tester into the glow plug bore.

NOTE: Crank the engine with the starter motor until the pointer on the compression tester stops rising.

- 14 Carry out the measurement on all cylinders, following the measuring equipment manufacturer's instructions.

- 15 Detach the compression tester and the special tool.



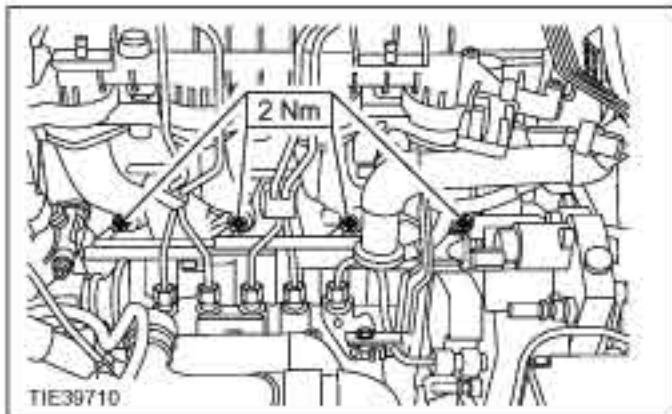
- 16 Install the glow plugs.

303-00-43

Engine System - General Information

303-00-43

DIAGNOSIS AND TESTING



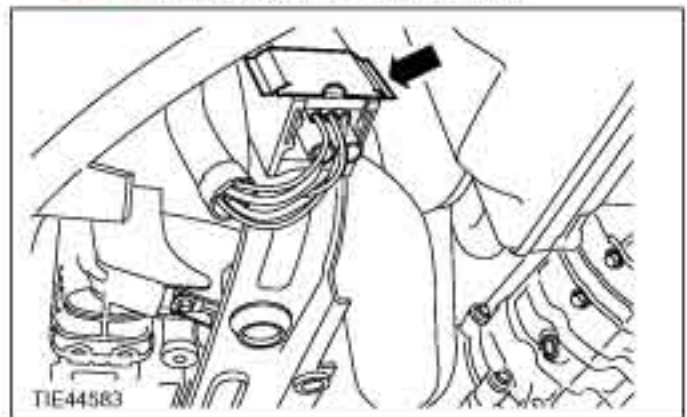
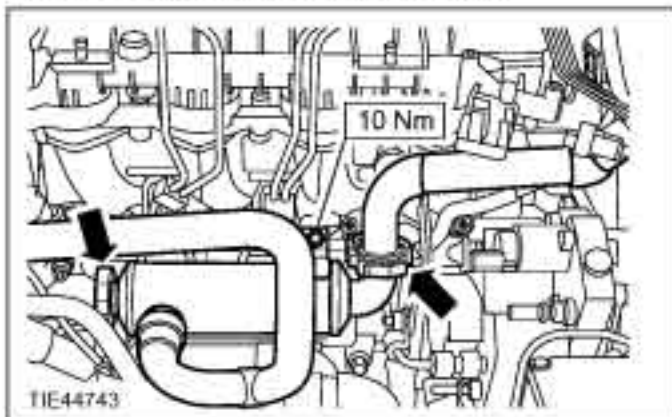
- 20 Install the engine upper cover.
21 Install the cowl panel grille.

REFER to: Cowl Panel Grille (501-02 Front End Body Panels, Removal and Installation).

- 22 Raise and support the vehicle. REFER to: (100-02 Jacking and Lifting)

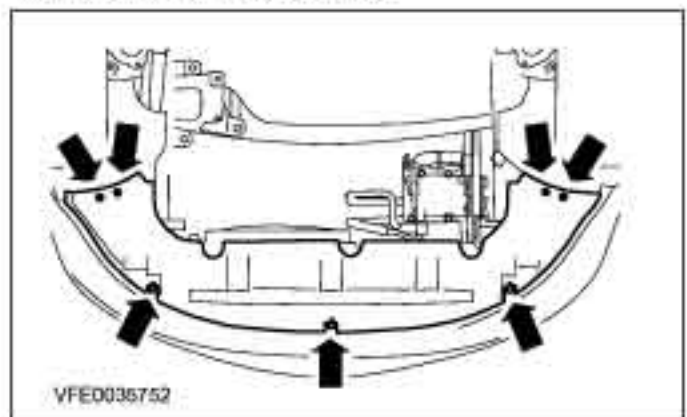
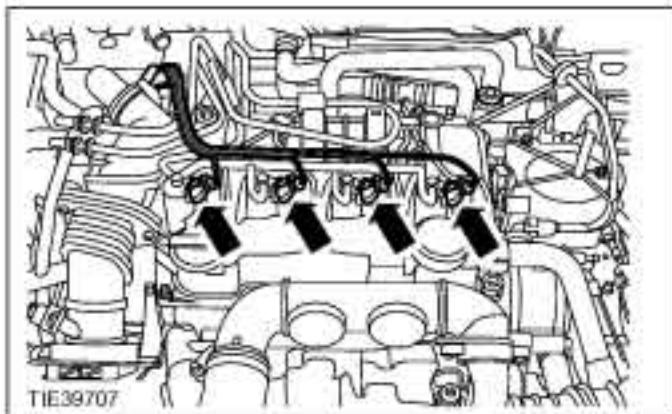
Jacking (Description and Operation),
Lifting (Description and Operation).

- 17 Install the glow plug power supply.



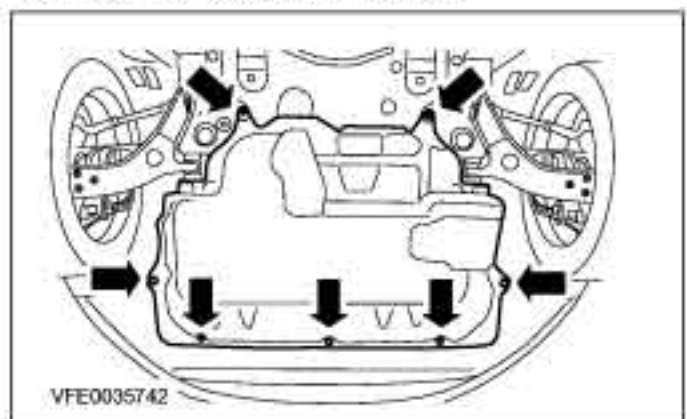
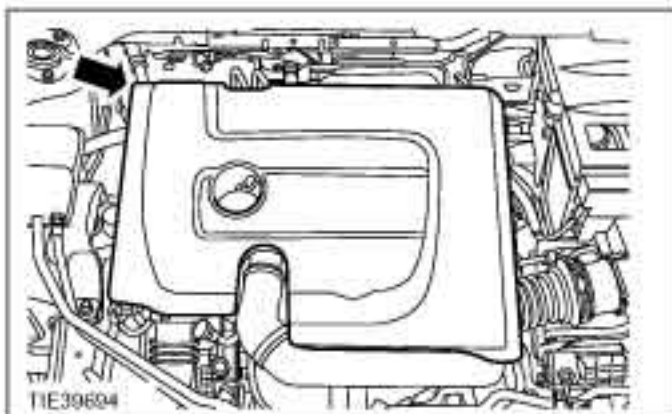
- 23 Install the glow plug relay.

- 18 Attach the EGR cooler (if equipped).



- 24 Install the radiator undershield.

- 19 Connect the fuel injector electrical connectors.



- 25 Install the engine undershield.
26 Lower the vehicle.
27 Reset the PCM fault memory.

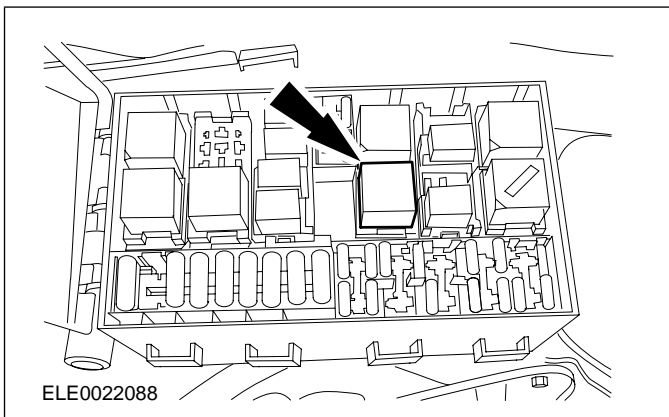
DIAGNOSIS AND TESTING

Measure the compression pressure
(Engine - 1.8L Duratorq-TDCI (Kent)
Diesel)

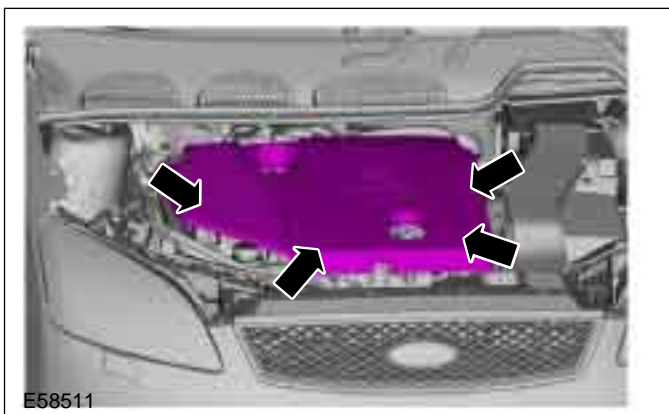
WARNINGS:

- ▲ Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable mixtures are always present and can ignite. Failure to follow these instructions may result in personal injury.
- ▲ Do not carry out any repairs to the fuel injection system without checking that the fuel pressure has dropped to zero and that the fuel temperature has either reached ambient temperature or is below 30°C, whichever is the greater. Failure to follow these instructions may result in personal injury.

1. Using datalogger in worldwide diagnostic system (WDS), check that the fuel pressure has dropped to zero and that the fuel temperature has either reached ambient temperature or is below 30°C, whichever is the greater.

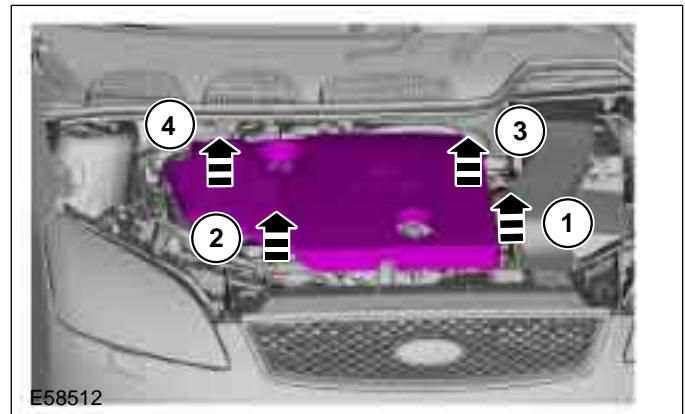


2. Open the central junction box (CJB) and remove the glow plug relay.



3. NOTE: The engine upper cover is held in place by 4 ball clips. The ball clips are not vertical, but are angled backwards by approximately 20 degrees.

Location of the engine upper cover retaining clips.



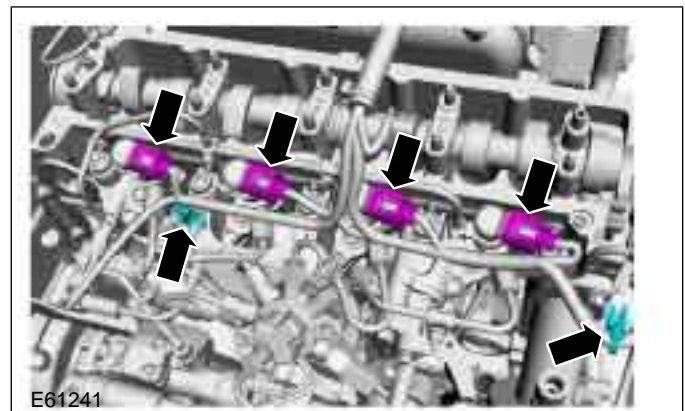
4. CAUTIONS:

⚠ Care must be taken when releasing the 4th retaining clip and manoeuvring the engine upper cover past the manifold absolute pressure (MAP) sensor. Failure to follow this instruction may result in damage to the MAP sensor.

⚠ Contact of the engine upper cover with the cowl panel may cause damage (scratches) on the engine upper cover. If the ambient temperature is below 0°C, detach the engine upper cover with extreme caution. Failure to follow this instruction may cause the engine upper cover to be damaged.

NOTE: Only remove and install the engine upper cover in the sequence shown.

Remove the engine upper cover.



5. Disconnect the fuel injector electrical connectors.

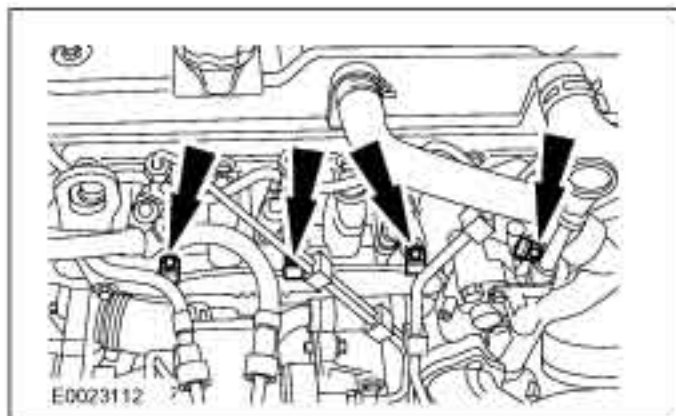
- Detach the wiring harness clips from the cylinder head.

303-00-45

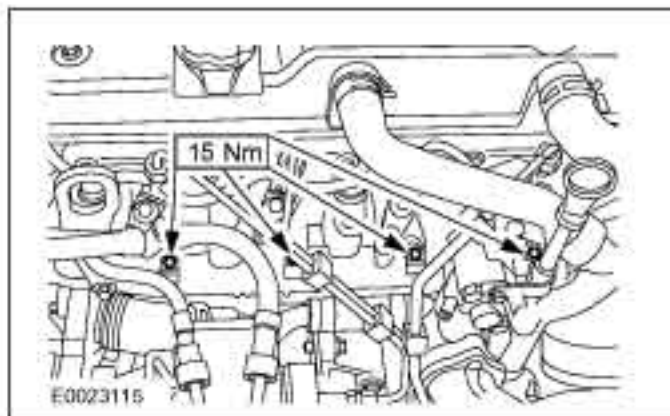
Engine System - General Information

303-00-45

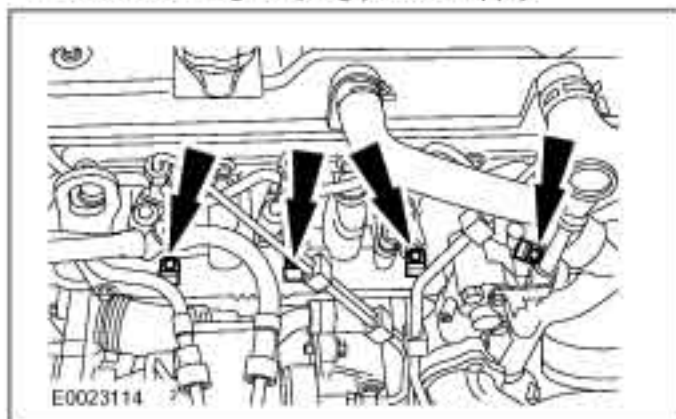
DIAGNOSIS AND TESTING



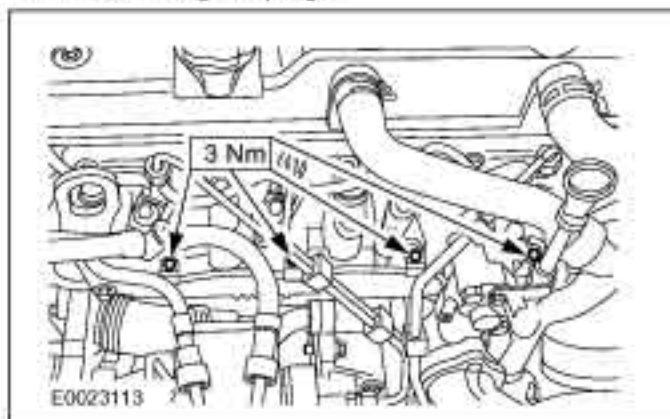
6. Remove the glow plug power supply.



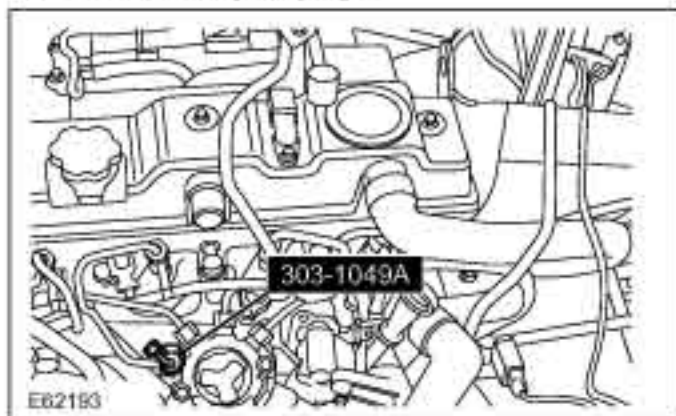
11. Install the glow plugs.



7. Remove the glow plugs.



12. Install the glow power supply.

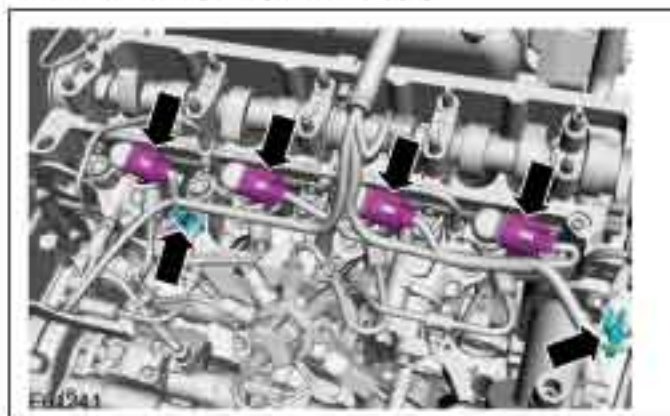


8. Install the special tool and a suitable compression tester into the glow plug bore.

NOTE: Crank the engine with the starter motor until the pointer on the compression tester stops rising.

9. Carry out the measurement on all cylinders, following the measuring equipment manufacturer's instructions.

10. Detach the compression tester and the special tool.



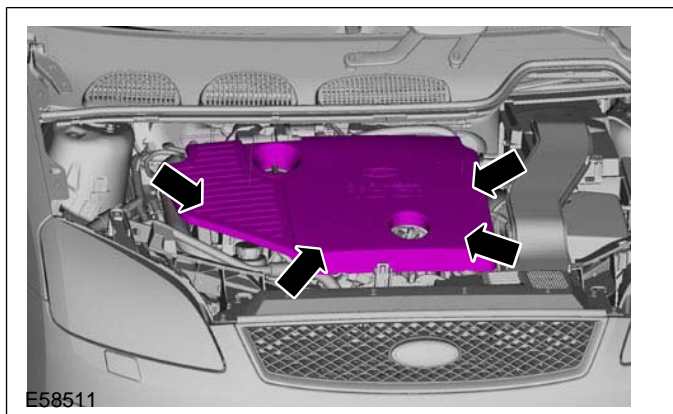
13. Connect the fuel injector electrical connectors.

- Attach the wiring harness clips to the cylinder head.

14. Apply soap solution to the ball clip mountings in the engine upper cover.

- Soap solution (maximum concentration of soap in water 1:200).

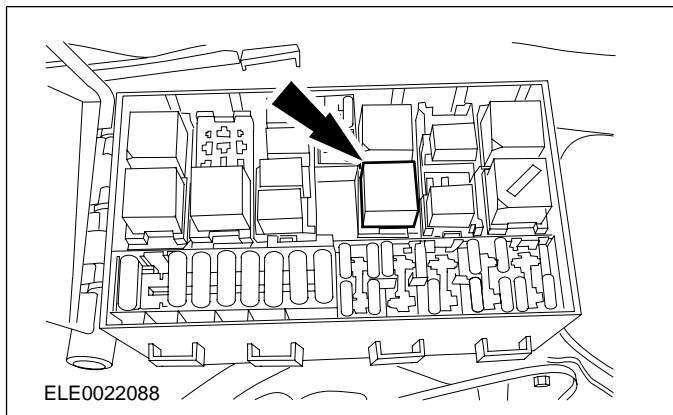
DIAGNOSIS AND TESTING



15. **⚠ CAUTION:** Contact of the engine upper cover with the cowl panel may cause damage (scratches) on the engine upper cover. Failure to follow this instruction may cause the engine upper cover to be damaged.

Put the engine cover into installation position and clip it in place by pressing at the places shown.

- Make sure that the engine upper cover is fully engaged in the area of the fuel filter, if necessary apply more pressure in the areas shown.



16. Install the glow plug relay and close the CJB.
17. Reset the PCM fault memory.

Measure the compression pressure (Engine - 2.0L Duratorq-TDCi (DW) Diesel)

WARNINGS:

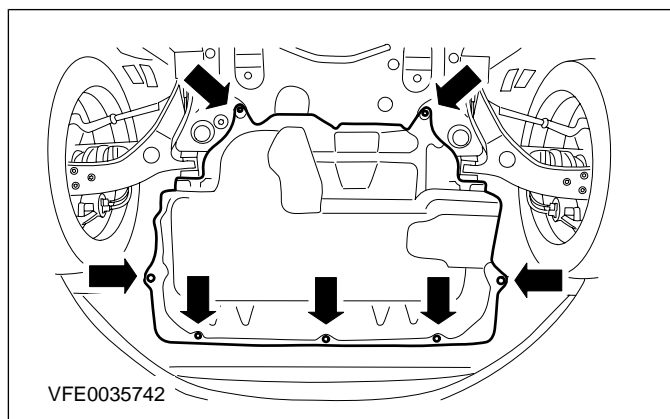
- ⚠** Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always

present and can ignite. Failure to follow these instructions may result in personal injury.

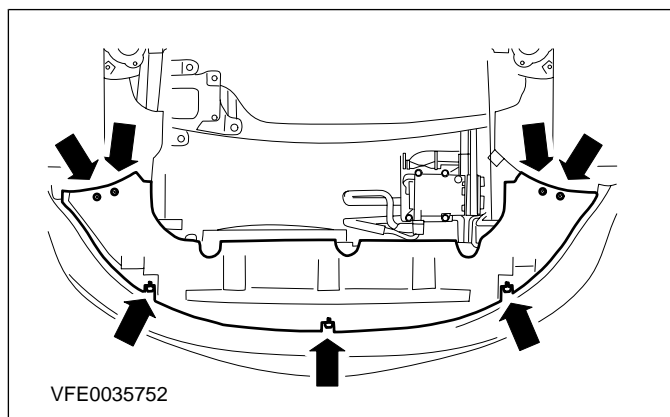
- ⚠** Do not carry out any repairs to the fuel injection system without checking that the fuel pressure has dropped to zero and that the fuel temperature has either reached ambient temperature or is below 30°C, whichever is the greater. Failure to follow these instructions may result in personal injury.

1. Using datalogger in world wide diagnostic system (WDS), check that the fuel pressure has dropped to zero and that the fuel temperature has either reached ambient temperature or is below 30°C, whichever is the greater.
2. Raise and support the vehicle. REFER to: (100-02 Jacking and Lifting)

Jacking (Description and Operation),
Lifting (Description and Operation).

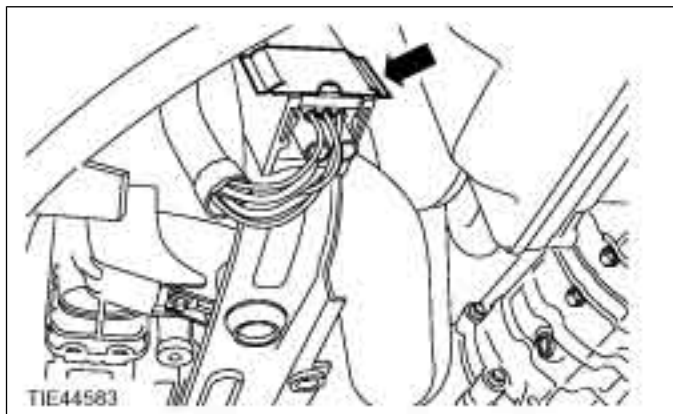


3. Remove the engine undershield.



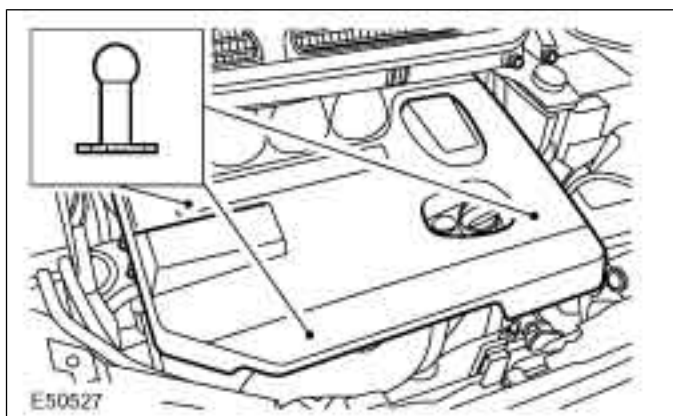
4. Remove the radiator undershield.

DIAGNOSIS AND TESTING



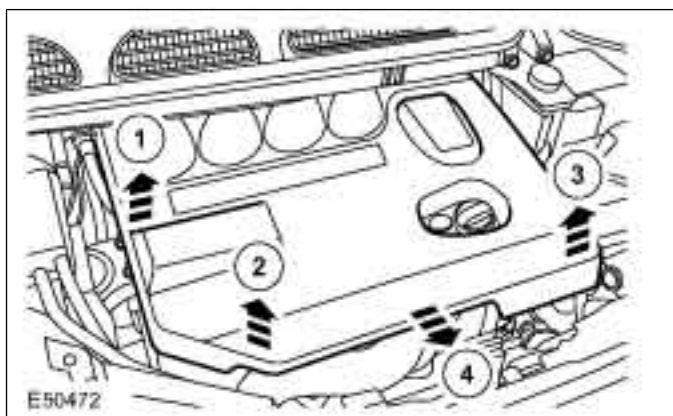
5. Remove the glow plug relay.
6. Lower the vehicle.
7. Remove the cowl panel grille.

REFER to: Cowl Panel Grille (501-02 Front End Body Panels, Removal and Installation).



8. **NOTE:** The engine upper cover is held in place by 3 ball clips. The ball clips are not vertical, but are angled backwards by approximately 20 degrees.

Location of the engine upper cover ball clips.



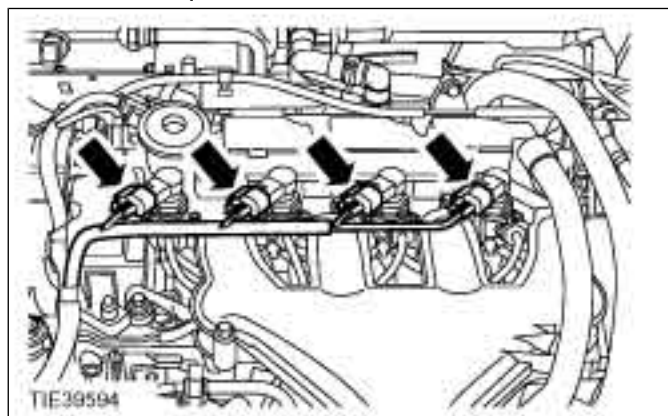
9. **CAUTION:** Contact of the engine upper cover with the cowl panel may cause damage (scratches) on the engine upper cover. If the ambient temperature is below 0°C, detach

the engine upper cover with extreme caution. Failure to follow this instruction may cause the engine upper cover to be damaged.

NOTE: Only remove and install the engine upper cover in the sequence shown.

Remove the engine upper cover.

- Detach the engine upper cover ball clips in the sequence shown.



10. **CAUTION:** Do not disconnect the fuel injection pump electrical connectors and crank the engine.

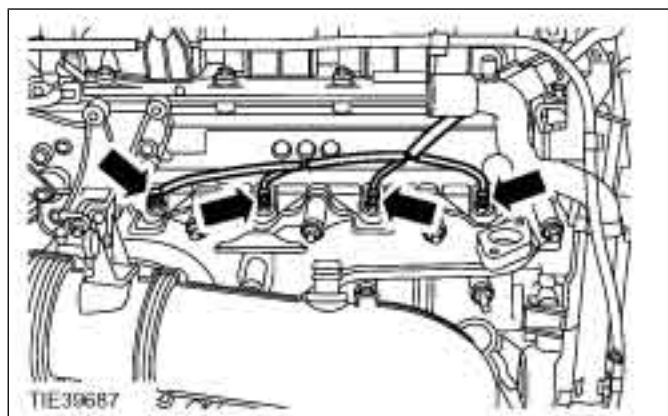
Disconnect the fuel injector electrical connectors.

11. Remove the exhaust gas recirculation (EGR) cooler.

REFER to: Exhaust Gas Recirculation (EGR) Cooler (303-08 Engine Emission Control - 2.0L Duratorq-TDCi (DW) Diesel, Removal and Installation).

12. Remove the EGR valve.

REFER to: Exhaust Gas Recirculation (EGR) Valve (303-08 Engine Emission Control - 2.0L Duratorq-TDCi (DW) Diesel, Removal and Installation).



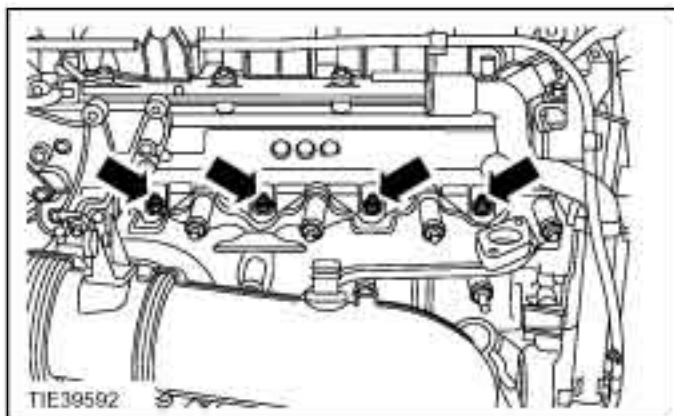
13. Remove the glow plug power supply.

303-00-48

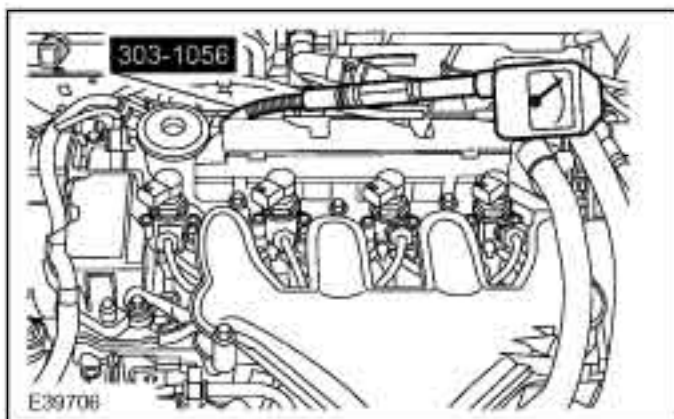
Engine System - General Information

303-00-48

DIAGNOSIS AND TESTING



14. Remove the glow plugs.

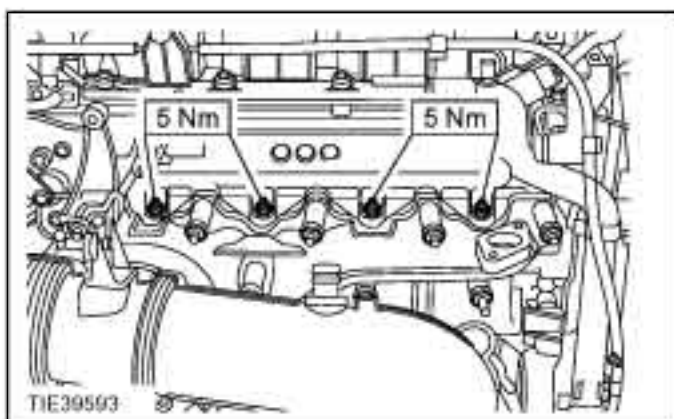


15. Install the special tool and a suitable compression tester into the glow plug bore.

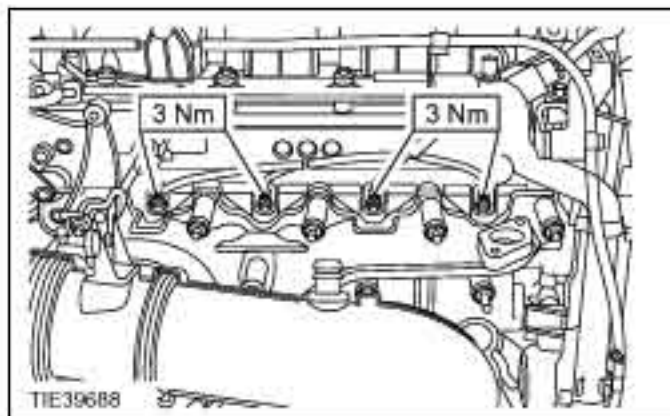
NOTE: Crank the engine with the starter motor until the pointer on the compression tester stops rising.

16. Carry out the measurement on all cylinders, following the measuring equipment manufacturer's instructions.

17. Detach the compression tester and the special tool.



18. Install the glow plugs.



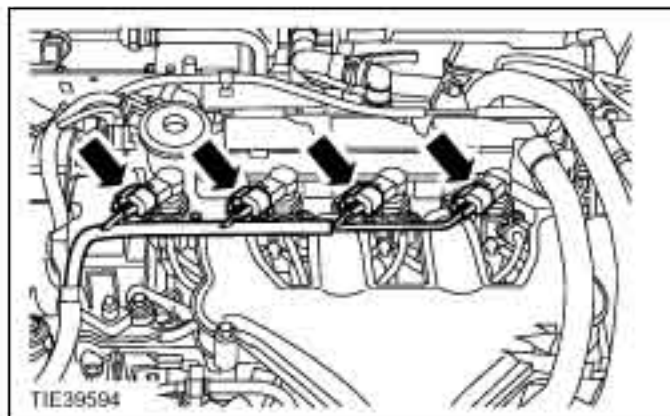
19. Install the glow plug power supply.

20. Install the EGR valve.

REFER to: **Exhaust Gas Recirculation (EGR) Valve** (303-08 Engine Emission Control - 2.0L Duratorq-TDCi (DW) Diesel, Removal and Installation).

21. Install the EGR cooler.

REFER to: **Exhaust Gas Recirculation (EGR) Cooler** (303-08 Engine Emission Control - 2.0L Duratorq-TDCi (DW) Diesel, Removal and Installation).

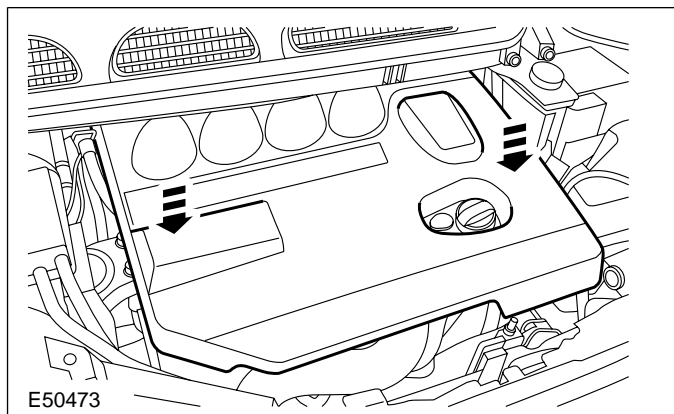


22. Connect the fuel injector electrical connectors.

23. Apply soap solution to the ball clip mountings in the engine upper cover.

- Soap solution (maximum concentration of soap in water 1:200).

DIAGNOSIS AND TESTING



24. **⚠ CAUTION:** Contact of the engine upper cover with the cowl panel may cause damage (scratches) on the engine upper cover. Failure to follow this instruction may cause the engine upper cover to be damaged.

Put the engine cover into installation position and clip it in place by pressing at the places shown.

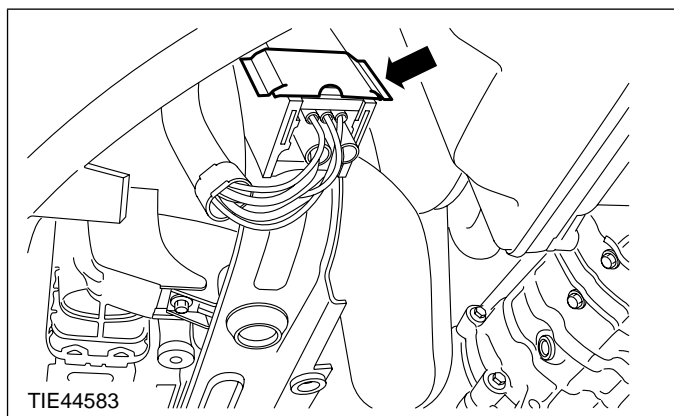
- Make sure that the engine upper cover is fully engaged in the area of the fuel filter, if necessary apply more pressure in the areas shown.

25. Install the cowl panel grille.

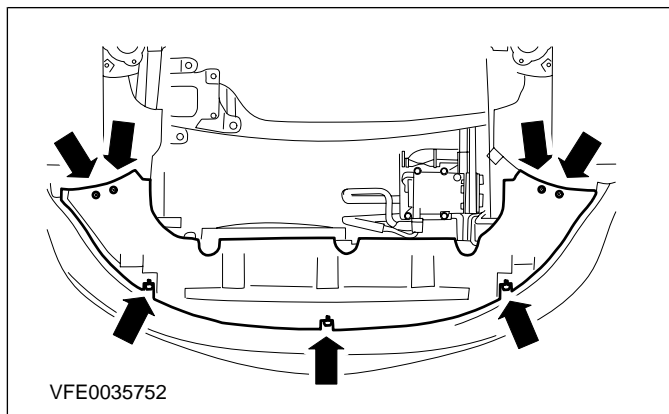
REFER to: Cowl Panel Grille (501-02 Front End Body Panels, Removal and Installation).

26. Raise and support the vehicle. REFER to: (100-02 Jacking and Lifting)

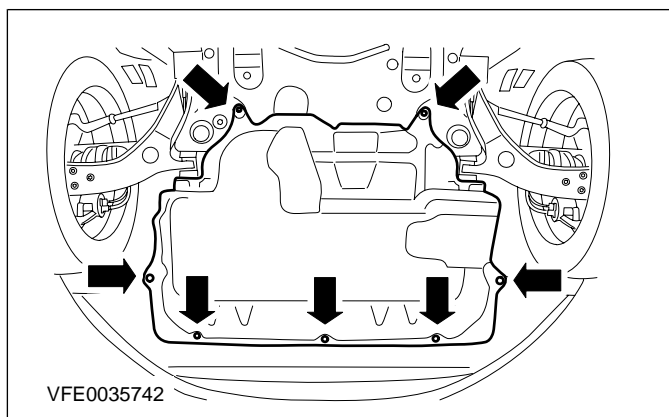
Jacking (Description and Operation),
Lifting (Description and Operation).



27. Install the glow plug relay.



28. Install the radiator undershield.



29. Install the engine undershield.

30. Lower the vehicle.

31. Reset the PCM fault memory.

Measure the oil pressure (21 113 0)

The oil pressure depends on various factors (engine speed, oil temperature, oil viscosity, amount of oil filter contamination etc.).

Measure the oil pressure (Engine - 1.6L Duratec-16V, Engine - 1.6L Duratec-16V Ti-VCT)

NOTE: The oil pressure depends on various factors (engine speed, oil temperature, oil viscosity, extent of oil filter contamination).

NOTE: Measure the oil pressure at the specified engine speed.

1. Raise and support the vehicle. REFER to: (100-02 Jacking and Lifting)

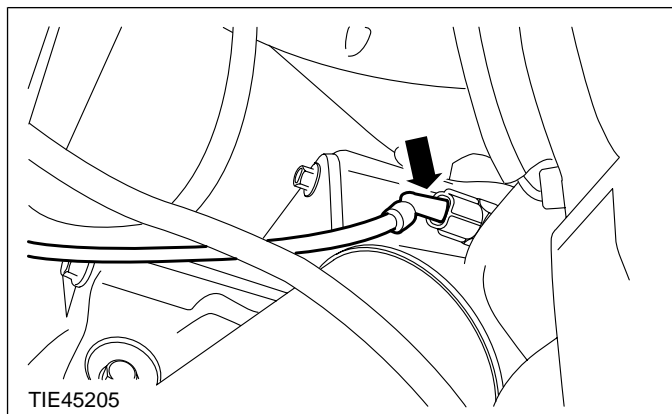
Jacking (Description and Operation),
Lifting (Description and Operation).

303-00-50

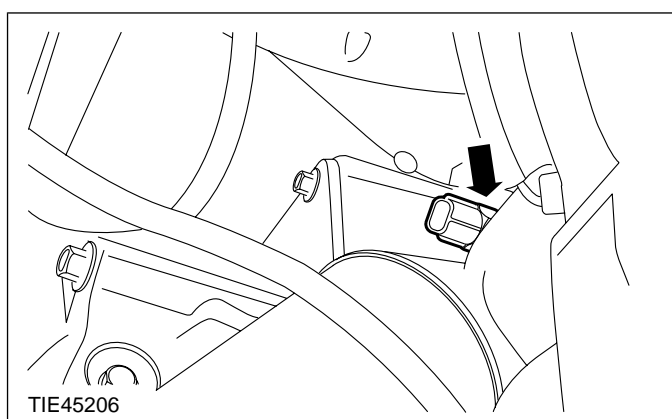
Engine System - General Information

303-00-50

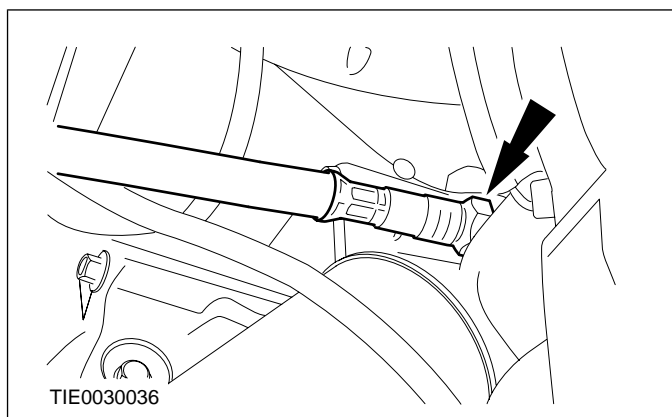
DIAGNOSIS AND TESTING



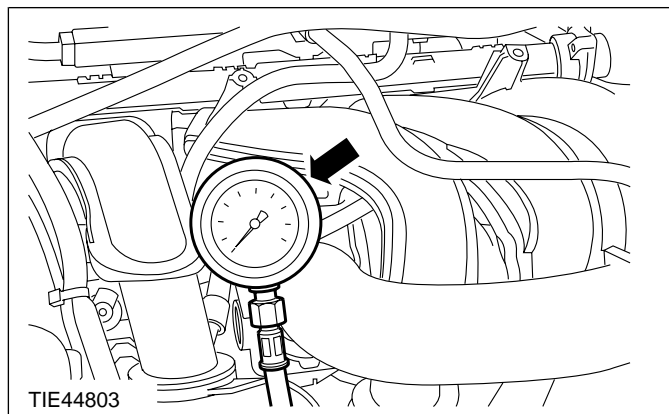
2. Disconnect the oil pressure switch electrical connector.



3. Remove the oil pressure switch.



4. Attach the oil pressure gauge with the oil pressure gauge connector to the oil pressure switch bore, and position it to allow reading from above.
5. Lower the vehicle.



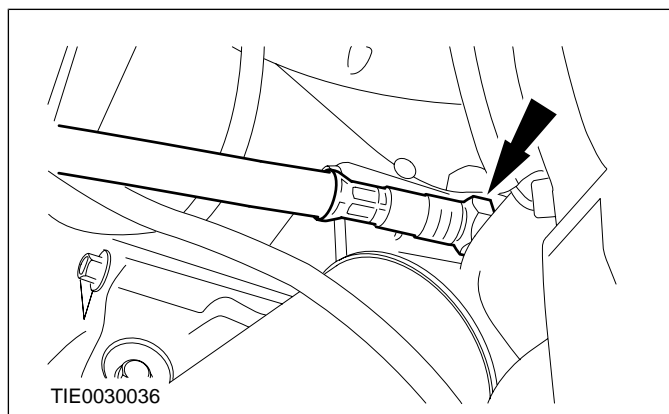
6. **NOTE: Measure the oil pressure at an oil temperature of 80°C.**

NOTE: Oil pressure at 2000 rpm: 2.5 bar.

Measure the oil pressure.

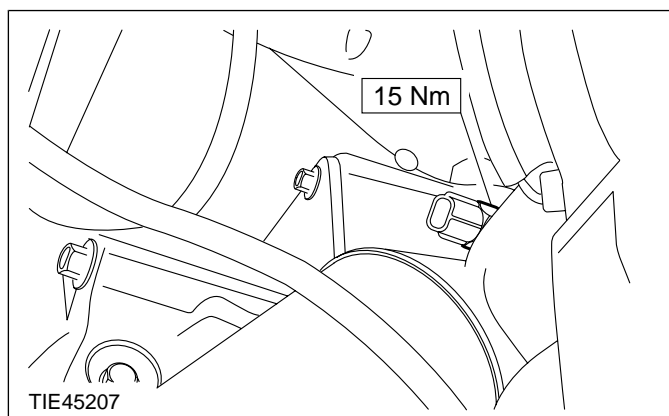
7. Raise and support the vehicle. REFER to: (100-02 Jacking and Lifting)

Jacking (Description and Operation),
Lifting (Description and Operation).



8. Detach the oil pressure gauge and connector from the oil pressure switch bore.

9. Coat the oil pressure switch with adhesive.



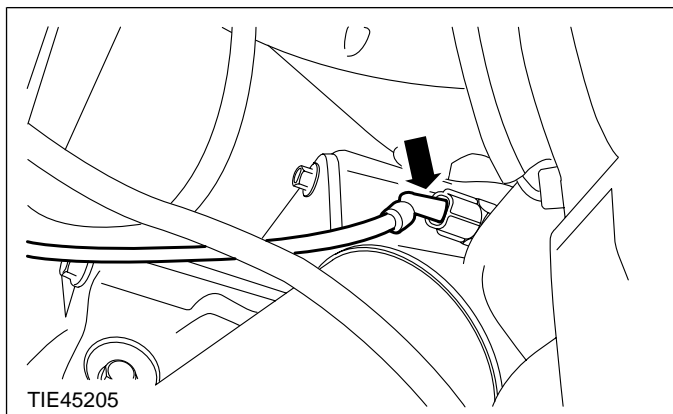
10. Install the oil pressure switch.

303-00-51

Engine System - General Information

303-00-51

DIAGNOSIS AND TESTING

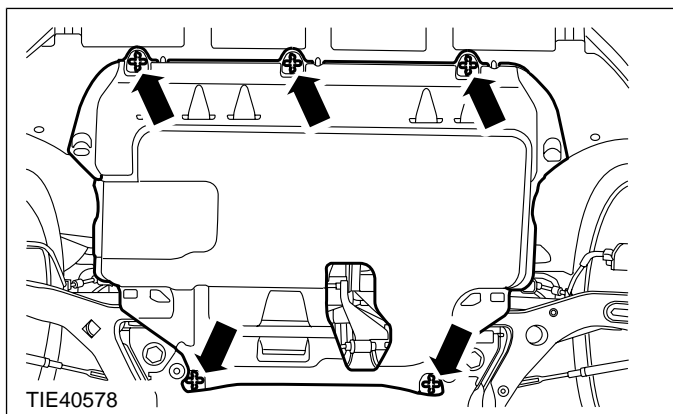


11. Connect the oil pressure switch electrical connector.
12. Lower the vehicle.

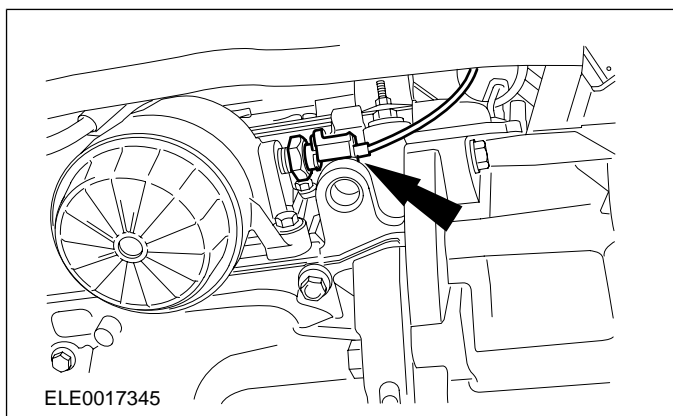
Measure the oil pressure (Engine - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4))

1. Raise and support the vehicle. REFER to: (100-02 Jacking and Lifting)

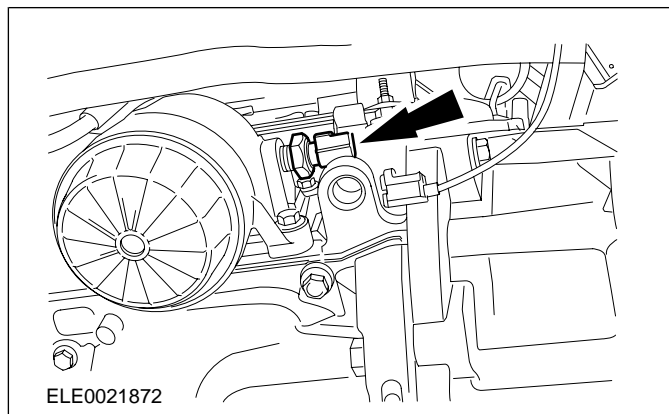
Jacking (Description and Operation),
Lifting (Description and Operation).



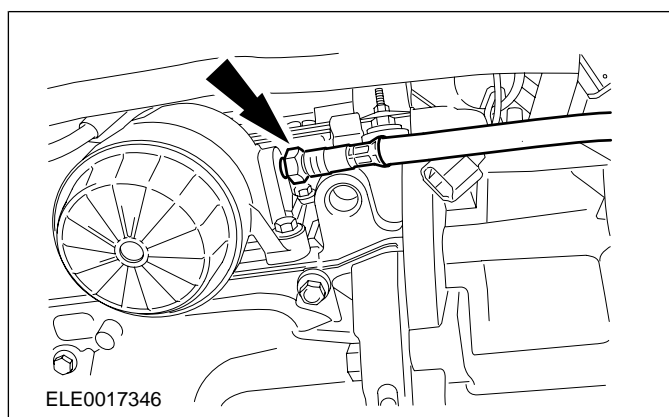
2. Remove the engine undershield.



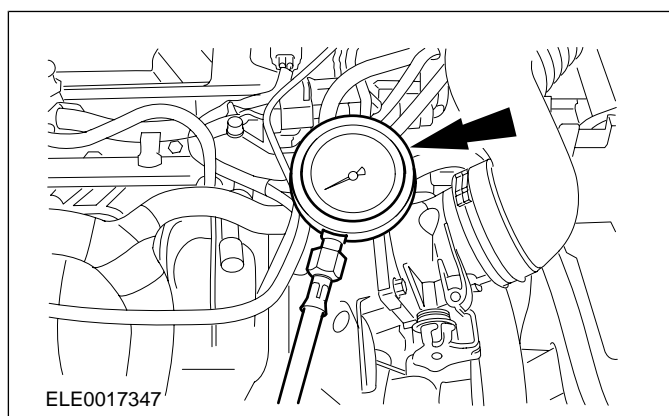
3. Disconnect the oil pressure switch electrical connector.



4. Remove the oil pressure switch.



5. Attach the oil pressure gauge with the oil pressure gauge connector to the oil pressure switch bore, and position it to allow reading from above.
6. Lower the vehicle.



7. **NOTE: Measure the oil pressure at the specified engine speed. Measure the oil pressure at an oil temperature of 100° C.**

NOTE: Oil pressure at 1500 rpm: 1.3 - 2.7 bar.

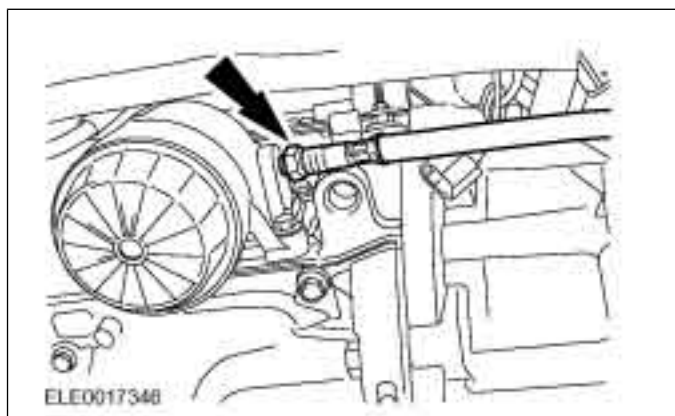
NOTE: Oil pressure at 3000 rpm: 2.3 - 5.2 bar.

Measure the oil pressure.

DIAGNOSIS AND TESTING

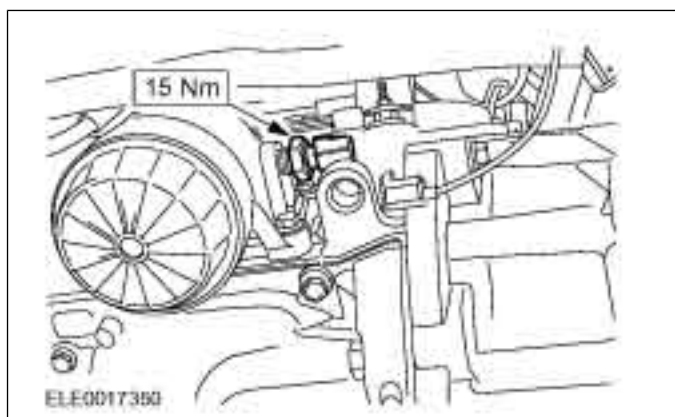
8. Raise and support the vehicle. REFER to:
(100-02 Jacking and Lifting)

Jacking (Description and Operation),
Lifting (Description and Operation).

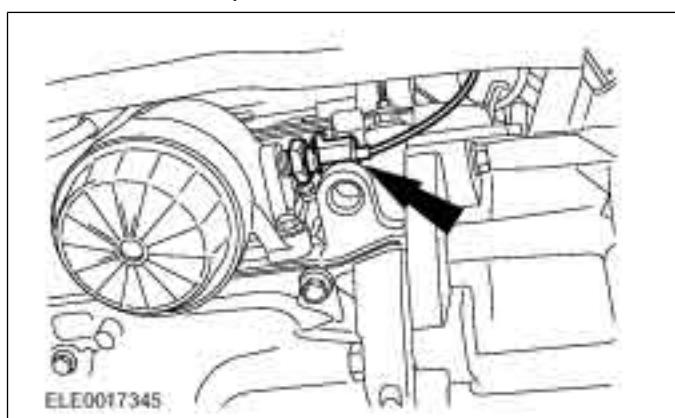


9. Detach the oil pressure gauge and connector from the oil pressure switch bore.

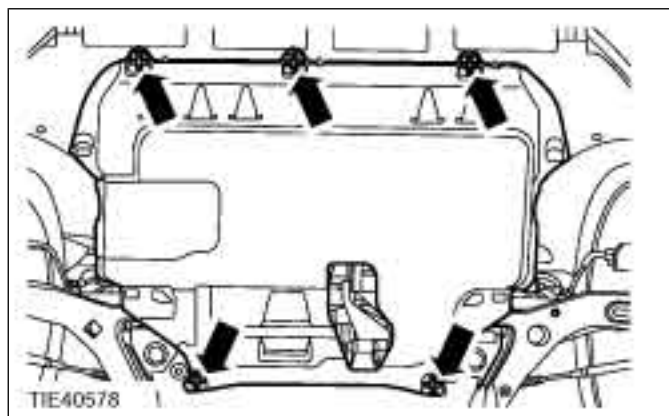
10. Coat the oil pressure switch with adhesive.



11. Install the oil pressure switch.



12. Connect the oil pressure switch electrical connector to the oil pressure switch.

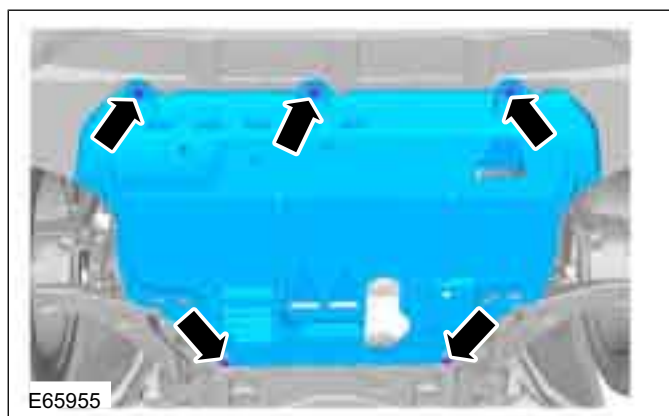


13. Install the engine undershield.
14. Lower the vehicle.

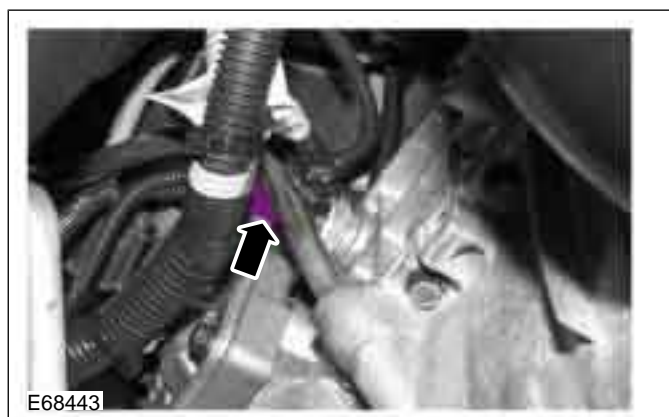
Measure the oil pressure (Engine - 2.5L Duratec-ST (VI5))

1. Raise and support the vehicle. REFER to:
(100-02 Jacking and Lifting)

Jacking (Description and Operation),
Lifting (Description and Operation).



2. Remove the engine undershield.



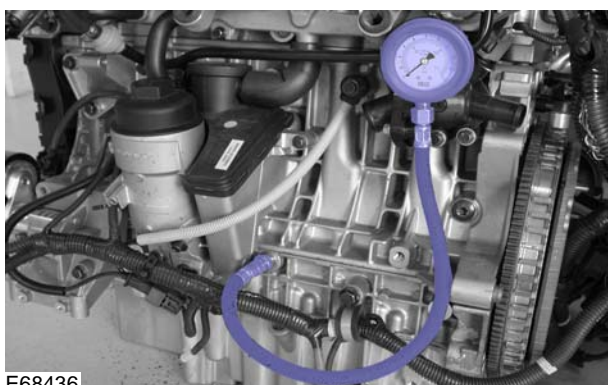
3. Disconnect the oil pressure switch electrical connector.

DIAGNOSIS AND TESTING



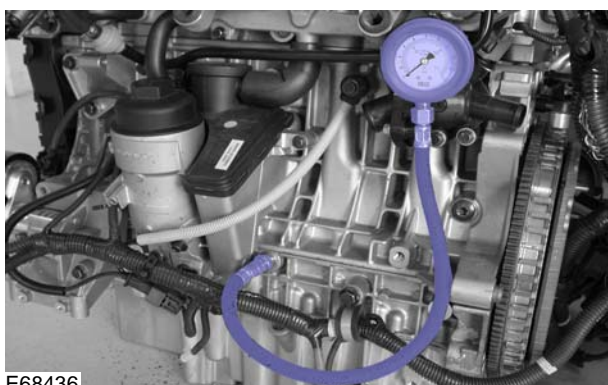
E68435

4. Remove the oil pressure switch.



E68436

5. Attach the oil pressure gauge with the oil pressure gauge connector to the oil pressure switch bore, and position it to allow reading from above.
6. Lower the vehicle.



E68436

7. **NOTE: Measure the oil pressure at an oil temperature of 100°C.**

NOTE: Measure the oil pressure at idle speed and at 4000 rpm.

NOTE: Minimum oil pressure at idle speed: 1.0 bar.

NOTE: Minimum oil pressure at 4000 rpm: 3.5 bar.

NOTE: Maximum oil pressure: 4.8 bar.

Measure the oil pressure.

8. Raise and support the vehicle. REFER to: (100-02 Jacking and Lifting)

Jacking (Description and Operation),
Lifting (Description and Operation).



E68436

9. Detach the oil pressure gauge and connector from the oil pressure switch bore.
10. Coat the oil pressure switch with adhesive.



E68435

11. Install the oil pressure switch.



E68443

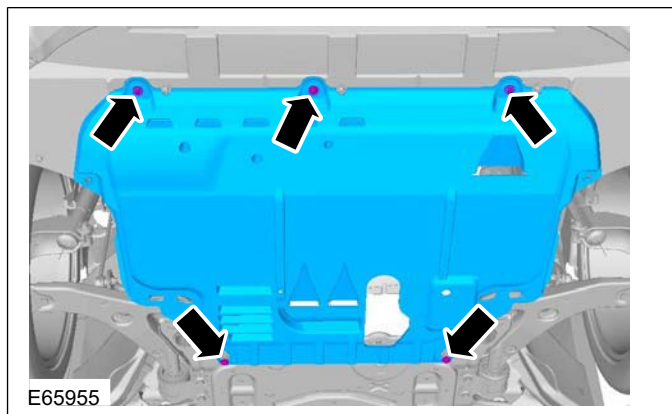
12. Connect the oil pressure switch electrical connector to the oil pressure switch.

303-00-54

Engine System - General Information

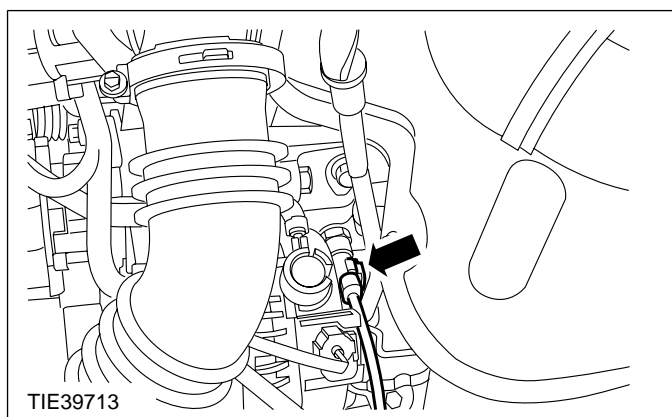
303-00-54

DIAGNOSIS AND TESTING

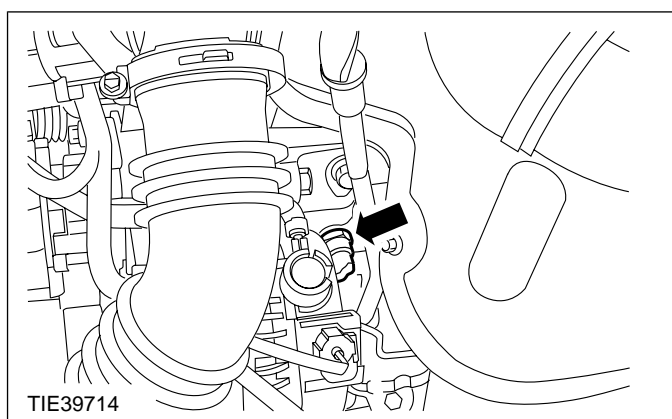


13. Install the engine undershield.
14. Lower the vehicle.

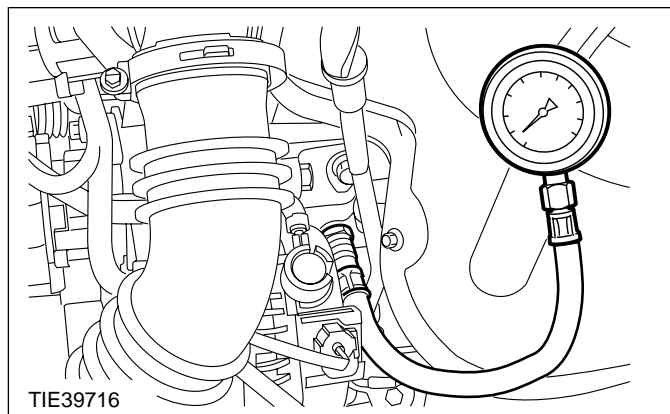
Measure the oil pressure (Engine - 1.6L Duratorq-TDCi (DV) Diesel)



1. Disconnect the oil pressure switch electrical connector.



2. Remove the oil pressure switch.



3. Attach the oil pressure gauge with the oil pressure gauge connector.

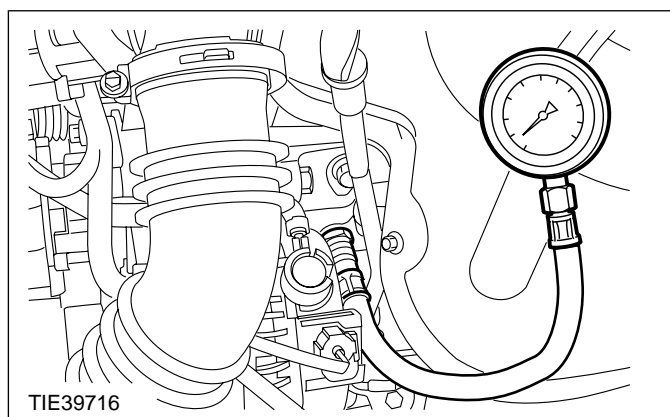
4. **NOTE: Measure the oil pressure at the specified engine speed. Measure the oil pressure at an oil temperature of 125° C.**

NOTE: Measure the oil pressure at idle speed and at 2000 rpm.

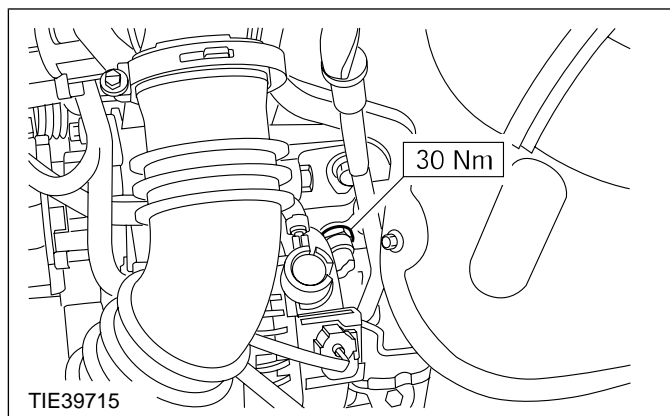
NOTE: Oil pressure at idle speed: 1.0 - 2.0 bar.

NOTE: Oil pressure at 2000 rpm: 2.3 - 3.7 bar.

Check the oil pressure.

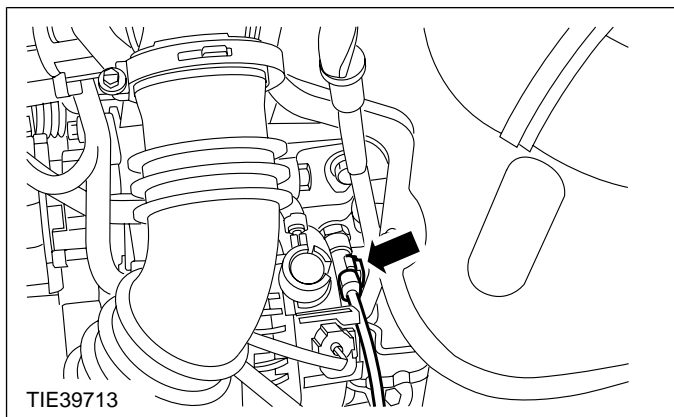


5. Detach the oil pressure gauge and the oil pressure gauge connector.
6. Coat the oil pressure switch with adhesive.



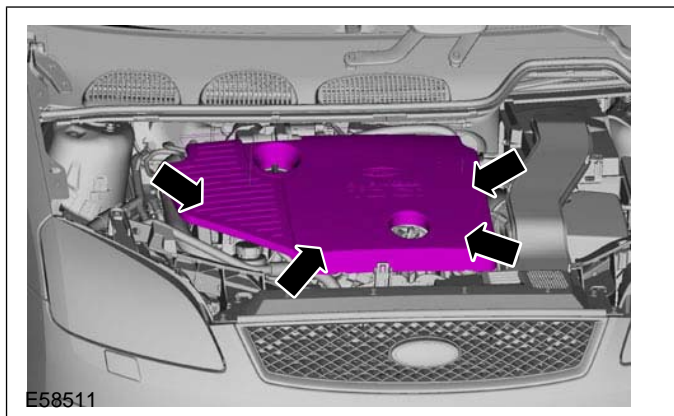
7. Install the oil pressure switch.

DIAGNOSIS AND TESTING



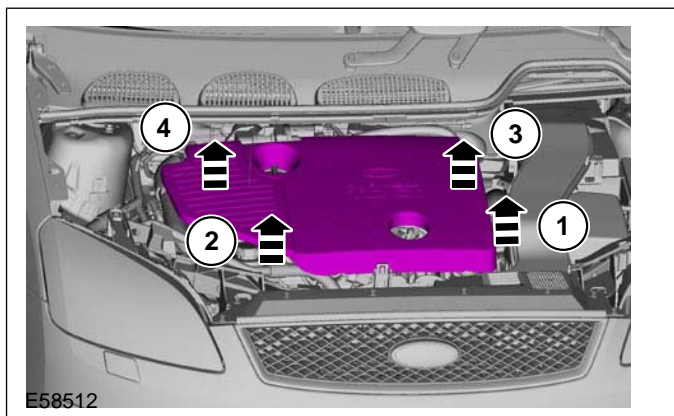
8. Connect the oil pressure switch electrical connector.

Measure the oil pressure (Engine - 1.8L Duratorq-TDCI (Kent) Diesel)



1. **NOTE:** The engine upper cover is held in place by 4 ball clips. The ball clips are not vertical, but are angled backwards by approximately 20 degrees.

Location of the engine upper cover retaining clips.



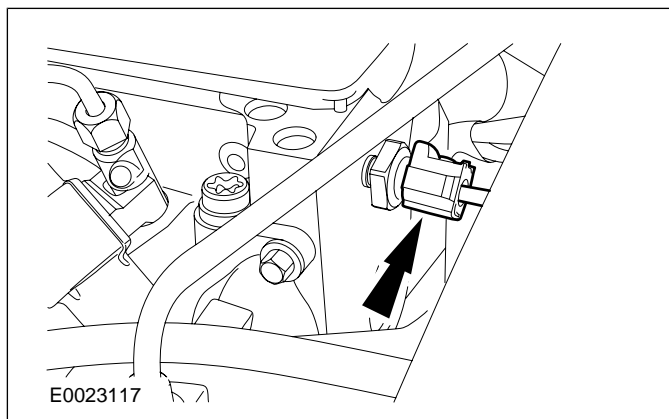
2. **CAUTIONS:**

⚠ Care must be taken when releasing the 4th retaining clip and manoeuvring the engine upper cover past the manifold absolute pressure (MAP) sensor. Failure to follow this instruction may result in damage to the MAP sensor.

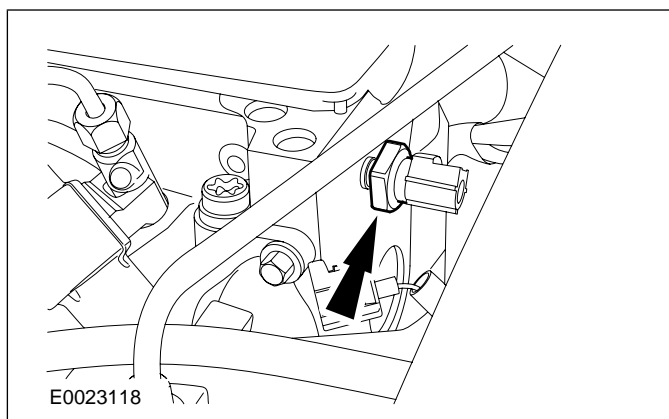
⚠ Contact of the engine upper cover with the cowl panel may cause damage (scratches) on the engine upper cover. If the ambient temperature is below 0°C, detach the engine upper cover with extreme caution. Failure to follow this instruction may cause the engine upper cover to be damaged.

NOTE: Only remove and install the engine upper cover in the sequence shown.

Remove the engine upper cover.



3. Disconnect the oil pressure switch electrical connector (components shown removed for clarity).



4. Remove the oil pressure switch (components shown removed for clarity).

5. **NOTE:** Measure the oil pressure at the specified engine speed. Measure the oil pressure at an oil temperature of 80° C.

NOTE: Measure the oil pressure at idle speed and at 2000 rpm.

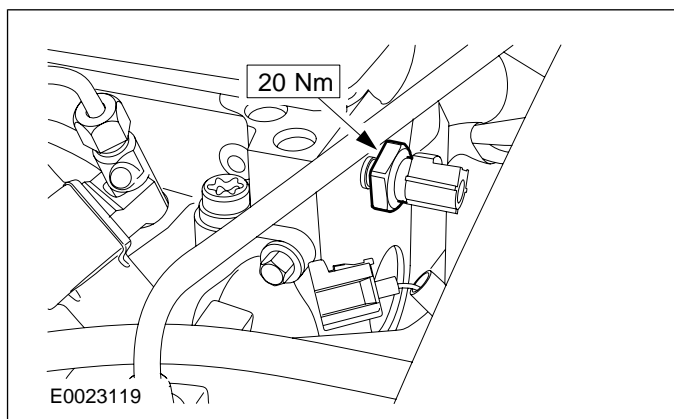
DIAGNOSIS AND TESTING

NOTE: Oil pressure at idle speed: 0.75 bar.

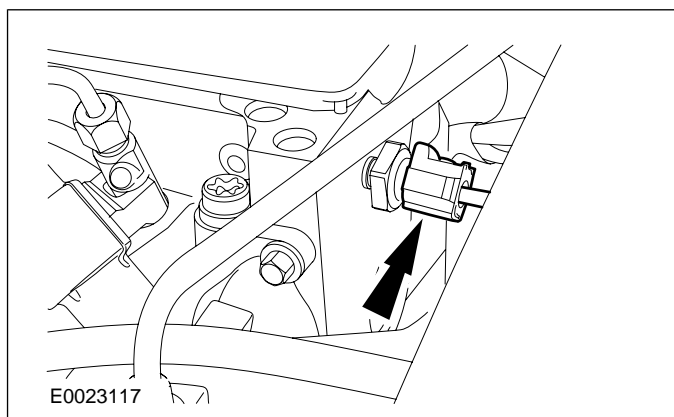
NOTE: Oil pressure at 2000 rpm: 1.5 bar.

Attach the oil pressure gauge with the oil pressure gauge connector.

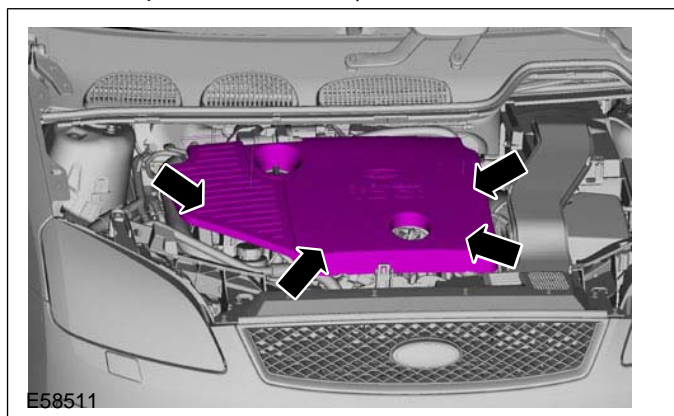
6. Check the oil pressure.
7. Detach the oil pressure gauge and the oil pressure gauge connector.
8. Coat the oil pressure switch with adhesive.



9. Install the oil pressure switch.



10. Connect the oil pressure switch electrical connector.
11. Apply soap solution to the ball clip mountings in the engine upper cover.
 - Soap solution (maximum concentration of soap in water 1:200).



12. **⚠ CAUTION:** Contact of the engine upper cover with the cowl panel may cause damage (scratches) on the engine upper cover. Failure to follow this instruction may cause the engine upper cover to be damaged.

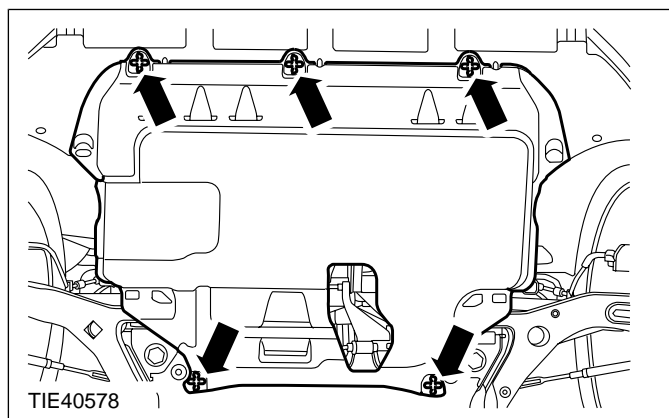
Put the engine cover into installation position and clip it in place by pressing at the places shown.

- Make sure that the engine upper cover is fully engaged in the area of the fuel filter, if necessary apply more pressure in the areas shown.

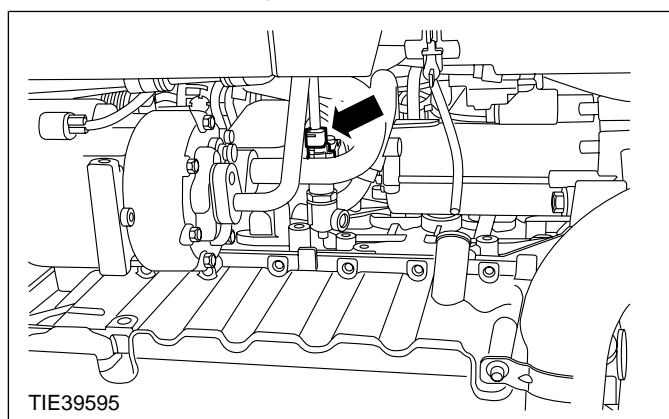
Measure the oil pressure (Engine - 2.0L Duratorq-TDCi (DW) Diesel)

1. Raise and support the vehicle. REFER to: (100-02 Jacking and Lifting)

Jacking (Description and Operation),
Lifting (Description and Operation).



2. Remove the engine under shield.



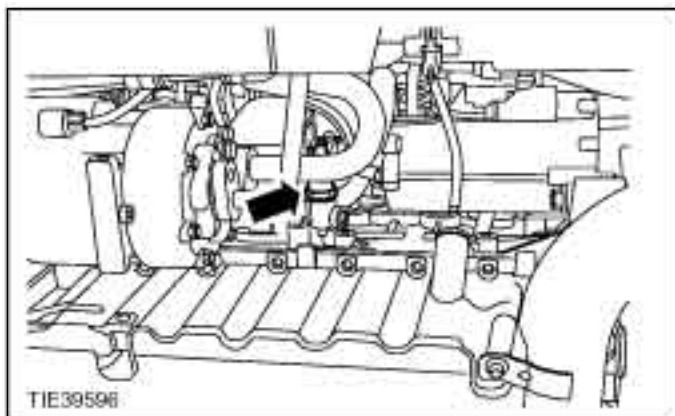
3. Disconnect the oil pressure switch electrical connector.

303-00-57

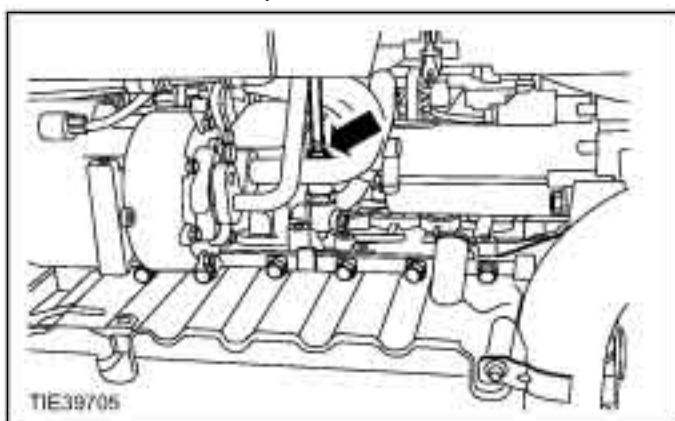
Engine System - General Information

303-00-57

DIAGNOSIS AND TESTING

4. **CAUTION:**

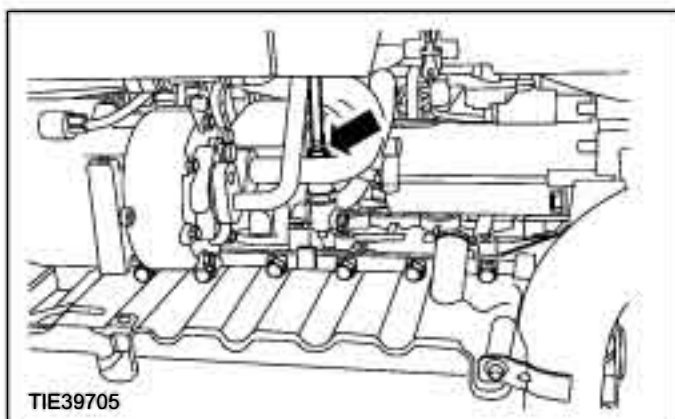
Remove the oil pressure switch.



5. Attach the oil pressure gauge with the oil pressure gauge connector.

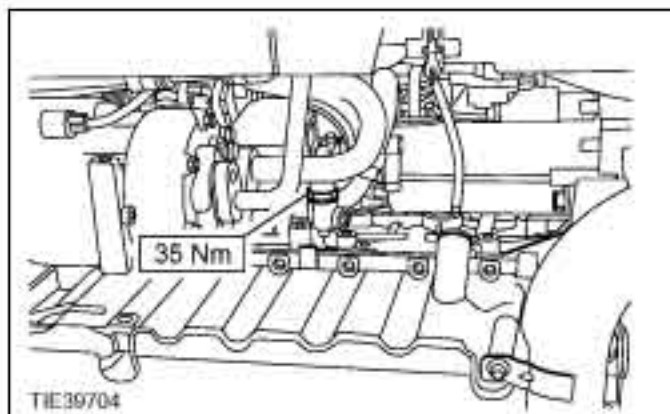
6. **NOTE: Measure the oil pressure at the specified engine speed. Measure the oil pressure at an oil temperature of 80° C.****NOTE:** Measure the oil pressure at 2000 rpm and at 4000 rpm.**NOTE:** Oil pressure at 2000 rpm: 2.0 bar.**NOTE:** Oil pressure at 4000 rpm: 4.0 bar.

Check the oil pressure.

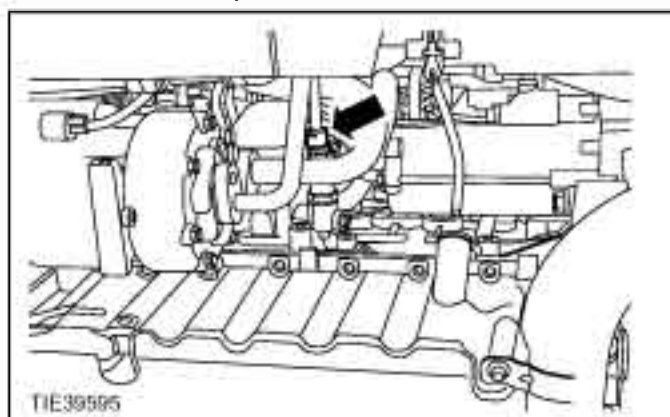


7. Detach the oil pressure gauge and the oil pressure gauge connector.

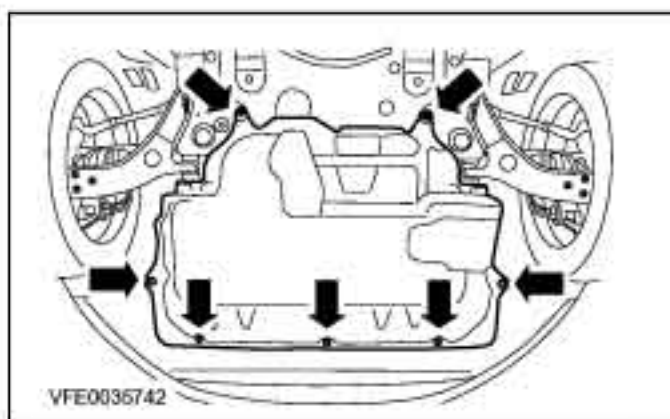
8. Coat the oil pressure switch with adhesive.



9. Install the oil pressure switch.



10. Connect the oil pressure switch electrical connector.



11. Install the engine under shield.

12. Lower the vehicle.

Valve train analysis - static (engine off)

Remove the valve cover.



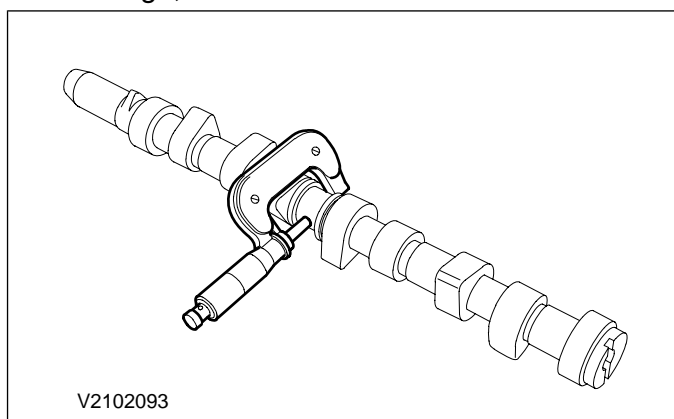
DIAGNOSIS AND TESTING

Check all valve train components for damage and wear. Ensure that only original components are installed and that all bolts and nuts have been tightened to the correct tightening torque.



GENERAL PROCEDURES**Camshaft Bearing Journal Diameter****1. Determine the diameter of the camshaft journals.**

- Using a micrometer measure the diameter at 90 degree intervals to determine if the journals are out-of-round.
- Measure at two different points on the journal to determine if there is any tapering.
- If the measurements are out of the specified range, install a new camshaft.



GENERAL PROCEDURES

Camshaft Bearing Journal Clearance

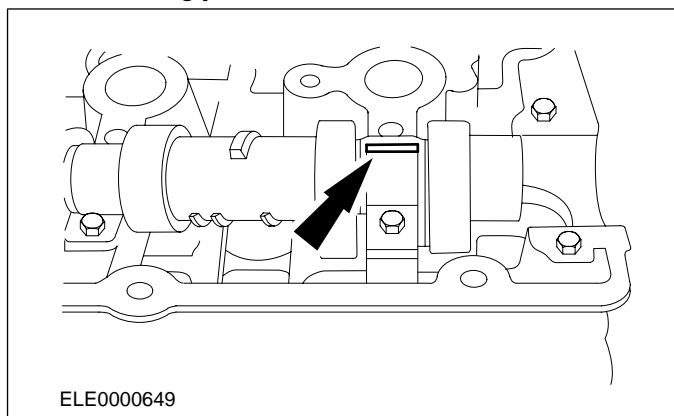
1. **NOTE:** Make sure that the following stages are followed exactly. The tappets or followers must be removed to carry out this measurement.

NOTE: Make sure that the camshaft is to specification.

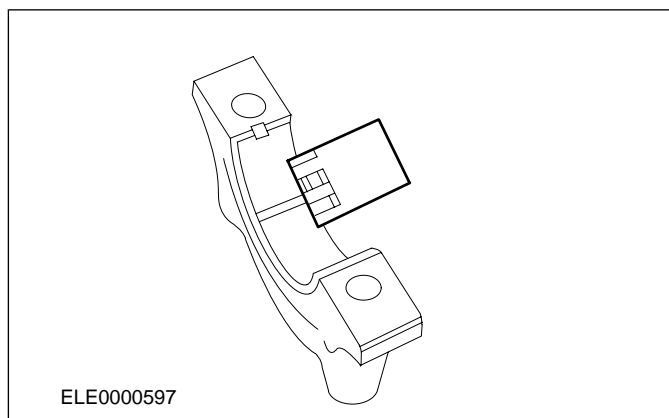
NOTE: The bearing caps and journals should be free from engine oil and dirt.

Position on a width of plastigage on the bearing cap.

- Insert the camshaft, without lubrication, into the cylinder head.
- Position a plastigage strip, which should be equal to the width of the bearing cap, on the bearing journal.



- The value that is read off is the bearing clearance.



2. Following the tightening specification, install the camshaft bearing caps. Refer to the corresponding Section 303-01.

3. **NOTE:** Do not strike the bearing caps.

Remove the camshaft bearing caps, refer to the corresponding **Section 303-01**.

4. Using the Plastigage, read off the measurement.

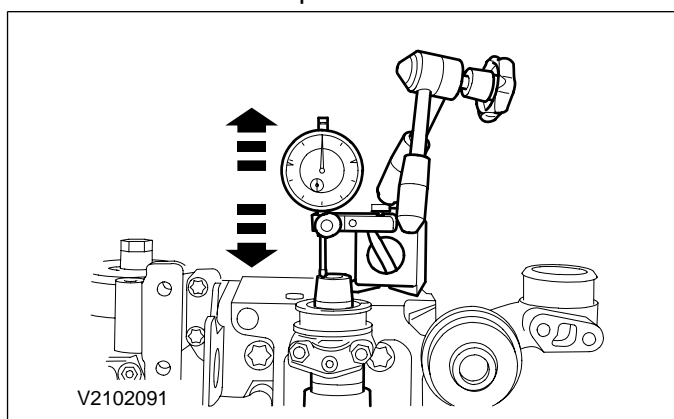
- Compare the width of plastigage with the plastigage scale.

GENERAL PROCEDURES**Camshaft End Play**

1. NOTE: Make sure that the camshaft is to specification.

Using a Dial Indicator Gauge, measure the end play.

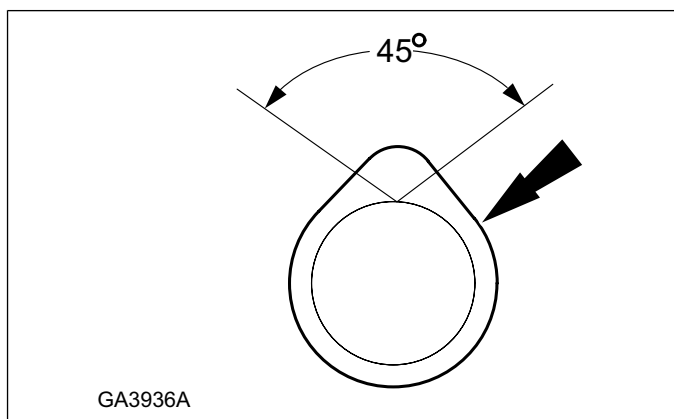
- Slide the camshaft in both directions. Read and note the maximum and minimum values on the Dial Indicator Gauge.
- End play = maximum value minus minimum value
- If the measurement is out of specification, install new components.



GENERAL PROCEDURES

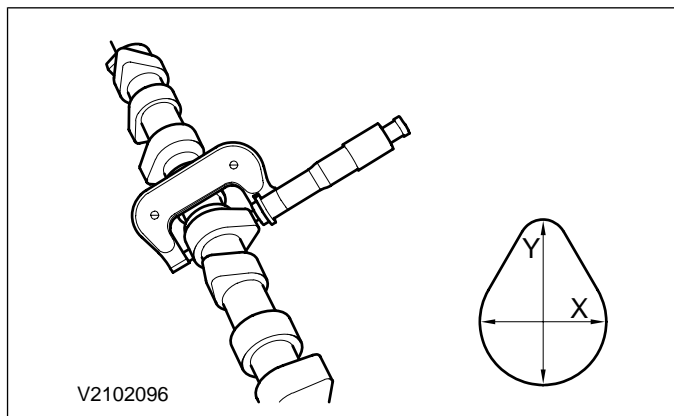
Camshaft Surface Inspection

1. Inspect the camshaft lobes for pitting or damage in the active area. Minor pitting is acceptable outside the active area.



GENERAL PROCEDURES**Camshaft Lobe Lift****1. Determine the cam lift.**

- Using a micrometer measure the cam in two directions.
- The difference between the two measurements is the cam lift.



GENERAL PROCEDURES

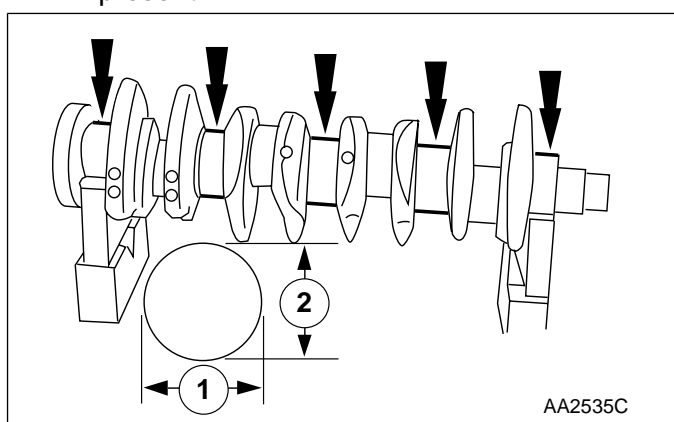
Crankshaft Main Bearing Journal Diameter

General Equipment

Micrometer

1. Measure the diameter of the main bearing journals and the big-end bearing journals.

- Repeat the measurement with the micrometer offset by 90°, in order to determine any eccentricity which may be present.
- Measure the journal at two different positions to determine any conicity which may be present.



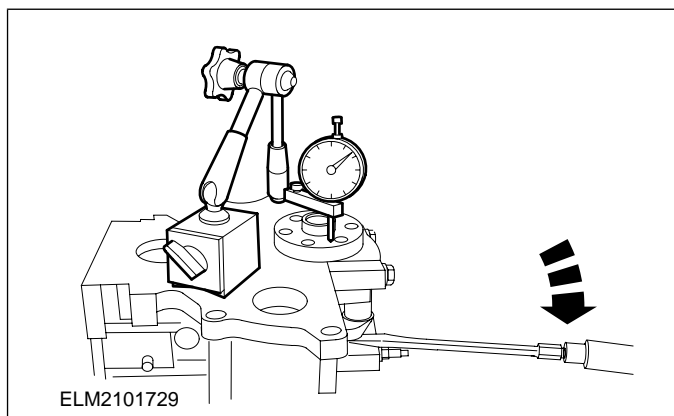
GENERAL PROCEDURES**Crankshaft End Play****General Equipment**

Dial indicator

Dial indicator fixture

1. Determine the end float

- Place on the dial indicator and bracket.
- Determine the end float by raising the crankshaft with the aid of a screwdriver.
- If necessary, correct the end float by using new thrust half washers.



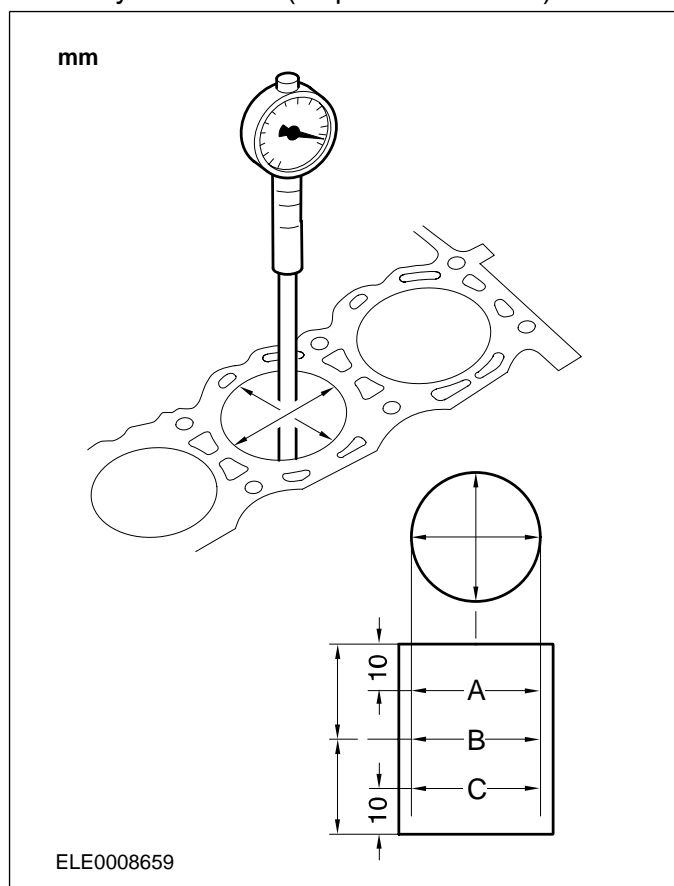
GENERAL PROCEDURES

Cylinder Bore Taper

- NOTE:** The main bearing caps or lower crankcase must be in place and tightened to the specified torque; however, the bearing shells should not be installed.

Measure the cylinder bore with an internal micrometer.

- Carry out the measurements in different directions and at different heights to determine if there is any out-of-roundness or tapering.
- If the measurement is out of the specified range, install a new block or hone out the cylinder block (if applicable/allowed).



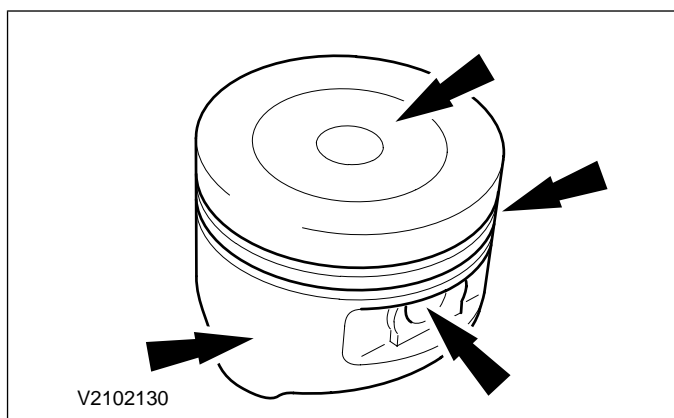
GENERAL PROCEDURES

Piston Inspection

1. **⚠ CAUTION:** Do not use any aggressive cleaning fluid or a wire brush to clean the piston.

Carry out a visual inspection.

- Clean the piston skirt, pin bush, ring grooves and crown and check for wear or cracks.
- If there are signs of wear on the piston skirt, check whether the connecting rod is twisted or bent.



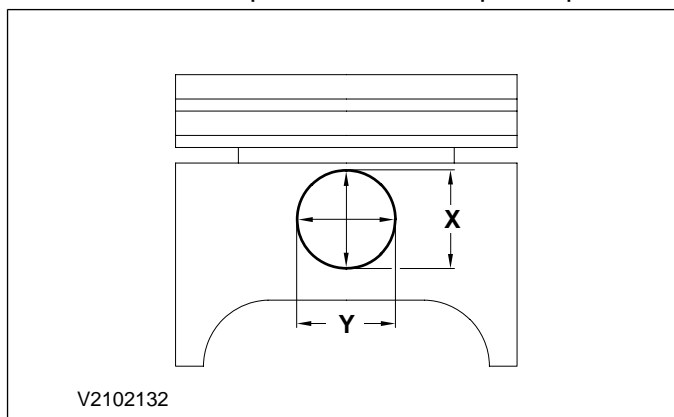
GENERAL PROCEDURES

Piston Pin to Bore Diameter

1. **NOTE:** The piston and piston pin form a matched pair. Do not mix up the components.

Measure the diameter of the piston pin bore.

- Measure the diameter in two directions.
- If the values are not to specification, install both a new piston and a new piston pin.

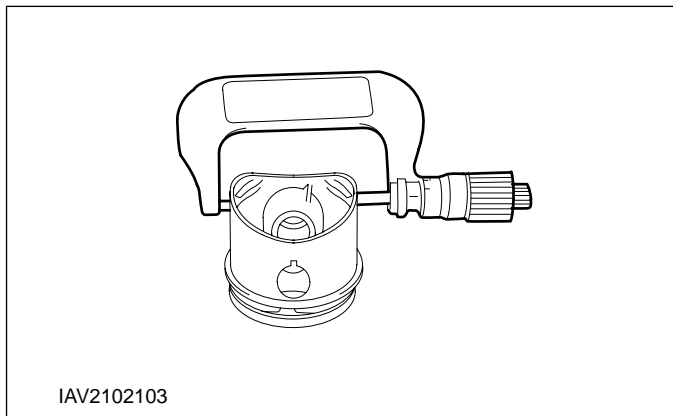


GENERAL PROCEDURES**Piston Diameter****General Equipment**

Micrometer

- NOTE:** Mark the piston to make sure the piston is installed correctly.

Using a Micrometer measure the piston diameter.

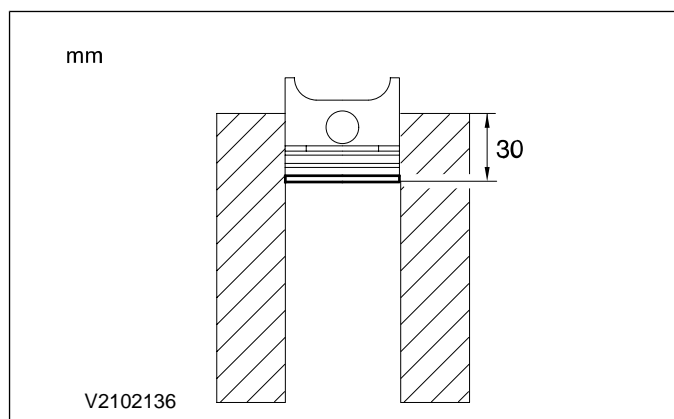


GENERAL PROCEDURES

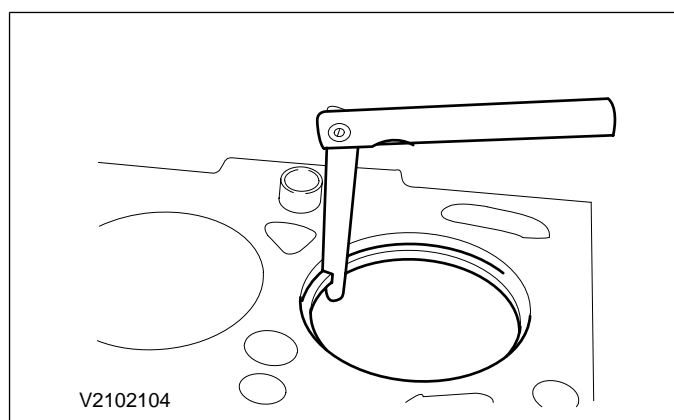
Piston Ring End Gap

1. **⚠ CAUTION:** Do not mix up the piston rings. Install the piston rings in the same position and location.

Take the piston ring and use a piston without ring to push the piston ring about 30 mm into the cylinder bore.



2. Using the Feeler Gauge, measure the piston ring gap.

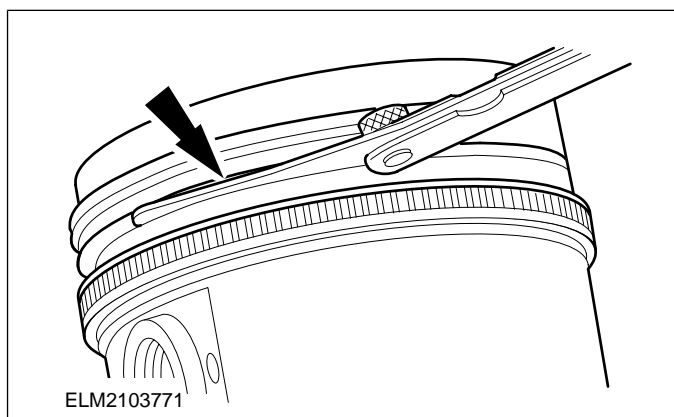


GENERAL PROCEDURES**Piston Ring-to-Groove Clearance****General Equipment**

Feeler Gauge

- NOTE:** The piston ring must protrude from the piston groove. To determine the piston ring clearance, insert the Feeler Gauge right to the back of the groove, behind the wear ridge.

Using the Feeler Gauge , measure the piston ring clearance.

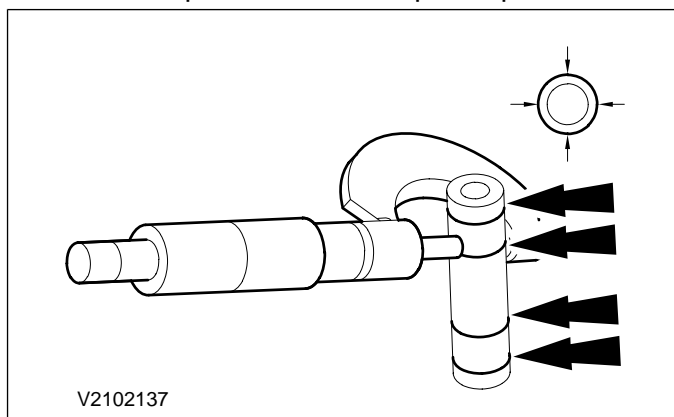


GENERAL PROCEDURES**Piston Pin Diameter**

1. **NOTE:** The piston and piston pin are a matched pair. Do not mix up the components.

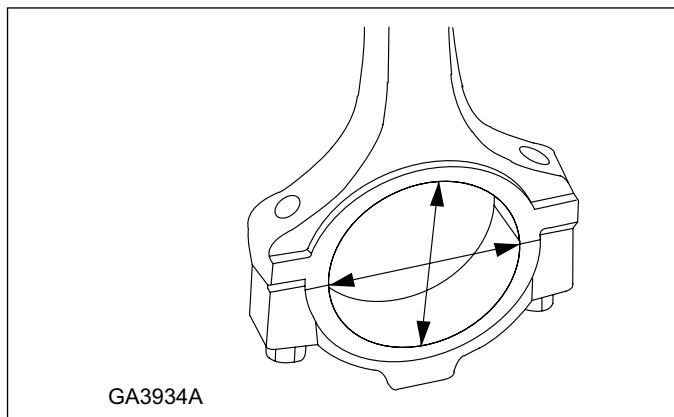
Measure the piston pin diameter.

- Measure the diameter in two directions.
- If the values are not to specification, install a new piston and a new piston pin.



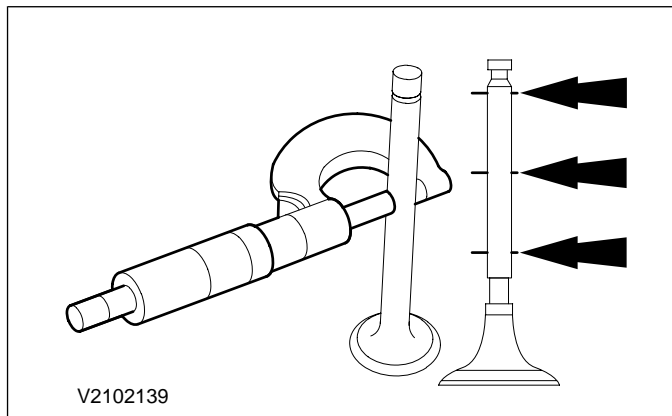
GENERAL PROCEDURES**Connecting Rod Large End Bore**

1. Measure the bearing bore in two directions. The difference is the connecting rod bore out-of-round. Verify the out-of-round and the bearing bore is within specification.



GENERAL PROCEDURES**Valve Stem Diameter****1. Using a micrometer measure the diameter of the valve stems.**

- If the measurements are not to specification, install a new valve.



GENERAL PROCEDURES

Flywheel Inspection

1. Inspection details for the dual mass flywheel are contained in the Diagnosis and Testing procedure. For additional information, refer to:

Lifting (**100-02 Jacking and Lifting**,
Description and Operation),

Manual Transaxle and Clutch - Vehicles With:

VXT-75 (308-00 Manual

Transmission/Transaxle and Clutch -
General Information, Diagnosis and
Testing),

Manual Transmission and Clutch - Vehicles

With: MT82 (308-00 Manual

Transmission/Transaxle and Clutch -
General Information, Diagnosis and
Testing).

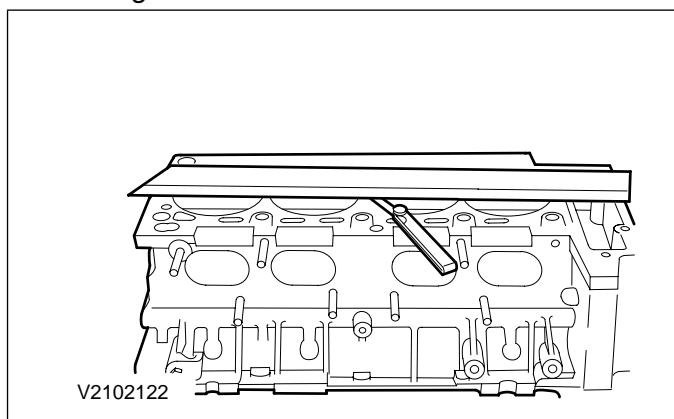
GENERAL PROCEDURES**Cylinder Head Distortion****General Equipment**

Feeler gauge

Straight edge

1. Using a straight edge and feeler gauge, measure the cylinder head distortion.

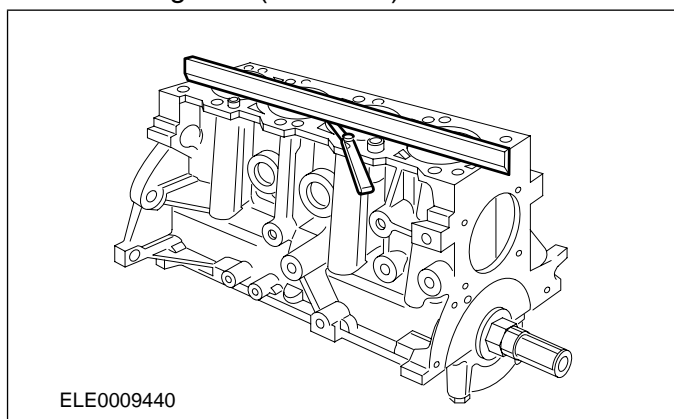
- Measure the mating face distortion.
- Refer to Specifications in the appropriate engine section.



GENERAL PROCEDURES**Cylinder Block Distortion**

1. Using a Straight Edge and a Feeler Gauge, measure the cylinder block/cylinder head distortion.

- Measure the mating face distortion.
- If the value is not to specification rework the mating face (if allowed).



GENERAL PROCEDURES**Exhaust Manifold Cleaning and Inspection**

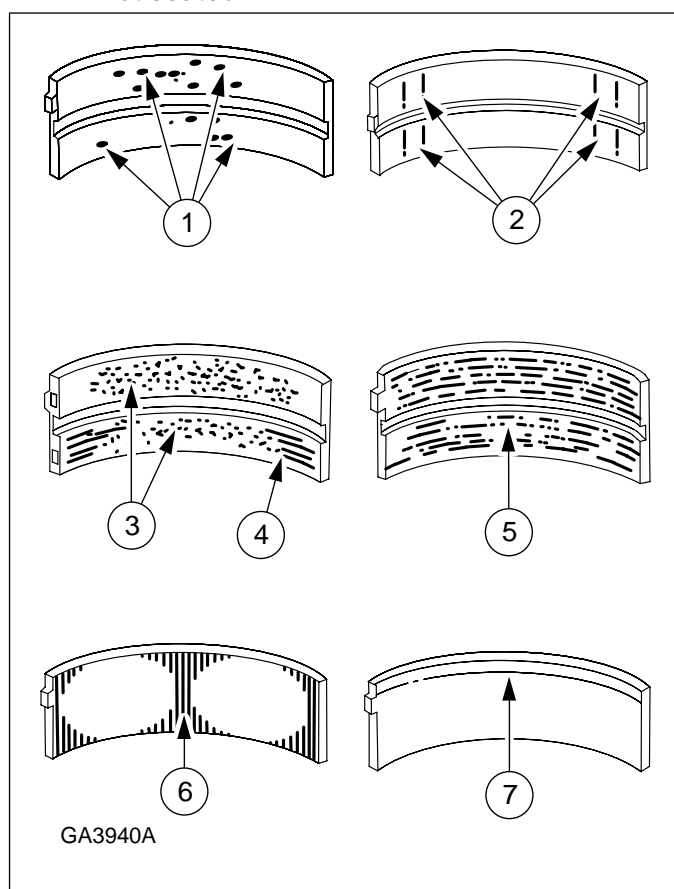
1. Inspect the cylinder head joining flanges of the exhaust manifold for evidence of exhaust gas leaks.
2. Inspect the exhaust manifold for cracks, damaged gasket surfaces, or other damage that would make it unfit for further use.

GENERAL PROCEDURES

Bearing Inspection

1. Inspect bearings for the following defects.

1. Cratering - fatigue failure
2. Spot polishing - incorrect seating.
3. Imbedded dirt engine oil.
4. Scratching - dirty engine oil.
5. Base exposed - poor lubrication.
6. Both edges worn - journal damaged.
7. One edge worn - journal tapered or bearing not seated.



SECTION 303-01 Engine — 2.5L Duratec-ST (VI5)

VEHICLE APPLICATION: 2008.75 Focus ST C307

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INSTALLATION

Engine Accessories..... (21 139 4) 303-01-80

Engine..... (21 134 0) 303-01-86



SPECIFICATIONS**Engine Data**

Description	
Engine code	HYDA
Firing order	1-2-4-5-3
Emission level	Stage IV
Bore	83 mm
Stroke	93.2 mm
Cubic capacity	2522 cm ³
Compression ratio	9 : 1
Power output at 6000 rpm	166 kW (225 PS)
Max. torque at 1600 rpm	320 Nm
Maximum engine speed (intermittent)	6850 rpm
Maximum engine speed (continuous)	6500 rpm
Idle speed	800 rpm
Number of main bearings	6
Camshaft drive	Belt
Oil consumption	0.5 l/1000 Km

Engine Oil

Viscosity /ambient temperature	Type	Specification
Recommended engine oil		
SAE 5W-30 /below -20°C to over +40°C	Ford Formula E	WSS-M2C913-B
Alternative engine oils (for top-up only)		
SAE 10W-40 /-20°C to over +40°C	Ford Formula XR+	ACEA A3/B3
SAE 5W-40 /below -20°C to over +40°C	Ford Formula S	ACEA A3/B3

Engine Oil Capacity

Description	Liters
Service fill including filter	6.4
Service fill excluding filter	6.1

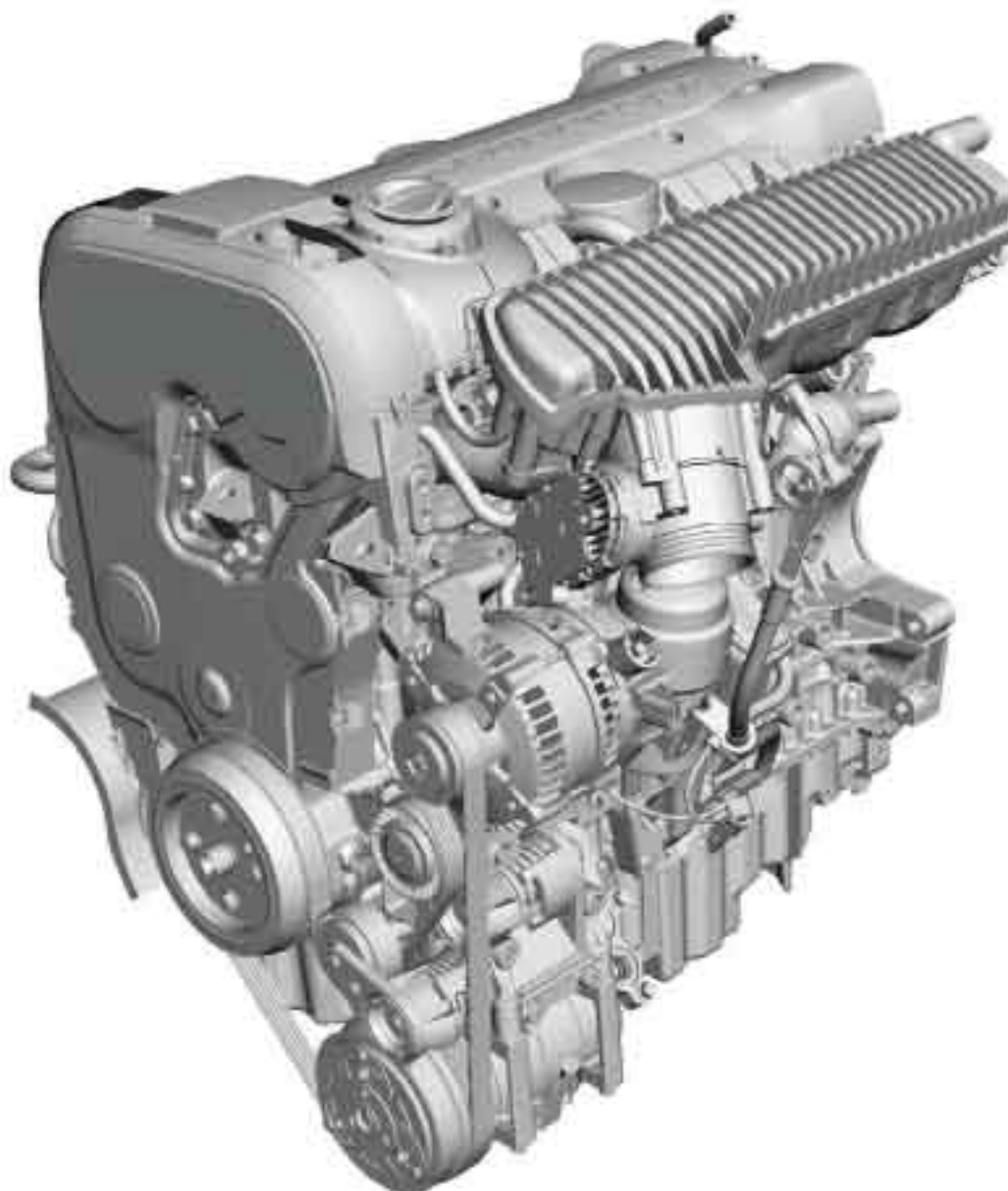
Valve Clearance

Description	mm
Valve clearance (engine cold), intake	0.17 - 0.23
Valve clearance (engine cold), exhaust	0.37 - 0.43

DESCRIPTION AND OPERATION

Engine

2.5L Duratec-ST (VI5) engine



E62439

General

The 2.5L Duratec-ST (VI5) engine is a transversely mounted 5-cylinder, 20-valve, 2522 cm³, turbo engine.

The cylinder bore is 83 mm.

The stroke is 93.2 mm.

It has a compression ratio of 9:1.

The valve train is driven by a timing belt.

The valve timing of the intake and exhaust camshafts is adjusted by variable camshaft timing (VCT) control units.

The accessories are driven by two elastic multigroove belts.

The tension of the two multigroove belts is maintained automatically by two separate mechanical belt tensioners.

DESCRIPTION AND OPERATION

Engine management

- Bosch ME 9.0 engine management system
- Knock control with two knock sensors
- Electronic throttle plate
- Electronic accelerator pedal
- Variable camshaft timing for intake and exhaust camshafts
- Fuel rail with combined fuel pressure and temperature sensor
- Sequential multi-port fuel injection
- Camshaft position (CMP) sensors for intake and exhaust camshafts.
- Crankshaft position (CKP) sensor

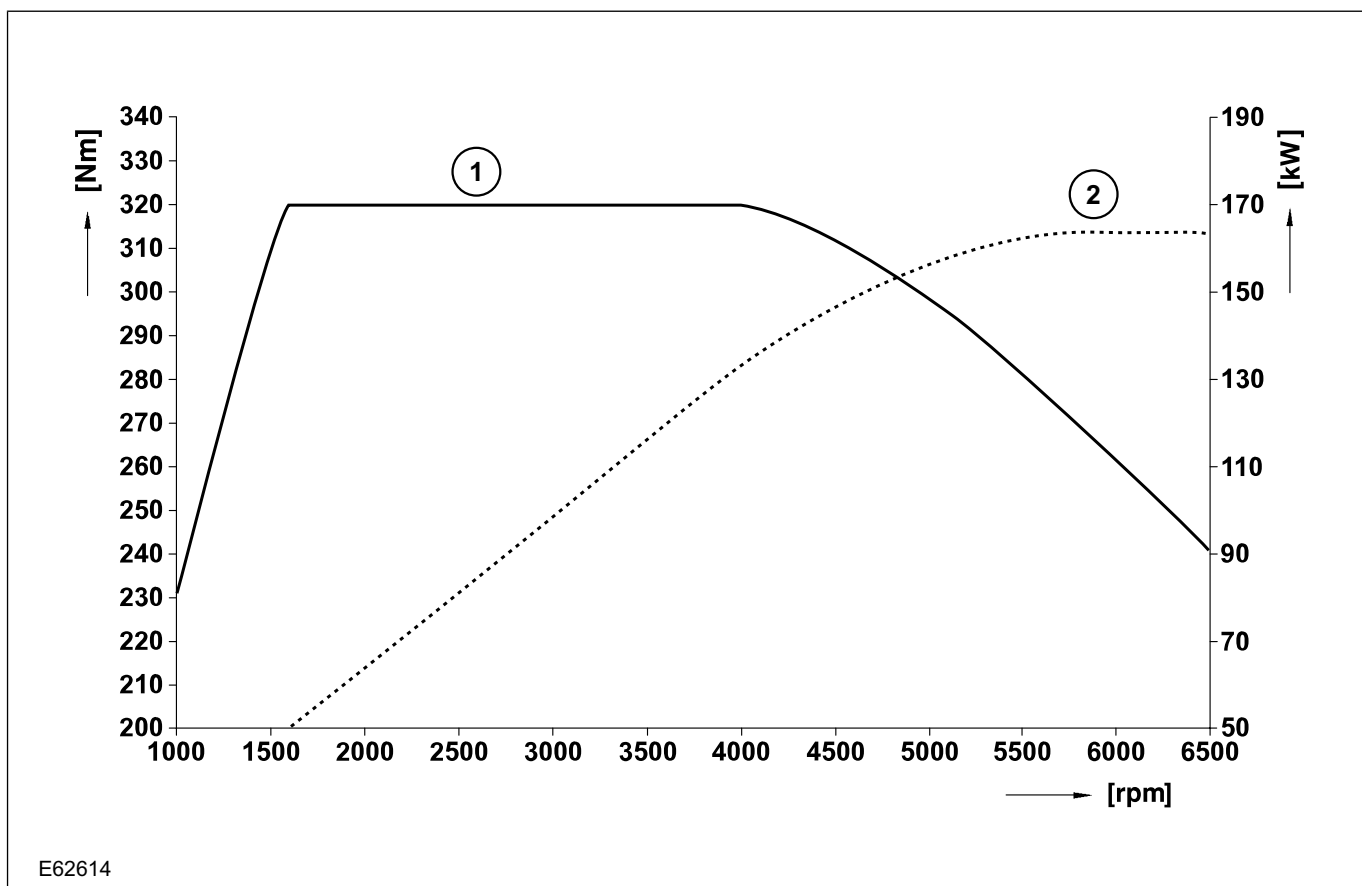
Engine power output and torque

Engine emission control

- Complies with European emissions standard IV
- EOBD (European On-board Diagnostic) for the monitoring of emissions-related components.
- HO2S (Heated Oxygen Sensor), pre- and post-catalytic converter

Diagnosis

Diagnosis is performed using WDS (Worldwide Diagnostic System) via the DLC (Data Link Connector).



E62614

Item	Description
1	Torque curve
2	Power output curve

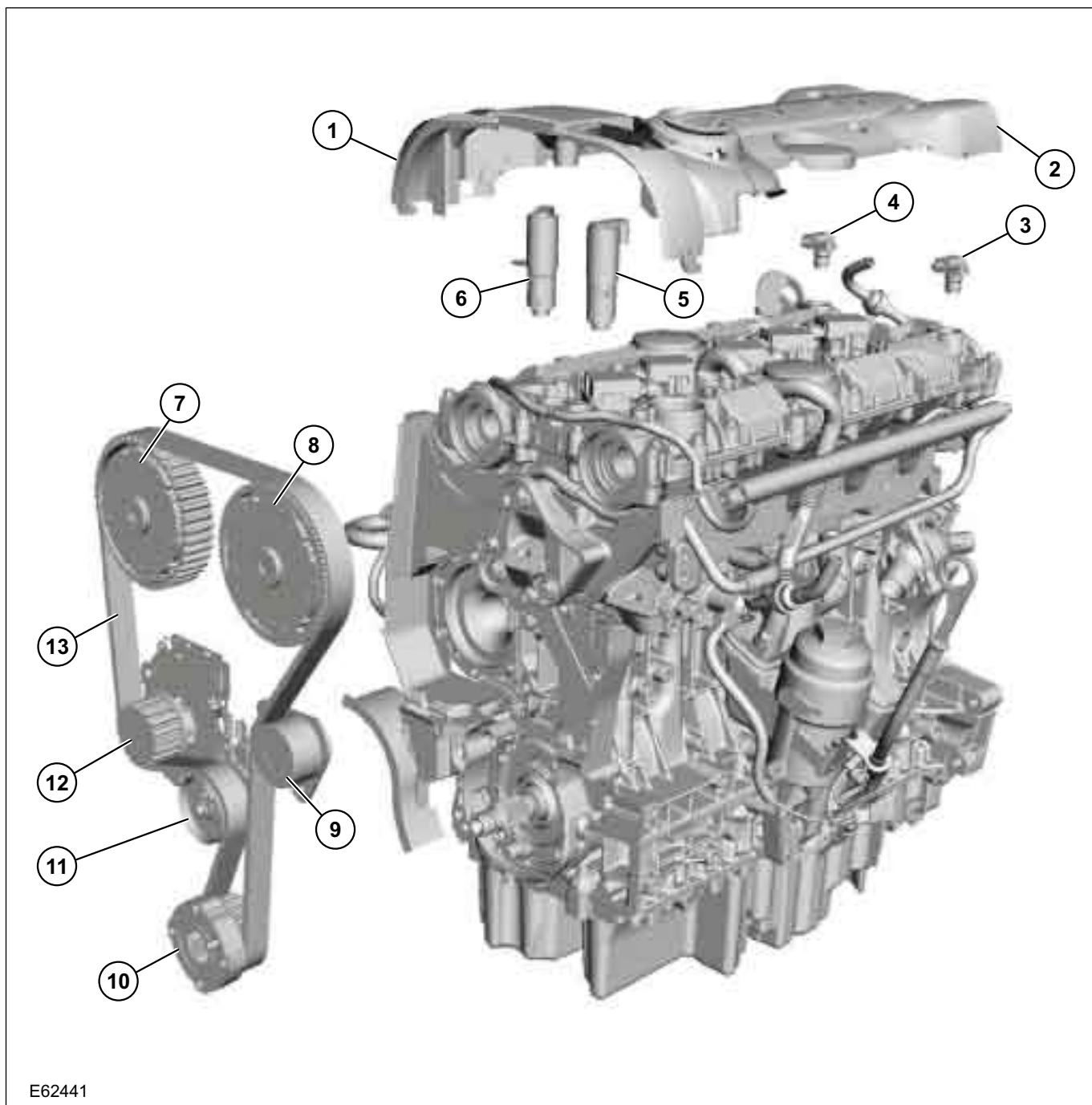
The maximum torque of 320 Nm is available between 1600 and 4000 rpm.

Maximum power output of the engine is 166 kW (225 PS) at 6000 rpm.

By the use of VCT for the intake and exhaust camshafts it is possible to attain maximum torque across a wide engine speed range.

DESCRIPTION AND OPERATION

2.5L Duratec-ST (VI5) engine



E62441

Item	Description
1	Engine front cover
2	Engine rear cover
3	CMP sensor, intake camshaft
4	CMP sensor, exhaust camshaft
5	VCT oil control solenoid, intake camshaft
6	VCT oil control solenoid, exhaust camshaft
7	Exhaust VCT control unit

Item	Description
8	Intake VCT control unit
9	Timing belt idler pulley
10	Crankshaft timing belt pulley
11	Timing belt tensioner
12	Coolant pump pulley
13	Timing belt

Design

DESCRIPTION AND OPERATION

The 2.5L Duratec-ST (VI5) engine is a turbo charged engine with 5 cylinders and 20 valves with electronically-controlled dual VCT.

The entire engine is made of aluminum.

The cylinder head consists of two parts.

The cylinder block consists of three parts.

A conventional cylinder head gasket is installed between the cylinder head and the cylinder block.

The gaskets between the other mating faces are fluid gaskets.

The two camshafts are supported by six bearing caps in the two halves of the cylinder head. The top half of the cylinder head consists of a valve cover with integral camshaft bearing caps.

Maintenance-free mechanical valve tappets are installed in the cylinder head.

The spark plug wells are additionally sealed by O-rings.

A cover has been fitted over the spark plug recesses as a protection against dirt and water.

The valve train is controlled via a timing belt which drives the intake VCT control unit and the exhaust VCT control unit. These control units then drive the respective camshafts.

The timing belt is tensioned via a mechanical timing belt tensioner.

The coolant pump is also driven via the timing belt.

The compact pent-roof combustion chamber design, the V-shaped arrangement of the valves and the centrally-positioned spark plugs ensure optimum combustion, low knock-susceptibility and low exhaust emissions.

The crankshaft has six bearings.

The shims are located at the 5th crankshaft main bearing.

The pistons are made of a homogeneous aluminum alloy with a graphite coating on the sides. This coating serves to reduce friction and dampen noise. The pistons are cooled from below via oil-spray nozzles screwed into the cylinder block.

Design of the variable camshaft timing system

This system is an electronically-controlled, dual, independent VCT control system that allows for independent, variable valve timing for the intake and exhaust camshafts.

A reference mark for the CMP sensor is machined into each camshaft.

The CMP sensors are located in the valve cover.

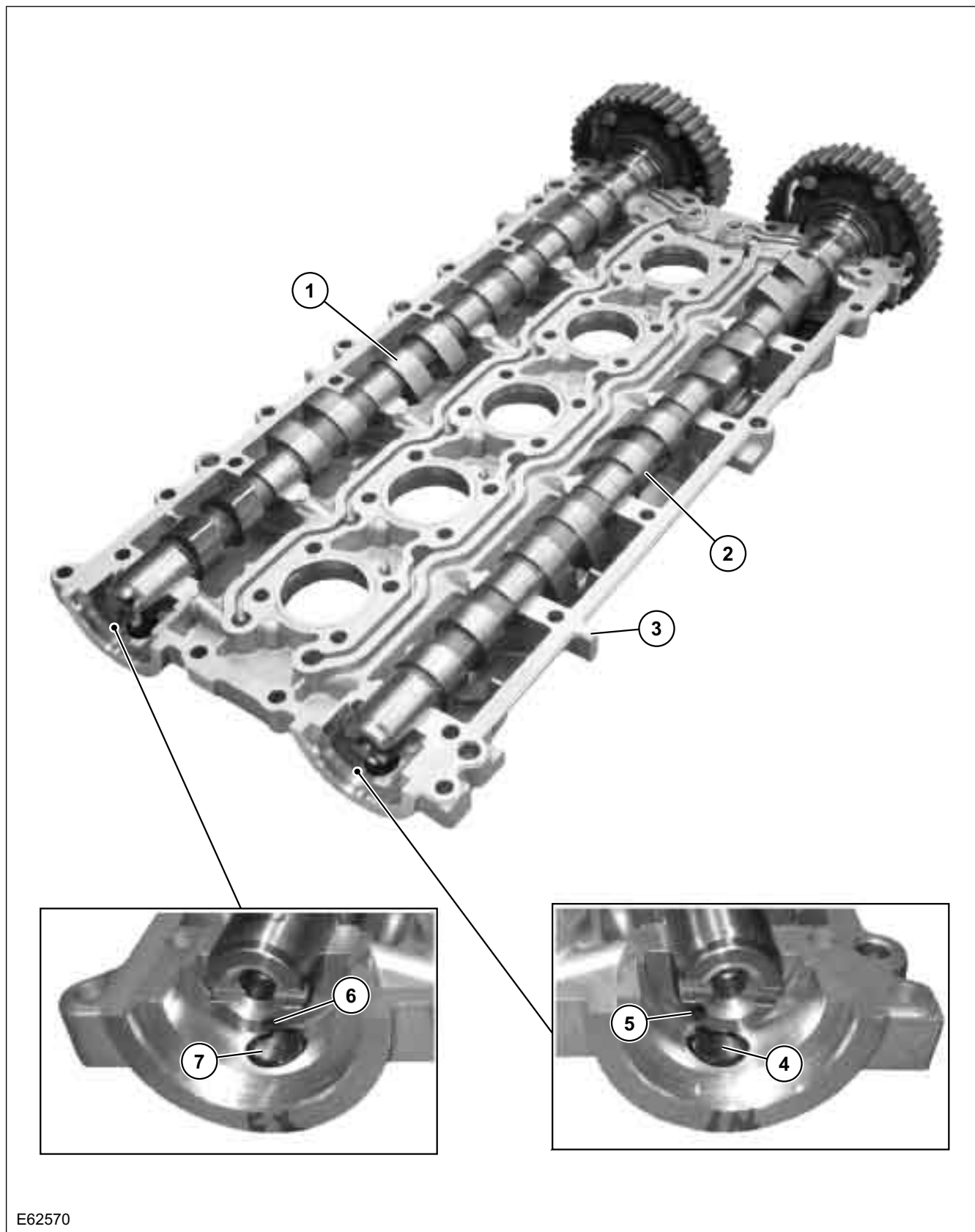
Function

The variable camshaft timing system is driven hydro-mechanically by means of the engine oil circuit.

Provided for this purpose on the drive side of each of the camshafts is a electronically-controlled flow valve with an integral spring mechanism (VCT oil control solenoid), which is supplied with the current engine-speed and load values by the powertrain control module (PCM). Based on these input signals, a larger or smaller camshaft rotation angle is achieved relative to the crankshaft. The CMP sensors register the position of the camshafts and transmit this information to the PCM.

Camshafts

DESCRIPTION AND OPERATION



E62570

Item	Description
1	Exhaust camshaft
2	Intake camshaft

Item	Description
3	Valve cover / upper camshaft bearings
4	CMP sensor for intake camshaft

DESCRIPTION AND OPERATION

Item	Description
5	Intake camshaft reference mark
6	Exhaust camshaft reference mark
7	CMP sensor for exhaust camshaft

Recesses are provided on the ends of the camshafts; these are for attaching the new special tool (Locking Tool, Camshaft 303-1183) for locking the camshafts.

Threads have been cut into the camshafts for attaching the special tool (303-1178).

NOTE: The new special tool (303-1178) can only be attached when the camshafts are precisely set to the timing marks.

Refer to the workshop literature for the exact procedure for attaching and using the new special tool (303-1178).

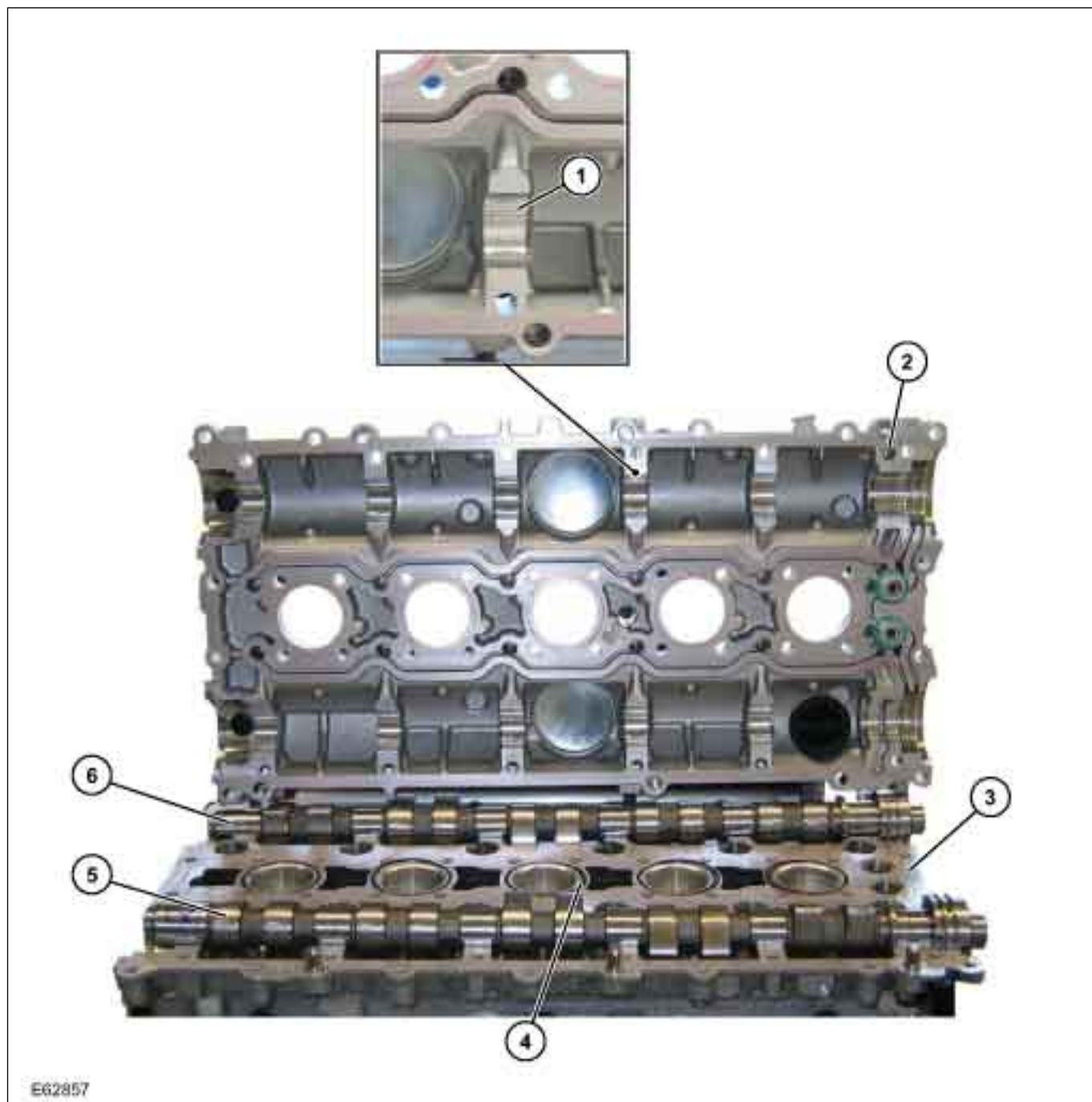
For detection of the CMP sensor signals, reference marks in the form of grooves have been machined into the ends of the camshafts. When the camshafts are set precisely to the timing marks, the machined mark on the exhaust camshaft is located roughly at the 5 o'clock position and the machined mark on the intake camshaft is located at 8 o'clock.

No marks have been provided on the camshafts in production; we therefore recommend marking the camshafts before removing them.

Camshaft bearings

DESCRIPTION AND OPERATION

Valve cover and cylinder head



Item	Description
1	Camshaft bearings
2	Valve cover
3	Cylinder head
4	Spark plug well sealing ring
5	Exhaust camshaft
6	Intake camshaft

The camshafts are supported in the cylinder head (lower camshaft bearings) and in the valve cover (upper camshaft bearings) by six bearings.

VCT (Variable Camshaft Timing)**VCT control units**

The engine oil is pumped from the oil pan via the VCT oil control solenoids to the control units of the intake and exhaust camshaft as needed. Here, the camshaft timing is advanced or retarded, based on the input signals from the PCM.

DESCRIPTION AND OPERATION

The VCT control units for the intake and exhaust camshafts are moved into the locked base position when the engine is stopped through the engagement of a spring-loaded locking pin.

The movement to the locked base position is assisted by the tensile force of the timing belt for the intake VCT control unit.

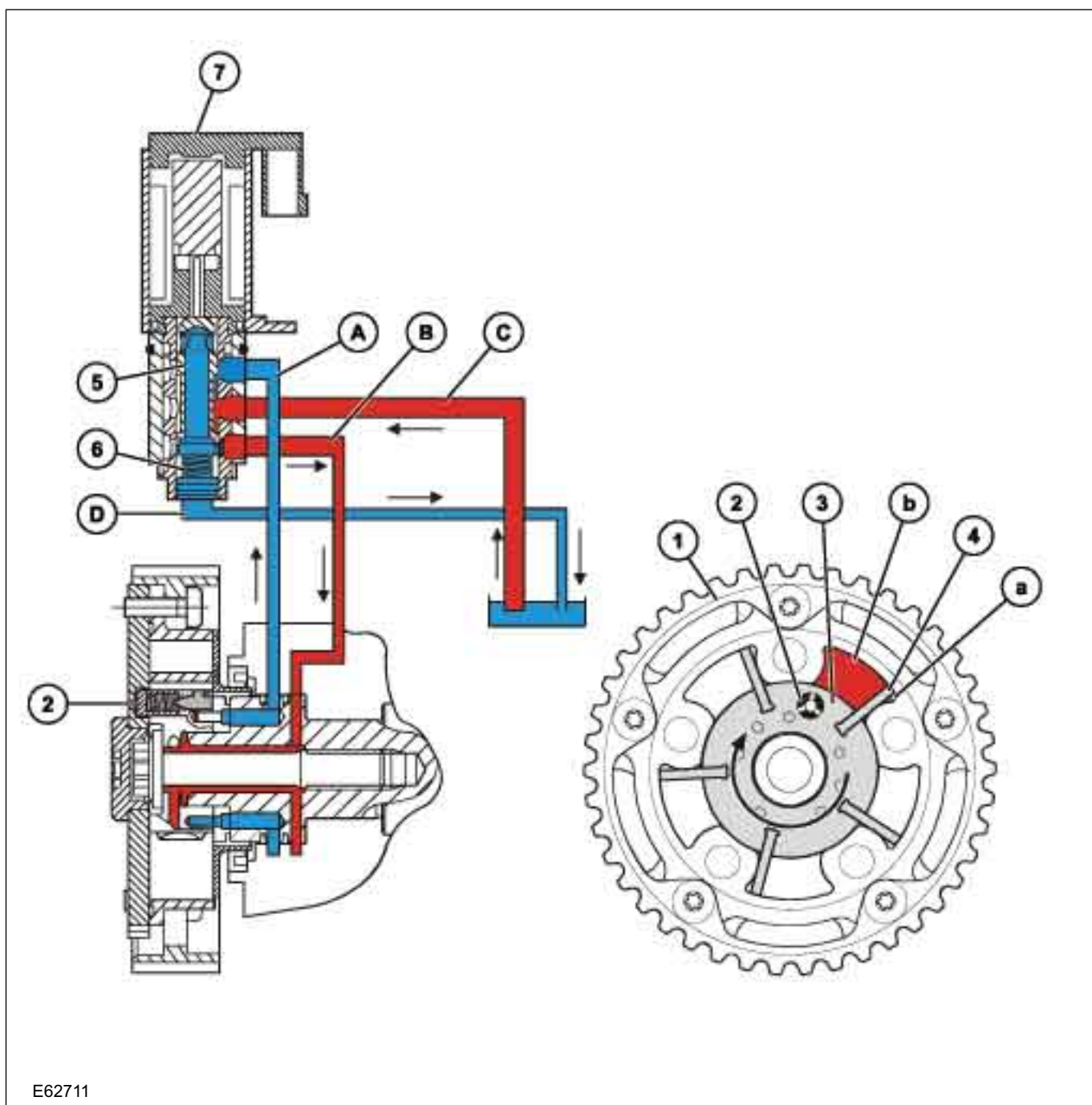
With the exhaust VCT control unit, a spring inside the control unit additionally assists in reaching the locked base position.

Timing retard

The intake VCT control unit is in the "retarded timing" position and the exhaust VCT control unit is in the "advanced timing" position when in the locked base position. When the engine is started, the lock is hydraulically released when a certain EOP (Engine Oil Pressure) is reached.

The procedures must therefore be strictly adhered to when performing adjustment work.

The intake and exhaust VCT control units can only be replaced as complete units during servicing.



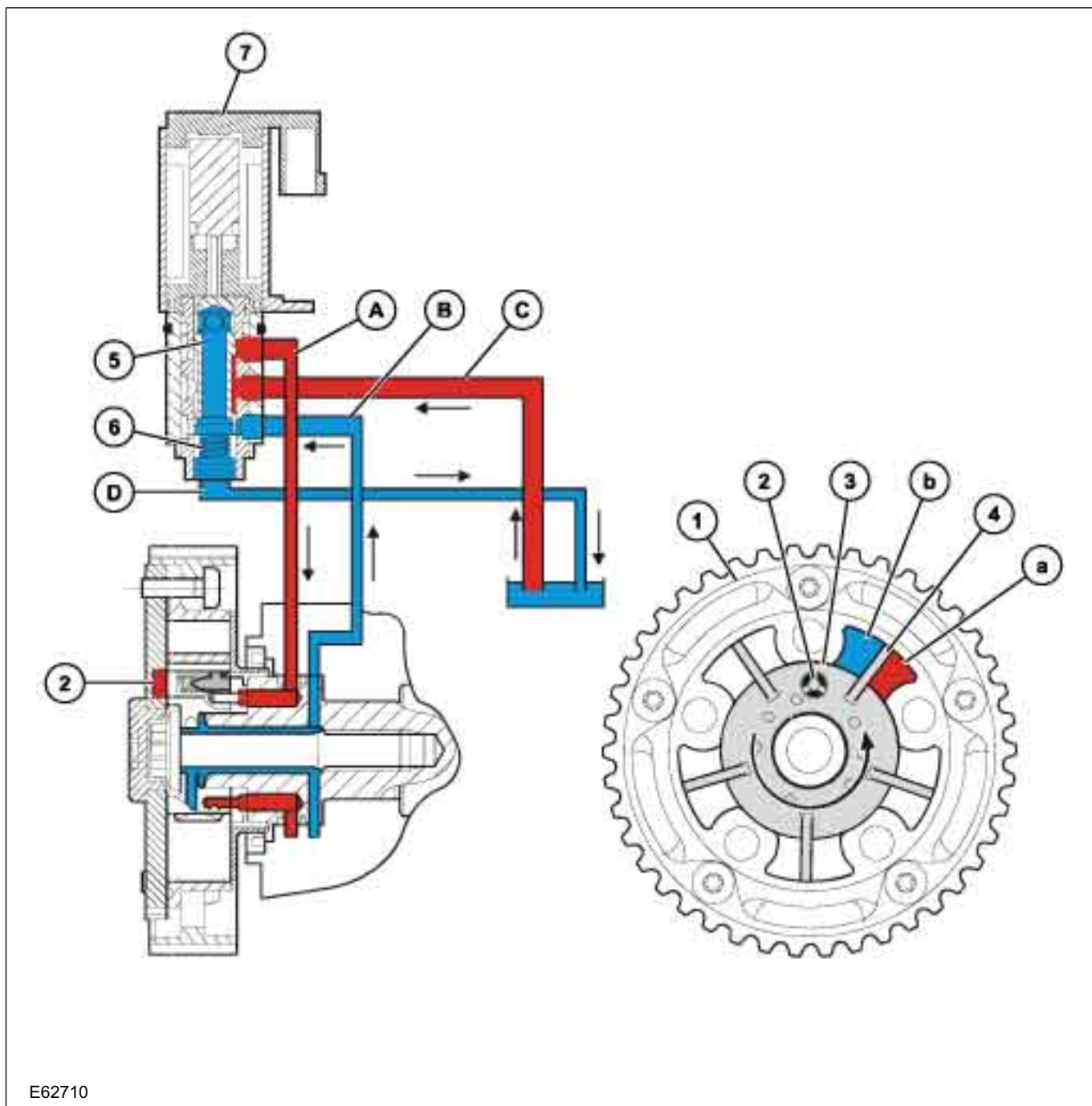
DESCRIPTION AND OPERATION

Item	Description
1	Camshaft pulley
2	Spring-loaded locking pin
3	Rotor
4	Rotor vane
5	Plunger
6	Return spring
7	VCT oil control solenoid
A	Duct connected to chamber (a)
B	Duct connected to chamber (b)
C	Oil feed duct
D	Oil return duct

The engine oil is drawn from the oil pan and routed to the camshaft oil ducts via the engine oil circuit before being routed from there to the VCT oil control solenoid (7) and to the locking pin (2). This releases the locking pin (2) and separates the positive engagement between the camshaft pulley (1) and the rotor (3). When the control unit is being retarded, the chamber (b) fills with engine oil. The rotor (3) starts to turn clockwise as a result of the EOP prevailing in the chamber (b). The engine oil returning from the chamber (a) flows via the oil return duct (D) to the VCT oil control solenoid and from there back into the oil pan.

DESCRIPTION AND OPERATION

Timing advance



E62710

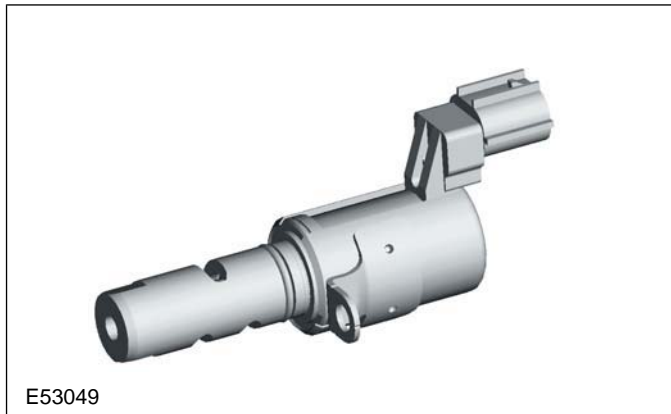
Item	Description
1	Camshaft pulley
2	Spring-loaded locking pin
3	Rotor
4	Rotor vane
5	Plunger
6	Return spring
7	VCT oil control solenoid

Item	Description
A	Duct connected to chamber (a)
B	Duct connected to chamber (b)
C	Oil feed duct
D	Oil return duct

When the VCT control unit is being advanced, the chamber (a) fills with engine oil. The rotor (3) starts to turn counter-clockwise as a result of the EOP prevailing in the chamber (a). This completes the

DESCRIPTION AND OPERATION

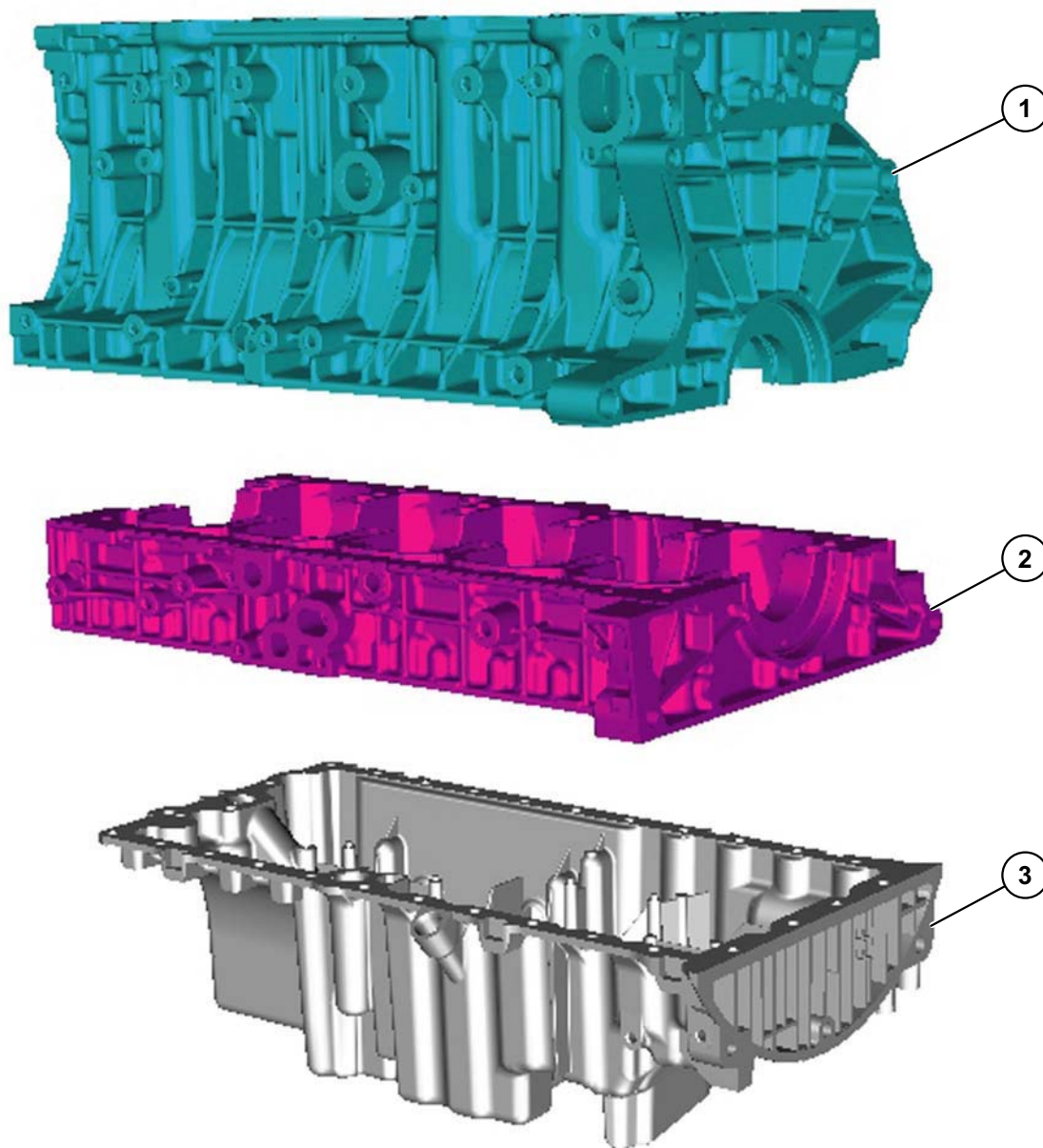
advance adjustment. The engine oil returning from the chamber (b) flows via the oil return duct (D) to the VCT oil control solenoid and from there back into the oil pan.

VCT oil control solenoid

The VCT oil control solenoids are located in the front area in the centre on the valve cover. The purpose of the VCT oil control solenoids is to supply engine oil to the VCT control units in accordance with the actuation by the PCM. This causes the camshaft/valve timing to be either advanced or retarded.

Cylinder block

DESCRIPTION AND OPERATION



E64016

Item	Description
1	Cylinder block
2	Ladder frame
3	Oil pan

The cylinder block consists of three parts. These are the cylinder block, ladder frame and oil pan.

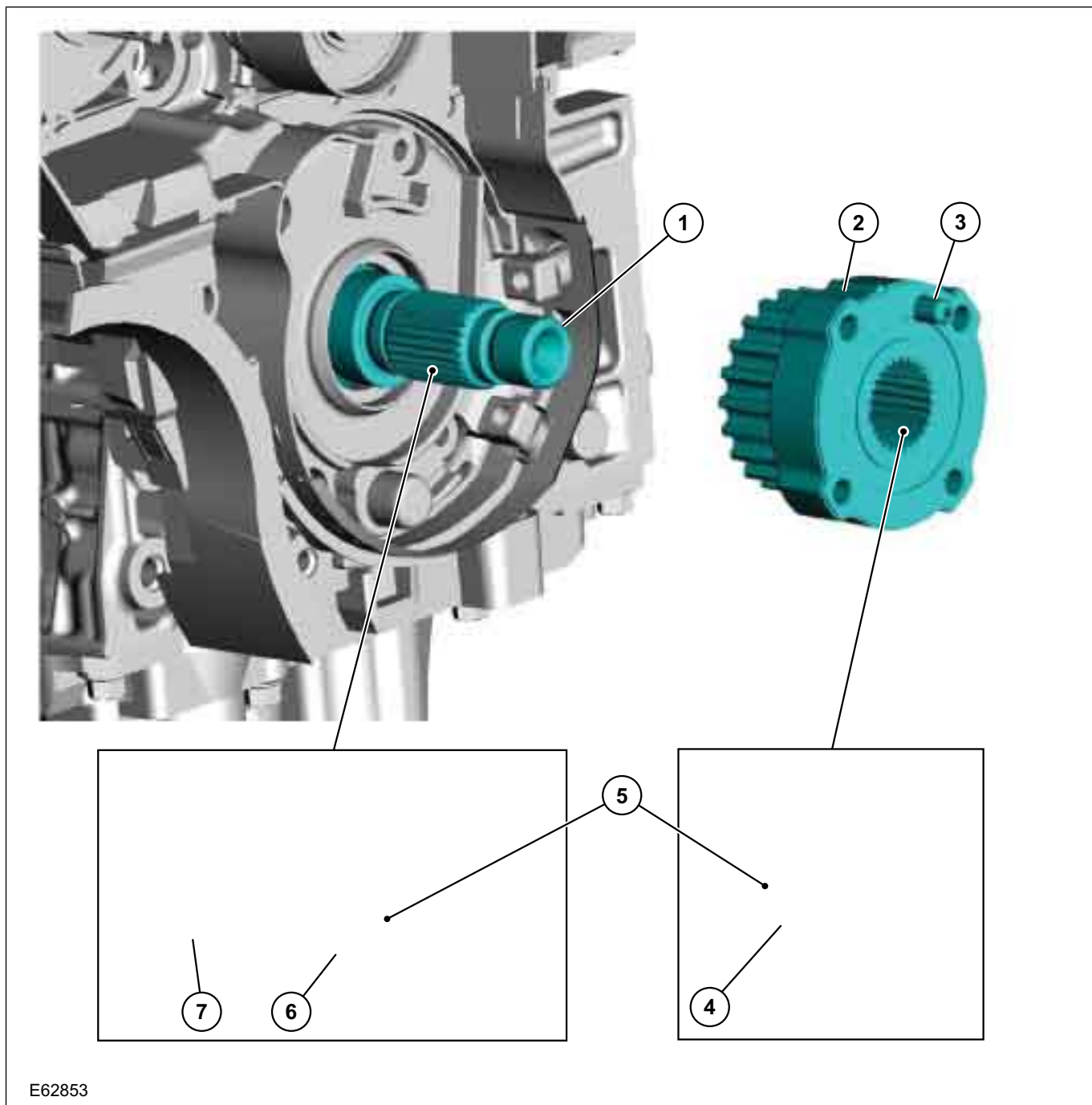
The cylinder block has five cylinder liners made of cast iron, which cannot be replaced.

The ladder frame serves as a reinforcement and also forms the lower crankshaft bearings.

The oil pan supports the sturdy construction and serves as an additional reinforcement.

Crankshaft

DESCRIPTION AND OPERATION



E62853

Item	Description
1	Crankshaft
2	Timing belt pulley
3	Cylindrical pin
4	Timing belt pulley splines
5	Wide spline
6	Crankshaft outer splines
7	Crankshaft inner splines

The forged crankshaft in the 2.5L Duratec-ST (VI5) engine is supported in the cylinder block (upper crankshaft bearings) and in the ladder frame (lower crankshaft bearings) by six bearings.

The shims are located at the 5th crankshaft main bearing.

Located on the drive side of the crankshaft are two sets of splines. The inner splines drive the oil pump. The outer splines engage in the timing belt pulley.

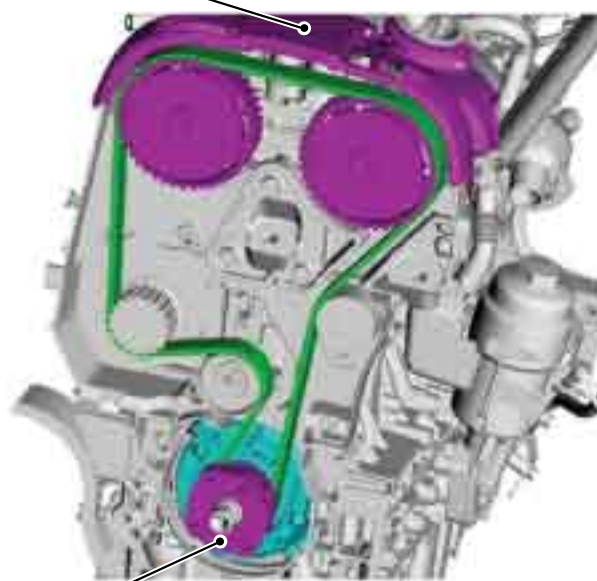
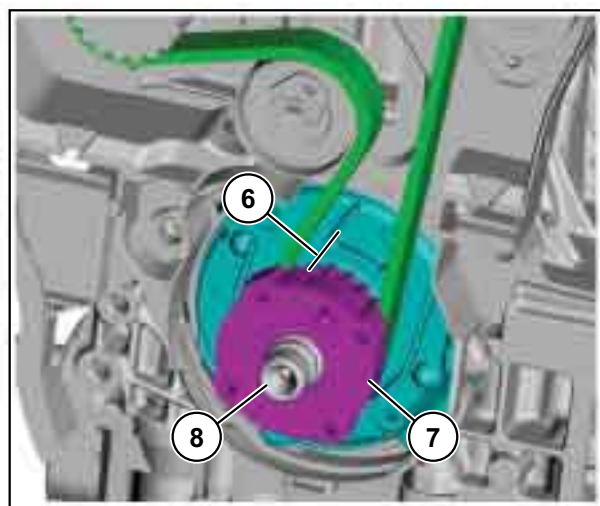
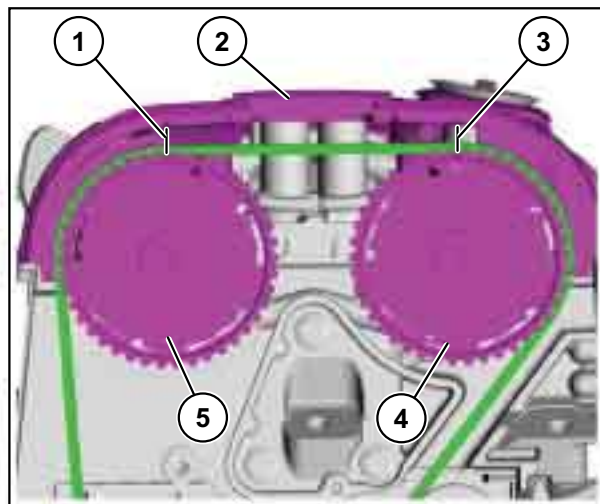
DESCRIPTION AND OPERATION

The timing belt pulley can only be pushed onto the outer shaft splines in one specific position. For this purpose, one spline on the timing belt pulley and one on the crankshaft have been made wider.

Timing marks

The cylindrical pin secures the mass damper.

Valve timing



E62440

Item	Description
1	Exhaust camshaft pulley timing mark
2	Engine front cover with timing marks
3	Intake camshaft pulley timing mark
4	Intake camshaft pulley

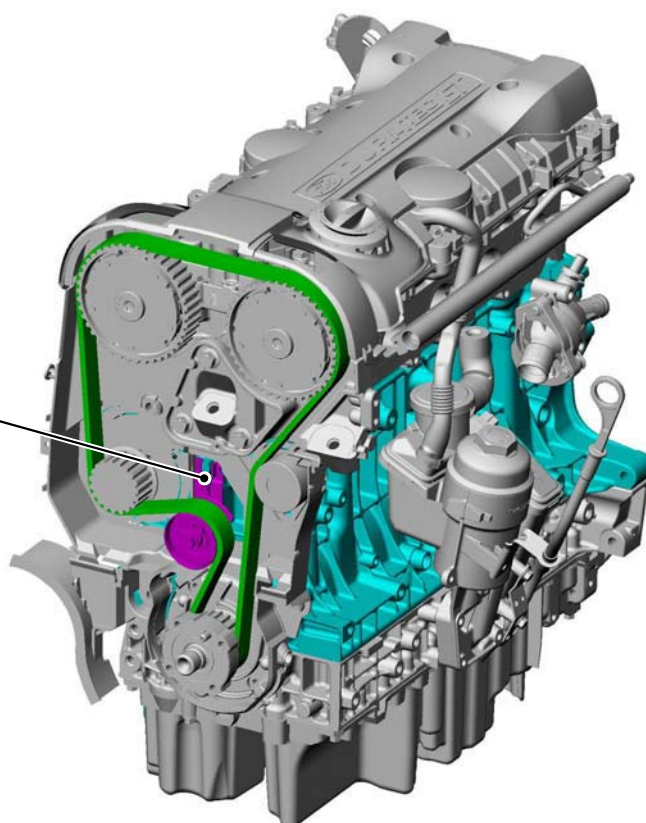
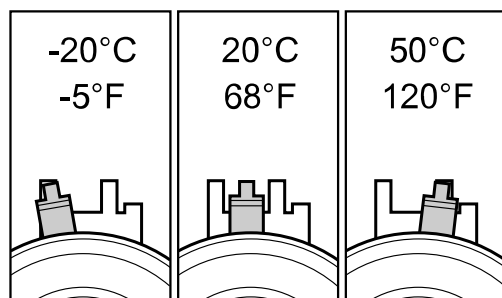
Item	Description
5	Exhaust camshaft pulley
6	Crankshaft timing belt pulley timing mark
7	Crankshaft timing belt pulley
8	Crankshaft

DESCRIPTION AND OPERATION

When checking the valve timing, ensure that the timing marks are aligned exactly.

The front engine cover must always be installed when checking and adjusting the valve timing, i.e. timing belt tension, as the timing marks for both camshaft pulleys are provided on its front end.

The mark on the crankshaft timing belt pulley must be in exact alignment with the mark on the oil pump housing.

Timing belt tension

E62854

The interior mechanism of the timing belt tensioner comprises a spring and a friction element. The friction element serves to absorb small vibrations and fluctuations in engine speed. The spring ensures the correct timing belt tension, regardless of wear and temperature.

The tension of the timing belt should be set when the engine is cold.

NOTE: If the engine temperature is higher or lower, remember that a different position is specified for the timing belt tensioner (see illustration).

The timing belt should be fitted starting from the crankshaft over the idler pulley, the intake and exhaust camshaft pulleys, the coolant pump and finally on the timing belt tensioner.

Once the timing belt has been correctly tensioned, the engine must be rotated by hand two turns clockwise at the crankshaft in order to allow a subsequent check of the timing belt tension and adjustment.

No direction of movement is specified when using a new timing belt. If, however, the old timing belt is reused, the direction of movement must be marked prior to removal.

DIAGNOSIS AND TESTING

Engine

General Equipment

Worldwide Diagnostic System (WDS).

Materials

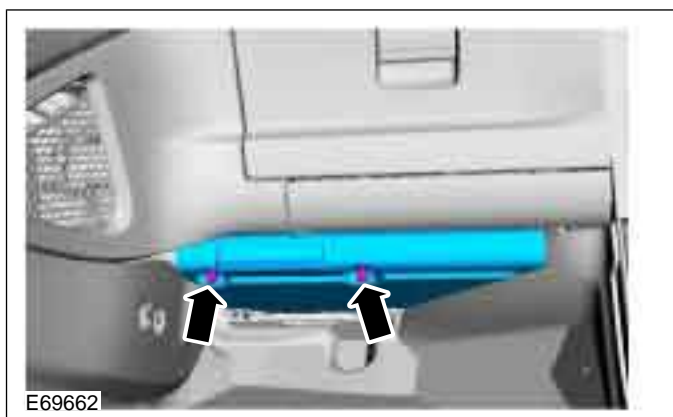
Name	Specification
Adhesive - Loctite 243	WSK-M2G349-A7

Measure the compression pressure

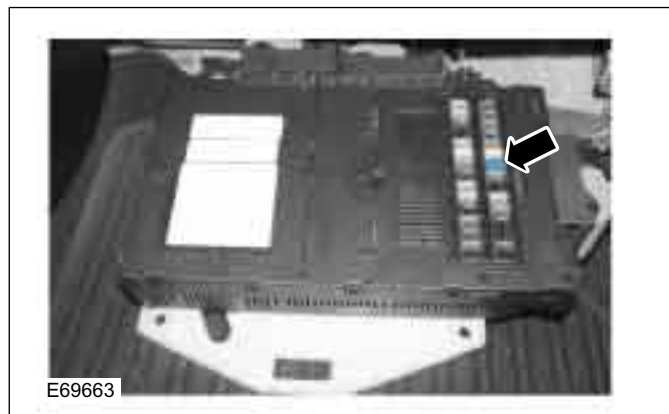
NOTE: The powertrain control module (PCM) receives an error message when the fuel pump relay is removed or electrical components are disconnected. This error message must be deleted from the fault memory using worldwide diagnostic system (WDS) after completing the compression test.

NOTE: Valve clearance must be set correctly before performing a compression test. Run the engine to normal operating temperature.

NOTE: The varying design of compression checking devices and fluctuating starter motor speeds normally only allows for a comparison to be made of the compression pressures in all cylinders.



1. Remove the central junction box (CJB) cover.

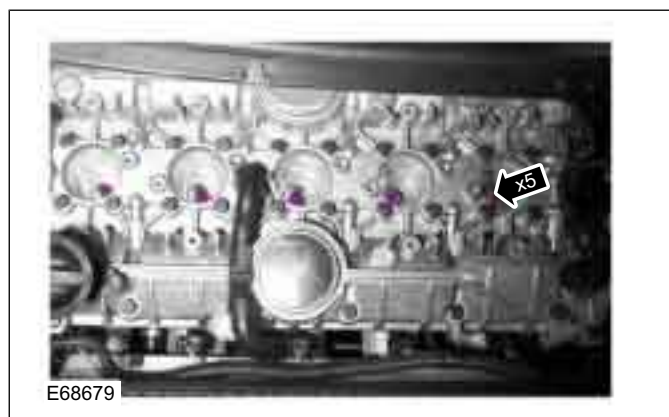


2. Open the CJB and remove fuse 22.
3. **NOTE: The engine will start, run for a few seconds and then stop.**

Start the engine.

4. Disconnect the ignition coil-on-plug.

REFER to: [Ignition Coil-On-Plug \(303-07 Engine Ignition - 2.5L Duratec-ST \(VI5\), Removal and Installation\)](#).



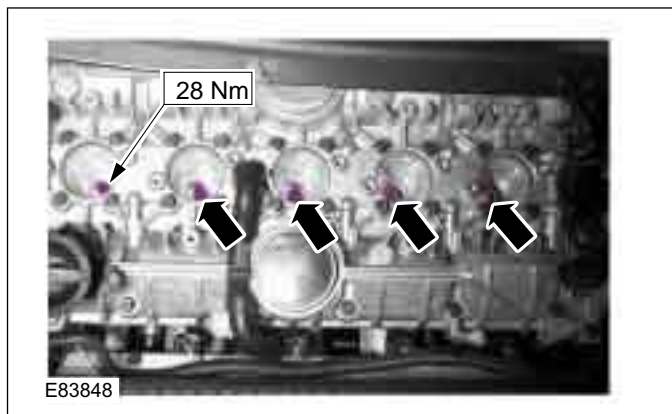
5. Remove the spark plugs.



NOTE: Operate the starter motor with wide open throttle until the reading on the compression tester stops rising.

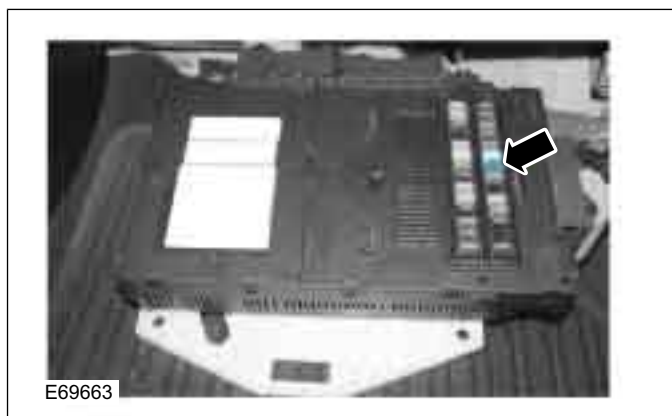
DIAGNOSIS AND TESTING

- Perform the measurement on each cylinder according to the instructions provided by the manufacturer of the measuring device. Use a compression pressure recorder with a suitable adapter.

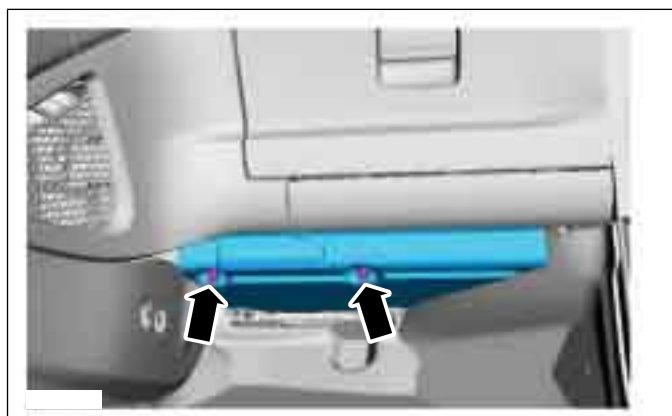


- Install the spark plugs.
- Install the ignition coil-on-plug.

REFER to: Ignition Coil-On-Plug (303-07 Engine Ignition - 2.5L Duratec-ST (VI5), Removal and Installation).



- Install fuse 22 and close the CJB.



- Install the CJB cover.
- Using worldwide diagnostic system (WDS), clear the fault codes from the powertrain control module (PCM).

Measuring the oil pressure

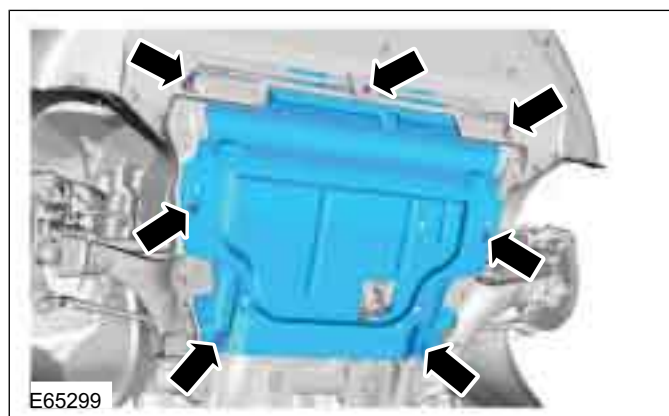
NOTE: The oil pressure is defined by several factors. Among others, this includes the engine speed, oil temperature, oil viscosity and the degree of filter contamination.

NOTE: Measure the oil pressure at the specified engine speed.

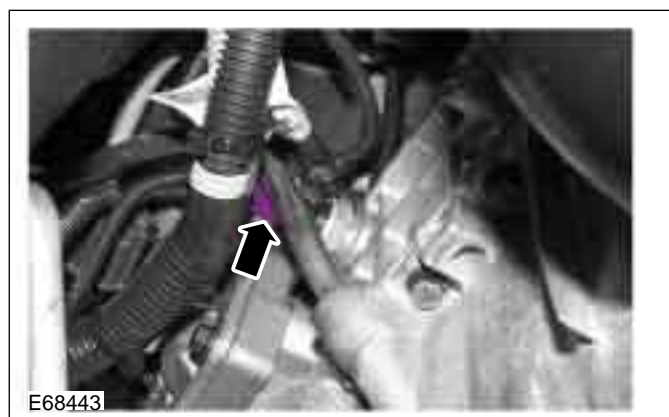
- Raise vehicle. REFER to:

Jacking (100-02 Jacking and Lifting, Description and Operation),

Lifting (100-02 Jacking and Lifting, Description and Operation).

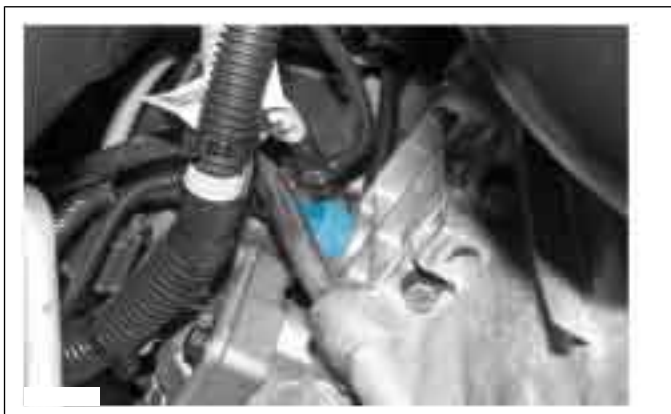


- Remove the engine under shield.



- Disconnect the oil pressure switch electrical connector from the oil pressure switch.

DIAGNOSIS AND TESTING



4. Remove the oil pressure switch.



5. Attach the oil pressure gauge with the oil pressure gauge connector to the oil pressure switch bore, and position it to allow reading from above.

6. Lower the vehicle.



7. **NOTE:** Measure the oil pressure at an oil temperature of 100° C.

NOTE: Measure the oil pressure at idle speed and at 4000 rpm.

NOTE: Minimum oil pressure at idle speed: 1.0 bar.

NOTE: Minimum oil pressure at 4000 rpm: 3.5 bar.

NOTE: Maximum oil pressure: 4.8 bar.

Check the oil pressure

8. Raise vehicle. REFER to:

Jacking (100-02 Jacking and Lifting, Description and Operation),

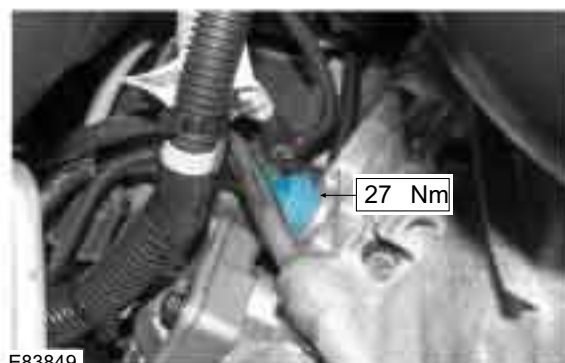
Lifting (100-02 Jacking and Lifting, Description and Operation).



E68436

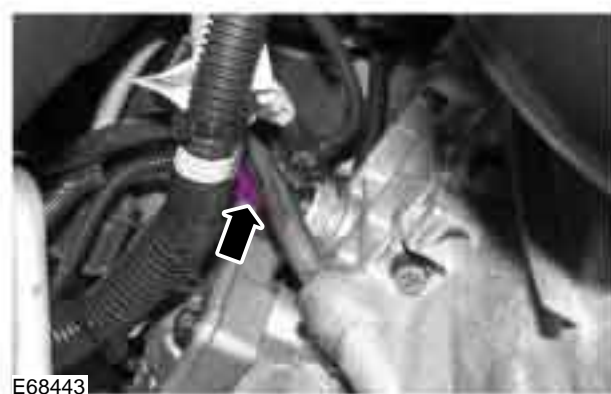
9. Detach the oil pressure gauge and connector from the oil pressure switch bore.

10. Coat the oil pressure switch with adhesive.



E83849

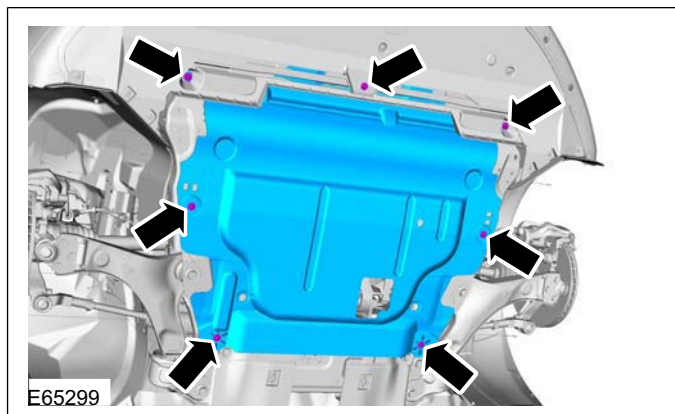
11. Install the oil pressure switch.



E68443

12 Push on the oil pressure switch connector.

DIAGNOSIS AND TESTING

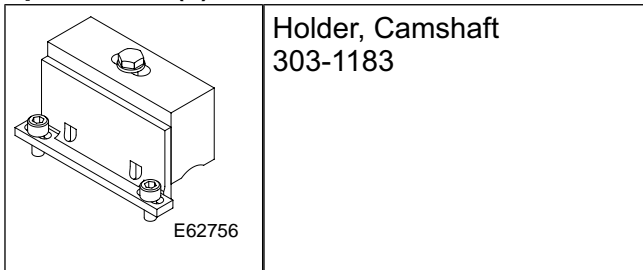


13. Install the engine under shield.
14. Lower the vehicle.

GENERAL PROCEDURES

Valve Clearance Adjustment

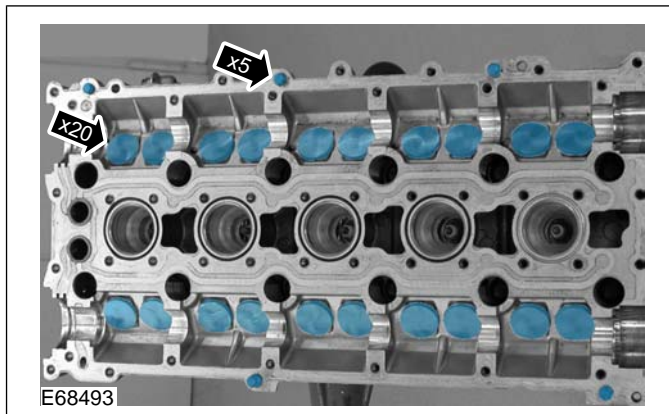
Special Tool(s)



1. Remove the camshafts.

Refer to: Camshafts (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation).

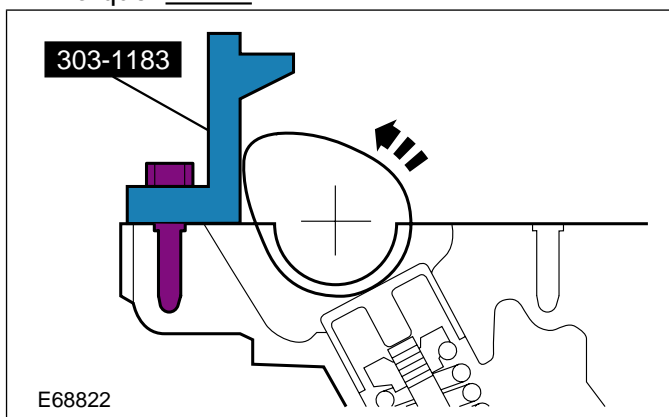
2.  **CAUTION: Make sure that the valve tappets are installed in their original locations.**



3. Install only one pair of tappets and the camshaft for the first measurement.

Special Tool(s): 303-1183

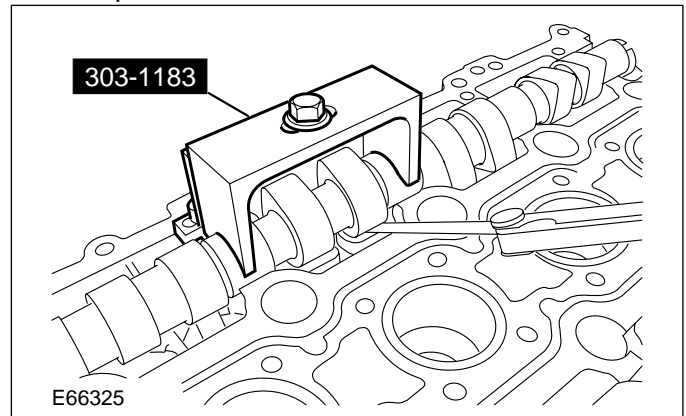
Torque: 17 Nm



4. Measure the valve clearance and if necessary, adjust by installing new tappets.

Special Tool(s): 303-1183

Torque: 12 Nm



5. Repeat the measuring procedures for all cylinders on the intake and on the exhaust side.

REMOVAL AND INSTALLATION

Intake Manifold

Removal

NOTE: Removal steps in this procedure may contain installation details.

1. Refer to: Petrol Fuel System Health and Safety Precautions ([100-00 General Information](#), Description and Operation).

2. Release the fuel system pressure.

Refer to: Fuel System Pressure Release - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) ([310-00 Fuel System](#) - General Information, General Procedures).

3. Disconnect the battery ground cable.

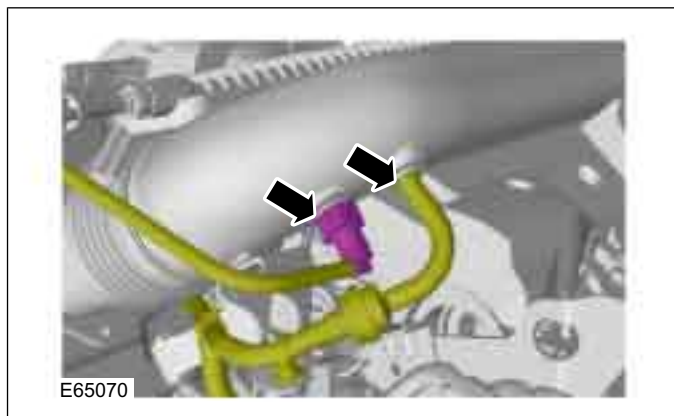
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

4. Remove the air cleaner.

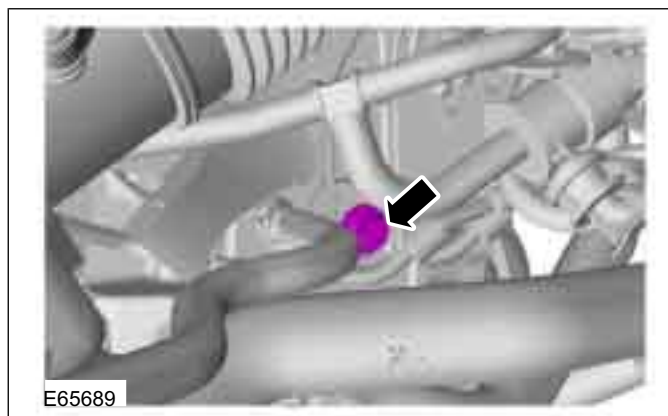
Refer to: Air Cleaner - Vehicles With: PCM Security Shield ([303-12 Intake Air Distribution and Filtering](#) - 2.5L Duratec-ST (VI5), Removal and Installation).

Refer to: Air Cleaner - Vehicles Without: PCM Security Shield ([303-12 Intake Air Distribution and Filtering](#) - 2.5L Duratec-ST (VI5), Removal and Installation).

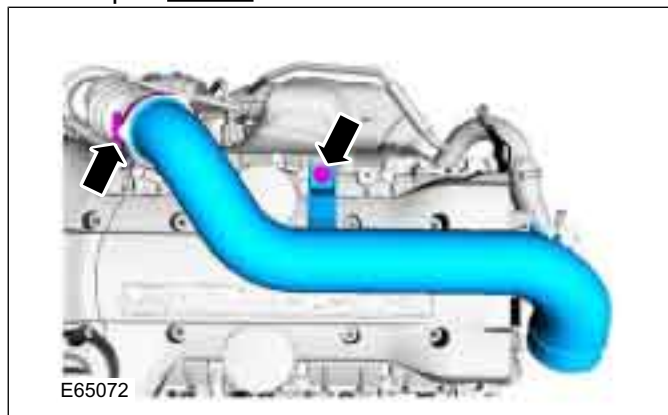
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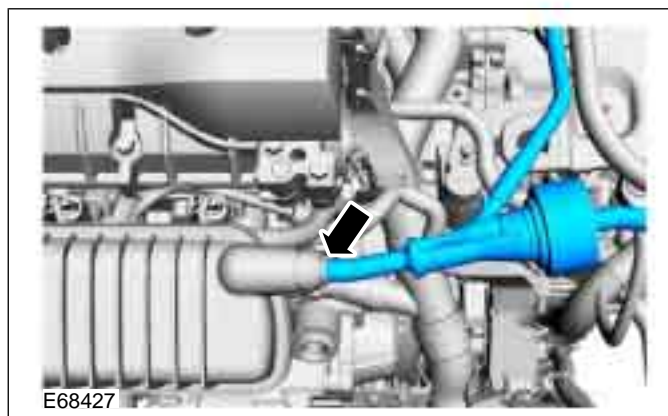
6.



7. Torque: 10 Nm



8.





303-01-25

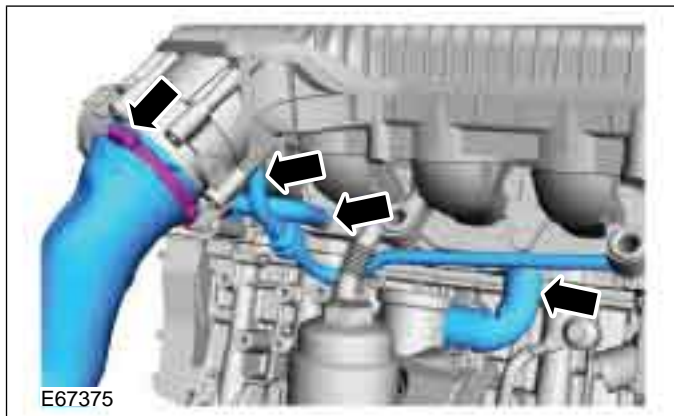
Engine — 2.5L Duratec-ST (VI5)

303-01-25

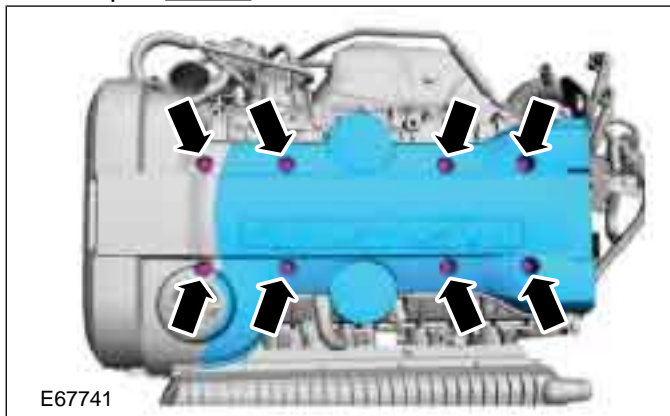


REMOVAL AND INSTALLATION

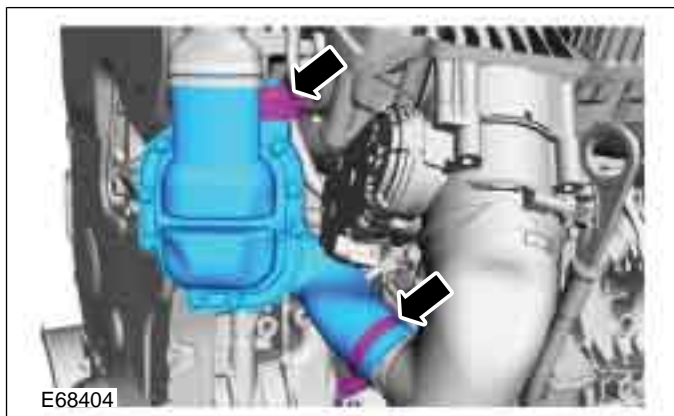
9.



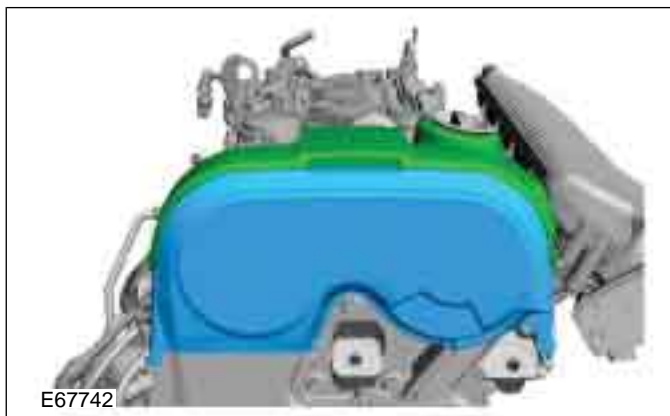
12 Torque: 10 Nm



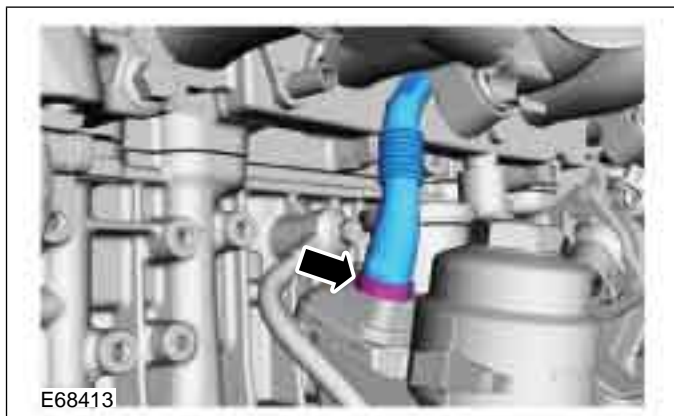
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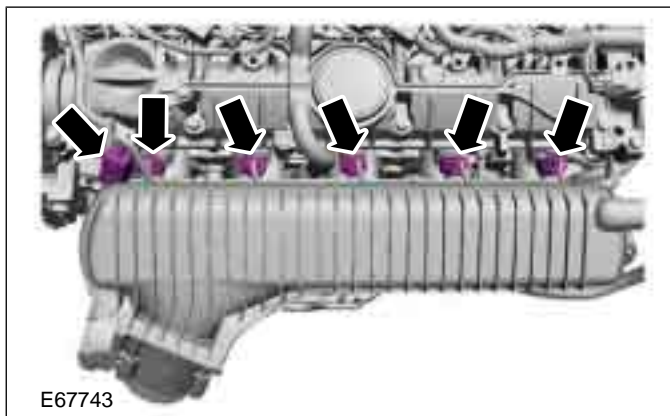
13.



11.



14.



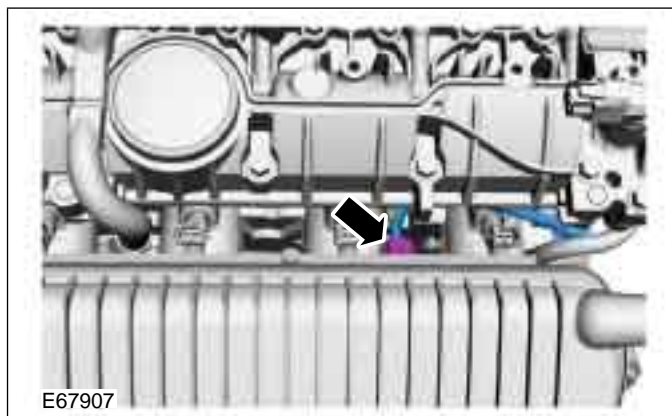
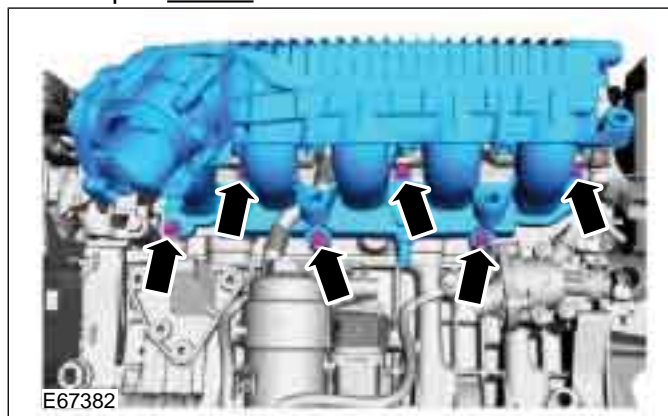
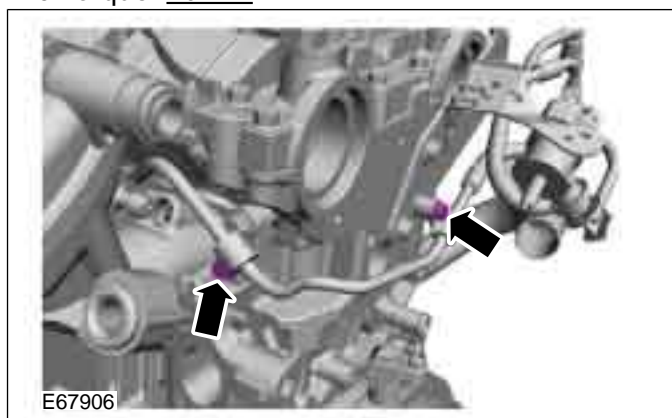
303-01-26

Engine — 2.5L Duratec-ST (VI5)

303-01-26

REMOVAL AND INSTALLATION

15.

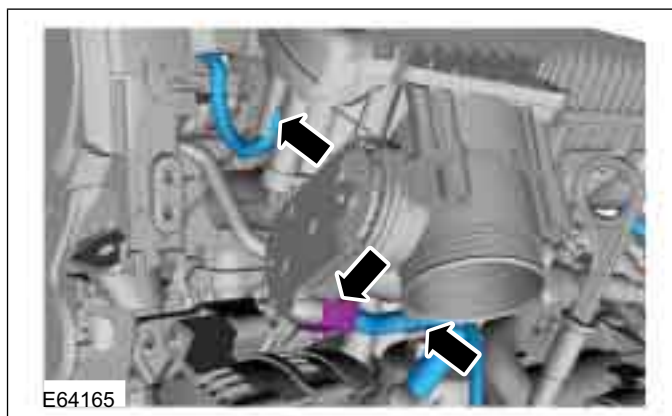
18. Torque: 24 Nm16. Torque: 10 Nm

Installation

1. To install, reverse the removal procedure.
2. Initialize the door window motors.

Refer to: Door Window Motor Initialization
(501-11 Glass, Frames and Mechanisms,
General Procedures).

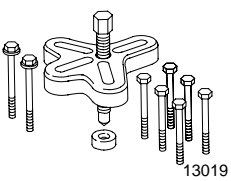
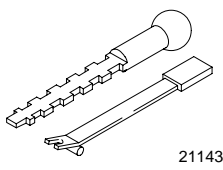
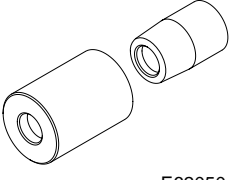
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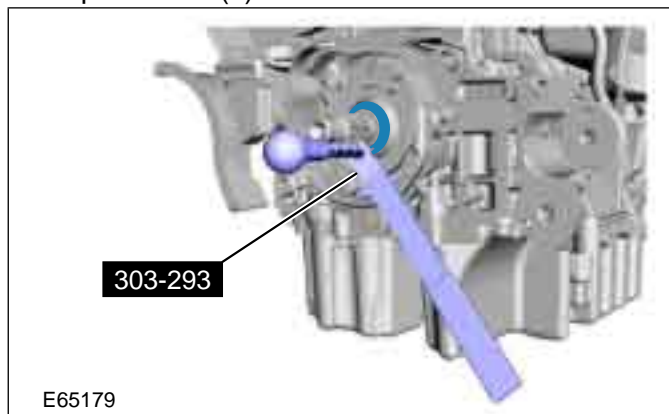
REMOVAL AND INSTALLATION

Crankshaft Front Seal(21 467 0)

Special Tool(s)

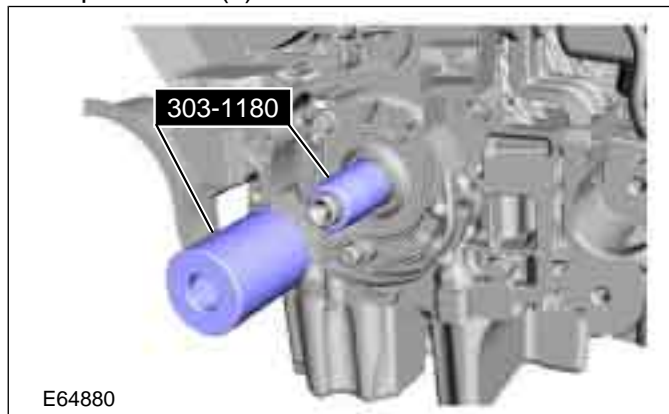
 <p>13019</p>	<p>Remover, Steering Wheel 211-014</p>
 <p>21143</p>	<p>Remover, Crankshaft Seal 303-293</p>
 <p>E62050</p>	<p>Installer, Crankshaft Front Seal 303-1180</p>

3. Special Tool(s): 303-293



Installation

1. Special Tool(s): 303-1180

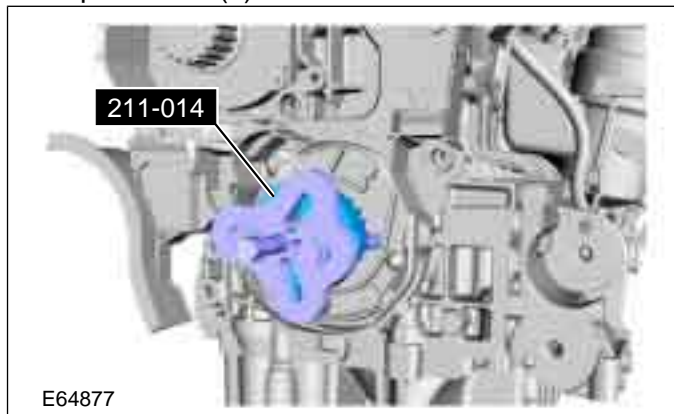


Removal

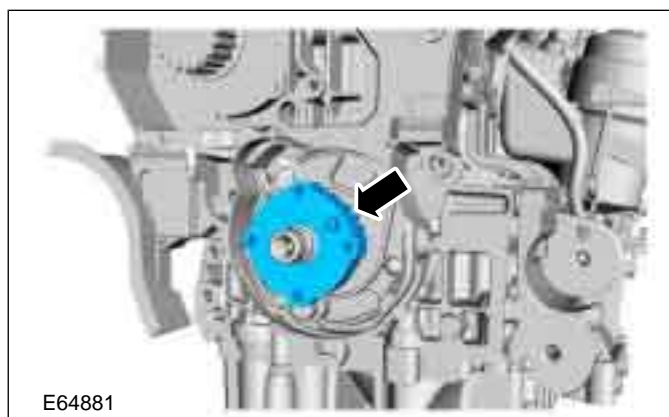
1. Remove the timing belt.

Refer to: Timing Belt (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation).

2. Special Tool(s): 211-014



2. **NOTE:** The crankshaft timing pulley can only be installed in one position on the crankshaft splines.



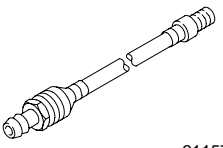
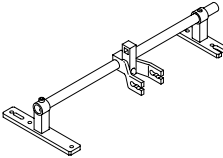
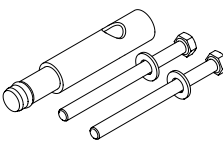
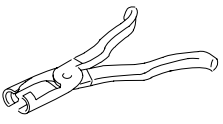
3. Install the timing belt.

Refer to: Timing Belt (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation).

REMOVAL AND INSTALLATION

Valve Stem Seals(21 238 0)

Special Tool(s)

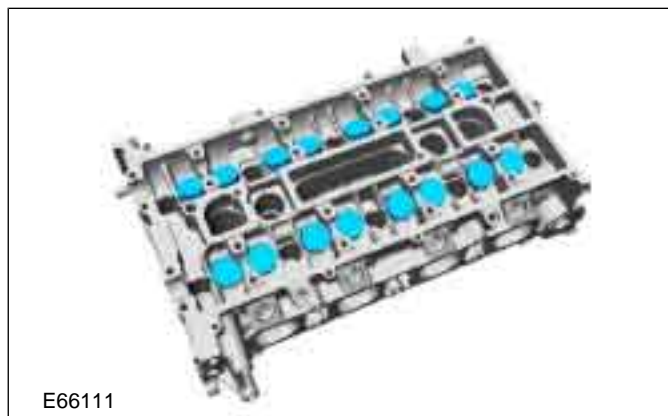
 <p>21157</p>	<p>Adapter, Air Supply (Cylinder Head) 303-363</p>
 <p>E62757</p>	<p>Compressor, Valve Spring 303-361B</p>
 <p>E62041</p>	<p>Adapter for 303-361B 303-361B-06</p>
 <p>21211</p>	<p>Pliers, Valve Stem Seal 303-508</p>

Removal

1. Remove the camshafts.

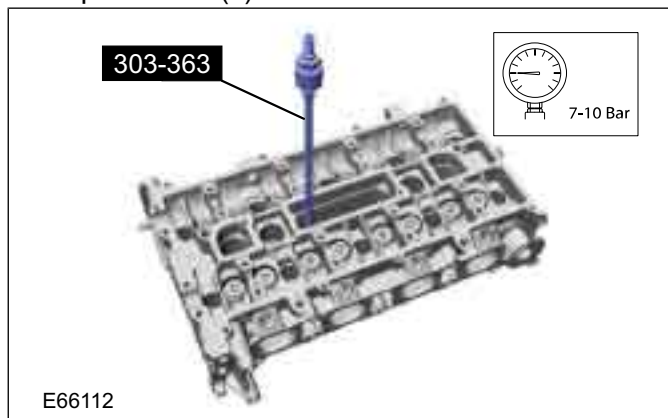
Refer to: Camshafts (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation).

- 2.

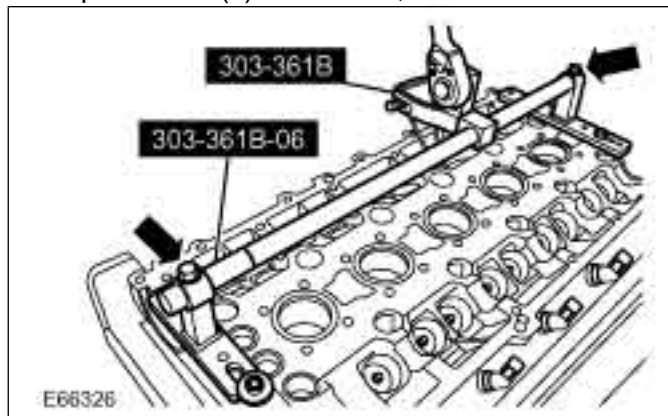


3. Using the special tool, apply 7 to 10 bar of compressed air into the cylinder.

Special Tool(s): 303-363

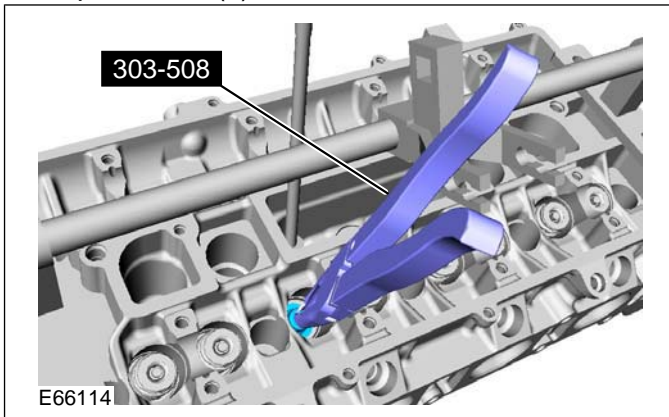


4. Special Tool(s): 303-361B, 303-361B-06



REMOVAL AND INSTALLATION

5. Special Tool(s): 303-508

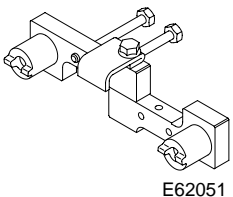
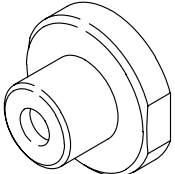
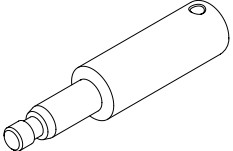
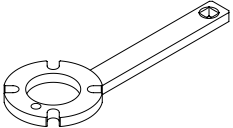
**Installation**

1. To install reverse the removal procedure.

REMOVAL AND INSTALLATION

Camshafts(21 284 0)

Special Tool(s)

 <p>E62051</p>	<p>Timing Tool Camshaft 303-1178</p>
 <p>21148</p>	<p>Aligner/Installer, Crankshaft Front Seal 303-318</p>
 <p>E62027</p>	<p>Timing Tool, Crankshaft 303-1182</p>
 <p>E62035</p>	<p>Holding Wrench, Crankshaft 303-1179</p>

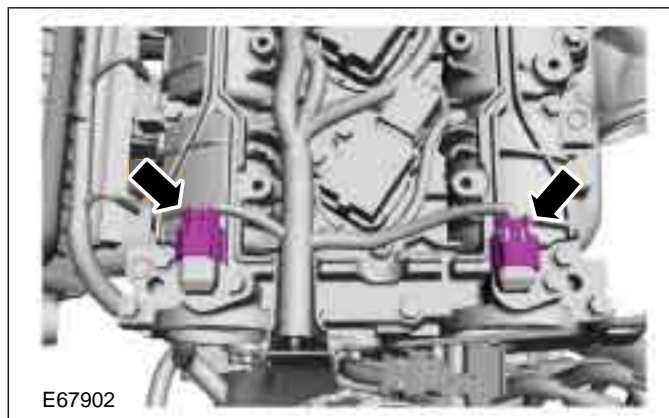
Materials

Name	Specification
Sealant - Loctite 510	WSK-M2G348-A7
Engine Oil - 5W-30	WSS-M2C913-B

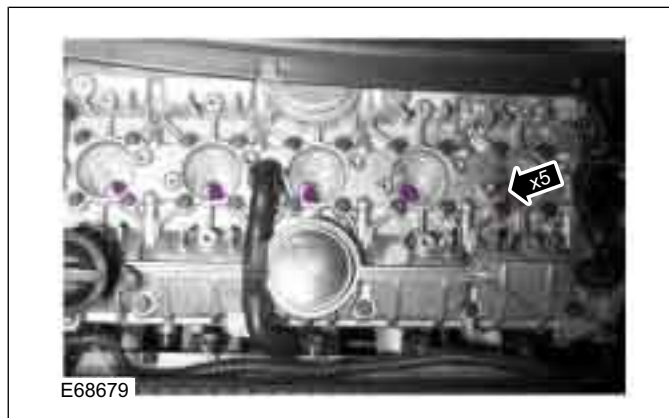
Removal

1. Remove the following items:
 1. Refer to: Timing Belt (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation).
 2. Refer to: Ignition Coil-On-Plug (303-07 Engine Ignition - 2.5L Duratec-ST (VI5), Removal and Installation).

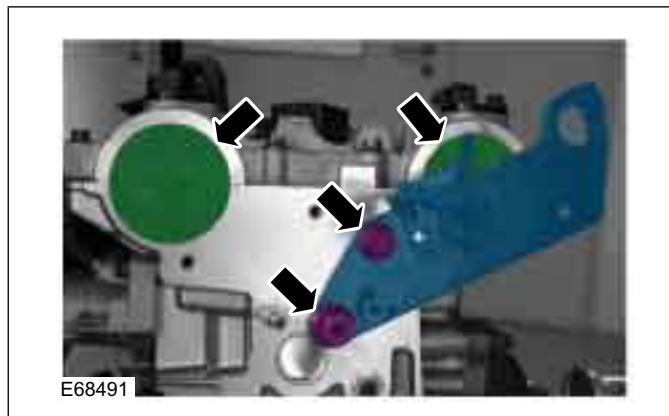
2.



3.



4.



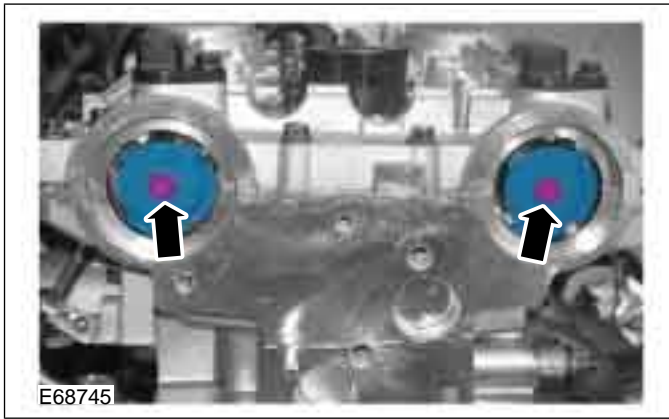
303-01-31

Engine — 2.5L Duratec-ST (VI5)

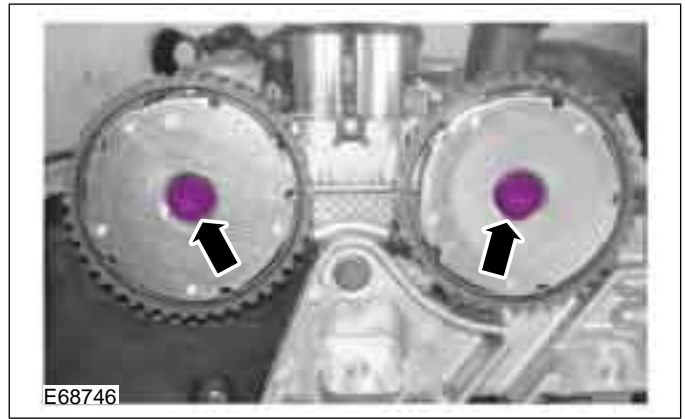
303-01-31

REMOVAL AND INSTALLATION

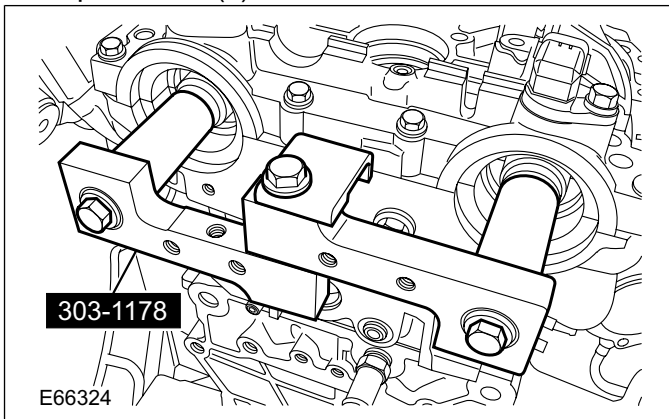
5.



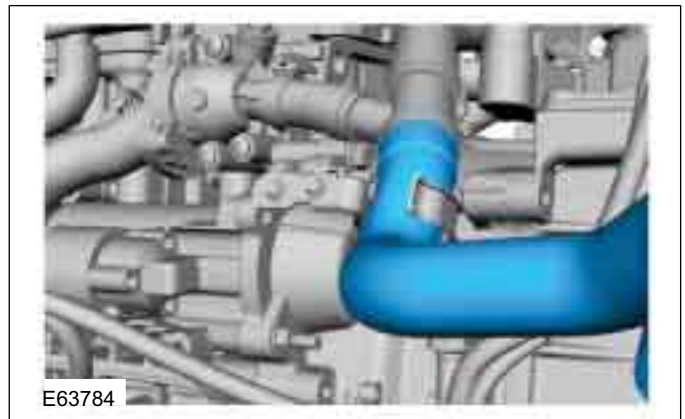
8.



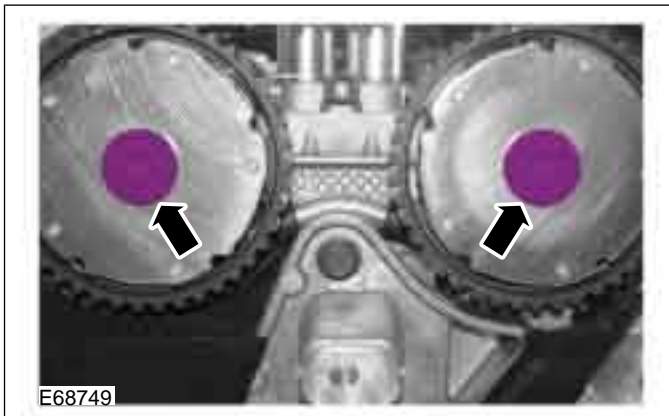
6. Special Tool(s): 303-1178



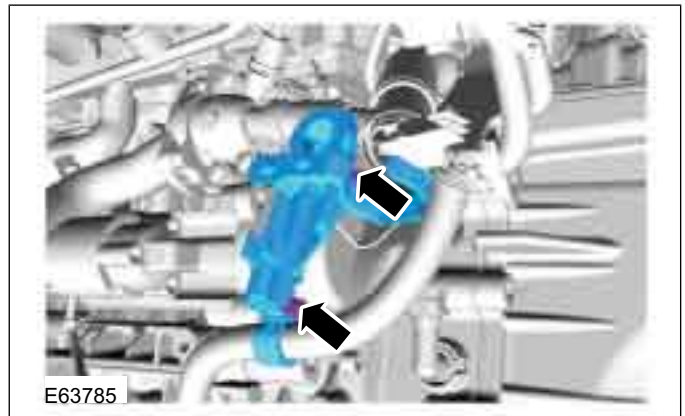
9.



7.

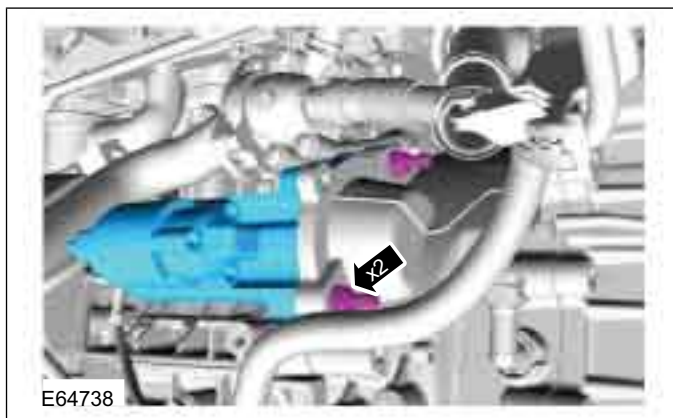


10.

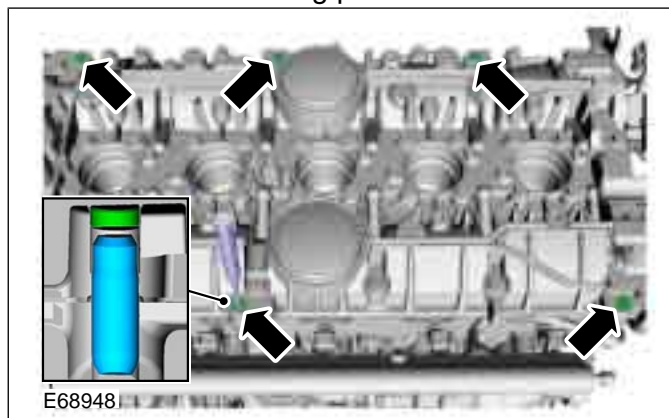


REMOVAL AND INSTALLATION

11.

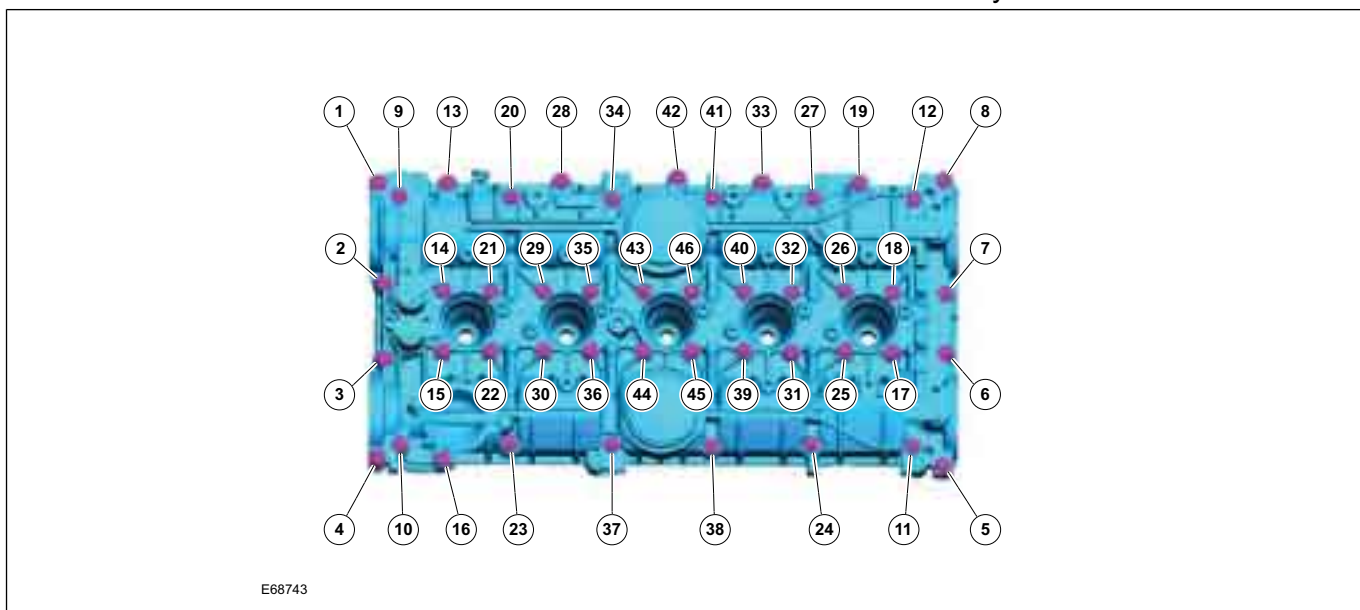


12 Remove the locating pins.



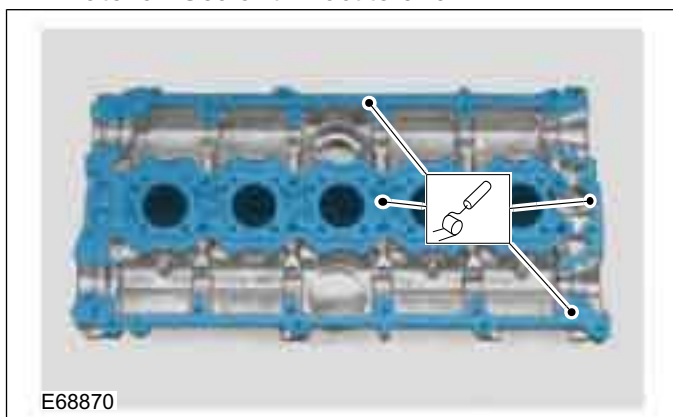
13. NOTE: bolts

Loosen the bolts by two turns at a time.



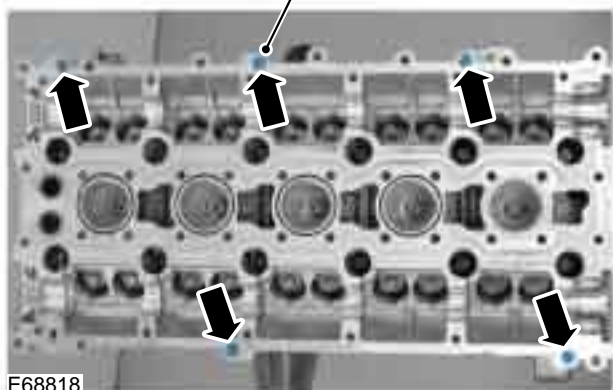
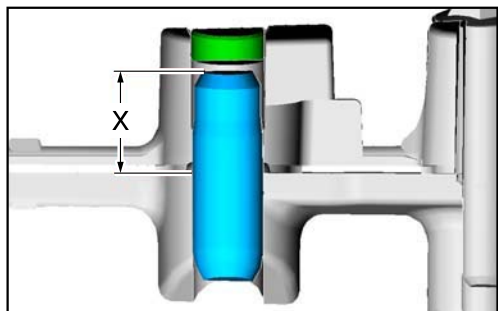
Installation

1. Refer to: **Valve Clearance Adjustment (303-01 Engine - 2.5L Duratec-ST (VI5), General Procedures).**
2. Material: Sealant - Loctite 510



REMOVAL AND INSTALLATION

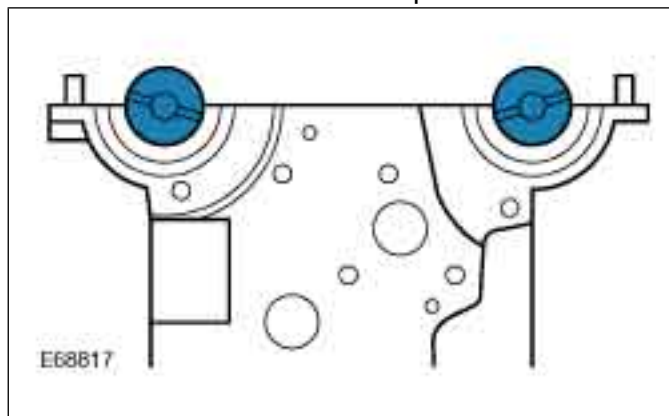
3. • Install the locating pins.
 - X = 15 mm.



E68818

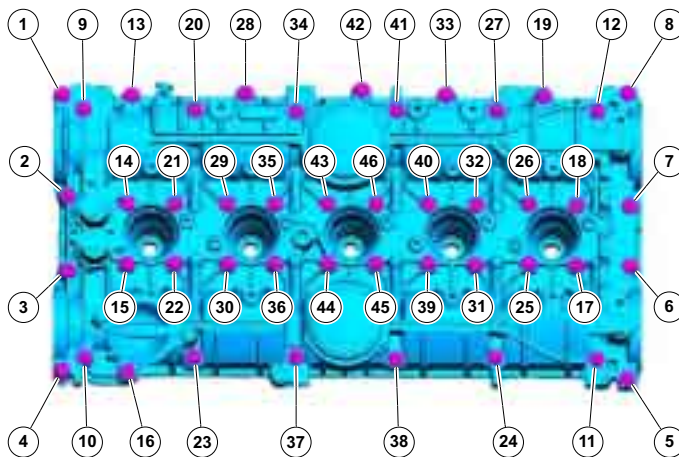
4. Apply engine oil to all camshaft bearings.
 - Material: Engine Oil - 5W-30

5. Insert the camshafts in the positions shown.



E68817

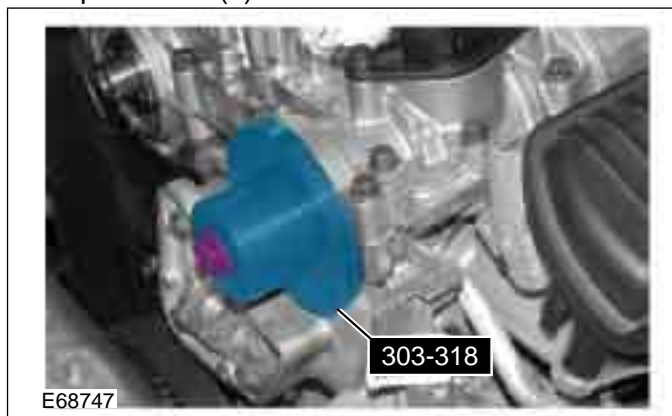
6. Tighten the bolts by two turns at a time.
 - Torque: 17 Nm



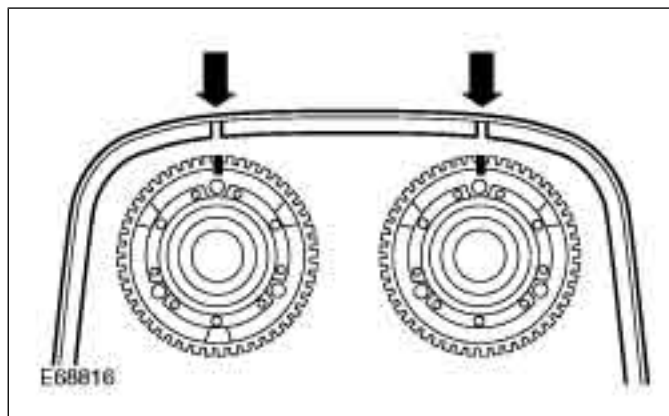
E68743

REMOVAL AND INSTALLATION

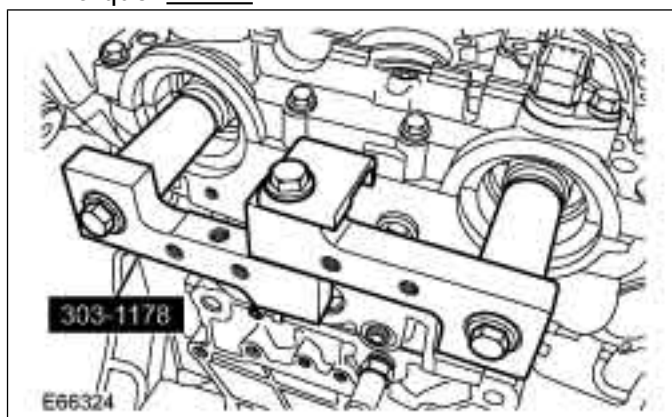
7. Special Tool(s): 303-318



10.

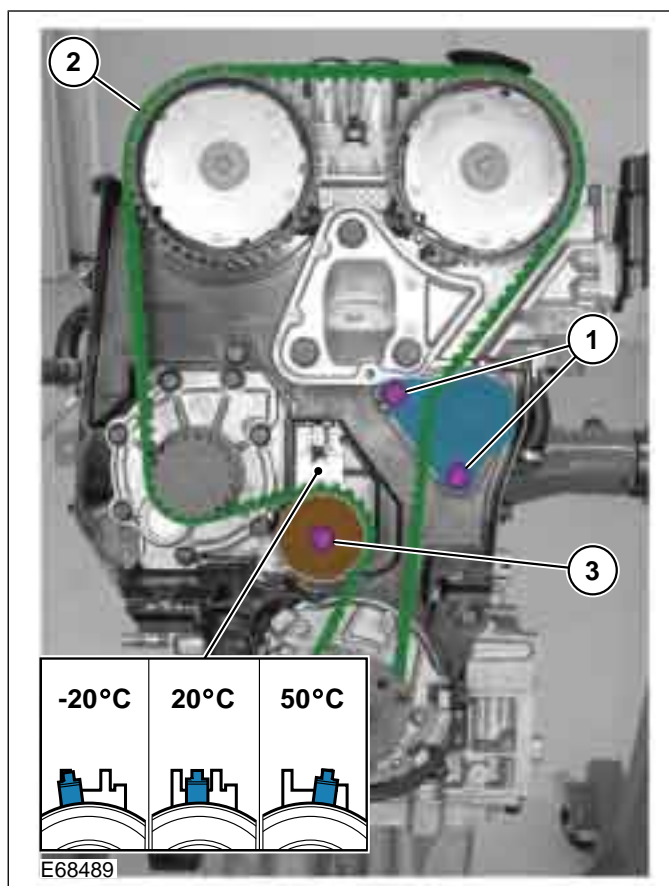
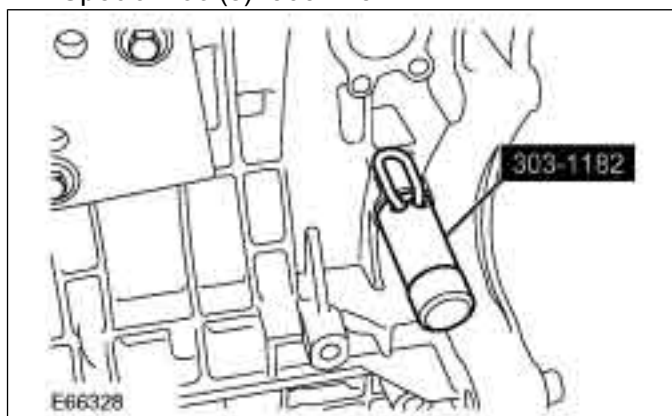


8. Special Tool(s): 303-1178
Torque: 24 Nm



11. 1. Torque: 20 Nm
2. **NOTE:** Make sure that a new component is installed.
3. Depending on the engine temperature, tension the timing belt.
Torque: 20 Nm

9. Use the special tool to adjust the crankshaft to TDC.
Special Tool(s): 303-1182



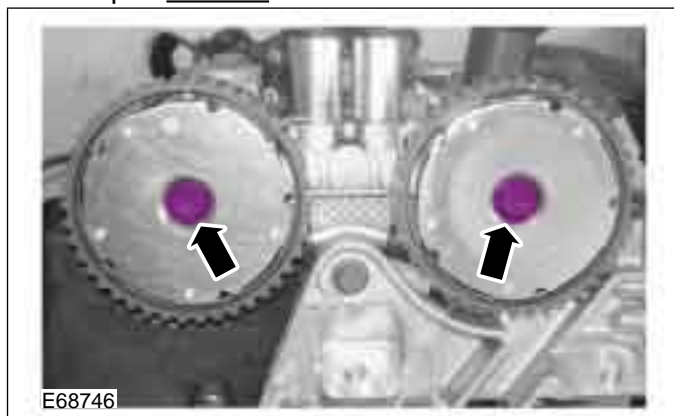
303-01-35

Engine — 2.5L Duratec-ST (VI5)

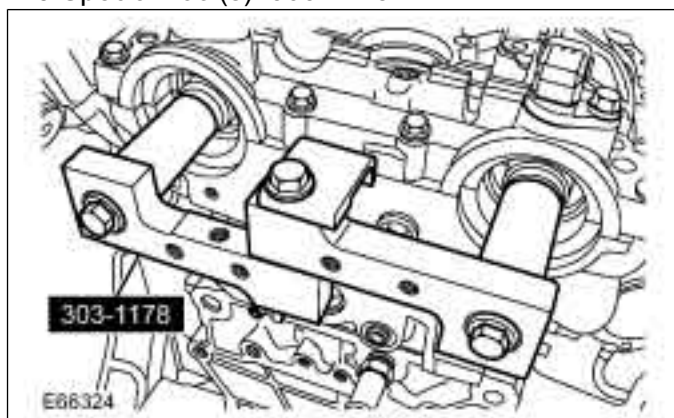
303-01-35

REMOVAL AND INSTALLATION

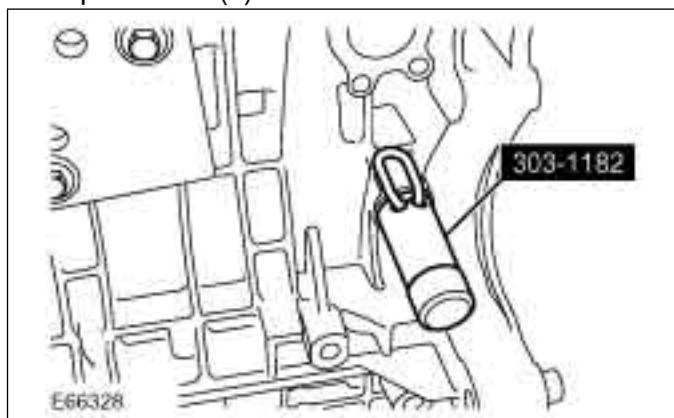
12. Torque: 120 Nm



13. Special Tool(s): 303-1178



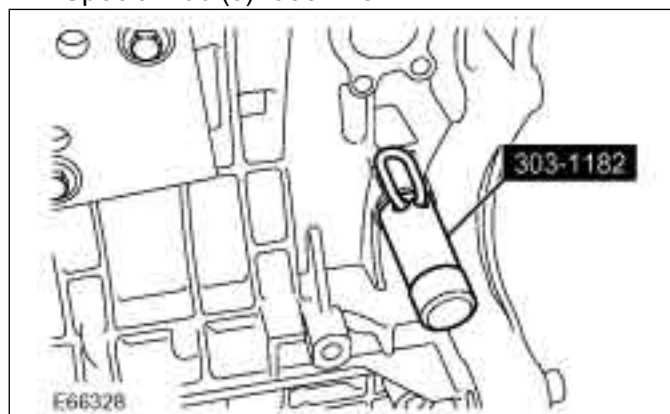
14. Special Tool(s): 303-1182



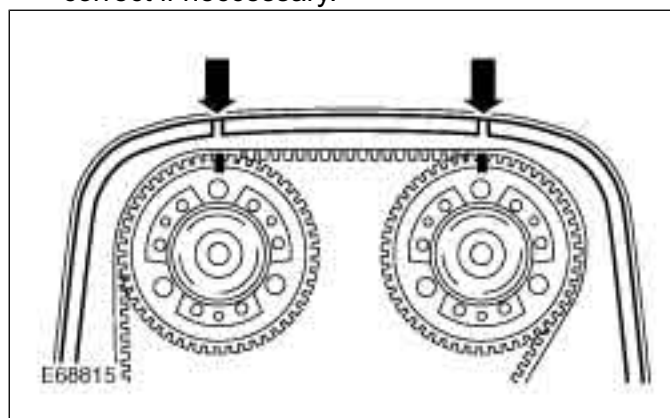
15. Rotate the crankshaft two revolutions clockwise.

16. Use the special tool to adjust the crankshaft to TDC.

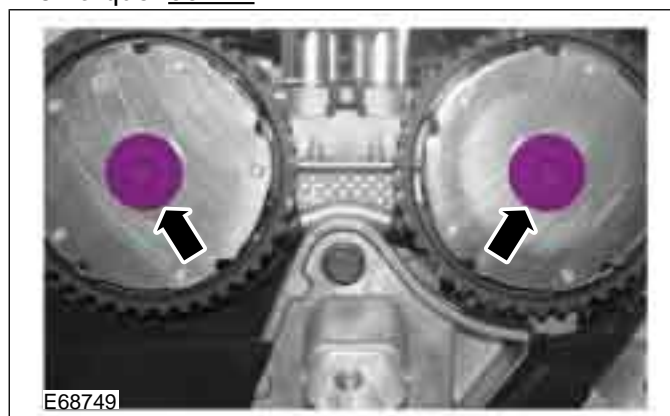
Special Tool(s): 303-1182



17. Check the position of the timing marks and correct if necessary.



18. Torque: 35 Nm



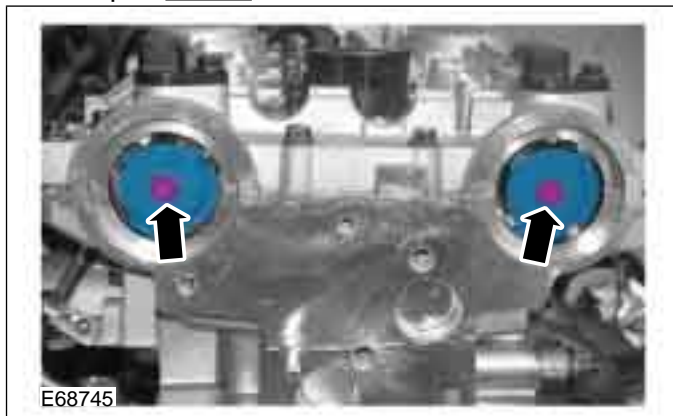
303-01-36

Engine — 2.5L Duratec-ST (VI5)

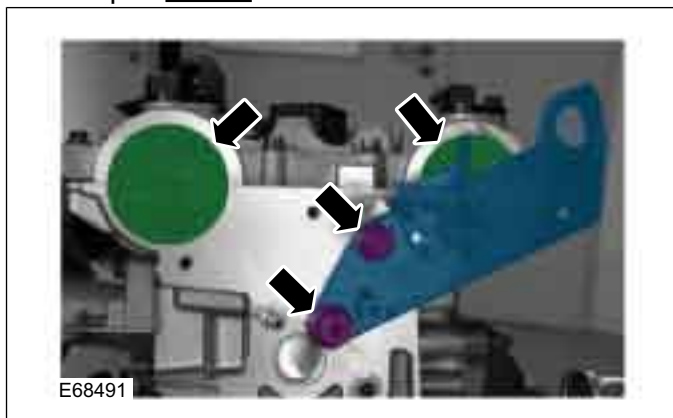
303-01-36

REMOVAL AND INSTALLATION

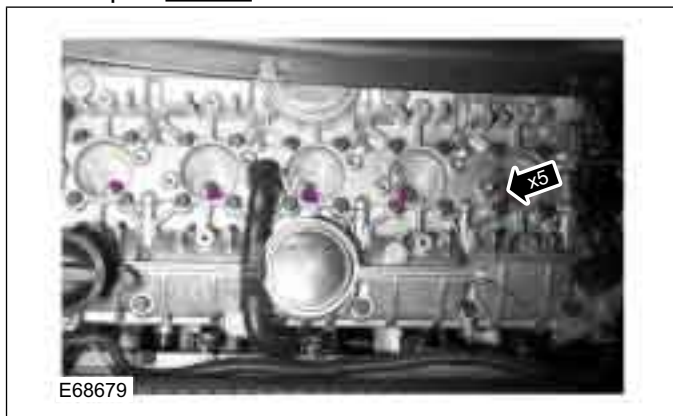
19. Torque: 17 Nm



20. Torque: 50 Nm

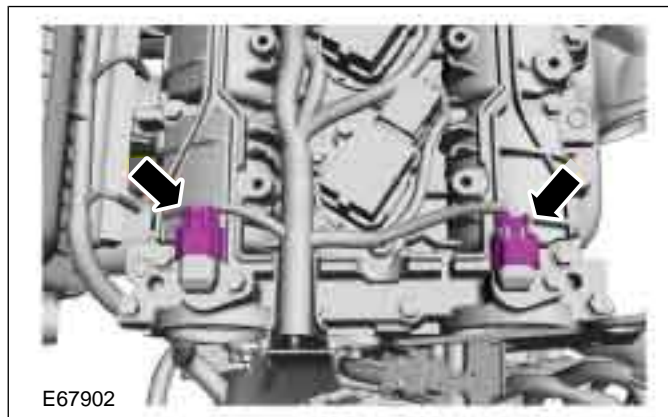


21. Torque: 28 Nm



22 Refer to: Ignition Coil-On-Plug (303-07 Engine Ignition - 2.5L Duratec-ST (VI5), Removal and Installation).

23.

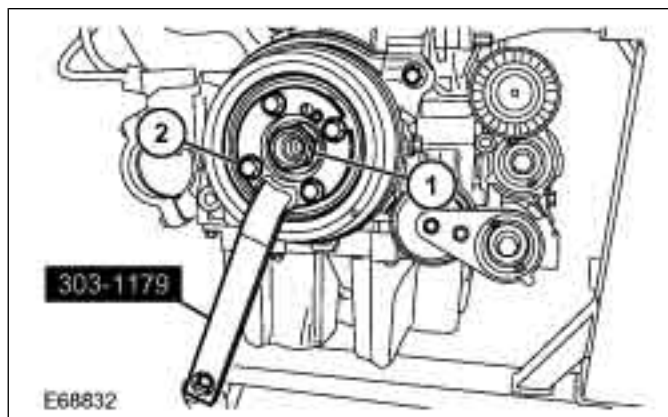


24. 1. Special Tool(s): 303-1179

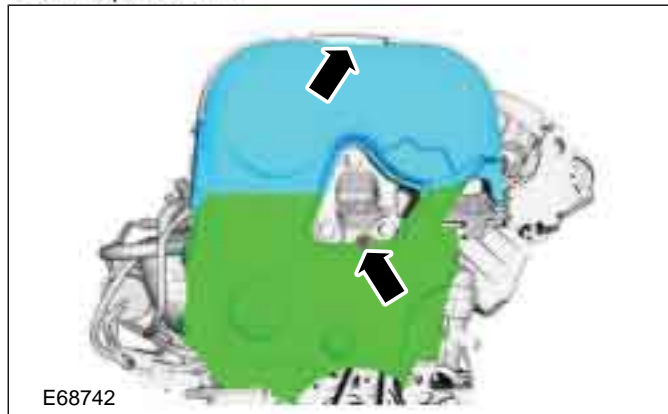
Torque: 180 Nm

2. Torque:

- Stage 1: 25 Nm
- Stage 2: 60°



25. Torque: 8 Nm



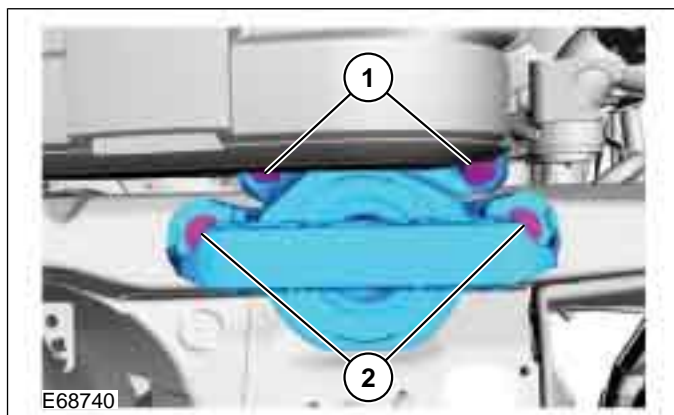
303-01-37

Engine — 2.5L Duratec-ST (VI5)

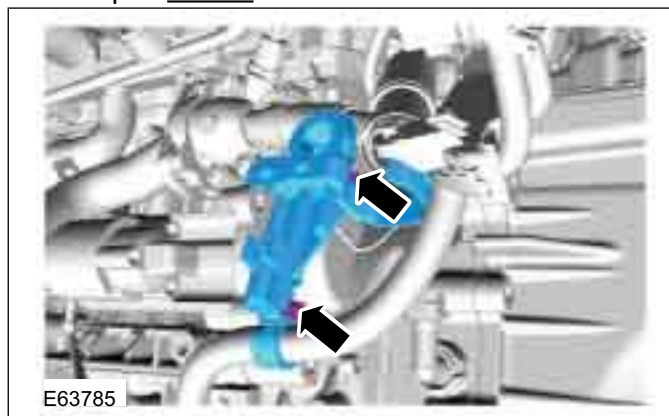
303-01-37

REMOVAL AND INSTALLATION

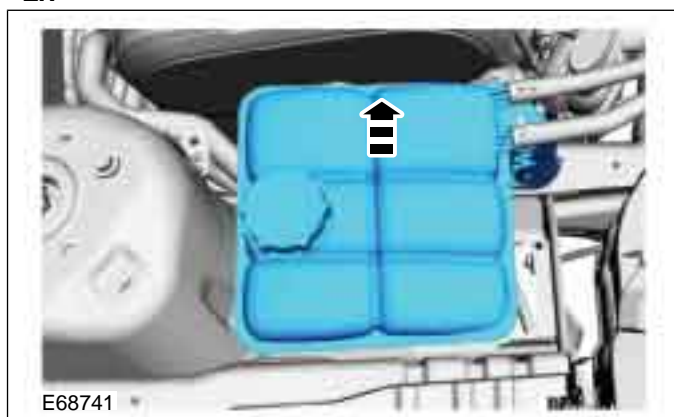
- 26. 1. Torque: 115 Nm
- 2. Torque: 90 Nm



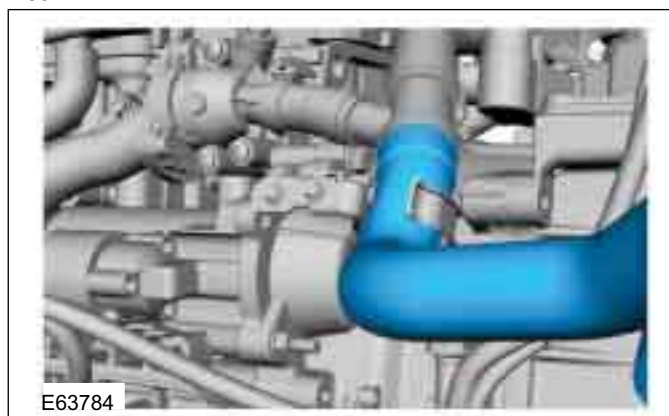
- 29. Torque: 15 Nm



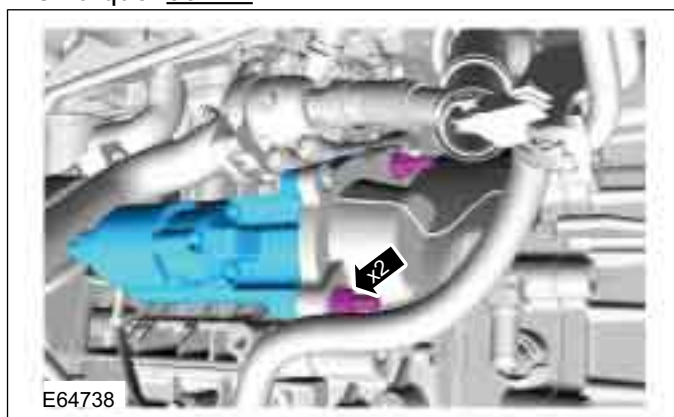
- 27.



- 30.



- 28. Torque: 35 Nm

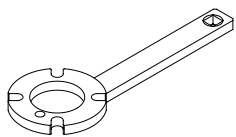


- 31. Refer to: **Accessory Drive Belt** (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).

REMOVAL AND INSTALLATION

Timing Belt(21 304 0)

Special Tool(s)

 <p>E62035</p>	<p>Holding Wrench, Crankshaft 303-1179</p>
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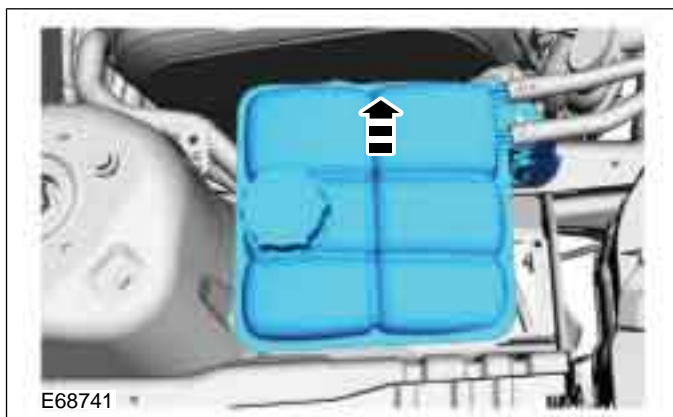
General Equipment

<p>Trolley jack</p>

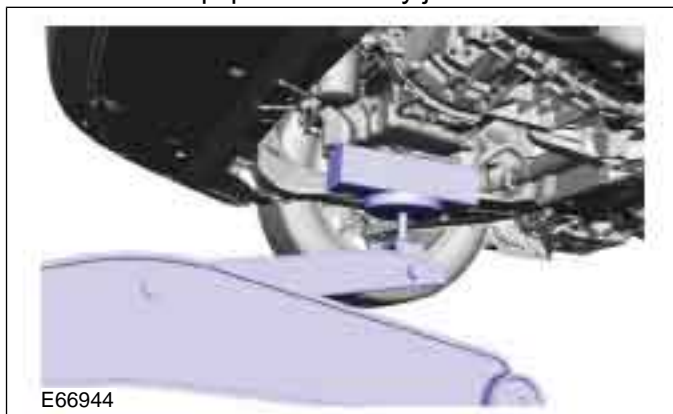
Removal

1. Remove the following items:
 1. Refer to: Air Conditioning (A/C) Compressor Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).
 2. Refer to: Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).

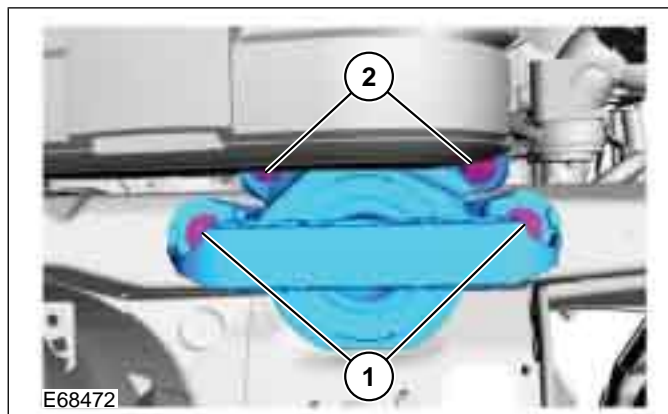
2.



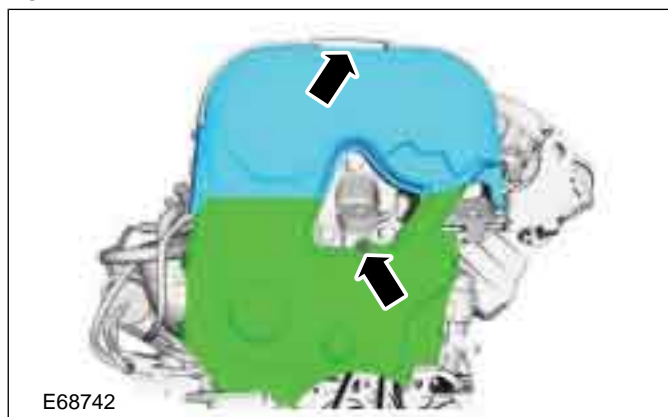
3. General Equipment: Trolley jack



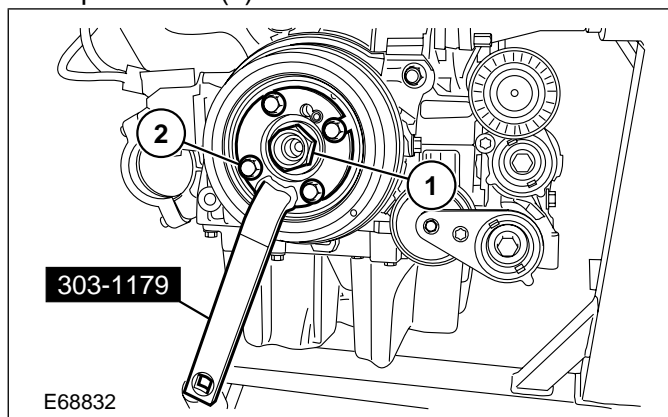
4.



5.

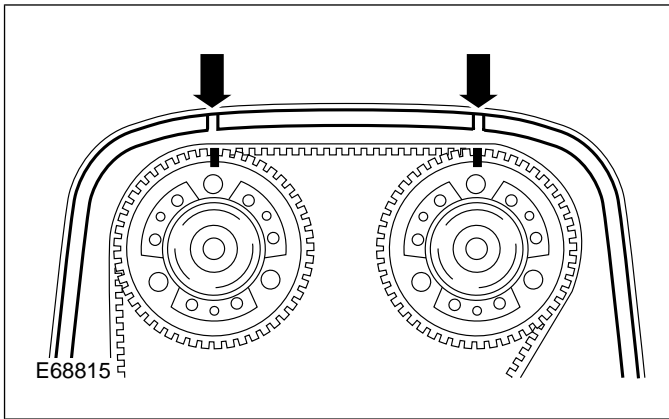


6. Special Tool(s): 303-1179

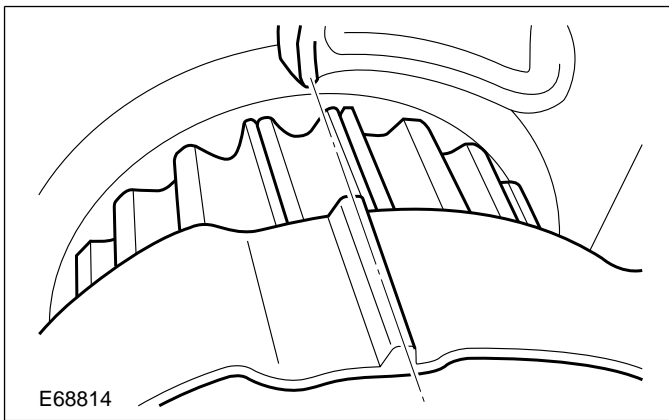


REMOVAL AND INSTALLATION

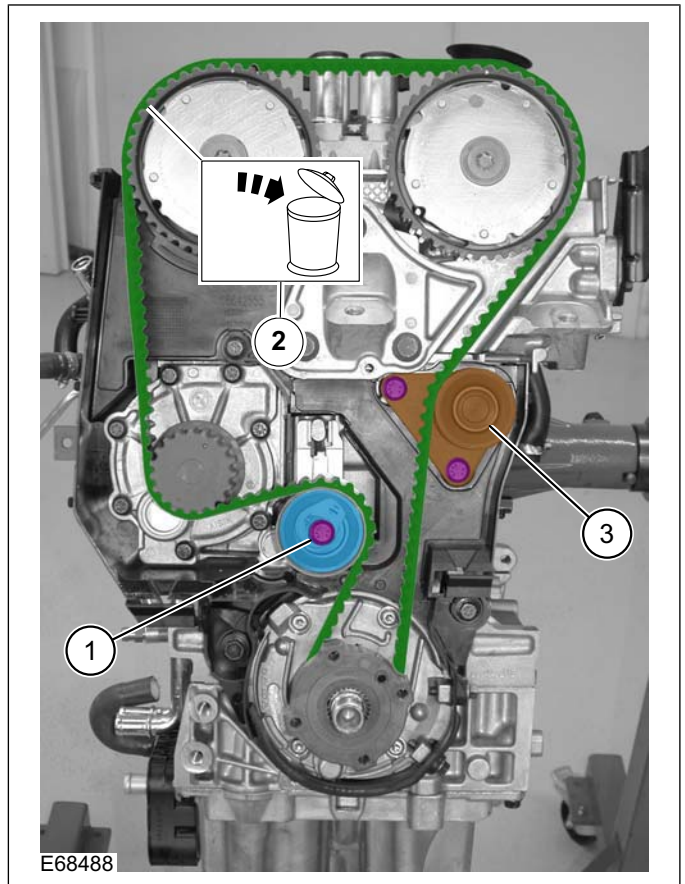
7.



8.



9.

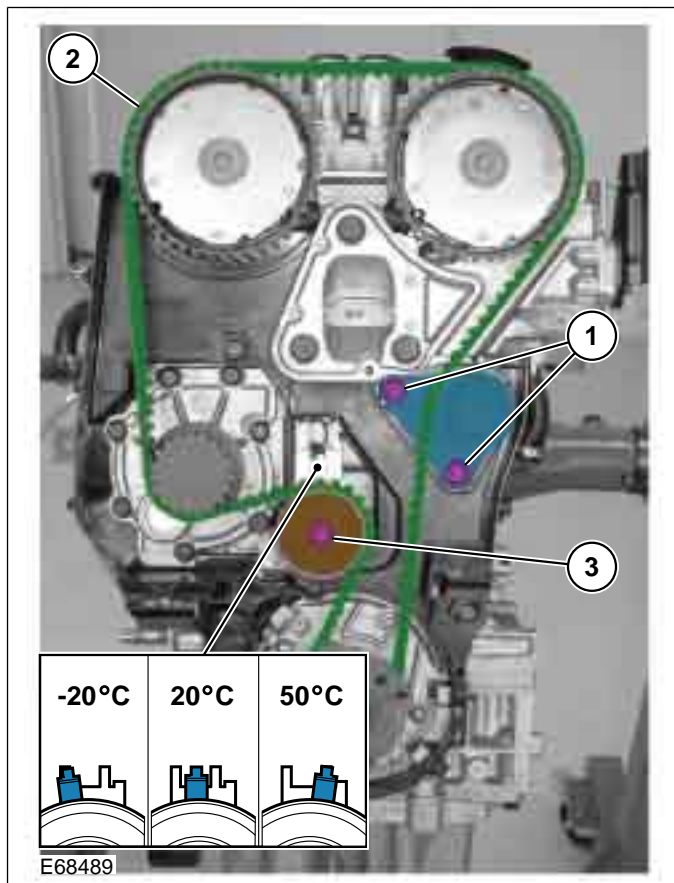


Installation

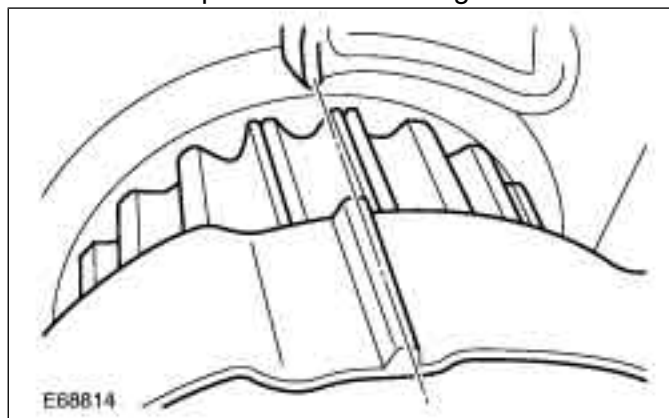
1. Check the position of the timing marks.

REMOVAL AND INSTALLATION

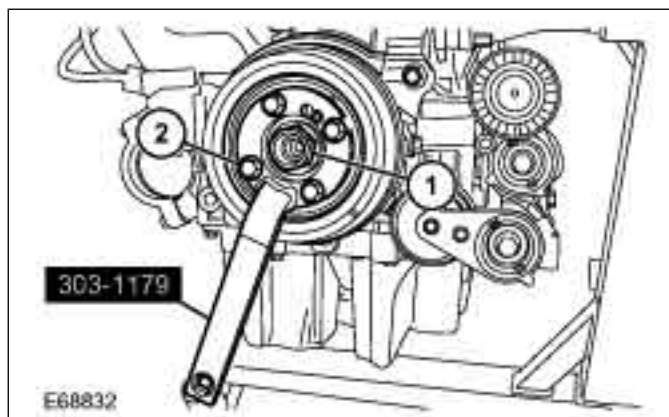
2. 1. Torque: 20 Nm
2. **NOTE:** Make sure that a new component is installed.
3. Depending on the engine temperature, tension the timing belt.
Torque: 20 Nm



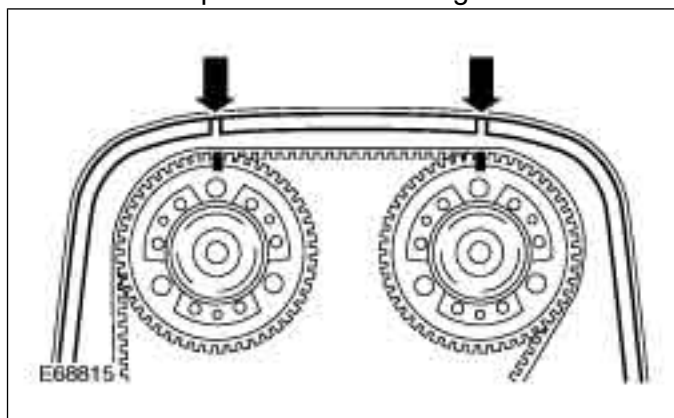
5. Check the position of the timing mark.



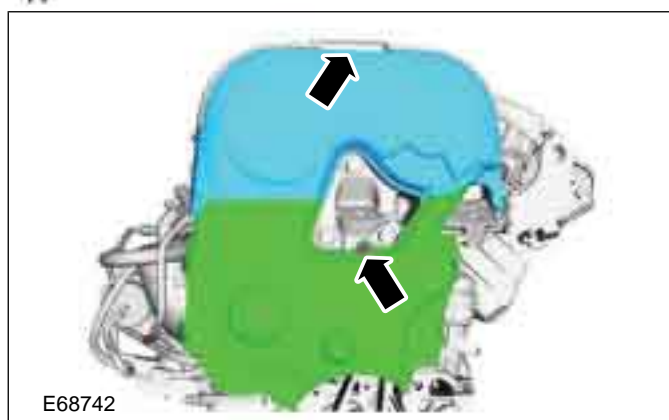
6. 1. Special Tool(s): 303-1179
Torque: 180 Nm
2. Torque:
 - Stage 1: 25 Nm
 - Stage 2: 60°



3. Rotate the crankshaft two revolutions clockwise.
4. Check the position of the timing marks.

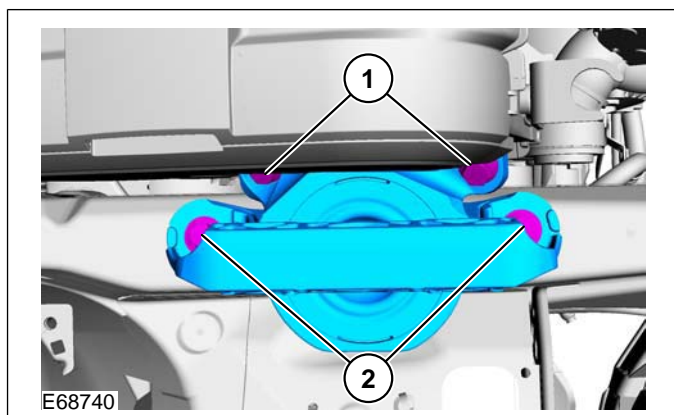


- 7.

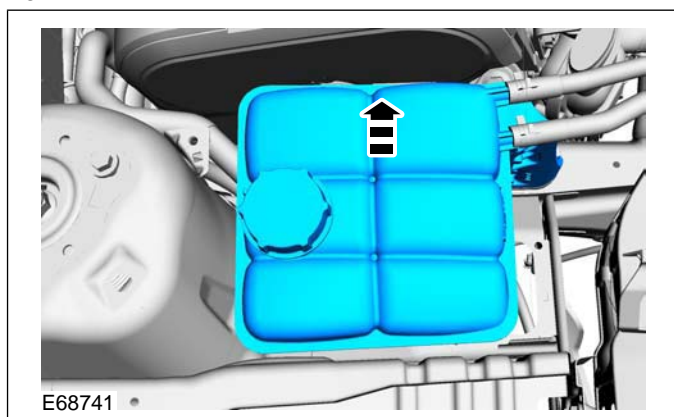


REMOVAL AND INSTALLATION

8. 1. Torque: 115 Nm
2. Torque: 90 Nm



9.



10. Install the following items:

1. Refer to: Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).
2. Refer to: Air Conditioning (A/C) Compressor Belt (**303-05 Accessory Drive - 2.5L Duratec-ST (VI5)**, Removal and Installation).

REMOVAL AND INSTALLATION**Exhaust Manifold(21 187 0)****Removal**

1. Remove the turbocharger.

Refer to: Turbocharger (303-04 Fuel Charging and Controls - Turbocharger - 2.5L Duratec-ST (VI5), Removal and Installation).

Installation

1. Install the turbocharger.

Refer to: Turbocharger (303-04 Fuel Charging and Controls - Turbocharger - 2.5L Duratec-ST (VI5), Removal and Installation).

REMOVAL AND INSTALLATION

Cylinder Head(21 163 0)

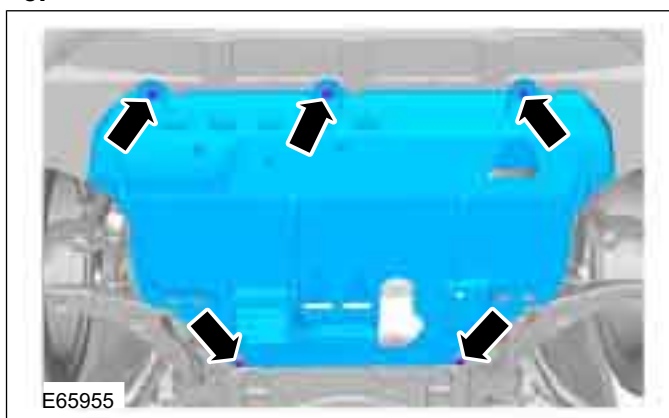
Materials	
Name	Specification
Grease	SA-M1C9107-A

Removal

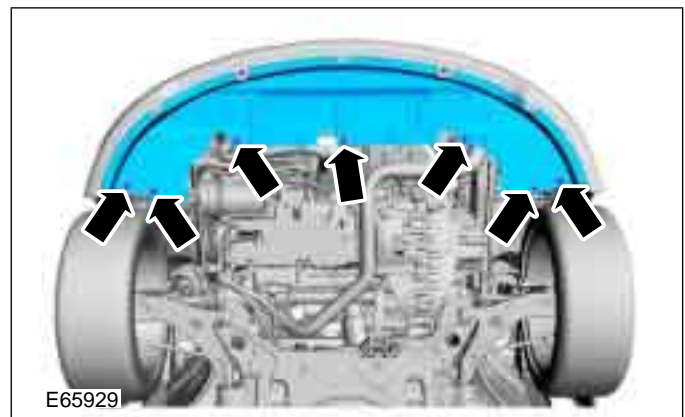
NOTE: Removal steps in this procedure may contain installation details.

1. Refer to: Petrol Fuel System Health and Safety Precautions ([100-00 General Information, Description and Operation](#)).
2. Release the fuel system pressure.
Refer to: Fuel System Pressure Release - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) ([310-00 Fuel System - General Information, General Procedures](#)).
3. Disconnect the battery ground cable.
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).
4. Remove the intake air cleaner.
Refer to: Air Cleaner - Vehicles With: PCM Security Shield ([303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST \(VI5\), Removal and Installation](#)).
Refer to: Air Cleaner - Vehicles Without: PCM Security Shield ([303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST \(VI5\), Removal and Installation](#)).

5.



6.



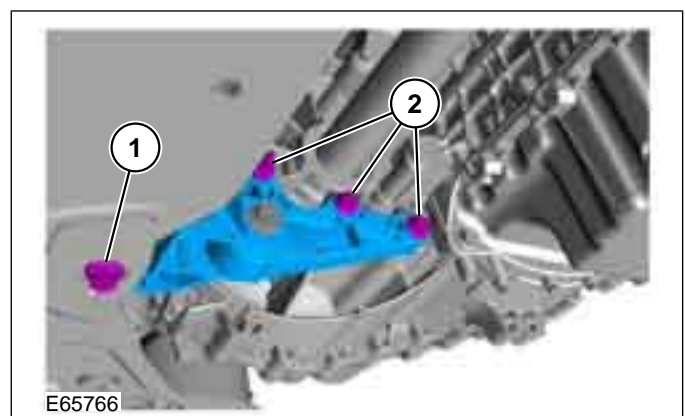
7. Drain the cooling system.

Refer to: Cooling System Draining, Filling and Bleeding ([303-03 Engine Cooling - 2.5L Duratec-ST \(VI5\), General Procedures](#)).

8.



9. 1. Torque: 80 Nm
2. Torque: 80 Nm



10. CAUTIONS:

⚠ Make sure that the exhaust flexible pipe is not twisted.

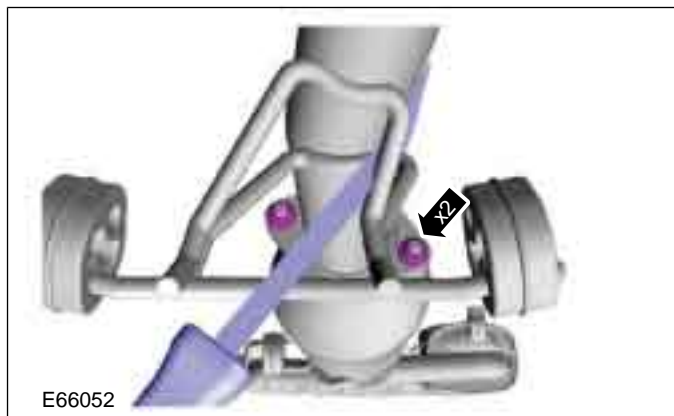
REMOVAL AND INSTALLATION

⚠ Jointing compound must not be used forward of the catalytic converter.

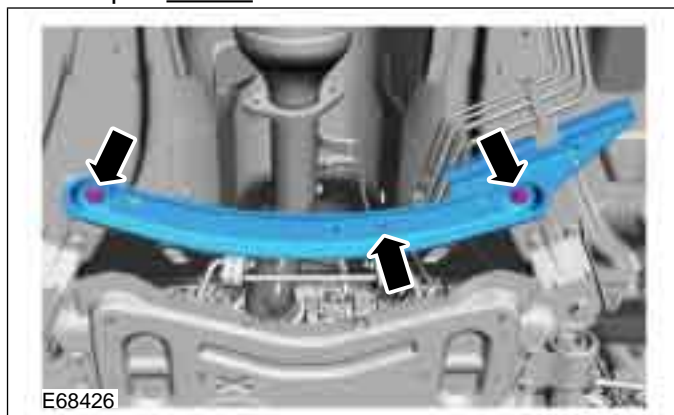
- Coat the catalytic converter to flexible pipe studs with grease.

Material: Grease

Torque: 48 Nm



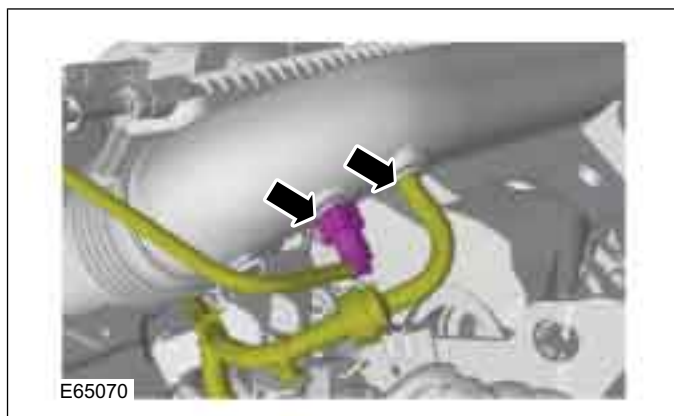
11. Torque: 24 Nm



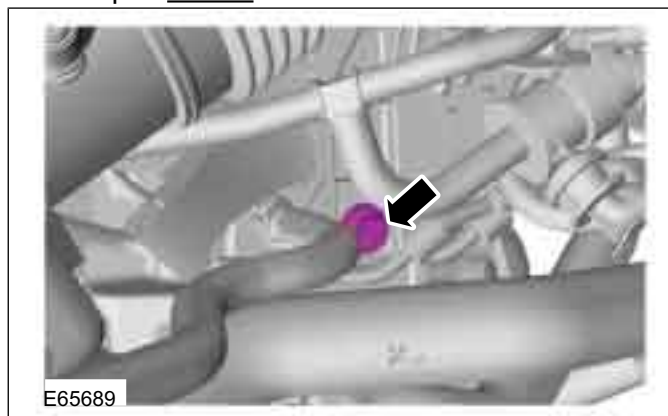
12 Detach the turbocharger from the cylinder head.

Refer to: Turbocharger (303-04 Fuel Charging and Controls - Turbocharger - 2.5L Duratec-ST (VI5), Removal and Installation).

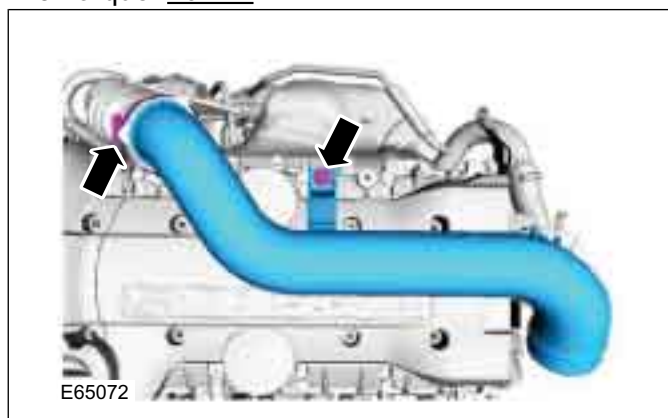
13.



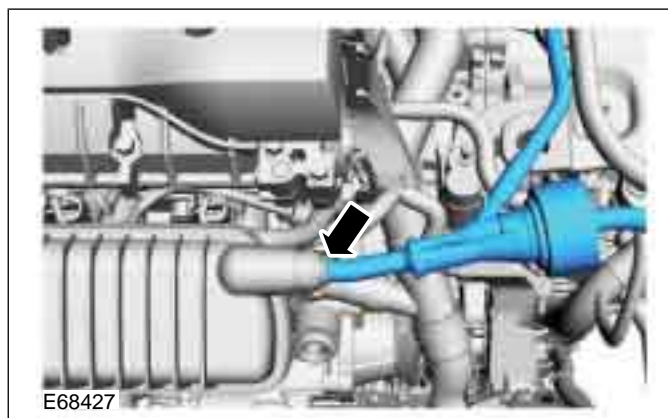
14. Torque: 10 Nm



15. Torque: 10 Nm



16.



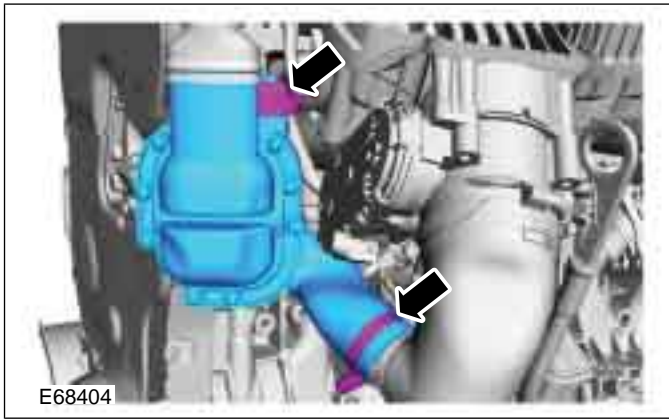
303-01-45

Engine — 2.5L Duratec-ST (VI5)

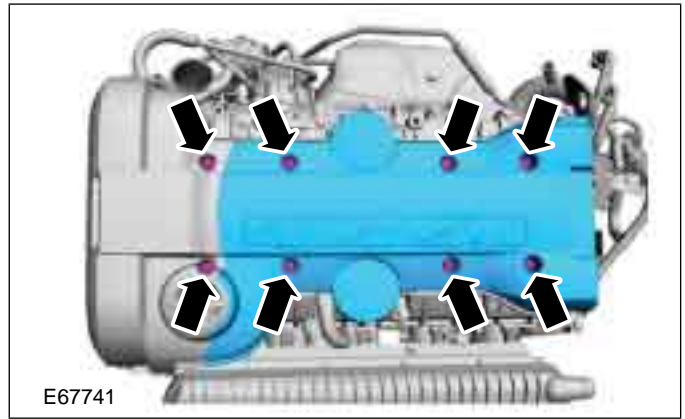
303-01-45

REMOVAL AND INSTALLATION

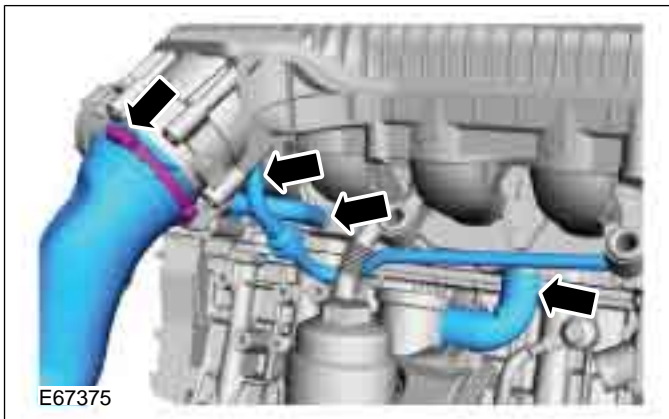
17.



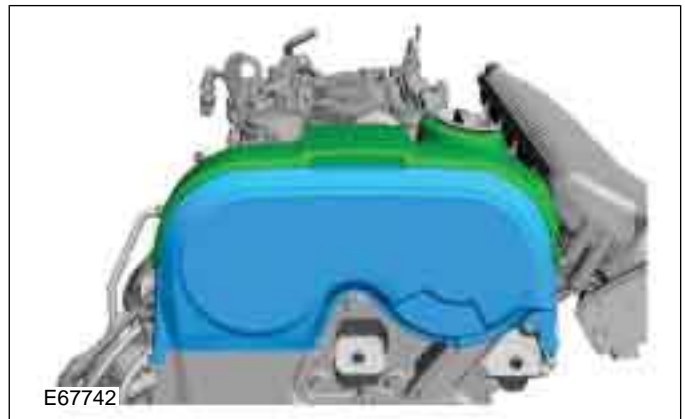
20. Torque: 10 Nm



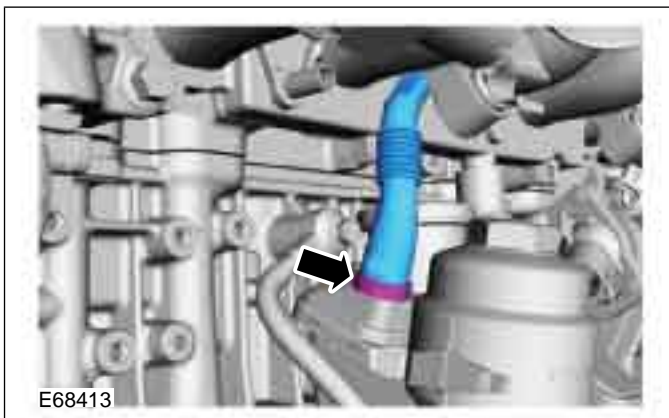
18.



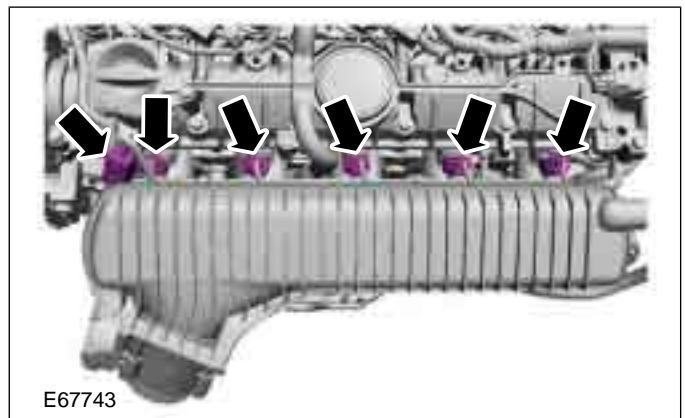
21.



19.



22.



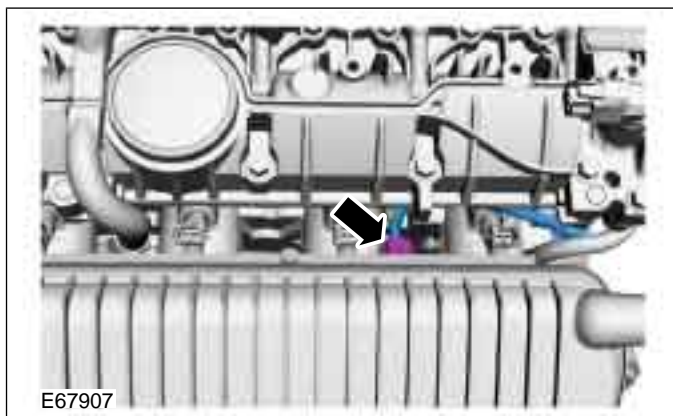
303-01-46

Engine — 2.5L Duratec-ST (VI5)

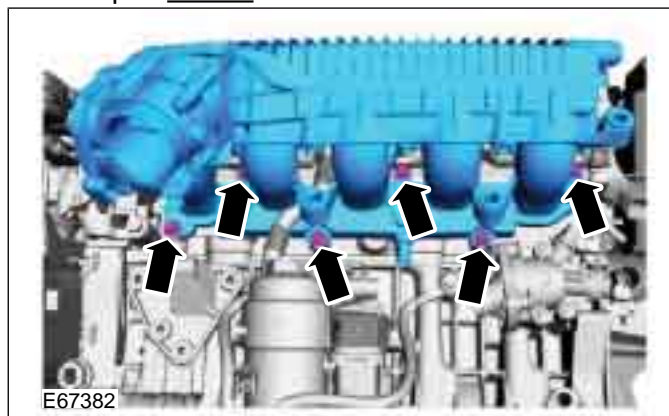
303-01-46

REMOVAL AND INSTALLATION

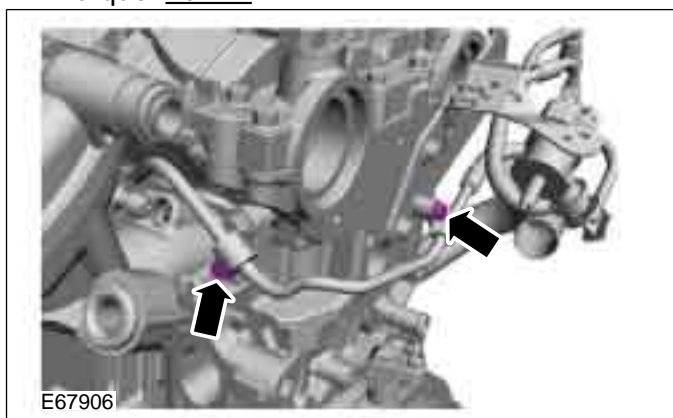
23.



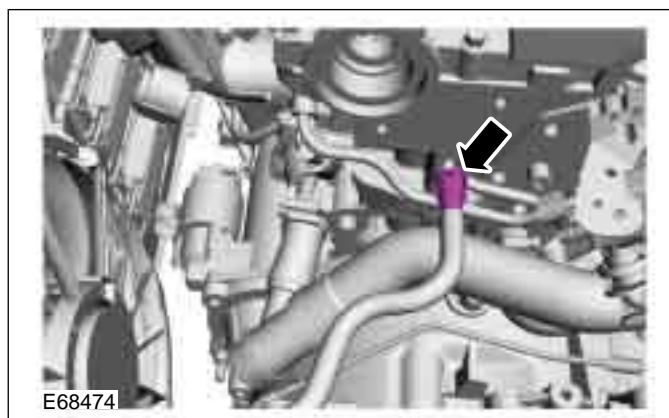
26. Torque: 24 Nm



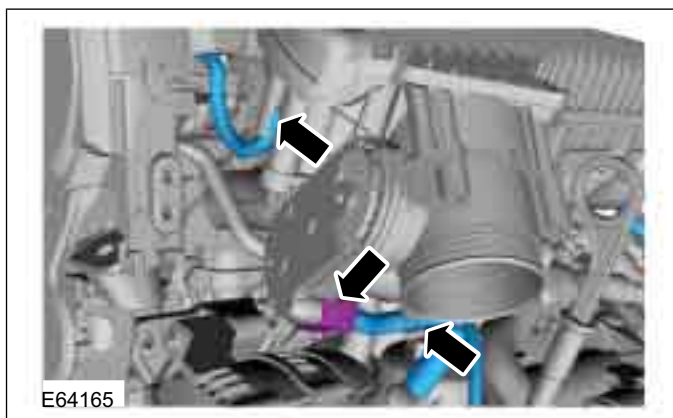
24. Torque: 10 Nm



27.



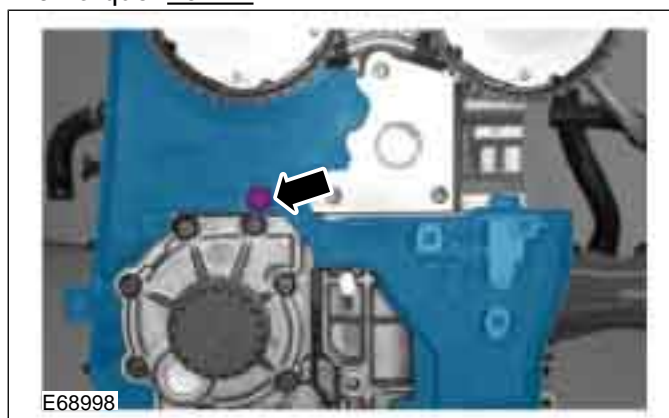
25.



28. Remove the timing belt.

Refer to: Timing Belt (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation).

29. Torque: 25 Nm

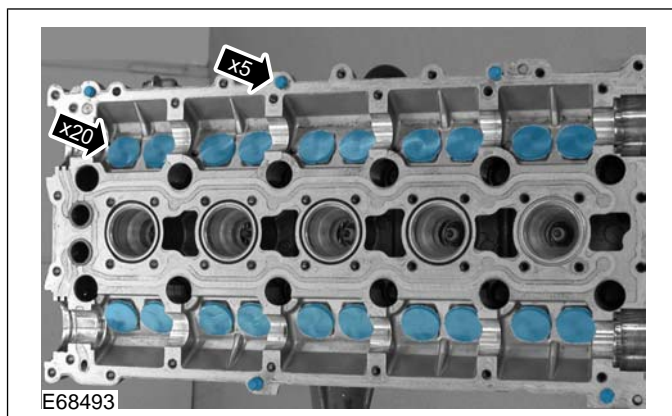


30. Remove the camshafts.

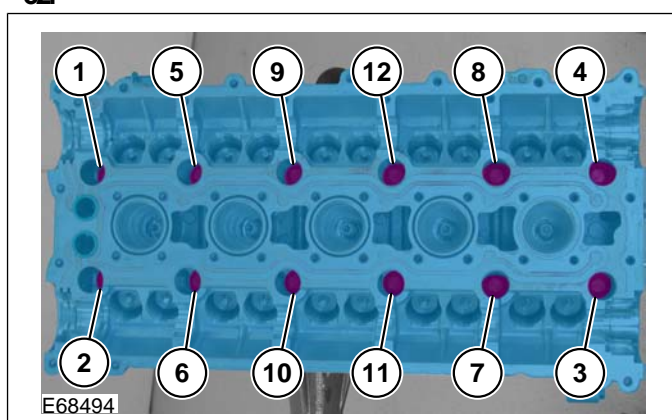
Refer to: Camshafts (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation).

REMOVAL AND INSTALLATION

31.

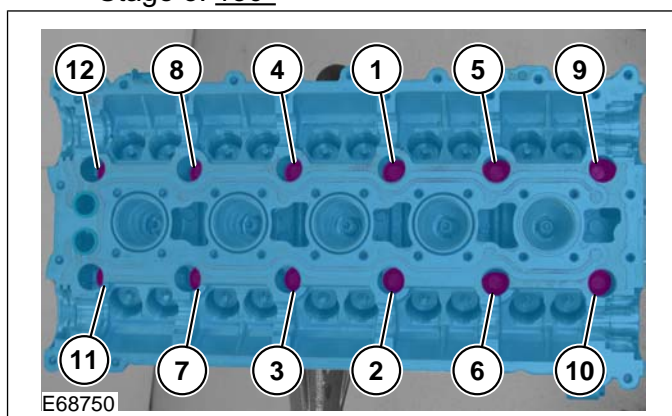


32.



Installation

1. To install, reverse the removal procedure.
2. Torque:
 - Stage 1: 20 Nm
 - Stage 2: 60 Nm
 - Stage 3: 130°



3. Initialize the door window motors.

Refer to: Door Window Motor Initialization
(501-11 Glass, Frames and Mechanisms,
General Procedures).

REMOVAL AND INSTALLATION

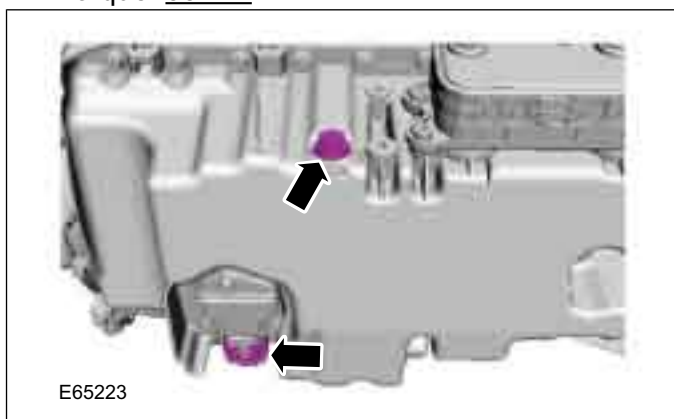
Oil Pan(21 154 0)

Materials	
Name	Specification
Sealant - Loctite 510	WSK-M2G348-A7
Engine Oil - 5W-30	WSS-M2C913-B

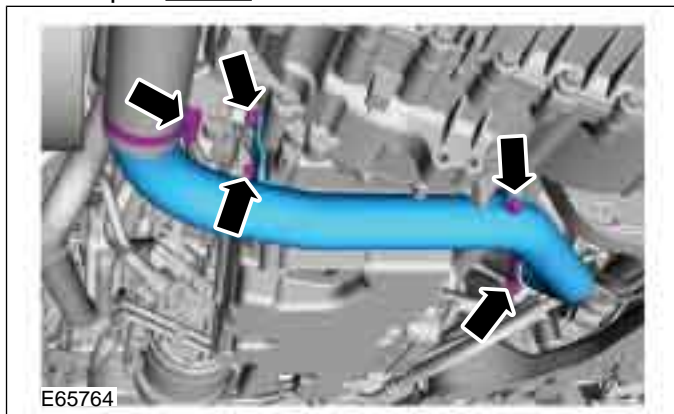
Removal

NOTE: Removal steps in the procedure may contain installation details.

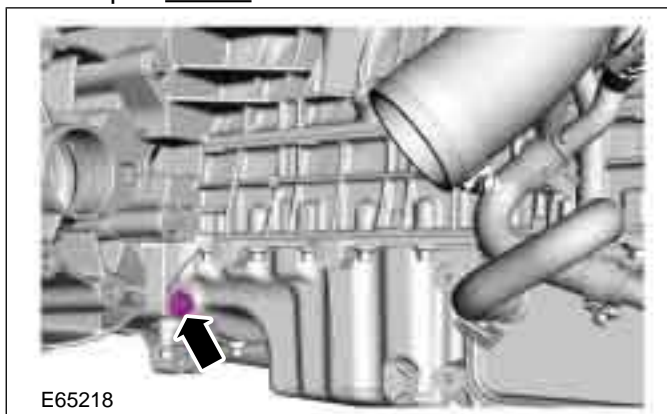
1. Torque: 38 Nm



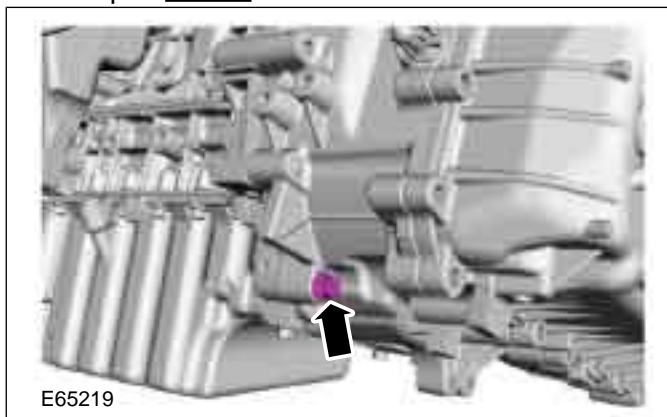
2. Torque: 17 Nm



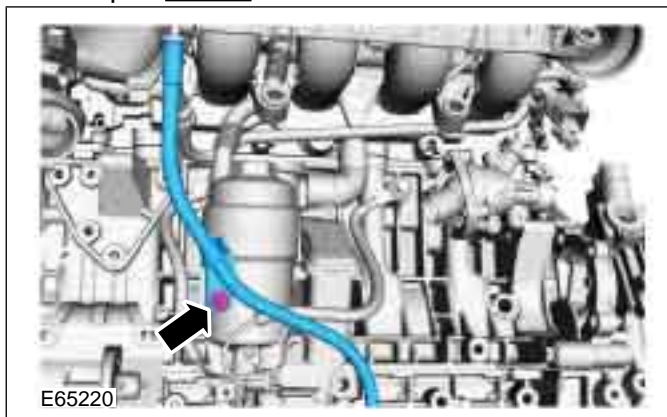
3. Torque: 50 Nm



4. Torque: 50 Nm



5. Torque: 24 Nm

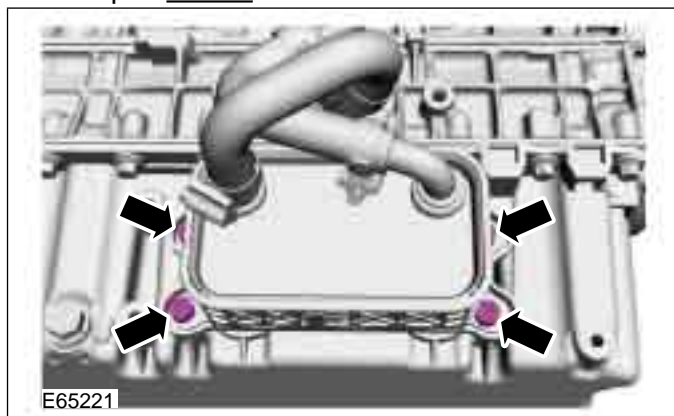
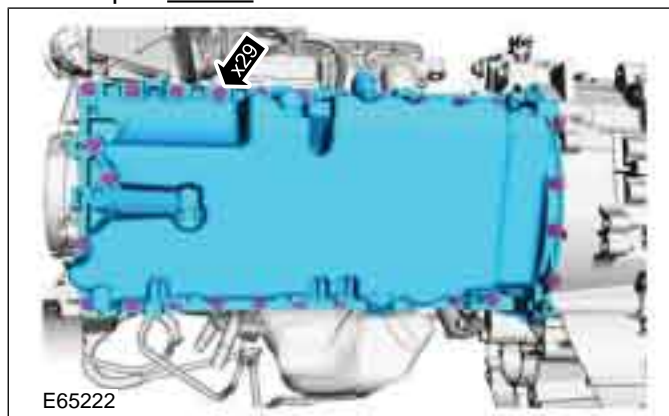


303-01-49

Engine — 2.5L Duratec-ST (VI5)

303-01-49

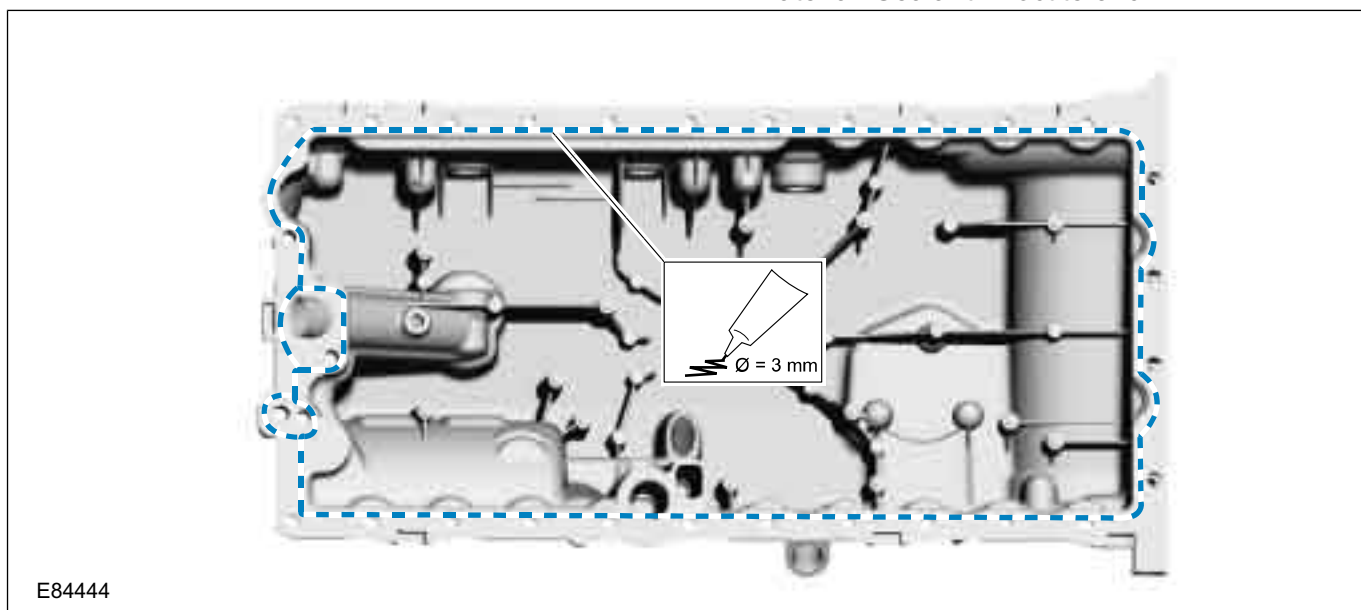
REMOVAL AND INSTALLATION

6. Torque: 17 Nm7. Torque: 17 Nm

Installation

- NOTE:** The component must be installed within 5 minutes of applying the sealant.

Material: Sealant - Loctite 510

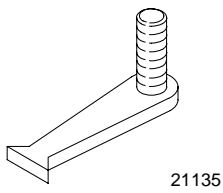
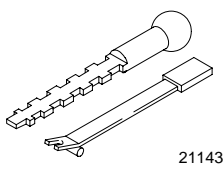
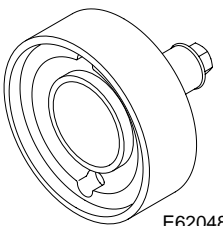


- To install, reverse the removal procedure.
- Fill the engine with
Material: Engine Oil - 5W-30
- Refer to: [Specifications \(303-01 Engine - 2.5L Duratec \(VI5\), Specifications\)](#).

REMOVAL AND INSTALLATION

Crankshaft Rear Seal(21 468 4)

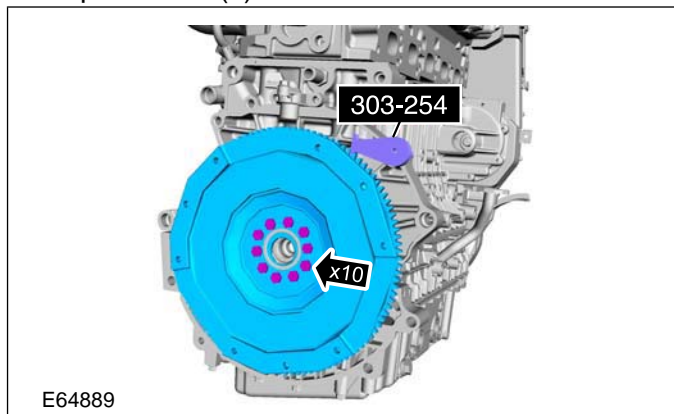
Special Tool(s)

 <p>21135</p>	<p>Locking Tool, Flywheel 303-254</p>
 <p>21143</p>	<p>Remover, Crankshaft Seal 303-293</p>
 <p>E62048</p>	<p>Installer, Crankshaft Rear Seal 303-1181</p>

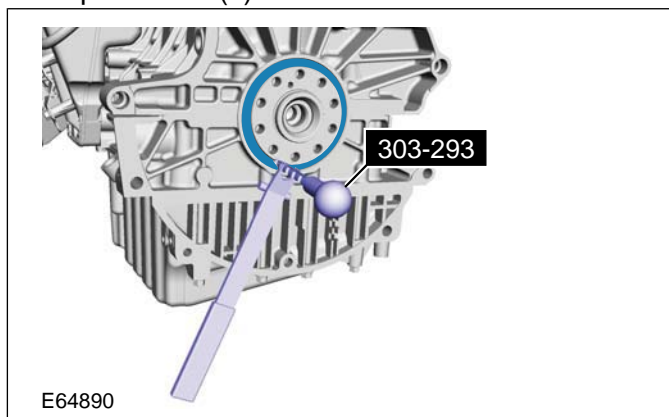
Removal

1. Refer to: Clutch Disc and Pressure Plate (308-01D, Removal and Installation).
2. **⚠ CAUTION: Discard the flywheel bolts.**

Special Tool(s): 303-254

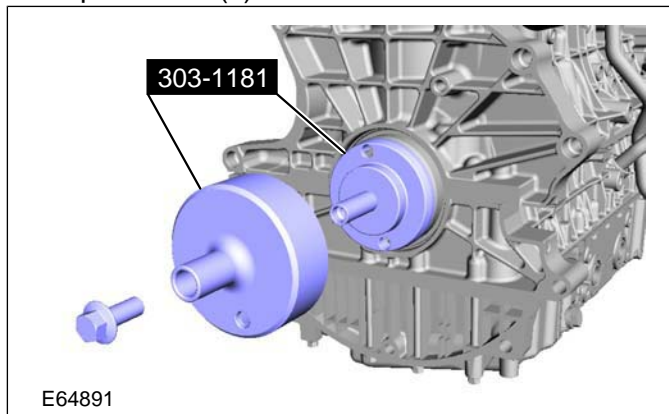


3. Special Tool(s): 303-293



Installation

1. Special Tool(s): 303-1181



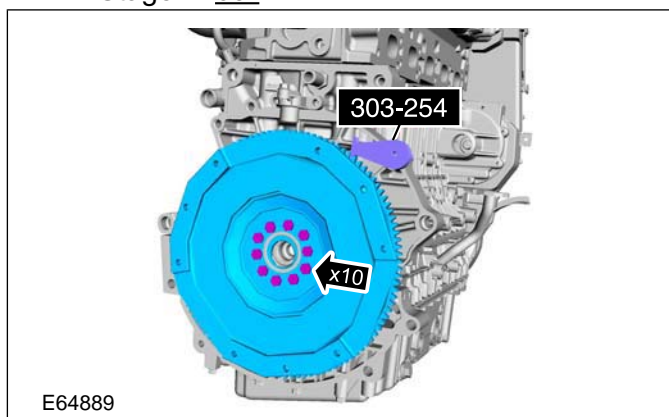
2. **⚠ CAUTION: Make sure that no excess sealant residue is evident.**

NOTE: Make sure that the locating pin on the crankshaft is aligned with the guide hole in the flywheel.

Special Tool(s): 303-254

Torque:

- Stage 1: 45 Nm
- Stage 2: 65°



 **303-01-51****Engine — 2.5L Duratec-ST (VI5)****303-01-51** 

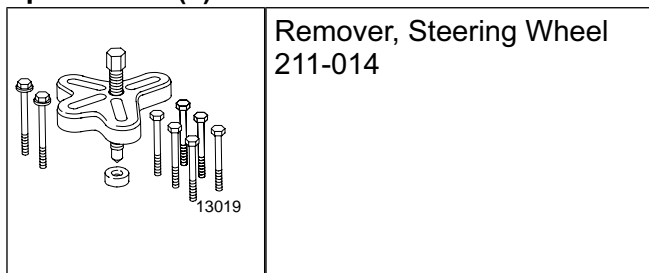
REMOVAL AND INSTALLATION

3. Refer to: Clutch Disc and Pressure Plate
(308-01D, Removal and Installation).

REMOVAL AND INSTALLATION

Oil Pump(21 714 0)

Special Tool(s)



2. Install the crankshaft front seal.

Refer to: Crankshaft Front Seal (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation).

3. Install the timing belt.

Refer to: Timing Belt (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation).

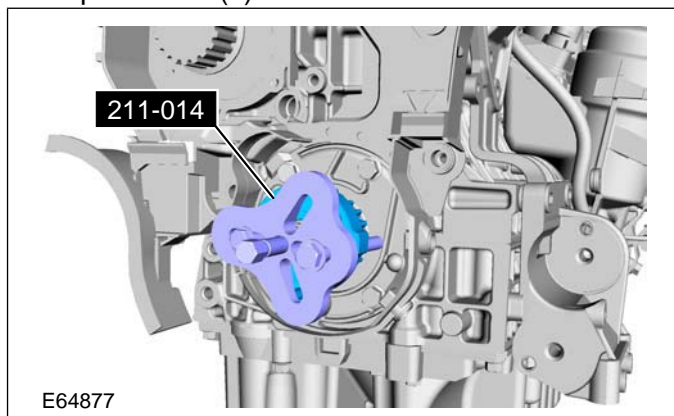
Removal

NOTE: Removal steps in this procedure may contain installation details.

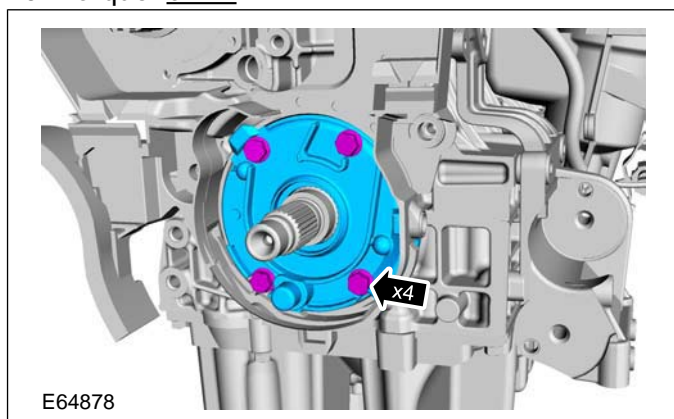
1. Remove the timing belt.

Refer to: Timing Belt (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation).

2. Special Tool(s): 211-014



3. Torque: 6 Nm



Installation

1. To install, reverse the removal procedure.

REMOVAL

Engine(21 134 0)

Removal

1. Release the fuel pressure.

Refer to: Fuel System Pressure Release - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (**310-00 Fuel System - General Information, General Procedures**).

2. Remove the battery tray.

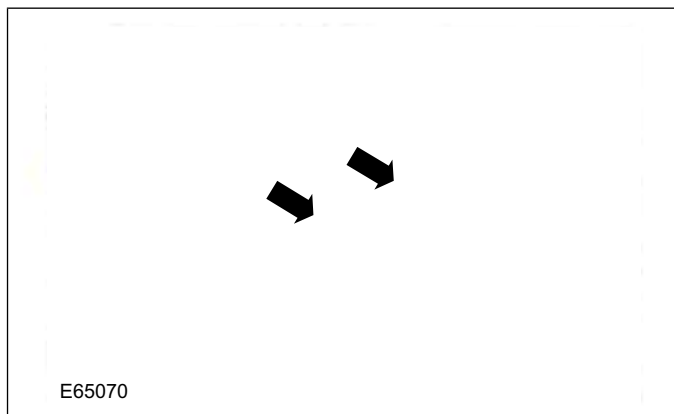
Refer to: Battery Tray - 2.5L Duratec-ST (VI5) (**414-01 Battery, Mounting and Cables, Removal and Installation**).

3. Remove the air cleaner.

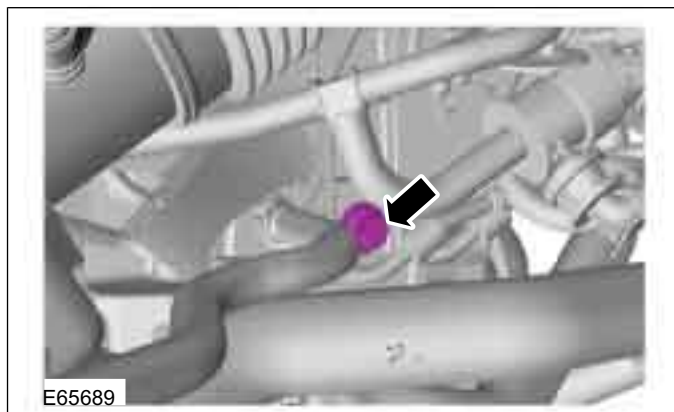
Refer to: Air Cleaner - Vehicles With: PCM Security Shield (**303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation**).

Refer to: Air Cleaner - Vehicles Without: PCM Security Shield (**303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation**).

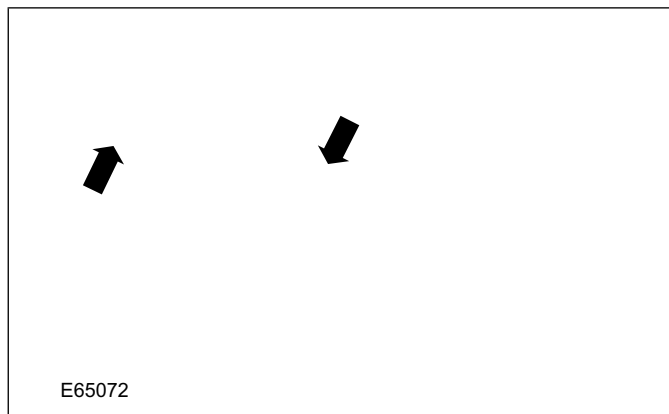
- 4.



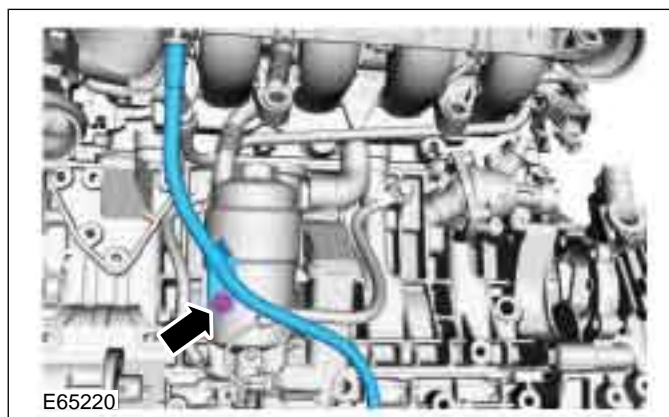
- 5.



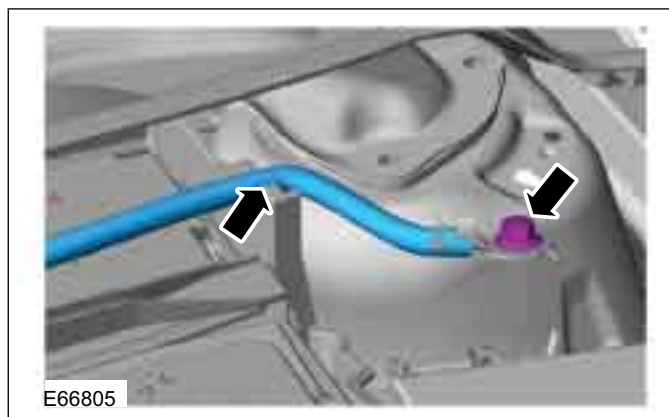
- 6.



- 7.

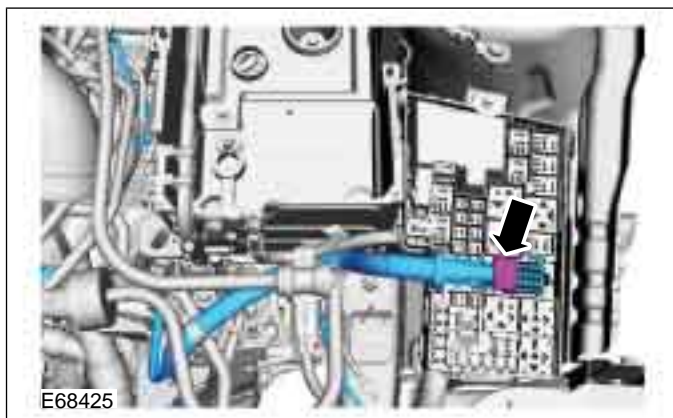


- 8.

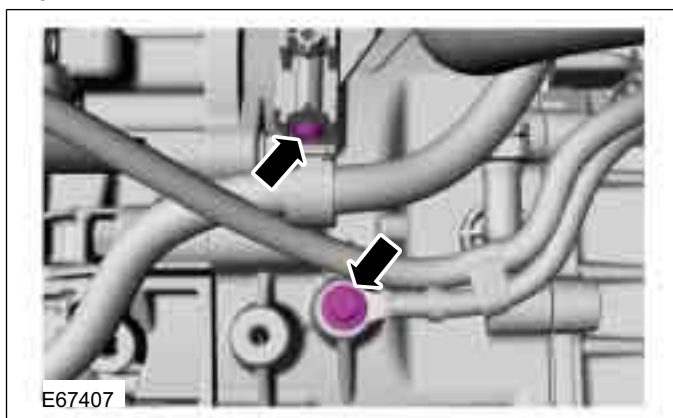


REMOVAL

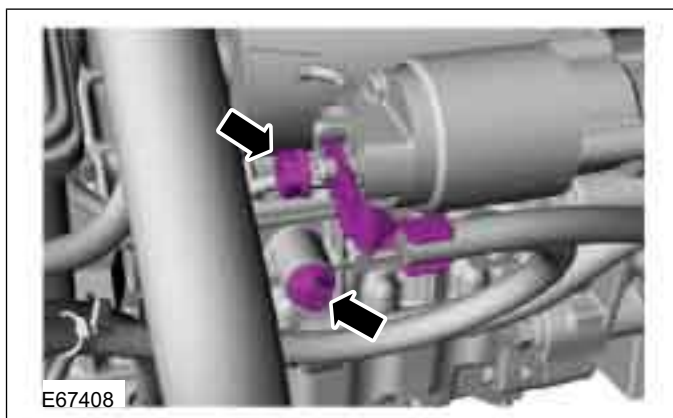
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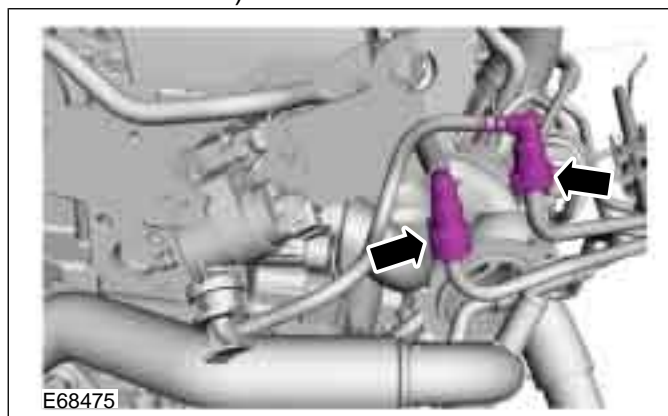


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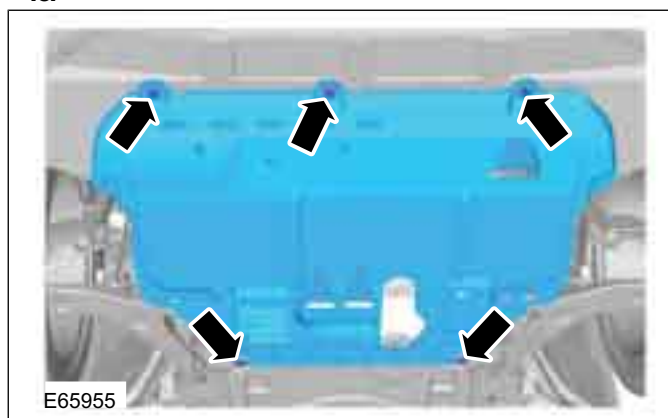


12 Disconnect the fuel lines.

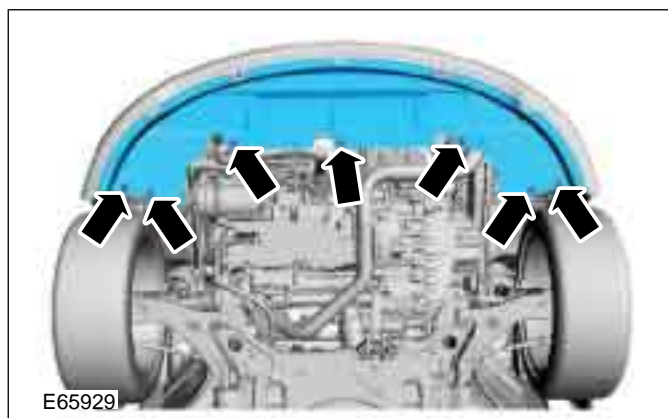
Refer to: **Quick Release Coupling (310-00 Fuel System - General Information, General Procedures).**



13.



14.



15. Drain the coolant.

Refer to: **Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), General Procedures).**

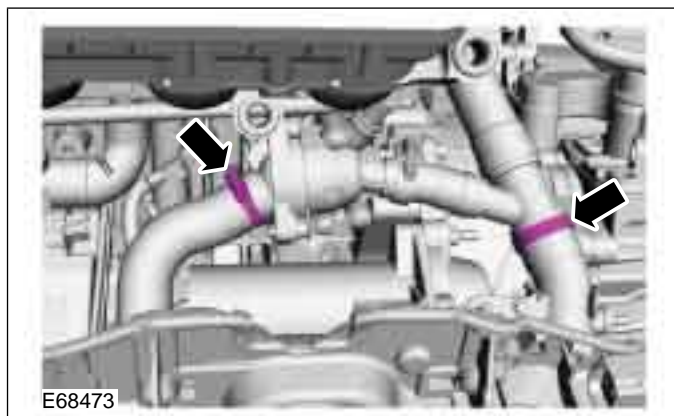
303-01-55

Engine — 2.5L Duratec-ST (VI5)

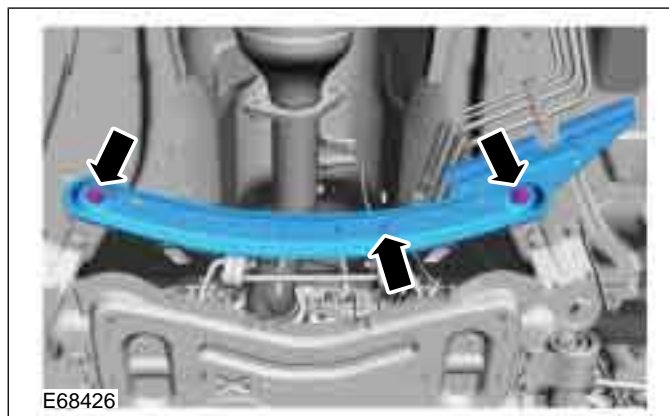
303-01-55

REMOVAL

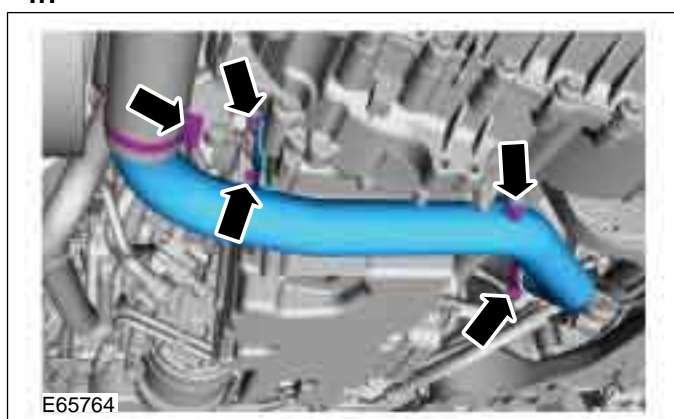
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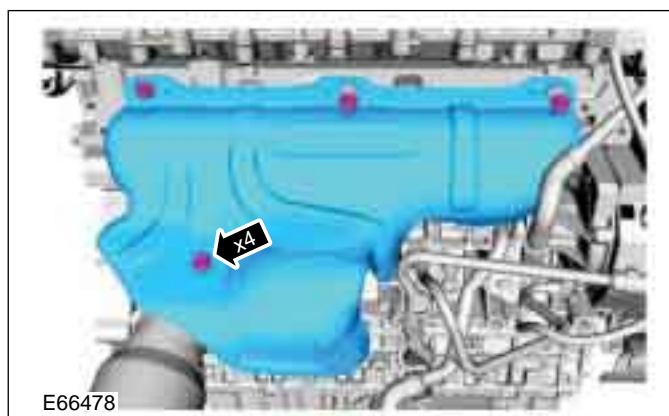
21.



17.



22 NOTE: Note the position of the spring washers to aid installation.



18. Remove the driveshafts.

Refer to: Front Halfshaft LH (205-04 Front Drive Halfshafts, Removal and Installation).

Refer to: Front Halfshaft RH - 3-Door (205-04 Front Drive Halfshafts, Removal and Installation).

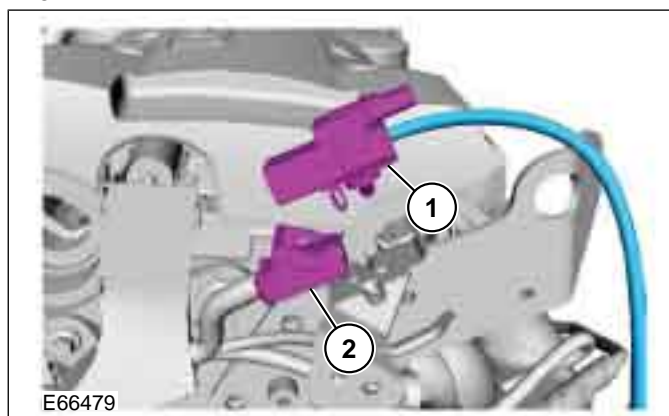
19. Remove the air conditioning (A/C) compressor belt.

Refer to: Air Conditioning (A/C) Compressor Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).

20. Remove the accessory drive belt.

Refer to: Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).

23.



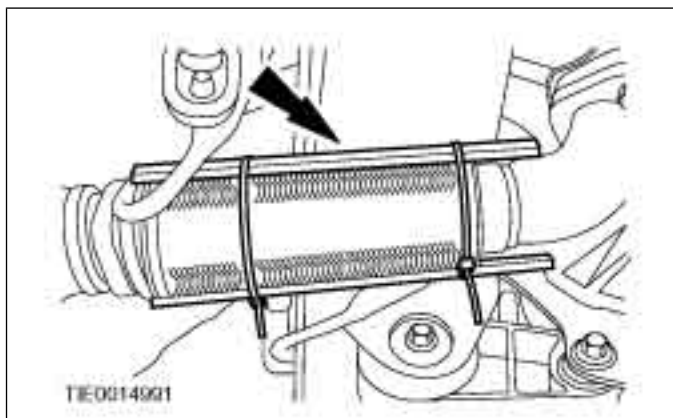
303-01-56

Engine — 2.5L Duratec-ST (VI5)

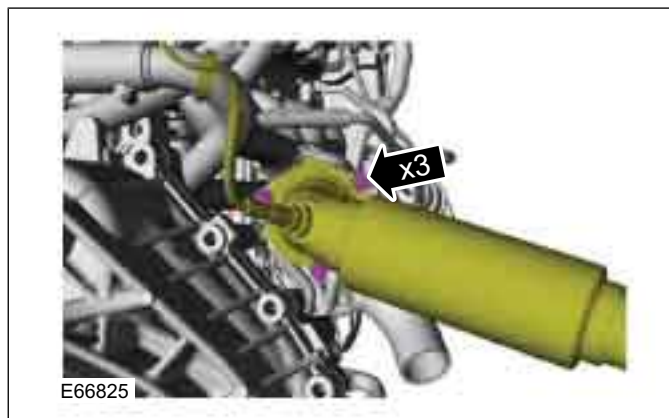
303-01-56

REMOVAL

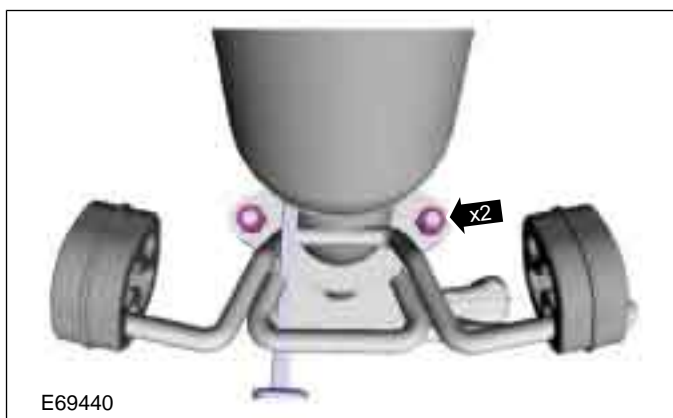
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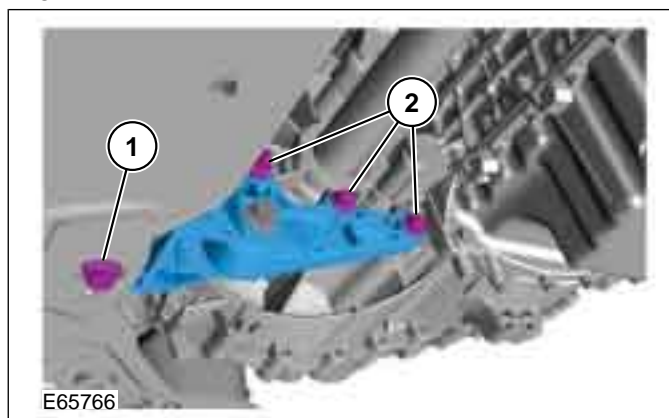
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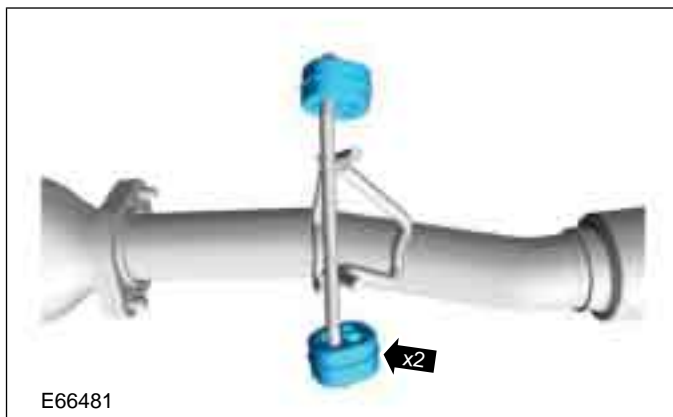
25. **CAUTION:** Make sure that the exhaust flexible pipe is not twisted.



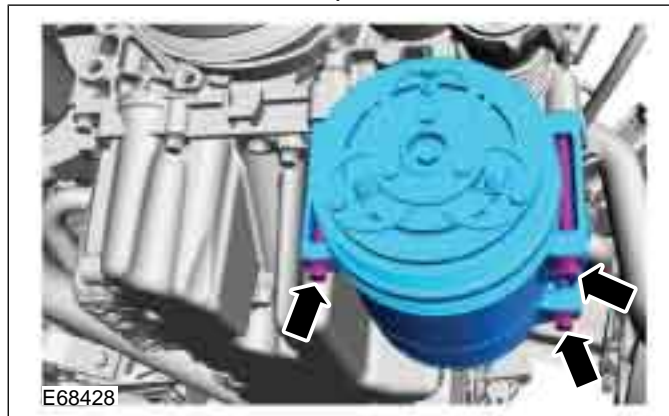
28.



26.



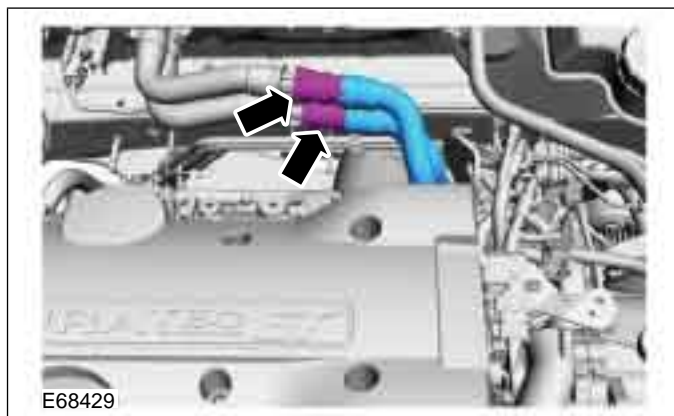
29. Position the A/C compressor to one side.



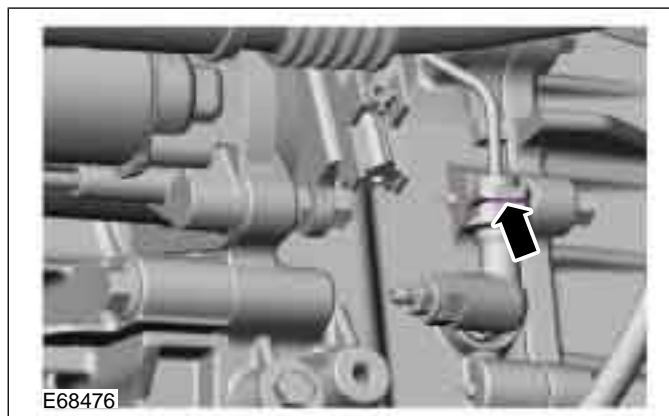


REMOVAL

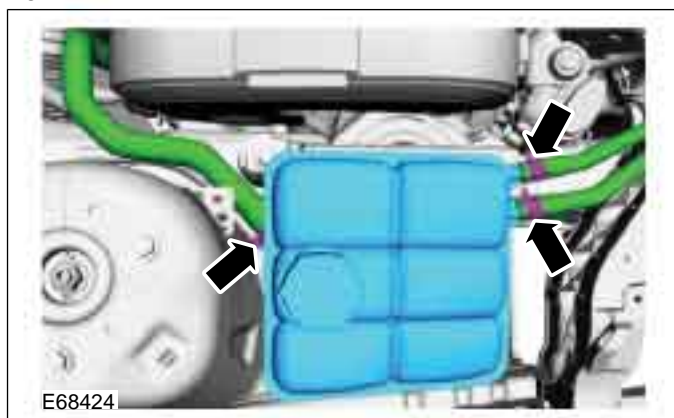
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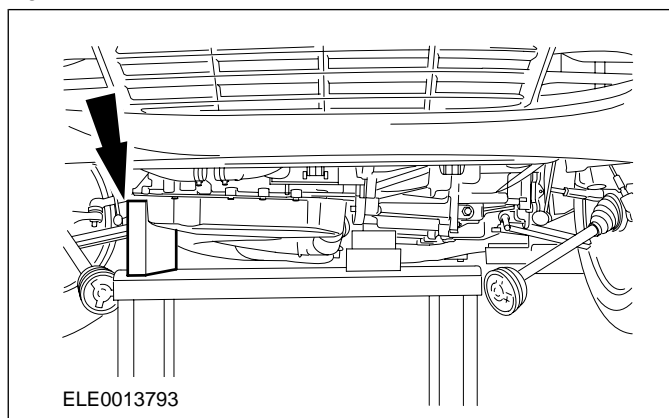
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31.

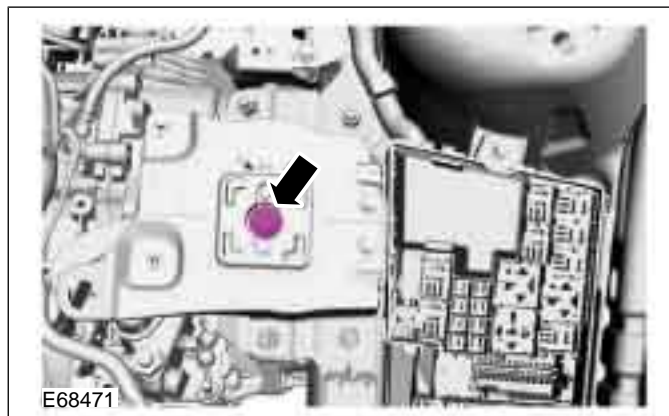
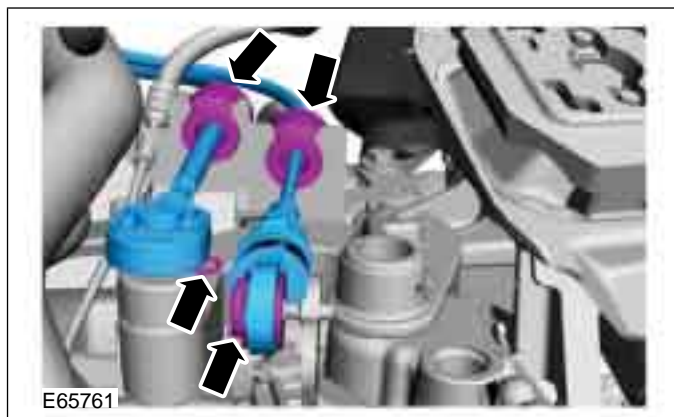


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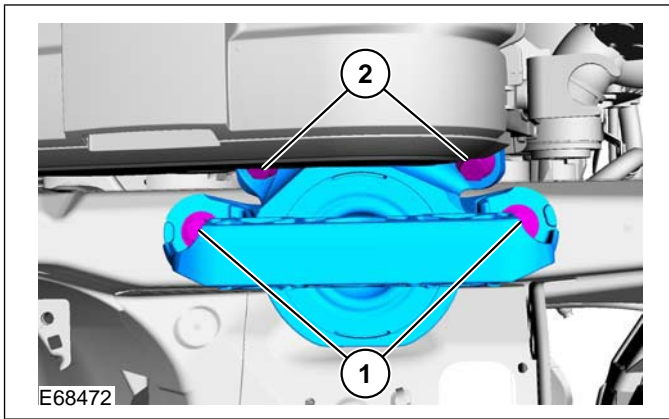
32.  **CAUTION:** Gearshift cables must not be kinked or bent.

35.



REMOVAL

36.

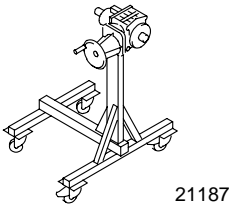
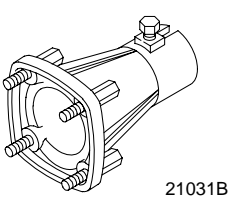
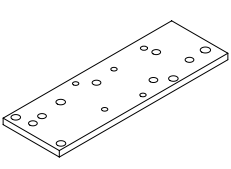
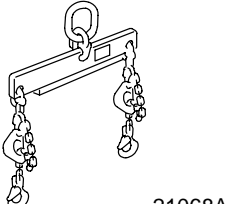
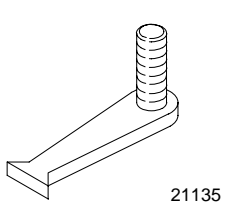


REMOVAL

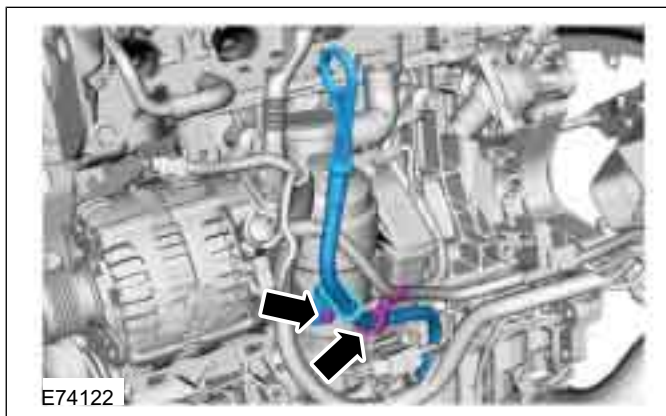
Engine Accessories(21 139 4)

Removal

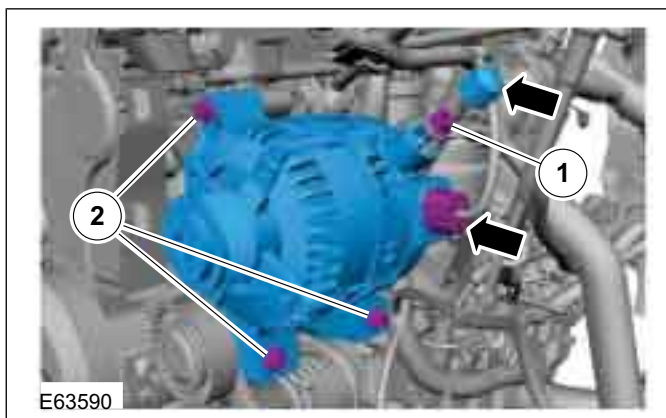
Special Tool(s)

 <p>21187</p>	<p>Mounting Stand 303-435</p>
 <p>21031B</p>	<p>Mounting Bracket for 303-435 303-435-06</p>
 <p>E62805</p>	<p>Mounting Plate for 303-435-06 303-435-14B</p>
 <p>21068A</p>	<p>Lifting Bracket, Engine 303-122</p>
 <p>21135</p>	<p>Locking Tool, Flywheel 303-254</p>

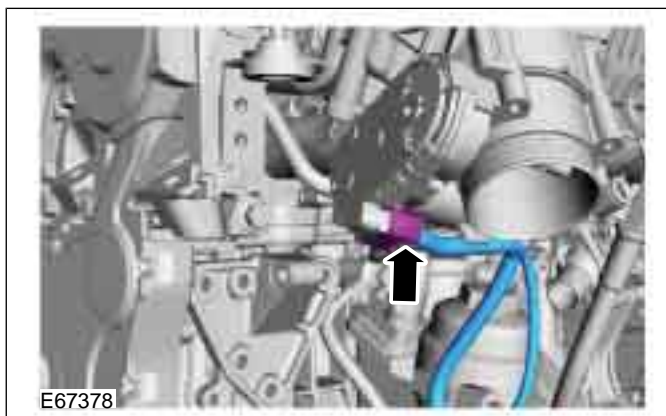
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2.



3.



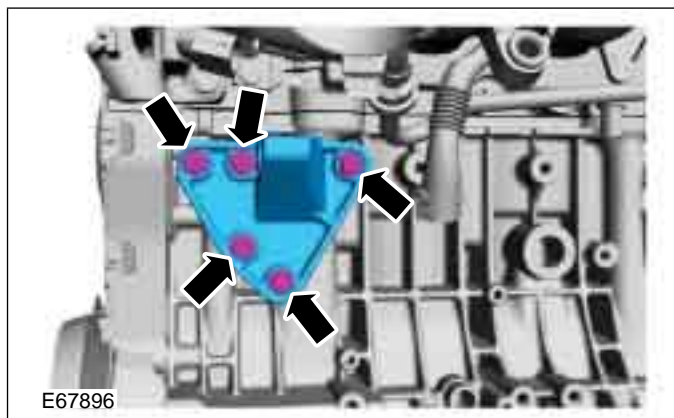
303-01-60

Engine — 2.5L Duratec-ST (VI5)

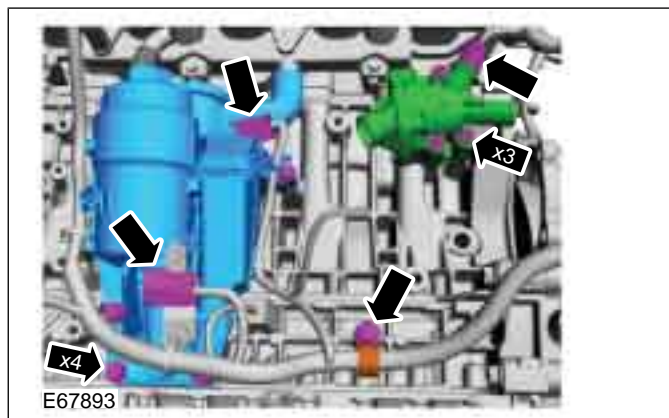
303-01-60

REMOVAL

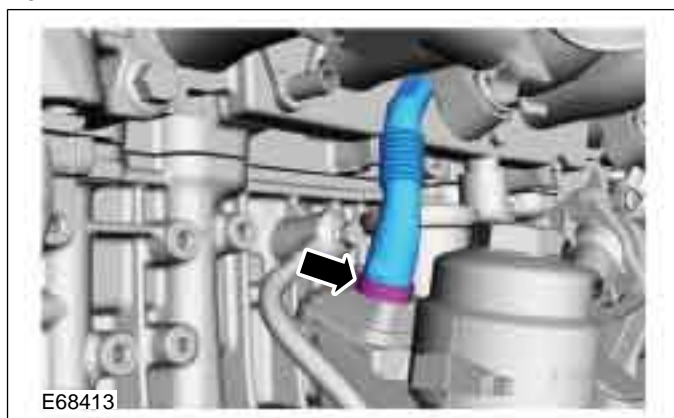
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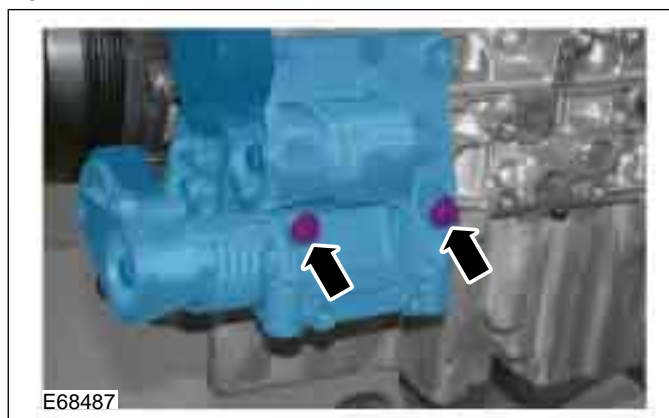
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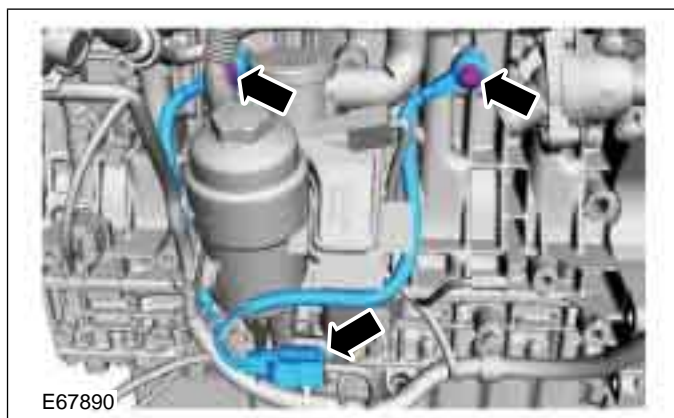
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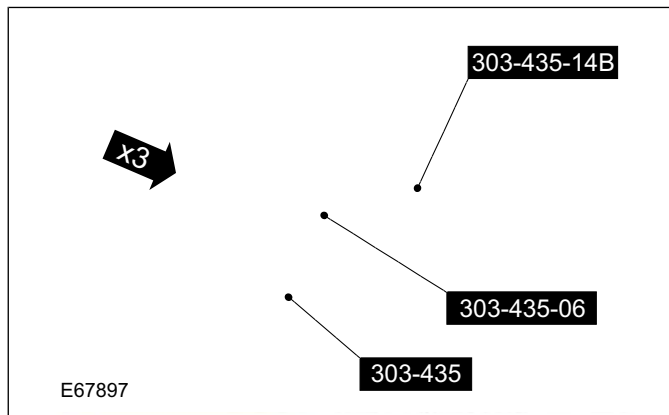
8.



6.



9. Install the Special Tool(s): 303-435, 303-435-06, 303-435-14B

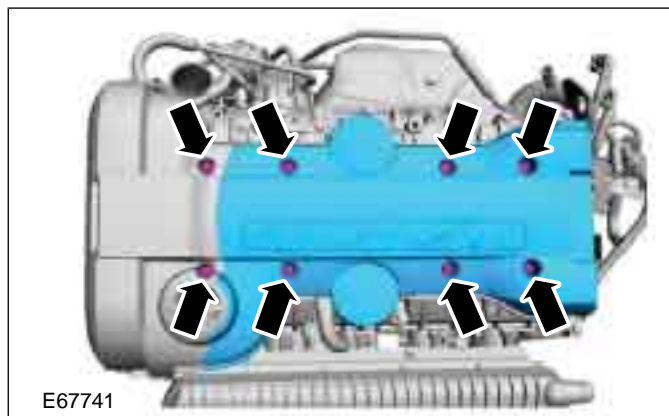


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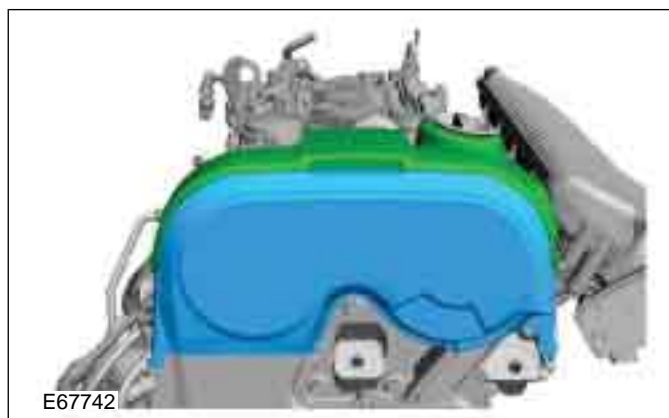
10. Remove the Special Tool(s): 303-122



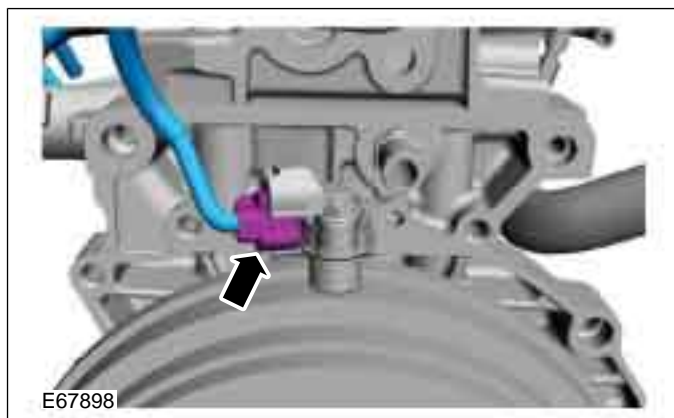
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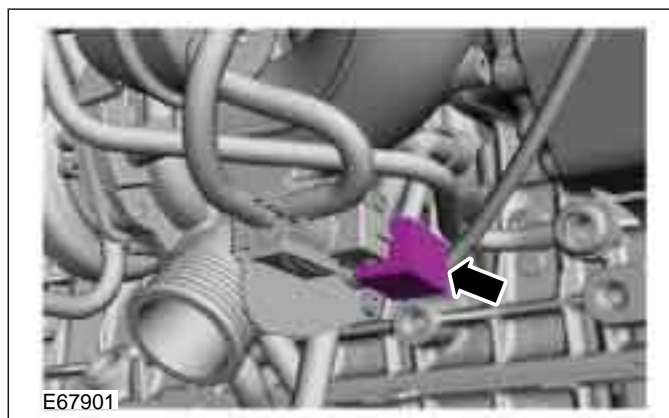
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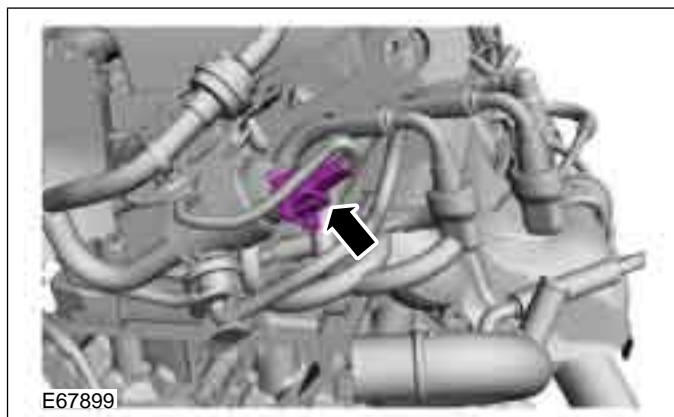
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15.



12.





303-01-62

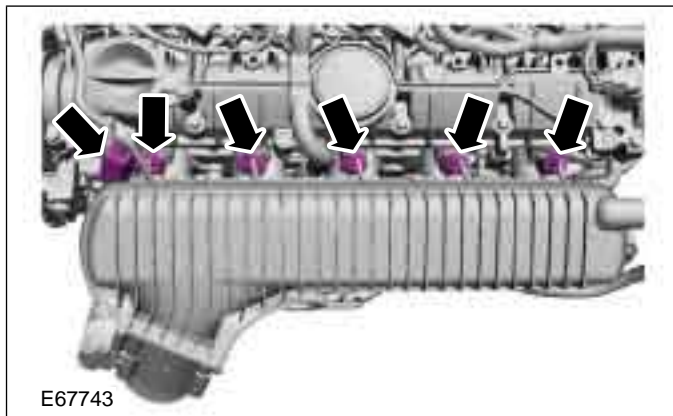
Engine — 2.5L Duratec-ST (VI5)

303-01-62

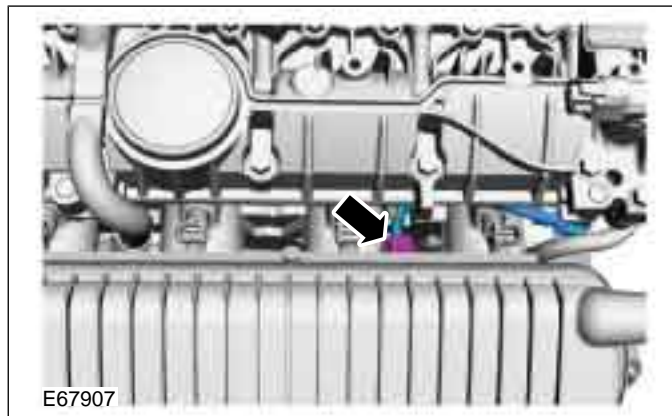


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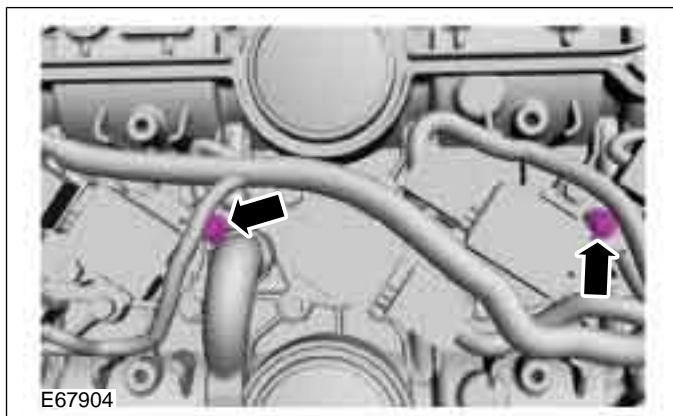
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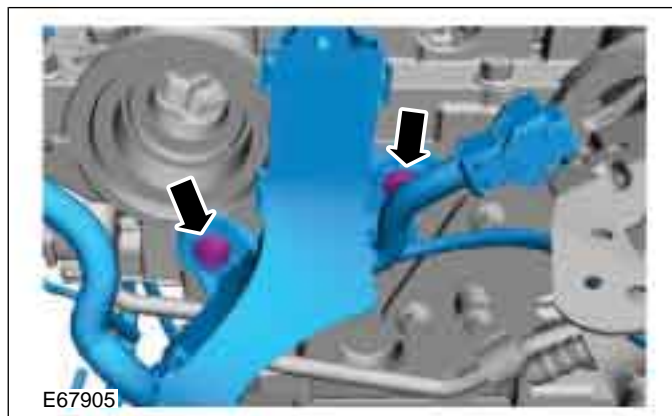
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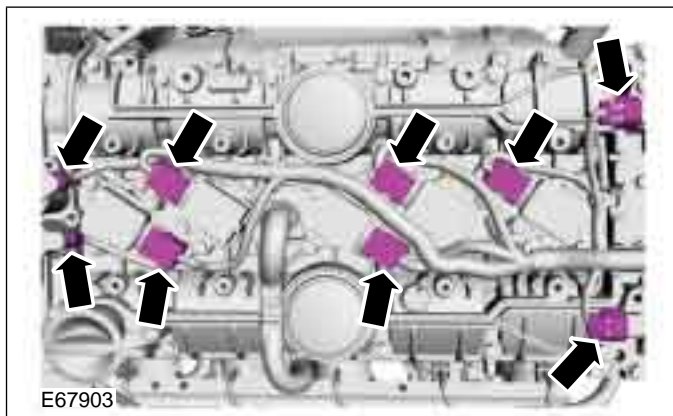
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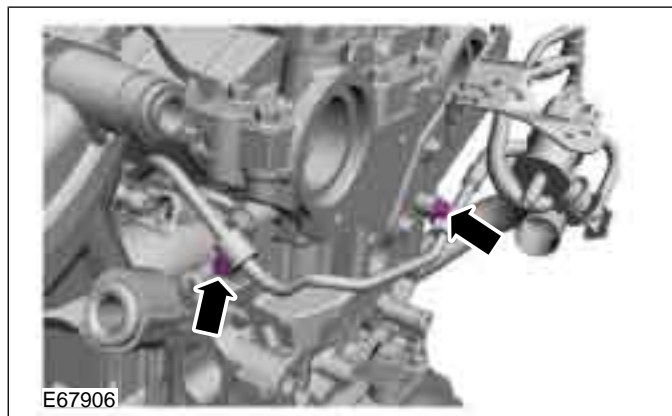
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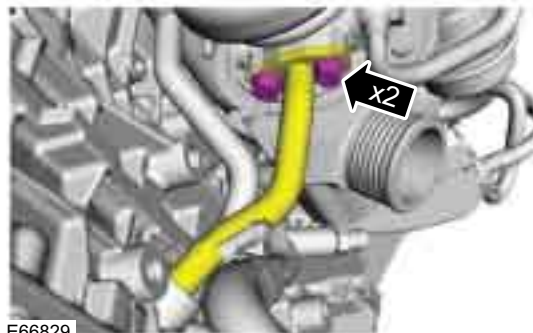


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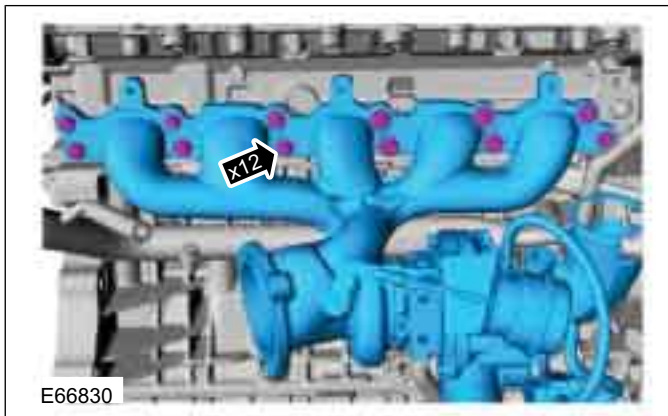
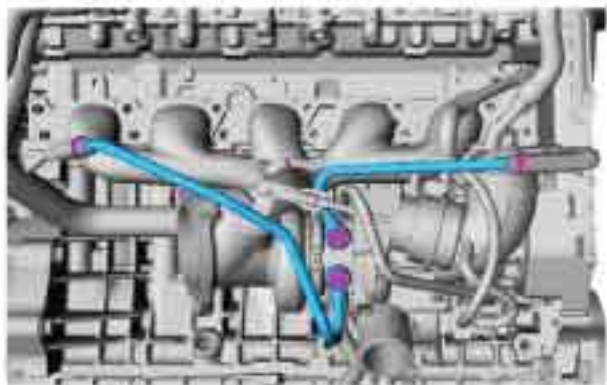


REMOVAL



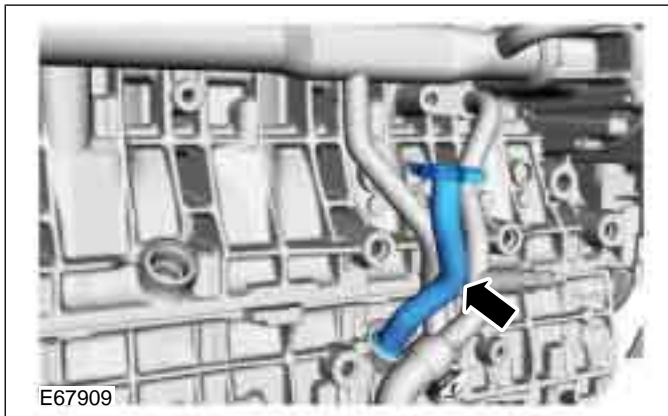
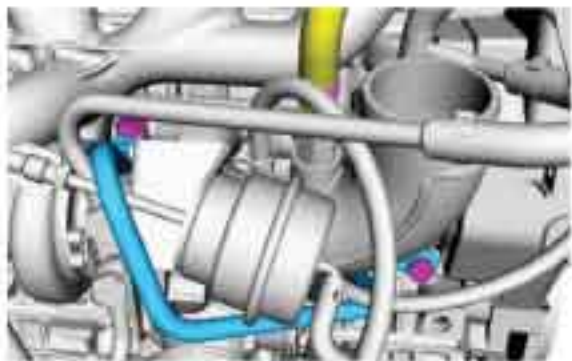
E66829

26.



E66830

27.



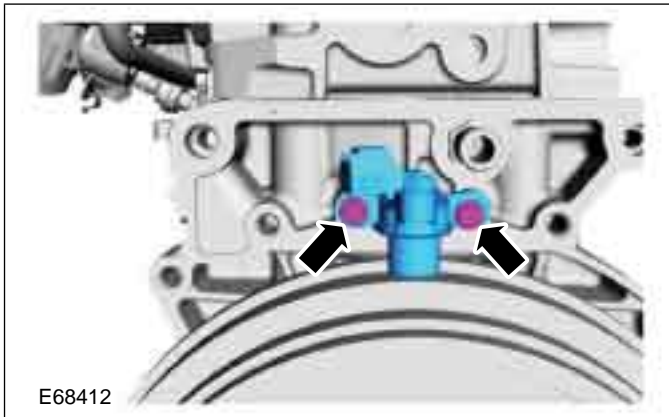
E67909



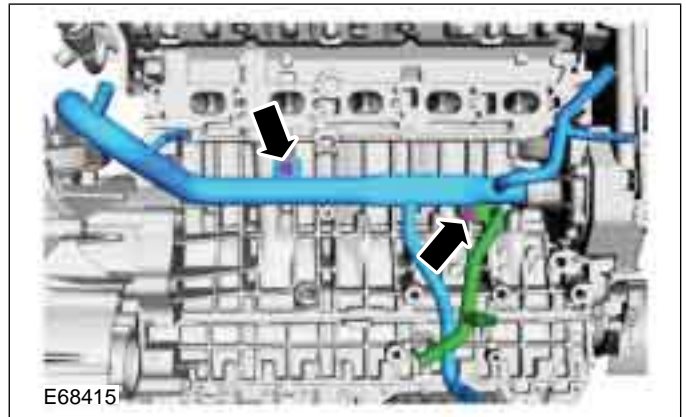


REMOVAL

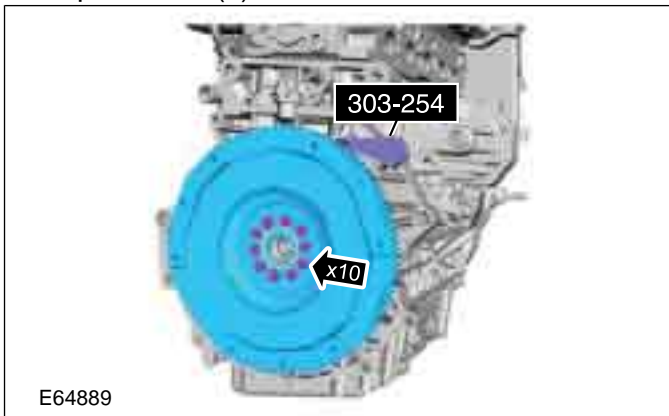
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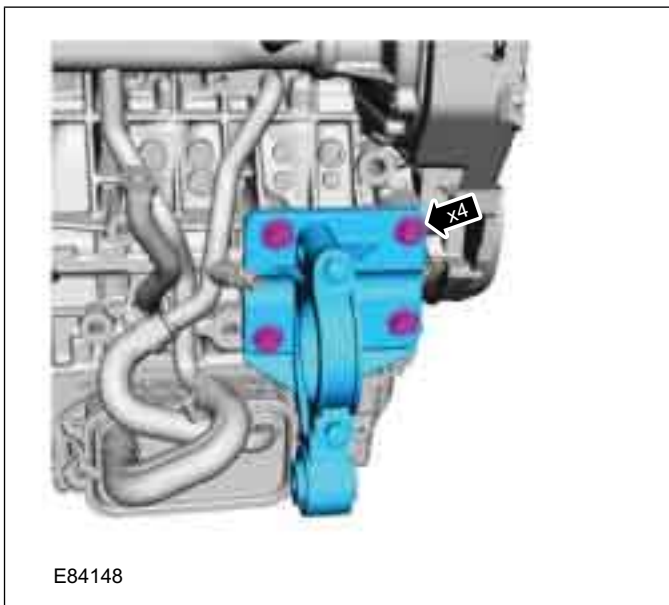
31.



29. Special Tool(s): 303-254



30.







DISASSEMBLY

Engine(21 134 8)

Disassembly

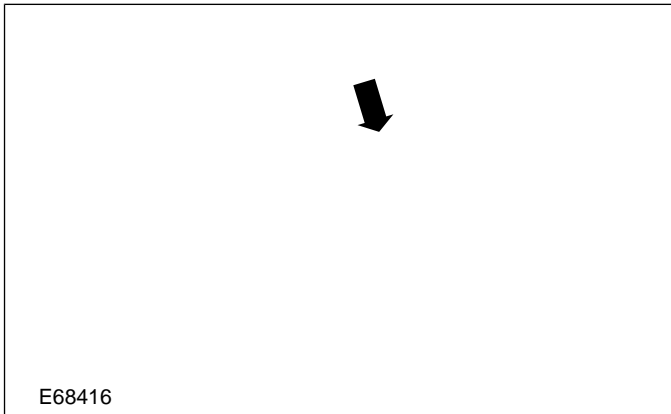
Special Tool(s)

 E62035	Holding Wrench, Crankshaft 303-1179
 13019	Remover, Steering Wheel 211-014

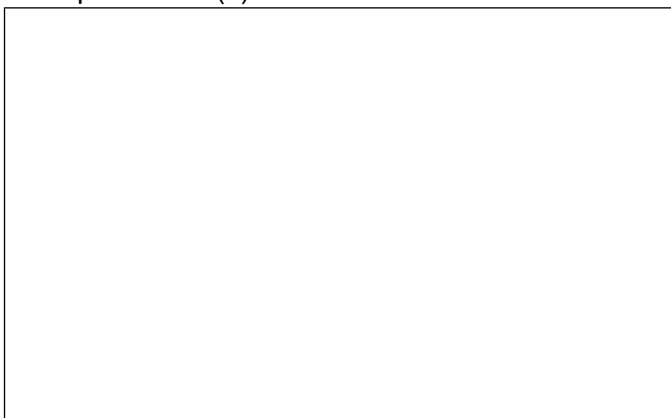
General Equipment

Punch

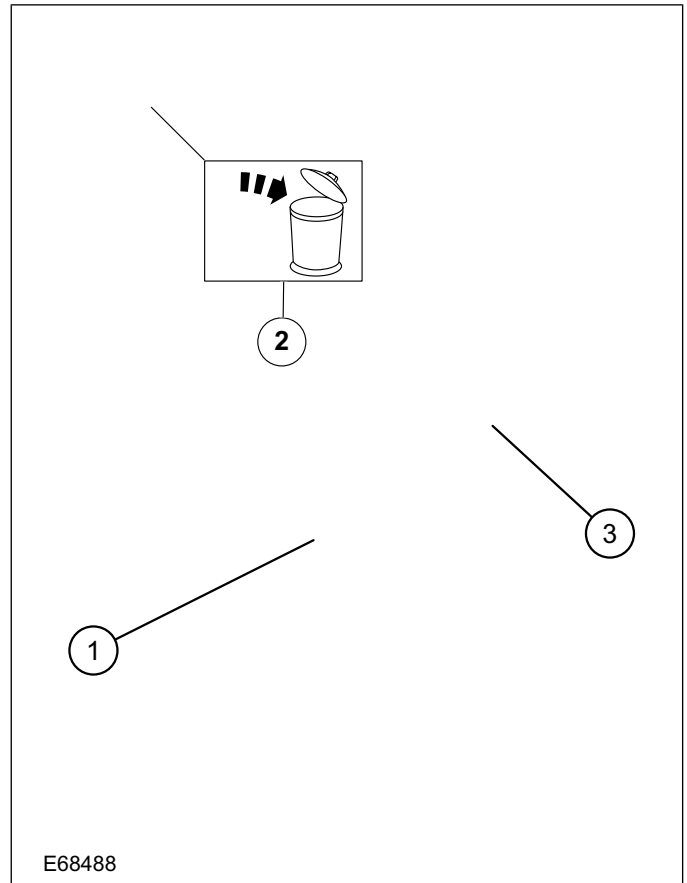
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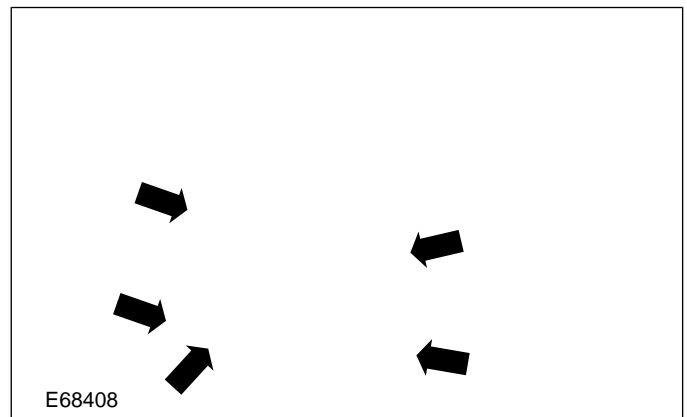
2. Special Tool(s): 303-1179



3.



4.



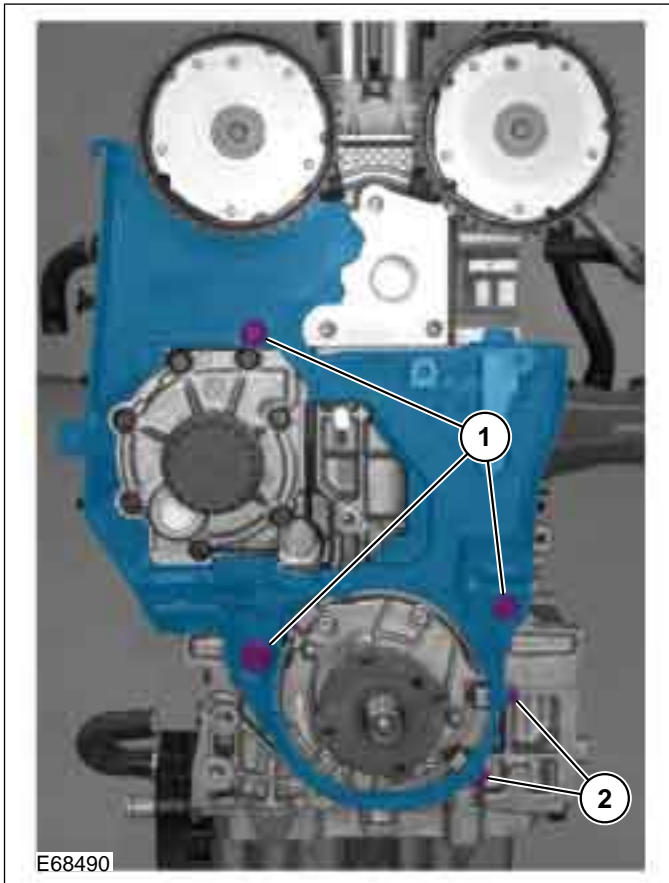
303-01-66

Engine — 2.5L Duratec-ST (VI5)

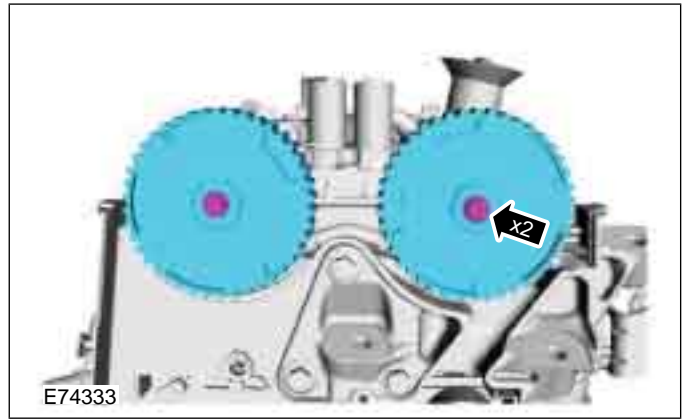
303-01-66

DISASSEMBLY

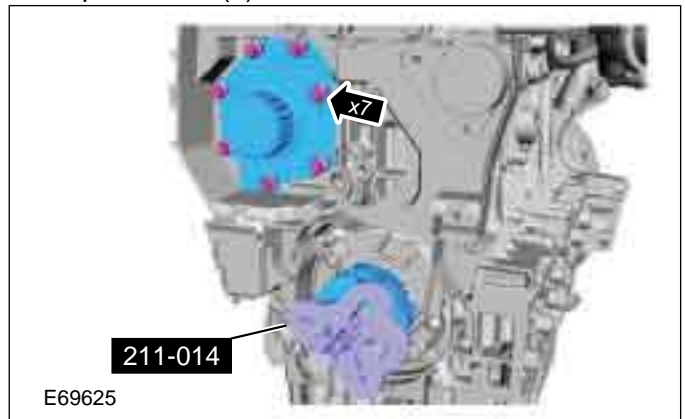
5.



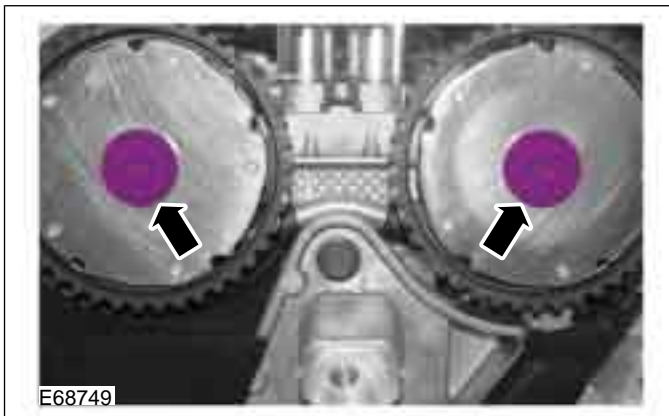
7.



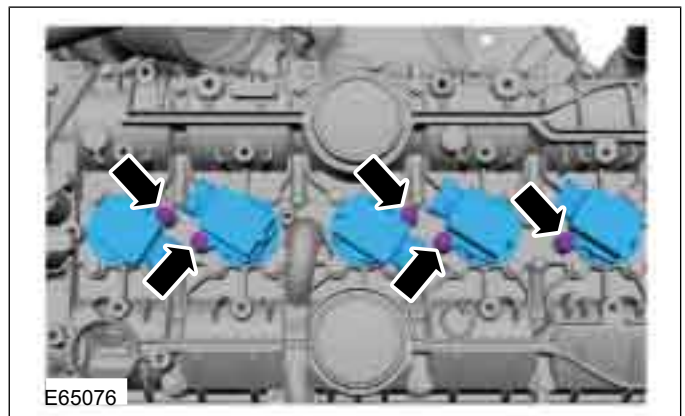
8. Special Tool(s): 211-014



6.



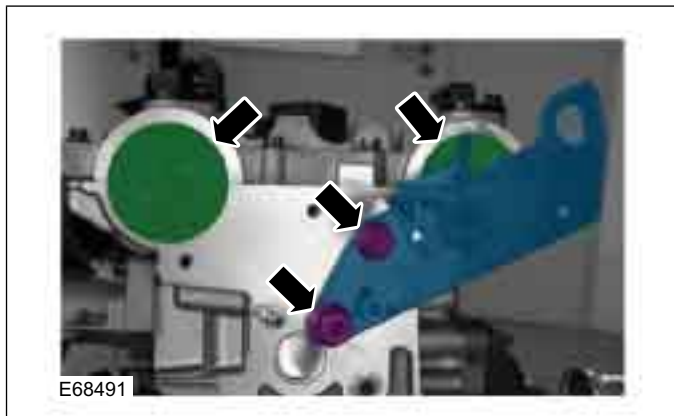
9.



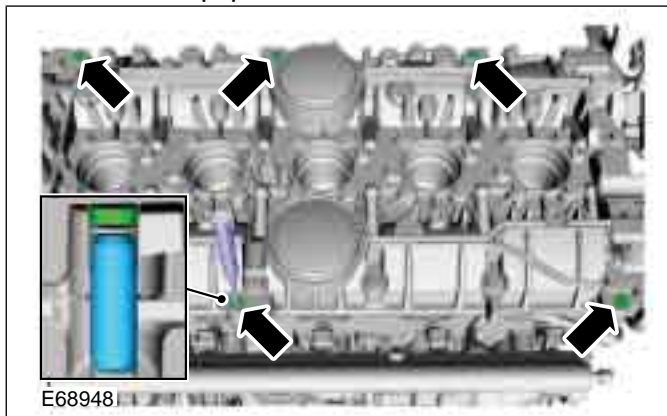


DISASSEMBLY

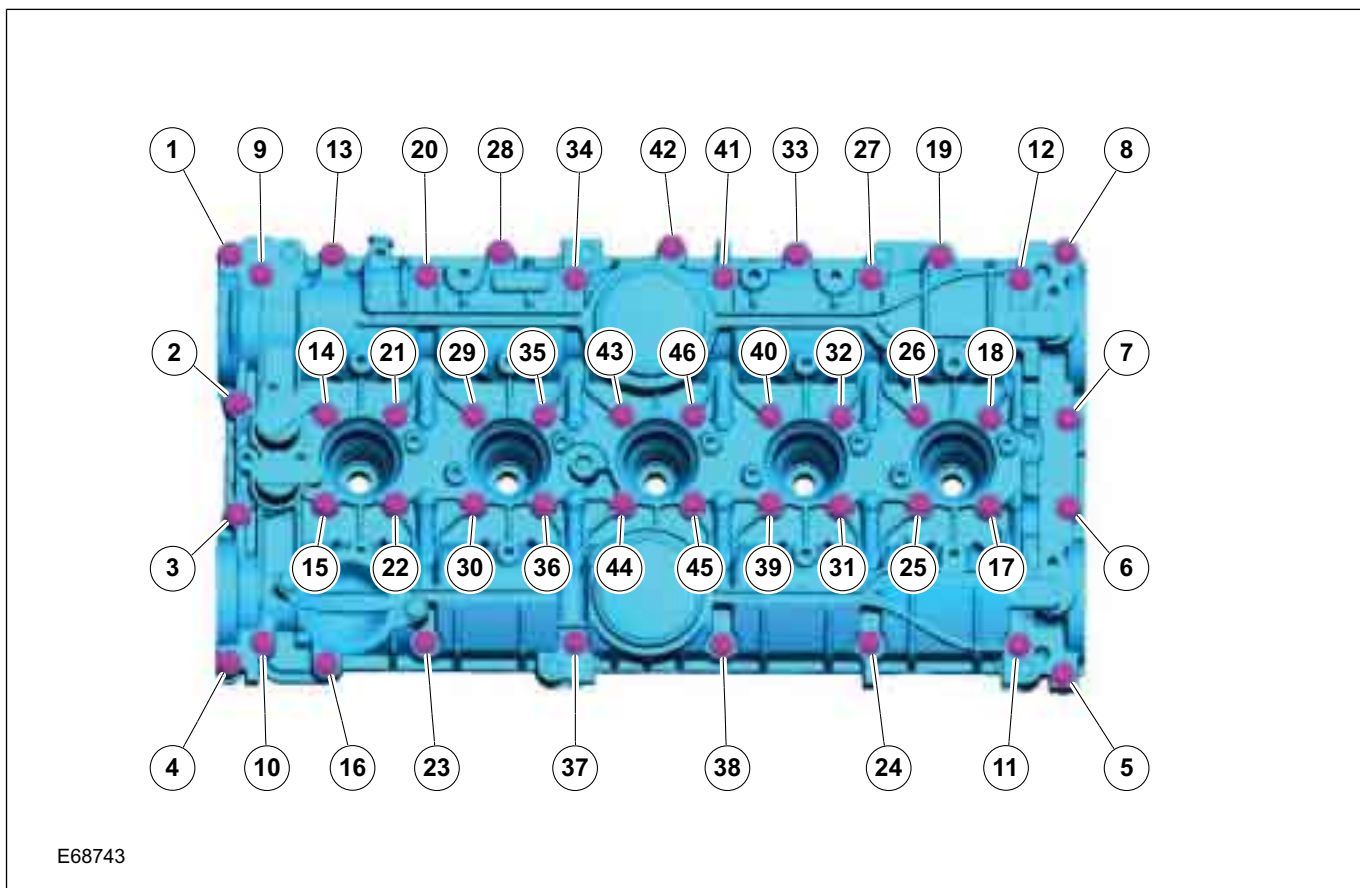
10.



11. General Equipment: Punch



12





303-01-68

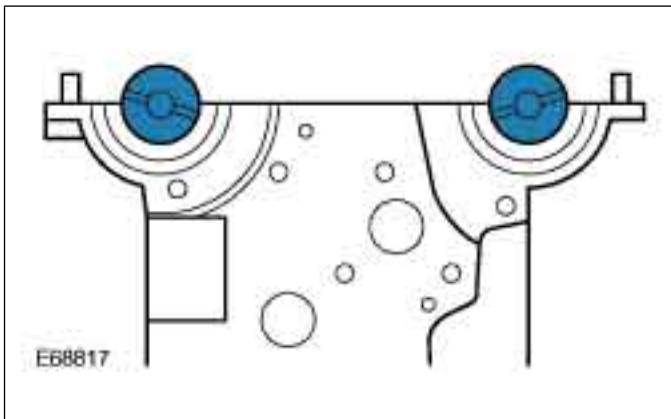
Engine — 2.5L Duratec-ST (VI5)

303-01-68

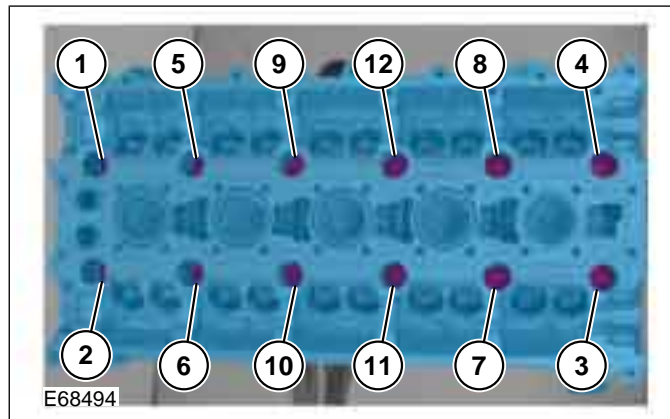


DISASSEMBLY

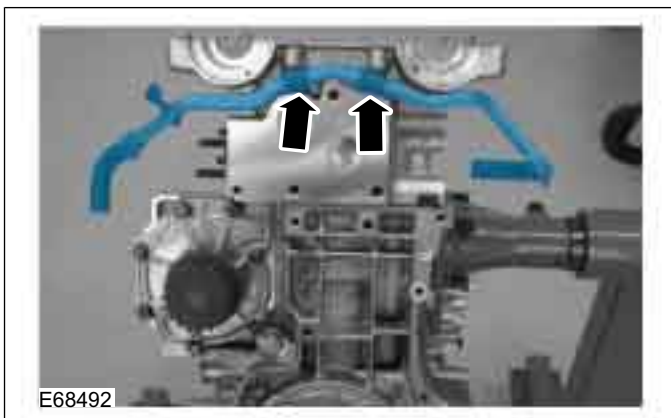
13.



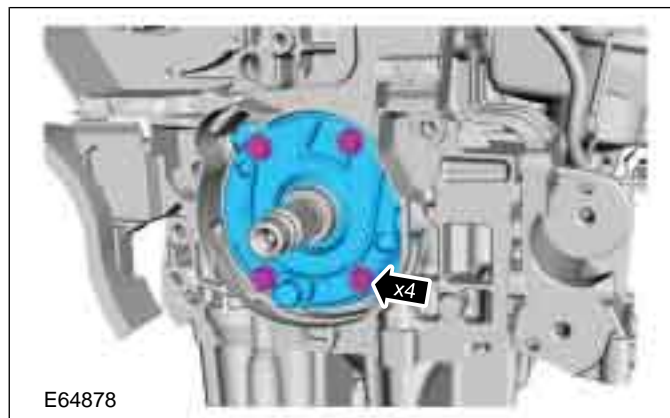
16.



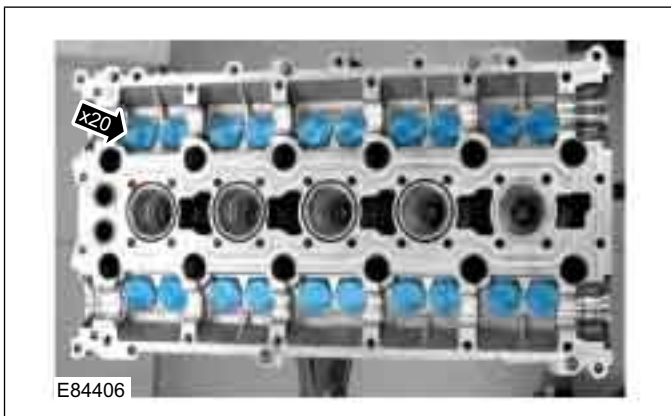
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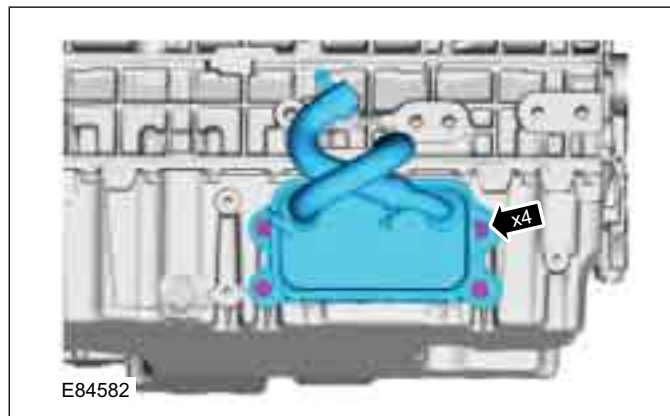
17.



15.



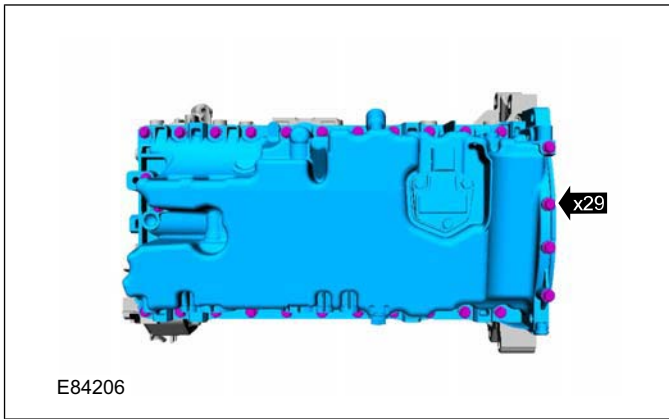
18.



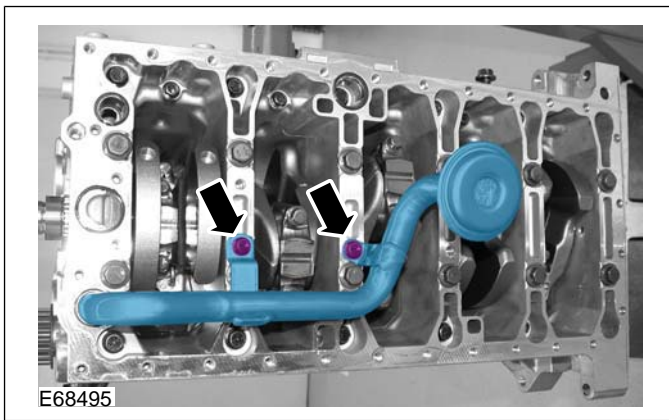


DISASSEMBLY

19.



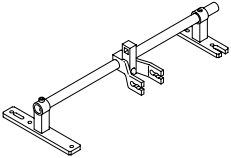
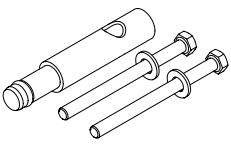
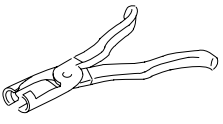
20.



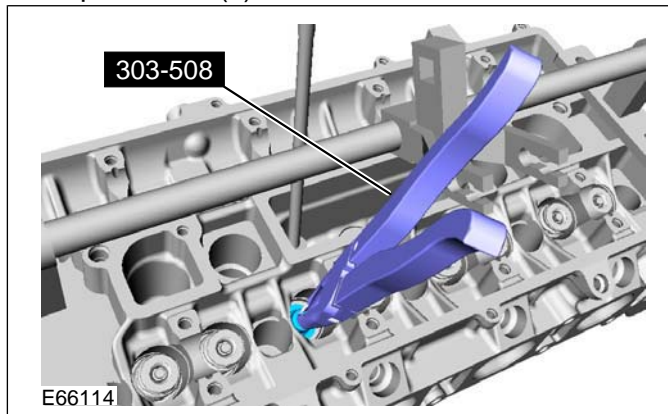
DISASSEMBLY AND ASSEMBLY OF SUBASSEMBLIES

Cylinder Head(21 165 6)

Special Tool(s)

 <p>E62757</p>	<p>Compressor, Valve Spring 303-361B</p>
 <p>E62041</p>	<p>Adapter for 303-361B 303-361B-06</p>
 <p>21211</p>	<p>Pliers, Valve Stem Seal 303-508</p>

2. Special Tool(s): 303-508

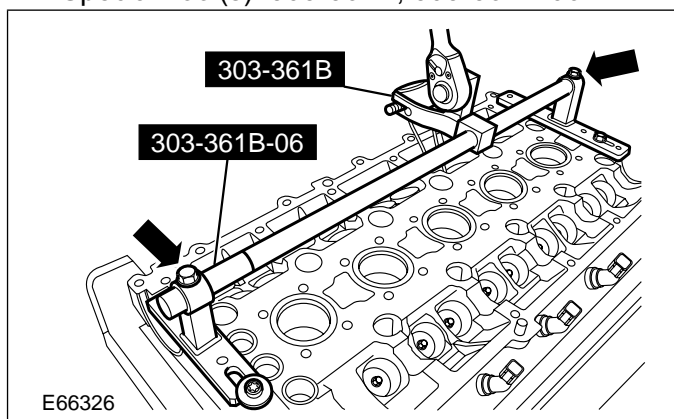


Assembly

3. To install, reverse the assembly procedure.

Disassembly

1. Special Tool(s): 303-361B, 303-361B-06

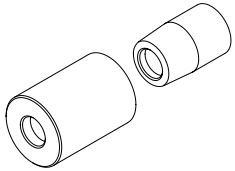
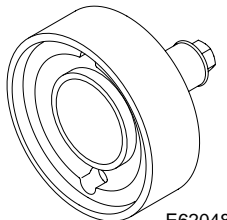
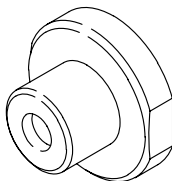
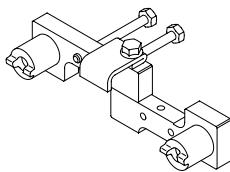
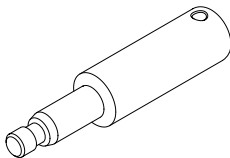


ASSEMBLY

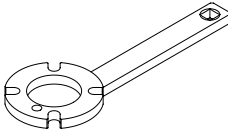
Engine(21 134 8)

Assembly

Special Tool(s)

 <p>E62050</p>	<p>Installer, Crankshaft Front Seal 303-1180</p>
 <p>E62048</p>	<p>Installer, Crankshaft Rear Seal 303-1181</p>
 <p>21148</p>	<p>Aligner/Installer, Crankshaft Front Seal 303-318</p>
 <p>E62051</p>	<p>Timing Tool Camshaft 303-1178</p>
 <p>E62027</p>	<p>Timing Tool, Crankshaft 303-1182</p>

Special Tool(s)

 <p>E62035</p>	<p>Holding Wrench, Crankshaft 303-1179</p>
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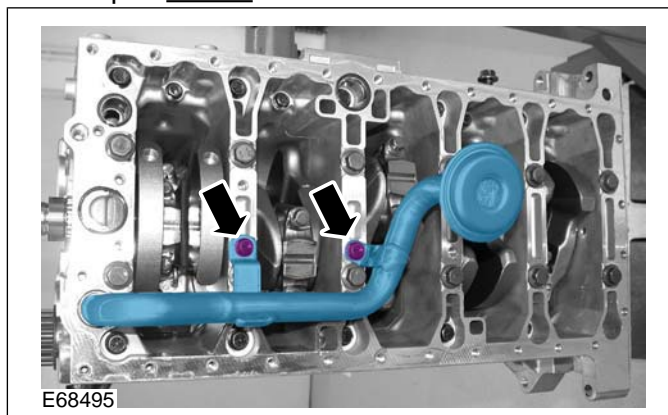
Materials

Name	Specification
Sealant - Loctite 510	WSK-M2G348-A7
Engine Oil - 5W-30	WSS-M2C913-B

General Equipment

<p>Round-ended steel rule</p>

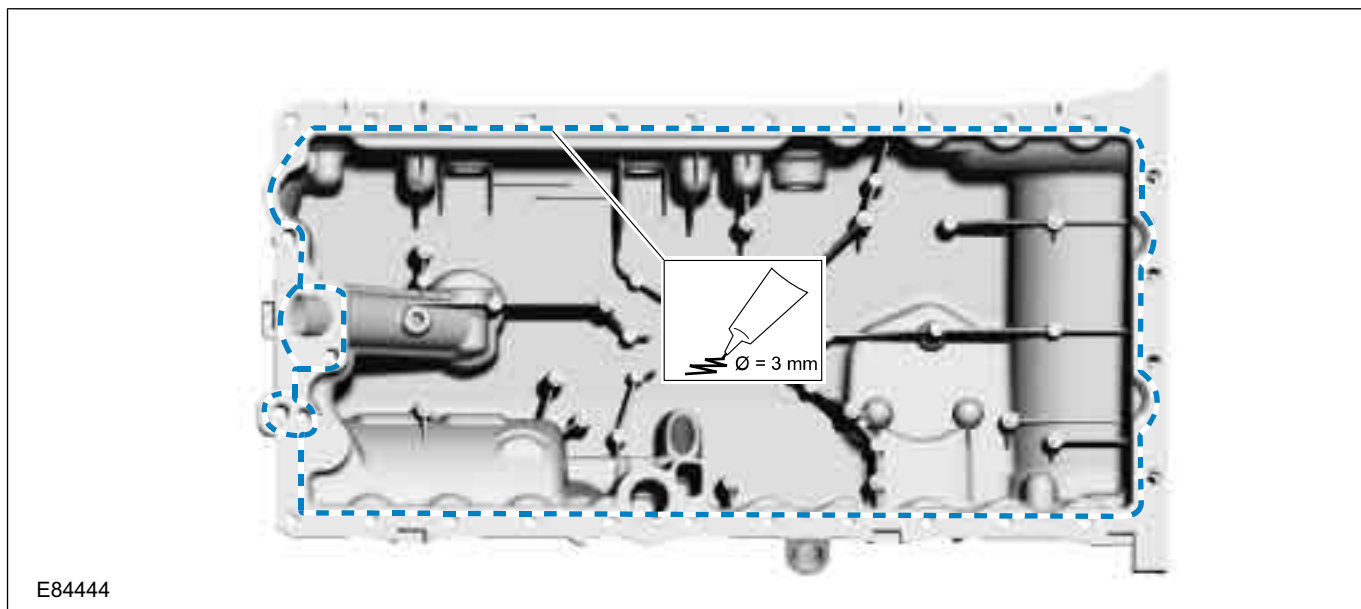
1. Torque: 17 Nm



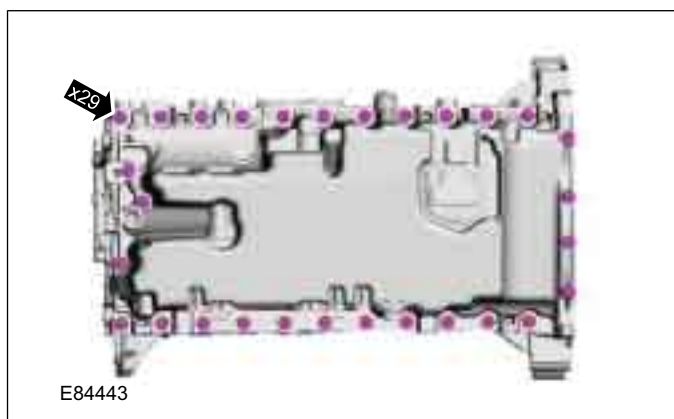
2. NOTE: The component must be installed within 5 minutes of applying the sealant.

Material: Sealant - Loctite 510

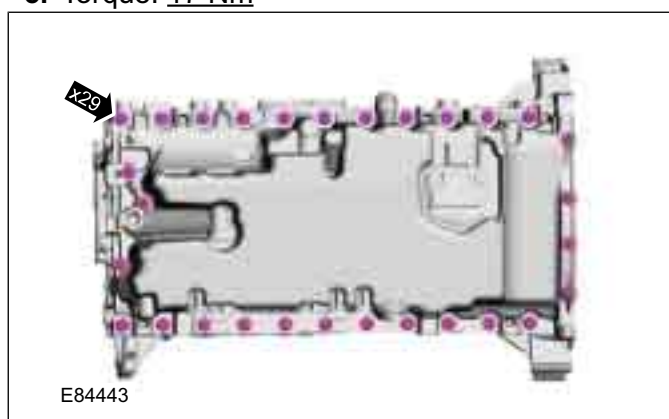
ASSEMBLY



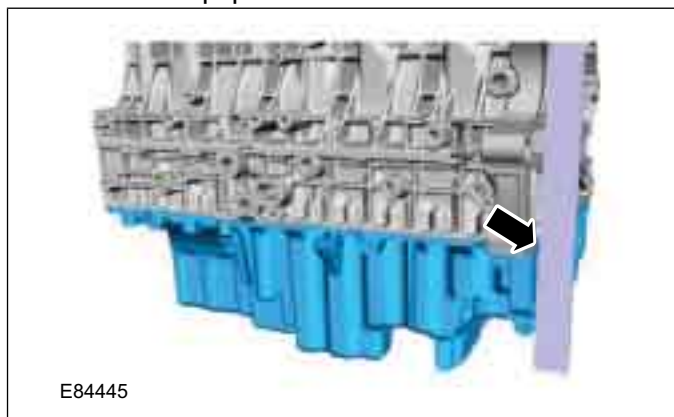
3. **NOTE:** Only tighten the bolts finger tight at this stage.



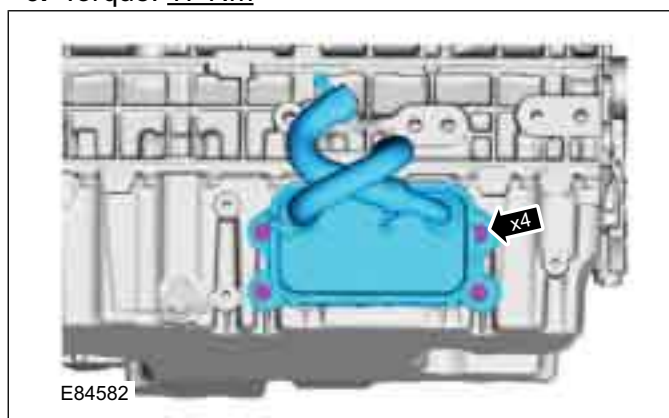
5. Torque: 17 Nm



4. General Equipment: Round-ended steel rule



6. Torque: 17 Nm



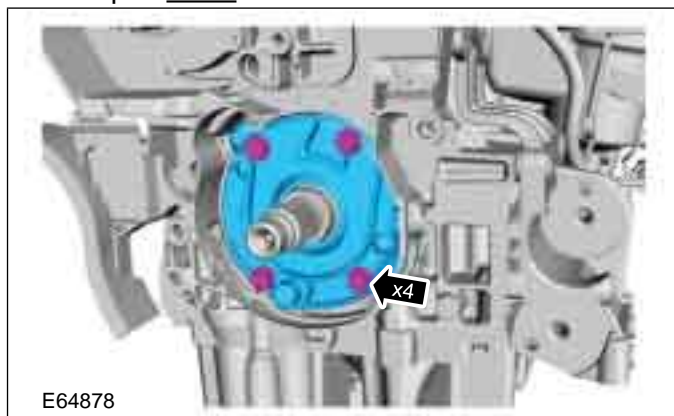
303-01-73

Engine — 2.5L Duratec-ST (VI5)

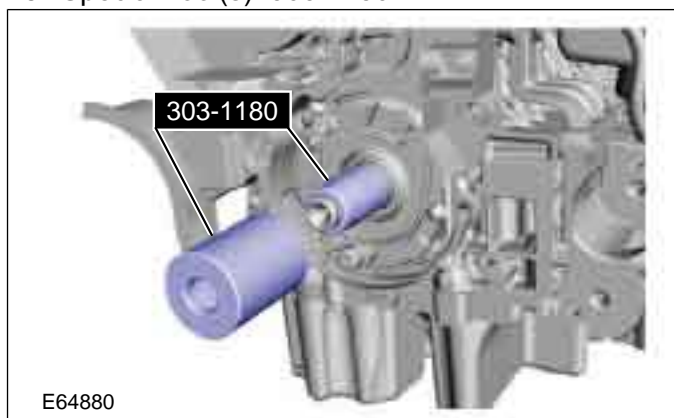
303-01-73

ASSEMBLY

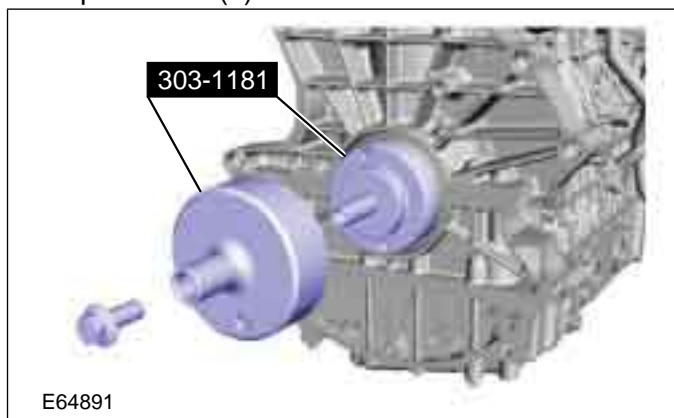
7. Torque: 6 Nm



8. Special Tool(s): 303-1180

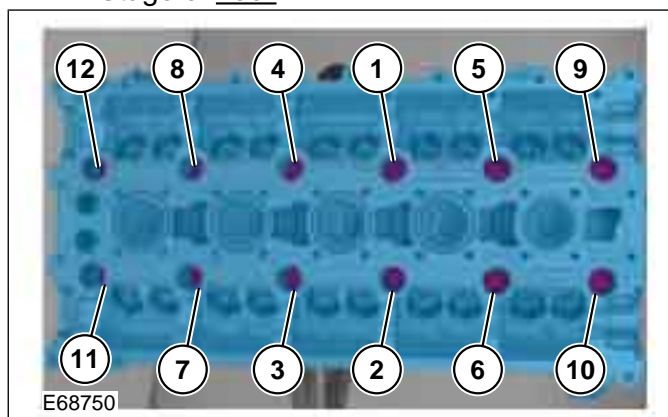


9. Special Tool(s): 303-1181



10. Torque:

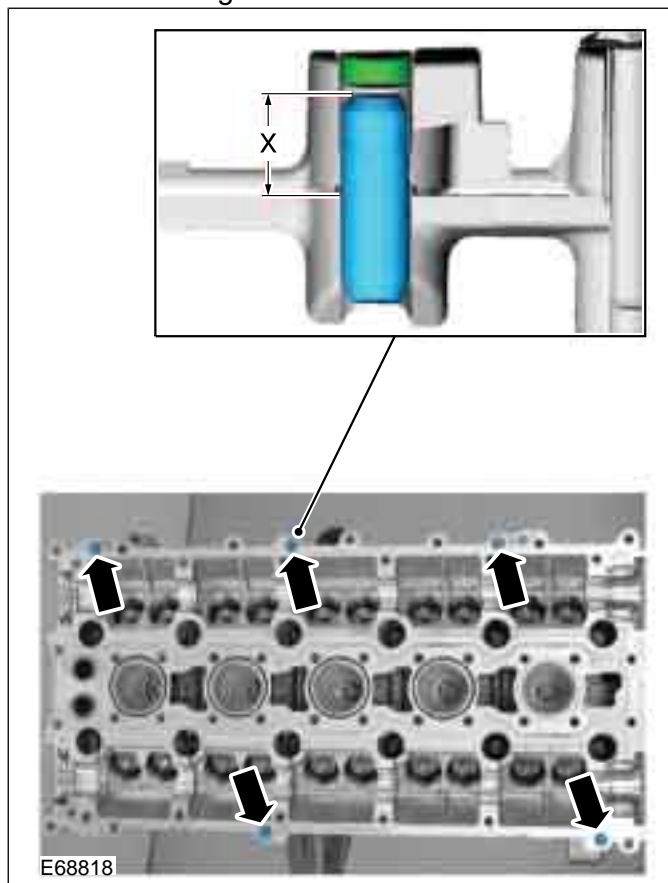
- Stage 1: 20 Nm
- Stage 2: 60 Nm
- Stage 3: 130°



11. • Install the locating pins.
• X = 15 mm.

12 Apply engine oil to all camshaft bearings.

Material: Engine Oil - 5W-30





303-01-74

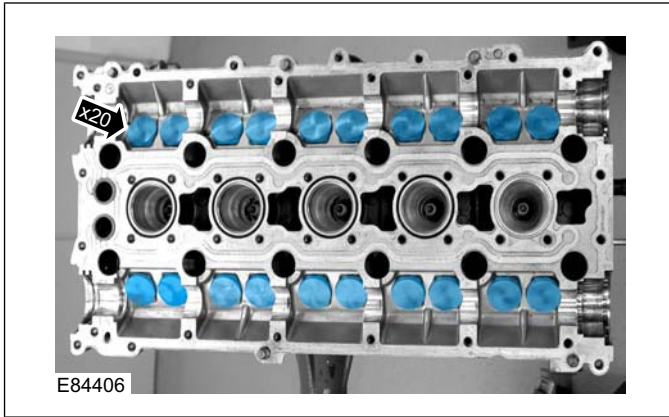
Engine — 2.5L Duratec-ST (VI5)

303-01-74

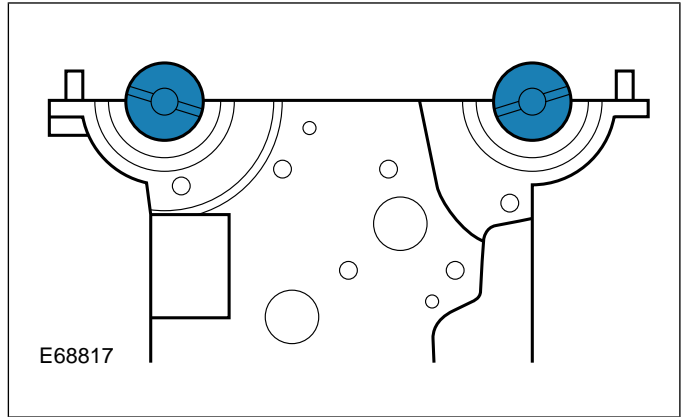


ASSEMBLY

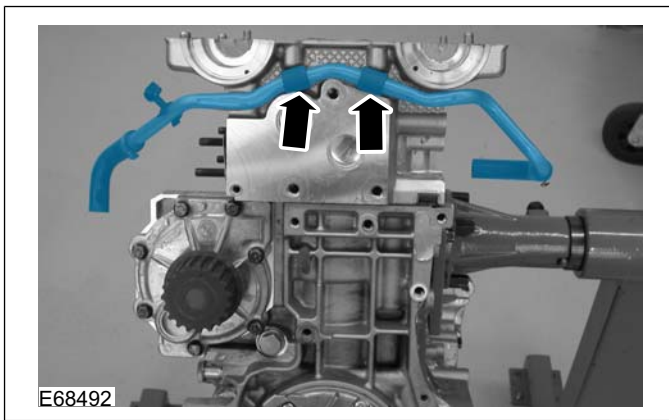
13.



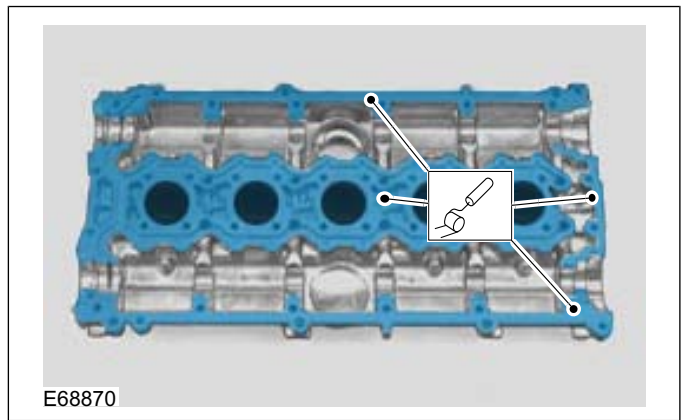
15.



14.



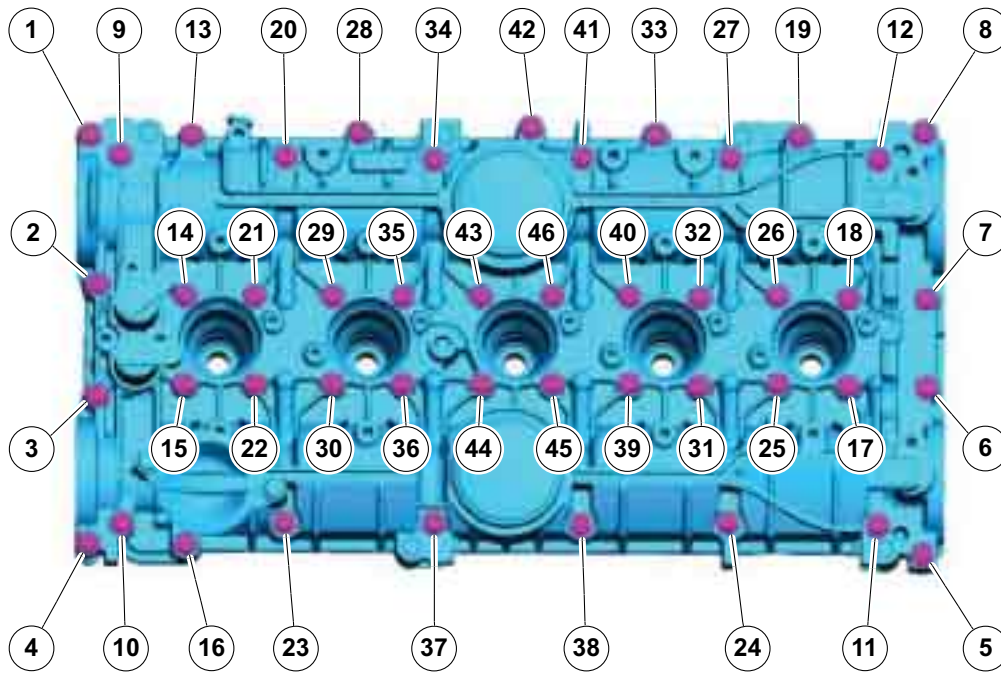
16. Material: Sealant - Loctite 510



17. Torque: 17 Nm

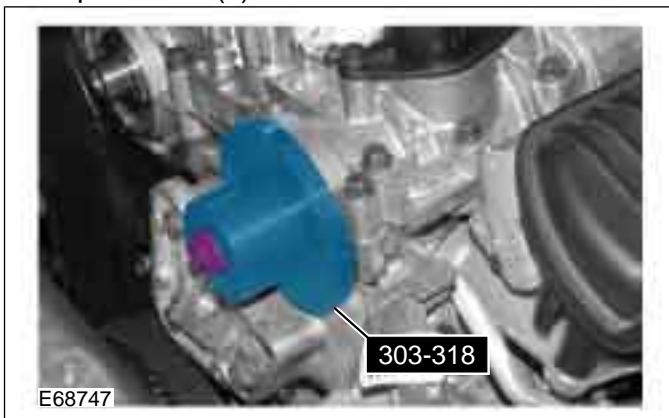


ASSEMBLY



E68743

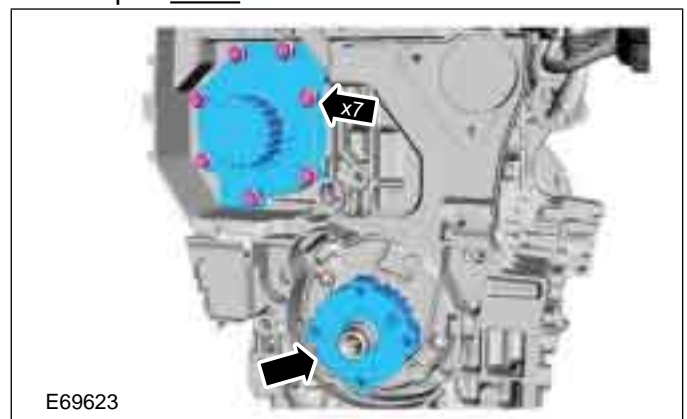
18. Special Tool(s): 303-318



E68747

19. **NOTE:** The crankshaft timing pulley can only be installed in 1 position on the crankshaft splines.

Torque: 7 Nm



E69623

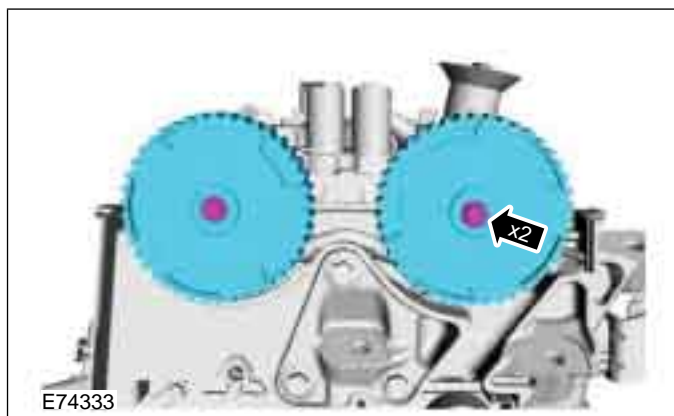
303-01-76

Engine — 2.5L Duratec-ST (VI5)

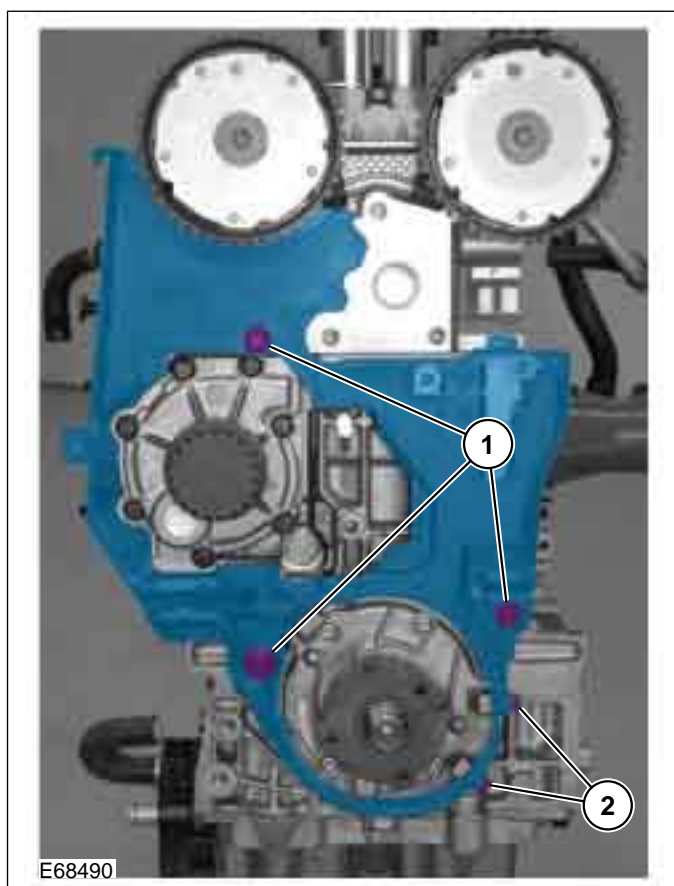
303-01-76

ASSEMBLY

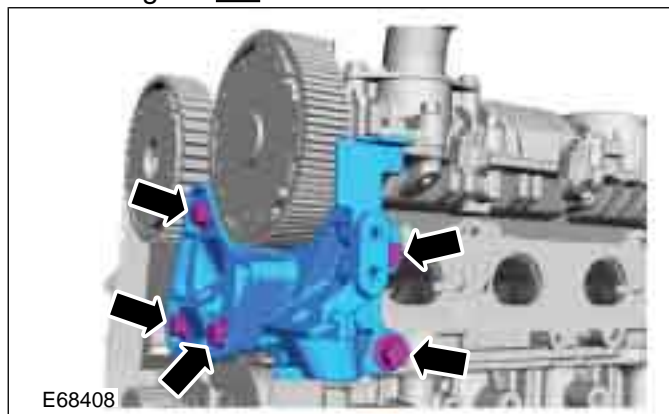
20. NOTE: Only tighten the bolts finger tight at this stage.



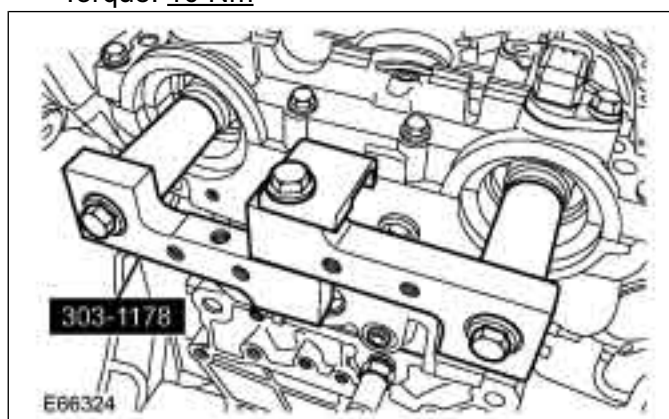
- 21. 1. Torque: 25 Nm
- 2. Torque: 12 Nm



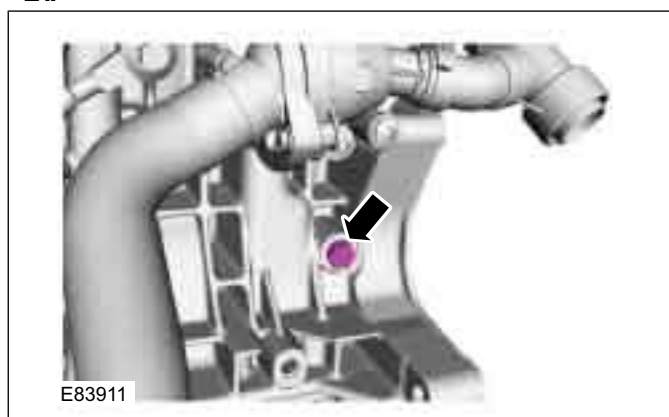
- 22 Torque:
 - Stage 1: 35 Nm
 - Stage 2: 75°



- 23. Install the Special Tool(s): 303-1178
Torque: 10 Nm



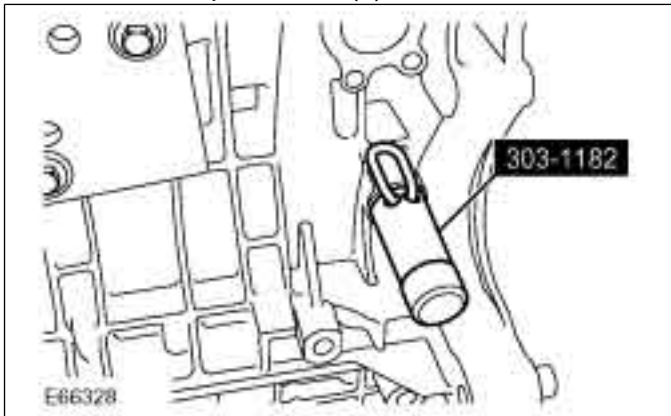
24.



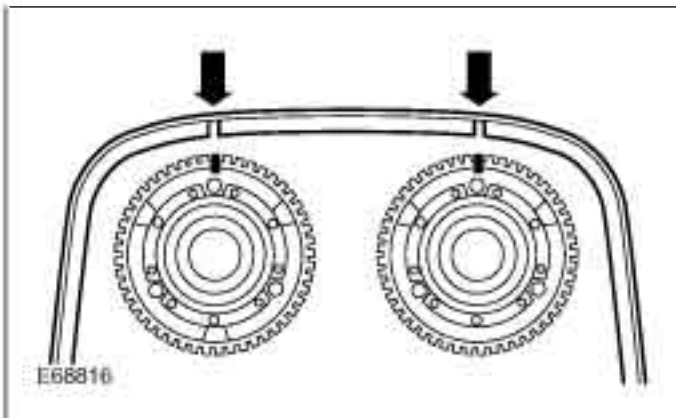
ASSEMBLY

25. Using the special tool, adjust the crankshaft to TDC.

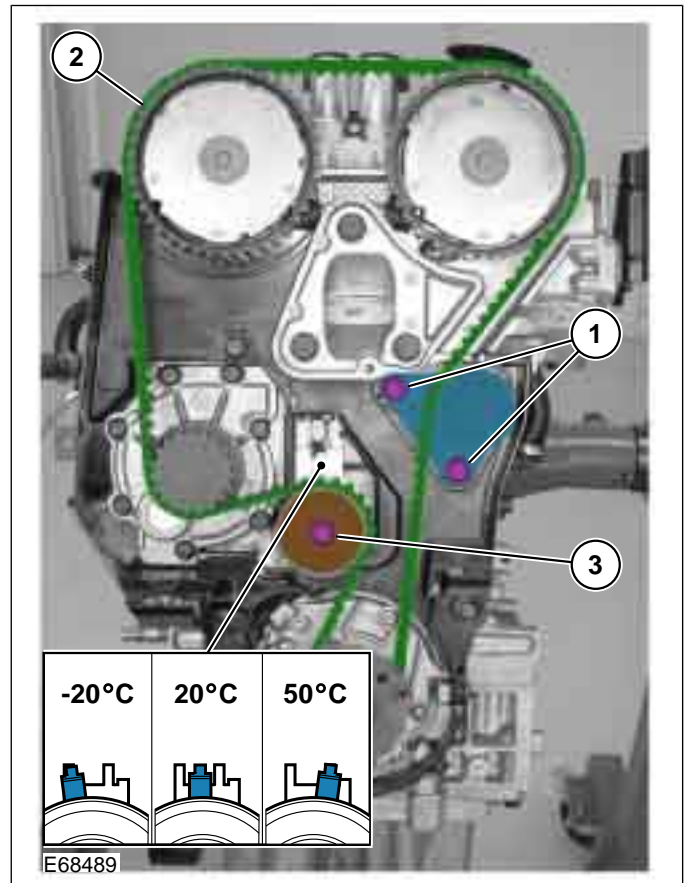
Install the Special Tool(s): 303-1182



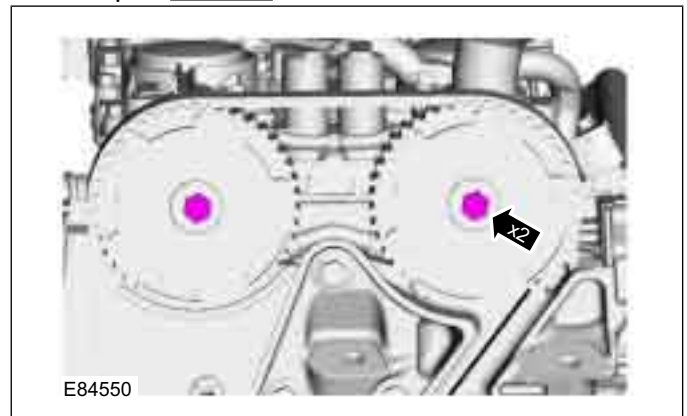
26. **NOTE:** Make sure that the camshaft sprockets can rotate on the camshafts.



- 27. 1. Torque: 20 Nm
- 2. **NOTE:** Make sure that a new component is installed.
- 3. Depending on the engine temperature, tension the timing belt.
Torque: 20 Nm

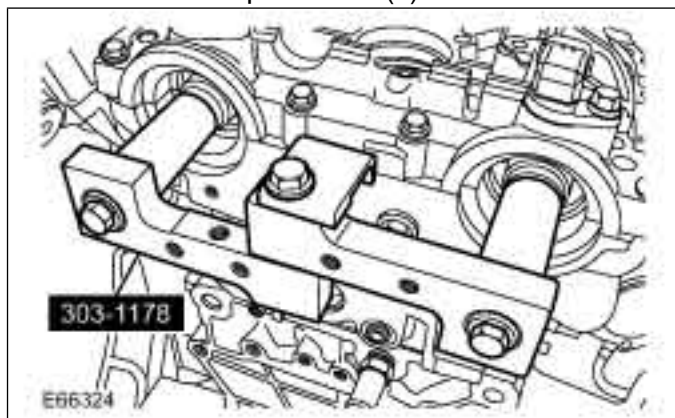


28. Torque: 120 Nm

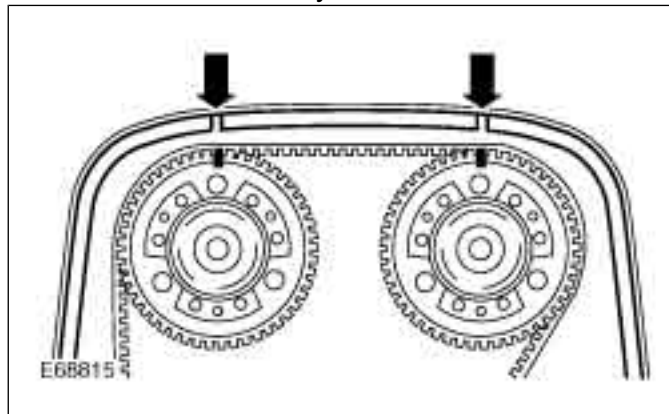


ASSEMBLY

29. Remove the Special Tool(s): 303-1178



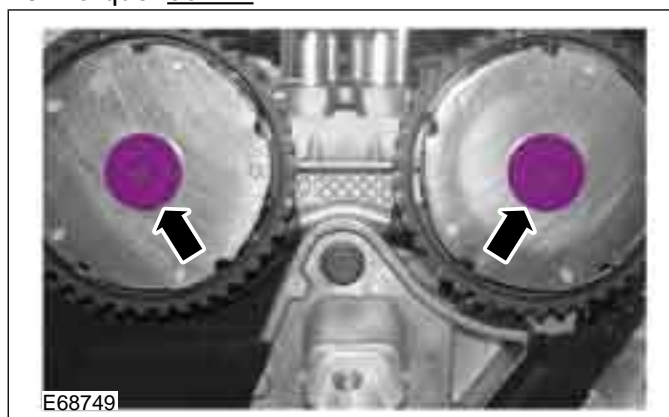
33. Check the position of the timing marks and correct if necessary.



30. Remove the Special Tool(s): 303-1182



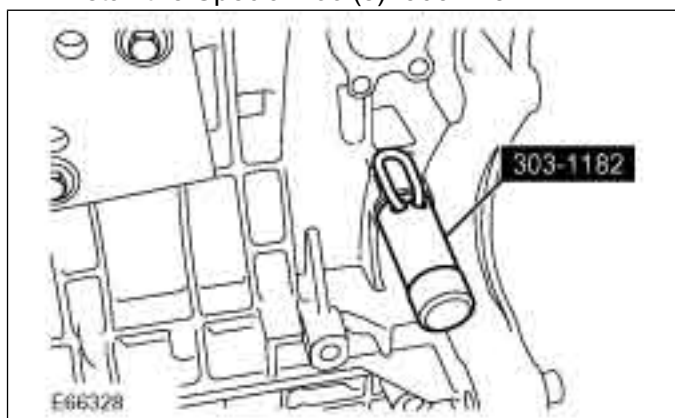
34. Torque: 35 Nm



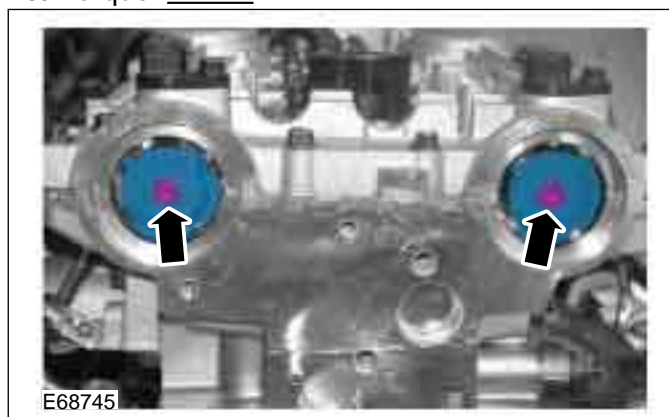
31. Rotate the crankshaft two revolutions clockwise.

32. Using the special tool, adjust the crankshaft to TDC.

Install the Special Tool(s): 303-1182



35. Torque: 17 Nm



303-01-79

Engine — 2.5L Duratec-ST (VI5)

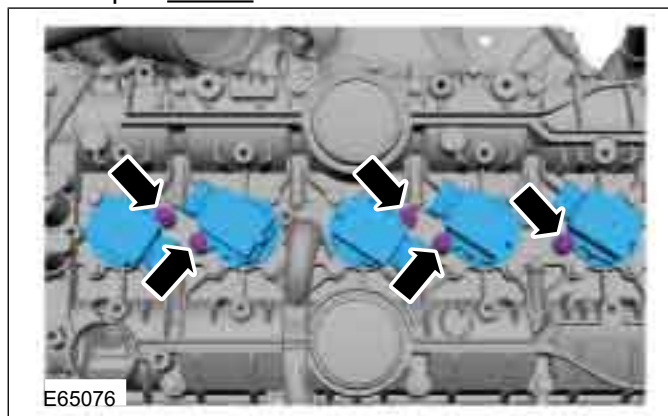
303-01-79

ASSEMBLY

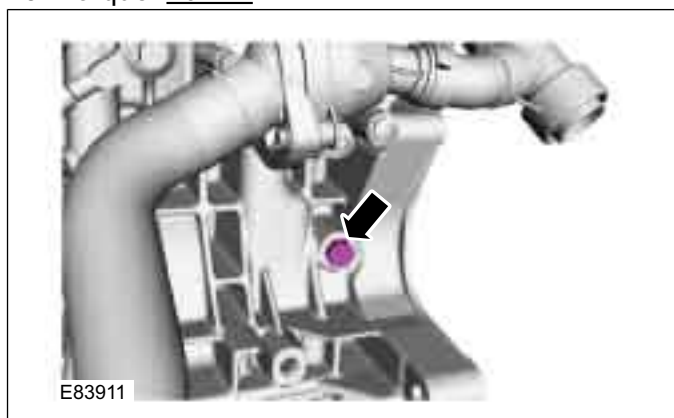
36. Remove the Special Tool(s): 303-1182



39. Torque: 10 Nm



37. Torque: 40 Nm

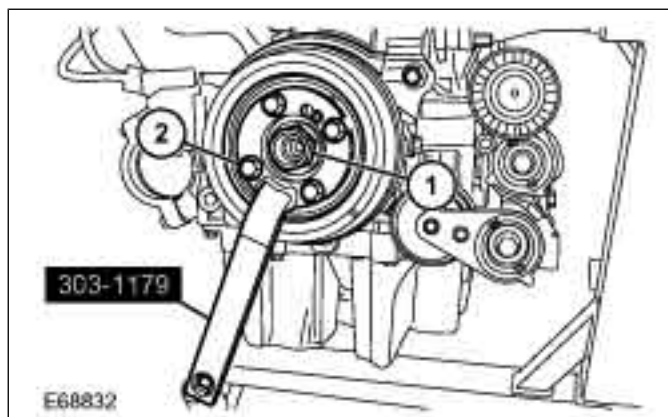


40. 1. Special Tool(s): 303-1179

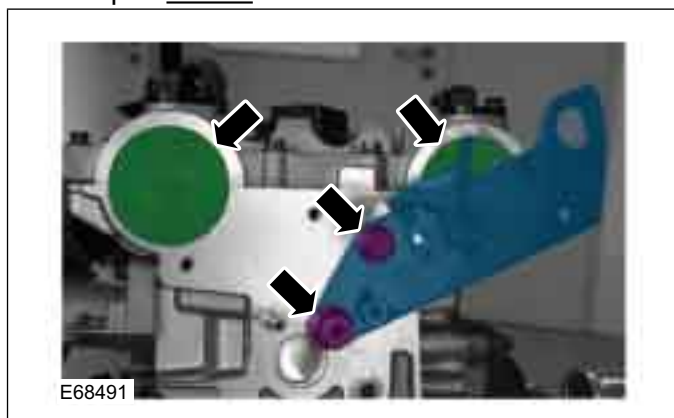
Torque: 180 Nm

2. Torque:

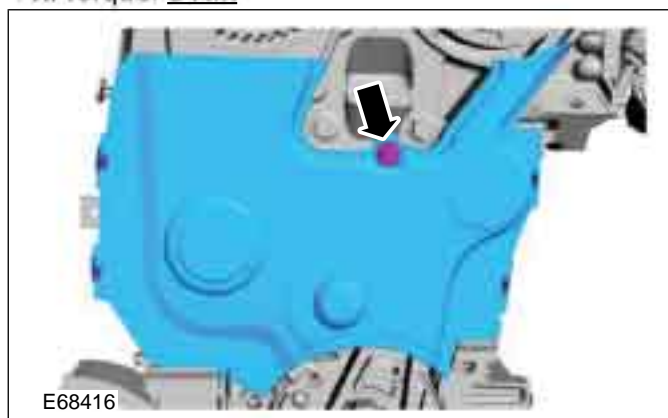
- Stage 1: 25 Nm
- Stage 2: 60°



38. Torque: 50 Nm



41. Torque: 8 Nm

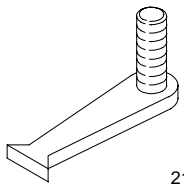
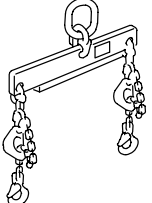
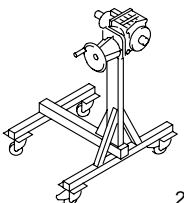
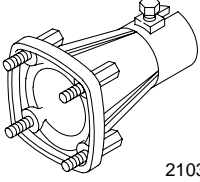
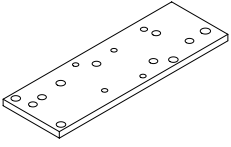


INSTALLATION

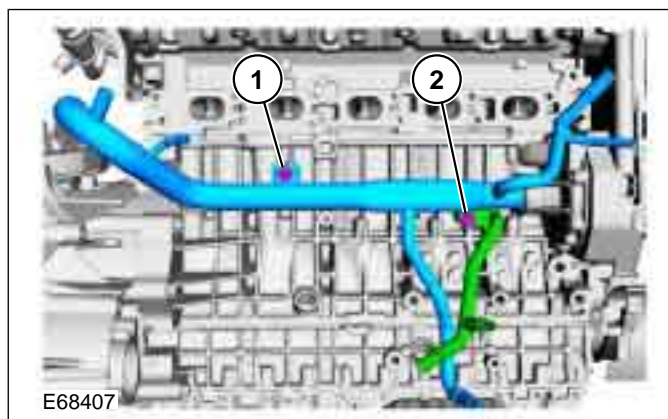
Engine Accessories(21 139 4)

Installation

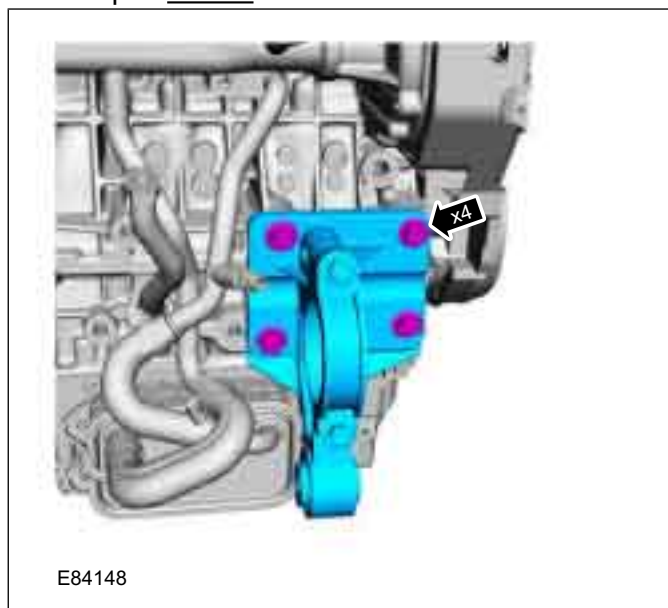
Special Tool(s)

 <p>21135</p>	<p>Locking Tool, Flywheel 303-254</p>
 <p>21068A</p>	<p>Lifting Bracket, Engine 303-122</p>
 <p>21187</p>	<p>Mounting Stand 303-435</p>
 <p>21031B</p>	<p>Mounting Bracket for 303-435 303-435-06</p>
 <p>E62805</p>	<p>Mounting Plate for 303-435-06 303-435-14B</p>

1. Torque: 17 Nm
2. Torque: 24 Nm



2. Torque: 48 Nm



3.  **CAUTION:** Make sure that no excess sealant residue is evident.

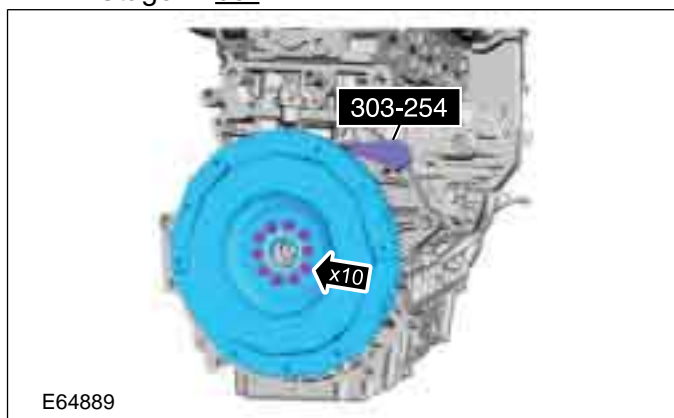
INSTALLATION

NOTE: Make sure that the locating pin on the crankshaft is aligned with the guide hole in the flywheel or flexplate.

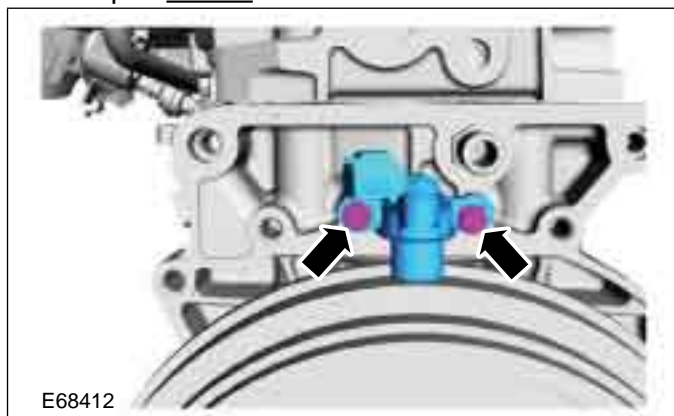
Special Tool(s): 303-254

Torque:

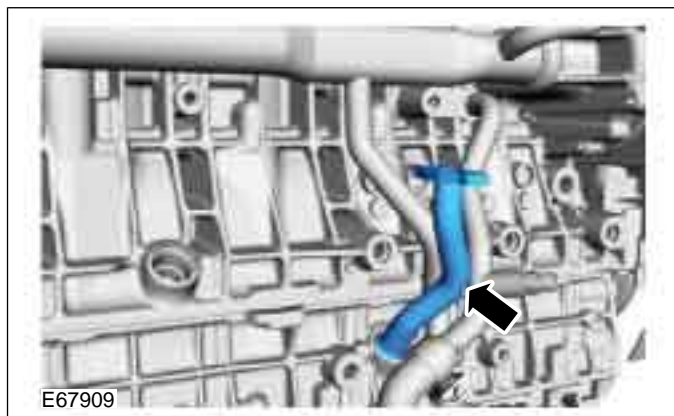
- Stage 1: 45 Nm
- Stage 2: 65°



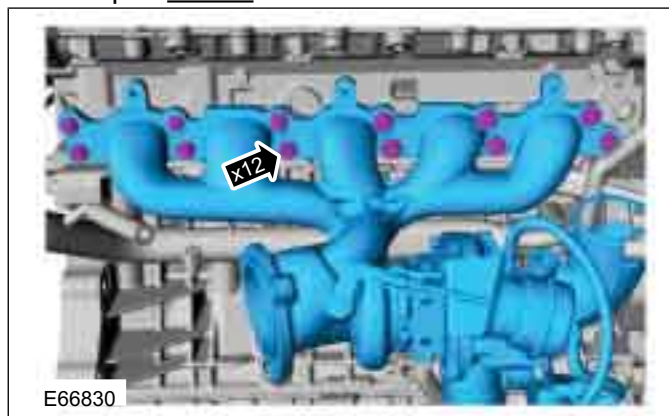
4. Torque: 17 Nm



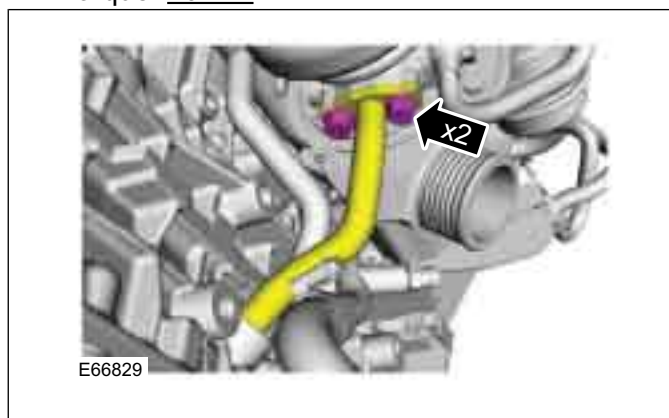
5.



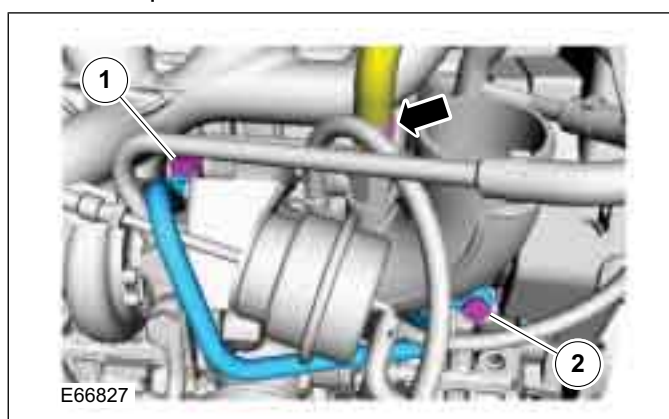
6. Torque: 37 Nm



7. Torque: 10 Nm



8. 1. Torque: 26 Nm
2. Torque: 38 Nm
3. Torque: 10 Nm





303-01-82

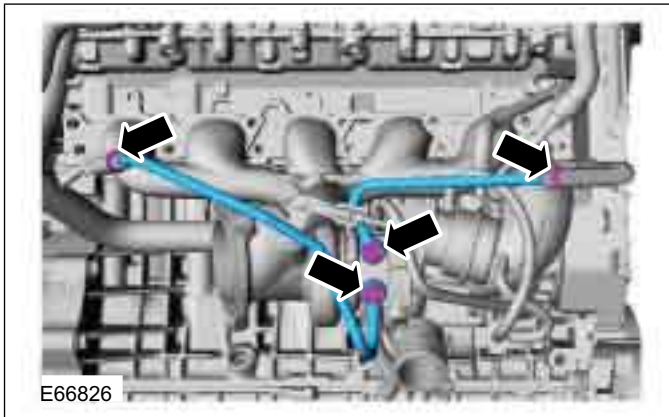
Engine — 2.5L Duratec-ST (VI5)

303-01-82

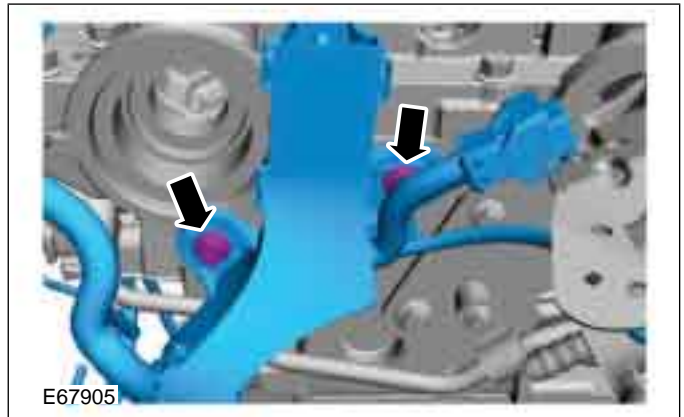


INSTALLATION

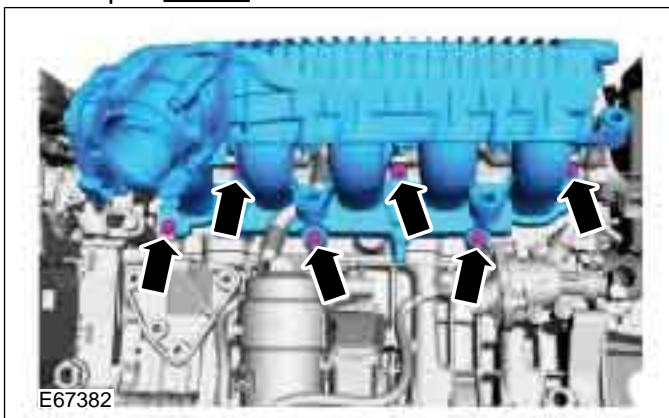
9. Torque: 26 Nm



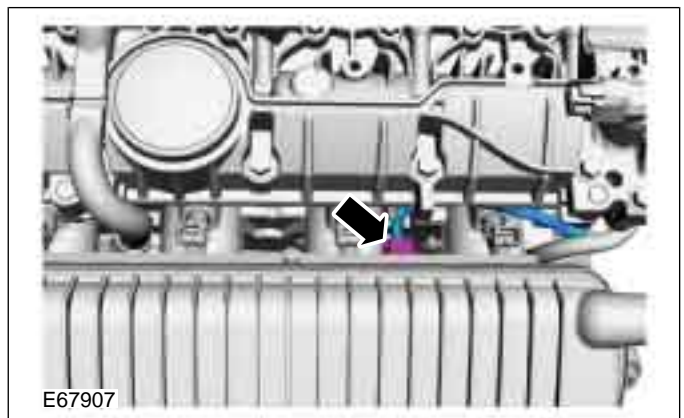
12 Torque: 10 Nm



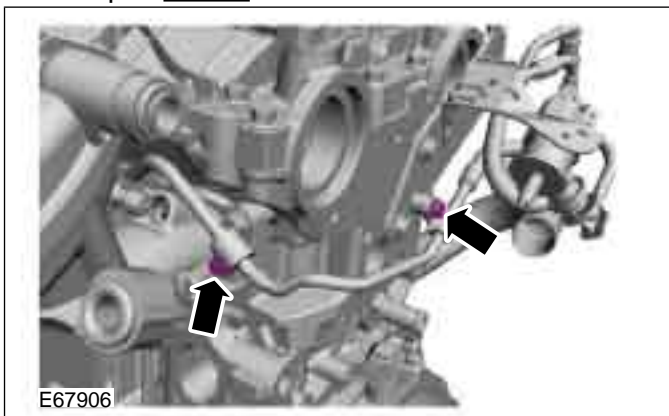
10. Torque: 24 Nm



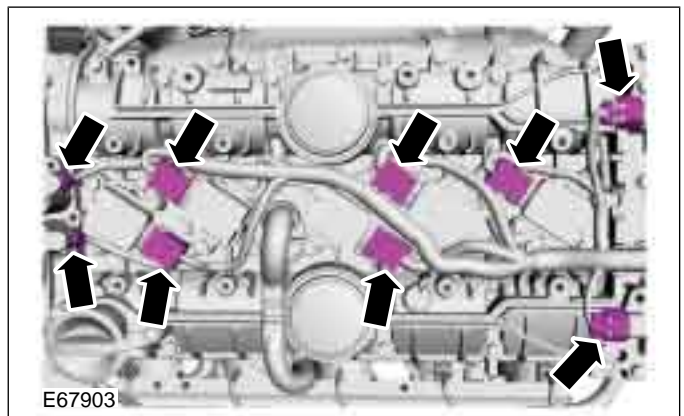
13.



11. Torque: 10 Nm



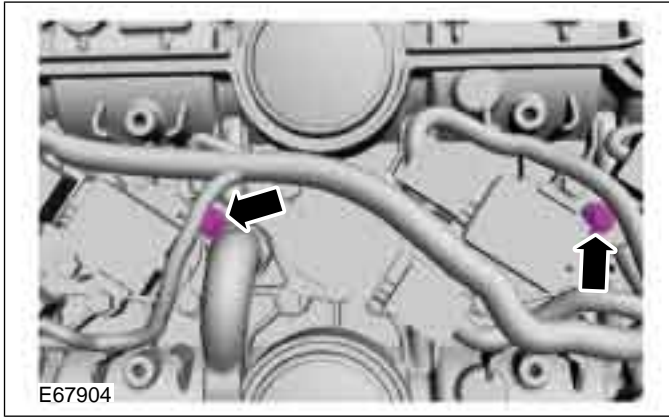
14.



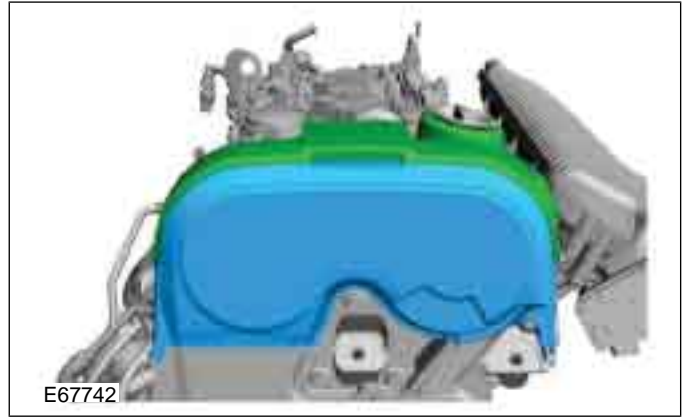


INSTALLATION

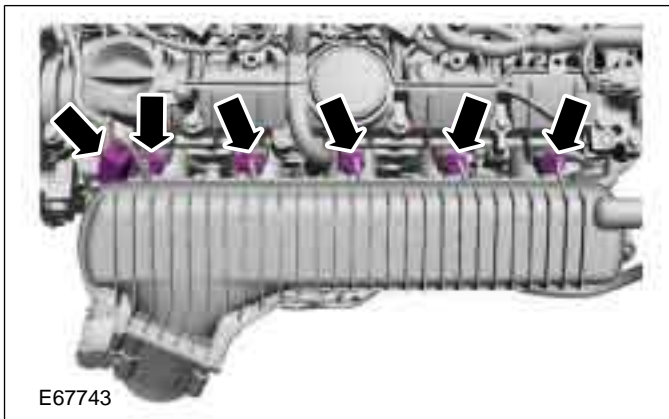
15. Torque: 10 Nm



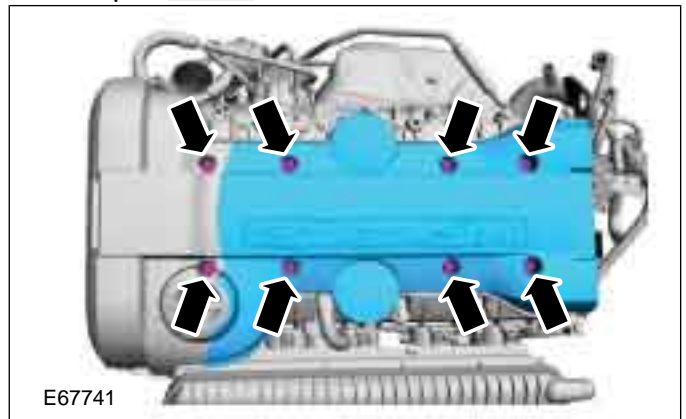
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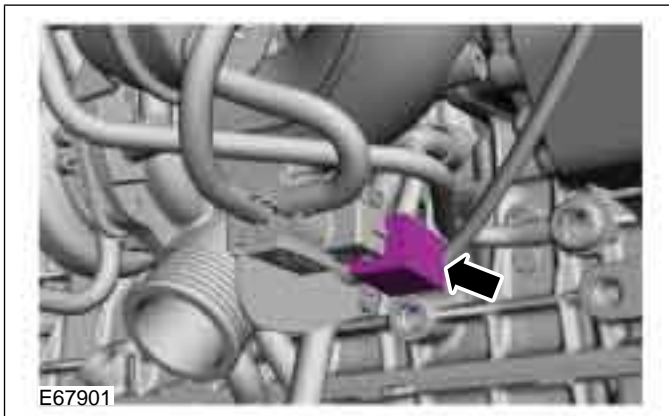
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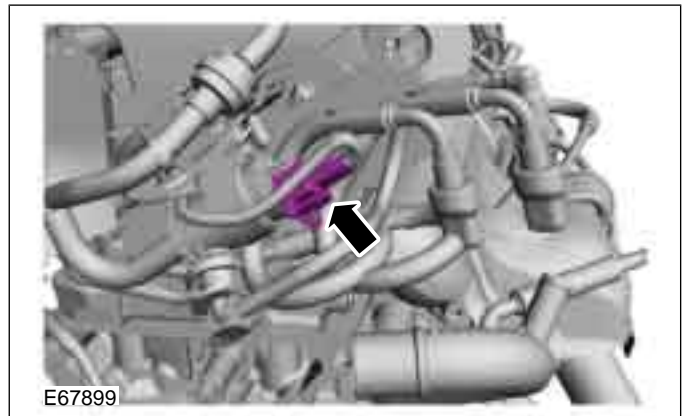
19. Torque: 10 Nm



17.



20.



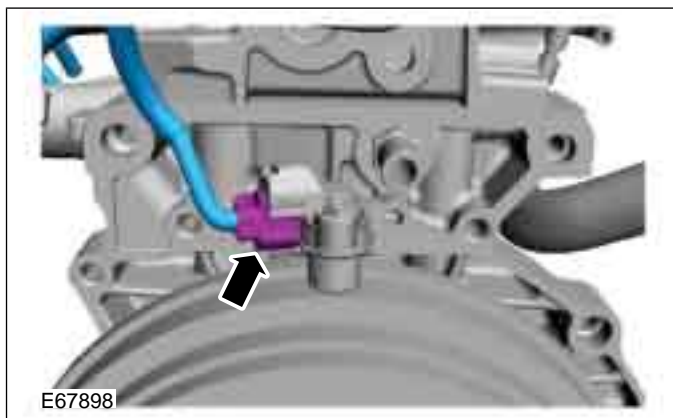
303-01-84

Engine — 2.5L Duratec-ST (VI5)

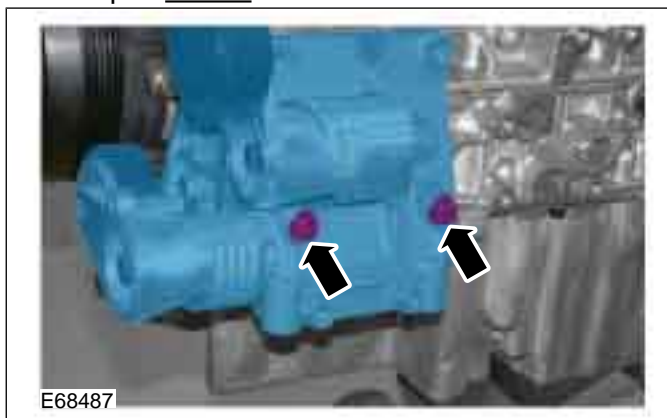
303-01-84

INSTALLATION

21.



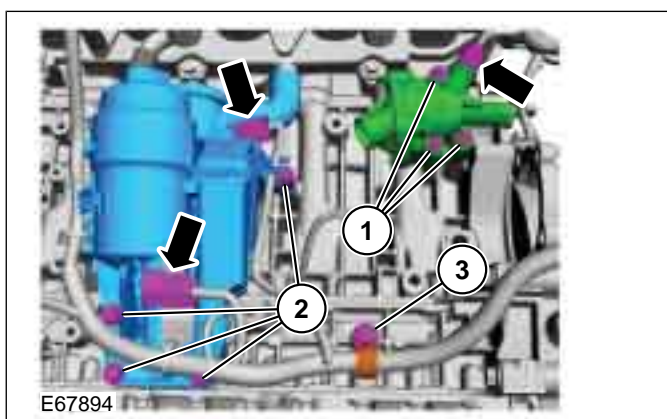
24. Torque: 24 Nm



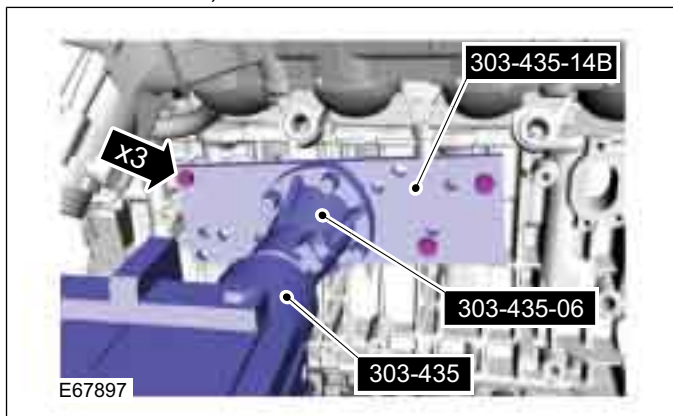
22 Install the Special Tool(s): 303-122



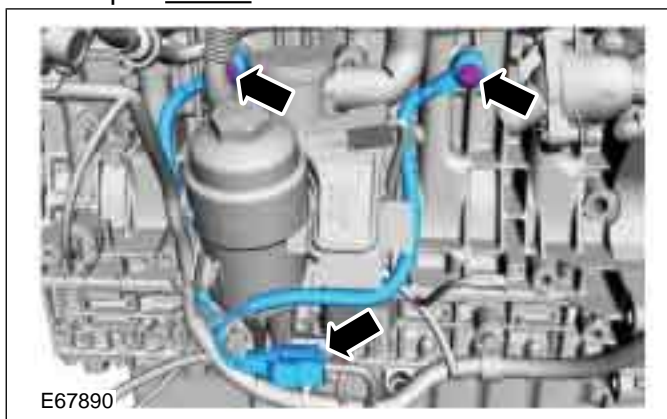
25. 1. Torque: 22 Nm
2. Torque: 35 Nm
3. Torque: 24 Nm



23. Remove the Special Tool(s): 303-435,
303-435-06, 303-435-14B



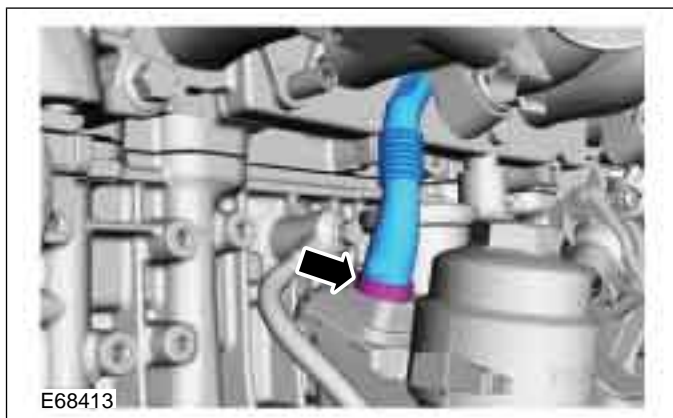
26. Torque: 20 Nm



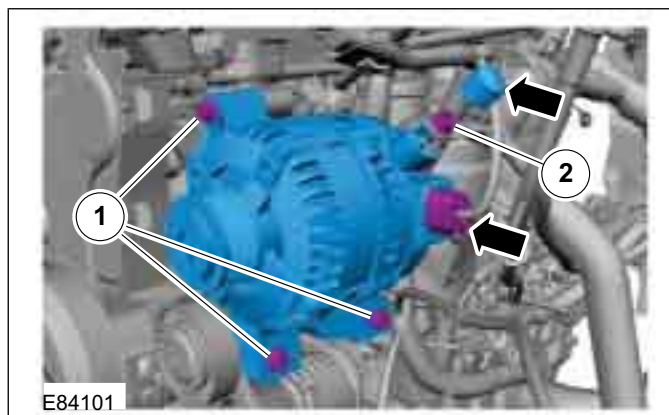


INSTALLATION

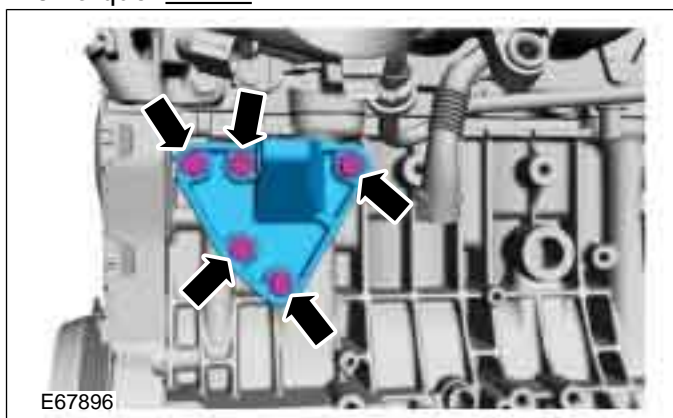
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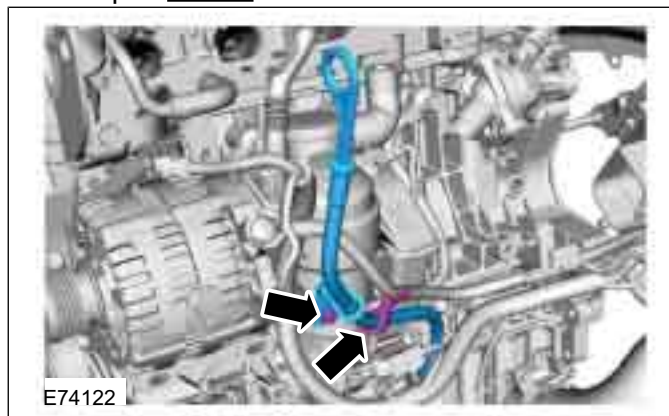
30. 1. Torque: 25 Nm
2. Torque: 15 Nm



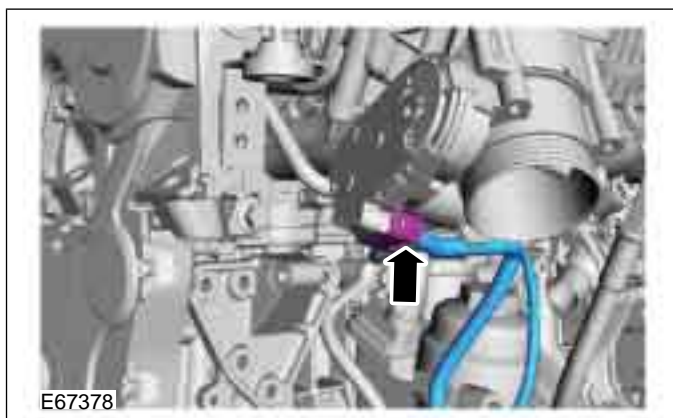
28. Torque: 24 Nm



31. Torque: 10 Nm



29.



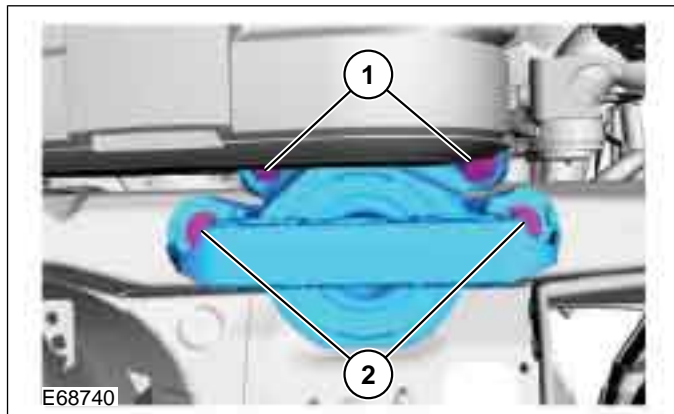
INSTALLATION

Engine(21 134 0)

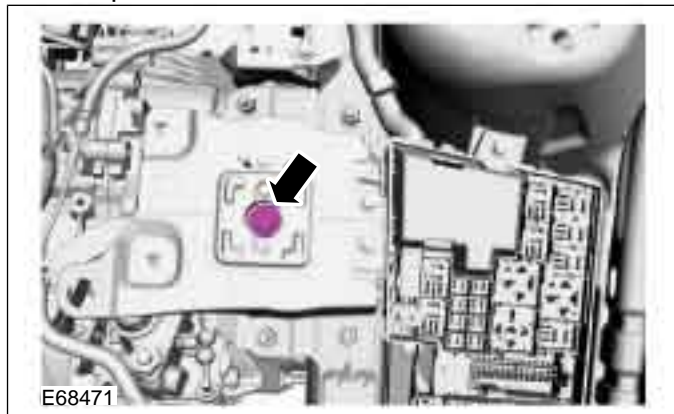
Installation

Materials	
Name	Specification
Grease	SA-M1C9107-A

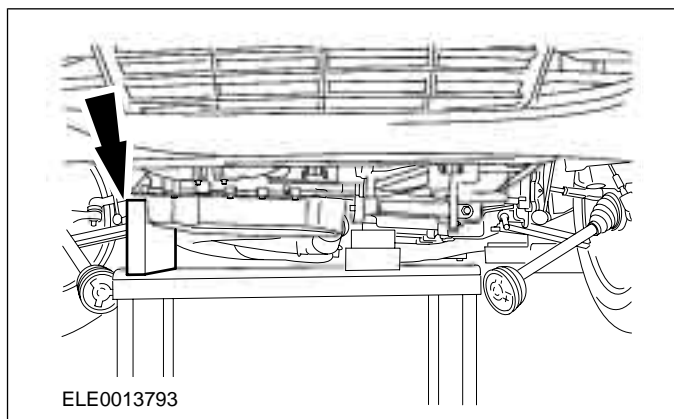
1. Torque: 115 Nm
2. Torque: 90 Nm



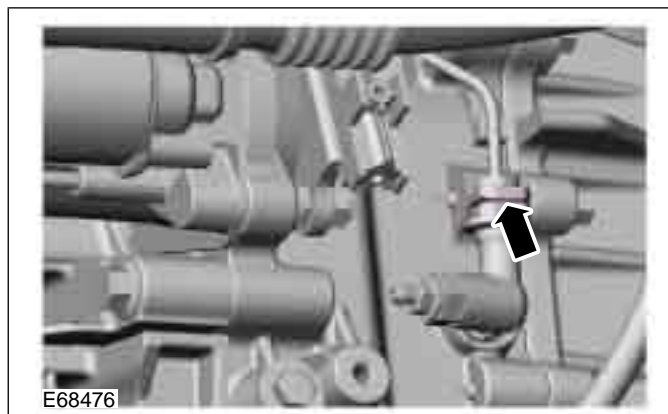
2. Torque: 148 Nm



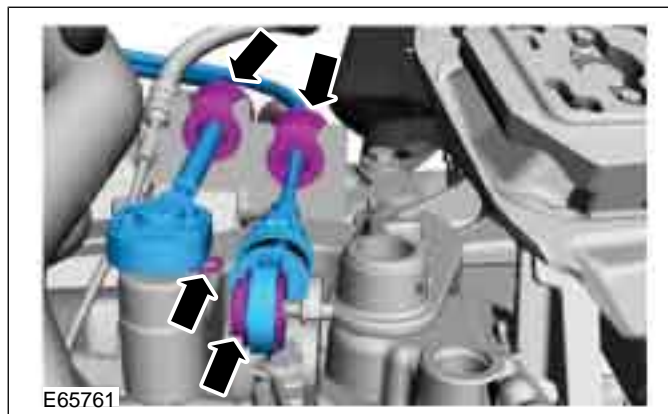
- 3.



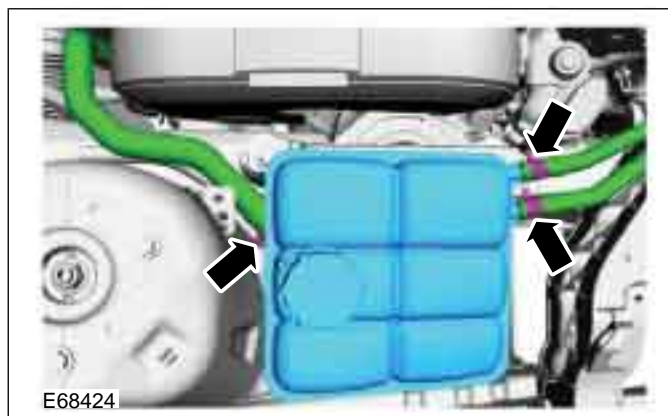
- 4.



5. **CAUTION:** Gearshift cables must not be kinked or bent.

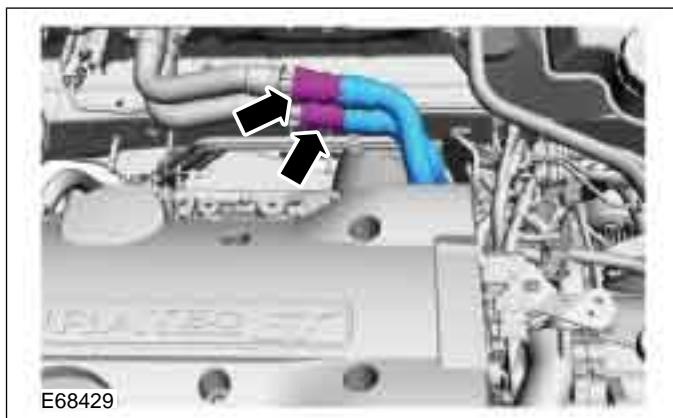


- 6.

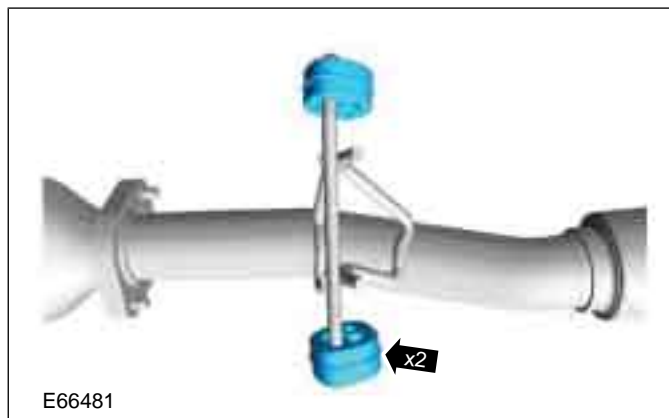


INSTALLATION

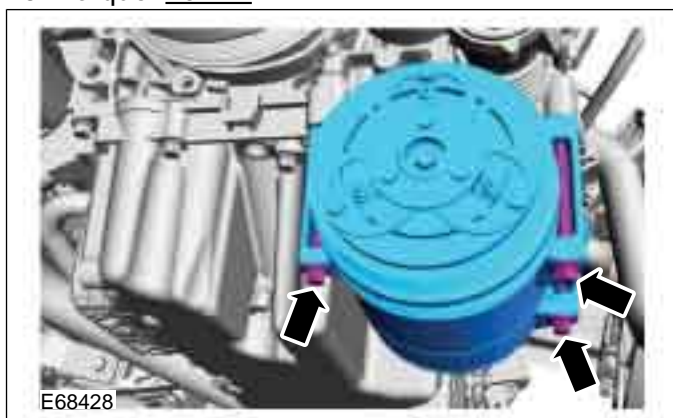
7.



10.

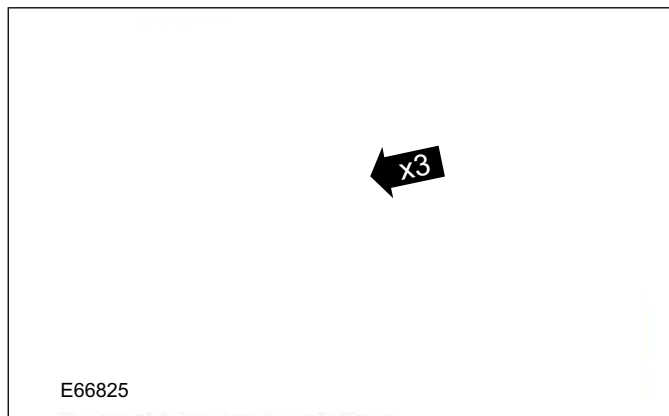


8. Torque: 25 Nm

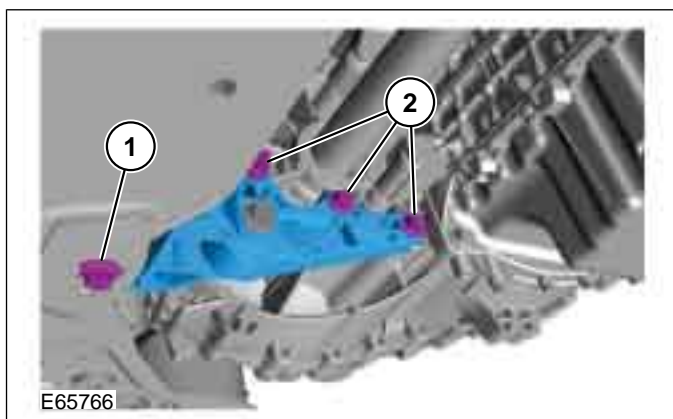


11. **⚠ CAUTION: Jointing compound must not be used forward of the catalytic converter.**

1. Torque: 45 Nm
2. Torque: 30 Nm



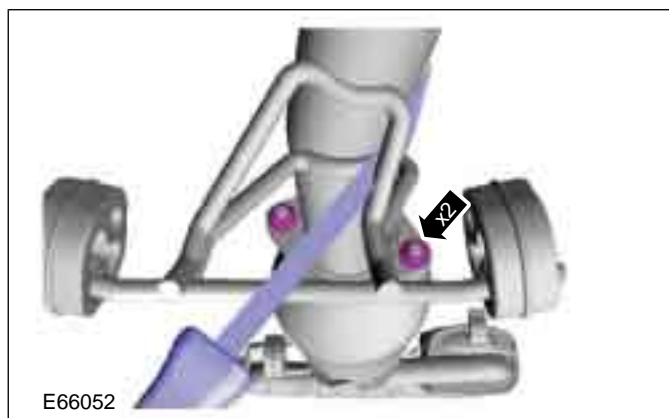
9. 1. Torque: 80 Nm
2. Torque: 48 Nm



12. **⚠ CAUTION: Make sure that the exhaust flexible pipe is not twisted.**

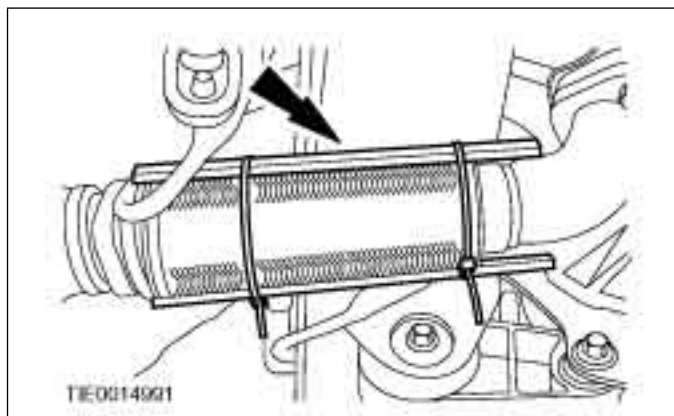
- Coat the catalytic converter to exhaust flexible pipe studs with grease.

Material: Grease
Torque: 48 Nm

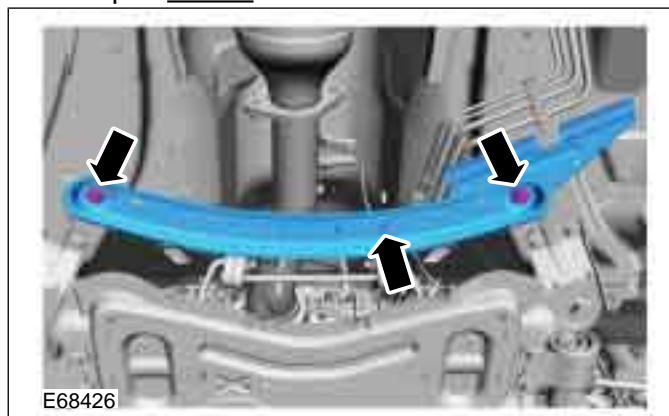


INSTALLATION

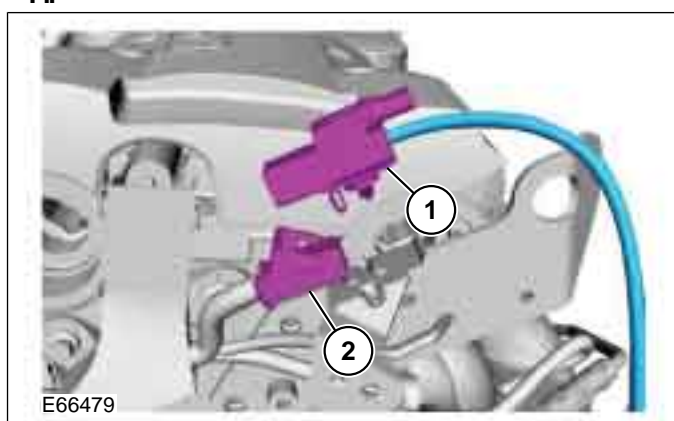
13.



16. Torque: 24 Nm



14.



17. Install the accessory drive belt.

Refer to: **Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation)**.

18. Install the air conditioning (A/C) compressor belt.

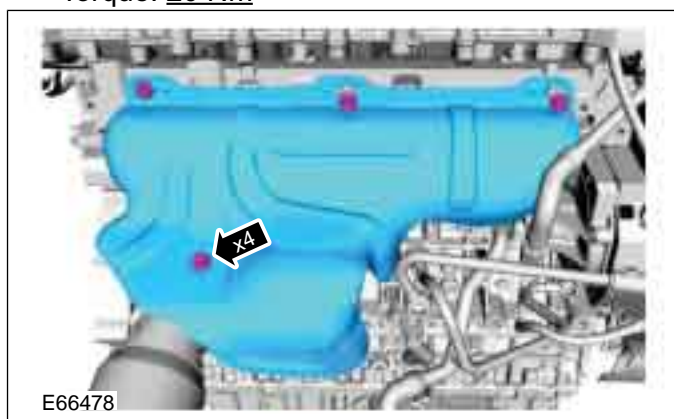
Refer to: **Air Conditioning (A/C) Compressor Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation)**.

19. Install the driveshafts.

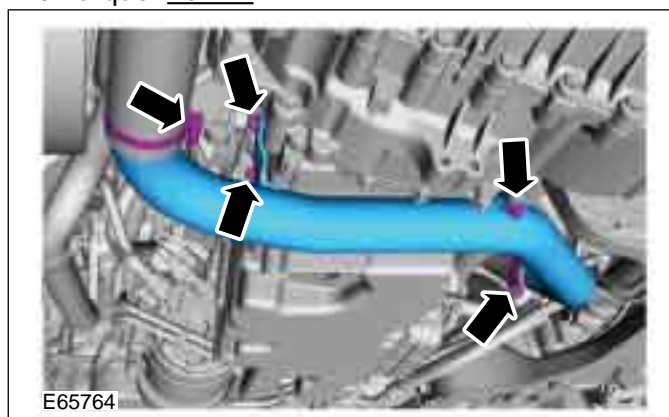
Refer to: **Front Halfshaft LH (205-04 Front Drive Halfshafts, Removal and Installation)**.
Refer to: **Front Halfshaft RH - 3-Door (205-04 Front Drive Halfshafts, Removal and Installation)**.

15. **NOTE:** Note the position of the spring washers to aid installation.

Torque: 20 Nm

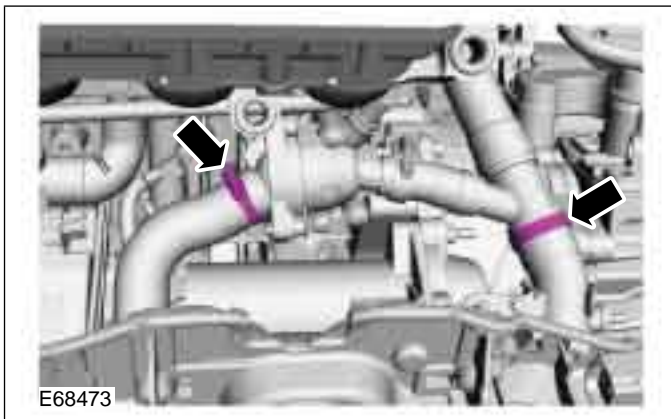


20. Torque: 20 Nm



INSTALLATION

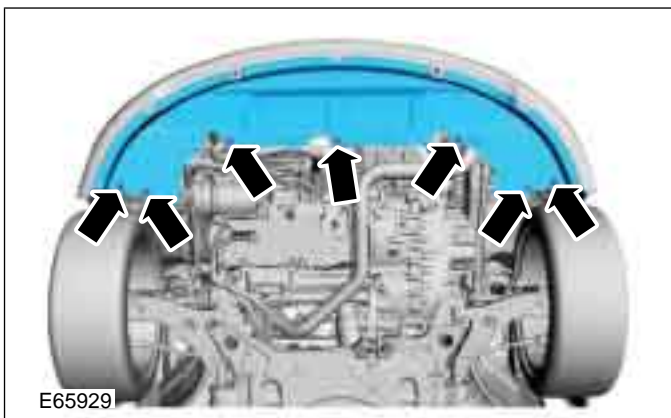
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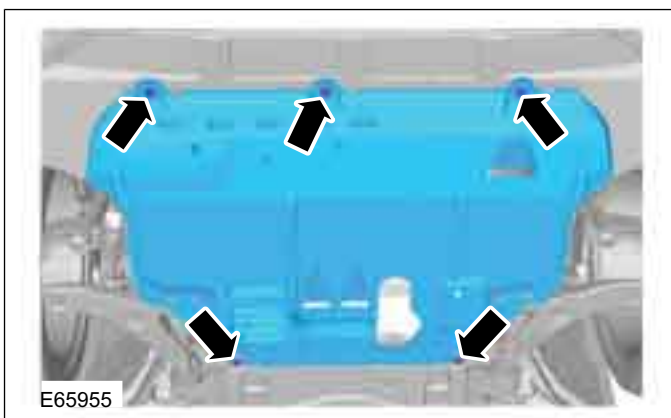
22. Fill and bleed the cooling system.

Refer to: Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), General Procedures).

23.

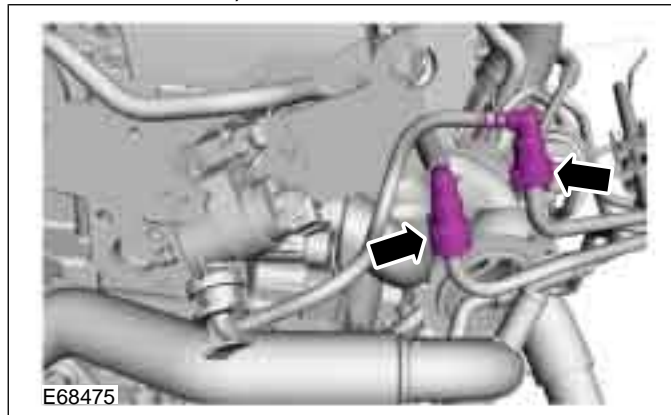


24.

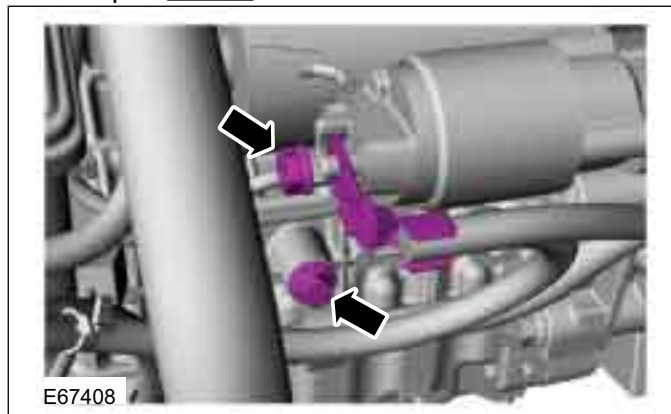


25. Connect the fuel lines.

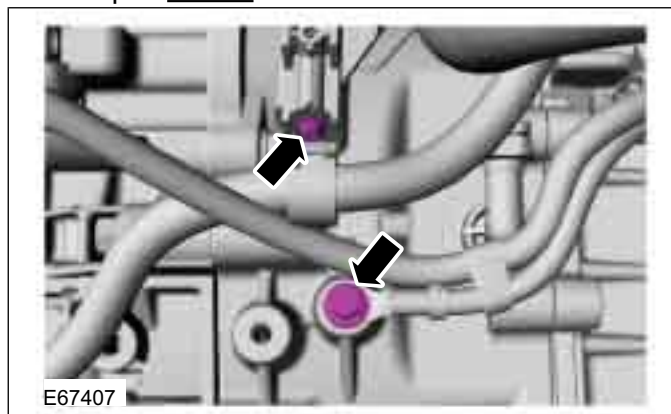
Refer to: Quick Release Coupling (310-00 Fuel System - General Information, General Procedures).



26. Torque: 12 Nm



27. Torque: 20 Nm



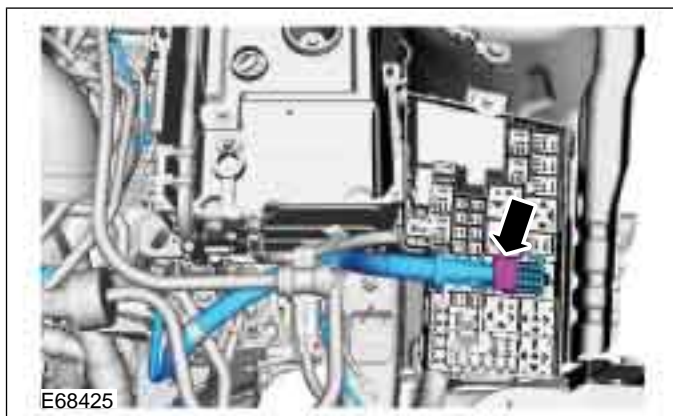
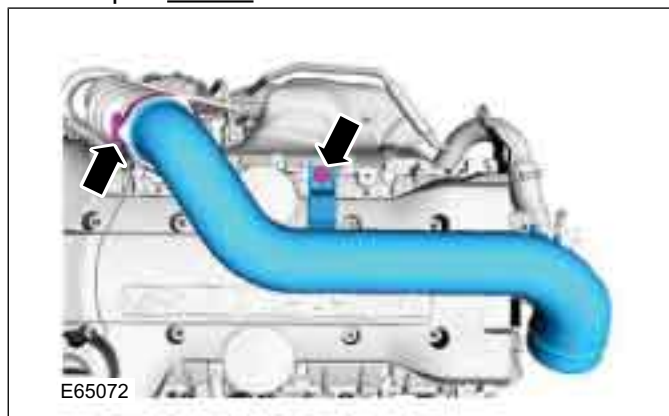
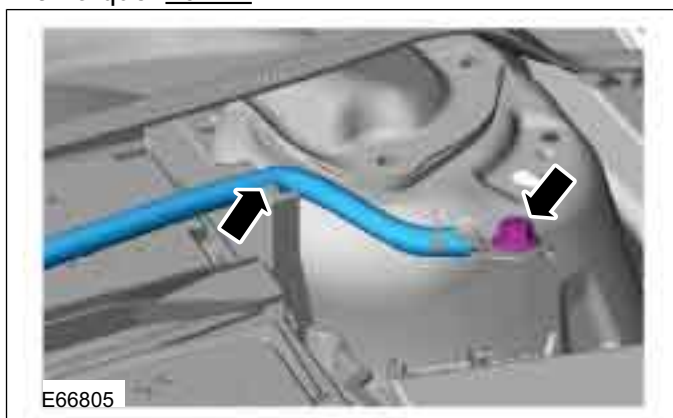
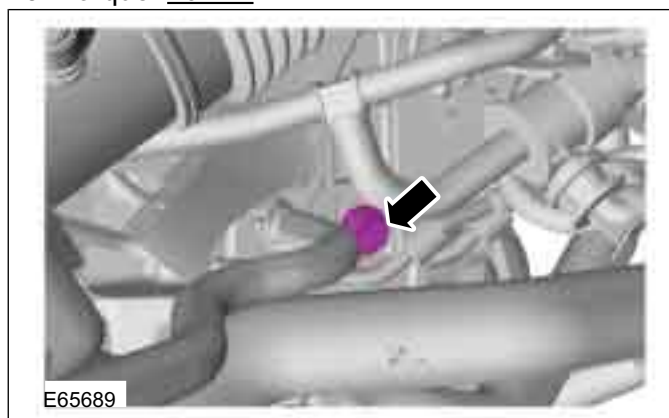
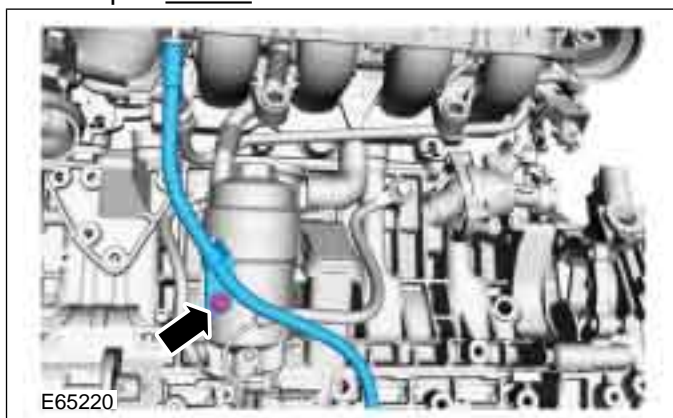
303-01-90

Engine — 2.5L Duratec-ST (VI5)

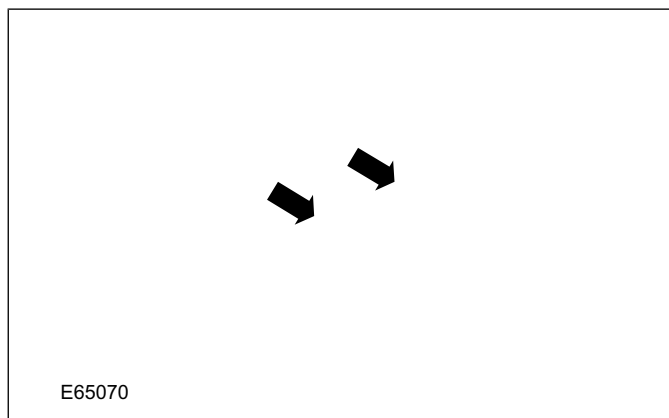
303-01-90

INSTALLATION

28.

31. Torque: 18 Nm29. Torque: 20 Nm32. Torque: 10 Nm30. Torque: 24 Nm

33.



34. Install the air cleaner.

Refer to: Air Cleaner - Vehicles With: PCM Security Shield (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).

Refer to: Air Cleaner - Vehicles Without: PCM Security Shield (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).

INSTALLATION

35. Install the battery tray.

Refer to: Battery Tray - 2.5L Duratec-ST (VI5)
([414-01 Battery, Mounting and Cables](#),
Removal and Installation).

SECTION 303-03 Engine Cooling — 2.5L Duratec-ST (VI5)

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Thermostat Housing..... (24 001 0)	303-03-17
Coolant Pump..... (24 404 0)	303-03-18
Radiator..... (24 254 0)	303-03-19

SPECIFICATIONS**Lubricants, Fluids, Sealers and Adhesives**

Item	Specification
Motorcraft Super Plus Antifreeze	WSS-M97B44-D

Antifreeze

Specific Gravity (providing no other additive is in coolant)	Approximate percentage of Anti- Freeze (by volume)	Remains Fluid to	Solidifies at
1.061 at +15°C	50%	-25°C (-13°F)	-37°C (-35°F)

Cooling System Refill Capacities

Description	Liters
Cooling system and heater	7.1

Cooling System Pressure Specification

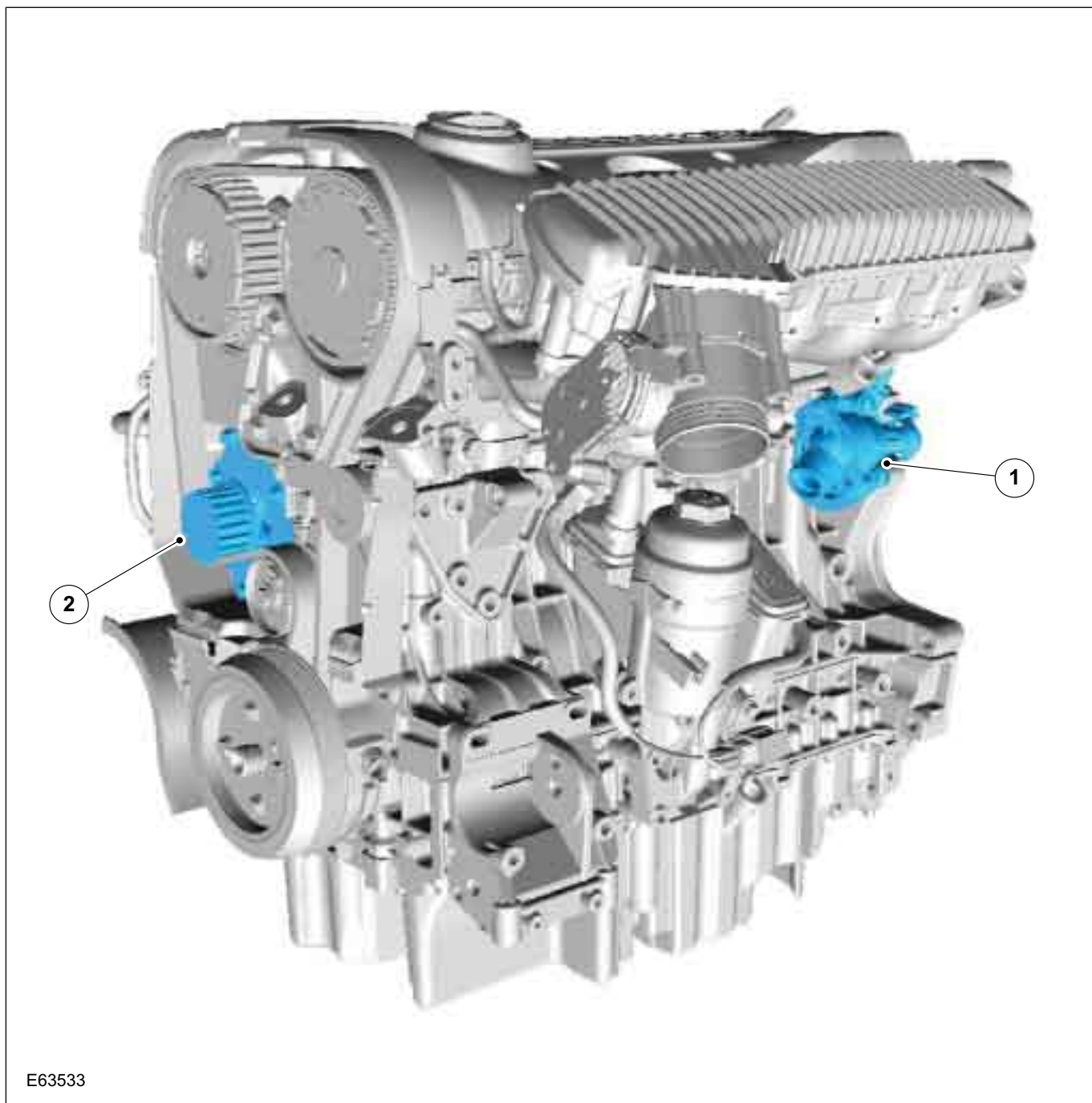
Description	Pressure kpa (psi)
Radiator pressure test	138 (20)
Coolant expansion tank cap release pressure	135 to 155 (19.6 to 22.5)

DESCRIPTION AND OPERATION

Engine Cooling

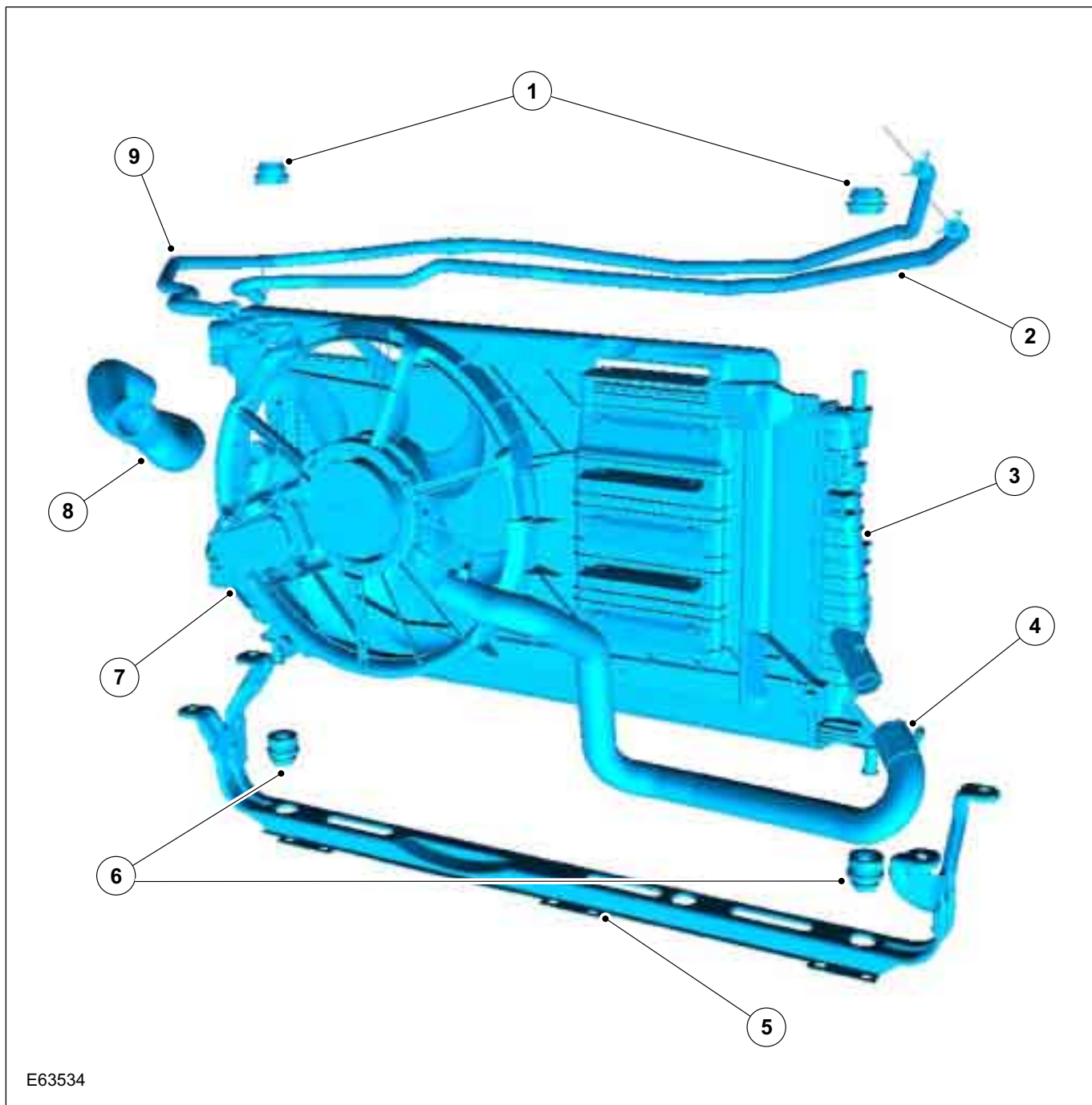
2.5L Duratec-ST (VI5)

Engine Cooling Components



Item	Description
1	Thermostat housing
2	Coolant pump

DESCRIPTION AND OPERATION



E63534

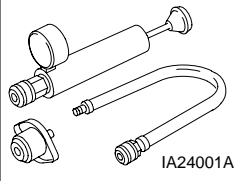
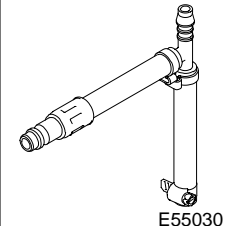
Item	Description
1	Radiator upper insulators
2	Radiator degas coolant hose
3	Radiator
4	Radiator lower coolant hose
5	Radiator support bracket
6	Radiator lower insulators
7	Cooling fan motor and shroud

Item	Description
8	Radiator upper coolant hose
9	Radiator degas coolant hose

DIAGNOSIS AND TESTING

Engine Cooling

Special Tool(s)

 <p>IA24001A</p>	<p>Pressure Tester, Cooling System 303-396</p>
 <p>E55030</p>	<p>Adaptor for 303-396 303-396-09</p>

General Equipment

<p>Ford approved diagnostic tool</p>

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> • Coolant leak(s) • Gasket(s) or seal(s) • Hose(s) or hose joints • Coolant expansion tank cap and seal • Coolant expansion tank • Radiator • Coolant pump • Thermostat housing • Engine coolant temperature (ECT) sensor • Heater core 	<ul style="list-style-type: none"> • Fuse(s) • Wiring harness • Electrical connector(s) • Engine coolant temperature (ECT) sensor • Cooling fan • Powertrain control module (PCM)

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • Loss of coolant 	<ul style="list-style-type: none"> • Hose(s) or hose joint(s). 	<ul style="list-style-type: none"> • INSPECT the hoses and hose joints. INSTALL a new hose(s) as necessary.
	<ul style="list-style-type: none"> • Radiator. 	<ul style="list-style-type: none"> • INSPECT the radiator for leaks. CARRY OUT the Pressure Test Component Test in this section. INSTALL a new radiator as necessary. <p>REFER to: Radiator (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), Removal and Installation).</p>

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Coolant pump. 	<ul style="list-style-type: none"> INSPECT the coolant pump for leaks. CARRY OUT the Pressure Test Component Test in this section. INSTALL a new coolant pump or coolant pump gasket as necessary. REFER to: Coolant Pump (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> Thermostat housing. 	<ul style="list-style-type: none"> INSPECT the thermostat housing for leaks. CARRY OUT the Pressure Test Component Test in this section. INSTALL a new thermostat housing and thermostat housing gasket as necessary. REFER to: Thermostat Housing (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> Coolant expansion tank cap or seal(s). 	<ul style="list-style-type: none"> CHECK the coolant expansion tank cap for tightness and damage. INSTALL a new coolant expansion cap as necessary.
	<ul style="list-style-type: none"> Coolant expansion tank. 	<ul style="list-style-type: none"> INSPECT the coolant expansion tank for damage. INSTALL a new coolant expansion tank as necessary.
	<ul style="list-style-type: none"> Heater core. 	<ul style="list-style-type: none"> CHECK the heater core for leaks.
	<ul style="list-style-type: none"> Engine. 	<ul style="list-style-type: none"> INSPECT the engine, cylinder head, cylinder block and cylinder head gasket. REFER to: Cylinder Head (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation).
<ul style="list-style-type: none"> The engine overheats (signs of coolant boiling) 	<ul style="list-style-type: none"> Air in cooling system. 	<ul style="list-style-type: none"> BLEED the cooling system. REFER to: Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), General Procedures).

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Radiator grille. 	<ul style="list-style-type: none"> INSPECT the radiator grille for air restrictions or damage. REPAIR or INSTALL new parts as necessary.
	<ul style="list-style-type: none"> Coolant expansion tank cap or seal(s). 	<ul style="list-style-type: none"> CHECK the coolant expansion tank cap for tightness and damage. INSTALL a new coolant expansion cap as necessary.
	<ul style="list-style-type: none"> Coolant expansion tank. 	<ul style="list-style-type: none"> INSPECT the coolant expansion tank for damage. INSTALL a new coolant expansion tank as necessary.
	<ul style="list-style-type: none"> Coolant level or condition. 	<ul style="list-style-type: none"> CHECK the coolant level. REFILL the cooling system as necessary. REFER to: Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), General Procedures). CHECK the coolant condition. If the coolant is in poor condition drain and refill with new coolant. REFER to: Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), General Procedures).
	<ul style="list-style-type: none"> Coolant concentration. 	<ul style="list-style-type: none"> REFER to: Specifications (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), Specifications).
	<ul style="list-style-type: none"> Cooling system does not hold pressure. 	<ul style="list-style-type: none"> INSPECT the coolant expansion tank for damage. INSTALL a new coolant expansion tank as necessary.
	<ul style="list-style-type: none"> Cooling fan. 	<ul style="list-style-type: none"> CHECK the operation of the cooling fan. REFER to the Ford approved diagnostic tool.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Thermostat. 	<ul style="list-style-type: none"> CARRY OUT the Thermostat Test Component Test in this section. INSTALL a new thermostat as necessary. REFER to: Thermostat (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> Coolant pump. 	<ul style="list-style-type: none"> CARRY OUT the Pressure Test Component Test in this section. INSPECT the coolant pump for leaks. INSTALL a new coolant pump or coolant pump gasket as necessary. REFER to: Coolant Pump (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> Thermostat. 	<ul style="list-style-type: none"> CARRY OUT the Thermostat Test Component Test in this section. INSTALL a new thermostat housing and thermostat housing gasket as necessary. REFER to: Thermostat (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> Engine. 	<ul style="list-style-type: none"> INSPECT the engine, cylinder head, cylinder block and cylinder head gasket. REFER to: Cylinder Head (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation).
<ul style="list-style-type: none"> The engine does not reach normal operating temperature. 	<ul style="list-style-type: none"> Thermostat. 	<ul style="list-style-type: none"> CARRY OUT the Thermostat Test Component Test in this section. INSTALL a new thermostat as necessary. REFER to: Thermostat (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> Cooling fan. 	<ul style="list-style-type: none"> CHECK the operation of the cooling fan. REFER to the Ford approved diagnostic tool.
<ul style="list-style-type: none"> The cooling fan is inoperative 	<ul style="list-style-type: none"> Cooling fan. 	<ul style="list-style-type: none"> CHECK the operation of the cooling fan. REFER to the Ford approved diagnostic tool.

DIAGNOSIS AND TESTING**Component Tests****Pressure Test**

▲ WARNING: When releasing the cooling system pressure, cover the coolant expansion tank cap with a thick cloth to prevent the possibility of coolant scalding. Failure to follow this instruction may result in personal injury.

NOTE: If the coolant expansion tank cap is rotated counterclockwise by ½ a full turn, the pressurized coolant will be vented to the underside of the coolant expansion tank cap.

1. Slowly remove the coolant expansion tank cap to release the cooling system pressure.
2. Install the coolant expansion tank cap.
3. Install the special tools 303-396 and 303-396-09 to the coolant expansion tank.
4. Pressurize the cooling system to the coolant expansion tank cap release pressure.

REFER to: **Specifications (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), Specifications).**

5. Observe the cooling system pressure tester gauge reading for approximately two minutes. The pressure should not drop during this time. If the cooling system holds pressure, **INSTALL** a new coolant expansion tank cap. If the cooling system does not hold pressure, check the cooling system thoroughly for coolant leaks.
6. Check the engine for coolant leaks. Drain the cooling system, repair any coolant leaks found and fill and bleed the cooling system as necessary.

REFER to: **Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), General Procedures).**

7. Recheck the cooling system by repeating Steps 3 and 4 at least twice.

Radiator Leak Test, Removed From Vehicle

▲ CAUTION: Radiator internal pressure must not exceed 138 kpa (20 psi) or damage may result.

Clean the radiator thoroughly before leak testing it, to prevent contamination of the water in the test tank. Leak test the radiator in clean water with 130 kpa (18 psi) air pressure. Check it thoroughly for air leaks. **INSTALL** a new radiator if necessary.

REFER to: **Radiator (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), Removal and Installation).**

Coolant Expansion Tank Cap Pressure Test

▲ WARNING: When releasing the cooling system pressure, cover the coolant expansion tank cap with a thick cloth.

1. Remove the coolant expansion tank cap.
2. Use water to clean the area of the rubber seal and pressure relief valve. Install the pressure tester and adapter and immerse the coolant expansion tank cap in water .

NOTE: If the plunger of the pump is depressed too quickly, an erroneous pressure reading will result.

3. Slowly depress the plunger of the pressure test pump until the pressure gauge reading stops increasing, and note the highest pressure reading obtained.
4. Release pressure by turning the pressure relief screw counterclockwise. Tighten the pressure relief screw and repeat step 3 at least twice to make sure the pressure test reading is repeatable and within acceptable gauge reading limits of the coolant expansion tank cap.
5. If the pressure test gauge readings are not within the acceptable gauge reading limits, **INSTALL** a new coolant expansion tank cap.

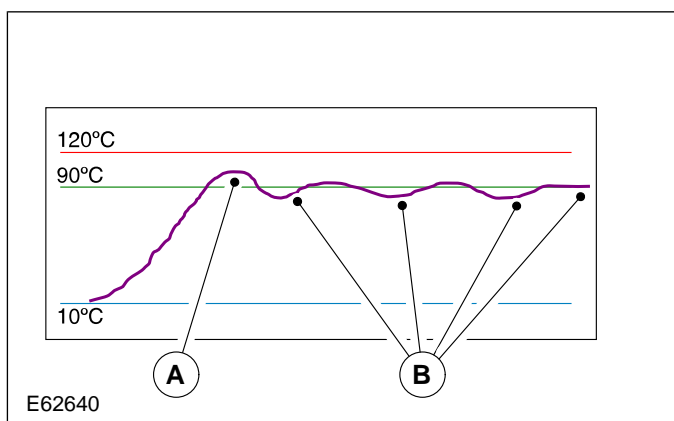
Thermostat Test

1. Connect the Ford approved diagnostic tool to the data link connector (DLC).
2. Using the Ford approved diagnostic tool datalogger function, **SELECT** the following sensors (as applicable to the application):
 - IAT - intake air temperature (IAT) sensor
 - ECT - engine coolant temperature (ECT) sensor
 - CHT - cylinder head temperature (CHT) sensor
 - LOAD - engine load
 - VSS - vehicle speed sensor (VSS)
 - RPM - engine speed
 - DSRPM - desired engine speed

DIAGNOSIS AND TESTING

The IAT sensor output is useful if the engine being tested is cold or after an over-night cold soak. The ECT sensor or CHT sensor and the IAT sensor should either indicate the same value or be within 1 to 2 degrees Celsius of each other.

The ECT sensor output is important to display as it indicates the engine warm-up and opening temperature for the thermostat. It will initially indicate a slightly higher reading just before the thermostat opens and then drops back before settling to a near flat line output (see graphic below).



Item	Description
A	Thermostat opens
B	Thermostat settles into a cyclic open and closure pattern

⚠ CAUTION: If the ECT sensor output reaches the 120°C default line under normal cooling system pressure, internal damage may be caused to the engine and a diagnostic trouble code (DTC) will be set in the PCM. The test should be stopped and the cause located and corrected. If the cooling system does not pressurize, the coolant will boil at 100°C which may also damage the engine. CARRY OUT the Coolant Expansion Tank Cap Pressure Test Component Test in this section.

If the Ford approved diagnostic tool only allows the ECT sensor to be displayed in volts, refer to the following table for corresponding Celsius values:

Volts	°Celsius
1.33	60
1.02	70
0.78	80
0.60	90

Volts	°Celsius
0.46	100
0.35	110
0.27	120

The CHT sensor output is useful to examine the cylinder head temperature rise during the warm-up cycle and later during the normal light throttle cruise test. This sensor output may vary between vehicles with manual transmission and vehicles with automatic transmission and should be used for reference only.

The LOAD display is used for reference as it is necessary to maintain a stable load line during the test. It is necessary to carry out the test under normal light throttle cruise driving conditions and average loads, typically 40% to 70% of the load value.

The VSS output is used for reference but can help to identify misfires and sensors which fail during the warm-up cycle.

The RPM display indicates the engine speed and can be compared with the DSRPM.

The DSRPM is the desired or calculated idle speed which the PCM commands the engine to reach. If the thermostat opens too early (before the correct opening temperature has been reached), the engine will not reach this value.

When using the Ford approved diagnostic tool in datalogger mode, the signals recorded should remain within the DEFAULT values set by the Ford approved diagnostic tool.

3. **⚠ WARNING:** Make sure that the Ford approved diagnostic tool is placed in the vehicle so that it does not interfere with the safe operation of the vehicle. Do not place the Ford approved diagnostic tool in the deployment path of any air bag. Failure to follow these instructions may result in personal injury.

NOTE: The road test is best carried out with the aid of another technician in the vehicle to enable the vehicle to be driven safely while the sensor outputs are monitored within datalogger. If there is only one technician available, the Ford approved diagnostic tool can be set up (using the record/capture mode camera icon) before leaving the workshop to record a 16 km (10 mile) test.

DIAGNOSIS AND TESTING

NOTE: The results from the test are more conclusive if the engine is cold when the test is started.

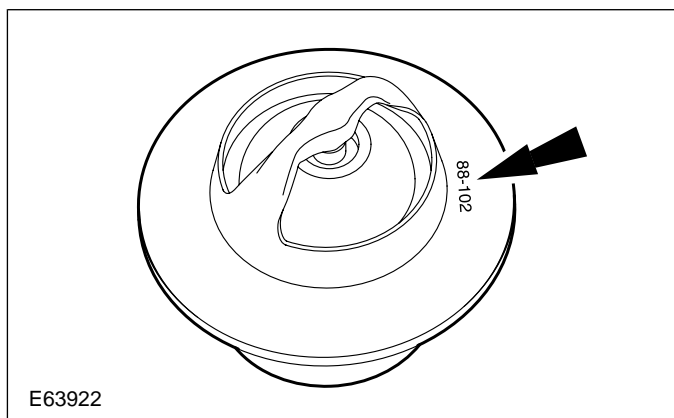
Carry out a road test.

REFER to: **Road/Roller Testing (100-00 General Information, Description and Operation)**.

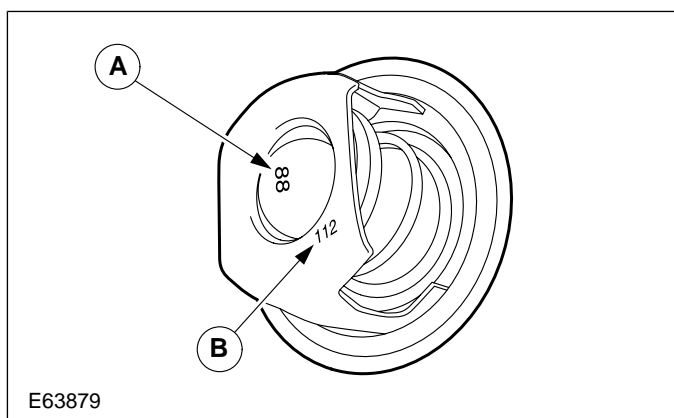
4. Drive the vehicle at a constant throttle opening and set speed until the ECT value settles into a shallow rise and fall signal, close to a straight line. This indicates that the thermostat is functioning correctly.

NOTE: Some thermostats indicate the temperature(s) in Celsius and Fahrenheit.

The graphic below shows the location and an example of the opening temperature (88°C) and fully open temperature (102°C) of a thermostat.



The graphic below shows an alternative method used to show the opening temperature (88°C) and fully open temperature (112°C) of a thermostat.



Item	Description
A	Opening temperature
B	Fully open temperature

NOTE: Generally, most thermostats maintain a coolant temperature between 88°C (190°F) and 92°C (198°F) although dual stage electric

thermostats may increase the coolant temperature up to 100°C (212°F) under light engine load conditions.

The engine should start cleanly and the ECT value will rise quite quickly with smooth progression. If the ECT signal appears unstable or erratic, the ECT sensor, electrical connector and wiring harness to the PCM need to be visually inspected for damage, chafing or water ingress.

The temperature should rise to approximately 90°C for a thermostat that has an 88°C value. The signal value will then fall as cooler coolant enters the engine.

If the ECT value fails to maintain a constant value and falls back to lower figures, typically between 60°C (140°F) and 70°C (150°F), the thermostat and its sealing function within the thermostat housing must be checked.

5. INSTALL a new thermostat housing and thermostat housing gasket as necessary.

REFER to: **Thermostat Housing (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), Removal and Installation)**.

6. Carry out another road test from step 1 using the same criteria to confirm that the concern has been rectified.
7. Using the Ford approved diagnostic tool, clear the PCM keep alive memory (KAM) or electrically erasable programmable read only memory (EEPROM) so that new drive values can be learnt.

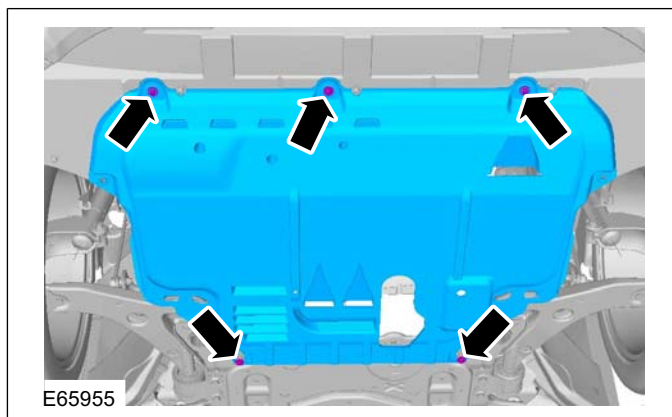
GENERAL PROCEDURES

Cooling System Draining, Filling and Bleeding(24 122 0)

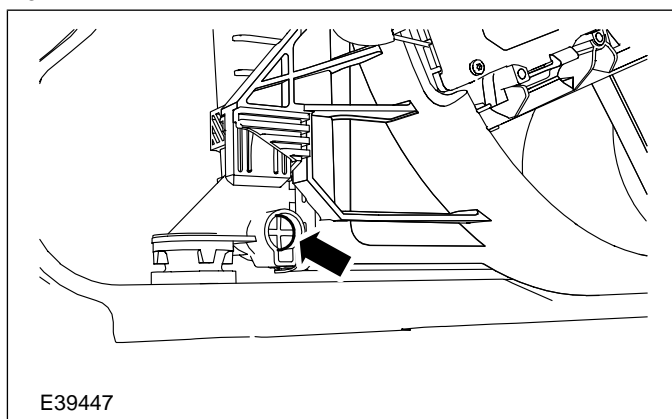
Draining

1. Refer to: **Engine Cooling System Health and Safety Precautions (100-00 General Information, Description and Operation)**.
2. Release the cooling system pressure by slowly turning the coolant expansion tank cap between 2 and 3 turns.
3. Remove the coolant expansion tank cap.
4. Raise and support the vehicle.
Refer to: **Lifting (100-02 Jacking and Lifting, Description and Operation)**.

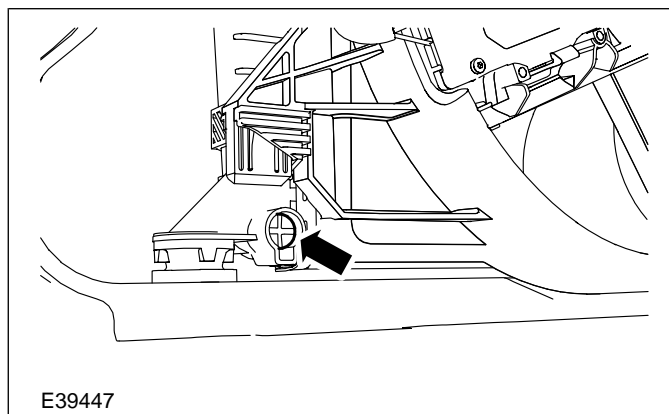
5.



6.



7.

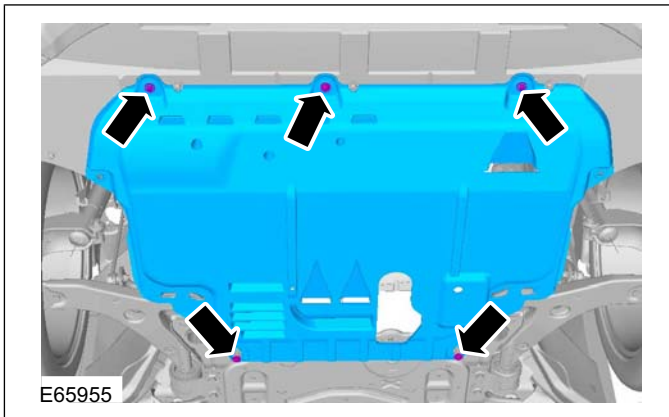


Filling and Bleeding

1. Switch the interior heater blower off.
2. Fill the coolant expansion tank 15 mm over the MAX mark.
3. Install the coolant expansion tank cap.
4. Start the engine, maintain the engine speed at 2500 revolutions per minute (RPM) for eight minutes or until the engine reaches normal operating temperature.
5. Maintain the engine speed at 2500 RPM for three minutes after the engine has reached normal operating temperature.
6. Increase the engine speed to 4000 RPM for five seconds.
7. Decrease the engine speed to 2500 RPM for three minutes.
8. Switch the engine off.
9. Check the cooling system for leaks.
10. Raise and support the vehicle.
Refer to: **Lifting (100-02 Jacking and Lifting, Description and Operation)**.

GENERAL PROCEDURES

11.



12. Lower the vehicle.

13. Allow the engine to cool.

14. Fill the coolant expansion tank to the MAX mark.

303-03-14

Engine Cooling — 2.5L Duratec-ST (VI5)

303-03-14

REMOVAL AND INSTALLATION

Cooling Fan Motor and Shroud(24 222 0)

Removal

NOTE: Removal steps in this procedure may contain installation details.

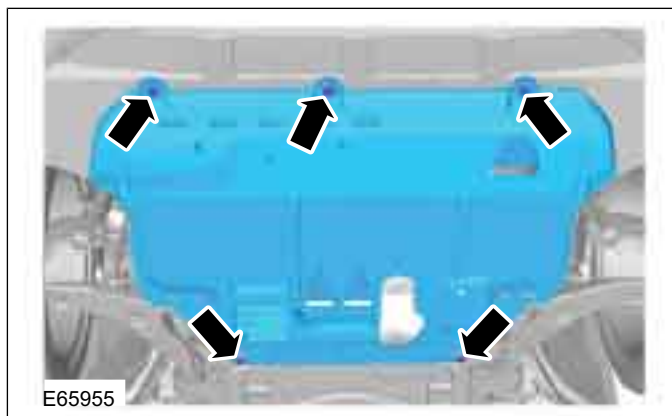
1. Disconnect the battery ground cable.

Refer to: **Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).**

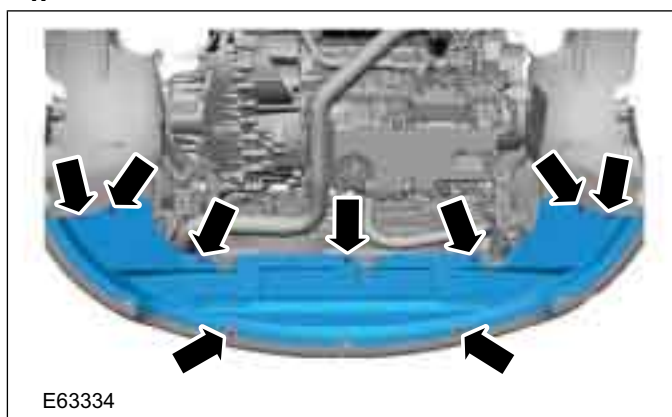
2. Raise and support the vehicle.

Refer to: **Lifting (100-02 Jacking and Lifting, Description and Operation).**

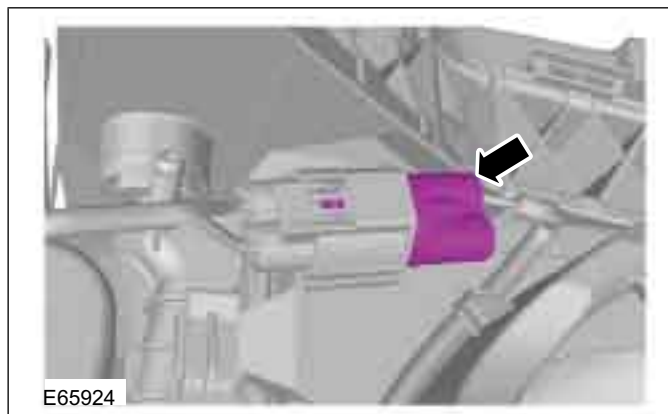
- 3.



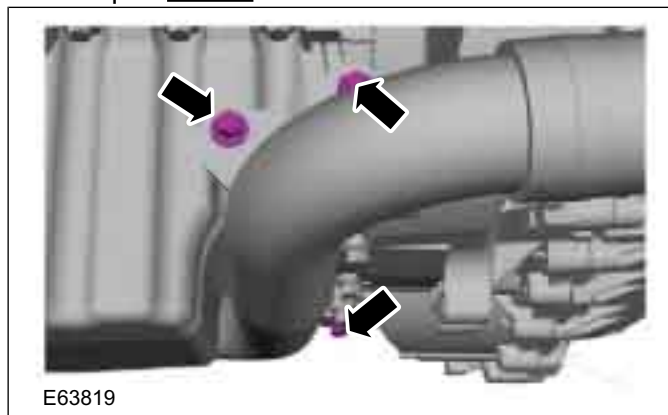
- 4.



- 5.

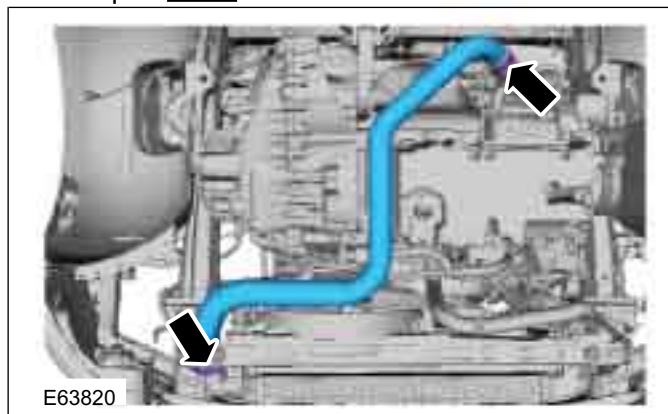


6. Torque: 20 Nm



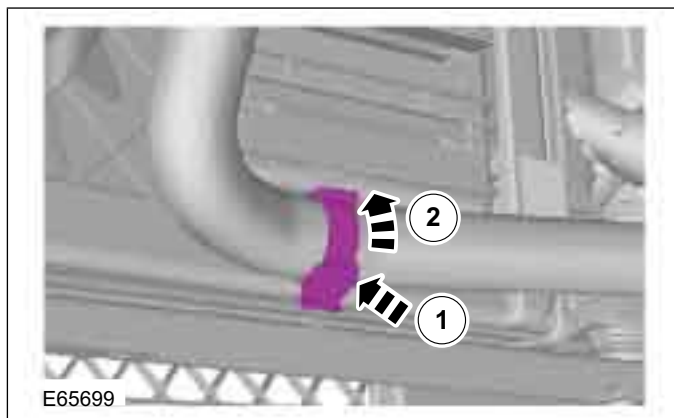
7. **CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.

Torque: 4 Nm

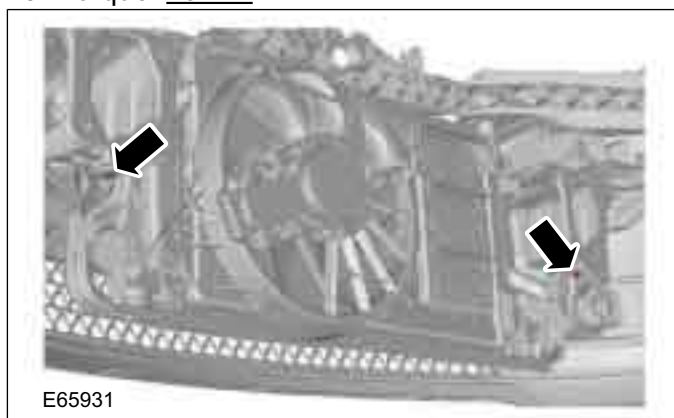


REMOVAL AND INSTALLATION

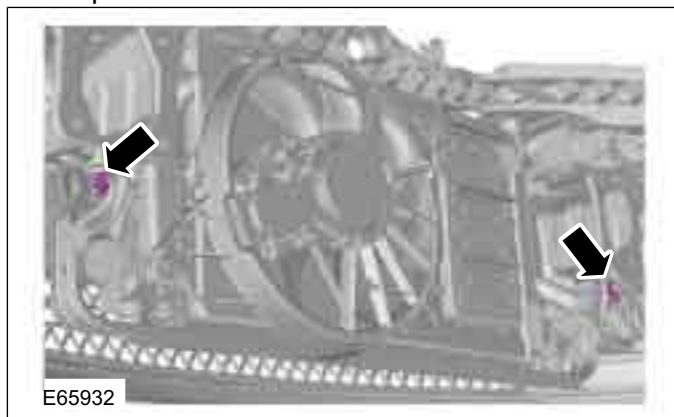
8.



9. Torque: 25 Nm

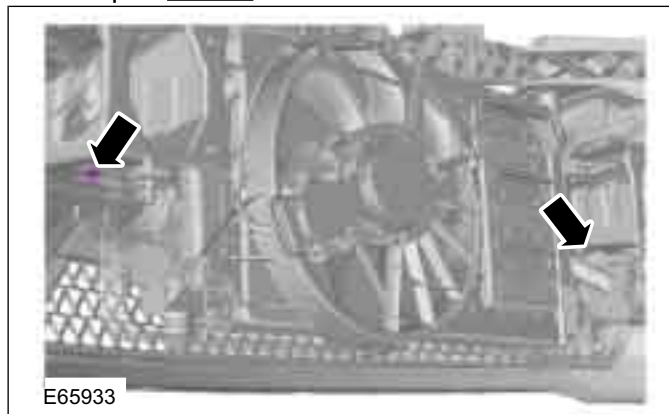


10. Install 30 mm M8 bolts leaving 15 mm of thread exposed.

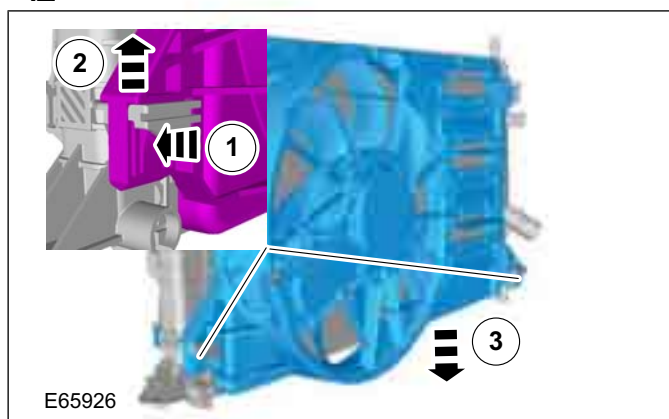


11. **NOTE:** This step requires the aid of another technician.

Torque: 25 Nm



12



Installation

1. To install, reverse the removal procedure.
2. Initialize the door window motors.

Refer to: **Door Window Motor Initialization (501-11 Glass, Frames and Mechanisms, General Procedures).**

REMOVAL AND INSTALLATION

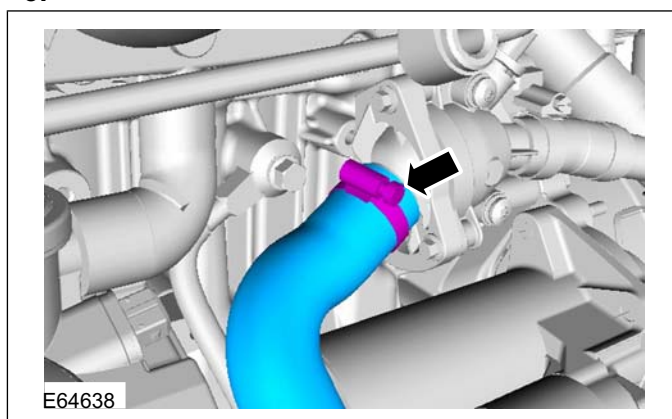
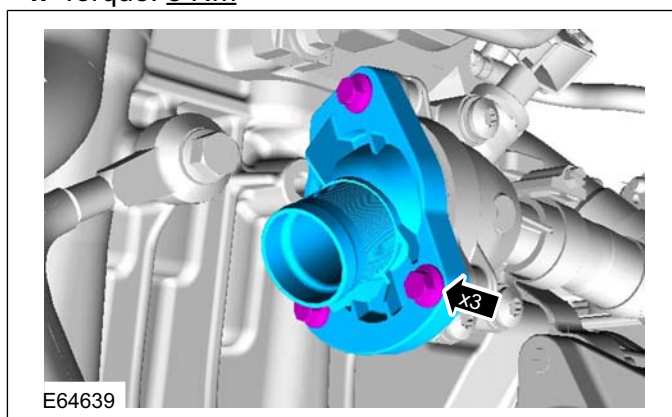
Thermostat(24 454 0)

Removal

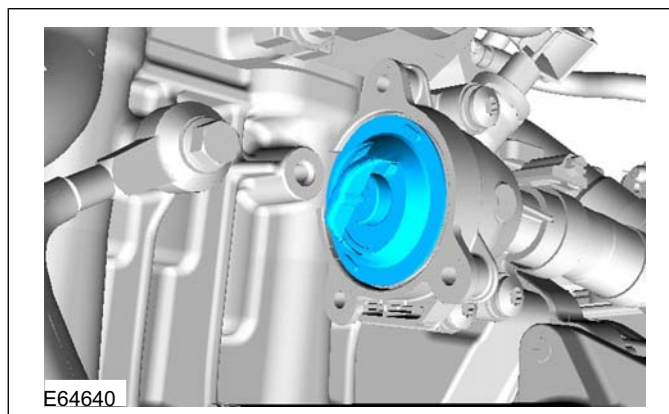
NOTE: Removal steps in this procedure may contain installation details.

1. Refer to: **Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), General Procedures).**
2. Refer to: **Air Cleaner - Vehicles With: PCM Security Shield (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).**

3.

4. Torque: 8 Nm

5.



Installation

1. To install, reverse the removal procedure.

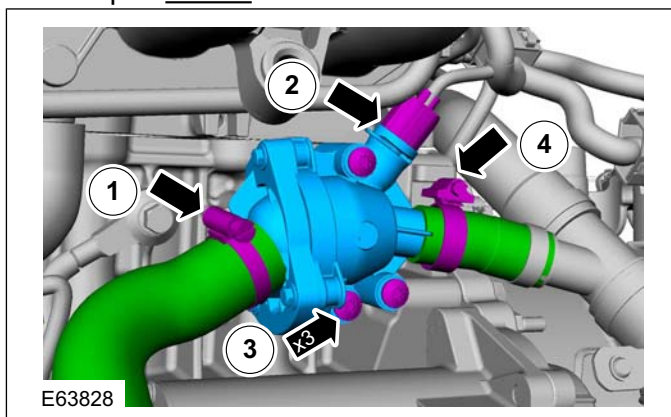
REMOVAL AND INSTALLATION

Thermostat Housing(24 001 0)

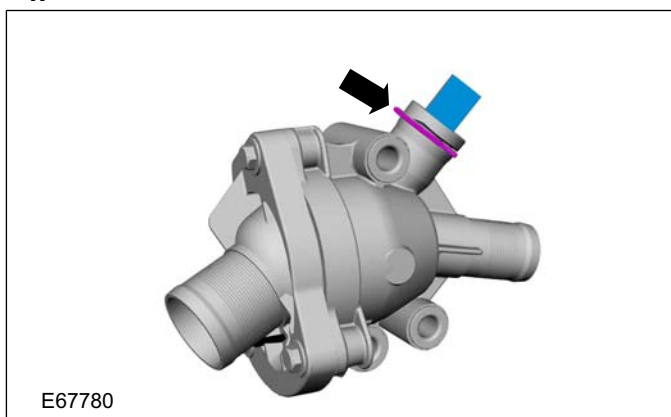
Removal

NOTE: Removal steps in this procedure may contain installation details.

1. Refer to: **Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), General Procedures).**
2. Refer to: **Air Cleaner - Vehicles With: PCM Security Shield (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).**
3. Torque: 22 Nm



4.



Installation

1. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Coolant Pump(24 404 0)

General Equipment

Trolley jack

Removal

NOTE: Removal steps in this procedure may contain installation details.

1. Drain the cooling system.

Refer to: **Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), General Procedures).**

2. Remove the timing belt.

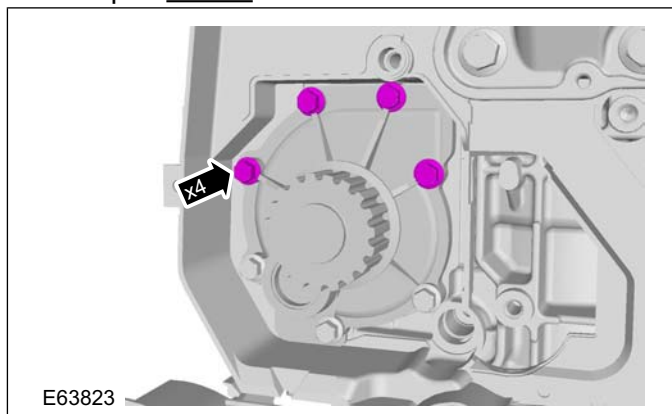
Refer to: **Timing Belt (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation).**

3. **CAUTION:** Use a wooden block to protect the oil pan when supporting the engine.

Position the trolley jack with the wooden block under the oil pan. Raise the trolley jack until the front of the engine is free from load and the coolant pump bolts can be accessed.

General Equipment: Trolley jack

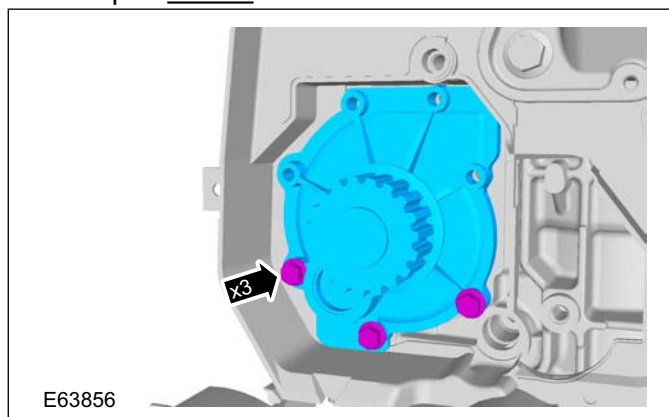
4. Torque: 17 Nm



5. Lower the engine.

General Equipment: Trolley jack

6. Torque: 17 Nm



Installation

1. **NOTE:** Install all the bolts finger tight before final tightening.

To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Radiator(24 254 0)

General Equipment

Cable ties
Hose clamp remover/installer

Removal

NOTE: Removal steps in this procedure may contain installation details.

1. Disconnect the battery ground cable.

Refer to: [Battery Disconnect and Connect \(414-01 Battery, Mounting and Cables, General Procedures\)](#).

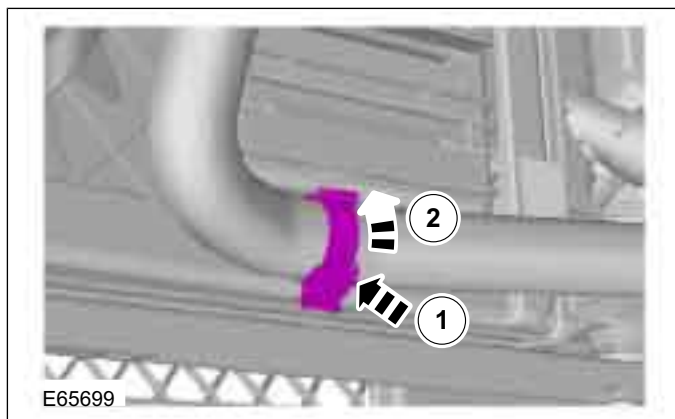
2. Drain the cooling system.

Refer to: [Cooling System Draining, Filling and Bleeding \(303-03 Engine Cooling - 2.5L Duratec-ST \(VI5\), General Procedures\)](#).

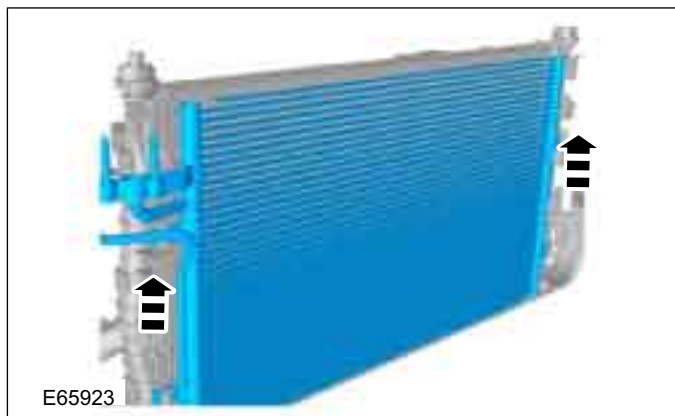
3. Remove the charge air cooler.

Refer to: [Charge Air Cooler \(303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST \(VI5\), Removal and Installation\)](#).

- 4.

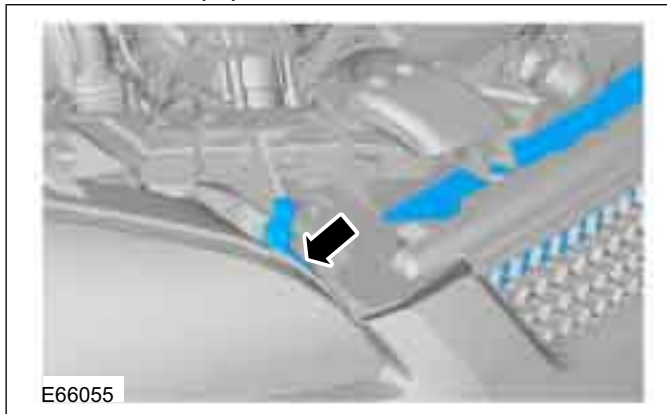


- 5.



6. Lower the vehicle.

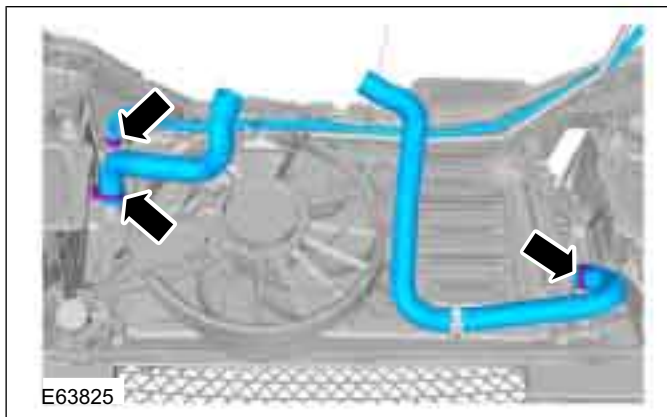
7. General Equipment: Cable ties



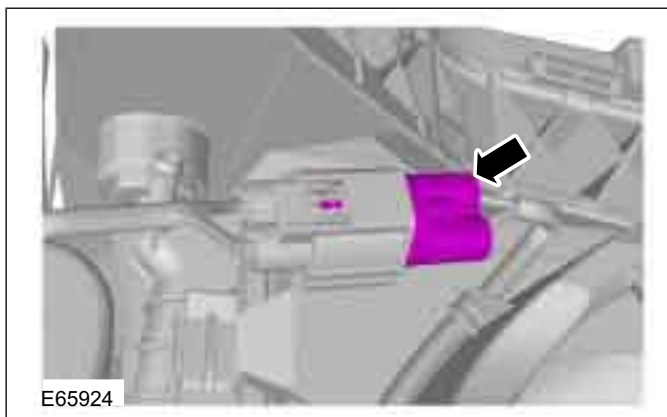
8. Raise and support the vehicle.

Refer to: [Lifting \(100-02 Jacking and Lifting, Description and Operation\)](#).

9. General Equipment: Hose clamp remover/installer



- 10.



303-03-20

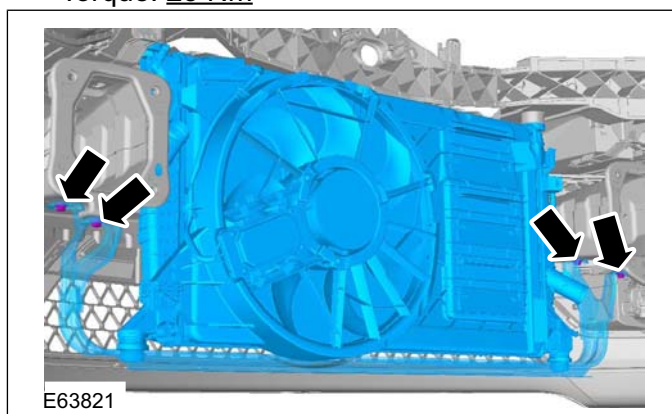
Engine Cooling — 2.5L Duratec-ST (VI5)

303-03-20

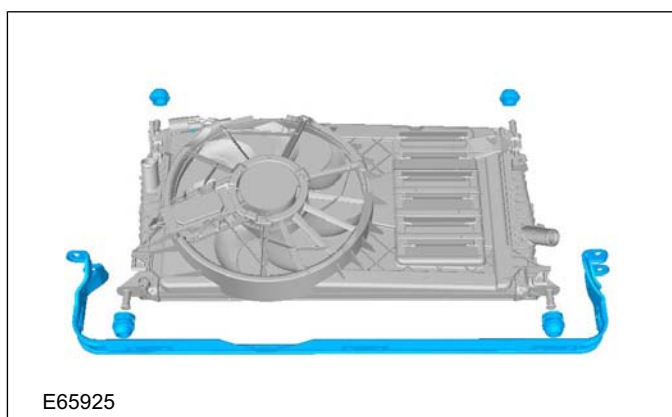
REMOVAL AND INSTALLATION

11. NOTE: This step requires the aid of another technician.

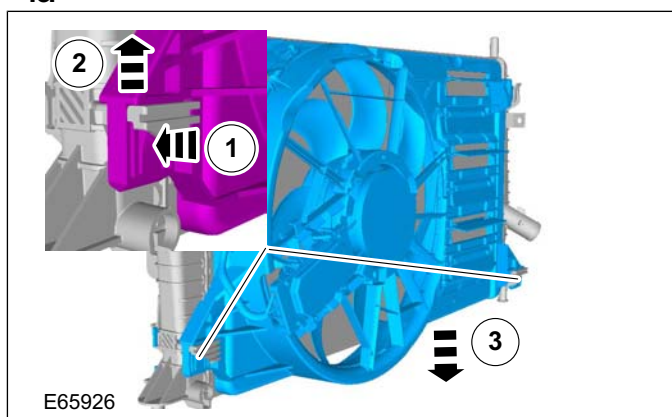
Torque: 25 Nm



12. NOTE: Radiator insulators are to be reused unless damaged.



13.



Installation

1. To install, reverse the removal procedure.
2. Initialize the door window motors.

Refer to: [Door Window Motor Initialization](#)
(501-11 Glass, Frames and Mechanisms,
General Procedures).

SECTION 303-04A Fuel Charging and Controls — 2.5L Duratec-ST (VI5)

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Fuel Injectors.....	(23 455 0) 303-04A-22
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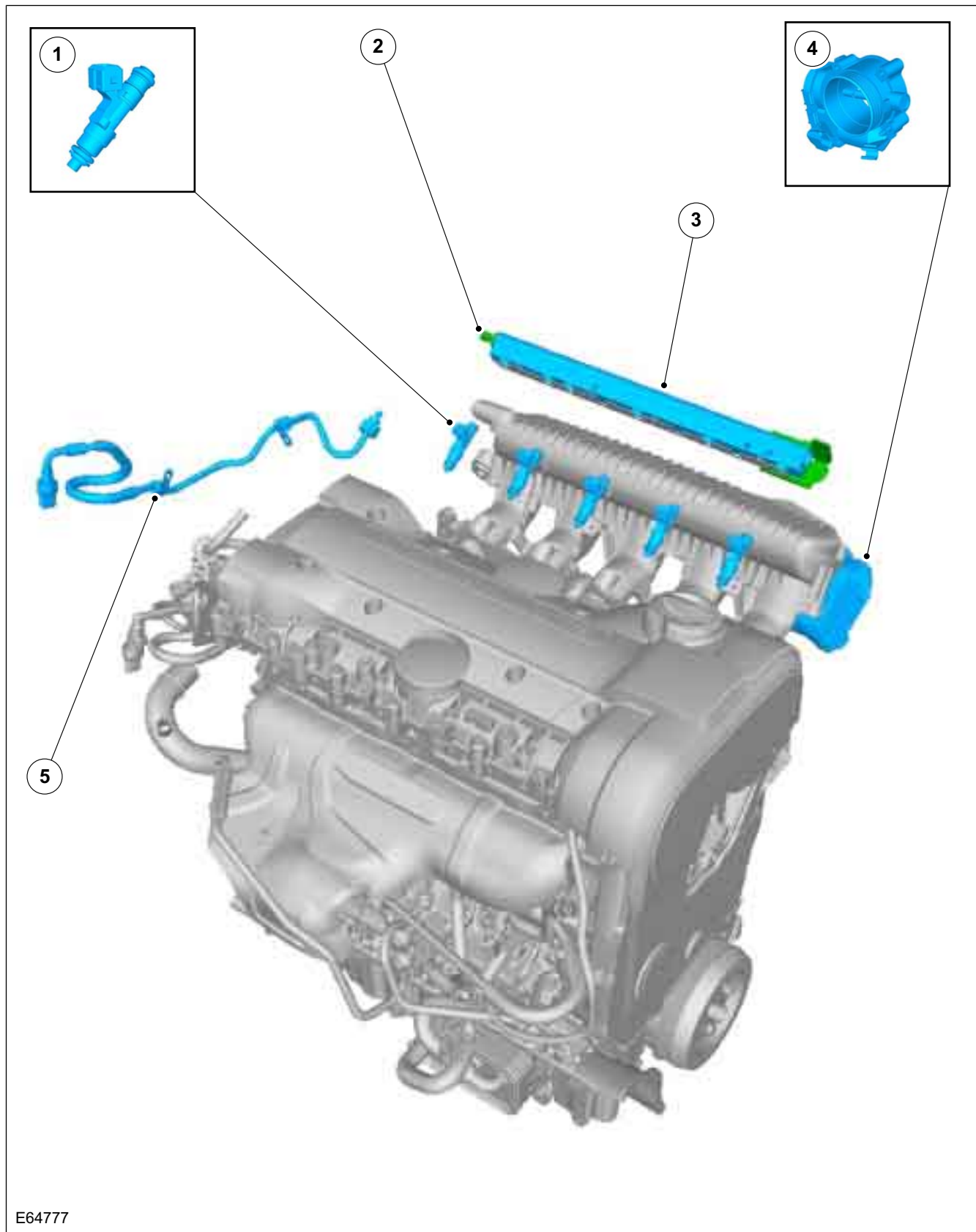
Fuel Charging and Controls — 2.5L Duratec-ST (VI5)

303-04A-2

303-04A-2

DESCRIPTION AND OPERATION

Fuel Charging and Controls



**Fuel Charging and Controls — 2.5L
Duratec-ST (VI5)****303-04A-3****303-04A-3****DESCRIPTION AND OPERATION**

Item	Description
1	Fuel Injectors
2	Fuel rail pressure relief valve
3	Fuel rail
4	Throttle body
5	Fuel tank to fuel rail fuel supply line

DIAGNOSIS AND TESTING

Fuel Charging and Controls

General Equipment

Worldwide Diagnostic System (WDS)

Inspection and Verification

1. Verify the customer concern by operating the system.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> - Fuel leaks - Blocked or contaminated fuel filter - Damaged fuel supply manifold - Damaged fuel line connections - Damaged vacuum hoses - Fuel pressure regulator (if equipped) - Fuel pulse damper (if equipped) 	<ul style="list-style-type: none"> - Loose or corroded connector(s) - Wiring harness - Fuel injector(s)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the concern is not visually evident, verify the symptom and refer to WDS.

Symptom Chart

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • Engine does not crank 	<ul style="list-style-type: none"> • PATS. 	<ul style="list-style-type: none"> • CHECK the PATS LED extinguishes within 3 seconds when the ignition is turned on. REFER to: Anti-Theft - Passive (419-01 Anti-Theft - Passive, Diagnosis and Testing).
	<ul style="list-style-type: none"> • Starting system. 	<ul style="list-style-type: none"> • REFER to: Starting System (303-06 Starting System, Diagnosis and Testing).
	<ul style="list-style-type: none"> • Ignition switch. 	<ul style="list-style-type: none"> • REFER to the Wiring Diagrams.
	<ul style="list-style-type: none"> • Powertrain control module (PCM). 	<ul style="list-style-type: none"> • Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
<ul style="list-style-type: none"> • Engine cranks but does not start 	<ul style="list-style-type: none"> • Inertia fuel shutoff (IFS) switch. 	<ul style="list-style-type: none"> • RESET the IFS switch.

Fuel Charging and Controls — 2.5L Duratec-ST (VI5)

303-04A-5

303-04A-5

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Low fuel system pressure. 	<ul style="list-style-type: none"> Check the fuel system pressure. <p>REFER to: Fuel System Pressure Check - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (310-00 Fuel System - General Information, General Procedures).</p>
	<ul style="list-style-type: none"> Fuel lines damaged or blocked. 	<ul style="list-style-type: none"> INSPECT the fuel lines. INSTALL new components as necessary. TEST the system for normal operation.
	<ul style="list-style-type: none"> Fuel filter blocked. 	<ul style="list-style-type: none"> INSTALL a new fuel filter. <p>REFER to: Fuel Pump Module (310-01 Fuel Tank and Lines, Removal and Installation).</p>
	<ul style="list-style-type: none"> Fuel pump module. 	<ul style="list-style-type: none"> REFER to: Fuel Pump Module (310-01 Fuel Tank and Lines, Removal and Installation).
	<ul style="list-style-type: none"> Crankshaft position (CKP) sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Camshaft position (CMP) sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> PCM. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Fuel rail fuel pressure sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Fuel injectors. 	<ul style="list-style-type: none"> INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. <p>REFER to: Fuel Injectors (303-04 Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).</p>
	<ul style="list-style-type: none"> Incorrect valve timing. 	<ul style="list-style-type: none"> CHECK the valve timing.
	<ul style="list-style-type: none"> Low cylinder compression. 	<ul style="list-style-type: none"> TEST the cylinder compression.

Fuel Charging and Controls — 2.5L Duratec-ST (VI5)

303-04A-6

303-04A-6

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Poor starting 	<ul style="list-style-type: none"> Low fuel system pressure. 	<ul style="list-style-type: none"> Check the fuel system pressure. <p>REFER to: Fuel System Pressure Check - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (310-00 Fuel System - General Information, General Procedures).</p>
	<ul style="list-style-type: none"> Fuel system leak. 	<ul style="list-style-type: none"> CHECK the system for fuel leak(s). REPAIR the system as necessary.
	<ul style="list-style-type: none"> Fuel system restriction. 	<ul style="list-style-type: none"> INSPECT the fuel system. INSTALL new components as necessary. TEST the system for normal operation.
	<ul style="list-style-type: none"> Fuel filter blocked. 	<ul style="list-style-type: none"> INSTALL a new fuel filter. <p>REFER to: Fuel Pump Module (310-01 Fuel Tank and Lines, Removal and Installation).</p>
	<ul style="list-style-type: none"> Air cleaner element blocked. 	<ul style="list-style-type: none"> INSTALL a new air cleaner element.
	<ul style="list-style-type: none"> Incorrect engine oil. 	<ul style="list-style-type: none"> INSTALL a new engine oil filter and engine oil.
	<ul style="list-style-type: none"> Incorrect power steering fluid. 	<ul style="list-style-type: none"> DRAIN and REFILL the power steering system with the correct fluid. <p>REFER to: Power Steering System Filling - Vehicles With: Electro-Hydraulic Power Steering (EHPS) (211-00 Steering System - General Information, General Procedures).</p>
	<ul style="list-style-type: none"> CKP sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Engine coolant temperature (ECT) sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Fuel injector(s). 	<ul style="list-style-type: none"> INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out.
<ul style="list-style-type: none"> Fuel rail fuel pressure sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS. 	

Fuel Charging and Controls — 2.5L Duratec-ST (VI5)

303-04A-7

303-04A-7

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Catalytic converter blocked. 	<ul style="list-style-type: none"> REMOVE and visually INSPECT the catalytic converter as necessary. REFER to: Catalytic Converter (309-00B, Removal and Installation).
	<ul style="list-style-type: none"> Low cylinder compression. 	<ul style="list-style-type: none"> TEST the engine cylinder compression.
<ul style="list-style-type: none"> Engine starts but immediately stops 	<ul style="list-style-type: none"> Air cleaner element blocked. 	<ul style="list-style-type: none"> INSTALL a new air cleaner element.
	<ul style="list-style-type: none"> CKP sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> CMP sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> PCM. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Low fuel system pressure. 	<ul style="list-style-type: none"> Check the fuel system pressure. REFER to: Fuel System Pressure Check - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (310-00 Fuel System - General Information, General Procedures).
	<ul style="list-style-type: none"> Fuel system restriction. 	<ul style="list-style-type: none"> INSPECT the fuel system. INSTALL new components as necessary. TEST the system for normal operation.
	<ul style="list-style-type: none"> Fuel filter blocked. 	<ul style="list-style-type: none"> INSTALL a new fuel filter. REFER to: Fuel Pump Module (310-01 Fuel Tank and Lines, Removal and Installation).
<ul style="list-style-type: none"> Poor idling 	<ul style="list-style-type: none"> Air cleaner element blocked. 	<ul style="list-style-type: none"> INSTALL a new air cleaner element.

Fuel Charging and Controls — 2.5L Duratec-ST (VI5)

303-04A-8

303-04A-8

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Incorrect or contaminated fuel. 	<ul style="list-style-type: none"> CHECK for signs of contamination such as strange odors from the fuel tank. If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean gasoline. <p>REFER to: Fuel Tank Draining (310-00 Fuel System - General Information, General Procedures).</p> <p>INSTALL a new fuel filter.</p> <ul style="list-style-type: none"> INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. INSTALL a new fuel rail. <p>REFER to: Fuel Rail (303-04 Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).</p>
	<ul style="list-style-type: none"> Low fuel system pressure. 	<ul style="list-style-type: none"> Check the fuel system pressure. <p>REFER to: Fuel System Pressure Check - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (310-00 Fuel System - General Information, General Procedures).</p>
	<ul style="list-style-type: none"> Fuel filter blocked. 	<ul style="list-style-type: none"> INSTALL a new fuel filter. <p>REFER to: Fuel Pump Module (310-01 Fuel Tank and Lines, Removal and Installation).</p>
	<ul style="list-style-type: none"> Fuel injectors. 	<ul style="list-style-type: none"> INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. <p>REFER to: Fuel Injectors (303-04 Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).</p>
	<ul style="list-style-type: none"> CKP sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.

Fuel Charging and Controls — 2.5L Duratec-ST (VI5)

303-04A-9

303-04A-9

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Knock sensor (KS). 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Fuel injection supply manifold fuel pressure sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
<ul style="list-style-type: none"> Engine stumbling 	<ul style="list-style-type: none"> Engine ignition. 	<ul style="list-style-type: none"> REFER to: Engine Ignition (303-07 Engine Ignition - 2.5L Duratec-ST (VI5), Diagnosis and Testing).
	<ul style="list-style-type: none"> Fuel injectors. 	<ul style="list-style-type: none"> INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out.
	<ul style="list-style-type: none"> Low fuel system pressure. 	<ul style="list-style-type: none"> Check the fuel system pressure. REFER to: Fuel System Pressure Check - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (310-00 Fuel System - General Information, General Procedures).
	<ul style="list-style-type: none"> Fuel rail fuel pressure sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
<ul style="list-style-type: none"> Engine lacks power 	<ul style="list-style-type: none"> Engine ignition. 	<ul style="list-style-type: none"> REFER to: Engine Ignition (303-07 Engine Ignition - 2.5L Duratec-ST (VI5), Diagnosis and Testing).
	<ul style="list-style-type: none"> Brakes binding. 	<ul style="list-style-type: none"> CHECK the braking system. REFER to: Brake System (206-00 Brake System - General Information, Diagnosis and Testing).
	<ul style="list-style-type: none"> Vehicle overloaded, or excessive wind resistance (roof racks, towing etc). 	<ul style="list-style-type: none"> ADVISE the customer about the effects of overloading the vehicle and wind resistance on the fuel consumption.
	<ul style="list-style-type: none"> Air cleaner element blocked. 	<ul style="list-style-type: none"> INSTALL a new air cleaner element as necessary.

Fuel Charging and Controls — 2.5L Duratec-ST (VI5)

303-04A-10

303-04A-10

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Low fuel system pressure. 	<ul style="list-style-type: none"> Check the fuel system pressure. <p>REFER to: Fuel System Pressure Check - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (310-00 Fuel System - General Information, General Procedures).</p>
	<ul style="list-style-type: none"> Kinked or restricted fuel lines. 	<ul style="list-style-type: none"> INSPECT the fuel lines. INSTALL new components as necessary. TEST the system for normal operation.
	<ul style="list-style-type: none"> Incorrect or contaminated fuel. 	<ul style="list-style-type: none"> CHECK for signs of contamination such as strange odors from the fuel tank. If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean gasoline. <p>REFER to: Fuel Tank Draining (310-00 Fuel System - General Information, General Procedures).</p> <ul style="list-style-type: none"> INSTALL a new fuel filter. INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. INSTALL a new rail. <p>REFER to: Fuel Rail (303-04 Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).</p>
	<ul style="list-style-type: none"> Fuel filter blocked. 	<ul style="list-style-type: none"> INSTALL a new fuel filter. <p>REFER to: Fuel Pump Module (310-01 Fuel Tank and Lines, Removal and Installation).</p>
	<ul style="list-style-type: none"> ECT sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.

Fuel Charging and Controls — 2.5L
Duratec-ST (VI5)

303-04A-11

303-04A-11

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Fuel injectors. 	<ul style="list-style-type: none"> INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. REFER to: Fuel Injectors (303-04 Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> Fuel rail fuel pressure sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Incorrect valve timing. 	<ul style="list-style-type: none"> CHECK the valve timing.
	<ul style="list-style-type: none"> Low cylinder compression. 	<ul style="list-style-type: none"> CHECK the cylinder compression.
	<ul style="list-style-type: none"> Catalytic converter blocked. 	<ul style="list-style-type: none"> REMOVE and visually INSPECT the catalytic converter for damage. INSTALL a new catalytic converter as necessary.
<ul style="list-style-type: none"> Black smoke at idle 	<ul style="list-style-type: none"> Air cleaner element blocked. 	<ul style="list-style-type: none"> INSTALL a new air cleaner element as necessary.
	<ul style="list-style-type: none"> Fuel injectors. 	<ul style="list-style-type: none"> INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. REFER to: Fuel Injectors (303-04 Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> ECT sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Fuel rail fuel pressure sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Catalytic converter blocked. 	<ul style="list-style-type: none"> REMOVE and visually INSPECT the catalytic converter for damage. INSTALL a new catalytic converter as necessary. REFER to: Catalytic Converter (309-00B, Removal and Installation).

Fuel Charging and Controls — 2.5L Duratec-ST (VI5)

303-04A-12

303-04A-12

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Incorrect valve timing. 	<ul style="list-style-type: none"> CHECK the valve timing. REFER to: Engine (303-00 Engine System - General Information, Diagnosis and Testing).
<ul style="list-style-type: none"> Excessive black smoke during acceleration 	<ul style="list-style-type: none"> Air cleaner element blocked. 	<ul style="list-style-type: none"> INSTALL a new air cleaner element as necessary.
	<ul style="list-style-type: none"> Incorrect or contaminated fuel. 	<ul style="list-style-type: none"> CHECK for signs of contamination such as strange odors from the fuel tank. If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean gasoline. REFER to: Fuel Tank Draining (310-00 Fuel System - General Information, General Procedures). INSTALL a new fuel filter. INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. INSTALL a new fuel rail. REFER to: Fuel Rail (303-04 Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> CKP sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> KS. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Fuel injectors. 	<ul style="list-style-type: none"> INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. REFER to: Fuel Injector (303-04D Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> Fuel rail fuel pressure sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.

Fuel Charging and Controls — 2.5L Duratec-ST (VI5)

303-04A-13

303-04A-13

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Catalytic converter blocked. 	<ul style="list-style-type: none"> REMOVE and visually INSPECT the catalytic converter for damage. INSTALL a new catalytic converter as necessary. REFER to: Catalytic Converter (309-00B, Removal and Installation).
<ul style="list-style-type: none"> Black smoke at cruising speeds 	<ul style="list-style-type: none"> Air cleaner element blocked. 	<ul style="list-style-type: none"> INSTALL a new air cleaner element.
	<ul style="list-style-type: none"> ECT sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Fuel injectors. 	<ul style="list-style-type: none"> INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. REFER to: Fuel Injector (303-04D Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> Fuel rail fuel pressure sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Catalytic converter blocked. 	<ul style="list-style-type: none"> REMOVE and visually INSPECT the catalytic converter for damage. INSTALL a new catalytic converter as necessary. REFER to: Catalytic Converter (309-00B, Removal and Installation).
<ul style="list-style-type: none"> Blue smoke 	<ul style="list-style-type: none"> Engine burning oil. 	<ul style="list-style-type: none"> CARRY OUT a controlled oil consumption test over 1000 km (600 miles). CONFIRM that the oil consumption is less than 0.1 litre per 1000 km (600 miles).

Fuel Charging and Controls — 2.5L
Duratec-ST (VI5)

303-04A-14

303-04A-14

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Incorrect or contaminated fuel. 	<ul style="list-style-type: none"> CHECK for signs of contamination such as strange odors from the fuel tank. If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean gasoline. REFER to: Fuel Tank Draining (310-00 Fuel System - General Information, General Procedures). INSTALL a new fuel filter. INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. INSTALL a new fuel rail. REFER to: Fuel Rail (303-04 Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> Positive crankcase ventilation (PCV) system. 	<ul style="list-style-type: none"> INSPECT for visible signs of damage or blockage. CLEAN, REPAIR or INSTALL new parts as necessary.
	<ul style="list-style-type: none"> Worn or damaged valve guide(s), piston ring(s), cylinder bore(s), cylinder head or gasket. 	<ul style="list-style-type: none"> REMOVE the cylinder head. INSPECT the cylinder head, pistons and cylinder bores for signs of wear or damage. REFER to: Engine (303-00 Engine System - General Information, Diagnosis and Testing).

Fuel Charging and Controls — 2.5L
Duratec-ST (VI5)

303-04A-15

303-04A-15

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> White smoke 	<ul style="list-style-type: none"> Incorrect or contaminated fuel. 	<ul style="list-style-type: none"> CHECK for signs of contamination such as strange odors from the fuel tank. If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean gasoline. REFER to: Fuel Tank Draining (310-00 Fuel System - General Information, General Procedures). INSTALL a new fuel filter. INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. REFER to: Fuel Injector (303-04D Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation). INSTALL a new fuel rail. REFER to: Fuel Rail (303-04 Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> Coolant in the combustion chamber. 	<ul style="list-style-type: none"> CARRY OUT a cooling system pressure test. REFER to: Engine Cooling (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), Diagnosis and Testing). REMOVE the cylinder head. INSPECT the cylinder head, cylinder head gasket and cylinder bores for wear or damage. REFER to: Cylinder Head (303-01 Engine - 1.8L Duratorq-TDCi (Lynx) Diesel, In-vehicle Repair).
<ul style="list-style-type: none"> Engine misfire 	<ul style="list-style-type: none"> Engine ignition. 	<ul style="list-style-type: none">

Fuel Charging and Controls — 2.5L
Duratec-ST (VI5)

303-04A-16

303-04A-16

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Incorrect or contaminated fuel. 	<ul style="list-style-type: none"> CHECK for signs of contamination such as strange odors from the fuel tank. If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean gasoline. <p>REFER to: Fuel Tank Draining (310-00 Fuel System - General Information, General Procedures).</p> <p>INSTALL a new fuel filter. <ul style="list-style-type: none"> INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. INSTALL a new fuel rail. <p>REFER to: Fuel Rail (303-04 Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).</p> </p>
	<ul style="list-style-type: none"> Low fuel system pressure. 	<ul style="list-style-type: none"> Check the fuel system pressure. <p>REFER to: Fuel System Pressure Check - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (310-00 Fuel System - General Information, General Procedures).</p>
	<ul style="list-style-type: none"> Engine operating temperature too high. 	<ul style="list-style-type: none"> REFER to: Engine Cooling (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), Diagnosis and Testing).
	<ul style="list-style-type: none"> ECT sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> CKP sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> CMP sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> KS. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.

Fuel Charging and Controls — 2.5L
Duratec-ST (VI5)

303-04A-17

303-04A-17

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Fuel injectors. 	<ul style="list-style-type: none"> INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. REFER to: Fuel Injector (303-04D Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> Fuel rail fuel pressure sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Low cylinder compression. 	<ul style="list-style-type: none"> CHECK the engine compression.
	<ul style="list-style-type: none"> Worn or damaged valve(s), tappet(s) or camshaft(s). 	<ul style="list-style-type: none"> REMOVE the cylinder head. INSPECT the cylinder head, valves, tappets and camshafts for signs of wear or damage. REFER to: Engine (303-00 Engine System - General Information, Diagnosis and Testing).
	<ul style="list-style-type: none"> Damaged cylinder head gasket. 	<ul style="list-style-type: none"> REMOVE the cylinder head. INSPECT the cylinder head gasket and cylinder bores for wear or damage. REFER to: Cylinder Head (303-01D, Removal and Installation).
<ul style="list-style-type: none"> Engine knock at idle 	<ul style="list-style-type: none"> Low engine oil level. 	<ul style="list-style-type: none"> CHECK the engine oil level. REFILL as necessary.

Fuel Charging and Controls — 2.5L
Duratec-ST (VI5)

303-04A-18

303-04A-18

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Incorrect or contaminated fuel. 	<ul style="list-style-type: none"> CHECK for signs of contamination such as strange odors from the fuel tank. If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean gasoline. <p>REFER to: Fuel Tank Draining (310-00 Fuel System - General Information, General Procedures).</p> <p>INSTALL a new fuel filter. <ul style="list-style-type: none"> INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. INSTALL a new fuel rail. <p>REFER to: Fuel Rail (303-04 Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).</p> </p>
	<ul style="list-style-type: none"> KS. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> CKP sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Fuel injector(s). 	<ul style="list-style-type: none"> INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. <p>REFER to: Fuel Injector (303-04D Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).</p>
	<ul style="list-style-type: none"> Incorrect valve timing. 	<ul style="list-style-type: none"> CHECK the valve timing.
	<ul style="list-style-type: none"> Excessive carbon build up. 	<ul style="list-style-type: none"> REMOVE the cylinder head. INSPECT the cylinder head and pistons for signs carbon build up. <p>REFER to: Cylinder Head (303-01D, Removal and Installation).</p>

Fuel Charging and Controls — 2.5L Duratec-ST (VI5)

303-04A-19

303-04A-19

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Worn or damaged oil pump. Worn or damaged timing chain or sprocket. Major mechanical engine failure. 	<ul style="list-style-type: none"> INSPECT the engine components.
<ul style="list-style-type: none"> Engine knock during acceleration 	<ul style="list-style-type: none"> KS. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Fuel injectors. 	<ul style="list-style-type: none"> INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. REFER to: Fuel Injector (303-04D Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> Major mechanical engine failure. 	<ul style="list-style-type: none"> REFER to: Engine (303-00 Engine System - General Information, Diagnosis and Testing).
<ul style="list-style-type: none"> Excessive fuel consumption 	<ul style="list-style-type: none"> Brakes binding. 	<ul style="list-style-type: none"> CHECK the braking system. REFER to: Brake System (206-00 Brake System - General Information, Diagnosis and Testing).
	<ul style="list-style-type: none"> Vehicle overloaded, or excessive wind resistance (roof racks, towing etc). 	<ul style="list-style-type: none"> ADVISE the customer about the effects of overloading the vehicle and wind resistance on the fuel consumption.
	<ul style="list-style-type: none"> Air cleaner element blocked. 	<ul style="list-style-type: none"> INSTALL a new air cleaner element.
	<ul style="list-style-type: none"> Fuel system leak(s). 	<ul style="list-style-type: none"> CHECK the system for fuel leak(s). REPAIR or INSTALL new parts as necessary.
	<ul style="list-style-type: none"> Fuel filter blocked. 	<ul style="list-style-type: none"> INSTALL a new fuel filter. REFER to: Fuel Pump Module (310-01 Fuel Tank and Lines, Removal and Installation).
	<ul style="list-style-type: none"> Incorrect engine oil. 	<ul style="list-style-type: none"> INSTALL a new oil filter and engine oil.
	<ul style="list-style-type: none"> Generator. 	<ul style="list-style-type: none"> REFER to WDS.

Fuel Charging and Controls — 2.5L Duratec-ST (VI5)

303-04A-20

303-04A-20

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Slipping clutch. 	<ul style="list-style-type: none"> REFER to: Clutch (308-01 Clutch - Vehicles With: 6-Speed Manual Transmission (M66), Diagnosis and Testing).
	<ul style="list-style-type: none"> ECT sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Fuel injectors. 	<ul style="list-style-type: none"> INSPECT the fuel injectors. CLEAN the fuel injectors or INSTALL a new set of injectors as required only after the checks have been carried out. REFER to: Fuel Injector (303-04D Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> PCM calibration. 	<ul style="list-style-type: none"> Using WDS, CHECK for the availability of a calibration update.
	<ul style="list-style-type: none"> Incorrect valve timing. 	<ul style="list-style-type: none"> CHECK the valve timing.
	<ul style="list-style-type: none"> Low cylinder compression. 	<ul style="list-style-type: none"> CHECK the engine compression.
<ul style="list-style-type: none"> Engine cuts out during hard acceleration 	<ul style="list-style-type: none"> CMP sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> CKP sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Fuel rail fuel pressure sensor. 	<ul style="list-style-type: none"> Carry out a full engine diagnosis using the guided diagnostic menu in WDS.
	<ul style="list-style-type: none"> Low fuel system pressure. 	<ul style="list-style-type: none"> Check the fuel system pressure. REFER to: Fuel System Pressure Check - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (310-00 Fuel System - General Information, General Procedures).

REMOVAL AND INSTALLATION

Throttle Body(23 198 0)

Removal

NOTE: Removal steps in this procedure may contain installation details.

1. Disconnect the battery ground cable.

Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

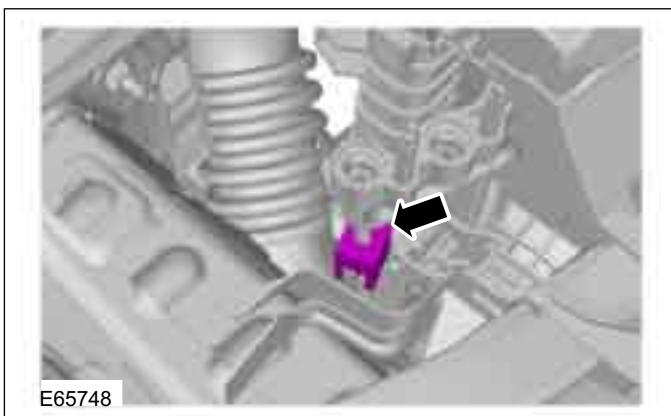
2. Remove the charge air cooler.

Refer to: Charge Air Cooler (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).

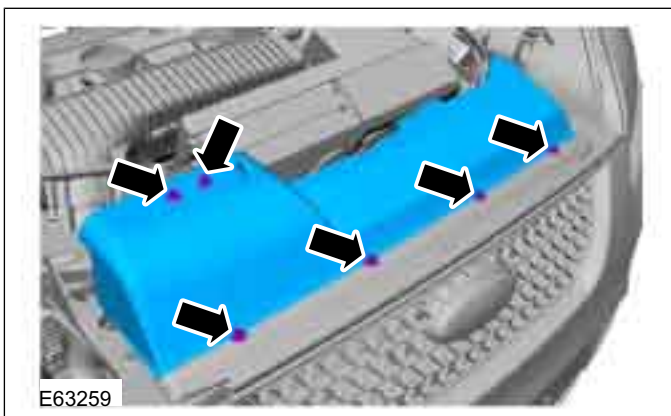
3. Remove the right-hand front headlamp.

Refer to: Headlamp Assembly (417-01 Exterior Lighting, Removal and Installation).

- 4.

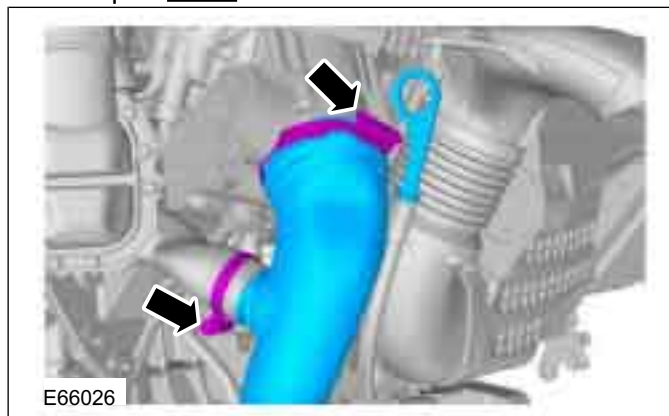


- 5.

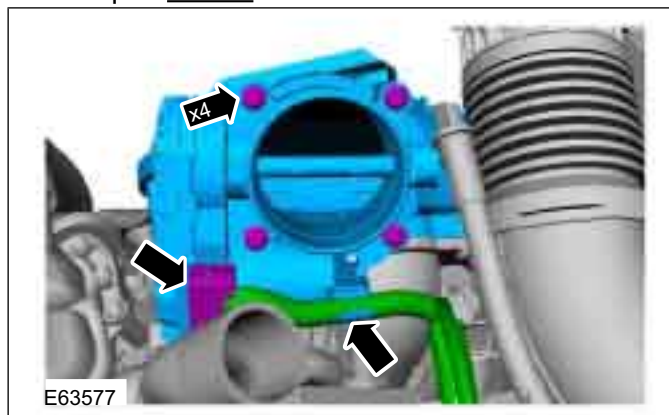


6. **⚠ CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.

Torque: 4 Nm



7. Torque: 10 Nm



Installation

1. To install, reverse the removal procedure.
2. Turn the ignition key to position II and wait for one minute to initialize the throttle body.
3. Turn the ignition key to the OFF position.
4. Initialize the door window motors.

Refer to: Door Window Motor Initialization (501-11 Glass, Frames and Mechanisms, General Procedures).

REMOVAL AND INSTALLATION

Fuel Injectors(23 455 0)

Materials	
Name	Specification
Engine Oil - 5W-30	WSS-M2C911-A

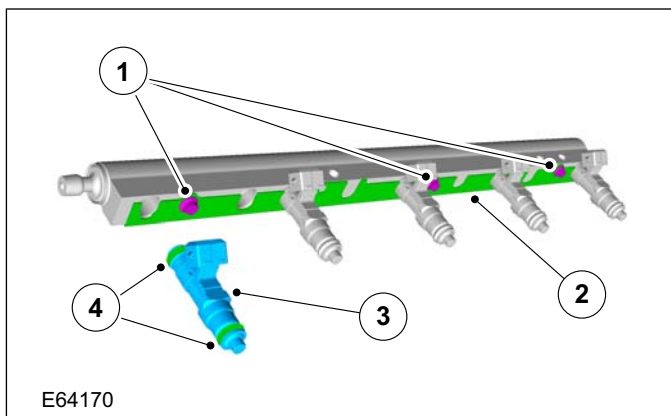
Removal

NOTE: Removal steps in this procedure may contain installation details.

1. Remove the fuel rail.

Refer to: Fuel Rail (303-04 Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Removal and Installation).

2. 1. Torque: 10 Nm



Installation

1. To install, reverse the removal procedure.
2. Lubricate the new fuel injector O-ring seals with clean engine oil to aid installation.

Material: Engine Oil - 5W-30

REMOVAL AND INSTALLATION

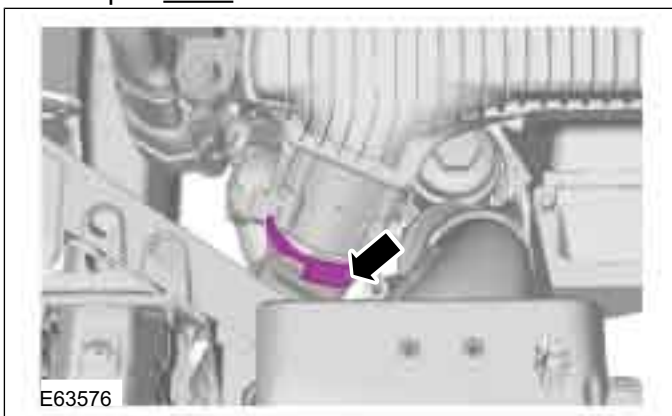
Fuel Rail

Removal

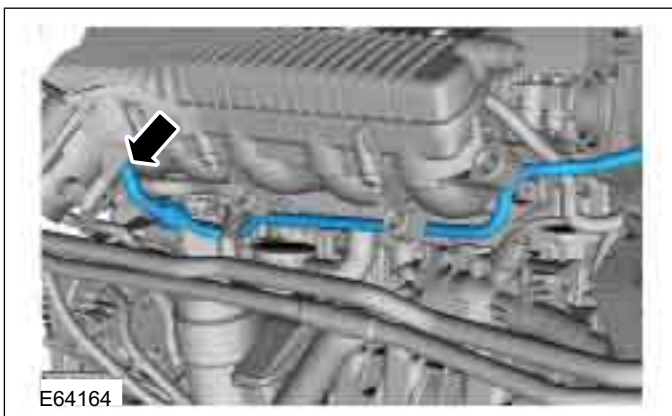
NOTE: Removal steps in this procedure may contain installation details.

1. Refer to: Petrol Fuel System Health and Safety Precautions (100-00 General Information, Description and Operation).
2. Refer to: Fuel System Pressure Release (310-00 Fuel System - General Information, General Procedures).
3. Refer to: Battery Disconnect (414-01 Battery, Mounting and Cables, General Procedures).
4. **CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.

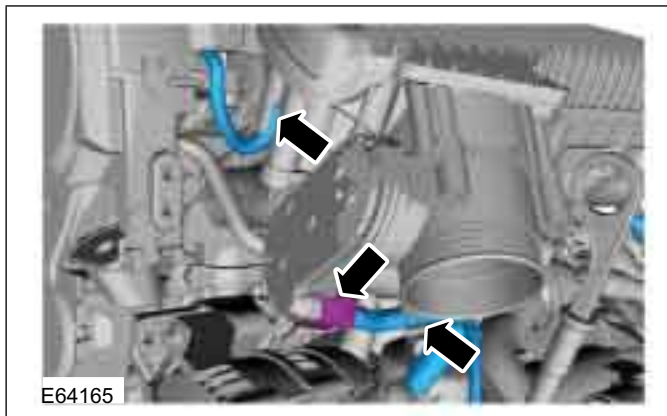
Torque: 4 Nm



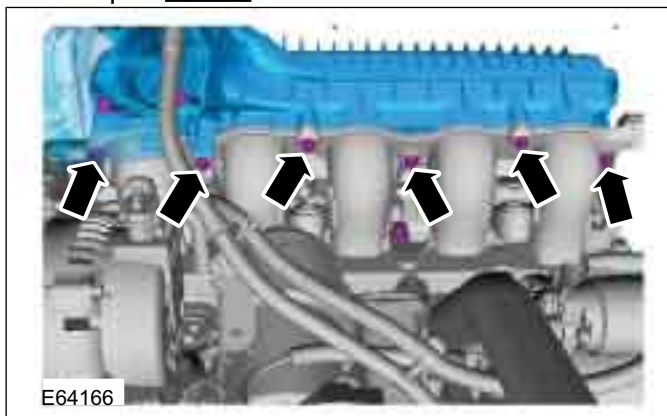
5. Refer to: Air Cleaner (303-12, Removal and Installation).
6. **CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.



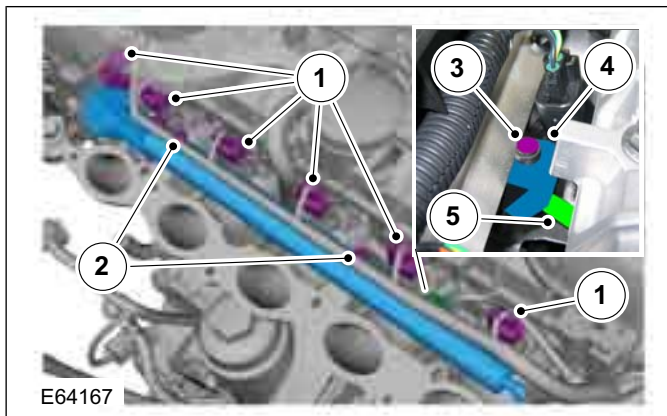
7. **CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.



8. Torque: 20 Nm



9. 2. Torque: 10 Nm
3. Torque: 2 Nm



Installation

1. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

2. Refer to: Door Window Motor Initialization
(501-11 Glass, Frames and Mechanisms,
General Procedures).

SECTION 303-04B Fuel Charging and Controls - Turbocharger — 2.5L Duratec-ST (VI5)

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Turbocharger.....	303-04B-2
Inspection and Verification.....	303-04B-2
REMOVAL AND INSTALLATION	
Turbocharger..... (23 612 0)	303-04B-4

Fuel Charging and Controls - Turbocharger
— 2.5L Duratec-ST (VI5)

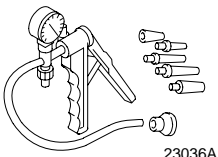
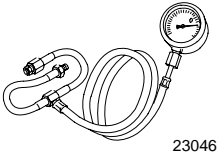
303-04B-2

303-04B-2

DIAGNOSIS AND TESTING

Turbocharger

Special Tool(s)

 <p>23036A</p>	<p>Hand Vacuum/Pressure Pump 416 - D001 (23 - 036A)</p>
 <p>23046</p>	<p>Fuel Pressure Gauge 310-053 (23-046)</p>

General Equipment

The Ford approved diagnostic tool

Inspection and Verification

NOTE: It is normal for a small amount of combustion gas to pass into the crankcase. This gas is scavenged into the air intake system through the positive crankcase ventilation (PCV) system, which incorporates a crankcase vent oil separator. Some engine oil, in the form of a vapor is carried into the air intake system with the blow-by gases (this engine oil also contributes to valve seat durability). This means that oil will collect inside the air intake components and the turbocharger. This is not an indication that the turbocharger oil seal has failed. The turbocharger oil seal will not fail unless the bearings fail first, which will cause the turbocharger to become noisy or seize. Do not install a new turbocharger due to oil inside the turbocharger or the air intake components. If a leak

is detected in the oil supply or return tubes or connections, locate and rectify the source. Do not install a new turbocharger due to an oil leak.

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> • Oil leak(s) • Air cleaner element • Air cleaner outlet pipe • Air cleaner intake pipe • Turbocharger oil supply or oil return tube • Turbocharger intake pipe • Turbocharger vacuum diaphragm unit • Turbocharger housing • Charge air cooler • Charge air cooler intake pipe and hose(s) • Charge air cooler outlet pipe and hose(s) 	<ul style="list-style-type: none"> • Wiring harness • Boost control solenoid valve • Powertrain control module (PCM)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Symptom Chart

NOTE: The vacuum diaphragm unit is a fixed part of the turbocharger and cannot be adjusted or renewed.

Fuel Charging and Controls - Turbocharger — 2.5L Duratec-ST (VI5)

303-04B-3

303-04B-3

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Blue smoke with excessive turbocharger noise 	<ul style="list-style-type: none"> Turbocharger compressor rubbing on housing walls. Turbocharger turbine rubbing on housing walls. Turbocharger bearings and oil seal(s). Turbocharger oil supply tube blocked or damaged. 	<ul style="list-style-type: none"> INSPECT the turbocharger for signs of damage. INSTALL a new turbocharger as necessary. REFER to: Turbocharger (303-04 Fuel Charging and Controls - Turbocharger - 2.5L Duratec-ST (VI5), Removal and Installation).
<ul style="list-style-type: none"> Blue smoke without excessive turbocharger noise 	<ul style="list-style-type: none"> Turbocharger oil return tube blocked or damaged. 	<ul style="list-style-type: none"> Check the oil return tube for blockage or damage, INSTALL a new oil return tube as necessary.
<ul style="list-style-type: none"> Poor engine performance 	<ul style="list-style-type: none"> Vacuum diaphragm unit vacuum line(s). 	<ul style="list-style-type: none"> CHECK all vacuum line(s) are installed and no signs of air leaks are present. REPAIR as necessary.
	<ul style="list-style-type: none"> Charge air cooler system. 	<ul style="list-style-type: none"> CHECK the charge air cooler, charge air cooler pipes and charge air cooler hoses for leaks and obstructions. REPAIR as necessary.
	<ul style="list-style-type: none"> Air cleaner intake pipe. 	<ul style="list-style-type: none"> CHECK the air cleaner intake pipe for obstruction. REPAIR the necessary.
	<ul style="list-style-type: none"> Unauthorized adjustment of the vacuum diaphragm unit actuator rod. 	<ul style="list-style-type: none"> The turbocharger boost pressure is factory set and must not be adjusted. CHECK the paint seal on the vacuum diaphragm unit actuator rod has not been broken. If the paint seal has been broken, INSTALL a new turbocharger. REFER to: Turbocharger (303-04 Fuel Charging and Controls - Turbocharger - 2.5L Duratec-ST (VI5), Removal and Installation).
	<ul style="list-style-type: none"> Vacuum diaphragm unit actuator rod. 	<ul style="list-style-type: none"> CHECK the vacuum diaphragm unit actuator rod moves freely, If the vacuum diaphragm unit actuator rod does not move freely. CHECK for signs of damage or signs of foreign material. REPAIR as necessary.

Fuel Charging and Controls - Turbocharger
— 2.5L Duratec-ST (VI5)

303-04B-4

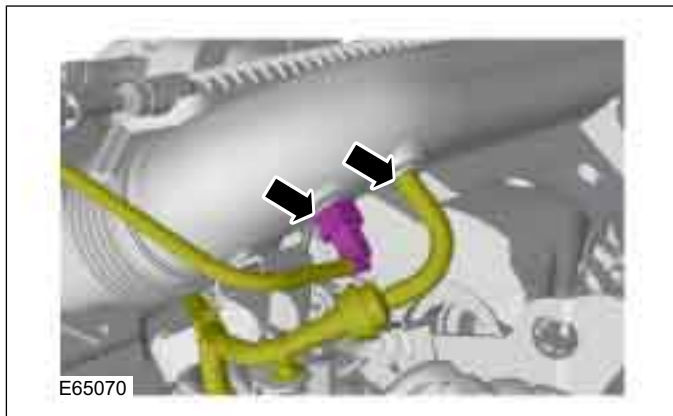
303-04B-4

REMOVAL AND INSTALLATION

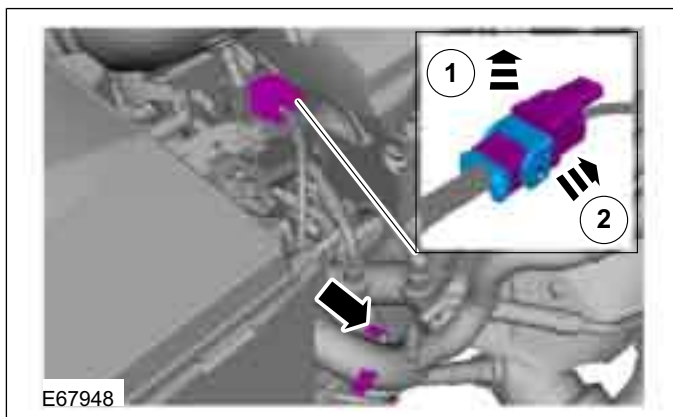
Turbocharger(23 612 0)

Removal

1. Refer to: Battery Disconnect and Connect (414-01, General Procedures).
2. **⚠ CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.

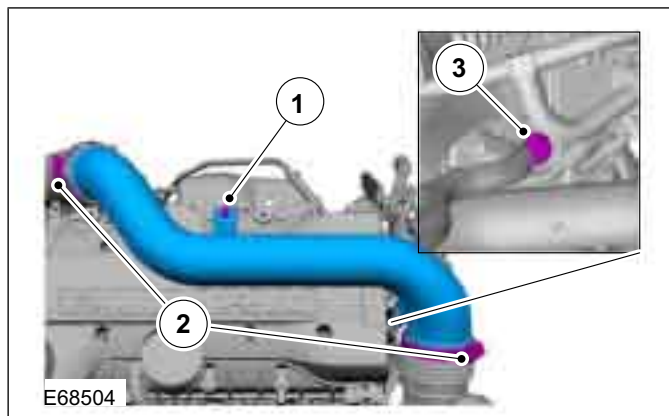


3.

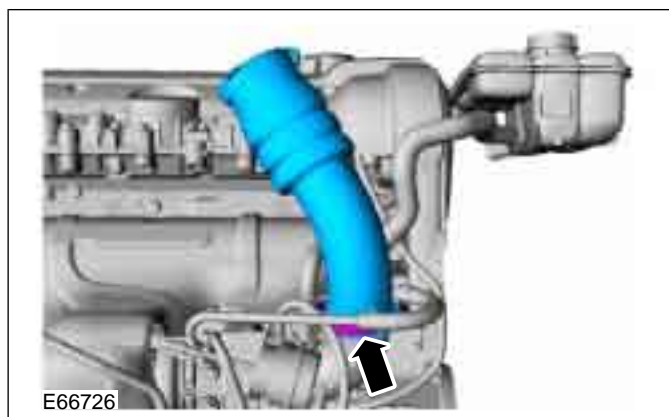


4. **⚠ CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.

1. Torque: 10 Nm



5. **⚠ CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.



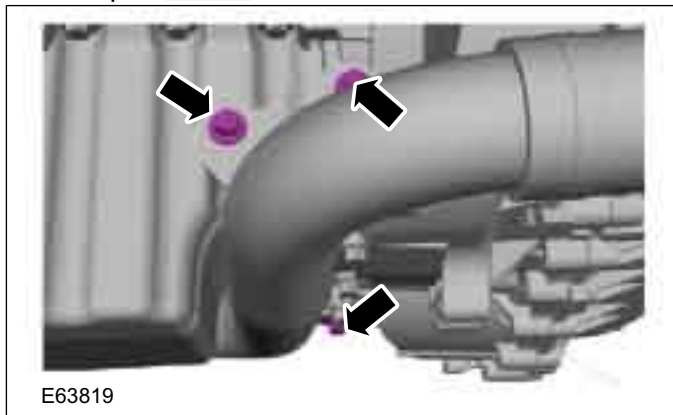
Fuel Charging and Controls - Turbocharger — 2.5L Duratec-ST (VI5)

303-04B-5

303-04B-5

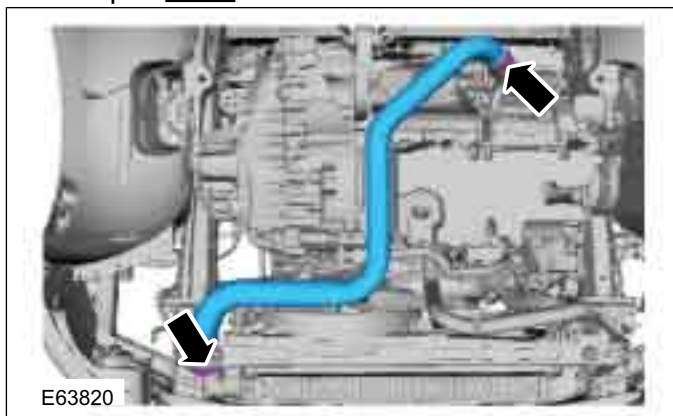
REMOVAL AND INSTALLATION

6. Refer to: Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), General Procedures).
7. Refer to: Front Halfshaft RH (205-04, Removal and Installation).
8. Torque: 20 Nm



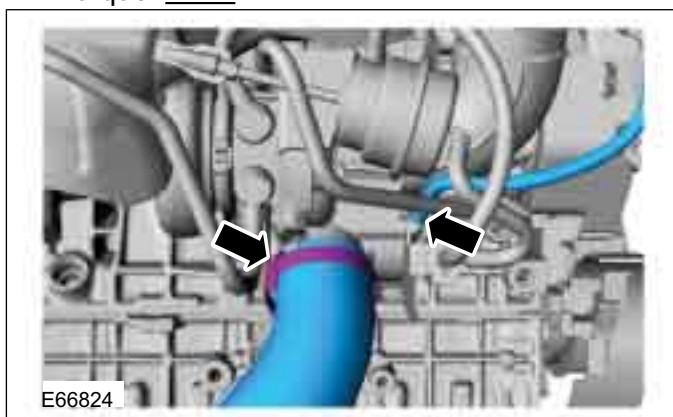
9. **CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.

Torque: 4 Nm



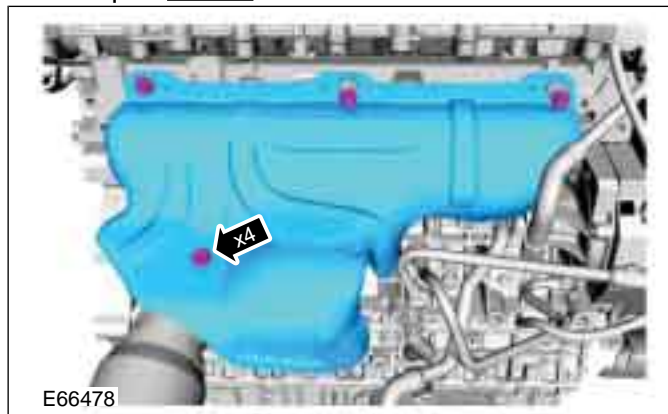
10. **CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.

Torque: 4 Nm

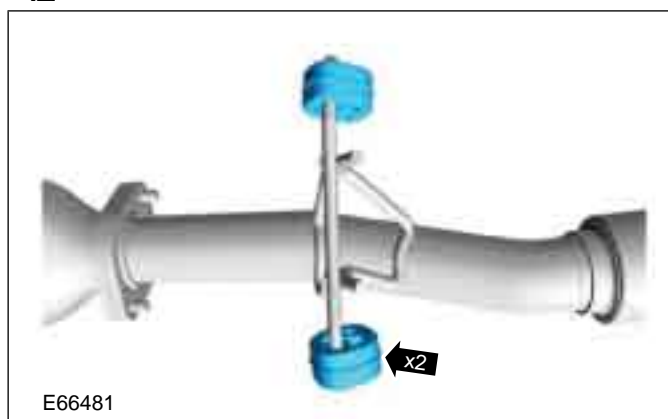


11. **NOTE:** Note the position of the spring washers to aid installation.

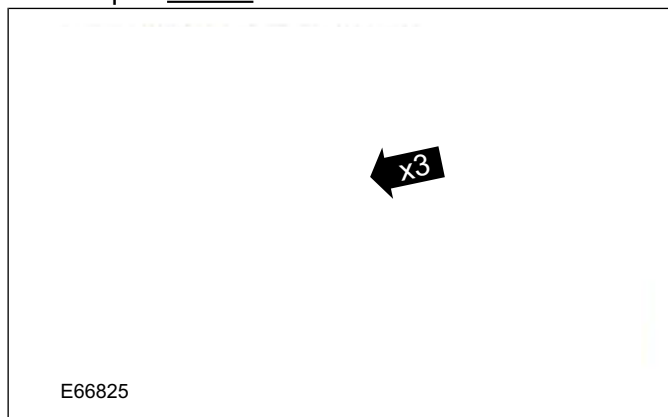
Torque: 10 Nm



12



13. Torque: 30 Nm



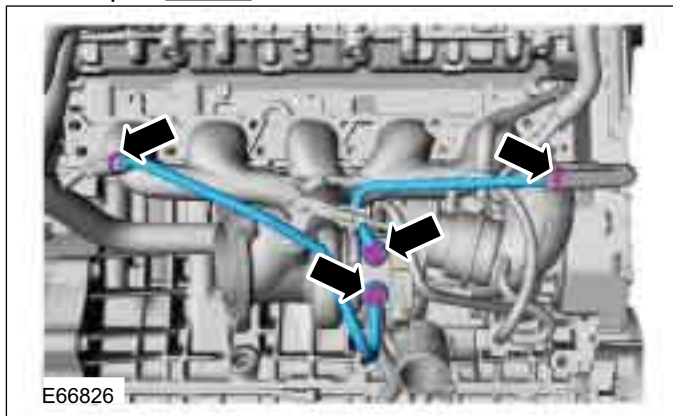
Fuel Charging and Controls - Turbocharger
— 2.5L Duratec-ST (VI5)

303-04B-6

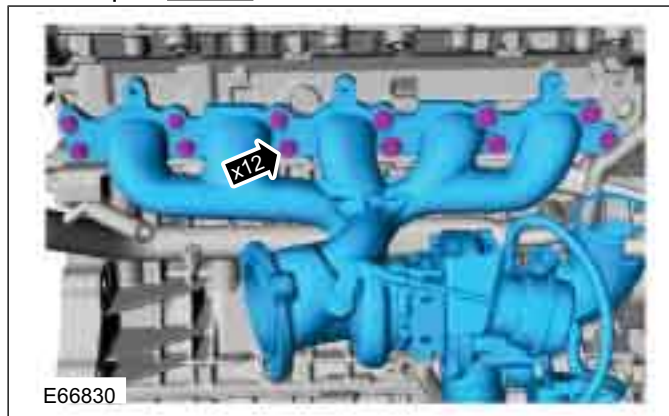
303-04B-6

REMOVAL AND INSTALLATION

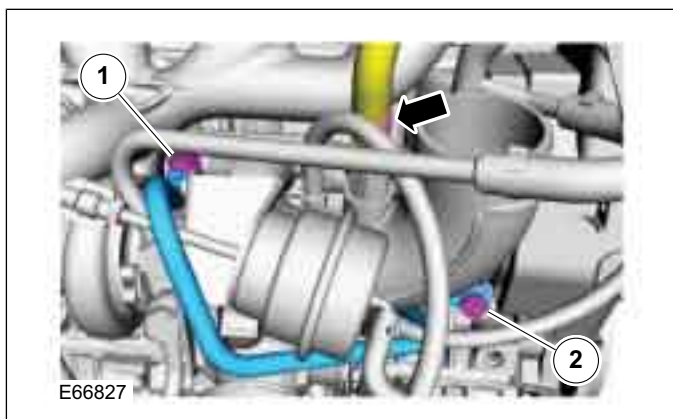
14. Torque: 26 Nm



17. Torque: 25 Nm



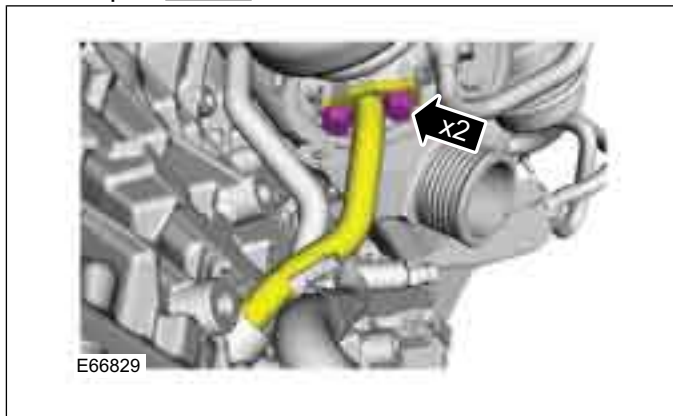
- 15. 1. Torque: 26 Nm**
- 2. Torque: 38 Nm**
- 3. Torque: 20 Nm**



Installation

- 1. To install, reverse the removal procedure.**
- 2. Refer to: Door Window Motor Initialization (501-11, General Procedures).**

16. Torque: 12 Nm



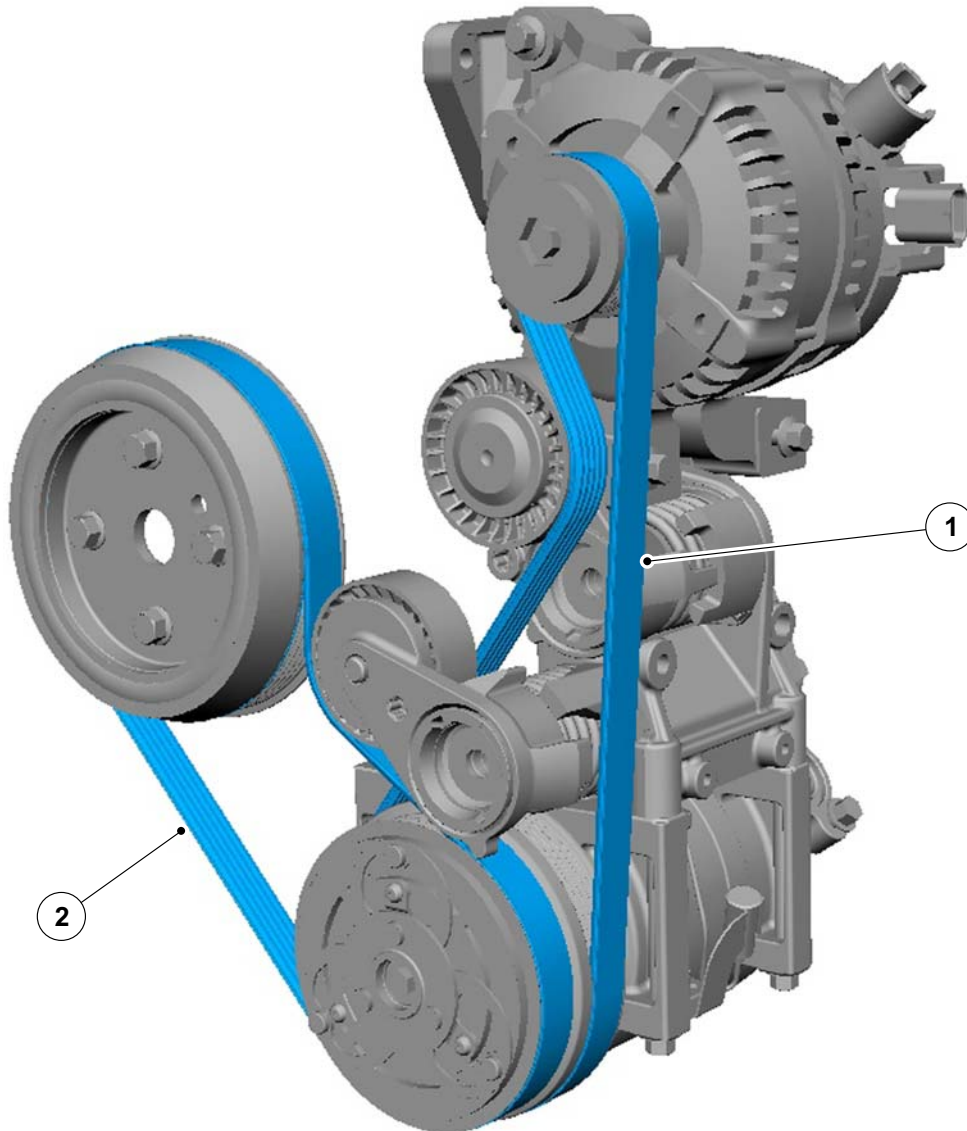
SECTION 303-05 Accessory Drive — 2.5L Duratec-ST (VI5)

VEHICLE APPLICATION: 2008.75 Focus ST C307

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DESCRIPTION AND OPERATION

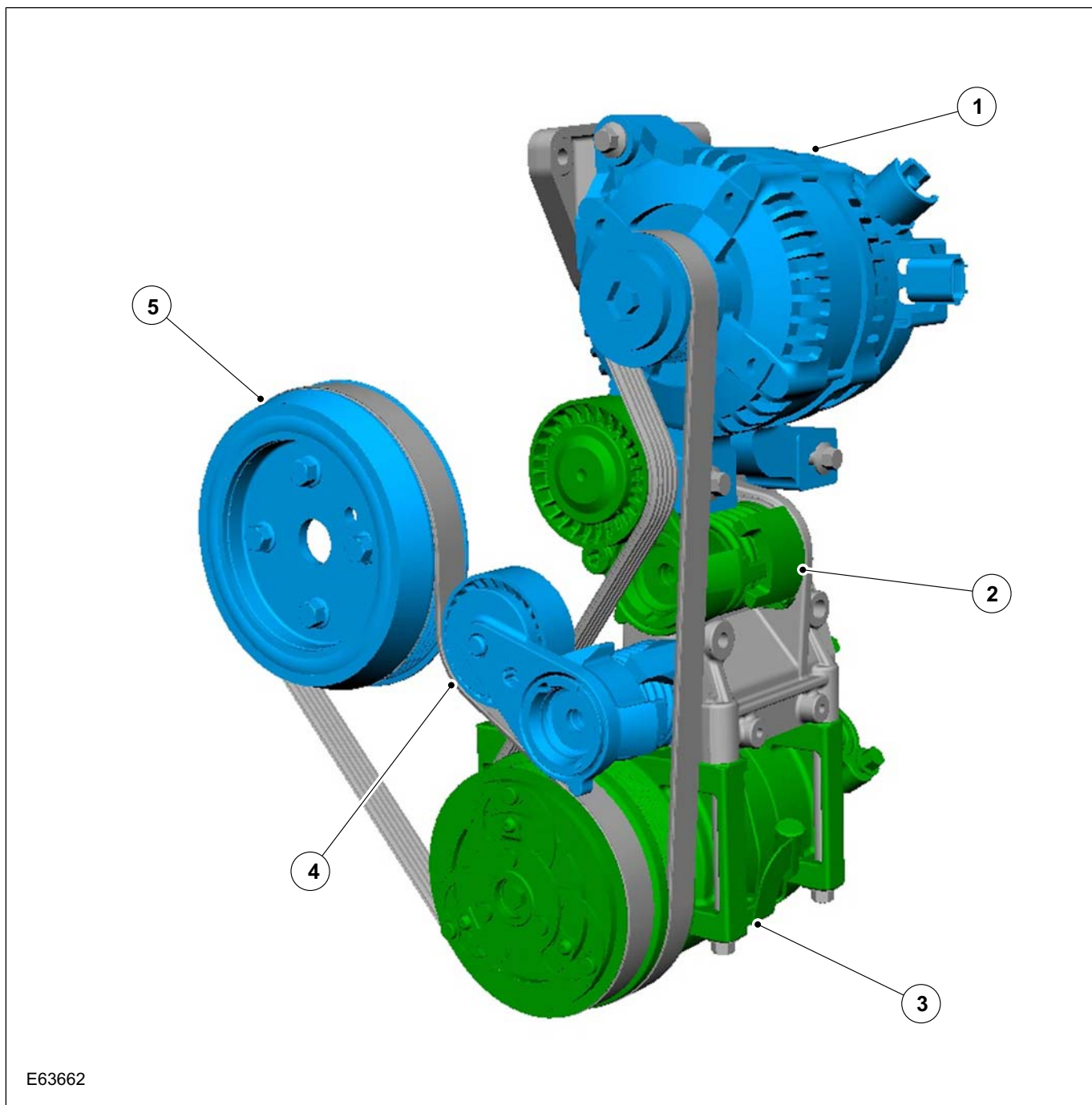
Accessory Drive



E63663

Item	Description
1	Accessory drive belt
2	Air conditioning (A/C) compressor belt

DESCRIPTION AND OPERATION



E63662

Item	Description
1	Generator
2	Accessory drive belt tensioner
3	A/C compressor
4	A/C drive belt tensioner
5	Crankshaft pulley

DIAGNOSIS AND TESTING

Accessory Drive

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical damage.

Visual Inspection Chart

Mechanical
– Damaged or contaminated accessory drive belt
– Damaged or contaminated pulley(s)
– Incorrect accessory drive belt
– Incorrect fitment of the accessory drive belt
– Accessory drive belt tensioner
– Accessory drive belt idler pulley
– Generator
– Power steering pump
– Power steering pump leakage
– Air conditioning (A/C) compressor
– Pulley(s)
– Loose hardware

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

Accessory Drive Belt Concerns

⚠ CAUTION: Do not lubricate the accessory drive belt, accessory drive belt tensioner or idler pulley(s) as potential damage to the accessory drive belt material construction, accessory drive belt tensioner damping mechanism, accessory drive belt tensioner pulley bearing and idler pulley(s) bearing may occur.

Cracking

Accessory drive belts are made from rubber which hardens with time and can develop cracks. As the accessory drive belt runs on the back of some of the pulleys, the cracks are opened up. Small cracks are not considered to be a failure of the accessory drive belt. Only if the crack is deep enough to reach the bottom of the groove to expose the cord or any chunks are found to be missing from the accessory drive belt, is the accessory drive belt condition considered to be unacceptable.

1. Check the accessory drive belt for cracks. If the damage exceeds the acceptable limit, install a new accessory drive belt. REFER to:

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05, Removal and Installation),

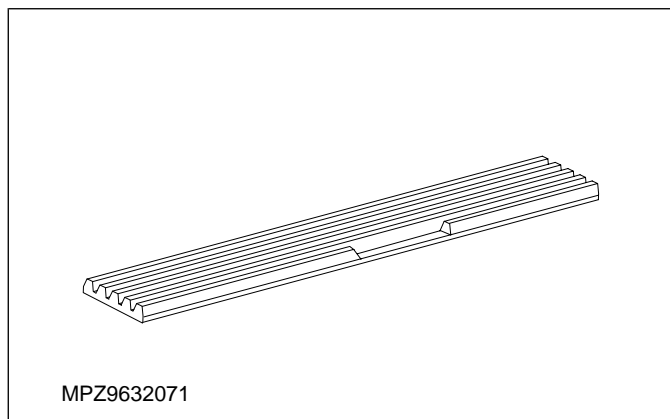
Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).

Chunking

Chunking describes the condition where long lengths of rubber become detached from the ribs of the accessory drive belt. This is considered to be a failure of the accessory drive belt.



DIAGNOSIS AND TESTING

2. Check the accessory drive belt for damage. If any chunks are found to be missing, install a new accessory drive belt. REFER to:

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05, Removal and Installation),

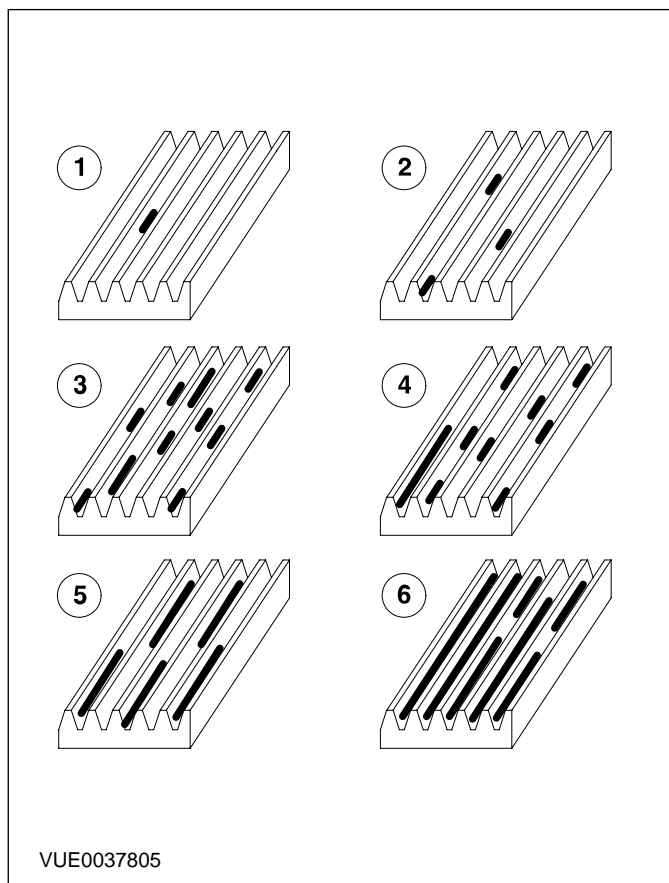
Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).

Pilling

Pilling is dust that forms in between the ribs of the accessory drive belt from rubber that is worn off the accessory drive belt when it is new. There may also be loose particles left on the accessory drive belt during the manufacturing process. These are worn off and form into small balls of rubber that then get trapped in the grooves of the accessory drive belt. This condition will usually clear itself within 4800 km - 8000 km (3000 miles - 5000 miles) of normal driving.



3. Check the accessory drive belt for pilling. The condition of the accessory drive belt should be compared against the illustration.

1. Small scattered pills. Not considered a concern. No action required.
2. Small scattered pills. Not considered a concern. No action required.
3. Longer pills up to 50% of the rib height. Possible noise concern. **INSTALL** a new accessory drive belt if noise is apparent. **REFER** to:

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05, Removal and Installation),

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).

DIAGNOSIS AND TESTING

4. Longer pills up to 50% of the rib height. Possible noise concern. INSTALL a new accessory drive belt if noise is apparent. REFER to:

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05, Removal and Installation),

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).

5. Heavy deposits in the grooves. Possible noise and stability concern. INSTALL a new accessory drive belt. REFER to:

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05, Removal and Installation),

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).

6. Heavy deposits in the grooves. Possible noise and stability concern. INSTALL a new accessory drive belt. REFER to:

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05, Removal and Installation),

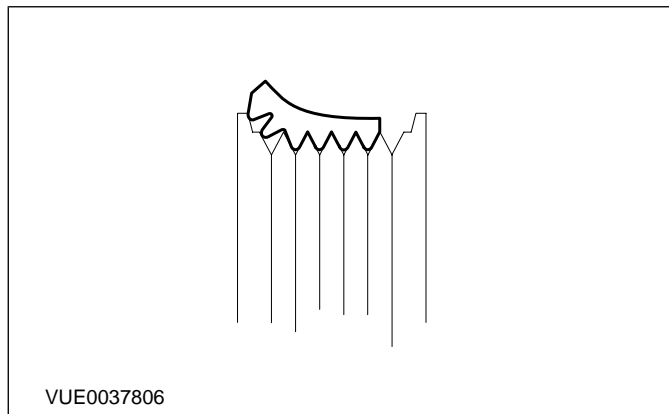
Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),

Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).

Incorrect fitment

Accessory drive belt noise can be generated by the accessory drive belt being incorrectly fitted on the pulley as shown in the following illustration. Make sure that all the V grooves on the accessory drive belt contact correctly with the pulley.



4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

DIAGNOSIS AND TESTING

Symptom Chart

Symptom	Possible Sources	Action
• Accessory drive belt noise	• Accessory drive system	<ul style="list-style-type: none"> CHECK the system with the engine running and the accessory drive belt removed (only run the engine for a very short period). If a noise is apparent, the cause is not the accessory drive system. If a noise is not apparent, the cause is the accessory drive system. CHECK where the noise is coming from. Use a stethoscope or other listening device to determine the source of the noise. INSTALL new components as necessary. TEST the system for normal operation.
	• Accessory drive belt incorrectly installed.	<ul style="list-style-type: none"> CHECK the accessory drive belt is correctly installed in the pulley grooves. INSTALL a new accessory drive belt as necessary. REFER to: Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation), Accessory Drive Belt (303-05, Removal and Installation), Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation), Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation), Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation). TEST the system for normal operation.
	• Pulley(s).	<ul style="list-style-type: none"> CHECK the pulley(s) for damage, freedom of rotation, stone entrapment and alignment. INSTALL new components as necessary. TEST the system for normal operation.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Lubricant or other contamination. 	<ul style="list-style-type: none"> CHECK the accessory drive belt for contamination or damage. RECTIFY the source of the leak and INSTALL a new accessory drive belt. REFER to: Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation), Accessory Drive Belt (303-05, Removal and Installation), Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation), Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation), Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation). TEST the system for normal operation.
<p>NOTE: Squeal is defined as a continuous shriek, most noticeable when the engine is being accelerated or with electrical load.</p> <ul style="list-style-type: none"> Accessory drive belt squeal 	<ul style="list-style-type: none"> Accessory drive belt tensioner worn, damaged or contaminated with oil. 	<ul style="list-style-type: none"> CHECK the accessory drive belt tensioner for correct operation, damage or contamination. REFER to the Accessory Drive Belt Tensioner Component Test in this procedure. INSTALL a new accessory drive belt tensioner as necessary. TEST the system for normal operation.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<p>NOTE: Whine is defined as a continuous noise at the same frequency, generally associated with plastic pulleys.</p> <ul style="list-style-type: none"> Accessory drive belt whine 	<ul style="list-style-type: none"> Poor surface finish on accessory drive belt idler pulley flat surface(s). 	<ul style="list-style-type: none"> REMOVE the accessory drive belt. REFER to: <ul style="list-style-type: none"> Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation), Accessory Drive Belt (303-05, Removal and Installation), Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation), Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation), Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation). INSPECT the idler pulley(s) for surface finish. INSTALL a new idler pulley(s) as necessary. TEST the system for normal operation.
	<ul style="list-style-type: none"> Accessory drive belt idler pulley bearing failure. 	<ul style="list-style-type: none"> REMOVE the accessory drive belt. REFER to: <ul style="list-style-type: none"> Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation), Accessory Drive Belt (303-05, Removal and Installation), Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation), Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation), Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation). INSPECT the idler pulley(s) for smooth rotation. INSTALL a new idler pulley(s) as necessary. TEST the system for normal operation.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<p>NOTE: Chirp is defined as a twittering noise, often intermittent</p> <ul style="list-style-type: none"> Accessory drive belt chirp 	<ul style="list-style-type: none"> Pulley misalignment (usually evident at idle). 	<ul style="list-style-type: none"> CHECK that the accessory drive belt is running centrally on the flat pulleys. TEST the system for normal operation. CHECK the pulleys for excessive end float and bent flanges. With the engine running at idle, use a stethoscope to identify the source of the noise. INSTALL new components as necessary. TEST the system for normal operation.
<p>NOTE: Rattle is defined as a metallic knocking noise</p> <ul style="list-style-type: none"> Accessory drive belt rattle 	<ul style="list-style-type: none"> Accessory drive belt tensioner hitting the end stops. 	<ul style="list-style-type: none"> CHECK the accessory drive belt tensioner for correct operation or damage. REFER to the Accessory Drive Belt Tensioner Component Test in this procedure. INSTALL a new accessory drive belt tensioner as necessary. TEST the system for normal operation.
	<ul style="list-style-type: none"> Loose components or hardware. 	<ul style="list-style-type: none"> CHECK the components or hardware for correct installation and tighten as necessary. TEST the system for normal operation.
<ul style="list-style-type: none"> Accessory drive belt fraying 	<ul style="list-style-type: none"> Accessory drive belt. Pulley(s). 	<ul style="list-style-type: none"> CHECK the extent of the fraying by referring to the illustrations shown in the Visual Inspection section. Only INSTALL a new accessory drive belt if the fraying is within the criteria quoted in the Visual Inspection section. TEST the system for normal operation. CHECK the pulley(s) for damage, freedom of rotation and alignment. INSTALL new components as necessary. TEST the system for normal operation.

Component Tests

Accessory Drive Belt Tensioner - Static Check

The accessory drive belt tensioner may be checked statically as follows:

1. Inspect the area surrounding the accessory drive belt tensioner for lubricant or other contamination. Rectify any leaks before installing a new accessory drive belt tensioner. If the accessory drive belt tensioner is contaminated, do not attempt to clean it as the damping mechanism inside may be damaged.

DIAGNOSIS AND TESTING

INSTALL a new accessory drive belt tensioner as necessary. TEST the system for normal operation.

2. Detach the accessory drive belt in the area of the accessory drive belt tensioner.
3. **NOTE: The accessory drive belt tensioner has a damping feature, which is usually a friction device, therefore some friction within the system is normal.**

Using the correct tool, move the accessory drive belt tensioner from its relaxed position through its full stroke and back to the relaxed position to make sure there is no excessive stick, grab or bind, and to make sure there is tension on the accessory drive belt tensioner spring.

4. Rotate the accessory drive belt tensioner pulley and check for damage, freedom of rotation and alignment. INSTALL a new accessory drive belt tensioner as necessary. TEST the system for normal operation.
5. If the accessory drive belt tensioner meets the above criteria, proceed to test the accessory drive belt tensioner dynamically. If the accessory drive belt tensioner does not meet the above criteria, INSTALL a new accessory drive belt tensioner. TEST the system for normal operation.

Accessory Drive Belt Tensioner - Dynamic Check

The accessory drive belt tensioner may be checked dynamically as follows:

1. With the engine running, observe the accessory drive belt tensioner movement. The accessory drive belt tensioner should move (respond) when the engine is accelerated rapidly or when the A/C clutch cycles ON and OFF (the degree of movement can be up to 4 mm). If the accessory drive belt tensioner movement is not constant without engine acceleration or A/C clutch cycling, a pulley or shaft is possibly bent, out of round, or the damping mechanism inside the accessory drive belt tensioner may be damaged. INSTALL a new accessory drive belt tensioner as necessary. TEST the system for normal operation.
2. Excessive accessory drive belt rideout (uneven depth of grooves in the accessory drive belt) may cause excessive accessory drive belt

tensioner movement. Check the condition by installing a new accessory drive belt. REFER to:

- Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),
- Accessory Drive Belt (303-05, Removal and Installation),
- Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),
- Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation),
- Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).

TEST the system for normal operation.

REMOVAL AND INSTALLATION

Accessory Drive Belt Tensioner(21 569 0)

Removal

NOTE: Removal steps in this procedure may contain installation details.

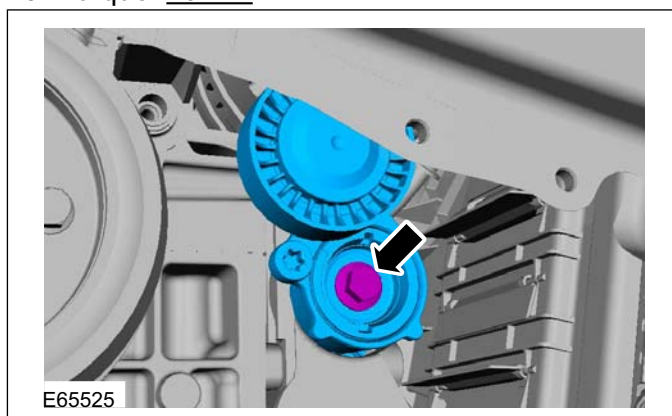
1. Remove the air conditioning (A/C) compressor belt tensioner.

Refer to: Air Conditioning (A/C) Compressor Belt Tensioner (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).

2. Remove the accessory drive belt.

Refer to: Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).

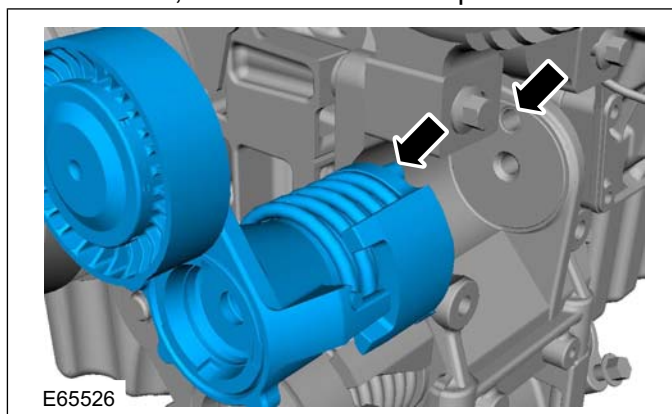
3. Torque: 45 Nm



Installation

1. **NOTE:** Make sure that the belt tensioner is aligned to the belt tensioner bracket.

To install, reverse the removal procedure.



REMOVAL AND INSTALLATION

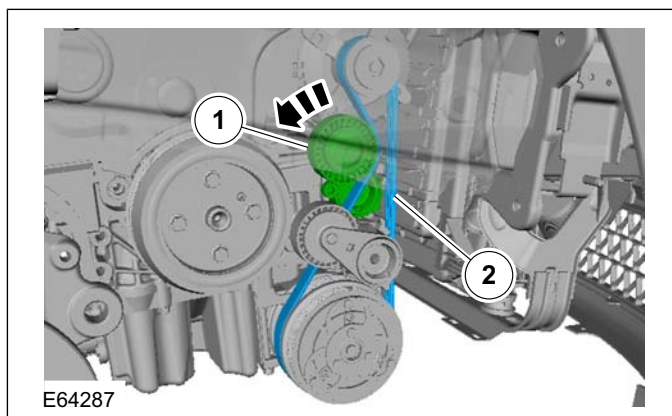
Accessory Drive Belt(21 567 0)

Removal

1. Remove the air conditioning (A/C) compressor belt.

Refer to: Air Conditioning (A/C) Compressor Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).

2.



Installation

1. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

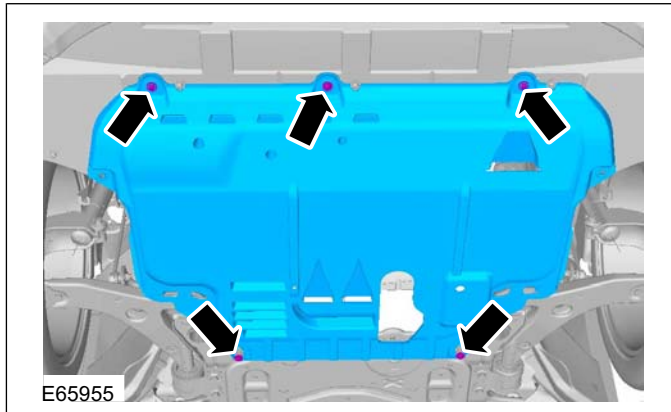
Air Conditioning (A/C) Compressor Belt(21 567 0)

Removal

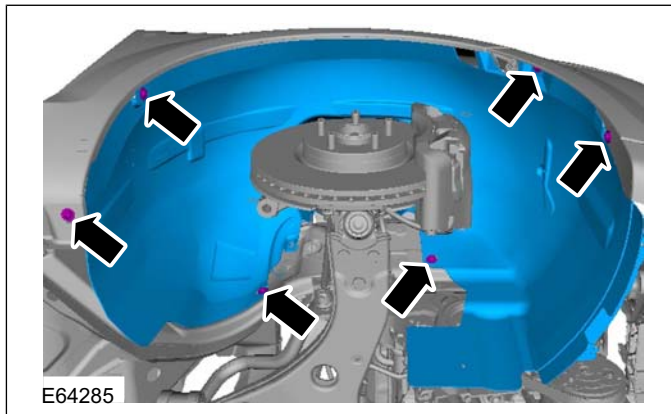
1. Remove the left-hand front wheel and tire.

Refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).

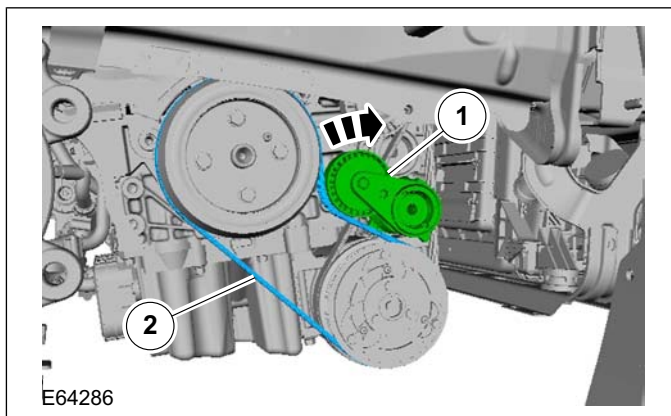
- 2.



- 3.



- 4.



Installation

1. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Air Conditioning (A/C) Compressor Belt Tensioner

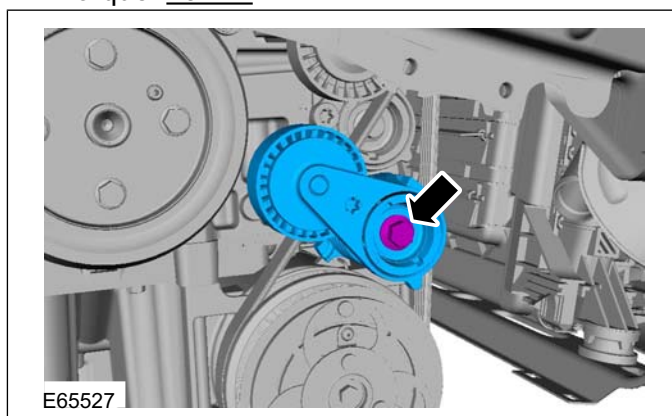
Removal

NOTE: Removal steps in this procedure may contain installation details.

1. Remove AC compressor belt.

Refer to: Air Conditioning (A/C) Compressor Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).

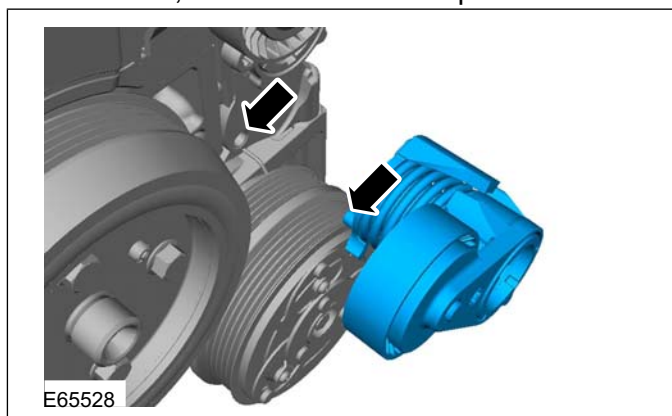
2. Torque: 45 Nm



Installation

1. **NOTE:** Make sure that the belt tensioner is aligned to the belt tensioner bracket.

To install, reverse the removal procedure.





SECTION 303-06 Starting System — 2.5L Duratec-ST (VI5)

VEHICLE APPLICATION:2008.75 Focus ST C307

CONTENTS PAGE

REMOVAL AND INSTALLATION

Starter Motor..... (26 204 0) 303-06-2



REMOVAL AND INSTALLATION

Starter Motor(26 204 0)

Removal

NOTE: Removal steps in this procedure may contain installation details.

1. Disconnect the battery ground cable.

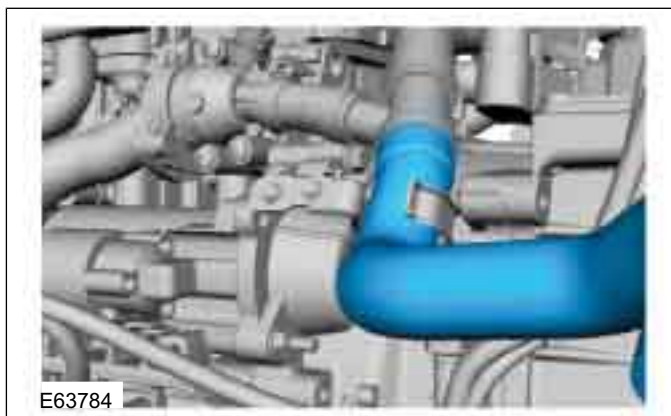
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Remove the air cleaner.

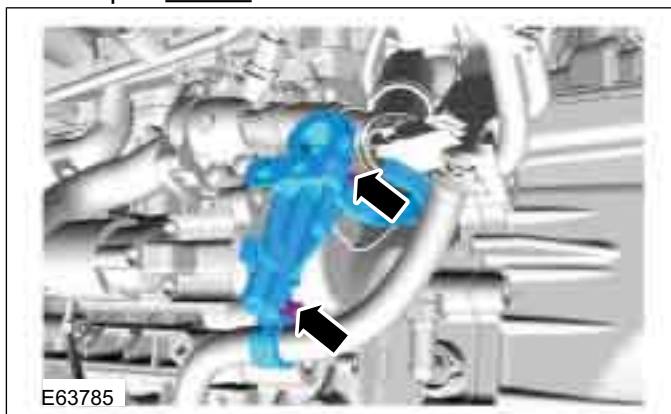
Refer to: Air Cleaner - Vehicles With: PCM Security Shield (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).

Refer to: Air Cleaner - Vehicles Without: PCM Security Shield (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).

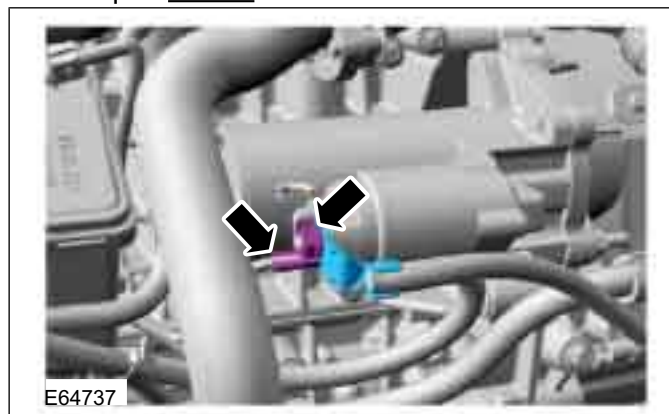
- 3.



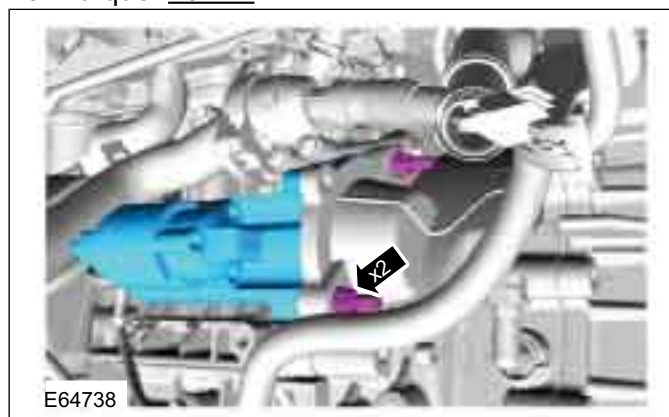
4. Torque: 10 Nm



5. Torque: 12 Nm



6. Torque: 25 Nm



Installation

1. To install, reverse the removal procedure.
2. Initialize the door window motors.

Refer to: Door Window Motor Initialization (501-11 Glass, Frames and Mechanisms, General Procedures).

SECTION 303-07 Engine Ignition — 2.5L Duratec-ST (VI5)

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Inspection and Verification.....	303-07-2
Symptom Chart.....	303-07-2
REMOVAL AND INSTALLATION	
Ignition Coil-On-Plug..... (22 414 0)	303-07-3

DIAGNOSIS AND TESTING

Engine Ignition

General Equipment

Worldwide Diagnostic System (WDS)

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of electrical damage.

Visual Inspection Chart

Electrical
<ul style="list-style-type: none"> • Circuit(s) • Wiring harness • Electrical connector(s) • Spark plug(s) • Ignition coil-on-plug(s) • Powertrain control module (PCM)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Symptom Chart

Symptom Chart

Symptom	Possible Sources	Action
• Engine misfire	• Spark plug(s).	• CARRY OUT a KV test using WDS.
	<ul style="list-style-type: none"> • Circuit(s) • Ignition coil-on-plug(s) • PCM. • PCM calibration. 	• REFER to WDS.
• Engine stumbling	• Spark plug(s).	• CARRY OUT a KV test using WDS.
	<ul style="list-style-type: none"> • Circuit(s) • Ignition coil-on-plug(s) • PCM. • PCM calibration. 	• REFER to WDS.
• Engine lacks power	• Spark plug(s).	• CARRY OUT a KV test using WDS.
	<ul style="list-style-type: none"> • Circuit(s) • Ignition coil-on-plug(s) 	• REFER to WDS.

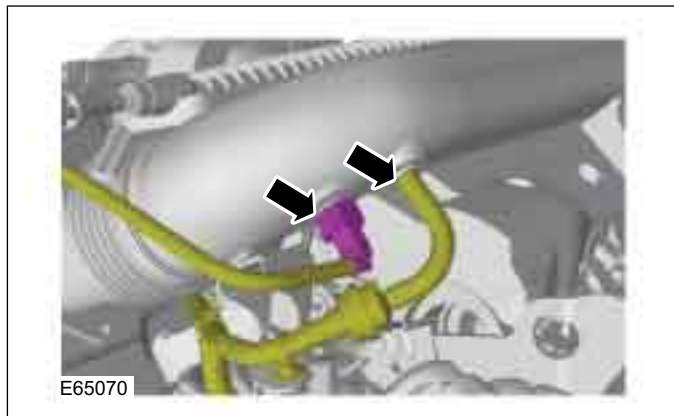
REMOVAL AND INSTALLATION


Ignition Coil-On-Plug(22 414 0)

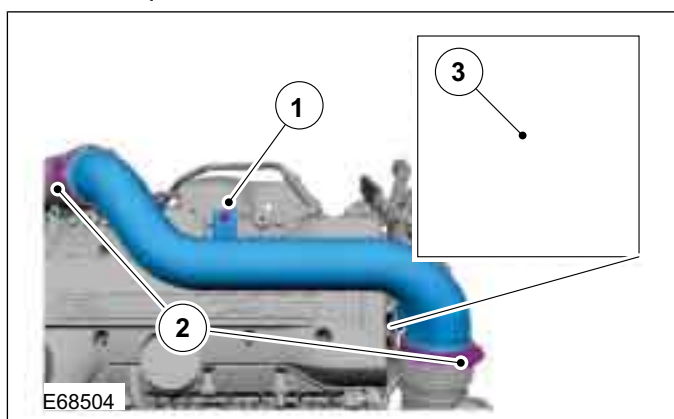
Removal

NOTE: Removal steps in this procedure may contain installation details.

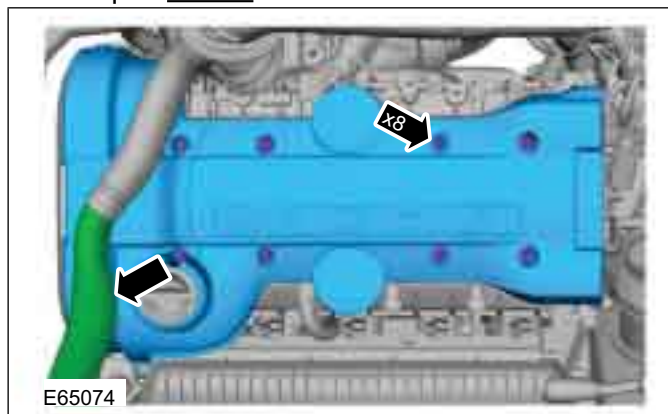
1.  **CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.



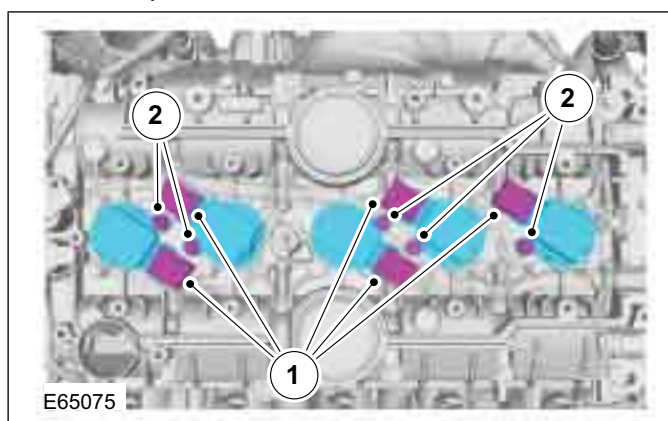
2.  **CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.
 1. Torque: 10 Nm
 2. Torque: 4 Nm
 3. Torque: 10 Nm



3. Torque: 10 Nm



4. 2. Torque: 10 Nm



Installation

1. To install, reverse the removal procedure.

SECTION 303-08 Engine Emission Control — 2.5L Duratec-ST (VI5)

VEHICLE APPLICATION: 2008.75 Focus ST C307

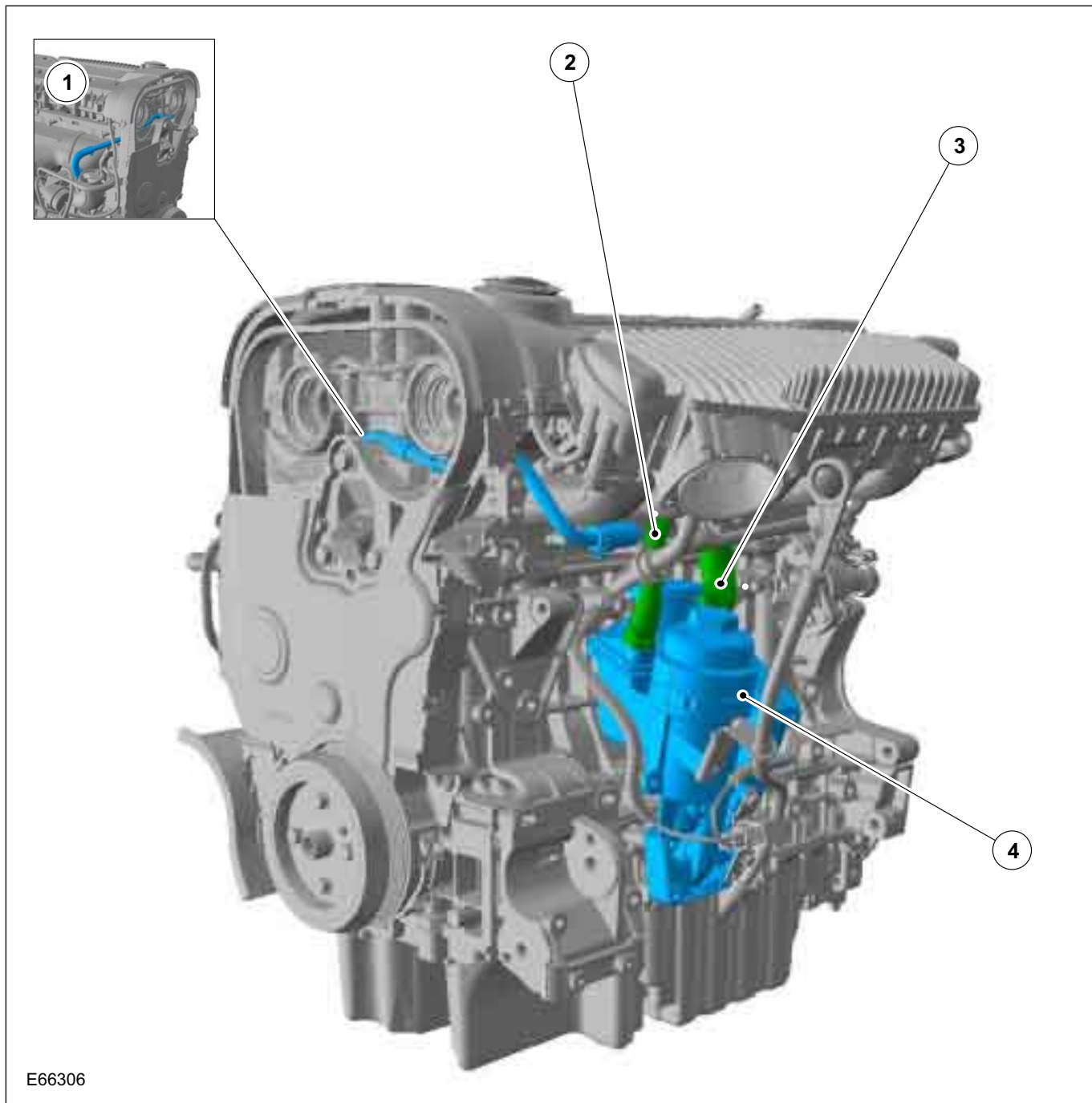
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Inspection and Verification.....	303-08-4
Symptom Chart.....	303-08-4
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Crankcase Vent Oil Separator.....	303-08-6

DESCRIPTION AND OPERATION

Engine Emission Control

2.5L Duratec-ST (VI5)

Engine Emission Components



E66306

**Engine Emission Control — 2.5L Duratec-ST
(VI5)****303-08-3****303-08-3****DESCRIPTION AND OPERATION**

Item	Description
1	Intake manifold to turbocharger breather hose
2	Crankcase vent oil separator to valve cover hose
3	Crankcase vent oil separator to intake manifold hose
4	Crankcase vent oil separator

DIAGNOSIS AND TESTING

Engine Emission Control

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical damage.
3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> – Hose(s)/hose joints – Gasket(s) – Positive crankcase ventilation (PCV) valve – PCV crankcase vent oil separator – Turbocharger 	<ul style="list-style-type: none"> – Electrical connector(s) – Wiring harness – Fuse(s) – Relay – Powertain control module (PCM)

Symptom Chart

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • Excessive crankcase pressure 	<ul style="list-style-type: none"> • Blocked PCV crankcase vent oil separator. • Blocked PCV hose. 	<ul style="list-style-type: none"> • CLEAN or INSTALL new PCV components as necessary. TEST the system for normal operation.
	<ul style="list-style-type: none"> • Engine. 	<ul style="list-style-type: none"> • Worn or damaged engine components. REFER to: Engine (303-00 Engine System - General Information, Diagnosis and Testing).
<ul style="list-style-type: none"> • Oil in the air intake system 	<ul style="list-style-type: none"> • Crankcase vent oil separator. 	<ul style="list-style-type: none"> • CLEAN or INSTALL a new crankcase vent oil separator. REFER to: Crankcase Vent Oil Separator (303-08 Engine Emission Control - 2.5L Duratec-ST (VI5), Removal and Installation). TEST the system for normal operation.

**Engine Emission Control — 2.5L Duratec-ST
(VI5)**

303-08-5

303-08-5

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none">Turbocharger	<ul style="list-style-type: none">Worn or damaged turbocharger. REFER to: Turbocharger (303-04 Fuel Charging and Controls - Turbocharger - 2.5L Duratec-ST (VI5), Diagnosis and Testing).
	<ul style="list-style-type: none">Excessive crankcase pressure	<ul style="list-style-type: none">Worn or damaged engine components. REFER to: Engine (303-00 Engine System - General Information, Diagnosis and Testing).

REMOVAL AND INSTALLATION

Crankcase Vent Oil Separator

Removal

NOTE: Removal steps in this procedure may contain installation details.

1. Disconnect the battery ground cable.

Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

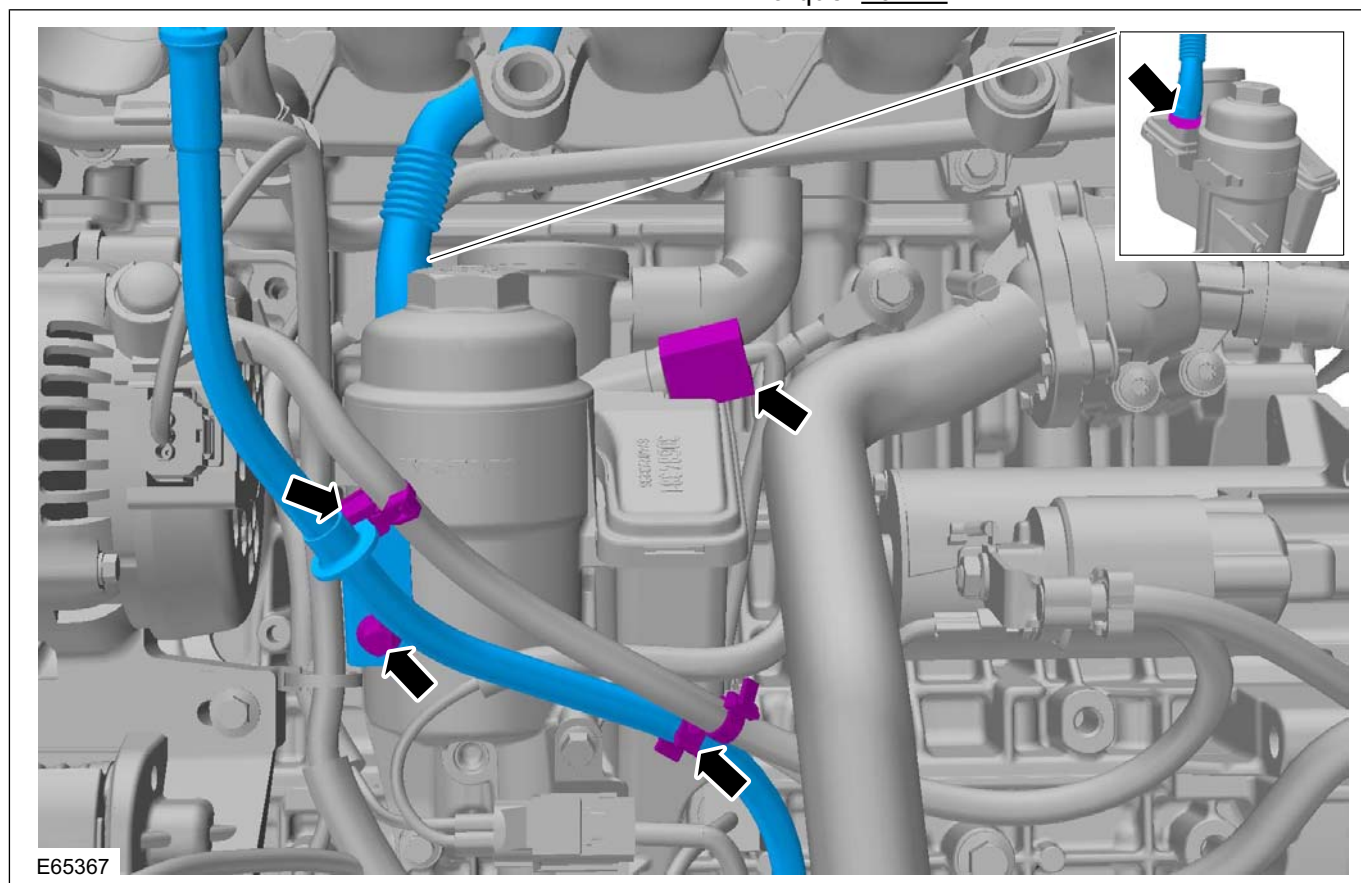
2. Remove the air cleaner.

Refer to: Air Cleaner - Vehicles With: PCM Security Shield (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (V15), Removal and Installation).

Refer to: Air Cleaner - Vehicles Without: PCM Security Shield (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (V15), Removal and Installation).

3. **NOTE:** Make sure that the inside of the pipe ends are clean and free of oil residue.

Torque: 10 Nm

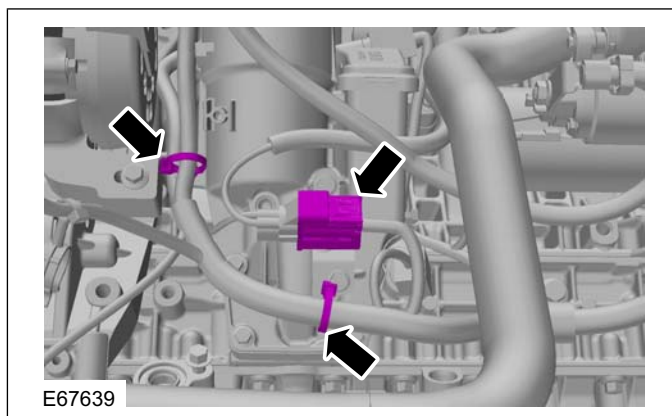


4. Raise and support the vehicle.

Refer to: Lifting (100-02 Jacking and Lifting, Description and Operation).

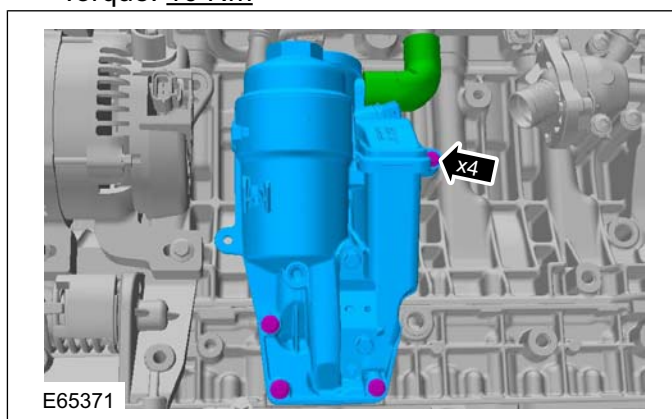
REMOVAL AND INSTALLATION

5.



6. **NOTE:** Make sure that the inside of the pipe ends are clean and free of oil residue.

Torque: 10 Nm



Installation

1. **NOTE:** Install all the bolts finger tight before final tightening.

To install, reverse the removal procedure.

SECTION 303-12 Intake Air Distribution and Filtering — 2.5L Duratec-ST (VI5)

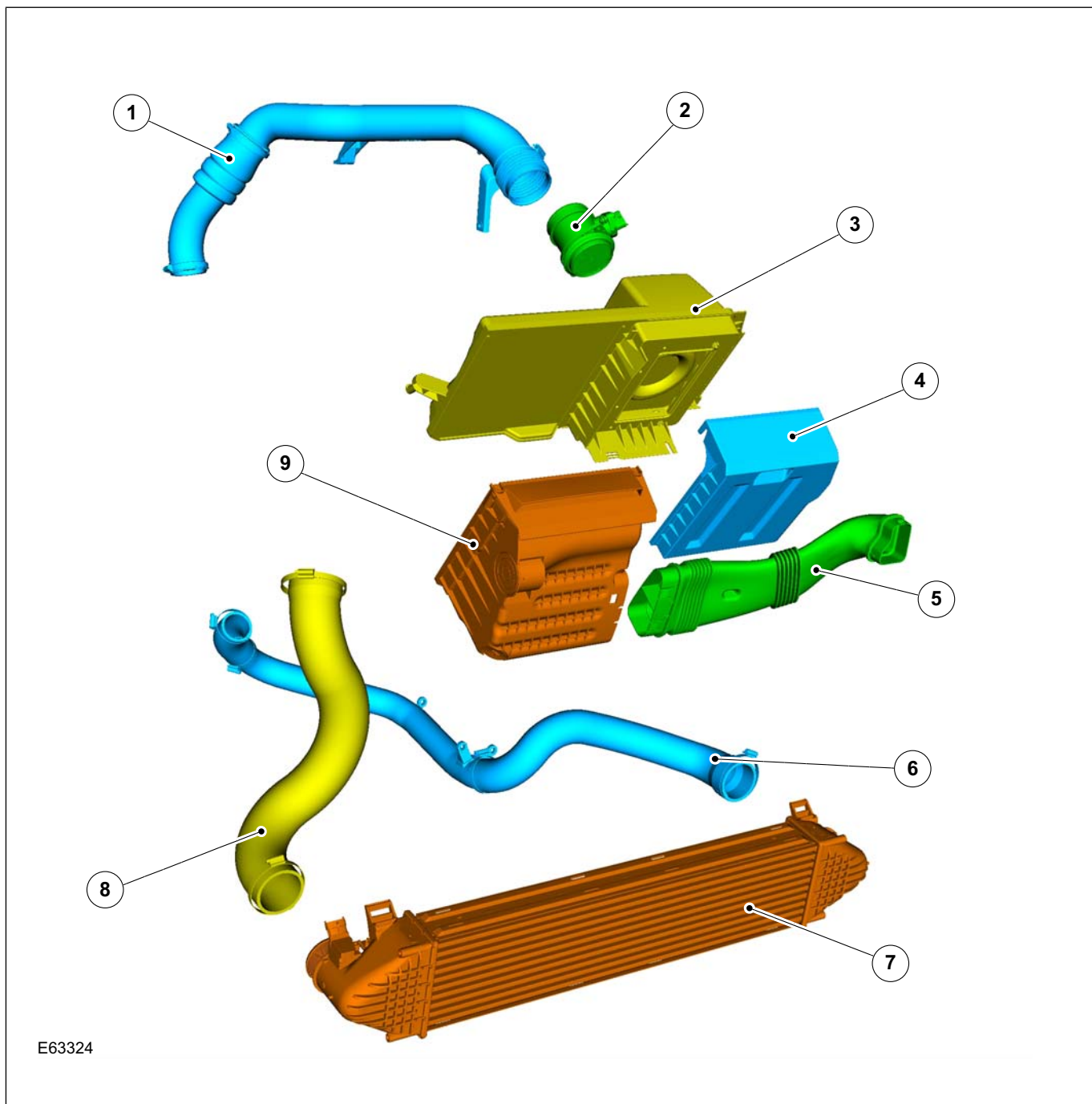
VEHICLE APPLICATION: 2008.75 Focus ST C307

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Inspection and Verification.....	303-12-4
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Air Cleaner — Vehicles Without: PCM Security Shield.....	(23 174 0) 303-12-8
Charge Air Cooler.....	(23 620 0) 303-12-10

DESCRIPTION AND OPERATION

Intake Air Distribution and Filtering

2.5L Duratec-ST (VI5)



E63324

Item	Description
1	Air cleaner outlet pipe
2	Mass air flow (MAF) sensor
3	Air cleaner housing
4	Air cleaner element housing

Item	Description
5	Powertrain control module (PCM) cover
6	Charge air cooler
7	Charge air cooler outlet pipe
8	Manifold absolute pressure (MAP) sensor

**Intake Air Distribution and Filtering — 2.5L
Duratec-ST (VI5)**

303-12-3

303-12-3

DESCRIPTION AND OPERATION

Item	Description
9	Charge air cooler intake pipe
10	Charge air cooler intake pipe resonator
11	Air cleaner intake pipe

DIAGNOSIS AND TESTING

Intake Air Distribution and Filtering

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.
3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> - Air cleaner element - Air cleaner intake pipe - Air cleaner outlet pipe - Charge air cooler - Charge air cooler intake pipe - Charge air cooler outlet pipe 	<ul style="list-style-type: none"> - Mass air flow (MAF) sensor - Manifold absolute pressure (MAP) sensor - Electrical connector(s)

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • Excessive intake air noise 	<ul style="list-style-type: none"> • Detached air cleaner pipe(s). • Detached turbocharger pipe(s). • Detached charge air cooler pipe(s). 	<ul style="list-style-type: none"> • CHECK the pipe(s) for security and leaks to atmosphere. INSTALL new intake air components as necessary. TEST the system for normal operation.
<ul style="list-style-type: none"> • Oil in the air intake system 	<ul style="list-style-type: none"> • Blocked or damaged PCV pipe(s)/hose(s). • Blocked or damaged crankcase vent oil separator. 	<ul style="list-style-type: none"> • REFER to: Engine Emission Control (303-08 Engine Emission Control - 2.5L Duratec-ST (VI5), Diagnosis and Testing).
	<ul style="list-style-type: none"> • Turbocharger. 	<ul style="list-style-type: none"> • REFER to: Turbocharger (303-04 Fuel Charging and Controls - Turbocharger - 2.5L Duratec-ST (VI5), Diagnosis and Testing).
<ul style="list-style-type: none"> • Water in the air cleaner 	<ul style="list-style-type: none"> • Air intake pipe splash shield. 	<ul style="list-style-type: none"> • CHECK the air intake pipe splash shield for correct installation and alignment. REPAIR/INSTALL the air intake pipe splash shield as necessary. TEST the system for normal operation.

Intake Air Distribution and Filtering — 2.5L
Duratec-ST (VI5)

303-12-5

303-12-5

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Blocked air cleaner drain. 	<ul style="list-style-type: none"> CHECK the air cleaner drain for blockage. TEST the system for normal operation.
<ul style="list-style-type: none"> Engine lacks power 	<ul style="list-style-type: none"> Air cleaner element blocked. 	<ul style="list-style-type: none"> INSPECT the air cleaner for signs of blockage. INSTALL a new air cleaner element as necessary.
	<ul style="list-style-type: none"> Charge air cooler pipe(s). 	<ul style="list-style-type: none"> INSPECT the charge air cooler pipes for damage. INSTALL a new charge air cooler pipe(s) as necessary.
	<ul style="list-style-type: none"> Charge air cooler blocked. 	<ul style="list-style-type: none"> INSPECT the charge air cooler for blockage. INSTALL a new charge air cooler as necessary. <p>REFER to: Charge Air Cooler (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).</p>
	<ul style="list-style-type: none"> Fuel charging and controls 	<ul style="list-style-type: none"> REFER to: Fuel Charging and Controls (303-04 Fuel Charging and Controls - 2.5L Duratec-ST (VI5), Diagnosis and Testing).
	<ul style="list-style-type: none"> Turbocharger. 	<ul style="list-style-type: none"> REFER to: Turbocharger (303-04 Fuel Charging and Controls - Turbocharger - 2.5L Duratec-ST (VI5), Diagnosis and Testing).
	<ul style="list-style-type: none"> Engine. 	<ul style="list-style-type: none"> REFER to: Engine (303-00 Engine System - General Information, Diagnosis and Testing).

**Intake Air Distribution and Filtering — 2.5L
Duratec-ST (VI5)**

303-12-6

303-12-6

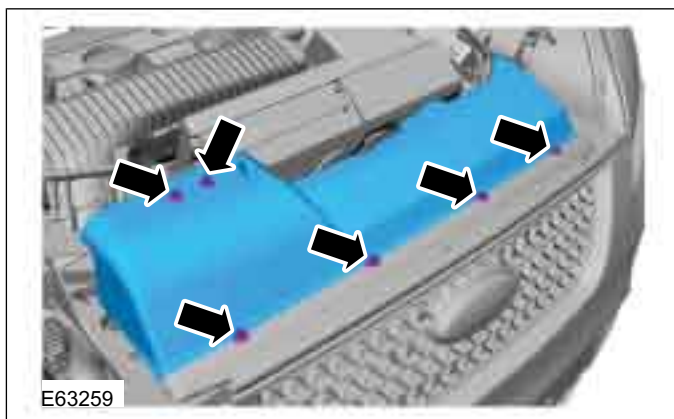
REMOVAL AND INSTALLATION

Air Cleaner — Vehicles With: PCM Security Shield(23 174 0)

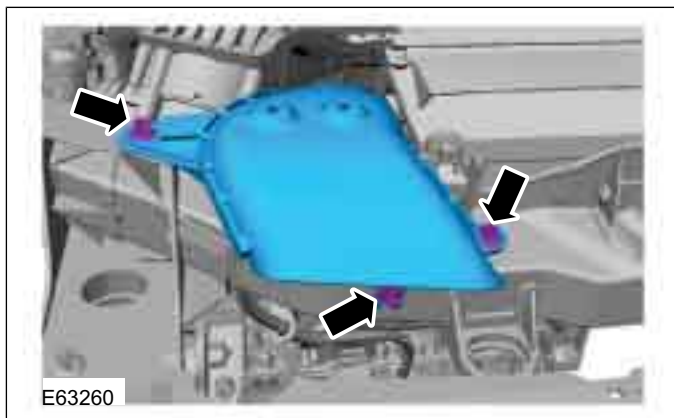
Removal

NOTE: Removal steps in this procedure may contain installation details.

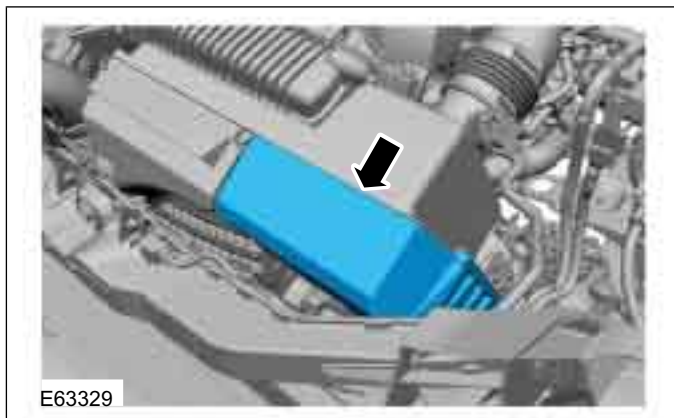
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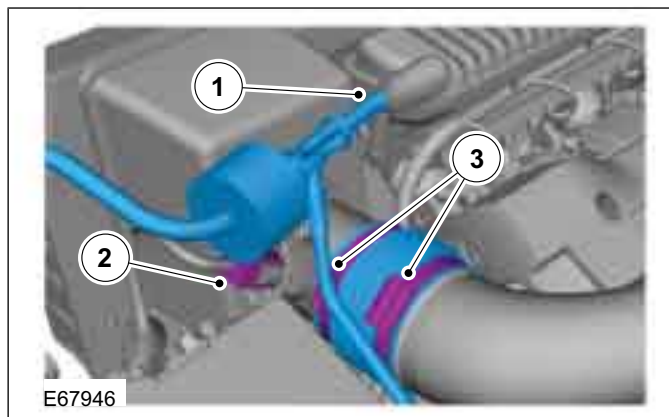
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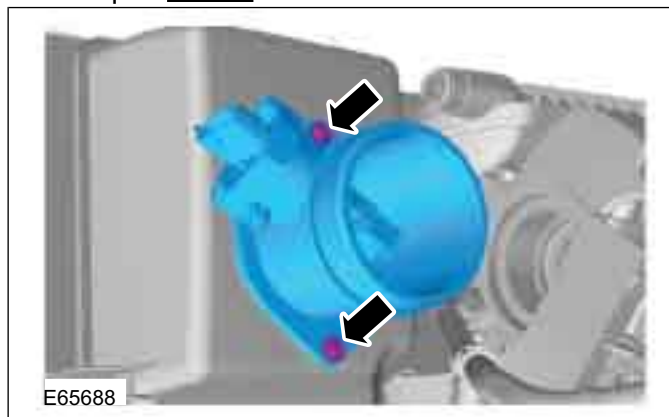
3.



4. **⚠ CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.



5. Torque: 10 Nm

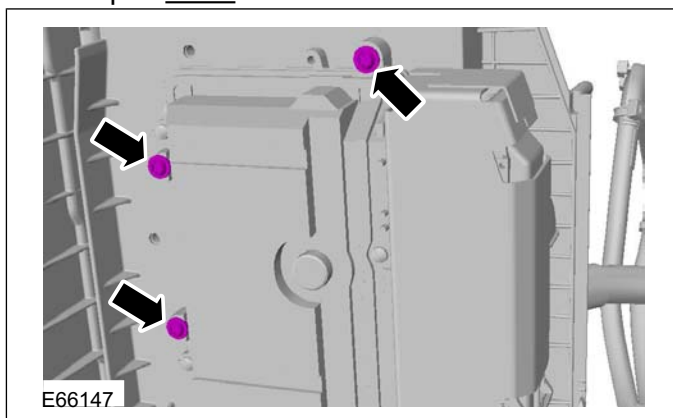


6.



REMOVAL AND INSTALLATION

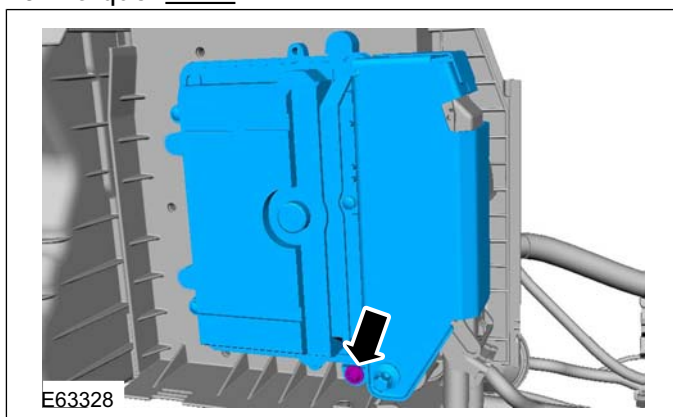
7. Torque: 7 Nm



8. Raise and support the vehicle.

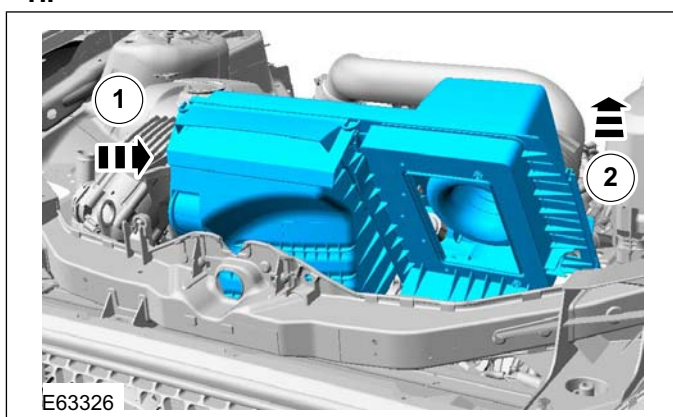
Refer to: Lifting (100-02 Jacking and Lifting, Description and Operation).

9. Torque: 7 Nm



10. Lower the vehicle.

11.



Installation

1. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Air Cleaner — Vehicles Without: PCM Security Shield(23 174 0)

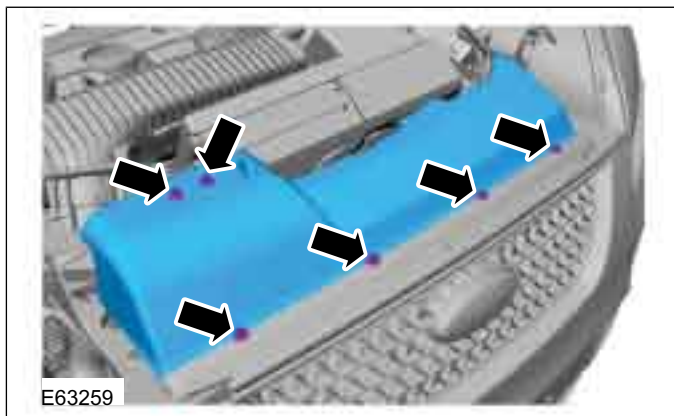
Removal

NOTE: Removal steps in this procedure may contain installation details.

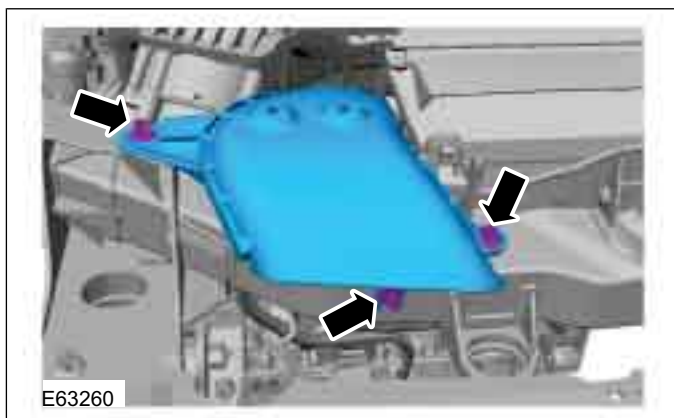
1. Disconnect the battery ground cable.

Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

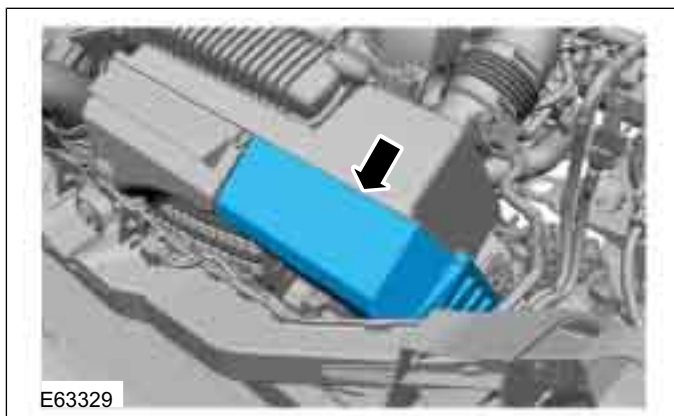
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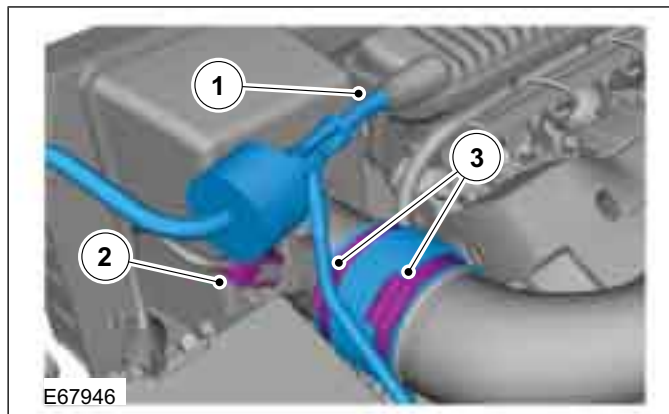
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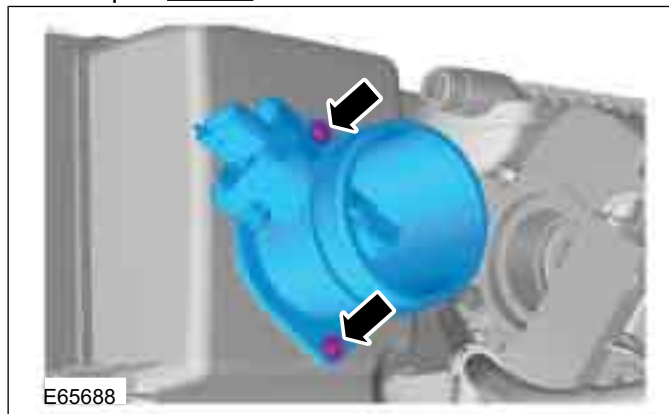
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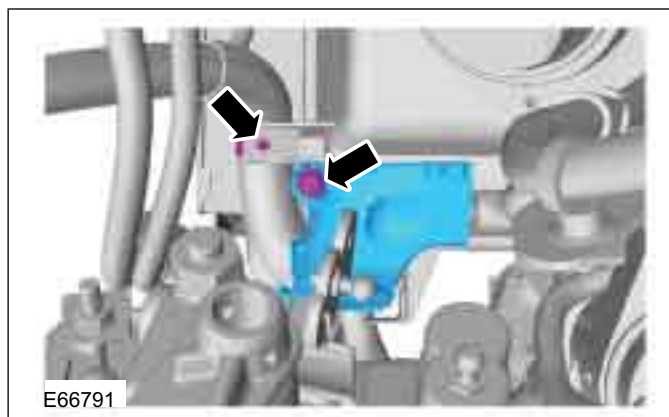
5. **NOTE:** Make sure that the inside of the pipe ends are clean and free of oil residue.



6. Torque: 10 Nm



7.



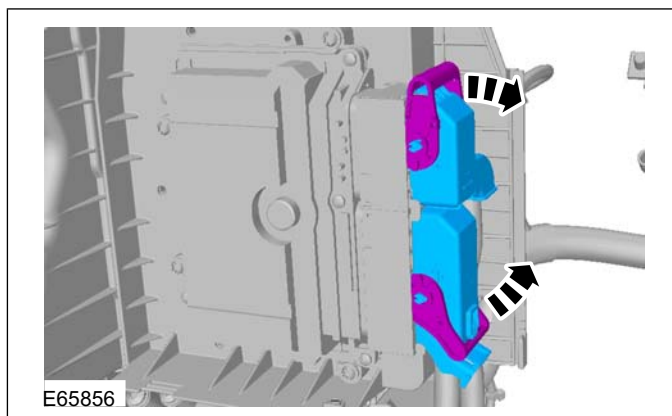
Intake Air Distribution and Filtering — 2.5L
Duratec-ST (VI5)

303-12-9

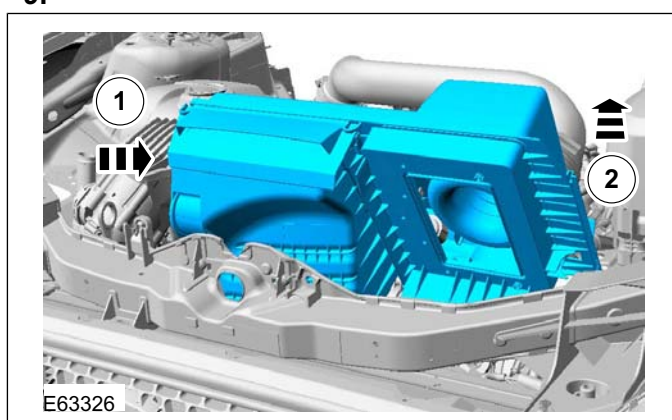
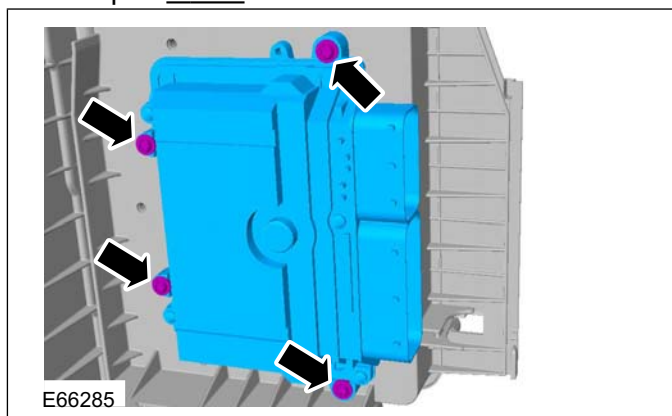
303-12-9

REMOVAL AND INSTALLATION

8.



9.

10. Torque: 7 Nm

Installation

1. To install, reverse the removal procedure.
2. Initialize the door window motors.

Refer to: Door Window Motor Initialization
(501-11 Glass, Frames and Mechanisms,
General Procedures).

REMOVAL AND INSTALLATION

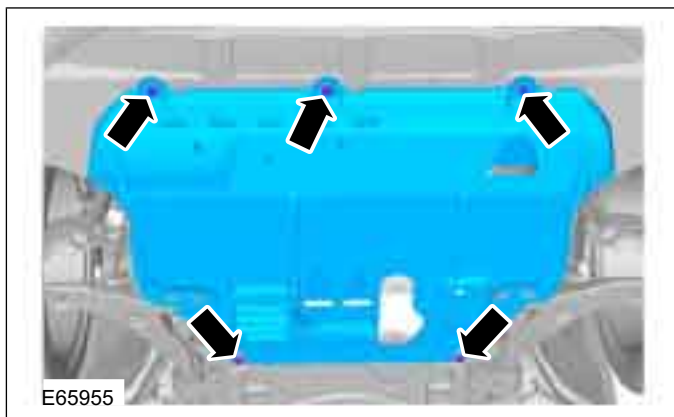
Charge Air Cooler(23 620 0)

Removal

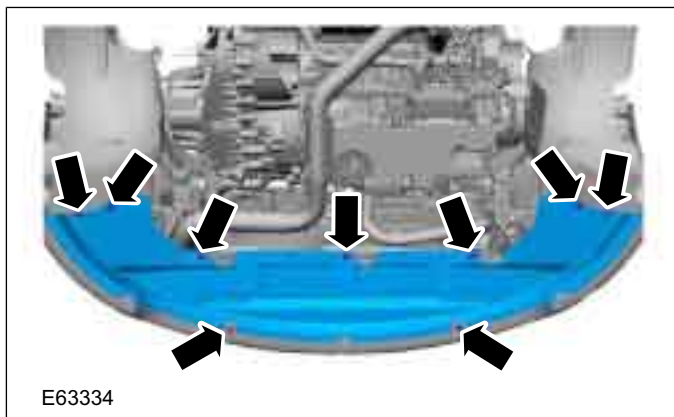
NOTE: Removal steps in this procedure may contain installation details.

1. Raise and support the vehicle.
Refer to: Lifting (100-02 Jacking and Lifting, Description and Operation).

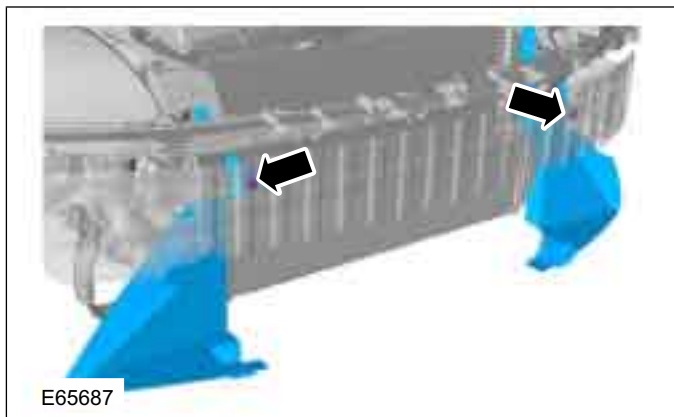
2.



3.

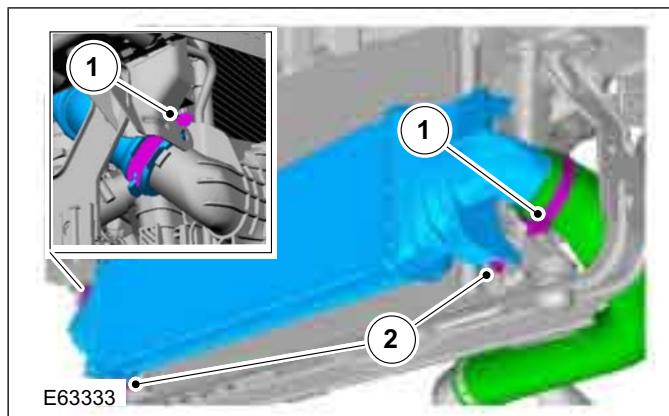


4.



5. **CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.

2. Torque: 5 Nm



Installation

1. To install, reverse the removal procedure.



SECTION 303-13 Evaporative Emissions

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Evaporative Emission Canister..... (29 250 0)	303-13-4



SPECIFICATIONS**Torque Specifications**

Item	Nm	lb-ft	lb-in
Evaporative emission canister retaining bolts	9	-	80

DIAGNOSIS AND TESTING**Evaporative Emissions****Inspection and Verification**

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> – Vacuum line(s) – Evaporative emission canister – Evaporative emission system hose(s) – Evaporative emission canister purge valve 	<ul style="list-style-type: none"> – Fuse(s) – Wiring harness – Electrical connector(s)

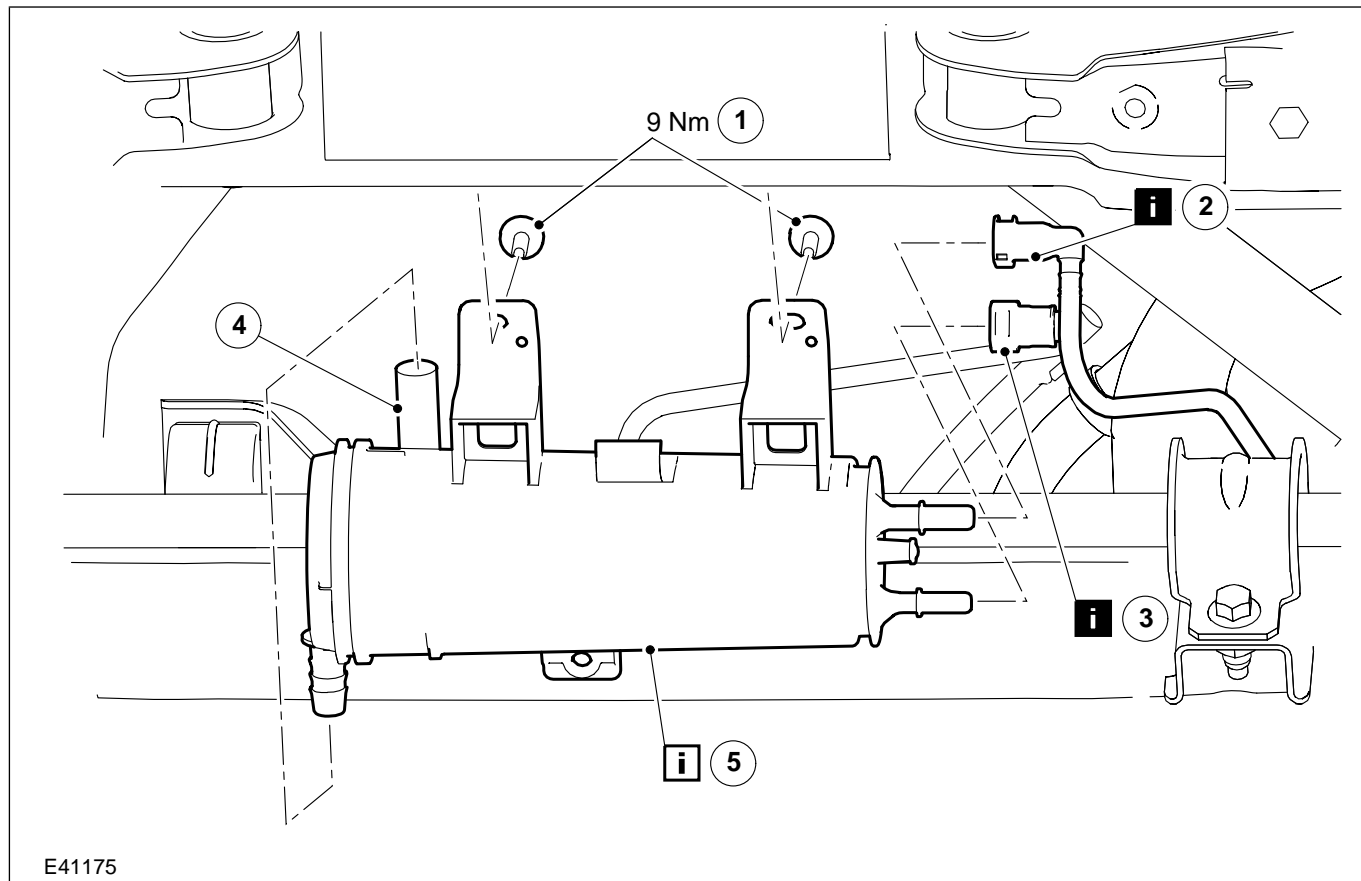
3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to WDS to diagnose the system.

REMOVAL AND INSTALLATION

Evaporative Emission Canister(29 250 0)

1. Raise and support the vehicle. For additional information, refer to **Section 100-02 [Jacking and Lifting]**.

2. Remove the components in the order indicated in the following illustration(s) and table(s).



E41175

Item	Description
1	Evaporative emission canister retaining bolts
2	Fuel tank vent pipe to evaporative emission canister quick release coupling See Removal Detail
3	Evaporative emission purge valve pipe to evaporative emission canister quick release coupling See Removal Detail

Item	Description
4	Evaporative emission canister breather hose
5	Evaporative emission canister See Installation Detail

3. To install, reverse the removal procedure.

Removal Details

Item 2 Fuel tank vent pipe to evaporative emission canister quick release coupling

1. Disconnect the fuel tank vent pipe to evaporative emission canister. For additional information, refer to **Section 310-00 [Fuel System - General Information]**.

REMOVAL AND INSTALLATION

Item 3 Evaporative emission purge valve pipe to evaporative emission canister quick release coupling

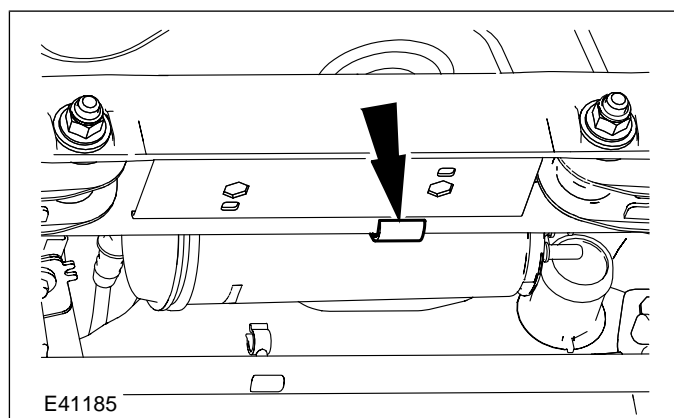
1. Disconnect the evaporative emission purge

valve pipe to evaporative emission canister. For additional information, refer to **Section 310-00 [Fuel System - General Information]**.

Installation Details

Item 5 Evaporative emission canister

1. Make sure the evaporative emission canister locating tang is positioned correctly on to the rear crossmember .



SECTION 303-14 Electronic Engine Controls — 2.5L Duratec-ST (VI5)

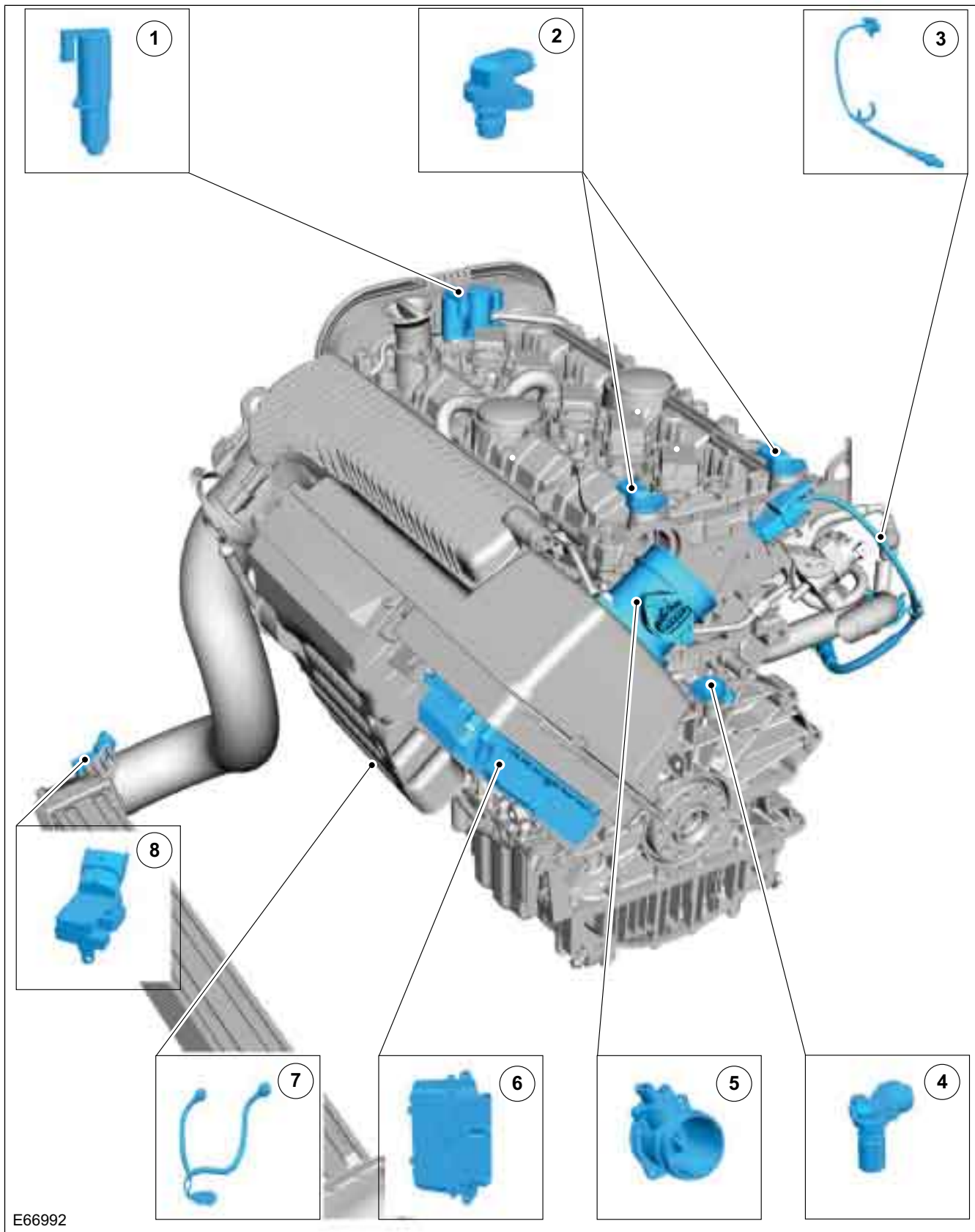
VEHICLE APPLICATION: 2008.75 Focus ST C307

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Electronic Engine Controls.....		303-14-4
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Crankshaft Position (CKP) Sensor.....	(29 230 0)	303-14-6
Heated Oxygen Sensor (HO2S).....	(29 220 0)	303-14-8
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Manifold Absolute Pressure (MAP) Sensor.....	(29 224 0)	303-14-15

DESCRIPTION AND OPERATION

Electronic Engine Controls

2.5L Duratec-ST (VI5)



**Electronic Engine Controls — 2.5L Duratec-ST
(VI5)****303-14-3****303-14-3****DESCRIPTION AND OPERATION**

Item	Description
1	Variable valve timing (VVT) oil control solenoid
2	Camshaft position (CMP) sensor
3	Heated oxygen sensor (HO2S)
4	Crankshaft position (CKP) sensor
5	Manifold absolute pressure (MAP) sensor
6	Powertrain control module (PCM)
7	Knock sensor (KS)
8	Manifold absolute pressure (MAP) sensor

DIAGNOSIS AND TESTING**Electronic Engine Controls****Inspection and Verification**

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Electrical
<ul style="list-style-type: none">– Fuse(s)– Wiring harness– Electrical connector(s)– Relay(s)– Sensor(s)– Switch(es)– Powertrain control module (PCM)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step
4. If the cause is not visually evident, verify the symptom and refer to WDS to diagnose the system.

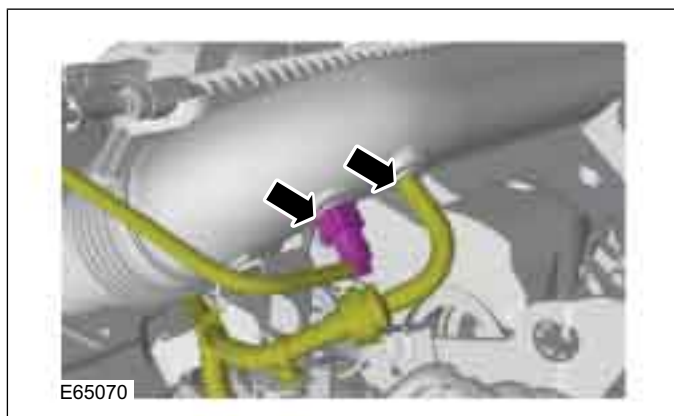
REMOVAL AND INSTALLATION

Camshaft Position (CMP) Sensor(29 232 0)

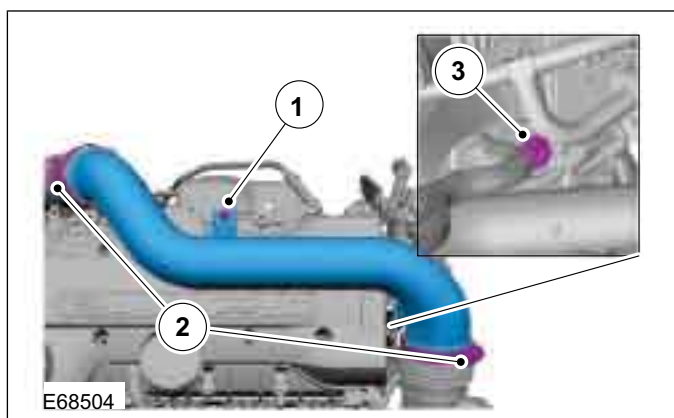
Removal

NOTE: Removal steps in this procedure may contain installation details.

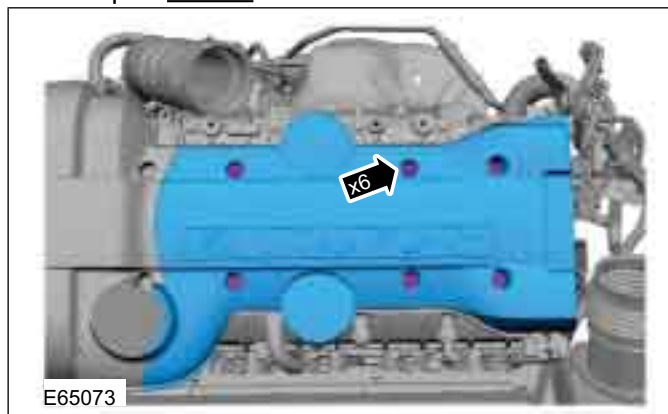
1. Refer to: Battery Disconnect and Connect (414-01, General Procedures).
2. **CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.



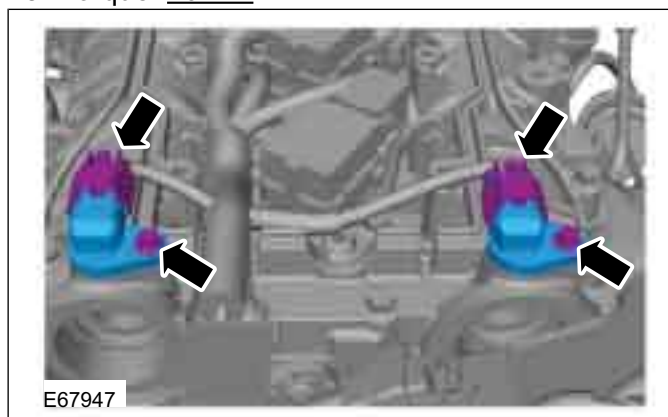
3. **CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.
 1. Torque: 10 Nm
 2. Torque: 4 Nm
 3. Torque: 10 Nm



4. Torque: 10 Nm



5. Torque: 10 Nm



Installation

1. **NOTE:** Make sure that the sensor housing is clean and free of foreign material.
To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Crankshaft Position (CKP) Sensor(29 230 0)

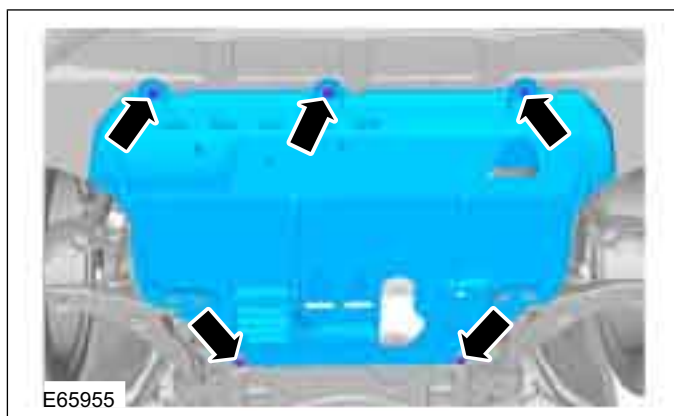
Removal

NOTE: Removal steps in this procedure may contain installation details.

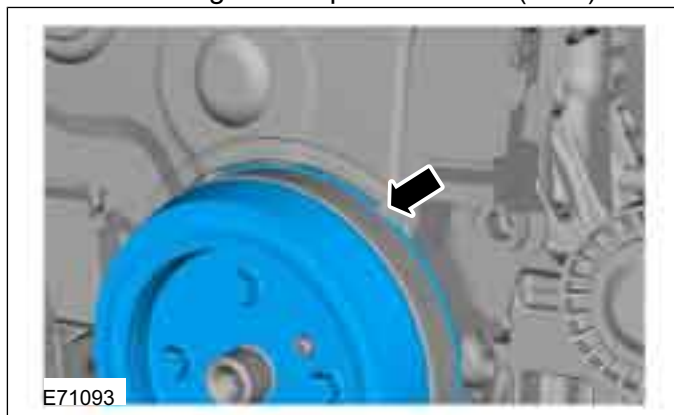
1. Raise and support the vehicle.

Refer to: **Lifting** (100-02 Jacking and Lifting, Description and Operation).

- 2.



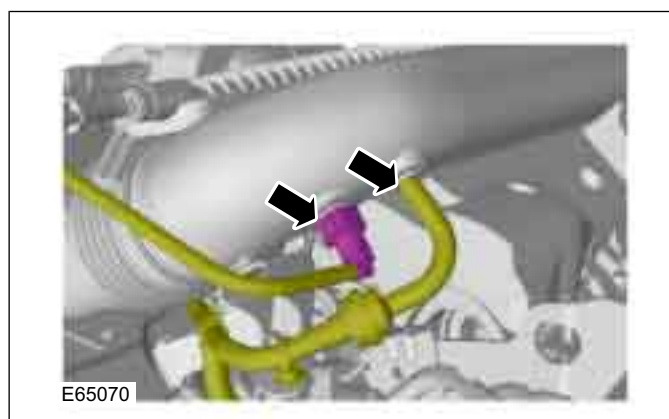
3. Turn the engine to top dead center (TDC).



4. Remove the air cleaner.

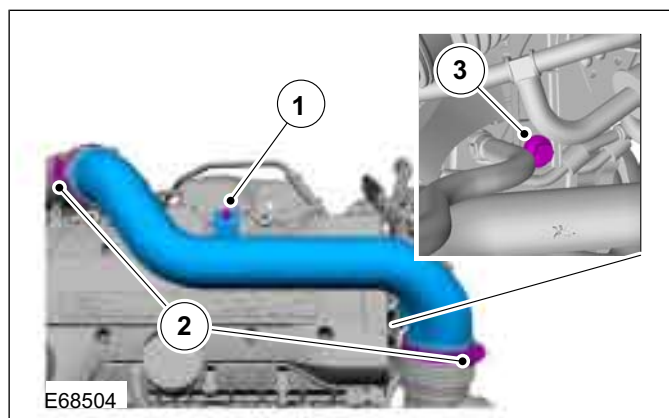
Refer to: Air Cleaner - Vehicles With: PCM Security Shield (**303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5)**, Removal and Installation).

5. **CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.

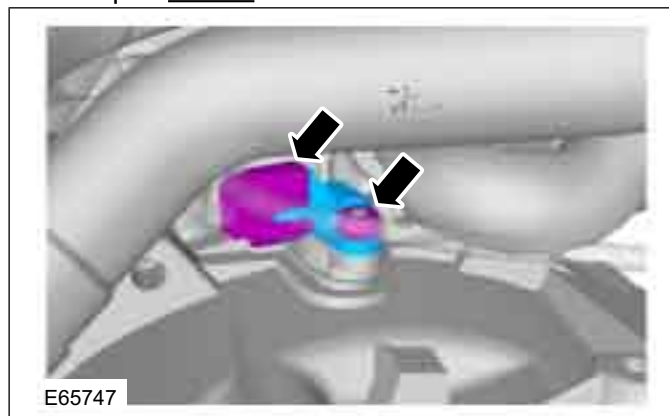


6. **CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.

1. Torque: 10 Nm
2. Torque: 4 Nm
3. Torque: 10 Nm



7. Torque: 10 Nm



REMOVAL AND INSTALLATION

Installation

1. **NOTE:** Make sure that the sensor housing is clean and free of foreign material.

To install, reverse the removal procedure.

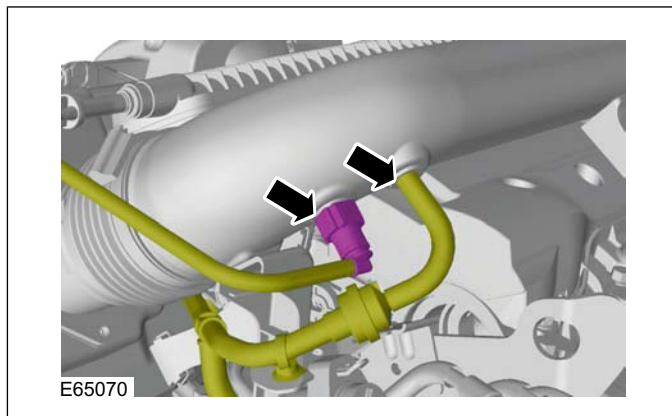
REMOVAL AND INSTALLATION

Heated Oxygen Sensor (HO2S)(29 220 0)

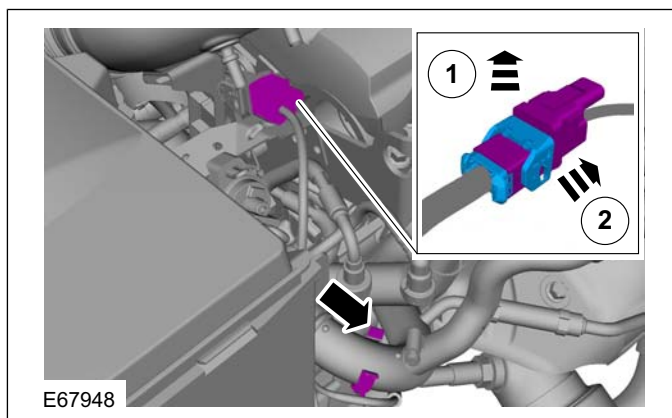
Removal

NOTE: Removal steps in this procedure may contain installation details.

1.  **CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.



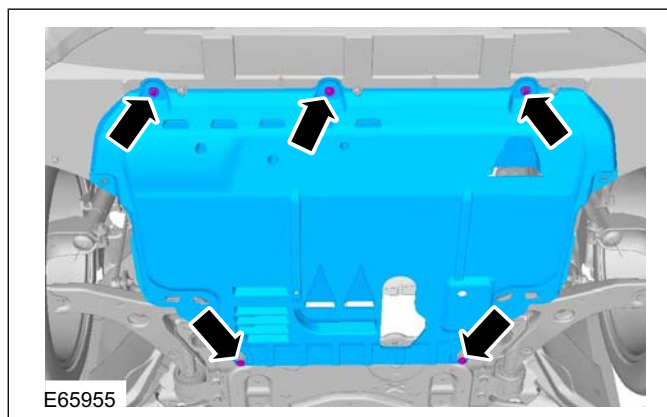
2.



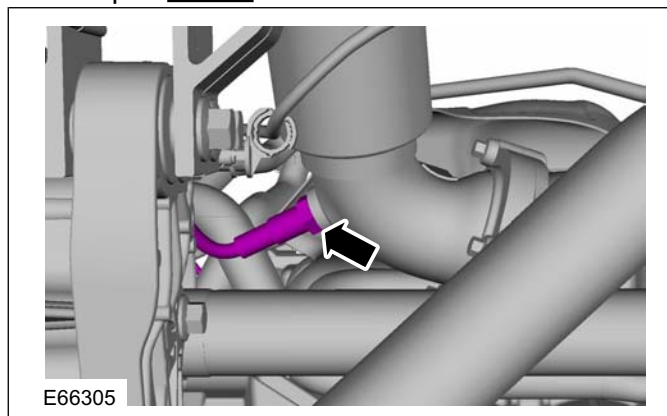
3. Raise and support the vehicle.

Refer to: **Lifting** (100-02 Jacking and Lifting, Description and Operation).

4.



5. Torque: 20 Nm



Installation

1. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Knock Sensor (KS)(29 222 0)

Removal

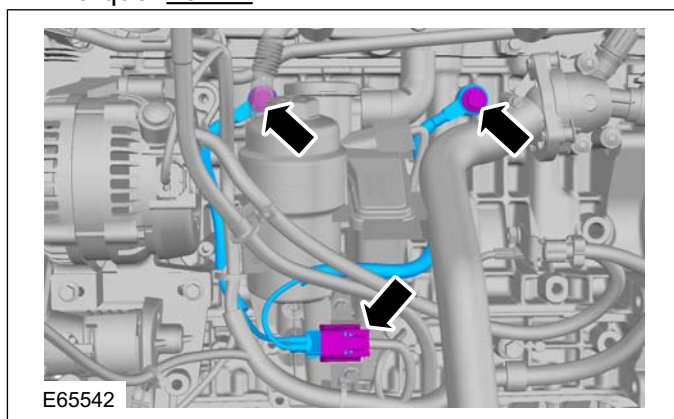
NOTE: Removal steps in this procedure may contain installation details.

1. Remove the air cleaner.

Refer to: Air Cleaner - Vehicles With: PCM Security Shield (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).

2. **NOTE:** Make sure that the sensor is installed in the same location as when removed.

Torque: 20 Nm



Installation

1. To install, reverse the removal procedure.

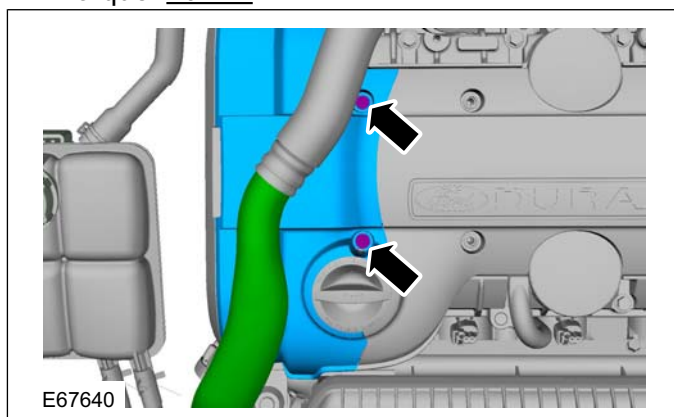
REMOVAL AND INSTALLATION

Variable Valve Timing (VVT) Oil Control Solenoid(29 233 0)

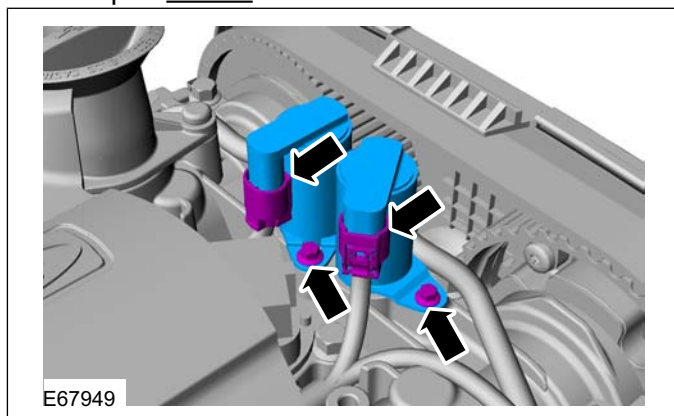
Removal

NOTE: Removal steps in this procedure may contain installation details.

1. Torque: 10 Nm



2. Torque: 10 Nm



Installation

1. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Powertrain Control Module (PCM) — Vehicles With: PCM Security
Shield(29 200 0)

General Equipment

Worldwide Diagnostic System (WDS)

2.5 mm drill bit

Removal

NOTE: Removal steps in this procedure may contain installation details.

1. Download the PCM and throttle body configuration information using the programmable modules installation routine after the installation of the PCM.

General Equipment: Worldwide Diagnostic System (WDS)

2. Disconnect the battery ground cable.

Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

3. Remove the air cleaner.

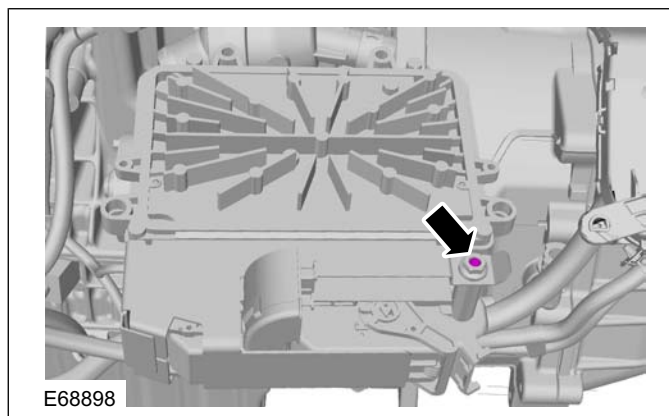
Refer to: Air Cleaner - Vehicles With: PCM Security Shield (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).

4. Remove the PCM security shield.
5. **⚠ CAUTION: Take extra care not to damage the wiring harnesses.**

NOTE: This step requires the aid of another technician.

1. Center punch the center of the security shield shear bolt.
2. Drill a 2.5 mm pilot hole in the center of the security shield shear bolt.

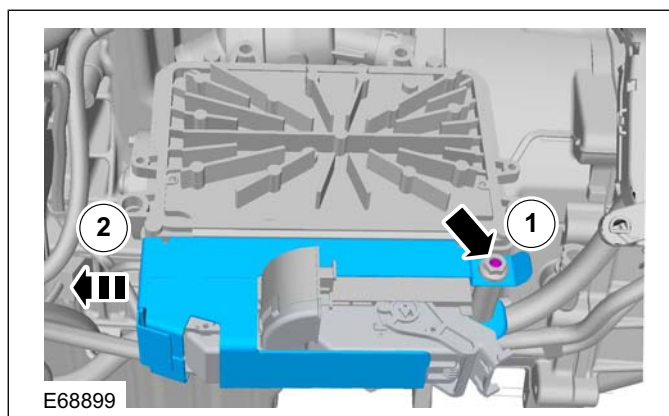
General Equipment: 2.5 mm drill bit



6. **⚠ CAUTION: Take extra care not to damage the wiring harnesses.**

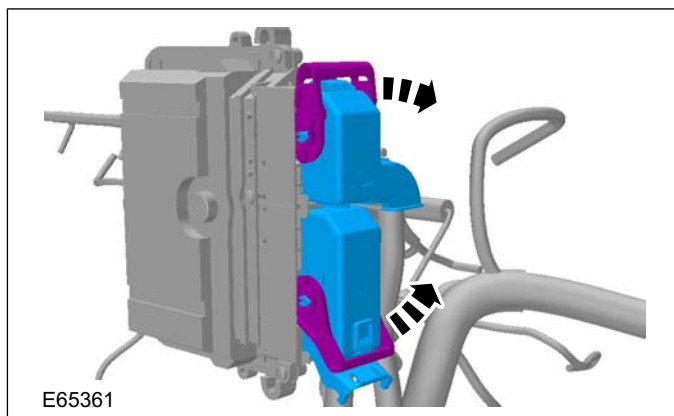
NOTE: This step requires the aid of another technician.

1. Drill a 6 mm hole in the center of the security shield shear bolt until threads are cut away.
2. Remove shear bolt and spacer tube. Slide the security shield off the PCM



REMOVAL AND INSTALLATION

7.



Installation

1. To install, reverse the removal procedure.
2. Upload the PCM and throttle body configuration information using the programmable modules installation routine prior to commencing the removal of the PCM.
General Equipment: Worldwide Diagnostic System (WDS)
3. Install a new PCM security shield and security shield shear bolt.
4. Tighten the bolt until the head is sheared off.
Torque: 10 Nm

REMOVAL AND INSTALLATION

Powertrain Control Module (PCM) — Vehicles Without: PCM Security Shield(29 200 0)

General Equipment

Ford diagnostic equipment

Removal

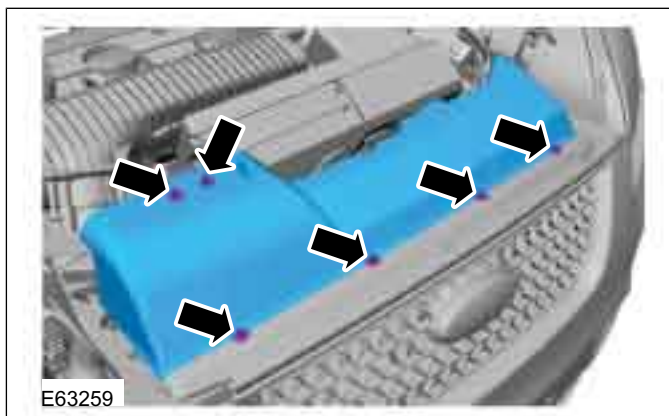
NOTE: Removal steps in this procedure may contain installation details.

1. Download the PCM and throttle body configuration information using the programmable modules installation routine after the installation of the PCM.

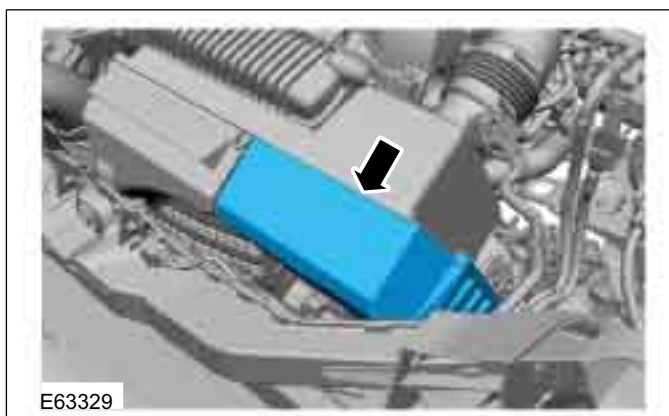
General Equipment: Ford diagnostic equipment

2. Refer to: Battery Disconnect and Connect (414-01, General Procedures).

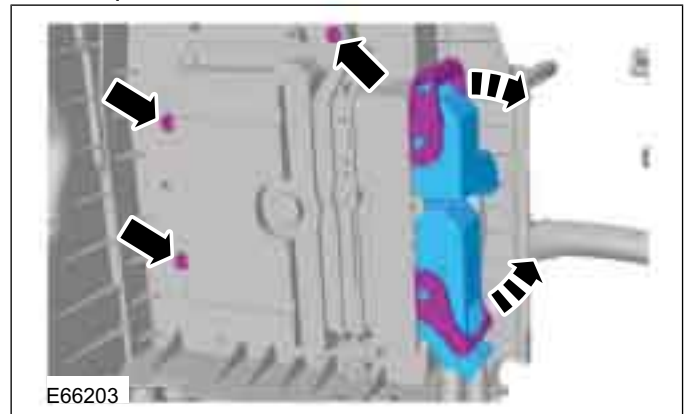
3.



4.

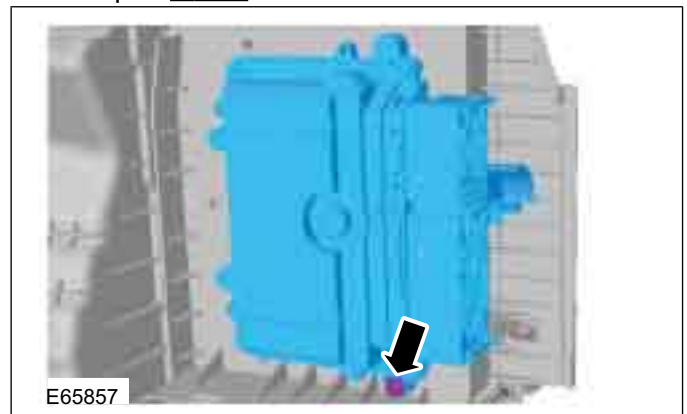


5. Torque: 7 Nm



6. Refer to: Lifting (100-02 Jacking and Lifting, Description and Operation).

7. Torque: 7 Nm



Installation

1. To install, reverse the removal procedure.
2. Upload the PCM and throttle body configuration information using the programmable modules installation routine prior to commencing the removal of the PCM.


General Equipment: Ford diagnostic equipment

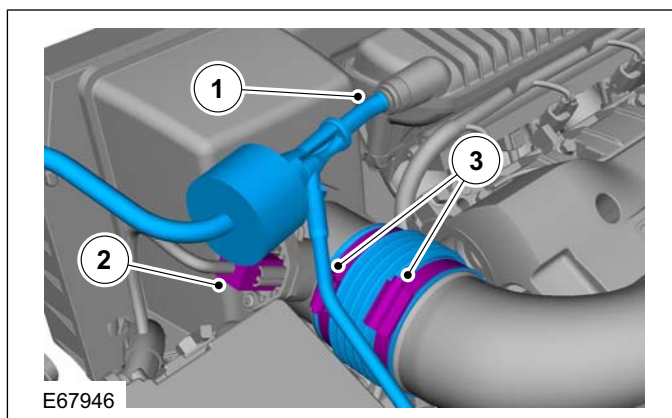
REMOVAL AND INSTALLATION

Mass Air Flow (MAF) Sensor(29 226 0)

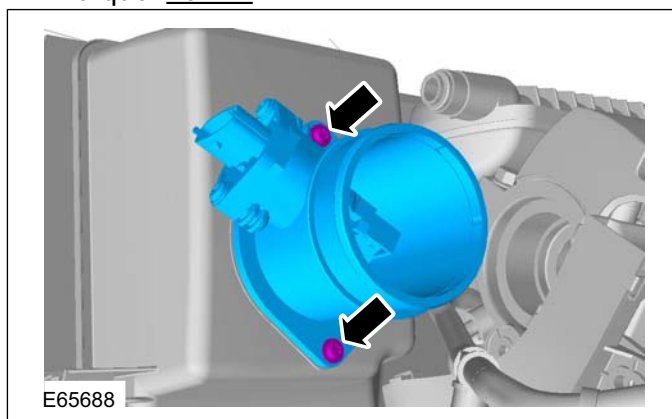
Removal

NOTE: Removal steps in this procedure may contain installation details.

1.  **CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.
3. Torque: 4 Nm



2. Torque: 10 Nm



Installation

1. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Manifold Absolute Pressure (MAP) Sensor(29 224 0)

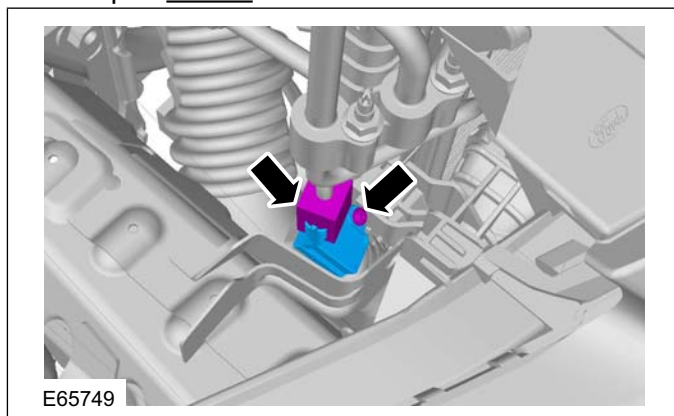
Removal

NOTE: Removal steps in this procedure may contain installation details.

1. Remove the right-hand front headlamp assembly.

Refer to: Headlamp Assembly (417-01 Exterior Lighting, Removal and Installation).

2. Torque: 10 Nm



Installation

1. To install, reverse the removal procedure.

SECTION 308-00 Manual Transmission/Transaxle and Clutch - General Information

VEHICLE APPLICATION:2008.75 Focus ST C307

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Manual Transmission/Transaxle and Clutch - General Information

308-00-2

308-00-2

SPECIFICATIONS

Lubricants, Sealers and Adhesives

Item	Specification
Transmission fluid	WSD-M2C200-C
High-temperature grease	ESD-M1C220-A
Super DOT4 brake fluid	ESD-M6C57-A

Filling Capacities

	Liters
iB5 manual transmission (5 - 10 mm below lower edge of check hole)	2.3
MTX -75 manual transmission (0 - 5 mm below lower edge of check hole)	1.9
MMT6 manual transmission (0 - 5 mm below lower edge of check hole)	1.75

Clutch

Description	mm
Clutch pedal travel - MTX-75 manual transmission	135 ± 3
Clutch pedal travel - MMT6 manual transmission	140 ± 3

Tightening Torques

Description	Nm	lb-ft	lb-in
Clutch bleed nipple - iB5 manual transmission	5	-	44
Clutch bleed nipple - MTX-75 manual transmission	5	-	44
Clutch bleed nipple - MMT6 manual transmission	5	-	44

DIAGNOSIS AND TESTING**Manual Transaxle and Clutch****Inspection and Checking**

1. Verify the customer concern.
2. Visually check for any obvious mechanical or electrical damage.
3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the concern persists, check the symptoms and proceed according to WDS instructions.

Inspection and Verification - Manual Transmission

The following checks should be carried out before repairing or installing a new transmission.

Inspection and checking for vehicles with manual transmission can be divided into three main areas.

Gear Shifting Concerns

- Clutch does not operate correctly
- External shift mechanism.

REFER to: External Controls (308-06 Manual Transmission/Transaxle External Controls - Vehicles With: 5-Speed Manual Transmission (iB5), Diagnosis and Testing)
/ External Controls (308-06C Manual Transmission/Transaxle External Controls - Vehicles With: 6-Speed Manual Transmission (MMT6), Diagnosis and Testing)
/ External Controls (308-06C Manual Transmission/Transaxle External Controls - Vehicles With: 6-Speed Manual Transmission (M66), Diagnosis and Testing).

Transmission Noise Concerns

- Check the engine and transmission mountings for sufficient clearance to the transmission and the body.
- Any other noise excluding shift noises.
- Perform the tests / recreate the driving situations listed in the following table under the conditions given and respond to the corresponding diagnoses with "Yes" or "No".

NOTE: If the response to one or more diagnoses is "Yes", the transmission must be removed and the dual mass flywheel checked according to GO to Pinpoint Test E.

Manual Transmission/Transaxle and Clutch - General Information

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308-00-4

DIAGNOSIS AND TESTING

Item No.	Situation, test /diagnosis	Yes	No
1	<p>Driving situation:</p> <p>Road test the vehicle. Accelerate the vehicle with maximum torque in 5th or 6th gear.</p> <p>REFER to: Specifications (303-01F Engine - 2.0L Duratorq-TDCi (DW) Diesel, Specifications).</p>	0	0
	<p>Diagnosis:</p> <p>Very rough vibrations from the powertrain? Vibrations disappear when the accelerator pedal is released briefly.</p>		
1a	<p>Driving situation:</p> <p>Road test the vehicle. Drive the vehicle in simulated "stop/go traffic" (1st/2nd gear). Check for transmission rattle during gentle acceleration and deceleration.</p>	0	0
	<p>Diagnosis:</p> <p>Are there noises from the drivetrain during driving conditions between engine idle and a maximum of 2000 rev/min, and which appear under particular, vehicle dependent vehicle speeds?</p>		
2	<p>Driving situation:</p> <p>Raise and support the vehicle. Check all engine/transmission and exhaust mountings with the engine not running, while starting the engine and when it is idling.</p>	0	0
	<p>Diagnosis:</p> <p>Does the engine/transmission shake severely or make rattling noises during starting? Long time before engine reaches idle speed. Renew any damaged components (engine/transmission or exhaust mountings) and redo the test.</p>		
3	<p>Driving situation:</p> <p>Check the front axle driveshafts and the manual transmission. Chock the wheels and apply the parking brake. Start the engine, engage 1st gear and slowly release the clutch pedal while the engine idles.</p>	0	0
	<p>Diagnosis:</p> <p>Engine speed does not drop, power not transferred, vehicle does not move.</p>		
4	<p>Driving situation:</p> <p>Start engine, put shift lever in neutral and slowly release the clutch. Turn the engine off.</p>	0	0
	<p>Diagnosis:</p> <p>Hard metallic noise as the engine stops, coming from the manual transmission during the last engine revolution before the engine finally stops, is NOT caused by the dual mass flywheel. On vehicles with a diesel engine and without an intake manifold flap solenoid valve, the concern (harsh, metallic noise) cannot be resolved by installing a new dual mass flywheel. On vehicles with a diesel engine and with an intake manifold flap solenoid valve, check the operation of the solenoid valve.</p>		

**Manual Transmission/Transaxle and Clutch -
General Information**

308-00-5

308-00-5

DIAGNOSIS AND TESTING

Item No.	Situation, test /diagnosis	Yes	No
	If a clattering noise is detected as the engine is switched off with the clutch pedal depressed, check the transmission housing for grease residues (more than 2 grams) from the dual mass flywheel (remove the starter motor and check the bell housing).		

Fluid Leakage Concerns

- Check that the leaking fluid is actually transmission fluid and not hydraulic fluid (from the hydraulically-operated clutch) or engine oil.
- Check the transmission fluid level. If necessary, drain off any excess fluid.

- Locate the fluid leak with the aid of a fluorescent tracer dye and an ultraviolet inspection lamp.
- Clean the transmission and the adjacent areas thoroughly before road testing.

Symptom Chart - General Concerns

Symptom	Possible Sources	Action
• High-effort gear shifting in one or more gears	• Synchronizer ring or synchronization damaged	• RENEW the synchronizer hub with synchronizer ring set and, if necessary, the relevant gear wheel. Because of various modifications and the difficulty in estimating the degree of wear, replacement of the complete unit (as described above) is recommended.
	• Clutch does not operate correctly	• CHECK the clutch function and the brake fluid level.
	• Internal gearshift mechanism.	• Remove the internal gearshift mechanism and check the components. If necessary, RENEW.
• Rattling or scratching noise during gear shifting	• Synchronizer hub or synchronizer ring damaged	• RENEW the synchronizer hub with synchronizer ring set and, if necessary, the relevant gear wheel. Because of various modifications and the difficulty in estimating the degree of wear, replacement of the complete unit (as described above) is recommended.
	• Clutch does not operate correctly	• CHECK the clutch function and the brake fluid level.

**Manual Transmission/Transaxle and Clutch -
General Information**

308-00-6

308-00-6

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Gear engagement not functioning correctly 	<ul style="list-style-type: none"> External gearshift mechanism damaged or incorrectly adjusted 	<ul style="list-style-type: none"> CHECK the external gearshift mechanism for damage. If no concern is determined, REMOVE the transmission. <p>REFER to: Transaxle - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) (308-03 Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (iB5), Removal) / Transaxle - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (308-03B Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal) / Transaxle - 1.6L Duratorq-TDCi (DV) Diesel (308-03B Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal) / Transaxle - 2.0L Duratorq-TDCi (DW) Diesel (308-03C Manual Transmission/Transaxle - Vehicles With: 6-Speed Manual Transmission (MMT6), Removal).</p>
<ul style="list-style-type: none"> Gear jumps out of engagement while driving 	<ul style="list-style-type: none"> Missing snap rings; synchronization components damaged or worn clutch splines 	<ul style="list-style-type: none"> RENEW gear wheels, synchronizer and selector fork as necessary. CHECK the transmission for damage, particularly to the sliding sleeve.
	<ul style="list-style-type: none"> Incorrect sliding sleeve; worn clutch splines 	<ul style="list-style-type: none"> RENEW gear wheels, synchronizer and selector fork as necessary. CHECK the transmission for damage, particularly to the sliding sleeve.
	<ul style="list-style-type: none"> Selector forks 	<ul style="list-style-type: none"> RENEW gear wheels, sliding sleeves and selector forks as necessary. CHECK the transmission for damage, particularly to the sliding sleeve.

Manual Transmission/Transaxle and Clutch - General Information

308-00-7

308-00-7

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • Gear lever feels loose 	<ul style="list-style-type: none"> • Gear lever mounting 	<ul style="list-style-type: none"> • Check the external gearshift mechanism; replace if necessary. Check gear lever mounting, external gearshift mechanism and shift cables; tighten if necessary. <p>REFER to: External Controls (308-06 Manual Transmission/Transaxle External Controls - Vehicles With: 5-Speed Manual Transmission (iB5), Diagnosis and Testing) / External Controls (308-06C Manual Transmission/Transaxle External Controls - Vehicles With: 6-Speed Manual Transmission (MMT6), Diagnosis and Testing) / External Controls (308-06C Manual Transmission/Transaxle External Controls - Vehicles With: 6-Speed Manual Transmission (M66), Diagnosis and Testing).</p>
	<ul style="list-style-type: none"> • Internal shift mechanism 	<ul style="list-style-type: none"> • Check the internal shift mechanism for play at the transmission.

Manual Transmission/Transaxle and Clutch - General Information

308-00-8

308-00-8

DIAGNOSIS AND TESTING

Symptom Chart - Transmission Noises

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Gear wheels grating when shifting 	<ul style="list-style-type: none"> Clutch worn 	<ul style="list-style-type: none"> Check clutch REFER to: Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 5-Speed Manual Transmission (iB5), Removal and Installation) / Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal and Installation) / Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 6-Speed Manual Transmission (MMT6), Removal and Installation).
	<ul style="list-style-type: none"> Air in the clutch system; fluid loss 	<ul style="list-style-type: none"> Check clutch system for leaks; bleed the clutch system. REFER to: Clutch System Bleeding (308-00 Manual Transmission/Transaxle and Clutch - General Information, General Procedures).
<ul style="list-style-type: none"> Slight buzzing, rattling or metallic scraping noise from the transmission at 2500 to 3500 rpm when on overrun or driving without load (particularly in 2nd and 3rd gear) 	<ul style="list-style-type: none"> Rotational vibration from the engine not sufficiently damped by the clutch. 	<ul style="list-style-type: none"> These noises do not affect the operation and service life of the transmission.

Manual Transmission/Transaxle and Clutch -
General Information

308-00-9

308-00-9

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Engine speed-dependent transmission noise 	<ul style="list-style-type: none"> CHECK transmission input shaft bearings. REMOVE the transmission <p>REFER to: Transaxle - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) (308-03 Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (iB5), Removal)</p> <p>/ Transaxle - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (308-03B Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal)</p> <p>/ Transaxle - 1.6L Duratorq-TDCi (DV) Diesel (308-03B Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal)</p> <p>/ Transaxle - 2.0L Duratorq-TDCi (DW) Diesel (308-03C Manual Transmission/Transaxle - Vehicles With: 6-Speed Manual Transmission (MMT6), Removal).</p>
	<ul style="list-style-type: none"> Vehicle speed-dependent transmission noise 	<ul style="list-style-type: none"> CHECK driveshaft tripod joints. <p>REFER to: Front Halfshaft LH (205-04 Front Drive Halfshafts, Removal and Installation)</p> <p>/ Front Halfshaft LH (205-04 Front Drive Halfshafts, Disassembly and Assembly)</p> <p>/ Front Halfshaft RH - 3-Door (205-04 Front Drive Halfshafts, Removal and Installation)</p> <p>/ Front Halfshaft RH (205-04 Front Drive Halfshafts, Disassembly and Assembly).</p>

Manual Transmission/Transaxle and Clutch -
General Information

308-00-10

308-00-10

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Steering angle-dependent transmission noise 	<ul style="list-style-type: none"> CHECK differential splines for damage. Turn the differential bevel gears against one another. For this purpose, REMOVE the differential. <p>REFER to: Front Halfshaft LH (205-04 Front Drive Halfshafts, Removal and Installation) / Intermediate Shaft (205-04 Front Drive Halfshafts, Removal and Installation).</p>
	<ul style="list-style-type: none"> The engine/transmission assembly is in contact with the body 	<ul style="list-style-type: none"> Visually inspect for evidence of contact and REPAIR as necessary.
	<ul style="list-style-type: none"> Engine/transmission washer-head bolts 	<ul style="list-style-type: none"> TIGHTEN the transmission retaining bolts. <p>REFER to: Transaxle - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma) (308-03A Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (iB5), Installation) / Transaxle - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (308-03B Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (MTX-75), Installation) / Transaxle - 1.6L Duratorq-TDCi (DV) Diesel (308-03B Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (MTX-75), Installation) / Transaxle - 2.0L Duratorq-TDCi (DW) Diesel (308-03C Manual Transmission/Transaxle - Vehicles With: 6-Speed Manual Transmission (MMT6), Installation).</p>
	<ul style="list-style-type: none"> Transmission fluid level too low. 	<ul style="list-style-type: none"> Check the transmission fluid level. <p>REFER to: Specifications (308-00 Manual Transmission/Transaxle and Clutch - General Information, Specifications).</p>

Manual Transmission/Transaxle and Clutch -
General Information

308-00-11

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DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Transmission bearings and gear wheels (usually on high-mileage vehicles) 	<ul style="list-style-type: none"> REMOVE the transmission. CHECK the transmission bearings and gear wheels and RENEW as necessary. <p>REFER to: Transaxle - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) (308-03 Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (iB5), Removal) / Transaxle - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (308-03B Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal) / Transaxle - 1.6L Duratorq-TDCi (DV) Diesel (308-03B Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal) / Transaxle - 2.0L Duratorq-TDCi (DW) Diesel (308-03C Manual Transmission/Transaxle - Vehicles With: 6-Speed Manual Transmission (MMT6), Removal).</p>
<ul style="list-style-type: none"> Rattling noises or vibration 	<ul style="list-style-type: none"> External gearshift mechanism 	<ul style="list-style-type: none"> CHECK the external gearshift mechanism. <p>REFER to: External Controls (308-06 Manual Transmission/Transaxle External Controls - Vehicles With: 5-Speed Manual Transmission (iB5), Diagnosis and Testing) / External Controls (308-06C Manual Transmission/Transaxle External Controls - Vehicles With: 6-Speed Manual Transmission (MMT6), Diagnosis and Testing) / External Controls (308-06B Manual Transmission/Transaxle External Controls - Vehicles With: 5-Speed Manual Transaxle (MTX-75), Diagnosis and Testing).</p>
	<ul style="list-style-type: none"> Front or rear engine mounting defective 	<ul style="list-style-type: none"> CHECK front or rear engine mounting; RENEW if necessary.

Manual Transmission/Transaxle and Clutch -
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DIAGNOSIS AND TESTING

Symptom Chart - Fluid Leakage

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Fluid leakage 	<ul style="list-style-type: none"> Oil seals or O-rings 	<ul style="list-style-type: none"> CHECK the mating surfaces and INSTALL a new gasket.
	<ul style="list-style-type: none"> Fluid leak between the clutch-side and transmission-side housing halves. Fluid leak at transmission housing bolt 	<ul style="list-style-type: none"> DISMANTLE the transmission and clean the mating surfaces. CHECK the mating surfaces for damage. Seal the transmission using WSK-M2G348-A5 sealer. Tighten transmission housing bolts to specified tightening torque.

Symptom Chart - Clutch

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Clutch slips 	<ul style="list-style-type: none"> No clutch pedal free play Clutch Belleville springs broken Clutch disc facing broken Clutch disc facing contaminated with oil 	<ul style="list-style-type: none"> GO to Pinpoint Test A.
<ul style="list-style-type: none"> Clutch juddering 	<ul style="list-style-type: none"> Engine roll restrictor defective Tilted clutch disc 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
<ul style="list-style-type: none"> Clutch disengages too late or not at all; high-effort gear shifting 	<ul style="list-style-type: none"> Insufficient brake fluid Air in hydraulic system Excessive clutch pedal free play Clutch Belleville springs broken Clutch disc deformed or broken Clutch disc splines corroded 	<ul style="list-style-type: none"> GO to Pinpoint Test C.
<ul style="list-style-type: none"> Clutch pedal pulsating 	<ul style="list-style-type: none"> Non-uniform Belleville spring fingers Frequency modulator defective (if present) 	<ul style="list-style-type: none"> GO to Pinpoint Test D.
<ul style="list-style-type: none"> Excessive noise 	<ul style="list-style-type: none"> Release bearing defective Input shaft pilot bearing Excessive crankshaft end float 	<ul style="list-style-type: none"> GO to Pinpoint Test E.
<ul style="list-style-type: none"> Fluid leakage 	<ul style="list-style-type: none"> Clutch master cylinder Clutch slave cylinder Hydraulic lines in area of engine and transmission 	<ul style="list-style-type: none"> GO to Pinpoint Test F.

Manual Transmission/Transaxle and Clutch -
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DIAGNOSIS AND TESTING

System Check

PINPOINT TEST A : CLUTCH SLIPS

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK THE CLUTCH FOR SLIPPAGE	
	1 Chock the wheels and apply the parking brake.
	2 Ignition switch in position III.
	3 Start the engine, depress the clutch pedal and engage 4th gear.
	4 Run the engine at approx. 2000 rpm.
	5 Release the clutch pedal slowly. <ul style="list-style-type: none"> Does the engine stall when the clutch pedal is fully released? → Yes Clutch OK. → No GO to A2.
A2: CHECK THE CLUTCH PEDAL FREE PLAY	
	1 Measure the clutch pedal free play.
	2 Depress the clutch pedal manually to the point of resistance and release, record clutch pedal travel. <ul style="list-style-type: none"> Is the pedal travel approx. 10 mm? → Yes Clutch pedal free play OK. → No GO to A3.

**Manual Transmission/Transaxle and Clutch -
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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A3: CHECK THE CLUTCH BELLEVILLE SPRINGS	
	<p>1 REMOVE the transmission. CHECK the clutch Belleville springs.</p> <p>REFER to: Transaxle - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) (308-03 Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (iB5), Removal) / Transaxle - 1.8L Duratec-HE (MI4) (308-03 Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (iB5), Removal) / Transaxle - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (308-03B Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal) / Transaxle - 1.6L Duratorq-TDCi (DV) Diesel (308-03B Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal) / Transaxle - 2.0L Duratorq-TDCi (DW) Diesel (308-03C Manual Transmission/Transaxle - Vehicles With: 6-Speed Manual Transmission (MMT6), Removal).</p> <ul style="list-style-type: none"> • Are clutch Belleville springs broken? <p>→ Yes REPLACE the clutch pressure plate.</p> <p>→ No GO to A4.</p>

**Manual Transmission/Transaxle and Clutch -
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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A4: CHECK THE CLUTCH DISC	
	<p>1 Remove the clutch disc and clutch pressure plate.</p> <p>REFER to: Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 5-Speed Manual Transmission (iB5), Removal and Installation) / Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal and Installation) / Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 6-Speed Manual Transmission (MMT6), Removal and Installation).</p> <ul style="list-style-type: none"> Is the clutch disc or the clutch pressure plate broken or contaminated with oil? <p>→ Yes CHECK the engine and transmission for leaks. REFER to: Engine (303-00 Engine System - General Information, Diagnosis and Testing). RENEW the clutch pressure plate and the clutch disc.</p> <p>→ No CHECK the operation of the system.</p>

PINPOINT TEST B : CLUTCH JUDDERING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK FOR CLUTCH JUDDER	
	<p>1 Ignition switch in position III.</p> <p>2 Start the engine, depress the clutch pedal and engage 1st gear.</p> <p>3 Run the engine at between 1200 and 1500 rpm.</p> <p>4 Release the clutch pedal slowly.</p> <ul style="list-style-type: none"> Does the vehicle judder when it starts off? <p>→ Yes GO to B2.</p> <p>→ No Clutch OK.</p>

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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B2: CHECK ENGINE/TRANSMISSION MOUNTINGS AND ROLL RESISTOR	
	<p>1 Check the engine/transmission mountings and the engine roll resistor for damage, loose bolted connections or over-stressed installation position.</p> <ul style="list-style-type: none"> Are the engine/transmission mountings or the engine roll restrictor loose, damaged or in an over-stressed installation position? <p>→ Yes TIGHTEN the bolts or REPLACE as necessary. INSTALL the engine/transmission mountings or the engine roll restrictor in installation position. CHECK the operation of the system.</p> <p>→ No GO to B3.</p>
B3: CHECK THE CLUTCH PRESSURE PLATE	
	<p>1 Remove the clutch pressure plate.</p> <p>REFER to: Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 5-Speed Manual Transmission (iB5), Removal and Installation) / Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal and Installation) / Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 6-Speed Manual Transmission (MMT6), Removal and Installation).</p> <ul style="list-style-type: none"> Are either the pressure plate or the leaf springs broken? <p>→ Yes REPLACE the clutch pressure plate.</p> <p>→ No GO to B4.</p>
B4: CHECK THE CLUTCH DISC	
	<p>1 CHECK the clutch disc.</p> <ul style="list-style-type: none"> Is the clutch disc broken, contaminated with oil or bent? <p>→ Yes REPLACE the clutch disc.</p> <p>→ No Clutch disc is OK.</p>

Manual Transmission/Transaxle and Clutch -
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DIAGNOSIS AND TESTING

PINPOINT TEST C : CLUTCH DISENGAGES TOO LATE OR NOT AT ALL

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: CHECK THE BRAKE FLUID LEVEL	
	<p>1 Check the brake fluid level.</p> <ul style="list-style-type: none"> Is the brake fluid level in the reservoir between the MAX and MIN marks? <p>→ Yes GO to C2.</p> <p>→ No Top up the brake fluid, CHECK the brake and clutch systems for leaks.</p>
C2: BLEED THE CLUTCH SYSTEM	
	<p>1 Bleed the clutch system.</p> <p>REFER to: Clutch System Bleeding (308-00 Manual Transmission/Transaxle and Clutch - General Information, General Procedures).</p> <ul style="list-style-type: none"> Does the clutch show improved disengaging characteristics following bleeding of the system? <p>→ Yes Clutch OK.</p> <p>→ No GO to C3.</p>
C3: CHECK THE CLUTCH PEDAL FREE PLAY	
	<p>1 Measure the clutch pedal free play.</p> <p>2 Depress the clutch pedal until resistance is felt, then release it again.</p> <ul style="list-style-type: none"> Is the pedal travel approx. 10 mm? <p>→ Yes GO to C4.</p> <p>→ No CHECK that the clutch pedal moves freely; remove if necessary.</p> <p>REFER to: Clutch Master Cylinder (308-02A Clutch Controls - Vehicles With: 5-Speed Manual Transmission (iB5), Removal and Installation).</p>

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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C4: CHECK THE CLUTCH BELLEVILLE SPRINGS	
	<p>1 Remove the transmission; CHECK clutch Belleville springs.</p> <p>REFER to: Transaxle - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) (308-03 Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (iB5), Removal)</p> <p>/ Transaxle - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (308-03B Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal)</p> <p>/ Transaxle - 1.6L Duratorq-TDCi (DV) Diesel (308-03B Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal)</p> <p>/ Transaxle - 2.0L Duratorq-TDCi (DW) Diesel (308-03C Manual Transmission/Transaxle - Vehicles With: 6-Speed Manual Transmission (MMT6), Removal).</p> <ul style="list-style-type: none"> • Are clutch Belleville springs broken? <p>→ Yes REPLACE the clutch pressure plate.</p> <p>REFER to: Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 5-Speed Manual Transmission (iB5), Removal and Installation)</p> <p>/ Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal and Installation)</p> <p>/ Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 6-Speed Manual Transmission (MMT6), Removal and Installation).</p> <p>CHECK operation of system.</p> <p>→ No GO to C5.</p>

**Manual Transmission/Transaxle and Clutch -
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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C5: CHECK THE CLUTCH DISC	
	<p>1 Remove the clutch disc.</p> <p>REFER to: Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 5-Speed Manual Transmission(iB5), Removal and Installation) / Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal and Installation) / Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 6-Speed Manual Transmission (MMT6), Removal and Installation).</p> <ul style="list-style-type: none"> Is the clutch disc bent, contaminated with oil or broken? <p>→ Yes RENEW the clutch disc.</p> <p>→ No GO to C6.</p>
C6: CHECK THE CLUTCH DISC SPLINES	
	<p>1 CHECK clutch disc splines for corrosion.</p> <ul style="list-style-type: none"> Are the clutch disc splines corroded? <p>→ Yes RENEW the clutch disc.</p> <p>→ No CHECK the splines on the transmission input shaft for damage and corrosion, CLEAN and grease.</p>

**Manual Transmission/Transaxle and Clutch -
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DIAGNOSIS AND TESTING

PINPOINT TEST D : CLUTCH PEDAL PULSATING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: CHECK THE BELLEVILLE SPRING FINGERS FOR UNIFORMITY	
	<p>1 REMOVE the transmission.</p> <p>REFER to: Transaxle - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) (308-03 Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (iB5), Removal) / Transaxle - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (308-03B Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal) / Transaxle - 1.6L Duratorq-TDCi (DV) Diesel (308-03B Manual Transmission/Transaxle - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal) / Transaxle - 2.0L Duratorq-TDCi (DW) Diesel (308-03C Manual Transmission/Transaxle - Vehicles With: 6-Speed Manual Transmission (MMT6), Removal).</p> <p>CHECK the Belleville spring fingers for uniformity.</p> <ul style="list-style-type: none"> • Are the Belleville spring fingers uniform? <p>→ Yes Check the frequency modulator and RENEW if necessary (if present)</p> <p>→ No REPLACE the clutch pressure plate.</p> <p>REFER to: Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 5-Speed Manual Transmission (iB5), Removal and Installation) / Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal and Installation) / Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 6-Speed Manual Transmission (MMT6), Removal and Installation).</p>

PINPOINT TEST E : EXCESSIVE NOISE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: CHECK FOR NOISES DURING IDLING	
	<p>1 Ignition switch in position III.</p> <p>2 Start the engine.</p>

Manual Transmission/Transaxle and Clutch -
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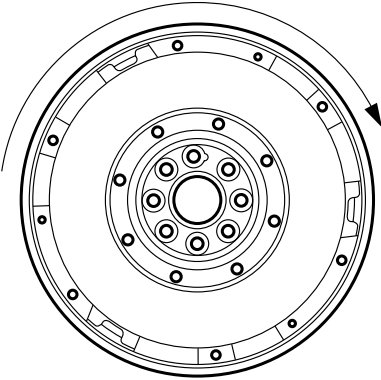



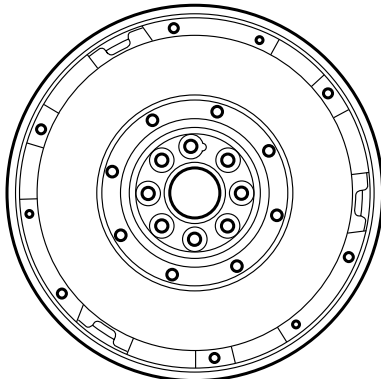
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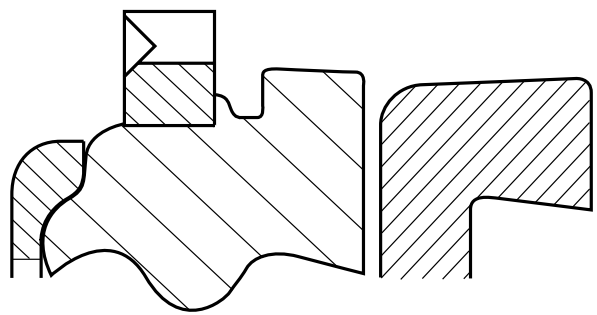
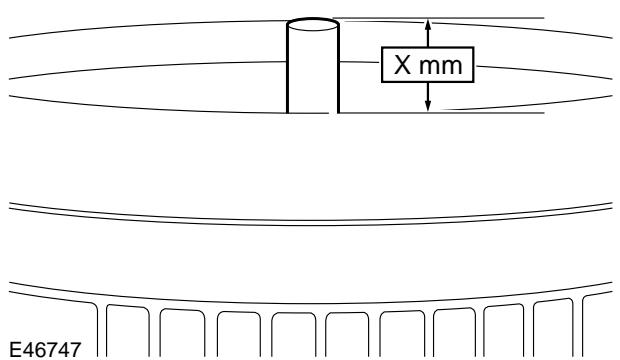
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Depress the clutch pedal fully.</p> <ul style="list-style-type: none"> • Are any noises audible when the clutch has been fully depressed? <p>→ Yes CHECK the clutch disc GO to C5.</p> <p>→ No Clutch is OK. CHECK the engine</p>
E2: CHECK THE CLUTCH RELEASE BEARING	
	<p>1 Remove the clutch slave cylinder/release bearing assembly.</p> <p>REFER to: Clutch Slave Cylinder (308-02 Clutch Controls - Vehicles With: 5-Speed Manual Transmission (iB5), Removal and Installation) / Clutch Slave Cylinder (308-02 Clutch Controls - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal and Installation) / Clutch Slave Cylinder (308-02 Clutch Controls - Vehicles With: 6-Speed Manual Transmission (MMT6), Removal and Installation).</p> <p>2 Check the release bearing for wear and corrosion.</p> <ul style="list-style-type: none"> • Are there signs of wear or corrosion? <p>→ Yes REPLACE the release bearing.</p> <p>→ No CHECK the crankshaft for excessive end float.</p> <p>REFER to: Crankshaft End Play (303-00 Engine System - General Information, General Procedures).</p> <p>Are there still noises? GO to E3.</p>

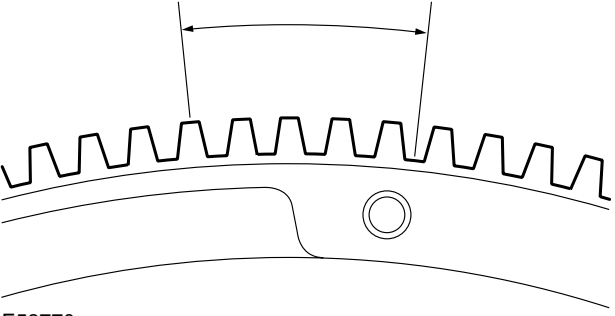
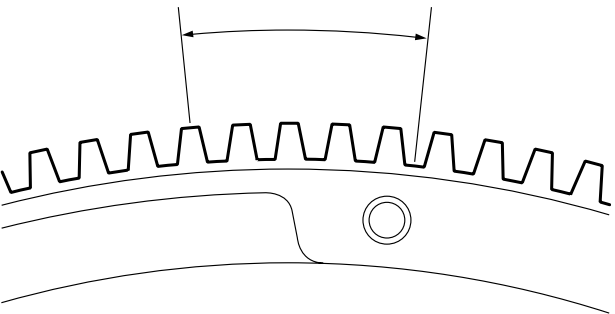

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E3: CHECK THE ROTATION OF THE SECONDARY MASS OF THE DUAL MASS FLYWHEEL	
 <p>E54978</p>	<p>CAUTIONS:</p> <ul style="list-style-type: none">  Do not rework the dual mass flywheel if it is distorted.  Do not use any fluids to clean the dual mass flywheel. Clean the flywheel with a dry cloth only.  Do not clean the gap between the primary and secondary mass. Only clean the bolt connection surface and the clutch surface. <p>NOTE: Heat discoloration is not a reason to renew the dual mass flywheel.</p> <p>1 Remove the clutch disc and clutch pressure plate.</p> <p>REFER to: Clutch Disc and Pressure Plate (308-01A Clutch - Vehicles With: 5-Speed Manual Transmission (iB5), Removal and Installation) / Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal and Installation) / Clutch Disc and Pressure Plate (308-01 Clutch - Vehicles With: 6-Speed Manual Transmission (MMT6), Removal and Installation).</p> <ul style="list-style-type: none"> • Can the secondary mass be turned freely by more than 15 teeth? <p>→ Yes RENEW the dual mass flywheel.</p> <p>→ No GO to E4.</p>
E4: CHECK THE SECONDARY MASS OF THE DUAL MASS FLYWHEEL.	
 <p>E53775</p>	<p>1 Visually inspect the secondary mass.</p> <ul style="list-style-type: none"> • Is the secondary mass damaged? <p>→ Yes RENEW the dual mass flywheel.</p> <p>→ No GO to E5.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E5: CHECK THE RING GEAR OF THE DUAL MASS FLYWHEEL	
 <p>E54975</p>	<p>1 Visually inspect the ring gear of the dual mass flywheel.</p> <ul style="list-style-type: none"> Is the ring gear of the dual mass flywheel OK? <p>→ Yes GO to E6.</p> <p>→ No RENEW the dual mass flywheel.</p>
E6: CHECK THE WELDED SEAM OF THE DUAL MASS FLYWHEEL	
	<p>1 Visually inspect the welded seam of the dual mass flywheel for loss of grease.</p> <ul style="list-style-type: none"> Is more than 2 grams of lost grease visible on the welded seam of the dual mass flywheel? <p>→ Yes RENEW the dual mass flywheel.</p> <p>→ No GO to E7.</p>
E7: DUAL MASS FLYWHEEL GUIDE PINS	
 <p>E46747</p>	<p>1 Check the installation of the guide pins of the dual mass flywheel.</p> <ul style="list-style-type: none"> X = 11.5 mm ± 0.5 mm Are the guide pins of the dual mass flywheel present and correctly installed? <p>→ Yes GO to E9.</p> <p>→ No RENEW the dual mass flywheel.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E8: SPRING RESISTANCE OF THE DUAL MASS FLYWHEEL	
 <p>E53770</p>	<p>1 Turn the secondary mass of the dual mass flywheel clockwise and counter-clockwise.</p> <ul style="list-style-type: none"> Is it possible to turn the secondary mass of the dual mass flywheel in both directions against the spring resistance? <p>→ Yes GO to E9.</p> <p>→ No RENEW the dual mass flywheel.</p>
E9: ROTATION OF THE DUAL MASS FLYWHEEL	
 <p>E53770</p>	<p>1 Turn the secondary mass clockwise and anti-clockwise and measure the rotation.</p> <ul style="list-style-type: none"> Is it possible to turn the secondary mass of the dual mass flywheel by 5 teeth without spring resistance? <p>→ Yes GO to E11.</p> <p>→ No RENEW the dual mass flywheel.</p>
E10: DISCOLORATION OF THE DUAL MASS FLYWHEEL DUE TO OVERHEATING	
 <p>E74182</p>	<p>1 Check the dual mass flywheel for discoloration due to overheating.</p> <ul style="list-style-type: none"> Is any discoloration due to overheating visible on the dual mass flywheel in the area shown? <p>→ Yes RENEW the dual mass flywheel.</p> <p>→ No GO to E11.</p>

**Manual Transmission/Transaxle and Clutch -
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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E11: DUAL MASS FLYWHEEL SPLITS	
	<p>1 Check the dual mass flywheel for splits.</p> <ul style="list-style-type: none"> • Can splits be seen on the dual mass flywheel? <p>→ Yes RENEW the dual mass flywheel.</p> <p>→ No Dual mass flywheel OK.</p>

PINPOINT TEST F : FLUID LEAKAGE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F1: CHECK THE CLUTCH SLAVE CYLINDER	
	<p>1 Check the clutch master cylinder for leaks.</p> <ul style="list-style-type: none"> • Is the clutch master cylinder OK? <p>→ Yes GO to F2.</p> <p>→ No RENEW the clutch master cylinder.</p> <p>REFER to: Clutch Master Cylinder Clutch Master Cylind Clutch Controls - Vehicles With: 5-Speed Manual Transmission (iB5), Removal and Installation) / Clutch Master Cylinder (308-02A Clutch Controls - Vehicles With: 5-Speed Manual Clutch Controls - Vehicles With: 5-Speed Manual Tran Transmission (MTX-75, / Clutch Slave Cylinder (308-02 Clutch Controls - Vehicles With: 6-Speed Manual Transmission (MMT6), Removal and Installation).</p>

Manual Transmission/Transaxle and Clutch -
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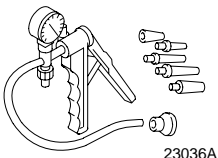
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F2: CHECK THE CLUTCH SLAVE CYLINDER	
	<p>1 Check the clutch slave cylinder for leaks.</p> <ul style="list-style-type: none"> • Is the clutch slave cylinder OK? <p>→ Yes GO to F3.</p> <p>→ No REPLACE the clutch slave cylinder.</p> <p>REFER to: Clutch Slave Cylinder (308-02 Clutch Controls - Vehicles With: 5-Speed Manual Transmission (iB5), Removal and Installation)</p> <p>/ Clutch Slave Cylinder (308-02 Clutch Controls - Vehicles With: 5-Speed Manual Transmission (MTX-75), Removal and Installation)</p> <p>/ Clutch Slave Cylinder (308-02 Clutch Controls - Vehicles With: 6-Speed Manual Transmission (MMT6), Removal and Installation).</p>
F3: CHECK THE HYDRAULIC PIPES	
	<p>1 Check the hydraulic lines in area of engine and transmission for loose or damaged unions.</p> <ul style="list-style-type: none"> • Are the hydraulic lines OK? <p>→ Yes PERFORM a road test to verify the customer concern.</p> <p>→ No REPAIR or REPLACE components as necessary. PERFORM road test.</p>

GENERAL PROCEDURES

Clutch System Bleeding(16 843 0)

Special Tool(s)

 <p>23036A</p>	<p>Hand Vacuum Pump/Pressure Pump 416-D001 (23-036A)</p>
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Materials

Name	Specification
Super DOT 4 Brake Fluid	ESD-M6C57-A

WARNING: Brake fluid contains polyglycol ethers and polyglycols. Avoid contact with the eyes. Wash hands thoroughly after handling. If brake fluid contacts the eyes, flush the eyes for 15 minutes with cold running water. Get medical attention if irritation persists. If taken internally, drink water and induce vomiting. Get medical attention immediately. Failure to follow these instructions may result in personal injury.

CAUTION: If brake fluid is spilled on the paintwork, the affected area must be immediately washed down with cold water.

NOTE: If proprietary brake bleeding equipment is available, this can be used to bleed the clutch system, following the method below. The maximum pressure must not exceed 1.5 bar.

NOTE: The clutch control system is self-venting. The components are arranged in such a way that small amounts of air trapped in the system are removed automatically during clutch operation.

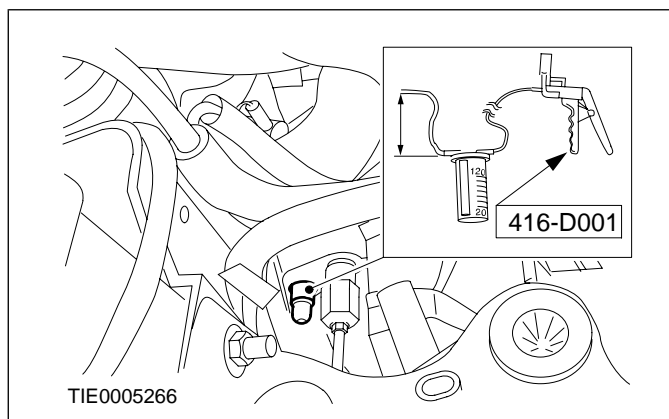
1. Remove the air cleaner, if necessary. For additional information, refer to Section **303-12A** [Intake Air Distribution and Filtering] / **303-12B** [Intake Air Distribution and Filtering -- 2.5L Duratec-ST (VI5)].
2. Remove the battery, if necessary. For additional information, refer to Section **414-01** [Battery, Mounting and Cables].
3. Remove the battery tray, if necessary.
4. Drain the brake fluid reservoir.

5. Raise and support the vehicle, if necessary. For additional information, refer to Section **100-02** [Jacking and Lifting].

6. Fill the reservoir of the special tool with approximately 100 ml of new brake fluid.

7. **NOTE:** Make sure that the special tool reservoir is positioned lower than the bleed nipple.

Install the special tool.



8. Using the special tool, bleed the clutch system.

- Pump approximately 80 ml of brake fluid into the clutch system.

9. Close the bleed nipple.

10. Remove the special tool.

11. Lower the vehicle, if necessary.

12. In order to remove any small amounts of trapped air remaining in the system, operate the clutch pedal several times (maximum five times), using the full clutch pedal travel.

13. Check the fluid level in the brake fluid reservoir and top up to the MAX mark with brake fluid if necessary.

14. Install the battery tray, if necessary.

15. Install the battery, if necessary. For additional information, refer to Section **414-01** [Battery, Mounting and Cables].

16. Install the air cleaner, if necessary. For additional information, refer to Section **303-12A** [Intake Air Distribution

GENERAL PROCEDURES


and Filtering] / 303-12B [Intake Air Distribution and Filtering -- 2.5L Duratec-ST (VI5)].

17. **Test the clutch control system for normal operation.**
 - Start the engine, depress the clutch pedal, wait two seconds, then carefully engage reverse gear. If there are any abnormal noises, or reverse gear is difficult to engage, repeat the clutch system bleeding procedure.
18. **Initialize the door window motors, if necessary. For additional information, refer to Section 501-11 [Glass, Frames and Mechanisms].**

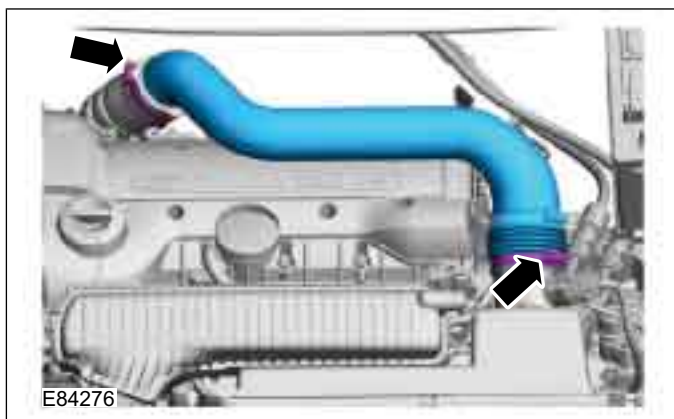
GENERAL PROCEDURES

Gearshift Cable Adjustment — Vehicles With: 6-Speed Manual Transmission (M66)

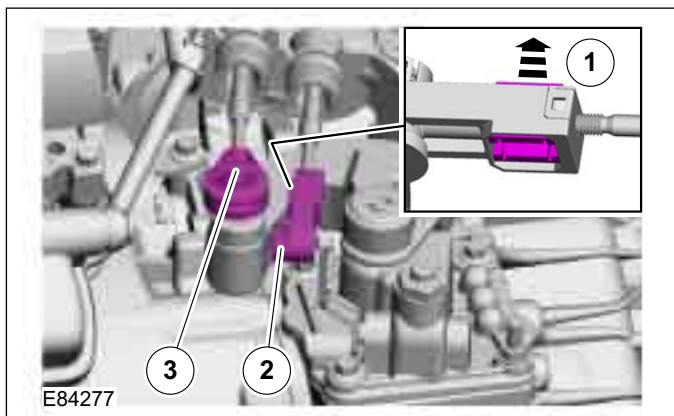
Special Tool(s)

 <p>E67470</p>	<p>Aligner, Gearshift Lever 308-647</p>
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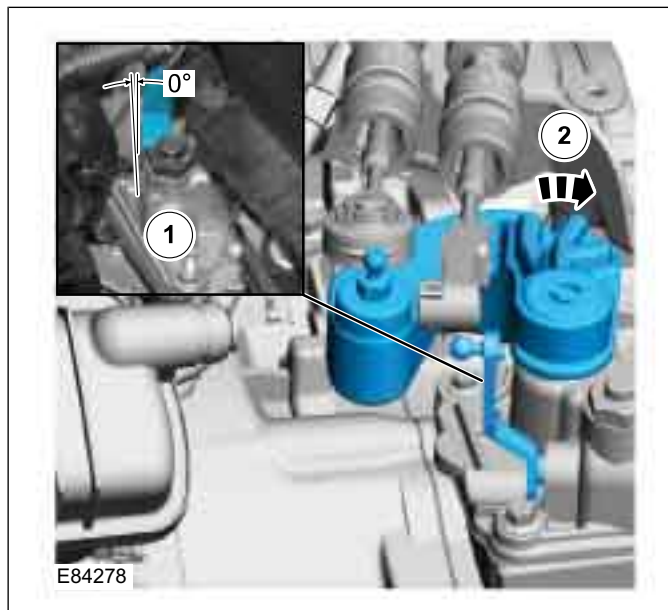
1.



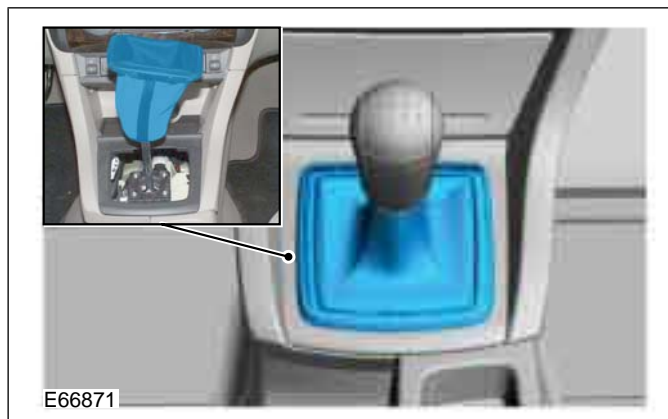
2. **CAUTION:** Gearshift cables must not be kinked or bent.



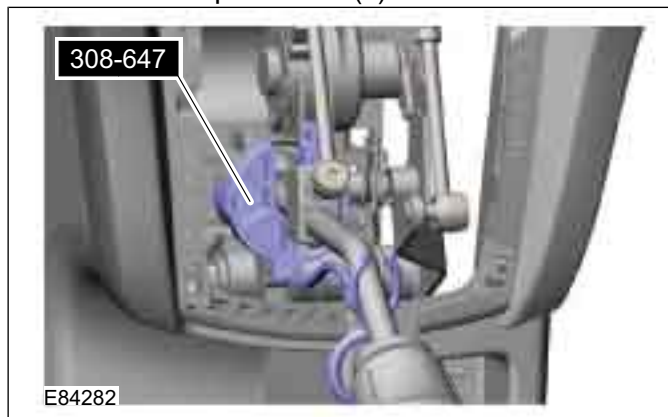
3. 2. **NOTE:** Ensure that 4th gear is engaged.



4.



5. Install the Special Tool(s): 308-647



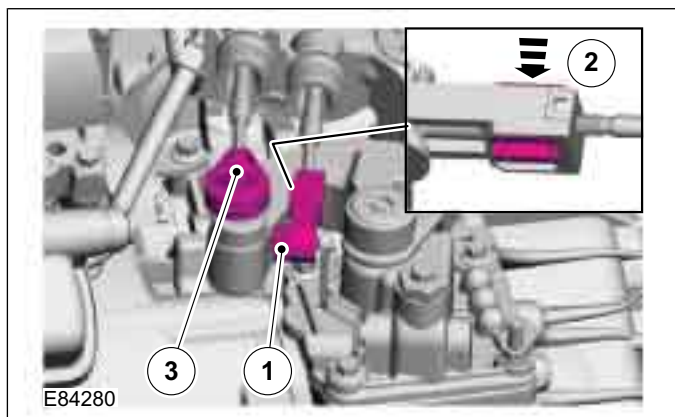
Manual Transmission/Transaxle and Clutch - General Information

308-00-30

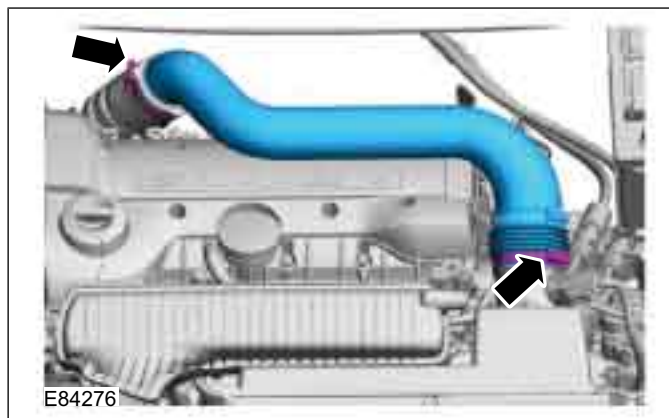
308-00-30

GENERAL PROCEDURES

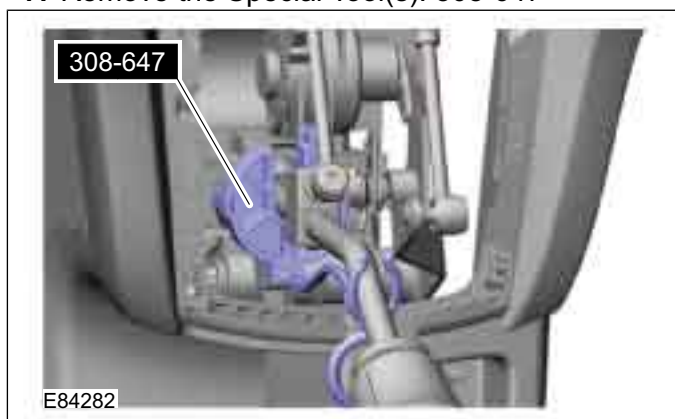
6.  **CAUTION:** Gearshift cables must not be kinked or bent.



9.



7. Remove the Special Tool(s): 308-647



8.



SECTION 308-01 Clutch — Vehicles With: 6-Speed Manual Transmission (M66)

VEHICLE APPLICATION: 2008.75 Focus ST C307

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DIAGNOSIS AND TESTING	
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REMOVAL AND INSTALLATION	
Clutch Disc and Pressure Plate.....	308-01-4

**Clutch — Vehicles With: 6-Speed Manual
Transmission (M66)**

308-01-2

308-01-2

SPECIFICATIONS**Technical Data and Specifications**

Clamped thickness - clutch plate *	Nominal thickness		Minimum thickness **	
	mm	inches	mm	inches
2.5L Engine	8.40	0.33	5.90	0.23

* Clamp the clutch disc hand-tight in the area of the friction linings.

** If the minimum thickness has been reached, the clutch disc must be renewed.

Clutch — Vehicles With: 6-Speed Manual Transmission (M66)

 **308-01-3****308-01-3** 

DIAGNOSIS AND TESTING

Clutch

REFER to: [Manual Transaxle and Clutch](#)
(308-00 Manual Transmission/Transaxle and
Clutch - General Information, Diagnosis
and Testing).

Clutch — Vehicles With: 6-Speed Manual
Transmission (M66)

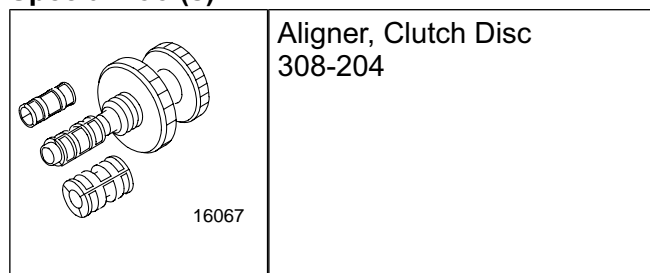
308-01-4

308-01-4

REMOVAL AND INSTALLATION

Clutch Disc and Pressure Plate

Special Tool(s)

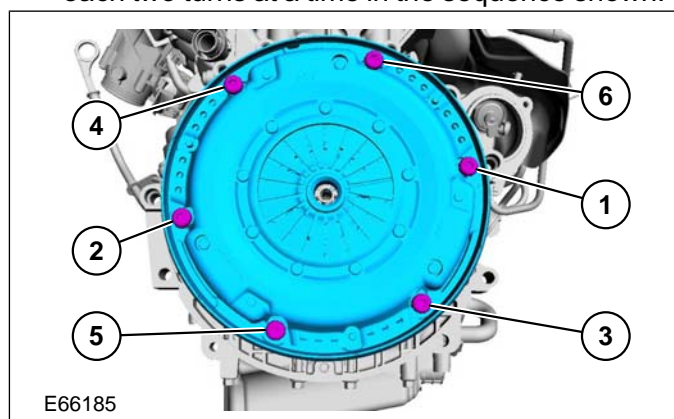


Removal

1. Remove the transmission.

Refer to: [Transaxle - 2.5L Duratec-ST \(VI5\)](#)
(308-03 Manual Transmission/Transaxle -
Vehicles With: 6-Speed Manual Transmission
(M66), Removal).

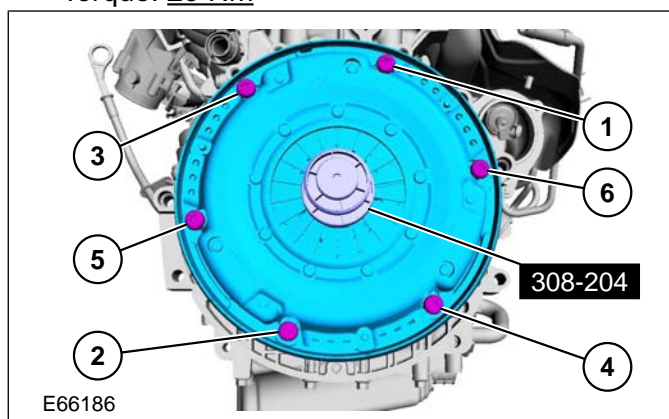
2. Slacken the bolts of the clutch pressure plate each two turns at a time in the sequence shown.



Installation

1. Follow the indicated sequence and tighten the bolts of the clutch pressure plate each two turns at a time until the specified tightening torque is achieved.

Special Tool(s): 308-204
Torque: 23 Nm



2. Install the transmission.

Refer to: [Transaxle - 2.5L Duratec-ST \(VI5\)](#)
(308-03 Manual Transmission/Transaxle -
Vehicles With: 6-Speed Manual Transmission
(M66), Installation).

SECTION 308-02 Clutch Controls — Vehicles With: 6-Speed Manual Transmission (M66)

VEHICLE APPLICATION:2008.75 Focus ST C307

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Specifications.....	308-02-2
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DIAGNOSIS AND TESTING	
Clutch Controls.....	308-02-3
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Clutch Master Cylinder.....	308-02-4
Clutch Slave Cylinder.....	308-02-7

**Clutch Controls — Vehicles With: 6-Speed
Manual Transmission (M66)**

308-02-2

308-02-2

SPECIFICATIONS

Clutch Controls

Description	
Operation	hydraulic
Adjustment	automatic

Clutch Controls — Vehicles With: 6-Speed Manual Transmission (M66)

 308-02-3

308-02-3 

DIAGNOSIS AND TESTING

Clutch Controls

REFER to: [Manual Transaxle and Clutch](#) (308-00
Manual Transmission/Transaxle and Clutch -
General Information, Diagnosis and Testing).

Clutch Controls — Vehicles With: 6-Speed
Manual Transmission (M66)

308-02-4

308-02-4

REMOVAL AND INSTALLATION

Clutch Master Cylinder

Special Tool(s)

 <p>E42935</p>	<p>Remover/Installer, Clutch Master Cylinder 308-554</p>
---	--

Materials

Name	Specification
Grease	WSD-M1C230-A

Removal

⚠ CAUTION: If brake fluid comes into contact with the paintwork, the affected area must be washed down immediately with cold water.

NOTE: Removal steps in this procedure may contain installation details.

All vehicles

1. Remove the air cleaner.

Refer to: **Air Cleaner - Vehicles With: PCM Security Shield** (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).

Refer to: **Air Cleaner - Vehicles Without: PCM Security Shield** (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).

Left-hand drive vehicles

2. Remove the battery carrier.

Refer to: **Battery Tray - 2.5L Duratec-ST (VI5)** (414-01 Battery, Mounting and Cables, Removal and Installation).

Right-hand drive vehicles

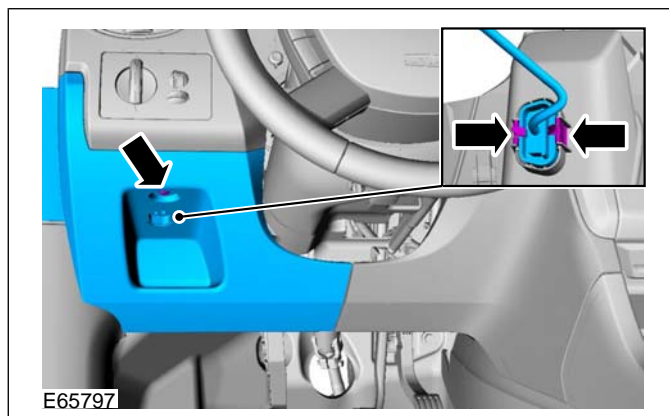
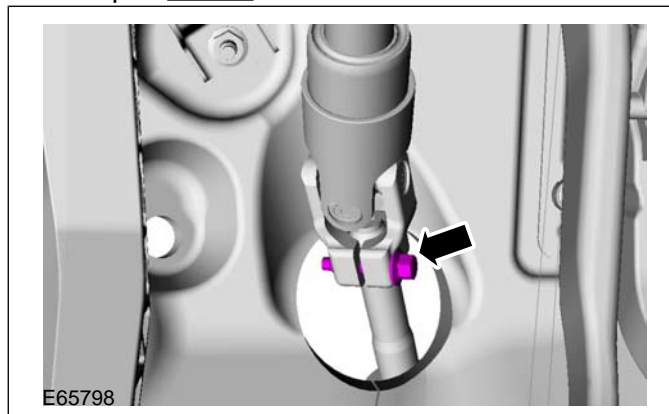
3. Disconnect the battery.

Refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

All vehicles

4. Extract brake fluid from the brake fluid reservoir until the level reaches the MIN mark.

5.

6. Torque: 28 Nm

7. **⚠ CAUTION:** Make sure that all openings are sealed.

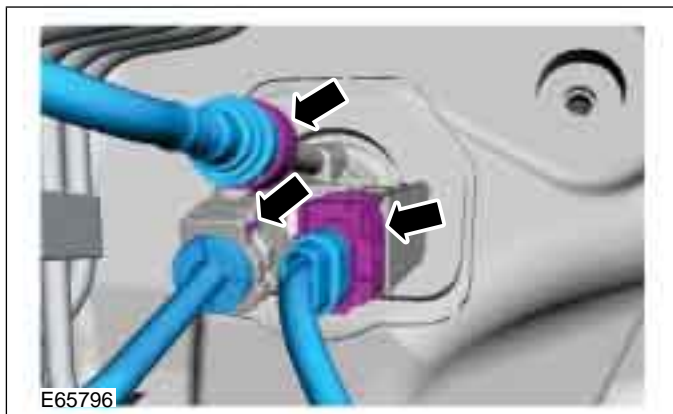
Clutch Controls — Vehicles With: 6-Speed Manual Transmission (M66)

308-02-5

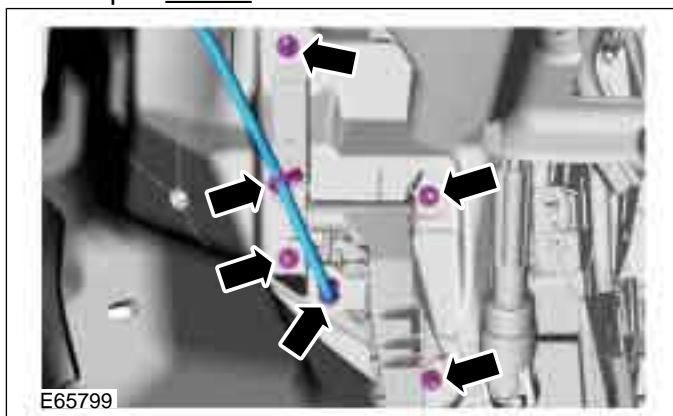
308-02-5

REMOVAL AND INSTALLATION

NOTE: This step can only be carried out from below on right-hand drive vehicles.



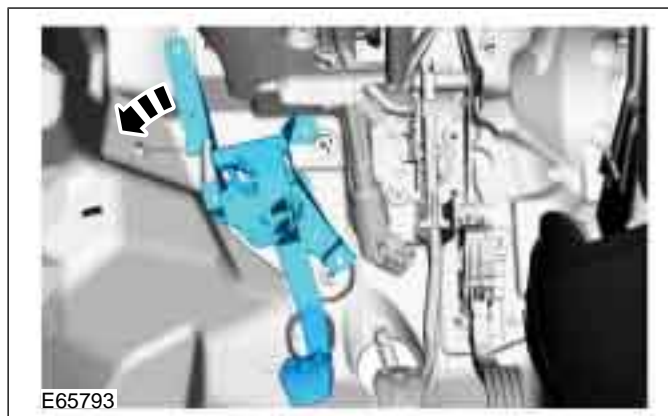
8. Torque: 28 Nm



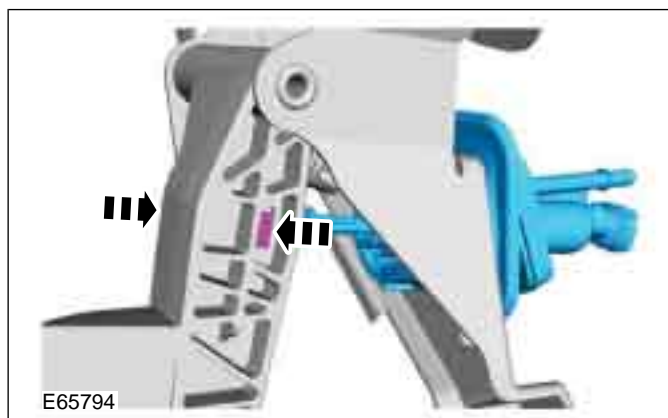
9. Special Tool(s): 308-554



10.



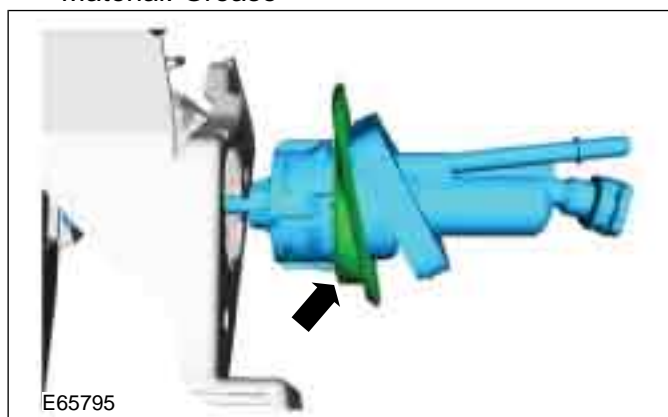
11.



Installation

1. Coat the clutch master cylinder gaiter with grease before installing.

Material: Grease



2. To install, reverse the removal procedure.

3. Bleed the clutch system.

Refer to: **Clutch System Bleeding** (308-00 Manual Transmission/Transaxle and Clutch - General Information, General Procedures).

**Clutch Controls — Vehicles With: 6-Speed
Manual Transmission (M66)** 308-02-6308-02-6 **REMOVAL AND INSTALLATION**

4. Initialize the window regulator motors.

Refer to: **Door Window Motor Initialization**
(501-11 Glass, Frames and Mechanisms,
General Procedures).

REMOVAL AND INSTALLATION

Clutch Slave Cylinder

Removal

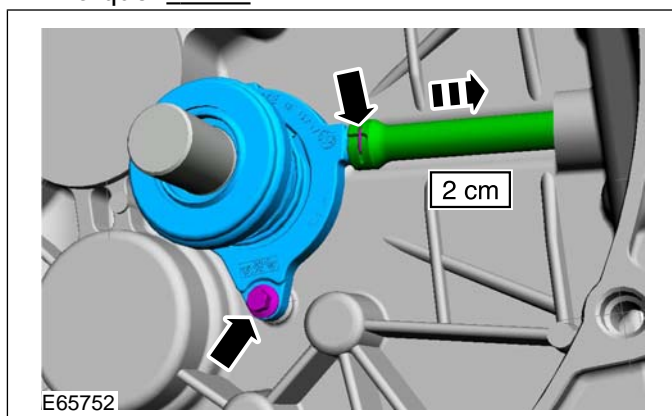
1. **NOTE:** Removal steps in this procedure may contain installation details.

Remove the transmission.

Refer to: [Transaxle - 2.5L Duratec-ST \(V15\)](#)
(308-03 Manual Transmission/Transaxle -
Vehicles With: 6-Speed Manual Transmission
(M66), Removal).

2. **▲ WARNING:** If brake fluid is spilt on the paintwork, the affected areas must be immediately washed down with cold water.

Torque: 11 Nm



Installation

1. To assemble, reverse the disassembly procedure.
2. Install the transmission.
Refer to: [Transaxle - 2.5L Duratec-ST \(V15\)](#)
(308-03 Manual Transmission/Transaxle -
Vehicles With: 6-Speed Manual Transmission
(M66), Installation).
3. Bleed the clutch system.
Refer to: [Clutch System Bleeding](#) (308-00,
General Procedures).

SECTION 308-03 Manual Transmission/Transaxle — Vehicles With: 6-Speed Manual Transmission (M66)

VEHICLE APPLICATION:2008.75 Focus ST C307

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Transmission Draining and Filling.....	308-03-9
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Transaxle — 2.5L Duratec-ST (V15).....	308-03-14
INSTALLATION	
Transaxle — 2.5L Duratec-ST (V15).....	308-03-19

SPECIFICATIONS**Capacities**

	Litres
transmission fluid	2.00

Transmission ratios

gear	Ratio
1st gear	3.385
2nd gear	2.050
3rd gear	1.433
4. gear	1.088
5th gear	0.868
6. gear	0.700
Reverse gear	0.773
Final drive ratio - forwards	4.000
Final drive ratio - reverse	3.231

DESCRIPTION AND OPERATION

Manual Transmission

Overview



E68455

The manual transaxle (M66) was designed for use in front-wheel and four-wheel drive vehicles and for high torques.

Its compact design enables transverse installation in conjunction with 2.5L Duratec-ST (V15) engine.

The transaxle is equipped with six forward gears.

The benefits:

- Optimized graduation of speed stages
- Lower fuel consumption
- Less noise emission due to lower engine speeds

The transaxle design is based on four shafts, one input shaft and three output shafts. (See also illustration on next page)

All the gears, including the reverse gear, are synchronized:

- Single synchronization - 4th/5th/6th and reverse gear
- Dual synchronization - 3rd gear
- Triple synchronization - 1st/2nd gear

The transaxle has a lifetime filling of synthetic oil.

An aperture is provided for checking the level and topping up.

Ford transmission fluid BO-VC with specification WSS-M2C200-C3 is used.

The total filling capacity is 2.0 liters.

After production startup, the transaxle undergoes a "Black Box Phase" and is therefore not repaired.

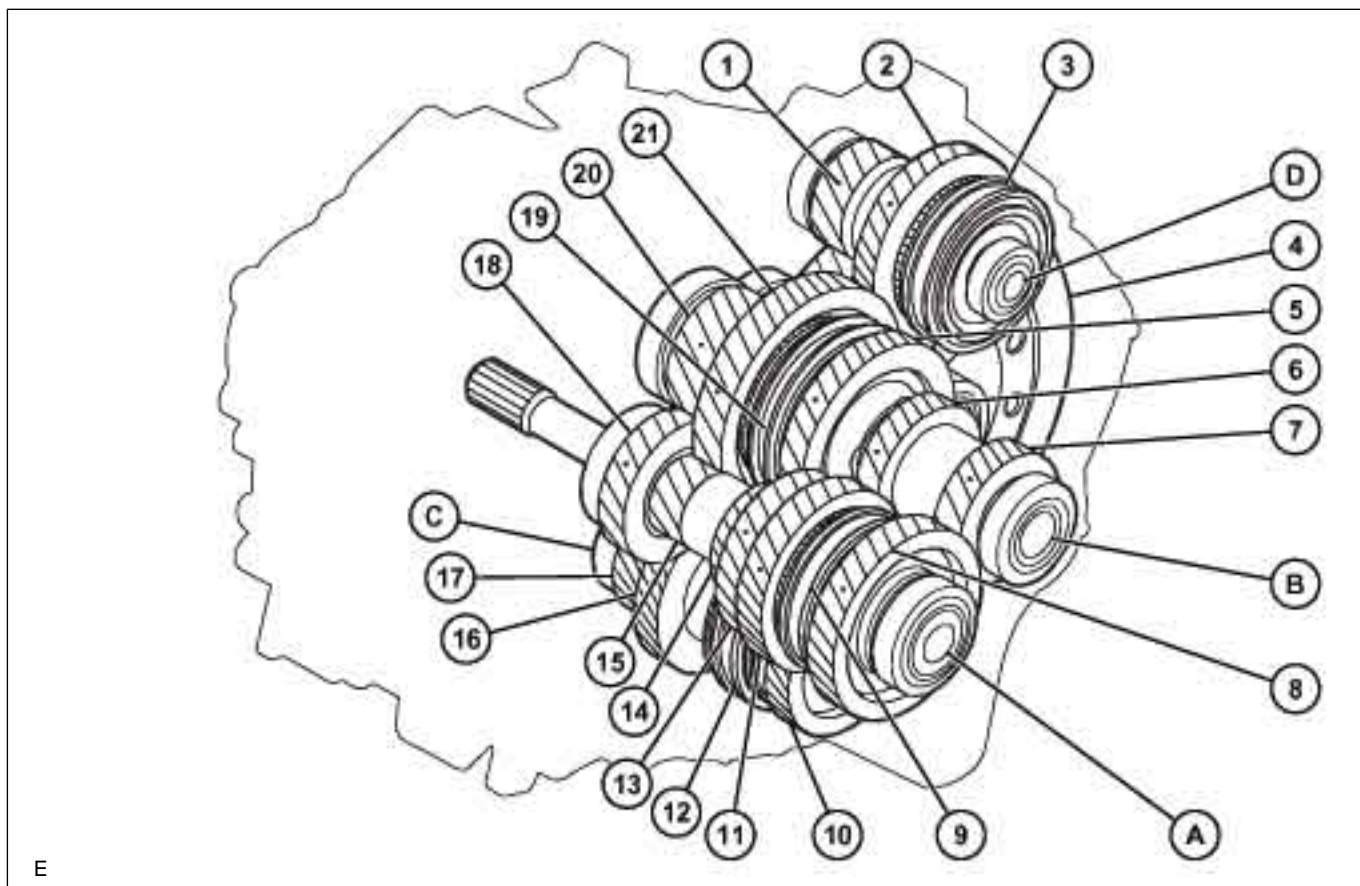
**Manual Transmission/Transaxle — Vehicles
With: 6-Speed Manual Transmission (M66)**

308-03-4

308-03-4

DESCRIPTION AND OPERATION

Internal Components



E

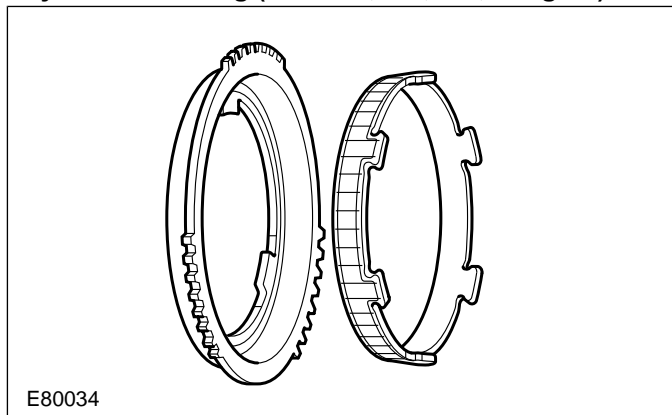
Item	Description
A	Input shaft
B	1st/2nd/5th/6th gear output shaft
C	3rd/4th gear output shaft
D	Reverse gear output shaft
1	Output pinion - reverse gear output shaft
2	Gear wheel - reverse gear
3	Synchronizer hub - reverse gear
4	Ring gear
5	Gear wheel - 2nd gear
6	Toothed wheel - 5th gear
7	Toothed wheel - 6th gear
8	Gear wheel - 6th gear
9	Synchronizer hub - 5th/6th gear
10	Gear wheel - 4th gear
11	Gear wheel - 5th gear
12	Synchronizer hub - 3rd/4th gear

Item	Description
13	Toothed wheel - 4th gear
14	Toothed wheel - 2nd gear
15	Toothed wheel - 1st gear
16	Gear wheel - 3rd gear
17	Output pinion - 3rd/4th gear output shaft
18	Toothed wheel - 3rd gear
19	Synchronizer hub - 1st/2nd gear
20	Output pinion - 1st/2nd/5th/6th gear output shaft
21	Gear wheel - 1st gear

DESCRIPTION AND OPERATION

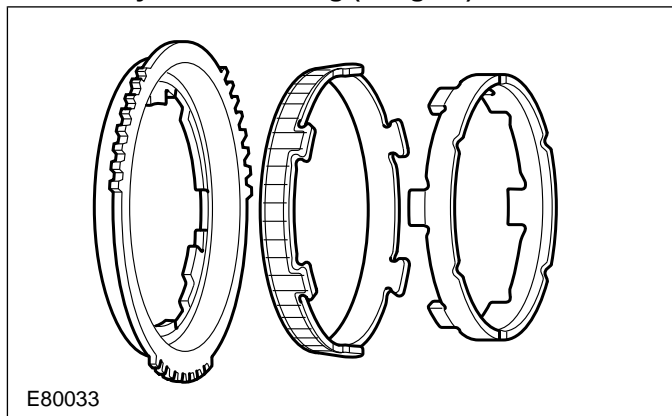
Synchronizer rings

Synchronizer ring (Reverse, 4th, 5th, 6th gear)



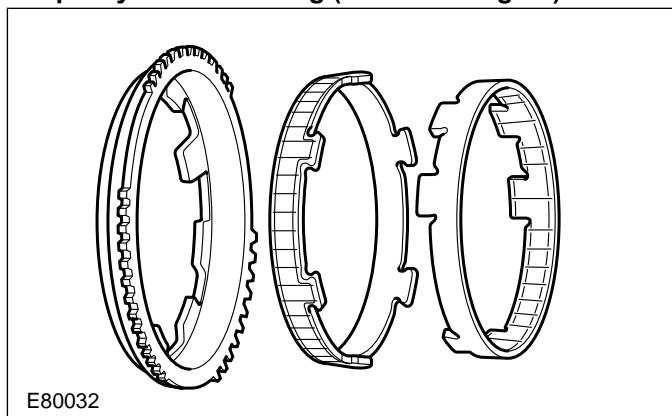
E80034

Double synchronizer ring (3rd gear)



E80033

Triple synchronizer ring (1st and 2nd gear)



E80032

Triple synchronization is provided for the 1st and 2nd gears.

This synchronization, which is subject to a greater load because of the tractive power, achieves a higher service life and a reduction in the shift force required.

Synchronization is intended to bring the synchronizer hubs with synchronizer clutch and the gear wheel to the same rotational speed. Only then is positive engagement possible.

To achieve this, sloped faces have been provided on all the illustrated components. Until synchronism is achieved, the synchronizer clutch is blocked from engaging with the external splines by a further ring gear on the outer synchronizer ring.

The basis for triple synchronization is a gear wheel with external splines. Its diameter is much larger than that of the friction cone. This creates space for the first synchronizer ring with two friction surfaces and the synchronizer cone also with two friction surfaces. The outer synchronizer cone is virtually unchanged. It is fitted into the synchronizer hub with its recesses in such a way that it can only turn by half a tooth in both directions.

An important aspect for the action of the two friction surfaces is the torque proof connection between the gear wheel and the intermediate ring. At the same time, the two synchronizer rings are also connected together in a torque proof manner via pawls. The synchronizer therefore operates like a multiple wet clutch.

Power flow

When a gear is to be selected, the synchronizing sleeve in question located on the relevant shaft is moved by its selector fork along the synchronizing hub towards the trailing wheel of the desired gear. The synchronizing sleeve and synchronizing hub engage and lock the trailing wheel to the hub and the relevant countershaft.

The power flow is transferred from the clutch to the input shaft. The power flow travels from the input shaft to a countershaft via a pair of drives consisting of a gear and a trailing wheel. The trailing wheel is locked to the hub by means of the synchronizing unit, which allows the power flow to be transferred. The power flow is transferred from the countershaft via the final drive pinion to the final drive (ring gear) mounted on the differential.

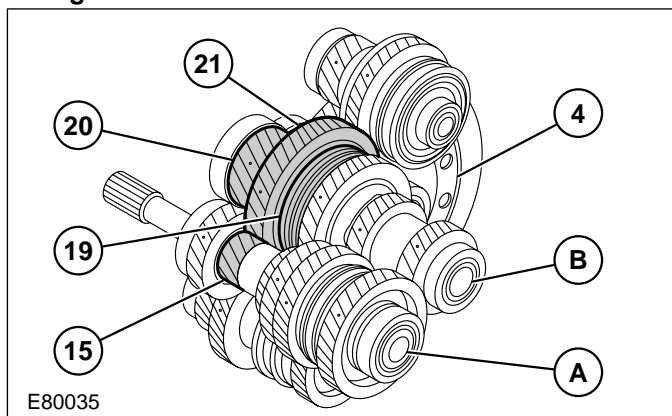
**Manual Transmission/Transaxle — Vehicles
With: 6-Speed Manual Transmission (M66)**

308-03-6

308-03-6

DESCRIPTION AND OPERATION

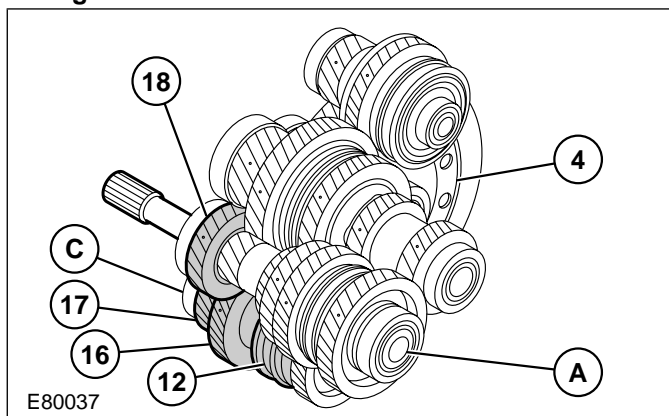
1st gear



E80035

Item	Description
A	Input shaft
B	1st/2nd/5th/6th gear output shaft
4	Ring gear
15	Toothed wheel - 1st gear
19	Synchronizer hub - 1st/2nd gear
20	Output pinion - 1st/2nd/5th/6th gear output shaft
21	Gear wheel - 1st gear

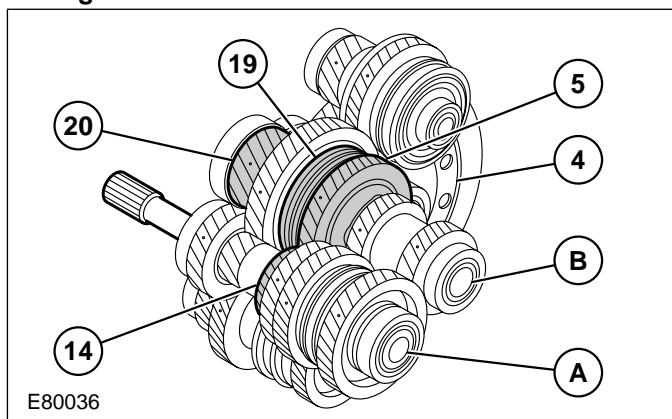
3rd gear



E80037

Item	Description
A	Input shaft
C	3rd/4th gear output shaft
4	Ring gear
12	Synchronizer hub - 3rd/4th gear
16	Gear wheel - 3rd gear
17	Output pinion - 3rd/4th gear output shaft
18	Toothed wheel - 3rd gear

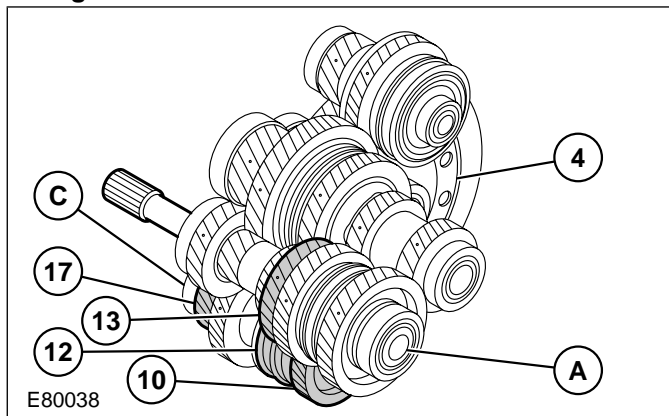
2nd gear



E80036

Item	Description
A	Input shaft
B	1st/2nd/5th/6th gear output shaft
4	Ring gear
5	Gear wheel - 2nd gear
14	Toothed wheel - 2nd gear
19	Synchronizer hub - 1st/2nd gear
20	Output pinion - 1st/2nd/5th/6th gear output shaft

4th gear



E80038

Item	Description
A	Input shaft
C	3rd/4th gear output shaft
4	Ring gear
10	Gear wheel - 4th gear
12	Synchronizer hub - 3rd/4th gear
13	Toothed wheel - 4th gear
17	Output pinion - 3rd/4th gear output shaft

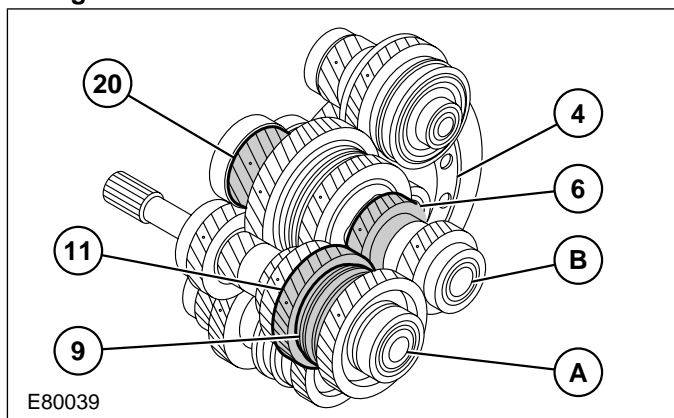
**Manual Transmission/Transaxle — Vehicles
With: 6-Speed Manual Transmission (M66)**

308-03-7

308-03-7

DESCRIPTION AND OPERATION

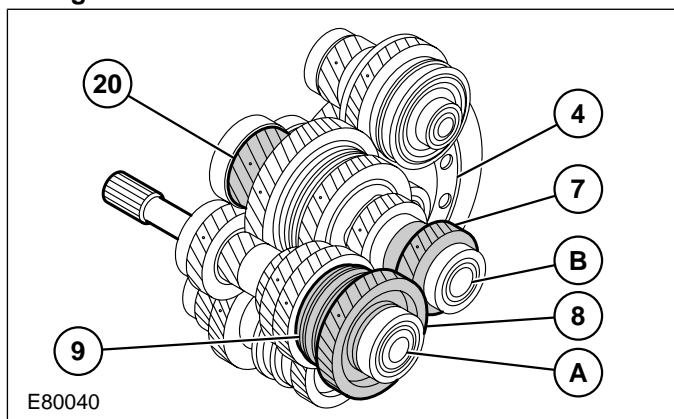
5th gear



E80039

Item	Description
A	Input shaft
B	1st/2nd/5th/6th gear output shaft
4	Ring gear
6	Toothed wheel - 5th gear
9	Synchronizer hub - 5th/6th gear
11	Gear wheel - 5th gear
20	Output pinion - 1st/2nd/5th/6th gear output shaft

6th gear

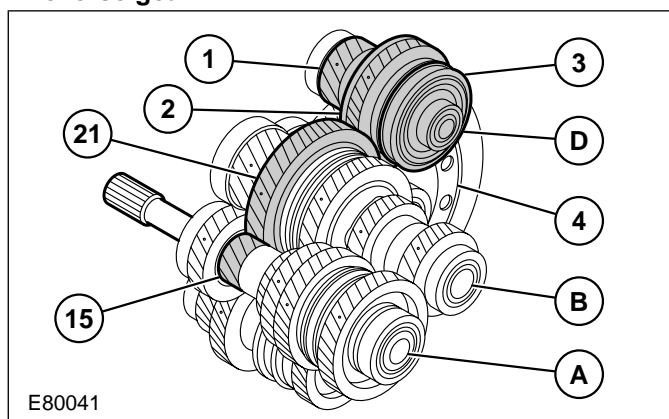


E80040

Item	Description
A	Input shaft
B	1st/2nd/5th/6th gear output shaft

Item	Description
4	Ring gear
7	Toothed wheel - 6th gear
8	Gear wheel - 6th gear
9	Synchronizer hub - 5th/6th gear
20	Output pinion - 1st/2nd/5th/6th gear output shaft

Reverse gear

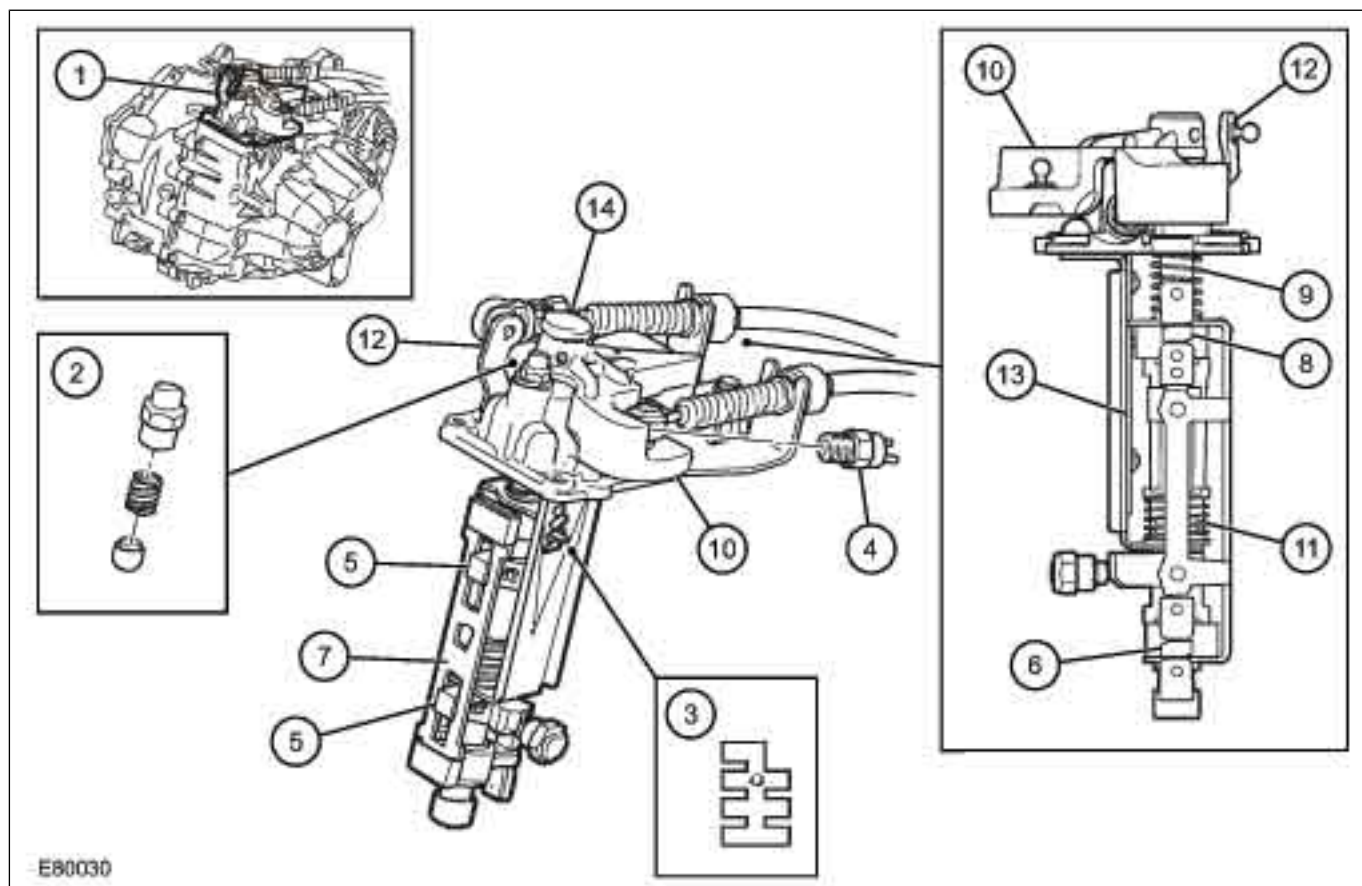


E80041

Item	Description
A	Input shaft
B	1st/2nd/5th/6th gear output shaft
D	Reverse gear output shaft
1	Output pinion - reverse gear output shaft
2	Gear wheel - reverse gear
3	Synchronizer hub - reverse gear
4	Ring gear
15	Toothed wheel - 1st gear
21	Gear wheel - 1st gear

DESCRIPTION AND OPERATION

Internal control



Item	Description
1	Shift unit
2	5th/6th gear governor
3	Carrier plate with gearshift gate
4	Switch for reverse gear signal
5	Shift guide
6	Lower shift finger
7	Guide plate
8	Upper shift finger
9	Spring
10	Shift arm with damping weight
11	Spring
12	Selector lever
13	Carrier plate with gearshift gate
14	Vent cap

Two alignment pins inserted loose in the transaxle housing facilitate installation of the shift unit and hold it in position.

⚠ CAUTION: Caution: When disassembling, the inserted alignment pins may fall out of the transaxle housing and into the transaxle when removing the shift unit.

A silicon-like sealing compound is used for the seals.

For the exact procedure, please refer to the current workshop literature.

The gearshift mechanism is secured to the transaxle housing by four bolts and may only be replaced as a complete unit in the event of a fault.

**Manual Transmission/Transaxle — Vehicles
With: 6-Speed Manual Transmission (M66)**

308-03-9

308-03-9

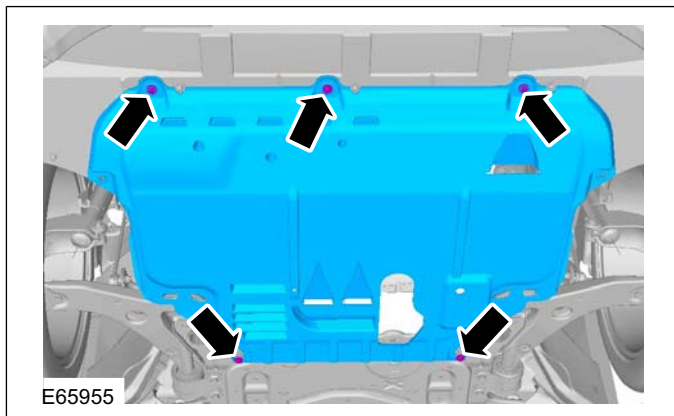
GENERAL PROCEDURES

Transmission Draining and Filling

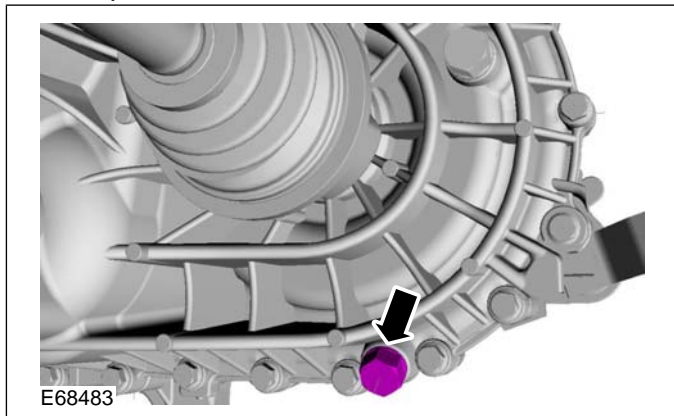
Materials	
Name	Specification
Transmission Oil	WSS-M2C200-C3

1. Refer to: **Health and Safety Precautions** (100-00 General Information, Description and Operation).

2.



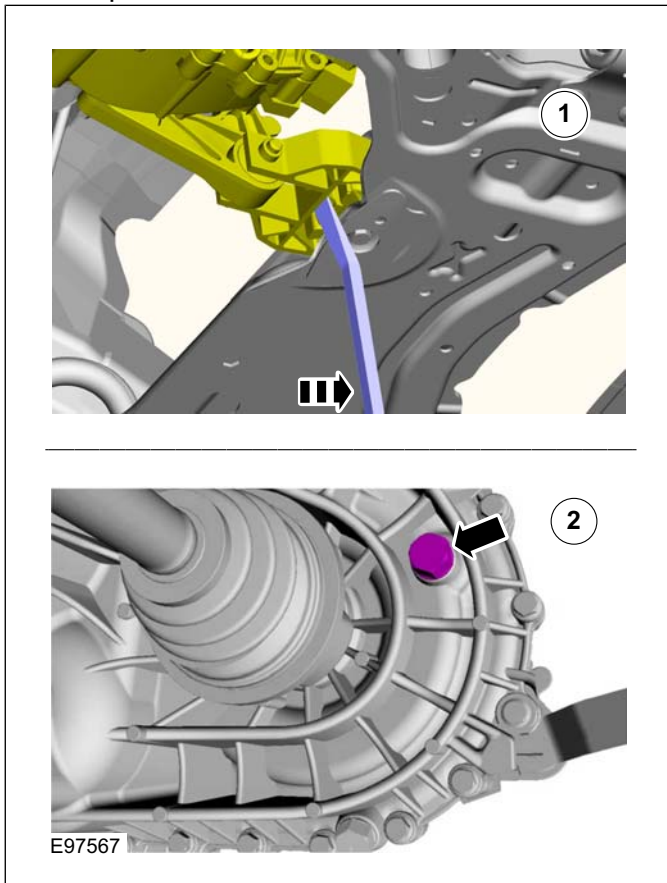
3. Torque: 35 Nm



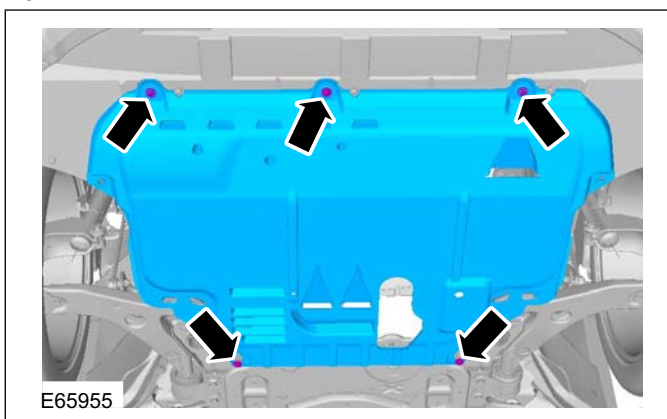
4. Fill up with manual transmission fluid to below the bottom edge of the filler hole.

Material: Transmission Oil

Torque: 35 Nm



5.



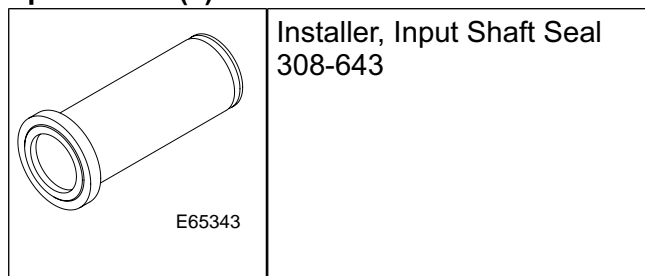
REMOVAL AND INSTALLATION

Input Shaft Seal

Special Tool(s)



Special Tool(s)



Removal

1. Remove the transmission.

Refer to: [Transaxle - 2.5L Duratec-ST \(VI5\)](#) (308-03 Manual Transmission/Transaxle - Vehicles With: 6-Speed Manual Transmission (M66), Removal).

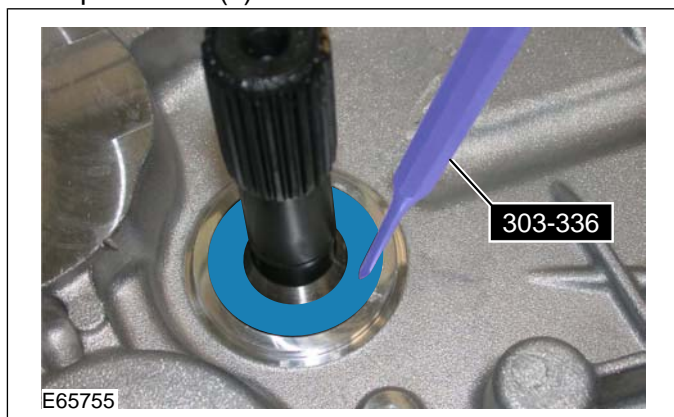
2. Remove the clutch slave cylinder.

Refer to: [Clutch Slave Cylinder](#) (308-02 Clutch Controls - Vehicles With: 6-Speed Manual Transmission (M66), Removal and Installation).

3. **⚠ CAUTION: Take special care to avoid damaging the bearing.**

Special Tool(s): 303-336

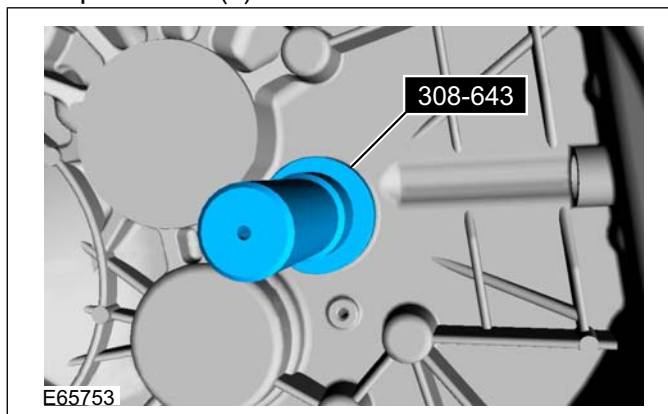
4. Screw a 2.5 x 15 mm self-tapping screw a maximum of two turns into the input shaft seal and pull out the input shaft seal using a pair of pliers.



Installation

1. **⚠ CAUTION: Use adhesive tape to cover the input shaft splines to prevent damage to the input shaft seal.**

Special Tool(s): 308-643



**Manual Transmission/Transaxle — Vehicles
With: 6-Speed Manual Transmission (M66)****308-03-11****308-03-11****REMOVAL AND INSTALLATION**

2. Remove the adhesive tape from the input shaft splines and install the clutch slave cylinder.

Refer to: **Clutch Slave Cylinder** (308-02 Clutch Controls - Vehicles With: 6-Speed Manual Transmission (M66), Removal and Installation).

3. Install the transmission.

Refer to: **Transaxle - 2.5L Duratec-ST (VI5)** (308-03 Manual Transmission/Transaxle - Vehicles With: 6-Speed Manual Transmission (M66), Installation).

4. Bleed the clutch system.

Refer to: **Clutch System Bleeding** (308-00, General Procedures).

Manual Transmission/Transaxle — Vehicles With: 6-Speed Manual Transmission (M66)

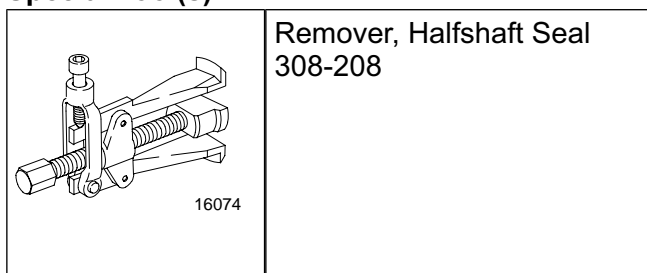
308-03-12

308-03-12

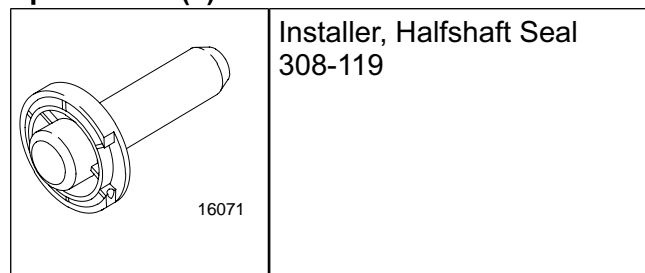
REMOVAL AND INSTALLATION

Halfshaft Seal LH

Special Tool(s)

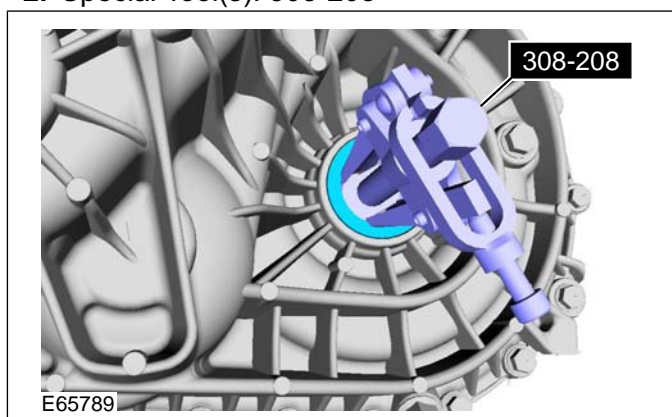


Special Tool(s)



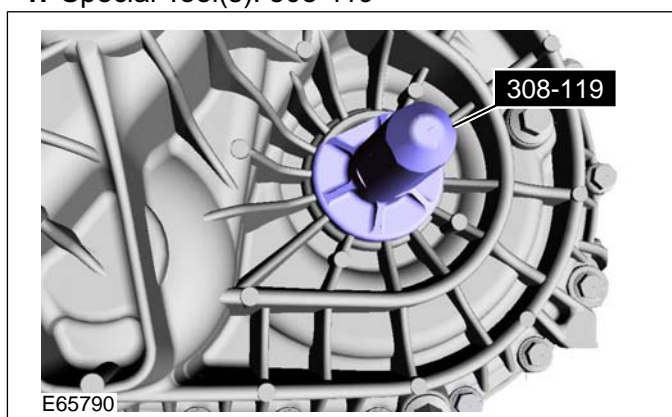
Removal

1. Remove the left-hand front axle driveshaft.
Refer to: **Front Halfshaft LH** (205-04 Front Drive Halfshafts, Removal and Installation).
2. Special Tool(s): 308-208



Installation

1. Special Tool(s): 308-119

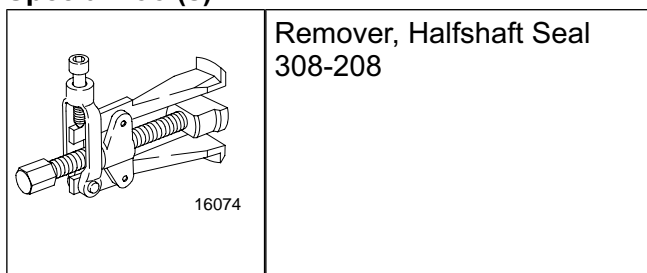


2. Install the left-hand front axle driveshaft.
Refer to: **Front Halfshaft LH** (205-04 Front Drive Halfshafts, Removal and Installation).

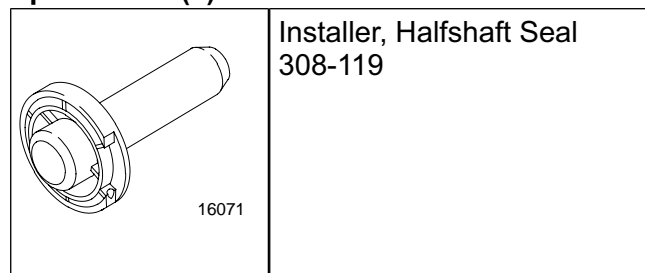
REMOVAL AND INSTALLATION

Halfshaft Seal RH

Special Tool(s)

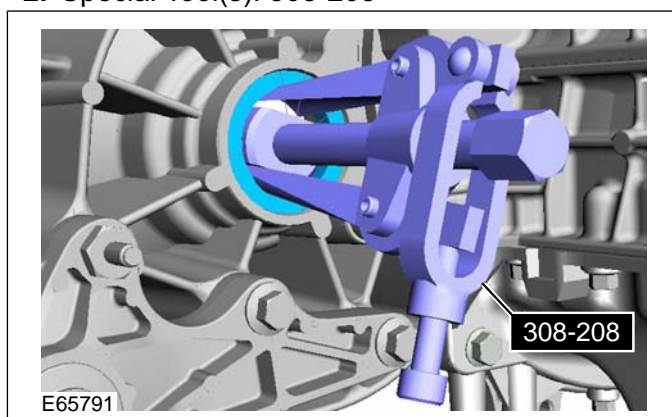


Special Tool(s)



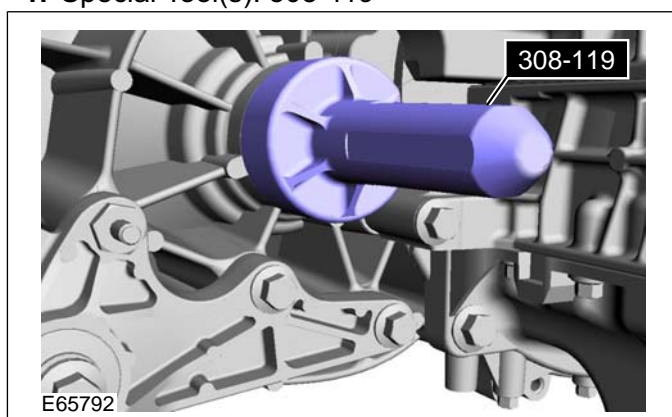
Removal

1. Remove the right-hand front axle driveshaft.
Refer to: **Front Halfshaft RH** (205-04 Front Drive Halfshafts, Removal and Installation).
2. Special Tool(s): 308-208



Installation

1. Special Tool(s): 308-119



2. Install the right-hand front axle driveshaft.
Refer to: **Front Halfshaft RH** (205-04 Front Drive Halfshafts, Removal and Installation).

**Manual Transmission/Transaxle — Vehicles
With: 6-Speed Manual Transmission (M66)**

308-03-14

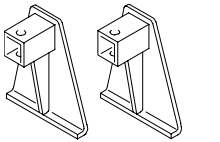
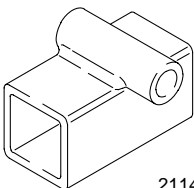
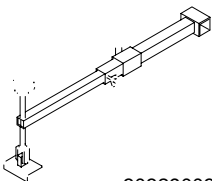
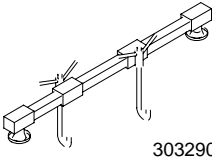
308-03-14

REMOVAL

Transaxle — 2.5L Duratec-ST (VI5)

Removal

Special Tool(s)

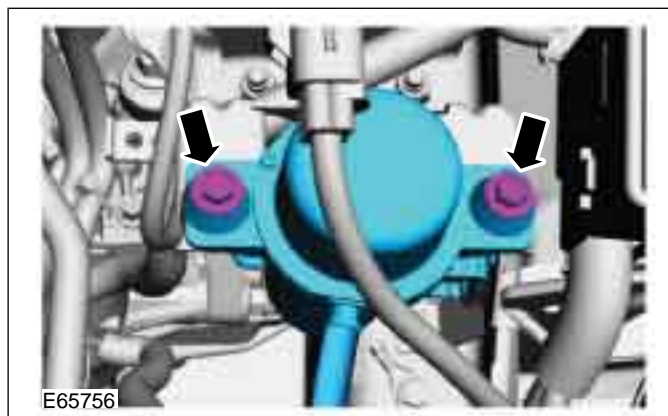
 <p>2114001</p>	<p>Adapter for 303-290A 303-290-01</p>
 <p>2114002</p>	<p>Adapter for 303-290A 303-290-02</p>
 <p>30329003A</p>	<p>Adapter for 303-290A 303-290-03A</p>
 <p>303290A</p>	<p>Support Bar, Engine 303-290A</p>

General Equipment

Transmission jack

1. Refer to: **Health and Safety Precautions** (100-00 General Information, Description and Operation).
2. Remove the air cleaner.
 - Refer to: **Air Cleaner - Vehicles With: PCM Security Shield** (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).
 - Refer to: **Air Cleaner - Vehicles Without: PCM Security Shield** (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).

3.



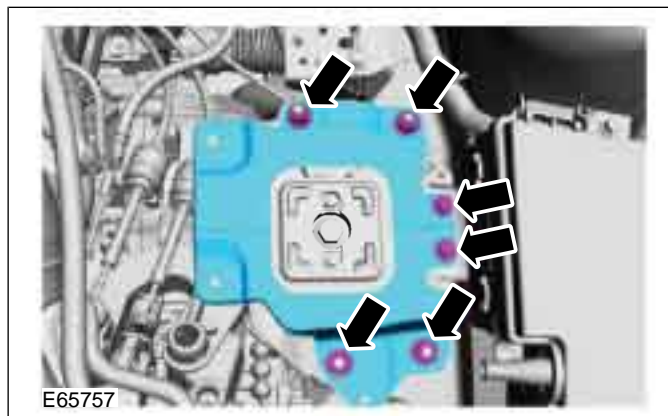
4. Remove the air cowl grille.

Refer to: **Cowl Panel Grille** (501-02 Front End Body Panels, Removal and Installation).

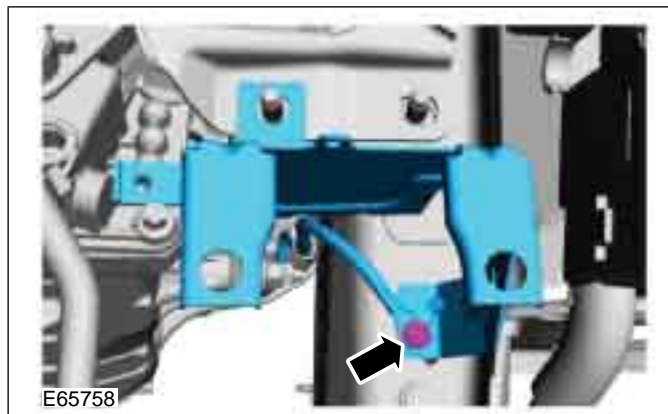
5. Remove the battery carrier.

Refer to: **Battery Tray - 2.5L Duratec-ST (VI5)** (414-01 Battery, Mounting and Cables, Removal and Installation).

6.



7.



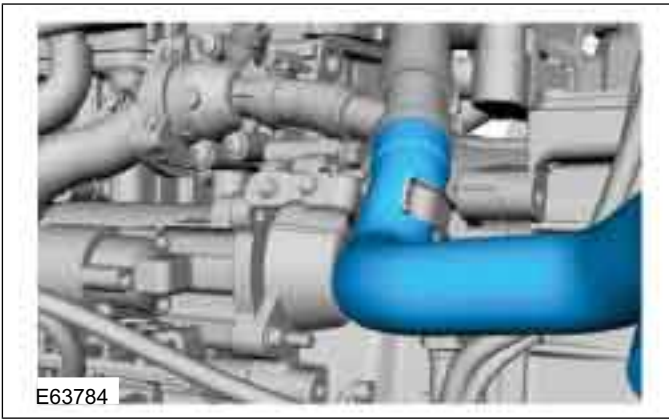
Manual Transmission/Transaxle — Vehicles With: 6-Speed Manual Transmission (M66)

308-03-15

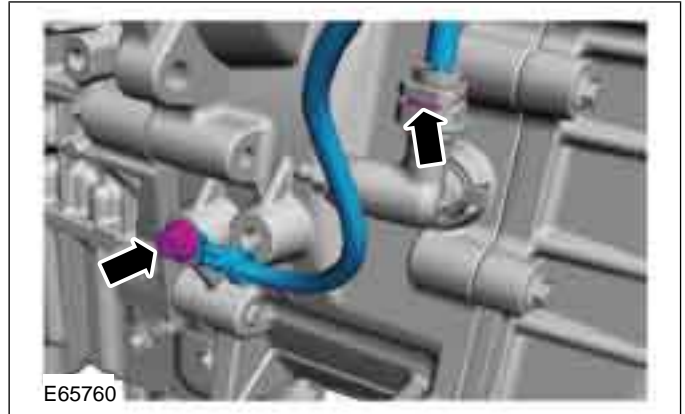
308-03-15

REMOVAL

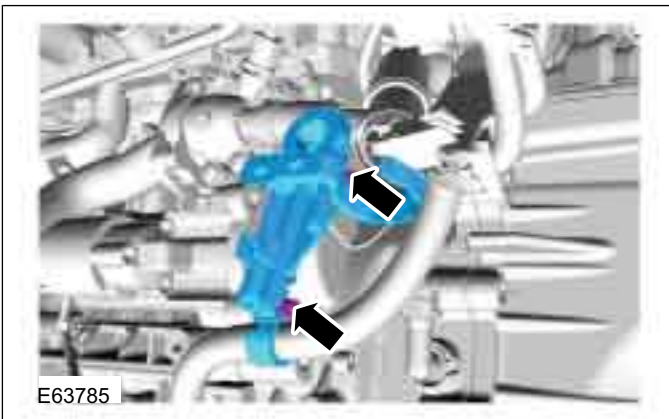
8.



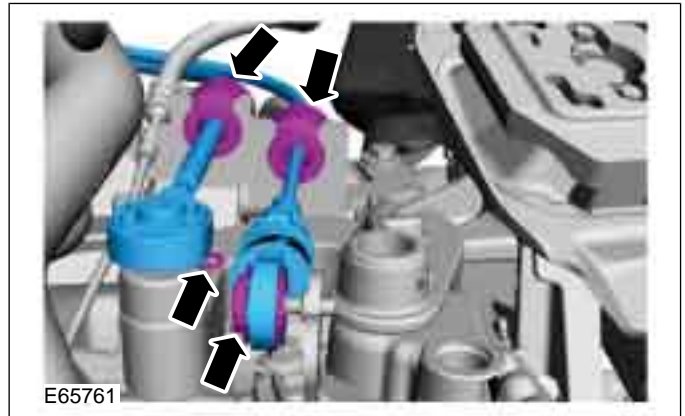
11. **⚠ CAUTION:** Make sure that all openings are sealed.



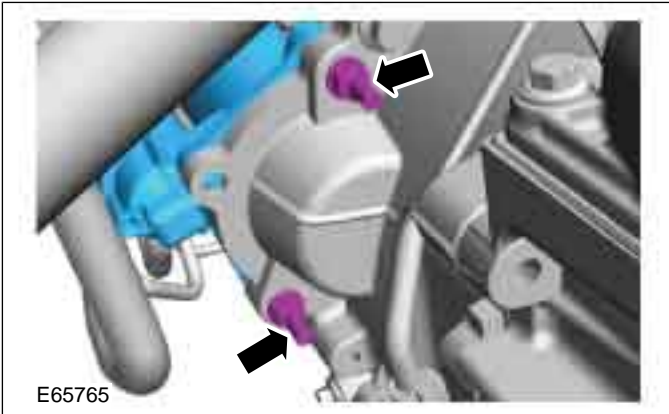
9.



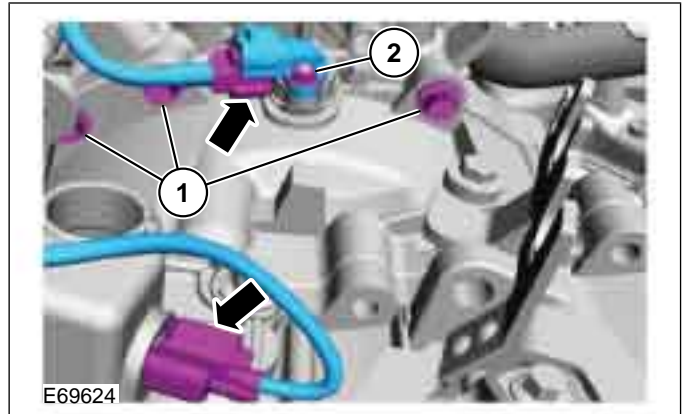
12



10. Detach the starter motor from the transmission and secure it to one side.



13.



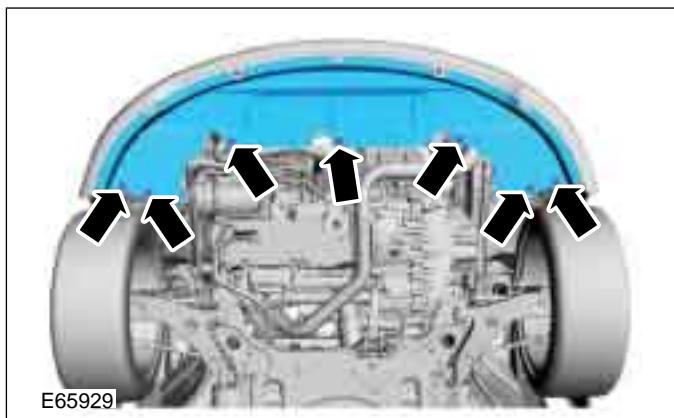
**Manual Transmission/Transaxle — Vehicles
With: 6-Speed Manual Transmission (M66)**

308-03-16

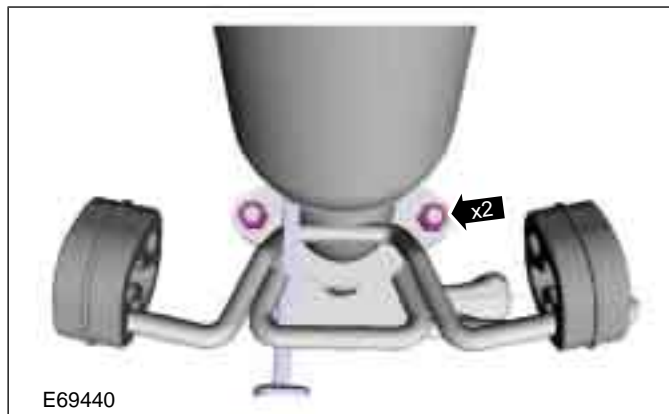
308-03-16

REMOVAL

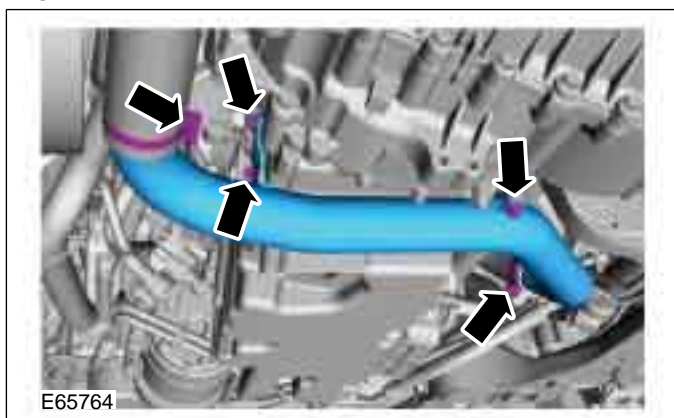
14.



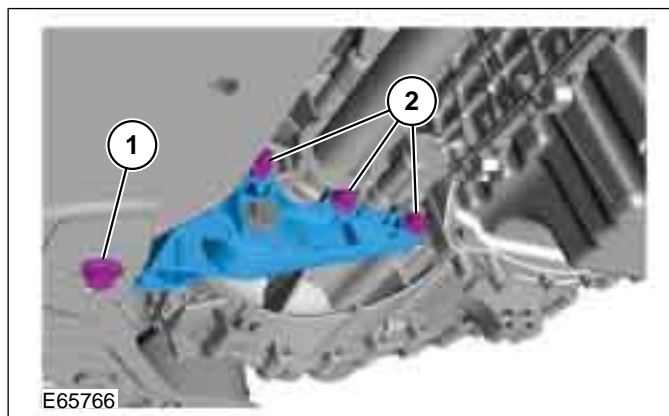
17. **NOTE:** The flexible exhaust pipe must not be twisted.



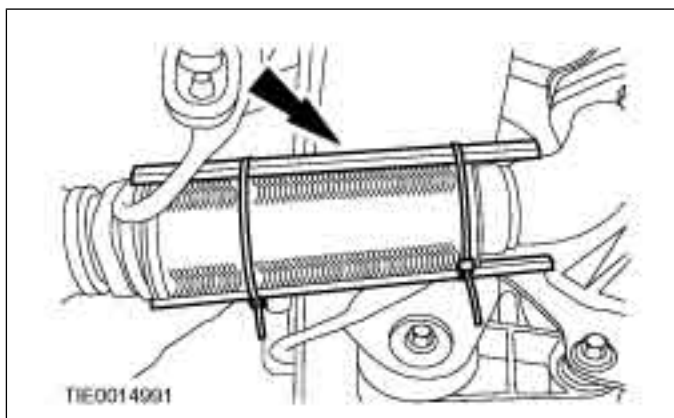
15.



18.



16.

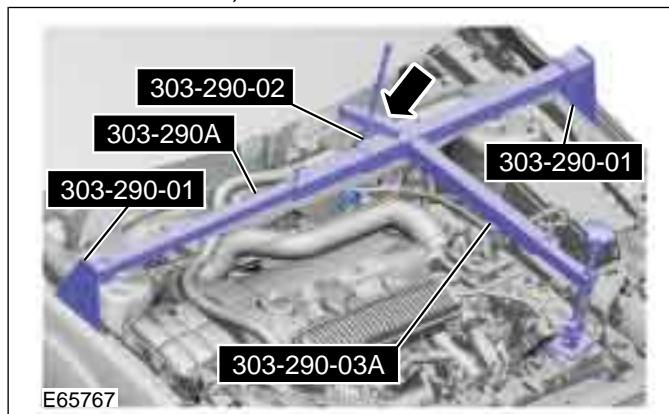


19. Remove the axle shafts.

Refer to: **Front Halfshaft RH - 3-Door** (205-04 Front Drive Halfshafts, Removal and Installation).

Refer to: **Front Halfshaft LH** (205-04 Front Drive Halfshafts, Removal and Installation).

20. Special Tool(s): 303-290-01, 303-290-02, 303-290-03A, 303-290A



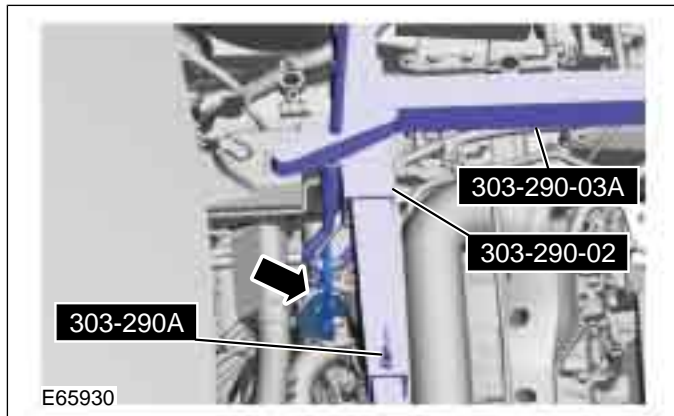
**Manual Transmission/Transaxle — Vehicles
With: 6-Speed Manual Transmission (M66)**

308-03-17

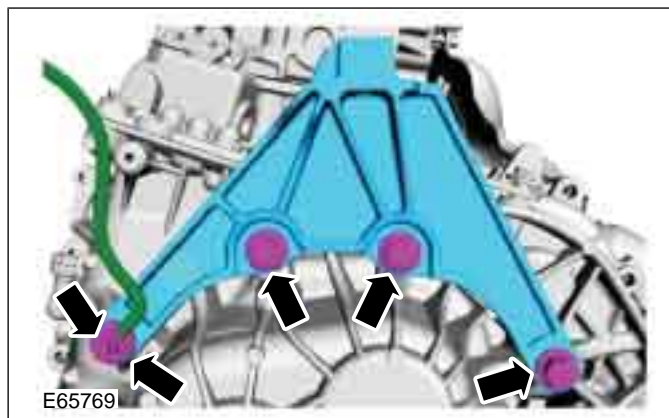
308-03-17

REMOVAL

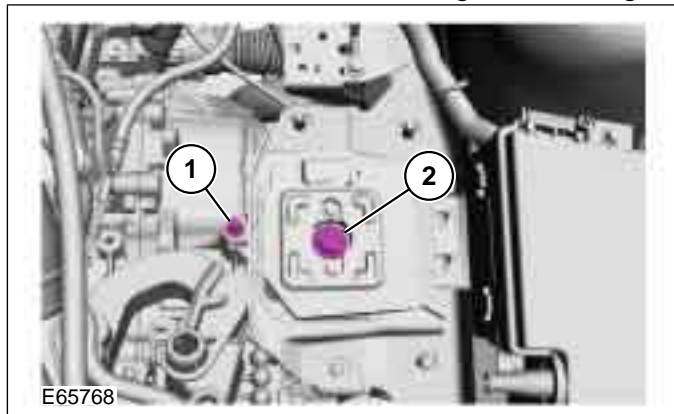
21. Special Tool(s): 303-290-02, 303-290-03A, 303-290A



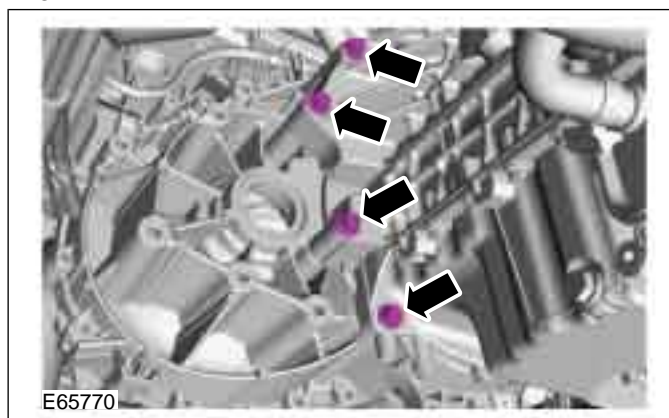
24.



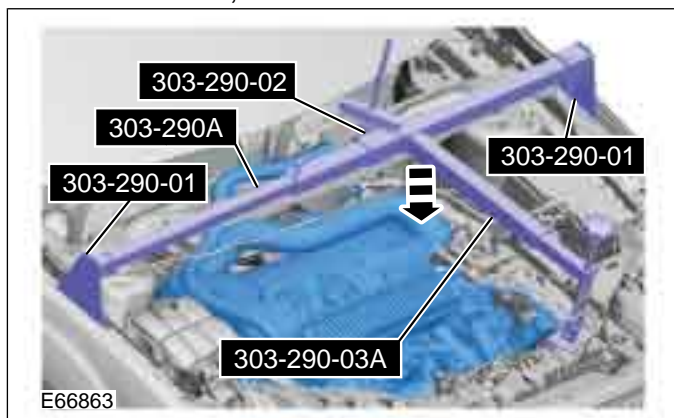
22. Discard the bolt on the rear engine mounting.



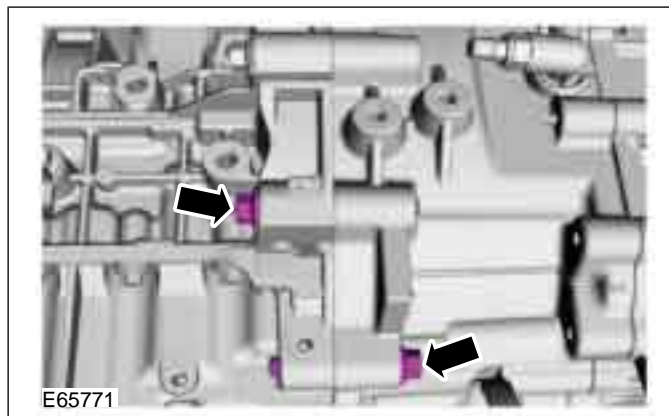
25.



23. Special Tool(s): 303-290-01, 303-290-02, 303-290-03A, 303-290A

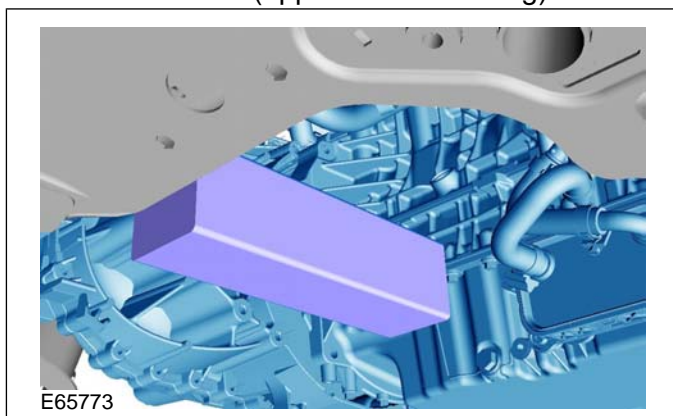


26.



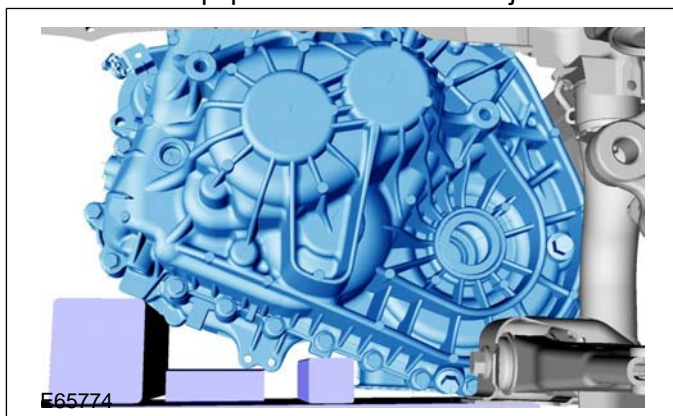
**Manual Transmission/Transaxle — Vehicles
With: 6-Speed Manual Transmission (M66)****308-03-18****308-03-18****REMOVAL**

27. Wooden block (approx. 300 mm long).

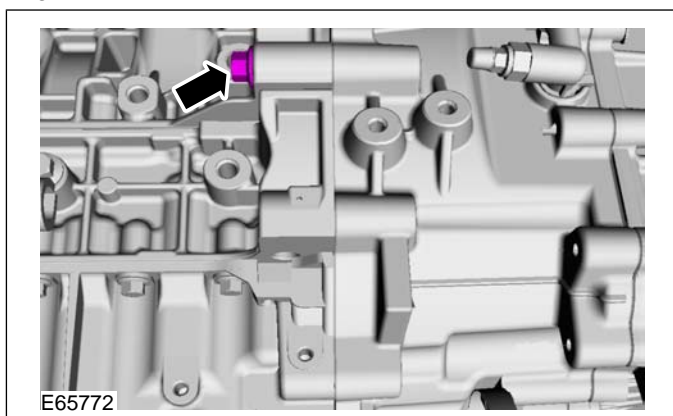


28. Support the transmission using wooden blocks.

General Equipment: Transmission jack



29.



30. Rotate the transmission approximately 30° counter-clockwise during removal.

General Equipment: Transmission jack

**Manual Transmission/Transaxle — Vehicles
With: 6-Speed Manual Transmission (M66)**

308-03-19

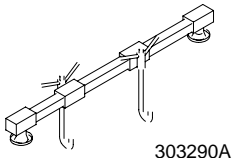
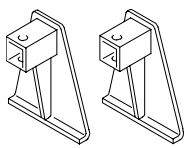
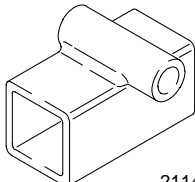
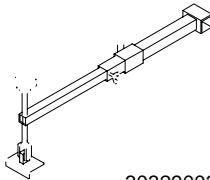
308-03-19

INSTALLATION

Transaxle — 2.5L Duratec-ST (VI5)

Installation

Special Tool(s)

 <p>303290A</p>	<p>Support Bar, Engine 303-290A</p>
 <p>2114001</p>	<p>Adapter for 303-290A 303-290-01</p>
 <p>2114002</p>	<p>Adapter for 303-290A 303-290-02</p>
 <p>30329003A</p>	<p>Adapter for 303-290A 303-290-03A</p>

Materials

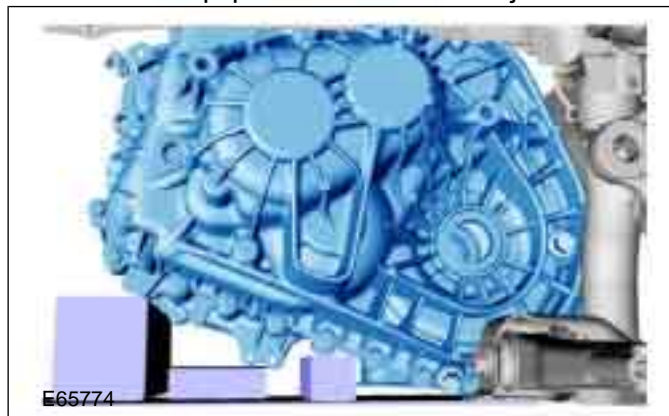
Name	Specification
High-Temperature Grease	ESD-M1C220-A
Grease	SA-M1C9107-A

General Equipment

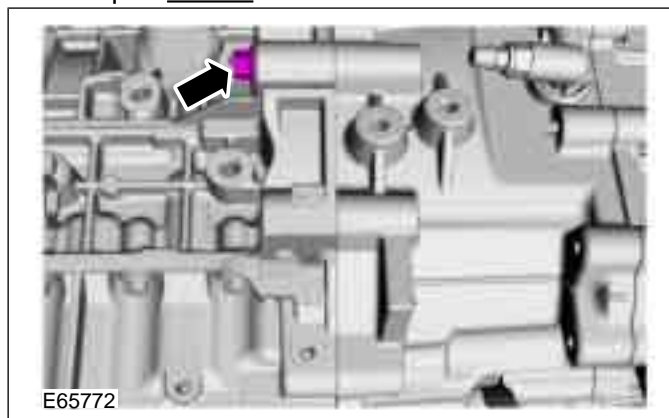
Transmission jack

⚠ CAUTION: Ensure that the two guide sleeves are installed.

1. Refer to: **Health and Safety Precautions (100-00 General Information, Description and Operation)**.
2. Coat the input shaft splines with a thin coating of grease.
Material: High-Temperature Grease
3. Rotate the transmission approximately 30° clockwise during installation.
General Equipment: Transmission jack



4. Torque: 48 Nm



5. Torque: 48 Nm



**Manual Transmission/Transaxle — Vehicles
With: 6-Speed Manual Transmission (M66)**

308-03-20

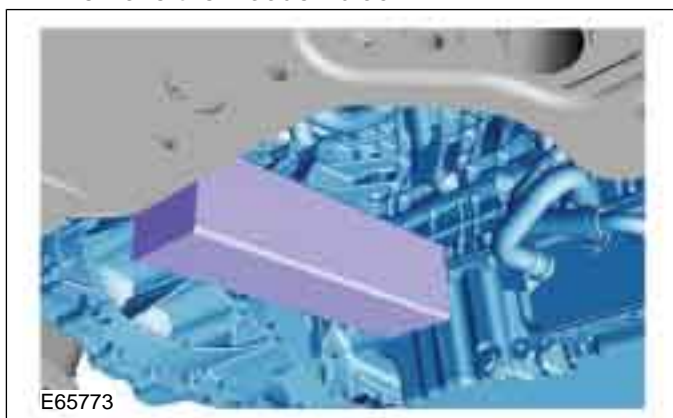
308-03-20

INSTALLATION

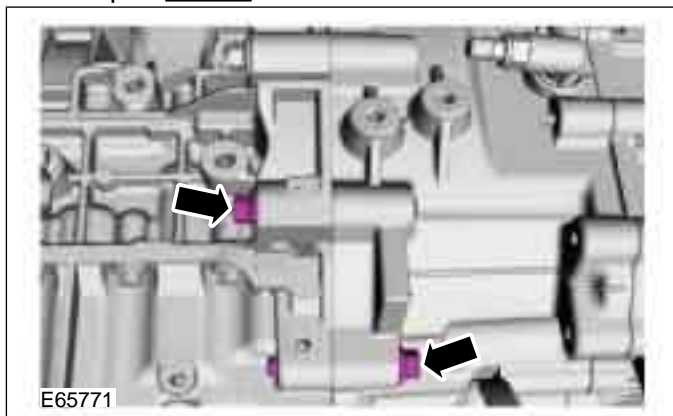
6. Remove the transmission jack.



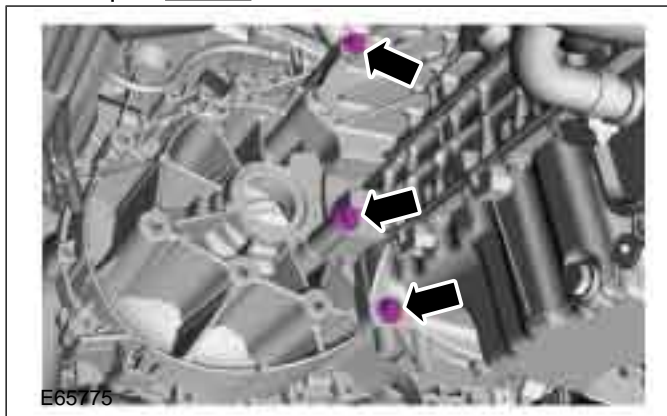
7. Remove the wooden block.



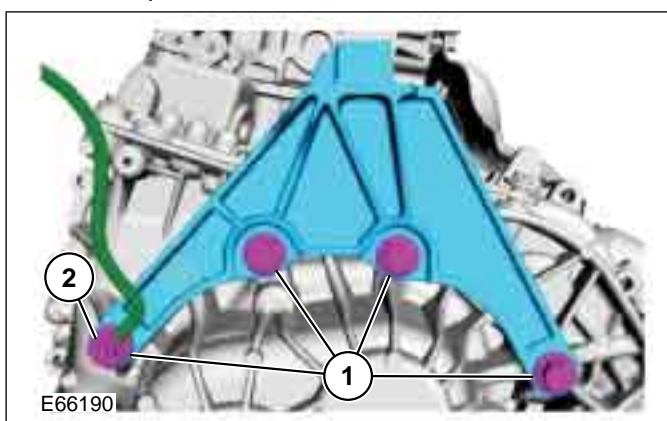
8. Torque: 48 Nm



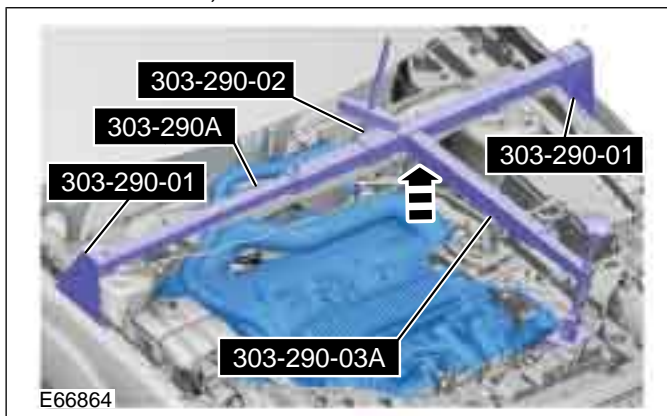
9. Torque: 48 Nm



10. 1. Torque:
 • Stage 1: 35 Nm
 • Stage 2: 60°
2. Torque: 25 Nm



11. Special Tool(s): 303-290A, 303-290-01, 303-290-02, 303-290-03A



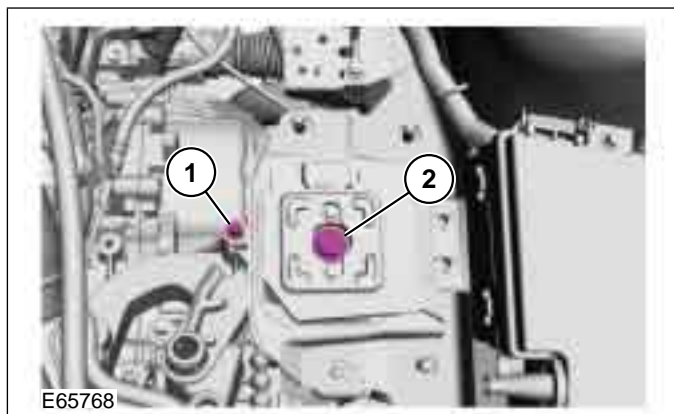
**Manual Transmission/Transaxle — Vehicles
With: 6-Speed Manual Transmission (M66)**

308-03-21

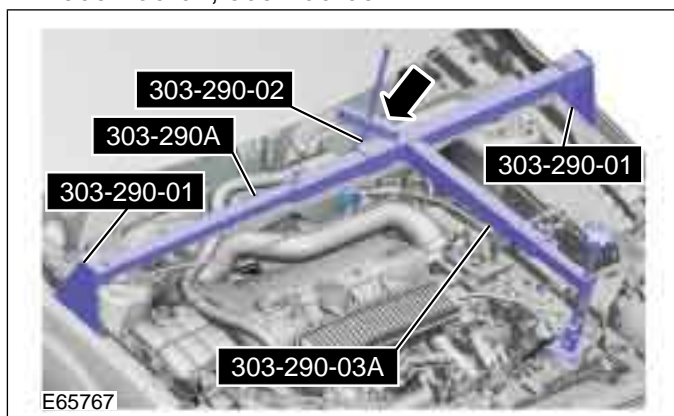
308-03-21

INSTALLATION

- 12 1. Torque: 24 Nm
2. Do not yet tighten the new bolt of the rear engine mounting.

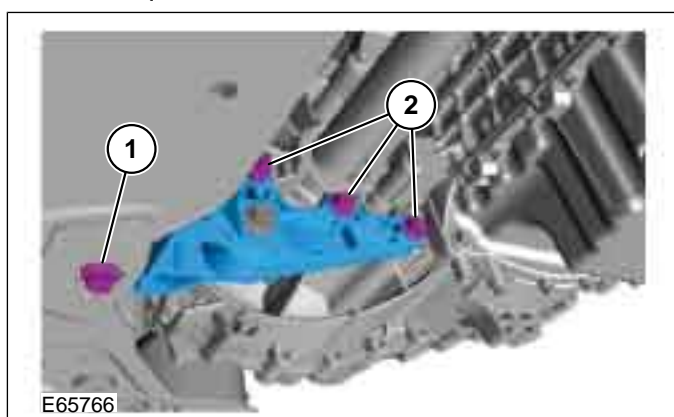


13. Remove the special tool.
- Special Tool(s): 303-290A, 303-290-01, 303-290-02, 303-290-03A



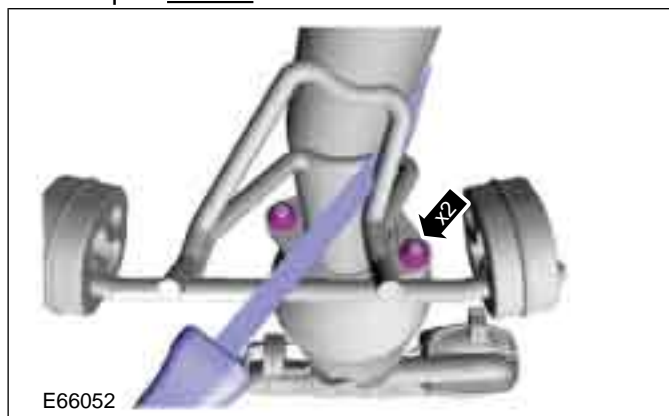
14. Install the drive halfshafts.
- Refer to: **Front Halfshaft RH - 3-Door** (205-04 Front Drive Halfshafts, Removal and Installation).
- Refer to: **Front Halfshaft LH** (205-04 Front Drive Halfshafts, Removal and Installation).

- 15 1. Torque: 80 Nm
2. Torque: 48 Nm

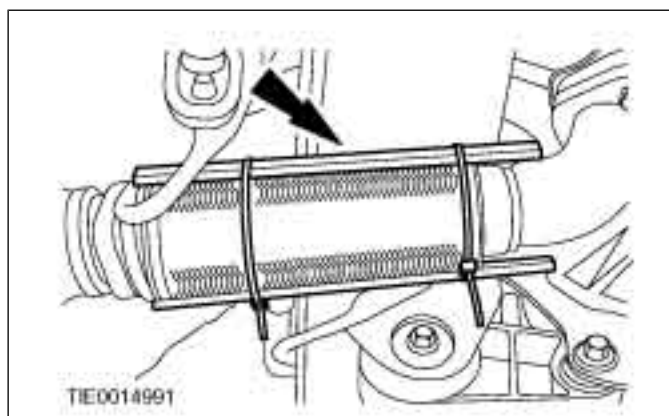


16. **NOTE:** The flexible exhaust pipe must not be twisted.

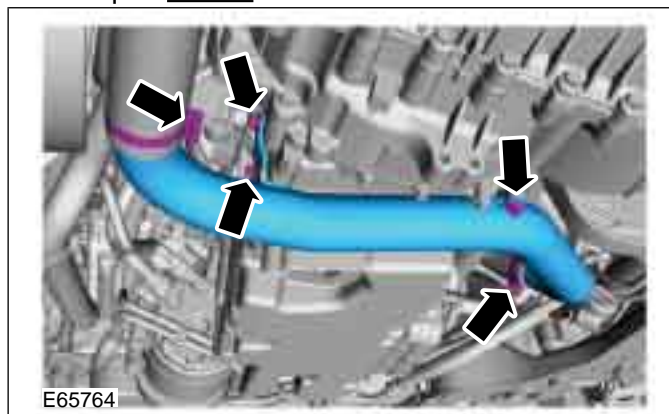
Material: Grease
Torque: 48 Nm



17.



18. Torque: 20 Nm



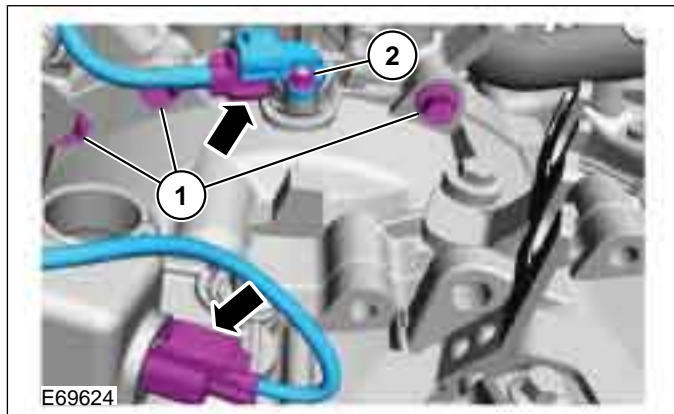
**Manual Transmission/Transaxle — Vehicles
With: 6-Speed Manual Transmission (M66)**

308-03-22

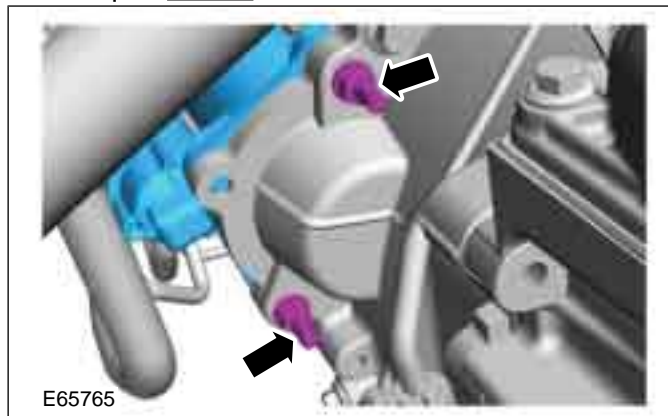
308-03-22

INSTALLATION

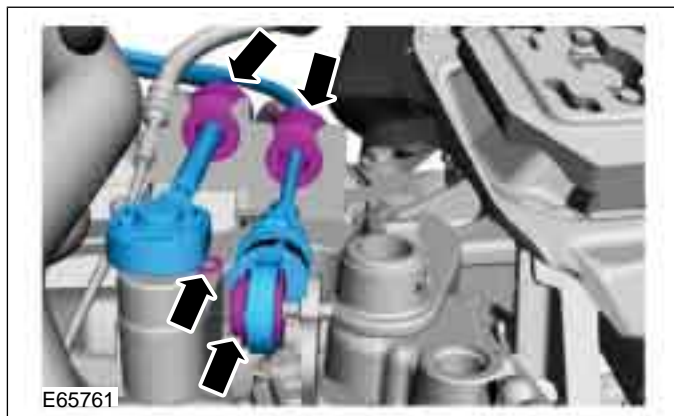
- 19. 1. Torque: 48 Nm
- 2. Torque: 9 Nm



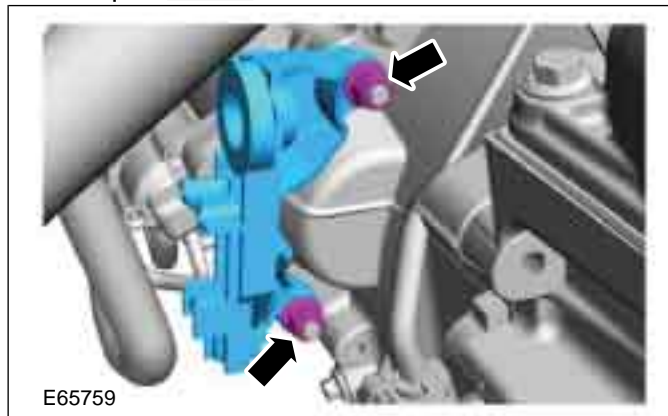
- 23. Torque: 25 Nm



- 20.



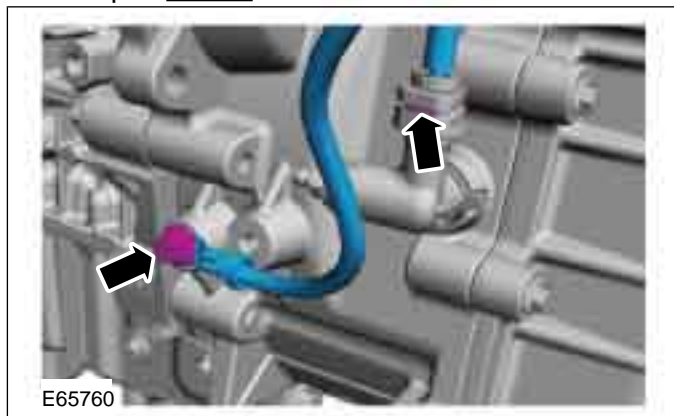
- 24. Torque: 10 Nm



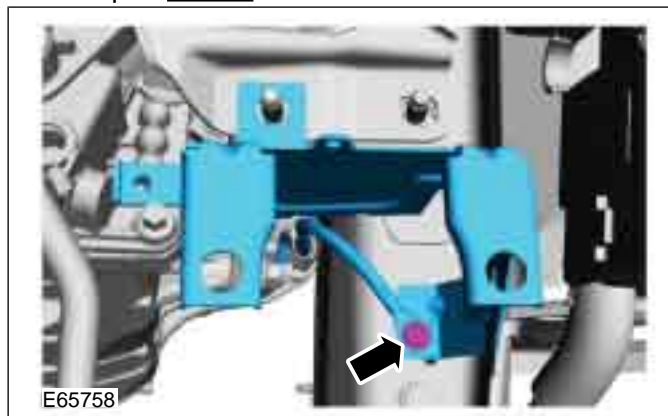
- 21. Adjust the selector cable.

Refer to: **Gearshift Cable Adjustment** - Vehicles With: 6-Speed Manual Transmission (M66) (308-00 Manual Transmission/Transaxle and Clutch - General Information, General Procedures).

- 22 Torque: 25 Nm



- 25. Torque: 25 Nm



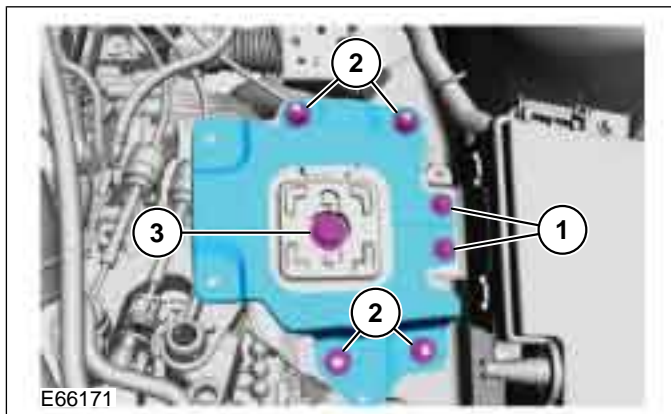
Manual Transmission/Transaxle — Vehicles With: 6-Speed Manual Transmission (M66)

308-03-23

308-03-23

INSTALLATION

26. 1. Torque: 25 Nm
2. Torque: 48 Nm
3. Torque: 148 Nm



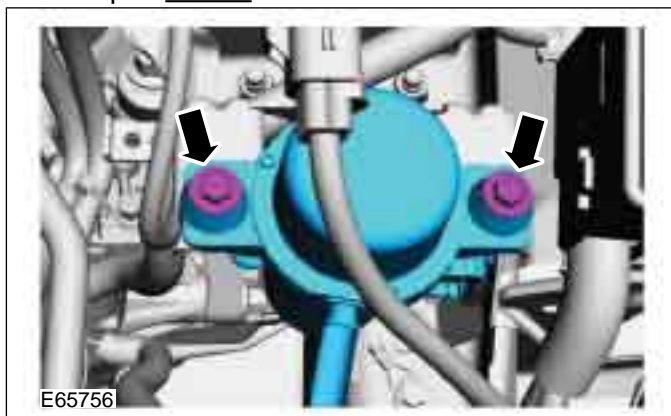
27. Install the battery tray.

Refer to: Battery Tray - 2.5L Duratec-ST (VI5) (414-01 Battery, Mounting and Cables, Removal and Installation).

28. Install the air cowl grille.

Refer to: Cowl Panel Grille (501-02 Front End Body Panels, Removal and Installation).

29. Torque: 25 Nm

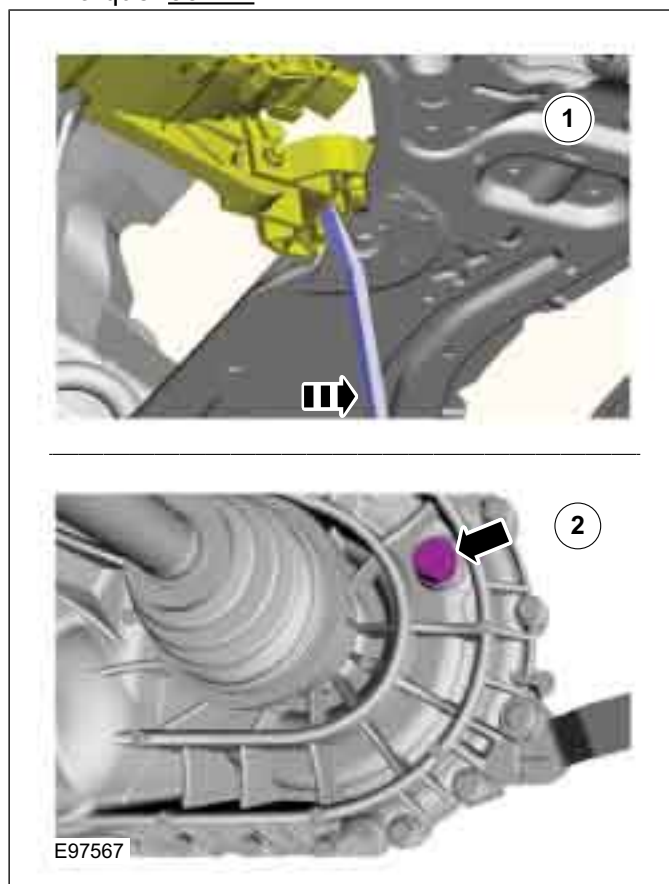


30. Install the intake air cleaner.

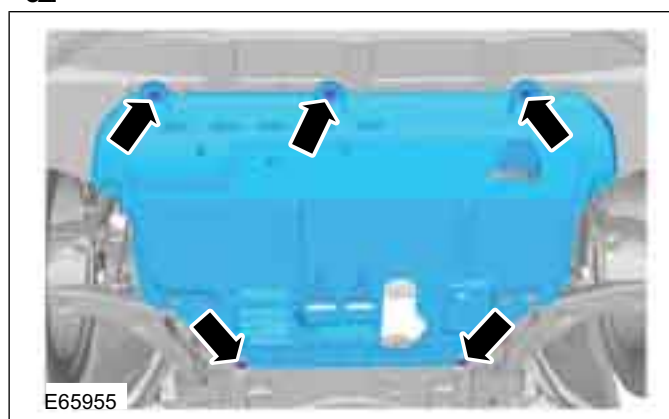
Refer to: Air Cleaner - Vehicles With: PCM Security Shield (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).

Refer to: Air Cleaner - Vehicles Without: PCM Security Shield (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).

31. With the vehicle on a level surface, fill the transmission with transmission fluid until the fluid level is just below the filler hole.
Torque: 35 Nm

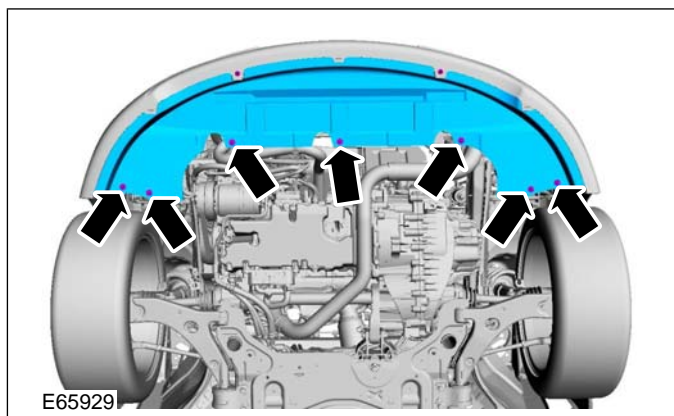


32



INSTALLATION

33.



34. Initialize the window regulator motors.

Refer to: Door Window Motor Initialization
(501-11 Glass, Frames and Mechanisms,
General Procedures).

SECTION 308-06 Manual Transmission/Transaxle External Controls — Vehicles With: 6-Speed Manual Transmission (M66)

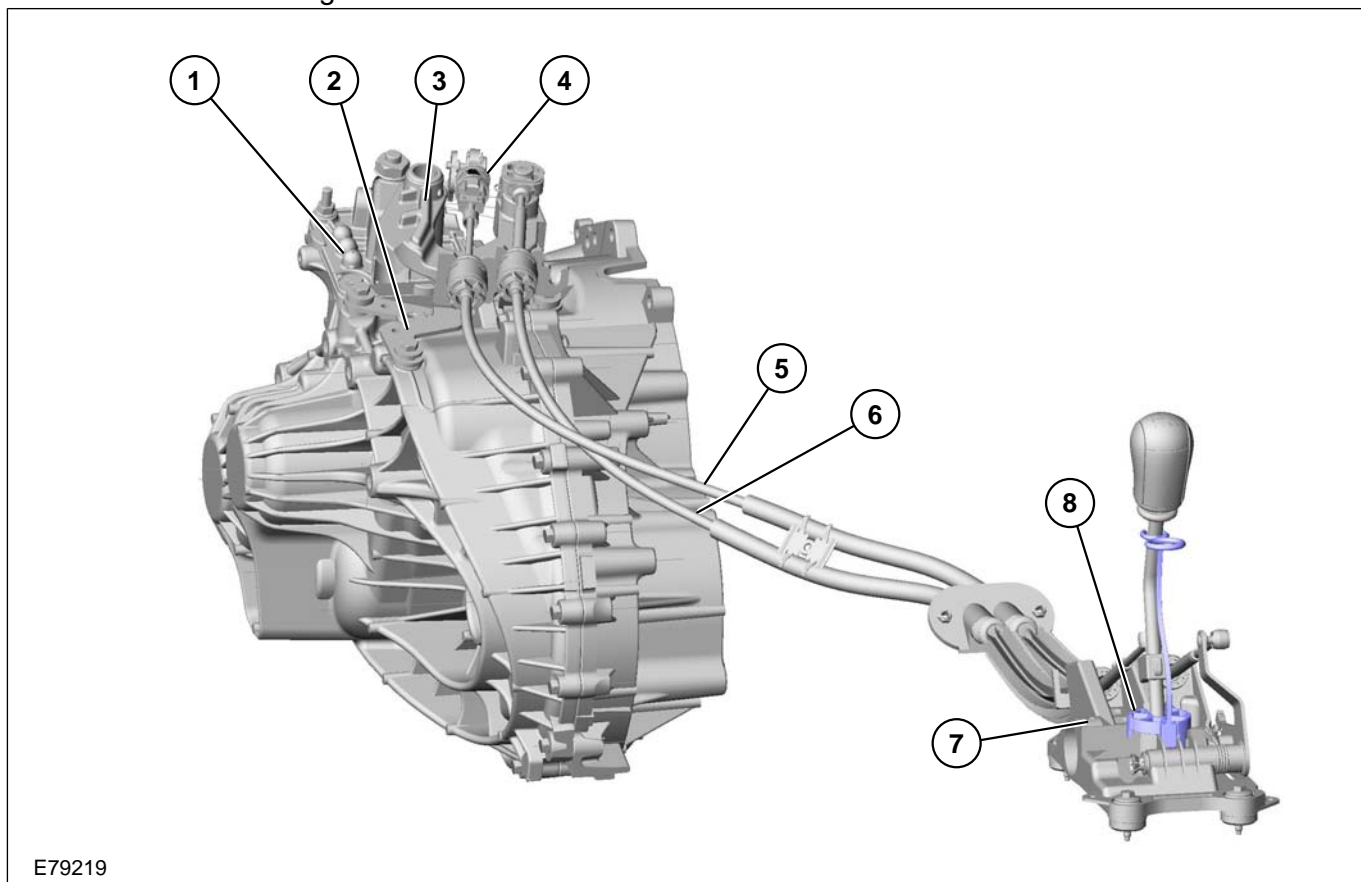
VEHICLE APPLICATION:2008.75 Focus ST C307

CONTENTS	PAGE
DESCRIPTION AND OPERATION	
External Controls.....	308-06-2
REMOVAL AND INSTALLATION	
Gearshift Lever.....	308-06-3
Gearshift Cables.....	308-06-4

DESCRIPTION AND OPERATION

External Controls

Gear selector unit and gearshift cables



E79219

Item	Description
1	Shift unit
2	Gearshift cable retaining brackets
3	Shift arm with damping weight
4	Selector cable adjusting mechanism
5	Selector cable
6	Gearshift
7	Shift lever
8	Adjustment tool, gearshift lever

The length of the selector cable can be adjusted.

The spring in the gearshift lever pulls the selector cable into the neutral position of the gate for 3rd/4th gear.

The gearshift lever is locked in this position using an adjustment tool.

The adjustment mechanism is located at the end nearest the transmission.

REMOVAL AND INSTALLATION

Gearshift Lever

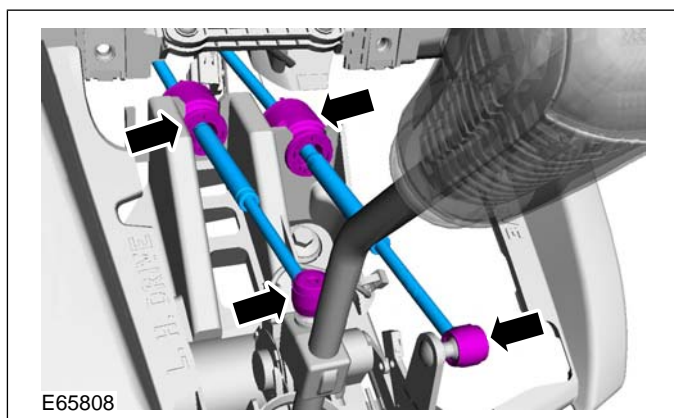
Removal

NOTE: Removal steps in this procedure may contain installation details.

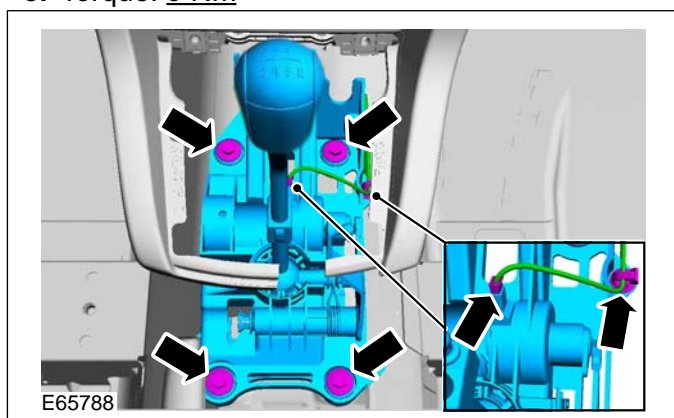
1. Remove the center console.

Refer to: Floor Console - 3-Door (501-12 Instrument Panel and Console, Removal and Installation).

- 2.



3. Torque: 9 Nm



Installation

1. To install, reverse the removal procedure.
2. Adjust the selector cable.

Refer to: Gearshift Cable Adjustment - Vehicles With: 6-Speed Manual Transmission (M66) (308-00 Manual Transmission/Transaxle and Clutch - General Information, General Procedures).

REMOVAL AND INSTALLATION

Gearshift Cables

Removal

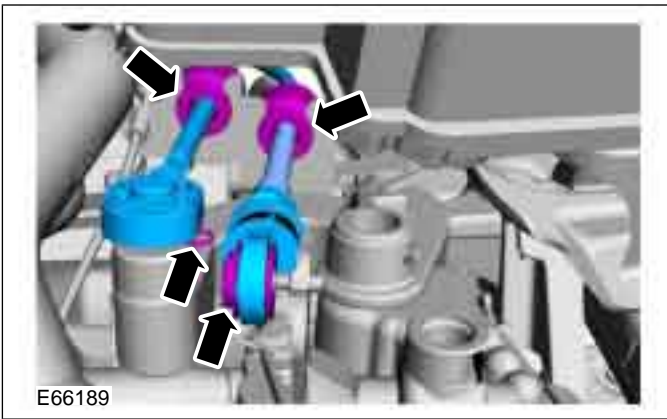
WARNING: Do not bend or kink the gearshift cables.

1. **NOTE:** Removal steps in this procedure may contain installation details.

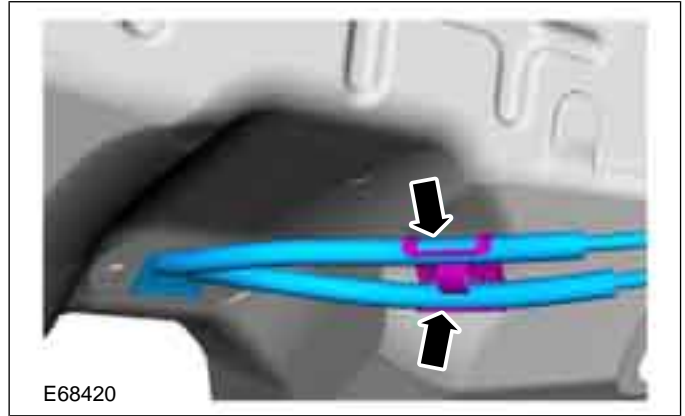
Remove the air cleaner.

Refer to: Air Cleaner - Vehicles With: PCM Security Shield (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).

2.



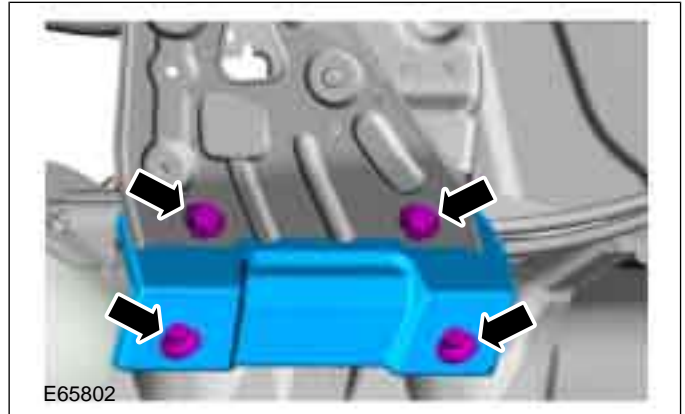
4.



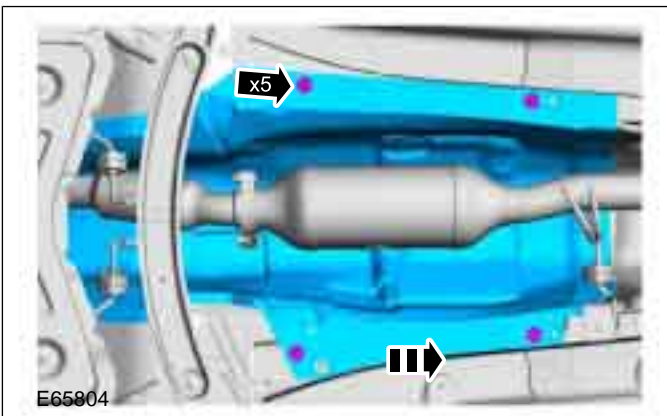
5. Remove the center console.

Refer to: Mittelkonsole (501-12, Removal and Installation).

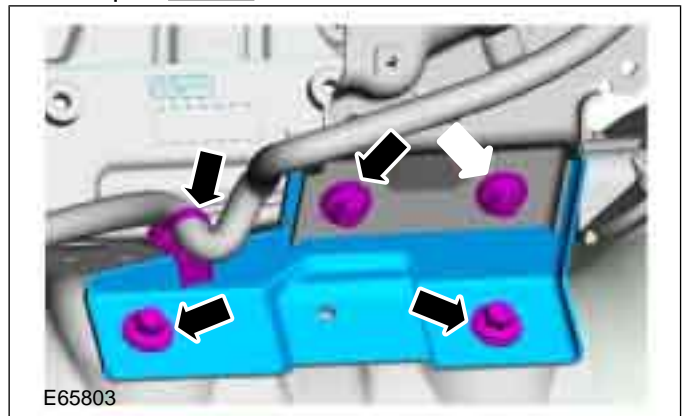
6. Torque: 25 Nm



3.

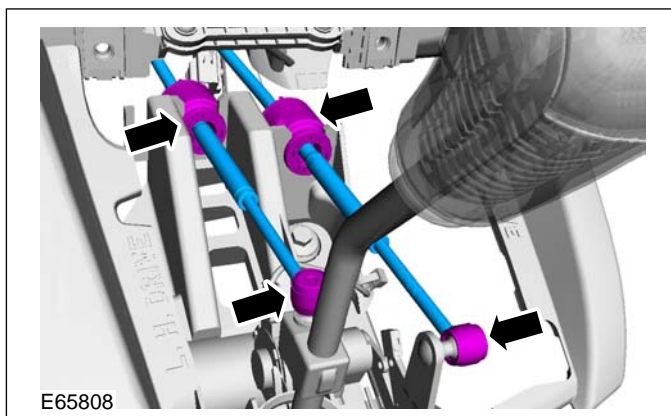
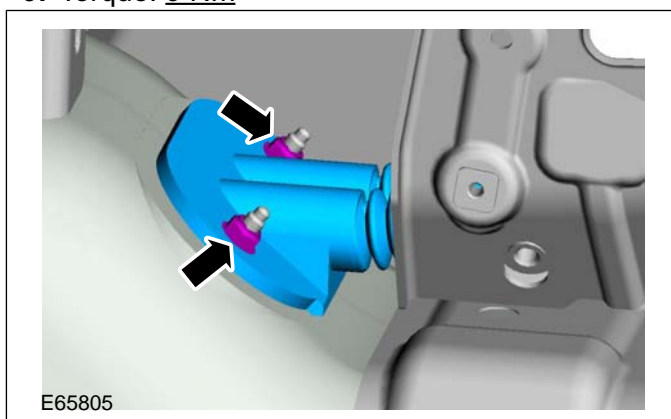


7. Torque: 25 Nm



REMOVAL AND INSTALLATION

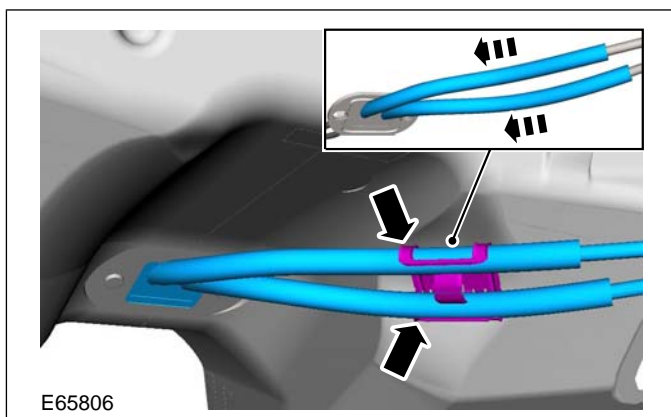
8.

9. Torque: 9 Nm

Installation

1. To install, reverse the removal procedure.

2.



3. Adjust the selector cable.

Refer to: Gearshift Cable Adjustment - Vehicles With: 6-Speed Manual Transmission (M66) (308-00 Manual Transmission/Transaxle and Clutch - General Information, General Procedures).



SECTION 309-00 Exhaust System — 2.5L Duratec-ST (VI5)

VEHICLE APPLICATION:2008.75 Focus ST C307

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SPECIFICATIONS	
Specifications.....	309-00-2
REMOVAL AND INSTALLATION	
Front Muffler.....	309-00-3
Rear Muffler.....	309-00-4
Catalytic Converter.....	309-00-5
Exhaust Flexible Pipe.....	309-00-7



SPECIFICATIONS**Lubricants, Fluids, Sealants and Adhesives**

	Specifica tions
Grease	SA-M1C9 107-A

Torque Specifications

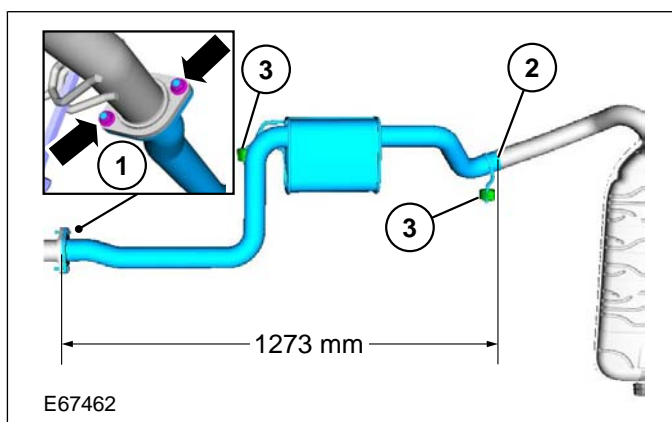
Item	Nm	lb-ft	lb-in
Exhaust manifold heat shield bolts	20	15	-
Exhaust flexible pipe to turbocharger bolts	48	35	-
Exhaust flexible pipe to catalytic converter nuts	48	35	-
Catalytic converter to front muffler nuts	48	35	-
Front muffler to rear muffler clamp nut	47	35	-
Heated oxygen sensor (HO2S)	47	35	-
Catalytic monitor sensor	47	35	-

REMOVAL AND INSTALLATION

Front Muffler

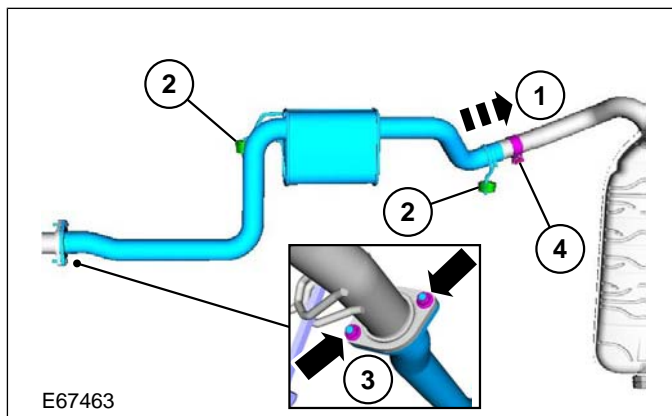
Removal

1. Raise and support the vehicle.
Refer to: Lifting (100-02 Jacking and Lifting, Description and Operation).
2. **⚠ CAUTION: Make sure that the exhaust flexible pipe is not twisted.**
2. Cut line.
3. Remove and discard the exhaust hanger insulators.



Installation

1. **⚠ CAUTION: Make sure that the exhaust flexible pipe is not twisted.**
1. Install new hanger insulators.
3. Torque: 47 Nm
4. Torque: 47 Nm

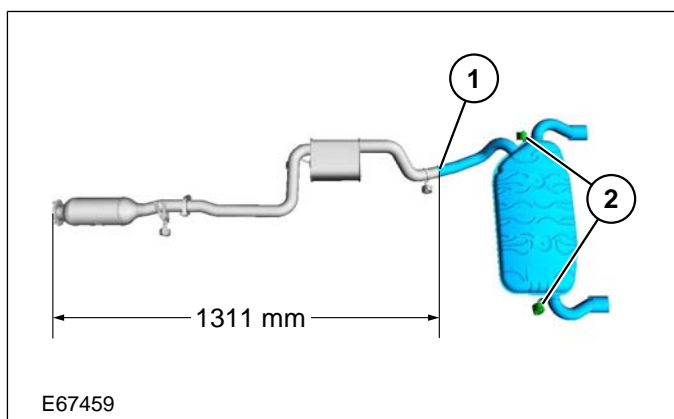


REMOVAL AND INSTALLATION

Rear Muffler

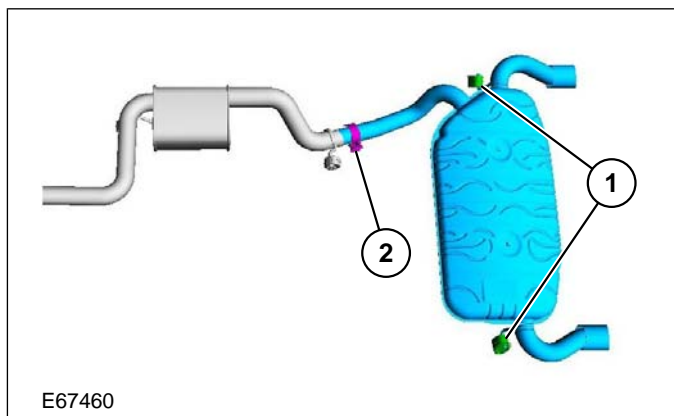
Removal

1. Raise and support the vehicle.
Refer to: Lifting (100-02 Jacking and Lifting, Description and Operation).
2. 1. Cut line.
2. Remove and discard the exhaust hanger insulators.



Installation

1. 1. Install new hanger insulators.
2. Torque: 47 Nm




REMOVAL AND INSTALLATION

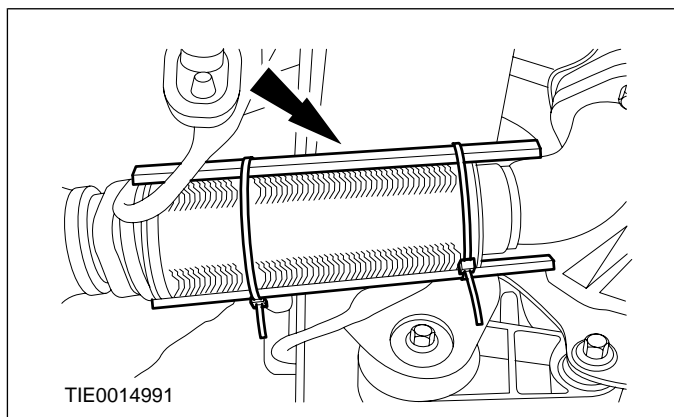
Catalytic Converter

Materials	
Name	Specification
Grease	SA-M1C9107-A

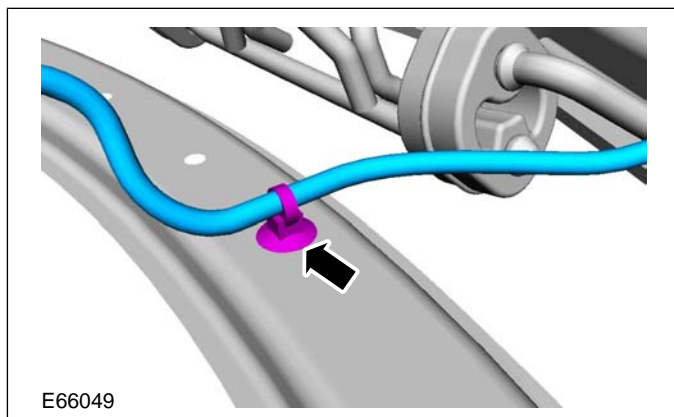
Removal

NOTE: Removal steps in this procedure may contain installation details.

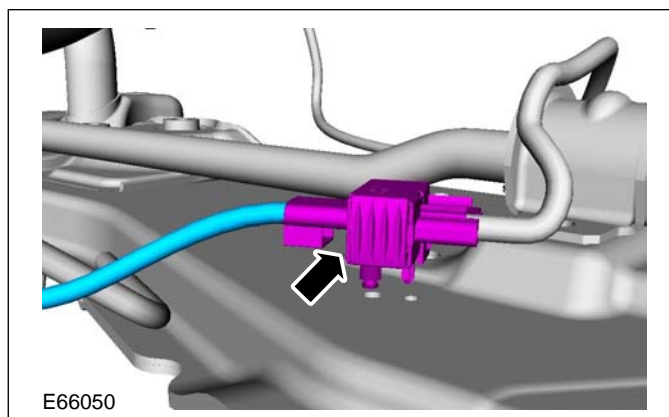
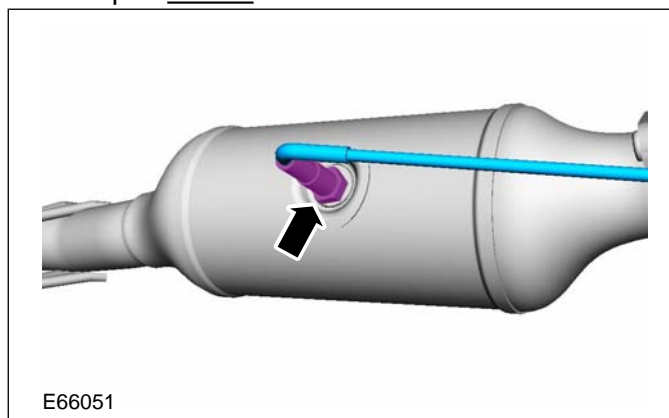
1. Raise and support the vehicle.
Refer to: Lifting (100-02 Jacking and Lifting, Description and Operation).
2.  **CAUTION:** Make sure that the exhaust flexible pipe is not forcible bent.



3.



4.

5. Torque: 47 Nm

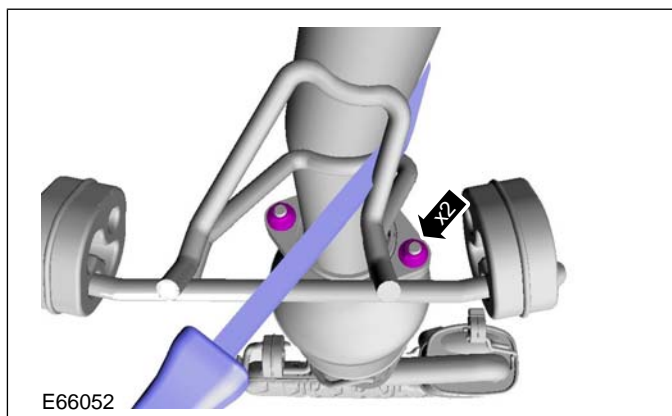
6.  **CAUTION:** Jointing compound must not be used forward of the catalytic converter.

REMOVAL AND INSTALLATION

NOTE: Make sure that the exhaust flexible pipe is not twisted.

- Torque: 48 Nm
- Coat the catalytic converter exhaust flexible pipe studs with grease.

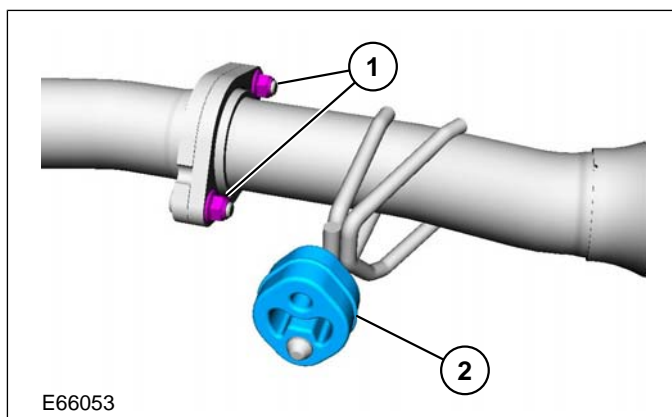
Material: Grease



7. 1. Coat the muffler and tail pipe assembly to catalytic converter studs with grease.

Material: Grease

2. Check the exhaust hanger insulator for damage. Install a new exhaust hanger insulator if required.



Installation

1. To install, reverse the removal procedure.

309-00-7 Exhaust System — 2.5L Duratec-ST (VI5)

309-00-7

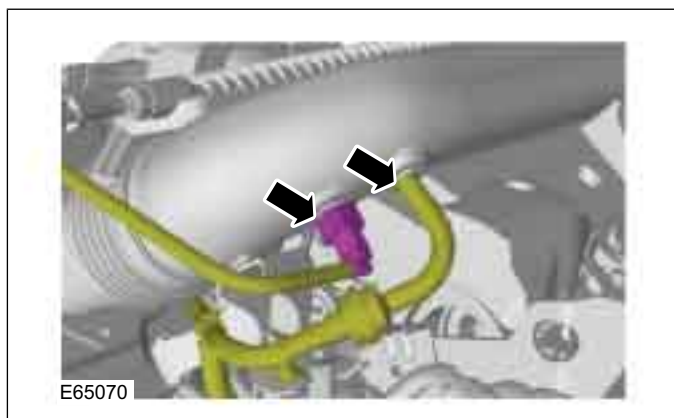
REMOVAL AND INSTALLATION

Exhaust Flexible Pipe

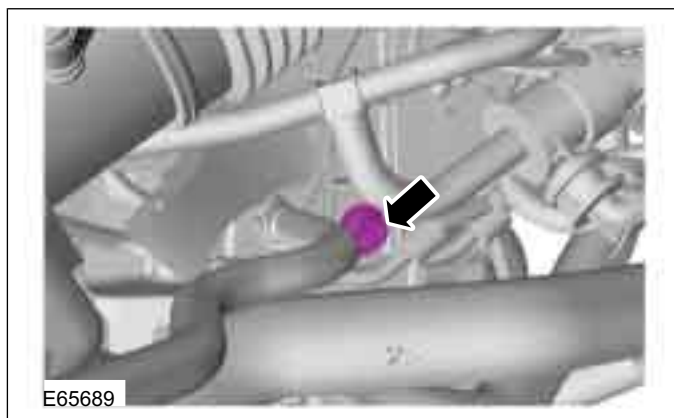
Materials	
Name	Specification
Grease	SA-M1C9107-A

Removal

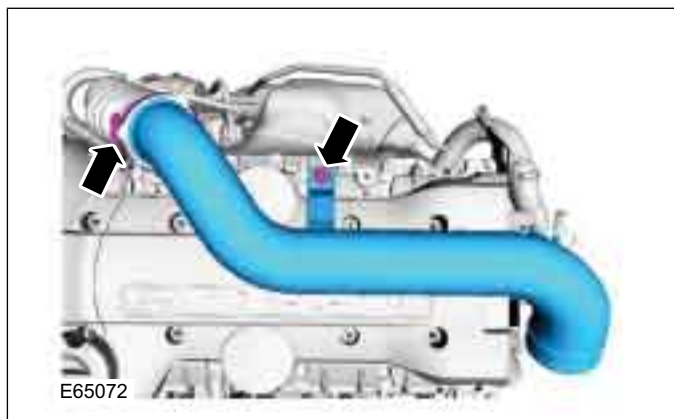
1.



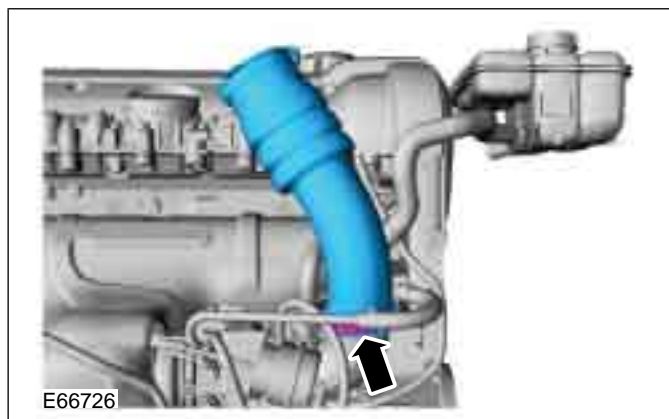
2.



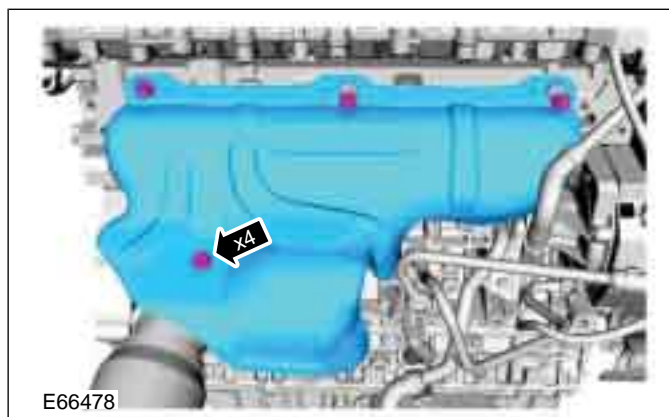
3.



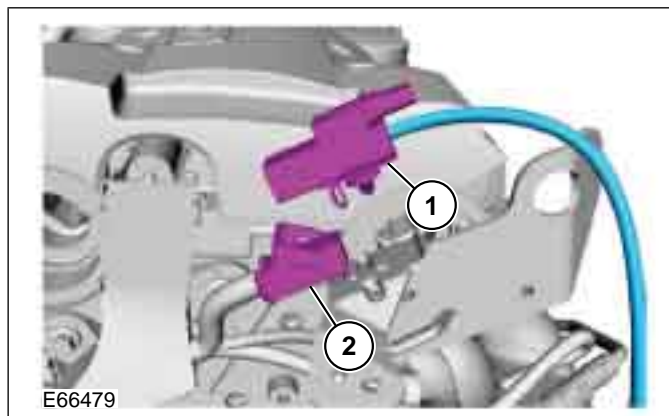
4.



5. **NOTE:** Note the position of the spring washers to aid installation.



6.

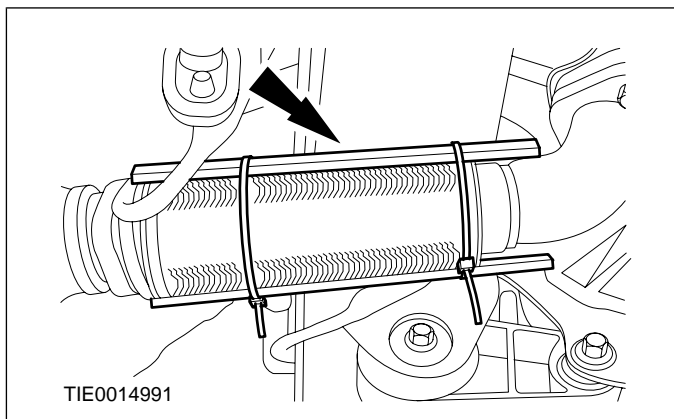


REMOVAL AND INSTALLATION

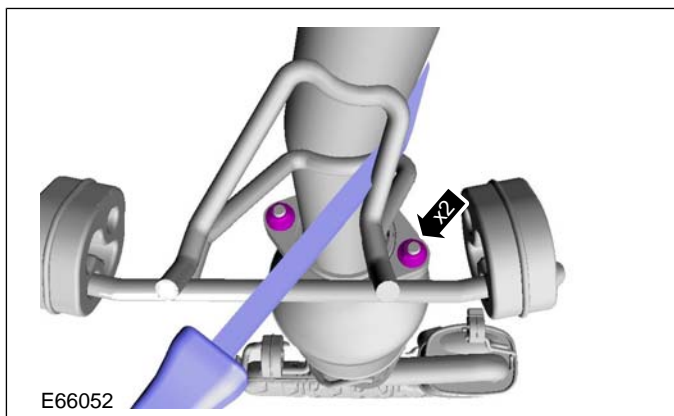
7. Raise and support the vehicle.

Refer to: Lifting (100-02 Jacking and Lifting, Description and Operation).

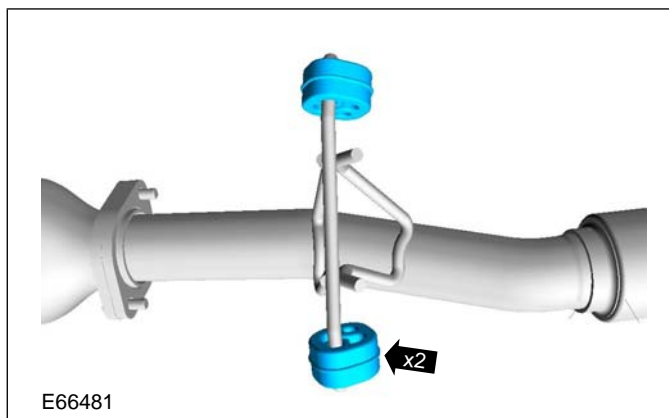
8. **CAUTION:** Make sure that the exhaust flexible pipe is not forcible bent.



9. **NOTE:** Make sure that the exhaust flexible pipe is not twisted.



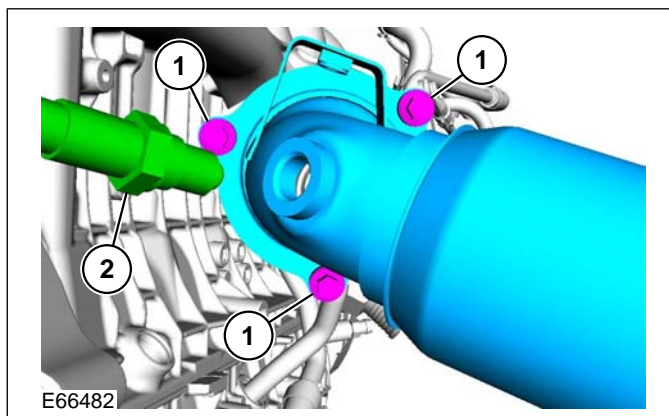
11.



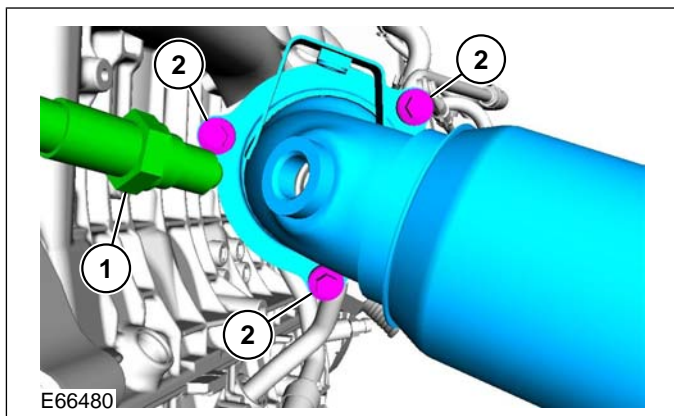
Installation

1. **CAUTION:** Jointing compound must not be used forward of the catalytic converter.

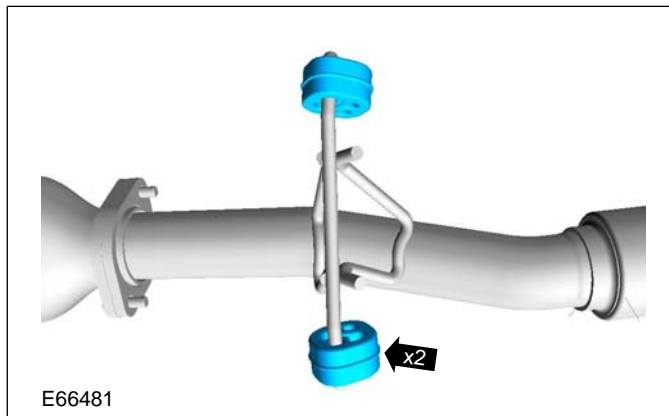
1. Torque: 48 Nm
2. Torque: 47 Nm



10.



2.



REMOVAL AND INSTALLATION

3. **NOTE:** Make sure that the exhaust flexible pipe is not twisted.

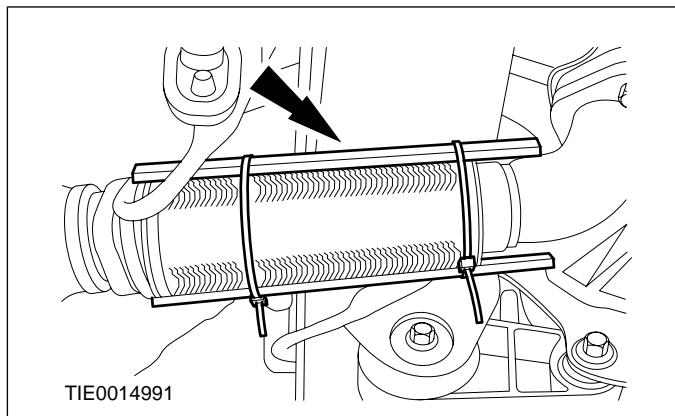
- Coat the catalytic converter to exhaust flexible pipe studs with grease.

Material: Grease

Torque: 48 Nm

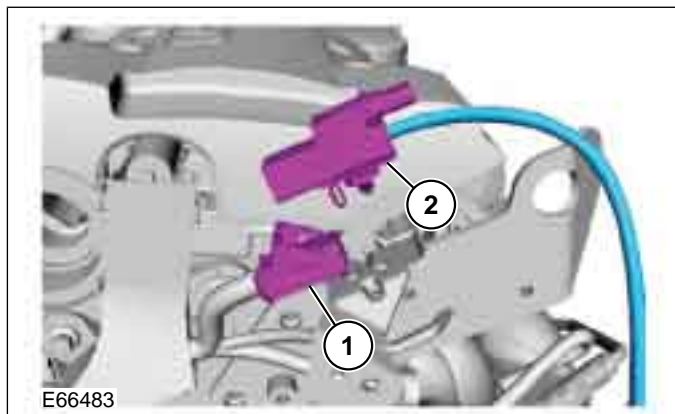


4. **CAUTION:** Make sure that the exhaust flexible pipe is not forcible bent.

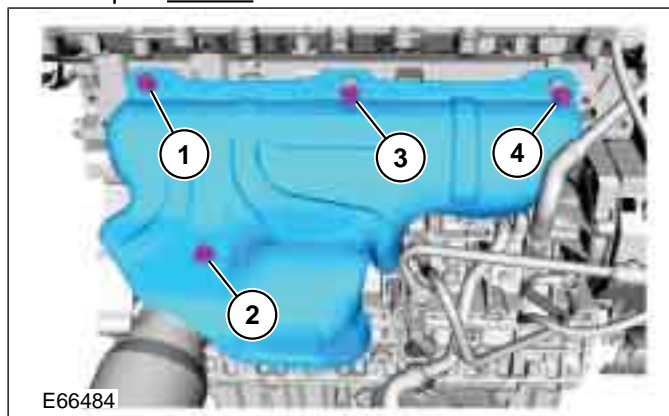


5. Lower the vehicle.

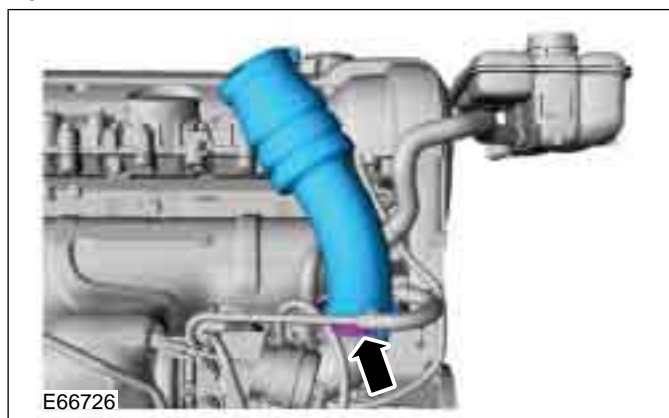
6.



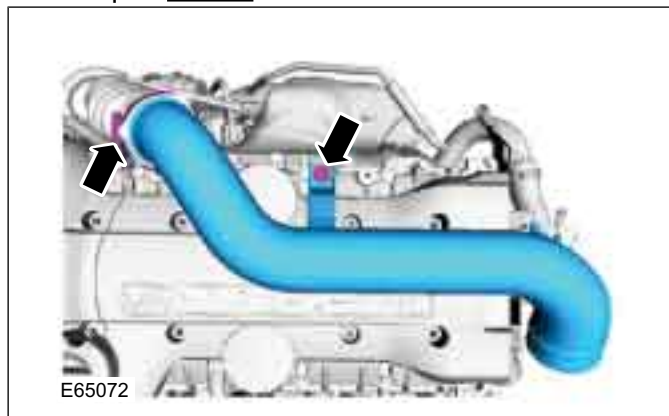
7. Torque: 20 Nm



8.



9. Torque: 10 Nm





309-00-10

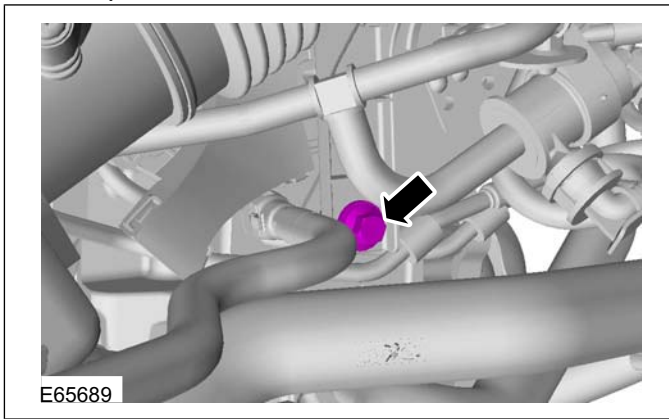
Exhaust System — 2.5L Duratec-ST (VI5)

309-00-10

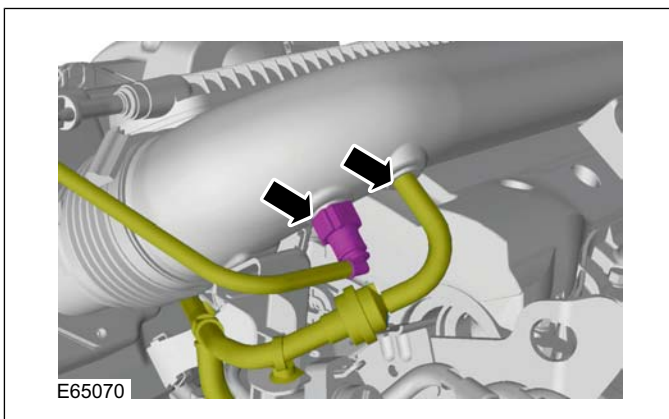


REMOVAL AND INSTALLATION

10. Torque: 10 Nm



11.



SECTION 310-00 Fuel System - General Information

VEHICLE APPLICATION: 2008.75 Focus ST C307

CONTENTS	PAGE
DIAGNOSIS AND TESTING	
Fuel System — 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4).....	310-00-2
Inspection and Verification.....	310-00-2
GENERAL PROCEDURES	
Fuel System Pressure Check — 2.5L Duratec-ST (VI5).....	310-00-3
Fuel System Pressure Release — 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4).....	(23 420 0) 310-00-5
Quick Release Coupling.....	310-00-6
Spring Lock Couplings.....	(23 004 0) 310-00-11

DIAGNOSIS AND TESTING**Fuel System — 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)****Inspection and Verification**

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

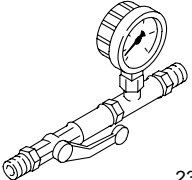
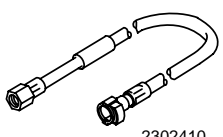
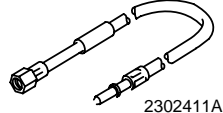

Mechanical	Electrical
– Fuel level	– Electrical connector(s)
– Fuel leak(s)	– Wiring harness
– Fuel line(s)	– Inertia fuel shutoff (IFS) switch
– Fuel filter (if equipped)	– Fuel pump module
– Fuel tank	
– Fuel tank filler pipe	
– Fuel filler cap	

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step
4. If the cause is not visually evident, verify the symptom and refer to WDS.

GENERAL PROCEDURES

Fuel System Pressure Check — 2.5L Duratec-ST (VI5)

Special Tool(s)

 23024	Fuel Pressure Gauge 310-025
 2302410	Test Hose for 310-025 310-025-18
 2302411A	Test Hose for 310-025 310-025-19A
 23033	Connector for 310-025 310-042

▲ WARNING:

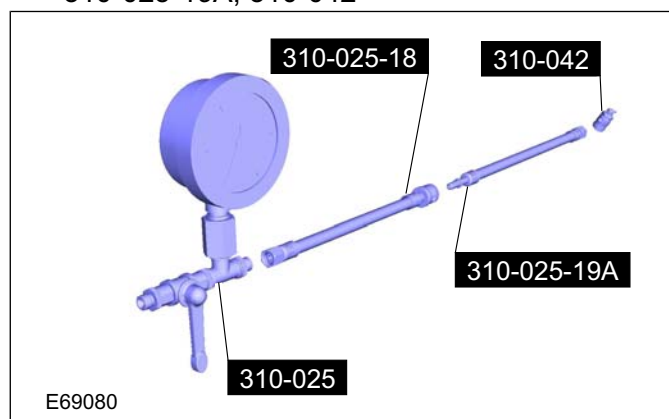
Refer to: **Petrol Fuel System Health and Safety Precautions (100-00 General Information, Description and Operation).**

1. Release the fuel system pressure.

Refer to: **Fuel System Pressure Release (310-00, General Procedures).**

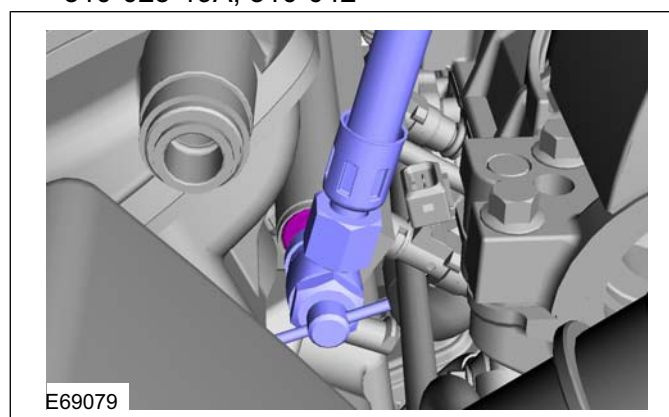
2. Assemble the special tools.

Special Tool(s): 310-025, 310-025-18, 310-025-19A, 310-042



3. Connect the special tools to the Schraeder valve.

Special Tool(s): 310-025, 310-025-18, 310-025-19A, 310-042

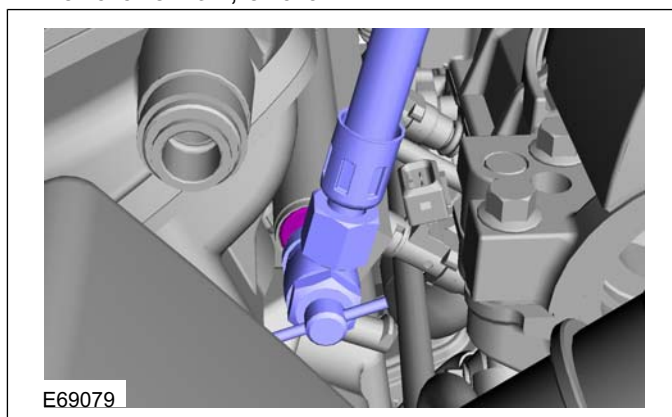


4. Start the engine and allow it to idle.
5. Record the fuel system pressure at idle (3.3 ± 0.1 bar maximum).
6. Stop the engine.
7. Release the fuel system pressure.
Refer to: **Fuel System Pressure Release (310-00, General Procedures).**

GENERAL PROCEDURES

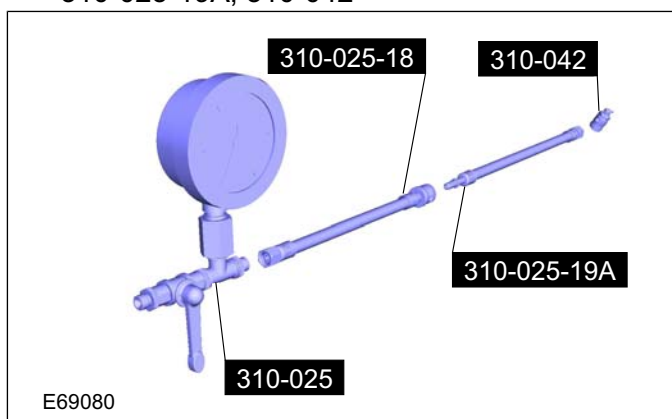
8. Disconnect the special tools from the Schraeder valve.

Special Tool(s): 310-025, 310-025-18,
310-025-19A, 310-042



9. Disassemble the special tools.

Special Tool(s): 310-025, 310-025-18,
310-025-19A, 310-042



GENERAL PROCEDURES**Fuel System Pressure Release — 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)(23 420 0)****Release****1. WARNINGS:**

▲ Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.

▲ The fuel system remains pressurized for a long time after the ignition is switched off. The fuel pressure must be released before attempting any repairs. Failure to follow this instruction may result in personal injury.

Remove the fuel pump fuse.

- 2. Start the engine and allow to idle until the engine stalls.**
- 3. Crank the engine for approximately five seconds to make sure the fuel injection supply manifold pressure has been released.**
- 4. Install the fuel pump fuse.**

GENERAL PROCEDURES

Quick Release Coupling

General Equipment

Flat-bladed screwdriver

Disconnection

WARNINGS:

▲ Do not carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always present and can ignite. Failure to follow these instructions may result in personal injury.

▲ This procedure involves fuel handling. Be prepared for fuel spillage at all times and always observe fuel handling precautions. Failure to follow these instructions may result in personal injury.

⚠ **CAUTION:** Fuel injection equipment is manufactured to very precise tolerances and fine clearances. It is therefore essential that absolute cleanliness is observed when working with these components. Always install blanking plugs to any open orifices or lines.

NOTE: Fuel supply line connectors are white or are identified by a white band. Fuel return line connectors are red or are identified by a red band.

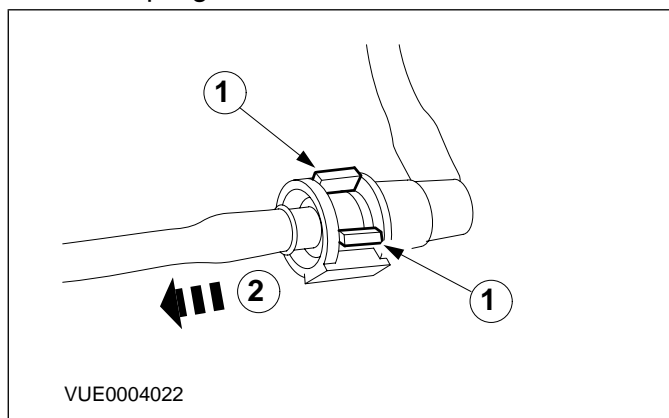
1. Release the fuel system pressure.

For additional information, refer to: **Fuel System Pressure Release - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)** (310-00 Fuel System - General Information, General Procedures).

2. Disconnect the fuel line quick release coupling.

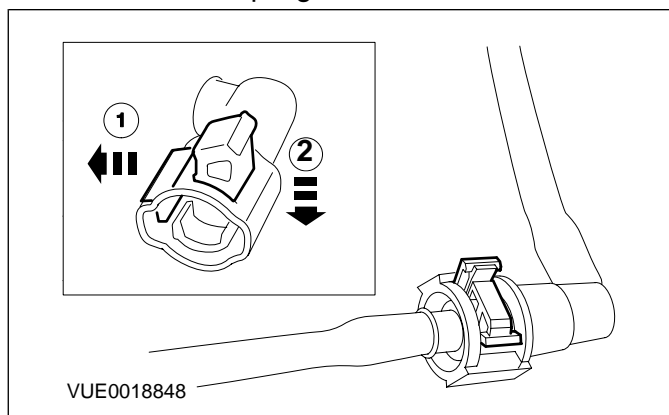
1. Press the fuel line quick release coupling locking tangs.

2. Disconnect the fuel line quick release coupling.



3. Disconnect the fuel line quick release coupling.

1. Pull the fuel line quick release coupling locking tang.
2. Push the clip through the fuel line quick release coupling to release the fuel line.

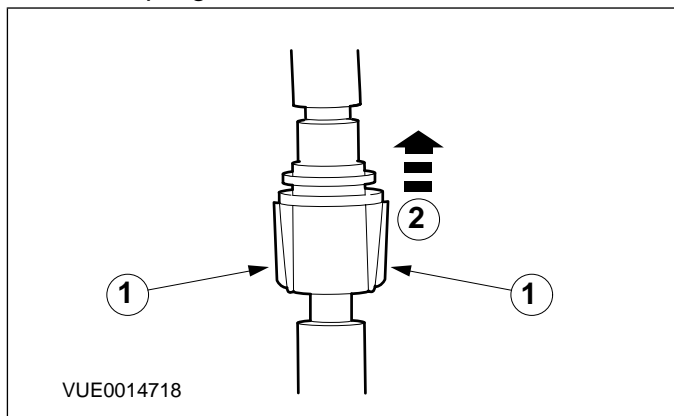


4. Disconnect the fuel line quick release coupling.

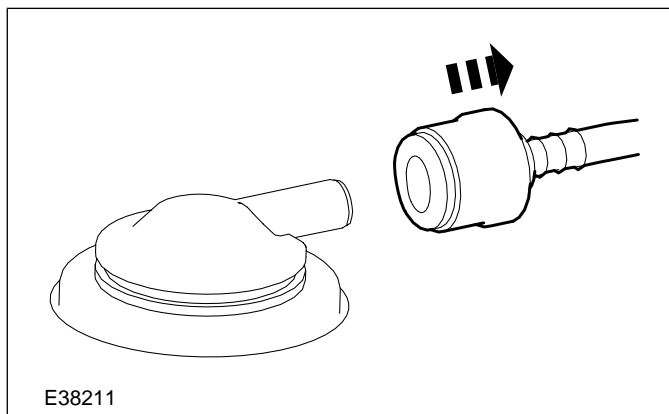
1. Press the fuel line quick release coupling locking tangs.

GENERAL PROCEDURES

2. Disconnect the fuel line quick release coupling.

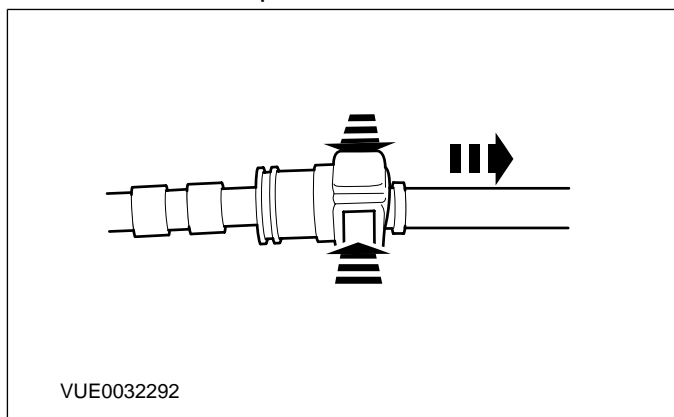


7. Disconnect the fuel tank vent line quick release coupling.



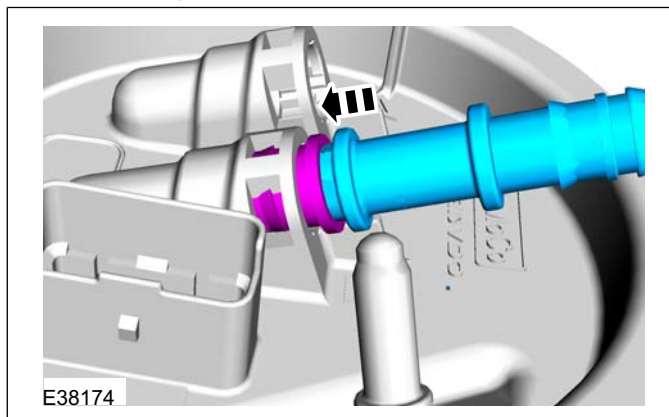
5. Disconnect the fuel line quick release coupling.

- Press the fuel line quick release coupling buttons and pull the fuel line to disconnect.



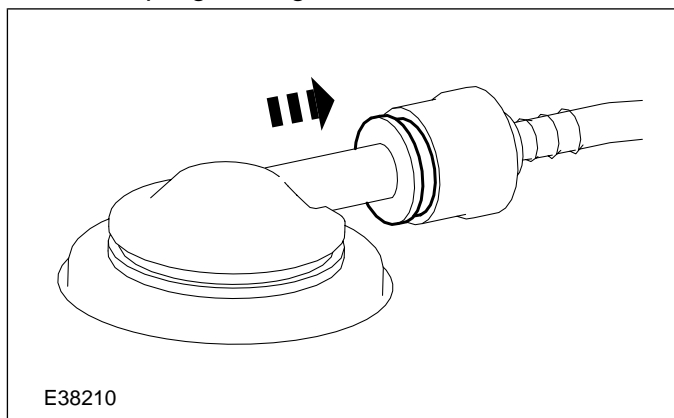
8. Release the fuel line quick release coupling.

- Press the fuel line quick release coupling locking release collar.

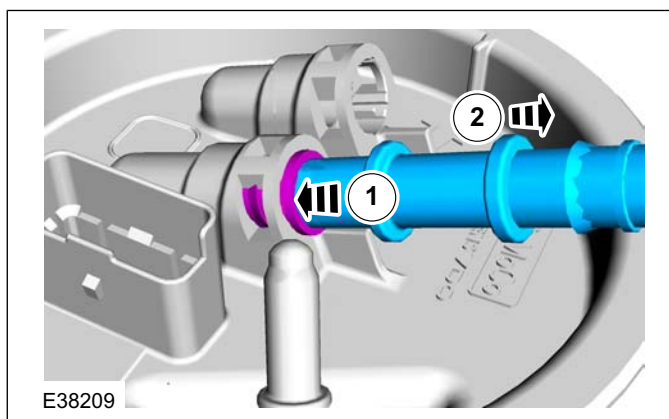


6. Release the fuel tank vent line quick release coupling.

- Press the fuel tank vent line quick release coupling locking release collar.

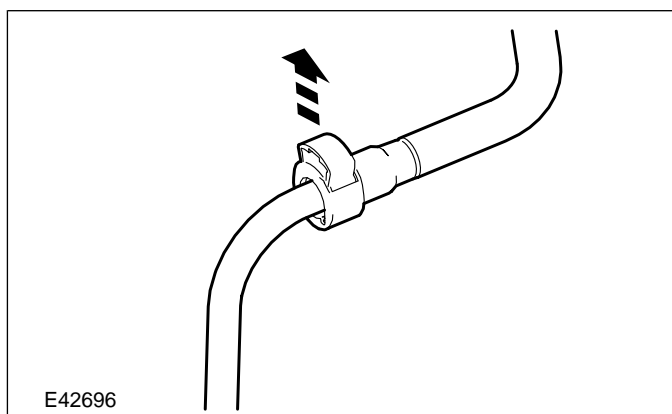


9. Disconnect the fuel line quick release coupling.



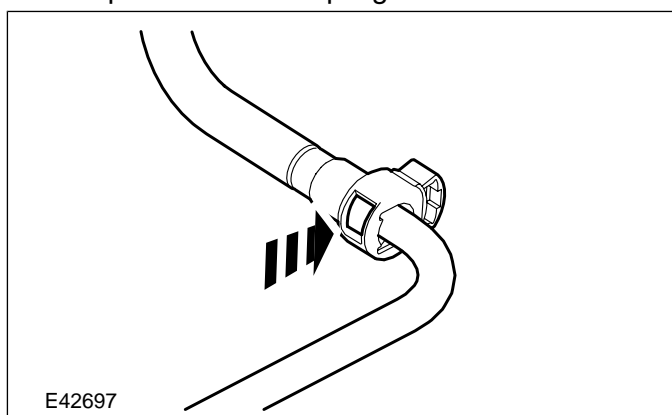
GENERAL PROCEDURES

10. Using a suitable Flat-bladed screwdriver release the fuel line quick release coupling secondary locking tang.

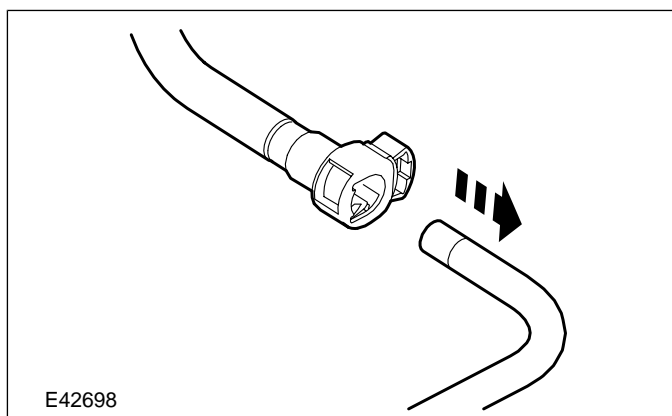


11. Operate the fuel line quick release coupling primary locking tang.

- Push the fuel line quick release coupling primary locking tang into from the fuel line quick release coupling.



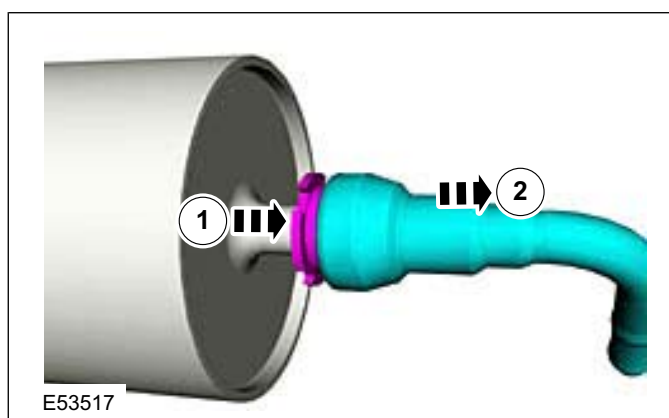
12. Disconnect the fuel line from the fuel line quick release coupling.



13. Disconnect the fuel line from the fuel filter.

1. Press the collar into the connector body.

2. Disconnect the fuel line from the fuel filter.



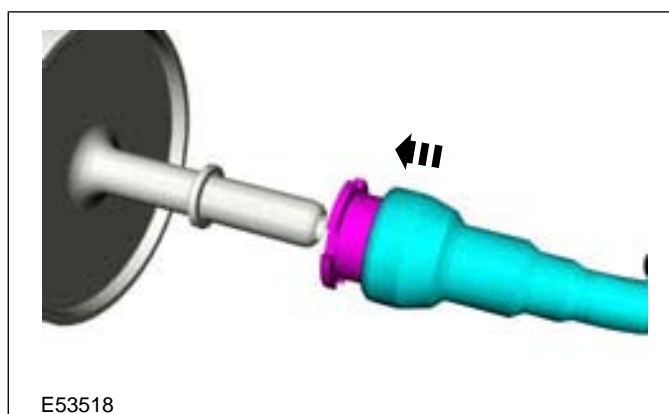
Connect

WARNINGS:

- ⚠ Do not carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always present and can ignite. Failure to follow these instructions may result in personal injury.
- ⚠ This procedure involves fuel handling. Be prepared for fuel spillage at all times and always observe fuel handling precautions. Failure to follow these instructions may result in personal injury.
- ⚠ CAUTION: Fuel injection equipment is manufactured to very precise tolerances and fine clearances. It is therefore essential that absolute cleanliness is observed when working with these components. Always install blanking plugs to any open orifices or lines.

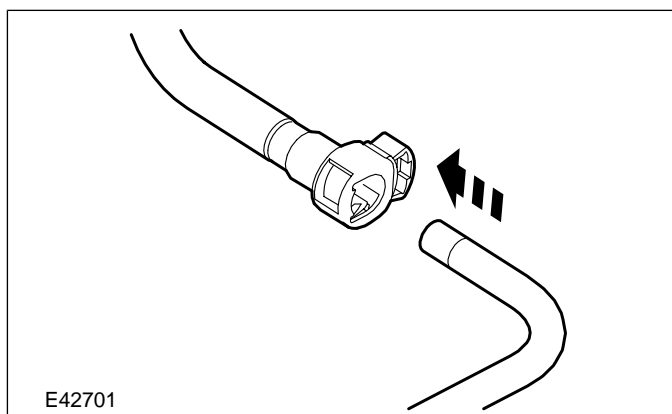
NOTE: Fuel supply line connectors are white or are identified by a white band. Fuel return line connectors are red or are identified by a red band.

1. Push the connector on to the fuel filter.



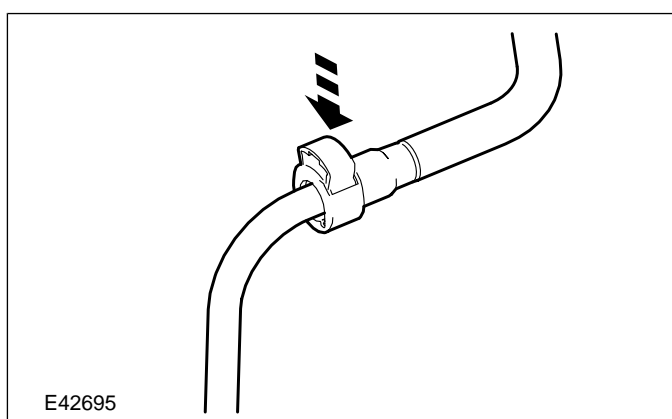
GENERAL PROCEDURES

2. Install the fuel line to the fuel line quick release coupling.



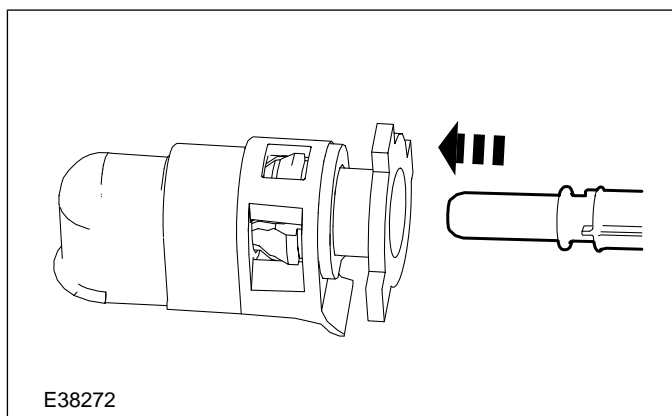
3. **CAUTION:** Make sure the quick release coupling primary locking tang clicks into place when installing.

Insert the fuel line quick release coupling secondary locking tang into the fuel line quick release coupling.



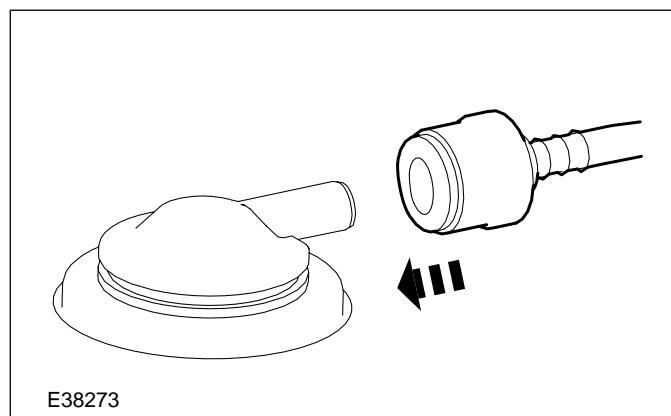
4. **CAUTION:** After installation, to make sure that the fuel line is fully seated, pull on the line.

Install the fuel line quick release coupling.



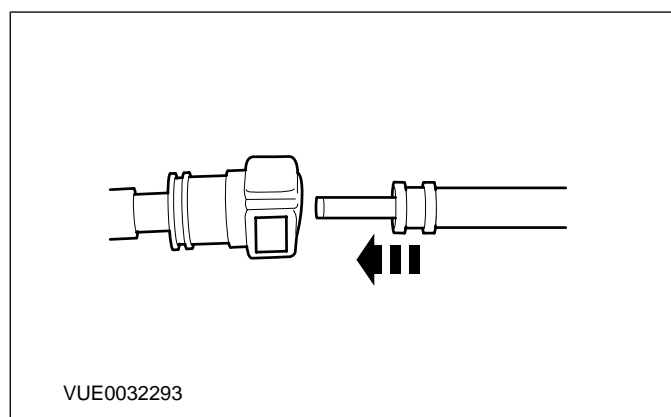
5. **CAUTION:** After installation, to make sure that the vent line is fully seated, pull on the line.

Install the fuel tank vent line quick release coupling.



6. **CAUTION:** Make sure the fuel line clicks into place when installing the line. To make sure that the fuel line is fully seated, pull on the line.

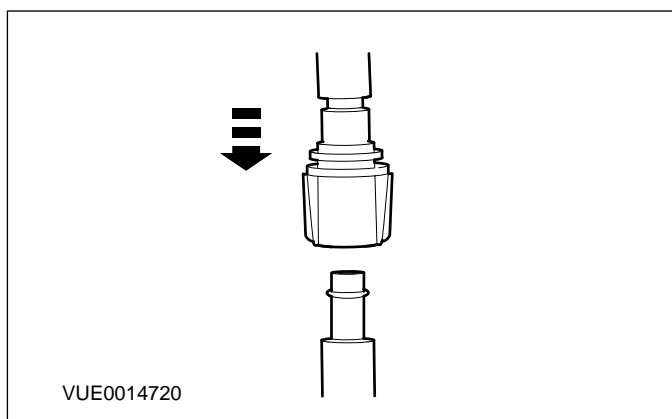
Install the fuel line quick release coupling.



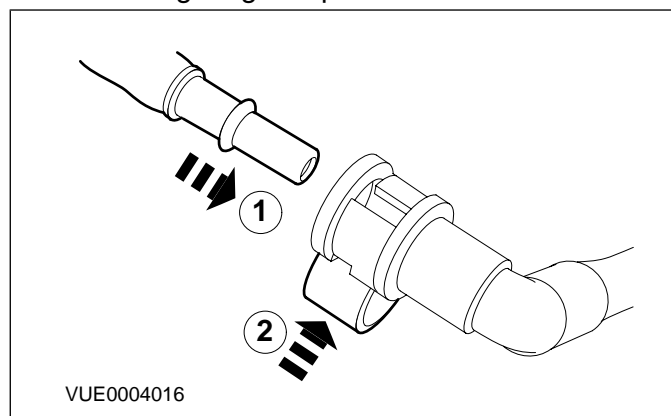
7. **NOTE:** Make sure the collar on the fuel line is inserted fully into the fuel line quick release coupling.

GENERAL PROCEDURES

Install the fuel line quick release coupling.



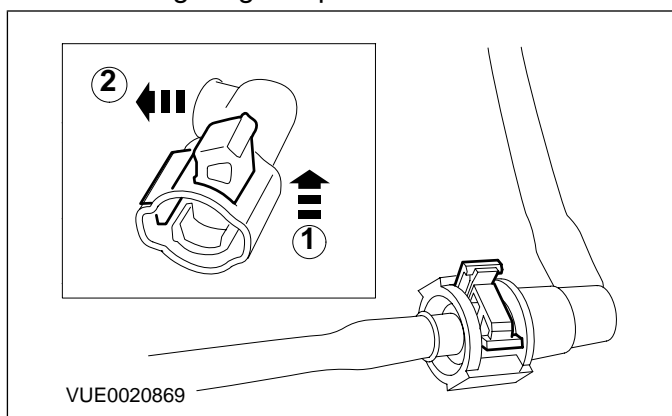
2. Press the fuel line quick release coupling locking tang into position.



8. NOTE: Make sure the collar on the fuel line is inserted fully into the fuel line quick release coupling before the locking tang is locked.

Install the fuel line quick release coupling.

1. Install the fuel line quick release coupling locking tang.
2. Rotate the fuel line quick release coupling locking tang into position.



9. NOTE: Make sure the collar on the fuel line is inserted fully into the fuel line quick release coupling before the locking tang is locked.

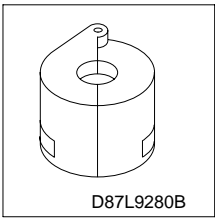
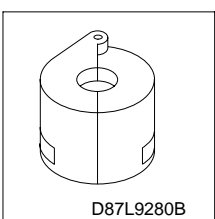
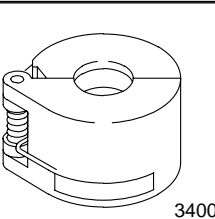
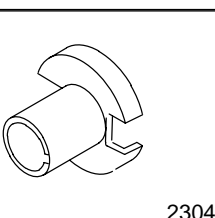
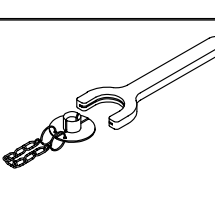
Install the fuel line quick release coupling.

1. Install the fuel line quick release coupling.

GENERAL PROCEDURES

Spring Lock Couplings(23 004 0)

Special Tool(s)

	Disconnect Tool, Spring Lock Coupling (3/8"yellow) 310-D004 (23-039)
	Disconnect Tool, Spring Lock Coupling (1/2"green) 310-D005 (23-040)
	Disconnect Tool, Spring Lock Coupling (5/8" black) 412-038 (34-003)
	Disconnect Tool, Fuel Line (5/16") 310-040 (23-041)
	Lösewerkzeug, Kraftstoffleitung 310-137

Disconnection

WARNINGS:

- ▲ Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.

▲ The fuel system remains pressurized for a long time after the ignition is switched off. The fuel pressure must be released before attempting any repairs. Failure to follow these instructions may result in personal injury.

▲ This procedure involves fuel handling. Be prepared for fuel spillage at all times and always observe fuel handling precautions. Failure to follow these instructions may result in personal injury.

1. Release the fuel system pressure.

For additional information, refer to: Fuel

System Pressure Release - 1.4L

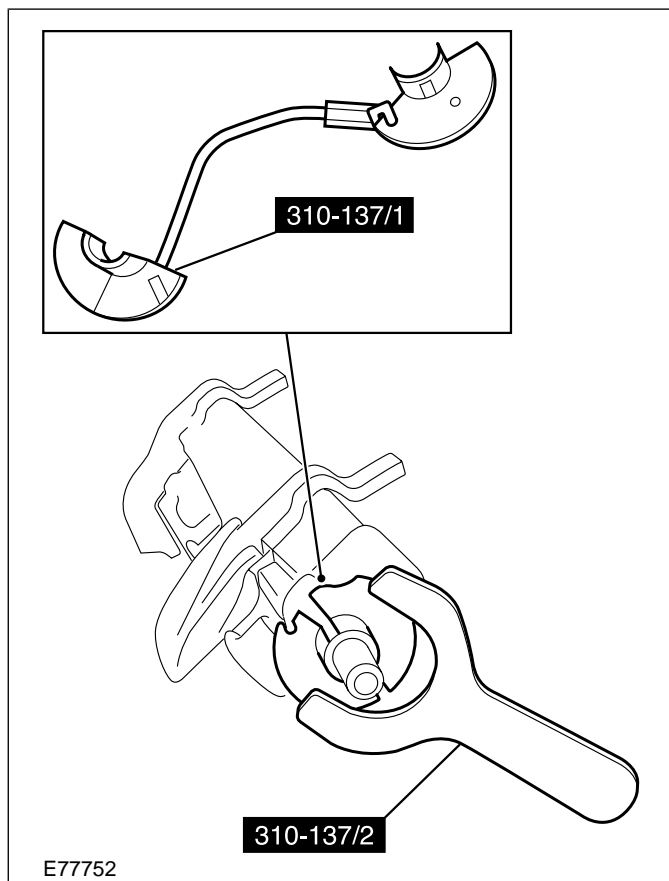
Duratec-16V (Sigma)/1.6L Duratec-16V

Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L

Duratec-HE (MI4) (310-00 Fuel System - General Information, General Procedures).

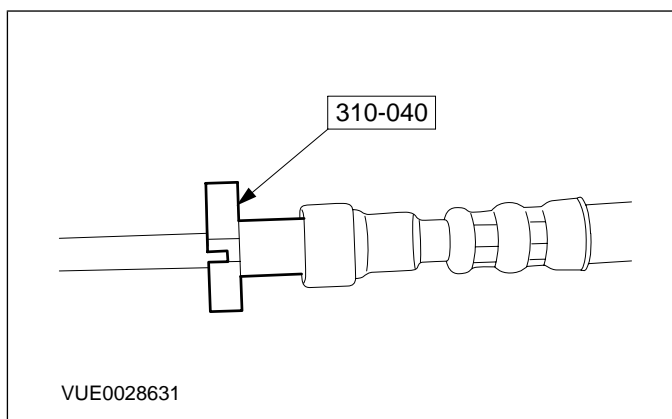
2.

1. Position the two half shells (310-137/1) onto the fuel line.
2. Slide the tool hand grip (310-137/2) onto the half shells and release the fuel connection.



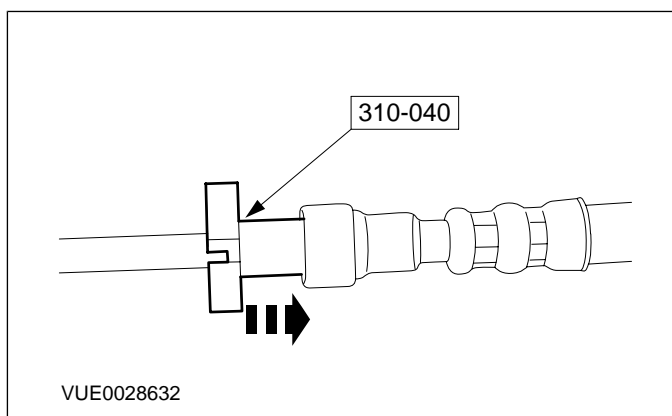
GENERAL PROCEDURES

3. Install the special tool to the fuel line.



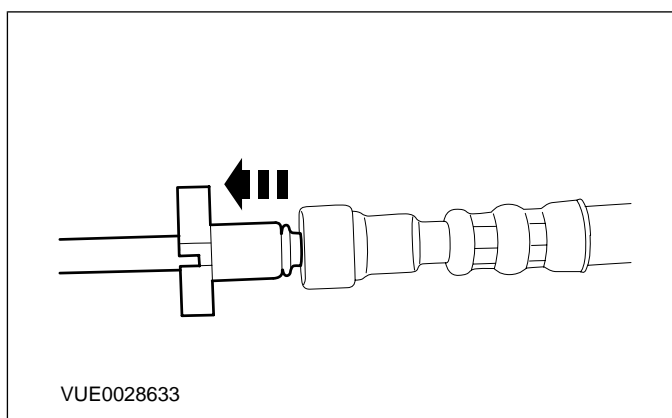
4. **NOTE:** Both sides of the spring lock coupling fuel line must be pushed together to enable the special tool to release the spring lock coupling locking tangs.

Slide the special tool into the spring lock coupling to release the locking tangs.

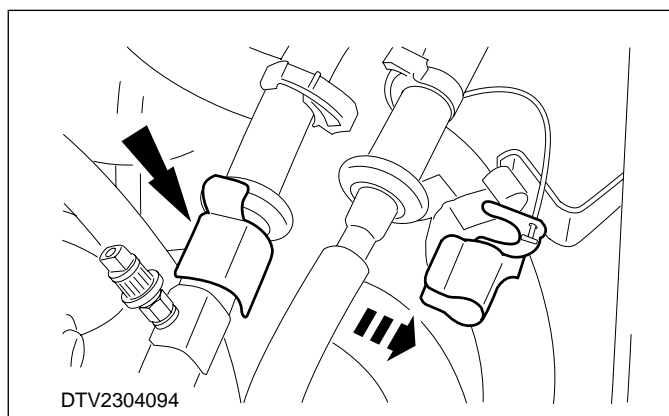


5. Disconnect the fuel line from the spring lock coupling.

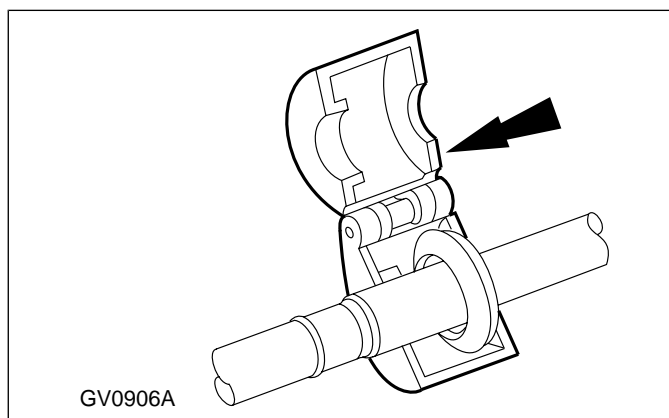
- Allow the fuel to drain into a suitable container.



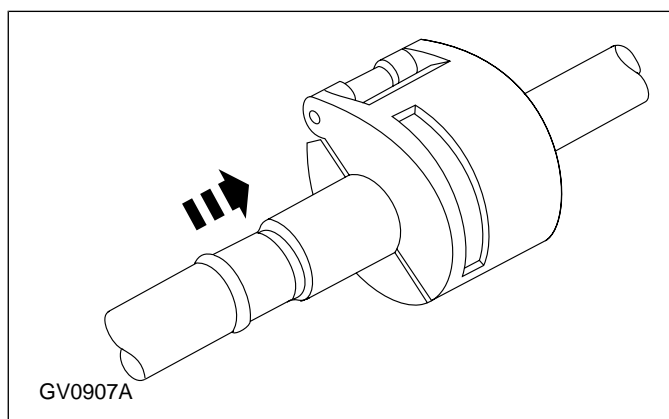
6. Remove the safety clips from the fuel line spring lock couplings.



7. Install the special tool onto the fuel line spring lock coupling.



8. Close and push the fuel line spring lock coupling tool into the open side of the cage.



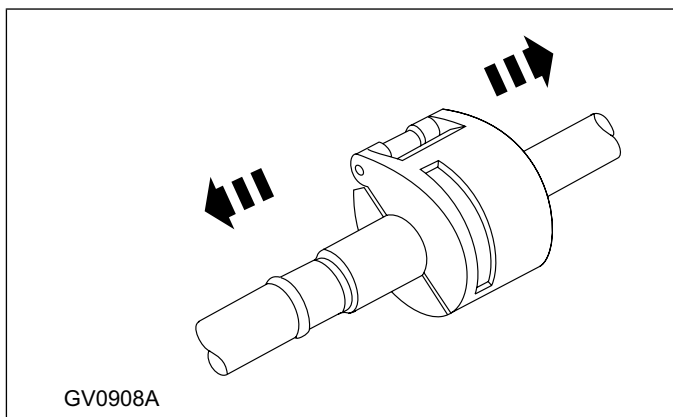
310-00-13

Fuel System - General Information

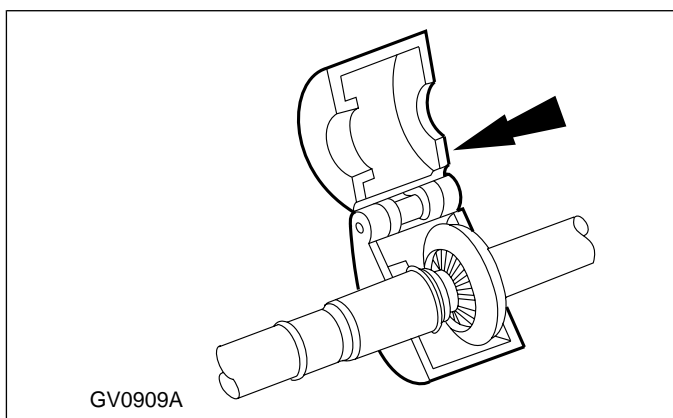
310-00-13

GENERAL PROCEDURES

9. Separate the fuel line spring lock coupling.






10. Remove the special tool.

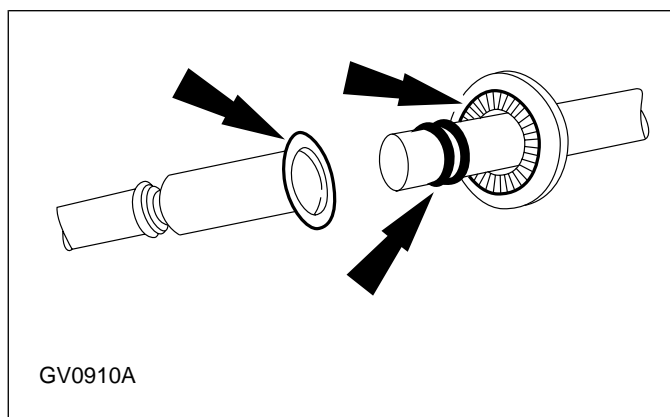


Installation

WARNINGS:

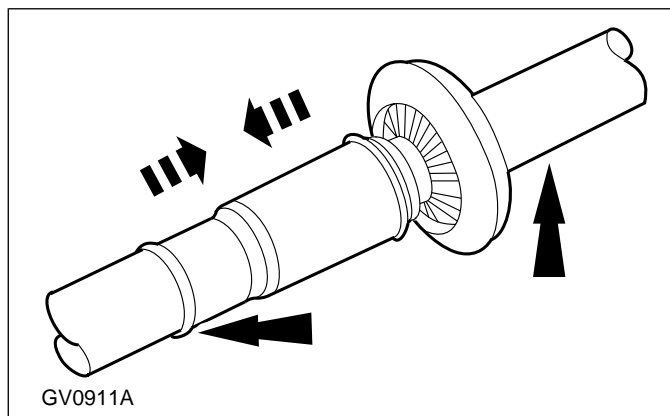
-  Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.
-  The fuel system remains pressurized for a long time after the ignition is switched off. The fuel pressure must be released before attempting any repairs. Failure to follow these instructions may result in personal injury.
-  This procedure involves fuel handling. Be prepared for fuel spillage at all times and always observe fuel handling precautions. Failure to follow these instructions may result in personal injury.

1. Inspect and clean both fuel line spring lock coupling ends. Install new O-rings and garter springs if necessary.

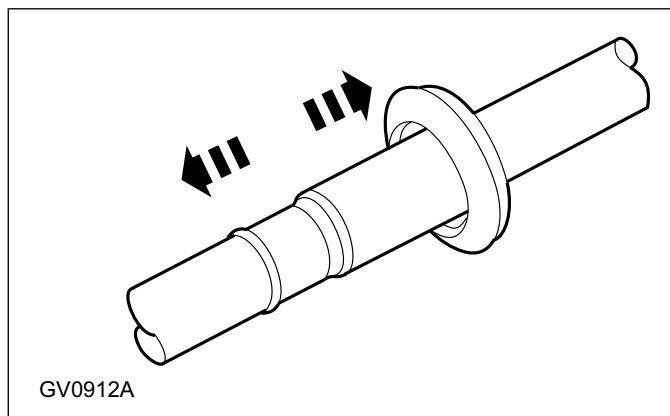


2. NOTE: Lubricate the O-rings seals with clean engine oil.

Insert the male fitting into the female end and push until the garter spring snaps over the flared end of the female fitting.



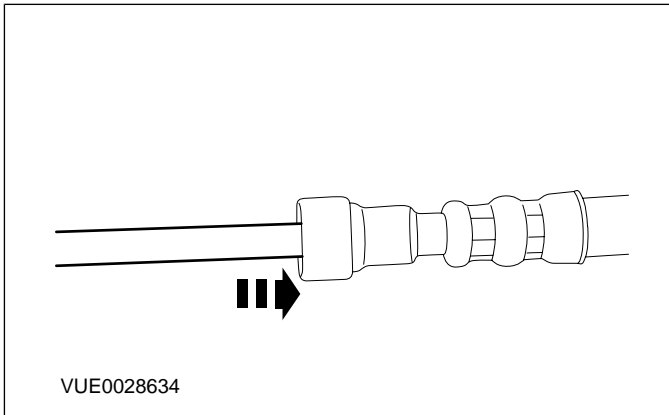
3. Make sure the fuel line spring lock coupling is engaged by pulling on the lines.



4. NOTE: Make sure the collar on the fuel line is inserted fully into the fuel line spring lock coupling and an audible click is heard.

GENERAL PROCEDURES

Install the spring lock coupling to the fuel line.



SECTION 310-01 Fuel Tank and Lines

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS**Lubricants, Fluids, Sealers and Adhesives**

Item	Specification
6.5% Fuel Additive Cerium/Iron Concentration Fluid	WSS-M99C127-A1

Description	Nm	lb-ft	lb-in
Fuel tank support strap retaining bolts	25	18	-
Fuel tank filler Pipe bracket retaining screw	10	-	89
Fuel additive tank retaining screws	8	-	71
Fuel additive system module retaining nuts	3	-	27
Fuel pump module locking ring	85	63	-
Fuel tank filler pipe retaining screw	10	-	89
Fuel tank filler hose retaining clamp	4	-	35
Fuel tank vent hose retaining clamp	4	-	35
Fuel filter retaining bracket retaining bolt - vehicles with 1.6L Duratec-16V (Sigma) engine/1.6L Duratec-16V Ti-VCT (Sigma) engine/1.8L Duratec-HE (MI4) engine or 2.0L Duratec-HE (MI4) engine	5	-	44
Fuel filter shield retaining bolts - vehicles with 1.6L Duratorq-TDCi (DV6) diesel engine	10	-	89
Fuel filter crash protection top shield - vehicles with 1.8L Duratorq-TDCi (Kent) diesel engine	9	-	80
Fuel filter crash protection shield - vehicles with 2.0L Duratorq-TDCi (DW10) diesel engine	9	-	80
Rear shock absorber lower retaining bolts	115	85	-
Rear axle crossmember retaining bolts	115	85	-



DESCRIPTION AND OPERATION

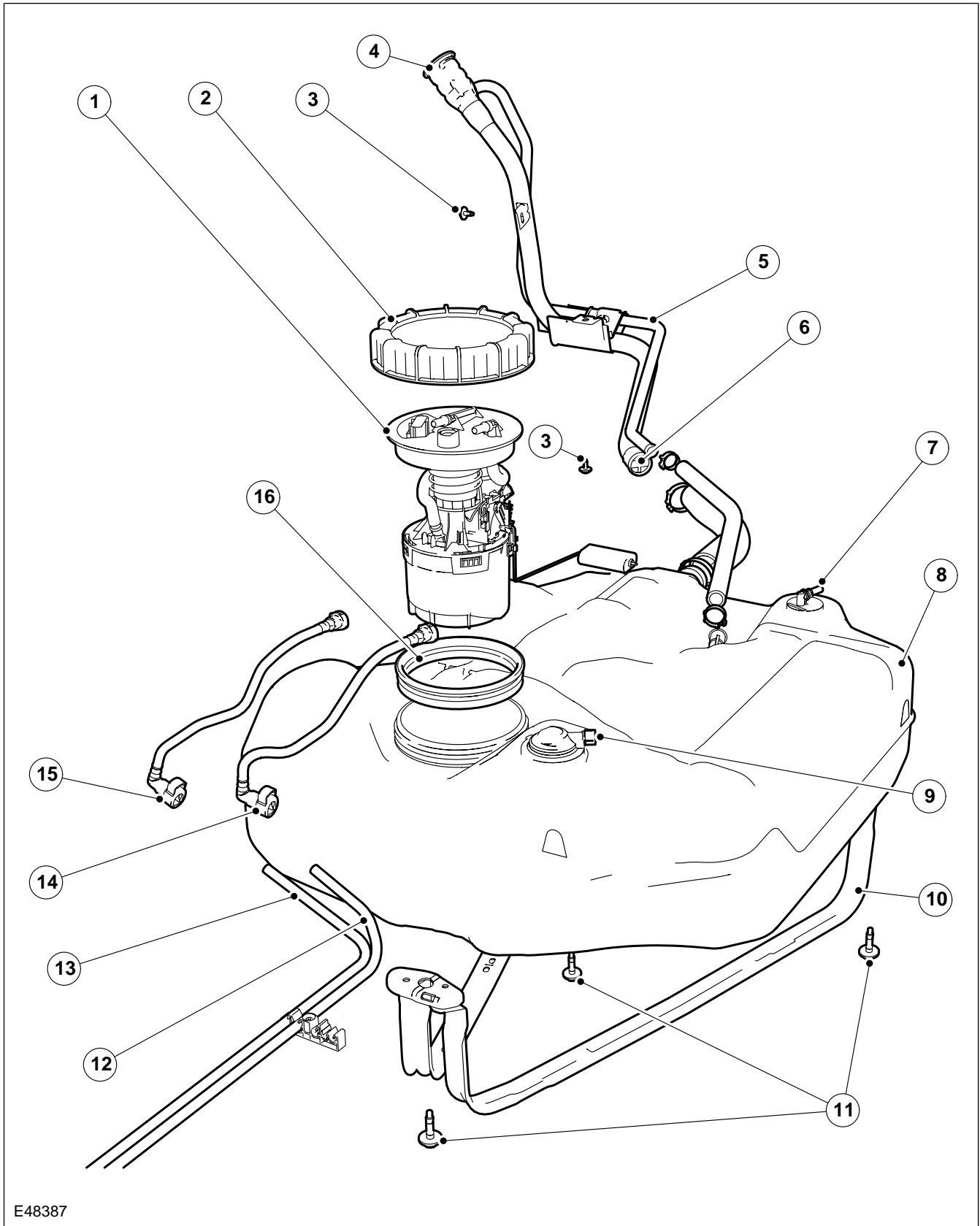
Fuel Tank and Lines

Vehicles with diesel engine

System Overview



DESCRIPTION AND OPERATION



E48387

Item	Description
1	Fuel level sensor
2	Fuel level sensor locking ring

Item	Description
3	Fuel tank filler pipe retaining bolts
4	Fuel tank filler pipe

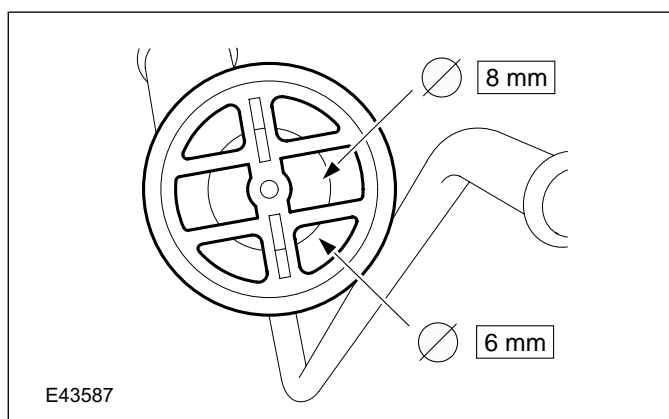
DESCRIPTION AND OPERATION

Item	Description
5	Fuel tank vent pipe
6	Fuel filler pipe spit back valve
7	Fuel tank fuel additive injector (if equipped)
8	Fuel tank
9	Fuel tank roll - over valves
10	Fuel tank support straps
11	Fuel tank support straps retaining bolts
12	Fuel filter to fuel tank fuel return line
13	Fuel tank to fuel filter fuel supply line
14	Fuel filter to fuel tank fuel return line
15	Fuel tank to fuel filter fuel supply line
16	Fuel level sensor seal

The fuel tank holds approximately 53 liters of usable fuel and is of a plastic construction. It is retained to the vehicle by means of two steel support straps, the fuel tank supports straps are secured by three retaining bolts onto the underside of the vehicle chassis.

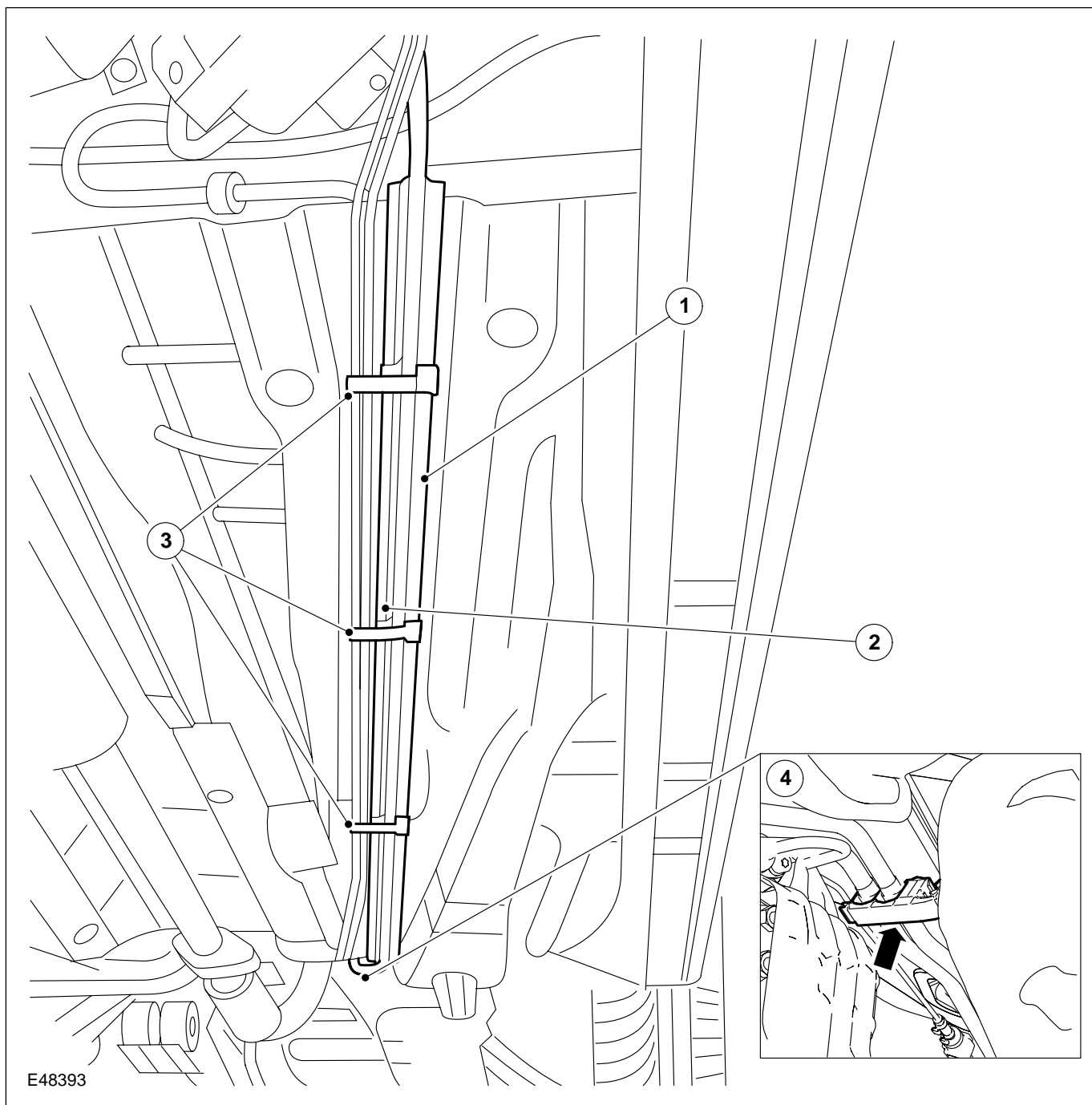
The fuel tank filler pipe is designed to fill the fuel tank, it consists of a fuel tank filler pipe and fuel tank vent pipe. Located within the fuel tank filler pipe is a fuel filler pipe spit back valve. The spit back valves have been designed to reduce the possibility of fuel tank siphoning. To enable the hose of the fuel tank draining equipment to enter the fuel tank, it must pass through the fuel filler pipe spit back valve. For additional information on fuel tank draining.

For additional information, refer to: Fuel Tank Draining (310-00 Fuel System - General Information, General Procedures).



The fuel tank filler pipe vent pipe allows air to escape from the tank when the fuel tank is being filled.

DESCRIPTION AND OPERATION



E48393

Item	Description
1	Fuel tank to fuel filter fuel supply line
2	Fuel filter to fuel tank fuel return line
3	Fuel line retaining clips
4	Fuel line grounding clip

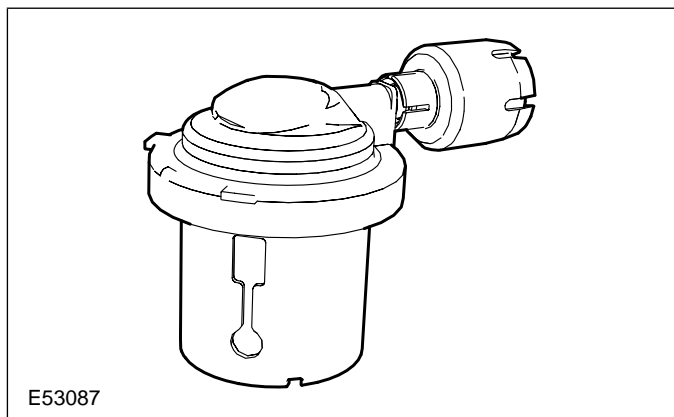
The fuel supply and return lines have either spring lock couplings or quick release couplings at each end to secure them to the fuel tank lines.

For additional information, refer to: **Quick Release Coupling** (310-00 Fuel System - General Information, General Procedures) / **Spring Lock Couplings** (310-00 Fuel System - General Information, General Procedures).

The fuel supply and return lines are constructed from a steel material coated with nylon and are retained by clips which are also made of plastic. At the front of the vehicle there is a fuel line grounding clip equipped with a conductive sleeve

DESCRIPTION AND OPERATION

made of steel or conductive plastic which also holds the fuel supply and return lines against the body. This clip is made of a conductive material which is designed to dissipate the static electricity created when fuel travels through the fuel supply and return lines.



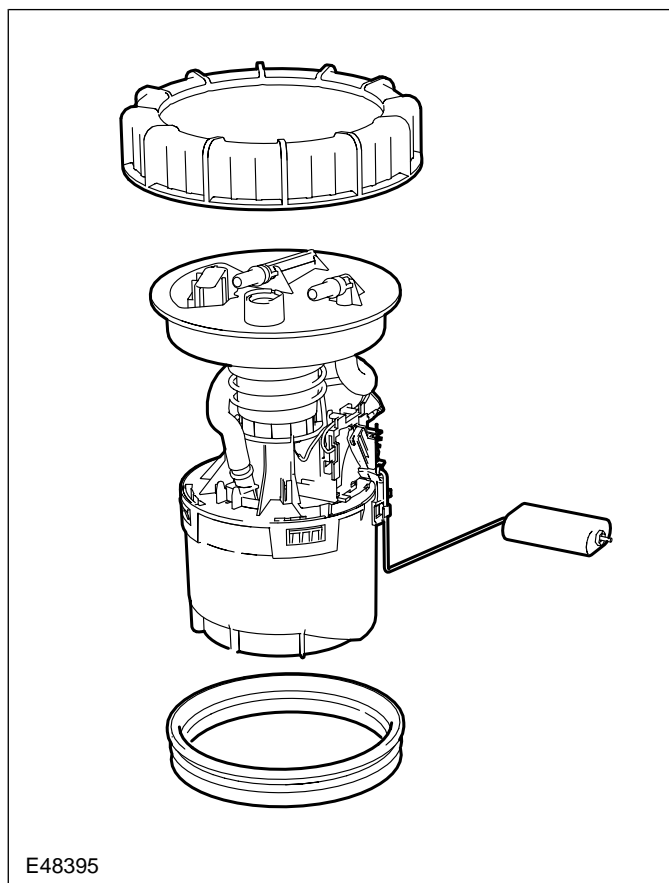
Fuel tank ventilation is achieved by a fuel tank roll-over valve which is installed into the top of the fuel tank and will prevent fuel loss from the fuel tank if the vehicle becomes inverted.

The fuel tank roll-over valve also acts as fuel tank breather with filter. If this filter become blocked or restricted during the vehicle's lifetime the customer will experience problems with draining the fuel tank and there could be a possibility of fuel tank deformation.

The fuel level sensor is located in the top of the fuel tank and retained by a fuel level sensor locking ring and seal, a new seal must be installed after the fuel level sensor is removed.

NOTE: The fuel tank must be completely removed from the vehicle before the fuel level sensor can be removed.

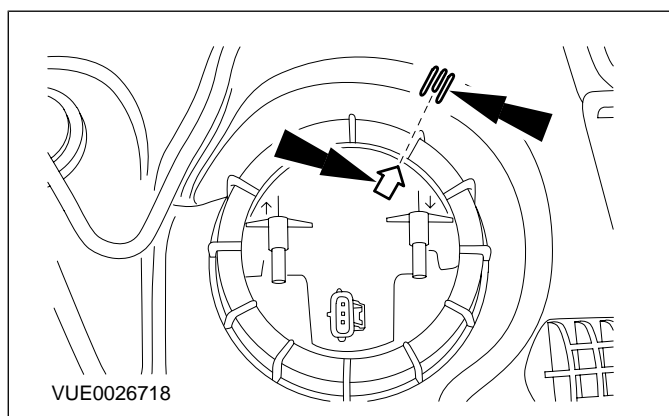
For additional information, refer to: **Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation).**



The fuel level sensor is equipped with a fuel tank sender unit. The fuel tank sender unit consists of a mechanical float and a potentiometer. The potentiometer communicates the fuel level information via a float directly with the fuel gauge in the instrument cluster informing the driver the amount of fuel that is currently in the fuel tank.

⚠ CAUTION: Make sure the fuel level sensor float and arm are not damaged during the removal or installation of the fuel level sensor.

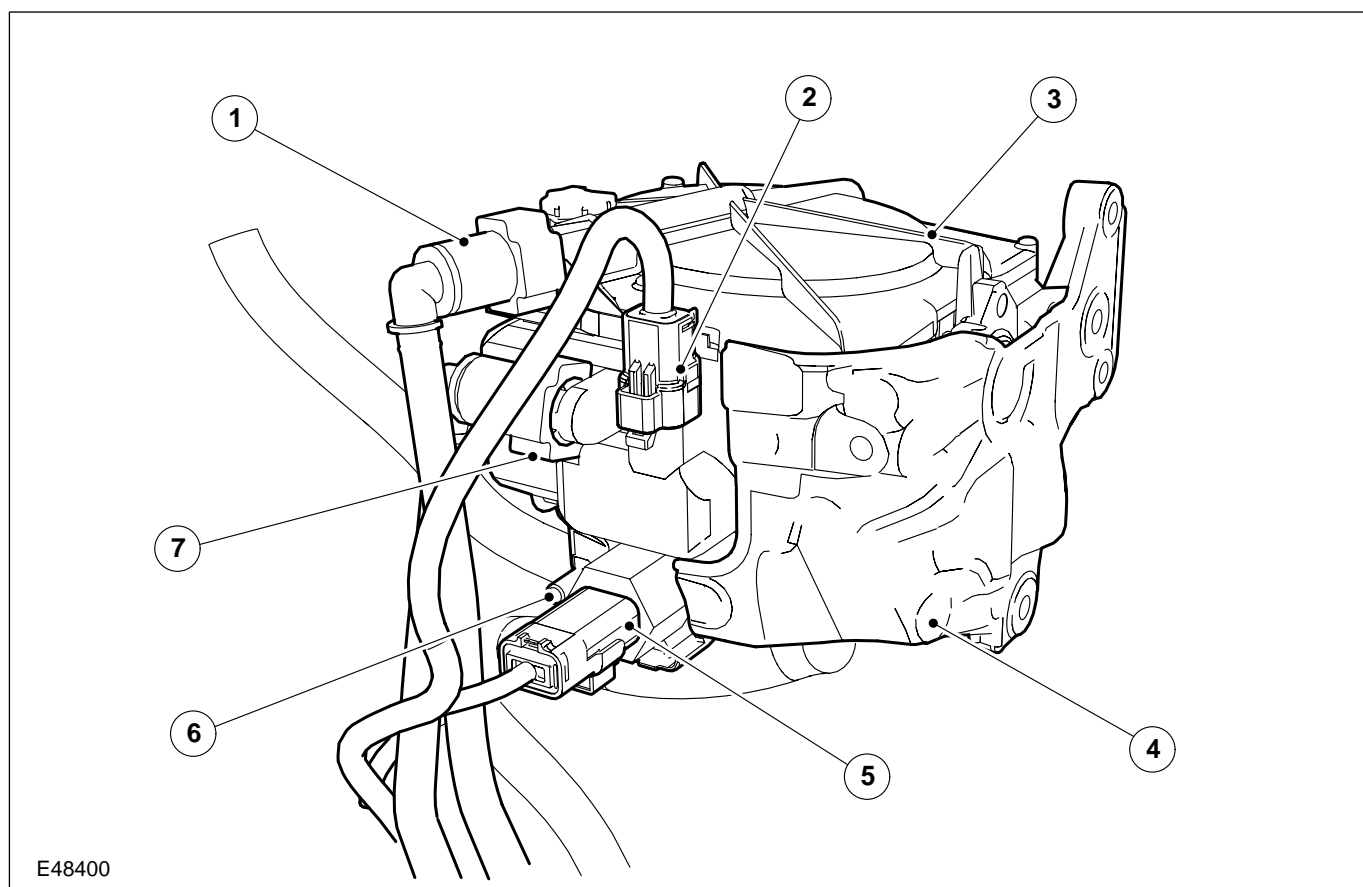
NOTE: Make sure the arrows on the fuel tank and fuel level sensor are aligned correctly. Failure to follow this may result in incorrect fuel gauge reading.



DESCRIPTION AND OPERATION

Vehicles with 1.6L Duratorq-TDCi (DV) diesel engine

Fuel Filter



E48400

Item	Description
1	Fuel tank to fuel filter fuel supply line
2	Fuel heater sensor
3	Fuel filter
4	Fuel filter retaining bracket
5	Water in fuel sensor (if equipped)
6	Fuel filter drain outlet
7	Fuel filter to fuel tank fuel return line

The 1.6L Duratorq-TDCi (DV6) diesel engine fuel filter is located above the gearbox and is attached to the cylinder head by means of a fuel filter shield and fuel filter retaining bracket. The fuel filter has an electric fuel heater which is located below the

fuel filter inlet pipe. The fuel filter forms a single component with the housing and can only be renewed as a complete unit.

For additional information, refer to: **Fuel Filter - 1.6L Duratorq-TDCi (DV) Diesel (310-01 Fuel Tank and Lines, Removal and Installation).**

When the temperature is below 15°C, a valve inside the fuel filter opens allowing fuel which is pre-heated by the fuel injection pump to be recirculated back through the fuel filter to the fuel injection pump. This aids engine performance during warm up.

Fuel is delivered through the fuel supply lines to the fuel filter. The fuel filter cleans the fuel of water and contaminants. Unused fuel is returned to the fuel pump supply line and eventually returned directly to the fuel tank.

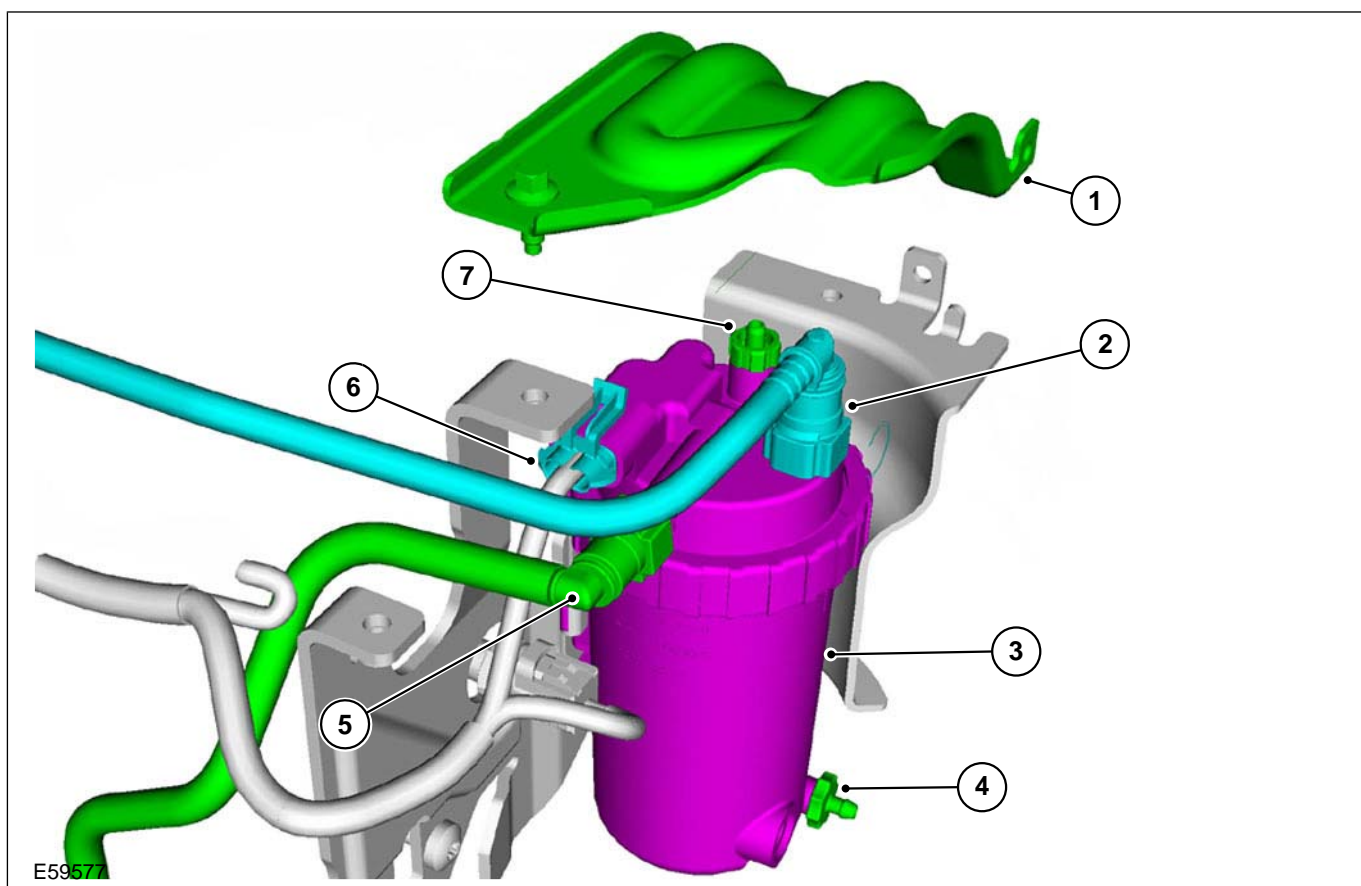
DESCRIPTION AND OPERATION

After the fuel filter has been replaced it must be bled with a hand pressure pump. Make sure that the arrows indicating the direction of fuel flow is pointing towards the fuel filter.

For additional information, refer to: [Fuel Filter - 1.6L Duratorq-TDCi \(DV\) Diesel \(310-01 Fuel Tank and Lines, Removal and Installation\)](#).

Vehicles with 1.8L Duratorq-TDCi (Kent) diesel engine

Fuel Filter



Item	Description
1	Fuel filter crash protection top shield
2	Fuel filter fuel supply line
3	Fuel filter housing
4	Fuel filter drain screw
5	Fuel filter to fuel pump fuel supply line
6	Fuel filter electrical connector
7	Fuel filter bleed screw

filter retaining bracket. The fuel filter has an electric fuel heater which is located next to the fuel pump fuel supply line.

When the temperature is below 15°C, a valve inside the fuel filter opens, allowing fuel which is pre-heated by the fuel pump to be recirculated back through the fuel filter to the fuel pump. This aids engine performance during warm up.

Fuel is delivered through the fuel supply line to the fuel filter. The fuel filter cleans the fuel of water and contaminants. Unused fuel is returned to the fuel tank through the fuel pump fuel return line.

The 1.8L Duratorq-TDCi (Kent) diesel engine fuel filter is located above the transmission and is attached to the cylinder head by means of a fuel

310-01-10

Fuel Tank and Lines

310-01-10

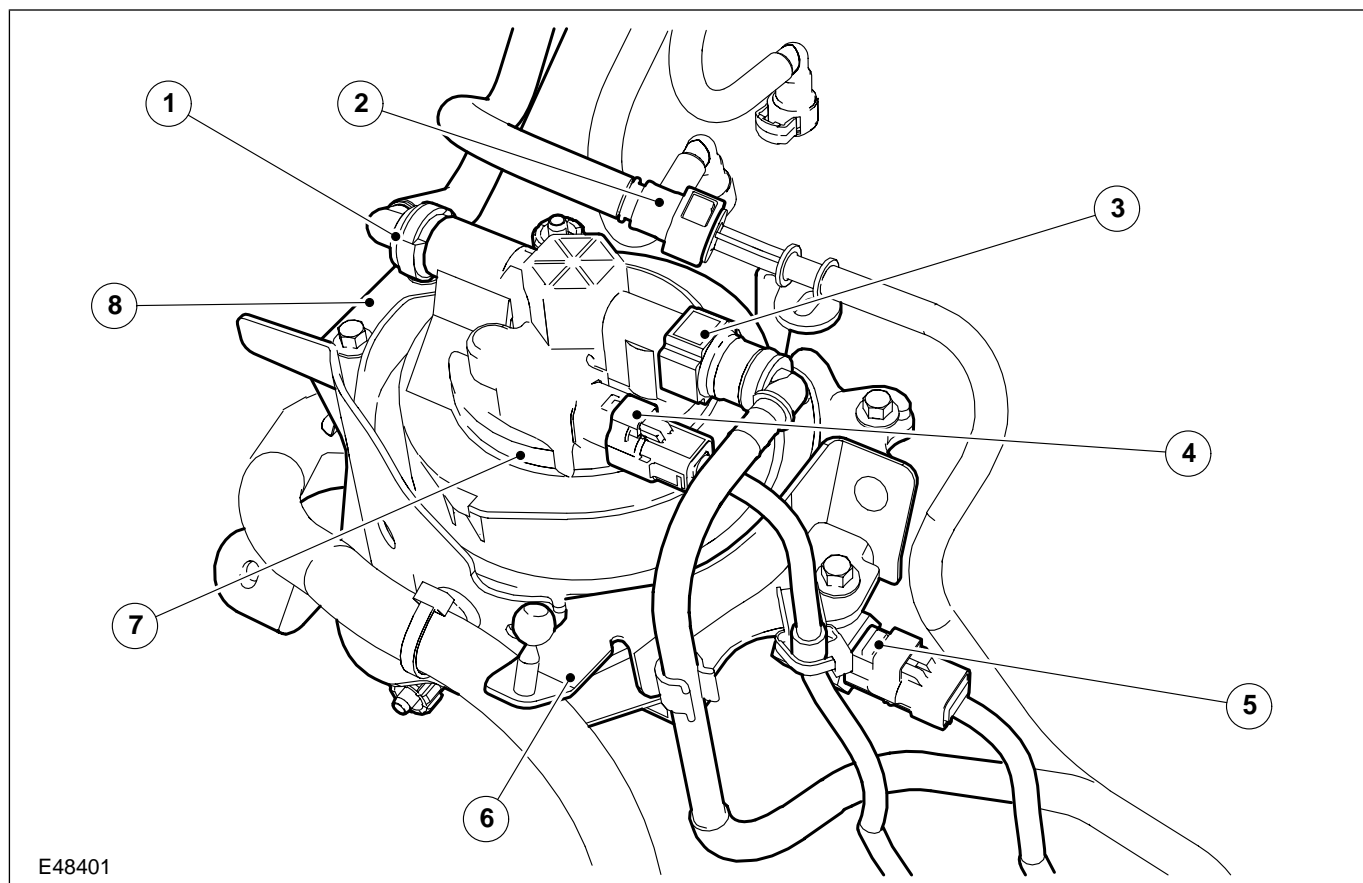
DESCRIPTION AND OPERATION

When a new fuel filter has been installed it must be bled using a hand pressure pump. Make sure that the arrows indicating the direction of fuel flow is pointing towards the fuel filter.

For additional information, refer to: **Fuel Filter - 1.8L Duratorq-TDCi (Lynx) Diesel, Vehicles Without: Water-in-Fuel Sensor (310-01 Fuel Tank and Lines, Removal and Installation).**

Vehicles with 2.0L Duratorq-TDCi (DW) diesel engine

Fuel Filter



Item	Description
1	Fuel tank to fuel filter fuel supply line
2	Fuel filter to fuel tank fuel return line
3	Fuel filter to fuel pump fuel supply line
4	Fuel heater sensor
5	Water in fuel sensor (if equipped)
6	Fuel filter crash protection shield
7	Fuel filter
8	Fuel filter retaining bracket

⚠ CAUTION: The generator must be protected from contamination. Failure to follow this instruction may cause premature failure of the generator.

The 2.0L Duratorq-TDCi (DW) diesel engine fuel filter is located above the generator and is attached to the cylinder head by means of a fuel filter crash protection shield, a fuel filter splash shield and a fuel filter retaining bracket. The fuel filter has an electric fuel heater which is located next to the fuel filter inlet pipe.

When the temperature is below 15°C, a valve inside the fuel filter opens allowing fuel which is pre-heated by the fuel injection pump to be recirculated back through the fuel filter to the fuel injection pump. This aids engine performance during warm up.

DESCRIPTION AND OPERATION





Fuel is delivered through the fuel supply lines to the fuel filter. The fuel filter cleans the fuel of water and contaminants. Unused fuel is returned to the fuel tank through the fuel pump return line.


The fuel filter is also equipped with a water-in-fuel sensor which is located at the base of the fuel filter housing. This sensor measures the amount of water which has collected in the fuel filter element. If the quantity of water present is greater than 90 ml then a warning indicator located on the instrument cluster is illuminated and the fuel filter element should then be drained of water.


When a new fuel filter has been fitted it must be bled with a hand pressure pump. Make sure that the arrows indicating the direction of fuel flow is pointing towards the fuel filter.

For additional information, refer to: **Fuel Filter - 2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Water-in-Fuel Sensor (310-01 Fuel Tank and Lines, Removal and Installation).**

Vehicles with fuel additive system**System Overview****WARNINGS:**

-  **Eye, hand, ear protection and protective clothing are required to be worn during any general service work or removal and installation of fuel additive system components. Failure to follow this instruction may result in personal injury.**
-  **In case of fuel additive fluid contact with the skin or the eyes, flush immediately with water for a minimum of 15 minutes and seek prompt medical attention. Failure to follow these instructions may result in personal injury.**
-  **If fuel additive fluid is swallowed, call a physician immediately. rinse mouth immediately with water, do not induce vomiting. Failure to follow these instructions may result in personal injury.**
-  **Always provide adequate ventilation when working on the fuel additive fluid system or related components. Failure to follow these instructions may result in personal injury.**

-  **Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.**

-  **CAUTION: Make sure the workshop area in which the vehicle is being worked on is as clean and as dust free as possible. Foreign matter from work on clutches, brakes or from machining or welding operations can contaminate the fuel system and may result in later malfunction.**

The fuel additive system supports the diesel particulate filter (DPF) to reduce the pollution generated by diesel vehicles by filtering solid elements out of the exhaust gases to reach stage 4 emission levels.

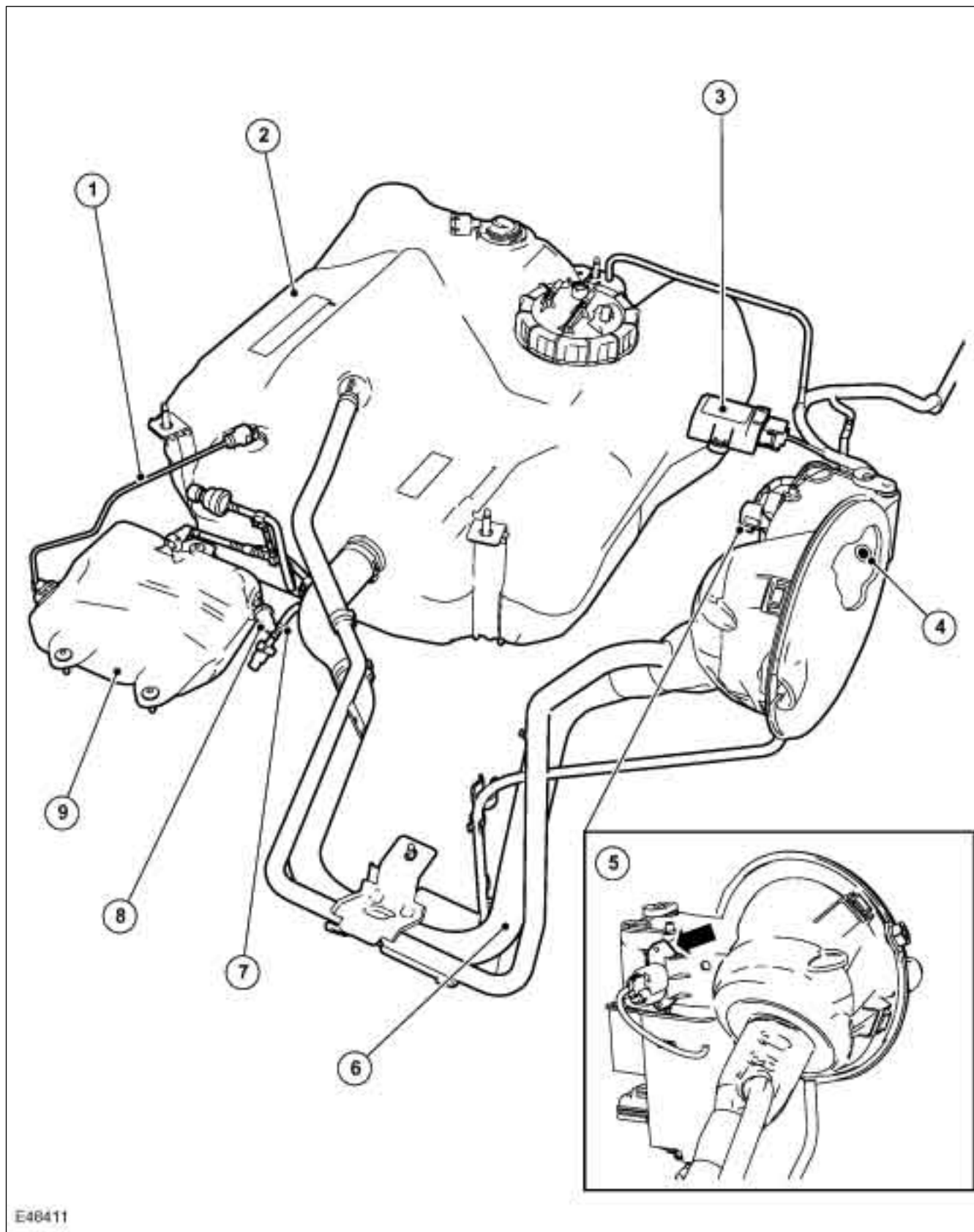
The additive system consists of a fuel additive system module, fuel additive tank to fuel tank line and a fuel additive tank with integral dosing pump. The fuel additive fluid is used to lower the combustion temperature of the unburnt fuel residues inside the DPF. The additive fluid, which contains cerium and iron must be exactly mixed with the fuel in the main fuel tank to achieve the right level when entering the DPF.

After fuel tank filling has been completed by the customer the fuel additive system module communicates information to the additive tank which injects a calculated dose of additive fluid into the main fuel tank when the vehicle reaches or exceeds a speed of 40 kph or 4 minutes after the fuel tank filling has been completed. The fuel additive system module uses signals and information from the CAN-bus, engine on/off signal, vehicle speed sensors and fuel gauge value from instrument cluster. It will also initially receive a signal from the fuel filler pipe filler flap switch to indicate that a fill up procedure may be about to occur.

Routine service interval maintenance is required for this system.

For additional information, refer to: **Fuel Additive System Filling and Bleeding (310-00 Fuel System - General Information, General Procedures).**

DESCRIPTION AND OPERATION



E48411

Item	Description
1	Fuel additive tank to fuel tank line
2	Fuel tank

Item	Description
3	Fuel additive system module
4	Fuel filler flap magnet

DESCRIPTION AND OPERATION

Item	Description
5	Fuel filler flap switch
6	Fuel tank filler pipe
7	Fuel additive tank vent and filler pipe
8	Fuel additive tank overflow port
9	Fuel additive tank and dosing pump

The fuel additive tank holds approximately 1.4 liters of usable fuel additive fluid and approximately 1.8 usable liters when completely refilled and is of a plastic construction. It is retained to the vehicle by means of three retaining bolts which are fitted to the top of the rear sub-frame on the underside of the vehicle chassis.

The fuel additive tank is also equipped with a internal dosing pump which is an integral part of the fuel additive tank. The dosing pump receives

a signal from the fuel additive system module and adds the correct amount of fuel additive to the main fuel tank. The fuel additive tank and dosing pump are a one piece unit and cannot be serviced separately.

For additional information, refer to: Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation).

The fuel additive system module controls the amount and frequency of fuel additive fluid injecting into the main fuel tank. It is retained to the vehicle by means of two retaining nuts and is located underneath the rear seat carpet.

For additional information, refer to: Fuel Additive System Module (310-01 Fuel Tank and Lines, Removal and Installation).



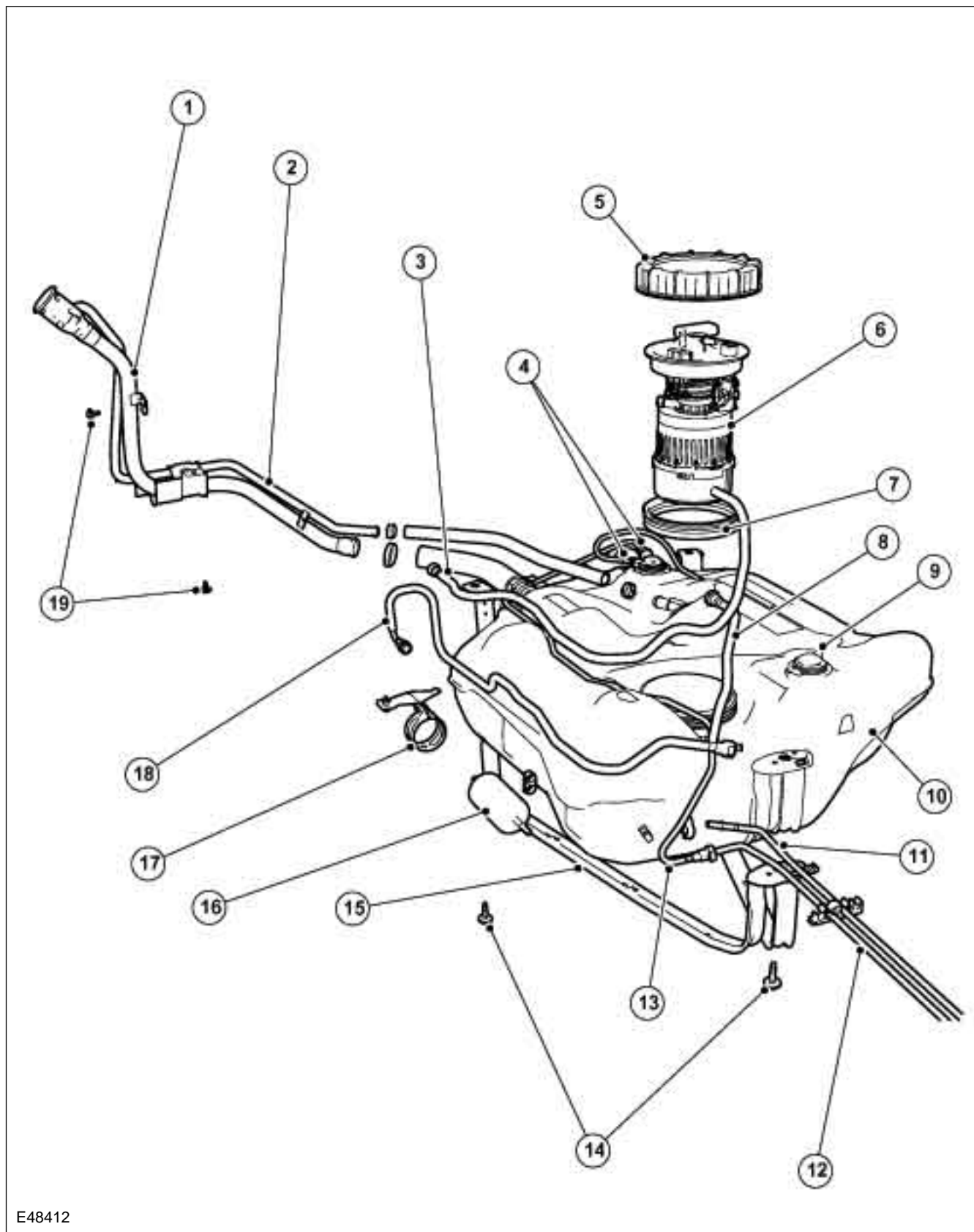
DESCRIPTION AND OPERATION

Vehicles with 1.6L Duratec-16V (Sigma) engine/1.6L Duratec-16V Ti-VCT (Sigma) engine/1.8L Duratec-HE (MI4) engine or 2.0L Duratec-HE (MI4) engine

System Overview



DESCRIPTION AND OPERATION



E48412

Item	Description
1	Fuel tank filler pipe
2	Fuel tank vent pipe

Item	Description
3	Fuel tank to fuel filter fuel supply line (if equipped)

DESCRIPTION AND OPERATION

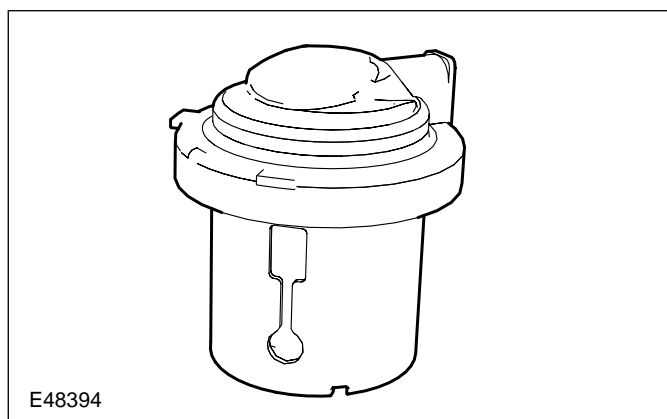
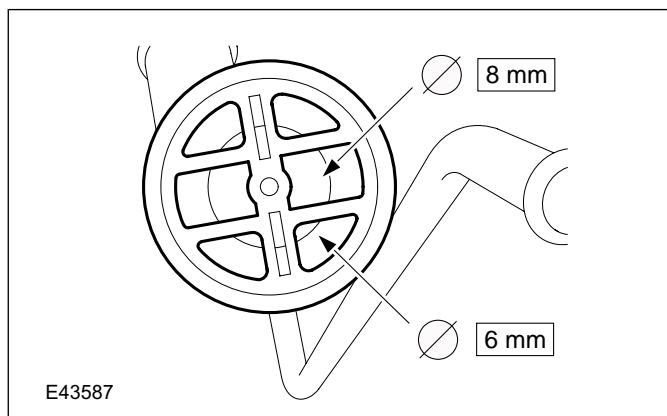
Item	Description
4	Fuel tank vent pipe
5	Fuel pump module locking ring
6	Fuel pump module
7	Fuel pump module seal
8	Fuel filter to fuel tank fuel return line (if equipped)
9	Fuel tank roll - over valves
10	Fuel tank
11	Fuel tank to fuel injection supply manifold fuel supply line
12	Evaporative emission canister pipe to evaporative emission purge valve pipe
13	Evaporative emission canister pipe
14	Fuel tank support straps retaining bolts
15	Fuel tank support straps
16	Fuel filter (if equipped)
17	Fuel filter retaining bracket (if equipped)
18	Fuel filter to fuel supply line fuel supply line (if equipped)
19	Fuel filler pipe retaining screws

The fuel tank holds approximately 55 liters of usable fuel and is of a plastic construction. It is retained to the vehicle by means of two steel support straps, the fuel tank supports straps are secured by three retaining bolts onto the underside of the vehicle chassis.

The fuel tank filler pipe is designed to fill the fuel tank it consists of a fuel tank filler pipe and fuel tank vent pipe, located within the fuel tank filler pipe is a fuel filler pipe spit back valve. The spit back valve has been designed to reduce the possibility of fuel tank siphoning. To enable the hose of the fuel tank draining equipment to enter the fuel tank, it must pass through the fuel filler pipe spit back valve. For additional information on fuel tank draining.

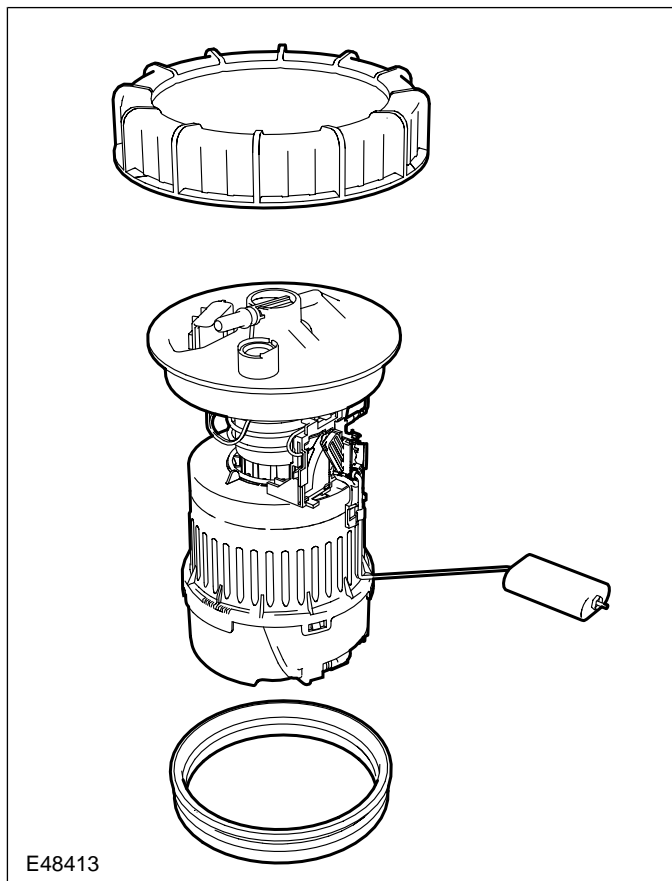
For additional information, refer to: Fuel Tank Draining (310-00 Fuel System - General Information, General Procedures).

The fuel tank filler pipe vent pipe allows air to escape from the tank when the fuel tank is being filled.



Fuel tank ventilation is achieved by two fuel tank roll - over valves venting through a back pressure valve and into an evaporative emission canister which absorbs the fuel vapor. The fuel tank roll - over valve are installed into the top of the fuel tank and will prevent fuel loss from the fuel tank if the vehicle becomes inverted.

DESCRIPTION AND OPERATION



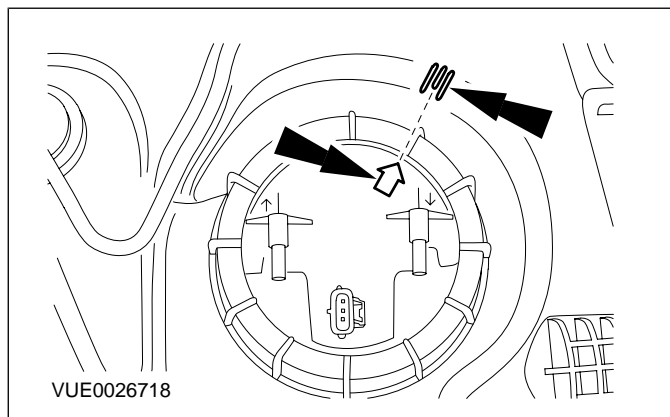
E48413

The fuel pump module is located in the top of the fuel tank and retained by a re-usable fuel tank locking ring. The fuel pump module seal must not be re-used once removed from the fuel tank.

The fuel pump module consists of a fuel sender, a fuel filter and a high pressure fuel pump with pressure regulator. The fuel filter is designed to reduce the amount of large fuel debris entering the main fuel system filter. The fuel tank module filter has been designed as a non serviceable item and will last the lifetime of the vehicle, if the fuel tank module filter becomes blocked a new fuel pump module must be installed

For additional information, refer to: **Fuel Pump Module** (310-01 Fuel Tank and Lines, Removal and Installation).

The fuel pump is a turbine type pump which is an integral part of the fuel pump module. The fuel tank module fuel sender communicates directly with the instrument cluster which drives the fuel gauge informing the driver the amount of fuel that is currently in the fuel tank.



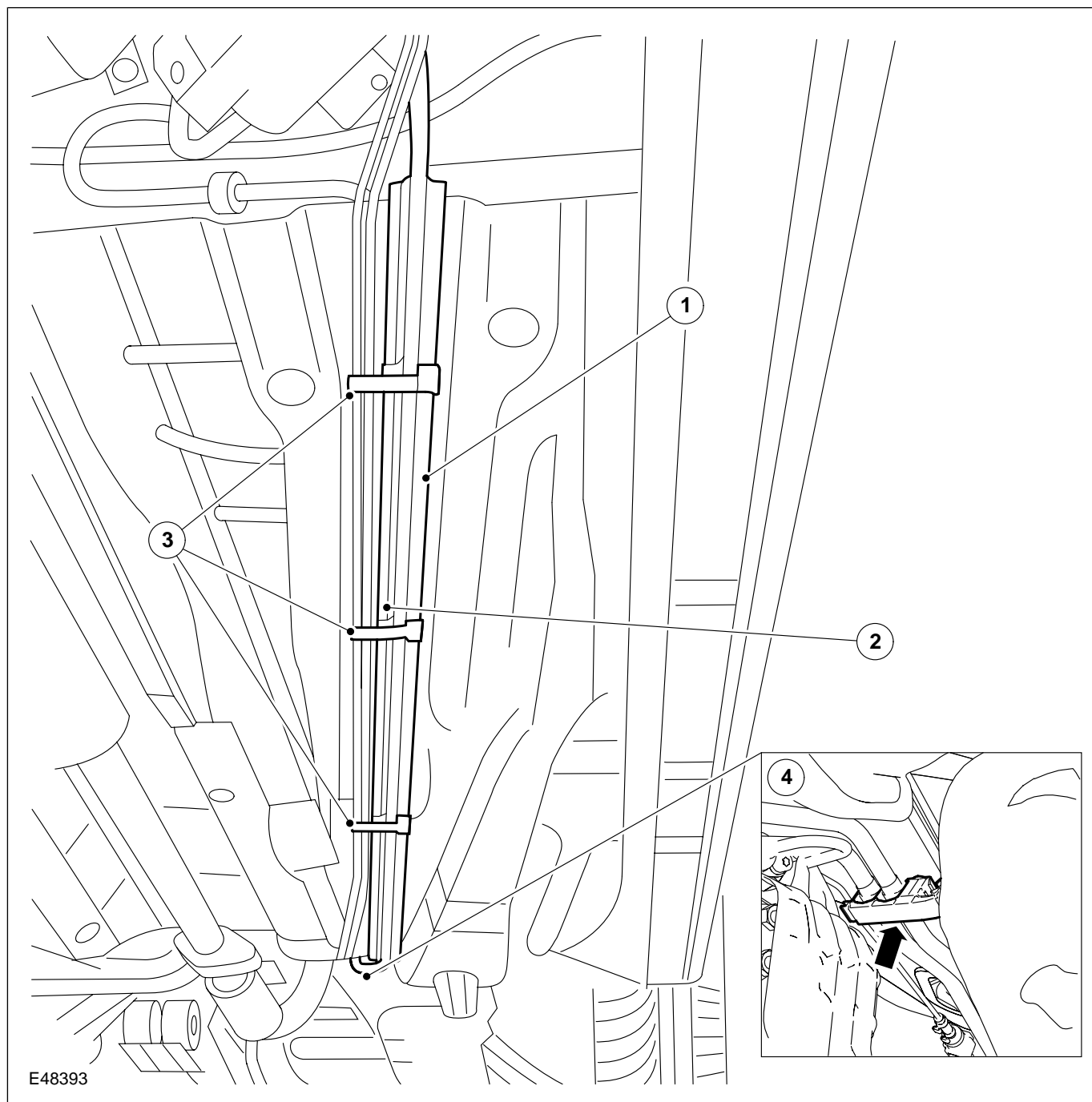
CAUTION: Make sure the fuel tank level sensor float and arm are not damaged during the installation of the fuel pump module.

NOTE: Make sure the arrows on the fuel tank and fuel pump module are aligned correctly. Failure to follow this may result in incorrect fuel gauge reading.

The fuel tank must be completely removed from the vehicle before the fuel pump module unit can be removed.

For additional information, refer to: **Fuel Tank - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)/2.5L Duratec-ST (VI5), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation).**

DESCRIPTION AND OPERATION



Item	Description
1	Fuel supply line
2	Evaporative emission purge valve pipe to evaporative emission canister
3	Fuel line retaining clips
4	Fuel line grounding clip

The fuel supply line has either spring lock couplings or quick release couplings at each end to secure it to the fuel tank.

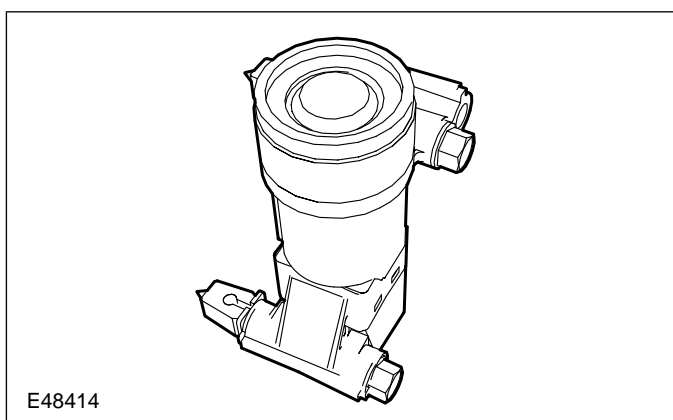
For additional information, refer to: **Quick Release Coupling** (310-00 Fuel System - General Information, General Procedures) / **Spring Lock Couplings** (310-00 Fuel System - General Information, General Procedures).

The fuel supply line is constructed from a steel material coated with nylon and is retained by clips which are also made of plastic. At the front of the vehicle there is a fuel line grounding clip equipped with a conductive sleeve made of steel or

DESCRIPTION AND OPERATION

conductive plastic which also holds the fuel supply line against the body. This clip is made of a conductive material which is designed to dissipate the static electricity created when fuel travels through the fuel supply line.

Vehicles with 1.6L Duratec-16V (Sigma) engine/1.6L Duratec-16V Ti-VCT (Sigma) engine/1.8L Duratec-HE (MI4) engine or 2.0L Duratec-HE (MI4) engine are equipped with a returnless fuel system. The returnless fuel system eliminates fuel system recirculation therefore reducing fuel heating and evaporative emissions. A fuel pressure sensor located in the fuel tank module controls a constant fuel rail pressure under all driving conditions.



The inertia fuel shutoff (IFS) switch cuts off the electrical supply to the fuel pump in the event of an accident and is located in the right hand footwell behind the front scuff plate trim panel.

For additional information, refer to: **Front Scuff Plate Trim Panel (501-05 Interior Trim and Ornamentation, Removal and Installation).**

DIAGNOSIS AND TESTING**Fuel Tank and Lines**

For vehicles with fuel additive tank.

REFER to: **Fuel System - 1.6L Duratorq-TDCi (DV)**
Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L
Duratorq-TDCi (DW) Diesel (310-00 Fuel System
- General Information, Diagnosis and Testing).

For vehicles with 1.6L Duratec-16V (Sigma)/1.8L
Duratec-HE (MI4)/2.0L Duratec-HE.

REFER to: **Fuel System - 1.4L Duratec-16V**
(Sigma)/1.6L Duratec-16V (Sigma)/1.8L
Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (310-00
Fuel System - General Information, Diagnosis
and Testing).

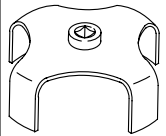
For vehicles with 1.6L Duratorq-TDCi (DV)
Diesel/2.0L Duratorq-TDCi (DW) Diesel.

REFER to: **Fuel System - 1.6L Duratorq-TDCi (DV)**
Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L
Duratorq-TDCi (DW) Diesel (310-00 Fuel System
- General Information, Diagnosis and Testing).

REMOVAL AND INSTALLATION

Fuel Tank — 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)/2.5L Duratec-ST (VI5), Vehicles Without: Fuel Fired Booster Heater

Special Tool(s)

 <p>23055</p>	<p>Wrench, Fuel Tank Sender Unit (310-069) 23-055</p>
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General Equipment

<p>Transmission jack</p>

WARNINGS:

- ▲ Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.
- ▲ This procedure involves fuel handling. Be prepared for fuel spillage at all times and always observe fuel handling precautions. Failure to follow these instructions may result in personal injury.
- ▲ The fuel system remains pressurized for a long time after the ignition is switched off. The fuel pressure must be released before attempting any repairs. Failure to follow these instructions may result in personal injury.

1. Release the fuel system pressure.

For additional information, refer to: **Fuel System Pressure Release - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)** (310-00 Fuel System - General Information, General Procedures).

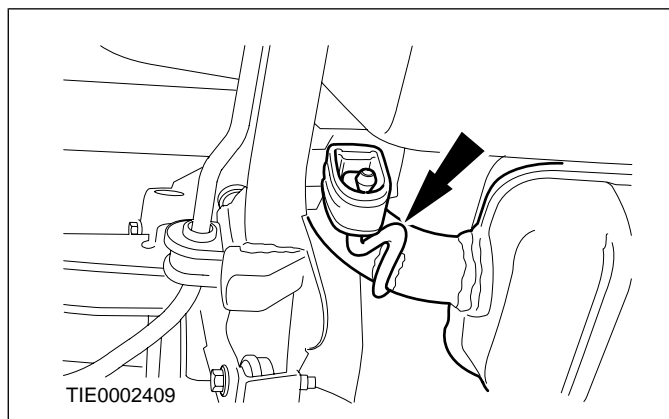
2. Drain the fuel tank.

For additional information, refer to: **Fuel Tank Draining** (310-00 Fuel System - General Information, General Procedures).

3. Raise and support the vehicle.

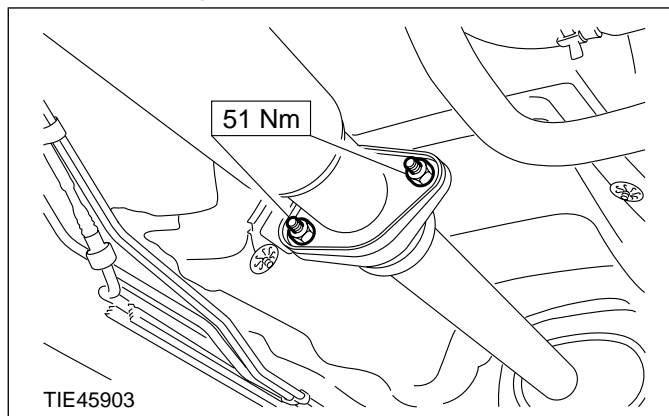
For additional information, refer to: **Lifting** (100-02 Jacking and Lifting, Description and Operation).

4. Detach the exhaust system from the middle hanger insulator.



5. Remove the exhaust flange nuts.

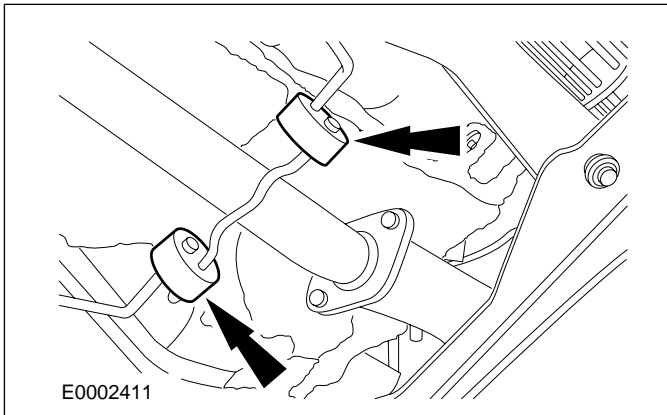
- Discard the gasket and exhaust flange retaining nuts.



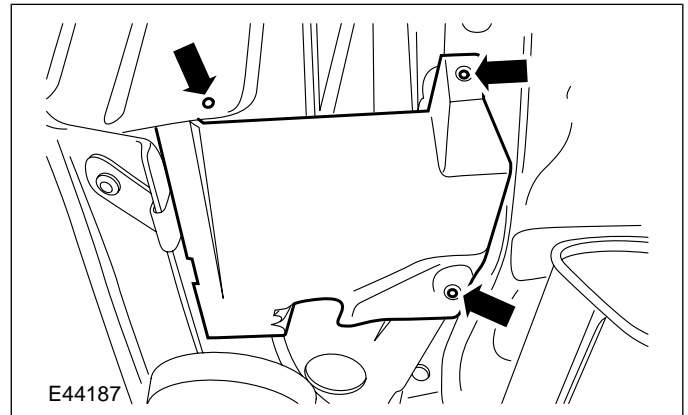
6. NOTE: With the aid of another technician support the exhaust.

REMOVAL AND INSTALLATION

Detach the exhaust system from the front hanger insulators.

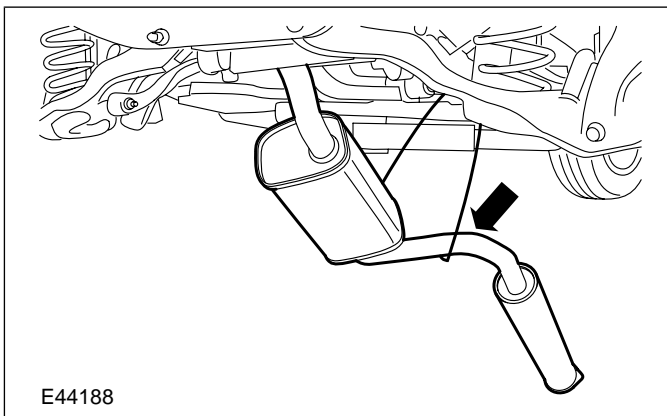


8. Remove the left hand side rear air deflector shield.



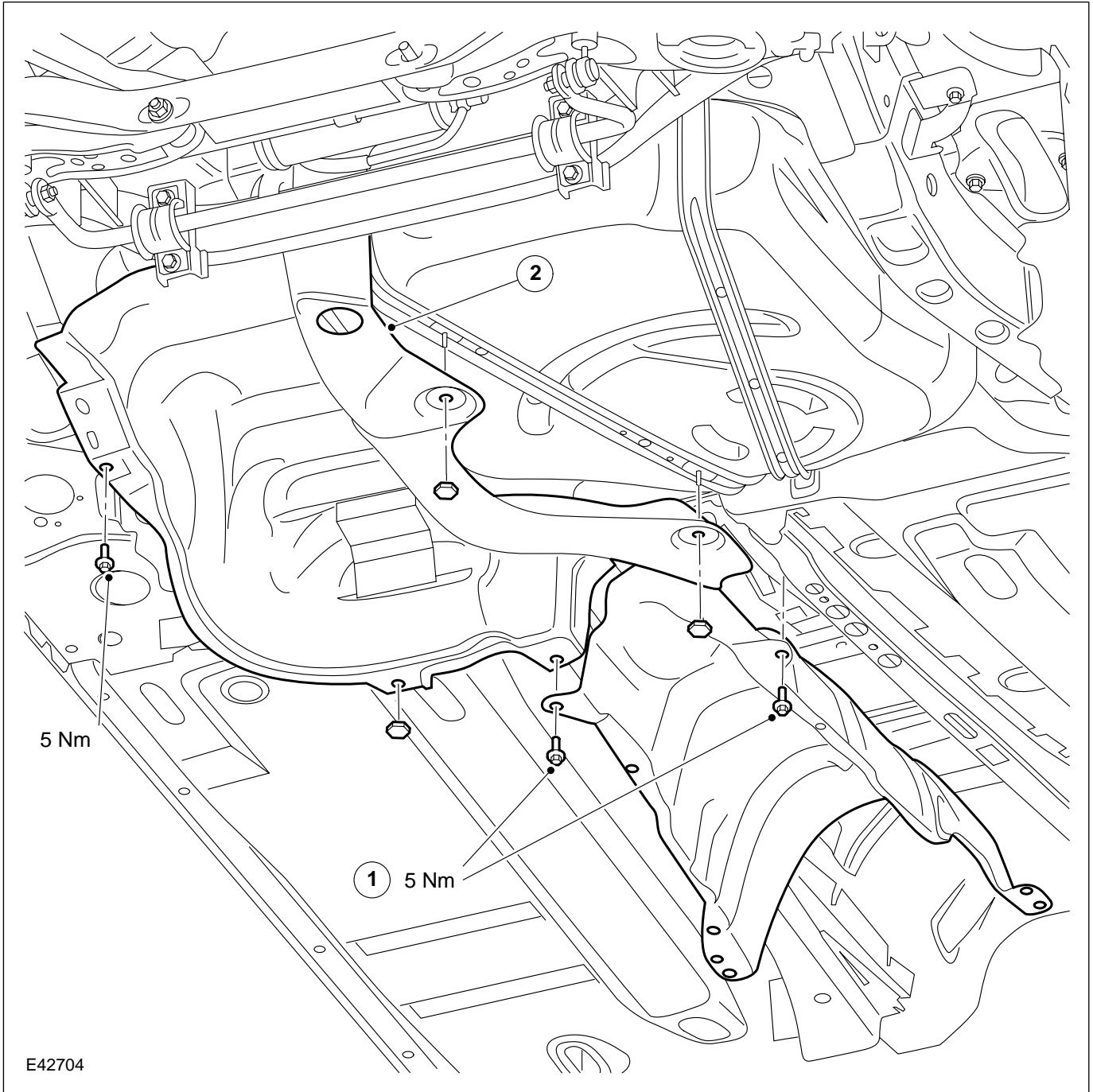
7. **NOTE:** With the aid of another technician support the exhaust.

Position the exhaust to one side and secure to the body with tie-straps.



9. Remove the components in the order indicated in the following illustration(s) and table(s).

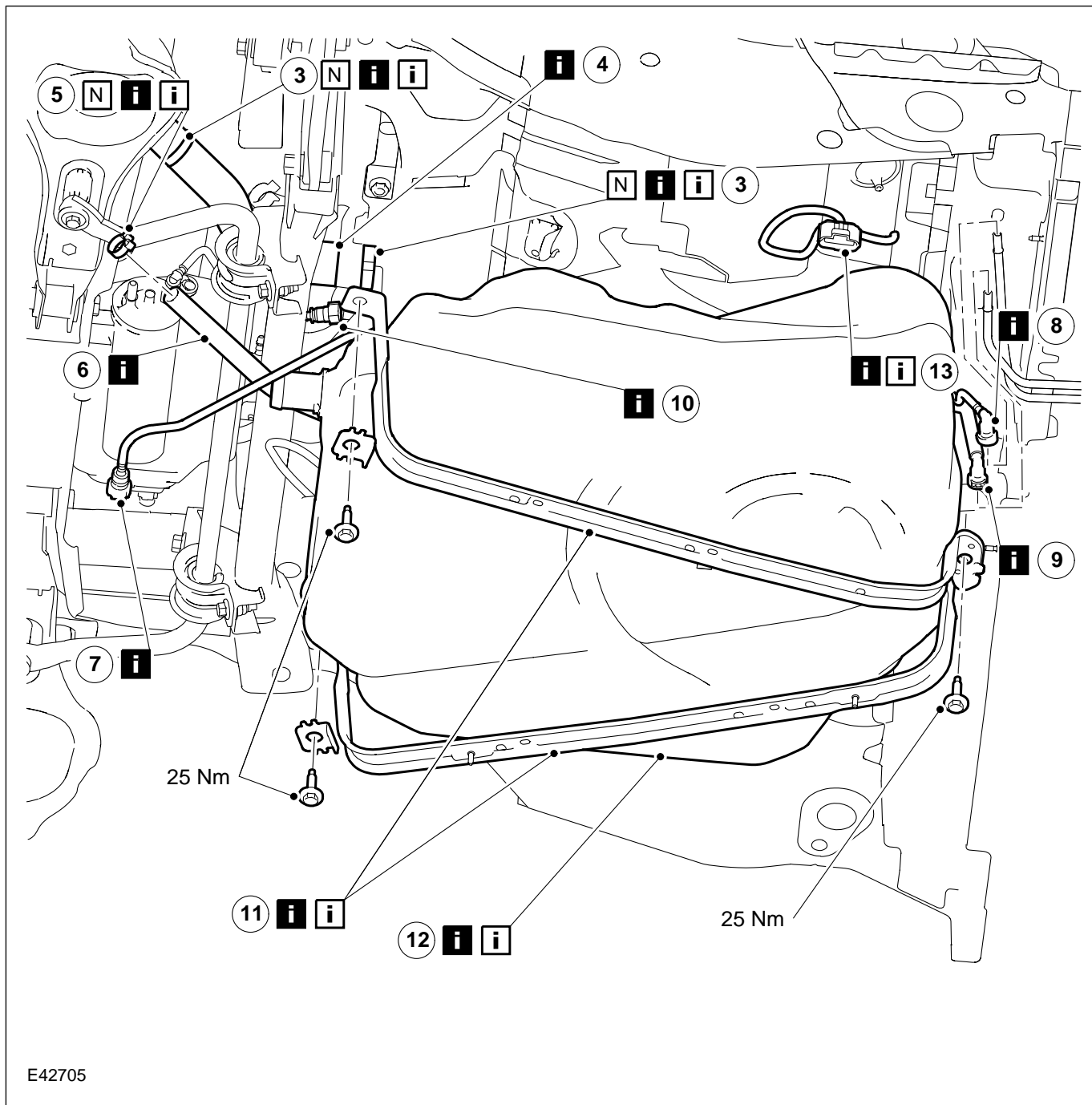
REMOVAL AND INSTALLATION



E42704

Item	Description
1	Exhaust pipe center heat shield retaining bolts
2	Fuel tank heat shield

REMOVAL AND INSTALLATION



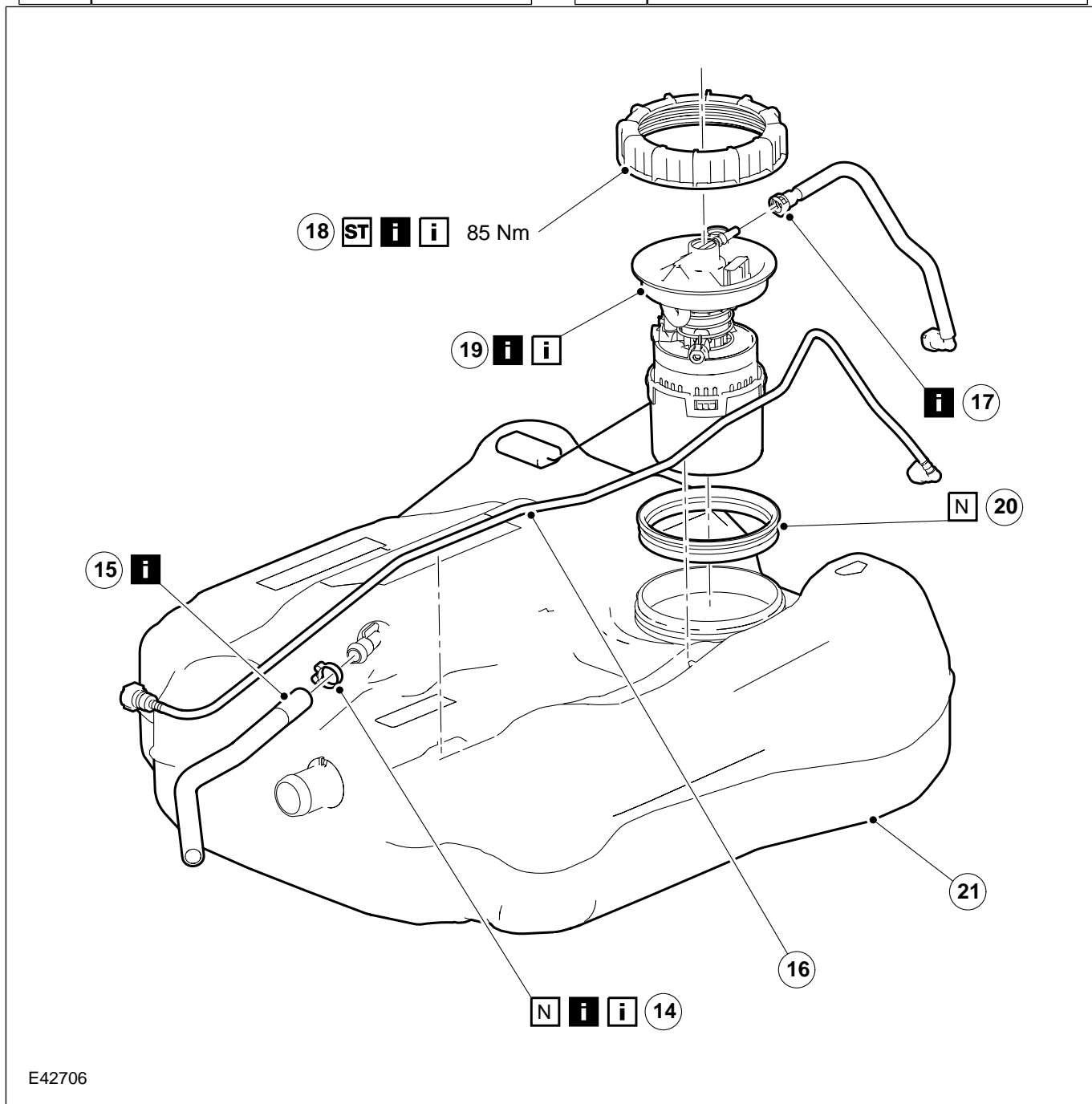
Item	Description
3	Fuel tank filler hose retaining clamps <i>See Removal Detail</i> <i>See Installation Detail</i>
4	Fuel tank filler hose <i>See Removal Detail</i>
5	Fuel tank vent hose retaining clamp <i>See Removal Detail</i> <i>See Installation Detail</i>
6	Fuel tank vent hose <i>See Removal Detail</i>

Item	Description
7	Evaporative emission canister vent pipe quick release coupling <i>See Removal Detail</i>
8	Fuel line to fuel tank vent pipe quick release coupling <i>See Removal Detail</i>
9	Fuel tank fuel supply line quick release coupling <i>See Removal Detail</i>

REMOVAL AND INSTALLATION

Item	Description
10	Evaporative emission canister to fuel tank vent pipe quick release coupling <i>See Removal Detail</i>
11	Fuel tank support straps <i>See Removal Detail</i> <i>See Installation Detail</i>

Item	Description
12	Fuel tank <i>See Removal Detail</i> <i>See Installation Detail</i>
13	Fuel pump module electrical connector <i>See Removal Detail</i> <i>See Installation Detail</i>



REMOVAL AND INSTALLATION

Item	Description
14	Fuel tank vent hose retaining clamp See Removal Detail See Installation Detail
15	Fuel tank vent hose See Removal Detail
16	Fuel tank vent pipe
17	Fuel supply line See Removal Detail
18	Fuel pump module locking ring See Removal Detail See Installation Detail

Item	Description
19	Fuel pump module See Removal Detail See Installation Detail
20	Fuel pump module seal
21	Fuel tank

10. To install, reverse the removal procedure.

11. Initialize the door window motors.

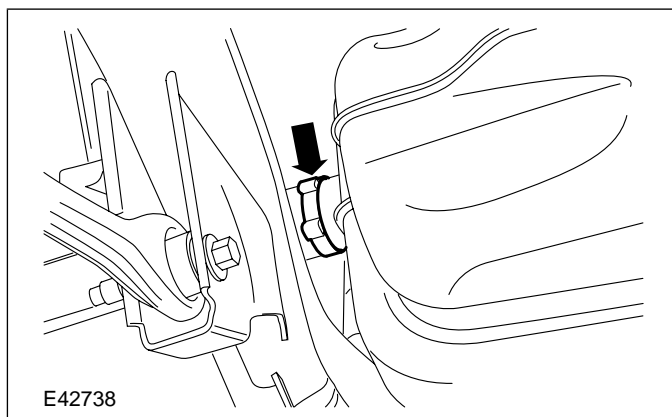
For additional information, refer to: **Door Window Motor Initialization** (501-11 Glass, Frames and Mechanisms, General Procedures).

Removal Details

Item 3 Fuel tank filler hose retaining clamps

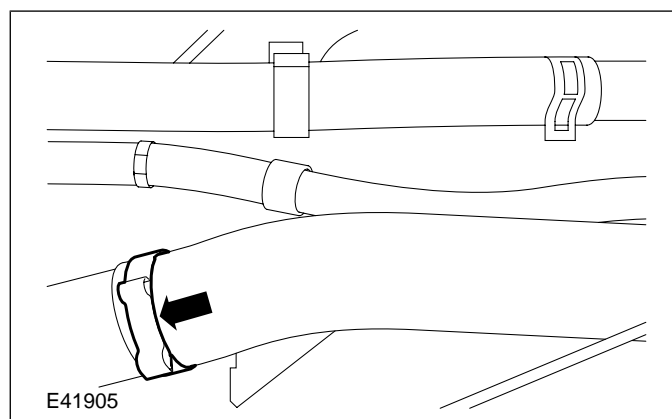
- NOTE: Make a note of the position of the fuel tank filler hose retaining clamp. Make sure that the new replacement screw type clamp is positioned so that the screw head is in the same position as as the original filler hose retaining clamp.

Remove and discard the fuel tank filler hose retaining clamp.



- NOTE: Make a note of the position of the fuel tank filler hose retaining clamp. Make sure that the new replacement screw type clamp is positioned so that the screw head is in the same position as as the original filler hose retaining clamp.

Remove and discard the fuel tank filler hose retaining clamp (rear sub-frame shown removed for clarity).



Item 4 Fuel tank filler hose

- CAUTION:** When removing the fuel tank filler hose, do not use any sharp edge tools to lever off the pipes. Failure to follow this instruction may result in damage to the filler hose.

Remove the fuel tank filler hose.

Item 5 Fuel tank vent hose retaining clamp

- NOTE: Make a note of the position of the fuel tank vent hose retaining clamp. Make sure that the new replacement screw type clamp is positioned so that the screw head is in the same position as as the original vent hose retaining clamp.

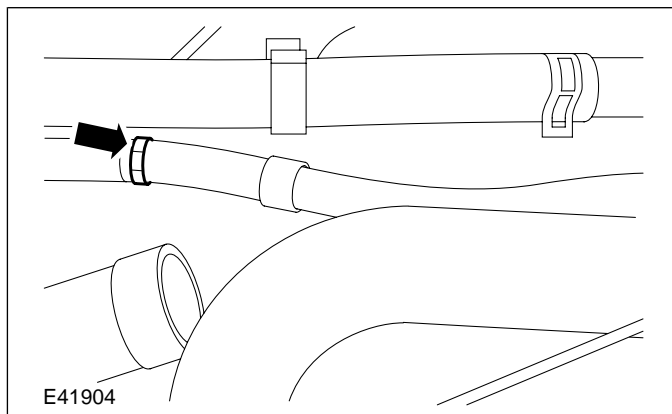
310-01-27

Fuel Tank and Lines

310-01-27

REMOVAL AND INSTALLATION

Remove and discard the fuel tank vent hose retaining clamp (rear sub-frame shown removed for clarity).



Item 6 Fuel tank vent hose

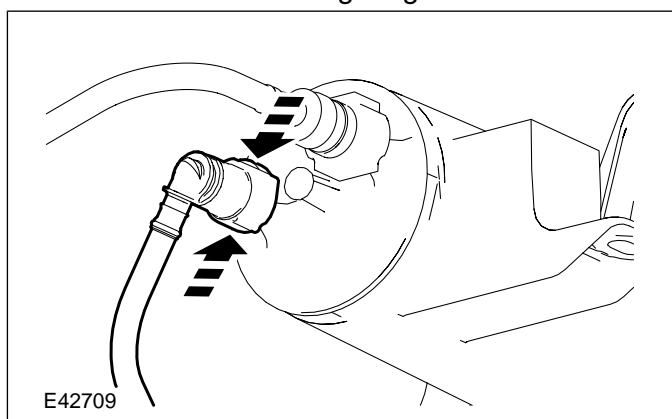
1. **CAUTION:** When removing the fuel tank vent hose, do not use any sharp edge tools to lever off the pipes. Failure to follow this instruction may result in damage to the vent hose.

Disconnect the fuel tank vent hose from the fuel tank filler pipe.

Item 7 Evaporative emission canister vent pipe quick release coupling

1. Disconnect the evaporative emission canister vent pipe quick release coupling from the evaporative emission canister.

- Release the locking tangs



Item 8 Fuel line to fuel tank vent pipe quick release coupling

1. Disconnect the fuel line to fuel tank vent pipe quick release coupling.

For additional information, refer to: **Quick Release Coupling** (310-00 Fuel System - General Information, General Procedures).

Item 9 Fuel tank fuel supply line quick release coupling

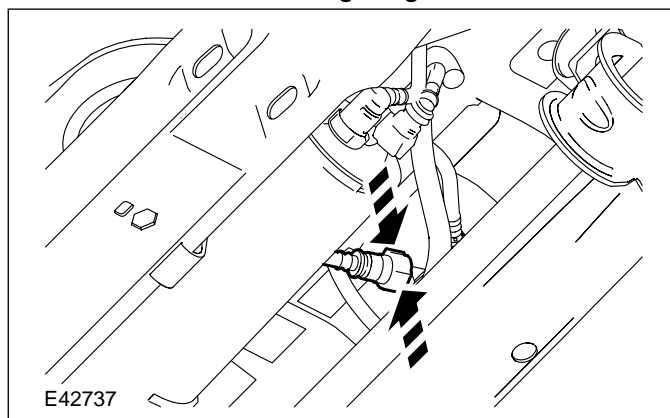
1. Disconnect the fuel tank fuel supply line quick release coupling.

For additional information, refer to: **Quick Release Coupling** (310-00 Fuel System - General Information, General Procedures).

Item 10 Evaporative emission canister to fuel tank vent pipe quick release coupling

1. Disconnect the evaporative emission canister to fuel tank vent pipe quick release coupling from the fuel tank.

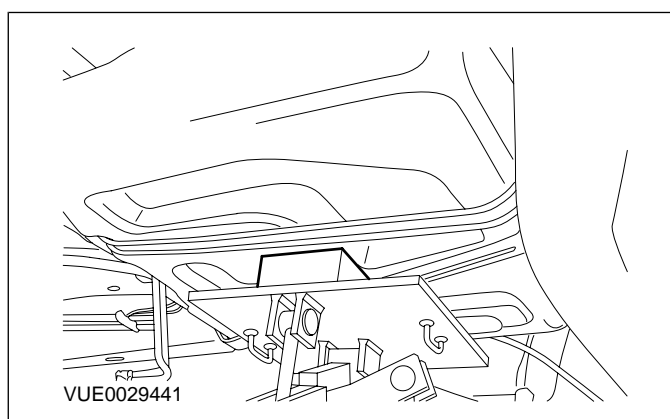
- Release the locking tangs



Item 11 Fuel tank support straps

1. **CAUTION:** When supporting the fuel tank, use a suitable packing material to prevent damage to the underside of the fuel tank.

1. Place a suitable transmission jack under the fuel tank.



Item 12 Fuel tank

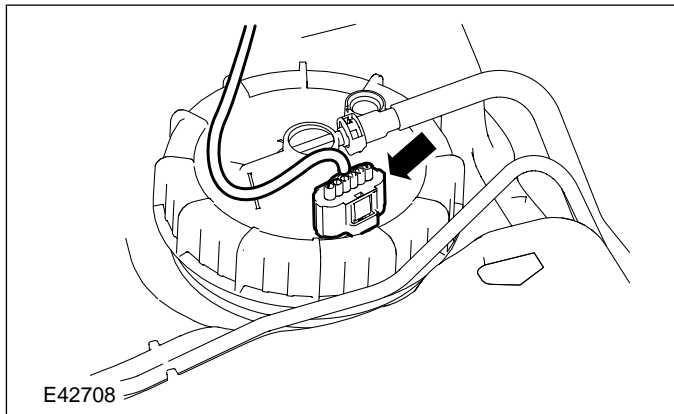
1. **CAUTION:** When lowering the fuel tank, do not place excessive strain on the fuel lines and wiring harness.

REMOVAL AND INSTALLATION

1. Partially lower the fuel tank.

Item 13 Fuel pump module electrical connector

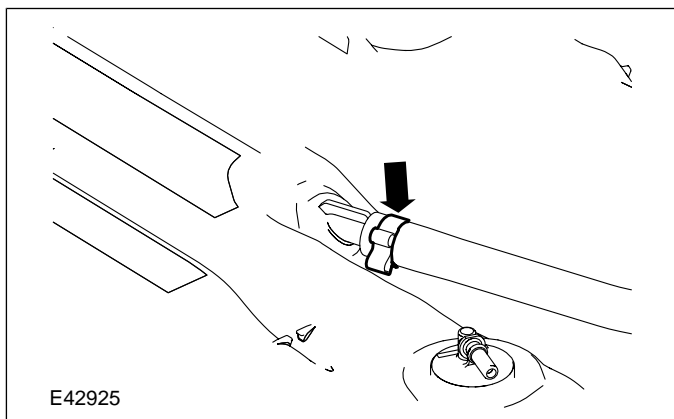
1. Disconnect the fuel pump module electrical connector.



Item 14 Fuel tank vent hose retaining clamp

1. **NOTE:** Make a note of the position of the fuel tank vent hose retaining clamp. Make sure that the new replacement screw type clamp is positioned so that the screw head is in the same position as the original vent hose retaining clamp.

Remove and discard the fuel tank vent hose retaining clamp.



Item 15 Fuel tank vent hose

1. **CAUTION:** When removing the fuel tank vent hose, do not use any sharp edge tools to lever off the pipes. Failure to follow this instruction may result in damage to the vent hose.

Remove the fuel tank vent hose from the fuel tank.

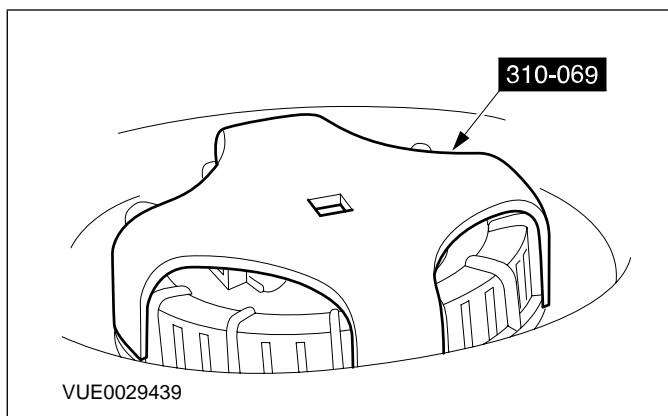
Item 17 Fuel supply line

1. Disconnect the fuel supply line quick release coupling.

For additional information, refer to: Quick Release Coupling (310-00 Fuel System - General Information, General Procedures).

Item 18 Fuel pump module locking ring

1. Using the special tool, remove the fuel pump locking ring.



Item 19 Fuel pump module

1. **CAUTION:** Make sure the fuel tank level sensor float and arm are not damaged during the removal of the fuel pump module.

Installation Details

Item 19 Fuel pump module

1. **CAUTION:** Make sure the fuel tank level sensor float and arm are not damaged during the installation of the fuel pump module.

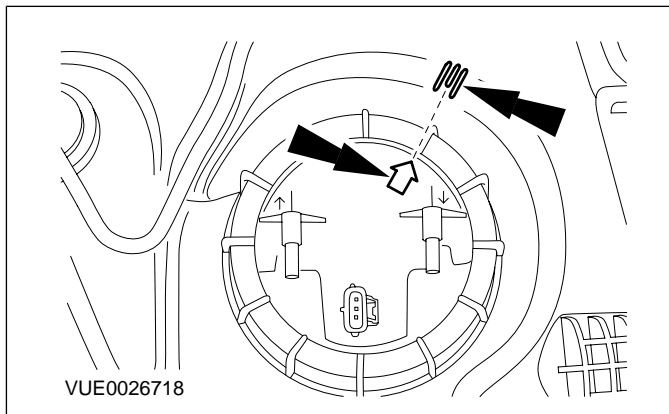
310-01-29

Fuel Tank and Lines

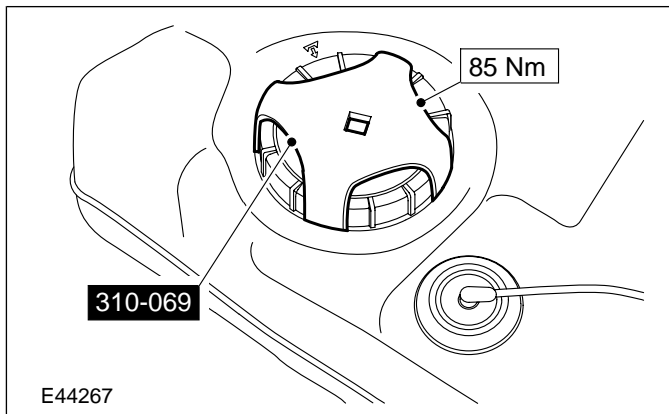
310-01-29

REMOVAL AND INSTALLATION

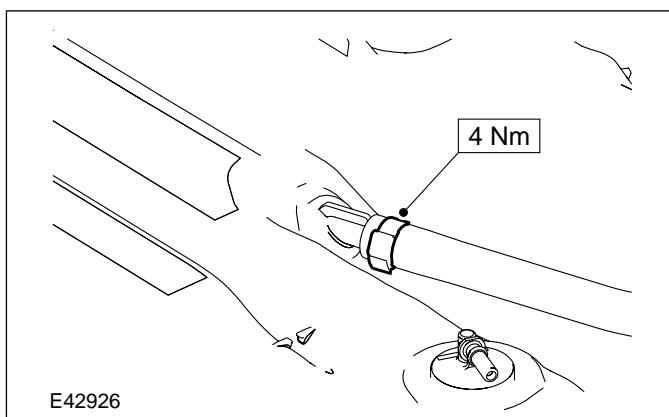
Make sure the arrows on the fuel tank and fuel pump module are aligned correctly.

**Item 18** Fuel pump module locking ring

1. Using the special tool, install the fuel pump locking ring.

**Item 14** Fuel tank vent hose retaining clamp

1. Install a new fuel tank vent hose retaining clamp in the position shown.

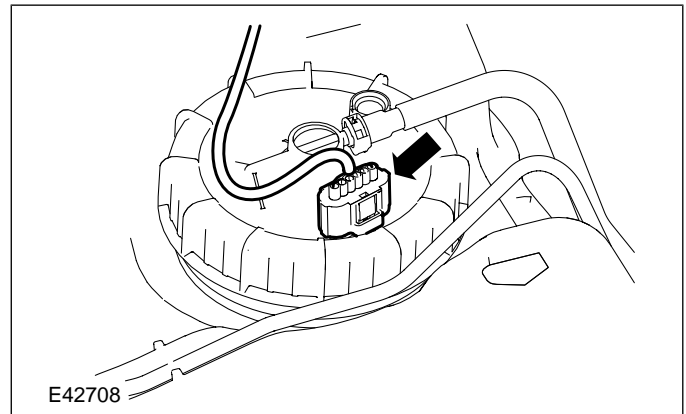
**Item 12** Fuel tank

- CAUTION:** When installing the fuel tank, make sure the fuel lines do not get kinked or trapped.

1. Partially raise the fuel tank.

Item 13 Fuel pump module electrical connector

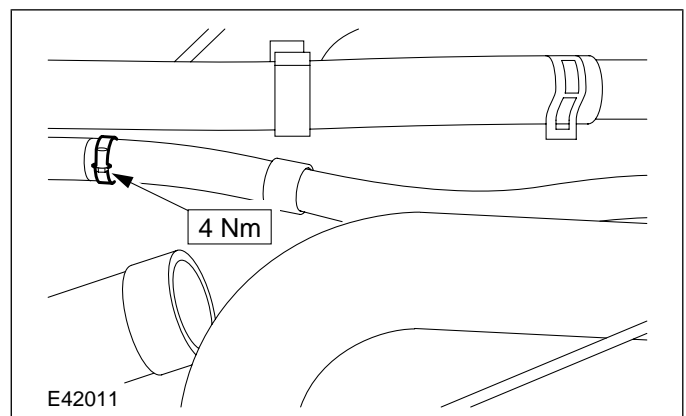
1. Connect the fuel pump module electrical connector.

**Item 11** Fuel tank support straps

1. Install the fuel tank support strap retaining bolts and remove the transmission jack.

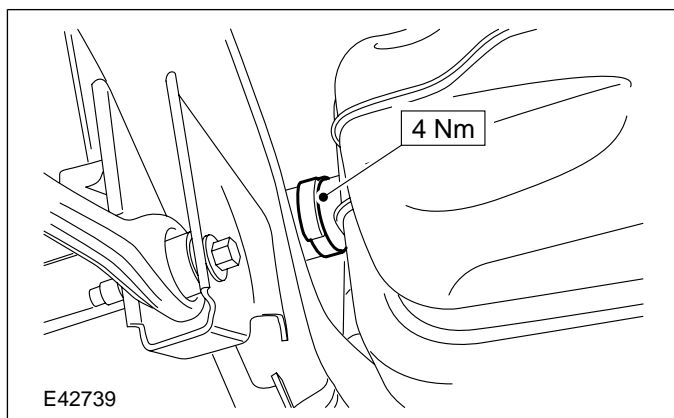
Item 5 Fuel tank vent hose retaining clamp

1. Install a new fuel tank filler hose retaining clamp in the position shown (rear sub-frame shown removed for clarity).

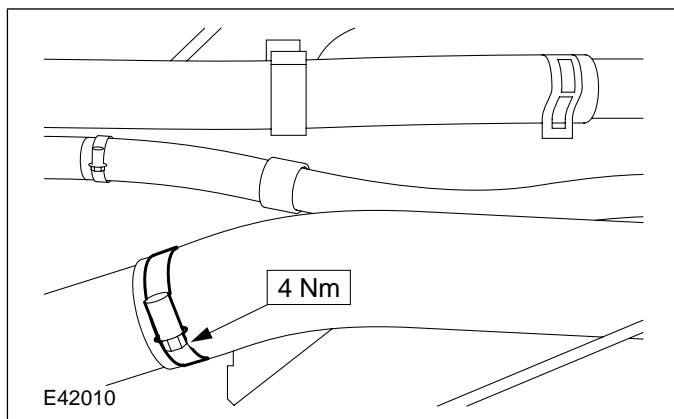


REMOVAL AND INSTALLATION**Item 3 Fuel tank filler hose retaining clamps**

1. Install a new fuel tank filler hose retaining clamp in the position shown.



2. Install a new fuel tank filler hose retaining clamp in the position shown (rear sub-frame shown removed for clarity).



REMOVAL AND INSTALLATION**Fuel Pump Module(23 534 0)****1. For vehicles fitted with petrol engines.**

For additional information, refer to: **Fuel Tank**

- 1.6L Duratec-16V (Sigma)/1.6L
Duratec-16V Ti-VCT (Sigma)/1.8L
Duratec-HE (MI4)/2.0L Duratec-HE
(MI4)/2.5L Duratec-ST (VI5), Vehicles
Without: Fuel Fired Booster Heater (310-01
Fuel Tank and Lines, Removal and
Installation).

**2. For vehicles fitted with diesel engines
without fuel additive tank.**

For additional information, refer to: **Fuel Tank**

- 1.6L Duratorq-TDCi (DV) Diesel/1.8L
Duratorq-TDCi (Lynx) Diesel/2.0L
Duratorq-TDCi (DW) Diesel, Vehicles
Without: Fuel Fired Booster Heater/Fuel
Additive Tank (310-01 Fuel Tank and Lines,
Removal and Installation).

**3. For vehicles fitted with diesel engines with
fuel additive tank.**

For additional information, refer to: **Fuel Tank**

- 1.6L Duratorq-TDCi (DV) Diesel/2.0L
Duratorq-TDCi (DW) Diesel, Vehicles With:
Fuel Additive Tank, Vehicles Without: Fuel
Fired Booster Heater (310-01 Fuel Tank and
Lines, Removal and Installation).

REMOVAL AND INSTALLATION

Fuel Tank Filler Pipe

General Equipment

Transmission jack

WARNINGS:

- ▲ This procedure involves fuel additive handling. Be prepared for fuel additive spillage at all times and always observe fuel handling precautions. Failure to follow these instructions may result in personal injury.
- ▲ Eye, hand, ear protection and protective clothing are required to be worn during any general service or removal and installation procedure of fuel additive system components. Failure to follow this instruction may result in personal injury.
- ▲ In case of fuel additive fluid contact with the skin or the eyes, flush immediately with water for a minimum of 15 minutes and seek prompt medical attention. Failure to follow these instructions may result in personal injury.
- ▲ If fuel additive fluid is swallowed, call a physician immediately. rinse mouth immediately with water, do not induce vomiting. Failure to follow these instructions may result in personal injury.
- ▲ Always provide adequate ventilation when working on the fuel additive fluid system or related components. Failure to follow these instructions may result in personal injury.
- ▲ Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.
- ▲ **CAUTION:** Make sure the workshop area in which the vehicle is being worked on is as clean and as dust free as possible. Foreign matter from work on clutches, brakes or from machining or welding operations can contaminate the fuel system and may result in later malfunction.

NOTE: After the fuel additive tank to fuel tank line has been connected it must be bled. For additional information on fuel additive tank to fuel tank line bleeding, Refer to WDS.

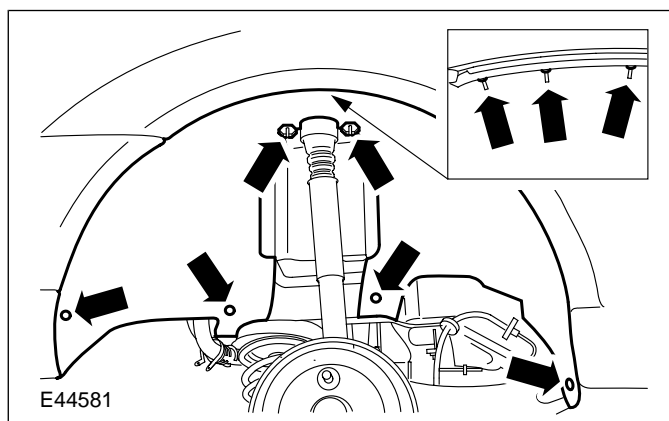
1. Drain the fuel tank.

For additional information, refer to: Fuel Tank Draining (310-00 Fuel System - General Information, General Procedures).

2. Remove the rear wheels and tires.

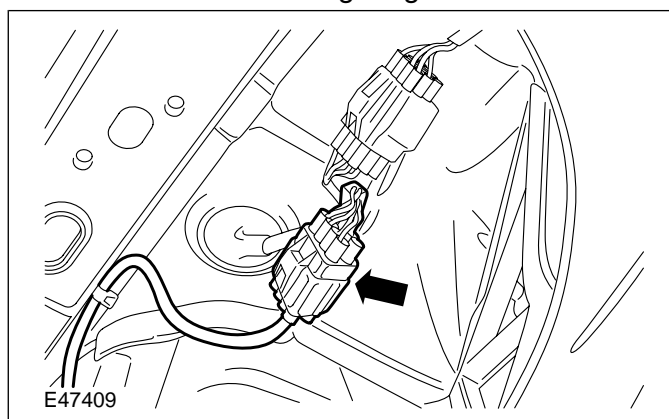
For additional information, refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).

3. Remove the right-hand rear splash shield.



4. Detach and disconnect the rear end wiring harness electrical connector.

1. Release the locking tang.



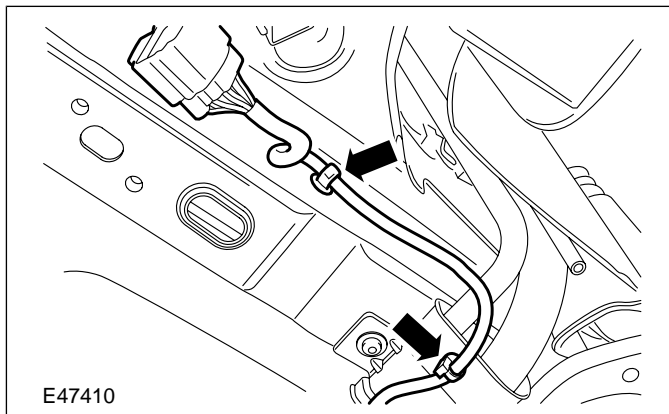
310-01-33

Fuel Tank and Lines

310-01-33

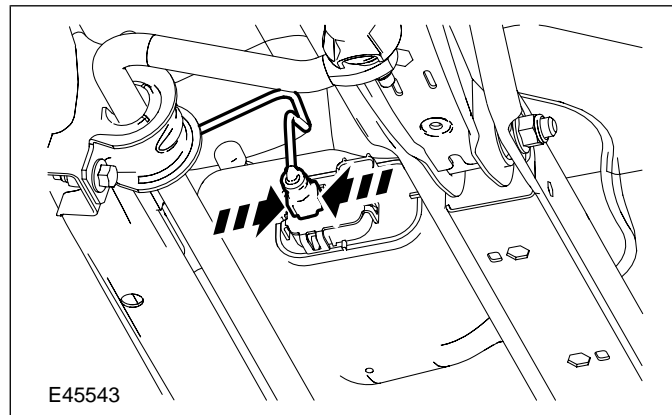
REMOVAL AND INSTALLATION

5. Detach the rear end wiring harness from the chassis and fuel tank filler pipe clamp.



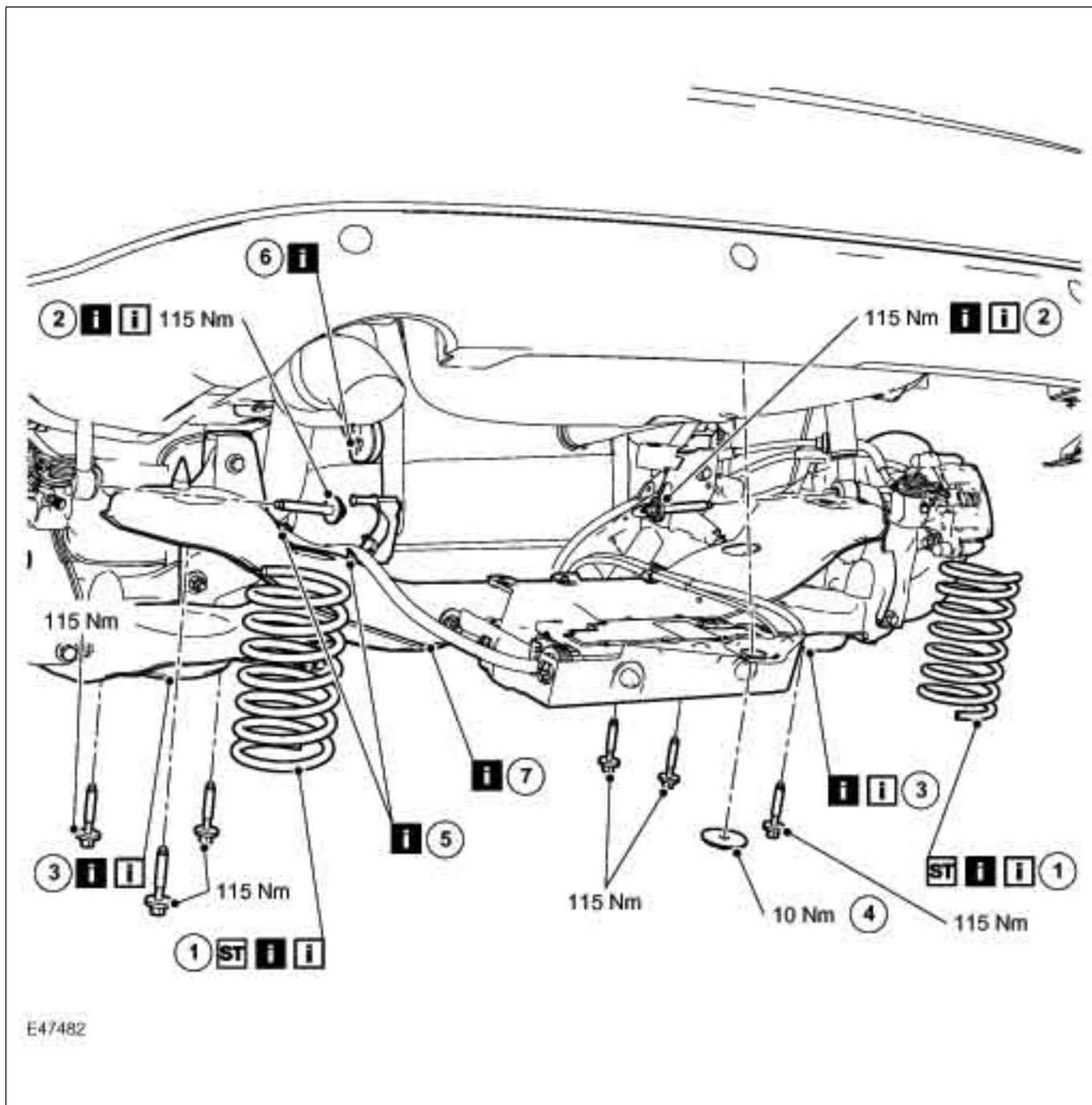
6. Disconnect the fuel additive tank to fuel tank line from the fuel additive tank (if equipped).

- Release the locking tangs.
- Drain the fluid into a suitable Oil drainer.



7. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION

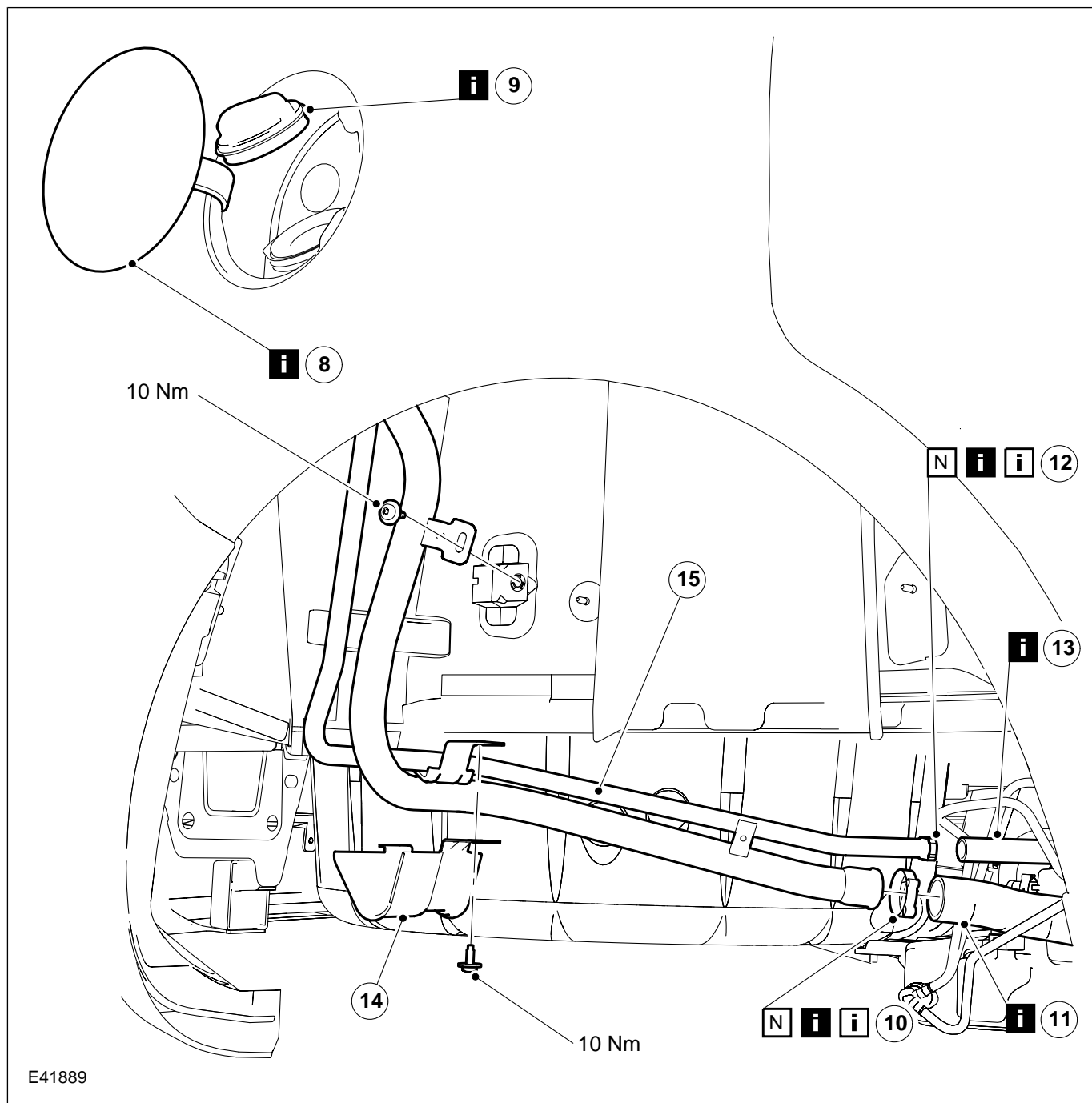


E47482

Item	Description
1	Rear springs See Removal Detail See Installation Detail
2	Rear damper lower retaining bolt See Removal Detail See Installation Detail
3	Rear lower arm See Removal Detail See Installation Detail

Item	Description
4	Electronic parking brake retaining nut (if equipped) See Removal Detail
5	Electronic parking brake cable See Removal Detail
6	Exhaust See Removal Detail
7	Rear crossmember See Removal Detail

REMOVAL AND INSTALLATION



E41889

Item	Description
8	Fuel tank filler pipe cover <i>See Removal Detail</i>
9	Fuel tank filler pipe cap <i>See Removal Detail</i>
10	Fuel tank filler hose to fuel tank filler pipe hose retaining clamp <i>See Removal Detail</i> <i>See Installation Detail</i>
11	Fuel tank filler hose to fuel tank filler pipe <i>See Removal Detail</i>

Item	Description
12	Fuel tank vent hose to fuel tank filler pipe retaining clamp <i>See Removal Detail</i> <i>See Installation Detail</i>
13	Fuel tank vent hose to fuel tank filler pipe <i>See Removal Detail</i>
14	Fuel tank filler pipe retaining bracket
15	Fuel tank filler pipe

8. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

9. Initialize the door window motors.

For additional information, refer to: Door **Window Motor Initialization** (501-11 Glass, Frames and Mechanisms, General Procedures).

10. NOTE: After the fuel additive tank to fuel tank line has been connected it must be bled. For additional information on fuel additive tank to fuel tank line bleeding, Refer to WDS.

Carry out the fuel additive tank to fuel tank line bleed procedure. Refer to WDS and follow the on screen instructions.

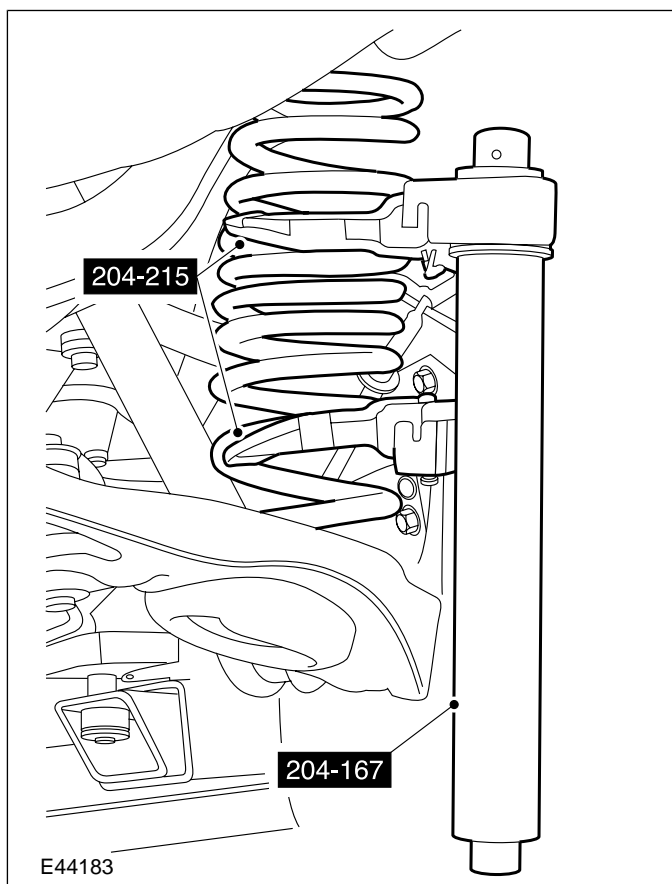
Removal Details

Item 1 Rear springs

- ▲WARNING:** As the spring is under extreme tension care must be taken at all times. Failure to follow this instruction may result in personal injury.

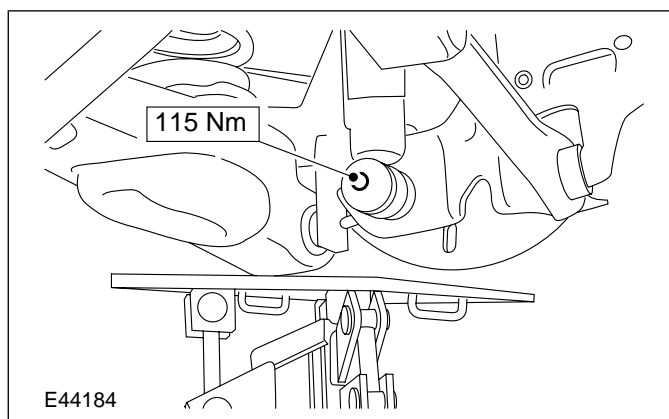
NOTE: After the spring has been compressed mark the location of tool and spring to aid installation.

Using the special tools, compress the rear springs.



Item 2 Rear damper lower retaining bolt

- Place a suitable transmission jack under the rear suspension and remove the rear damper lower retaining bolts.



Item 3 Rear lower arm

- Lower the transmission jack and with the aid of another technician, pull the rear lower arm downwards to remove the rear spring.

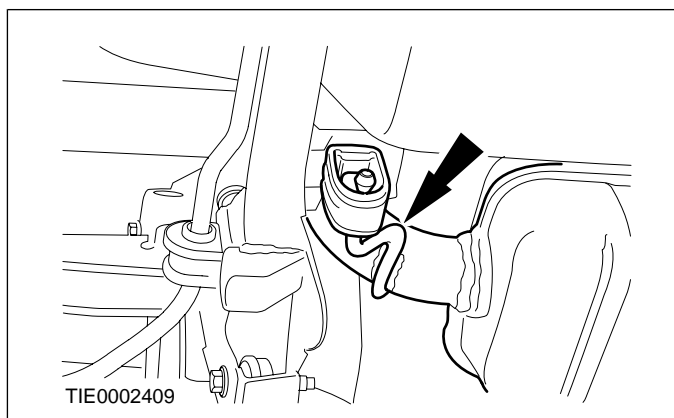
Item 5 Electronic parking brake cable

- Detach the electronic parking brake cable from the retaining clips.

REMOVAL AND INSTALLATION

Item 6 Exhaust

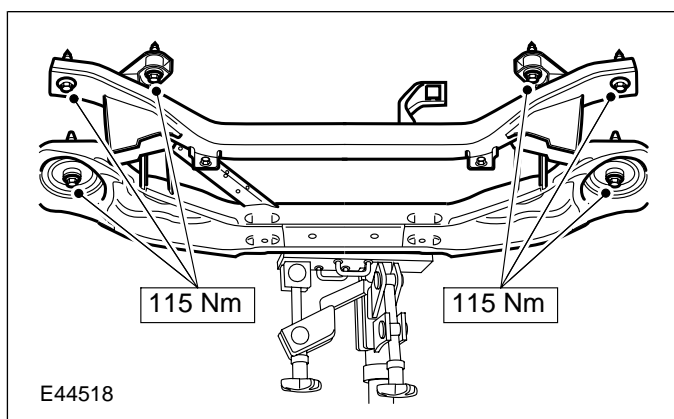
1. Detach the exhaust system from the middle hanger insulator.



Item 7 Rear crossmember

1. **NOTE:** The rear axle crossmember must be supported.

Remove the rear axle crossmember retaining bolts.



Item 8 Fuel tank filler pipe cover

1. Open the fuel tank filler pipe cover.

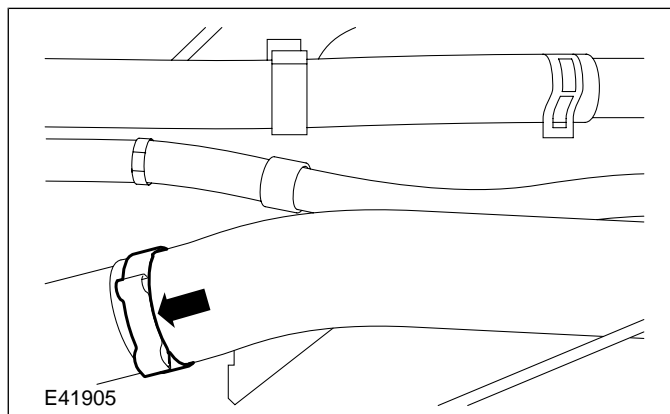
Item 9 Fuel tank filler pipe cap

1. Detach the fuel tank filler pipe cap from the fuel filler pipe.

Item 10 Fuel tank filler hose to fuel tank filler pipe hose retaining clamp

1. **NOTE:** Make a note of the position of the fuel tank filler hose to fuel tank filler pipe hose retaining clamp. Make sure that the new replacement screw type clamp is positioned so that the screw head is in the same position as as the original filler hose retaining clamp.

Remove and discard the fuel tank filler hose to fuel tank filler pipe hose retaining clamp.



Item 11 Fuel tank filler hose to fuel tank filler pipe

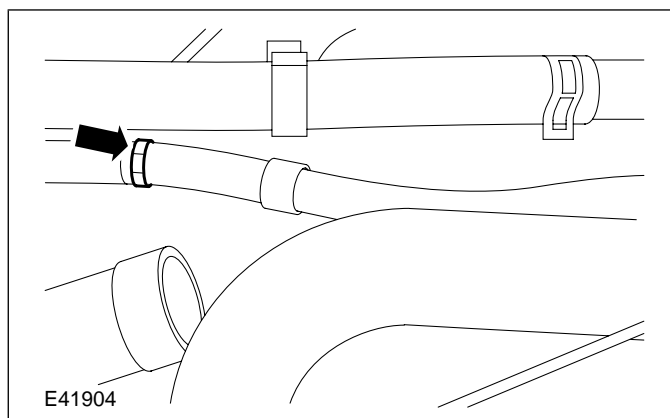
1. **CAUTION:** When removing the fuel tank filler hose to fuel tank filler pipe, do not use any sharp edge tools to lever off the pipes. Failure to follow this instruction may result in damage to the filler hose.

Disconnect the fuel tank filler hose from the fuel tank filler pipe.

Item 12 Fuel tank vent hose to fuel tank filler pipe retaining clamp

1. **NOTE:** Make a note of the position of the fuel tank vent hose to fuel tank filler pipe retaining clamp. Make sure that the new replacement screw type clamp is positioned so that the screw head is in the same position as as the original vent hose retaining clamp.

Remove and discard the fuel tank vent hose to fuel tank filler pipe retaining clamp.



REMOVAL AND INSTALLATION

Item 13 Fuel tank vent hose to fuel tank filler pipe

1. **CAUTION:** When removing the fuel tank vent hose to fuel tank filler pipe, do not use

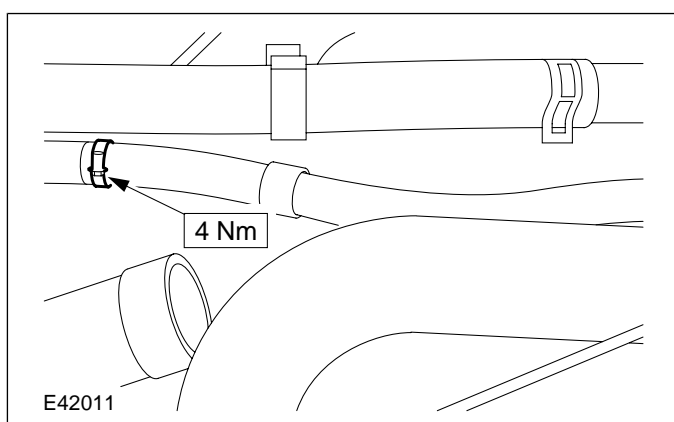
any sharp edge tools to lever off the pipes. Failure to follow this instruction may result in damage to the vent hose.

Disconnect the fuel tank vent hose from the fuel tank filler pipe.

Installation Details

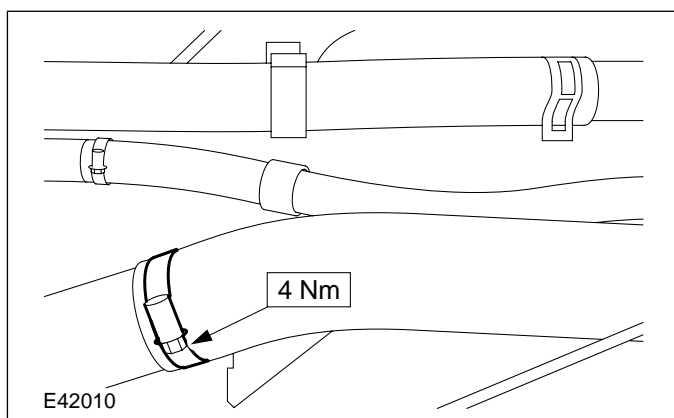
Item 12 Fuel tank vent hose to fuel tank filler pipe retaining clamp

1. Install a new fuel tank filler hose to fuel tank filler pipe hose retaining clamp in the position shown.



Item 10 Fuel tank filler hose to fuel tank filler pipe hose retaining clamp

1. Install a new fuel tank filler hose to fuel tank filler pipe hose retaining clamp in the position shown.



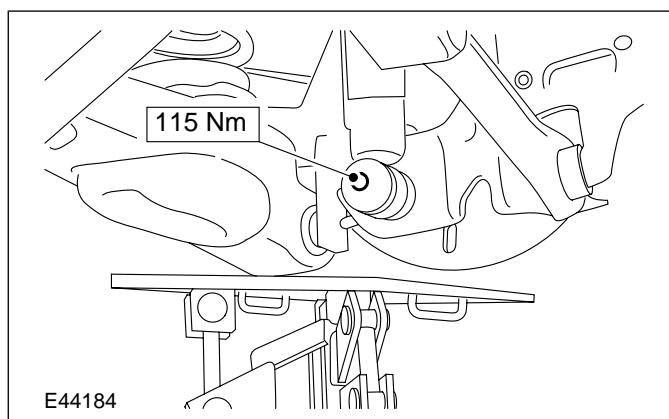
Item 3 Rear lower arm

1. **CAUTION:** Make sure the top seat mounting is installed, and the spring ends butt correctly against the upper and lower spring seats.

1. With the aid of another technician, pull the rear lower arm downwards to install the rear spring and special tools.

Item 2 Rear damper lower retaining bolt

1. Place a suitable transmission jack under the rear suspension and install the rear damper lower retaining bolts.



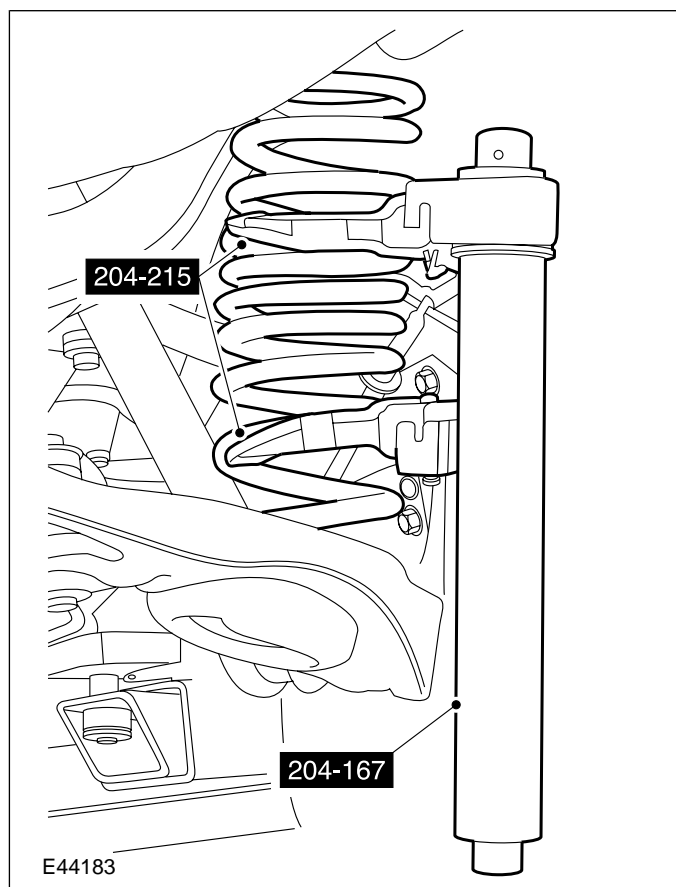
Item 1 Rear springs

1. **WARNING:** As the spring is under extreme tension care must be taken at all times. Failure to follow this instruction may result in personal injury.

1. **CAUTION:** Make sure the top seat mounting is installed, and the spring ends butt correctly against the upper and lower spring seats.

REMOVAL AND INSTALLATION

Using the special tools, release the compression on the rear spring the rear springs.



REMOVAL AND INSTALLATION

Fuel Filter — 2.0L Duratec-HE (MI4)/2.5L Duratec-ST (VI5)

WARNINGS:

- ▲ Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always present and can ignite. Failure to follow these instructions may result in personal injury.
- ▲ This procedure involves fuel handling. Be prepared for fuel spillage at all times and always observe fuel handling precautions. Failure to follow these instructions may result in personal injury.
- ▲ The fuel system remains pressurized for a long time after the ignition is switched off. The fuel pressure must be released before attempting any repairs. Failure to follow these instructions may result in personal injury.

1. Depressurize the fuel system.

For additional information, refer to: Fuel System Pressure Release - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (310-00 Fuel System - General Information, General Procedures).

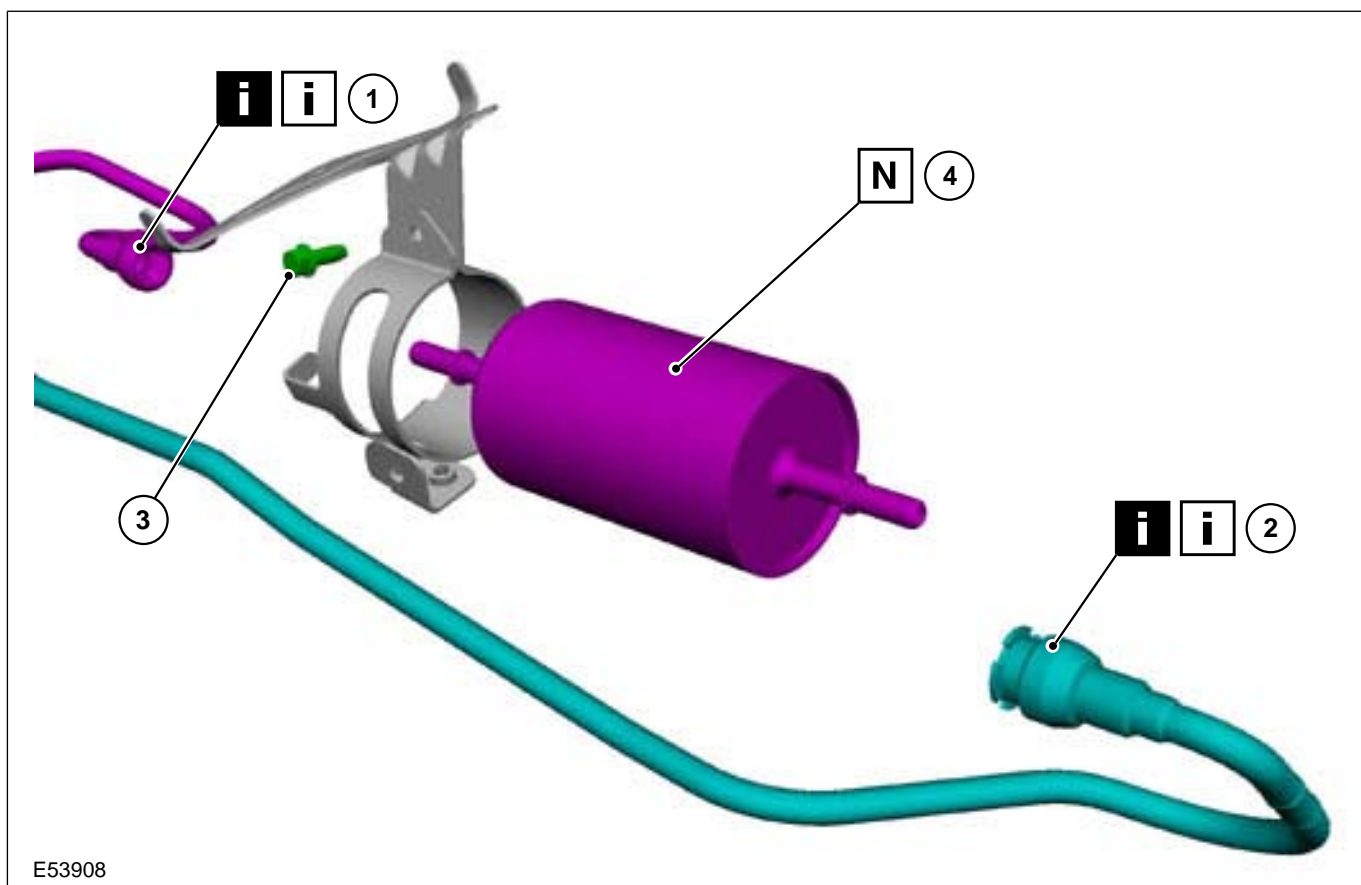
2. Disconnect the battery ground cable.

For additional information, refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

3. Raise and support the vehicle.

For additional information, refer to: Lifting (100-02 Jacking and Lifting, Description and Operation).

4. Remove the components in the order indicated in the following illustration(s) and table(s).



E53908

REMOVAL AND INSTALLATION

Item	Description
1	Fuel tank to fuel filter fuel supply line See Removal Detail See Installation Detail
2	Fuel filter to fuel rail fuel supply line See Removal Detail

Item	Description
	See Installation Detail
3	Fuel filter retaining bracket bolt
4	Fuel filter

5. To install, reverse the removal procedure.

Removal Details

Item 1 Fuel tank to fuel filter fuel supply line

1. Disconnect the fuel tank to fuel filter fuel supply line.

For additional information, refer to: Quick **Release Coupling** (310-00 Fuel System - General Information, General Procedures).

Item 2 Fuel filter to fuel rail fuel supply line

1. Disconnect the fuel filter to fuel rail fuel supply line.

For additional information, refer to: Quick **Release Coupling** (310-00 Fuel System - General Information, General Procedures).

Installation Details

Item 2 Fuel filter to fuel rail fuel supply line

1. Connect the fuel filter to fuel rail fuel supply line.

For additional information, refer to: Quick **Release Coupling** (310-00 Fuel System - General Information, General Procedures).

Item 1 Fuel tank to fuel filter fuel supply line

1. Connect the fuel tank to fuel filter fuel supply line.

For additional information, refer to: Quick **Release Coupling** (310-00 Fuel System - General Information, General Procedures).

REMOVAL AND INSTALLATION

Fuel Supply Line — 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)/2.5L Duratec-ST (VI5)

WARNINGS:

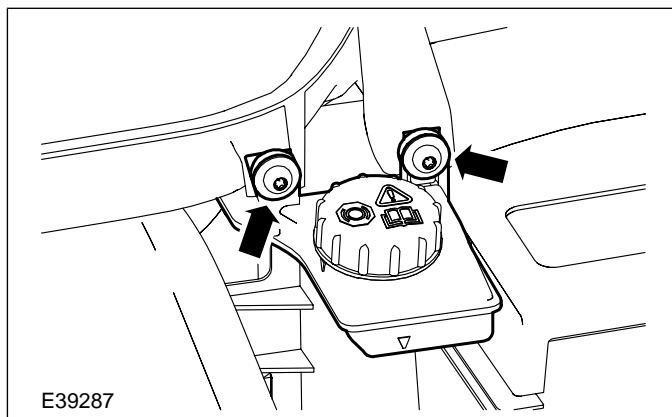
- ▲ Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable mixtures are always present and may ignite. Failure to follow these instructions may result in personal injury.
- ▲ This procedure involves fuel handling. Be prepared for fuel spillage at all times and always observe fuel handling precautions. Failure to follow these instructions may result in personal injury.

NOTE: Make sure that the windshield wiper motor is in the park position.

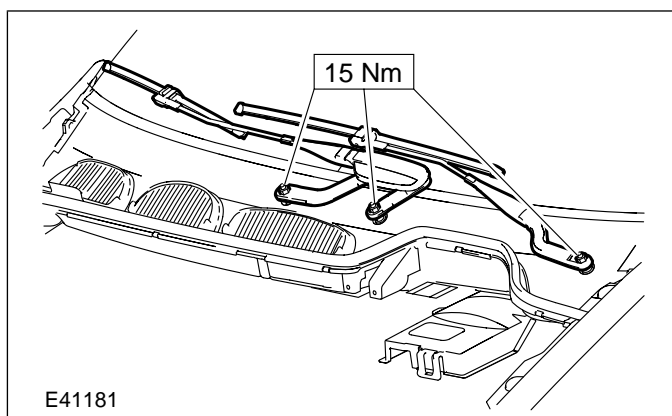
1. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

2. Detach the brake fluid reservoir from the bulkhead extension panel.

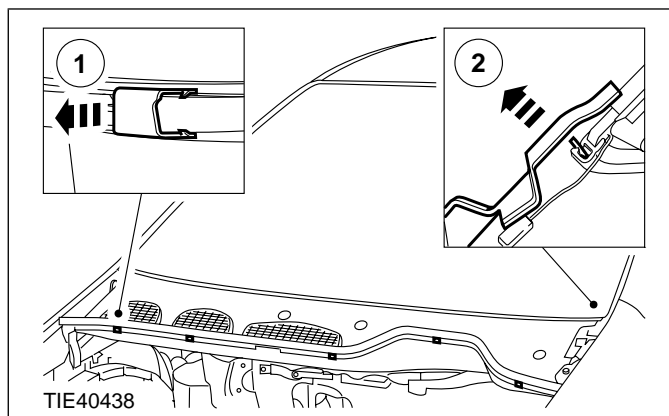


3. Remove the windshield wiper arms.

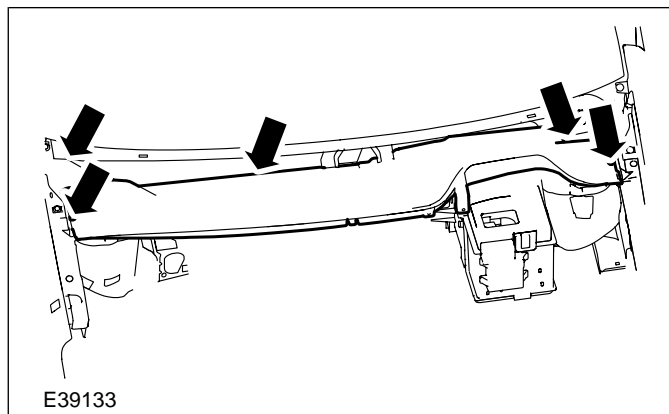


4. Remove the cowl panel grille.

1. Detach the cowl panel grille retaining clips.
2. Detach the cowl panel grille from the windshield glass lower weatherstrip and remove.



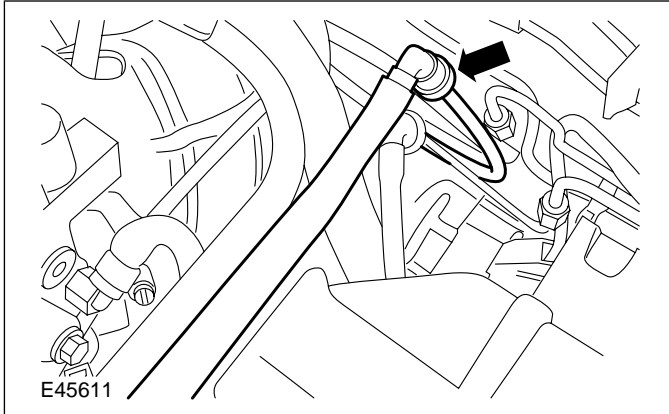
5. Remove the bulkhead extension panel.



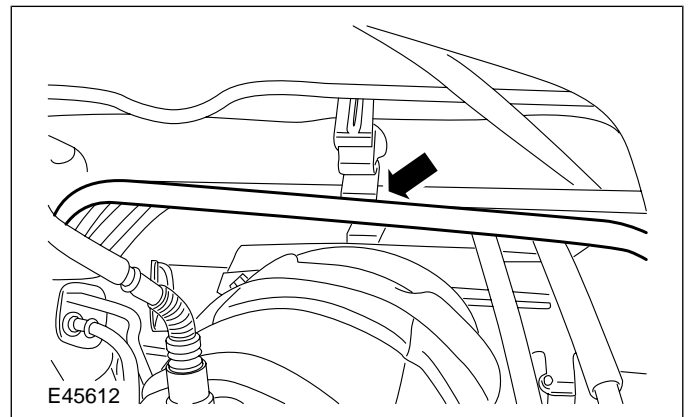
REMOVAL AND INSTALLATION

6. Disconnect the fuel supply line quick release coupling from the fuel supply line.

For additional information, refer to: **Quick Release Coupling** (310-00 Fuel System - General Information, General Procedures).



7. Detach the fuel supply line from the fuel supply line retaining clip.

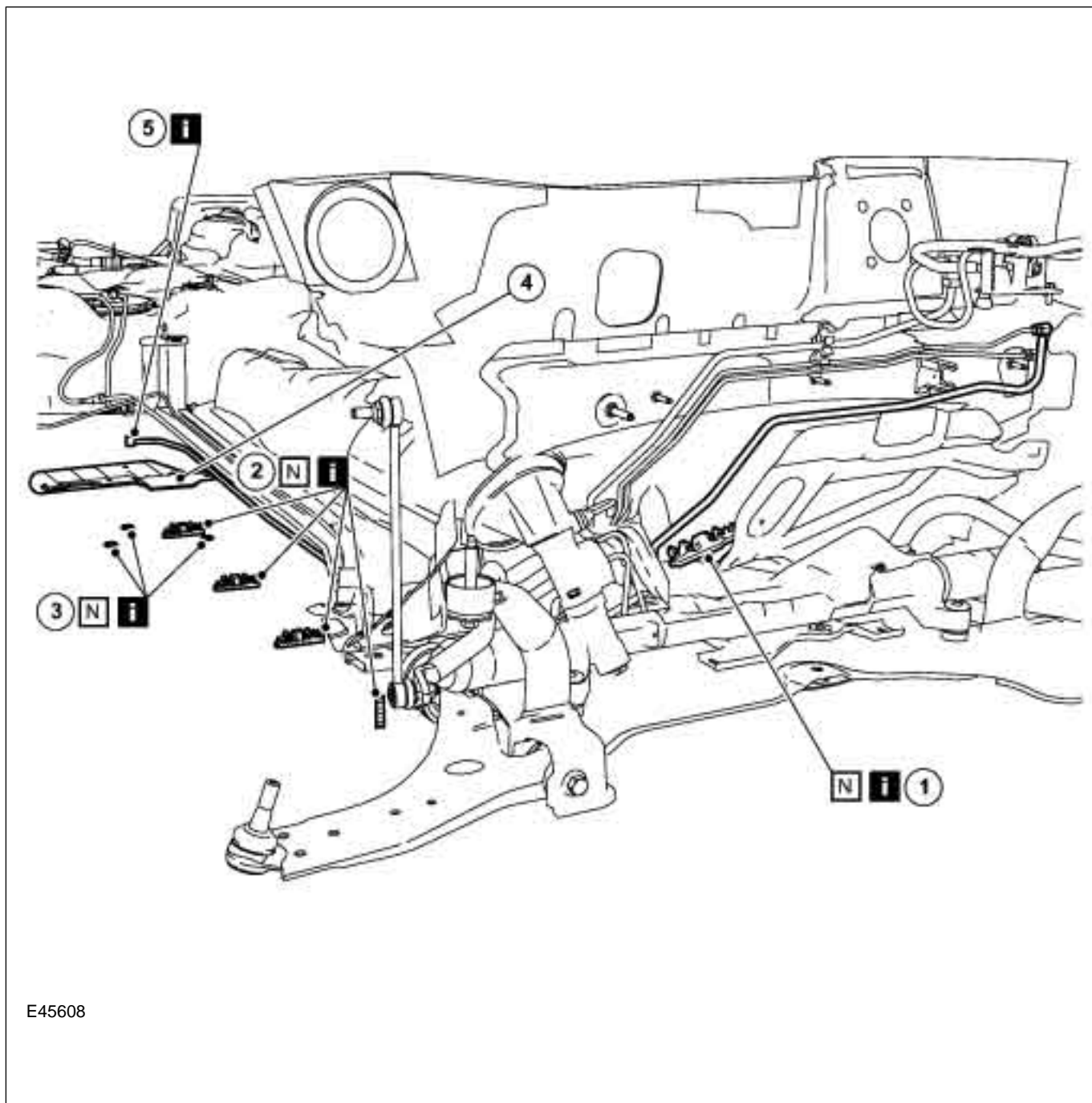


8. Raise and support the vehicle.

For additional information, refer to: **Lifting** (100-02 Jacking and Lifting, Description and Operation).

9. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



E45608

Item	Description
1	Fuel supply line earth retaining clip See Removal Detail
2	Fuel supply line retaining clips See Removal Detail
3	Fuel tank deflector shield retaining clips See Removal Detail
4	Fuel tank deflector shield

Item	Description
5	Fuel supply line quick release coupling See Removal Detail
6	Fuel supply line

10. To install, reverse the removal procedure.

11. Initialize the door window motors.

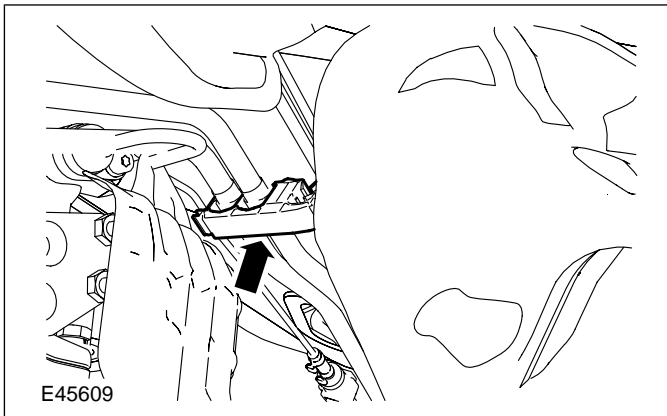
For additional information, refer to: **Door Window Motor Initialization** (501-11 Glass, Frames and Mechanisms, General Procedures).

REMOVAL AND INSTALLATION

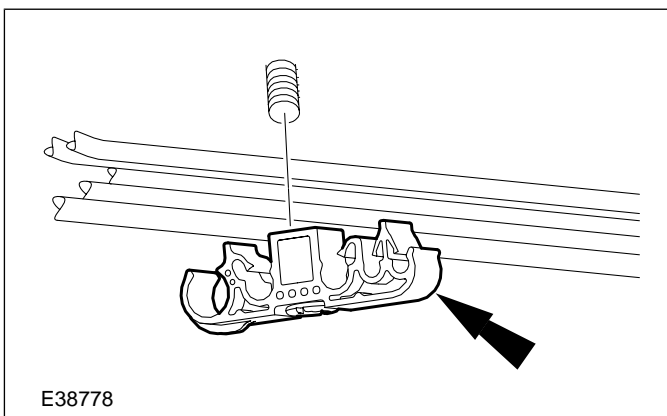
Removal Details

Item 1 Fuel supply line earth retaining clip

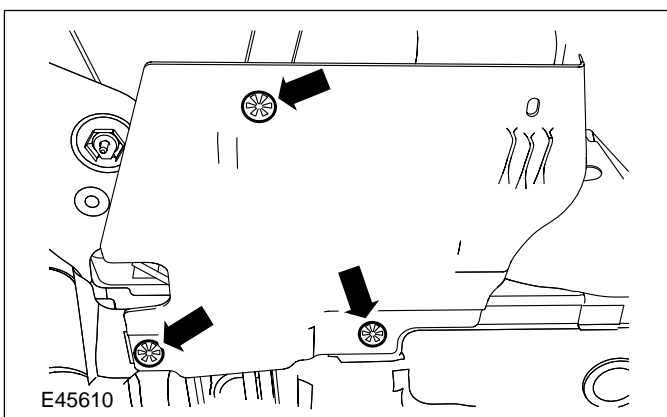
1. Remove and discard the fuel supply line earth retaining clip.

**Item 2 Fuel supply line retaining clips**

1. Remove and discard the fuel supply line retaining clips.

**Item 3 Fuel tank deflector shield retaining clips**

1. Remove and discard the fuel tank deflector shield retaining clips.

**Item 5 Fuel supply line quick release coupling**

1. Disconnect the fuel supply line quick release coupling from the fuel tank fuel supply line.

For additional information, refer to: **Quick Release Coupling** (310-00 Fuel System - General Information, General Procedures).

REMOVAL AND INSTALLATION

Fuel Level Resistor Card

Removal

All except vehicles with diesel engine

1. Remove the fuel pump and sender unit.

For additional information, refer to: **Fuel Tank**
- 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)/2.5L Duratec-ST (VI5), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation).

Vehicles with diesel engine

2. Remove the fuel level sensor.

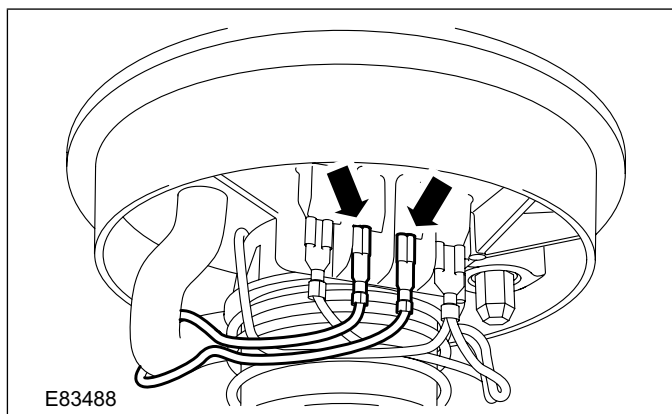
For additional information, refer to: **Fuel Tank**
- 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)
/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation).

All vehicles

3. **NOTE:** Make a note of the position and colors of the wiring before disconnecting the electrical connectors to aid installation.

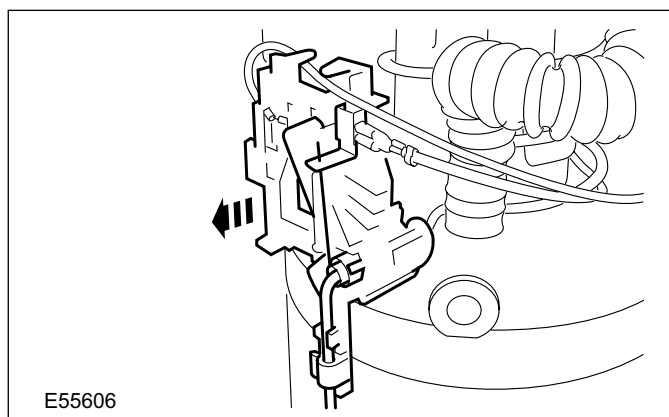
NOTE: Diesel engine variants only have 2 wires.

Disconnect the fuel level resistor card electrical connectors.



4. Remove the fuel level resistor card.

- Release the locking tang at the rear of the fuel level resistor card.
- Discard the fuel level resistor card.



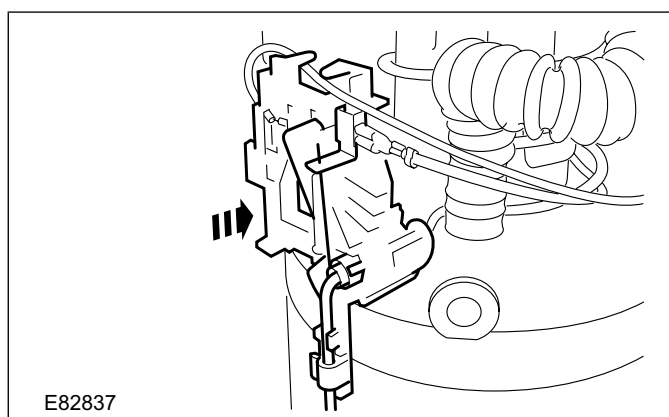
Installation

All vehicles

1. **CAUTION:** Do not touch the fuel level resistor card surface with tools or hands. Failure to follow this instruction may result in damage to the fuel level resistor card.

NOTE: An audible click will be heard when the fuel level resistor card is correctly installed.

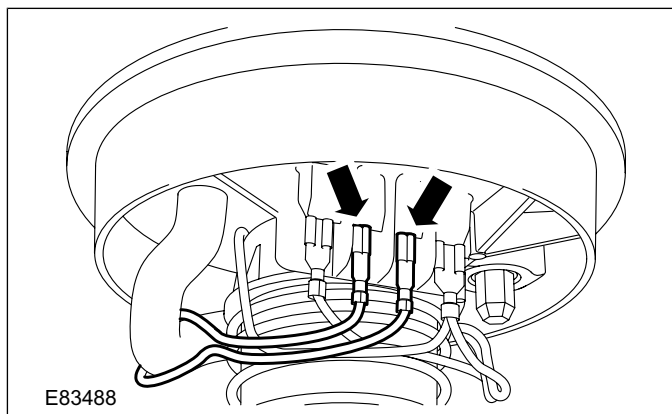
Install the new fuel level resistor card.



2. **NOTE:** Diesel engine variants only have 2 wires.

REMOVAL AND INSTALLATION

Connect the fuel level resistor card electrical connectors to the noted positions.



3. Make sure that the float rod and arm are able to sweep their full ranges without contacting or fouling on any wires.

Vehicles with diesel engine

4. **NOTE:** Install a new fuel level sensor gasket.

Install the fuel level sensor.

For additional information, refer to: **Fuel Tank** - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)

/ **Fuel Tank - 1.6L Duratorq-TDCi (DV)** Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation).

All except vehicles with diesel engine

5. **NOTE:** Install a new fuel pump and sender unit gasket.

Install the fuel pump and sender unit.

For additional information, refer to: **Fuel Tank** - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)/2.5L Duratec-ST (VI5), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation).

SECTION 310-02 Acceleration Control

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS	
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REMOVAL AND INSTALLATION	
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Accelerator Cable.....	310-02-8



SPECIFICATIONS

Description	Nm	lb-ft	lb-in
Accelerator pedal retaining nuts	8	-	71



DIAGNOSIS AND TESTING

Acceleration Control

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.
3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> - Accelerator pedal - Throttle body 	<ul style="list-style-type: none"> - Wiring harness(s) - Wiring harness retaining clips - Electrical connector(s) - Accelerator pedal - Powertrain control module (PCM) - Electronic throttle body

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • Accelerator pedal is hard to depress or has a rough/raspy or sticky feel 	<ul style="list-style-type: none"> • Accelerator pedal incorrectly installed. 	<ul style="list-style-type: none"> • CHECK the accelerator pedal for the correct installation.
	<ul style="list-style-type: none"> • Worn or damaged accelerator pedal. 	<ul style="list-style-type: none"> • INSTALL a new accelerator pedal. REFER to: Accelerator Pedal (310-02 Acceleration Control, Removal and Installation).
<ul style="list-style-type: none"> • Accelerator pedal does not return freely 	<ul style="list-style-type: none"> • Accelerator pedal incorrectly installed. 	<ul style="list-style-type: none"> • CHECK the accelerator pedal for the correct installation.
	<ul style="list-style-type: none"> • Worn or damaged accelerator pedal. 	<ul style="list-style-type: none"> • INSTALL a new accelerator pedal. REFER to: Accelerator Pedal (310-02 Acceleration Control, Removal and Installation).
<ul style="list-style-type: none"> • High engine idle speed 	<ul style="list-style-type: none"> • Damaged accelerator pedal. 	<ul style="list-style-type: none"> • Refer to WDS to diagnose the system.
	<ul style="list-style-type: none"> • Electronic throttle body. 	<ul style="list-style-type: none"> • Refer to WDS to diagnose the system.
	<ul style="list-style-type: none"> • PCM calibration. 	<ul style="list-style-type: none"> • Refer to WDS to diagnose the system.

310-02-4

Acceleration Control

310-02-4

DIAGNOSIS AND TESTING

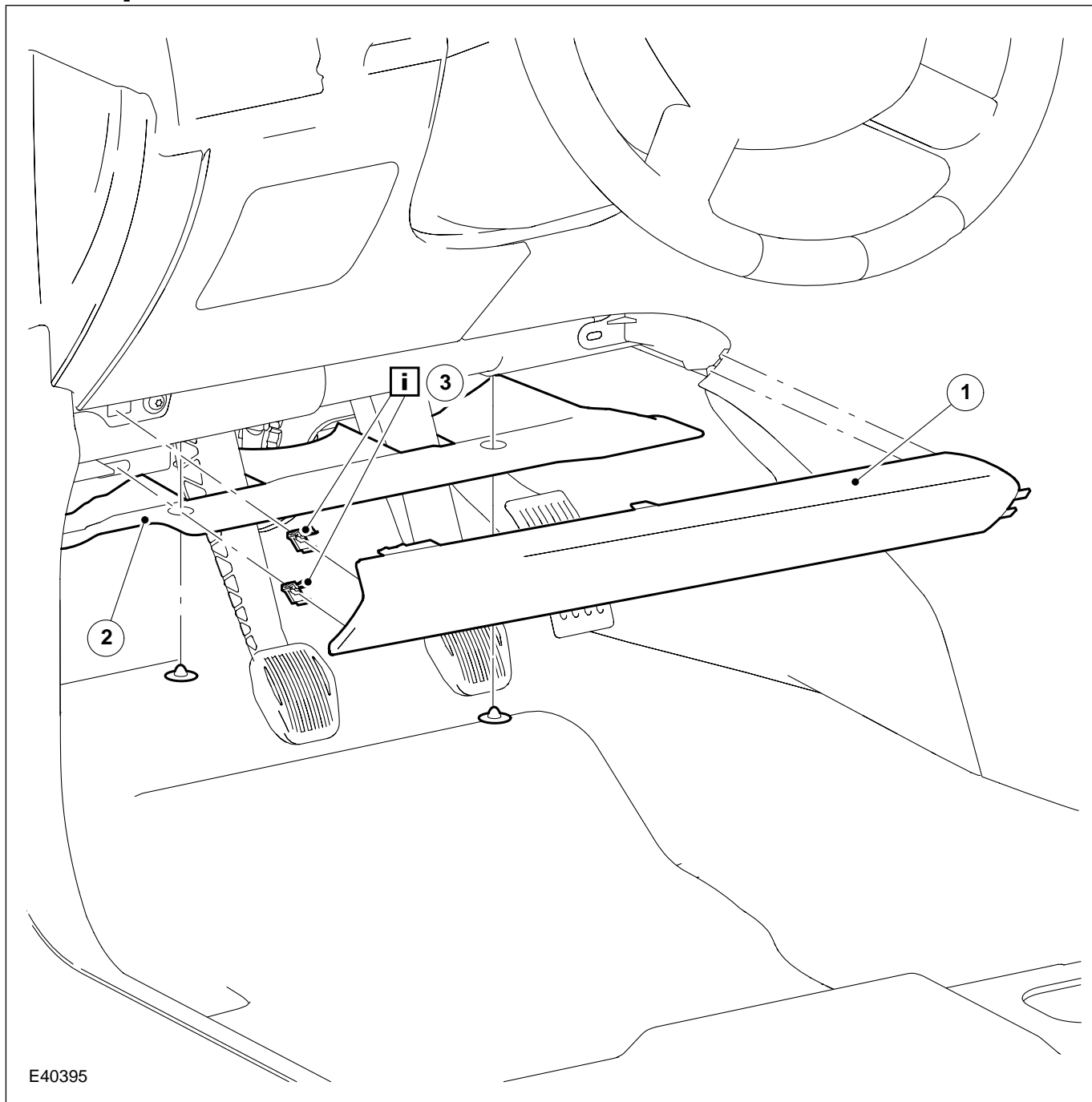
Symptom	Possible Sources	Action
• Poor idling	• Electronic throttle body.	• Refer to WDS to diagnose the system.
	• PCM calibration.	• Refer to WDS to diagnose the system.

REMOVAL AND INSTALLATION

Accelerator Pedal

1. Disconnect the battery ground cable. For additional information, refer to Section 414-01 [Battery, Mounting and Cables].

2. Remove the components in the order indicated in the following illustration(s) and table(s).

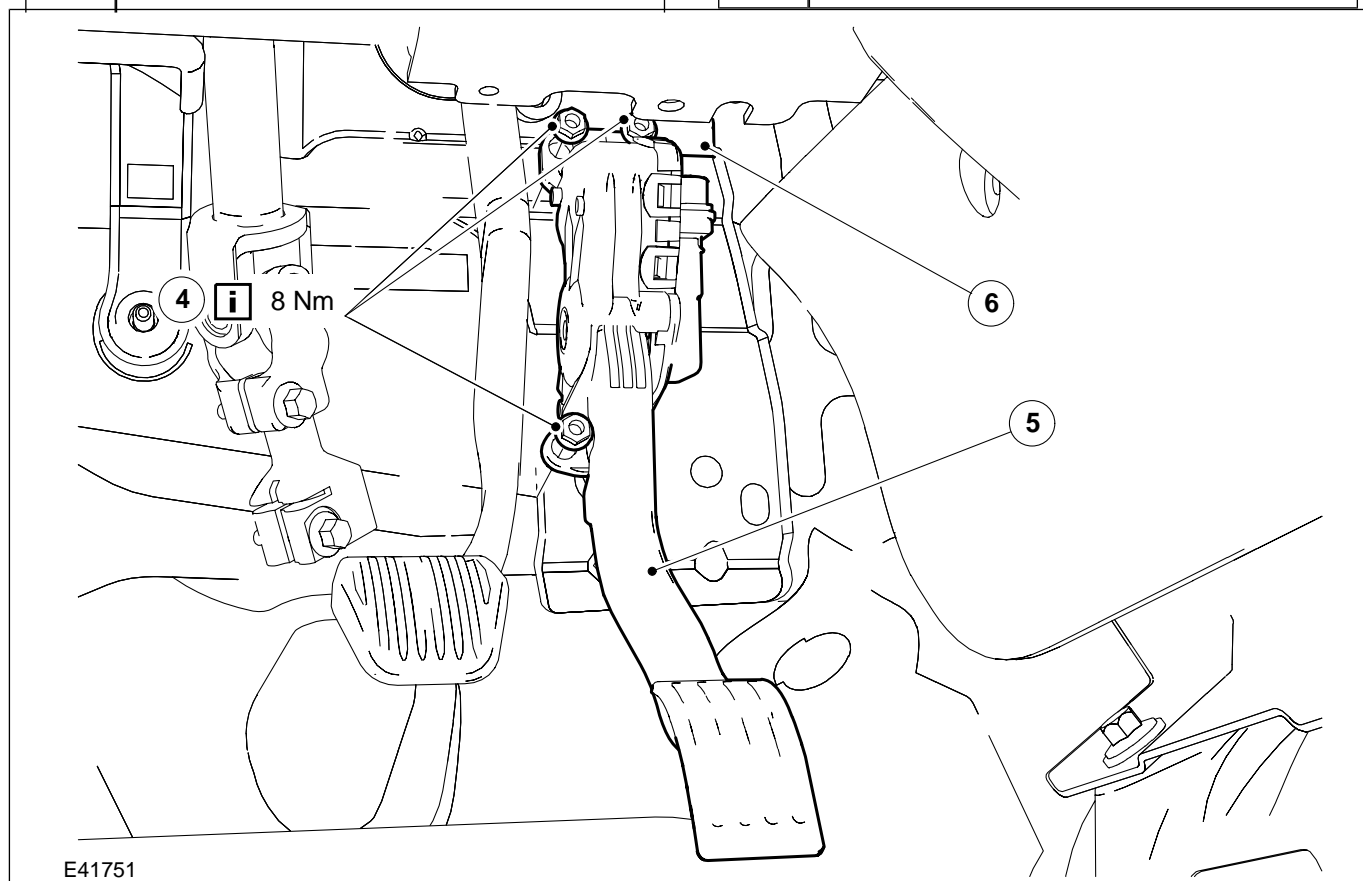


E40395

REMOVAL AND INSTALLATION

Item	Description
1	Instrument panel lower trim panel
2	Instrument panel insulation pad

Item	Description
3	Instrument panel lower trim panel retraining clips See Installation Detail



Item	Description
4	Accelerator pedal retaining nuts See Installation Detail
5	Accelerator pedal
6	Accelerator pedal electrical connector See Removal Detail

3. To install, reverse the removal procedure.

4. Initialize the door window motors. For additional information, refer to **Section 501-11 [Glass, Frames and Mechanisms]**.

Removal Details

Item 6 Accelerator pedal electrical connector

NOTE: The accelerator pedal electrical connector can only be disconnected 10 times during the lifetime of the accelerator pedal. Failure to follow this instruction may cause damage to the accelerator pedal electrical connector.

1. Using a suitable marker, mark the accelerator pedal electrical connector when it has been disconnected from the accelerator pedal wiring harness.

Installation Details

REMOVAL AND INSTALLATION**Item 4** Accelerator pedal retaining nuts

1. Loosely install all the accelerator pedal retaining nuts before tightning.

Item 3 Instrument panel lower trim panel retraining clips

1. Install the instrument panel lower trim panel retraining clips to the instrument panel lower trim panel.

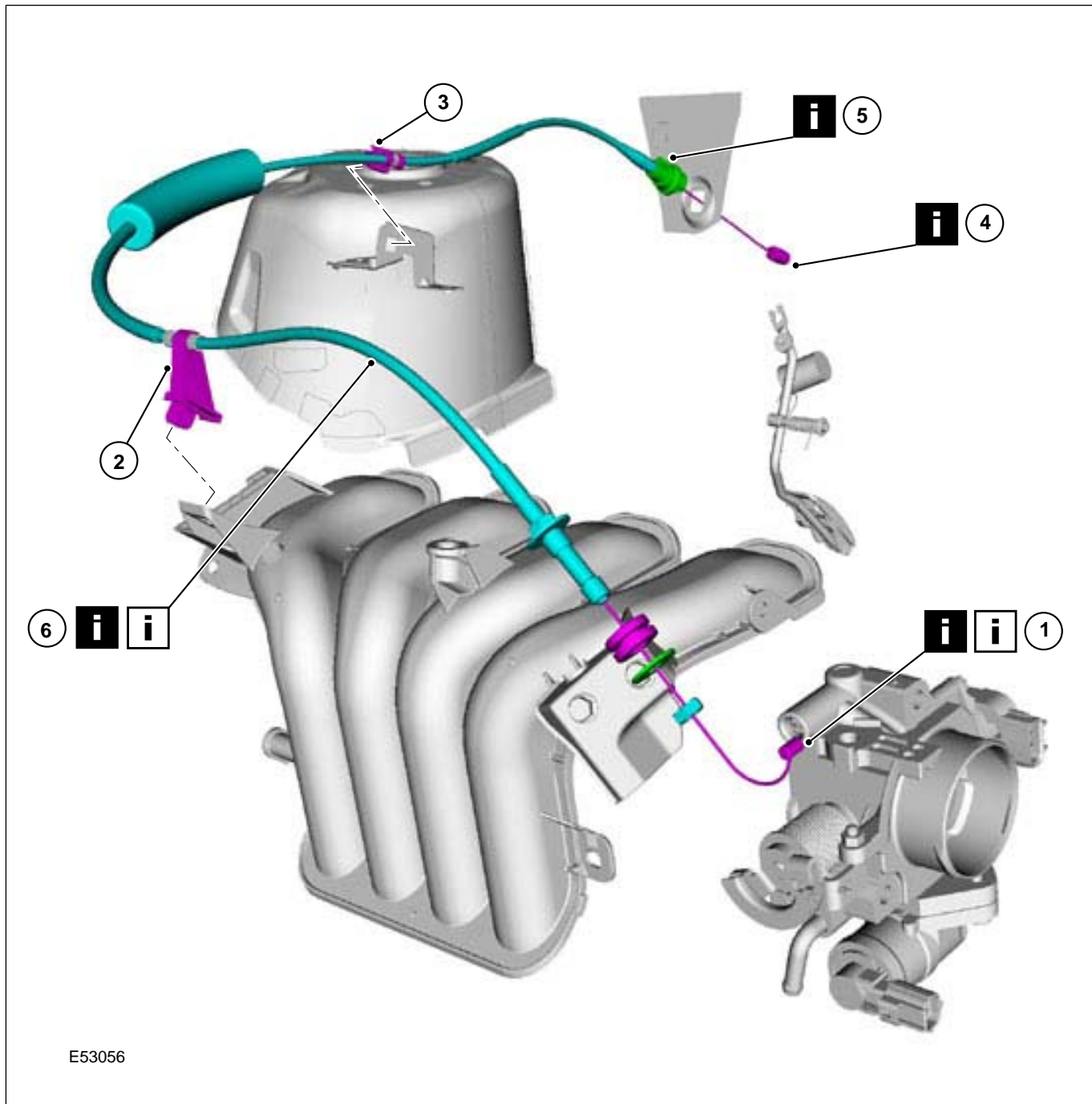
REMOVAL AND INSTALLATION

Accelerator Cable

General Equipment

Draw cord

1. Remove the components in the order indicated in the following illustration(s) and table(s).



E53056

Item	Description
1	Accelerator cable to throttle body See Removal Detail See Installation Detail
2	Accelerator cable to intake manifold retaining clip

Item	Description
3	Accelerator cable to body retaining clip
4	Accelerator cable to accelerator pedal See Removal Detail

REMOVAL AND INSTALLATION

Item	Description
5	Accelerator cable to bulkhead retaining clip See Removal Detail
6	Accelerator cable

Item	Description
	See Removal Detail See Installation Detail

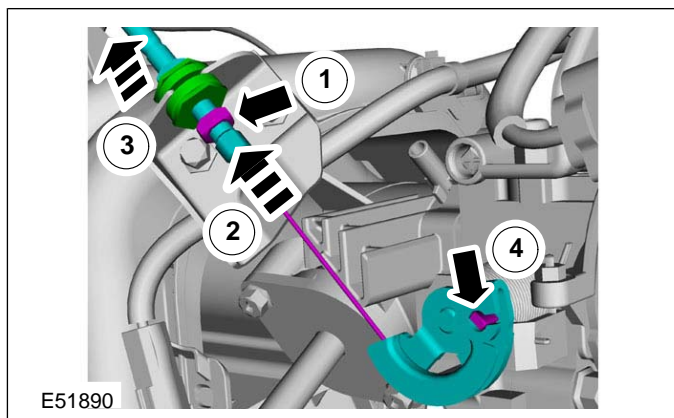
2. To install, reverse the removal procedure.

Removal Details

Item 1 Accelerator cable to throttle body

1. Detach the accelerator cable.

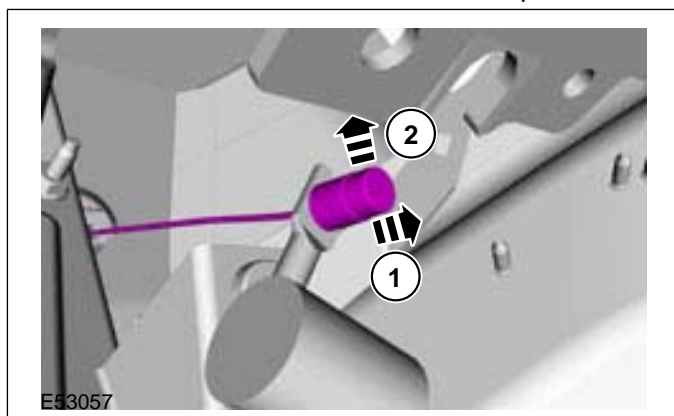
1. Detach the accelerator cable locking nut.
2. Pull the accelerator outer cable through the accelerator cable grommet.
3. Detach the accelerator cable grommet from the accelerator cable support bracket.
4. Rotate the throttle lever clockwise and detach the accelerator cable from the throttle lever.



Item 4 Accelerator cable to accelerator pedal

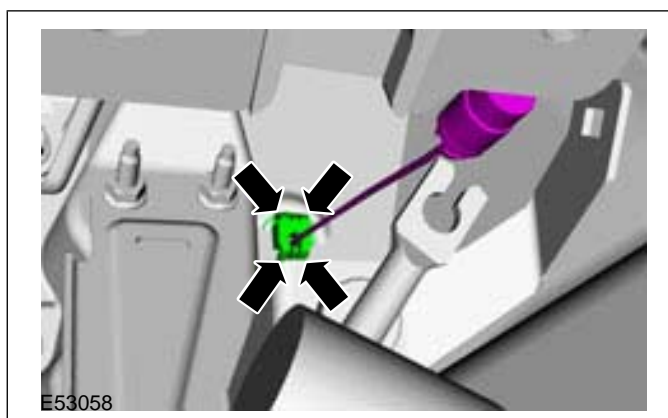
1. Detach the accelerator cable from the accelerator pedal.

1. Pull the accelerator inner cable forward.
2. Lift the accelerator inner cable and grommet out of the fork of the accelerator pedal.



Item 5 Accelerator cable to bulkhead retaining clip

1. Release the accelerator cable to bulkhead retaining clip tangs.



Item 6 Accelerator cable

1. Remove the accelerator cable.

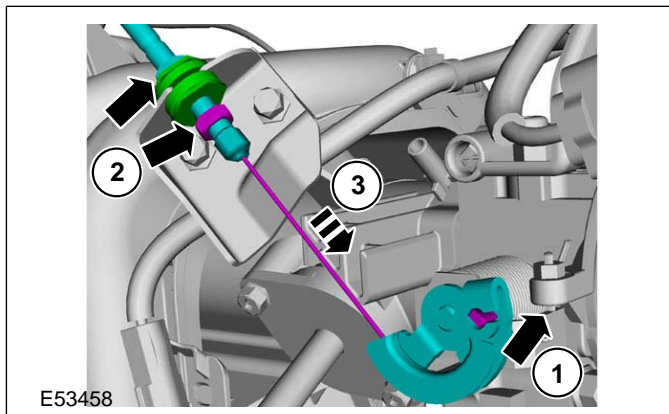
- Attach a draw cord to the end of the accelerator inner cable.
- From the engine bay, pull the accelerator cable out of the bulkhead until the draw cord can be detached from the accelerator inner cable.

REMOVAL AND INSTALLATION**Installation Details****Item 6 Accelerator cable****1. Install the accelerator cable.**

- Attach the draw cord to the end of the accelerator inner cable.
- From inside the vehicle, pull the accelerator cable through the bulkhead.
- Remove the draw cord.

Item 1 Accelerator cable to throttle body**1. Adjust the accelerator cable.**

1. Make sure the throttle body linkage is against the throttle stop screw.
2. Adjust the throttle cable using the throttle cable locking nuts.
3. Check the accelerator inner cable free play. The free play should not be less than 1mm and not exceed 3mm.





SECTION 310-03 Speed Control

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Speed Control.....	310-03-2
Inspection and Verification.....	310-03-2
Diagnostic Trouble Code (DTC) Index.....	310-03-2
REMOVAL AND INSTALLATION	
Speed Control Switch.....	310-03-15



DIAGNOSIS AND TESTING

Speed Control

Inspection and Verification

1. Verify the customer concern by operating the system.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> - Brake pedal - Clutch pedal 	<ul style="list-style-type: none"> - Fuse(s) - Connections - Wiring harness - Clockspring - Loose or corroded electrical connector(s) - Speed control switch - Brake pedal position (BPP) deactivation switch - Clutch pedal position (CPP) deactivation Switch - Powertrain control module (PCM) - Central junction box (CJB)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4. NOTE: Not all passenger junction box (PJB) variants support the speed control system.

NOTE: If the PJB is configured for speed control disable, speed control operation is not transmitted, no Diagnostic Trouble Codes (DTCs) are generated.

If the cause is not visually evident, verify the symptom and refer DTC index.

5. Connect the WDS to the data link connector (DLC) located beneath the instrument panel and select the vehicle to be tested from the WDS menu.

Diagnostic Trouble Code (DTC) Index

DTC	Description	Possible Source	Action
PCM - B1483	BPP deactivation switch fault.	<ul style="list-style-type: none"> • BPP deactivation switch • Instrument cluster. 	REFER to WDS.
PCM - B2163	CPP deactivation switch fault.	<ul style="list-style-type: none"> • CPP deactivation switch • Instrument cluster. 	REFER to WDS.

DIAGNOSIS AND TESTING

DTC	Description	Possible Source	Action
PJB - P0565	Speed control ON Signal	On button failure short circuit	Make sure all speed control switch buttons are released. CHECK and CLEAR all current PJB DTCs. CYCLE ignition from OFF to ON. CARRY out PJB selftest. CHECK for PJB DTCs. If DTCs are found. GO to Pinpoint Test B. If no DTCs are found, TEST the system for normal operation.
PJB - P0566	Speed control OFF Signal	OFF button failure short circuit	Make sure all speed control switch buttons are released. CHECK and CLEAR all current PJB DTCs. CYCLE ignition from OFF to ON. CARRY out PJB selftest. CHECK for PJB DTCs. If DTCs are found. GO to Pinpoint Test B. If no DTCs are found, TEST the system for normal operation.
PJB - P0567	Speed control RESUME Signal	RESUME button failure short circuit	Make sure all speed control switch buttons are released. CHECK and CLEAR all current PJB DTCs. CYCLE ignition from OFF to ON. CARRY out PJB selftest. CHECK for PJB DTCs. If DTCs are found. GO to Pinpoint Test B. If no DTCs are found, TEST the system for normal operation.
PJB - P0568	Speed control SET + Signal	SET + button failure short circuit	Make sure all speed control switch buttons are released. CHECK and CLEAR all current PJB DTCs. CYCLE ignition from OFF to ON. CARRY out PJB selftest. CHECK for PJB DTCs. If DTCs are found. GO to Pinpoint Test B. If no DTCs are found, TEST the system for normal operation.

DIAGNOSIS AND TESTING

DTC	Description	Possible Source	Action
PJB - P0569	Speed control SET - Signal	SET - button failure short circuit	Make sure all speed control switch buttons are released. CHECK and CLEAR all current PJB DTCs. CYCLE ignition from OFF to ON. CARRY out PJB selftest. CHECK for PJB DTCs. If DTCs are found. GO to Pinpoint Test B. If no DTCs are found, TEST the system for normal operation.
PJB - P0579	Speed control multi-function input A circuit range/performance	Input circuit in -range failure	Make sure all speed control switch buttons are released. CHECK and CLEAR all current PJB DTCs. CYCLE ignition from OFF to ON. CARRY out PJB selftest. CHECK for PJB DTCs. If DTCs are found. GO to Pinpoint Test B. If no DTCs are found, TEST the system for normal operation.
PJB - P0581	Cruise control multi-function input A circuit high resistance	Input circuit open circuit failure	Make sure all speed control switch buttons are released. CHECK and CLEAR all current PJB DTCs. CYCLE ignition from OFF to ON. CARRY out PJB selftest. CHECK for PJB DTCs. If DTCs are found. GO to Pinpoint Test B. If no DTCs are found, TEST the system for normal operation.

1. If the DTCs retrieved are not related to the concern, verify the symptom and refer to the Symptom Chart.

Symptom Chart

310-03-5

Speed Control

310-03-5

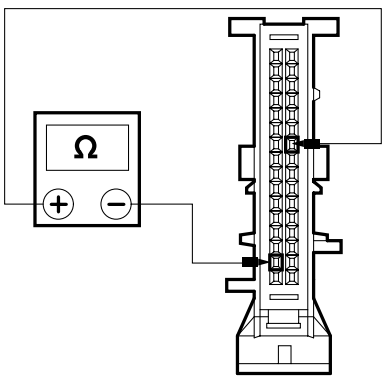
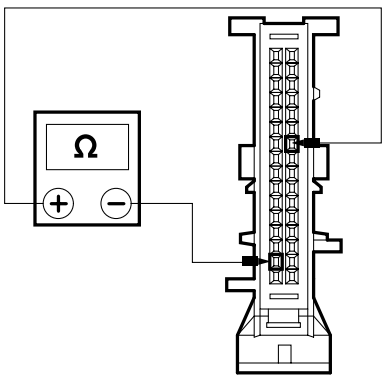
DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> The speed control is inoperative 	<ul style="list-style-type: none"> Parking brake control switch Parking brake 	<ul style="list-style-type: none"> Check the alignment and function of the parking brake lever and parking brake control switch. INSTALL new parts as necessary. TEST the system for normal operation.
	<ul style="list-style-type: none"> BPP deactivation switch. 	<ul style="list-style-type: none"> Check the BPP switch for correct operation. REFER to WDS.
	<ul style="list-style-type: none"> CPP deactivation switch. 	<ul style="list-style-type: none"> Check the BPP switch for correct operation. REFER to WDS.
	<ul style="list-style-type: none"> Speed control switch. Clockspring. 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
	<ul style="list-style-type: none"> PCM. 	<ul style="list-style-type: none"> REFER to: Electronic Engine Controls (303-14 Electronic Engine Controls - 2.5L Duratec-ST (VI5), Diagnosis and Testing).
	<ul style="list-style-type: none"> Speed control switch. 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
	<ul style="list-style-type: none"> PCM. 	<ul style="list-style-type: none"> REFER to: Electronic Engine Controls (303-14 Electronic Engine Controls - 2.5L Duratec-ST (VI5), Diagnosis and Testing).
	<ul style="list-style-type: none"> Faulty communication between the modules - MS CAN bus 	<ul style="list-style-type: none"> REFER to: Electronic Engine Controls (303-14 Electronic Engine Controls - 2.5L Duratec-ST (VI5), Diagnosis and Testing).
<ul style="list-style-type: none"> The speed control does not disengage when the brake pedal is applied 	<ul style="list-style-type: none"> BPP deactivation switch. 	<ul style="list-style-type: none"> REFER to WDS.
	<ul style="list-style-type: none"> PCM. 	<ul style="list-style-type: none"> REFER to: Electronic Engine Controls (303-14 Electronic Engine Controls - 2.5L Duratec-ST (VI5), Diagnosis and Testing).
<ul style="list-style-type: none"> The speed control does not disengage when the clutch pedal is applied 	<ul style="list-style-type: none"> CPP deactivation switch. 	<ul style="list-style-type: none"> REFER to WDS.

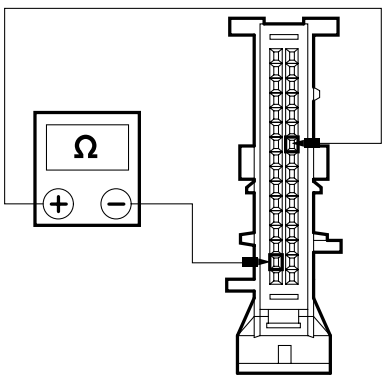
DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> PCM. 	<ul style="list-style-type: none"> REFER to: Electronic Engine Controls (303-14 Electronic Engine Controls - 2.5L Duratec-ST (VI5), Diagnosis and Testing).

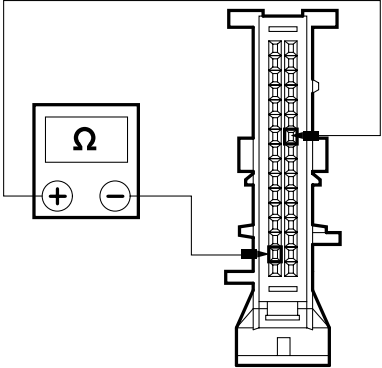
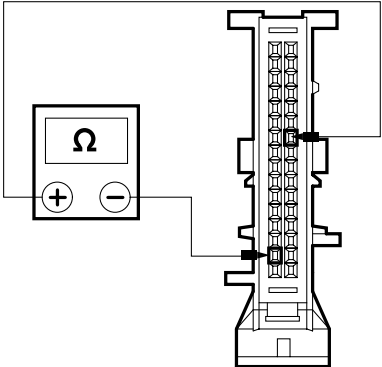
PINPOINT TEST A : THE SPEED CONTROL SWITCH READING IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK THE SPEED CONTROL CIRCUIT FOR CORRECT OPERATION	
 <p>E56788</p>	<ol style="list-style-type: none"> 1 Disconnect CJB C103. 2 Measure the resistance between the CJB C103 pin 18, circuit 8-PG13 (WH), harness side and CJB C103 pin 10, circuit 9-PG13 (BN), harness side. <ul style="list-style-type: none"> • Is the resistance between 2088 and 2143 ohms? <ul style="list-style-type: none"> → Yes GO to A2. → No GO to Pinpoint Test B.
A2: CHECK THE SPEED CONTROL SWITCH OFF BUTTON FOR CORRECT OPERATION	
 <p>E56788</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the CJB C103 pin 18, circuit 8-PG13 (WH), harness side and CJB C103 pin 10, circuit 9-PG13 (BN), harness side with the speed control switch in the OFF position.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Press and hold the speed control switch in the OFF position.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes GO to A3. → No INSTALL a new speed control switch. <p>REFER to: Speed Control Switch (310-03 Speed Control, Removal and Installation). TEST the system for normal operation.</p>
<p>A3: CHECK THE SPEED CONTROL SWITCH SET - BUTTON FOR CORRECT OPERATION</p>	
 <p>E56788</p>	<p>1 Measure the resistance between the CJB C103 pin 18, circuit 8-PG13 (WH), harness side and CJB C103 pin 10, circuit 9-PG13 (BN), harness side with the speed control switch in the SET - position.</p>
	<p>2 Press and hold the speed control switch in the SET - position.</p> <ul style="list-style-type: none"> • Is the resistance between 118 and 129 ohms? → Yes GO to A4. → No INSTALL a new speed control switch. <p>REFER to: Speed Control Switch (310-03 Speed Control, Removal and Installation). TEST the system for normal operation.</p>

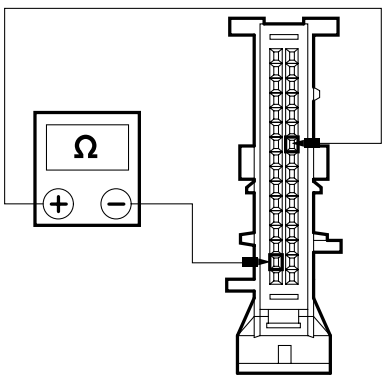
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A4: CHECK THE SPEED CONTROL SWITCH SET + BUTTON FOR CORRECT OPERATION	
 <p>E56788</p>	<p>1 Measure the resistance between the CJB C103 pin 18, circuit 8-PG13 (WH), harness side and CJB C103 pin 10, circuit 9-PG13 (BN), harness side with the speed control switch in the SET + position.</p>
	<p>2 Press and hold the speed control switch in the SET + position.</p> <ul style="list-style-type: none"> • Is the resistance 297 and 318 ohms? → Yes GO to A5. → No INSTALL a new speed control switch. <p>REFER to: Speed Control Switch (310-03 Speed Control, Removal and Installation). TEST the system for normal operation.</p>
A5: CHECK THE SPEED CONTROL SWITCH RESUME BUTTON FOR CORRECT OPERATION	
 <p>E56788</p>	<p>1 Measure the resistance between the CJB C103 pin 18, circuit 8-PG13 (WH), harness side and CJB C103 pin 10, circuit 9-PG13 (BN), harness side with the speed control switch in the RESUME position.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Press and hold the speed control switch in the RESUME position.</p> <ul style="list-style-type: none"> • Is the resistance between 594 and 616 ohms? <p>→ Yes GO to A6.</p> <p>→ No INSTALL a new speed control switch.</p> <p>REFER to: Speed Control Switch (310-03 Speed Control, Removal and Installation). TEST the system for normal operation.</p>

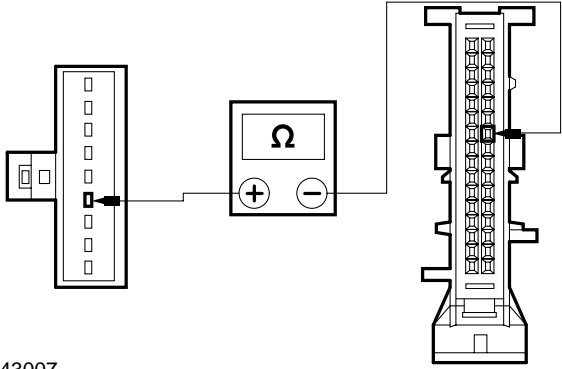
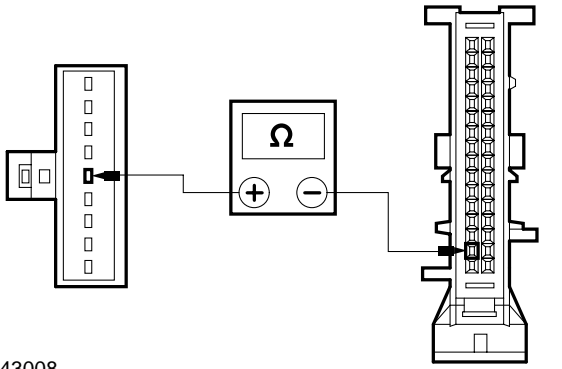
A6: CHECK THE SPEED CONTROL SWITCH ON BUTTON FOR CORRECT OPERATION

 <p>E56788</p>	<p>1 Measure the resistance between the CJB C103 pin 18, circuit 8-PG13 (WH), harness side and CJB C103 pin 10, circuit 9-PG13 (BN), harness side with the speed control switch in the ON position.</p>
	<p>2 Press and hold the speed control switch in the ON position.</p> <ul style="list-style-type: none"> • Is the resistance between 1098 and 1134 ohms? <p>→ Yes CLEAR the DTCs. TEST the system for normal operation.</p> <p>→ No INSTALL a new speed control switch.</p> <p>REFER to: Speed Control Switch (310-03 Speed Control, Removal and Installation). TEST the system for normal operation.</p>

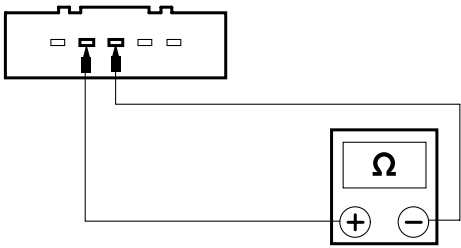
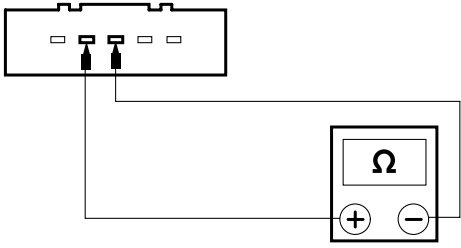
PINPOINT TEST B : CHECK SPEED CONTROL SWITCH CIRCUITS FOR HIGH RESISTANCE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>B1: CHECK THE SPEED CONTROL CIRCUIT 9-PG13 (BN) FOR RESISTANCE</p>	
	<p>1 Disconnect Clockspring C896.</p>

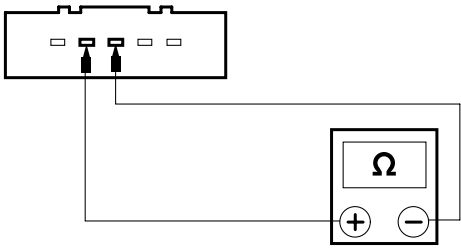
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E43007</p>	<p>2 Measure the resistance between the CJB C103 pin 10, circuit 9-PG13 (BN), harness side and the clockspring C896 pin 4, circuit 9-PG13 (BN), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes GO to B2. → No REPAIR the circuit. TEST the system for normal operation.
B2: CHECK THE SPEED CONTROL CIRCUIT 8-PG13 (WH) FOR RESISTANCE	
 <p>E43008</p>	<p>1 Measure the resistance between the CJB C103 pin 18, circuit 8-PG13 (WH), harness side and the clockspring C896 pin 5, circuit 8-PG13 (WH), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes GO to B3. → No REPAIR the circuit. TEST the system for normal operation.
B3: CHECK THE SPEED CONTROL OFF SWITCH FOR CORRECT OPERATION	
	<p>▲ WARNING: To deactivate the air bag module, refer to the procedure in Section 501-20B for the correct air bag module deactivation procedure. Failure to follow this instruction may result in personal injury.</p> <p>1 Remove the driver air bag module.</p> <p>REFER to: Driver Air Bag Module - Vehicles Built Up To: 06/2004 (501-20B, Removal and Installation) / Driver Air Bag Module - Vehicles Built From: 06/2004 (501-20B, Removal and Installation).</p> <p>2 Disconnect Speed control switch C921.</p>

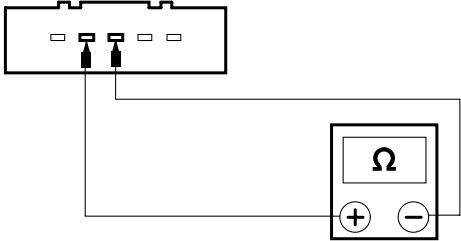
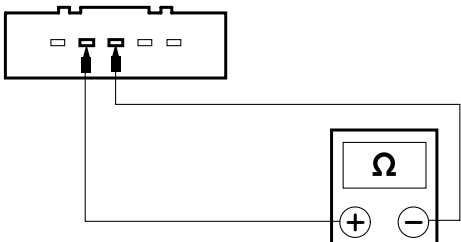
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E43006</p>	<p>3 Measure resistance between the speed control switch C921 pin 2, and pin 3, harness side.</p>
	<p>4 Press and hold the speed control switch in the OFF position.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes GO to B4. → No INSTALL a new speed control switch. <p>REFER to: Speed Control Switch (310-03 Speed Control, Removal and Installation). TEST the system for normal operation.</p>
<p>B4: CHECK THE SPEED CONTROL SET - SWITCH FOR CORRECT OPERATION</p>	
 <p>E43006</p>	<p>1 Measure resistance between the speed control switch C921 pin 2, and pin 3, harness side.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Press and hold the speed control switch in the SET - position.</p> <ul style="list-style-type: none"> Is the resistance between 119 and 127 ohms? <p>→ Yes GO to B5.</p> <p>→ No INSTALL a new speed control switch.</p> <p>REFER to: Speed Control Switch (310-03 Speed Control, Removal and Installation). TEST the system for normal operation.</p>
B5: CHECK THE SPEED CONTROL SET + SWITCH FOR CORRECT OPERATION	
 <p>E43006</p>	<p>1 Measure resistance between the speed control switch C921 pin 2, and pin 3, harness side.</p>
	<p>2 Press and hold the speed control switch in the SET + position.</p> <ul style="list-style-type: none"> Is the resistance 299 and 312 ohms? <p>→ Yes GO to B6.</p> <p>→ No INSTALL a new speed control switch.</p> <p>REFER to: Speed Control Switch (310-03 Speed Control, Removal and Installation). TEST the system for normal operation.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B6: CHECK THE SPEED CONTROL RESUME SWITCH FOR CORRECT OPERATION	
 <p>E43006</p>	<p>1 Measure resistance between the speed control switch C921 pin 2, and pin 3, harness side.</p>
	<p>2 Press and hold the speed control switch in the RESUME position.</p> <ul style="list-style-type: none"> • Is the resistance between 597 and 616 ohms? → Yes GO to B7. → No INSTALL a new speed control switch. <p>REFER to: Speed Control Switch (310-03 Speed Control, Removal and Installation). TEST the system for normal operation.</p>
B7: CHECK THE SPEED CONTROL SWITCH ON BUTTON FOR CORRECT OPERATION	
 <p>E43006</p>	<p>1 Measure resistance between the speed control switch C921 pin 2, and pin 3, harness side.</p>

DIAGNOSIS AND TESTING

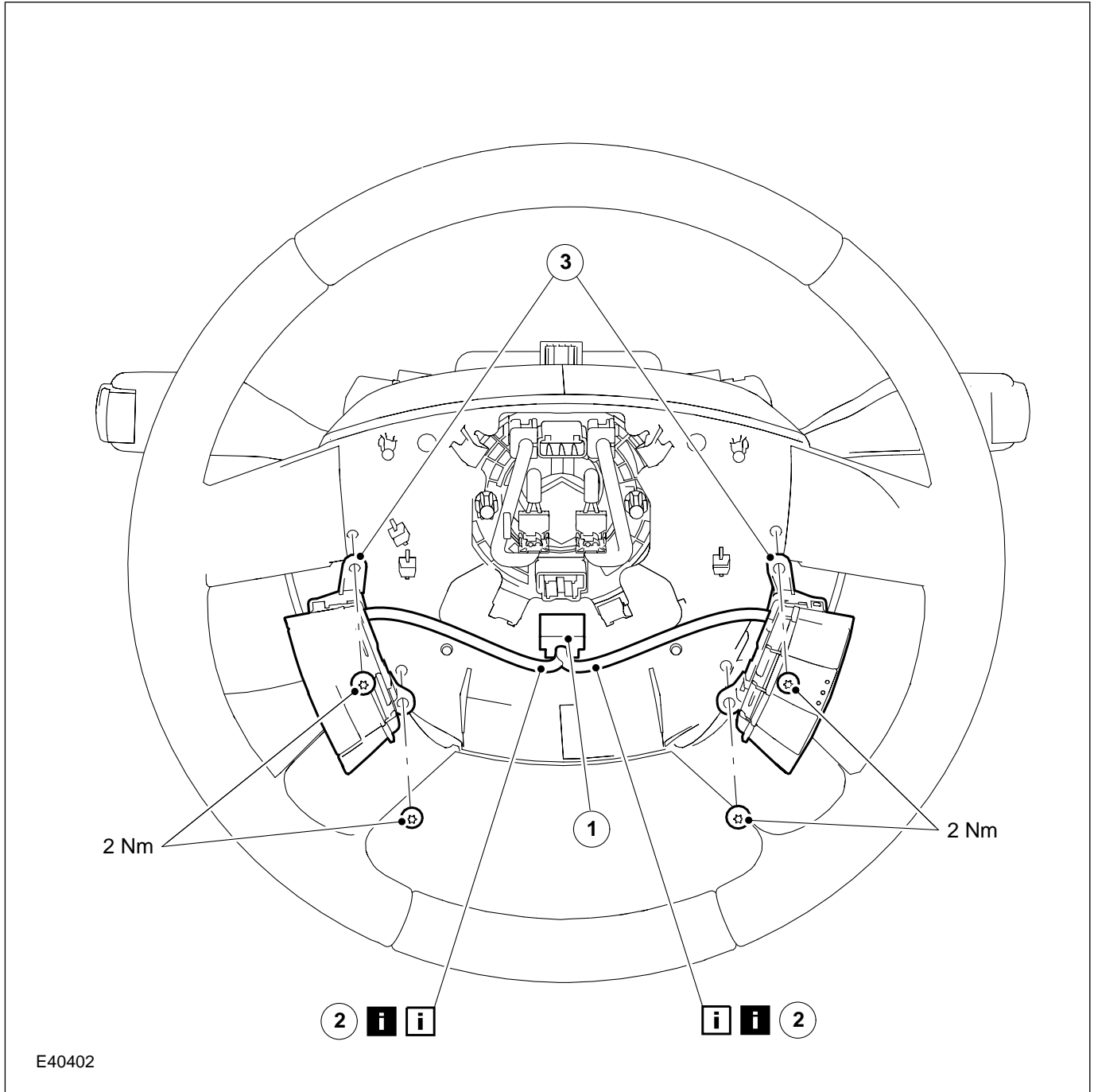
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Press and hold the speed control switch in the ON position.</p> <ul style="list-style-type: none"> • Is the resistance between 1103 and 1133 ohms? <p>→ Yes INSTALL a new clockspring.</p> <p>REFER to: Clockspring - Vehicles Built Up To: 06/2004 (501-20B, Removal and Installation) / Clockspring - Vehicles Built From: 06/2004 (501-20B, Removal and Installation). TEST the system for normal operation.</p> <p>→ No INSTALL a new speed control switch.</p> <p>REFER to: Speed Control Switch (310-03 Speed Control, Removal and Installation). TEST the system for normal operation.</p>

REMOVAL AND INSTALLATION

Speed Control Switch

1. Remove the driver air bag module. For additional information, refer to Section **501-20A [Safety Belt System]** / **501-20B [Supplemental Restraint System]**.

2. Remove the components in the order indicated in the following illustration(s) and table(s).



E40402

REMOVAL AND INSTALLATION

Item	Description
1	Speed control switch electrical connector
2	Speed control switch wiring harness See Removal Detail


Item	Description
	See Installation Detail
3	Speed control switch

3. To install, reverse the removal procedure.

Removal Details**Item 2 Speed control switch wiring harness**

1. Detach the speed control wiring harness from the steering wheel back plate wiring harness retainers.

Installation Details**Item 2 Speed control switch wiring harness**

1.  **CAUTION:** Make sure the speed control wiring harness is correctly attached to the steering wheel back plate during installation. Failure to follow this instruction may cause damage to the speed control wiring harness.

Attach the speed control wiring harness to the steering wheel back plate wiring harness retainers.

Electrical

4

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SECTION 412-00 Climate Control System - General Information

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS**Lubricants, Fluids, Sealers and Adhesives**

Item	Specification
R134a refrigerant	WSH-M17B19-A
Air conditioning compressor oil	WSH-M1C231-B
Ford A/C cleaning agent F4AZ-19579A	-
Fluorescent leak detector additive 164-R-3712	-

Refrigerant Capacities (when charging)

	Grammes
Air Conditioning (A/C) System	600 ± 15

Refrigerant Oil Fill Quantities

	Milliliters
Air Conditioning (A/C) System	200

Addition of Refrigerant Oil (When new components are installed)**CAUTIONS:**

 The refrigerant oil top-up quantity must not exceed the refrigerant oil fill quantity.

 If other A/C components are being renewed in addition to the A/C compressor, there is no need to top up with additional refrigerant oil, apart from filling the compressor.

 Because factory fill quantities differ, the refrigerant oil must be drained from the new A/C compressor.

	Milliliters
When all lines and components are replaced.	add 200.
Air conditioning (A/C) compressor - if the quantity of refrigerant oil drained from the faulty compressor is less than 150 ml	add 150.
Air conditioning compressor (if the amount of refrigerant oil drained from the faulty compressor is more than 150 ml)	add 200.
Air conditioning condenser	add 30.
Air conditioning (A/C) evaporator core	add 30.
A/C dehydrator	add 90.
Every time if refrigerant oil is collected after refrigerant is extracted.	Add the same quantity as the quantity that was collected.

Air Conditioning (A/C) Clutch

	mm
A/C clutch air gap (vehicles with diesel engine built from 08/2005 and vehicles with petrol engine)	0.35 - 0.75
A/C clutch air gap (vehicles with diesel engine, built until 08/2005)	0.4 - 0.8

SPECIFICATIONS**Torque Specifications**

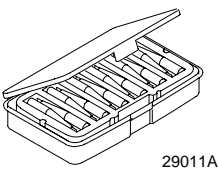
Description	Nm	lb-ft	lb-in
A/C compressor drive plate bolt (vehicles with petrol engine)	13	10	-
A/C compressor drive plate bolt (vehicles with diesel engine)	22	16	-

DIAGNOSIS AND TESTING

Climate Control System

Refer to Wiring Diagrams Section 412-00, for schematic and connector information.

Special Tool(s)

 <p>29011A</p>	<p>Terminal Probe Kit 418-S035</p>
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General Equipment

Digital Multimeter (compatible with K-type thermocouple)
The Ford approved diagnostic tool (IDS)
Refrigerant center
Thermometer - Fluke 80 PK-8 (FSE number 260 4102 001 07)

Inspection and Checking

NOTE: The electronic automatic temperature control (EATC) module is integrated into the control panel for the climate control system.

1. VERIFY the customer concern.
2. Visually CHECK for any obvious mechanical or electrical damage.

NOTE: Ensure correct locking of wiring harness connector.

Visual Inspection

Mechanical	Electrical
<ul style="list-style-type: none"> • Refrigerant lines • Condenser • Coolant level • Drive belt • A/C compressor 	<ul style="list-style-type: none"> • Fuses • Wiring harness • Connector

3. RECTIFY any obvious causes for a concern found during the visual inspection before performing any further tests. CHECK the operation of the system.
4. If the concern persists after the visual inspection, PERFORM a fault diagnosis on the electronic engine management, the charging system, the generic electronic module (GEM) and the instrument cluster (vehicles with EATC:

also read out the EATC fault memory) with WDS and RECTIFY any displayed faults in accordance with the fault description. CHECK the operation of the system.

5. For vehicles with no stored faults, PROCEED in accordance with the Symptom Chart according to the fault symptom.
6. Following checking or elimination of the fault(s) and after completion of operations, the fault memories of all vehicle modules must be READ OUT and any stored faults must be DELETED. READ OUT all fault memories again following a road test.

Refrigerant Circuit - Quick Check

▲ WARNING: The air conditioning system is filled with refrigerant R134a. Observe "Health and Safety Precautions". For further information

REFER to: **Health and Safety Precautions** (100-00 General Information, Description and Operation).

Refrigerant circuit check

▲ WARNING: Under certain circumstances, refrigerant lines and A/C components may be extremely hot or cold. Exercising care, touch the refrigerant lines or A/C components in order to check this. Failure to follow these instructions may result in personal injury.

When the A/C system is operating, the following conditions should apply:

- The refrigerant line from the refrigerant compressor to the condenser must be hot.
- The refrigerant line from the A/C condenser to the fixed orifice tube must be warm, but not so hot as the refrigerant line mentioned above.
- Determine the difference in temperature upstream and downstream of the A/C condenser by measuring the temperatures. Depending on the ambient temperature, the temperature difference should be more than 20°C. If the temperature difference is less, check the condenser for contamination or damage to the fins as well as operation of the radiator fans.

DIAGNOSIS AND TESTING

- The refrigerant line between the fixed orifice tube and the evaporator must be cold from the point where the fixed orifice tube is installed. Depending on the weather, the refrigerant line may also have ice on its surface.
- The refrigerant line between the evaporator and the A/C compressor including the refrigerant accumulator must be cold.

Evaporator outlet temperature test

To test the power of the A/C system, the temperature of the refrigerant outlet line of the evaporator needs to be measured. To do this, the following preconditions must be met:

- Open all windows.
- Set the air distribution to the defrost/dashboard position and open all the ventilation nozzles.
- DO NOT switch on recirculated air.
- Select lowest blower switch setting.
- Select lowest temperature setting.

NOTE: The temperature measurement cannot be done with a thermometer which makes no contact. The surface reflection from the metal line may cause incorrect readings.

Connect the temperature sensor (Fluke 80 PK-8) to the refrigerant outlet line of the evaporator. The temperature sensor must be positioned as closely as possible to the evaporator. Connect the temperature sensor to the multimeter.

Start the engine and allow it to run at idle speed for several minutes.

Switch on the air-conditioning system.

After three minutes, measure the surface temperature of the refrigerant outlet line of the evaporator.

If the temperature measured is 4° C or lower, the A/C system is OK. If the temperature is higher, the A/C system may be under-filled. For further information, refer to

REFER to: Air Conditioning (A/C) System

Recovery, Evacuation and Charging (412-00 Climate Control System - General Information, General Procedures).

Frequent faults and their causes

If the cooling power of the A/C system is not adequate, make certain that the temperature control flap(s) is/are operating correctly.

- No or poor cooling performance:
 - Blockage or narrowing of a refrigerant line or in the suction accumulator: The location of the blockage or narrowing can easily be located by temperature comparisons at the refrigerant lines and the suction accumulator. The blockage or restriction is located at the point where the temperature difference is identified. **Note: A temperature difference in the area of the fixed orifice tube is normal.** Once the location of the blockage or restriction has been found, check the relevant component and renew it if necessary.
- Sudden poor cooling performance (after the air conditioning has been switched off for approx. 5 minutes, the cooling performance returns to normal):
 - Cause is an iced-up fixed orifice tube caused by moisture in the refrigerant circuit. In order to ensure that moisture is completely removed from the refrigerant circuit, renew the refrigerant accumulator and extend the evacuation time to 2-3 hours. For further information REFER to:

Suction Accumulator (412-03 Air Conditioning, Removal and Installation),

Suction Accumulator - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) (412-03 Air Conditioning, Removal and Installation),

Air Conditioning (A/C) System Recovery, Evacuation and Charging (412-00 Climate Control System - General Information, General Procedures).

Sequence of A/C Request Signal

NOTE: The electronic automatic temperature control (EATC) module is integrated into the control panel for the climate control system.

NOTE: The generic electronic module (GEM) is an integral part of the central junction box (CJB).

After activation of the climate control switch, which is integrated in the control panel for the climate control system, an A/C request signal is sent from the control panel for the climate control system (vehicles with electronic automatic temperature control (EATC): EATC module) to the GEM.

From there, the signal is sent to the instrument cluster via the MS-CAN bus. A gateway is installed in the instrument cluster, which establishes the connection between the MS-CAN bus and the HS-CAN bus.

DIAGNOSIS AND TESTING

After the signal has been converted in the gateway, it is relayed to the powertrain control module (PCM) via the HS-CAN bus. Once all the required parameters have been met, the PCM switches on the refrigerant compressor using the A/C clutch relay, thus starting the A/C system.

Fault Memory Interrogation without WDS - vehicles with electronic automatic temperature control (EATC)

NOTE: NOTE: On vehicles equipped with a DVD navigation system with touchscreen, interrogation of the fault memory is only possible using WDS.

The climate control system features a self-diagnosis function which can detect and store both current permanent faults as well as intermittent faults which have occurred during normal operation of the vehicle. It is also possible to read out these faults via the display of the EATC module. To read out the fault memory, the ignition key must be turned to the "ON" position and the battery voltage must be between 9 V and 16 V.

Activation of self-diagnosis

At the control panel for the climate control system, PRESS the "OFF" and "FOOTWELL" buttons simultaneously for **exactly** 2 seconds, then PRESS "AUTO" within 1.5 seconds. The self-diagnosis which then starts lasts a few seconds. An animated display appears in the EATC display during this time. Any faults found are displayed on both displays of the EATC in the form of trouble codes.

Example: Left-hand display shows "90", right-hand display shows "27", i.e. the trouble code read out is 9027 = short in circuit for right-hand center vents air outlet temperature sensor (short to ground).

The following table gives information on the possible DTCs and their corresponding meanings. By PRESSING the "DEFROST" button, the fault memory is cleared and diagnosis mode is ended. To end the diagnostic mode without clearing the DTCs, PRESS any other EATC button.

Read out stored faults

At the control panel for the climate control system, PRESS the "OFF" and "FOOTWELL" buttons simultaneously for **exactly** 2 seconds, then PRESS "HEAD AREA" within 1.5 seconds. Any stored faults are shown on the EATC display and should be noted for safety reasons. By PRESSING the "DEFROST" button, the fault memory is cleared and diagnosis mode is ended. To end the diagnostic mode without clearing the DTCs, PRESS any other EATC button.

Reading out the software version

At the control panel for the climate control system, PRESS the "OFF" and "FOOTWELL" buttons simultaneously for **exactly** 2 seconds, then PRESS "A/C" within 1.5 seconds. The software version is shown on the EATC display. The output mode can be exited by PRESSING any operating button of the EATC.

Fault Code Table - vehicles with electronic automatic temperature control (EATC)**Electronic automatic temperature control (EATC) fault code table**

Self-test code	Description	Action
9027	Short in circuit for right-hand center vents air outlet temperature sensor (short to ground)	GO to Pinpoint Test N.
9028	Break in circuit for right-hand center vents air outlet temperature sensor	GO to Pinpoint Test N.
9029	Short in circuit for right-hand footwell air outlet temperature sensor (short to ground)	GO to Pinpoint Test O.
9030	Break in circuit for right-hand footwell air outlet temperature sensor	GO to Pinpoint Test O.

DIAGNOSIS AND TESTING

Self-test code	Description	Action
9200	Circuit for push buttons, EATC module faulty	CLEAR the fault memory. If the fault occurs again after a functional test, RENEW the EATC module.
9242	Circuit of actuator for recirculated air flap faulty	GO to Pinpoint Test G.
9251	Break in circuit for interior temperature sensor	GO to Pinpoint Test Q.
9253	Short in circuit for interior temperature sensor (short to ground)	GO to Pinpoint Test Q.
9259	Break in circuit for left-hand sun load sensor	GO to Pinpoint Test P.
9261	Short in circuit for left-hand sun load sensor (short to ground)	GO to Pinpoint Test P.
9262	Fault in circuit of air flap actuator for defroster/center vents flap	GO to Pinpoint Test K.
9263	Circuit of actuator for air distribution flap faulty	GO to Pinpoint Test J.
9342	Internal control unit fault	CLEAR the fault memory. If the fault occurs again after a functional test, RENEW the EATC module.
9676	Power supply voltage outside tolerance (9 V - 16 V)	GO to Pinpoint Test D.
A266	Circuit of left-hand temperature control flap actuator faulty	GO to Pinpoint Test H.
A267	Circuit of right-hand temperature control flap actuator faulty	GO to Pinpoint Test I.
A297	Break in circuit for left-hand center vents air outlet temperature sensor	GO to Pinpoint Test L.
A298	Short in circuit for left-hand center vents air outlet temperature sensor (short to ground)	GO to Pinpoint Test L.
A299	Break in circuit for left-hand footwell air outlet temperature sensor	GO to Pinpoint Test M.
A307	Short in circuit for left-hand footwell air outlet temperature sensor (short to ground)	GO to Pinpoint Test M.
A308	Fault in the circuit of the interior temperature sensor blower	GO to Pinpoint Test R.
A426	Break in circuit for right-hand sun load sensor	GO to Pinpoint Test P.
A427	Short in circuit for right-hand sun load sensor (short to ground)	GO to Pinpoint Test P.

DIAGNOSIS AND TESTING

Self-test code	Description	Action
A516	Circuit of blower control module faulty	GO to Pinpoint Test E.

Symptom Chart

NOTE: The generic electronic module (GEM) is integrated into the central junction box (CJB).

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Blower motor inoperative/incorrect function - vehicles without electronic automatic temperature control (EATC) 	<ul style="list-style-type: none"> Fuse(s) Circuit(s) Blower motor Control panel - climate control system blower resistor Blower relay Generic electronic module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test A.
<ul style="list-style-type: none"> Malfunction of the recirculated air flap 	<ul style="list-style-type: none"> Fuse(s) Circuit(s) Control panel - climate control system Electronic automatic temperature control (EATC) module Actuator - recirculated air flap Recirculated air flap 	<ul style="list-style-type: none"> Vehicles without electronic automatic temperature control (EATC): GO to Pinpoint Test B. Vehicles with electronic automatic temperature control (EATC): GO to Pinpoint Test G.
<ul style="list-style-type: none"> Air conditioning inoperative (blower OK) 	<ul style="list-style-type: none"> Fuse(s) Circuit(s) Control panel - climate control system Electronic automatic temperature control (EATC) module Refrigerant high-pressure switch Refrigerant pressure transducer Refrigerant low-pressure switch A/C clutch relay Air conditioning clutch Quantity of refrigerant. Generic electronic module (GEM) Powertrain control module (PCM) Ambient temperature sensor 	<ul style="list-style-type: none"> GO to Pinpoint Test C.
<ul style="list-style-type: none"> Control panel for the climate control system inoperative - vehicles with electronic automatic temperature control (EATC) 	<ul style="list-style-type: none"> Fuse(s) Circuit(s) Electronic automatic temperature control (EATC) module 	<ul style="list-style-type: none"> GO to Pinpoint Test D.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Blower malfunction - vehicles with electronic automatic temperature control (EATC) (display in the control panel of the climate control system OK) 	<ul style="list-style-type: none"> Fuse(s) Circuit(s) Electronic automatic temperature control (EATC) module Blower Blower control module Blower relay Generic electronic module (GEM) Central junction box (CJB) 	<ul style="list-style-type: none"> Vehicles built up to 10/2005: GO to Pinpoint Test E. Vehicles built from 10/2005: GO to Pinpoint Test F.
<ul style="list-style-type: none"> Malfunction of left-hand temperature control flap - vehicles with electronic automatic temperature control (EATC) 	<ul style="list-style-type: none"> Circuit(s) Left-hand temperature control flap actuator Left-hand temperature control flap Electronic automatic temperature control (EATC) module 	<ul style="list-style-type: none"> GO to Pinpoint Test H.
<ul style="list-style-type: none"> Malfunction of right-hand temperature control flap - vehicles with electronic automatic temperature control (EATC) 	<ul style="list-style-type: none"> Circuit(s) Right-hand temperature control flap actuator Right-hand temperature control flap Electronic automatic temperature control (EATC) module 	<ul style="list-style-type: none"> GO to Pinpoint Test I.
<ul style="list-style-type: none"> Malfunction of air distribution flap - vehicles with electronic automatic temperature control (EATC) 	<ul style="list-style-type: none"> Circuit(s) Actuator – air distribution flap Air distribution flap Electronic automatic temperature control (EATC) module 	<ul style="list-style-type: none"> GO to Pinpoint Test J.
<ul style="list-style-type: none"> Malfunction of defrost/center vents air flap actuator - vehicles with electronic automatic temperature control (EATC) 	<ul style="list-style-type: none"> Circuit(s) Defrost/center vents air flap actuator Defrost flap Electronic automatic temperature control (EATC) module 	<ul style="list-style-type: none"> GO to Pinpoint Test K.
<ul style="list-style-type: none"> Fault in left-hand center vents air outlet temperature sensor circuit - vehicles with electronic automatic temperature control (EATC) 	<ul style="list-style-type: none"> Circuit(s) Air outlet temperature sensor, centre vents, left Electronic automatic temperature control (EATC) module 	<ul style="list-style-type: none"> GO to Pinpoint Test L.
<ul style="list-style-type: none"> Fault in left-hand footwell air outlet temperature sensor circuit - vehicles with electronic automatic temperature control (EATC) 	<ul style="list-style-type: none"> Circuit(s) Left-hand footwell air outlet temperature sensor Electronic automatic temperature control (EATC) module 	<ul style="list-style-type: none"> GO to Pinpoint Test M.
<ul style="list-style-type: none"> Fault in right-hand center vents air outlet temperature sensor circuit - vehicles with electronic automatic temperature control (EATC) 	<ul style="list-style-type: none"> Circuit(s) Air outlet temperature sensor, centre vents, right Electronic automatic temperature control (EATC) module 	<ul style="list-style-type: none"> GO to Pinpoint Test N.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Fault in right-hand footwell air outlet temperature sensor circuit - vehicles with electronic automatic temperature control (EATC) 	<ul style="list-style-type: none"> Circuit(s) Right-hand footwell air outlet temperature sensor Electronic automatic temperature control (EATC) module 	<ul style="list-style-type: none"> GO to Pinpoint Test O.
<ul style="list-style-type: none"> Sun load sensor circuit faulty - vehicles with electronic automatic temperature control (EATC) 	<ul style="list-style-type: none"> Circuit(s) Sun load sensor Electronic automatic temperature control (EATC) module 	<ul style="list-style-type: none"> GO to Pinpoint Test P.
<ul style="list-style-type: none"> Passenger compartment temperature sensor circuit faulty - vehicles with electronic automatic temperature control (EATC) 	<ul style="list-style-type: none"> Circuit(s) Passenger compartment temperature sensor Electronic automatic temperature control (EATC) module 	<ul style="list-style-type: none"> GO to Pinpoint Test Q.
<ul style="list-style-type: none"> Blower passenger compartment temperature sensor circuit faulty - vehicles with electronic automatic temperature control (EATC) 	<ul style="list-style-type: none"> Circuit(s) Blower passenger compartment temperature sensor Electronic automatic temperature control (EATC) module 	<ul style="list-style-type: none"> GO to Pinpoint Test R.

Pinpoint Tests

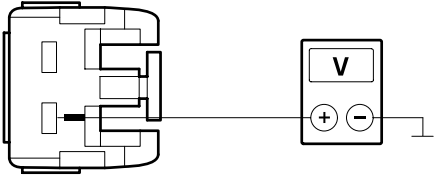
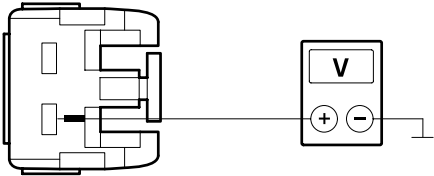
PINPOINT TEST A : BLOWER MOTOR INOPERATIVE/INCORRECT FUNCTION - VEHICLES WITHOUT ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK ALL SPEED SETTINGS OF THE BLOWER MOTOR	
	<ol style="list-style-type: none"> Ignition switch in position II. Move the blower switch through all its positions. <ul style="list-style-type: none"> Is the blower motor inoperative in all the switch positions? <ul style="list-style-type: none"> → Yes GO to A2. → No <ul style="list-style-type: none"> - The blower motor is only inoperative in switch position 4: GO to A15. - The blower motor is inoperative in switch positions 1, 2 and/or 3: GO to A16.
A2: CHECK FUSE F10	
	<ol style="list-style-type: none"> Ignition switch in position 0.

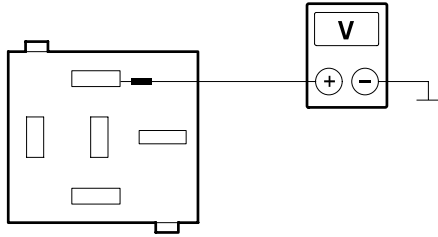
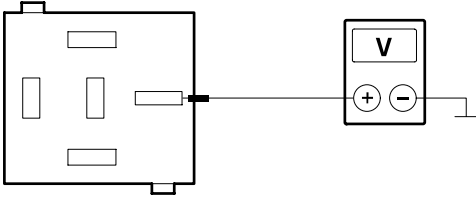
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK Fuse F10 (BJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to A3.</p> <p>→ No INSTALL NEW fuse F10 (30 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short using the Wiring Diagrams.</p>
A3: CHECK THE EQUIPMENT LEVEL	
	<p>1 Compare the following systems with the equipment level of the vehicle:</p> <ul style="list-style-type: none"> • Double locking. • Footwell lighting. • Reading lights. • Anti-theft alarm. • Headlamp switch-off delay. <ul style="list-style-type: none"> • Is the vehicle equipped with one of the above systems? <p>→ Yes GO to A6.</p> <p>→ No GO to A4.</p>
A4: CHECK THE VOLTAGE AT FUSE F10	
	<p>1 Connect Fuse F10 (BJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F10 (30 A) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to A5.</p> <p>→ No REPAIR the voltage supply to fuse F10 with the aid of the Wiring Diagrams. CHECK the operation of the system.</p>
A5: CHECK THE VOLTAGE AT THE BLOWER MOTOR	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C789 of heater blower motor.</p> <p>3 Ignition switch in position II.</p>

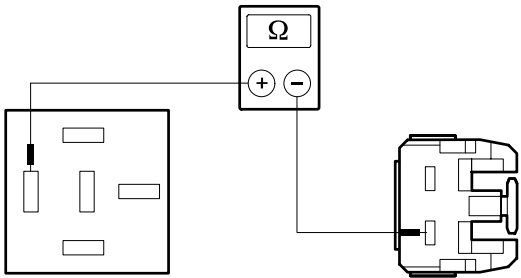
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0028910</p>	<p>4 Measure the voltage between the blower motor, connector C789, pin 1, circuit 15-FA18 (GN/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes GO to A12.</p> <p>→ No LOCATE and REPAIR the break in the circuit between the blower motor and fuse F10 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>A6: CHECK THE VOLTAGE AT FUSE F10</p>	
	<p>1 Connect Fuse F10 (BJB).</p> <p>2 Measure the voltage between fuse F10 (30 A) and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes GO to A7.</p> <p>→ No REPAIR the voltage supply to fuse F10 with the aid of the Wiring Diagrams. CHECK the operation of the system.</p>
<p>A7: CHECK THE VOLTAGE AT THE BLOWER MOTOR</p>	
 <p>VFE0028910</p>	<p>1 Disconnect connector C789 of heater blower motor.</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between the blower motor, connector C789, pin 1, circuit 15-FA18 (GN/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes GO to A12.</p> <p>→ No GO to A8.</p>
<p>A8: CHECK VOLTAGE AT THE BLOWER RELAY</p>	
	<p>1 Ignition switch in position 0.</p>

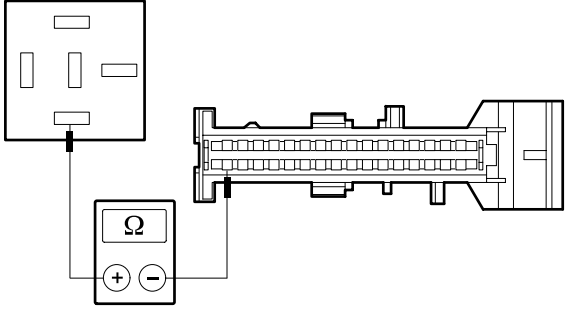
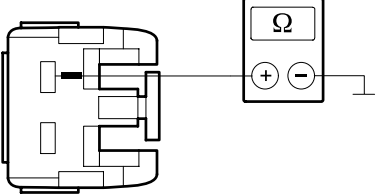
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect blower relay from socket C1010 (BJB).</p>
 <p>VFE0016041</p>	<p>3 Measure the voltage between the blower relay, socket C1010, pin 1, circuit 30-FA23 (RD), wiring harness side and ground.</p>
 <p>VFE0015930</p>	<p>4 Measure the voltage between the blower relay, socket C1010, pin 3, circuit 30-FA24 (RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured in both cases? → Yes GO to A9. → No <ul style="list-style-type: none"> - If battery voltage is not measured during one measurement: LOCATE and REPAIR the break in the relevant circuit between the blower relay and soldered connection S119 using the Wiring Diagrams. CHECK the operation of the system. - Battery voltage not measured in any case: LOCATE and REPAIR the break in circuit 30-FA23A (RD) between soldered connection S119 and fuse F10 using the Wiring Diagrams. CHECK the operation of the system.

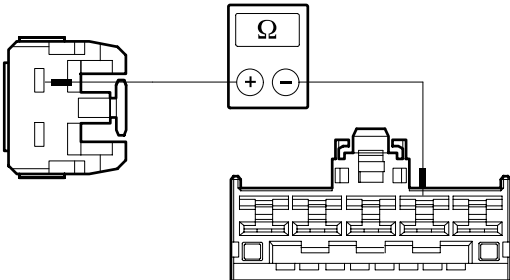
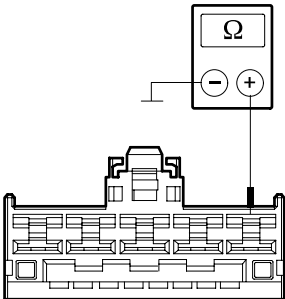
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A9: CHECK CIRCUIT BETWEEN THE BLOWER RELAY AND THE BLOWER MOTOR FOR OPEN CIRCUIT	
 <p>VFE0037803</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the blower relay, socket C1010, pin 5, circuit 15-FA18 (GN/OG), wiring harness side and blower motor, connector C789, pin 1, circuit 15-FA18 (GN/OG), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <ul style="list-style-type: none"> → Yes GO to A10. → No LOCATE and REPAIR the break in the circuit between the blower relay and the blower motor using the Wiring Diagrams. CHECK the operation of the system.
A10: CHECK BLOWER RELAY	
	<ol style="list-style-type: none"> 1 Check blower relay according to the component test at the end of this section. <ul style="list-style-type: none"> • Is the blower relay OK? <ul style="list-style-type: none"> → Yes GO to A11. → No RENEW the blower relay. CHECK the operation of the system.
A11: CHECK CIRCUIT BETWEEN THE BLOWER RELAY AND THE CJB FOR OPEN CIRCUIT	
<p>NOTE: If the generic electronic module (GEM) is changed, the new one must be configured. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
	<ol style="list-style-type: none"> 1 Disconnect Connector C95 from CJB.

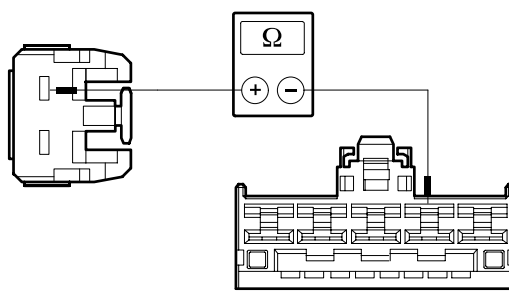
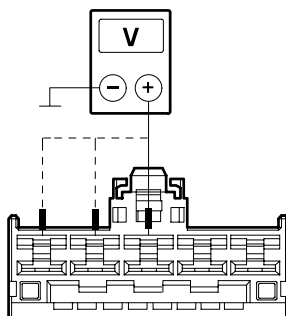
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037804</p>	<p>2 Measure the resistance between the blower relay, socket C1010, pin 2, circuit 31S-FA23 (BK/BU), wiring harness side and CJB, connector C95, pin 32, circuit 31S-FA23 (BK/BU), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohm measured? <p>→ Yes CHECK the CJB and RENEW as required. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in circuit 31S-FA23 (BK/BU) between the blower relay and CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>A12: CHECK GROUND CONNECTION OF BLOWER MOTOR</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Set the blower switch to position 4.</p>
 <p>E0028911</p>	<p>3 Measure the resistance between the blower motor, connector C789, pin 2, circuit 31S-FA18 (BK/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohm measured? <p>→ Yes RENEW the blower motor. CHECK the operation of the system.</p> <p>→ No GO to A13.</p>
<p>A13: CHECK THE CIRCUIT BETWEEN THE BLOWER MOTOR AND THE BLOWER SWITCH FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect Connector C380 from blower switch.</p>

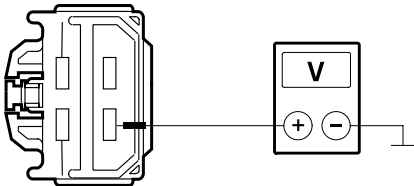
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037930</p>	<p>2 Measure the resistance between the blower motor, connector C789, pin 2, circuit 31S-FA18 (BK/RD), wiring harness side and the blower switch, connector C380, pin 4, circuit 31S-FA33 (BK/OG), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes GO to A14. → No LOCATE and REPAIR the break in circuit 31S-FA18 (BK/RD) between the blower motor and soldered connection S24 using the Wiring Diagrams. CHECK the operation of the system.
<p>A14: CHECK THE GROUND CONNECTION OF THE BLOWER SWITCH</p>	
 <p>VFE0037931</p>	<p>1 Measure the resistance between the blower switch, connector C380, pin 5, circuit 31-FA25 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes RENEW the blower switch. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the blower switch and ground connection G20 using the Wiring Diagrams. CHECK the operation of the system.
<p>A15: CHECK FOR OPEN CIRCUIT BETWEEN THE BLOWER MOTOR AND BLOWER SWITCH (4TH SPEED INOPERATIVE)</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C789 of heater blower motor.</p> <p>3 Disconnect Connector C380 from blower switch.</p>

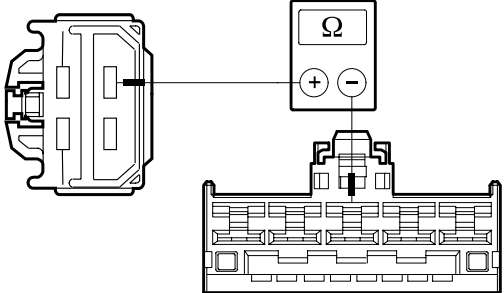
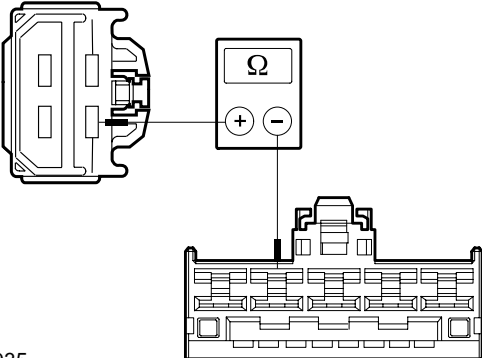
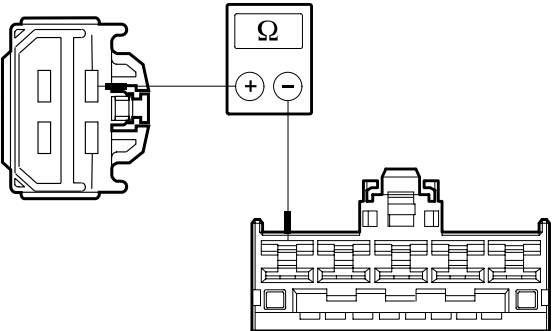
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037930</p>	<p>4 Measure the resistance between the blower motor, connector C789, pin 2, circuit 31S-FA18 (BK/RD), wiring harness side and the blower switch, connector C380, pin 4, circuit 31S-FA33 (BK/OG), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes RENEW the blower switch. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 31S-FA33 (BK/OG) between the blower switch and soldered connection S24 using the Wiring Diagrams. CHECK the operation of the system.
<p>A16: CHECK THE BLOWER SWITCH</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C380 from blower switch.</p> <p>3 Ignition switch in position II.</p>
 <p>VFE0037932</p>	<p>4 Measure the voltage between the blower switch, connector C380, pin 3, circuit 31S-FA32 (BK/BU), wiring harness side and ground.</p>
	<p>5 Measure the voltage between the blower switch, connector C380, pin 2, circuit 31S-FA31 (BK/YE), wiring harness side and ground.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>6 Measure the voltage between the blower switch, connector C380, pin 1, circuit 31S-FA30 (BK/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured in all cases? → Yes RENEW the blower switch. CHECK the operation of the system. → No <ul style="list-style-type: none"> - Battery voltage not measured in any case: GO to A17. - Battery voltage not measured in one/two cases: GO to A18.
<p>A17: CHECK THE VOLTAGE AT THE BLOWER RESISTOR</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C470 from blower resistor.</p> <p>3 Ignition switch in position II.</p>
 <p>E0037933</p>	<p>4 Measure the voltage between the blower resistor, connector C470, pin 4, circuit 31S-FA33A (BK/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes RENEW the blower resistor. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 31S-FA33A (BK/OG) between the blower resistor and soldered connection S24 using the Wiring Diagrams. CHECK the operation of the system.
<p>A18: CHECK THE CIRCUIT BETWEEN THE BLOWER RESISTOR AND THE BLOWER SWITCH FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C470 from blower resistor.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E0037934</p>	<p>3 Measure the resistance between the blower resistor, connector C470, pin 3, circuit 31S-FA32 (BK/BU), wiring harness side and the blower switch, connector C380, pin 3, circuit 31S-FA32 (BK/BU), wiring harness side.</p>
 <p>E0037935</p>	<p>4 Measure the resistance between the blower resistor, connector C470, pin 1, circuit 31S-FA31 (BK/YE), wiring harness side and the blower switch, connector C380, pin 2, circuit 31S-FA31 (BK/YE), wiring harness side.</p>
 <p>E0037936</p>	<p>5 Measure the resistance between the blower resistor, connector C470, pin 2, circuit 31S-FA30 (BK/WH), wiring harness side and the blower switch, connector C380, pin 1, circuit 31S-FA30 (BK/WH), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured in all of the cases? → Yes RENEW the blower resistor. CHECK the operation of the system. → No LOCATE and REPAIR the break in the relevant circuit between the blower resistor and the blower switch using the Wiring Diagrams. CHECK the operation of the system.

412-00-20

Climate Control System - General Information

412-00-20

DIAGNOSIS AND TESTING

PINPOINT TEST B : MALFUNCTION OF THE RECIRCULATED AIR FLAP - VEHICLES WITHOUT ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: The recirculated air flap is actuated by means of a DC motor. This is activated for a maximum of 7 seconds by the control panel for the climate control system following actuation of the recirculated air button. Opening and closing of the recirculated air flap is performed by reversing the polarity of the applied voltage.</p>	
<p>NOTE: Air recirculation mode is not available if the air distribution control is set to "Defrost/demist windscreen".</p>	
B1: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> 1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? → Yes GO to B2. → No GO to B4.
B2: CHECK FUSE F100	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F100 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to B3. → No RENEW fuse F100 (10 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short using the Wiring Diagrams.
B3: CHECK THE VOLTAGE AT FUSE F100	
	<ol style="list-style-type: none"> 1 Connect Fuse F100 (CJB). 2 Ignition switch in position II.

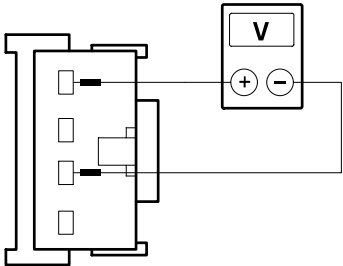
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between fuse F100 (10 A) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes</p> <ul style="list-style-type: none"> - Vehicles without air conditioning: GO to B11. - Vehicles with air conditioning: GO to B7. <p>→ No</p> <p>REPAIR the voltage supply of fuse F100 using the wiring diagrams. CHECK the operation of the system.</p>
B4: CHECK FUSE F70	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F70 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes</p> <p>GO to B5.</p> <p>→ No</p> <p>INSTALL NEW fuse F70 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short using the Wiring Diagrams.</p>
B5: CHECK THE VOLTAGE AT FUSE F70	
	<p>1 Connect Fuse F70 (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F70 (10 A) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes</p> <ul style="list-style-type: none"> - Vehicles without air conditioning: GO to B11. - Vehicles with air conditioning: GO to B7. <p>→ No</p> <p>REPAIR the voltage supply to fuse F70 with the aid of the Wiring Diagrams. CHECK the operation of the system.</p>

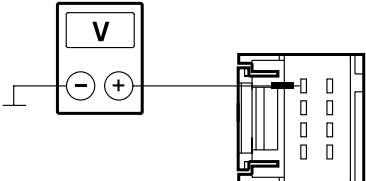
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B6: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to B7.</p> <p>→ No GO to B9.</p>
B7: CHECK FUSE F102	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F102 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to B8.</p> <p>→ No RENEW fuse F102 (10 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short using the Wiring Diagrams.</p>
B8: CHECK THE VOLTAGE AT FUSE F102	
	<p>1 Connect Fuse F102 (CJB).</p> <p>2 Measure the voltage between fuse F102 (10 A) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to B11.</p> <p>→ No REPAIR the voltage supply to fuse F102 using the Wiring Diagrams. CHECK the operation of the system.</p>
B9: CHECK FUSE F43	
	<p>1 Ignition switch in position 0.</p>

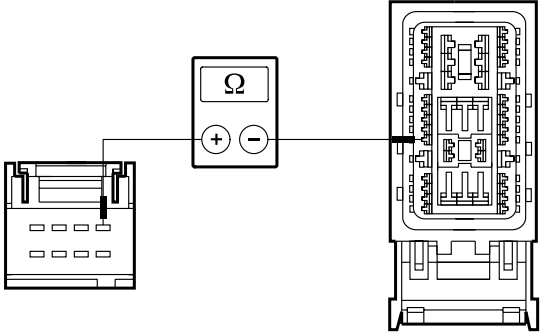
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK Fuse F43 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to B10.</p> <p>→ No INSTALL NEW fuse F43 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short using the Wiring Diagrams.</p>
B10: CHECK THE VOLTAGE AT FUSE F43	
	<p>1 Connect Fuse F43 (CJB).</p> <p>2 Measure the voltage between fuse F43 (10 A) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to B11.</p> <p>→ No REPAIR the voltage supply to fuse F43 using the Wiring Diagrams. CHECK the operation of the system.</p>
B11: TEST THE VOLTAGE AT THE RECIRCULATED AIR FLAP ACTUATOR	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C538 from recirculated air flap actuator.</p> <p>3 Ignition switch in position II.</p> <p>4 Set the air distribution control switch to footwell.</p>
 <p>VFE0028920</p>	<p>5 Measure the voltage at the air recirculation flap actuator, connector C538, between pin 2 and pin 4, wiring harness side.</p>

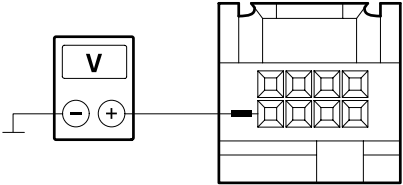
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>6 Press the recirculated air button several times during the measurement.</p> <ul style="list-style-type: none"> Is a voltage of at least 10 V measured with alternating polarity? <p>→ Yes CHECK the recirculated air flap for ease of movement and correct operation. If the air recirculation flap is OK, RENEW the air recirculation flap actuator. CHECK the operation of the system.</p> <p>→ No</p> <ul style="list-style-type: none"> Vehicles without air conditioning: GO to B14. Vehicles with air conditioning: GO to B12.
<p>B12: CHECK THE VOLTAGE AT THE CONTROL PANEL OF THE CLIMATE CONTROL SYSTEM - PIN 1</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C378 from the control panel for the climate control system.</p>
 <p>E57210</p>	<p>3 Measure the voltage between the control panel for the climate control system, connector C378, pin 1, circuit 29-FA13 (OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes GO to B14.</p> <p>→ No GO to B13.</p>
<p>B13: CHECK FOR OPEN CIRCUIT BETWEEN THE CONTROL PANEL OF THE CLIMATE CONTROL SYSTEM AND THE CJB</p>	
<p>NOTE: If the generic electronic module (GEM) is changed, the new one must be configured. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C102 from CJB.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57211</p>	<p>3 Measure the resistance between the control panel for the climate control system, connector C378, pin 1, circuit 29-FA13 (OG), wiring harness side and the CJB, connector C102, pin 10, circuit 29-FA13 (OG), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohm registered? <p>→ Yes CHECK the CJB and RENEW as necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in circuit 29-FA13 (OG) between the control panel for the climate control system and the CJB using the Wiring Diagrams. CHECK the operation of the system.</p>

B14: CHECK THE VOLTAGE AT THE CONTROL PANEL OF THE CLIMATE CONTROL SYSTEM - PIN 8

	<p>1 Vehicles without air conditioning:</p> <ul style="list-style-type: none"> Key in the OFF position. Disconnect connector C378 from the control panel for the climate control system.
 <p>VFE0037937</p>	<p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between the control panel for the climate control system, connector C378, pin 8, circuit 15-FA13 (GN/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to B16.</p> <p>→ No GO to B15.</p>

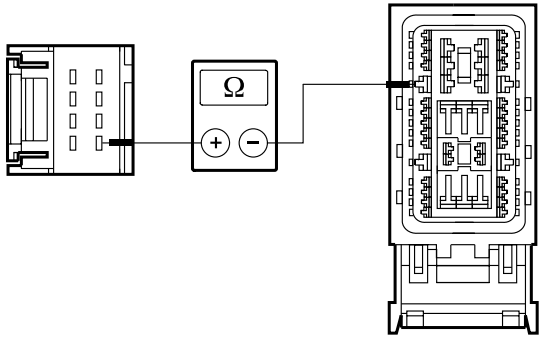
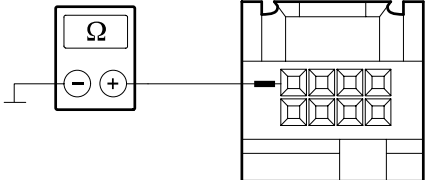
B15: CHECK FOR OPEN CIRCUIT BETWEEN THE CONTROL PANEL OF THE CLIMATE CONTROL SYSTEM AND THE CJB

NOTE: If the generic electronic module (GEM) is changed, the new one must be configured. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.

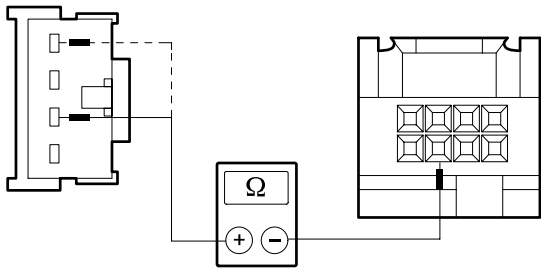
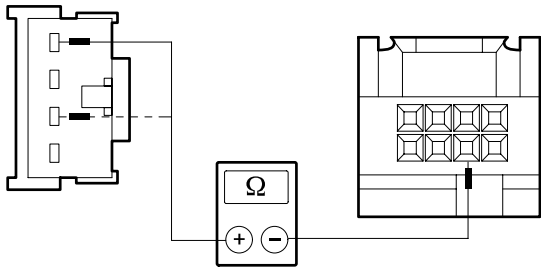
REFER to: **Module Configuration** (418-01 Module Configuration, General Procedures).

	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect Connector C102 from CJB.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57212</p>	<p>3 Measure the resistance between the control panel for the climate control system, connector C378, pin 8, circuit 15-FA13 (GN/RD), wiring harness side and CJB, connector C102, pin 5, circuit 15-DA4 (GN/BK), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK the CJB and RENEW as necessary. CHECK the operation of the system. → No LOCATE and RECTIFY the open circuit between the control panel for the climate control system and the CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>B16: CHECK THE GROUND CONNECTION OF THE CONTROL PANEL FOR THE CLIMATE CONTROL SYSTEM</p>	
 <p>VFE0037938</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the control panel for the climate control system, connector C378, pin 4, circuit 91-FA13 (BK/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes GO to B17. → No LOCATE and RECTIFY the open circuit in circuit 91-FA13 (BK/OG) between the control panel for the climate control system and soldered connection S12 with the aid of the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B17: CHECK FOR OPEN CIRCUIT BETWEEN RECIRCULATED AIR FLAP ACTUATOR AND CONTROL PANEL OF THE CLIMATE CONTROL SYSTEM	
 <p>VFE0037939</p>	<p>1 Measure the resistance between the air recirculation flap actuator, connector C538, pin 2, circuit 32-FA76 (WH/BU) (RHD vehicles: pin 4), circuit 32-FA76A (WH/BU)), wiring harness side and the control panel for the climate control system, connector C378, pin 7, circuit 32-FA76 (WH/BU) (RHD vehicles: circuit 32-FA76A (WH/BU)), wiring harness side.</p>
 <p>VFE0037940</p>	<p>2 Measure the resistance between the air recirculation flap actuator, connector C538, pin 4, circuit 33-FA76 (YE/BU) (RHD vehicles: pin 2, circuit 33-FA76A (YE/BU)), wiring harness side and the control panel for the climate control system, connector C378, pin 6, circuit 33-FA76 (YE/BU) (RHD vehicles: circuit 33-FA76A (YE/BU)), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured in both cases? → Yes CHECK and if necessary RENEW the control panel for the climate control system. CHECK the operation of the system. → No LOCATE and REPAIR the break in the respective circuit between the control panel for the climate control system and the air recirculation flap actuator using the Wiring Diagrams. CHECK the operation of the system.


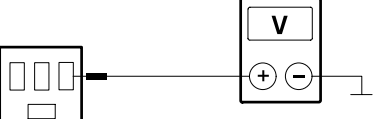
PINPOINT TEST C : AIR CONDITIONING INOPERATIVE (BLOWER FUNCTION OK)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: CHECK FUSE F27	
	<p>1 Ignition switch in position 0.</p>

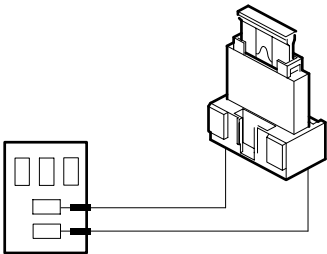
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK Fuse F27 (BJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to C2.</p> <p>→ No INSTALL NEW fuse F27 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short using the Wiring Diagrams.</p>
C2: CHECK THE VOLTAGE AT FUSE F27	
	<p>1 Connect Fuse F27 (BJB).</p> <p>2 Measure the voltage between fuse F27 (10 A) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to C3.</p> <p>→ No REPAIR the voltage supply to fuse F27 with the aid of the Wiring Diagrams. CHECK the operation of the system.</p>
C3: CHECK FUSE F35	
	<p>1 CHECK Fuse F35 (BJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to C4.</p> <p>→ No INSTALL a NEW fuse F35 (10 A (vehicles with 2.5L Duratec-ST (VI5): 15 A)). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short using the Wiring Diagrams.</p>
C4: CHECK THE VOLTAGE AT FUSE F35	
	<p>1 Connect Fuse F35 (BJB).</p>
	<p>2 Ignition switch in position II.</p>

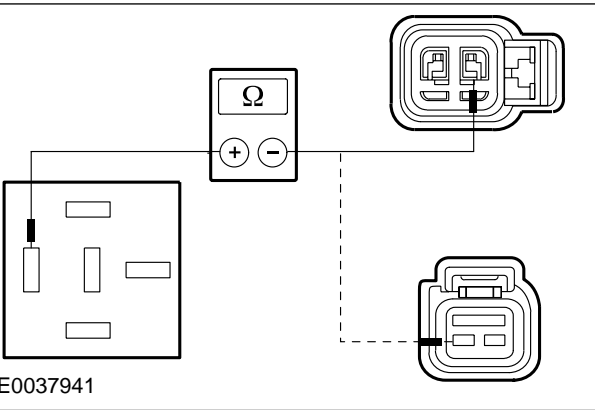
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between fuse F35 (10 A (vehicles with 2.5L Duratec-ST (VI5): 15 A)) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to C5. → No REPAIR the voltage supply to fuse F35 with the aid of the Wiring Diagrams. CHECK the operation of the system.
<p>C5: CHECK THE VOLTAGE AT THE AIR CONDITIONING CLUTCH RELAY</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect A/C clutch relay from socket C1011 (BJB).</p>
 <p>VFE0016004</p>	<p>3 Measure the voltage between the A/C clutch relay, socket C1011, pin 3, circuit 30-FA2 (RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to C6. → No LOCATE and RECTIFY the break in circuit 30-FA2 (RD) between fuse F27 and the the A/C clutch relay using the Wiring Diagrams. CHECK the operation of the system.
<p>C6: CHECK THE CONTROL VOLTAGE AT THE AIR CONDITIONING CLUTCH RELAY</p>	
	<p>1 Ignition switch in position II.</p>
 <p>VFE0016104</p>	<p>2 Measure the voltage between the air conditioning clutch relay, socket C1011, pin 1, circuit 15-FA11 (GN/YE) (vehicles with a diesel engine: circuit 15-FA11A (GN/YE)), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to C7. → No LOCATE and RECTIFY the break in circuit between fuse F35 and the the A/C clutch relay using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C7: CHECK THE CIRCUIT OF THE A/C CLUTCH	
 <p>VFE0019865</p>	<p>1 Ignition switch in position 0.</p> <p>2 Using a fused test cable ((10 A), bridge between the relay of the air conditioning clutch, socket C1011, pin 3, circuit 30-FA2 (RD), wiring harness side and pin 5, circuit 15S-FA6 (GN/YE), wiring harness side.</p>
	<p>3 Check the operation of the A/C clutch.</p> <ul style="list-style-type: none"> • Does the air conditioning clutch work? → Yes GO to C10. → No GO to C8.
C8: CHECK FOR OPEN CIRCUIT BETWEEN AIR CONDITIONING CLUTCH RELAY AND AIR CONDITIONING CLUTCH	
	<p>1 Disconnect Connector C952 (vehicles with diesel engine: C957) from A/C clutch.</p>

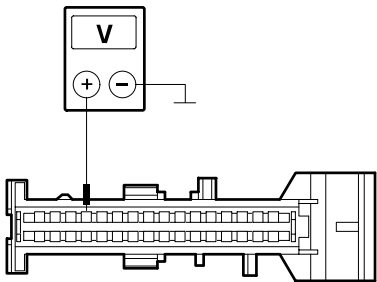
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037941</p>	<p>2 Measure the resistance between the A/C clutch relay, socket C1011, pin 5, circuit 15S-FA6 (GN/YE), wiring harness side and the A/C clutch, connector C952, pin 1 (vehicles with diesel engine: connector C957, pin 2), circuit 15S-FA6 (GN/YE) (vehicles with 1.6L Duratorq-TDCi (DV) diesel engine (81 KW) with soot particulate filter: circuit 15S-FA6B (GN/YE), vehicles with diesel engine, except vehicles with the 1.6L Duratorq-TDCi (DV) diesel engine (110 PS) with soot particulate filter and vehicles with 2.0L Duratorq-TDCi (DW) diesel engine: circuit 15S-FA6C (GN/YE), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <ul style="list-style-type: none"> → Yes GO to C9. → No LOCATE and REPAIR the open circuit between the air conditioning clutch relay and air conditioning clutch using the Wiring Diagrams. CHECK the operation of the system.
C9: CHECK THE GROUND CONNECTION OF THE A/C CLUTCH	
<p>VFE0037942</p>	<p>1 Measure the resistance between the A/C clutch, connector C952, pine 2 (vehicles with a diesel engine: connector C957, pin 1), circuit 31-FA6 (BK) (vehicles with 1.6L Duratorq-TDCi (DV) diesel engine (81 KW) with soot particulate filter: circuit 31-FA6B (BK), vehicles with diesel engine, except vehicles with the 1.6L Duratorq-TDCi (DV) diesel engine (81 kW) with soot particulate filter and vehicles with 2.0L Duratorq-TDCi (DW) diesel engine: circuit 31-FA6C (BK)), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <ul style="list-style-type: none"> → Yes RENEW the air conditioning clutch. CHECK the operation of the system. → No LOCATE and REPAIR the open circuit between the air conditioning clutch and ground G68 (vehicles with diesel engine: G57) using the Wiring Diagrams. CHECK the operation of the system.
C10: CHECK THAT THE OUTSIDE TEMPERATURE IS PLAUSIBLE	
	<p>1 Connect the diagnostic tool.</p>

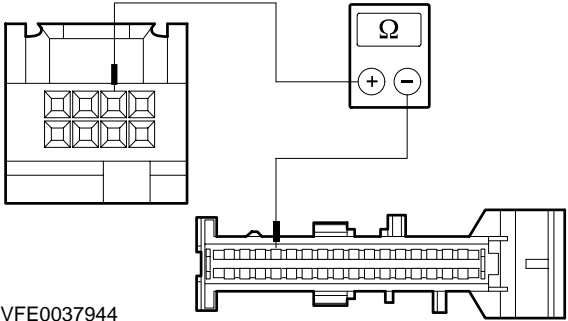
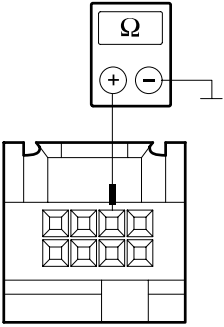
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Using the Ford approved diagnostic tool, select the GEM and check the ambient temperature in the Data Logger.</p> <ul style="list-style-type: none"> • Is the indicated ambient temperature plausible? <p>→ Yes GO to C11.</p> <p>→ No GO to C45.</p>
C11: CHECK THE A/C REQUEST SIGNAL IN THE POWERTRAIN CONTROL MODULE (PCM)	
	<p>1 Switch on the blower.</p> <p>2 Switch on the air-conditioning system.</p> <p>3 Using the Ford approved diagnostic tool, select the PCM and check in the data logger whether an A/C request signal is displayed.</p> <ul style="list-style-type: none"> • Is an A/C request signal displayed in the data logger of the PCM? <p>→ Yes GO to C16.</p> <p>→ No</p> <ul style="list-style-type: none"> - Vehicles without electronic automatic temperature control (EATC): GO to C12. - Vehicles with electronic automatic temperature control (EATC): CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system.
C12: CHECK THE MS-CAN SIGNAL IN THE GENERIC ELECTRONIC MODULE (GEM)	
<p>NOTE: If the generic electronic module (GEM) is changed, the new one must be configured. For this purpose, the vehicle-specific data is read out of the module to be replaced using the Ford approved diagnostic tool and is transferred to the new module.</p>	
<p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
<p>NOTE: The generic electronic module (GEM) is integrated into the central junction box (CJB).</p>	
	<p>1 Set the blower switch to position 1.</p>
	<p>2 Switch on the air-conditioning system.</p>

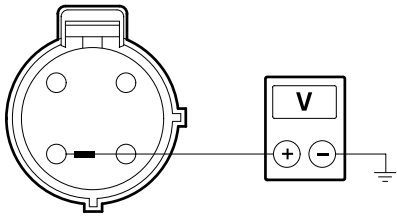
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Using the Ford approved diagnostic tool, select the GEM and check in the data logger whether the MS-CAN signal is displayed.</p> <ul style="list-style-type: none"> Is the MS-CAN signal displayed in the data logger of the GEM? <p>→ Yes VERIFY the customer concern. TEST the system for normal operation. If the concern persists, install a new GEM. TEST the system for normal operation.</p> <p>→ No GO to C13.</p>
<p>C13: CHECK THE SIGNAL FROM THE SWITCH FOR THE CLIMATE CONTROL SYSTEM AT THE CJB.</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C103 from CJB.</p> <p>3 Ignition switch in position II.</p> <p>4 Set the blower switch to position 1.</p> <p>5 Switch on the air-conditioning system.</p>
 <p>VFE0037943</p>	<p>6 Measure the voltage between the CJB, connector C103, pin 13, circuit 8-FA9 (WH/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes</p> <ul style="list-style-type: none"> - Vehicles with 2.5L Duratec-ST (VI5): GO to C39. - All except vehicles with 2.5L Duratec-ST (VI5): GO to C16. <p>→ No GO to C14.</p>
<p>C14: CHECK FOR OPEN CIRCUIT BETWEEN THE CONTROL PANEL OF THE CLIMATE CONTROL SYSTEM AND THE CJB</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C378 from the control panel for the climate control system.</p>

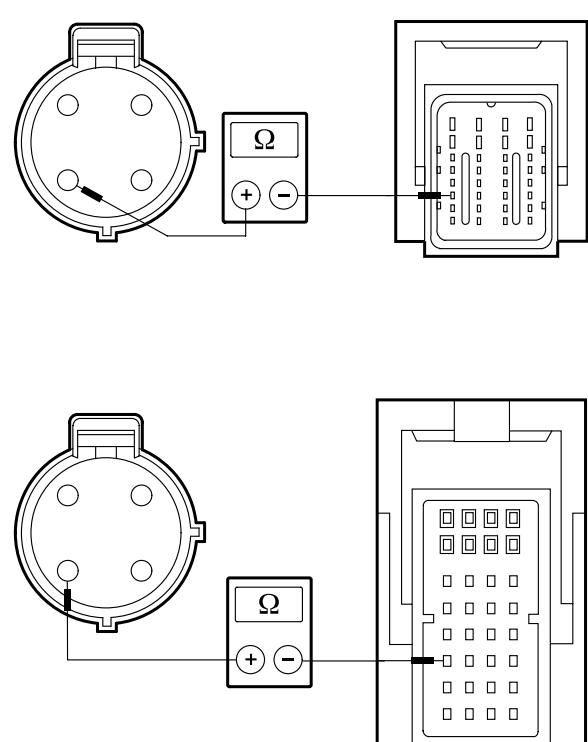
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037944</p>	<p>3 Measure the resistance between the control panel for the climate control system, connector C378, pin 2, circuit 8-FA9 (WH/GN), wiring harness side and the CJB, connector C103, pin 13, circuit 8-FA9 (WH/GN) wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes GO to C15.</p> <p>→ No LOCATE and REPAIR the break in circuit 8-FA9 (WH/GN) between the control panel for the climate control system and the CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>C15: CHECK CIRCUIT BETWEEN THE CONTROL PANEL FOR THE CLIMATE CONTROL SYSTEM AND THE CJB FOR A SHORT TO GROUND</p>	
 <p>VFE0037945</p>	<p>1 Measure the resistance between the control panel for the climate control system, connector C378, pin 2, circuit 8-FA9 (WH/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohm measured? <p>→ Yes CHECK and if necessary RENEW the control panel for the climate control system. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the short to ground in circuit 8-FA9 (WH/GN) between the control panel for the climate control system and the CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>C16: CHECK VOLTAGE AT REFRIGERANT LOW-PRESSURE SWITCH</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C692 from the refrigerant low-pressure switch.</p> <p>3 Start the engine and allow it to idle.</p>

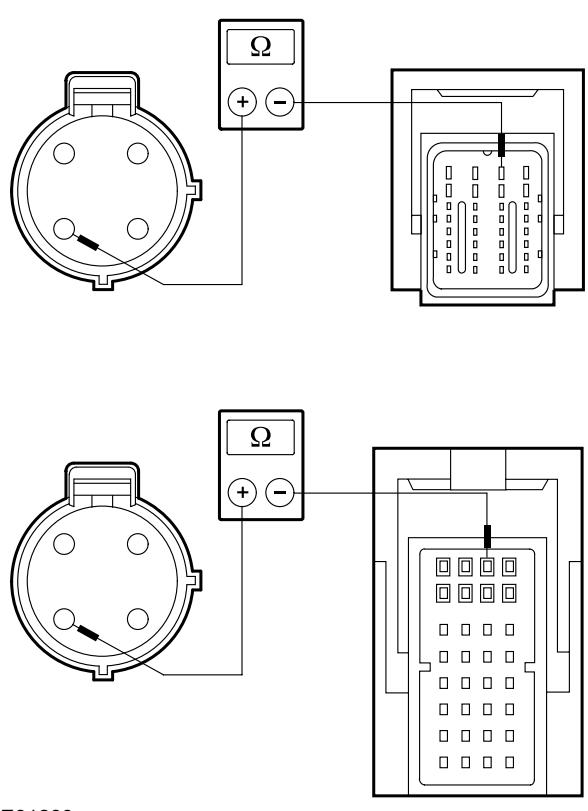
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E0011398</p>	<p>4 Measure the voltage between the refrigerant low-pressure switch, connector C692, pin 4, circuit 91S-RE8 (BK/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes GO to C21.</p> <p>→ No</p> <ul style="list-style-type: none"> - Vehicles with 1.6L Duratorq-TDCi (DV) diesel engine: GO to C17. - Vehicles with 1.8L Duratorq-TDCi (Lynx) diesel engine/2.0L Duratorq-TDCi (DW) diesel engine: GO to C18. - Vehicles with 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4): GO to C19. - Vehicles with 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma): GO to C20.
<p>C17: CHECK CIRCUIT BETWEEN REFRIGERANT LOW-PRESSURE SWITCH AND PCM FOR OPEN CIRCUIT - VEHICLES WITH 1.6L DURATORQ-TDCI (DV) DIESEL ENGINE</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C418 from the PCM.</p>

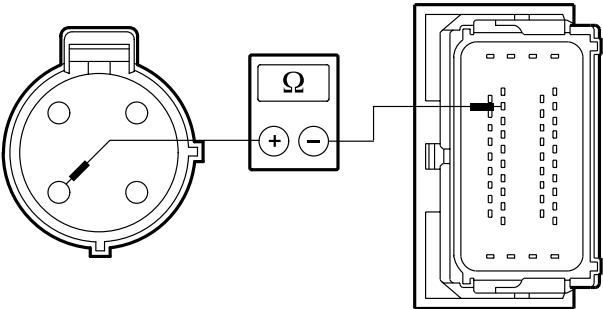
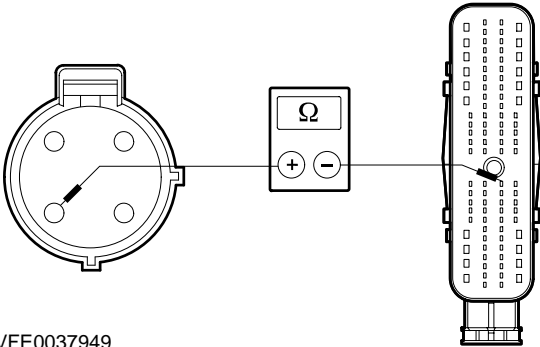
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E81285</p>	<p>3 Measure the resistance between the refrigerant low-pressure switch, connector C692, pin 4, circuit 91S-RE8 (BK/YE), wiring harness side and PCM, connector C418, pin C4, circuit 91S-RE8 (BK/YE), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 91S-RE8 (BK/YE) between the refrigerant low-pressure switch and the PCM using the Wiring Diagrams. CHECK the operation of the system.
<p>C18: CHECK THE CIRCUIT BETWEEN THE REFRIGERANT LOW-PRESSURE SWITCH AND THE PCM FOR OPEN CIRCUIT - VEHICLES WITH 1.8L DURATORQ-TDCI (LYNX) DIESEL ENGINE/2.0L DURATORQ-TDCI (DW) DIESEL ENGINE</p>	
<p>NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C418 from the PCM.</p>	

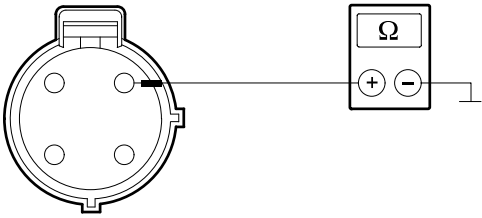
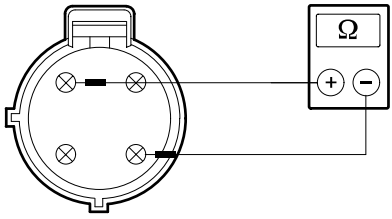
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E81283</p>	<p>3 Measure the resistance between the refrigerant low-pressure switch, connector C692, pin 4, circuit 91S-RE8 (BK/YE), wiring harness side and PCM, connector C418, pin H2, circuit 91S-RE8 (BK/YE), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohm measured? <p>→ Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in circuit 91S-RE8 (BK/YE) between the refrigerant low-pressure switch and the PCM using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>C19: CHECK FOR OPEN CIRCUIT BETWEEN REFRIGERANT LOW-PRESSURE SWITCH AND PCM - VEHICLES WITH 1.8L DURATEC-HE (MI4)/2.0L DURATEC-HE (MI4) ENGINE</p>	
<p>NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C690 from the PCM.</p>	

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E81284</p>	<p>3 Measure the resistance between the refrigerant low-pressure switch, connector C692, pin 4, circuit 91S-RE8 (BK/YE), wiring harness side and PCM, connector C690, pin 14, circuit 91S-RE8 (BK/YE), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 91S-RE8 (BK/YE) between the refrigerant low-pressure switch and the PCM using the Wiring Diagrams. CHECK the operation of the system.
<p>C20: CHECK FOR OPEN CIRCUIT BETWEEN REFRIGERANT LOW-PRESSURE SWITCH AND PCM - VEHICLES WITH 1.4L DURATEC-16V (SIGMA)/1.6L DURATEC-16V (SIGMA)/1.6L DURATEC-16V TI-VCT (SIGMA)</p>	
<p>NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C594 from the PCM.</p>
 <p>VFE0037949</p>	<p>3 Measure the resistance between the refrigerant low-pressure switch, connector C692, pin 4, circuit 91S-RE8 (BK/YE), wiring harness side and PCM, connector C594, pin F22, circuit 91S-RE8 (BK/YE), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 91S-RE8 (BK/YE) between the refrigerant low-pressure switch and the PCM using the Wiring Diagrams. CHECK the operation of the system.
<p>C21: CHECK GROUND CONNECTION OF REFRIGERANT LOW-PRESSURE SWITCH</p>	
	<p>1 Ignition switch in position 0.</p>

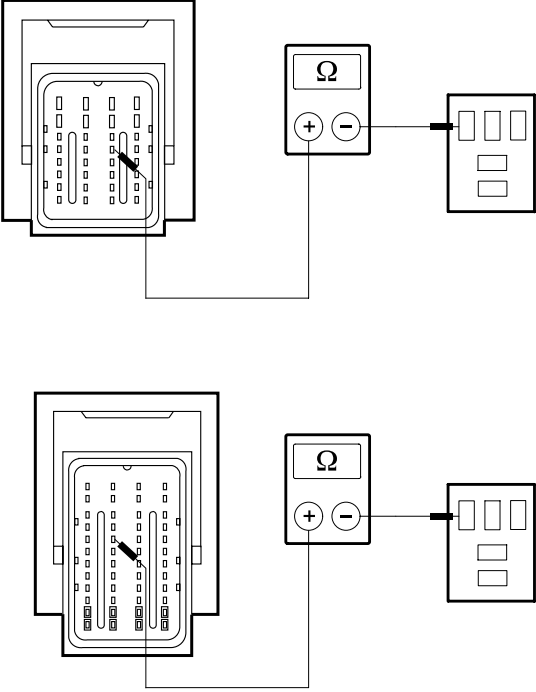
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0023413</p>	<p>2 Measure the resistance between the refrigerant low-pressure switch, connector C692, pin 1, circuit 91-FA17 (BK/RD) (vehicles with a diesel engine: circuit 91S-FA17A (BK/RD)), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes GO to C22. → No <ul style="list-style-type: none"> - Vehicles with diesel engine: GO to C37. - All except vehicles with diesel engine: LOCATE and REPAIR the open circuit between the refrigerant low-pressure switch and ground G31 using the Wiring Diagrams. CHECK the operation of the system.
<p>C22: CHECK THE REFRIGERANT LOW-PRESSURE SWITCH</p>	
 <p>VFE0015915</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance at the refrigerant low-pressure switch, connector C692, between pin 1 and pin 4, component side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes GO to C23. → No CHECK the quantity of refrigerant. REFER to: Air Conditioning (A/C) System Recovery, Evacuation and Charging (412-00 Climate Control System - General Information, General Procedures). If the refrigerant quantity is in accordance with manufacturer's specifications, INSTALL a NEW refrigerant low-pressure switch. CHECK the operation of the system.

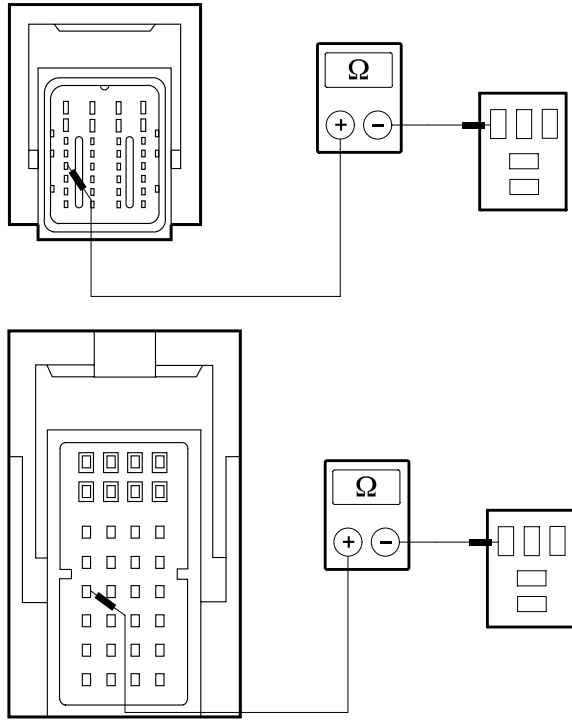
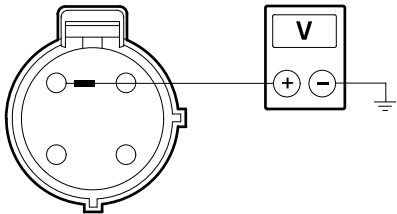
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C23: CHECK THE A/C CLUTCH RELAY	
	<p>1 Check the A/C clutch relay according to the component check at the end of the section.</p> <ul style="list-style-type: none"> <li>• Is the A/C clutch relay OK? <p>→ Yes</p> <ul style="list-style-type: none"> <li>- Vehicles with 1.6L Duratorq-TDCi (DV) diesel engine: GO to C24. <li>- Vehicles with 1.8L Duratorq-TDCi (Lynx) diesel engine/2.0L Duratorq-TDCi (DW) diesel engine: GO to C25. <li>- All except vehicles with diesel engines: GO to C26. <p>→ No</p> <p>RENEW the air conditioning clutch relay. CHECK the operation of the system.</p>
C24: CHECK CIRCUIT BETWEEN A/C CLUTCH RELAY AND PCM FOR OPEN CIRCUIT - VEHICLES WITH 1.6L DURATORQ-TDCI (DV) DIESEL ENGINE	
NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.	
REFER to: Module Configuration (418-01 Module Configuration, General Procedures).	
	<p>1 Disconnect connector C419 from the PCM.</p>

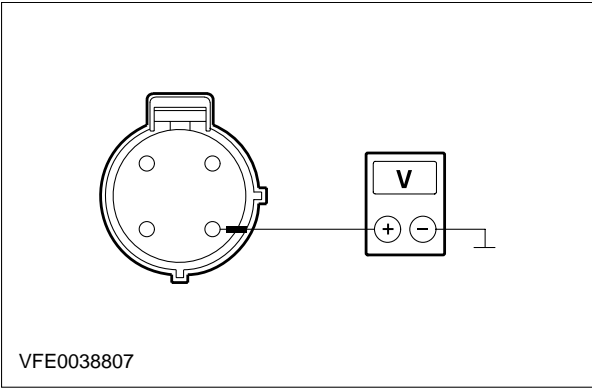
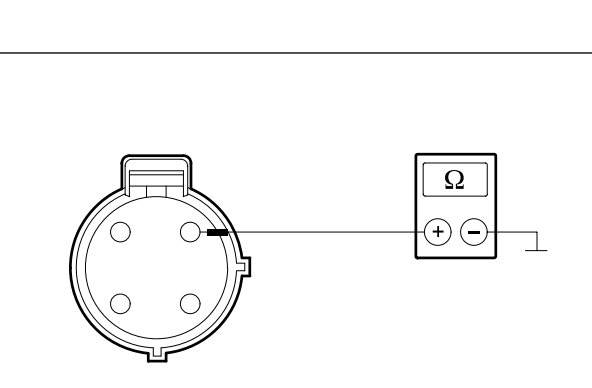
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E81281</p>	<p>2 Measure the resistance between the PCM, connector C419, pin E2, circuit 31S-FA11 (BK/YE), wiring harness side and the A/C clutch relay, socket C1011, pin 2, circuit 31S-FA11 (BK/YE), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and RECTIFY the break in circuit 31S-FA11 (BK/YE) between PCM and the air conditioning clutch relay using the Wiring Diagrams. CHECK the operation of the system.
<p>C25: CHECK THE CIRCUIT BETWEEN THE A/C CLUTCH RELAY AND THE PCM FOR OPEN CIRCUIT - VEHICLES WITH 1.8L DURATORQ-TDCI (LYNX) DIESEL ENGINE/2.0L DURATORQ-TDCI (DW) DIESEL ENGINE</p>	
<p>NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p>	
<p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
	<p>1 Disconnect connector C418 from the PCM.</p>

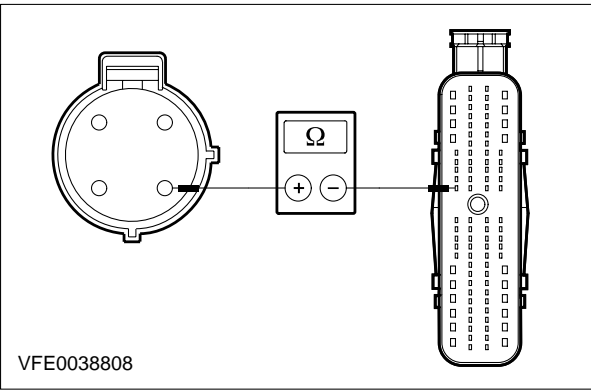
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E81282</p>	<p>2 Measure the resistance between the PCM, connector C418, pin D4, circuit 31S-FA11A (BK/YE), wiring harness side and the A/C clutch relay, socket C1011, pin 2, circuit 31S-FA11 (BK/YE), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohm measured? <p>→ Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in circuit 31S-FA11 (BK/YE) between PCM and the air conditioning clutch relay using the Wiring Diagrams. CHECK the operation of the system.</p>
C26: CHECK THE VOLTAGE AT THE REFRIGERANT PRESSURE TRANSDUCER	
	<p>1 Disconnect Connector C965 from refrigerant pressure transducer.</p> <p>2 Ignition switch in position II.</p>
 <p>E0011401</p>	<p>3 Measure the voltage between the refrigerant pressure transducer, connector C965, pin 2, circuit 7-FA88 (YE/VT), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a voltage of approx. 5 volts measured? <p>→ Yes GO to C27.</p> <p>→ No</p> <ul style="list-style-type: none"> Vehicles with 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma): GO to C33. Vehicles with 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4): GO to C34. Vehicles with 2.5L Duratec-ST (VI5): GO to C40.

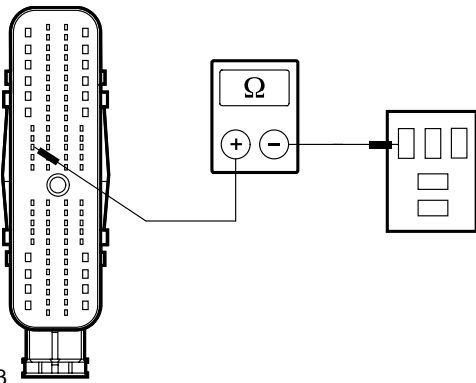
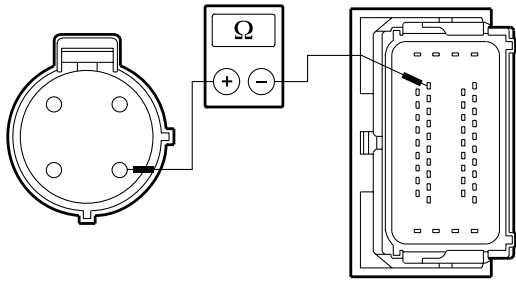
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C27: CHECK THE CONTROL VOLTAGE AT THE REFRIGERANT PRESSURE TRANSDUCER	
 <p>VFE0038807</p>	<p>1 Measure the voltage between the refrigerant pressure transducer, connector C965, pin 3, circuit 8-FA88 (WH/VT), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a voltage of approx. 4 volts measured? <p>→ Yes GO to C28.</p> <p>→ No</p> <ul style="list-style-type: none"> - Vehicles with 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma): GO to C29. - Vehicles with 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4): GO to C31. - Vehicles with 2.5L Duratec-ST (VI5): GO to C41.
C28: CHECK THE GROUND CONNECTION OF THE REFRIGERANT PRESSURE TRANSDUCER	
 <p>VFE0023413</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the refrigerant pressure transducer, connector C965, pin 1, circuit 9-FA88 (BN/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <p>→ Yes</p> <ul style="list-style-type: none"> - Vehicles with 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma): GO to C30. - Vehicles with 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4): GO to C32. - Vehicles with 2.5L Duratec-ST (VI5): GO to C42. <p>→ No</p> <ul style="list-style-type: none"> - Vehicles with 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma): GO to C35. - Vehicles with 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4): GO to C36. - Vehicles with 2.5L Duratec-ST (VI5): GO to C43.

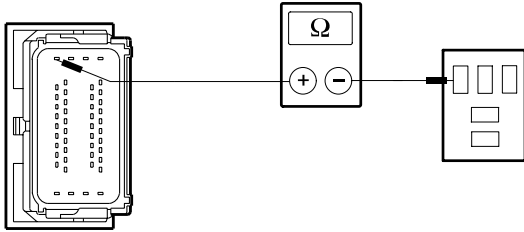
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>C29: CHECK FOR OPEN CIRCUIT BETWEEN REFRIGERANT PRESSURE TRANSDUCER AND PCM - VEHICLES WITH 1.4L DURATEC-16V (SIGMA)/1.6L DURATEC-16V (SIGMA)/1.6L DURATEC-16V TI-VCT (SIGMA)</p>	
<p>NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
 <p>VFE0038808</p>	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect Connector C594 from the PCM.</p>
	<p>3 Measure the resistance between the refrigerant pressure transducer, connector C965, pin 3, circuit 8-FA88 (WH/VT), wiring harness side and PCM, connector C594, pin F34, circuit 8-FA88 (WH/VT), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <ul style="list-style-type: none"> → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 8-FA88 (WH/VT) between the refrigerant pressure transducer and the PCM using the Wiring Diagrams. CHECK the operation of the system.
<p>C30: CHECK FOR OPEN CIRCUIT BETWEEN THE A/C CLUTCH RELAY AND THE PCM - VEHICLES WITH 1.4L DURATEC-16V (SIGMA)/1.6L DURATEC-16V (SIGMA)/1.6L DURATEC-16V TI-VCT (SIGMA)</p>	
<p>NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
	<p>1 Disconnect connector C594 from the PCM.</p>

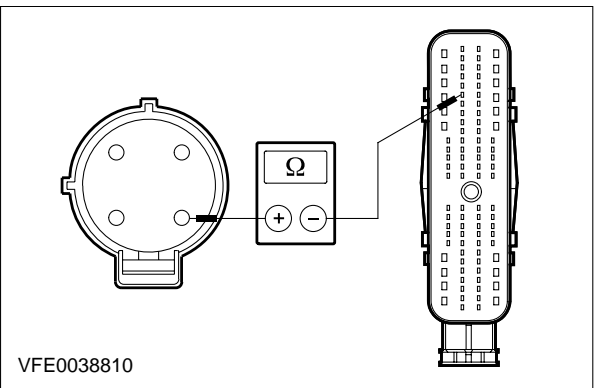
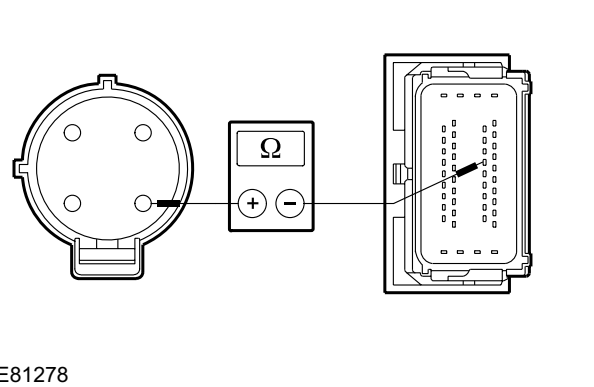
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037953</p>	<p>2 Measure the resistance between the PCM, connector C594, pin M9, circuit 31S-FA11 (BK/YE), wiring harness side and the A/C clutch relay, socket C1011, pin 2, circuit 31S-FA11 (BK/YE), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes RENEW the refrigerant pressure transducer. CHECK the operation of the system. If the system is still inoperative, CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and RECTIFY the break in circuit 31S-FA11 (BK/YE) between PCM and the air conditioning clutch relay using the Wiring Diagrams. CHECK the operation of the system.
<p>C31: CHECK FOR OPEN CIRCUIT BETWEEN THE REFRIGERANT PRESSURE TRANSDUCER AND THE PCM - VEHICLES WITH 1.8L DURATEC-HE (MI4)/2.0L DURATEC-HE (MI4) ENGINE</p>	
<p>NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
 <p>E81280</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C690 from the PCM.</p> <p>3 Measure the resistance between the refrigerant pressure transducer, connector C965, pin 3, circuit 8-FA88 (WH/VT), wiring harness side and PCM, connector C690, pin 13, circuit 8-FA88 (WH/VT), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 8-FA88 (WH/VT) between the refrigerant pressure transducer and the PCM using the Wiring Diagrams. CHECK the operation of the system.

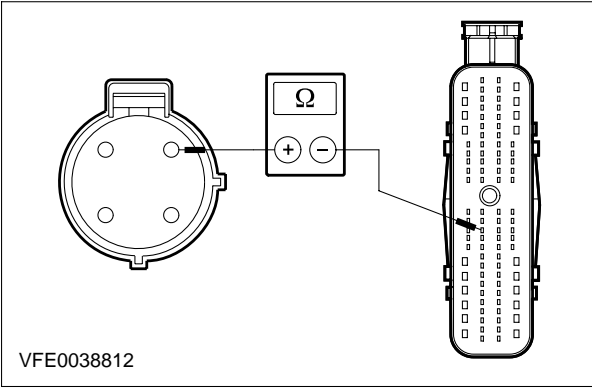
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>C32: CHECK FOR OPEN CIRCUIT BETWEEN THE A/C CLUTCH RELAY AND THE PCM - VEHICLES WITH 1.8L DURATEC-HE (MI4)/2.0L DURATEC-HE (MI4) ENGINE</p>	
<p>NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
<div style="text-align: center;">  <p>E81279</p> </div>	<ol style="list-style-type: none"> 1 Disconnect Connector C690 from the PCM. 2 Measure the resistance between the PCM, connector C690, pin 1, circuit 31S-FA11 (BK/YE), wiring harness side and the A/C clutch relay, socket C1011, pin 2, circuit 31S-FA11 (BK/YE), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <ul style="list-style-type: none"> → Yes RENEW the refrigerant pressure transducer. CHECK the operation of the system. If the system is still inoperative, CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and RECTIFY the break in circuit 31S-FA11 (BK/YE) between PCM and the air conditioning clutch relay using the Wiring Diagrams. CHECK the operation of the system.
<p>C33: CHECK FOR OPEN CIRCUIT BETWEEN REFRIGERANT PRESSURE TRANSDUCER AND PCM - VEHICLES WITH 1.4L DURATEC-16V (SIGMA)/1.6L DURATEC-16V (SIGMA)/1.6L DURATEC-16V TI-VCT (SIGMA)</p>	
<p>NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C594 from the PCM.

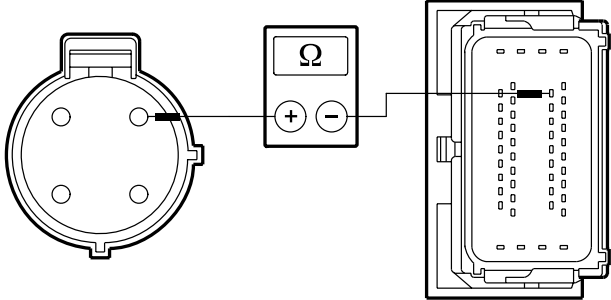
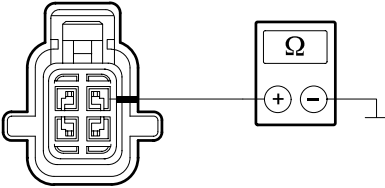
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038810</p>	<p>3 Measure the resistance between the refrigerant pressure transducer, connector C965, pin 2, circuit 7-FA88 (YE/VT), wiring harness side and PCM, connector C594, pin M17, circuit 7-FA88 (YE/VT), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <p>→ Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in circuit 7-FA88 (YE/VT) between the refrigerant pressure transducer and the PCM using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>C34: CHECK FOR OPEN CIRCUIT BETWEEN THE REFRIGERANT PRESSURE TRANSDUCER AND THE PCM - VEHICLES WITH 1.8L DURATEC-HE (MI4)/2.0L DURATEC-HE (MI4) ENGINE</p>	
<p>NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C690 from the PCM.</p>
 <p>E81278</p>	<p>3 Measure the resistance between the refrigerant pressure transducer, connector C965, pin 2, circuit 7-FA88 (YE/VT), wiring harness side and PCM, connector C690, pin 28, circuit 7-FA88 (YE/VT), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <p>→ Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in circuit 7-FA88 (YE/VT) between the refrigerant pressure transducer and the PCM using the Wiring Diagrams. CHECK the operation of the system.</p>

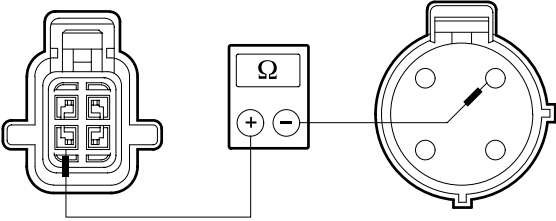
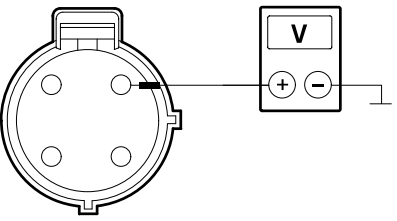
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C35: CHECK FOR OPEN CIRCUIT BETWEEN REFRIGERANT PRESSURE TRANSDUCER AND PCM - VEHICLES WITH 1.4L DURATEC-16V (SIGMA)/1.6L DURATEC-16V (SIGMA)/1.6L DURATEC-16V TI-VCT (SIGMA)	
<p>NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
 <p>VFE0038812</p>	<ol style="list-style-type: none"> 1 Disconnect connector C594 from the PCM. 2 Measure the resistance between the refrigerant pressure transducer, connector C965, pin 1, circuit 9-FA88 (BN/WH), wiring harness side and PCM, connector C594, pin M39, circuit 9-FA88 (BN/WH), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <ul style="list-style-type: none"> → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 9-FA88 (BN/WH) between the refrigerant pressure transducer and the PCM using the Wiring Diagrams. CHECK the operation of the system.
C36: CHECK FOR OPEN CIRCUIT BETWEEN THE REFRIGERANT PRESSURE TRANSDUCER AND THE PCM - VEHICLES WITH 1.8L DURATEC-HE (MI4)/2.0L DURATEC-HE (MI4) ENGINE	
<p>NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
	<ol style="list-style-type: none"> 1 Disconnect Connector C690 from the PCM.

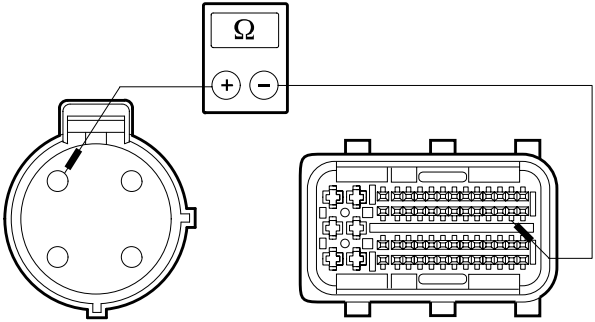
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E81277</p>	<p>2 Measure the resistance between the refrigerant pressure transducer, connector C965, pin 1, circuit 9-FA88 (BN/WH), wiring harness side and PCM, connector C690, pin 25, circuit 9-RE8 (BN), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 9-FA88 (BN/WH) between the refrigerant pressure transducer and soldered connection S63 using the Wiring Diagrams. CHECK the operation of the system.
<p>C37: CHECK GROUND CONNECTION OF REFRIGERANT HIGH-PRESSURE SWITCH</p>	
 <p>VFE0037954</p>	<p>1 Disconnect Connector C882 from the refrigerant high-pressure switch.</p> <p>2 Measure the resistance between the refrigerant high-pressure switch, connector 882, pin 1, circuit 91-FA38 (BK/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes GO to C38. → No LOCATE and REPAIR the break in circuit 91-FA38 (BK/OG) between the refrigerant high-pressure switch and soldered connection S118 using the Wiring Diagrams. CHECK the operation of the system.

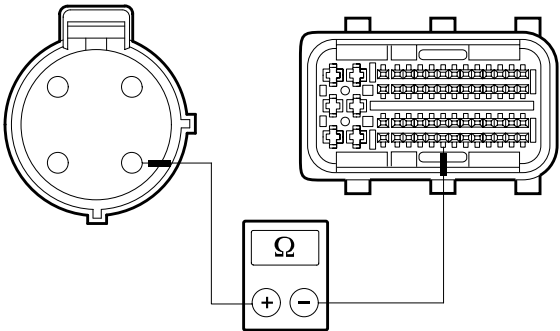
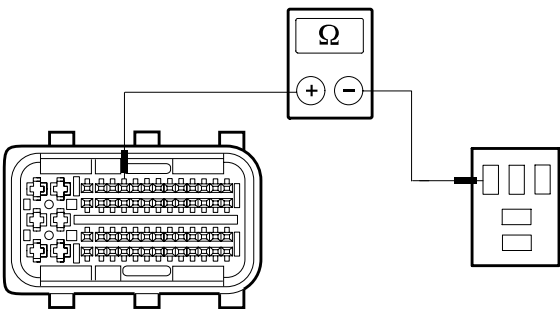
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C38: CHECK CIRCUIT BETWEEN REFRIGERANT HIGH-PRESSURE SWITCH AND REFRIGERANT LOW-PRESSURE SWITCH FOR OPEN CIRCUIT	
 <p>VFE0037955</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the refrigerant high-pressure switch, connector 882, pin 4, circuit 91S-FA17 (BK/RD), wiring harness side and refrigerant low-pressure switch, connector C692, pin 1, circuit 91S-FA17 (BK/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <ul style="list-style-type: none"> → Yes RENEW the refrigerant high-pressure switch. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 91S-FA17 (BK/RD) between the refrigerant high-pressure switch and the refrigerant low-pressure switch using the Wiring Diagrams. CHECK the operation of the system.
C39: CHECK THE VOLTAGE AT THE REFRIGERANT LOW-PRESSURE SWITCH - VEHICLES WITH 2.5L DURATEC-ST (VI5)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C692 from the refrigerant low-pressure switch. 3 Ignition switch in position II.
 <p>VFE0013994</p>	<ol style="list-style-type: none"> 4 Measure the voltage between the refrigerant low-pressure switch, connector C692, pin 1, circuit 15-FA17 (GN/OG), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <ul style="list-style-type: none"> → Yes GO to C22. → No LOCATE and REPAIR the break in circuit 15-FA17 (GN/OG) between the refrigerant low-pressure switch and soldered connection S164 using the Wiring Diagrams. CHECK the operation of the system.

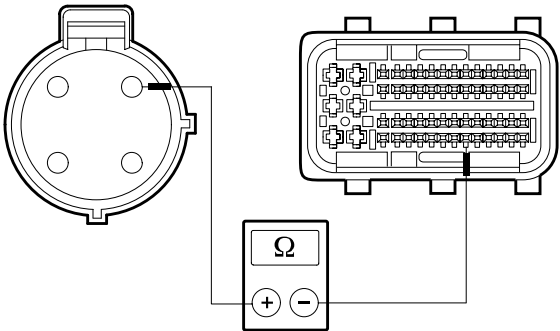
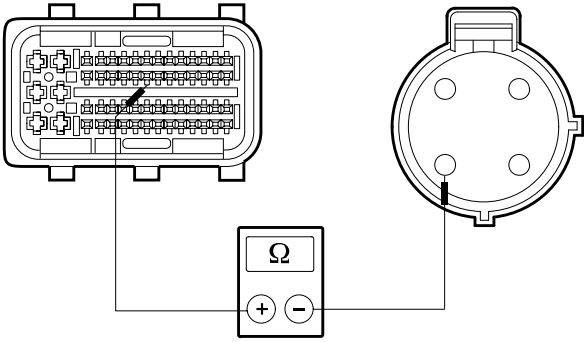
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>C40: CHECK THE CIRCUIT BETWEEN THE REFRIGERANT PRESSURE TRANSDUCER AND THE PCM FOR OPEN CIRCUIT - VEHICLES WITH 2.5L DURATEC-ST (VI5)</p>	
<p>NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect connector C690 from the PCM.</p>
 <p>E64883</p>	<p>3 Measure the resistance between the refrigerant pressure transducer, connector C965, pin 2, circuit 7-FA88 (YE/VT), wiring harness side and PCM, connector C690, pin 31, circuit 7-FA88 (YE/VT), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 7-FA88 (YE/VT) between the refrigerant pressure transducer and the PCM using the Wiring Diagrams. CHECK the operation of the system.
<p>C41: CHECK THE CIRCUIT BETWEEN THE REFRIGERANT PRESSURE TRANSDUCER AND THE PCM FOR OPEN CIRCUIT - VEHICLES WITH 2.5L DURATEC-ST (VI5)</p>	
<p>NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect connector C690 from the PCM.</p>

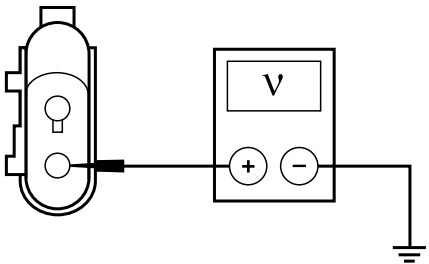
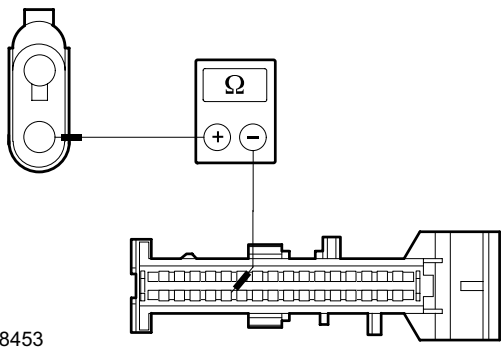
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E64884</p>	<p>3 Measure the resistance between the refrigerant pressure transducer, connector C965, pin 3, circuit 8-FA88 (WH/VT), wiring harness side and PCM, connector C690, pin 51, circuit 8-FA88 (WH/VT), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 8-FA88 (WH/VT) between the refrigerant pressure transducer and the PCM using the Wiring Diagrams. CHECK the operation of the system.
<p>C42: CHECK THE CIRCUIT BETWEEN THE RELAY FOR THE AIR CONDITIONING CLUTCH AND THE PCM FOR OPEN CIRCUIT - VEHICLES WITH 2.5L DURATEC-ST (VI5)</p>	
<p>NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
 <p>E64885</p>	<p>1 Disconnect connector C690 from the PCM.</p> <p>2 Measure the resistance between the PCM, connector C690, pin 10, circuit 31S-FA11 (BK/YE), wiring harness side and the A/C clutch relay, socket C1011, pin 2, circuit 31S-FA11 (BK/YE), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? → Yes GO to C44. → No LOCATE and RECTIFY the break in circuit 31S-FA11 (BK/YE) between PCM and the air conditioning clutch relay using the Wiring Diagrams. CHECK the operation of the system.
<p>C43: CHECK THE CIRCUIT BETWEEN THE REFRIGERANT PRESSURE TRANSDUCER AND THE PCM FOR OPEN CIRCUIT - VEHICLES WITH 2.5L DURATEC-ST (VI5)</p>	
<p>NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.</p> <p>REFER to: Module Configuration (418-01 Module Configuration, General Procedures).</p>	
<p>1 Disconnect connector C690 from the PCM.</p>	

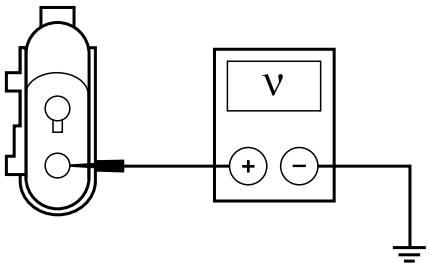
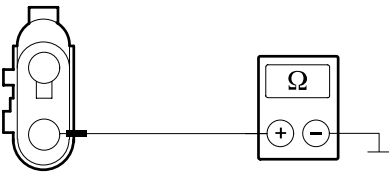
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E64887</p>	<p>2 Measure the resistance between the refrigerant pressure transducer, connector C965, pin 1, circuit 9-FA88 (BN/WH), wiring harness side and PCM, connector C690, pin 53, circuit 9-FA88 (BN/WH), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in circuit 9-FA88 (BN/WH) between the refrigerant pressure transducer and the PCM using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>C44: CHECK THE CIRCUIT BETWEEN THE PCM AND THE REFRIGERANT LOW-PRESSURE SWITCH FOR OPEN CIRCUIT - VEHICLES WITH 2.5L DURATEC-ST (VI5)</p>	
 <p>E64886</p>	<p>1 Disconnect connector C690 from the PCM.</p> <p>2 Measure the resistance between the PCM, connector C690, pin 25, circuit 15S-FA17 (GN/OG), wiring harness side and the refrigerant low-pressure switch, connector C692, pin 4, circuit 15S-FA17 (GN/OG), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes RENEW the refrigerant pressure transducer. CHECK the operation of the system. If the system is still inoperative, CHECK the PCM and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in circuit 15S-FA17 (GN/OG) between the refrigerant low-pressure switch and the PCM using the Wiring Diagrams.</p>
<p>C45: CHECK THE VOLTAGE AT THE AMBIENT TEMPERATURE SENSOR</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C974 from the ambient temperature sensor.</p> <p>3 Ignition switch in position II.</p>

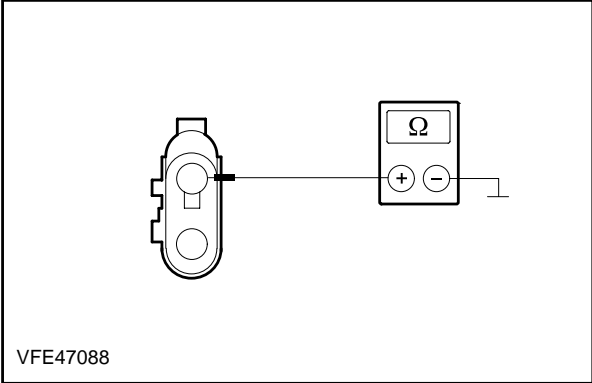
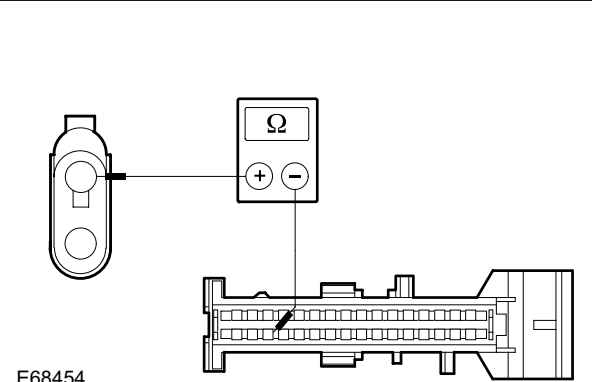
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>GL1652A</p>	<p>4 Measure the voltage at the ambient temperature sensor, connector C974, pin 2, circuit 8-GE38 (WH/BK), between wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a voltage of approx. 5 volts measured? <p>→ Yes GO to C49.</p> <p>→ No</p> <ul style="list-style-type: none"> - No voltage measured: GO to C46. - The measured voltage is greater than 6 V: GO to C47.
<p>C46: CHECK THE CIRCUIT BETWEEN THE AMBIENT TEMPERATURE SENSOR AND THE GEM FOR OPEN CIRCUIT</p>	
 <p>E68453</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C95 from GEM.</p> <p>3 Measure the resistance between the ambient temperature sensor, connector C974, pin 2, circuit 8-GE38 (WH/BK), wiring harness side and the GEM, connector C95, pin 28, circuit 8-GE38 (WH/BK), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes GO to C48.</p> <p>→ No LOCATE and REPAIR the break in circuit 8-GE38 (WH/BK) between the ambient temperature sensor and the GEM using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>C47: CHECK THE CIRCUIT BETWEEN THE AMBIENT TEMPERATURE SENSOR AND THE GEM FOR SHORT TO VOLTAGE SUPPLY</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C95 from GEM.</p> <p>3 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>GL1652A</p>	<p>4 Measure the voltage at the ambient temperature sensor, connector C974, pin 2, circuit 8-GE38 (WH/BK), between wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a voltage measured? <p>→ Yes LOCATE and REPAIR the short to voltage supply in circuit 8-GE38 (WH/BK) between the ambient temperature sensor and the GEM using the Wiring Diagrams. CHECK the operation of the system.</p> <p>→ No TEST the GEM and RENEW as necessary. CHECK the operation of the system.</p>
<p>C48: CHECK THE CIRCUIT BETWEEN THE AMBIENT TEMPERATURE SENSOR AND THE GEM FOR SHORT TO GROUND</p>	
 <p>VFE0022794</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance at the ambient temperature sensor, connector C974, pin 2, circuit 8-GE38 (WH/BK), between wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of more than 10,000 Ohm measured? <p>→ Yes TEST the GEM and RENEW as necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the short to ground in circuit 8-GE38 (WH/BK) between the ambient temperature sensor and the GEM using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>C49: CHECK THE GROUND CONNECTION OF THE AMBIENT TEMPERATURE SENSOR</p>	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE47088</p>	<p>2 Measure the resistance at the ambient temperature sensor, connector C974, pin 1, circuit 9-GE38 (BN/YE), between wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes INSTALL a NEW ambient temperature sensor. CHECK the operation of the system. → No GO to C50.
<p>C50: CHECK THE CIRCUIT BETWEEN THE AMBIENT TEMPERATURE SENSOR AND THE GEM FOR OPEN CIRCUIT</p>	
 <p>E68454</p>	<p>1 Disconnect Connector C95 from GEM.</p> <p>2 Measure the resistance between the ambient temperature sensor, connector C974, pin 1, circuit 9-GE38 (BN/YE), wiring harness side and the GEM, connector C95, pin 30, circuit 9-GE38 (BN/YE), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes TEST the GEM and RENEW as necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 9-GE38 (BN/YE) between the ambient temperature sensor and the GEM using the Wiring Diagrams. CHECK the operation of the system.

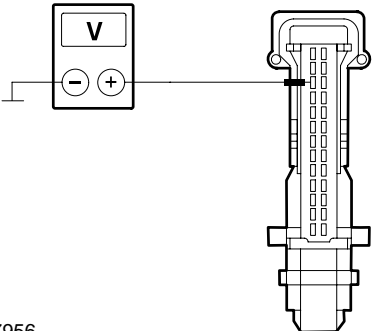
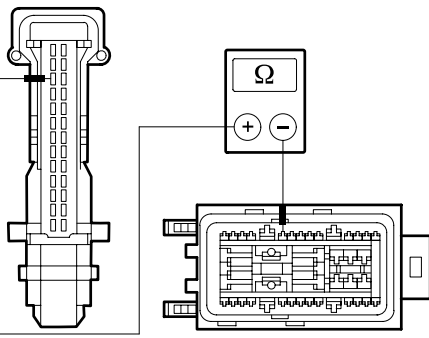
PINPOINT TEST D : CONTROL PANEL FOR THE CLIMATE CONTROL SYSTEM INOPERATIVE - VEHICLES WITH ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>D1: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).</p>	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? → Yes GO to D2. → No GO to D4.

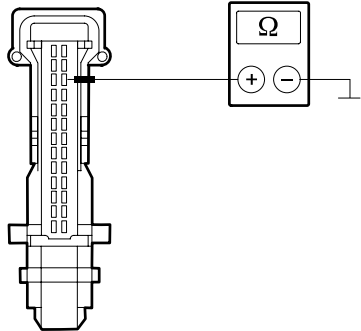
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D2: CHECK FUSE F102	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li> 2 CHECK Fuse F102 (CJB). <ul style="list-style-type: none"> <li>• Is the fuse OK? <li>→ Yes GO to D3. <li>→ No RENEW fuse F102 (10 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short using the Wiring Diagrams.
D3: CHECK THE VOLTAGE AT FUSE F102	
	<ol style="list-style-type: none"> <li>1 Connect Fuse F102 (CJB). <li> 2 Measure the voltage between fuse F102 (10 A) and ground. <ul style="list-style-type: none"> <li>• Does the meter display battery voltage? <li>→ Yes GO to D6. <li>→ No REPAIR the voltage supply to fuse F102 using the Wiring Diagrams. CHECK the operation of the system.
D4: CHECK FUSE F43	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li> 2 CHECK fuse F43 (CJB). <ul style="list-style-type: none"> <li>• Is the fuse OK? <li>→ Yes GO to D5. <li>→ No RENEW fuse F43 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short using the Wiring Diagrams.
D5: CHECK THE VOLTAGE AT FUSE F43	
	<ol style="list-style-type: none"> <li>1 Connect fuse F43 (CJB).

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the voltage between fuse F43 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to D6. → No REPAIR the voltage supply to fuse F43 with the aid of the Wiring Diagrams. CHECK the operation of the system.
<p>D6: CHECK VOLTAGE AT ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE</p>	
 <p>VFE0037956</p>	<p>1 Disconnect Connector C539 of EATC module.</p> <p>2 Measure the voltage between the EATC module, connector C539, pin 11, circuit 29-FA94 (OG/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to D8. → No GO to D7.
<p>D7: CHECK CIRCUIT BETWEEN THE EATC MODULE AND CJB FOR OPEN CIRCUIT</p>	
 <p>VFE0037957</p>	<p>1 Disconnect Connector C102 from CJB.</p> <p>2 Measure the resistance between the EATC module, connector C539, pin 11, circuit 29-FA94 (OG/BK), wiring harness side and CJB, connector C102, pin 10, circuit 29-FA94 (OG/BK), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes CHECK the CJB and RENEW as required. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 29-FA94 (OG/BK) between the EATC module and CJB using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D8: CHECK GROUND CONNECTION OF THE EATC MODULE	
 <p>VFE0037958</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the EATC module, connector C539, pin 24, circuit 91-FA94 (BK/GN), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <ul style="list-style-type: none"> → Yes CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 91-FA94 (BK/GN) between the EATC module and soldered connection S12 using the Wiring Diagrams. CHECK the operation of the system.

PINPOINT TEST E : BLOWER MALFUNCTION - VEHICLES WITH ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) BUILT UP TO 10/2005 (DISPLAY IN THE CONTROL PANEL FOR THE CLIMATE CONTROL SYSTEM OK)

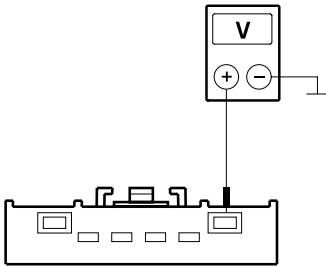
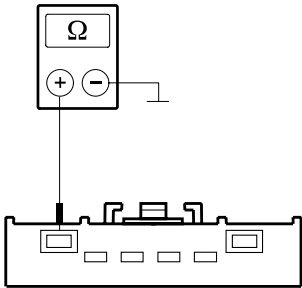
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: CHECK FUSE F10	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F10 (BJB). <ul style="list-style-type: none"> • Is the fuse OK? <ul style="list-style-type: none"> → Yes GO to E2. → No INSTALL NEW fuse F10 (30 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short using the Wiring Diagrams.
E2: CHECK THE VOLTAGE AT FUSE F10	
	<ol style="list-style-type: none"> 1 Connect Fuse F10 (BJB). 2 Measure the voltage between fuse F10 (30 A) and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes GO to E3. → No REPAIR the voltage supply to fuse F10 with the aid of the Wiring Diagrams. CHECK the operation of the system.

412-00-60

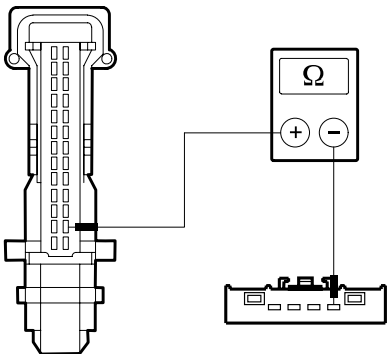
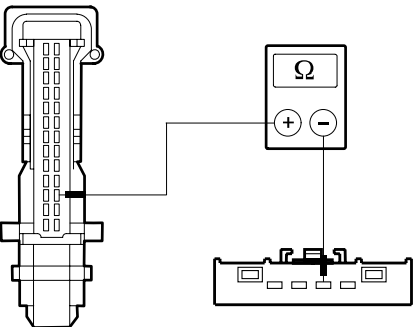
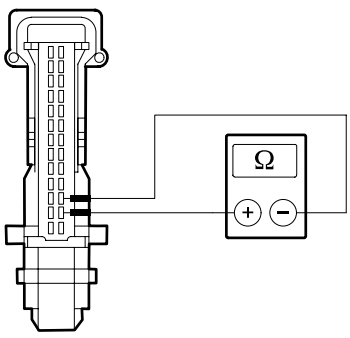
Climate Control System - General Information

412-00-60

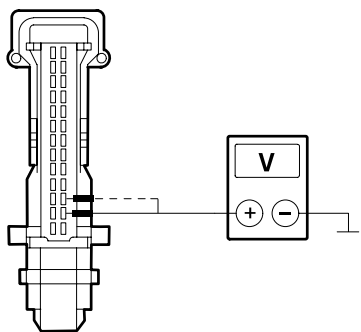

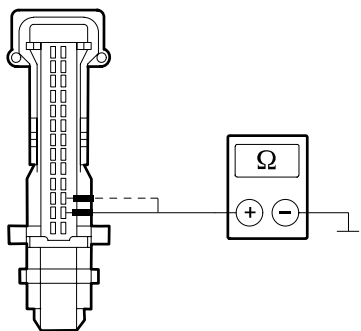
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E3: CHECK THE VOLTAGE AT THE BLOWER MOTOR	
	<ol style="list-style-type: none"> <li>1 Disconnect Connector C537 from heater blower motor.
 <p>VFE0037959</p>	<ol style="list-style-type: none"> <li>2 Ignition switch in position II. <li>3 Measure the voltage between the blower motor, connector C537, pin 1, circuit 15-FA18A (GN/OG), wiring harness side and ground. <ul style="list-style-type: none"> <li>• Does the meter display battery voltage? <li>→ Yes GO to E4. <li>→ No GO to E9.
E4: CHECK GROUND CONNECTION OF BLOWER MOTOR	
 <p>VFE0037960</p>	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 Measure the resistance between the blower motor, connector C537, pin 6, circuit 31-FA45 (BK), wiring harness side and ground. <ul style="list-style-type: none"> <li>• Is a resistance of less than 2 Ohm measured? <li>→ Yes GO to E5. <li>→ No LOCATE and REPAIR the break in the circuit between the blower motor and ground G20 using the Wiring Diagrams. Check that the system operates correctly.
E5: CHECK CIRCUITS BETWEEN ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE AND BLOWER MOTOR FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> <li>1 Disconnect Connector C540 from EATC module.

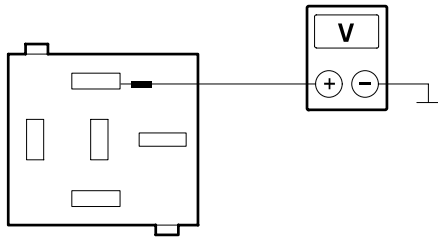
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037961</p>	<p>2 Measure the resistance between the EATC module, connector C540, pin 15, circuit 49S-FA45 (BU/WH), wiring harness side and the blower motor, connector C537, pin 2, circuit 49S-FA45 (BU/WH), wiring harness side.</p>
 <p>VFE0037962</p>	<p>3 Measure the resistance between the EATC module, connector C540, pin 16, circuit 9-FA45 (BN/BU), wiring harness side and the blower motor, connector C537, pin 3, circuit 9-FA45 (BN/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured in both cases? → Yes GO to E6. → No LOCATE and REPAIR the break in the relevant circuit between the EATC module and the blower motor using the Wiring Diagrams. CHECK the operation of the system.
<p>E6: CHECK THE CIRCUITS BETWEEN THE EATC MODULE AND BLOWER MOTOR FOR SHORT CIRCUIT</p>	
 <p>VFE0037963</p>	<p>1 Measure the resistance between the EATC module, connector C540, pin 15, circuit 49S-FA45 (BU/WH), wiring harness side and the EATC module, connector C540, pin 16, circuit 9-FA45 (BN/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohms measured? → Yes GO to E7. → No LOCATE and REPAIR the short in the relevant circuits between the EATC module and the blower motor using the Wiring Diagrams. CHECK the operation of the system.

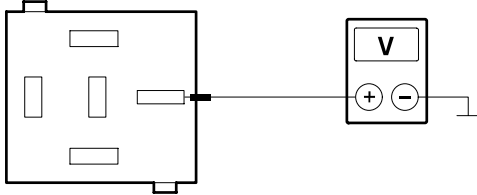
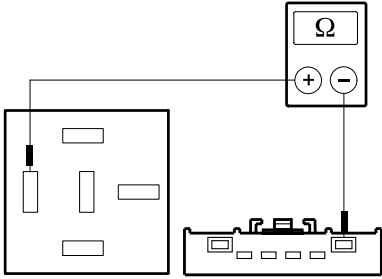
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E7: CHECK CIRCUITS BETWEEN THE EATC MODULE AND BLOWER MOTOR FOR A SHORT TO VOLTAGE	
 <p>VFE0037964</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the EATC module, connector C540, pin 15, circuit 49S-FA45 (BU/WH), wiring harness side and ground.</p>
 <p>VFE0037964</p>	<p>3 Measure the voltage between the EATC module, connector C540, pin 16, circuit 9-FA45 (BN/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a voltage measured during one / both measurement(s)? → Yes LOCATE and REPAIR the short to voltage in the relevant circuit between the EATC module and the blower motor using the Wiring Diagrams. CHECK the operation of the system. → No GO to E8.
E8: CHECK CIRCUITS BETWEEN THE EATC MODULE AND BLOWER MOTOR FOR A SHORT TO GROUND	
 <p>VFE0037965</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the EATC module, connector C540, pin 15, circuit 49S-FA45 (BU/WH), wiring harness side and ground.</p>

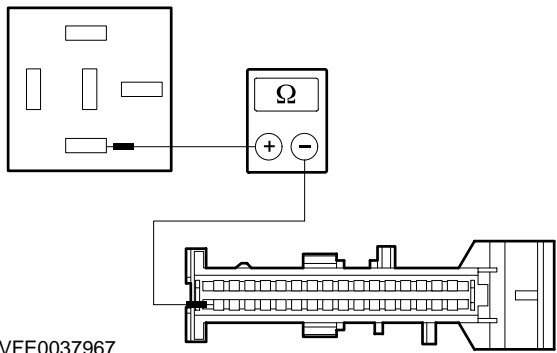
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the resistance between the EATC module, connector C540, pin 16, circuit 9-FA45 (BN/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance greater than 10,000 Ohms measured in both cases? <p>→ Yes RENEW the blower motor. CHECK the operation of the system. If the blower motor is still inoperative, RENEW the EATC module.</p> <p>→ No LOCATE and REPAIR the short to ground in the relevant circuit between the EATC module and the blower motor using the Wiring Diagrams. CHECK the operation of the system.</p>
E9: CHECK VOLTAGE AT BLOWER RELAY	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect blower relay from socket C1010 (BJB).</p>
 <p>VFE0016041</p>	<p>3 Measure the voltage between the blower relay, socket C1010, pin 1, circuit 30-FA23 (RD), wiring harness side and ground.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0015930</p>	<p>4 Measure the voltage between the blower relay, socket C1010, pin 3, circuit 30-FA24 (RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured in both cases? → Yes GO to E10. → No <ul style="list-style-type: none"> - If battery voltage is not measured during one measurement: LOCATE and REPAIR the break in the relevant circuit between the blower relay and soldered connection S119 using the Wiring Diagrams. CHECK the operation of the system. - Battery voltage not measured in any case: LOCATE and REPAIR the break in circuit 30-FA23A (RD) between soldered connection S119 and fuse F10 using the Wiring Diagrams. CHECK the operation of the system.
<p>E10: CHECK CIRCUIT BETWEEN THE BLOWER RELAY AND THE BLOWER MOTOR FOR OPEN CIRCUIT</p>	
 <p>VFE0037966</p>	<p>1 Measure the resistance between the blower relay, socket C1010, pin 5, circuit 15-FA18 (GN/OG), wiring harness side and blower motor, connector C537, pin 1, circuit 15-FA18A (GN/OG), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to E11. → No LOCATE and REPAIR the break in the circuit between the blower relay and the blower motor using the Wiring Diagrams. CHECK the operation of the system.
<p>E11: CHECK CIRCUIT BETWEEN THE BLOWER RELAY AND THE CJB FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect Connector C95 from CJB.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037967</p>	<p>2 Measure the resistance between the blower relay, socket C1010, pin 2, circuit 31S-FA23 (BK/BU), wiring harness side and CJB, connector C95, pin 32, circuit 31S-FA23 (BK/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to E12.</p> <p>→ No LOCATE and REPAIR the break in circuit 31S-FA23 (BK/BU) between the blower relay and CJB using the Wiring Diagrams. CHECK the operation of the system.</p>

E12: CHECK BLOWER RELAY

NOTE: If the generic electronic module (GEM) is changed, the new one must be configured. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module.

REFER to: [Module Configuration](#) (418-01 Module Configuration, General Procedures).

	<p>1 Check blower relay according to the component test at the end of this section.</p> <ul style="list-style-type: none"> • Is the blower relay OK? <p>→ Yes CHECK the CJB and RENEW as required. CHECK the operation of the system.</p> <p>→ No RENEW the blower relay. CHECK the operation of the system.</p>
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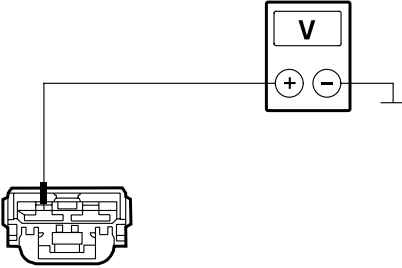
PINPOINT TEST F : BLOWER MALFUNCTION - VEHICLES WITH ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) BUILT FROM 10/2005 (DISPLAY IN CONTROL PANEL OK)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>F1: CHECK THE OPERATION OF THE BLOWER MOTOR</p>	
	<p>1 Ignition switch in position II.</p> <p>2 Test all of the speeds of the heater blower motor.</p> <ul style="list-style-type: none"> • Is the blower motor inoperative in all speed settings? <p>→ Yes GO to F2.</p> <p>→ No GO to F17.</p>

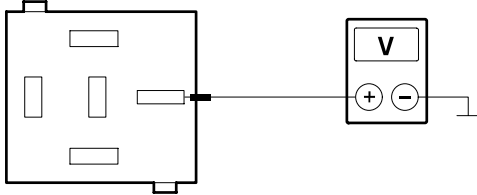
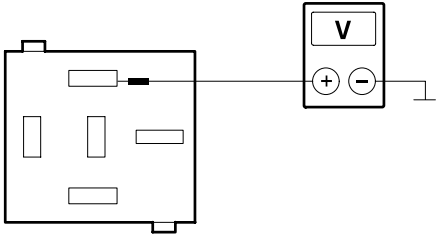
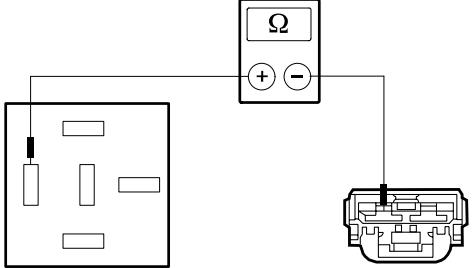
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F2: CHECK FUSE F10	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li> <ol style="list-style-type: none"> <li>2 CHECK Fuse F10 (BJB). <ul style="list-style-type: none"> <li>• Is the fuse OK? <li>→ Yes GO to F3. <li>→ No INSTALL NEW fuse F10 (30 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short using the Wiring Diagrams.
F3: CHECK THE VOLTAGE AT FUSE F10	
	<ol style="list-style-type: none"> <li>1 Connect Fuse F10 (BJB). <li> <ol style="list-style-type: none"> <li>2 Measure the voltage between fuse F10 (30 A) and ground. <ul style="list-style-type: none"> <li>• Does the meter display battery voltage? <li>→ Yes GO to F4. <li>→ No REPAIR the voltage supply to fuse F10 with the aid of the Wiring Diagrams. CHECK the operation of the system.
F4: CHECK FUSE F29	
	<ol style="list-style-type: none"> <li>1 CHECK Fuse F29 (BJB). <ul style="list-style-type: none"> <li>• Is the fuse OK? <li>→ Yes GO to F5. <li>→ No INSTALL a new fuse F29 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short using the Wiring Diagrams.
F5: CHECK THE VOLTAGE AT FUSE F29	
	<ol style="list-style-type: none"> <li>1 Connect Fuse F29 (BJB). <li>2 Ignition switch in position II.

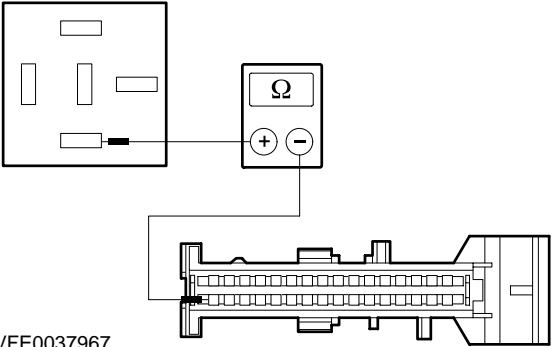
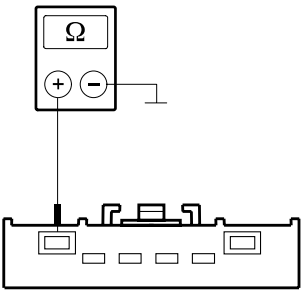
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between fuse F29 (10 A) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to F6. → No REPAIR the voltage supply to fuse F29 with the aid of the Wiring Diagrams. CHECK the operation of the system.
F6: CHECK THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C540 of EATC module.</p> <p>3 Ignition switch in position II.</p> <ul style="list-style-type: none"> • Does the blower motor run at its highest speed setting? → Yes CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system. → No GO to F7.
F7: CHECK THE VOLTAGE AT THE BLOWER MOTOR	
 <p>E80941</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C832 from blower motor.</p> <p>3 Ignition switch in position II.</p> <p>4 Measure the voltage between the blower motor, connector C832, pin 1, circuit 15-FA18A (GN/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to F12. → No GO to F8.
F8: CHECK VOLTAGE AT THE BLOWER RELAY	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Blower relay from socket C1010.</p>

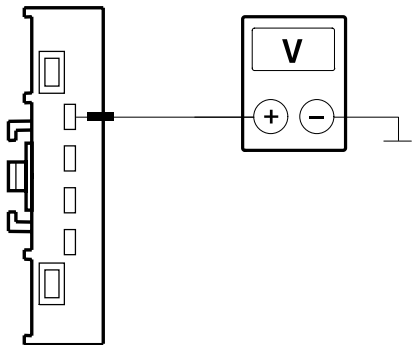
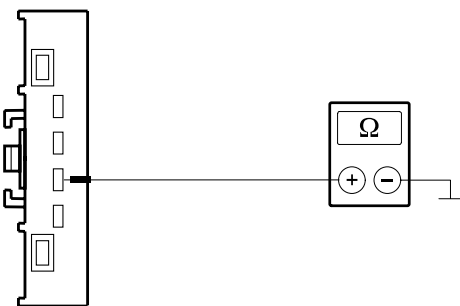
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0015930</p>	<p>3 Measure the voltage between the blower relay, socket C1010, pin 3, circuit 30-FA24 (RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? → Yes GO to F9. → No LOCATE and REPAIR the open circuit between the blower relay and fuse F10 using the Wiring Diagrams. CHECK the operation of the system.
<p>F9: CHECK THE CONTROL VOLTAGE AT THE BLOWER RELAY</p>	
 <p>VFE0016041</p>	<p>1 Measure the voltage between the blower relay, socket C1010, pin 1, circuit 30-FA23 (RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? → Yes GO to F10. → No LOCATE and REPAIR the break in the circuit between the blower relay and soldered connection S119 with the aid of the Wiring Diagrams. CHECK the operation of the system.
<p>F10: CHECK CIRCUIT BETWEEN THE BLOWER RELAY AND THE BLOWER MOTOR FOR OPEN CIRCUIT</p>	
 <p>E80942</p>	<p>1 Measure the resistance between the blower relay, socket C1010, pin 5, circuit 15-FA18 (GN/OG), wiring harness side and blower motor, connector C832, pin 1, circuit 15-FA18A (GN/OG), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohm measured? → Yes GO to F11. → No LOCATE and REPAIR the break in the circuit between the blower relay and the blower motor using the Wiring Diagrams. CHECK the operation of the system.
<p>F11: CHECK CIRCUIT BETWEEN THE BLOWER RELAY AND THE CJB FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect Connector C95 from CJB.</p>

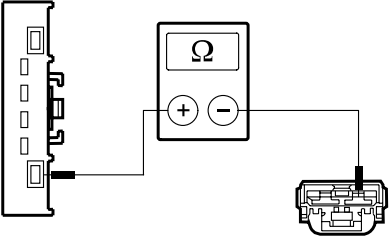
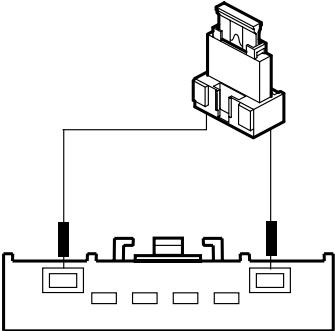
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037967</p>	<p>2 Measure the resistance between the blower relay, socket C1010, pin 2, circuit 31S-FA23 (BK/BL), wiring harness side and the CJB, connector C95, pin 32, circuit 31S-FA23 (BK/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <p>→ Yes CHECK the blower relay in accordance with the component checks at the end of the section. If the blower relay is OK, CHECK and if necessary RENEW the CJB. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in circuit 31S-FA23 (BK/BU) between the blower relay and CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>F12: CHECK THE GROUND CONNECTION OF THE BLOWER CONTROL MODULE</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C834 from blower control module.</p>
 <p>VFE0037960</p>	<p>3 Measure the resistance between the blower control module, connector C834, pin 6, circuit 31-FA45 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <p>→ Yes GO to F13.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the blower control module and ground connection G20 with the aid of the Wiring Diagrams. CHECK the operation of the system.</p>
<p>F13: CHECK THE VOLTAGE AT THE BLOWER CONTROL MODULE</p>	
	<p>1 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E56130</p>	<p>2 Measure the voltage between the blower control module, connector C834, pin 2, circuit 15-FA18C (GN/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to F14.</p> <p>→ No LOCATE and RECTIFY the open circuit in circuit 15-FA18C (GN/OG) between the blower control module and fuse F29 with the aid of the Wiring Diagrams. CHECK the operation of the system.</p>
<p>F14: CHECK THE CIRCUIT BETWEEN THE BLOWER CONTROL MODULE AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR SHORT TO GROUND</p>	
 <p>E77080</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the blower control module, connector C834, pin 4, circuit 49S-FA45 (BU/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohm measured? <p>→ Yes GO to F15.</p> <p>→ No LOCATE and REPAIR the short to ground in circuit 49S-FA45 (BU/WH) between the blower control module and the EATC module with the aid of the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

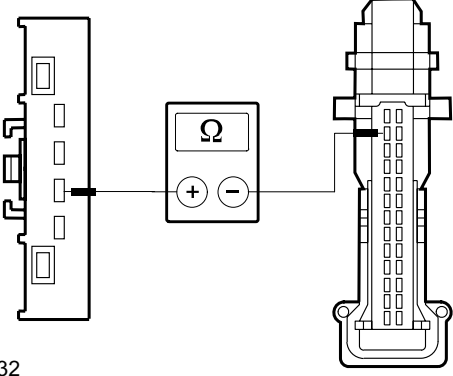
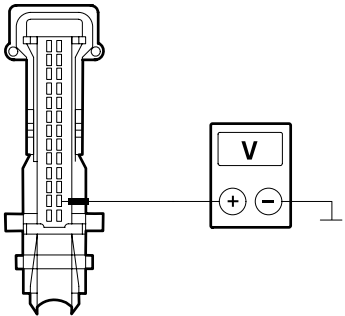
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F15: CHECK THE CIRCUIT BETWEEN THE BLOWER MOTOR AND THE BLOWER CONTROL MODULE FOR OPEN CIRCUIT	
 <p>E80943</p>	<ol style="list-style-type: none"> <li>1 Measure the resistance between the blower motor, connector C832, pin 2, circuit 31S-FA18A (BK/WH), wiring harness side and the blower control module, connector C834, pin 1, circuit 31S-FA18A (BK/RD), wiring harness side. <ul style="list-style-type: none"> <li>• Is a resistance of less than 2 Ohm measured? <ul style="list-style-type: none"> <li>→ Yes GO to F16. <li>→ No LOCATE and REPAIR the break in circuit 31S-FA18A (BK/WH) between the blower motor and the blower control module with the aid of the Wiring Diagrams. CHECK the operation of the system.
F16: CHECK THE BLOWER CONTROL MODULE	
 <p>E56128</p>	<ol style="list-style-type: none"> <li>1 Connect Connector C832 to the blower motor. <li>2 Using a fused test cable (30 A), bridge the blower control module, connector C834, between pin 1, circuit 31S-FA18A (BK/BU), wiring harness side and pin 6, circuit 31-FA45 (BK), wiring harness side.
	<ol style="list-style-type: none"> <li>3 Ignition switch in position II. <ul style="list-style-type: none"> <li>• Does the blower motor run at full speed? <ul style="list-style-type: none"> <li>→ Yes RENEW the blower control module. CHECK the operation of the system. If the system is still not working, CHECK the EATC module and INSTALL A NEW ONE if necessary. <li>→ No RENEW the blower motor. CHECK the operation of the system.
F17: CHECK CIRCUIT BETWEEN THE BLOWER CONTROL MODULE AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0.

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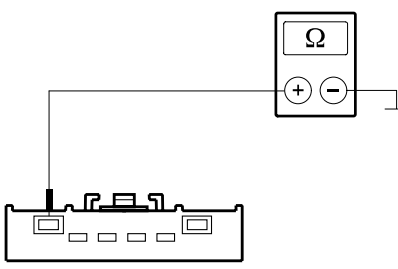
Climate Control System - General Information

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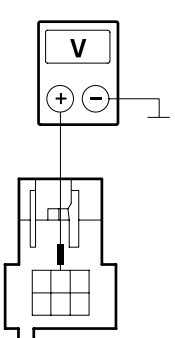
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect Connector C834 from blower control module.</p> <p>3 Disconnect connector C540 of EATC module.</p>
 <p>E56132</p>	<p>4 Measure the resistance between the blower control module, connector C834, pin 4, circuit 49S-FA45 (BU/WH), wiring harness side and the EATC module, connector C540, pin 15, circuit 49S-FA45 (BU/WH), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohm measured? <p>→ Yes GO to F18.</p> <p>→ No LOCATE and REPAIR the break in circuit 49S-FA45 (BU/WH) between the blower control module and the EATC module with the aid of the Wiring Diagrams. CHECK the operation of the system.</p>
F18: CHECK THE CIRCUIT BETWEEN THE BLOWER CONTROL MODULE AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR SHORT TO VOLTAGE	
	<p>1 Ignition switch in position II.</p>
 <p>VFE0038625</p>	<p>2 Measure the voltage between the EATC module, connector C540, pin 15, circuit 49S-FA45 (BU/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a voltage measured? <p>→ Yes GO to F19.</p> <p>→ No RENEW the blower control module. CHECK the operation of the system. If the system is still not working, CHECK the EATC module and INSTALL A NEW ONE if necessary.</p>
F19: CHECK THE CIRCUIT BETWEEN THE BLOWER CONTROL MODULE AND THE BLOWER MOTOR FOR A SHORT TO GROUND	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect Connector C832 from blower motor.</p>

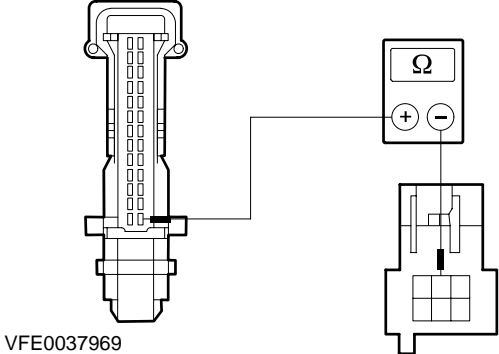
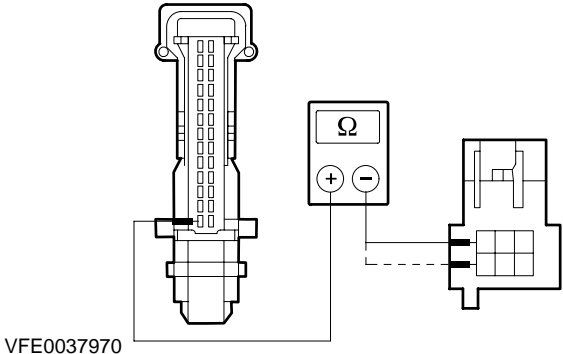
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E80944</p>	<p>3 Measure the resistance between the blower control module, connector C834, pin 1, circuit 31S-FA18A (BK/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of more than 10,000 Ohm measured? <p>→ Yes RENEW the blower control module. CHECK the operation of the system. If the system is still not working, CHECK the EATC module and INSTALL A NEW ONE if necessary.</p> <p>→ No LOCATE and REPAIR the short to ground in circuit 31S-FA18A (BK/RD) between the blower control module and the blower motor with the aid of the Wiring Diagrams. CHECK the operation of the system.</p>

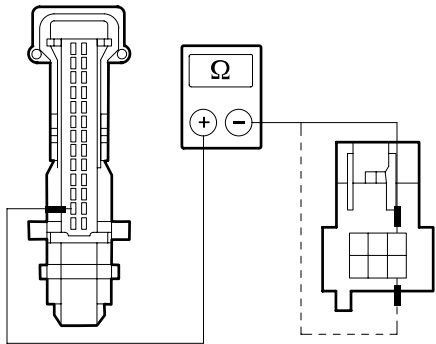
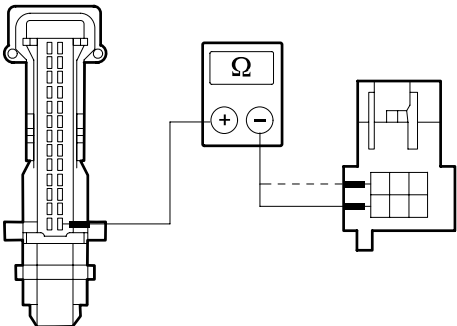
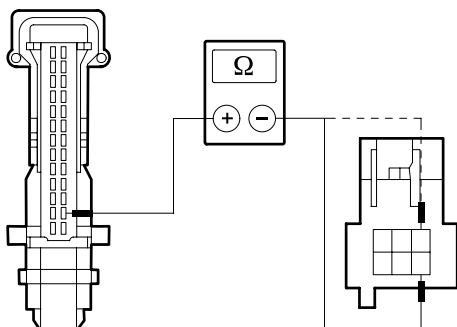
PINPOINT TEST G : MALFUNCTION OF THE RECIRCULATED AIR FLAP - VEHICLES WITH ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: Air recirculation mode is not available when the "Defrost/demist windscreen" function is active.</p>	
<p>NOTE: Ensure that the recirculated air flap is mechanically OK.</p>	
<p>G1: TEST THE VOLTAGE AT THE RECIRCULATED AIR FLAP ACTUATOR</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C541 from recirculated air flap actuator.</p> <p>3 Ignition switch in position II.</p>
 <p>VFE0037968</p>	<p>4 Measure the voltage between the recirculated air flap actuator, connector C541, pin 2, circuit 15S-FA42 (GN/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes GO to G3.</p> <p>→ No GO to G2.</p>

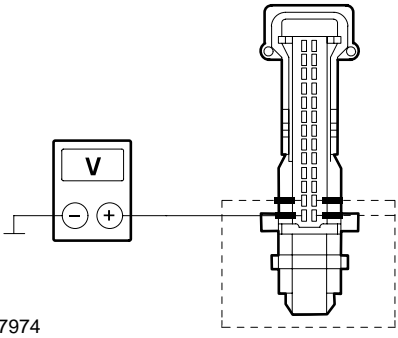
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
G2: CHECK CIRCUIT BETWEEN THE RECIRCULATED AIR FLAP ACTUATOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect connector C540 of EATC module.
 <p>VFE0037969</p>	<ol style="list-style-type: none"> 3 Measure the resistance between the EATC module, connector C540, pin 14, circuit 15S-FA42 (GN/YE), wiring harness side and the recirculated air flap actuator, connector C541, pin 2, circuit 15S-FA42 (GN/YE), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 15S-FA42 (GN/YE) between the EATC module and the recirculated air flap actuator using the Wiring Diagrams. CHECK the operation of the system.
G3: CHECK THE CIRCUITS BETWEEN THE RECIRCULATED AIR FLAP ACTUATOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect connector C539 of EATC module.
 <p>VFE0037970</p>	<ol style="list-style-type: none"> 3 Measure the resistance between the EATC module, connector C539, pin 1, circuit 31S-FA54 (BK/BU) (RHD vehicles: circuit 31S-FA54A (BK/BU)), wiring harness side and recirculated air flap actuator, connector C541, pin 1, circuit 31S-FA54 (BK/BU) (RHD vehicles: pin 4, circuit 31S-FA54A (BK/BU)), wiring harness side.

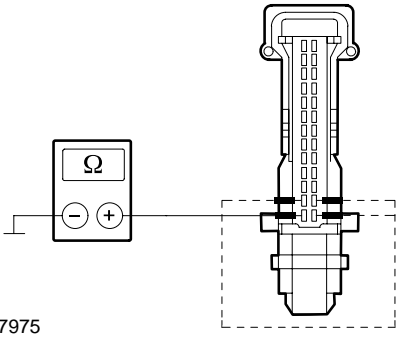
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037971</p>	<p>4 Measure the resistance between the EATC module, connector C539, pin 2, circuit 31S-FA55 (BK/OG) (RHD vehicles: circuit 31S-FA55A (BK/OG)), wiring harness side and recirculated air flap actuator, connector C541, pin 3, circuit 31S-FA55 (BK/OG) (RHD vehicles: pin 6, circuit 31S-FA55A (BK/OG)), wiring harness side.</p>
 <p>VFE0037972</p>	<p>5 Measure the resistance between the EATC module, connector C539, pin 14, circuit 31S-FA56 (BK/GN) (RHD vehicles: circuit 31S-FA56A (BK/GN)), wiring harness side and recirculated air flap actuator, connector C541, pin 4, circuit 31S-FA56 (BK/GN) (RHD vehicles: pin 1, circuit 31S-FA56A (BK/GN)), wiring harness side.</p>
 <p>VFE0037973</p>	<p>6 Measure the resistance between the EATC module, connector C539, pin 15, circuit 31S-FA57 (BK/RD) (RHD vehicles: circuit 31S-FA57A (BK/RD)), wiring harness side and recirculated air flap actuator, connector C541, pin 6, circuit 31S-FA57 (BK/RD) (RHD vehicles: pin 3, circuit 31S-FA57A (BK/RD)), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured in all of the cases? → Yes GO to G4. → No LOCATE and REPAIR the break in the relevant circuit between the recirculated air flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.
<p>G4: CHECK CIRCUITS BETWEEN THE RECIRCULATED AIR FLAP ACTUATOR AND THE EATC MODULE FOR SHORT TO VOLTAGE</p>	
	<p>1 Ignition switch in position II.</p>

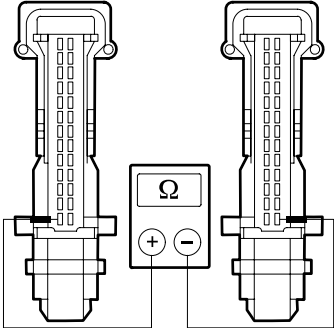
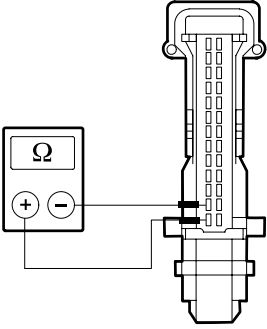
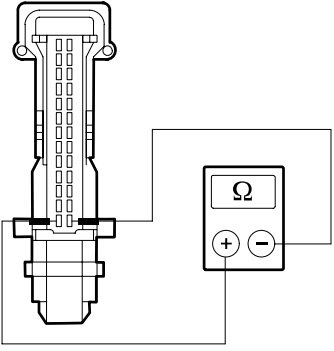
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037974</p>	<p>2 Measure the voltage between the EATC module, connector C539, pin 1, circuit 31S-FA54 (BK/BU) (RHD vehicles: circuit 31S-FA54A (BK/BU)), wiring harness side and ground.</p>
	<p>3 Measure the voltage between the EATC module, connector C539, pin 2, circuit 31S-FA55 (BK/OG) (RHD vehicles: circuit 31S-FA55A (BK/OG)), wiring harness side and ground.</p>
	<p>4 Measure the voltage between the EATC module, connector C539, pin 14, circuit 31S-FA56 (BK/GN) (RHD vehicles: circuit 31S-FA56A (BK/GN)), wiring harness side and ground.</p>
	<p>5 Measure the voltage between the EATC module, connector C539, pin 15, circuit 31S-FA57 (BK/RD) (RHD vehicles: circuit 31S-FA57A (BK/RD)), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a voltage measured during one or more measurements? → Yes LOCATE and REPAIR short to voltage in the relevant circuit(s) between the recirculated air flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system. → No GO to G5.
<p>G5: CHECK CIRCUITS BETWEEN THE RECIRCULATED AIR FLAP ACTUATOR AND THE EATC MODULE FOR SHORT TO GROUND</p>	
	<p>1 Ignition switch in position 0.</p>

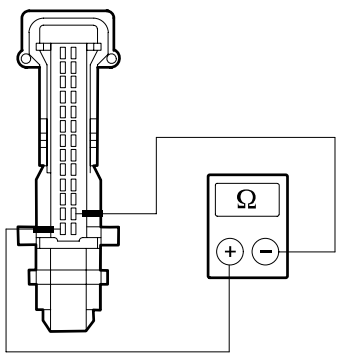
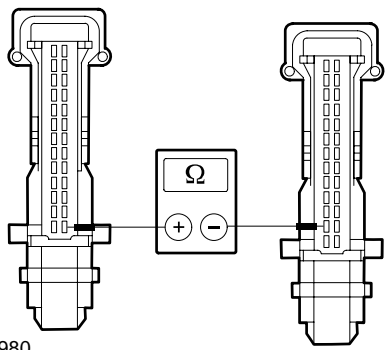
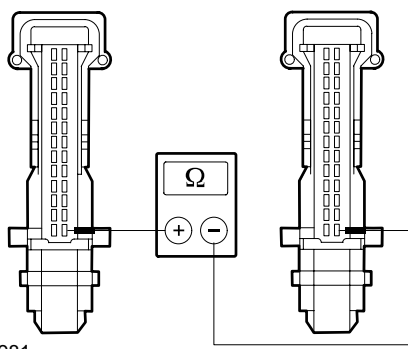
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037975</p>	<p>2 Measure the resistance between the EATC module, connector C539, pin 1, circuit 31S-FA54 (BK/BU) (RHD vehicles: circuit 31S-FA54A (BK/BU)), wiring harness side and ground.</p>
	<p>3 Measure the resistance between the EATC module, connector C539, pin 2, circuit 31S-FA55 (BK/OG) (RHD vehicles: circuit 31S-FA55A (BK/OG)), wiring harness side and ground.</p>
	<p>4 Measure the resistance between the EATC module, connector C539, pin 14, circuit 31S-FA56 (BK/GN) (RHD vehicles: circuit 31S-FA56A (BK/GN)), wiring harness side and ground.</p>
	<p>5 Measure the resistance between the EATC module, connector C539, pin 15, circuit 31S-FA57 (BK/RD) (RHD vehicles: circuit 31S-FA57A (BK/RD)), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohms measured in all of the measurements? → Yes GO to G6. → No LOCATE and REPAIR short to ground in the relevant circuit(s) between the recirculated air flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.

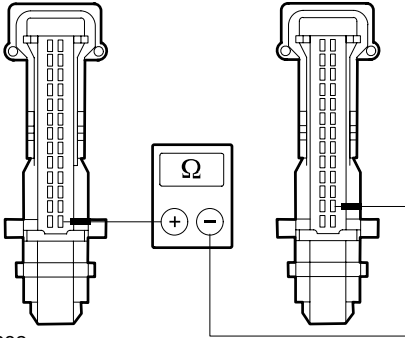
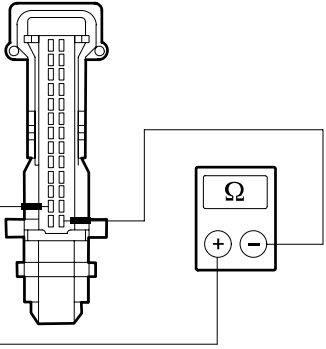
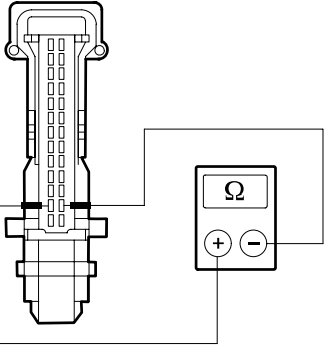
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>G6: CHECK CIRCUITS BETWEEN THE RECIRCULATED AIR FLAP ACTUATOR AND THE EATC MODULE FOR A SHORT CIRCUIT</p>	
 <p>VFE0037976</p>	<p>1 Measure the resistance between the EATC module, connector C539, pin 1, circuit 31S-FA54 (BK/BU) (RHD vehicles: circuit 31S-FA54A (BK/BU)), wiring harness side and EATC module, connector C540, pin 14, circuit 15S-FA42 (GN/YE), wiring harness side.</p>
 <p>VFE0037977</p>	<p>2 Measure the resistance between the EATC module, connector C539, pin 1, circuit 31S-FA54 (BK/BU) (RHD vehicles: circuit 31S-FA54A (BK/BU)), wiring harness side and EATC module, connector C539, pin 2, circuit 31S-FA55 (BK/OG) (RHD vehicles: circuit 31S-FA55A (BK/OG)), wiring harness side.</p>
 <p>VFE0037978</p>	<p>3 Measure the resistance between the EATC module, connector C539, pin 1, circuit 31S-FA54 (BK/BU) (RHD vehicles: circuit 31S-FA54A (BK/BU)), wiring harness side and EATC module, connector C539, pin 14, circuit 31S-FA56 (BK/GN) (RHD vehicles: circuit 31S-FA56A (BK/GN)), wiring harness side.</p>

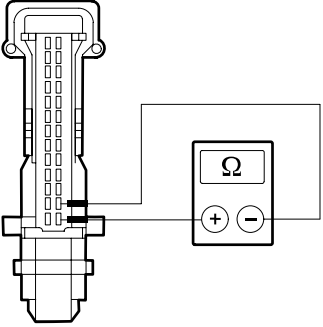
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037979</p>	<p>4 Measure the resistance between the EATC module, connector C539, pin 1, circuit 31S-FA54 (BK/BU) (RHD vehicles: circuit 31S-FA54A (BK/BU)), wiring harness side and EATC module, connector C539, pin 15, circuit 31S-FA57 (BK/RD) (RHD vehicles: circuit 31S-FA57A (BK/RD)), wiring harness side.</p>
 <p>VFE0037980</p>	<p>5 Measure the resistance between the EATC module, connector C540, pin 14, circuit 15S-FA42 (GN/YE), wiring harness side and the EATC module, connector C539, pin 2, circuit 31S-FA55 (BK/OG) (RHD vehicles: circuit 31S-FA55A (BK/OG)), wiring harness side.</p>
 <p>VFE0037981</p>	<p>6 Measure the resistance between the EATC module, connector C540, pin 14, circuit 15S-FA42 (GN/YE), wiring harness side and the EATC module, connector C539, pin 14, circuit 31S-FA56 (BK/GN) (RHD vehicles: circuit 31S-FA56A (BK/GN)), wiring harness side.</p>

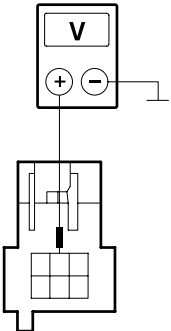
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037982</p>	<p>7 Measure the resistance between the EATC module, connector C540, pin 14, circuit 15S-FA42 (GN/YE), wiring harness side and the EATC module, connector C539, pin 15, circuit 31S-FA57 (BK/RD), (RHD vehicles: circuit 31S-FA57A (BK/RD)), wiring harness side.</p>
 <p>VFE0037983</p>	<p>8 Measure the resistance between the EATC module, connector C539, pin 2, circuit 31S-FA55 (BK/OG) (RHD vehicles: circuit 31S-FA55A (BK/OG)), wiring harness side and EATC module, connector C539, pin 14, circuit 31S-FA56 (BK/GN) (RHD vehicles: circuit 31S-FA56A (BK/GN)), wiring harness side.</p>
 <p>VFE0037984</p>	<p>9 Measure the resistance between the EATC module, connector C539, pin 2, circuit 31S-FA55 (BK/OG) (RHD vehicles: circuit 31S-FA55A (BK/OG)), wiring harness side and EATC module, connector C539, pin 15, circuit 31S-FA57 (BK/RD) (RHD vehicles: circuit 31S-FA57A (BK/RD)), wiring harness side.</p>

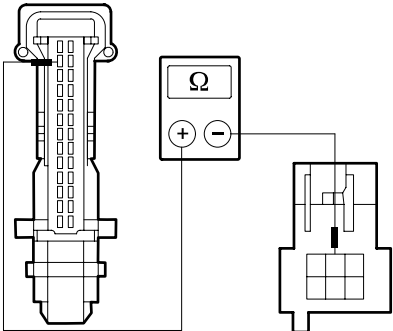
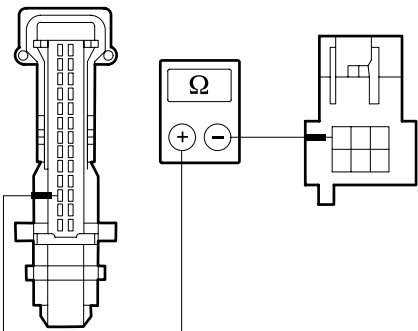
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037985</p>	<p>10 Measure the resistance between the EATC module, connector C539, pin 14, circuit 31S-FA56 (BK/GN) (RHD vehicles: circuit 31S-FA56A (BK/GN)), wiring harness side and EATC module, connector C539, pin 15, circuit 31S-FA57 (BK/RD) (RHD vehicles: circuit 31S-FA57A (BK/RD)), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohms measured in all of the measurements? <p>→ Yes RENEW the recirculated air flap actuator. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the short between the relevant circuits between the recirculated air flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>

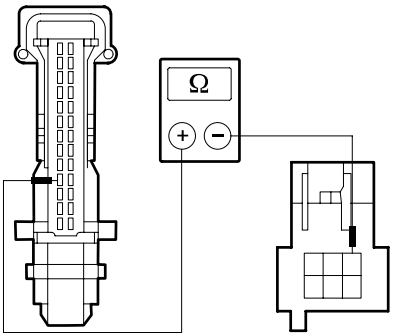
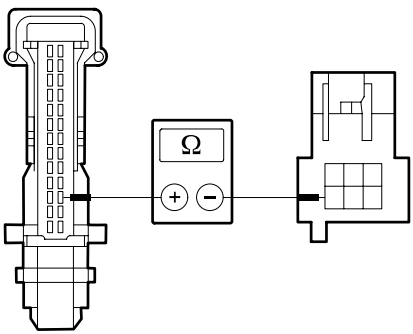
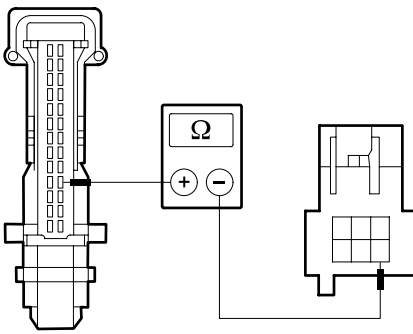
PINPOINT TEST H : MALFUNCTION OF LEFT-HAND TEMPERATURE CONTROL FLAP - VEHICLES WITH ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: Check that the left-hand temperature control flap is mechanically OK.</p>	
<p>H1: CHECK VOLTAGE AT LEFT-HAND TEMPERATURE CONTROL FLAP ACTUATOR</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C553 from left-hand temperature control flap actuator.</p> <p>3 Ignition switch in position II.</p>
 <p>VFE0037968</p>	<p>4 Measure the voltage between left-hand temperature control flap actuator, connector C553, pin 2, circuit 15S-FA46 (GN/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to H3.</p> <p>→ No GO to H2.</p>

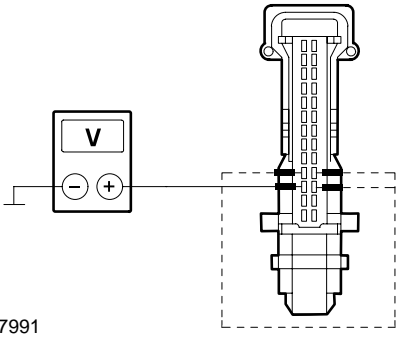
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>H2: CHECK CIRCUIT BETWEEN THE LEFT-HAND TEMPERATURE CONTROL FLAP ACTUATOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C539 of EATC module.</p>
 <p>VFE0037986</p>	<p>3 Measure the resistance between the EATC module, connector C539, pin 12, circuit 15S-FA46 (GN/BU), wiring harness side and the left-hand temperature control flap actuator, connector C553, pin 2, circuit 15S-FA46 (GN/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 15S-FA46 (GN/BU) between the EATC module and the left-hand temperature control flap actuator using the Wiring Diagrams. CHECK the operation of the system.
<p>H3: CHECK CIRCUITS BETWEEN THE LEFT-HAND TEMPERATURE CONTROL FLAP ACTUATOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C539 of EATC module.</p>
 <p>VFE0037987</p>	<p>3 Measure the resistance between the EATC module, connector C539, pin 3, circuit 31S-FA58 (BK/OG), wiring harness side and the left-hand temperature control flap actuator, connector C553, pin 1, circuit 31S-FA58 (BK/OG), wiring harness side.</p>

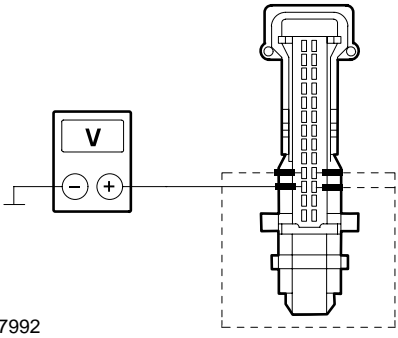
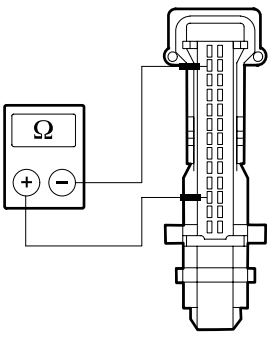
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037988</p>	<p>4 Measure the resistance between the EATC module, connector C539, pin 4, circuit 31S-FA59 (BK/GN), wiring harness side and the left-hand temperature control flap actuator, connector C553, pin 3, circuit 31S-FA59 (BK/GN), wiring harness side.</p>
 <p>VFE0037989</p>	<p>5 Measure the resistance between the EATC module, connector C539, pin 16, circuit 31S-FA60 (BK/RD), wiring harness side and the left-hand temperature control flap actuator, connector C553, pin 4, circuit 31S-FA60 (BK/RD), wiring harness side.</p>
 <p>VFE0037990</p>	<p>6 Measure the resistance between the EATC module, connector C539, pin 17, circuit 31S-FA61 (BK/WH), wiring harness side and the left-hand temperature control flap actuator, connector C553, pin 6, circuit 31S-FA61 (BK/WH), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured in all of the cases? → Yes GO to H4. → No LOCATE and REPAIR the break in the relevant circuit between the left-hand temperature control flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.
<p>H4: CHECK CIRCUITS BETWEEN THE LEFT-HAND TEMPERATURE CONTROL FLAP ACTUATOR AND THE EATC MODULE FOR SHORT TO VOLTAGE</p>	
<p>1 Ignition switch in position II.</p>	

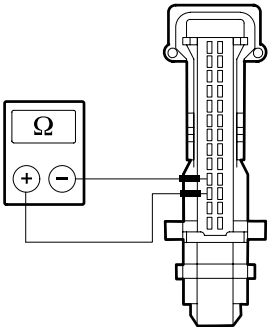
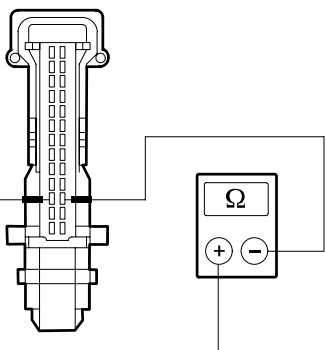
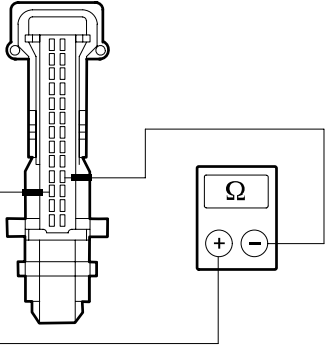
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037991</p>	<p>2 Measure the voltage between the EATC module, connector C539, pin 3, circuit 31S-FA58 (BK/OG), wiring harness side and ground.</p>
	<p>3 Measure the voltage between the EATC module, connector C539, pin 4, circuit 31S-FA59 (BK/GN), wiring harness side and ground.</p>
	<p>4 Measure the voltage between the EATC module, connector C539, pin 16, circuit 31S-FA60 (BK/RD), wiring harness side and ground.</p>
	<p>5 Measure the voltage between the EATC module, connector C539, pin 17, circuit 31S-FA61 (BK/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a voltage measured during one or more measurements? → Yes LOCATE and REPAIR short to voltage in the relevant circuit(s) between the left-hand temperature control flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system. → No GO to H5.
<p>H5: CHECK CIRCUITS BETWEEN THE LEFT-HAND TEMPERATURE CONTROL FLAP ACTUATOR AND THE EATC MODULE FOR SHORT TO GROUND</p>	
	<p>1 Ignition switch in position 0.</p>

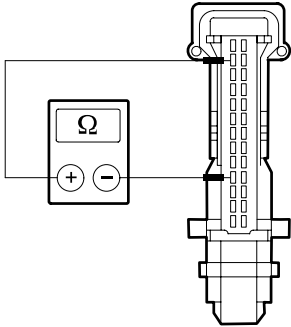
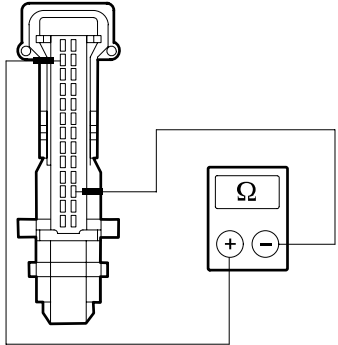
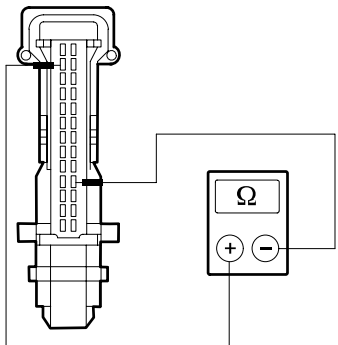
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037992</p>	<p>2 Measure the resistance between the EATC module, connector C539, pin 3, circuit 31S-FA58 (BK/OG), wiring harness side and ground.</p>
	<p>3 Measure the resistance between the EATC module, connector C539, pin 4, circuit 31S-FA59 (BK/GN), wiring harness side and ground.</p>
	<p>4 Measure the resistance between the EATC module, connector C539, pin 16, circuit 31S-FA60 (BK/RD), wiring harness side and ground.</p>
	<p>5 Measure the resistance between the EATC module, connector C539, pin 17, circuit 31S-FA61 (BK/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohms measured in all of the measurements? → Yes GO to H6. → No LOCATE and REPAIR short to ground in the relevant circuit(s) between the left-hand temperature control flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.
<p>H6: CHECK CIRCUITS BETWEEN THE LEFT-HAND TEMPERATURE CONTROL FLAP ACTUATOR AND THE EATC MODULE FOR SHORT</p>	
 <p>VFE0037993</p>	<p>1 Measure the resistance between the EATC module, connector C539, pin 3, circuit 31S-FA58 (BK/OG), wiring harness side and the EATC module, connector C539, pin 12, circuit 15S-FA46 (GN/BU), wiring harness side.</p>

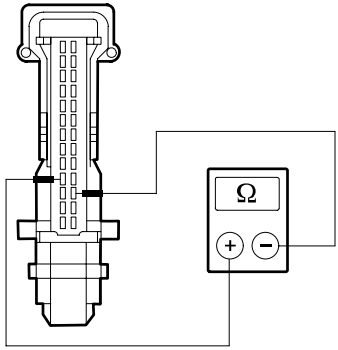
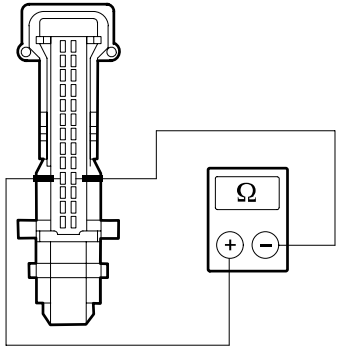
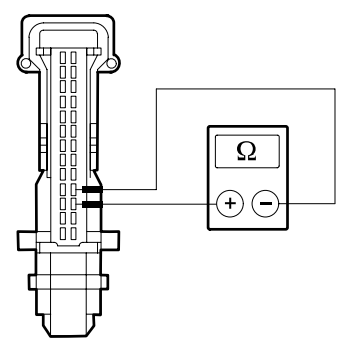
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037994</p>	<p>2 Measure the resistance between the EATC module, connector C539, pin 3, circuit 31S-FA58 (BK/OG), wiring harness side and the EATC module, connector C539, pin 4, circuit 31S-FA59 (BK/GN), wiring harness side.</p>
 <p>VFE0037995</p>	<p>3 Measure the resistance between the EATC module, connector C539, pin 3, circuit 31S-FA58 (BK/OG), wiring harness side and the EATC module, connector C539, pin 16, circuit 31S-FA60 (BK/RD), wiring harness side.</p>
 <p>VFE0037996</p>	<p>4 Measure the resistance between the EATC module, connector C539, pin 3, circuit 31S-FA58 (BK/OG), wiring harness side and the EATC module, connector C539, pin 17, circuit 31S-FA61 (BK/WH), wiring harness side.</p>

DIAGNOSIS AND TESTING

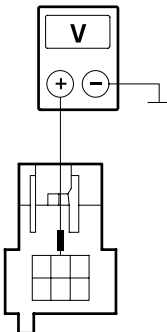
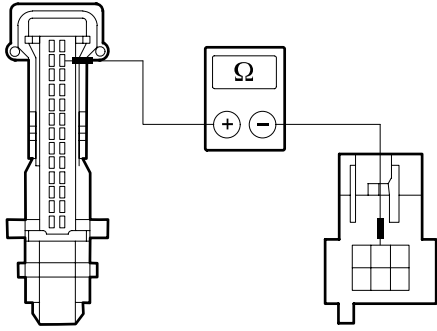
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037997</p>	<p>5 Measure the resistance between the EATC module, connector C539, pin 12, circuit 15S-FA46 (GN/BU), wiring harness side and the EATC module, connector C539, pin 4, circuit 31S-FA59 (BK/GN), wiring harness side.</p>
 <p>VFE0037998</p>	<p>6 Measure the resistance between the EATC module, connector C539, pin 12, circuit 15S-FA46 (GN/BU), wiring harness side and the EATC module, connector C539, pin 16, circuit 31S-FA60 (BK/RD), wiring harness side.</p>
 <p>VFE0037999</p>	<p>7 Measure the resistance between the EATC module, connector C539, pin 12, circuit 15S-FA46 (GN/BU), wiring harness side and the EATC module, connector C539, pin 17, circuit 31S-FA61 (BK/WH), wiring harness side.</p>

DIAGNOSIS AND TESTING

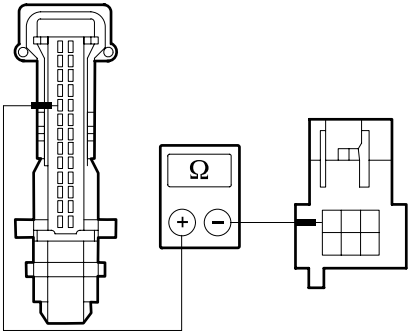
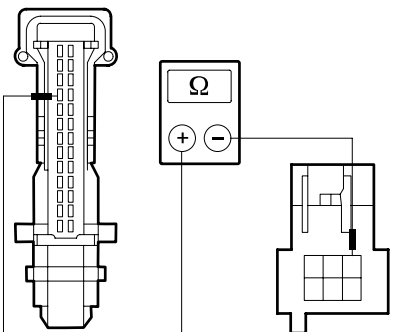
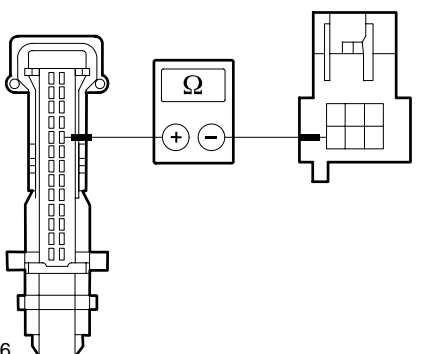
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038000</p>	<p>8 Measure the resistance between the EATC module, connector C539, pin 4, circuit 31S-FA59 (BK/GN), wiring harness side and the EATC module, connector C539, pin 16, circuit 31S-FA60 (BK/RD), wiring harness side.</p>
 <p>VFE0038001</p>	<p>9 Measure the resistance between the EATC module, connector C539, pin 4, circuit 31S-FA59 (BK/GN), wiring harness side and the EATC module, connector C539, pin 17, circuit 31S-FA61 (BK/WH), wiring harness side.</p>
 <p>VFE0038002</p>	<p>10 Measure the resistance between the EATC module, connector C539, pin 16, circuit 31S-FA60 (BK/RD), wiring harness side and the EATC module, connector C539, pin 17, circuit 31S-FA61 (BK/WH), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohms measured in all of the measurements? <p>→ Yes RENEW the left-hand temperature control flap actuator. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the short between the relevant circuits between the left-hand temperature control flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

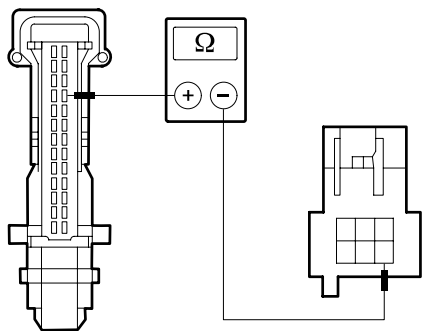
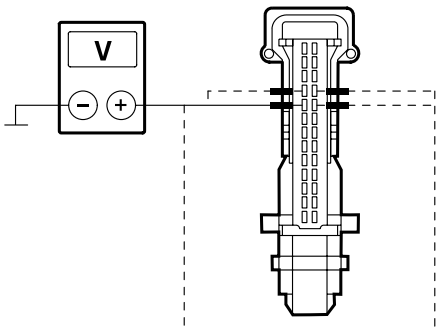
PINPOINT TEST I : MALFUNCTION OF RIGHT-HAND TEMPERATURE CONTROL FLAP - VEHICLES WITH ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
NOTE: Check that the right-hand temperature control flap is mechanically OK.	
I1: CHECK VOLTAGE AT RIGHT-HAND TEMPERATURE CONTROL FLAP ACTUATOR	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect connector C534 from right-hand temperature control flap actuator. 3 Ignition switch in position II.
 <p>VFE0037968</p>	<ol style="list-style-type: none"> 4 Measure the voltage between right-hand temperature control flap actuator, connector C534, pin 2, circuit 15S-FB9 (GN/RD), wiring harness side and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes GO to I3. → No GO to I2.
I2: CHECK CIRCUIT BETWEEN THE RIGHT-HAND TEMPERATURE CONTROL FLAP ACTUATOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect connector C539 of EATC module.
 <p>VFE0038003</p>	<ol style="list-style-type: none"> 3 Measure the resistance between the EATC module, connector C539, pin 25, circuit 15S-FB9 (GN/RD), wiring harness side and the right-hand temperature control flap actuator, connector C534, pin 2, circuit 15S-FB9 (GN/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 15S-FB9 (GN/RD) between the EATC module and the right-hand temperature control flap actuator using the Wiring Diagrams. CHECK the operation of the system.

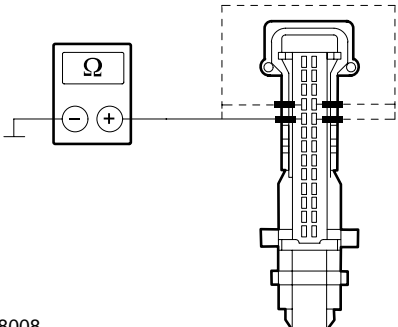
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>I3: CHECK CIRCUITS BETWEEN THE RIGHT-HAND TEMPERATURE CONTROL FLAP ACTUATOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C539 of EATC module.</p>
 <p>VFE0038004</p>	<p>3 Measure the resistance between the EATC module, connector C539, pin 9, circuit 31S-FB10 (BK/GN), wiring harness side and the right-hand temperature control flap actuator, connector C534, pin 1, circuit 31S-FB10 (BK/GN), wiring harness side.</p>
 <p>VFE0038005</p>	<p>4 Measure the resistance between the EATC module, connector C539, pin 10, circuit 31S-FB11 (BK/RD), wiring harness side and the right-hand temperature control flap actuator, connector C534, pin 3, circuit 31S-FB11 (BK/RD), wiring harness side.</p>
 <p>VFE0038006</p>	<p>5 Measure the resistance between the EATC module, connector C539, pin 22, circuit 31S-FB12 (BK/WH), wiring harness side and the right-hand temperature control flap actuator, connector C534, pin 4, circuit 31S-FB12 (BK/WH), wiring harness side.</p>

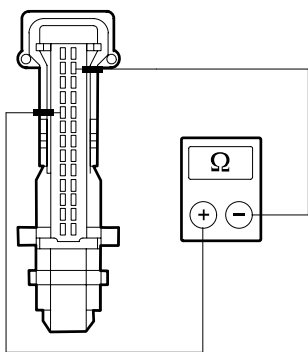
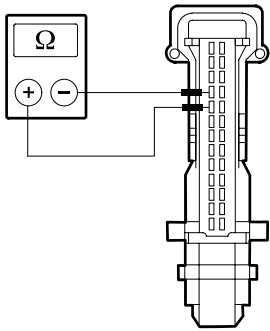
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038007</p>	<p>6 Measure the resistance between the EATC module, connector C539, pin 23, circuit 31S-FB13 (BK/YE), wiring harness side and the right-hand temperature control flap actuator, connector C534, pin 6, circuit 31S-FB13 (BK/YE), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured in all of the cases? <p>→ Yes GO to I4.</p> <p>→ No LOCATE and REPAIR the break in the relevant circuit between the right-hand temperature control flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>I4: CHECK CIRCUITS BETWEEN THE RIGHT-HAND TEMPERATURE CONTROL FLAP ACTUATOR AND THE EATC MODULE FOR SHORT TO VOLTAGE</p>	
 <p>VFE0038009</p>	<p>1 Ignition switch in position II.</p>
	<p>2 Measure the voltage between the EATC module, connector C539, pin 9, circuit 31S-FB10 (BK/GN), wiring harness side and ground.</p>
	<p>3 Measure the voltage between the EATC module, connector C539, pin 10, circuit 31S-FB11 (BK/RD), wiring harness side and ground.</p>
	<p>4 Measure the voltage between the EATC module, connector C539, pin 22, circuit 31S-FB12 (BK/WH), wiring harness side and ground.</p>

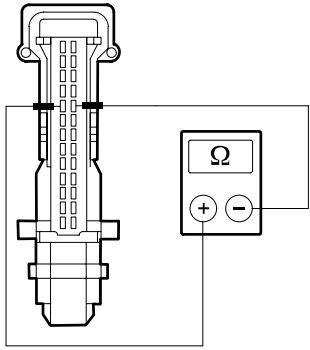
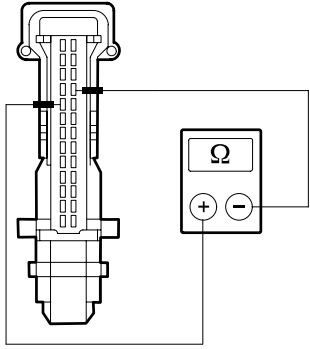
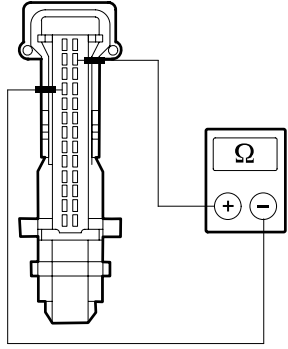
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 Measure the voltage between the EATC module, connector C539, pin 23, circuit 31S-FB13 (BK/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a voltage measured during one or more measurements? <p>→ Yes LOCATE and REPAIR short to voltage in the relevant circuit(s) between the right-hand temperature control flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p> <p>→ No GO to I5.</p>
<p>I5: CHECK CIRCUITS BETWEEN THE RIGHT-HAND TEMPERATURE CONTROL FLAP ACTUATOR AND THE EATC MODULE FOR SHORT TO GROUND</p>	
 <p>VFE0038008</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the EATC module, connector C539, pin 9, circuit 31S-FB10 (BK/GN), wiring harness side and ground.</p>
	<p>3 Measure the resistance between the EATC module, connector C539, pin 10, circuit 31S-FB11 (BK/RD), wiring harness side and ground.</p> <p>4 Measure the resistance between the EATC module, connector C539, pin 22, circuit 31S-FB12 (BK/WH), wiring harness side and ground.</p>

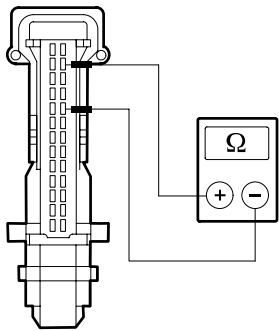
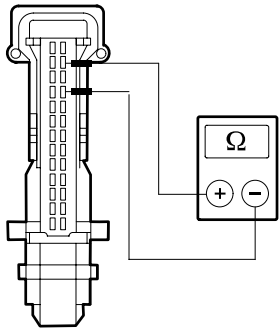
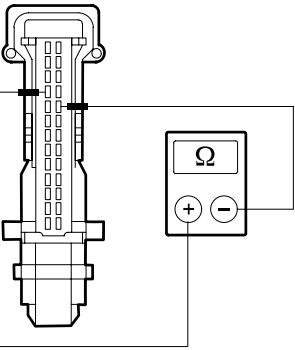
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 Measure the resistance between the EATC module, connector C539, pin 23, circuit 31S-FB13 (BK/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of more than 10,000 Ohms measured in all of the measurements? <p>→ Yes GO to I6.</p> <p>→ No LOCATE and RECTIFY short to ground in the relevant circuit(s) between the right-hand temperature control flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>I6: CHECK CIRCUITS BETWEEN THE RIGHT-HAND TEMPERATURE CONTROL FLAP ACTUATOR AND THE EATC MODULE FOR SHORT</p>	
 <p>VFE0038010</p>	<p>1 Measure the resistance between the EATC module, connector C539, pin 9, circuit 31S-FB10 (BK/GN), wiring harness side and the EATC module, connector C539, pin 25, circuit 15S-FB9 (GN/RD), wiring harness side.</p>
 <p>E0038011</p>	<p>2 Measure the resistance between the EATC module, connector C539, pin 9, circuit 31S-FB10 (BK/GN), wiring harness side and the EATC module, connector C539, pin 10, circuit 31S-FB11 (BK/RD), wiring harness side.</p>

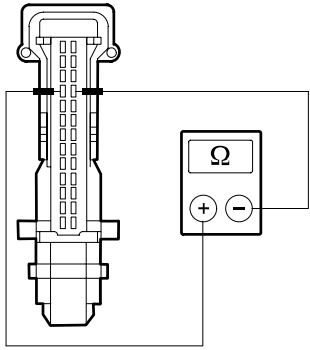
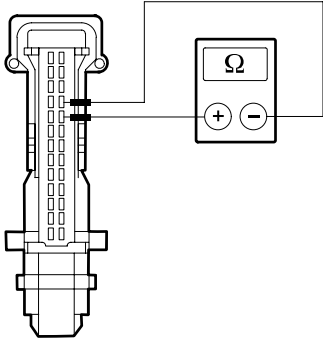
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038012</p>	<p>3 Measure the resistance between the EATC module, connector C539, pin 9, circuit 31S-FB10 (BK/GN), wiring harness side and the EATC module, connector C539, pin 22, circuit 31S-FB12 (BK/WH), wiring harness side.</p>
 <p>VFE0038013</p>	<p>4 Measure the resistance between the EATC module, connector C539, pin 9, circuit 31S-FB10 (BK/GN), wiring harness side and the EATC module, connector C539, pin 23, circuit 31S-FB13 (BK/YE), wiring harness side.</p>
 <p>VFE0038014</p>	<p>5 Measure the resistance between the EATC module, connector C539, pin 25, circuit 15S-FB9 (GN/RD), wiring harness side and the EATC module, connector C539, pin 10, circuit 31S-FB11 (BK/RD), wiring harness side.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038015</p>	<p>6 Measure the resistance between the EATC module, connector C539, pin 25, circuit 15S-FB9 (GN/RD), wiring harness side and the EATC module, connector C539, pin 22, circuit 31S-FB12 (BK/WH), wiring harness side.</p>
 <p>VFE0038016</p>	<p>7 Measure the resistance between the EATC module, connector C539, pin 25, circuit 15S-FB9 (GN/RD), wiring harness side and the EATC module, connector C539, pin 23, circuit 31S-FB13 (BK/YE), wiring harness side.</p>
 <p>VFE0038017</p>	<p>8 Measure the resistance between the EATC module, connector C539, pin 10, circuit 31S-FB11 (BK/RD), wiring harness side and the EATC module, connector C539, pin 22, circuit 31S-FB12 (BK/WH), wiring harness side.</p>

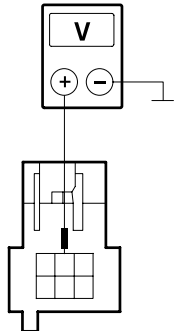
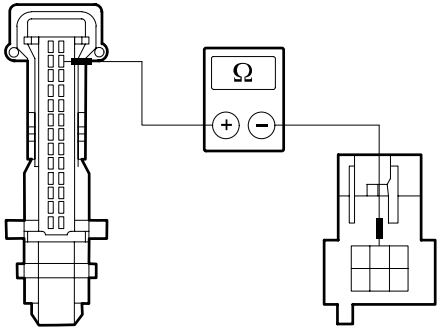
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038018</p>	<p>9 Measure the resistance between the EATC module, connector C539, pin 10, circuit 31S-FB11 (BK/RD), wiring harness side and the EATC module, connector C539, pin 23, circuit 31S-FB13 (BK/YE), wiring harness side.</p>
 <p>VFE0038019</p>	<p>10 Measure the resistance between the EATC module, connector C539, pin 22, circuit 31S-FB12 (BK/WH), wiring harness side and the EATC module, connector C539, pin 23, circuit 31S-FB13 (BK/YE), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohms measured in all of the measurements? → Yes RENEW the right-hand temperature control flap actuator. CHECK the operation of the system. → No LOCATE and REPAIR the short between the relevant circuits between the right-hand temperature control flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.

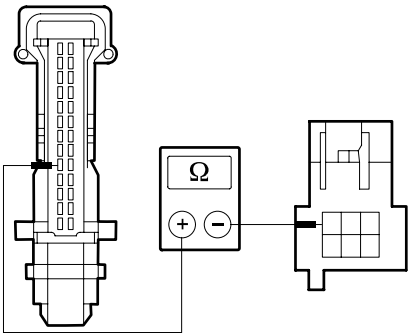
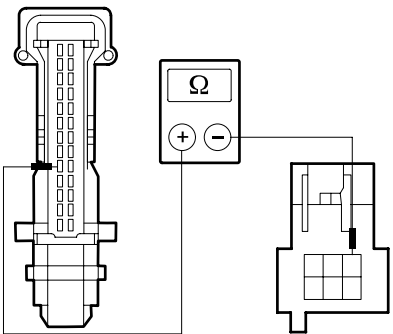
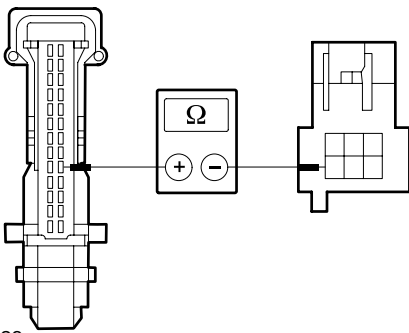
PINPOINT TEST J : MALFUNCTION OF AIR DISTRIBUTION FLAP - VEHICLES WITH ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: Check that the air distribution flap is mechanically OK.</p>	
<p>J1: CHECK VOLTAGE AT THE AIR DISTRIBUTION FLAP ACTUATOR</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect connector C533 from air distribution flap actuator.</p>
	<p>3 Ignition switch in position II.</p>

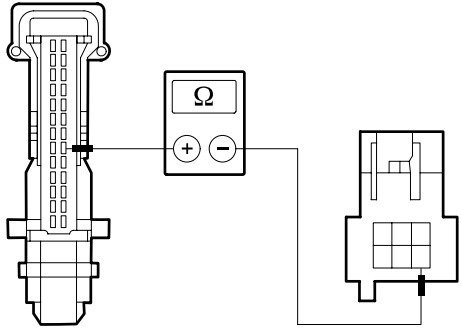
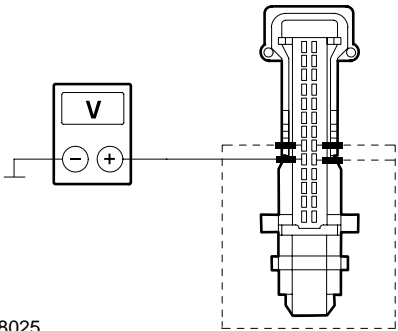
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037968</p>	<p>4 Measure the voltage between the air distribution flap actuator, connector C533, pin 2, circuit 15S-FB19 (GN/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to J3. → No GO to J2.
<p>J2: CHECK CIRCUIT BETWEEN THE AIR DISTRIBUTION FLAP ACTUATOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
 <p>VFE0038020</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C539 of EATC module.</p> <p>3 Measure the resistance between the EATC module, connector C539, pin 26, circuit 15S-FB19 (GN/YE), wiring harness side and the air distributor flap actuator, connector C533, pin 2, circuit 15S-FB19 (GN/YE), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 15S-FB19 (GN/YE) between the EATC module and the air distribution flap actuator using the Wiring Diagrams. CHECK the operation of the system.
<p>J3: CHECK CIRCUITS BETWEEN THE AIR DISTRIBUTION FLAP ACTUATOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C539 of EATC module.</p>

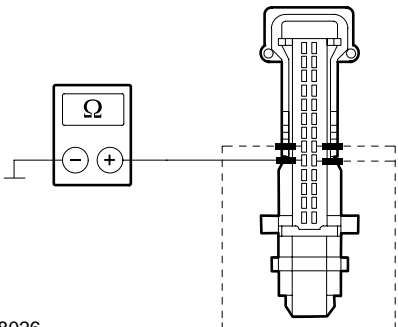
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038021</p>	<p>3 Measure the resistance between the EATC module, connector C539, pin 5, circuit 31S-FB20 (BK/BU), wiring harness side and the air distribution flap actuator, connector C533, pin 1, circuit 31S-FB20 (BK/BU), wiring harness side.</p>
 <p>VFE0038022</p>	<p>4 Measure the resistance between the EATC module, connector C539, pin 6, circuit 31S-FB21 (BK/OG), wiring harness side and the air distribution flap actuator, connector C533, pin 3, circuit 31S-FB21 (BK/OG), wiring harness side.</p>
 <p>VFE0038023</p>	<p>5 Measure the resistance between the EATC module, connector C539, pin 18, circuit 31S-FB22 (BK/GN), wiring harness side and the air distribution flap actuator, connector C533, pin 4, circuit 31S-FB22 (BK/GN), wiring harness side.</p>

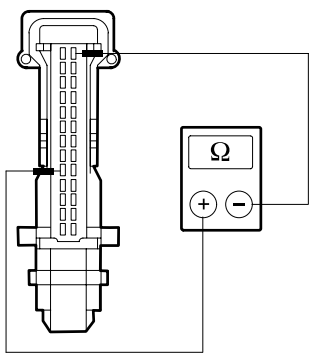
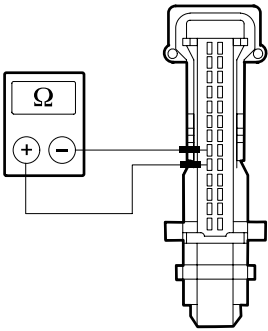
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038024</p>	<p>6 Measure the resistance between the EATC module, connector C539, pin 19, circuit 31S-FB23 (BK/RD), wiring harness side and the air distribution flap actuator, connector C533, pin 6, circuit 31S-FB23 (BK/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured in all of the cases? <p>→ Yes GO to J4.</p> <p>→ No LOCATE and REPAIR the break in the relevant circuit between the air distribution flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>J4: CHECK CIRCUITS BETWEEN THE AIR DISTRIBUTION FLAP ACTUATOR AND THE EATC MODULE FOR SHORT TO VOLTAGE</p>	
 <p>VFE0038025</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the EATC module, connector C539, pin 5, circuit 31S-FB20 (BK/BU), wiring harness side and ground.</p>
	<p>3 Measure the voltage between the EATC module, connector C539, pin 6, circuit 31S-FB21 (BK/OG), wiring harness side and ground.</p> <p>4 Measure the voltage between the EATC module, connector C539, pin 18, circuit 31S-FB22 (BK/GN), wiring harness side and ground.</p>

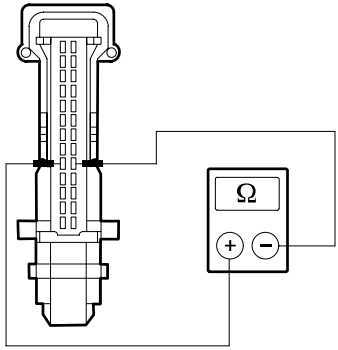
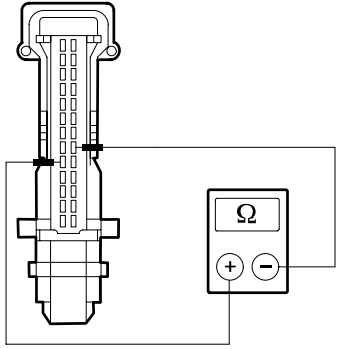
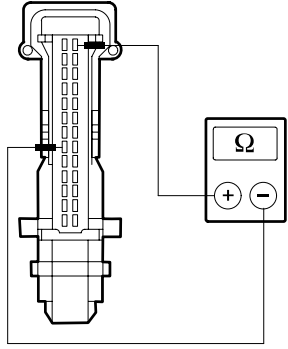
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 Measure the voltage between the EATC module, connector C539, pin 19, circuit 31S-FB23 (BK/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a voltage measured during one or more measurements? <p>→ Yes LOCATE and REPAIR short to voltage in the relevant circuit(s) between the air distribution flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p> <p>→ No GO to J5.</p>
<p>J5: CHECK CIRCUITS BETWEEN THE AIR DISTRIBUTION FLAP ACTUATOR AND THE EATC MODULE FOR SHORT TO GROUND</p>	
 <p>VFE0038026</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the EATC module, connector C539, pin 5, circuit 31S-FB20 (BK/BU), wiring harness side and ground.</p>
	<p>3 Measure the resistance between the EATC module, connector C539, pin 6, circuit 31S-FB21 (BK/OG), wiring harness side and ground.</p> <p>4 Measure the resistance between the EATC module, connector C539, pin 18, circuit 31S-FB22 (BK/GN), wiring harness side and ground.</p>

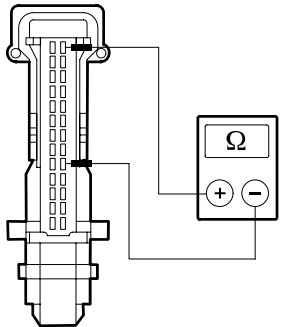
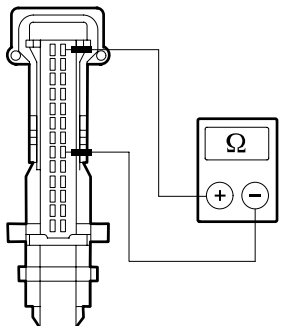
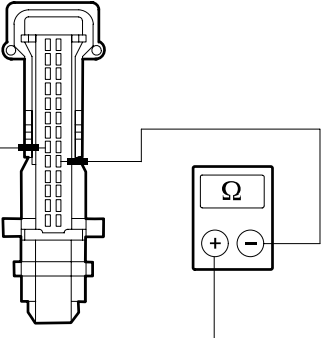
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 Measure the resistance between the EATC module, connector C539, pin 19, circuit 31S-FB23 (BK/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of more than 10,000 Ohms measured in all of the measurements? <p>→ Yes GO to J6.</p> <p>→ No LOCATE and REPAIR short to ground in the relevant circuit(s) between the air distribution flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>J6: CHECK CIRCUITS BETWEEN THE AIR DISTRIBUTION FLAP ACTUATOR AND THE EATC MODULE FOR SHORT</p>	
 <p>VFE0038027</p>	<p>1 Measure the resistance between the EATC module, connector C539, pin 5, circuit 31S-FB20 (BK/BU), wiring harness side and the EATC module, connector C539, pin 26, circuit 15S-FB19 (GN/YE), wiring harness side.</p>
 <p>VFE0038028</p>	<p>2 Measure the resistance between the EATC module, connector C539, pin 5, circuit 31S-FB20 (BK/BU), wiring harness side and the EATC module, connector C539, pin 6, circuit 31S-FB21 (BK/OG), wiring harness side.</p>

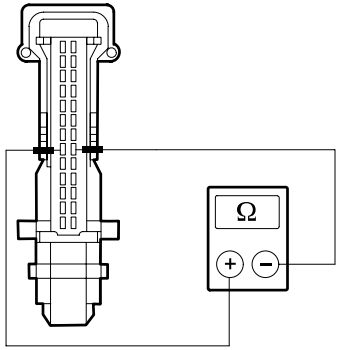
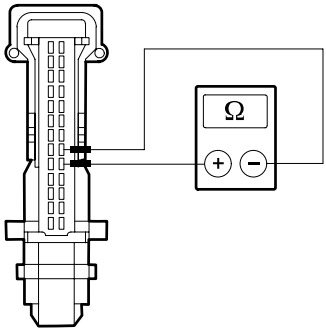
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038029</p>	<p>3 Measure the resistance between the EATC module, connector C539, pin 5, circuit 31S-FB20 (BK/BU), wiring harness side and the EATC module, connector C539, pin 18, circuit 31S-FB22 (BK/GN), wiring harness side.</p>
 <p>VFE0038030</p>	<p>4 Measure the resistance between the EATC module, connector C539, pin 5, circuit 31S-FB20 (BK/BU), wiring harness side and the EATC module, connector C539, pin 19, circuit 31S-FB23 (BK/RD), wiring harness side.</p>
 <p>VFE0038031</p>	<p>5 Measure the resistance between the EATC module, connector C539, pin 26, circuit 15S-FB19 (GN/YE), wiring harness side and the EATC module, connector C539, pin 6, circuit 31S-FB21 (BK/OG), wiring harness side.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038032</p>	<p>6 Measure the resistance between the EATC module, connector C539, pin 26, circuit 15S-FB19 (GN/YE), wiring harness side and the EATC module, connector C539, pin 18, circuit 31S-FB22 (BK/GN), wiring harness side.</p>
 <p>VFE0038033</p>	<p>7 Measure the resistance between the EATC module, connector C539, pin 26, circuit 15S-FB19 (GN/YE), wiring harness side and the EATC module, connector C539, pin 19, circuit 31S-FB23 (BK/RD), wiring harness side.</p>
 <p>VFE0038034</p>	<p>8 Measure the resistance between the EATC module, connector C539, pin 6, circuit 31S-FB21 (BK/OG), wiring harness side and the EATC module, connector C539, pin 18, circuit 31S-FB22 (BK/GN), wiring harness side.</p>

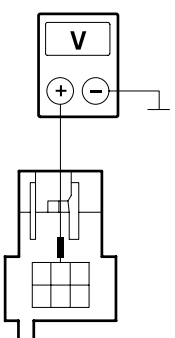
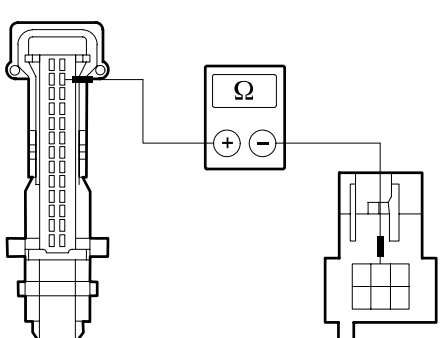
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038035</p>	<p>9 Measure the resistance between the EATC module, connector C539, pin 6, circuit 31S-FB21 (BK/OG), wiring harness side and the EATC module, connector C539, pin 19, circuit 31S-FB23 (BK/RD), wiring harness side.</p>
 <p>VFE0038036</p>	<p>10 Measure the resistance between the EATC module, connector C539, pin 18, circuit 31S-FB22 (BK/GN), wiring harness side and the EATC module, connector C539, pin 19, circuit 31S-FB23 (BK/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohms measured in all of the measurements? → Yes RENEW the air distribution flap actuator. CHECK the operation of the system. → No LOCATE and REPAIR the short between the relevant circuits between the air distribution flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.

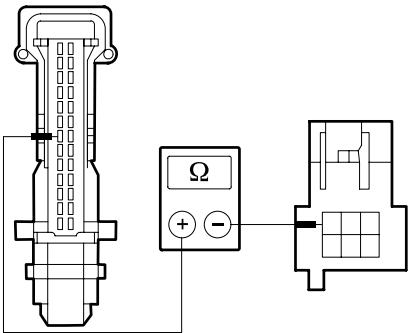
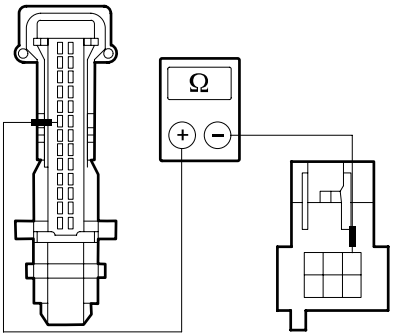
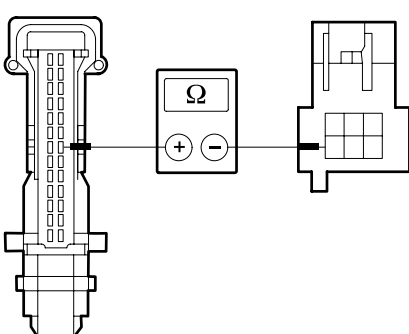
PINPOINT TEST K : MALFUNCTION OF DEFROST/CENTER VENTS AIR FLAP ACTUATOR - VEHICLES WITH ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: Check that the defrost flap is mechanically OK.</p>	
<p>K1: CHECK VOLTAGE AT DEFROSTER/CENTER VENTS AIR FLAP ACTUATOR</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect Connector C532 from defrost/center vents air flap actuator.</p>
	<p>3 Ignition switch in position II.</p>

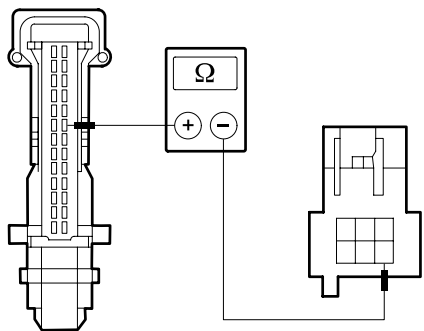
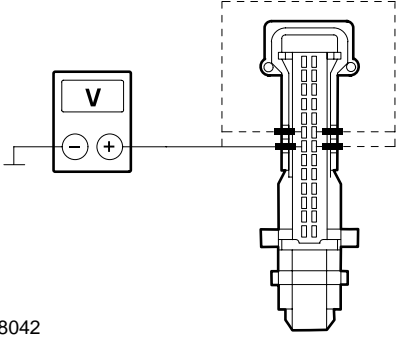
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037968</p>	<p>4 Measure the voltage between the defrost/center vents air flap actuator, connector C532, pin 2, circuit 15S-FB14 (GN/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to K3. → No GO to K2.
<p>K2: CHECK CIRCUIT BETWEEN THE DEFROST/CENTER VENT AIR FLAP ACTUATOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
 <p>VFE0038037</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C539 of EATC module.</p> <p>3 Measure the resistance between the EATC module, connector C539, pin 13, circuit 15S-FB14 (GN/BU), wiring harness side and the defrost/center vent air flap actuator, connector C532, pin 2, circuit 15S-FB14 (GN/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 15S-FB14 (GN/BU) between the EATC module and the defrost/center vent air flap actuator using the Wiring Diagrams. CHECK the operation of the system.
<p>K3: CHECK CIRCUITS BETWEEN THE DEFROST/CENTER VENT AIR FLAP ACTUATOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C539 of EATC module.</p>

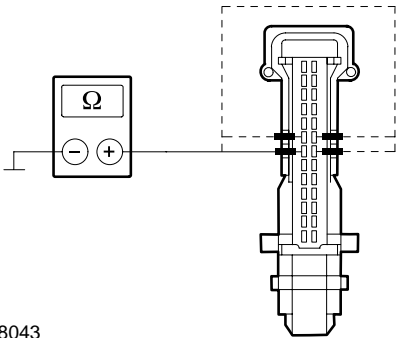
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038038</p>	<p>3 Measure the resistance between the EATC module, connector C539, pin 7, circuit 31S-FB15 (BK/OG), wiring harness side and the defrost/center vent air flap actuator, connector C52, pin 1, circuit 31S-FB15 (BK/OG), wiring harness side.</p>
 <p>VFE0038039</p>	<p>4 Measure the resistance between the EATC module, connector C539, pin 8, circuit 31S-FB16 (BK/GN), wiring harness side and the defrost/center vent air flap actuator, connector C52, pin 3, circuit 31S-FB16 (BK/GN), wiring harness side.</p>
 <p>VFE0038040</p>	<p>5 Measure the resistance between the EATC module, connector C539, pin 20, circuit 31S-FB17 (BK/RD), wiring harness side and the defrost/center vent air flap actuator, connector C52, pin 4, circuit 31S-FB17 (BK/RD), wiring harness side.</p>

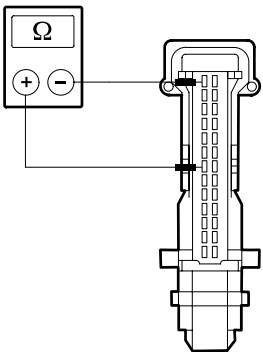
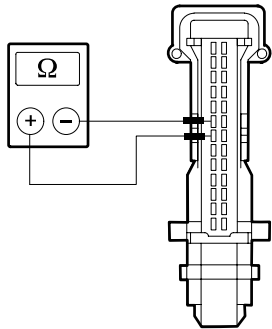
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038041</p>	<p>6 Measure the resistance between the EATC module, connector C539, pin 21, circuit 31S-FB18 (BK/WH), wiring harness side and the defrost/center vent air flap actuator, connector C532, pin 6, circuit 31S-FB18 (BK/WH), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured in all of the cases? <p>→ Yes GO to K4.</p> <p>→ No LOCATE and REPAIR the break in the relevant circuit between the defrost/center vent air flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>K4: CHECK CIRCUITS BETWEEN THE DEFROST/CENTER VENT AIR FLAP ACTUATOR AND THE EATC MODULE FOR SHORT TO VOLTAGE</p>	
 <p>VFE0038042</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the EATC module, connector C539, pin 7, circuit 31S-FB15 (BK/OG), wiring harness side and ground.</p> <p>3 Measure the voltage between the EATC module, connector C539, pin 8, circuit 31S-FB16 (BK/GN), wiring harness side and ground.</p> <p>4 Measure the voltage between the EATC module, connector C539, pin 20, circuit 31S-FB17 (BK/RD), wiring harness side and ground.</p>

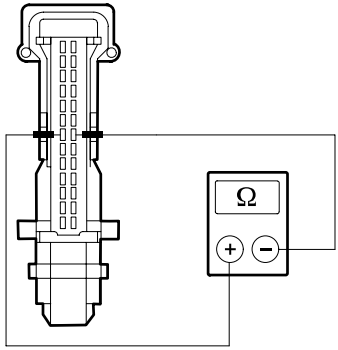
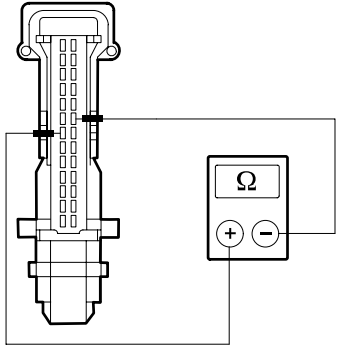
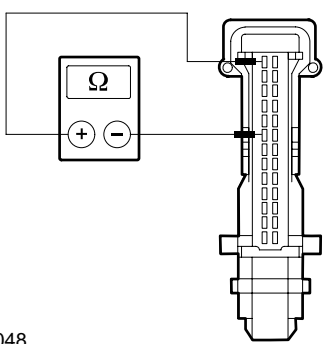
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 Measure the voltage between the EATC module, connector C539, pin 21, circuit 31S-FB18 (BK/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a voltage measured during one or more measurements? <p>→ Yes LOCATE and REPAIR short to voltage in the relevant circuit(s) between the defrost/center vent air flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p> <p>→ No GO to K5.</p>
<p>K5: CHECK CIRCUITS BETWEEN THE DEFROST/CENTER VENT AIR FLAP ACTUATOR AND THE EATC MODULE FOR SHORT TO GROUND</p>	
 <p>VFE0038043</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the EATC module, connector C539, pin 7, circuit 31S-FB15 (BK/OG), wiring harness side and ground.</p>
	<p>3 Measure the resistance between the EATC module, connector C539, pin 8, circuit 31S-FB16 (BK/GN), wiring harness side and ground.</p> <p>4 Measure the resistance between the EATC module, connector C539, pin 20, circuit 31S-FB17 (BK/RD), wiring harness side and ground.</p>

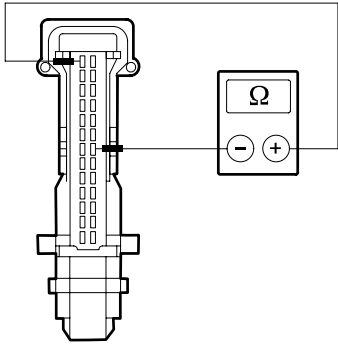
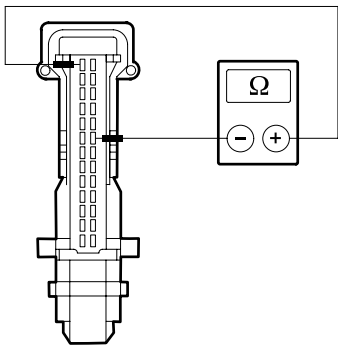
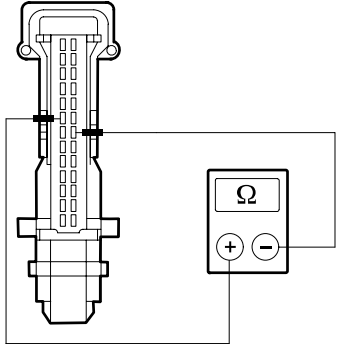
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 Measure the resistance between the EATC module, connector C539, pin 21, circuit 31S-FB18 (BK/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of more than 10,000 Ohms measured in all of the measurements? <p>→ Yes GO to K6.</p> <p>→ No LOCATE and REPAIR short to ground in the relevant circuit(s) between the defrost/center vent air flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>K6: CHECK CIRCUITS BETWEEN THE DEFROST/CENTER VENT AIR FLAP ACTUATOR AND THE EATC MODULE FOR SHORT CIRCUIT</p>	
 <p>VFE0038044</p>	<p>1 Measure the resistance between the EATC module, connector C539, pin 7, circuit 31S-FB15 (BK/OG), wiring harness side and the EATC module, connector C539, pin 13, circuit 15S-FB14 (GN/BU), wiring harness side.</p>
 <p>VFE0038045</p>	<p>2 Measure the resistance between the EATC module, connector C539, pin 7, circuit 31S-FB15 (BK/OG), wiring harness side and the EATC module, connector C539, pin 8, circuit 31S-FB16 (BK/GN), wiring harness side.</p>

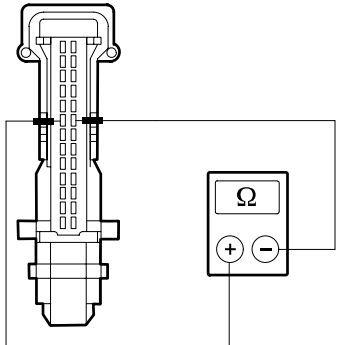
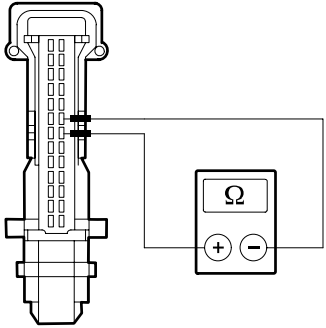
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038046</p>	<p>3 Measure the resistance between the EATC module, connector C539, pin 7, circuit 31S-FB15 (BK/OG), wiring harness side and the EATC module, connector C539, pin 20, circuit 31S-FB17 (BK/RD), wiring harness side.</p>
 <p>VFE0038047</p>	<p>4 Measure the resistance between the EATC module, connector C539, pin 7, circuit 31S-FB15 (BK/OG), wiring harness side and the EATC module, connector C539, pin 21, circuit 31S-FB18 (BK/WH), wiring harness side.</p>
 <p>VFE0038048</p>	<p>5 Measure the resistance between the EATC module, connector C539, pin 13, circuit 15S-FB14 (GN/BU), wiring harness side and the EATC module, connector C539, pin 8, circuit 31S-FB16 (BK/GN), wiring harness side.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038049</p>	<p>6 Measure the resistance between the EATC module, connector C539, pin 13, circuit 15S-FB14 (GN/BU), wiring harness side and the EATC module, connector C539, pin 20, circuit 31S-FB17 (BK/RD), wiring harness side.</p>
 <p>VFE0038050</p>	<p>7 Measure the resistance between the EATC module, connector C539, pin 13, circuit 15S-FB14 (GN/BU), wiring harness side and the EATC module, connector C539, pin 21, circuit 31S-FB18 (BK/WH), wiring harness side.</p>
 <p>VFE0038051</p>	<p>8 Measure the resistance between the EATC module, connector C539, pin 8, circuit 31S-FB16 (BK/GN), wiring harness side and the EATC module, connector C539, pin 20, circuit 31S-FB17 (BK/RD), wiring harness side.</p>

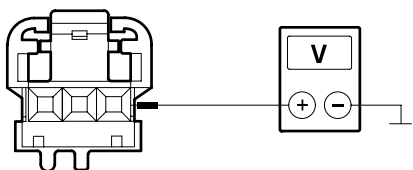
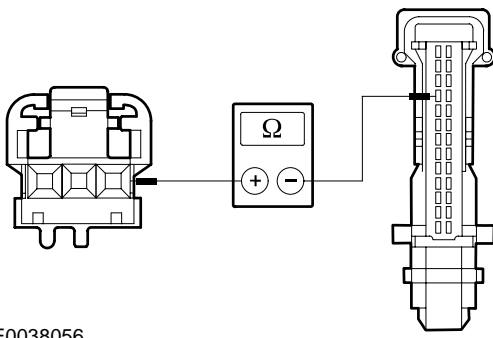
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038052</p>	<p>9 Measure the resistance between the EATC module, connector C539, pin 8, circuit 31S-FB16 (BK/GN), wiring harness side and the EATC module, connector C539, pin 21, circuit 31S-FB18 (BK/WH), wiring harness side.</p>
 <p>VFE0038053</p>	<p>10 Measure the resistance between the EATC module, connector C539, pin 20, circuit 31S-FB17 (BK/RD), wiring harness side and the EATC module, connector C539, pin 21, circuit 31S-FB18 (BK/WH), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohms measured in all of the measurements? → Yes RENEW the defrost/center vents air flap actuator CHECK the operation of the system. → No LOCATE and REPAIR the short between the relevant circuits between the defrost/center vents air flap actuator and the EATC module using the Wiring Diagrams. CHECK the operation of the system.

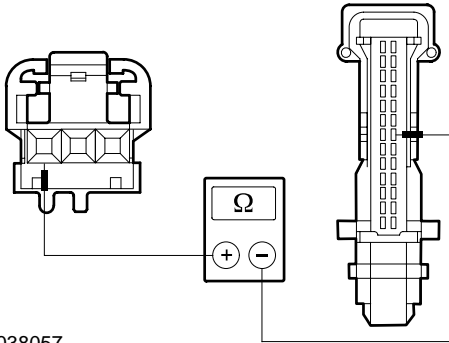
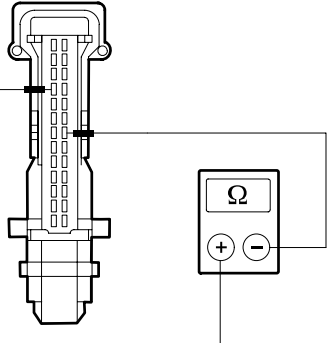
PINPOINT TEST L : FAULT IN LEFT-HAND CENTER VENTS AIR OUTLET TEMPERATURE SENSOR CIRCUIT - VEHICLES WITH ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>L1: CHECK VOLTAGE AT LEFT-HAND CENTER VENTS AIR OUTLET TEMPERATURE SENSOR</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect connector C542 from left-hand center vents air outlet temperature sensor.</p>
	<p>3 Ignition switch in position II.</p>
	<p>4 Switch on the air-conditioning system.</p>

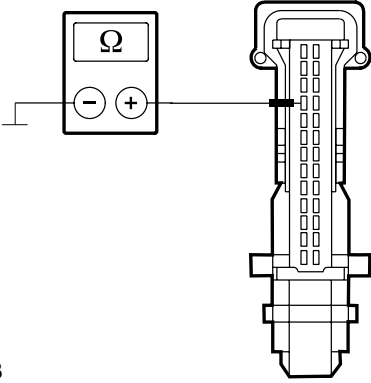
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038054</p>	<p>5 Measure the voltage between the left-hand center vents air outlet temperature sensor, connector C542, pin 1, circuit 8-FA47 (WH/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a voltage of approx. 5 V measured? → Yes GO to L3. → No GO to L2.
<p>L2: CHECK CIRCUIT BETWEEN THE LEFT-HAND CENTER VENTS AIR OUTLET TEMPERATURE SENSOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
 <p>VFE0038056</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C540 of EATC module.</p> <p>3 Measure the resistance between the left-hand center vents air outlet temperature sensor, connector C542, pin 1, circuit 8-FA47 (WH/GN), wiring harness side and the EATC module, connector C540, pin 10, circuit 8-FA47 (WH/GN), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 8-FA47 (WH/GN) between the left-hand center vents air outlet temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.
<p>L3: CHECK CIRCUIT BETWEEN THE LEFT-HAND CENTER VENTS AIR OUTLET TEMPERATURE SENSOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C540 of EATC module.</p>

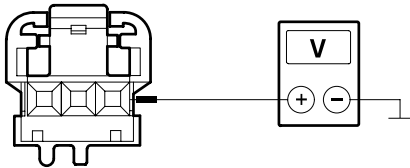
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038057</p>	<p>3 Measure the resistance between the left-hand center vents air outlet temperature sensor, connector C542, pin 3, circuit 9-FA47 (BN/GN), wiring harness side and the EATC module, connector C540, pin 20, circuit 9-FA47A (BN/GN), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <p>→ Yes GO to L4.</p> <p>→ No LOCATE and REPAIR the break in the circuit between the left-hand center vents air outlet temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>L4: CHECK FOR SHORT CIRCUIT BETWEEN THE LEFT-HAND CENTER VENTS AIR OUTLET TEMPERATURE SENSOR AND THE EATC MODULE</p>	
 <p>VFE0038058</p>	<p>1 Measure the resistance between the EATC module, connector C540, pin 10, circuit 8-FA47 (WH/GN), wiring harness side and the EATC module, connector C540, pin 20, circuit 9-FA47A (BN/GN), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohm measured? <p>→ Yes GO to L5.</p> <p>→ No LOCATE and REPAIR the short in the circuits between the left-hand center vents air outlet temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>

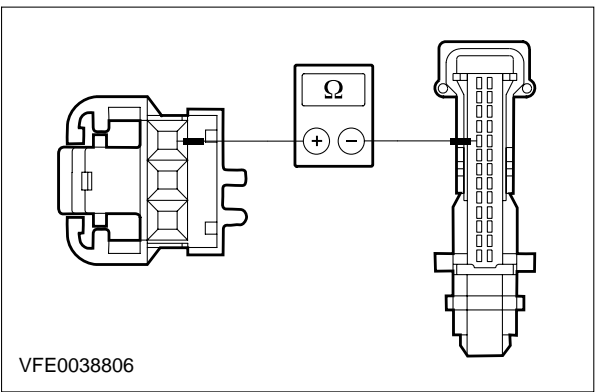
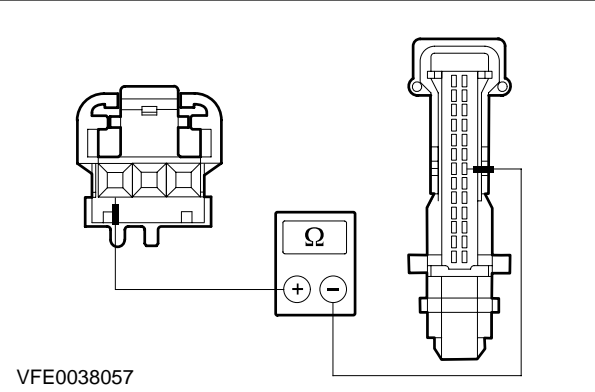
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
L5: CHECK THE CIRCUIT BETWEEN THE LEFT-HAND CENTER VENTS AIR OUTLET TEMPERATURE SENSOR AND THE EATC MODULE FOR SHORT TO GROUND	
 <p>E49853</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the EATC module, connector C540, pin 10, circuit 8-FA47 (WH/GN), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohm measured? → Yes RENEW the left-hand centre vents air outlet temperature sensor. CHECK the operation of the system. → No LOCATE and REPAIR the short to ground in the circuits between the left-hand center vents air outlet temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.

PINPOINT TEST M : FAULT IN LEFT-HAND FOOTWELL AIR OUTLET TEMPERATURE SENSOR CIRCUIT - VEHICLES WITH ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
M1: CHECK VOLTAGE AT LEFT-HAND FOOTWELL AIR OUTLET TEMPERATURE SENSOR	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect connector C544 from left-hand footwell air outlet temperature sensor. 3 Ignition switch in position II. 4 Switch on the air-conditioning system.
 <p>VFE0038054</p>	<ol style="list-style-type: none"> 5 Measure the voltage between the left-hand footwell air outlet temperature sensor, connector C544, pin 1, circuit 8-FA48 (WH/GN), wiring harness side and ground. <ul style="list-style-type: none"> • Is a voltage of approx. 5 V measured? → Yes GO to M3. → No GO to M2.
M2: CHECK CIRCUIT BETWEEN THE LEFT-HAND FOOTWELL AIR OUTLET TEMPERATURE SENSOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038806</p>	<p>2 Disconnect connector C540 of EATC module.</p> <p>3 Measure the resistance between the left-hand footwell air outlet temperature sensor, connector C544, pin 1, circuit 8-FA48 (WH/GN), wiring harness side and the EATC module, connector C540, pin 9, circuit 8-FA48 (WH/GN), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohm measured? <p>→ Yes CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in circuit 8-FA48 (WH/GN) between the left-hand footwell air outlet temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>M3: CHECK CIRCUIT BETWEEN THE LEFT-HAND FOOTWELL AIR OUTLET TEMPERATURE SENSOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
 <p>VFE0038057</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C540 of EATC module.</p> <p>3 Measure the resistance between the left-hand footwell air outlet temperature sensor, connector C544, pin 3, circuit 9-FA48 (BN/GN), wiring harness side and the EATC module, connector C540, pin 20, circuit 9-FA47A (BN/GN), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohm measured? <p>→ Yes GO to M4.</p> <p>→ No LOCATE and REPAIR the break in the circuit between the left-hand footwell air outlet temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>

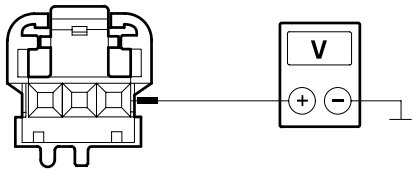
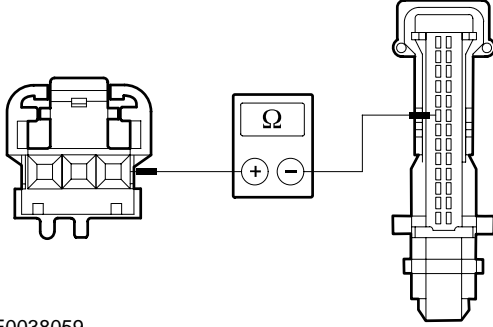
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
M4: CHECK CIRCUIT BETWEEN THE LEFT-HAND FOOTWELL AIR OUTLET TEMPERATURE SENSOR AND THE EATC MODULE FOR SHORT	
<p>E45662</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the EATC module, connector C540, pin 9, circuit 8-FA48 (WH/GN), wiring harness side and the EATC module, connector C540, pin 20, circuit 9-FA47A (BN/GN), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohm measured? → Yes GO to M5. → No LOCATE and REPAIR the short in the circuits between the left-hand footwell air outlet temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.
M5: CHECK THE CIRCUIT BETWEEN THE LEFT-HAND FOOTWELL AIR OUTLET TEMPERATURE SENSOR AND THE EATC MODULE FOR SHORT TO GROUND	
<p>E49854</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the EATC module, connector C540, pin 9, circuit 8-FA48 (WH/GN), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohm measured? → Yes RENEW the left-hand footwell air outlet temperature sensor. CHECK the operation of the system. → No LOCATE and REPAIR the short to ground in the circuits between the left-hand footwell air outlet temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.

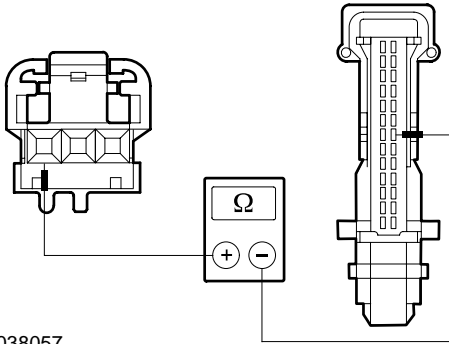
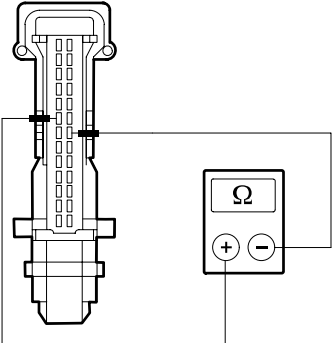
PINPOINT TEST N : FAULT IN RIGHT-HAND CENTER VENTS AIR OUTLET TEMPERATURE SENSOR CIRCUIT - VEHICLES WITH ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
N1: CHECK VOLTAGE AT RIGHT-HAND CENTER VENTS AIR OUTLET TEMPERATURE SENSOR	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect connector C543 from right-hand center vents air outlet temperature sensor. 3 Ignition switch in position II.

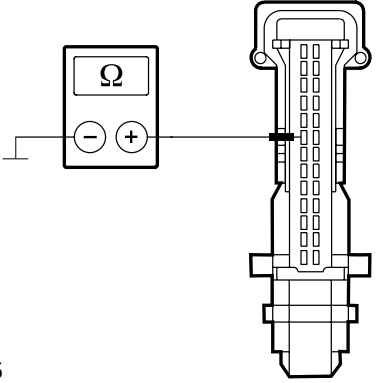
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038054</p>	<p>4 Switch on the air-conditioning system.</p> <p>5 Measure the voltage between the right-hand center vents air outlet temperature sensor, connector C543, pin 1, circuit 8-FA52 (WH/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a voltage of approx. 5 V measured? → Yes GO to N3. → No GO to N2.
<p>N2: CHECK CIRCUIT BETWEEN THE RIGHT-HAND CENTER VENTS AIR OUTLET TEMPERATURE SENSOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
 <p>VFE0038059</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C540 of EATC module.</p> <p>3 Measure the resistance between the right-hand center vents air outlet temperature sensor, connector C543, pin 1, circuit 8-FA52 (WH/BK), wiring harness side and the EATC module, connector C540, pin 8, circuit 8-FA52 (WH/BK), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 8-FA52 (WH/BK) between the right-hand center vents air outlet temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.
<p>N3: CHECK CIRCUIT BETWEEN THE RIGHT-HAND CENTER VENTS AIR OUTLET TEMPERATURE SENSOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C540 of EATC module.</p>

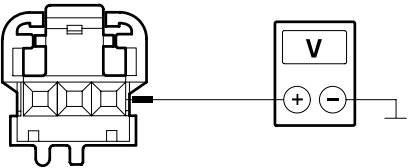
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038057</p>	<p>3 Measure the resistance between the right-hand center vents air outlet temperature sensor, connector C543, pin 3, circuit 9-FA52 (BN/YE), wiring harness side and the EATC module, connector C540, pin 20, circuit 9-FA47A (BN/GN) wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <p>→ Yes GO to N4.</p> <p>→ No LOCATE and REPAIR the break in the circuit between the right-hand center vents air outlet temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>N4: CHECK FOR SHORT CIRCUIT BETWEEN THE RIGHT-HAND CENTER VENTS AIR OUTLET TEMPERATURE SENSOR AND THE EATC MODULE</p>	
 <p>VFE0038060</p>	<p>1 Measure the resistance between the EATC module, connector C540, pin 8, circuit 8-FA52 (WH/BK), wiring harness side and the EATC module, connector C540, pin 20, circuit 9-FA47A (BN/GN), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohm measured? <p>→ Yes GO to N5.</p> <p>→ No LOCATE and REPAIR the short in the circuits between the right-hand center vents air outlet temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>

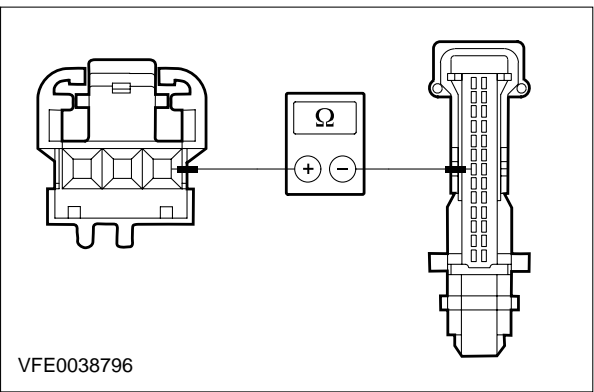
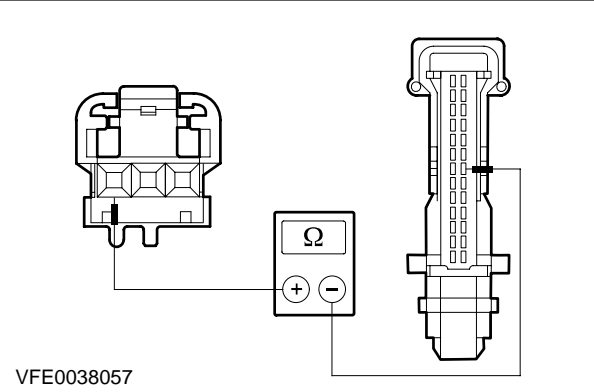
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
N5: CHECK THE CIRCUIT BETWEEN THE RIGHT-HAND CENTER VENTS AIR OUTLET TEMPERATURE SENSOR AND THE EATC MODULE FOR SHORT TO GROUND	
 <p>E49855</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the EATC module, connector C540, pin 8, circuit 8-FA52 (WH/BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohm measured? <p>→ Yes RENEW the right-hand centre vents air outlet temperature sensor. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the short to ground in the circuits between the right-hand center vents air outlet temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>

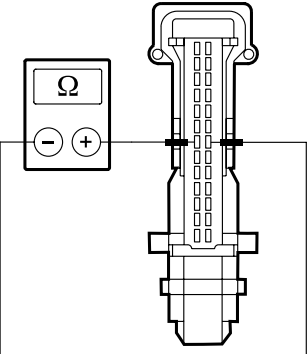
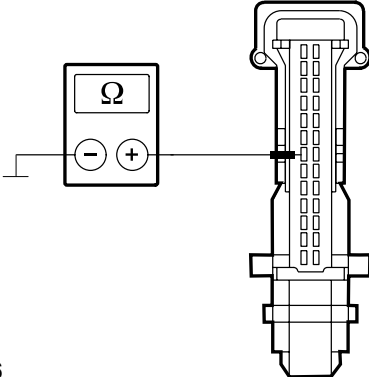
PINPOINT TEST O : FAULT IN RIGHT-HAND FOOTWELL AIR OUTLET TEMPERATURE SENSOR CIRCUIT - VEHICLES WITH ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
O1: CHECK VOLTAGE AT RIGHT-HAND FOOTWELL AIR OUTLET TEMPERATURE SENSOR	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect connector C536 from right-hand footwell air outlet temperature sensor. 3 Ignition switch in position II. 4 Switch on the air-conditioning system.
 <p>VFE0038054</p>	<ol style="list-style-type: none"> 5 Measure the voltage between the right-hand footwell air outlet temperature sensor, connector C536, pin 1, circuit 8-FA51 (WH/BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a voltage of approx. 5 V measured? <p>→ Yes GO to O3.</p> <p>→ No GO to O2.</p>
O2: CHECK CIRCUIT BETWEEN THE RIGHT-HAND FOOTWELL VENTS AIR OUTLET TEMPERATURE SENSOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038796</p>	<p>2 Disconnect connector C540 of EATC module.</p> <p>3 Measure the resistance between the right-hand footwell air outlet temperature sensor, connector C536, pin 1, circuit 8-FA51 (WH/BK), wiring harness side and the EATC module, connector C540, pin 7, circuit 8-FA51 (WH/BK), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohm measured? <p>→ Yes CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in circuit 8-FA51 (WH/BK) between the right-hand footwell air outlet temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>O3: CHECK CIRCUIT BETWEEN THE RIGHT-HAND FOOTWELL VENTS AIR OUTLET TEMPERATURE SENSOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
 <p>VFE0038057</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C540 of EATC module.</p> <p>3 Measure the resistance between the right-hand footwell air outlet temperature sensor, connector C536, pin 3, circuit 9-FA51 (BN/YE), wiring harness side and the EATC module, connector C540, pin 20, circuit 9-FA47A (BN/GN), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohm measured? <p>→ Yes GO to O4.</p> <p>→ No LOCATE and REPAIR the break in the circuit between the right-hand footwell air outlet temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>

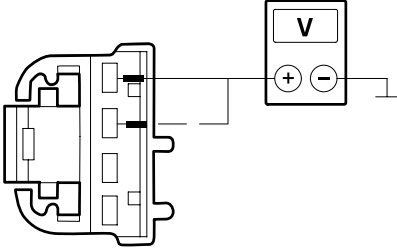
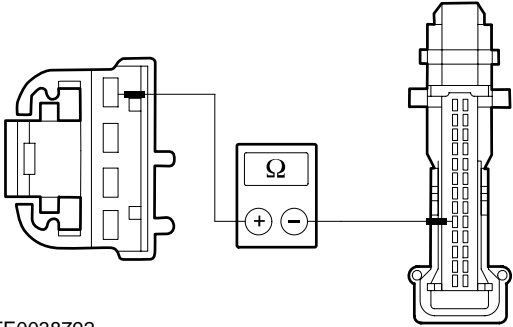
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
O4: CHECK CIRCUIT BETWEEN THE RIGHT-HAND FOOTWELL AIR OUTLET TEMPERATURE SENSOR AND THE EATC MODULE FOR SHORT	
 <p>E45665</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the EATC module, connector C540, pin 7, circuit 8-FA51 (WH/BK), wiring harness side and the EATC module, connector C540, pin 20, circuit 9-FA47A (BN/GN), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohm measured? <p>→ Yes GO to O5.</p> <p>→ No LOCATE and REPAIR the short in the circuits between the right-hand footwell air outlet temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>
O5: CHECK CIRCUIT BETWEEN THE RIGHT-HAND FOOTWELL AIR OUTLET TEMPERATURE SENSOR AND THE EATC MODULE FOR SHORT TO GROUND	
 <p>E49856</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the EATC module, connector C540, pin 7, circuit 8-FA51 (WH/BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohm measured? <p>→ Yes RENEW the right-hand footwell air outlet temperature sensor. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the short to ground in the circuits between the right-hand footwell air outlet temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>

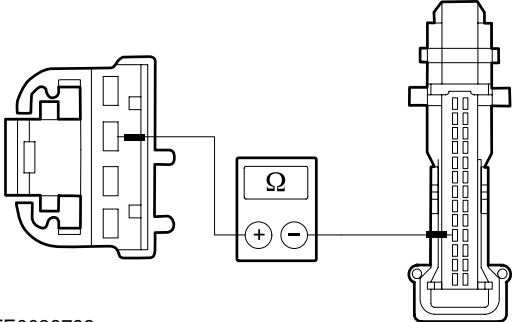
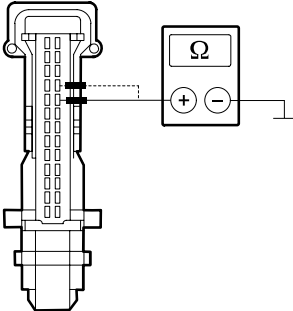
PINPOINT TEST P : SUN LOAD SENSOR CIRCUIT FAULTY - VEHICLES WITH ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
P1: CHECK VOLTAGE AT SUN LOAD SENSOR	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect connector C554 from sun load sensor. 3 Ignition switch in position II.

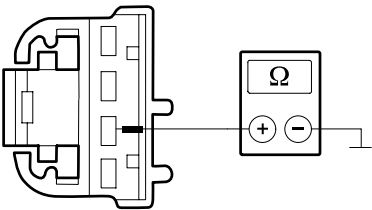
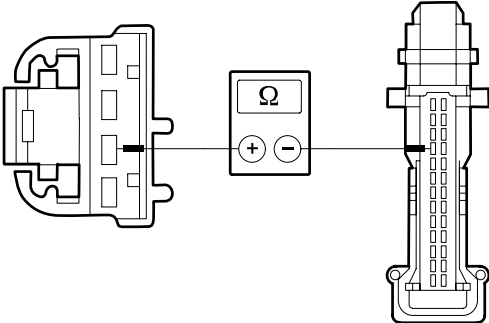
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038786</p>	<p>4 Switch on the air-conditioning system.</p> <p>5 Measure the voltage between the sun load sensor, connector C554, pin 1, circuit 8-FA53 (WH/BU), wiring harness side and ground.</p>
	<p>6 Measure the voltage between the sun load sensor, connector C554, pin 2, circuit 10-FA53 (GY/VT), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a voltage of approx. 5 V measured during both measurements? <p>→ Yes GO to P4.</p> <p>→ No GO to P2.</p>
<p>P2: CHECK CIRCUITS BETWEEN THE SUN LOAD SENSOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
 <p>VFE0038792</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C540 of EATC module.</p> <p>3 Measure the resistance between the sun load sensor, connector C554, pin 1, circuit 8-FA53 (WH/BU), wiring harness side and the EATC module, connector C540, pin 22, circuit 8-FA53 (WH/BU), wiring harness side.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038793</p>	<p>4 Measure the resistance between the sun load sensor, connector C554, pin 2, circuit 10-FA53 (GY/VT), wiring harness side and the EATC module, connector C540, pin 23, circuit 10-FA53 (GY/VT), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured in both cases? <p>→ Yes GO to P3.</p> <p>→ No LOCATE and REPAIR the break in the relevant circuit between the sun load sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>P3: CHECK CIRCUITS BETWEEN THE SUN LOAD SENSOR AND THE EATC MODULE FOR A SHORT TO GROUND</p>	
 <p>E49857</p>	<p>1 Measure the resistance between the EATC module, connector C540, pin 22, circuit 8-FA53 (WH/BU), wiring harness side and ground.</p>
	<p>2 Measure the resistance between the EATC module, connector C540, pin 23, circuit 10-FA53 (GY/VT), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance greater than 10,000 Ohm measured in both cases? <p>→ Yes CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the short to ground in the affected circuit using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>P4: CHECK GROUND CONNECTION OF THE SUN LOAD SENSOR</p>	
	<p>1 Ignition switch in position 0.</p>

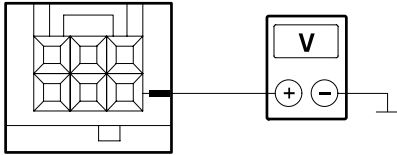
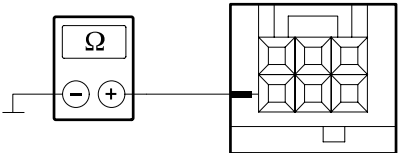
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038794</p>	<p>2 Measure the resistance between the sun load sensor, connector C554, pin 3, circuit 9-FA53 (BN/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <p>→ Yes RENEW the sun load sensor. CHECK the operation of the system.</p> <p>→ No GO to P5.</p>
<p>P5: CHECK CIRCUIT BETWEEN THE SUN LOAD SENSOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
 <p>VFE0038795</p>	<p>1 Measure the resistance between the sun load sensor, connector C554, pin 3, circuit 9-FA53 (BN/BU), wiring harness side and the EATC module, connector C540, pin 17, circuit 9-FA1 (BN/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <p>→ Yes CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in the circuit between the sun load sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.</p>

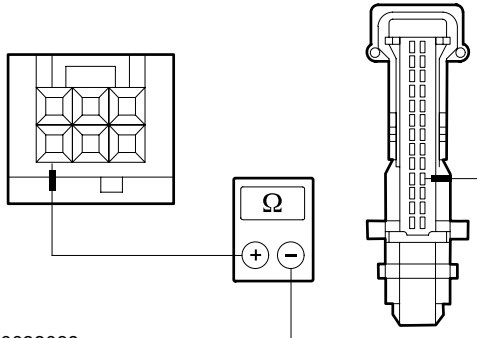
PINPOINT TEST Q : PASSENGER COMPARTMENT TEMPERATURE SENSOR CIRCUIT FAULTY - VEHICLES WITH ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>Q1: CHECK THE VOLTAGE AT THE PASSENGER COMPARTMENT TEMPERATURE SENSOR</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C776 from passenger compartment temperature sensor.</p> <p>3 Ignition switch in position II.</p> <p>4 Switch on the air-conditioning system.</p>

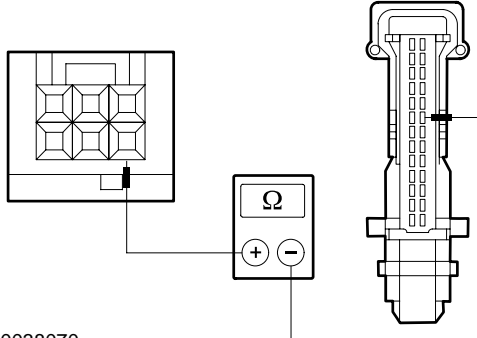
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038067</p>	<p>5 Measure the voltage between the passenger compartment temperature sensor, connector C776, pin 4, circuit 8-FA95 (WH/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a voltage of approx. 5 V measured? <p>→ Yes GO to Q2.</p> <p>→ No GO to Q4.</p>
<p>Q2: CHECK GROUND CONNECTION OF PASSENGER COMPARTMENT TEMPERATURE SENSOR</p>	
 <p>VFE0038068</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the passenger compartment temperature sensor, connector C776, pin 6, circuit 9-FA95 (BN/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? <p>→ Yes INSTALL NEW passenger compartment temperature sensor. CHECK the operation of the system.</p> <p>→ No GO to Q3.</p>
<p>Q3: CHECK CIRCUIT BETWEEN THE PASSENGER COMPARTMENT TEMPERATURE SENSOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect connector C540 of EATC module.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038069</p>	<p>2 Measure the resistance between the passenger compartment temperature sensor, connector C776, pin 6, circuit 9-FA95 (BN/GN), wiring harness side and the EATC module, connector C540, pin 17, circuit 9-FA1 (BN/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the passenger compartment temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.

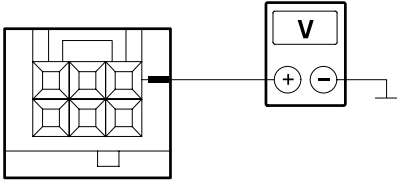
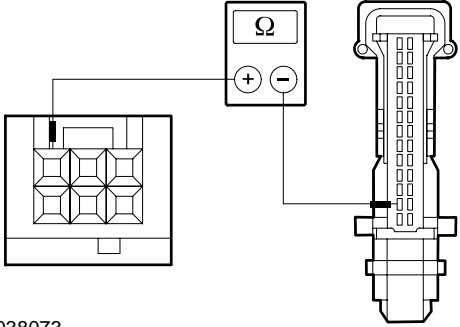
Q4: CHECK CIRCUIT BETWEEN THE PASSENGER COMPARTMENT TEMPERATURE SENSOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT

	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect connector C540 of EATC module.</p>
 <p>VFE0038070</p>	<p>3 Measure the resistance between the passenger compartment temperature sensor, connector C776, pin 4, circuit 8-FA95 (WH/GN), wiring harness side and the EATC module, connector C540, pin 21, circuit 8-FA95 (WH/GN), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 8-FA95 (WH/GN) between the passenger compartment temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.

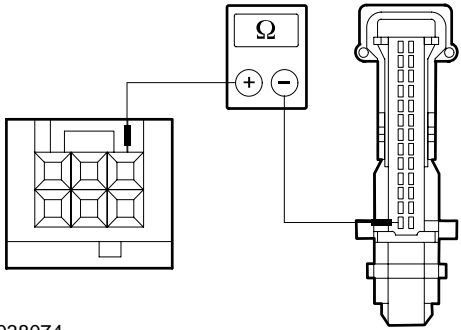
PINPOINT TEST R : BLOWER PASSENGER COMPARTMENT TEMPERATURE SENSOR CIRCUIT FAULTY - VEHICLES WITH ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>R1: CHECK VOLTAGE AT THE BLOWER PASSENGER COMPARTMENT TEMPERATURE SENSOR</p>	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

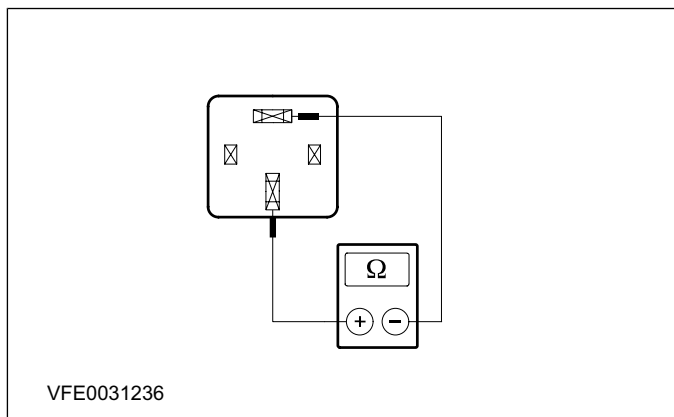
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect Connector C776 from passenger compartment temperature sensor.</p> <p>3 Ignition switch in position II.</p> <p>4 Switch on the air-conditioning system.</p>
 <p>VFE0038071</p>	<p>5 Measure the voltage between the passenger compartment temperature sensor, connector C776, pin 1, circuit 15S-FA95 (GN/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to R2. → No GO to R3.
<p>R2: CHECK CIRCUIT BETWEEN THE BLOWER PASSENGER COMPARTMENT TEMPERATURE SENSOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect connector C540 of EATC module.</p>
 <p>VFE0038073</p>	<p>3 Measure the resistance between the passenger compartment temperature sensor, connector C776, pin 3, circuit 31-FA95 (BK), wiring harness side and the EATC module, connector C540, pin 2, circuit 31-FA95 (BK), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes INSTALL NEW passenger compartment temperature sensor. CHECK the operation of the system. If the system is still not working, CHECK the EATC module and INSTALL A NEW ONE if necessary. → No LOCATE and REPAIR the break in circuit 31-FA95 (BK) between the passenger compartment temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.
<p>R3: CHECK CIRCUIT BETWEEN THE BLOWER PASSENGER COMPARTMENT TEMPERATURE SENSOR AND THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

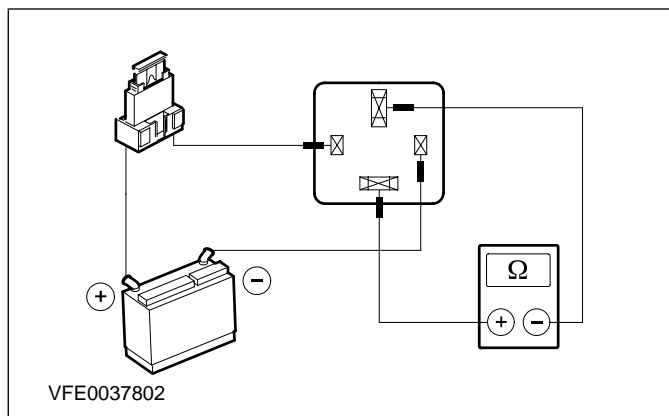
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038074</p>	<p>2 Disconnect connector C540 of EATC module.</p> <p>3 Measure the resistance between the passenger compartment temperature sensor, connector C776, pin 1, circuit 15S-FA95 (GN/BK), wiring harness side and the EATC module, connector C540, pin 1, circuit 15S-FA95 (GN/BK), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm measured? → Yes CHECK the EATC module, if necessary INSTALL a new one. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 15S-FA95 (GN/BK) between the passenger compartment temperature sensor and the EATC module using the Wiring Diagrams. CHECK the operation of the system.

Component Tests

Blower relay



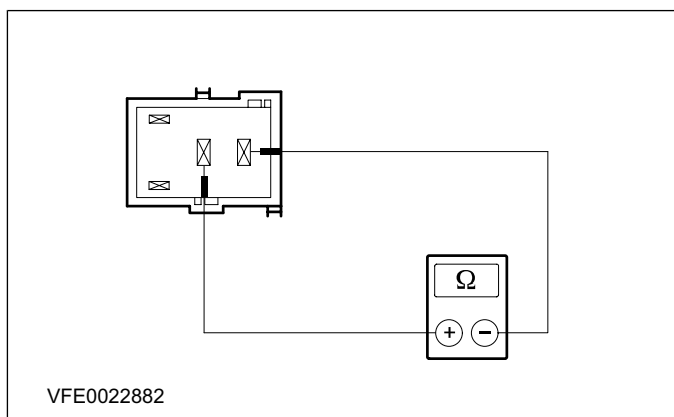
1. Check the normally open contact in the unswitched state.
 1. Measure the resistance at the blower relay, between pin 3 and pin 5, component side.
 2. Is a resistance of more than 10,000 Ohm measured?
 3. If yes, go to 2.
 4. If no, INSTALL a new blower relay.



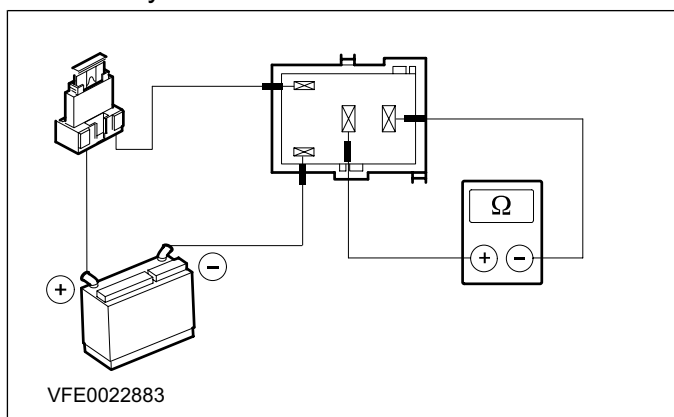
2. Check the normally open contact in the switched state.
 1. Using a fused test cable (1 A), connect pin 1 of the blower relay, component side, to the battery positive terminal.
 2. Use a test cable to connect pin 2 of the blower relay, component side, to the battery negative terminal.
 3. Measure the resistance at the blower relay, between pin 3 and pin 5, component side.
 4. Is a resistance of less than 2 Ohm measured?
 5. If yes, the blower relay is OK.
 6. If no, INSTALL a new blower relay.

DIAGNOSIS AND TESTING

A/C clutch relay



3. Check the normally open contact in the unswitched state.
 1. Measure the resistance at the air conditioning clutch relay, between pin 3 and pin 5, component side.
 2. Is a resistance of more than 10,000 Ohm measured?
 3. If yes, go to 4.
 4. If no, RENEW the air conditioning clutch relay.



4. Check the normally open contact in the switched state.
 1. Use a fused test cable (1 A) to connect pin 1 of the air conditioning clutch relay, component side, to the battery positive terminal.
 2. Use a test cable to connect pin 2 of the air conditioning clutch relay, component side, to the battery negative terminal.
 3. Measure the resistance at the air conditioning clutch relay, between pin 3 and pin 5, component side.
 4. Is a resistance of less than 2 Ohm measured?
 5. If yes, then the air conditioning clutch relay is OK.

6. If no, RENEW the air conditioning clutch relay.

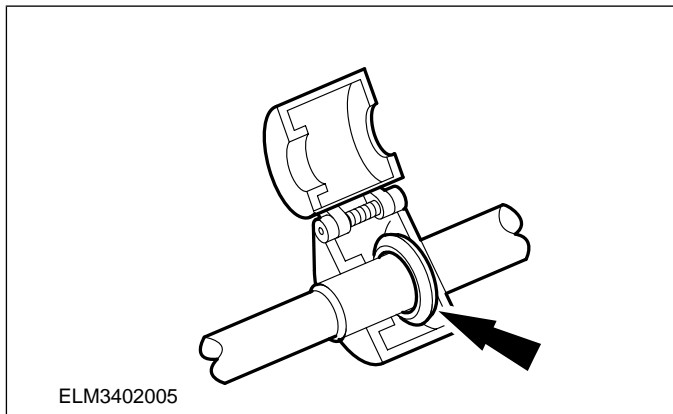
GENERAL PROCEDURES

Spring Lock Coupling

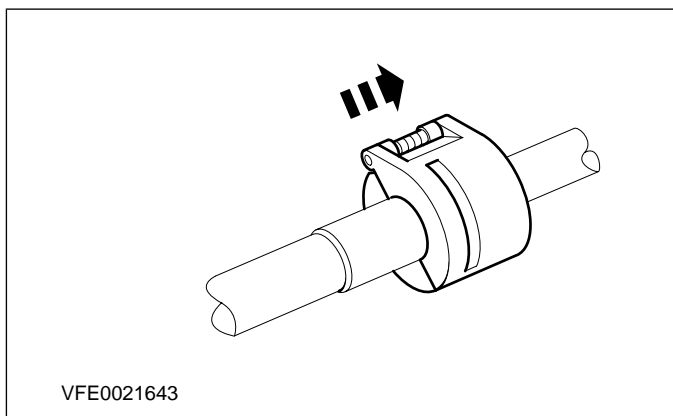
1. **NOTE:** Select special tool to suit the line diameter.

Fit the special tool.

- Fit the special tool so that the inner collar can be guided into the clamping spring.

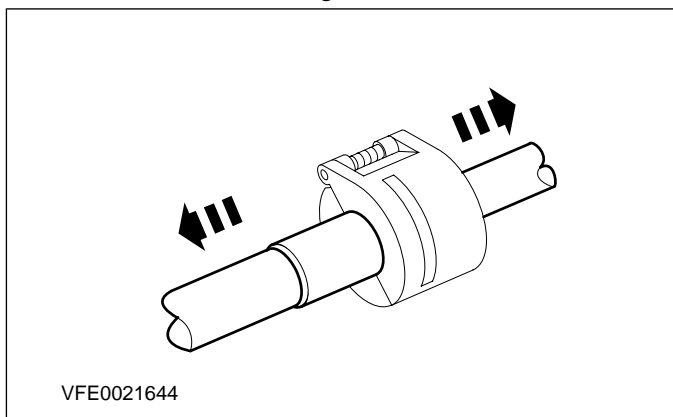


2. Press the special tool into the clamping spring.



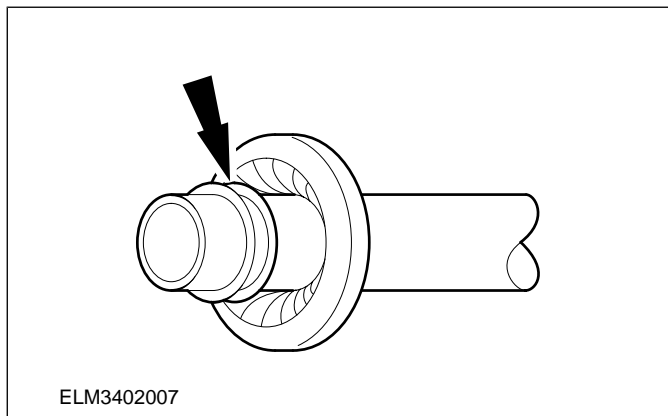
3. Disconnect the refrigerant line.

- Discard the O-ring seals.



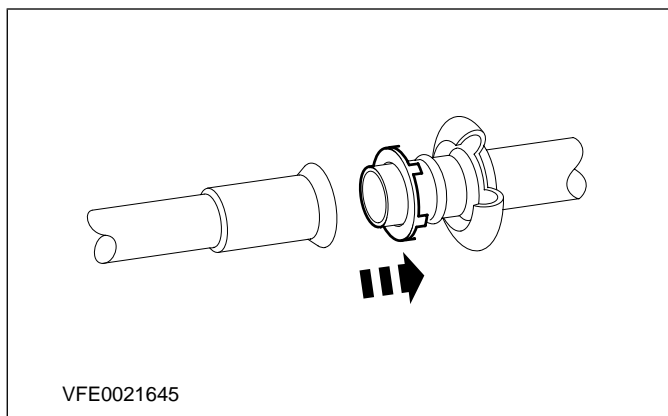
4. Connect the refrigerant line.

- Check the clamping spring for damage.
- Carefully pull out any damaged clamping springs using a thin piece of wire and install new one.



5. **NOTE:** Clean the connections using refrigerant oil and a lint-free cloth.

Press the indicator ring into the clamping spring.



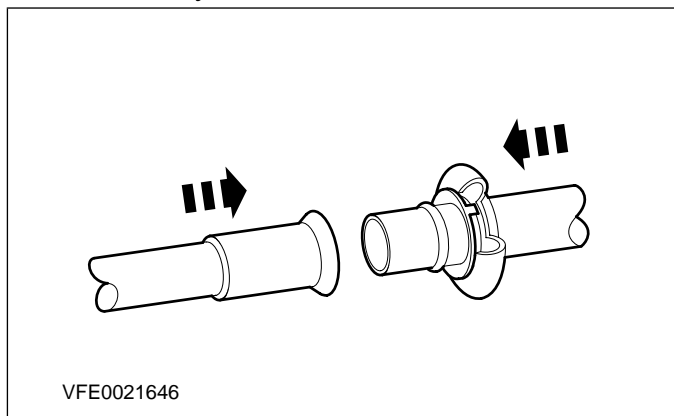
6. **NOTE:** Install new refrigerant line O-ring seals.

NOTE: Coat the refrigerant line O-ring seals in clean refrigerant oil prior to installation.

Connect the refrigerant lines.

GENERAL PROCEDURES

- Check that the clamping spring engages correctly.



GENERAL PROCEDURES

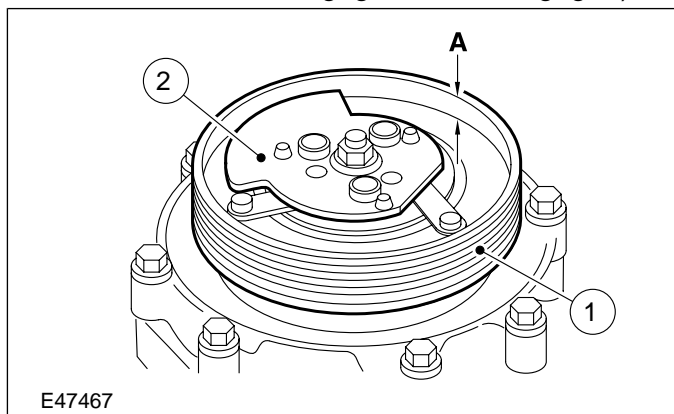
Air Conditioning (A/C) Clutch Air Gap Adjustment(34 628 6)

Materials	
Name	Specification
Spacer washer set	

1. Measurement for recessed pulley

Check the air gap A between the drive plate and the pulley at 60 degree intervals around the circumference of the pulley, while operating the A/C clutch several times by means of a 5A fused jumper wire connected between the battery positive terminal, A/C clutch and battery ground. For additional information, refer to Specifications in this section.

1. Belt pulley
 2. Drive plate
- Air gap A (the difference measured between the A/C clutch engaged and disengaged)

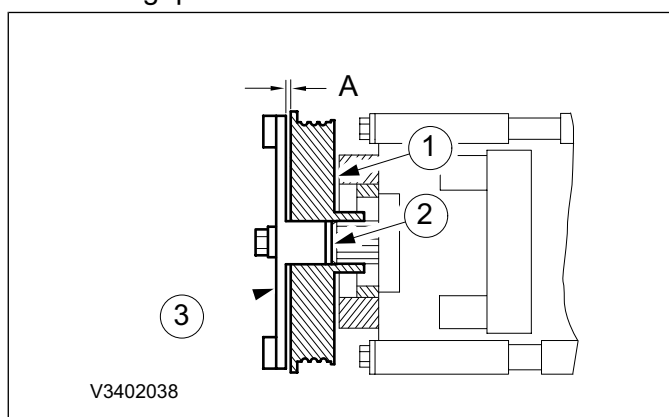


2. Measurement for non recessed pulley

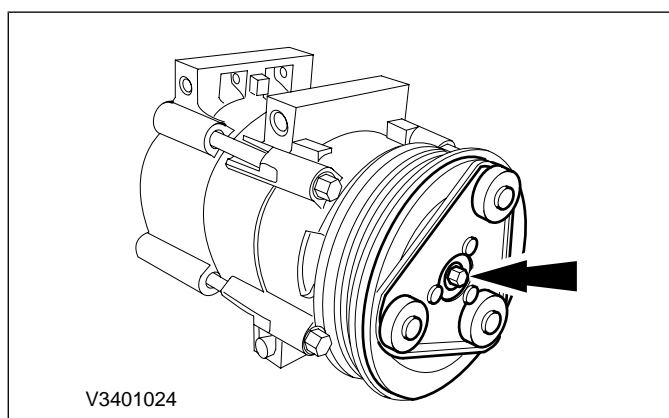
Check the air gap A between the drive plate and the pulley at 60 degrees intervals around the circumference. For additional information, refer to Specifications in this section.

1. Belt pulley
2. Spacer washer
3. Drive plate

- Air gap A



3. Remove the drive plate.



4. Correct air gap A as necessary using spacer washers.

5. Install the drive plate. For additional information, refer to Specifications in this section.

6. Check air gap A as described in step 1 or step 2. Repeat steps 3-5 if necessary.

GENERAL PROCEDURES**Fluorescent Dye Leak Detection****General Equipment**

UV Spot Lamp
Manifold Gauge Set
Fluorescent Dye Injector

NOTE: Vehicles built 07/1999 onwards have a fluorescent tracer dye tablet inserted into the air conditioning (A/C) system. If tracer dye is present, there is a green cross on the suction accumulator.

NOTE: On vehicles built up to 07/1999 tracer dye must be added.

1. Using the dye injector, add 7.4 ml of Fluorescent Tracer Dye.

NOTE: Some vehicles may have signs of refrigerant oil at the spring lock couplers. This may be caused from the assembly process which applies to the fittings before installation to aid in assembly. When a spring lock coupler is suspected of leaking, always wipe the fitting clean and verify the leak with R-134a Automatic Calibration Halogen Leak Detector.

NOTE: The exact location of leaks can be pinpointed by the bright yellow - green glow of the tracer dye. Since more than one leak may exist, always inspect each component.

2. Check for leaks using a 120 Watt UV Spot Lamp. Always scan all components, fittings and lines of the A/C system.**3. After the leak is found and repaired, remove any traces of dye with a general purpose oil solvent.****4. Verify the repair by operating the system for some minutes and inspecting with the UV lamp again.**

GENERAL PROCEDURES**Electronic Leak Detection(34 620 7)****General Equipment**

Automatic Calibration Halogen Leak Detector
Manifold Gauge Set
Refrigerant Identifier

▲ WARNING: Good ventilation before leak detection is necessary in the area where it is to be performed. If the surrounding air is contaminated with refrigerant gas, the leak detector will indicate this gas all the time. Odors from other chemicals such as antifreeze, diesel fuel, disc brake cleaner, or other cleaning solvents can cause the same problem. While leak detection air movement must be prevented.

1. **▲ CAUTION:** The refrigerant identification equipment must be used before the manifold gauge set is installed, otherwise the manifold gauge may become contaminated. Contaminated refrigerant must be disposed of as special waste. The manufacturer's instructions must be followed when working with the service unit.

NOTE: Both manifold gauges should indicate 4,1-5,5 bar at 24°C with the engine off.

Attach the manifold gauge set to the service gauge port valves.

1. For the leak test, close the manual valves on the gauge set.
2. If little or no pressure is indicated, charge the system with approx. 300g of refrigerant.

For additional information, refer to **Air Conditioning (A/C) System Recovery, Evacuation and Charging** in this section.

2. **Use R-134a Automatic Calibration Halogen Leak Detector to leak test the refrigerant system. Follow the instructions included with leak detector for handling and operation techniques.**

3. **If a leak is found, recover the A/C system.**

For additional information, **refer to Air Conditioning (A/C) System Recovery, Evacuation and Charging** in this section.

GENERAL PROCEDURES

Air Conditioning (A/C) System Recovery, Evacuation and Charging(34 620 2)

General Equipment

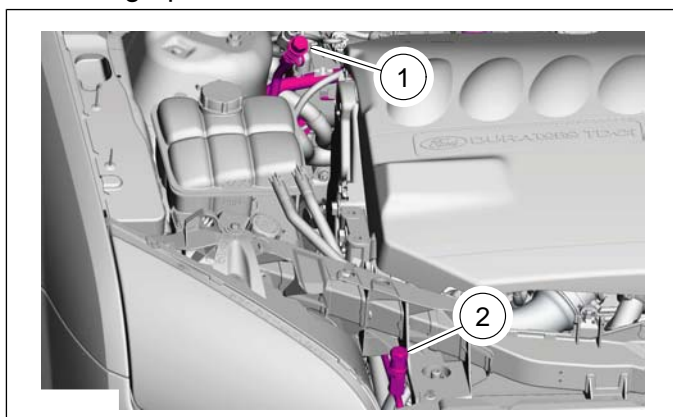
Refrigerant center

Refrigerant analyzer

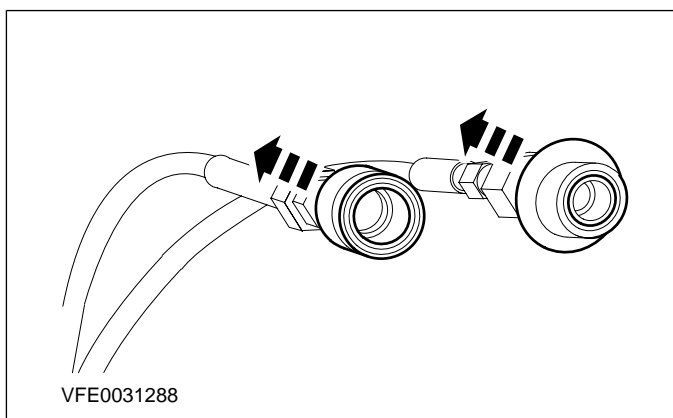
1. **CAUTION:** The refrigerant analyzer must be used before recovery, otherwise the refrigerant center may become contaminated. Contaminated refrigerant must be disposed of as hazardous waste. Always follow the manufacturer's instructions when using the refrigerant center and the refrigerant analyzer.

Unscrew and remove the protective caps from the A/C charging connections.

1. Low-pressure connection
2. High-pressure connection



2. Pull back the catches of the quick-fit unions on the refrigerant center lines.



3. **NOTE:** Larger inner diameter for high-pressure side. Smaller inner diameter for low-pressure side.

Connect the refrigerant center lines to the A/C charging connections.

4. **WARNING:** When recovering the refrigerant do not allow it to enter the atmosphere under any circumstances. Failure to follow these instructions may result in personal injury.

NOTE: When removing components of the air conditioning system, calculate the residual quantity of refrigerant oil.

For additional information, refer to: **Refrigerant Oil Adding** (412-00, General Procedures).

Recover the refrigerant from the A/C system via the low-pressure connection in accordance with the refrigerant centre manufacturer's instructions.

5. **CAUTIONS:**

CAUTION: The A/C system must be evacuated for about 30 minutes before recharging, to ensure that it operates correctly.

CAUTION: If moisture was able to enter an open system over an extended period (several hours), install a new suction accumulator and increase the evacuation time to 2-3 hours.

Evacuate the A/C system according to the refrigerant center manufacturer's instructions.

6. **NOTE:** If an air conditioning system that was filled with refrigerant is being evacuated, some refrigerant will still be in the refrigerant oil in the compressor. This remaining refrigerant may evaporate, causing a slight increase in pressure during the leak test. The system is leak-free, provided that this pressure increase does not exceed 20 mbar (2 kPa, 0.29 psi).

Perform the leak test.

1. For the leak test, close the hand valves on the pressure gauge set, switch off the refrigerant center vacuum pump and observe the low pressure gauge.

GENERAL PROCEDURES

2. Locate any leaks in the A/C refrigerant circuit using a leak tester. For additional information, refer to: (412-00)

Flourescent Dye Leak Detection

(General Procedures),


Electronic Leak Detection

(General Procedures).

7. Top up with refrigerant oil.

For additional information, refer to:


Refrigerant Oil Adding (412-00, General Procedures).

-  **CAUTION:** The A/C system must always be evacuated before charging. Failure to observe this instruction can cause damage to the A/C system.

8. **NOTE:** Depending on the type of refrigerant centre and the equipment (with or without heated filling cylinder), the air conditioning system is either charged with liquid via the high-pressure connection or with gas through the low-pressure connection.


NOTE: Charge quantity on sticker in engine compartment.**Charging the A/C system (with liquid) via the high-pressure connection.**

1. Open the shut-off valve on the high-pressure side.
2. Switch the refrigerant center to "Fill" mode and fill with the prescribed quantity of liquid refrigerant (R134a).

9.  **CAUTION:** Only gaseous charging of the air conditioning system is performed via the low-pressure connection. Failure to follow these instructions may cause damage to the compressor.

Charging the A/C system via the low-pressure connection.

1. Open the shut-off valve on the low-pressure side.
2. Switch the refrigerant center to "Fill" mode and charge with gaseous refrigerant.
3. Top up with the remaining amount of refrigerant with the A/C system switched on. For this purpose, run the engine at approx. 1200-1500 rpm. Switch the air conditioning to maximum cooling power and fresh air mode. Set the blower to maximum speed. Fill with the remainder of the prescribed fill quantity.

10.  **WARNING:** Do not detach the high-pressure hose when the A/C system is switched on. Failure to follow these instructions may result in personal injury.

Disconnect the refrigerant center.

1. Close the shut-off valves.
2. Switch off the refrigerant center.
3. Disconnect the service unit line from the A/C charging connection.
4. Attach the protective caps to the charging valves.

GENERAL PROCEDURES**Refrigerant Oil Adding(34 621 1)**

⚠ CAUTION: Collect the refrigerant oil in a clean measuring cylinder.

1. NOTE: This step only needs to be carried out when replacing the A/C compressor.

NOTE: Rotate the compressor shaft at least 6 to 8 turns when draining the refrigerant oil.

Drain the refrigerant oil from the defective A/C compressor and dispose of it.

2. ⚠ CAUTION: If the refrigerant oil is not to be reused within 15 minutes of draining it from the new compressor, store it in a closed and sealed container to prevent ingress of moisture.

NOTE: The refrigerant oil from the new A/C compressor needs to be drained because the fill capacities at the factory are not always the same.

NOTE: Rotate the compressor shaft at least 6 to 8 turns when draining the refrigerant oil.

Drain the refrigerant oil from the new A/C compressor.


3. CAUTIONS:

⚠ The amount of refrigerant oil topped up must not exceed the refrigerant oil fill capacity.

⚠ If other A/C components are being renewed in addition to the A/C compressor, there is no need to top up with additional refrigerant oil, apart from filling the compressor.

Add the calculated quantity of new refrigerant oil. See: Specifications (412-00 Heating, Ventilation, Air-Conditioning - General information, Specifications).

GENERAL PROCEDURES**Contaminated Refrigerant Handling(34 620 9)**

 **CAUTION:** Any R134a or R12 refrigerant which is contaminated with unsuitable refrigerant should be extracted only by means of a suitable servicing unit designed for the purpose of collecting and storing contaminated refrigerant, so that the spread to other vehicles can be prevented.

1. Use refrigerant identification equipment to check that there is contaminated refrigerant in the air conditioning system.
2. Inform the customer about the additional cost to repairing the system caused by the contamination.
3. Extract the contaminated refrigerant.

GENERAL PROCEDURES

Air Distribution System Cleaning

General Equipment

Spray gun with hose	
Materials	
Name	Specification
Odour eliminating agent (240 ml) (TOX Number 142040)	

All vehicles

1. **▲WARNING: Avoid contact with eyes and skin; wear gloves and respiratory protection. Ensure that you perform this operation in a well ventilated room. Keep all vehicle doors and windows open for the duration of the operation. Do not inhale vapors under any circumstances. Do not smoke and avoid open fire and unprotected light sources. Avoid contact with eyes and skin; wear gloves and respiratory protection. Ensure that you perform this operation in a well ventilated room. Keep all vehicle doors and windows open for the duration of the operation. Do not inhale vapors under any circumstances. Do not smoke and avoid open fire and unprotected light sources. Failure to observe this instruction can lead to injuries.**

NOTE: The odour eliminating agent can remove deposits in the heater housing but cannot prevent odours that are distributed by the ventilation system, for example those caused by damp carpets.

Precisely locate the musty or damp odour.

2. Disconnect the low pressure switch connector.
3. Turn on the ignition.
4. Open all ventilation nozzles.
5. Set the temperature control to maximum heating power.
6. Set the blower motor control switch to the highest setting.
7. Set the air distribution control to the fresh air position.
8. Start the engine and let it warm up to operating temperature.

9. To dry out the system, switch off the air conditioning system and ventilate the vehicle for approx. 15 minutes.

10. Switch off the engine.

Only Focus to MY 2004.75 and Galaxy

11. Remove the blower motor.

Only Ka, Fiesta 96 to MY 2002.25 and Puma

12. Remove the blower motor resistor

Only Fiesta from MY 2002.25, Focus C-Max and Focus from MY 2004.75 with pollen filter

13. Remove the pollen filter.

Only Fiesta from MY 2002.25, Focus C-Max and Focus from MY 2004.75 without pollen filter

14. Remove the pollen filter housing cover.

All vehicles

15. Fill the spray gun with the odour eliminating agent (240 ml).

16. **▲WARNING: The maximum pressure of 13.5 bar must not be exceeded. Failure to observe this instruction can lead to injuries.**

Use the tyre inflator to apply pressure of 5.5 to 10 bar (operating pressure) to the spray gun.

17. Insert the hose of the spray gun as far as possible into the opening created by removal of the above component and point it in the direction of the evaporator.
18. By moving the hose, spray the odour eliminating agent over the entire surface of the evaporator.
19. Spray all of the odour eliminating agent into the opening.
 - Allow the odour eliminating agent to take effect for 10 minutes.
20. Install the components in reverse order.
21. Start the engine, switch off the air conditioning system and ventilate the vehicle for approx. 15 minutes.
22. Open all ventilation nozzles.

GENERAL PROCEDURES

23. Set the temperature control to maximum heating power.
24. Set the blower motor control switch to the highest setting.
25. Set the air distribution control to the fresh air position.
26. Switch off the engine.
27. Connect the low pressure switch connector.
28. Ventilate the vehicle with the doors open for another 30 minutes.

GENERAL PROCEDURES**Vacuum Leak Detection(34 620 3)**

1. Drain the air conditioning (A/C) system.

For additional information, **refer to Air Conditioning** (A/C) System Recovery, Evacuation and Charging in this section.

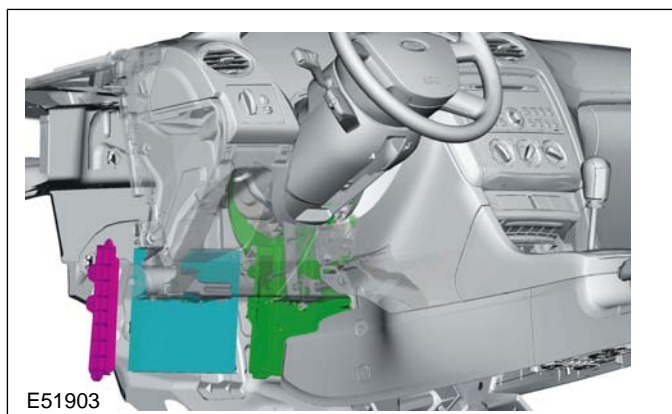
SECTION 412-01 Air Distribution and Filtering

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Air Distribution and Filtering.....	412-01-4
REMOVAL AND INSTALLATION	
Pollen Filter — RHD.....	412-01-5

SPECIFICATIONS**Tightening Torques**

Description	Nm	lb-ft	lb-in
Accelerator pedal retaining nuts	9	-	80

DESCRIPTION AND OPERATION**Air Distribution and Filtering****Pollen filter**

The fresh air flowing into the vehicle through the air intake housing is cleaned of dirt particles which are larger than 0.003mm and of pollen by passing it through a pollen filter which is located on the left-hand side of the heater core/ evaporator housing (LHD and RHD vehicles).

The pollen filter must be changed at intervals in accordance with the service schedule.

A special production pollen filter is installed in the factory and this must be cut off when the filter is changed. The service pollen filter is flexible and can be pushed together during installation or removal.



DIAGNOSIS AND TESTING

Air Distribution and Filtering

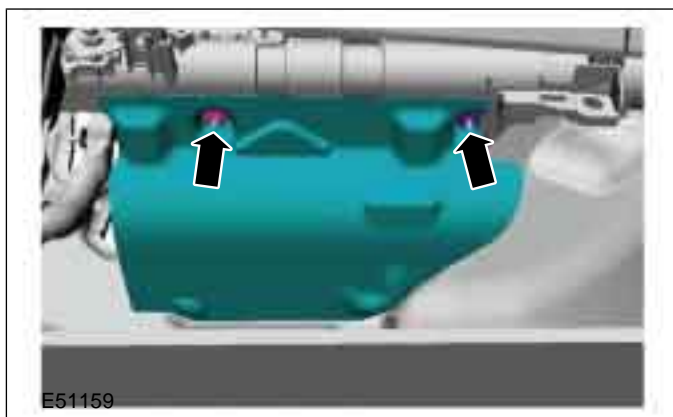
REFER to: **Climate Control System - 3-Door**
(412-00 Climate Control System - General
Information, Diagnosis and Testing).



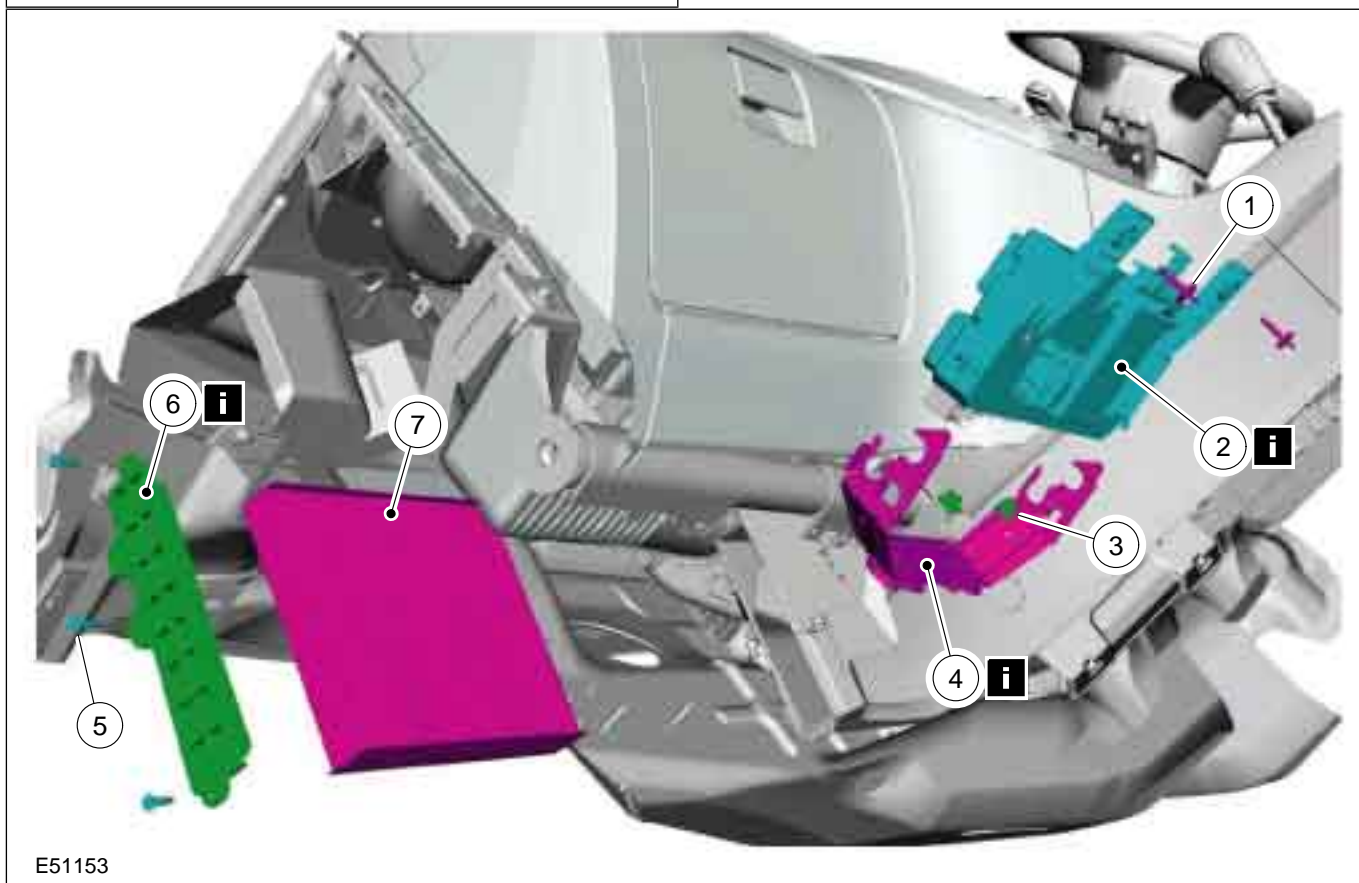
REMOVAL AND INSTALLATION

Pollen Filter — RHD

1. Remove the footwell trim.



2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Central junction box (CJB) bolts
2	CJB See Removal Detail
3	CJB bracket nuts
4	CJB bracket See Removal Detail

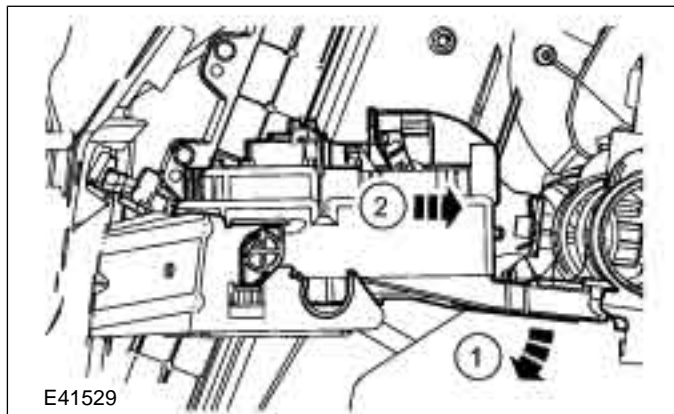
Item	Description
5	Pollen filter housing cover bolts
6	Pollen filter housing cover See Removal Detail
7	Pollen filter

3. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION**Removal Details****Item 2 CJB**

1. Detach the CJB from the CJB bracket and secure it to one side.

1. Turn the CJB downwards.
2. Pull out the CJB.

**Item 4 CJB bracket**

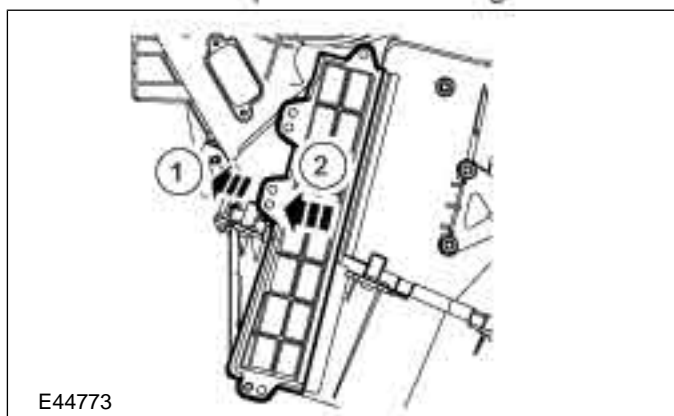
1. Detach the electric booster heater wiring harness from the CJB bracket (if fitted).

Item 6 Pollen filter housing cover

1. **NOTE:** In the event of damage to a pollen filter housing cover threaded hole, the pollen filter housing cover can be attached by means of the additional hole next to the original hole.

Remove the pollen filter housing cover.

1. Lift the pollen filter housing cover sideways.
2. Pull out the pollen filter housing cover.



SECTION 412-02 Heating and Ventilation

VEHICLE APPLICATION: 2008.75 Focus ST C307

CONTENTS	PAGE
SPECIFICATIONS	
Specifications.....	412-02-2
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Blower Motor.....	412-02-9
Heater Core and Evaporator Core Housing.....	412-02-16
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DISASSEMBLY AND ASSEMBLY	
Heater Core and Evaporator Core Housing — Vehicles With: Manual Temperature Control.....	412-02-37
Heater Core and Evaporator Core Housing — Vehicles With: Automatic Temperature Control.....	412-02-41

SPECIFICATIONS**Lubricants, Sealers and Adhesives**

Item	Specification
Refrigerant oil	WSH-M1C231-B

Torque Specifications

Description	Nm	lb-ft	lb-in
Reinforcing element bolts	22	16	-
Bolts, reinforcing element bracket	25	18	-
Steering column shaft joint bolt	28	21	-
Dashboard crossmember outer bolts	25	18	-
Dashboard crossmember inner bolts	20	15	-
Clutch pedal bracket retaining nuts	25	18	-
Steering column bracket bolts	25	18	-
Bolt for refrigerant lines to A/C evaporator	25	18	-
Door check strap bolt	23	17	-
Door hinge bolts	15	11	-
Dashboard crossmember side bolts	80	59	-
Bolts for windshield wiper motor with linkage	7	-	62
Nuts, windshield wiper arms	22	16	-

DESCRIPTION AND OPERATION

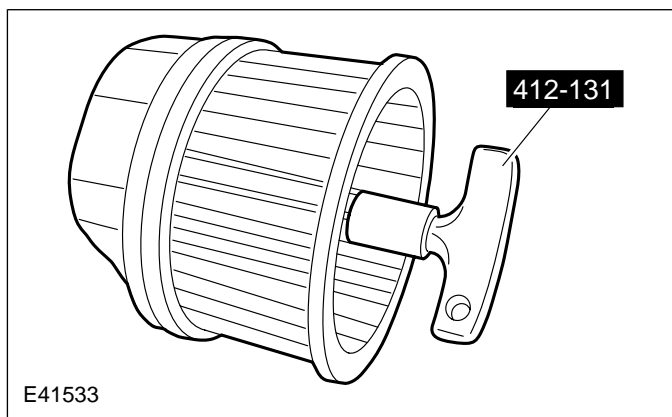
Heating and Ventilation

Heater Core and Evaporator Core Housing

The heater core and evaporator core housing contains the blower motor, the pollen filter, the heater core, the evaporator core (on vehicles with air conditioning (A/C)), the electric booster heater (if equipped) and various diverter flaps.

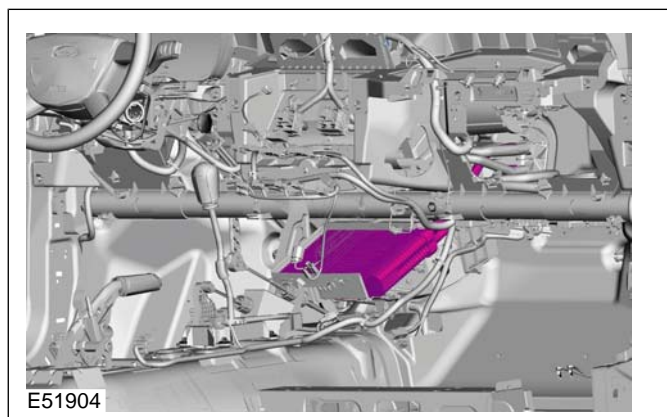
Blower motor

CAUTION: Do not put the blower motor down on the blower motor fan wheel.



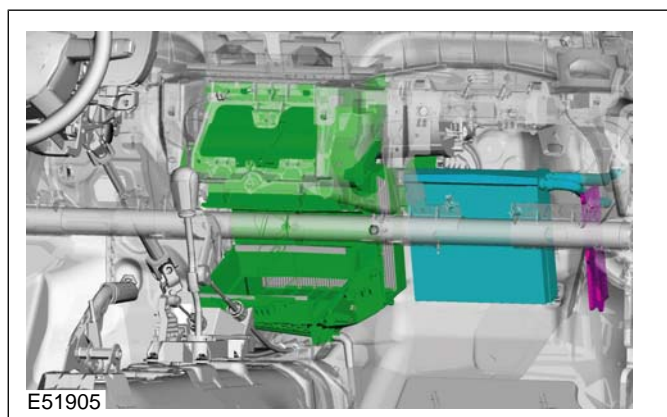
To prevent damage to the fan wheel vanes, the fan wheel must not be touched. For this reason, a special tool (412-131) has been introduced for removal and installation of the blower motor. This tool is pushed onto the central shaft in order to lift out the blower motor.

Heater core



The heater core is accessible from the right-hand side of the heater core and evaporator core housing (LHD and RHD). It can be removed and installed with the heater core and evaporator core housing installed. During removal, the coolant pipes of the production heater core must be sawn through. During servicing, a heater core with separate coolant pipes is installed.

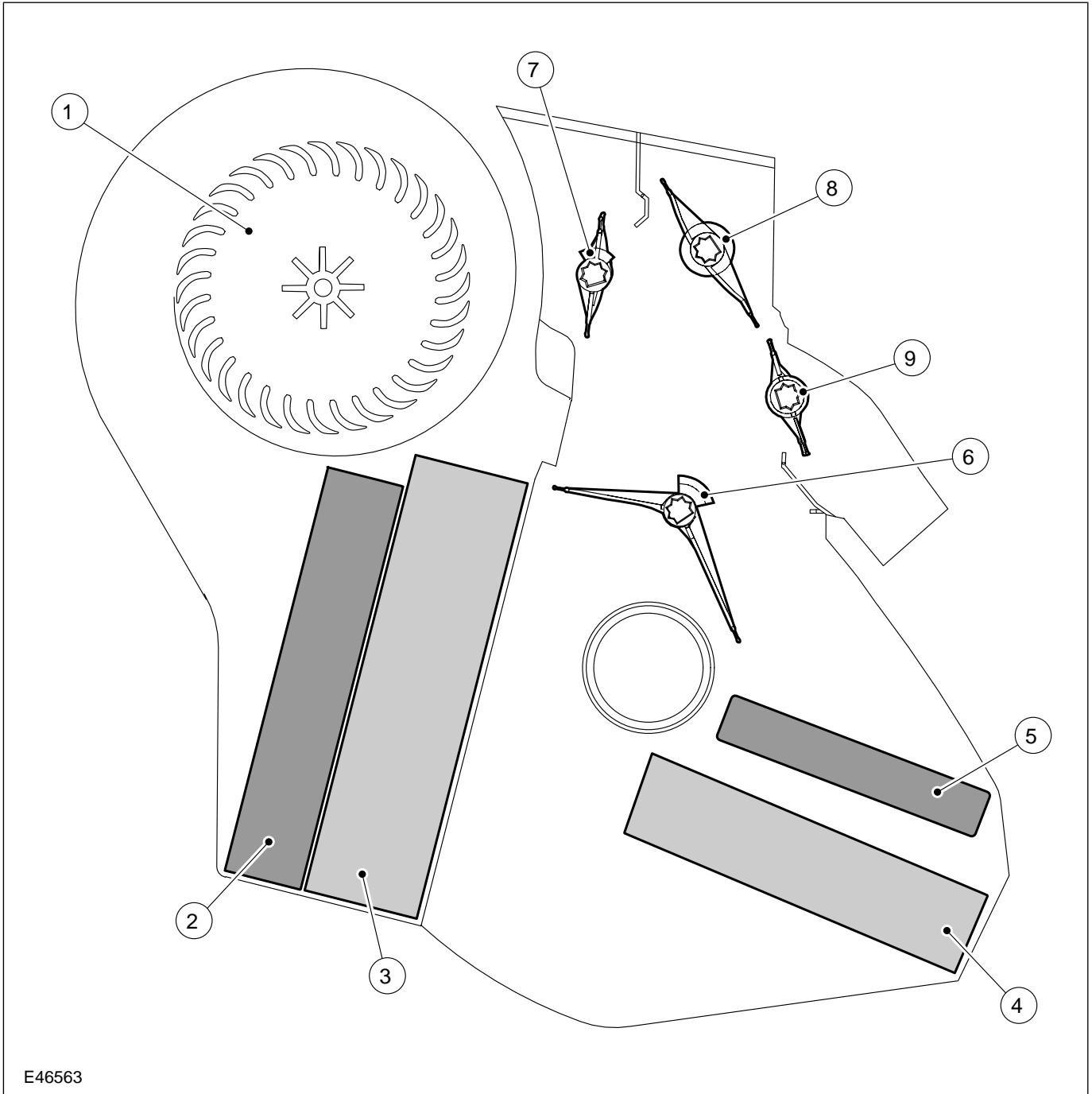
Evaporator core



The evaporator core is located on the right-hand side of the heater core and evaporator core housing (LHD and RHD). During servicing, it can only be removed with the heater core and evaporator core housing removed.

DESCRIPTION AND OPERATION

Overview



E46563

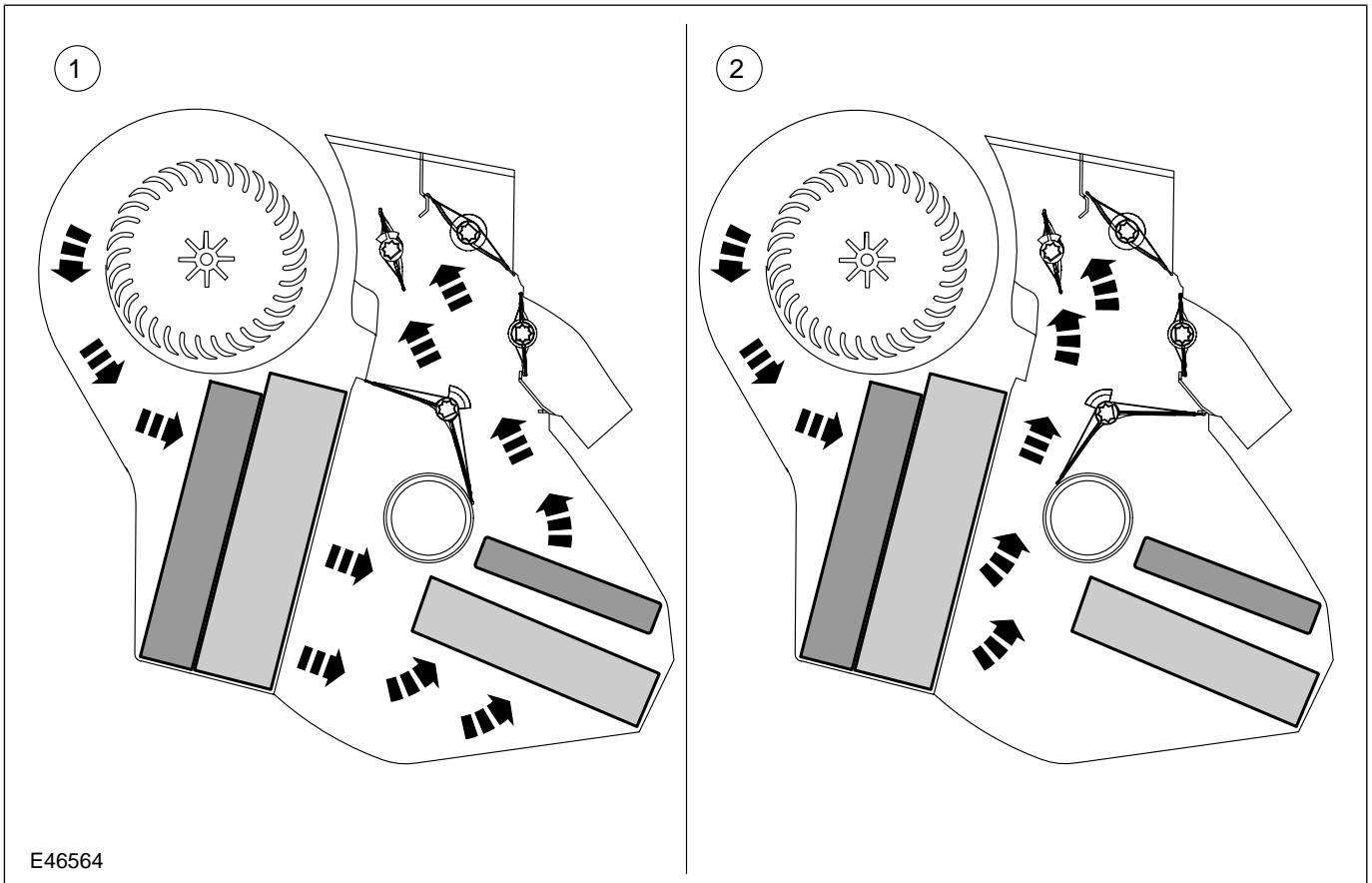
Item	Description
1	Blower motor
2	Pollen filter
3	Evaporator core
4	Heater core

Item	Description
5	Electric booster heater (if equipped)
6	Temperature blend door motor
7	Air distribution door - defroster vents
8	Air distribution door - center vents
9	Air distribution door - footwell



DESCRIPTION AND OPERATION

Air flow - defroster vents



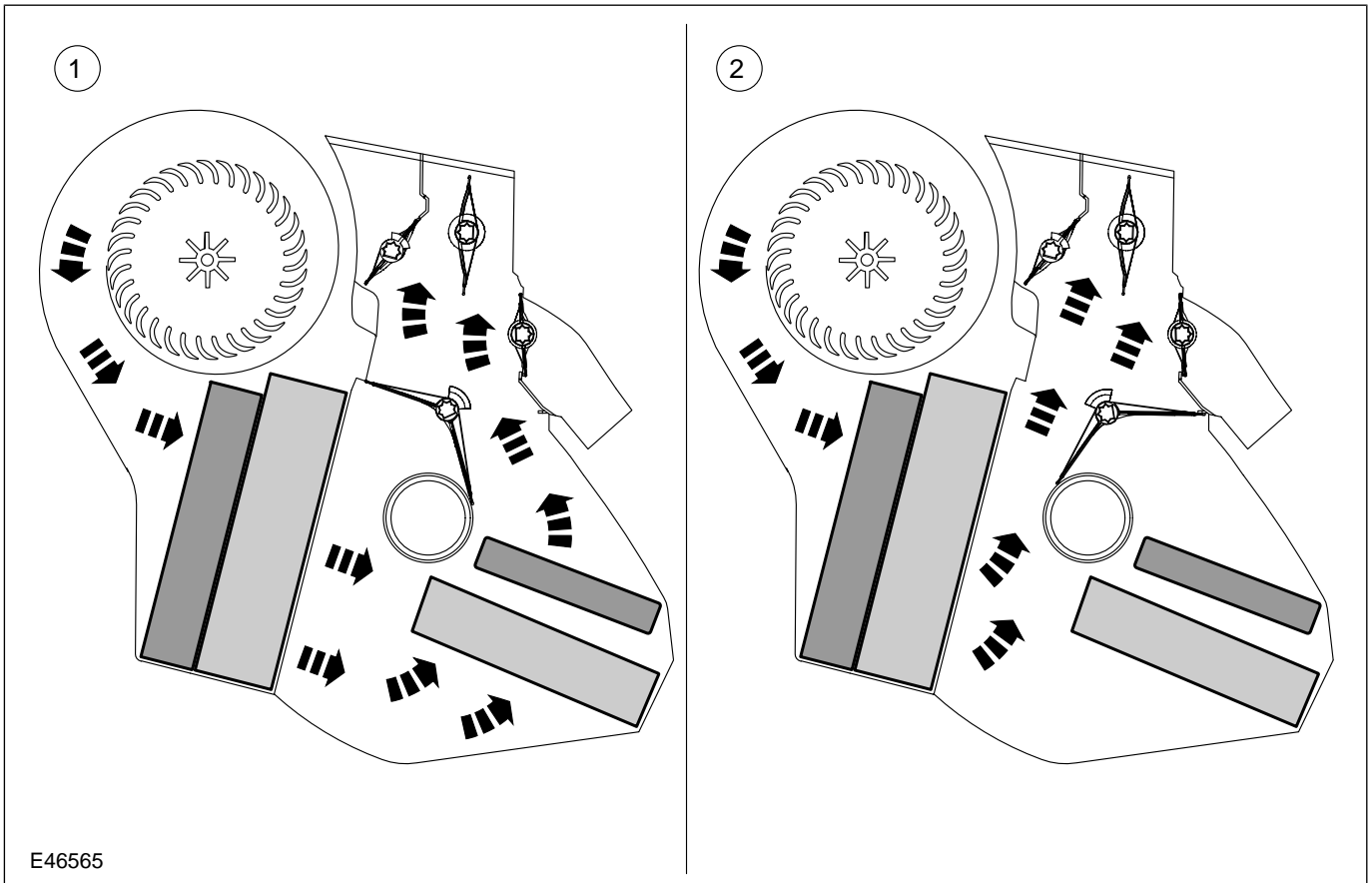
Item	Description
1	Warm air
2	Cold air





DESCRIPTION AND OPERATION

Air flow - center vents



E46565

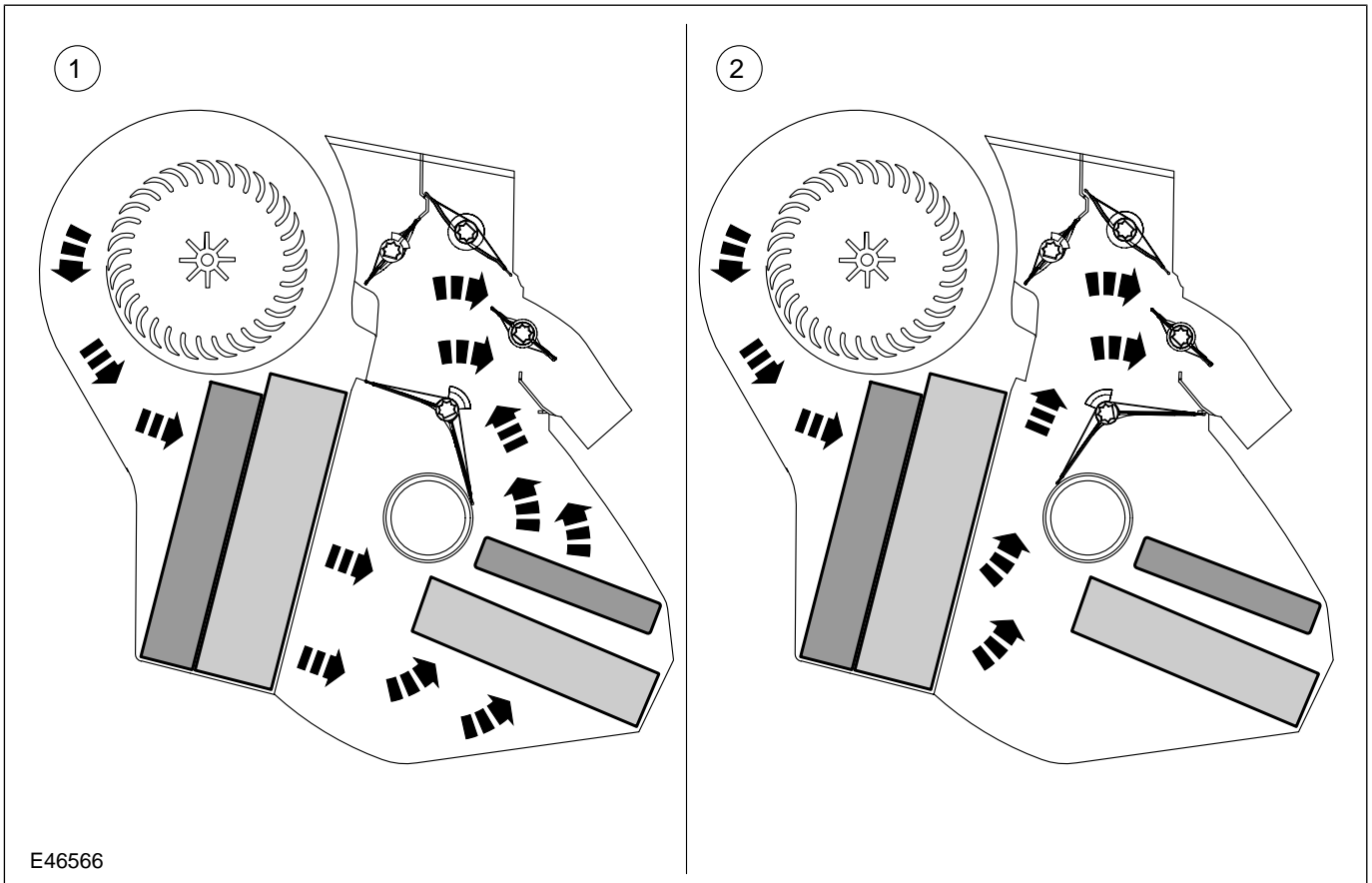
Item	Description
1	Warm air
2	Cold air





DESCRIPTION AND OPERATION

Air flow - footwell



E46566

Item	Description
1	Warm air
2	Cold air





DIAGNOSIS AND TESTING

Heating and Ventilation

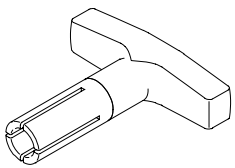
REFER to Section [412-00 \[Climate Control System - General Information\]](#).



REMOVAL AND INSTALLATION

Blower Motor

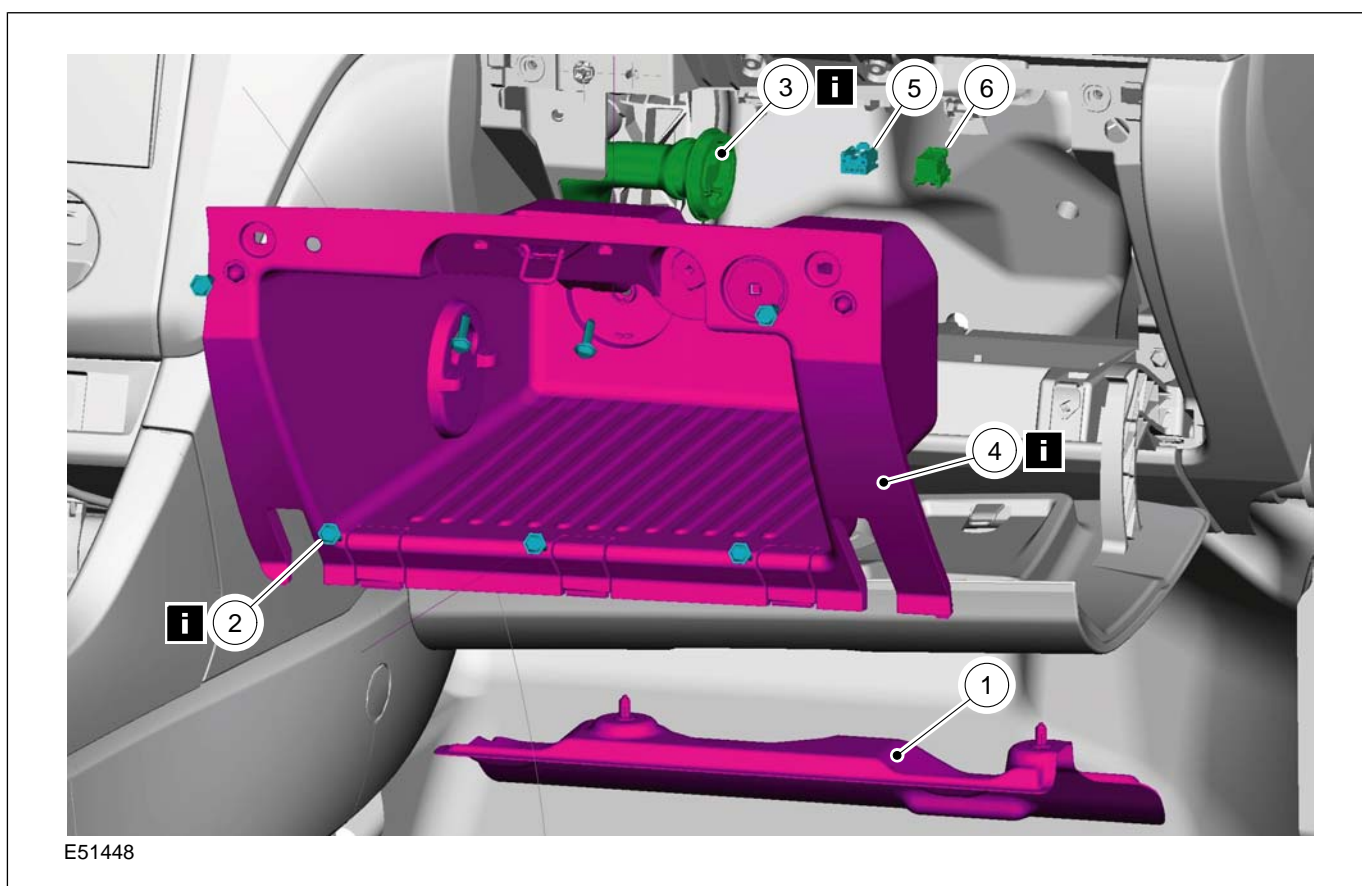
Special Tool(s)

 <p>E42948</p>	<p>Remover/installer, blower motor 412-131</p>
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1. Remove the components in the order indicated in the following illustration(s) and table(s).

CAUTIONS:

- ⚠ To avoid damaging the vanes of the fan wheel, never touch the blower motor fan wheel. Failure to follow these instructions may lead to an imbalance of the fan wheel.
- ⚠ Do not put the blower motor down on the blower motor fan wheel.

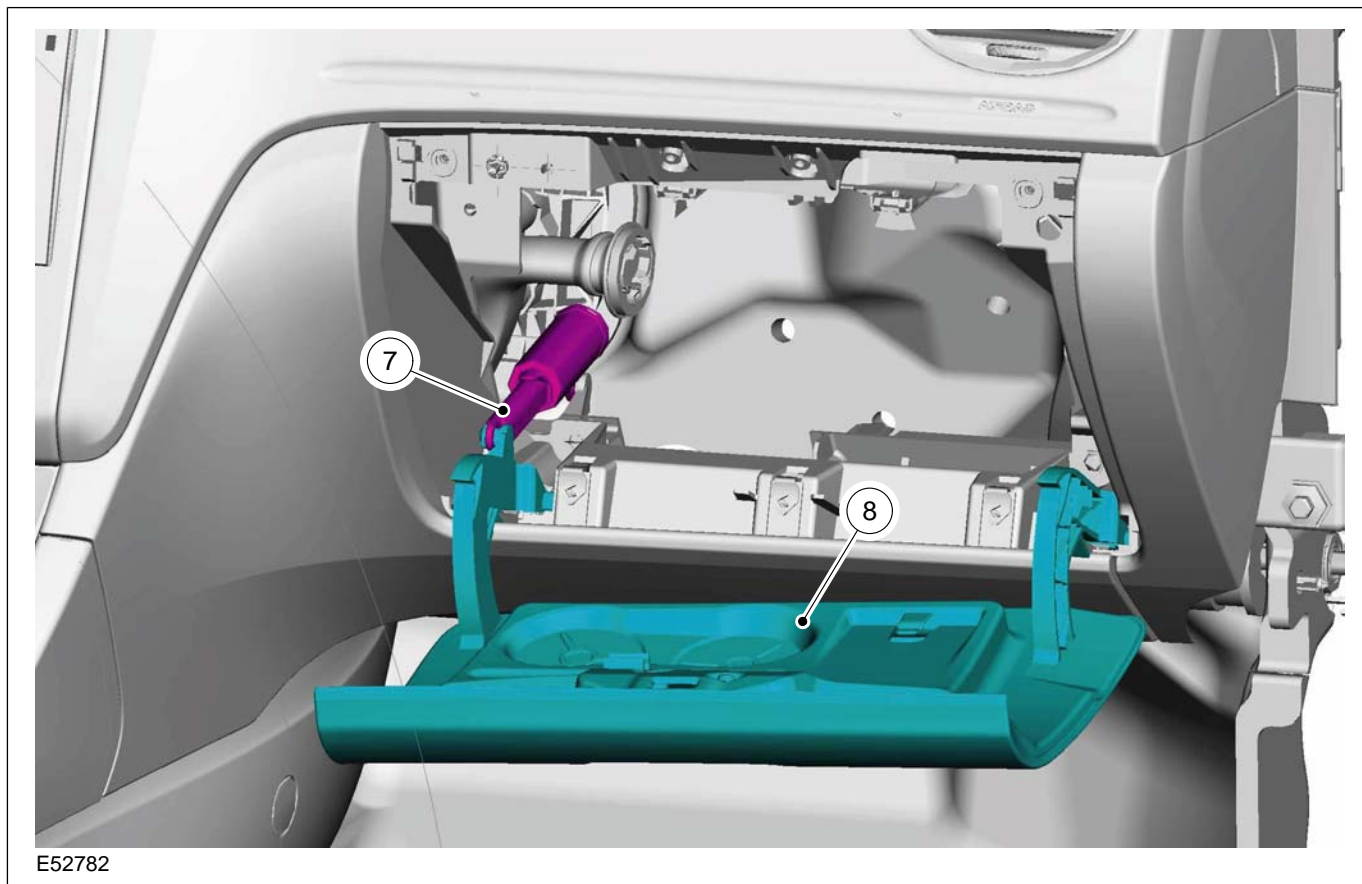


E51448

Item	Description
1	Footwell trim panel
2	Glove compartment screws See Removal Detail
3	Hose, glove compartment cooling (if equipped) See Removal Detail

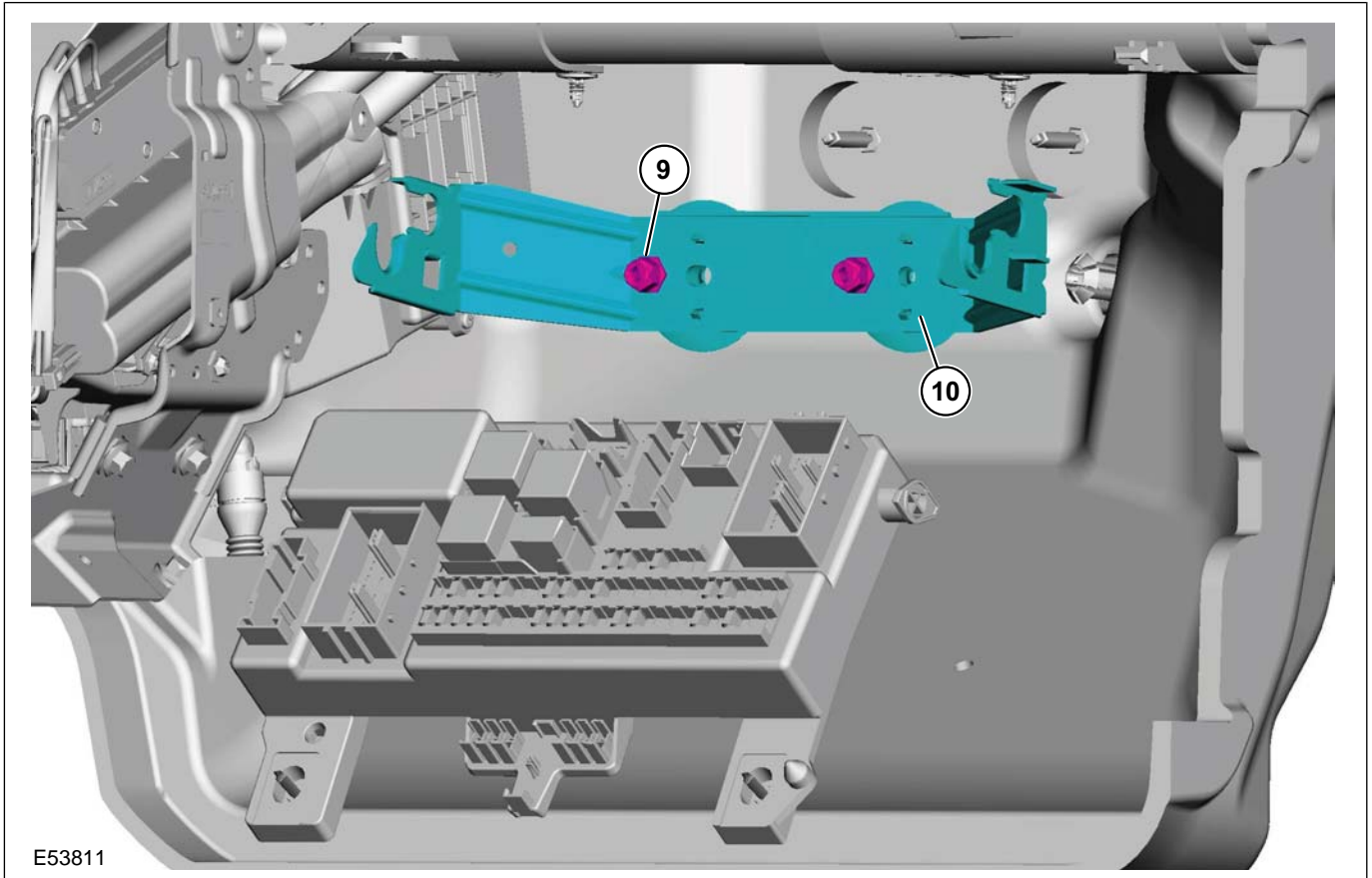
Item	Description
4	Glove compartment See Removal Detail
5	Electrical connector, additional audio input
6	Passenger air bag deactivation (PAD) switch electrical connector (if equipped)

REMOVAL AND INSTALLATION



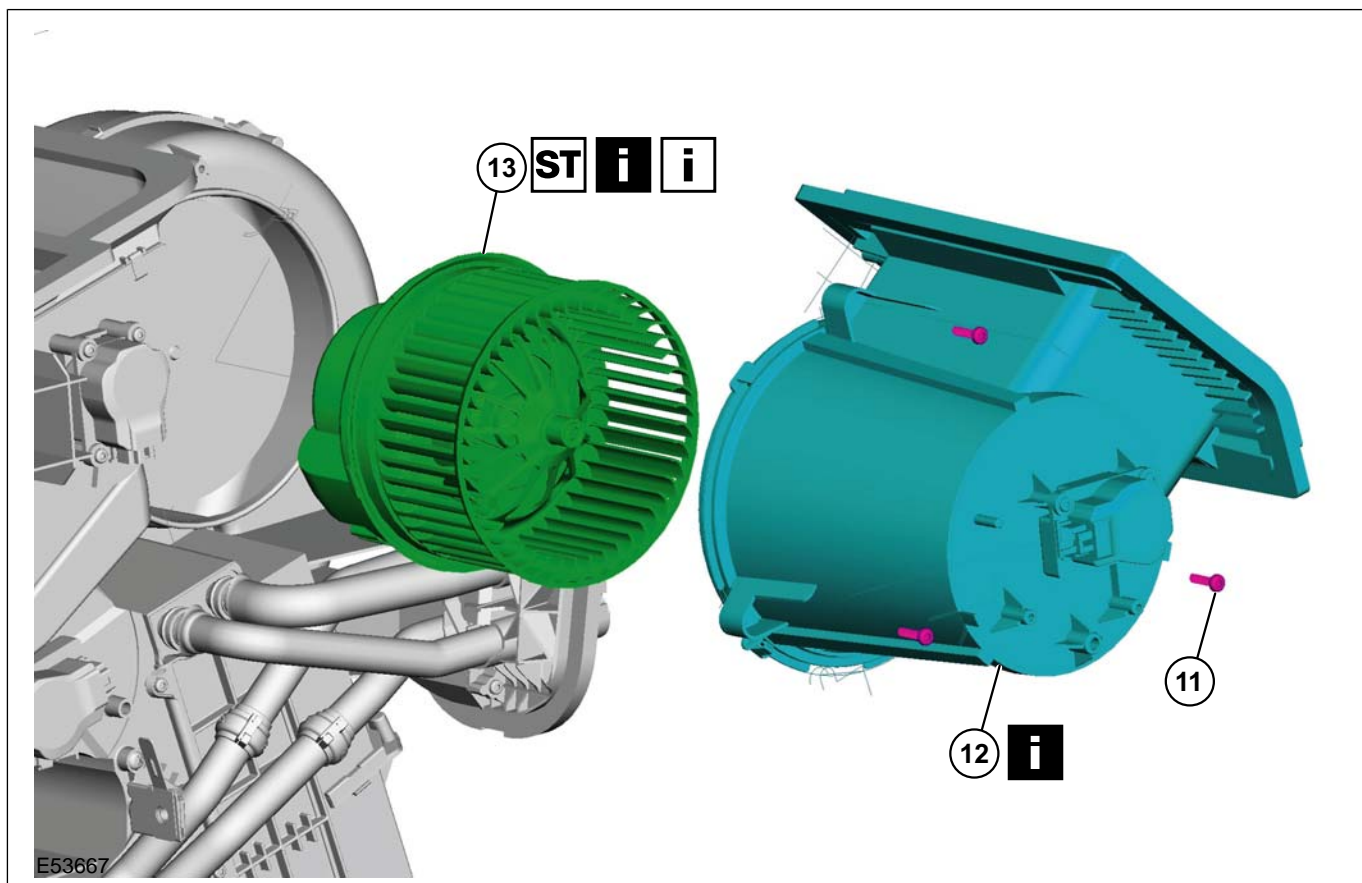
Item	Description
7	Opening damper, glove compartment cover (unhook)
8	Glove compartment cover

REMOVAL AND INSTALLATION



Item	Description
9	CJB bracket nuts
10	CJB bracket

REMOVAL AND INSTALLATION



Item	Description
11	Air recirculation flap housing bolts
12	Air recirculation flap housing See Removal Detail
13	Blower motor See Removal Detail See Installation Detail

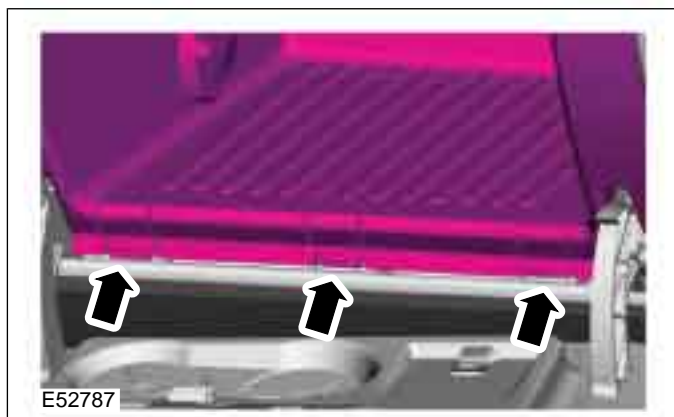
2. To install, reverse the removal procedure.

Removal Details

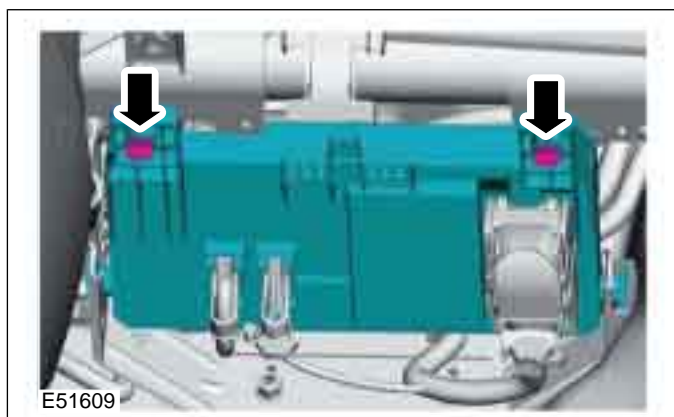
REMOVAL AND INSTALLATION

Item 2 Glove compartment screws

1. Fold down the covering caps of the screws for the glove compartment.

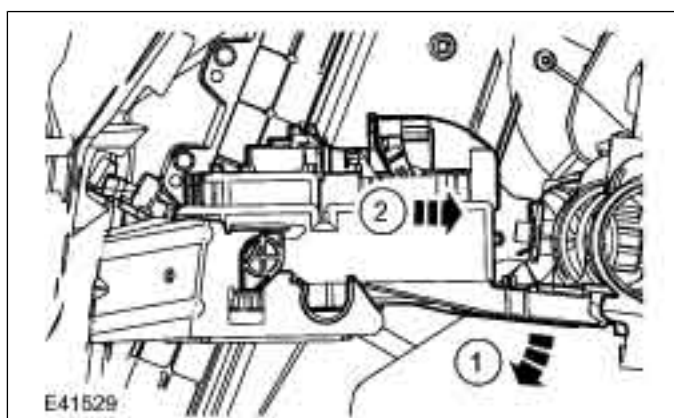


2. Detach the central junction box (CJB) from the reinforcing element.



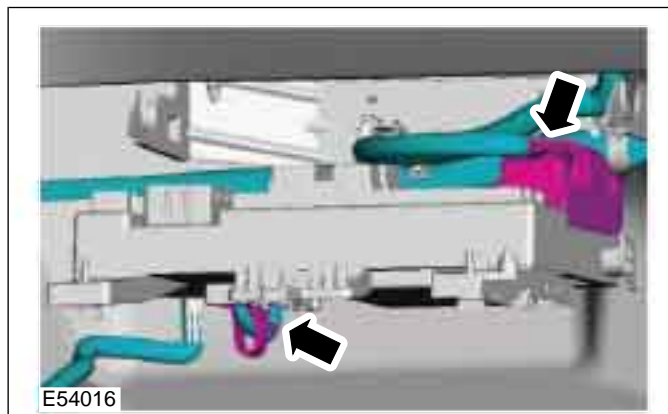
3. Detach the CJB from the CJB bracket.

1. Turn the CJB downwards.
2. Pull out the CJB.



4. **NOTE: RHD vehicles only**

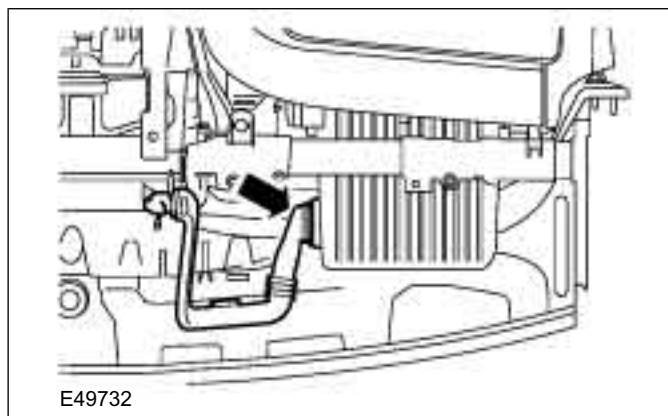
Pull off the engine wiring harness connector from the CJB and secure the CJB to the side.



5. Detach the electric booster heater wiring harness from the CJB bracket (if equipped).

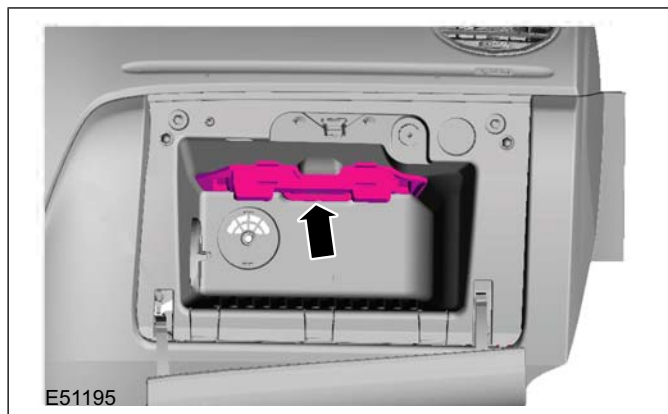
Item 3 Hose, glove compartment cooling (if equipped)

1. Detach the glove compartment cooling hose from the glove compartment.



Item 4 Glove compartment

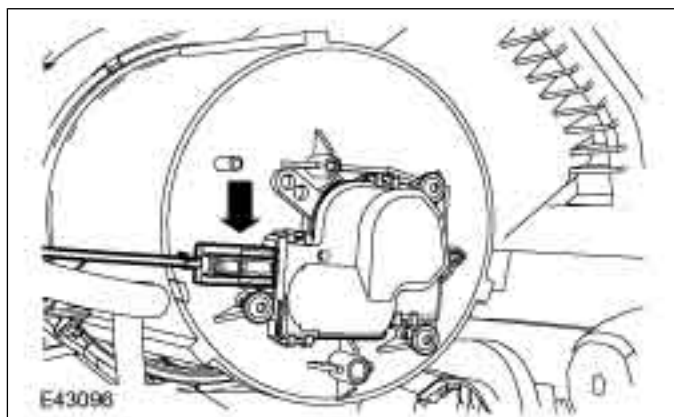
1. Remove the access flap for the DVD drive (if equipped).



REMOVAL AND INSTALLATION

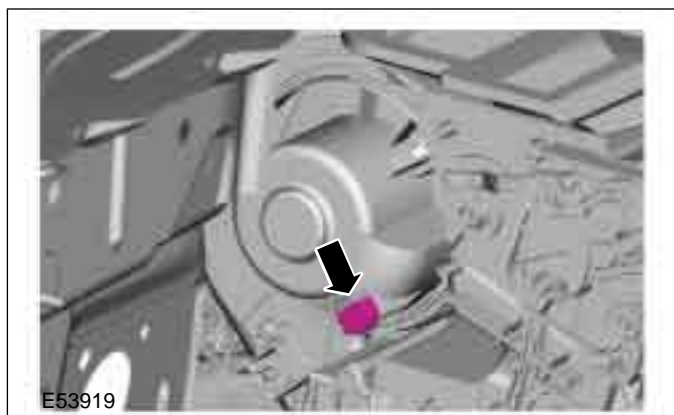
Item 12 Air recirculation flap housing

1. Detach the air recirculation flap actuator connector.



Item 13 Blower motor

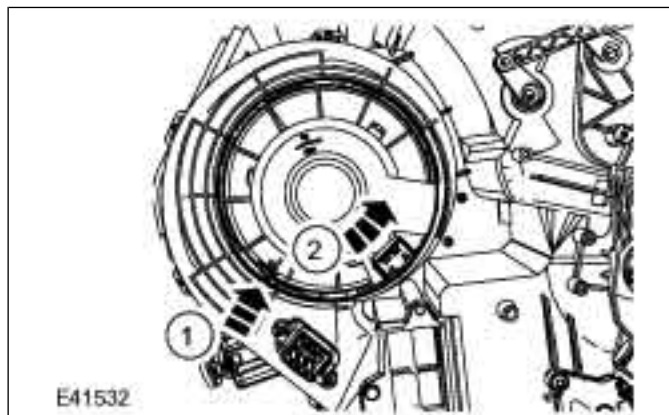
1. Disconnect the blower motor electrical connector.



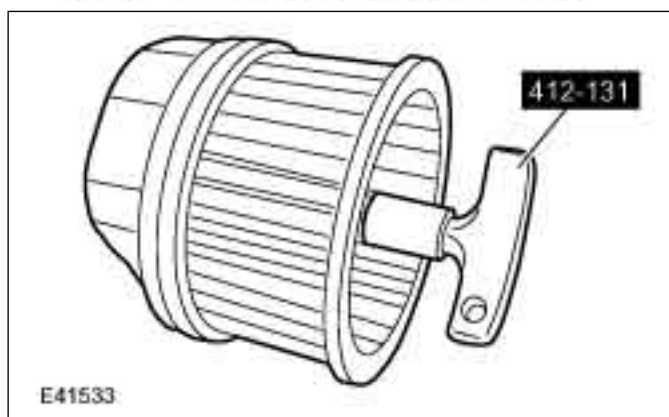
2. **NOTE:** On RHD vehicles, turn the blower motor clockwise to the stop to release.

Release the blower motor.

1. Press the release button.
2. Turn the blower motor counter-clockwise as far as possible.



3. Remove the blower motor from the passenger side using the special tool.



Installation Details

Item 13 Blower motor

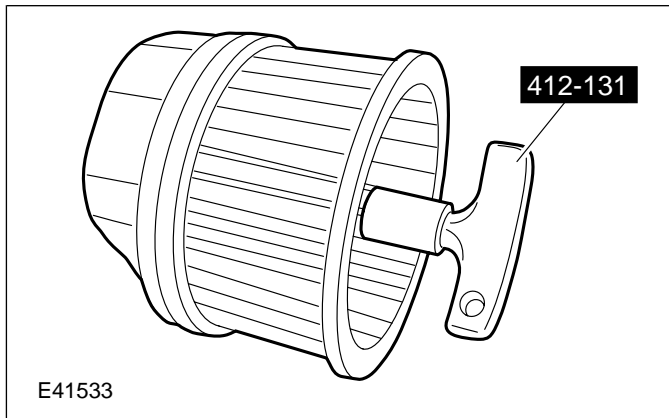
1. **NOTE:** On RHD vehicles, turn the blower motor counter-clockwise to the stop to lock it.

NOTE: Note top position on blower motor.

Move blower motor into the installation position from the passenger side using the special tool.

REMOVAL AND INSTALLATION

- Turn the blower motor into the installation position with the aid of another technician from the driver's side, insert and turn clockwise as far as possible.



REMOVAL AND INSTALLATION

Heater Core and Evaporator Core Housing

NOTE: Four M10 x 120 mm guide bolts are required for removing the dashboard together with the dashboard crossmember.

Vehicles with air conditioning

1. Evacuate the air conditioning (A/C) system.

For additional information, refer to: **Air Conditioning** (A/C) System Recovery, Evacuation and Charging (412-00 Climate Control System - General Information, General Procedures).

All vehicles

2. Drain the cooling system. For additional information, refer to:

Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma), General Procedures),

Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 1.6L Duratec-16V Ti-VCT (Sigma), General Procedures),

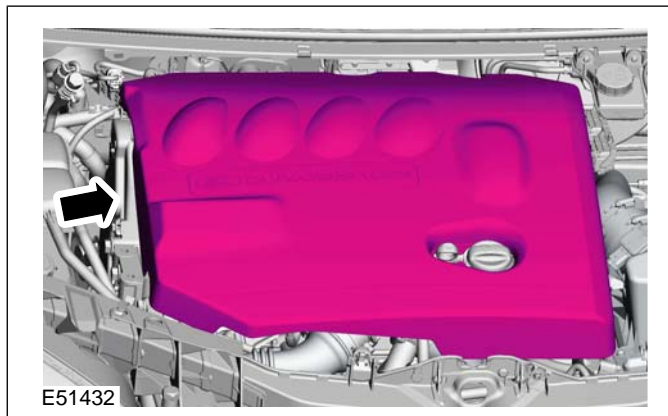
Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), General Procedures),

Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 1.6L Duratorq-TDCi (DV) Diesel, General Procedures),

Cooling System Draining, Filling and Bleeding - 2.0L (303-03 Engine Cooling - 2.0L Duratorq-TDCi (DW) Diesel, General Procedures),

Cooling System Draining, Filling and Bleeding - 2.0L (303-03 Engine Cooling - 2.0L Duratorq-TDCi (DW) Diesel, General Procedures).

3. Remove the engine cover (2.0L diesel shown).



4. Remove the facia crash padding.

For additional information, refer to: **Instrument Panel** (501-12 Instrument Panel and Console, Removal and Installation).

5. Remove the A-pillar trim on the right and left-hand sides.

For additional information, refer to: **A-Pillar Trim Panel** (501-05 Interior Trim and Ornamentation, Removal and Installation).

6. Remove the front rocker panel trim on the right and left hand sides.

For additional information, refer to: **Front Scuff Plate Trim Panel** (501-05 Interior Trim and Ornamentation, Removal and Installation).

7. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



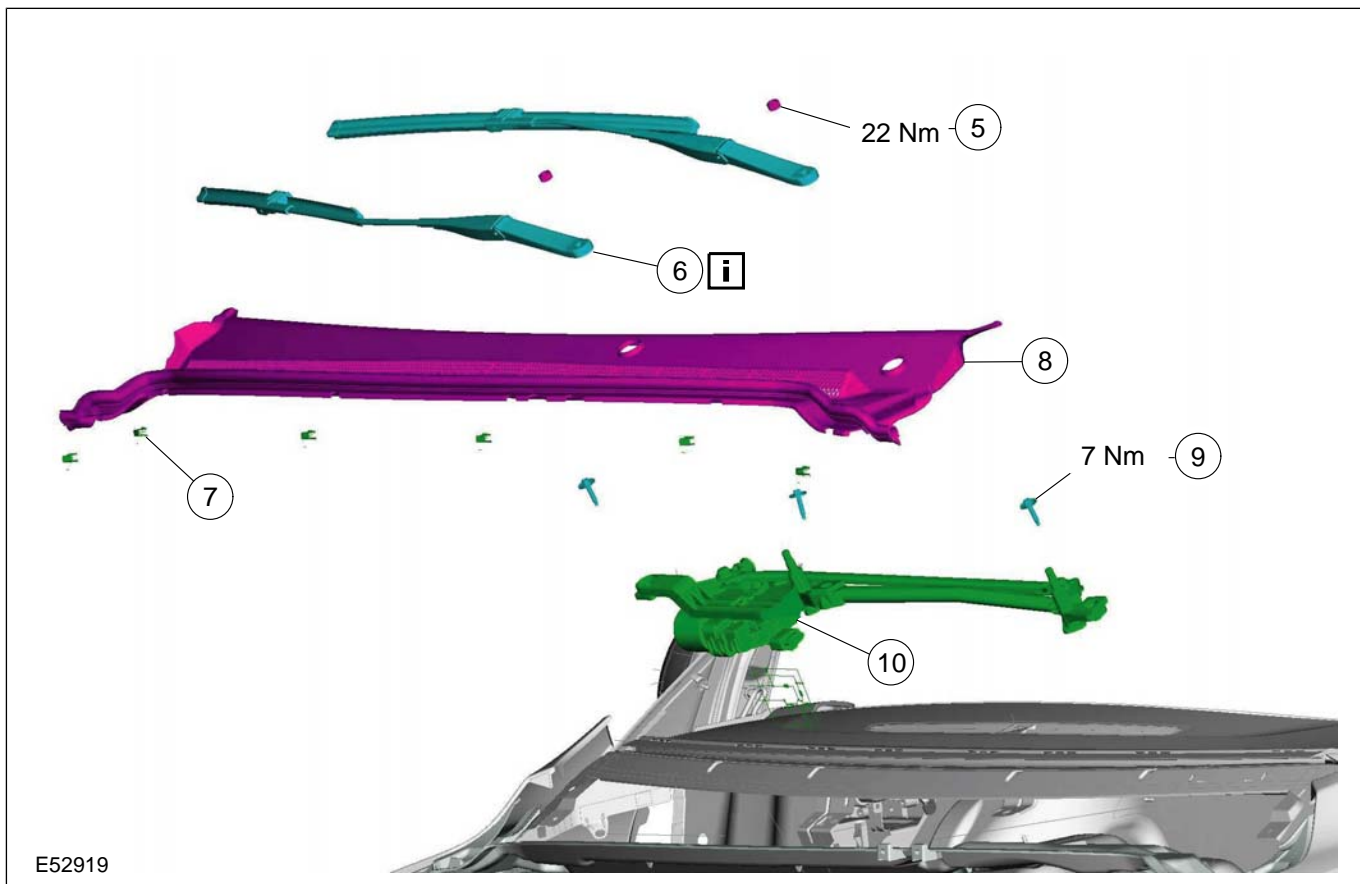
E52944

Item	Description
1	Door check strap bolt
2	Door hinge bolts See Removal Detail See Installation Detail

Item	Description
3	Front doors (driver's door shown) See Removal Detail
4	Dashboard crossmember side bolts See Removal Detail

REMOVAL AND INSTALLATION

⚠ CAUTION: Make sure that the windshield wiper motor is in the park position.



E52919

Item	Description
5	Windshield wiper arm nuts
6	Windshield wiper arms See Installation Detail
7	Clips, cowl panel grille

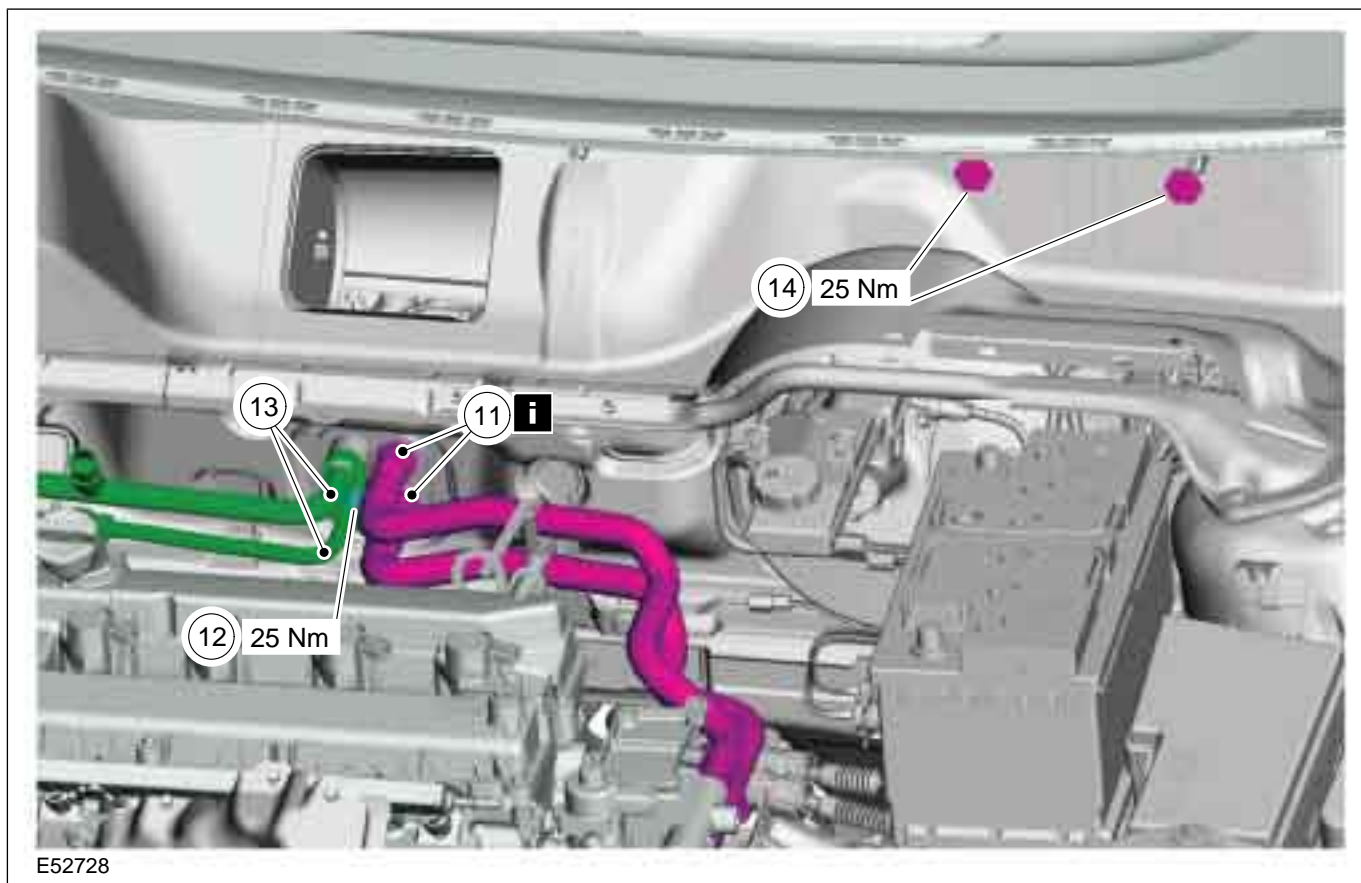
Item	Description
8	Cowl Panel Grille
9	Bolts for windshield wiper motor with linkage
10	Windshield wiper motor with linkage (secure to the side)

REMOVAL AND INSTALLATION

CAUTIONS:

- ⚠ Close off the coolant lines to prevent fluid loss or dirt ingress.
- ⚠ Close off the refrigerant lines and the evaporator to prevent dirt ingress.

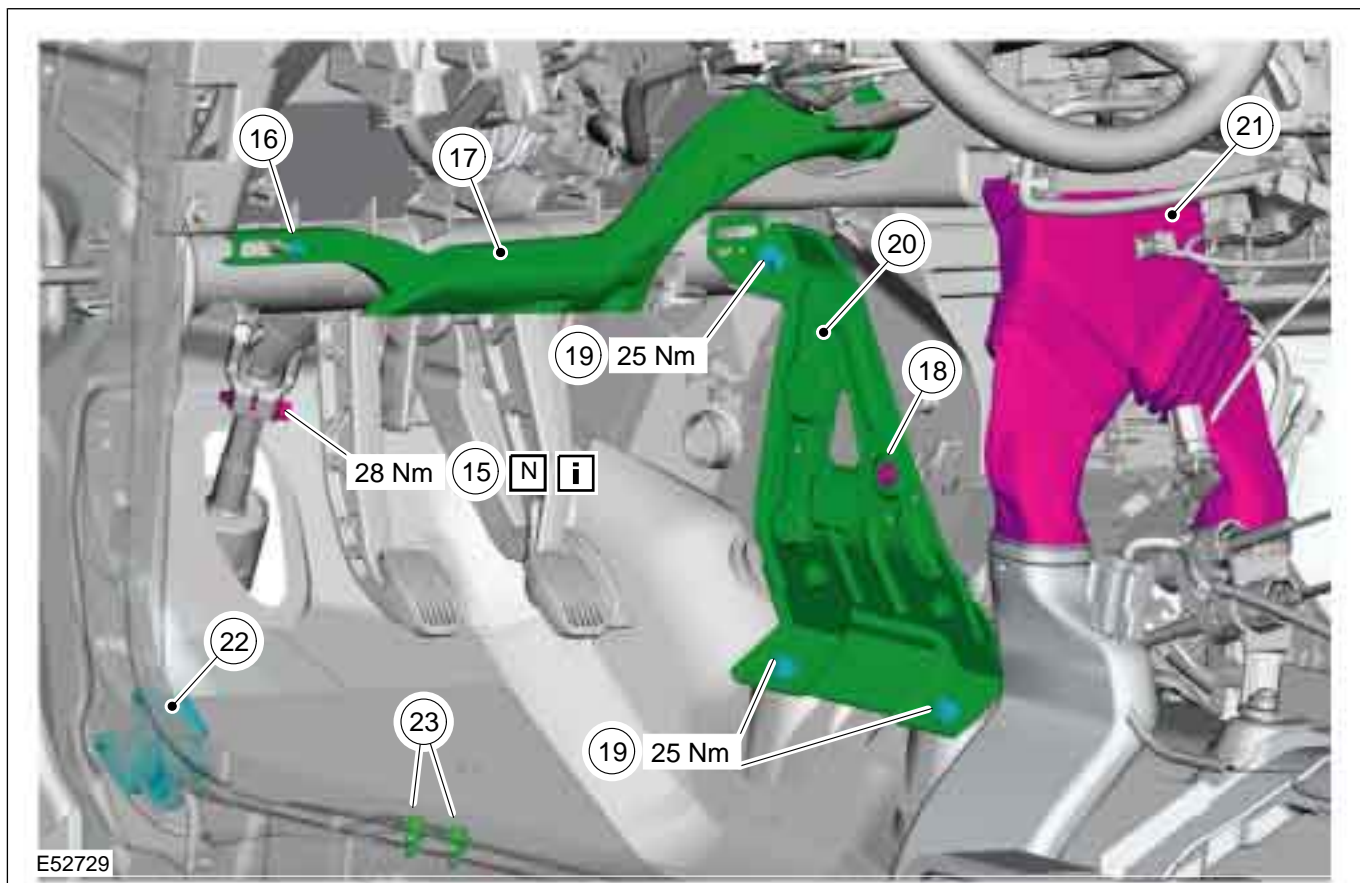
NOTE: Discard the refrigerant line O-rings.



Item	Description
11	Coolant lines See Removal Detail
12	Bolt, refrigerant lines (if equipped)

Item	Description
13	Refrigerant lines (if equipped)
14	Steering column bracket upper bolts

REMOVAL AND INSTALLATION



Item	Description
15	Steering column shaft joint bolt See Installation Detail
16	Bolt, footwell air duct
17	Footwell air duct
18	Bolt, heater core/evaporator housing

Item	Description
19	Bolts, bracket for reinforcing element
20	Bracket, reinforcing element
21	Rear footwell air duct
22	Connector - passenger compartment wiring harness
23	Ground cable bolts

REMOVAL AND INSTALLATION

▲ WARNING: Never perform work on the electric booster heater before the electric booster heater element has cooled to ambient temperature. Failure to observe this instruction can lead to injury.

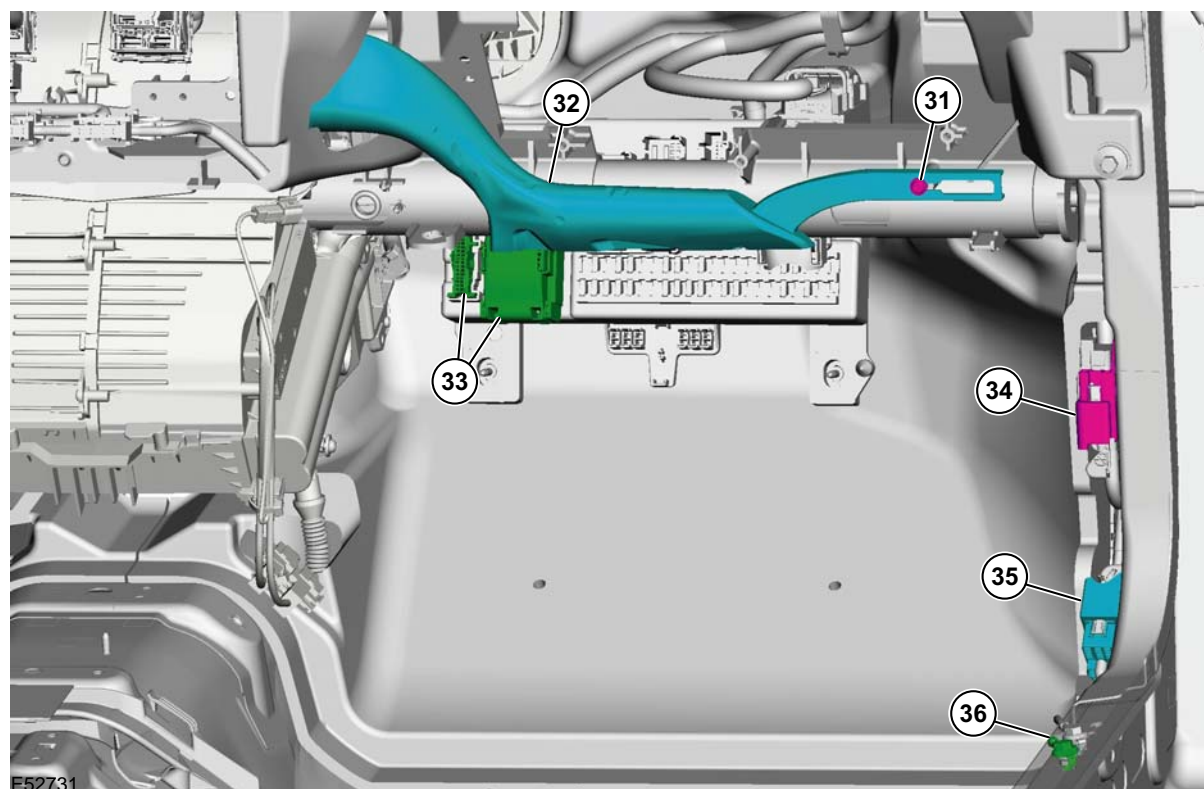


E52730

Item	Description
24	Bolt, heater core/evaporator housing
25	Retaining clips, instrument panel wiring harness
26	Ground cable bolt

Item	Description
27	Retaining clip, engine compartment wiring harness (if equipped)
28	Bolts, bracket for reinforcing element
29	Bracket, reinforcing element
30	Connector - electric booster heater (if equipped)

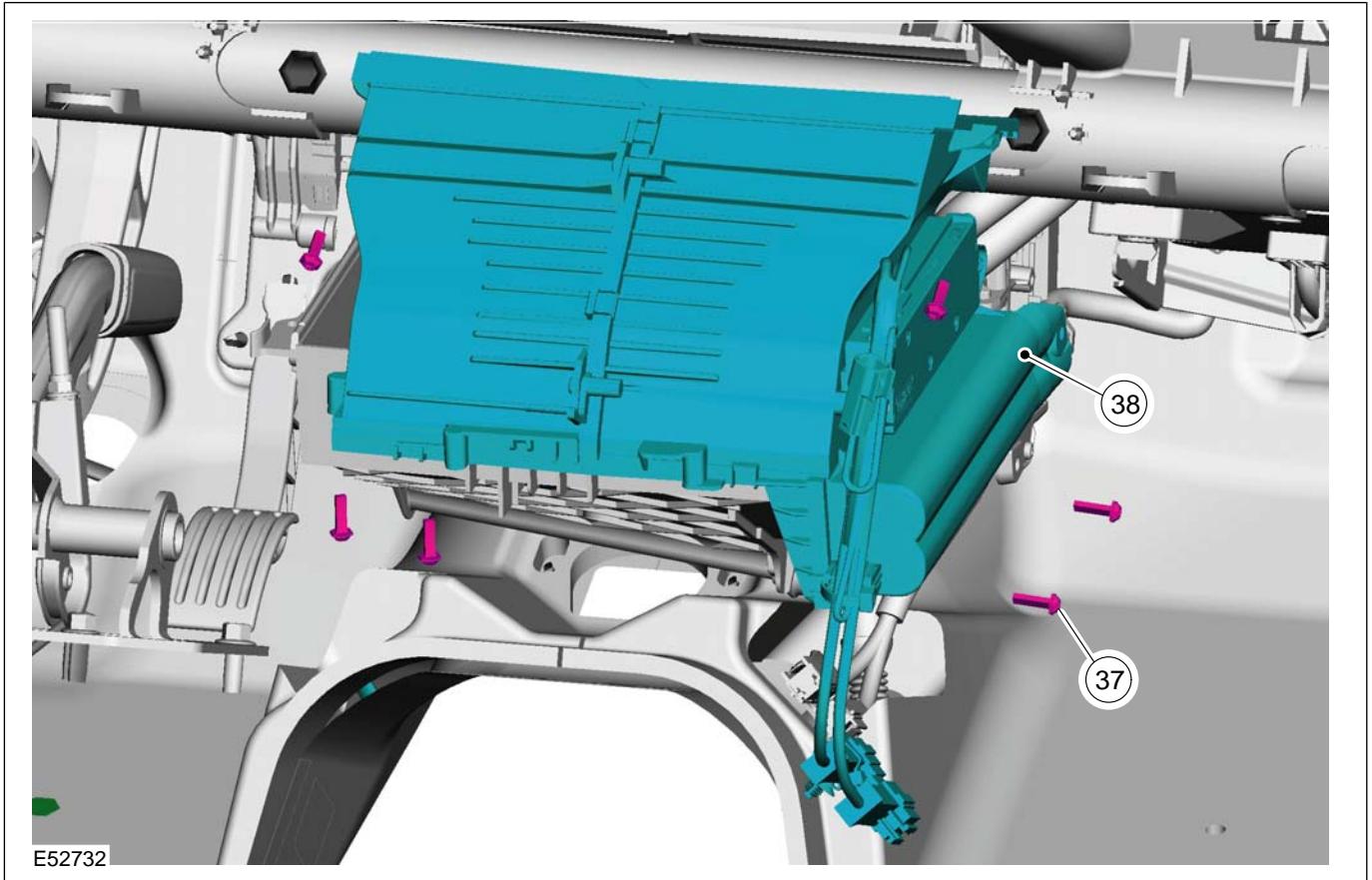
REMOVAL AND INSTALLATION



Item	Description
31	Bolt, footwell air duct
32	Footwell air duct
33	Dashboard wiring harness connector

Item	Description
34	Connector - engine compartment wiring harness
35	Connector - passenger compartment wiring harness
36	Ground cable bolt

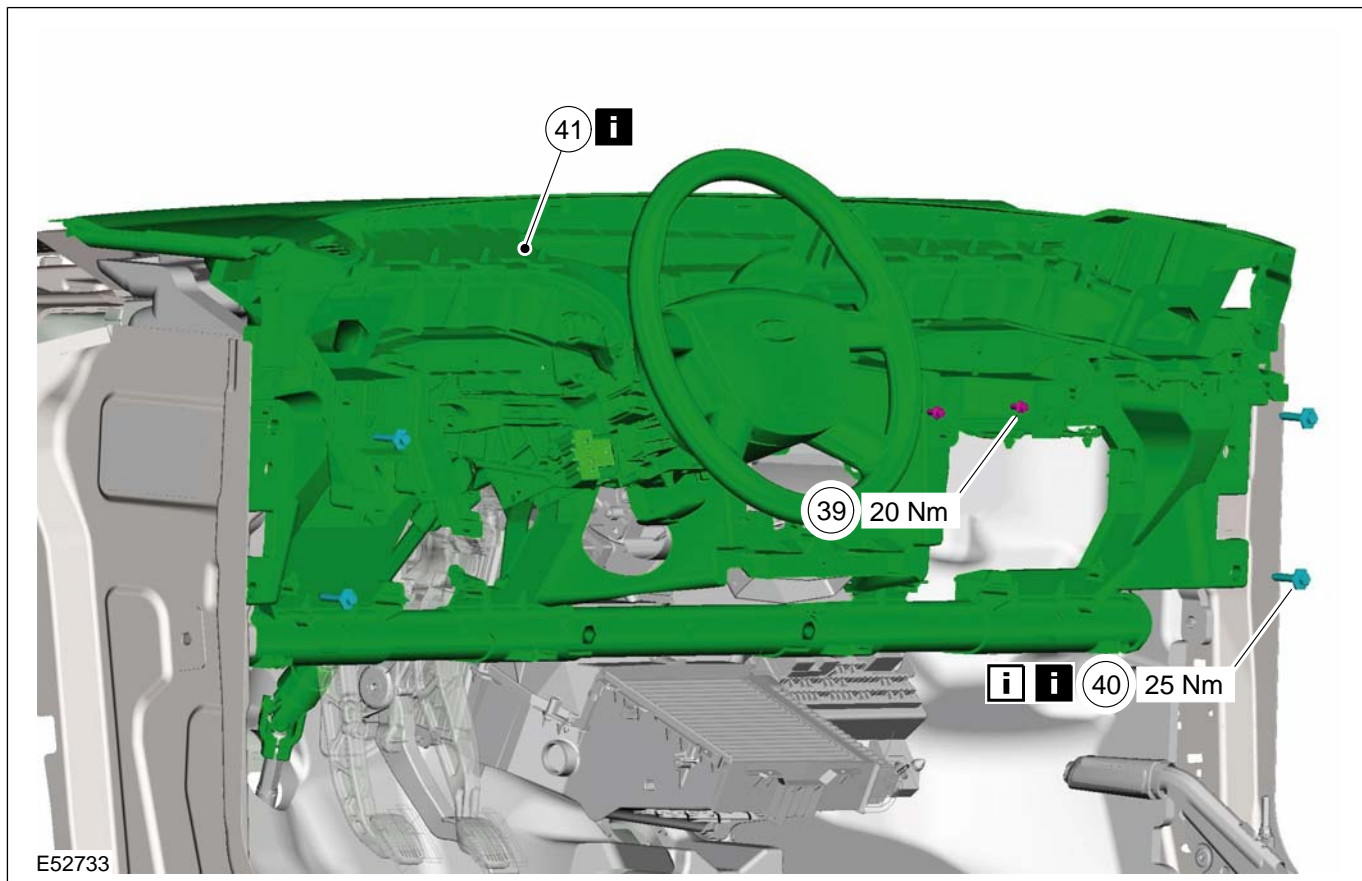
REMOVAL AND INSTALLATION



E52732

Item	Description
37	Heater core upper cover bolts
38	Heater core upper cover

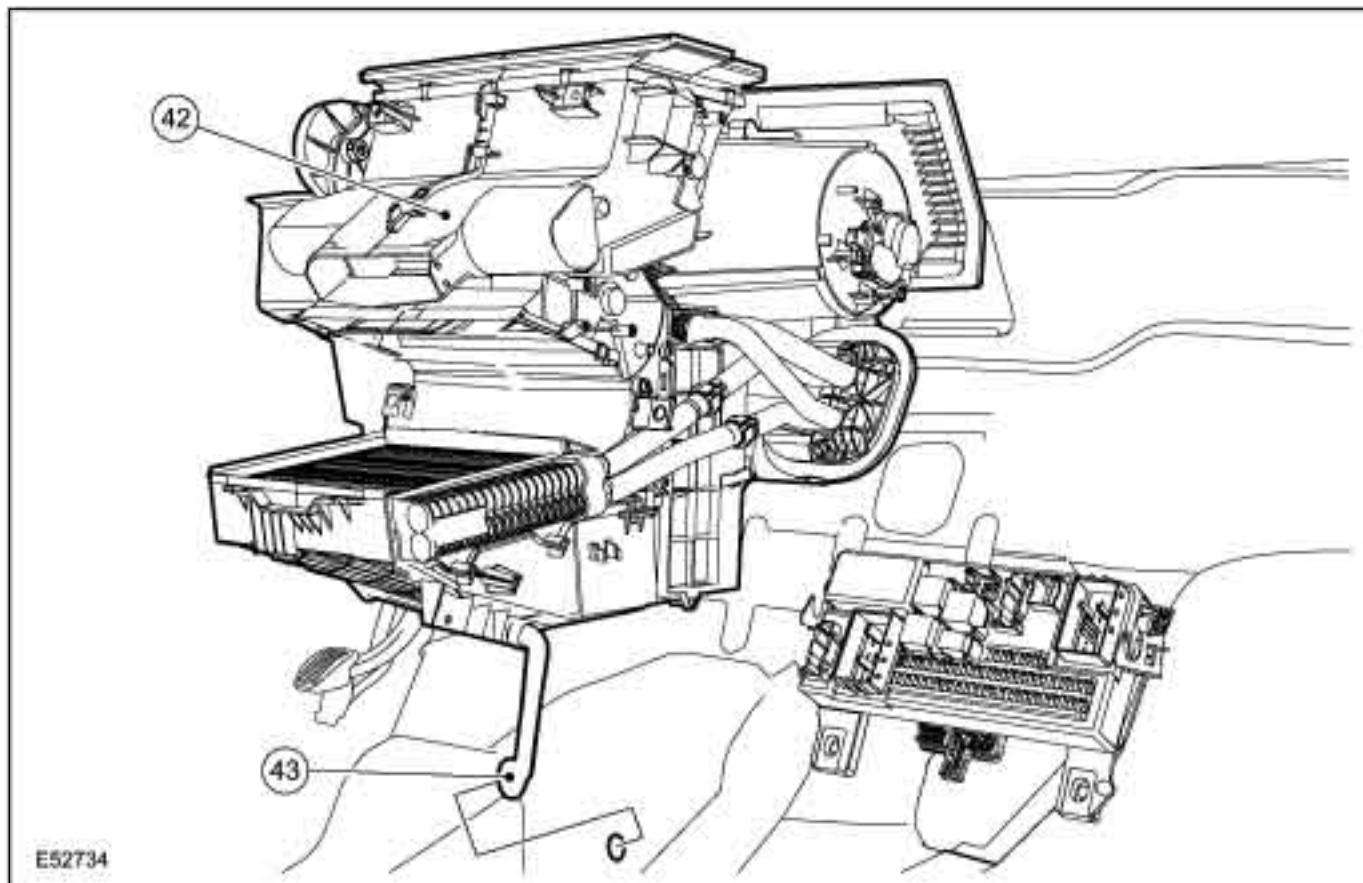
REMOVAL AND INSTALLATION



Item	Description
39	Dashboard crossmember inner bolts
40	Dashboard crossmember outer bolts See Removal Detail See Installation Detail
41	Dashboard crossmember See Removal Detail

REMOVAL AND INSTALLATION

⚠ CAUTION: Ensure that no coolant gets into the footwell in order to prevent soiling of the carpet.



Item	Description
42	Heater housing
43	Heater housing water drain pipe

8. To install, reverse the removal procedure.

NOTE: Install new refrigerant line O-rings.

NOTE: Coat the refrigerant line O-rings with clean refrigerant oil before installation.

9. Check the angle of the windshield wiper arms in relation to the windshield.

For additional information, refer to:

Windshield Wiper Blade and Pivot Arm Adjustment (501-16 Wipers and Washers, General Procedures).

Removal Details

412-02-26

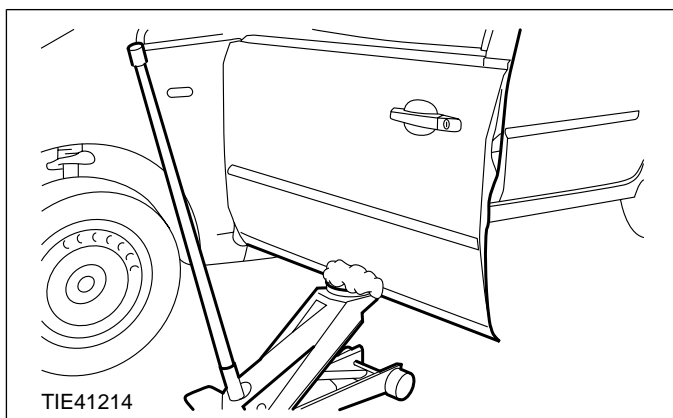
Heating and Ventilation

412-02-26

REMOVAL AND INSTALLATION

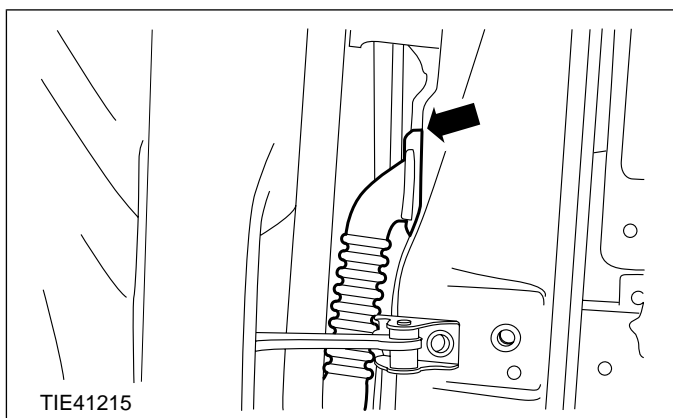
Item 2 Door hinge bolts

1. Support the door using a trolley jack with the aid of another technician.

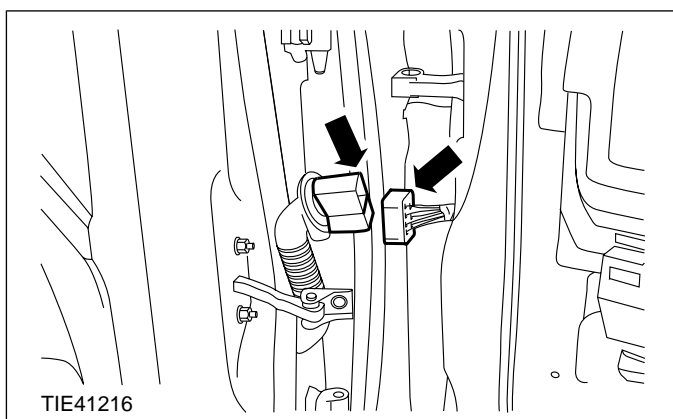


Item 3 Front doors (driver's door shown)

1. Detach the front door wiring harness connector from the A-pillar.



2. Detach the front door wiring harness connector.



Item 4 Dashboard crossmember side bolts

1. **CAUTION:** Do not remove the dashboard crossmember side bolts.

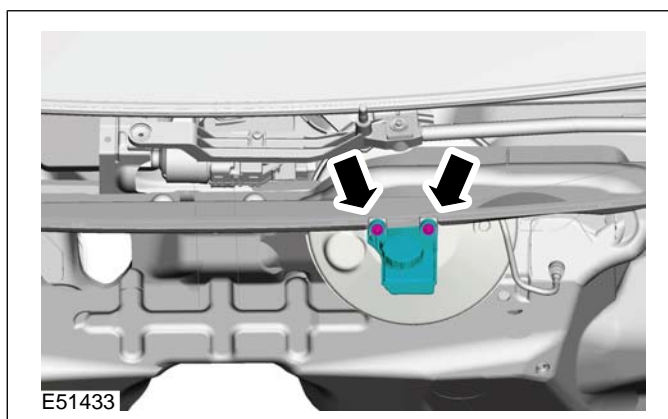
Loosen the dashboard crossmember right and left-hand side bolts.

Item 11 Coolant lines

1. **CAUTION:** If brake fluid comes into contact with the paintwork, the affected area must be washed down immediately with cold water.

NOTE: Only vehicles with 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) or diesel engine

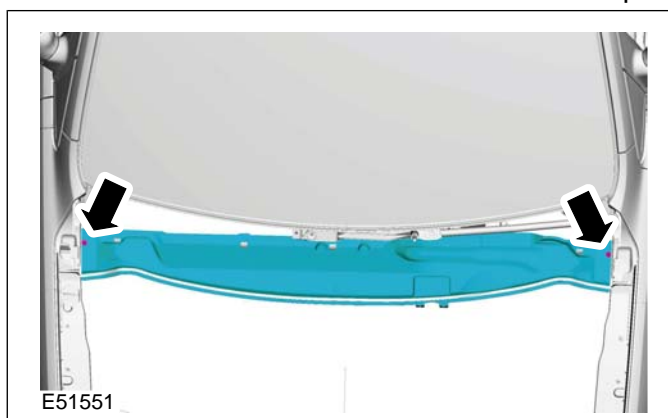
Detach the brake fluid reservoir from the bulkhead extension and tie it back to one side.



2. **NOTE:** Only vehicles with 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) or diesel engine

Remove the bulkhead extension.

- Pull the bulkhead extension out of the clips.



3. **CAUTION:** Close off the coolant lines to prevent fluid loss or dirt ingress.

Detach the coolant lines from the heater core.

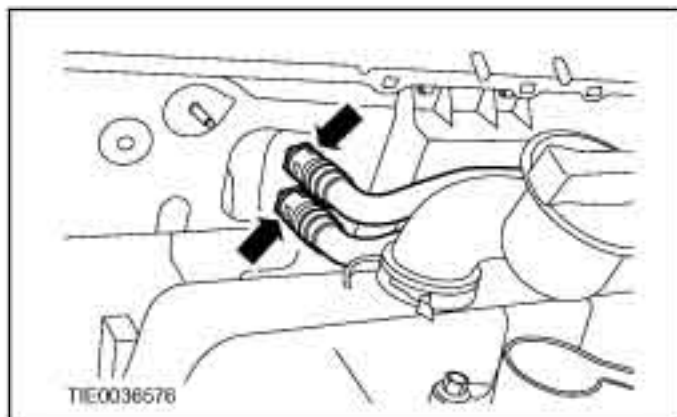
412-02-27

Heating and Ventilation

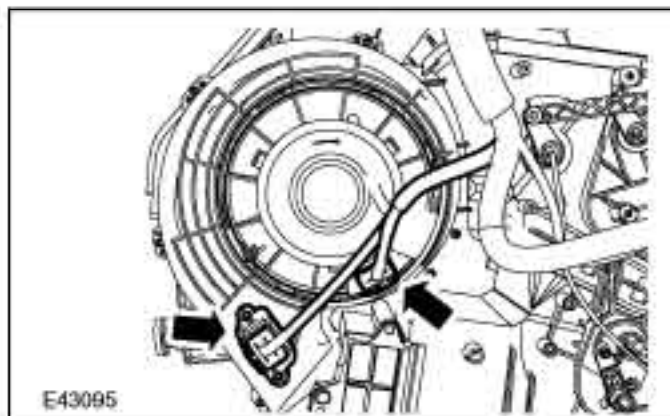
412-02-27

REMOVAL AND INSTALLATION

- Turn the coolant line snap ring counter-clockwise to the stop and detach the coolant line.

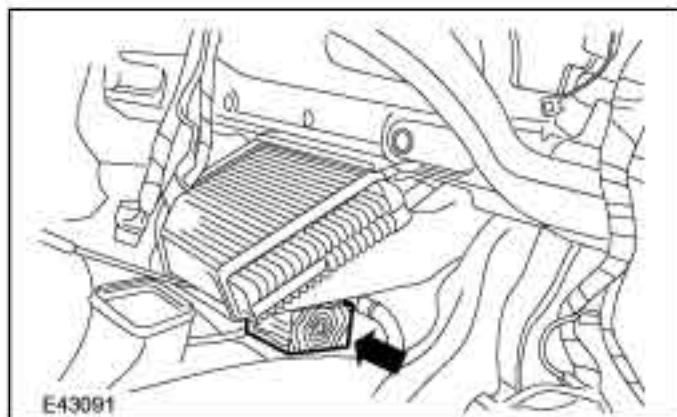


3. Detach the blower resistor connector (if fitted) and the blower motor connector.

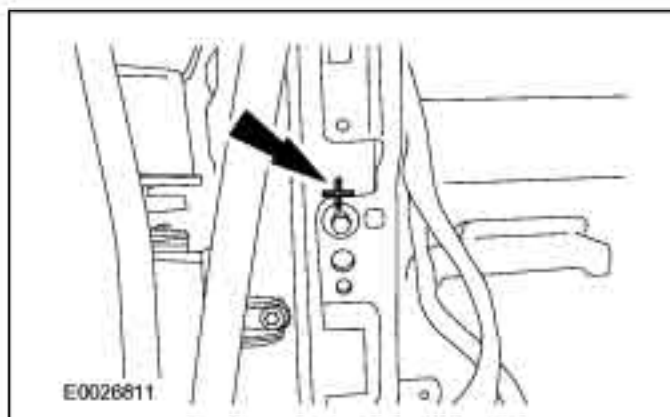


Item 40 Dashboard crossmember outer bolts

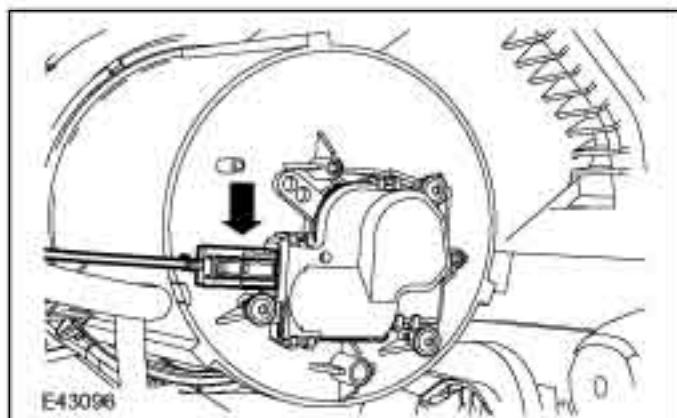
1. Support the heater housing with a wooden block.



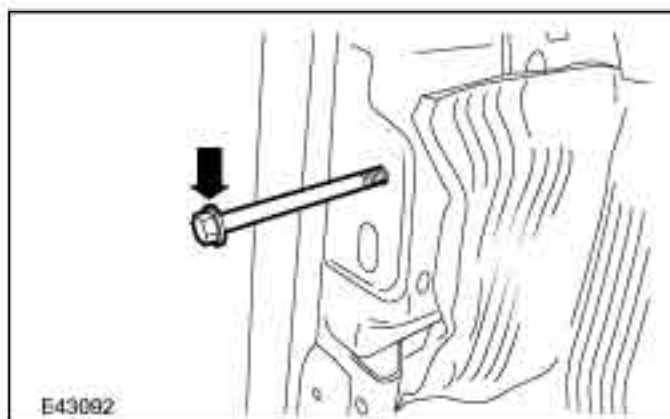
4. Mark the position of the dashboard crossmember relative to the A-pillars (left-hand side shown).



2. Detach the air recirculation flap actuator connector.



5. After removing the outer bolts of the dashboard crossmember, screw in two M10 x 120 mm guide bolts each into the right and left-hand A-pillars (shown without dashboard crossmember for clarity).



6. Remove the right and left-hand side bolts of the dashboard crossmember.

412-02-28

Heating and Ventilation

412-02-28

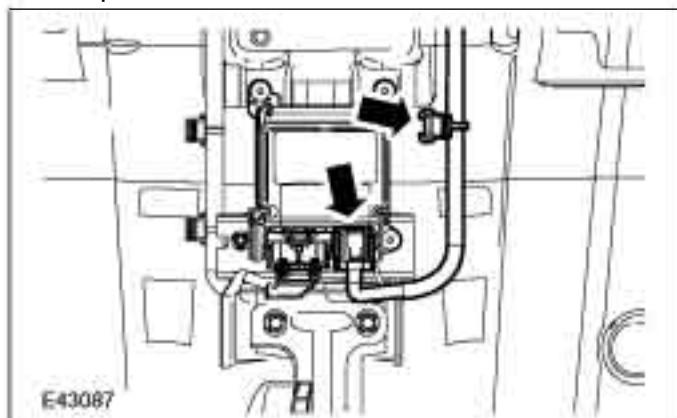
REMOVAL AND INSTALLATION

7. Pull the dashboard crossmember forwards until it reaches a stop.

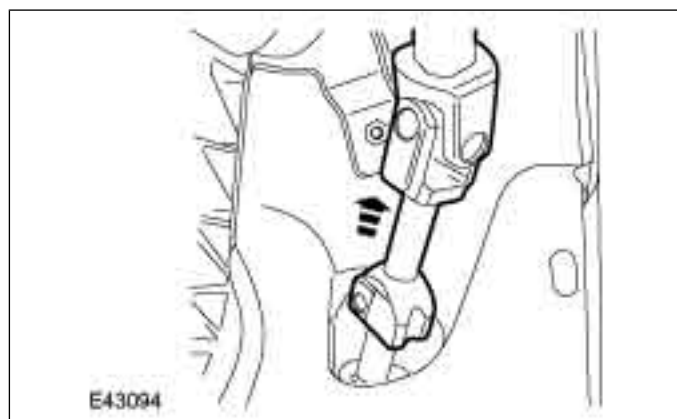


Item 41 Dashboard crossmember

1. Disconnect the connector from the airbag module.
- Unclip the centre console wiring harness and pull it out.

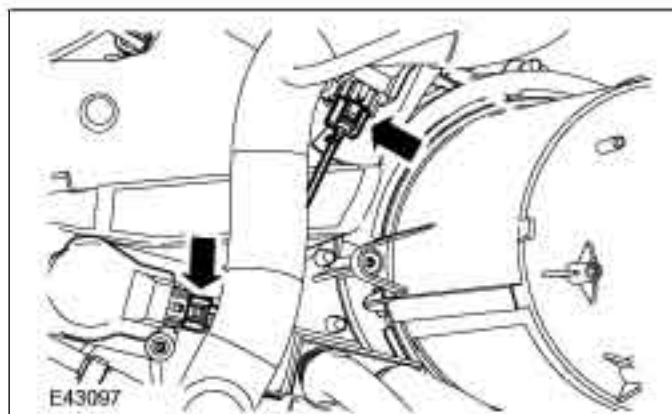


2. Detach the steering column shaft joint from the steering column shaft.



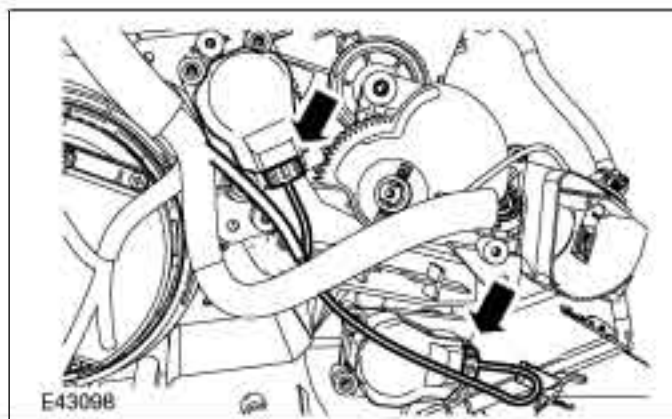
3. NOTE: Vehicles with EATC only

- Detach the right-hand temperature flap actuator connector and the defrost flap actuator connector.



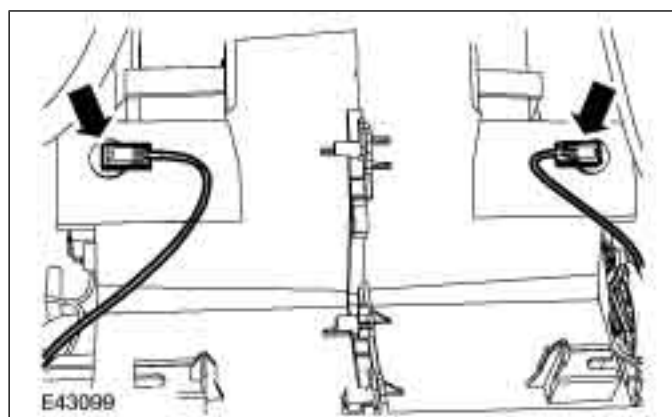
4. NOTE: Vehicles with EATC only

- Detach the left-hand temperature flap actuator connector and the air distribution flap actuator connector.



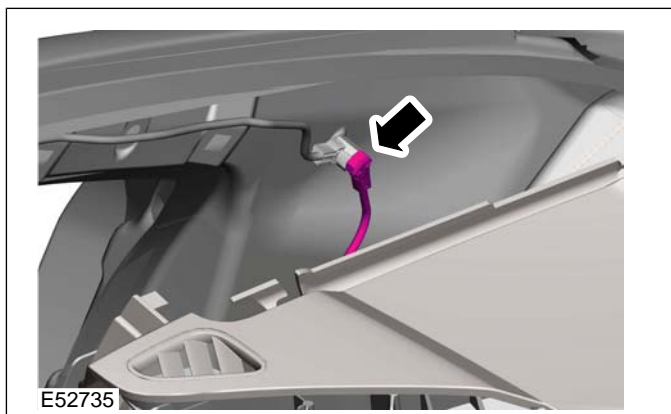
5. NOTE: Vehicles with EATC only

- Detach the air outlet temperature sensor connector.

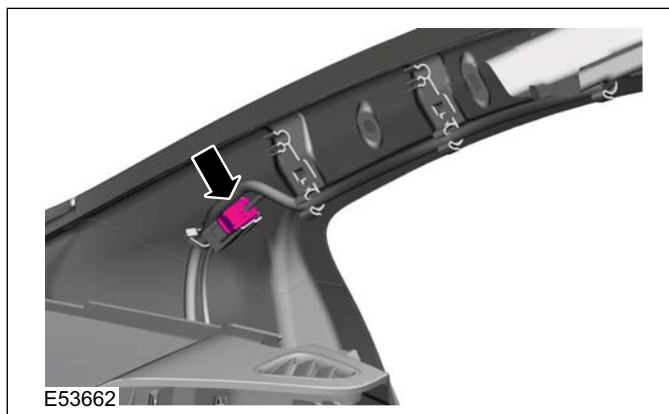


REMOVAL AND INSTALLATION

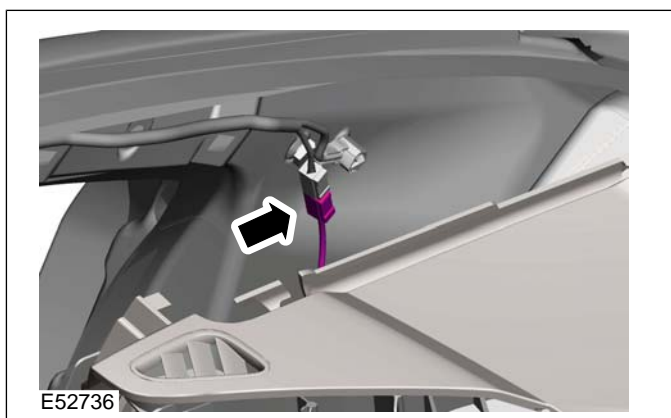
6. Separate the radio antenna cable push-fit connector.



8. Detach the overhead console wiring harness connector.



7. Separate the car telephone antenna cable push-fit connector (if equipped).

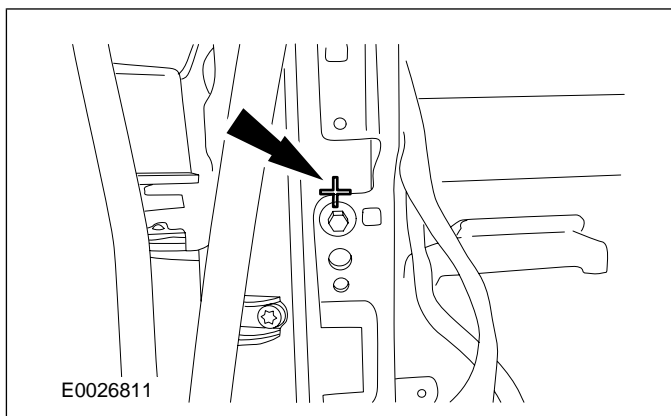


9. Remove the right and left-hand M10 x 120 mm guide bolts.

Installation Details

Item 40 Dashboard crossmember outer bolts

1. Align the dashboard crossmember to the A-pillars (left-hand side shown).



Item 15 Steering column shaft joint bolt

▲ WARNING: Install a new steering column shaft joint bolt. Failure to follow this instruction may result in personal injury.

Item 6 Windshield wiper arms

▲ CAUTION: Move the windshield wiper motor to the parked position before installing the wiper arms.

Item 2 Door hinge bolts

1. Apply thread locking compound to the door hinge bolts.

REMOVAL AND INSTALLATION

Heater Core — RHD

All vehicles

1. Drain the cooling system. For additional information, refer to:

Cooling System Draining, Filling and

Bleeding (303-03 Engine Cooling - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma), General Procedures),

Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 1.6L Duratec-16V Ti-VCT (Sigma), General Procedures),

Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4), General Procedures),

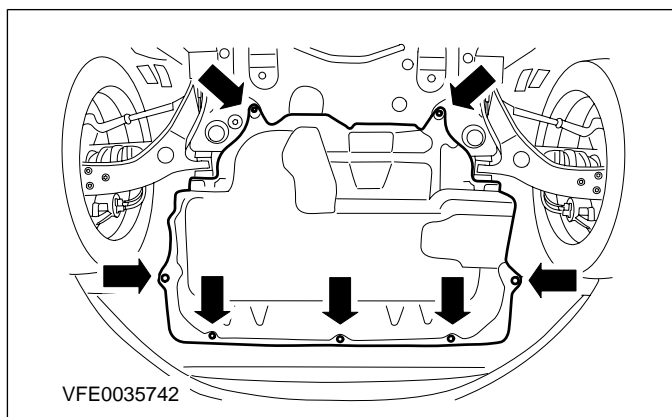
Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 1.6L Duratorq-TDCi (DV) Diesel, General Procedures),

Cooling System Draining, Filling and Bleeding - 2.0L (303-03 Engine Cooling - 2.0L Duratorq-TDCi (DW) Diesel, General Procedures),

Cooling System Draining, Filling and Bleeding (303-03 Engine Cooling - 2.5L Duratec-ST (VI5), General Procedures).

Vehicles with manual transaxle

2. Remove the engine undershield (if fitted).



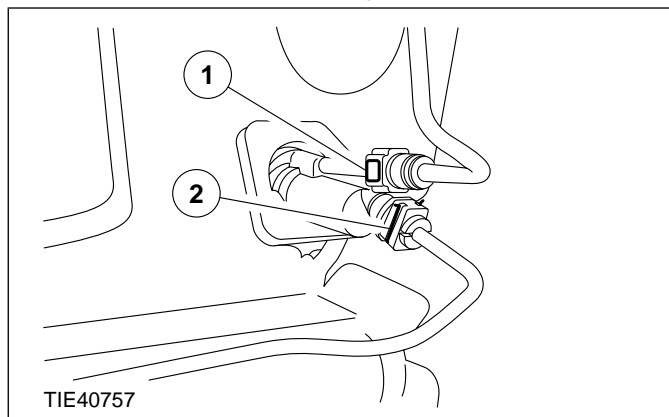
3. CAUTIONS:

⚠ If brake fluid comes into contact with the paintwork, the affected area must be washed down immediately with cold water.

⚠ Ensure that no brake fluid gets into the footwell in order to prevent soiling of the carpet.

Detach the clutch slave cylinder pressure pipe and the brake fluid reservoir hose from the clutch master cylinder.

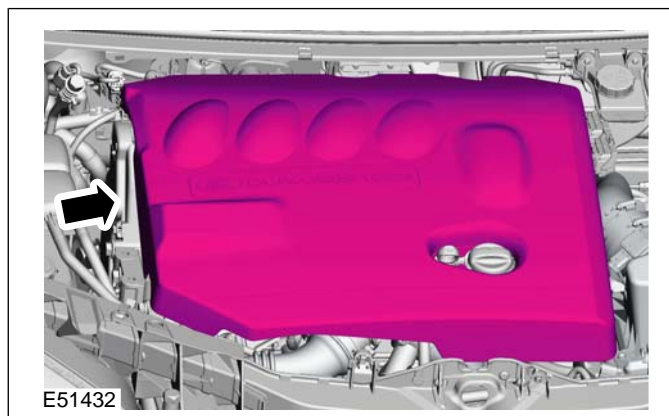
- Remove the retaining clips.



4. Lower the vehicle.

Vehicles built from 10/2004

5. Remove the engine cover (2.0L diesel shown).

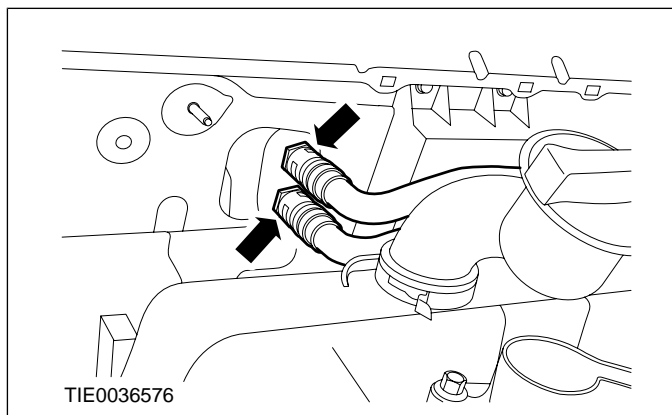


6. ⚠ CAUTION: Close off the coolant lines to prevent fluid loss or dirt ingress.

Detach the coolant lines from the heater core.

REMOVAL AND INSTALLATION

- Turn the coolant line snap ring counter-clockwise to the stop and detach the coolant line.



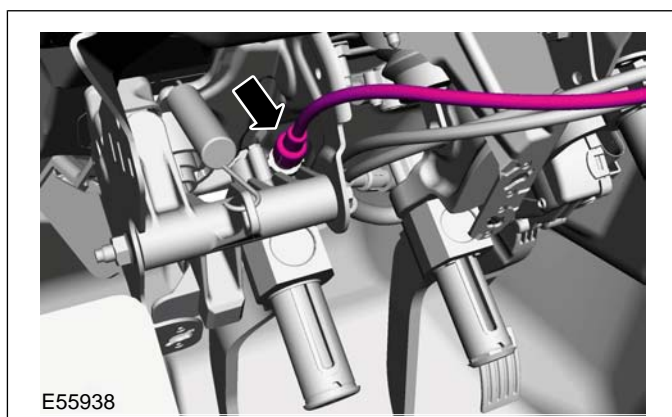
All vehicles

7. Remove the facia crash padding.

For additional information, refer to:
Instrument Panel (501-12 Instrument Panel and Console, Removal and Installation).

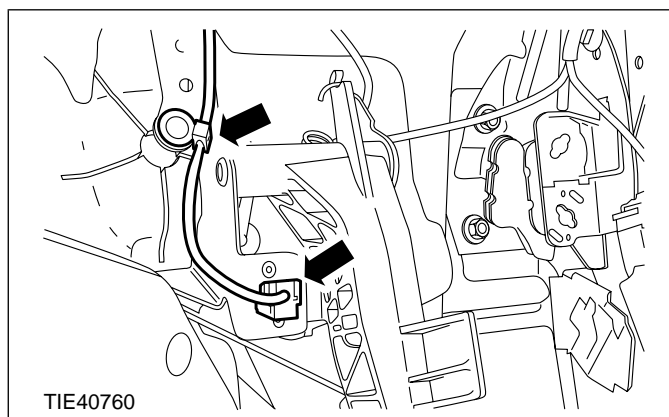
Vehicles with adjustable pedal unit

8. Set the adjustable pedal unit to the rear end position.
9. Detach the shaft of the adjustable clutch pedal from the clutch pedal.

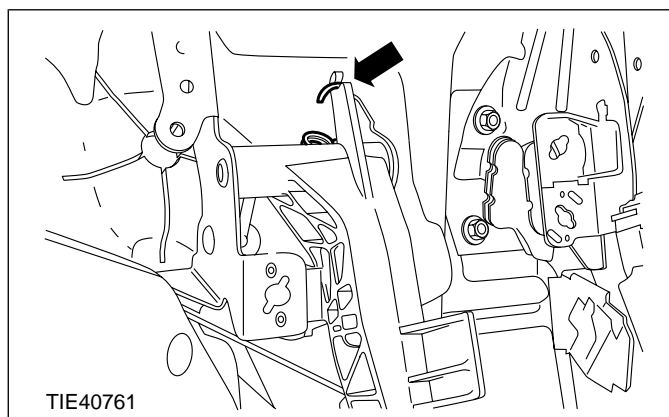


Vehicles with manual transaxle

10. Detach the clutch pedal position (CPP) switch from the clutch pedal bracket.

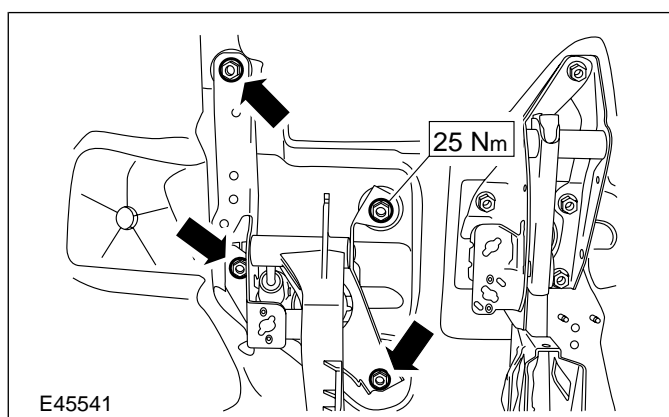


11. Detach the clutch pedal return spring from the clutch pedal (if fitted).



12. Remove the clutch pedal bracket nuts.

- Discard the nuts.



13. Remove the clutch pedal together with the clutch pedal bracket and the clutch master cylinder.

14. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION

▲ WARNING: Never perform work on the electric booster heater before the electric booster heater element has cooled to ambient temperature. Failure to observe this instruction can lead to injury.

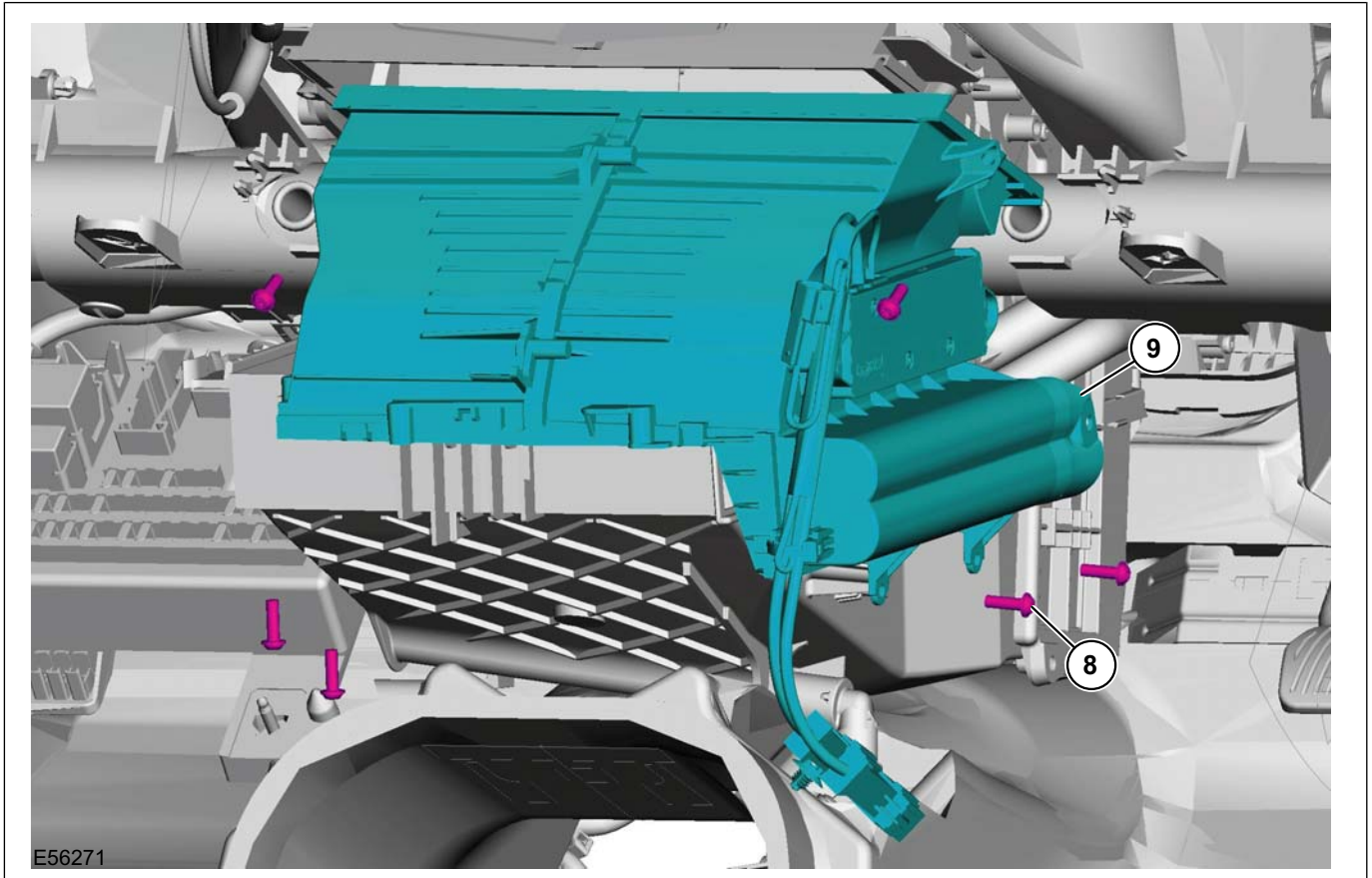


E56259

Item	Description
1	Bolt, heater core/evaporator housing
2	Retaining clips, instrument panel wiring harness
3	Ground cable bolt

Item	Description
4	Retaining clip, engine compartment wiring harness (if equipped)
5	Bolts, bracket for reinforcing element
6	Bracket, reinforcing element
7	Connector - electric booster heater (if fitted)

REMOVAL AND INSTALLATION

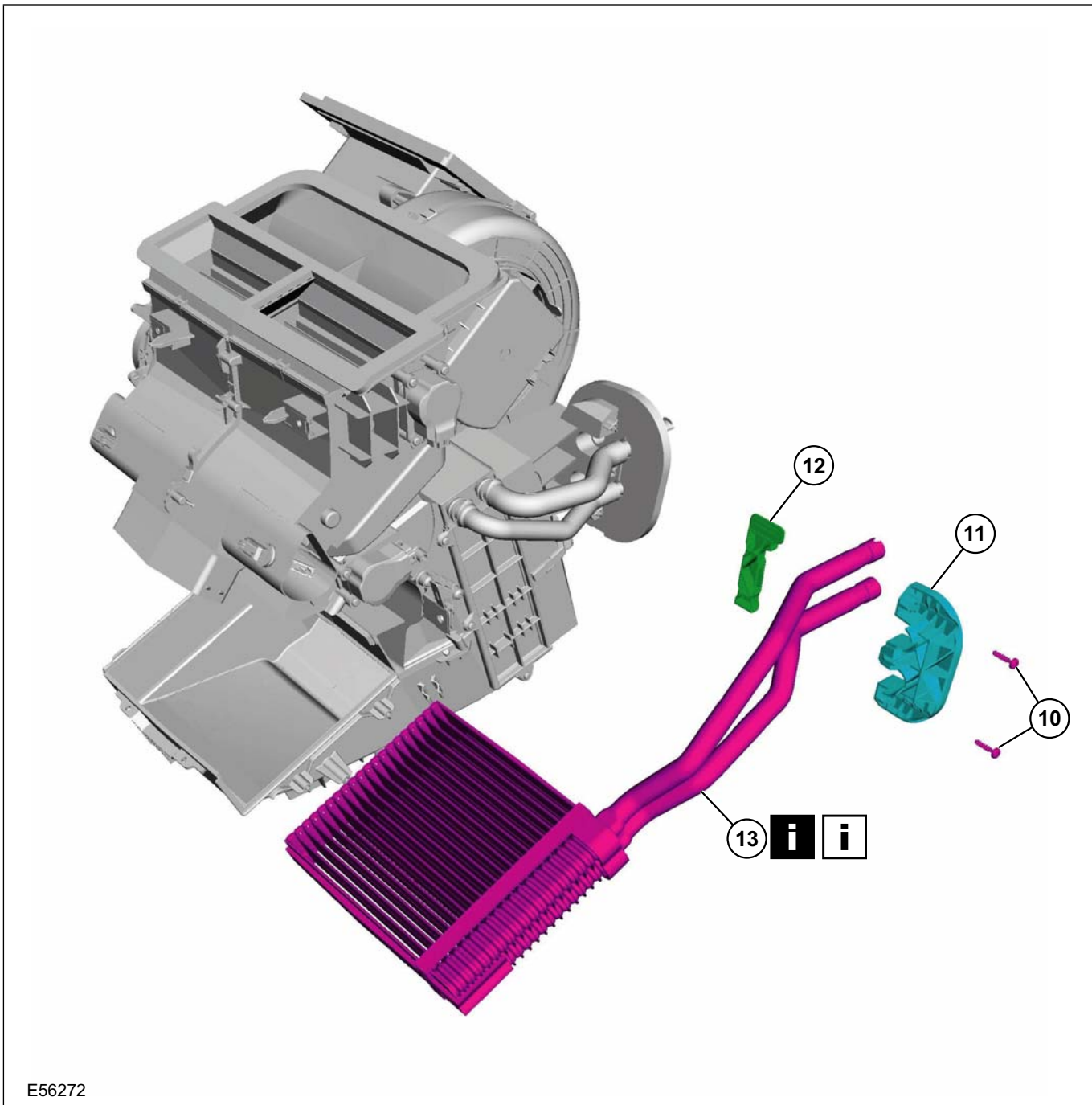


Item	Description
8	Heater core upper cover bolts
9	Heater core upper cover

REMOVAL AND INSTALLATION

CAUTIONS:

- ⚠ Ensure that no coolant gets into the footwell in order to prevent soiling of the carpet.
- ⚠ Close off the heater core and coolant lines to prevent fluid loss or dirt ingress.



E56272

Item	Description
10	Bulkhead aperture cover section bolts
11	Bulkhead aperture cover section

Item	Description
12	Bulkhead aperture spacer
13	Heater core See Removal Detail See Installation Detail

15. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

NOTE: Install new clutch pedal bracket retaining nuts.

16. Bleed the clutch system.

For additional information, refer to: **Clutch System Bleeding** (308-00 Manual Transmission/Transaxle and Clutch - General Information, General Procedures).

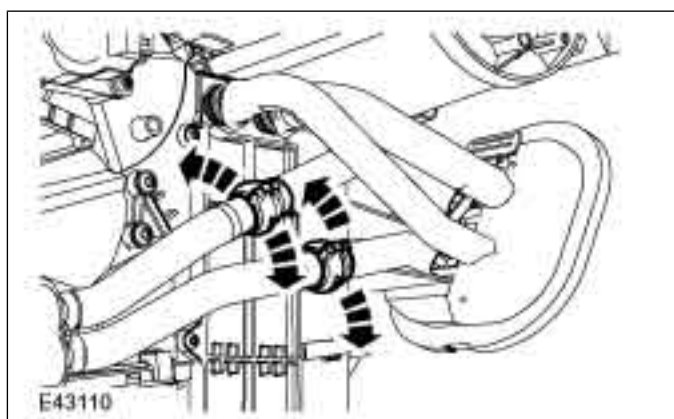
17. Check the operation of the adjustable pedal unit (if fitted).

Removal Details

Item 13 Heater core

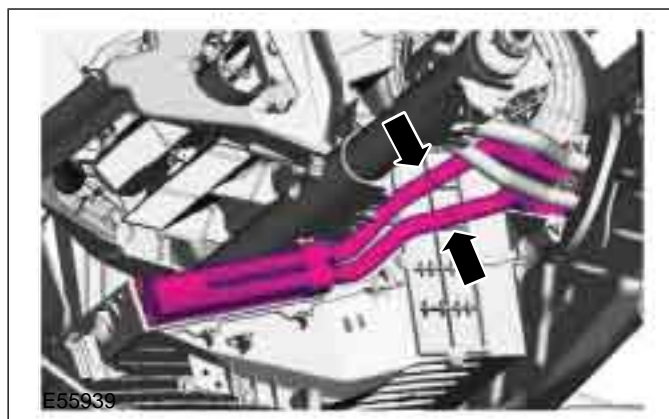
1. **NOTE:** Only for vehicles built up to 10/2004 Release the coolant line retaining clips.

- Slide the coolant line ends forward.



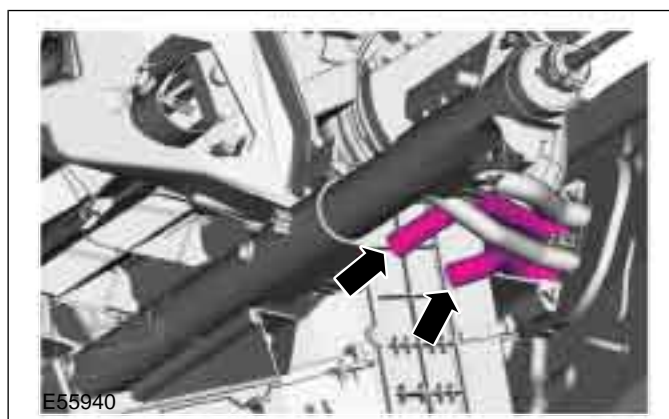
2. **NOTE:** Only for vehicles built from 10/2004 Saw through the heater core coolant lines.

- Slide the coolant line ends forward.



3. **NOTE:** Only for vehicles built from 10/2004 Remove the heater core coolant line ends.

- Pull the coolant line ends out towards the vehicle interior and discard them.



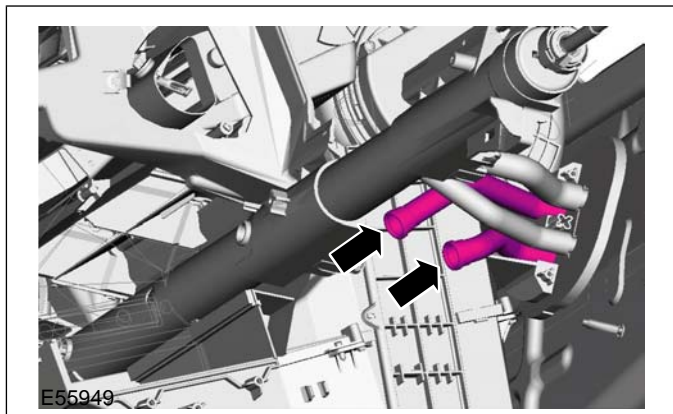
Installation Details

Item 13 Heater core

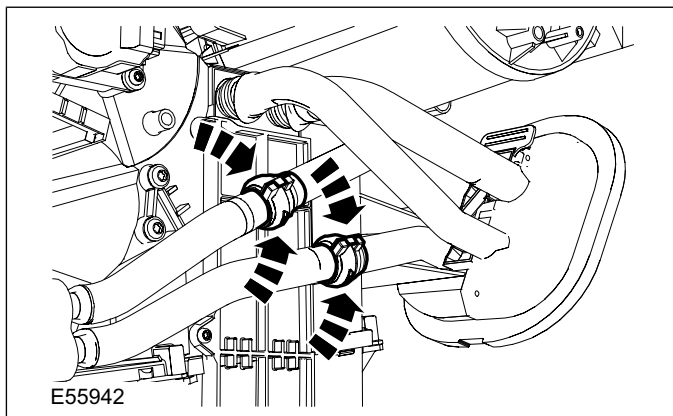
1. **NOTE:** Only for vehicles built from 10/2004 Install the heater core coolant line ends.

REMOVAL AND INSTALLATION

- Slide in the coolant line ends working from inside the vehicle interior.



2. **⚠ CAUTION:** Make certain that the seals of the heater core coolant lines are installed.
Engage the coolant line retaining clips.

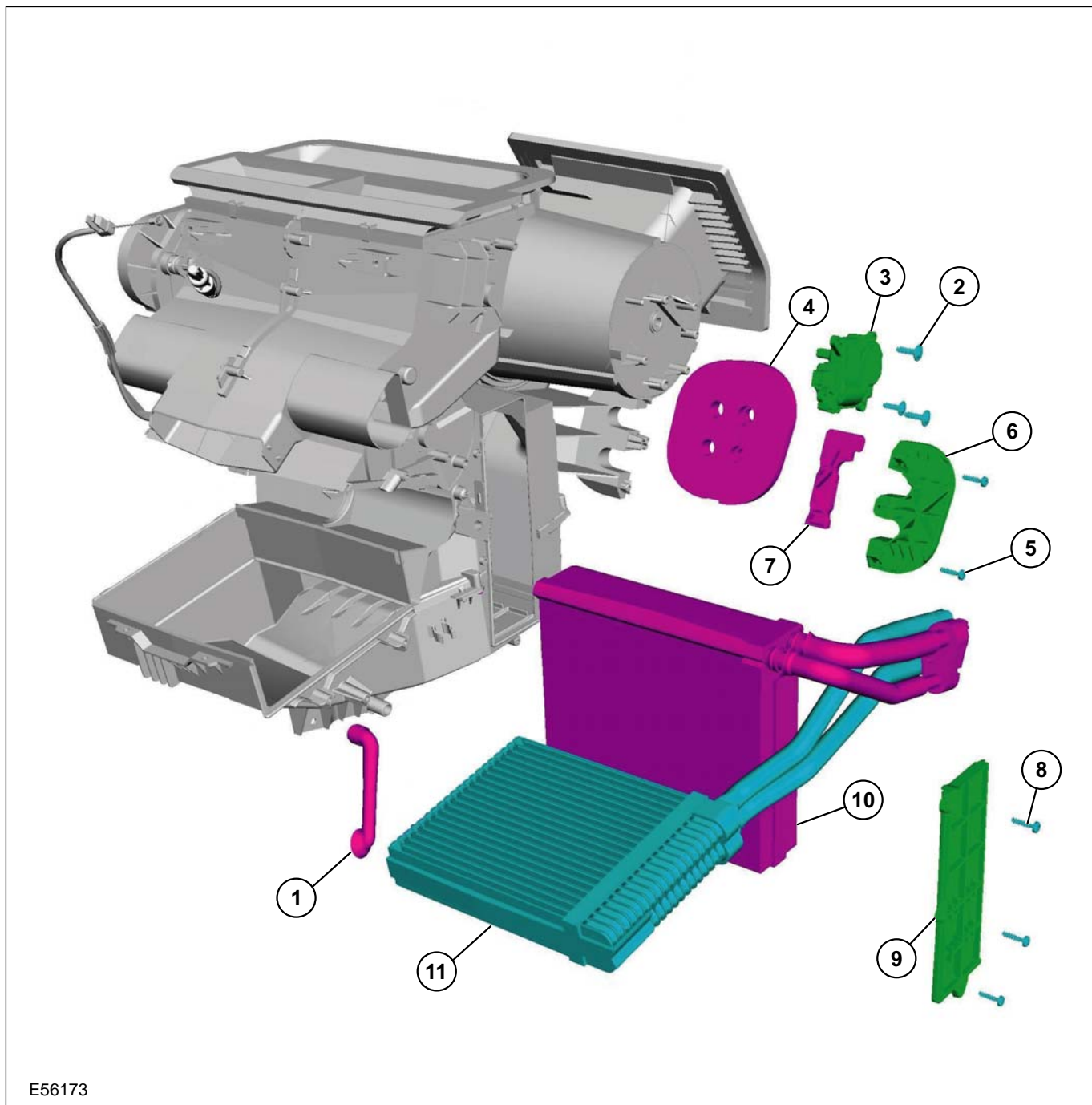


DISASSEMBLY AND ASSEMBLY

Heater Core and Evaporator Core Housing — Vehicles With:
Manual Temperature Control

1. Disassemble the components in the order indicated in the following illustration(s) and table(s).

NOTE: Pull out the evaporator and heat exchanger at the same time.



E56173

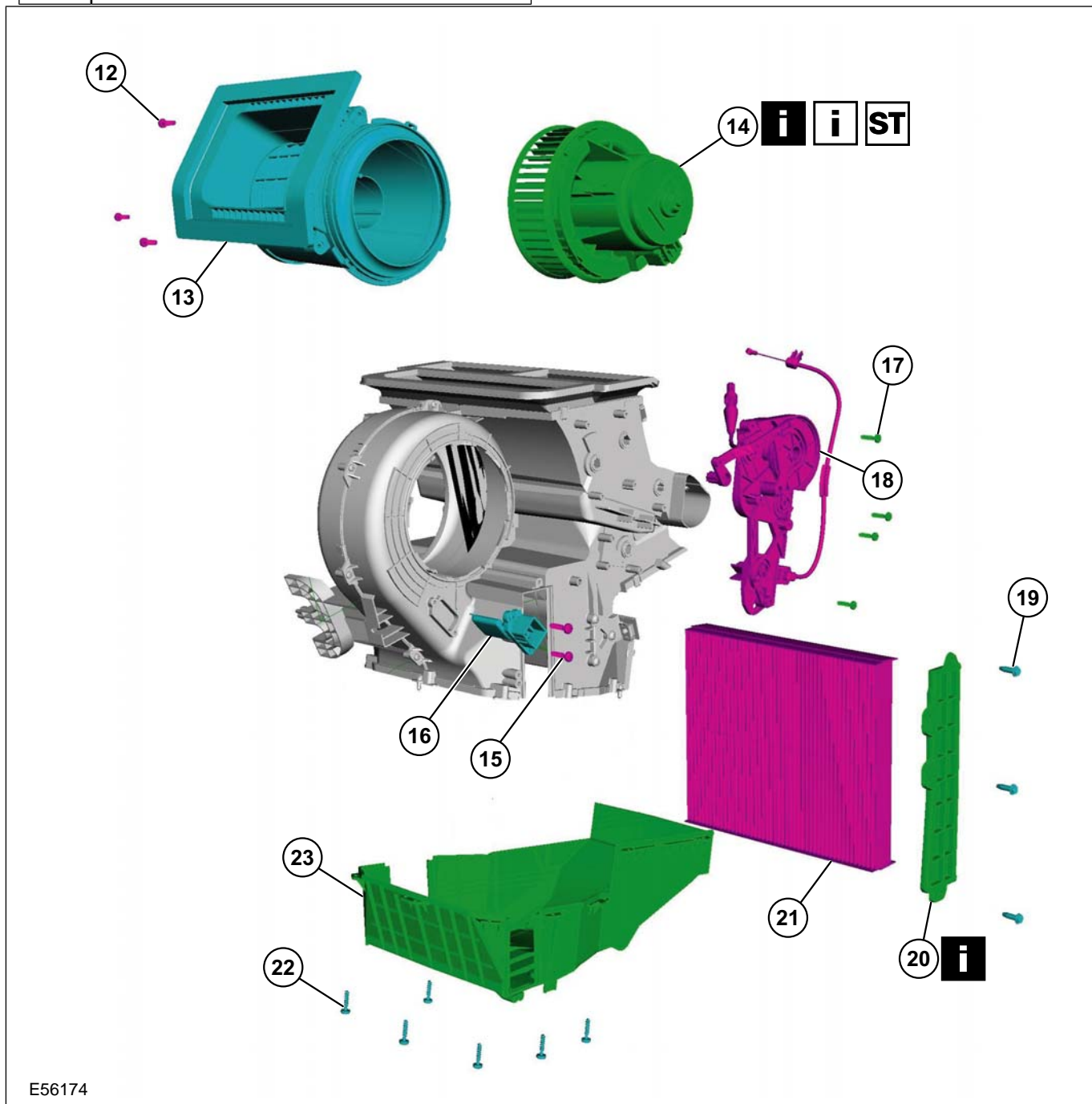
Item	Description
1	Heater housing water drain pipe
2	Air distribution flap actuator bolts

Item	Description
3	Air distribution flap actuator
4	Heater core/evaporator housing gasket

DISASSEMBLY AND ASSEMBLY

Item	Description
5	Bulkhead aperture cover section bolts
6	Bulkhead aperture cover section
7	Bulkhead aperture spacer
8	Evaporator housing cover bolts

Item	Description
9	Evaporator housing cover
10	Evaporator
11	Heater core



E56174

Item	Description
12	Air distribution flap housing bolts
13	Air distribution flap housing

Item	Description
14	Blower motor See Disassembly Detail See Assembly Detail
15	Blower motor resistor retaining bolts

DISASSEMBLY AND ASSEMBLY

Item	Description
16	Blower motor resistor
17	Air distribution flap/temperature control flap actuator bolts
18	Air distribution flap/temperature control flap actuator
19	Pollen filter housing cover bolts
20	Pollen filter housing cover See Disassembly Detail

Item	Description
21	Pollen filter
22	Heater core / evaporator lower housing bolts
23	Heater core / evaporator lower housing

2. To assemble, reverse the disassembly procedure.

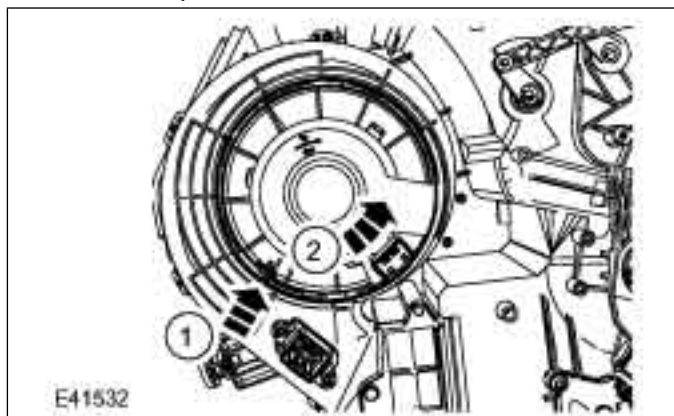
Disassembly Details

Item 14 Blower motor

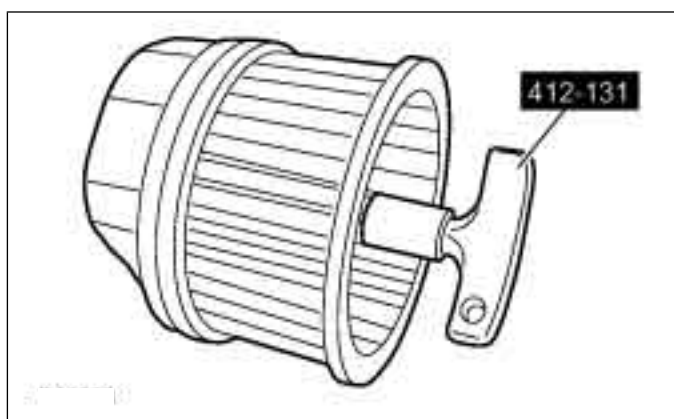
1. NOTE: On RHD vehicles, turn the blower motor clockwise to release.

Release the blower motor.

1. Press release button.
2. Turn the blower motor counter-clockwise as far as possible.



2. Remove the blower motor using the special tool.

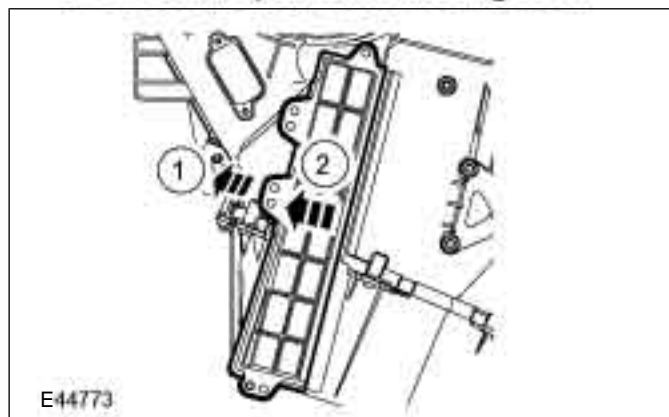


Item 20 Pollen filter housing cover

1. NOTE: In the event of damage to a pollen filter housing cover threaded hole, the pollen filter housing cover can be attached by means of the additional hole next to the original hole.

Remove the pollen filter housing cover.

1. Lift the pollen filter housing cover sideways.
2. Pull out the pollen filter housing cover.



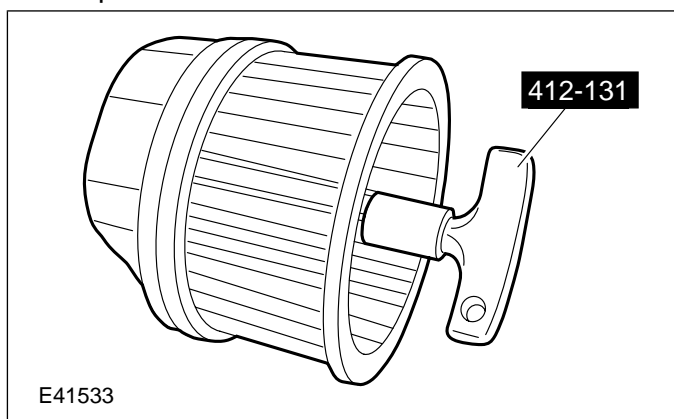
DISASSEMBLY AND ASSEMBLY**Assembly Details****Item 14 Blower motor**

1. **NOTE:** On RHD vehicles, turn the blower motor clockwise to lock.

NOTE: Note top position on blower motor.

Move the blower motor into the installation position using the special tool.

- Turn the blower motor into the installation position, insert and turn clockwise as far as possible.

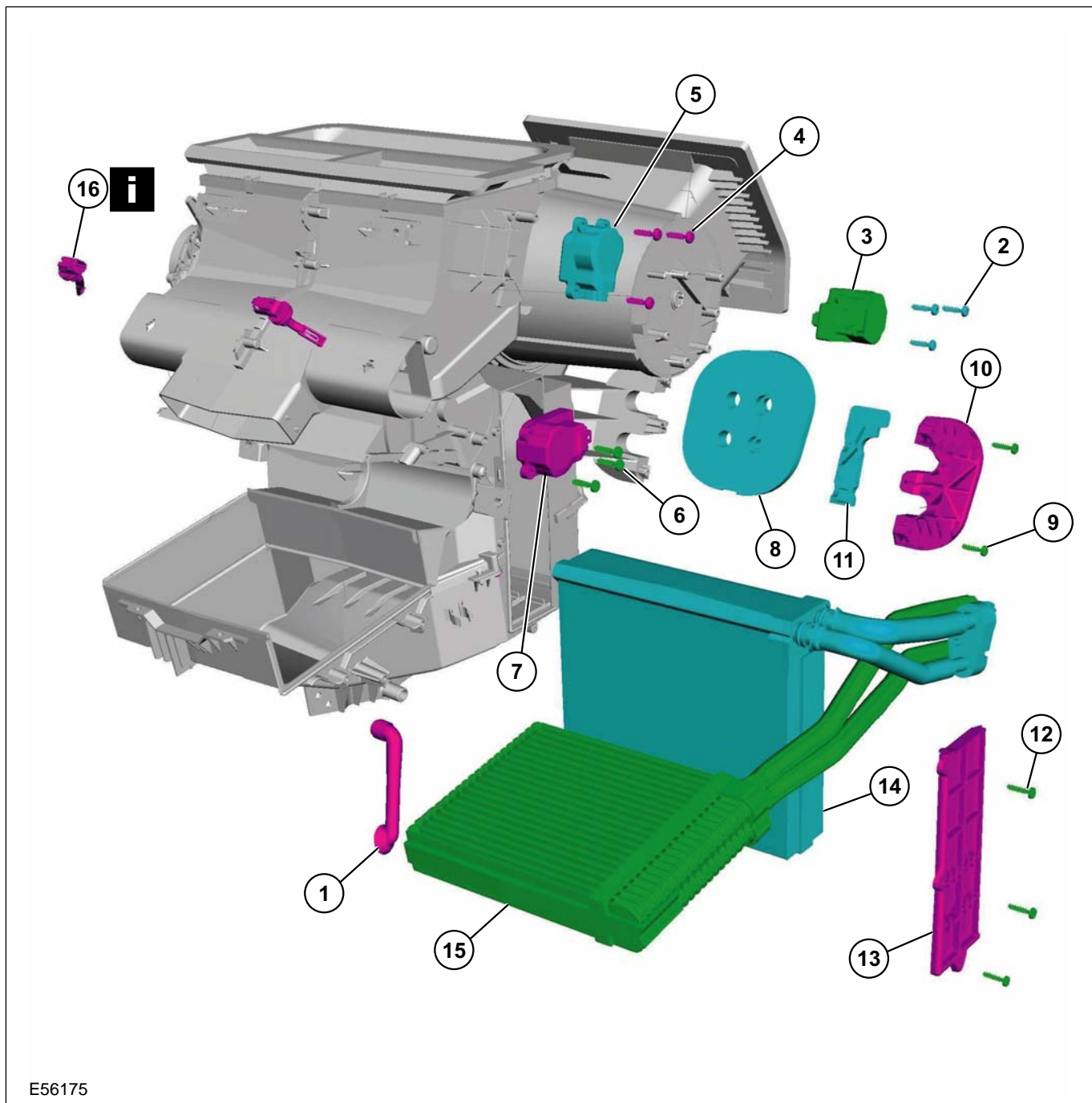


DISASSEMBLY AND ASSEMBLY

Heater Core and Evaporator Core Housing — Vehicles With:
Automatic Temperature Control

1. Disassemble the components in the order indicated in the following illustration(s) and table(s).

NOTE: Pull out the evaporator and heat exchanger at the same time.



E56175

Item	Description
1	Heater housing water drain pipe
2	Air distribution flap actuator bolts

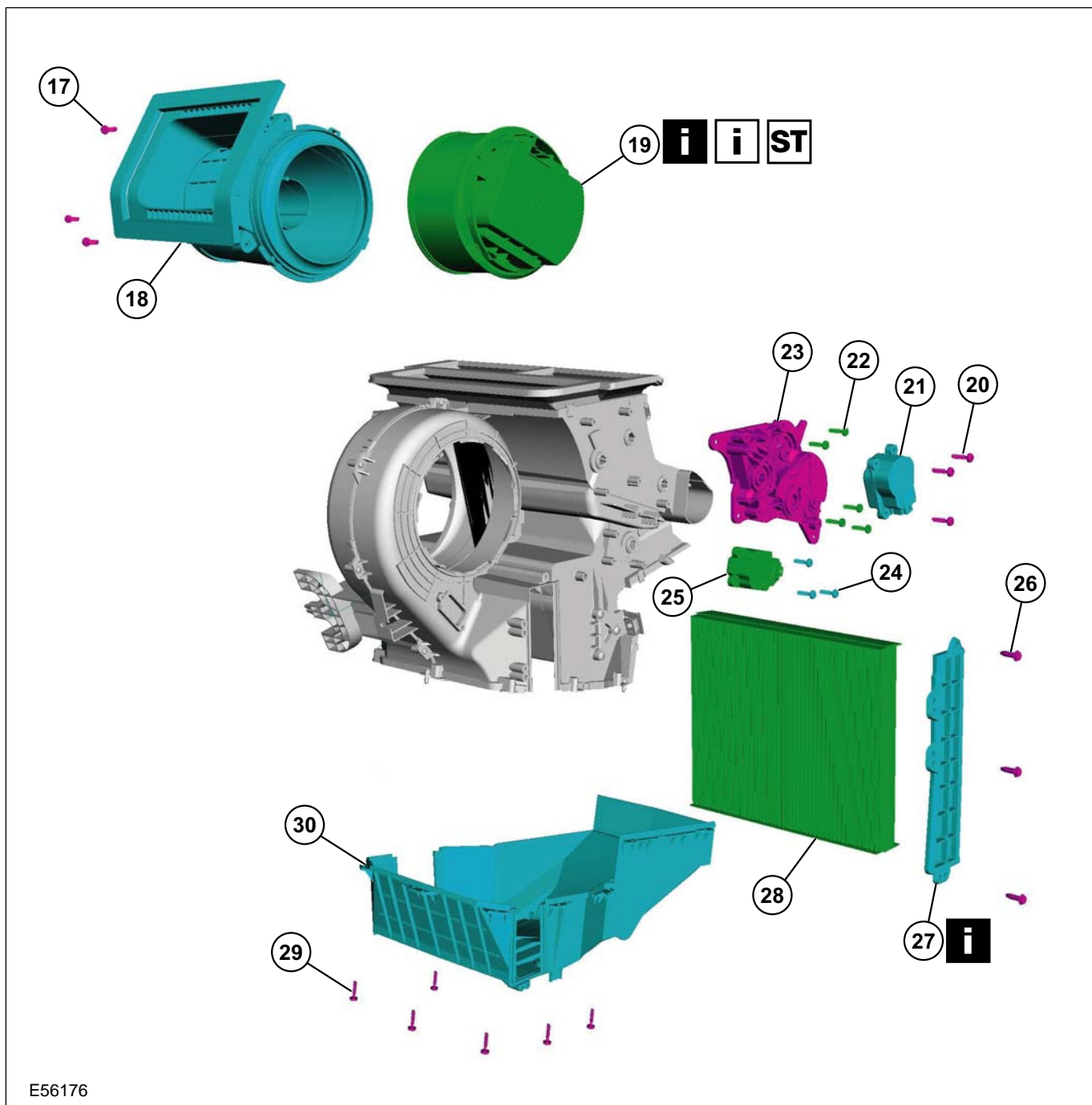
Item	Description
3	Air distribution flap actuator

DISASSEMBLY AND ASSEMBLY

Item	Description
4	Defroster jet actuator bolts/air vent distribution flap
5	Defroster jet actuator/air vent distribution flap
6	Passenger-side temperature control flap actuator bolts
7	Passenger-side temperature control flap actuator
8	Heater core/evaporator housing gasket
9	Bulkhead aperture cover section bolts

Item	Description
10	Bulkhead aperture cover section
11	Bulkhead aperture spacer
12	Evaporator housing cover bolts
13	Evaporator housing cover
14	Evaporator
15	Heater core
16	Air outlet temperature sensor See Disassembly Detail

DISASSEMBLY AND ASSEMBLY



E56176

Item	Description
17	Air distribution flap housing bolts
18	Air distribution flap housing
19	Blower motor See Disassembly Detail See Assembly Detail
20	Air distribution flap actuator bolts
21	Air distribution flap actuator
22	Air distribution flap actuator bolts

Item	Description
23	Air distribution flap actuator
24	Driver-side temperature control flap actuator bolts
25	Driver-side temperature control flap actuator
26	Pollen filter housing cover bolts
27	Pollen filter housing cover See Disassembly Detail
28	Pollen filter

DISASSEMBLY AND ASSEMBLY

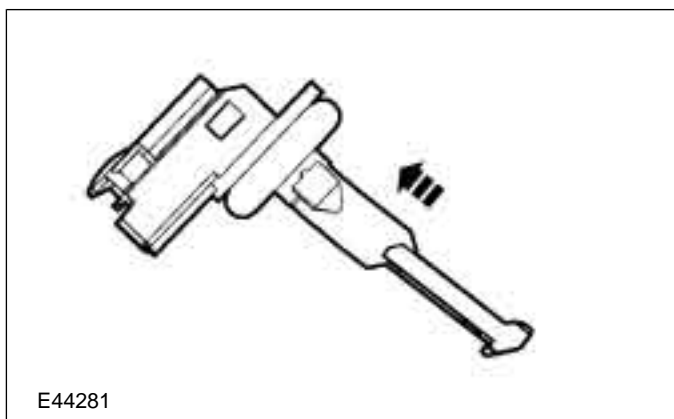
Item	Description
29	Heater core / evaporator lower housing bolts
30	Heater core / evaporator lower housing

2. To assemble, reverse the disassembly procedure.

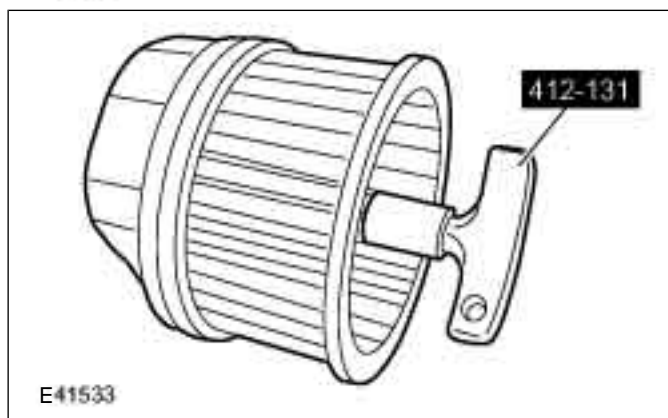
Disassembly Details

Item 16 Air outlet temperature sensor

1. Turn the air outlet temperature sensor clockwise through 90 degrees and remove.



2. Remove the blower motor using the special tool.

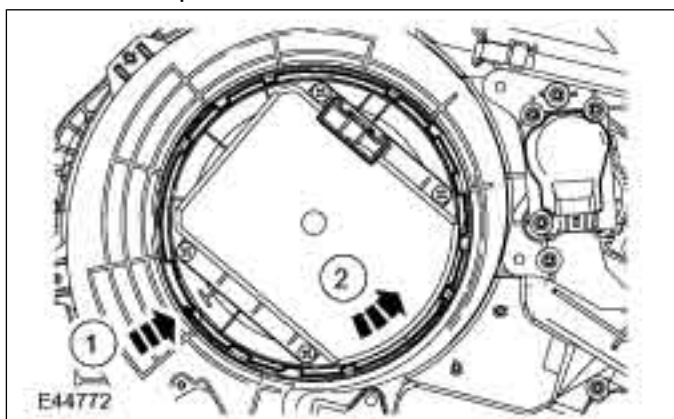


Item 19 Blower motor

1. NOTE: On RHD vehicles, turn the blower motor clockwise to release.

Release the blower motor.

1. Press the release button.
2. Turn the blower motor counter-clockwise as far as possible.

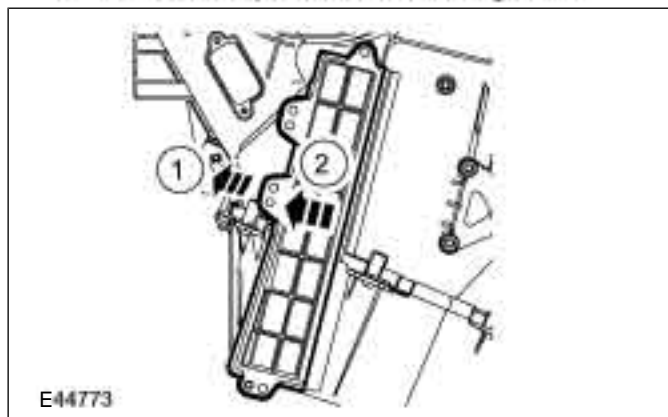


Item 27 Pollen filter housing cover

1. NOTE: In the event of damage to a pollen filter housing cover threaded hole, the pollen filter housing cover can be attached by means of the additional hole next to the original hole.

Remove the pollen filter housing cover.

1. Lift the pollen filter housing cover sideways.
2. Pull out the pollen filter housing cover.



Assembly Details

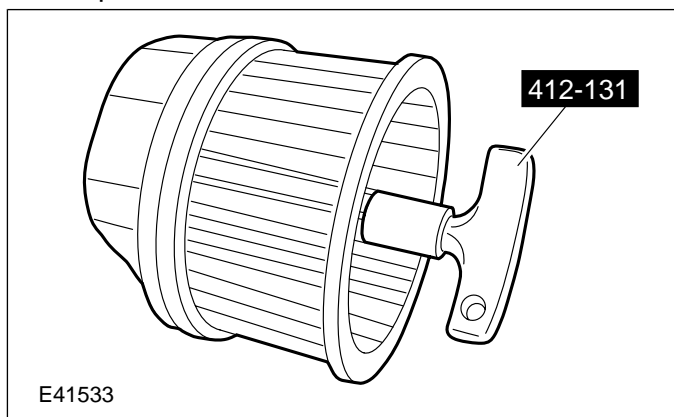
DISASSEMBLY AND ASSEMBLY**Item 19 Blower motor**

1. **NOTE:** On RHD vehicles, turn the blower motor clockwise to lock.

NOTE: Note top position on blower motor.

Move the blower motor into the installation position using the special tool.

- Turn the blower motor into the installation position, insert and turn clockwise as far as possible.



SECTION 412-03 Air Conditioning

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS**Lubricants, Sealants and Adhesives**

Item	Specification
Refrigerant oil	WSH-M1C231-B

A/C compressor

	Type
A/C compressor	VS16
A/C compressor (vehicles with diesel engine built to 08/2005)	7V16

A/C Fixed Orifice Tube

	Color
A/C Fixed Orifice Tube	Red

Torque Specifications

Description	Nm	lb-ft	lb-in
Refrigerant lines to A/C compressor	20	15	-
Refrigerant lines to A/C dehydrator	8	-	71
Refrigerant lines to A/C condenser	8	-	71
Bolt for refrigerant lines to A/C evaporator	25	18	-
Bolts for evaporator refrigerant lines to A/C evaporator	5	-	44
A/C compressor bolts	25	18	-
A/C condenser bolts	25	18	-
A/C clutch drive plate bolt (vehicles with petrol engine)	13	10	-
A/C clutch drive plate bolt (vehicles with diesel engine)	22	16	-
Threaded connection - fixed orifice tube	25	18	-
Bolts - A/C dehydrator	25	18	-
Nuts - A/C dehydrator	25	18	-
Refrigerant line bracket bolts	25	18	-
Refrigerant high-pressure switch	8	-	71
Refrigerant low-pressure switch	2.5	-	23
Bolts for windshield wiper motor with linkage	7	-	62
Nuts, windshield wiper arms	22	16	-
Steering column bracket bolts	25	18	-
Clutch pedal bracket nuts	25	18	-
Radiator crossmember	25	18	-
Power steering fluid cooler bracket bolt.	9	-	80
Power steering fluid cooler	9	-	80

DESCRIPTION AND OPERATION

Air Conditioning

Temperature control

Three versions are available:

- Vehicles with manual temperature control without air conditioning
- Vehicles with manual temperature control with air conditioning
- Vehicles with electronic temperature control with two-zone air conditioning

Depending upon engine model, two different air conditioning compressors are used:

- Visteon VS16 variable-stroke compressor in vehicles with diesel engines built from 08/2005 and vehicles with petrol engines
- Sanden SD7V16 variable-stroke compressor in vehicles with diesel engines built up to 08/2005

Manual temperature control



The manual temperature control is located on the floor console instrument panel.

One button actuates the air conditioning (if equipped) and one the air inlet blend door. The blower speed, the passenger compartment temperature and the air distribution are adjusted by means of three rotary controls.

The air conditioning control request signal is transmitted to the Generic Electronic Module (GEM). Data transmission to the GEM is performed via a single-wire lead. From the GEM this signal is relayed via the CAN bus to the instrument cluster, and from there on to the Powertrain Control Module (PCM).

Electronic automatic temperature control (EATC)



The Electronic Automatic Temperature Control (EATC) controls the passenger compartment temperature automatically for two zones according to the settings made by the driver/front passenger.

The pushbuttons are located in the floor console instrument panel beneath the multimedia system, or they are integrated in the touch-screen of the navigation device where applicable.

The temperature is regulated by changing the positions of the distribution flaps of the heating and ventilation system.

Five individual stepper motors are used to control the following components:

- Temperature control air flaps (2 stepper motors, one on each side)
- Air distribution door (footwell/instrument panel)
- Defroster flap
- Air inlet blend door

The following functions can be controlled automatically:

- Temperature
- Blower setting
- Air distribution
- Air conditioning
- Recirculated air mode

Automatic mode is exited by switching off the system.

DESCRIPTION AND OPERATION

Automatic mode is partially exited when one of the following buttons is pressed, in which case any functions which have not been selected continue to operate automatically:

- Air distribution
- Blower setting
- Recirculated air mode
- Defrost

Automatic control is reactivated by pressing the "Auto" button or by pressing the corresponding button again. The automatic mode is not exited when the temperature is adjusted or the Air Conditioning (A/C) button is pressed.

Blower controller: Automatic mode

Based on driver preference, the blower setting is determined as a function of the following input variables in automatic mode:

- Passenger compartment temperature
- Ambient temperature
- Sun load
- Coolant temperature
- Vehicle speed

Blower controller: Manual operation

The first time a blower control button is pressed, the blower symbol is switched on and the automatic symbol switched off. Each time a blower control button is pressed subsequently, the blower speed is set one step higher or lower. Continuous pressing of a button adjusts the blower speed by one step every 0.4 seconds.

Continuous pressing of the button to adjust the blower speed downwards does not switch off the blower. The OFF button needs to be pressed to do this.

Seven blower speed settings can be adjusted manually. In the "Defrost" setting the blower operates at 80% of the maximum speed, unless the maximum value was selected beforehand.

Air distribution: Automatic mode

In automatic mode the air distribution setting is determined on the basis of the driver requests as a function of the following input variables:

- Passenger compartment temperature
- Ambient temperature
- Sun load
- Air conditioning status
- Coolant temperature
- Vehicle speed

Cold air comes out of the instrument panel air vents during air conditioning operation. During warm-up phase warm air is directed into the footwell.

When the vehicle and the engine are cold, air is directed onto the windshield to prevent cold air from entering the footwell.

The air only comes out of the footwell and defroster vents once the preselected temperature has been reached.

When the air conditioning system is switched off (no A/C symbol) the air flow is directed into the footwell to prevent the windows from misting up.

In order to achieve maximum cooling of the interior air in the case of high passenger compartment and ambient temperatures, the system switches to recirculated air in automatic mode. After reaching the temperature set, the system automatically switches back to fresh air intake. The recirculated air warning indicator does not illuminate when automatic recirculated air control is activated.

Air distribution: Manual operation

Each manual operation causes the automatic display to extinguish and activates the LED of the relevant button, and the previously selected settings are stored.

The air distribution modes (windshield, instrument panel and footwell) can be selected individually or together, i.e. one/two/three mode(s) can be selected or deselected by pressing the corresponding buttons.

Operating one of the previously selected buttons switches off the relevant mode. If all modes are deactivated, the system reverts automatically to automatic mode and adopts the previously selected settings.

DESCRIPTION AND OPERATION**Defrost**

Selection of the "Defrost" mode has the following effects:

- The LED is switched on for the "Defrost" button and the symbol for automatic mode goes out.
- The system changes over to the specified flap position for maximum warm air temperature, and the "HI" symbol is displayed.
- The air conditioning and the A/C symbol are switched on.
- All the modes currently selected manually are stored, terminated and the LEDs are deactivated.
- The air inlet blend door is moved to the "fresh air" position, and the previously selected recirculated air mode is deactivated.
- The blower speed is set to 80% of the maximum value or remains at a higher setting if it was selected beforehand.
- The windshield and rear window heating are switched on.

"Defrost" mode is terminated and all the previously stored modes are activated when one of the following settings is selected:

- The "Auto" button is pressed.
- Temperature controllers are actuated.
- The "Defrost" button is pressed again (if it was previously set to "OFF" then the system switches over to "Auto").
- One of the air distribution buttons is pressed.

ECO mode

The EATC transmits the A/C request signal to the GEM via the CAN bus. The signal is then relayed by the GEM via the instrument cluster to the PCM, which actuates the A/C compressor clutch and the cooler fan motor. The EATC request can be interrupted by the PCM, e.g. during full load operation.

In the "Auto A/C" mode, the air conditioning is activated when the user's temperature selection makes this necessary.

Pressing the "A/C" button in "Auto A/C" mode switches the system to the "ECO" status and the compressor is switched off.

Recirculated air mode

Selection of the "Auto" mode results in automatic recirculated air control without the recirculated air LED being switched on.

Pressing the "Recirculated air" button while the LED is switched off selects recirculated air mode; pressing the button again cancels the recirculated air mode and returns the air inlet blend door to the fresh air position.

Recirculated air mode is activated automatically by switching the system off (pressing the "OFF" button). After the system has been activated (i.e. any button has been pressed), the previous settings are called back up.

Temperature adjustment

In "dual mode" the driver and front passenger temperature settings are combined together. As a result, any adjustment of the control elements on the driver's side will adjust the temperature on both sides of the vehicle.

The temperature can be individually adjusted by pressing the driver's side control elements.

Press the "Auto" button for longer than two seconds to switch back and forth between dual temperature controls and individual temperature controls. The display then switches from "Auto" to "Mono".

The temperature can be adjusted in steps of 0.5 °C between 16 °C and 28 °C. Temperature values outside this range are indicated on the display with either "LO" or "HI".

The maximum difference between the temperature on the driver's and front passenger's sides is 4 °C in "Auto" mode. If a greater difference is selected then the opposite side automatically tracks the new temperature setting with a difference of 4 °C.

When "HI" or "LO" are selected the same temperature settings are set on both sides. On both sides of the vehicle the temperature is set to 28°C when any button is pressed after the "HI" mode is switched off, and similarly the temperature is set to 16 °C on both sides when any button is pressed after the "LO" mode is switched off.

In the "HI" setting the system limits the maximum temperature to 28 °C.

Each press of the button increases or decreases the temperature by one step. Continuous pressing of the button changes the temperature setting every 0.4 seconds.

DESCRIPTION AND OPERATION

In vehicles with "Bluetooth & Voice Control" function (activation via the "Voice" button on the steering column stalk) the temperature and blower speed can be modified via the voice function.

External controller - EATC



In vehicles equipped with the touch-screen DVD navigation system, the control components for the EATC are integrated in the unit. The information exchange takes place on the mid-speed CAN bus (MS-CAN).

The following display values are transmitted via the MS CAN bus:

- Blower setting
- Temperature on the driver's side
- Temperature on the front passenger's side
- A/C or ECO
- Diagnostic code

The following warning indicators are actuated via the MS CAN bus:

- Air distribution
- Recirculated air, Auto, Defrost

The following request signals are transmitted via the MS CAN bus:

- Raise/lower blower setting
- Temperature adjustment
- Manual air distribution
- Diagnostic information

Switch over from Celsius to Fahrenheit

Adjustment between Celsius and Fahrenheit is performed via the instrument cluster display and is transmitted to the EATC module via the MS CAN bus.

Special service modes

By pressing the appropriate buttons on the control panel, various special service modes can be selected in the EATC module:

- Read out stored Diagnostic Trouble Code (DTC): The DTCs are displayed in the EATC. In order to start read-out of the stored faults, the "OFF" and "Footwell" buttons must be pressed and held for two seconds. Release the buttons and press the "Headroom" button within 1.5 seconds.
- Activate on-board diagnostic: Start the self-test (re-calibration is performed). Any faults found are displayed in the form of trouble codes on both displays. Press the "OFF" and "Footwell" buttons for two seconds. Release both buttons and then press the "Auto" button within 1.5 seconds.
- Read out the software version indicated on both displays: Press the "Off" and "Footwell" buttons for two seconds, release them and then press the "A/C" button within 1.5 seconds.
- To delete the trouble codes and exit the diagnostic mode press the "Defrost" button. To exit the diagnostic mode without deleting the trouble codes press any other button.

System off

When the system is switched off the blower motor, A/C compressor, LCD and LEDs are also shut off. The air inlet blend door is moved to the fresh air position.

The EATC module stores both the dual and the manual temperature blend door position settings.

Pressing "OFF" again starts the system with the previously-stored settings.



DIAGNOSIS AND TESTING

Air Conditioning

REFER to: **Climate Control System - 3-Door**
(412-00 Climate Control System - General
Information, Diagnosis and Testing).



REMOVAL AND INSTALLATION

Air Conditioning (A/C) Compressor — 2.5L Duratec-ST
(VI5)(34 626 4)

1. Evacuate the air conditioning (A/C) system.

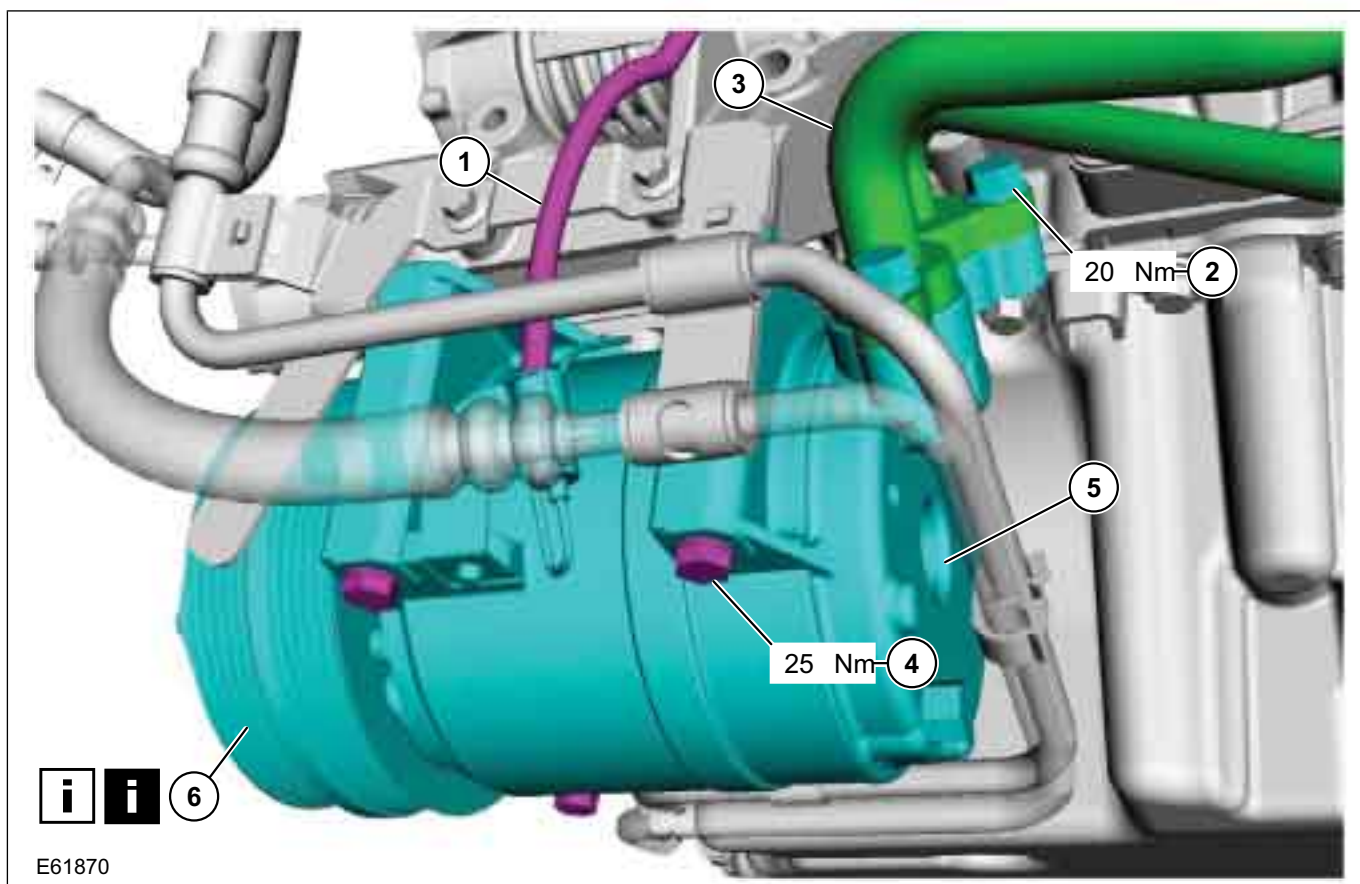
For additional information, refer to: **Air Conditioning (A/C) System Recovery, Evacuation and Charging (412-00 Climate Control System - General Information, General Procedures).**

2. Detach the accessory drive belt.

For additional information, refer to: **Accessory Drive Belt (303-05B, Removal and Installation).**

3. Remove the components in the order indicated in the following illustration(s) and table(s).

CAUTION: Cap the refrigerant lines and the A/C compressor to prevent dirt ingress.



E61870

Item	Description
1	A/C compressor electrical connector
2	A/C compressor refrigerant line bolts
3	A/C compressor refrigerant lines
4	A/C compressor bolts
5	A/C compressor
6	Field coil See Removal Detail See Installation Detail

4. To install, reverse the removal procedure.

5. Check the A/C clutch air gap.

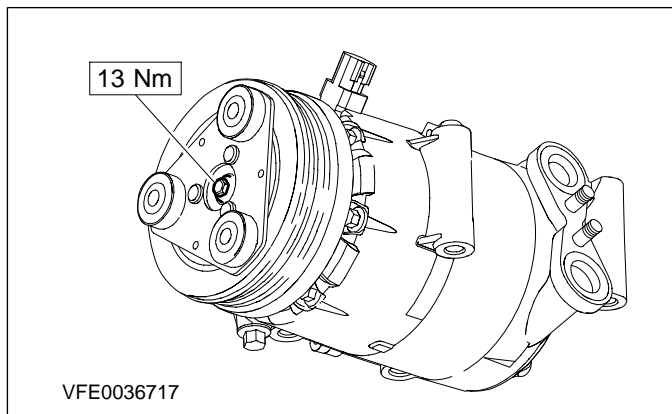
For additional information, refer to: **Air Conditioning (A/C) Clutch Air Gap Adjustment (412-00, General Procedures).**

REMOVAL AND INSTALLATION

Removal Details

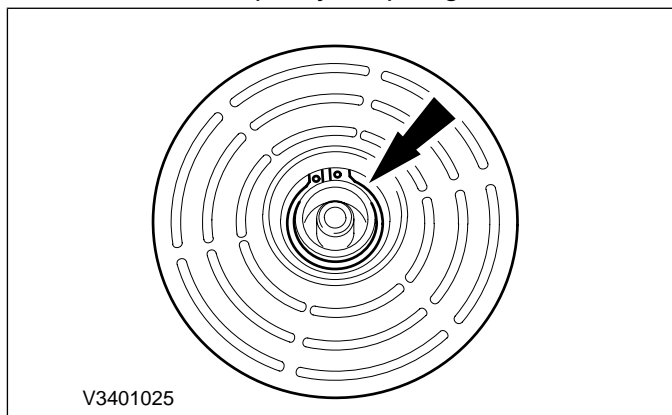
Item 6 Field coil

1. Remove the A/C clutch drive plate.

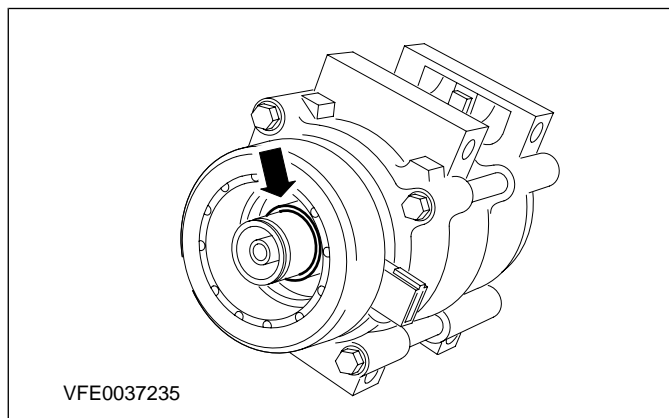
2. **NOTE:** If necessary, remove a seized A/C compressor pulley using a suitable remover.

Remove the A/C compressor pulley.

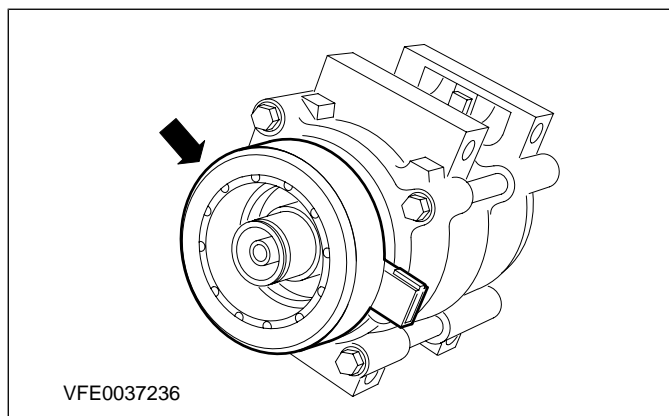
- Remove the distance washers.
- Discard the pulley snap ring.



3. Remove the clutch field coil snap ring.

4. **NOTE:** Mark the installed position of the A/C compressor clutch electrical connector in relation to the compressor housing.

Remove the clutch field coil.



Installation Details

Item 6 Field coil

CAUTION: Do not skew the clutch field coil when installing in the A/C compressor.

NOTE: Installed position of the A/C compressor clutch electrical connector in relation to the compressor housing.

NOTE: Install a new A/C compressor pulley snap ring.

REMOVAL AND INSTALLATION

Clutch and Clutch Field Coil(34 628 0)

Removal

1. Remove the A/C compressor. For additional information, refer to:

Air Conditioning (A/C) Compressor - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) (412-03, Removal and Installation),

Air Conditioning (A/C) Compressor - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (412-03 Air Conditioning, Removal and Installation),

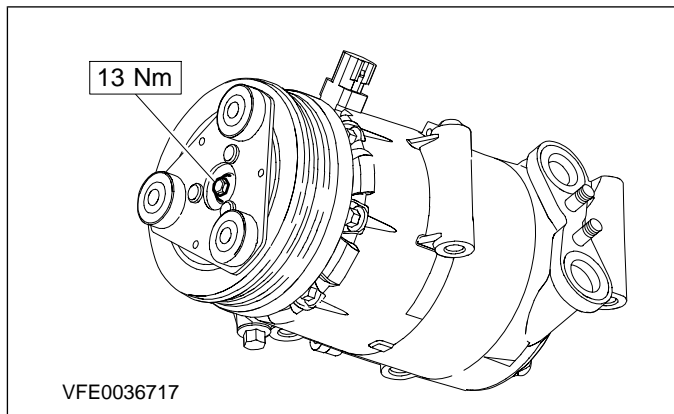
Air Conditioning (A/C) Compressor - 2.5L Duratec-ST (VI5) (412-03 Air Conditioning, Removal and Installation),

Air Conditioning (A/C) Compressor - 1.6L Duratorq-TDCi (DV) Diesel (412-03 Air Conditioning, Removal and Installation),

Air Conditioning (A/C) Compressor - 1.8L Duratorq-TDCi (Lynx) Diesel (412-03 Air Conditioning, Removal and Installation),

Air Conditioning (A/C) Compressor - 2.0L Duratorq-TDCi (DW) Diesel (412-03 Air Conditioning, Removal and Installation).

2. Remove the A/C clutch drive plate.

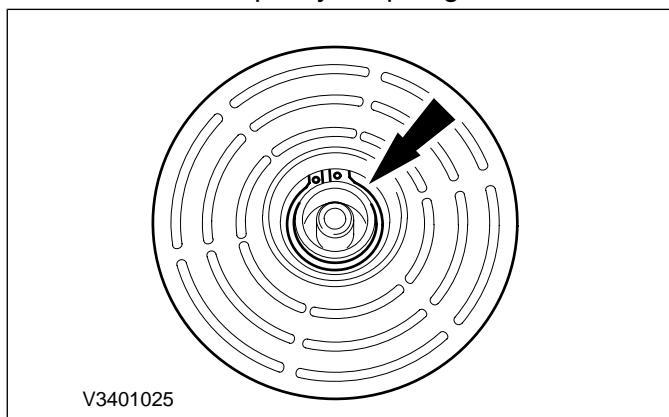


3. **NOTE:** If necessary, remove a seized A/C compressor pulley using a suitable remover.

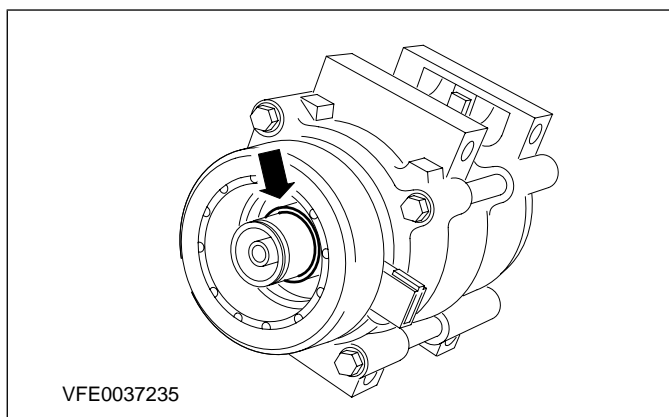
Remove the A/C compressor pulley.

- Remove the distance washers.

- Discard the pulley snap ring.

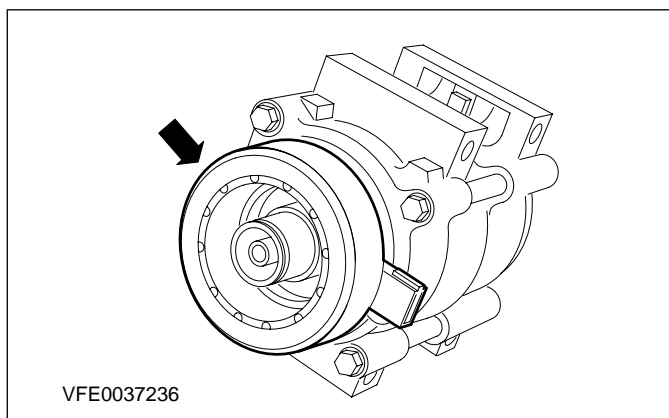


4. Remove the clutch field coil snap ring.



5. **NOTE:** Mark the installed position of the A/C compressor clutch electrical connector in relation to the compressor housing.

Remove the clutch field coil.



Installation

- CAUTION:** Do not tilt the clutch field coil when installing in the A/C compressor.

REMOVAL AND INSTALLATION

NOTE: Installed position of the A/C compressor clutch electrical connector in relation to the compressor housing.

NOTE: Install a new A/C compressor pulley snap ring.

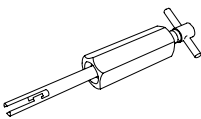
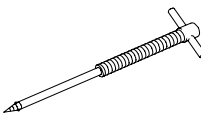
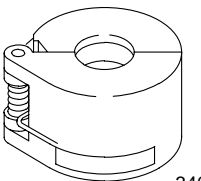
1. To install, reverse the removal procedure.
2. Check the gap of the A/C clutch.

For additional information, refer to: Air
Conditioning (A/C) Clutch Air Gap
Adjustment (412-00 Climate Control System
- General Information, General Procedures).

REMOVAL AND INSTALLATION

Evaporator Core Orifice(34 624 4)

Special Tool(s)

 <p>34004</p>	<p>Remover/Installer, Fixed Orifice 412-034 (34-004)</p>
 <p>34005</p>	<p>Remover, Broken Orifice 412-035 (34-005)</p>
 <p>34001</p>	<p>Disconnect Tool, Spring Lock Coupling (1/2" blue) 412-027</p>

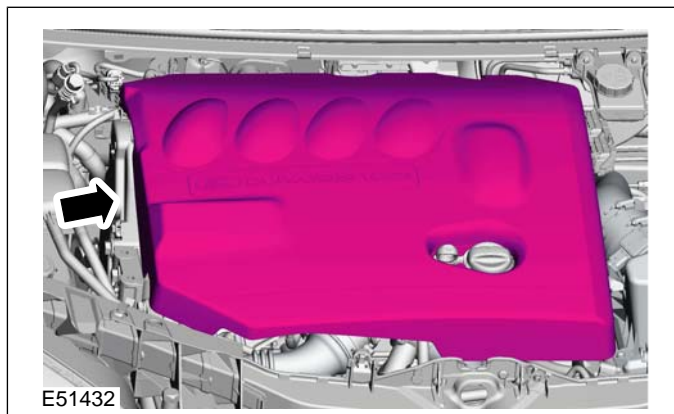
Removal

All vehicles

1. Evacuate the air conditioning (A/C) system.

For additional information, refer to: **Air Conditioning (A/C) System Recovery, Evacuation and Charging (412-00 Climate Control System - General Information, General Procedures).**

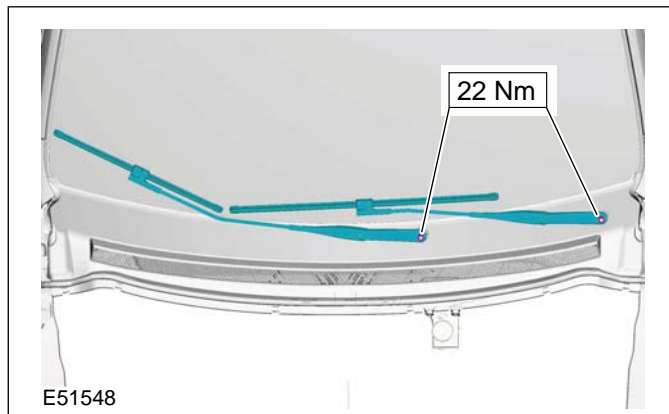
2. Remove the engine cover (2.0L diesel shown).



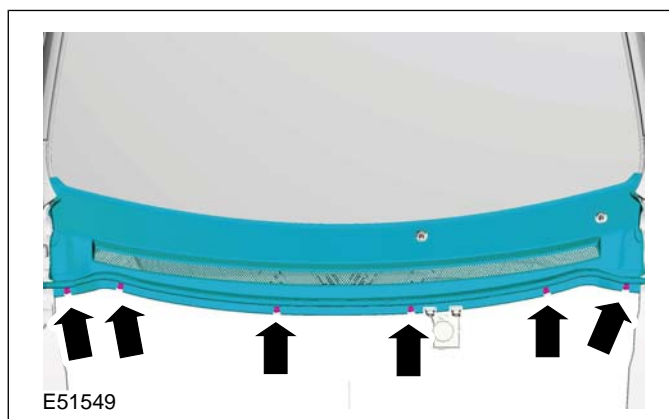
Vehicles with diesel engine

3. **CAUTION:** Ensure that the windshield wiper motor is in the park position.

Remove the windshield wiper arms.



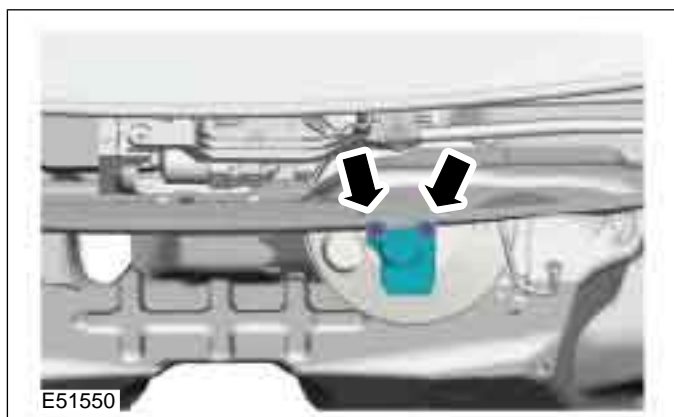
4. Remove the cowl grille.



5. **CAUTION:** If brake fluid comes into contact with the paintwork, rinse off the affected areas with cold water without delay.

REMOVAL AND INSTALLATION

Detach the brake fluid reservoir from the bulkhead extension and tie it back to one side.



6. Remove the bulkhead extension.

- Pull the bulkhead extension out of the clips.

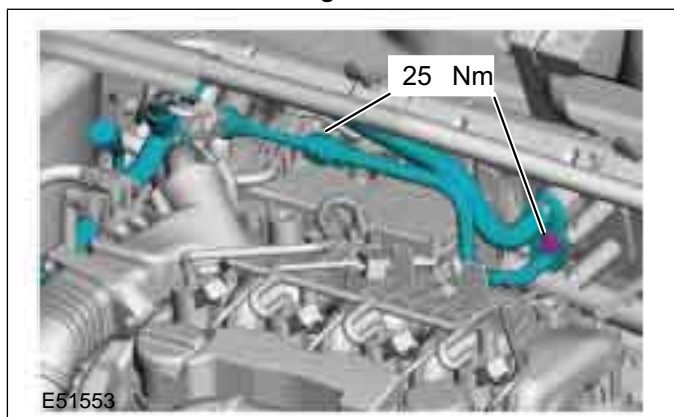


Vehicles built up to 05/2007

7. **CAUTION:** Close off the refrigerant line to stop dirt from entering.

Remove the refrigerant line fixed orifice tube.

- Discard the O-rings.

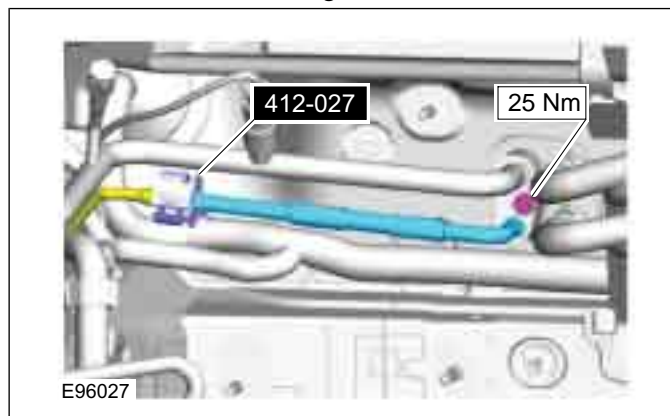


Vehicles built from 06/2007

8. **CAUTION:** Close off the refrigerant line to stop dirt from entering.

Refrigerant line - remove the fixed orifice tube using the special tool.

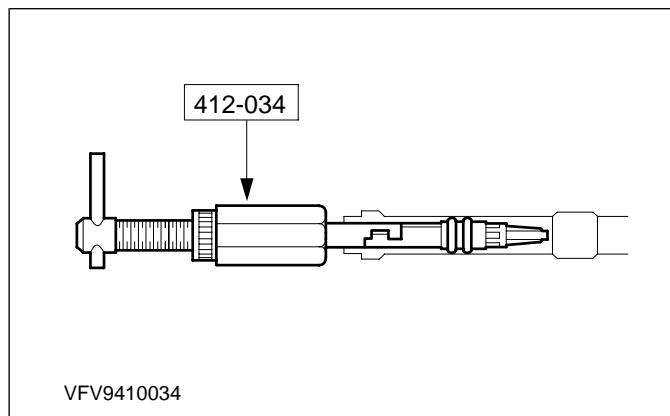
- Discard the O-rings.



All vehicles

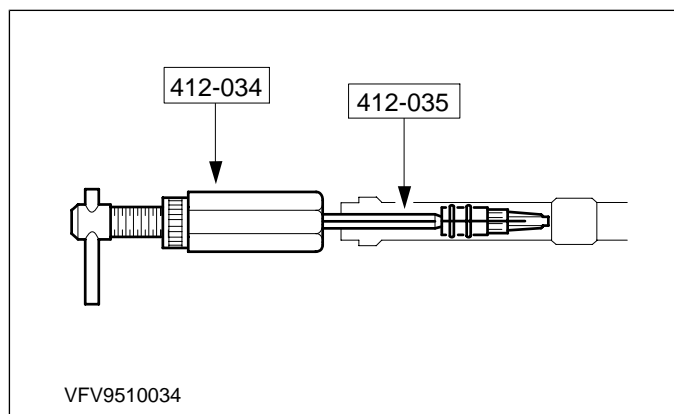
9. Using the special tool, remove the fixed orifice tube.

- Hook the special tool into the fixed orifice tube, turn it clockwise and remove the fixed orifice tube.

10. **NOTE:** This step is necessary if the evaporator core orifice is broken.

REMOVAL AND INSTALLATION

Using the special tools, remove the broken fixed orifice tube.

**Installation**

All vehicles

1. NOTE: Install new refrigerant line O-rings.

NOTE: Coat the refrigerant line O-rings with clean refrigerant oil before installation.

Install the components in reverse order.

Vehicles with diesel engine

2. ⚠️ WARNING: Move the windshield wiper motor to the parked position before installing the wiper arms.

Check the angle of the windshield wiper arms in relation to the windshield.

For additional information, refer to:

Windshield Wiper Blade and Pivot Arm Adjustment (501-16 Wipers and Washers, General Procedures).

REMOVAL AND INSTALLATION

Suction Accumulator(34 630 4)

1. Remove the right-hand headlamp assembly.

For additional information, refer to:

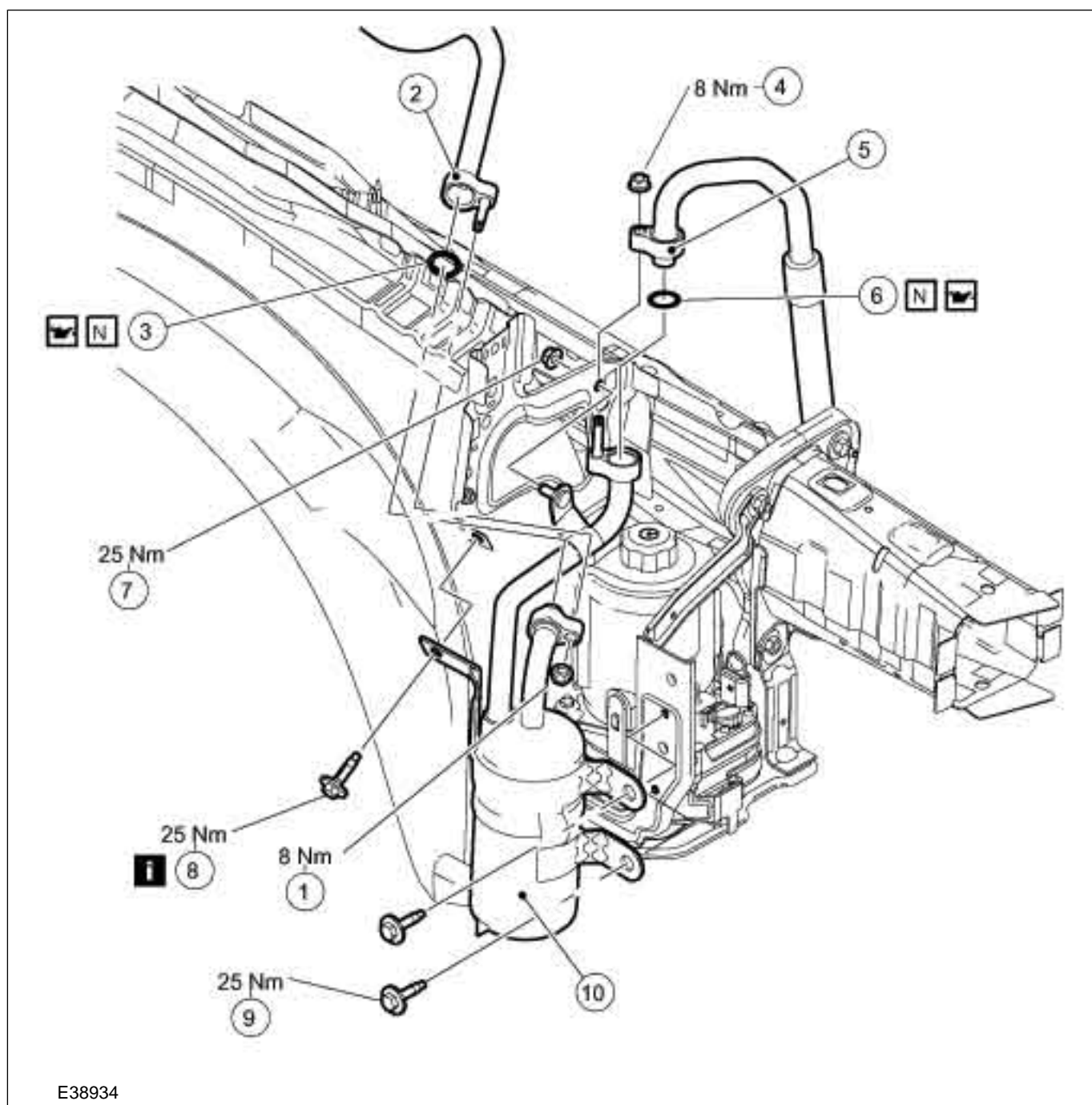
Headlamp Assembly (417-01, Removal and Installation).

2. Evacuate the air conditioning (A/C) system.

For additional information, refer to: **Air Conditioning (A/C) System Recovery, Evacuation and Charging** (412-00, General Procedures).

3. Remove the components in the order indicated in the following illustration(s) and table(s).

CAUTION: Close off the refrigerant lines and the dehydrator to prevent contamination.



REMOVAL AND INSTALLATION

Item	Description
1	Nut, dehydrator refrigerant line to evaporator
2	Refrigerant line, dehydrator to evaporator
3	Seal, dehydrator refrigerant line to evaporator
4	Nut, dehydrator refrigerant line to condenser
5	Dehydrator refrigerant line to condenser

Item	Description
6	Seal, dehydrator refrigerant line to condenser
7	Nut, dehydrator
8	Dehydrator rear bolt See Removal Detail
9	Dehydrator front bolt
10	Dehydrator

4. To install, reverse the removal procedure.

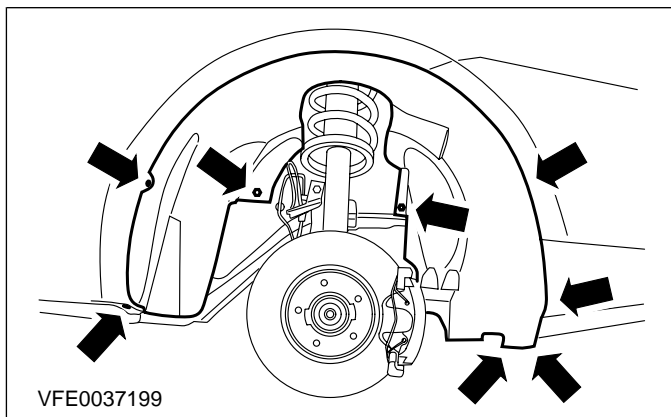
Removal Details

Item 8 Dehydrator rear bolt

1. Raise and support the vehicle.

For additional information, refer to:
Lifting (100-02, Description and Operation).

2. Remove the right-hand wheelhouse cover (shown with wheel removed for clarity).



REMOVAL AND INSTALLATION

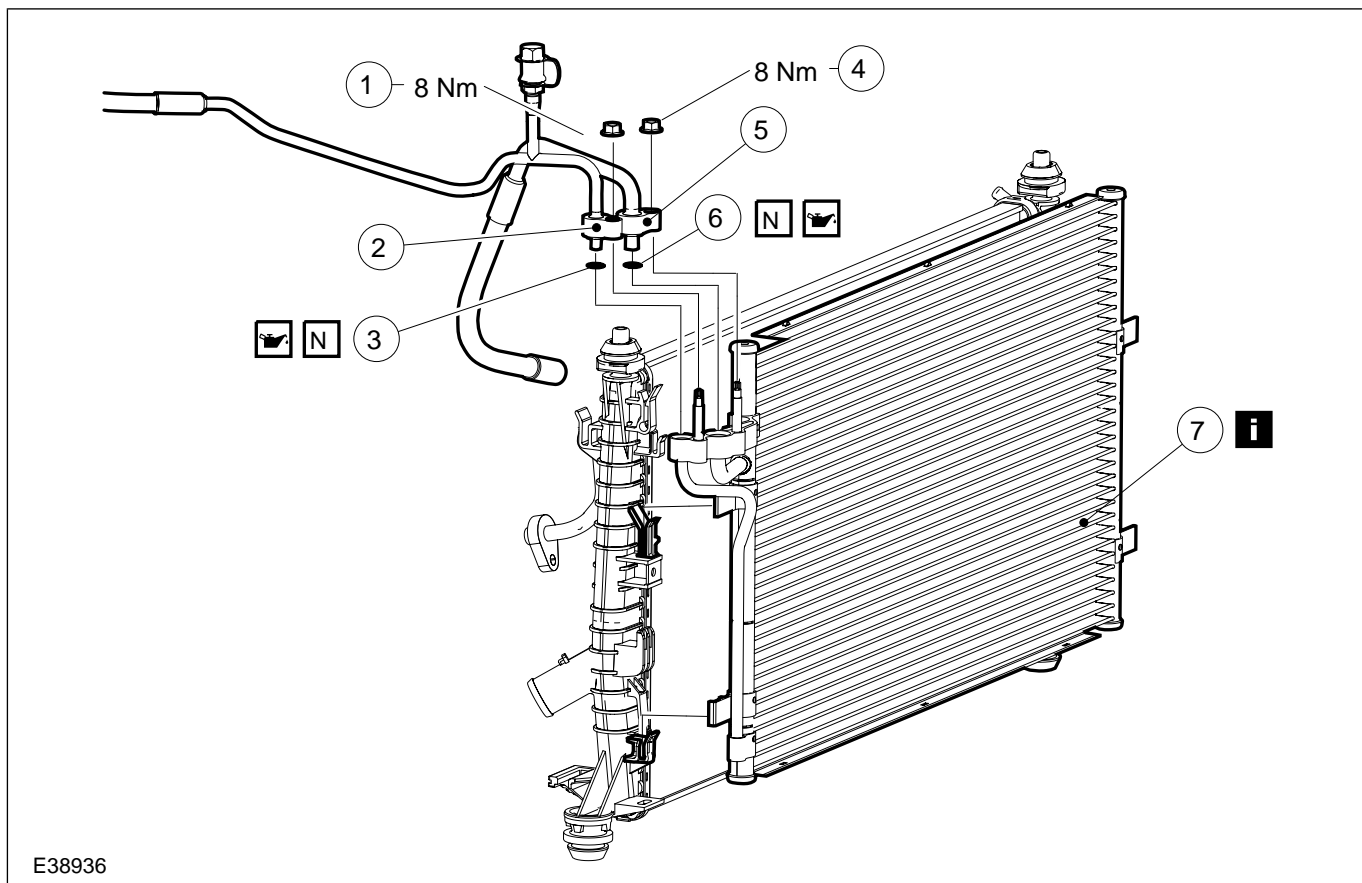
Condenser Core(34 632 4)

1. Evacuate the air conditioning (A/C) system.

For additional information, refer to: **Air Conditioning (A/C) System Recovery, Evacuation and Charging (412-00 Climate Control System - General Information, General Procedures).**

2. Remove the components in the order indicated in the following illustration(s) and table(s).

CAUTION: Cap the refrigerant lines and the condenser core to prevent dirt ingress.



E38936

Item	Description
1	Nut for condenser core refrigerant line to fixed orifice tube
2	Condenser core refrigerant line to fixed orifice tube
3	Seal for condenser core refrigerant line to fixed orifice tube
4	Nut for condenser core refrigerant line to compressor

Item	Description
5	Condenser core refrigerant line to compressor
6	Seal for condenser core refrigerant line to compressor
7	Capacitor See Removal Detail

3. To install, reverse the removal procedure.

Removal Details

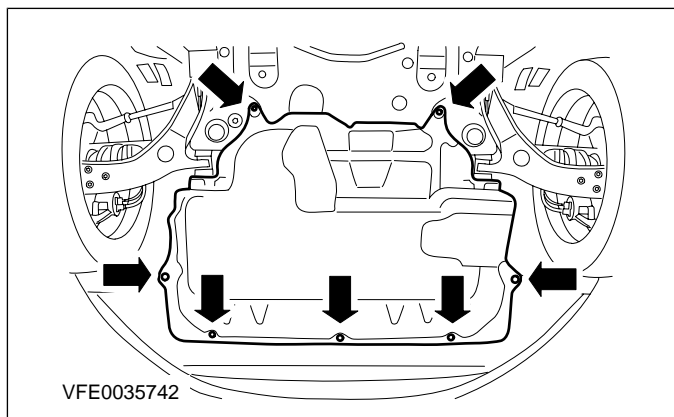
REMOVAL AND INSTALLATION

Item 7 Capacitor

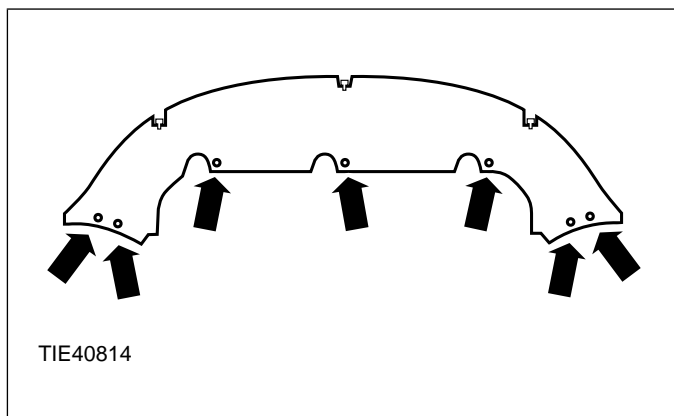
1. Raise and support the vehicle.

For additional information, refer to: **Lifting** (100-02 Jacking and Lifting, Description and Operation).

2. Remove the engine undershield.



3. Remove the lower radiator cover.



4. NOTE: Only vehicles with a 2.5L or diesel engine

Remove the charge air cooler. For additional information, refer to:

Charge Air Cooler (303-12B, Removal and Installation),

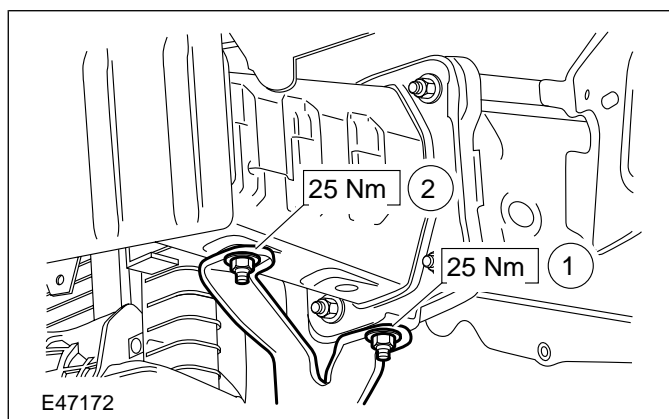
Charge Air Cooler - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel (303-12A, Removal and Installation).

5. NOTE: For vehicles with automatic transmission only

Loosen the radiator crossmember (left side shown).

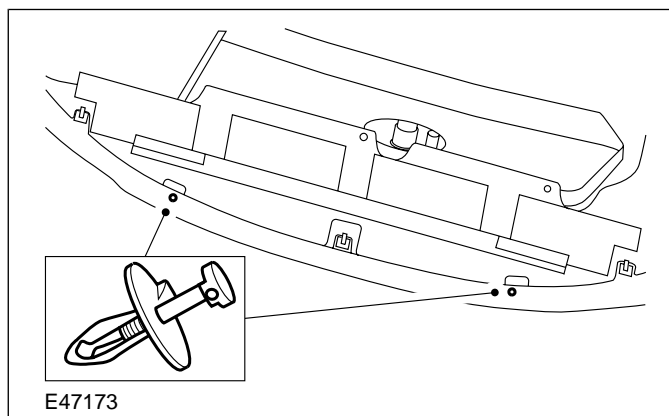
1. Loosen the rear bolts by four turns.

2. Remove the front bolts.



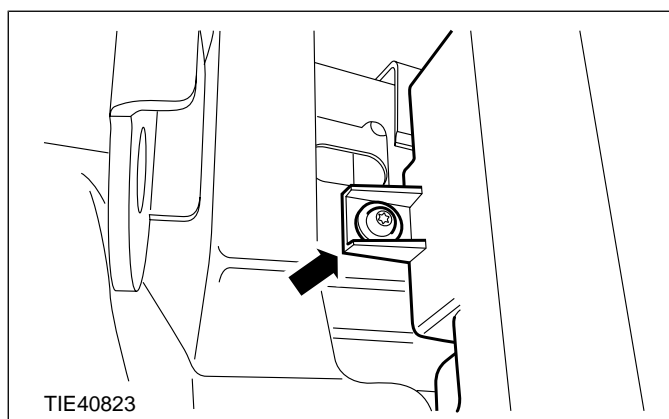
6. NOTE: For vehicles with automatic transmission only

Detach the air deflectors from the front bumper cover.



7. NOTE: For vehicles with automatic transmission only

Remove the air deflector on both sides (left-hand side shown).



8. NOTE: For vehicles with automatic transmission only

Unclip left-hand side of transmission fluid cooler.

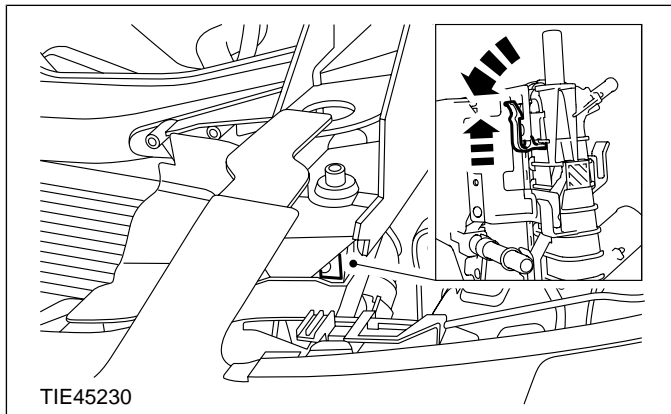
412-03-19

Air Conditioning

412-03-19

REMOVAL AND INSTALLATION

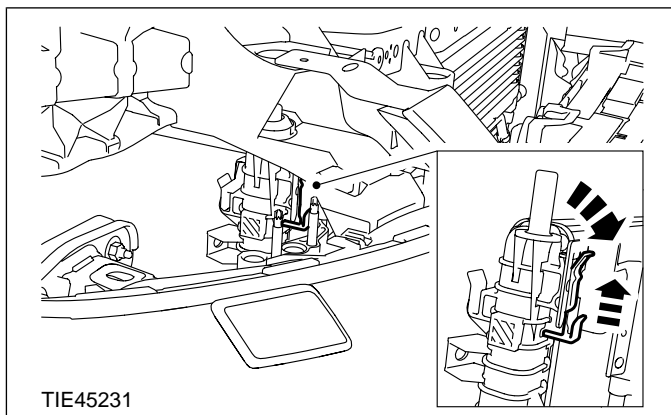
- Pull the clip forwards and hold, then pull the transmission fluid cooler upwards out of the bracket.



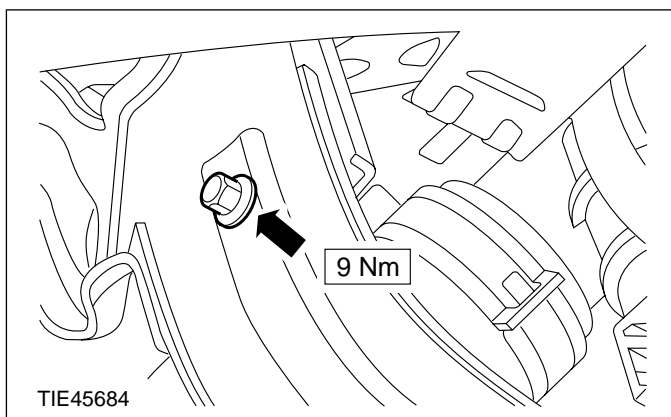
9. NOTE: For vehicles with automatic transmission only

Unclip the transmission fluid cooler on the right-hand side and secure to one side.

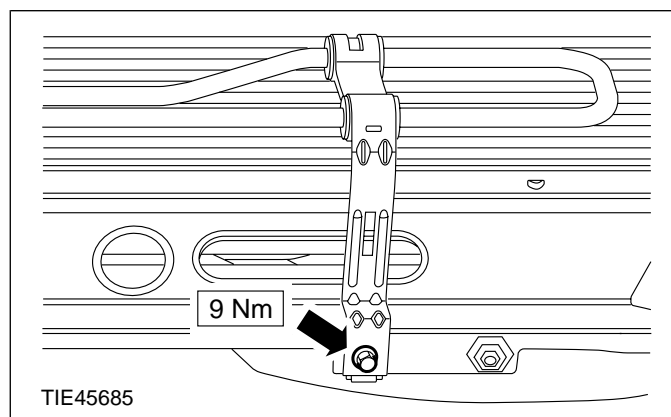
- Pull the clip forwards and hold, then pull the transmission fluid cooler upwards out of the bracket.



10. Remove the power steering fluid cooler bracket bolt.



- 11. Detach the power steering fluid cooler from the radiator crossmember and secure to one side.**



- 12. Push the condenser core upwards out of the mountings and remove it downwards.**

REMOVAL AND INSTALLATION

Condenser to Evaporator Line

Special Tool(s)

	Remover/Installer, Coolant Hose Clamp 303-397
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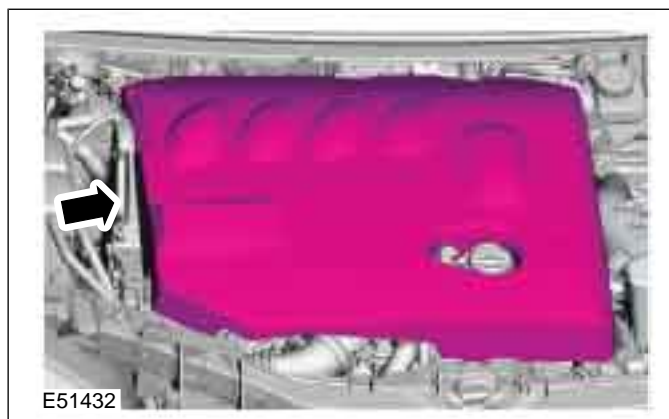
General Equipment

Hose clamp - coolant hose

1. Evacuate the air conditioning (A/C) system.

For additional information, refer to:
Air Conditioning (A/C) System Recovery, Evacuation and Charging (412-00).

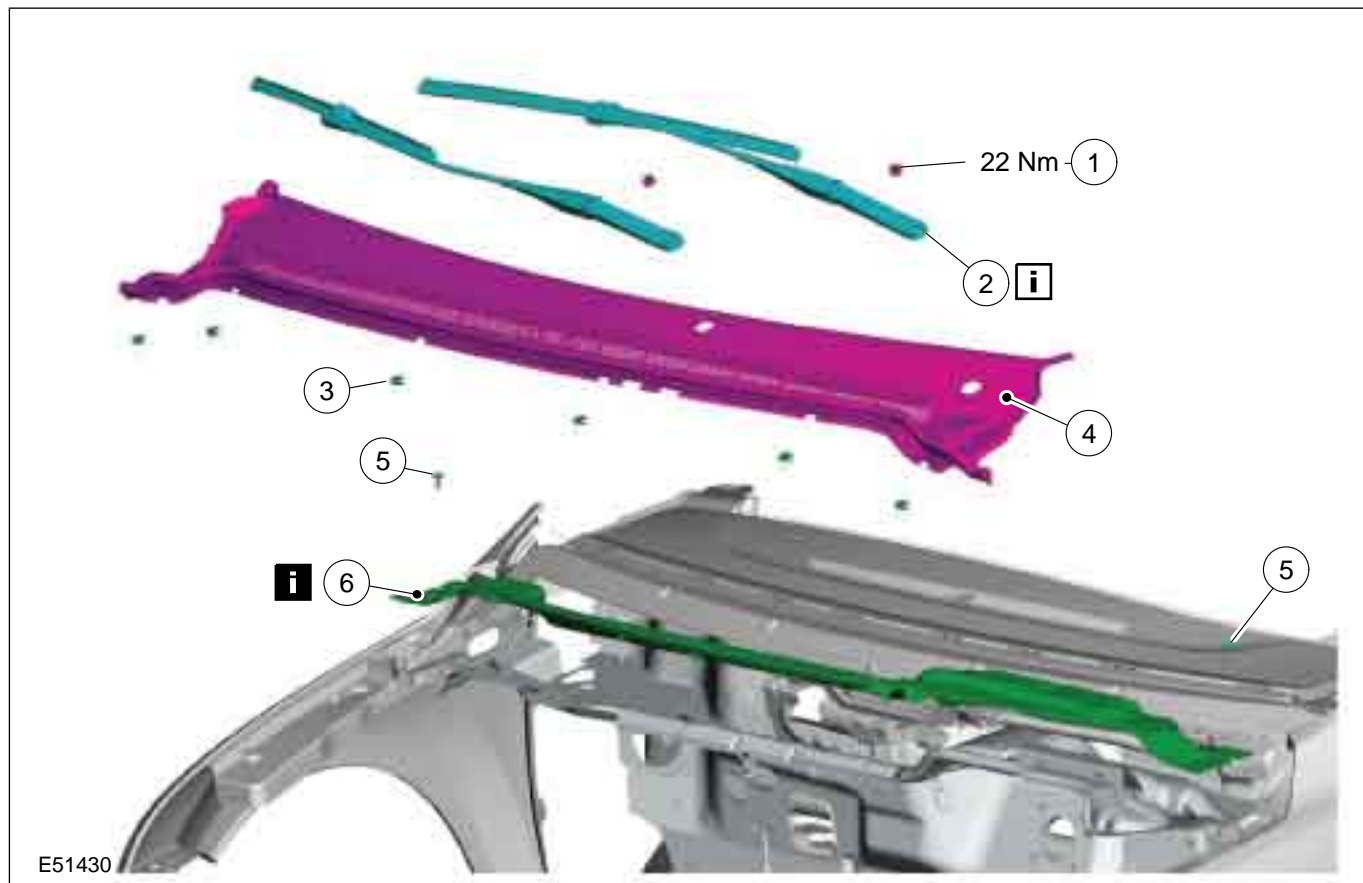
2. Remove the engine cover (2.0L diesel shown).



3. Remove the components in the order indicated in the following illustration(s) and table(s).

⚠ CAUTION: Make sure that the windshield wiper motor is in the park position.

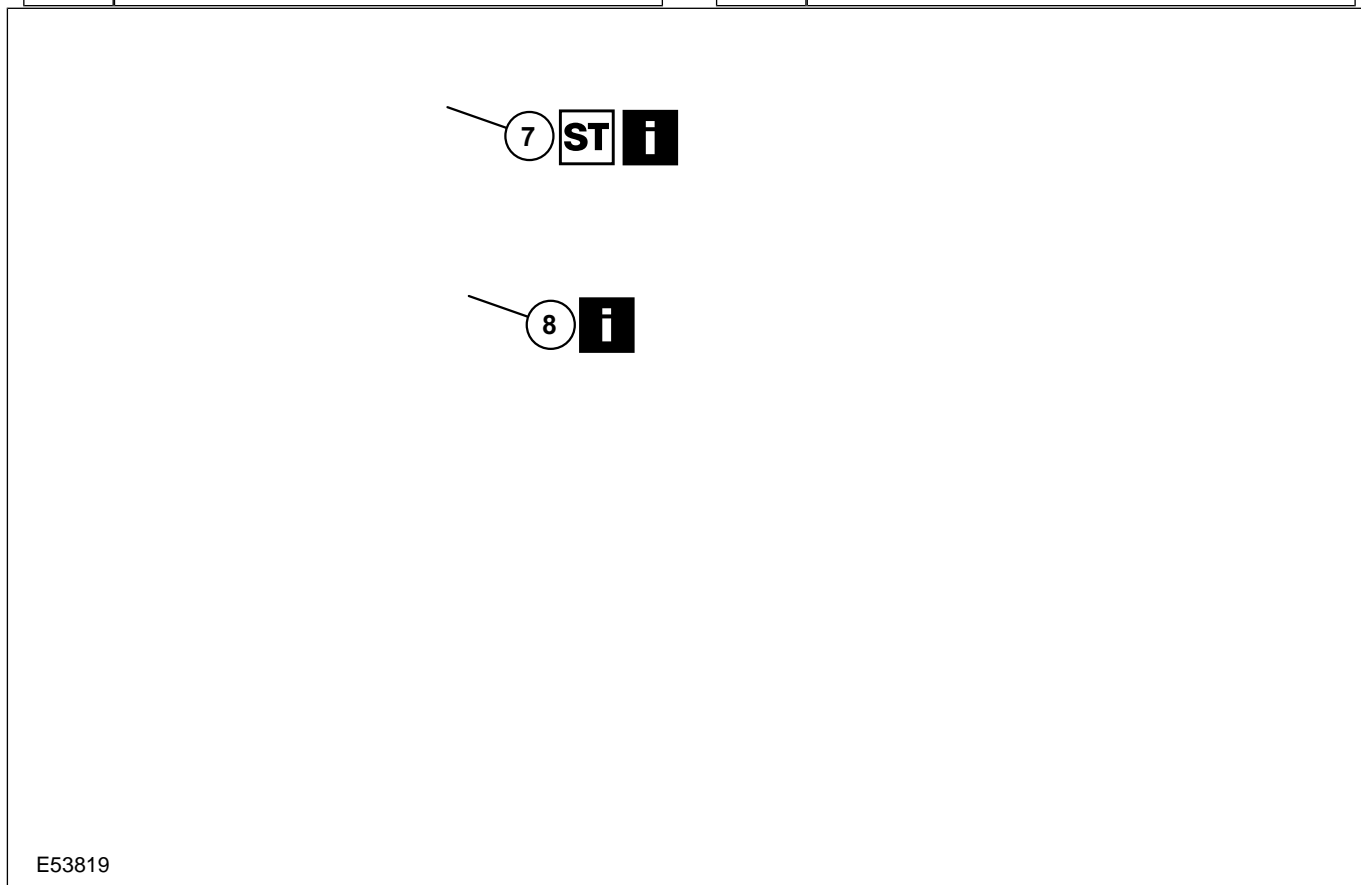
NOTE: Vehicles with diesel engines only



REMOVAL AND INSTALLATION

Item	Description
1	Windshield wiper arm nuts
2	Windshield wiper arms <i>See Installation Detail</i>
3	Clips, cowl panel grille

Item	Description
4	Cowl panel grille
5	Bulkhead extension screws
6	Bulkhead extension <i>See Removal Detail</i>

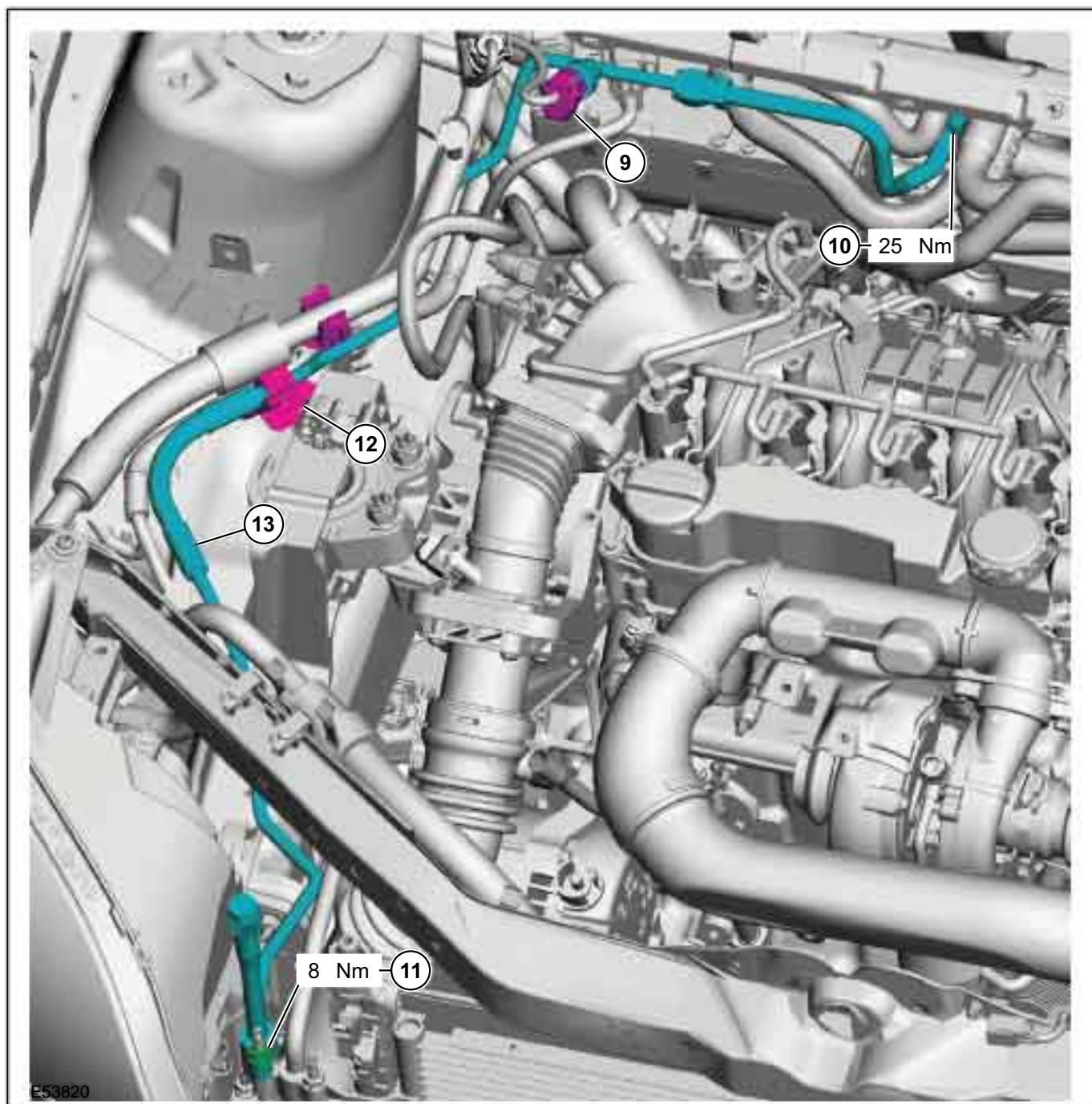


E53819

Item	Description
7	Coolant hose, coolant reservoir (only 1.6L diesel engine) <i>See Removal Detail</i>
8	Coolant expansion tank <i>See Removal Detail</i>

REMOVAL AND INSTALLATION

⚠ CAUTION: Close off the A/C condenser and A/C evaporator to stop dirt from entering.



Item	Description
9	High pressure switch connector
10	Bolt, refrigerant line to A/C evaporator
11	Nut, refrigerant line to A/C condenser
12	Condenser refrigerant line bracket to the evaporator (unclip)
13	Condenser refrigerant line to evaporator

4. To install, reverse the removal procedure.

NOTE: Install new refrigerant line O-rings.

NOTE: Coat the refrigerant line O-rings with clean refrigerant oil before installation.

5. NOTE: Vehicles with diesel engines only

Check the angle of the windshield wiper arms in relation to the windshield.

For additional information, refer to: Windshield Wiper Blade and Pivot Arm Adjustment (501-16, General Procedures).

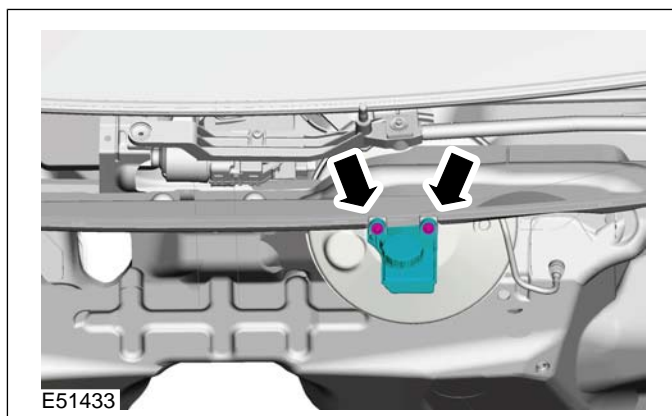
REMOVAL AND INSTALLATION

Removal Details

Item 6 Bulkhead extension

1. **⚠ CAUTION:** If brake fluid comes into contact with the paintwork, the affected area must be washed down immediately with cold water.

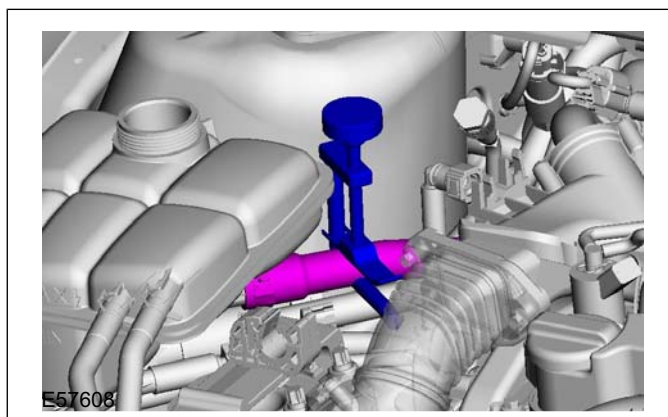
Detach the brake fluid reservoir from the bulkhead extension and tie it back to one side.



Item 7 Coolant hose, coolant reservoir (only 1.6L diesel engine)

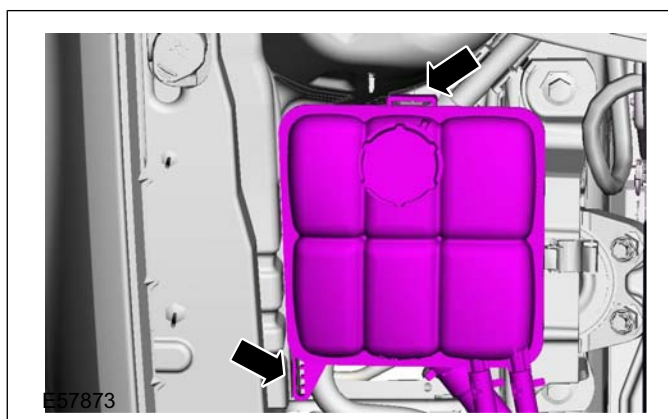
1. Empty the coolant expansion tank.
2. **⚠ CAUTION:** Close off the coolant hose from the expansion tank using a hose clamp, so that coolant is prevented from escaping from the coolant hose.

Clamp the coolant hose shut.



Item 8 Coolant expansion tank

1. Unclip the coolant expansion tank and place to one side.



Installation Details

Item 2 Windshield wiper arms

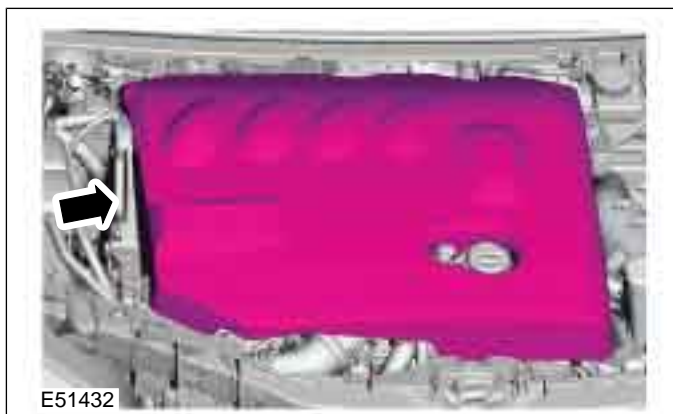
1. **⚠ CAUTION:** Move the windshield wiper motor to the parked position before installing the wiper arms.

REMOVAL AND INSTALLATION

Low-Pressure Cutoff Switch(34 629 0)

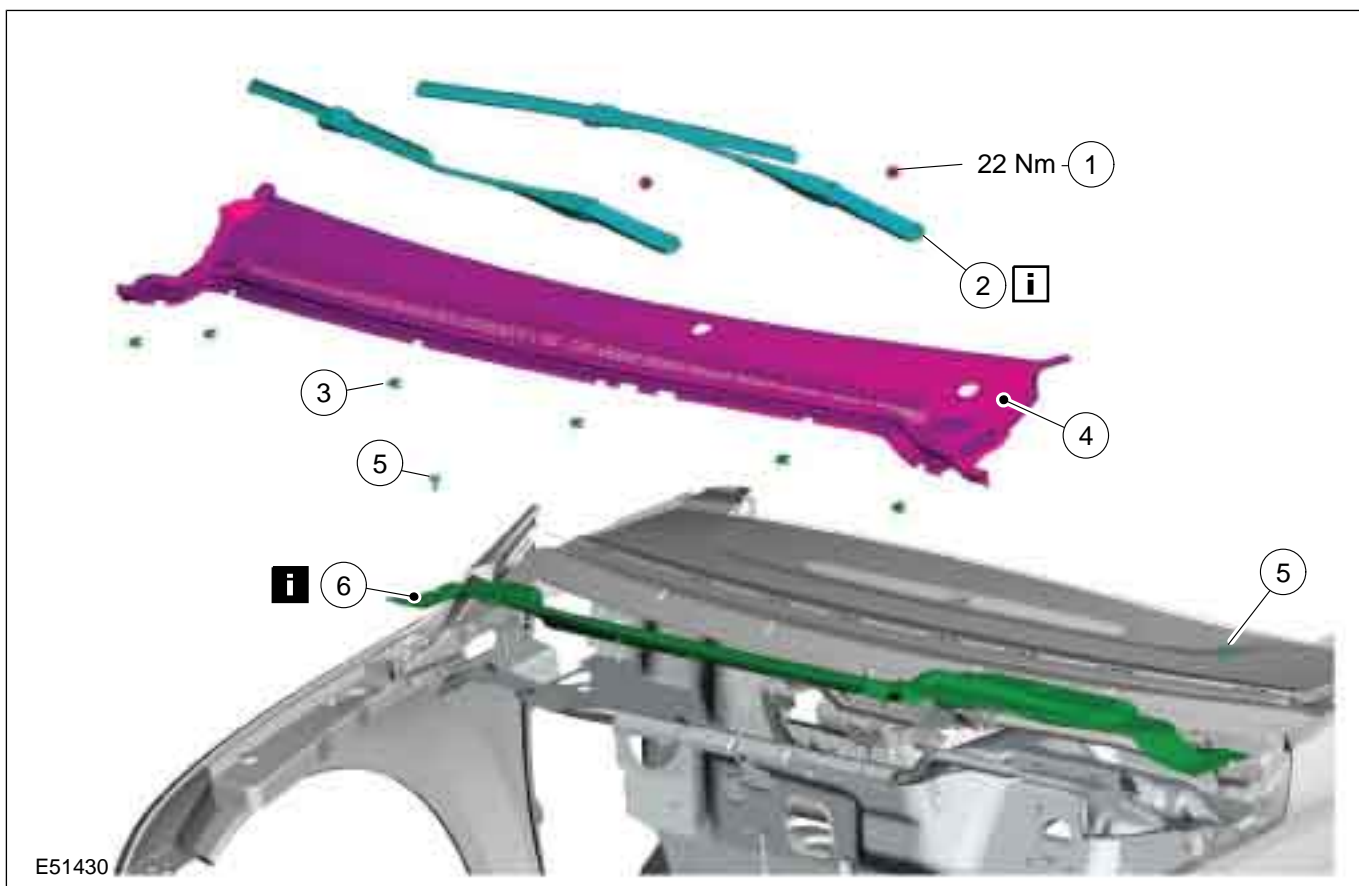
1. Remove the engine cover (2.0L diesel shown).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



CAUTION: Make sure that the windshield wiper motor is in the park position.

NOTE: Vehicles with diesel engines only

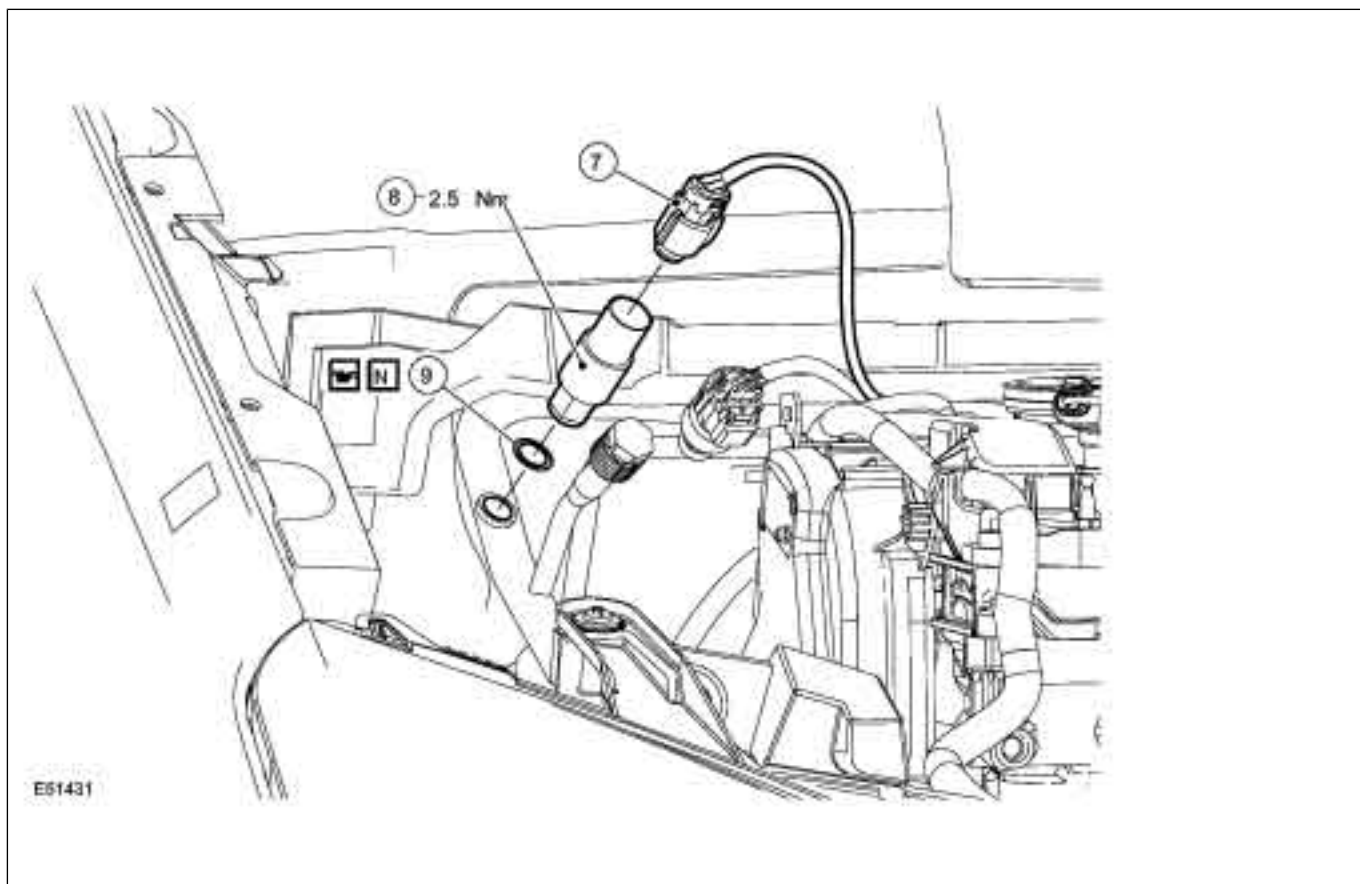


Item	Description
1	Windshield wiper arm nuts
2	Windshield wiper arms <i>See Installation Detail</i>
3	Clips, cowl panel grille

Item	Description
4	Cowl panel grille
5	Bulkhead extension screws
6	Bulkhead extension <i>See Removal Detail</i>

REMOVAL AND INSTALLATION

- ⚠ CAUTION:** After removing the low pressure switch, make sure that the low pressure switch valve is completely closed, in order to prevent refrigerant from escaping. Failure to observe this instruction can lead to injury.



Item	Description
7	Low pressure switch connector
8	Low-pressure switch
9	Low pressure switch seal

3. To install, reverse the removal procedure.

Removal Details

Item 6 Bulkhead extension

1. **⚠ CAUTION:** If brake fluid comes into contact with the paintwork, the affected area must be washed down immediately with cold water.

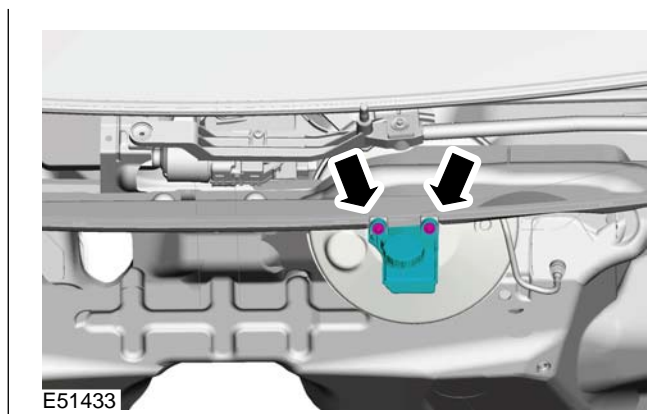
4. **NOTE:** Vehicles with diesel engines only

Check the angle of the windshield wiper arms in relation to the windshield.

For additional information, refer to: **Windshield Wiper Blade and Pivot Arm Adjustment (501-16, General Procedures)**.

REMOVAL AND INSTALLATION

Detach the brake fluid reservoir from the bulkhead extension and tie it back to one side.

**Installation Details****Item 2 Windshield wiper arms**

⚠ CAUTION: Move the windshield wiper motor to the parked position before installing the wiper arms.

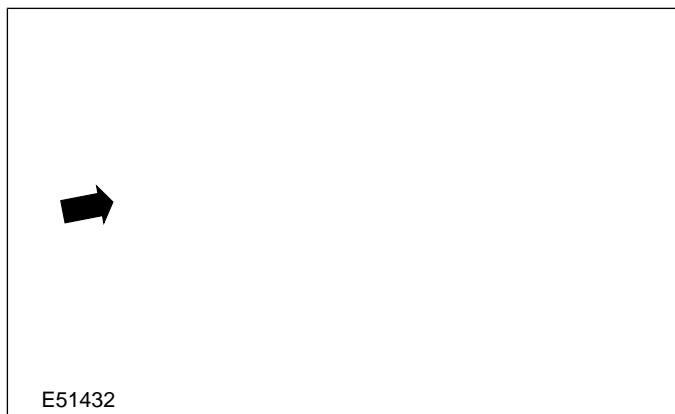


REMOVAL AND INSTALLATION

High-Pressure Cutoff Switch(34 631 0)

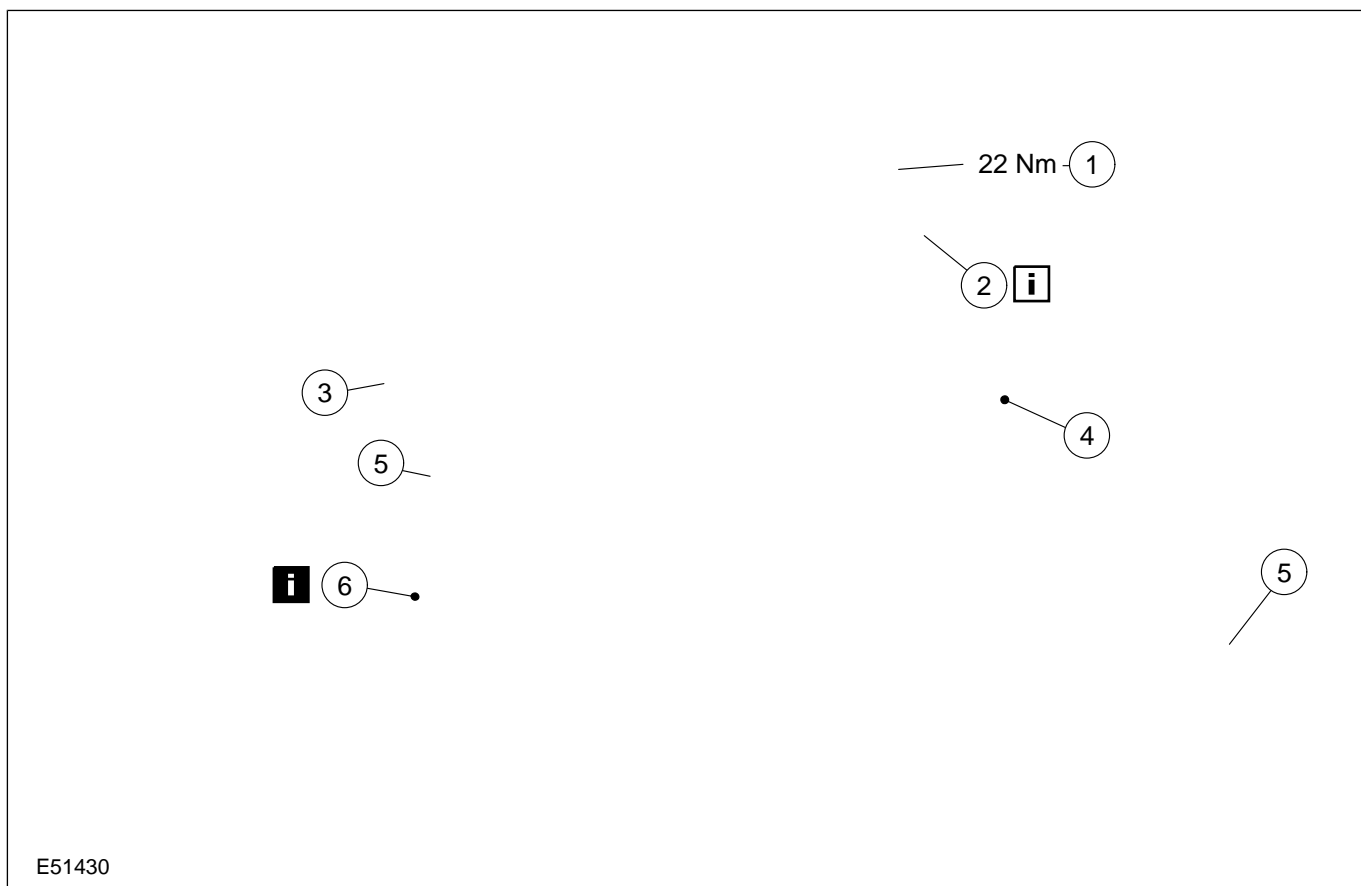
1. Remove the engine cover (2.0L diesel shown).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



CAUTION: Make sure that the windshield wiper motor is in the park position.

NOTE: Vehicles with diesel engines only



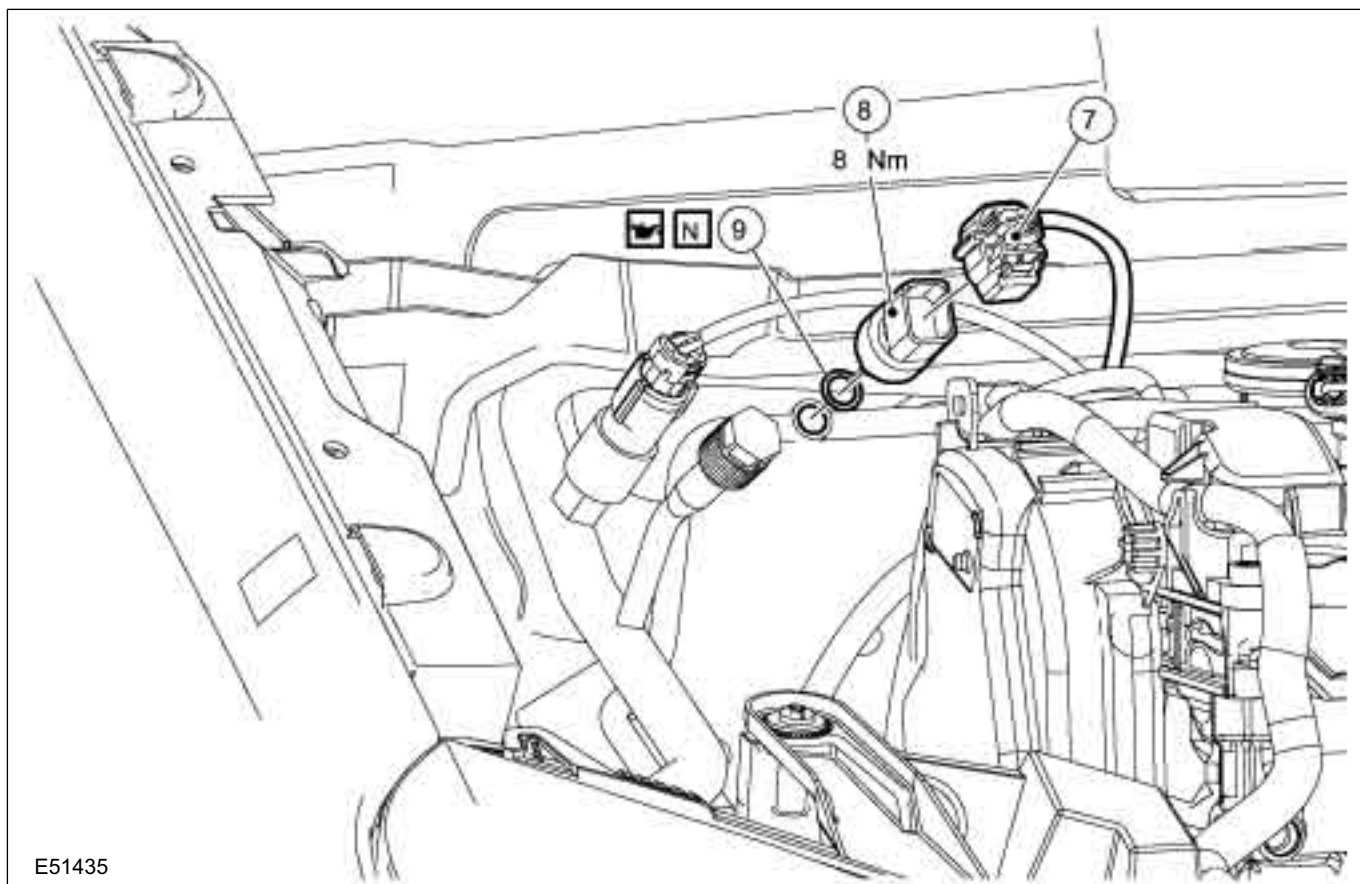
Item	Description
1	Windshield wiper arm nuts
2	Windshield wiper arms <i>See Installation Detail</i>
3	Clips, cowl panel grille

Item	Description
4	Cowl panel grille
5	Bulkhead extension screws
6	Bulkhead extension <i>See Removal Detail</i>



REMOVAL AND INSTALLATION

- ⚠ CAUTION:** Make sure that the high-pressure cutoff switch valve closes completely after removal of the high-pressure cutoff switch to prevent loss of refrigerant. Failure to observe this instruction can lead to injury.



E51435

Item	Description
7	High pressure switch connector
8	High Pressure Switch
9	High pressure switch seal

3. To install, reverse the removal procedure.

Removal Details

Item 6 Bulkhead extension

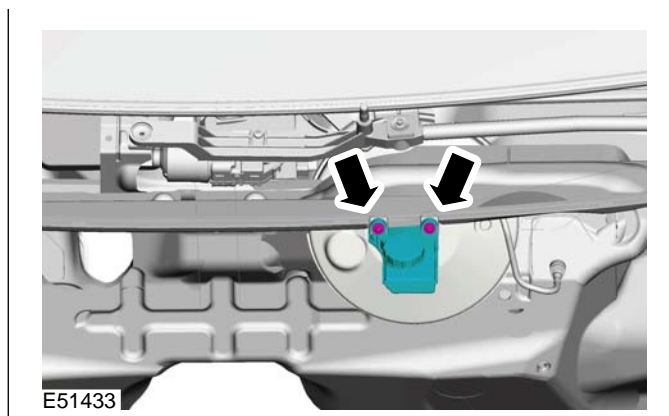
1. **⚠ CAUTION:** If brake fluid comes into contact with the paintwork, the affected area must be washed down immediately with cold water.

4. **NOTE:** Vehicles with diesel engines only
Check the angle of the wiper arms to the windscreen.

For additional information, refer to: **Windshield Wiper Blade and Pivot Arm Adjustment (501-16, General Procedures)**.

REMOVAL AND INSTALLATION

Detach the brake fluid reservoir from the bulkhead extension and tie it back to one side.

**Installation Details****Item 2 Windshield wiper arms**

⚠ CAUTION: Move the windshield wiper motor to the parked position before installing the wiper arms.

REMOVAL AND INSTALLATION

Evaporator Core(34 622 7)

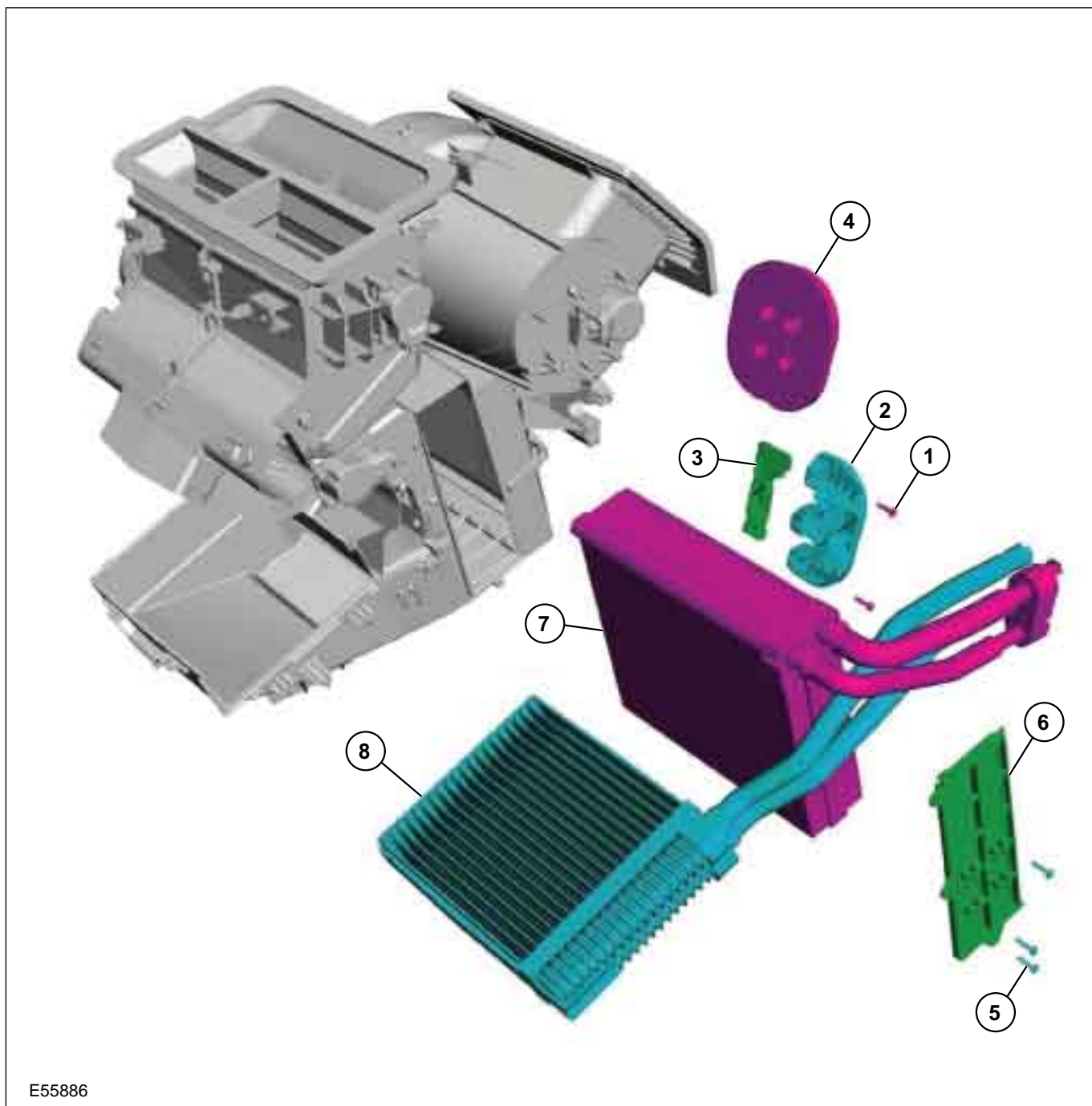
1. Remove the heater core / evaporator core housing.

For additional information, refer to:

Heater Core and Evaporator Core Housing
(412-02A, Removal and Installation).

NOTE: Pull out the evaporator and heater core at the same time.

2. Remove the components in the order indicated in the following illustration(s) and table(s).



E55886

REMOVAL AND INSTALLATION

Item	Description
1	Bulkhead aperture cover section bolts
2	Bulkhead aperture cover section
3	Bulkhead aperture spacer
4	Bulkhead aperture gasket
5	Evaporator housing cover bolts
6	Evaporator housing cover
7	Evaporator
8	Heater core

3. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Evaporator Core — RHD(34 622 7)

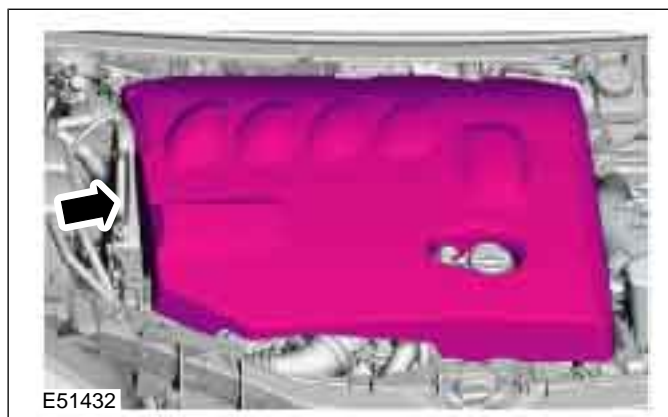
1. Drain the air conditioning system.

For additional information, refer to: Air Conditioning (A/C) System Recovery, Evacuation and Charging (412-00 Climate Control System - General Information, General Procedures).

2. Remove the heater core.

For additional information, refer to: Heater Core - RHD (412-02 Heating and Ventilation, Removal and Installation).

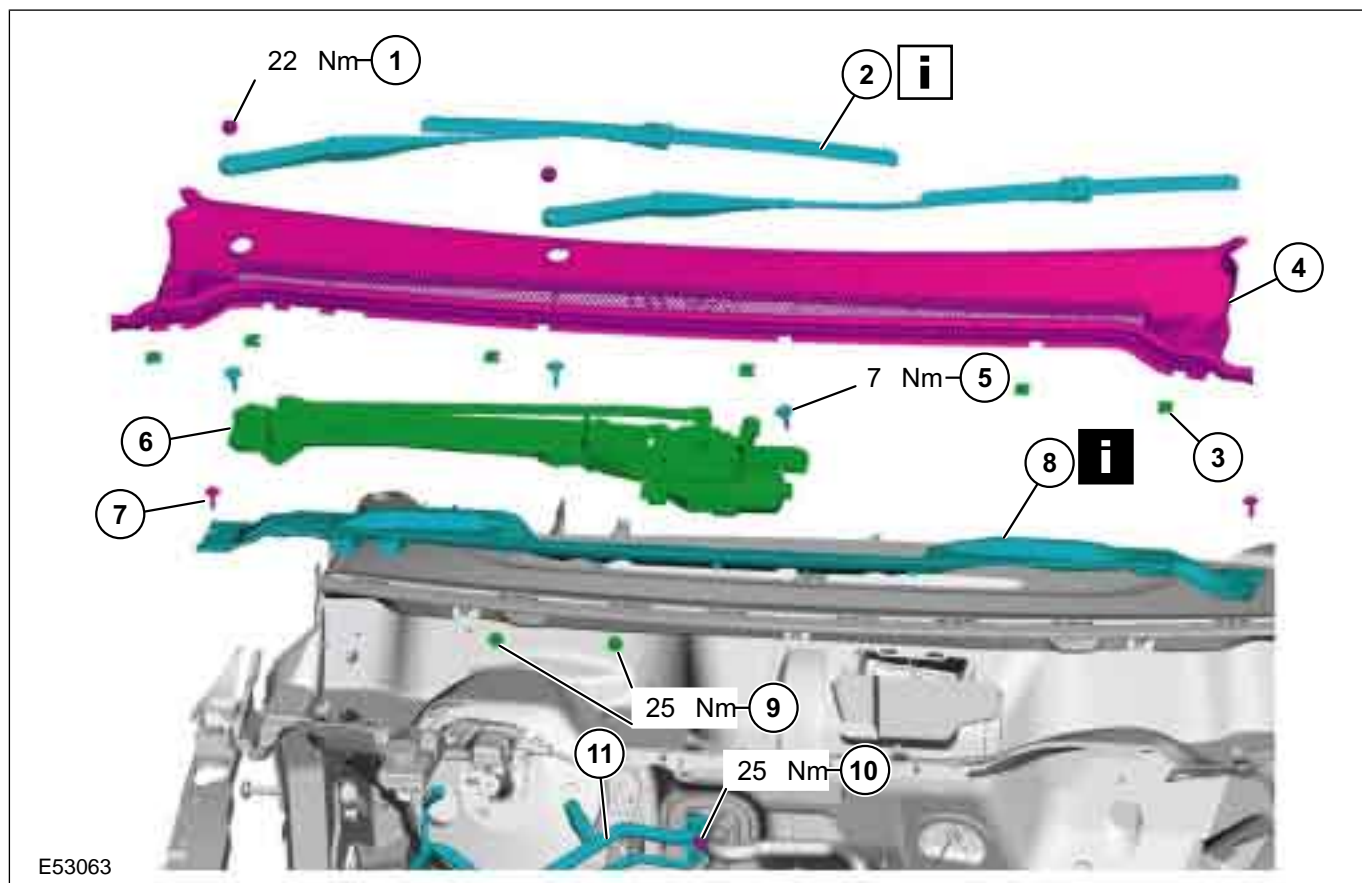
3. Remove the engine cover (2.0L Diesel engine shown).



4. Remove the components in the order indicated in the following illustration(s) and table(s).

CAUTION: Ensure that the windshield wiper motor is in the park position.

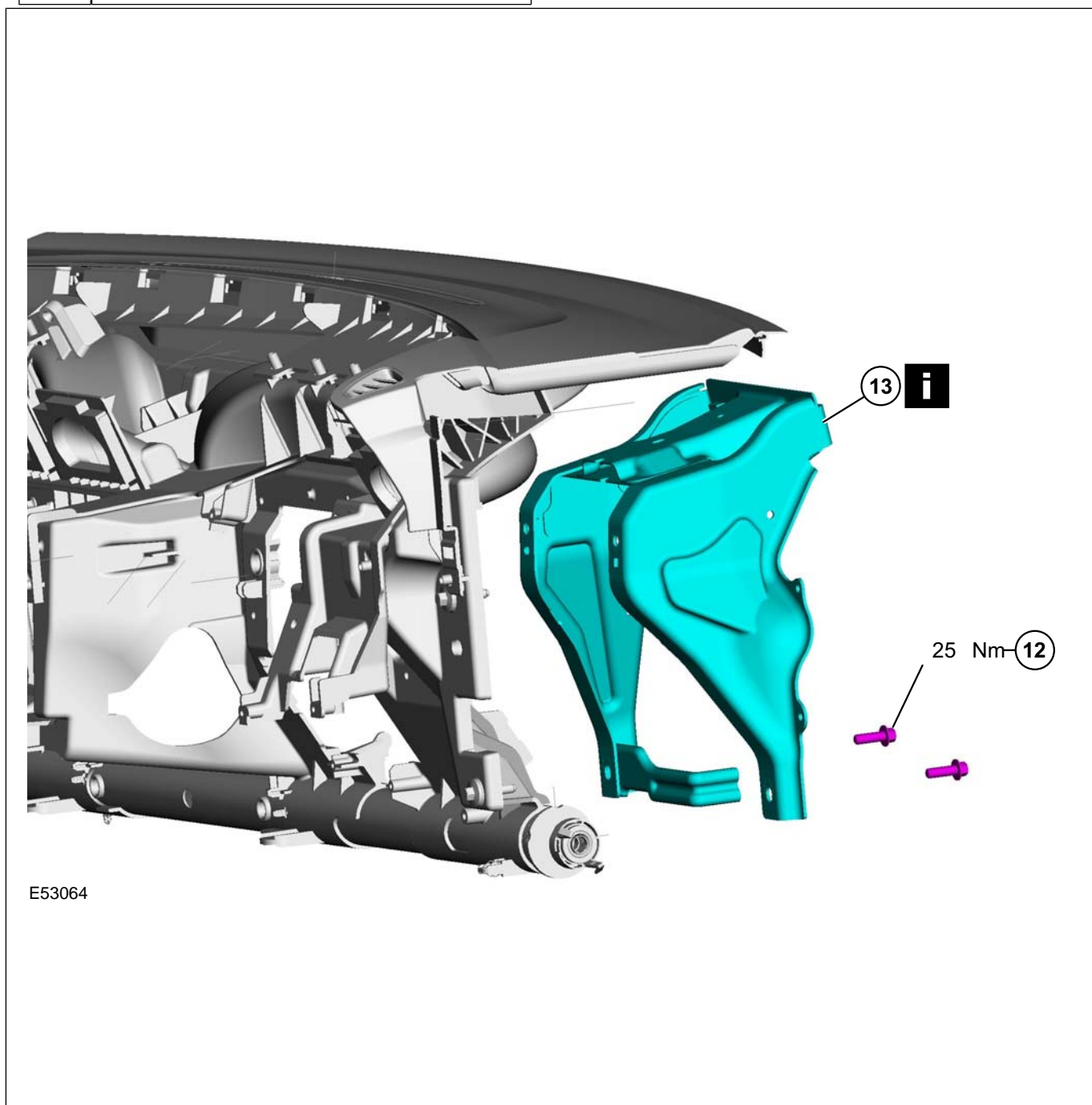
NOTE: Discard the refrigerant line O-ring seals.



REMOVAL AND INSTALLATION

Item	Description
1	Windshield wiper arm nuts
2	Windshield wiper arms <i>See Installation Detail</i>
3	Cowl grille clips
4	Cowl grille
5	Windshield wiper linkage bolts
6	Windshield wiper motor with linkage

Item	Description
7	Bulkhead extension bolts
8	Bulkhead extension <i>See Removal Detail</i>
9	Steering column bracket upper bolts
10	Refrigerant lines bolt
11	Refrigerant lines

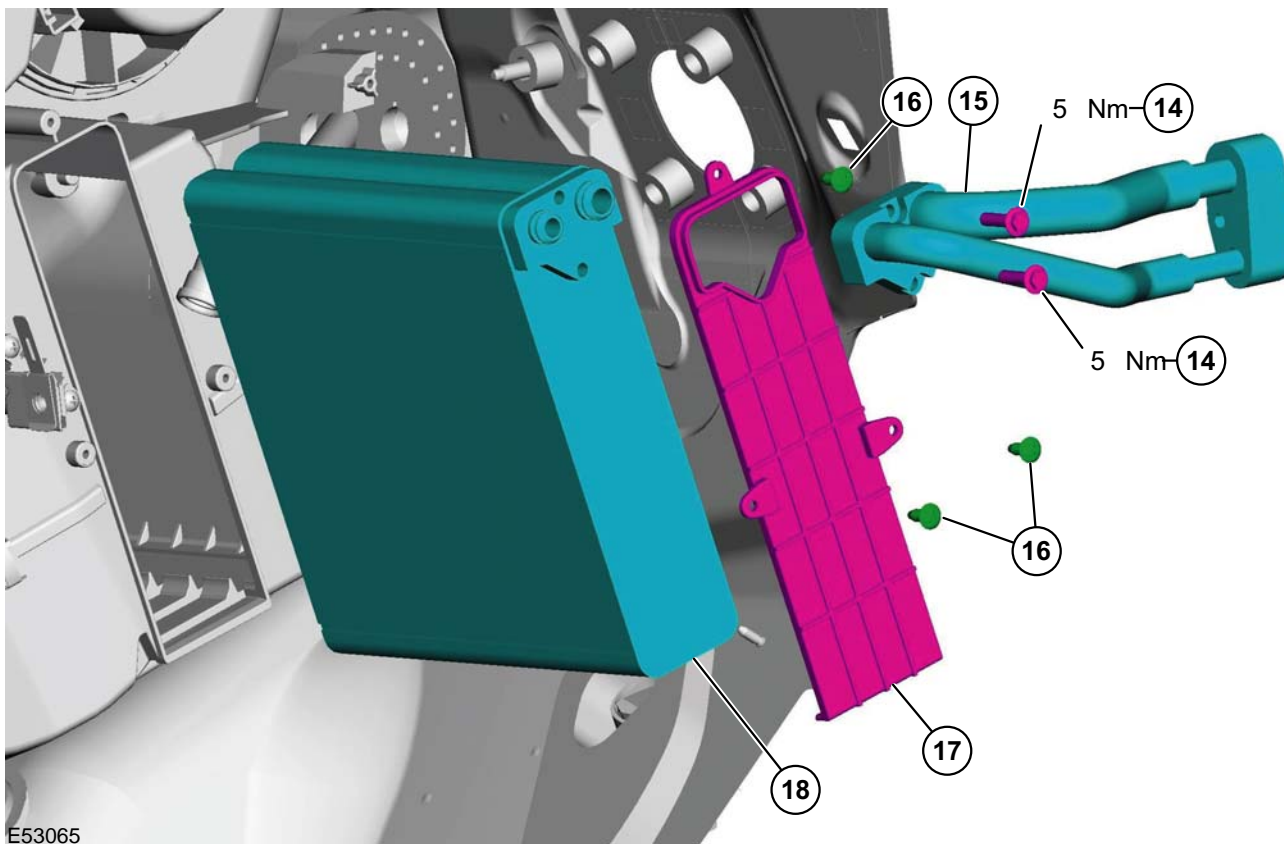


REMOVAL AND INSTALLATION

Item	Description
12	Steering column bracket lower bolts

Item	Description
13	Steering column bracket See Removal Detail

NOTE: Discard the refrigerant line O-ring seals.



E53065

Item	Description
14	Evaporator core refrigerant lines bolts
15	Evaporator core refrigerant lines
16	Evaporator core cover bolts

Item	Description
17	Evaporator core cover
18	Evaporator core

5. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

WARNINGS:

- ▲ Install new steering column retaining bolts. Failure to follow this instruction may result in personal injury.

- ▲ Install a new steering column shaft to steering gear pinion retaining bolt. Failure to follow this instruction may result in personal injury.

NOTE: Lubricate the refrigerant line O-ring seals with clean refrigerant oil before installation.

NOTE: Install new refrigerant line O-ring seals.

Removal Details

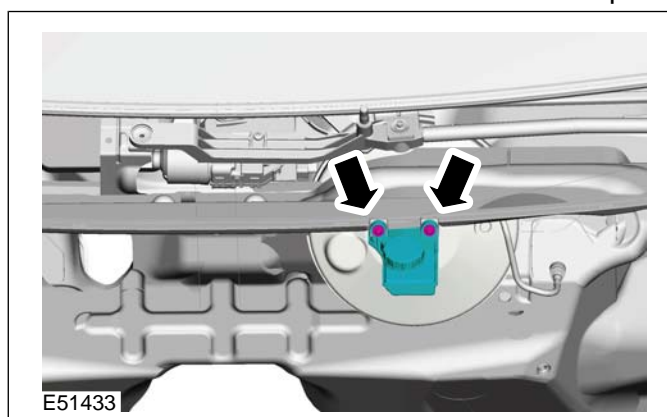
Item 8 Bulkhead extension

1. ▲ **CAUTION:** If brake fluid is spilt on the paintwork, the affected area must be immediately washed down with cold water.

NOTE: Only vehicles with 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) or diesel engine.

Detach the brake fluid retainer from the bulkhead extension and secure it to one side.

1. Pull the bulkhead extension from the clips.



Item 13 Steering column bracket

1. Unclip the instrument panel wiring harness from the instrument panel console.
2. Detach the steering column bracket from the instrument panel console and pull it to side.

Installation Details

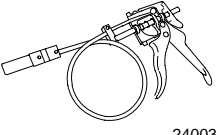
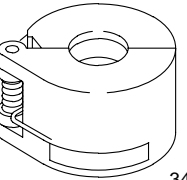
Item 2 Windshield wiper arms

- ▲ **CAUTION:** Move the windshield wiper motor to park position before installing the windshield wiper arms.

REMOVAL AND INSTALLATION

Evaporator Outlet Line

Special Tool(s)

 <p>24003</p>	<p>Remover/Installer, Coolant Hose Clamp 303-397</p>
 <p>34002</p>	<p>Disconnect Tool, Spring Lock Coupling 3/4" (white) 412-040</p>

General Equipment

Hose clamp - coolant hose

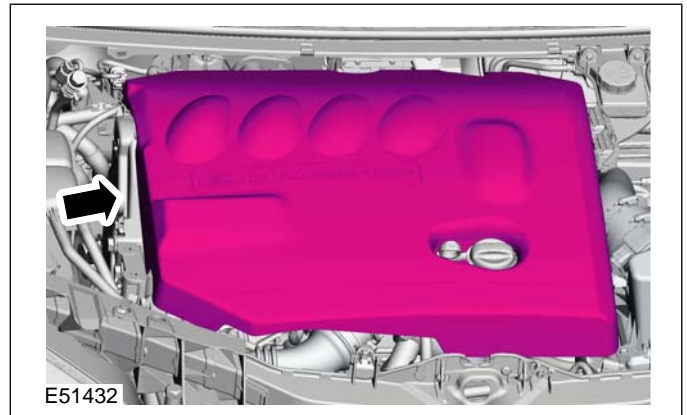
1. Evacuate the air conditioning (A/C) system.

For additional information, refer to:
**Air Conditioning (A/C) System Recovery,
Evacuation and Charging (412-00).**

2. Remove the right-hand headlamp assembly.

For additional information, refer to:

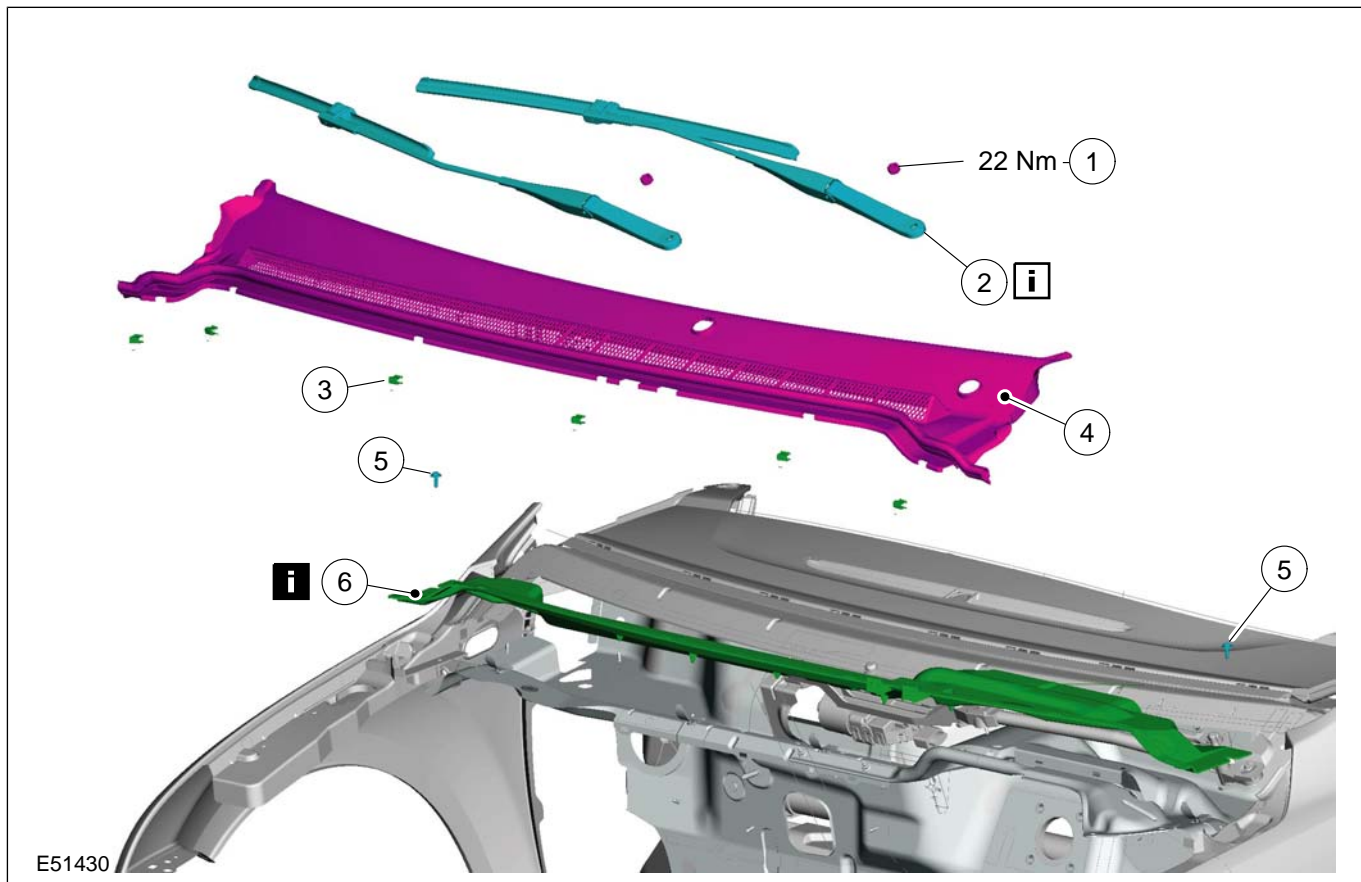
**Headlamp Assembly (417-01, Removal and
Installation).**

3. Remove the engine cover (2.0L diesel
shown).4. Remove the components in the order
indicated in the following illustration(s) and
table(s).

REMOVAL AND INSTALLATION

⚠ CAUTION: Make sure that the windshield wiper motor is in the park position.

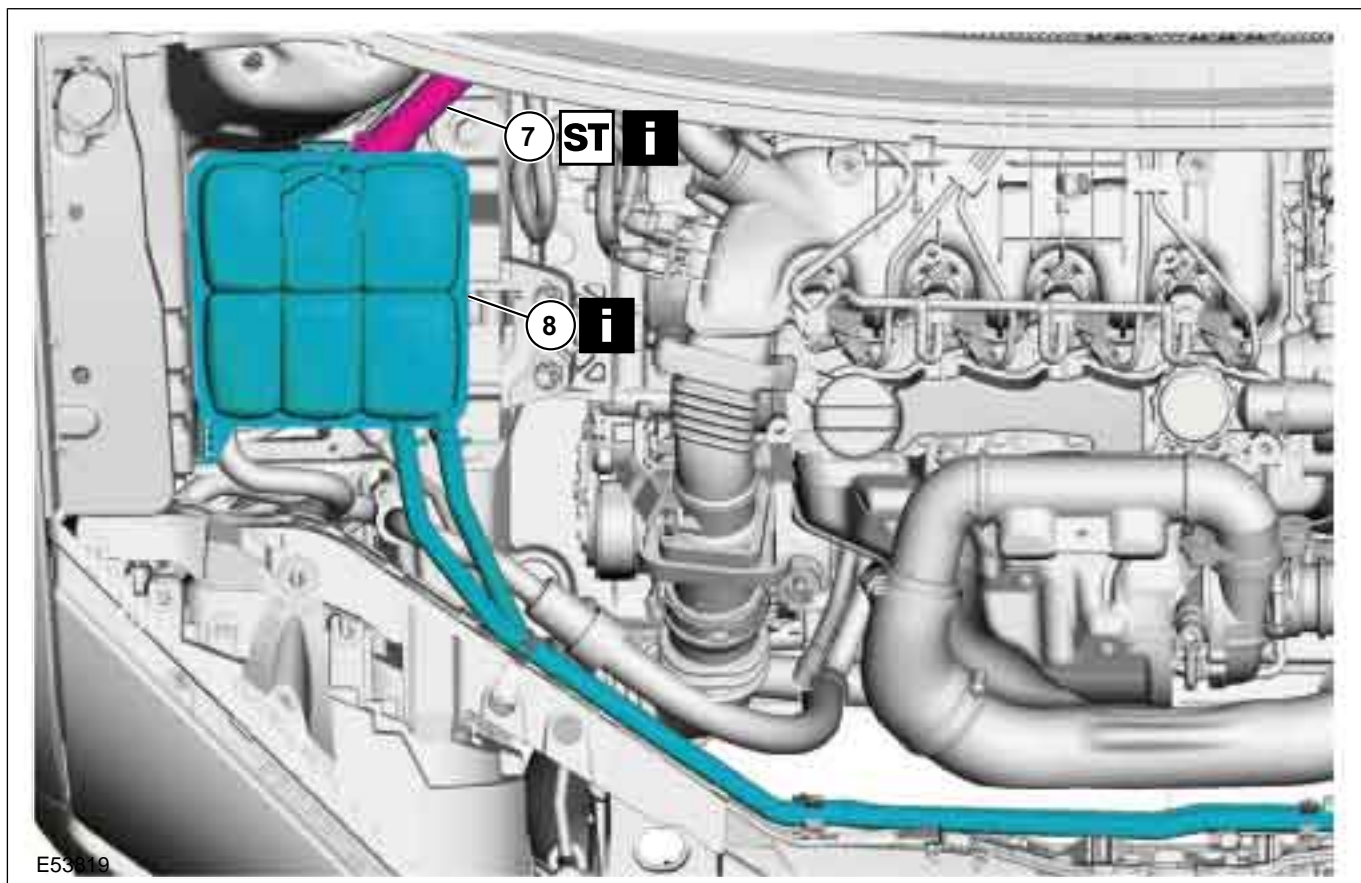
NOTE: Vehicles with diesel engines only



Item	Description
1	Windshield wiper arm nuts
2	Windshield wiper arms <i>See Installation Detail</i>
3	Clips, cowl panel grille

Item	Description
4	Cowl panel grille
5	Bulkhead extension screws
6	Bulkhead extension <i>See Removal Detail</i>

REMOVAL AND INSTALLATION

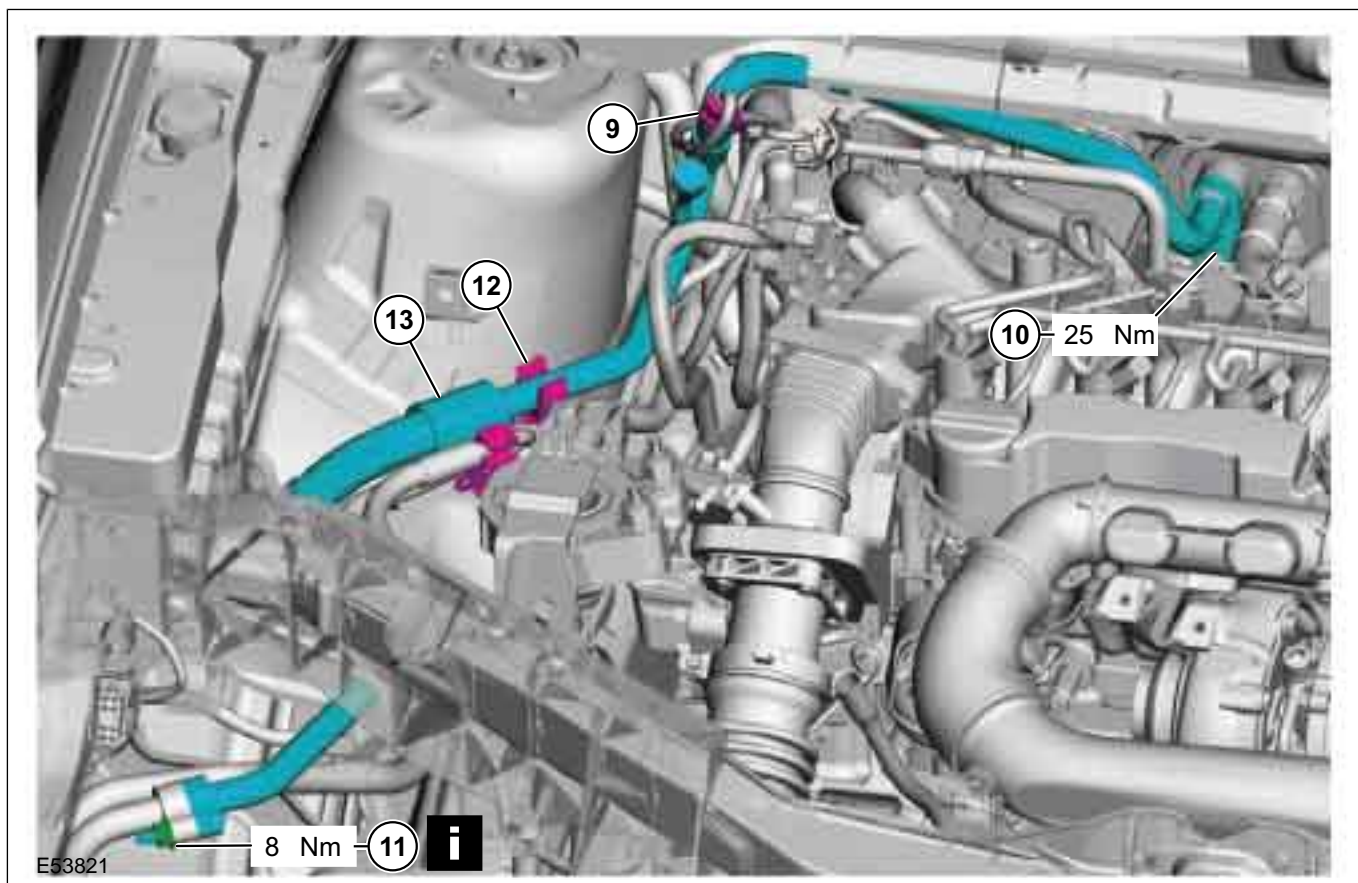


E53619

Item	Description
7	Coolant hose, coolant reservoir (only 1.6L diesel engine) See Removal Detail
8	Coolant expansion tank See Removal Detail

REMOVAL AND INSTALLATION

⚠ CAUTION: Close off the A/C dehydrator and evaporator to stop dirt from entering.



Item	Description
9	Low pressure switch connector
10	Bolt, refrigerant line to A/C evaporator
11	Nut, refrigerant line to A/C dehydrator See Removal Detail
12	Bracket, evaporator refrigerant outlet line (unclip)
13	Refrigerant outlet line, evaporator

NOTE: Install new refrigerant line O-rings.

NOTE: Coat the refrigerant line O-rings with clean refrigerant oil before installation.

6. NOTE: Vehicles with diesel engines only

Check the angle of the windshield wiper arms in relation to the windshield.

For additional information, refer to: Windshield Wiper Blade and Pivot Arm Adjustment (501-16, General Procedures).

5. To install, reverse the removal procedure.

Removal Details

Item 6 Bulkhead extension

- ⚠ CAUTION:** If brake fluid comes into contact with the paintwork, the affected area must be washed down immediately with cold water.

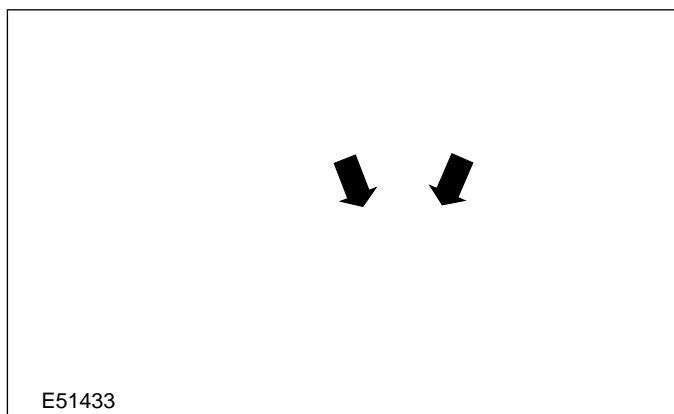
412-03-40

Air Conditioning

412-03-40

REMOVAL AND INSTALLATION

Detach the brake fluid reservoir from the bulkhead extension and tie it back to one side.



Item 7 Coolant hose, coolant reservoir (only 1.6L diesel engine)

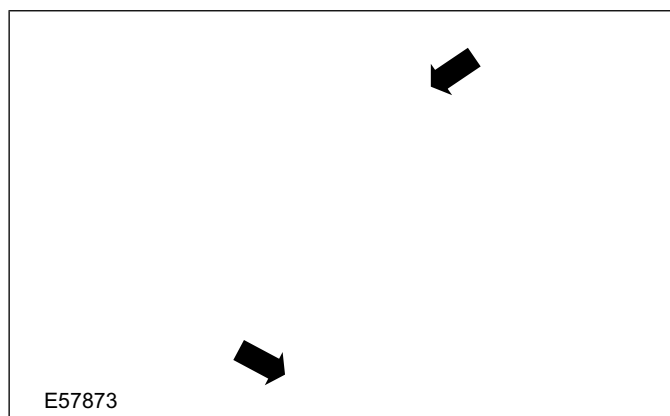
1. Empty the coolant expansion tank.
2. **⚠ CAUTION:** Close off the coolant hose from the expansion tank using a hose clamp, so that coolant is prevented from escaping from the coolant hose.

Clamp the coolant hose shut.



Item 8 Coolant expansion tank

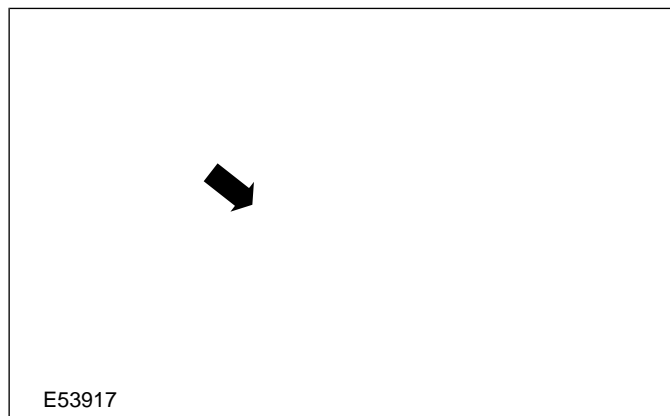
1. Unclip the coolant expansion tank and place to one side.



Item 11 Nut, refrigerant line to A/C dehydrator

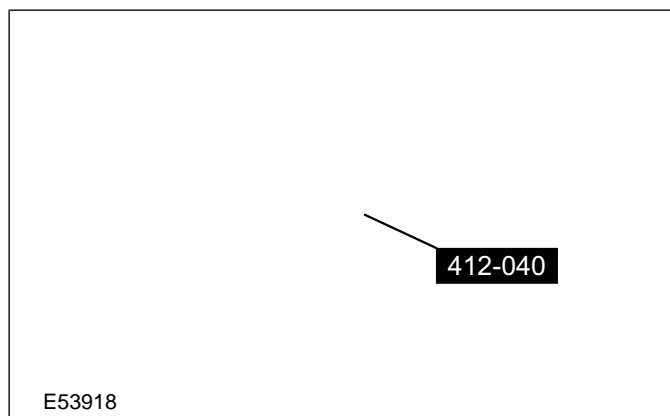
1. **NOTE:** Only vehicles with 1.4L Duratec-16V (Sigma) or 1.6L Duratec-16V (Sigma)

Remove the retaining clip of the A/C line.



2. **NOTE:** Only vehicles with 1.4L Duratec-16V (Sigma) or 1.6L Duratec-16V (Sigma)

Disconnect the refrigerant line from the dehydrator using the special tool.






REMOVAL AND INSTALLATION

Installation Details

Item 2 Windshield wiper arms

 **CAUTION:** Move the windshield wiper motor to the parked position before installing the wiper arms.



SECTION 412-04 Control Components

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Blower Motor Resistor — Vehicles Built From: 10/2005, Vehicles With: Dual Automatic Temperature Control.....	412-04-78

SPECIFICATIONS**Tightening Torques**

Description	Nm	lb-ft	lb-in
Bolts, reinforcing element	22	16	-
Bolts, reinforcing element bracket	25	18	-
Steering column shaft joint bolt	28	21	-
Dashboard crossmember outer bolts	25	18	-
Dashboard crossmember inner bolts	20	15	-
Clutch pedal bracket retaining nuts	25	18	-
Steering column bracket bolts	25	18	-
Door check strap bolt	23	17	-
Door hinge bolts	15	11	-
Dashboard crossmember side bolts	80	59	-
Bolts for windshield wiper motor with linkage	7	-	62
Windshield wiper arm nuts	22	16	-

DESCRIPTION AND OPERATION

Control Components

Heating and Ventilation

Climate control assembly - vehicles equipped with manual temperature control

The heating and air conditioning is controlled by three rotary switches on vehicles equipped with manual temperature control. Movement of the air distribution flaps is carried out by the air distribution flap/temperature flap control unit, which is connected to the control assembly via a rod. Movement of the temperature flap is also carried out by the air distribution flap/temperature flap control unit, which is connected to the control assembly via a cable.

In addition, on the control assembly there is an operating switch for the recirculated air mode and an on/off switch for the air conditioning system.

Climate control assembly - vehicles equipped with automatic temperature control, built up to 03/2007

Vehicles with automatic temperature control have a control assembly with buttons to control the following functions:

- Switching the air conditioning system on and off
- Temperature adjustment for the driver's side/front passenger's side
- Switching the windshield defrost function on and off
- Switching the electronic automatic climate control and the dual mode on and off
- Air distribution
- Blower control
- Switching off the dual automatic climate control
- Recirculated air control

Climate control assembly - vehicles equipped with automatic temperature control, built from 03/2007

Vehicles with automatic temperature control have a control assembly with buttons to control the following functions:

- Switching the air conditioning system on and off
- Temperature adjustment for the driver's side/front passenger's side
- Switching the windshield defrost function on and off
- Switching the electronic automatic climate control and the dual mode on and off
- Air distribution
- Blower control
- Switching off the dual automatic climate control
- Recirculated air control

DESCRIPTION AND OPERATION

Climate control assembly - vehicles equipped with DVD navigation system with touchscreen, built up to 01/2008



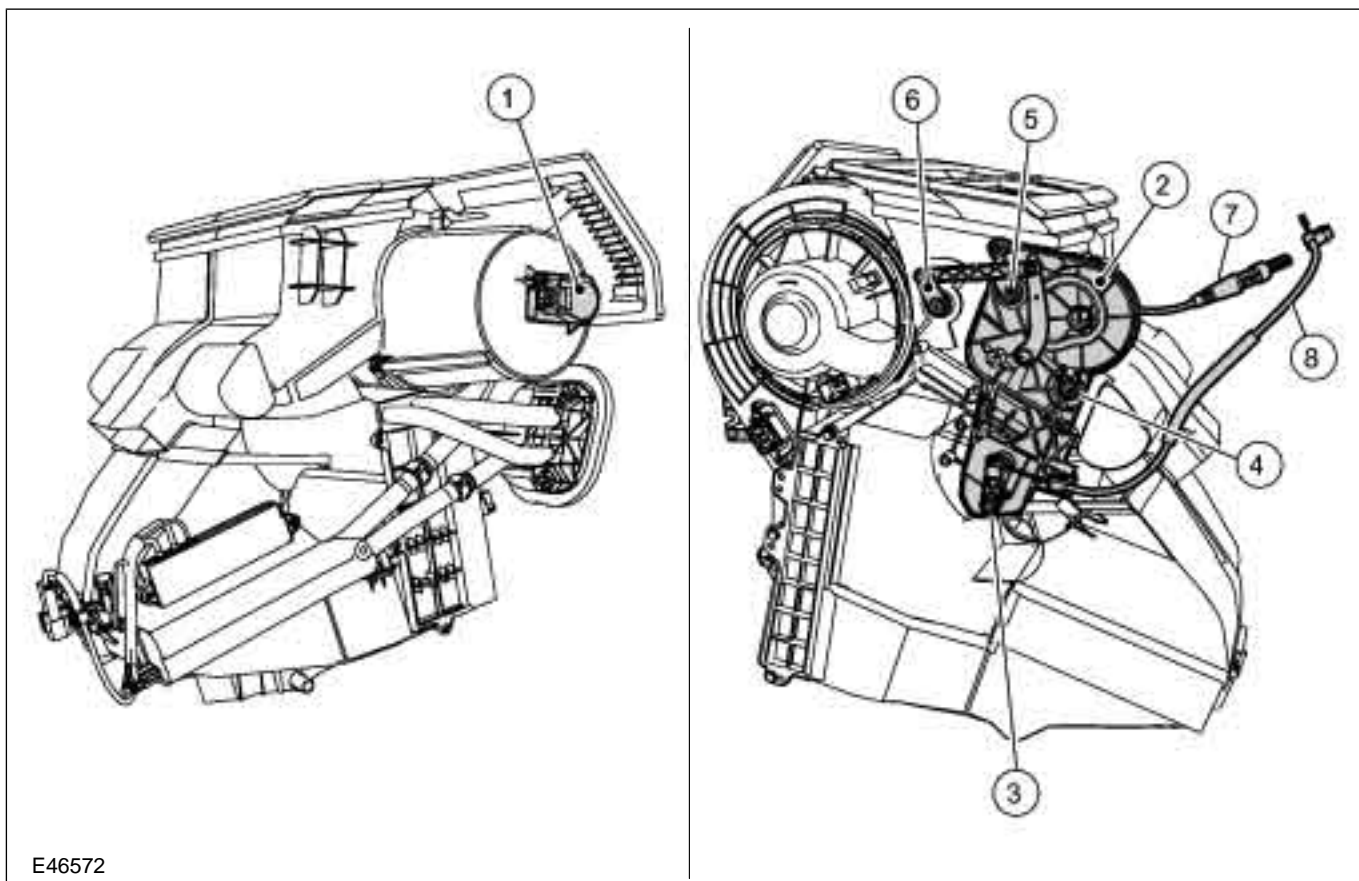
On vehicles with a DVD navigation system with touchscreen, the control buttons of the automatic temperature control of the heating/air conditioning system are built into this unit. In addition, all heating and air conditioning functions can be controlled via the touchscreen.

Climate control assembly - vehicles equipped with DVD navigation system with touchscreen, built from 01/2008



On vehicles with a DVD navigation system with touchscreen, the control buttons of the automatic temperature control of the heating/air conditioning system are built into this unit. In addition, all heating and air conditioning functions can be controlled via the touchscreen.

Overview - heater core and evaporator core housing - vehicles equipped with manual temperature control

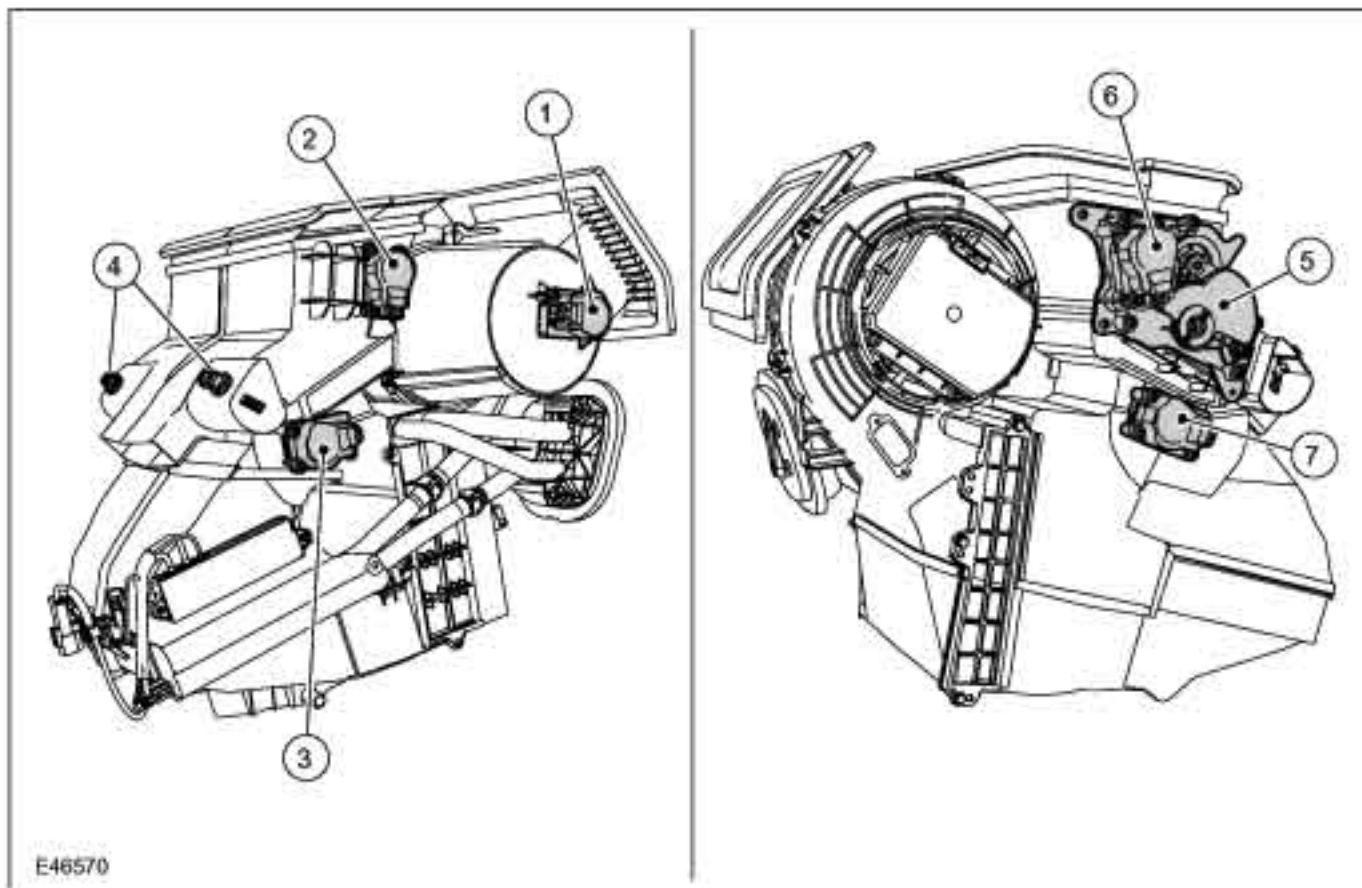


DESCRIPTION AND OPERATION

Item	Description
1	Actuator - air distribution flap
2	Control unit - air distribution flap/temperature control flap
3	Operating lever - temperature control flap
4	Operating lever - air distribution flap - footwell

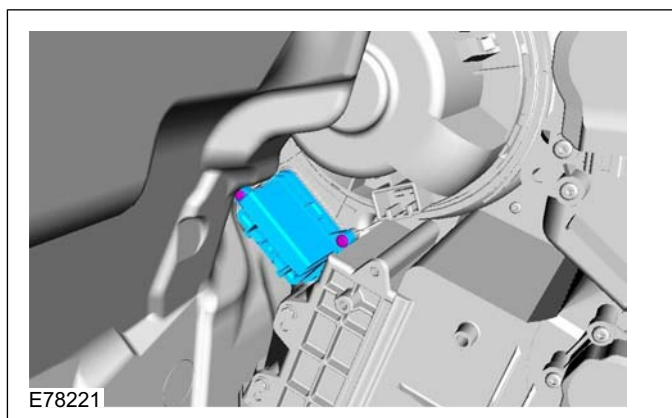
Item	Description
5	Operating lever - air distribution flap - central nozzles
6	Operating lever - air distribution flap - defrost nozzle
7	Rod - air distribution flap
8	Operating cable - temperature control flap

Overview - heater core and evaporator core housing - vehicles equipped with automatic temperature control



Item	Description
1	Actuator - air distribution flap
2	Actuator - defroster nozzle/air distribution flap - air vent
3	Actuator - right-hand temperature control flap
4	Air vent temperature sensors
5	Operating unit - air distribution flaps

Item	Description
6	Actuator - air distribution flaps
7	Actuator - left-hand temperature control flap

DESCRIPTION AND OPERATION**Blower motor control - vehicles equipped with automatic temperature control built from 10/2005**

On vehicles with electronic automatic temperature control (EATC) built from 10/2005, a blower motor with brushes is used.

For this reason, a regulated blower motor resistor is installed in these vehicles instead of the conventional blower motor resistor. This is located in the usual position next to the blower motor, so that the cooling fins of the resistor are cooled by the air flow.

The climate control module regulates the blower motor resistor via a PWM signal, which in turn regulates the voltage at the blower motor to between 3 V and 12.8 V in an infinitely variable manner.

The blower motor resistor is equipped with a temperature monitor, which continuously monitors the internal temperature of the resistor. If the temperature rises above 105°C, the blower motor is switched off until the temperature in the resistor falls to below 100°C.

If the current increases and exceeds a value of 26 A \pm 3 A defined in the blower motor resistor (e.g. high dynamic pressure in the blower housing during fast motorway driving), the current flow through the blower motor is limited by the blower motor resistor until a safe value is achieved. If this value cannot be achieved (e.g. blower motor blocked or partially seized or dynamic pressure in the blower housing permanently too high), the value is limited to 6 A \pm 2 A.

Under normal conditions, the blower motor control returns to the normal state.



DIAGNOSIS AND TESTING

Control Components

REFER to: **Climate Control System** (412-00
Climate Control System - General Information,
Diagnosis and Testing).



REMOVAL AND INSTALLATION

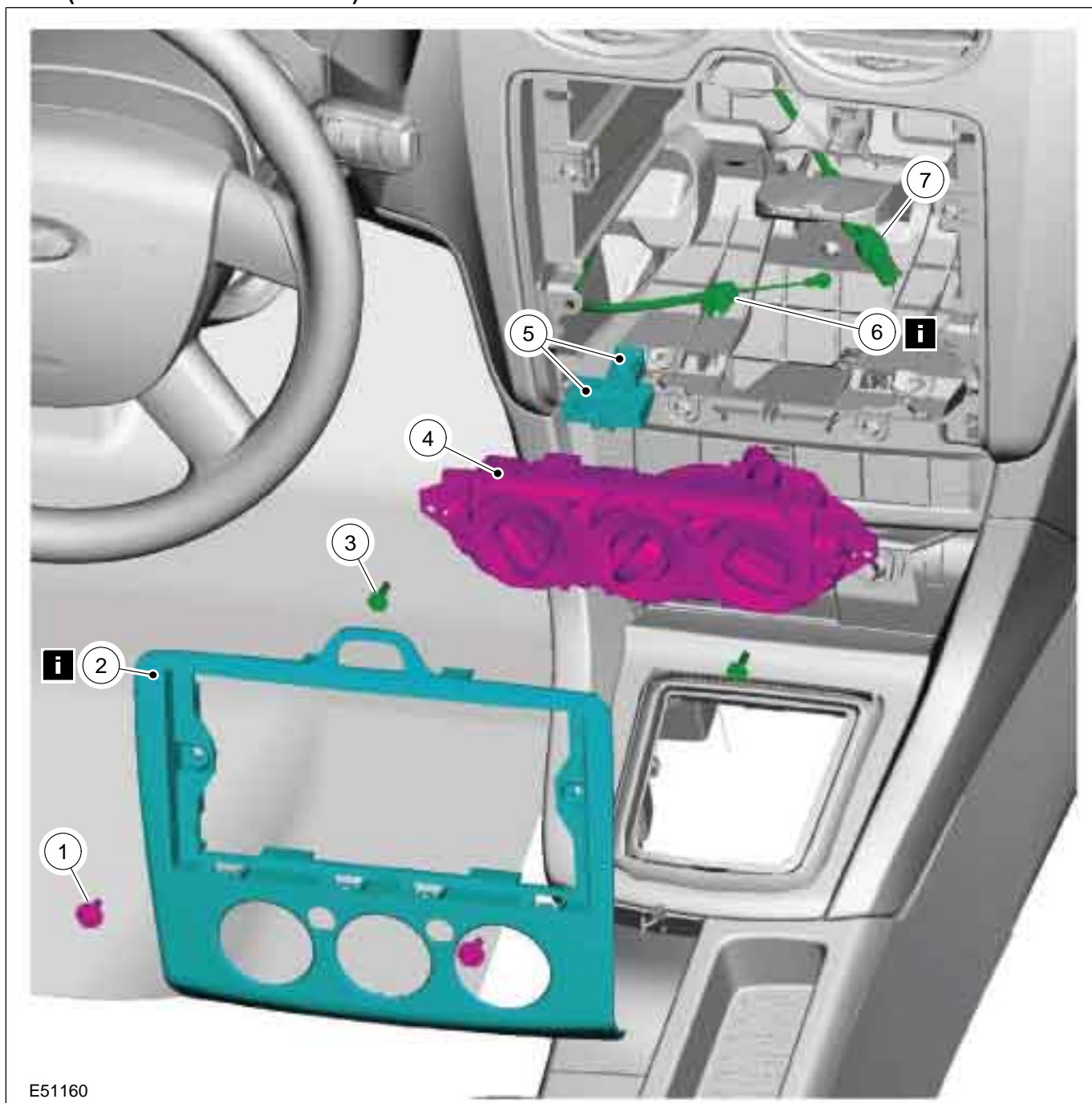
Climate Control Assembly — Vehicles With: Manual Temperature Control

1. Remove the audio unit. For additional information, refer to: (415-01 Audio Unit)

Audio Unit - Vehicles Built Up To: 03/2007
(Removal and Installation),

Audio Unit - Vehicles Built From: 03/2007
(Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



REMOVAL AND INSTALLATION

Item	Description
1	Instrument panel console screws
2	Instrument panel console See Removal Detail
3	Heating / air conditioning control panel screws
4	Heating / air conditioning control panel

Item	Description
5	Heating / air conditioning control panel electrical connectors
6	Cable, temperature flap See Removal Detail
7	Rod - air distribution flap

3. To install, reverse the removal procedure.

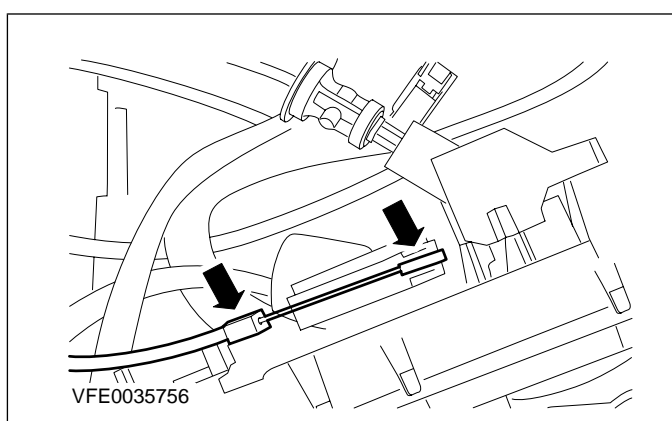
Removal Details

Item 2 Instrument panel console

1. Unclip the instrument panel console.

**Item 6 Cable, temperature flap**

1. Detach the temperature flap cable from the adjusting mechanism.



REMOVAL AND INSTALLATION

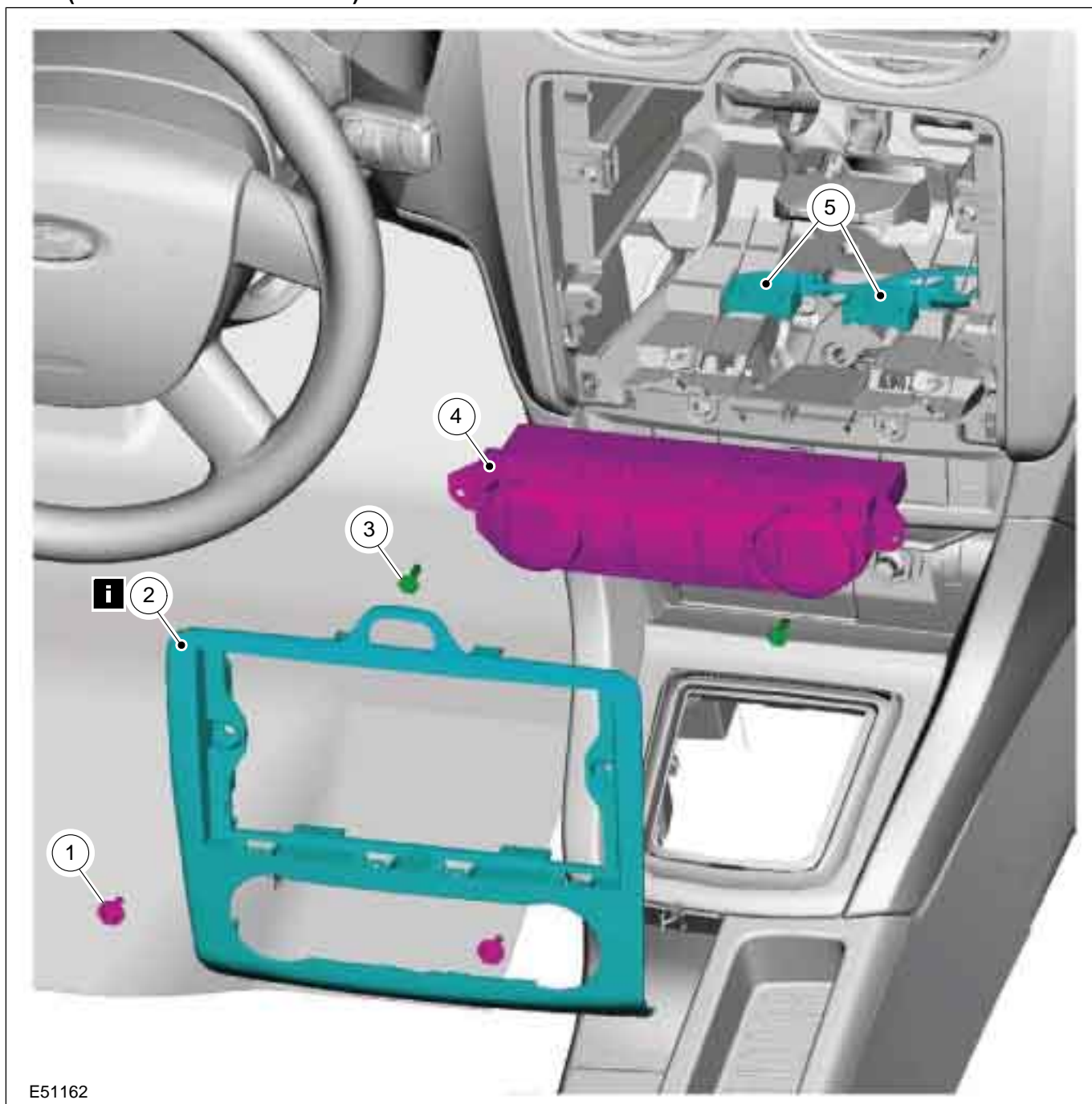
Climate Control Assembly — Vehicles With: Automatic
Temperature Control

1. Remove the audio unit. For additional information, refer to: (415-01 Audio Unit)

Audio Unit - Vehicles Built Up To: 03/2007
(Removal and Installation),

Audio Unit - Vehicles Built From: 03/2007
(Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



REMOVAL AND INSTALLATION

Item	Description
1	Instrument panel console screws
2	Instrument panel console See Removal Detail
3	Heating / air conditioning control panel screws

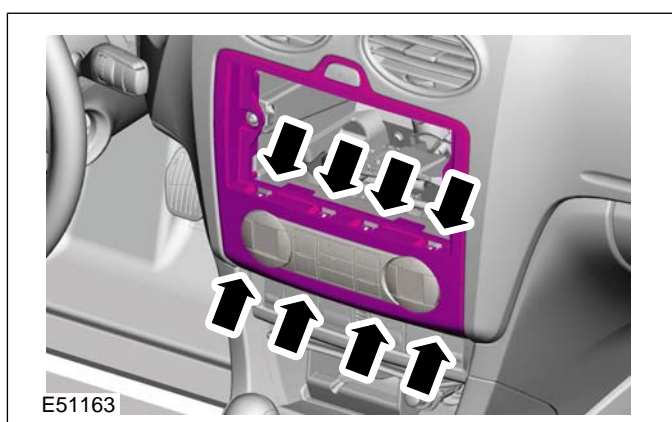
Item	Description
4	Heating / air conditioning control panel
5	Heating / air conditioning control panel electrical connectors

3. To install, reverse the removal procedure.

Removal Details

Item 2 Instrument panel console

1. Unclip the instrument panel console.



E51163

REMOVAL AND INSTALLATION

Climate Control Module — Vehicles Built Up To: 01/2008

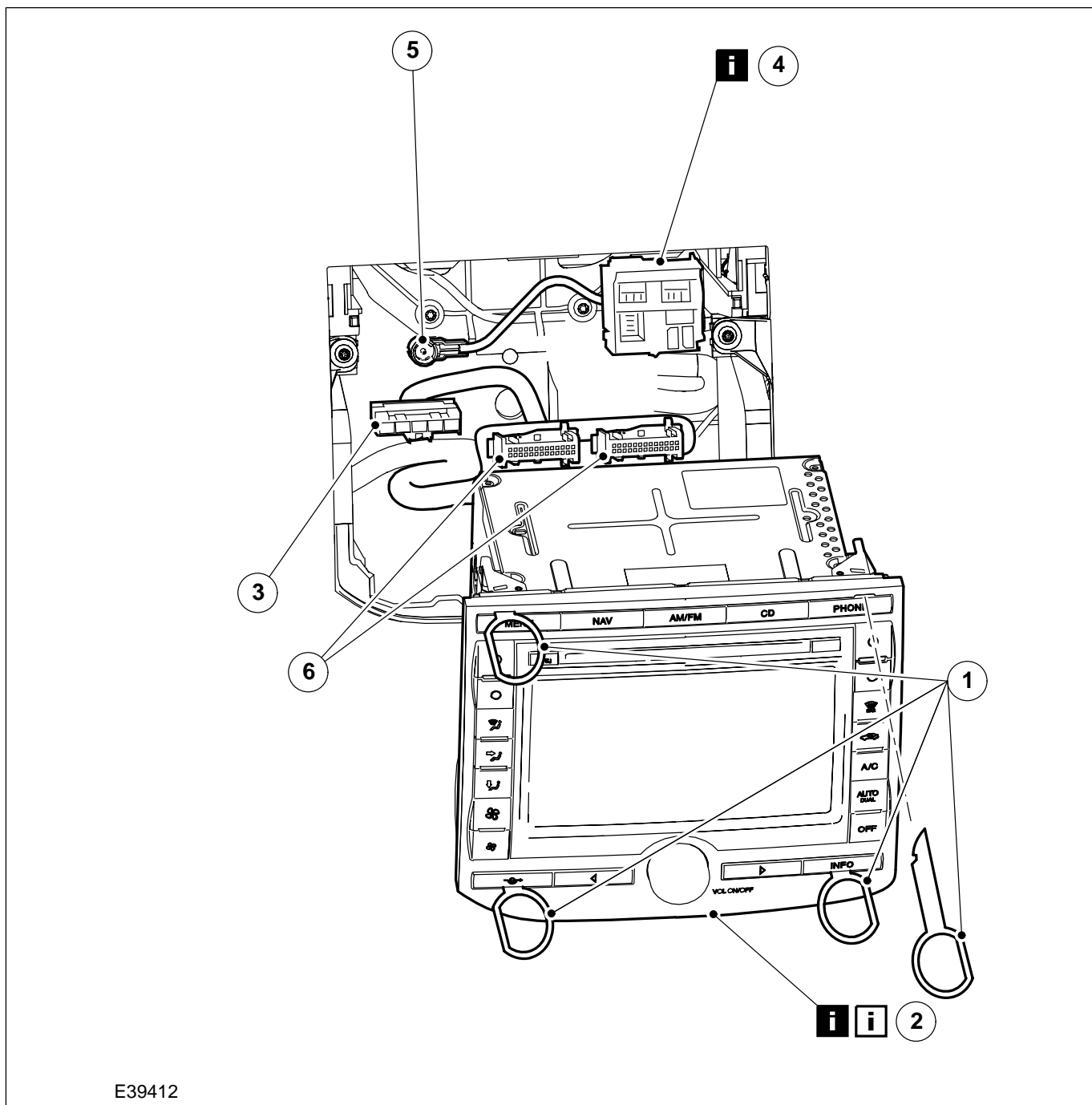
General Equipment

Audio unit removal tools (GV3301)

NOTE: When attaching the audio unit removal tools, ensure that they are attached according to the markings on the removal tools: TOP L (left)

indicates the top left-hand side of the removal tool, TOP R (right) indicates the top right-hand side of the removal tool.

1. Remove the components in the order indicated in the following illustration(s) and table(s).



E39412

412-04-13

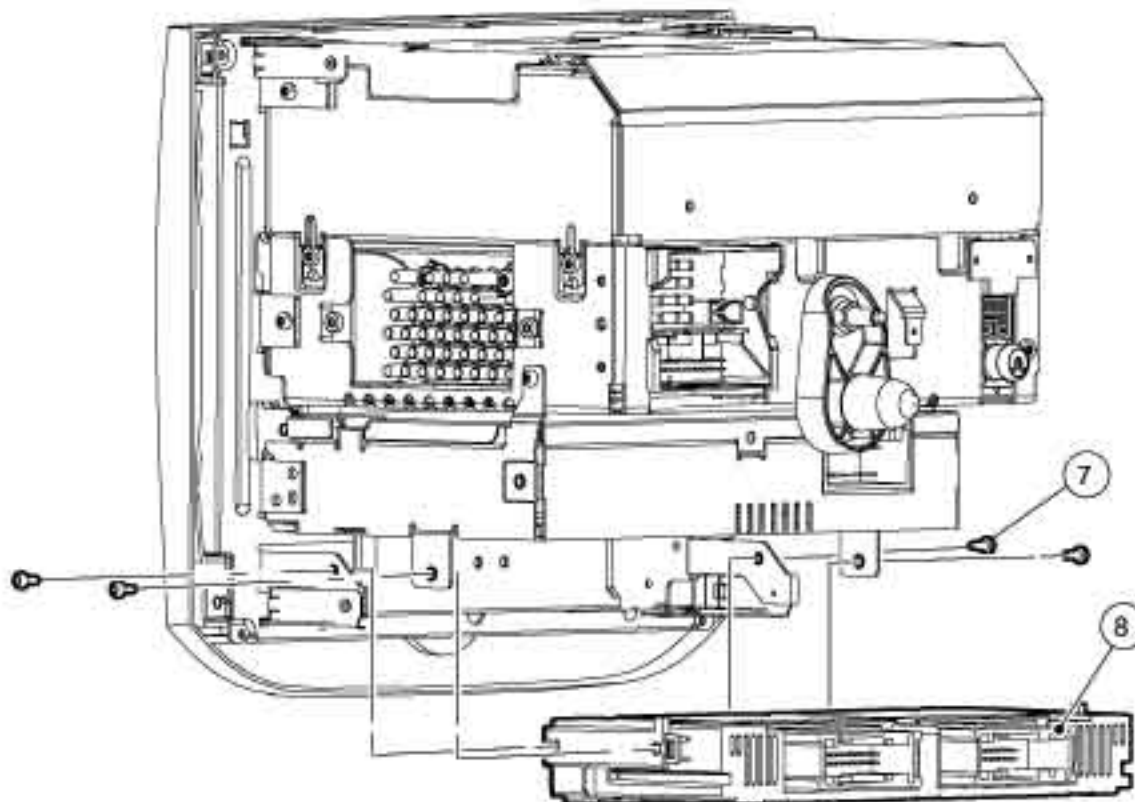
Control Components

412-04-13

REMOVAL AND INSTALLATION

Item	Description
1	Audio unit removal tools
2	Navigation system control panel See Removal Detail See Installation Detail
3	Navigation system control panel connector

Item	Description
4	Audio unit connector See Removal Detail
5	Antenna cable
6	A/C module connector



E44154

Item	Description
7	A/C module bolts
8	A/C module

2. To install, reverse the removal procedure.

NOTE: Detach the audio unit removal tools from the navigation system control panel prior to installing the navigation system control panel.

Removal Details

Item 2 Navigation system control panel

- CAUTION:** Make certain that the wiring harnesses are not put under excessive tension when the navigation system control panel is pulled out.

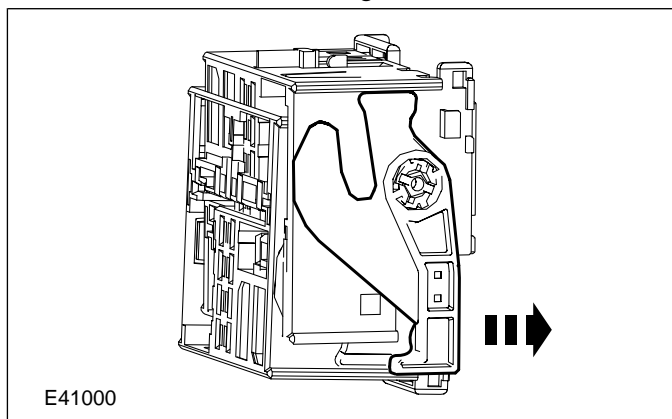
Remove the navigation system control panel from the instrument panel.

Item 4 Audio unit connector

- Disconnect the audio unit connector.

REMOVAL AND INSTALLATION

- Release the retaining tabs.

**Installation Details****Item 2 Navigation system control panel**

1. **⚠ CAUTION:** Make sure that the audio unit wiring harness, climate control module wiring harness, navigation system display module wiring harness and antenna cable do not become trapped when installing the navigation system control panel.

The audio unit rear bracket must engage in the audio unit mounting.

REMOVAL AND INSTALLATION

Climate Control Module — Vehicles Built From: 01/2008

General Equipment

Ford diagnostic equipment

General Equipment

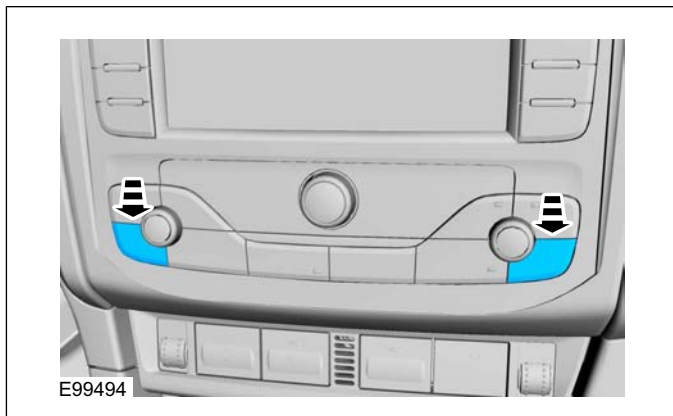
Audio unit removal tools

Removal

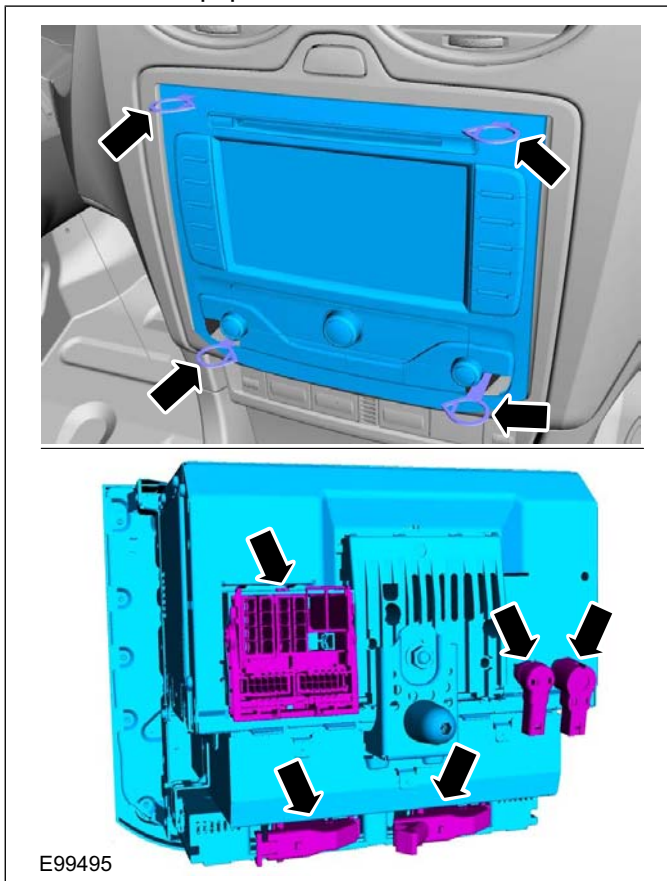
1. Connect the diagnostic tool and upload the climate control module configuration information using the Programmable Modules Installation Routine, prior to commencing the removal of the climate control module.

General Equipment: Ford diagnostic equipment

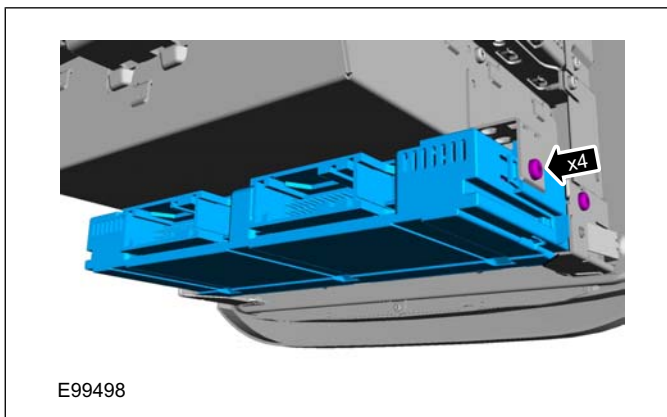
2.



3. General Equipment: Audio unit removal tools



4.



REMOVAL AND INSTALLATION

Installation

1. **NOTE:** New units must be configured using the Programmable Module Installation Routine in the diagnostic tool.

To install, reverse the removal procedure.

General Equipment: Ford diagnostic equipment

REMOVAL AND INSTALLATION

Blower Motor Switch

1. Remove the heater/air conditioning control panel.

For additional information, refer to:

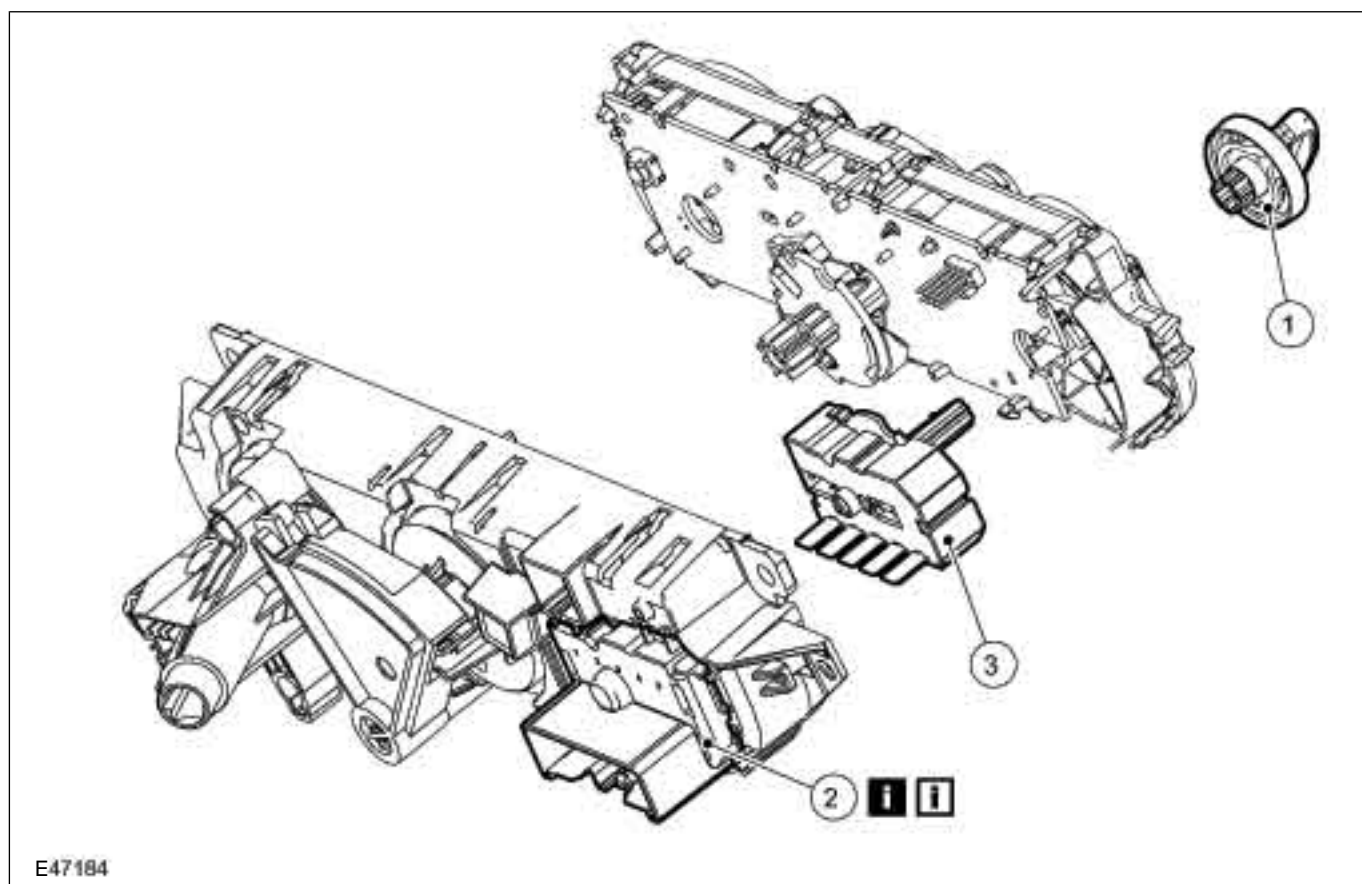
Climate Control Assembly - Vehicles

With: Manual Temperature Control
(412-04, Removal and Installation).
Installation).

CAUTION: Ensure that the blower motor switch is set to switch position 1 during installation and removal, in order to prevent damage to the control panel electronics.

NOTE: The rear cover of the climate control assembly is shown removed for clarity.

2. Remove the components in the order indicated in the following illustration(s) and table(s).



E47184

Item	Description
1	Blower motor switch rotary knob
2	Blower motor switch cover See Removal Detail See Installation Detail
3	Blower motor switch

3. To install, reverse the removal procedure.

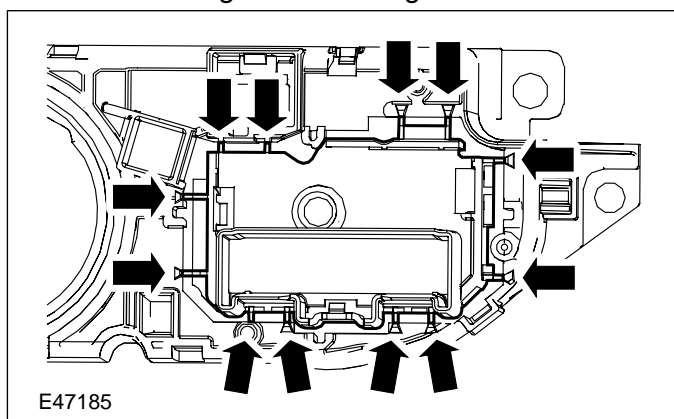
Removal Details

Item 2 Blower motor switch cover

1. Remove the blower motor switch cover.

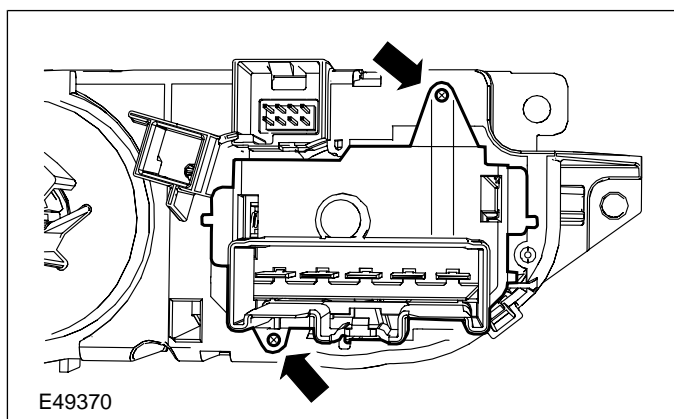
REMOVAL AND INSTALLATION

- Cut through the retaining tabs.

**Installation Details****Item 2 Blower motor switch cover**

1. **NOTE:** The service kit for the motor blower switch contains a modified cover which can be attached to the climate control assembly rear cover by means of the two screws provided.

Install the blower motor switch together with the blower motor switch cover.



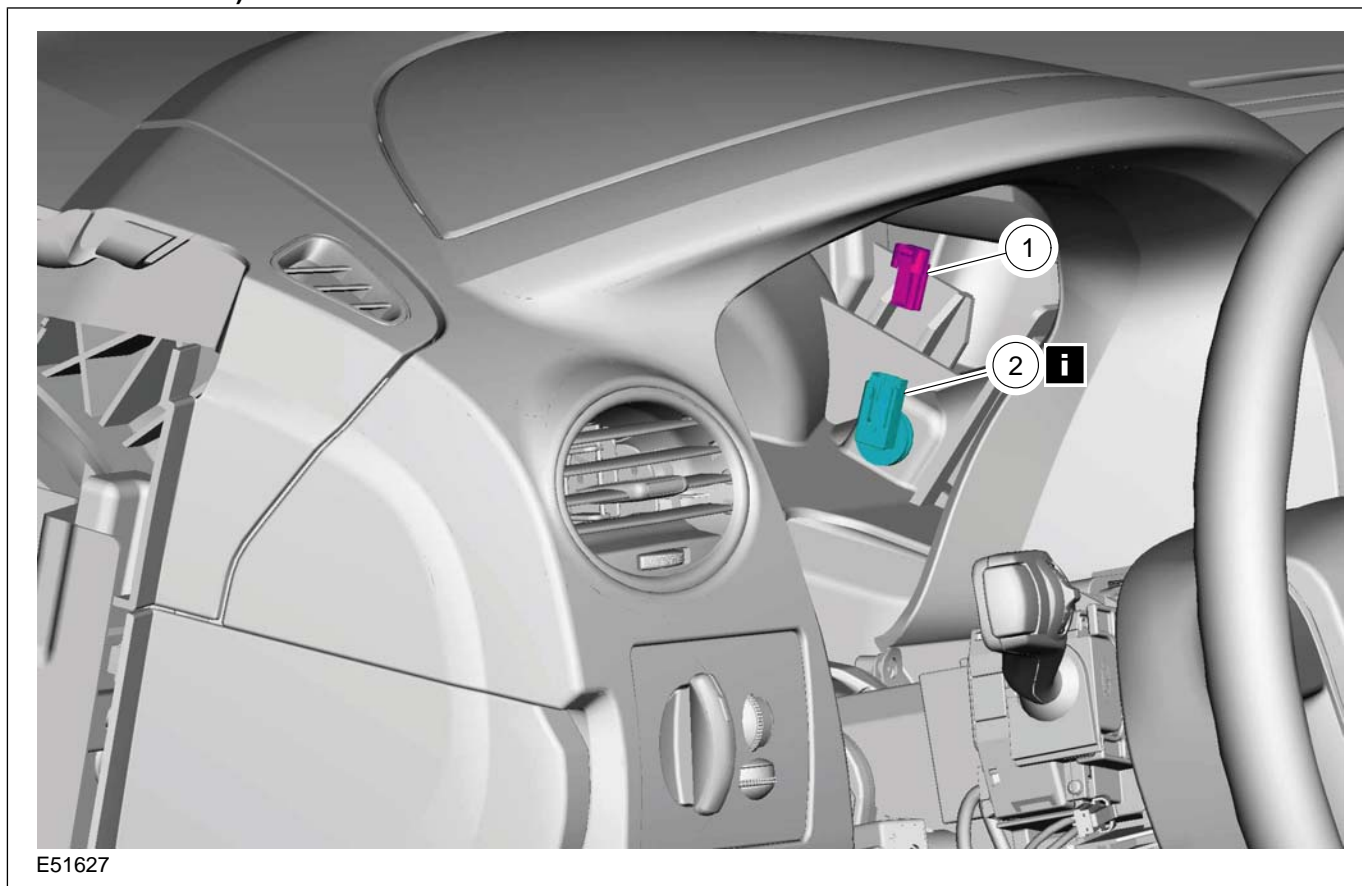
REMOVAL AND INSTALLATION

Driver Side Center Register Air Discharge Temperature Sensor

1. Remove the instrument cluster.

For additional information, refer to:
Instrument Cluster (413-01, Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



E51627

Item	Description
1	Electrical connector, air outlet temperature sensor, centre nozzles, driver's side
2	Air outlet temperature sensor, centre nozzles, driver's side See Removal Detail

3. To install, reverse the removal procedure.

Removal Details

REMOVAL AND INSTALLATION

Item 2 Air outlet temperature sensor, centre nozzles, driver's side

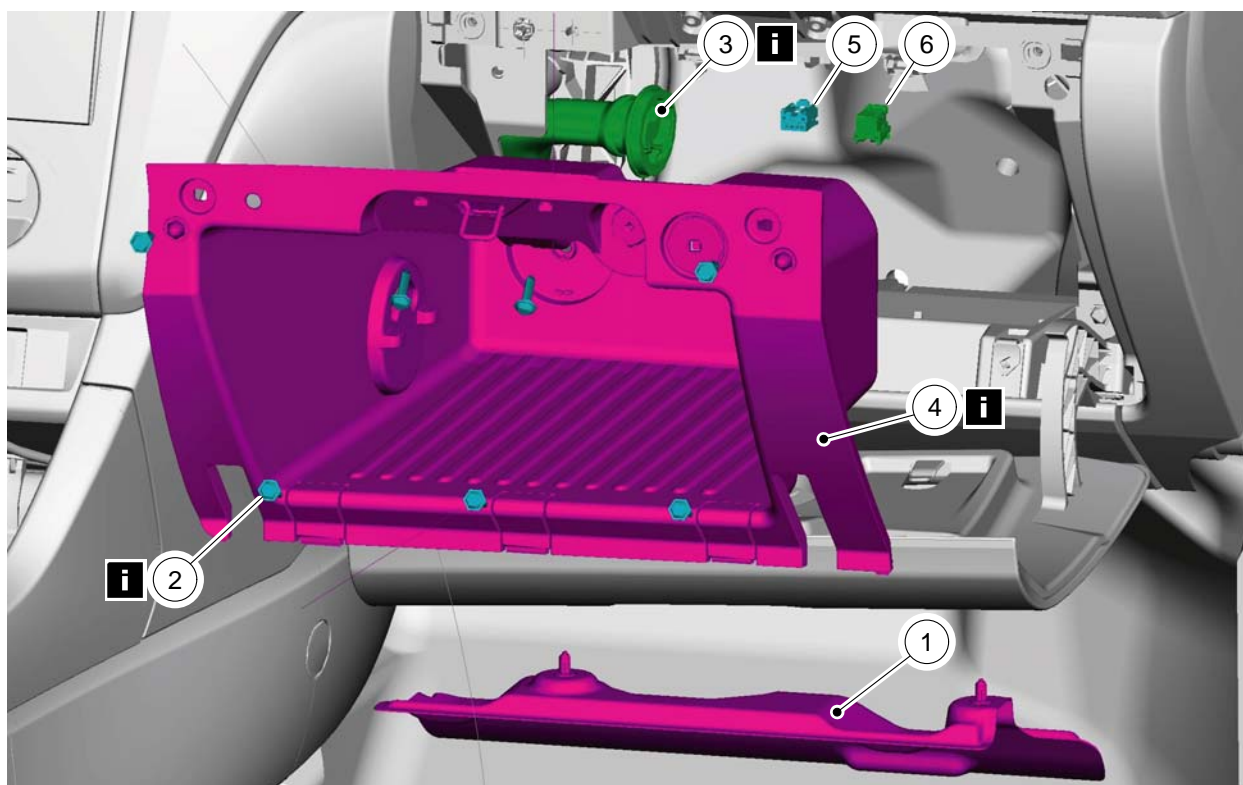
1. Turn the air outlet temperature sensor clockwise through 90 degrees and remove.



REMOVAL AND INSTALLATION

Passenger Side Center Register Air Discharge Temperature Sensor

1. Remove the components in the order indicated in the following illustration(s) and table(s).

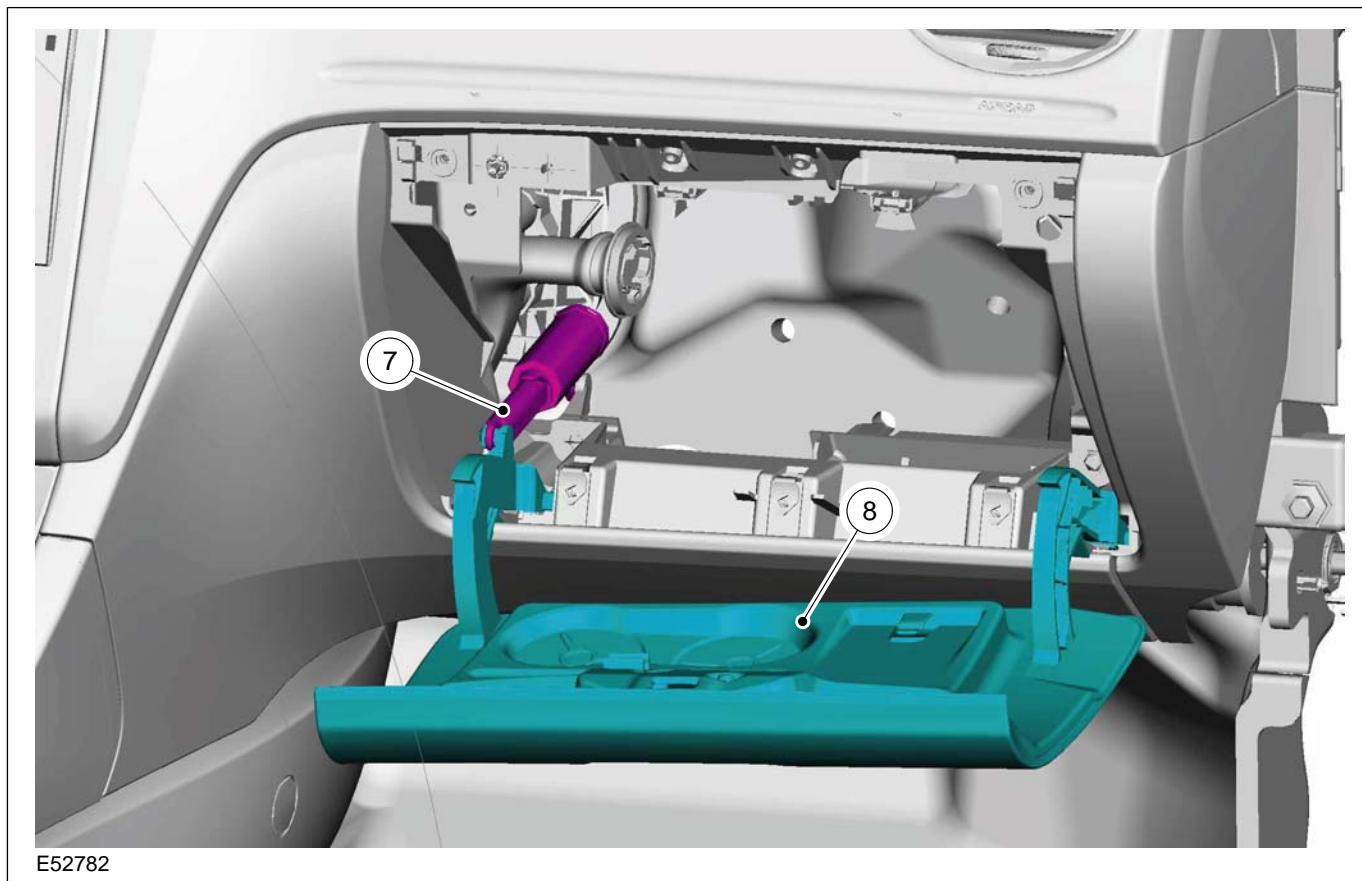


E51448

Item	Description
1	Footwell trim panel
2	Glove compartment screws See Removal Detail
3	Hose, glove compartment cooling (if equipped) See Removal Detail

Item	Description
4	Glove compartment See Removal Detail
5	Electrical connector, audio unit input (if equipped)
6	Passenger air bag deactivation (PAD) switch electrical connector (if equipped)

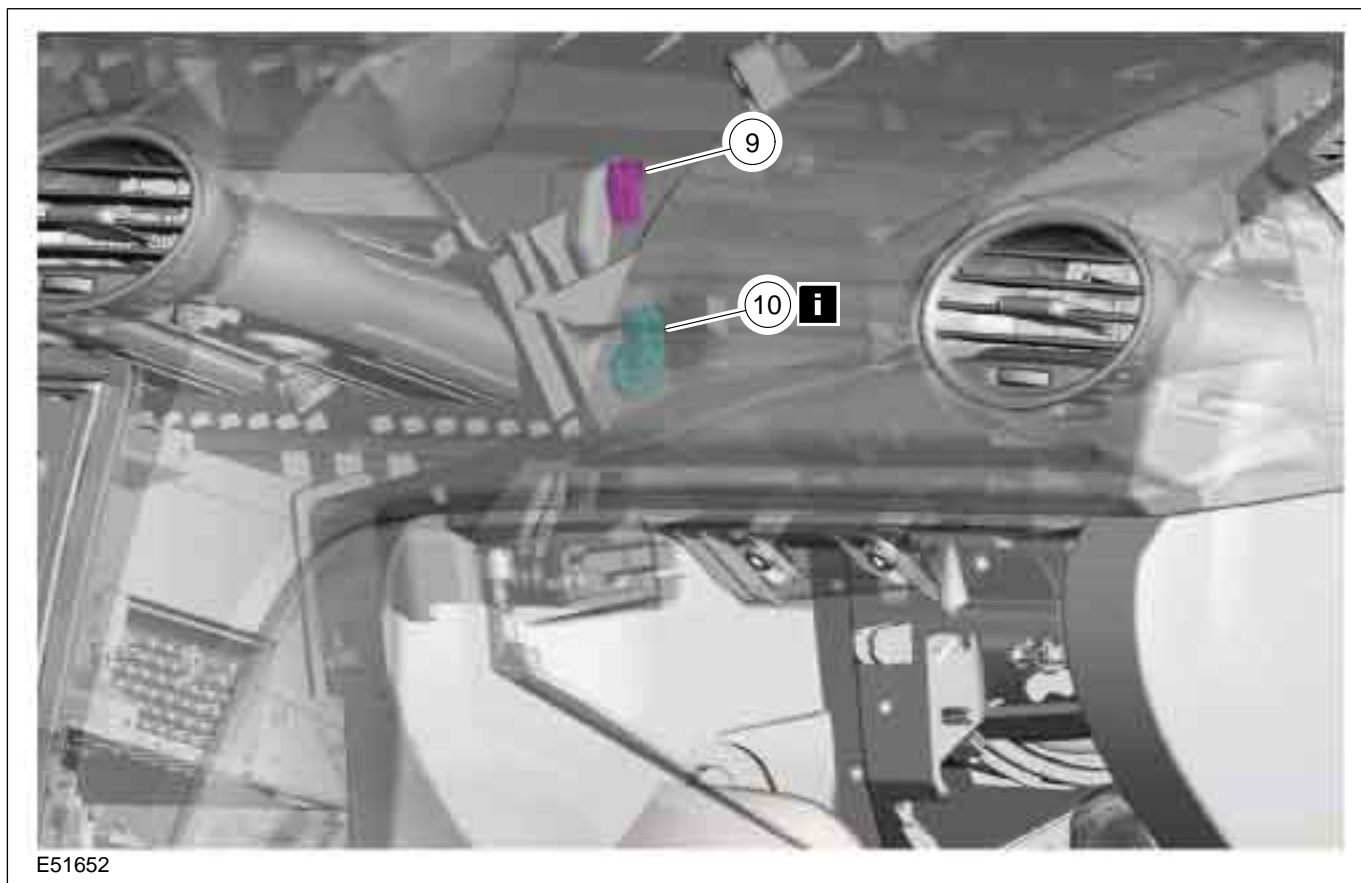
REMOVAL AND INSTALLATION



E52782

Item	Description
7	Opening damper, glove compartment cover (unhook)
8	Glove compartment cover

REMOVAL AND INSTALLATION



E51652

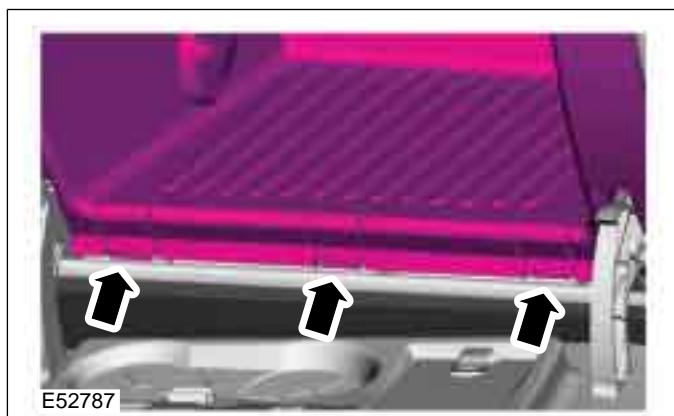
Item	Description
9	Electrical connector, air outlet temperature sensor, centre nozzles, passenger's side
10	Air outlet temperature sensor, centre nozzles, passenger's side See Removal Detail

2. To install, reverse the removal procedure.

Removal Details

Item 2 Glove compartment screws

1. Fold down the covering caps of the screws for the glove compartment.



E52787

Item 3 Hose, glove compartment cooling (if equipped)

NOTE: Only vehicles with glove compartment cooling

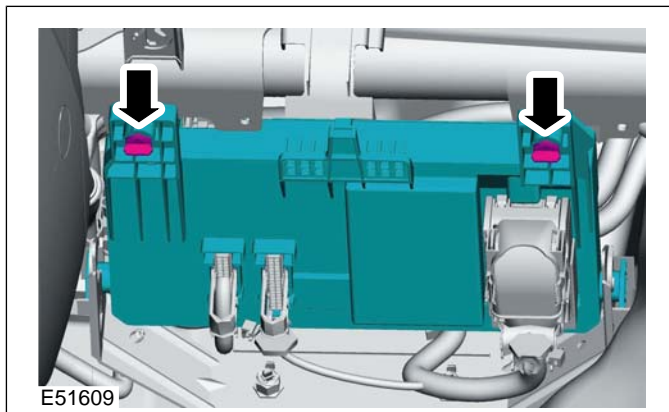
412-04-24

Control Components

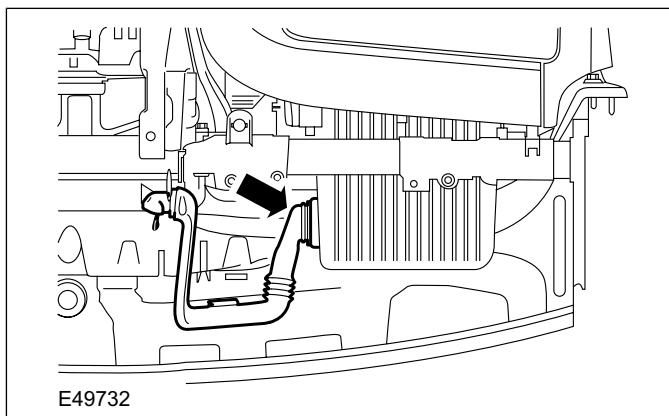
412-04-24

REMOVAL AND INSTALLATION

1. Detach the central junction box (CJB) from the reinforcing element.

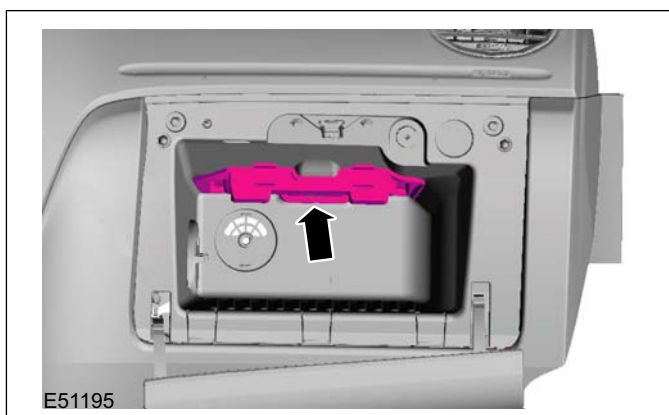


2. Detach the glove compartment cooling hose from the glove compartment.



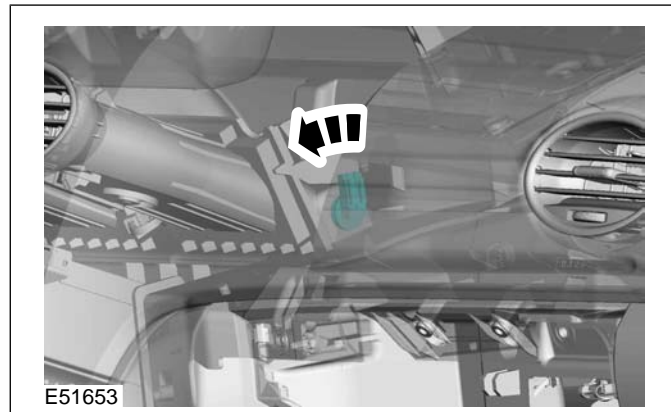
Item 4 Glove compartment

1. Remove the access flap for the navigation system DVD mechanism (if equipped).



Item 10 Air outlet temperature sensor, centre nozzles, passenger's side

1. Turn the air outlet temperature sensor anti-clockwise through 90 degrees and remove.

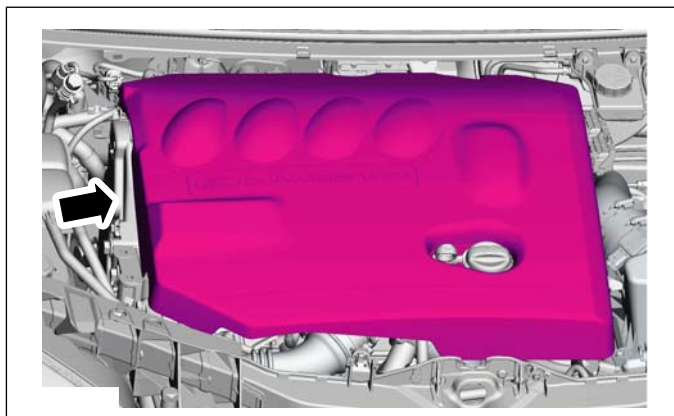


REMOVAL AND INSTALLATION

Defrost Vent/Register Blend Door Actuator — RHD

NOTE: Four M10 x 120 mm guide bolts are required for removing the dashboard together with the dashboard crossmember.

1. Remove the engine cover (2.0L diesel shown).



2. Remove the facia crash padding.

For additional information, refer to:

Instrument panel (501-12, Removal and Installation).

3. Remove the A-pillar trim on the right and left-hand sides.

For additional information, refer to:

A-Pillar Trim Panel (501-05, Removal and Installation).

4. Remove the front rocker panel trim on the right and left hand sides.

For additional information, refer to: Front

Scuff Plate Trim Panel (501-05, Removal and Installation).

5. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



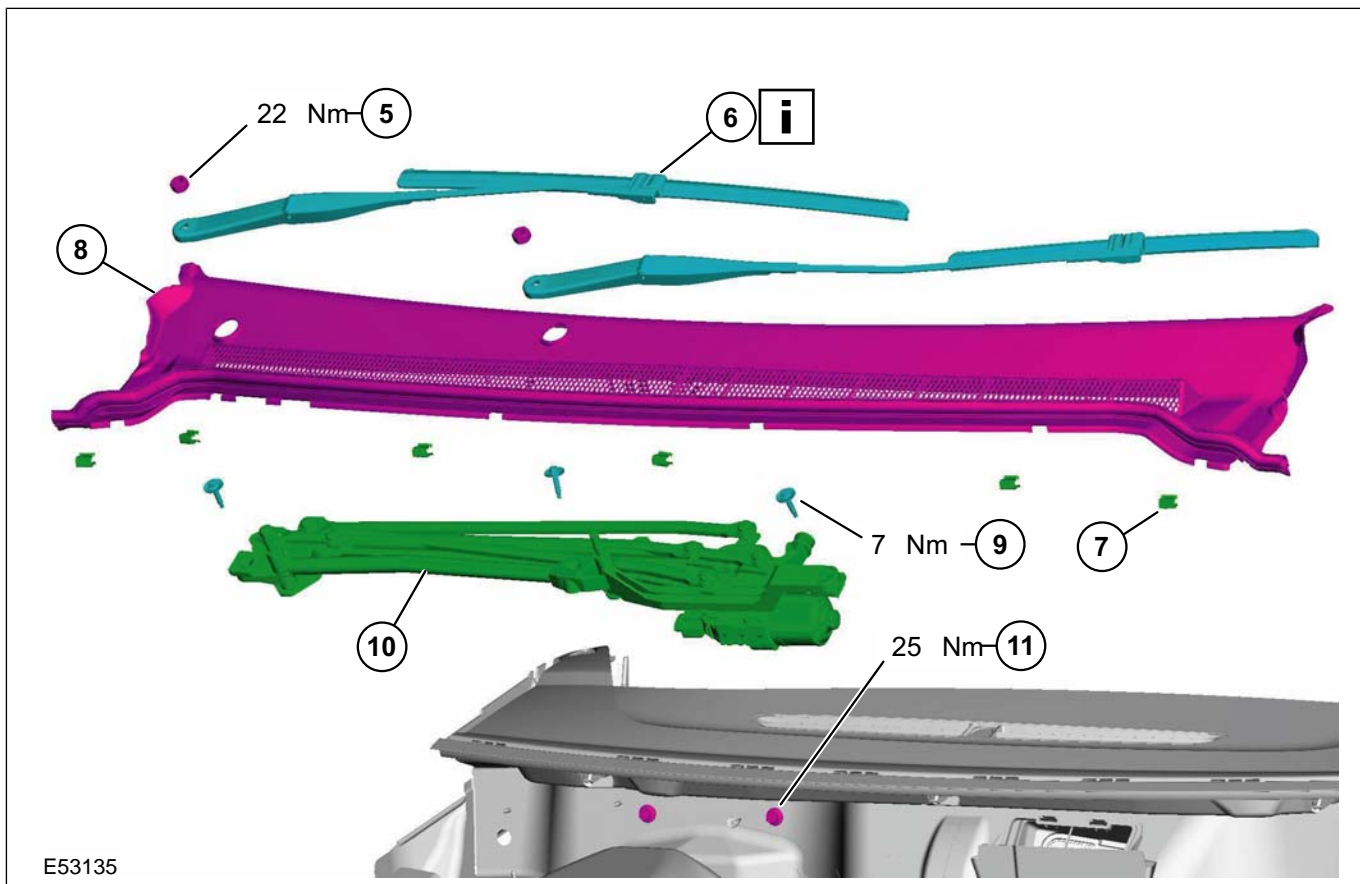
E53134

Item	Description
1	Door check strap bolt
2	Door hinge bolts See Removal Detail See Installation Detail

Item	Description
3	Front doors (driver's door shown) See Removal Detail
4	Dashboard crossmember side bolts See Removal Detail

REMOVAL AND INSTALLATION

⚠ CAUTION: Make sure that the windshield wiper motor is in the park position.

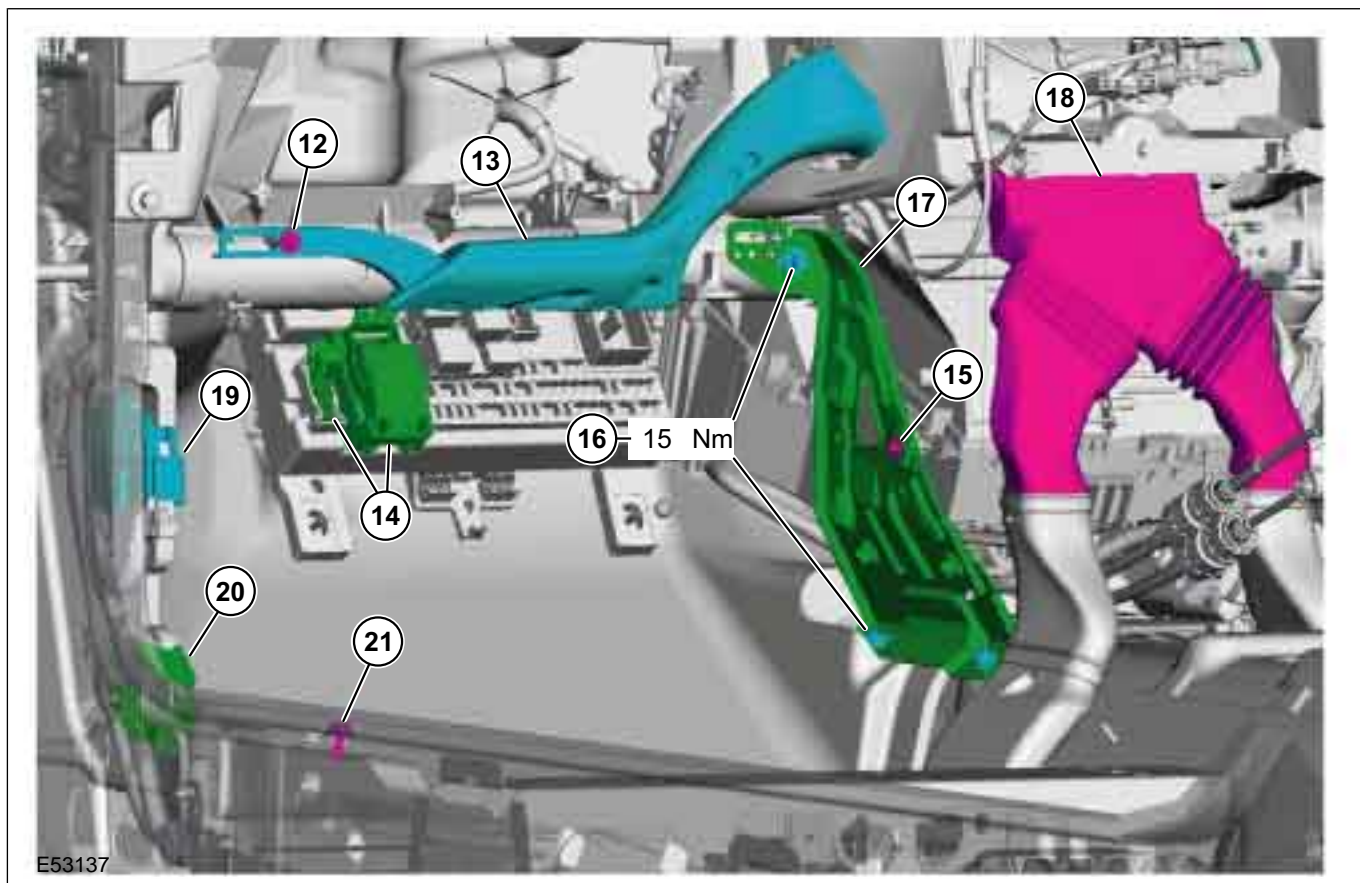


E53135

Item	Description
5	Windshield wiper arm nuts
6	Windshield wiper arms <i>See Installation Detail</i>
7	Clips, cowl panel grille
8	Cowl Panel Grille

Item	Description
9	Bolts for windshield wiper motor with linkage
10	Windshield wiper motor with linkage (secure to the side)
11	Steering column bracket upper bolts

REMOVAL AND INSTALLATION

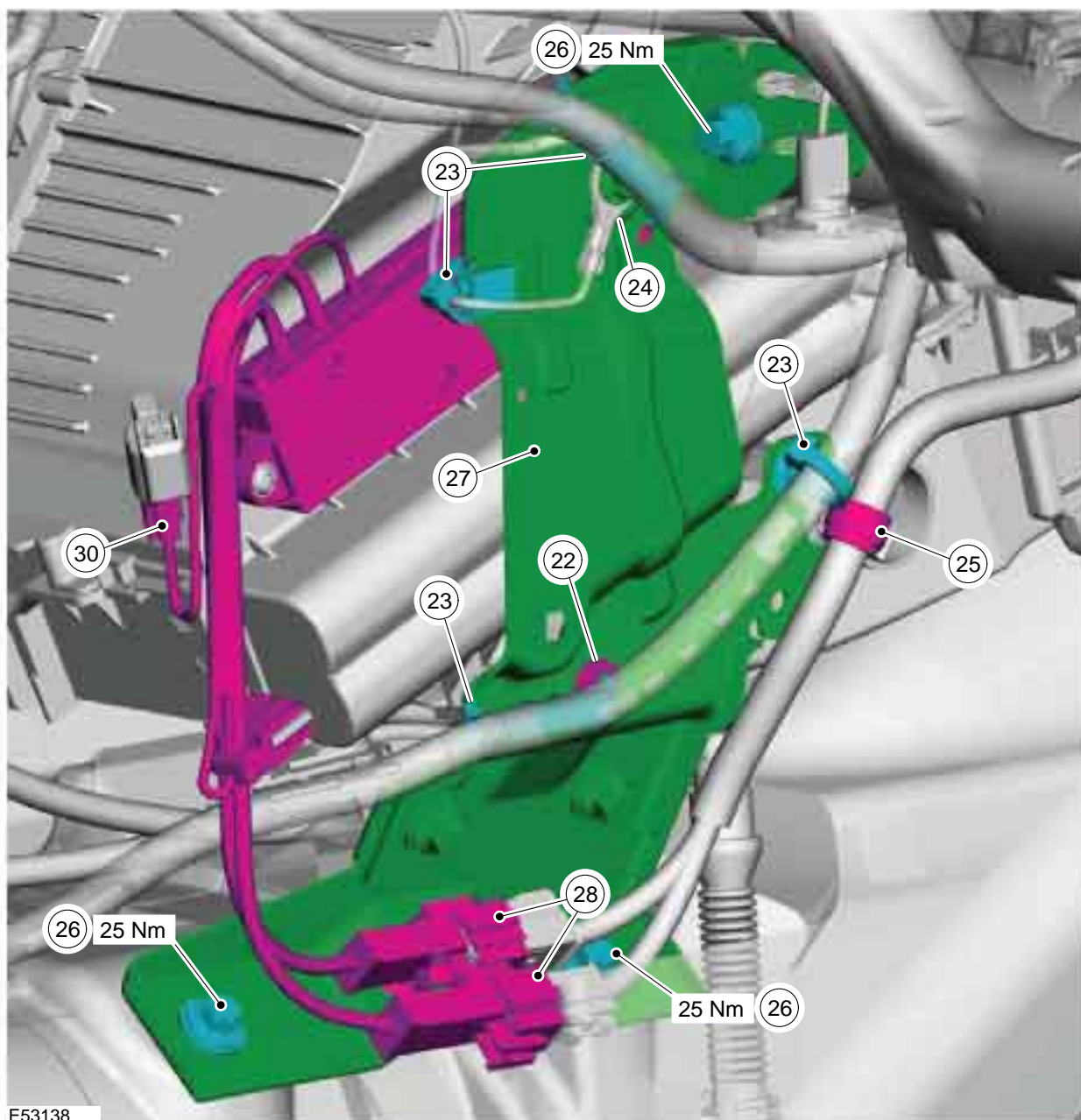


E53137

Item	Description
12	Bolts, footwell air duct
13	Air duct, footwell
14	Instrument cluster wiring harness connector
15	Bolt, heater core/evaporator housing
16	Bolts, bracket for reinforcing element

Item	Description
17	Bracket, reinforcing element
18	Rear footwell air duct
19	Connector - engine compartment wiring harness
20	Passenger compartment wiring harness connector
21	Ground cable bolt

REMOVAL AND INSTALLATION



E53138

Item	Description
22	Bolt, heater core/evaporator housing
23	Retaining clips, instrument panel wiring harness
24	Ground cable bolt

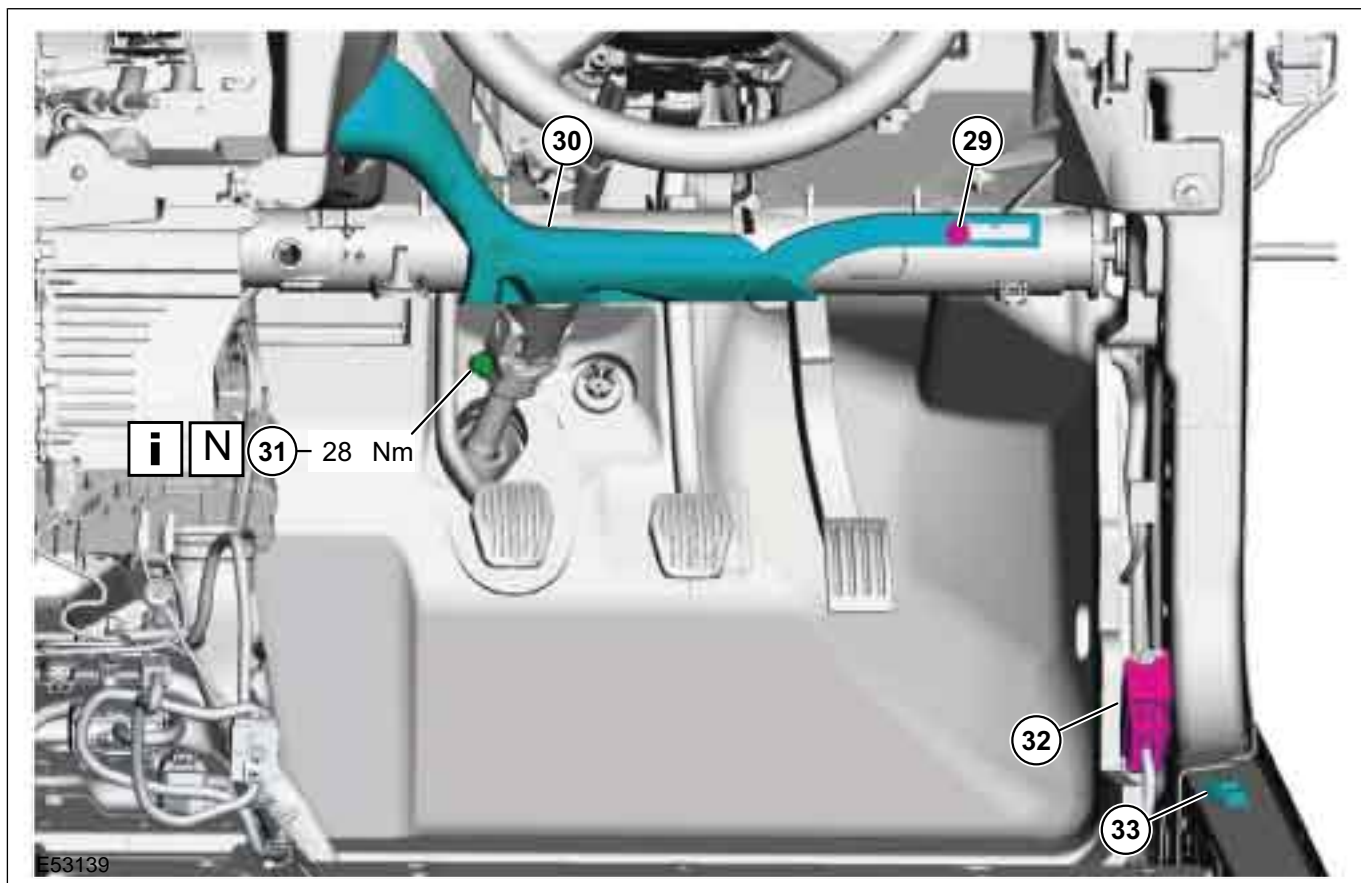
Item	Description
25	Retaining clip, engine compartment wiring harness (if present)
26	Bolts, bracket for reinforcing element
27	Bracket, reinforcing element
28	Connector - electric booster heater (if equipped)

412-04-30

Control Components

412-04-30

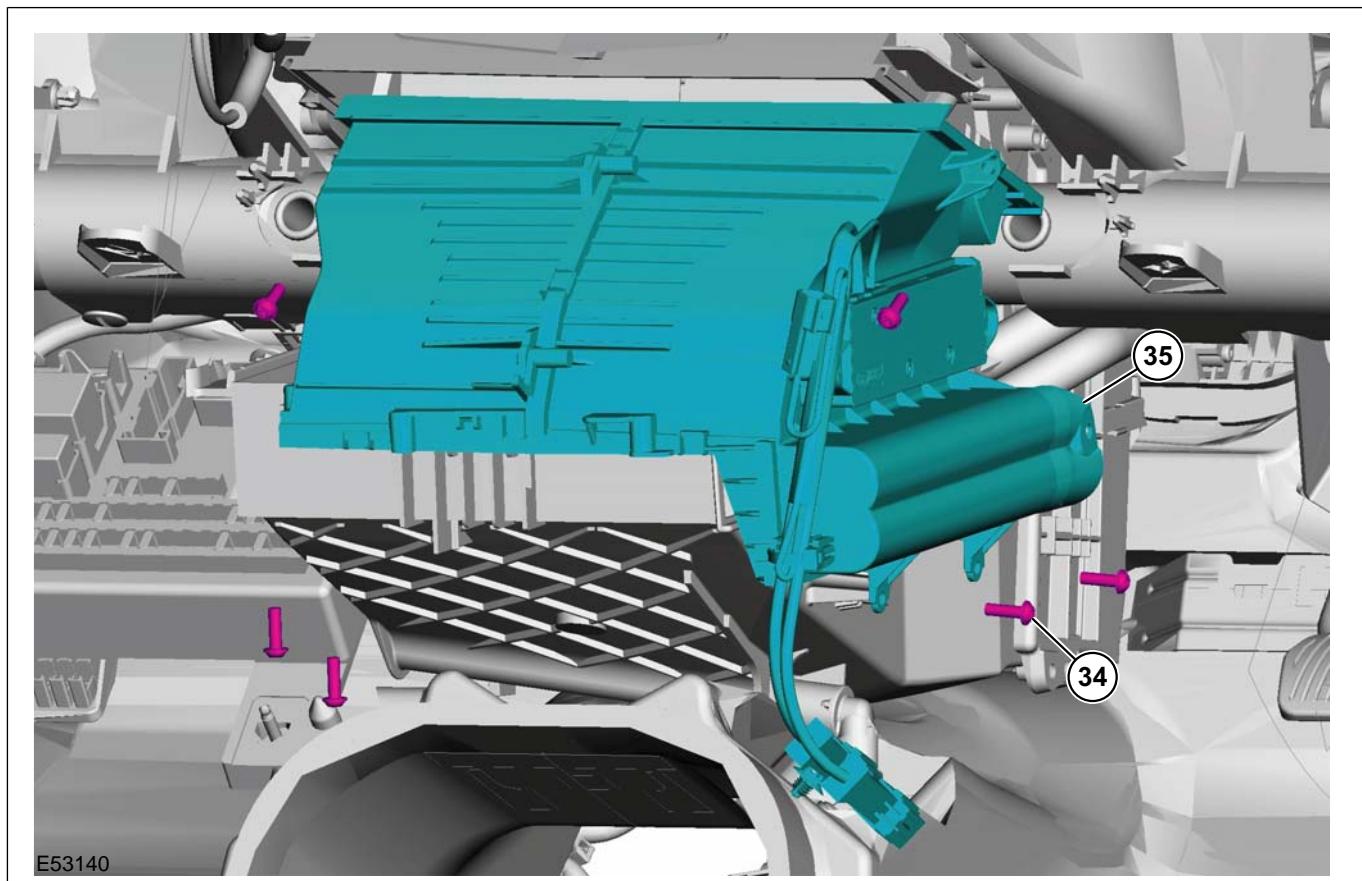
REMOVAL AND INSTALLATION



Item	Description
29	Bolts, footwell air duct
30	Air duct, footwell
31	Steering column shaft joint bolt See Installation Detail

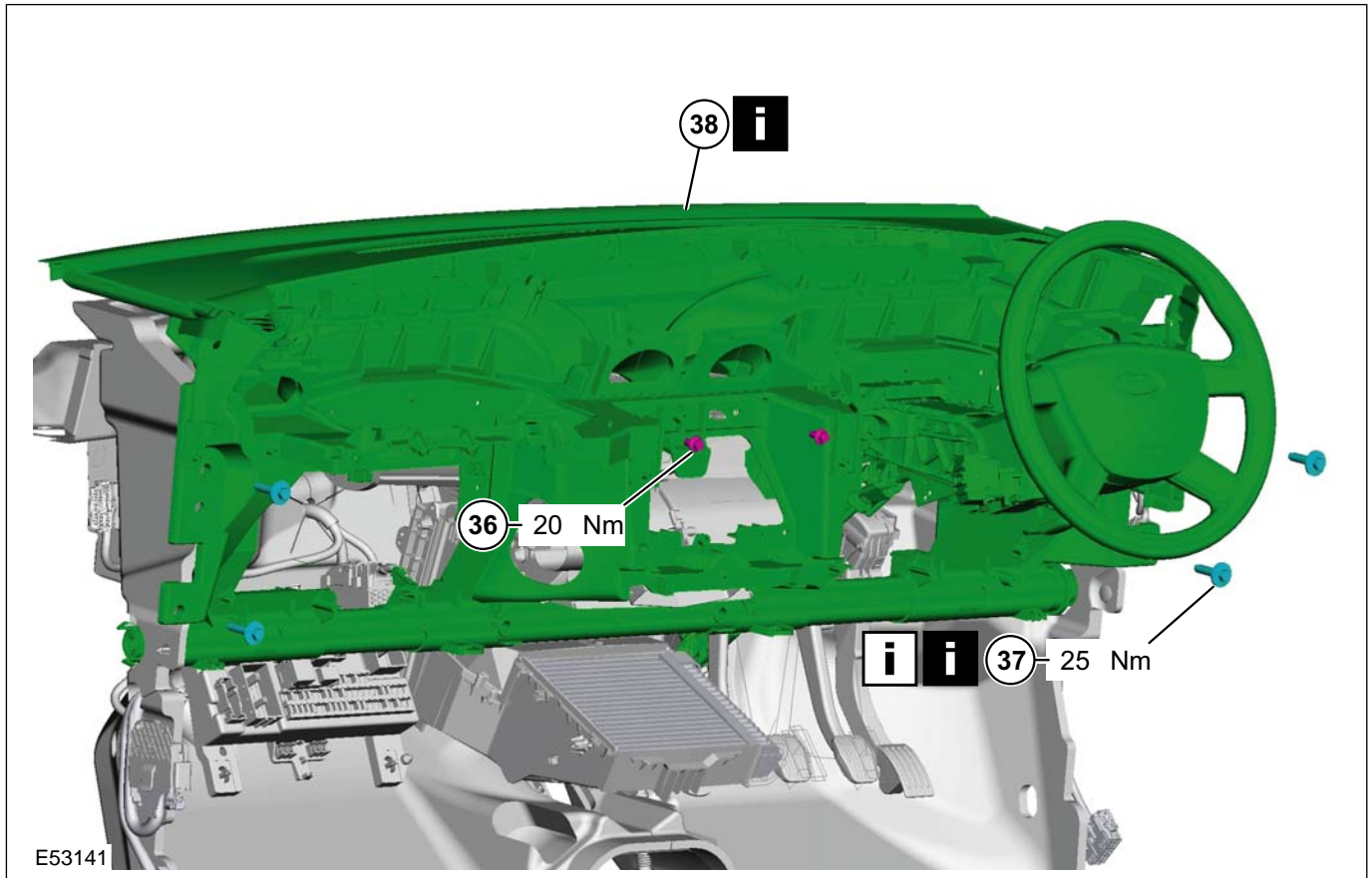
Item	Description
32	Passenger compartment wiring harness connector
33	Ground cable bolts

REMOVAL AND INSTALLATION



Item	Description
34	Heater core upper cover bolts.
35	Heater core upper cover

REMOVAL AND INSTALLATION



E53141

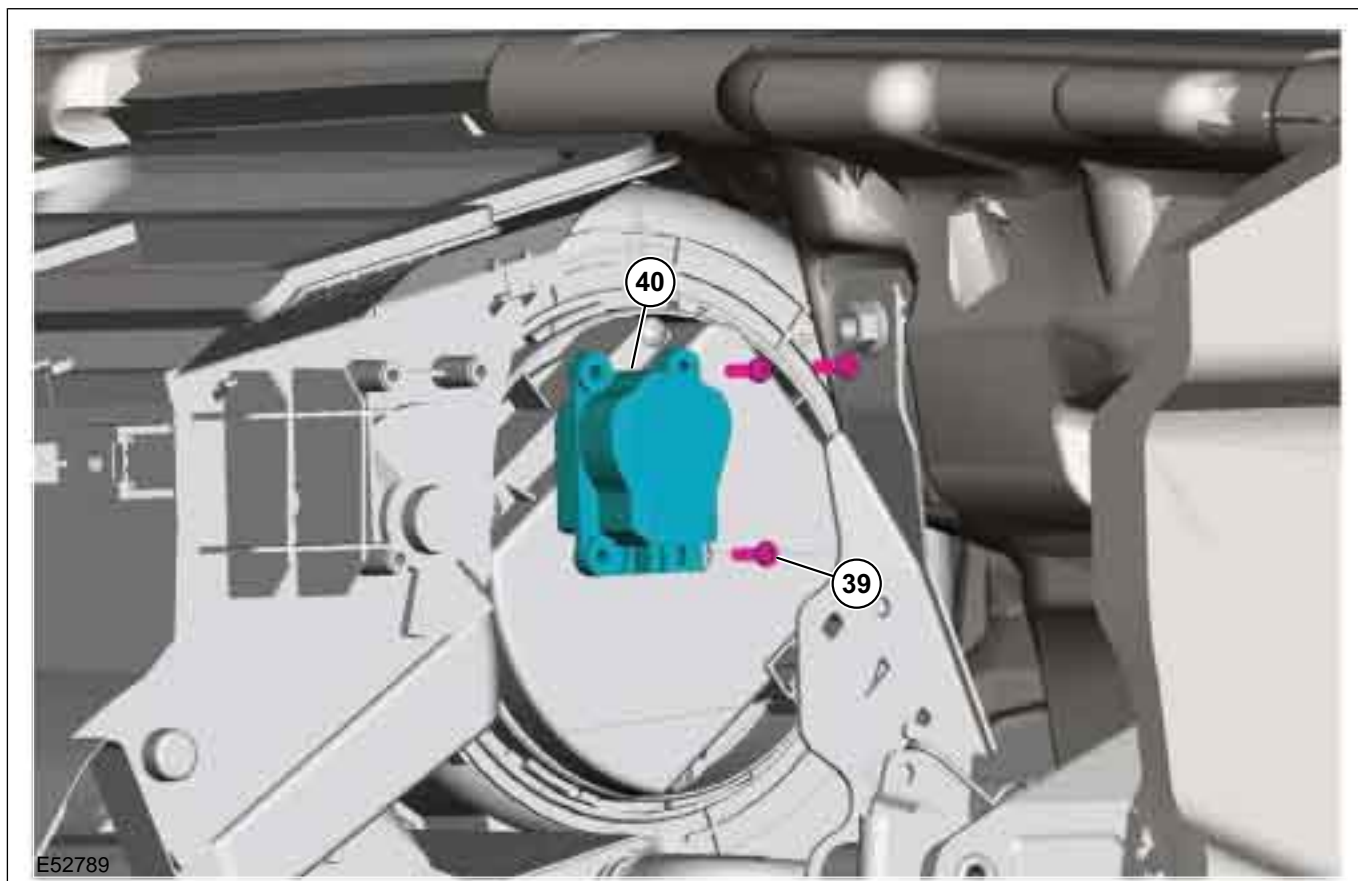
Item	Description
36	Dashboard crossmember inner bolts
37	Dashboard crossmember outer bolts <i>See Removal Detail</i> <i>See Installation Detail</i>
38	Dashboard crossmember <i>See Removal Detail</i>

412-04-33

Control Components

412-04-33

REMOVAL AND INSTALLATION



Item	Description
39	Bolts - actuator - defroster jet / air vent distribution flap
40	Actuator - defroster jet/air vent distribution flap

6. To install, reverse the removal procedure.

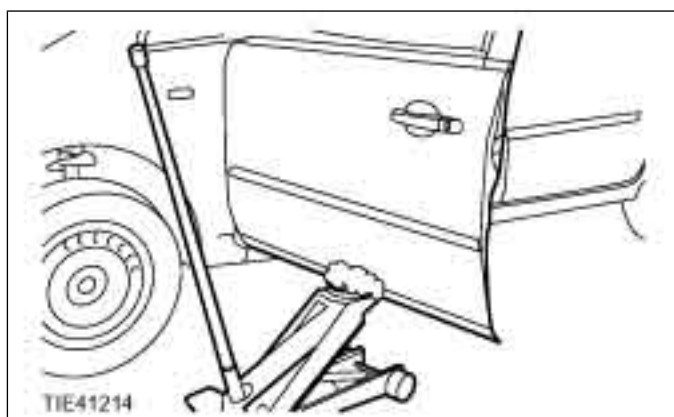
7. Check the angle of the windshield wiper arms in relation to the windshield.

For additional information, refer to: **Windshield Wiper Blade and Pivot Arm Adjustment (501-16, General Procedures)**.

Removal Details

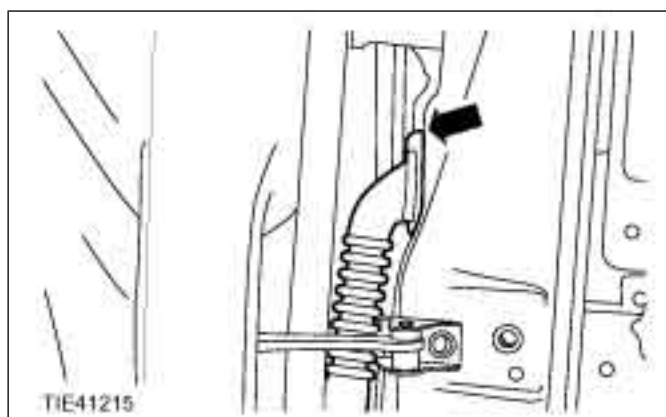
Item 2 Door hinge bolts

1. Support the door using a trolley jack with the aid of another technician.



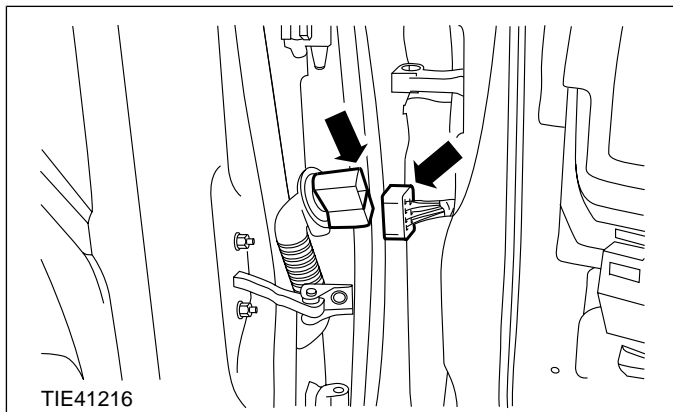
Item 3 Front doors (driver's door shown)

1. Detach the front door wiring harness connector from the A-pillar.

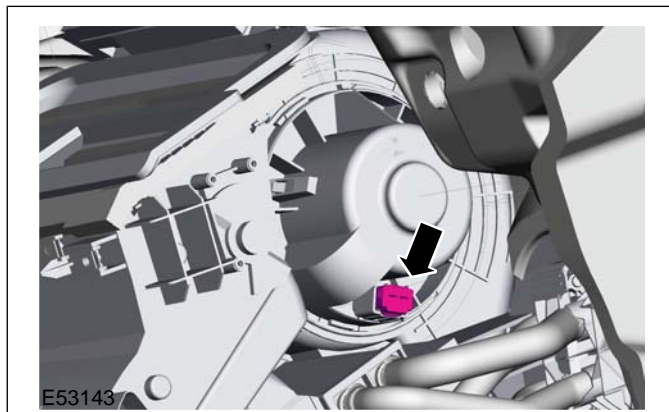


REMOVAL AND INSTALLATION

2. Detach the front door wiring harness connector.



3. Disconnect the blower motor electrical connector.



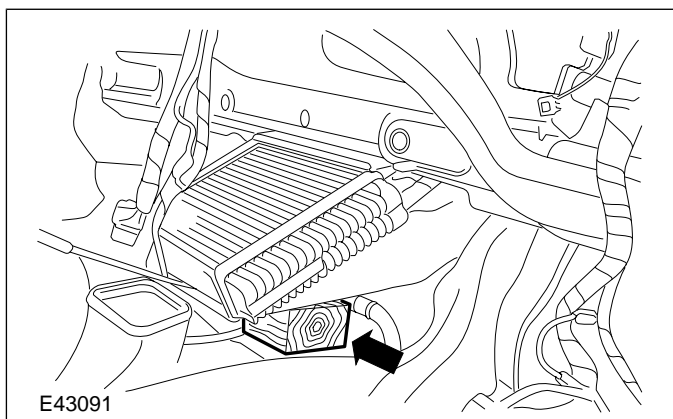
Item 4 Dashboard crossmember side bolts

1. **CAUTION:** Do not remove the dashboard crossmember side bolts.

Loosen the dashboard crossmember right and left-hand side bolts.

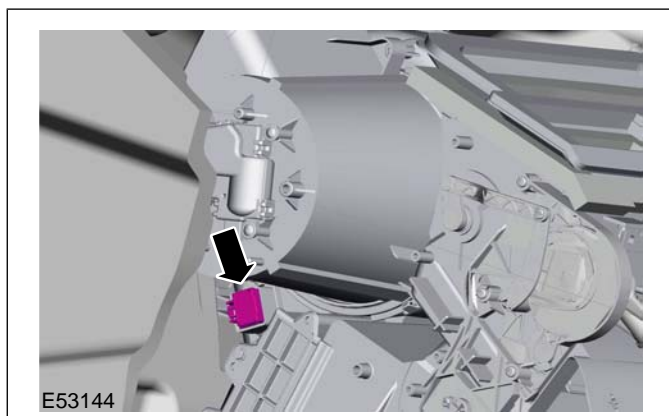
Item 37 Dashboard crossmember outer bolts

1. Support the heater housing with a wooden block.

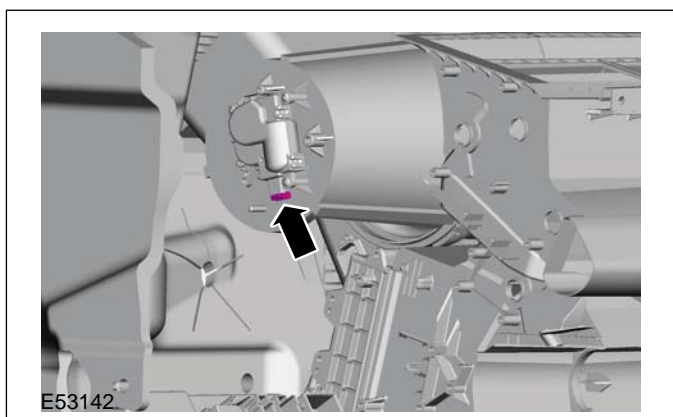


4. **NOTE:** Only vehicles with manual temperature control

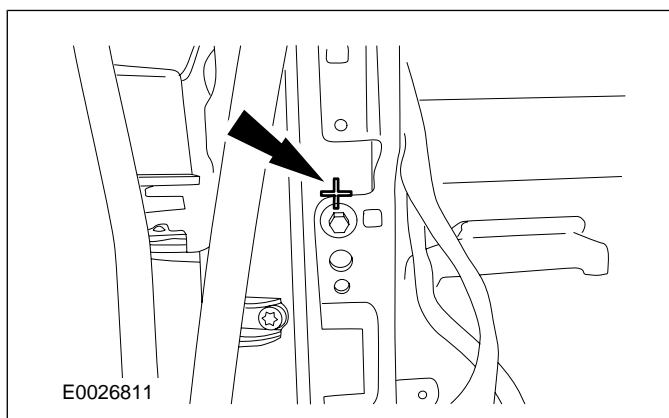
Disconnect the blower motor resistor electrical connector.



2. Detach the air recirculation flap actuator connector.

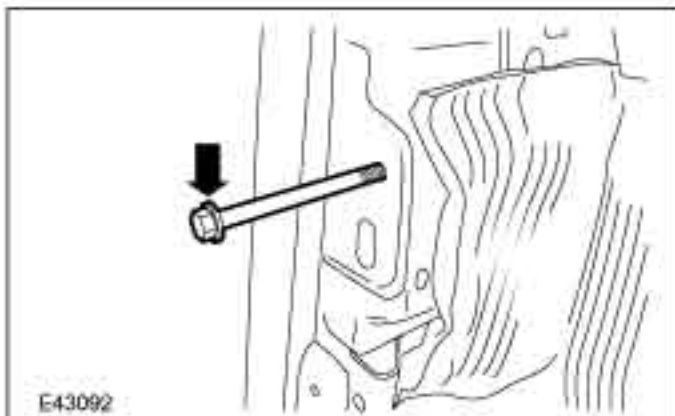


5. Mark the position of the dashboard crossmember relative to the A-pillars (left-hand side shown).



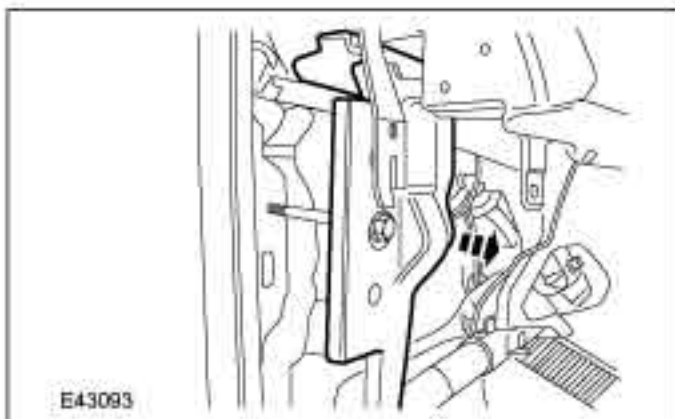
REMOVAL AND INSTALLATION

6. After removing the outer bolts of the dashboard crossmember, screw in two M10 x 120 mm guide bolts each into the right and left-hand A-pillars (shown without dashboard crossmember for clarity).



7. Remove the right and left-hand side bolts of the dashboard crossmember.

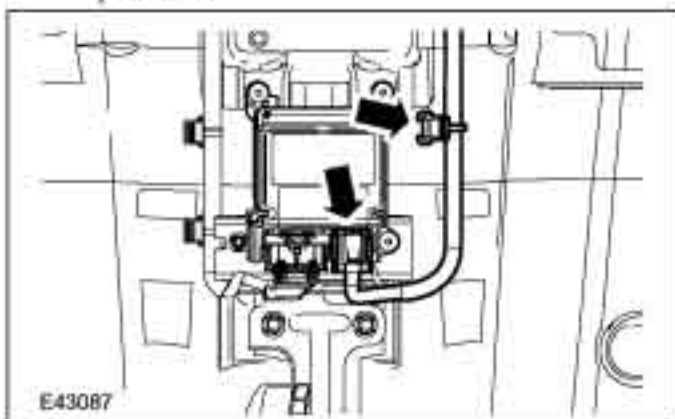
8. Pull the dashboard crossmember forwards until it reaches the stop.



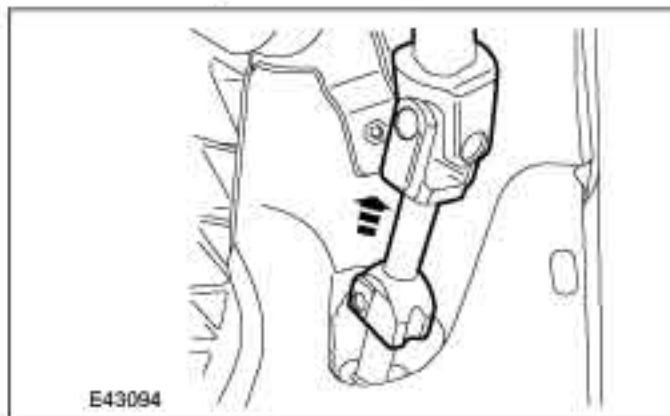
Item 38 Dashboard crossmember

1. Disconnect the connector from the airbag module.

- Unclip the centre console wiring harness and pull it out.

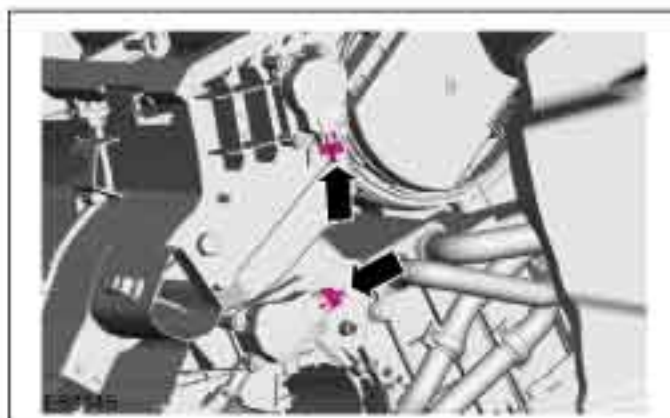


2. Detach the steering column shaft joint from the steering column shaft.



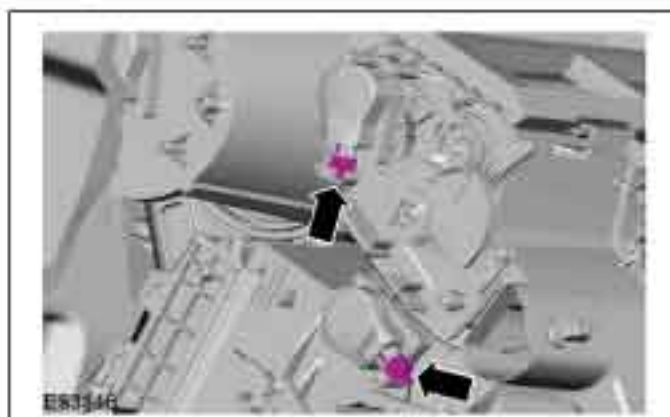
3. **NOTE: Vehicles with EATC only**

Detach the right-hand temperature flap actuator connector and the defrost flap actuator connector.



4. **NOTE: Vehicles with EATC only**

Detach the left-hand temperature flap actuator connector and the air distribution flap actuator connector.



5. **NOTE: Vehicles with EATC only**

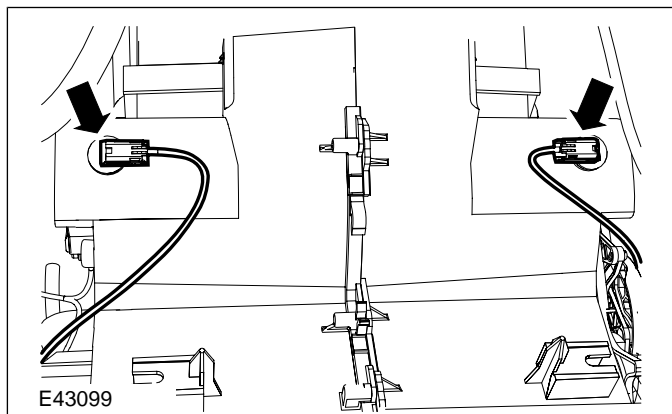
412-04-36

Control Components

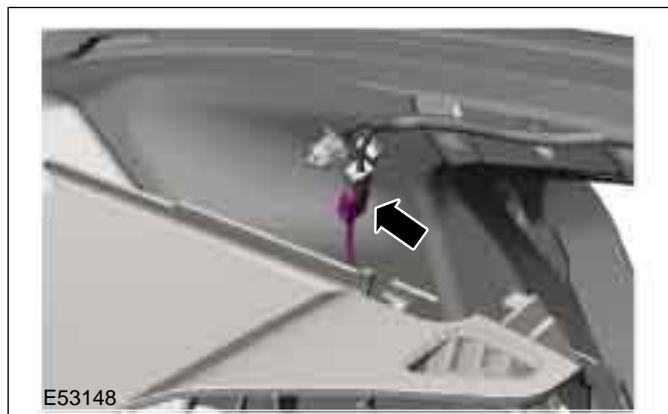
412-04-36

REMOVAL AND INSTALLATION

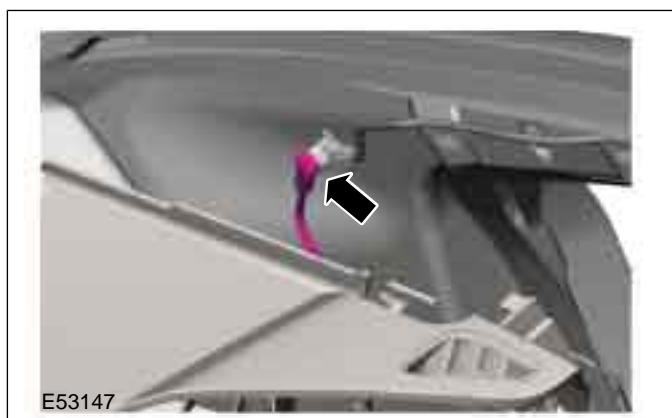
Detach the air outlet temperature sensor connector.



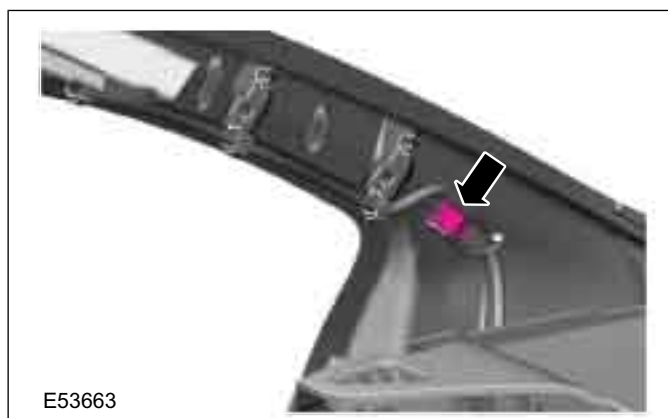
7. Separate the car telephone antenna cable push-fit connector (if equipped).



6. Separate the radio antenna cable push-fit connector.



8. Detach the overhead console wiring harness connector.

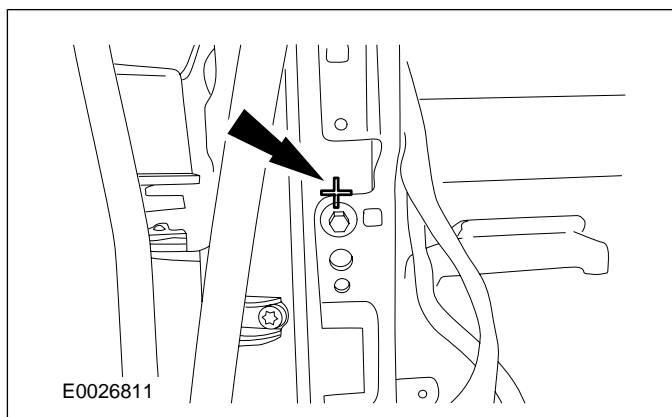


9. Remove the right and left-hand M10 x 120 mm guide bolts.

Installation Details

Item 37 Dashboard crossmember outer bolts

1. Align the dashboard crossmember to the A-pillars (left-hand side shown).



Item 31 Steering column shaft joint bolt

WARNING: Install a new steering column shaft joint bolt. Failure to follow this instruction may result in personal injury.

Item 6 Windshield wiper arms

CAUTION: Move the windshield wiper motor to the parked position before installing the wiper arms.

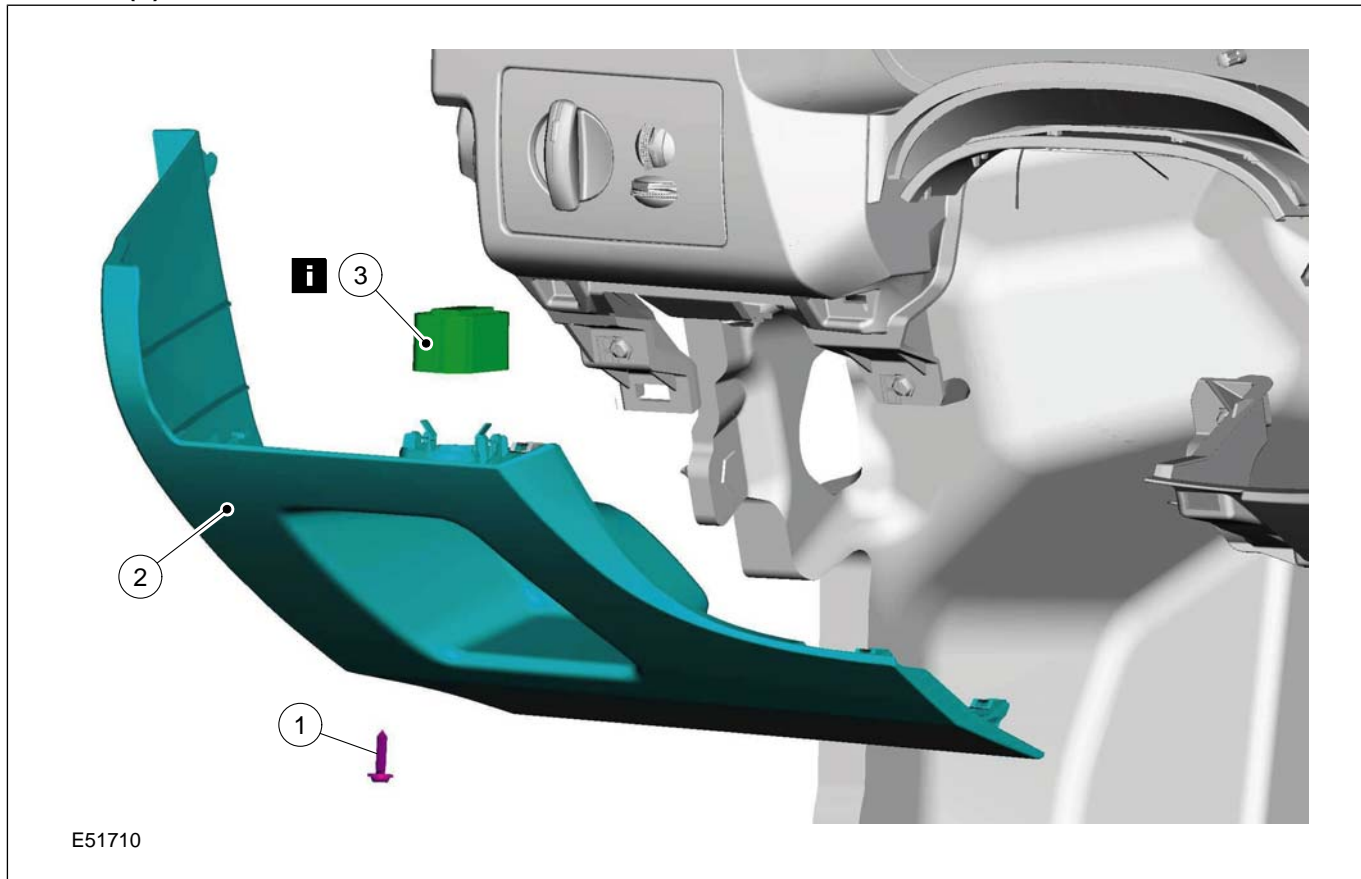
Item 2 Door hinge bolts

1. Apply thread locking compound to the door hinge bolts.

REMOVAL AND INSTALLATION

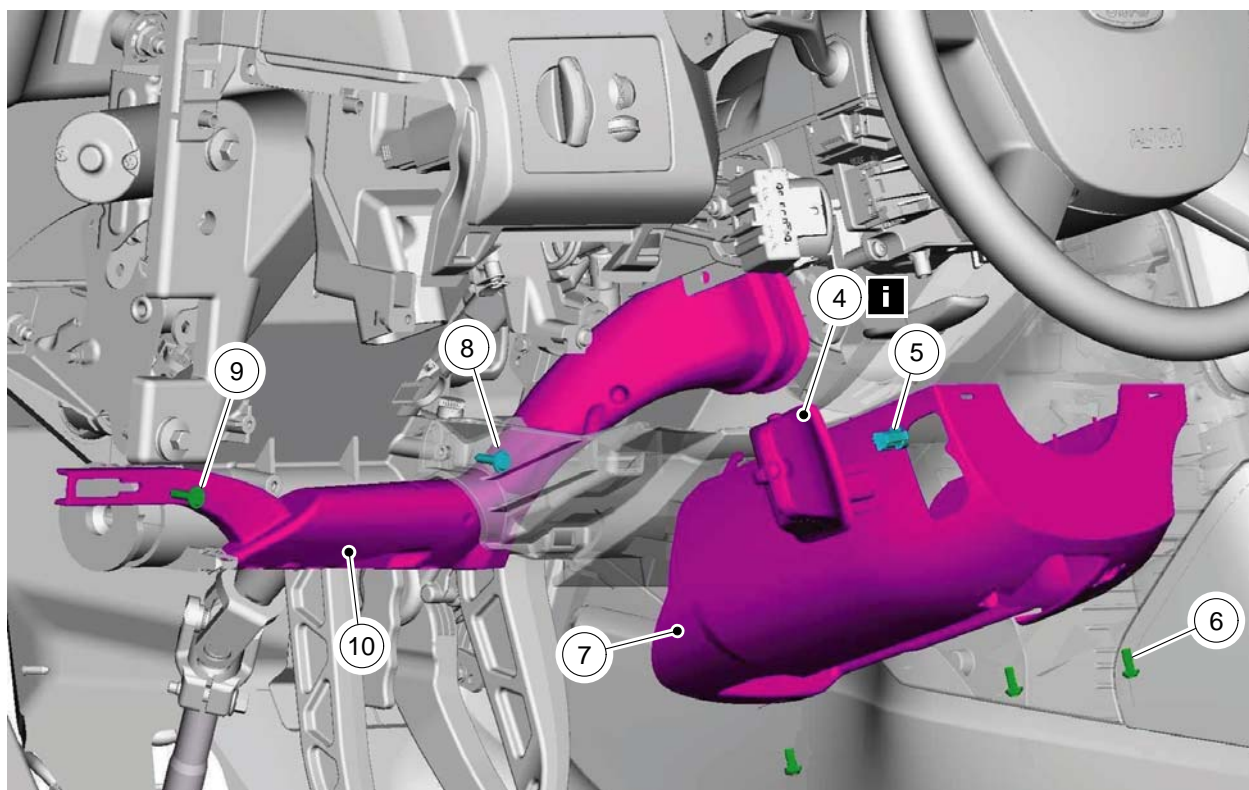
Driver Side Footwell Air Discharge Temperature Sensor

1. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Bolt, lower dashboard cover
2	Lower dashboard cover
3	Data link connector (DLC) See Removal Detail

REMOVAL AND INSTALLATION

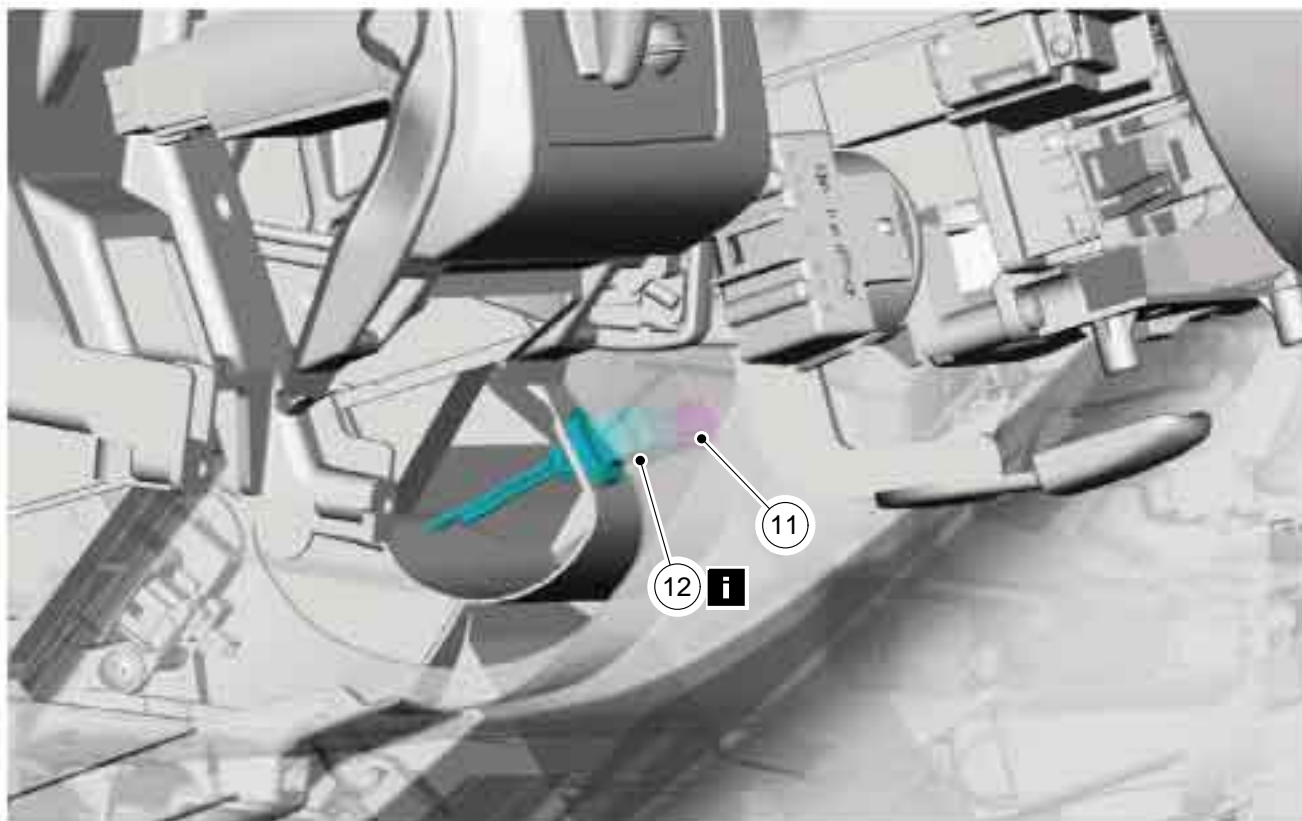


E51711

Item	Description
4	Remote control, audio unit (if equipped) See Removal Detail
5	Remote control electrical connector, audio unit (if equipped)
6	Bolts, steering column lower cover

Item	Description
7	Steering column lower cover
8	Bolts, dashboard
9	Bolts, front footwell air duct
10	Front footwell air duct

REMOVAL AND INSTALLATION



E51712

Item	Description
11	Electrical connector, air outlet temperature sensor, driver's side footwell
12	Air outlet temperature sensor, driver's side footwell See Removal Detail

2. To install, reverse the removal procedure.

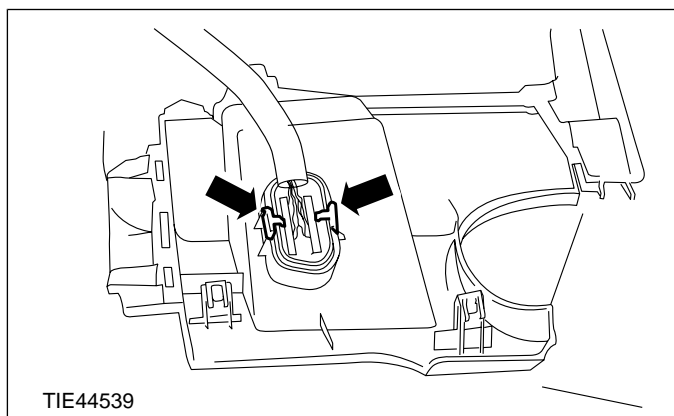
Removal Details

Item 3 Data link connector (DLC)

1. Detach the DLC from the lower dashboard cover.

Item 4 Remote control, audio unit (if equipped)

1. Detach the audio unit remote control from the steering column lower cover.



TIE44539

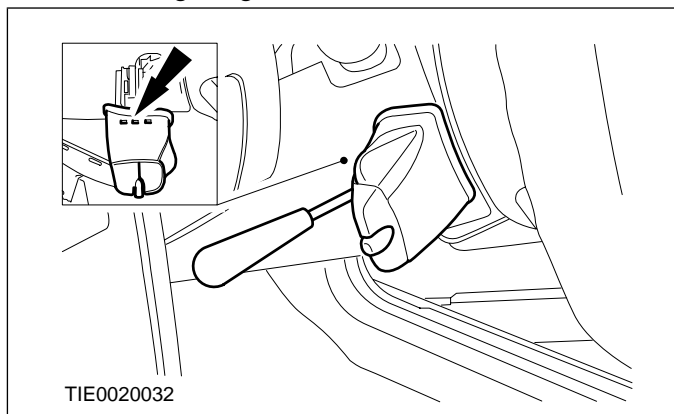
412-04-40

Control Components

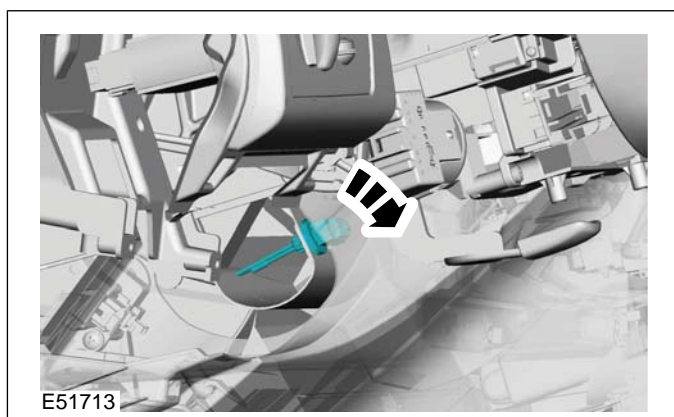
412-04-40

REMOVAL AND INSTALLATION

- Using a thin bladed screwdriver, release the locking tang.

**Item 12 Air outlet temperature sensor, driver's side footwell**

1. Turn the air outlet temperature sensor clockwise through 90 degrees and remove it.

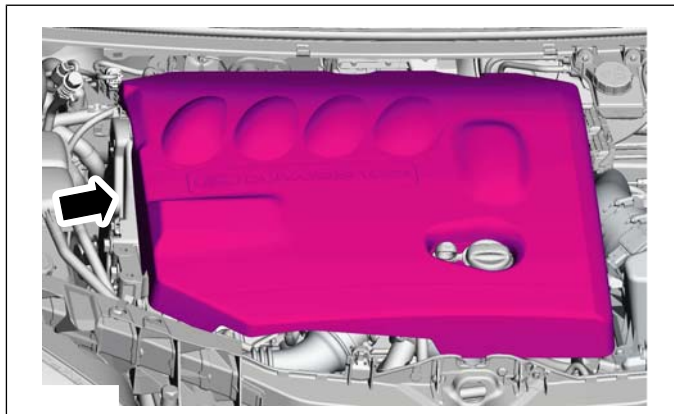


REMOVAL AND INSTALLATION

Passenger Side Footwell Air Discharge Temperature Sensor

NOTE: Four M10 x 120 mm guide bolts are required for removing the dashboard together with the dashboard crossmember.

1. Remove the engine cover (2.0L diesel shown).



2. Remove the facia crash padding.

For additional information, refer to:

Instrument panel (501-12, Removal and Installation).

3. Remove the A-pillar trim on the right and left-hand sides.

For additional information, refer to:

A-Pillar Trim Panel (501-05, Removal and Installation).

4. Remove the front rocker panel trim on the right and left hand sides.

For additional information, refer to: Front

Scuff Plate Trim Panel (501-05, Removal and Installation).

5. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



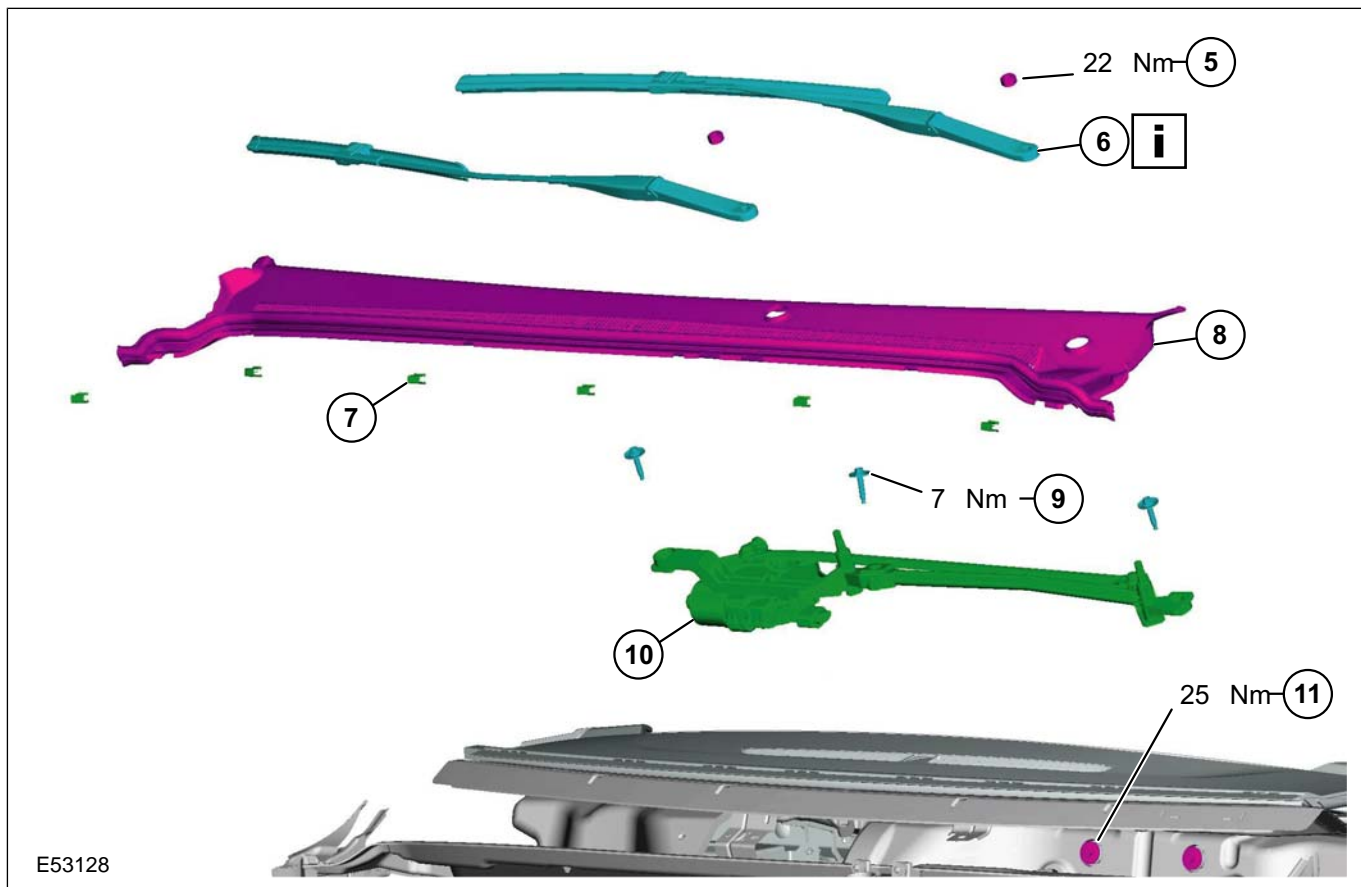
E52944

Item	Description
1	Door check strap bolt
2	Door hinge bolts See Removal Detail See Installation Detail

Item	Description
3	Front doors (driver's door shown) See Removal Detail
4	Dashboard crossmember side bolts See Removal Detail

REMOVAL AND INSTALLATION

⚠ CAUTION: Make sure that the windshield wiper motor is in the park position.



E53128

Item	Description
5	Windshield wiper arm nuts
6	Windshield wiper arms <i>See Installation Detail</i>
7	Clips, cowl panel grille

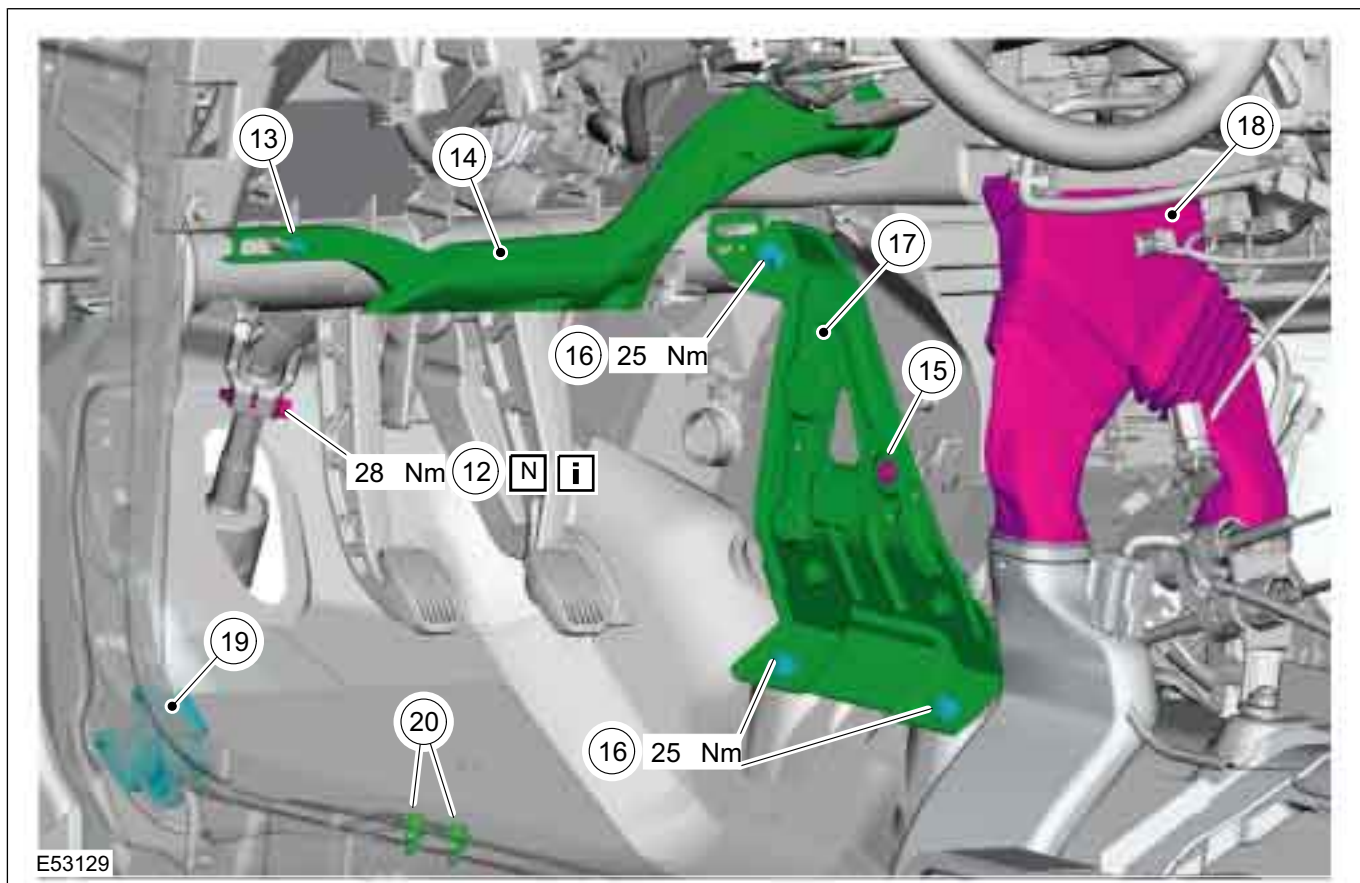
Item	Description
8	Cowl Panel Grille
9	Bolts for windshield wiper motor with linkage
10	Windshield wiper motor with linkage
11	Steering column bracket upper bolts

412-04-44

Control Components

412-04-44

REMOVAL AND INSTALLATION



Item	Description
12	Steering column shaft joint bolt See Installation Detail
13	Bolt, footwell air duct
14	Footwell air duct
15	Bolt, heater core/evaporator housing

Item	Description
16	Bolts, bracket for reinforcing element
17	Bracket, reinforcing element
18	Rear footwell air duct
19	Connector - passenger compartment wiring harness
20	Ground cable bolts

REMOVAL AND INSTALLATION

▲ WARNING: Never perform work on the electric booster heater before the electric booster heater element has cooled to ambient temperature. Failure to observe this instruction can lead to injury.

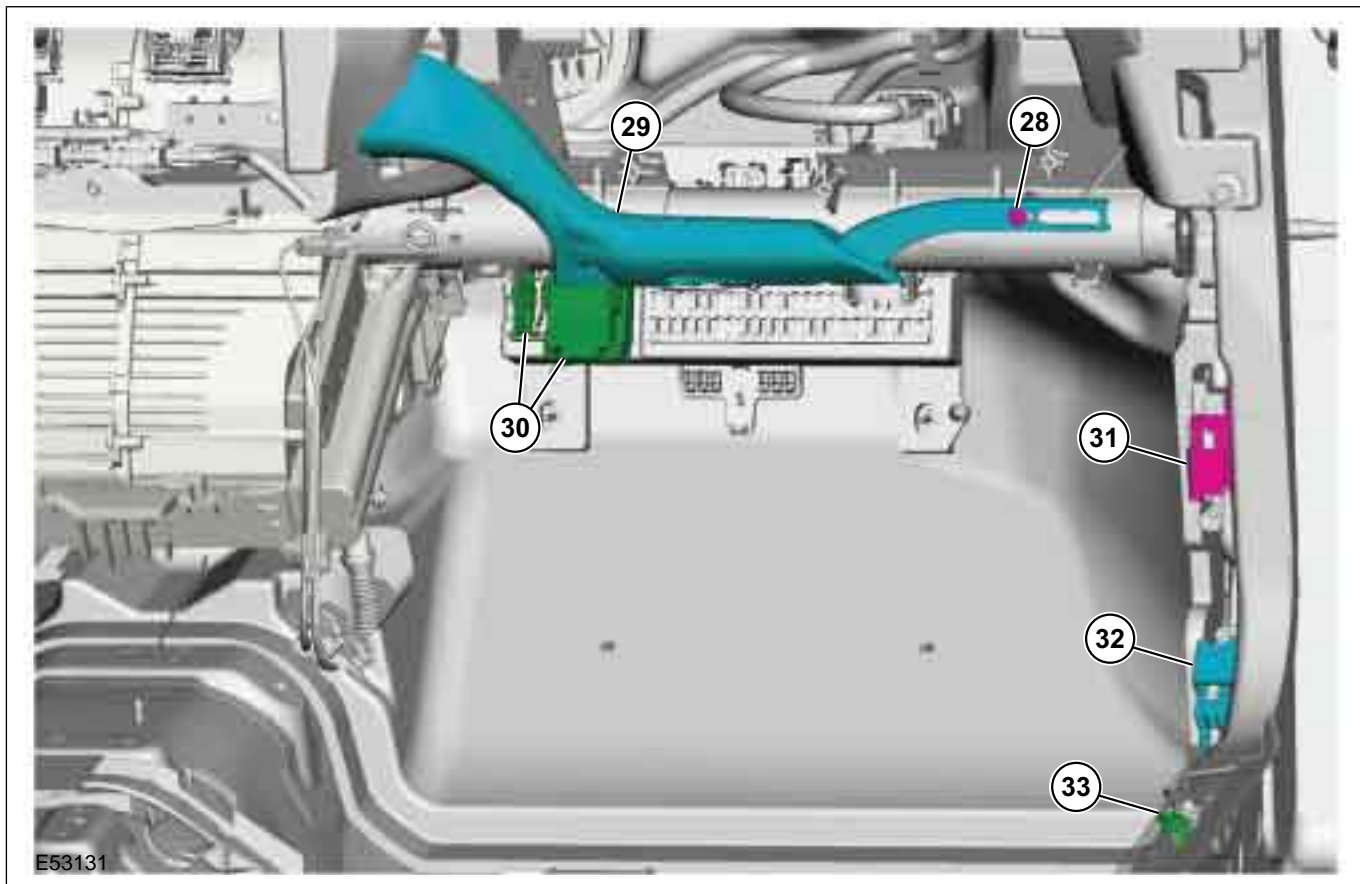


E53130

Item	Description
21	Bolt, heater core/evaporator housing
22	Retaining clips, instrument panel wiring harness
23	Ground cable bolt

Item	Description
24	Retaining clip, engine compartment wiring harness (if equipped)
25	Bolts, bracket for reinforcing element
26	Bracket, reinforcing element
27	Connector - electric booster heater (if fitted)

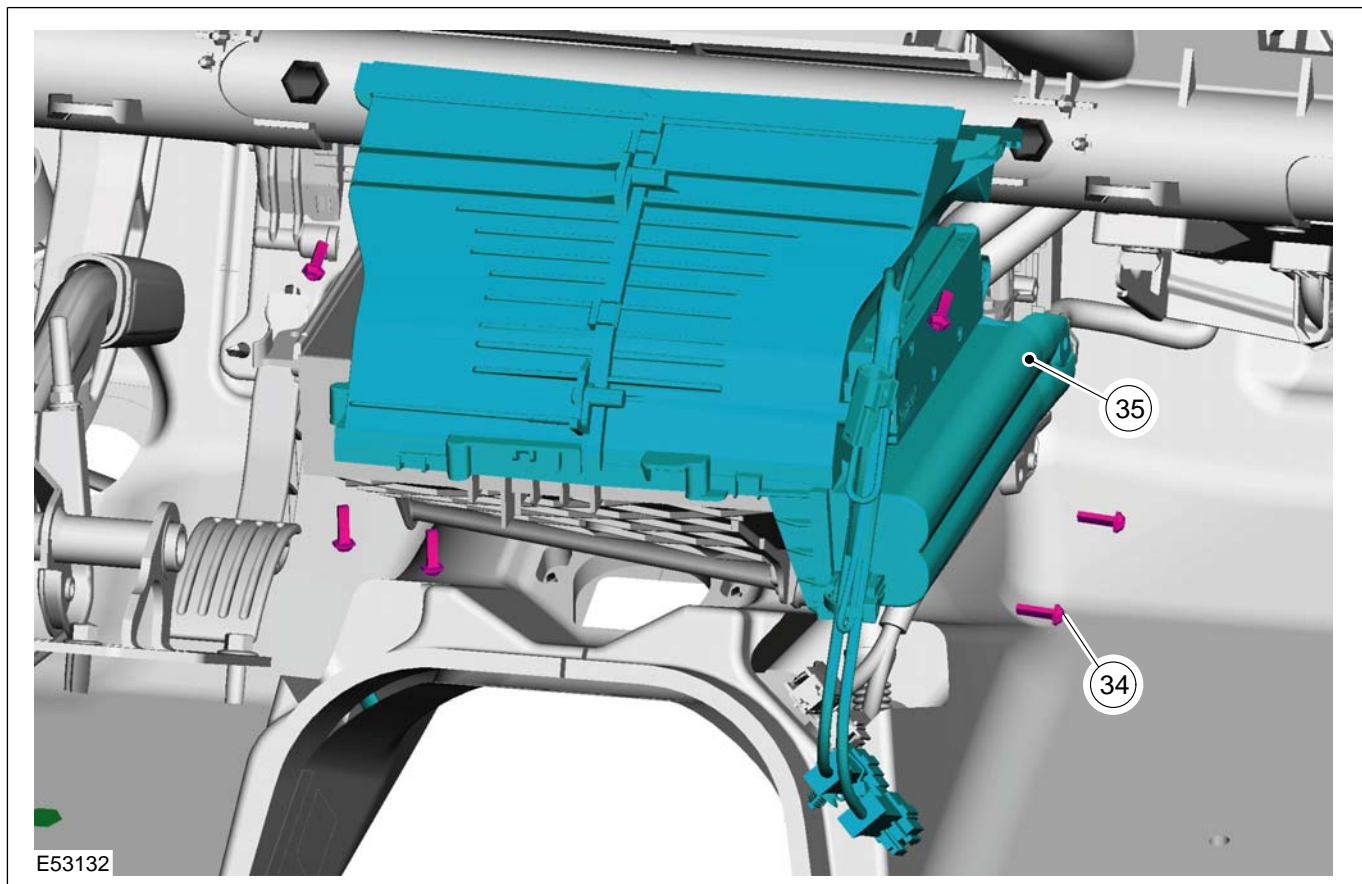
REMOVAL AND INSTALLATION



Item	Description
28	Bolt, footwell air duct
29	Footwell air duct
30	Dashboard wiring harness connector

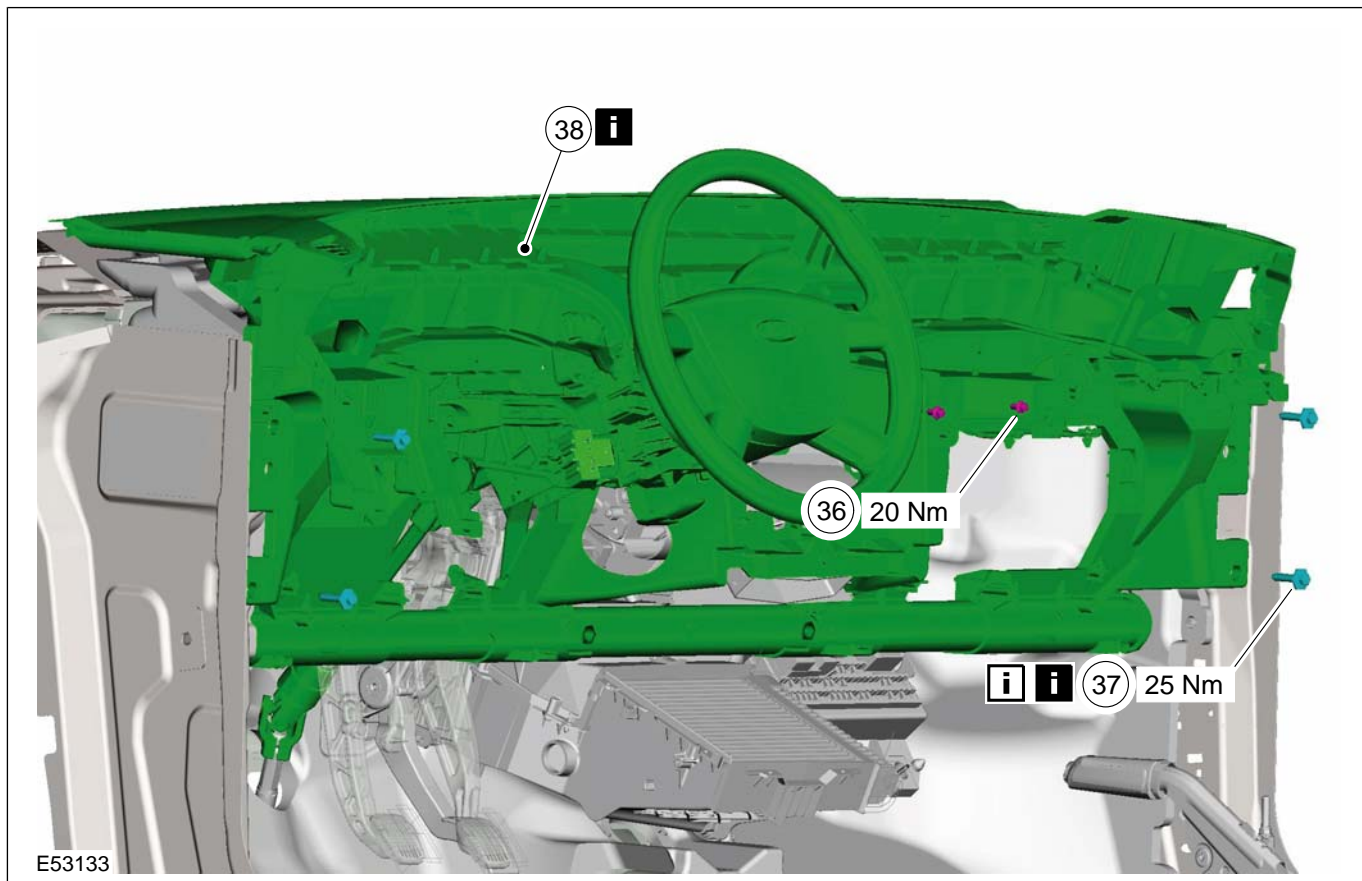
Item	Description
31	Connector - engine compartment wiring harness
32	Connector - passenger compartment wiring harness
33	Ground cable bolt

REMOVAL AND INSTALLATION



Item	Description
34	Heater core upper cover bolts
35	Heater core upper cover

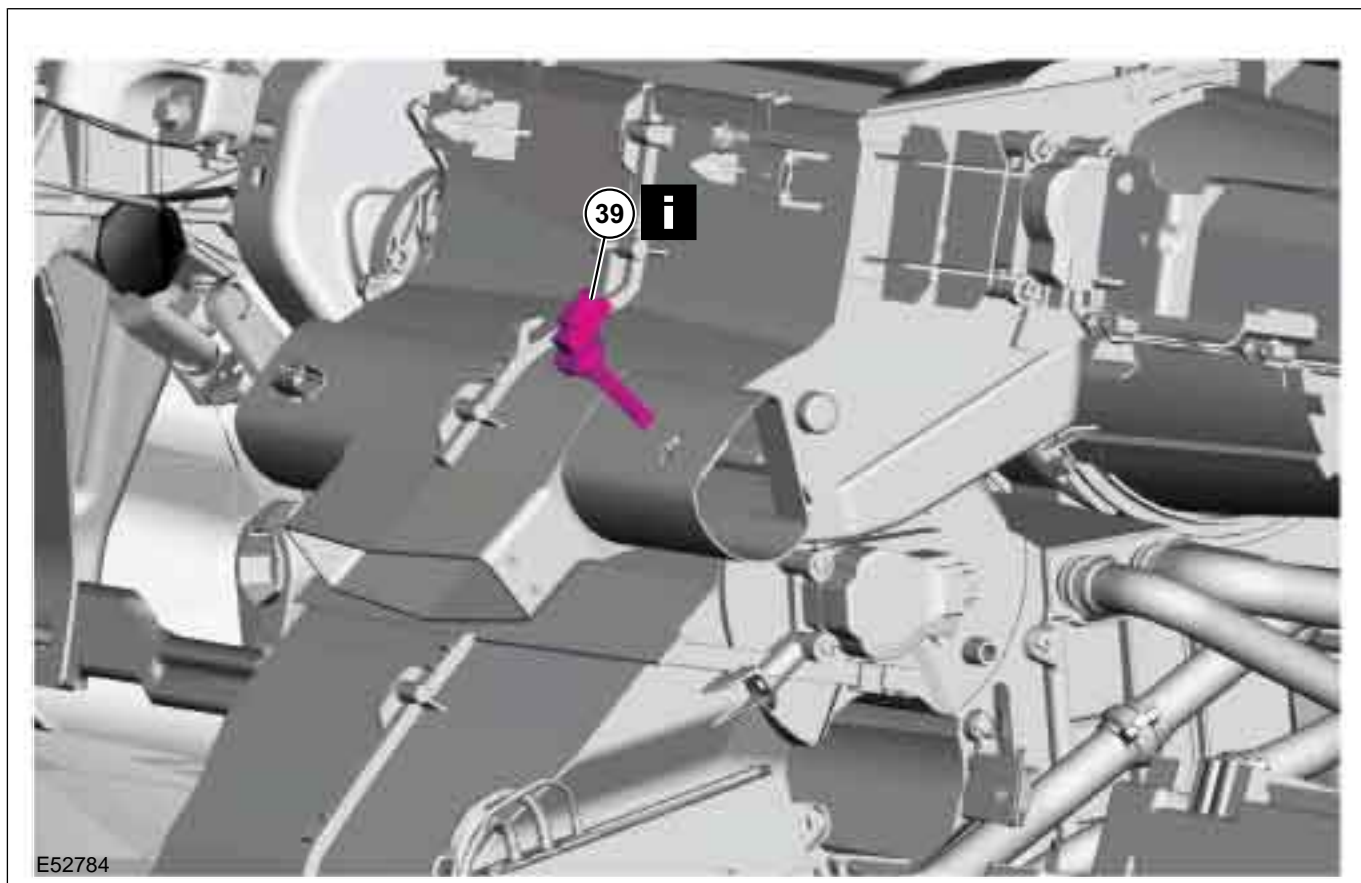
REMOVAL AND INSTALLATION



E53133

Item	Description
36	Dashboard crossmember inner bolts
37	Dashboard crossmember outer bolts See Removal Detail See Installation Detail
38	Dashboard crossmember See Removal Detail

REMOVAL AND INSTALLATION



Item	Description
39	Air outlet temperature sensor, passenger side footwell See Removal Detail

7. Check the angle of the windshield wiper arms in relation to the windshield.

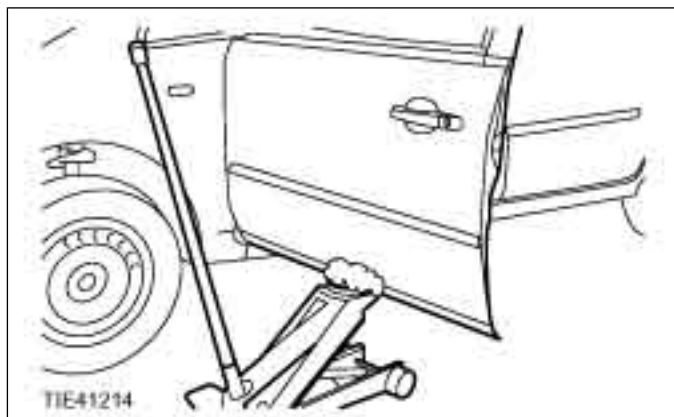
For additional information, refer to: **Windshield Wiper Blade and Pivot Arm Adjustment (501-16, General Procedures)**.

6. To install, reverse the removal procedure.

Removal Details

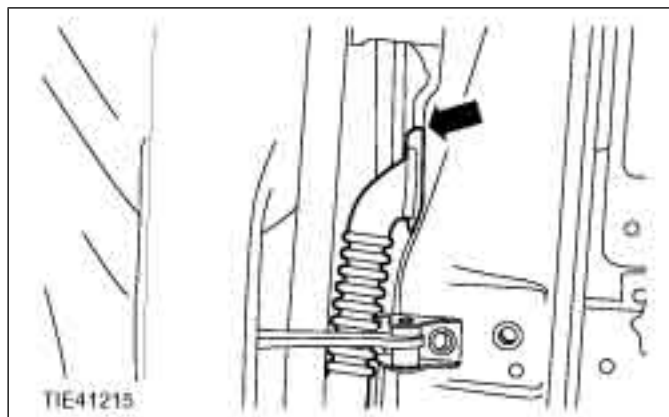
Item 2 Door hinge bolts

1. Support the door using a trolley jack with the aid of another technician.



Item 3 Front doors (driver's door shown)

1. Detach the front door wiring harness connector from the A-pillar.



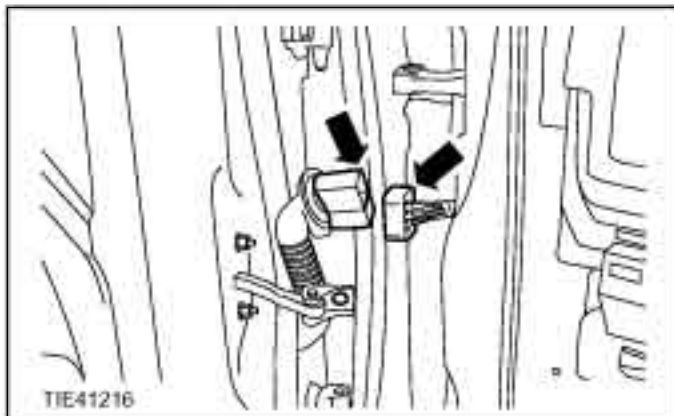
412-04-50

Control Components

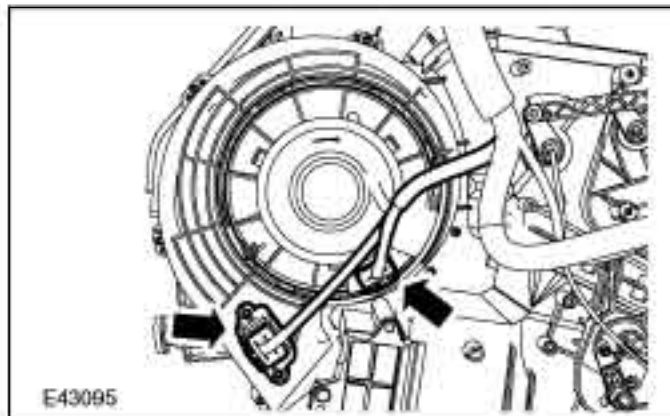
412-04-50

REMOVAL AND INSTALLATION

2. Detach the front door wiring harness connector.



3. Detach the blower resistor connector (if fitted) and the blower motor connector.



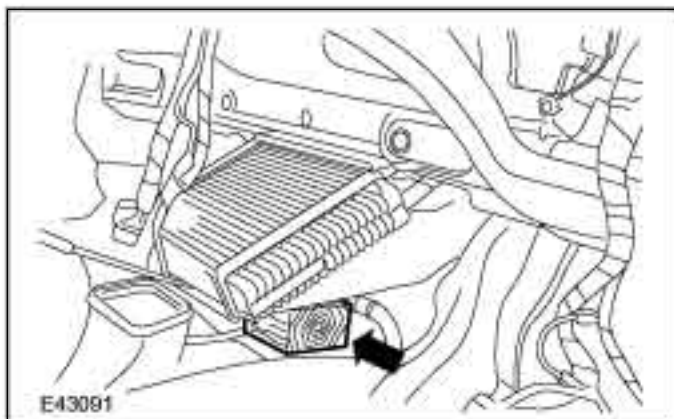
Item 4 Dashboard crossmember side bolts

1. **CAUTION:** Do not remove the dashboard crossmember side bolts.

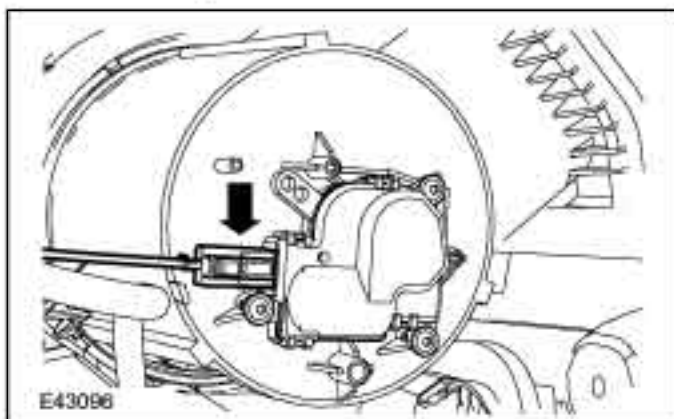
Loosen the dashboard crossmember right and left-hand side bolts.

Item 37 Dashboard crossmember outer bolts

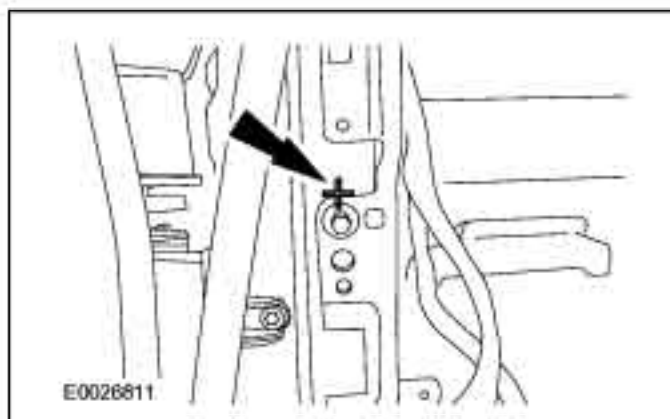
1. Support the heater housing with a wooden block.



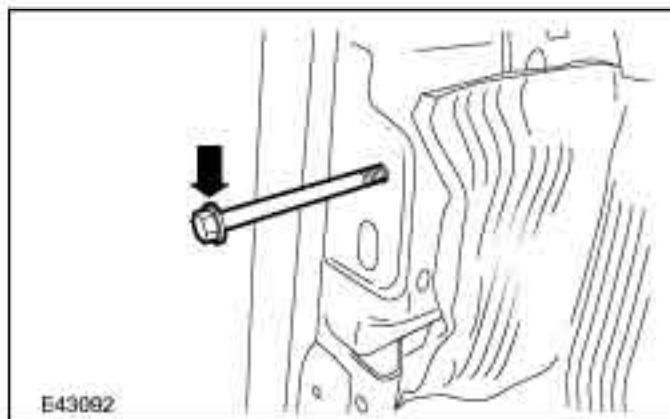
2. Detach the air recirculation flap actuator connector.



4. Mark the position of the dashboard crossmember relative to the A-pillars (left-hand side shown).



5. After removing the outer bolts of the dashboard crossmember, screw in two M10 x 120 mm guide bolts each into the right and left-hand A-pillars (shown without dashboard crossmember for clarity).



6. Remove the right and left-hand side bolts of the dashboard crossmember.

412-04-51

Control Components

412-04-51

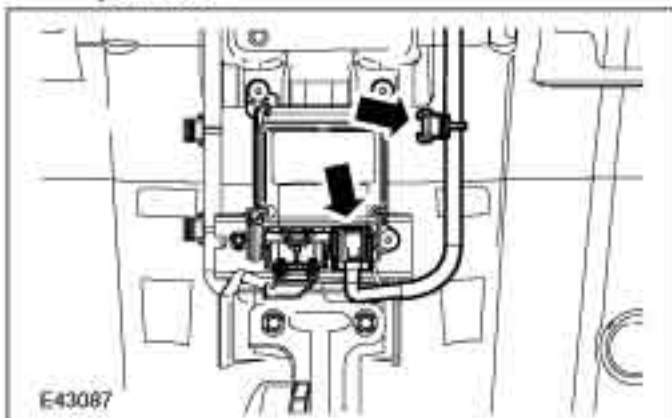
REMOVAL AND INSTALLATION

7. Pull the dashboard crossmember forwards until it reaches a stop.

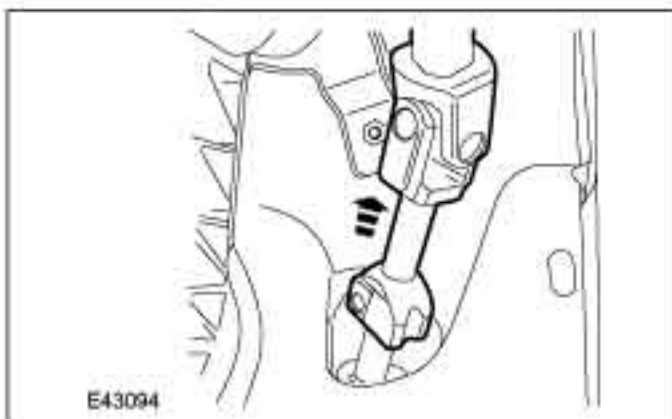


Item 38 Dashboard crossmember

1. Disconnect the connector from the airbag module.
- Unclip the centre console wiring harness and pull it out.

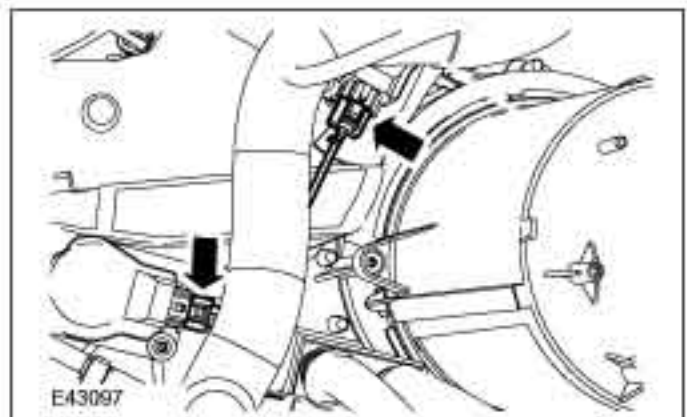


2. Detach the steering column shaft joint from the steering column shaft.



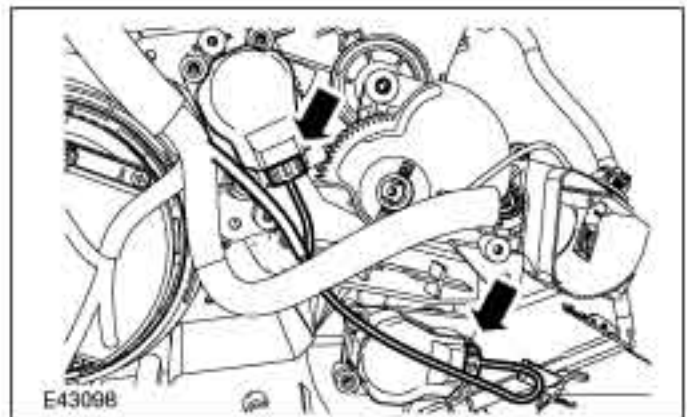
3. NOTE: Vehicles with EATC only

- Detach the right-hand temperature flap actuator connector and the defrost flap actuator connector.



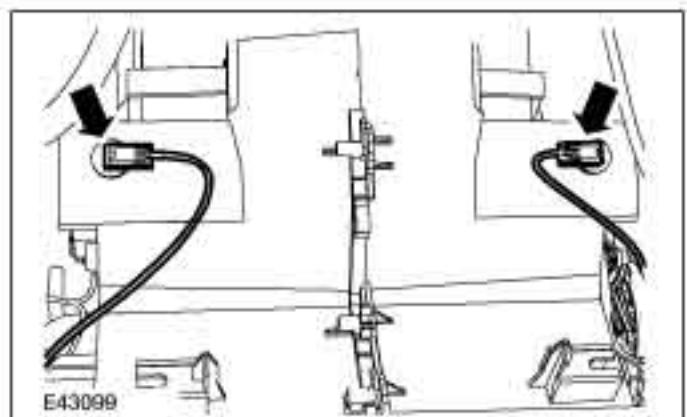
4. NOTE: Vehicles with EATC only

- Detach the left-hand temperature flap actuator connector and the air distribution flap actuator connector.



5. NOTE: Vehicles with EATC only

- Detach the air outlet temperature sensor connector.



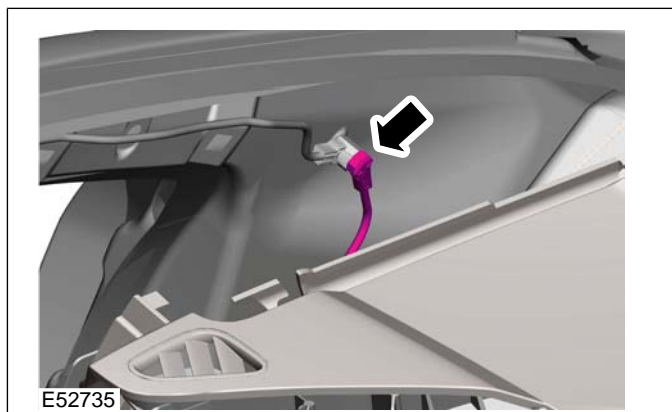
412-04-52

Control Components

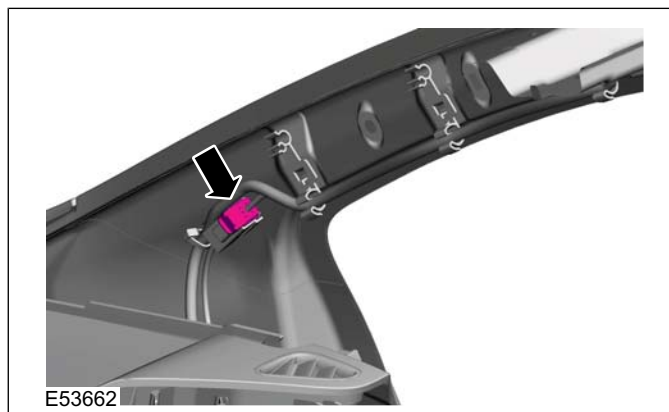
412-04-52

REMOVAL AND INSTALLATION

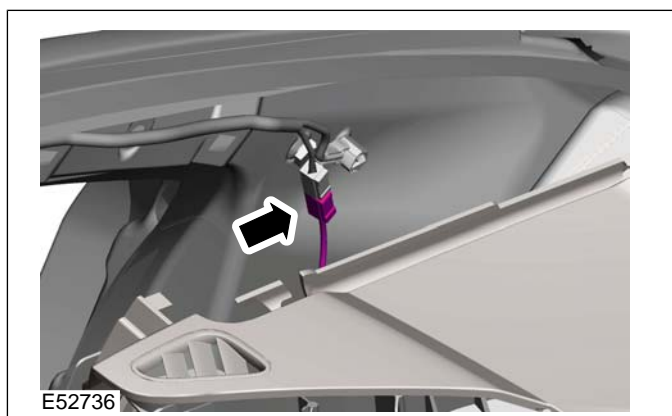
6. Separate the radio antenna cable push-fit connector.



8. Detach the overhead console wiring harness connector.



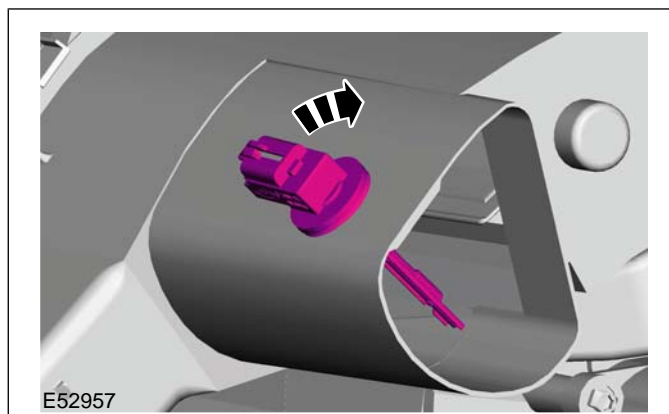
7. Separate the car telephone antenna cable push-fit connector (if equipped).



9. Remove the right and left-hand M10 x 120 mm guide bolts.

Item 39 Air outlet temperature sensor, passenger side footwell

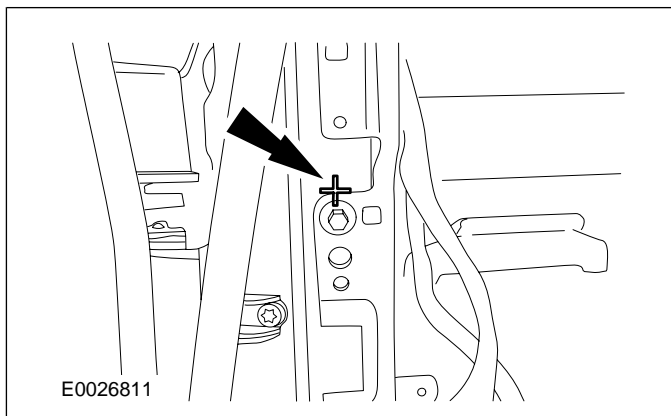
1. Turn the air outlet temperature sensor clockwise through 90 degrees and remove it.



Installation Details

REMOVAL AND INSTALLATION**Item 37 Dashboard crossmember outer bolts**

1. Align the dashboard crossmember to the A-pillars (left-hand side shown).

**Item 12 Steering column shaft joint bolt**

- WARNING:** Install a new steering column shaft joint bolt. Failure to follow this instruction may result in personal injury.

Item 6 Windshield wiper arms

- CAUTION:** Move the windshield wiper motor to the parked position before installing the wiper arms.

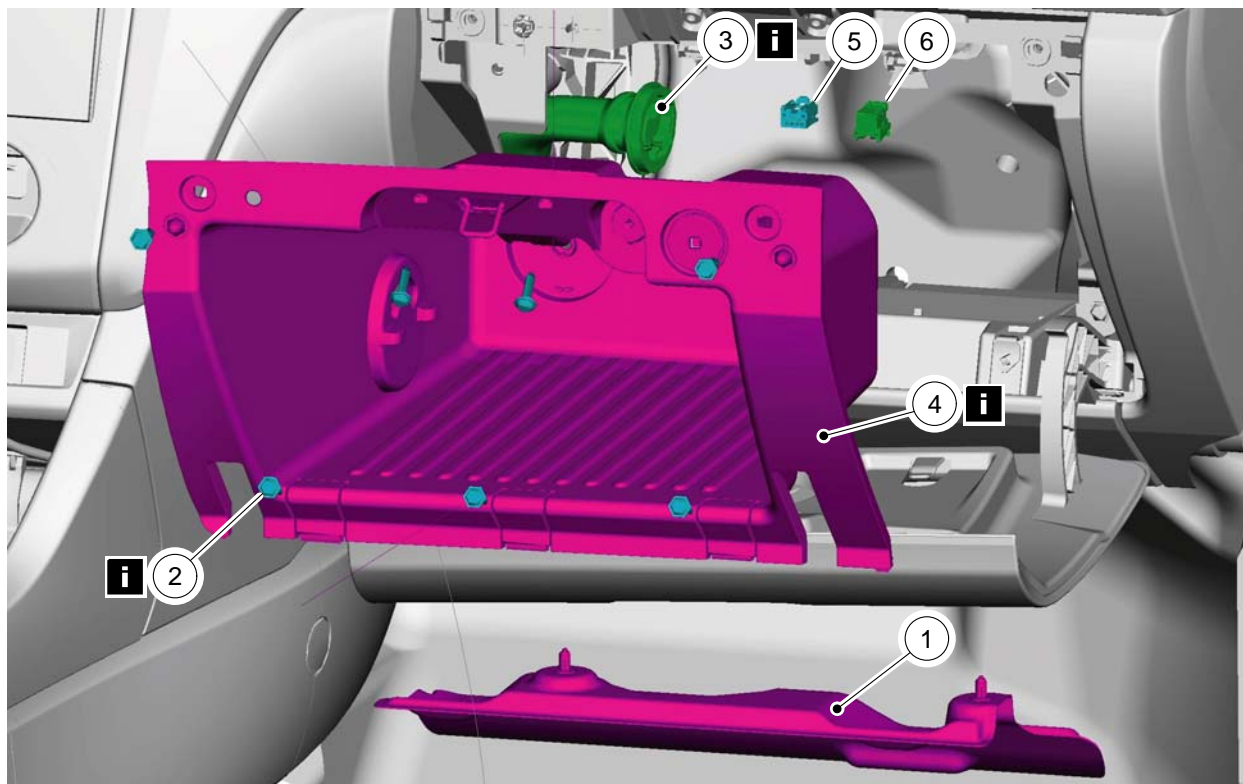
Item 2 Door hinge bolts

1. Apply thread locking compound to the door hinge bolts.

REMOVAL AND INSTALLATION

Air Inlet Blend Door Actuator

1. Remove the components in the order indicated in the following illustration(s) and table(s).

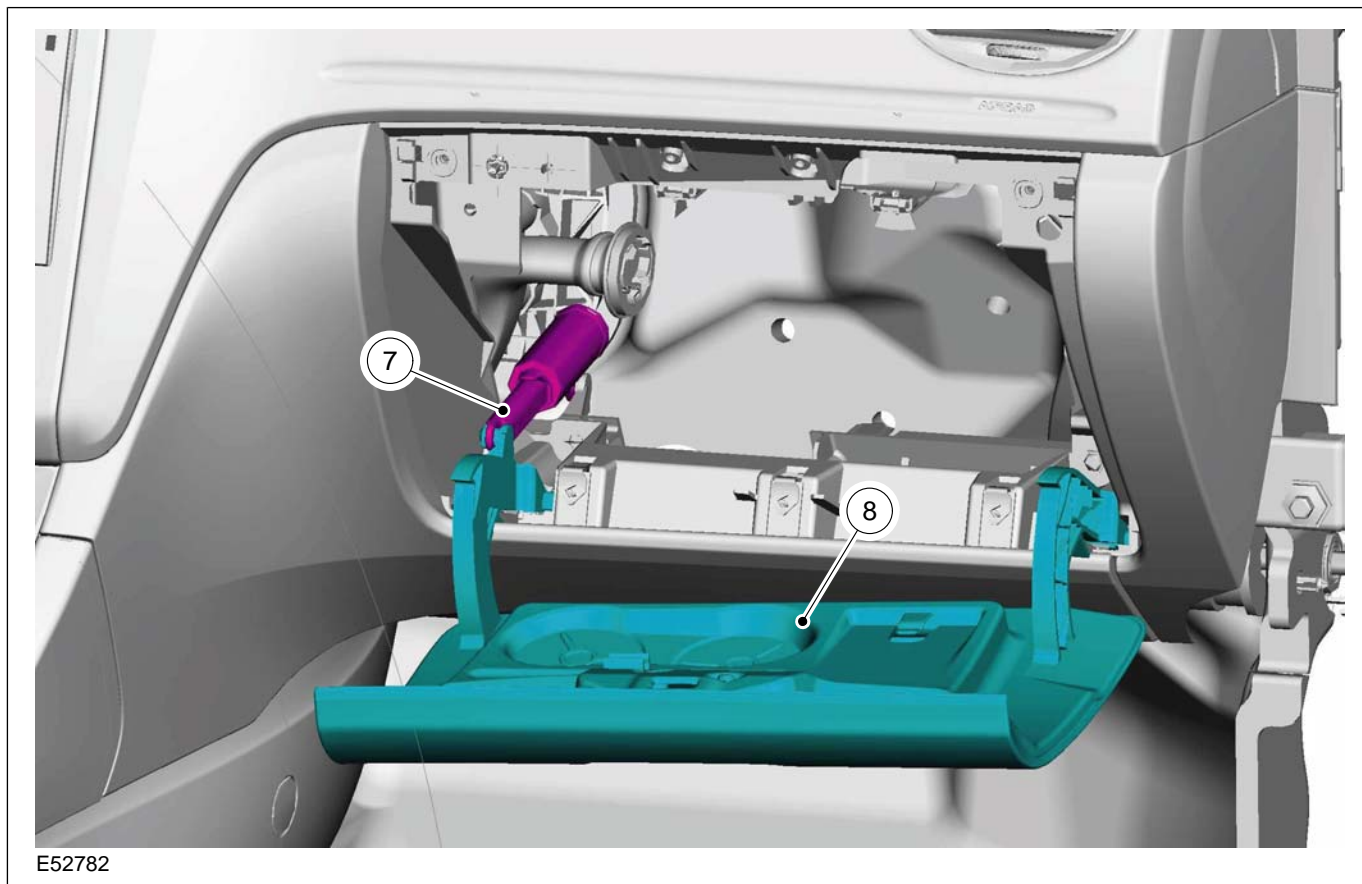


E51448

Item	Description
1	Footwell trim panel
2	Glove compartment screws See Removal Detail
3	Hose, glove compartment cooling (if equipped) See Removal Detail

Item	Description
4	Glove compartment See Removal Detail
5	Electrical connector, audio unit input (if equipped)
6	Passenger air bag deactivation (PAD) switch electrical connector (if equipped)

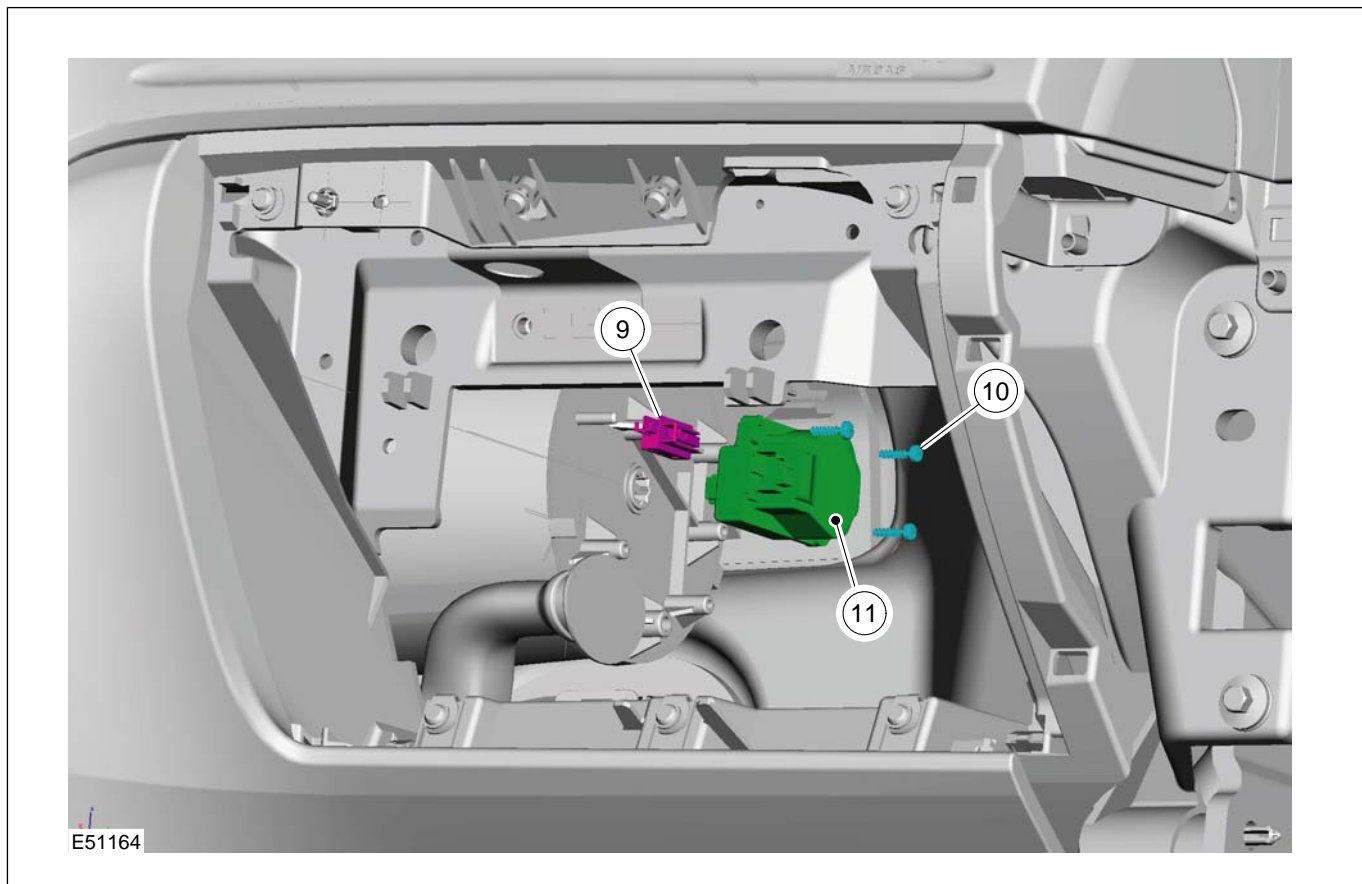
REMOVAL AND INSTALLATION



E52782

Item	Description
7	Opening damper, glove compartment cover (unhook)
8	Glove compartment cover

REMOVAL AND INSTALLATION



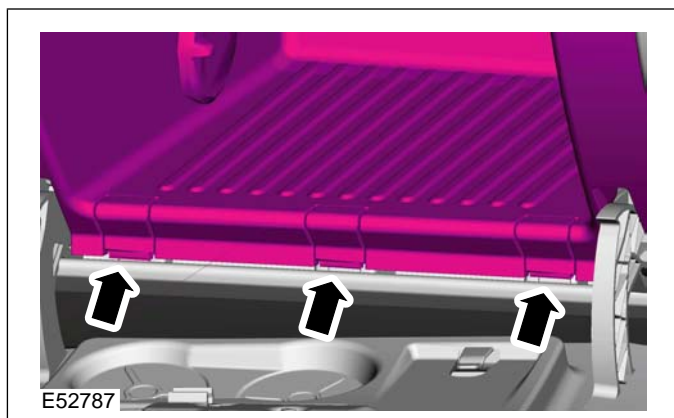
Item	Description
9	Air distribution flap actuator connector
10	Air distribution flap actuator bolts
11	Actuator - air distribution flap

2. To install, reverse the removal procedure.

Removal Details

Item 2 Glove compartment screws

1. Fold down the covering caps of the screws for the glove compartment.

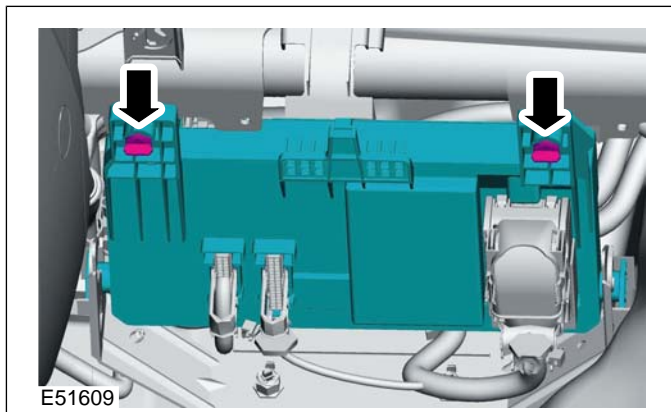


Item 3 Hose, glove compartment cooling (if equipped)

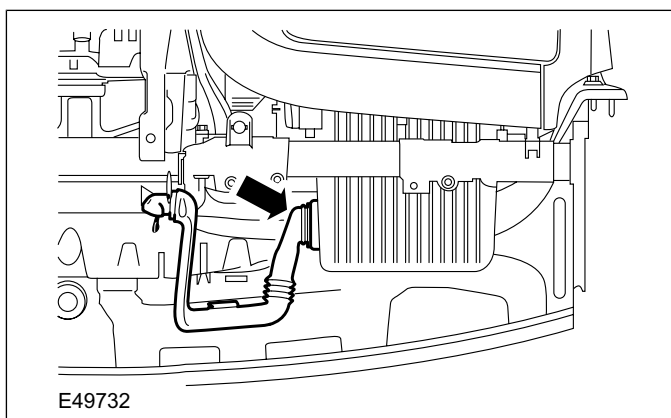
NOTE: Only vehicles with glove compartment cooling

REMOVAL AND INSTALLATION

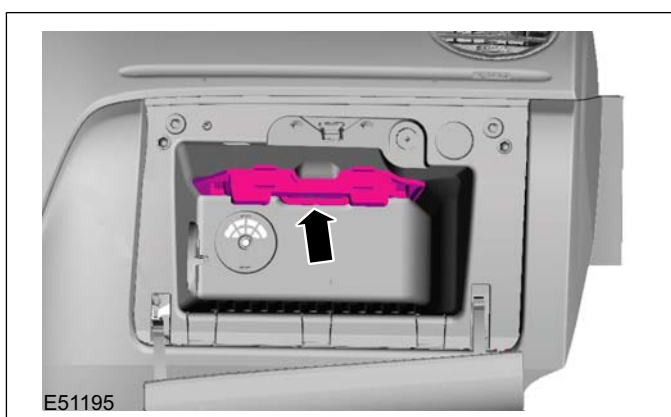
1. Detach the central junction box (CJB) from the reinforcing element.



2. Detach the glove compartment cooling hose from the glove compartment.

**Item 4 Glove compartment**

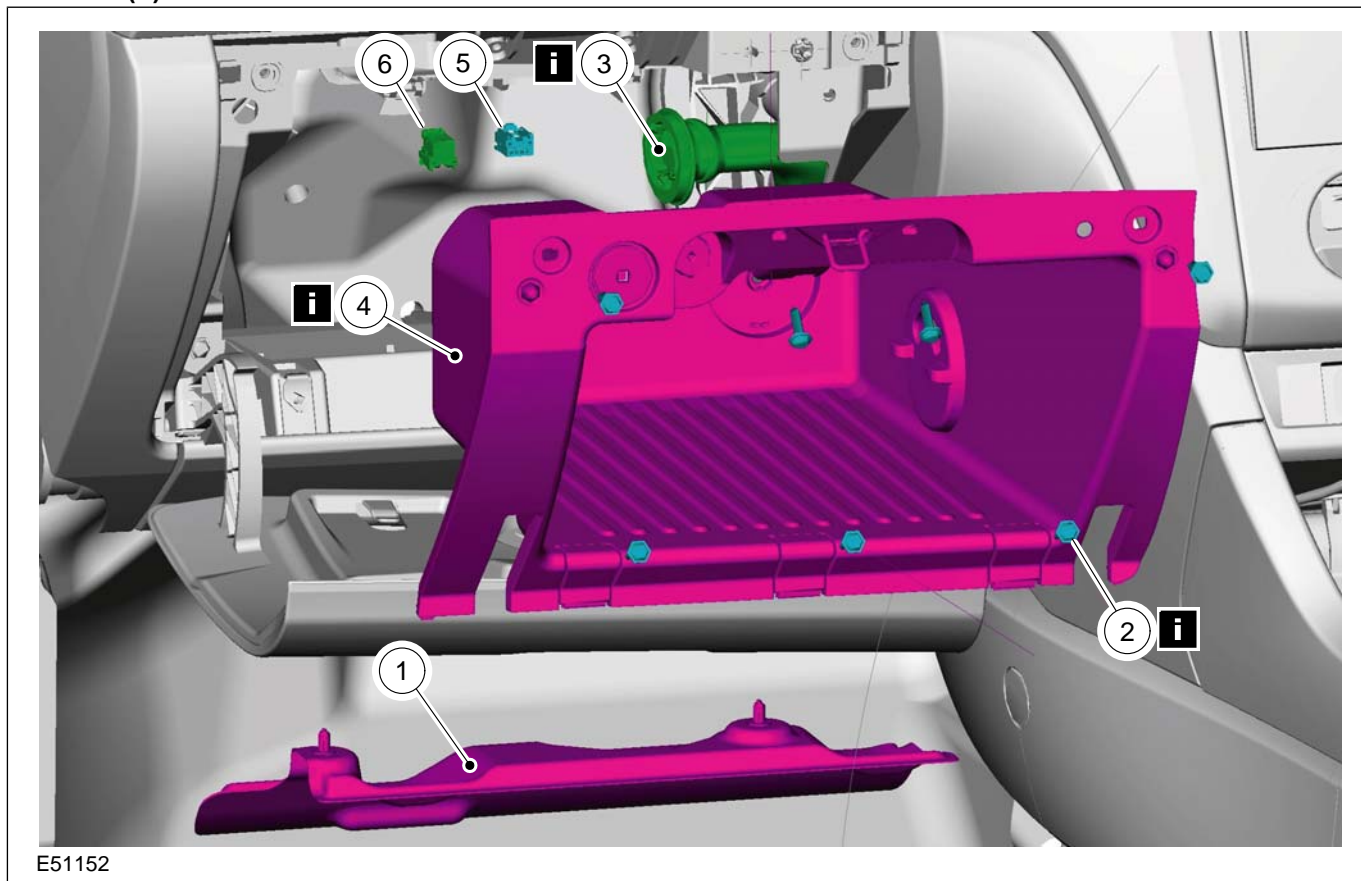
1. Remove the access flap for the navigation system DVD mechanism (if equipped).



REMOVAL AND INSTALLATION

Footwell Vent/Duct Blend Door Actuator — RHD

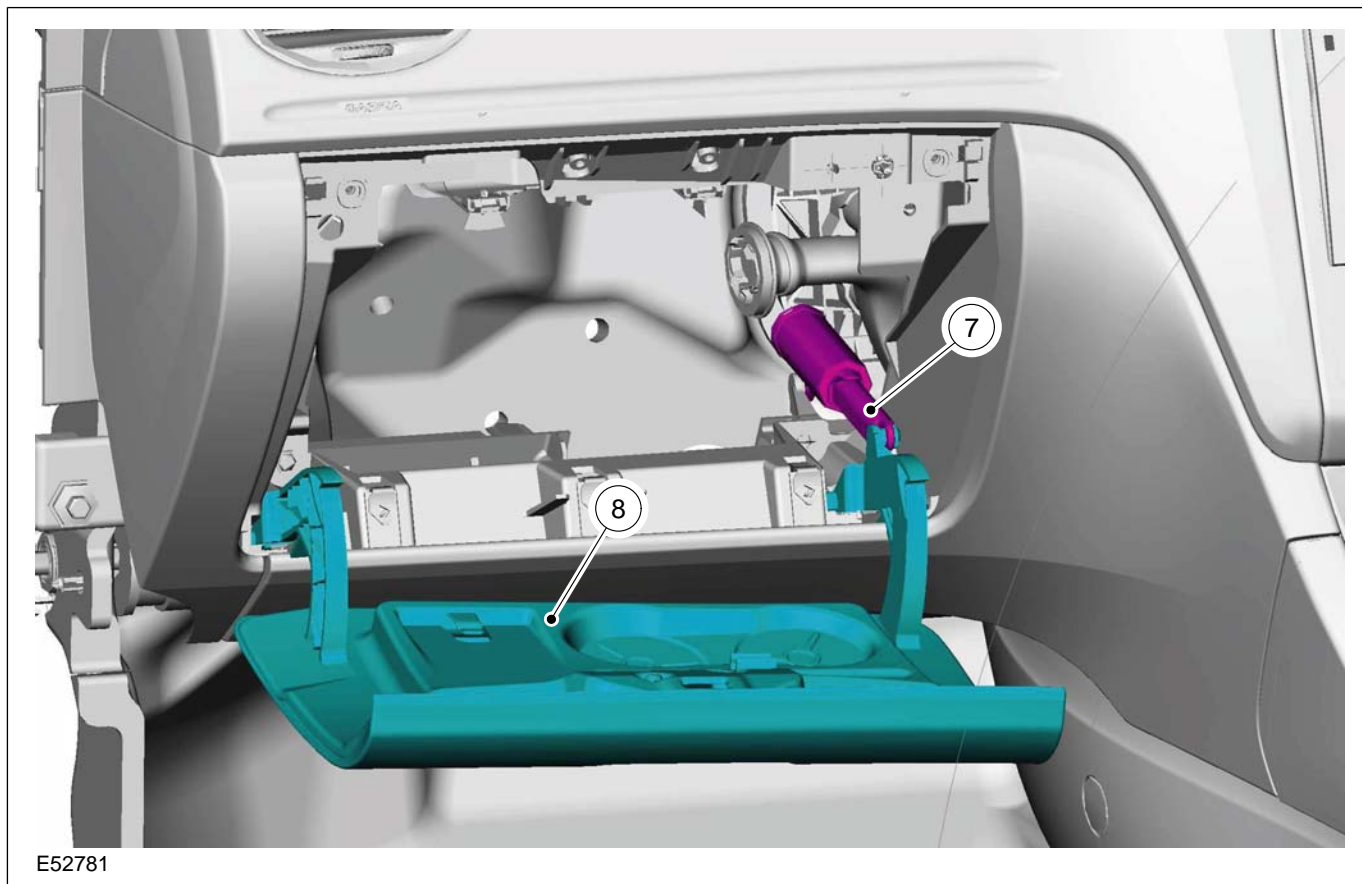
1. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Footwell trim panel
2	Glove compartment screws See Removal Detail
3	Hose, glove compartment cooling (if equipped) See Removal Detail

Item	Description
4	Glove compartment See Removal Detail
5	Electrical connector, audio unit input (if equipped)
6	Passenger air bag deactivation (PAD) switch electrical connector (if equipped)

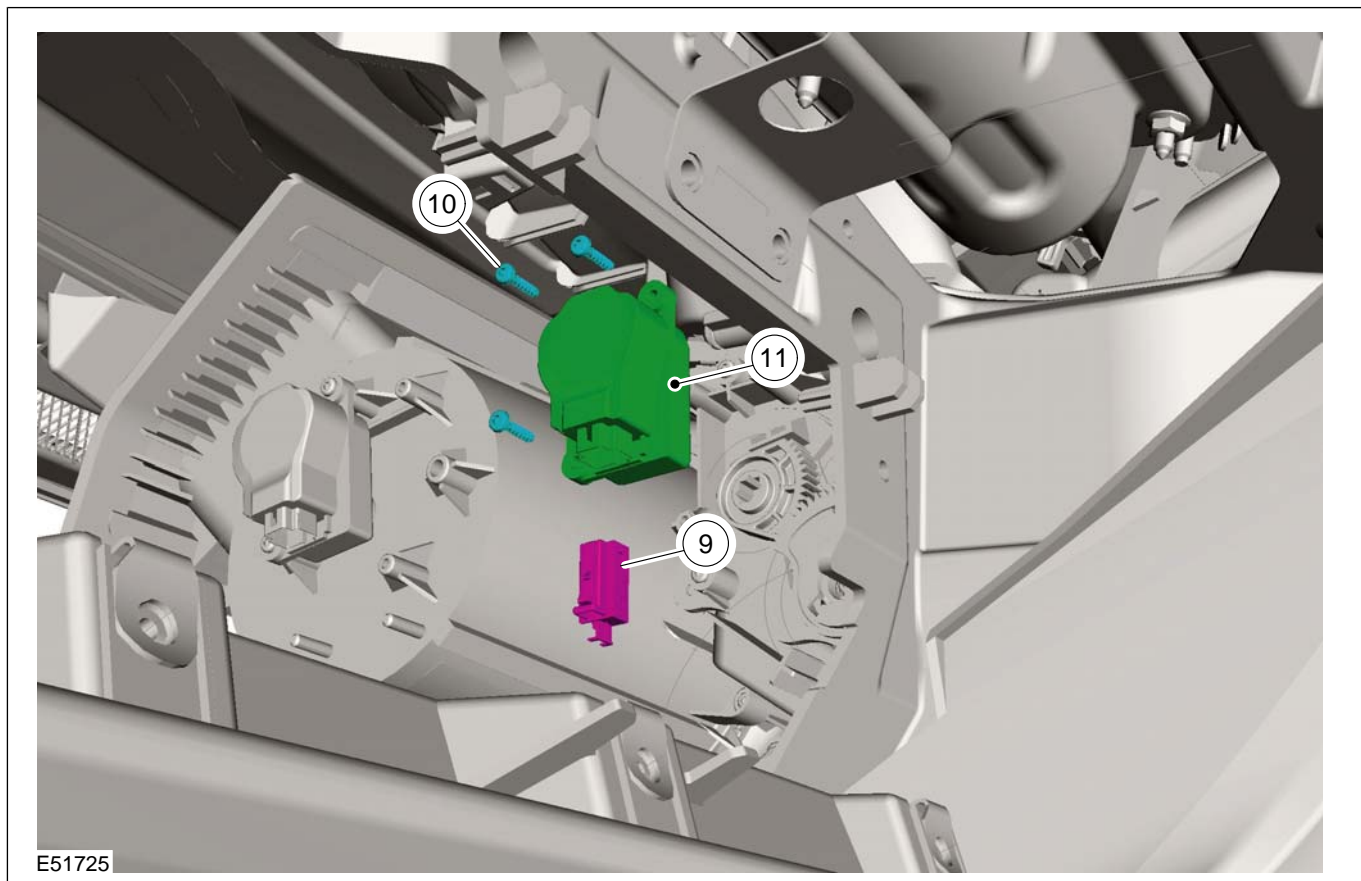
REMOVAL AND INSTALLATION



E52781

Item	Description
7	Opening damper, glove compartment cover (unhook)
8	Glove compartment cover

REMOVAL AND INSTALLATION



E51725

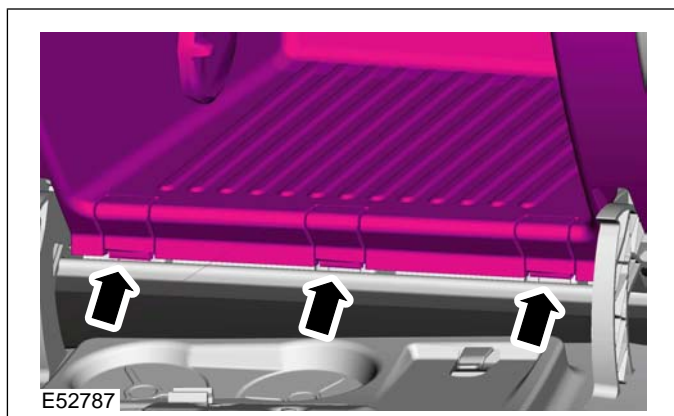
Item	Description
9	Connector, footwell air vent flap actuator
10	Bolts, footwell air vent flap actuator
11	Actuator, footwell air vent flap

2. To install, reverse the removal procedure.

Removal Details

Item 2 Glove compartment screws

1. Fold down the covering caps of the screws for the glove compartment.



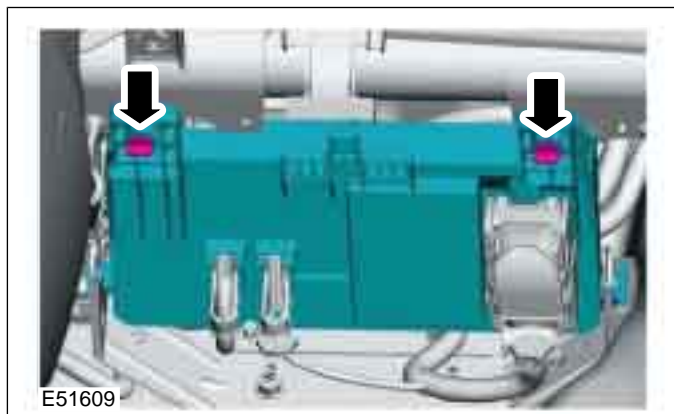
E52787

Item 3 Hose, glove compartment cooling (if equipped)

NOTE: Only vehicles with glove compartment cooling

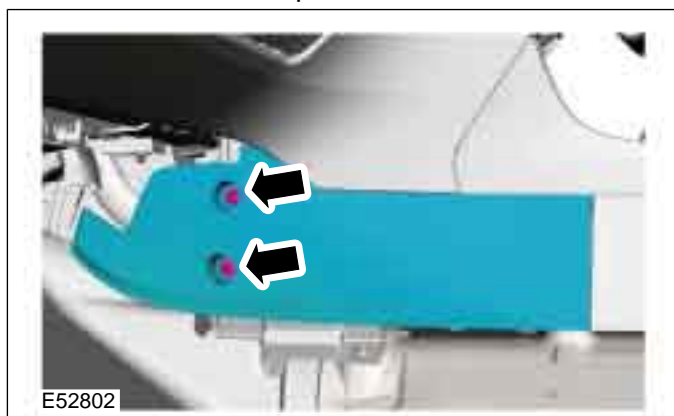
REMOVAL AND INSTALLATION

1. Detach the central junction box (CJB) from the reinforcing element.

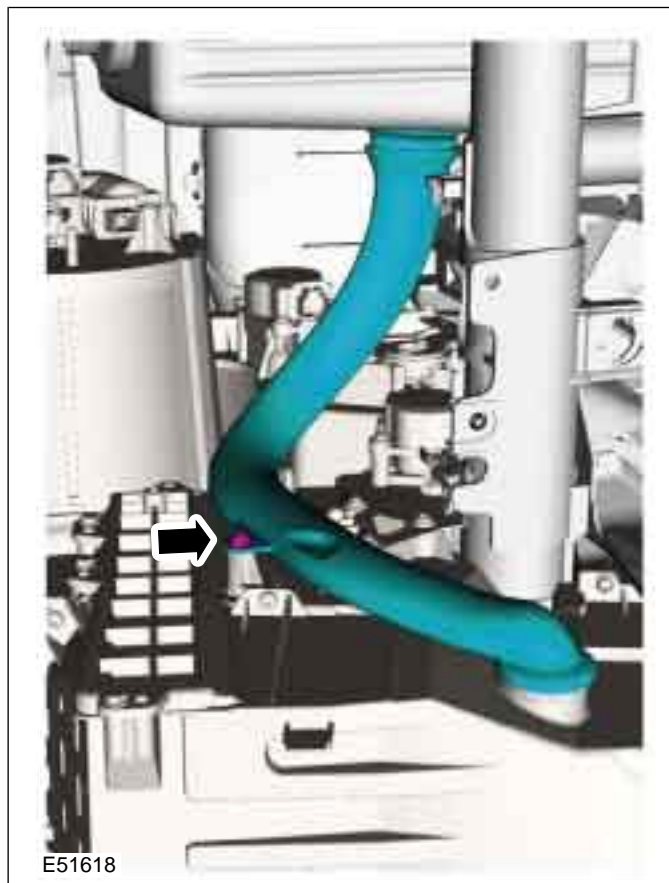


2. Detach the centre console side trim on the left-hand side.

- Remove the caps.

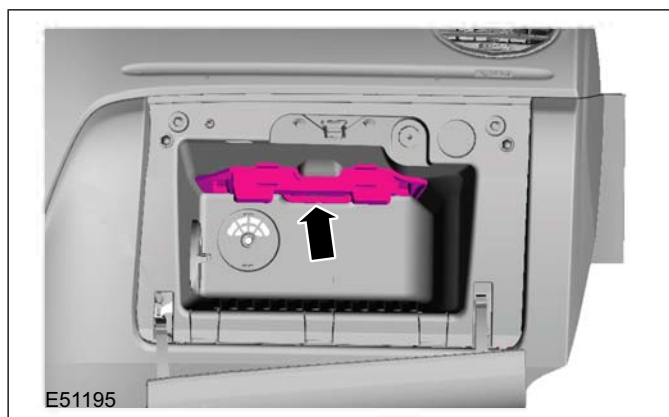


3. Remove the glove compartment cooling hose.



Item 4 Glove compartment

1. Remove the access flap for the navigation system DVD mechanism (if equipped).

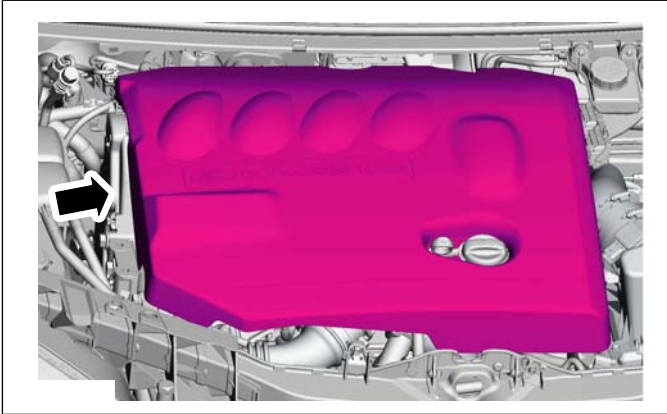


REMOVAL AND INSTALLATION

Temperature Blend Door Actuator

NOTE: Four M10 x 120 mm guide bolts are required for removing the dashboard together with the dashboard crossmember.

1. Remove the engine cover (2.0L diesel shown).



2. Remove the facia crash padding.

For additional information, refer to:

Instrument panel (501-12, Removal and Installation).

3. Remove the A-pillar trim on the right and left-hand sides.

For additional information, refer to:

A-Pillar Trim Panel (501-05, Removal and Installation).

4. Remove the front rocker panel trim on the right and left hand sides.

For additional information, refer to: Front

Scuff Plate Trim Panel (501-05, Removal and Installation).

5. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



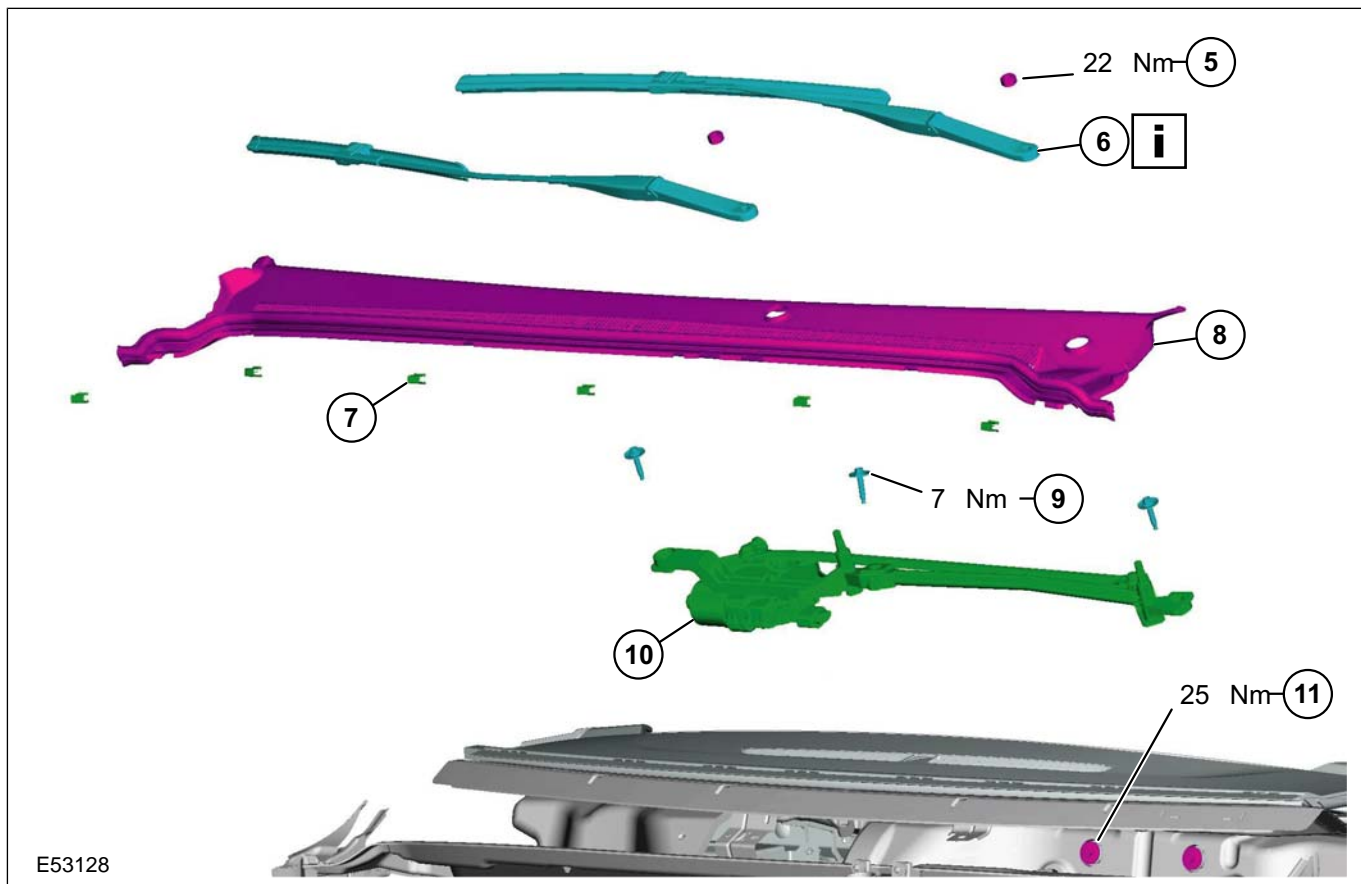
E52944

Item	Description
1	Door check strap bolt
2	Door hinge bolts See Removal Detail See Installation Detail

Item	Description
3	Front doors (driver's door shown) See Removal Detail
4	Dashboard crossmember side bolts See Removal Detail

REMOVAL AND INSTALLATION

⚠ CAUTION: Make sure that the windshield wiper motor is in the park position.

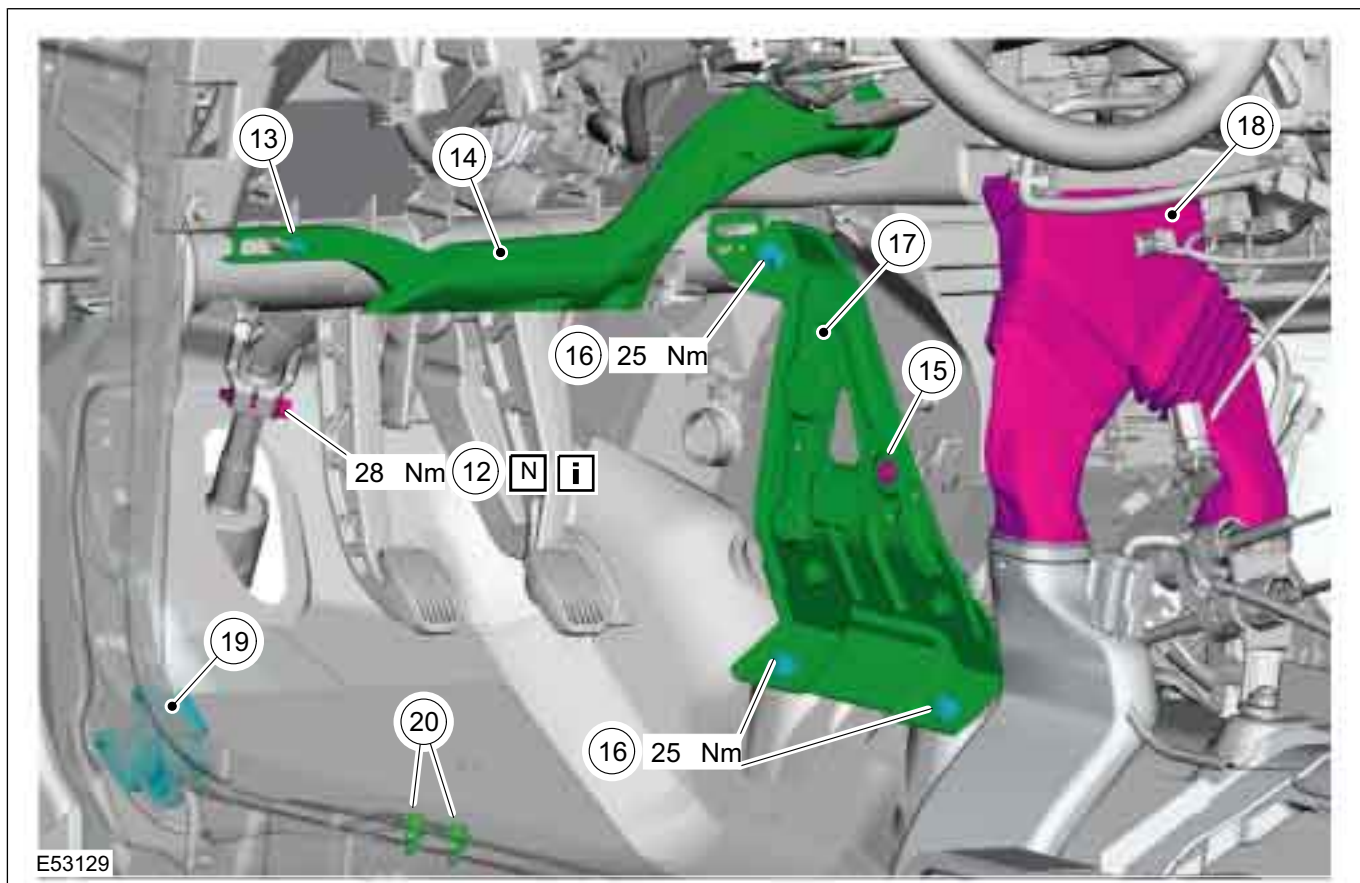


E53128

Item	Description
5	Windshield wiper arm nuts
6	Windshield wiper arms <i>See Installation Detail</i>
7	Clips, cowl panel grille
8	Cowl Panel Grille

Item	Description
9	Bolts for windshield wiper motor with linkage
10	Windshield wiper motor with linkage (secure to the side)
11	Steering column bracket upper bolts

REMOVAL AND INSTALLATION



Item	Description
12	Steering column shaft joint bolt See Installation Detail
13	Bolt, footwell air duct
14	Footwell air duct
15	Bolt, heater core/evaporator housing

Item	Description
16	Bolts, bracket for reinforcing element
17	Bracket, reinforcing element
18	Rear footwell air duct
19	Connector - passenger compartment wiring harness
20	Ground cable bolts

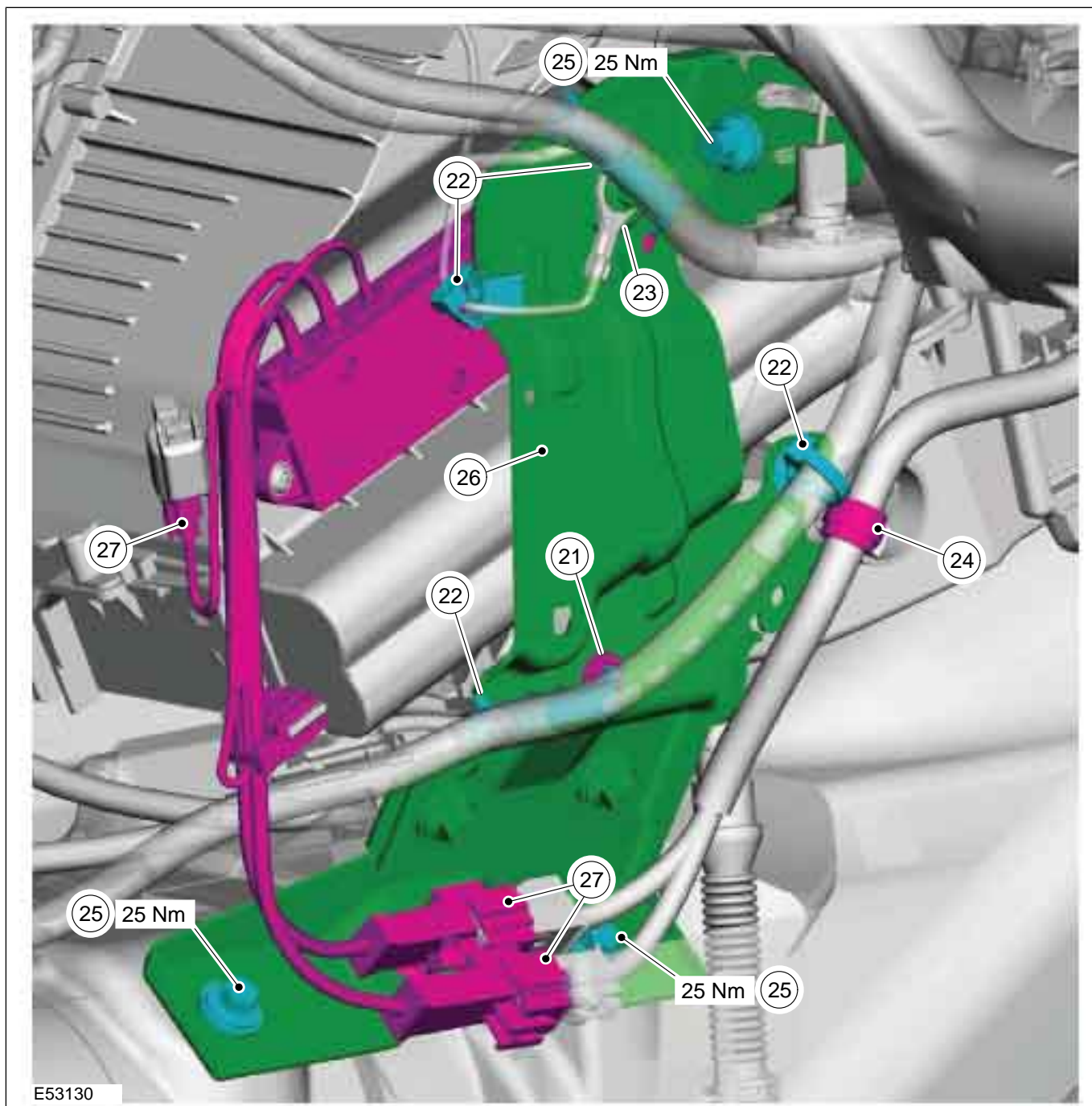
412-04-66

Control Components

412-04-66

REMOVAL AND INSTALLATION

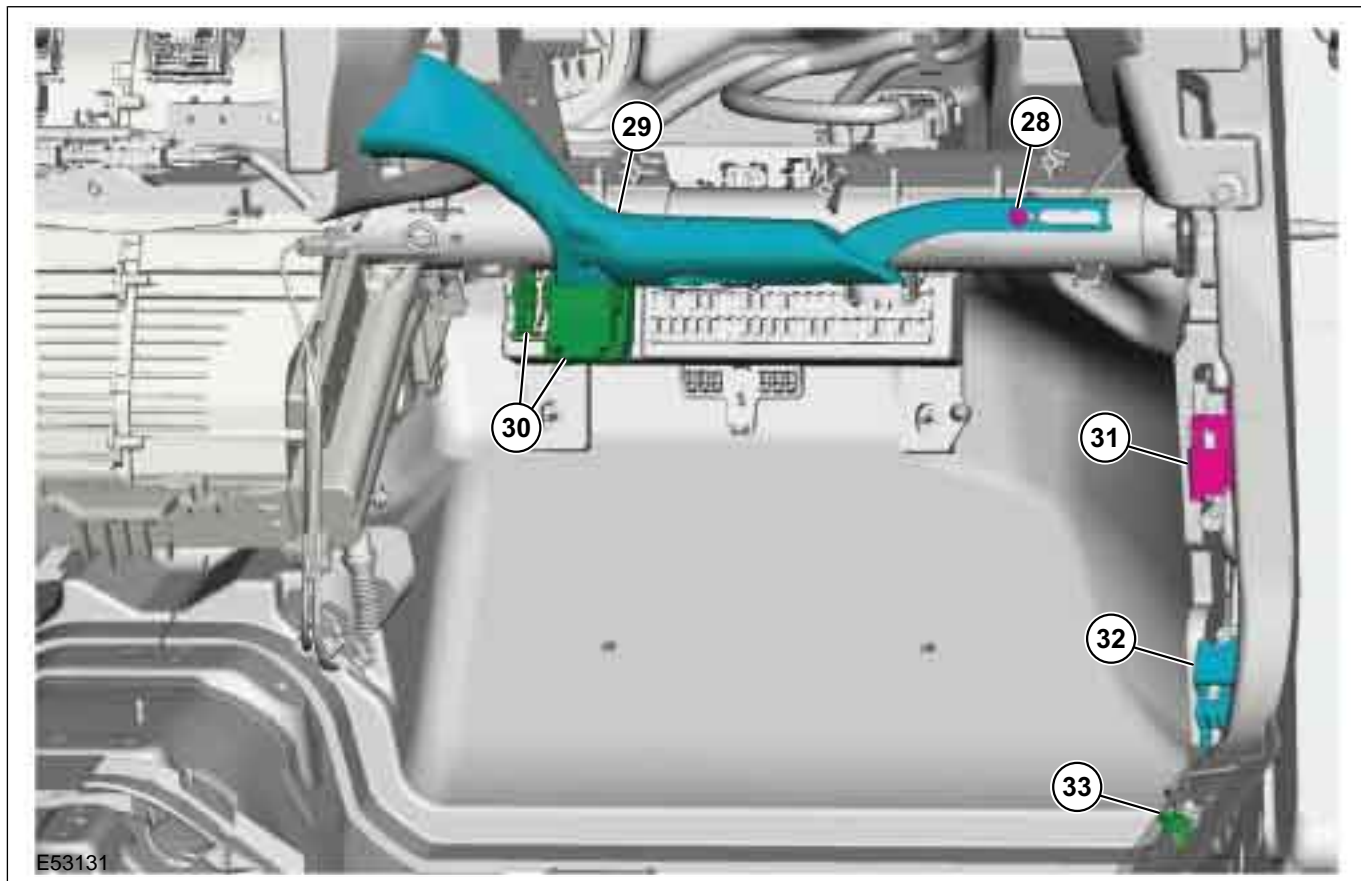
▲ WARNING: Never perform work on the electric booster heater before the electric booster heater element has cooled to ambient temperature. Failure to observe this instruction can lead to injury.



Item	Description
21	Bolt, heater core/evaporator housing
22	Retaining clips, instrument panel wiring harness
23	Ground cable bolt

Item	Description
24	Retaining clip, engine compartment wiring harness (if equipped)
25	Bolts, bracket for reinforcing element
26	Bracket, reinforcing element
27	Connector - electric booster heater (if fitted)

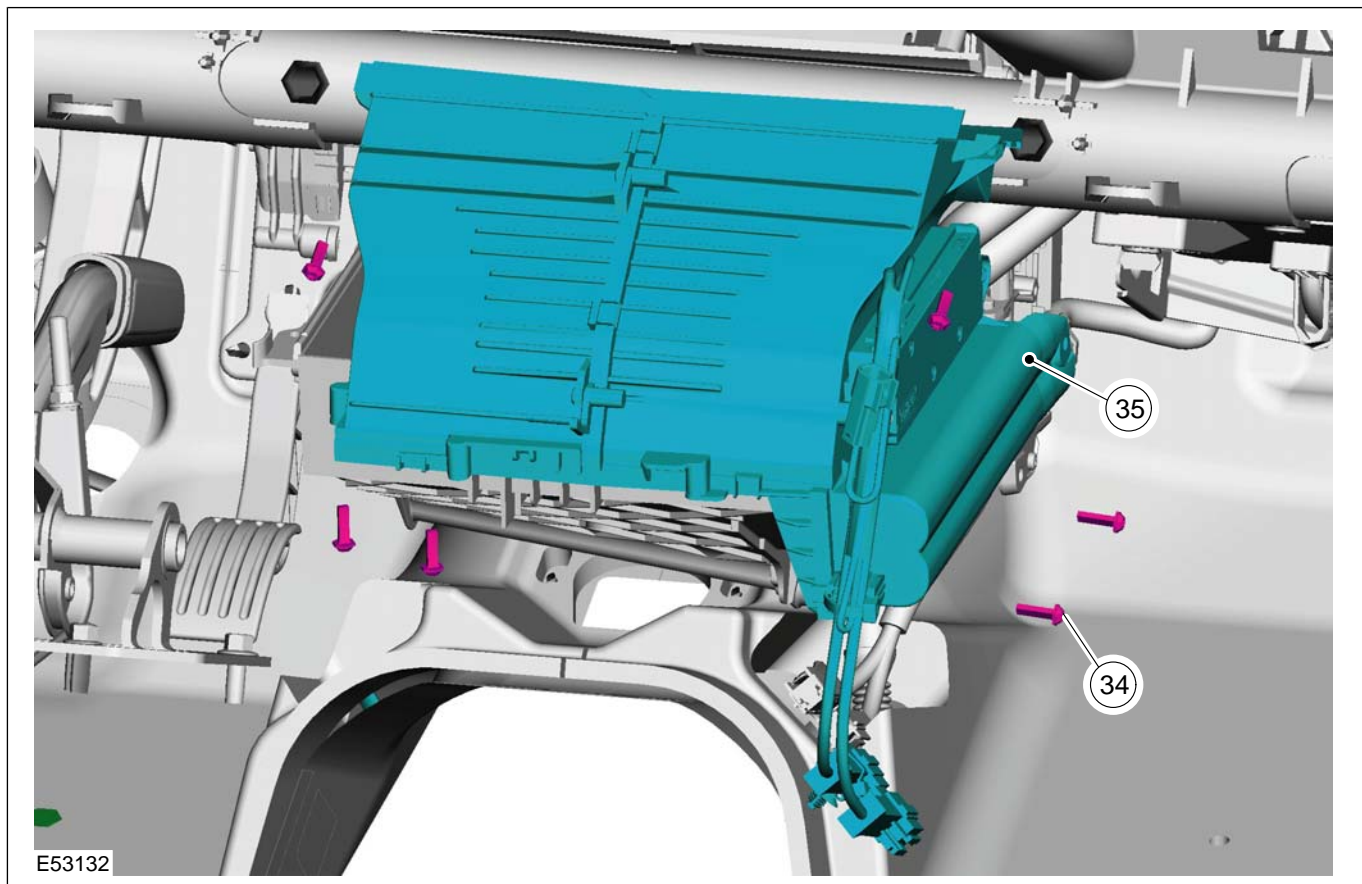
REMOVAL AND INSTALLATION



Item	Description
28	Bolt, footwell air duct
29	Footwell air duct
30	Dashboard wiring harness connector

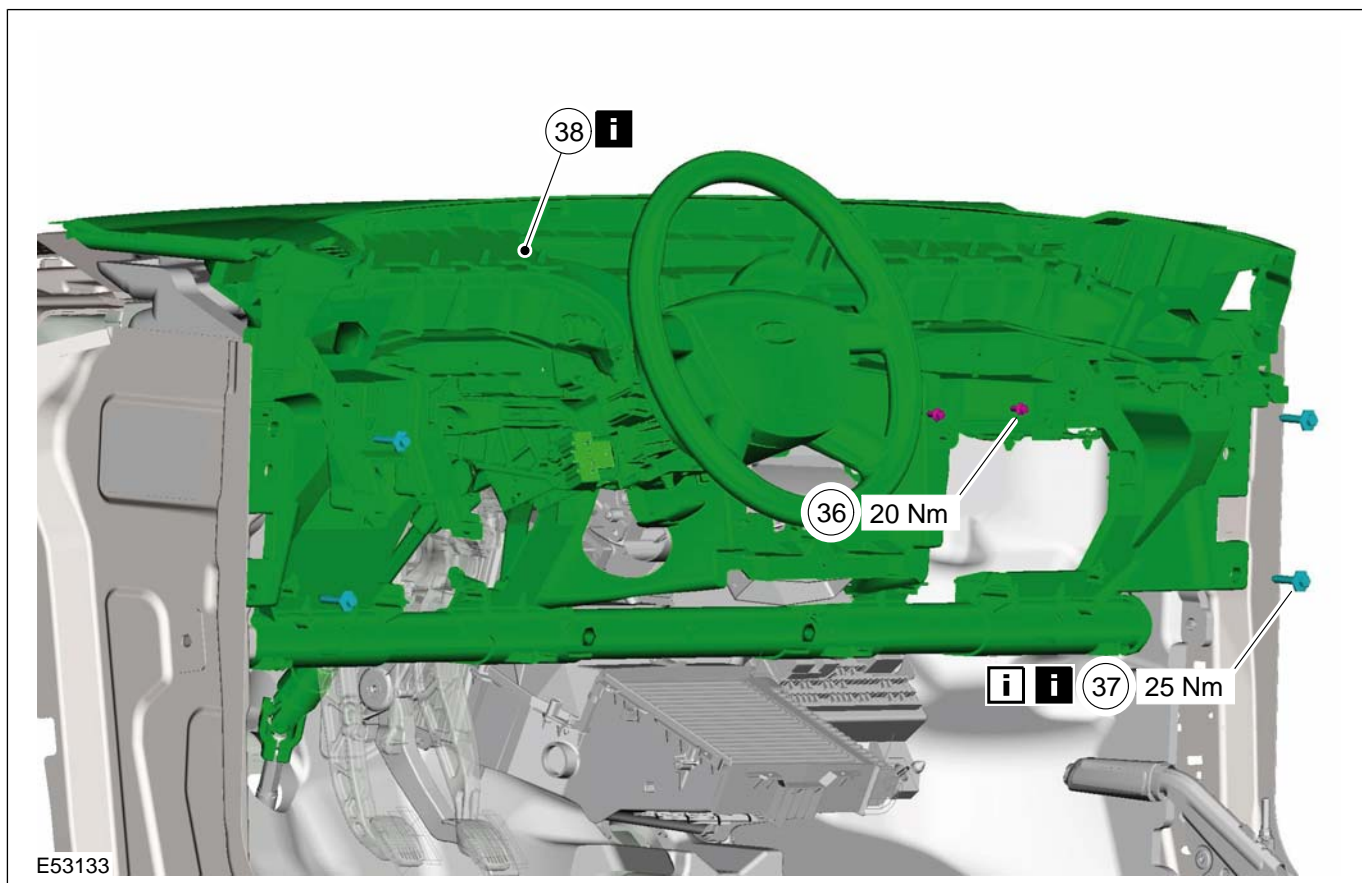
Item	Description
31	Connector - engine compartment wiring harness
32	Connector - passenger compartment wiring harness
33	Ground cable bolt

REMOVAL AND INSTALLATION



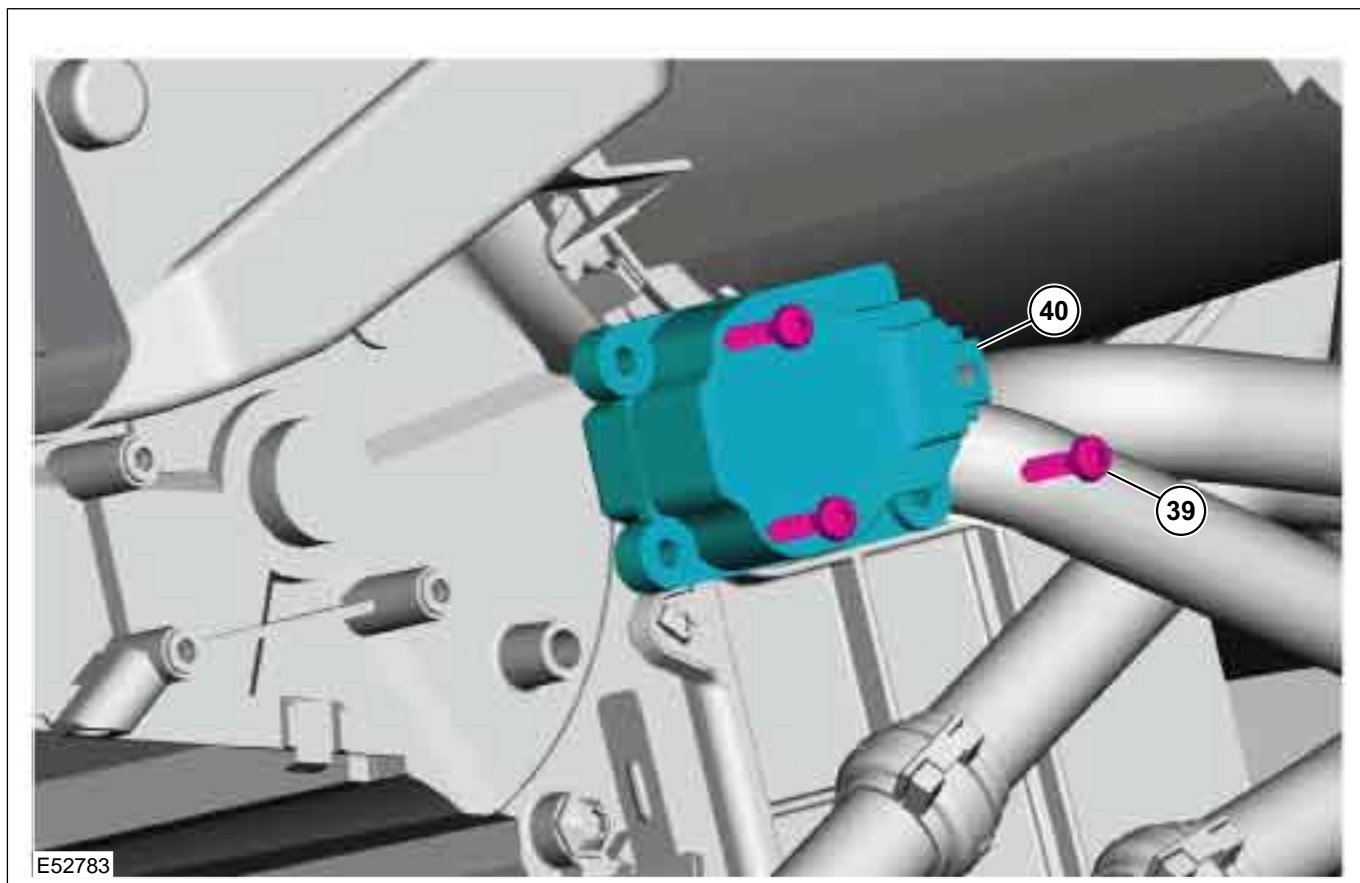
Item	Description
34	Heater core upper cover bolts
35	Heater core upper cover

REMOVAL AND INSTALLATION



Item	Description
36	Dashboard crossmember inner bolts
37	Dashboard crossmember outer bolts See Removal Detail See Installation Detail
38	Dashboard crossmember See Removal Detail

REMOVAL AND INSTALLATION



E52783

Item	Description
39	Bolts, temperature control flap actuator
40	Temperature control flap actuator

6. To install, reverse the removal procedure.

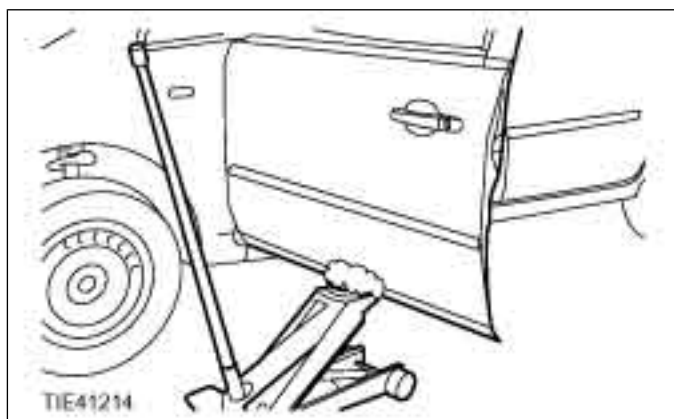
7. Check the angle of the windshield wiper arms in relation to the windshield.

For additional information, refer to: **Windshield Wiper Blade and Pivot Arm Adjustment (501-16, General Procedures)**.

Removal Details

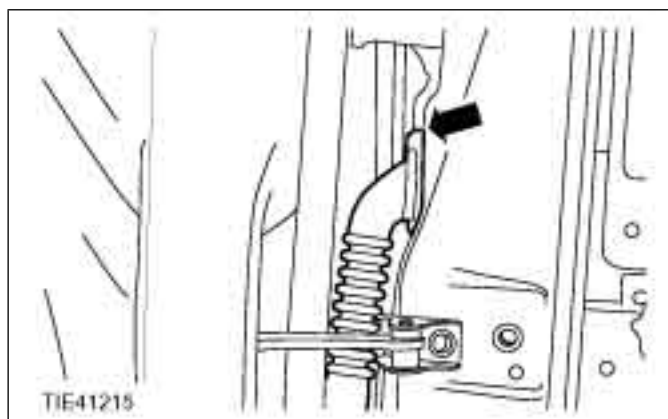
Item 2 Door hinge bolts

1. Support the door using a trolley jack with the aid of another technician.



Item 3 Front doors (driver's door shown)

1. Detach the front door wiring harness connector from the A-pillar.



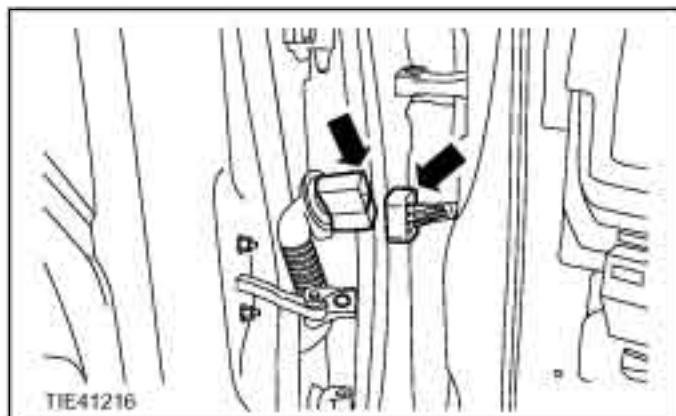
412-04-71

Control Components

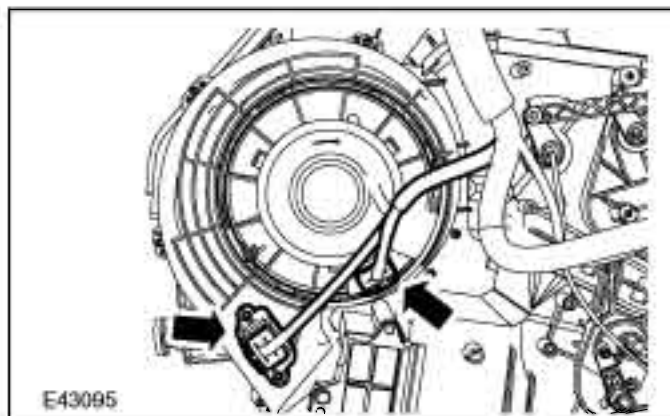
412-04-71

REMOVAL AND INSTALLATION

2. Detach the front door wiring harness connector.



3. Detach the blower resistor connector (if fitted) and the blower motor connector.



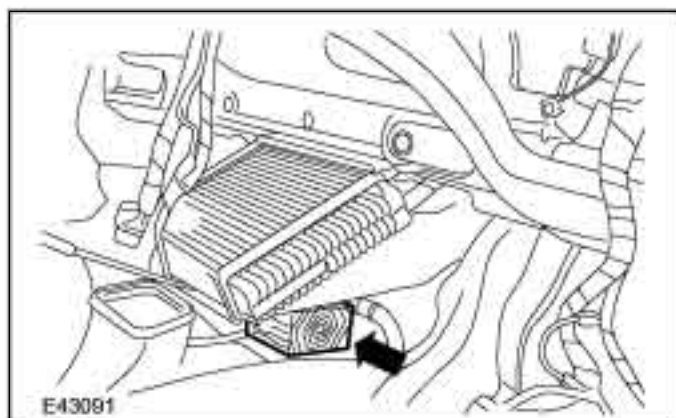
Item 4 Dashboard crossmember side bolts

1. **CAUTION:** Do not remove the dashboard crossmember side bolts.

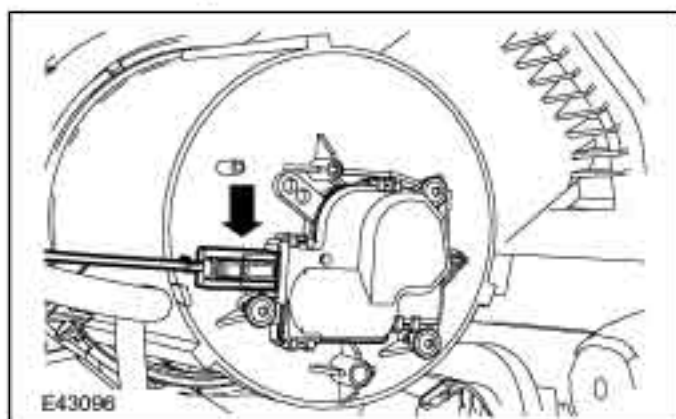
Loosen the dashboard crossmember right and left-hand side bolts.

Item 37 Dashboard crossmember outer bolts

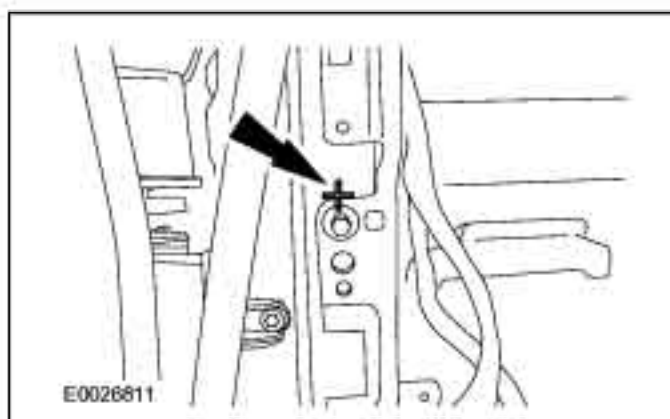
1. Support the heater housing with a wooden block.



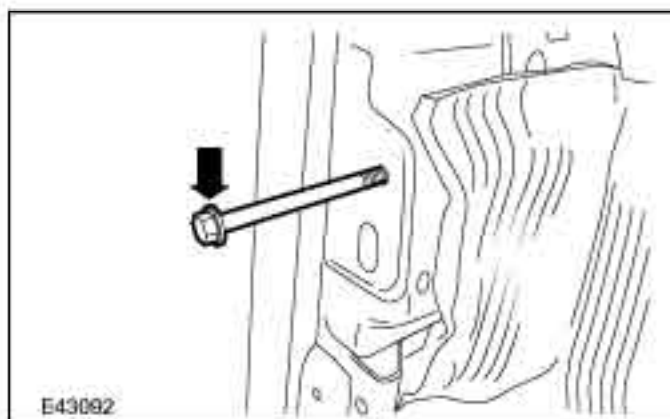
2. Detach the air recirculation flap actuator connector.



4. Mark the position of the dashboard crossmember relative to the A-pillars (left-hand side shown).



5. After removing the outer bolts of the dashboard crossmember, screw in two M10 x 120 mm guide bolts each into the right and left-hand A-pillars (shown without dashboard crossmember for clarity).



6. Remove the right and left-hand side bolts of the dashboard crossmember.

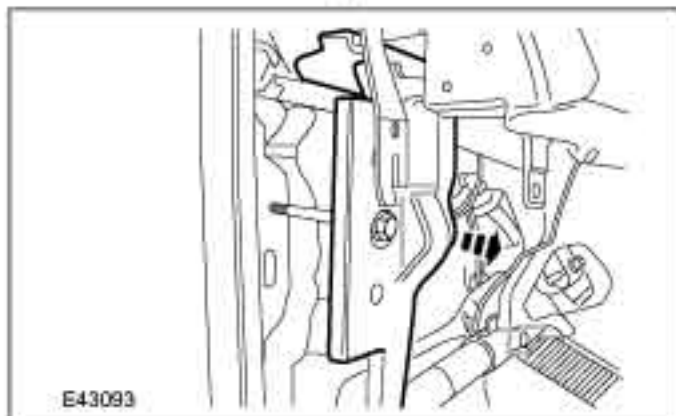
412-04-72

Control Components

412-04-72

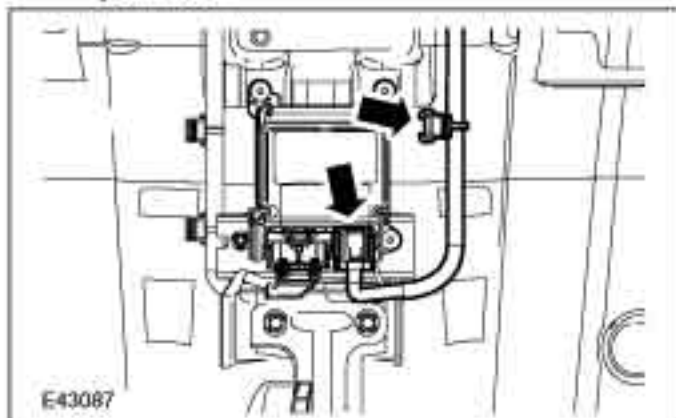
REMOVAL AND INSTALLATION

7. Pull the dashboard crossmember forwards until it reaches a stop.

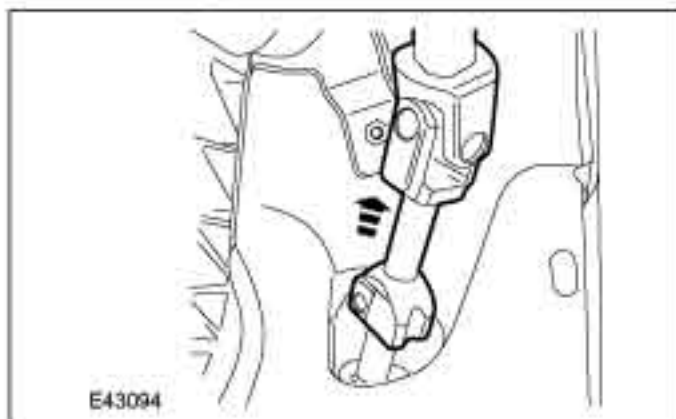


Item 38 Dashboard crossmember

1. Disconnect the connector from the airbag module.
- Unclip the centre console wiring harness and pull it out.

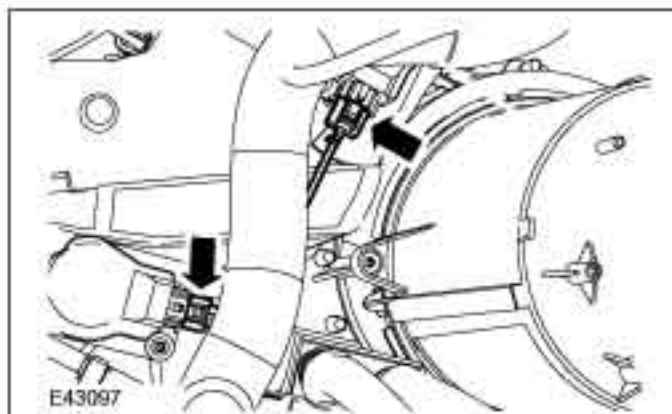


2. Detach the steering column shaft joint from the steering column shaft.



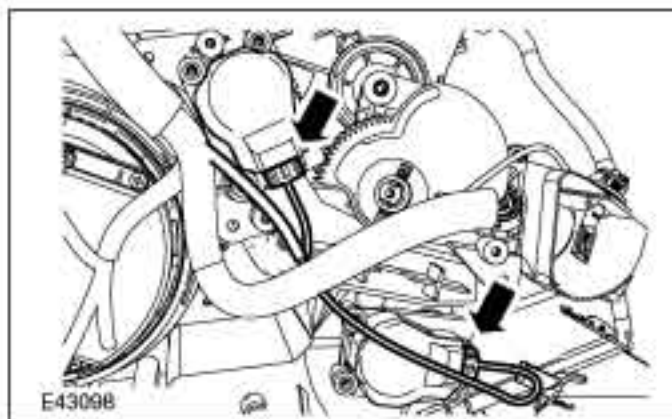
3. NOTE: Vehicles with EATC only

- Detach the right-hand temperature flap actuator connector and the defrost flap actuator connector.



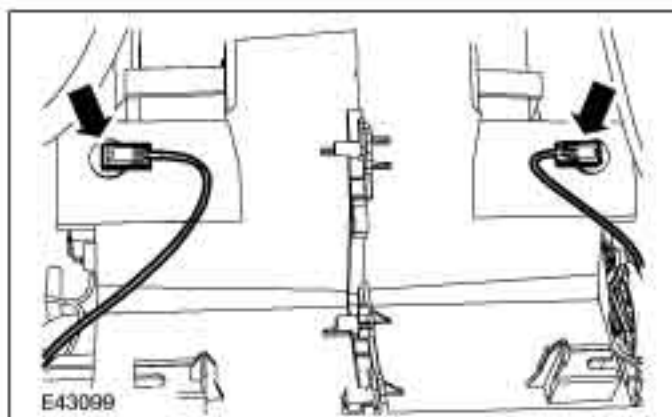
4. NOTE: Vehicles with EATC only

- Detach the left-hand temperature flap actuator connector and the air distribution flap actuator connector.



5. NOTE: Vehicles with EATC only

- Detach the air outlet temperature sensor connector.



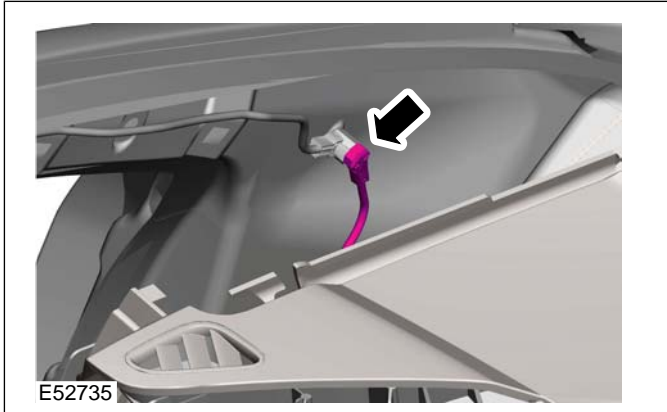
412-04-73

Control Components

412-04-73

REMOVAL AND INSTALLATION

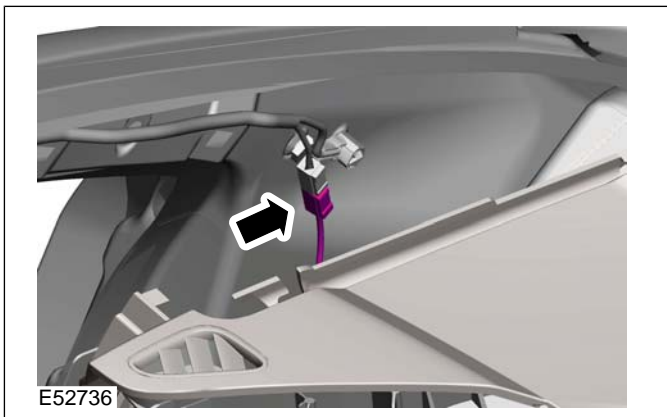
6. Separate the radio antenna cable push-fit connector.



8. Detach the overhead console wiring harness connector.



7. Separate the car telephone antenna cable push-fit connector (if equipped).

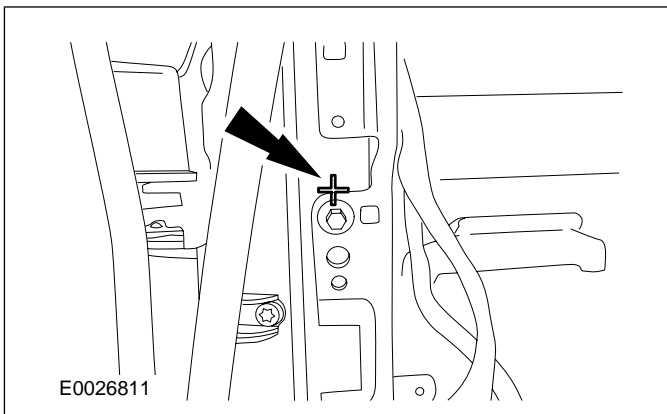


9. Remove the right and left-hand M10 x 120 mm guide bolts.

Installation Details

Item 37 Dashboard crossmember outer bolts

1. Align the dashboard crossmember to the A-pillars (left-hand side shown).



Item 12 Steering column shaft joint bolt

- WARNING:** Install a new steering column shaft joint bolt. Failure to follow this instruction may result in personal injury.

Item 6 Windshield wiper arms

- CAUTION:** Move the windshield wiper motor to the parked position before installing the wiper arms.

Item 2 Door hinge bolts

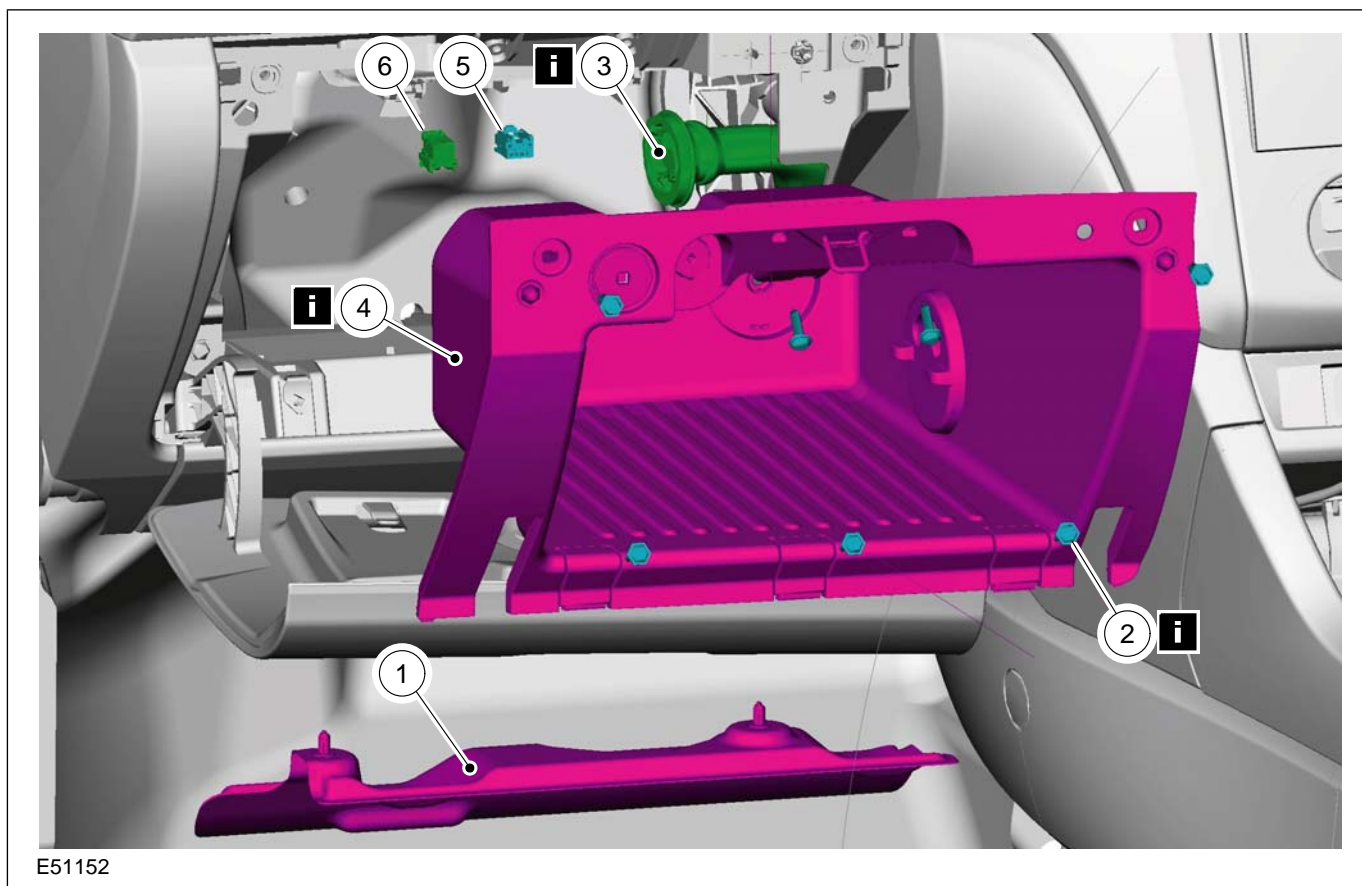
1. Apply thread locking compound to the door hinge bolts.

REMOVAL AND INSTALLATION

Blower Motor Resistor — RHD

1. Remove the components in the order indicated in the following illustration(s) and table(s).

▲ WARNING: Never perform operations on the blower motor resistor before the blower motor resistor has cooled to ambient temperature. Failure to observe this instruction can lead to injury.

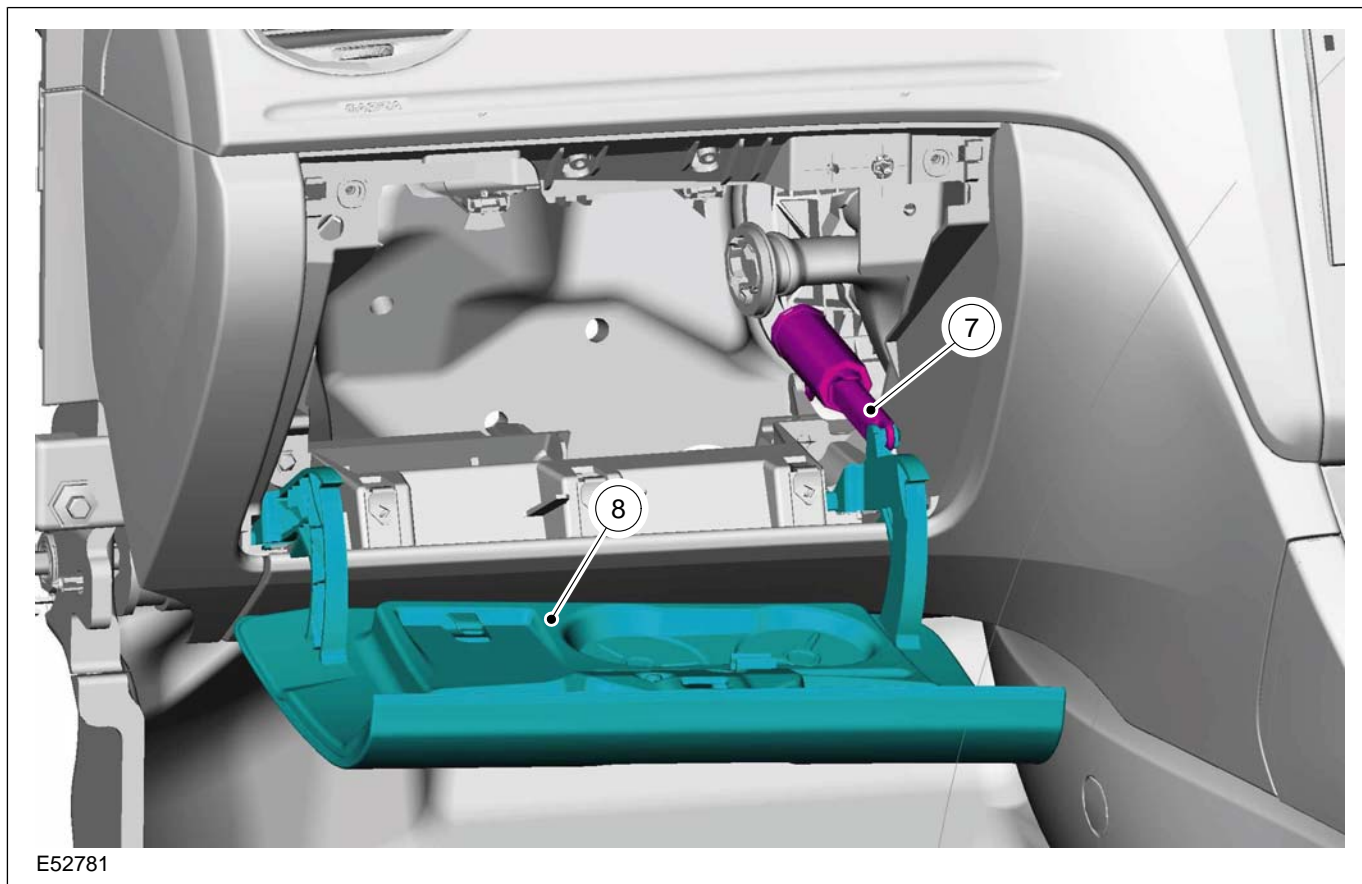


E51152

Item	Description
1	Footwell trim panel
2	Glove compartment screws <i>See Removal Detail</i>
3	Hose, glove compartment cooling (if equipped) <i>See Removal Detail</i>

Item	Description
4	Glove compartment <i>See Removal Detail</i>
5	Electrical connector, additional audio input
6	Passenger air bag deactivation (PAD) switch electrical connector (if equipped)

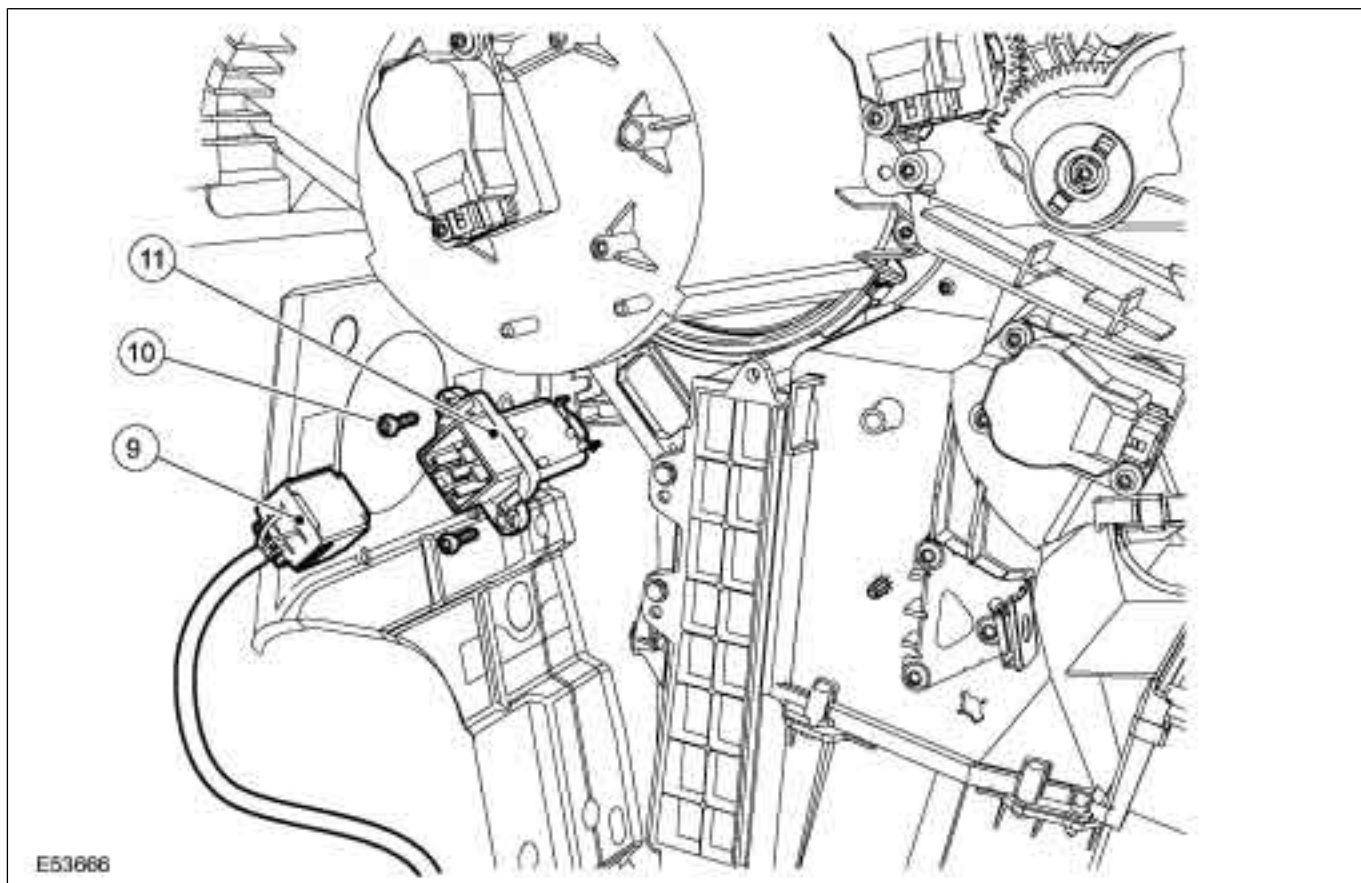
REMOVAL AND INSTALLATION



E52781

Item	Description
7	Opening damper, glove compartment cover (unhook)
8	Glove compartment cover

REMOVAL AND INSTALLATION



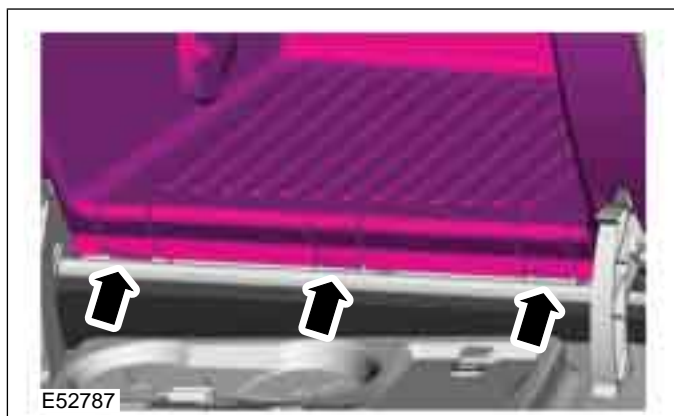
Item	Description
9	Blower motor resistor connector
10	Blower motor resistor bolts
11	Blower motor resistor

2. To install, reverse the removal procedure.

Removal Details

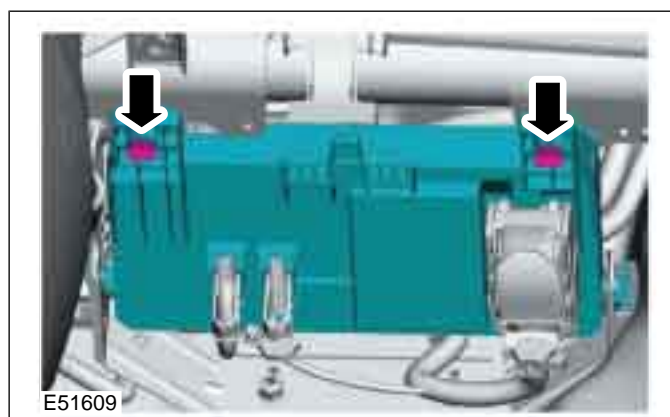
Item 2 Glove compartment screws

1. Fold down the covering caps of the screws for the glove compartment.



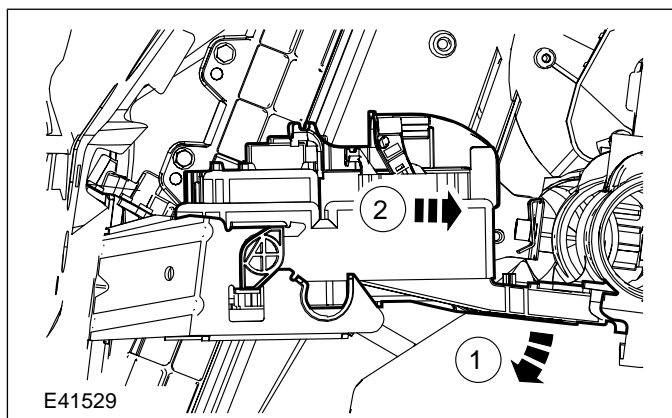
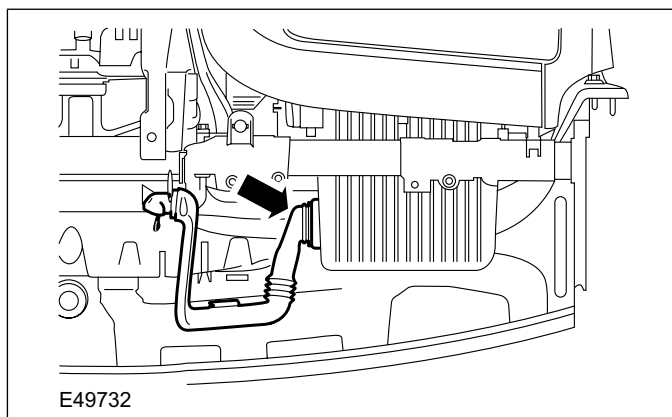
Item 3 Hose, glove compartment cooling (if equipped)

1. Detach the central junction box (CJB) from the reinforcing element.

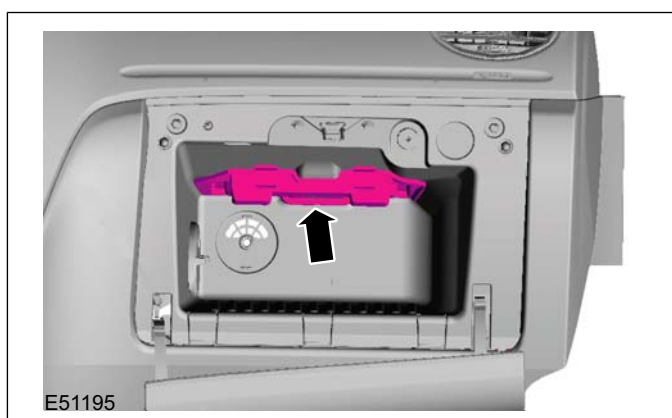


REMOVAL AND INSTALLATION**2. Detach the CJB from the CJB bracket.**

1. Turn the CJB downwards.
2. Pull out the CJB.

**3. Detach the glove compartment cooling hose from the glove compartment.****Item 4 Glove compartment**

1. Remove the access flap for the navigation system DVD mechanism (if equipped).

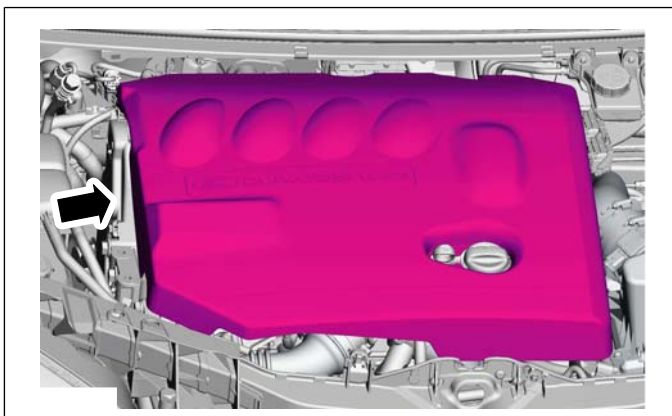


REMOVAL AND INSTALLATION

Blower Motor Resistor — Vehicles Built From: 10/2005, Vehicles
With: Dual Automatic Temperature Control

NOTE: Four guide bolts (M10 x 120 mm) are required for removal of the dash panel together with the dash panel crossmember.

1. Remove the engine cover (2.0L diesel engine shown).



2. Remove the dash panel.

For additional information, refer to:

Instrument panel (501-12, Removal and Installation).

3. Remove the left and right-hand A-pillar trim.

For additional information, refer to: **A-Pillar Trim Panel** (501-05 Interior Trim and Ornamentation, Removal and Installation).

4. Remove the left and right-hand entry trim panel.

For additional information, refer to: **Front Scuff Plate Trim Panel** (501-05 Interior Trim and Ornamentation, Removal and Installation).

5. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



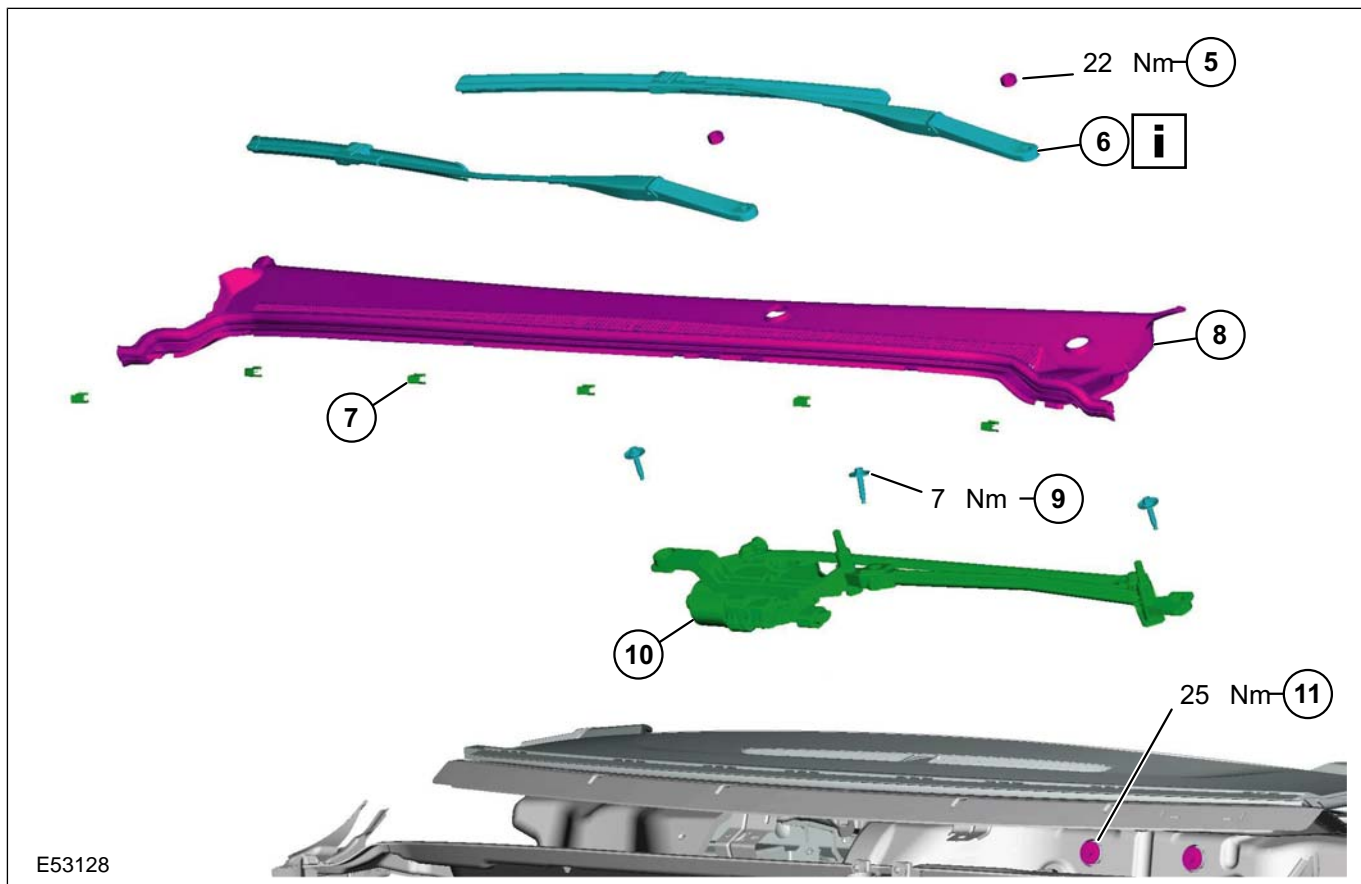
E52944

Item	Description
1	Door arrester bolt
2	Door hinge bolts See Removal Detail See Installation Detail

Item	Description
3	Front doors (driver's door shown) See Removal Detail
4	Side bolts on the dash panel crossmember See Removal Detail

REMOVAL AND INSTALLATION

⚠ CAUTION: Make sure that the windshield wiper motor is in the park position.

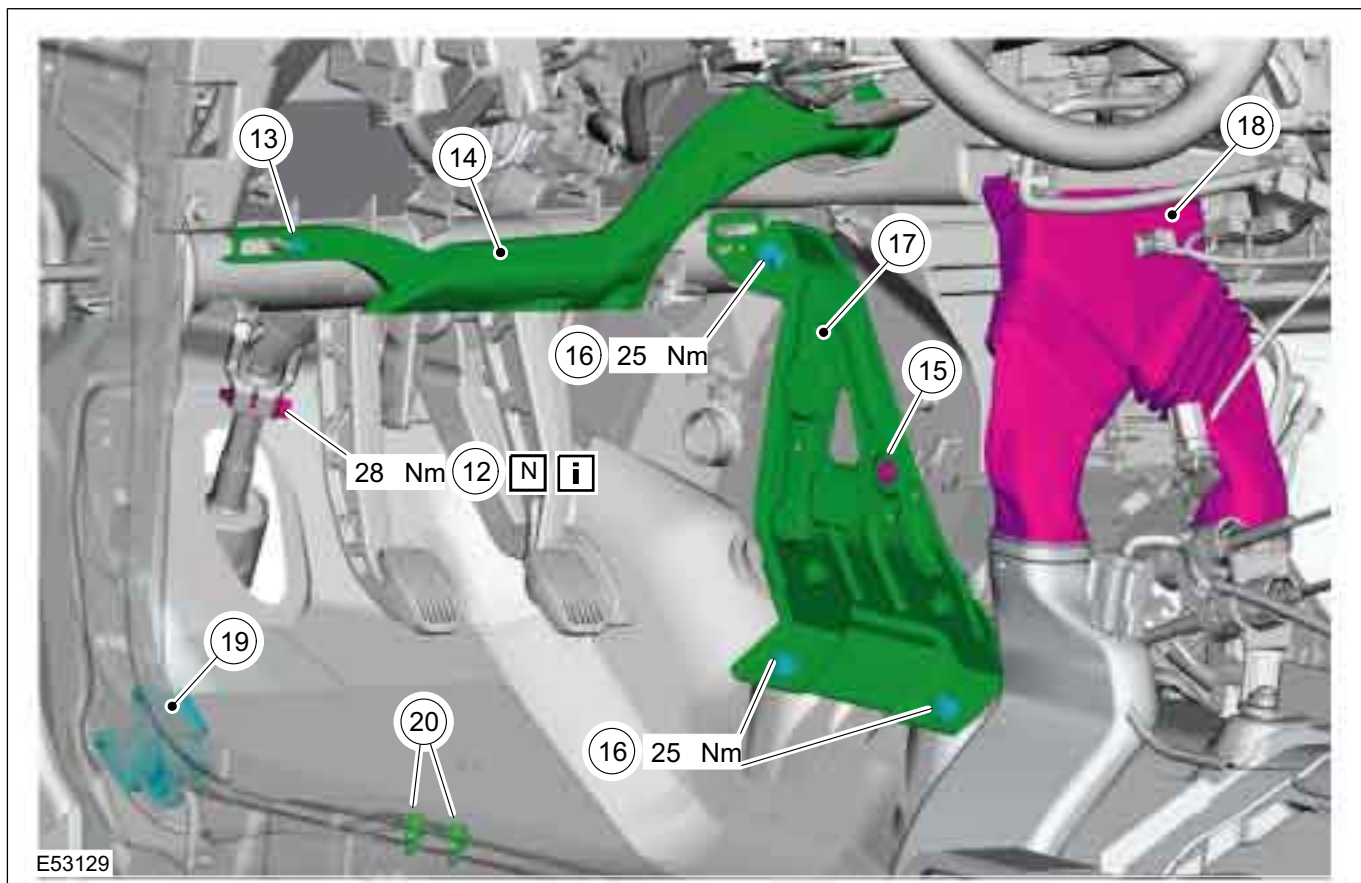


E53128

Item	Description
5	Windshield wiper arm nuts
6	Windshield wiper arms <i>See Installation Detail</i>
7	Cowl screen clips

Item	Description
8	Cowl screen
9	Bolts, windshield wiper motor with linkage
10	Windshield wiper motor with linkage
11	Upper bolts, steering column bracket

REMOVAL AND INSTALLATION



Item	Description
12	Bolts, steering spindle connecting joint See Installation Detail
13	Bolt, footwell air duct
14	Footwell air duct
15	Bolt, heat exchanger/evaporator housing

Item	Description
16	Bolts, reinforcement element holder
17	Reinforcement element holder
18	Air duct, rear footwell
19	Connector, passenger compartment wiring harness
20	Ground cable bolts

REMOVAL AND INSTALLATION

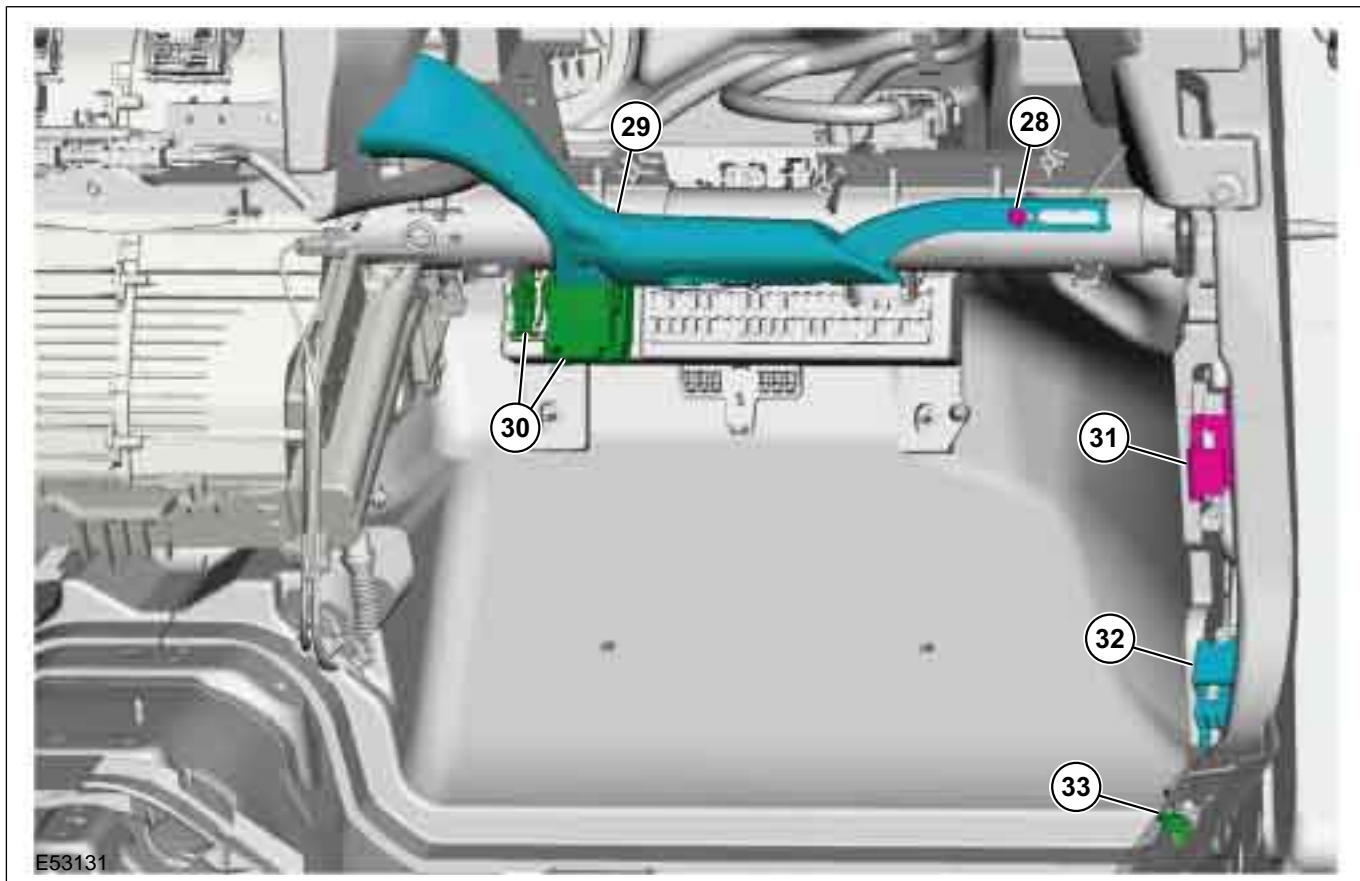
▲ WARNING: Never perform any work on the electric booster heater before the heater element of the electric booster heater has cooled down to normal ambient temperature. Failure to observe this instruction can lead to injury.



Item	Description
21	Bolts, heat exchanger/evaporator housing
22	Retaining clips, instrument panel wiring harness
23	Ground cable bolt

Item	Description
24	Retaining clip, engine compartment wiring harness (if equipped)
25	Bolts, reinforcing element bracket
26	Bracket, reinforcing element
27	Connector - electric booster heater (if equipped)

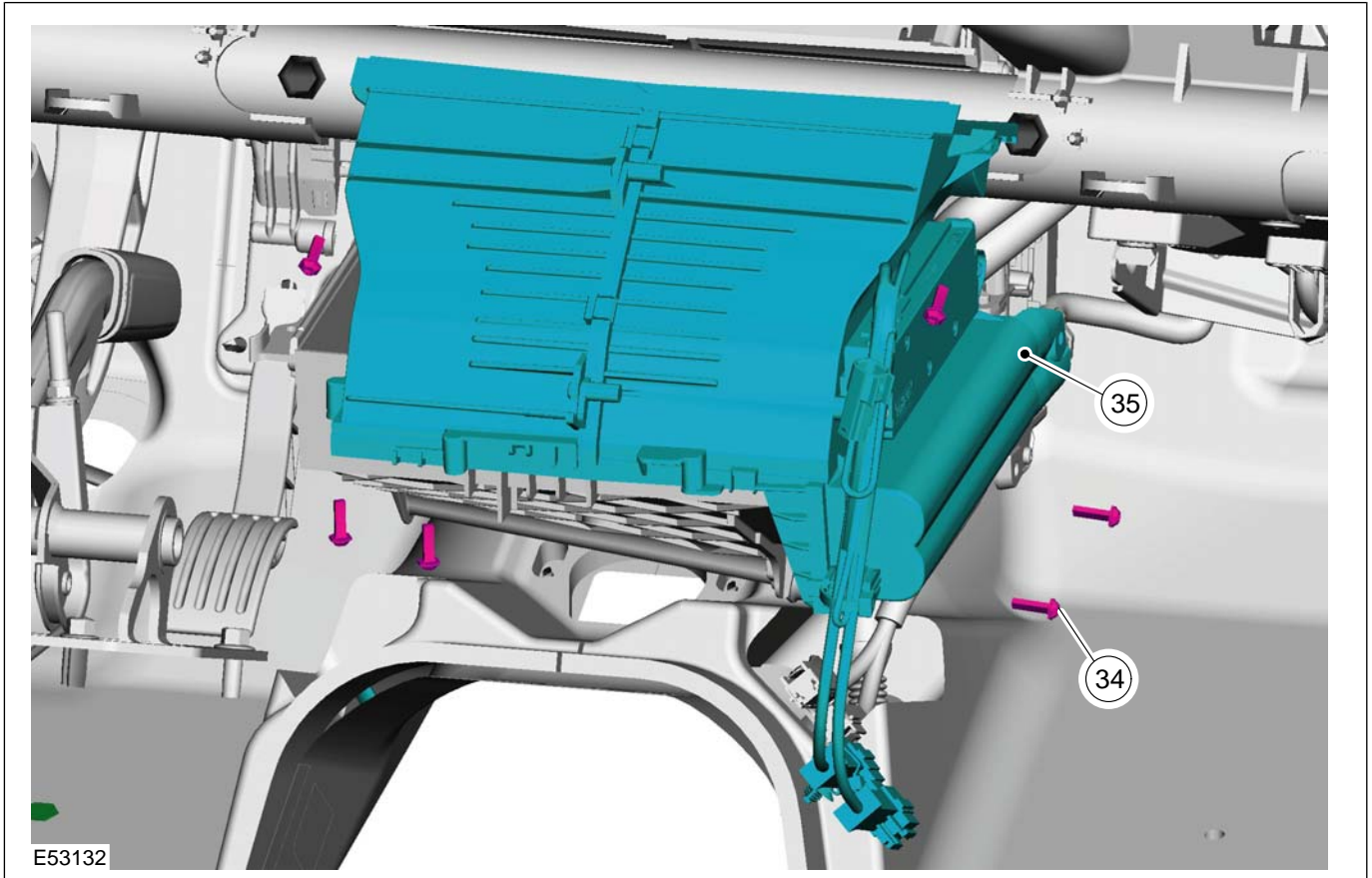
REMOVAL AND INSTALLATION



Item	Description
28	Bolts, footwell air duct
29	Footwell air duct
30	Instrument panel wiring harness connector

Item	Description
31	Connector - engine compartment wiring harness
32	Passenger compartment wiring harness connector
33	Ground wire bolt

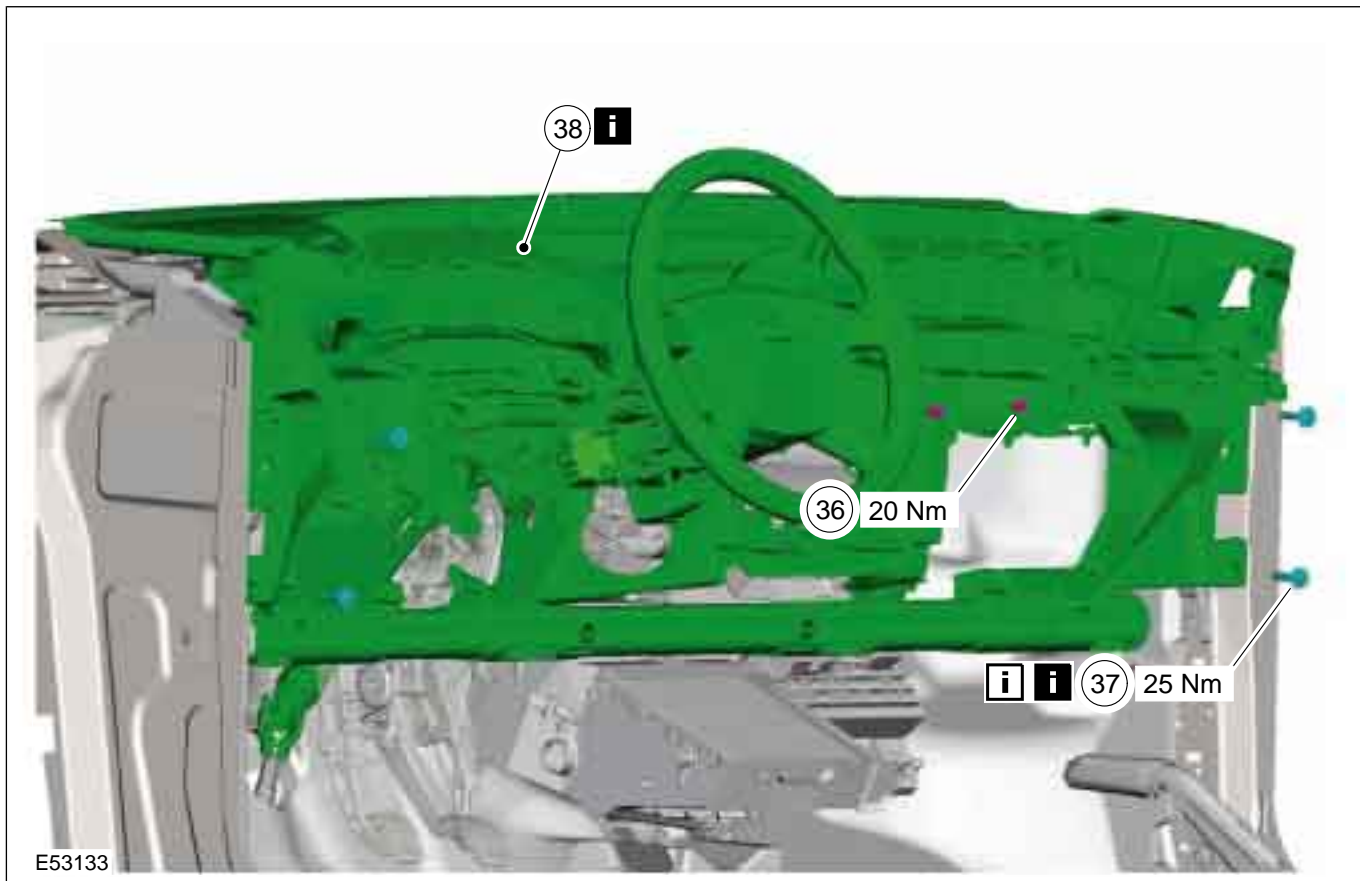
REMOVAL AND INSTALLATION



E53132

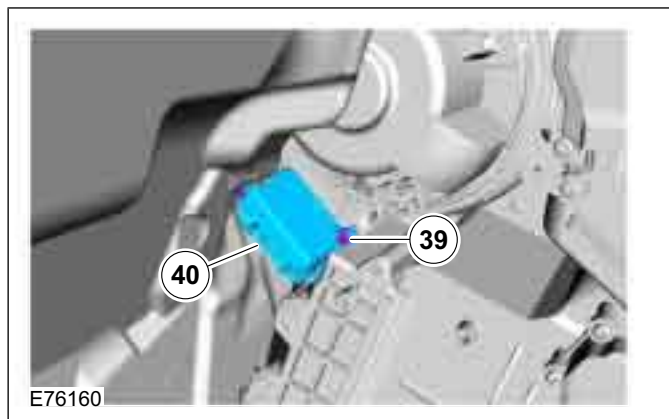
Item	Description
34	Remove the heater core upper cover bolts
35	Heater core upper cover

REMOVAL AND INSTALLATION



E53133

Item	Description
36	Dashboard crossmember inner bolts
37	Dashboard crossmember outer bolts See Removal Detail See Installation Detail
38	Dashboard crossmember See Removal Detail



E76160

Item	Description
39	Blower motor resistor retaining bolts
40	Blower motor resistor

6. To install, reverse the removal procedure.

Removal Details

412-04-86

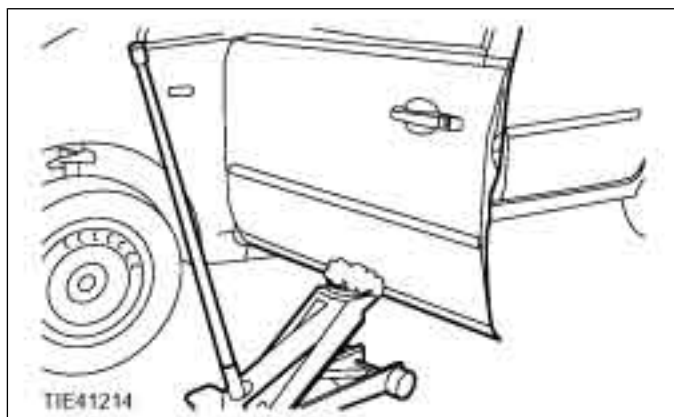
Control Components

412-04-86

REMOVAL AND INSTALLATION

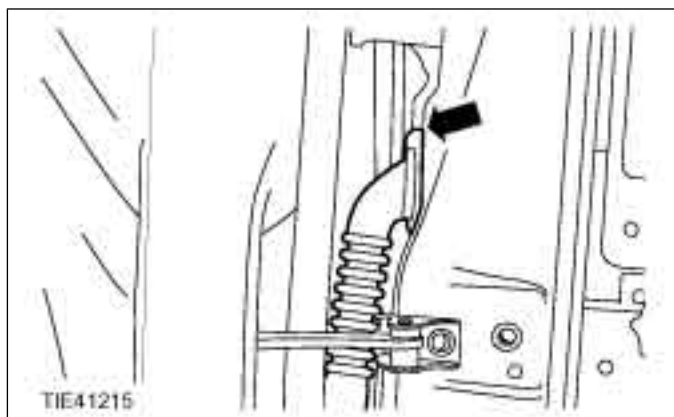
Item 2 Door hinge bolts

1. Support the door using a trolley jack with the aid of another technician.

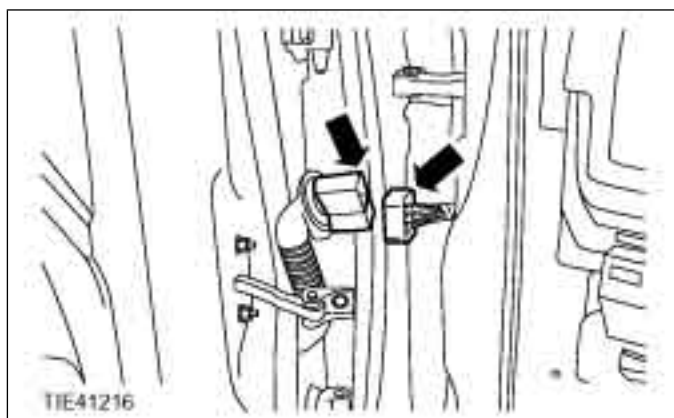


Item 3 Front doors (driver's door shown)

1. Detach the front door wiring harness connector from the A-pillar.



2. Detach the front door wiring harness connector.



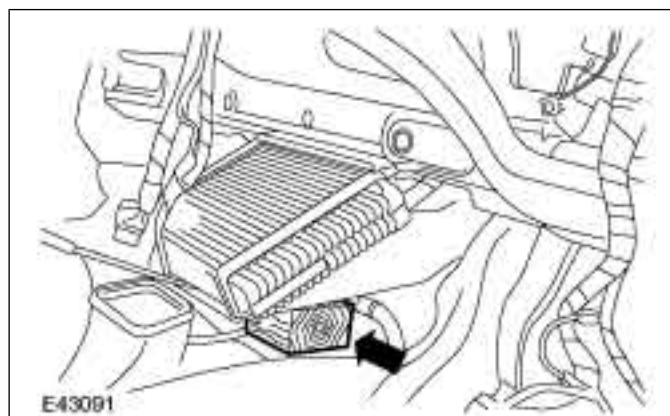
Item 4 Side bolts on the dash panel crossmember

1. **CAUTION:** Do not remove the dashboard crossmember side bolts.

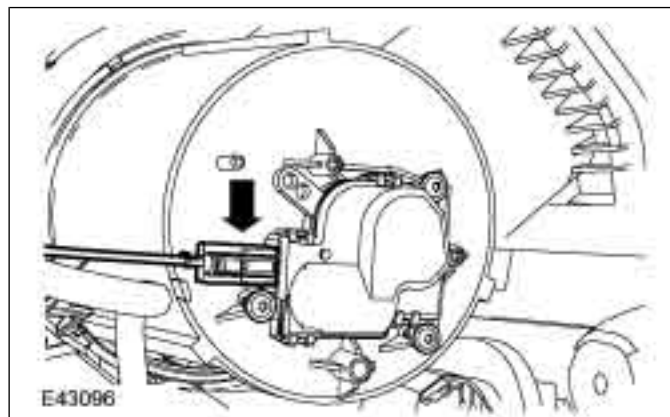
Loosen the dashboard crossmember right and left-hand side bolts.

Item 37 Dashboard crossmember outer bolts

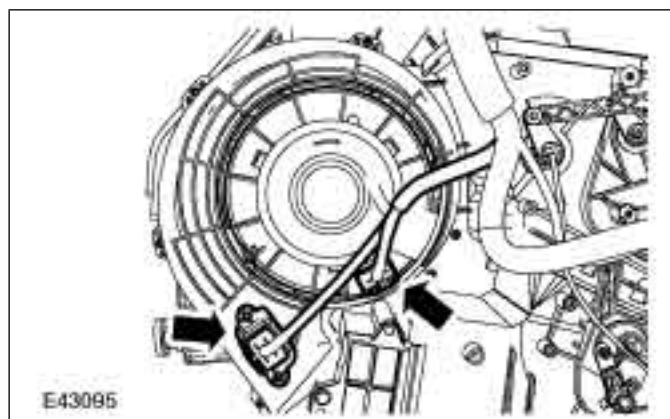
1. Support the heater housing with wooden blocks.



2. Detach the air recirculation flap actuator connector.



3. Disconnect the connector from the blower motor resistor and the connector from the blower motor.



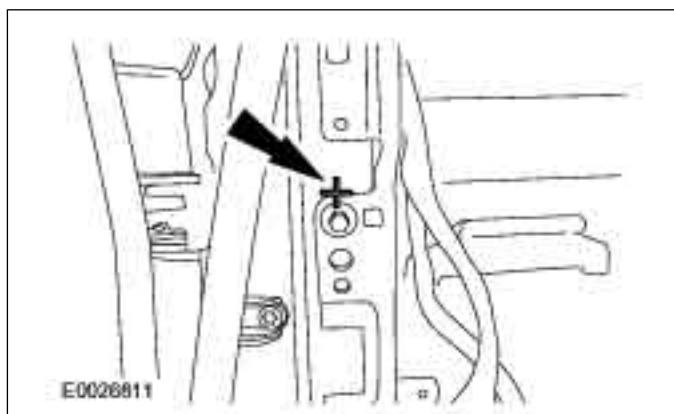
412-04-87

Control Components

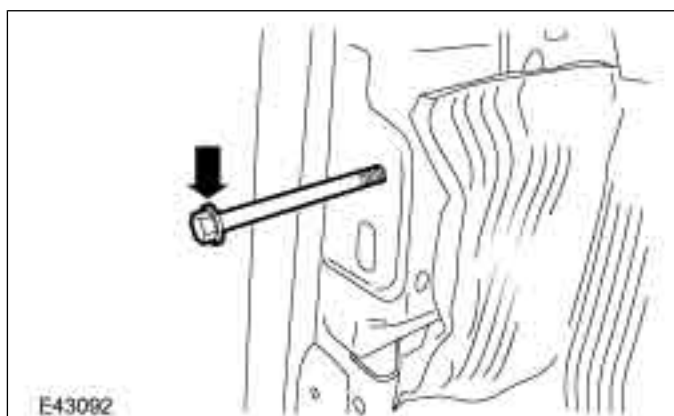
412-04-87

REMOVAL AND INSTALLATION

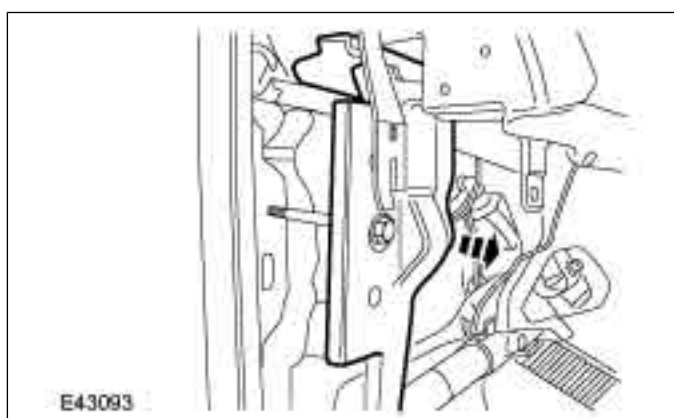
4. Mark the position of the dashboard crossmember relative to the A-pillars (left-hand side shown).



5. After removing the outer bolts of the dashboard crossmember, screw in two M10 x 120 mm guide bolts each into the right and left-hand A-pillars (shown without dashboard crossmember for clarity).



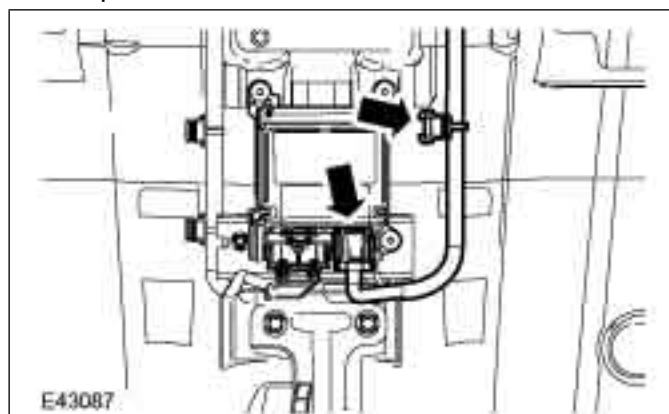
6. Remove the dashboard crossmember right and left-hand side bolts.
7. Pull the dashboard crossmember forwards until it reaches a stop.



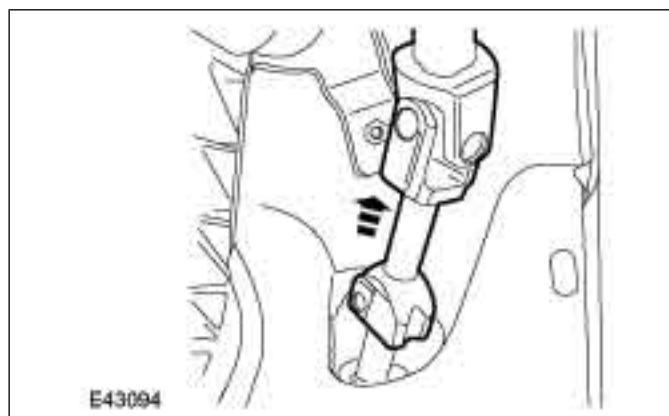
Item 38 Dashboard crossmember

1. Disconnect the airbag module connector.

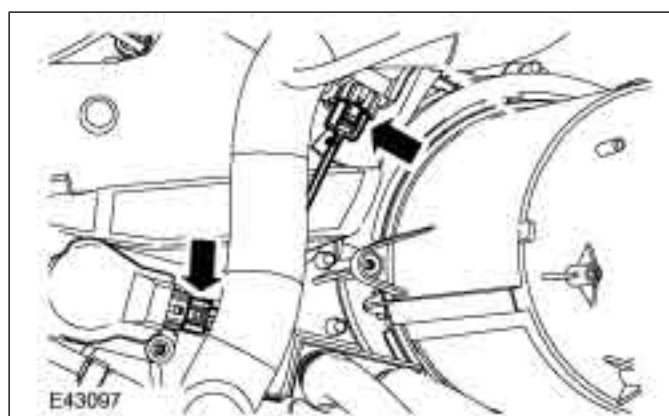
- Unclip the center console wiring harness and pull it out.



2. Detach the steering column shaft joint from the steering column shaft.



3. Detach the right-hand temperature flap actuator connector and the defrost flap actuator connector.



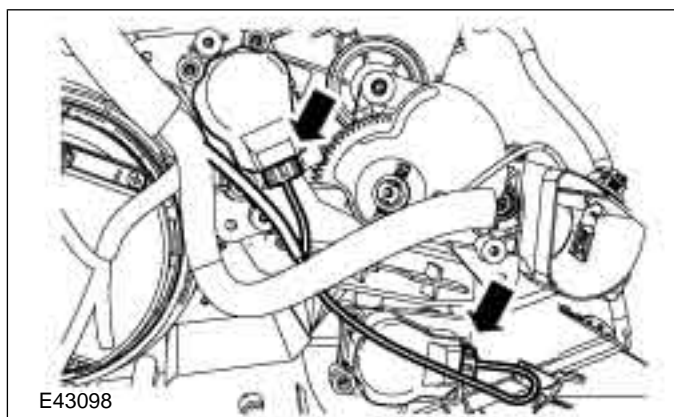
412-04-88

Control Components

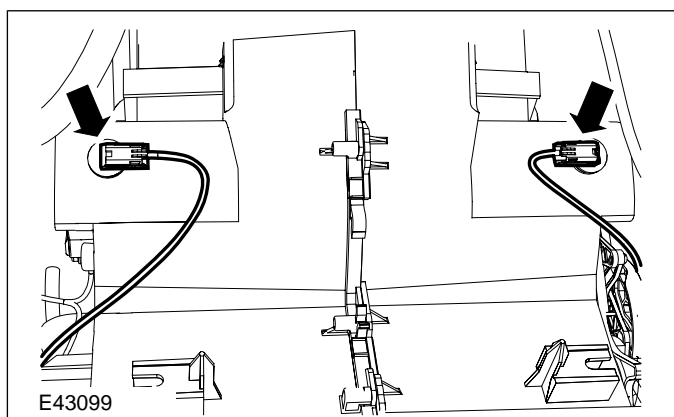
412-04-88

REMOVAL AND INSTALLATION

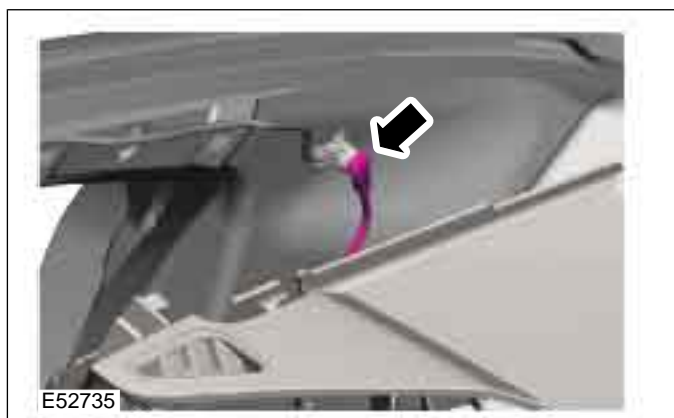
4. Detach the left-hand temperature flap actuator connector and the air distribution flap actuator connector.



5. Detach the air outlet temperature sensor connector.



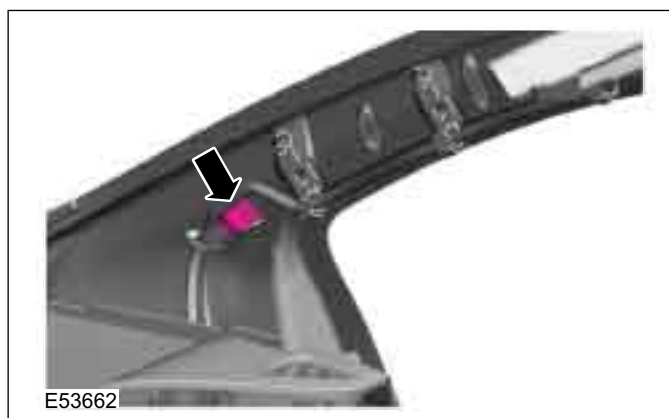
6. Separate the radio antenna cable push-fit connector.



7. Separate the car telephone antenna cable push-fit connector (if equipped).



8. Detach the overhead console wiring harness connector.

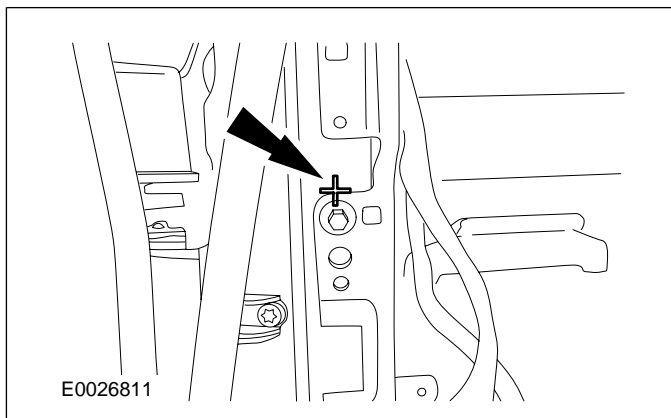


9. Remove the right and left-hand M10 x 120 mm guide bolts.

Installation Details

REMOVAL AND INSTALLATION**Item 37 Dashboard crossmember outer bolts**

1. Align the dashboard crossmember to the A-pillars (left-hand side shown).

**Item 12 Bolts, steering spindle connecting joint**

- WARNING:** Install a new steering column shaft joint bolt. Failure to observe this instruction can lead to injuries.

Item 6 Windshield wiper arms

- CAUTION:** Move the windshield wiper motor to the parked position before installing the wiper arms.

Item 2 Door hinge bolts

1. Apply thread locking compound to the door hinge bolts.



SECTION 413-00 Instrument Cluster and Panel Illumination

VEHICLE APPLICATION:2008.75 Focus ST C307

CONTENTS

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DIAGNOSIS AND TESTING**Instrument Cluster and Panel Illumination**

Refer to Wiring Diagrams Section 413-00, for schematic and connector information.

Principles of Operation

NOTE: A new instrument cluster must be configured.

REFER to: **Instrument Cluster** (413-01 Instrument Cluster, Removal and Installation).

The instrument cluster and panel illumination consists of dimmable and non-dimmable illumination. The dimmable panel illumination is controlled by the panel illumination switch (part of the headlamp switch), which allows the brightness level of the backlights to be adjusted dependent on the customer preference. When the headlamp switch is in the parking lamps ON or headlamps ON position, the intensity of the backlighting can be adjusted using the panel dimmer switch. The non dimmable illumination allows for full intensity dependant on the ignition switch position.

Instrument Cluster and Dimmable Backlighting

The dimmable illumination utilizes light emitting diodes (LEDs) and bulb(s). The following dimmable components are backlight using LEDs only:

- ashtray
- cigar lighter
- transmission control lever
- heater control panel

- audio unit
- navigation system display module
- instrument cluster
- climate control module
- hazard switch
- traction control system disable switch
- right-hand and left-hand heated front seat switch(es)

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> – Engine/engine compartment or underbody components – Fluid levels – Accessory installation 	<ul style="list-style-type: none"> – Fuse(s) – Loose or corroded connector(s) – Instrument cluster – Wiring Harness – Circuit – LED(s) – Bulb(s)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Symptom Chart**Symptom Chart**

Symptom	Possible Sources	Action
• The control illumination is inoperative	<ul style="list-style-type: none"> • Fuse. • Headlamp switch. • Circuit. 	• GO to Pinpoint Test A.
• The Instrument cluster illumination is inoperative	<ul style="list-style-type: none"> • Circuit(s). • Instrument cluster. 	• GO to Pinpoint Test B.
• The climate control illumination is inoperative	<ul style="list-style-type: none"> • Circuit(s). • Climate control assembly. 	• GO to Pinpoint Test C.
• The audio system illumination is inoperative	<ul style="list-style-type: none"> • Circuit(s). • Audio unit. 	• GO to Pinpoint Test D.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
• The navigation system display module illumination (vehicles with DVD Navigation System with Touchscreen) is inoperative	• Circuit(s). • Navigation system display module.	• GO to Pinpoint Test E.
• The gearshift illumination is inoperative	• Circuit(s). • Transmission Selector Lever.	• GO to Pinpoint Test F.
• The cigar lighter illumination is inoperative	• Circuit(s). • Cigar lighter.	• GO to Pinpoint Test G.
• The traction control switch illumination is inoperative	• Circuit(s). • Traction control switch.	• GO to Pinpoint Test H.
• The hazard switch illumination is inoperative	• Circuit(s). • Hazard switch.	• GO to Pinpoint Test I.
• The front seat heater switch(es) illumination is inoperative	• Circuit(s). • Front seat heater switch(es).	• GO to Pinpoint Test J.
• The front window defrost switch illumination is inoperative	• Circuit(s). • Front window defrost switch.	• GO to Pinpoint Test K.
• The rear window defrost switch illumination is inoperative	• Circuit(s). • Rear window defrost switch.	• GO to Pinpoint Test L.
• The rear auxiliary audio control illumination is inoperative	• Circuit(s). • Rear auxiliary audio control.	• GO to Pinpoint Test M.
• The instrument panel illumination does not dim	• Dimmer switch.	• INSTALL a new head-lamp/dimmer switch unit.

Pinpoint Tests

NOTE: Use a digital multimeter for all electrical measurements.

PINPOINT TEST A : THE CONTROL ILLUMINATION IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK PARKING LAMP OPERATION	
	1 Ignition switch in position 0.

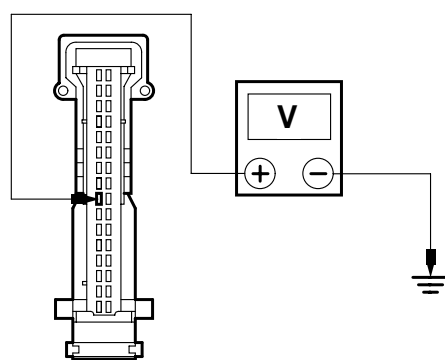
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Place the side lamps in the ON position.</p> <ul style="list-style-type: none"> Do the side lamps and license plate lamps illuminate? <p>→ Yes INSTALL a new headlamp switch. TEST the system for normal operation.</p> <p>→ No CHECK fuse F49 (10A). If the fuse is OK then diagnose exterior lighting.</p> <p>REFER to: Headlamps - 3-Door (417-01 Exterior Lighting, Diagnosis and Testing). If the fuse has failed, INSTALL a new fuse. TEST the system for normal operation. If the fuse fails again, CHECK for a short to ground, REPAIR as necessary.</p>

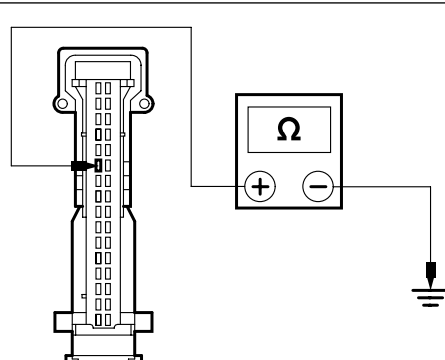
PINPOINT TEST B : THE INSTRUMENT CLUSTER ILLUMINATION IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK THE INSTRUMENT CLUSTER ILLUMINATION	
	<p>1 Place the headlamp switch in the headlamps ON position.</p> <ul style="list-style-type: none"> Is only the instrument cluster illumination inoperative? <p>→ Yes Place the headlamp switch in the OFF position. GO to B2.</p> <p>→ No If the exterior lighting is inoperative, REFER to: Headlamps - 3-Door (417-01 Exterior Lighting, Diagnosis and Testing). If all of the control illumination is inoperative, GO to Pinpoint Test A.</p>
B2: CHECK CIRCUIT 29S-GG14 (OG) FOR VOLTAGE	
	<p>1 Disconnect Instrument Cluster C809.</p> <p>2 Make sure that the illumination dimmer switch is in the full illumination position.</p> <p>3 Place the headlamp switch in the headlamp ON position.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E44987</p>	<p>4 Measure the voltage between the instrument cluster C809 pin 9, circuit 29S-GG14 (OG), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to B3. → No REPAIR the circuit. TEST the system for normal operation.

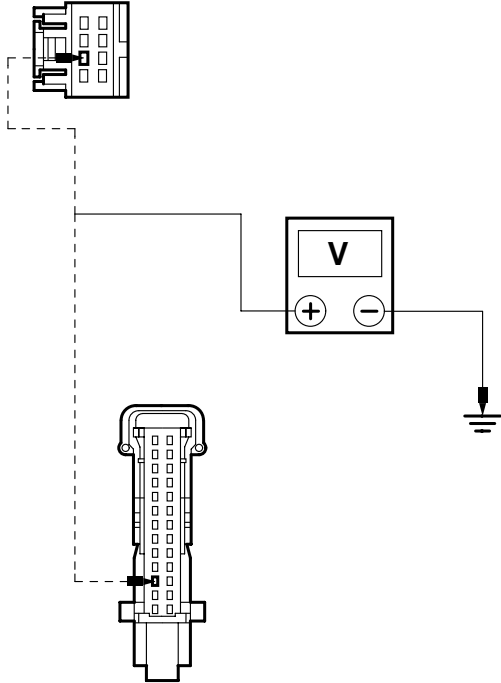
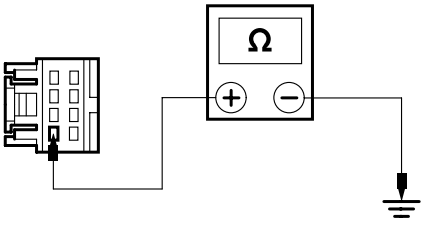
B3: CHECK CIRCUIT 91-GG14 (BK/OG) FOR OPEN

	<p>1 Place the headlamp switch in the OFF position.</p>
 <p>E44988</p>	<p>2 Measure the resistance between instrument cluster C809 pin 6, circuit 91-GG14 (BK/OG), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new instrument cluster. REFER to: Instrument Cluster (413-01 Instrument Cluster, Removal and Installation). TEST the system for normal operation. → No REPAIR the circuit. TEST the system for normal operation.

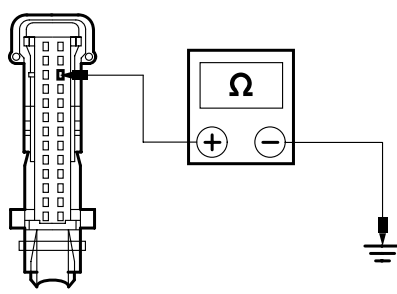
PINPOINT TEST C : THE CLIMATE CONTROL ILLUMINATION IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>C1: CHECK CIRCUIT 29S-LE10 (OG/GN) FOR VOLTAGE</p>	
	<p>1 Disconnect Climate Control Assembly C378 - vehicles without electronic automatic temperature control (EATC) module or C540 - vehicles with electronic automatic temperature control (EATC) module.</p>
	<p>2 Ignition switch in position II.</p>

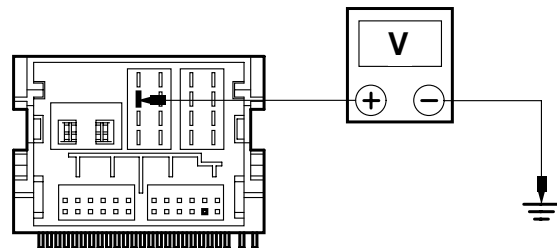
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E44989</p>	<p>3 Measure the voltage between the climate control assembly C378 (vehicles without electronic automatic temperature control (EATC) module) or C540 (vehicles with electronic automatic temperature control (EATC) module) pin 3, circuit 29S-LE10 (OG/GN), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <ul style="list-style-type: none"> → Yes Vehicles without electronic automatic temperature control (EATC) module. GO to C2. Vehicles with electronic automatic temperature control (EATC) module. GO to C3. → No REPAIR the circuit. TEST the system for normal operation.
C2: CHECK CIRCUIT 91-FA13 (BK/OG) TO GROUND	
 <p>E44990</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the climate control assembly C378 pin 4, circuit 91-FA13 (BK/OG), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new climate control assembly. REFER to: Climate Control Assembly - Vehicles With: Manual Temperature Control (412-04 Control Components, Removal and Installation). TEST the system for normal operation. → No REPAIR the circuit. TEST the system for normal operation.
C3: CHECK CIRCUIT 91-FA94 (BK/GN) TO GROUND	
	<p>1 Ignition switch in position 0.</p> <p>2 Connect Climate Control Assembly C540.</p>

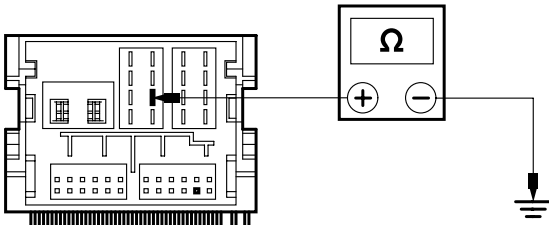
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E44991</p>	<p>3 Disconnect Climate Control Assembly C539.</p> <p>4 Measure the resistance between the climate control assembly C539 pin 24, circuit 91-FA94 (BK/GN), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new climate control assembly. REFER to: Climate Control Assembly - Vehicles With: Automatic Temperature Control (412-04 Control Components, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>

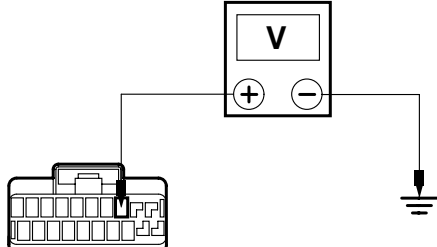
PINPOINT TEST D : THE AUDIO SYSTEM ILLUMINATION IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: CHECK VOLTAGE TO THE AUDIO UNIT CIRCUIT 29S-LK34 (OG/BK)	
	<p>1 Ignition switch in position II.</p> <p>2 Disconnect Audio Unit C442.</p> <p>3 Make sure that the illumination dimmer switch is in the full illumination position.</p> <p>4 Place the headlamp switch in the headlamps ON position.</p>
 <p>E44992</p>	<p>5 Measure the voltage between audio unit C442 pin 14, circuit 29S-LK34 (OG/BK), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <p>→ Yes GO to D2.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>
D2: CHECK CIRCUIT 91-MD5 (BK/BU) TO GROUND	
	<p>1 Ignition switch in position 0.</p>

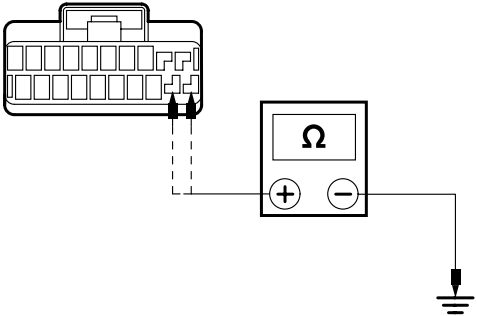
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E44993</p>	<p>2 Measure the resistance between the audio unit C442 pin 11, circuit 91-MD5 (BK/BU), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new audio unit.</p> <p>REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation).</p> <p>TEST the system for normal operation.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>

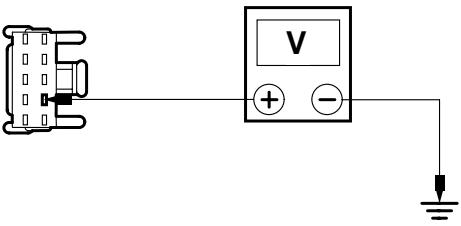
PINPOINT TEST E : THE NAVIGATION SYSTEM DISPLAY MODULE ILLUMINATION (VEHICLES WITH DVD NAVIGATION SYSTEM WITH TOUCHSCREEN) IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>E1: CHECK VOLTAGE TO THE NAVIGATION SYSTEM DISPLAY MODULE CIRCUIT 29S-LK40 (OG/BU)</p>	
	<p>1 Ignition switch in position II.</p> <p>2 Disconnect Navigation System Display Module C487.</p> <p>3 Make sure that the illumination dimmer switch is in the full illumination position.</p> <p>4 Place the headlamp switch in the headlamps ON position.</p>
 <p>E44994</p>	<p>5 Measure the voltage between navigation system display module C487 pin 3, circuit 29S-LK40 (OG/BU), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <p>→ Yes GO to D2.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>
<p>E2: CHECK THE NAVIGATION SYSTEM DISPLAY MODULE GROUND CIRCUITS FOR OPEN</p>	
	<p>1 Ignition switch in position 0.</p>

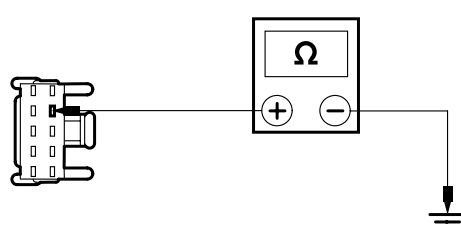
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E42112</p>	<p>2 Measure the resistance between the navigation system display module C487 pin 11, circuit 91-GK49 (BK/GN), harness side and ground; and between the navigation system display module C487 pin 12, circuit 91-GK49A (BK/GN), harness side and ground.</p> <ul style="list-style-type: none"> • Are the resistances less than 5 ohms? <p>→ Yes INSTALL a new navigation system display module.</p> <p>REFER to: Audio Unit - Vehicles Built Up To: 01/2008, Vehicles With: Digital Versatile Disc (DVD) Navigation System (415-01 Audio Unit, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR circuit 91-GK49 (BK/GN) or 91-GK49A (BK/GN). TEST the system for normal operation.</p>

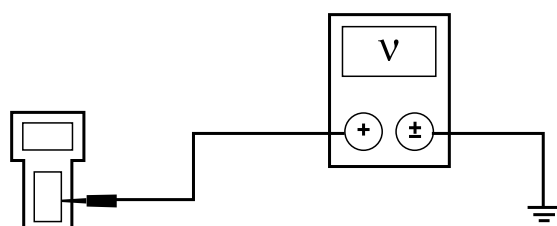
PINPOINT TEST F : THE GEARSHIFT ILLUMINATION IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>F1: CHECK CIRCUIT 29S-PF35 (OG/BK) FOR VOLTAGE</p>	
	<p>1 Disconnect Transmission Selector Lever C383.</p> <p>2 Ignition switch in position II.</p> <p>3 Make sure that the illumination dimmer switch is in the full illumination position.</p> <p>4 Place the headlamp switch in the headlamps ON position.</p>
 <p>E44995</p>	<p>5 Measure the voltage between the transmission selector lever C383 pin 2, circuit 29S-PF35 (OG/BK), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <p>→ Yes GO to F2.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>
<p>F2: CHECK CIRCUIT 31-PF35 (BK) FOR VOLTAGE</p>	
	<p>1 Ignition switch in position 0.</p>

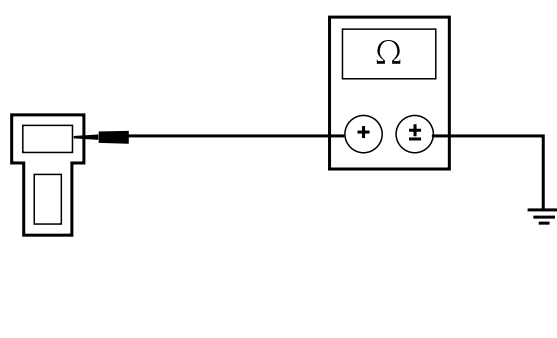
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E44996</p>	<p>2 Measure the voltage between the transmission selector lever C383 pin 4, circuit 31-PF35 (BK), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <p>→ Yes INSTALL a new transmission selector lever. REFER to: Selector Lever (307-05A, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>

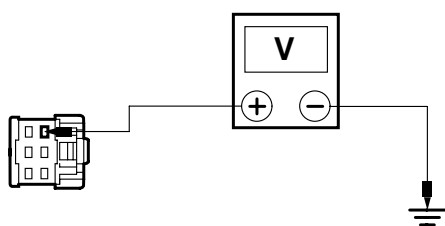
PINPOINT TEST G : THE CIGAR LIGHTER ILLUMINATION IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
G1: CHECK CIRCUIT 29S-LK15 (OG) FOR VOLTAGE	
	<p>1 Disconnect Cigar Lighter C160.</p> <p>2 Ignition switch in position II.</p> <p>3 Make sure that the illumination dimmer switch is in the full illumination position.</p> <p>4 Place the headlamp switch in the headlamp ON position.</p>
 <p>GK5220A</p>	<p>5 Measure the voltage between the cigar lighter C160 pin 1, circuit 29S-LK15 (OG), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <p>→ Yes</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>
G2: CHECK CIRCUIT 31-HA6 (BK) FOR OPEN	
	<p>1 Connect Cigar Lighter C160.</p> <p>2 Disconnect Cigar Lighter C912.</p>

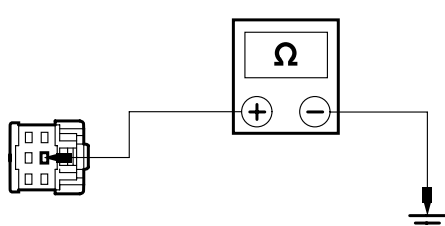
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>GK5221A</p>	<p>3 Measure the resistance between the cigar lighter C912 pin 1, circuit 31-HA6 (BK), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? → Yes INSTALL a new cigar lighter. TEST the system for normal operation. → No REPAIR the circuit. TEST the system for normal operation.

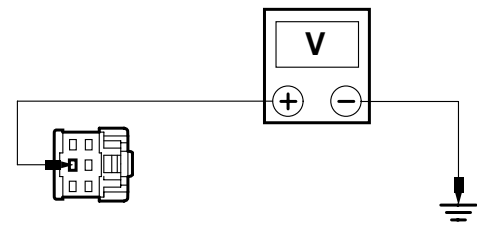
PINPOINT TEST H : THE TRACTION CONTROL SWITCH ILLUMINATION IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>H1: CHECK CIRCUIT 29S-LH45 (OG/WH) FOR VOLTAGE</p>	
	<p>1 Disconnect Traction Control Switch C717.</p> <p>2 Ignition switch in position II.</p> <p>3 Make sure that the illumination dimmer switch is in the full illumination position.</p> <p>4 Place the headlamp switch in the ON position.</p>
 <p>E44997</p>	<p>5 Measure the voltage between the traction control switch C717 pin 3, circuit 29S-LH45 (OG/WH) harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? → Yes GO to H2. → No REPAIR the circuit. TEST the system for normal operation.
<p>H2: CHECK CIRCUIT 91-CF54 (BK/WH) FOR OPEN</p>	
	<p>1 Ignition switch in position 0.</p>

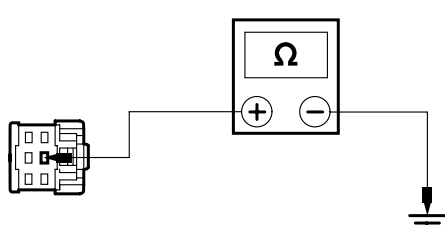
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E44998</p>	<p>2 Measure the resistance between the traction control switch C717 pin 2, circuit 91-CF54 (BK/WH), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? → Yes INSTALL a new traction control switch. TEST the system for normal operation. → No REPAIR the circuit. TEST the system for normal operation.

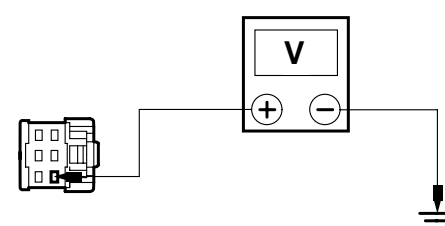
PINPOINT TEST I : THE HAZARD SWITCH ILLUMINATION IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>I1: CHECK CIRCUIT 29S-LH54 (OG/GN) FOR VOLTAGE</p>	
	<p>1 Disconnect Hazard Switch C455.</p> <p>2 Ignition switch in position II.</p> <p>3 Make sure that the illumination dimmer switch is in the full illumination position.</p> <p>4 Place the headlamp switch in the ON position.</p>
 <p>E44999</p>	<p>5 Measure the voltage between the hazard switch C455 pin 5, circuit 29S-LH54 (OG/GN), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? → Yes GO to I2. → No REPAIR the circuit. TEST the system for normal operation.
<p>I2: CHECK CIRCUIT 91-LG8 (BK/OG) FOR OPEN</p>	
	<p>1 Ignition switch in position 0.</p>

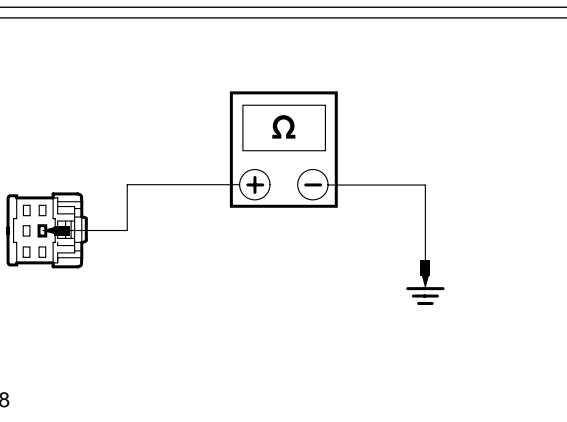
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E44998</p>	<p>2 Measure the resistance between hazard switch C455 pin 2, circuit 91-LG8 (BK/OG), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes INSTALL a new hazard switch. TEST the system for normal operation. → No REPAIR the circuit. TEST the system for normal operation.

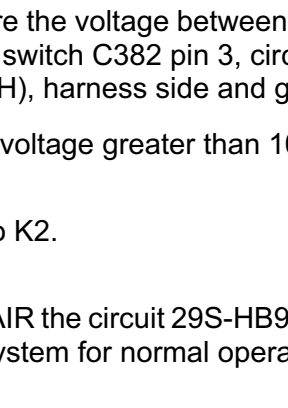
PINPOINT TEST J : THE FRONT SEAT HEATER SWITCH ILLUMINATION IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
J1: CHECK INOPERATIVE FRONT SEAT HEATER SWITCH FOR VOLTAGE	
	<p>1 Disconnect Inoperative Front Seat Heater Switch - C694 (driver side) or C695 (passenger side).</p> <p>2 Ignition switch in position II.</p> <p>3 Make sure that the illumination dimmer switch is in the full illumination position.</p> <p>4 Place the headlamp switch in the ON position.</p>
 <p>E45000</p>	<p>5 Measure the voltage between the inoperative front seat heater switch:</p> <ul style="list-style-type: none"> - C694 (driver side) pin 1, circuit 29S-LH29 (OG/YE), harness side and ground. - C695 (passenger side) pin 1, circuit 29S-LH43 (OG/BU), harness side and ground. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes GO to J2. → No REPAIR circuit 29S-LH29 (OG/YE) or circuit 29S-LH43 (OG/BU) as necessary. TEST the system for normal operation.

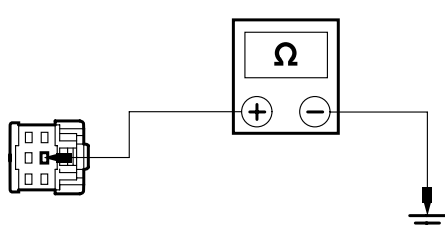
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
J2: CHECK GROUND TO INOPERATIVE FRONT SEAT HEATER SWITCH FOR OPEN	
 <p>E44998</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the inoperative front seat heater switch: <ul style="list-style-type: none"> - C694 (driver side) pin 2, circuit 31-LH29 (BK), harness side and ground. - C695 (passenger side) pin 2, circuit 31-LH43 (BK), harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new front seat heater switch. TEST the system for normal operation. → No REPAIR circuit 31-LH29 (BK) or circuit 31-LH43 (BK) as necessary. TEST the system for normal operation.

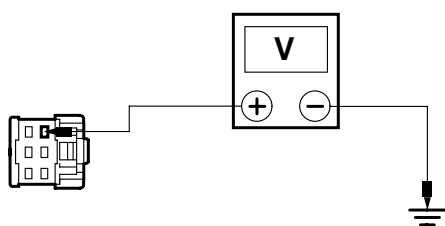
PINPOINT TEST K : THE FRONT WINDOW DEFROST SWITCH ILLUMINATION IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
K1: CHECK THE FRONT WINDOW DEFROST SWITCH FOR VOLTAGE	
	<ol style="list-style-type: none"> 1 Disconnect Front Window Defrost Switch C382. 2 Ignition switch in position II. 3 Make sure that the illumination dimmer switch is in the full illumination position. 4 Place the headlamp switch in the ON position.
 <p>E44997</p>	<ol style="list-style-type: none"> 5 Measure the voltage between the front window defrost switch C382 pin 3, circuit 29S-HB9 (OG/WH), harness side and ground. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to K2. → No REPAIR the circuit 29S-HB9 (OG/WH). TEST the system for normal operation.
K2: CHECK CIRCUIT 91-HB9 (BK/WH) FOR OPEN	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

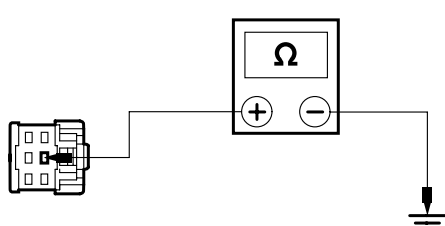
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E44998</p>	<p>2 Measure the resistance between the front window defrost switch C382 pin 2, circuit 91-HB9 (BK/WH), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new front window defrost switch. TEST the system for normal operation.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>

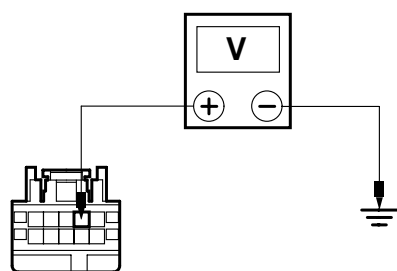
PINPOINT TEST L : THE REAR WINDOW DEFROST SWITCH ILLUMINATION IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
L1: CHECK THE REAR WINDOW DEFROST SWITCH FOR VOLTAGE	
	<p>1 Disconnect Rear Window Defrost Switch C381.</p> <p>2 Ignition switch in position II.</p> <p>3 Make sure that the illumination dimmer switch is in the full illumination position.</p> <p>4 Place the headlamp switch in the ON position.</p>
 <p>E44997</p>	<p>5 Measure the voltage between the rear window defrost switch C381 pin 3, circuit 29S-HB22 (OG/BK), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <p>→ Yes GO to L2.</p> <p>→ No REPAIR the circuit 29S-HB22 (OG/BK). TEST the system for normal operation.</p>
L2: CHECK CIRCUIT 91-HB22 (BK/GN) FOR OPEN	
	<p>1 Ignition switch in position 0.</p>

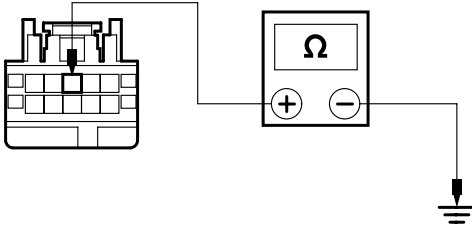
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E44998</p>	<ol style="list-style-type: none"> 2 Measure the resistance between the rear window defrost switch C381 pin 2, circuit 91-HB9 (BK/GN), harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new rear window defrost switch. TEST the system for normal operation. → No REPAIR the circuit. TEST the system for normal operation.

PINPOINT TEST M : THE REAR AUXILAIRY AUDIO CONTROL ILLUMINATION IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>M1: CHECK THE REAR AUXILAIRY AUDIO CONTROL FOR VOLTAGE</p>	
	<ol style="list-style-type: none"> 1 Disconnect Rear Auxilairy Audio Control C451. 2 Ignition switch in position II. 3 Make sure that the illumination dimmer switch is in the full illumination position. 4 Place the headlamp switch in the ON position.
 <p>E45001</p>	<ol style="list-style-type: none"> 5 Measure the voltage between the rear auxiliary audio control C451 pin 2, circuit 29S-MD16 (OG/GN), harness side and ground. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to M2. → No REPAIR the circuit 29S-MD16 (OG/GN). TEST the system for normal operation.
<p>M2: CHECK CIRCUIT 91-MD16 (BK/RD) FOR GROUND</p>	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E42142</p>	<p>2 Measure the resistance between the rear auxiliary audio control C451 pin 3, circuit 91-MD16 (BK/RD), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new rear auxiliary audio control. REFER to: Rear Auxiliary Audio Controls (415-01, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>

SECTION 413-01 Instrument Cluster

VEHICLE APPLICATION: 2008.75 Focus ST C307

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DESCRIPTION AND OPERATION

Instrument Cluster

Replacing the instrument cluster

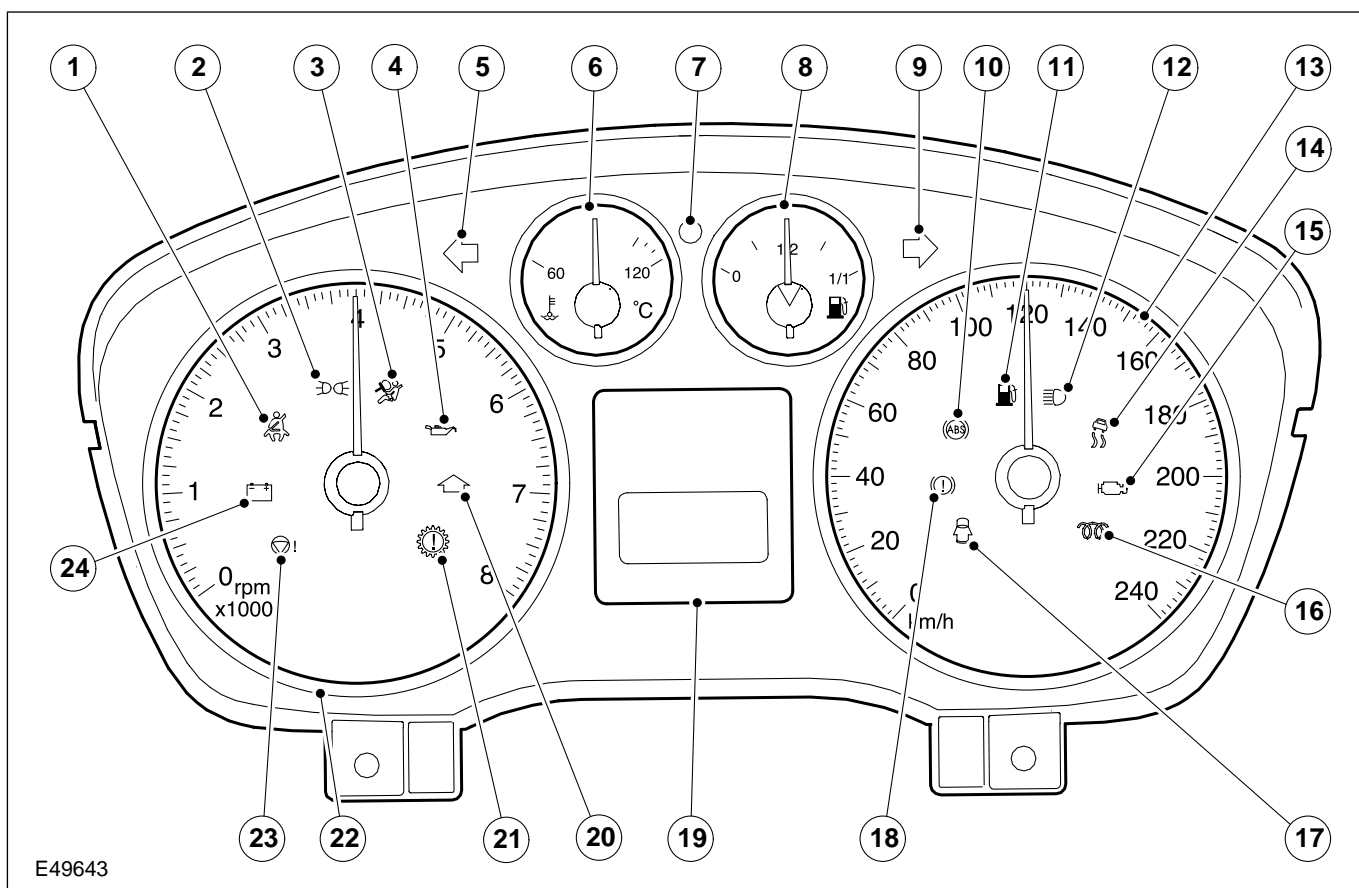
When installing a new instrument cluster, the Ford diagnostics device must be connected before dismantling the instrument cluster, in order to load the configuration data of the defective instrument cluster using the "Installation of programmable modules" routine. In addition, the value on the odometer of the defective instrument cluster must be noted, as this is required for configuration of the new instrument cluster. If the odometer value

cannot be obtained from the instrument cluster (display failure), the customer should supply the approximate value.

When installing a new instrument cluster, the Ford diagnostics device must be connected after installation in order to download the configuration data of the defective instrument cluster into the new instrument cluster using the "Installation of programmable modules" routine, and to configure the newly installed instrument cluster to the PATS system.

Instrument cluster - Vehicles built up to 12/2007

Vehicles with low series instrument cluster



E49643

Item	Description
1	Safety belt indicator
2	Headlamp indicator
3	Air bag warning indicator
4	Low oil pressure warning indicator

Item	Description
5	LH turn signal indicator
6	Temperature gauge
7	Passive anti-theft system (PATS) LED
8	Fuel gauge

DESCRIPTION AND OPERATION

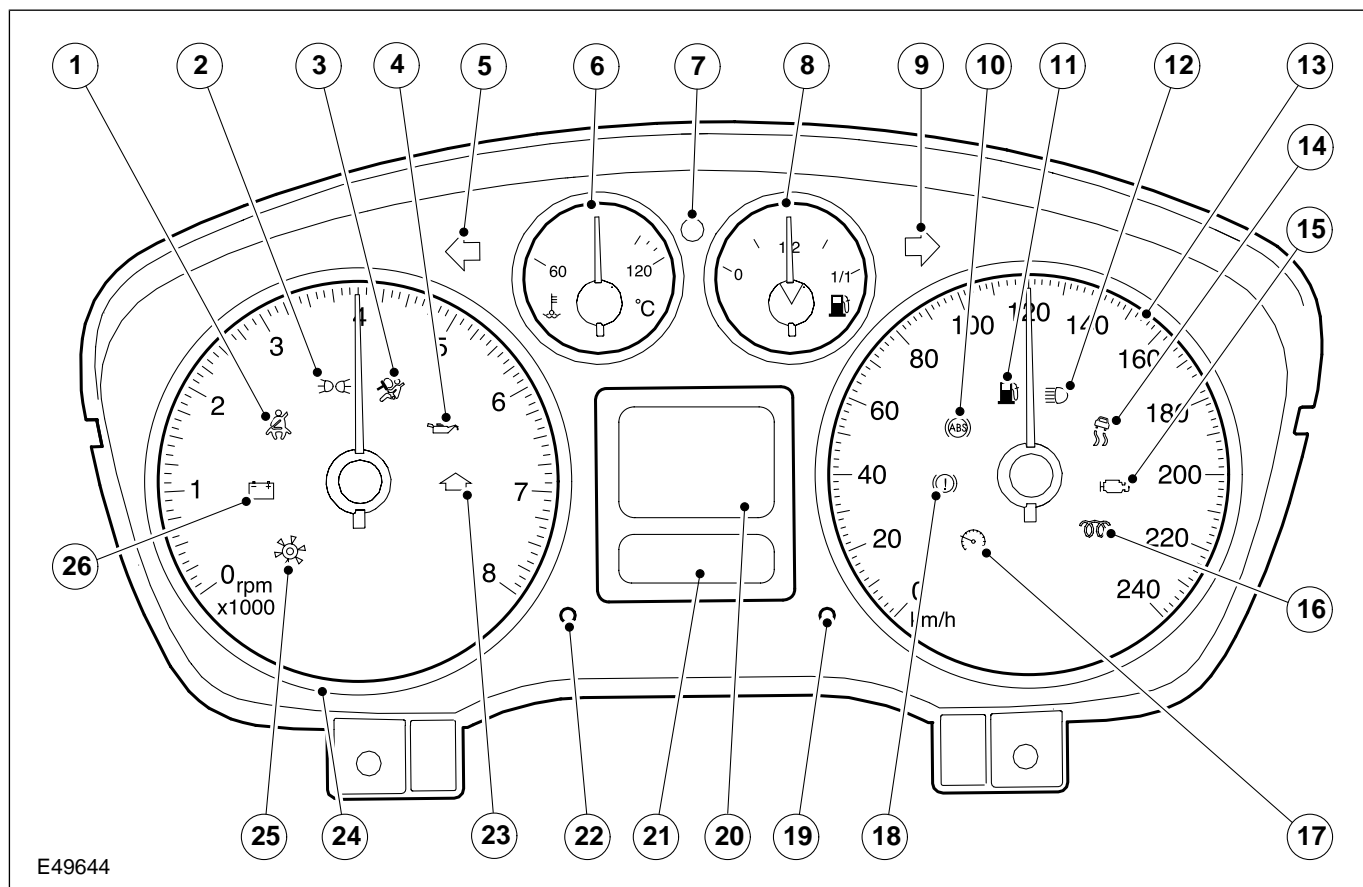
Item	Description
9	RH turn signal indicator
10	Anti-lock brake system (ABS) warning indicator
11	Low fuel indicator
12	High beam indicator
13	Speedometer
14	Stability assist indicator
15	Malfunction indicator lamp (MIL)
16	Glow plug indicator (Vehicles with diesel engine)
17	Door ajar indicator
18	Parking brake/Brake warning indicator
19	Odometer
20	Gear shift indicator
21	Powertrain warning lamp
22	Tachometer
23	Electrical power steering warning indicator
24	Charge warning indicator

Self-Diagnostic Mode

1. To enter the instrument cluster self-diagnostic mode, simultaneously press and hold the tripmeter reset button and turn the ignition switch from position 0 to position II.
2. Entry to the self-diagnostic mode is confirmed when 'Test' is displayed in the odometer's LCD display. After that, the Reset button on the instrument cluster must be released within three seconds. Otherwise the system will exit self-diagnosis mode.
3. To navigate through or skip any of the instrument cluster Self-Diagnostic Mode tests press the tripmeter RESET button.
4. Self-diagnostic mode is deactivated when the ignition switch is turned to off, low battery voltage is detected, or the Reset button is pressed for more than 3 seconds between tests.
5. If there is missing or invalid input data for the instrument cluster, '---' is displayed in the LCD (liquid crystal display) indicator of the tripometer.

DESCRIPTION AND OPERATION

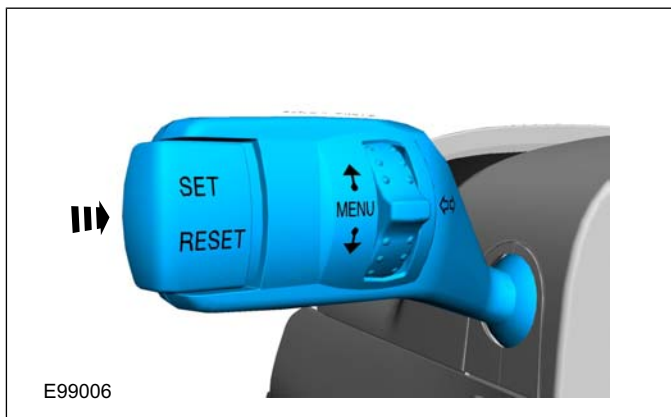
Vehicles with high series instrument cluster



E49644

Item	Description
1	Safety belt indicator
2	Headlamp indicator
3	Air bag warning indicator
4	Low oil pressure warning indicator
5	LH turn signal indicator
6	Temperature gauge
7	Passive anti-theft system (PATS) LED
8	Fuel gauge
9	RH turn signal indicator
10	Anti-lock brake system (ABS) warning indicator
11	Low fuel indicator
12	High beam indicator
13	Speedometer
14	Stability assist indicator
15	Malfunction indicator lamp (MIL)

Item	Description
16	Glow plug indicator (Vehicles with diesel engine)
17	Vehicle speed control indicator
18	Parking brake/Brake warning indicator
19	Generic red telltale light
20	Dot matrix display for gear indication and navigation system
21	Information and message center
22	Generic amber telltale light
23	Gear shift indicator
24	Tachometer
25	Ice warning indicator
26	Charge warning indicator

DESCRIPTION AND OPERATION**Message center**

The message center is operated using the left-hand switch on the steering column.

The SET/RESET button is activated to select a submenu and change the settings. If signal tones have been activated, a short acoustic signal will sound each time a button is pressed.

By turning the rotary switch, you can scroll through the different menu displays or select a setting.

In this display, the navigation system can also display direction and distance information.

In addition, safety and warning messages can be displayed in this system, such as "Coolant overheating", "Engine system error" or "Washer fluid level too low". In addition to a safety message, a general warning light (red/yellow) lights up.

Self-Diagnostic Mode

1. To enter the instrument cluster self-diagnostic mode, simultaneously press and hold the set button and turn the ignition switch from position 0 to position II.
2. Entry to the Self-Diagnostic Mode is confirmed when 'TEST' is displayed in the odometer tripmeter liquid crystal display (LCD). The instrument cluster set button must be released within 3 seconds of TEST being displayed in the tripmeter LCD display. Otherwise the system will exit self-diagnosis mode.
3. To navigate through or skip any of the instrument cluster Self-Diagnostic Mode tests, press the SET button.
4. Self-diagnostic mode is deactivated when the ignition switch is turned to OFF, low battery voltage is detected, or the set button is pressed for more than 3 seconds between tests.

5. If there is missing or invalid input data for the instrument cluster, '---' is displayed in the LCD indicator of the tripometer.
6. If the self-diagnostic mode cannot be activated, test the instrument cluster using the Ford diagnostic device.

Instrument cluster - Vehicles built from 12/2007**Gauges**

The instrument cluster contains analog displays as well as warning and control lamps for displaying the system status; in addition, there is an LCD indicator field for driver information.

The instrument cluster receives the following signals from the PCM (powertrain control module) via the high speed CAN (controller area network) Bus (HS-CAN):

- Vehicle speed
 - The PCM receives the necessary signals from the ABS (anti-lock brake system) wheel sensors from the ABS control unit on the HS-CAN.
- Engine Coolant Temperature
- Engine oil pressure.
- Engine speed

The instrument cluster receives the following signals from the GEM (generic electronic module) via the medium speed CAN Bus (MS-CAN):

- Ambient temperature
- Brake fluid level
- Handbrake control
- Door locking control
- Tailgate locking control
- Full beam lights control
- Headlight flasher control
- Direction indicator control

The fuel level signal is supplied from the fuel level sensor in the fuel pump in the fuel tank, which is wired to the instrument cluster. The instrument cluster converts the raw fuel level signal into a damped fuel level value.

The odometer shows the total distance travelled by the vehicle and is based on the same signal as is processed for the daily mileage counter. The value is recorded by the instrument cluster and stored in a protected Electronically Erasable

DESCRIPTION AND OPERATION

Programmable Read Only Memory (EEPROM) area. This area is a memory protected against manipulation. If the instrument cluster detects an error in this memory area, e.g. through damage, the driver is notified with the "Odometer error" message.

Message center

The message center is operated using the left-hand switch on the steering column.

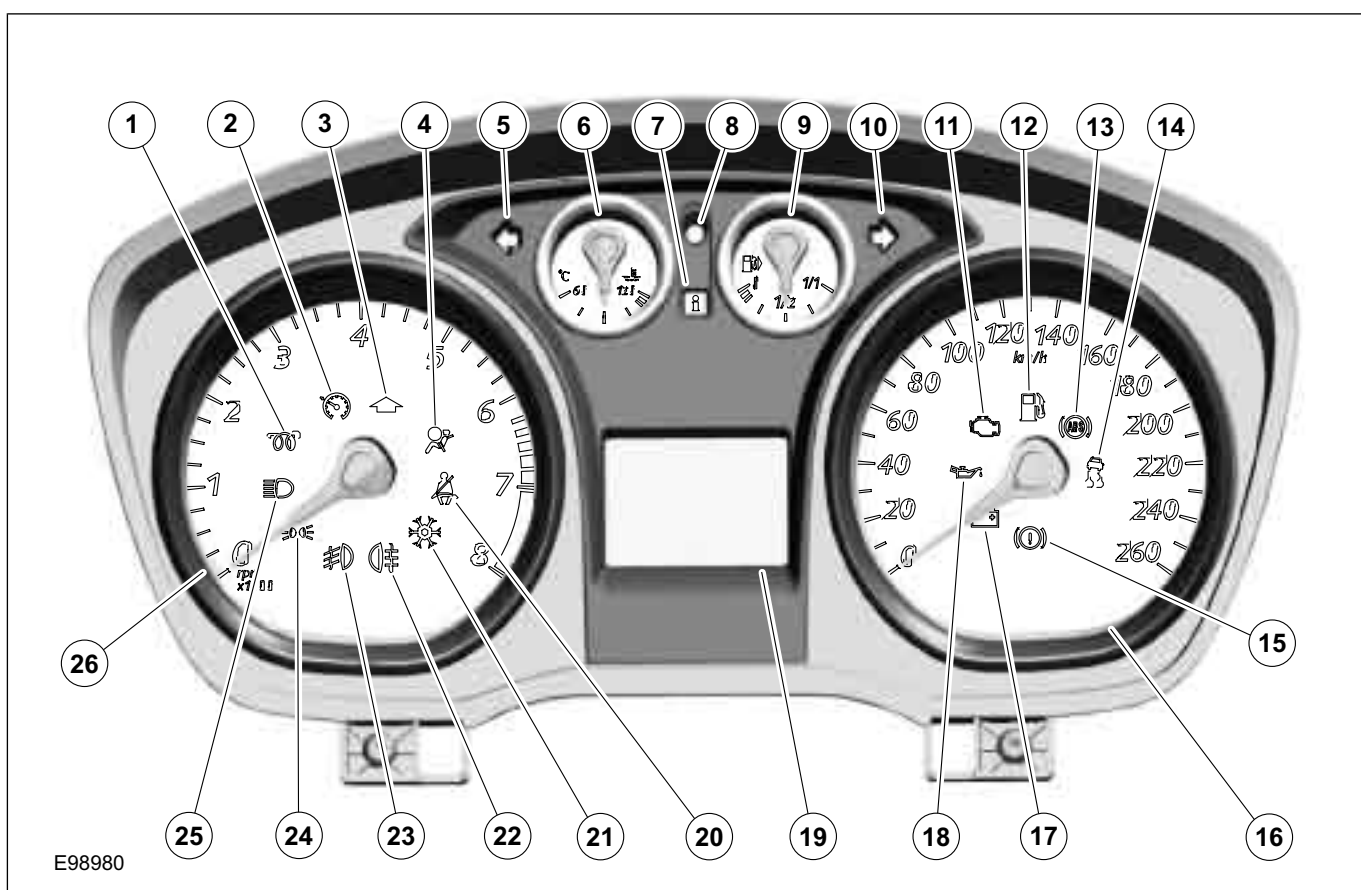
The SET/RESET button is activated to select a submenu and change the settings. If signal tones have been activated, a short acoustic signal will sound each time a button is pressed.

By turning the rotary switch, you can scroll through the different menu displays or select a setting.

In this display, the navigation system can also display direction and distance information.

In addition, safety and warning messages can be displayed in this system, such as "Coolant overheating", "Engine system error" or "Washer fluid level too low". In addition to a safety message, a general warning light (red/yellow) lights up.

Vehicles with low series instrument cluster



Item	Description
1	Glow plug indicator
2	Speed control indicator
3	Gear shift indicator
4	Air bag warning indicator
5	Left-hand turn signal indicator

Item	Description
6	Coolant temperature gauge
7	Generic warning indicator (red/amber)
8	PATS control
9	Fuel Level Gauge
10	Right-hand turn signal indicator

413-01-7

Instrument Cluster

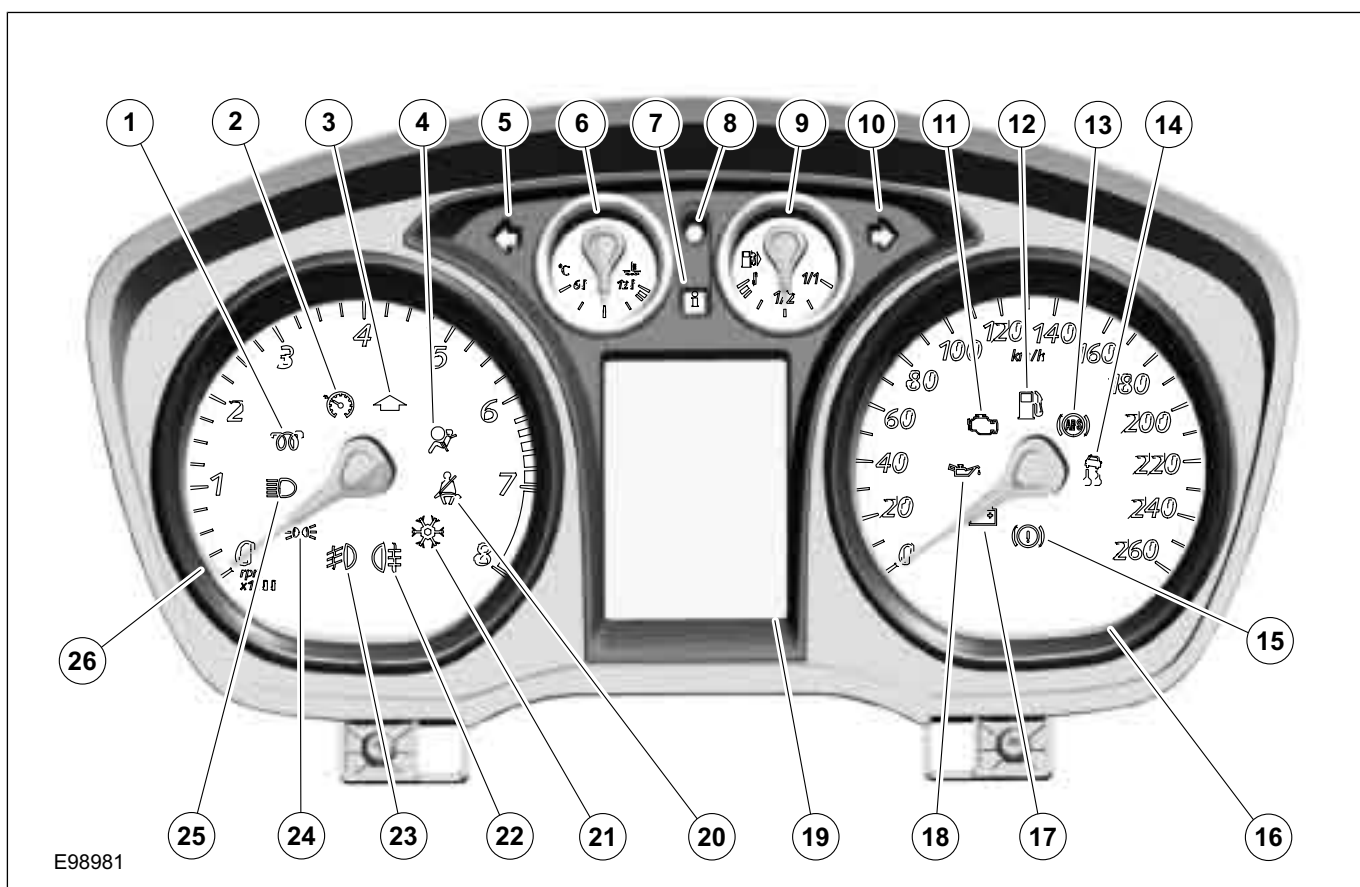
413-01-7

DESCRIPTION AND OPERATION

Item	Description
11	Malfunction Indicator Lamp (MIL)
12	Low fuel indicator
13	Anti-lock Braking system (ABS) Warning Indicator
14	Stability assist indicator
15	Brake warning indicator
16	Speedometer
17	Charging system warning indicator
18	Low oil pressure warning indicator

Item	Description
19	Message center
20	Seat belt indicator
21	Ice warning indicator
22	Rear Fog Lamp Indicator
23	Front fog lamp indicator
24	Headlamp indicator
25	High beam indicator
26	Tachometer

Vehicles with high series instrument cluster



E98981

Item	Description
1	Glow plug indicator
2	Speed control indicator
3	Gear shift indicator
4	Air bag warning indicator
5	Left-hand turn signal indicator

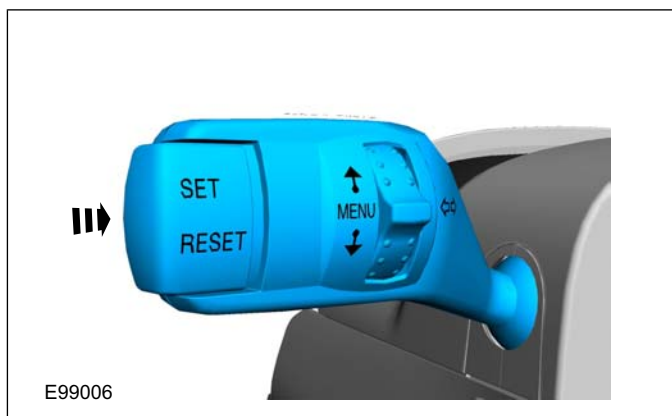
Item	Description
6	Coolant temperature gauge
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8	PATS control
9	Fuel Level Gauge
10	Right-hand turn signal indicator

DESCRIPTION AND OPERATION

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19	Message center
20	Seat belt indicator
21	Ice warning indicator
22	Rear Fog Lamp Indicator
23	Front fog lamp indicator
24	Headlamp indicator
25	High beam indicator
26	Tachometer

- To navigate through or skip any of the instrument cluster Self-Diagnostic Mode tests, press the SET button. If the set button is depressed for more than 3 seconds between tests, the instrument cluster will exit the Self-Diagnostic Mode.
- The Self-Diagnostic Mode is deactivated when the ignition switch is turned to the OFF position or low battery voltage is detected.
- If there is missing or invalid input data for the instrument cluster, '---' is displayed in the LCD indicator of the tripometer.
- If the self-diagnostic mode cannot be activated, test the instrument cluster using the Ford diagnostic device.

Self-Diagnostic Mode



- To enter the instrument cluster self-diagnostic mode, simultaneously press and hold the set button and turn the ignition switch from position 0 to position II.
- Entry to the Self-Diagnostic Mode is confirmed when 'TEST' is displayed in the odometer tripmeter liquid crystal display (LCD). The instrument cluster set button must be released within 3 seconds of TEST being displayed in the tripmeter LCD display. Otherwise the system will exit self-diagnosis mode.

DIAGNOSIS AND TESTING

Instrument Cluster

Refer to Wiring Diagrams Section 413-01, for schematic and connector information.

General Equipment

Worldwide Diagnostic System (WDS)

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

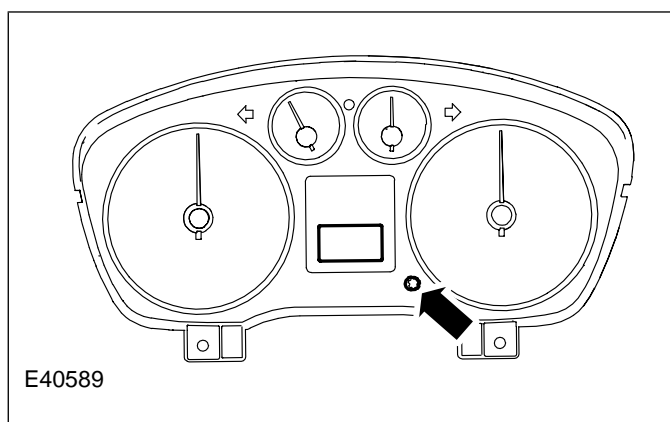
Mechanical	Electrical
<ul style="list-style-type: none"> - Engine oil filter - Engine oil level - Engine coolant level - Oil pressure switch - Engine coolant level - Coolant thermostat - Engine coolant temperature (ECT) sensor - Fuel gauge - Collapsed or damaged fuel tank - Recirculation hose - Fuel tank filler pipe/hose - Indicated fuel level - Fuel lines - Fuel tank filler cap - Fuel filter (external to the fuel tank) - Fuel tank - Door adjustment 	<ul style="list-style-type: none"> - Fuse(s) - Wiring harness - Electrical connector(s) - Instrument cluster - Light emitting diode(s) (LED)(s)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. **NOTE: If none of the following warning indicators are operating correctly this may indicate a concern with the central junction box (CJB). If only one or two of the following warning indicators are not operating correctly this may indicate an instrument cluster concern.**

Verify the following warning indicators are working correctly:

- Charging.
 - Turn signals.
 - Headlamps.
5. If the cause is not visually evident, verify the symptom and enter the instrument cluster Self-Diagnostic Mode.

Self-Diagnostic Mode. Vehicles with low series instrument cluster



NOTE: The instrument cluster tripmeter reset button is located on the right-hand side of the instrument cluster lens.

1. To enter the instrument cluster Self-Diagnostic Mode. Simultaneously press and hold the tripmeter RESET button and turn the ignition switch from position 0, to position II.
2. Entry to the Self-Diagnostic Mode is confirmed when 'tEST' is displayed in the odometer tripmeter liquid crystal display (LCD). The tripmeter reset button must be released within three seconds of 'tEST' being displayed or the instrument cluster will exit the Self-Diagnostic mode.
3. To navigate through or skip any of the instrument cluster Self-Diagnostic Mode tests, press the tripmeter RESET button. If the reset button is depressed for more than 3 seconds between tests, the instrument cluster will exit the Self-Diagnostic Mode.
4. The Self-Diagnostic Mode is deactivated when the ignition switch is turned to the OFF position or low battery voltage is detected.
5. If input data to the instrument cluster is missing or invalid, the tripmeter LCD will display '----'

DIAGNOSIS AND TESTING

6. If the Self-Diagnostic Mode cannot be accessed, use the WDS to diagnose the instrument cluster.

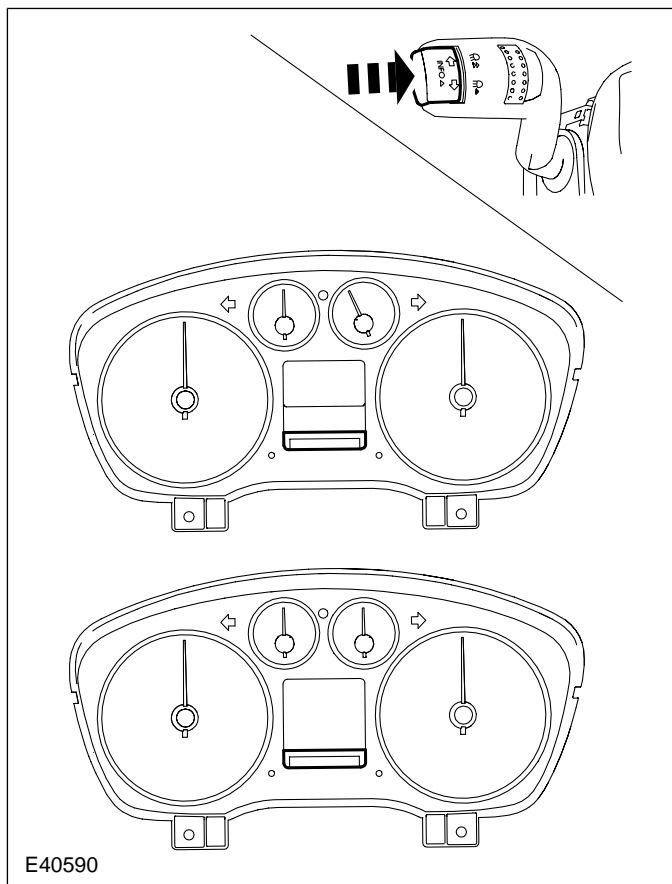
NOTE: Additional tests are available after the following Self-Diagnostic Mode tests, but are not applicable for this diagnostic.

Test	Odometer Display	Gauge/Indicator/ Display Tested	Description
1. Self-Diagnostic entry	tEst	Instrument cluster	Establishes Self-Diagnostic Mode.
2. Gauge sweep	gAgE	Tachometer, speedometer, temperature and fuel	All gauges go through a full up and down pointer sweep smoothness check. The pointers should take 3 seconds to achieve full sweep and 3 seconds to return to the rest position.
3. Odometer LCD	888888	Odometer LCD	Fills in the LCDs of the odometer display.
4. Indicator LED(s)	LeD	Indicators and warning indicators	Illuminates all the LED warning indicators that are controlled by the instrument cluster.
5. ROM level	r XXXX /FAIL	Instrument cluster read only memory (ROM)	Displays the instrument cluster ROM level and type.
6. Not required	ErXXXX	-	Not required.
7. Not required	E XX /FAIL	-	Not required.
8. Manufacturing date	dtXXXX	Instrument cluster manufacturing date	Displays the instrument cluster date of manufacture.
9. Diagnostic trouble code (DTC)	<ul style="list-style-type: none"> • dtc then XXX • nonE 	DTCs	Display the individual DTCs at 1 second intervals. REFER to the WDS to diagnose the instrument cluster.
10. Vehicle speed mph	SPXXXX	Speedometer	Displays the speed signal input in miles per hour.
11. Vehicle speed km/h	SPXXXX	Speedometer	Displays the speed signal input in kilometers per hour.
12. Not required	SgXXXX	-	Not required.
13. Engine speed	tAXXXX	Tachometer	Displays the engine speed input signal (RPM)
14. Not required	tgXXXX	-	Not required.
15. Odometer count	od XXX	Odometer	Displays the odometer rolling count

DIAGNOSIS AND TESTING

Test	Odometer Display	Gauge/Indicator/ Display Tested	Description
16. Fuel volume	F XXX	Fuel sender system	<ul style="list-style-type: none"> Displays the fuel volume signal input. 000 - 009 Short circuit 010 - 254 Normal range 255 open circuit
17. Not required	FgXXXX	-	Not required.
18. Not required	FL XX	-	Not required.
19. Fuel level percentage	FP XX	Fuel gauge	<ul style="list-style-type: none"> Displays the fuel average percentage level. Range of display 00 to 64 64 being 100% full FF will be displayed for invalid data
20. Engine coolant temperature (ETC)	XXX C	ECT	<ul style="list-style-type: none"> Displays the engine coolant temperature as a decimal. Range 0 to 254 255 would indicate invalid data
21. Not required	XXX Cg	-	Not required.
22. Battery voltage	btXXX	Battery voltage	Displays battery voltage input.
23. to 28. Not required	A0-XX to A5-XX	-	Not required.
29. to 42. Not required	PA-HH to Pn-HH	-	Not required.
43. to 46. Not required	P1 XX to P4 XX	-	Not required.
47. Distance to empty	dtEXXX	Trip computer	Displays the distance to fuel tank empty.
48. Fuel economy	rAFEXX	Trip computer	Displays the rolling average fuel economy in miles per UK gallon.

DIAGNOSIS AND TESTING

Self-Diagnostic Mode. Vehicles with mid or high series instrument cluster

NOTE: The set button is located on the steering column left hand multifunction switch.

1. To enter the instrument cluster Self-Diagnostic Mode. Simultaneously press and hold the SET button and turn the ignition switch from position 0, to position II.
2. Entry to the Self-Diagnostic Mode is confirmed when 'TEST' is displayed in the odometer tripmeter liquid crystal display (LCD). The tripmeter set button must be released within three seconds of 'TEST' being displayed or the instrument cluster will exit the Self-Diagnostic Mode.
3. To navigate through or skip any of the instrument cluster Self-Diagnostic Mode tests, press the SET button. If the set button is depressed for more than 3 seconds between tests, the instrument cluster will exit the Self-Diagnostic Mode.
4. The Self-Diagnostic Mode is deactivated when the ignition switch is turned to the OFF position or low battery voltage is detected.
5. If input data to the instrument cluster is missing or invalid, the tripmeter LCD will display '----'
6. If the Self-Diagnostic Mode cannot be accessed, use the WDS to diagnose the instrument cluster.

NOTE: Additional tests are available after the following Self-Diagnostic Mode tests, but are not applicable for this diagnostic.

Self-Diagnostic Mode

Test	Odometer Display	Gauge/Indicator/Display Tested	Description
1. Self-Diagnostic entry	<ul style="list-style-type: none"> • TEST • no display 	Instrument cluster	Establishes Self-Diagnostic Mode.
2. Gauge sweep	<ul style="list-style-type: none"> • GAUGE SWEEP • no display 	Tachometer, speedometer, temperature and fuel	All gauges go through a full up and down pointer sweep smoothness check. The pointers should take 3 seconds to achieve full sweep and 3 seconds to return to the rest position.
3. Odometer LCD	Filled in black	Odometer LCD	Fills in the LCDs of the odometer display.
4. Indicator LED(s)	<ul style="list-style-type: none"> • LED TEST • no display 	Indicators and warning indicators	Illuminates all the LED warning indicators that are controlled by the instrument cluster.

DIAGNOSIS AND TESTING

Test	Odometer Display	Gauge/Indicator/ Display Tested	Description
5. ROM level	<ul style="list-style-type: none"> ROM LEVEL XXXX / FAIL 	Instrument cluster read only memory (ROM)	Displays the instrument cluster ROM level and type.
6. Not required	<ul style="list-style-type: none"> NVM TARGET ROM XXXX 	-	Not required.
7. Not required	<ul style="list-style-type: none"> NVM EEPROM LVL XXXX / FAIL 	-	Not required.
8. Manufacturing date	<ul style="list-style-type: none"> MANUFACTURE HOURS XXXX 	Instrument cluster manufacturing date	Displays the instrument cluster date of manufacture.
9. Diagnostic trouble code (DTC)	<ul style="list-style-type: none"> DTC #NN XXXX 	DTCs	Display the individual DTCs at 1 second intervals. REFER to the WDS to diagnose the instrument cluster.
10. Vehicle speed mph	<ul style="list-style-type: none"> ROAD SPEED XXX.X MPH 	Speedometer	Displays the speed signal input in miles per hour.
11. Vehicle speed km/h	<ul style="list-style-type: none"> ROAD SPEED XXX.X KM/H 	Speedometer	Displays the speed signal input in kilometers per hour.
12. Not required	<ul style="list-style-type: none"> SPEEDO GAUGE XXXX 	-	Not required.
13. Engine speed	<ul style="list-style-type: none"> ENGINE SPEED XXXX 	Tachometer	Displays the engine speed input signal (RPM)
14. Not required	<ul style="list-style-type: none"> TACHO GAUGE XXXX 	-	Not required.
15. Odometer count	<ul style="list-style-type: none"> ODO ROLL COUNT XXX 	Odometer	Displays the odometer rolling count
16. Fuel volume	<ul style="list-style-type: none"> FUEL A/D INPUT XXX 	Fuel sender system	<ul style="list-style-type: none"> Displays the fuel volume signal input. 000 - 009 Short circuit 010 - 254 Normal range 255 open circuit
17. Not required	<ul style="list-style-type: none"> FUEL GAUGE XXXX 	-	Not required.
18. Not required	<ul style="list-style-type: none"> FUEL FLOW XXXX 	-	Not required.

DIAGNOSIS AND TESTING

Test	Odometer Display	Gauge/Indicator/ Display Tested	Description
19. Fuel level percentage	<ul style="list-style-type: none"> FUEL PERCENT XXXX 	Fuel gauge	<ul style="list-style-type: none"> Displays the fuel average percentage level. Range of display 00 to 64 64 being 100% full FF will be displayed for invalid data
20. Engine coolant temperature (ECT)	<ul style="list-style-type: none"> ENGINE TEMP XXX C 	ECT	<ul style="list-style-type: none"> Displays the engine coolant temperature as a decimal. Range 0 to 254 255 would indicate invalid data
21. Not required	<ul style="list-style-type: none"> TEMP GAUGE XXXX 	-	Not required.
22. Battery voltage	<ul style="list-style-type: none"> BATTERY XX.X 	Battery voltage	Displays battery voltage input.
23. to 28. Not required	<ul style="list-style-type: none"> A/D INPUT 00 to A/D INPUT 05 XX 	-	Not required.
29. to 42. Not required	<ul style="list-style-type: none"> PORT A to PORT N XX 	-	Not required.
43. to 46. Not required	<ul style="list-style-type: none"> PERSONALITY 01 to PERSONALITY 04 XX 	-	Not required.
47. Distance to empty	<ul style="list-style-type: none"> DIST. TO EMPTY XXX MILES 	Information and message center	Displays the distance to fuel tank empty.
48. Fuel economy	<ul style="list-style-type: none"> RAFE XXX MPG 	Information and message center	Displays the rolling average fuel economy in miles per UK gallon.

DIAGNOSIS AND TESTING

Instrument Cluster DTC Index Chart

Self Diagnostic Mode Displayed DTC	DTC	Description	Source	Action
115A	P115A	Low Fuel Level - Forced Limited Power	Instrument cluster	<ul style="list-style-type: none"> If the fuel gauge shows EMPTY and the Distance To Empty = 0 kilometers/miles: Delete the DTC and the customer can refill the fuel tank. NO further action must be taken. If the fuel gauge shows more than EMPTY and/or the Distance To Empty is greater than 0 kilometers/miles GO to Pinpoint Test F.
115B	P115B	Low Fuel Level - Forced Engine Shutdown	Instrument cluster	<ul style="list-style-type: none"> If the fuel gauge shows EMPTY and the Distance To Empty = 0: Delete the DTC and the customer can refill the fuel tank. NO further action must be taken. If the fuel gauge shows more than Empty and/or the Distance To Empty is greater than 0 kilometers/miles GO to Pinpoint Test F.

DIAGNOSIS AND TESTING

Self Diagnostic Mode Displayed DTC	DTC	Description	Source	Action
9202	B1202	Fuel pump and sender unit/fuel level sensor open circuit	Instrument cluster	GO to Pinpoint Test A.
9204	B1204	Fuel pump and sender unit/fuel level sensor short to ground	Instrument cluster	GO to Pinpoint Test A.
9317	B1317	Battery voltage high (greater than 16V)	Instrument cluster	REFER to the WDS
9318	B1318	Battery voltage low (less than 10V)	Instrument cluster	REFER to the WDS
9342	B1342	PCM is defective	Instrument cluster	REFER to the WDS
A477	B2477	Module configuration failure	Instrument cluster	REFER to the WDS
E196	U2196	Invalid data for engine RPM (Invalid CAN message)	Instrument cluster	REFER to the WDS
E197	U2197	Invalid data for vehicle speed (Invalid CAN message)	Instrument cluster	REFER to the WDS
E198	U2198	Invalid data for fuel pulse (Invalid CAN message)	Instrument cluster	REFER to the WDS
E199	U2199	Invalid data for engine coolant temperature (Invalid CAN message)	Instrument cluster	REFER to the WDS
E200	U2200	Invalid data for odometer (Invalid CAN message)	Instrument cluster	REFER to the WDS
E201	U2201	Invalid data for ambient temperature (Invalid CAN message)	Instrument cluster	REFER to the WDS

7. The self-diagnostic mode is to act as a guide to establish if the concern is instrument cluster related. For any concerns not related to the fuel gauge, REFER to the WDS to continue diagnostics.

8. For any fuel gauge concerns, REFER to the **Symptom Chart**.

DIAGNOSIS AND TESTING**Symptom Chart**

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> The fuel gauge pointer does not move down at a constant rate (Full to 3/4 and 1/4 to empty periods vary) 	<ul style="list-style-type: none"> The fuel gauge considers unindicated full and empty reserve as part of the indicated volume. The pointer catches up with the real volume outside of these areas. 	<ul style="list-style-type: none"> No action required. Do not install a new component.
<ul style="list-style-type: none"> Information and message center inconsistent with the fuel gauge 	<ul style="list-style-type: none"> The fuel gauge considers unindicated full and empty reserve as part of the indicated volume. The pointer catches up with the real volume outside of these areas. A certain amount of fuel is not indicated or not useable respectively and is needed to avoid unintended engine hesitations at low fuel levels. This amount is carline and engine type dependent. 	<ul style="list-style-type: none"> No action required. Do not install a new component.
<ul style="list-style-type: none"> The low fuel warning indicator illuminates too early 	<ul style="list-style-type: none"> This is dependant on the drive style. The on-board computer calculates the average consumption and illuminates the low fuel warning indicator when there is 80 Km (50 miles) of fuel left in the fuel tank. The on-board computer does not consider a more economical drive style after a higher fuel consumption, but keeps the Distance To Empty (DTE) constant until the fuel level has caught up with the remaining DTE. 	<ul style="list-style-type: none"> No action required. Do not install a new component.
<ul style="list-style-type: none"> The fuel gauge pointer moves too quickly off the full position or needs too long to move off the full position after refuelling 	<ul style="list-style-type: none"> A certain amount of unindicated fuel is normal and is dependent on fuel tank geometry and the fuel station filler nozzle shutoff behaviour 	<ul style="list-style-type: none"> No action required. Do not install a new component.
<ul style="list-style-type: none"> Indicated fuel level does not match the amount of fuel expected to be in the fuel tank 	<ul style="list-style-type: none"> A certain amount of fuel is not indicated or not useable respectively and is needed to avoid unintended engine hesitations at low fuel levels. This amount is carline and engine type dependent. 	<ul style="list-style-type: none"> No action required. Do not install a new component.

413-01-18

Instrument Cluster

413-01-18

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Indicated fuel level does not match the amount of fuel expected to be in the fuel tank 	<ul style="list-style-type: none"> A certain amount of fuel is not indicated or not useable respectively and is needed to avoid unintended engine hesitations at low fuel levels. This amount is carline and engine type dependent. 	<ul style="list-style-type: none"> No action required. Do not install a new component.
<ul style="list-style-type: none"> Fuel gauge shows less than full (even when refilled/trickle filled) 	<ul style="list-style-type: none"> Fuel tank refilled with the ignition ON 	<ul style="list-style-type: none"> Refilling with the ignition OFF next time will cure the concern. Do not install a new component.
	<ul style="list-style-type: none"> Fuel tank only filled up to the 1st click on the fuel station filling nozzle. 	<ul style="list-style-type: none"> Advise the customer to fill the fuel tank up to the 3rd click on the fuel station filling nozzle. Do not install a new component.
	<ul style="list-style-type: none"> Superseded ROM level in the instrument cluster Fuel gauge pointer sticking at times or does not move over the complete range Instrument cluster not receiving or processing input signals correctly Recirculation hose incorrectly routed Float arm obstructed or collision between the fuel fired booster heater pipe (if equipped) and the float arm Fuel tank does not reach correct fuel level Fuel level resistor card 	<ul style="list-style-type: none"> GO to Pinpoint Test A.
<ul style="list-style-type: none"> Fuel gauge shows empty even when refilled 	<ul style="list-style-type: none"> Fuel gauge pointer sticking at times or does not move over the complete range Open circuit Short circuit Instrument cluster not receiving or processing input signals correctly Float arm obstructed or collision between the fuel fired booster heater pipe (if equipped) and the float arm 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
<ul style="list-style-type: none"> Fuel gauge shows 1/4, 1/2 or is stuck at a specific position 	<ul style="list-style-type: none"> Fuel gauge pointer sticking at times or does not move over the complete range Float arm obstructed or collision between the fuel fired booster heater pipe (if equipped) and the float arm 	<ul style="list-style-type: none"> GO to Pinpoint Test C.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Fuel gauge pointer delayed in moving up when the fuel tank is refilled 	<ul style="list-style-type: none"> Fuel tank refilled with the ignition ON 	<ul style="list-style-type: none"> Refilling with the ignition OFF next time will cure the concern. Do not install a new component.
	<ul style="list-style-type: none"> Fuel gauge pointer sticking at times or does not move over the complete range Float arm obstructed or collision between the fuel fired booster heater pipe (if equipped) and the float arm 	<ul style="list-style-type: none"> GO to Pinpoint Test D.
<ul style="list-style-type: none"> Fuel gauge pointer fluctuates up and down while driving on straight/flat roads 	<ul style="list-style-type: none"> Fuel gauge pointer sticking at times or does not move over the complete range Float arm obstructed or collision between the fuel fired booster heater pipe (if equipped) and the float arm 	<ul style="list-style-type: none"> GO to Pinpoint Test E.

Pinpoint Tests

NOTE: Use a digital multimeter for all electrical measurements.

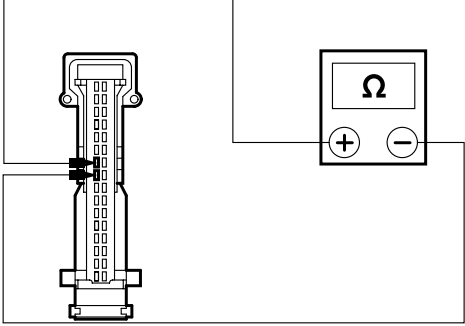
PINPOINT TEST A : FUEL GAUGE SHOWS LESS THAN FULL (EVEN WHEN REFILLED/TRICKLE FILLED)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK THE INSTRUMENT CLUSTER ROM LEVEL (HIGH SERIES INSTRUMENT CLUSTER ONLY)	<ol style="list-style-type: none"> Carry out the instrument cluster Self-Diagnostic Mode and scroll to the ROM LEVEL <ul style="list-style-type: none"> Is the ROM LEVEL 040D, 0422, 0423 or 0424? <ul style="list-style-type: none"> → Yes REFER to the WDS. SELECT Toolbox/Module Programming/Module Reprogramming/HEC. FLASH the instrument cluster with ROM LEVEL 0425 or later. Test the system for normal operation. → No GO to A2.

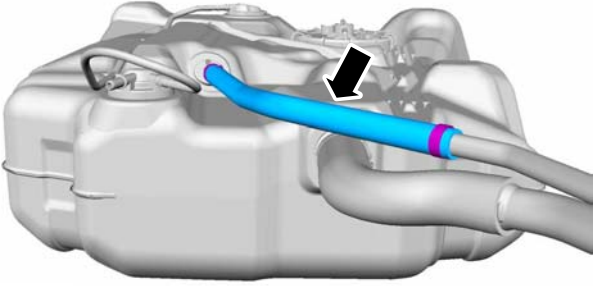
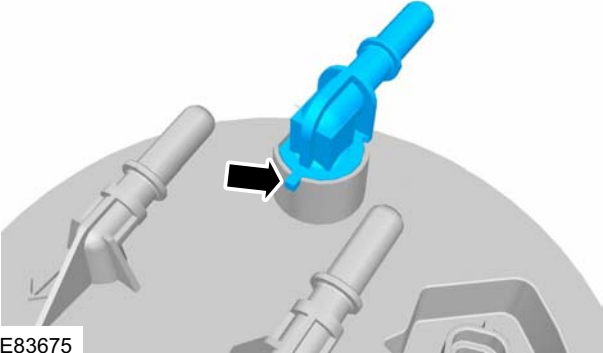
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A2: CHECK THE OPERATION OF THE FUEL GAUGE POINTER	
	<p>NOTE: The fuel gauge pointer should move smoothly from empty to full in 2.5 seconds. At the maximum full position, the fuel gauge pointer must be on the full mark and not below it.</p> <p>1 Carry out the instrument cluster Self-Diagnostic Mode.</p> <ul style="list-style-type: none"> • Does the fuel gauge pointer operate correctly? <p>→ Yes GO to A3.</p> <p>→ No REFER to the WDS. SELECT Guided Diagnostic/Body/Instrument Panel and Console/Instrument Cluster/Fuel Gauge and follow the instructions on the display.</p>
A3: CHECK THE INSTRUMENT CLUSTER IS RECEIVING AND PROCESSING INPUT SIGNALS CORRECTLY	
	<p>1 With the vehicle on level ground, fill the fuel tank up to the 1st click on the fuel station filler nozzle, making sure that at least 10 liters of fuel is added (with the ignition switch OFF).</p> <p>2 Make sure that the fuel gauge pointer is on the FULL mark.</p> <p>3 Carry out the instrument cluster Self-Diagnostic Mode and scroll to the FUEL A/D and the FUEL PERCENT tests and note the readings.</p> <ul style="list-style-type: none"> • Is the FUEL A/D less than or equal to 17 with the pointer showing FULL? • Is the FUEL PERCENT greater than or equal to 5F, 60, 61, 62, 63, 64 with the pointer showing FULL? <p>→ Yes Suspect fuel tank not filled correctly previously. Re-verify the customer concern.</p> <p>→ No GO to A4.</p>
A4: CHECK THE FUEL GAUGE WIRING	
	<p>1 Remove the instrument cluster.</p> <p>REFER to: Instrument Cluster (413-01 Instrument Cluster, Removal and Installation).</p>

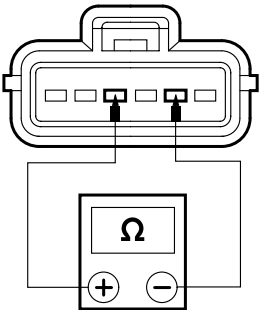
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83653</p>	<p>2 Measure the resistance between the instrument cluster C809 pin 8, circuit 8-GA7 (WH/RD), harness side and pin 7, circuit 9-GA7 (BN/RD), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 13.5 Ohms? <p>→ Yes REFER to the WDS. SELECT Guided Diagnostic/Body/Instrument Panel and Console/Instrument Cluster/Fuel Gauge and follow the instructions on the display.</p> <p>→ No GO to A5.</p>
A5: CHECK THAT THE FUEL REACHES THE CORRECT FILL LEVEL	
	<p>NOTE: Make a note of the amount of fuel required to reach the 3rd click on the fuel station filler nozzle.</p> <p>1 Fill the fuel tank up to the 3rd click on the fuel station filler nozzle.</p> <ul style="list-style-type: none"> Does the fuel gauge pointer show FULL with more than 3 liters of fuel added? <p>→ Yes GO to A6.</p> <p>→ No If the amount of fuel added is less than 3 liters, the customer may have refuelled at a fuel station with a too high fill rate. Advise customer to fill up to the 3rd click on the fuel station filler nozzle. Do not install a new component. If the fuel gauge pointer still shows less than FULL, Vehicles with fuel fired booster heater GO to A7. Vehicles without fuel fired booster heater GO to A8.</p>
A6: CHECK THE ROUTING OF THE RECIRCULATION HOSE	
	<p>1 Raise and support the vehicle.</p> <p>REFER to: Lifting (100-02 Jacking and Lifting, Description and Operation).</p>

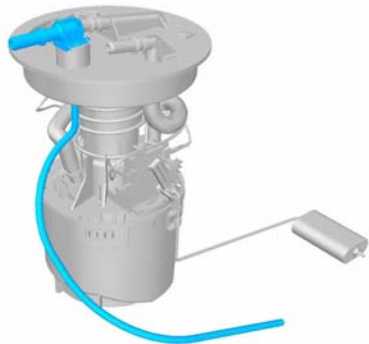
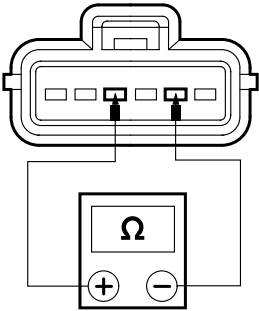
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83714</p>	<p>2 Inspect the recirculation hose routing to make sure that the top of the hose is not lower than the valve on the fuel tank.</p> <ul style="list-style-type: none"> Is the recirculation hose correctly routed? <p>→ Yes Vehicles with fuel fired booster heater GO to A7. Vehicles without fuel fired booster heater GO to A8.</p> <p>→ No INSTALL the recirculation hose correctly. Test the system for normal operation.</p>
<p>A7: CHECK THE ORIENTATION OF THE FUEL FIRED BOOSTER HEATER PORT (IF EQUIPPED)</p>	
	<p>1 Remove the fuel tank.</p> <p>REFER to: Fuel Tank - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (M14)/2.0L Duratec-HE (M14)/2.5L Duratec-ST (V15), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation).</p>
 <p>E83675</p>	<p>2 Check that the fuel fired booster heater port locating pin is correctly located into the slot.</p> <ul style="list-style-type: none"> Is the fuel fired booster heater port correctly installed? <p>→ Yes GO to A8.</p> <p>→ No INSTALL the fuel fired booster heater port correctly. Test the system for normal operation.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A8: TEST THE OPERATION OF THE FUEL PUMP AND SENDER UNIT/FUEL LEVEL SENSOR	
 <p>E83280</p>	<p>1 Measure the resistance between the fuel pump and sender unit/fuel level sensor C732 pin 2, component side and pin 4, component side with the fuel tank upright on a level surface and with the fuel tank inverted on a level surface.</p> <ul style="list-style-type: none"> Is the resistance between 200 Ohms and 206 Ohms with the fuel tank in the upright position and between 7.7 Ohms and 9.3 Ohms in the inverted position? <p>→ Yes INSTALL the fuel tank.</p> <p>REFER to: Fuel Tank - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)/2.5L Duratec-ST (VI5), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation). Test the system for normal operation.</p> <p>→ No GO to A9.</p>
A9: FLOAT ARM OBSTRUCTED OR COLLISION BETWEEN THE FUEL FIRED BOOSTER HEATER PIPE (IF EQUIPPED) AND THE FLOAT ARM.	
	<p>1 Remove the fuel pump and sender unit/fuel level sensor.</p>

DIAGNOSIS AND TESTING

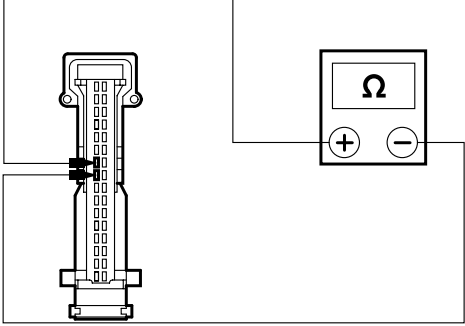
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83680</p>	<p>2 Check whether the fuel fired booster heater pipe (if equipped) or any foreign material is obstructing the float arm.</p>
	<p>3 Check for any foreign material or obstruction that prevents the float arm from moving correctly.</p> <ul style="list-style-type: none"> • Is there any sign of foreign material or causes of obstruction? → Yes REMOVE the foreign material or the cause of the obstruction. Test the system for normal operation. → No GO to A10.
<p>A10: TEST THE OPERATION OF THE FUEL PUMP AND SENDER UNIT/FUEL LEVEL SENSOR</p>	
 <p>E83280</p>	<p>1 Measure the resistance between the fuel pump and sender unit/fuel level sensor C732 pin 2, component side and pin 4, component side with the float arm at the empty and the full positions.</p> <ul style="list-style-type: none"> • Is the resistance between 200 Ohms and 206 Ohms with the float in the empty position and between 7.7 Ohms and 9.3 Ohms in the full position? → Yes INSTALL the original fuel pump and sender unit/fuel level sensor. Test the system for normal operation. → No INSTALL a new fuel level resistor card. REFER to: Fuel Level Resistor Card (310-01 Fuel Tank and Lines, Removal and Installation). Test the system for normal operation.

DIAGNOSIS AND TESTING

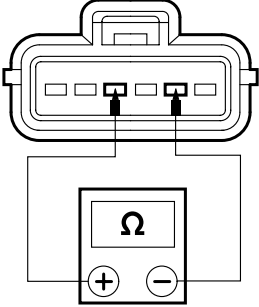
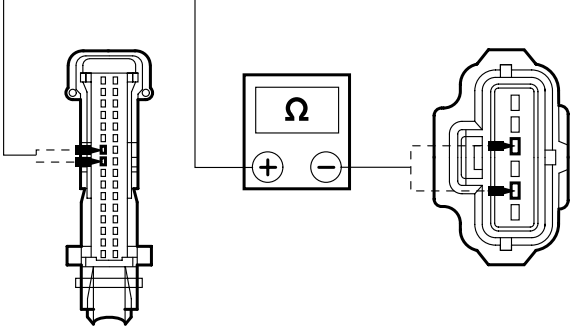
PINPOINT TEST B : FUEL GAUGE SHOWS EMPTY EVEN WHEN REFILLED

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK THE OPERATION OF THE FUEL GAUGE POINTER	
	<p>NOTE: The fuel gauge pointer should move smoothly from empty to full in 2.5 seconds. At the maximum full position, the fuel gauge pointer must be on the full mark and not below it.</p> <p>1 Carry out the instrument cluster Self-Diagnostic Mode.</p> <ul style="list-style-type: none"> • Does the fuel gauge pointer operate correctly? <p>→ Yes GO to B2.</p> <p>→ No REFER to the WDS. SELECT Guided Diagnostic/Body/Instrument Panel and Console/Instrument Cluster/Fuel Gauge and follow the instructions on the display.</p>
B2: CHECK THE INSTRUMENT CLUSTER FOR OPEN CIRCUIT DTC	
	<p>1 Using the WDS, check for DTC B1202 or carry out the instrument cluster Self-Diagnostic Mode and check for DTC 9202.</p> <ul style="list-style-type: none"> • Is DTC B1202 or DTC 9202 displayed? <p>→ Yes GO to B3.</p> <p>→ No GO to B7.</p>
B3: CHECK THE INSTRUMENT CLUSTER WIRING FOR OPEN CIRCUIT	
	<p>1 Remove the instrument cluster.</p> <p>REFER to: Instrument Cluster (413-01 Instrument Cluster, Removal and Installation).</p>

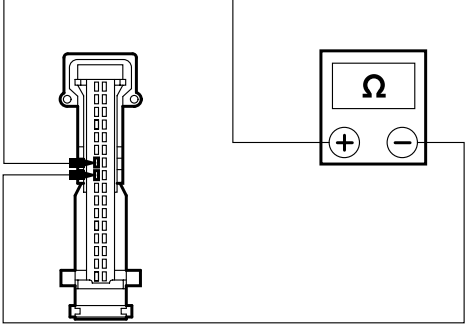
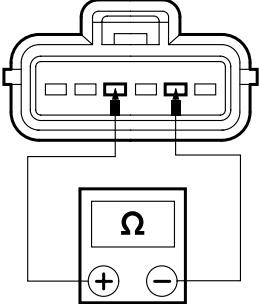
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83653</p>	<p>2 Measure the resistance between the instrument cluster C809 pin 8, circuit 8-GA7 (WH/RD), harness side and pin 7, circuit 9-GA7 (BN/RD), harness side.</p> <ul style="list-style-type: none"> • Is the resistance greater than 218 Ohms? → Yes GO to B4. → No CHECK the electrical connector for corrosion and a secure connection, if OK, REFER to the WDS. SELECT Guided Diagnostic/Body/Instrument Panel and Console/Instrument Cluster/Fuel Gauge and follow the instructions on the display.
B4: TEST THE OPERATION OF THE FUEL PUMP AND SENDER UNIT/FUEL LEVEL SENSOR	
	<p>1 Remove the fuel tank.</p> <p>REFER to: Fuel Tank - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)/2.5L Duratec-ST (VI5), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation).</p>

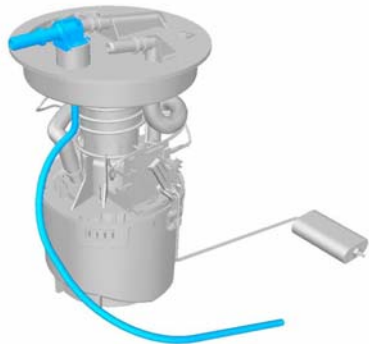
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83280</p>	<p>2 Measure the resistance between the fuel pump and sender unit/fuel level sensor C732 pin 2, component side and pin 4, component side with the float arm at the empty and the full positions.</p> <ul style="list-style-type: none"> Is the resistance greater than 218 Ohms? <p>→ Yes INSTALL a new fuel level resistor card. REFER to: Fuel Level Resistor Card (310-01 Fuel Tank and Lines, Removal and Installation). Test the system for normal operation.</p> <p>→ No GO to B5.</p>
B5: CHECK CIRCUITS 8-GA7 (WH/RD) AND 9-GA7 (BN/RD) FOR OPEN CIRCUIT	
 <p>E83682</p>	<p>1 Measure the resistance between the:</p> <ul style="list-style-type: none"> instrument cluster C809 pin 8, circuit 8-GA7 (WH/RD), harness side and the fuel pump and sender unit/fuel level sensor C732 pin 2, circuit 8-GA7 (WH/RD), harness side. instrument cluster C809 pin 7, circuit 9-GA7 (BN/RD), harness side and the fuel pump and sender unit/fuel level sensor C732 pin 4, circuit 9-GA7 (BN/RD), harness side. <ul style="list-style-type: none"> Are the resistances less than 1 Ohm? <p>→ Yes GO to B6.</p> <p>→ No REPAIR circuit 8-GA7 (WH/RD) or circuit 9-GA7 (BN/RD) as necessary. Test the system for normal operation.</p>
B6: CHECK THE INSTRUMENT CLUSTER FOR SHORT CIRCUIT DTC	
	<p>1 Using the WDS, check for DTC B1202 or carry out the instrument cluster Self-Diagnostic Mode and check for DTC 9202.</p> <ul style="list-style-type: none"> Is DTC B1204 or DTC 9204 displayed? <p>→ Yes GO to B7.</p> <p>→ No GO to B9.</p>
B7: CHECK THE FUEL GAUGE WIRING	
	<p>1 Remove the instrument cluster. REFER to: Instrument Cluster (413-01 Instrument Cluster, Removal and Installation).</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83653</p>	<p>2 Measure the resistance between the instrument cluster C809 pin 8, circuit 8-GA7 (WH/RD), harness side and pin 7, circuit 9-GA7 (BN/RD), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 Ohms? <p>→ Yes GO to B8.</p> <p>→ No REFER to the WDS. SELECT Guided Diagnostic/Body/Instrument Panel and Console/Instrument Cluster/Fuel Gauge and follow the instructions on the display.</p>
B8: TEST THE OPERATION OF THE FUEL PUMP AND SENDER UNIT/FUEL LEVEL SENSOR	
 <p>E83280</p>	<p>1 Measure the resistance between the fuel pump and sender unit/fuel level sensor C732 pin 2, component side and pin 4, component side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 Ohms? <p>→ Yes INSTALL a new fuel level resistor card. REFER to: Fuel Level Resistor Card (310-01 Fuel Tank and Lines, Removal and Installation). Test the system for normal operation.</p> <p>→ No GO to B9.</p>
B9: CHECK THE INSTRUMENT CLUSTER IS PROCESSING INPUT SIGNALS CORRECTLY	
	<p>1 Carry out the instrument cluster Self-Diagnostic Mode and scroll to the FUEL A/D and the FUEL PERCENT tests and note the readings.</p> <ul style="list-style-type: none"> • Is the FUEL A/D greater than or equal to 181 with the pointer showing FULL? • Is the FUEL PERCENT less than or equal to 08 with the pointer showing FULL? <p>→ Yes Suspect fuel tank not filled correctly previously. Re-verify the customer complaint.</p> <p>→ No GO to B10.</p>
B10: FLOAT ARM OBSTRUCTED OR COLLISION BETWEEN THE FUEL FIRED BOOSTER HEATER PIPE (IF EQUIPPED) AND THE FLOAT ARM.	
	<p>1 Remove the fuel pump and sender unit/fuel level sensor.</p>

DIAGNOSIS AND TESTING

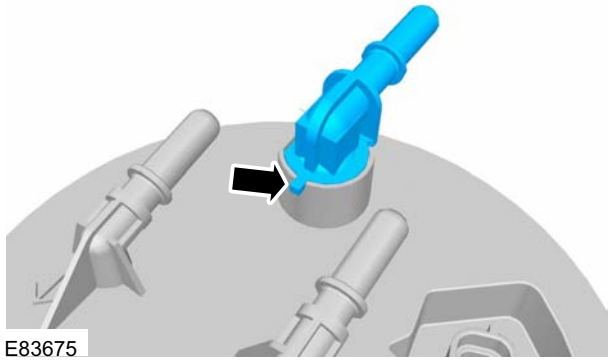
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83680</p>	<p>2 Check whether the fuel fired booster heater pipe (if equipped) or any foreign material is obstructing the float arm.</p>
	<p>3 Check for any foreign material or obstruction that prevents the float arm from moving correctly.</p> <ul style="list-style-type: none"> • Is there any sign of foreign material or causes of obstruction? <p>→ Yes REMOVE the foreign material or the cause of the obstruction. Test the system for normal operation.</p> <p>→ No INSTALL a new fuel level resistor card.</p> <p>REFER to: Fuel Level Resistor Card (310-01 Fuel Tank and Lines, Removal and Installation). Test the system for normal operation.</p>

DIAGNOSIS AND TESTING

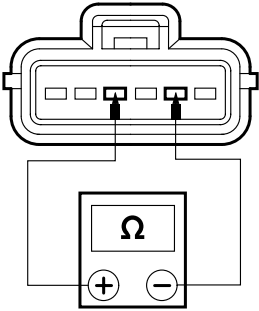
PINPOINT TEST C : FUEL GAUGE SHOWS 1/4, 1/2 OR IS STUCK AT A SPECIFIC POSITION

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: CHECK THE OPERATION OF THE FUEL GAUGE POINTER	
	<p>NOTE: The fuel gauge pointer should move smoothly from empty to full in 2.5 seconds. At the maximum full position, the fuel gauge pointer must be on the full mark and not below it.</p> <p>1 Carry out the instrument cluster Self-Diagnostic Mode.</p> <ul style="list-style-type: none"> • Does the fuel gauge pointer operate correctly? <p>→ Yes Vehicles with fuel fired booster heater, GO to C2. Vehicles without fuel fired booster heater, GO to C3.</p> <p>→ No REFER to the WDS. SELECT Guided Diagnostic/Body/Instrument Panel and Console/Instrument Cluster/Fuel Gauge and follow the instructions on the display.</p>
C2: CHECK THE ORIENTATION OF THE FUEL FIRED BOOSTER HEATER PORT (IF EQUIPPED)	
	<p>1 Remove the fuel tank.</p> <p>REFER to: Fuel Tank - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)/2.5L Duratec-ST (VI5), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation).</p>

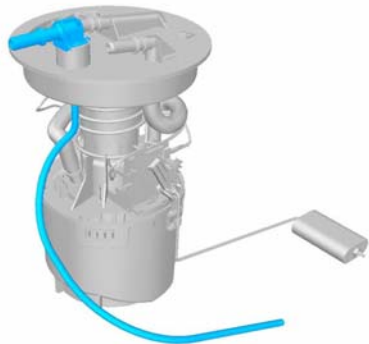
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83675</p>	<p>2 Check that the fuel fired booster heater port locating pin is correctly located into the slot.</p> <ul style="list-style-type: none"> • Is the fuel fired booster heater port correctly installed? <p>→ Yes GO to C3.</p> <p>→ No INSTALL the fuel fired booster heater port correctly. Test the system for normal operation.</p>
C3: TEST THE OPERATION OF THE FUEL PUMP AND SENDER UNIT/FUEL LEVEL SENSOR	
	<p>1 Remove the fuel tank.</p> <p>REFER to: Fuel Tank - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)/2.5L Duratec-ST (VI5), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation).</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83280</p>	<p>2 Measure the resistance between the fuel pump and sender unit/fuel level sensor C732 pin 2, component side and pin 4, component side with the fuel tank upright on a level surface and with the fuel tank inverted on a level surface.</p> <ul style="list-style-type: none"> Is the resistance between 200 Ohms and 206 Ohms with the fuel tank in the upright position and between 7.7 Ohms and 9.3 Ohms in the inverted position? <p>→ Yes INSTALL the fuel tank.</p> <p>REFER to: Fuel Tank - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)/2.5L Duratec-ST (VI5), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation). Test the system for normal operation.</p> <p>→ No GO to C4.</p>
<p>C4: FLOAT ARM OBSTRUCTED OR COLLISION BETWEEN THE FUEL FIRED BOOSTER HEATER PIPE (IF EQUIPPED) AND THE FLOAT ARM.</p>	
	<p>1 Remove the fuel pump and sender unit/fuel level sensor.</p>

DIAGNOSIS AND TESTING

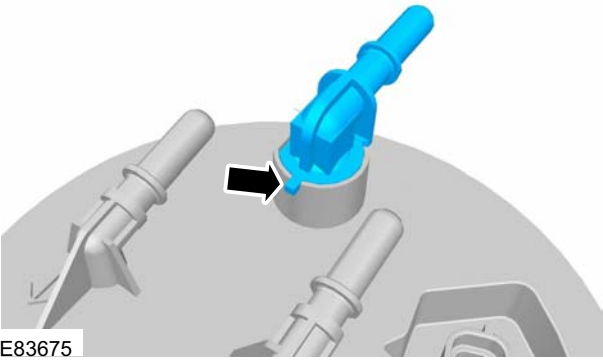
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83680</p>	<p>2 Check whether the fuel fired booster heater pipe (if equipped) or any foreign material is obstructing the float arm.</p>
	<p>3 Check for any foreign material or obstruction that prevents the float arm from moving correctly.</p> <ul style="list-style-type: none"> • Is there any sign of foreign material or causes of obstruction? <p>→ Yes REMOVE the foreign material or the cause of the obstruction. Test the system for normal operation.</p> <p>→ No INSTALL a new fuel level resistor card.</p> <p>REFER to: Fuel Level Resistor Card (310-01 Fuel Tank and Lines, Removal and Installation). Test the system for normal operation.</p>

DIAGNOSIS AND TESTING

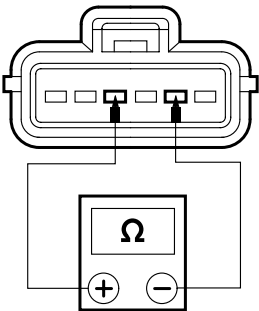
PINPOINT TEST D : FUEL GAUGE POINTER DELAYED IN MOVING UP WHEN THE FUEL TANK IS REFILLED

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: CHECK THE OPERATION OF THE FUEL GAUGE POINTER	
	<p>NOTE: The fuel gauge pointer should move smoothly from empty to full in 2.5 seconds. At the maximum full position, the fuel gauge pointer must be on the full mark and not below it.</p> <p>1 Carry out the instrument cluster Self-Diagnostic Mode.</p> <ul style="list-style-type: none"> • Does the fuel gauge pointer operate correctly? <p>→ Yes Vehicles with fuel fired booster heater, GO to D2. Vehicles without fuel fired booster heater, GO to D3.</p> <p>→ No REFER to the WDS. SELECT Guided Diagnostic/Body/Instrument Panel and Console/Instrument Cluster/Fuel Gauge and follow the instructions on the display.</p>
D2: CHECK THE ORIENTATION OF THE FUEL FIRED BOOSTER HEATER PORT (IF EQUIPPED)	
	<p>1 Remove the fuel tank.</p> <p>REFER to: Fuel Tank - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)/2.5L Duratec-ST (VI5), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation).</p>

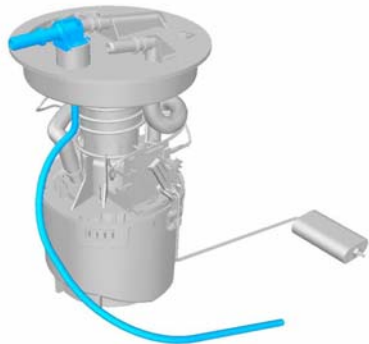
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83675</p>	<p>2 Check that the fuel fired booster heater port locating pin is correctly located into the slot.</p> <ul style="list-style-type: none"> Is the fuel fired booster heater port correctly installed? <p>→ Yes GO to D3.</p> <p>→ No INSTALL the fuel fired booster heater port correctly. Test the system for normal operation.</p>
D3: TEST THE OPERATION OF THE FUEL PUMP AND SENDER UNIT/FUEL LEVEL SENSOR	
	<p>1 Remove the fuel tank.</p> <p>REFER to: Fuel Tank - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)/2.5L Duratec-ST (VI5), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation).</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83280</p>	<p>2 Measure the resistance between the fuel pump and sender unit/fuel level sensor C732 pin 2, component side and pin 4, component side with the fuel tank upright on a level surface and with the fuel tank inverted on a level surface.</p> <ul style="list-style-type: none"> Is the resistance between 200 Ohms and 206 Ohms with the fuel tank in the upright position and between 7.7 Ohms and 9.3 Ohms in the inverted position? <p>→ Yes INSTALL the fuel tank.</p> <p>REFER to: Fuel Tank - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (M14)/2.0L Duratec-HE (M14)/2.5L Duratec-ST (V15), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation). Test the system for normal operation.</p> <p>→ No GO to D4.</p>
<p>D4: FLOAT ARM OBSTRUCTED OR COLLISION BETWEEN THE FUEL FIRED BOOSTER HEATER PIPE (IF EQUIPPED) AND THE FLOAT ARM.</p>	
	<p>1 Remove the fuel pump and sender unit/fuel level sensor.</p>

DIAGNOSIS AND TESTING

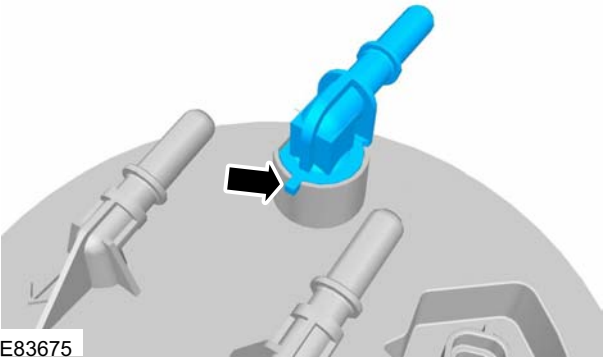
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83680</p>	<p>2 Check whether the fuel fired booster heater pipe (if equipped) or any foreign material is obstructing the float arm.</p>
	<p>3 Check for any foreign material or obstruction that prevents the float arm from moving correctly.</p> <ul style="list-style-type: none"> • Is there any sign of foreign material or causes of obstruction? <p>→ Yes REMOVE the foreign material or the cause of the obstruction. Test the system for normal operation.</p> <p>→ No INSTALL a new fuel level resistor card.</p> <p>REFER to: Fuel Level Resistor Card (310-01 Fuel Tank and Lines, Removal and Installation). Test the system for normal operation.</p>

DIAGNOSIS AND TESTING

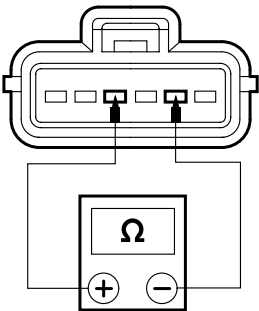
PINPOINT TEST E : FUEL GAUGE POINTER FLUCTUATES UP AND DOWN WHILE DRIVING ON STRAIGHT/FLAT ROADS

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: CHECK THE OPERATION OF THE FUEL GAUGE POINTER	
	<p>NOTE: The fuel gauge pointer should move smoothly from empty to full in 2.5 seconds. At the maximum full position, the fuel gauge pointer must be on the full mark and not below it.</p> <p>1 Carry out the instrument cluster Self-Diagnostic Mode.</p> <ul style="list-style-type: none"> • Does the fuel gauge pointer operate correctly? <p>→ Yes Vehicles with fuel fired booster heater, GO to E2. Vehicles without fuel fired booster heater, GO to E3.</p> <p>→ No REFER to the WDS. SELECT Guided Diagnostic/Body/Instrument Panel and Console/Instrument Cluster/Fuel Gauge and follow the instructions on the display.</p>
E2: CHECK THE ORIENTATION OF THE FUEL FIRED BOOSTER HEATER PORT (IF EQUIPPED)	
	<p>1 Remove the fuel tank.</p> <p>REFER to: Fuel Tank - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (M14)/2.0L Duratec-HE (M14)/2.5L Duratec-ST (V15), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation).</p>

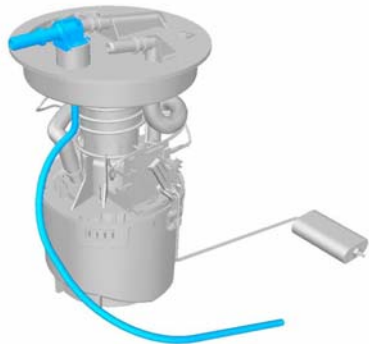
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83675</p>	<p>2 Check that the fuel fired booster heater port locating pin is correctly located into the slot.</p> <ul style="list-style-type: none"> Is the fuel fired booster heater port correctly installed? <p>→ Yes GO to E3.</p> <p>→ No INSTALL the fuel fired booster heater port correctly. Test the system for normal operation.</p>
E3: TEST THE OPERATION OF THE FUEL PUMP AND SENDER UNIT/FUEL LEVEL SENSOR	
	<p>1 Remove the fuel tank.</p> <p>REFER to: Fuel Tank - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)/2.5L Duratec-ST (VI5), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation).</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83280</p>	<p>2 Measure the resistance between the fuel pump and sender unit/fuel level sensor C732 pin 2, component side and pin 4, component side with the fuel tank upright on a level surface and with the fuel tank inverted on a level surface.</p> <ul style="list-style-type: none"> Is the resistance between 200 Ohms and 206 Ohms with the fuel tank in the upright position and between 7.7 Ohms and 9.3 Ohms in the inverted position? <p>→ Yes INSTALL the fuel tank.</p> <p>REFER to: Fuel Tank - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (M14)/2.0L Duratec-HE (M14)/2.5L Duratec-ST (V15), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation). Test the system for normal operation.</p> <p>→ No GO to E4.</p>
<p>E4: FLOAT ARM OBSTRUCTED OR COLLISION BETWEEN THE FUEL FIRED BOOSTER HEATER PIPE (IF EQUIPPED) AND THE FLOAT ARM.</p>	
	<p>1 Remove the fuel pump and sender unit/fuel level sensor.</p>

DIAGNOSIS AND TESTING

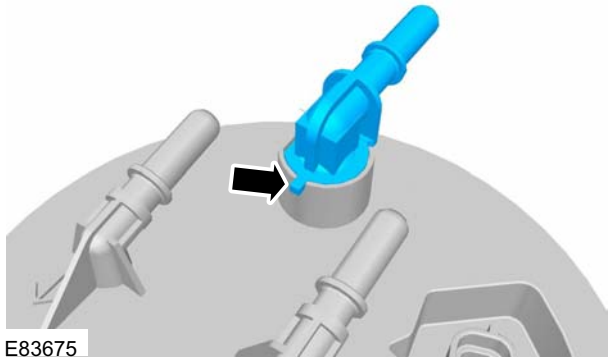
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83680</p>	<p>2 Check whether the fuel fired booster heater pipe (if equipped) or any foreign material is obstructing the float arm.</p>
	<p>3 Check for any foreign material or obstruction that prevents the float arm from moving correctly.</p> <ul style="list-style-type: none"> • Is there any sign of foreign material or causes of obstruction? <p>→ Yes REMOVE the foreign material or the cause of the obstruction. Test the system for normal operation.</p> <p>→ No INSTALL a new fuel level resistor card.</p> <p>REFER to: Fuel Level Resistor Card (310-01 Fuel Tank and Lines, Removal and Installation). Test the system for normal operation.</p>

DIAGNOSIS AND TESTING

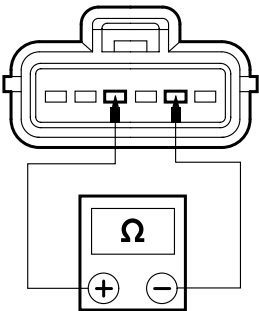
PINPOINT TEST F : VEHICLE RUNS OUT OF FUEL BUT THE FUEL GAUGE INDICATES A QUANTITY OF FUEL LEFT IN THE FUEL TANK

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F1: CHECK THE OPERATION OF THE FUEL GAUGE POINTER	
	<p>NOTE: The fuel gauge pointer should move smoothly from empty to full in 2.5 seconds. At the maximum full position, the fuel gauge pointer must be on the full mark and not below it.</p> <p>1 Carry out the instrument cluster Self-Diagnostic Mode.</p> <ul style="list-style-type: none"> • Does the fuel gauge pointer operate correctly? <p>→ Yes Vehicles with fuel fired booster heater, GO to F2. Vehicles without fuel fired booster heater, GO to F3.</p> <p>→ No REFER to the WDS. SELECT Guided Diagnostic/Body/Instrument Panel and Console/Instrument Cluster/Fuel Gauge and follow the instructions on the display.</p>
F2: CHECK THE ORIENTATION OF THE FUEL FIRED BOOSTER HEATER PORT (IF EQUIPPED)	
	<p>1 Remove the fuel tank.</p> <p>REFER to: Fuel Tank - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)/2.5L Duratec-ST (VI5), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation).</p>

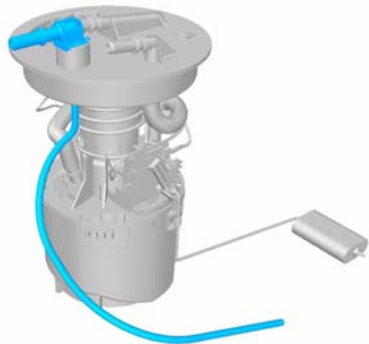
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83675</p>	<p>2 Check that the fuel fired booster heater port locating pin is correctly located into the slot.</p> <ul style="list-style-type: none"> Is the fuel fired booster heater port correctly installed? <p>→ Yes GO to F3.</p> <p>→ No INSTALL the fuel fired booster heater port correctly. Test the system for normal operation.</p>
F3: TEST THE OPERATION OF THE FUEL PUMP AND SENDER UNIT/FUEL LEVEL SENSOR	
	<p>1 Remove the fuel tank.</p> <p>REFER to: Fuel Tank - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4)/2.5L Duratec-ST (VI5), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation).</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83280</p>	<p>2 Measure the resistance between the fuel pump and sender unit/fuel level sensor C732 pin 2, component side and pin 4, component side with the fuel tank upright on a level surface and with the fuel tank inverted on a level surface.</p> <ul style="list-style-type: none"> Is the resistance between 200 Ohms and 206 Ohms with the fuel tank in the upright position and between 7.7 Ohms and 9.3 Ohms in the inverted position? <p>→ Yes INSTALL the fuel tank.</p> <p>REFER to: Fuel Tank - 1.6L Duratec-16V (Sigma)/1.6L Duratec-16V Ti-VCT (Sigma)/1.8L Duratec-HE (M14)/2.0L Duratec-HE (M14)/2.5L Duratec-ST (VI5), Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation) / Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Fuel Additive Tank, Vehicles Without: Fuel Fired Booster Heater (310-01 Fuel Tank and Lines, Removal and Installation)</p> <p>/ Fuel Tank - 1.6L Duratorq-TDCi (DV) Diesel/1.8L Duratorq-TDCi (Lynx) Diesel/2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Fuel Fired Booster Heater/Fuel Additive Tank (310-01 Fuel Tank and Lines, Removal and Installation). Test the system for normal operation.</p> <p>→ No GO to F4.</p>
<p>F4: FLOAT ARM OBSTRUCTED OR COLLISION BETWEEN THE FUEL FIRED BOOSTER HEATER PIPE (IF EQUIPPED) AND THE FLOAT ARM.</p>	
	<p>1 Remove the fuel pump and sender unit/fuel level sensor.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83680</p>	<p>2 Check whether the fuel fired booster heater pipe (if equipped) or any foreign material is obstructing the float arm.</p>
	<p>3 Check for any foreign material or obstruction that prevents the float arm from moving correctly.</p> <ul style="list-style-type: none"> • Is there any sign of foreign material or causes of obstruction? → Yes REMOVE the foreign material or the cause of the obstruction. Test the system for normal operation. → No INSTALL a new fuel level resistor card. REFER to: Fuel Level Resistor Card (310-01 Fuel Tank and Lines, Removal and Installation). Test the system for normal operation.

Configuration of the Instrument Cluster

The instrument cluster is a programmable module, which must be configured by selecting the Programmable Module Installation Routine on the WDS.

NOTE: When the new instrument cluster has been configured with the odometer value, its configuration cannot be decreased or matched. A new configuration will result in an increase in the displayed odometer value by a minimum of two units.

NOTE: The odometer value must be recorded from the original instrument cluster before removal.

If the odometer value cannot be obtained from the original instrument cluster (display failure) the customer should supply the approximate value.

The following features will need to be configured when a new instrument cluster is installed:

- Anti-lock Brake System (ABS)
- All wheel drive
- Keyless vehicle entry
- Electronic power assisted steering
- Trip computer
- Voice control
- Parking aid
- Belt minder
- Safety belt not fastened
- Right hand drive
- Overspeed warning
- Reverse warning
- Turbocharger boost pressure
- Speed control
- Auxiliary heater

DIAGNOSIS AND TESTING

- Suspension control
- Washer fluid sensor
- Navigation
- Fuel cap release
- Engine type
- Display language

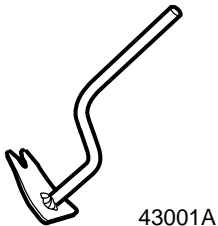
In addition the new instrument cluster will require the original odometer value to be entered.

After the installation and configuration of a new instrument cluster. The passive anti-theft system (PATS) will require programming by selecting the Security Access routine on the WDS.

REMOVAL AND INSTALLATION

Instrument Cluster

Special Tool(s)

 <p>43001A</p>	<p>Remover, Door Trim Panel 501-028A (43-001A)</p>
---	--

CAUTION: At no time should the battery positive terminal be connected with the audio unit disconnected. The clock function of the audio unit is controlled by communication with the instrument cluster via the control area network (CAN). If the battery positive terminal is connected with the audio unit disconnected, the instrument cluster will cancel the clock function and --:-- will be displayed when the audio unit is installed.

NOTE: If a new instrument cluster is to be installed, connect WDS and upload the instrument cluster configuration information using the programmable modules installation routine prior to commencing the removal of the instrument cluster.

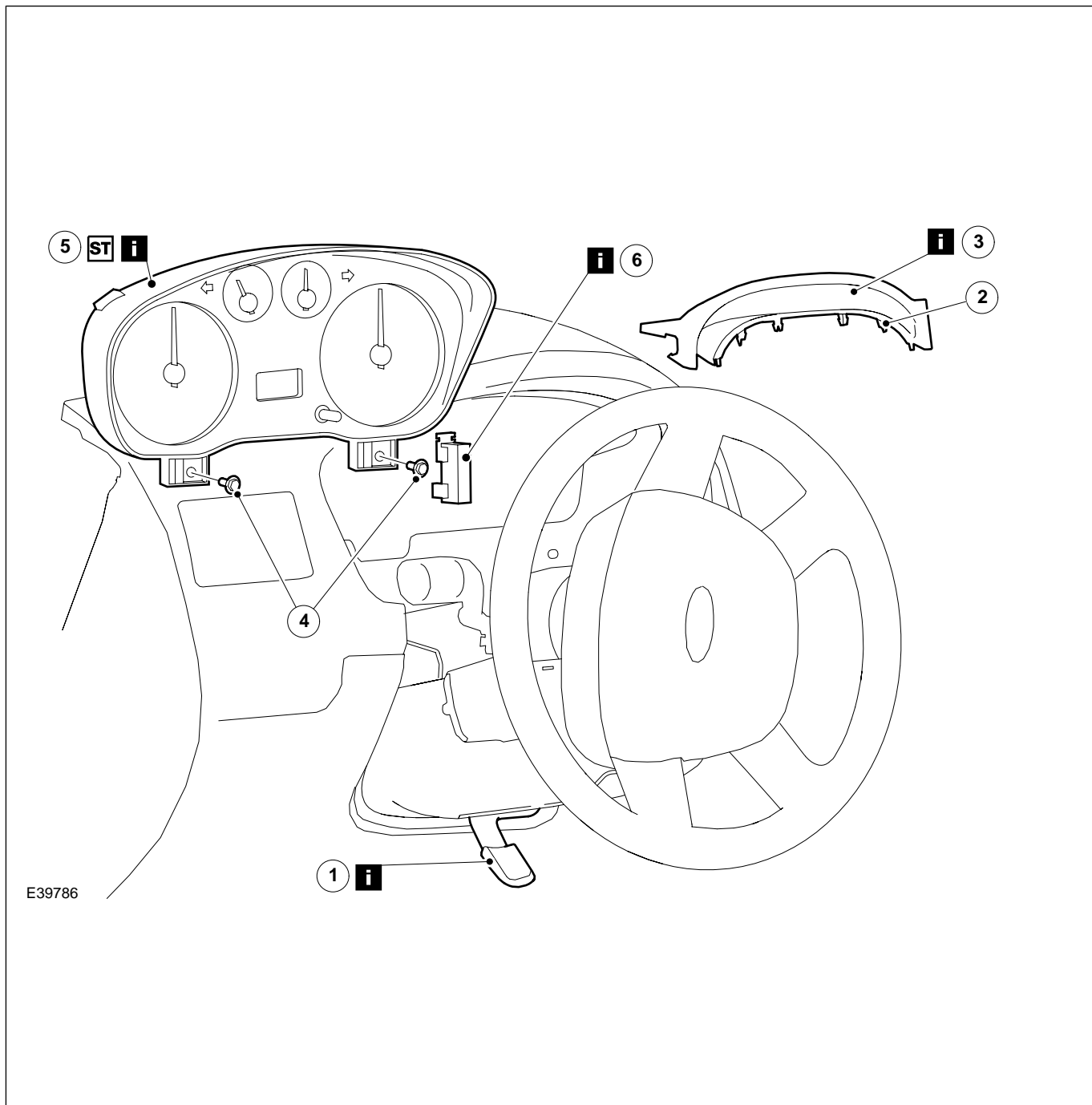
NOTE: If a new instrument cluster is to be installed, the odometer value must be recorded from the original instrument cluster before removal as this will be required when configuring the new instrument cluster. If the odometer value cannot be obtained from the instrument cluster (display failure), the customer should supply the approximate odometer value.

1. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

2. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



E39786

Item	Description
1	Steering column adjustment lever See Removal Detail
2	Instrument cluster bezel gaiter to steering column upper shroud
3	Instrument cluster bezel See Removal Detail
4	Instrument cluster retaining screws

Item	Description
5	Instrument cluster See Removal Detail
6	Instrument cluster electrical connector See Removal Detail

3. To install, reverse the removal procedure.

NOTE: If a new instrument cluster is being installed, connect WDS and download the instrument cluster configuration information to the newly installed instrument cluster using the programmable modules installation routine.

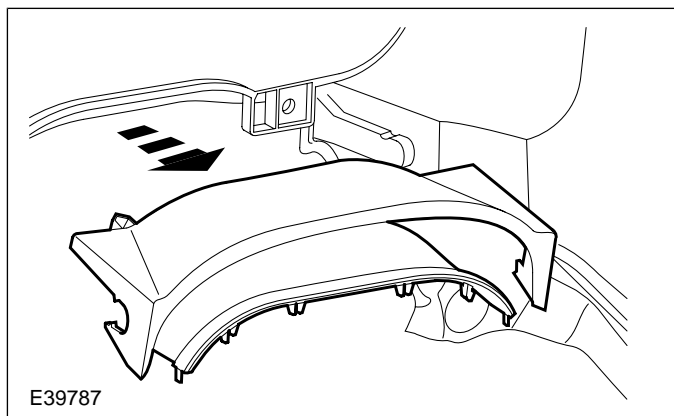
REMOVAL AND INSTALLATION

NOTE: If a new instrument cluster is being installed, connect WDS and configure the newly

installed instrument cluster to the PATS system.

Removal Details**Item 1 Steering column adjustment lever**

1. Adjust the steering column to its maximum extension and lowest position.

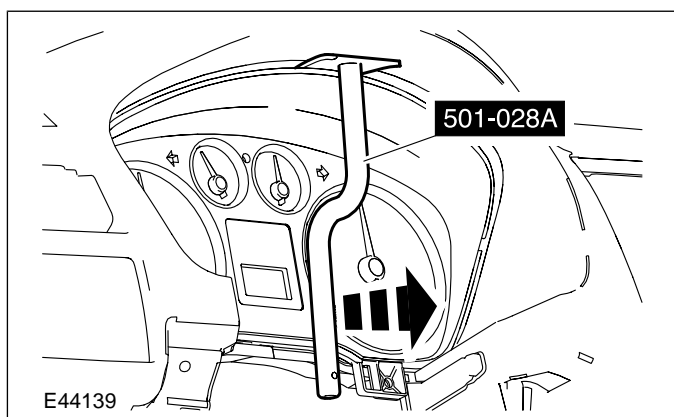
Item 3 Instrument cluster bezel

1. Pull the instrument cluster bezel forward.

Item 5 Instrument cluster

CAUTION: Make sure the instrument cluster lens is protected by a clean soft cloth. Failure to follow this instruction may result in damage to the instrument cluster lens.

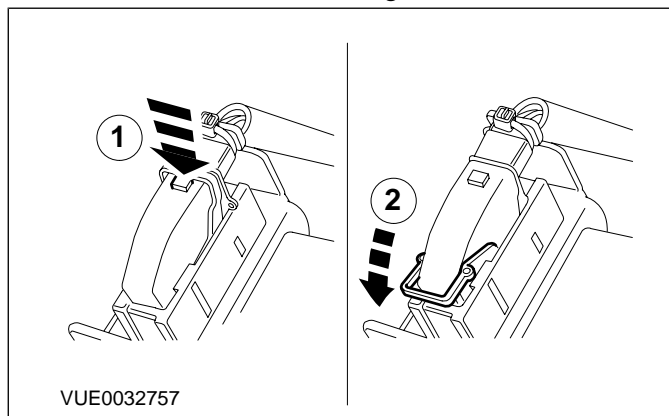
1. Using the special tool, detach the instrument cluster from the instrument panel.

**Item 6 Instrument cluster electrical connector**

1. Disconnect the instrument cluster electrical connector.

1. Press the locking tang.

2. Detach the self locating electrical connector.



SECTION 413-06 Horn

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Inspection and Verification.....	413-06-3
Pinpoint Tests.....	413-06-3
REMOVAL AND INSTALLATION	
Horn.....	413-06-8
Horn Switch..... (33 523 0)	413-06-9



SPECIFICATIONS

Description	Nm	lb-ft	lb-in
Horn retaining bolt	25	18	-



DIAGNOSIS AND TESTING

Horn

Principles of Operation

The horn system consists of a relay, a steering wheel switch and either one or two horns. The horn(s) receives voltage from the switched side of the relay, and the relay switch is controlled on its ground side by the steering wheel switch.

The horn relay, is located in the Battery junction box (BJB) and is supplied with a permanent voltage from the battery.

The steering wheel horn switch shares the steering wheel clockspring circuit with the air-bag circuit. Each of these systems work completely independent of each other.

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Electrical
<ul style="list-style-type: none"> • Fuse(s) • Wiring harness • Electrical connector(s) • Horn switch • Horn • Clockspring • Horn relay • BJB

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Symptom Chart

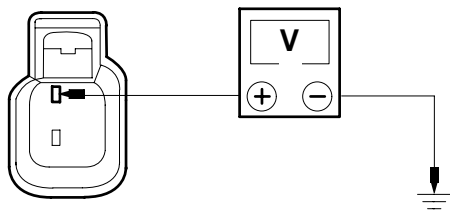
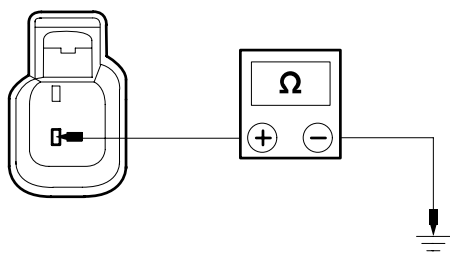
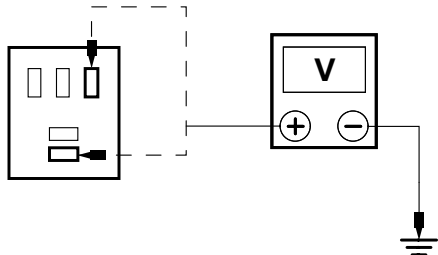
Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • The horn is inoperative 	<ul style="list-style-type: none"> • Circuit(s). • Horn. • Horn relay. • Clockspring. • Horn switch. 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.
<ul style="list-style-type: none"> • The horn is always on 	<ul style="list-style-type: none"> • Horn relay. • Horn switch. • Circuit(s). • Clockspring. 	<ul style="list-style-type: none"> • GO to Pinpoint Test B.

Pinpoint Tests

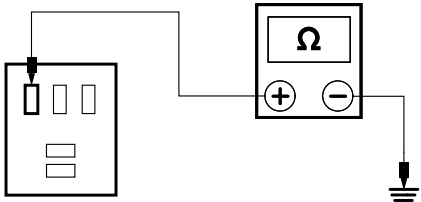
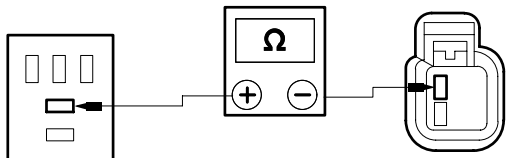
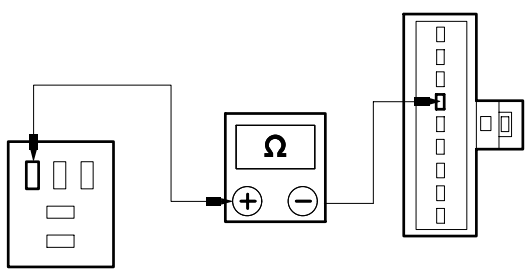
PINPOINT TEST A : THE HORN IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK POWER TO THE HORN	
	1 Disconnect Horn C77.

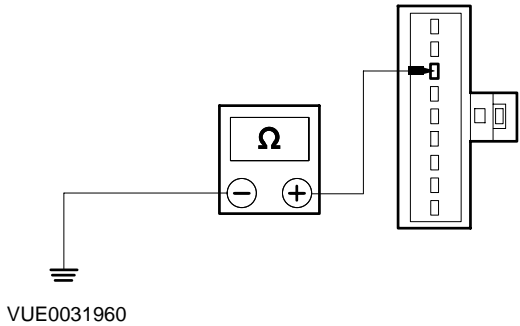
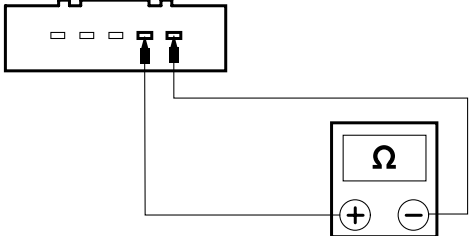
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VUE0003574</p>	<p>2 Measure the voltage between the horn C77 pin 1, circuit 29S-GJ1 (OG/BU), harness side and ground while pressing the horn switch.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to A2. → No GO to A3.
<p>A2: CHECK GROUND TO THE HORN</p>	
 <p>VUE0003575</p>	<p>1 Measure the resistance between the horn C77 pin 2, circuit 31-GJ1 (BK), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new horn. REFER to Horn - in this section. TEST the system for normal operation. → No REPAIR circuit 31-GJ1 (BK). TEST the system for normal operation.
<p>A3: CHECK POWER TO THE HORN RELAY</p>	
 <p>E43186</p>	<p>1 Disconnect Horn Relay C1002.</p> <p>2 Measure the voltage between the horn relay C1002 pin 1, harness side and ground; and horn relay C1002 pin 3, harness side and ground.</p> <ul style="list-style-type: none"> Are the voltages greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to A4. → No INSTALL a new BJB. TEST the system for normal operation.

DIAGNOSIS AND TESTING

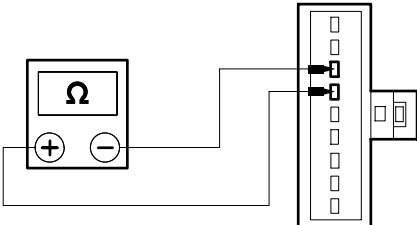
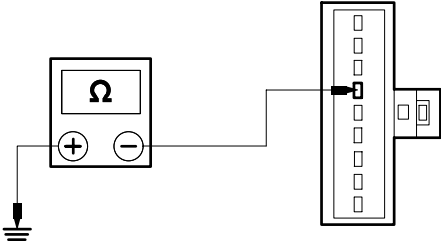
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A4: CHECK HORN SWITCH CIRCUIT FOR OPEN	
 <p>E43187</p>	<p>1 Measure the resistance between the horn relay C1002 pin 2, circuit 91S-GJ7 (BK/BU), harness side and ground while pressing the horn switch.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes GO to A5. → No GO to A6.
A5: CHECK CIRCUIT 29S-GJ1 (OG/BU) FOR OPEN	
 <p>VUE0031962</p>	<p>1 Measure the resistance between the horn relay C1002 pin 5, circuit 29S-GJ1 (OG/BU), harness side and horn C77 pin 1, circuit 29S-GJ1 (OG/BU), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes INSTALL a new horn relay. TEST the system for normal operation. → No REPAIR the circuit. TEST the system for normal operation.
A6: CHECK CIRCUIT 91S-GJ7 (BK/BU) FOR OPEN	
<p>▲ WARNING: To deactivate the driver air bag, refer to the procedure in section 501-20B for the correct air bag deactivation procedure. Failure to follow this instruction, may result in personal injury.</p>	
 <p>VUE0031961</p>	<p>1 Disconnect Clockspring C896.</p> <p>2 Measure the resistance between the clockspring C896 pin 6, circuit 91S-GJ7 (BK/BU), harness side and horn relay C1002 pin 2, circuit 91S-GJ7 (BK/BU), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes GO to A7. → No REPAIR the circuit. TEST the system for normal operation.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A7: CHECK CIRCUIT 91-PG30 (BK/WH) FOR OPEN	
 <p>VUE0031960</p>	<ol style="list-style-type: none"> <li> <p>1 Measure the resistance between the clockspring C896 pin 7, circuit 91-PG30 (BK/WH), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? → Yes GO to A8. → No REPAIR the circuit. TEST the system for normal operation.
A8: CHECK THE HORN SWITCH	
 <p>E43054</p>	<ol style="list-style-type: none"> <li> <p>1 Detach the drivers air bag module. REFER to Section 501-20A [Safety Belt System] / 501-20B [Supplemental Restraint System].</p> <li> <p>2 Disconnect Speed control switch C921.</p> <li> <p>3 Measure the resistance between the speed control switch C921 pin 4, Harness side and speed control switch C921 pin 5, harness side while pressing the horn switch.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? → Yes INSTALL a new clockspring. REFER to Section 501-20A [Safety Belt System] / 501-20B [Supplemental Restraint System]. TEST the system for normal operation. → No INSTALL a new driver air bag module. REFER to Section 501-20A [Safety Belt System] / 501-20B [Supplemental Restraint System]. TEST the system for normal operation.

DIAGNOSIS AND TESTING

PINPOINT TEST B : THE HORN IS ALWAYS ON

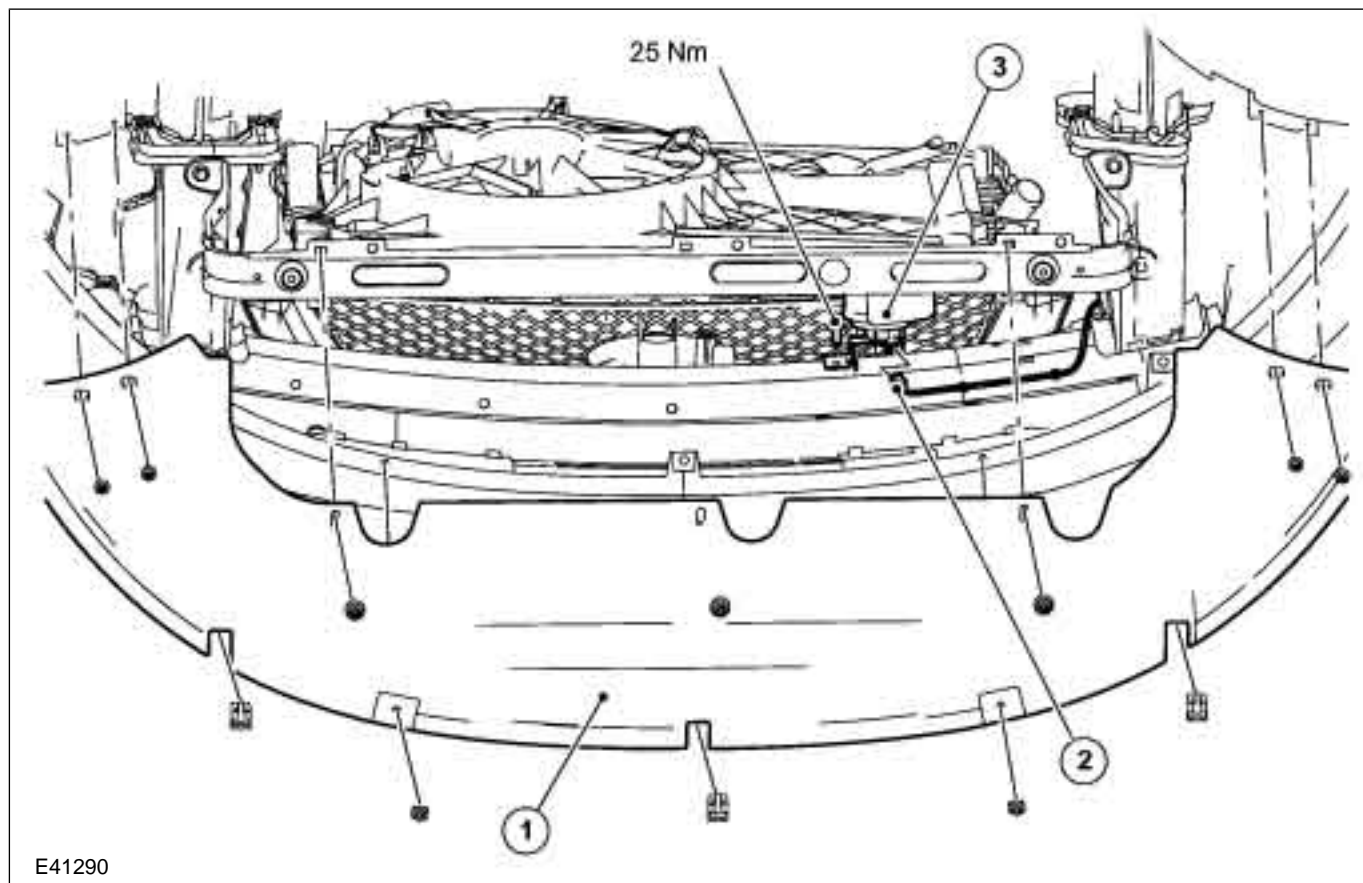
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK CIRCUIT 29S-GJ1 (OG/BU) FOR SHORT TO BATTERY POSITIVE	
	<p>1 Disconnect Horn Relay C1002.</p> <ul style="list-style-type: none"> Does the horn stop sounding with the horn relay C1002 disconnected? <p>→ Yes GO to B2.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>
B2: CHECK THE HORN SWITCH CIRCUIT FOR CONTINUITY	
 <p>VUE0031959</p>	<p>1 Disconnect Clockspring C896.</p> <p>2 Measure the resistance between the clockspring C896 pin 6, circuit 91S-GJ7 (BK/BU), component side and clockspring C896 pin 7, circuit 91-PG30 (BK/WH), component side.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? <p>→ Yes GO to B3.</p> <p>→ No INSTALL a new driver air bag module. REFER to Section 501-20A [Safety Belt System] / 501-20B [Supplemental Restraint System]. TEST the system for normal operation.</p>
B3: CHECK HORN SWITCH CIRCUIT FOR SHORT TO GROUND	
 <p>VUE0031958</p>	<p>1 Measure the resistance between the clockspring C896 pin 6, circuit 91S-GJ7 (BK/BU), component side and ground.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? <p>→ Yes REPAIR circuit 91S-GJ7 (BK/BU). TEST the system for normal operation.</p> <p>→ No INSTALL a new driver air bag module. REFER to Section 501-20A [Safety Belt System] / 501-20B [Supplemental Restraint System]. TEST the system for normal operation.</p>

REMOVAL AND INSTALLATION

Horn

1. Raise and support the vehicle. For additional information, refer to Section 100-02 [Jacking and Lifting].

2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Radiator splash shield
2	Horn electrical connector
3	Horn

3. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION**Horn Switch(33 523 0)**

1. The horn switch is an integral part of the drivers air bag module. Remove the driver air bag module. For additional information, refer to Section **501-20A [Safety Belt System]** / **501-20B [Supplemental Restraint System]**.



SECTION 413-07 Clock

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Clock..... (33 374 0)	413-07-3





DIAGNOSIS AND TESTING

Clock

NOTE: The clock and instrument cluster are one component and can not be diagnosed separately.

REFER to Section [413-01 \[Instrument Cluster\]](#).



REMOVAL AND INSTALLATION

Clock(33 374 0)

1. **NOTE:** The clock and instrument cluster are one component and can not be removed separately.

For additional information, refer to Section **413-01 [Instrument Cluster]**.



SECTION 413-08 Information and Message Center

VEHICLE APPLICATION: 2008.75 Focus ST C307

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REMOVAL AND INSTALLATION	
Message Center..... (33 367 0)	413-08-3



DIAGNOSIS AND TESTING

Information and Message Center

NOTE: The information and message center and the instrument cluster are one component and can not be diagnosed separately.

REFER to Section [413-01 \[Instrument Cluster\]](#).

REMOVAL AND INSTALLATION**Message Center(33 367 0)**

NOTE: The message center and the instrument cluster are one component and can not be removed separately.

1. **Remove the instrument cluster. For additional information, refer to Section [413-01 \[Instrument Cluster\]](#).**



SECTION 413-09 Warning Devices

VEHICLE APPLICATION: 2008.75 Focus ST C307

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DIAGNOSIS AND TESTING

Warning Devices

Refer to Wiring Diagrams Section 501-20A, for schematic and connector information.

General Equipment

Worldwide Diagnostic System (WDS)

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> - Safety belt buckle 	<ul style="list-style-type: none"> - Wiring harness - Electrical connector(s) - Safety belt buckle switch - Restraints control module

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, retrieve the Diagnostic Trouble Codes (DTCs) using Worldwide Diagnostic System (WDS).
5. If DTC B2433 is displayed by WDS.

REFER to: **Air Bag and Safety Belt Pretensioner Supplemental Restraint System (SRS)** (501-20B Supplemental Restraint System, Diagnosis and Testing).

6. If no DTCs are displayed relating to the symptom, refer to the Symptom Chart.

Symptom Chart

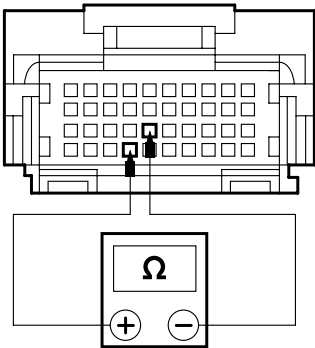
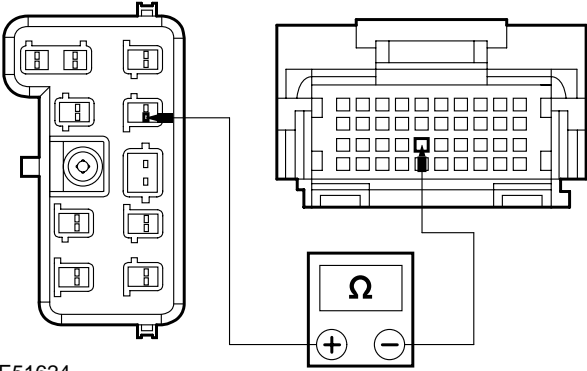
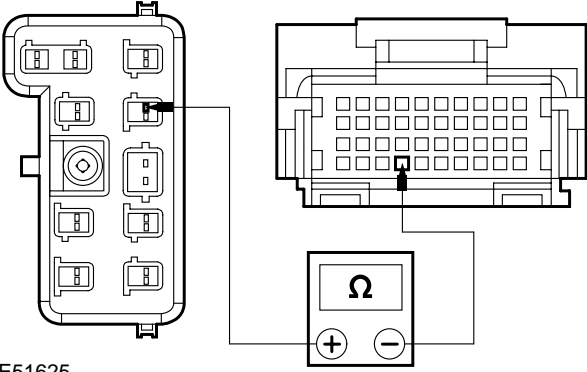
Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • The safety belt indicator does not illuminate 	<ul style="list-style-type: none"> • Driver safety belt buckle switch. • Circuit(s). • Restraints Control Module (RCM). 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.
<ul style="list-style-type: none"> • The safety belt indicator is illuminated continuously 	<ul style="list-style-type: none"> • Driver safety belt buckle switch. • Circuit(s). • RCM. 	<ul style="list-style-type: none"> • GO to Pinpoint Test B.

PINPOINT TEST A : THE SAFETY BELT INDICATOR DOES NOT ILLUMINATE

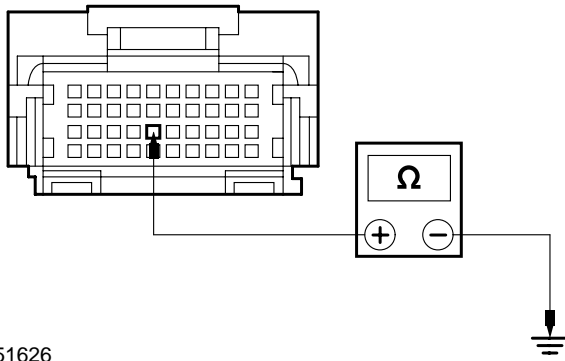
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK THE SAFETY BELT BUCKLE SWITCH CIRCUIT FOR OPEN CIRCUIT	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the supplemental restraint system (SRS), or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p>
	<p>2 Unfasten the driver safety belt.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E51623</p>	<p>3 Disconnect Restraints Control Module (RCM) C423.</p> <p>4 Measure the resistance between the RCM C423 pin 25, circuit 8-JA54 (WH), harness side and C423 pin 34, circuit 9-JA54 (BN), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new RCM.</p> <p>REFER to: Restraints Control Module (RCM) (501-20 Supplemental Restraint System, Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to A2.</p>
<p>A2: CHECK CIRCUIT 8-JA54 (WH) FOR OPEN CIRCUIT</p>	
 <p>E51624</p>	<p>1 Disconnect Safety Belt Buckle Switch C335.</p> <p>2 Measure the resistance between the driver seat C30 pin 14, circuit 8-JA54 (WH), harness side and the RCM C423 pin 25, circuit 8-JA54 (WH), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes GO to A3.</p> <p>→ No REPAIR circuit 8-JA54 (WH). TEST the system for normal operation.</p>
<p>A3: CHECK CIRCUIT 9-JA54 (BN) FOR OPEN CIRCUIT</p>	
 <p>E51625</p>	<p>1 Measure the resistance between the drivers seat C30 pin 13, circuit 9-JA54 (BN), harness side and the RCM C423, pin 34 (BN) harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new driver safety belt buckle and pretensioner.</p> <p>REFER to: Safety Belt Buckle and Preten-sioner (501-20 Safety Belt System, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR circuit 9-JA54 (BN). TEST the system for normal operation.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST B : THE SAFETY BELT INDICATOR IS ILLUMINATED CONTINUOUSLY.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK THE DRIVER SAFETY BELT SWITCH	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Ignition switch in position 0. 3 Disconnect Safety Belt Buckle Switch C335. 4 Ignition switch in position II. <ul style="list-style-type: none"> • Is the safety belt indicator illuminated? → Yes GO to B2. → No INSTALL a new safety belt buckle and pretensioner. REFER to: Safety Belt Buckle and Pretensioner (501-20 Safety Belt System, Removal and Installation). TEST the system for normal operation.
B2: CHECK CIRCUIT 8-JA54 (WH) AND FOR SHORT TO GROUND	
 <p>E51626</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect RCM C423. 3 Measure the resistance between the RCM C423 pin 25, circuit 8-JA54 (WH), harness side and ground. <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? → Yes INSTALL a new RCM. REFER to: Restraints Control Module (RCM) (501-20 Supplemental Restraint System, Removal and Installation). TEST the system for normal operation. → No REPAIR circuit 8-JA54. TEST the system for normal operation.

GENERAL PROCEDURES

Safety Belt Minder Deactivating/Activating

Preparation

1. Apply the parking brake.
2. Place the transmission selector lever in P (Park) - vehicles with automatic transmission or the neutral position - vehicles with manual transmission.
3. Turn the ignition switch to the 0 position.
4. Close all the vehicle doors from the inside of the vehicle.
5. Unbuckle the drivers safety belt.

Deactivating/Activating

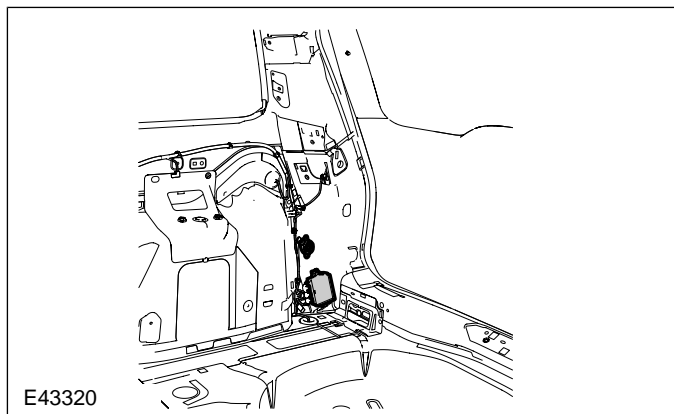
NOTE: Deactivation of the belt minder may also be carried out using WDS. Follow the instructions on the screen.

1. Turn the ignition switch to position II. (Do not start the engine).
2. The safety belt warning indicator will extinguish within 10 seconds.
3. **NOTE:** Step 3 must be completed within 60 seconds or the procedure must be repeated.
Buckle then unbuckle the safety belt nine times, ending with the safety belt unbuckled.
4. The safety belt warning indicator flashes three times to confirm the belt minder status change.
5. To activate the belt minder, repeat Steps 1 through 3.
6. After confirmation, the deactivation/activation procedure is complete.

SECTION 413-13 Parking Aid — Vehicles With: Rear Parking Aid

VEHICLE APPLICATION: 2008.75 Focus ST C307

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DESCRIPTION AND OPERATION**Parking Aid — Vehicles With: Rear Parking Aid****Parking aid control module**

The control unit processes the following functions:

- Processing of the echo signals (sound waves) from the sensors.
- Actuation of the speakers.
- Monitoring of the system and storing of any trouble codes.

Layout and operation

A 4-channel parking aid is available as an option.

The parking aid comprises the following components:

- the parking aid control module
- four ultrasonic sensors
- one speaker

If the ignition lock is turned to the position "II" and reverse gear is engaged then the sensors at the rear of the vehicle are activated. A signal is then sounded to indicate readiness for operation.

After activation the system performs a self-test.

In the event of a fault a signal tone sounds for three seconds at a frequency of 1.5 kHz.

The middle sensors can detect obstacles to the rear of the vehicle at a distance of up to 150 cm. The corner sensors both detect obstacles to the side of the vehicle at a distance of up to 60 cm.

Ultrasonic sensors

The parking aid sensor emits an ultrasonic signal and then receives back the reflected sound waves. The time taken by the sound waves to return to the

sensor corresponds to the distance to the obstacle. The faster the sound waves are reflected, the closer is the obstacle.

The sensors must be kept free of ice, snow, dirt, scratches and dust deposits to ensure reliable operation of the system.

When cleaning the vehicle with a high-pressure water jet, the sensors must only be sprayed for a short time, and never from a distance below 20 cm.

Never use rough or sharp objects to clean the sensors.

Parking Aid — Vehicles With: Rear Parking Aid

413-13-3

413-13-3

DIAGNOSIS AND TESTING

Parking Aid

Refer to Wiring Diagrams Section 413-13, for schematic and connector information.

General Equipment

Worldwide Diagnostic System (WDS) (418-F224)

Principles of Operation

NOTE: The rear parking aid system will be de-activated when a Ford rear trailer tow module is attached to the vehicle.

The ultrasonic parking aid system will default to enabled when the ignition switch is turned to the RUN position, the system is activated by selecting reverse gear. The parking aid system will be disabled if a fault is detected in one of the four rear parking aid sensors, the parking aid speaker or the parking aid module. An error tone approximately 3 seconds long will be emitted from the rear parking aid speaker if a fault is detected. The rear parking aid speaker will also sound for approximately 3 seconds if an error is detected at each ignition cycle or if an error is detected when the system has been activated.

Inspection and Verification

1. Verify the customer concern.

Diagnostic Trouble Codes (DTC) Index

DTC Index

DTC	Description	Possible Source	Action
C1699	Rear outer left sensor signal circuit short to battery	<ul style="list-style-type: none"> • Parking aid sensor signal circuit. • Parking aid module. 	Check the circuit 8-GN22 (WH/GN) for short to battery. IF the circuit is OK, INSTALL a new parking aid module. REFER to: Parking Aid Module (413-13 Parking Aid - Vehicles With: Rear Parking Aid, Removal and Installation). TEST the system for normal operation.
C1700	Rear outer left sensor signal circuit open or short to ground	<ul style="list-style-type: none"> • Parking aid sensor signal circuit. • Parking aid sensor. • Parking aid module. 	GO to Pinpoint Test C.

2. Visually inspect for obvious signs of electrical damage.

Visual Inspection Chart

Electrical
<ul style="list-style-type: none"> – Fuse(s) – Wiring harness(s) – Electrical connector(s) – Battery junction box (BJB) – Rear parking aid sensor(s) – Rear parking aid speaker – Parking aid module

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step
4. If the cause is not visually evident, connect WDS to the data link connector (DLC) and select the vehicle system to be tested from the diagnostic menu.
5. Retrieve the Diagnostic Trouble Code (DTC)s and refer to the DTC Index.
6. If no DTC's are retrieved or there is no communication with the module, proceed to the Symptom Chart to continue diagnostics.

Parking Aid — Vehicles With: Rear Parking Aid

413-13-4

413-13-4

DIAGNOSIS AND TESTING

DTC	Description	Possible Source	Action
C1701	Concern with rear outer left parking aid sensor	<ul style="list-style-type: none"> Rear outer left parking aid sensor. 	CHECK parking aid sensor for contamination. IF a parking sensor is OK. INSTALL a new parking aid sensor. TEST the system for normal operation.
C1702	Rear outer right sensor signal circuit short to battery	<ul style="list-style-type: none"> Parking aid sensor signal circuit. Parking aid module. 	CHECK the circuit 8-GN19 (WH) for short to battery. IF the circuit is OK, INSTALL a new parking aid module. REFER to: Parking Aid Module (413-13 Parking Aid - Vehicles With: Rear Parking Aid, Removal and Installation) . TEST the system for normal operation.
C1703	Rear outer right sensor signal circuit open or short to ground	<ul style="list-style-type: none"> Parking aid sensor signal circuit. Parking aid sensor. Parking aid module. 	GO to Pinpoint Test D.
C1704	Concern with rear outer right parking aid sensor	<ul style="list-style-type: none"> Rear outer right parking aid sensor. 	CHECK parking aid sensor for contamination. IF a parking sensor is OK. INSTALL a new parking aid sensor. TEST the system for normal operation.
C1705	Rear inner left sensor signal circuit short to battery	<ul style="list-style-type: none"> Parking aid sensor signal circuit. Parking aid module. 	CHECK the circuit 8-GN21 (WH/BU) for short to battery. IF the circuit is OK, INSTALL a new parking aid module. REFER to: Parking Aid Module (413-13 Parking Aid - Vehicles With: Rear Parking Aid, Removal and Installation) . TEST the system for normal operation.
C1706	Rear inner left sensor signal circuit open or short to ground	<ul style="list-style-type: none"> Parking aid sensor signal circuit. Parking aid sensor. Parking aid module. 	GO to Pinpoint Test E.
C1707	Concern with rear inner left parking aid sensor	<ul style="list-style-type: none"> Rear inner left parking aid sensor. 	CHECK parking aid sensor for contamination. IF a parking sensor is OK. INSTALL a new parking aid sensor. TEST the system for normal operation.

Parking Aid — Vehicles With: Rear Parking Aid

413-13-5

413-13-5

DIAGNOSIS AND TESTING

DTC	Description	Possible Source	Action
C1708	Rear inner right sensor signal circuit short to battery	<ul style="list-style-type: none"> Parking aid sensor signal circuit. Parking aid module. 	<p>CHECK the circuit 8-GN20 (WH/RD) for short to battery. IF the circuit is OK, INSTALL a new parking aid module.</p> <p>REFER to: Parking Aid Module (413-13 Parking Aid - Vehicles With: Rear Parking Aid, Removal and Installation).</p> <p>TEST the system for normal operation.</p>
C1709	Rear inner right sensor signal circuit open or short to ground	<ul style="list-style-type: none"> Parking aid sensor signal circuit. Parking aid sensor. Parking aid module. 	GO to Pinpoint Test F.
C1710	Concern with rear inner right parking aid sensor	<ul style="list-style-type: none"> Rear inner right parking aid sensor. 	<p>CHECK parking aid sensor for contamination. IF a parking sensor is OK. INSTALL a new parking aid sensor. TEST the system for normal operation.</p>
B1299	Sensor voltage supply short to ground	<ul style="list-style-type: none"> Parking aid sensors voltage supply circuits. 	GO to Pinpoint Test G.
C1742	Parking aid speaker circuit short to ground	<ul style="list-style-type: none"> Parking aid module. circuit(s). 	GO to Pinpoint Test I.
C1743	Parking aid speaker circuit short to battery	<ul style="list-style-type: none"> Parking aid module. circuit(s). 	GO to Pinpoint Test J.
B1342	RAM Error	<ul style="list-style-type: none"> Parking aid module. 	<p>INSTALL a new parking aid module.</p> <p>REFER to: Parking Aid Module (413-13 Parking Aid - Vehicles With: Rear Parking Aid, Removal and Installation).</p> <p>TEST the system for normal operation.</p>
B2477	ROM/EEPROM Error	<ul style="list-style-type: none"> Parking aid module. 	<p>INSTALL a new parking aid module.</p> <p>REFER to: Parking Aid Module (413-13 Parking Aid - Vehicles With: Rear Parking Aid, Removal and Installation).</p> <p>TEST the system for normal operation.</p>

Parking Aid — Vehicles With: Rear Parking Aid

413-13-6

413-13-6

DIAGNOSIS AND TESTING

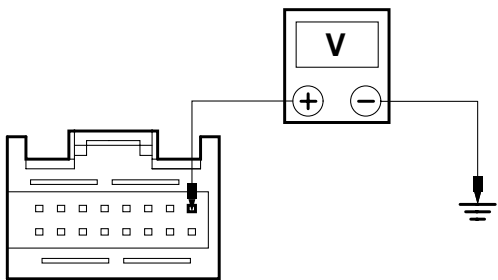
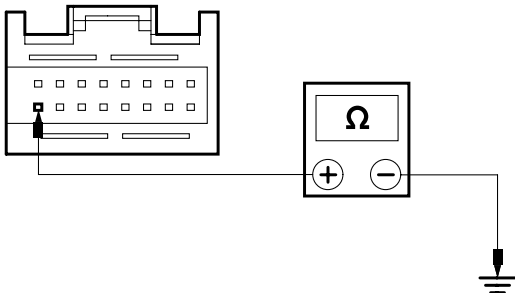
Symptom Chart

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> The rear parking aid is inoperative/does not operate correctly 	<ul style="list-style-type: none"> Fuse. Circuit(s). Parking aid module. 	<ul style="list-style-type: none"> GO to Pinpoint Test A.
<ul style="list-style-type: none"> No communication with the parking aid module 	<ul style="list-style-type: none"> DLC. Circuit(s). Parking aid module. 	<ul style="list-style-type: none"> GO to Pinpoint Test B.

Pinpoint Tests

PINPOINT TEST A : THE REAR PARKING AID IS INOPERATIVE/DOES NOT OPERATE CORRECTLY

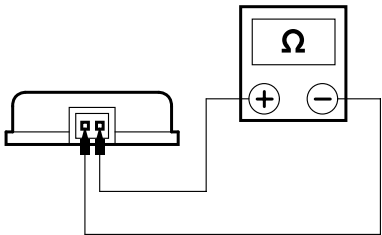
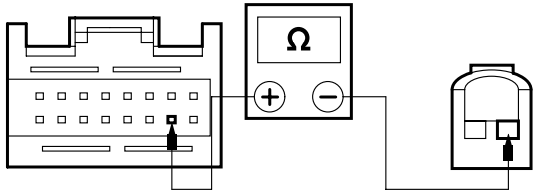
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK FOR VOLTAGE TO THE PARKING AID MODULE	
 <p>E41122</p>	<ol style="list-style-type: none"> 1 Disconnect Parking aid module C622. 2 Ignition switch in position II.
	<ol style="list-style-type: none"> 3 Measure the voltage between the parking aid module C622 pin 1, circuit 15-GN10 (GN/YE), harness side and ground. <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to A2. → No REPAIR the circuit 15-GN10 (GN/YE). TEST the system for normal operation.
A2: CHECK THE PARKING AID MODULE GROUND CIRCUIT	
 <p>E41123</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the parking aid module C622 pin 16, circuit 31-GN10 (BK), harness side and ground. <ul style="list-style-type: none"> Is the resistance less than 5 Ohms? <ul style="list-style-type: none"> → Yes GO to A3. → No REPAIR the circuit 31-GN10 (BK/YE). TEST the system for normal operation.
A3: CHECK THE REVERSE LAMP FOR CORRECT OPERATION	
	<ol style="list-style-type: none"> 1 Select REVERSE.

Parking Aid — Vehicles With: Rear Parking Aid

413-13-7

413-13-7

DIAGNOSIS AND TESTING

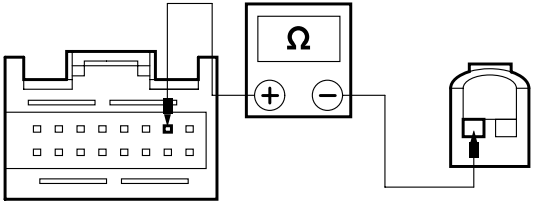
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Check the reverse lamps for correct operation.</p> <ul style="list-style-type: none"> • Do the reversing lamps illuminate? → Yes GO to A4. → No REFER to: Reversing Lamps (417-01 Exterior Lighting, Diagnosis and Testing). TEST the system for normal operation.
<p>A4: CHECK THE REAR PARKING AID SPEAKER FOR CORRECT OPERATION</p>	
	<p>1 Remove the rear parking aid speaker.</p> <p>REFER to: Accessory Drive Belt - 1.6L Duratorq-TDCi (DV) Diesel (303-05 Accessory Drive, Removal and Installation).</p>
 <p>E41163</p>	<p>2 Measure the resistance between the rear parking aid speaker C947 pin 1, and pin 2, component side.</p> <ul style="list-style-type: none"> • Is the resistance 50 Ohms +/- 7.5 Ohms? → Yes GO to A5. → No INSTALL a new rear parking aid speaker. TEST the system for normal operation.
<p>A5: CHECK THE CIRCUIT 8-GN26 FOR OPEN</p>	
 <p>E41162</p>	<p>1 Disconnect Parking aid module C622.</p> <p>2 Measure the resistance between the parking aid module C622 pin 10, circuit 8-GN26 (WH), harness side and the rear parking aid speaker C947 pin 1, circuit 8-GN26 (WH), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 Ohms? → Yes GO to A6. → No REPAIR the circuit. TEST the system for normal operation.

Parking Aid — Vehicles With: Rear Parking Aid

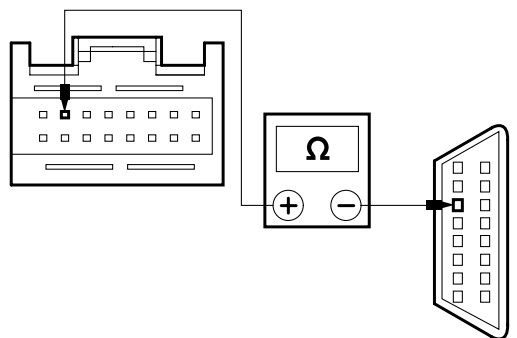
413-13-8

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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A6: CHECK THE CIRCUIT 10-GN26 FOR OPEN	
 <p>E41167</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the parking aid module C622 pin 2, circuit 10-GN26 (GY), harness side and the rear parking aid speaker C947 pin 2, circuit 10-GN26 (GY), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 Ohms? <ul style="list-style-type: none"> → Yes For vehicles fitted with a rear trailer tow module GO to Pinpoint Test H. For vehicles fitted without a rear trailer tow module. INSTALL a new parking aid module. REFER to: Parking Aid Module (413-13 Parking Aid - Vehicles With: Rear Parking Aid, Removal and Installation). TEST the system for normal operation. → No REPAIR the circuit. TEST the system for normal operation.

PINPOINT TEST B : NO COMMUNICATION WITH THE PARKING AID MODULE

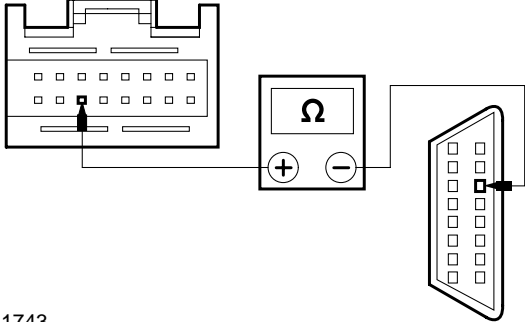
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK THAT WDS IS COMMUNICATING THROUGH THE DLC	
	<ol style="list-style-type: none"> 1 Select an alternative system to check the DLC. <ul style="list-style-type: none"> • Is WDS able to communicate with the selected system. <ul style="list-style-type: none"> → Yes GO to B2. → No CHECK the DLC. For additional information, refer the the Wiring Diagrams.
B2: CHECK THE CIRCUIT 8-EE13 FOR OPEN	
 <p>E41124</p>	<ol style="list-style-type: none"> 1 Disconnect Parking aid module C622. 2 Measure the resistance between the DLC pin 11 and parking aid module C622 pin 7, circuit 8-EE13 (WH/RD), harness side. <ul style="list-style-type: none"> • Is the resistance less the 5 Ohms? <ul style="list-style-type: none"> → Yes GO to B3. → No REPAIR the circuit 8-EE13 (WH/RD). TEST the system for normal operation.

Parking Aid — Vehicles With: Rear Parking Aid

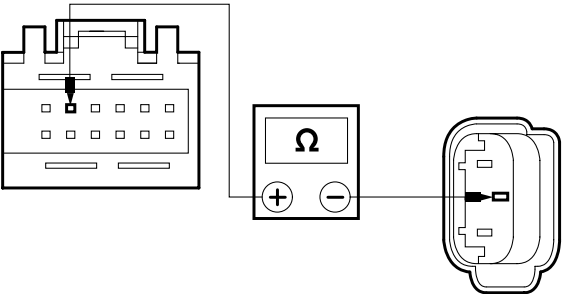
413-13-9

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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B3: CHECK THE DLC CIRCUIT FOR OPEN	
 <p>E41743</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the DLC pin 3 and parking aid module C622 pin 14, harness side. <ul style="list-style-type: none"> • Is the resistance less the 5 Ohms? <ul style="list-style-type: none"> → Yes INSTALL a new parking aid module. REFER to: Parking Aid Module (413-13 Parking Aid - Vehicles With: Rear Parking Aid, Removal and Installation). TEST the system for normal operation. → No REPAIR the circuit. TEST the system for normal operation.

PINPOINT TEST C : DTC C1700 : REAR OUTER LEFT SENSOR SIGNAL CIRCUIT OPEN OR SHORT TO GROUND

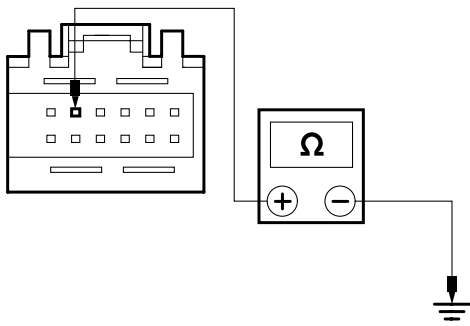
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: CHECK CIRCUIT 8-GN22 (WH/GN) FOR OPEN	
 <p>E41125</p>	<ol style="list-style-type: none"> 1 Disconnect Parking aid module C623. 2 Disconnect Parking aid sensor C607. 3 Measure the resistance between the parking aid module C623 pin 5, circuit 8-GN22 (WH/GN), harness side and parking aid sensor C607 pin 2, circuit 8-GN22 (WH/GN), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 Ohms? <ul style="list-style-type: none"> → Yes GO to C2. → No REPAIR the circuit. TEST the system for normal operation.

Parking Aid — Vehicles With: Rear Parking Aid

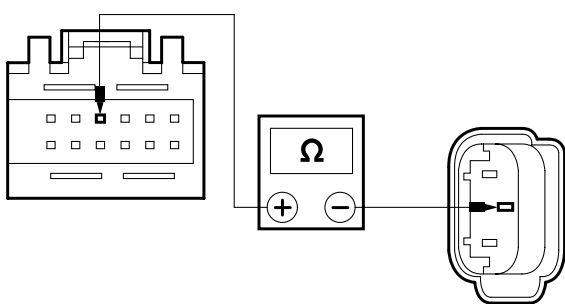
413-13-10

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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C2: CHECK CIRCUIT 8-GN22 (WH/GN) FOR SHORT TO GROUND	
 <p>E41126</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the parking aid module C623 pin 5, circuit 8-GN22 (WH/GN), harness side and ground. <ul style="list-style-type: none"> • Is the resistance greater than 10,000 Ohms? <ul style="list-style-type: none"> → Yes INSTALL a new parking aid sensor. If the concern persists, INSTALL a new parking aid module. REFER to: Parking Aid Module (413-13 Parking Aid - Vehicles With: Rear Parking Aid, Removal and Installation). → No REPAIR the short to ground. TEST the system for normal operation.

PINPOINT TEST D : DTC C1703 : REAR OUTER RIGHT SENSOR SIGNAL CIRCUIT OPEN OR SHORT TO GROUND

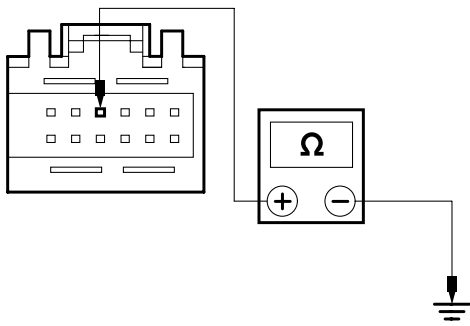
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: CHECK CIRCUIT 8-GN19 (WH) FOR OPEN	
 <p>E41127</p>	<ol style="list-style-type: none"> 1 Disconnect Parking aid module C623. 2 Disconnect Parking aid sensor C604. 3 Measure the resistance between the parking aid module C623 pin 4, circuit 8-GN19 (WH), harness side and parking aid sensor C604 pin 2, circuit 8-GN19 (WH), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 Ohms? <ul style="list-style-type: none"> → Yes GO to D2. → No REPAIR the circuit. TEST the system for normal operation.

Parking Aid — Vehicles With: Rear Parking Aid

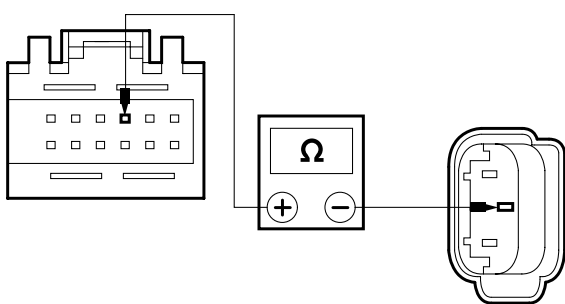
413-13-11

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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D2: CHECK CIRCUIT 8-GN19 (WH) FOR SHORT TO GROUND	
 <p>E41128</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the parking aid module C623 pin 4, circuit 8-GN19 (WH), harness side and ground. <ul style="list-style-type: none"> • Is the resistance greater than 10,000 Ohms? <ul style="list-style-type: none"> → Yes INSTALL a new parking aid sensor. If the concern persists, INSTALL a new parking aid module. REFER to: Parking Aid Module (413-13 Parking Aid - Vehicles With: Rear Parking Aid, Removal and Installation). → No REPAIR the short to ground. TEST the system for normal operation.

PINPOINT TEST E : DTC C1706 : REAR INNER LEFT SENSOR SIGNAL CIRCUIT OPEN OR SHORT TO GROUND

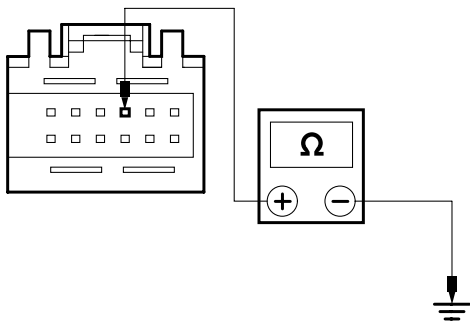
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: CHECK CIRCUIT 8-GN21 (WH/BU) FOR OPEN	
 <p>E41129</p>	<ol style="list-style-type: none"> 1 Disconnect Parking aid module C623. 2 Disconnect Parking aid sensor C606. 3 Measure the resistance between the parking aid module C623 pin 3, circuit 8-GN21 (WH/BU), harness side and parking aid sensor C606 pin 2, circuit 8-GN21 (WH/BU), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 Ohms? <ul style="list-style-type: none"> → Yes GO to E2. → No REPAIR the circuit. TEST the system for normal operation.

Parking Aid — Vehicles With: Rear Parking Aid

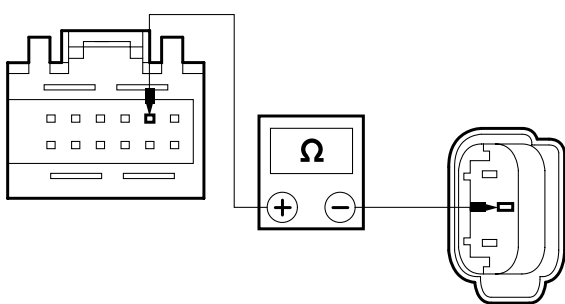
413-13-12

413-13-12

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E2: CHECK CIRCUIT 8-GN21 (WH/BU) FOR SHORT TO GROUND	
 <p>E41130</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the parking aid module C623 pin 3, circuit 8-GN21 (WH/BU), harness side and ground. <ul style="list-style-type: none"> • Is the resistance greater than 10,000 Ohms? <ul style="list-style-type: none"> → Yes INSTALL a new parking aid sensor. If the concern persists, INSTALL a new parking aid module. REFER to: Parking Aid Module (413-13 Parking Aid - Vehicles With: Rear Parking Aid, Removal and Installation). → No REPAIR the short to ground. TEST the system for normal operation.

PINPOINT TEST F : DTC C1709 : REAR INNER RIGHT SENSOR SIGNAL CIRCUIT OPEN OR SHORT TO GROUND

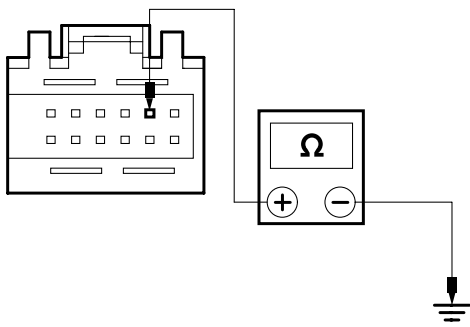
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F1: CHECK CIRCUIT 8-GN20 (WH/RD) FOR OPEN	
 <p>E41131</p>	<ol style="list-style-type: none"> 1 Disconnect Parking aid module C623. 2 Disconnect Parking aid sensor C605. 3 Measure the resistance between the parking aid module C623 pin 2, circuit 8-GN20 (WH/RD), harness side and parking aid sensor C605 pin 2, circuit 8-GN20 (WH/RD), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 Ohms? <ul style="list-style-type: none"> → Yes GO to F2. → No REPAIR the circuit. TEST the system for normal operation.

Parking Aid — Vehicles With: Rear Parking Aid

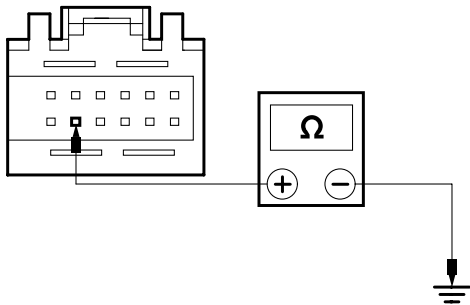
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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F2: CHECK CIRCUIT 8-GN20 (WH/RD) FOR SHORT TO GROUND	
 <p>E41132</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the parking aid module C623 pin 2, circuit 8-GN20 (WH/RD), harness side and ground. <ul style="list-style-type: none"> • Is the resistance greater than 10,000 Ohms? <ul style="list-style-type: none"> → Yes INSTALL a new parking aid sensor. If the concern persists, INSTALL a new parking aid module. REFER to: Parking Aid Module (413-13 Parking Aid - Vehicles With: Rear Parking Aid, Removal and Installation). → No REPAIR the short to ground. TEST the system for normal operation.

PINPOINT TEST G : DTC B1299 : PARKING AID SENSOR VOLTAGE SUPPLY SHORT TO GROUND

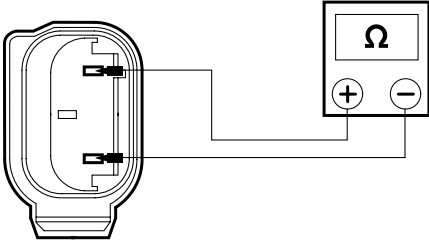
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
G1: CHECK THE CIRCUIT 7-GN19 (YE/RD) FOR SHORT TO GROUND	
	<ol style="list-style-type: none"> 1 Disconnect Parking aid sensors C604, C605, C606, C607.
 <p>E41133</p>	<ol style="list-style-type: none"> 2 Disconnect Parking aid module C623. 3 Measure the resistance between the parking aid module C623 pin 11, circuit 7-GN19 (YE/RD), harness side and ground. <ul style="list-style-type: none"> • Is the resistance greater than 10,000 Ohms? <ul style="list-style-type: none"> → Yes GO to G2. → No REPAIR the short to ground. TEST the system for normal operation.

Parking Aid — Vehicles With: Rear Parking Aid

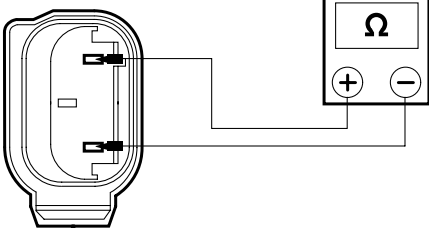
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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
G2: CHECK EACH PARKING AID SENSOR FOR SHORT BETWEEN PINS 1 AND 3	
 <p>E38442</p>	<ol style="list-style-type: none"> <li>1 Measure the resistance of each parking aid sensor between pins 1 and 3 component side. <ul style="list-style-type: none"> <li>• Is the resistance less than 5 Ohms? <li>→ Yes INSTALL a new parking aid sensor(s). TEST the system for normal operation. <li>→ No INSTALL a new parking aid module. TEST the system for normal operation.

PINPOINT TEST H : TRAILER TOW INPUT SHORT TO GROUND

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
H1: CHECK PARKING AID MODULE CIRCUIT 9-GN18 (BN/BU) FOR SHORT TO GROUND	
 <p>E38442</p>	<ol style="list-style-type: none"> <li>1 Disconnect Parking aid module C622. <li>2 Measure the resistance between the parking aid module C622 pin 5, circuit 9-GN18 (BN/BU), harness side and ground. <ul style="list-style-type: none"> <li>• Is the resistance greater than 10,000 Ohms? <li>→ Yes TEST the system for normal operation. <li>→ No REPAIR the short to ground. TEST the system for normal operation.

PINPOINT TEST I : DTC C1742 PARKING AID SPEAKER CIRCUIT SHORT TO GROUND

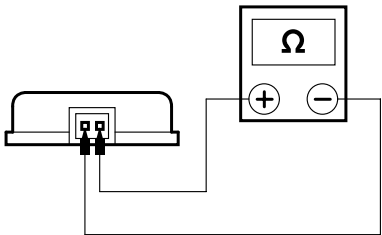
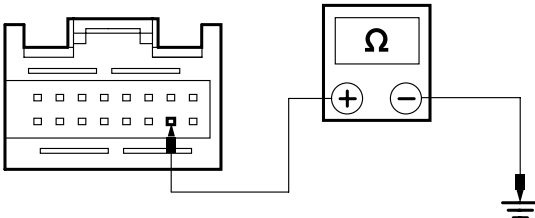
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
I1: CHECK THE REAR PARKING AID SPEAKER FOR CORRECT OPERATION	
	<ol style="list-style-type: none"> <li>1 Remove the rear parking aid speaker. REFER to: Accessory Drive Belt - 1.6L Duratorq-TDCi (DV) Diesel (303-05 Accessory Drive, Removal and Installation).

Parking Aid — Vehicles With: Rear Parking Aid

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DIAGNOSIS AND TESTING

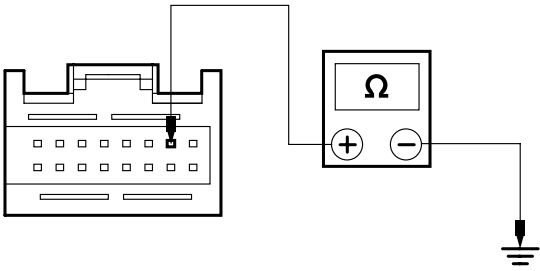
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E41163</p>	<p>2 Measure the resistance between the rear parking aid speaker C947 pin 1, and pin 2, component side.</p> <ul style="list-style-type: none"> Is the resistance 50 Ohms +/- 7.5 Ohms? <p>→ Yes GO to I2.</p> <p>→ No INSTALL a new rear parking aid speaker. TEST the system for normal operation.</p>
<p>I2: CHECK THE CIRCUIT 8-GN26 (WH) FOR SHORT TO GROUND</p>	
 <p>E59860</p>	<p>1 Disconnect Parking Aid Module C622.</p> <p>2 Measure the resistance between the parking aid module C622 pin 10, circuit 8-GN26 (WH), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 Ohms? <p>→ Yes INSTALL a new rear parking aid speaker. TEST the system for normal operation. If the concern persists, INSTALL a new parking aid module.</p> <p>REFER to: Parking Aid Module (413-13 Parking Aid - Vehicles With: Rear Parking Aid, Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to I3.</p>

Parking Aid — Vehicles With: Rear Parking Aid

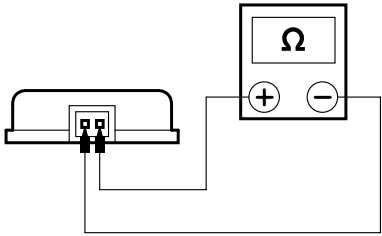
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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
I3: CHECK THE CIRCUIT 10-GN26 (GY) FOR SHORT TO GROUND	
 <p>E59861</p>	<p>1 Measure the resistance between the parking aid module C622 pin 2, circuit 10-GN26 (GY), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 Ohms? <p>→ Yes For vehicles fitted with a rear trailer tow module GO to Pinpoint Test H. For vehicles fitted without a rear trailer tow module. INSTALL a new parking aid module.</p> <p>REFER to: Parking Aid Module (413-13 Parking Aid - Vehicles With: Rear Parking Aid, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR the short to ground. TEST the system for normal operation.</p>

PINPOINT TEST J : DTC C1743 PARKING AID SPEAKER CIRCUIT SHORT TO BATTERY

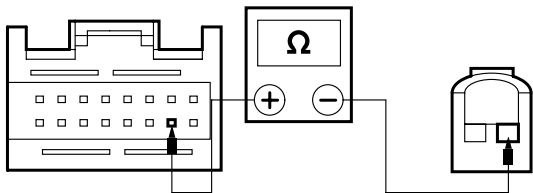
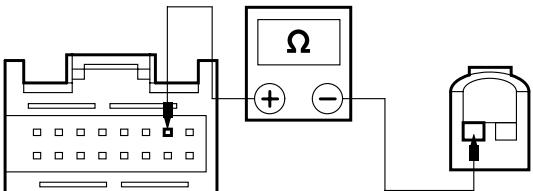
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
J1: CHECK THE REAR PARKING AID SPEAKER FOR CORRECT OPERATION	
	<p>1 Remove the rear parking aid speaker.</p> <p>REFER to: Accessory Drive Belt - 1.6L Duratorq-TDCi (DV) Diesel (303-05 Accessory Drive, Removal and Installation).</p>
 <p>E41163</p>	<p>2 Measure the resistance between the rear parking aid speaker C947 pin 1, and pin 2, component side.</p> <ul style="list-style-type: none"> • Is the resistance 50 Ohms +/- 7.5 Ohms? <p>→ Yes GO to J2.</p> <p>→ No INSTALL a new rear parking aid speaker. TEST the system for normal operation.</p>
J2: CHECK THE CIRCUIT 8-GN26 (WH) FOR OPEN	
	<p>1 Disconnect Parking aid module C622.</p>

Parking Aid — Vehicles With: Rear Parking Aid

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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E41162</p>	<p>2 Measure the resistance between the parking aid module C622 pin 10, circuit 8-GN26 (WH), harness side and the rear parking aid speaker C947 pin 1, circuit 8-GN26 (WH), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 Ohms? <p>→ Yes GO to J3.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>
<p>J3: CHECK THE CIRCUIT 10-GN26 (GY) FOR OPEN</p>	
 <p>E41167</p>	<p>1 Measure the resistance between the parking aid module C622 pin 2, circuit 10-GN26 (GY), harness side and the rear parking aid speaker C947 pin 2, circuit 10-GN26 (GY), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 Ohms? <p>→ Yes For vehicles fitted with a rear trailer tow module GO to Pinpoint Test H. For vehicles fitted without a rear trailer tow module. INSTALL a new parking aid module.</p> <p>REFER to: Parking Aid Module (413-13 Parking Aid - Vehicles With: Rear Parking Aid, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>

GENERAL PROCEDURES

Azimuth System Check

Rear Parking Aid

1. **NOTE:** The rear parking aid system measures the distance to the closest obstacle when manoeuvring and helps the driver to judge distances correctly by audible signals.

NOTE: If a parking aid switch is fitted the system will be de-activated and a light emitting diode (LED) will indicate the state of the system. A lit LED will indicate that the system is currently de-activated.

NOTE: The rear parking aid system will be de-activated when a Ford rear trailer tow module is attached to the vehicle.

NOTE: If the parking aid system is faulty, an error tone approximately 3 seconds long will be issued at each ignition cycle or the first activation of the system. If an LED is fitted and is lit, this will indicate that a fault is present in the system.

Using a suitable pole, test the rear parking aid system for normal operation.

2. **⚠ CAUTION:** Do not clean the sensors with abrasive or sharp objects. Failure to follow this instruction may result in premature failure of the parking aid sensors.

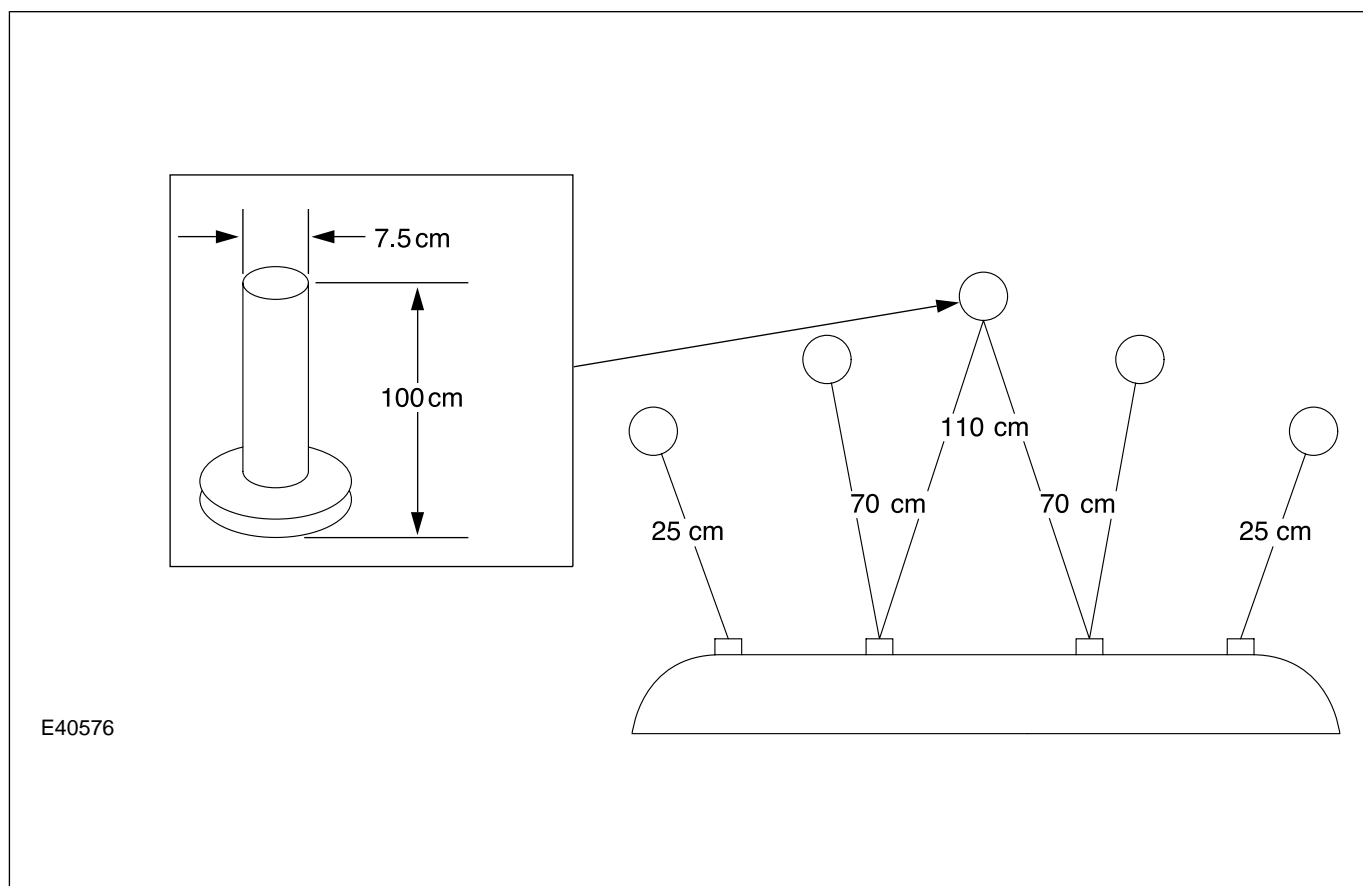
Make sure the rear parking aid sensors are free from ice, snow, dirt, scratches or grime.

3. **NOTE:** The object used in this system check can be fabricated from a tube approximately 7.5 cm in diameter and approximately 100 cm in height.

NOTE: The following system check should be carried out with the vehicle on a flat dry surface.

NOTE: The parking aid system will switch on when the ignition switch is turned to position II.

Turn the ignition switch to position II.



4. With the aid of another technician chock the wheels with a suitable object, apply the brakes and select reverse gear.

5. **NOTE:** The front parking aid will also operate when reverse gear has been selected.

Parking Aid — Vehicles With: Rear Parking Aid

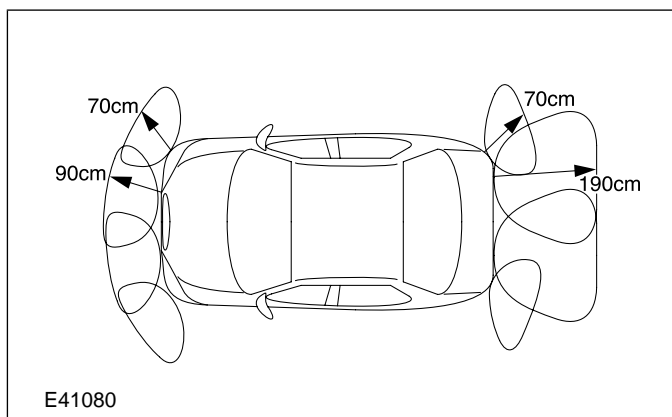
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GENERAL PROCEDURES

NOTE: When checking the rear system make sure that there are no other obstacle(s) to the front, rear or side of the vehicle within the range shown. Failure to follow this instruction may give a false reading of the rear parking aid sensors.

Check the vehicle is clear from obstacles to the front, rear and sides.



6. NOTE: Make sure the vehicle is not overloaded and is on a flat surface. Failure to follow this instruction may give a false reading of the rear parking aid sensors.

The following system check should be carried out with the vehicle on an approximately 4.8 meters wide by 3.00 meters deep surface, free of all obstacle(s). The area should also be free of noise, especially from fans and pneumatic tools.

7. NOTE: Make sure the vehicle is not overloaded and is on a flat dry surface. Failure to follow this instruction may give a false reading of the rear parking aid sensors.

Verify the parking aid system detects the Tube by emitting an audible tone through the rear speaker (approximately 7.5 cm in diameter and 100 cm high) when placed in the specified locations.

GENERAL PROCEDURES

Elevation System Check

Rear Parking Aid

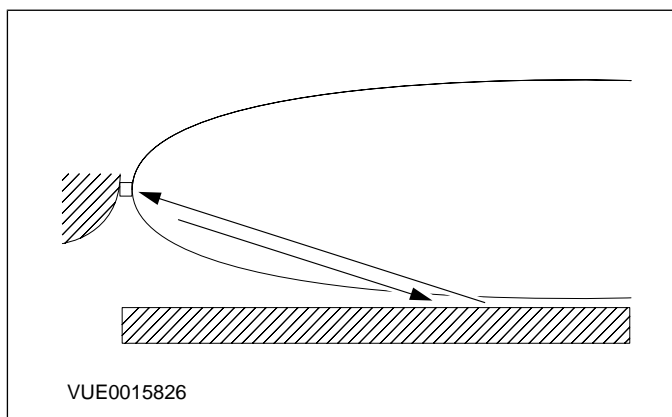
1. **NOTE:** The rear parking aid system measures the distance to the closest obstacle when manoeuvring and helps the driver to judge distances correctly by audible signals.

NOTE: If a parking aid switch is fitted the system will be de-activated and a light emitting diode (LED) will indicate the state of the system. A lit LED will indicate that the system is currently de-activated.

NOTE: The rear parking aid system will be de-activated when a Ford rear trailer tow module is attached to the vehicle.

NOTE: If the parking aid system is faulty, an error tone approximately 3 seconds long will be issued at each ignition cycle or the first activation of the system. If an LED is fitted and is lit, this will indicate that a fault is present in the system.

Ground reflection verification and sensor coverage pattern.



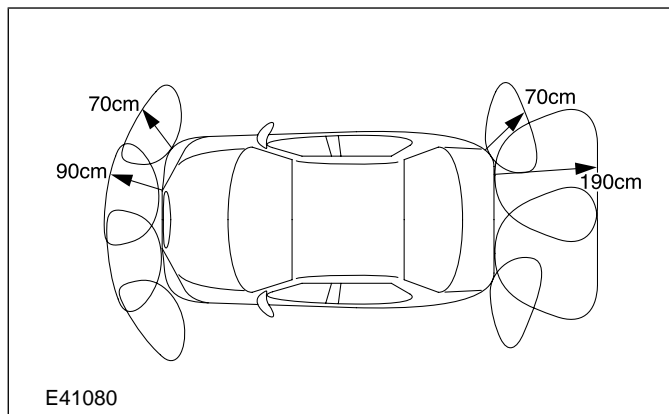
2. **CAUTION:** Do not clean the sensors with abrasive or sharp objects. Failure to follow this instruction may result in premature failure of the parking aid sensors.

Make sure the rear parking aid sensors are free from ice, snow, dirt, scratches or grime.

3. The parking aid system must be checked to make sure that the system does not see signals from ground reflections.

4. **NOTE:** When checking the rear system make sure that there are no other obstacle(s) to the front, rear or side of the vehicle within the range shown. Failure to follow this instruction may give a false reading of the rear parking aid sensors.

Check the vehicle is clear from obstacles to the front, rear and sides.



5. **NOTE:** The front parking aid will also operate when reverse gear has been selected.

NOTE: Make sure the vehicle is not overloaded and is on a flat surface. Failure to follow this instruction may give a false reading of the rear parking aid sensors.

The following system check should be carried out with the vehicle on an approximately 4.8 meters wide by 3.00 meters deep surface, free of all obstacle(s). The area should also be free of noise, especially from fans and pneumatic tools.

6. **NOTE:** The parking aid system will switch on when the ignition switch is turned to position II.

Turn the ignition switch to position II.

7. With the aid of another technician chock the wheels with a suitable object, apply the brakes and select reverse gear.

8. **NOTE:** If any audible alerts are heard, check to make sure the bumper is properly installed and is not tilted downward so the sensor is pointing towards the ground.

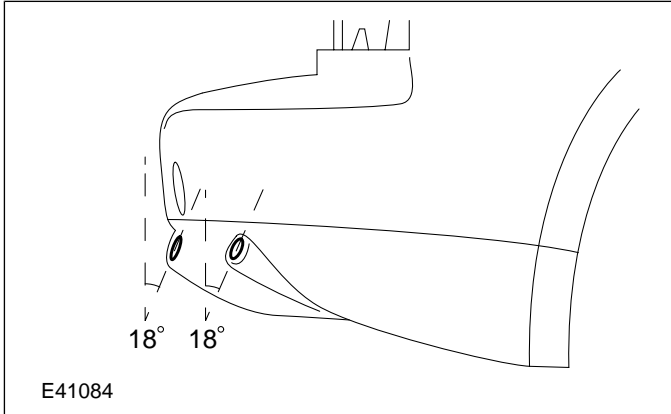
Parking Aid — Vehicles With: Rear Parking Aid

413-13-21

413-13-21

GENERAL PROCEDURES

Verify that no audible alert is heard from the rear speaker.



REMOVAL AND INSTALLATION

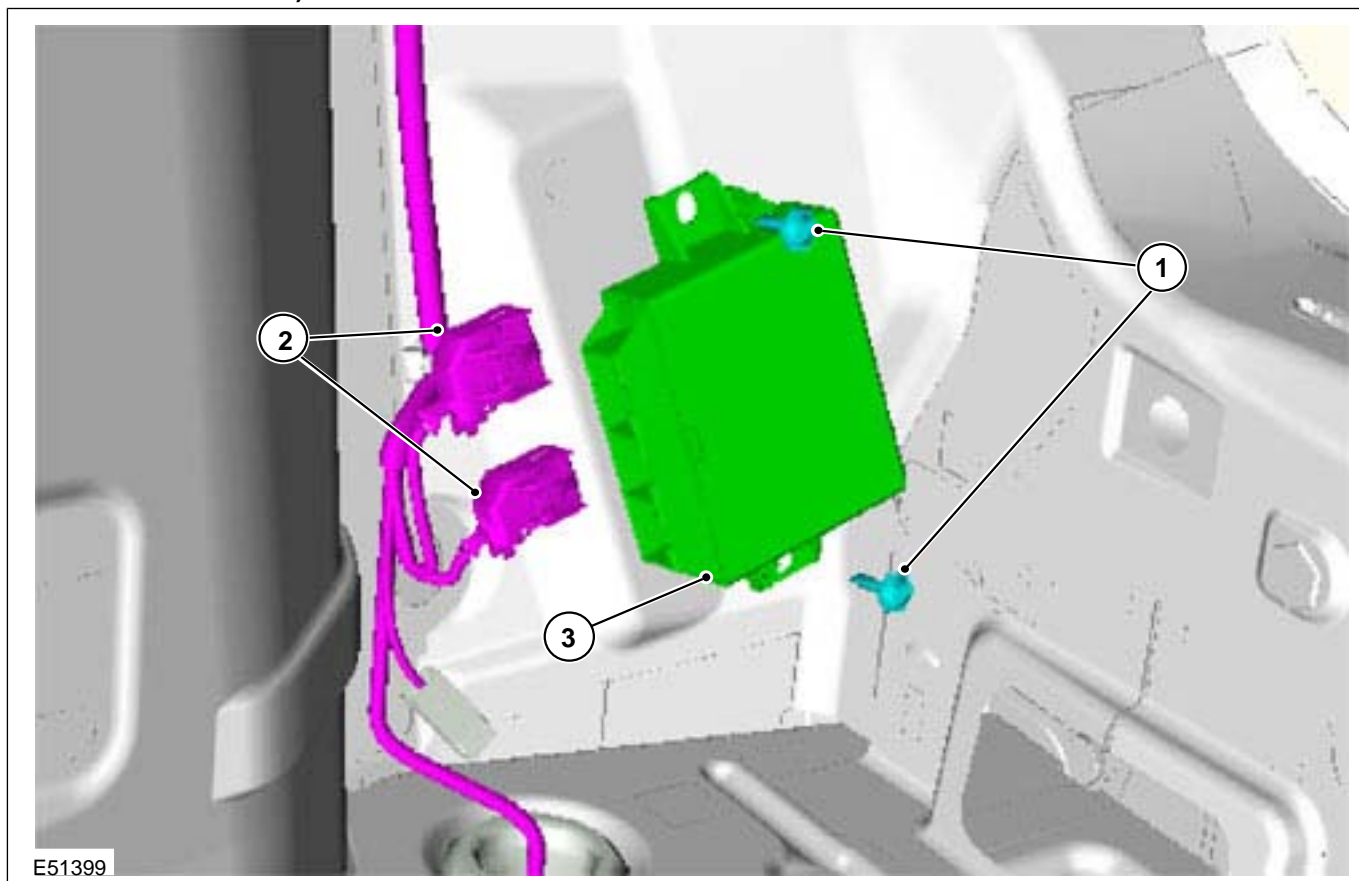
Parking Aid Module

1. Remove the loadspace trim panel.

For additional information, refer to:

Loadspace Trim Panel - 3-Door (501-05
Interior Trim and Ornamentation, Removal
and Installation)

/ **Loadspace Trim Panel - 5-Door** (501-05
Interior Trim and Ornamentation, Removal
and Installation).

2. Remove the components in the order
indicated in the following illustration(s) and
table(s).

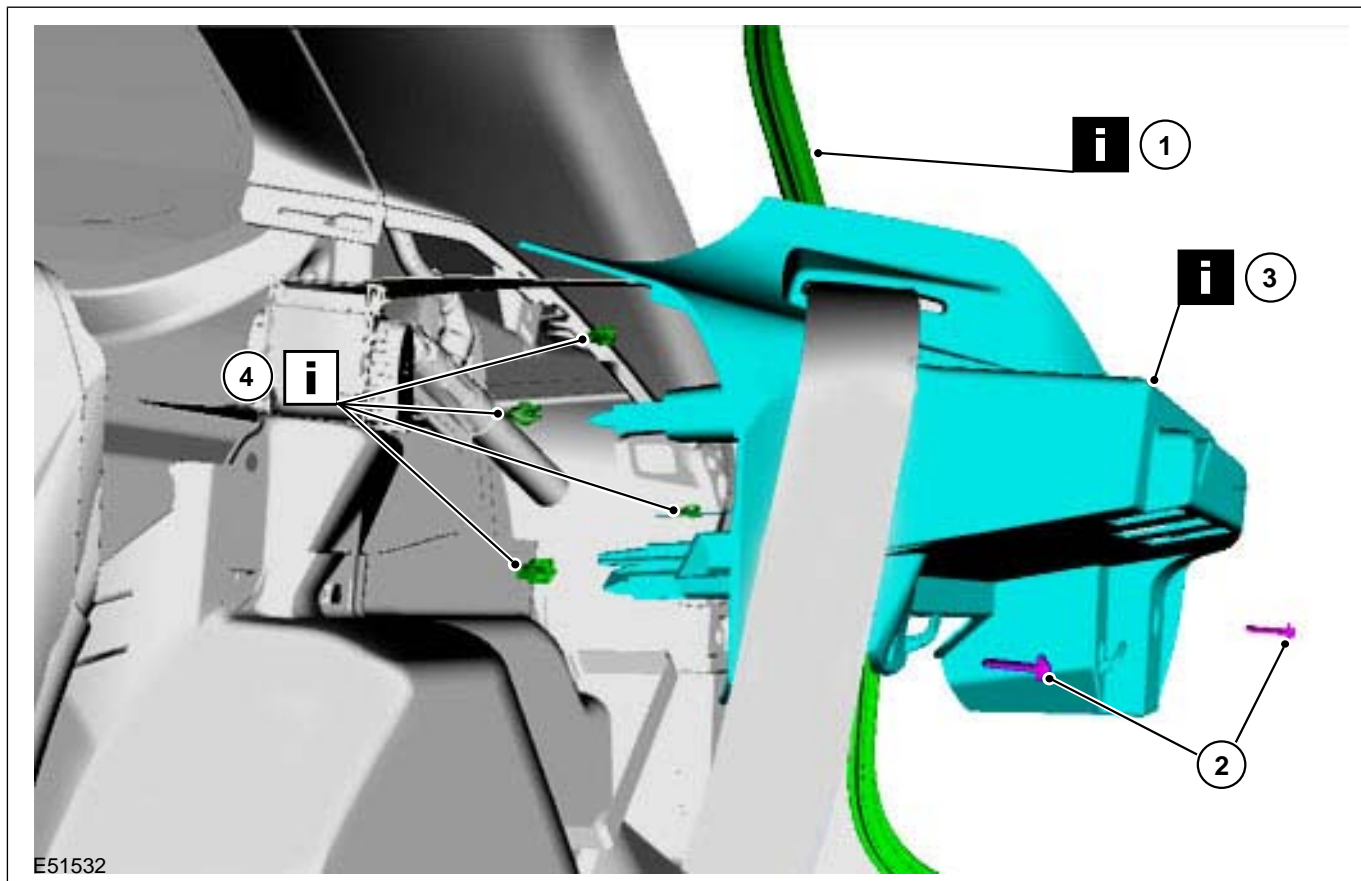
Item	Description
1	Parking aid module retaining screws
2	Parking aid module electrical connectors
3	Parking aid module

3. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Parking Aid Speaker — 3-Door

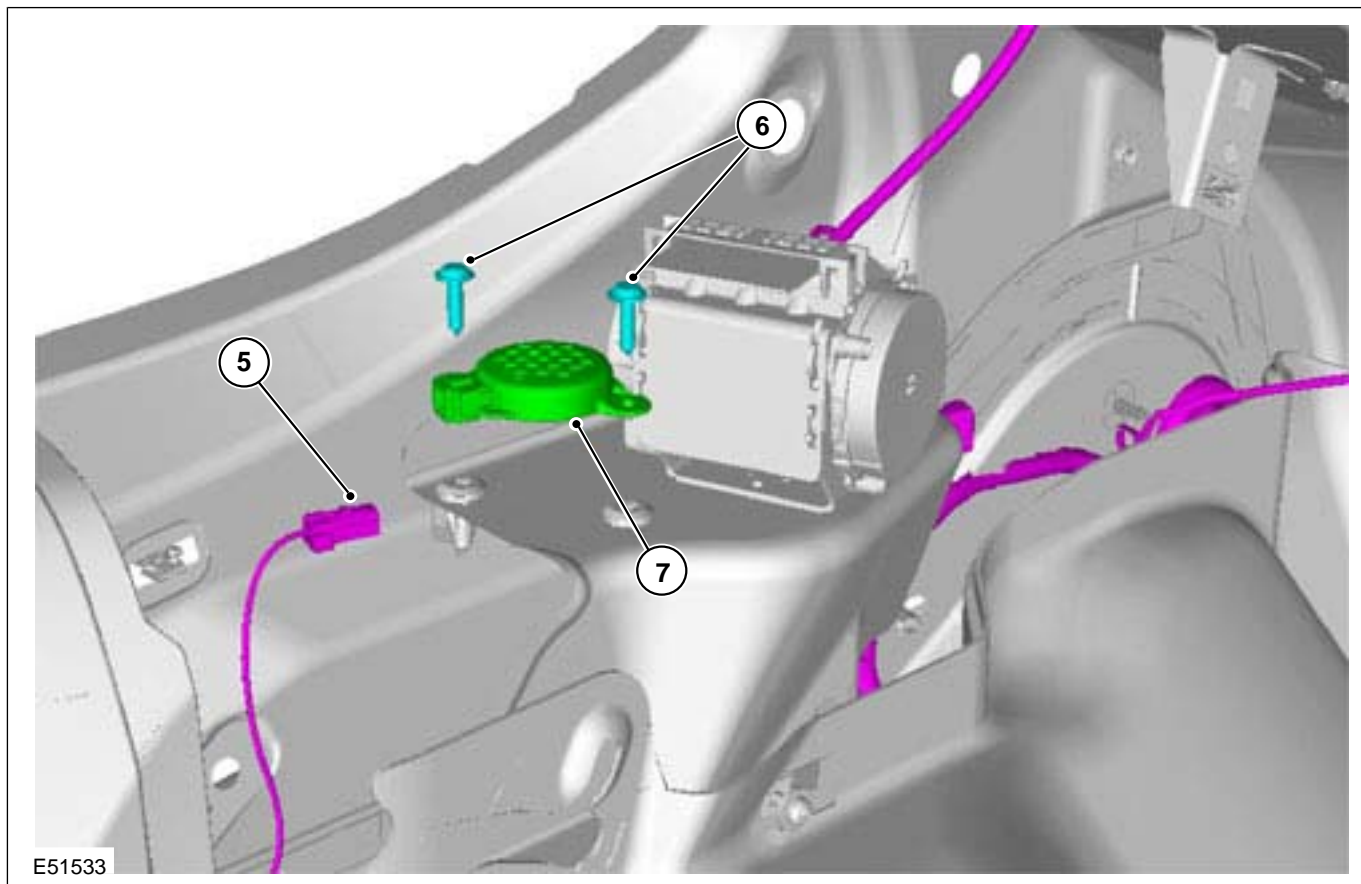
1. Remove the rear parcel shelf.
2. Fold the rear seat backrest forward.
3. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Liftgate opening weatherstrip See Removal Detail
2	Rear parcel shelf support trim panel retaining screws

Item	Description
3	Rear parcel shelf support trim panel See Removal Detail
4	Rear parcel shelf support trim panel retaining clips See Installation Detail

REMOVAL AND INSTALLATION



Item	Description
5	Parking aid speaker electrical connector
6	Parking aid speaker retaining screws
7	Parking aid speaker

4. To install, reverse the removal procedure.

Removal Details

Item 1 Liftgate opening weatherstrip

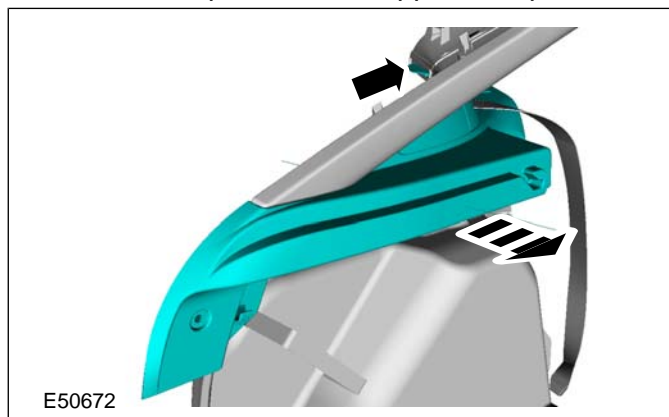
1. Detach the liftgate opening weatherstrip.

Item 3 Rear parcel shelf support trim panel

1. Detach the rear parcel shelf support trim panel.

- Pull the rear parcel shelf support trim panel away from the rear quarter body panel to unlock the retaining tang from the rear quarter window glass trim panel.

- Feed the rear safety belt harness through the rear parcel shelf support trim panel.



REMOVAL AND INSTALLATION**Installation Details**

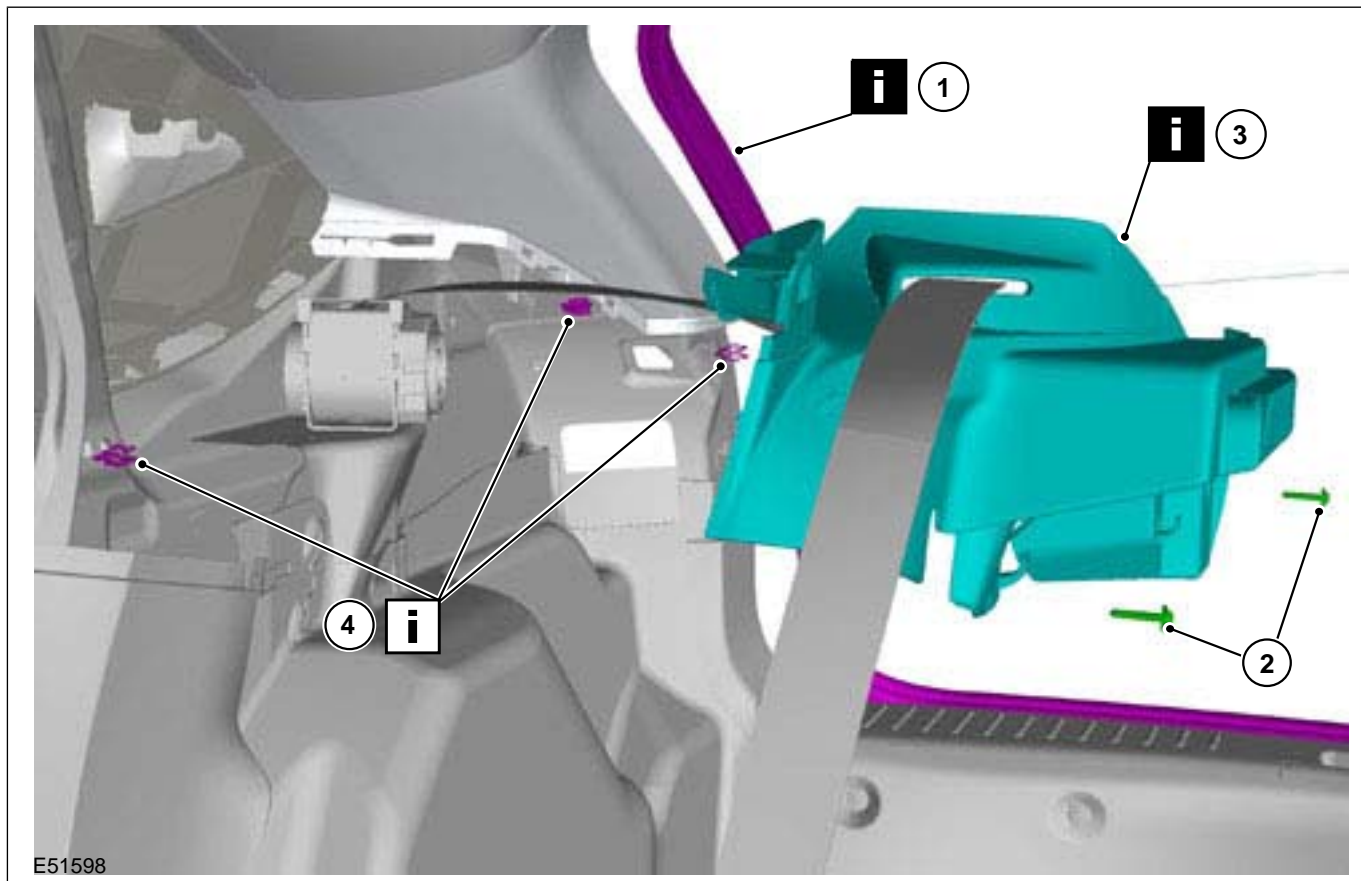
Item 4 Rear parcel shelf support trim panel retaining clips

1. Install the rear parcel shelf support trim panel retaining clips to the trim panel before the trim panel is installed to the vehicle.

REMOVAL AND INSTALLATION

Parking Aid Speaker — 5-Door

1. Remove the rear parcel shelf.
2. Fold the rear seat backrest forward.
3. Remove the components in the order indicated in the following illustration(s) and table(s).

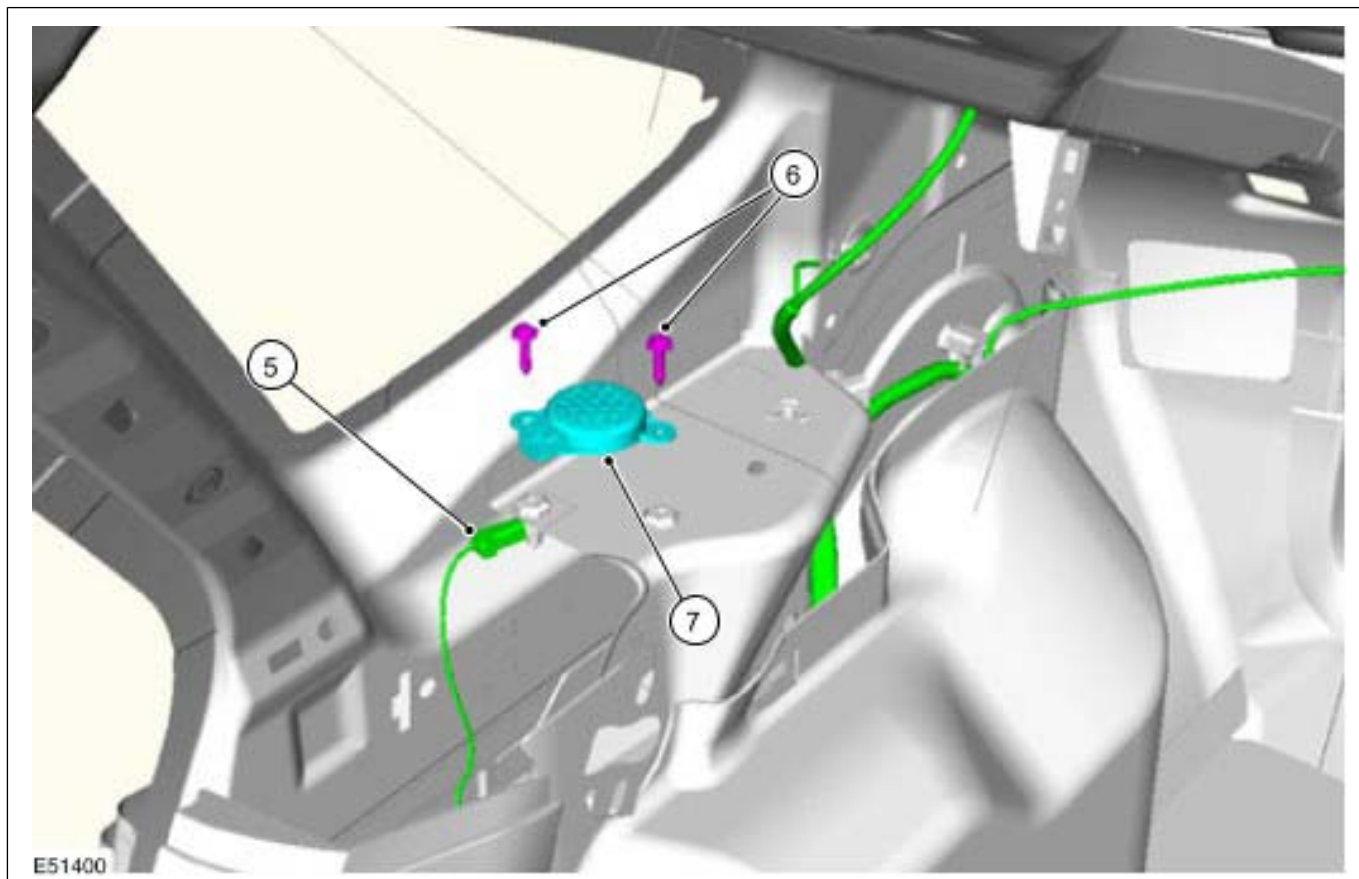


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Item	Description
1	Liftgate opening weatherstrip See Removal Detail
2	Rear parcel shelf support trim panel retaining screws

Item	Description
3	Rear parcel shelf support trim panel See Removal Detail
4	Rear parcel shelf support trim panel retaining clips See Installation Detail

REMOVAL AND INSTALLATION



Item	Description
5	Parking aid speaker electrical connector
6	Parking aid speaker retaining screws
7	Parking aid speaker

4. To install, reverse the removal procedure.

Removal Details

Item 1 Liftgate opening weatherstrip

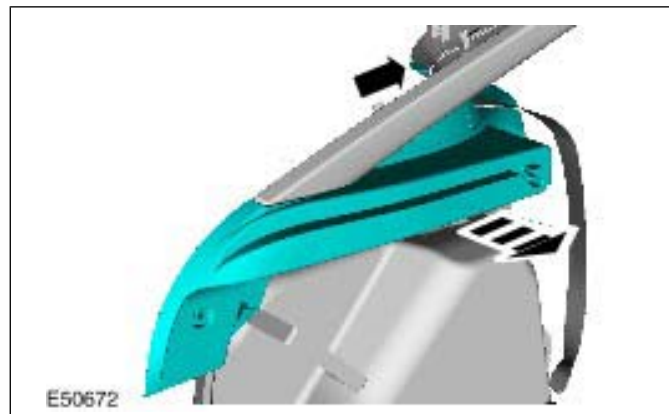
1. Detach the liftgate opening weatherstrip.

Item 3 Rear parcel shelf support trim panel

1. Detach the rear parcel shelf support trim panel.

- Pull the rear parcel shelf support trim panel away from the rear quarter body panel to unlock the retaining tang from the rear quarter window glass trim panel.

- Feed the rear safety belt webbing through the rear parcel shelf support trim panel.



REMOVAL AND INSTALLATION**Installation Details**

Item 4 Rear parcel shelf support trim panel retaining clips

1. Install the rear parcel shelf support trim panel retaining clips to the trim panel before the trim panel is installed to the vehicle.



SECTION 414-00 Charging System - General Information

VEHICLE APPLICATION: 2008.75 Focus ST C307

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DESCRIPTION AND OPERATION

Charging System

'Smart charge' generator control system - all except 2.5L Duratec-ST (VI5)**General**

The generator creates electrical current to supply the vehicle electrical system and maintain the battery in a charged condition. The generator is driven by the accessory drive belt.

For additional information, refer to: **Accessory Drive**
- 1.8L Duratec-HE (MI4) (303-05 Accessory Drive, Description and Operation)
/ Accessory Drive - 2.0L Duratorq-TDCi (DW) Diesel (303-05 Accessory Drive, Description and Operation)
/ Accessory Drive - 1.6L (Z6) (303-05 Accessory Drive, Description and Operation).

When the engine is started, the generator begins to generate alternating current (AC) which it converts to direct current (DC) internally. The DC current is supplied to the battery and vehicle electrical loads at a voltage controlled by the voltage regulator (located on the back of the generator). The charging system voltage is controlled by the powertrain control module (PCM). The battery is more efficiently charged with a higher voltage when the battery is cold and a lower voltage when the battery is warm. The PCM is able to adjust the charging voltage according to battery temperature, which it calculates based on intake air temperature (IAT) and engine coolant temperature (ECT).

The PCM simultaneously monitors and controls the voltage output of the generator. When the current consumption is high or the battery is excessively discharged, the system is able to increase the idle speed. To minimize the engine drag when starting the engine, the PCM deactivates the generator. When the engine has started, the PCM then progressively increases the output of the generator.

The PCM controls the operation of the charging system warning indicator which is located in the instrument cluster. The PCM is therefore responsible for turning the warning indicator off after the engine is started and illuminating it under fault conditions, the warning indicator will also be illuminated by the PCM at key-on, engine-off, and stall conditions.

The smart charging system consists of the following functions:

- Battery temperature estimation and charging voltage control
- Generator load feed forward
- Generator deactivation during engine crank
- Idle speed increase under low voltage / high electrical load conditions (to increase alternator output and reduce battery discharge)
- Low voltage electrical load deactivation
- Over-voltage activation of electrical loads

By continually calculating the battery temperature and controlling generator output voltage the battery charging current is optimized. The generator load feed forward function gives the PCM advance warning of impending electrical load, and hence impending changes in alternator torque. Using this information, the PCM is able to achieve a greater degree of idle stability. The PCM also controls the generator activation during crank, and the idle speed increase functions. The passenger junction box (PJB) controls the two remaining smart charging functions, low voltage electrical load deactivation and over-voltage activation of electrical loads. When the battery voltage drops below the low voltage threshold, the PJB disables the following components in this order with a 5 second delay between each load deactivation:

- Heated windshield
- Heated rear window
- Air conditioning

The PJB re-enables all previously disabled electrical loads when the battery voltage is above the low voltage threshold. The order for re-enabling loads is air conditioning, then the heated rear window, then the heated windshield, with a 5 second delay between each load reactivation. When re-enabled, the electrical loads are returned to normal mode, therefore the component is switched off awaiting a PJB input signal from the switch. Over-voltage activation of electrical loads is enabled when the PJB recognizes the battery voltage is above the over-voltage threshold for a 20 second period, and the charging system warning indicator is on.

When the threshold is reached the PJB activates the following components in this order with a 5 second delay between each load:

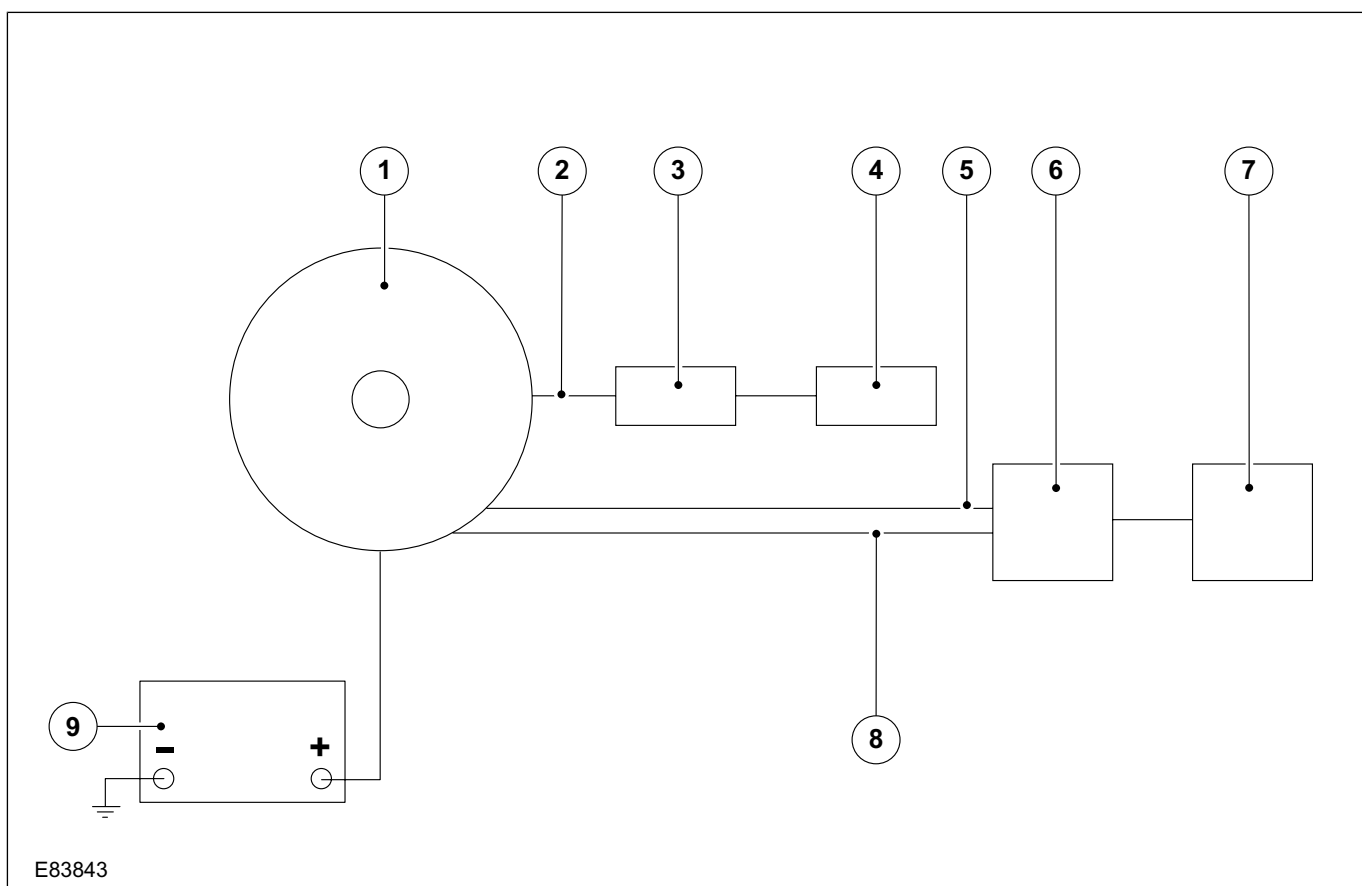
DESCRIPTION AND OPERATION

- Heated rear window
- Heated windshield

The purpose of this is to reduce the voltage back within specification, and reduce any overcharging damage to the battery. The PJB returns the electrical loads to normal mode if the battery voltage drops below the high voltage threshold for a 20 second period. This is in order to prevent excessive battery drain. The order for returning loads to normal mode is heated windshield then heated rear window, with a 5 second delay between each load reactivation. A cycling condition

may occur where loads are repeatedly activated and deactivated as the voltage levels increase and decrease. This behavior is to be expected in a continuous over-voltage fault condition, and serves to minimize both damage to the battery due to overcharging, and the battery current drain due to activation of the heated rear window and heated windshield. In normal mode, the electrical loads are switched off awaiting a PJB input signal from the switch. The low voltage threshold is approximately 10.3 volts and the over-voltage threshold is approximately 16 volts.

Schematic of the 'Smart charge' generator control system



Item	Description
1	Generator
2	Battery voltage sensing line
3	3 Amp fuse
4	Battery junction box (BJB)
5	Generator required output signal from the PCM
6	PCM

Item	Description
7	Instrument cluster
8	Generator operation monitoring signal to the PCM
9	Battery

DESCRIPTION AND OPERATION

Starting the generator during engine starting

In the "smart charge" generator control system", the generator is deactivated during engine starting. The generator is only switched on after the engine has started.

Switching on is done electronically by the PCM. The generator power is then increased smoothly to the value required.

Increased idle speed

At idle with high generator load, the idle speed is increased in order to increase the generator power.

The system can increase the idle speed in steps by up to 150 rev/min above the base idle speed.

Diagnosis

There is a self-test facility for the Smart Charge System, stored in the PCM and which can be accessed through the WDS. If a fault occurs in the system, the charging system warning indicator is illuminated by the PCM. If voltage regulation fails, the generator operates with a fixed charging voltage of approximately 13.5 Volts.

With fixed charging voltage the generator operates as usual and still delivers enough current for the vehicle systems. After the ignition is switched on, the PCM switches on the charging system warning

indicator to check that it operates. After the engine starts the charging system warning indicator is switched off again. During the engine run condition, the charging system warning indicator will only illuminate if the PCM identifies that there is a fault present for a 20 second period. (Voltage out of range, internal generator fault, or PCM to generator communication fault).

'Smart charge' generator control system - 2.5L Duratec-ST (VI5)

General

The charging system for this vehicle consists of a generator combined with a generator control module.

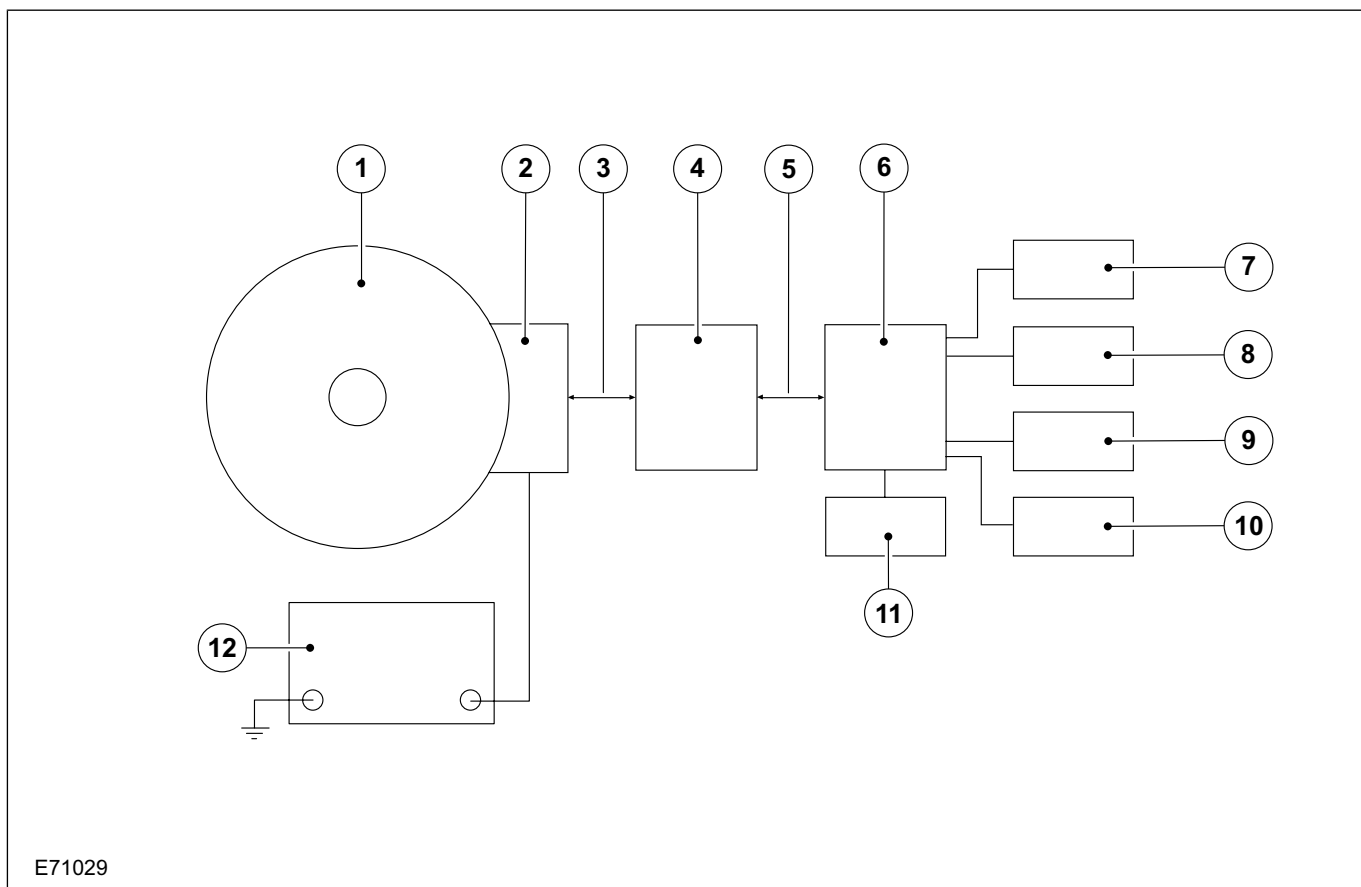
The generators for some variants are equipped with pulleys with built in reverse rotation clutches. These pulleys allow the generator armature to free-wheel during sudden engine deceleration so smoothing the reduction in charge rate output. This also reduces the load changes on the accessory drive belt.

The generator creates electrical current to supply the vehicle electrical system and maintain the battery in a charged condition. The generator is driven by the accessory drive belt.

For additional information, refer to: [Accessory Drive \(303-05 Accessory Drive - 2.5L Duratec-ST \(VI5\), Description and Operation\)](#).

DESCRIPTION AND OPERATION

Charging Control



E71029

Item	Description
1	Generator
2	Generator control module
3	Local interconnect network (LIN) communication
4	Powertrain control module (PCM)
5	Control area network (CAN) communication
6	General electronic module (GEM)
7	Heated windshield
8	Heated rear window
9	Heated mirrors
10	Supplementary heater
11	Instrument cluster
12	Battery

Charging is controlled by the PCM and the GEM. The PCM communicates with the generator control module using a LIN connection. The PCM will instruct the generator to increase or decrease

charging voltages in accordance with the requirements of the power supply systems. In turn the generator control module will inform the PCM of the current output of the generator.

The generator control module monitors the generator output. If a fault develops in the generator control module, control circuits or the generator, the PCM will be informed and a diagnostic trouble code (DTC) will be set.

Using the information received by the PCM from the generator control module, the PCM can calculate the generator load. The generator load information is transferred to the GEM using CAN communication. The GEM uses the load information to calculate maximum allowable current consumption of the climate related systems. The GEM also controls the initiation of fault warnings to the display information module. The battery charge warning indicator is turned off by means of an instruction from the GEM using CAN communication.

To reduce the load on the generator to within its working limits and assist with battery recovery after start up, the GEM will switch non critical systems off and on.

DESCRIPTION AND OPERATION

The systems that are controlled by the GEM have typical loads of:

- Heated windshield
 - 70 amps
- Heated rear window
 - 25 amps
- Heated mirrors
 - 4 amps
- Supplementary heating
 - 80 amps

The climate systems have been chosen because they can be switched off for short periods of time with barely detectable changes in their ultimate function. During this control period, the function indicators for the system being controlled will remain illuminated. The total load reduction if all controlled components were switched off would be in the region of 180 amps.

Conversely, the GEM can switch the same components on at any time thereby increasing engine load. This function is used to assist with the engine warm up process.

DIAGNOSIS AND TESTING

Charging System

Refer to Wiring Diagrams Section 414-02, for schematic and connector information.

General Equipment

Surface charge dissipation unit (SCD ²)
Micro390 battery tester

battery, always shield your face and protect your eyes. Always provide ventilation. Failure to follow these instructions may result in personal injury.

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Inspection and Verification

WARNINGS:

▲ Batteries contain sulphuric acid. Avoid contact with skin, eyes, or clothing. Also, shield your eyes when working near batteries to protect against possible splashing of the acid solution. In case of acid contact with skin or eyes, flush immediately with water for a minimum of 15 minutes and get prompt medical attention. If acid is swallowed, call a physician immediately. Failure to follow these instructions may result in personal injury.

▲ Batteries normally produce explosive gases which can cause personal injury. Therefore, do not allow flames, sparks or lighted substances to come near the battery. When charging or working near a

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> - Accessory drive belt - Generator 	<ul style="list-style-type: none"> - Fuse(s) - Wiring harness(es) - Generator - Electrical connector(s) - Battery - Battery cables - Charging warning indicator

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. Check the operation of the charging system warning indicator lamp, located in the instrument cluster. Normal operation is as follows:

Normal Charging System Voltages

Ignition Switch Position	I Circuit	Generator B+ Circuit	Battery	Engine to battery ground	Charging System Warning Indicator Operation
Position 0	0V	10-12V	10-12V	0V	OFF
Position II	0V	10-12V	10-12V	0V	Illuminated
Position II with the engine running	13-15V	13-15V	13-15V	0V	OFF

5. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

DIAGNOSIS AND TESTING

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> The charging system warning indicator is on with the engine running (The charging system voltage does not increase) 	<ul style="list-style-type: none"> Accessory drive belt. 	<ul style="list-style-type: none"> CHECK the accessory drive belt condition, REFER to: Accessory Drive (303-05 Accessory Drive, Diagnosis and Testing) / Accessory Drive (303-05 Accessory Drive, Diagnosis and Testing).
	<ul style="list-style-type: none"> Generator decoupler (vehicles with 1.8L diesel engine). 	<ul style="list-style-type: none"> CARRY out the Generator Decoupler Component Test, REFER to: Accessory Drive (303-05 Accessory Drive, Diagnosis and Testing) / Accessory Drive (303-05 Accessory Drive, Diagnosis and Testing).
	<ul style="list-style-type: none"> Circuit. Generator. Voltage regulator. 	<ul style="list-style-type: none"> GO to Pinpoint Test A.
<ul style="list-style-type: none"> The charging system warning indicator is off with the ignition switch in the RUN position and the engine off 	<ul style="list-style-type: none"> Bulb. 	<ul style="list-style-type: none"> INSTALL a new bulb.
	<ul style="list-style-type: none"> Ignition switch. 	<ul style="list-style-type: none"> CHECK the ignition switch.
	<ul style="list-style-type: none"> Circuit. Generator. 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> Radio interference 	<ul style="list-style-type: none"> Circuit. Generator. 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
<ul style="list-style-type: none"> The generator is noisy 	<ul style="list-style-type: none"> Accessory drive belt. 	<ul style="list-style-type: none"> REFER to: Accessory Drive (303-05 Accessory Drive, Diagnosis and Testing) / Accessory Drive (303-05 Accessory Drive, Diagnosis and Testing).
	<ul style="list-style-type: none"> Generator decoupler (vehicles with 1.8L diesel engine). 	<ul style="list-style-type: none"> CARRY out the Generator Decoupler Component Test, REFER to: Accessory Drive (303-05 Accessory Drive, Diagnosis and Testing) / Accessory Drive (303-05 Accessory Drive, Diagnosis and Testing).
	<ul style="list-style-type: none"> Loose generator mounting bolts. 	<ul style="list-style-type: none"> TIGHTEN the generator mounting bolts.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> Generator. 	<ul style="list-style-type: none"> INSTALL a new generator. REFER to: (414-02 Generator and Regulator) Generator - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) (Removal and Installation), Generator - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (Removal and Installation), Generator - 1.6L Duratorq-TDCi (DV) Diesel (90 PS), VIN Plate Emission Level Code: S, Vehicles With: Air Conditioning (Removal and Installation), Generator - 1.6L Duratorq-TDCi (DV) Diesel (90 PS), VIN Plate Emission Level Code: K, Vehicles With: Air Conditioning (Removal and Installation), Generator - 1.6L Duratorq-TDCi (DV) Diesel (90 PS), Vehicles Without: Air Conditioning (Removal and Installation), Generator - 1.6L (Z6) (Removal and Installation), Generator - 1.8L Duratorq-TDCi (Lynx) Diesel, Vehicles With: Air Conditioning (Removal and Installation), Generator - 1.8L Duratorq-TDCi (Lynx) Diesel, Vehicles Without: Air Conditioning (Removal and Installation), Generator - 2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Water-in-Fuel Sensor (Removal and Installation), Generator - 2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Water-in-Fuel Sensor (Removal and Installation), Generator - 2.5L Duratec-ST (VI5) (Removal and Installation).
<ul style="list-style-type: none"> Vehicle electrical systems inoperative 	<ul style="list-style-type: none"> Battery. 	<ul style="list-style-type: none"> CARRY OUT the battery test, REFER to the Battery Test in Component Tests in this section.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> The engine cranks slowly 	<ul style="list-style-type: none"> Battery. 	<ul style="list-style-type: none"> CARRY OUT the battery test, REFER to the Battery Test in Component Tests in this section.
	<ul style="list-style-type: none"> Battery cable(s). Starter motor. 	<ul style="list-style-type: none"> REFER to: Starting System (303-06 Starting System, Diagnosis and Testing).

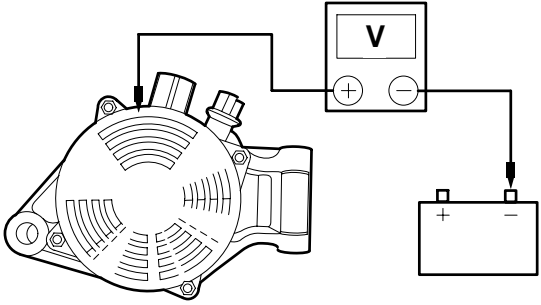
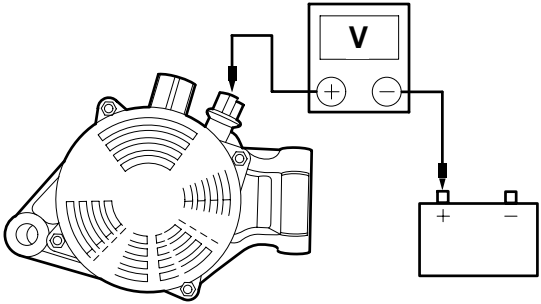
Pinpoint Tests

NOTE: Use a digital multimeter for all electrical measurements.

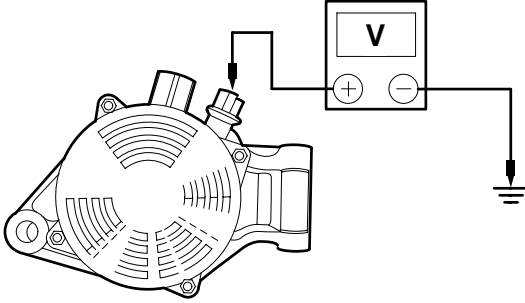
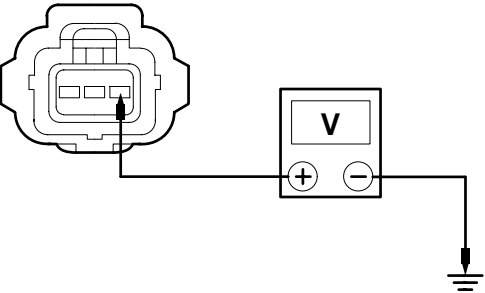
PINPOINT TEST A : THE CHARGING SYSTEM WARNING INDICATOR IS ON WITH THE ENGINE RUNNING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK THE BATTERY	
	<p>1 CARRY OUT the battery test, REFER to the Battery Test in Component Tests in this section.</p> <ul style="list-style-type: none"> Is the battery OK? <p>→ Yes GO to A2.</p> <p>→ No INSTALL a new battery. REFER to: (414-01 Battery, Mounting and Cables)</p> <p>Battery - 1.4L Duratec-16V (Sigma)/1.6L (Z6)/1.6L Duratec-16V (Sigma)/1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (Removal and Installation),</p> <p>Battery - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel (Removal and Installation),</p> <p>Battery - 2.5L Duratec-ST (VI5) (Removal and Installation).</p> <p>TEST the system for normal operation.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A2: CHECK THE CHARGING SYSTEM	
	<p>1 CARRY OUT the generator tests, REFER to the Generator On-Vehicle Tests in Component Tests in this section.</p> <ul style="list-style-type: none"> • Is the generator output OK? <p>→ Yes DIAGNOSE the charging system warning indicator. REFER to: Instrument Cluster (413-01 Instrument Cluster, Diagnosis and Testing).</p> <p>→ No GO to A3.</p>
A3: CHECK FOR A GOOD GROUND	
 <p>VUE0004619</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the generator housing and the battery negative terminal.</p> <ul style="list-style-type: none"> • Is the voltage less than 0.5 volts? <p>→ Yes GO to A4.</p> <p>→ No CLEAN and TIGHTEN the generator mounting, engine to body ground strap, and battery ground cable. TEST the system for normal operation. If the concern persists, INSTALL a new battery ground cable.</p>
A4: CHECK BATTERY CABLE	
 <p>VUV9110224</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the generator B+ terminal and the battery positive terminal.</p> <ul style="list-style-type: none"> • Is the voltage less than 0.5 volts? <p>→ Yes GO to A5.</p> <p>→ No CLEAN and TIGHTEN the battery positive cable connections. TEST the system for normal operation.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A5: CHECK BATTERY FEED TO THE GENERATOR	
 <p>VUE0004620</p>	<ol style="list-style-type: none"> 1 Measure the voltage between the generator B+ terminal, circuit 30-BA6 (RD), and ground. <ul style="list-style-type: none"> • Is the voltage equal to the battery voltage? <ul style="list-style-type: none"> → Yes GO to A6. → No REPAIR circuit 30-BA6 (RD) (starter motor to generator) or circuit 30-BB10 (RD) (battery to starter motor). TEST the system for normal operation.
A6: CHECK POWER TO THE VOLTAGE REGULATOR	
 <p>VUV9910080</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Generator C870. 3 Measure the voltage between the generator C870 pin 3, circuit 30-BA10 (RD), harness side and ground. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to A7. → No REPAIR circuit 30-BA10. TEST the system for normal operation.
A7: CHECK POWERTRAIN CONTROL MODULE AND COMMUNICATIONS LINK WITH GENERATOR	
	<ol style="list-style-type: none"> 1 Connect Generator C870. 2 Connect the diagnostic tool. 3 Ignition switch in position II.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 Retrieve PCM diagnostic trouble codes (DTCs).</p> <ul style="list-style-type: none"> • Are any DTCs retrieved? <p>→ Yes Use the WDS to diagnose the PCM and communications.</p> <p>→ No INSTALL a new generator. REFER to: (414-02 Generator and Regulator)</p> <p>Generator - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) (Removal and Installation), Generator - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (Removal and Installation), Generator - 1.6L Duratorq-TDCi (DV) Diesel (90 PS), VIN Plate Emission Level Code: S, Vehicles With: Air Conditioning (Removal and Installation), Generator - 1.6L Duratorq-TDCi (DV) Diesel (90 PS), VIN Plate Emission Level Code: K, Vehicles With: Air Conditioning (Removal and Installation), Generator - 1.6L Duratorq-TDCi (DV) Diesel (90 PS), Vehicles Without: Air Conditioning (Removal and Installation), Generator - 1.6L (Z6) (Removal and Installation), Generator - 1.8L Duratorq-TDCi (Lynx) Diesel, Vehicles With: Air Conditioning (Removal and Installation), Generator - 1.8L Duratorq-TDCi (Lynx) Diesel, Vehicles Without: Air Conditioning (Removal and Installation), Generator - 2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Water-in-Fuel Sensor (Removal and Installation), Generator - 2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Water-in-Fuel Sensor (Removal and Installation), Generator - 2.5L Duratec-ST (VI5) (Removal and Installation). TEST the system for normal operation.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST B : RADIO INTERFERENCE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: ISOLATE THE GENERATOR	
	<p>1 Remove the accessory drive belt. REFER to: (303-05 Accessory Drive)</p> <p>Accessory Drive Belt - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma), Vehicles With: Air Conditioning (Removal and Installation),</p> <p>Accessory Drive Belt - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma), Vehicles Without: Air Conditioning (Removal and Installation),</p> <p>Accessory Drive Belt - Vehicles Built Up To: 02/2008 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (Removal and Installation),</p> <p>Accessory Drive Belt - 1.6L Duratorq-TDCi (DV) Diesel (Removal and Installation),</p> <p>Accessory Drive Belt - 1.8L Duratorq-TDCi (Lynx) Diesel (Removal and Installation),</p> <p>Accessory Drive Belt - 2.0L Duratorq-TDCi (DW) Diesel (Removal and Installation),</p> <p>Accessory Drive Belt - 1.6L (Z6) (Removal and Installation).</p> <p>REFER to: Accessory Drive Belt (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).</p>
	2 Ignition switch in position II.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Run the engine for a few seconds with the radio turned on.</p> <ul style="list-style-type: none"> • Is interference still present? <p>→ Yes Vehicles with subwoofer, REFER to: Audio System (415-00 Information and Entertainment System - General Information, Diagnosis and Testing).</p> <p>→ No CLEAN and TIGHTEN all mounting points and positive and ground cable connections. TEST the system for normal operation. If interference is still present, INSTALL a new generator. REFER to: (414-02 Generator and Regulator)</p> <p>Generator - 1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma) (Removal and Installation), Generator - 1.8L Duratec-HE (MI4)/2.0L Duratec-HE (MI4) (Removal and Installation), Generator - 1.6L Duratorq-TDCi (DV) Diesel (90 PS), VIN Plate Emission Level Code: S, Vehicles With: Air Conditioning (Removal and Installation), Generator - 1.6L Duratorq-TDCi (DV) Diesel (90 PS), VIN Plate Emission Level Code: K, Vehicles With: Air Conditioning (Removal and Installation), Generator - 1.6L Duratorq-TDCi (DV) Diesel (90 PS), Vehicles Without: Air Conditioning (Removal and Installation), Generator - 1.6L (Z6) (Removal and Installation), Generator - 1.8L Duratorq-TDCi (Lynx) Diesel, Vehicles With: Air Conditioning (Removal and Installation), Generator - 1.8L Duratorq-TDCi (Lynx) Diesel, Vehicles Without: Air Conditioning (Removal and Installation), Generator - 2.0L Duratorq-TDCi (DW) Diesel, Vehicles With: Water-in-Fuel Sensor (Removal and Installation), Generator - 2.0L Duratorq-TDCi (DW) Diesel, Vehicles Without: Water-in-Fuel Sensor (Removal and Installation), Generator - 2.5L Duratec-ST (VI5) (Removal and Installation).</p>

DIAGNOSIS AND TESTING

Component Tests

Generator On-Vehicle Tests - No-Load Test

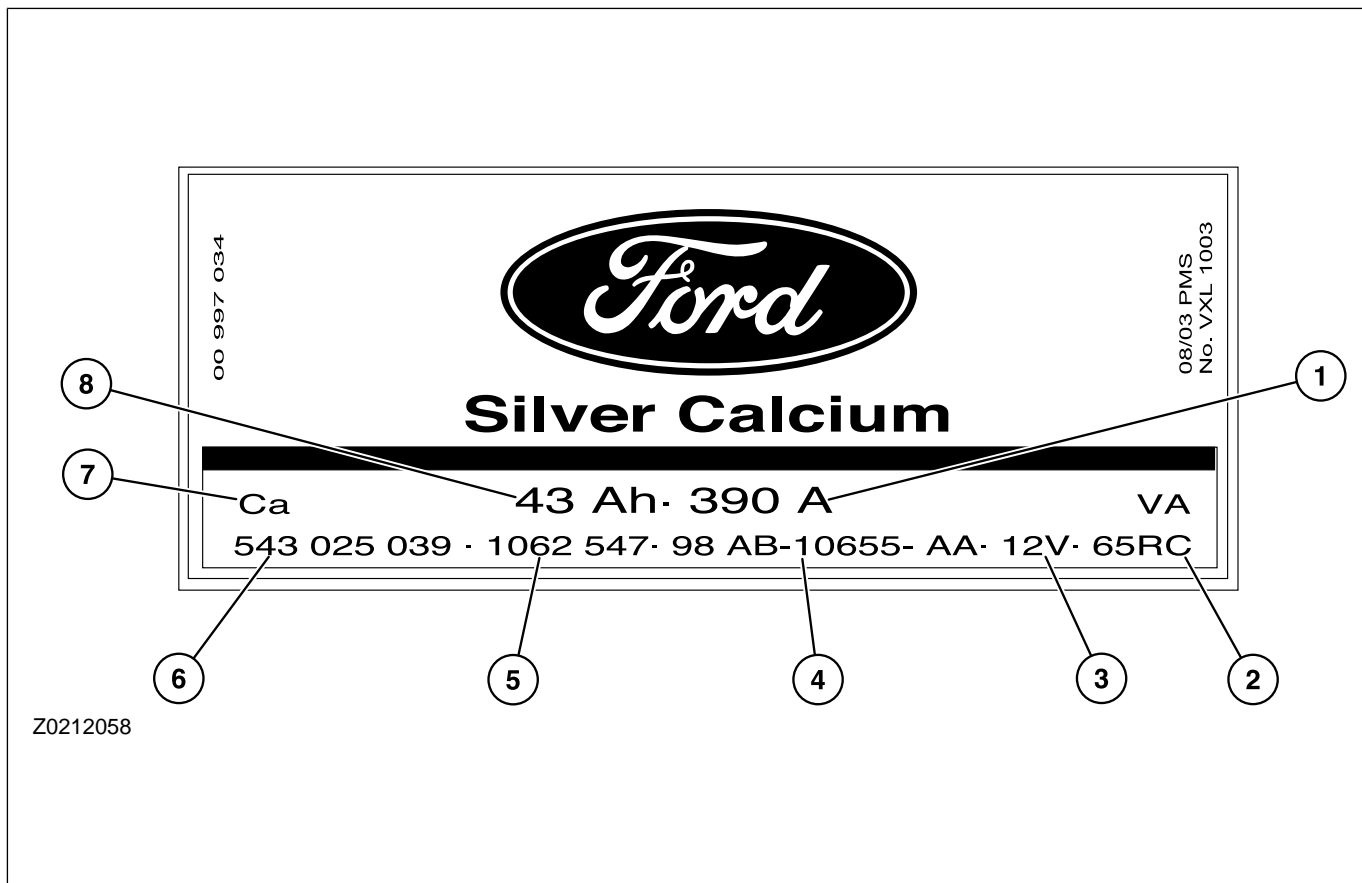
1. Turn off all electrical loads and the ignition switch.
2. Switch the multimeter to the voltage function.
3. Connect the leads of the multimeter across the battery terminals.
4. Read the voltage (base voltage).
5. Start the engine.
6. Run the engine at 1500 rpm with no electrical load.
7. Read the voltage. The voltage should be in the range of 14.1 volts to 15.1 volts. If the voltage increase is less than 2.5 volts above the base

voltage, carry out the Load Test. If the voltage increase is greater than 2.5 volts, REFER to the WDS.

Generator On-Vehicle Tests - Load Test

1. With the engine running, turn on the air conditioning (if equipped), turn the blower motor to high speed and the headlamps to high beam.
2. Increase the engine speed to 2000 rpm. The voltage should increase a minimum of 0.5 volts above the base voltage. If the voltage does not increase as specified, REFER to the WDS. If the voltage increases as specified, the charging system is charging correctly. REFER to the **Symptom Chart**.

Battery Identification



Z0212058

Item	Description
1	Cold crank amp (CCA) rating
2	Reserve capacity (RC) rating (minutes)
3	Battery voltage

Item	Description
4	Ford Part number
5	FINIS code
6	EN number (European Norm)

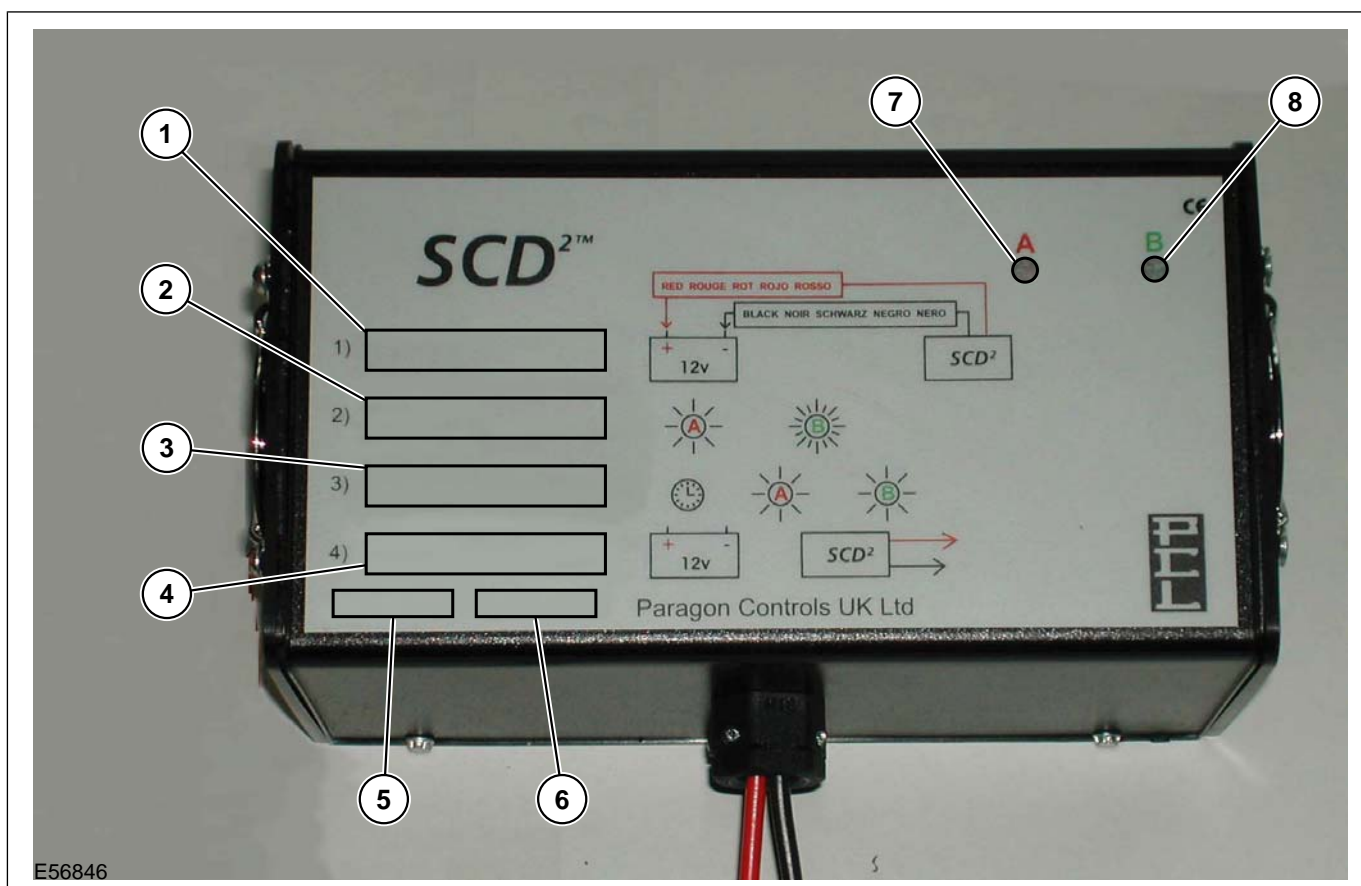
DIAGNOSIS AND TESTING

Item	Description
7	Battery type: Ca = Silver/Calcium; Sb = Lead/Antimony

Item	Description
8	Amp hour rating

Battery Surface Charge Removal

Surface charge dissipation unit (SCD²)



Item	Description
1	Connect black lead to battery - Connect red lead to battery +
2	Red A indicator illuminates and green B indicator flashes
3	Wait until green B indicator illuminates
4	Disconnect from battery
5	Max 18v
6	-20°C to +55°C
7	Red indicator (A)
8	Green indicator (B)

disconnected from the vehicle. If the battery is holding a surface charge, the battery tester will give false readings.

NOTE: The SCD² tool eliminates the need to dissipate the battery's surface charge via the manual process of loading the battery via the operation of the vehicles electrical systems. It also removes the variability in the process and makes sure that the actual dissipation of the surface charge is qualified prior to testing.

1. Connect the black lead to the battery negative terminal and the red lead to the battery positive terminal.
2. The red indicator (A) illuminates and the green indicator (B) flashes.
3. Wait until the green indicator (B) fully illuminates, then disconnect from the battery.

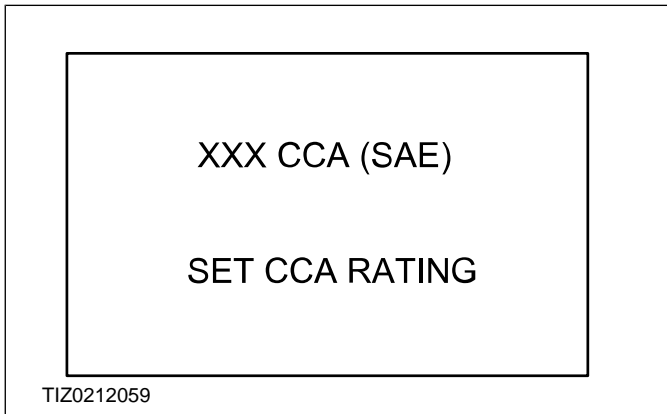
⚠ CAUTION: Prior to testing any battery, the surface discharge must be dissipated. This includes batteries that are returned

DIAGNOSIS AND TESTING

Alternative Method To Dissipate The Battery Surface Charge

1. Leave the battery to stand for a minimum of six hours without charging or discharging or remove the surface charge through partial loading as follows:
 - Turn the ignition key to position II and switch on the headlamps (main beam), heated windshield (if equipped), heated rear window (if equipped) and the heater blower motor (position II). Leave the vehicle in this condition for a minimum of 60 seconds to dissipate the battery surface charge.
 - Turn the ignition key to position 0 and switch off the headlamps, heated windshield (if equipped), heated rear window (if equipped) and the heater blower motor. Leave the vehicle in this condition for a minimum of five minutes before testing battery condition.

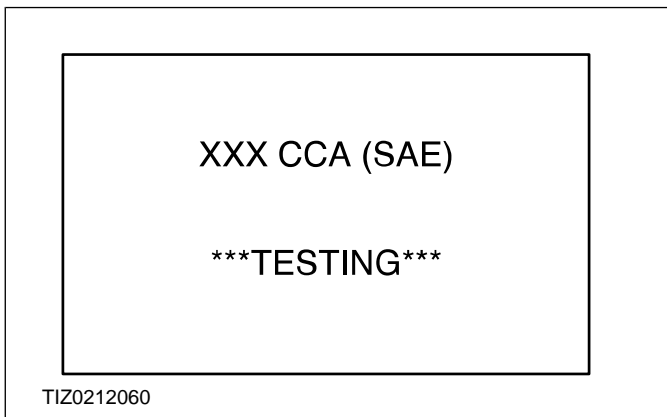
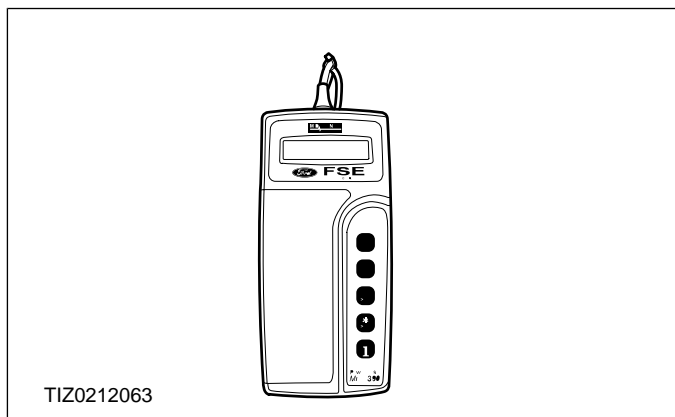
- Connect the red clip to the battery positive (+) terminal and the black clip to the battery negative (-) terminal.



2. **NOTE: The label affixed to the top of batteries progressively from 06/1998 identifies the battery CCA rating. Remove the battery if the label is obscured.**

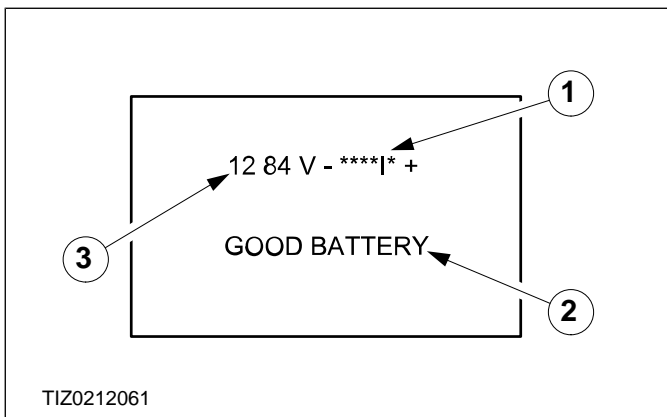
Use the "Arrow" buttons on the battery tester to scroll to the battery's labelled CCA rating.

Battery Test



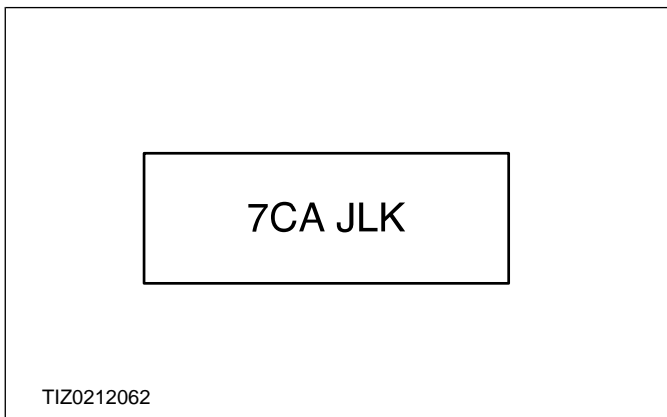
NOTE: Using the Micro390 Battery Tester: To fully determine battery condition once the surface charge has been dissipated, the Micro390 battery tester must be used. For the Micro390 battery tester to operate, it requires a minimum of 5.5 volts charge to be present on the test battery. Therefore, if the Micro390 does not operate when connected to a test battery, then a charge of less than 5.5 volts is present. In this instance, the battery must be charged in line with the battery charging instructions prior to testing. In the event of a conflict of results between the charge eye indicator and the battery tester, the battery tester result must always be used. The charge eye indicator is for guidance only.

3. Press the "Test" button that corresponds to the correct battery temperature.
 - If the battery temperature is above zero degrees centigrade: press the "sun" button.
 - If the battery temperature is below zero degrees centigrade: press the "Ice-crystal" button.




DIAGNOSIS AND TESTING

4. Carry out the action based upon the test result displayed and the following table.
 1. Charge level bar graph.
 2. Test result.
 3. Battery voltage.



5. Press the "information" button and carefully note the six-digit "Test Code" on the job card for claim submission and audit purposes (graphic shows an example of the code only).

Battery tester results and required actions

Tester Reading	Action
GOOD BATTERY	Return to service
GOOD RECHARGE	Fully charge the battery and return to service*
CHARGE & RETEST	Fully charge the battery and retest
REPLACE BATTERY or BAD CELL BATTERY	 WARNING: Do not recharge the battery. Make sure that the surface charge was removed. If so, disconnect the battery from the vehicle and retest. If the result remains after surface charge removal, install a new battery.
UNABLE TO TEST	Disconnect the battery from the vehicle and retest.

*In addition, it is advisable to check the vehicle electrical system. Check that the generator is functioning correctly and that all key-off loads (luggage compartment lamps, glove compartment lamp and interior lamps) are not staying on.

GENERAL PROCEDURES




Battery Charging(31 003 0)

General Equipment





Midtronics GR-590 Battery Management Center

Battery Charger

WARNINGS:

-  **Always observe the battery charger equipment manufacturer's instructions.**
-  **Do not jump/slave start using a battery charging system from another vehicle.**
-  **Do not overfill a battery as this can cause acid leakage that will result in damage to the vehicle and possible personal injury.**

CAUTIONS:

-  **Do not rely on the generator to recharge a discharged battery. It would take in excess of eight hours of continuous driving with no additional loads placed on the charging system.**
-  **Make sure that the battery electrolyte reaches the indicated maximum mark.**
-  **Connect the battery charger cables to the battery before switching the battery charger on.**
-  **Switch the battery charger off before disconnecting the battery charger cables from the battery.**

NOTE: Ford batteries generally require no maintenance however, in certain conditions, it is possible for the electrolyte in a battery to fall below the minimum level.

NOTE: The use of the Midtronics GR-590 Battery Management Center, which has been specifically designed for use on silver calcium type batteries is recommended. Once connected to the battery, the battery charger detects the state of battery charge and then applies the appropriate charge rate and duration. When the battery is fully charged, the battery charger switches to stand-by, keeping the battery in a fully charged state preventing excessive gassing and overcharging. The Midtronics GR-590 Battery Management Center also incorporates a software program that has the capability to assist in the recovery of deeply discharged (sulphated) batteries.

NOTE: Charging methods and types of battery chargers vary widely. Whichever method is utilized it must be carried out carefully to avoid damage to

the battery and possible personal injury. Specific instructions accompanying each battery charger and must be followed exactly. Safeguards provided by the equipment manufacturer should not be disregarded by the operator.

NOTE: A battery which has been stored in a highly discharged state may be slow to accept a charge at first. In such cases the initial charging rate may be so low that the ammeter on some battery testers will not show any indication of charge for 5 to 10 minutes.

NOTE: Automatic battery chargers are also protected against reverse polarity connection and require no adjustment or monitoring.

NOTE: Slow-charging will readily restore a battery to a full state of charge and, since the charging current is relatively low, the possibility of overcharging a battery are minimized. The charge rate used should be approximately equal to 5% of the reserve capacity of the battery being charged (approximately three to six Amps depending on battery size). The charging current should be adjusted 10 minutes after initial setting and again after 1 hour before being left to charge the battery for between 8 and 12 hours.

NOTE: A constant voltage battery charger will charge a battery at a set maximum voltage. The voltage used depends upon the design and condition of the battery charger and the age and temperature of the battery. This type of battery charger initially charges at a high rate of current that reduces as battery voltage is restored. When using a constant voltage battery charger, the charging current should be recorded after five minutes and the battery charger switched off when the charging current falls to one-third of the recorded value, or after eight hours whichever occurs first.

NOTE: Multiple battery chargers are designed to charge a number of batteries, simultaneously. Of the two different types of multiple battery chargers available, only those that charge batteries in series should be used and it is important that batteries are of the same or very similar ratings and voltages. Multiple battery chargers that charge batteries in parallel are not recommended.

NOTE: The use of a fast (boost) battery charger is not recommended as it can cause damage to a battery. Fast charging will only restore a battery to a state of charge that will enable it to carry out its critical function of cranking the engine. Fast

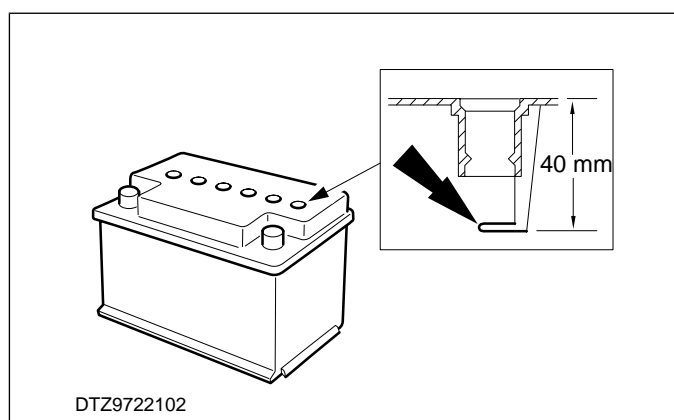
GENERAL PROCEDURES

charging will not restore a battery to a full state of charge and must therefore be followed by a period of slow charging. Excessively fast charging can cause damage to a battery. For this reason, charging times must be carefully controlled. Fast battery chargers vary widely in design so it is very important to strictly adhere to the equipment manufacturer's instructions. A charge of 30 amps for up to 30 minutes is the most common fast charging application. If the battery is very discharged and requires additional restoration, an additional charge of 20 amps for a period up to one and a half hours should be applied. Fast charging for a period in excess of two hours significantly increases the risk of causing damage to the battery.

NOTE: When connecting and disconnecting the battery from the vehicle, make sure that the battery ground cable is disconnected first and connected last and that all electrical items are switched off. Record the audio unit keycode and preset radio frequencies before disconnecting the battery.

1. **Remove the battery (Focus C-MAX 2003.75, Focus 2004.75, S-MAX/Galaxy 2006.50, Mondeo 2007.50 only).**
2. **Disconnect the battery ground cable (All, except the vehicles mentioned in the previous step).**
3. **NOTE: The maximum battery electrolyte level is approximately 40 mm below the very top of the battery casing. This corresponds to a point just below the lower rim of the battery casing.**

Check that the battery electrolyte reaches the indicated maximum level. Top up with distilled/de-ionized water, as necessary.



4. **Connect the positive red clamp from the battery charger to the positive battery terminal.**

5. **Connect the negative black clamp from the battery charger to the negative battery terminal.**
6. **Connect the AC power cable to the mains outlet and switch on.**
7. **Follow the instructions supplied with the battery charger to charge the battery.**
8. **To disconnect the battery charger, reverse the connection procedure.**

SECTION 414-01 Battery, Mounting and Cables

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS**Battery Specifications**

Ah Rating	Battery Type	Build date that Ca battery can be installed from
43	Silver Calcium (Ca)	All
50	Silver Calcium (Ca)	All
60	Silver Calcium (Ca)	All
70	Silver Calcium (Ca)	All

Torque Specifications - vehicles with 1.4L Duratec-16V (Sigma) engine/1.6L Duratec-16V (Sigma) engine/1.6L Duratec-16V Ti-VCT (Sigma) engine

Description	Nm	lb-ft	lb-in
Battery terminal clamp retaining nuts	6	-	53
Battery retaining strap retaining nuts	6	-	53
Battery tray retaining bolts	12	9	-
Battery ground cable to body electrical connector retaining bolt	8	-	71
Battery cable electrical connector to battery positive terminal clamp retaining nut	12	9	-
Battery to starter motor solenoid cable electrical connector retaining nut	12	9	-
Ignition switch to starter motor solenoid cable electrical connector retaining nut	7	-	62
Battery cable to generator electrical connector retaining nut	8	-	71
Battery to transaxle ground cable electrical connector retaining bolt	35	26	-

Torque Specifications - vehicles with 1.6L (Z6) engine

Description	Nm	lb-ft	lb-in
Battery terminal clamp retaining nuts	6	-	53
Battery retaining strap retaining nuts	6	-	53
Battery tray retaining bolts	12	9	-
Battery ground cable to body electrical connector retaining bolt	10	-	89
Battery cable electrical connector to battery positive terminal clamp retaining nut	12	9	-
Battery to starter motor solenoid cable electrical connector retaining nut	10	-	89
Battery cable to generator electrical connector retaining nut	13	10	-
Battery to transaxle ground cable electrical connector retaining bolt	10	-	89

SPECIFICATIONS

Description	Nm	lb-ft	lb-in
Battery to engine ground cable electrical connector retaining bolt	10	-	89

Torque Specifications - vehicles with 1.6L Duratorq-TDCi (DV) diesel engine

Description	Nm	lb-ft	lb-in
Battery terminal clamp retaining nuts	6	-	53
Battery retaining strap retaining nuts	6	-	53
Battery tray retaining bolts	12	9	-
Battery ground cable to body electrical connector retaining bolt	8	-	71
Battery cable electrical connector to battery positive terminal clamp retaining nut	12	9	-
Battery to starter motor solenoid cable electrical connector retaining nut	12	9	-
Ignition switch to starter motor solenoid cable electrical connector retaining nut	6	-	53
Battery cable to generator electrical connector retaining nut	15	11	-
Battery to transaxle ground cable electrical connector retaining bolt	25	18	-

Torque Specifications - vehicles with 1.8L Duratorq-TDCi (Kent) diesel engine

Description	Nm	lb-ft	lb-in
Battery terminal clamp retaining nuts	6	-	53
Battery retaining strap retaining nuts	6	-	53
Battery tray retaining bolts	12	9	-
Battery ground cable to body electrical connector retaining bolt	8	-	71
Battery cable electrical connector to battery positive terminal clamp retaining nut	12	9	-
Ignition switch to starter motor cable retaining nut	7	5	-
Starter motor positive cable retaining nut	12	9	-
Battery cable to generator electrical connector retaining nut	15	11	-
Starter motor retaining bolt	35	26	-

Torque Specifications - vehicles with 1.8L Duratec-HE (MI4) engine/2.0L Duratec-HE (MI4) engine

Description	Nm	lb-ft	lb-in
Battery terminal clamp retaining nuts	6	-	53
Battery retaining strap retaining nuts	6	-	53

SPECIFICATIONS

Description	Nm	lb-ft	lb-in
Battery tray retaining bolts	12	9	-
Battery ground cable to body electrical connector retaining bolt	8	-	71
Battery cable electrical connector to battery positive terminal clamp retaining nut	12	9	-
Battery to starter motor solenoid cable electrical connector retaining nut	12	9	-
Ignition switch to starter motor solenoid cable electrical connector retaining nut	6	-	53
Battery cable to generator electrical connector retaining nut	15	11	-
Battery to transaxle ground cable electrical connector retaining bolt	18	13	-

Torque Specifications - vehicles with 2.0L Duratorq-TDCi (DW) diesel engine

Description	Nm	lb-ft	lb-in
Battery terminal clamp retaining nuts	6	-	53
Battery retaining strap retaining nuts	6	-	53
Battery tray retaining bolts	12	9	-
Battery ground cable to body electrical connector retaining bolt	8	-	71
Battery cable electrical connector to battery positive terminal clamp retaining nut	12	9	-
Battery to starter motor solenoid cable electrical connector retaining nut	12	9	-
Ignition switch to starter motor solenoid cable electrical connector retaining nut	6	-	53
Battery cable to generator electrical connector retaining nut	15	11	-
Battery to transaxle ground cable electrical connector retaining bolt	25	18	-



DIAGNOSIS AND TESTING

Battery

REFER to: [Charging System](#) (414-00 Charging System - General Information, Diagnosis and Testing).







GENERAL PROCEDURES

Battery Disconnect and Connect

Disconnect

WARNINGS:

-  Batteries normally produce explosive gases which may cause personal injury, therefore do not allow flames, sparks or lighted substances to come near the battery. When charging or working near the battery always shield your face and protect your eyes. Always provide adequate ventilation. Failure to follow these instructions may result in personal injury.
-  Batteries contain sulphuric acid, avoid contact with skin, eyes or clothing. Shield your eyes when working near the battery to protect against possible splashing of the acid solution. In case of acid contact with the skin or eyes, flush immediately for a minimum of 15 minutes and seek prompt medical attention. If swallowed, call a physician immediately. Failure to follow these instructions may result in personal injury.
-  Audio unit key code saving devices must not be used when working on supplemental restraint or fuel systems. When using these devices the vehicle electrical system is still live but with a reduced current flow. Failure to follow this instruction may result in personal injury.
-  **CAUTION:** Make sure the engine is not running before disconnecting the battery ground cable to avoid damage to the vehicle electrical system.




NOTE: Before disconnecting the battery make sure that no data is required from the powertrain control module (PCM), as battery cable disconnection will erase any fault codes and idle/drive values held in the keep alive memory (KAM). It is not necessary to disconnect or remove electronic control modules.

NOTE: This procedure should be used to disconnect the battery while carrying out repairs that refer to the battery being disconnected.

1. Obtain and record the audio unit keycode and preset radio frequencies.
2. Disconnect the battery ground cable.

Connect

WARNINGS:

-  Batteries normally produce explosive gases which may cause personal injury, therefore do not allow flames, sparks or lighted substances to come near the battery. When charging or working near the battery always shield your face and protect your eyes. Always provide adequate ventilation. Failure to follow these instructions may result in personal injury.
 -  Batteries contain sulphuric acid, avoid contact with skin, eyes or clothing. Shield your eyes when working near the battery to protect against possible splashing of the acid solution. In case of acid contact with the skin or eyes, flush immediately for a minimum of 15 minutes and seek prompt medical attention. If swallowed, call a physician immediately. Failure to follow these instructions may result in personal injury.
 -  **CAUTION:** Make sure all electrical systems are switched OFF before connecting the battery ground cable to avoid damage to the vehicle electrical system.
1. Connect the battery ground cable.
 2. Enter the audio unit keycode and preset radio frequencies.
 3. Reset the clock to the correct time.
 4. **NOTE:** When the battery has been disconnected and connected, the stored idle and drive values contained within the powertrain control module (PCM) will have been erased. The following steps must be carried out to allow the PCM to relearn its idle and drive values.
Start and run the engine at idle for three minutes.
 5. When the engine reaches normal operating temperature, increase the engine speed to 1200 rpm and maintain for approximately two minutes.
 6. Drive the vehicle for approximately five miles/eight kilometers of varied driving.

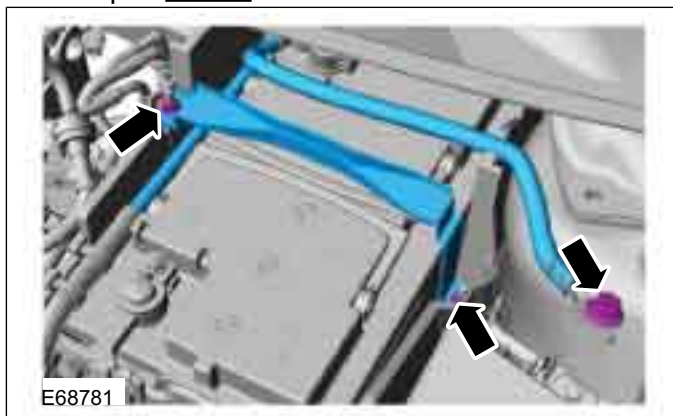
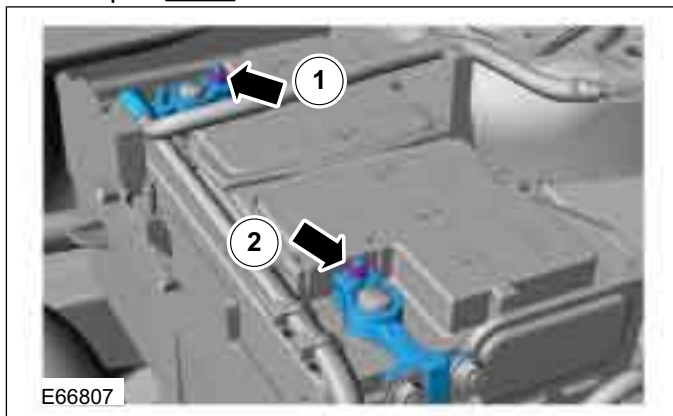
REMOVAL AND INSTALLATION

Battery — 2.5L Duratec-ST (VI5)

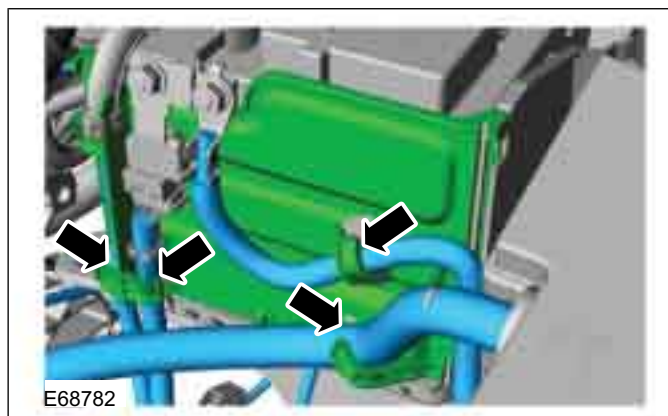
Removal

NOTE: Removal steps in this procedure may contain installation details.

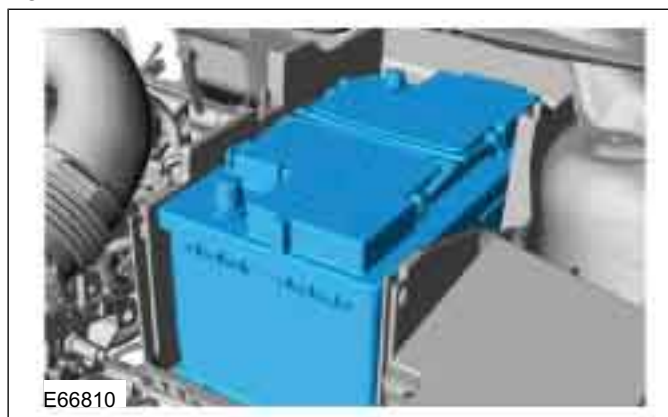
1.

2. Torque: 10 Nm3. Torque: 6 Nm

4.



5.



Installation

1. **CAUTION:** If installing a new battery, only install the specified battery type.
Refer to: **Specifications** (414-01 Battery, Mounting and Cables, Specifications).
To install, reverse the removal procedure.
2. Initialize the door window motors.
Refer to: **Door Window Motor Initialization** (501-11 Glass, Frames and Mechanisms, General Procedures).

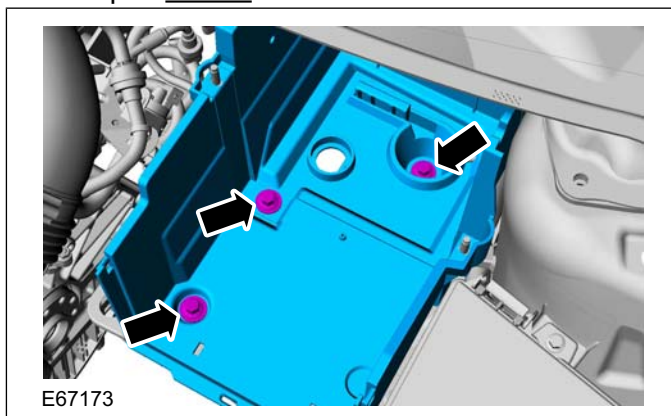
REMOVAL AND INSTALLATION**Battery Tray — 2.5L Duratec-ST (VI5)****Removal**

NOTE: Removal steps in this procedure may contain installation details.

1. Remove the battery.

Refer to: **Battery - 2.5L Duratec-ST (VI5)**
(414-01 Battery, Mounting and Cables,
Removal and Installation).

2. Torque: 12 Nm

**Installation**

1. To install, reverse the removal procedure.
2. Initialize the door window motors.

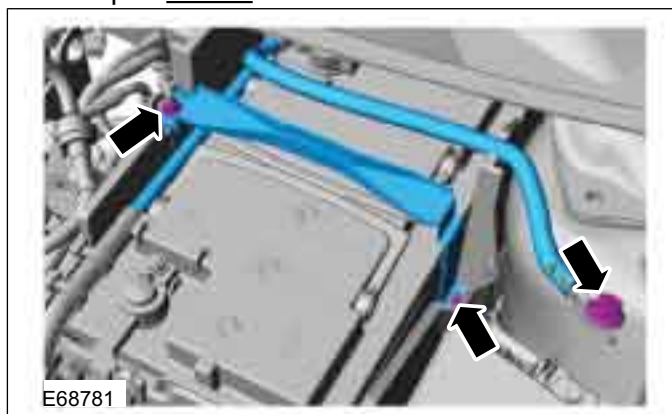
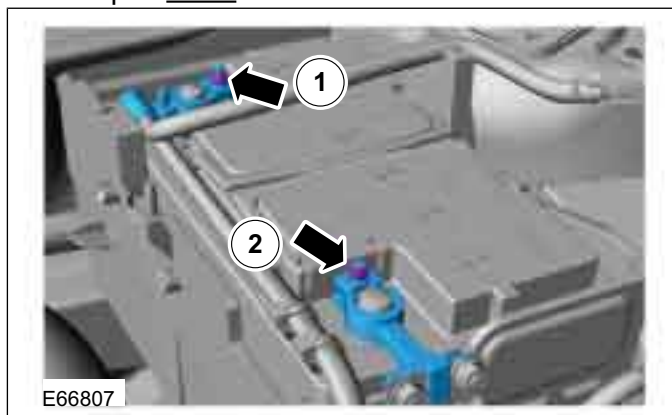
Refer to: **Door Window Motor Initialization**
(501-11 Glass, Frames and Mechanisms,
General Procedures).

REMOVAL AND INSTALLATION

Battery Cables — 2.5L Duratec-ST (VI5)

Removal

1.

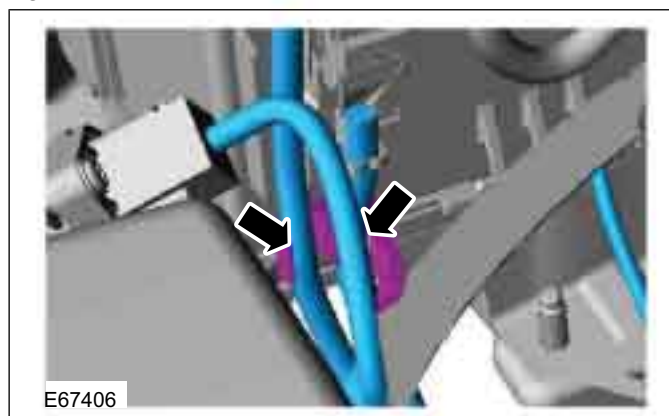
2. Torque: 10 Nm3. Torque: 6 Nm

4. Remove the air cleaner.

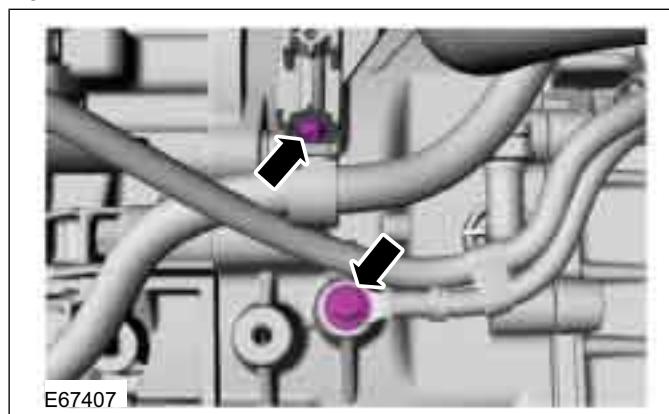
Refer to: **Air Cleaner - Vehicles With: PCM Security Shield** (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).

Refer to: **Air Cleaner - Vehicles Without: PCM Security Shield** (303-12 Intake Air Distribution and Filtering - 2.5L Duratec-ST (VI5), Removal and Installation).

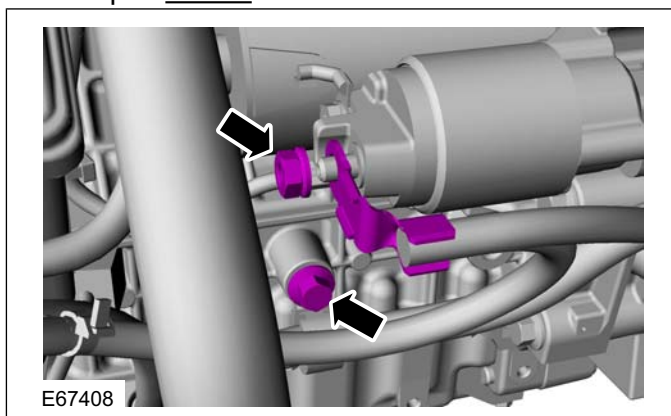
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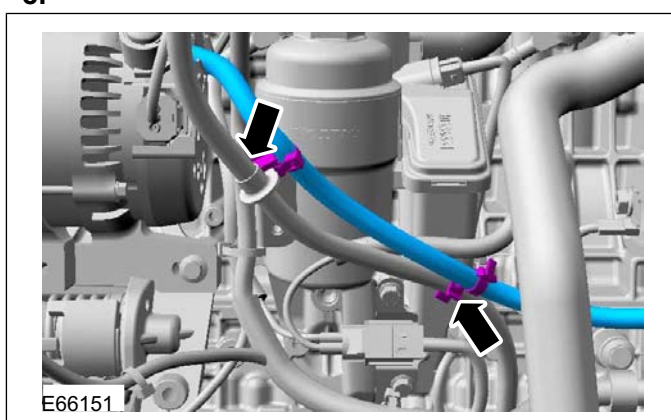
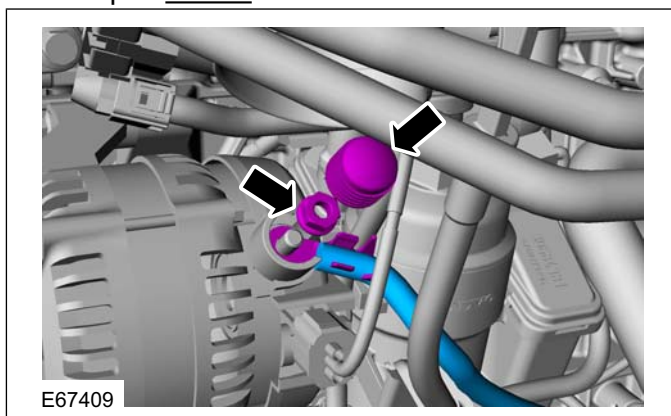
6.



REMOVAL AND INSTALLATION

7. Torque: 12 Nm

8.

9. Torque: 15 Nm

Installation

1. To install, reverse the removal procedure.
2. Initialize the door window motors.

Refer to: [Door Window Motor Initialization](#)
(501-11 Glass, Frames and Mechanisms,
General Procedures).



SECTION 414-02 Generator and Regulator

VEHICLE APPLICATION: 2008.75 Focus ST C307

CONTENTS	PAGE
DIAGNOSIS AND TESTING	
Generator.....	414-02-2
REMOVAL AND INSTALLATION	
Generator — 2.5L Duratec-ST (VI5).....	414-02-3





DIAGNOSIS AND TESTING

Generator

1. REFER to **Section 414-00** [Charging System - General Information].



REMOVAL AND INSTALLATION

Generator — 2.5L Duratec-ST (VI5)

Removal

NOTE: Removal steps in this procedure may contain installation details.

1. Remove the accessory drive belt.

Refer to: **Accessory Drive Belt** (303-05 Accessory Drive - 2.5L Duratec-ST (VI5), Removal and Installation).

2. Lower the vehicle.

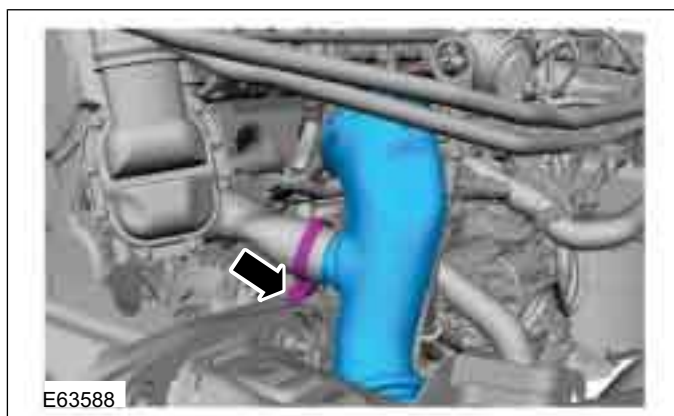
3. Disconnect the battery ground cable.

Refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

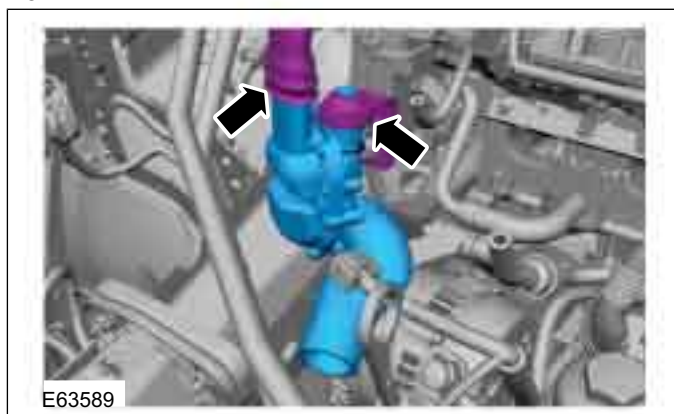
4. Remove the intake manifold.

Refer to: **Intake Manifold** (303-01 Engine - 2.5L Duratec-ST (VI5), Removal and Installation).

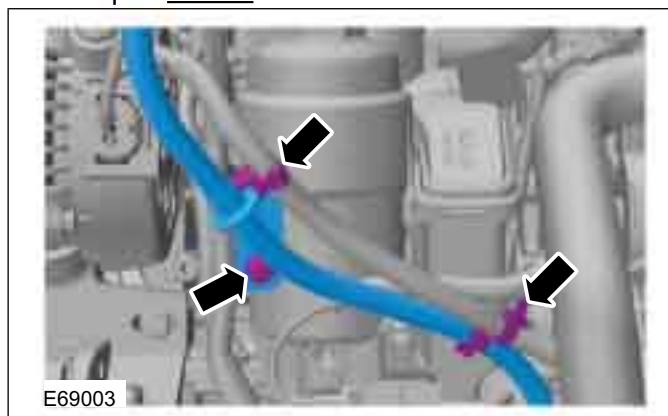
5. **CAUTION:** Make sure that the inside of the pipe ends are clean and free of oil residue.



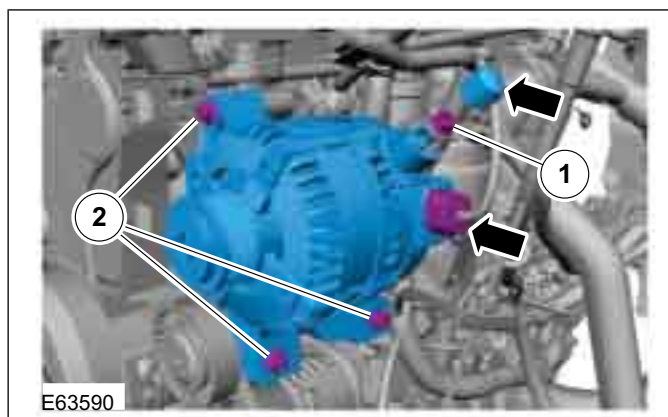
- 6.



7. Torque: 10 Nm



8. 1. Torque: 15 Nm
2. Torque: 25 Nm



Installation

1. **NOTE:** Install all the bolts finger tight before final tightening.

To install, reverse the removal procedure.

2. Initialize the door window motors.

Refer to: **Door Window Motor Initialization** (501-11 Glass, Frames and Mechanisms, General Procedures).



SECTION 414-05 Voltage Converter/Inverter

VEHICLE APPLICATION: 2008.75 Focus ST C307

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DESCRIPTION AND OPERATION	
Direct Current/Alternating Current (DC/AC) Inverter.....	414-05-2
Function indicator.....	414-05-2
DC/AC converter.....	414-05-3
AC mains outlet	414-05-3
AC mains outlet	414-05-4
REMOVAL AND INSTALLATION	
Direct Current/Alternating Current (DC/AC) Inverter.....	414-05-5



DESCRIPTION AND OPERATION

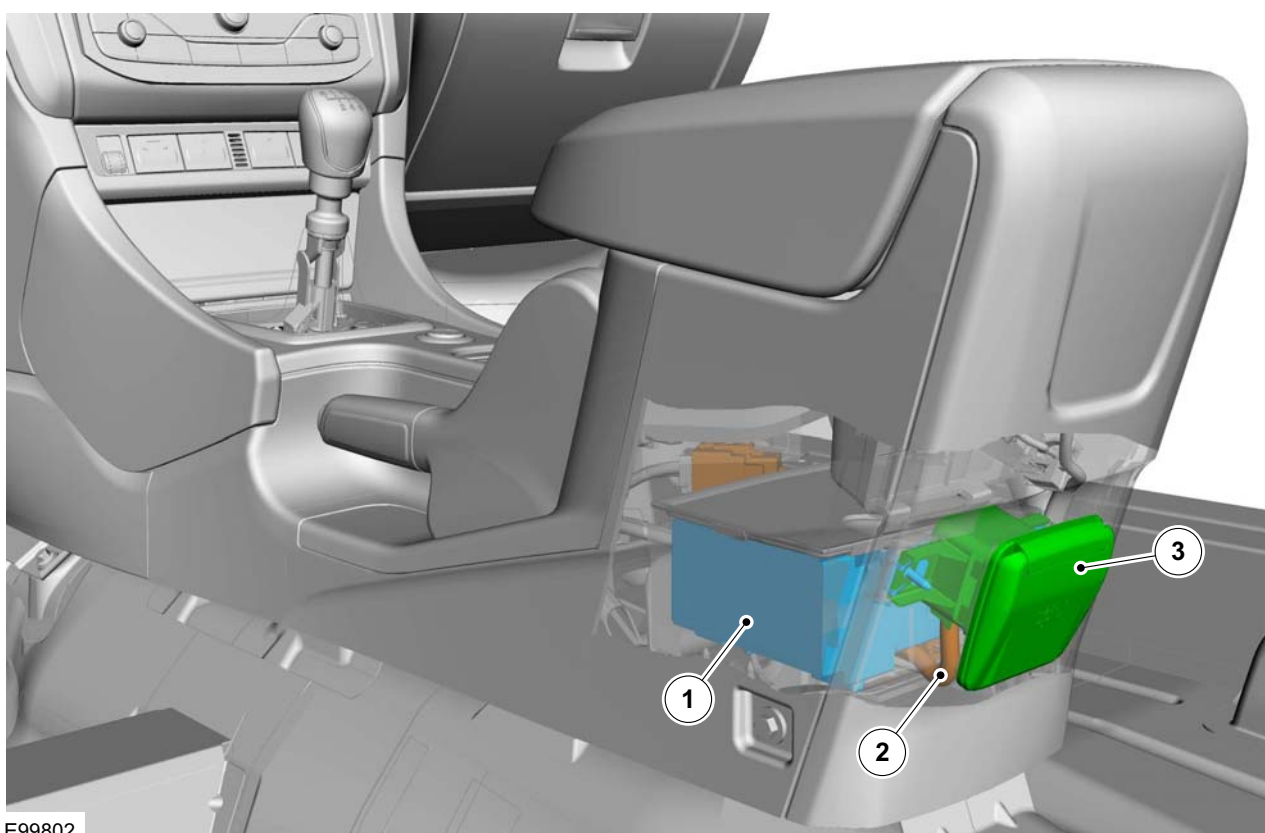
Direct Current/Alternating Current (DC/AC) Inverter

▲ WARNING: For workshop repairs, it is only permissible to replace the converter as a complete unit together with the wiring harness and the socket. The component must not be opened, as charged capacitors inside can still carry dangerously high residual voltages.

In the rear part of the center console there is an optional 230 V socket instead of the outlet of the standard 12 V electrical system.

In this case a DC/AC converter supplies a continuous power of 150 W at 230 V/50 Hz. It can also absorb temporary power peaks of up to 300 W when consumers are switched on.

For example, an output of 150 W is sufficient to run laptops, games consoles and mobile phone chargers.



1. DC/AC converter
2. AC mains outlet wiring harness
3. AC mains outlet

Function indicator

▲ WARNING: For workshop repairs, it is only permissible to replace the converter as a complete unit together with the wiring harness and the socket. The component must not be opened, as charged capacitors inside can still carry dangerously high residual voltages.

The LED in the socket lights up orange when the converter is supplying a voltage.

In the event of a fault the system switches off and indicates the cause of the fault by flashing a trouble code via the LED in the socket:

- 1x flash
 - High temperature
- 2x flashes
 - Overload
- 3x flashes
 - Internal overvoltage

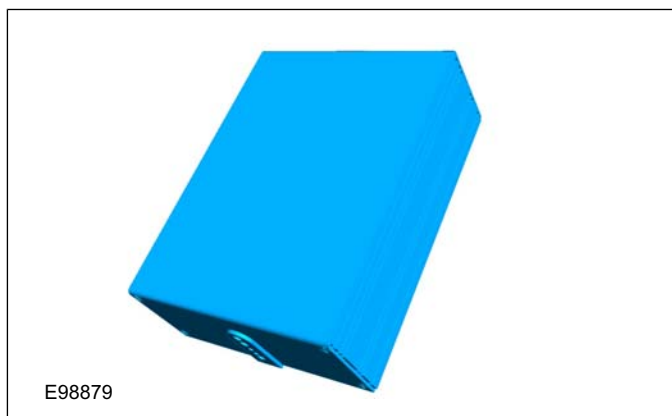
DESCRIPTION AND OPERATION

- 4x flashes
 - Internal undervoltage
- Continuous flashing
 - Short circuit to power

If the converter switches off due to high temperature then it switches back on again automatically once the temperature has cooled down sufficiently.

With all of the other faults which are displayed, the converter can be reset by switching the ignition off and back on again or by unplugging and reinserting the plug in the socket.

If these measures are unsuccessful then there are no further options for directly influencing the function yourself.

DC/AC converter

The converter operates with a series connection of two power converter circuits. The primary power converter here is a push-pull converter. It converts the 12 V supply from the electrical system of the vehicle to an intermediate direct current link of approx. 320 V.

From this intermediate direct current link, the downstream full H-bridge circuit generates a pulse-width modulated output voltage with 230 V/50 Hz.

A controller modulates the pulse width of the square-wave output voltage and maintains an effective output voltage of 230 V under varying load conditions and under different input voltages. Here, the rising and falling edge of the positive and negative square wave pulse are controlled symmetrically to the ideal shape of a sine wave, which - among other things - also makes a positive contribution to electromagnetic compatibility.

DC/AC converters which supply a modified square wave output voltage are referred to as "Modified Sine Wave Inverters".

With this type of system there is no need for a residual current operated device for protection in the event of accidental contact, as all of the 230 V lines are double-insulated. Potential-free separation of the entire 230 V voltage part from the vehicle is provided (electrical isolation).

The output voltage of 230 V/50 Hz is not generated until the switching voltage is present at terminal 1 of the converter via the AC mains outlet switch.

The converter operates with the ignition switched on and a vehicle electrical supply of between 11 V and 16 V. Internal voltage monitoring in the converter deactivates the system if the input voltage is outside this range.

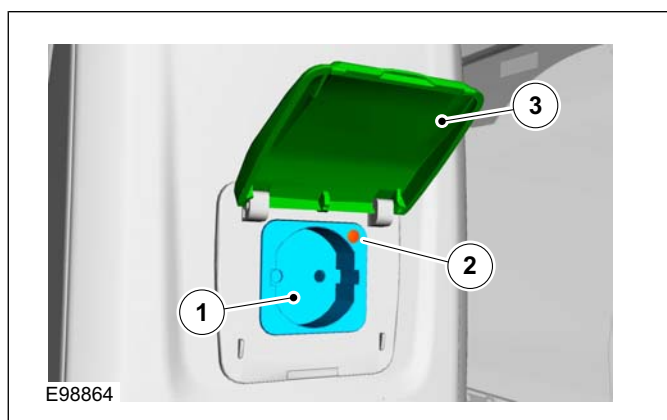
AC mains outlet

In order to prevent accidents and the risk of electrical shock, the outlet is protected with a child safety device and the AC outlet switch.

In order to make the system safer for children, the safety catches for the 230 V contacts can only be pushed to one side by pressing a Euro plug evenly into both of the connector openings.

The AC mains outlet switch only activates the system when a consumer is connected to the outlet.

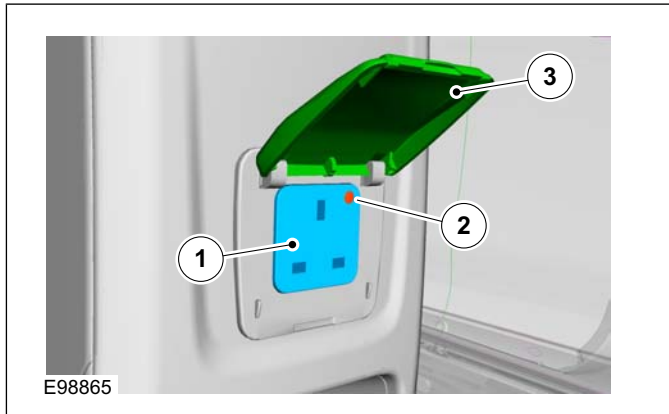
The contacts of the outlet exert a more powerful grip on the plug so that it does not shake loose on poor road surfaces. An orange LED lights up to show that the unit has been activated.



1. 230 V/50 Hz outlet
2. LED (light emitting diode)
 - 230 V/50 Hz outlet

DESCRIPTION AND OPERATION

AC mains outlet



1. 230 V/50 Hz outlet (for UK vehicles)
2. LED
 - 230 V/50 Hz outlet

REMOVAL AND INSTALLATION

Direct Current/Alternating Current (DC/AC) Inverter

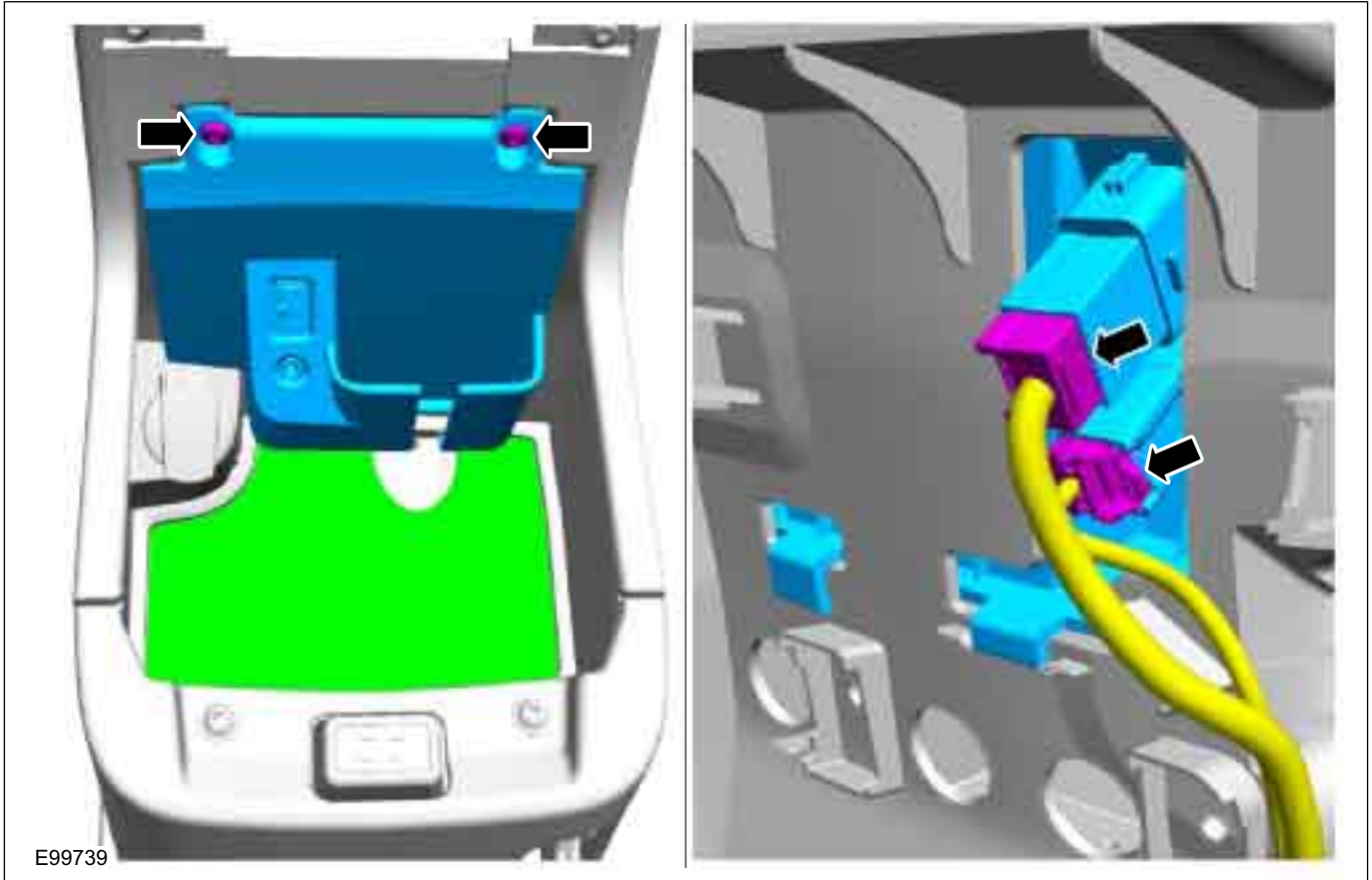
Removal

1. Refer to: **Floor Console - Vehicles Built From:** 03/2007 (501-12 Instrument Panel and Console, Removal and Installation).

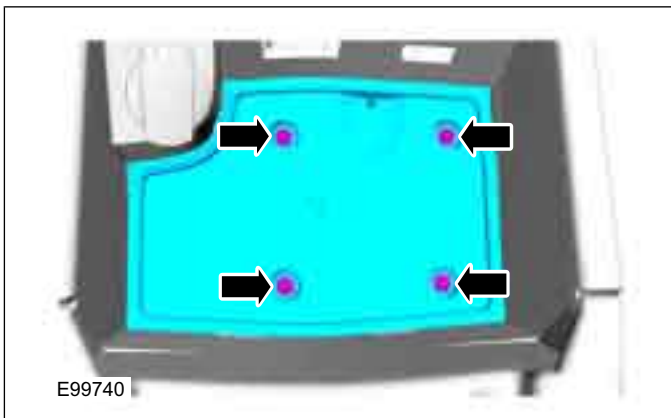
- 2.



REMOVAL AND INSTALLATION



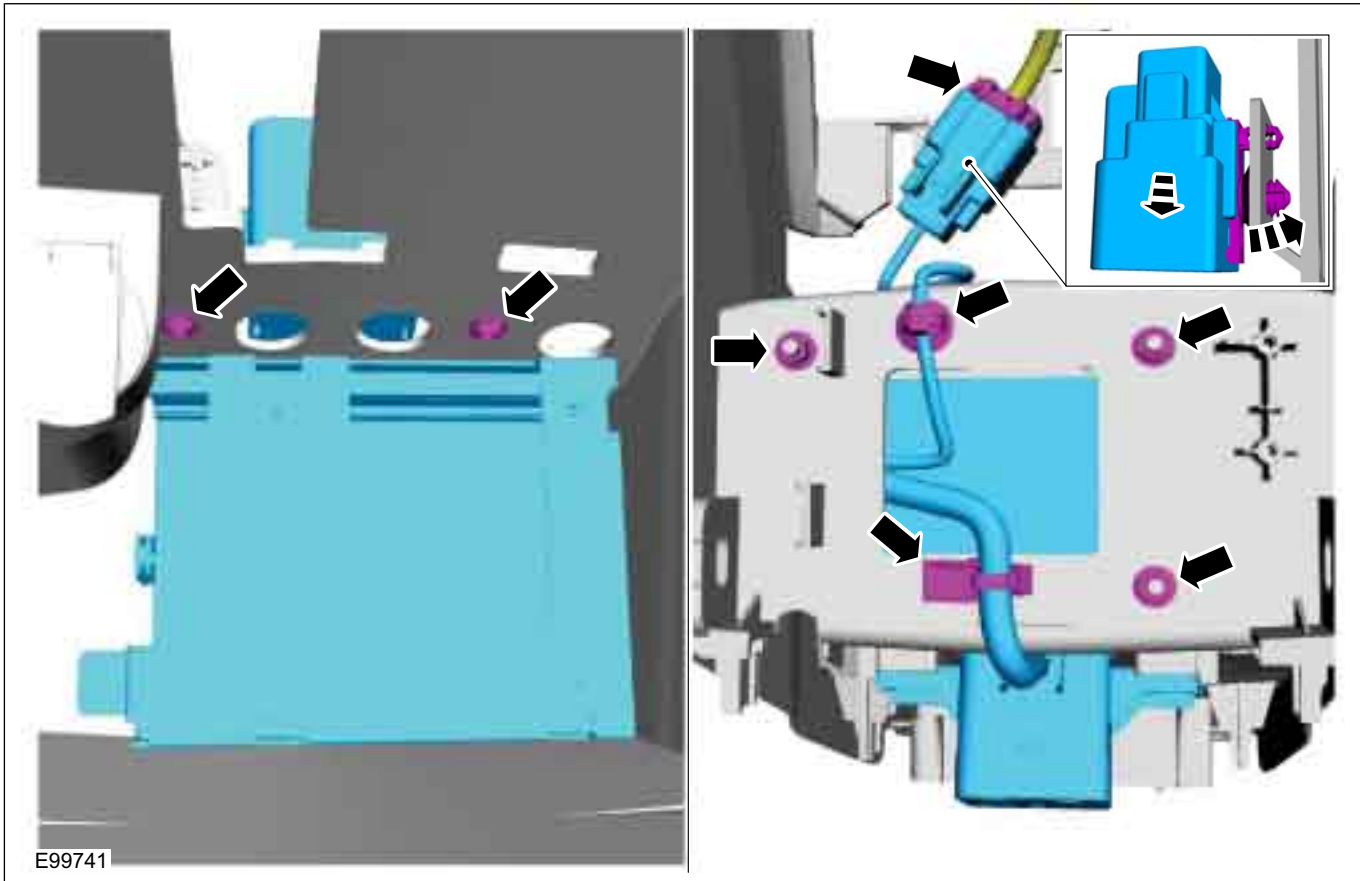
4.



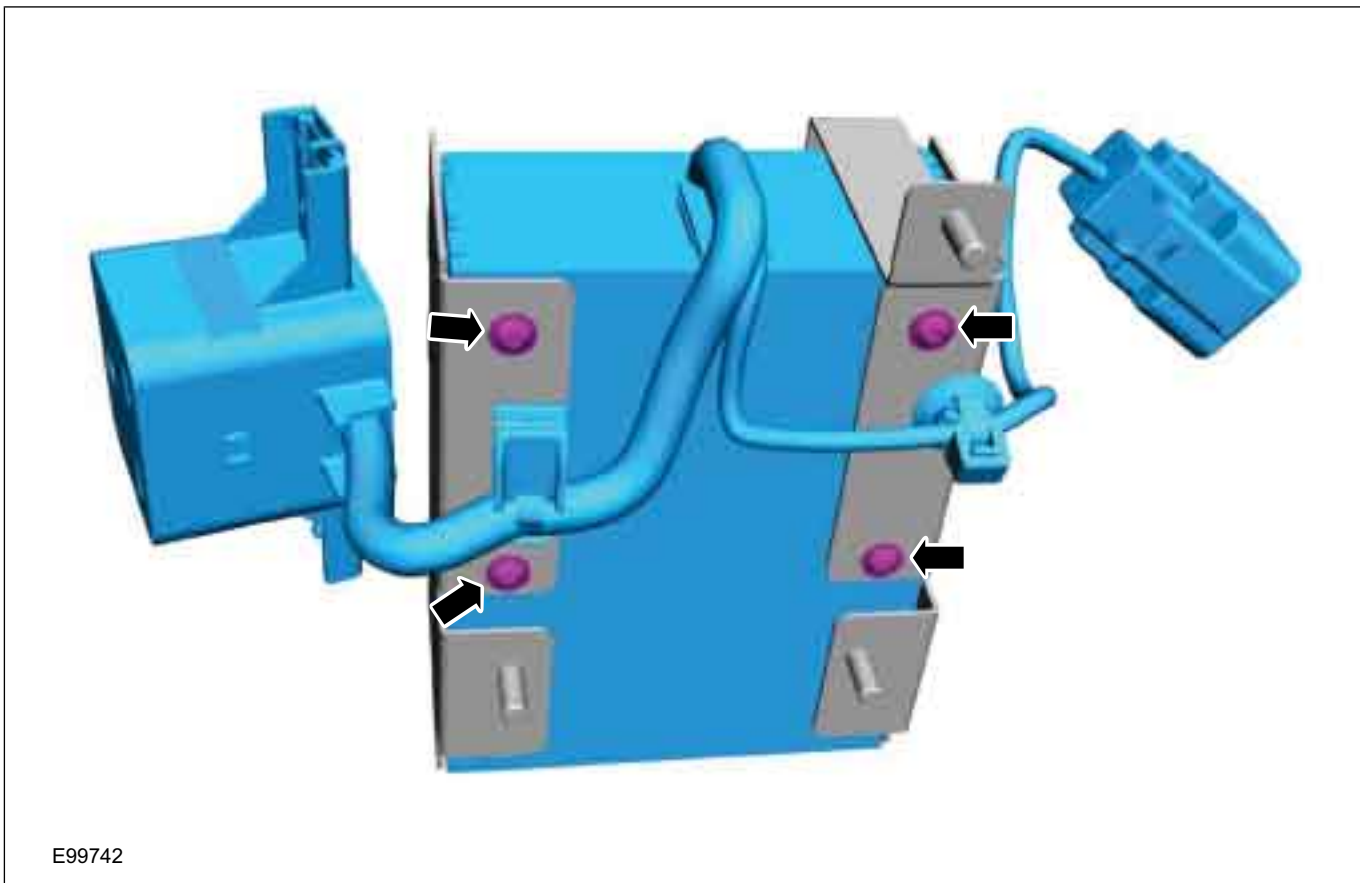
5.



REMOVAL AND INSTALLATION



6.





REMOVAL AND INSTALLATION

Installation

1. To install, reverse the removal procedure.



SECTION 415-00 Information and Entertainment System - General Information

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Inspection and Verification.....	415-00-2
Self-Diagnostic Mode - Low Series Audio Unit.....	415-00-2
Self-Diagnostic Mode - High Series Audio Unit.....	415-00-2
Diagnostic Trouble Code (DTC) Index Chart.....	415-00-3
Symptom Chart.....	415-00-4
Pinpoint Tests.....	415-00-6
Cellular Phone.....	415-00-24
Principles of Operation.....	415-00-24
Inspection and Verification.....	415-00-24
Diagnostic Trouble Code (DTC) Index Chart.....	415-00-25
Symptom Chart.....	415-00-27
Pinpoint Tests.....	415-00-28

DIAGNOSIS AND TESTING

Audio System

Refer to Wiring Diagrams Section 415-01, for schematic and connector information.
Refer to Wiring Diagrams Section 415-03, for schematic and connector information.

General Equipment

Worldwide Diagnostic System (WDS)

Inspection and Verification

NOTE: If the code is entered incorrectly 3 times, the system will lock out. The component can only be unlocked by the manufacturer.

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> - Audio unit - Antenna - Foreign objects contacting speaker - Trim poorly fitted/resonance - Audio control switch (if equipped) - Rear auxiliary audio control (if equipped) - Compact disc (CD) changer - Digital versatile disc (DVD) player 	<ul style="list-style-type: none"> - Fuse(s) - Wiring harness - Electrical connector(s) - Audio unit - Audio control switch (if equipped) - Rear auxiliary audio control (if equipped) - CD changer - DVD player - Central junction box (CJB)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Self-Diagnostic Mode.

Self-Diagnostic Mode - Low Series Audio Unit

NOTE: The audio unit must be in radio mode before entering the Self-Diagnostic Mode.

1. To enter the audio unit Self-Diagnostic Mode, switch the audio unit ON. Within four seconds depress the preset buttons 3 and 6 together.

2. Release the preset buttons 3 and 6 and the audio unit will enter the Self-Diagnostic Mode.
3. To exit the Self-Diagnostic Mode, switch the audio unit OFF.

Self-Diagnostic Mode

Message Displayed	Circuit Tested
1. 4CH LF for four channel system 2CH LF for two channel system.	Left hand front speaker circuit.
2. 4CH RF for four channel system 2CH RF for two channel system.	Right hand front speaker circuit.
3. 4CH LR for four channel system.	Left hand rear speaker circuit.
4. 4CH RR for four channel system.	Right hand rear speaker circuit.

4. If the cause is not evident after the Self-Diagnostic Mode, connect WDS to the data link connector (DLC).
5. Retrieve the Diagnostic Trouble Code (DTC)s and refer to the DTC Index Chart.

Self-Diagnostic Mode - High Series Audio Unit

NOTE: The audio unit must be in radio mode before entering the Self-Diagnostic Mode.

1. To enter the audio unit Self-Diagnostic Mode, switch the audio unit ON. Within four seconds depress the preset button 4 and TA together.
2. Release the preset button 4 and TA and the audio unit will enter the Self-Diagnostic Mode.
3. To exit the Self-Diagnostic Mode, switch the audio unit OFF.

Self-Diagnostic Mode

Message Displayed	Circuit Tested
1. 4CH LF for four channel system 2CH LF for two channel system.	Left hand front speaker circuit.

Information and Entertainment System - General Information

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415-00-3

DIAGNOSIS AND TESTING

Message Displayed	Circuit Tested
2. 4CH RF for four channel system 2CH RF for two channel system.	Right hand front speaker circuit.
3. 4CH LR for four channel system.	Left hand rear speaker circuit.
4. 4CH RR for four channel system.	Right hand rear speaker circuit.

Message Displayed	Circuit Tested
5. FM frequency received.	Antenna cable.

- If the cause is not evident after the Self-Diagnostic Mode, connect WDS to the data link connector (DLC).
- Retrieve the Diagnostic Trouble Code (DTC)s and refer to the DTC Index Chart.

Diagnostic Trouble Code (DTC) Index Chart

Diagnostic Trouble Code (DTC) Index Chart - Audio Unit

DTC	Description/Condition	Possible Source	Action
B1342	Audio unit internal failure	Audio unit	INSTALL a new audio unit. REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation).
B2401	Tape player failure	Audio unit	INSTALL a new audio unit. REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation).
B2403	CD player internal failure	Audio unit	INSTALL a new audio unit. REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation).
B2404	Audio control switch circuit failure	Audio control switch	GO to Pinpoint Test E.
B2406	CD player internal failure	Audio unit	INSTALL a new audio unit. REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation).
B2408	Speaker line short circuit	Speaker(s)	GO to Pinpoint Test D.
B2409	AM receiving signal error	Antenna cable	GO to Pinpoint Test B.

Information and Entertainment System - General Information

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415-00-4

DIAGNOSIS AND TESTING

DTC	Description/Condition	Possible Source	Action
B2410	FM receiving signal error	Antenna cable	GO to Pinpoint Test B.
B2477	Module configuration failure	Audio unit and central junction box (CJB)	REFER to WDS.
P1628	Module ignition supply input	CJB	REFER to WDS.

Diagnostic Trouble Code (DTC) Index Chart - CD Changer

DTC	Description/Condition	Possible Source	Action
B1342	CD changer defective	CD changer	INSTALL a new CD changer. REFER to: Compact Disc (CD) Changer (415-01 Audio Unit, Removal and Installation).
B2403	CD changer internal failure	CD changer	INSTALL a new CD changer. REFER to: Compact Disc (CD) Changer (415-01 Audio Unit, Removal and Installation).

1. If the cause is still evident, refer to the Symptom Chart.

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> The audio unit is inoperative/does not operate correctly 	<ul style="list-style-type: none"> Circuit. Audio unit. 	<ul style="list-style-type: none"> GO to Pinpoint Test A.
<ul style="list-style-type: none"> The display is blank - radio and cassette player operate 	<ul style="list-style-type: none"> Audio unit. 	<ul style="list-style-type: none"> INSTALL a new audio unit. REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation). TEST the system for normal operation.
<ul style="list-style-type: none"> The display is blank - radio and CD player operate 	<ul style="list-style-type: none"> Audio unit. 	<ul style="list-style-type: none"> INSTALL a new audio unit. REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation). TEST the system for normal operation.

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415-00-5

415-00-5

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Poor reception 	<ul style="list-style-type: none"> Antenna. Antenna cable. Audio unit. 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
<ul style="list-style-type: none"> Poor quality/distorted sound from one or more speakers (not all speakers) 	<ul style="list-style-type: none"> Speaker(s). Circuit. Audio unit. 	<ul style="list-style-type: none"> GO to Pinpoint Test C.
<ul style="list-style-type: none"> No sound from all speakers 	<ul style="list-style-type: none"> Audio unit. 	<ul style="list-style-type: none"> INSTALL a new audio unit. REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation). TEST the system for normal operation.
<ul style="list-style-type: none"> No sound from one or more of the speakers (not all speakers) 	<ul style="list-style-type: none"> Speaker(s). Circuit. Audio unit. 	<ul style="list-style-type: none"> GO to Pinpoint Test D.
<ul style="list-style-type: none"> The auxiliary audio control is inoperative/does not operate correctly. 	<ul style="list-style-type: none"> Circuit. Auxiliary audio control switch. Rear auxiliary audio control. Audio unit. 	<ul style="list-style-type: none"> GO to Pinpoint Test E.
<ul style="list-style-type: none"> The CD changer is inoperative/does not operate correctly 	<ul style="list-style-type: none"> Circuit(s). CD changer. Audio unit. 	<ul style="list-style-type: none"> GO to Pinpoint Test F.
<ul style="list-style-type: none"> The digital versatile disc (DVD) player is inoperative/does not operate correctly 	<ul style="list-style-type: none"> Circuit(s). DVD player. 	<ul style="list-style-type: none"> GO to Pinpoint Test G.
<ul style="list-style-type: none"> No sound from headphone(s) 	<ul style="list-style-type: none"> Headphone(s). DVD player. 	<ul style="list-style-type: none"> Using a known good headphone, check the headphone in the right-hand and left-hand sockets. If sound is heard from each headphone socket, INSTALL a new headphone(s). If no sound is heard from the headphone socket(s), INSTALL a new DVD player. REFER to: Digital Versatile Disc (DVD) Player (415-07 Video System, Removal and Installation). TEST the system for normal operation.

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415-00-6

415-00-6

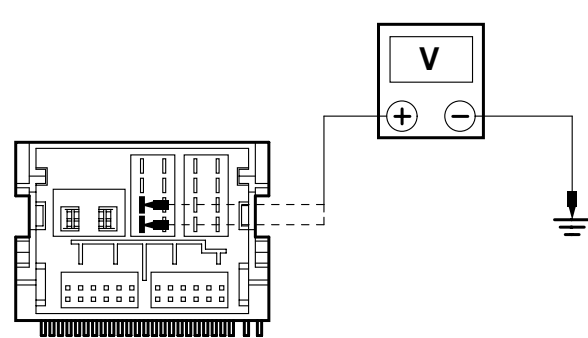
DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> The audio unit illumination is inoperative 	<ul style="list-style-type: none"> Fuse(s). Circuit(s). Audio unit. Genetic electronic module (GEM). 	<ul style="list-style-type: none"> REFER to: Instrument Cluster and Panel Illumination (413-00 Instrument Cluster and Panel Illumination, Diagnosis and Testing).
<ul style="list-style-type: none"> The audio unit clock is not displayed 	<ul style="list-style-type: none"> Audio unit connector. Audio unit. Instrument cluster. 	<ul style="list-style-type: none"> REFER to: Instrument Cluster (413-01 Instrument Cluster, Diagnosis and Testing).

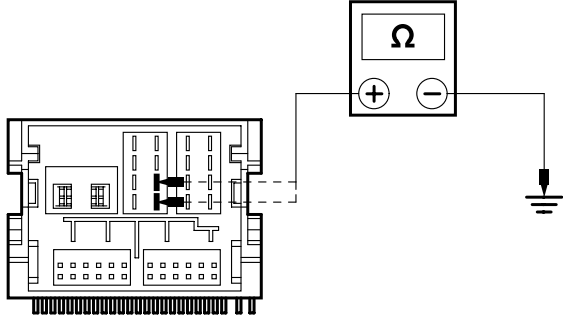
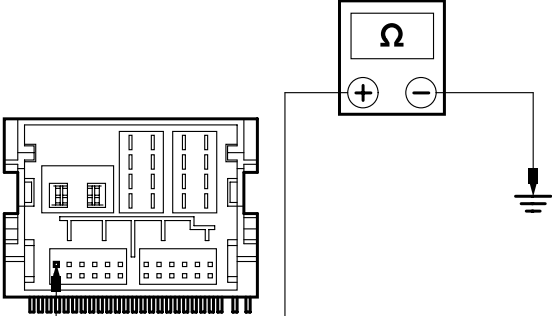
Pinpoint Tests

NOTE: Use a digital multimeter for all electrical measurements.

PINPOINT TEST A : THE AUDIO UNIT IS INOPERATIVE/DOES NOT OPERATE CORRECTLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK FOR VOLTAGE TO AUDIO UNIT	
	<ol style="list-style-type: none"> 1 Disconnect Audio Unit C442. 2 Ignition switch in position I.
 <p>E42130</p>	<ol style="list-style-type: none"> 3 Measure the voltage between the audio unit C442 pin 15, circuit 29-MD15 (OG/BK), harness side and ground, and between the audio unit C442 pin 16, circuit 75-MD15 (YE/GN), harness side and ground. <ul style="list-style-type: none"> Are the voltages greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to A2. → No REPAIR circuit 29-MD15 (OG/BK) or circuit 75-MD15 (YE/GN). TEST the system for normal operation.
A2: CHECK THE AUDIO UNIT GROUND CIRCUITS FOR OPEN	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E42131</p>	<p>2 Measure the resistance between the audio unit C442 pin 11, circuit 91-MD5 (BK/BU), harness side and ground, and between the audio unit C442 pin 12, circuit 91-MD15 (BK/GN), harness side and ground.</p> <ul style="list-style-type: none"> • Are the resistances less than 1 ohm? <p>→ Yes GO to A3.</p> <p>→ No REPAIR circuit 91-MD5 (BK/BU) or 91-MD15 (BK/GN). TEST the system for normal operation.</p>
<p>A3: CHECK CIRCUIT 9-MD27 (BN/WH) TO GROUND</p>	
	<p>1 Connect Audio Unit C442.</p>
	<p>2 Disconnect Audio Unit C448.</p>
 <p>E42132</p>	<p>3 Measure the resistance between the audio unit C448 pin 6, circuit 9-MD27 (BN/WH), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? <p>→ Yes INSTALL a new audio unit.</p> <p>REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR circuit 91-MD5 (BK/BU) . TEST the system for normal operation.</p>

PINPOINT TEST B : POOR RECEPTION

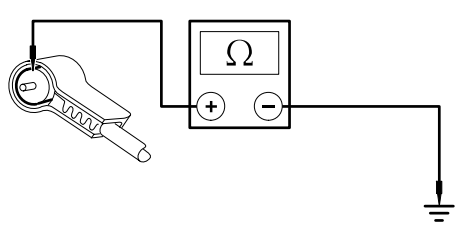
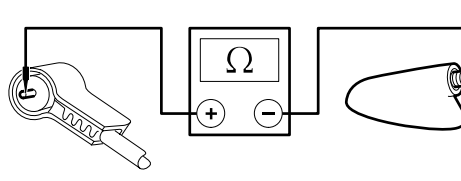
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>B1: CHECK THE ANTENNA CABLE SHIELD</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect the antenna cable from the audio unit.</p>

Information and Entertainment System -
General Information

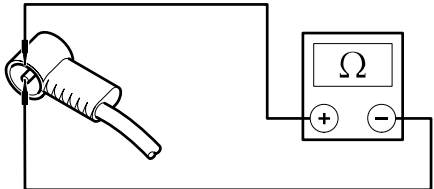
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415-00-8

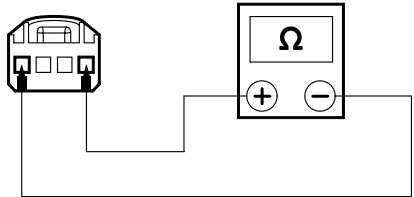
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIW3801009</p>	<p>3 Measure the resistance between the antenna cable ground connector (shield), and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 1 ohm? <p>→ Yes GO to B2.</p> <p>→ No CLEAN and TIGHTEN the antenna base connection to the body. If the concern persists, INSTALL a new antenna cable.</p> <p>REFER to: Antenna Cable (415-02 Antenna, Removal and Installation). TEST the system for normal operation.</p>
<p>B2: CHECK THE ANTENNA CENTER CONDUCTOR FOR OPEN</p>	
 <p>TIW3801010</p>	<p>1 Remove the antenna mast.</p> <p>2 Measure the resistance of the center conductor between the ends of the antenna cable.</p> <ul style="list-style-type: none"> Is the resistance less than 1 ohm? <p>→ Yes GO to B3.</p> <p>→ No INSTALL a new antenna cable.</p> <p>REFER to: Antenna Cable (415-02 Antenna, Removal and Installation). TEST the system for normal operation.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B3: CHECK ANTENNA CABLE FOR SHORT	
 <p>V3801158</p>	<p>1 Measure the resistance between the antenna center conductor and the antenna ground (shield).</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms (open circuit)? <p>→ Yes CLEAN and TIGHTEN the ground connections at the base of the antenna and battery negative cable to the body. If concern the persists, INSTALL a new audio unit.</p> <p>REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation). TEST the system for normal operation.</p> <p>→ No INSTALL a new antenna cable.</p> <p>REFER to: Antenna Cable (415-02 Antenna, Removal and Installation). TEST the system for normal operation. If the concern persists, INSTALL a new audio unit. REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation).</p>

PINPOINT TEST C : POOR QUALITY/DISTORTED SOUND FROM ONE OR MORE SPEAKERS (NOT ALL SPEAKERS)

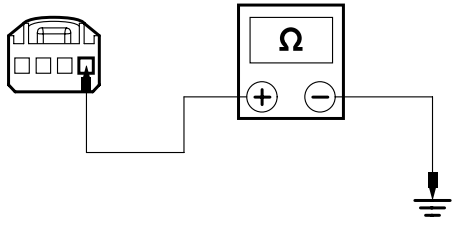
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: CHECK THE SPEAKER RESISTANCE	
 <p>E42133</p>	<p>1 Disconnect Affected Speaker.</p> <p>2 Measure the resistance between the affected speaker pin 1 and pin 4, component side.</p> <ul style="list-style-type: none"> Is the resistance approximately 4.0 ohms? <p>→ Yes GO to C2.</p> <p>→ No INSTALL a new speaker. TEST the system for normal operation.</p>
C2: CHECK SPEAKER INPUT FOR SHORT TO GROUND	
	<p>1 Disconnect Audio Unit C442.</p>

Information and Entertainment System -
General Information

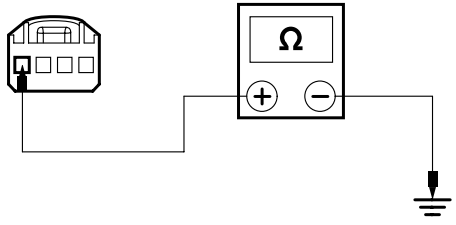
415-00-10

415-00-10

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E42134</p>	<p>2 Measure the resistance between the affected speaker connector pin 1, harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms (open circuit)? <p>→ Yes GO to C3.</p> <p>→ No REPAIR speaker input circuit. TEST the system for normal operation.</p>

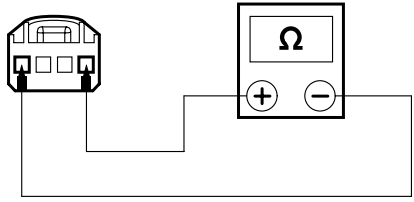
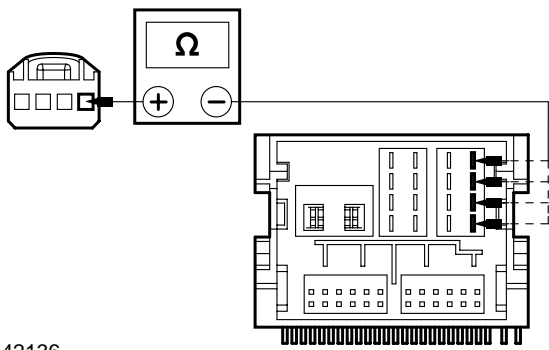
C3: CHECK SPEAKER RETURN FOR SHORT TO GROUND

 <p>E42135</p>	<p>1 Measure the resistance between the affected speaker connector pin 4, harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms (open circuit)? <p>→ Yes INSTALL a new speaker. TEST the system for normal operation. If the concern persists, INSTALL a new audio unit.</p> <p>REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation).</p> <p>→ No REPAIR speaker return circuit. TEST the system for normal operation.</p>
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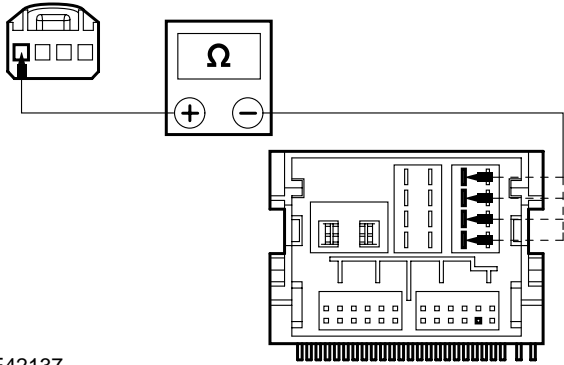
PINPOINT TEST D : NO SOUND FROM ONE OR MORE OF THE SPEAKERS (NOT ALL SPEAKERS)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: CHECK THE SPEAKER RESISTANCE	
	<p>1 Disconnect Inoperative Speaker.</p>

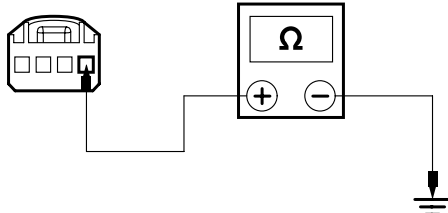
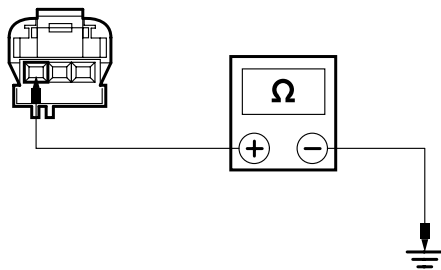
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E42133</p>	<p>2 Measure the resistance between the inoperative speaker pin 1 and pin 4, component side.</p> <ul style="list-style-type: none"> • Is the resistance approximately 4.0 ohms? <p>→ Yes GO to D2.</p> <p>→ No INSTALL a new speaker(s). TEST the system for normal operation.</p>
<p>D2: CHECK THE INOPERATIVE SPEAKER(S) CONNECTOR PIN 1 CIRCUIT</p>	
 <p>E42136</p>	<p>1 Disconnect Audio Unit C442.</p> <p>2 Measure the resistance between the following audio unit C442 pins, harness side and the inoperative speaker(s) connector pin 1, harness side:</p> <ul style="list-style-type: none"> – (Left front speaker) C937 pin 1, circuit 8-MD28 (WH) to C442 pin 3, circuit 8-MD10 (WH/BK). – (Right front speaker) C938 pin 1, circuit 8-MD28 (WH) to C442 pin 2, circuit 8-MD17 (WH/RD). – (Left rear speaker) C939 pin 1, circuit 8-MD29 (WH/VT) to C442 pin 4, circuit 8-MD11 (WH/VT). – (Right rear speaker) C940 pin 1, circuit 8-MD29B (WH/VT) to C442 pin 1, circuit 8-MD18 (WH). <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? <p>→ Yes GO to D3.</p> <p>→ No REPAIR the circuit in question. TEST the system for normal operation.</p>

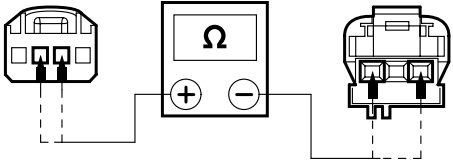
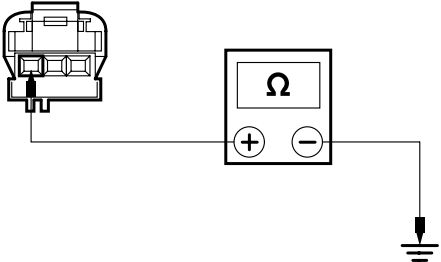
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D3: CHECK THE INOPERATIVE SPEAKER(S) CONNECTOR PIN 4 CIRCUIT	
 <p>E42137</p>	<p>1 Measure the resistance between the following audio unit C442 pins, harness side and the inoperative speaker(s) connector pin 4, harness side:</p> <ul style="list-style-type: none"> - (Left front speaker) C937 pin 4, circuit 10-MD28 (GY) to C442 pin 7, circuit 10-MD10 (GY/BK). - (Right front speaker) C938 pin 4, circuit 10-MD28 (GY) to C442 pin 6, circuit 10-MD17 (GY/RD). - (Left rear speaker) C939 pin 4, circuit 10-MD29 (GY/WH) to C442 pin 8, circuit 10-MD11 (GY/WH). - (Right rear speaker) C940 pin 4, 10-MD29B (GY/WH) to C442 pin 5, 10-MD18 (GY). <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? <ul style="list-style-type: none"> → Yes GO to D4. → No REPAIR the circuit in question. TEST the system for normal operation.
D4: CHECK THE INOPERATIVE SPEAKER(S) CIRCUIT FOR SHORT TO GROUND	
	<p>1 Disconnect Front Door Tweeter Speaker(s) C941 (left-hand) C943 (right-hand).</p> <p>2 Disconnect Rear Door Tweeter Speaker(s) C942 (left-hand) C944 (right-hand).</p>

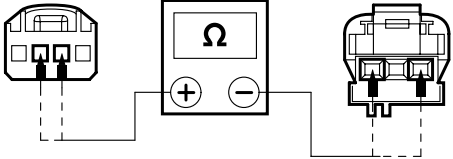
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E42134</p>	<p>3 Measure the resistance between the following inoperative speaker(s) connector pin 1, harness side and ground:</p> <ul style="list-style-type: none"> - (Left front speaker) C937 pin 1, circuit 8-MD28 (WH), to ground. - (Right front speaker) C938 pin 1, circuit 8-MD28 (WH), to ground. - (Left rear speaker) C939 pin 1, circuit 8-MD29 (WH/VT), to ground. - (Right rear speaker) C940 pin 1, 8-MD29B (WH/VT), to ground. <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms (open circuit)? <ul style="list-style-type: none"> → Yes INSTALL a new speaker. TEST the system for normal operation. If the front door tweeter speaker(s) are inoperative, GO to D5. If the rear door tweeter speaker(s) are inoperative, GO to D7. → No REPAIR the circuit in question. TEST the system for normal operation.
<p>D5: CHECK THE INOPERATIVE FRONT DOOR TWEETER SPEAKER(S) CIRCUIT FOR SHORT TO GROUND</p>	
 <p>E44211</p>	<p>1 Measure the resistance between the following inoperative front door tweeter speaker(s) connector pin 1, harness side and ground:</p> <ul style="list-style-type: none"> - (Left front door tweeter speaker) C941 pin 1, circuit 8-MD28A (WH), to ground. - (Right front door tweeter speaker) C943 pin 1, circuit 8-MD28A (WH), to ground. <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms (open circuit)? <ul style="list-style-type: none"> → Yes INSTALL a new front door tweeter speaker. REFER to: Front Door Tweeter Speaker (415-03 Speakers, Removal and Installation). TEST the system for normal operation. → No GO to D6.
<p>D6: CHECK THE FRONT SPEAKER(S) TO FRONT DOOR TWEETER SPEAKER(S) CIRCUIT(S) FOR OPEN</p>	
	<p>1 Connect Audio Unit C442.</p>

DIAGNOSIS AND TESTING

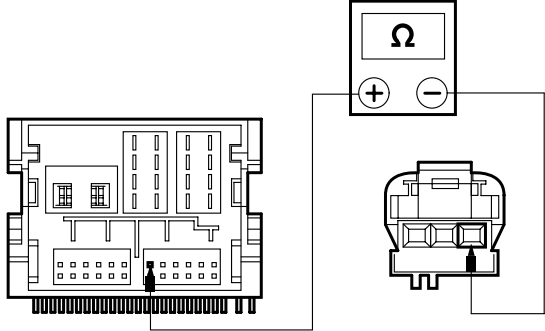
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E42138</p>	<p>2 Measure the resistance between the following front speaker(s) and front door tweeter speaker(s):</p> <ul style="list-style-type: none"> - left-hand front door tweeter speaker C941 pin 1, circuit 8-MD28A (WH), harness side and front speaker C937 pin 2, circuit 8-MD28A (WH), harness side. - left-hand front door tweeter speaker C941 pin 3, circuit 10-MD28A (GY), harness side and front speaker C937 pin 3, circuit 10-MD28A (GY), harness side. - right-hand front door tweeter speaker C943 pin 1, circuit 8-MD28A (WH), harness side and front speaker C938 pin 2, circuit 8-MD28A (WH), harness side. - right-hand front door tweeter speaker C943 pin 3, circuit 10-MD28A (GY), harness side and front speaker C938 pin 3, circuit 10-MD28A (GY), harness side. <ul style="list-style-type: none"> • Are the resistances less than 1 ohm? <ul style="list-style-type: none"> → Yes INSTALL a new front door tweeter speaker. REFER to: Front Door Tweeter Speaker (415-03 Speakers, Removal and Installation). TEST the system for normal operation. If the concern persists, INSTALL a new audio unit. REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation). → No REPAIR the circuit in question. TEST the system for normal operation.
<p>D7: CHECK THE INOPERATIVE REAR DOOR TWEETER SPEAKER(S) CIRCUIT FOR SHORT TO GROUND</p>	
 <p>E44211</p>	<p>1 Measure the resistance between the following inoperative rear door tweeter speaker(s) connector pin 1, harness side and ground:</p> <ul style="list-style-type: none"> - (Left rear door tweeter speaker) C942 pin 1, circuit 8-MD29A (WH/VT), to ground. - (Right rear door tweeter speaker) C943 pin 1, circuit 8-MD29C (WH/VT), to ground. <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms (open circuit)? <ul style="list-style-type: none"> → Yes INSTALL a new rear door tweeter speaker. TEST the system for normal operation. → No GO to D8.

DIAGNOSIS AND TESTING

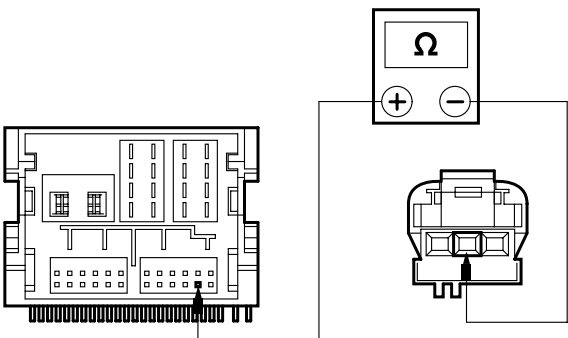
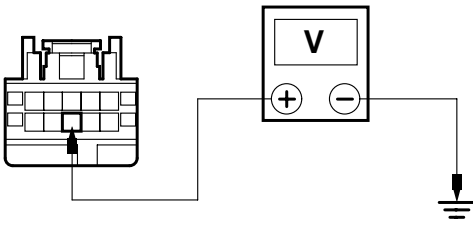
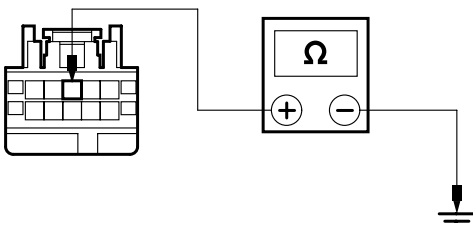
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D8: CHECK THE REAR SPEAKER(S) TO REAR DOOR TWEETER SPEAKER(S) CIRCUIT(S) FOR OPEN	
 <p>E42138</p>	<p>1 Connect Audio Unit C442.</p> <p>2 Measure the resistance between the following rear speaker(s) and rear door tweeter speaker(s):</p> <ul style="list-style-type: none"> - left-hand rear door tweeter speaker C942 pin 1, circuit 8-MD29A (WH/VT), harness side and rear speaker C939 pin 2, circuit 8-MD29A (WH/VT), harness side. - left-hand rear door tweeter speaker C942 pin 3, circuit 10-MD29A (GY/WH), harness side and rear speaker C939 pin 3, circuit 10-MD29A (GY/WH), harness side. - right-hand rear door tweeter speaker C944 pin 1, circuit 8-MD29C (WH/VT), harness side and rear speaker C940 pin 2, circuit 8-MD29C (WH/VT), harness side. - right-hand rear door tweeter speaker C944 pin 3, circuit 10-MD29C (GY/WH), harness side and rear speaker C940 pin 3, circuit 10-MD29C (GY/WH), harness side. <ul style="list-style-type: none"> • Are the resistances less than 1 ohm? <ul style="list-style-type: none"> → Yes INSTALL a new rear door tweeter speaker. TEST the system for normal operation. If the concern persists, INSTALL a new audio unit. REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation). → No REPAIR the circuit in question. TEST the system for normal operation.

DIAGNOSIS AND TESTING

PINPOINT TEST E : THE AUXILIARY AUDIO CONTROL SWITCH IS INOPERATIVE/DOES NOT OPERATE CORRECTLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: CHECK THE AUDIO UNIT OPERATES CORRECTLY USING THE AUDIO UNIT CONTROLS	
	<p>1 Operate the audio unit using the audio unit controls.</p> <ul style="list-style-type: none"> Does the audio unit operate correctly using the audio controls? <p>→ Yes If the auxiliary audio control switch is inoperative, GO to E2. If the rear auxiliary audio control is inoperative, GO to E4.</p> <p>→ No INSTALL a new audio unit.</p> <p>REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation). TEST the system for normal operation.</p>
E2: CHECK THE CIRCUIT 8-MD26 (WH/BK) FOR OPEN	
 <p>E42139</p>	<p>1 Disconnect Audio Unit C447.</p> <p>2 Disconnect Auxiliary Audio Control Switch C437.</p> <p>3 Measure the resistance between the audio unit C447 pin 6, circuit 8-MD26 (WH/BK) harness side and the auxiliary audio control switch C437 pin 1, circuit 8-MD26 (WH/BK) harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 1 ohm? <p>→ Yes GO to E3.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>

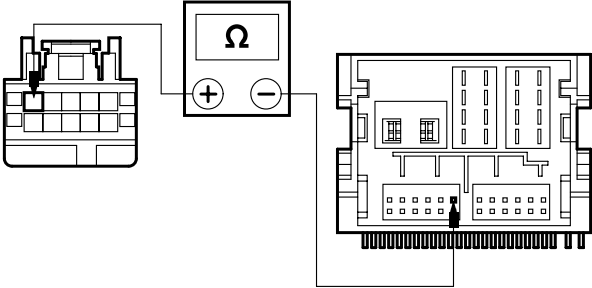
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E3: CHECK CIRCUIT 9-MD26 (BN/YE) FOR OPEN	
 <p>E42140</p>	<ol style="list-style-type: none"> <li>1 Measure the resistance between the audio unit C447 pin 8, circuit 9-MD26 (BN/YE) harness side and the auxiliary audio control switch C437 pin 2, circuit 9-MD26 (BN/YE) harness side. <ul style="list-style-type: none"> <li>• Is the resistance less than 1 ohm? <li>→ Yes INSTALL a new auxiliary audio control switch. TEST the system for normal operation. If the concern persists, INSTALL a new audio unit. REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation). <li>→ No REPAIR the circuit. TEST the system for normal operation.
E4: CHECK CIRCUIT 29-MD16B (OG/GN) FOR VOLTAGE	
 <p>E42141</p>	<ol style="list-style-type: none"> <li>1 Disconnect Rear Auxiliary Audio Control C451. <li>2 Measure the voltage between the rear auxiliary audio control C451 pin 8, circuit 29-MD16B (OG/GN), harness side and ground. <ul style="list-style-type: none"> <li>• Is the voltage greater than 10 volts? <li>→ Yes GO to E5. <li>→ No REPAIR the circuit. TEST the system for normal operation.
E5: CHECK CIRCUIT 91-MD16 (BK/RD) FOR GROUND	
 <p>E42142</p>	<ol style="list-style-type: none"> <li>1 Measure the resistance between the rear auxiliary audio control C451 pin 3, circuit 91-MD16 (BK/RD), harness side and ground. <ul style="list-style-type: none"> <li>• Is the resistance less than 1 ohm? <li>→ Yes GO to E6. <li>→ No REPAIR the circuit. TEST the system for normal operation.

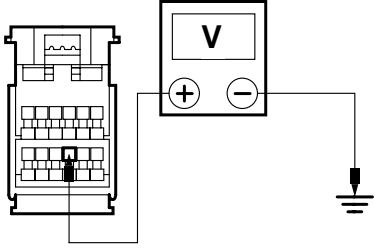
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E6: CHECK CIRCUIT 2-MD16 (GY/BK) FOR OPEN	
<p>E42143</p>	<ol style="list-style-type: none"> 1 Disconnect Audio Unit C448. 2 Measure the resistance between the rear auxiliary audio control C451 pin 9, circuit 2-MD16 (GY/BK), harness side and the audio unit C448 pin 8, circuit 2-MD16 (GY/BK), harness side. <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? <ul style="list-style-type: none"> → Yes GO to E7. → No REPAIR the circuit. TEST the system for normal operation.
E7: CHECK CIRCUIT 1-MD16 (WH/BK) FOR OPEN	
<p>E42144</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the rear auxiliary audio control C451 pin 10, circuit 1-MD16 (WH/BK), harness side and the audio unit C448 pin 2, circuit 1-MD16 (WH/BK), harness side. <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? <ul style="list-style-type: none"> → Yes GO to E8. → No REPAIR the circuit. TEST the system for normal operation.
E8: CHECK CIRCUIT 2-MD19 (GY/RD) FOR OPEN	
<p>E42145</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the rear auxiliary audio control C451 pin 4, circuit 2-MD19 (GY/RD), harness side and the audio unit C448 pin 7, circuit 2-MD19 (GY/RD), harness side. <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? <ul style="list-style-type: none"> → Yes GO to E9. → No REPAIR the circuit. TEST the system for normal operation.

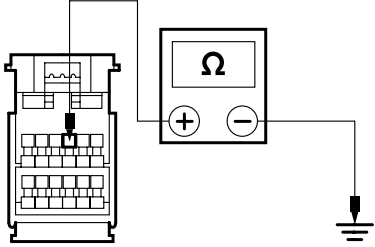
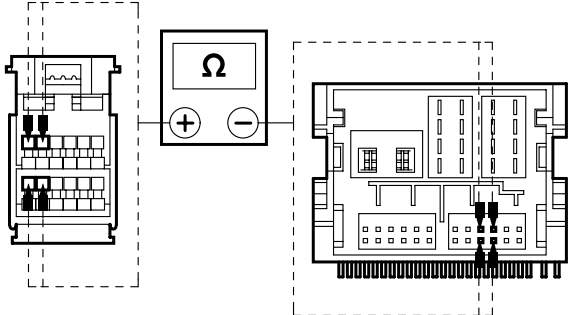
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E9: CHECK CIRCUIT 1-MD19 (WH/RD) FOR OPEN	
 <p>E42146</p>	<ol style="list-style-type: none"> <li>1 Measure the resistance between the rear auxiliary audio control C451 pin 5, circuit 1-MD19 (WH/RD), harness side and the audio unit C448 pin 1, circuit 1-MD19 (WH/RD), harness side. <ul style="list-style-type: none"> <li>• Is the resistance less than 1 ohm? <li>→ Yes INSTALL a new rear auxiliary audio control. REFER to: Rear Auxiliary Audio Controls (415-01 Audio Unit, Removal and Installation). TEST the system for normal operation. <li>→ No REPAIR the circuit. TEST the system for normal operation. If the concern persists, INSTALL a new audio unit. REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation). TEST the system for normal operation.

PINPOINT TEST F : CD CHANGER IS INOPERATIVE/DOES NOT OPERATE CORRECTLY

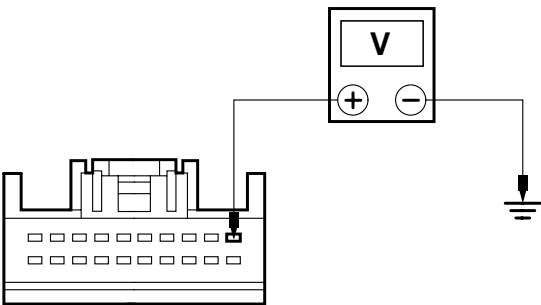
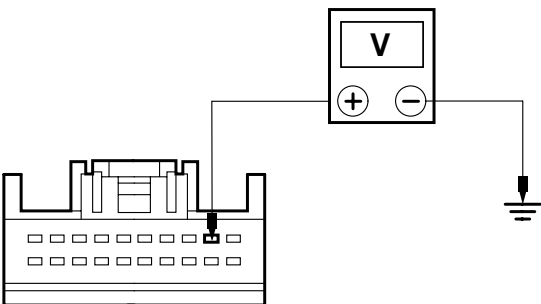
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F1: CHECK THE CD CHANGER FOR VOLTAGE	
 <p>E42149</p>	<ol style="list-style-type: none"> <li>1 Disconnect CD Changer C440. <li>2 Measure the voltage between the CD changer C440 pin 9, circuit 29-MD8 (OG), harness side and ground. <ul style="list-style-type: none"> <li>• Is the voltage greater than 10 volts? <li>→ Yes GO to F2. <li>→ No REPAIR circuit 29-MD8 (OG). TEST the system for normal operation.

DIAGNOSIS AND TESTING

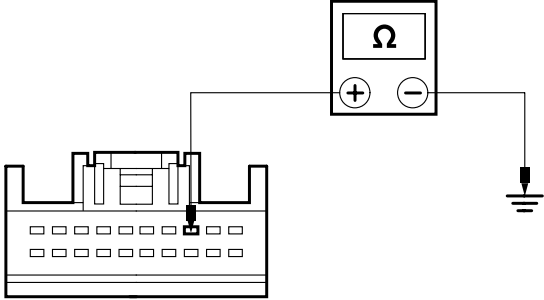
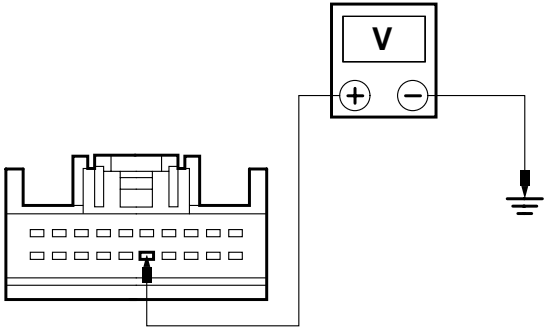
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F2: CHECK THE CD CHANGER FOR GROUND	
 <p>E42148</p>	<ol style="list-style-type: none"> <li>1 Measure the resistance between the CD changer C440 pin 3, circuit 91-MD8 (BK/OG), harness side and ground. <ul style="list-style-type: none"> <li>• Is the resistance less than 1 ohm? <li>→ Yes GO to F3. <li>→ No REPAIR the circuit 91-MD8 (BK/OG). TEST the system for normal operation.
F3: CHECK THE CD CHANGER TO AUDIO UNIT CIRCUIT(S) FOR OPEN	
 <p>E42147</p>	<ol style="list-style-type: none"> <li>1 Disconnect Audio Unit C447. <li>2 Measure the resistance between the following CD changer circuit(s) and the audio unit circuit(s): <ul style="list-style-type: none"> <li>– CD changer C440 pin 5, circuit 1-MD49 (WH/GN), harness side and audio unit C447 pin 3, circuit 1-MD49 (WH/GN), harness side. <li>– CD changer C440 pin 11, circuit 2-MD49 (GY/OG), harness side and audio unit C447 pin 9, circuit 2-MD49 (GY/OG), harness side. <li>– CD changer C440 pin 6, circuit 1-MD50 (WH/BK), harness side and audio unit C447 pin 4, circuit 1-MD50 (WH/BK), harness side. <li>– CD changer C440 pin 12, circuit 2-MD50 (GY/BK), harness side and audio unit C447 pin 10, circuit 2-MD50 (GY/BK), harness side.
	<ul style="list-style-type: none"> <li>• Are the resistances less than 1 ohm? <li>→ Yes INSTALL a new CD changer. REFER to: Compact Disc (CD) Changer (415-01 Audio Unit, Removal and Installation). TEST the system for normal operation. <li>→ No REPAIR the circuit(s) as necessary. TEST the system for normal operation. If the concern persists, INSTALL a new audio unit. REFER to: Audio Unit - Vehicles Built Up To: 03/2007 (415-01 Audio Unit, Removal and Installation). TEST the system for normal operation.

DIAGNOSIS AND TESTING

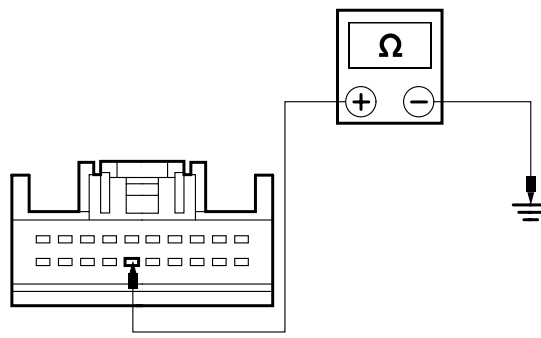
PINPOINT TEST G : THE DIGITAL VERSATILE DISC (DVD) PLAYER IS INOPERATIVE/DOES NOT OPERATE CORRECTLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
G1: CHECK THE DVD PLAYER FOR POWER	
 <p>E0037521</p>	<ol style="list-style-type: none"> 1 Disconnect DVD Player C437. 2 Measure the voltage between the DVD player C437 pin 1, circuit 29-MD8 (OG), harness side and ground. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to G2. → No REPAIR circuit 29-MD8 (OG). TEST the system for normal operation. If the concern persists, install a new CJB. Test the system for normal operation.
G2: CHECK THE DVD PLAYER FOR SWITCHED POWER	
 <p>E0037522</p>	<ol style="list-style-type: none"> 1 Ignition switch in position II.
	<ol style="list-style-type: none"> 2 Measure the voltage between the DVD player C437 pin 2, circuit 75-MD8 (YE/BU), harness side and ground. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to G3. → No REPAIR circuit 75-MD8 (YE/BU). Test the system for normal operation.
G3: CHECK THE DVD PLAYER FOR GROUND	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E0037520</p>	
	<p>2 Measure the resistance between the DVD player C437 pin 3, circuit 31-MD8 (BK), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? → Yes GO to G4. → No REPAIR circuit 31-MD8 (BK). Test the system for normal operation.
<p>G4: CHECK THE DVD PLAYER ILLUMINATION CIRCUIT FOR POWER</p>	
 <p>E0037523</p>	<p>1 Turn the multi-function switch to the on position.</p>
	<p>2 Measure the voltage between the DVD player C437 pin 15, circuit 29S-LK17 (OG/BK), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes GO to G5. → No REPAIR circuit 29S-LK17 (OG-BK). Test the system for normal operation.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
G5: CHECK THE DVD PLAYER ILLUMINATION CIRCUIT FOR GROUND	
 <p>E0037524</p>	<p>1 Measure the resistance between the DVD player C437 pin 16, 31-LK17 (BK), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? <p>→ Yes INSTALL a new DVD player. REFER to: Digital Versatile Disc (DVD) Player (415-07 Video System, Removal and Installation). Test the system for normal operation.</p> <p>→ No Repair the circuit(s) 31-LK17 (BK) or 31-MD8. Test the system for normal operation.</p>

DIAGNOSIS AND TESTING**Cellular Phone**

Refer to Wiring Diagrams Section 415-00, for schematic and connector information.

General Equipment

Worldwide Diagnostic System (WDS)

Principles of Operation

NOTE: Voice control will only operate with the audio unit and components required switched ON.

Voice Control

The portable support electronics (PSE) module has a voice control system. The customer will be able to push the VOICE button on the audio control switch located on the steering column lower shroud, this will activate the PSE module and allow voice control. An audible tone will be heard through the audio unit speakers after which, a voice command can then be spoken into the microphone located in the overhead console.

The incoming calls and voice confirmation can be heard through the audio system speakers.

When a voice command is spoken into the microphone it will be sent as a signal to the PSE module. The signal is then sent from the PSE module to the relevant components on the medium-speed controller area network (CAN) bus network. The component will then convert the signal back into the original voice command.

The components that the PSE module interacts with are as follows:

- audio unit
- navigation system display module
- cellular phone

For additional information on the cellular phone system, REFER to the cellular phone Owner's Guide.

Bluetooth

An input can be given through the cellular phone with or without the cellular phone connected to the handset holder. Providing that the cellular phone is one of the recommended cellular phones for the system, is supplied with the Bluetooth technology and the cellular phone is programmed to the PSE module.

When selected as active the Bluetooth technology is a wireless system that interacts with the relevant component modules through the PSE module. The general operation of the Bluetooth is similar to the voice control.

Bluetooth technology cannot transfer the cellular phone's PHONEBOOK or recent outgoing and incoming call details to the audio unit or navigation system display module. If the cellular phone is placed into the handset holder the PHONEBOOK data and recent outgoing and incoming call information will be transferred to the audio unit or navigation system display module.

For additional information, REFER to the cellular phone Owner's Guide.

Inspection and Verification

NOTE: Make sure that the cellular phone is featured on the list of recommended cellular phones for the system.

Make sure that the PSE module and cellular phone are configured to each other before starting a system diagnosis. ENTER the following PIN number on the cellular phone to configure the cellular phone to the PSE module: 0000.

Make sure that the MUTE symbol is not displayed on the audio unit when trying to operate the cellular phone system. If the MUTE symbol is displayed, this indicates that the PSE module requires configuring to the vehicle and the cellular phone requires programming to the PSE module. GO to Pinpoint Test F.

1. Verify the customer concern by operating the system using the customers cellular phone.
2. Visually inspect for obvious signs of electrical damage.

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DIAGNOSIS AND TESTING

Visual Inspection Chart

Electrical
<ul style="list-style-type: none"> • Fuse(s) • Wiring harness • Electrical connector(s) • Cellular phone • Microphone • Handset holder • PSE module • Audio unit • Instrument cluster • Navigation system display module

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, connect the WDS to the data link connector (DLC).
5. SELECT the **TOOLBOX** menu.
6. SELECT the **ENTERTAINMENT/COMMUNICATION** menu.
7. SELECT the **SPEECH RECOGNITION MODULE** option and follow the instructions on the display.
8. Retrieve the diagnostic trouble codes (DTC)s and refer to the Diagnostic Trouble Code (DTC) Index Chart.
9. If no DTCs are retrieved or there is no communication with the module, proceed to the Symptom Chart to continue diagnostics.

Diagnostic Trouble Code (DTC) Index Chart

DTC	Description/Condition	Possible Source	Action
B1038	Microphone input circuit failure	Microphone defect or short to ground	GO to Pinpoint Test C.
B1317	Battery voltage high	Battery voltage above 16 volts	REFER to: Charging System (414-00 Charging System - General Information, Diagnosis and Testing).
B1318	Battery voltage low	Battery voltage below 9 volts	REFER to: Charging System (414-00 Charging System - General Information, Diagnosis and Testing).
B1342	PSE module failure	PSE module	INSTALL a new PSE module. REFER to: Portable Support Electronics (PSE) Module (419-08 Cellular Phone, Removal and Installation). TEST the system for normal operation.
B1899	Microphone input signal circuit open	Microphone defect or not connected	GO to Pinpoint Test C.
B2272	Microphone bias circuit failure	No supply to microphone	GO to Pinpoint Test C.

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DTC	Description/Condition	Possible Source	Action
B228A	Voice recognition base-plate detection	Wiring harness, connectors or cellular phone handset holder	GO to Pinpoint Test E.
B2477	Faulty module configuration	PSE module	REFER to the WDS.
P2503	Charging system voltage low	Short to ground	GO to Pinpoint Test B.
U0074	Bluetooth communication failure to cellular phone	PSE module or cellular phone	CHECK the cellular phone Bluetooth function with another application to determine if the cellular phone is the concern. If the Bluetooth function operates correctly with the other application, INSTALL a new PSE module. REFER to: Portable Support Electronics (PSE) Module (419-08 Cellular Phone, Removal and Installation). TEST the system for normal operation. If the Bluetooth function does not operate with other application, REFER to the cellular phone Owner's Guide.
U2050	No application present	PSE module	INSTALL a new PSE module. REFER to: Portable Support Electronics (PSE) Module (419-08 Cellular Phone, Removal and Installation). TEST the system for normal operation.

1. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

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DIAGNOSIS AND TESTING

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> No communication with the portable support electronics (PSE) module 	<ul style="list-style-type: none"> PSE module not configured to the vehicle. 	<ul style="list-style-type: none"> GO to Pinpoint Test F.
	<ul style="list-style-type: none"> Fuse(s). Circuit(s). PSE module. 	<ul style="list-style-type: none"> GO to Pinpoint Test A.
	<ul style="list-style-type: none"> DLC. 	<ul style="list-style-type: none"> REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).
<ul style="list-style-type: none"> The audio unit display does not display PHONE 	<ul style="list-style-type: none"> PSE module not configured to the vehicle. 	<ul style="list-style-type: none"> GO to Pinpoint Test F.
	<ul style="list-style-type: none"> Audio unit. Navigation system display module. PSE module. Instrument cluster. 	<ul style="list-style-type: none"> CHECK all communication between the instrument cluster, audio unit, navigation system display module and PSE module. REFER to the WDS.
<ul style="list-style-type: none"> The handset battery does not charge 	<ul style="list-style-type: none"> Fuse(s). Circuit(s). PSE module. Handset holder. 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
	<ul style="list-style-type: none"> Cellular phone battery. 	<ul style="list-style-type: none"> REFER to the cellular phone Owner's Guide.
<ul style="list-style-type: none"> The cellular phone microphone is not operating correctly 	<ul style="list-style-type: none"> Circuit(s). Microphone. PSE module. 	<ul style="list-style-type: none"> GO to Pinpoint Test C.
<ul style="list-style-type: none"> Reduced sound or no sound through the speakers 	<ul style="list-style-type: none"> Audio unit. PSE module. 	<ul style="list-style-type: none"> CHECK all communication between the audio unit and PSE module. REFER to the WDS.
	<ul style="list-style-type: none"> Circuit(s). Audio unit. PSE module. 	<ul style="list-style-type: none"> GO to Pinpoint Test D.
<ul style="list-style-type: none"> The cellular phone information is not displayed 	<ul style="list-style-type: none"> Audio unit. Navigation system display module. PSE module. Instrument cluster. 	<ul style="list-style-type: none"> CHECK all communication between the instrument cluster, audio unit, navigation system display module and PSE module. REFER to the WDS.
<ul style="list-style-type: none"> The voice activated phone functions are inoperative 	<ul style="list-style-type: none"> Audio unit. Navigation system display module. PSE module. Instrument cluster. 	<ul style="list-style-type: none"> CHECK all communication between the instrument cluster, audio unit, navigation system display module and PSE module. REFER to the WDS.

DIAGNOSIS AND TESTING

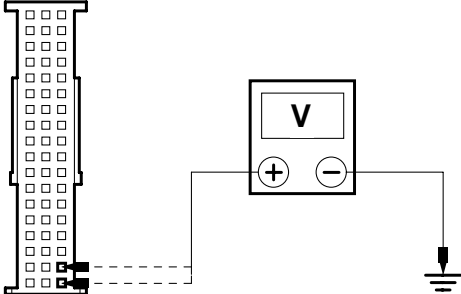
Symptom	Possible Sources	Action
	<ul style="list-style-type: none"> • Circuit(s). • Cellular Phone. • Handset holder. • PSE module. 	<ul style="list-style-type: none"> • GO to Pinpoint Test E.
	<ul style="list-style-type: none"> • Cellular phone is not featured on the list of recommended cellular phones for the system 	<ul style="list-style-type: none"> • CHECK the make and model of the cellular phone against those on the list of recommended cellular phones for the system.

Pinpoint Tests

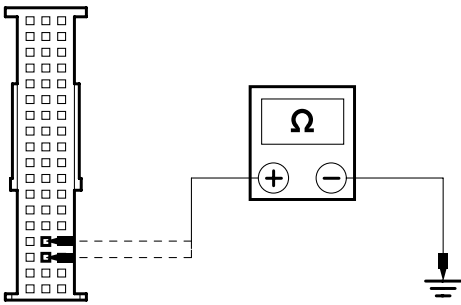
NOTE: Use a digital multimeter for all electrical measurements.

NOTE: ENTER the following PIN number on the cellular phone to configure the cellular phone to the PSE module: 0000.

PINPOINT TEST H : NO COMMUNICATION WITH THE PORTABLE SUPPORT ELECTRONICS (PSE) MODULE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK FOR VOLTAGE AT THE PSE MODULE	
	<ol style="list-style-type: none"> 1 Disconnect PSE Module C432.
 <p>E53363</p>	<ol style="list-style-type: none"> 2 Measure the voltage between the PSE module C432 pin 17, circuit 29-MC12C (OG/YE), harness side and ground; and the PSE module C432 pin 18, circuit 29-MC12B (OG/YE), harness side and ground. <ul style="list-style-type: none"> • Are the voltages greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to A2. → No REPAIR circuit 29-MC12C (OG/YE) or circuit 29-MC12B (OG/YE) as necessary. TEST the system for normal operation.

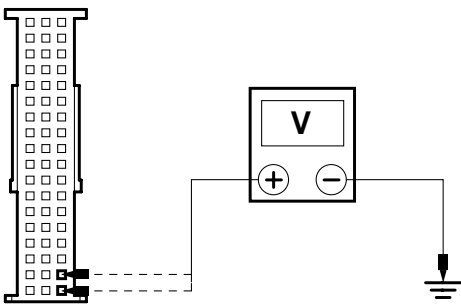
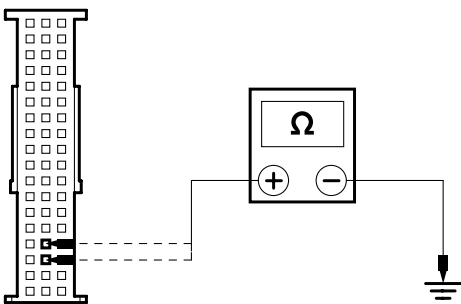
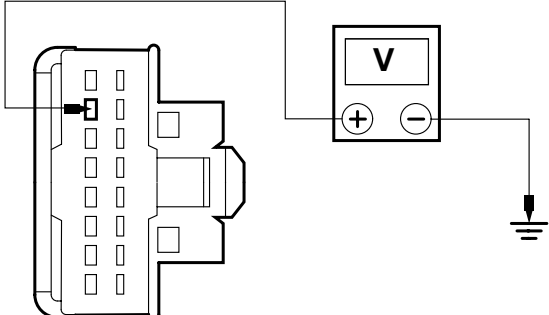
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A2: CHECK THE PSE MODULE GROUND CIRCUIT(S)	
 <p>E53364</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the PSE module C432 pin 33, circuit 91-MC12 (BK/YE), harness side and ground; and the PSE module C432 pin 34, circuit 91-MC12A (BK/YE), harness side and ground. <ul style="list-style-type: none"> • Are the resistances less than 1 ohm? <ul style="list-style-type: none"> → Yes INSTALL a new PSE module. REFER to: Portable Support Electronics (PSE) Module (419-08 Cellular Phone, Removal and Installation). TEST the system for normal operation. → No REPAIR circuit 91-MC12 (BK/YE) or circuit 91-MC12A (BK/YE) as necessary. TEST the system for normal operation.

PINPOINT TEST I : THE CELLULAR PHONE HANDSET BATTERY DOES NOT CHARGE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK THE CELLULAR PHONE DISPLAY WHEN BEING USED OUTSIDE OF THE VEHICLE	
	<ol style="list-style-type: none"> 1 Operate the cellular phone outside of the vehicle. <ul style="list-style-type: none"> • Does the cellular phone display low battery? <ul style="list-style-type: none"> → Yes CHECK the cellular phone battery. REFER to the cellular phone Owner's Guide. → No GO to B2.
B2: CHECK THE BATTERY SYMBOL ON THE CELLULAR PHONE	
	<ol style="list-style-type: none"> 1 Ignition switch in position II. 2 INSTALL the cellular phone into the handset holder. <ul style="list-style-type: none"> • Does the battery symbol flash? <ul style="list-style-type: none"> → Yes The cellular phone battery is charging correctly. WAIT for the cellular phone battery to charge. TEST the system for normal operation. → No GO to B3.

DIAGNOSIS AND TESTING

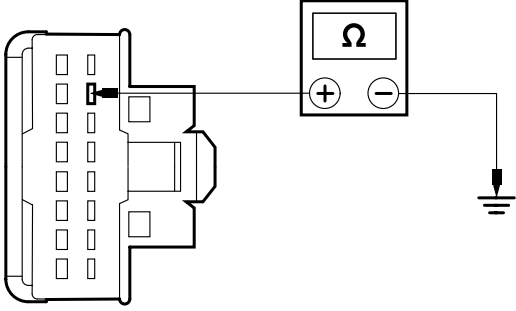
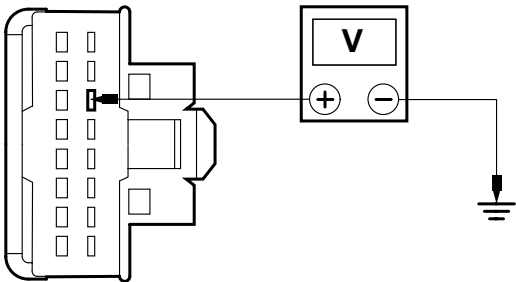
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B3: CHECK FOR VOLTAGE AT THE PSE MODULE	
 <p>E53363</p>	<ol style="list-style-type: none"> 1 Disconnect PSE Module C432. 2 Measure the voltage between the PSE module C432 pin 17, circuit 29-MC12C (OG/YE), harness side and ground; and the PSE module C432 pin 18, circuit 29-MC12B (OG/YE), harness side and ground. <ul style="list-style-type: none"> • Are the voltages greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to B4. → No REPAIR circuit 29-MC12C (OG/YE) or circuit 29-MC12B (OG/YE) as necessary. TEST the system for normal operation.
B4: CHECK THE PSE MODULE GROUND CIRCUIT(S)	
 <p>E53364</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the PSE module C432 pin 33, circuit 91-MC12 (BK/YE), harness side and ground; and the PSE module C432 pin 34, circuit 91-MC12A (BK/YE), harness side and ground. <ul style="list-style-type: none"> • Are the resistances less than 1 ohm? <ul style="list-style-type: none"> → Yes GO to B5. → No REPAIR circuit 91-MC12 (BK/YE) or circuit 91-MC12A (BK/YE) as necessary. TEST the system for normal operation.
B5: CHECK FOR CHARGE VOLTAGE AT THE HANDSET HOLDER	
 <p>E83444</p>	<ol style="list-style-type: none"> 1 Connect PSE Module C432. 2 Disconnect Handset Holder C131. 3 Measure the voltage between the handset holder C131 pin 15, circuit 29-MC11 (OG/WH), harness side and ground. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to B6. → No NOTE: If the connector is damaged install a new harness. REPAIR the circuit 29-MC11 (WH/OG). TEST the system for normal operation.

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DIAGNOSIS AND TESTING

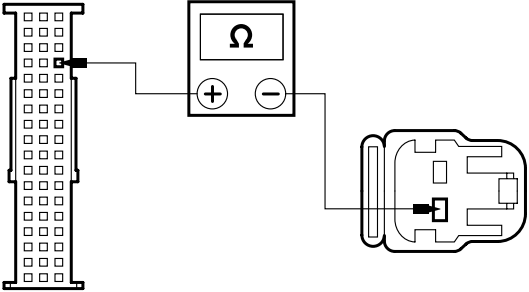
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B6: CHECK GROUND CIRCUIT 31-MC11 (BK)	
 <p>E83445</p>	<p>1 Measure the resistance between the handset holder C131 pin 8, circuit 31-MC11 (BK), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? <p>→ Yes GO to B7.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>
B7: CHECK FOR VOLTAGE AT CIRCUIT 30-MC11 (RD)	
 <p>E83446</p>	<p>1 Measure the voltage between the handset holder C131 pin 7, circuit 30-MC11 (RD), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <p>→ Yes INSTALL a new PSE module. REFER to: Portable Support Electronics (PSE) Module (419-08 Cellular Phone, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation. If the concern persists, INSTALL a new handset holder. REFER to: Handset Holder (419-08 Cellular Phone, Removal and Installation). TEST the system for normal operation.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST J : THE CELLULAR PHONE MICROPHONE IS NOT OPERATING CORRECTLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>C1: CHECK THAT THE VOICE IS BEING TRANSMITTED DURING A TELEPHONE CONVERSATION OUTSIDE OF THE VEHICLE</p>	
<p>NOTE: Make sure that the Bluetooth functionality is disabled for this test.</p>	
	<p>1 Operate the cellular phone outside the vehicle.</p> <ul style="list-style-type: none"> Does the cellular phone transmit the voice during a telephone conversation outside of the vehicle? <p>→ Yes GO to C2.</p> <p>→ No REFER to the cellular phone Owner's Guide.</p>
<p>C2: CHECK CIRCUIT 8-MC8 (WH/RD) FOR OPEN</p>	
	<p>1 Disconnect PSE Module C432.</p> <p>2 Disconnect Microphone C493.</p>
<p>E83447</p>	<p>3 Measure the resistance between the PSE module C432 pin 3, circuit 8-MC8 (WH/RD), harness side and the microphone C493 pin 1, circuit 8-MC8 (WH/RD), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 1 ohm? <p>→ Yes GO to C3.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>

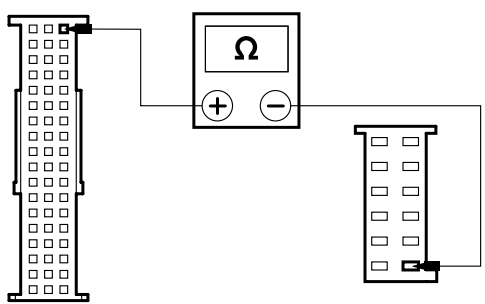
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C3: CHECK CIRCUIT 3-MC8 (BK) FOR OPEN	
 <p>E83448</p>	<p>1 Measure the resistance between the PSE module C432 pin 4, circuit 3-MC8 (BK), harness side and the microphone C493 pin 2, circuit 3-MC8 (BK), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 1 ohm? <p>→ Yes INSTALL a new microphone. TEST the system for normal operation.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation. If the concern persists, INSTALL a new PSE module.</p> <p>REFER to: Portable Support Electronics (PSE) Module (419-08 Cellular Phone, Removal and Installation). TEST the system for normal operation.</p>

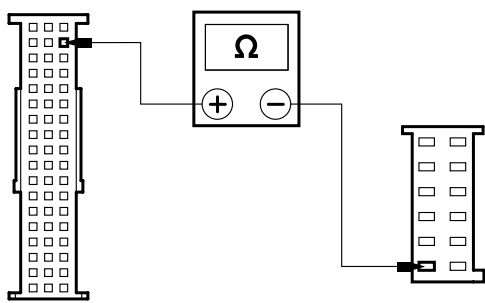
PINPOINT TEST K : REDUCED SOUND OR NO SOUND THROUGH THE SPEAKERS

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: Before carrying out the following tests make sure that the cellular phone system volume is not set too low. Operate the cellular phone system and use the volume control on the audio unit to set the cellular phone system volume.</p>	
D1: CHECK THE CELLULAR PHONE OPERATES CORRECTLY OUTSIDE THE VEHICLE	
	<p>1 CARRY OUT an audio unit self-diagnostic mode.</p> <p>REFER to: Audio System (415-00 Information and Entertainment System - General Information, Diagnosis and Testing).</p> <p>2 Operate the cellular phone outside the vehicle.</p> <ul style="list-style-type: none"> Does the cellular phone operate correctly outside the vehicle? <p>→ Yes GO to D2.</p> <p>→ No REFER to the cellular phone Owner's Guide.</p>
D2: CHECK CIRCUIT 8-MC12 (WH) FOR OPEN	
	<p>1 Disconnect PSE Module C432.</p>
	<p>2 Disconnect Audio Unit C447.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83449</p>	<p>3 Measure the resistance between the PSE module C432 pin 1, circuit 8-MC12 (WH), harness side and the audio unit C447 pin 1, circuit 8-MC12 (WH), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? <p>→ Yes GO to D3.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>

D3: CHECK CIRCUIT 9-MC12 (BN) FOR OPEN

 <p>E83450</p>	<p>1 Measure the resistance between the PSE module C432 pin 2, circuit 9-MC12 (BN), harness side and the audio unit C447 pin 7, circuit 9-MC12 (BN), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? <p>→ Yes INSTALL a new PSE module. REFER to: Portable Support Electronics (PSE) Module (419-08 Cellular Phone, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation. If the concern persists, REFER to: Audio System (415-00 Information and Entertainment System - General Information, Diagnosis and Testing).</p>
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PINPOINT TEST L : THE VOICE ACTIVATED PHONE FUNCTIONS ARE INOPERATIVE

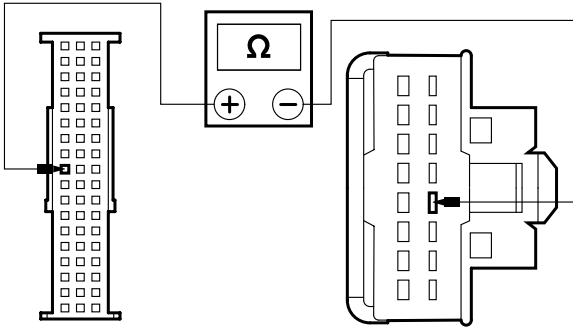
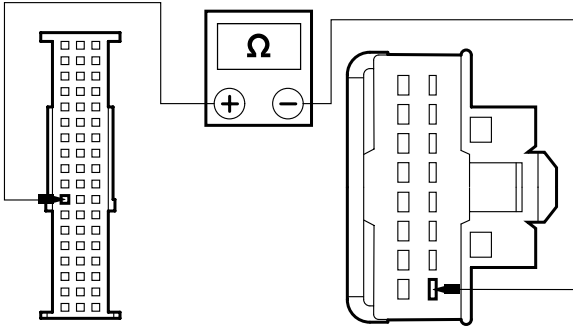
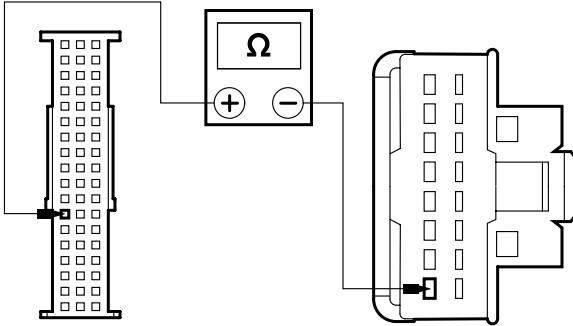
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: CHECK CIRCUIT 8-MC11 (WH/VT) FOR OPEN	
	1 Disconnect PSE Module C432.
	2 Disconnect Handset Holder C131.

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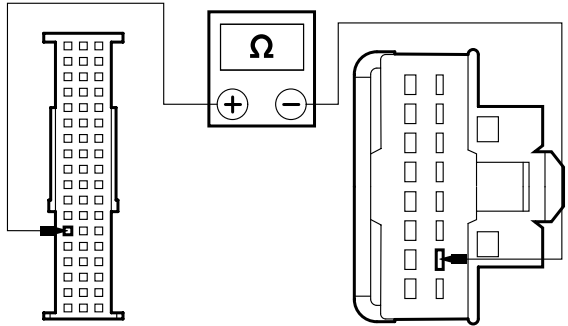
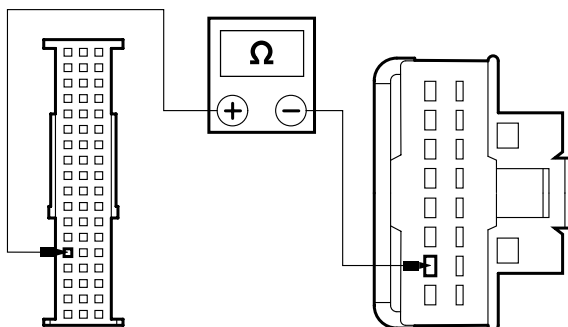
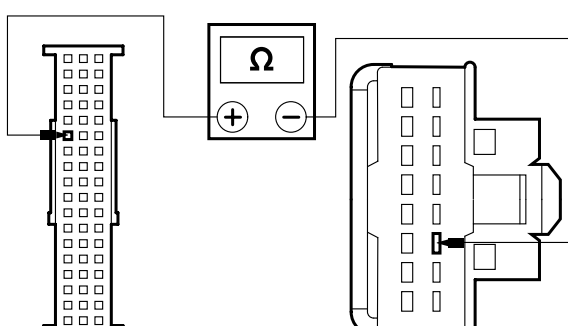
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415-00-35

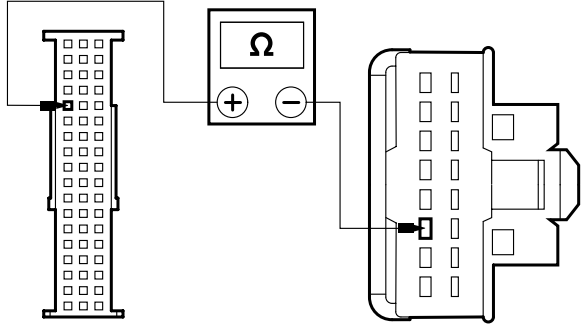
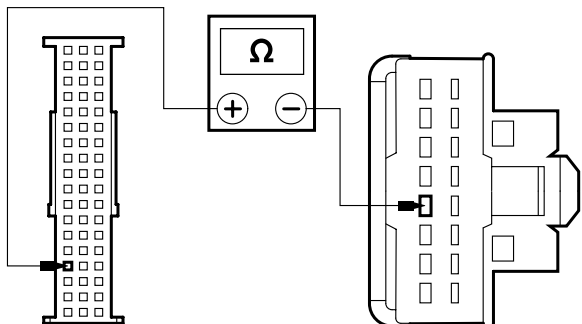
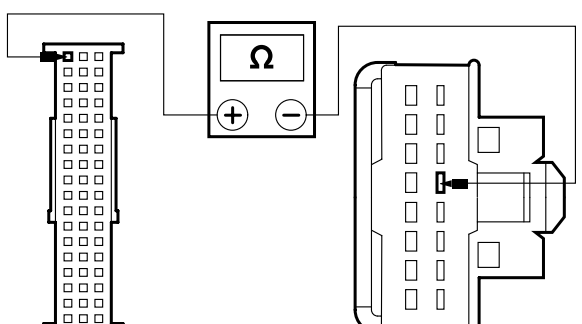
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83451</p>	<p>3 Measure the resistance between the PSE module C432 pin 45, circuit 8-MC11 (WH/VT), harness side and the handset holder C131 pin 4, circuit 8-MC11 (WH/VT), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? → Yes GO to E2. → No REPAIR the circuit. TEST the system for normal operation.
E2: CHECK CIRCUIT 4-MC16 (GY) FOR OPEN	
 <p>E83452</p>	<p>1 Measure the resistance between the PSE module C432 pin 47, circuit 4-MC16 (GY), harness side and the handset holder C131 pin 1, circuit 8-MC16 (GY), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? → Yes GO to E3. → No REPAIR the circuit. TEST the system for normal operation.
E3: CHECK CIRCUIT 5-MC16 (BU) FOR OPEN	
 <p>E83453</p>	<p>1 Measure the resistance between the PSE module C432 pin 48, circuit 5-MC16 (BU), harness side and the handset holder C131 pin 9, circuit 5-MC16 (BU), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? → Yes GO to E4. → No REPAIR the circuit. TEST the system for normal operation.

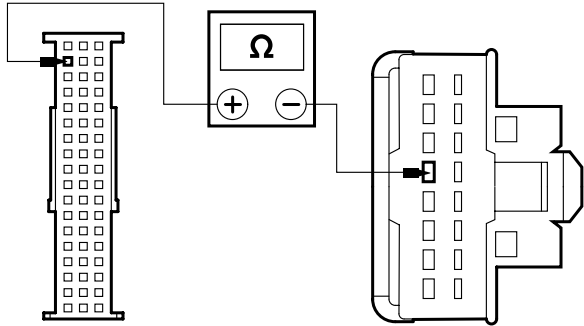
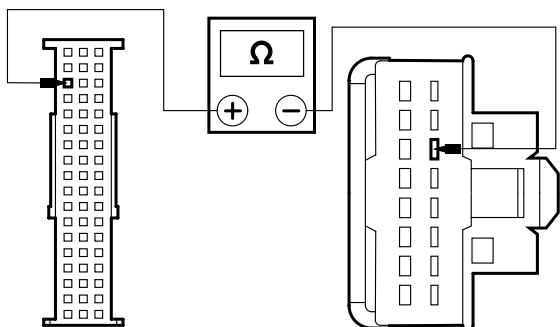
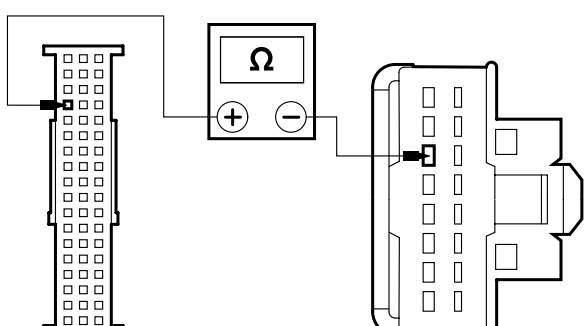
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E4: CHECK CIRCUIT 4-MC15 (GY/OG) FOR OPEN	
 <p>E83454</p>	<p>1 Measure the resistance between the PSE module C432 pin 49, circuit 4-MC15 (GY/OG), harness side and the handset holder C131 pin 2, circuit 4-MC15 (GY/OG), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? → Yes GO to E5. → No REPAIR the circuit. TEST the system for normal operation.
E5: CHECK CIRCUIT 5-MC11 (BU/OG) FOR OPEN	
 <p>E83455</p>	<p>1 Measure the resistance between the PSE module C432 pin 50, circuit 5-MC11 (BU/OG), harness side and the handset holder C131 pin 10, circuit 5-MC11 (BU/OG), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? → Yes GO to E6. → No REPAIR the circuit. TEST the system for normal operation.
E6: CHECK CIRCUIT 10-MC19 (GY/OG) FOR OPEN	
 <p>E83456</p>	<p>1 Measure the resistance between the PSE module C432 pin 42, circuit 10-MC19 (GY/OG), harness side and the handset holder C131 pin 3, circuit 10-MC19 (GY/OG), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? → Yes GO to E7. → No REPAIR the circuit. TEST the system for normal operation.

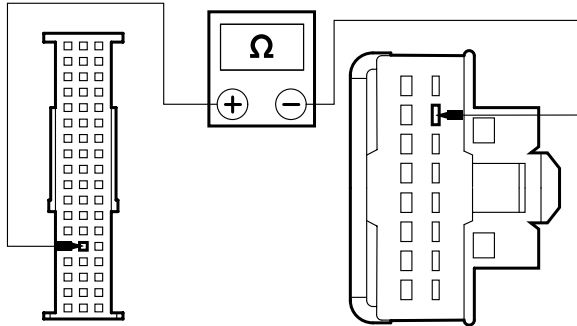
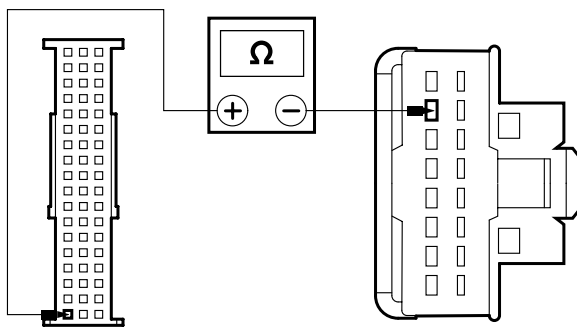
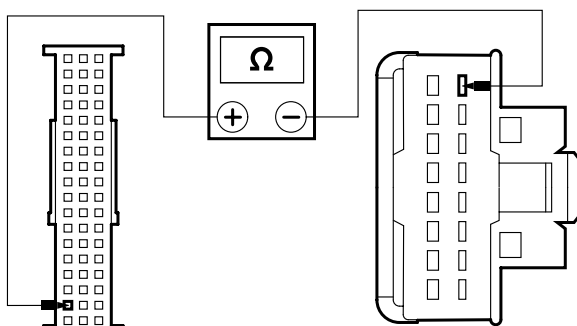
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E7: CHECK CIRCUIT 8-MC19 (WH/GN) FOR OPEN	
 <p>E83457</p>	<p>1 Measure the resistance between the PSE module C432 pin 41, circuit 8-MC19 (WH/GN), harness side and the handset holder C131 pin 11, circuit 8-MC19 (WH/GN), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? → Yes GO to E8. → No REPAIR the circuit. TEST the system for normal operation.
E8: CHECK CIRCUIT 9-MC19 (BN/GN) FOR OPEN	
 <p>E83458</p>	<p>1 Measure the resistance between the PSE module C432 pin 51, circuit 9-MC19 (BN/GN), harness side and the handset holder C131 pin 12, circuit 9-MC19 (BN/GN), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? → Yes GO to E9. → No REPAIR the circuit. TEST the system for normal operation.
E9: CHECK CIRCUIT 1-MC13 (WH/RD) FOR OPEN	
 <p>E83459</p>	<p>1 Measure the resistance between the PSE module C432 pin 37, circuit 1-MC13 (WH/RD), harness side and the handset holder C131 pin 5, circuit 1-MC13 (WH/RD), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? → Yes GO to E10. → No REPAIR the circuit. TEST the system for normal operation.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E10: CHECK CIRCUIT 2-MC13 (GY/RD) FOR OPEN	
 <p>E83460</p>	<p>1 Measure the resistance between the PSE module C432 pin 38, circuit 2-MC13 (GY/RD), harness side and the handset holder C131 pin 13, circuit 2-MC13 (GY/RD), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? → Yes GO to E11. → No REPAIR the circuit. TEST the system for normal operation.
E11: CHECK CIRCUIT 1-MC14 (WH/BU) FOR OPEN	
 <p>E83461</p>	<p>1 Measure the resistance between the PSE module C432 pin 39, circuit 1-MC14 (WH/BU), harness side and the handset holder C131 pin 6, circuit 1-MC14 (WH/BU), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? → Yes GO to E12. → No REPAIR the circuit. TEST the system for normal operation.
E12: CHECK CIRCUIT 2-MC14 (GY/VT) FOR OPEN	
 <p>E83482</p>	<p>1 Measure the resistance between the PSE module C432 pin 40, circuit 2-MC14 (GY/VT), harness side and the handset holder C131 pin 14, circuit 2-MC14 (GY/VT), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? → Yes GO to E13. → No REPAIR the circuit. TEST the system for normal operation.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E13: CHECK CIRCUIT 30-MC11 (RD) FOR OPEN	
 <p>E84216</p>	<p>1 Measure the resistance between the PSE module C432 pin 32, circuit 30-MC11 (RD), harness side and the handset holder C131 pin 7, circuit 30-MC11 (RD), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? → Yes GO to E14. → No REPAIR the circuit. TEST the system for normal operation.
E14: CHECK CIRCUIT 29-MC11 (OG/WH) FOR OPEN	
 <p>E84217</p>	<p>1 Measure the resistance between the PSE module C432 pin 54, circuit 29-MC11 (OG/WH), harness side and the handset holder C131 pin 15, circuit 29-MC11 (OG/WH), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? → Yes GO to E15. → No REPAIR the circuit. TEST the system for normal operation.
E15: CHECK CIRCUIT 31-MC11 (BK) FOR OPEN	
 <p>E84218</p>	<p>1 Measure the resistance between the PSE module C432 pin 53, circuit 31-MC11 (BK), harness side and the handset holder C131 pin 8, circuit 31-MC11 (BK), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 1 ohm? → Yes INSTALL a new PSE module. REFER to: Portable Support Electronics (PSE) Module (419-08 Cellular Phone, Removal and Installation). TEST the system for normal operation. → No REPAIR the circuit. TEST the system for normal operation. If the concern persists, INSTALL a new handset holder. REFER to: Handset Holder (419-08 Cellular Phone, Removal and Installation). TEST the system for normal operation.

Information and Entertainment System -
General Information

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415-00-40

DIAGNOSIS AND TESTING

PINPOINT TEST M : THE MUTE SYMBOL IS DISPLAYED ON THE AUDIO UNIT WHEN TRYING TO OPERATE THE CELLULAR PHONE SYSTEM

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F1: CONFIGURE THE PSE MODULE TO THE VEHICLE	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 Connect the WDS to the DLC. <li>3 Select the TOOLBOX menu. <li>4 Select the MODULE PROGRAMMING menu. <li>5 Select the MODULE REPROGRAMMING menu. <li>6 Select the SPEECH RECOGNITION MODULE option and follow the instructions on the display. <li>7 Ignition switch in position II. <li>8 Ignition switch in position 0. <li>9 Ignition switch in position II. <li>10 Ignition switch in position 0. <li>11 Ignition switch in position II. <li> 12 Ignition switch in position 0. <ul style="list-style-type: none"> <li>• Is the MUTE symbol displayed on the audio unit when the cellular phone system is operated? <li>→ Yes Carry out the PSE module configuration procedure again. If the concern persists, INSTALL a new PSE module. REFER to: Portable Support Electronics (PSE) Module (419-08 Cellular Phone, Removal and Installation). TEST the system for normal operation. <li>→ No TEST the system for normal operation.

SECTION 415-01 Audio Unit

VEHICLE APPLICATION: 2008.75 Focus ST C307

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DESCRIPTION AND OPERATION**Audio System****General**

A multimedia system with RDS/EON and mobile telephone compatibility is available. This includes a radio, navigation system and an entertainment system for the rear passengers. All systems have AVC, whereby the volume can be set by the user, and are equipped for voice control (Bluetooth).

All units offer the performance and functionality of earlier systems.

Every system is capable of performing a self-test; diagnosis is performed with WDS via the CAN bus.

The following units are available:

- Audio, basic version
 - Radio/cassette unit 5000 C,
 - Radio/individual CD player 6000 CD,
- Entertainment system for rear passengers, basic version
 - Rear audio control unit (with display and control elements)
- Audio, luxury version
 - Sony radio/individual CD player (MP3-capable), luxury version
 - Sony 6 CD radio with integral 6-CD changer
- CDDJ external 6-CD changer (underneath the seat or in the luggage compartment)

Navigation, luxury version - distributed system with:

- Navigation control module with maps stored on DVD (in glove compartment) (Denso)
- Display with a TFT screen and control keys (Denso)
- Navigation/audio unit, installed behind the display (Visteon)
- Air conditioning/navigation unit, installed behind the display (Visteon)

Audio remote controls

Most current vehicles can be supplied with steering wheel buttons for the audio remote controls. The steering wheel buttons control the following functions:

- Volume adjustment ("VOL")
- Station search ("SEEK")
- Track search ("SEEK" when playing a CD)

- Change to a different preset radio station ("PRESET/DISC")
- Change the CD ("PRESET/DISC" when playing a CD)
- Switch off traffic bulletins (quick press of "AM/FM")
- Switch over to a different frequency band (press and hold "AM/FM" slightly longer)

Different equipment levels**Radio/cassette 5000C, basic version**

10% more power output than previous units

Electronic cassette player mechanism with autoreverse and noise suppression

4 x 17 watt loudspeakers

Auxiliary audio stereo input

Larger LCD display

Fittings for voice control

Speed-dependent volume control via CAN bus

Radio/individual CD player 6000 CD, basic version

10% more power output than previous units

4 x 17 watt loudspeakers

Auxiliary audio stereo input

Larger LCD display

Fittings for voice control

Speed-dependent volume control via CAN bus

Entertainment system for rear passengers, basic version - rear audio control unit (with display and control elements)

The entertainment system for rear passengers, which is only available in conjunction with the luxury audio systems and the luxury navigation system, includes a control unit and two headphone sockets.

This allows passengers in the rear to select a different audio source to the driver.

DESCRIPTION AND OPERATION**Sony radio/individual CD player, luxury version**

CD/CDR/CDRW/MP3 playback

30% more power

Auxiliary audio stereo input

4 x 20 watt loudspeakers

Digital sound processing with delay compensation

Entertainment system for rear passengers with double playback device

Sony 6-CD changer in dashboard

30% more power

Auxiliary audio stereo input

4 x 20 watt loudspeakers

CD/CDR playback

Digital sound processing with delay compensation

Entertainment system for rear passengers with double playback device



DIAGNOSIS AND TESTING

Audio System

REFER to Section 415-00 [Information and Entertainment System - General Information].



REMOVAL AND INSTALLATION

Audio Unit — Vehicles Built Up To: 03/2007

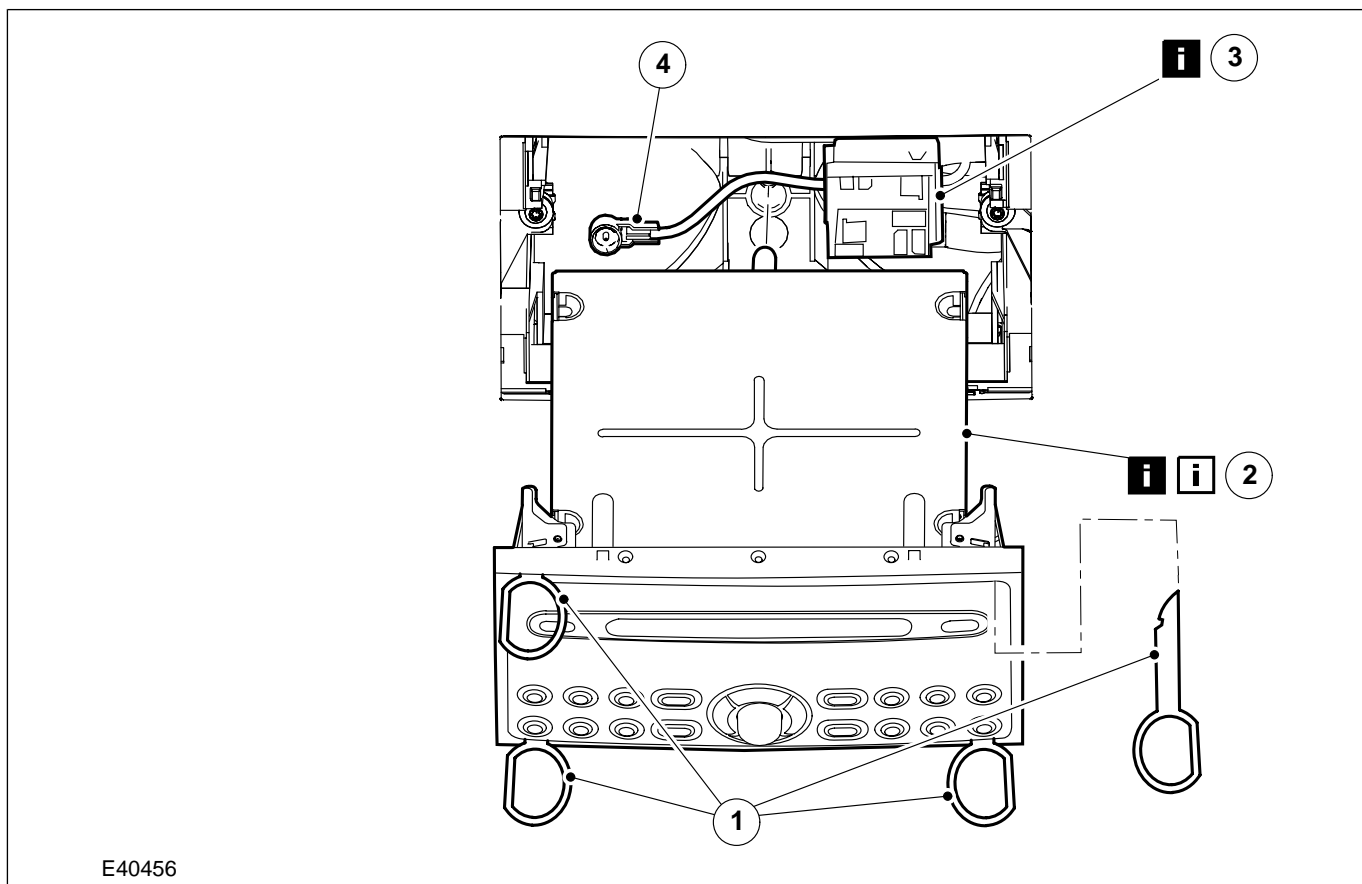
General Equipment

Audio unit removal tools (GV3301)

NOTE: When installing the audio unit removal tools, make sure that the wording on the audio unit removal tools is followed, TOP L (left-hand)

indicates the top of the tool, left-hand side of the removal tool and TOP R (right-hand) indicates the top of the tool, right-hand side of the removal tool.

1. Remove the components in the order indicated in the following illustration(s) and table(s).



E40456

Item	Description
1	Audio unit removal tools
2	Audio unit <i>See Removal Detail</i> <i>See Installation Detail</i>
3	Audio unit electrical connector <i>See Removal Detail</i>
4	Antenna cable

NOTE: Remove the audio unit removal tools from the audio unit before installing the original audio unit.

NOTE: When installing a new audio unit, the audio unit must be configured by selecting the Programmable Module Installation Routine on WDS.

2. To install, reverse the removal procedure.

Removal Details

REMOVAL AND INSTALLATION**Item 2 Audio unit**

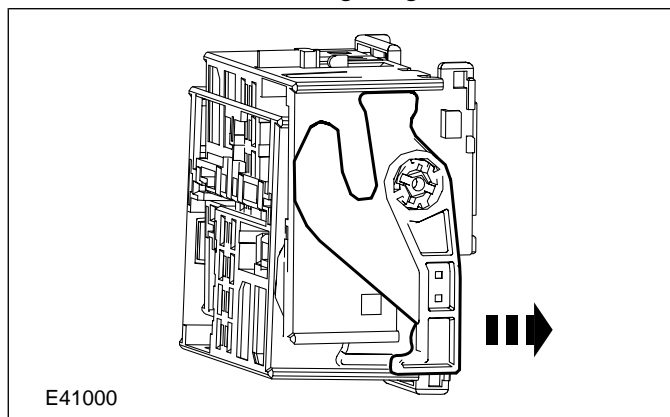
1.  **CAUTION:** When detaching the audio unit, do not place excessive strain on the wiring harness.

Detach the audio unit from the instrument panel.

Item 3 Audio unit electrical connector

1. Disconnect the audio unit electrical connector.

- Release the locking tangs.

**Installation Details****Item 2 Audio unit**

1.  **CAUTION:** The audio unit wiring harness and antenna cable must not become trapped when installing the audio unit.

1. The audio unit rear support must engage with the audio unit support bracket.

REMOVAL AND INSTALLATION

Audio Unit — Vehicles Built From: 03/2007

General Equipment

Ford diagnostic equipment

General Equipment

Flat-bladed screwdriver

Removal

- NOTE:** Make sure that any media is ejected from the unit.

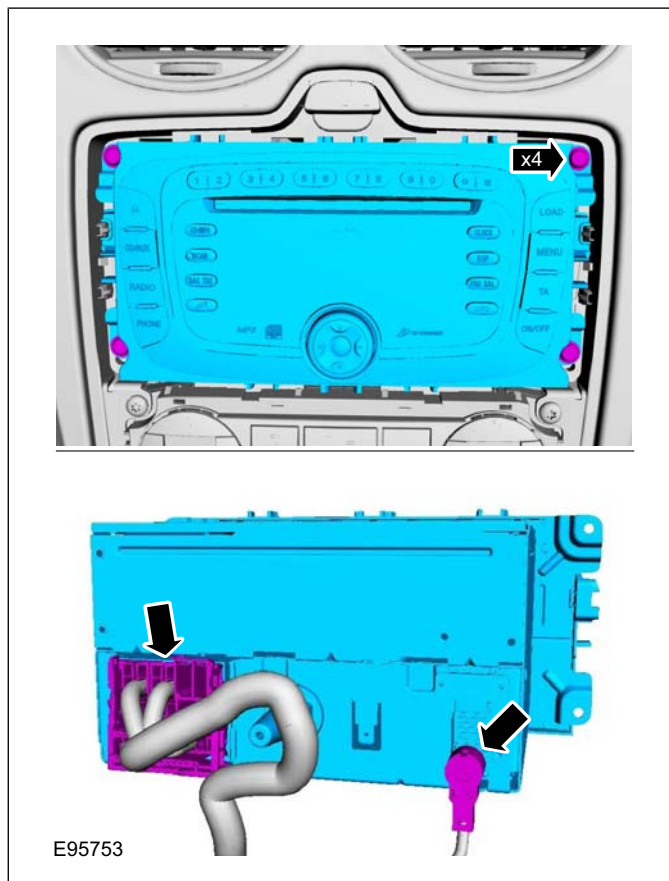
If a new unit is to be installed, connect the diagnostic tool and upload the unit configuration information using the Programmable Modules Installation Routine, prior to commencing the removal of the unit.

General Equipment: Ford diagnostic equipment

- General Equipment: Flat-bladed screwdriver



3.



Installation

- NOTE:** New units must be configured using the Programmable Module Installation Routine in the diagnostic tool.

To install, reverse the removal procedure.

General Equipment: Ford diagnostic equipment

REMOVAL AND INSTALLATION

Compact Disc (CD) Changer

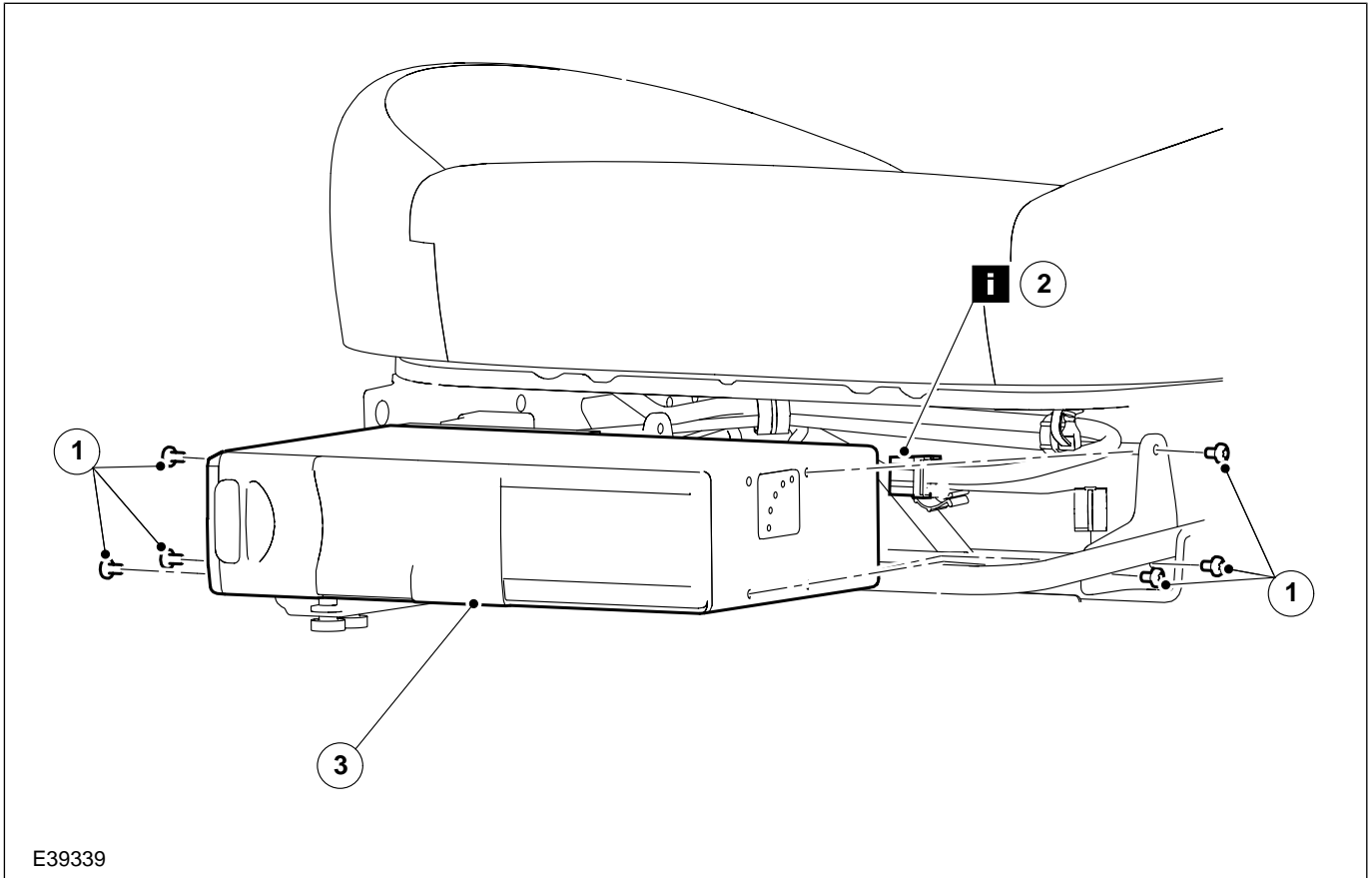
General Equipment

Worldwide Diagnostic System (WDS)

1. Remove the passenger side front seat.

For additional information, refer to: **Front Seat (501-10 Seating, Removal and Installation)**.

2. Remove the components in the order indicated in the following illustration(s) and table(s).



E39339

Item	Description
1	CD changer retaining screws
2	CD changer electrical connector See Removal Detail
3	CD changer

CAUTION: Make sure that the horizontal/vertical orientation setting on the CD changer is in the horizontal

position. Failure to follow this instruction may result in internal damage to the CD changer.

NOTE: Before installing a new CD changer, remove the CD changer transportation retaining clips.

NOTE: When installing a new CD changer, the CD changer must be configured by selecting the Programmable Module Installation Routine on WDS.

3. To install, reverse the removal procedure.

Removal Details

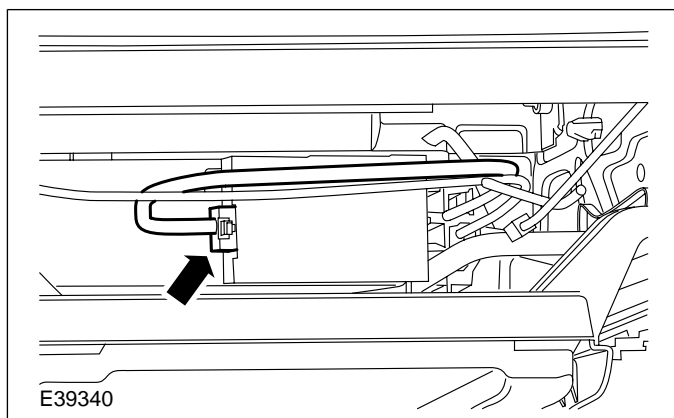
415-01-9

Audio Unit

415-01-9

REMOVAL AND INSTALLATION**Item 2 CD changer electrical connector**

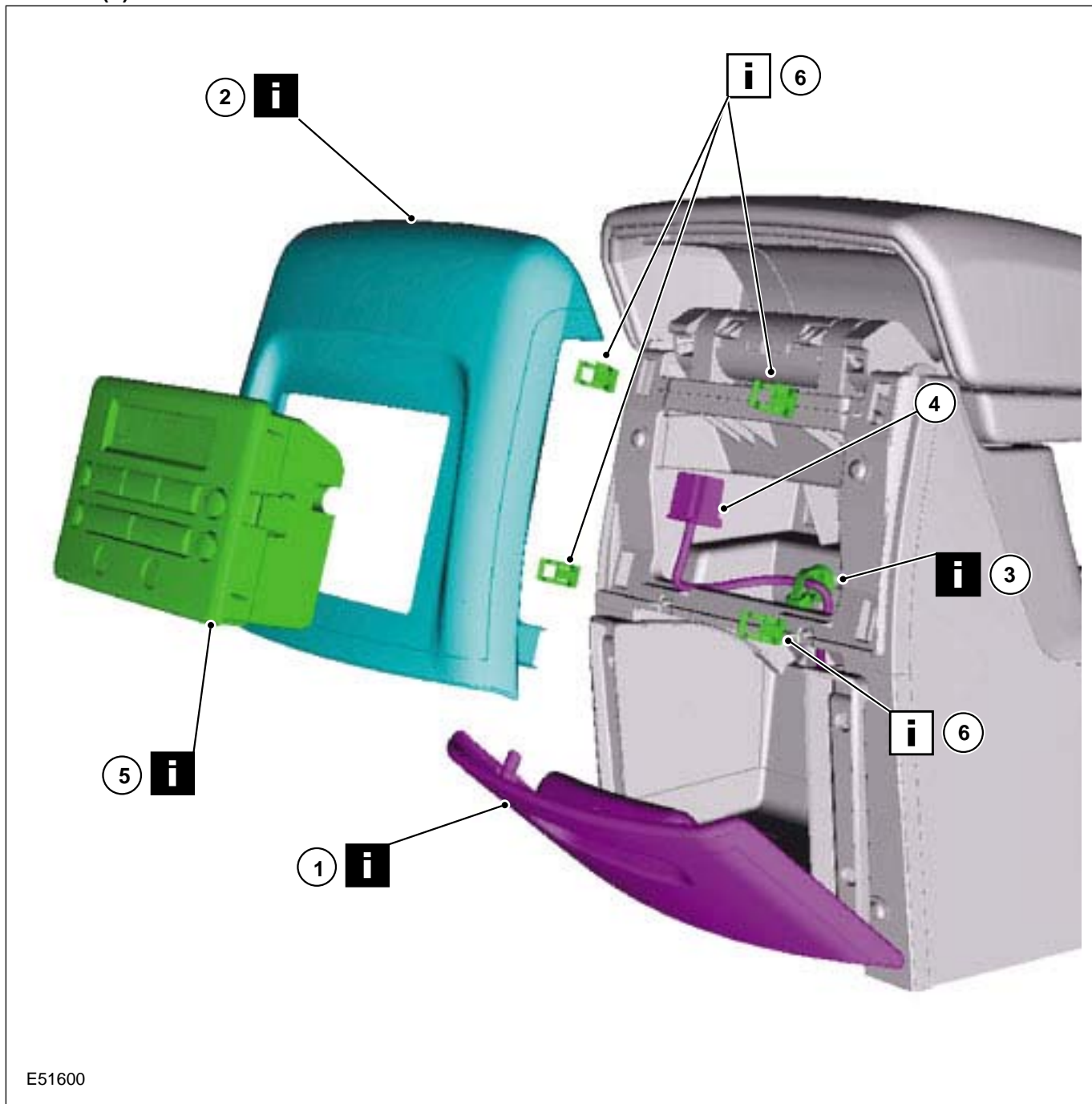
1. Disconnect the CD changer electrical connector.



REMOVAL AND INSTALLATION

Rear Auxiliary Audio Controls

1. Remove the components in the order indicated in the following illustration(s) and table(s).



E51600

Item	Description
1	Floor console compartment See Removal Detail
2	Rear auxiliary audio controls trim panel See Removal Detail

Item	Description
3	Rear auxiliary audio controls wiring harness retaining clip See Removal Detail
4	Rear auxiliary audio controls electrical connector

REMOVAL AND INSTALLATION

Item	Description
5	Rear auxiliary audio controls See Removal Detail
6	Rear auxiliary audio controls trim panel

Item	Description
	retaining clips See Installation Detail

2. To install, reverse the removal procedure.

Removal Details

Item 1 Floor console compartment

1. Open the floor console compartment.

Item 2 Rear auxiliary audio controls trim panel

1. **NOTE: Do not place excessive stress on the rear auxiliary audio controls wiring harness.**

Detach the rear auxiliary audio controls trim panel from the floor console.

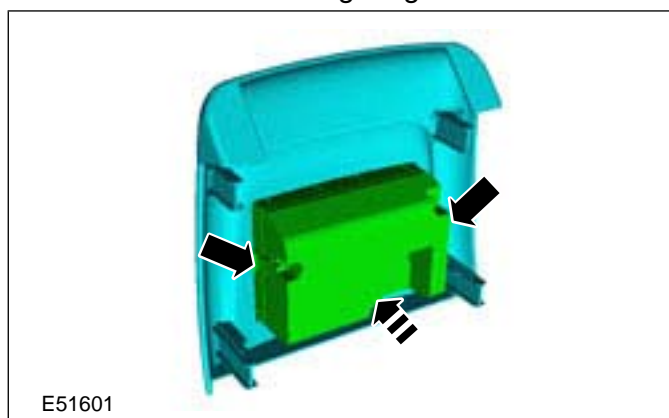
Item 3 Rear auxiliary audio controls wiring harness retaining clip

1. Detach the rear auxiliary audio controls wiring harness retaining clip from the floor console.

Item 5 Rear auxiliary audio controls

1. Remove the rear auxiliary audio controls from the rear auxiliary audio controls trim panel.

- Release the locking tangs.



Installation Details

Item 6 Rear auxiliary audio controls trim panel retaining clips

1. Install the rear auxiliary audio controls trim panel retaining clips to the rear auxiliary audio controls trim panel before installation.



SECTION 415-02 Antenna

VEHICLE APPLICATION: 2008.75 Focus ST C307

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DIAGNOSIS AND TESTING

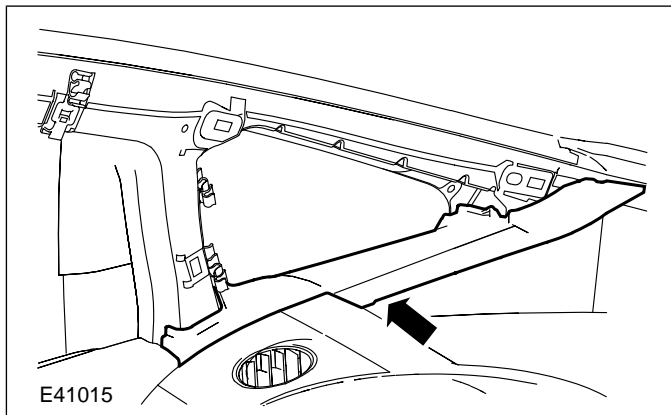
Antenna

REFER to Section 415-00 [Information and Entertainment System - General Information].



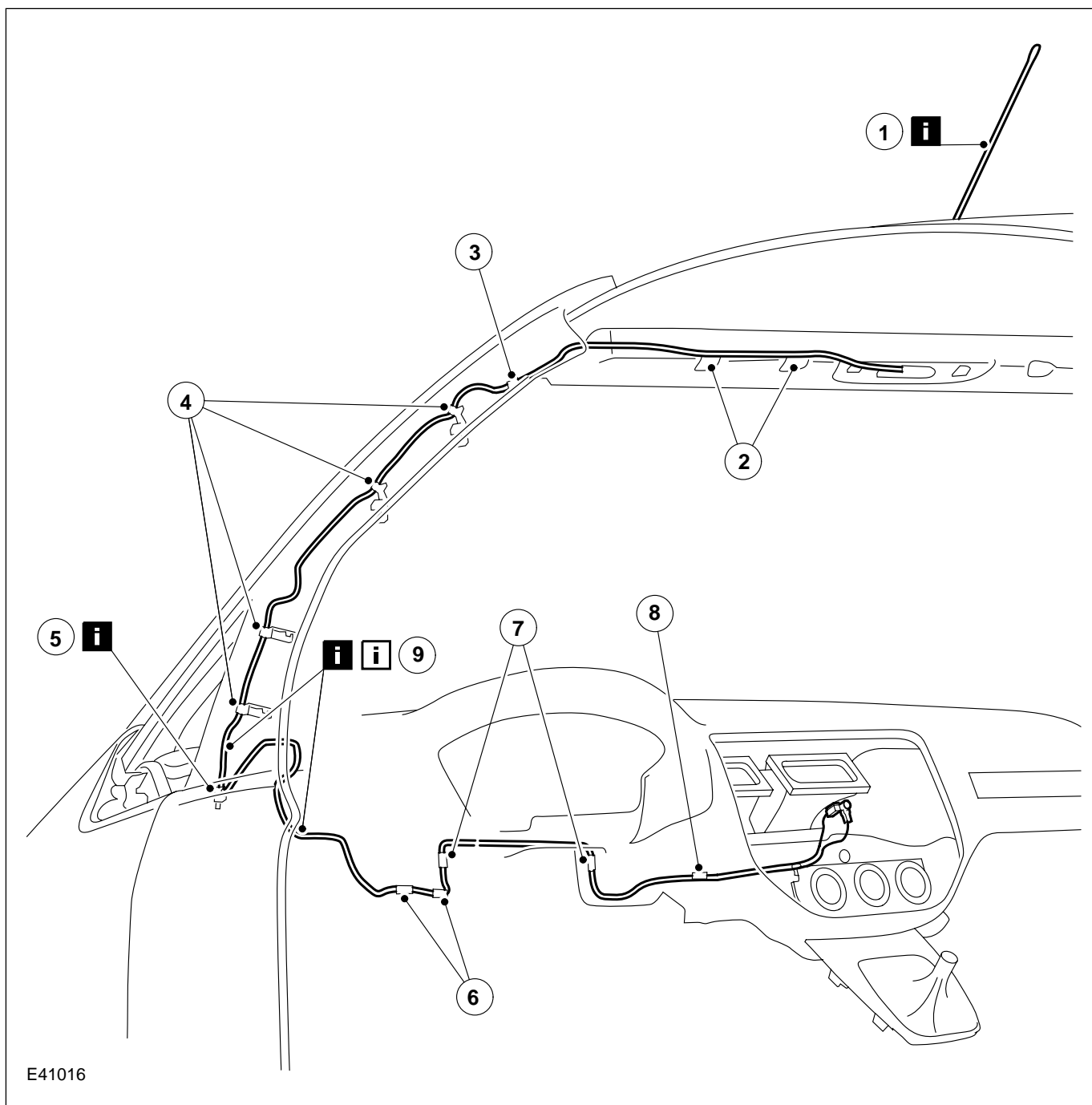
REMOVAL AND INSTALLATION**Antenna Cable**

1. Remove the headliner. For additional information, refer to Section 501-05 [Interior Trim and Ornamentation].
2. Remove the steering column. For additional information, refer to Section 211-04 [Steering Column].
3. Remove the side window trim panel.
4. Remove the audio unit. For additional information, refer to Section 415-01A [Audio Unit] / 415-01B [Information and Entertainment System].
5. Remove the components in the order indicated in the following illustration(s) and table(s).



REMOVAL AND INSTALLATION

NOTE: Instrument panel shown removed for clarity.



Item	Description
1	Antenna base and antenna See Removal Detail
2	Antenna cable to windscreen header rail retaining clips
3	Antenna cable to roof panel retaining clip
4	Antenna cable to A-pillar retaining clips
5	Antenna cable electrical connectors See Removal Detail

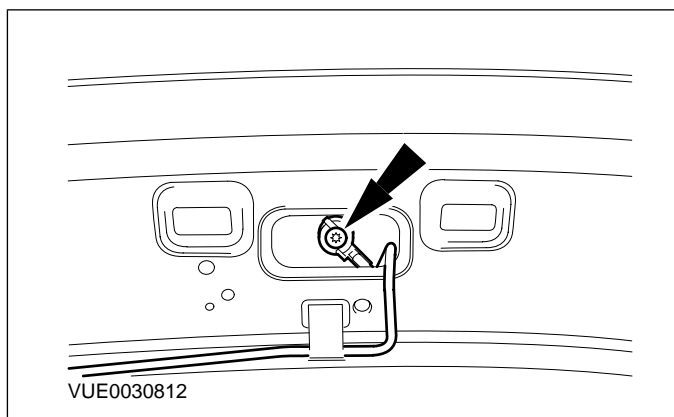
Item	Description
6	Antenna cable to instrument panel retaining clips
7	Antenna cable to steering column support bracket retaining clips
8	Antenna cable to audio unit support bracket retaining clip
9	Antenna cable See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION

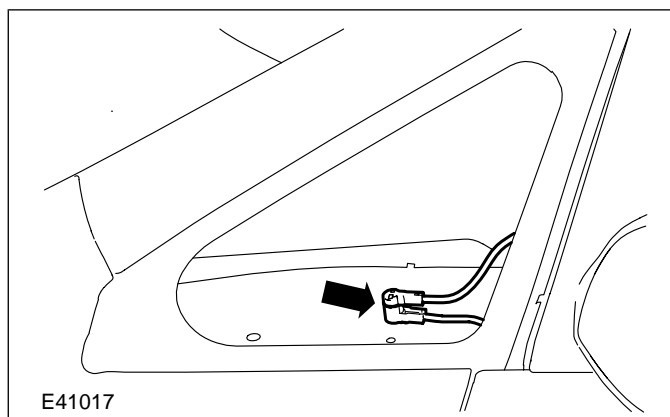
6. To install, reverse the removal procedure.

Removal Details**Item 1 Antenna base and antenna**

1. Disconnect the antenna base electrical connector.

**Item 5 Antenna cable electrical connectors**

1. Disconnect the antenna cable electrical connectors.

**Item 9 Antenna cable**

NOTE: Make a note of the routing of the antenna cable.

Installation Details**Item 9 Antenna cable**

NOTE: The antenna cable must be installed to the same routing as when removed.



SECTION 415-03 Speakers

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DIAGNOSIS AND TESTING

Speakers

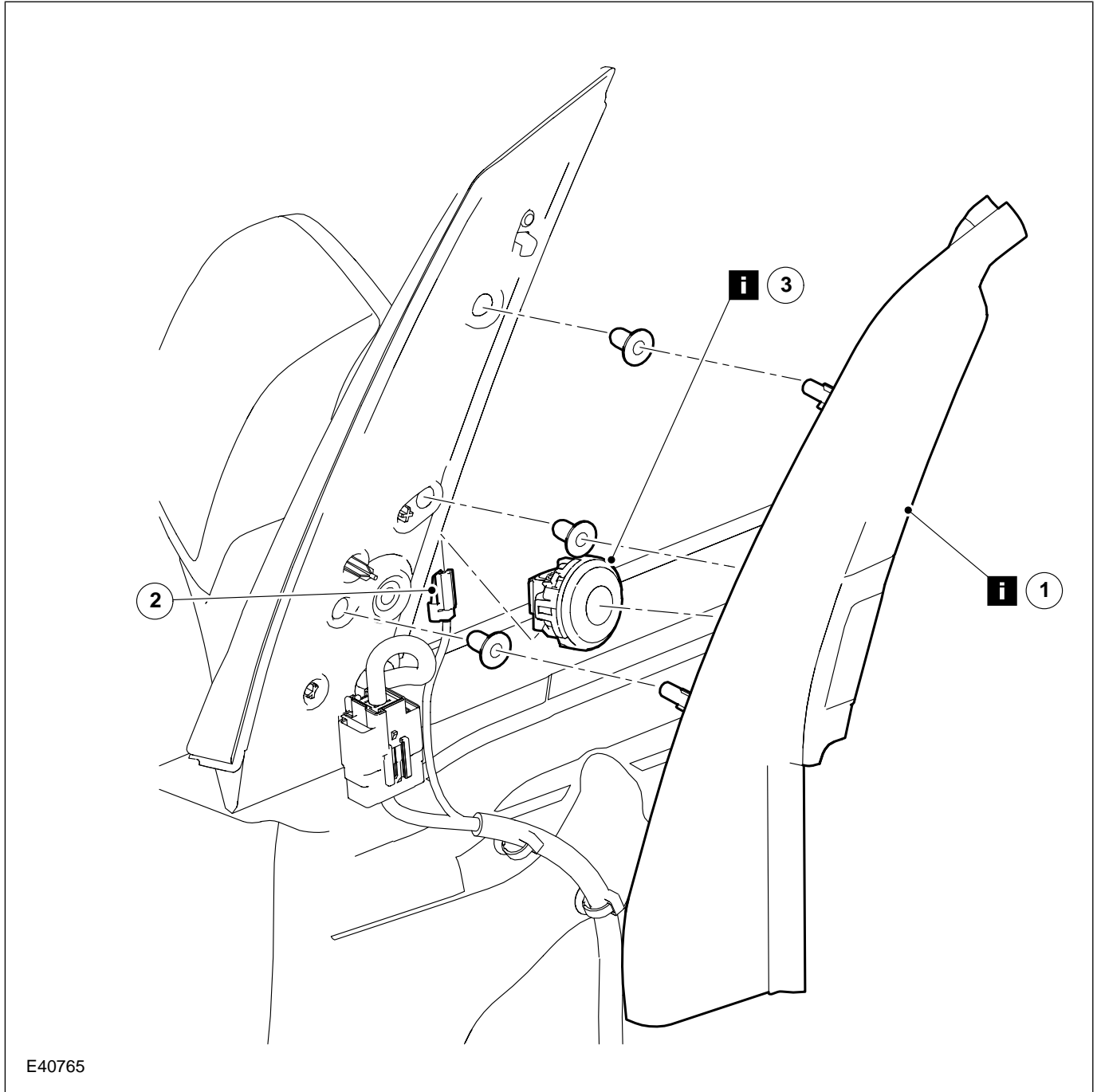
REFER to Section 415-00 [Information and Entertainment System - General Information].



REMOVAL AND INSTALLATION

Front Door Tweeter Speaker

1. Remove the components in the order indicated in the following illustration(s) and table(s).



REMOVAL AND INSTALLATION

Item	Description
1	Exterior mirror interior trim panel. See Removal Detail
2	Front door tweeter speaker electrical connector
3	Front door tweeter speaker See Removal Detail

2. To install, reverse the removal procedure.

CAUTIONS:

! Care must be taken when installing the front door tweeter speaker to the exterior mirror interior trim panel. Failure to follow this instruction may result in damage to the front door tweeter speaker cone.

! Make sure when installing the front door tweeter speaker, foreign matter is not attached to the speaker magnet or cone. Failure to follow this instruction may result in noise, vibration or harshness (NVH) issues.

NOTE: When installing the front door tweeter speaker to the exterior mirror interior trim panel an audible click should be heard to indicate correct installation.

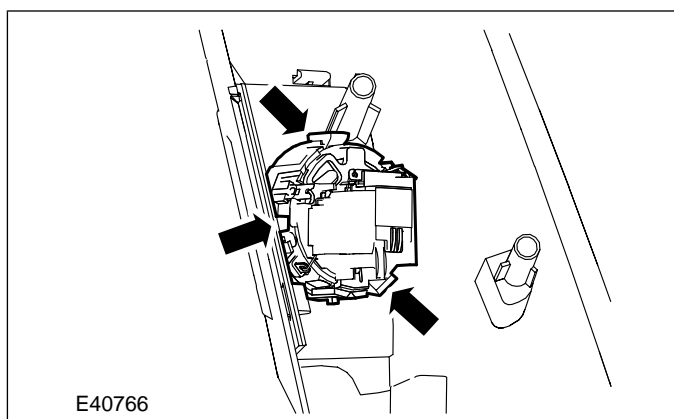
Removal Details

Item 1 Exterior mirror interior trim panel.

1. Detach the exterior mirror electrical connector from the exterior mirror interior trim panel.

Item 3 Front door tweeter speaker

1. Release the locking tangs and remove the front door tweeter speaker.



SECTION 417-01 Exterior Lighting

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Exterior Lighting

417-01-3

SPECIFICATIONS

Headlamp alignment

Item	X value
Headlamp.	$X = 10 \text{ cm}/10 \text{ m} = 0^{\circ}34' = 1.0\%$
Front fog lamps	$X = 22 \text{ cm}/10 \text{ m} = 1 \text{ degree } 16 \text{ minutes} = 2.2\%$

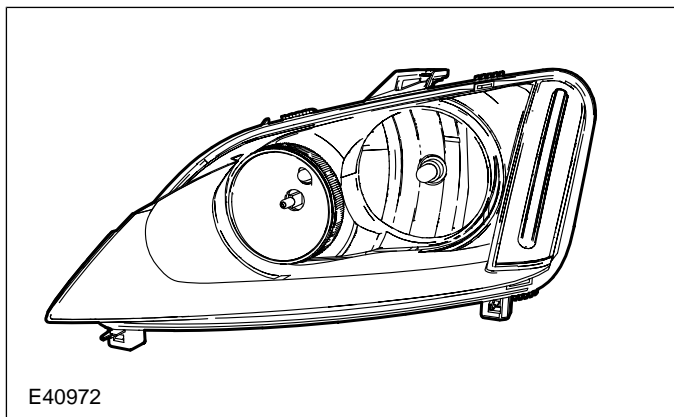
Torque Specifications

Description	Nm	lb-ft	lb-in
Bolt, headlamp	4	-	35
Rear lamp assembly screws	1	-	9
Bolt, front headlamp leveling sensor	8	-	35
Upper bolt, rear headlamp leveling sensor	8	-	71
Lower bolt, rear headlamp leveling sensor	48	35	-

DESCRIPTION AND OPERATION

Exterior Lighting

Conventional headlamps



The headlamp units are primarily made of plastic and make use of free-form reflectors in order to optimize light distribution.

The transparent plastic cover is made from polycarbonate, which is coated for protection against scratches and cracks.

In the event of damage to the cover the entire headlamp unit needs to be replaced.

The turn signal lamps and side lights are also integrated in the headlamp unit.

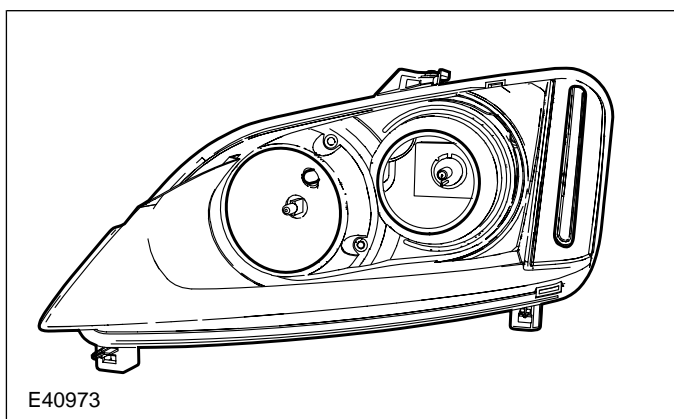
The manual headlamp leveling system operates with an electric motor which is controlled via a rotary control in the instrument cluster.

For conventional headlamps, adapting the vehicle to conform to country-specific traffic situations (left/right-hand side traffic) during travel is accomplished by affixing punched adhesive strips to specific areas of the headlamp.

All conventional headlamps use 12 V bulbs with a spiral-wound filament.

Lamp	Bulb	Current draw	Bulb color
Low beam	H7	55W	clear
High beam	H1	55W	clear
Turn Signal Lamp	Bayonet base	21W	orange
Side Lamp	Glass base	5W	clear

High intensity discharge headlamps



WARNING: High voltages of up to 30 kV are present in the system. Ensure that the headlamp assembly electrical connector is disconnected if the headlamp assembly is removed.

High intensity discharge headlamps are optionally available.

A single xenon high intensity discharge bulb in the outer projector is used both for low and high beams.

If the battery voltage drops below 7 volts during engine start-up, the high intensity discharge headlamps are switched off by the GEM. On vehicles built from 03/2007, the headlamps are switched on again 50ms after being switched off by the GEM.

In order to prevent dazzling the oncoming traffic in low beam mode, the light cone is modified by means of a shutter. An additional reflector is provided for the high beam, which is generated using a conventional bulb with a spiral-wound filament. This bulb is switched on when the headlamps are switched to high beam and when the headlamp flasher is operated.

DESCRIPTION AND OPERATION

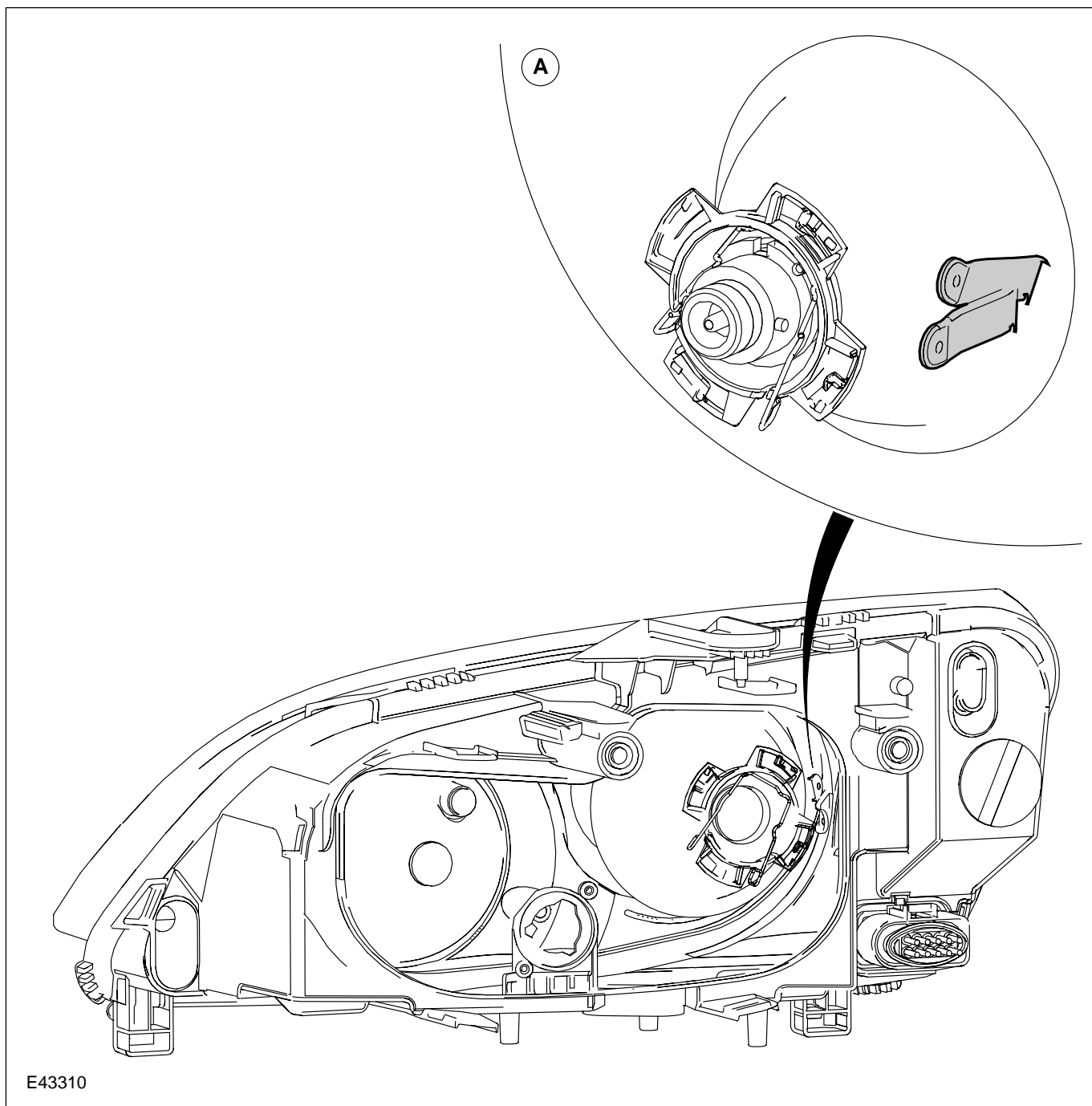
The headlamp flasher operates as follows:

- When the low beam is switched off the headlamp flasher function is provided solely by means of the conventional bulb in the additional reflector.
- When the low beam is switched on the headlamp flasher function is provided by moving the masking screen away from the main reflector and switching on the conventional bulb in the additional reflector.

The turn signal lamps and side lights are the same as in conventional headlamps.

Lamp	Bulb	Current draw	Bulb color
Low beam	High intensity discharge lamp	35W	clear
High beam	H1	55W	clear
Turn signal lamp	Bayonet base	21W	orange
Side lamp	Glass base	5W	clear

DESCRIPTION AND OPERATION

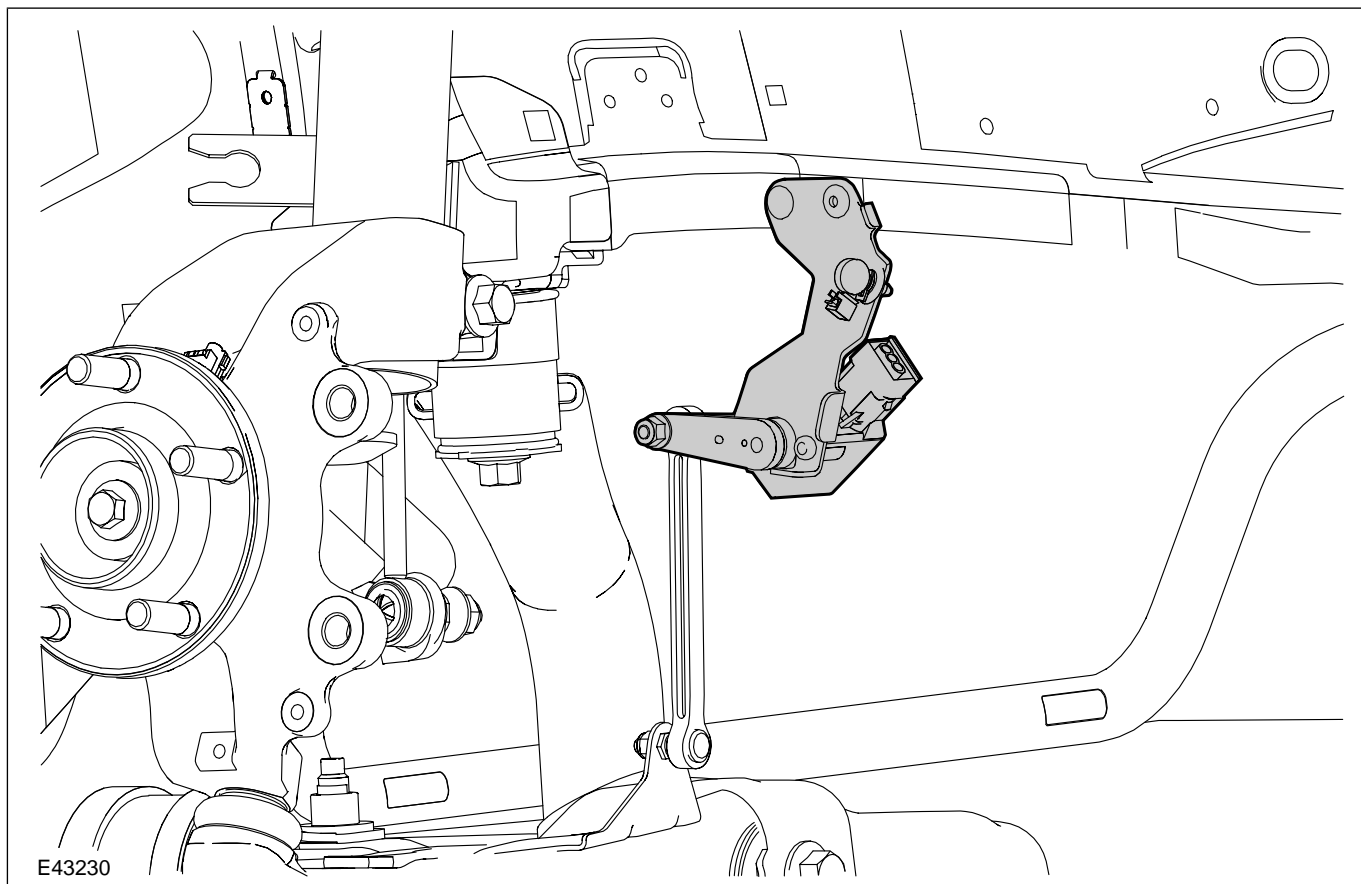


For high intensity discharge headlamps, adapting the vehicle to conform to country-specific traffic situations (left/right-hand side traffic) during travel is accomplished using a lever behind the headlamp cover, which is used to alter the headlamp beam.

To prevent oncoming traffic from being dazzled, the lever controls a second shutter which partially blocks the headlight beams in order to produce symmetrically-shaped beams of light in low beam mode.

DESCRIPTION AND OPERATION

Headlamp leveling system



An automatic headlamp leveling system is a legal requirement for vehicles with high intensity discharge headlamps.

The automatic headlamp leveling system is a second-generation dynamic system which provides additional benefits for the driver in terms of improved illumination of the road due to improved control over the headlamp beam.

In a static system, the vehicle is only considered as a stationary object, whereas a dynamic system also takes into account the dynamic changes to the inclination of the vehicle owing to load changes whilst driving.

The system is designed to respond to changes in the inclination of the vehicle caused by the long-term effects of aerodynamic forces acting on the vehicle (e.g. due to continuous driving at high speeds).

In order to prevent unnecessary changes in the height of the headlamp beam, the system filters out surface irregularities and any pitching of the vehicle under braking and acceleration.

The following components are part of the headlamp leveling system:

- Headlamp leveling sensors on the front and rear axles
- Control module
- Actuator motors for headlamp leveling

Accordingly, the system needs to be set up with WDS after any components are replaced or any other repairs are carried out.

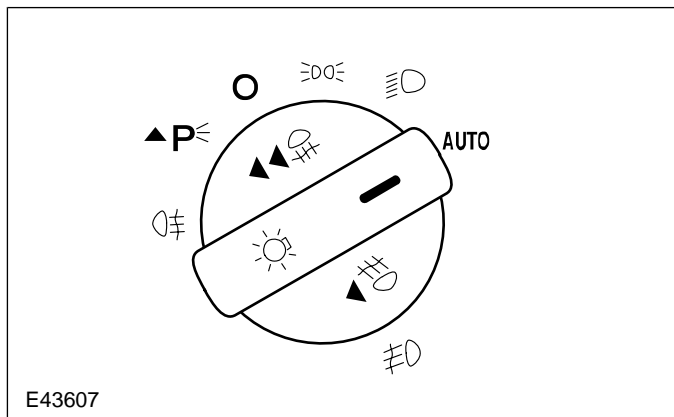
The front and rear sensors are Hall sensors, which transmit an analog signal to the control module.

Autolamps

CAUTIONS:

- ⚠ **On vehicles with autolamps, retrofitting with daytime running lamps is not permissible, as otherwise, the engine cannot be stopped when the lighting is switched on.**
- ⚠ **On vehicles with autolamps, the daytime running lamp fuse must not be fitted, as otherwise, the engine cannot be stopped when the lighting is switched on.**

DESCRIPTION AND OPERATION

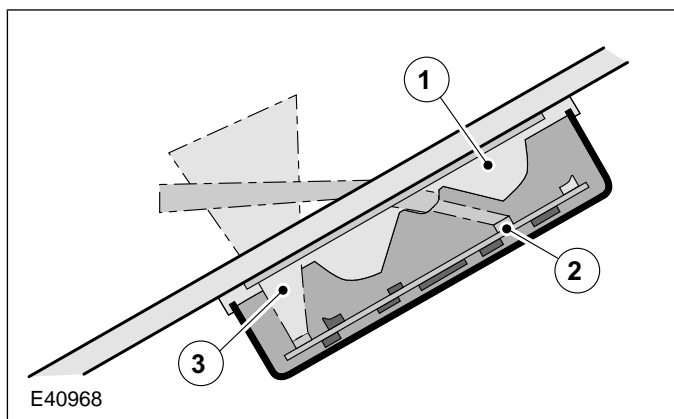


The low beams, side lamps, license plate lamps as well as the instrument cluster and instrument panel illumination are switched on automatically if all the following conditions are met:

- Ignition switch in the "II" or "III" position
- Light switch in the "AUTO" position
- Detected ambient light conditions below a stored threshold value

These are switched on and off by the Generic Electronic Module (GEM) in accordance with the input signals from the combined rain/light sensor.

Combined rain sensor/light sensor



Item	Description
1	Lens
2	Front light sensor
3	Ambient light sensor

The combined rain sensor/light sensor is attached to the windshield, near to the interior rear view mirror.

The ambient light sensor determines the general light intensity. For this purpose, it records the light over as wide an angle as possible, without taking the direction of incidence into account.

The front light sensor determines the light intensity directly in front of the vehicle.

If both the ambient light sensor and the front light sensor detect a sudden reduction in light intensity at the same time, then an algorithm-based calculation is used to determine the fact that the vehicle has entered a tunnel, a multi-storey car park or a long underpass.

In this type of case a request to switch on the exterior lights and the display lamps in the instrument cluster is transmitted to the GEM.

If the vehicle is suddenly thrown into the shade by a large truck, the two sensors will register different light intensities. In this case, the algorithm-based calculation will not result in the lights being switched on.

In vehicles built from 07/2004, a stepped switch-off of the low beams, side lamps, license plate lamps as well as the instrument cluster and instrument panel illumination is implemented in the GEM. If the ambient light changes from dark to bright, the GEM first switches off the low beams. The side lamps, license plate lamps, as well as the instrument cluster and instrument panel illumination are switched off approx. 6 seconds after the low beams have been switched off.

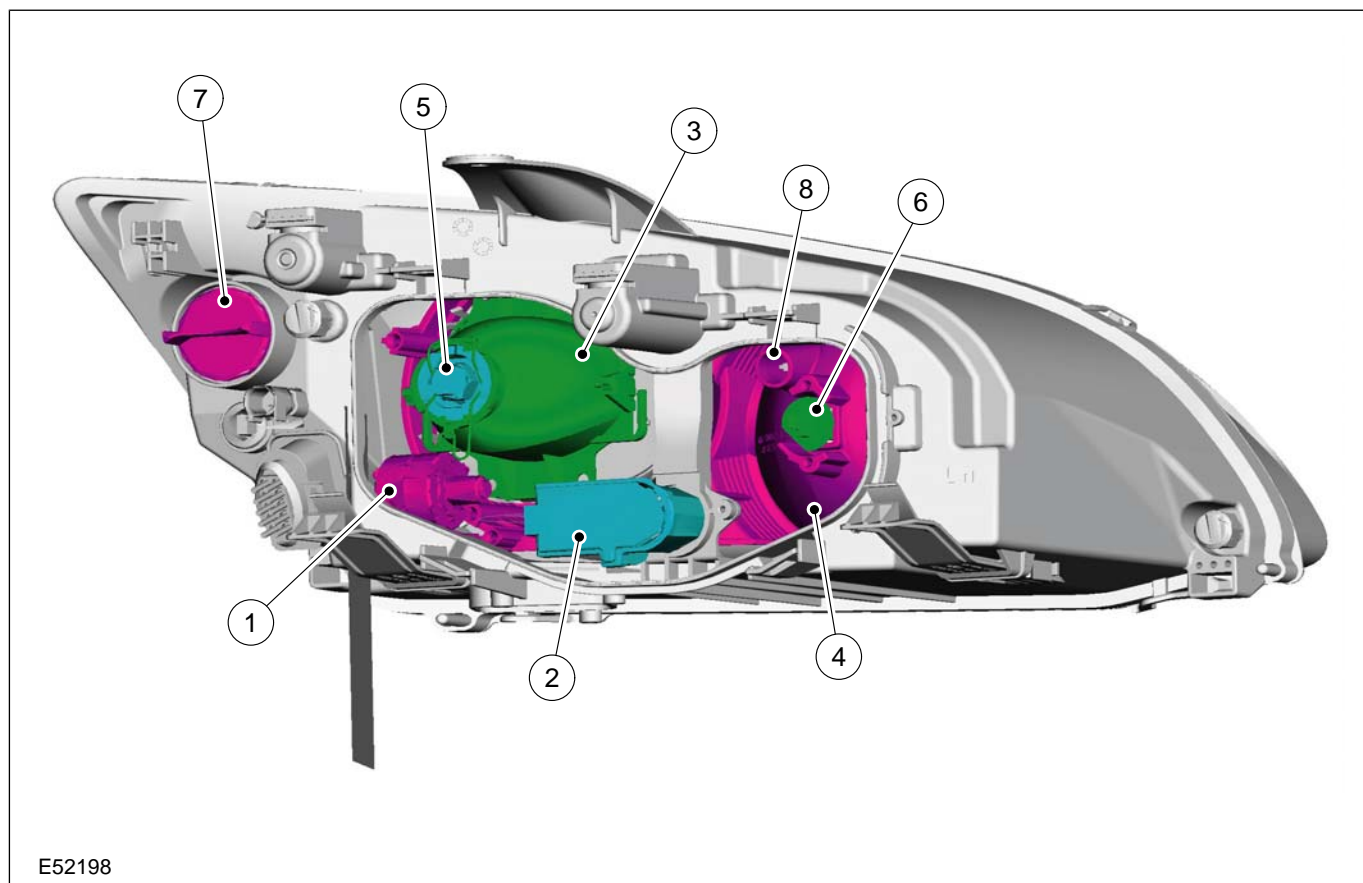
Adaptive front lighting



Lamp	Bulb	Current draw	Bulb color
Low beam	H7	55W	clear

DESCRIPTION AND OPERATION

Lamp	Bulb	Current draw	Bulb color
High beam	H1	55W	clear
Turn signal lamp	Bayonet base	21W	orange
Side lamp	Glass base	5W	clear



E52198

Item	Description
1	Adaptive front lighting actuator motor
2	Headlamp leveling motor
3	Low beam projector
4	High beam reflector
5	Low beam lamp bulb
6	High beam lamp bulb
7	Turn signal lamp bulb
8	Parking lamp bulb

Vehicles with conventional lighting (low beam with projector) can optionally be equipped with the newly developed adaptive front lighting. The system is not compatible with automatic headlamp inclination and only works when the lights are switched on.

The adaptive front lighting module must be configured for the various vehicle versions (wagon, 3-door, 5-door, engine type, RHD/LHD etc.) using the Worldwide Diagnostic System (WDS).

During cornering, the dipped light projectors swivel toward the inside of the curve, with a maximum correction angle of 9° for the projector on the outside of the curve and 14° for the projector on the inside of the curve.

When reverse gear is engaged, adaptive front lighting is disabled. When reverse gear is disengaged again and the vehicle moves at a speed above 3 km/h, the adaptive front lighting follows the relevant steering movements.

When performing parking maneuvers at a speed below 3 km/h, the adaptive front lighting swivels, in accordance with the country-specific configuration (LHD/RHD), to the relevant edge of the road in order to avoid dazzling the oncoming traffic when the steering wheel is turned in the opposite direction.

DESCRIPTION AND OPERATION

The straight ahead position of the steering should be checked using WDS prior to headlamp adjustment. For this purpose, the headlamp leveling system must be in the "0" position and the steering wheel in the "0" (+/- 3°) position.

The adaptive front lighting actuator motors are stepper motors.

The headlamp leveling system motors are DC motors.

If there is a system fault with the adaptive front lighting actuator motors, the fault code "Advance Front Light Failure (adaptive front lighting malfunction)" will be shown in the driver information display of the instrument cluster and the indicator will flash.

In the event of a headlamp leveling motor fault, both headlamps are moved to the central position by means of the adaptive front lighting actuator motors and they remain in this position.

In the event of an adaptive front lighting actuator motor fault, the headlamp leveling motor moves the relevant headlamp to the lowest position where it remains. The intact headlamp is moved to the "0" position by the adaptive front lighting actuator motor.

For adaptive front lighting headlamps, adapting the vehicle to conform to country-specific traffic situations (left/right-hand side traffic) during travel is accomplished using a lever behind the headlamp cover, which is used to alter the headlamp beam.

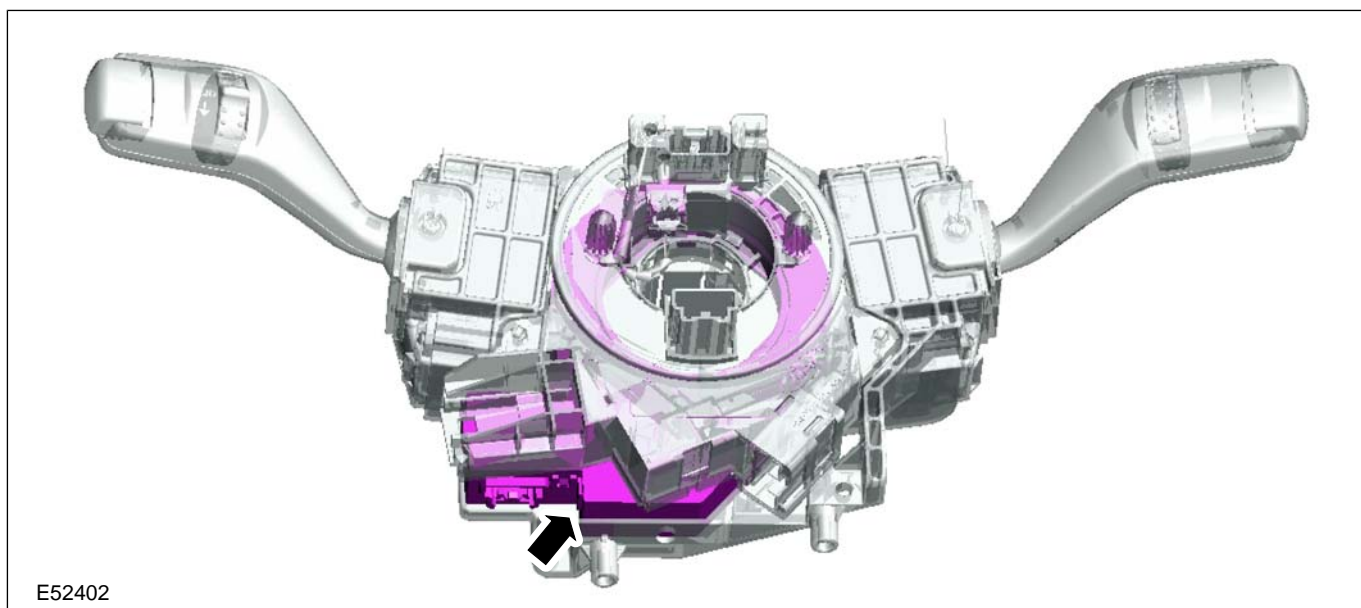
To prevent oncoming traffic from being dazzled, the lever controls a shutter which partially blocks the headlight beams in order to produce symmetrically-shaped beams of light in low beam mode.

Adaptive front lighting module

The adaptive front lighting module, which is connected to the high-speed Controller Area Network (CAN), processes the CAN reverse gear switch, vehicle speed, light switch position and daytime running lamp signals as well as the steering angle sensor and headlamp leveling signals and sends control commands to the adaptive front lighting actuator motors and the headlamp leveling motors. The adaptive front lighting module must be configured with the WDS after renewal.

When the ignition and lights are switched on, the adaptive front lighting module performs calibration of the headlamps, during which both move inwards and then to the "0" position, independently of the steering wheel position. The headlamps only turn in the direction of cornering when the steering wheel is turned by more than 4°. Calibration is performed only once during an operating cycle (ignition key in position "2" and then in position "0").

Steering angle sensor



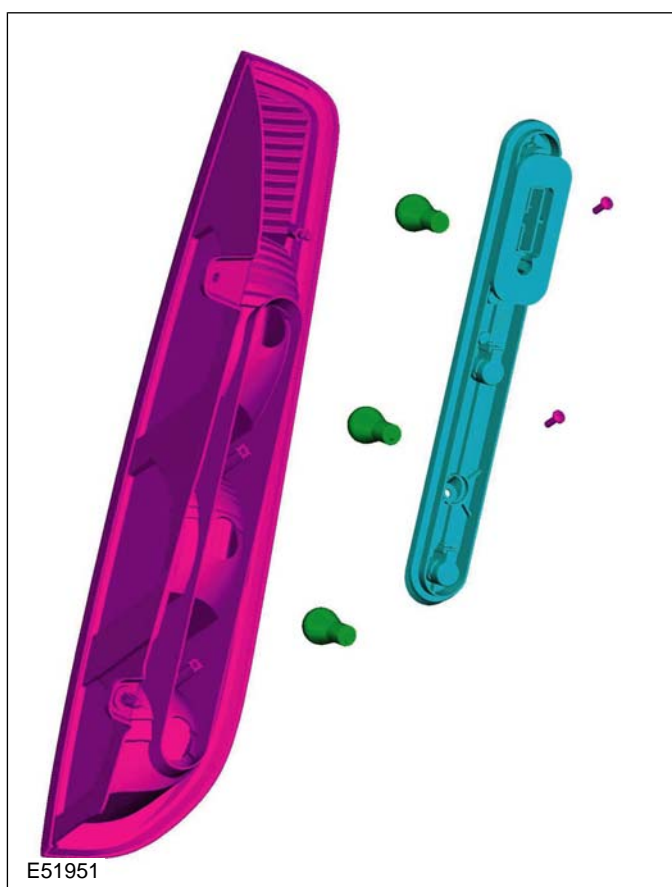
DESCRIPTION AND OPERATION

The steering angle sensor is located in the section of the steering wheel below the steering column stalk and is clipped to the clock spring. In vehicles with adaptive front lighting, a sensor with 6 connector contacts is used. Vehicles with ABS/ESP without adaptive front lighting are equipped with a sensor with 4 connector contacts.

Before attaching it to the clock spring, the steering angle sensor with 6 connector contacts must be brought into the installation position (triangle marking must align with the line in the alignment window).

The steering angle sensor does not need to be initialized following renewal.

Rear lighting



The rear lamp assemblies of wagon vehicles include all the rear lamp functions except the license plate lamp and high mounted stoplamp.

In 3-door and 5-door vehicles, the rear fog lamp, reversing lamp and reflectors are integrated in the rear bumper.

The rear lamp assemblies are replaced as a complete unit during servicing.

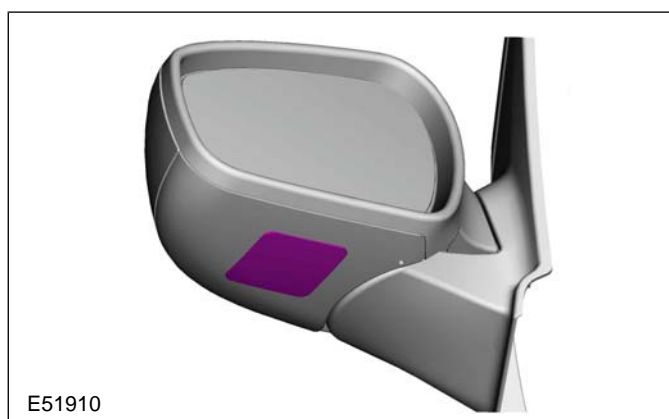
The rear lamp assemblies need to be removed in order to change a bulb.

The individual bulb holders and circuits are integrated in the bulb holder assembly in wagon and 4-door vehicles. In 3-door and 5-door vehicles this function is performed by the wiring harness.

In wagon and 4-door vehicles, a compact connector is used to connect the bulb holder with the wiring harness. In 3-door and 5-door vehicles, the wiring harness is connected to the bulb holder by means of two connectors.

The high mounted stoplamp is installed in the centre of the liftgate in wagon vehicles. In 3-door and 5-door vehicles it is installed in the rear spoiler and in 4-door vehicles it is installed in the headliner behind the rear window.

Peripheral lights



The purpose of peripheral lights is to illuminate the ground in the immediate vicinity of the front doors. The illumination is provided in the form of white bulbs which are located on the underside of the mirrors.

The peripheral lights are switched on when a door or the liftgate are opened or an unlock command is detected and the following conditions are fulfilled:

- The ignition key is in position "0" or "I".
- Reverse gear is not engaged.
- The vehicle speed is below 7 km/h.

The peripheral lights are switched off when one of the following conditions is fulfilled:

- The ignition switch is turned to the position "II" or "III".
- Reverse gear is engaged.
- The vehicle speed exceeds 7 km/h.

DESCRIPTION AND OPERATION

- More than 25 seconds have elapsed since the liftgate was closed or a central locking command was detected.
- The time set for the battery protection function for the interior lighting has elapsed.
- More than 5 seconds have elapsed since the doors and the liftgate were closed.
- More than 5 seconds have elapsed since a central locking command was received and the all doors and the liftgate were closed.

Headlamp switch-off delay

In vehicles with mid to high-end equipment, the headlamp switch-off delay uses the low beams and the peripheral lights (if equipped) for illuminating the vehicle surroundings. The function is activated by operating the high beam lever when the ignition switch is in the "0" position.

After the last door has been closed, the function remains active for a further 30 seconds and then switches off automatically.

When a door or the liftgate is open, the switch-off time is extended to 180 seconds. After the last door has been closed, the switch-off time is reset to 30 seconds.

The headlamp switch-off delay can be deactivated prematurely by operating the high beam lever again or by switching on the ignition.

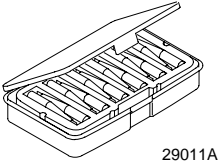
The switch-off time is adjusted to set values at the factory and cannot be re-programmed using WDS.

DIAGNOSIS AND TESTING

Stoplamps

Refer to Wiring Diagrams Section 417-01, for schematic and connector information.

Special Tool(s)

 <p>29011A</p>	<p>Terminal Probe Kit 29-011A</p>
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Inspection and Checking

NOTE: The generic electronic module (GEM) forms part of the central junction box (CJB).

NOTE: If the powertrain control module (PCM) is changed, the new one must be programmed. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module. u260.3

REFER to: **Module Configuration** (418-01 Module Configuration, General Procedures).

NOTE: Before reading out the vehicle-specific data, remake all the electrical connections which were separated in the vehicle, so that communication between the module and WDS is ensured.

1. Verify the customer concern.
2. Visually check the following electrical or mechanical causes for the concern.

Visual Inspection

Mechanical	Electrical
<ul style="list-style-type: none"> • Stop lamp switch adjustment 	<ul style="list-style-type: none"> • Fuse(s) • Lamp(s) • Connector(s) • Switches • Wiring harness

3. Resolve any obvious causes or concerns found during the visual inspection before carrying out any further tests.
4. If the concern is not visually evident, refer to the Symptom Chart.

Symptom Chart

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • All stop lamps are inoperative 	<ul style="list-style-type: none"> • Fuse • Circuit(s) • Stop lamp switch • Central junction box (CJB) 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.
<ul style="list-style-type: none"> • One or more stoplamps inoperative 	<ul style="list-style-type: none"> • Circuit(s) • Left/right-hand rear lamp assembly • Additional high-mounted stop lamp 	<ul style="list-style-type: none"> • GO to Pinpoint Test B.
<ul style="list-style-type: none"> • Stoplamps permanently on 	<ul style="list-style-type: none"> • Circuit(s) • Stop lamp switch • Transmission selector lever assembly • Central junction box (CJB) • Powertrain control module (PCM) 	<ul style="list-style-type: none"> • GO to Pinpoint Test C.

DIAGNOSIS AND TESTING

System Checks

NOTE: Use a digital multimeter for all electrical measurements.

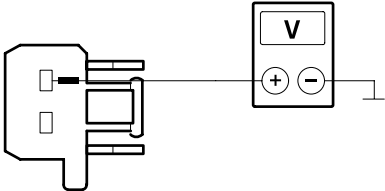
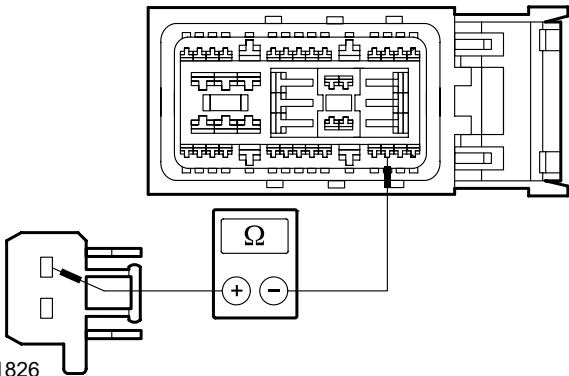
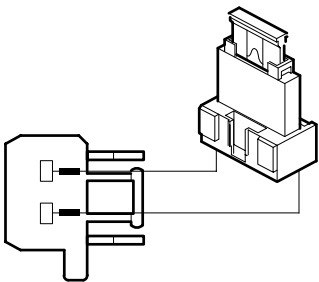
PINPOINT TEST A : ALL STOP LAMPS ARE INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> Unfasten the CJB and fold it down. <ul style="list-style-type: none"> Is the location for connector C100 on the top of the CJB? <ul style="list-style-type: none"> → Yes GO to A4. → No GO to A2.
A2: CHECK FUSE F74 (15 A) (CJB).	
	<ol style="list-style-type: none"> Ignition switch in position 0. Disconnect fuse F74 (15 A) (CJB). CHECK fuse F74 (15 A) (CJB). <ul style="list-style-type: none"> Is the fuse OK? <ul style="list-style-type: none"> → Yes GO to A3. → No RENEW fuse F74 (15 A) (CJB) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.
A3: CHECK THE VOLTAGE AT FUSE F74 (15 A) (CJB)	
	<ol style="list-style-type: none"> Connect fuse F74 (15 A) (CJB). Ignition switch in position II. Measure the voltage between fuse F74 (15 A) (CJB) and ground. <ul style="list-style-type: none"> Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes GO to A6. → No LOCATE and RECTIFY the break in the voltage supply of fuse F74 (15 A) (CJB) using the Wiring Diagrams, if necessary RENEW the CJB. CHECK the operation of the system.
A4: CHECK FUSE F132 (15 A) (CJB)	
	<ol style="list-style-type: none"> Ignition switch in position 0.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect Fuse F132 (15 A) (CJB).</p> <p>3 CHECK Fuse F132 (15 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to A5.</p> <p>→ No RENEW fuse F132 (15 A) (CJB) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
A5: CHECK VOLTAGE AT FUSE F132 (15 A) (CJB)	
	<p>1 Connect Fuse F132 (15 A) (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F132 (15 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to A6.</p> <p>→ No LOCATE and RECTIFY the break in the voltage supply from fuse F132 (15 A) (CJB) using the Wiring Diagrams, if necessary RENEW the CJB. CHECK the operation of the system.</p>
A6: CHECK VOLTAGE AT STOP LAMP SWITCH	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect stop lamp switch from connector C444.</p> <p>3 Ignition switch in position II.</p>

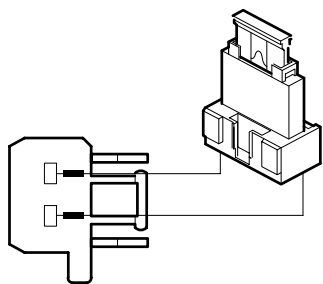
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038418</p>	<p>4 Measure the voltage between the stoplamp switch, connector C444, pin 2, circuit 15-LG23 (GN/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? → Yes GO to A8. → No GO to A7.
<p>A7: CHECK VOLTAGE SUPPLY TO THE STOP LAMP SWITCH FOR OPEN CIRCUIT</p>	
 <p>E81826</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C444.</p> <p>3 Measure the resistance between the CJB, connector C100, pin 13, circuit 15-LG23 (GN/WH), wiring harness side and the stoplamp switch, connector C444, pin 2, circuit 15-LG23 (GN/WH), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? → Yes INSTALL a new CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and the stoplamp switch with the aid of the Wiring Diagrams. CHECK the operation of the system.
<p>A8: CHECK THE STOP LAMP SWITCH</p>	
 <p>VFE0038423</p>	<p>1 Ignition switch in position 0.</p> <p>2 Connect a fused jumper wire (15 A) to the stop lamp switch, connector C444, between pin 2, circuit 15-LG23 (GN/WH) and pin 1, circuit 15S-LG23 (GN/WH), wiring harness side.</p> <p>3 Ignition switch in position II.</p>

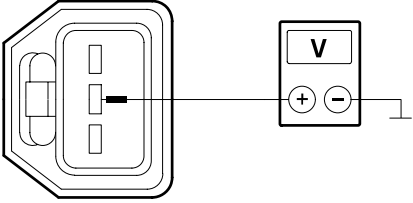
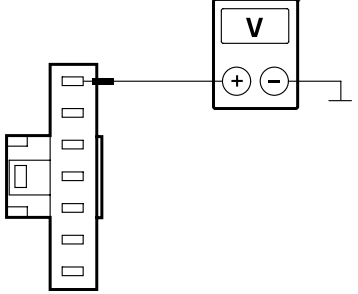
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 CHECK the operation of the stoplamps.</p> <ul style="list-style-type: none"> • Do the stop lamps illuminate? <p>→ Yes INSTALL A NEW stop lamp switch. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the stop lamp switch and soldered connection S112 using the Wiring Diagrams. CHECK the operation of the system.</p>

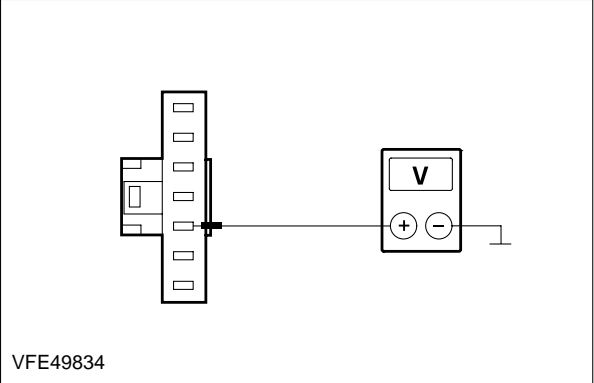
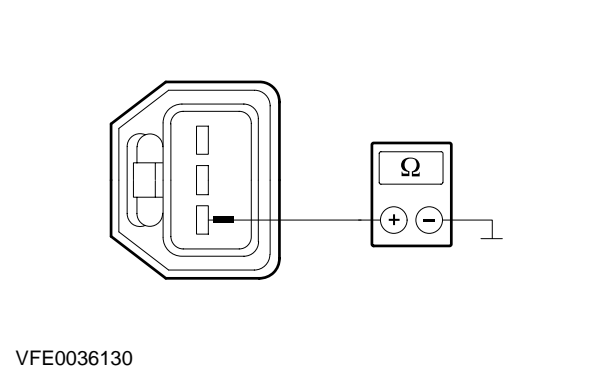
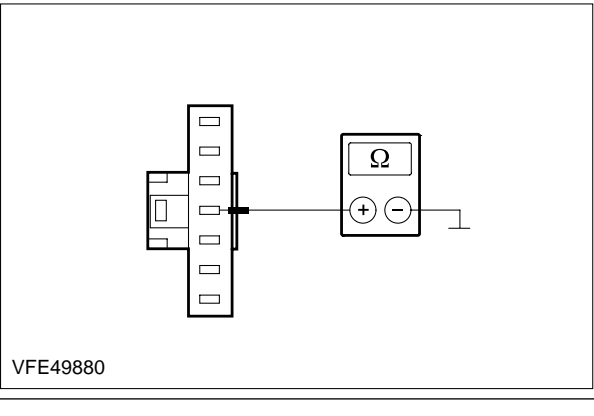
PINPOINT TEST B : ONE OR MORE STOPLAMPS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: DETERMINE THE FAULT CONDITION	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect stop lamp switch from connector C444.</p>
 <p>VFE0038423</p>	<p>3 Connect a fused jumper wire (15 A) to the stop lamp switch, connector C444, between pin 2, circuit 15-LG23 (GN/WH) and pin 1, circuit 15-LG23 (GN/WH), wiring harness side.</p>
	<p>4 Ignition switch in position II.</p> <p>5 Determine the fault condition.</p> <p>6 CHECK the stop lamps.</p> <ul style="list-style-type: none"> • Is only the additional high-mounted stoplamp inoperative? <p>→ Yes GO to B6.</p> <p>→ No</p> <ul style="list-style-type: none"> - Left-hand stop lamp is inoperative: GO to B2. - Right-hand stop lamp is inoperative: GO to B4.

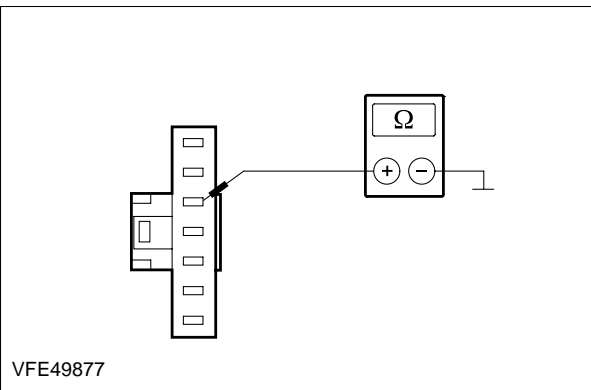
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B2: CHECK THE VOLTAGE SUPPLY OF THE LEFT-HAND STOP LAMP	
NOTE: The fused jumper lead used in the previous step is still connected to the stop lamp switch.	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Left-hand rear lamp assembly from connector.</p> <ul style="list-style-type: none"> - 3-door and 5-door versions, without trailer hitch: C472 - 3-door and 5-door versions, with trailer hitch: C2004 - 4-door and estate versions, without trailer hitch: C476 - 4-door and estate versions, with trailer hitch: C2035 - Cabriolet: C3928 <p>3 Ignition switch in position II.</p>
 <p>VFE0037441</p>	<p>4 Measure voltage between left-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions, without trailer hitch: connector C472, pin 2, circuit 15S-LG14B (GN/RD), wiring harness side and ground. - 3-door and 5-door versions, with trailer hitch: connector C2004, pin 2, circuit (BK/RD), wiring harness side and ground. - Cabriolet: Connector C3928, pin 2, circuit 15S-LG14A (GN/RD), wiring harness side and ground.
 <p>E80968</p>	<p>5 Measure voltage between left-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - 4-door versions, without trailer hitch: connector C476, pin 1, circuit 15S-LG14C (GN/RD), wiring harness side and ground. - 4-door versions, with trailer hitch: connector C2035, pin 1, circuit 15S-LG14 (BK/RD), wiring harness side and ground.

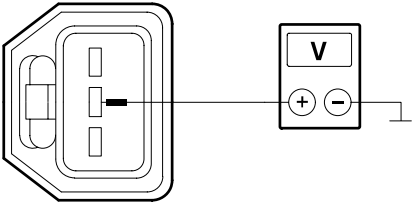
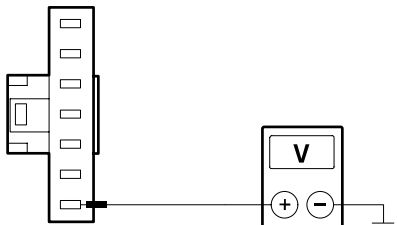
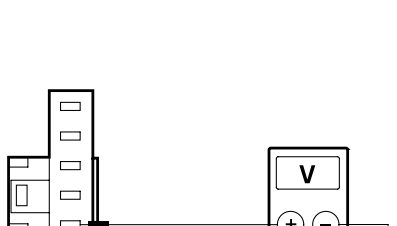
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE49834</p>	<p>6 Measure voltage between left-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - Estate versions, without trailer hitch: connector C476, pin 5, circuit 15S-LG14A (GN/RD), wiring harness side and ground. - Estate versions, with trailer hitch: connector C2035, pin 5, circuit 15S-LG14 (BK/RD), wiring harness side and ground. <p>• Does the meter display battery voltage?</p> <p>→ Yes GO to B3.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between soldered connection S112 and the rear lamp assembly using the Wiring Diagrams. CHECK the operation of the system.</p>
B3: CHECK THE GROUND CONNECTION TO THE LEFT-HAND REAR LAMP ASSEMBLY	
	<p>1 Ignition switch in position 0.</p>
 <p>VFE0036130</p>	<p>2 Measure resistance between left-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions, without trailer hitch: connector C472, pin 3, circuit 31-LF23(A/B) (BK), wiring harness side and ground. - 3-door and 5-door versions, with trailer hitch: connector C2004, pin 3, circuit (BK), wiring harness side and ground. - Cabriolet: Connector C3928, pin 3, circuit 31-LF23A (BK), wiring harness side and ground.
 <p>VFE49880</p>	<p>3 Measure resistance between left-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - 4-door versions, without trailer hitch: connector C476, pin 4, circuit 31-LF23C (BK), wiring harness side and ground. - 4-door versions, with trailer hitch: connector C2035, pin 4, circuit 31-LF23 (GN), wiring harness side and ground.

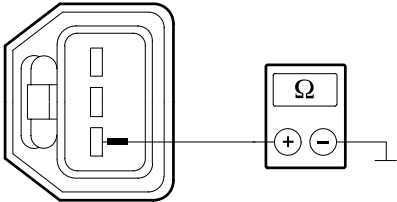
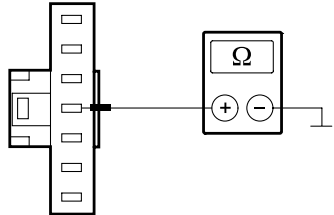
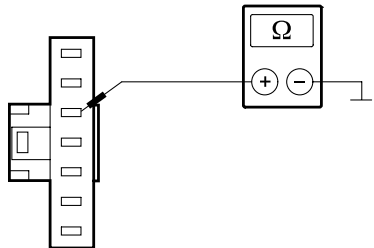
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE49877</p>	<p>4 Measure resistance between left-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - Estate versions, without trailer hitch: connector C476, pin 3, circuit 31-LF23 (BK), wiring harness side and ground. - Estate versions, with trailer hitch: connector C2035, pin 3, circuit 31-LF23 (GN), wiring harness side and ground. <p>• Is a resistance of less than 2 Ohms registered?</p> <p>→ Yes CHECK and if necessary RENEW the rear lamp assembly. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit(s) between the rear lamp assembly and ground connection G77 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B4: CHECK THE VOLTAGE SUPPLY OF THE RIGHT-HAND STOP LAMP</p>	
<p>NOTE: The fused jumper lead used in the first step is still connected to the stop lamp switch.</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Right-hand rear lamp assembly from connector.</p> <ul style="list-style-type: none"> - 3-door and 5-door versions, without trailer hitch: C473 - 3-door and 5-door versions, with trailer hitch: C2007 - 4-door and estate versions, without trailer hitch: C477 - 4-door and estate versions, with trailer hitch: C2037 - Cabriolet: C3929 <p>3 Ignition switch in position II.</p>

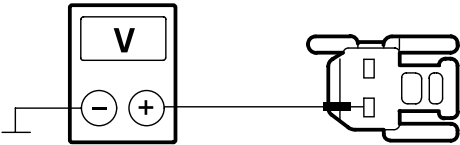
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037441</p>	<p>4 Measure voltage between right-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions, without trailer hitch: connector C473, pin 2, circuit 15S-LG21A (GN/BK), wiring harness side and ground. - 3-door and 5-door versions, with trailer hitch: connector C2007, pin 2, circuit (GN), wiring harness side and ground. - Cabriolet: Connector C3929, pin 2, circuit 15S-LG21 (GN/BK), wiring harness side and ground.
 <p>E0031100</p>	<p>5 Measure voltage between right-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - 4-door versions, without trailer hitch: connector C477, pin 7, circuit 15S-LG21B (GN/BK), wiring harness side and ground. - 4-door versions, with trailer hitch: connector C2037, pin 7, circuit 15S-LG14 (GN), wiring harness side and ground.
 <p>VFE49834</p>	<p>6 Measure voltage between right-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - Estate versions, without trailer hitch: connector C477, pin 5, circuit 15S-LG21 (GN/BK), wiring harness side and ground. - Estate versions, with trailer hitch: connector C2037, pin 5, circuit 15S-LG21 (GN), wiring harness side and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes GO to B5. → No LOCATE and RECTIFY the break in the circuit(s) between soldered connection S112 and the rear lamp assembly using the Wiring Diagrams. CHECK the operation of the system.
<p>B5: CHECK THE GROUND CONNECTION OF THE RIGHT-HAND REAR LAMP ASSEMBLY</p>	
	<p>1 Ignition switch in position 0.</p>

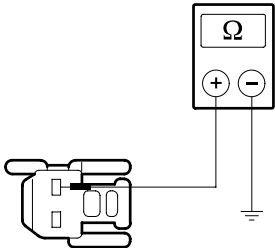
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0036130</p>	<p>2 Measure the resistance between the right-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions, without trailer hitch: connector C473, pin 3, circuit 31-LF24 (BK), wiring harness side and ground. - 3-door and 5-door versions, with trailer hitch: connector C2007, pin 3, circuit (BK), wiring harness side and ground. - Cabriolet: Connector C3929, pin 3, circuit 31-LF24A (BK), wiring harness side and ground.
 <p>VFE49880</p>	<p>3 Measure the resistance between the right-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - 4-door versions, without trailer hitch: connector C477, pin 4, circuit 31-LF24B (BK), wiring harness side and ground. - 4-door versions, with trailer hitch: connector C2037, pin 4, circuit 31-LF24A (GN), wiring harness side and ground.
 <p>VFE49877</p>	<p>4 Measure the resistance between the right-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - Estate versions, without trailer hitch: connector C477, pin 3, circuit 31-LF24A (BK), wiring harness side and ground. - Estate versions, with trailer hitch: connector C2037, pin 3, circuit 31-LF24A (GN), wiring harness side and ground. <p>• Is a resistance of less than 2 Ohms registered?</p> <p>→ Yes CHECK and if necessary RENEW the rear lamp assembly. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit(s) between the right-hand rear lamp assembly and ground connection G70 using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B6: CHECK VOLTAGE SUPPLY OF ADDITIONAL HIGH-MOUNTED STOP LAMP	
NOTE: The fused jumper lead used in the first step is still connected to the stop lamp switch.	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect additional high-mounted stop lamp from connector C107. 3 Ignition switch in position II.
 <p>VFE0003040</p>	<ol style="list-style-type: none"> 4 Measure the voltage between additional high-mounted stoplamp, connector C107, pin 1: <ul style="list-style-type: none"> - 3/5-door version: circuit 15S-LG6 (BK), wiring harness side and ground. - 4-door: circuit 15S-LG6C (GN/YE), wiring harness side and ground. - Estate versions: circuit 15S-LG6 (BK), wiring harness side and ground. - Cabriolet: circuit 15S-LG6 (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes GO to B7. → No <ul style="list-style-type: none"> - 4-door: LOCATE and RECTIFY the break in the circuit between the stoplamp switch and the additional high-mounted stop lamp using the wiring diagrams. CHECK the operation of the system. - All other models: LOCATE and RECTIFY the break in the circuit(s) between soldered connection S112 and the additional high-mounted stop lamp using the wiring diagrams. CHECK the operation of the system.
B7: CHECK THE GROUND CONNECTION OF THE ADDITIONAL HIGH-MOUNTED STOPLAMP	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0003041</p>	<p>2 Measure the resistance between additional high-mounted stoplamp, connector C107, pin 2:</p> <ul style="list-style-type: none"> - 3/5-door version: circuit 31-LG6 (BK), wiring harness side and ground. - 4-door: circuit 91-LG6 (BK/YE), wiring harness side and ground. - Wagon: circuit 31-LG6 (BK), wiring harness side and ground. - Cabriolet: circuit 31-LG6 (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary INSTALL A NEW additional high-mounted stop lamp. CHECK the operation of the system. → No <ul style="list-style-type: none"> - 4-door: LOCATE and RECTIFY the break in the circuit between the additional high-mounted stoplamp and soldered connection S203 using the Wiring Diagrams. CHECK the operation of the system. - All other models: LOCATE and RECTIFY the break in the circuit between the additional high-mounted stoplamp and ground connection G77 with the aid of the wiring diagrams. CHECK the operation of the system.

PINPOINT TEST C : STOPLAMPS PERMANENTLY ON

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: CHECK THE STOP LAMP SWITCH	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect stop lamp switch from connector C444.</p> <p>3 Ignition switch in position II.</p> <p>4 CHECK the stop lamps.</p> <ul style="list-style-type: none"> • Do the stop lamps illuminate continuously? <ul style="list-style-type: none"> → Yes GO to C2. → No INSTALL A NEW stop lamp switch. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C2: DETERMINE THE EQUIPMENT OF THE VEHICLE	
	<p>1 FIND OUT whether the vehicle is fitted with a trailer hitch.</p> <ul style="list-style-type: none"> • Is the vehicle equipped with a trailer hitch? <p>→ Yes GO to C3.</p> <p>→ No</p> <ul style="list-style-type: none"> - Vehicles without automatic transmission: GO to C6. - Vehicles with automatic transmission: GO to C4.
C3: ELIMINATE THE TRAILER CONTROL UNIT AS THE CAUSE FOR THE SHORT TO BATTERY VOLTAGE.	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse F59 (20 A) (CJB).</p> <p>3 Ignition switch in position II.</p> <p>4 CHECK the stop lamps.</p> <ul style="list-style-type: none"> • Do the stop lamps illuminate continuously? <p>→ Yes</p> <ul style="list-style-type: none"> - Vehicles without automatic transmission: GO to C6. - Vehicles with automatic transmission: GO to C4. <p>→ No RENEW the trailer control unit. CHECK the operation of the system.</p>
C4: RULE OUT TRANSMISSION SELECTOR LEVER ASSEMBLY AS POSSIBLE CAUSE FOR A SHORT TO BATTERY VOLTAGE	
	<p>1 Ignition switch in position 0.</p> <p>2 Connect Vehicles with trailer socket only: Fuse F59 (20 A) (CJB).</p> <p>3 Disconnect fuse F70 (10 A) (CJB).</p> <p>4 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 CHECK the stop lamps.</p> <ul style="list-style-type: none"> • Do the stop lamps illuminate continuously? <p>→ Yes GO to C5.</p> <p>→ No INSTALL A NEW transmission selector lever assembly. CHECK the operation of the system.</p>
C5: NARROW DOWN THE CAUSE OF THE SHORT TO BATTERY VOLTAGE	
	<p>1 Ignition switch in position 0.</p> <p>2 Connect fuse F70 (10 A) (CJB).</p> <p>3 Disconnect CJB from connector C102.</p> <p>4 Ignition switch in position II.</p> <p>5 CHECK the stop lamps.</p> <ul style="list-style-type: none"> • Do the stop lamps illuminate continuously? <p>→ Yes GO to C6.</p> <p>→ No LOCATE and RECTIFY the short to battery voltage in the circuits connected to the CJB, connector C102, pin 17 using the Wiring Diagrams. CHECK the operation of the system.</p>
C6: RULE OUT PCM AS POSSIBLE CAUSE FOR A SHORT TO BATTERY VOLTAGE	
	<p>1 Ignition switch in position 0.</p> <p>2 Connect Vehicles with trailer socket only: Fuse F59 (20 A) (CJB).</p> <p>3 Disconnect fuse F36 (10 A) (BJB).</p> <p>4 Disconnect fuse F75 (10 A) (CJB).</p> <p>5 Disconnect fuse F30 (3 A) (BJB).</p> <ul style="list-style-type: none"> - 1.6l Duratec 16V engine - 2.0l Duratorq TDCi Engine <p>6 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>7 CHECK the stop lamps.</p> <ul style="list-style-type: none"> • Do the stop lamps illuminate continuously? <p>→ Yes GO to C7.</p> <p>→ No INSTALL a new PCM. CHECK the operation of the system.</p>
C7: NARROW DOWN THE CAUSE OF THE SHORT TO BATTERY VOLTAGE	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Connect fuse F36 (10 A) (BJB).</p>
	<p>3 Connect fuse F75 (10 A) (CJB).</p>
	<p>4 Connect fuse F30 (3 A) (BJB).</p> <ul style="list-style-type: none"> - 1.6l Duratec 16V engine - 2.0l Duratorq TDCi Engine
	<p>5 Disconnect CJB from connector C96.</p>
	<p>6 Ignition switch in position II.</p>
	<p>7 CHECK the stop lamps.</p> <ul style="list-style-type: none"> • Do the stop lamps illuminate continuously? <p>→ Yes GO to C8.</p> <p>→ No LOCATE and RECTIFY the short to battery voltage in the circuits connected to the CJB, connector C96, pin 31 using the Wiring Diagrams. CHECK the operation of the system.</p>
C8: NARROW DOWN THE CAUSE OF THE SHORT TO BATTERY VOLTAGE	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect CJB from connector C100.</p>
	<p>3 Ignition switch in position II.</p>

417-01-28

Exterior Lighting

417-01-28

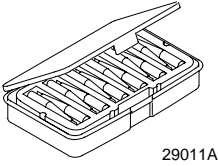
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 CHECK the stop lamps.</p> <ul style="list-style-type: none"> <li>• Do the stop lamps illuminate continuously? <p>→ Yes</p> <p>LOCATE and RECTIFY short to battery voltage in the circuits connected to soldered connection S112 with the aid of the wiring diagrams. CHECK the operation of the system. Vehicles with trailer hitch, CHECK the trailer socket and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No</p> <p>CHECK and if necessary INSTALL A NEW CJB. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING**Turn Signal and Hazard Lamps**

Refer to Wiring Diagrams Section 417-01, for schematic and connector information.

Special Tool(s)

 <p>29011A</p>	<p>Terminal Probe Kit 29-011A</p>
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General Equipment

Worldwide Diagnostic System (WDS)

Description of operation

A diagnosis of the generic electronic module (GEM) can be performed with WDS. Furthermore, an integrated service mode enables testing of the input and output signals without the need for further tools. To enable activation of service mode:

- switch off the ignition,
- switch off all other electrical consumers,
- apply the handbrake,
- shift to neutral
- and close the doors.

Activating the service mode

Proceed as follows to activate the service mode:

- OPERATE the switch of the heated rear window and HOLD IT THERE
- Turn on the ignition.
- RELEASE the switch of the heated rear window

A signal sounds and the turn signal lamps come on to indicate that service mode has been successfully activated.

NOTE: If the alarm is activated (in vehicles fitted with an anti-theft alarm system), service mode cannot be activated.

Inputs

SWITCH the windshield wiper switch to the "OFF" position to test the input signals. The following is a list of the switch signals to be tested, in no particular order:

- Turn signals (right, left, hazard warning lights)
- Windshield wiper stage I

- Windshield wiper stage II
- Windshield washer system
- Rear window wiper
- Rear window washer system
- Doors open/closed
- Remote control for central locking with double locking
- Hood open/closed (in vehicles equipped with an anti-theft alarm system)
- Tailgate open/closed
- A/C request signal
- Heated windscreen (if fitted)
- Parking Brake
- Brake reservoir fluid level
- Speed control system
- Autolamps
- Low beam
- High beam
- Headlamp flasher
- Marker Lamps
- Reversing lamp
- Liftgate release
- Ignition switch, terminal 15 (turn key to 0 position, then turn key to II position.)

An acoustic signal sounds and the turn signal lamps flash to indicate receipt of each input signal by the generic electronic module.

Test the windshield wiper "intermittent mode" stage input signal (only vehicles with adjustable intermittent mode)

The windshield wiper switch must be switched to "intermittent mode" in order to test the input signal. The delay times of the input signals can then be tested by operating the rotary switch. Each change of the rotary switch position is indicated by an acoustic signal and illumination of the turn signals.

Output signals

SWITCH the wiper switch to the "intermittent" position to test the output signals. PRESSING the heated rear window switch activates the output signals in the following order:

- a. Turn Indicator Left Hand
- b. Turn Indicator Right Hand
- c. High beam
- d. Low beam

DIAGNOSIS AND TESTING

- e. Windshield wiper stage I
- f. Windshield wiper stage II
- g. Heated rear window
- h. Heater blower motor
- i. Headlamp washer system (vehicles with gas discharge headlamps)
- j. Electric booster heater (if fitted)
- k. Automatic headlamps (if equipped)
- l. Alarm horn (vehicles with alarm system)
- m. Rear window wiper
- n. Rear heated window relay

When the heated rear window switch is pressed again, the test of the relevant signal is terminated. When the heated rear window switch is pressed once more, the test for the next signal in the list is started.

Ending the service mode

The GEM automatically ends service mode 20 seconds after the last input or at a driving speed of over 7 km/h. However, service mode can be manually ended at any time by proceeding as follows:

- OPERATE the switch of the heated rear window and HOLD IT THERE
- SWITCH OFF the ignition
- RELEASE the switch of the heated rear window

3 signals sound and the turn signal lamps illuminate to indicate that service mode has ended.

Reset service mode

If, after completion of service mode, some functions do not operate or do not operate properly, check the following functions:

- Instrument cluster illumination, side lamps and license plate lamp in autolamps mode
- Rear wiper
- Headlamp Washers
- Electric booster heater
- Active anti-theft sounder
- Heated windshield

If one or more of the listed functions is not OK, it's possible that the cause of the fault is due to not exiting service mode properly. To reactivate the functions correctly, perform the following steps:

1. SWITCH OFF the ignition
2. SWITCH OFF the switch for the windscreen wash/wipe system

3. OPERATE the switch of the heated rear window and HOLD IT THERE
4. Turn on the ignition.
5. RELEASE the heated rear window switch (an acoustic signal will sound if activation has been performed correctly)
6. SWITCH the windscreen wash/wipe switch to the "Intermittent wipe" position
7. OPERATE the heated rear window switch 6 times (the main beam headlamps switch on and off)
8. SWITCH OFF the switch for the windscreen wash/wipe system
9. OPERATE the switch of the heated rear window and HOLD IT THERE
10. SWITCH OFF the ignition
11. RELEASE the heated rear window switch (three acoustic signals will sound if activation has been performed correctly)

After completion of the work, check all the functions.

Inspection and Testing

NOTE: The generic electronic module (GEM) forms part of the central junction box (CJB).

NOTE: If the generic electronic module (GEM) is changed, the new one must be configured. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module. REFER to:

Communications Network - 3-Door (418-00 Module Communications Network, Diagnosis and Testing),

Communications Network (418-00 Module Communications Network, Diagnosis and Testing),

Generic Electronic Module (GEM) (419-10 Multifunction Electronic Modules, Diagnosis and Testing).

NOTE: Before reading out the vehicle-specific data, remake all the electrical connections which were separated in the vehicle, so that communication between the module and WDS is ensured.

1. Verify the customer concern.
2. Visually inspect for obvious signs of electrical damage.

DIAGNOSIS AND TESTING**Visual Inspection**

Electrical
<ul style="list-style-type: none"> • Fuse(s) • Lamp(s) • Connector(s). • Switches • Wiring harness

3. Resolve any obvious causes or concerns found during the visual inspection before carrying out any further tests.
4. If the cause of the concern cannot be found by visual inspection, continue with the symptom chart.

Trouble Code Table - Generic Electronic Module (GEM)**Trouble Code Table - Generic Electronic Module (GEM)**

DTC	Description	Action
B1502	Circuit of left-hand turn signal lamp(s) faulty (short to ground).	GO to Pinpoint Test C.
B1506	Circuit of right-hand turn signal lamp(s) faulty (short to ground).	GO to Pinpoint Test C.
B1873	Circuit of turn signal lamp/hazard warning lamp faulty (short to ground)	GO to Pinpoint Test F.
B2898	Turn signal lamp(s) (right) (failure)	GO to Pinpoint Test B.
B2899	Turn signal lamp(s) (left) (failure)	GO to Pinpoint Test B.

Symptom Chart**Symptom Chart**

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • All turn signal lamps inoperative 	<ul style="list-style-type: none"> • Fuse(s) • Circuit(s) • Steering column multifunction switch • Central junction box (CJB) • Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.
<ul style="list-style-type: none"> • All turn signal lamps illuminate continuously 	<ul style="list-style-type: none"> • Central junction box (CJB) • Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> • CHECK the generic electronic module (GEM) using WDS, and INSTALL a new one if necessary. CHECK the operation of the system.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> One/several turn signal lamps are inoperative 	<ul style="list-style-type: none"> Circuit(s) Headlamp Turn signal lamp (side) Integrated turn signal lamp in the exterior mirror Rear lamp cluster(s) Turn signal lamp(s) (rear) Steering column multifunction switch. Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
<ul style="list-style-type: none"> Left-hand or right-hand turn signal lamps flash continuously 	<ul style="list-style-type: none"> Circuit(s) Steering column multifunction switch Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test C.
<ul style="list-style-type: none"> Left-hand or right-hand turn signal lamps illuminate continuously 	<ul style="list-style-type: none"> Circuit(s) Headlamp Turn signal lamp (side) Integrated turn signal lamp in the exterior mirror Rear lamp assembly Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test D.
<ul style="list-style-type: none"> The hazard warning light is inoperative 	<ul style="list-style-type: none"> Fuse(s) Circuit(s) Hazard warning light switch Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test E.
<ul style="list-style-type: none"> The hazard warning light flashes continuously 	<ul style="list-style-type: none"> Circuit(s) Hazard warning light switch Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test F.

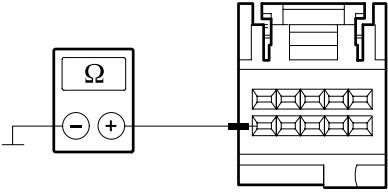
System Check

NOTE: Use a digital multimeter for all electrical measurements.

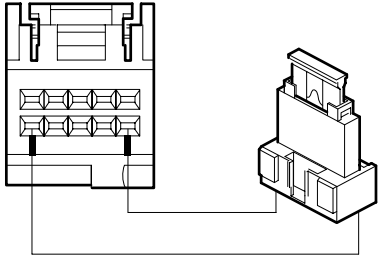
PINPOINT TEST D : ALL TURN SIGNAL LAMPS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK GROUND CONNECTION TO STEERING COLUMN MULTIFUNCTION SWITCH	
	1 Ignition switch in position 0.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038452</p>	<p>2 Disconnect steering column multifunction switch from connector C459.</p> <p>3 Measure the resistance between the steering column multifunction switch, connector C459, pin 10, circuit 91-LG27 (BK/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes GO to A2.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the steering column multifunction switch and soldered connection S12 using the Wiring Diagrams. CHECK the operation of the system.</p>

A2: CHECK STEERING COLUMN MULTIFUNCTION SWITCH

 <p>VFE0038506</p>	<p>1 Connect a fused jumper wire (10 A) to the steering column multifunction switch, connector C459, between pin 6, circuit 91S-LG1 (BK/YE) and pin 10, circuit 91-LG27 (BK/GN), wiring harness side.</p>
	<p>2 Ignition switch in position II.</p> <p>3 CHECK left-hand turn signal lamp operation.</p> <ul style="list-style-type: none"> Are the left-hand turn signal lamps flashing? <p>→ Yes INSTALL a new steering column multifunction switch. CHECK the operation of the system.</p> <p>→ No CHECK and if necessary RENEW the CJB. CHECK the operation of the system.</p>

PINPOINT TEST E : ONE/SEVERAL TURN SIGNAL LAMPS ARE INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: DETERMINE THE FAULT CONDITION	
	<p>1 Ignition switch in position II.</p>



DIAGNOSIS AND TESTING

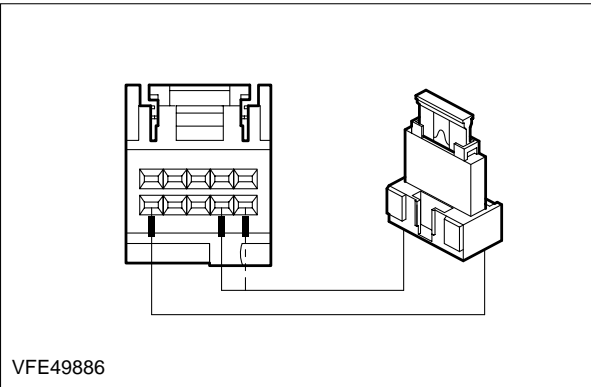
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	2 DETERMINE inoperative turn signal lamp(s).
	3 SWITCH ON the left-hand turn signal lamps.



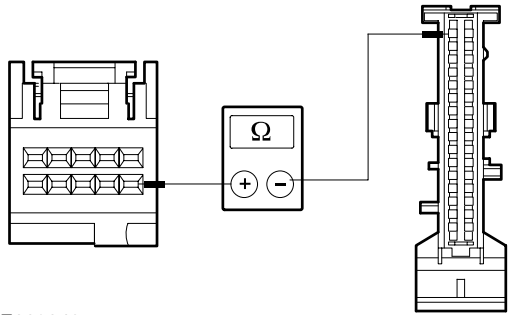
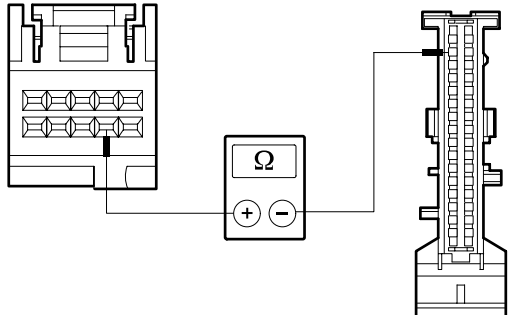
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 SWITCH ON the right-hand turn signal lamps.</p> <ul style="list-style-type: none"> • Is one left-hand turn signal lamp inoperative? <ul style="list-style-type: none"> → Yes <ul style="list-style-type: none"> - All left-hand turn signal lamps are inoperative: GO to B2. - Left-hand front turn signal lamp and left-hand (side) turn signal lamp are inoperative: GO to B5. - Left-hand rear turn signal lamp is inoperative: GO to B7. - Left-hand front turn signal lamp is inoperative: GO to B13. - Integrated turn signal lamp in the left-hand exterior mirror inoperative, Focus ST model variant without global closing function only: GO to B20. - Integrated turn signal lamp in the left-hand exterior mirror inoperative, Focus ST model variant with global closing function only: GO to B24. - Integrated turn signal lamp in the left-hand exterior mirror is inoperative, Cabriolet: GO to B24. - Rear left-hand turn signal lamp and integrated turn signal lamp in the left-hand exterior mirror inoperative, Focus ST model variant without global closing function only: GO to B22. - Left-hand (side) turn signal lamp inoperative: all Focus ST model variants: GO to B17. → No <ul style="list-style-type: none"> - All right-hand turn signal lamps are inoperative: GO to B2. - Right-hand front turn signal lamp and right-hand (side) turn signal lamp are inoperative: GO to B37. - Right-hand rear turn signal lamp is inoperative: GO to B39. - Right-hand front turn signal lamp is inoperative: GO to B45. - Integrated turn signal lamp in the right-hand exterior mirror inoperative, Focus ST model variant without global closing function only: GO to B52. - Integrated turn signal lamp in the right-hand exterior mirror inoperative, Focus ST model variant with global closing function only: GO to B55. - Integrated turn signal lamp in the left-hand exterior mirror is inoperative, Cabriolet: GO to B55.

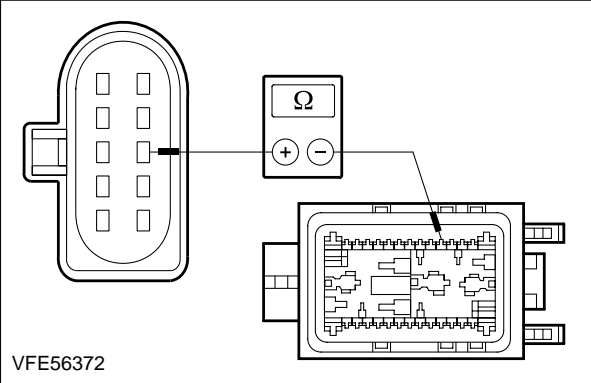
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<ul style="list-style-type: none"> - Rear right-hand turn signal lamp and integrated turn signal lamp in the right-hand exterior mirror inoperative, Focus ST model variant without global closing function only: GO to B68. - Right-hand (side) turn signal lamp inoperative: all Focus ST model variants: GO to B49.
B2: CHECK STEERING COLUMN MULTIFUNCTION SWITCH	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect steering column multifunction switch from connector C459.</p>
 <p>VFE49886</p>	<p>3 Fused jumper wire (10A) onto the steering column multifunction switch, connector C459, between pin 10, circuit 91-LG27 (BK/GN), wiring harness side and:</p> <ul style="list-style-type: none"> - Left-hand turn signal lamps inoperative: Connect pin 6, circuit 91S-LG1 (BK/YE), wiring harness side. - Right-hand turn signal lamps inoperative: Connect pin 7, circuit 91S-LG2 (BK/BU), wiring harness side.
	<p>4 Ignition switch in position II.</p>
	<p>5 CHECK the operation of the turn signal system.</p> <ul style="list-style-type: none"> • Do the affected turn signal lamps work now? <ul style="list-style-type: none"> → Yes INSTALL a new steering column multifunction switch. CHECK the operation of the system. → No <ul style="list-style-type: none"> - Left-hand turn signal lamps inoperative: GO to B3. - Right-hand turn signal lamps inoperative: GO to B4.
B3: CHECK LEFT-HAND TURN SIGNAL LAMP CONTROL CIRCUIT FOR OPEN CIRCUIT	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect CJB from connector C103.</p>

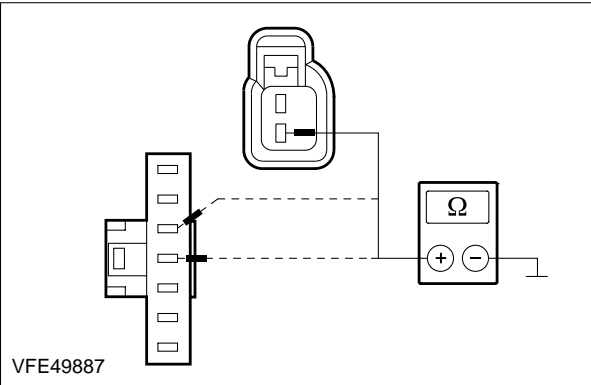
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038467</p>	<p>3 Measure the resistance between the CJB, connector C103, pin 32, circuit 91S-LG1 (BK/YE), wiring harness side and the steering column multifunction switch, connector C459, pin 6, circuit 91S-LG1 (BK/YE), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and the steering column multifunction switch using the Wiring Diagrams. CHECK the operation of the system.
<p>B4: CHECK RIGHT-HAND TURN SIGNAL LAMP CONTROL CIRCUIT FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C103.</p>
 <p>VFE0038496</p>	<p>3 Measure the resistance between the CJB, connector C103, pin 31, circuit 91S-LG2 (BK/BU), wiring harness side and steering column multifunction switch, connector C459, pin 7, circuit 91S-LG2 (BK/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and the steering column multifunction switch using the Wiring Diagrams. CHECK the operation of the system.
<p>B5: CHECK THE COMMON GROUND OF THE LEFT-HAND TURN SIGNAL LAMPS FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position II.</p>

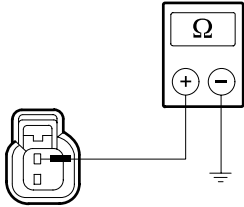
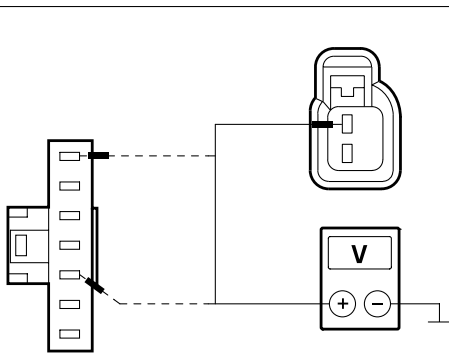
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 OPERATE the horn.</p> <ul style="list-style-type: none"> • Does the horn work? <p>→ Yes</p> <ul style="list-style-type: none"> - Vehicles built before 12/2005: GO to B6. - Vehicles built from 12/2005: CHECK and if necessary RENEW the CJB. CHECK the operation of the system. <p>→ No</p> <p>LOCATE and RECTIFY the break in circuit 31-DA3 (BK) between soldered connection S121 and ground G37 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B6: CHECK THE COMMON VOLTAGE SUPPLY OF THE LEFT-HAND TURN SIGNAL LAMPS FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C96.</p> <p>3 Disconnect left-hand headlamp from connector C836.</p>
 <p>VFE56372</p>	<p>4 Measure the resistance between the CJB, connector C96, pin 37, circuit 49S-LG11(A) (BU/OG), wiring harness side and the left-hand headlamp, connector C836, pin 3, circuit 49S-LG11(A) (BU/OG), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes</p> <p>CHECK and if necessary RENEW the CJB. CHECK the operation of the system.</p> <p>→ No</p> <p>LOCATE and RECTIFY the break in the circuit between the CJB and soldered connection S125 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B7: CHECK THE GROUND CONNECTION TO THE LEFT-HAND REAR LAMP ASSEMBLY/TURN SIGNAL LAMP</p>	
	<p>1 Ignition switch in position 0.</p>


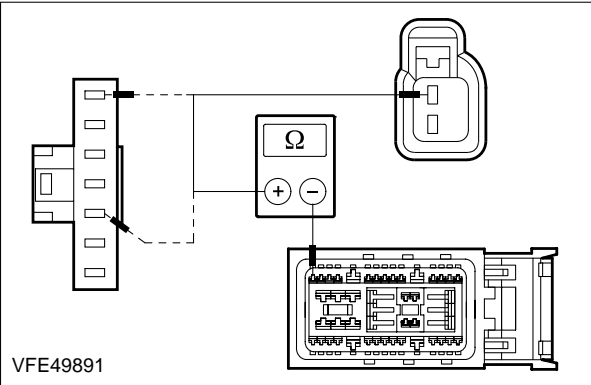
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect corresponding component.</p> <ul style="list-style-type: none"> - 3-door and 5-door versions, without trailer hitch: left-hand rear turn signal lamp from connector C461 - 3-door and 5-door versions, with trailer hitch: left-hand rear turn signal lamp from connector C2005 - 4-door and estate versions, without trailer hitch: left-hand rear lamp assembly from connector C476 - 4-door and estate versions, with trailer hitch: left-hand rear lamp assembly from connector C2035 - Cabriolet: left-hand rear turn signal lamp from connector C3931
 <p>VFE49887</p>	<p>3 All variants except Cabriolet: Measure the resistance between:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions, without trailer hitch: left-hand rear turn signal lamp, connector C461, pin 2, circuit 31-LG12(A) (BK), wiring harness side and ground. - 3-door and 5-door versions, with trailer hitch: left-hand rear turn signal lamp, connector C2005, pin 2, circuit (BK), wiring harness side and ground. - 4-door versions, without trailer hitch: left-hand rear lamp assembly, connector C476, pin 4, circuit 31-LF23 (C/D/E) (BK), wiring harness side and ground. - 4-door version, with trailer hitch: left-hand rear lamp assembly, connector C2035, pin 4, circuit 31-LF23 (GN), wiring harness side and ground. - Estate, without trailer hitch: left-hand rear lamp assembly, connector C476, pin 3, circuit 31-LF23 (BK), wiring harness side and ground. - Estate, with trailer hitch: left-hand rear lamp assembly, connector C2035, pin 3, circuit 31-LF23 (GN), wiring harness side and ground.

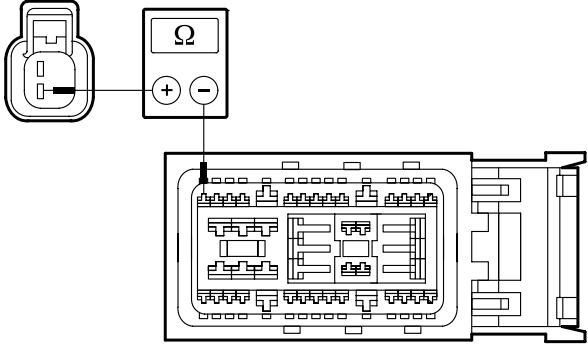
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0003021</p>	<p>4 Cabriolet: Measure the resistance between the left-hand rear turn signal lamp, connector C3931, pin 1, circuit 31-LF23C (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes <ul style="list-style-type: none"> - Focus ST model variant only, without global closing function: LOCATE and REPAIR the break in circuit 49S-LG12D (BU) between soldered connection S240 and the rear lamp assembly/turn signal lamp using the Wiring Diagrams. CHECK and INSTALL A NEW rear turn signal lamp if necessary. CHECK the operation of the system. - All other model variants: GO to B8. → No <ul style="list-style-type: none"> LOCATE and RECTIFY the break in the circuit(s) between the rear lamp assembly/turn signal lamp and ground connection G77 using the Wiring Diagrams. CHECK the operation of the system.
<p>B8: CHECK THE LEFT-HAND REAR LAMP ASSEMBLY/TURN SIGNAL LAMP</p>	
	<p>1 Ignition switch in position II.</p> <p>2 SWITCH ON the left-hand turn signal lamps.</p>
 <p>VFE49889</p>	<p>3 All variants except Cabriolet: Measure the voltage between:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions, without trailer hitch: left-hand rear turn signal lamp, connector C461, pin 1, circuit 49S-LG12 (BU), wiring harness side and ground. - 3-door and 5-door versions, with trailer hitch: left-hand rear turn signal lamp, connector C2005, pin 1, circuit (GY/WH), wiring harness side and ground. - 4-door version, without trailer hitch: left-hand rear lamp assembly, connector C476, pin 5, circuit 49S-LG12A (BU), wiring harness side and ground. - 4-door version, with trailer hitch: left-hand rear lamp assembly, connector C2035, pin 5, circuit 49S-LG12A (GY/WH), wiring harness side and ground. - Estate, without trailer hitch: left-hand rear lamp assembly, connector C476, pin 1, circuit 49S-LG12B (BU), wiring harness side and ground. - Estate, with trailer hitch: left-hand rear lamp assembly, connector C2035, pin 1, circuit 49S-LG12A (GY/WH), wiring harness side and ground.

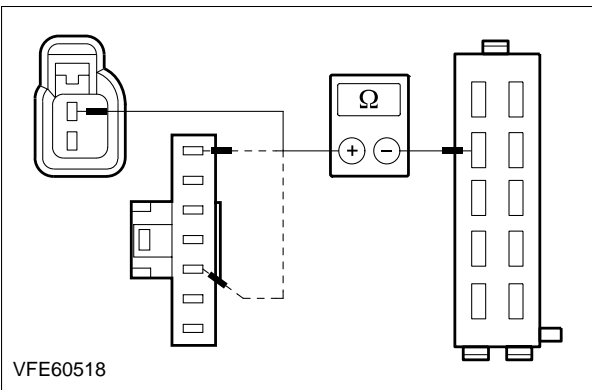
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0016137</p>	<p>4 Cabriolet: Measure the voltage between the left-hand rear turn signal lamp, connector C3931, pin 2, circuit 49S-LG12B (BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display fluctuating battery voltage? <p>→ Yes</p> <ul style="list-style-type: none"> - 3/5 door variants: CHECK and if necessary INSTALL A NEW rear turn signal lamp. CHECK the operation of the system. - 4-door and estate versions: CHECK and if necessary RENEW the rear lamp assembly. CHECK the operation of the system. - Cabriolet: CHECK and if necessary INSTALL A NEW rear turn signal lamp. CHECK the operation of the system. <p>→ No</p> <ul style="list-style-type: none"> - Vehicles without trailer hitch: GO to B9. - Vehicles with trailer hitch: GO to B10.
<p>B9: CHECK THE VOLTAGE SUPPLY TO THE LEFT-HAND REAR LAMP ASSEMBLY/TURN SIGNAL LAMP FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C100.</p>
 <p>VFE49891</p>	<p>3 All variants except Cabriolet: Measure the resistance between:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions: CJB, connector C100, pin 32, circuit 49S-LG12 (BU), wiring harness side and left-hand rear turn signal lamp, connector C461, pin 1, circuit 49S-LG12 (BU), wiring harness side. - 4-door: CJB, connector C100, pin 32, circuit 49S-LG12A (BU), wiring harness side and left-hand rear lamp assembly, connector C476, pin 5, circuit 49S-LG12A (BU), wiring harness side. - Wagon: CJB, connector C100, pin 32, circuit 49S-LG12B (BU), wiring harness side and left-hand rear lamp assembly, connector C476, pin 1, circuit 49S-LG12B (BU), wiring harness side.

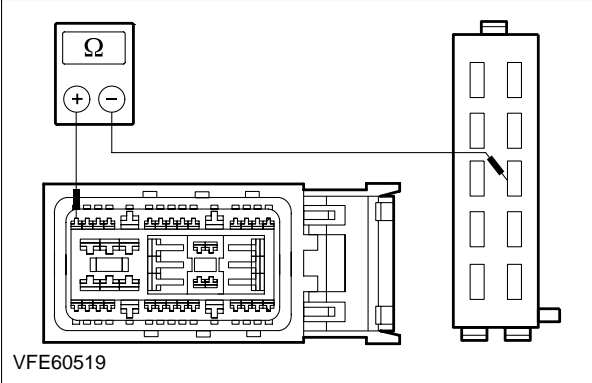
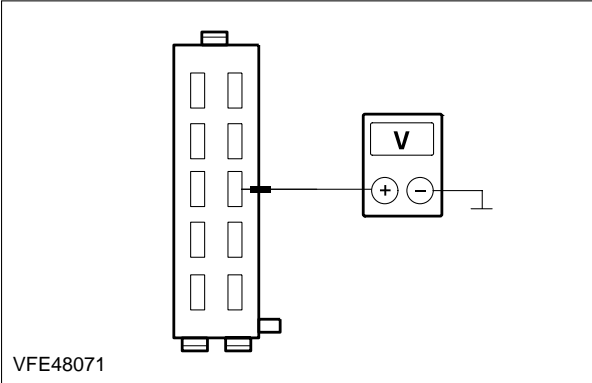
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83501</p>	<p>4 Cabriolet: Measure the resistance between the CJB, connector C100, pin 32, circuit 49S-LG12B (BU), wiring harness side and the left-hand rear turn signal lamp, connector C3931, pin 2, circuit 49S-LG12B (BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system. → No <ul style="list-style-type: none"> - 3/5 door variants: LOCATE and RECTIFY the break in the circuit between the CJB and the rear turn signal lamp using the Wiring Diagrams. CHECK the operation of the system. -4-door and estate versions: LOCATE and RECTIFY the break in the circuit between the CJB and the rear lamp assembly using the Wiring Diagrams. CHECK the operation of the system. - Cabriolet: LOCATE and RECTIFY the break in the circuit between the CJB and the rear turn signal lamp using the Wiring Diagrams. CHECK the operation of the system.
<p>B10: CHECK THE VOLTAGE SUPPLY TO THE LEFT-HAND REAR LAMP ASSEMBLY/TURN SIGNAL LAMP FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Trailer control unit from connector C2002.</p>

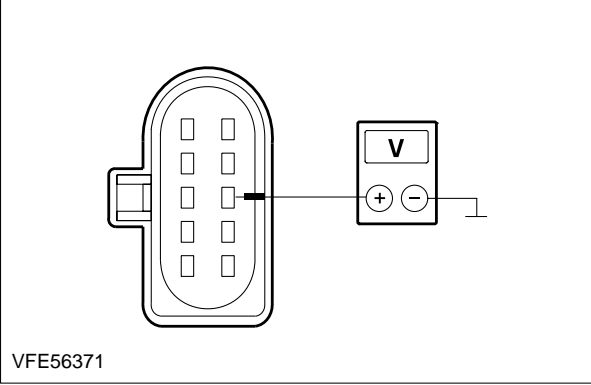
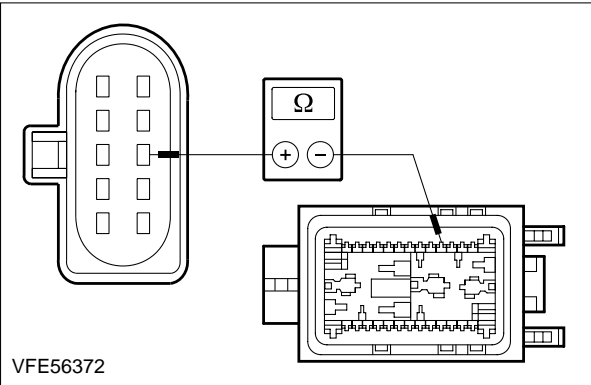
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE60518</p>	<p>3 Measure the resistance between:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions: trailer control unit, connector C2002, pin 8, circuit (GY/WH), wiring harness side and left-hand rear turn signal lamp, connector C2005, pin 1, circuit (GY/WH), wiring harness side. - 4-door version: trailer control unit, connector C2002, pin 8, circuit 49S-LG12A (GY/WH), wiring harness side and left-hand rear lamp assembly, connector C2035, pin 5, circuit 49S-LG12A (GY/WH), wiring harness side. - Estate: trailer control unit, connector C2002, pin 8, circuit 49S-LG12A (GY/WH), wiring harness side and left-hand rear lamp assembly, connector C2035, pin 1, circuit 49S-LG12A (GY/WH), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes GO to B11. → No LOCATE and RECTIFY the break in the circuit between the trailer control unit and the rear lamp assembly/turn signal lamp using the Wiring Diagrams. CHECK the operation of the system.
<p>B11: CHECK CONTROL CIRCUIT TO TRAILER CONTROL UNIT FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect CJB from connector C100.</p>

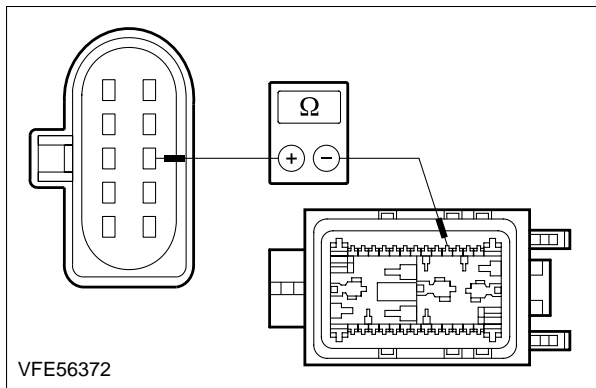
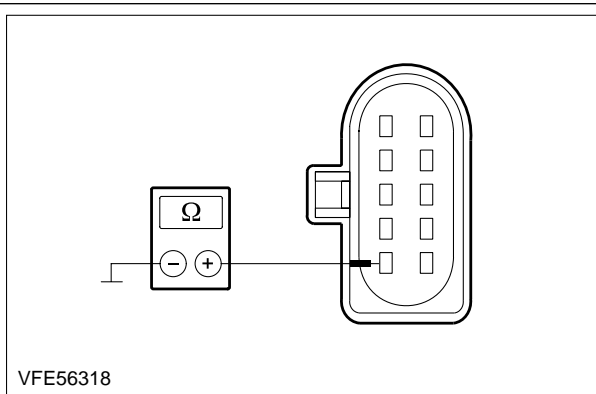
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE60519</p>	<p>3 Measure the resistance between:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions: CJB, connector C100, pin 32, circuit 49S-LG12 (BU), wiring harness side and trailer control unit, connector C2002, pin 5, circuit (WH), wiring harness side. - 4-door version: CJB, connector C100, pin 32, circuit 49S-LG12A (BU), wiring harness side and trailer control unit, connector C2002, pin 5, circuit 49S-LG12 (WH), wiring harness side. - Estate: CJB, connector C100, pin 32, circuit 49S-LG12B (BU), wiring harness side and trailer control unit, connector C2002, pin 5, circuit 49S-LG12 (WH), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes GO to B12. → No LOCATE and RECTIFY the break in the circuit between the CJB and the trailer control unit using the Wiring Diagrams. CHECK the operation of the system.
<p>B12: ELIMINATE THE GEM AS THE CAUSE OF THE FAULT</p>	
	<p>1 Connect CJB to connector C100.</p> <p>2 Ignition switch in position II.</p> <p>3 TURN ON the turn signal lamps, left-hand side.</p>
 <p>VFE48071</p>	<p>4 Measure the voltage between:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions: trailer control unit, connector C2002, pin 5, circuit (WH), wiring harness side and ground. - 4-door and estate versions: trailer control unit, connector C2002, pin 5, circuit 49S-LG12 (WH), wiring harness side and ground. <ul style="list-style-type: none"> • Does the meter display fluctuating battery voltage? <ul style="list-style-type: none"> → Yes RENEW the trailer control unit. CHECK the operation of the system. → No CHECK and if necessary RENEW the CJB. CHECK the operation of the system.
<p>B13: CHECK VOLTAGE SUPPLY TO FRONT LEFT-HAND TURN SIGNAL LAMP FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p>

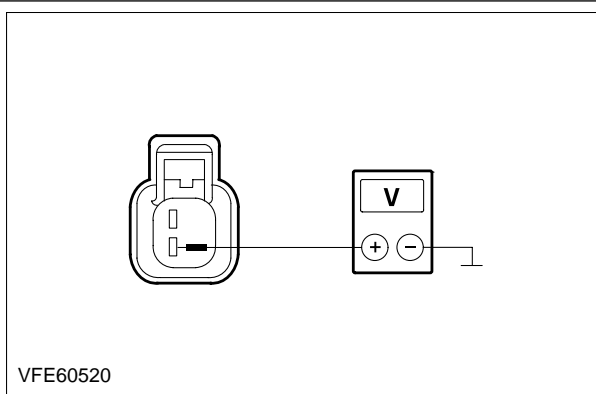
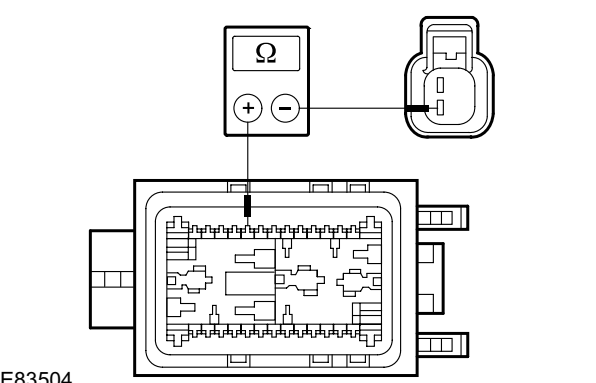
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<ol style="list-style-type: none"> 2 Disconnect left-hand headlamp from connector C836. 3 Ignition switch in position II. 4 SWITCH ON the left-hand turn signal lamps.
 <p>VFE56371</p>	<ol style="list-style-type: none"> 5 Measure the voltage between the left-hand headlamp, connector C836, pin 3, circuit 49S-LG11 (BU/OG), wiring harness side and ground. <ul style="list-style-type: none"> • Does the meter display fluctuating battery voltage? <ul style="list-style-type: none"> → Yes GO to B16. → No <ul style="list-style-type: none"> - Focus ST model variant only: GO to B15. - All other model variants, built before 12/2005: LOCATE and RECTIFY the break in the circuit between soldered connection S125 and the headlamp using the Wiring Diagrams. CHECK the operation of the system. - All other model variants, built from 12/2005: GO to B14.
B14: CHECK VOLTAGE SUPPLY TO FRONT LEFT-HAND TURN SIGNAL LAMP FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect CJB from connector C96.
 <p>VFE56372</p>	<ol style="list-style-type: none"> 3 Measure the resistance between the CJB, connector C96, pin 37, circuit 49S-LG11 (BU/OG), wiring harness side and the left-hand headlamp, connector C836, pin 3, circuit 49S-LG11 (BU/OG), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and the headlamp using the Wiring Diagrams. CHECK the operation of the system.
B15: CHECK VOLTAGE SUPPLY TO FRONT LEFT-HAND TURN SIGNAL LAMP FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect CJB from connector C96.

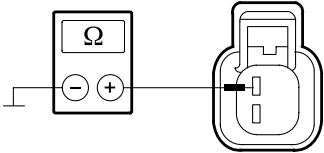
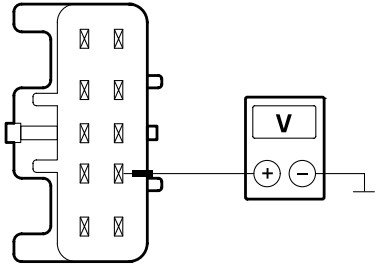
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE56372</p>	<p>3 Measure the resistance between the left-hand headlamp, connector C836, pin 3, circuit 49S-LG11 (BU/OG), wiring harness side and the CJB, connector C96, pin 37, CJB side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and the headlamp using the Wiring Diagrams. CHECK the operation of the system.
<p>B16: CHECK GROUND SUPPLY OF LEFT-HAND HEADLAMP FOR OPEN CIRCUIT</p>	
 <p>VFE56318</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the left-hand headlamp, connector C836, pin 6, circuit 31-LE31 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK and if necessary RENEW the headlamp. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the headlamp and soldered connection S121 using the Wiring Diagrams. CHECK the operation of the system.
<p>B17: CHECK VOLTAGE SUPPLY TO LEFT-HAND (SIDE) TURN SIGNAL LAMP FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect left-hand (side) turn signal lamp from connector C753.</p> <p>3 Ignition switch in position II.</p> <p>4 SWITCH ON the left-hand turn signal lamps.</p>

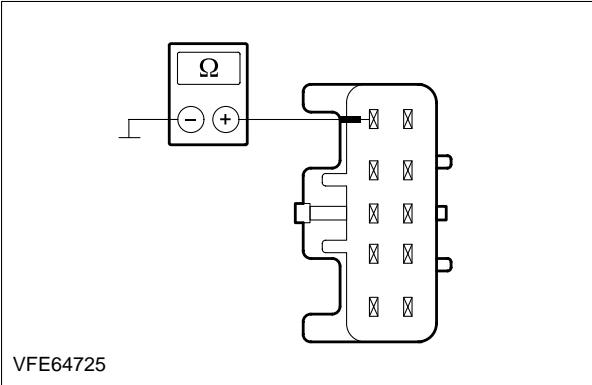
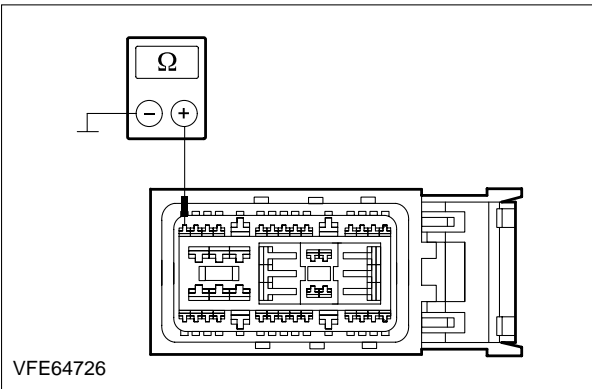
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE60520</p>	<p>5 Measure the voltage between the left-hand (side) turn signal lamp, connector C753, pin 2, circuit 49S-LG13 (BU/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display fluctuating battery voltage? <p>→ Yes GO to B19.</p> <p>→ No</p> <ul style="list-style-type: none"> Vehicles built before 12/2005: LOCATE and RECTIFY the break in the circuit between soldered connection S125 and the turn signal lamp (side) using the Wiring Diagrams. CHECK the operation of the system. Vehicles built from 12/2005: GO to B18.
<p>B18: CHECK VOLTAGE SUPPLY TO LEFT-HAND (SIDE) TURN SIGNAL LAMP FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect CJB from connector C96.</p>
 <p>E83504</p>	<p>3 Measure the resistance between the CJB, connector C96, pin 32, circuit 49S-LG13 (BU/RD), wiring harness side and the left-hand (side) turn signal lamp, connector C753, pin 2, circuit 49S-LG13 (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the CJB and the (side) turn signal lamp using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B19: CHECK GROUND CONNECTION OF LEFT-HAND (SIDE) TURN SIGNAL LAMP FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE60521</p>	<p>2 Measure the resistance between left-hand (side) turn signal lamp, connector C753, pin 1, circuit 31-LG13 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? → Yes CHECK and if necessary INSTALL a new (side) turn signal lamp. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the (side) turn signal lamp and soldered connection S121 using the Wiring Diagrams. CHECK the operation of the system.
<p>B20: CHECK THE VOLTAGE SUPPLY TO THE INTEGRATED TURN SIGNAL LAMP IN THE LEFT-HAND EXTERIOR MIRROR FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Integrated turn signal lamp in the left-hand exterior mirror.</p> <ul style="list-style-type: none"> LHD: from connector C807 RHD: from connector C821 <p>3 Ignition switch in position II.</p> <p>4 TURN ON the turn signal lamps, left-hand side.</p>
 <p>VFE64724</p>	<p>5 Measure the voltage between the integrated turn signal lamp in the left-hand exterior mirror and</p> <ul style="list-style-type: none"> LHD: Connector C807, pin 7, circuit 49S-LG13A (BU/RD), wiring harness side and ground. RHD: Connector C821, pin 7, circuit 49S-LG20A (BU/WH), wiring harness side and ground. <ul style="list-style-type: none"> Does the meter display fluctuating battery voltage? → Yes GO to B21. → No LOCATE and RECTIFY the break in the circuit between soldered connection S240 and the integrated turn signal lamp in the exterior mirror using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B21: CHECK THE GROUND SUPPLY TO THE INTEGRATED TURN SIGNAL LAMP IN THE LEFT-HAND EXTERIOR MIRROR FOR OPEN CIRCUIT	
 <p>VFE64725</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Measure the resistance between the integrated turn signal lamp in the left-hand exterior mirror and <ul style="list-style-type: none"> - LHD: Connector C807, pin 5, circuit 31-LG13 (BK), wiring harness side and ground. - RHD: Connector C821, pin 5, circuit 31-LG20 (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the integrated turn signal side lamp in the exterior mirror. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the integrated turn signal lamp in the exterior mirror and ground connection G12 using the Wiring Diagrams. CHECK the operation of the system.
B22: CHECK THE VOLTAGE SUPPLY TO THE INTEGRATED TURN SIGNAL LAMP IN THE LEFT-HAND EXTERIOR MIRROR FOR OPEN CIRCUIT	
 <p>VFE64726</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect CJB rear left from connector C100. 3 Measure the resistance between the CJB, connector C100, pin 32, circuit 49S-LG12C (BU), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 10,000 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and soldered connection S20 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B23: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to B24.</p> <p>→ No GO to B26.</p>
B24: CHECK THE FUSE	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse.</p> <ul style="list-style-type: none"> - LHD: F134 (20 A) (CJB) - RHD: F106 (20 A) (CJB) <p>3 CHECK .</p> <ul style="list-style-type: none"> - LHD: Fuse F134 (20 A) (CJB) - RHD: Fuse F106 (20 A) (CJB) <ul style="list-style-type: none"> • Is the fuse OK.? <p>→ Yes GO to B25.</p> <p>→ No</p> <ul style="list-style-type: none"> - LHD: RENEW fuse F134 (20 A) (CJB) and CHECK the operation of the system. If fuse blows again, LOCATE and REMEDY the short to ground with the aid of the wiring diagrams. CHECK the operation of the system. - RHD: RENEW fuse F106 (20 A) (CJB) and CHECK the operation of the system. If fuse blows again, LOCATE and REMEDY the short to ground with the aid of the wiring diagrams. CHECK the operation of the system.
B25: CHECK THE VOLTAGE SUPPLY TO THE FUSE	
	<p>1 Connect Fuse.</p> <ul style="list-style-type: none"> - LHD: F134 (20 A) (CJB) - RHD: F106 (20 A) (CJB) <p>2 Ignition switch in position II.</p>

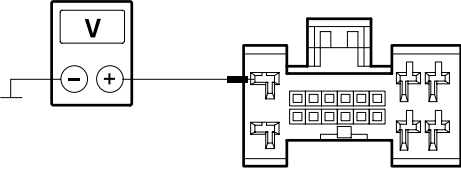
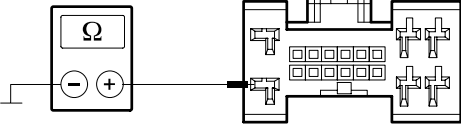
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between</p> <ul style="list-style-type: none"> - LHD: Fuse F134 (20 A) (CJB) and ground. - RHD: Fuse F106 (20 A) (CJB) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes Cabriolet: GO to B32. All other model variants: GO to B28.</p> <p>→ No</p> <ul style="list-style-type: none"> - LHD: LOCATE and RECTIFY the break in the voltage supply from fuse F134 (20 A) (CJB) using the Wiring Diagrams, if necessary CHECK and RENEW the CJB. CHECK the operation of the system. - RHD: LOCATE and RECTIFY the break in the voltage supply from fuse F106 (20 A) (CJB) using the Wiring Diagrams, if necessary CHECK and RENEW the CJB. CHECK the operation of the system.
B26: CHECK THE FUSE	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse.</p> <ul style="list-style-type: none"> - LHD: F55 (20 A) (CJB) - RHD: F41 (20 A) (CJB) <p>3 CHECK .</p> <ul style="list-style-type: none"> - LHD: Fuse F55 (20 A) (CJB) - RHD: Fuse F41 (20 A) (CJB) <ul style="list-style-type: none"> • Is the fuse OK.? <p>→ Yes GO to B27.</p> <p>→ No</p> <ul style="list-style-type: none"> - LHD: RENEW fuse F55 (20 A) (CJB) and CHECK the operation of the system. If fuse blows again, LOCATE and REMEDY the short to ground with the aid of the wiring diagrams. CHECK the operation of the system. - RHD: RENEW fuse F41 (20 A) (CJB) and CHECK the operation of the system. If fuse blows again, LOCATE and REMEDY the short to ground with the aid of the wiring diagrams. CHECK the operation of the system.
B27: CHECK THE VOLTAGE SUPPLY TO THE FUSE	
	<p>1 Connect Fuse.</p> <ul style="list-style-type: none"> - LHD: F55 (20 A) (CJB) - RHD: F41 (20 A) (CJB) <p>2 Ignition switch in position II.</p>

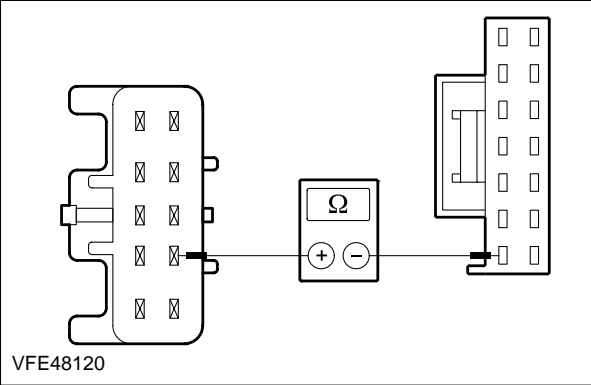
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between</p> <ul style="list-style-type: none"> - LHD: Fuse F55 (20 A) (CJB) and ground. - RHD: Fuse F41 (20 A) (CJB) and ground. <p>• Is battery voltage measured?</p> <p>→ Yes Cabriolet: GO to B32. All other model variants: GO to B28.</p> <p>→ No</p> <ul style="list-style-type: none"> - LHD: LOCATE and RECTIFY the break in the voltage supply from fuse F55 (20 A) (CJB) using the Wiring Diagrams, if necessary CHECK and RENEW the CJB. CHECK the operation of the system. - RHD: LOCATE and RECTIFY the break in the voltage supply from fuse F41 (20 A) (CJB) using the Wiring Diagrams, if necessary CHECK and RENEW the CJB. CHECK the operation of the system.
B28: CHECK VOLTAGE SUPPLY OF DOOR CONTROL MODULE FOR OPEN CIRCUIT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect corresponding component.</p> <ul style="list-style-type: none"> - LHD: driver's door control module from connector C729 - RHD: passenger door control module from connector C722 <p>3 Ignition switch in position II.</p>

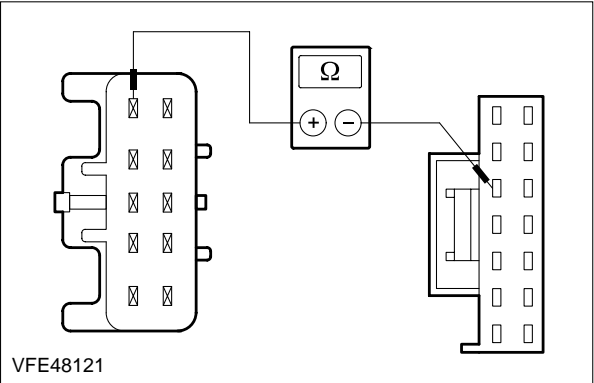
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038472</p>	<p>4 Measure the voltage between</p> <ul style="list-style-type: none"> - LHD: driver's door control module, connector C729, pin 9, circuit 29-AJ26 (OG/YE), wiring harness side and ground. - RHD: passenger door control module, connector C722, pin 9, circuit 29-AJ27 (OG/WH), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to B29.</p> <p>→ No</p> <ul style="list-style-type: none"> - LHD: LOCATE and RECTIFY the break in the circuit between fuse F55 (20 A) (CJB) and the driver's door control module using the Wiring Diagrams. CHECK the operation of the system. - RHD: LOCATE and RECTIFY the break in the circuit between fuse F41 (20 A) (CJB) and the passenger door control module using the Wiring Diagrams. CHECK the operation of the system.
<p>B29: CHECK THE GROUND SUPPLY TO THE DOOR MODULE FOR OPEN CIRCUIT</p>	
 <p>VFE0038473</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between:</p> <ul style="list-style-type: none"> - LHD: Driver's door control module, connector C729, pin 18, circuit 31-DA11A (BK), wiring harness side and ground. - RHD: Passenger door control module, connector C722, pin 18, circuit 31-DA12A (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes GO to B30.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the door control module and ground connection G12 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B30: CHECK THE VOLTAGE SUPPLY TO THE INTEGRATED TURN SIGNAL LAMP IN THE LEFT-HAND EXTERIOR MIRROR FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Integrated turn signal lamp in the left-hand exterior mirror.</p> <ul style="list-style-type: none"> - LHD: from connector C807 - RHD: from connector C821

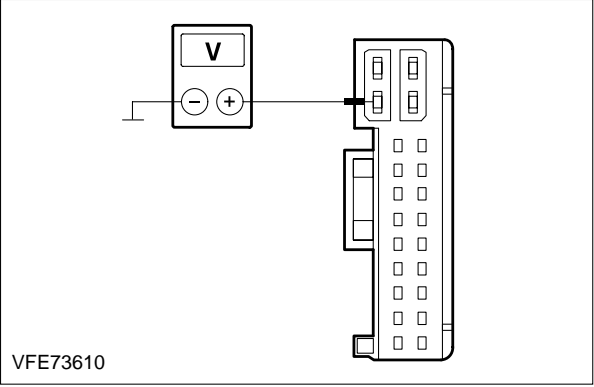
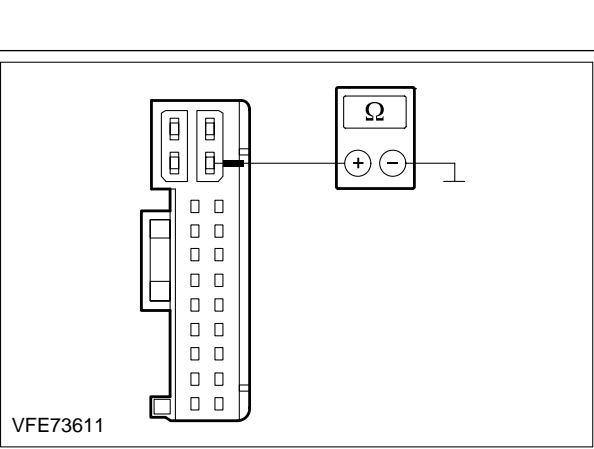
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Disconnect corresponding component.</p> <ul style="list-style-type: none"> - LHD: driver's door control module from connector C728 - RHD: passenger door control module from connector C723
 <p>VFE48120</p>	<p>4 Measure the resistance between:</p> <ul style="list-style-type: none"> - LHD: Driver's door control module, connector C728, pin 7, circuit 49S-LG13 (BU/RD), wiring harness side and integrated turn signal lamp in the exterior mirror, connector C807, pin 7, circuit 49S-LG13 (BU/RD), wiring harness side. - RHD: Passenger door control module, connector C723, pin 7, circuit 49S-LG20 (BU/WH), wiring harness side and integrated turn signal lamp in the exterior mirror, connector C821, pin 7, circuit 49S-LG20 (BU/WH), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes GO to B31. → No LOCATE and RECTIFY the break in the circuit between the door control module and the integrated turn signal lamp in the exterior mirror using the Wiring Diagrams. CHECK the operation of the system.

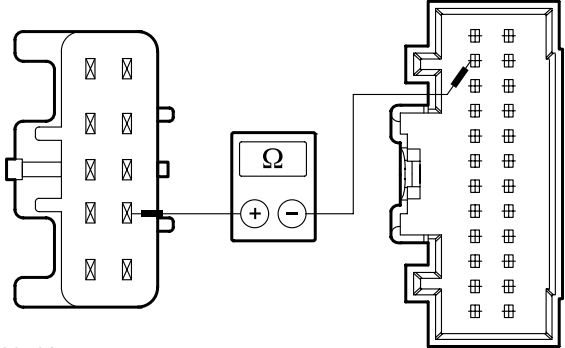
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>B31: CHECK THE GROUND SUPPLY TO THE INTEGRATED TURN SIGNAL LAMP IN THE LEFT-HAND EXTERIOR MIRROR FOR OPEN CIRCUIT</p>	
 <p>VFE48121</p>	<p>1 Measure the resistance between:</p> <ul style="list-style-type: none"> - LHD: Driver's door control module, connector C728, pin 3, circuit 31-HB35A (BK), wiring harness side and integrated turn signal lamp in the left-hand exterior mirror, connector C807, pin 5, circuit 31-HB35A (BK), wiring harness side. - RHD: Passenger door control module, connector C723, pin 3, circuit 31-HB36A (BK), wiring harness side and integrated turn signal lamp in the left-hand exterior mirror, connector C821, pin 5, circuit 31-HB36A (BK), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm registered? → Yes CHECK and if necessary RENEW the integrated turn signal side lamp in the exterior mirror. CHECK the operation of the system. If the concern persists: REFER to: Communications Network - 3-Door (418-00 Module Communications Network, Diagnosis and Testing). → No LOCATE and RECTIFY the break in the circuit between the door control module and the integrated turn signal lamp in the exterior mirror using the Wiring Diagrams. CHECK the operation of the system.
<p>B32: CHECK VOLTAGE SUPPLY OF DOOR CONTROL MODULE FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect corresponding component.</p> <ul style="list-style-type: none"> - LHD: driver's door control module from connector C734 - RHD: passenger door control module from connector C735 <p>3 Ignition switch in position II.</p>

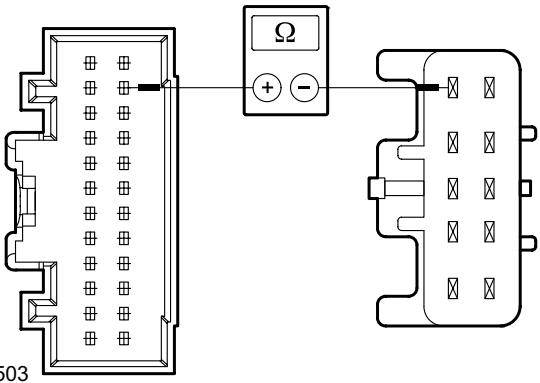
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE73610</p>	<p>4 Measure the voltage between</p> <ul style="list-style-type: none"> - LHD: driver's door control module, connector C734, pin 2, circuit 29-AJ26 (OG/YE), wiring harness side and ground. - RHD: passenger door control module, connector C735, pin 2, circuit 29-AJ27 (OG/WH), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to B33.</p> <p>→ No</p> <ul style="list-style-type: none"> - LHD: LOCATE and RECTIFY the break in the circuit between fuse F55 (20 A) (CJB) and the driver's door control module using the Wiring Diagrams. CHECK the operation of the system. - RHD: LOCATE and RECTIFY the break in the circuit between fuse F41 (20 A) (CJB) and the passenger door control module using the Wiring Diagrams. CHECK the operation of the system.
B33: CHECK THE GROUND SUPPLY TO THE DOOR MODULE FOR OPEN CIRCUIT	
 <p>VFE73611</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between:</p> <ul style="list-style-type: none"> - LHD: Driver's door control module, connector C734, pin 13, circuit 31-DA11C (BK), wiring harness side and ground. - RHD: Passenger door control module, connector C735, pin 13, circuit 31-DA12A (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes GO to B34.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the door control module and ground connection G12 using the Wiring Diagrams. CHECK the operation of the system.</p>

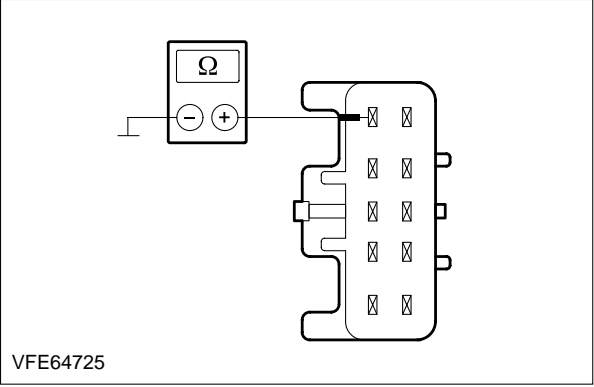
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B34: CHECK THE VOLTAGE SUPPLY TO THE INTEGRATED TURN SIGNAL LAMP IN THE LEFT-HAND EXTERIOR MIRROR FOR OPEN CIRCUIT	
	<p>1 Disconnect Integrated turn signal lamp in the left-hand exterior mirror.</p> <ul style="list-style-type: none"> - LHD, vehicles without electric mirror adjustment: from connector C802 - LHD, vehicles with electric mirror adjustment: from connector C807 - RHD, vehicles without electric mirror adjustment: from connector C804 - RHD, vehicles with electric mirror adjustment: from connector C821
 <p>E83502</p>	<p>2 Measure the resistance between:</p> <ul style="list-style-type: none"> - LHD, vehicles without electric mirror adjustment: Driver's door control module, connector C729, pin 11, circuit 49S-LG13 (BU/RD), wiring harness side and integrated turn signal lamp in the exterior mirror, connector C802, pin 7, circuit 49S-LG13 (BU/RD), wiring harness side. - LHD, vehicles with electric mirror adjustment: Driver's door control module, connector C729, pin 11, circuit 49S-LG13 (BU/WH), wiring harness side and integrated turn signal lamp in the exterior mirror, connector C807, pin 7, circuit 49S-LG13 (BU/RD), wiring harness side. - RHD, vehicles without electric mirror adjustment: Passenger door control module, connector C722, pin 11, circuit 49S-LG20 (BU/WH), wiring harness side and integrated turn signal lamp in the exterior mirror, connector C804, pin 7, circuit 49S-LG20 (BU/WH), wiring harness side. - RHD, vehicles with electric mirror adjustment: Passenger door control module, connector C722, pin 11, circuit 49S-LG20 (BU/WH), wiring harness side and integrated turn signal lamp in the exterior mirror, connector C821, pin 7, circuit 49S-LG20 (BU/WH), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes GO to B35. → No LOCATE and RECTIFY the break in the circuit between the door control module and the integrated turn signal lamp in the exterior mirror using the Wiring Diagrams. CHECK the operation of the system.

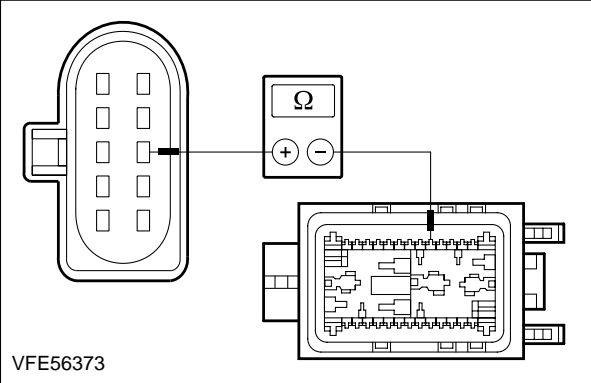
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>B35: CHECK THE GROUND SUPPLY TO THE INTEGRATED TURN SIGNAL LAMP IN THE LEFT-HAND EXTERIOR MIRROR FOR OPEN CIRCUIT</p>	
 <p>E83503</p>	<p>1 Measure the resistance between:</p> <ul style="list-style-type: none"> - LHD, vehicles without electric mirror adjustment: Driver's door control module, connector C729, pin 23, circuit 31-HB35A (BK), wiring harness side and integrated turn signal lamp in the left-hand exterior mirror, connector C802, pin 5, circuit 31-HB35A (BK), wiring harness side. - LHD, vehicles with electric mirror adjustment: Driver's door control module, connector C729, pin 23, circuit 31-HB35A (BK), wiring harness side and integrated turn signal lamp in the left-hand exterior mirror, connector C807, pin 5, circuit 31-HB35A (BK), wiring harness side. - RHD, vehicles without electric mirror adjustment: Passenger door control module, connector C722, pin 23, circuit 31-HB36A (BK), wiring harness side and integrated turn signal lamp in the left-hand exterior mirror, connector C804, pin 5, circuit 31-HB36A (BK), wiring harness side. - RHD, vehicles with electric mirror adjustment: Passenger door control module, connector C722, pin 23, circuit 31-HB36A (BK), wiring harness side and integrated turn signal lamp in the left-hand exterior mirror, connector C821, pin 5, circuit 31-HB36A (BK), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes GO to B36. → No LOCATE and RECTIFY the break in the circuit between the door control module and the integrated turn signal lamp in the exterior mirror using the Wiring Diagrams. CHECK the operation of the system.
<p>B36: CHECK THE GROUND SUPPLY TO THE INTEGRATED TURN SIGNAL LAMP IN THE LEFT-HAND EXTERIOR MIRROR FOR OPEN CIRCUIT</p>	
	<p>1 Connect Corresponding component in the left-hand exterior mirror.</p> <ul style="list-style-type: none"> - LHD: Driver's door control module to connectors C729 and C734 - RHD, passenger door control module to connectors C722 and C735

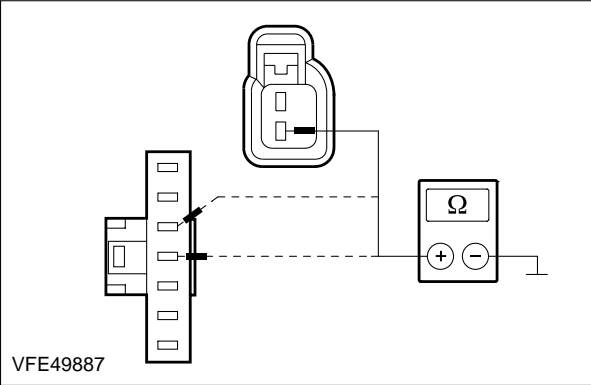
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE64725</p>	<p>2 Measure the resistance between:</p> <ul style="list-style-type: none"> - LHD, vehicles without electric mirror adjustment: integrated turn signal lamp in the exterior mirror, left-hand side, connector C802, pin 5, circuit 31-HB35A (BK), wiring harness side and ground. - LHD, vehicles with electric mirror adjustment: integrated turn signal lamp in the exterior mirror, left-hand side, connector C807, pin 5, circuit 31-HB35A (BK), wiring harness side and ground. - RHD, vehicles without electric mirror adjustment: integrated turn signal lamp in the exterior mirror, left-hand side, connector C804, pin 5, circuit 31-HB36A (BK), wiring harness side and ground. - RHD, vehicles with electric mirror adjustment: integrated turn signal lamp in the exterior mirror, left-hand side, connector C821, pin 5, circuit 31-HB36A (BK), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the integrated turn signal side lamp in the exterior mirror. CHECK the operation of the system. If the concern persists: REFER to: Communications Network - 3-Door (418-00 Module Communications Network, Diagnosis and Testing). → No <ul style="list-style-type: none"> - LHD: RENEW the drivers's door control module. CHECK the operation of the system. - RHD: RENEW the passenger door control module. CHECK the operation of the system.
<p>B37: CHECK THE COMMON GROUND CONNECTION OF RIGHT-HAND TURN SIGNAL LAMPS</p>	
	<p>1 Ignition switch in position II.</p>

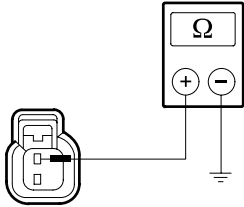
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 SWITCH ON windshield wipers.</p> <ul style="list-style-type: none"> • Do the wipers operate? <p>→ Yes Vehicles built before 12/2005: GO to B38. Vehicles built from 12/2005: CHECK and if necessary RENEW the CJB. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in circuit 31-DA4 (BK) between soldered connection S109 and ground G56 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B38: CHECK THE COMMON VOLTAGE SUPPLY OF THE RIGHT-HAND TURN SIGNAL LAMPS FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C96.</p> <p>3 Disconnect right-hand headlamp from connector C837.</p>
 <p>VFE56373</p>	<p>4 Measure the resistance between the CJB, connector C96, pin 36, circuit 49S-LG18 (BU), wiring harness side and the right-hand headlamp, connector C837, pin 3, circuit 49S-LG18 (BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the CJB and soldered connection S126 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B39: CHECK THE GROUND CONNECTION TO THE RIGHT-HAND REAR LAMP ASSEMBLY/TURN SIGNAL LAMP</p>	
	<p>1 Ignition switch in position 0.</p>

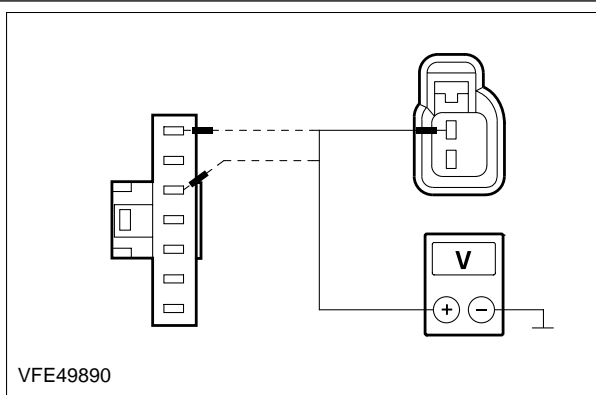
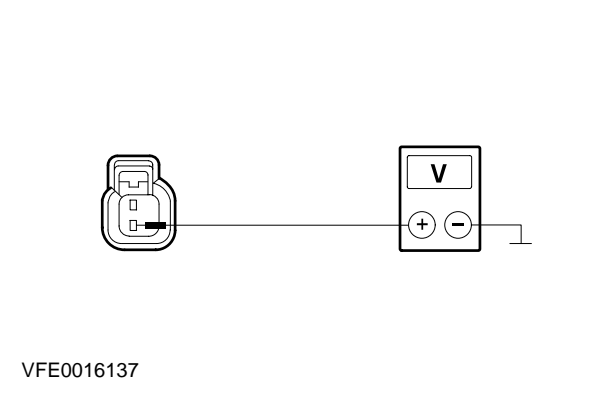
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect corresponding component.</p> <ul style="list-style-type: none"> - 3-door and 5-door versions, without trailer hitch: right-hand rear turn signal lamp from connector C462 - 3-door and 5-door versions, with trailer hitch: right-hand rear turn signal lamp from connector C2006 - 4-door and estate versions, without trailer hitch: right-hand rear lamp assembly from connector C477 - 4-door and estate versions, with trailer hitch: right-hand rear lamp assembly from connector C2037 - Cabriolet: right-hand rear turn signal lamp from connector C3932
 <p>VFE49887</p>	<p>3 All variants except Cabriolet: Measure the resistance between:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions, without trailer hitch: right-hand rear turn signal lamp, connector C462, pin 2, circuit 31-LG19 (BK), wiring harness side and ground. - 3-door and 5-door versions, with trailer hitch: right-hand rear turn signal lamp, connector C2006, pin 2, circuit (BK), wiring harness side and ground. - 4-door version, without trailer hitch: right-hand rear lamp assembly, connector C477, pin 4, circuit 31-LF23B (BK), wiring harness side and ground. - 4-door version, with trailer hitch: right-hand rear lamp assembly, connector C2037, pin 4, circuit 31-LF24A (GN), wiring harness side and ground. - Estate, without trailer hitch: right-hand rear lamp assembly, connector C477, pin 3, circuit 31-LF24A (BK), wiring harness side and ground. - Estate, with trailer hitch: right-hand rear lamp assembly, connector C2037, pin 3, circuit 31-LF24A (GN), wiring harness side and ground.

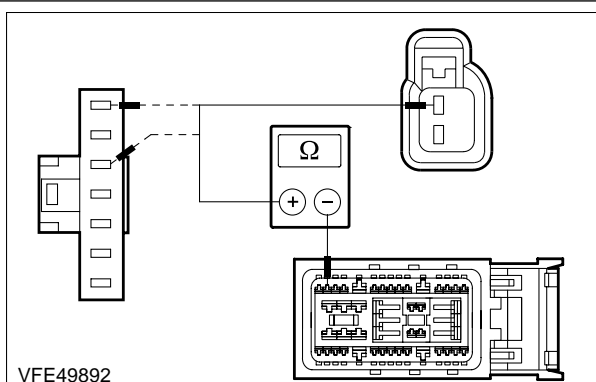
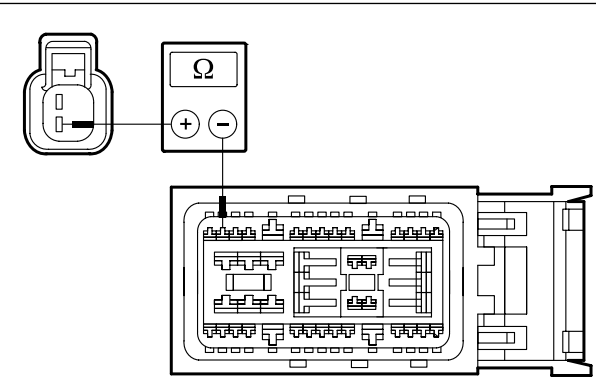
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0003021</p>	<p>4 Cabriolet: Measure the resistance between the right-hand rear turn signal lamp, connector C3932, pin 1, circuit 31-LF24C (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes</p> <ul style="list-style-type: none"> - Focus ST model variant without global closing function only: LOCATE and RECTIFY the break in circuit 49S-LG19D (BU/RD) between soldered connection S241 and the rear turn signal lamp using the Wiring Diagrams. CHECK and INSTALL A NEW rear turn signal lamp if necessary. CHECK the operation of the system. - All other model variants: GO to B40. <p>→ No</p> <p>LOCATE and RECTIFY the break in the circuits between the rear lamp assembly/turn signal lamp and ground connection G70 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B40: CHECK THE RIGHT-HAND REAR LAMP ASSEMBLY/TURN SIGNAL LAMP</p>	
	<p>1 Ignition switch in position II.</p> <p>2 SWITCH ON the right-hand turn signal lamps.</p>

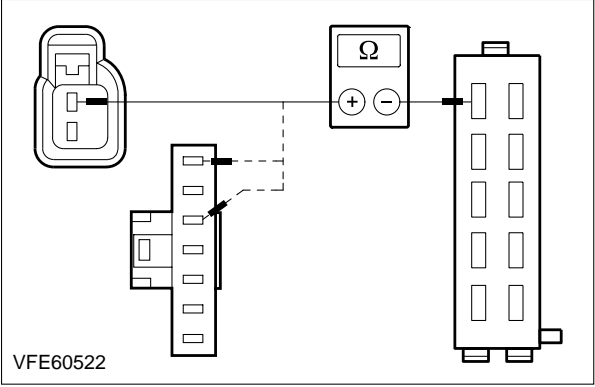
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE49890</p>	<p>3 All variants except Cabriolet: Measure the voltage between:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions, without trailer hitch: right-hand rear turn signal lamp, connector C462, pin 1, circuit 49S-LG19 (BU/RD), wiring harness side and ground. - 3-door and 5-door versions, with trailer hitch: right-hand rear turn signal lamp, connector C2006, pin 1, circuit (GN/YE), wiring harness side and ground. - 4-door version, without trailer hitch: right-hand rear lamp assembly, connector C477, pin 3, circuit 49S-LG19B (BU/RD), wiring harness side and ground. - 4-door version, with trailer hitch: right-hand rear lamp assembly, connector C2037, pin 3, circuit 49S-LG19A (GN/YE), wiring harness side and ground. - Estate, without trailer hitch: right-hand rear lamp assembly, connector C477, pin 1, circuit 49S-LG19A (BU/RD), wiring harness side and ground. - Estate, with trailer hitch: right-hand rear lamp assembly, connector C2037, pin 1, circuit 49S-LG19A (GN/YE), wiring harness side and ground.
 <p>VFE0016137</p>	<p>4 Cabriolet: Measure the voltage between the right-hand rear turn signal lamp, connector C3932, pin 2, circuit 49S-LG19A (BU/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display fluctuating battery voltage? → Yes CHECK and if necessary INSTALL a new rear lamp assembly/turn signal lamp. CHECK the operation of the system. → No <ul style="list-style-type: none"> - Vehicles without trailer hitch: GO to B41. - Vehicles with trailer hitch: GO to B42.
<p>B41: CHECK THE VOLTAGE SUPPLY TO THE RIGHT-HAND REAR LAMP ASSEMBLY/TURN SIGNAL LAMP FOR OPEN CIRCUIT</p>	
<p>1 Ignition switch in position 0.</p>	
<p>2 Disconnect CJB from connector C100.</p>	

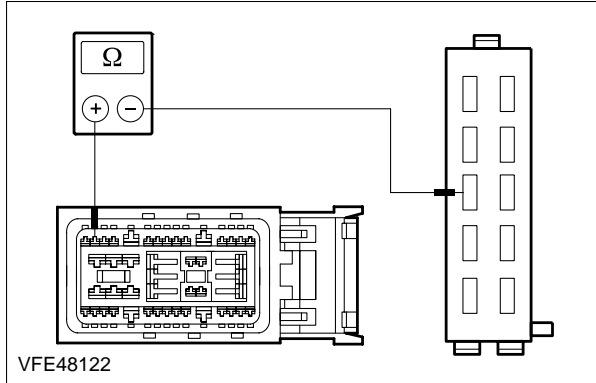
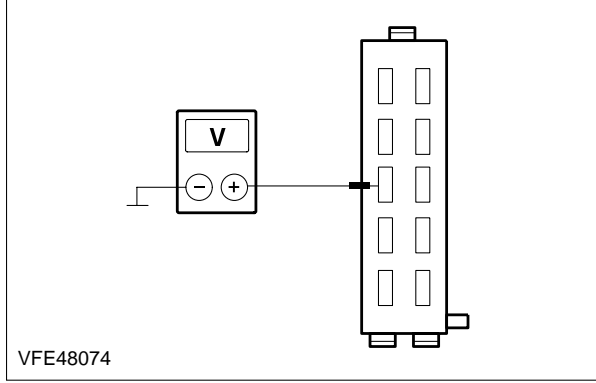
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE49892</p>	<p>3 All variants except Cabriolet: Measure the resistance between:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions: CJB, connector C100, pin 33, circuit 49S-LG19 (BU/RD) wiring harness side and right-hand rear turn signal lamp, connector C462, pin 1, circuit 49S-LG19 (BU/RD), wiring harness side. - 4-door: CJB, connector C100, pin 33, circuit 49S-LG19B (BU/RD) wiring harness side and right-hand rear lamp assembly, connector C477, pin 3, circuit 49S-LG19B (BU/RD), wiring harness side. - Wagon: CJB, connector C100, pin 33, circuit 49S-LG19A (BU/RD) wiring harness side and right-hand rear lamp assembly, connector C477, pin 1, circuit 49S-LG19A (BU/RD), wiring harness side.
 <p>E83505</p>	<p>4 Cabriolet: Measure the resistance between the CJB, connector C100, pin 33, circuit 49S-LG19A (BU/RD), wiring harness side and the right-hand rear turn signal lamp, connector C3932, pin 2, circuit 49S-LG19A (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and the rear turn signal lamp using the Wiring Diagrams. CHECK the operation of the system.
<p>B42: CHECK THE VOLTAGE SUPPLY OF THE REAR RIGHT-HAND TURN SIGNAL LAMP FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Trailer control unit from connector C2002.</p>

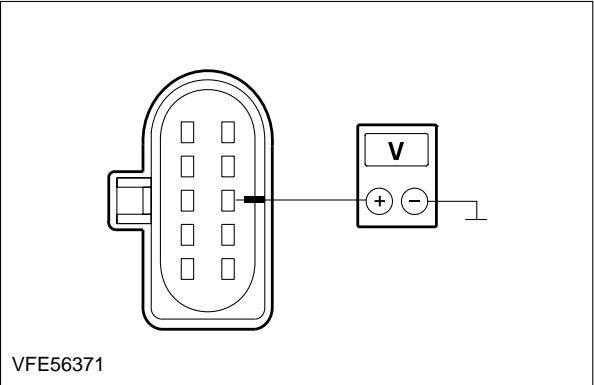
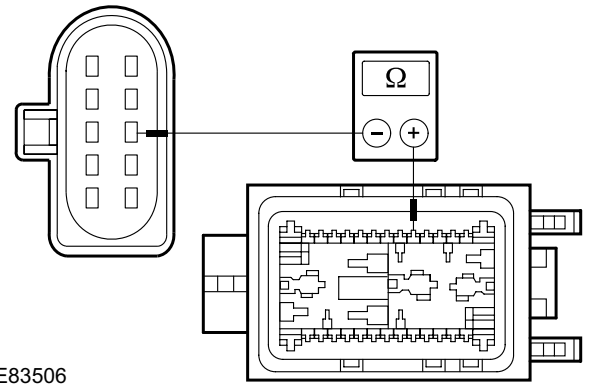
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE60522</p>	<p>3 Measure the resistance between:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions: trailer control unit, connector C2002, pin 10, circuit (GN/YE), wiring harness side and right-hand rear turn signal lamp, connector C2006, pin 1, circuit (GN/YE), wiring harness side. - 4-door: trailer control unit, connector C2002, pin 10, circuit 49S-LG19A (GN/YE), wiring harness side and right-hand rear lamp assembly, connector C2037, pin 3, circuit 49S-LG19A (GN/YE), wiring harness side. - Wagon: trailer control unit, connector C2002, pin 10, circuit 49S-LG19A (GN/YE), wiring harness side and right-hand rear lamp assembly, connector C2037, pin 1, circuit 49S-LG19A (GN/YE), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes GO to B43. → No LOCATE and RECTIFY the break in the circuit between the trailer control unit and the rear lamp assembly/turn signal lamp using the Wiring Diagrams. CHECK the operation of the system.
<p>B43: CHECK THE CONTROL CIRCUIT TO THE TRAILER CONTROL UNIT FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect CJB from connector C100.</p>

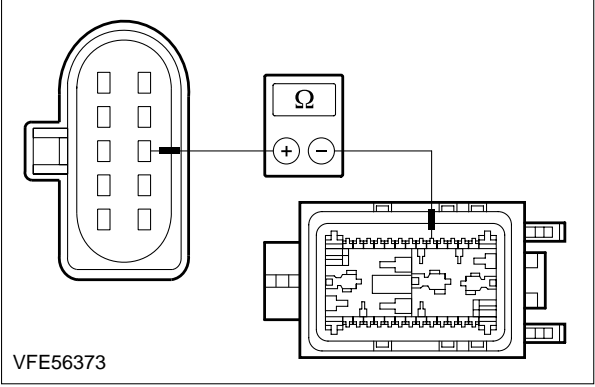
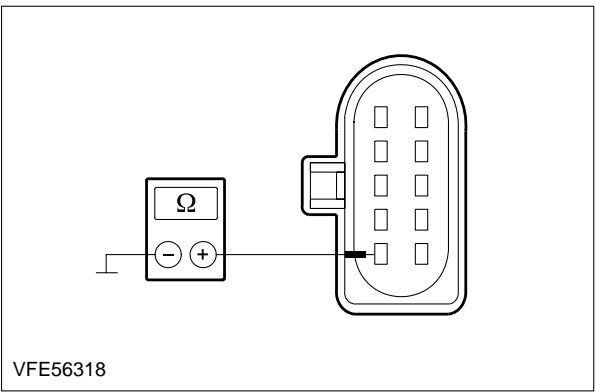
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE48122</p>	<p>3 Measure the resistance between:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions: CJB, connector C100, pin 33, circuit 49S-LG19 (BU/RD), wiring harness side and trailer control unit, connector C2002, pin 6, circuit (GN/RD), wiring harness side. - 4-door version: CJB, connector C100, pin 33, circuit 49S-LG19B (BU/RD), wiring harness side and trailer control unit, connector C2002, pin 6, circuit 49S-LG19 (GN/RD), wiring harness side. - Estate: CJB, connector C100, pin 33, circuit 49S-LG19A (BU/RD), wiring harness side and trailer control unit, connector C2002, pin 6, circuit 49S-LG19 (GN/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes GO to B44. → No LOCATE and RECTIFY the break in the circuit between the CJB and the trailer control unit using the Wiring Diagrams. CHECK the operation of the system.
<p>B44: ELIMINATE THE GEM AS THE CAUSE OF THE FAULT</p>	
	<p>1 Connect CJB to connector C100.</p> <p>2 Ignition switch in position II.</p> <p>3 TURN ON the turn signal lamps, right-hand side.</p>
 <p>VFE48074</p>	<p>4 Measure the voltage between:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions: trailer control unit, connector C2002, pin 6, circuit (GN/RD), wiring harness side and ground. - 4-door version: trailer control unit, connector C2002, pin 6, circuit 49S-LG19 (GN/RD), wiring harness side and ground. - Estate: trailer control unit, connector C2002, pin 6, circuit 49S-LG19 (GN/RD), wiring harness side and ground. <ul style="list-style-type: none"> • Does the meter display fluctuating battery voltage? <ul style="list-style-type: none"> → Yes RENEW the trailer control unit. CHECK the operation of the system. → No CHECK and if necessary RENEW the CJB. CHECK the operation of the system.

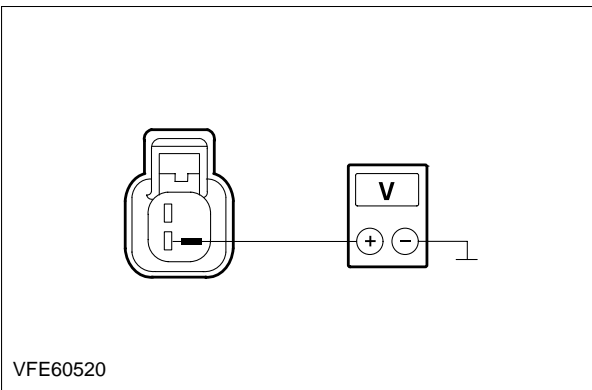
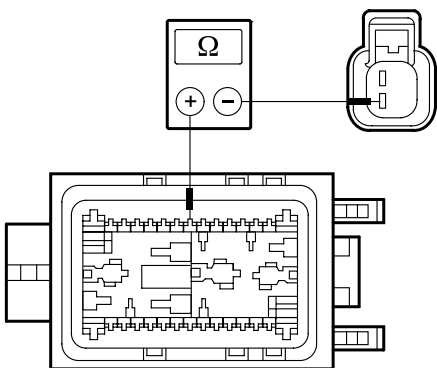
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B45: CHECK THE VOLTAGE SUPPLY TO THE FRONT RIGHT-HAND TURN SIGNAL LAMP FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect right-hand headlamp from connector C837. 3 Ignition switch in position II. 4 SWITCH ON the right-hand turn signal lamps.
 <p>VFE56371</p>	<ol style="list-style-type: none"> 5 Measure the voltage between the right-hand headlamp, connector C837, pin 3, circuit 49S-LG18 (BU), wiring harness side and ground. <ul style="list-style-type: none"> • Does the meter display fluctuating battery voltage? <ul style="list-style-type: none"> → Yes GO to B48. → No <ul style="list-style-type: none"> - Focus ST model variant only: GO to B47. - All other model variants, vehicles built before 12/2005: LOCATE and RECTIFY the break in the circuit between soldered connection S126 and the headlamp using the Wiring Diagrams. CHECK the operation of the system. - All other model variants, vehicles built from 12/2005: GO to B46.
B46: CHECK THE VOLTAGE SUPPLY TO THE FRONT RIGHT-HAND TURN SIGNAL LAMP FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect CJB from connector C96.
 <p>E83506</p>	<ol style="list-style-type: none"> 3 Measure the resistance between the CJB, connector C96, pin 36, circuit 49S-LG18 (BU), wiring harness side and the right-hand headlamp, connector C837, pin 3, circuit 49S-LG18 (BU), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and the headlamp using the Wiring Diagrams. CHECK the operation of the system.

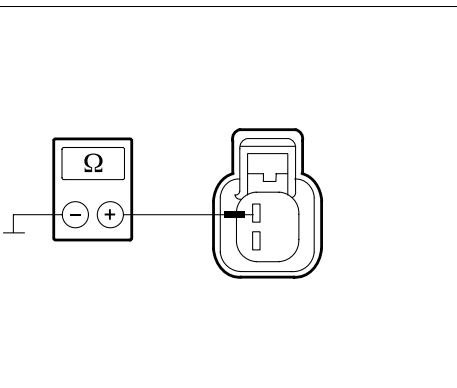
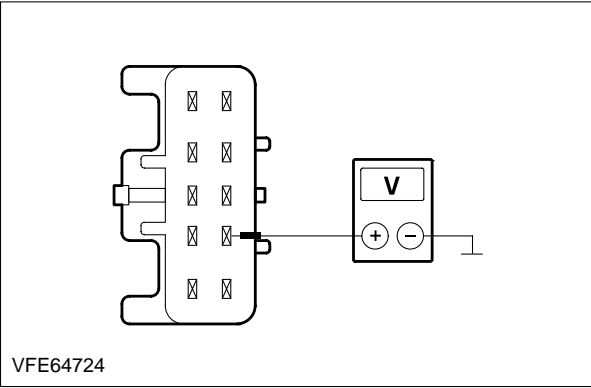
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B47: CHECK THE VOLTAGE SUPPLY TO THE FRONT RIGHT-HAND TURN SIGNAL LAMP FOR OPEN CIRCUIT	
 <p>VFE56373</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect CJB from connector C96. 3 Measure the resistance between the right-hand headlamp, connector C837, pin 3, circuit 49S-LG18 (BU), wiring harness side and the CJB, connector C96, pin 36, circuit 49S-LG18 (BU), CJB side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and the headlamp using the Wiring Diagrams. CHECK the operation of the system.
B48: CHECK THE GROUND CONNECTION TO THE RIGHT-HAND HEADLAMP FOR OPEN CIRCUIT	
 <p>VFE56318</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Measure the resistance between right-hand headlamp, connector C837, pin 6, circuit 31-LE30 (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the headlamp. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the headlamp and soldered connection S109 using the Wiring Diagrams. CHECK the operation of the system.
B49: CHECK THE VOLTAGE SUPPLY TO THE RIGHT-HAND TURN SIGNAL LAMP (SIDE) FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect right-hand (side) turn signal lamp from connector C754. 3 Ignition switch in position II. 4 SWITCH ON the right-hand turn signal lamps.

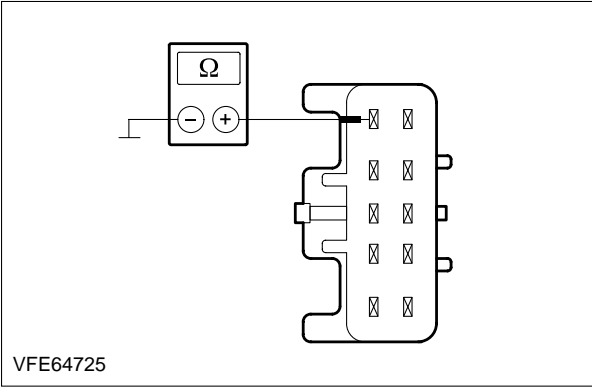
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE60520</p>	<p>5 Measure the voltage between right-hand (side) turn signal lamp, connector C754, pin 2, circuit 49S-LG20 (BU/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display fluctuating battery voltage? <p>→ Yes GO to B51.</p> <p>→ No</p> <ul style="list-style-type: none"> Vehicles built before 12/2005: LOCATE and RECTIFY the break in the circuit between the (side) turn signal lamp and soldered connection S126 using the wiring diagrams. CHECK the operation of the system. Vehicles built from 12/2005: GO to B50.
<p>B50: CHECK THE VOLTAGE SUPPLY TO THE RIGHT-HAND TURN SIGNAL LAMP (SIDE) FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C96.</p>
 <p>E83507</p>	<p>3 Measure the resistance between the CJB, connector C96, pin 34, circuit 49S-LG20 (BU/WH), wiring harness side and the left-hand (side) turn signal lamp, connector C754, pin 2, circuit 49S-LG20 (BU/WH), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the CJB and the (side) turn signal lamp using the Wiring Diagrams.</p>
<p>B51: CHECK THE GROUND CONNECTION OF THE RIGHT-HAND TURN SIGNAL LAMP (SIDE) FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE60521</p>	<p>2 Measure the resistance between right-hand (side) turn signal lamp, connector C754, pin 1, circuit 31-LG20 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes CHECK and if necessary INSTALL a new (side) turn signal lamp. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the (side) turn signal lamp and soldered connection S109 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B52: CHECK THE VOLTAGE SUPPLY TO THE INTEGRATED TURN SIGNAL LAMP IN THE RIGHT-HAND EXTERIOR MIRROR FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Integrated turn signal lamp in the right-hand exterior mirror.</p> <ul style="list-style-type: none"> – LHD: from connector C821 – RHD: from connector C807 <p>3 Ignition switch in position II.</p> <p>4 TURN ON the turn signal right-hand side.</p>
 <p>VFE64724</p>	<p>5 Measure the voltage between the integrated turn signal lamp in the right-hand exterior mirror and</p> <ul style="list-style-type: none"> – LHD: Connector C821, pin 7, circuit 49S-LG20A (BU/WH), wiring harness side and ground. – RHD: Connector C807, pin 7, circuit 49S-LG13A (BU/RD), wiring harness side and ground. <ul style="list-style-type: none"> • Does the meter display fluctuating battery voltage? <p>→ Yes GO to B53.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between soldered connection S241 and the integrated turn signal lamp in the exterior mirror using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B53: CHECK THE GROUND SUPPLY TO THE INTEGRATED TURN SIGNAL LAMP IN THE RIGHT-HAND EXTERIOR MIRROR FOR OPEN CIRCUIT	
 <p>VFE64725</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Measure the resistance between the integrated turn signal lamp in the right-hand exterior mirror and <ul style="list-style-type: none"> - LHD: Connector C821, pin 5, circuit 31-LG20 (BK), wiring harness side and ground. - RHD: Connector C807, pin 5, circuit 31-LG13 (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the integrated turn signal side lamp in the exterior mirror. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the integrated turn signal lamp in the exterior mirror and ground connection G53 using the Wiring Diagrams. CHECK the operation of the system.
B54: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> 1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <ul style="list-style-type: none"> → Yes GO to B55. → No GO to B57.
B55: CHECK THE FUSE	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Fuse. <ul style="list-style-type: none"> - LHD: F106 (20 A) (CJB) - RHD: F134 (20 A) (CJB)

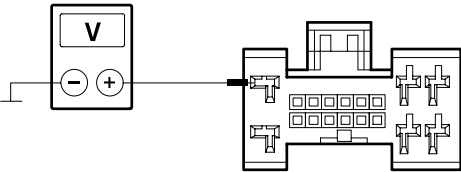
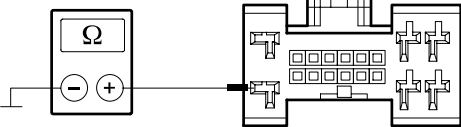
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 CHECK .</p> <ul style="list-style-type: none"> - LHD: Fuse F106 (20 A) (CJB) - RHD: Fuse F134 (20 A) (CJB) <ul style="list-style-type: none"> • Is the fuse OK.? <p>→ Yes GO to B56.</p> <p>→ No</p> <ul style="list-style-type: none"> - LHD: RENEW fuse F106 (20 A) (CJB) and CHECK the operation of the system. If fuse blows again, LOCATE and REMEDY the short to ground with the aid of the wiring diagrams. CHECK the operation of the system. - RHD: RENEW fuse F134 (20 A) (CJB) and CHECK the operation of the system. If fuse blows again, LOCATE and REMEDY the short to ground with the aid of the wiring diagrams. CHECK the operation of the system.
B56: CHECK THE VOLTAGE SUPPLY TO THE FUSE	
	<p>1 Connect Fuse.</p> <ul style="list-style-type: none"> - LHD: F106 (20 A) (CJB) - RHD: F134 (20 A) (CJB) <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between</p> <ul style="list-style-type: none"> - LHD: Fuse F106 (20 A) (CJB) and ground. - RHD: Fuse F134 (20 A) (CJB) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes</p> <ul style="list-style-type: none"> - Cabriolet: GO to B63. - All other model variants GO to B59. <p>→ No</p> <ul style="list-style-type: none"> - LHD: LOCATE and RECTIFY the break in the voltage supply from fuse F106 (20 A) (CJB) using the Wiring Diagrams, if necessary CHECK and RENEW the CJB. CHECK the operation of the system. - RHD: LOCATE and RECTIFY the break in the voltage supply from fuse F134 (20 A) (CJB) using the Wiring Diagrams, if necessary CHECK and RENEW the CJB. CHECK the operation of the system.
B57: CHECK THE FUSE	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse.</p> <ul style="list-style-type: none"> - LHD: F41 (20 A) (CJB) - RHD: F55 (20 A) (CJB)

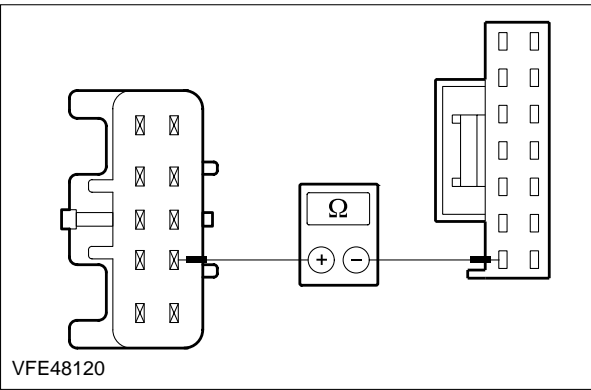
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 CHECK .</p> <ul style="list-style-type: none"> - LHD: Fuse F41 (20 A) (CJB) - RHD: Fuse F55 (20 A) (CJB) <p>• Is the fuse OK.?</p> <p>→ Yes GO to B58.</p> <p>→ No</p> <ul style="list-style-type: none"> - LHD: RENEW fuse F41 (20 A) (CJB) and CHECK the operation of the system. If fuse blows again, LOCATE and REMEDY the short to ground with the aid of the wiring diagrams. CHECK the operation of the system. - RHD: RENEW fuse F55 (20 A) (CJB) and CHECK the operation of the system. If fuse blows again, LOCATE and REMEDY the short to ground with the aid of the wiring diagrams. CHECK the operation of the system.
B58: CHECK THE VOLTAGE SUPPLY TO THE FUSE	
	<p>1 Connect Fuse.</p> <ul style="list-style-type: none"> - LHD: F41 (20 A) (CJB) - RHD: F55 (20 A) (CJB) <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between</p> <ul style="list-style-type: none"> - LHD: Fuse F41 (20 A) (CJB) and ground. - RHD: Fuse F55 (20 A) (CJB) and ground. <p>• Is battery voltage measured?</p> <p>→ Yes</p> <ul style="list-style-type: none"> - Cabriolet: GO to B63. - All other model variants GO to B59. <p>→ No</p> <ul style="list-style-type: none"> - LHD: LOCATE and RECTIFY the break in the voltage supply from fuse F41 (20 A) (CJB) using the Wiring Diagrams, if necessary CHECK and RENEW the CJB. CHECK the operation of the system. - RHD: LOCATE and RECTIFY the break in the voltage supply from fuse F55 (20 A) (CJB) using the Wiring Diagrams, if necessary CHECK and RENEW the CJB. CHECK the operation of the system.
B59: CHECK THE VOLTAGE SUPPLY TO THE DOOR MODULE FOR OPEN CIRCUIT	
	<p>1 Ignition switch in position 0.</p>

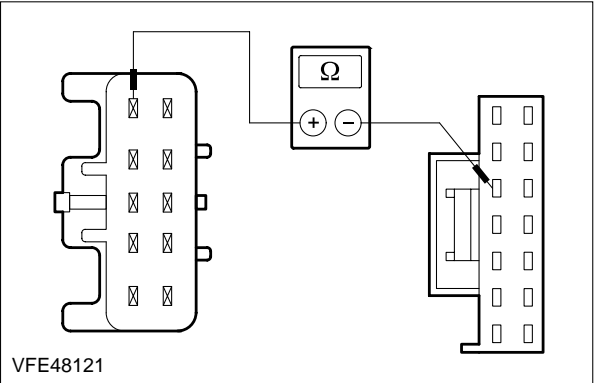
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect corresponding component.</p> <ul style="list-style-type: none"> - LHD: passenger door control module from connector C722 - RHD: driver's door control module from connector C729 <p>3 Ignition switch in position II.</p>
 <p>VFE0038472</p>	<p>4 Measure the voltage between</p> <ul style="list-style-type: none"> - LHD: passenger door control module, connector C722, pin 9, circuit 29-AJ27 (OG/WH), wiring harness side and ground. - RHD: driver's door control module, connector C729, pin 9, circuit 29-AJ26 (OG/YE), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to B60. → No <ul style="list-style-type: none"> - LHD: LOCATE and RECTIFY the break in the circuit between fuse F41 (20 A) (CJB) and the door control module using the Wiring Diagrams. CHECK the operation of the system. - RHD: LOCATE and RECTIFY the break in the circuit between fuse F55 (20 A) (CJB) and the door control module using the Wiring Diagrams. CHECK the operation of the system.
<p>B60: CHECK THE GROUND SUPPLY TO THE DOOR MODULE FOR OPEN CIRCUIT</p>	
 <p>VFE0038473</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between:</p> <ul style="list-style-type: none"> - LHD: Passenger door control module, connector C722, pin 18, circuit 31-DA12A (BK), wiring harness side and ground. - RHD: Driver's door control module, connector C729, pin 18, circuit 31-DA11A (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes GO to B61. → No LOCATE and RECTIFY the break in the circuit between the door control module and ground connection G53 using the Wiring Diagrams. CHECK the operation of the system.

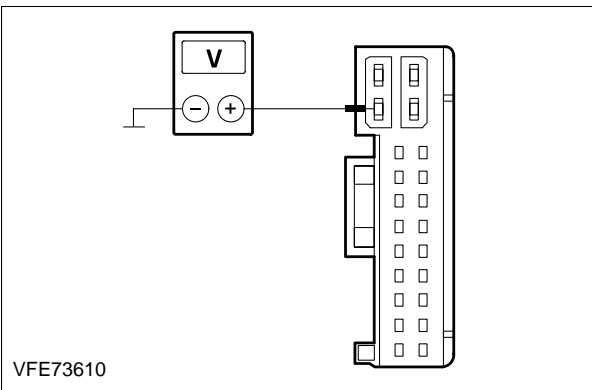
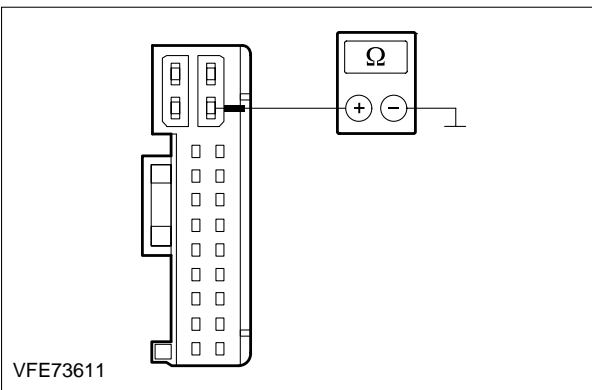
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B61: CHECK THE VOLTAGE SUPPLY TO THE INTEGRATED TURN SIGNAL LAMP IN THE RIGHT-HAND EXTERIOR MIRROR FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 Disconnect Integrated turn signal lamp in the exterior mirror. <ul style="list-style-type: none"> <li>– LHD: from connector C821 <li>– RHD: from connector C807 <li>3 Disconnect corresponding component. <ul style="list-style-type: none"> <li>– LHD: passenger door control module from connector C723 <li>– RHD: driver's door control module from connector C728
 <p>VFE48120</p>	<ol style="list-style-type: none"> <li>4 Measure the resistance between: <ul style="list-style-type: none"> <li>– LHD: Passenger door control module, connector C723, pin 7, circuit 49S-LG20 (BU/WH), wiring harness side and integrated turn signal lamp in the exterior mirror, connector C821, pin 7, circuit 49S-LG20 (BU/WH), wiring harness side. <li>– RHD: Driver's door control module, connector C728, pin 7, circuit 49S-LG13 (BU/RD), wiring harness side and integrated turn signal lamp in the exterior mirror, connector C807, pin 7, circuit 49S-LG13 (BU/RD), wiring harness side. <ul style="list-style-type: none"> <li>• Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> <li>→ Yes GO to B62. <li>→ No LOCATE and RECTIFY the break in the circuit between the door control module and the integrated turn signal lamp in the exterior mirror using the Wiring Diagrams. CHECK the operation of the system.

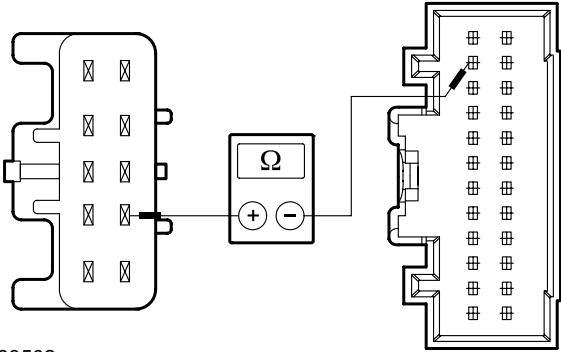
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B62: CHECK THE GROUND SUPPLY TO THE INTEGRATED TURN SIGNAL LAMP IN THE RIGHT-HAND EXTERIOR MIRROR FOR OPEN CIRCUIT	
 <p>VFE48121</p>	<ol style="list-style-type: none"> 1 Measure the resistance between: <ul style="list-style-type: none"> - LHD: Passenger door control module, connector C723, pin 3, circuit 31-HB36A (BK), wiring harness side and integrated turn signal lamp in the exterior mirror, connector C821, pin 5, circuit 31-HB36A (BK), wiring harness side. - RHD: Driver's door control module, connector C728, pin 3, circuit 31-HB35A (BK), wiring harness side and integrated turn signal lamp in the exterior mirror, connector C807, pin 5, circuit 31-HB35A (BK), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the integrated turn signal side lamp in the exterior mirror. CHECK the operation of the system. If the concern persists: REFER to: Communications Network - 3-Door (418-00 Module Communications Network, Diagnosis and Testing). → No LOCATE and RECTIFY the break in the circuit between the door control module and the integrated turn signal lamp in the exterior mirror using the Wiring Diagrams. CHECK the operation of the system.
B63: CHECK THE VOLTAGE SUPPLY TO THE RIGHT-HAND DOOR CONTROL MODULE FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect corresponding component. <ul style="list-style-type: none"> - LHD: passenger door control module from connector C735 - RHD: driver's door control module from connector C734 3 Ignition switch in position II.

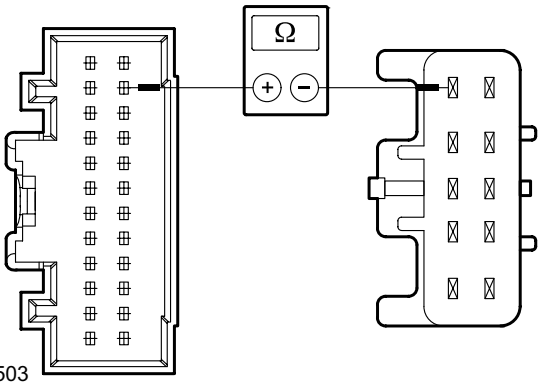
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE73610</p>	<p>4 Measure the voltage between</p> <ul style="list-style-type: none"> - LHD: passenger door control module, connector C735, pin 2, circuit 29-AJ27 (OG/WH), wiring harness side and ground. - RHD: driver's door control module, connector C734, pin 2, circuit 29-AJ26 (OG/YE), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to B64.</p> <p>→ No</p> <ul style="list-style-type: none"> - LHD: LOCATE and RECTIFY the break in the circuit between fuse F41 (20 A) (CJB) and the door control module using the Wiring Diagrams. CHECK the operation of the system. - RHD: LOCATE and RECTIFY the break in the circuit between fuse F55 (20 A) (CJB) and the door control module using the Wiring Diagrams. CHECK the operation of the system.
<p>B64: CHECK THE GROUND SUPPLY TO THE RIGHT-HAND DOOR MODULE FOR OPEN CIRCUIT</p>	
 <p>VFE73611</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between:</p> <ul style="list-style-type: none"> - LHD: Passenger door control module, connector C735, pin 13, circuit 31-DA12A (BK), wiring harness side and ground. - RHD: Driver's door control module, connector C734, pin 13, circuit 31-DA11C (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes GO to B65.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the door control module and ground connection G53 using the Wiring Diagrams. CHECK the operation of the system.</p>

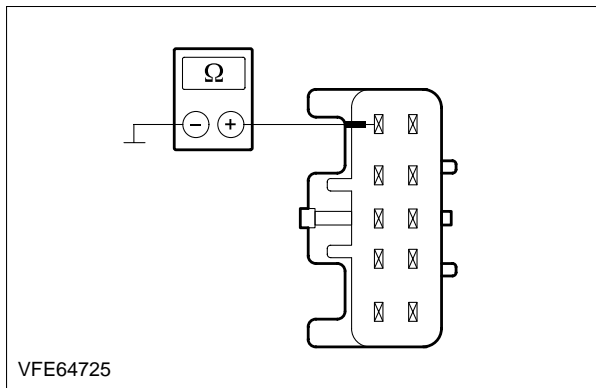
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>B65: CHECK THE VOLTAGE SUPPLY TO THE INTEGRATED TURN SIGNAL LAMP IN THE RIGHT-HAND EXTERIOR MIRROR FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect Integrated turn signal lamp in the right-hand exterior mirror.</p> <ul style="list-style-type: none"> - LHD, vehicles without electric mirror adjustment: from connector C804 - LHD, vehicles with electric mirror adjustment: from connector C821 - RHD, vehicles without electric mirror adjustment: from connector C802 - RHD, vehicles with electric mirror adjustment: from connector C807
 <p>E83502</p>	<p>2 Measure the resistance between:</p> <ul style="list-style-type: none"> - LHD, vehicles without electric mirror adjustment: Passenger door control module, connector C722, pin 11, circuit 49S-LG20 (BU/WH), wiring harness side and integrated turn signal lamp in the exterior mirror, connector C804, pin 7, circuit 49S-LG20 (BU/WH), wiring harness side. - LHD, vehicles with electric mirror adjustment: Passenger door control module, connector C722, pin 11, circuit 49S-LG20 (BU/WH), wiring harness side and integrated turn signal lamp in the exterior mirror, connector C821, pin 7, circuit 49S-LG20 (BU/WH), wiring harness side. - RHD, vehicles without electric mirror adjustment: Driver's door control module, connector C729, pin 11, circuit 49S-LG13 (BU/RD), wiring harness side and integrated turn signal lamp in the exterior mirror, connector C802, pin 7, circuit 49S-LG13 (BU/RD), wiring harness side. - RHD, vehicles with electric mirror adjustment: Driver's door control module, connector C729, pin 11, circuit 49S-LG13 (BU/RD), wiring harness side and integrated turn signal lamp in the exterior mirror, connector C807, pin 7, circuit 49S-LG13 (BU/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes GO to B66. → No LOCATE and RECTIFY the break in the circuit between the door control module and the integrated turn signal lamp in the exterior mirror using the Wiring Diagrams. CHECK the operation of the system.

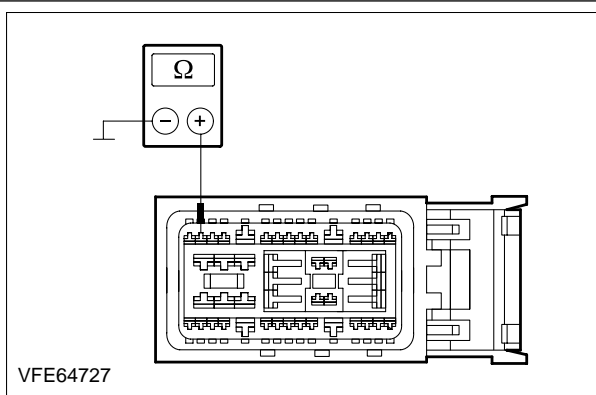
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>B66: CHECK THE GROUND SUPPLY TO THE INTEGRATED TURN SIGNAL LAMP IN THE RIGHT-HAND EXTERIOR MIRROR FOR OPEN CIRCUIT</p>	
 <p>E83503</p>	<p>1 Measure the resistance between:</p> <ul style="list-style-type: none"> - LHD, vehicles without electric mirror adjustment: Passenger door control module, connector C722, pin 23, circuit 31-HB36A (BK), wiring harness side and integrated turn signal lamp in the left-hand exterior mirror, connector C804, pin 5, circuit 31-HB36A (BK), wiring harness side. - LHD, vehicles with electric mirror adjustment: Passenger door control module, connector C722, pin 23, circuit 31-HB36A (BK), wiring harness side and integrated turn signal lamp in the left-hand exterior mirror, connector C821, pin 5, circuit 31-HB36A (BK), wiring harness side. - RHD, vehicles without electric mirror adjustment: Driver's door control module, connector C729, pin 23, circuit 31-HB35A (BK), wiring harness side and integrated turn signal lamp in the left-hand exterior mirror, connector C802, pin 5, circuit 31-HB35A (BK), wiring harness side. - RHD, vehicles with electric mirror adjustment: Driver's door control module, connector C729, pin 23, circuit 31-HB35A (BK), wiring harness side and integrated turn signal lamp in the left-hand exterior mirror, connector C807, pin 5, circuit 31-HB35A (BK), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes GO to B67. → No LOCATE and RECTIFY the break in the circuit between the door control module and the integrated turn signal lamp in the exterior mirror using the Wiring Diagrams. CHECK the operation of the system.
<p>B67: CHECK THE GROUND SUPPLY TO THE INTEGRATED TURN SIGNAL LAMP IN THE RIGHT-HAND EXTERIOR MIRROR FOR OPEN CIRCUIT</p>	
	<p>1 Connect Corresponding component in the right-hand exterior mirror.</p> <ul style="list-style-type: none"> - LHD: Passenger door control module to connectors C722 and C735 - RHD: Driver's door control module to connectors C729 and C734

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE64725</p>	<p>2 Measure the resistance between:</p> <ul style="list-style-type: none"> - LHD, vehicles without electric mirror adjustment: integrated turn signal lamp in the exterior mirror, right-hand side, connector C804, pin 5, circuit 31-HB36A (BK), wiring harness side and ground. - LHD, vehicles with electric mirror adjustment: integrated turn signal lamp in the exterior mirror, right-hand side, connector C821, pin 5, circuit 31-HB36A (BK), wiring harness side and ground. - RHD, vehicles without electric mirror adjustment: integrated turn signal lamp in the exterior mirror, right-hand side, connector C802, pin 5, circuit 31-HB35A (BK), wiring harness side and ground. - RHD, vehicles with electric mirror adjustment: integrated turn signal lamp in the exterior mirror, right-hand side, connector C807, pin 5, circuit 31-HB35A (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the integrated turn signal side lamp in the exterior mirror. CHECK the operation of the system. If the concern persists: REFER to: Communications Network - 3-Door (418-00 Module Communications Network, Diagnosis and Testing). → No <ul style="list-style-type: none"> - LHD: RENEW the passenger door control module. CHECK the operation of the system. - RHD: RENEW the drivers's door control module. CHECK the operation of the system.
<p>B68: CHECK THE VOLTAGE SUPPLY TO THE INTEGRATED TURN SIGNAL LAMP IN THE RIGHT-HAND EXTERIOR MIRROR FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect CJB rear left from connector C100.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE64727</p>	<p>3 Measure the resistance between the CJB, connector C100, pin 33, circuit 49S-LG19C (BU/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 10,000 Ohms registered? <p>→ Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the CJB and soldered connection S241 using the Wiring Diagrams. CHECK the operation of the system.</p>

PINPOINT TEST F : LEFT-HAND OR RIGHT-HAND TURN SIGNAL LAMPS FLASH CONTINUOUSLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: CHECK STEERING COLUMN MULTIFUNCTION SWITCH	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect steering column multifunction switch from connector C459.</p> <p>3 Ignition switch in position II.</p> <p>4 CHECK the turn signal lamps.</p> <ul style="list-style-type: none"> Do the turn signals flash continuously on one side? <p>→ Yes</p> <ul style="list-style-type: none"> - Turn signal lamps on the left-hand side flash continuously: GO to C2. - Turn signal lamps on the right-hand side flash continuously: GO to C3. <p>→ No INSTALL a new steering column multifunction switch. CHECK the operation of the system.</p>
C2: NARROW DOWN THE CAUSE OF THE FAULT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C103.</p> <p>3 Ignition switch in position II.</p>

417-01-82

Exterior Lighting

417-01-82

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TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 CHECK the turn signal lamps.</p> <ul style="list-style-type: none"> Do the turn signals flash continuously on one side? <p>→ Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY short to ground in control circuit 91S-LG1 (BK/YE) between the CJB and the steering column multifunction switch using the Wiring Diagrams. CHECK the operation of the system.</p>
C3: NARROW DOWN THE CAUSE OF THE FAULT	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect CJB from connector C103.</p>
	<p>3 Ignition switch in position II.</p>
	<p>4 CHECK the turn signal lamps.</p> <ul style="list-style-type: none"> Do the turn signals flash continuously on one side? <p>→ Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY short to ground in control circuit 91S-LG2 (BK/BU) between the CJB and the steering column multifunction switch using the Wiring Diagrams. CHECK the operation of the system.</p>

PINPOINT TEST G : LEFT-HAND OR RIGHT-HAND TURN SIGNAL LAMPS ILLUMINATE CONTINUOUSLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: DETERMINE THE FAULT CONDITION	
	<p>1 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK the turn signal lamps.</p> <ul style="list-style-type: none"> • Is at least one of the turn signal lamps on the left-hand side lit continuously? <p>→ Yes</p> <ul style="list-style-type: none"> - Front left-hand turn signal lamp(s) lit continuously: GO to D2. - Rear left-hand turn signal lamp lit continuously: GO to D3. - Integrated turn signal lamp in the left-hand exterior mirror lit continuously, Cabriolet: GO to D7. - Integrated turn signal lamp in the left-hand exterior mirror lit continuously, all other model variants: GO to D6. - Integrated turn signal lamp in the left-hand exterior mirror and left-hand rear turn signal lamp lit continuously: GO to D3. <p>→ No</p> <ul style="list-style-type: none"> - Front right-hand turn signal lamp(s) lit continuously: GO to D2. - Right-hand rear turn signal lamp is continuously illuminated: GO to D3. - Integrated turn signal lamp in the right-hand exterior mirror lit continuously, Cabriolet: GO to D9. - Integrated turn signal lamp in the right-hand exterior mirror lit continuously, all other model variants: GO to D8. - Integrated turn signal lamp in the right-hand exterior mirror and right-hand rear turn signal lamp lit continuously: GO to D3.
<p>D2: CHECK VOLTAGE SUPPLY TO FRONT TURN SIGNAL LAMPS FOR SHORT TO BATTERY VOLTAGE</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect CJB from connector C96.</p>
	<p>3 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 CHECK the turn signal lamps.</p> <ul style="list-style-type: none"> • Do the turn signal lamps still illuminate continuously? <p>→ Yes</p> <ul style="list-style-type: none"> - Left-hand turn signal lamps (front and side): LOCATE and RECTIFY short to battery voltage in the circuits connected to soldered connection S125 with the aid of the wiring diagrams. CHECK the operation of the system. - Left-hand turn signal (front): LOCATE and RECTIFY the short to battery voltage in the circuits connected to the CJB, connector C96, pin 37 using the Wiring Diagrams. CHECK the operation of the system. - Left-hand turn signal (side): LOCATE and RECTIFY the short to battery voltage in the circuits connected to the CJB, connector C96, pin 32 using the Wiring Diagrams. CHECK the operation of the system. - Right-hand turn signal lamps (front and side): LOCATE and RECTIFY short to battery voltage in the circuits connected to soldered connection S126 with the aid of the wiring diagrams. CHECK the operation of the system. - Right-hand turn signal lamps (front): LOCATE and RECTIFY the short to battery voltage in the circuits connected to the CJB, connector C96, pin 36 using the Wiring Diagrams. CHECK the operation of the system. - Right-hand turn signal lamps (side): LOCATE and RECTIFY the short to battery voltage in the circuits connected to the CJB, connector C96, pin 34 using the Wiring Diagrams. CHECK the operation of the system. <p>→ No</p> <p>CHECK and if necessary RENEW the CJB. CHECK the operation of the system.</p>
D3: CHECK THE VOLTAGE SUPPLY TO THE REAR LAMP ASSEMBLY/TURN SIGNAL LAMP FOR SHORT TO BATTERY VOLTAGE	
	1 Ignition switch in position 0.
	2 Disconnect CJB from connector C100.
	3 Ignition switch in position II.

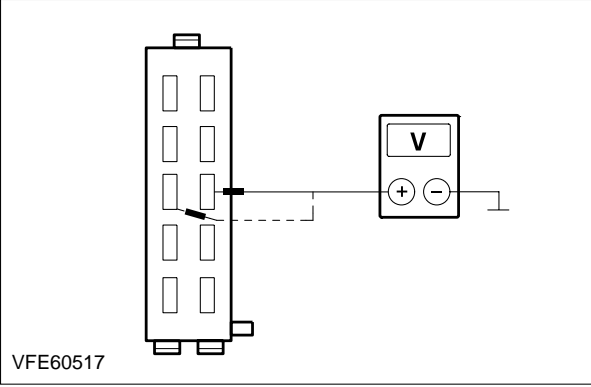
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 CHECK the turn signal lamps.</p> <ul style="list-style-type: none"> • Does the rear lamp assembly/turn signal lamp illuminate continuously? <p>→ Yes</p> <ul style="list-style-type: none"> - Left-hand rear lamp assembly/turn signal lamp, vehicles without trailer hitch: LOCATE and RECTIFY short to battery voltage in the circuit(s) connected to the CJB, connector C100, pin 32 using the Wiring Diagrams. CHECK the operation of the system. - Left-hand rear lamp assembly/turn signal lamp, vehicles with trailer hitch: GO to D4. - Right-hand rear lamp assembly/turn signal lamp, vehicles without trailer hitch: LOCATE and RECTIFY short to battery voltage in the circuit(s) connected to the CJB, connector C100, pin 33 using the Wiring Diagrams. CHECK the operation of the system. - Right-hand rear lamp assembly/turn signal lamp, vehicles with trailer hitch: GO to D4. <p>→ No</p> <p>CHECK and if necessary RENEW the CJB. CHECK the operation of the system.</p>
<p>D4: CHECK THE VOLTAGE SUPPLY TO THE REAR LAMP ASSEMBLY/TURN SIGNAL LAMP FOR SHORT TO BATTERY VOLTAGE</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Connect CJB to connector C100.</p> <p>3 Disconnect Fuse F59 (20 A) (CJB).</p> <p>4 Ignition switch in position II.</p>

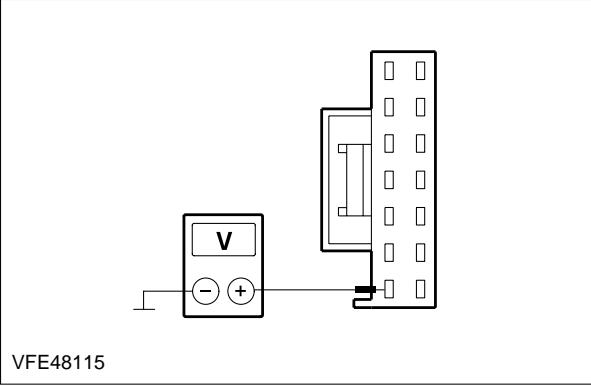
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 CHECK the turn signal lamps.</p> <ul style="list-style-type: none"> • Does the rear lamp assembly/turn signal lamp illuminate continuously? <p>→ Yes</p> <ul style="list-style-type: none"> - Left-hand rear lamp assembly/turn signal lamp: LOCATE and RECTIFY short to battery voltage in the circuit(s) connected to the trailer control unit, connector C2002, pin 8 using the Wiring Diagrams. CHECK the operation of the system. - Right-hand rear lamp assembly/turn signal lamp: LOCATE and RECTIFY short to battery voltage in the circuit(s) connected to the trailer control unit, connector C2002, pin 10 using the Wiring Diagrams. CHECK the operation of the system. <p>→ No GO to D5.</p>
D5: CHECK THE VOLTAGE SUPPLY TO THE REAR LAMP ASSEMBLY/TURN SIGNAL LAMP FOR SHORT TO BATTERY VOLTAGE	
	<p>1 Ignition switch in position 0.</p> <p>2 Connect Fuse F59 (20 A) (CJB).</p> <p>3 Disconnect Trailer control unit from connector C2002.</p> <p>4 Ignition switch in position II.</p>

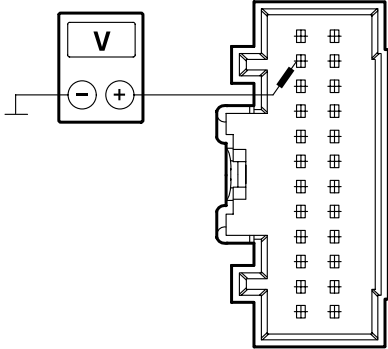
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE60517</p>	<p>5 Measure the voltage between the trailer control unit, connector C2002:</p> <ul style="list-style-type: none"> - Left-hand rear turn signal lamp, 3-door and 5-door versions: pin 5, circuit (WH), wiring harness side and ground. - Left-hand rear lamp assembly/turn signal lamp, 4 door and estate versions: pin 5, circuit 49S-LG12 (WH), wiring harness side and ground. - Right-hand rear turn signal lamp, 3-door and 5-door versions: pin 6, circuit (GN/RD), wiring harness side and ground. - Right-hand rear lamp assembly/turn signal lamp, 4 door and estate versions: pin 6, circuit 49S-LG19 (GN/RD), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <ul style="list-style-type: none"> → Yes <ul style="list-style-type: none"> - Left-hand rear lamp assembly/turn signal lamp: LOCATE and RECTIFY short to battery voltage in the circuit(s) connected to the trailer control unit, connector C2002, pin 5 using the Wiring Diagrams. CHECK the operation of the system. - Right-hand rear lamp assembly/turn signal lamp: LOCATE and RECTIFY short to battery voltage in the circuit(s) connected to the trailer control unit, connector C2002, pin 6 using the Wiring Diagrams. CHECK the operation of the system. → No <ul style="list-style-type: none"> RENEW the trailer control unit. CHECK the operation of the system.
<p>D6: CHECK CIRCUITS FOR SHORT TO BATTERY VOLTAGE, LEFT-HAND INTEGRATED TURN SIGNAL LAMP</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect corresponding component.</p> <ul style="list-style-type: none"> - LHD: driver's door control module from connector C728 - RHD: passenger door control module from connector C723 <p>3 Ignition switch in position II.</p>

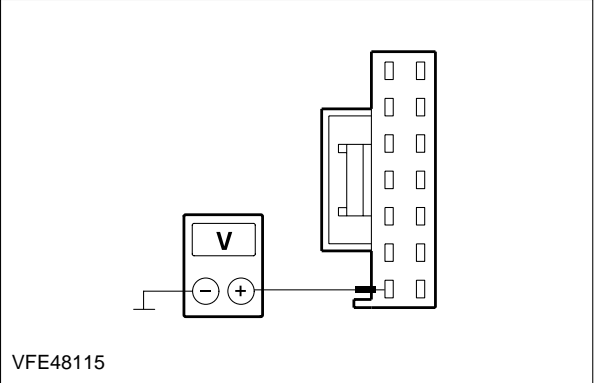
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE48115</p>	<p>4 Measure the voltage between</p> <ul style="list-style-type: none"> - LHD: Driver's door control module, connector C728, pin 7, circuit 49S-LG13 (BU/RD), wiring harness side and ground. - RHD: Passenger door control module, connector C723, pin 7, circuit 49S-LG20 (BU/WH), wiring harness side and ground. <p>• Is battery voltage measured?</p> <p>→ Yes LOCATE and RECTIFY the short to battery voltage in the circuit between the door control module and the integrated turn signal lamp in the exterior mirror using the Wiring Diagrams.</p> <p>→ No CHECK and if necessary RENEW the door control module. CHECK the operation of the system. If the concern persists: REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).</p>
<p>D7: CHECK CIRCUITS FOR SHORT TO BATTERY VOLTAGE, LEFT-HAND INTEGRATED TURN SIGNAL LAMP, CABRIOLET</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect corresponding component.</p> <ul style="list-style-type: none"> - LHD: driver's door control module from connector C729 - RHD: passenger door control module from connector C722 <p>3 Ignition switch in position II.</p>

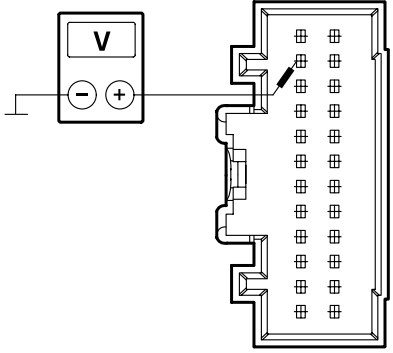
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83508</p>	<p>4 Measure the voltage between</p> <ul style="list-style-type: none"> - LHD: Driver's door control module, connector C729, pin 11, circuit 49S-LG13 (BU/RD), wiring harness side and ground. - RHD: Passenger door control module, connector C722, pin 11, circuit 49S-LG20 (BU/WH), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes LOCATE and RECTIFY the short to battery voltage in the circuit between the door control module and the integrated turn signal lamp in the exterior mirror using the Wiring Diagrams.</p> <p>→ No CHECK and if necessary RENEW the door control module. CHECK the operation of the system. If the concern persists: REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).</p>
<p>D8: CHECK CIRCUITS FOR SHORT TO BATTERY VOLTAGE, RIGHT-HAND INTEGRATED TURN SIGNAL LAMP</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect corresponding component.</p> <ul style="list-style-type: none"> - LHD: passenger door control module from connector C723 - RHD: driver's door control module from connector C728 <p>3 Ignition switch in position II.</p>

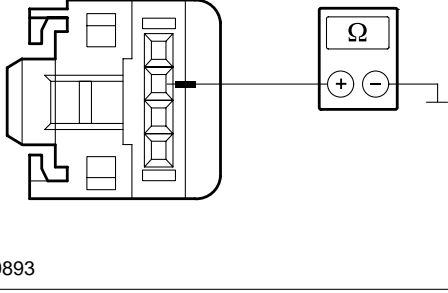
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE48115</p>	<p>4 Measure the voltage between</p> <ul style="list-style-type: none"> - LHD: Passenger door control module, connector C723, pin 7, circuit 49S-LG20 (BU/WH), wiring harness side and ground. - RHD: Driver's door control module, connector C728, pin 7, circuit 49S-LG13 (BU/RD), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes LOCATE and RECTIFY the short to battery voltage in the circuit between the door control module and the integrated turn signal lamp in the exterior mirror using the Wiring Diagrams. CHECK the operation of the system.</p> <p>→ No CHECK and if necessary RENEW the door control module. CHECK the operation of the system. If the concern persists: REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).</p>
<p>D9: CHECK CIRCUITS FOR SHORT TO BATTERY VOLTAGE, RIGHT-HAND INTEGRATED TURN SIGNAL LAMP, CABRIOLET</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect corresponding component.</p> <ul style="list-style-type: none"> - LHD: passenger door control module from connector C722 - RHD: driver's door control module from connector C729 <p>3 Ignition switch in position II.</p>

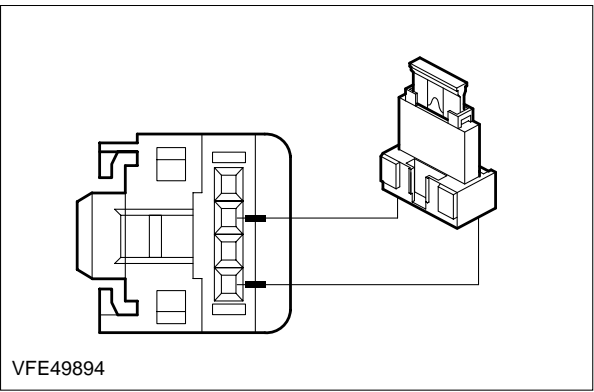
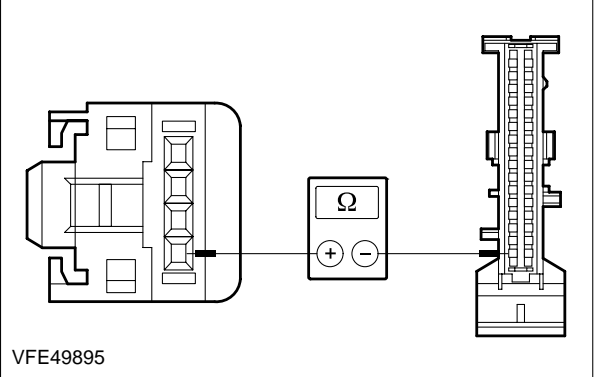
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83508</p>	<p>4 Measure the voltage between</p> <ul style="list-style-type: none"> - LHD: Passenger door control module, connector C722, pin 11, circuit 49S-LG20 (BU/WH), wiring harness side and ground. - RHD: Driver's door control module, connector C729, pin 11, circuit 49S-LG13 (BU/RD), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes LOCATE and RECTIFY the short to battery voltage in the circuit between the door control module and the integrated turn signal lamp in the exterior mirror using the Wiring Diagrams.</p> <p>→ No CHECK and if necessary RENEW the door control module. CHECK the operation of the system. If the concern persists: REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).</p>

PINPOINT TEST H : THE HAZARD WARNING LIGHT IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: CHECK HAZARD WARNING LIGHT SWITCH	
 <p>VFE49893</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect hazard warning light switch from connector C454.</p> <p>3 Measure resistance between hazard warning light switch, connector C454, pin 2, circuit 91-LG8 (BK/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes GO to E2.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the hazard warning light switch and soldered connection S12 using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E2: CHECK HAZARD WARNING LIGHT SWITCH	
 <p>VFE49894</p>	<p>1 Connect a fused jumper wire (5 A) at the hazard warning light switch, connector C454, between pin 4, circuit 91S-LG8 (BK/OG) and pin 2, circuit 91-LG8 (BK/OG), wiring harness side.</p>
	<p>2 Ignition switch in position II.</p> <p>3 CHECK the turn signal lamps.</p> <ul style="list-style-type: none"> • Do the turn signal lamps work? → Yes INSTALL A NEW hazard warning light switch. CHECK the operation of the system. → No GO to E3.
E3: CHECK CONTROL CIRCUIT OF HAZARD WARNING LIGHT SWITCH FOR OPEN CIRCUIT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C103.</p>
 <p>VFE49895</p>	<p>3 Measure resistance between the CJB, connector C103, pin 17, circuit 91S-LG8 (BK/OG), wiring harness side and hazard warning light switch, connector C454, pin 4, circuit 91S-LG8 (BK/OG), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and the hazard warning light switch using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

PINPOINT TEST I : THE HAZARD WARNING LIGHT FLASHES CONTINUOUSLY

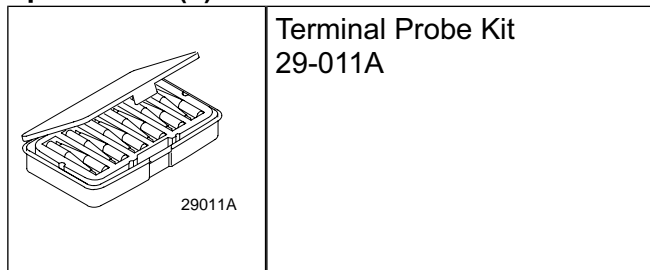
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F1: CHECK HAZARD WARNING LIGHT SWITCH	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect hazard warning light switch from connector C454.</p> <p>3 Ignition switch in position II.</p> <ul style="list-style-type: none"> • Do the turn signal lamps flash continuously? → Yes GO to F2. → No INSTALL A NEW hazard warning light switch. CHECK the operation of the system.
F2: CHECK CONTROL CIRCUIT OF HAZARD WARNING LIGHT SWITCH FOR SHORT TO GROUND	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C103.</p> <p>3 Ignition switch in position II.</p> <p>4 CHECK the turn signal lamps.</p> <ul style="list-style-type: none"> • Do the turn signal lamps flash continuously? → Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY short to ground in control circuit 91S-LG8 (BK/OG) between the CJB and the hazard warning light switch using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

Parking, Rear and License Plate Lamps

Refer to Wiring Diagrams Section 417-01, for schematic and connector information.

Special Tool(s)



NOTE: Before reading out the vehicle-specific data, remake all the electrical connections which were separated in the vehicle, so that communication between the module and WDS is ensured.

1. Verify the customer concern.
2. Visually inspect for obvious signs of electrical damage.

Visual Inspection

Electrical
<ul style="list-style-type: none"> • Fuse(s) • Lamp(s) • Connector(s) • Switches • Wiring harness

Inspection and Checking

NOTE: The generic electronic module (GEM) forms part of the central junction box (CJB).

NOTE: If the generic electronic module (GEM) is changed, the new one must be configured. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module. REFER to: (418-00 Module Communications Network)

- **Communications Network - 3-Door** (Diagnosis and Testing),
- **Communications Network** (Diagnosis and Testing).

3. Resolve any obvious causes or concerns found during the visual inspection before carrying out any further tests.
4. If the cause of the concern cannot be found by visual inspection, continue with the symptom chart.

Symptom Chart

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • Parking lamps, rear lamps and license plate lamps are inoperative when side lights are switched on 	<ul style="list-style-type: none"> • Fuse(s) • Circuit(s) • Headlight switch • Central junction box (CJB) 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.
<ul style="list-style-type: none"> • Parking lamps and rear lamps are inoperative when the parking lights are switched on 	<ul style="list-style-type: none"> • Fuse(s) • Circuit(s) • Ignition switch • Headlight switch • Central junction box (CJB) 	<ul style="list-style-type: none"> • GO to Pinpoint Test B.
<ul style="list-style-type: none"> • One or more parking lamps, rear lamps or license plate lamps is inoperative 	<ul style="list-style-type: none"> • Fuse(s) • Circuit(s) • Headlight switch • Left/right-hand headlamp • Left/right-hand rear lamp assembly • Left/right-hand license plate lamp • Central junction box (CJB) 	<ul style="list-style-type: none"> • GO to Pinpoint Test C.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Parking lamps, rear lamps and license plate lamps are on permanently 	<ul style="list-style-type: none"> Circuit(s) Headlight switch Central junction box (CJB) 	<ul style="list-style-type: none"> GO to Pinpoint Test D.

System Checks

NOTE: Use a digital multimeter for all electrical measurements.

PINPOINT TEST J : PARKING LAMPS, REAR LAMPS AND LICENSE PLATE LAMPS ARE INOPERATIVE WHEN SIDE LIGHTS ARE SWITCHED ON

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> Unfasten the CJB and fold it down. <ul style="list-style-type: none"> Is the location for connector C100 on the top of the CJB? <ul style="list-style-type: none"> → Yes GO to A2. → No GO to A4.
A2: CHECK FUSE F103 (15 A) (CJB)	
	<ol style="list-style-type: none"> Disconnect Fuse F103 (15 A) (CJB). CHECK Fuse F103 (15 A) (CJB). <ul style="list-style-type: none"> Is the fuse OK? <ul style="list-style-type: none"> → Yes GO to A3. → No RENEW fuse F103 (15 A) (CJB) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.
A3: CHECK THE VOLTAGE SUPPLY TO FUSE F103 (15 A) (CJB) FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> Connect Fuse F103 (15 A) (CJB).

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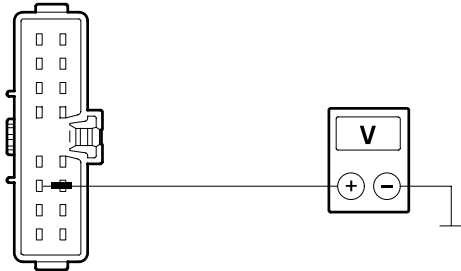
Exterior Lighting

417-01-96

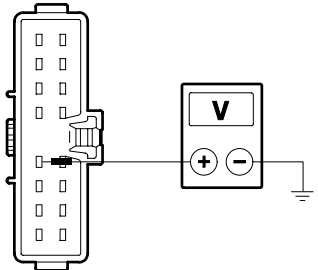
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the voltage between fuse F103 (15 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to A6.</p> <p>→ No LOCATE AND RECTIFY the break in the voltage supply of fuse F103 (15 A) (CJB) using the Wiring Diagrams. If necessary CHECK and RENEW the CJB. CHECK the operation of the system.</p>
A4: CHECK FUSE F49 (15 A) (CJB).	
	<p>1 Disconnect fuse F49 (15 A) (CJB).</p> <p>2 CHECK fuse F49 (15 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to A5.</p> <p>→ No RENEW fuse F49 (15 A) (CJB) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
A5: CHECK THE VOLTAGE SUPPLY TO FUSE F49 (15 A) (CJB) FOR OPEN CIRCUIT	
	<p>1 Connect fuse F49 (15 A) (CJB).</p> <p>2 Measure the voltage between fuse F49 (15 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to A6.</p> <p>→ No LOCATE AND RECTIFY the break in the voltage supply of fuse F49 (15 A) (CJB) using the Wiring Diagrams. If necessary CHECK and RENEW the CJB. CHECK the operation of the system.</p>
A6: CHECK THE VOLTAGE SUPPLY TO THE HEADLIGHT SWITCH FOR OPEN CIRCUIT	
	<p>1 Disconnect Headlight switch from connector C320.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0016145</p>	<p>2 Measure the voltage between the headlight switch, connector C320, pin 11, circuit 29-LE29 (OG/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes INSTALL A NEW headlight switch. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between fuse F49 (CJB) and the headlight switch using the Wiring Diagrams. CHECK the operation of the system.</p>

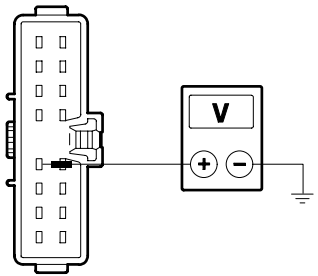
PINPOINT TEST K : PARKING LAMPS AND REAR LAMPS ARE INOPERATIVE WHEN THE PARKING LIGHTS ARE SWITCHED ON

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK THE VOLTAGE SUPPLY TO THE HEADLIGHT SWITCH FOR OPEN CIRCUIT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Headlight switch from connector C320.</p>
 <p>VFE0003169</p>	<p>3 Measure the voltage between the headlight switch, connector C320, pin 12, circuit 30S-LE29 (RD/GN)/30-LE6 (RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes</p> <ul style="list-style-type: none"> - Vehicles without daytime running lights: GO to B8. - Vehicles with daytime running lights: GO to B3. <p>→ No LOCATE and RECTIFY the break in the circuit between the ignition switch and headlight switch using the wiring diagrams. CHECK the operation of the system. If the concern persists, INSTALL a new ignition switch. CHECK the operation of the system.</p>

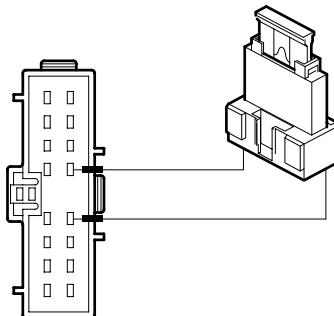
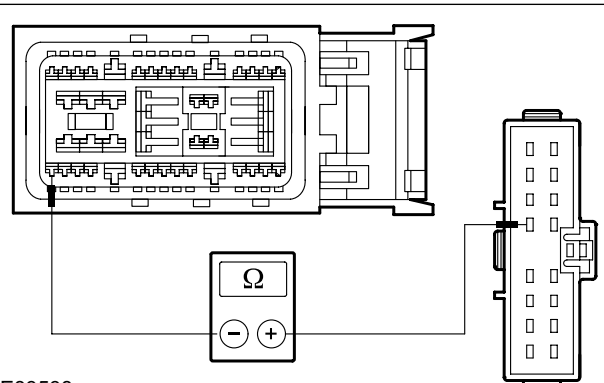
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> 1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <ul style="list-style-type: none"> → Yes GO to B3. → No GO to B5.
B3: CHECK FUSE F113 (10 A) (CJB)	
	<ol style="list-style-type: none"> 1 Disconnect Fuse F113 (10 A) (CJB). 2 CHECK Fuse F113 (10 A) (CJB). <ul style="list-style-type: none"> • Is the fuse OK? <ul style="list-style-type: none"> → Yes GO to B4. → No RENEW fuse F113 (10 A) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.
B4: CHECK THE VOLTAGE SUPPLY TO FUSE F113 (10 A) (CJB) FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Connect Fuse F113 (10 A) (CJB). 2 Ignition switch in position II. 3 Measure the voltage between fuse F113 (10 A) (CJB) and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes GO to B7. → No RECTIFY the break in the voltage supply of fuse F113 (CJB) with the aid of the wiring diagrams. CHECK the operation of the system. If necessary CHECK and RENEW the CJB. CHECK the operation of the system.
B5: CHECK FUSE F45 (10 A) (CJB).	
	<ol style="list-style-type: none"> 1 Disconnect fuse F45 (10 A) (CJB).

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK fuse F45 (10 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to B6.</p> <p>→ No RENEW fuse F45 (10 A) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B6: CHECK THE VOLTAGE SUPPLY TO FUSE F45 (10 A) (CJB) FOR OPEN CIRCUIT</p>	
	<p>1 Connect fuse F45 (10 A) (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F45 (10 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to B7.</p> <p>→ No RECTIFY the break in the voltage supply of fuse F45 (CJB) with the aid of the wiring diagrams. CHECK the operation of the system. CHECK and INSTALL A NEW CJB if necessary. CHECK the operation of the system.</p>
<p>B7: CHECK THE VOLTAGE SUPPLY TO THE HEADLIGHT SWITCH FOR OPEN CIRCUIT</p>	
 <p>VFE0003169</p>	<p>1 Ignition switch in position I.</p> <p>2 Measure the voltage between the headlight switch, connector C320, pin 12, circuit 30S-LE29 (RD/GN)/30-LE6 (RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to B8.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between fuse F45 (CJB) and the headlight switch using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B8: CHECK THE HEADLIGHT SWITCH</p>	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E0036118</p>	<p>2 Using a fused bridging cable (20 A) at the headlight switch, connect between connector C320, pin 12, circuit 30S-LE29 (RD/GN)/30-LE6 (RD) and pin 13, circuit 29S-LF1 (OG/YE), wiring harness side.</p> <ul style="list-style-type: none"> Do the parking lamps and rear lamps illuminate? <p>→ Yes INSTALL A NEW headlight switch. CHECK the operation of the system.</p> <p>→ No GO to B9.</p>
<p>B9: CHECK THE POWER SUPPLY TO THE PARKING LAMPS FOR OPEN CIRCUIT</p>	
 <p>E83538</p>	<p>1 Disconnect CJB from connector C102.</p> <p>2 Measure the resistance between the headlamp switch, connector C320, pin 13, circuit 29S-LF1 (OG/YE), wiring harness side and the CJB, connector C102, pin 1, circuit 29S-LF1 (OG/YE), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the headlight switch and CJB using the wiring diagrams. CHECK the operation of the system.</p>

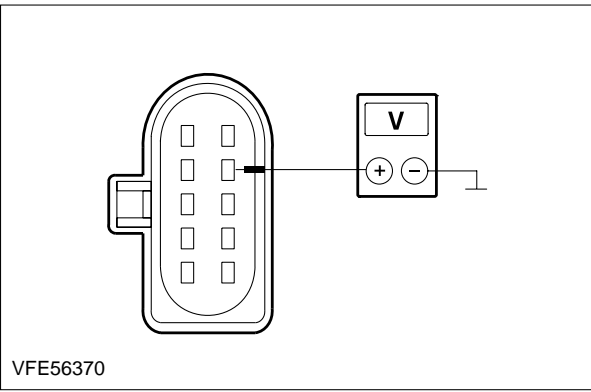
PINPOINT TEST L : ONE OR MORE PARKING LAMPS, REAR LAMPS OR LICENSE PLATE LAMPS IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>C1: DETERMINE THE FAULT CONDITION</p>	
	<p>1 Determine the fault condition.</p>

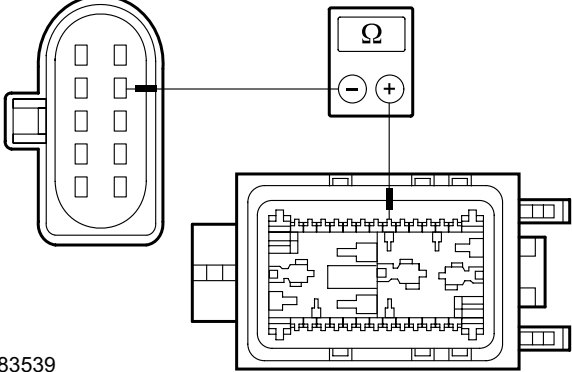
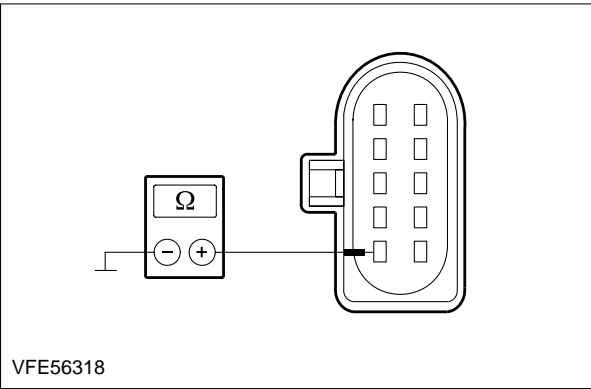
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Switch on SIDE LIGHTS.</p> <ul style="list-style-type: none"> • Is a left-hand parking lamp or license plate lamp inoperative? <p>→ Yes</p> <ul style="list-style-type: none"> - Front left-hand parking lamp and left-hand rear lamp inoperative (all other lamps OK): GO to C3. - Front left-hand parking lamp inoperative (all other lamps OK): GO to C5. - Cabriolet: Left-hand rear lamp(s) inoperative (all other lamps OK): GO to C30. - All other model variants: Left-hand rear lamp inoperative (all other lamps OK): GO to C8. - Left-hand license plate lamp inoperative (all other lamps OK): LOCATE and RECTIFY the break in circuit 31-LF21 (BK), between the license plate lamp and soldered connection S196 using the Wiring Diagrams. CHECK the operation of the system. - Both license plate lamps inoperative (all other lamps OK): GO to C21. - Front and rear parking lamps inoperative (both license plate lamps OK): GO to C28. <p>→ No</p> <ul style="list-style-type: none"> - Front right-hand parking lamp and right-hand rear lamp inoperative (all other lamps OK): GO to C11. - Front right-hand parking lamp inoperative (all other lamps OK): GO to C13. - Cabriolet: Right-hand rear lamp(s) inoperative (all other lamps OK): GO to C37. - All other model variants: Right-hand rear lamp inoperative (all other lamps OK): GO to C16. - Right-hand license plate lamp inoperative (all other lamps OK): GO to C18.
C2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to C3.</p> <p>→ No GO to C4.</p>
C3: CHECK FUSE F124 (7.5 A) (CJB)	
	<p>1 Disconnect Fuse F124 (7.5 A) (CJB).</p>

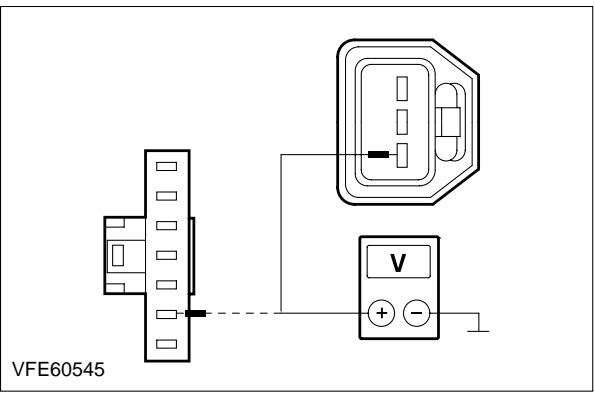
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK Fuse F124 (7.5 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? → Yes INSTALL a new CJB. CHECK the operation of the system. → No RENEW fuse F124 (7.5 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.
C4: CHECK FUSE F53 (7.5 A) (CJB).	
	<p>1 Disconnect fuse F53 (7.5 A) (CJB).</p> <p>2 CHECK fuse F53 (7.5 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? → Yes INSTALL a new CJB. CHECK the operation of the system. → No RENEW fuse F53 (7.5 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.
C5: CHECK THE VOLTAGE SUPPLY TO THE FRONT LEFT-HAND PARKING LIGHT FOR OPEN CIRCUIT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect left-hand headlamp from connector C836.</p> <p>3 Switch on SIDE LIGHTS.</p>
	<p>4 Test voltage between left-hand headlamp connector C836, pin 4, circuit 29S-LF7 (OG/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to C7. → No GO to C6.

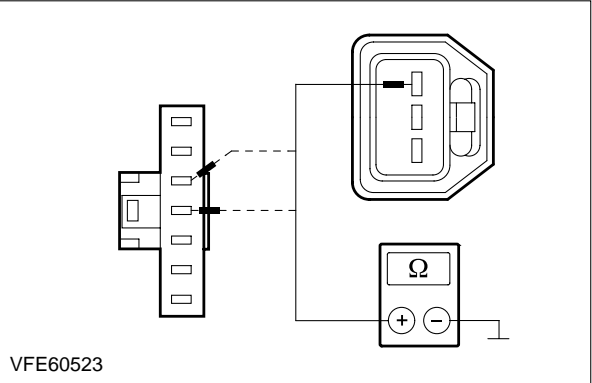
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C6: CHECK THE VOLTAGE SUPPLY TO THE FRONT LEFT-HAND PARKING LIGHT FOR OPEN CIRCUIT	
 <p>E83539</p>	<ol style="list-style-type: none"> 1 Disconnect CJB from connector C96. 2 Measure the resistance between the CJB, connector C96, pin 35, circuit 29S-LF7 (OG/BU), wiring harness side and the left-hand headlamp, connector C836, pin 4, circuit 29S-LF7 (OG/BU), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and the headlamp using the Wiring Diagrams. CHECK the operation of the system.
C7: CHECK THE GROUND CONNECTION TO THE LEFT-HAND HEADLAMP FOR OPEN CIRCUIT	
 <p>VFE56318</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the left-hand headlamp, connector C836, pin 6, circuit 31-LE31 (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the headlamp. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the headlamp and soldered connection S121 using the Wiring Diagrams. CHECK the operation of the system.
C8: CHECK THE VOLTAGE SUPPLY TO THE LEFT-HAND REAR LAMP ASSEMBLY FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Disconnect Left-hand rear lamp assembly from connector. <ul style="list-style-type: none"> – 3-door and 5-door versions: Without trailer hitch: C472 – 3-door and 5-door versions: With trailer hitch: C2004 – 4-door and estate versions: Without trailer hitch: C476 – 4-door and estate versions: With trailer hitch: C2035 2 Switch on SIDE LIGHTS.

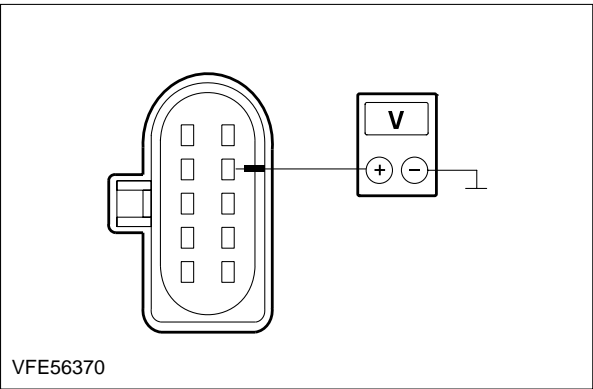
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE60545</p>	<p>3 Measure voltage between left-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions: Without trailer hitch: connector C472, pin 1, circuit 29S-LF11A (OG/WH), wiring harness side and ground. - 3-door and 5-door versions: With trailer hitch: connector C2004, pin 1, circuit (OG/WH), wiring harness side and ground. - 4-door and estate versions, without trailer hitch: connector C476, pin 6, circuit 29S-LF11 (OG/WH), wiring harness side and ground. - 4-door and estate versions: With trailer hitch: connector C2035, pin 6, circuit 29S-LF11 (OG/WH), wiring harness side and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes GO to C9. → No LOCATE and RECTIFY the break in the circuit between fuse F53 (CJB) and the left-hand rear lamp assembly using the Wiring Diagrams. CHECK the operation of the system.

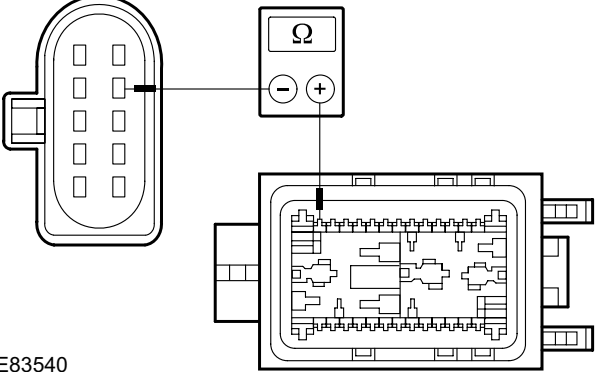
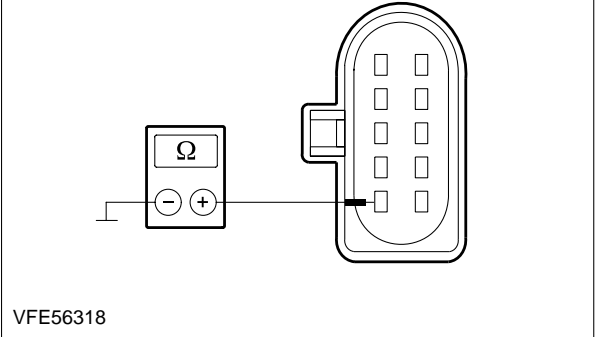
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C9: CHECK THE GROUND CONNECTION TO THE LEFT-HAND REAR LAMP ASSEMBLY FOR OPEN CIRCUIT	
 <p>VFE60523</p>	<p>1 Measure the resistance between the left-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions: Without trailer hitch: connector C472, pin 3, circuit 31-LF23(A/B) (BK), wiring harness side and ground. - 3-door and 5-door versions: With trailer hitch: connector C2004, pin 3, circuit (BK), wiring harness side and ground. - 4-door version: Without trailer hitch: connector C476, pin 4, circuit 31-LF23C (BK), wiring harness side and ground. - 4-door version: With trailer hitch: connector C2034, pin 4, circuit 31-LF23 (GN), wiring harness side and ground. - Estate: Without trailer hitch: connector C476, pin 3, circuit 31-LF23 (BK), wiring harness side and ground. - Estate: With trailer hitch: connector C2034, pin 3, circuit 31-LF23 (GN), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the left-hand rear lamp assembly. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the left-hand rear lamp assembly and ground connection G77 using the Wiring Diagrams. CHECK the operation of the system.
C10: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <ul style="list-style-type: none"> → Yes GO to C11. → No GO to C12.
C11: CHECK FUSE F125 (7.5 A) (CJB)	
	<p>1 Disconnect Fuse F125 (7.5 A) (CJB).</p>

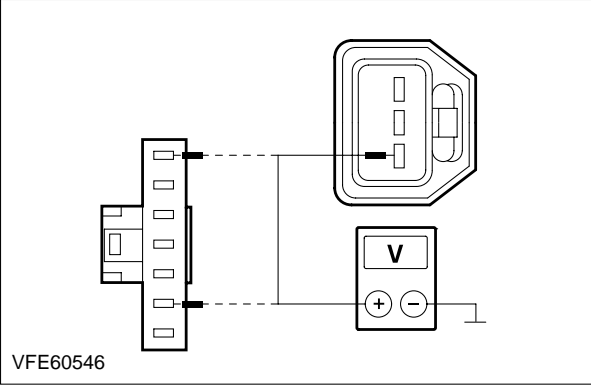
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK Fuse F125 (7.5 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? → Yes INSTALL a new CJB. CHECK the operation of the system. → No RENEW fuse F125 (7.5 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.
C12: CHECK FUSE F54 (7.5 A) (CJB).	
	<p>1 Disconnect fuse F54 (7.5 A) (CJB).</p> <p>2 CHECK fuse F54 (7.5 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? → Yes INSTALL a new CJB. CHECK the operation of the system. → No RENEW fuse F54 (7.5 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.
C13: CHECK THE VOLTAGE SUPPLY TO THE RIGHT-HAND FRONT PARKING LIGHT FOR OPEN CIRCUIT	
	<p>1 Disconnect right-hand headlamp from connector C837.</p> <p>2 Switch on SIDE LIGHTS.</p>
 <p>VFE56370</p>	<p>3 Test voltage between right-hand headlamp connector C837, pin 4, circuit 29S-LF16 (OG/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to C15. → No GO to C14.

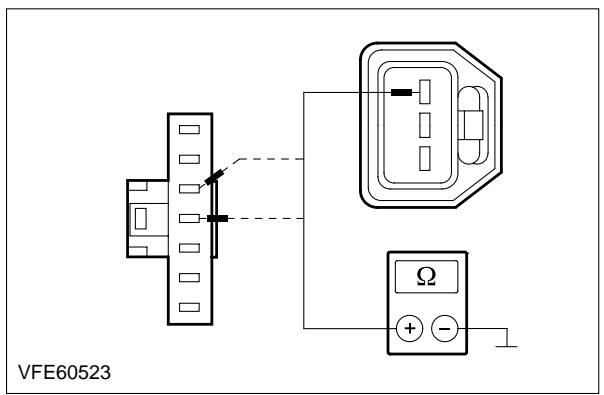
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C14: CHECK THE VOLTAGE SUPPLY TO THE RIGHT-HAND FRONT PARKING LIGHT FOR OPEN CIRCUIT	
 <p>E83540</p>	<ol style="list-style-type: none"> 1 Disconnect CJB from connector C96. 2 Measure the resistance between the CJB, connector C96, pin 28, circuit 29S-LF16 (OG/GN), wiring harness side and the right-hand headlamp, connector C837, pin 4, circuit 29S-LF16 (OG/GN), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and the headlamp using the Wiring Diagrams. CHECK the operation of the system.
C15: CHECK THE GROUND CONNECTION TO THE RIGHT-HAND HEADLAMP FOR OPEN CIRCUIT	
 <p>VFE56318</p>	<ol style="list-style-type: none"> 1 Measure the resistance between right-hand headlamp, connector C837, pin 6, circuit 31-LE30 (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the headlamp. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the headlamp and soldered connection S109 using the Wiring Diagrams. CHECK the operation of the system.
C16: CHECK THE VOLTAGE SUPPLY TO THE RIGHT-HAND REAR LAMP ASSEMBLY FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Disconnect Right-hand rear lamp assembly from connector. <ul style="list-style-type: none"> – 3-door and 5-door versions: Without trailer hitch: C473 – 3-door and 5-door versions: With trailer hitch: C2007 – 4-door and estate versions: Without trailer hitch: C477 – 4-door and estate versions: With trailer hitch: C2037 2 Switch on SIDE LIGHTS.

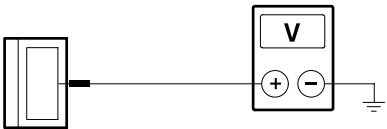
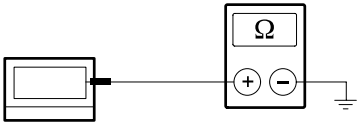
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE60546</p>	<p>3 Measure voltage between right-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions: Without trailer hitch: connector C473, pin 1, circuit 29S-LF20A (OG), wiring harness side and ground. - 3-door and 5-door versions: With trailer hitch: connector C2007, pin 1, circuit (OG), wiring harness side and ground. - 4-door version: Without trailer hitch: connector C477, pin 1, circuit 29S-LF20B (OG), wiring harness side and ground. - 4-door version: With trailer hitch: connector C2037, pin 1, circuit 29S-LF20 (OG), wiring harness side and ground. - Estate: Without trailer hitch: connector C477, pin 6, circuit 29S-LF20 (OG), wiring harness side and ground. - Estate: With trailer hitch: connector C2037, pin 6, circuit 29S-LF20 (OG), wiring harness side and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes GO to C17. → No LOCATE and RECTIFY the break in the circuit between fuse F54 (CJB) and the right-hand rear lamp assembly using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>C17: CHECK THE GROUND CONNECTION TO THE RIGHT-HAND REAR LAMP ASSEMBLY FOR OPEN CIRCUIT</p>	
 <p>VFE60523</p>	<p>1 Measure the resistance between the right-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions: Without trailer hitch: Connector C473, pin 3, circuit 31-LF24 (BK), wiring harness side and ground. - 3-door and 5-door versions: With trailer hitch: connector C2007, pin 3, circuit (BK), wiring harness side and ground. - 4-door versions: Without trailer hitch: connector C477, pin 4, circuit 31-LF24B (BK), wiring harness side and ground. - 4-door versions: With trailer hitch: connector C2037, pin 4, circuit 31-LF24A (BK), wiring harness side and ground. - Estate: Without trailer hitch: connector C477, pin 3, circuit 31-LF24A (BK), wiring harness side and ground. - Estate: With trailer hitch: connector C2037, pin 3, circuit 31-LF24A (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the right-hand rear lamp assembly. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the right-hand rear lamp assembly and ground connection G70 using the Wiring Diagrams. CHECK the operation of the system.
<p>C18: CHECK THE VOLTAGE SUPPLY TO THE RIGHT-HAND LICENCE PLATE LAMP FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect right-hand license plate lamp from connector C497.</p> <p>2 Switch on SIDE LIGHTS.</p>

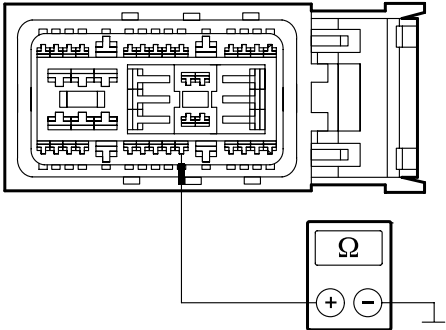
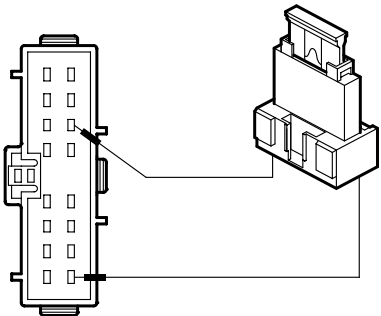
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0007844</p>	<p>3 Measure the voltage between right-hand license lamp, connector C497, pin 1, circuit 29S-LF22 (OG/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes GO to C19.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the right-hand license plate lamp and the left-hand license plate lamp using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>C19: CHECK THE GROUND CONNECTION TO THE RIGHT-HAND LICENCE PLATE LAMP FOR OPEN CIRCUIT</p>	
	<p>1 Switch off side lights.</p> <p>2 Disconnect right-hand license plate lamp from connector C496.</p>
 <p>E0011541</p>	<p>3 Measure the resistance between right-hand license lamp, connector C496, pin 1, circuit 31-LF22 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes CHECK and if necessary RENEW the license plate lamp. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the right-hand license plate lamp and soldered connection S196 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>C20: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).</p>	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to C21.</p> <p>→ No GO to C23.</p>
<p>C21: CHECK FUSE F127 (7.5 A) (CJB)</p>	
	<p>1 Disconnect Fuse F127 (7.5 A) (CJB).</p>

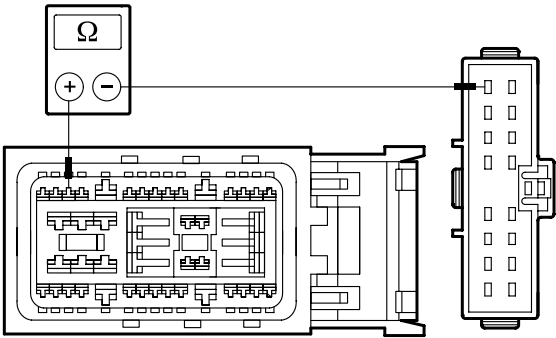
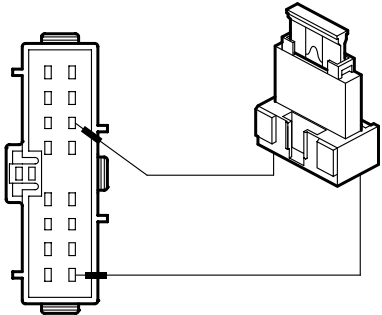
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK Fuse F127 (7.5 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to C22.</p> <p>→ No RENEW fuse F127 (7.5 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
C22: CHECK THE VOLTAGE SUPPLY TO FUSE F127 (7.5 A) (CJB) FOR OPEN CIRCUIT	
	<p>1 Connect Fuse F127 (7.5 A) (CJB).</p> <p>2 Switch on SIDE LIGHTS.</p> <p>3 Measure the voltage between fuse F127 (7.5 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to C25.</p> <p>→ No GO to C26.</p>
C23: CHECK FUSE F73 (7.5 A) (CJB).	
	<p>1 Disconnect fuse F73 (7.5 A) (CJB).</p> <p>2 CHECK fuse F73 (7.5 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to C24.</p> <p>→ No RENEW fuse F73 (7.5 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
C24: CHECK THE VOLTAGE SUPPLY TO FUSE F73 (7.5 A) (CJB) FOR OPEN CIRCUIT	
	<p>1 Connect fuse F73 (7.5 A) (CJB).</p> <p>2 Switch on SIDE LIGHTS.</p>

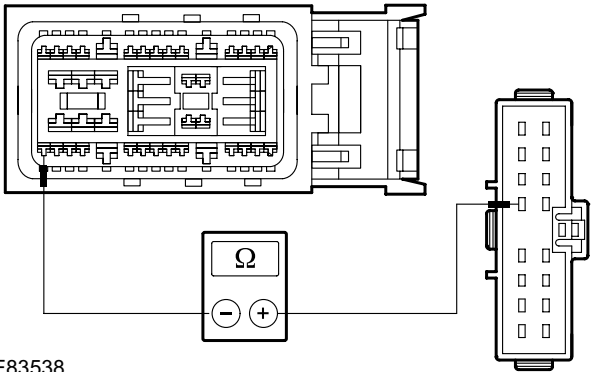
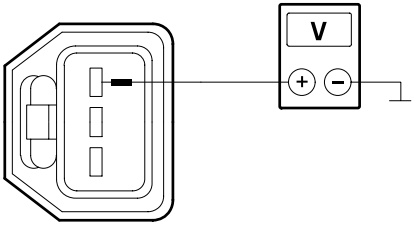
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between fuse F73 (7.5 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to C25. → No GO to C26.
C25: CHECK THE COMMON POWER SUPPLY OF THE LICENSE PLATE LAMPS FOR OPEN	
 <p>E83541</p>	<p>1 Disconnect CJB from connector C100.</p> <p>2 Measure the resistance between the CJB, connector C100, pin 10, 29S-LF21 (OG/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohm measured? → Yes LOCATE and RECTIFY the break in circuit 29S-LF21 (OG/BK) or 29S-LF21 (BK), between the CJB and the left-hand license plate lamp using the Wiring Diagrams. CHECK the operation of the system. → No CHECK and if necessary RENEW the CJB. CHECK the operation of the system.
C26: CHECK THE HEADLIGHT SWITCH	
 <p>E83547</p>	<p>1 Switch off side lights.</p> <p>2 Disconnect Headlight switch from connector C320.</p> <p>3 Using a fused bridging cable (15 A) at the headlamp switch, connect between connector C320, pin 11, circuit 29-LE29 (RD/GN) and pin 16, circuit 29S-LF5 (OG/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Do the license plate lamps illuminate? → Yes INSTALL A NEW headlight switch. CHECK the operation of the system. → No GO to C27.
C27: CHECK THE VOLTAGE SUPPLY FOR OPEN CIRCUIT	
	<p>1 Disconnect CJB from connector C102.</p>

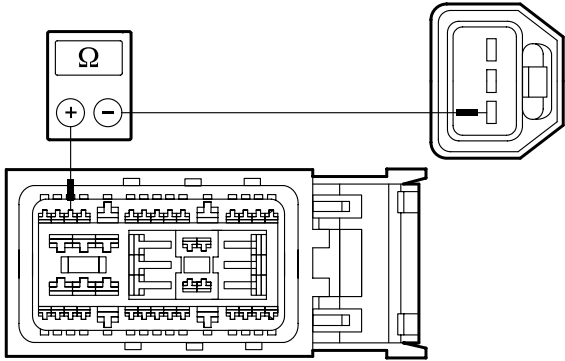
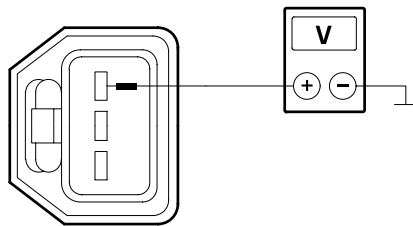
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83542</p>	<p>2 Measure the resistance between the headlamp switch, connector C320, pin 16, circuit 29S-LF5 (OG/BU), wiring harness side and the CJB, connector C102, pin 34, circuit 29S-LF5 (OG/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in circuit 29S-LF5 (OG/BU), between the headlamp switch and the CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>C28: CHECK THE HEADLIGHT SWITCH</p>	
 <p>E83547</p>	<p>1 Disconnect Headlight switch from connector C320.</p> <p>2 Connect a fused jumper wire (15 A) to the headlight switch, connector C320, between pin 11, circuit 29-LE29 (OG/BK) and pin 13, circuit 29S-LF1 (OG/YE), wiring harness side.</p> <ul style="list-style-type: none"> • Do the parking lamps and rear lamps illuminate? → Yes INSTALL A NEW headlight switch. CHECK the operation of the system. → No GO to C29.
<p>C29: CHECK THE COMMON POWER SUPPLY OF THE PARKING LAMPS FOR OPEN</p>	
	<p>1 Disconnect CJB from connector C102.</p>

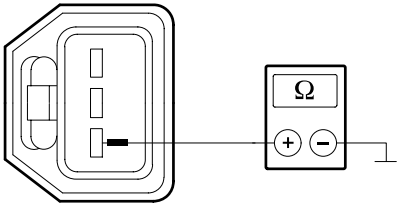
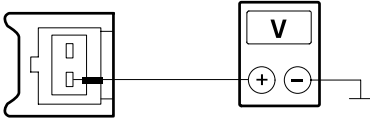
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E83538</p>	<p>2 Measure the resistance between the CJB, connector C102, pin 1, circuit 29S-LF1 (OG/YE), wiring harness side and the headlamp switch, connector C320, pin 13, circuit 29S-LF1 (OG/YE), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the headlight switch and CJB using the wiring diagrams. CHECK the operation of the system.</p>
<p>C30: DETERMINE THE FAULT CONDITION</p>	
	<p>1 Switch on SIDE LIGHTS.</p> <ul style="list-style-type: none"> Are the left-hand rear lamp and the left-hand rear lamp (tailgate) inoperative? <p>→ Yes GO to C31.</p> <p>→ No</p> <ul style="list-style-type: none"> - Left-hand rear lamp inoperative: GO to C33. - Left-hand rear lamp (tailgate) inoperative: GO to C35.
<p>C31: CHECK THE COMMON GROUND OF THE LEFT-HAND REAR LAMPS FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect left-hand rear lamp from connector C3928.</p> <p>2 Switch on SIDE LIGHTS.</p>
 <p>VFE0029271</p>	<p>3 Measure the voltage between the left-hand rear lamp, connector C3928, pin 1, circuit 29S-LF11A (OG/WH), harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes LOCATE and RECTIFY the break in the circuits between soldered connection S2 and ground connection G77 with the aid of the Wiring Diagrams. CHECK the operation of the system.</p> <p>→ No GO to C32.</p>

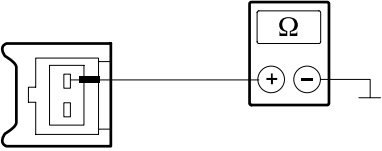
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C32: CHECK THE COMMON VOLTAGE SUPPLY OF THE LEFT-HAND REAR LAMPS FOR OPEN CIRCUIT	
 <p>E83543</p>	<ol style="list-style-type: none"> 1 Disconnect CJB from connector C100. 2 Measure the resistance between the CJB, connector C100, pin 34, circuit 29S-LF11 (OG/WH), wiring harness side and the left-hand rear lamp, connector C3928, pin 1, circuit 29S-LF11A (OG/WH), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and soldered connection S8 using the Wiring Diagrams. CHECK the operation of the system.
C33: CHECK THE POWER SUPPLY TO THE LEFT-HAND REAR LAMP FOR OPEN CIRCUIT	
 <p>VFE0029271</p>	<ol style="list-style-type: none"> 1 Disconnect left-hand rear lamp from connector C3928. 2 Switch on SIDE LIGHTS. 3 Measure the voltage between the left-hand rear lamp, connector C3928, pin 1, circuit 29S-LF11A (OG/WH), harness side and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes GO to C34. → No LOCATE and RECTIFY the break in the circuit between soldered connection S8 and the rear lamp using the Wiring Diagrams. CHECK the operation of the system.

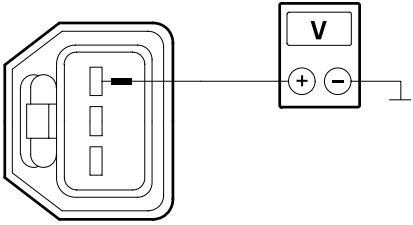
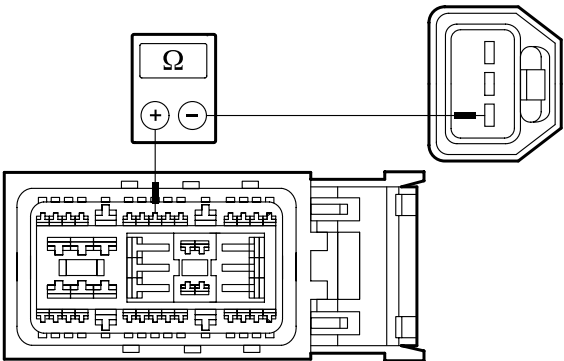
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C34: CHECK GROUND SUPPLY OF LEFT-HAND REAR LAMP FOR OPEN CIRCUIT	
 <p>VFE0036130</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the left-hand rear lamp, connector C3928, pin 3, circuit 31-LF23A (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK the rear lamp and INSTALL a NEW one if necessary. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the rear lamp and soldered connection S2 using the wiring diagrams. CHECK the operation of the system.
C35: CHECK THE VOLTAGE SUPPLY OF THE LEFT-HAND REAR LAMP (TAILGATE) FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Disconnect left-hand rear lamp (tailgate) from connector C3935.
 <p>VFE0022789</p>	<ol style="list-style-type: none"> 2 Switch on SIDE LIGHTS. 3 Measure the voltage between the left-hand rear lamp (tailgate), connector C3935, pin 1, circuit 29S-LF11B (OG/WH), harness side and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes GO to C36. → No LOCATE and RECTIFY the break in the circuit between soldered connection S8 and the rear lamp (tailgate) using the Wiring Diagrams. CHECK the operation of the system.

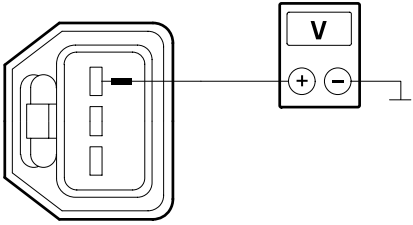
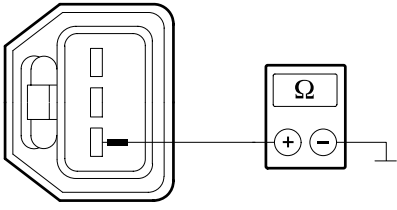
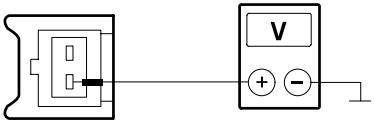
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C36: CHECK THE GROUND CONNECTION OF THE LEFT-HAND REAR LAMP (TAILGATE) FOR OPEN CIRCUIT	
 <p>VFE0022792</p>	<p>1 Measure the resistance between the left-hand rear lamp (tailgate), connector C3935, pin 2, circuit 31-LF23B (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes CHECK the rear lamp (tailgate) and INSTALL a NEW one if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the rear lamp (tailgate) and soldered connection S2 using the wiring diagrams. CHECK the operation of the system.</p>
C37: DETERMINE THE FAULT CONDITION	
	<p>1 Switch on SIDE LIGHTS.</p> <ul style="list-style-type: none"> Are the right-hand rear lamp and rear lamp (tailgate) inoperative? <p>→ Yes GO to C38.</p> <p>→ No</p> <ul style="list-style-type: none"> - Right-hand rear lamp inoperative: GO to C40. - Right-hand rear lamp (tailgate) inoperative: GO to C42.
C38: CHECK THE SHARED GROUND SUPPLY OF THE RIGHT-HAND REAR LAMPS FOR OPEN CIRCUIT	
	<p>1 Disconnect right-hand rear lamp from connector C3929.</p> <p>2 Switch on SIDE LIGHTS.</p>

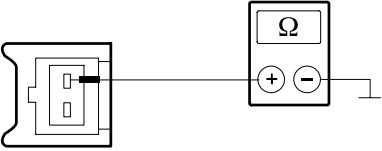
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0029271</p>	<p>3 Measure the voltage between the right-hand rear lamp, connector C3929, pin 1, circuit 29S-LF20A (OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? → Yes LOCATE and RECTIFY the break in the circuits between soldered connection S199 and ground connection G70 with the aid of the Wiring Diagrams. CHECK the operation of the system. → No GO to C39.
<p>C39: CHECK THE SHARED VOLTAGE SUPPLY OF THE RIGHT-HAND REAR LAMPS FOR OPEN CIRCUIT</p>	
 <p>E83544</p>	<p>1 Disconnect CJB from connector C100.</p> <p>2 Measure the resistance between the CJB, connector C100, pin 39, circuit 29S-LF20 (OG), wiring harness side and the right-hand rear lamp, connector C3929, pin 1, circuit 29S-LF20A (OG), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? → Yes CHECK and if necessary RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and soldered connection S9 using the Wiring Diagrams. CHECK the operation of the system.
<p>C40: CHECK THE VOLTAGE SUPPLY TO THE RIGHT-HAND REAR LAMP FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect right-hand rear lamp from connector C3929.</p> <p>2 Switch on SIDE LIGHTS.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0029271</p>	<p>3 Measure the voltage between the right-hand rear lamp, connector C3929, pin 1, circuit 29S-LF20A (OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes GO to C41.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between soldered connection S9 and the rear lamp using the Wiring Diagrams. CHECK the operation of the system.</p>
C41: CHECK THE GROUND SUPPLY TO THE RIGHT-HAND REAR LAMP FOR OPEN CIRCUIT	
 <p>VFE0036130</p>	<p>1 Measure the resistance between the right-hand rear lamp, connector C3929, pin 3, circuit 31-LF24A (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes CHECK the rear lamp and INSTALL a NEW one if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the rear lamp and soldered connection S199 using the Wiring Diagrams. CHECK the operation of the system.</p>
C42: CHECK THE VOLTAGE SUPPLY TO THE RIGHT-HAND REAR LAMP (TAILGATE) FOR OPEN CIRCUIT	
	<p>1 Disconnect right-hand rear lamp (tailgate) from connector C3936.</p>
	<p>2 Switch on SIDE LIGHTS.</p>
 <p>VFE0022789</p>	<p>3 Measure the voltage between the right-hand rear lamp (tailgate), connector C3936, pin 1, circuit 29S-LF20B (OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes GO to C43.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between soldered connection S9 and the rear lamp (tailgate) using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C43: CHECK THE GROUND SUPPLY TO THE RIGHT-HAND REAR LAMP (TAILGATE) FOR OPEN CIRCUIT	
 <p>VFE0022792</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the right-hand rear lamp (tailgate), connector C3936, pin 2, circuit 31-LF24B (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK the rear lamp (tailgate) and INSTALL a NEW one if necessary. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the rear lamp (tailgate) and soldered connection S199 using the wiring diagrams. CHECK the operation of the system.

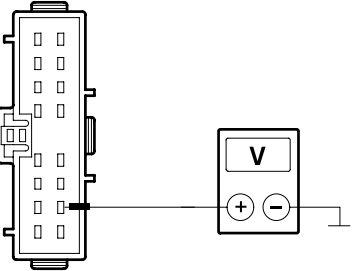
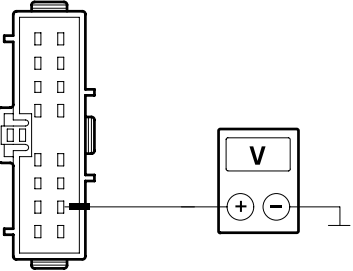
PINPOINT TEST M : PARKING LAMPS, REAR LAMPS AND LICENSE PLATE LAMPS ARE ON PERMANENTLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: DETERMINE THE FAULT CONDITION	
	<ol style="list-style-type: none"> 1 Disconnect fuse F53 (7.5 A) (CJB).
	<ol style="list-style-type: none"> 2 Disconnect fuse F54 (7.5 A) (CJB).
	<ol style="list-style-type: none"> 3 Disconnect fuse F73 (7.5 A) (CJB).
	<ol style="list-style-type: none"> 4 Ignition switch in position II.

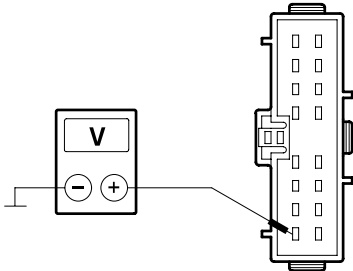
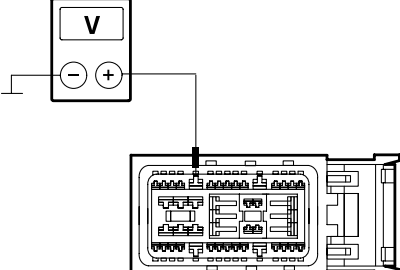
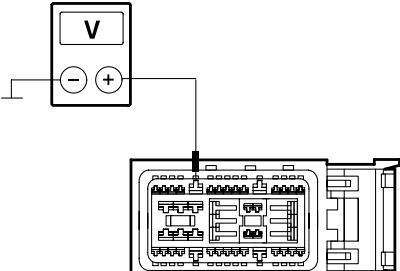
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 CHECK parking lamps, rear lamps and license plate lamps.</p> <ul style="list-style-type: none"> • Are the left-hand parking lamps illuminated continuously? <p>→ Yes LOCATE AND RECTIFY the short to battery voltage in the circuits connected to fuse F53 (CJB), output side, using the Wiring Diagrams. CHECK the operation of the system. Vehicles with trailer hitch, check trailer connection and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No</p> <ul style="list-style-type: none"> - Right-hand parking lamps illuminate continuously: LOCATE and RECTIFY the short to battery voltage in the circuits connected to fuse F54 (CJB), output side, using the Wiring Diagrams. CHECK the operation of the system. Vehicles with trailer hitch, check trailer connection and RENEW if necessary. CHECK the operation of the system. - License plate lamps illuminate continuously: LOCATE and RECTIFY the short to battery voltage in the circuits connected to fuse F73 (CJB), output side, using the Wiring Diagrams. CHECK the operation of the system. - Parking lamps, rear lamps and license plate lamps do not light up: GO to D2.
D2: CHECK THE HEADLIGHT SWITCH	
	<p>1 Ignition switch in position 0.</p> <p>2 Connect fuse F53 (7.5 A) (CJB).</p> <p>3 Connect fuse F54 (7.5 A) (CJB).</p> <p>4 Connect fuse F73 (7.5 A) (CJB).</p> <p>5 Disconnect Headlight switch from connector C320.</p> <p>6 Ignition switch in position II.</p>

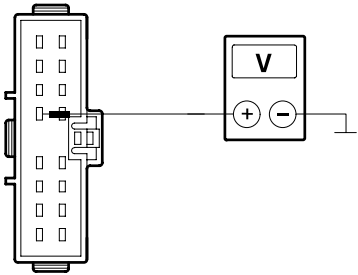
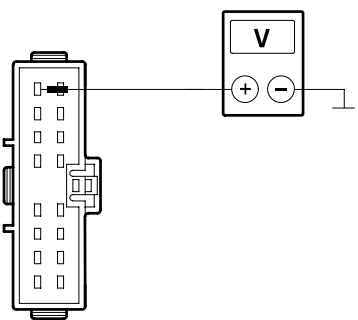
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>7 CHECK parking lamps, rear lamps and license plate lamps.</p> <ul style="list-style-type: none"> Do the parking lamps and rear lamps illuminate continuously? <p>→ Yes GO to D7.</p> <p>→ No</p> <ul style="list-style-type: none"> The license plate lamps illuminate continuously: GO to D8. No fault can be detected, vehicles without daytime running lamps: RENEW the light switch. CHECK the operation of the system. No fault can be detected, vehicles with daytime running lamps: GO to D3.
<p>D3: CHECK CIRCUIT FOR SHORT TO BATTERY VOLTAGE</p>	
 <p>VFE0033878</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the voltage between the headlamp switch, C320, pin 15, circuit 15-LE6 (GN/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes GO to D4.</p> <p>→ No INSTALL A NEW headlight switch. CHECK the operation of the system.</p>
<p>D4: CHECK CIRCUIT FOR SHORT TO BATTERY VOLTAGE</p>	
 <p>VFE0033878</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C102.</p> <p>3 Measure the voltage between the headlamp switch, C320, pin 15, circuit 15-LE6 (GN/YE), wiring harness side and ground.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038441</p>	<p>4 Measure the voltage between the headlamp switch, C320, pin 8, circuit 15-LE29 (GN/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? → Yes LOCATE and RECTIFY the short to battery voltage in the corresponding circuit between the CJB and the headlamp switch using the Wiring Diagrams. CHECK the operation of the system. → No GO to D5.
<p>D5: CHECK CIRCUIT FOR SHORT TO BATTERY VOLTAGE</p>	
 <p>VFE48134</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the voltage between the CJB, connector C102, pin 36, circuit 15-DA1 (GN/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? → Yes GO to D6. → No CHECK and if necessary RENEW the CJB. CHECK the operation of the system.
<p>D6: CHECK CIRCUIT FOR SHORT TO BATTERY VOLTAGE</p>	
 <p>VFE48134</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Ignition switch from connector C456.</p> <p>3 Measure the voltage between the CJB, connector C102, pin 36, circuit 15-DA1 (GN/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? → Yes LOCATE and RECTIFY the short to battery voltage in the circuit between the ignition switch and CJB using the Wiring Diagrams. CHECK the operation of the system. → No RENEW the ignition switch. CHECK the operation of the system.

DIAGNOSIS AND TESTING

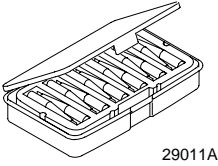
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D7: ELIMINATE THE CENTRAL JUNCTION BOX (CJB) AS CAUSE FOR THE SHORT TO BATTERY VOLTAGE	
	1 Ignition switch in position 0.
	2 Disconnect CJB from connector C102.
	3 Ignition switch in position II.
 <p>VFE0034861</p>	<p>4 Measure the voltage between the headlamp switch, connector C320, pin 13, circuit 29S-LF1 (OG/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? → Yes LOCATE and RECTIFY the short to battery voltage in the circuit between the headlamp switch and the CJB using the Wiring Diagrams. CHECK the operation of the system. → No CHECK and if necessary RENEW the CJB. CHECK the operation of the system.
D8: ELIMINATE THE CENTRAL JUNCTION BOX (CJB) AS CAUSE FOR THE SHORT TO BATTERY VOLTAGE	
	1 Ignition switch in position 0.
	2 Disconnect CJB from connector C102.
	3 Ignition switch in position II.
 <p>VFE0034837</p>	<p>4 Measure the voltage between the headlamp switch, connector C320, pin 16, circuit 29S-LF5 (OG/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? → Yes LOCATE and RECTIFY the short to battery voltage in the circuit between the headlamp switch and the CJB using the Wiring Diagrams. CHECK the operation of the system. → No CHECK and if necessary RENEW the CJB. CHECK the operation of the system.

DIAGNOSIS AND TESTING

Fog Lamps

Refer to Wiring Diagrams Section 417-01, for schematic and connector information.

Special Tool(s)

 <p>29011A</p>	<p>Terminal Probe Kit 29-011A</p>
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NOTE: Before reading out the vehicle-specific data, remake all the electrical connections which were separated in the vehicle, so that communication between the module and WDS is ensured.

1. Verify the customer concern.
2. Visually inspect for obvious signs of electrical damage.

NOTE: Ensure correct engagement of the wiring harness connectors.

Visual Inspection

Electrical
<ul style="list-style-type: none"> • Fuse(s) • Lamp(s) • Connector(s). • Switches • Relay • Wiring harness

Inspection and Checking

NOTE: The generic electronic module (GEM) forms part of the central junction box (CJB).

NOTE: If the generic electronic module (GEM) is changed, the new one must be configured. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module. REFER to:

Communications Network - 3-Door (418-00 Module Communications Network, Diagnosis and Testing),

Communications Network (418-00 Module Communications Network, Diagnosis and Testing),

Generic Electronic Module (GEM) (419-10 Multifunction Electronic Modules, Diagnosis and Testing).

3. Resolve any obvious causes or concerns found during the visual inspection before carrying out any further tests.
4. If the cause of the concern cannot be determined with a visual inspection, proceed to the Symptom Chart.

Symptom Chart

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • Fog lamps inoperative 	<ul style="list-style-type: none"> • Fuse • Circuit(s) • Headlight switch • Rear fog lamp cut-off relay • Central Junction Box (CJB) • Left/right-hand rear lamp assembly • Left/right-hand rear fog lamp 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.
<ul style="list-style-type: none"> • One fog lamp is inoperative 	<ul style="list-style-type: none"> • Circuit(s) • Left/right-hand front fog lamp • Left/right-hand rear lamp assembly • Left/right-hand tailgate lamp assembly 	<ul style="list-style-type: none"> • GO to Pinpoint Test B.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Rear fog lamps or front fog lamps illuminate continuously 	<ul style="list-style-type: none"> Circuit(s) Headlight switch Instrument cluster 	<ul style="list-style-type: none"> GO to Pinpoint Test C.
<ul style="list-style-type: none"> The fog lamp warning lamp in the instrument cluster is inoperative. 	<ul style="list-style-type: none"> Circuit(s) Instrument cluster 	<ul style="list-style-type: none"> GO to Pinpoint Test D.

System Checks

NOTE: Use a digital multimeter for all electrical measurements.

PINPOINT TEST N : FOG LAMPS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: DETERMINE THE FAULT CONDITION	
	<ol style="list-style-type: none"> Ignition switch in position II. Switch on the front fog lamps. Switch on the REAR FOG LIGHT. CHECK the front and rear fog lamps. <ul style="list-style-type: none"> Are all fog lamps inoperative? <ul style="list-style-type: none"> → Yes GO to A3. → No <ul style="list-style-type: none"> - Front fog lamps inoperative: GO to A9. - Rear fog lamp(s) inoperative: GO to A11.
A2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> Unfasten the CJB and fold it down. <ul style="list-style-type: none"> Is the location for connector C100 on the top of the CJB? <ul style="list-style-type: none"> → Yes GO to A3. → No GO to A5.
A3: CHECK FUSE F116 (20 A) (CJB)	
	<ol style="list-style-type: none"> Ignition switch in position 0. Disconnect Fuse F116 (20 A) (CJB).

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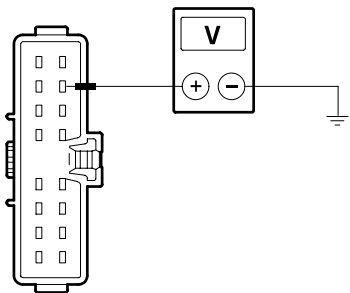
Exterior Lighting

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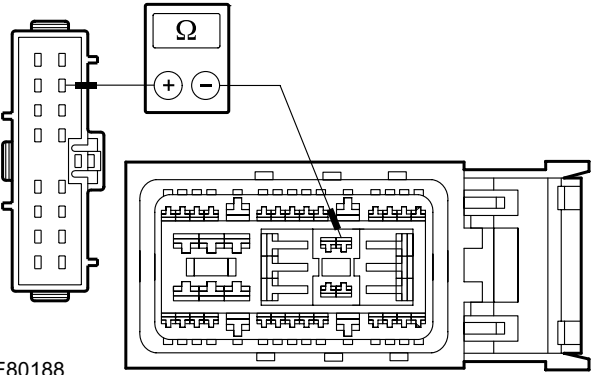
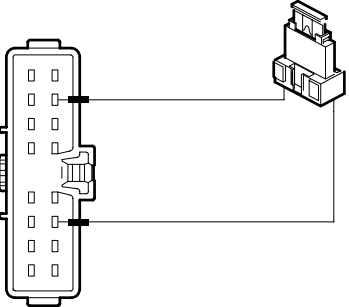
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 CHECK Fuse F116 (20 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK.? <p>→ Yes GO to A4.</p> <p>→ No RENEW fuse F116 (20 A) (CJB) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
A4: CHECK THE VOLTAGE SUPPLY TO FUSE F116 (20 A) (CJB) FOR OPEN CIRCUIT	
	<p>1 Connect Fuse F116 (20 A) (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F116 (20 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to A7.</p> <p>→ No LOCATE AND RECTIFY the break in the voltage supply of fuse F116 (20 A) (CJB) using the Wiring Diagrams. If necessary RENEW the CJB. CHECK the operation of the system.</p>
A5: CHECK FUSE F69 (20 A) (CJB).	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse F169 (20 A) (CJB).</p> <p>3 CHECK fuse F69 (20 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK.? <p>→ Yes GO to A6.</p> <p>→ No RENEW fuse F69 (20 A) (CJB) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
A6: CHECK THE VOLTAGE SUPPLY TO FUSE F69 (20 A) (CJB) FOR OPEN CIRCUIT	
	<p>1 Connect fuse F69 (20 A) (CJB).</p> <p>2 Ignition switch in position II.</p>

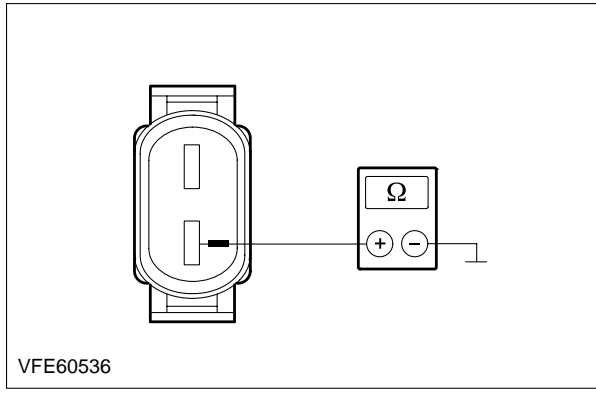
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between fuse F69 (20 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to A7.</p> <p>→ No LOCATE AND RECTIFY the break in the voltage supply of fuse F69 (20 A) (CJB) using the Wiring Diagrams. If necessary RENEW the CJB. CHECK the operation of the system.</p>
<p>A7: CHECK THE VOLTAGE SUPPLY TO THE HEADLIGHT SWITCH FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Headlight switch from connector C320.</p> <p>3 Ignition switch in position II.</p>
 <p>VFE0003184</p>	<p>4 Measure the voltage between the headlamp switch, connector C320, pin 7, circuit 15-LD16 (GN/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes INSTALL A NEW headlight switch. CHECK the operation of the system.</p> <p>→ No GO to A8.</p>
<p>A8: CHECK CIRCUIT 15-LD16 (GN/RD) BETWEEN THE CJB AND THE HEADLAMP SWITCH FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p>

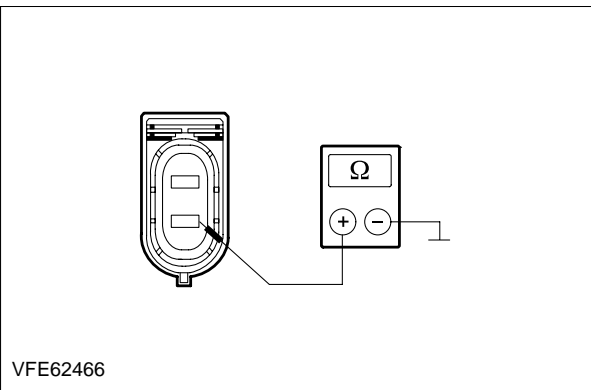
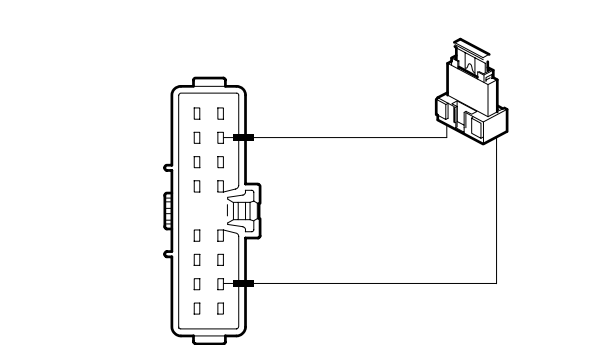
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E80188</p>	<p>2 Measure the resistance between the CJB, connector C102, pin 30, circuit 15-LD16 (GN/RD), wiring harness side and the headlamp switch, connector C320, pin 7, circuit 15-LD16 (GN/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes RENEW THE CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and the headlamp switch with the aid of the Wiring Diagrams. CHECK the operation of the system.
<p>A9: CHECK THE HEADLIGHT SWITCH</p>	
 <p>E0024111</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Headlight switch from connector C320.</p> <p>3 Using a fused bridging cable (20 A) at the headlight switch, connect between connector C320, pin 7, circuit 15-LD16 (GN/RD) and pin 3, circuit 15S-LD7A (GN/BU), wiring harness side.</p>
	<p>4 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 CHECK the front fog lamps and the front fog lamp warning lamp.</p> <ul style="list-style-type: none"> • Do the front fog lamps illuminate? <p>→ Yes INSTALL A NEW headlight switch. CHECK the operation of the system.</p> <p>→ No</p> <ul style="list-style-type: none"> - Front fog lamps inoperative, front fog lamp warning lamp ON: GO to A10. - Front fog lamps and front fog lamp warning lamp inoperative. LOCATE and RECTIFY the break in circuit 15S-LD7A (GN/BU) between the headlamp switch and soldered connection S71 using the Wiring Diagrams. CHECK the operation of the system.
A10: CHECK THE COMMON GROUND OF THE FOG LAMPS FOR OPEN CIRCUIT	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect Left-hand front fog lamp from connector C302.</p>
 <p>VFE60536</p>	<p>3 Vehicles built before 01/2005: Measure the resistance between left-hand front fog lamp, connector C302, pin 2, circuit 31-LD11 (BK), wiring harness side and ground.</p>

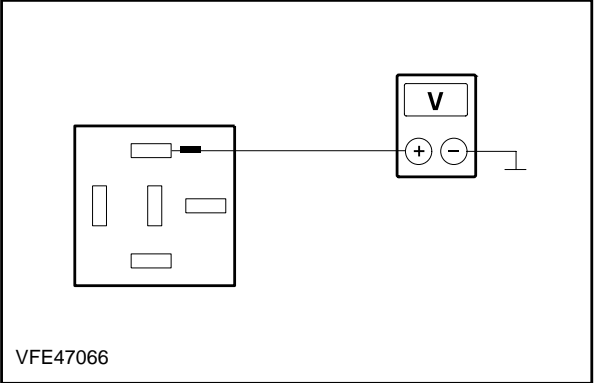
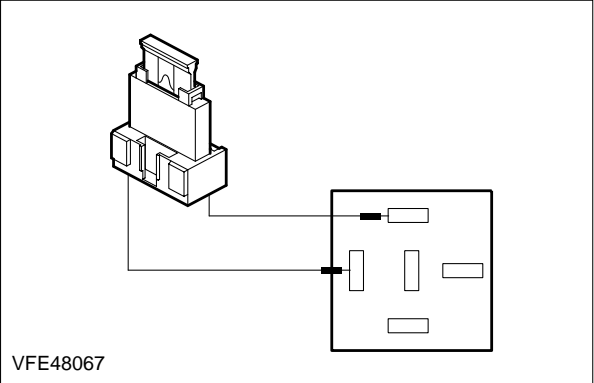
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE62466</p>	<p>4 Vehicles built from 01/2005: Measure the resistance between left-hand front fog lamp, connector C302, pin 2, circuit 31-LD11 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? → Yes LOCATE and RECTIFY the break in circuit 15S-LD1 (GN/YE) between soldered connection S71 and soldered connection S108 using the Wiring Diagrams. CHECK the operation of the system. → No LOCATE and RECTIFY the break in circuit 31-DA3 (BK) between soldered connection S121 and ground connection G37 using the Wiring Diagrams. CHECK the operation of the system.
<p>A11: CHECK THE HEADLIGHT SWITCH</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Headlight switch from connector C320.</p>
 <p>E0024110</p>	<p>3 Using a fused bridging cable (20 A) at the headlight switch, connect between connector C320, pin 7, circuit 15-LD16 (GN/RD) and pin 2, circuit 15S-LD13A (GN/OG), wiring harness side.</p>
	<p>4 Ignition switch in position II.</p>

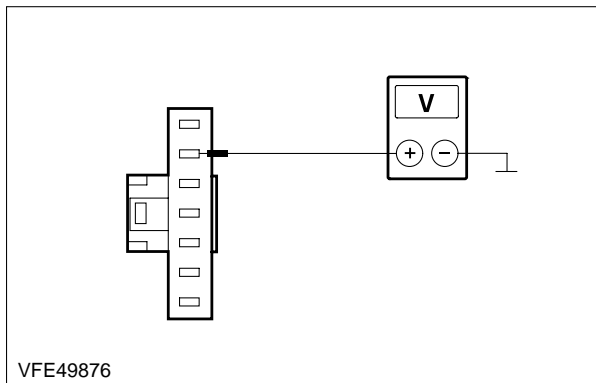
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 CHECK the rear fog lamps and the rear fog lamp warning lamp.</p> <ul style="list-style-type: none"> • Do the rear fog lamps illuminate? <p>→ Yes INSTALL A NEW headlight switch. CHECK the operation of the system.</p> <p>→ No</p> <ul style="list-style-type: none"> - 3-door and 5-door versions: Rear fog lamp inoperative, rear fog lamp warning lamp ON, vehicles without trailer coupling: GO to A16. - 4-door: Rear fog lamps inoperative, rear fog lamp warning lamp ON, vehicles without trailer coupling: LOCATE and RECTIFY the break in the circuit between soldered connection S72 and intermediate connector C112 using the Wiring Diagrams. CHECK the operation of the system. - Estate: Rear fog lamp inoperative, rear fog lamp warning lamp ON, vehicles without trailer coupling: GO to A14. - Vehicles with trailer hitch: Rear fog lamp(s) inoperative, rear fog lamp warning lamp ON: GO to A12. - All models: Rear fog lamp(s) and rear fog lamp warning lamp inoperative: LOCATE and RECTIFY the break in circuit 15S-LD13A (GN/OG) between the headlamp switch and soldered connection S72 using the Wiring Diagrams. CHECK the operation of the system.
<p>A12: CHECK THE VOLTAGE SUPPLY TO THE REAR FOG LAMP CUT-OFF RELAY FOR OPEN CIRCUIT</p>	
<p>NOTE: The fused jumper lead used in the previous test step is still connected to the headlamp switch.</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Rear fog lamp cut-off relay from socket C2011.</p> <p>3 Ignition switch in position II.</p>

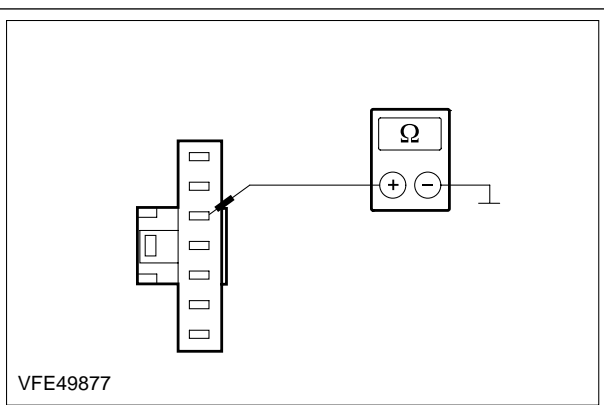
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE47066</p>	<p>4 Measure the voltage between the rear fog lamp cut-off relay:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions: socket C2011, circuit (RD/WH), socket side and ground. - All other models: socket C2011, pin 3, circuit 15S-LG6 (RD/WH), socket side and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes GO to A13. → No LOCATE and RECTIFY the break in the circuit between soldered connection S72 and the rear fog lamp shut-off relay using the Wiring Diagrams. CHECK the operation of the system.
A13: CHECK THE REAR FOG LAMP CUT-OFF RELAY	
NOTE: The fused jumper lead used in the previous test step is still connected to the headlamp switch.	
 <p>VFE48067</p>	<p>1 Ignition switch in position 0.</p> <p>2 Fused jumper lead (20A) at the rear fog lamp cut-off relay:</p> <ul style="list-style-type: none"> - 3-door and 5-door versions: connect socket C2011, circuit (RD/WH), and circuit (VT/YE), socket side. - All other models: connect socket C2011, pin 3, circuit 15S-LG6 (RD/WH) and pin 4, circuit 15S-LG6A (VT/YE), socket side.
	<p>3 Ignition switch in position II.</p> <ul style="list-style-type: none"> • Do the rear fog lamps illuminate? <ul style="list-style-type: none"> → Yes RENEW the rear fog lamp cut-off relay CHECK the operation of the system. → No <ul style="list-style-type: none"> - 3-door and 5-door versions: GO to A16. - 4-door versions: LOCATE and RECTIFY the break in circuit 15S-LG6A (VT/YE) between the rear fog lamp cut-off relay and the left-hand rear lamp assembly using the Wiring Diagrams. CHECK the operation of the system. - Wagon: GO to A14.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>A14: CHECK THE VOLTAGE SUPPLY TO THE REAR LAMP ASSEMBLY FOR OPEN CIRCUIT (ESTATE)</p>	
<p>NOTE: All models: The fused jumper lead used in the previous test step is still connected to the headlamp switch.</p>	
<p>NOTE: Vehicles with trailer hitch: The fused jumper lead used in the previous step is still connected to the rear fog lamp cut-off relay.</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Rear lamp assembly.</p> <ul style="list-style-type: none"> - LHD: Without trailer hitch: left from connector C476 - LHD: With trailer hitch: left from connector C2035 - RHD: Without trailer hitch: right from connector C477 - RHD: With trailer hitch: right from connector C2037 <p>3 Ignition switch in position II.</p>
 <p>VFE49876</p>	

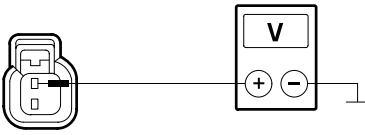
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 Measure the voltage between the rear lamp cluster:</p> <ul style="list-style-type: none"> - LHD: Without trailer hitch: left, connector C476, pin 2, circuit 15S-LD6 (GN/YE), wiring harness side and ground. - LHD: With trailer hitch: left, connector C2035, pin 2, circuit 15S-LG6A (VT/YE), wiring harness side and ground. - RHD: Without trailer hitch: right, connector C477, pin 2, circuit 15S-LD12 (GN/YE), wiring harness side and ground. - RHD: With trailer hitch: right, connector C2037, pin 2, circuit 15S-LG6A (VT/YE), wiring harness side and ground. <p>• Does the meter display battery voltage?</p> <p>→ Yes GO to A15.</p> <p>→ No</p> <ul style="list-style-type: none"> - Vehicles without trailer hitch: LOCATE and RECTIFY the break in the circuit between soldered connection S72 and the rear lamp assembly using the Wiring Diagrams. CHECK the operation of the system. - Vehicles with trailer hitch: LOCATE and RECTIFY the break in the circuit between the rear fog lamp cut-off relay and the rear lamp assembly using the Wiring Diagrams. CHECK the operation of the system.
<p>A15: CHECK THE GROUND CONNECTION TO THE REAR LAMP ASSEMBLY FOR OPEN CIRCUIT (ESTATE)</p>	
 <p>VFE49877</p>	<p>1 Ignition switch in position 0.</p>

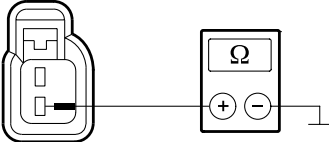
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the resistance between the rear lamp cluster:</p> <ul style="list-style-type: none"> - LHD: Without trailer hitch: left, connector C476, pin 3, circuit 31-LF23 (F/G) (BK), wiring harness side and ground. - LHD: With trailer hitch: left, connector C2035, pin 3, circuit 31-LF23 (F/G) (GN), wiring harness side and ground. - RHD: Without trailer hitch: right, connector C477, pin 3, circuit 31-LF24A (BK), wiring harness side and ground. - RHD: With trailer hitch: right, connector C2037, pin 3, circuit 31-LF24A (GN), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary INSTALL A NEW rear lamp assembly. CHECK the operation of the system. → No <ul style="list-style-type: none"> - LHD: LOCATE and RECTIFY the break in the circuit between the rear lamp assembly and ground connection G77 using the Wiring Diagrams. CHECK the operation of the system. - RHD: LOCATE and RECTIFY the break in the circuit between the rear lamp assembly and soldered connection S199 using the Wiring Diagrams. CHECK the operation of the system.
A16: CHECK THE VOLTAGE SUPPLY TO THE REAR FOG LAMPS FOR OPEN CIRCUIT (3 DOOR AND 5-DOOR VERSIONS)	
NOTE: All models: The fused jumper lead used in the previous test step is still connected to the headlamp switch.	
NOTE: Vehicles with trailer hitch: The fused jumper lead used in the previous step is still connected to the rear fog lamp cut-off relay.	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Rear fog lamp.</p> <ul style="list-style-type: none"> - LHD: Without trailer hitch: left from connector C434 - LHD: With trailer hitch: left from connector C2012 - RHD: Without trailer hitch: right from connector C430 - RHD: With trailer hitch: right from connector C2013

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0016230</p>	<p>3 Ignition switch in position II.</p>
	<p>4 Measure the voltage between rear fog lamps:</p> <ul style="list-style-type: none"> - LHD: Without trailer hitch: left, connector C434, pin 1, circuit 15S-LD6(A) (GN/YE), wiring harness side and ground. - LHD: With trailer hitch: left, connector C2012, pin 1, circuit (VT/YE), wiring harness side and ground. - RHD: Without trailer hitch: right, connector C430, pin 1, circuit 15S-LG16(A) (GN/OG), wiring harness side and ground. - RHD: With trailer hitch: right, connector C2013, pin 1, circuit (VT/YE), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <ul style="list-style-type: none"> → Yes GO to A17. → No <ul style="list-style-type: none"> - Vehicles without trailer hitch: LOCATE and RECTIFY the break in the circuit(s) between soldered connection S72 and the rear fog lamp using the wiring diagrams. CHECK the operation of the system. - Vehicles with trailer hitch: LOCATE and RECTIFY the break in the circuit(s) between the rear fog lamp cut-off relay and the rear fog lamps using the Wiring Diagrams. CHECK the operation of the system.
<p>A17: CHECK THE GROUND CONNECTION TO THE REAR FOG LAMPS FOR OPEN CIRCUIT (3 DOOR AND 5-DOOR VERSIONS)</p>	
	<p>1 Ignition switch in position 0.</p>

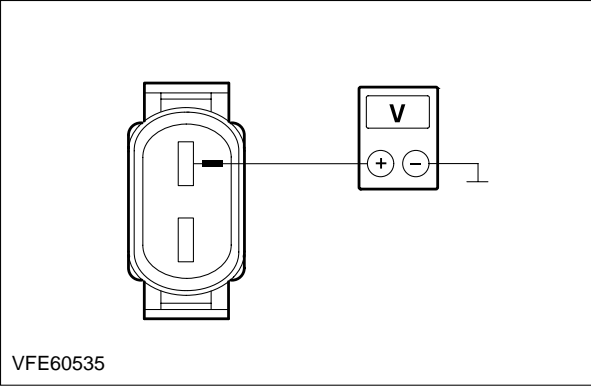
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE49878</p>	<p>2 Measure the resistance between rear fog lamps:</p> <ul style="list-style-type: none"> - LHD: Without trailer hitch: left, connector C434, pin 2, circuit 31-LG16 (BK), wiring harness side and ground. - LHD: With trailer hitch: left, connector C2012, pin 2, circuit (GN), wiring harness side and ground. - RHD: Without trailer hitch: right, connector C430, pin 2, circuit 31-LD6 (BK), wiring harness side and ground. - RHD: With trailer hitch: right, connector C2013, pin 2, circuit (GN), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK rear fog lamp and if necessary RENEW. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the rear fog lamp and soldered connection S199 using the Wiring Diagrams. CHECK the operation of the system.

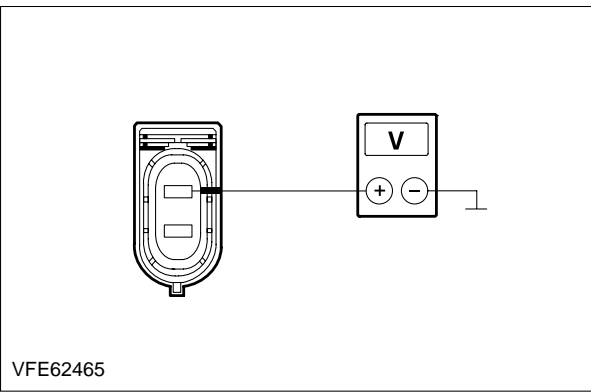
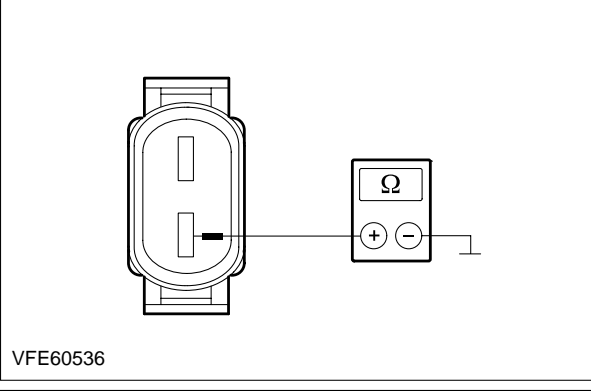
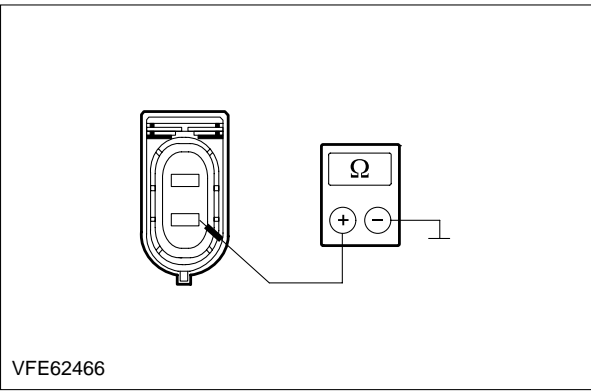
PINPOINT TEST O : ONE FOG LAMP IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: DETERMINE THE FAULT CONDITION	
	1 Ignition switch in position II.
	2 Switch on the front fog lamps.
	3 Switch on the REAR FOG LIGHT.

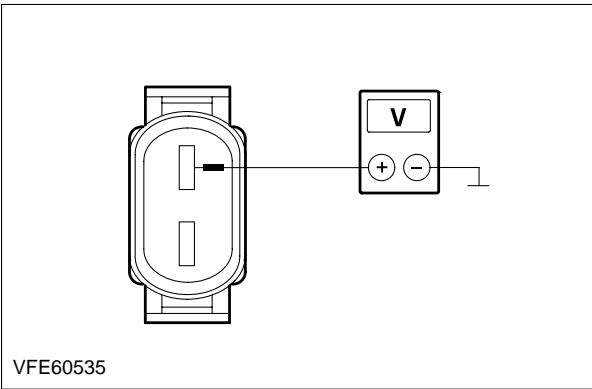
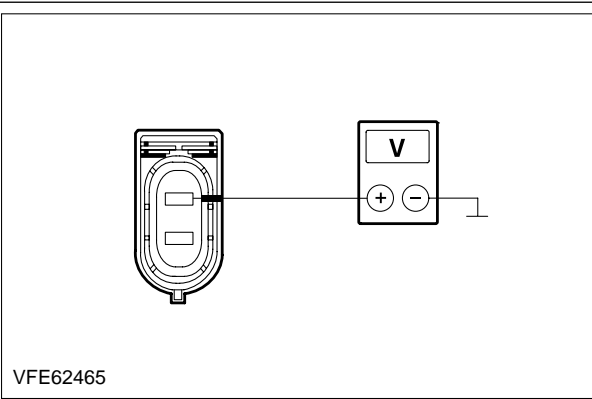
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 DETERMINE the fault conditions.</p> <ul style="list-style-type: none"> • Is one front fog lamp inoperative? <ul style="list-style-type: none"> → Yes <ul style="list-style-type: none"> - Left-hand front fog lamp inoperative: GO to B2. - Right-hand front fog lamp inoperative: GO to B4. → No <ul style="list-style-type: none"> - Vehicles without trailer hitch: Left-hand rear fog lamp inoperative, 4-door versions: GO to B6. - Left-hand rear fog lamp inoperative, Cabriolet: GO to B10. - Vehicles with trailer hitch: Left-hand rear fog lamp inoperative, 4-door versions: GO to B7. - Right-hand rear fog lamp inoperative, 4-door versions: GO to B8. - Right-hand rear fog lamp inoperative, Cabriolet: GO to B12.
<p>B2: CHECK VOLTAGE SUPPLY OF LEFT-HAND FRONT FOG LAMP FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect left-hand front fog lamp from connector C302.</p> <p>3 Ignition switch in position II.</p> <p>4 Switch on the front fog lamps.</p>
 <p>VFE60535</p>	<p>5 Vehicles built before 01/2005: Measure the voltage between left-hand front fog lamp, connector C302, pin 1, circuit 15S-LD11 (GN/WH), wiring harness side and ground.</p>

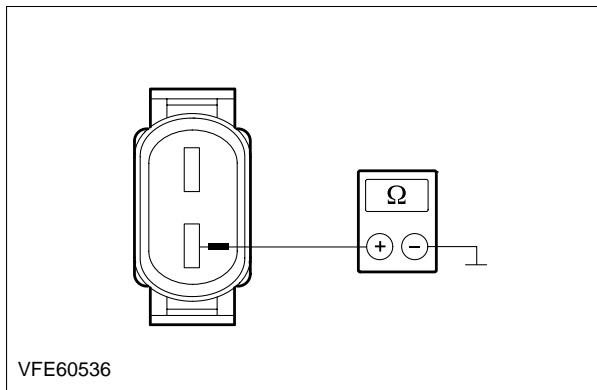
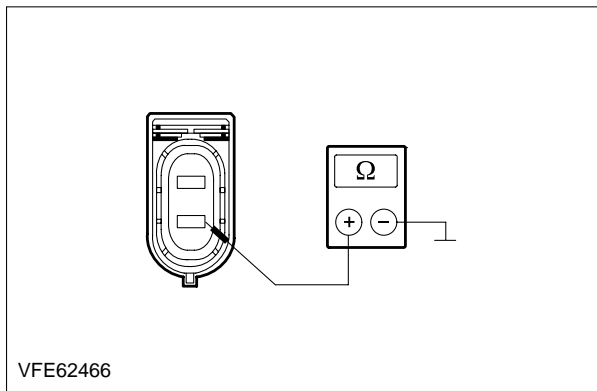
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE62465</p>	<p>6 Vehicles built from 01/2005: Measure the voltage between left-hand front fog lamp, connector C302, pin 1, circuit 15S-LD11 (GN/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? → Yes GO to B3. → No LOCATE and RECTIFY the break in the circuit between soldered connection S108 and the front fog lamps using the Wiring Diagrams. CHECK the operation of the system.
<p>B3: CHECK GROUND CONNECTION OF LEFT-HAND FRONT FOG LAMP FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 SWITCH OFF the front fog lamps.</p>
 <p>VFE60536</p>	<p>3 Vehicles built before 01/2005: Measure the resistance between left-hand front fog lamp, connector C302, pin 2, circuit 31-LD11 (BK), wiring harness side and ground.</p>
 <p>VFE62466</p>	<p>4 Vehicles built from 01/2005: Measure the resistance between left-hand front fog lamp, connector C302, pin 2, circuit 31-LD11 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? → Yes CHECK and if necessary RENEW the front fog lamp. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the front fog lamps and soldered connection S121 using the Wiring Diagrams. CHECK the operation of the system.
<p>B4: CHECK VOLTAGE SUPPLY OF RIGHT-HAND FRONT FOG LAMP FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p>

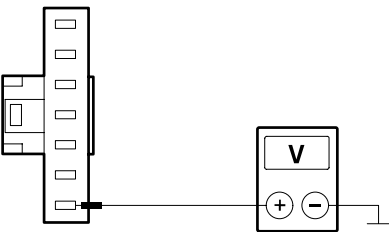
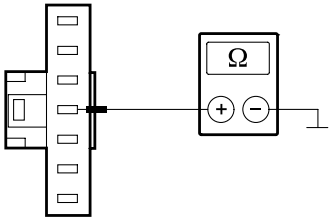
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect right-hand front fog lamp from connector C304.</p>
	<p>3 Ignition switch in position II.</p>
 <p>VFE60535</p>	<p>5 Vehicles built before 01/2005: Measure the voltage between right-hand front fog lamp, connector C304, pin 1, circuit 15S-LD17 (GN/WH), wiring harness side and ground.</p>
 <p>VFE62465</p>	<p>6 Vehicles built from 01/2005: Measure the voltage between right-hand front fog lamp, connector C304, pin 1, circuit 15S-LD17 (GN/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to B5. → No LOCATE and RECTIFY the break in the circuit between soldered connection S108 and the front fog lamps using the Wiring Diagrams. CHECK the operation of the system.
<p>B5: CHECK THE GROUND CONNECTION TO THE RIGHT-HAND FRONT FOG LAMP FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 SWITCH OFF the front fog lamps.</p>

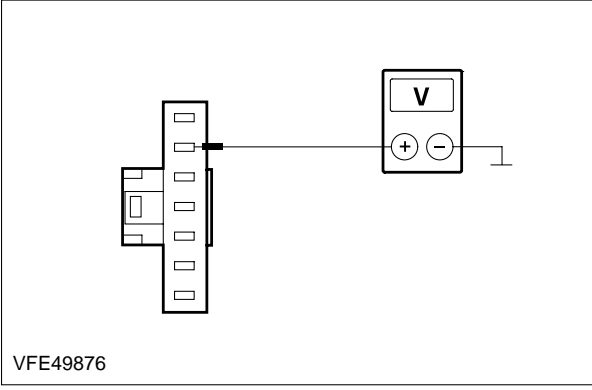
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE60536</p>	<p>3 Vehicles built before 01/2005: Measure the resistance between right-hand front fog lamp, connector C304, pin 2, circuit 31-LD17 (BK), wiring harness side and ground.</p>
 <p>VFE62466</p>	<p>4 Vehicles built from 01/2005: Measure the resistance between right-hand front fog lamp, connector C304, pin 2, circuit 31-LD17 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK and if necessary RENEW the front fog lamp. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the front fog lamps and soldered connection S121 using the Wiring Diagrams. CHECK the operation of the system.
<p>B6: CHECK THE VOLTAGE SUPPLY TO THE LEFT-HAND REAR LAMP ASSEMBLY FOR OPEN CIRCUIT (4-DOOR VERSIONS)</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect left-hand rear lamp assembly from connector C476.</p> <p>3 Ignition switch in position II.</p> <p>4 SWITCH ON the rear fog lamps.</p>

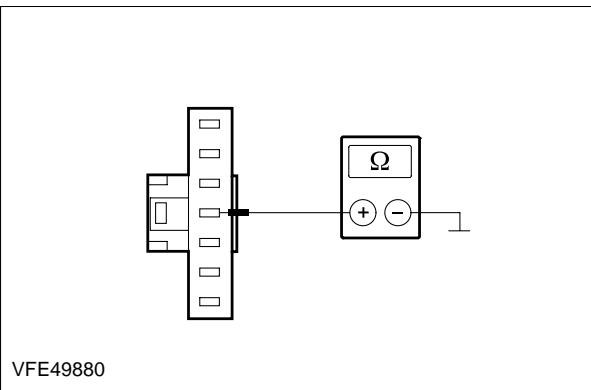
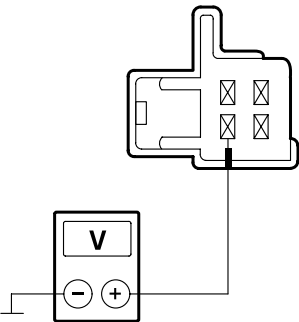
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E0031100</p>	<p>5 Measure the voltage between the left-hand rear lamp assembly, connector C476, pin 7, circuit 15S-LD6C (GN/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes GO to B7.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the left-hand rear lamp assembly and intermediate connector C112 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B7: CHECK THE GROUND CONNECTIOIN TO THE LEFT-HAND REAR LAMP ASSEMBLY FOR OPEN CIRCUIT (4-DOOR VERSIONS)</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 SWITCH OFF the rear fog lamps.</p>
	<p>3 Disconnect Only vehicles with trailer hitch: left-hand rear lamp assembly from connector C2035.</p>
 <p>VFE49880</p>	<p>4 Measure the resistance between the left-hand rear lamp assembly:</p> <ul style="list-style-type: none"> Without trailer hitch: connector C476, pin 4, circuit 31-LF23 (C/D/E) (BK), wiring harness side and ground. With trailer hitch: connector C2035, pin 4, circuit 31-LF23 (GN), wiring harness side and ground. <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes CHECK and if necessary RENEW the left-hand rear lamp assembly. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the left-hand rear lamp assembly and ground connection G77 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B8: CHECK THE VOLTAGE SUPPLY TO THE RIGHT-HAND REAR LAMP ASSEMBLY FOR OPEN CIRCUIT (4-DOOR VERSIONS)</p>	
	<p>1 Ignition switch in position 0.</p>

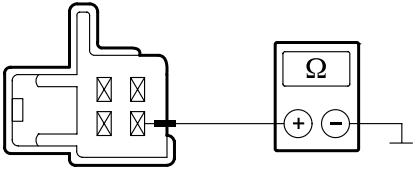
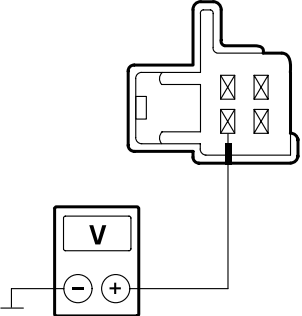
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect Right-hand rear lamp assembly from connector.</p> <ul style="list-style-type: none"> - Vehicles without trailer hitch: C477 - Vehicles with trailer hitch: C2037 <p>3 Ignition switch in position II.</p> <p>4 SWITCH ON the rear fog lamps.</p>
 <p>VFE49876</p>	<p>5 Measure the voltage between the right-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - Vehicles without trailer hitch: connector C477, pin 2, circuit 15S-LD12 (GN/YE), wiring harness side and ground. - Vehicles with trailer hitch: connector C2037, pin 2, circuit 15S-LG6B (VT/YE), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to B9.</p> <p>→ No</p> <ul style="list-style-type: none"> - Vehicles without trailer hitch: LOCATE and RECTIFY the break in the circuit between the right-hand rear lamp assembly and intermediate connector C112 using the Wiring Diagrams. CHECK the operation of the system. - Vehicles with trailer hitch: LOCATE and RECTIFY the break in the circuit between the left-hand rear lamp assembly and the right-hand rear lamp assembly using the Wiring Diagrams. CHECK the operation of the system.
<p>B9: CHECK THE GROUND CONNECTION TO THE RIGHT-HAND REAR LAMP ASSEMBLY FOR OPEN CIRCUIT (4-DOOR VERSIONS)</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 SWITCH OFF the rear fog lamps.</p>

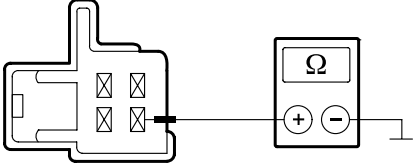
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE49880</p>	<p>3 Measure the resistance between the right-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - Vehicles without trailer hitch: connector C477, pin 4, circuit 31-LF24B (BK), wiring harness side and ground. - Vehicles with trailer hitch: connector C2037, pin 4, circuit 31-LF24A (GN), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK and if necessary RENEW the right-hand rear lamp assembly. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the right-hand rear lamp assembly and ground connection G70 using the Wiring Diagrams. CHECK the operation of the system.
<p>B10: CHECK THE VOLTAGE SUPPLY TO THE LEFT-HAND REAR LAMP ASSEMBLY (TAILGATE) FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Left-hand rear lamp assembly (tailgate) from connector C2320.</p> <p>3 Ignition switch in position II.</p> <p>4 SWITCH ON the rear fog lamps.</p>
 <p>E80189</p>	<p>5 Measure the voltage between the left-hand rear lamp assembly (tailgate), connector C2320, pin 1, circuit (GN/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to B11. → No LOCATE and RECTIFY the break in the circuit between the left-hand rear lamp assembly (tailgate) and soldered connection S2010 using the Wiring Diagrams. CHECK the operation of the system.
<p>B11: CHECK THE GROUND SUPPLY TO THE LEFT-HAND REAR LAMP ASSEMBLY (TAILGATE) FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 SWITCH OFF the rear fog lamps.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E80190</p>	<p>3 Measure the resistance between the left-hand rear lamp assembly (tailgate), connector C2320, pin 3, circuit (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes CHECK and if necessary RENEW the left-hand rear lamp assembly (tailgate). CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the left-hand rear lamp assembly (tailgate) and soldered connection S196 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B12: CHECK THE VOLTAGE SUPPLY TO THE RIGHT-HAND REAR LAMP ASSEMBLY (TAILGATE) FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Right-hand rear lamp assembly (tailgate) from connector C2321.</p> <p>3 Ignition switch in position II.</p> <p>4 SWITCH ON the rear fog lamps.</p>
 <p>E80189</p>	<p>5 Measure the voltage between the right-hand rear lamp assembly (tailgate), connector C2321, pin 1, circuit (GN/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to B13.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the right-hand rear lamp assembly (tailgate) and soldered connection S2010 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B13: CHECK THE GROUND SUPPLY TO THE RIGHT-HAND REAR LAMP ASSEMBLY (TAILGATE) FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 SWITCH OFF the rear fog lamps.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E80190</p>	<p>3 Measure the resistance between the right-hand rear lamp assembly (tailgate), connector C2321, pin 3, circuit (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes CHECK and if necessary RENEW the right-hand rear lamp assembly (tailgate). CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the right-hand rear lamp assembly (tailgate) and soldered connection S196 using the Wiring Diagrams. CHECK the operation of the system.</p>

PINPOINT TEST P : REAR FOG LAMPS OR FRONT FOG LAMPS ILLUMINATE CONTINUOUSLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: CHECK THE HEADLIGHT SWITCH	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Headlight switch from connector C320.</p> <p>3 Ignition switch in position II.</p> <p>4 CHECK fog lamps.</p> <ul style="list-style-type: none"> • Are the front fog lamps or the rear fog lamp(s) lit up? <p>→ Yes</p> <ul style="list-style-type: none"> - Front fog lamps permanently lit: GO to C3. - Vehicles without trailer hitch: Rear fog lamp(s) permanently lit: GO to C3. - Vehicles with trailer hitch: Rear fog lamp(s) permanently lit: GO to C2. <p>→ No INSTALL A NEW headlight switch. CHECK the operation of the system.</p>
C2: NARROW DOWN THE FAULT CONDITION	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Rear fog lamp cut-off relay from socket C2011.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Ignition switch in position II.</p> <ul style="list-style-type: none"> • Do the rear fog lamps illuminate? <p>→ Yes</p> <ul style="list-style-type: none"> - LHD: 3-door and 5-door versions: LOCATE and RECTIFY the short to battery voltage in the circuits connected to the left-hand rear fog lamp, connector C2012, pin 1 using the Wiring Diagrams. CHECK the operation of the system. - RHD: 3-door and 5-door versions: LOCATE and RECTIFY the short to battery voltage in the circuits connected to the right-hand rear fog lamp, connector C2013, pin 1 using the Wiring Diagrams. CHECK the operation of the system. - All other models: LOCATE and RECTIFY the short to battery voltage in the circuits connected to the rear fog lamp cut-off relay, connector C2011, pin 4 using the Wiring Diagrams. CHECK the operation of the system. <p>→ No GO to C3.</p>
C3: EXCLUDE THE INSTRUMENT CLUSTER AS THE CAUSE OF THE FAULT	
	<p>1 Ignition switch in position 0.</p> <p>2 Connect Only vehicles with trailer hitch: Rear fog lamp cut-off relay to socket C2011.</p> <p>3 Disconnect fuse F67 (10 A) (CJB).</p> <p>4 Disconnect fuse F46 (10 A) (CJB).</p> <p>5 Ignition switch in position II.</p>

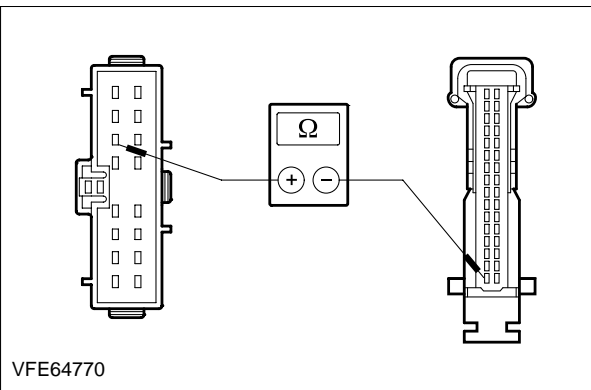
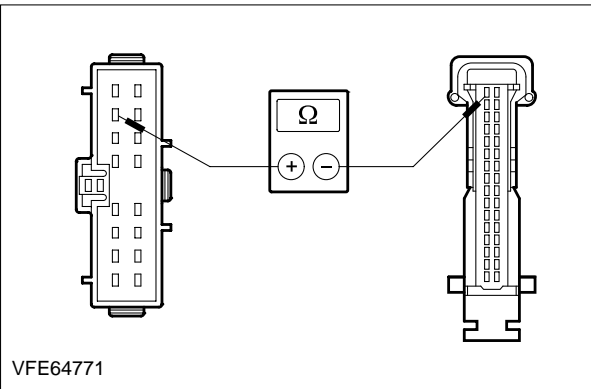
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>6 CHECK fog lamps.</p> <ul style="list-style-type: none"> • Are the front fog lamps or the rear fog lamp(s) lit up? <p>→ Yes</p> <ul style="list-style-type: none"> - Front fog lamp permanently lit: LOCATE and RECTIFY the short to battery voltage in the circuits connected to soldered connection S71 using the Wiring Diagrams. CHECK the operation of the system. - Rear fog lamp(s) permanently lit: LOCATE and RECTIFY the short to battery voltage in the circuits connected to soldered connection S72 using the Wiring Diagrams. CHECK the operation of the system. <p>→ No</p> <p>Install a new instrument cluster. CHECK the operation of the system.</p>

PINPOINT TEST Q : FOG LAMP WARNING LAMP IN THE INSTRUMENT CLUSTER INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: DETERMINE THE FAULT CONDITION	
	<p>1 Ignition switch in position II.</p> <p>2 Switch on the front fog lamps.</p> <p>3 Switch on the REAR FOG LIGHT.</p> <p>4 CHECK the operation of the warning lamp in both switch positions.</p> <ul style="list-style-type: none"> • Are both telltales inoperative? <p>→ Yes</p> <p>Install a new instrument cluster. CHECK the operation of the system.</p> <p>→ No</p> <ul style="list-style-type: none"> - The front fog lamp warning lamp is inoperative: GO to D2. - Rear fog lamp warning lamp is inoperative: GO to D3.
D2: CHECK THE SIGNAL LINE FOR THE FRONT FOG LAMP WARNING LAMP FOR OPEN CIRCUIT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Headlight switch from connector C320.</p> <p>3 Disconnect Instrument cluster from connector C809.</p>

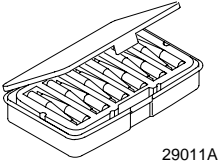
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE64770</p>	<p>4 Measure resistance between headlamp switch, connector C320, pin 3, circuit 15S-LD7A (GN/BU), wiring harness side and instrument cluster, connector C809, pin 16, circuit 15S-LD7 (GN/BU) wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes Install a new instrument cluster. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between soldered connection S71 and the instrument cluster using the Wiring Diagrams. CHECK the operation of the system.
D3: CHECK THE SIGNAL LINE FOR THE REAR FOG LAMP WARNING LAMP FOR OPEN CIRCUIT	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect Headlight switch from connector C320.</p>
	<p>3 Disconnect Instrument cluster from connector C809.</p>
 <p>VFE64771</p>	<p>4 Measure resistance between headlamp switch, connector C320, pin 2, circuit 15S-LD13A (GN/OG), wiring harness side and instrument cluster, connector C809, pin 1, circuit 15S-LD13 (GN/OG) wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes Install a new instrument cluster. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between soldered connection S72 and the instrument cluster using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING**Reversing Lamps**

Refer to Wiring Diagrams Section 417-01, for schematic and connector information.

Special Tool(s)

 <p>29011A</p>	<p>Terminal Probe Kit 29-011A</p>
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General Equipment

Worldwide Diagnostic System (WDS)

Description of operation

A diagnosis of the generic electronic module (GEM) can be performed with WDS. Furthermore, an integrated service mode enables testing of the input and output signals without the need for further tools. To enable activation of service mode:

- switch off the ignition,
- switch off all other electrical consumers,
- apply the handbrake,
- shift to neutral
- and close the doors.

Activating the service mode

Proceed as follows to activate the service mode:

- OPERATE the switch of the heated rear window and HOLD IT THERE
- Turn on the ignition.
- RELEASE the switch of the heated rear window

A signal sounds and the turn signal lamps come on to indicate that service mode has been successfully activated.

NOTE: If the alarm is activated (in vehicles fitted with an anti-theft alarm system), service mode cannot be activated.

Inputs

SWITCH the windshield wiper switch to the "Off" position to test the input signals. The following is a list of the switch signals to be tested, in no particular order:

- Turn signals (right, left, hazard warning lights)
- Windshield wiper stage I

- Windshield wiper stage II
- Windshield washer system
- Rear window wiper
- Rear window washer system
- Doors open/closed
- Remote control for central locking with double locking
- Hood open/closed (in vehicles equipped with an anti-theft alarm system)
- Tailgate open/closed
- A/C request signal
- Heated windscreen (if fitted)
- Parking Brake
- Brake reservoir fluid level
- Speed control system
- Autolamps
- dipped beam
- main beam
- headlamp flasher
- Marker Lamps
- Reversing lamp
- Liftgate release
- Ignition switch, terminal 15 (turn key to 0 position, then turn key to II position.)

An acoustic signal sounds and the turn signal lamps flash to indicate receipt of each input signal by the generic electronic module.

Test the windshield wiper "intermittent mode" stage input signal (only vehicles with adjustable intermittent mode)

The windshield wiper switch must be switched to "intermittent mode" in order to test the input signal. The delay times of the input signals can then be tested by operating the rotary switch. Each change of the rotary switch position is indicated by an acoustic signal and illumination of the turn signals.

Output signals

SWITCH the wiper switch to the "intermittent" position to test the output signals. PRESSING the heated rear window switch activates the output signals in the following order:

- a. Turn Indicator Left Hand
- b. Turn Indicator Right Hand
- c. main beam
- d. dipped beam

DIAGNOSIS AND TESTING

- e. Windshield wiper stage I
- f. Windshield wiper stage II
- g. Heated rear window
- h. Heater blower motor
- i. Headlamp washer system (vehicles with gas discharge headlamps)
- j. Electric booster heater (if fitted)
- k. Autolamps (if fitted)
- l. Alarm horn (vehicles with alarm system)
- m. Rear window wiper
- n. Rear heated window relay

When the heated rear window switch is pressed again, the test of the relevant signal is terminated. When the heated rear window switch is pressed once more, the test for the next signal in the list is started.

Ending the service mode

The GEM automatically ends service mode 20 seconds after the last input or at a driving speed of over 7km/h. However, service mode can be manually ended at any time by proceeding as follows:

- OPERATE the switch of the heated rear window and HOLD IT THERE
- SWITCH OFF the ignition
- RELEASE the switch of the heated rear window

3 signals sound and the turn signal lamps illuminate to indicate that service mode has ended.

Reset service mode

If, after completion of service mode, some functions do not operate or do not operate properly, check the following functions:

- Instrument cluster illumination, side lamps and license plate lamp in autolamps mode
- Rear wiper
- Headlamp Washers
- Electric booster heater
- Active anti-theft sounder
- Heated windshield

If one or more of the listed functions is not OK, it's possible that the cause of the fault is due to not exiting service mode properly. To reactivate the functions correctly, perform the following steps:

1. SWITCH OFF the ignition
2. SWITCH OFF the switch for the windscreen wash/wipe system

3. OPERATE the switch of the heated rear window and HOLD IT THERE
4. Turn on the ignition.
5. RELEASE the heated rear window switch (an acoustic signal will sound if activation has been performed correctly)
6. SWITCH the windscreen wash/wipe switch to the "Intermittent wipe" position
7. OPERATE the heated rear window switch 6 times (the main beam headlamps switch on and off automatically)
8. SWITCH OFF the switch for the windscreen wash/wipe system
9. OPERATE the switch of the heated rear window and HOLD IT THERE
10. SWITCH OFF the ignition
11. RELEASE the heated rear window switch (three acoustic signals will sound if activation has been performed correctly)

After completion of the work, check all the functions.

Inspection and Verification

NOTE: The generic electronic module (GEM) forms part of the central junction box (CJB).

NOTE: If the generic electronic module (GEM) is changed, the new one must be configured. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module. REFER to:

**Module Configuration (418-01 Module Configuration, General Procedures),
Generic Electronic Module (GEM) (419-10 Multifunction Electronic Modules, Diagnosis and Testing).**

NOTE: Before reading out the vehicle-specific data, remake all the electrical connections which were separated in the vehicle, so that communication between the module and WDS is ensured.

1. Verify the customer concern.
2. Visually inspect for obvious signs of electrical damage:

NOTE: Ensure correct engagement of the wiring harness connectors.

DIAGNOSIS AND TESTING

Visual Inspection

Electrical
<ul style="list-style-type: none"> • Fuse(s) • Lamp(s) • Connector(s) • Switch(es) • Wiring harness

3. Resolve any obvious causes or concerns found during the visual inspection before carrying out any further tests.

4. If the concern persists after the visual inspection, **PERFORM** a fault diagnosis with WDS and **RECTIFY** any displayed faults in accordance with the displayed fault description. **TEST** the system for normal operation.
5. For vehicles with no stored fault(s), **PROCEED** in accordance with the Symptom Chart according to the fault symptom.
6. After testing and resolving the fault, the fault memory of all vehicles should be **READ OUT** and any stored faults **CLEARED**. **READ OUT** all fault memories again after a road test.

Trouble Code Table - Generic Electronic Module (GEM)

Trouble Code Table - Generic Electronic Module (GEM)

DTC	Description	Action
B1812	Circuit of reversing light switch faulty (short to voltage)	GO to Pinpoint Test C.

Symptom Chart

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • Reversing lamps are inoperative 	<ul style="list-style-type: none"> • Fuse • Circuit(s) • Rear lamp cluster(s) • Reversing lamp switch • Reversing lamp relay • Central junction box (CJB) 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.
<ul style="list-style-type: none"> • One reversing lamp is inoperative (4-door/Cabriolet) 	<ul style="list-style-type: none"> • Circuit(s) • Bulb • Left/right-hand rear lamp assembly • Left/right-hand tailgate lamp assembly 	<ul style="list-style-type: none"> • GO to Pinpoint Test B.
<ul style="list-style-type: none"> • The reversing lamps illuminate continuously 	<ul style="list-style-type: none"> • Circuit(s) • Reversing lamp switch • Reversing lamp relay • Interior mirror with automatic glare adjustment • Central junction box (CJB) 	<ul style="list-style-type: none"> • GO to Pinpoint Test C.

System Checks

NOTE: Use a digital multimeter for all electrical measurements.

DIAGNOSIS AND TESTING

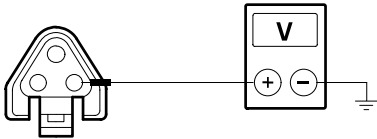
PINPOINT TEST R : REVERSING LAMPS ARE INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> Unfasten the CJB and fold it down. <ul style="list-style-type: none"> Is the location for connector C100 on the top of the CJB? <ul style="list-style-type: none"> → Yes GO to A2. → No GO to A4.
A2: CHECK FUSE F141 (10 A) (CJB)	
	<ol style="list-style-type: none"> Ignition switch in position 0. Disconnect Fuse F141 (10 A) (CJB). CHECK Fuse F141 (10 A) (CJB). <ul style="list-style-type: none"> Is the fuse OK? <ul style="list-style-type: none"> → Yes GO to A3. → No RENEW fuse F141 (10 A) (CJB) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. TEST the system for normal operation.
A3: CHECK THE VOLTAGE SUPPLY TO FUSE F141 (10 A) (CJB) FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> Connect Fuse F141 (10 A) (CJB). Ignition switch in position II. Measure the voltage between fuse F141 (10 A) (CJB) and ground. <ul style="list-style-type: none"> Is battery voltage measured? <ul style="list-style-type: none"> → Yes <ul style="list-style-type: none"> - Focus ST: GO to A8. - All other model variants: GO to A6. → No LOCATE AND RECTIFY the break in the voltage supply to fuse F141 (10 A) (CJB) using the Wiring Diagrams. If necessary RENEW the CJB. TEST the system for normal operation.
A4: CHECK FUSE F84 (10 A) (CJB).	
	<ol style="list-style-type: none"> Ignition switch in position 0.

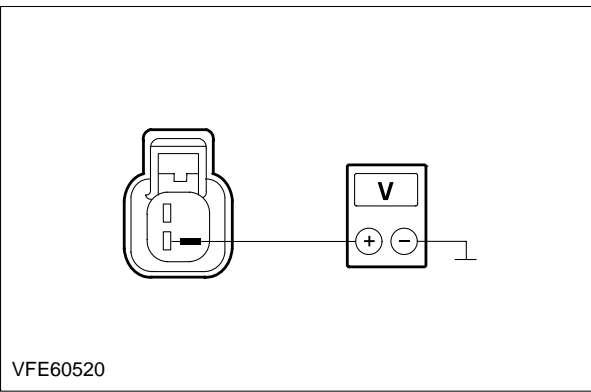
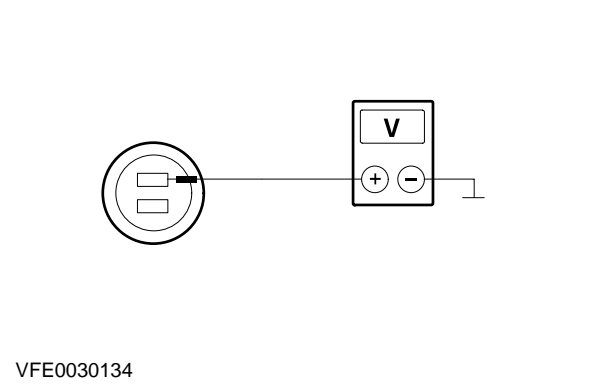
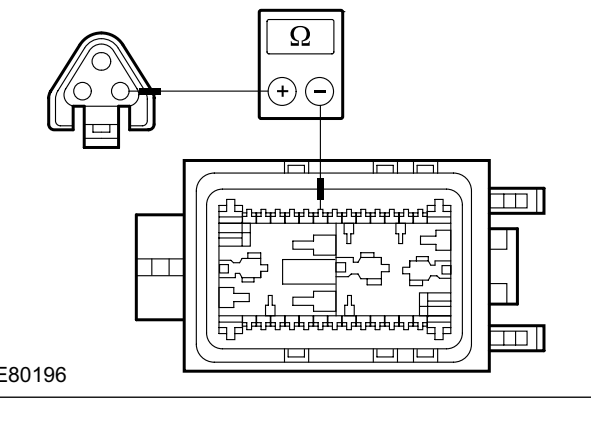
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect fuse F84 (10 A) (CJB).</p> <p>3 CHECK fuse F84 (10 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to A5.</p> <p>→ No RENEW fuse F84 (10 A) (CJB) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. TEST the system for normal operation.</p>
A5: CHECK THE VOLTAGE SUPPLY TO FUSE F84 (10 A) (CJB) FOR OPEN CIRCUIT	
	<p>1 Connect fuse F84 (10 A) (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F84 (10 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes - Focus ST: GO to A8. - All other model variants: GO to A6.</p> <p>→ No LOCATE AND RECTIFY the break in the voltage supply to fuse F84 (10 A) (CJB) using the Wiring Diagrams. If necessary RENEW the CJB. TEST the system for normal operation.</p>
A6: DETERMINE MODEL VERSION	
	<p>1 Determine the model version.</p> <ul style="list-style-type: none"> • Does the vehicle have an automatic transmission? <p>→ Yes GO to A12.</p> <p>→ No GO to A7.</p>

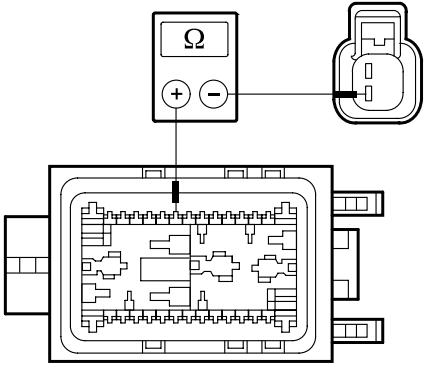
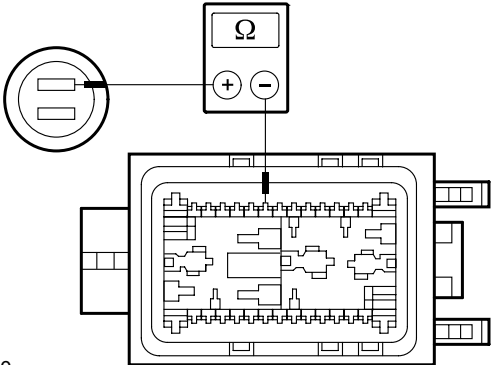
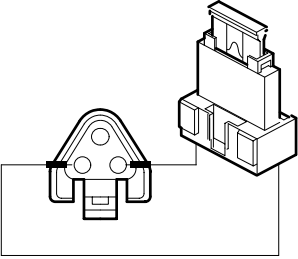
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A7: CHECK THE EQUIPMENT LEVEL	
	<p>1 Compare the following systems with the equipment level of the vehicle:</p> <ul style="list-style-type: none"> • Double locking • Footwell lamps • Map reading lamps • Anti-theft alarm • Headlamp switch-off delay <p>• Is the vehicle equipped with one of the above systems?</p> <p>→ Yes Vehicles with high equipment level: GO to A12.</p> <p>→ No Vehicles with low equipment level: GO to A8.</p>
A8: CHECK VOLTAGE SUPPLY TO THE REVERSING LAMP SWITCH FOR OPEN CIRCUIT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Reversing lamp switch.</p> <ul style="list-style-type: none"> – MTX/MMT6 transmission: from connector C864 – IB5/M66 transmission: from connector C866 <p>3 Ignition switch in position II.</p>
 <p>VFE0013669</p>	<p>4 Measure the voltage between the reversing lamp switch:</p> <ul style="list-style-type: none"> – MTX/MMT6 transmission, vehicles built before 01/2005: Connector C864, pin 2, circuit 15-LG28 (GN/WH), wiring harness side and ground. – IB5 transmission: Connector C866, pin 2, circuit 15-LG28 (GN/WH), wiring harness side and ground.

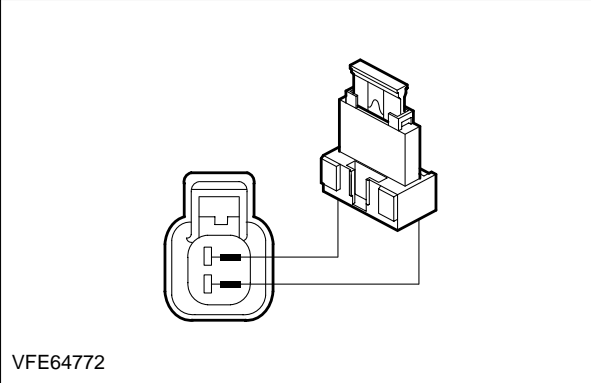
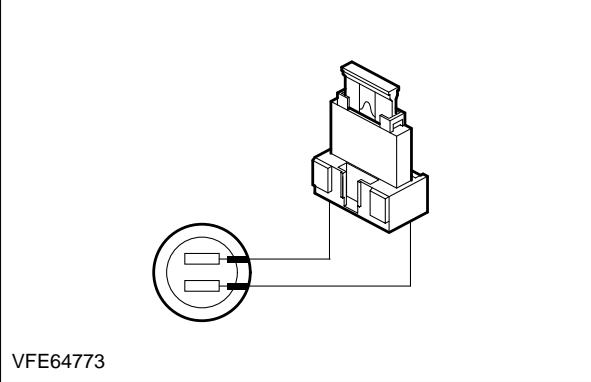
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE60520</p>	<p>5 MTX/MMT6 transmission, vehicles built from 01/2005: Measure the voltage between the reversing lamp switch, connector C864, pin 2, circuit 15-LG28 (GN/WH), wiring harness side and ground.</p>
 <p>VFE0030134</p>	<p>6 M66 transmission: Measure the voltage between the reversing lamp switch, connector C866, pin 2, circuit 15-LG28 (GN/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to A10. → No GO to A9. - Vehicles with high equipment level: LOCATE and RECTIFY the break in the circuit between the reversing lamp relay, pin 3 and the reversing lamp switch using the Wiring Diagrams. CHECK the operation of the system.
<p>A9: CHECK CIRCUIT 15-LG28(A) (GN/WH) BETWEEN THE CJB AND THE REVERSING LAMP SWITCH FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p>
 <p>E80196</p>	<p>2 Disconnect CJB from connector C96.</p> <p>3 Measure the resistance between CJB:</p> <ul style="list-style-type: none"> - MTX/MMT6 transmission, vehicles built before 01/2005: Connector C96, pin 33, circuit 15-LG28A (GN/WH), wiring harness side and the reversing lamp switch, connector C864, pin 2, circuit 15-LG28 (GN/WH), wiring harness side. - IB5 transmission: Connector C96, pin 33, circuit 15-LG28A (GN/WH), wiring harness side and the reversing lamp switch, connector C866, pin 2, circuit 15-LG28 (GN/WH), wiring harness side.

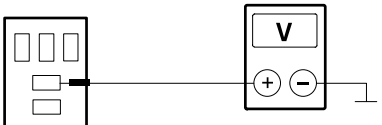
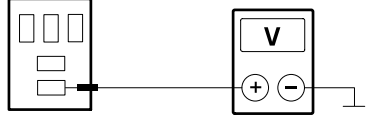
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E80197</p>	<p>4 MTX/MMT6 transmission, vehicles built from 01/2005: Measure the resistance between the CJB, connector C96, pin 33, circuit 15-LG28A (GN/WH), wiring harness side and the reversing lamp switch, connector C864, pin 2, circuit 15-LG28 (GN/WH), wiring harness side.</p>
 <p>E80200</p>	<p>5 M66 transmission: Measure the resistance between the CJB, connector C96, pin 33, circuit 15-LG28A (GN/WH), wiring harness side and the reversing lamp switch, connector C866, pin 2, circuit 15-LG28 (GN/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes RENEW the CJB. TEST the system for normal operation. → No Vehicles with low equipment level or vehicles with M66 transmission: LOCATE and RECTIFY the break in the circuit between the CJB and the reversing lamp switch with the aid of the Wiring Diagrams. TEST the system for normal operation.
<p>A10: CHECK THE REVERSING LAMP SWITCH</p>	
	<p>1 Ignition switch in position 0.</p>
 <p>VFE0013668</p>	<p>2 Fused bridging cable (10A) at the reversing lamp switch</p> <ul style="list-style-type: none"> - MTX/MMT6 transmission, vehicles built before 01/2005: Bridge connector C864 between pin 2, circuit 15-LG28 (GN/WH) and pin 1, circuit 15S-LG9 (GN/BK), wiring harness side. - IB5 transmission: Bridge connector C866 between pin 2, circuit 15-LG28 (GN/WH) and pin 1, circuit 15S-LG9 (GN/BK), wiring harness side.

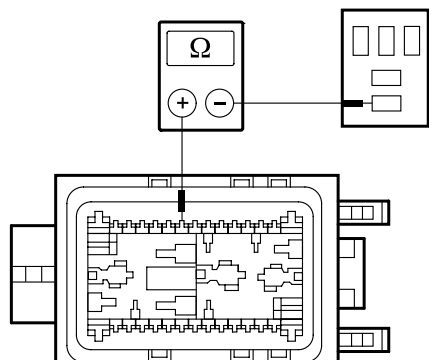
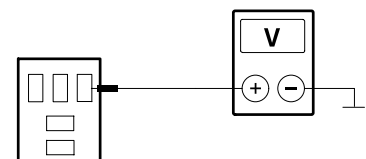
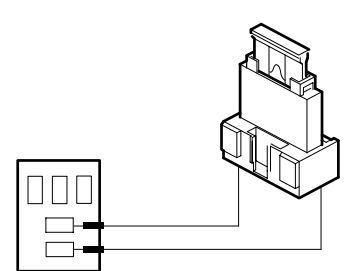
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE64772</p>	<p>3 MTX/MMT6 transmission, vehicles built from 01/2005: Connect a fused bridging cable (10 A) at the reversing lamp switch, connector C864 between pin 2, circuit 15-LG28 (GN/WH) and pin 1, circuit 15S-LG9 (GN/BK), wiring harness side.</p>
 <p>VFE64773</p>	<p>4 M66 transmission: Connect a fused bridging cable (10 A) at the reversing lamp switch, connector C866 between pin 2, circuit 15-LG28 (GN/WH) and pin 1, circuit 15S-LG9 (GN/BK), wiring harness side.</p>
	<p>5 Ignition switch in position II.</p> <p>6 CHECK the operation of the reversing lamps.</p> <ul style="list-style-type: none"> • Do the reversing lamps illuminate? <ul style="list-style-type: none"> → Yes INSTALL A NEW reversing lamp switch. TEST the system for normal operation. → No <ul style="list-style-type: none"> - Vehicles with high equipment level: GO to A11. - Vehicles with low equipment level or vehicles with M66 transmission: GO to A17.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A11: CHECK CIRCUIT 15S-LG9 (GN/BK) FOR OPEN CIRCUIT	
NOTE: All model variants: The fused jumper lead used in the previous test step is still connected to the reversing lamp switch.	
 <p>VFE0019862</p>	<ol style="list-style-type: none"> 1 Measure the voltage between the reversing lamp relay, socket C1003, pin 5, circuit 15S-LG46 (GN/OG) and circuit 15S-LG9 (GN/BK), BJB side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to A17.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the reversing lamp switch and the reversing lamp relay using the Wiring Diagrams. CHECK the operation of the system.</p>
A12: CHECK THE VOLTAGE AT THE POWER CIRCUIT OF THE REVERSING LAMP RELAY	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Only vehicles with automatic transmission: Reversing lamp relay from socket C1003. 3 Ignition switch in position II.
 <p>VFE0016103</p>	<ol style="list-style-type: none"> 4 Measure the voltage between the reversing lamp relay, socket C1003, pin 3, circuit 15-LG46 (GN/OG) and 15-LG28 (GN/WH), BJB side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes</p> <ul style="list-style-type: none"> - Automatic Transmission: GO to A14. - Manual transmission, vehicles with high equipment level: GO to A8. <p>→ No GO to A13.</p>
A13: CHECK CIRCUIT 15-LG46 (GN/OG) BETWEEN THE CJB AND THE REVERSING LAMP RELAY FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect CJB from connector C96.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E80201</p>	<p>3 Measure the resistance between the CJB, connector C96, pin 33, circuit 15-LG46 (GN/OG), wiring harness side and the backup lamp relay, socket C1003, pin 3, circuit 15-LG46 (GN/OG) and 15-LG28 (GN/WH), BJB side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes RENEW the CJB. TEST the system for normal operation.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the CJB and the reversing lamp relay with the aid of the Wiring Diagrams. CHECK the operation of the system.</p>
<p>A14: CHECK THE VOLTAGE AT THE CONTROL CIRCUIT OF THE REVERSING LAMP RELAY</p>	
 <p>E0036110</p>	<p>1 Measure the voltage between the reversing lamp relay, socket C1003, pin 1, circuit 15-LG45 (GN/BK), BJB side and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to A15.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between soldered connection S164 and the reversing lamp relay using the Wiring Diagrams. TEST the system for normal operation.</p>
<p>A15: CHECK THE REVERSING LAMP RELAY</p>	
 <p>VFE0019865</p>	<p>1 Ignition switch in position 0.</p> <p>2 Connect a fused jumper wire (10 A) at the reversing lamp relay, socket C1003, between pin 3, circuit 15-LG46 (GN/OG) and circuit 15-LG28 (GN/WH), and pin 5, circuit 15S-LG46 (GN/OG) and circuit 15S-LG9 (GN/BK), BJB side.</p> <p>3 Ignition switch in position II.</p>

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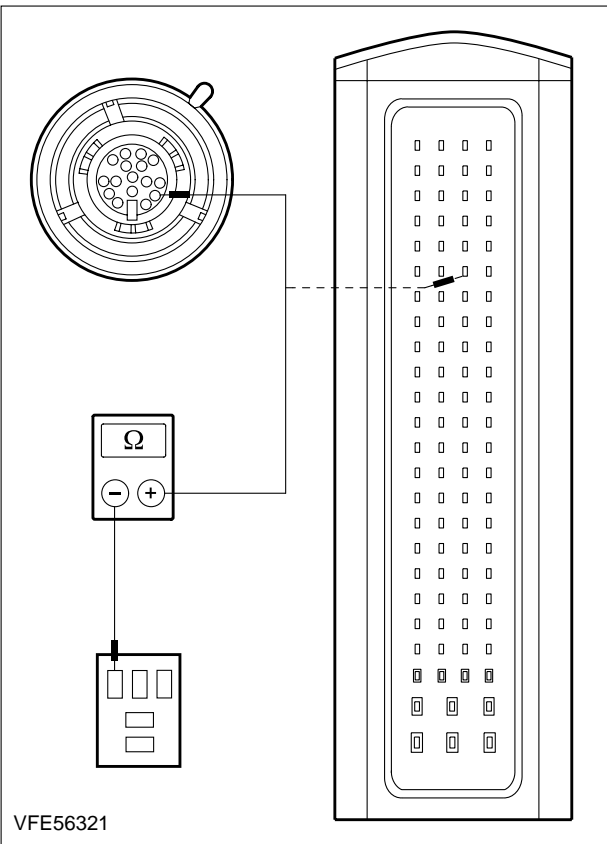
Exterior Lighting

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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 CHECK the operation of the reversing lamps.</p> <ul style="list-style-type: none"> • Do the reversing lamps illuminate? <p>→ Yes GO to A16.</p> <p>→ No GO to A17.</p>
A16: CHECK THE CONTROL CIRCUIT 91S-LG45 (BK/GN) OF THE REVERSING LAMP RELAY FOR OPEN CIRCUIT	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect Transmission control unit (TCU).</p> <ul style="list-style-type: none"> – Vehicles with automatic transmission (CFT23): from connector C812 – Vehicles with 4-speed automatic transmission: from connector C414

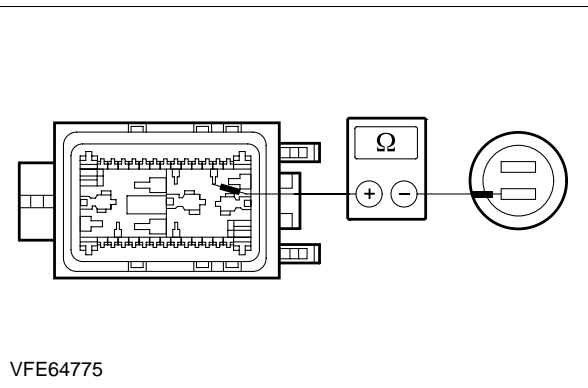
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE56321</p>	<p>3 Measure the resistance between the reversing lamp relay, socket C1003, pin 2, circuit 91S-LG45 (BK/GN), BJB side and:</p> <ul style="list-style-type: none"> - Vehicles with automatic transmission (CFT23): Transmission control unit (TCU), connector C812, pin 15, circuit 91S-LG45 (BK/GN), wiring harness side. - Vehicles with 4-speed automatic transmission: Transmission control unit (TCU), connector C414, pin 67, circuit 91S-LG45 (BK/GN), wiring harness side. <p>• Is a resistance of less than 2 Ohms registered?</p> <p>→ Yes</p> <ul style="list-style-type: none"> - Vehicles with automatic transmission (CFT23): CHECK the reversing lamp relay according to the component test at the end of this section and RENEW as necessary. TEST the system for normal operation. If the relay is OK: <p>REFER to: Diagnostics (307-01 Automatic Transmission/Transaxle - Vehicles With: Automatic Transmission (CFT23), Diagnosis and Testing).</p> <ul style="list-style-type: none"> - Vehicles with 4-speed automatic transmission: CHECK the reversing lamp relay according to the component test at the end of this section and RENEW as necessary. TEST the system for normal operation. If the relay is OK: REFER to: (307-01 Automatic Transmission/Transaxle - Vehicles With: 4-Speed Automatic Transmission (4F27E)) <p>Diagnostic Trouble Code Charts (Diagnosis and Testing), Diagnosis By Symptom (Diagnosis and Testing).</p> <p>→ No</p> <p>LOCATE and RECTIFY the break in the circuit between the reversing lamp relay and the transmission control unit using the Wiring Diagrams. TEST the system for normal operation.</p>
<p>A17: CHECK FOR OPEN CIRCUIT IN 15S-LG9(A) (GN/BK), OR 15S-LG46 (GN/OG)</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect CJB from connector C96.</p>

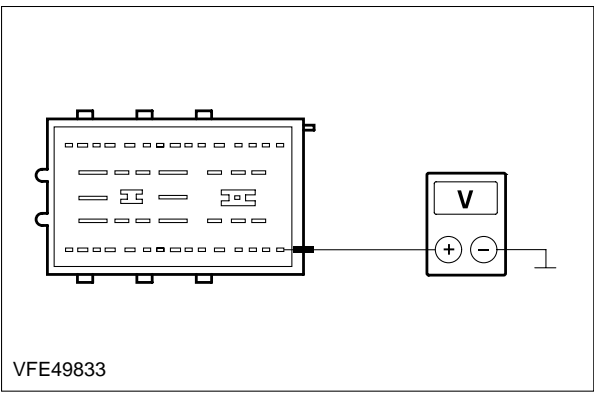
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>VFE60579</p>	<p>3 Measure the resistance between:</p> <ul style="list-style-type: none"> - Manual transmission, vehicles with low equipment level, vehicles built before 01/2005: Reversing lamp switch, connector C864, between pin 1, circuit 15S-LG9 (GN/BK) and the CJB, connector C96, pin 25, circuit 15S-LG9(A) (GN/BK), wiring harness side. - Manual transmission, vehicles with low equipment level: Reversing lamp switch, connector C866, between pin 1, circuit 15S-LG9 (GN/BK) and the CJB, connector C96, pin 25, circuit 15S-LG9(A) (GN/BK), wiring harness side. - Manual transmission, vehicles with high equipment level: Reversing lamp relay, socket C1003, between pin 5, circuit 15S-LG46 (GN/OG)/15S-LG9 (GN/BK), BJB side and CJB, connector C96, pin 25, circuit 15S-LG46 (GN/OG), wiring harness side. - Automatic Transmission: Reversing lamp relay, socket C1003, between pin 5, circuit 15S-LG46 (GN/OG)/15S-LG9 (GN/BK), BJB side and CJB, connector C96, pin 25, circuit 15S-LG46 (GN/OG), wiring harness side.
<p>VFE64774</p>	<p>4 Manual transmission, vehicles with low equipment level, vehicles built from 01/2005:</p> <ul style="list-style-type: none"> - Measure the resistance between the reversing lamp switch, connector C864, between pin 1, circuit 15S-LG9 (GN/BK) and the CJB, connector C96, pin 25, circuit 15S-LG9(A) (GN/BK), wiring harness side.

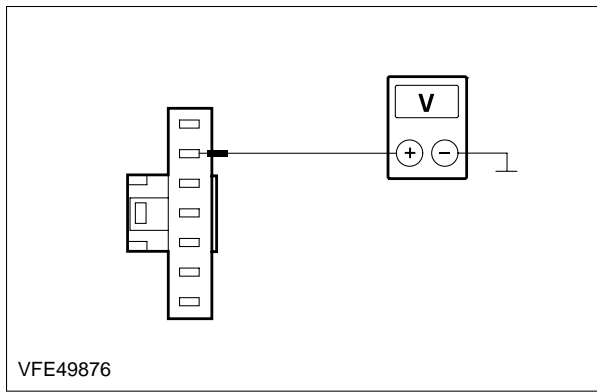
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE64775</p>	<p>5 Vehicles with M66 transmission: Measure the resistance between the reversing lamp switch, connector C866, between pin 1, circuit 15S-LG9 (GN/BK) and the CJB, connector C96, pin 25, circuit 15S-LG9 (GN/BK), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes GO to A18. → No <ul style="list-style-type: none"> - Manual transmission, vehicles with low equipment level or vehicles with M66 transmission: LOCATE and RECTIFY the break in the circuit between the reversing lamp switch and the CJB using the Wiring Diagrams. CHECK the operation of the system. - Manual transmission, vehicles with high equipment level: LOCATE and RECTIFY the break in the circuit between the reversing lamp relay and the CJB using the Wiring Diagrams. TEST the system for normal operation. - Automatic Transmission: LOCATE and RECTIFY the break in the circuit between the reversing lamp relay and the CJB using the Wiring Diagrams. TEST the system for normal operation.
<p>A18: CHECK THE CIRCUIT IN THE CJB FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect CJB from connector C100.</p> <p>2 Connect CJB to connector C96.</p> <p>3 Connect Vehicles with automatic transmission Reversing lamp relay to socket C1003.</p> <p>4 Connect Vehicles without automatic transmission: Reversing lamp switch.</p> <ul style="list-style-type: none"> - MTX/MMT6 transmission: to connector C864 - IB5/M66 transmission: to connector C866 <p>5 Ignition switch in position II.</p> <p>6 Engage reverse gear.</p>

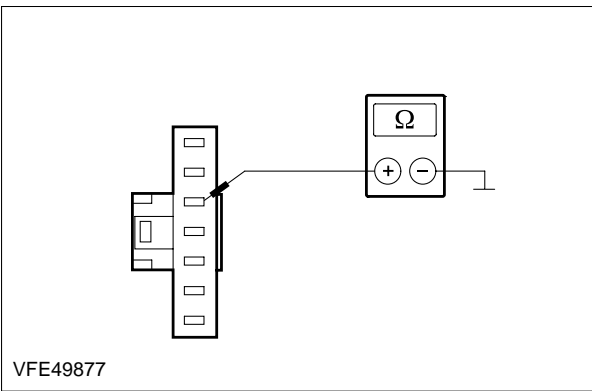
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE49833</p>	<p>7 Measure voltage between CJB, connector C100, pin 1, CJB side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes</p> <ul style="list-style-type: none"> - 3-door and 5-door versions: GO to A21. - 4-door: LOCATE and RECTIFY the break in the circuit between the CJB, connector C100 and soldered connection S172 using the Wiring Diagrams. TEST the system for normal operation. - Cabriolet: LOCATE and RECTIFY the break in the circuit between the CJB, connector C100 and soldered connection S2011 using the Wiring Diagrams. TEST the system for normal operation. - Wagon: GO to A19. <p>→ No</p> <p>RENEW the CJB. CHECK the operation of the system.</p>
<p>A19: CHECK THE POWER SUPPLY TO THE REVERSING LAMPS FOR OPEN CIRCUIT (ESTATE)</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Rear lamp assembly.</p> <ul style="list-style-type: none"> - LHD: Without trailer hitch: right from connector C477 - LHD: With trailer hitch: right from connector C2037 - RHD: Without trailer hitch: left from connector C476 - RHD: With trailer hitch: left from connector C2035 <p>3 Ignition switch in position II.</p>

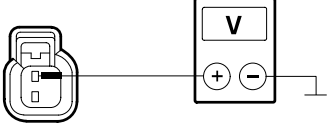
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE49876</p>	<p>4 Measure the voltage between the rear lamp assembly:</p> <ul style="list-style-type: none"> - LHD: Without trailer hitch: right, connector C477, pin 2, circuit 15S-LG16A (GN/OG), wiring harness side and ground. - LHD: With trailer hitch: right, connector C2037, pin 2, circuit 15S-LG16A (GN), wiring harness side and ground. - RHD: Without trailer hitch: left, connector C476, pin 2, circuit 15S-LG9B (GN/BK), wiring harness side and ground. - RHD: With trailer hitch: left, connector C2035, pin 2, circuit 15S-LG16A (GN), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <ul style="list-style-type: none"> → Yes GO to A20. → No LOCATE and RECTIFY the break in the circuit between the rear lamp assembly and the CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>A20: CHECK THE GROUND CONNECTION TO THE REAR LAMP ASSEMBLY FOR OPEN CIRCUIT (ESTATE)</p>	
	<p>1 Ignition switch in position 0.</p>

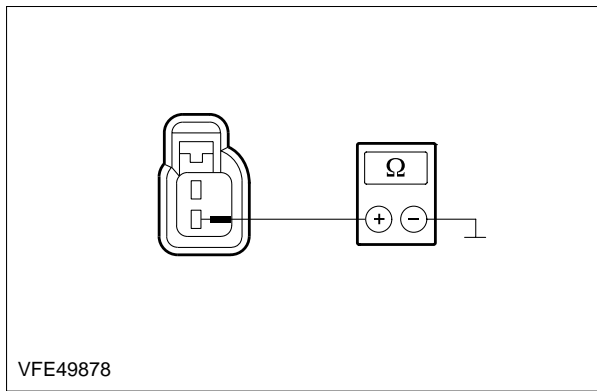
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE49877</p>	<p>2 Measure the resistance between the rear lamp assembly:</p> <ul style="list-style-type: none"> - LHD: Without trailer hitch: right, connector C477, pin 3, circuit 31-LF24A (BK), wiring harness side and ground. - LHD: With trailer hitch: right, connector C2037, pin 3, circuit 31-LF24A (GN), wiring harness side and ground. - RHD: Without trailer hitch: left, connector C476, pin 3, circuit 31-LF23 (BK), wiring harness side and ground. - RHD: With trailer hitch: left, connector C2035, pin 3, circuit 31-LF23 (GN), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the rear lamp assembly. TEST the system for normal operation. → No <ul style="list-style-type: none"> - LHD: LOCATE and RECTIFY the break in the circuit between the right-hand rear lamp assembly and soldered connection S199 using the Wiring Diagrams. TEST the system for normal operation. - RHD: LOCATE and RECTIFY the break in the circuit between the left-hand rear lamp assembly and ground connection G77 using the Wiring Diagrams. TEST the system for normal operation.
<p>A21: CHECK THE POWER SUPPLY TO THE REVERSING LAMP FOR OPEN CIRCUIT (3/5-DOOR VERSIONS).</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Rear lamp assembly.</p> <ul style="list-style-type: none"> - LHD: Without trailer hitch: right from connector C430 - LHD: With trailer hitch: right from connector C2024 - RHD: Without trailer hitch: left from connector C434 - RHD: With trailer hitch: left from connector C2025 <p>3 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E0024112</p>	<p>4 Measure the voltage between the rear lamp assembly:</p> <ul style="list-style-type: none"> - LHD: Without trailer hitch: right, connector C430, pin 1, circuit 15S-LG16(A) (GN/OG), wiring harness side and ground. - LHD: With trailer hitch: right, connector C2024, pin 1, circuit (WH/BK), wiring harness side and ground. - RHD: Without trailer hitch: left, connector C434, pin 1, circuit 15S-LD6(A) (GN/YE), wiring harness side and ground. - RHD: With trailer hitch: left, connector C2025, pin 1, circuit (VT/YE), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <ul style="list-style-type: none"> → Yes GO to A22. → No LOCATE and RECTIFY the break in the circuit between the rear lamp assembly and the CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>A22: CHECK THE GROUND CONNECTION TO THE REVERSING LAMP FOR OPEN CIRCUIT (3/5-DOOR VERSIONS).</p>	
	<p>1 Ignition switch in position 0.</p>

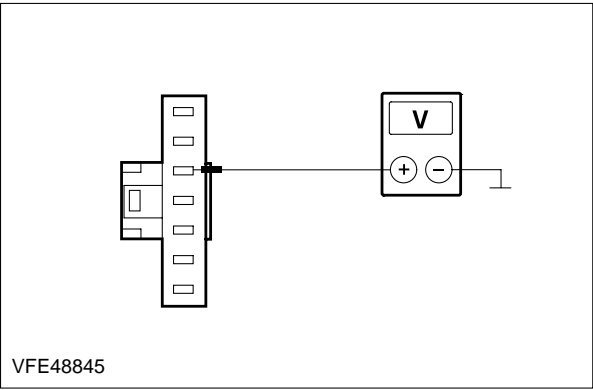
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE49878</p>	<p>2 Measure the resistance between the rear lamp assembly:</p> <ul style="list-style-type: none"> - LHD: Without trailer hitch: right, connector C430, pin 2, circuit 31-LD6 (BK), wiring harness side and ground. - LHD: With trailer hitch: right, connector C2024, pin 2, circuit (GN), wiring harness side and ground. - RHD: Without trailer hitch: left, connector C434, pin 2, circuit 31-LG16 (BK), wiring harness side and ground. - RHD: With trailer hitch: left, connector C2025, pin 2, circuit (GN), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the rear lamp assembly. TEST the system for normal operation. → No LOCATE and RECTIFY the break in the circuit between the rear lamp assembly and soldered connection S199 using the Wiring Diagrams. TEST the system for normal operation.

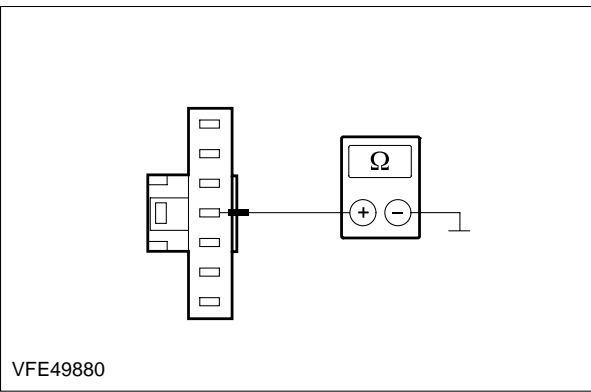
PINPOINT TEST S : ONE REVERSING LAMP IS INOPERATIVE (4-DOOR/CABRIOLET)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: DETERMINE INOPERATIVE LAMP.	
	<p>1 Ignition switch in position II.</p> <p>2 Engage reverse gear.</p> <p>3 CHECK the reversing lamps.</p> <ul style="list-style-type: none"> • Is the left-hand back-up lamp inoperative? <ul style="list-style-type: none"> → Yes <ul style="list-style-type: none"> - 4-door model: GO to B2. - Cabriolet: GO to B6. → No <ul style="list-style-type: none"> - 4-door: Right-hand backup lamp inoperative: GO to B4. - Cabriolet: Right-hand backup lamp inoperative: GO to B8.

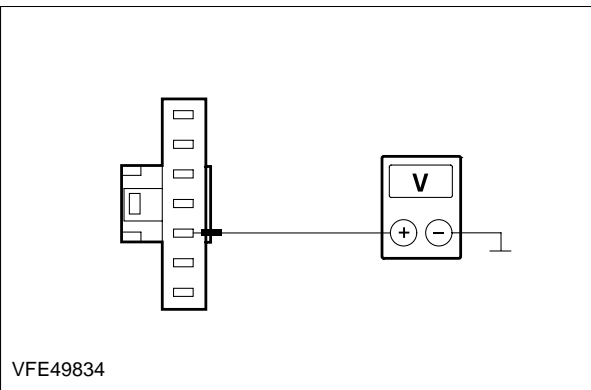
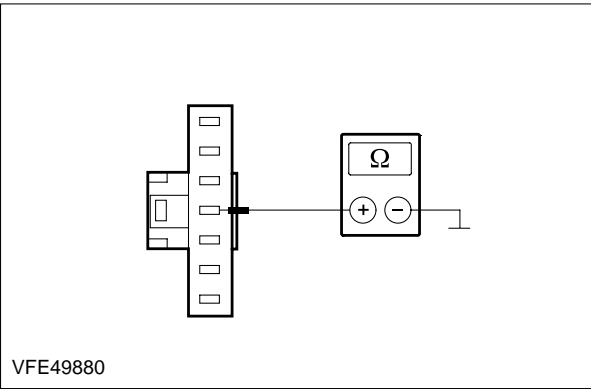
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B2: CHECK THE VOLTAGE SUPPLY TO THE LEFT-HAND REAR LAMP ASSEMBLY FOR OPEN CIRCUIT (4-DOOR VERSIONS)	
NOTE: Reverse gear is still engaged.	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Left-hand rear lamp assembly.</p> <ul style="list-style-type: none"> - Vehicles without trailer hitch: from connector C476 - Vehicles with trailer hitch: from connector C2035 <p>3 Ignition switch in position II.</p>
 <p>VFE48845</p>	<p>4 Measure the voltage between the left-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - Vehicles without trailer hitch: connector C476, pin 3, circuit 15S-LG9C (GN/BK), wiring harness side and ground. - Vehicles with trailer hitch: connector C2035, pin 3, circuit 15S-LG16A (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to B3.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the left-hand rear lamp assembly and soldered connection S172 using the Wiring Diagrams. CHECK the operation of the system.</p>
B3: CHECK THE GROUND CONNECTION TO THE LEFT-HAND REAR LAMP ASSEMBLY FOR OPEN CIRCUIT (4-DOOR VERSIONS)	
	<p>1 Ignition switch in position 0.</p>

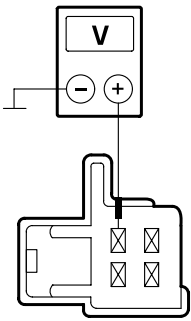
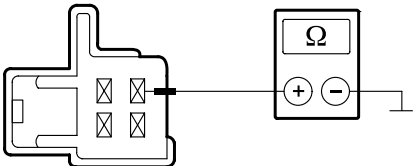
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE49880</p>	<p>2 Measure the resistance between the left-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - Without trailer hitch: connector C476, pin 4, circuit 31-LF23C (BK), wiring harness side and ground. - With trailer hitch: connector C2035, pin 4, circuit 31-LF23 (GN), wiring harness side and ground. <p>• Is a resistance of less than 2 Ohms registered?</p> <p>→ Yes CHECK and if necessary RENEW the left-hand rear lamp assembly. TEST the system for normal operation.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the left-hand rear lamp assembly and ground connection G77 using the Wiring Diagrams. TEST the system for normal operation.</p>
<p>B4: CHECK THE VOLTAGE SUPPLY TO THE RIGHT-HAND REAR LAMP ASSEMBLY FOR OPEN CIRCUIT (4-DOOR VERSIONS)</p>	
<p>NOTE: Reverse gear is still engaged.</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Right-hand rear lamp assembly.</p> <ul style="list-style-type: none"> - Vehicles without trailer hitch: from connector C477 - Vehicles with trailer hitch: from connector C2037 <p>3 Ignition switch in position II.</p>

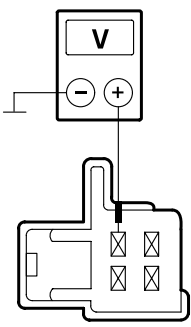
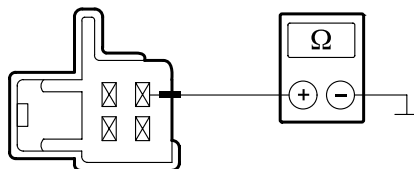
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE49834</p>	<p>4 Measure the voltage between the right-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - Vehicles without trailer hitch: connector C477, pin 5, circuit 15S-LG16C (GN/OG), wiring harness side and ground. - Vehicles with trailer hitch: connector C2037, pin 5, circuit 15S-LG16B (YE/BU), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to B5.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the right-hand rear lamp assembly and soldered connection S172 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B5: CHECK THE GROUND CONNECTION TO THE RIGHT-HAND REAR LAMP ASSEMBLY FOR OPEN CIRCUIT (4-DOOR VERSIONS)</p>	
 <p>VFE49880</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the right-hand rear lamp assembly:</p> <ul style="list-style-type: none"> - Vehicles without trailer hitch: connector C477, pin 4, circuit 31-LF24B (BK), wiring harness side and ground. - Vehicles with trailer hitch: connector C2037, pin 4, circuit 31-LF24A (GN), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes CHECK and if necessary RENEW the right-hand rear lamp assembly. TEST the system for normal operation.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the right-hand rear lamp assembly and ground connection G70 using the Wiring Diagrams. TEST the system for normal operation.</p>
<p>B6: CHECK THE VOLTAGE SUPPLY TO THE LEFT-HAND REAR LAMP ASSEMBLY (TAILGATE) FOR OPEN CIRCUIT</p>	
<p>NOTE: Reverse gear is still engaged.</p>	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect Left-hand rear lamp assembly (tailgate) from connector C2320.</p> <p>3 Ignition switch in position II.</p>
 <p>E80198</p>	<p>4 Measure the voltage between the left-hand rear lamp assembly (tailgate), connector C2320, pin 2, circuit (GN/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to B7. → No LOCATE and RECTIFY the break in the circuit between the left-hand rear lamp assembly (tailgate) and soldered connection S2011 using the Wiring Diagrams. TEST the system for normal operation.
<p>B7: CHECK THE GROUND SUPPLY TO THE LEFT-HAND REAR LAMP ASSEMBLY (TAILGATE) FOR OPEN CIRCUIT</p>	
 <p>E80199</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the left-hand rear lamp assembly (tailgate), connector C2320, pin 4, circuit (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK and if necessary RENEW the left-hand rear lamp assembly (tailgate). TEST the system for normal operation. → No LOCATE and RECTIFY the break in the circuit between the left-hand rear lamp assembly (tailgate) and soldered connection S196 using the Wiring Diagrams. TEST the system for normal operation.
<p>B8: CHECK THE VOLTAGE SUPPLY TO THE RIGHT-HAND REAR LAMP ASSEMBLY (TAILGATE) FOR OPEN CIRCUIT</p>	
<p>NOTE: Reverse gear is still engaged.</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Right-hand rear lamp assembly (tailgate) from connector C2321.</p> <p>3 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E80198</p>	<p>4 Measure the voltage between the right-hand rear lamp assembly (tailgate), connector C2321, pin 2, circuit (GN/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to B9. → No LOCATE and RECTIFY the break in the circuit between the right-hand rear lamp assembly (tailgate) and soldered connection S2011 using the Wiring Diagrams. TEST the system for normal operation.
<p>B9: CHECK THE GROUND SUPPLY TO THE RIGHT-HAND REAR LAMP ASSEMBLY (TAILGATE) FOR OPEN CIRCUIT</p>	
 <p>E80199</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the right-hand rear lamp assembly (tailgate), connector C2321, pin 4, circuit (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK and if necessary RENEW the right-hand rear lamp assembly (tailgate). TEST the system for normal operation. → No LOCATE and RECTIFY the break in the circuit between the right-hand rear lamp assembly (tailgate) and soldered connection S196 using the Wiring Diagrams. TEST the system for normal operation.

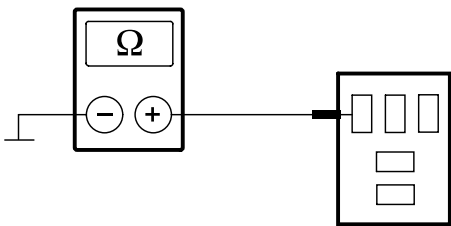
PINPOINT TEST T : THE REVERSING LAMPS ILLUMINATE CONTINUOUSLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>C1: DETERMINE MODEL VERSION.</p>	
	<p>1 Determine the model version.</p> <ul style="list-style-type: none"> • Does the vehicle have an automatic transmission? → Yes GO to C3. → No GO to C2.

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TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C2: CHECK THE REVERSING LAMP SWITCH	
	<ol style="list-style-type: none"> 1 Disconnect Reversing lamp switch. <ul style="list-style-type: none"> – MTX/MMT6 transmission: from connector C864 – IB5/M66 transmission: from connector C866
	<ol style="list-style-type: none"> 2 Ignition switch in position II.
	<ol style="list-style-type: none"> 3 CHECK the reversing lamps. <ul style="list-style-type: none"> • Do the reversing lamps illuminate continuously? → Yes GO to C5. → No INSTALL A NEW reversing lamp switch. TEST the system for normal operation.
C3: NARROW DOWN THE CAUSE OF THE FAULT	
	<ol style="list-style-type: none"> 1 Disconnect reversing lamp relay from socket C1003.
	<ol style="list-style-type: none"> 2 Ignition switch in position II. <ul style="list-style-type: none"> • Do the reversing lamps illuminate continuously? → Yes GO to C5. → No GO to C4.
C4: CHECK THE CONTROL CIRCUIT 91S-LG45 (BK/GN) OF THE REVERSING LAMP RELAY FOR SHORT TO GROUND	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.
	<ol style="list-style-type: none"> 2 Disconnect Transmission control unit (TCU). <ul style="list-style-type: none"> – Vehicles with automatic transmission (CFT23): from connector C812 – Vehicles with 4-speed automatic transmission: from connector C414

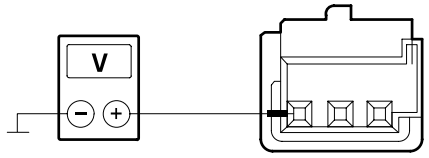
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0016108</p>	<p>3 Measure the resistance between the reversing lamp relay, socket C1003, pin 2, circuit 91S-LG45 (BK/GN), BJB side and ground.</p> <ul style="list-style-type: none"> Is a resistance of more than 10,000 ohms measured? <p>→ Yes</p> <ul style="list-style-type: none"> Vehicles with automatic transmission (CFT23): CHECK the reversing lamp relay according to the component test at the end of this section and RENEW as necessary. TEST the system for normal operation. If the relay is OK: <p>REFER to: Diagnostics (307-01 Automatic Transmission/Transaxle - Vehicles With: Automatic Transmission (CFT23), Diagnosis and Testing).</p> <ul style="list-style-type: none"> Vehicles with 4-speed automatic transmission: CHECK the reversing lamp relay according to the component test at the end of this section and RENEW as necessary. TEST the system for normal operation. If the relay is OK: REFER to: (307-01 Automatic Transmission/Transaxle - Vehicles With: 4-Speed Automatic Transmission (4F27E)) <p>Diagnostic Trouble Code Charts (Diagnosis and Testing), Diagnosis By Symptom (Diagnosis and Testing).</p> <p>→ No</p> <p>LOCATE and RECTIFY the short to ground between the reversing lamp relay and transmission control unit using the Wiring Diagrams. TEST the system for normal operation.</p>
<p>C5: CHECK CIRCUIT 15S-LG9(A) (GN/BK), OR 15S-LG46 (GN/OG) FOR SHORT TO BATTERY VOLTAGE</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect CJB from connector C96.</p>

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TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Ignition switch in position II.</p> <ul style="list-style-type: none"> • Do the reversing lamps illuminate continuously? <p>→ Yes</p> <ul style="list-style-type: none"> - Vehicles with interior mirror with automatic glare adjustment: GO to C6. - Vehicles without interior mirror with automatic glare adjustment: GO to C8. <p>→ No</p> <p>LOCATE and RECTIFY the short to battery voltage in the circuits connected to the CJB, connector C96, pin 25 using the Wiring Diagrams. TEST the system for normal operation.</p>
C6: NARROW DOWN THE CAUSE OF THE FAULT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C98.</p> <p>3 Ignition switch in position II.</p> <p>4 CHECK the reversing lamps</p> <ul style="list-style-type: none"> • Do the reversing lamps illuminate continuously? <p>→ Yes</p> <p>GO to C8.</p> <p>→ No</p> <p>GO to C7.</p>
C7: CHECK CIRCUIT 15S-AD15 (GN/RD) FOR SHORT TO BATTERY VOLTAGE	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Interior mirror with automatic glare adjustment from connector C742.</p> <p>3 Ignition switch in position II.</p>

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TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038439</p>	<p>4 Measure the voltage between the interior mirror with automatic glare adjustment, connector C742, pin 3, circuit 15S-AD15 (GN/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes LOCATE and RECTIFY the short to battery voltage in the circuit between the CJB and the interior mirror with automatic glare adjustment using the Wiring Diagrams. TEST the system for normal operation.</p> <p>→ No RENEW the interior mirror with automatic glare adjustment. TEST the system for normal operation.</p>
<p>C8: ELIMINATE THE CENTRAL JUNCTION BOX AS THE CAUSE FOR THE SHORT TO BATTERY VOLTAGE</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C100.</p> <p>3 Ignition switch in position II.</p> <p>4 CHECK the reversing lamps.</p> <ul style="list-style-type: none"> Do the reversing lamps illuminate continuously? <p>→ Yes LOCATE and RECTIFY short to battery voltage in the circuits connected to the CJB, connector C100, pin 1 with the aid of the wiring diagrams. TEST the system for normal operation.</p> <p>→ No RENEW the CJB. TEST the system for normal operation.</p>

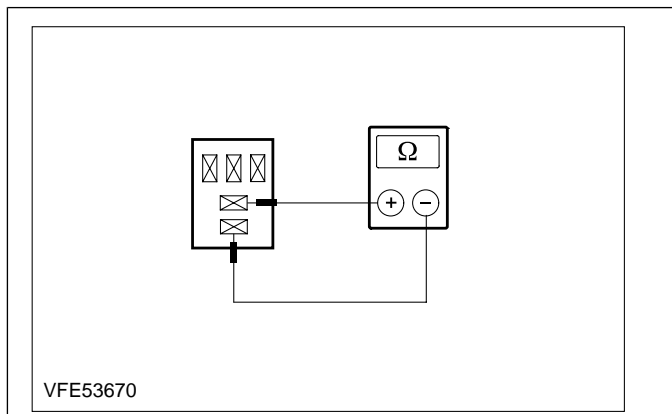
Component Tests

- If no, INSTALL a new relay.

Reversing lamp relay

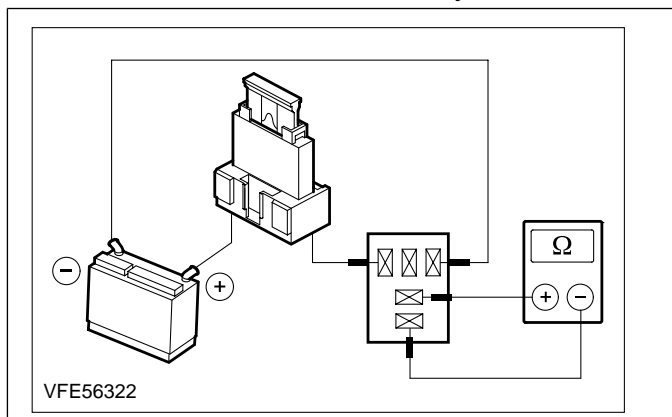
- Check the normally open contact in the unswitched state.
 - Measure resistance at relay between pin 3 component side and pin 5 component side.
 - Is a resistance of more than 10,000 ohms measured?
 - If yes, go to 2.

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2. Check the normally open contact in the switched state.

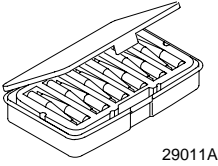
- Using a fused test cable (3 A), connect pin 1 of the relay, component side, with the battery positive pole.
- Use a test cable to connect pin 2 of the relay, component side, to the battery negative terminal.
- Measure resistance at relay between pin 3 component side and pin 5 component side.
- Is a resistance of less than 2 Ohm registered?
 - If yes, then the relay is OK.
 - If no, INSTALL a new relay.



DIAGNOSIS AND TESTING**Headlamps**

Refer to Wiring Diagrams Section 417-01, for schematic and connector information.

Special Tool(s)

 <p>29011A</p>	<p>Terminal Probe Kit 29-011A</p>
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General Equipment

Worldwide Diagnostic System (WDS)

Description of operation

A diagnosis of the generic electronic module (GEM) can be performed with WDS. Furthermore, an integrated service mode enables testing of the input and output signals without the need for further tools. To enable activation of service mode:

- switch off the ignition,
- switch off all other electrical consumers,
- apply the handbrake,
- shift to neutral
- and close the doors.

Activating the service mode

Proceed as follows to activate the service mode:

- OPERATE the switch of the heated rear window and HOLD IT THERE
- Turn on the ignition.
- RELEASE the switch of the heated rear window

A signal sounds and the turn signal lamps come on to indicate that service mode has been successfully activated.

NOTE: If the alarm is activated (in vehicles fitted with an anti-theft alarm system), service mode cannot be activated.

Inputs

SWITCH the windshield wiper switch to the "OFF" position to test the input signals. The following is a list of the switch signals to be tested, in no particular order:

- Turn signals (right, left, hazard warning lights)
- Windshield wiper stage I

- Windshield wiper stage II
- Windshield washer system
- Rear window wiper
- Rear window washer system
- Doors open/closed
- Remote control for central locking with double locking
- Hood open/closed (in vehicles equipped with an anti-theft alarm system)
- Tailgate open/closed
- A/C request signal
- Heated windscreen (if fitted)
- Parking Brake
- Brake reservoir fluid level
- Speed control system
- Autolamps
- Dipped beam
- High beam
- Headlamp flasher
- Marker Lamps
- Reversing lamp
- Liftgate release
- Ignition switch, terminal 15 (turn key to 0 position, then turn key to II position.)

An acoustic signal sounds and the turn signal lamps flash to indicate receipt of each input signal by the generic electronic module.

Test the windshield wiper "intermittent mode" stage input signal (only vehicles with adjustable intermittent mode)

The windshield wiper switch must be switched to "intermittent mode" in order to test the input signal. The delay times of the input signals can then be tested by operating the rotary switch. Each change of the rotary switch position is indicated by an acoustic signal and illumination of the turn signals.

Output signals

SWITCH the wiper switch to the "intermittent" position to test the output signals. PRESSING the heated rear window switch activates the output signals in the following order:

- a. Turn Indicator Left Hand
- b. Turn Indicator Right Hand
- c. High beam
- d. Dipped beam

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- e. Windshield wiper stage I
- f. Windshield wiper stage II
- g. Heated rear window
- h. Heater blower motor
- i. Headlamp washer (vehicles with gas discharge headlamps)
- j. Electric booster heater (if fitted)
- k. Autolamps (if fitted)
- l. Alarm horn (vehicles with alarm system)
- m. Rear window wiper
- n. Rear heated window relay

When the heated rear window switch is pressed again, the test of the relevant signal is terminated. When the heated rear window switch is pressed once more, the test for the next signal in the list is started.

Ending the service mode

The GEM automatically ends service mode 20 seconds after the last input or at a driving speed of over 7 km/h. However, service mode can be manually ended at any time by proceeding as follows:

- OPERATE the switch of the heated rear window and HOLD IT THERE
- SWITCH OFF the ignition
- RELEASE the switch of the heated rear window

3 signals sound and the turn signal lamps illuminate to indicate that service mode has ended.

Reset service mode

If, after completion of service mode, some functions do not operate or do not operate properly, check the following functions:

- Instrument cluster illumination, side lamps and license plate lamp in autolamps mode
- Rear wiper
- Headlamp Washers
- Electric booster heater
- Active anti-theft sounder
- Heated windshield

If one or more of the listed functions is not OK, it's possible that the cause of the fault is due to not exiting service mode properly. To reactivate the functions correctly, perform the following steps:

1. SWITCH OFF the ignition
2. SWITCH OFF the switch for the windscreen wash/wipe system

3. OPERATE the switch of the heated rear window and HOLD IT THERE
4. Turn on the ignition.
5. RELEASE the heated rear window switch (an acoustic signal will sound if activation has been performed correctly)
6. SWITCH the windscreen wash/wipe switch to the "Intermittent wipe" position
7. OPERATE the heated rear window switch 6 times (the main beam headlamps switch on and off automatically)
8. SWITCH OFF the switch for the windscreen wash/wipe system
9. OPERATE the switch of the heated rear window and HOLD IT THERE
10. SWITCH OFF the ignition
11. RELEASE the heated rear window switch (three acoustic signals will sound if activation has been performed correctly)

After completion of the work, check all the functions.

Diagnosis and Testing

NOTE: The generic electronic module (GEM) forms part of the central junction box (CJB).

NOTE: If the generic electronic module (GEM) is changed, the new one must be configured. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module. REFER to:

**Module Configuration (418-01 Module Configuration, General Procedures),
Generic Electronic Module (GEM) (419-10 Multifunction Electronic Modules, Removal and Installation).**

NOTE: Before reading out the vehicle-specific data, remake all the electrical connections to the module to be removed, so that communication between the module and WDS is ensured.

1. Verify the customer concern.
2. Visually inspect for obvious signs of electrical (or mechanical) damage.

DIAGNOSIS AND TESTING**Visual Inspection Chart**

Mechanical	Electrical
<ul style="list-style-type: none"> Check the windshield for damage/cracks in the vicinity of the rain sensor. Check that the rain sensor retaining frame is correctly attached to the windshield. 	<ul style="list-style-type: none"> Fuse(s) Lamp(s) Connection(s) Switches Wiring harness

- Resolve any obvious causes or concerns found during the visual inspection before carrying out any further tests.
- If the cause of the concern cannot be determined with a visual inspection, proceed to the Symptom Chart.

Trouble Code Table - Generic Electronic Module (GEM)**Trouble Code Table - Generic Electronic Module (GEM)**

DTC	Description	Action
B1510	Headlamp flasher circuit faulty (short to ground)	GO to Pinpoint Test G.
B1570	Main beam circuit faulty (short to ground)	GO to Pinpoint Test G.
B1792	Automatic headlamps sensor circuit faulty (short to voltage)	GO to Pinpoint Test C.
B1796	Dipped beam circuit faulty (short to voltage)	GO to Pinpoint Test G.

Symptom Chart**Symptom Chart**

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Dipped beam and main beam inoperative 	<ul style="list-style-type: none"> Fuse Circuit(s) Headlight switch Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test A.
<ul style="list-style-type: none"> Dipped beam is inoperative 	<ul style="list-style-type: none"> Fuse Circuit(s) Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
<ul style="list-style-type: none"> Dipped beam does not switch on, the automatic headlamp system is inoperative 	<ul style="list-style-type: none"> Circuit(s) Headlight switch Rain sensor Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test C.

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Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Main beam is inoperative 	<ul style="list-style-type: none"> Circuit(s) Steering column multifunction switch Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test D.
<ul style="list-style-type: none"> One dipped beam is inoperative 	<ul style="list-style-type: none"> Fuse Circuit(s) Left/right-hand headlamp Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test E.
<ul style="list-style-type: none"> One main beam is inoperative 	<ul style="list-style-type: none"> Fuse Circuit(s) Left/right-hand headlamp Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test F.
<ul style="list-style-type: none"> Headlamps illuminate continuously 	<ul style="list-style-type: none"> Circuit(s) Headlight switch Steering column multifunction switch Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test G.
<ul style="list-style-type: none"> Flash-to-pass feature is inoperative 	<ul style="list-style-type: none"> Circuit(s) Steering column multifunction switch Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test H.
<ul style="list-style-type: none"> Main beam warning lamp is inoperative 	<ul style="list-style-type: none"> Circuit(s) Instrument cluster Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> REFER to: Instrument Cluster (413-01 Instrument Cluster, Diagnosis and Testing).
<ul style="list-style-type: none"> Adaptive front lighting is inoperative 	<ul style="list-style-type: none"> Fuse Circuit(s) Steering position sensor Adaptive front lighting module 	<ul style="list-style-type: none"> REFER to: Communications Network - 3-Door (418-00 Module Communications Network, Diagnosis and Testing).

System Checks

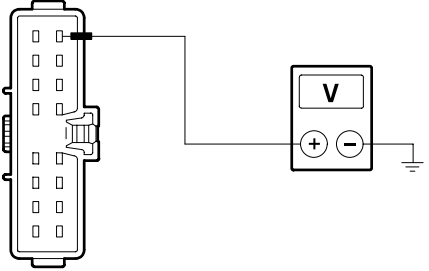
NOTE: Use a digital multimeter for all electrical measurements.

DIAGNOSIS AND TESTING

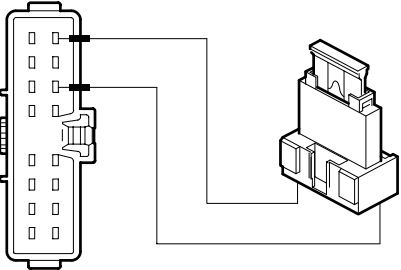
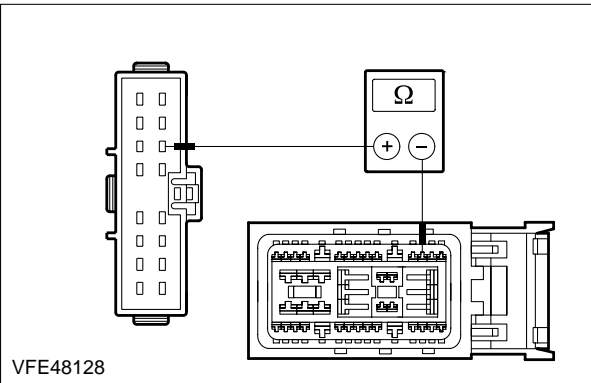
PINPOINT TEST U : DIPPED BEAM AND MAIN BEAM INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> 1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? → Yes GO to A2. → No GO to A4.
A2: CHECK FUSE F115 (CJB)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Fuse F115 (7.5 A) (CJB). 3 CHECK Fuse F115 (7.5 A) (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to A3. → No RENEW fuse F115 (7.5 A) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.
A3: CHECK THE VOLTAGE SUPPLY OF FUSE F115 (CJB)	
	<ol style="list-style-type: none"> 1 Connect Fuse F115 (7.5 A) (CJB). 2 Ignition switch in position II. 3 Measure the voltage between fuse F115 (7.5 A) (CJB) and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to A6. → No LOCATE and RECTIFY the break in the voltage supply of fuse F115 (CJB) using the Wiring Diagrams, if necessary CHECK and RENEW the CJB. CHECK the operation of the system.
A4: CHECK FUSE F66 (CJB)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Fuse F66 (7.5 A) (CJB).

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 CHECK Fuse F66 (7.5 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to A5.</p> <p>→ No RENEW fuse F66 (7.5 A) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>A5: CHECK THE VOLTAGE SUPPLY TO FUSE F66 (CJB)</p>	
	<p>1 Connect Fuse F66 (7.5 A) (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F66 (7.5 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to A6.</p> <p>→ No LOCATE and RECTIFY the break in the voltage supply to fuse F66 (CJB) using the Wiring Diagrams, if necessary CHECK and RENEW the CJB. CHECK the operation of the system.</p>
<p>A6: CHECK THE VOLTAGE SUPPLY OF THE HEADLIGHT SWITCH</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Headlight switch from connector C320.</p> <p>3 Ignition switch in position II.</p>
 <p>VFE0001471</p>	<p>4 Measure the voltage between the headlight switch, connector C320, pin 8, circuit 15-LE29 (GN/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to A7.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the CJB and the headlight switch using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A7: CHECK THE HEADLIGHT SWITCH	
 <p>VFE0016100</p>	<p>1 Using a fused bridging cable (7.5 A) at the headlight switch, connect between connector C320, pin 8, circuit 15-LE29 (GN/BK) and pin 6, circuit 15S-LE21 (GN/BK), wiring harness side.</p>
	<p>2 Ignition switch in position II.</p> <p>3 CHECK the operation of the dipped beam.</p> <ul style="list-style-type: none"> • Does the dipped beam illuminate? → Yes RENEW the headlight switch. CHECK the operation of the system. → No GO to A8.
A8: CHECK CIRCUIT 15S-LE21 (GN/BK) FOR OPEN CIRCUIT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C102.</p>
 <p>VFE48128</p>	<p>3 Measure the resistance between CJB, connector C102, pin 44, circuit 15S-LE21 (GN/BK), wiring harness side and headlight switch, connector C320, pin 6, circuit 15S-LE21 (GN/BK), wiring harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 2 ohm? → Yes CHECK the GEM using WDS, RENEW CJB if necessary. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and the headlight switch using the Wiring Diagrams. CHECK the operation of the system. CHECK the operation of the system.

417-01-188

Exterior Lighting

417-01-188

DIAGNOSIS AND TESTING

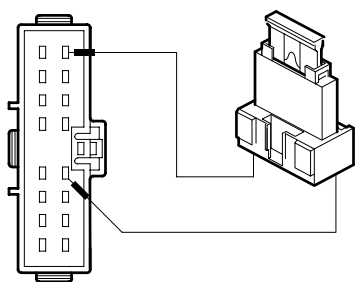
PINPOINT TEST V : DIPPED BEAM IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> Unfasten the CJB and fold it down. <ul style="list-style-type: none"> Is the location for connector C100 on the top of the CJB? <ul style="list-style-type: none"> → Yes GO to B2. → No GO to B4.
B2: CHECK FUSE F135 (CJB)	
	<ol style="list-style-type: none"> Ignition switch in position 0. Disconnect Fuse F135 (20 A) (CJB). CHECK Fuse F135 (20 A) (CJB). <ul style="list-style-type: none"> Is the fuse OK? <ul style="list-style-type: none"> → Yes GO to B3. → No RENEW fuse F135 (20 A) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.
B3: CHECK VOLTAGE AT FUSE F135 (CJB)	
	<ol style="list-style-type: none"> Connect Fuse F135 (20 A) (CJB). Measure the voltage between fuse F135 (20 A) (CJB) and ground. <ul style="list-style-type: none"> Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes CHECK the GEM using WDS, RENEW CJB if necessary. CHECK the operation of the system. → No RENEW THE CJB. CHECK the operation of the system.
B4: CHECK FUSE F48 (CJB)	
	<ol style="list-style-type: none"> Ignition switch in position 0. Disconnect Fuse F48 (20 A) (CJB).

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 CHECK Fuse F48 (20 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to B5. → No RENEW fuse F48 (20 A) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.
B5: CHECK THE VOLTAGE AT FUSE F48 (CJB)	
	<p>1 Connect Fuse F48 (20 A) (CJB).</p> <p>2 Measure the voltage between fuse F48 (20 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes CHECK the GEM using WDS, RENEW CJB if necessary. CHECK the operation of the system. → No RENEW THE CJB. CHECK the operation of the system.

PINPOINT TEST W : DIPPED BEAM DOES NOT SWITCH ON, THE AUTOMATIC HEADLAMP SYSTEM IS INOPERATIVE

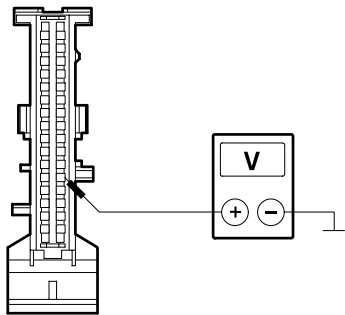
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: CHECK THE HEADLIGHT SWITCH	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Headlight switch from connector C320.</p>
 <p>VFE0028649</p>	<p>3 Using a fused bridging cable (7.5 A) at the headlight switch, connect between connector C320, pin 8, circuit 15-LE29 (GN/BK) and pin 4, circuit 15S-LE42 (GN/RD), wiring harness side.</p>

417-01-190

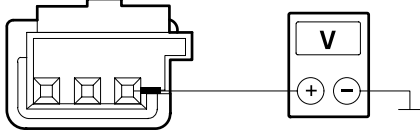
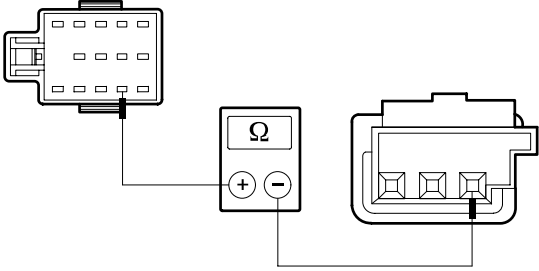
Exterior Lighting

417-01-190

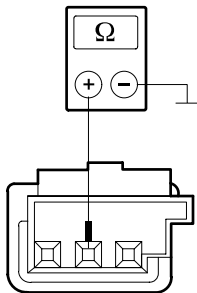
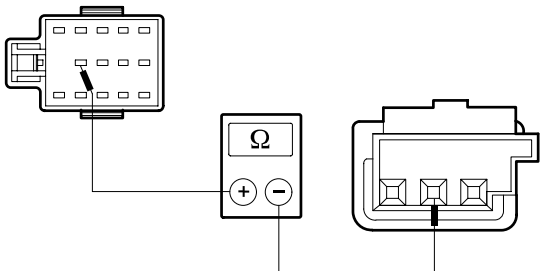
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 Ignition switch in position II.</p> <p>5 Cover rain sensor with a light-proof material to simulate darkness.</p> <p>6 CHECK the operation of the dipped beam.</p> <ul style="list-style-type: none"> • Does the dipped beam illuminate? → Yes RENEW headlight switch. CHECK the operation of the system. → No GO to C2.
C2: CHECK CIRCUIT 15S-LE42 (GN/RD) FOR OPEN CIRCUIT	
	<p>1 Connect Headlight switch with connector C320.</p> <p>2 Disconnect CJB from connector C103.</p> <p>3 Ignition switch in position II.</p> <p>4 Headlight switch in AUTOMATIC HEADLAMP SYSTEM position.</p>
 <p>VFE0038443</p>	<p>5 Measure the voltage between CJB, connector C103, pin 5, circuit 15S-LE42 (GN/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to C3. → No LOCATE and RECTIFY the break in the circuit between the CJB and the headlight switch using the Wiring Diagrams. CHECK the operation of the system. If necessary CHECK the GEM using WDS and RENEW. CHECK the operation of the system.
C3: CHECK VOLTAGE SUPPLY TO RAIN SENSOR	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Rain sensor from connector C526.</p> <p>3 Ignition switch in position II.</p>

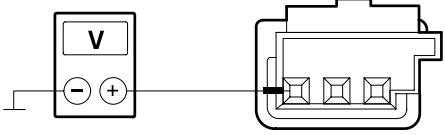
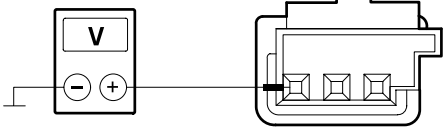
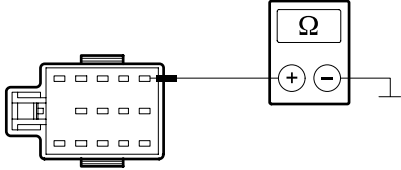
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038444</p>	<p>4 Measure the voltage between rain sensor, connector C526, pin 1:</p> <ul style="list-style-type: none"> - Vehicles with sliding sunroof: Circuit 15-KA41 (GN/BK), wiring harness side and ground. - Vehicles without sliding sunroof: Circuit 15-AG12B (GN/BK), wiring harness side and ground. <p>• Does the meter display battery voltage?</p> <p>→ Yes GO to C5.</p> <p>→ No GO to C4.</p>
<p>C4: CHECK THE CJB</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C98.</p>
 <p>VFE0038445</p>	<p>3 Measure resistance between CJB, connector C98, pin 11:</p> <ul style="list-style-type: none"> - Vehicles with sliding sunroof: Circuit 15-AG12A (GN/BK), wiring harness side and rain sensor, connector C526, pin 1, circuit 15-KA41 (GN/BK), wiring harness side. - Vehicles without sliding sunroof: Circuit 15-AG12B (GN/BK), wiring harness side and rain sensor, connector C526, pin 1, circuit 15-AG12B (GN/BK), wiring harness side. <p>• Is the resistance less than 2 ohm?</p> <p>→ Yes CHECK CJB and if necessary RENEW. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between CJB and the rain sensor using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>C5: CHECK GROUND CONNECTION OF RAIN SENSOR FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p>

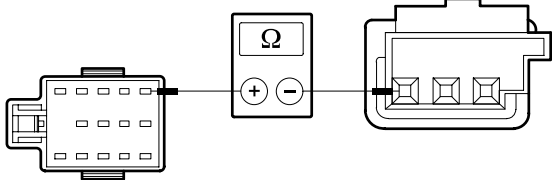
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038446</p>	<p>2 Measure resistance between rain sensor, connector C526, pin 2, circuit 91-KA41 (GN/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 2 ohm? → Yes GO to C8. → No GO to C6.
<p>C6: CHECK GROUND CONNECTION OF RAIN SENSOR FOR OPEN CIRCUIT</p>	
 <p>VFE0038447</p>	<p>1 Disconnect CJB from connector C98.</p> <p>2 Measure the resistance between CJB, connector C98, pin 4, circuit 91-DA4 (BK/GN), wiring harness side and rain sensor, connector C526, pin 2, circuit 91-KA41 (BK/GN), wiring harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 2 ohm? → Yes GO to C7. → No LOCATE and RECTIFY the break in the circuit(s) between CJB and the rain sensor using the Wiring Diagrams. CHECK the operation of the system.
<p>C7: CHECK GROUND CONNECTION OF CJB FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect CJB from connector C96.</p> <p>2 Measure the resistance between the CJB, connector C96, pin 39, circuit 91-DK20 (BK/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 2 ohm? → Yes CHECK CJB and if necessary RENEW. CHECK the operation of the system. → No LOCATE and RECTIFY break in circuit between CJB and ground connection G19 using the Wiring Diagrams. CHECK the operation of the system.
<p>C8: CHECK SIGNAL CABLE OF RAIN SENSOR FOR SHORT TO BATTERY VOLTAGE</p>	
	<p>1 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038449</p>	<p>2 Measure voltage between rain sensor, connector C526, pin 3, circuit 8-KA41 (WH/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes GO to C9. → No GO to C10.
<p>C9: CHECK SIGNAL CABLE OF RAIN SENSOR FOR SHORT TO BATTERY VOLTAGE</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C98.</p> <p>3 Ignition switch in position II.</p>
 <p>VFE0038449</p>	<p>4 Measure voltage between rain sensor, connector C526, pin 3, circuit 8-KA41 (WH/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes LOCATE and RECTIFY the short to battery voltage in the circuit between CJB and the rain sensor using the Wiring Diagrams. CHECK the operation of the system. → No CHECK the GEM using WDS, RENEW if necessary. CHECK the operation of the system.
<p>C10: CHECK SIGNAL CABLE OF RAIN SENSOR FOR SHORT TO GROUND</p>	
 <p>VFE0038450</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure resistance between CJB, connector C98, pin 12, circuit 8-KA41 (WH/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 Ohms? <ul style="list-style-type: none"> → Yes GO to C11. → No LOCATE and RECTIFY the short to ground in the circuit between CJB and the rain sensor using the Wiring Diagrams. CHECK the operation of the system.

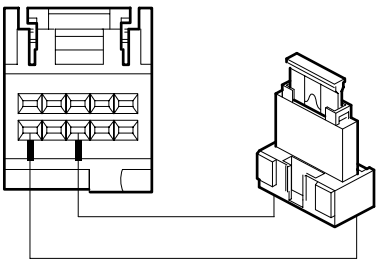
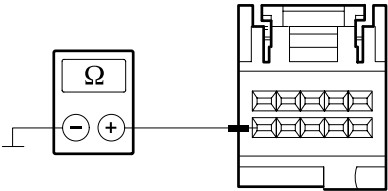
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C11: CHECK SIGNAL CABLE OF RAIN SENSOR FOR OPEN CIRCUIT	
 <p>VFE0038451</p>	<ol style="list-style-type: none"> 1 Measure the resistance between CJB, connector C98, pin 12, circuit 8-KA41 (WH/GN), wiring harness side and rain sensor, connector C526, pin 3, circuit 8-KA41 (WH/GN), wiring harness side. <ul style="list-style-type: none"> • Is the resistance less than 2 ohm? <ul style="list-style-type: none"> → Yes CHECK the GEM using WDS, RENEW if necessary. CHECK the operation of the system. If the concern is not rectified, RENEW the rain sensor. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between CJB and the rain sensor using the Wiring Diagrams. CHECK the operation of the system.

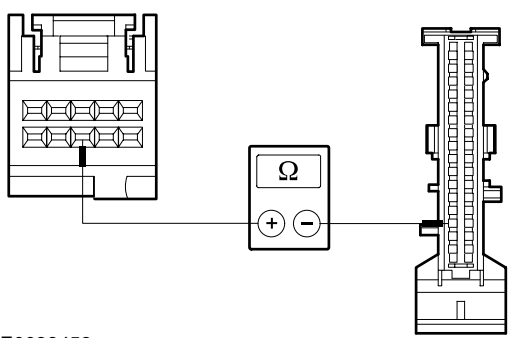
PINPOINT TEST X : MAIN BEAM IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: DETERMINE THE FAULT CONDITION	
	<ol style="list-style-type: none"> 1 Ignition switch in position II. 2 SWITCH ON the dipped beam. 3 SWITCH ON the main beam. 4 SWITCH OFF main beam. 5 OPERATE flash-to-pass feature. 6 Determine the fault condition. <ul style="list-style-type: none"> • Are dipped beams and main beams inoperative? <ul style="list-style-type: none"> → Yes GO to D2. → No <ul style="list-style-type: none"> - Only the main beam feature is inoperative: GO to D2. - Only the flash to pass feature is inoperative: GO to Pinpoint Test H.
D2: CHECK THE STEERING COLUMN MULTIFUNCTION SWITCH.	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Steering column multifunction switch from connector C459.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038456</p>	<p>3 Using a fused bridging cable (7.5 A) at the steering column multifunction switch, connect between connector C459, pin 8, circuit 91S-LE14 (BK/OG) and pin 10, circuit 91-LG27 (BK/GN), wiring harness side.</p>
	<p>4 Ignition switch in position II.</p> <p>5 SWITCH ON the dipped beam.</p> <p>6 CHECK the operation of the main beam.</p> <ul style="list-style-type: none"> • Does the main beam illuminate? → Yes RENEW the steering column multifunction switch. CHECK the operation of the system. → No <ul style="list-style-type: none"> - Dipped beam and main beam were inoperative: GO to D3. - Main beam was inoperative: GO to D4.
<p>D3: CHECK GROUND CONNECTION OF THE STEERING COLUMN MULTIFUNCTION SWITCH</p>	
 <p>VFE0038452</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between steering column multifunction switch, connector C459, pin 10, circuit 91-LG27 (BK/GN) and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 2 ohm? → Yes CHECK the GEM using WDS, RENEW if necessary. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the steering column multifunction switch and soldered connection S12 using the Wiring Diagrams. CHECK the operation of the system.
<p>D4: CHECK CONTROL CIRCUIT 91S-LE14 (BK/OG) FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect CJB from connector C103.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038453</p>	<p>2 Measure the resistance between CJB, connector C103, pin 19, circuit 91S-LE14 (BK/OG), wiring harness side and steering column multifunction switch, connector C459, pin 8, circuit 91S-LE14 (BK/OG), wiring harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 2 ohm? <p>→ Yes CHECK the GEM using WDS, RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the CJB and the steering column multifunction switch using the Wiring Diagrams. CHECK the operation of the system.</p>

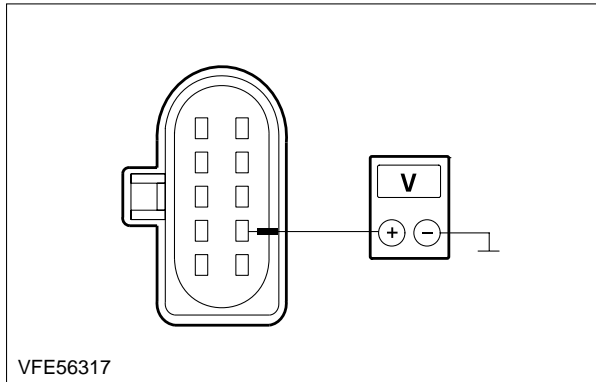
PINPOINT TEST Y : ONE DIPPED BEAM IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: DETERMINE THE FAULT CONDITION	
	<p>1 Ignition switch in position II.</p> <p>2 SWITCH ON the dipped beam.</p> <p>3 Determine the fault condition.</p> <ul style="list-style-type: none"> Is the left-hand dipped beam inoperative? <p>→ Yes GO to E3.</p> <p>→ No The right-hand dipped beam is inoperative: GO to E11.</p>
E2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to E3.</p> <p>→ No GO to E5.</p>
E3: CHECK FUSE F143 (CJB)	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse F143 (15 A) (CJB).</p>

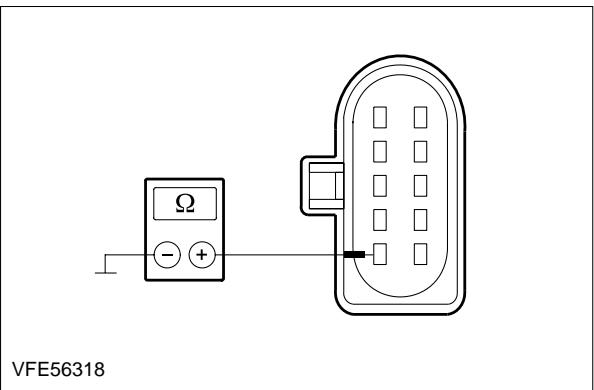
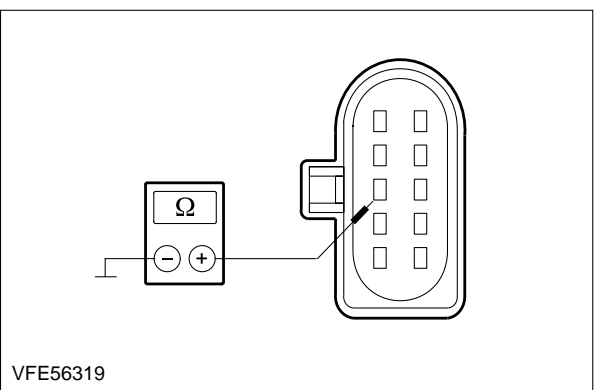
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 CHECK Fuse F143 (15 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to E4.</p> <p>→ No RENEW fuse F143 (15 A) (CJB). If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
E4: CHECK VOLTAGE AT FUSE F143 (CJB)	
	<p>1 Connect Fuse F143 (15 A) (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 SWITCH ON the dipped beam.</p> <p>4 Measure the voltage between fuse F143 (15 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to E7.</p> <p>→ No LOCATE AND RECTIFY the break in the voltage supply of fuse F143 (CJB) with the aid of the wiring diagrams. CHECK the operation of the system. If necessary CHECK and RENEW the CJB. CHECK the operation of the system.</p>
E5: CHECK FUSE F61 (CJB)	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse F61 (15 A) (CJB).</p> <p>3 CHECK Fuse F61 (15 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to E6.</p> <p>→ No RENEW fuse F61 (15 A). If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
E6: CHECK THE VOLTAGE AT FUSE F61 (CJB)	
	<p>1 Connect Fuse F61 (15 A) (CJB).</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Ignition switch in position II.</p> <p>3 SWITCH ON the dipped beam.</p> <p>4 Measure the voltage between fuse F61 (15 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to E7. → No LOCATE and RECTIFY the break in the voltage supply to fuse F61 (CJB) using the Wiring Diagrams. CHECK the operation of the system. If necessary CHECK and RENEW the CJB. CHECK the operation of the system.
E7: CHECK VOLTAGE SUPPLY OF LEFT-HAND HEADLAMP	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Left-hand headlamp from connector C836.</p> <p>3 Ignition switch in position II.</p> <p>4 SWITCH ON the dipped beam.</p>
 <p>VFE56317</p>	<p>5 Measure the voltage between left-hand headlamp, connector C836, pin 2, circuit 15S-LE16 (GN/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to E8. → No LOCATE and RECTIFY break in circuit between CJB and headlamp using the wiring diagrams. CHECK the operation of the system. If necessary CHECK and RENEW the CJB. CHECK the operation of the system.
E8: CHECK THE GROUND CONNECTION OF THE LEFT-HAND HEADLAMP	
	<p>1 Ignition switch in position 0.</p>

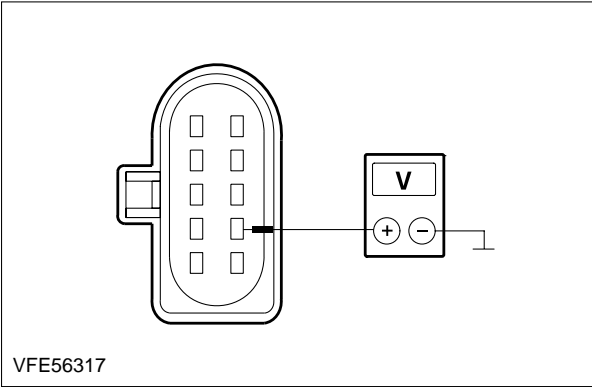
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE56318</p>	<p>2 Measure the resistance between the left-hand headlamp, connector C836, pin 6, circuit 31-LE31 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is less than 2 Ohm measured? <p>→ Yes</p> <ul style="list-style-type: none"> Vehicles with conventional headlamps: CHECK and if necessary RENEW the left-hand headlamp. CHECK the operation of the system. Vehicles with xenon headlamps: GO to E9. <p>→ No</p> <p>LOCATE and RECTIFY the break in the circuit between the headlamp and soldered connection S121 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>E9: CHECK THE GROUND CONNECTION OF THE LEFT-HAND HEADLAMP</p>	
 <p>VFE56319</p>	<p>1 Measure the resistance between the left-hand headlamp, connector C836, pin 8:</p> <ul style="list-style-type: none"> Vehicles built before 01/2005: circuit 31-LE45A (BK), wiring harness side and ground. Vehicles built from 01/2005: circuit 31-LE45A (BK/OG), wiring harness side and ground. <ul style="list-style-type: none"> Is less than 2 Ohm measured? <p>→ Yes</p> <p>CHECK and if necessary RENEW left-hand headlamp. CHECK the operation of the system.</p> <p>→ No</p> <p>LOCATE and RECTIFY the break in the circuit between the headlamp and soldered connection S121 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>E10: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).</p>	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> Is the location for connector C100 on the top of the CJB? <p>→ Yes</p> <p>GO to E11.</p> <p>→ No</p> <p>GO to E13.</p>
<p>E11: CHECK FUSE F142 (CJB)</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect Fuse F142 (15 A) (CJB).</p>

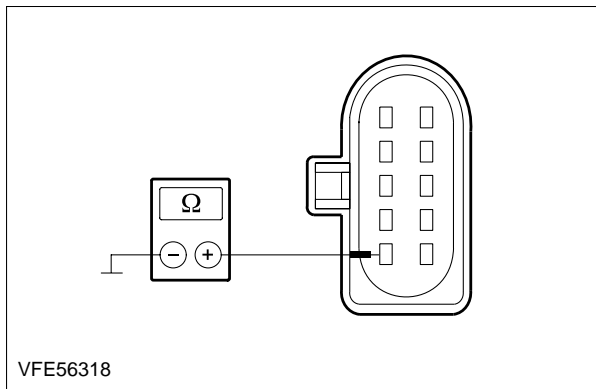
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 CHECK Fuse F142 (15 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to E12.</p> <p>→ No RENEW fuse F142 (15 A) (CJB). If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
E12: CHECK VOLTAGE AT FUSE F142 (CJB)	
	<p>1 Connect Fuse F142 (15 A) (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 SWITCH ON the dipped beam.</p> <p>4 Measure the voltage between fuse F142 (15 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to E15.</p> <p>→ No LOCATE AND RECTIFY the break in the voltage supply of fuse F142 (CJB) with the aid of the wiring diagrams. CHECK the operation of the system. If necessary CHECK and RENEW the CJB. CHECK the operation of the system.</p>
E13: CHECK FUSE F60 (CJB)	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse F60 (15 A) (CJB).</p> <p>3 CHECK Fuse F60 (15 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to E14.</p> <p>→ No RENEW fuse F60 (15 A). If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
E14: CHECK THE VOLTAGE AT FUSE F60 (CJB)	
	<p>1 Connect Fuse F60 (15 A) (CJB).</p>

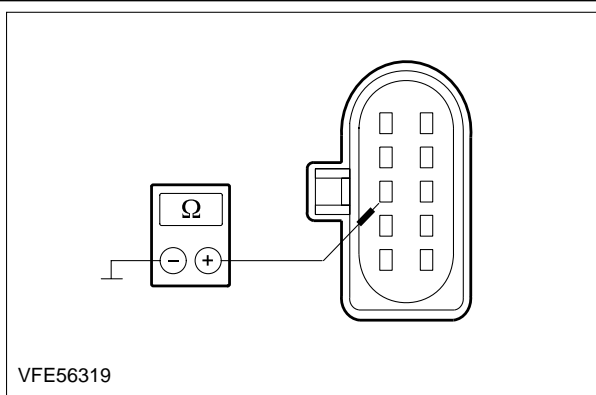
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Ignition switch in position II.</p> <p>3 SWITCH ON the dipped beam.</p> <p>4 Measure the voltage between fuse F60 (15 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to E15. → No LOCATE and RECTIFY the break in the voltage supply to fuse F60 (CJB) using the Wiring Diagrams. CHECK the operation of the system. If necessary CHECK and RENEW the CJB. CHECK the operation of the system.
E15: CHECK VOLTAGE SUPPLY OF RIGHT-HAND HEADLAMP	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Right-hand headlamp from connector C837.</p> <p>3 Ignition switch in position II.</p> <p>4 SWITCH ON the dipped beam.</p>
 <p>VFE56317</p>	<p>5 Measure the voltage between the right-hand headlamp, connector C837, pin 2, circuit 15S-LE23 (GN/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to E16. → No LOCATE and RECTIFY break in circuit(s) between CJB and headlamp using the wiring diagrams. CHECK the operation of the system. If necessary CHECK and RENEW the CJB. CHECK the operation of the system.
E16: CHECK THE GROUND CONNECTION OF THE RIGHT-HAND HEADLAMP	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE56318</p>	<p>2 Measure the resistance between right-hand headlamp, connector C837, pin 6, circuit 31-LE30 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is less than 2 Ohm measured? <p>→ Yes</p> <ul style="list-style-type: none"> Vehicles with conventional headlamps: CHECK and if necessary RENEW the right-hand headlamp. CHECK the operation of the system. Vehicles with xenon headlamps: GO to E17. <p>→ No</p> <p>LOCATE and RECTIFY the break in the circuit between the headlamp and soldered connection S109 using the Wiring Diagrams. CHECK the operation of the system.</p>

E17: CHECK THE GROUND CONNECTION OF THE RIGHT-HAND HEADLAMP

 <p>VFE56319</p>	<p>1 Measure the resistance between the right-hand headlamp, connector C837, pin 8:</p> <ul style="list-style-type: none"> Vehicles built before 01/2005: circuit 31-LE46A (BK), wiring harness side and ground. Vehicles built from 01/2005: circuit 31-LE46A (BK/OG), wiring harness side and ground. <ul style="list-style-type: none"> Is less than 2 Ohm measured? <p>→ Yes</p> <p>CHECK and if necessary RENEW right-hand headlamp. CHECK the operation of the system.</p> <p>→ No</p> <p>LOCATE and RECTIFY the break in the circuit between the headlamp and soldered connection S109 using the Wiring Diagrams. CHECK the operation of the system.</p>
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PINPOINT TEST Z : ONE MAIN BEAM IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F1: DETERMINE THE FAULT CONDITION	
	<p>1 Ignition switch in position II.</p> <p>2 SWITCH ON the dipped beam.</p> <p>3 SWITCH ON the main beam.</p>

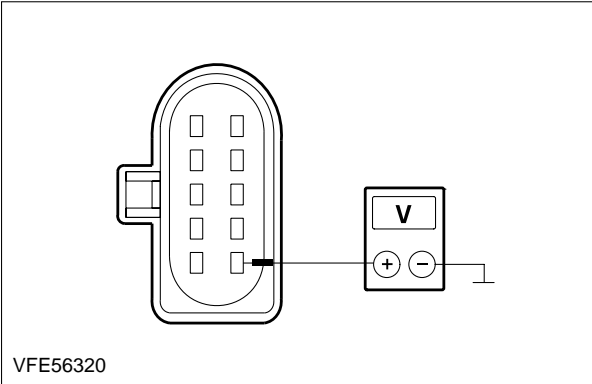
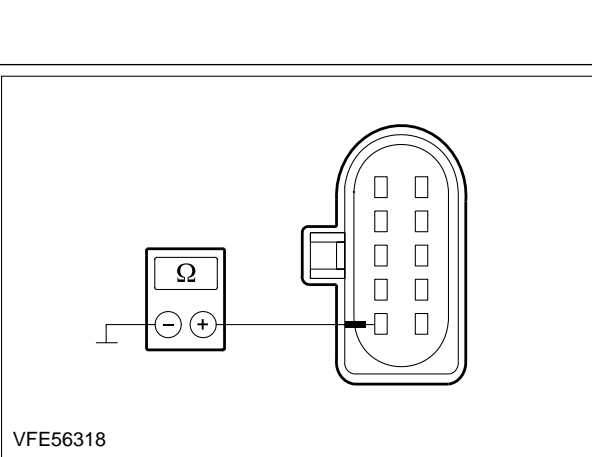
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 Determine the fault condition.</p> <ul style="list-style-type: none"> • Is the left-hand main beam inoperative? <p>→ Yes GO to F3.</p> <p>→ No The right-hand main beam is inoperative: GO to F11.</p>
F2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to F3.</p> <p>→ No GO to F5.</p>
F3: CHECK FUSE F140 (CJB)	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse F140 (10 A) (CJB).</p> <p>3 CHECK Fuse F140 (10 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to F4.</p> <p>→ No RENEW fuse F140 (10 A) (CJB). If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
F4: CHECK VOLTAGE AT FUSE F140 (CJB)	
	<p>1 Connect Fuse F140 (10 A) (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 SWITCH ON the dipped beam.</p> <p>4 SWITCH ON the main beam.</p>

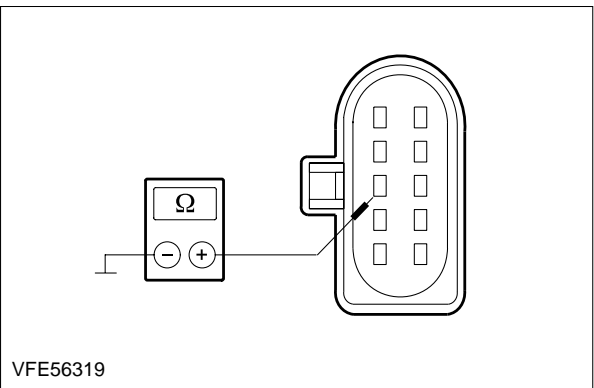
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 Measure the voltage between fuse F140 (10 A) (CJB) and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes GO to F7.</p> <p>→ No LOCATE AND RECTIFY the break in the voltage supply of fuse F140 (CJB) with the aid of the wiring diagrams. CHECK the operation of the system. If necessary CHECK the CJB and RENEW if necessary. CHECK the operation of the system.</p>
F5: CHECK FUSE F37 (CJB)	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse F37 (10 A) (CJB).</p> <p>3 CHECK Fuse F37 (10 A) (CJB).</p> <ul style="list-style-type: none"> Is the fuse OK? <p>→ Yes GO to F6.</p> <p>→ No RENEW fuse F37 (10 A). If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
F6: CHECK THE VOLTAGE AT FUSE F37 (CJB)	
	<p>1 Connect Fuse F37 (10 A) (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 SWITCH ON the dipped beam.</p> <p>4 SWITCH ON the main beam.</p> <p>5 Measure the voltage between fuse F37 (10 A) (CJB) and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes GO to F7.</p> <p>→ No LOCATE AND RECTIFY the break in the voltage supply of the CJB with the aid of the wiring diagrams. CHECK the operation of the system. If necessary CHECK the CJB and RENEW if necessary. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F7: CHECK VOLTAGE SUPPLY OF LEFT-HAND HEADLAMP	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 Disconnect Left-hand headlamp from connector C836. <li>3 Ignition switch in position II. <li>4 SWITCH ON the dipped beam. <li>5 SWITCH ON the main beam.
 <p>VFE56320</p>	<ol style="list-style-type: none"> <li>6 Measure the voltage between left-hand headlamp, connector C836, pin 1, circuit 15S-LE15 (GN/BK), wiring harness side and ground. <ul style="list-style-type: none"> <li>• Does the meter display battery voltage? <li>→ Yes GO to F8. <li>→ No LOCATE and RECTIFY break in circuit(s) between CJB and headlamp using the wiring diagrams. CHECK the operation of the system. If necessary CHECK and RENEW the CJB. CHECK the operation of the system.
F8: CHECK THE GROUND CONNECTION OF THE LEFT-HAND HEADLAMP	
 <p>VFE56318</p>	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 Measure the resistance between the left-hand headlamp, connector C836, pin 6, circuit 31-LE31 (BK), wiring harness side and ground. <ul style="list-style-type: none"> <li>• Is less than 2 Ohm measured? <li>→ Yes <ul style="list-style-type: none"> <li>- Vehicles with conventional headlamps: CHECK and if necessary RENEW the left-hand headlamp. CHECK the operation of the system. <li>- Vehicles with xenon headlamps: GO to F9. <li>→ No LOCATE and RECTIFY the break in the circuit between the headlamp and soldered connection S121 using the Wiring Diagrams. CHECK the operation of the system.
F9: CHECK THE GROUND CONNECTION OF THE LEFT-HAND HEADLAMP	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0.

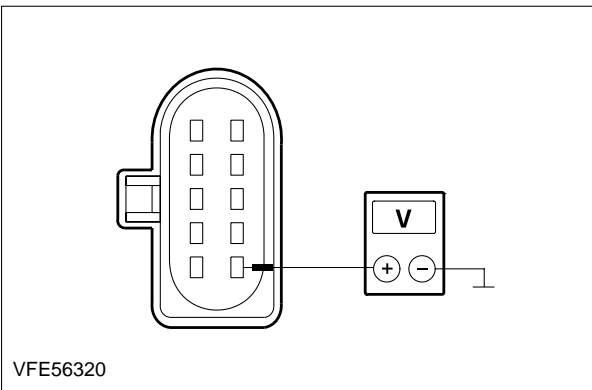
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE56319</p>	<p>2 Measure the resistance between the left-hand headlamp, connector C836, pin 8:</p> <ul style="list-style-type: none"> - Vehicles built before 01/2005: circuit 31-LE45A (BK), wiring harness side and ground. - Vehicles built from 01/2005: circuit 31-LE45A (BK/OG), wiring harness side and ground. <ul style="list-style-type: none"> • Is less than 2 Ohm measured? → Yes CHECK and if necessary RENEW left-hand headlamp. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the headlamp and soldered connection S121 using the Wiring Diagrams. CHECK the operation of the system.
F10: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? → Yes GO to F11. → No GO to F13.
F11: CHECK FUSE F139 (CJB)	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse F139 (10 A) (CJB).</p> <p>3 CHECK Fuse F139 (10 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to F12. → No RENEW fuse F139 (10 A) (CJB). If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.
F12: CHECK VOLTAGE AT FUSE F139 (CJB)	
	<p>1 Connect Fuse F139 (10 A) (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 SWITCH ON the dipped beam.</p>

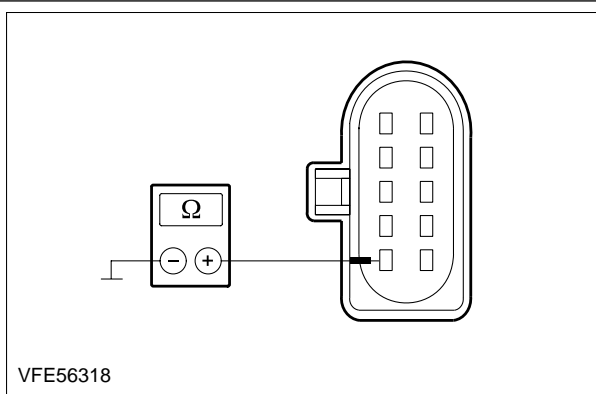
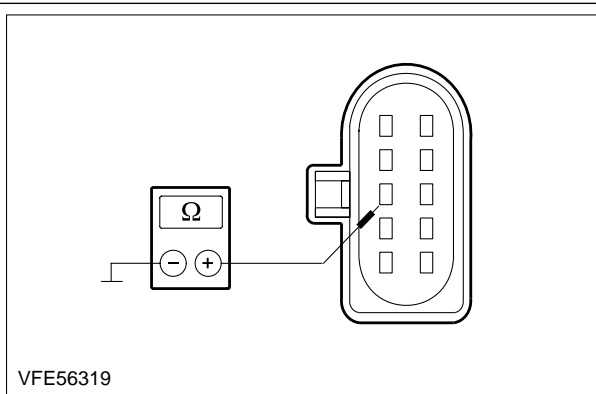
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 SWITCH ON the main beam.</p> <p>5 Measure the voltage between fuse F139 (10 A) (CJB) and ground.</p> <ul style="list-style-type: none"> <li>• Does the meter display battery voltage? <li>→ Yes GO to F15. <li>→ No LOCATE AND RECTIFY the break in the voltage supply of fuse F139 (CJB) with the aid of the wiring diagrams. CHECK the operation of the system. If necessary CHECK and RENEW the CJB. CHECK the operation of the system.
F13: CHECK FUSE F38 (CJB)	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse F38 (10 A) (CJB).</p> <p>3 CHECK Fuse F38 (10 A) (CJB).</p> <ul style="list-style-type: none"> <li>• Is the fuse OK? <li>→ Yes GO to F14. <li>→ No RENEW fuse F38 (10 A). If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.
F14: CHECK THE VOLTAGE AT FUSE F38 (CJB)	
	<p>1 Connect Fuse F38 (10 A) (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 SWITCH ON the dipped beam.</p> <p>4 SWITCH ON the main beam.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 Measure the voltage between fuse F38 (10 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to F15.</p> <p>→ No LOCATE and RECTIFY the break in the voltage supply to fuse F38 (CJB) using the Wiring Diagrams. CHECK the operation of the system. If necessary CHECK and RENEW the CJB. CHECK the operation of the system.</p>
F15: CHECK VOLTAGE SUPPLY OF RIGHT-HAND HEADLAMP	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Right-hand headlamp from connector C837.</p> <p>3 Ignition switch in position II.</p> <p>4 SWITCH ON the dipped beam.</p> <p>5 SWITCH ON the main beam.</p>
 <p>VFE56320</p>	<p>6 Measure the voltage between right-hand headlamp, connector C837, pin 1, circuit 15S-LE22 (GN/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to F16.</p> <p>→ No LOCATE and RECTIFY break in circuit(s) between CJB and headlamp using the wiring diagrams. CHECK the operation of the system. If necessary CHECK and RENEW the CJB. CHECK the operation of the system.</p>
F16: CHECK THE GROUND CONNECTION OF THE RIGHT-HAND HEADLAMP	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE56318</p>	<p>2 Measure the resistance between right-hand headlamp, connector C837, pin 6, circuit 31-LE30 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is less than 2 Ohm measured? <p>→ Yes</p> <ul style="list-style-type: none"> Vehicles with conventional headlamps: CHECK and if necessary RENEW the right-hand headlamp. CHECK the operation of the system. Vehicles with xenon headlamps: GO to F17. <p>→ No</p> <p>LOCATE and RECTIFY the break in the circuit between the headlamp and soldered connection S109 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>F17: CHECK THE GROUND CONNECTION OF THE RIGHT-HAND HEADLAMP</p>	
 <p>VFE56319</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the right-hand headlamp, connector C837, pin 8:</p> <ul style="list-style-type: none"> Vehicles built before 01/2005: circuit 31-LE46A (BK), wiring harness side and ground. Vehicles built from 01/2005: circuit 31-LE46A (BK/OG), wiring harness side and ground. <ul style="list-style-type: none"> Is less than 2 Ohm measured? <p>→ Yes</p> <p>CHECK and if necessary RENEW right-hand headlamp. CHECK the operation of the system.</p> <p>→ No</p> <p>LOCATE and RECTIFY the break in the circuit between the headlamp and soldered connection S109 using the Wiring Diagrams. CHECK the operation of the system.</p>

PINPOINT TEST AA : HEADLAMPS ILLUMINATE CONTINUOUSLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>G1: DETERMINE THE FAULT CONDITION</p>	
	<p>1 Determine the fault condition.</p>

417-01-210

Exterior Lighting

417-01-210

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Ignition switch in position II.</p> <ul style="list-style-type: none"> • Does the main beam illuminate continuously? <p>→ Yes GO to G5.</p> <p>→ No Dipped beam illuminates continuously: GO to G2.</p>
G2: NARROW DOWN THE CAUSE OF THE SHORT TO BATTERY VOLTAGE	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Headlight switch from connector C320.</p> <p>3 Ignition switch in position II.</p> <p>4 CHECK the dipped beam.</p> <ul style="list-style-type: none"> • Does the dipped beam illuminate continuously? <p>→ Yes GO to G3.</p> <p>→ No RENEW headlight switch. CHECK the operation of the system.</p>
G3: CHECK CIRCUIT 15S-LE21 (GN/BK) FOR SHORT TO BATTERY VOLTAGE	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C102.</p> <p>3 Ignition switch in position II.</p> <p>4 CHECK the dipped beam.</p> <ul style="list-style-type: none"> • Does the dipped beam illuminate continuously? <p>→ Yes GO to G4.</p> <p>→ No LOCATE and RECTIFY short to battery voltage in circuit 15S-LE21 (GN/BK) between headlight switch and CJB using the Wiring Diagrams. CHECK the operation of the system. If the concern persists, CHECK the GEM using WDS, RENEW if necessary. CHECK the operation of the system.</p>
G4: NARROW DOWN THE CAUSE OF THE SHORT TO BATTERY VOLTAGE	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse F60 (15 A) (CJB).</p>

DIAGNOSIS AND TESTING

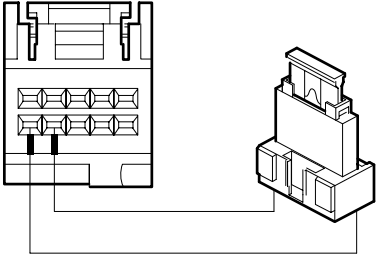
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Disconnect Fuse F61 (15 A) (CJB).</p> <p>4 Ignition switch in position II.</p> <p>5 CHECK the dipped beam.</p> <ul style="list-style-type: none"> • Does the dipped beam illuminate on one side continuously? <p>→ Yes</p> <ul style="list-style-type: none"> - Left-hand dipped beam illuminates: LOCATE and RECTIFY the short to battery voltage in circuit 15S-LE16 (GN/OG) between fuse F61 (CJB) and the headlamp using the Wiring Diagrams. CHECK the operation of the system. If necessary CHECK and RENEW the CJB. CHECK the operation of the system. - Right-hand dipped beam illuminates: LOCATE and RECTIFY the short to battery voltage in circuit 15S-LE23 (GN/WH) between fuse F60 (CJB) and the headlamp using the Wiring Diagrams. CHECK the operation of the system. If necessary CHECK and RENEW the CJB. CHECK the operation of the system. <p>→ No</p> <p>CHECK CJB and if necessary RENEW. CHECK the operation of the system.</p>
G5: NARROW DOWN THE CAUSE OF THE FAULT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Steering column multifunction switch from connector C459.</p> <p>3 Ignition switch in position II.</p> <p>4 SWITCH ON the dipped beam.</p> <p>5 CHECK the main beam.</p> <ul style="list-style-type: none"> • Does the main beam illuminate continuously? <p>→ Yes</p> <p>GO to G6.</p> <p>→ No</p> <p>RENEW steering column multifunction switch. CHECK the operation of the system.</p>
G6: NARROW DOWN THE CAUSE OF THE SHORT TO GROUND	
NOTE: Main beam is switched off.	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C103.</p>

DIAGNOSIS AND TESTING

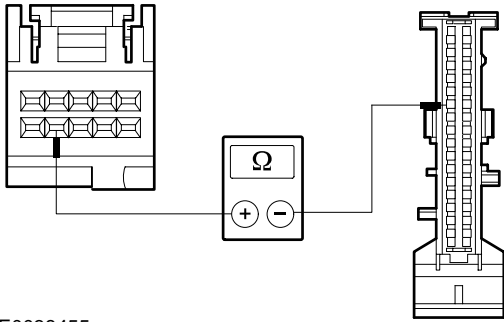
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Ignition switch in position II.</p> <p>4 SWITCH ON the dipped beam.</p> <p>5 CHECK the main beam.</p> <ul style="list-style-type: none"> • Does the main beam illuminate? <p>→ Yes GO to G7.</p> <p>→ No LOCATE and RECTIFY short to ground in circuit 91S-LE14 (BK/OG) or 91S-LE25 (BK/BU) between the CJB and the steering column multifunction switch using the Wiring Diagrams. CHECK the operation of the system.</p>
G7: NARROW DOWN THE CAUSE OF THE SHORT TO BATTERY VOLTAGE	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse F37 (10 A) (CJB).</p> <p>3 Disconnect Fuse F38 (10 A) (CJB).</p> <p>4 Ignition switch in position II.</p> <p>5 CHECK the main beam.</p> <ul style="list-style-type: none"> • Does main beam illuminate on one side continuously? <p>→ Yes - Left-hand main beam illuminates: LOCATE and RECTIFY the short to battery voltage in circuit 15S-LE15 (GN/BK) between fuse F37 (CJB) and the headlamp using the Wiring Diagrams. CHECK the operation of the system. If necessary CHECK and RENEW the CJB. CHECK the operation of the system. - Right-hand main beam illuminates: LOCATE and RECTIFY the short to battery voltage in circuit 15S-LE22 (GN/OG), between fuse F38 (CJB) and the headlamp using the Wiring Diagrams. CHECK the operation of the system. If necessary CHECK and RENEW the CJB. CHECK the operation of the system.</p> <p>→ No CHECK CJB and if necessary RENEW. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST AB : FLASH-TO-PASS FEATURE IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
H1: DETERMINE THE FAULT CONDITION	
	<ol style="list-style-type: none"> 1 Ignition switch in position II. 2 SWITCH ON the dipped beam. 3 SWITCH ON the main beam. 4 CHECK the main beam. <ul style="list-style-type: none"> • Does the main beam illuminate? → Yes GO to H2. → No GO to Pinpoint Test D.
H2: CHECK CONTROL CIRCUIT 91S-LE25 (BK/BU) FOR OPEN CIRCUIT	
 <p>VFE0038457</p>	<ol style="list-style-type: none"> 1 Ignition switch in position II. 2 Disconnect Steering column multifunction switch from connector C459. 3 Using a fused bridging cable (10 A) at the steering column multifunction switch, connect between connector C459, pin 9, circuit 91S-LE25 (BK/BU) and pin 10, circuit 91-LG27 (BK/GN), wiring harness side.
	<ol style="list-style-type: none"> 4 Ignition switch in position II. 5 CHECK the main beam. <ul style="list-style-type: none"> • Does the main beam illuminate? → Yes RENEW steering column multifunction switch. CHECK the operation of the system. → No GO to H3.
H3: CHECK CONTROL CIRCUIT 91S-LE25 (BK/BU) FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position II. 2 Disconnect CJB from connector C103.

DIAGNOSIS AND TESTING

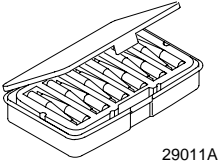
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038455</p>	<p>3 Measure the resistance between CJB, connector C103, pin 27, circuit 91S-LE25 (BK/BU), wiring harness side and steering column multifunction switch, connector C459, pin 9, circuit 91S-LE25 (BK/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 2 ohm? <p>→ Yes CHECK the GEM using WDS, RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the CJB and the steering column multifunction switch using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

Headlamp Leveling

Refer to Wiring Diagrams Section 417-01, for schematic and connector information.

Special Tool(s)

 <p>29011A</p>	<p>Terminal Probe Kit 29-011A</p>
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NOTE: Before reading out the vehicle-specific data, remake all the electrical connections to the module to be removed, so that communication between the module and WDS is ensured.

1. Verify the customer concern.
2. Visually inspect for obvious signs of electrical (or mechanical) damage.

Visual Inspection

Mechanical	Electrical
<ul style="list-style-type: none"> • Headlamp • Headlamp adjuster unit 	<ul style="list-style-type: none"> • Fuse(s) • Connector(s) • Switches • Wiring harness • Headlamp levelling sensors • Gas discharge headlamp control module

Diagnosis and Testing

NOTE: The generic electronic module (GEM) forms part of the central junction box (CJB).

NOTE: If the generic electronic module (GEM) or the gas discharge headlamp control module is changed, the new one must be reinitialised. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module. REFER to:

Module Configuration (418-01 Module Configuration, General Procedures), Generic Electronic Module (GEM) (419-10 Multifunction Electronic Modules, Removal and Installation).

3. Resolve any obvious causes or concerns found during the visual inspection before carrying out any further tests.
4. If the concern is not visually evident, refer to the Symptom Chart.

Symptom Chart

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • Headlamp levelling system is inoperative, vehicles with conventional headlamps. 	<ul style="list-style-type: none"> • Fuse • Circuit(s) • Headlamp adjust variable resistor • Adaptive front lighting module • Left/right-hand headlamp • Central Junction Box (CJB) 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.
<ul style="list-style-type: none"> • Headlamp levelling system is inoperative, vehicles with gas discharge headlamps. 	<ul style="list-style-type: none"> • Fuse • Circuit(s) • Gas discharge headlamp control module • Front/rear headlamp levelling sensor • Gas discharge headlamp left-/right-hand side 	<ul style="list-style-type: none"> • GO to Pinpoint Test B.

DIAGNOSIS AND TESTING

Pinpoint Tests

NOTE: Use a digital multimeter for all electrical measurements.

PINPOINT TEST AC : HEADLAMP LEVELLING SYSTEM IS INOPERATIVE, VEHICLES WITH CONVENTIONAL HEADLAMPS.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: DETERMINE THE FAULT CONDITION	
	<p>1 Determine the fault condition.</p> <ul style="list-style-type: none"> Does the headlamp range control of both headlamps function incorrectly? <p>→ Yes INSTALL A NEW headlight switch. CHECK the operation of the system.</p> <p>→ No</p> <ul style="list-style-type: none"> Inoperative: GO to A3. Left-hand side is inoperative: GO to A21. Right-hand side is inoperative: GO to A24. Left or right-hand side malfunctioning: CHECK the headlamp levelling unit in the relevant headlamp and if necessary RENEW. CHECK the operation of the system.
A2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to A3.</p> <p>→ No GO to A5.</p>
A3: CHECK FUSE F115 (CJB)	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect Fuse F115 (7.5 A) (CJB).</p>
	<p>3 CHECK Fuse F115 (7.5 A) (CJB).</p> <ul style="list-style-type: none"> Is the fuse OK.? <p>→ Yes GO to A4.</p> <p>→ No RENEW fuse F115 (7.5 A) and CHECK the operation of the system. If fuse blows again, LOCATE and REMEDY the short to ground with the aid of the wiring diagrams. CHECK the operation of the system.</p>

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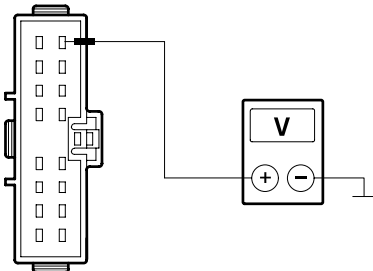
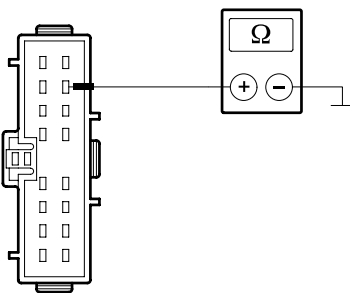
Exterior Lighting

417-01-217

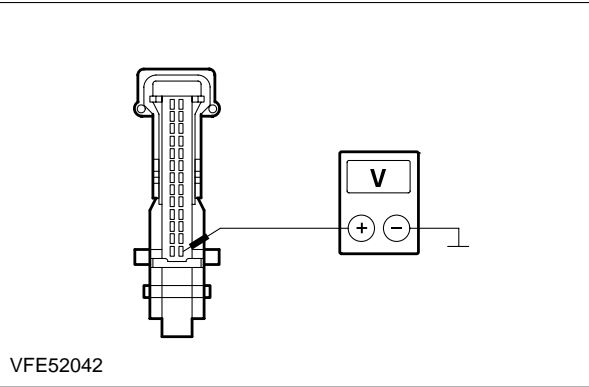
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A4: CHECK VOLTAGE AT FUSE F115 (CJB)	
	<ol style="list-style-type: none"> 1 Connect Fuse F115 (7.5 A) (CJB). 2 Ignition switch in position II. 3 Measure the voltage between fuse F115 (7.5 A) (CJB) and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to A7. → No RECTIFY the break in the voltage supply to fuse F115 (CJB) with the aid of the wiring diagrams. CHECK the operation of the system. CHECK and RENEW the CJB if necessary. CHECK the operation of the system.
A5: CHECK FUSE F66 (CJB)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect fuse F66 (7.5 A) (CJB). 3 CHECK fuse F66 (7.5 A) (CJB). <ul style="list-style-type: none"> • Is the fuse OK.? → Yes GO to A6. → No RENEW fuse F66 (7.5 A) and CHECK the operation of the system. If fuse blows again, LOCATE and REMEDY the short to ground with the aid of the wiring diagrams. CHECK the operation of the system.
A6: CHECK THE VOLTAGE AT FUSE F66 (CJB)	
	<ol style="list-style-type: none"> 1 Connect fuse F66 (7.5 A) (CJB). 2 Ignition switch in position II.

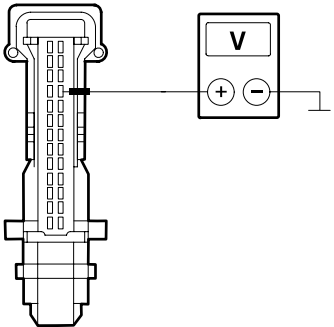
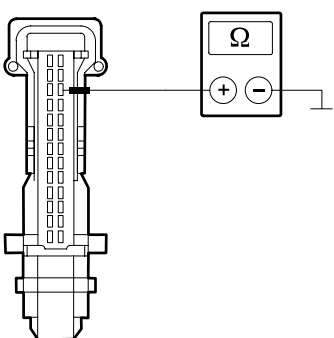
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between fuse F66 (7.5 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to A7. → No RECTIFY the break in the voltage supply of fuse F66 (CJB) with the aid of the wiring diagrams. CHECK the operation of the system. CHECK and RENEW the CJB if necessary. CHECK the operation of the system.
<p>A7: CHECK THE VOLTAGE SUPPLY OF THE HEADLIGHT SWITCH</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Headlight switch from connector C320.</p> <p>3 Ignition switch in position II.</p>
 <p>VFE0029340</p>	<p>4 Measure the voltage between the headlight switch, connector C320, pin 8, circuit 15-LE29 (GN/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to A8. → No LOCATE and RECTIFY the break in the circuit between fuse F66 (CJB) and the headlight switch using the wiring diagrams. CHECK the operation of the system.
<p>A8: CHECK THE GROUND CONNECTION OF THE HEADLAMP ADJUSTMENT VARIABLE RESISTOR IN THE HEADLAMP SWITCH</p>	
 <p>VFE0033915</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the headlamp switch, connector C320, pin 10, circuit 31-LE29 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 2 Ohm? → Yes GO to A9. → No LOCATE and RECTIFY the break in the circuit between the headlight switch and soldered connection S7 using the wiring diagrams. CHECK the operation of the system.

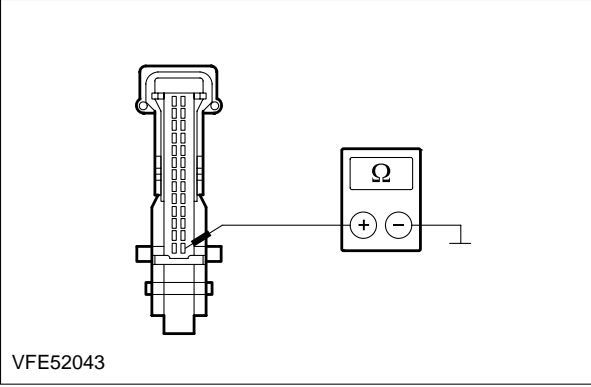
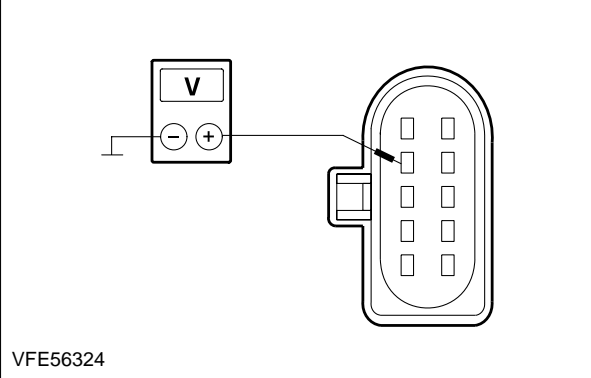
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A9: CHECK THE HEADLIGHT SWITCH	
	<ol style="list-style-type: none"> 1 CHECK the headlamp switch according to the component check at the end of this section. <ul style="list-style-type: none"> • Is the headlight switch OK? <ul style="list-style-type: none"> → Yes <ul style="list-style-type: none"> - vehicles without adaptive front lighting: GO to A14. - vehicles with adaptive front lighting: GO to A10. → No <ul style="list-style-type: none"> INSTALL A NEW headlight switch. CHECK the operation of the system.
A10: CHECK CONTROL CIRCUIT OF HEADLAMP RANGE CONTROL FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Connect Headlight switch with connector C320. 2 Disconnect Adaptive front lighting module from connector C838. 3 Ignition switch in position II. 4 SWITCH ON dipped beam. 5 CHANGE the SETTING of the headlamp leveling system during the measurement (UP/DOWN).
 <p>VFE52042</p>	<ol style="list-style-type: none"> 6 Measure the voltage between adaptive front lighting module, connector C838, pin 14, circuit 8-LE46B (WH/RD), wiring harness side and ground. <ul style="list-style-type: none"> • Does the voltage measured vary proportionally with the setting of the variable resistor? <ul style="list-style-type: none"> → Yes <ul style="list-style-type: none"> GO to A11. → No <ul style="list-style-type: none"> - Constant battery voltage is measured: LOCATE and RECTIFY the short to battery voltage in the circuits connected to the headlamp switch, C320, pin 1 using the Wiring Diagrams. CHECK the operation of the system. - No voltage measured: GO to A13.

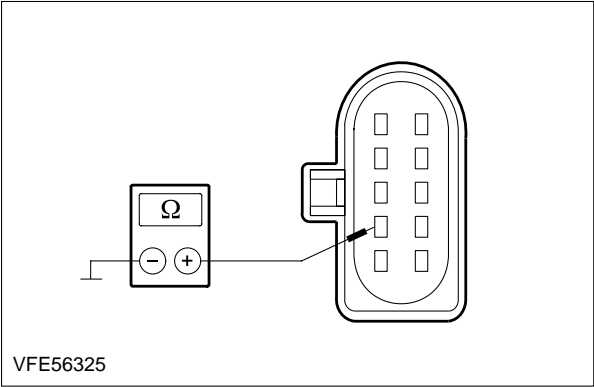
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A11: CHECK VOLTAGE SUPPLY TO ADAPTIVE FRONT LIGHTING MODULE FOR OPEN CIRCUIT	
 <p>E0038511</p>	<ol style="list-style-type: none"> 1 Measure the voltage between adaptive front lighting module, connector C838, pin 23, circuit 15-LE58 (GN/OG), wiring harness side and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes GO to A12. → No LOCATE and RECTIFY the break in the circuit between fuse F66 (CJB) and the adaptive front lighting module using the Wiring Diagrams. CHECK the operation of the system.
A12: CHECK GROUND CONNECTION TO ADAPTIVE FRONT LIGHTING MODULE FOR OPEN CIRCUIT	
 <p>VFE0038512</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Measure the resistance between adaptive front lighting module, connector C838, pin 24, circuit 91-LE58 (BK/RD), wiring harness side and ground. <ul style="list-style-type: none"> • Is less than 2 Ohm measured? <ul style="list-style-type: none"> → Yes CHECK the adaptive front lighting module using WDS, RENEW if necessary. CHECK the operation of the system. → No LOCATE and RECTIFY break in circuit between adaptive front lighting module and soldered connection S12 with the aid of the wiring diagrams. CHECK the operation of the system.
A13: CHECK CONTROL CIRCUIT OF HEADLAMP LEVELLING SYSTEM FOR SHORT TO GROUND	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Headlight switch from connector C320.

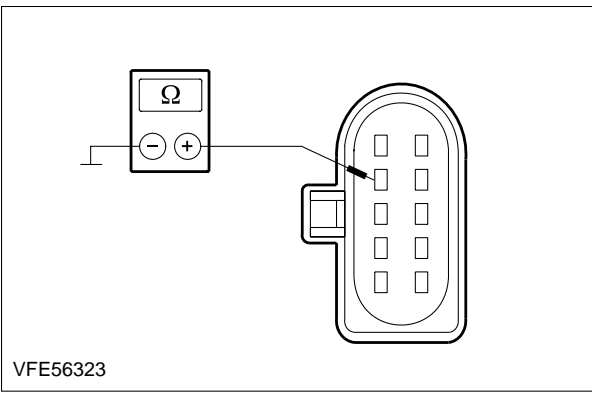
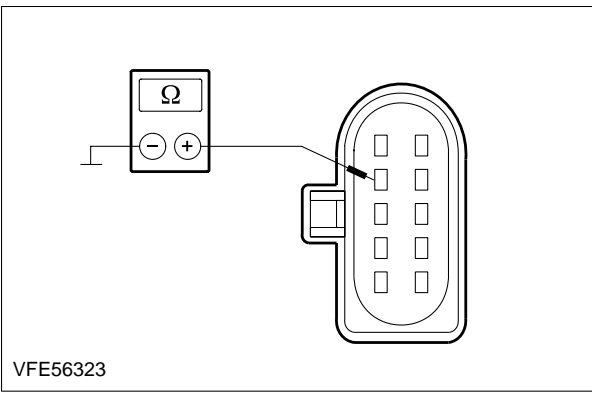
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE52043</p>	<p>3 Measure the resistance between adaptive front lighting module, connector C838, pin 14, circuit 8-LE46B (WH/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance more than 10,000 Ohm? <p>→ Yes LOCATE and RECTIFY the break in the circuit between the headlight switch and adaptive front lighting module using the wiring diagrams. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the short to ground in the circuit connected to the light switch, connector C320, pin 1 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>A14: CHECK CONTROL CIRCUIT OF HEADLAMP RANGE CONTROL FOR OPEN CIRCUIT</p>	
	<p>1 Connect Headlight switch with connector C320.</p> <p>2 Disconnect left-hand headlamp from connector C836.</p> <p>3 Disconnect right-hand headlamp from connector C837.</p> <p>4 Ignition switch in position II.</p> <p>5 SWITCH ON dipped beam.</p> <p>6 CHANGE the SETTING of the headlamp leveling system during the measurement (UP/DOWN).</p>
 <p>VFE56324</p>	<p>7 Measure the voltage between left-hand headlamp, connector C836, pin 9, circuit 8-LE56 (WH/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the voltage measured vary proportionally with the setting of the variable resistor? <p>→ Yes GO to A15.</p> <p>→ No</p> <ul style="list-style-type: none"> - Constant battery voltage is measured: LOCATE and RECTIFY the short to battery voltage in the circuits connected to the headlamp switch, C320, pin 1 using the Wiring Diagrams. CHECK the operation of the system. - No voltage measured: GO to A17.

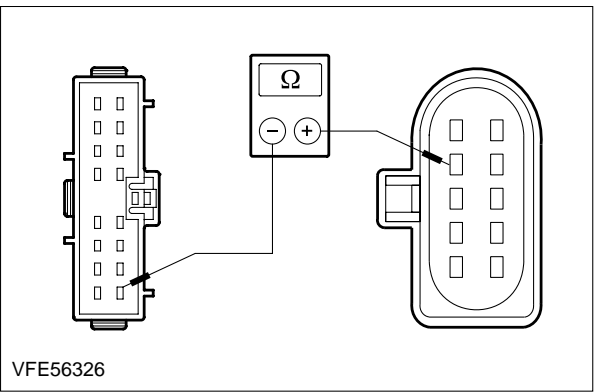
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A15: CHECK THE COMMON GROUND OF THE HEADLAMP ADJUSTMENT UNITS FOR OPEN CIRCUIT	
 <p>VFE56325</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Measure the resistance between left-hand headlamp, connector C836, pin 7, circuit 9-LE45 (BN), wiring harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 2 Ohm? → Yes GO to A16. → No LOCATE and RECTIFY the break in the circuit between soldered connection S7 and ground connection G20 using the Wiring Diagrams. CHECK the operation of the system.
A16: CHECK RIGHT-HAND HEADLAMP FOR SHORT TO BATTERY VOLTAGE	
	<ol style="list-style-type: none"> 1 Connect right-hand headlamp to connector C837. 2 Ignition switch in position II. 3 SWITCH ON dipped beam. 4 CHANGE the SETTING of the headlamp range control (UP/DOWN). 5 Check the right-hand headlamp position. <ul style="list-style-type: none"> • Can the headlamp range be adjusted correctly? → Yes CHECK and if necessary INSTALL A NEW left-hand headlamp. CHECK the operation of the system. → No CHECK and if necessary INSTALL A NEW right-hand headlamp. CHECK the operation of the system.
A17: CHECK CONTROL CIRCUIT OF HEADLAMP LEVELLING SYSTEM FOR SHORT TO GROUND	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

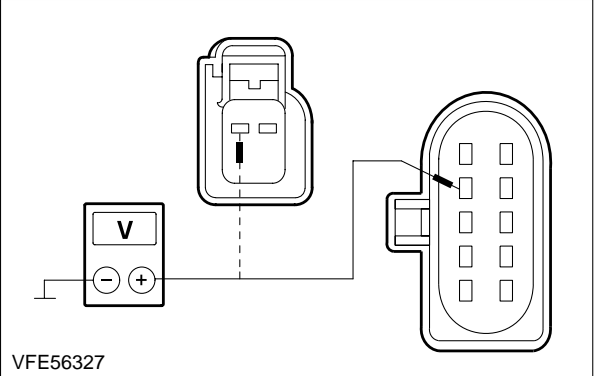
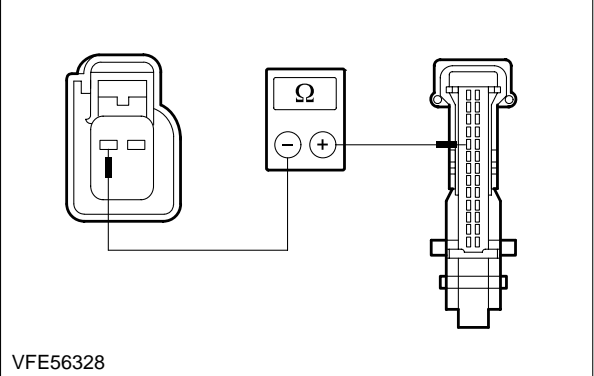
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE56323</p>	<p>2 Measure the resistance between left-hand headlamp, connector C836, pin 9, circuit 8-LE56 (WH/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance more than 10,000 Ohm? → Yes GO to A19. → No GO to A18.
<p>A18: CHECK HEADLAMP SWITCH FOR SHORT TO GROUND</p>	
 <p>VFE56323</p>	<p>1 Disconnect Headlight switch from connector C320.</p> <p>2 Measure the resistance between left-hand headlamp, connector C836, pin 9, circuit 8-LE56 (WH/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance more than 10,000 Ohm? → Yes INSTALL A NEW headlight switch. CHECK the operation of the system. → No LOCATE and RECTIFY the short to ground in the circuits connected to the headlight switch, connector C320, pin 1 using the Wiring Diagrams. CHECK the operation of the system.
<p>A19: CHECK CONTROL CIRCUIT OF HEADLAMP RANGE CONTROL FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect Headlight switch from connector C320.</p>

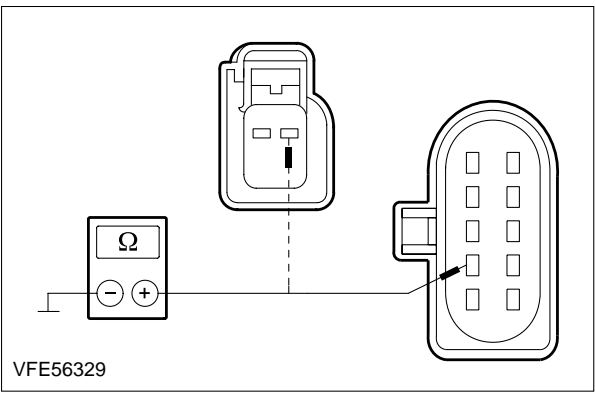
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE56326</p>	<p>2 Measure resistance between headlamp switch, connector C320, pin 1, circuit 8-LE46A (WH/RD), wiring harness side and headlamp, left, connector C836, pin 9, circuit 8-LE56 (WH/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 2 Ohm? <p>→ Yes GO to A20.</p> <p>→ No LOCATE and RECTIFY break in circuit between headlamp switch and intermediate connection C111 with the aid of the wiring diagrams. CHECK the operation of the system.</p>
<p>A20: CHECK RIGHT-HAND HEADLAMP FOR SHORT TO GROUND</p>	
	<p>1 Connect right-hand headlamp to connector C837.</p> <p>2 Connect Headlamp switch with C320.</p> <p>3 Ignition switch in position II.</p> <p>4 SWITCH ON dipped beam.</p> <p>5 CHANGE the SETTING of the headlamp range control (UP/DOWN).</p> <p>6 Check the right-hand headlamp position.</p> <ul style="list-style-type: none"> • Can the headlamp range be adjusted correctly? <p>→ Yes CHECK and if necessary INSTALL A NEW left-hand headlamp. CHECK the operation of the system.</p> <p>→ No CHECK and if necessary INSTALL A NEW right-hand headlamp. CHECK the operation of the system.</p>
<p>A21: CHECK CONTROL VOLTAGE AT LEFT-HAND HEADLAMP</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Left-hand headlamp from connector.</p> <ul style="list-style-type: none"> - Vehicles without adaptive front lighting: C836 - Vehicles with adaptive front lighting: C842 <p>3 Ignition switch in position II.</p> <p>4 SWITCH ON dipped beam.</p>

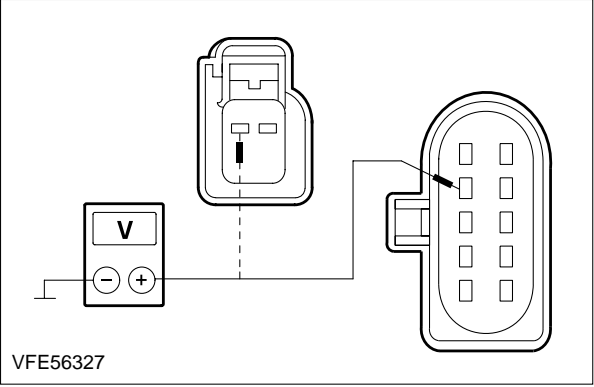
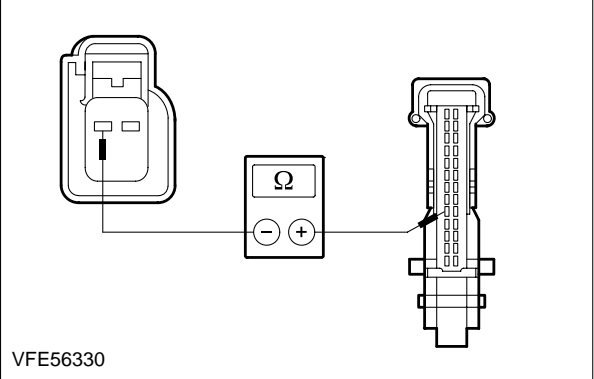
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 CHANGE the SETTING of the headlamp leveling system during the measurement (UP/DOWN).</p>
 <p>VFE56327</p>	<p>6 Measure voltage between the left-hand headlamps:</p> <ul style="list-style-type: none"> - Vehicles without adaptive front lighting: Connector C836, pin 9, circuit 8-LE56 (WH/BU), wiring harness side and ground. - Vehicles with adaptive front lighting: Connector C842, pin 2, circuit 7-LE56 (YE/BU), wiring harness side and ground. <ul style="list-style-type: none"> • Does the voltage measured vary proportionally with the setting of the variable resistor? <ul style="list-style-type: none"> → Yes GO to A23. → No Vehicles without adaptive front lighting: LOCATE and RECTIFY break in circuit(s) between headlamp and intermediate connection C111 with the aid of the wiring diagrams. CHECK the operation of the system. Vehicles with adaptive front lighting: GO to A22.
A22: CHECK CONTROL CIRCUIT OF LEFT HEADLAMP LEVELING FOR OPEN CIRCUIT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Adaptive front lighting module from connector C838.</p>
 <p>VFE56328</p>	<p>3 Measure resistance between adaptive front lighting module, connector C838, pin 9, circuit 7-LE56 (YE/BU), wiring harness side and headlamp, left, connector C842, pin 2, circuit 7-LE56 (YE/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 2 Ohm? <ul style="list-style-type: none"> → Yes CHECK the adaptive front lighting module using WDS, RENEW if necessary. CHECK the operation of the system. → No LOCATE and RECTIFY break in circuit(s) between adaptive front lighting module and headlamp with the aid of the wiring diagrams. CHECK the operation of the system.
A23: CHECK GROUND CONNECTION TO LEFT-HAND HEADLAMP	
	<p>1 Ignition switch in position 0.</p>

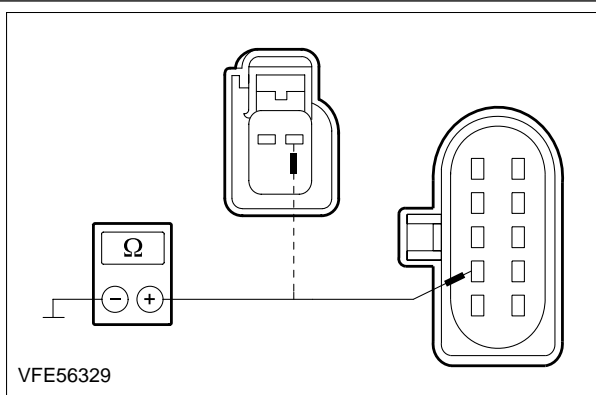
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE56329</p>	<p>2 Measure resistance between the left-hand headlamp:</p> <ul style="list-style-type: none"> - Vehicles without adaptive front lighting: Connector C836, pin 7, circuit 9-LE45 (BN), wiring harness side and ground. - Vehicles with adaptive front lighting: Connector C842, pin 1, circuit 31-LE56 (BK), wiring harness side and ground. <p>• Is the resistance less than 2 Ohm?</p> <p>→ Yes Visually inspect and if necessary RENEW the headlamp and headlamp adjuster unit. CHECK the operation of the system.</p> <p>→ No</p> <ul style="list-style-type: none"> - vehicles without adaptive front lighting: LOCATE and REPAIR the break in the circuit(s) between headlamp and soldered connection S7 using the Wiring Diagrams. CHECK the operation of the system. - vehicles with adaptive front lighting: LOCATE and REPAIR the break in the circuit(s) between headlamp and soldered connection S121 using the Wiring Diagrams. CHECK the operation of the system.
<p>A24: CHECK CONTROL VOLTAGE AT RIGHT-HAND HEADLAMP</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Right-hand headlamp from connector.</p> <ul style="list-style-type: none"> - Vehicles without adaptive front lighting: C837 - Vehicles with adaptive front lighting: C843 <p>3 Ignition switch in position II.</p> <p>4 SWITCH ON dipped beam.</p> <p>5 CHANGE the SETTING of the headlamp leveling system during the measurement (UP/DOWN).</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE56327</p>	<p>6 Measure voltage between the right-hand headlamps:</p> <ul style="list-style-type: none"> - Vehicles without adaptive front lighting: Connector C837, pin 9, circuit 8-LE57 (WH/GN), wiring harness side and ground. - Vehicles with adaptive front lighting: Connector C843, pin 2, circuit 7-LE57 (YE/GN), wiring harness side and ground. <ul style="list-style-type: none"> • Does the voltage measured vary proportionally with the setting of the variable resistor? <ul style="list-style-type: none"> → Yes GO to A26. → No <ul style="list-style-type: none"> - vehicles without adaptive front lighting: LOCATE and RECTIFY break in circuit(s) between headlamp and intermediate connection C111 with the aid of the wiring diagrams. CHECK the operation of the system. - vehicles with adaptive front lighting: GO to A25.
<p>A25: CHECK CONTROL CIRCUIT OF RIGHT-HAND HEADLAMP LEVELING FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Adaptive front lighting module from connector C838.</p>
 <p>VFE56330</p>	<p>3 Measure resistance between adaptive front lighting module, connector C838, Pin 5, circuit 7-LE57 (YE/GN), wiring harness side and headlamp, right, connector C843, pin 2, circuit 7-LE57 (YE/GN), wiring harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 2 Ohm? <ul style="list-style-type: none"> → Yes CHECK the adaptive front lighting module using WDS, RENEW if necessary. CHECK the operation of the system. → No LOCATE and RECTIFY break in circuit(s) between adaptive front lighting module and headlamp with the aid of the wiring diagrams. CHECK the operation of the system.
<p>A26: CHECK GROUND CONNECTION AT THE RIGHT-HAND HEADLAMP</p>	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE56329</p>	<p>2 Measure the resistance between the right-hand headlamp:</p> <ul style="list-style-type: none"> - Vehicles without adaptive front lighting: Connector C837, pin 7, circuit 9-LE46 (BN/RD), wiring harness side and ground. - Vehicles with adaptive front lighting: Connector C843, pin 1, circuit 31-LE57 (BK), wiring harness side and ground. <p>• Is the resistance less than 2 Ohm?</p> <p>→ Yes Visually inspect and if necessary RENEW the headlamp and headlamp adjuster unit. CHECK the operation of the system.</p> <p>→ No</p> <ul style="list-style-type: none"> - vehicles without adaptive front lighting: LOCATE and REPAIR the break in the circuit(s) between headlamp and soldered connection S7 using the Wiring Diagrams. CHECK the operation of the system. - vehicles with adaptive front lighting: LOCATE and REPAIR the break in the circuit(s) between headlamp and soldered connection S109 using the Wiring Diagrams. CHECK the operation of the system.

PINPOINT TEST AD : HEADLAMP LEVELLING SYSTEM IS INOPERATIVE, VEHICLES WITH GAS DISCHARGE HEADLAMPS.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: DETERMINE THE FAULT CONDITION	
	<p>1 Determine the fault condition.</p> <ul style="list-style-type: none"> • Is the headlamp leveling system inoperative for both headlamps? <p>→ Yes GO to B3.</p> <p>→ No</p> <ul style="list-style-type: none"> - Left-hand side is inoperative: GO to B17. - Right-hand side is inoperative: GO to B20.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> 1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? → Yes GO to B3. → No GO to B5.
B3: CHECK FUSE F115 (CJB)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Fuse F115 (7.5 A) (CJB). 3 CHECK Fuse F115 (7.5 A) (CJB). <ul style="list-style-type: none"> • Is the fuse OK.? → Yes GO to B4. → No RENEW fuse F115 (7.5 A) and CHECK the operation of the system. If fuse blows again, LOCATE and REMEDY the short to ground with the aid of the wiring diagrams. CHECK the operation of the system.
B4: CHECK VOLTAGE AT FUSE F115 (CJB)	
	<ol style="list-style-type: none"> 1 Connect Fuse F115 (CJB). 2 Ignition switch in position II. 3 Measure the voltage between fuse F115 (7.5 A) (CJB) and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to B7. → No RECTIFY the break in the voltage supply to fuse F115 (CJB) with the aid of the wiring diagrams. CHECK the operation of the system. CHECK and RENEW the CJB if necessary. CHECK the operation of the system.
B5: CHECK FUSE F66 (CJB)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect fuse F66 (7.5 A) (CJB).

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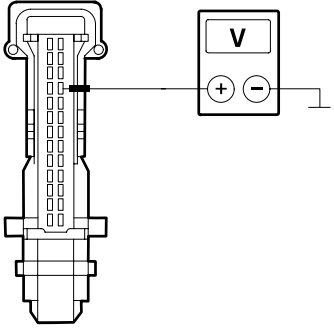
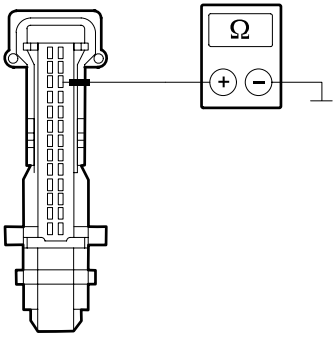
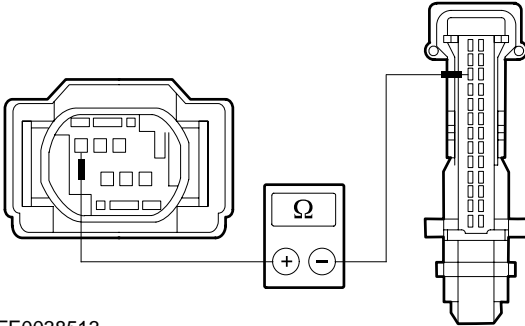
Exterior Lighting

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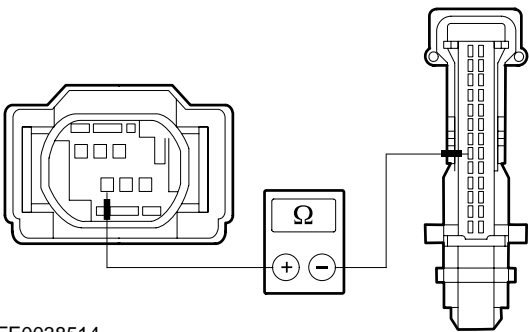
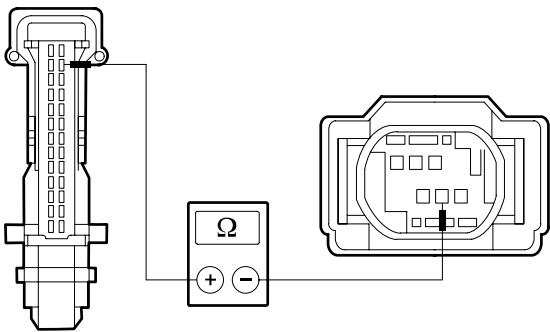
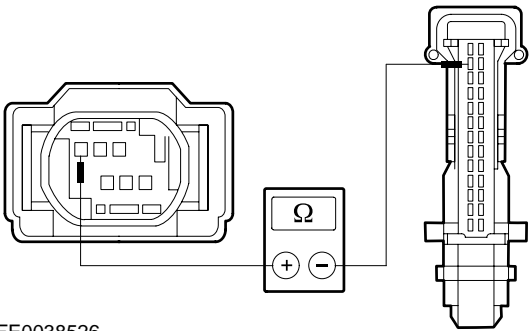
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 CHECK fuse F66 (7.5 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK.? <p>→ Yes GO to B6.</p> <p>→ No RENEW fuse F66 (7.5 A) and CHECK the operation of the system. If fuse blows again, LOCATE and REMEDY the short to ground with the aid of the wiring diagrams. CHECK the operation of the system.</p>
B6: CHECK THE VOLTAGE AT FUSE F66 (CJB)	
	<p>1 Connect Fuse F66 (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F66 (7.5 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to B7.</p> <p>→ No RECTIFY the break in the voltage supply of fuse F66 (CJB) with the aid of the wiring diagrams. CHECK the operation of the system. CHECK and RENEW the CJB if necessary. CHECK the operation of the system.</p>
B7: CHECK THE VOLTAGE SUPPLY TO THE GAS DISCHARGE HEADLAMP CONTROL MODULE	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Gas discharge headlamp control module from connector C838.</p> <p>3 Ignition switch in position II.</p>

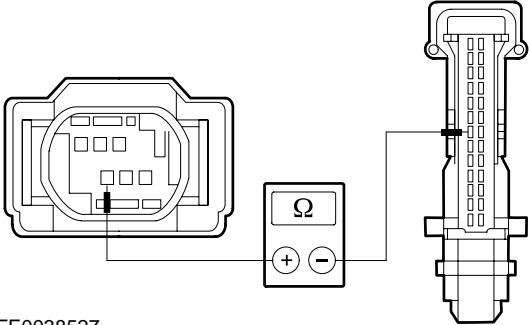
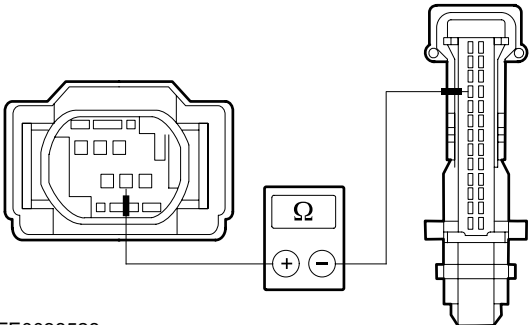
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E0038511</p>	<p>4 Measure the voltage between gas discharge headlamp control module, connector C838, pin 23, circuit 15-LE58 (GN/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to B8. → No LOCATE and RECTIFY the break in the circuit between fuse F66 (CJB) and the gas discharge headlamp control module using the Wiring Diagrams. CHECK the operation of the system.
<p>B8: CHECK THE GROUND SUPPLY TO THE GAS DISCHARGE HEADLAMP CONTROL MODULE</p>	
 <p>VFE0038512</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between gas discharge headlamp control module, connector C838, pin 24, circuit 91-LE58 (BK/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 2 Ohm? → Yes GO to B9. → No LOCATE and RECTIFY the break in the circuit between the gas discharge headlamp control module and soldered connection S12 using the wiring diagrams. CHECK the operation of the system.
<p>B9: CHECK FOR BREAK IN CIRCUITS TO FRONT HEADLAMP LEVELLING SENSOR</p>	
 <p>VFE0038513</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect front headlamp levelling sensor from connector C323.</p> <p>3 Measure the resistance between the headlamp levelling sensor, front, connector C323, pin 1, circuit 9-LE53 (BN/BU), wiring harness side and gas discharge headlamp control module, connector C838, pin 11, circuit 9-LE53 (BN/BU), wiring harness side.</p>

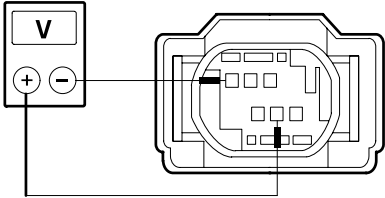
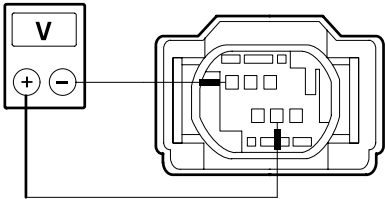
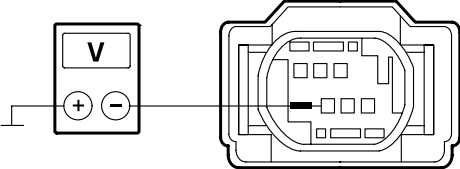
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038514</p>	<p>4 Measure the resistance between the headlamp levelling sensor, front, connector C323, pin 4, circuit 8-LE53 (WH/BU), wiring harness side and gas discharge headlamp control module, connector C838, pin 6, circuit 8-LE53 (WH/BU), wiring harness side.</p>
 <p>VFE0038525</p>	<p>5 Measure the resistance between the headlamp levelling sensor, front, connector C323, pin 5, circuit 7-LE53 (YE/BU), wiring harness side and gas discharge headlamp control module, connector C838, pin 25, circuit 7-LE53 (YE/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is the resistance in all the measurements less than 2 Ohms? → Yes GO to B10. → No LOCATE and RECTIFY the break in the relevant circuit between the headlamp levelling sensor and the gas discharge headlamp control module using the Wiring Diagrams. CHECK the operation of the system.
<p>B10: CHECK FOR BREAK IN CIRCUITS TO REAR HEADLAMP LEVELLING SENSOR</p>	
<p>1 Disconnect rear headlamp levelling sensor from connector C839.</p>	<p>1 Disconnect rear headlamp levelling sensor from connector C839.</p>
 <p>VFE0038526</p>	<p>2 Measure the resistance between the headlamp levelling sensor, rear, connector C839, pin 1, circuit 9-LE54 (BN/YE), wiring harness side and gas discharge headlamp control module, connector C838, pin 12, circuit 9-LE54 (BN/YE), wiring harness side.</p>

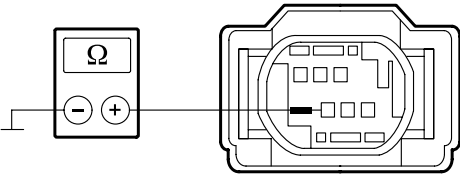
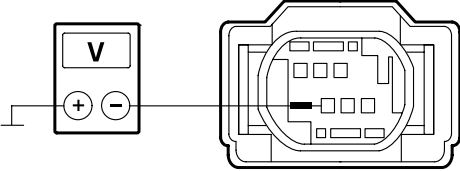
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038527</p>	<p>3 Measure the resistance between the headlamp levelling sensor, rear, connector C839, pin 4, circuit 8-LE54 (WH/BK), wiring harness side and gas discharge headlamp control module, connector C838, pin 7, circuit 8-LE54 (WH/BK), wiring harness side.</p>
 <p>VFE0038528</p>	<p>4 Measure the resistance between the headlamp levelling sensor, rear, connector C839, pin 5, circuit 7-LE54 (YE/BK), wiring harness side and gas discharge headlamp control module, connector C838, pin 10, circuit 7-LE54 (YE/BK), wiring harness side.</p> <ul style="list-style-type: none"> • Is the resistance in all the measurements less than 2 Ohms? → Yes GO to B11. → No LOCATE and RECTIFY the break in the relevant circuit between the headlamp levelling sensor and the gas discharge headlamp control module using the Wiring Diagrams. CHECK the operation of the system.
<p>B11: CHECK VOLTAGE SUPPLY TO FRONT HEADLAMP LEVELLING SENSOR</p>	
	<p>1 Connect Gas discharge headlamp control module with connector C838.</p> <p>2 Ignition switch in position II.</p> <p>3 SWITCH ON dipped beam.</p>

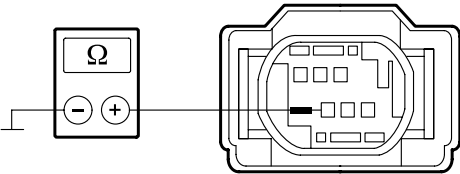
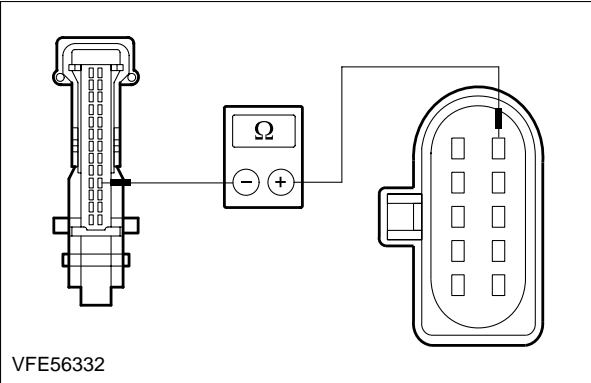
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038529</p>	<p>4 Measure the voltage between the headlamp levelling sensor, front, connector C323, pin 5, circuit 7-LE53 (YE/BU), wiring harness side and pin 1, circuit 9-LE53 (BN/BU), wiring harness side.</p> <ul style="list-style-type: none"> Is a voltage of 5 Volts measured? → Yes GO to B12. → No CHECK the gas discharge headlamp control module using WDS, RENEW if necessary. CHECK the operation of the system.
<p>B12: CHECK VOLTAGE SUPPLY TO REAR HEADLAMP LEVELLING SENSOR.</p>	
 <p>VFE0038529</p>	<p>1 Measure the voltage between the headlamp levelling sensor, rear, connector C839, pin 5, circuit 7-LE54 (YE/BK), wiring harness side and pin 1, circuit 9-LE54 (BN/YE), wiring harness side.</p> <ul style="list-style-type: none"> Is a voltage of 5 Volts measured? → Yes GO to B13. → No CHECK the gas discharge headlamp control module using WDS, RENEW if necessary. CHECK the operation of the system.
<p>B13: CHECK THE SIGNAL CABLE OF THE HEADLAMP LEVELLING SENSOR (FRONT) FOR A SHORT TO BATTERY VOLTAGE</p>	
 <p>E81379</p>	<p>1 Measure the voltage between the headlamp levelling sensor, front, connector C323, pin 4, circuit 8-LE53 (WH/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? → Yes LOCATE and RECTIFY the short to battery voltage in the circuits connected to the headlamp levelling sensor, front, connector C323, pin 4 with the aid of the Wiring Diagrams. CHECK the operation of the system. → No GO to B14.
<p>B14: CHECK THE SIGNAL CABLE OF THE HEADLAMP LEVELLING SENSOR (FRONT) FOR A SHORT TO GROUND</p>	
	<p>1 Ignition switch in position 0.</p>

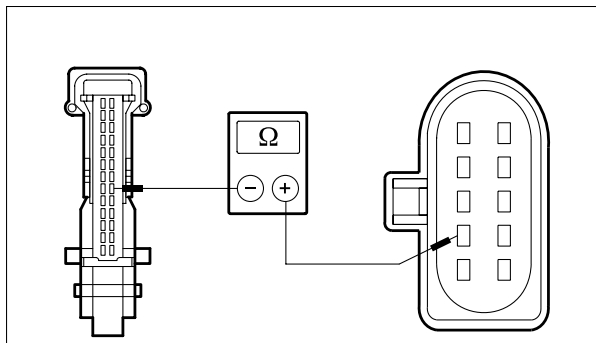
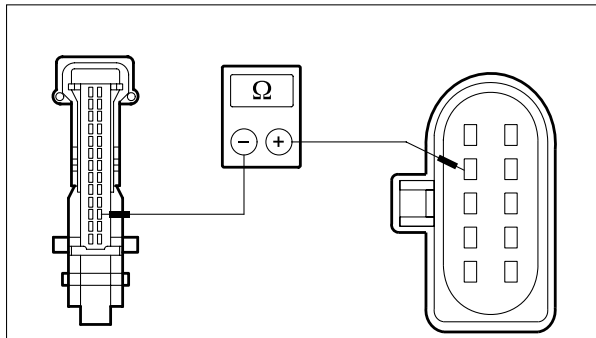
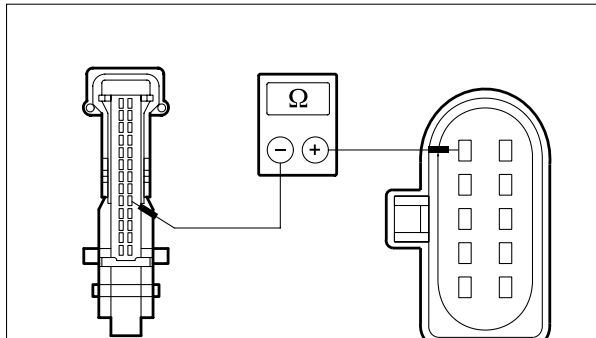
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E81380</p>	<p>2 Measure the resistance between the headlamp levelling sensor, front, connector C323, pin 4, circuit 8-LE53 (WH/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance more than 10,000 Ohm? → Yes GO to B15. → No LOCATE and RECTIFY the short to ground in the circuits connected to the headlamp levelling sensor, front, connector C323, pin 4 with the aid of the Wiring Diagrams. CHECK the operation of the system.
<p>B15: CHECK THE SIGNAL CABLE OF THE HEADLAMP LEVELLING SENSOR (REAR) FOR A SHORT TO BATTERY VOLTAGE</p>	
	<p>1 Ignition switch in position II.</p>
	<p>2 SWITCH ON dipped beam.</p>
 <p>E81379</p>	<p>3 Measure the voltage between the headlamp levelling sensor, rear, connector C839, pin 4, circuit 8-LE54 (WH/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes LOCATE and RECTIFY the short to battery voltage in the circuits connected to the headlamp levelling sensor, rear, connector C839, pin 4 with the aid of the Wiring Diagrams. CHECK the operation of the system. → No GO to B16.
<p>B16: CHECK THE SIGNAL CABLE OF THE HEADLAMP LEVELLING SENSOR (REAR) FOR A SHORT TO GROUND</p>	
	<p>1 Ignition switch in position 0.</p>

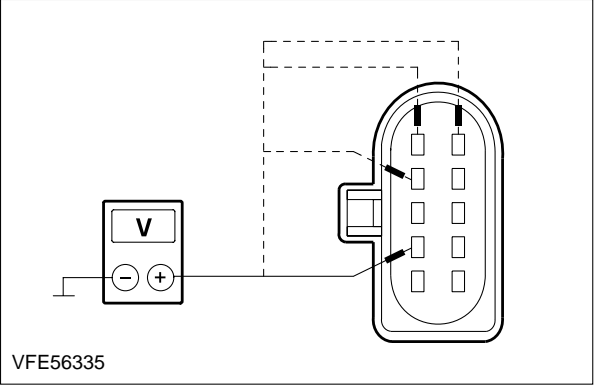
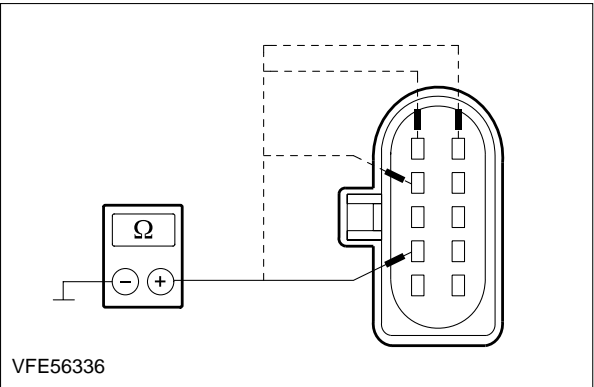
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E81380</p>	<p>2 Measure the resistance between the headlamp levelling sensor, rear, connector C839, pin 4, circuit 8-LE54 (WH/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance more than 10,000 Ohm? <p>→ Yes CHECK the front and rear headlamp levelling sensors and RENEW if necessary. CHECK the operation of the system. If the concern persists, CHECK the gas discharge headlamp control module using WDS and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the short to ground in the circuits connected to the headlamp levelling sensor, rear, connector C839, pin 4 with the aid of the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B17: CHECK FOR BREAK IN CIRCUITS TO LEFT-HAND ADJUSTER UNIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Gas discharge headlamp control module from connector C838.</p> <p>3 Disconnect Left-hand gas discharge headlamp from connector C836.</p>
 <p>VFE56332</p>	<p>4 Measure the resistance between the gas discharge headlamp, left, connector C836, pin 5, circuit 8-LE45 (WH), wiring harness side and gas discharge headlamp control module, connector C838, pin 17, circuit 8-LE45 (WH), wiring harness side.</p>

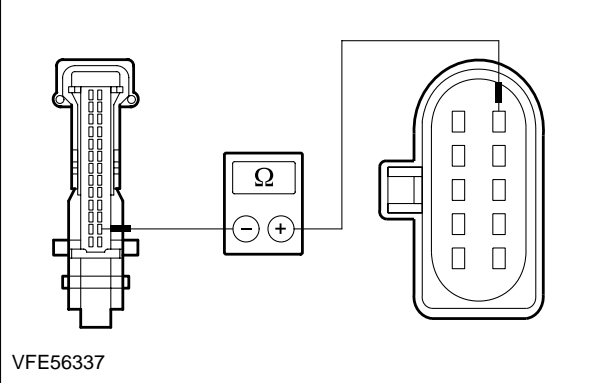
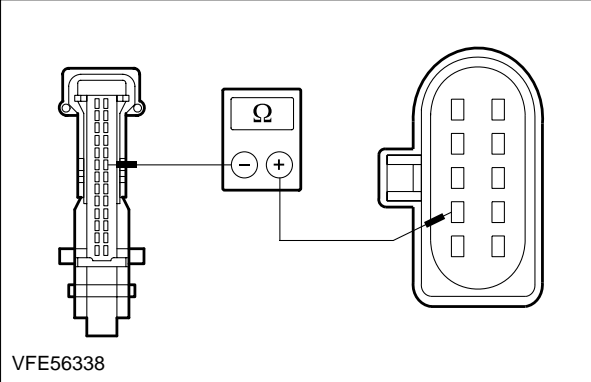
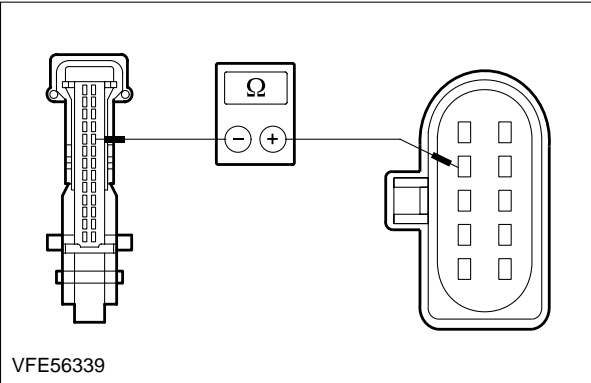
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE56331</p>	<p>5 Measure the resistance between the gas discharge headlamp, left, connector C836, pin 7, circuit 9-LE45 (BN), wiring harness side and gas discharge headlamp control module, connector C838, pin 19, circuit 9-LE45 (BN), wiring harness side.</p>
 <p>VFE56333</p>	<p>6 Measure the resistance between the gas discharge headlamp, left, connector C836, pin 9, circuit 8-LE56 (WH/BU), wiring harness side and gas discharge headlamp control module, connector C838, pin 16, circuit 8-LE56 (WH/BU), wiring harness side.</p>
 <p>VFE56334</p>	<p>7 Measure the resistance between the gas discharge headlamp, left, connector C836, pin 10, circuit 9-LE56 (BN/BU), wiring harness side and gas discharge headlamp control module, connector C838, pin 18, circuit 9-LE56 (BN/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is the resistance in all the measurements less than 2 Ohms? → Yes GO to B18. → No LOCATE and RECTIFY the break in the relevant circuit between the gas discharge headlamp, left, and the gas discharge headlamp control module using the Wiring Diagrams. CHECK the operation of the system.
<p>B18: CHECK CIRCUITS FOR SHORT TO BATTERY VOLTAGE</p>	
	<p>1 Ignition switch in position II.</p>

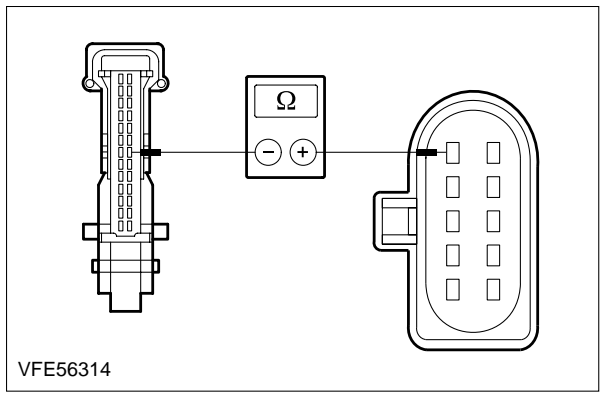
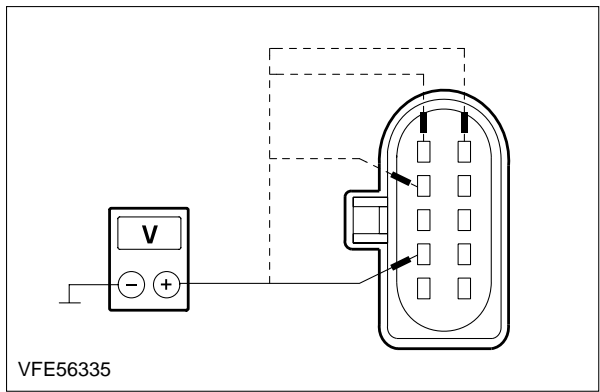
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE56335</p>	<p>2 Measure the voltage between the gas discharge headlamp, left, connector C836:</p> <ul style="list-style-type: none"> – pin 5, circuit 8-LE45 (WH), wiring harness side and ground. – pin 7, circuit 9-LE45 (BN), wiring harness side and ground. – pin 9, circuit 8-LE56 (WH/BU), wiring harness side and ground. – pin 10, circuit 9-LE56 (BN/BU), wiring harness side and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes LOCATE and RECTIFY the short to battery voltage in the relevant circuit between the gas discharge headlamp, left, and the gas discharge headlamp control module using the Wiring Diagrams. CHECK the operation of the system. → No GO to B19.
B19: CHECK CIRCUITS FOR SHORT TO GROUND	
 <p>VFE56336</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the gas discharge headlamp, left, connector C836:</p> <ul style="list-style-type: none"> – pin 5, circuit 8-LE45 (WH), wiring harness side and ground. – pin 7, circuit 9-LE45 (BN), wiring harness side and ground. – pin 9, circuit 8-LE56 (WH/BU), wiring harness side and ground. – pin 10, circuit 9-LE56 (BN/BU), wiring harness side and ground. <ul style="list-style-type: none"> • Is the resistance more than 10,000 Ohm? <ul style="list-style-type: none"> → Yes Continue fault finding using WDS and if necessary CHECK and RENEW the headlamp and gas discharge headlamp control module. CHECK the operation of the system. → No LOCATE and RECTIFY the short to ground in the relevant circuit between the gas discharge headlamp, left, and the gas discharge headlamp control module using the Wiring Diagrams. CHECK the operation of the system.

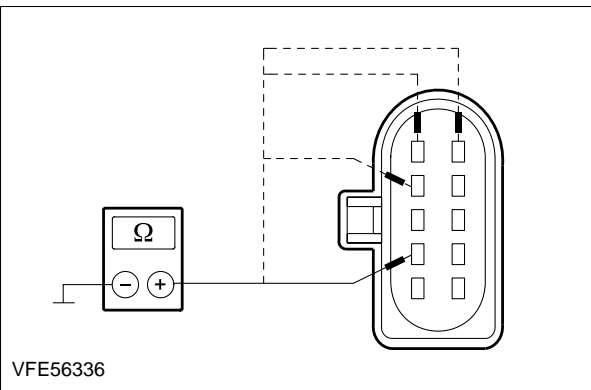
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B20: CHECK FOR BREAK IN CIRCUITS TO RIGHT-HAND ADJUSTER UNIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Gas discharge headlamp control module from connector C838. 3 Disconnect Gas discharge headlamp, right from connector C837.
 <p>VFE56337</p>	<ol style="list-style-type: none"> 4 Measure the resistance between the gas discharge headlamp, right, connector C837, pin 5, circuit 8-LE46 (WH/RD), wiring harness side and gas discharge headlamp control module, connector C838, pin 15, circuit 8-LE46 (WH/RD), wiring harness side.
 <p>VFE56338</p>	<ol style="list-style-type: none"> 5 Measure the resistance between the gas discharge headlamp, right, connector C837, pin 7, circuit 9-LE46 (BN/RD), wiring harness side and gas discharge headlamp control module, connector C838, pin 21, circuit 9-LE46 (BN/RD), wiring harness side.
 <p>VFE56339</p>	<ol style="list-style-type: none"> 6 Measure the resistance between the gas discharge headlamp, right, connector C837, pin 9, circuit 8-LE57 (WH/GN), wiring harness side and gas discharge headlamp control module, connector C838, pin 22, circuit 8-LE57 (WH/GN), wiring harness side.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE56314</p>	<p>7 Measure the resistance between the gas discharge headlamp, right, connector C837, pin 10, circuit 9-LE57 (BN/GN), wiring harness side and gas discharge headlamp control module, connector C838, pin 20, circuit 9-LE57 (BN/GN), wiring harness side.</p> <ul style="list-style-type: none"> • Is the resistance in all the measurements less than 2 Ohms? <p>→ Yes GO to B21.</p> <p>→ No LOCATE and RECTIFY the break in the relevant circuit between the gas discharge headlamp, right, and the gas discharge headlamp control module using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B21: CHECK CIRCUITS FOR SHORT TO BATTERY VOLTAGE</p>	
 <p>VFE56335</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the gas discharge headlamp, right, connector C837:</p> <ul style="list-style-type: none"> – pin 5, circuit 8-LE46 (WH/RD), wiring harness side and ground. – pin 7, circuit 9-LE46 (BN/RD), wiring harness side and ground. – pin 9, circuit 8-LE57 (WH/GN), wiring harness side and ground. – pin 10, circuit 9-LE57 (BN/GN), wiring harness side and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes LOCATE and RECTIFY the short to battery voltage in the relevant circuit between the gas discharge headlamp, right, and the gas discharge headlamp control module using the Wiring Diagrams. CHECK the operation of the system.</p> <p>→ No GO to B22.</p>
<p>B22: CHECK CIRCUITS FOR SHORT TO GROUND</p>	
	<p>1 Ignition switch in position 0.</p>

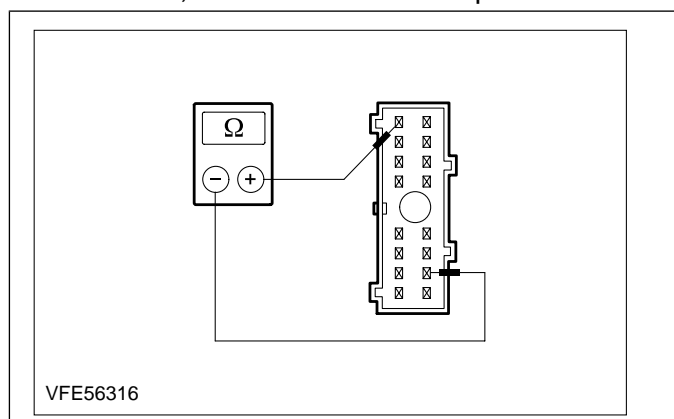
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE56336</p>	<p>2 Measure the resistance between the gas discharge headlamp, right, connector C837:</p> <ul style="list-style-type: none"> - pin 5, circuit 8-LE46 (WH/RD), wiring harness side and ground. - pin 7, circuit 9-LE46 (BN/RD), wiring harness side and ground. - pin 9, circuit 8-LE57 (WH/GN), wiring harness side and ground. - pin 10, circuit 9-LE57 (BN/GN), wiring harness side and ground. <p>• Is the resistance more than 10,000 Ohm?</p> <p>→ Yes Continue fault finding using WDS and if necessary CHECK and RENEW the headlamp and gas discharge headlamp control module. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the short to ground in the relevant circuit between the gas discharge headlamp, right, and the gas discharge headlamp control module using the Wiring Diagrams. CHECK the operation of the system.</p>

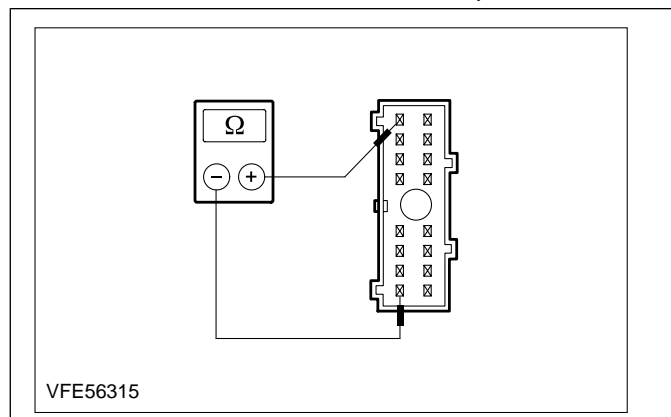
Component Tests

Headlight switch

1. Test the resistance of the headlamp levelling control switch:
 - SWITCH ON dipped beam.
 - Measure the resistance at the headlamp switch between pin 8, component side, and pin 10, component side.
 - Is a resistance of 4.7 kOhms registered?
 - If yes, go to 2.
 - If no, RENEW the headlamp switch.



2. Test the resistance of the headlamp levelling control switch during adjustment:
 - Measure the resistance at the headlamp switch between pin 8, component side, and pin 1, component side.
 - Adjust the headlamp levelling control switch from min. to max.
 - Does the resistance measured change smoothly from 0 to 4.7 kOhm?
 - If yes, the headlamp levelling control switch is OK.
 - If no, RENEW the headlamp switch.



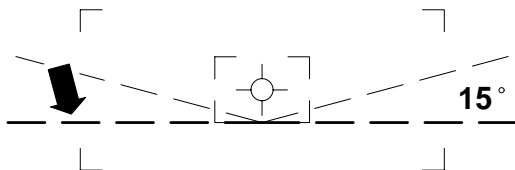
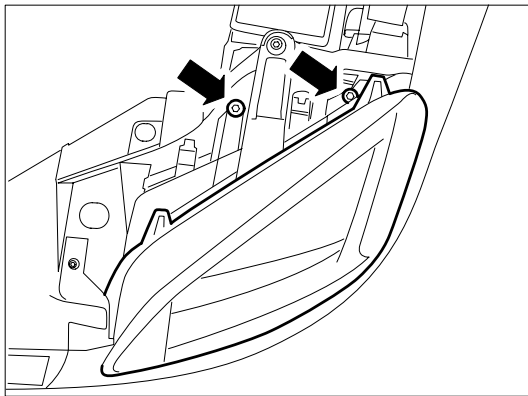
GENERAL PROCEDURES

Headlamp Adjustment(32 113 0)

General Equipment

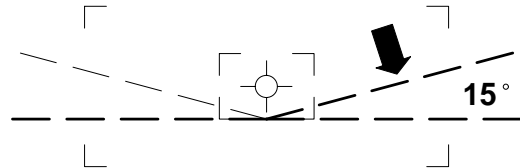
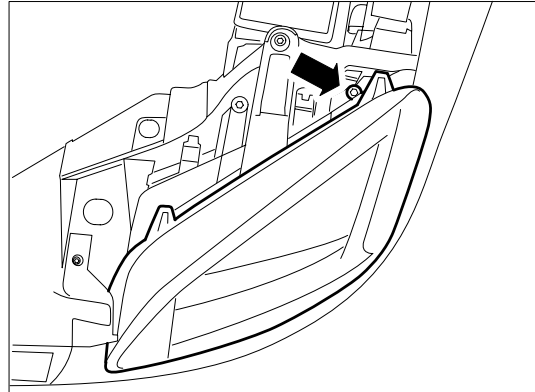
Headlamp beam setting equipment

1. Park the vehicle on a level surface.
2. Ensure that the tire pressures are to specification and that the vehicle is not overloaded.
3. Switch on the dipped beam.
4. Repeatedly actuate the headlamp levelling switch and then set it to "0".
5. Set the measuring screen of the headlamp beam setting equipment to the correct headlamp alignment setting.
6. Adjust the dipped beam so that the light/dark boundary touches the horizontal line.



VFE0035162

Adjust the dipped beam so that the rising line of the light/dark boundary lies at the point of intersection of the horizontal line and the 15° line.



VFE0035163

7. **NOTE:** Scattered light from the dipped beam may cross the 15 degree line.

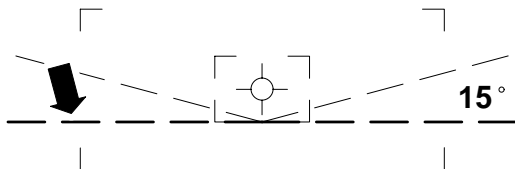
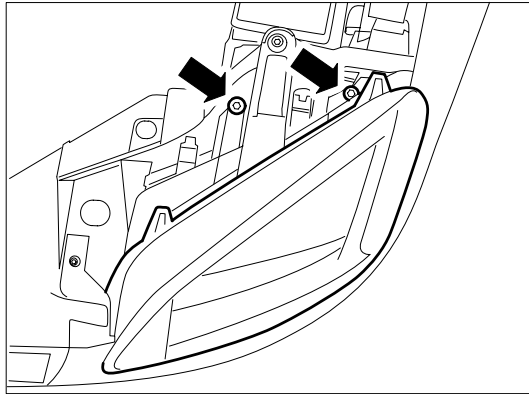
GENERAL PROCEDURES

Headlamp Adjustment — Vehicles With: Adaptive Front
Lighting(32 113 0)

General Equipment

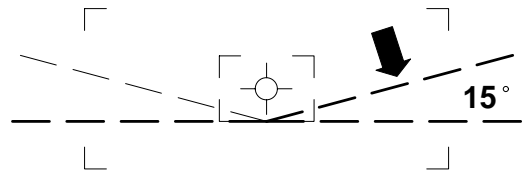
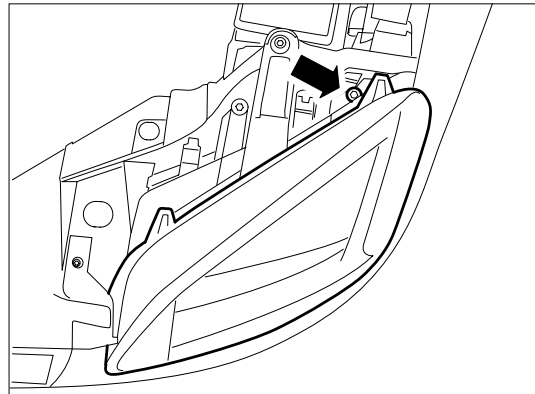
Beam setting equipment

1. Stand the vehicle on a level surface.
2. Make sure that the tire pressures are to specification and that the vehicle is not abnormally laden.
3. Switch the headlamps on and to dipped beam.
4. Repeatedly operate the headlamp levelling switch through its range, then set it to "0".
5. Use WDS to make certain that the front wheels are in the straight ahead position.
6. Set up the measuring screen of the beam setting device to the correct headlamp setting value.
7. Adjust the headlamps so that the boundary line touches the horizontal line.



VFE0035162

Adjust the dipped beam so that the rising line of the light/dark boundary lies in the intersection point of the horizontal line and the 15 degree line.



VFE0035163

8. **NOTE:** A stray portion of the dipped beam may cross the 15 degree line.

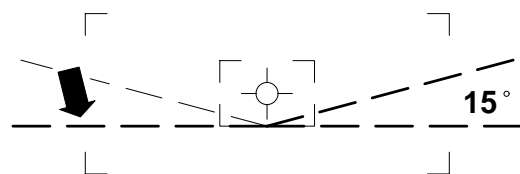
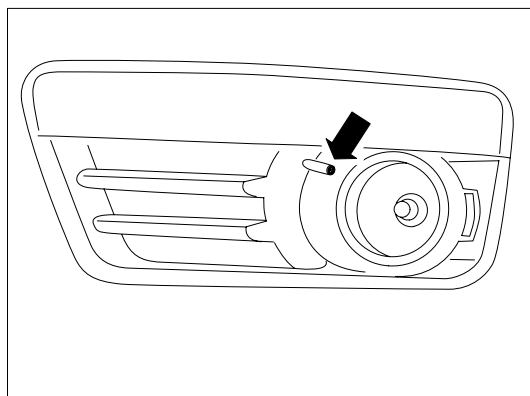
GENERAL PROCEDURES

Front Fog Lamp Adjustment

General Equipment

Headlamp beam setting equipment

1. Park the vehicle on a level surface.
2. Ensure that the tire pressures are to specification and that the vehicle is not overloaded.
3. Switch on the front fog lamps.
4. Set the measuring screen of the headlamp beam setting equipment to the correct front fog lamp alignment setting.
5. Adjust the front fog lamps so that the light/dark boundary touches the horizontal line.



VFE0035164

REMOVAL AND INSTALLATION

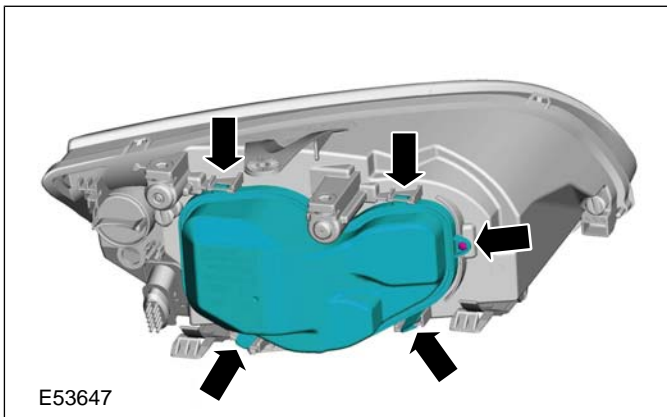
High Beam Headlamp Bulb — Vehicles With: High Intensity
Discharge Headlamps

Removal

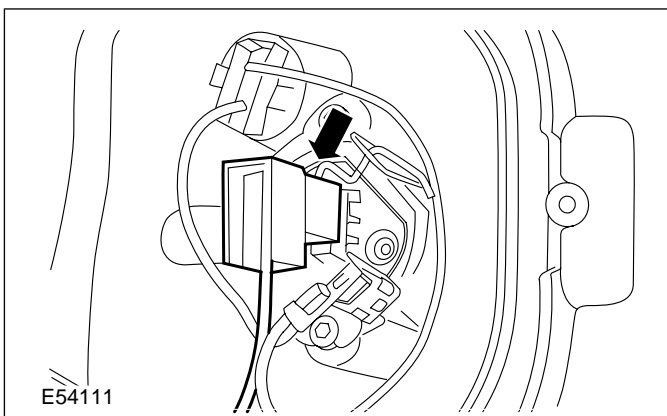
1. Remove the headlamp assembly.

For additional information, refer to:
**Headlamp Assembly (417-01 Exterior
Lighting, Removal and Installation).**

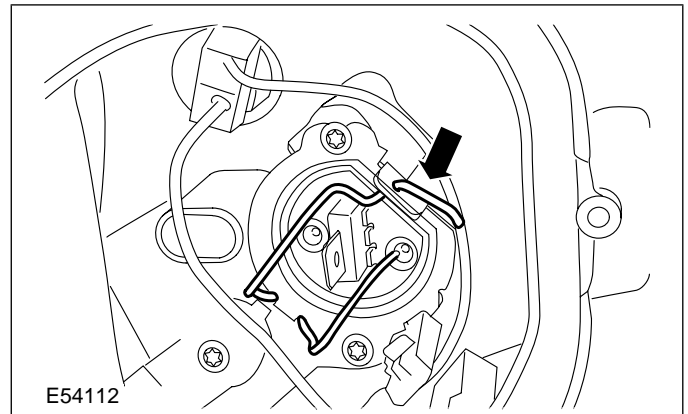
2. **⚠ WARNING:** High voltages are present in the system. Ensure that the headlamp connector is disconnected before removing the headlamp rear cover. Failure to follow this instruction may result in personal injury.
Remove the rear headlamp cover.



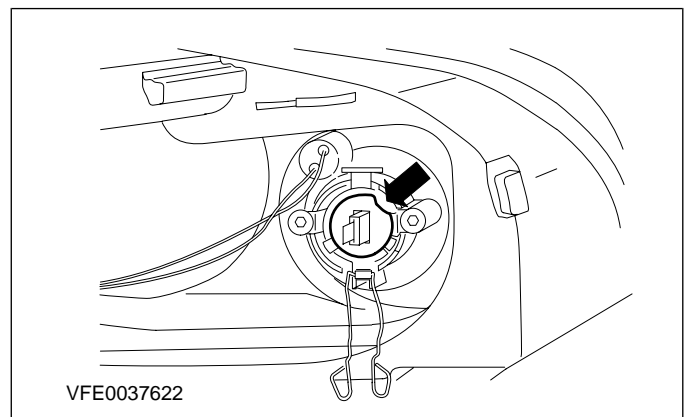
3. Detach the main beam bulb connector.



4. Detach the main beam bulb U-clip from the fixings.



5. Remove the main beam bulb.



Installation

⚠ CAUTION: Ensure that the internal headlamp wiring harness is not trapped when installing the headlamp rear cover.

1. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Low Beam Headlamp Bulb — Vehicles Built Up To: 12/2007,
Vehicles With: High Intensity Discharge Headlamps

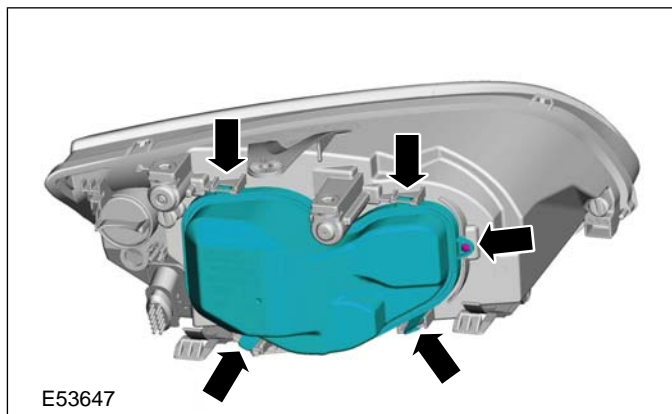
Removal

1. Remove the headlamp assembly.

For additional information, refer to:
Headlamp Assembly (417-01 Exterior Lighting, Removal and Installation).

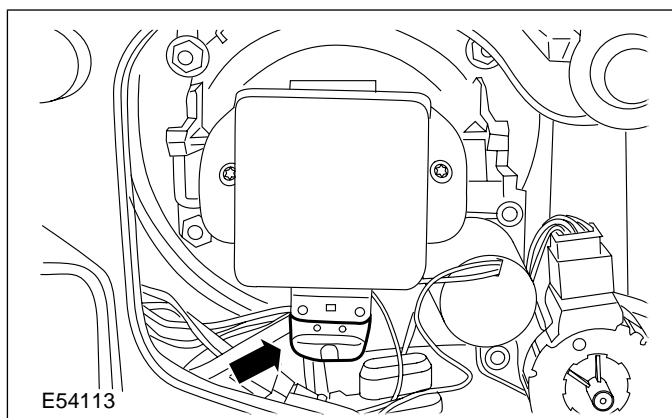
- ▲ WARNING:** High voltages are present in this system. Make sure that the headlamp assembly electrical connector is disconnected if the headlamp rear cover is removed. Failure to follow these instructions may result in personal injury.

2. Remove the headlamp rear cover.

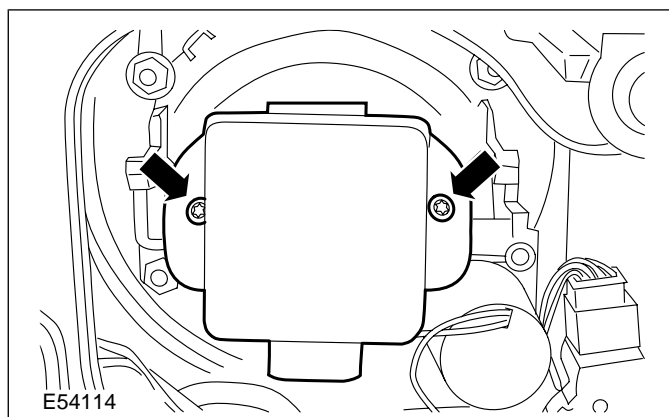


3. **▲ CAUTION:** Make sure that the headlamps are not switched on with the low beam headlamp bulb ignitor electrical connector disconnected.

Disconnect the low beam headlamp bulb electrical connector.



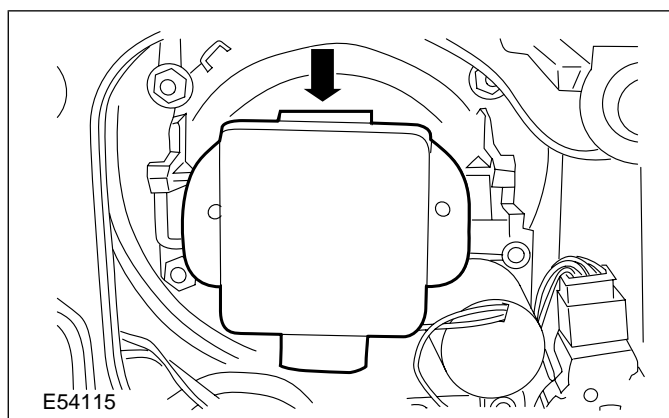
4. Remove the low beam headlamp bulb retaining bolts.



5. **▲ WARNING:** Wear safety glasses and protective gloves when removing high intensity discharge headlamp bulbs. Failure to follow these instructions may result in personal injury.

- ▲ CAUTION:** Do not touch the glass surface of the headlamp bulb.

Remove the low beam headlamp bulb.




Installation


- ▲ WARNING:** Wear safety glasses and protective gloves when installing high intensity discharge headlamp bulbs. Failure to follow these instructions may result in personal injury.



REMOVAL AND INSTALLATION

CAUTIONS:

 Do not touch the glass surface of the headlamp bulb.

 Make sure that the internal headlamp wiring harness is not trapped when installing the headlamp rear cover.

1. To install, reverse the removal procedure.



REMOVAL AND INSTALLATION

Low Beam Headlamp Bulb — Vehicles Built From: 12/2007,
Vehicles With: High Intensity Discharge Headlamps

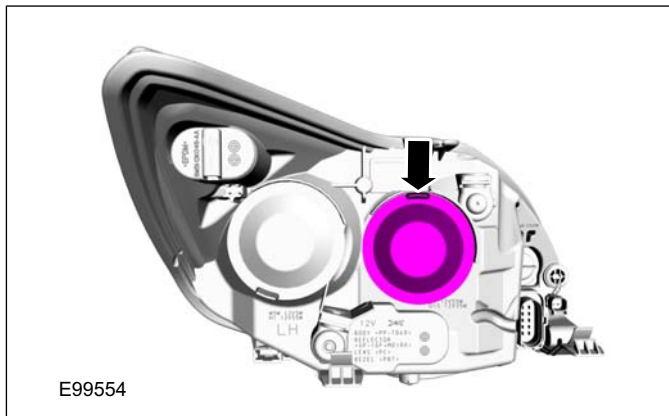
Removal



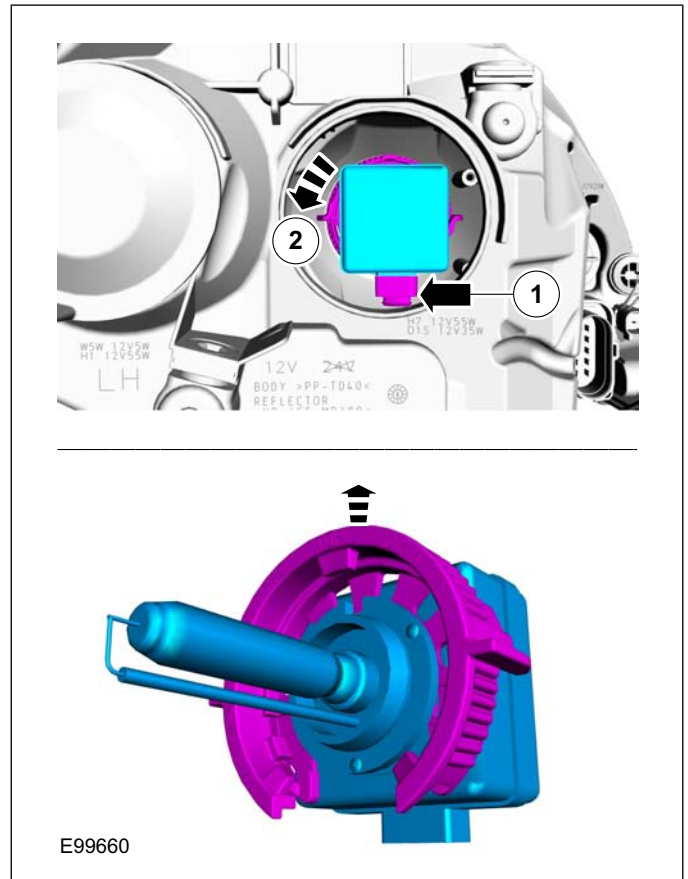
CAUTION: Make sure that the headlamps are not switched on with the headlamp bulb electrical connectors disconnected.

1. Refer to: **Headlamp Assembly (417-01 Exterior Lighting, Removal and Installation)**.

2.



3.



Installation

1.



To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Parking Lamp Bulb — Vehicles With: High Intensity Discharge Headlamps

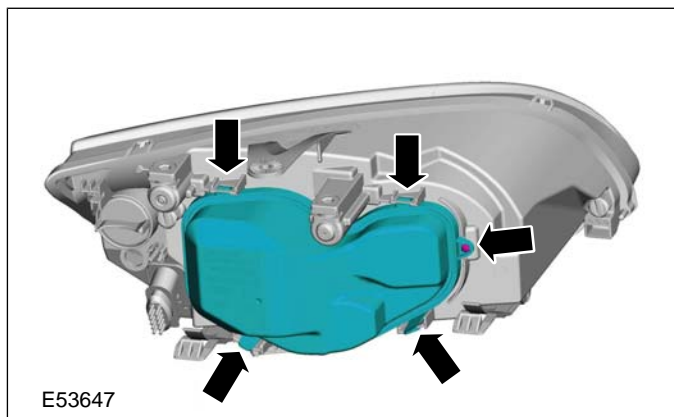
Removal

1. Remove the headlamp assembly.

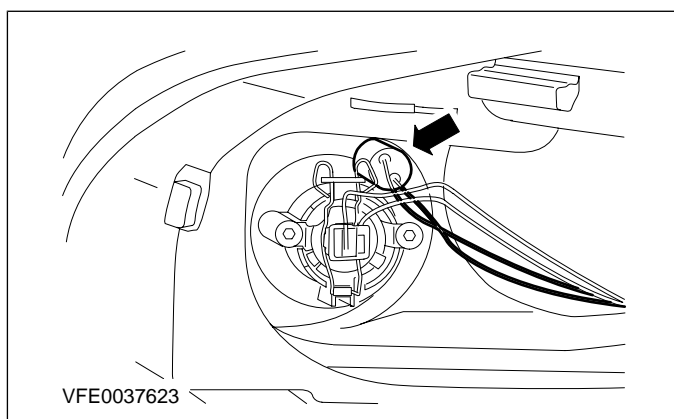
For additional information, refer to:

Headlamp Assembly (417-01 Exterior Lighting, Removal and Installation).

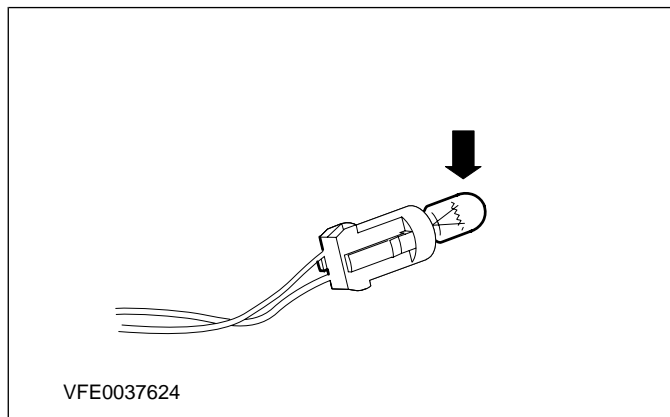
2. **⚠️WARNING:** High voltages are present in the system. Ensure that the headlamp connector is disconnected before removing the headlamp rear cover. Failure to follow this instruction may result in personal injury.
Remove the rear headlamp cover.



3. Pull out the parking lamp bulb holder with bulb.



4. Remove the parking lamp bulb.



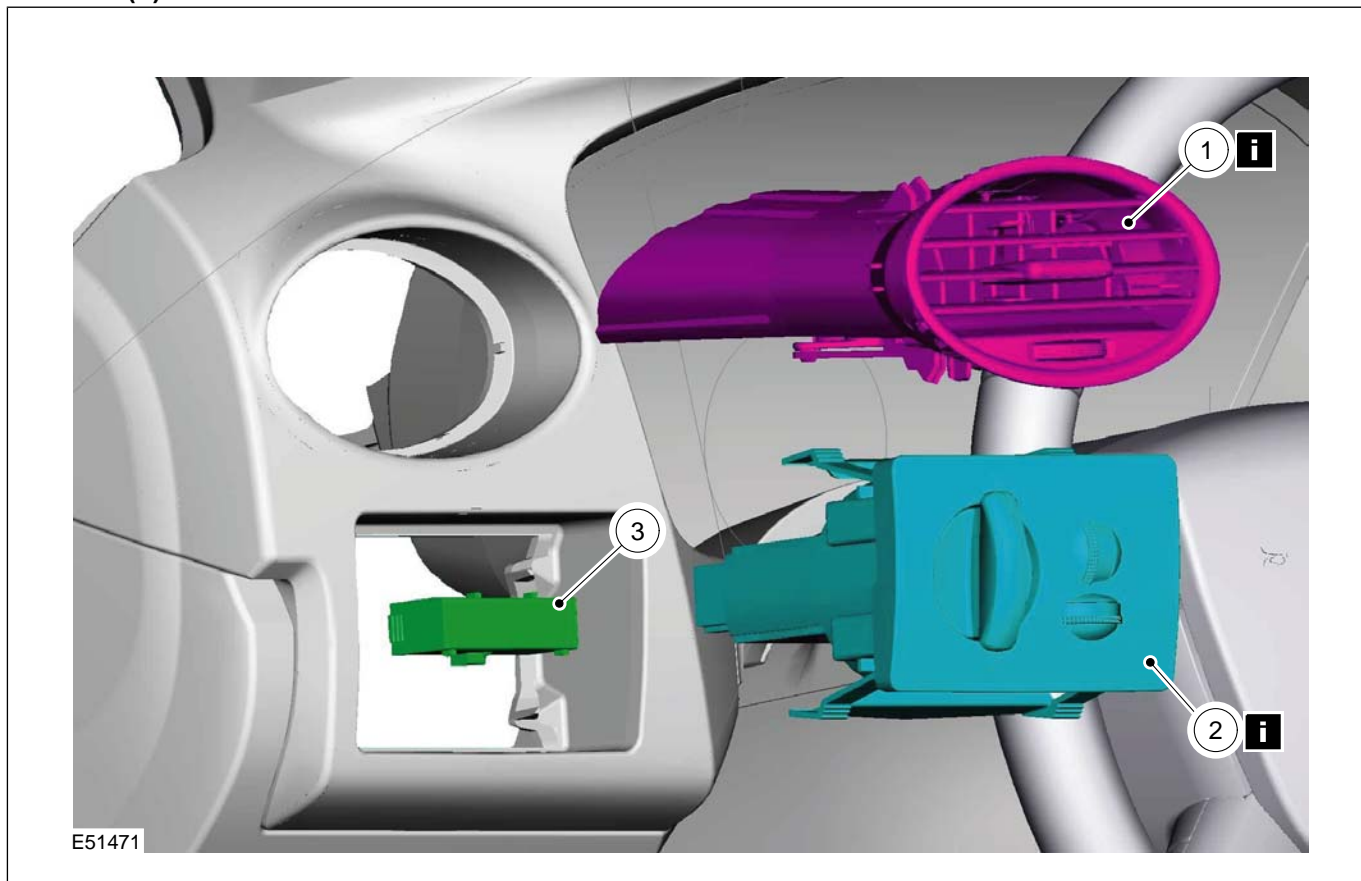
Installation

1. **⚠️CAUTION:** Ensure that the internal headlamp wiring harness is not trapped when installing the headlamp rear cover.
To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Headlamp Switch

1. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Driver side air vent See Removal Detail
2	Dipped beam switch See Removal Detail
3	Dipped beam switch connector

2. To install, reverse the removal procedure.

Removal Details

Item 1 Driver side air vent

1. **NOTE:** The air vent is held in place by four retaining tangs. Disengage the upper retaining tangs and pull the air vent forwards until the lower retaining tangs are accessible.

Remove the passenger side air vent.

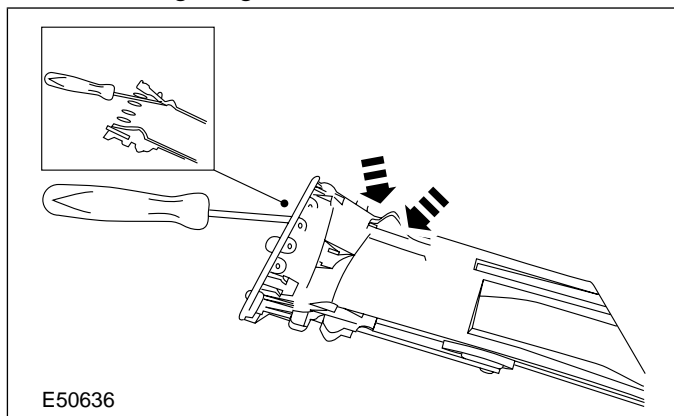
417-01-251

Exterior Lighting

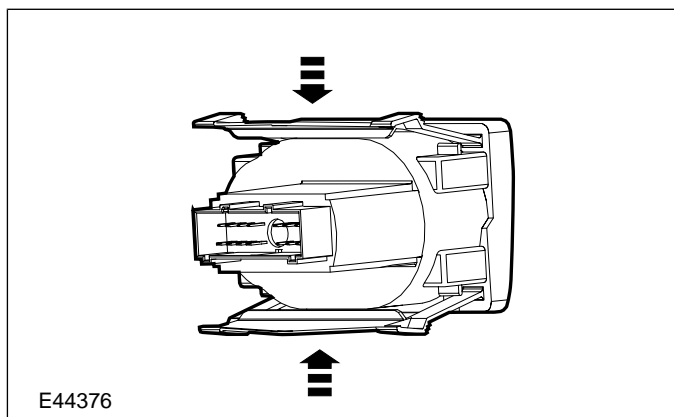
417-01-251

REMOVAL AND INSTALLATION

- Using a thin bladed screwdriver, release the locking tangs.

**Item 2 Dipped beam switch**

1. Unclip the dipped beam switch through the driver side air vent cut-out.

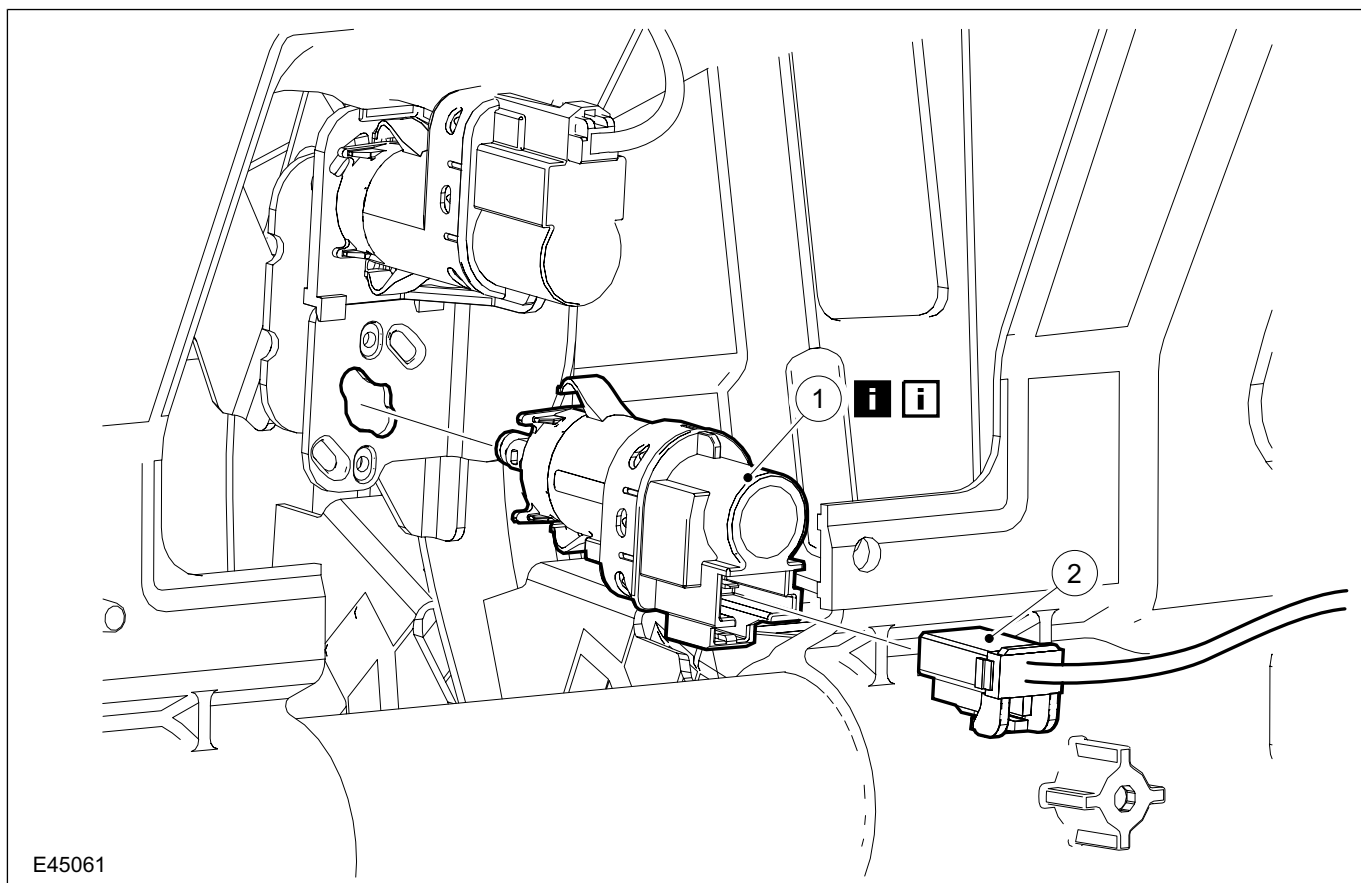


REMOVAL AND INSTALLATION

Stoplamp Switch

1. Remove the components in the order indicated in the following illustration(s) and table(s).

NOTE: In order to synchronise the stop lamp switch and the brake pedal position switch (BPP switch) the BPP switch must be removed, and it must be reinstalled before the stop lamp switch is installed.



Item	Description
1	Stop lamp switch See Removal Detail See Installation Detail
2	Stop lamp switch connector

2. To install, reverse the removal procedure.

NOTE: After installation of the stop lamp switch, check the synchronisation of the stop lamp switch and the BPP switch using WDS.

Removal Details

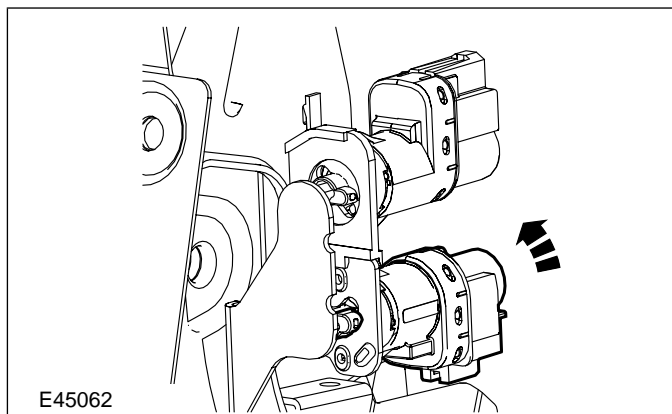
Item 1 Stop lamp switch

CAUTION: Make sure that during removal of the stop lamp switch and the BPP switch, the brake pedal is pulled right up to its stop and held there. Failure to observe this instruction can cause damage to the switch.

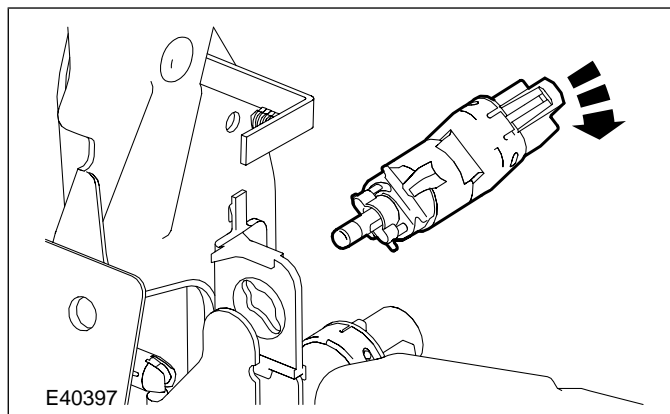
1. Remove the stoplamp switch.

REMOVAL AND INSTALLATION

- Turn the stop lamp switch clockwise and pull it out.



- Turn the BPP switch anti-clockwise and pull it out.

**2. Remove the BPP switch.****Installation Details****Item 1 Stop lamp switch**

⚠ CAUTION: Make certain that the brake pedal remains in its rest position during installation of the BPP switch and the stop lamp switch. Failure to observe this instruction can lead to faults in the engine management.

1. Install the BPP switch.

- Slide the BPP switch in and turn it clockwise until it reaches the stop.

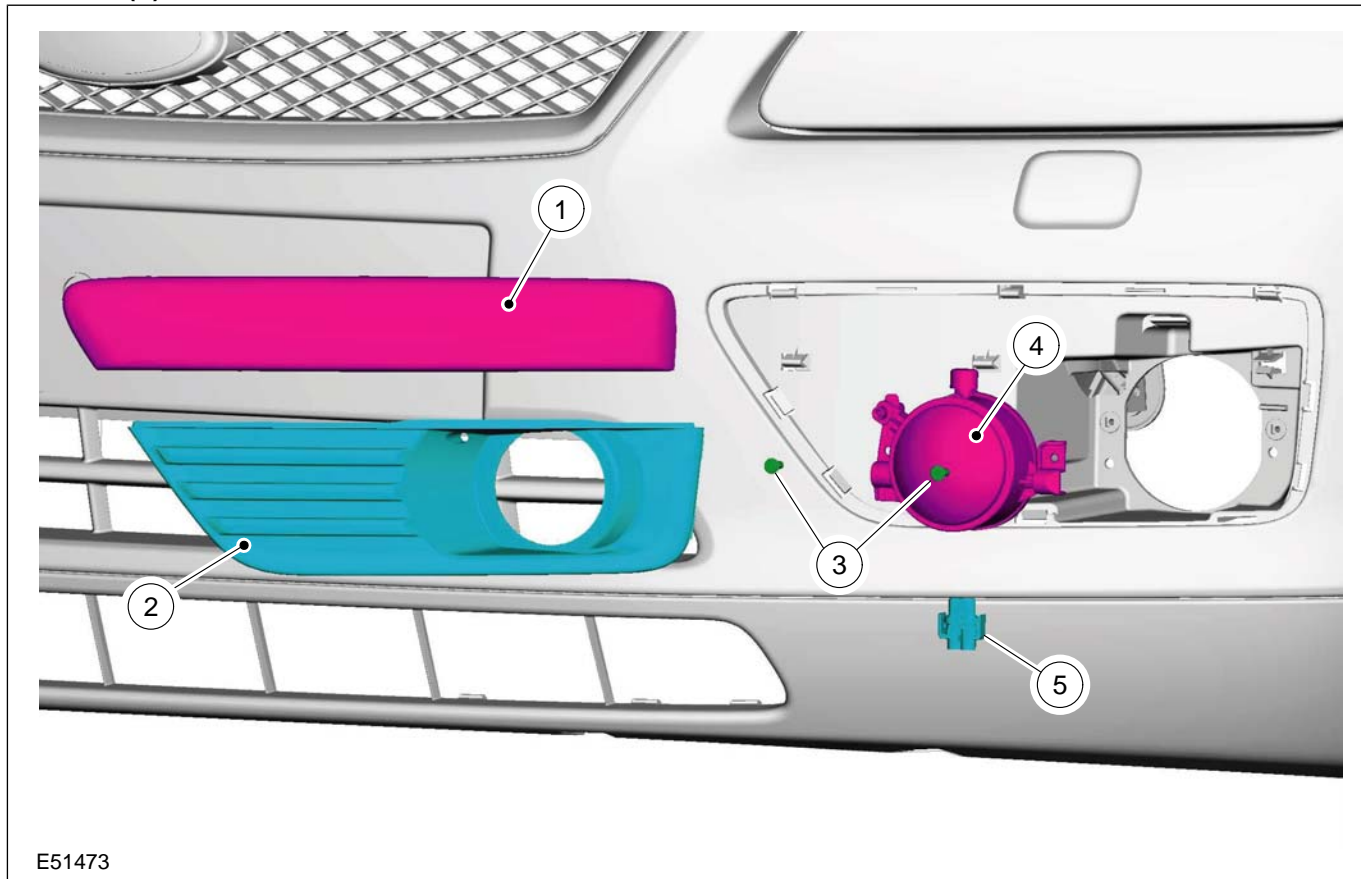
2. Install the stop light switch.

- Slide the stop light switch in and turn it anti-clockwise until it reaches its stop.

REMOVAL AND INSTALLATION

Front Fog Lamp — Vehicles Built Up To: 12/2007

1. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Fog lamp bezel
2	Cover, fog lamp
3	Screw, fog lamp
4	Fog lamp
5	Fog lamp connector

2. To install, reverse the removal procedure.
3. Adjust the fog lamp beam alignment.

For additional information, refer to:

Front Fog Lamp Adjustment (417-01, General Procedures).

REMOVAL AND INSTALLATION

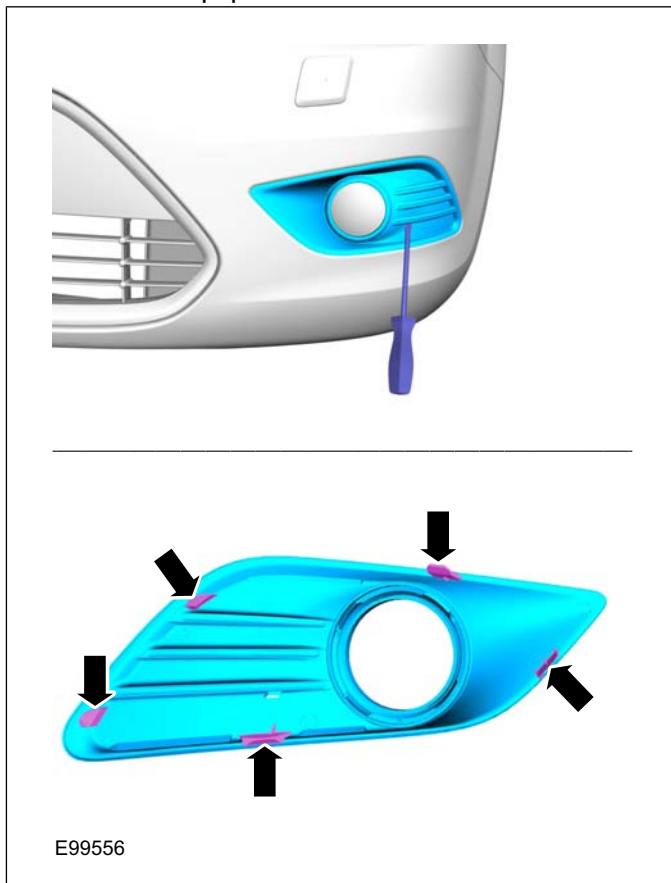
Front Fog Lamp — Vehicles Built From: 12/2007

General Equipment

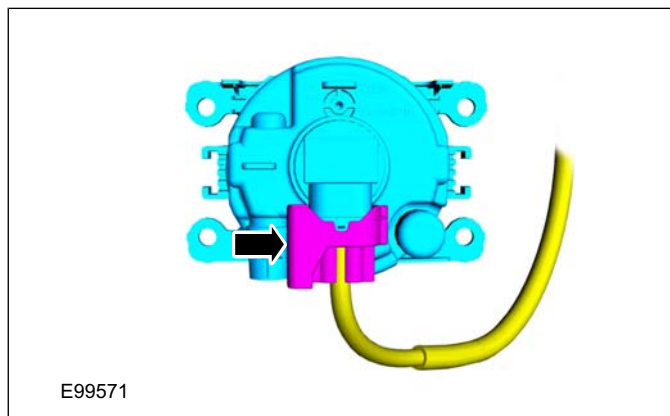
Flat-bladed screwdriver

Removal

1. General Equipment: Flat-bladed screwdriver



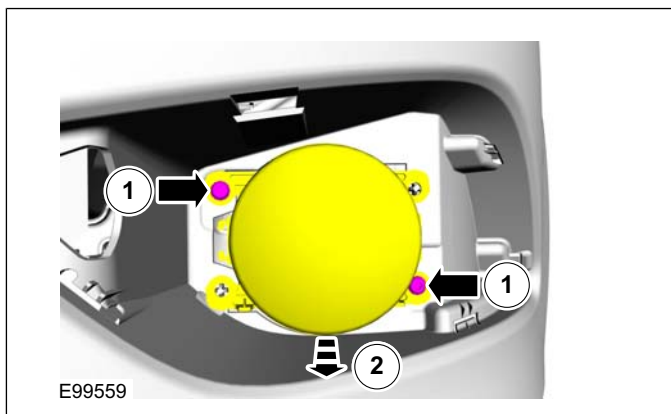
3.



Installation

1. To install, reverse the removal procedure.
2. Refer to: [Front Fog Lamp Adjustment \(417-01 Exterior Lighting, General Procedures\)](#).

2.



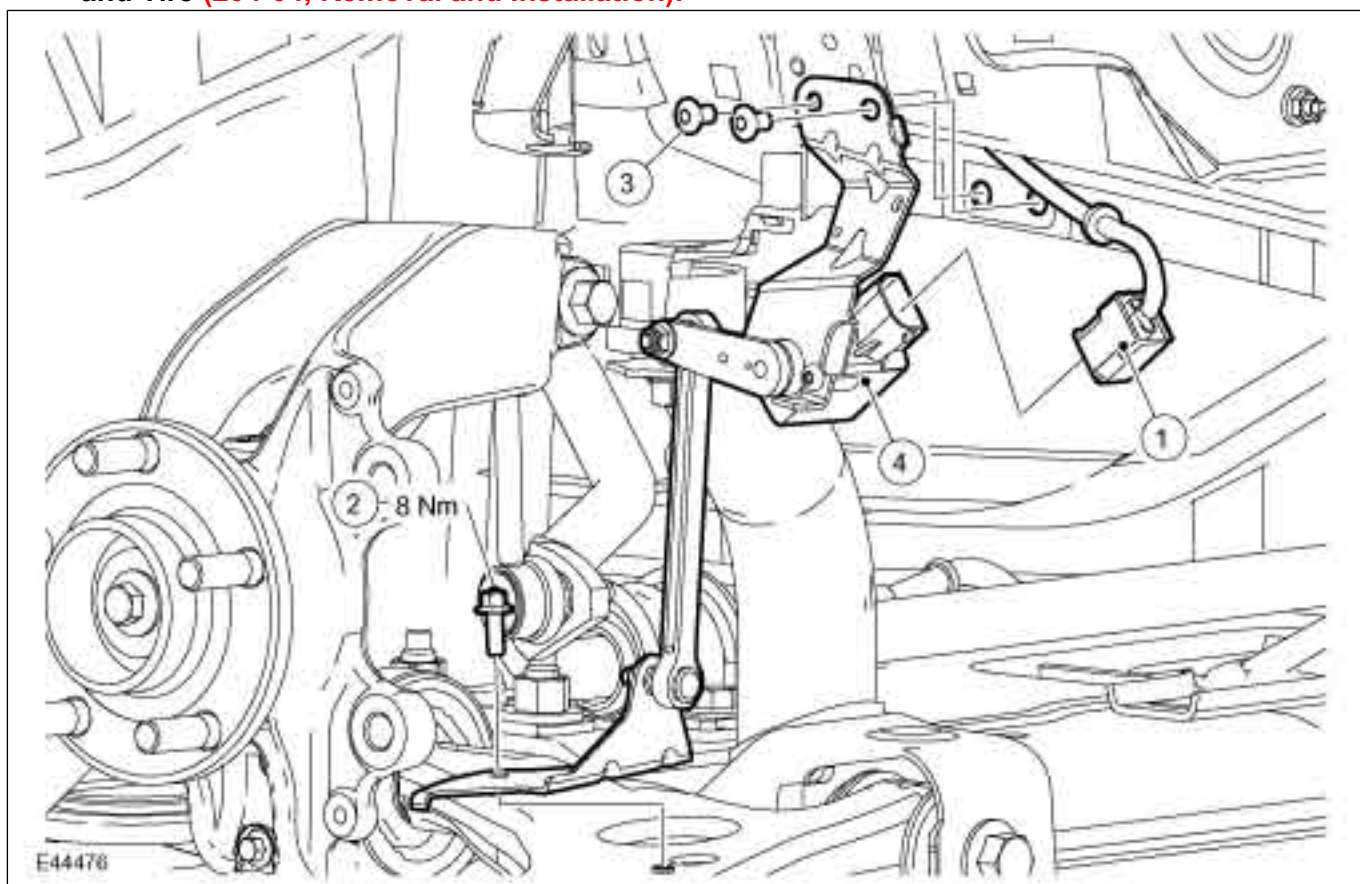
REMOVAL AND INSTALLATION

Headlamp Leveling Front Sensor

1. Detach the right-hand front wheel.

For additional information, refer to: Wheel and Tire (204-04, Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Front headlamp leveling sensor connector
2	Front headlamp leveling sensor bolt
3	Front headlamp leveling sensor rivets
4	Front headlamp leveling sensor

3. To install, reverse the removal procedure.

NOTE: Following installation of the front headlamp leveling sensor, calibrate the headlamp leveling system using WDS.

4. Align the headlamps.

For additional information, refer to: Headlamp Adjustment (417-01, General Procedures).

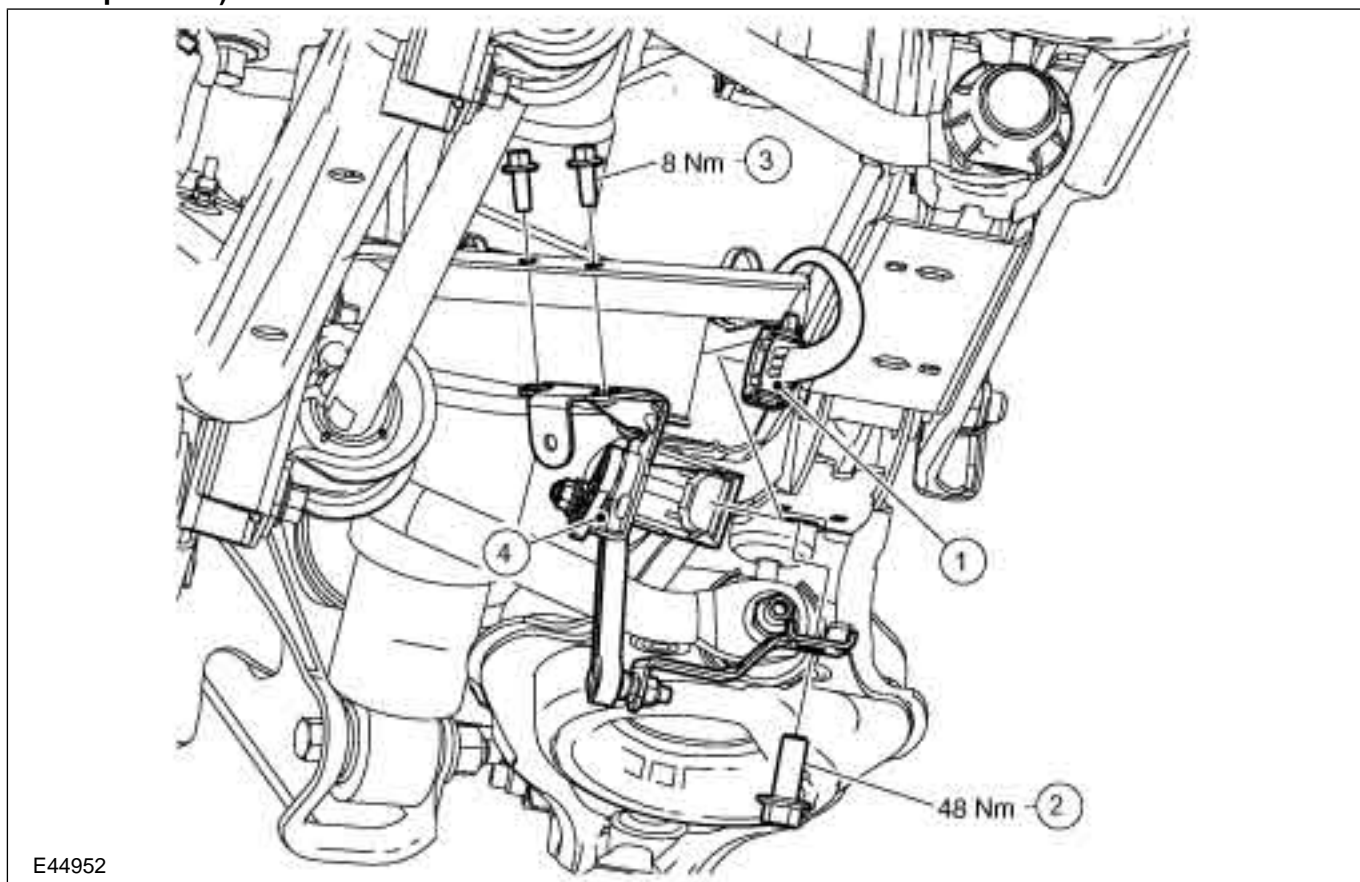
REMOVAL AND INSTALLATION

Headlamp Leveling Rear Sensor

1. Raise and support the vehicle.

For additional information, refer to:
Lifting (100-02, Description and
Operation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



E44952

Item	Description
1	Rear headlamp leveling sensor connector
2	Lower bolt, rear headlamp leveling sensor
3	Upper bolt, rear headlamp leveling sensor
4	Rear headlamp leveling sensor

3. To install, reverse the removal procedure.

NOTE: Following installation of the rear headlamp leveling sensor, calibrate the headlamp leveling system using WDS.

4. Align the headlamps.

For additional information, refer to:
**Headlamp Adjustment (417-01 Exterior
Lighting, General Procedures).**

REMOVAL AND INSTALLATION

Headlamp Leveling Motor — Vehicles With: High Intensity
Discharge Headlamps

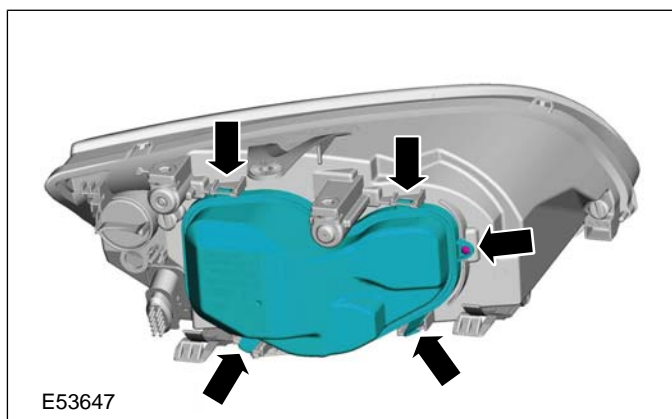
Removal

1. Remove the headlamp assembly.

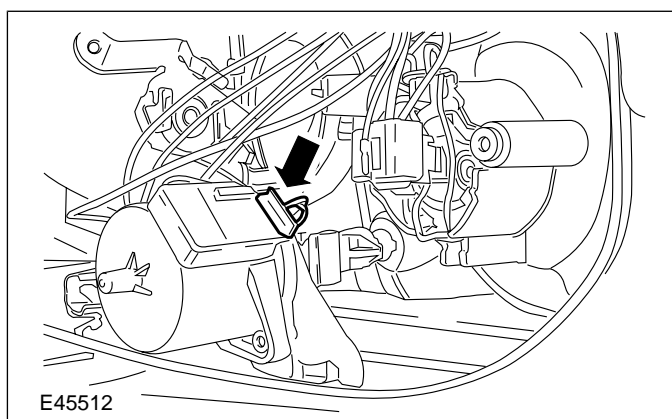
For additional information, refer to:

Headlamp Assembly (417-01, Removal and Installation).

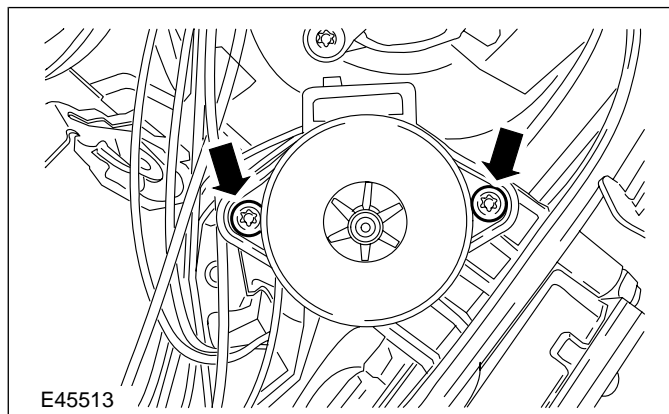
2. **▲WARNING:** High voltages are present in the system. Ensure that the headlamp connector is disconnected before removing the headlamp rear cover. Failure to follow this instruction may result in personal injury.
Remove the rear headlamp cover.



3. Disconnect the headlamp leveling motor electrical connector.

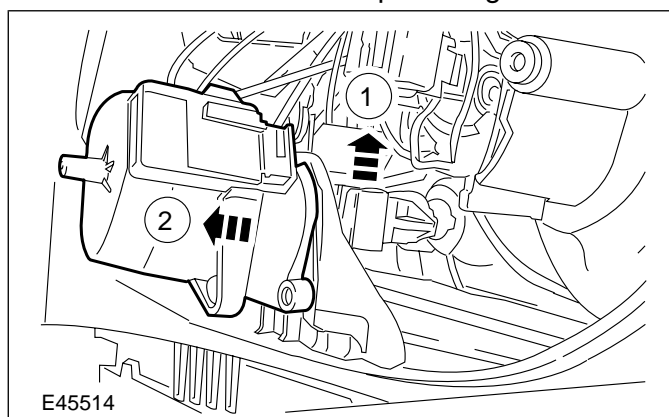


4. Remove the headlamp leveling motor bolts.



5. Remove the headlamp leveling motor.

1. Pull out the headlamp leveling motor ball head from the guide.
2. Remove the headlamp leveling motor.



Installation

1. **CAUTIONS:**

▲ Ensure that the internal headlamp wiring harness is not trapped when installing the headlamp rear cover.

▲ Ensure that the ball head of the headlamp leveling motor is pushed correctly into the guide.

To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Headlamp Leveling Motor

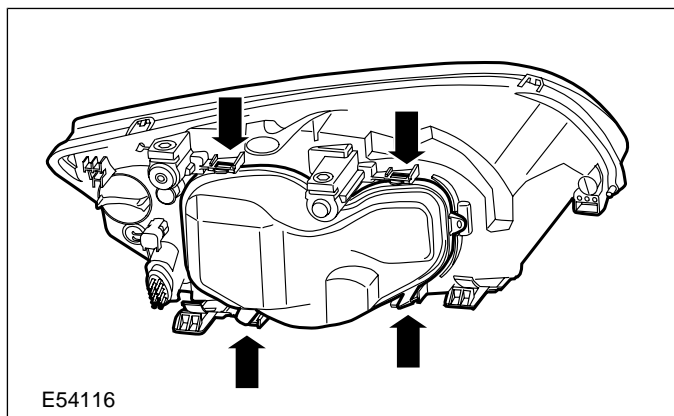
Removal

1. Remove the headlamp assembly.

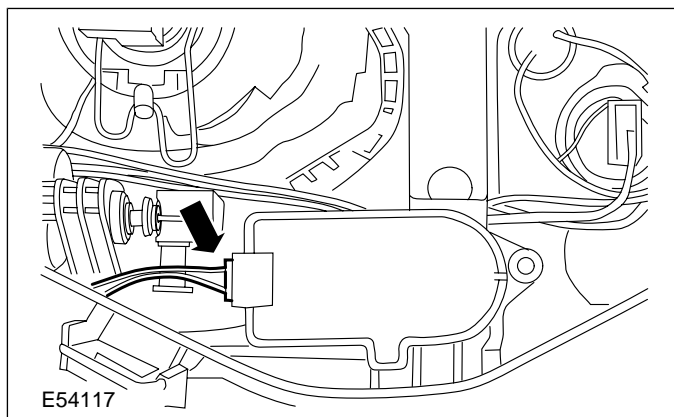
For additional information, refer to:

Headlamp Assembly (417-01, Removal and Installation).

2. Remove the rear headlamp cover.

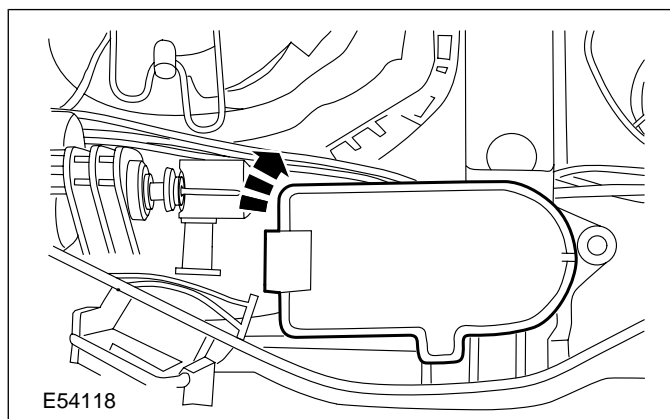


3. Disconnect the headlamp leveling motor electrical connector.



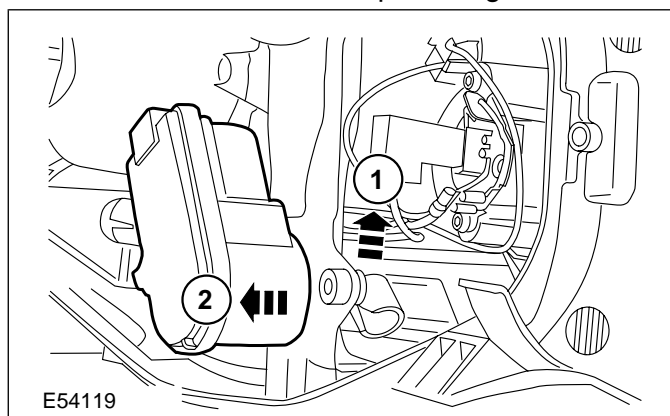
4. **NOTE:** The headlamp leveling motor must be turned clockwise when removing from the left-hand headlamp and counter-clockwise when removing from the right-hand headlamp.

Turn the headlamp leveling motor to the stop.



5. Remove the headlamp leveling motor.

1. Pull out the headlamp leveling motor ball head from the guide.
2. Remove the headlamp leveling motor.



Installation

1. **CAUTIONS:**

⚠ Ensure that the internal headlamp wiring harness is not trapped when installing the headlamp rear cover.

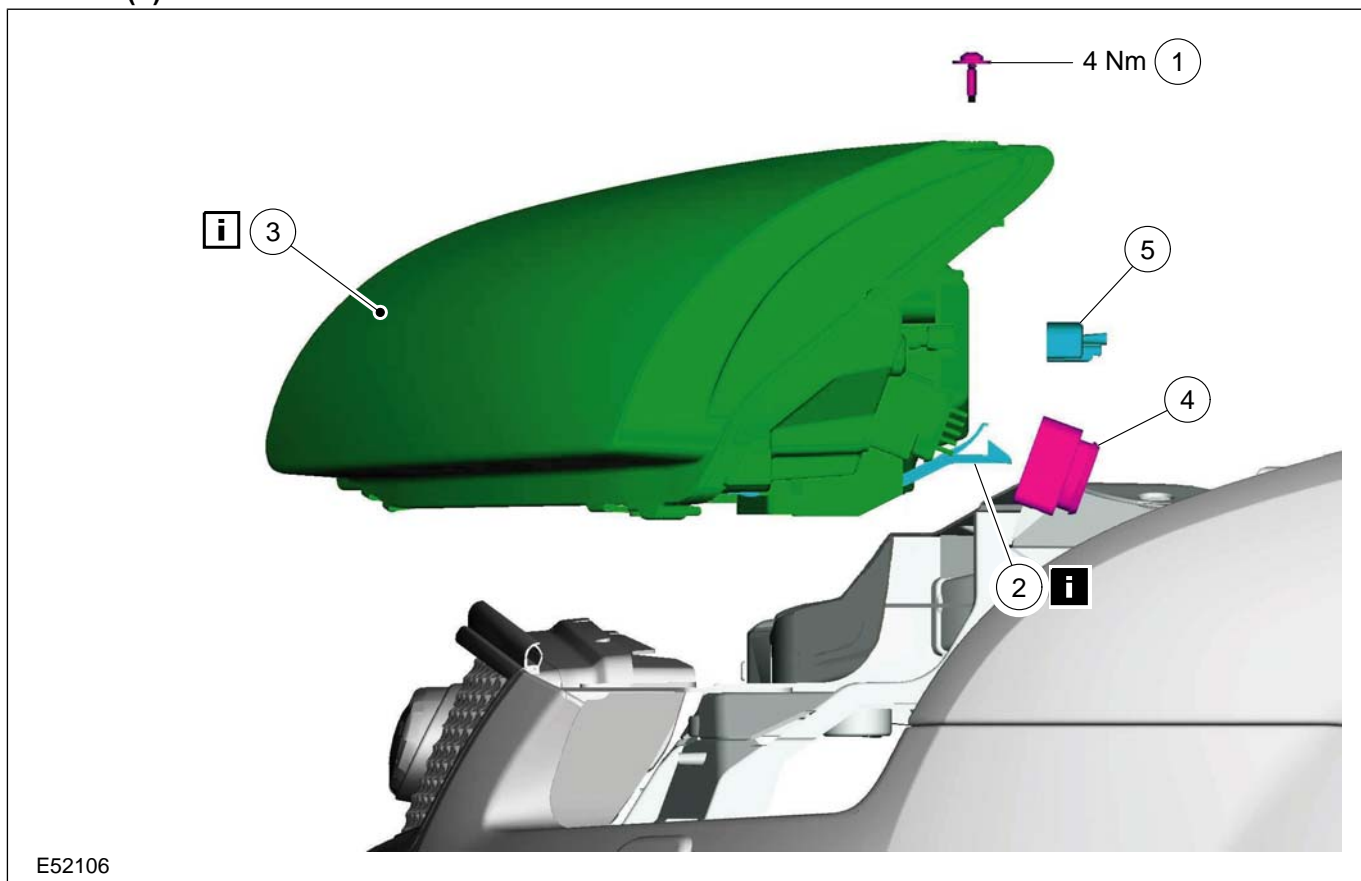
⚠ Ensure that the ball head of the headlamp leveling motor is pushed correctly into the guide.

To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Headlamp Assembly

1. Remove the components in the order indicated in the following illustration(s) and table(s).



E52106

Item	Description
1	Screw, headlamp
2	Detent mechanism, headlamp See Removal Detail
3	Headlamp See Installation Detail
4	Connector, headlamp
5	Electrical connector, curve lights actuator (if equipped)

2. To install, reverse the removal procedure.
3. **NOTE:** In the event of a defective headlamp, the headlamp leveling motor must be removed and installed on the new headlamp.

Remove the headlamp leveling motor. For additional information, [refer to: \(417-01 Exterior Lighting\)](#)

Headlamp Leveling Motor - Vehicles With: High Intensity Discharge Headlamps (Removal and Installation), Headlamp Leveling Motor (Removal and Installation).

4. **NOTE:** Only vehicles with gas discharge lamps

Adjust the headlamp.

For additional information, refer to: [Headlamp Adjustment \(417-01 Exterior Lighting, General Procedures\).](#)

Removal Details

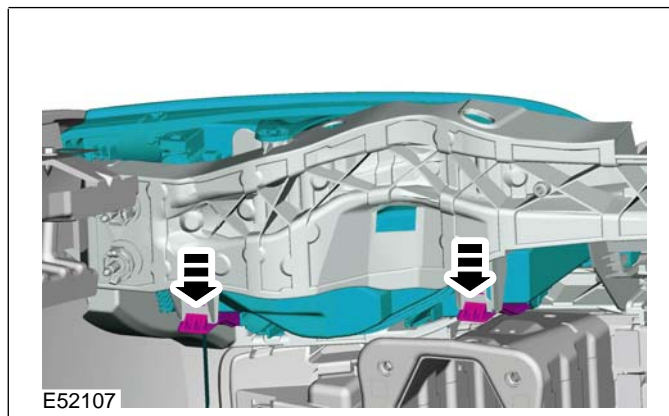
417-01-261

Exterior Lighting

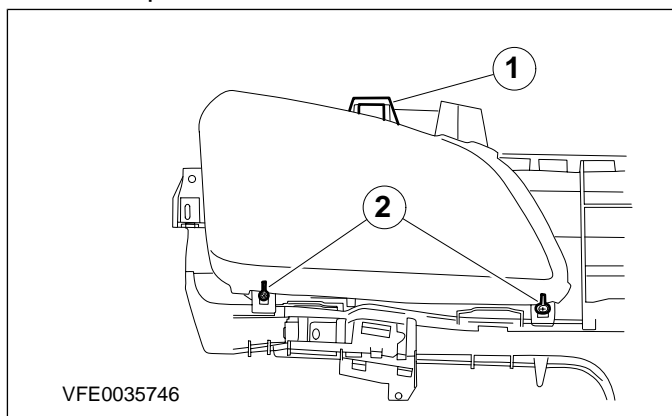
417-01-261

REMOVAL AND INSTALLATION**Item 2 Detent mechanism, headlamp**

1. Press down the detent mechanism by approx. 1 cm.

**Installation Details****Item 3 Headlamp**

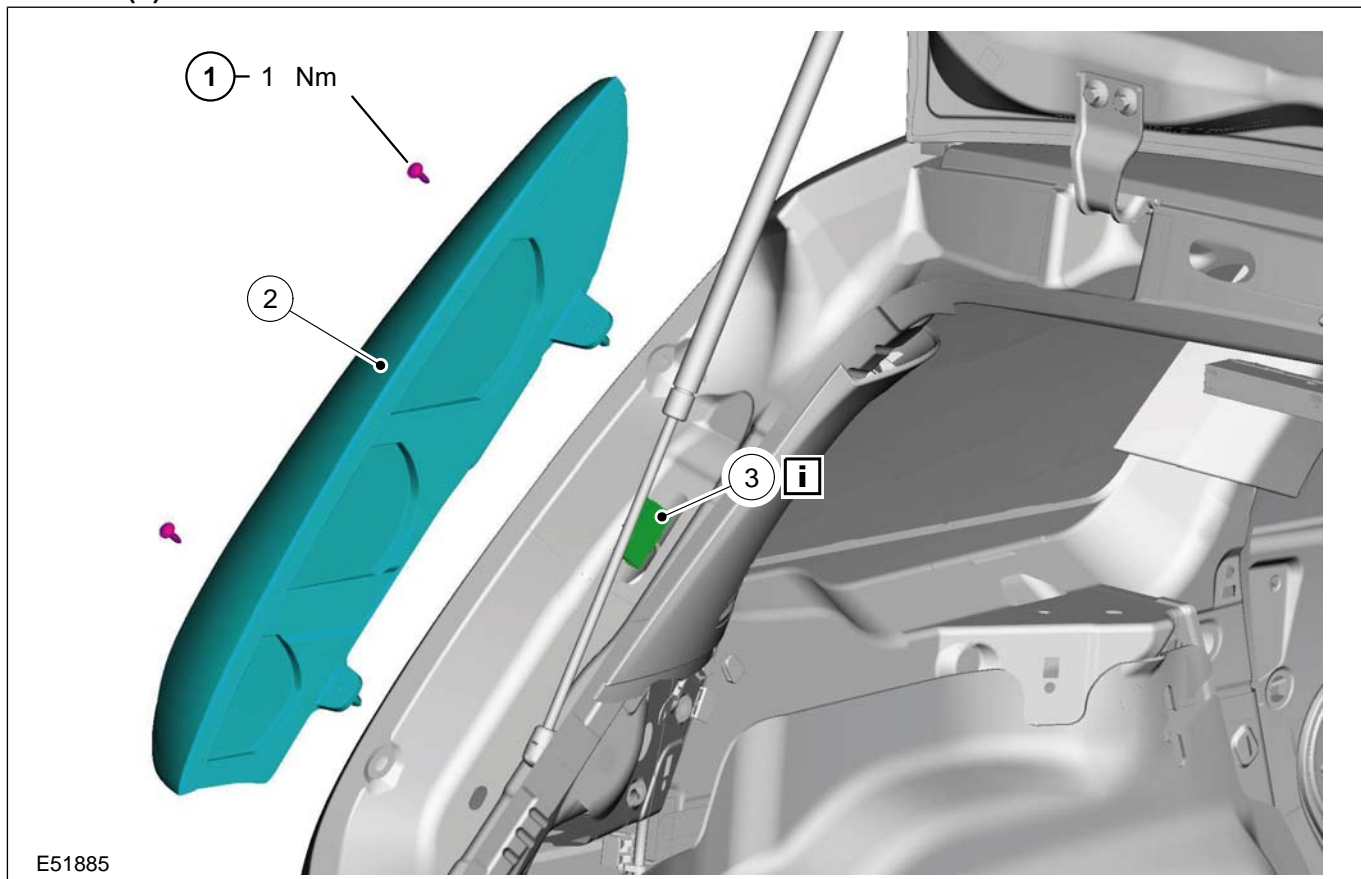
1. Push the headlamp into the headlamp fixing points.
 1. Fit the headlamp.
 2. Slide the locating pins into the retaining straps.



REMOVAL AND INSTALLATION

Rear Lamp Assembly

1. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Rear lamp assembly screws
2	Rear lamp assembly
3	Electrical connector, rear lamp assembly See Installation Detail

2. To install, reverse the removal procedure.

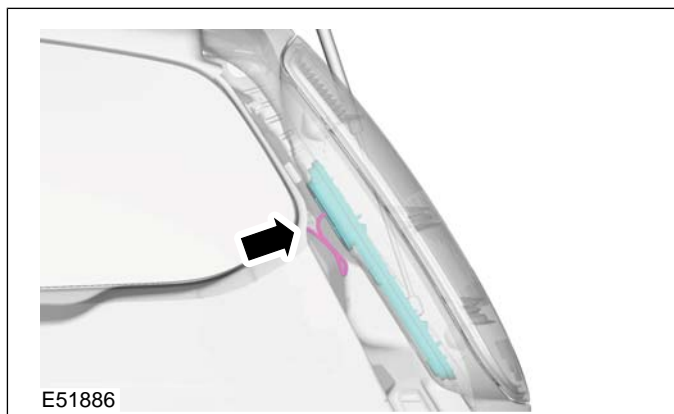
Installation Details

Item 3 Electrical connector, rear lamp assembly

1. **CAUTION:** On Combi vehicles, to prevent water entry, make sure that the rear light wiring harness is not trapped between the rear light assembly and the bodywork.

REMOVAL AND INSTALLATION

Fully push back the rear light assembly wiring harness.





SECTION 417-02 Interior Lighting

VEHICLE APPLICATION: 2008.75 Focus ST C307

CONTENTS	PAGE
DIAGNOSIS AND TESTING	
Interior Lighting.....	417-02-2
Inspection and Verification.....	417-02-2
Symptom Chart.....	417-02-2
Pinpoint Tests.....	417-02-3



DIAGNOSIS AND TESTING

Interior Lighting

Refer to Wiring Diagrams Section 417-02, for schematic and connector information.

General Equipment

Worldwide Diagnostic System (WDS)

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of electrical damage.

Visual Inspection Chart

Electrical
<ul style="list-style-type: none"> - Fuse(s) - Bulb(s) - Switch(es) - Wiring harness - Electrical connector(s) - Interior lamp(s) - Battery saver relay - Door - Central junction box (CJB)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • The front interior lamp is inoperative 	<ul style="list-style-type: none"> • Fuse(s). • Bulb(s). • Circuit(s). • Front interior lamp. • Battery saver relay. • CJB. 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.
<ul style="list-style-type: none"> • The rear interior lamp is inoperative 	<ul style="list-style-type: none"> • Fuse(s). • Bulb(s). • Circuit(s). • Rear interior lamp. • Battery saver relay. • CJB. 	<ul style="list-style-type: none"> • GO to Pinpoint Test B.
<ul style="list-style-type: none"> • The luggage compartment lamp is inoperative 	<ul style="list-style-type: none"> • Fuse(s). • Bulb(s). • Circuit(s). • Luggage compartment lamp. • Luggage compartment lamp switch. • Liftgate latch motor. • CJB. 	<ul style="list-style-type: none"> • GO to Pinpoint Test C.
<ul style="list-style-type: none"> • The glove compartment lamp is inoperative 	<ul style="list-style-type: none"> • Fuse(s). • Bulb(s). • Circuit(s). • Glove compartment lamp. • CJB. 	<ul style="list-style-type: none"> • GO to Pinpoint Test D.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> The left-hand front footwell lamp is inoperative 	<ul style="list-style-type: none"> Fuse(s). Bulb(s). Circuit(s). Left-hand front footwell lamp. CJB. 	<ul style="list-style-type: none"> GO to Pinpoint Test E.
<ul style="list-style-type: none"> The right-hand front footwell lamp is inoperative 	<ul style="list-style-type: none"> Fuse(s). Bulb(s). Circuit(s). Right-hand front footwell lamp. CJB. 	<ul style="list-style-type: none"> GO to Pinpoint Test F.
<ul style="list-style-type: none"> The illuminated entry is inoperative using the remote transmitter/keypad 	<ul style="list-style-type: none"> Circuit. CJB. 	<ul style="list-style-type: none"> REFER to: Locks, Latches and Entry Systems (501-14 Handles, Locks, Latches and Entry Systems, Diagnosis and Testing).
<ul style="list-style-type: none"> The battery saver is inoperative/does not operate correctly 	<ul style="list-style-type: none"> Circuit(s). Door module(s). Door ajar switch(es). CJB. 	<ul style="list-style-type: none"> Refer to WDS.

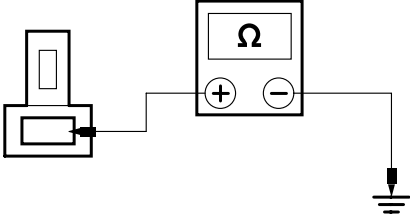
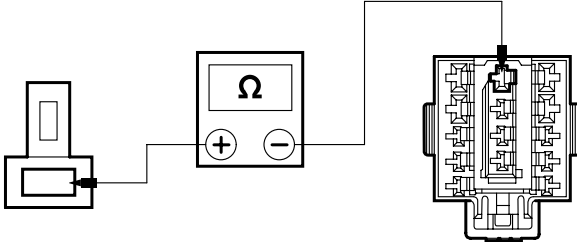
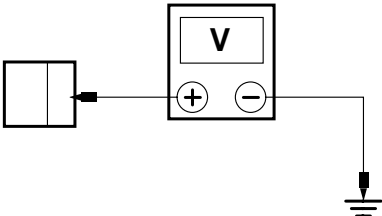
Pinpoint Tests

NOTE: Use a digital multimeter for all electrical measurements.

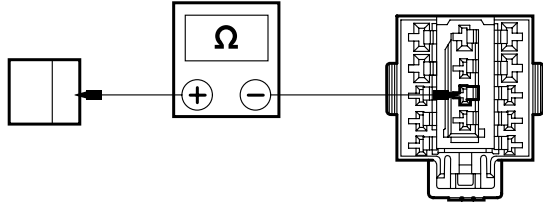
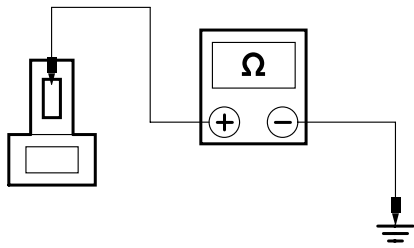
PINPOINT TEST A : THE FRONT INTERIOR LAMP IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK OPERATION OF THE INTERIOR LAMP	
	<ol style="list-style-type: none"> Check for operation of the interior lamp in both the ON and DOOR OPEN positions. <ul style="list-style-type: none"> Is the interior lamp inoperative in both positions? <ul style="list-style-type: none"> → Yes GO to A4. → No If the interior lamp is inoperative in the ON position. GO to A6. If the interior lamp is inoperative in the DOOR OPEN position. GO to A2.
A2: CHECK CIRCUIT 31S-LB12 (BK/YE) FOR GROUND	
	<ol style="list-style-type: none"> Disconnect Front Interior Lamp C890.

DIAGNOSIS AND TESTING

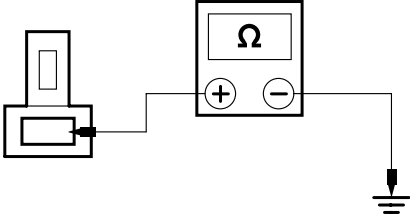
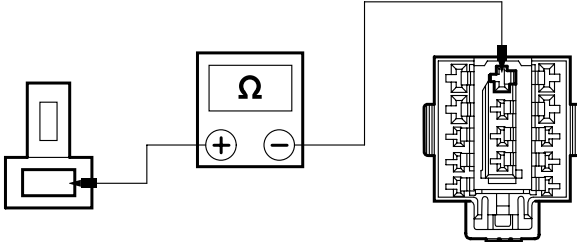
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E41026</p>	<p>2 Measure the resistance between the front interior lamp C890 pin 1, circuit 31S-LB12 (BK/YE), harness side and ground with a door in the closed position.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new front interior lamp. TEST the system for normal operation.</p> <p>→ No GO to A3.</p>
A3: CHECK CIRCUIT 31S-LB12 (BK/YE) FOR OPEN	
 <p>E41027</p>	<p>1 Disconnect CJB C98.</p> <p>2 Measure the resistance between the front interior lamp C890 pin 1, circuit 31S-LB12 (BK/YE), harness side and the CJB C98 pin 13, circuit 31S-LB12 (BK/YE), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REFER to WDS.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>
A4: CHECK CIRCUIT 29-LC7A (OG/BU) FOR VOLTAGE	
 <p>E41028</p>	<p>1 Disconnect Front Interior Lamp C893.</p> <p>2 Measure the voltage between the front interior lamp C893 pin 1, circuit 29-LC7A (OG/BU), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <p>→ Yes INSTALL a new front interior lamp. TEST the system for normal operation. If the concern persists, INSTALL a new battery saver relay. TEST the system for normal operation.</p> <p>→ No GO to A5.</p>
A5: CHECK FRONT INTERIOR LAMP POWER CIRCUIT FOR OPEN	
	<p>1 Disconnect CJB C98.</p>

DIAGNOSIS AND TESTING

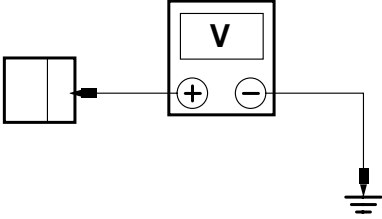
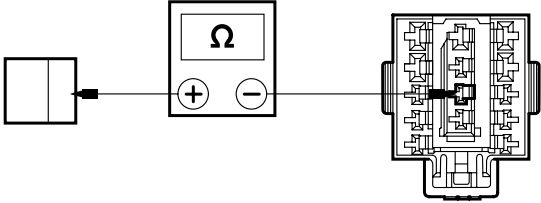
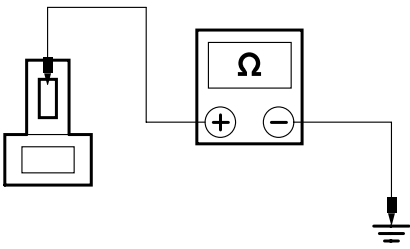
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E41029</p>	<p>2 Measure the resistance between the front interior lamp C893 pin 1, circuit 29-LC7A (OG/BU), harness side and the CJB C98 pin 7, circuit 29-LB6A (OG/YE), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REFER to WDS.</p> <p>→ No REPAIR the circuit 29-LC7A (OG/BU) or circuit 29-LB6A (OG/YE) as necessary . TEST the system for normal operation.</p>
<p>A6: CHECK CIRCUIT 91-LC7 (BK-BU) FOR GROUND</p>	
	<p>1 Disconnect the battery ground cable. REFER to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).</p> <p>2 Disconnect Front Interior Lamp C890.</p>
 <p>E41030</p>	<p>3 Measure the resistance between the front interior lamp C890 pin 2, circuit 91-LC7 (BK/BU), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new front interior lamp. TEST the system for normal operation.</p> <p>→ No REPAIR the circuit. TEST the system for normal operation.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST B : THE REAR INTERIOR LAMP IS INOPERATIVE

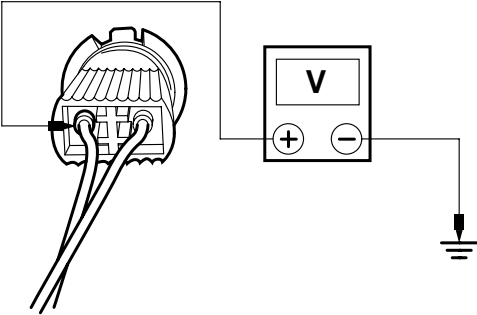
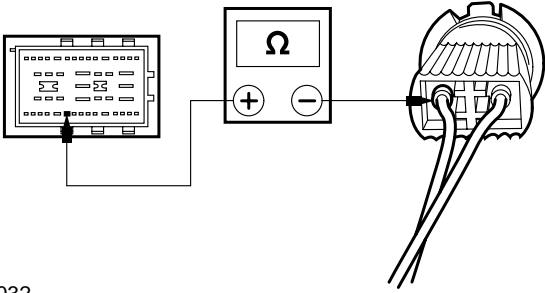
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK OPERATION OF THE INTERIOR LAMP	
	<ol style="list-style-type: none"> <li> Check for operation of the interior lamp in both the ON and DOOR OPEN positions. <ul style="list-style-type: none"> <li>• Is the interior lamp inoperative in both positions? <li>→ Yes GO to B4. <li>→ No If the interior lamp is inoperative in the ON position. GO to B6. If the interior lamp is inoperative in the DOOR OPEN position. GO to B2.
B2: CHECK CIRCUIT 31S-LC17 (BK/YE) FOR GROUND	
 <p>E41026</p>	<ol style="list-style-type: none"> <li>Disconnect Rear Interior Lamp C891. <li> Measure the resistance between the rear interior lamp C891 pin 1, circuit 31S-LC17 (BK/YE), harness side and ground with a door in the closed position. <ul style="list-style-type: none"> <li>• Is the resistance less than 5 ohms? <li>→ Yes INSTALL a new rear interior lamp. TEST the system for normal operation. <li>→ No GO to B3.
B3: CHECK CIRCUIT 31S-LC17 (BK/YE) TO CJB FOR OPEN	
 <p>E41027</p>	<ol style="list-style-type: none"> <li>Disconnect CJB C98. <li> Measure the resistance between the rear interior lamp C891 pin 1, circuit 31S-LC17 (BK/YE), harness side and the CJB C98 pin 13, circuit 31S-LB12 (BK/YE), harness side. <ul style="list-style-type: none"> <li>• Is the resistance less than 5 ohms? <li>→ Yes REFER to WDS. <li>→ No REPAIR the circuit 31S-LC17 (BK/YE) or 31S-LB12 (BK/YE) as necessary. TEST the system for normal operation.
B4: CHECK CIRCUIT 29-LC17 (OG/YE) FOR VOLTAGE	
	<ol style="list-style-type: none"> <li>Disconnect Rear Interior Lamp C892.

DIAGNOSIS AND TESTING

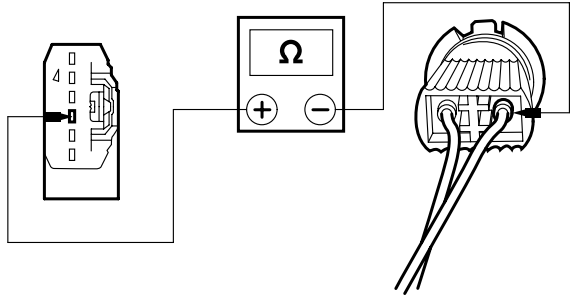
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E41028</p>	<p>2 Measure the voltage between the rear interior lamp C892 pin 1, circuit 29-LC17 (OG/YE), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? → Yes INSTALL a new rear interior lamp. TEST the system for normal operation. If the concern persists, INSTALL a new battery saver relay. TEST the system for normal operation. → No GO to B5.
<p>B5: CHECK REAR INTERIOR LAMP POWER CIRCUIT FOR OPEN</p>	
 <p>E41029</p>	<p>1 Disconnect CJB C98.</p> <p>2 Measure the resistance between the rear interior lamp C892 pin 1, circuit 29-LC17 (OG-YE), harness side and the CJB C98 pin 7, circuit 29-LB6A (OG-YE), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? → Yes REFER to WDS. → No REPAIR the circuit 29-LC17 (OG-YE) or circuit 29-LB6A (OG-YE) as necessary . TEST the system for normal operation.
<p>B6: CHECK CIRCUIT 91-LC17 (BK/YE) FOR GROUND</p>	
 <p>E41030</p>	<p>1 Disconnect the battery ground cable. REFER to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).</p> <p>2 Disconnect Rear Interior Lamp C891.</p> <p>3 Measure the resistance between the rear interior lamp C891 pin 2, circuit 91-LC17 (BK/YE), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? → Yes INSTALL a new rear interior lamp. TEST the system for normal operation. → No REPAIR the circuit. TEST the system for normal operation.

DIAGNOSIS AND TESTING

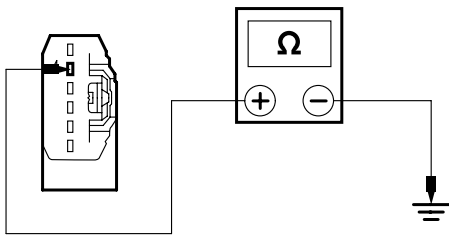
PINPOINT TEST C : THE LUGGAGE COMPARTMENT LAMP IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: CHECK CIRCUIT 29-LB25 (OG/BU) FOR VOLTAGE	
 <p>E41031</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Luggage Compartment Lamp C820. 3 Measure the voltage between the luggage compartment lamp C820 pin 2, circuit 29-LB25 (OG/BU), harness side and ground. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to C3. → No GO to C2.
C2: CHECK CIRCUIT 29-LB25 (OG/BU) FOR OPEN	
 <p>E41032</p>	<ol style="list-style-type: none"> 1 Disconnect CJB C100. 2 Measure the resistance between the luggage compartment lamp C820 pin 2, circuit 29-LB25 (OG/BU), harness side and the CJB C100 pin 38, circuit 29-LB25 (OG/BU), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new luggage compartment lamp. TEST the system for normal operation. If the concern persists, REFER to WDS. → No REPAIR the circuit. TEST the system for normal operation.
C3: CHECK THE SWITCHED SIGNAL TO THE LUGGAGE COMPARTMENT LAMP	
	<ol style="list-style-type: none"> 1 Disconnect Liftgate Latch Motor C798.

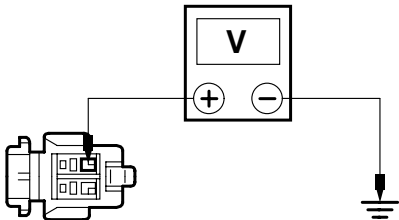
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E41033</p>	<p>2 Measure the resistance between the luggage compartment lamp C820 pin 1, circuit 31S-LB25A (BK/BU), harness side and the liftgate latch motor C798 pin 4, circuit 31S-LB25 (BK/BU), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes INSTALL a new luggage compartment lamp. TEST the system for normal operation. If the concern persists, GO to C4. → No REPAIR the circuit 31S-LB25A (BK-BU) or circuit 31S-LB25 (BK-BU) as necessary . TEST the system for normal operation.

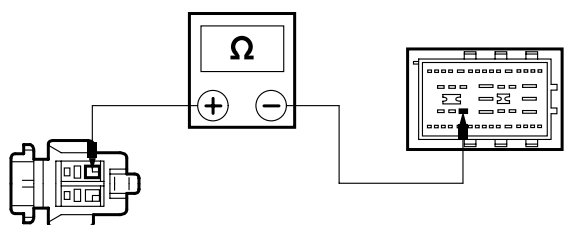
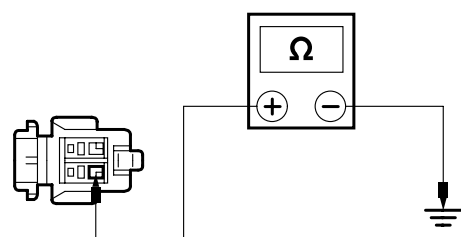
C4: CHECK THE LIFTGATE LATCH MOTOR FOR GROUND

 <p>E41034</p>	<p>1 Measure the resistance between the liftgate latch motor C798 pin 2, circuit 31-GL20 (BK), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes INSTALL a new liftgate latch motor. TEST the system for normal operation. → No REPAIR the circuit 31-GL20 (BK). TEST the system for normal operation.
--	---

PINPOINT TEST D : THE GLOVE COMPARTMENT LAMP IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: CHECK CIRCUIT 29-LB8 (OG) FOR VOLTAGE	
 <p>E41035</p>	<p>1 Disconnect Glove Compartment Lamp C846.</p> <p>2 Measure the voltage between the glove compartment lamp C846 pin 1, circuit 29-LB8 (OG), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes GO to D3. → No GO to D2.

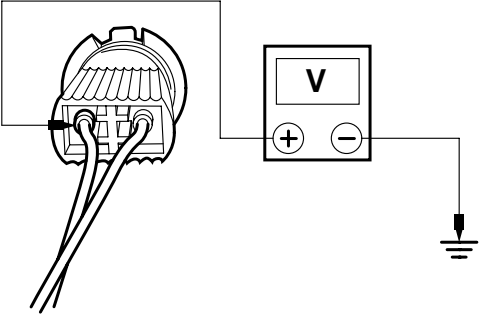
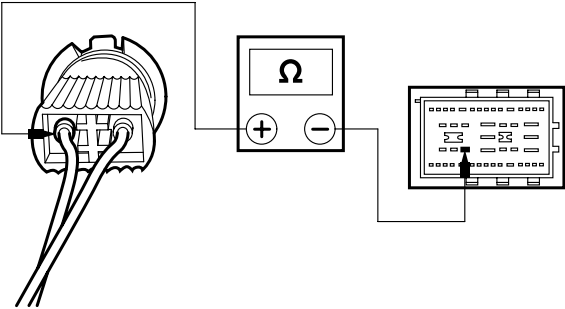
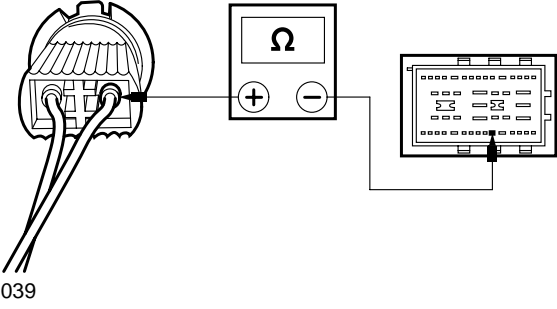
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D2: CHECK THE GLOVE COMPARTMENT LAMP POWER CIRCUIT FOR OPEN	
 <p>E41036</p>	<ol style="list-style-type: none"> 1 Disconnect CJB C102. 2 Measure the resistance between the glove compartment lamp C846 pin 1, circuit 29-LB8 (OG), harness side and the CJB C102 pin 27, circuit 29-LC1 (OG/BU), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes REFER to WDS. → No REPAIR the circuit 29-LB8 (OG) or circuit 29-LC1 (OG/BU) as necessary. TEST the system for normal operation.
D3: CHECK CIRCUIT 31-LB8 FOR GROUND	
 <p>E41037</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the glove compartment lamp C846 pin 2, circuit 31-LB8 (BK), harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new glove compartment lamp. TEST the system for normal operation. → No REPAIR the circuit. TEST the system for normal operation.

PINPOINT TEST E : THE LEFT-HAND FRONT FOOTWELL LAMP IS INOPERATIVE

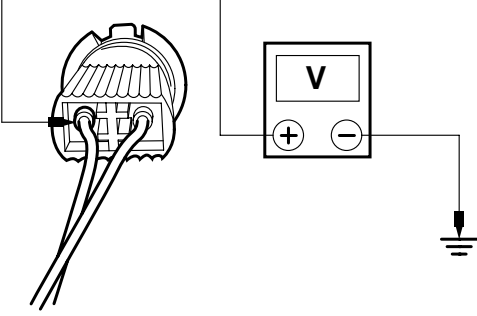
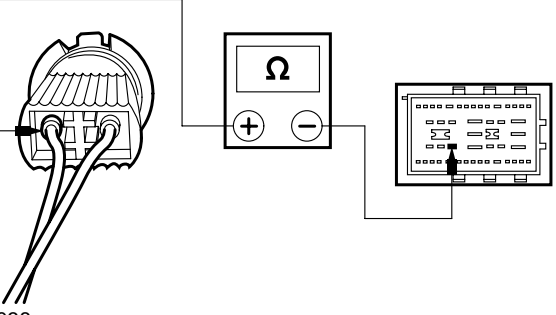
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: CHECK CIRCUIT 29-LC11 (OG/WH) FOR VOLTAGE	
	<ol style="list-style-type: none"> 1 Disconnect Left-hand Front Footwell Lamp C841.

DIAGNOSIS AND TESTING

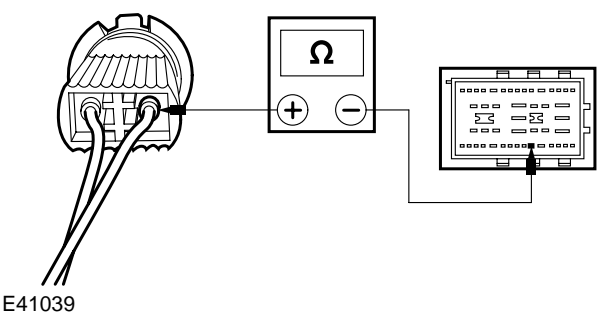
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E41031</p>	<p>2 Measure the voltage between the left-hand front footwell lamp C841 pin 1, circuit 29-LC11 (OG/WH), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes GO to E3. → No GO to E2.
E2: CHECK THE LEFT-HAND FRONT FOOTWELL LAMP POWER CIRCUIT FOR OPEN	
 <p>E41038</p>	<p>1 Disconnect CJB C102.</p> <p>2 Measure the resistance between the left-hand front footwell lamp C841 pin 1, circuit 29-LC11 (OG/WH), harness side and the CJB C102 pin 27, circuit 29-LC1 (OG/BU), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes REFER to WDS. → No REPAIR the circuit 29-LC11 (OG/WH) or circuit 29-LC1 (OG/BU) as necessary. TEST the system for normal operation. If the concern persists, INSTALL a new left-hand front footwell lamp. TEST the system for normal operation.
E3: CHECK CIRCUIT 31S-LC11 (BK/WH) FOR OPEN	
 <p>E41039</p>	<p>1 Disconnect CJB C102.</p> <p>2 Measure the resistance between the left-hand front footwell lamp C841 pin 2, circuit 31S-LC11 (BK/WH), harness side and the CJB C102 pin 41, circuit 31S-LC11 (BK/WH), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes REFER to WDS. → No REPAIR the circuit. TEST the system for normal operation. If the concern persists, INSTALL a new left-hand front footwell lamp. TEST the system for normal operation.

DIAGNOSIS AND TESTING

PINPOINT TEST F : THE RIGHT-HAND FRONT FOOTWELL LAMP IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F1: CHECK CIRCUIT 29-LC23 (OG/WH) FOR VOLTAGE	
 <p>E41031</p>	<ol style="list-style-type: none"> <li>1 Disconnect Right-hand Front Footwell Lamp C849. <li>2 Measure the voltage between the right-hand front footwell lamp C849 pin 1, circuit 29-LC23 (OG/WH), harness side and ground. <ul style="list-style-type: none"> <li>• Is the voltage greater than 10 volts? <li>→ Yes GO to F3. <li>→ No GO to F2.
F2: CHECK THE RIGHT-HAND FRONT FOOTWELL LAMP POWER CIRCUIT FOR OPEN	
 <p>E41038</p>	<ol style="list-style-type: none"> <li>1 Disconnect CJB C102. <li>2 Measure the resistance between the right-hand front footwell lamp C849 pin 1, circuit 29-LC23 (OG/WH), harness side and the CJB C102 pin 27, circuit 29-LC1 (OG/BU), harness side. <ul style="list-style-type: none"> <li>• Is the resistance less than 5 ohms? <li>→ Yes REFER to WDS. <li>→ No REPAIR the circuit 29-LC23 (OG/WH) or circuit 29-LC1 (OG/BU) as necessary. TEST the system for normal operation. If the concern persists, INSTALL a new right-hand front footwell lamp. TEST the system for normal operation.
F3: CHECK CIRCUIT 31S-LC23 (BK-WH) FOR OPEN	
	<ol style="list-style-type: none"> <li>1 Disconnect CJB C102.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E41039</p>	<p>2 Measure the resistance between the right-hand front footwell lamp C849 pin 2, circuit 31S-LC23 (BK/WH), harness side and the CJB C102 pin 41, circuit 31S-LC23 (BK/WH), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes REFER to WDS. → No REPAIR the circuit. TEST the system for normal operation. If the concern persists, INSTALL a new right-hand front footwell lamp. TEST the system for normal operation.

SECTION 418-00 Module Communications Network

VEHICLE APPLICATION: 2008.75 Focus ST C307

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DESCRIPTION AND OPERATION

Communications Network

General

In a communication network (data bus system), the various modules of different systems are connected to one another via one or several lines.

The data bus system is used exclusively for the transmission of data between the connected modules themselves, as well as between the connected modules and the Worldwide Diagnostic System (WDS).

In a data bus system, complete data blocks are transmitted instead of single in/out pulses. In addition to the actual information, these data blocks also contain data regarding the address of the module to be addressed, the size of the data block and information for monitoring the content of each individual data block.

Data bus systems offer various advantages:

- Simplified data transmission between the modules due to a standardised protocol
- Fewer sensors and connectors
- Improved diagnostic options
- Lower costs

The WDS is connected to the various bus systems and to the power supply via the standard 16-pin Data Link Connector (DLC). The signal for the module programming is also transmitted via the DLC.

If, in a data bus system, there is a break in one or both lines or a short to ground or short to voltage is present, then communication between the modules and with the WDS is faulty or is no longer possible at all.

In order to be able to establish communication with one another, the modules of the individual systems must use the same language. This language is called a protocol.

At present, Ford uses four different data bus systems. Depending upon model and equipment level, all three data bus systems are used. Each of these data bus systems has its own protocol.

Data bus systems:

- Standard Corporate Protocol (SCP) bus. This consists of two twisted wires. It is used for communication between the Powertrain Control Module (PCM) and the WDS via the DLC. Depending upon engine version and year of

manufacture, a third wire (ACP bus) is used for programming the PCM. This bus is only used in conjunction with the SCP bus.

- International Organisation for Standardisation ISO 9141 bus. This consists of a single wire and is used exclusively for communication between the modules and the WDS. The fault memories of the various modules are read out via the ISO 9141 bus.
- The Local Interconnect Network (LIN) bus is a standard especially for the cost-efficient communication between intelligent sensors and actuators in motor vehicles. Local Interconnect Network (LIN) is used in every situation where the band width and versatility of CAN is not needed. The LIN specification comprises the LIN protocol, a standard format for describing a complete LIN and the interface between a LIN and the application. A LIN comprises a LIN master and one or several LIN slaves. The LIN network utilizes the master/slave principle for the purpose of bus access control. This has the significant advantage that few resources (CPU performance, ROM, RAM) are required for bus management in the slave module. The master is implemented in a control module or a gateway which has the necessary resources. All communication is initiated by the master. Consequently, a message always consists of a header, which is generated by the master, and a response from the slave. The data transfer rate is in the region of up to 20 Kbit/s. The LIN master knows the time sequence of all data which are to be transmitted. These data are transmitted by the corresponding LIN slaves (e.g. ultrasonic sensors) when requested to do so by the LIN master. LIN is a single-wire bus, i.e. the data is transferred in the cable via one wire. Usually the same cable is also used to provide the supply voltage. The ground connection of the supply voltage also acts as the ground connection of the data transmission. No terminating resistors are used in the LIN.
- Controller Area Network (CAN) bus. This consists of two twisted wires and operates serially (data is transmitted sequentially). It is used for communication between the modules themselves and between the modules and the WDS. The modules are connected to the data bus in parallel. New modules can be incorporated easily, without modifying the other wiring or modules. The transmitted data is

DESCRIPTION AND OPERATION

received by every module connected to the Controller Area Network (CAN). As each data packet has an identifier, in which the priority of the message is determined as well as the content identification, each module can detect whether or not the data is relevant for its own information processing. This enables several modules to be addressed with a particular data packet and supplied with data simultaneously. For this purpose, it is ensured that important data (for example from the Anti-lock Brake System (ABS)) is transmitted first. The other modules are only able to submit their data to the data bus after the high-priority messages have been received.

In order to guarantee a high degree of error protection, two 120 Ohm terminating resistors are installed in the CAN. These are integrated in the first module connected to the CAN and in the last module connected to the CAN respectively and are used for suppression as well as the elimination of voltage peaks. In order to ensure correct functioning of the data bus system, the modules must always be connected with an integral terminating resistor.

The advantages of the CAN bus are:

- Minimization of wiring requirements.
- High degree of error protection (fault / fail-proof).
- Robustness.
- Good extendibility.
- Prioritization of messages.
- Inexpensive.

- Automatic repetition of faulty messages.
- Independent system monitoring and option for automatic disconnection of faulty modules from the data bus.

In vehicles built from MY 2003.75, an additional second CAN is used depending upon vehicle model. The only significant difference is a lower transmission rate and it is mainly used for the convenience electronics at present. In order to be able to differentiate between individual CAN systems, the CAN with the high transmission rate is designated as high-speed (HS) CAN and the CAN with the lower transmission rate as mid-speed (MS) CAN. As in all CAN systems, two 120 Ohm terminating resistors are also installed in the MS CAN in order to increase the error protection. In order to enable communication between the modules on the HS CAN and the modules on the MS CAN, one module is connected to both data bus systems. The connection of both data bus systems is designated as gateway. In this gateway, the received data is converted to the transmission rate required for the relevant data bus and is transmitted. This ensures an optimal distribution of information between both data bus systems.

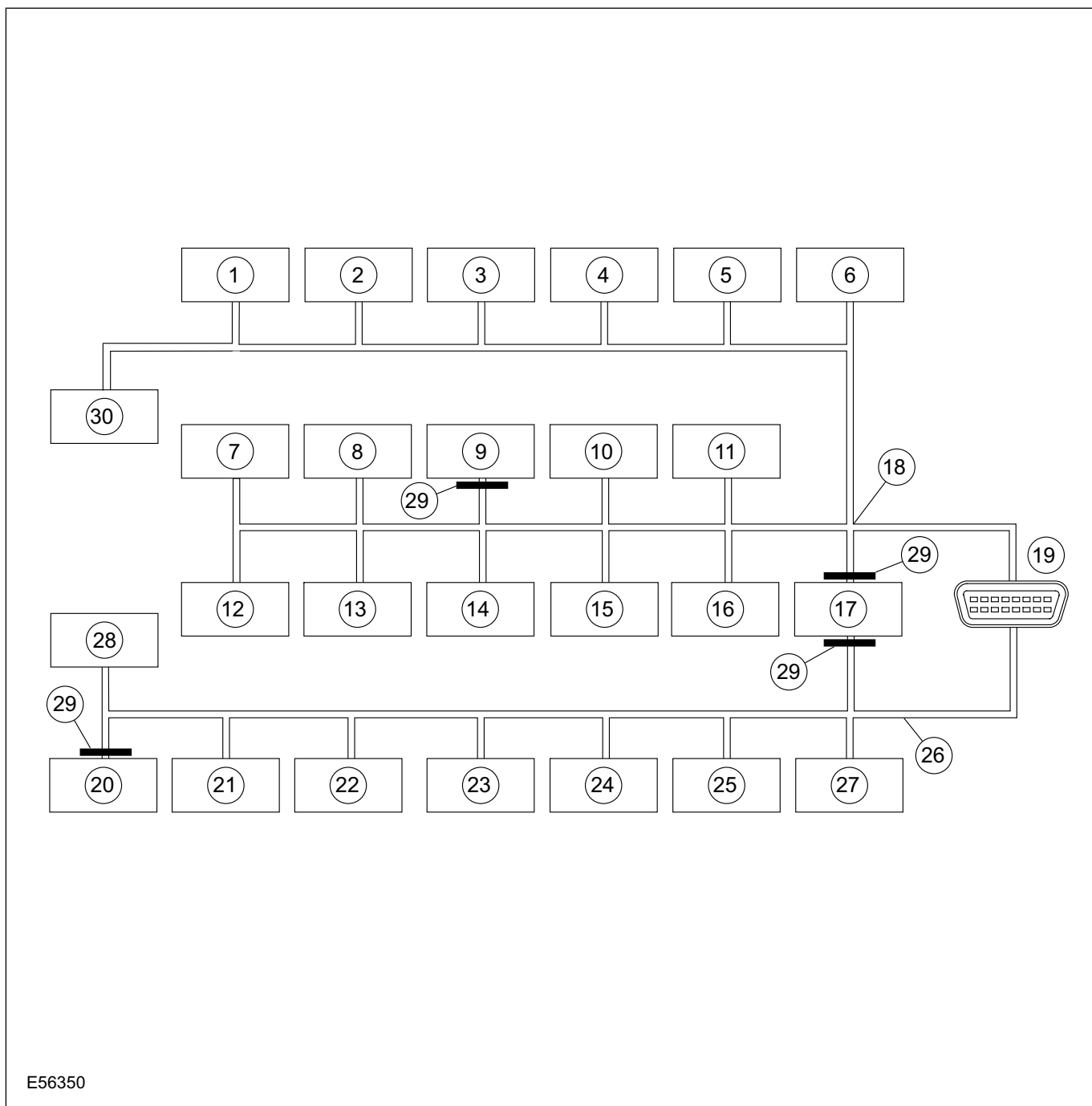
Network Components

Depending upon equipment level, two data bus systems are used in the Focus CMax as well as in Focus vehicles built from MY 2005.

The number of modules connected to the two data bus systems depends upon the equipment level of the vehicle.

DESCRIPTION AND OPERATION

CAN



E56350

Item	Description
1	Compact Disc (CD) changer
2	Navigation system module - vehicles equipped with DVD navigation system with touchscreen
3	Touchscreen
4	Audio system control panel
5	Portable Support Electronics (PSE)

Item	Description
6	Rear seat entertainment system module
7	Electronic Automatic Temperature Control (EATC)
8	Restraints Control Module (RCM)
9	Generic Electronic Module (GEM)
10	Front left-hand side door module
11	Front right-hand side door module

DESCRIPTION AND OPERATION

Item	Description
12	Rear right-hand side door module - all, except Convertible
13	Rear left-hand side door module - all, except Convertible
14	Fuel fired booster heater /programmable fuel fired booster heater
15	Parking aid module
16	Key-free vehicle system module
17	Electronic instrument cluster
18	Mid-speed CAN
19	DLC
20	PCM
21	Transmission Control Module (TCM)
22	Electro-hydraulic Power Steering (EHPS)
23	ABS module or ESP module
24	Fuel additive system module
25	Lighting Control Module (LCM)) - vehicles with high intensity discharge lamps and vehicles with adaptive front lighting
26	High-speed CAN
27	Electronic Parking Brake (EPB)
28	Supplementary instrument cluster

Item	Description
29	Terminating resistors
30	Convertible top control module

Due to the increased number of modules and the resulting ever-increasing data transmission, a second CAN bus (mid-speed CAN bus (MS CAN)) is used in Focus CMax vehicles as well as in Focus vehicles built from MY 2005. This operates at a lower speed and is mainly used for communication relating to the convenience electronics.

A gateway is used in order to enable data exchange between the HS CAN bus and the MS CAN bus. The gateway serves as interface between the two CAN data bus systems and is installed in the electronic instrument cluster.

The number of modules connected to the two CAN data bus systems depends on the equipment level of the vehicle.

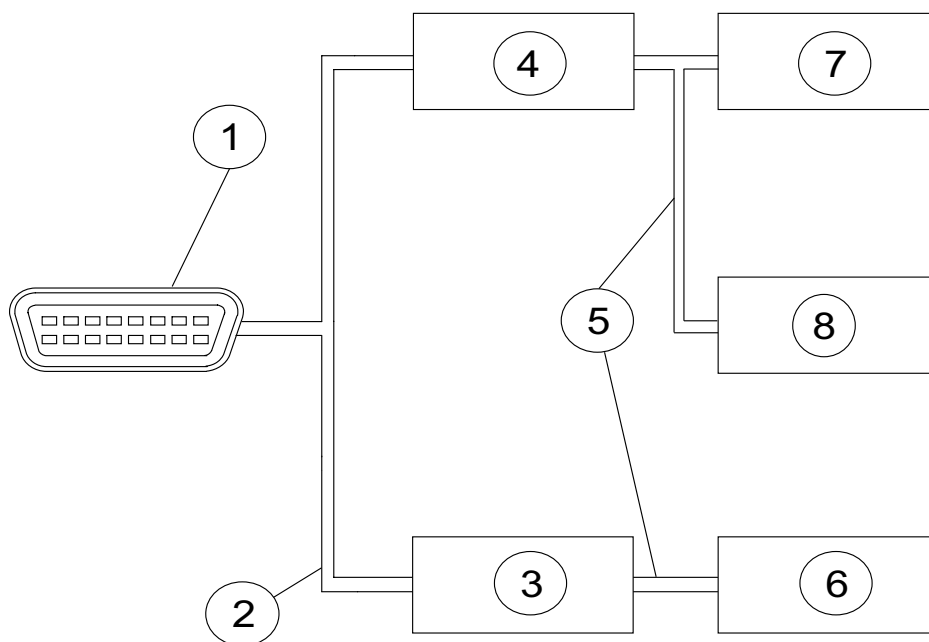
One 120 Ohm terminating resistor of the HS CAN bus is installed in the PCM and in the electronic instrument cluster respectively.

One 120 Ohm terminating resistor of the MS CAN bus is installed in the GEM and in the electronic instrument cluster respectively.

These terminating resistors are used for suppression of the data bus system. In order to be able to ensure correct functioning of the data bus system, the modules must always be connected with an integral terminating resistor.

DESCRIPTION AND OPERATION

LIN - Convertible



E79230

Item	Description
1	DLC
2	Mid-speed CAN
3	Passenger Door Module (PDM)
4	Driver Door Module (DDM)
5	LIN
6	Rear PDM

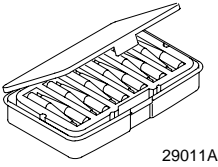
Item	Description
7	Rear DDM
8	Door lock switch - driver's side

The DDM or PDM acts as LIN master and has information on the chronological order of all data to be transmitted.

DIAGNOSIS AND TESTING

Communications Network

Special Tool(s)

 <p>29011A</p>	<p>Terminal Probe Kit 418-S035</p>
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General Equipment

<p>Digital Multimeter</p>
<p>Worldwide Diagnostic System (WDS)</p>

Diagnosis and Testing

1. CHECK the concern.
2. Visually CHECK for any obvious mechanical or electrical damage.

NOTE: Ensure correct locking of wiring harness connector.

Visual Inspection

<p>Electrical</p>
<ul style="list-style-type: none"> • Fuses. • Wiring harness. • Electrical connectors.

3. RECTIFY any obvious causes for a concern found during the visual inspection before performing any further tests. CHECK the operation of the system.
4. If the concern persists after the visual inspection, PERFORM a fault diagnosis with WDS and RECTIFY any displayed faults in accordance with the displayed fault description. CHECK the operation of the system.
5. For vehicles with no stored fault(s), PROCEED in accordance with the symptom chart according to the fault symptom.
6. Following checking or elimination of the fault and after completion of operations, the fault memories of all vehicle modules must be READ OUT and any stored faults must be DELETED. READ OUT all fault memories again following a road test.

Symptom Chart

Symptom Chart

NOTE: After connecting the battery, initialize the power window motors.

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • Restraint control module not communicating with the diagnostic unit. 	<ul style="list-style-type: none"> • Fuse(s). • Circuit(s). • Restraints control module. 	<ul style="list-style-type: none"> • GO to Pinpoint Test F.
<ul style="list-style-type: none"> • Parking aid module not communicating with the diagnostic tester 	<ul style="list-style-type: none"> • Fuse(s). • Circuit(s). • Parking aid module. 	<ul style="list-style-type: none"> • GO to Pinpoint Test E.
<ul style="list-style-type: none"> • Folding top control unit not communicating with the diagnostic tester - Cabriolet. 	<ul style="list-style-type: none"> • Fuse(s). • Circuit(s). • Folding top control unit. 	<ul style="list-style-type: none"> • GO to Pinpoint Test D.
<ul style="list-style-type: none"> • Control module for the mobile electronic auxiliary equipment (PSE) not communicating with the diagnostic tester. 	<ul style="list-style-type: none"> • Fuse(s). • Circuit(s). • PSE module. 	<ul style="list-style-type: none"> • GO to Pinpoint Test Q.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Fuel-fired booster heater/programmable fuel-fired booster heater not communicating with the diagnostic tester. 	<ul style="list-style-type: none"> Fuse(s). Circuit(s). Fuel-fired booster heater/programmable fuel-fired booster heater. 	<ul style="list-style-type: none"> GO to Pinpoint Test H.
<ul style="list-style-type: none"> Audio module not communicating with the diagnostic tester. 	<ul style="list-style-type: none"> Fuse(s). Circuit(s). Audio module. 	<ul style="list-style-type: none"> GO to Pinpoint Test I.
<ul style="list-style-type: none"> Keyless vehicle module not communicating with the diagnostic tester. 	<ul style="list-style-type: none"> Fuse(s). Circuit(s). Keyless vehicle module 	<ul style="list-style-type: none"> GO to Pinpoint Test P.
<ul style="list-style-type: none"> Electrohydraulic power steering module not communicating with the diagnostic tester. 	<ul style="list-style-type: none"> Fuse(s). Circuit(s). Electrohydraulic power steering module. 	<ul style="list-style-type: none"> GO to Pinpoint Test J.
<ul style="list-style-type: none"> ABS module or ESP module not communicating with the diagnostic tester. 	<ul style="list-style-type: none"> Fuse(s). Circuit(s). ABS module or ESP module. 	<ul style="list-style-type: none"> GO to Pinpoint Test K.
<ul style="list-style-type: none"> Transmission control module (TCM) not communicating with the diagnostic tester. 	<ul style="list-style-type: none"> Fuse(s). Circuit(s). Transmission control module (TCM). 	<ul style="list-style-type: none"> - Vehicles with automatic transmission (CFT23): GO to Pinpoint Test L. - Vehicles with automatic transmission: GO to Pinpoint Test G. - Vehicles with 6-speed automatic transmission: GO to Pinpoint Test A.
<ul style="list-style-type: none"> Lighting control module (LCM) not communicating with the diagnostic tester - vehicles with gas discharge lamps and/or vehicles with adaptive front lighting. 	<ul style="list-style-type: none"> Fuse(s). Circuit(s). LCM. 	<ul style="list-style-type: none"> GO to Pinpoint Test M.
<ul style="list-style-type: none"> Electronic automatic temperature control (EATC) module not communicating with diagnostic tester. 	<ul style="list-style-type: none"> Fuse(s). Circuit(s). Electronic automatic temperature control (EATC) module. 	<ul style="list-style-type: none"> GO to Pinpoint Test N.
<ul style="list-style-type: none"> Fuel additive system module not communicating with the diagnostic tester. 	<ul style="list-style-type: none"> Fuse(s). Circuit(s). Fuel additive system module. 	<ul style="list-style-type: none"> GO to Pinpoint Test O.
<ul style="list-style-type: none"> Electronic instrument cluster not communicating with the diagnostic tester. 	<ul style="list-style-type: none"> Fuse(s). Circuit(s). Electronic instrument cluster. 	<ul style="list-style-type: none"> GO to Pinpoint Test S.
<ul style="list-style-type: none"> Additional instrument cluster not communicating with the diagnostic tester - vehicles with 2.5L engine. 	<ul style="list-style-type: none"> Fuse(s). Circuit(s). Additional instrument cluster. 	<ul style="list-style-type: none"> GO to Pinpoint Test R.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
• Navigation system screen module not communicating with the diagnostic tester - vehicles equipped with DVD navigation system with touchscreen	• Fuse(s). • Circuit(s). • Navigation system screen module.	• GO to Pinpoint Test T.
• Navigation system module not communicating with the diagnostic tester - vehicles equipped with DVD navigation system with touch screen	• Fuse(s). • Circuit(s). • Navigation system module.	• GO to Pinpoint Test U.
• CD changer module not communicating with the diagnostic tester.	• Fuse(s). • Circuit(s). • CD changer module.	• GO to Pinpoint Test V.
• Rear seat entertainment system module not communicating with the diagnostic tester	• Fuse(s). • Circuit(s). • Rear seat entertainment system module.	• GO to Pinpoint Test W.
• Left-hand front door module not communicating with the diagnostic tester	• Fuse(s). • Circuit(s). • Left-hand front door module.	• GO to Pinpoint Test X.
• Rear left-hand door module not communicating with the diagnostic tester - all except Cabriolet.	• Fuse(s). • Circuit(s). • Left-hand rear door module	• GO to Pinpoint Test Y.
• Left-hand rear door module not communicating with the diagnostic tester.	• Fuse(s). • Circuit(s). • Left-hand rear door module	• GO to Pinpoint Test C.
• Right-hand front door module not communicating with the diagnostic tester	• Fuse(s). • Circuit(s). • Right-hand front door module.	• GO to Pinpoint Test Z.
• Right-hand rear door module not communicating with the diagnostic tester.	• Fuse(s). • Circuit(s). • Right-hand rear door module.	• GO to Pinpoint Test B.
• Rear right-hand door module not communicating with the diagnostic tester - all except Cabriolet.	• Fuse(s). • Circuit(s). • Right-hand rear door module.	• GO to Pinpoint Test AA.
• Powertrain control module (PCM) not communicating with the diagnostic tester	• Fuse(s). • Circuit(s). • Powertrain control module (PCM).	• GO to Pinpoint Test AB.
• Generic electronic module (GEM) not communicating with the diagnostic unit.	• Fuse(s). • Circuit(s). • Generic electronic module (GEM).	• GO to Pinpoint Test AC.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Faulty communication between the modules - MS CAN bus. 	<ul style="list-style-type: none"> Circuit(s). Plugs. Cabriolet folding top control unit. Restraints control module. Keyless vehicle module Electronic instrument cluster. Generic electronic module (GEM). Electronic automatic temperature control (EATC) module. CD changer module. Rear seat entertainment system module. Control module for mobile electronic auxiliary equipment (PSE). Audio module. Left-hand front door module. Rear left-hand door module - all except Cabriolet. Right-hand front door module. Rear right-hand door module - all except Cabriolet. Navigation system module. Navigation system screen module. Fuel-fired booster heater/programmable fuel-fired booster heater. 	<ul style="list-style-type: none"> GO to Pinpoint Test AD.
<ul style="list-style-type: none"> Faulty communication between the modules - HS CAN bus. 	<ul style="list-style-type: none"> Circuit(s). Plugs. ABS module or ESP module. Vehicles with automatic transmission Transmission control module (TCM). Electrohydraulic power steering module. Lighting control module (LCM) - vehicles with high intensity discharge lamps and vehicles with adaptive front lighting Fuel additive system module. Electronic instrument cluster. Additional instrument cluster. Powertrain control module (PCM). 	<ul style="list-style-type: none"> GO to Pinpoint Test AE.

DIAGNOSIS AND TESTING

System checks

PINPOINT TEST A : TRANSMISSION CONTROL MODULE (TCM) NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK COMMUNICATION WITH THE POWERTRAIN CONTROL MODULE (PCM)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Connect the diagnostic tool. 3 Select the powertrain control module (PCM) with the diagnostic tester. <ul style="list-style-type: none"> • Is it possible to establish communication with the PCM? → Yes GO to A2. → No GO to Pinpoint Test AE.
A2: CHECK FUSE F26	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F26 (BJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to A3. → No RENEW fuse F26 (15 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
A3: CHECK THE VOLTAGE AT FUSE F26	
	<ol style="list-style-type: none"> 1 Connect Fuse F26 (BJB). 2 Measure the voltage between fuse F26 (15 A) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to A5. → No RECTIFY the voltage supply to fuse F26 using the Wiring Diagrams. CHECK the operation of the system.


DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A4: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to A5.</p> <p>→ No GO to A7.</p>
A5: CHECK FUSE F138	
	<p>1 CHECK Fuse F138 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to A6.</p> <p>→ No RENEW fuse F138 (10 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
A6: CHECK THE VOLTAGE AT FUSE F138	
	<p>1 Connect Fuse F138 (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F138 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to A9.</p> <p>→ No REPAIR the voltage supply of fuse F138 using the wiring diagrams. CHECK the operation of the system.</p>
A7: CHECK FUSE F75	
	<p>1 CHECK Fuse F75 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to A8.</p> <p>→ No RENEW fuse F75 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>


DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A8: CHECK THE VOLTAGE AT FUSE F75	
	<ol style="list-style-type: none"> 1 Connect Fuse F75 (CJB). 2 Ignition switch in position II. 3 Measure the voltage between fuse F75 (10 A) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to A9. → No RECTIFY the voltage supply to fuse F75 using the Wiring Diagrams. CHECK the operation of the system.
A9: CHECK THE VOLTAGE AT THE TCM (TERMINAL 30)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C827 from TCM. 3 Measure the voltage between the TCM, connector C827, pin 6, circuit 30-TA36 (RD), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to A10. → No LOCATE and REPAIR the break in the circuit between the TCM and fuse F26 using the Wiring Diagrams. CHECK the operation of the system.
A10: CHECK THE VOLTAGE AT THE TCM (TERMINAL 15)	
	<ol style="list-style-type: none"> 1 Ignition switch in position II. 2 Measure the voltage between the TCM, connector C827, pin 11, circuit 15-TA36A (GN/BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to A12. → No GO to A11.
A11: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE TCM	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C96 from CJB.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the resistance between the CJB, connector C96, pin 38, circuit 15-RE17 (GN/BU), wiring harness side and the TCM, connector C827, pin 11, circuit 15-TA36A (GN/BK), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the open circuit between the TCM and the CJB with the aid of the Wiring Diagrams. CHECK the operation of the system.
A12: CHECK GROUND CONNECTION OF TCM	
	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the TCM, connector C827, pin 19, circuit 91-TA36B (BK/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to A13. → No LOCATE and REPAIR the break in the circuit between the TCM and ground connection G57 using the Wiring Diagrams. CHECK the operation of the system.
A13: CHECK FOR OPEN CIRCUIT BETWEEN THE TCM AND THE DATA LINK CONNECTOR (DLC)	
<p> CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
	<p>1 Measure the resistance between the TCM, connector C827, pin 4, circuit 5-EC7G (BU/RD), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to A14. → No LOCATE and REPAIR the break in the circuit between the TCM and soldered connection S214 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A14: CHECK FOR OPEN CIRCUIT BETWEEN THE TCM AND THE DLC.	
 CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.	
	<ol style="list-style-type: none"> 1 Measure the resistance between the TCM, connector C827, pin 9, circuit 4-EC7G (GY/RD), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the TCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the TCM and soldered connection S215 using the Wiring Diagrams. CHECK the operation of the system.

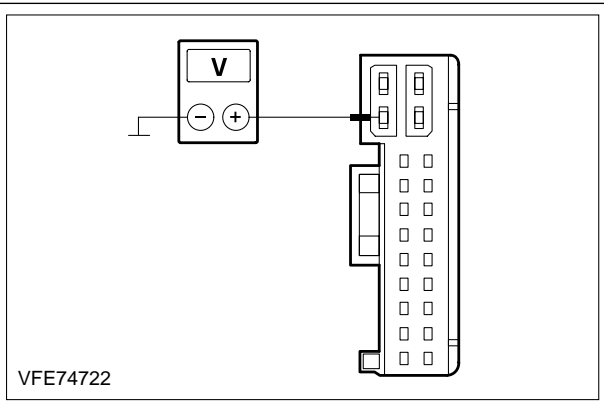
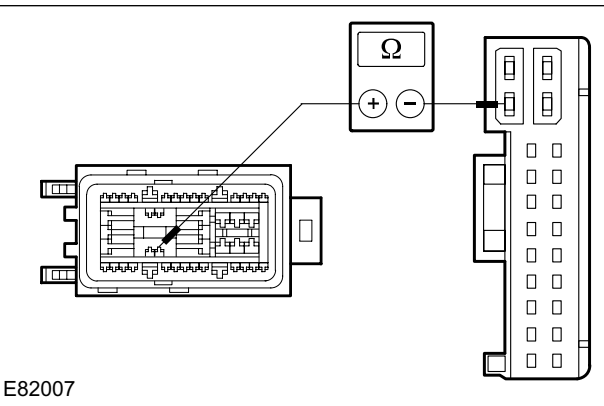
PINPOINT TEST B : RIGHT-HAND REAR DOOR MODULE NOT COMMUNICATING WITH THE FRONT RIGHT-HAND DOOR MODULE - CABRIOLET.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK THE COMMUNICATIONS WITH THE RIGHT-HAND REAR DOOR MODULE	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Connect the diagnostic tool. 3 Select the front right door module with the diagnostic tester. <ul style="list-style-type: none"> • Is it possible to establish a connection to the rear right door module? → Yes GO to B3. → No GO to Pinpoint Test Z.
B2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> 1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? → Yes GO to B3. → No GO to B5.

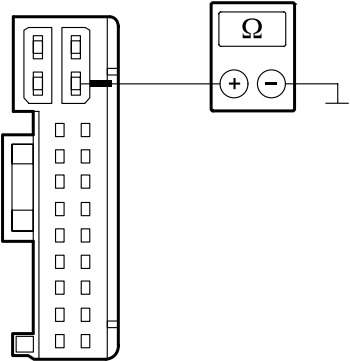
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B3: CHECK FUSE F120	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F120 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to B4. → No RENEW fuse F120 (20 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
B4: CHECK THE VOLTAGE AT FUSE F120	
	<ol style="list-style-type: none"> 1 Connect Fuse F120 (CJB). 2 Measure the voltage between fuse F120 (20 A) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to B7. → No REPAIR the voltage supply of fuse F120 using the wiring diagrams. CHECK the operation of the system.
B5: CHECK FUSE F81	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F81 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to B6. → No RENEW fuse F81 (20 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
B6: CHECK THE VOLTAGE AT FUSE F81	
	<ol style="list-style-type: none"> 1 Connect Fuse F81 (CJB).

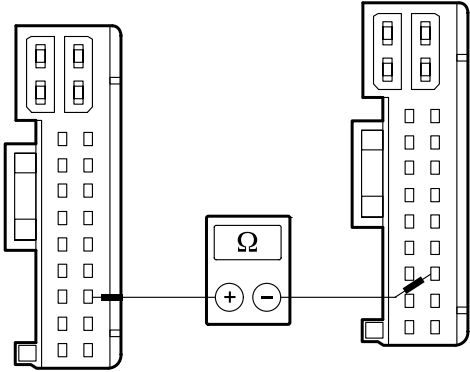
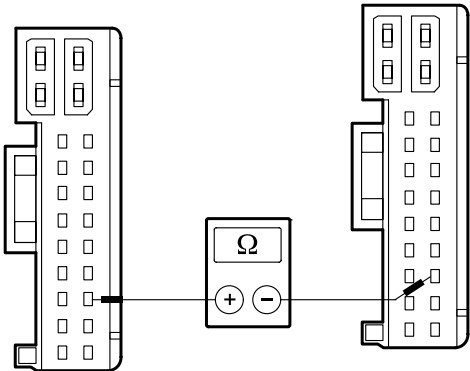
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the voltage between fuse F81 (20 A) and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to B7.</p> <p>→ No RECTIFY the voltage supply to fuse F81 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B7: CHECK THE VOLTAGE AT THE RIGHT-HAND REAR DOOR MODULE</p>	
 <p>VFE74722</p>	<p>1 Disconnect Connector C737 from the rear right-hand door module.</p> <p>2 Measure the voltage between the right-hand rear door module, connector C737, pin 2, circuit 29-AJ84 (OG/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to B9.</p> <p>→ No GO to B8.</p>
<p>B8: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE RIGHT-HAND REAR DOOR MODULE</p>	
 <p>E82007</p>	<p>1 Disconnect Connector C100 from CJB.</p> <p>2 Measure the resistance between the CJB, connector C100, pin 29, circuit 29-AJ84 (OG/WH), wiring harness side and the right-hand rear door module, connector C737, pin 2, circuit 29-AJ84 (OG/WH), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured? <p>→ Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in circuit 29-AJ84 (OG/WH) between the right-hand rear door module and the CJB using the Wiring Diagrams. CHECK the operation of the system.</p>

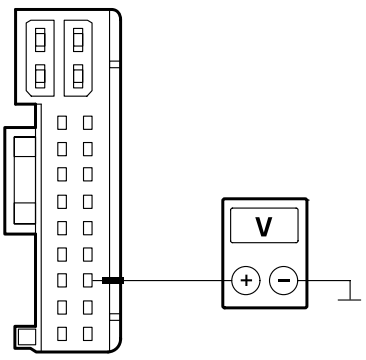
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B9: CHECK THE GROUND CONNECTION OF THE RIGHT-HAND REAR DOOR MODULE	
 <p>E74723</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the right-hand rear door module, connector C737, pin 13, circuit 31-DA22 (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes <ul style="list-style-type: none"> - RHD vehicles: GO to B10. - LHD vehicles: GO to B12. → No LOCATE and REPAIR the break in circuit 31-DA22 (BK) between the right-hand rear door module and ground connection G45 using the Wiring Diagrams. CHECK the operation of the system.
B10: PERFORM NETWORK TEST	
	<ol style="list-style-type: none"> 1 Connect the diagnostic tool. 2 Disconnect C485 from the front right door lock switch. 3 Select the rear right door module with the diagnostic tester. <ul style="list-style-type: none"> • Is it possible to establish a connection to the rear right door module? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the right-hand front door lock switch. CHECK the operation of the system. → No GO to B11.
B11: CHECK FOR A BREAK IN THE CIRCUIT BETWEEN THE RIGHT-HAND REAR DOOR MODULE AND THE RIGHT-HAND FRONT DOOR MODULE	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
	<ol style="list-style-type: none"> 1 Disconnect Connector C734 from the right-hand front door module.

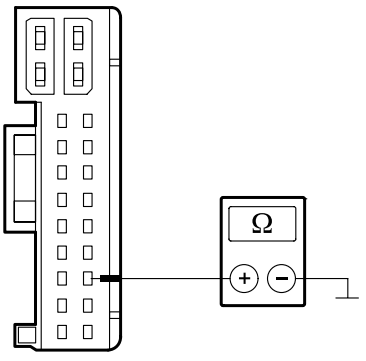
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E74790</p>	<p>2 Measure the resistance between the rear right door module, connector C737, pin 20, circuit 4-EE9D (GY/OG), wiring harness side and the front right door module, connector C734, pin 20, circuit 4-EE9B (GY/OG), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to B13.</p> <p>→ No LOCATE and REPAIR the open circuit between the right-hand rear door module and the right-hand front door module using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B12: CHECK FOR A BREAK IN THE CIRCUIT BETWEEN THE RIGHT-HAND REAR DOOR MODULE AND THE RIGHT-HAND FRONT DOOR MODULE</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E74790</p>	<p>1 Disconnect Connector C735 from the right-hand front door module.</p> <p>2 Measure the resistance between the rear right door module, connector C737, pin 20, circuit 4-EE9B (GY/OG), wiring harness side and the front right door module, connector C735, pin 20, circuit 4-EE9B (GY/OG), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to B13.</p> <p>→ No LOCATE and REPAIR the break in circuit 4-EE9B (GY/OG) between the right-hand rear door module and the right-hand front door module using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>B13: CHECK THE LIN BUS FOR A SHORT TO VOLTAGE SUPPLY</p>	
	<p>1 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E74791</p>	<p>2 Measure the voltage between the right-hand rear door module, connector C737, pin 20, circuit 4-EE9D (GY/OG)(- LHD vehicles: circuit 4-EE9B (GY/OG)), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a voltage measured? <p>→ Yes LOCATE and REPAIR the short to voltage in the circuit between the right-hand rear door module and the right-hand front door module using the Wiring Diagrams. CHECK the operation of the system.</p> <p>→ No GO to B14.</p>

B14: CHECK THE LIN BUS FOR A SHORT TO GROUND

	<p>1 Ignition switch in position 0.</p>
 <p>E74792</p>	<p>2 Measure the resistance between the right-hand rear door module, connector C737, pin 20, circuit 4-EE9D (GY/OG)(- LHD vehicles: circuit 4-EE9B (GY/OG)), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohm measured? <p>→ Yes CHECK and if necessary RENEW the right-hand rear door module. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the short to ground in the circuit between the right-hand rear door module and the right-hand front door module using the Wiring Diagrams. CHECK the operation of the system.</p>

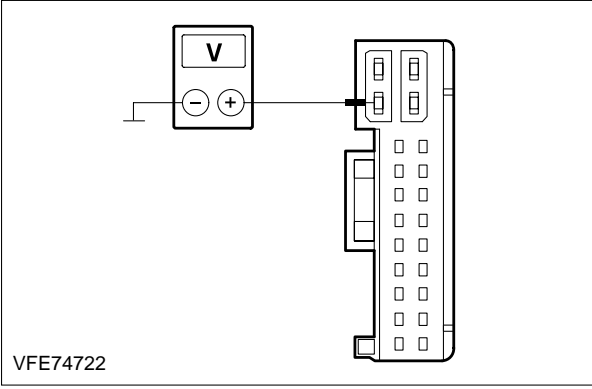
PINPOINT TEST C : LEFT-HAND REAR DOOR MODULE NOT COMMUNICATING WITH THE RIGHT-HAND FRONT DOOR MODULE - CABRIOLET.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>C1: CHECK THE COMMUNICATIONS WITH THE LEFT-HAND REAR DOOR MODULE</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Connect the diagnostic tool.</p>

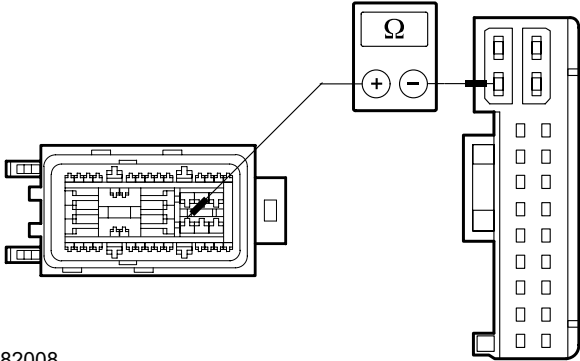
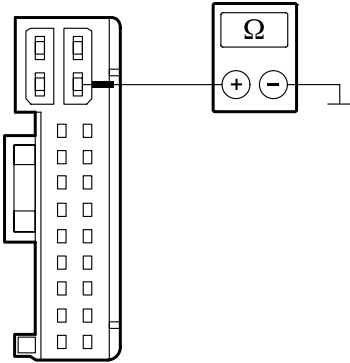
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Select the front left door module with the diagnostic tester.</p> <ul style="list-style-type: none"> Is it possible to establish a connection to the rear left door module? <p>→ Yes GO to C3.</p> <p>→ No GO to Pinpoint Test X.</p>
C2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to C3.</p> <p>→ No GO to C5.</p>
C3: CHECK FUSE F118	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F118 (CJB).</p> <ul style="list-style-type: none"> Is the fuse OK? <p>→ Yes GO to C4.</p> <p>→ No RENEW fuse F118 (20 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
C4: CHECK THE VOLTAGE AT FUSE F118	
	<p>1 Connect Fuse F118 (CJB).</p> <p>2 Measure the voltage between fuse F118 (20 A) and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to C7.</p> <p>→ No REPAIR the voltage supply of fuse F118 using the wiring diagrams. CHECK the operation of the system.</p>

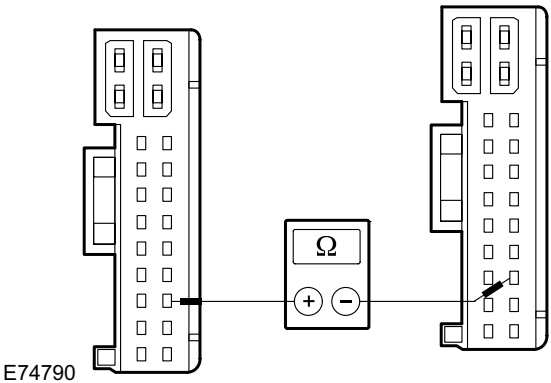
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C5: CHECK FUSE F82	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F82 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to C6. → No RENEW fuse F82 (20 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
C6: CHECK THE VOLTAGE AT FUSE F82	
	<ol style="list-style-type: none"> 1 Connect Fuse F82 (CJB). 2 Measure the voltage between fuse F82 (20 A) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to C7. → No RECTIFY the voltage supply to fuse F82 using the Wiring Diagrams. CHECK the operation of the system.
C7: CHECK THE VOLTAGE AT THE LEFT-HAND REAR DOOR MODULE	
 <p>VFE74722</p>	<ol style="list-style-type: none"> 1 Disconnect Connector C736 from the left-hand rear door module. 2 Measure the voltage between the left-hand rear door module, connector C736, pin 2, circuit 29-AJ83 (OG/BU), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to C9. → No GO to C8.
C8: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE LEFT-HAND REAR DOOR MODULE	
	<ol style="list-style-type: none"> 1 Disconnect Connector C100 from CJB.

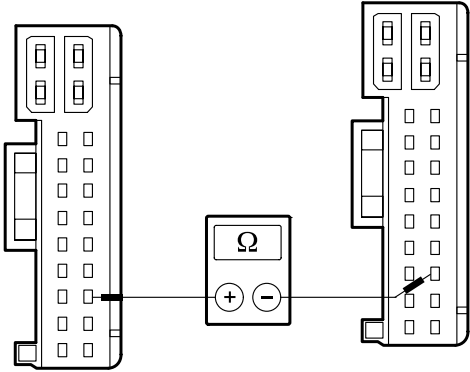
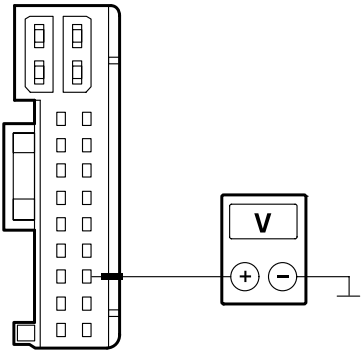
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E82008</p>	<p>2 Measure the resistance between the CJB, connector C100, pin 27, circuit 29-AJ83 (OG/BU), wiring harness side and the left-hand rear door module, connector C736, pin 2, circuit 29-AJ83 (OG/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 29-AJ83 (OG/BU) between the left-hand rear door module and the CJB using the Wiring Diagrams. CHECK the operation of the system.
C9: CHECK THE GROUND CONNECTION OF THE LEFT-HAND REAR DOOR MODULE	
 <p>E74723</p>	<p>1 Measure the resistance between the left-hand rear door module, connector C736, pin 13, circuit 31-DA21 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes <ul style="list-style-type: none"> - RHD vehicles: GO to C12. - LHD vehicles: GO to C10. → No LOCATE and REPAIR the break in circuit 31-DA21 (BK) between the left-hand rear door module and ground connection G45 using the Wiring Diagrams. CHECK the operation of the system.
C10: PERFORM NETWORK TEST	
	<p>1 Connect the diagnostic tool.</p> <p>2 Disconnect C485 from the front left door lock switch.</p>

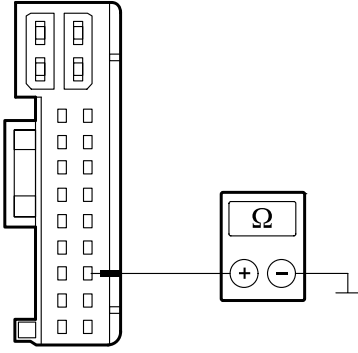
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Select the rear left door module with the diagnostic tester.</p> <ul style="list-style-type: none"> Is it possible to establish a connection to the rear left door module? <p>→ Yes CHECK and if necessary RENEW the left-hand front door lock switch. CHECK the operation of the system.</p> <p>→ No GO to C11.</p>
<p>C11: CHECK FOR A BREAK IN THE CIRCUIT BETWEEN THE LEFT-HAND REAR DOOR MODULE AND THE RIGHT-HAND FRONT DOOR MODULE</p>	
<p>CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E74790</p>	<p>1 Disconnect Connector C734 from the left-hand front door module.</p> <p>2 Measure the resistance between the rear left door module, connector C736, pin 20, circuit 4-EE9A (GY/OG), wiring harness side and the front left door module, connector C734, pin 20, circuit 4-EE9B (GY/OG), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to C13.</p> <p>→ No LOCATE and REPAIR the open circuit between the left-hand rear door module and the left-hand front door module using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>C12: CHECK FOR A BREAK IN THE CIRCUIT BETWEEN THE LEFT-HAND REAR DOOR MODULE AND THE LEFT-HAND FRONT DOOR MODULE</p>	
<p>CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
	<p>1 Disconnect Connector C735 from the left-hand front door module.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E74790</p>	<p>2 Measure the resistance between the rear left door module, connector C736, pin 20, circuit 4-EE9C (GY/OG), wiring harness side and the front left door module, connector C735, pin 20, circuit 4-EE9B (GY/OG), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to C13.</p> <p>→ No LOCATE and REPAIR the open circuit between the left-hand rear door module and the left-hand front door module using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>C13: CHECK THE LIN BUS FOR A SHORT TO VOLTAGE SUPPLY</p>	
 <p>E74791</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the left-hand rear door module, connector C736, pin 20, circuit 4-EE9A (GY/OG)(- LHD vehicles: circuit 4-EE9C (GY/OG)), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a voltage measured? <p>→ Yes LOCATE and REPAIR the short to voltage in the circuit between the left-hand rear door module and the left-hand front door module using the Wiring Diagrams. CHECK the operation of the system.</p> <p>→ No GO to C14.</p>
<p>C14: CHECK THE LIN BUS FOR A SHORT TO GROUND</p>	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E74792</p>	<p>2 Measure the resistance between the left-hand rear door module, connector C736, pin 20, circuit 4-EE9C (GY/OG)(- LHD vehicles: circuit 4-EE9A (GY/OG)), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of more than 10,000 Ohm measured? <p>→ Yes CHECK and if necessary RENEW the left-hand rear door module. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the short to ground in the circuit between the left-hand rear door module and the left-hand front door module using the Wiring Diagrams. CHECK the operation of the system.</p>

PINPOINT TEST D : FOLDING TOP CONTROL UNIT NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER - CABRIOLET.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: CHECK COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE (GEM)	
	<p>1 Ignition switch in position 0.</p> <p>2 Connect the diagnostic tool.</p> <p>3 Select the generic electronic module (GEM) with the diagnostic tester.</p> <ul style="list-style-type: none"> • Is it possible to establish communication with the GEM? <p>→ Yes GO to D2.</p> <p>→ No GO to Pinpoint Test AD.</p>
D2: CHECK FUSE F17	
	<p>1 Ignition switch in position 0.</p>

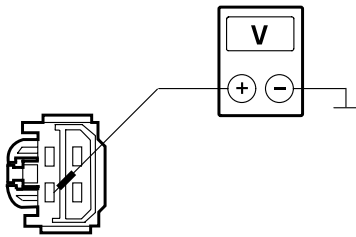
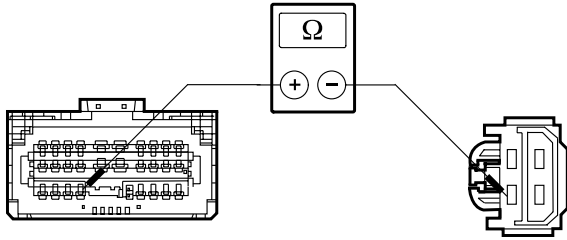
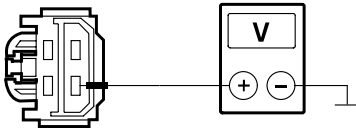
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK fuse F17 (BJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to D3.</p> <p>→ No RENEW fuse F17 (30 A). CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short circuit using the Wiring Diagrams.</p>
D3: CHECK THE VOLTAGE AT FUSE F17	
	<p>1 Connect fuse F17 (BJB).</p> <p>2 Measure the voltage between fuse F17 (30 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to D5.</p> <p>→ No REPAIR the voltage supply to fuse F17 with the aid of the Wiring Diagrams. CHECK the operation of the system.</p>
D4: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to D5.</p> <p>→ No GO to D7.</p>
D5: CHECK FUSE F101	
	<p>1 CHECK Fuse F101 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to D6.</p> <p>→ No RENEW fuse F101 (20 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
D6: CHECK THE VOLTAGE AT FUSE F101	
	<p>1 Connect Fuse F101 (CJB).</p>

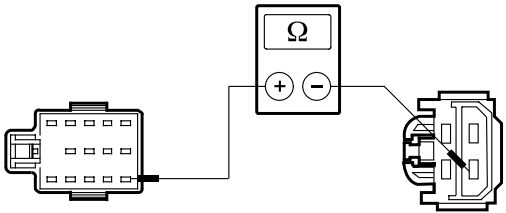
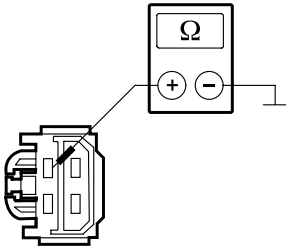
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F101 (20 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to D9.</p> <p>→ No REPAIR the voltage supply to fuse F101 using the Wiring Diagrams. CHECK the operation of the system.</p>
D7: CHECK FUSE F40	
	<p>1 CHECK fuse F40 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to D8.</p> <p>→ No RENEW fuse F40 (20 A). CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short circuit using the Wiring Diagrams.</p>
D8: CHECK THE VOLTAGE AT FUSE F40	
	<p>1 Connect fuse F40 (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F40 (20 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to D9.</p> <p>→ No REPAIR the voltage supply to fuse F40 using the Wiring Diagrams. CHECK the operation of the system.</p>
D9: CHECK THE VOLTAGE AT THE FOLDING TOP CONTROL UNIT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C561 from the folding top control unit.</p>

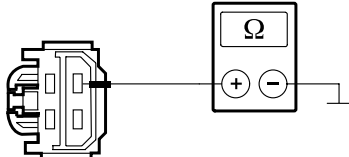
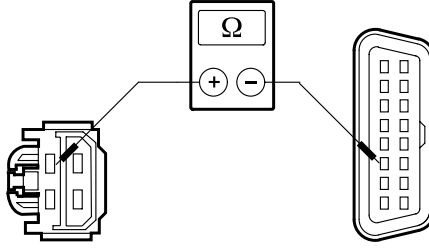
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E82009</p>	<p>3 Measure the voltage between the folding top control unit, connector C561, pin 2, circuit 30-AG14A (RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to D11. → No GO to D10.
D10: CHECK FOR OPEN CIRCUIT BETWEEN THE BJB AND THE FOLDING TOP CONTROL UNIT	
 <p>E82010</p>	<p>1 Disconnect Connector C113.</p> <p>2 Measure the resistance between connector C113, pin 24, circuit 30-AG14 (RD), wiring harness side and the folding top control unit, connector C561, pin 2, circuit 30-AG14A (RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes LOCATE and REPAIR the break in circuit 30-CG16 (RD) between connector C113 and the BJB with the aid of the Wiring Diagrams. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the folding top control unit and connector C113 using the Wiring Diagrams. CHECK the operation of the system.
D11: CHECK THE VOLTAGE AT THE FOLDING TOP CONTROL UNIT	
 <p>E82011</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the folding top control unit, connector C561, pin 4, circuit 15-AG25A (GN/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to D13. → No GO to D12.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D12: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE FOLDING TOP CONTROL UNIT	
 <p>E82012</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C98 from CJB. 3 Measure the resistance between the CJB, connector C98, pin 14, circuit 15-AG25 (GN/OG), wiring harness side and the folding top control unit, connector C561, pin 4, circuit 15-AG25A (GN/OG), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the folding top control unit and the CJB using the Wiring Diagrams. CHECK the operation of the system.
D13: CHECK THE GROUND CONNECTION OF THE FOLDING TOP CONTROL UNIT	
 <p>E82013</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Measure the resistance between the folding top control unit, connector C561, pin 1, circuit 31-AG14A (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes GO to D14. → No LOCATE and REPAIR the break in the circuit between the folding top control unit and ground connection G75 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D14: CHECK THE GROUND CONNECTION OF THE FOLDING TOP CONTROL UNIT	
 <p>E82014</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the folding top control unit, connector C561, pin 3, circuit 31-AG25A (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes GO to D15. → No LOCATE and REPAIR the break in the circuit between the folding top control unit and ground connection G75 using the Wiring Diagrams. CHECK the operation of the system.
D15: CHECK FOR OPEN CIRCUIT BETWEEN THE FOLDING TOP CONTROL UNIT AND THE DATA LINK CONNECTOR (DLC)	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E82015</p>	<ol style="list-style-type: none"> 1 Disconnect Connector C562 from the folding top control unit. 2 Measure the resistance between the folding top control unit, connector C562, pin 1, circuit 4-EC10F (GY)(- RHD vehicles: 4-EC10G (GY)), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes GO to D16. → No LOCATE and REPAIR the break in the circuit between the folding top control unit and the DLC using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>D16: CHECK THE CIRCUIT BETWEEN THE FOLDING TOP CONTROL UNIT AND THE DLC FOR OPEN CIRCUIT</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
<p>E82016</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the folding top control unit, connector C562, pin 9, circuit 5-EC10F (BU)(- RHD vehicles: 5-EC10G (BU)), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the folding top control unit and RENEW it if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the folding top control unit and the DLC using the Wiring Diagrams. CHECK the operation of the system.

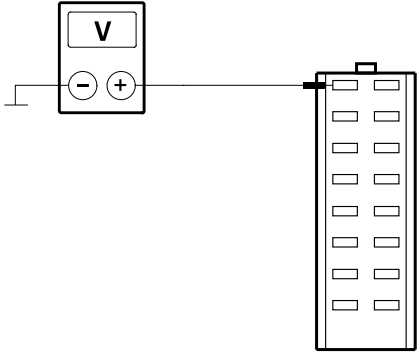
PINPOINT TEST E : PARKING AID MODULE NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>E1: CHECK COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE (GEM)</p>	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Connect the diagnostic tool. 3 Select the generic electronic module (GEM) with the diagnostic tester. <ul style="list-style-type: none"> • Is it possible to establish communication with the GEM? <ul style="list-style-type: none"> → Yes GO to E3. → No GO to Pinpoint Test AD.

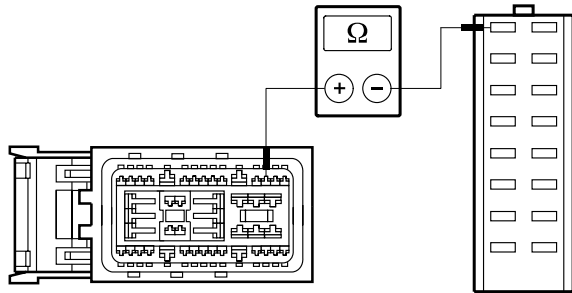
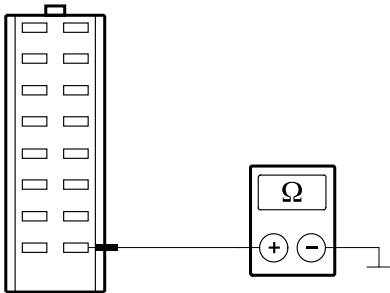
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> 1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? → Yes GO to E3. → No GO to E5.
E3: CHECK FUSE F100	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F100 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to E4. → No RENEW fuse F100 (10 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
E4: CHECK THE VOLTAGE AT FUSE F100	
	<ol style="list-style-type: none"> 1 Connect Fuse F100 (CJB). 2 Ignition switch in position II. 3 Measure the voltage between fuse F100 (10 A) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to E7. → No REPAIR the voltage supply of fuse F100 using the wiring diagrams. CHECK the operation of the system.
E5: CHECK FUSE F70	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

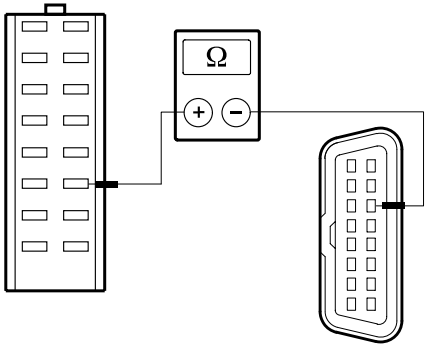
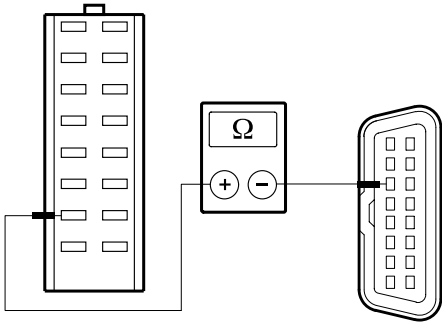
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK Fuse F70 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to E6.</p> <p>→ No RENEW fuse F70 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
E6: CHECK THE VOLTAGE AT FUSE F70	
	<p>1 Connect Fuse F70 (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F70 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to E7.</p> <p>→ No RECTIFY the voltage supply to fuse F70 with the aid of the Wiring Diagrams. CHECK the operation of the system.</p>
E7: CHECK THE VOLTAGE AT THE PARKING AID MODULE	
 <p>E62364</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C622 of the parking aid module.</p> <p>3 Ignition switch in position II.</p> <p>4 Measure the voltage between the parking aid module, connector C622, pin 1, circuit 15-GN10 (GN/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to E9.</p> <p>→ No GO to E8.</p>
E8: CHECK FOR OPEN CIRCUIT BETWEEN THE PARKING AID MODULE AND THE CJB	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING




TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E62365</p>	<p>2 Disconnect Connector C100 from CJB.</p> <p>3 Measure the resistance between the CJB, connector C100, pin 3, circuit 15-GN10 (GN/YE), wiring harness side and the parking aid module, connector C622, pin 1, circuit 15-GN10 (GN/YE), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK the CJB and RENEW as necessary. CHECK the operation of the system. → No LOCATE and RECTIFY the break in circuit 15-GN10 (GN/YE) between the parking aid module and the CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>E9: CHECK THE GROUND CONNECTION OF THE PARKING AID MODULE</p>	
 <p>E62366</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the parking aid module, connector C622, pin 16, circuit 31-GN10 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes GO to E10. → No LOCATE and REPAIR the break in the circuit between the parking aid module and ground connection G70 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E10: CHECK FOR OPEN CIRCUIT BETWEEN THE PARKING AID MODULE AND THE DATA LINK CONNECTOR (DLC)	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E62367</p>	<p>1 Measure the resistance between the parking aid module, connector C622, pin 14, circuit 4-EC10AL (GY), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to E11. → No LOCATE and REPAIR the break in the circuit between the parking aid module and soldered connection S85 using the Wiring Diagrams. CHECK the operation of the system.
E11: CHECK FOR OPEN CIRCUIT BETWEEN THE PARKING AID MODULE AND THE DLC	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E62368</p>	<p>1 Measure the resistance between the parking aid module, connector C622, pin 7, circuit 5-EC10AL (BU), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK the parking aid module if necessary INSTALL a new one. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the parking aid module and soldered connection S86 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

PINPOINT TEST F : RESTRAINT CONTROL MODULE NOT COMMUNICATING WITH THE DIAGNOSTIC UNIT.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
WARNINGS:	
<p> The stored voltage must be discharged in order to prevent unintentional deployment of the airbag/belt pretensioner. After disconnecting the battery, wait at least 1 minute before starting work on the supplemental restraint system (SRS). Failure to follow these instructions may result in personal injury.</p>	
<p> Do not program any keycodes while working on the supplemental restraint system in order to prevent the risk of accidental deployment of supplemental restraint system components. Failure to follow these instructions may result in personal injury.</p>	
<p> Only test the connectors of airbags or other supplemental restraint systems using the correct test probe adapter. Failure to follow these instructions may result in personal injury.</p>	
<p>NOTE: The restraints control module is grounded through the module housing. Ensure correct fixing.</p>	
F1: CHECK COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE (GEM)	
	<p>1 Ignition switch in position 0.</p> <p>2 Connect the diagnostic tool.</p> <p>3 Select the generic electronic module (GEM) with the diagnostic tester.</p> <ul style="list-style-type: none"> • Is it possible to establish communication with the GEM? → Yes GO to F3. → No GO to Pinpoint Test AD.
F2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? → Yes GO to F3. → No GO to F5.
F3: CHECK FUSE F122	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK Fuse F122 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to F4.</p> <p>→ No RENEW fuse F122 (10 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
F4: CHECK THE VOLTAGE AT FUSE F122	
	<p>1 Connect Fuse F122 (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F122 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to F7.</p> <p>→ No REPAIR the voltage supply of fuse F122 using the wiring diagrams. CHECK the operation of the system.</p>
F5: CHECK FUSE F65	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F65 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to F6.</p> <p>→ No RENEW fuse F65 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
F6: CHECK THE VOLTAGE AT FUSE F65	
	<p>1 Connect Fuse F65 (CJB).</p> <p>2 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between fuse F65 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to F7. → No RECTIFY the voltage supply to fuse F65 using the Wiring Diagrams. CHECK the operation of the system.

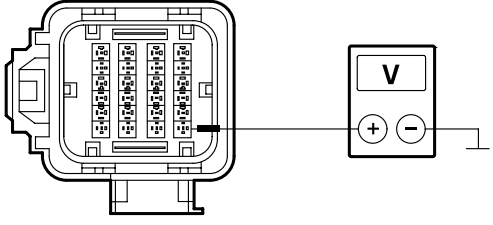
F7: CHECK THE VOLTAGE AT THE SUPPLEMENTAL RESTRAINT SYSTEM MODULE

WARNINGS:

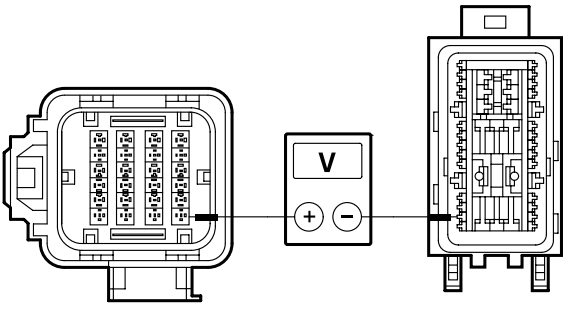
▲ The stored voltage must be discharged in order to prevent unintentional deployment of the airbag/belt pretensioner. After disconnecting the battery, wait at least 1 minute before starting work on the supplemental restraint system (SRS). Failure to follow these instructions may result in personal injury.

▲ Do not program any keycodes while working on the supplemental restraint system in order to prevent the risk of accidental deployment of supplemental restraint system components. Failure to follow these instructions may result in personal injury.

▲ Only test the connectors of airbags or other supplemental restraint systems using the correct test probe adapter. Failure to follow these instructions may result in personal injury.

	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect the ground cable from the battery.</p>
	<p>3 Disconnect Connector C426 from restraints control module (RCM).</p>
	<p>4 Connect the ground cable to the battery.</p>
	<p>5 Ignition switch in position II.</p>
 <p>E45686</p>	<p>6 Measure the voltage between the restraints control module, connector C426, pin 24, circuit 15-JA10 (GN/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to F9. → No GO to F8.

DIAGNOSIS AND TESTING

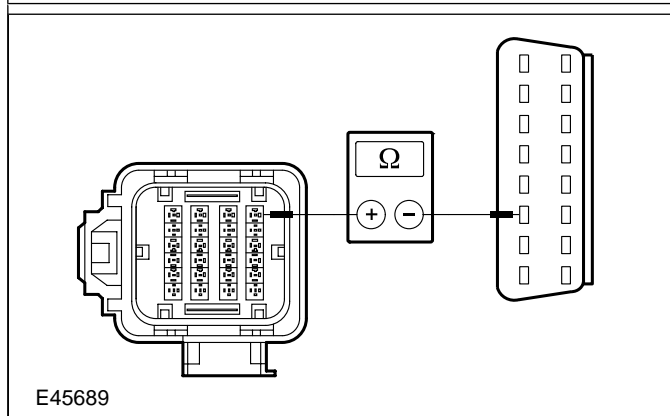
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F8: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE RESTRAINTS CONTROL MODULE	
 <p>E45687</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0.
	<ol style="list-style-type: none"> 2 Disconnect Connector C102 from CJB.
	<ol style="list-style-type: none"> 3 Measure the resistance between the CJB, connector C102, pin 14, circuit 15-JA10 (GN/OG), wiring harness side and restraints control module, connector C426, pin 24, circuit 15-JA10 (GN/OG), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the open circuit in 15-JA10 (GN/OG) between the restraints control module and the CJB using the Wiring Diagrams. CHECK the operation of the system.
F9: CHECK THE GROUND CONNECTION OF THE RESTRAINTS CONTROL MODULE	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.
	<ol style="list-style-type: none"> 2 Measure the resistance between the housing of the restraints control module and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to F10. → No DETACH the restraints control module and CLEAN the mounting points. REINSTALL the restraints control module (RCM). CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
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F10: CHECK FOR OPEN CIRCUIT BETWEEN THE RESTRAINTS CONTROL MODULE (RCM) AND THE DATA LINK CONNECTOR (DLC)

⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.

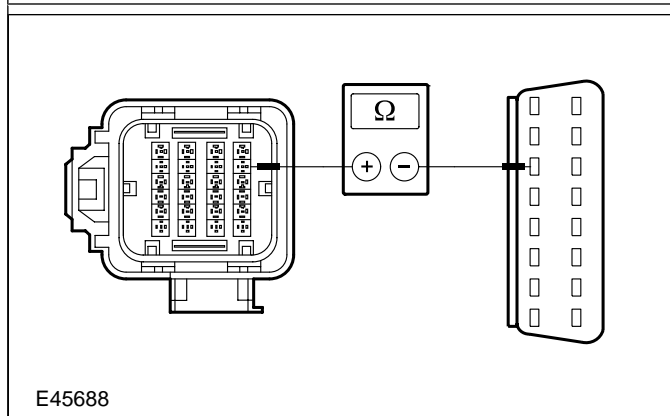


1 Measure the resistance between the restraints control module, connector C426, pin 19, circuit 4-EC10N (GY), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side.

- Is a resistance of less than 2 Ohms measured?
 - **Yes**
GO to F11.
 - **No**
LOCATE and REPAIR the break in circuit 4-EC10N (GY) between the restraints control module and soldered connection S81 using the Wiring Diagrams. CHECK the operation of the system.

F11: CHECK FOR OPEN CIRCUIT BETWEEN THE RESTRAINTS CONTROL MODULE AND DLC

⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.



1 Measure the resistance between the restraints control module, connector C426, pin 20, circuit 5-EC10N (BU), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side.

- Is a resistance of less than 2 Ohms measured?
 - **Yes**
CHECK and if necessary RENEW the restraints control module. CHECK the operation of the system.
 - **No**
LOCATE and REPAIR the break in circuit 5-EC10N (BU) between the restraints control module and soldered connection S82 using the Wiring Diagrams. CHECK the operation of the system.

PINPOINT TEST G : TRANSMISSION CONTROL MODULE (TCM) NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER - VEHICLES WITH AUTOMATIC TRANSMISSION.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
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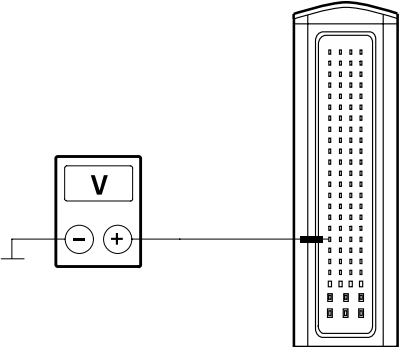
G1: CHECK COMMUNICATION WITH THE POWERTRAIN CONTROL MODULE (PCM)

1 Ignition switch in position 0.

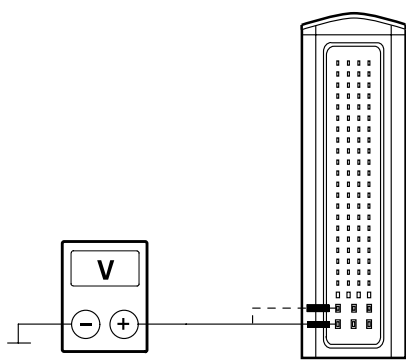
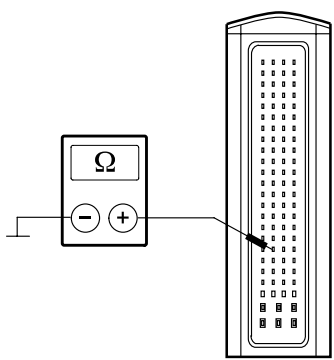
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Connect the diagnostic tool.</p> <p>3 Select the powertrain control module (PCM) with the diagnostic tester.</p> <ul style="list-style-type: none"> • Is it possible to establish communication with the PCM? <p>→ Yes GO to G2.</p> <p>→ No GO to Pinpoint Test AE.</p>
G2: CHECK FUSE F30	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F30 (BJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to G3.</p> <p>→ No RENEW fuse F30 (3 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
G3: CHECK THE VOLTAGE AT FUSE F30	
	<p>1 Connect Fuse F30 (BJB).</p> <p>2 Measure the voltage between fuse F30 (3 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to G4.</p> <p>→ No RECTIFY the voltage supply to fuse F30 using the Wiring Diagrams. CHECK the operation of the system.</p>

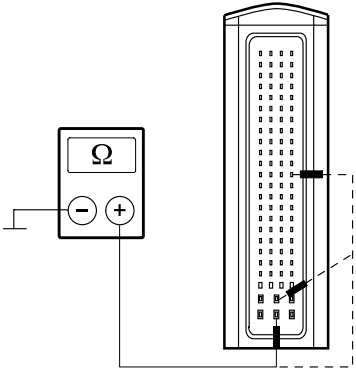
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
G4: CHECK FUSE F32	
	<ol style="list-style-type: none"> 1 CHECK Fuse F32 (BJB). <ul style="list-style-type: none"> • Is the fuse OK? <ul style="list-style-type: none"> → Yes GO to G5. → No RENEW fuse F32 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
G5: CHECK THE VOLTAGE AT FUSE F32	
	<ol style="list-style-type: none"> 1 Connect Fuse F32 (BJB). 2 Ignition switch in position II. 3 Measure the voltage between fuse F32 (10 A) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <ul style="list-style-type: none"> → Yes GO to G6. → No RECTIFY the voltage supply to fuse F32 using the Wiring Diagrams. CHECK the operation of the system.
G6: CHECK THE VOLTAGE AT THE TCM (TERMINAL 30)	
 <p>E62326</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C414 from TCM. 3 Measure the voltage between the TCM, connector C414, pin 11, circuit 30-TA55 (RD), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <ul style="list-style-type: none"> → Yes GO to G7. → No LOCATE and REPAIR the break in the circuit between the TCM and fuse F30 using the Wiring Diagrams. CHECK the operation of the system.
G7: CHECK THE VOLTAGE AT THE TCM (TERMINAL 15)	
	<ol style="list-style-type: none"> 1 Ignition switch in position II.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E62327</p>	<p>2 Measure the voltage between the TCM, connector C414, pin 1, circuit 15-TA55A (GN/BK), wiring harness side and ground.</p>
	<p>3 Measure the voltage between the TCM, connector C414, pin 2, circuit 15-TA55B (GN/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured in both cases? → Yes GO to G8. → No <ul style="list-style-type: none"> - If battery voltage is not measured during one measurement: LOCATE and REPAIR the break in the affected circuit between the TCM and soldered connection S224 using the Wiring Diagrams. CHECK the operation of the system. - If battery voltage is not measured during both measurements: LOCATE and REPAIR the break in the circuit between fuse F32 and soldered connection S224 using the Wiring Diagrams. CHECK the operation of the system.
<p>G8: CHECK GROUND CONNECTION OF TCM</p>	
	<p>1 Ignition switch in position 0.</p>
 <p>E62328</p>	<p>2 Measure the resistance between the TCM, connector C414, pin 33, circuit 91-TA55 (BK/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to G9. → No LOCATE and REPAIR the break in the circuit between the TCM and ground connection G68 using the Wiring Diagrams. CHECK the operation of the system.

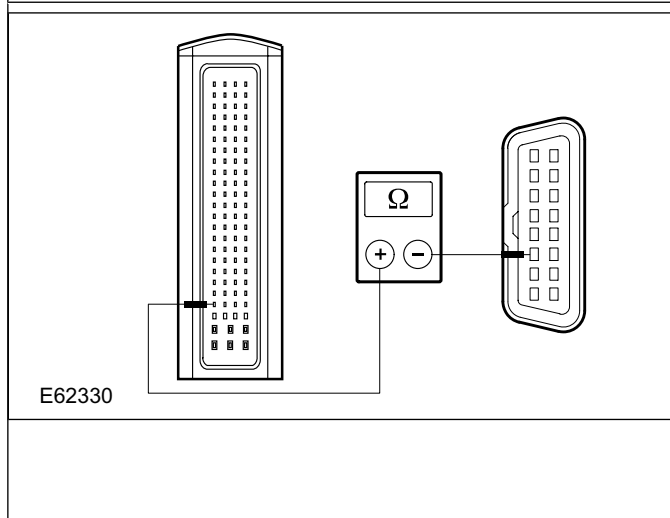
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
G9: CHECK GROUND CONNECTION OF TCM	
 <p>E62329</p>	<p>1 Measure the resistance between the TCM, connector C414, pin 3, circuit 91-TA55A (BK/GN), wiring harness side and ground.</p> <p>2 Measure the resistance between the TCM, connector C414, pin 4, circuit 91-TA55B (BK/GN), wiring harness side and ground.</p>
	<p>3 Measure the resistance between the TCM, connector C414, pin 83, circuit 91-TA55C (BK/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured in all of the cases? → Yes GO to G10. → No <ul style="list-style-type: none"> - If a resistance of more than 2 Ohms is measured in one or two of the measurements: LOCATE and REPAIR the break in the affected circuit between the TCM and soldered connection S225 using the Wiring Diagrams. CHECK the operation of the system. - Is a resistance of more than 2 Ohms measured in all of the measurements? LOCATE and REPAIR the open circuit between soldered connection S225 and ground connection G68 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
G10: CHECK FOR OPEN CIRCUIT BETWEEN THE TCM AND THE DATA LINK CONNECTOR (DLC)	

⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.



1 Measure the resistance between the TCM, connector C414, pin 8, circuit 5-EC7E (BU/RD), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side.

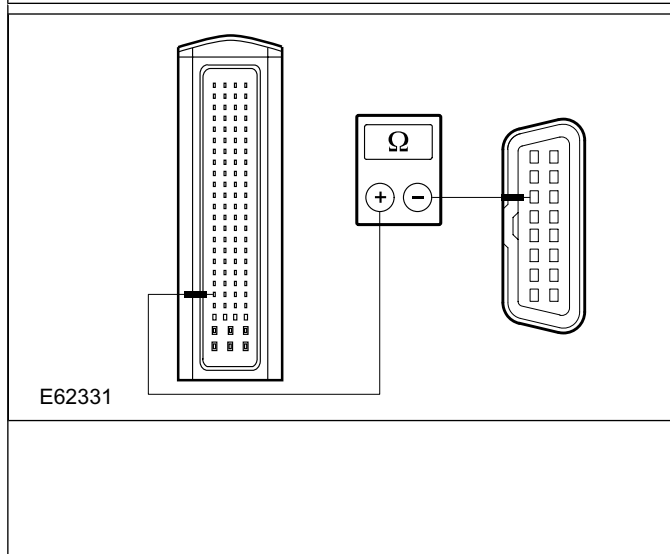
- Is a resistance of less than 2 Ohms registered?

→ **Yes**
GO to G11.

→ **No**
LOCATE and REPAIR the break in the circuit between the TCM and soldered connection S214 using the Wiring Diagrams. CHECK the operation of the system.

G11: CHECK FOR OPEN CIRCUIT BETWEEN THE TCM AND THE DLC.	
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⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.



1 Measure the resistance between the TCM, connector C414, pin 9, circuit 4-EC7E (GY/RD), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side.

- Is a resistance of less than 2 Ohms measured?

→ **Yes**
CHECK the TCM and RENEW if necessary. CHECK the operation of the system.

→ **No**
LOCATE and REPAIR the break in the circuit between the TCM and soldered connection S215 using the Wiring Diagrams. CHECK the operation of the system.

PINPOINT TEST H : FUEL-FIRED BOOSTER HEATER/PROGRAMMABLE FUEL-FIRED BOOSTER HEATER NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
H1: CHECK COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE (GEM)	
	1 Ignition switch in position 0.
	2 Connect the diagnostic tool.

DIAGNOSIS AND TESTING

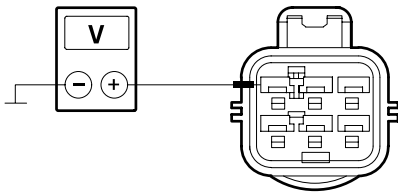
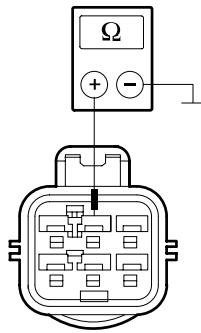
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Select the generic electronic module (GEM) with the diagnostic tester.</p> <ul style="list-style-type: none"> • Is it possible to establish communication with the GEM? <p>→ Yes GO to H2.</p> <p>→ No GO to Pinpoint Test AD.</p>
H2: CHECK FUSE F21	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F21 (BJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to H3.</p> <p>→ No RENEW fuse F21 (20 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
H3: CHECK THE VOLTAGE AT FUSE F21	
	<p>1 Connect Fuse F21 (BJB).</p> <p>2 Measure the voltage between fuse F21 (20 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to H4.</p> <p>→ No RECTIFY the voltage supply to fuse F21 using the Wiring Diagrams. CHECK the operation of the system.</p>
H4: CHECK THE VOLTAGE AT THE FUEL-FIRED BOOSTER HEATER / PROGRAMMABLE FUEL-FIRED BOOSTER HEATER	
	<p>1 Disconnect Connector C307 from fuel-fired booster heater / programmable fuel-fired booster heater.</p>

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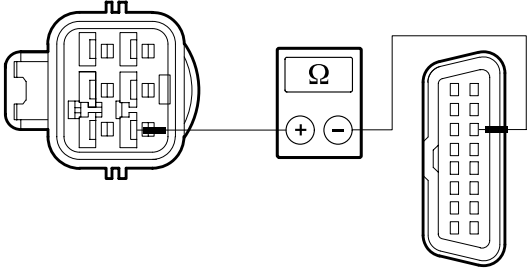
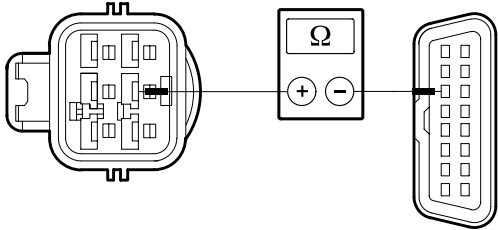
Module Communications Network

418-00-48

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038062</p>	<p>2 Measure the voltage between the fuel-fired booster heater / programmable fuel-fired booster heater, connector C307, pin 1, circuit 30-RD18 (RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to H5.</p> <p>→ No LOCATE and REPAIR the break in circuit 30-RD18 (RD) between the fuel-fired booster heater /programmable fuel-fired booster heater and fuse F21 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>H5: CHECK THE GROUND CONNECTION OF THE FUEL-FIRED BOOSTER HEATER / PROGRAMMABLE FUEL-FIRED BOOSTER HEATER</p>	
 <p>VFE0038063</p>	<p>1 Measure the resistance between the fuel fired booster heater / programmable fuel-fired booster heater, connector C307, pin 2, circuit 31-RD18 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to H6.</p> <p>→ No LOCATE and REPAIR the open circuit between the fuel-fired booster heater / programmable fuel-fired booster heater and ground connection G56 using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
H6: CHECK FOR OPEN CIRCUIT BETWEEN THE FUEL-FIRED BOOSTER HEATER / PROGRAMMABLE FUEL-FIRED BOOSTER HEATER AND THE DATA LINK CONNECTOR (DLC)	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E62332</p>	<p>1 Measure the resistance between the fuel-fired booster heater / programmable fuel-fired booster heater, connector C307, pin 4, circuit 4-EC2 (GY/RD), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to H7. → No LOCATE and REPAIR the break in circuit 4EC2 (GY/RD) between the fuel-fired booster heater / programmable fuel-fired booster heater and connector C111 using the Wiring Diagrams. CHECK the operation of the system.
H7: CHECK FOR OPEN CIRCUIT BETWEEN THE FUEL-FIRED BOOSTER HEATER / PROGRAMMABLE FUEL-FIRED BOOSTER HEATER AND THE DLC	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E62333</p>	<p>1 Measure the resistance between the fuel-fired booster heater / programmable fuel-fired booster heater, connector C307, pin 5, circuit 5-EC2 (BU/RD), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK and if necessary RENEW the fuel-fired booster heater / programmable fuel-fired booster heater. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 5-EC2 (BU/RD) between the fuel-fired booster heater / programmable fuel-fired booster heater and connector C111 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

PINPOINT TEST I : AUDIO MODULE NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
I1: CHECK COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE (GEM)	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 Connect the diagnostic tool. <li>3 Select the generic electronic module (GEM) with the diagnostic tester. <ul style="list-style-type: none"> <li>• Is it possible to establish communication with the GEM? <li>→ Yes GO to I3. <li>→ No GO to Pinpoint Test AD.
I2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> <li>1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> <li>• Is the location for connector C100 on the top of the CJB? <li>→ Yes GO to I3. <li>→ No GO to I5.
I3: CHECK FUSE F112	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 CHECK Fuse F112 (CJB). <ul style="list-style-type: none"> <li>• Is the fuse OK? <li>→ Yes GO to I4. <li>→ No RENEW fuse F112 (15 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
I4: CHECK THE VOLTAGE AT FUSE F112	
	<ol style="list-style-type: none"> <li>1 Connect Fuse F112 (CJB).

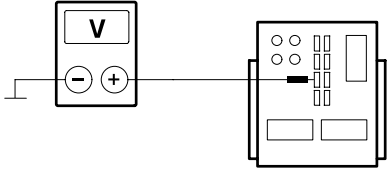
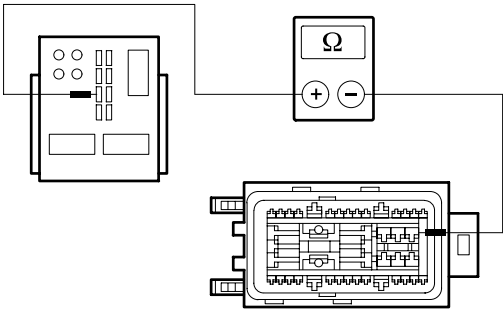
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the voltage between fuse F112 (15 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to I8.</p> <p>→ No REPAIR the voltage supply of fuse F112 (15A) using the wiring diagrams. CHECK the operation of the system.</p>
I5: CHECK FUSE F58	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F58 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to I6.</p> <p>→ No RENEW fuse F58 (15 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
I6: CHECK THE VOLTAGE AT FUSE F58	
	<p>1 Connect Fuse F58 (CJB).</p> <p>2 Measure the voltage between fuse F58 (15 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to I8.</p> <p>→ No RECTIFY the voltage supply to fuse F58 using the Wiring Diagrams. CHECK the operation of the system.</p>
I7: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to I8.</p> <p>→ No GO to I10.</p>

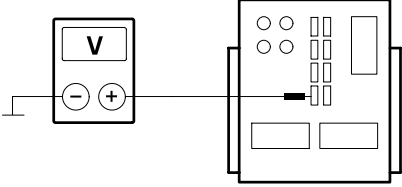
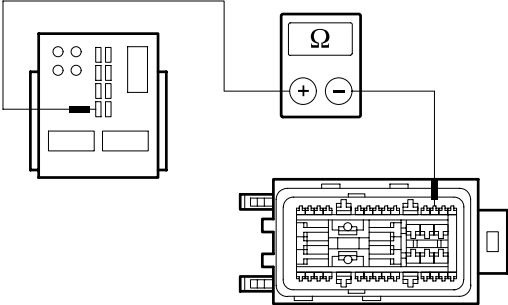
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
I8: CHECK FUSE F108	
	<p>1 CHECK Fuse F108 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to I9.</p> <p>→ No RENEW fuse F108 (7.5 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
I9: CHECK THE VOLTAGE AT FUSE F108	
	<p>1 Ignition switch in position I.</p> <p>2 Connect Fuse F108 (CJB).</p> <p>3 Measure the voltage between fuse F108 (7.5 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to I12.</p> <p>→ No REPAIR the voltage supply of fuse F108 using the wiring diagrams. CHECK the operation of the system.</p>
I10: CHECK FUSE F68	
	<p>1 CHECK Fuse F68 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to I11.</p> <p>→ No RENEW fuse F68 (7.5 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
I11: CHECK THE VOLTAGE AT FUSE F68	
	<p>1 Ignition switch in position I.</p> <p>2 Connect Fuse F68 (CJB).</p>

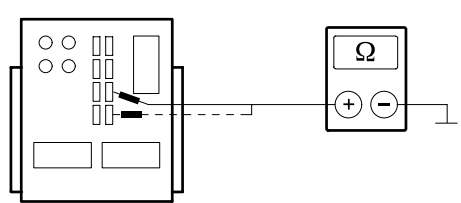
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between fuse F68 (7.5 A) and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? → Yes GO to I12. → No RECTIFY the voltage supply to fuse F68 using the Wiring Diagrams. CHECK the operation of the system.
<p>I12: CHECK THE VOLTAGE AT THE AUDIO MODULE (TERMINAL 30)</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C443 from the audio module.</p>
 <p>VFE0037890</p>	<p>3 Measure the voltage between the audio module, connector C443, pin 15, circuit 29-MD15 (OG/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? → Yes GO to I14. → No GO to I13.
<p>I13: CHECK THE CIRCUIT BETWEEN THE CJB AND THE AUDIO MODULE FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C102 from CJB.</p>
 <p>VFE0037891</p>	<p>3 Measure the resistance between the CJB, connector C102, pin 16, circuit 29-MD15 (OG/BK), wiring harness side and the audio module, connector C443, pin 15, circuit 29-MD15 (OG/BK), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 29-MD15 (OG/BK) between the audio module and the CJB using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
I14: CHECK THE VOLTAGE AT THE AUDIO MODULE (TERMINAL 75)	
 <p>VFE0037892</p>	<ol style="list-style-type: none"> 1 Ignition switch in position I. 2 Measure the voltage between the audio module, connector C443, pin 16, circuit 75-MD15 (YE/GN), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <ul style="list-style-type: none"> → Yes GO to I16. → No GO to I15.
I15: CHECK THE CIRCUIT BETWEEN THE CJB AND THE AUDIO MODULE FOR OPEN CIRCUIT	
 <p>VFE0037893</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C102 from CJB. 3 Measure the resistance between the CJB, connector C102, pin 3, circuit 75-MD15 (YE/RD) (vehicles with DVD player: circuit 75-DA2 (YE/RD)), wiring harness side and the audio module, connector C443, pin 16, circuit 75-MD15 (YE/GN), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the audio module and the CJB using the Wiring Diagrams. CHECK the operation of the system.
I16: CHECK THE GROUND CONNECTION OF THE AUDIO MODULE	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037894</p>	<p>2 Measure the resistance between the audio module, connector C443, pin 11, circuit 91-MD5 (BK/BU), wiring harness side and ground.</p>
	<p>3 Measure the resistance between the audio module, connector C443, pin 12, circuit 91-MD15 (BK/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured in both cases? <p>→ Yes CHECK and if necessary RENEW the audio module. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in the relevant circuit between the audio module and ground connection G63 using the Wiring Diagrams. CHECK the operation of the system.</p>

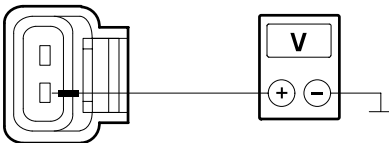
PINPOINT TEST J : ELECTROHYDRAULIC POWER STEERING MODULE NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
J1: CHECK COMMUNICATION WITH THE POWERTRAIN CONTROL MODULE (PCM)	
	<p>1 Ignition switch in position 0.</p> <p>2 Connect the diagnostic tool.</p> <p>3 Select the powertrain control module (PCM) with the diagnostic tester.</p> <ul style="list-style-type: none"> Is it possible to establish communication with the PCM? <p>→ Yes GO to J2.</p> <p>→ No GO to Pinpoint Test AE.</p>
J2: CHECK FUSE F2	
	<p>1 Ignition switch in position 0.</p>

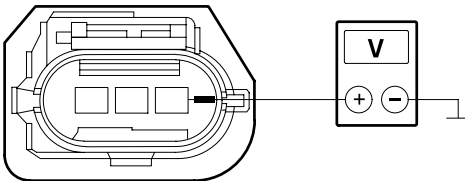
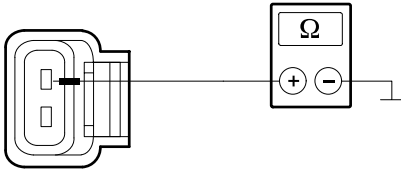
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK Fuse F2 (BJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to J3.</p> <p>→ No RENEW fuse F2 (80 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
J3: CHECK THE VOLTAGE AT FUSE F2	
	<p>1 Connect Fuse F2 (BJB).</p> <p>2 Measure the voltage between fuse F2 (80 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to J4.</p> <p>→ No RECTIFY the voltage supply to fuse F2 using the Wiring Diagrams. CHECK the operation of the system.</p>
J4: CHECK FUSE F22	
	<p>1 CHECK Fuse F22 (BJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to J5.</p> <p>→ No RENEW fuse F22 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
J5: CHECK THE VOLTAGE AT FUSE F22	
	<p>1 Connect Fuse F22 (BJB).</p>
	<p>2 Ignition switch in position II.</p>

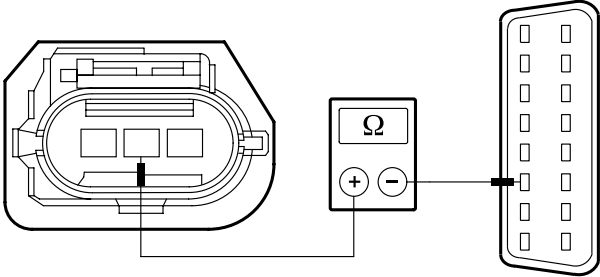
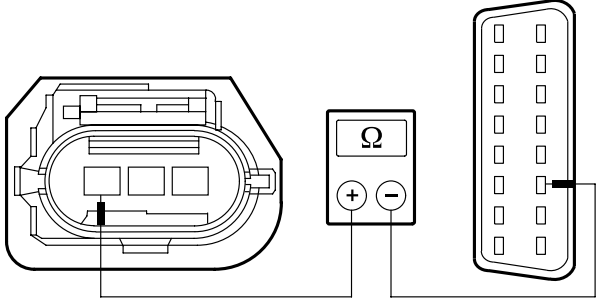
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between fuse F22 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to J6.</p> <p>→ No RECTIFY the voltage supply to fuse F22 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>J6: CHECK THE VOLTAGE AT THE ELECTROHYDRAULIC POWER STEERING MODULE (TERMINAL 30)</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect Connector C793 from electro-hydraulic power steering module.</p>
 <p>VFE0037902</p>	<p>3 Measure the voltage between the electro-hydraulic power steering module, connector C793, pin 1, circuit 30-CE7 (RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to J7.</p> <p>→ No LOCATE and REPAIR the break in circuit 30-CE7 (RD), between the electrohydraulic power steering module and fuse F2 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>J7: CHECK THE VOLTAGE AT THE ELECTROHYDRAULIC POWER STEERING MODULE (TERMINAL 15)</p>	
	<p>1 Disconnect Connector C794 from electro-hydraulic power steering module.</p>
	<p>2 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037903</p>	<p>3 Measure the voltage between the electrohydraulic power steering module, connector C794, pin 1, circuit 15-CE7 (GN/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to J8.</p> <p>→ No LOCATE and REPAIR the break in circuit 15-CE7 (GN/BU), between the electrohydraulic power steering module and fuse F22 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>J8: CHECK THE GROUND CONNECTION OF THE ELECTROHYDRALIC POWER STEERING MODULE</p>	
 <p>VFE0037904</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the electrohydraulic power steering module, connector C793, pin 2, circuit 31-CE7 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 0.5 Ohms measured? <p>→ Yes GO to J9.</p> <p>→ No LOCATE and REPAIR the break in circuit 31-CE7 (BK), between the electrohydraulic power steering module and ground connection G56 using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>J9: CHECK FOR OPEN CIRCUIT BETWEEN THE ELECTROHYDRAULIC POWER STEERING MODULE AND THE DATA LINK CONNECTOR (DLC).</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0037905</p>	<p>1 Measure the resistance between the electrohydraulic power steering module, connector C794, pin 2, circuit 5-EC7W (BU/RD), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes GO to J10. → No LOCATE and REPAIR the break in circuit 5-EC7W (BU/RD) between the electrohydraulic power steering module and soldered connection S222 using the Wiring Diagrams. CHECK the operation of the system.
<p>J10: CHECK FOR OPEN CIRCUIT BETWEEN THE ELECTROHYDRAULIC POWER STEERING MODULE AND THE DLC.</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0037906</p>	<p>1 Measure the resistance between the electrohydraulic power steering module, connector C794, pin 3, circuit 4-EC7W (GY/RD), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK and if necessary RENEW the electrohydraulic power steering module. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 4-EC7W (GY/RD) between the electrohydraulic power steering module and soldered connection S223 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

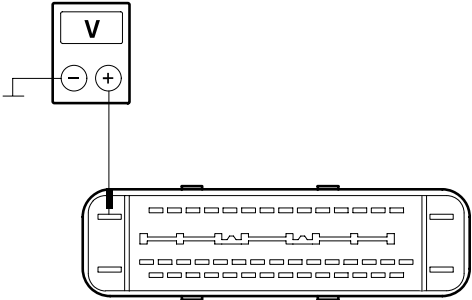
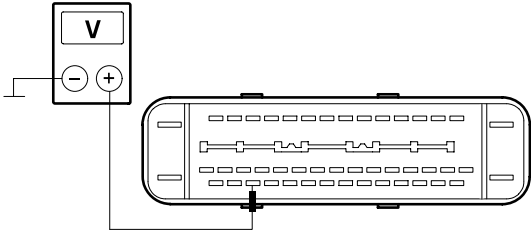
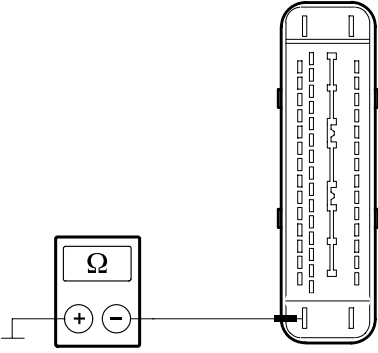
PINPOINT TEST K : ABS MODULE OR ESP MODULE NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
K1: CHECK COMMUNICATION WITH THE POWERTRAIN CONTROL MODULE (PCM)	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 Connect the diagnostic tool. <li> 3 Select the powertrain control module (PCM) with the diagnostic tester. <ul style="list-style-type: none"> <li>• Is it possible to establish communication with the PCM? <li>→ Yes GO to K2. <li>→ No GO to Pinpoint Test AE.
K2: CHECK FUSE F8	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li> 2 CHECK Fuse F8 (BJB). <ul style="list-style-type: none"> <li>• Is the fuse OK? <li>→ Yes GO to K3. <li>→ No RENEW fuse F8 (20 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
K3: CHECK THE VOLTAGE AT FUSE F8	
	<ol style="list-style-type: none"> <li>1 Connect Fuse F8 (BJB). <li> 2 Measure the voltage between fuse F8 (20 A) and ground. <ul style="list-style-type: none"> <li>• Is battery voltage measured? <li>→ Yes GO to K4. <li>→ No RECTIFY the voltage supply to fuse F8 using the Wiring Diagrams. CHECK the operation of the system.

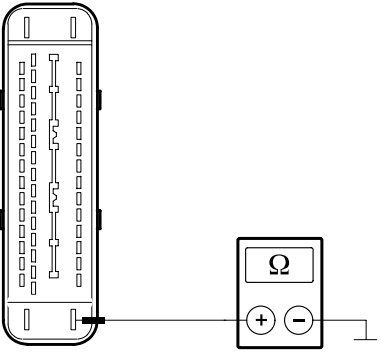
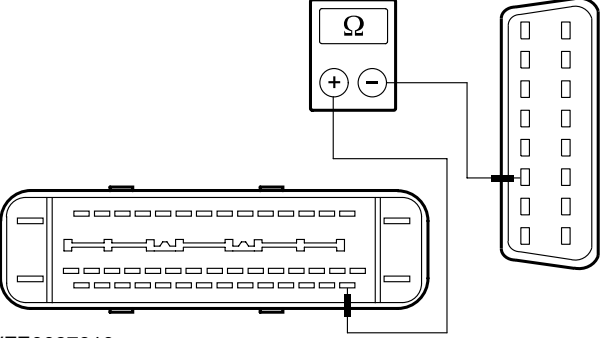
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
K4: CHECK FUSE F19	
	<p>1 CHECK Fuse F19 (BJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to K5.</p> <p>→ No RENEW fuse F19 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
K5: CHECK THE VOLTAGE AT FUSE F19	
	<p>1 Connect Fuse F19 (BJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F19 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes - Vehicles with electronic stability program (ESP): GO to K6. - Vehicles without electronic stability program (ESP): GO to K12.</p> <p>→ No RECTIFY the voltage supply to fuse F19 using the Wiring Diagrams. CHECK the operation of the system.</p>
K6: CHECK THE VOLTAGE AT THE ESP MODULE (TERMINAL 30)	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C830 from electronic stability program module.</p>

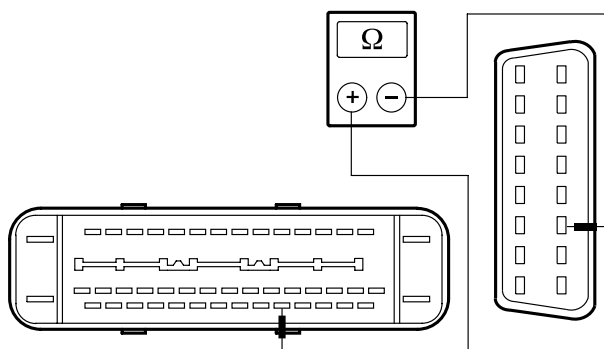
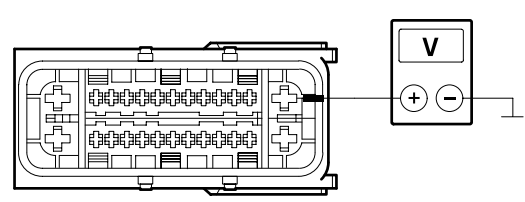
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037907</p>	<p>3 Measure the voltage between the electronic stability program module, connector C830, pin 32, circuit 30-CF6A (RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to K7. → No LOCATE and REPAIR the break in circuit 30-CF6A (RD) between the electronic stability program module and fuse F8 using the Wiring Diagrams. CHECK the operation of the system.
K7: CHECK THE VOLTAGE AT THE ESP MODULE (TERMINAL 15)	
 <p>VFE0037908</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the electronic stability program module, connector C830, pin 4, circuit 15-CF6A (GN/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to K8. → No LOCATE and REPAIR the break in circuit 15-CF6A (GN/YE) between the electronic stability program module and fuse F19 using the Wiring Diagrams. CHECK the operation of the system.
K8: CHECK THE GROUND CONNECTION OF THE ESP MODULE (PIN 16)	
 <p>E62334</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the electronic stability program module, connector C830, pin 16, circuit 31-CF6 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to K9. → No LOCATE and REPAIR the break in affected circuit 31-CF6 (BK) between the ESP module and ground connection G55 using the Wiring Diagrams. CHECK the operation of the system.

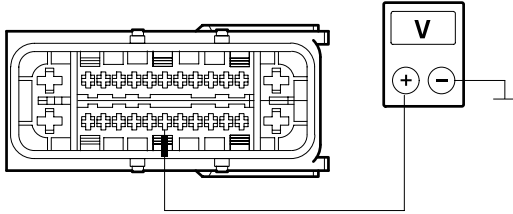
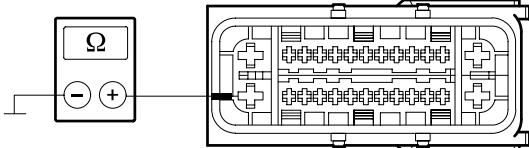
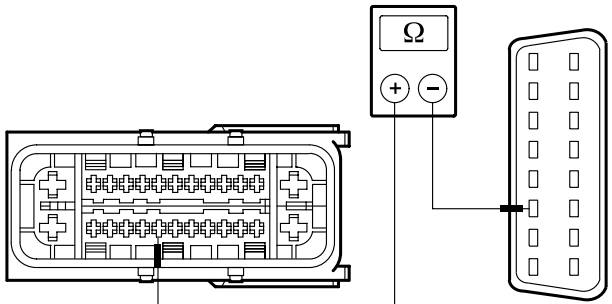
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
K9: CHECK THE GROUND CONNECTION OF THE ESP MODULE (PIN 47)	
 <p>E62335</p>	<p>1 Measure the resistance between the electronic stability program module, connector C830, pin 47, circuit 31-CF13A (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to K10. → No LOCATE and REPAIR the break in affected circuit 31-CF13A (BK) between the ESP module and ground connection G1 using the Wiring Diagrams. CHECK the operation of the system.
K10: CHECK FOR OPEN CIRCUIT BETWEEN THE ELECTRONIC STABILITY PROGRAM MODULE AND THE DATA LINK CONNECTOR (DLC)	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0037910</p>	<p>1 Measure the resistance between the ESP module, connector C830, pin 15, circuit 5-EC7K (BU/RD), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to K11. → No LOCATE and REPAIR the break in circuit 5-EC7K (BU/RD) between the electronic stability program module and soldered connection S219 using the Wiring Diagrams. CHECK the operation of the system.

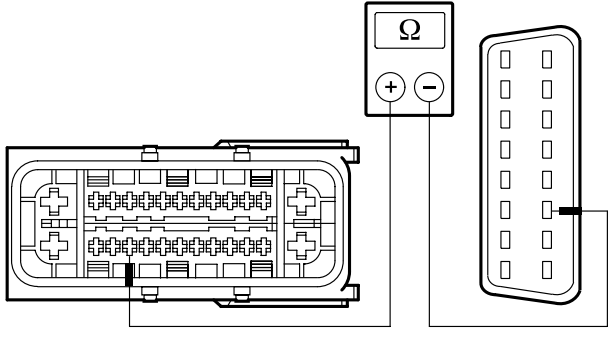
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>K11: CHECK FOR OPEN CIRCUIT BETWEEN THE ELECTRONIC STABILITY PROGRAM MODULE AND THE DLC</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0037911</p>	<p>1 Measure the resistance between the ESP module, connector C830, pin 11, circuit 4-EC7K (GY/RD), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes CHECK and if necessary RENEW the electronic stability program module. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in circuit 4-EC7K (GY/RD) between the electronic stability program module and soldered connection S220 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>K12: CHECK THE VOLTAGE AT THE ANTI-LOCK BRAKE SYSTEM MODULE (TERMINAL 30)</p>	
 <p>VFE0037912</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C831 from ABS module.</p> <p>3 Measure voltage between the ABS module, connector C831, pin 1, circuit 30-CF6 (RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to K13.</p> <p>→ No LOCATE and REPAIR the break in circuit 30-CF6 (RD) between the ABS module and fuse F8 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>K13: CHECK THE VOLTAGE AT THE ANTI-LOCK BRAKE SYSTEM MODULE (TERMINAL 15)</p>	
	<p>1 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037913</p>	<p>2 Measure the voltage between the ABS module, connector C831, pin 20, circuit 15-CF6 (GN/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to K14. → No LOCATE and REPAIR the break in circuit 15-CF6 (GN/YE) between the ABS module and fuse F19 using the Wiring Diagrams. CHECK the operation of the system.
<p>K14: CHECK THE GROUND CONNECTION OF THE ABS MODULE</p>	
 <p>VFE0037914</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the ABS module, connector C831, pin 26, circuit 31-CF13 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to K15. → No LOCATE and REPAIR the break in circuit 31-CF13 (BK) between the ABS module and ground connection G55 using the Wiring Diagrams. CHECK the operation of the system.
<p>K15: CHECK FOR OPEN CIRCUIT BETWEEN THE ABS MODULE AND THE DATA LINK CONNECTOR (DLC)</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0037915</p>	<p>1 Measure the resistance between the ABS module, connector C831, pin 21, circuit 5-EC7F (BU/RD), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to K16. → No LOCATE and REPAIR the break in circuit 5-EC7F (BU/RD) between the ABS module and soldered connection S219 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
K16: CHECK FOR OPEN CIRCUIT BETWEEN THE ABS MODULE AND THE DLC	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0037916</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the ABS module, connector C831, pin 23, circuit 4-EC7F (GY/RD), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the ABS module and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 4-EC7F (GY/RD) between the ABS module and soldered connection S220 using the Wiring Diagrams. CHECK the operation of the system.

PINPOINT TEST L : TRANSMISSION CONTROL MODULE (TCM) NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER - VEHICLES WITH AUTOMATIC TRANSMISSION (CFT23)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
L1: CHECK COMMUNICATION WITH THE POWERTRAIN CONTROL MODULE (PCM)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Connect the diagnostic tool. 3 Select the powertrain control module (PCM) with the diagnostic tester. <ul style="list-style-type: none"> • Is it possible to establish communication with the PCM? <ul style="list-style-type: none"> → Yes GO to L2. → No GO to Pinpoint Test AE.
L2: CHECK FUSE F26	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

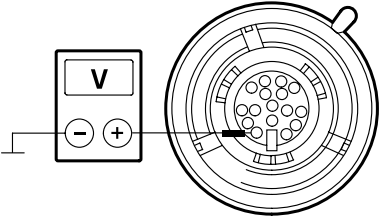
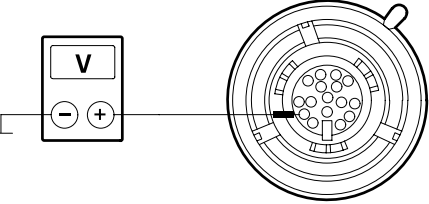
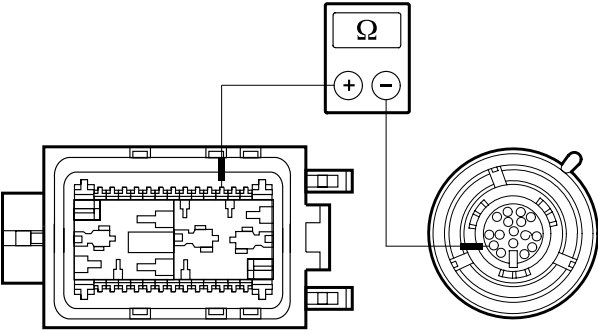
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK Fuse F26 (BJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to L3.</p> <p>→ No RENEW fuse F26 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short circuit using the Wiring Diagrams.</p>
L3: CHECK THE VOLTAGE AT FUSE F26	
	<p>1 Connect fuse F26 (BJB).</p> <p>2 Measure the voltage between fuse F26 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to L5.</p> <p>→ No REPAIR the voltage supply to fuse F26 using the Wiring Diagrams. CHECK the operation of the system.</p>
L4: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to L5.</p> <p>→ No GO to L7.</p>
L5: CHECK FUSE F138	
	<p>1 CHECK Fuse F138 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to L6.</p> <p>→ No RENEW fuse F138 (10 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
L6: CHECK THE VOLTAGE AT FUSE F138	
	<p>1 Connect Fuse F138 (CJB).</p>

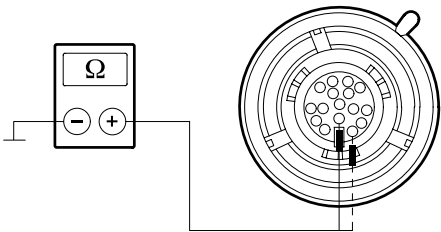
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F138 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to L9.</p> <p>→ No RECTIFY the voltage supply to fuse F75 using the Wiring Diagrams. CHECK the operation of the system.</p>
L7: CHECK FUSE F75	
	<p>1 CHECK Fuse F75 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to L8.</p> <p>→ No RENEW fuse F75 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
L8: CHECK THE VOLTAGE AT FUSE F75	
	<p>1 Connect Fuse F75 (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F75 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to L9.</p> <p>→ No RECTIFY the voltage supply to fuse F75 using the Wiring Diagrams. CHECK the operation of the system.</p>
L9: CHECK THE VOLTAGE AT THE TCM (TERMINAL 30)	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C812 from TCM.</p>

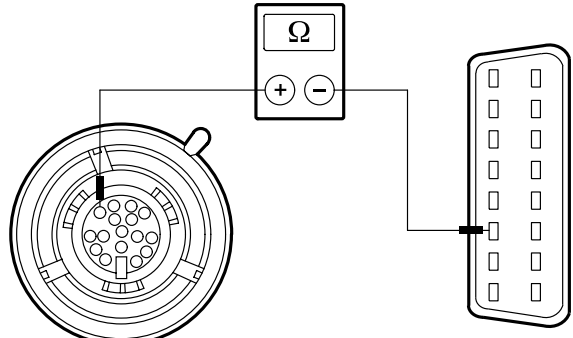
DIAGNOSIS AND TESTING

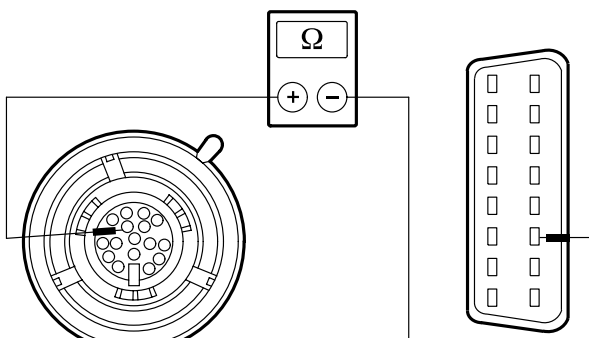
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E45691</p>	<p>3 Measure the voltage between the TCM, connector C812, pin 14, circuit 30-TA36 (RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to L10. → No LOCATE and REPAIR the break in the circuit between the TCM and fuse F26 using the Wiring Diagrams. CHECK the operation of the system.
<p>L10: CHECK THE VOLTAGE AT THE TCM (TERMINAL 15)</p>	
 <p>VFE0037918</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the TCM, connector C812, pin 9, circuit 15-TA36 (GN/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to L12. → No GO to L11.
<p>L11: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE TCM</p>	
 <p>E62336</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C96 from CJB.</p> <p>3 Measure the resistance between the CJB, connector C96, pin 38, circuit 15-RE17 (GN/BU), wiring harness side and the TCM, connector C812, pin 9, circuit 15-TA36 (GN/BK), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the TCM and soldered connection S55 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
L12: CHECK GROUND CONNECTION OF TCM	
 <p>VFE0037919</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the TCM, connector C812, pin 13, circuit 91-TA36A (BK), wiring harness side and ground.</p>
	<p>3 Measure the resistance between the TCM, connector C812, pin 16, circuit 91-TA36 (BK/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured in both cases? → Yes GO to L13. → No <ul style="list-style-type: none"> - If a resistance of more than 2 Ohms is measured in one of the measurements: LOCATE and REPAIR the break in the affected circuit between the TCM and soldered connection S53 using the Wiring Diagrams. CHECK the operation of the system. - If a resistance greater than 2 Ohm is measured in both cases: LOCATE and REPAIR the break in the circuit between soldered connection S53 and ground connection G68 (vehicles with diesel engine: ground connection G57) using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
L13: CHECK FOR OPEN CIRCUIT BETWEEN THE TCM AND THE DATA LINK CONNECTOR (DLC)	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0037920</p>	<p>1 Measure the resistance between the TCM, connector C812, pin 2, circuit 5-EC7A (BU/RD), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to L14. → No LOCATE and REPAIR the break in the circuit between the TCM and soldered connection S214 using the Wiring Diagrams. CHECK the operation of the system.

L14: CHECK FOR OPEN CIRCUIT BETWEEN THE TCM AND THE DLC.	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0037921</p>	<p>1 Measure the resistance between the TCM, connector C812, pin 6, circuit 4-EC7A (GY/RD), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the TCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the TCM and soldered connection S215 using the Wiring Diagrams. CHECK the operation of the system.

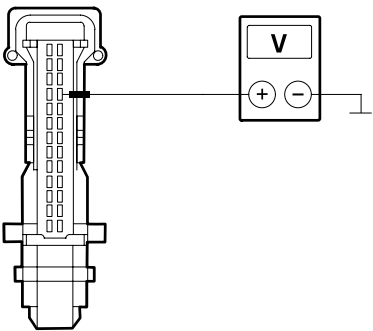
PINPOINT TEST M : LIGHTING CONTROL MODULE (LCM) NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER - VEHICLES WITH GAS DISCHARGE LAMPS AND/OR VEHICLES WITH ADAPTIVE FRONT LIGHTING.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
M1: CHECK COMMUNICATION WITH THE POWERTRAIN CONTROL MODULE (PCM)	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Connect the diagnostic tool.</p>

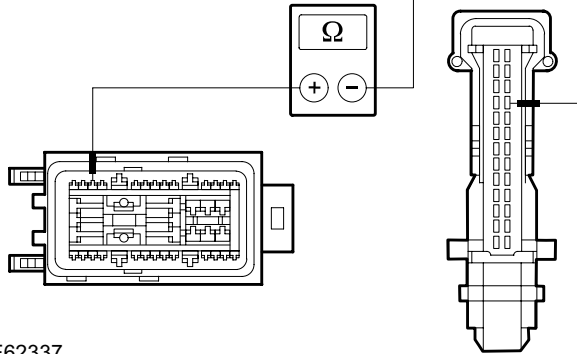
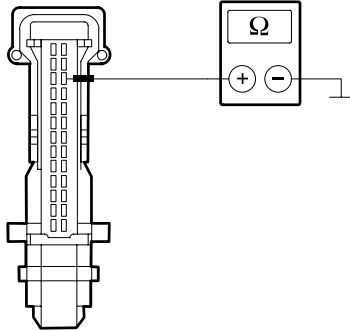
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Select the powertrain control module (PCM) with the diagnostic tester.</p> <ul style="list-style-type: none"> Is it possible to establish communication with the PCM? <p>→ Yes GO to M3.</p> <p>→ No GO to Pinpoint Test AE.</p>
M2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to M3.</p> <p>→ No GO to M5.</p>
M3: CHECK FUSE F115	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F115 (CJB).</p> <ul style="list-style-type: none"> Is the fuse OK? <p>→ Yes GO to M4.</p> <p>→ No RENEW fuse F115 (7.5 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
M4: CHECK THE VOLTAGE AT FUSE F115	
	<p>1 Connect Fuse F115 (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F115 (7.5 A) and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to M7.</p> <p>→ No REPAIR the voltage supply of fuse F115 using the wiring diagrams. CHECK the operation of the system.</p>

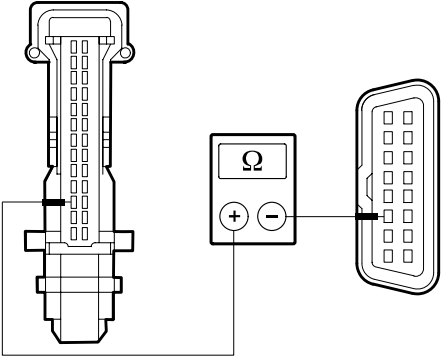
DIAGNOSIS AND TESTING

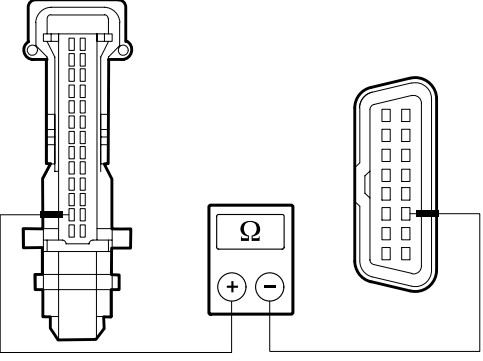
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
M5: CHECK FUSE F66	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F66 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? <ul style="list-style-type: none"> → Yes GO to M6. → No RENEW fuse F66 (7.5 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
M6: CHECK THE VOLTAGE AT FUSE F66	
	<ol style="list-style-type: none"> 1 Connect Fuse F66 (CJB). 2 Ignition switch in position II. 3 Measure the voltage between fuse F66 (7.5 A) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <ul style="list-style-type: none"> → Yes GO to M7. → No RECTIFY the voltage supply to fuse F66 using the Wiring Diagrams. CHECK the operation of the system.
M7: CHECK THE VOLTAGE AT THE LCM	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C838 from the LCM. 3 Ignition switch in position II.
 <p>VFE0037922</p>	<ol style="list-style-type: none"> 4 Measure the voltage between the LCM, connector C838, pin 23, circuit 15-LE58 (GN/OG), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <ul style="list-style-type: none"> → Yes GO to M9. → No GO to M8.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
M8: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE LCM	
 <p>E62337</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C102 from CJB. 3 Measure the resistance between the CJB, connector C102, pin 13, circuit 15-LE58 (GN/OG), wiring harness side and the LCM, connector C838, pin 23, circuit 15-LE58 (GN/OG), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 15-LE58 (GN/BU) between the LCM and the CJB using the Wiring Diagrams. CHECK the operation of the system.
M9: CHECK THE GROUND CONNECTION OF THE LCM	
 <p>VFE0037923</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Measure the resistance between the LCM, connector C838, pin 24, circuit 91-LE58 (BK/RD), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes GO to M10. → No LOCATE and REPAIR the break in the circuit between the LCM and ground connection G7 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
M10: CHECK FOR OPEN CIRCUIT BETWEEN THE LCM AND THE DATA LINK CONNECTOR (DLC)	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E62338</p>	<p>1 Measure the resistance between the LCM, connector C838, pin 3, circuit 5-EC7N (BU/RD), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes GO to M11. → No LOCATE and REPAIR the open circuit between the LCM and soldered connection S157 using the Wiring Diagrams. CHECK the operation of the system.

M11: CHECK FOR OPEN CIRCUIT BETWEEN THE LCM AND THE DLC	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E62339</p>	<p>1 Measure the resistance between the LCM, connector C838, pin 2, circuit 4-EC7N (GY/RD), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK the LCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the open circuit between the LCM and soldered connection S156 using the Wiring Diagrams. CHECK the operation of the system.

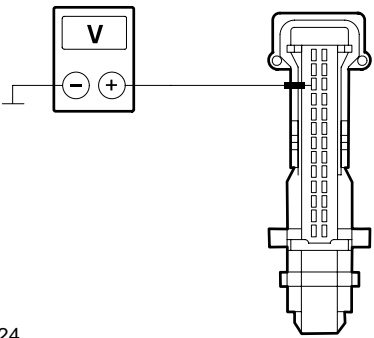
PINPOINT TEST N : ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE NOT COMMUNICATING WITH DIAGNOSTIC TESTER.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
N1: CHECK COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE (GEM)	
	<p>1 Ignition switch in position 0.</p> <p>2 Connect the diagnostic tool.</p>

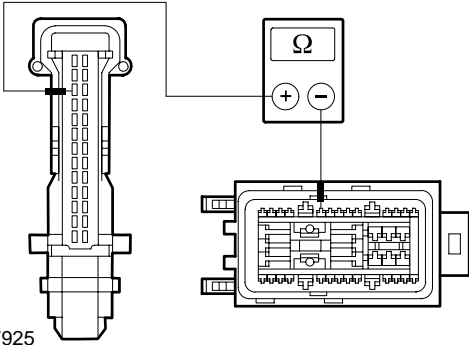
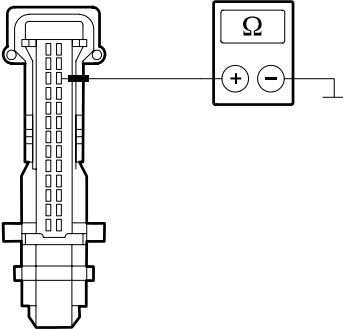
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Select the generic electronic module (GEM) with the diagnostic tester.</p> <ul style="list-style-type: none"> Is it possible to establish communication with the GEM? <p>→ Yes GO to N3.</p> <p>→ No GO to Pinpoint Test AD.</p>
N2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to N3.</p> <p>→ No GO to N5.</p>
N3: CHECK FUSE F102	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F102 (CJB).</p> <ul style="list-style-type: none"> Is the fuse OK? <p>→ Yes GO to N4.</p> <p>→ No RENEW fuse F102 (10 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
N4: CHECK THE VOLTAGE AT FUSE F102	
	<p>1 Connect Fuse F102 (CJB).</p> <p>2 Measure the voltage between fuse F102 (10 A) and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to N7.</p> <p>→ No REPAIR the voltage supply to fuse F102 using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
N5: CHECK FUSE F43	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 CHECK Fuse F43 (CJB). <ul style="list-style-type: none"> <li>• Is the fuse OK? <li>→ Yes GO to N6. <li>→ No RENEW fuse F43 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
N6: CHECK THE VOLTAGE AT FUSE F43	
	<ol style="list-style-type: none"> <li>1 Connect Fuse F43 (CJB). <li>2 Measure the voltage between fuse F43 (10 A) and ground. <ul style="list-style-type: none"> <li>• Is battery voltage measured? <li>→ Yes GO to N7. <li>→ No RECTIFY the voltage supply to fuse F43 using the Wiring Diagrams. CHECK the operation of the system.
N7: CHECK VOLTAGE AT THE EATC MODULE	
 <p>VFE0037924</p>	<ol style="list-style-type: none"> <li>1 Disconnect Connector C539 from EATC module. <li>2 Measure the voltage between the EATC module, connector C539, pin 11, circuit 29-FA94 (OG/BK), wiring harness side and ground. <ul style="list-style-type: none"> <li>• Is battery voltage measured? <li>→ Yes GO to N9. <li>→ No GO to N8.
N8: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE EATC MODULE	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 Disconnect Connector C102 from CJB.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037925</p>	<p>3 Measure the resistance between the CJB, connector C102, pin 10, circuit 29-FA94 (OG/BK), wiring harness side and the EATC module, connector C539, pin 11, circuit 29-FA94 (OG/BK), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 29-FA94 (OG/BK) between the EATC module and fuse F43 using the Wiring Diagrams. CHECK the operation of the system.
<p>N9: CHECK GROUND CONNECTION OF THE EATC MODULE</p>	
 <p>VFE0037926</p>	<p>1 Measure the resistance between the EATC module, connector C539, pin 24, circuit 91-FA94 (BK/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured? → Yes GO to N10. → No LOCATE and REPAIR the break in the affected circuit between the EATC module and ground connection G7 using the Wiring Diagrams. CHECK the operation of the system.
<p>N10: CHECK FOR OPEN CIRCUIT BETWEEN THE EATC MODULE AND THE DATA LINK CONNECTOR (DLC)</p>	
<p>CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
	<p>1 Disconnect Connector C540 from EATC module.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>E62340</p>	<p>2 Measure the resistance between the EATC module, connector C540, pin 19, circuit 5-EC10W (BU), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured? → Yes GO to N11. → No LOCATE and REPAIR the break in circuit 5-EC10W (BU) between the EATC module and soldered connection S114 using the Wiring Diagrams. CHECK the operation of the system.

N11: CHECK FOR OPEN CIRCUIT BETWEEN THE EATC MODULE AND THE DLC

⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.

<p>E62341</p>	<p>1 Measure the resistance between the EATC module, connector C540, pin 18, circuit 4-EC10W (GY), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC10M (GY), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured? → Yes CHECK and if necessary RENEW the EATC module. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 4-EC10W (GY) between the EATC module and soldered connection S113 using the Wiring Diagrams. CHECK the operation of the system.
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PINPOINT TEST O : FUEL ADDITIVE SYSTEM MODULE NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER - VEHICLES WITH DIESEL ENGINE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
O1: CHECK COMMUNICATION WITH THE POWERTRAIN CONTROL MODULE (PCM)	
	1 Ignition switch in position 0.
	2 Connect the diagnostic tool.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Select the powertrain control module (PCM) with the diagnostic tester.</p> <ul style="list-style-type: none"> • Is it possible to establish communication with the PCM? <p>→ Yes GO to O3.</p> <p>→ No GO to Pinpoint Test AE.</p>
O2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to O3.</p> <p>→ No GO to O5.</p>
O3: CHECK FUSE F102	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F102 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to O4.</p> <p>→ No RENEW fuse F102 (10 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
O4: CHECK THE VOLTAGE AT FUSE F102	
	<p>1 Connect Fuse F102 (CJB).</p> <p>2 Measure the voltage between fuse F102 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to O8.</p> <p>→ No REPAIR the voltage supply to fuse F102 using the Wiring Diagrams. CHECK the operation of the system.</p>

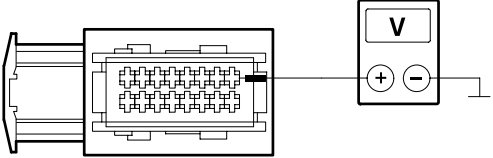
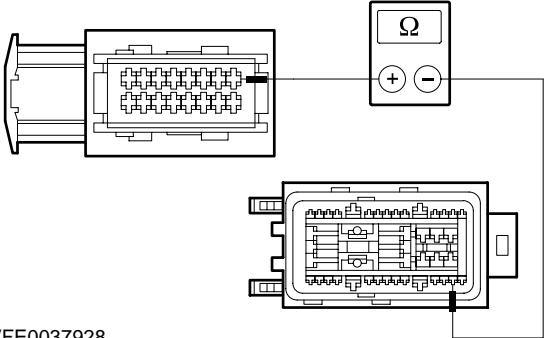
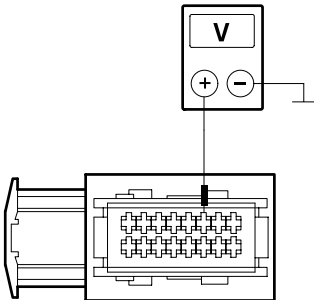
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
O5: CHECK FUSE F43	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F43 (CJB).</p> <ul style="list-style-type: none"> <li>• Is the fuse OK? <li>→ Yes GO to O6. <li>→ No RENEW fuse F43 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
O6: CHECK THE VOLTAGE AT FUSE F43	
	<p>1 Connect Fuse F43 (CJB).</p> <p>2 Measure the voltage between fuse F43 (10 A) and ground.</p> <ul style="list-style-type: none"> <li>• Is battery voltage measured? <li>→ Yes GO to O8. <li>→ No RECTIFY the voltage supply to fuse F43 using the Wiring Diagrams. CHECK the operation of the system.
O7: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> <li>• Is the location for connector C100 on the top of the CJB? <li>→ Yes GO to O8. <li>→ No GO to O10.
O8: CHECK FUSE F100	
	<p>1 CHECK Fuse F100 (CJB).</p> <ul style="list-style-type: none"> <li>• Is the fuse OK? <li>→ Yes GO to O9. <li>→ No RENEW fuse F100 (10 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.

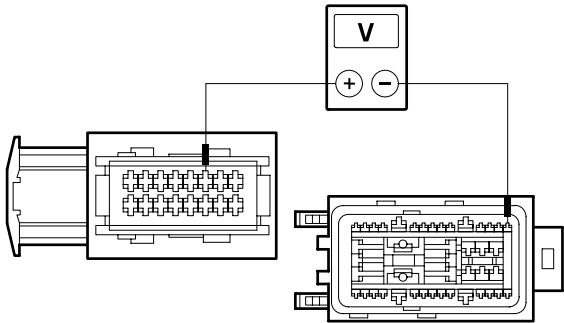
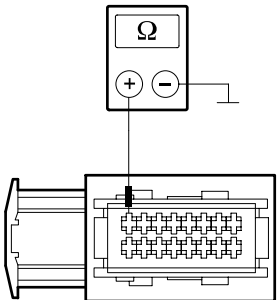
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
O9: CHECK THE VOLTAGE AT FUSE F100	
	<ol style="list-style-type: none"> 1 Connect Fuse F100 (CJB). 2 Ignition switch in position II. 3 Measure the voltage between fuse F100 (10 A) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to O12. → No REPAIR the voltage supply of fuse F100 using the wiring diagrams. CHECK the operation of the system.
O10: CHECK FUSE F70	
	<ol style="list-style-type: none"> 1 CHECK fuse F70 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to O11. → No RENEW fuse F70 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short circuit using the Wiring Diagrams.
O11: CHECK THE VOLTAGE AT FUSE F70	
	<ol style="list-style-type: none"> 1 Connect fuse F70 (CJB). 2 Ignition switch in position II. 3 Measure the voltage between fuse F70 (10 A) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to O12. → No RECTIFY the voltage supply to fuse F70 using the Wiring Diagrams. CHECK the operation of the system.
O12: CHECK THE VOLTAGE AT THE FUEL ADDITIVE SYSTEM MODULE (TERMINAL 30)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C985 from the fuel additive system module.

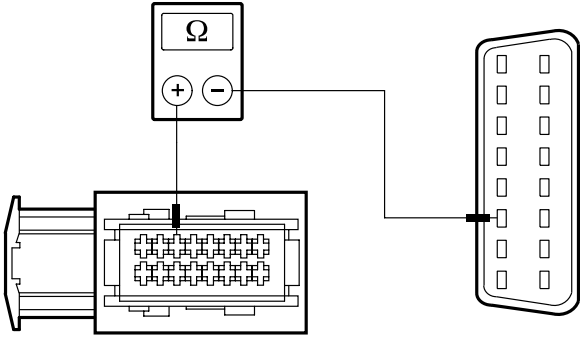
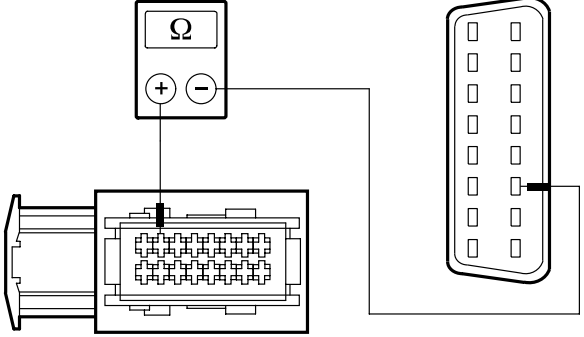
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0037927</p>	<p>3 Measure the voltage between the fuel additive system module, connector C985, pin 1, circuit 29-RE43 (OG/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to O14.</p> <p>→ No GO to O13.</p>
<p>O13: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE FUEL ADDITIVE SYSTEM MODULE.</p>	
 <p>VFE0037928</p>	<p>1 Disconnect Connector C100 from CJB.</p> <p>2 Measure the resistance between the CJB, connector C100, pin 2, circuit 29-RE43 (OG/YE), wiring harness side and the fuel additive system module, connector C985, pin 1, circuit 29-RE43 (OG/YE), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in circuit 29-RE43 (OG/YE) between the fuel additive system module and the CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>O14: CHECK THE VOLTAGE AT THE FUEL ADDITIVE SYSTEM MODULE (TERMINAL 15)</p>	
 <p>VFE0037929</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the fuel additive system module, connector C985, pin 3, circuit 15-RE43 (GN/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to O16.</p> <p>→ No GO to O15.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
O15: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE FUEL ADDITIVE SYSTEM MODULE.	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C100 from CJB.
 <p>VFE0038080</p>	<ol style="list-style-type: none"> 3 Measure the resistance between the CJB, connector C100, pin 3, circuit 15-RE43 (GN/YE), wiring harness side and the fuel additive system module, connector C985, pin 3, circuit 15-RE43 (GN/YE), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 15-RE43 (GN/YE) between the fuel additive system module and the CJB using the Wiring Diagrams. CHECK the operation of the system.
O16: CHECK THE GROUND CONNECTION OF THE FUEL ADDITIVE SYSTEM MODULE	
 <p>VFE0038081</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Measure the resistance between the fuel additive system module, connector C985, pin 8, circuit 31-RE43 (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to O17. → No LOCATE and REPAIR the break in the circuit between the fuel additive system module and ground connection G70 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
O17: CHECK FOR OPEN CIRCUIT BETWEEN THE FUEL ADDITIVE SYSTEM MODULE AND THE DATA LINK CONNECTOR (DLC)	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038082</p>	<p>1 Measure the resistance between the fuel additive system module, connector C985, pin 6, circuit 5-EC7V (BU/RD), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to O18. → No LOCATE and REPAIR the break in circuit 5-EC7V (BU/RD) between the fuel additive system module and soldered connection S182 using the Wiring Diagrams. CHECK the operation of the system.
O18: CHECK FOR OPEN CIRCUIT BETWEEN THE FUEL ADDITIVE SYSTEM MODULE AND THE DLC	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038083</p>	<p>1 Measure the resistance between the fuel additive system module, connector C985, pin 7, circuit 4-EC7V (GY/RD), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK and if necessary RENEW the fuel additive system module. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 4-EC7V (GY/RD) between the fuel additive system module and soldered connection S183 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

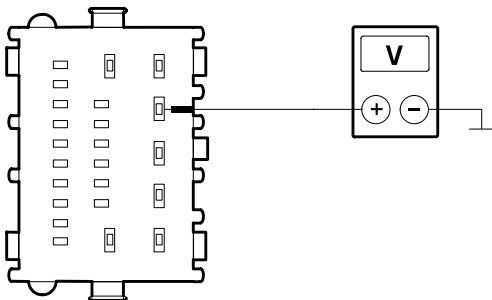
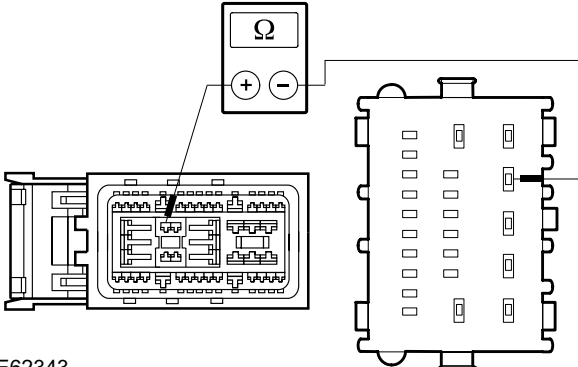
PINPOINT TEST P : KEYLESS VEHICLE MODULE NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
P1: CHECK COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE (GEM)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Connect the diagnostic tool. 3 Select the generic electronic module (GEM) with the diagnostic tester. <ul style="list-style-type: none"> • Is it possible to establish communication with the GEM? → Yes GO to P3. → No GO to Pinpoint Test AD.
P2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> 1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? → Yes GO to P3. → No GO to P5.
P3: CHECK FUSE F126	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F126 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to P4. → No RENEW fuse F126 (20 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
P4: CHECK THE VOLTAGE AT FUSE F126	
	<ol style="list-style-type: none"> 1 Connect Fuse F126 (CJB).

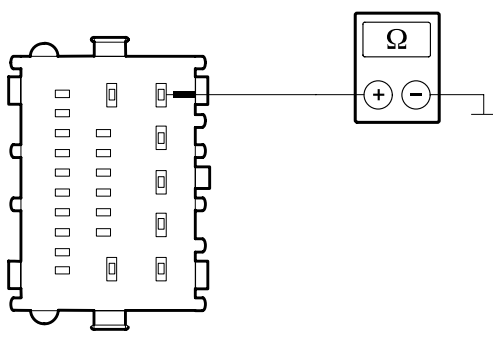
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the voltage between fuse F126 (20 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to P7.</p> <p>→ No RECTIFY the voltage supply to fuse F56 using the Wiring Diagrams. CHECK the operation of the system.</p>
P5: CHECK FUSE F56	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F56 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to P5.</p> <p>→ No RENEW fuse F56 (20 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
P6: CHECK THE VOLTAGE AT FUSE F56	
	<p>1 Connect Fuse F56 (CJB).</p> <p>2 Measure the voltage between fuse F56 (20 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to P7.</p> <p>→ No RECTIFY the voltage supply to fuse F56 using the Wiring Diagrams. CHECK the operation of the system.</p>
P7: CHECK THE VOLTAGE AT THE KEYLESS VEHICLE MODULE	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C217 from keyless vehicle module .</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E62342</p>	<p>3 Measure the voltage between the keyless vehicle module, connector C217, pin 4, circuit 29-AB11 (OG/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to P9.</p> <p>→ No GO to P8.</p>
P8: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE KEYLESS VEHICLE MODULE	
 <p>E62343</p>	<p>1 Disconnect Connector C100 from CJB.</p> <p>2 Measure the resistance between the CJB, connector C100, pin 21, circuit 29-AB11 (OG/WH), wiring harness side and the keyless vehicle module, connector C217, pin 4, circuit 29-AB11 (OG/WH), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes CHECK the CJB and RENEW as necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in circuit 29-AB11 (OG/WH) between the keyless vehicle module and the CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
P9: CHECK THE GROUND CONNECTION OF THE KEYLESS VEHICLE MODULE	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E62344</p>	<p>2 Measure the resistance between the keyless vehicle module, connector C217, pin 5, circuit 31-AB11 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes CHECK and if necessary RENEW the keyless vehicle module. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in circuit 31-AB11 (BK) between the keyless vehicle module and ground connection G77 (Cabriolet: ground connection G45) with the aid of the Wiring Diagrams. CHECK the operation of the system.</p>

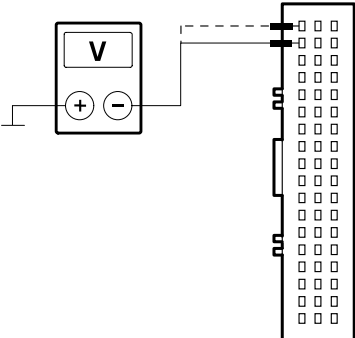
PINPOINT TEST Q : CONTROL MODULE FOR THE MOBILE ELECTRONIC AUXILIARY EQUIPMENT (PSE) NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
Q1: CHECK COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE (GEM)	
	<p>1 Ignition switch in position 0.</p> <p>2 Connect the diagnostic tool.</p> <p>3 Select the generic electronic module (GEM) with the diagnostic tester.</p> <ul style="list-style-type: none"> Is it possible to establish communication with the GEM? <p>→ Yes GO to Q3.</p> <p>→ No GO to Pinpoint Test AD.</p>
Q2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to Q3.</p> <p>→ No GO to Q5.</p>
Q3: CHECK FUSE F112	
	<p>1 Ignition switch in position 0.</p>

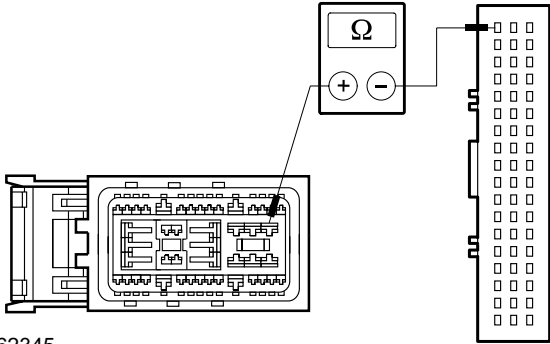
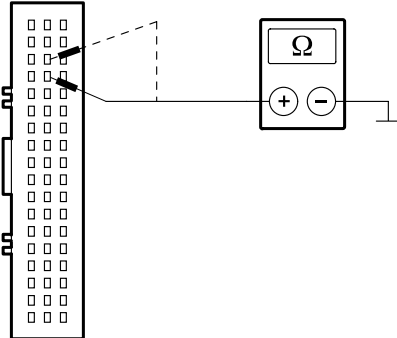
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK Fuse F112 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to Q4.</p> <p>→ No RENEW fuse F112 (15 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
Q4: CHECK THE VOLTAGE AT FUSE F112	
	<p>1 Connect Fuse F112 (CJB).</p> <p>2 Measure the voltage between fuse F112 (15 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to Q7.</p> <p>→ No REPAIR the voltage supply of fuse F112 using the wiring diagrams. CHECK the operation of the system.</p>
Q5: CHECK FUSE F58	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F58 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to Q6.</p> <p>→ No RENEW fuse F58 (15 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
Q6: CHECK THE VOLTAGE AT FUSE F58	
	<p>1 Connect Fuse F58 (CJB).</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the voltage between fuse F58 (15 A) and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to Q7.</p> <p>→ No RECTIFY the voltage supply to fuse F58 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>Q7: CHECK THE VOLTAGE AT THE PSE MODULE</p>	
	<p>1 Disconnect Connector C432 from the PSE module.</p>
 <p>E61587</p>	<p>2 Measure the voltage between the PSE module, connector C432, pin 17, circuit 29-MC12C (OG/YE), wiring harness side and ground.</p>
	<p>3 Measure the voltage between the PSE module, connector C432, pin 18, circuit 29-MC12B (OG/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured in both cases? <p>→ Yes</p> <ul style="list-style-type: none"> Vehicles with navigation system: GO to Q9. Vehicles without navigation system: GO to Q10. <p>→ No</p> <ul style="list-style-type: none"> If battery voltage is not measured during one measurement: LOCATE and REPAIR the break in the relevant circuit between the PSE module and soldered connection S135 using the Wiring Diagrams. CHECK the operation of the system. If battery voltage is not measured during both measurements: GO to Q8.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
Q8: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE PSE MODULE.	
 <p>E62345</p>	<ol style="list-style-type: none"> 1 Disconnect Connector C102 from CJB. 2 Measure the resistance between the CJB, connector C102, pin 16, circuit 29-MD1 (OG/YE), wiring harness side and the PSE module, connector C432, pin 18, circuit 29-MC12B (OG/YE), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between soldered connection S135 and the CJB using the Wiring Diagrams. CHECK the operation of the system.
Q9: CHECK THE GROUND CONNECTION OF THE PSE MODULE - VEHICLES WITH NAVIGATION SYSTEM	
 <p>E61589</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the PSE module, connector C432, pin 33, circuit 91-MC12C (BK/YE), wiring harness side and ground.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the resistance between the PSE module, connector C432, pin 34, circuit 91-MC12D (BK/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured in both cases? <p>→ Yes GO to Q11.</p> <p>→ No</p> <ul style="list-style-type: none"> If a resistance of more than 2 Ohms is measured in one of the measurements: LOCATE and REPAIR the break in the relevant circuit between the PSE module and soldered connection S136 using the Wiring Diagrams. CHECK the operation of the system. If a resistance of more than 2 Ohms is measured in both of the measurements: LOCATE and REPAIR the break in circuit 91-MD1 (BK/YE) between soldered connection S136 and ground connection G6 using the Wiring Diagrams. CHECK the operation of the system.

Q10: CHECK THE GROUND CONNECTION OF THE PSE MODULE - VEHICLES WITHOUT A NAVIGATION SYSTEM

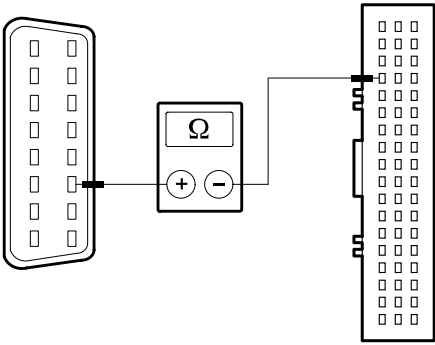
<p>E61589</p>	<p>1 Measure the resistance between the PSE module, connector C432, pin 33, circuit 91-MC12 (BK/YE), wiring harness side and ground.</p>
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DIAGNOSIS AND TESTING

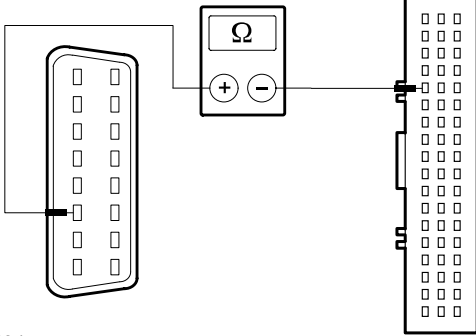
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the resistance between the PSE module, connector C432, pin 34, circuit 91-MC12A (BK/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured in both cases? <p>→ Yes GO to Q11.</p> <p>→ No LOCATE and REPAIR the break in the relevant circuit between the PSE module and ground connection G6 using the Wiring Diagrams. CHECK the operation of the system.</p>

Q11: CHECK FOR OPEN CIRCUIT BETWEEN THE PSE MODULE AND THE DATA LINK CONNECTOR (DLC)

CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.

 <p>E61590</p>	<p>1 Measure the resistance between the PSE module, connector C432, pin 15, circuit 5-EC10DE (BU), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to Q12.</p> <p>→ No LOCATE and REPAIR the break in the circuit between the PSE module and connector C112 using the Wiring Diagrams. CHECK the operation of the system.</p>
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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
Q12: CHECK FOR OPEN CIRCUIT BETWEEN THE PSE MODULE AND THE DLC	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E61591</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the PSE module, connector C487, pin 14, circuit 4-EC10DE (GY), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the PSE module. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the PSE module and connector C112 using the Wiring Diagrams. CHECK the operation of the system.

PINPOINT TEST R : ADDITIONAL INSTRUMENT CLUSTER NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER - VEHICLES WITH 2.5L ENGINE.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
R1: CHECK COMMUNICATION WITH THE POWERTRAIN CONTROL MODULE (PCM)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Connect the diagnostic tool. 3 Select the powertrain control module (PCM) with the diagnostic tester. <ul style="list-style-type: none"> • Is it possible to establish communication with the PCM? <ul style="list-style-type: none"> → Yes GO to R3. → No GO to Pinpoint Test AE.
R2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> 1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <ul style="list-style-type: none"> → Yes GO to R3. → No GO to R5.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
R3: CHECK FUSE F107	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F107 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to R4. → No RENEW fuse F107 (10 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
R4: CHECK THE VOLTAGE AT FUSE F107	
	<ol style="list-style-type: none"> 1 Connect Fuse F107 (CJB). 2 Measure the voltage between fuse F107 (10 A) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to R8. → No REPAIR the voltage supply of fuse F107 using the wiring diagrams. CHECK the operation of the system.
R5: CHECK FUSE F46	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F46 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to R6. → No RENEW fuse F46 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
R6: CHECK THE VOLTAGE AT FUSE F46	
	<ol style="list-style-type: none"> 1 Connect Fuse F46 (CJB).

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the voltage between fuse F46 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to R8.</p> <p>→ No RECTIFY the voltage supply to fuse F46 using the Wiring Diagrams. CHECK the operation of the system.</p>
R7: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to R8.</p> <p>→ No GO to R10.</p>
R8: CHECK FUSE F108	
	<p>1 CHECK Fuse F108 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to R9.</p> <p>→ No RENEW fuse F108 (7.5 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
R9: CHECK THE VOLTAGE AT FUSE F108	
	<p>1 Connect Fuse F108 (CJB).</p> <p>2 Ignition switch in position I.</p> <p>3 Measure the voltage between fuse F108 (7.5 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to R13.</p> <p>→ No REPAIR the voltage supply of fuse F108 using the wiring diagrams. CHECK the operation of the system.</p>

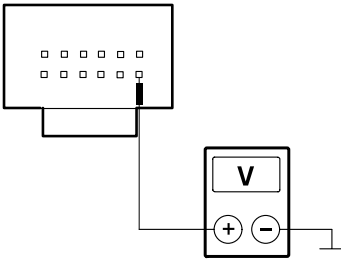
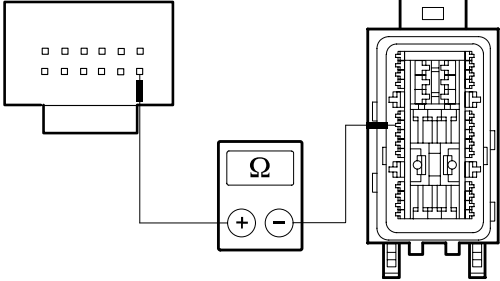
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
R10: CHECK FUSE F68	
	<p>1 CHECK Fuse F68 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to R11.</p> <p>→ No RENEW fuse F68 (7.5 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
R11: CHECK THE VOLTAGE AT FUSE F68	
	<p>1 Connect Fuse F68 (CJB).</p> <p>2 Ignition switch in position I.</p> <p>3 Measure the voltage between fuse F68 (7.5 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to R13.</p> <p>→ No RECTIFY the voltage supply to fuse F68 using the Wiring Diagrams. CHECK the operation of the system.</p>
R12: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to R13.</p> <p>→ No GO to R15.</p>
R13: CHECK FUSE F114	
	<p>1 Ignition switch in position 0.</p>

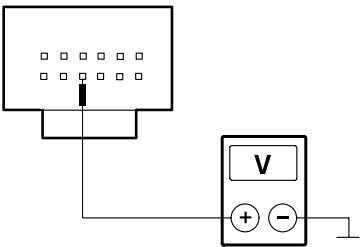
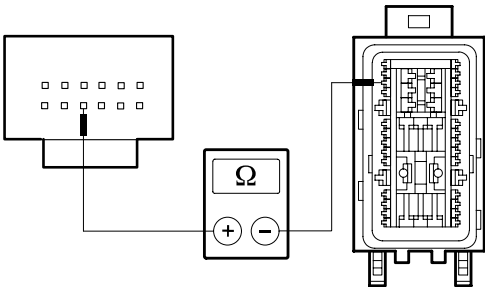
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK Fuse F114 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to R14.</p> <p>→ No RENEW fuse F114 (10 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
R14: CHECK THE VOLTAGE AT FUSE F114	
	<p>1 Connect Fuse F114 (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F114 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to R17.</p> <p>→ No REPAIR the voltage supply of fuse F114 using the wiring diagrams. CHECK the operation of the system.</p>
R15: CHECK FUSE F67	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F67 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to R16.</p> <p>→ No RENEW fuse F67 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
R16: CHECK THE VOLTAGE AT FUSE F67	
	<p>1 Connect Fuse F67 (CJB).</p> <p>2 Ignition switch in position II.</p>

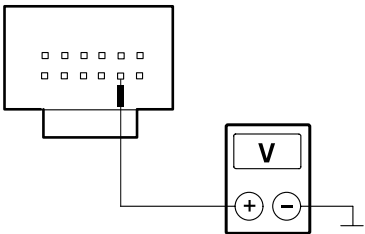
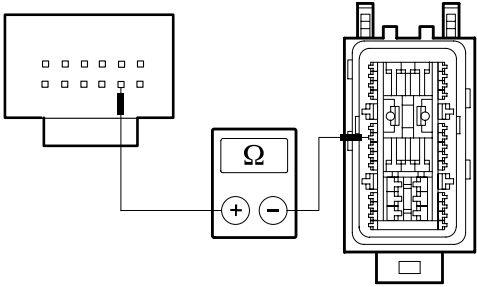
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between fuse F67 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to R17. → No RECTIFY the voltage supply to fuse F67 using the Wiring Diagrams. CHECK the operation of the system.
<p>R17: CHECK THE VOLTAGE AT THE ADDITIONAL INSTRUMENT CLUSTER (TERMINAL 30)</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C826 from the additional instrument cluster.</p>
 <p>E68447</p>	<p>3 Measure the voltage between the additional instrument cluster, connector C826, pin 1, circuit 29-GG14R (OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to R19. → No GO to R18.
<p>R18: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE ADDITIONAL INSTRUMENT CLUSTER</p>	
 <p>E68452</p>	<p>1 Disconnect Connector C102 from CJB.</p> <p>2 Measure the resistance between the CJB, connector C102, pin 7, circuit 29-GG14R (OG), wiring harness side and the additional instrument cluster, connector C826, pin 1, circuit 29-GG14R (OG), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 29-GG14R (OG) between the additional instrument cluster and the CJB using the Wiring Diagrams. CHECK the operation of the system.

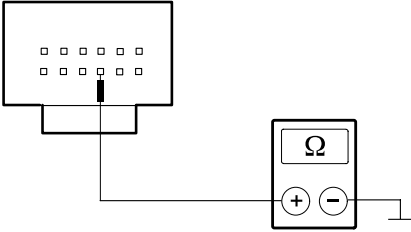
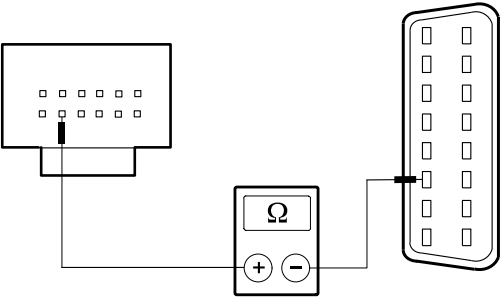
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
R19: CHECK THE VOLTAGE AT THE ADDITIONAL INSTRUMENT CLUSTER (TERMINAL 75)	
 <p>E68448</p>	<ol style="list-style-type: none"> 1 Ignition switch in position I. 2 Measure the voltage between the additional instrument cluster, connector C826, pin 4, circuit 75-GG14C (YE/BU), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to R21. → No GO to S20.
R20: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE ADDITIONAL INSTRUMENT CLUSTER	
 <p>E68451</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C102 from CJB. 3 Measure the resistance between the CJB, connector C102, pin 3, circuit 75-DA2 (YE/RD), wiring harness side and the additional instrument cluster, connector C826, Pin 4, circuit 75-GG14C (YE/BU), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK the CJB and RENEW as necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the additional instrument cluster and the CJB using the Wiring Diagrams. CHECK the operation of the system.
R21: CHECK THE VOLTAGE AT THE ADDITIONAL INSTRUMENT CLUSTER (TERMINAL 15)	
	<ol style="list-style-type: none"> 1 Ignition switch in position II.

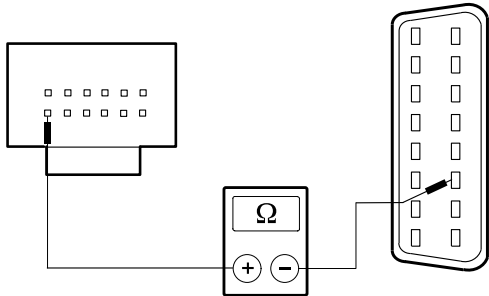
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E68449</p>	<p>2 Measure the voltage between the additional instrument cluster, connector C826, pin 2, circuit 15-GG14C (GN/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to S23. → No GO to S22.
<p>R22: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE ADDITIONAL INSTRUMENT CLUSTER</p>	
 <p>E68450</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C102 from CJB.</p> <p>3 Measure the resistance between the CJB, connector C102, pin 40, circuit 15-GG14A (GN/RD), wiring harness side and the additional instrument cluster, connector C826, Pin 2, circuit 15-GG14C (GN/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the additional instrument cluster and the CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>R23: CHECK THE GROUND CONNECTION OF THE ADDITIONAL INSTRUMENT CLUSTER</p>	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E68446</p>	<p>2 Measure the resistance between the additional instrument cluster, connector C826, pin 3, circuit 91-GG14L (BK/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes GO to S24.</p> <p>→ No LOCATE and RECTIFY the open circuit in circuit 91-GG14L (BK/OG) between the additional instrument cluster and soldered connection S12 with the aid of the Wiring Diagrams. CHECK the operation of the system.</p>
<p>R24: CHECK THE CIRCUIT BETWEEN THE ADDITIONAL INSTRUMENT CLUSTER AND THE DATA LINK CONNECTOR (DLC) FOR OPEN CIRCUIT</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E68445</p>	<p>1 Measure the resistance between the additional instrument cluster, connector C826, pin 5, circuit 5-EC7Z (BU/RD), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to S25.</p> <p>→ No LOCATE and REPAIR the open circuit between the additional instrument cluster and soldered connection S130 using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>R25: CHECK THE CIRCUIT BETWEEN ADDITIONAL INSTRUMENT CLUSTER AND THE DLC FOR OPEN</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E68444</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the additional instrument cluster, connector C826, pin 6, circuit 4-EC7Z (GY/RD), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK the additional instrument cluster and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the open circuit between the additional instrument cluster and soldered connection S129 using the Wiring Diagrams. CHECK the operation of the system.

PINPOINT TEST S : ELECTRONIC INSTRUMENT CLUSTER NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>S1: CHECK COMMUNICATION WITH THE POWERTRAIN CONTROL MODULE (PCM)</p>	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Connect the diagnostic tool. 3 Select the powertrain control module (PCM) with the diagnostic tester. <ul style="list-style-type: none"> • Is it possible to establish communication with the PCM? <ul style="list-style-type: none"> → Yes GO to S3. → No GO to Pinpoint Test AE.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
S2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to S3.</p> <p>→ No GO to S5.</p>
S3: CHECK FUSE F107	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F107 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to S4.</p> <p>→ No RENEW fuse F107 (10 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
S4: CHECK THE VOLTAGE AT FUSE F107	
	<p>1 Connect Fuse F107 (CJB).</p> <p>2 Measure the voltage between fuse F107 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to S8.</p> <p>→ No REPAIR the voltage supply of fuse F107 using the wiring diagrams. CHECK the operation of the system.</p>
S5: CHECK FUSE F46	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK fuse F46 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to S6.</p> <p>→ No RENEW fuse F46 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short using the Wiring Diagrams.</p>
S6: CHECK THE VOLTAGE AT FUSE F46	
	<p>1 Connect fuse F46 (CJB).</p> <p>2 Measure the voltage between fuse F46 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to S8.</p> <p>→ No REPAIR the voltage supply to fuse F46 using the Wiring Diagrams. CHECK the operation of the system.</p>
S7: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to S8.</p> <p>→ No GO to S10.</p>
S8: CHECK FUSE F108	
	<p>1 CHECK Fuse F108 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to S9.</p> <p>→ No RENEW fuse F108 (7.5 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
S9: CHECK THE VOLTAGE AT FUSE F108	
	<p>1 Connect Fuse F108 (CJB).</p>

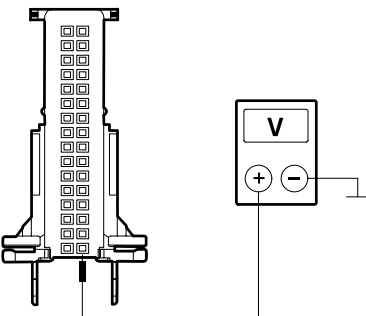
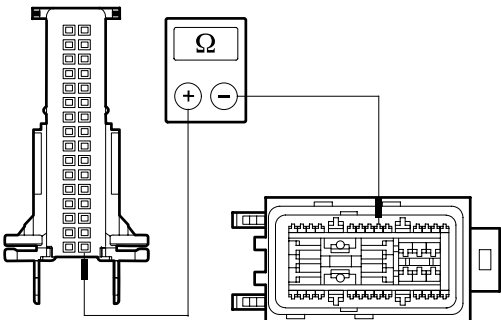
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Ignition switch in position I.</p> <p>3 Measure the voltage between fuse F108 (7.5 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to S13.</p> <p>→ No REPAIR the voltage supply of fuse F108 using the wiring diagrams. CHECK the operation of the system.</p>
S10: CHECK FUSE F68	
	<p>1 CHECK Fuse F68 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to S11.</p> <p>→ No RENEW fuse F68 (7.5 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
S11: CHECK THE VOLTAGE AT FUSE F68	
	<p>1 Connect Fuse F68 (CJB).</p> <p>2 Ignition switch in position I.</p> <p>3 Measure the voltage between fuse F68 (7.5 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to S13.</p> <p>→ No RECTIFY the voltage supply to fuse F68 using the Wiring Diagrams. CHECK the operation of the system.</p>
S12: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to S13.</p> <p>→ No GO to S15.</p>

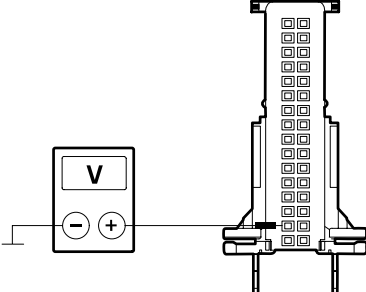
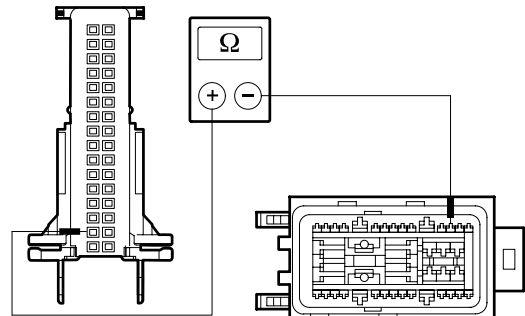
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
S13: CHECK FUSE F114	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F114 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to S14. → No RENEW fuse F114 (10 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
S14: CHECK THE VOLTAGE AT FUSE F114	
	<ol style="list-style-type: none"> 1 Connect Fuse F114 (CJB). 2 Ignition switch in position II. 3 Measure the voltage between fuse F114 (10 A) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to S17. → No REPAIR the voltage supply of fuse F114 using the wiring diagrams. CHECK the operation of the system.
S15: CHECK FUSE F67	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK fuse F67 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to S16. → No RENEW fuse F67 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short using the Wiring Diagrams.
S16: CHECK THE VOLTAGE AT FUSE F67	
	<ol style="list-style-type: none"> 1 Connect fuse F67 (CJB). 2 Ignition switch in position II.

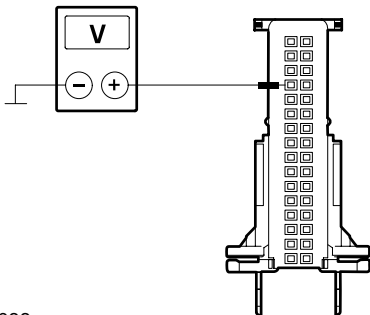
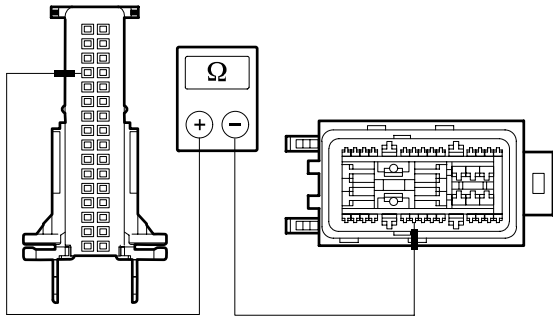
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between fuse F67 (10 A) and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to S17.</p> <p>→ No REPAIR the voltage supply to fuse F67 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>S17: CHECK THE VOLTAGE AT THE ELECTRONIC INSTRUMENT CLUSTER (TERMINAL 30)</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C809 from electronic instrument cluster.</p>
 <p>VFE0038084</p>	<p>3 Measure the voltage between the electronic instrument cluster, connector C809, pin 32, circuit 29-GG14 (OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to S19.</p> <p>→ No GO to S18.</p>
<p>S18: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE ELECTRONIC INSTRUMENT CLUSTER</p>	
 <p>VFE0038085</p>	<p>1 Disconnect Connector C102 from CJB.</p> <p>2 Measure the resistance between the CJB, connector C102, pin 7, circuit 29-GG14 (OG), wiring harness side and the electronic instrument cluster, connector C809, pin 32, circuit 29-GG14 (OG), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured? <p>→ Yes CHECK the CJB and RENEW as required. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in circuit 29-GG14 (OG) between the electronic instrument cluster and the CJB using the Wiring Diagrams. CHECK the operation of the system.</p>

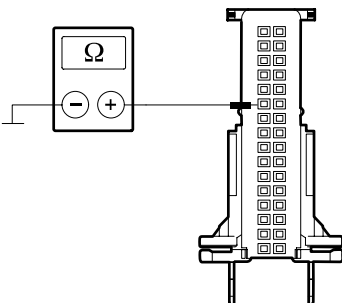
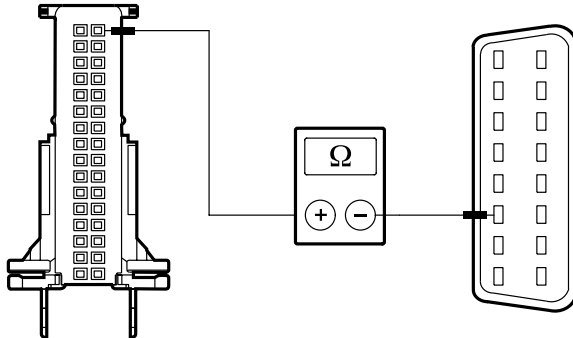
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
S19: CHECK THE VOLTAGE AT THE ELECTRONIC INSTRUMENT CLUSTER (TERMINAL 75)	
 <p>VFE0038086</p>	<ol style="list-style-type: none"> 1 Ignition switch in position I. 2 Measure the voltage between the electronic instrument cluster, connector C809, pin 15, circuit 75-GG14A (YE/BU), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to S21. → No GO to S20.
S20: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE ELECTRONIC INSTRUMENT CLUSTER	
 <p>VFE0038087</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C102 from CJB. 3 Measure the resistance between the CJB, connector C102, pin 3, circuit 75-GG14A (YE/BU) (vehicles with navigation system and/or DVD player: circuit 75-DA2 (YE/RD)), wiring harness side and the electronic instrument cluster, connector C809, pin 15, circuit 75-GG14A (YE/BU), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the electronic instrument cluster and the CJB using the Wiring Diagrams. CHECK the operation of the system.
S21: CHECK THE VOLTAGE AT THE ELECTRONIC INSTRUMENT CLUSTER (TERMINAL 15)	
	<ol style="list-style-type: none"> 1 Ignition switch in position II.

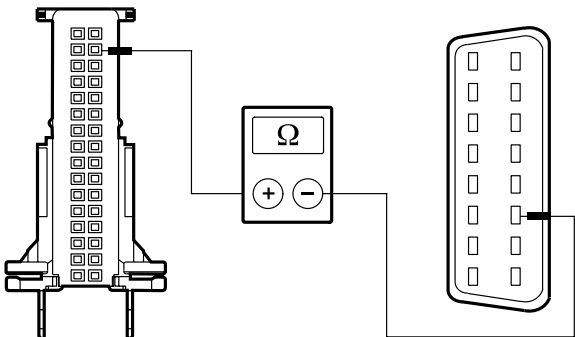
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038088</p>	<p>2 Measure the voltage between the electronic instrument cluster, connector C809, pin 4, circuit 15-GG14 (GN/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to S23. → No GO to S22.
<p>S22: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE ELECTRONIC INSTRUMENT CLUSTER</p>	
 <p>VFE0038089</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C102 from CJB.</p> <p>3 Measure the resistance between the CJB, connector C102, pin 40, circuit 15-GG14 (GN/RD), wiring harness side and the electronic instrument cluster, connector C809, Pin 4, circuit 15-GG14 (GN/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and RECTIFY the break in circuit 15-GG14 (GN/RD) between the electronic instrument cluster and the CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>S23: CHECK THE GROUND CONNECTION OF THE ELECTRONIC INSTRUMENT CLUSTER</p>	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038090</p>	<p>2 Measure the resistance between the electronic instrument cluster, connector C809, pin 6, circuit 91-GG14 (BK/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to S24. → No LOCATE and RECTIFY the open circuit between the electronic instrument cluster and ground connection G7 using the Wiring Diagrams. CHECK the operation of the system.
<p>S24: CHECK FOR OPEN CIRCUIT BETWEEN THE ELECTRONIC INSTRUMENT CLUSTER AND THE DATA LINK CONNECTOR (DLC)</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038091</p>	<p>1 Measure the resistance between the electronic instrument cluster, connector C809, pin 17, circuit 5-EC7H (BU/RD), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to S25. → No LOCATE and RECTIFY the break in the circuit between the electronic instrument cluster and soldered connection S128 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>S25: CHECK FOR OPEN CIRCUIT BETWEEN THE ELECTRONIC INSTRUMENT CLUSTER AND THE DLC</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038092</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the electronic instrument cluster, connector C809, pin 18, circuit 4-EC7H (GY/RD), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the electronic instrument cluster. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the electronic instrument cluster and soldered connection S127 using the Wiring Diagrams. CHECK the operation of the system.

PINPOINT TEST T : NAVIGATION SYSTEM SCREEN MODULE NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER - VEHICLES EQUIPPED WITH DVD NAVIGATION SYSTEM WITH TOUCHSCREEN

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>T1: CHECK COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE (GEM)</p>	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Connect the diagnostic tool. 3 Select the generic electronic module (GEM) with the diagnostic tester. <ul style="list-style-type: none"> • Is it possible to establish communication with the GEM? <ul style="list-style-type: none"> → Yes GO to T3. → No GO to Pinpoint Test AD.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
T2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to T3.</p> <p>→ No GO to T5.</p>
T3: CHECK FUSE F112	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F112 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to T4.</p> <p>→ No RENEW fuse F112 (15 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
T4: CHECK THE VOLTAGE AT FUSE F112	
	<p>1 Connect Fuse F112 (CJB).</p> <p>2 Measure the voltage between fuse F112 (15 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to T8.</p> <p>→ No REPAIR the voltage supply of fuse F112 using the wiring diagrams. CHECK the operation of the system.</p>
T5: CHECK FUSE F58	
	<p>1 Ignition switch in position 0.</p>

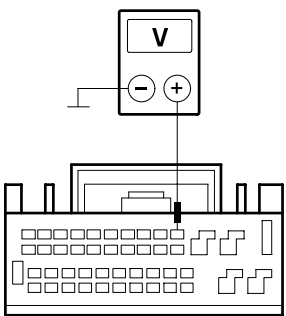
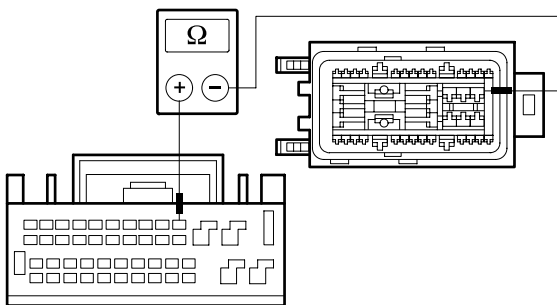
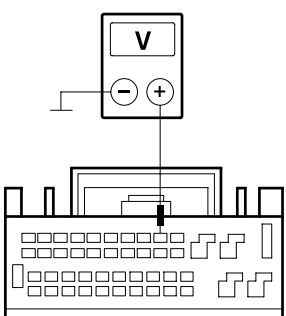
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK Fuse F58 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to T9.</p> <p>→ No RENEW fuse F58 (15 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
T6: CHECK THE VOLTAGE AT FUSE F58	
	<p>1 Connect Fuse F58 (CJB).</p> <p>2 Measure the voltage between fuse F58 (15 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to T8.</p> <p>→ No RECTIFY the voltage supply to fuse F58 using the Wiring Diagrams. CHECK the operation of the system.</p>
T7: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to T8.</p> <p>→ No GO to T10.</p>
T8: CHECK FUSE F108	
	<p>1 CHECK Fuse F108 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to T9.</p> <p>→ No RENEW fuse F108 (7.5 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
T9: CHECK THE VOLTAGE AT FUSE F108	
	<p>1 Connect Fuse F108 (CJB).</p>

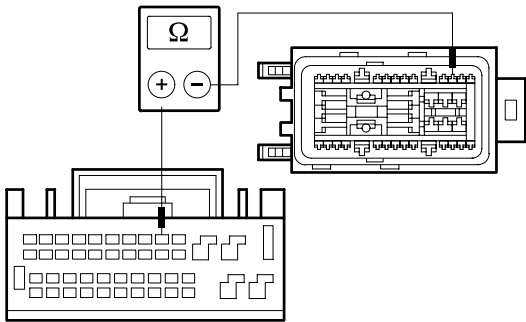
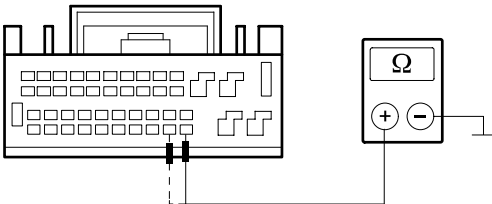
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Ignition switch in position I.</p> <p>3 Measure the voltage between fuse F108 (7.5 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to T12.</p> <p>→ No REPAIR the voltage supply of fuse F108 using the wiring diagrams. CHECK the operation of the system.</p>
T10: CHECK FUSE F68	
	<p>1 CHECK fuse F68 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to T11.</p> <p>→ No RENEW fuse F68 (7.5 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short using the Wiring Diagrams.</p>
T11: CHECK THE VOLTAGE AT FUSE F68	
	<p>1 Connect fuse F68 (CJB).</p> <p>2 Ignition switch in position I.</p> <p>3 Measure the voltage between fuse F68 (7.5 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to T12.</p> <p>→ No REPAIR the voltage supply to fuse F68 using the Wiring Diagrams. CHECK the operation of the system.</p>
T12: CHECK THE VOLTAGE AT THE NAVIGATION SYSTEM SCREEN MODULE	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C487 from navigation system screen module.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038093</p>	<p>3 Measure the voltage between the navigation system screen module, connector C487, pin 1, circuit 29-GK49 (OG/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to T14.</p> <p>→ No GO to T13.</p>
<p>T13: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE NAVIGATION SYSTEM SCREEN MODULE.</p>	
 <p>VFE0038094</p>	<p>1 Disconnect Connector C102 from CJB.</p> <p>2 Measure the resistance between the CJB, connector C102, pin 16, circuit 29-MD1 (OG/YE), wiring harness side and the navigation system screen module, connector C487, pin 1, circuit 29-GK49 (OG/BK), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured? <p>→ Yes CHECK the CJB and RENEW as necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in the circuit between the navigation system screen module and the CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>T14: CHECK THE VOLTAGE AT THE NAVIGATION SYSTEM SCREEN MODULE</p>	
 <p>VFE0038095</p>	<p>1 Ignition switch in position I.</p> <p>2 Measure the voltage between the navigation system screen module, connector C487, pin 2, circuit 75-GK49 (YE/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to T16.</p> <p>→ No GO to T15.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
T15: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE NAVIGATION SYSTEM SCREEN MODULE.	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C102 from CJB.
 <p>VFE0038096</p>	<ol style="list-style-type: none"> 3 Measure the resistance between the CJB, connector C102, pin 3, circuit 75-DA2 (YE/RD), wiring harness side and the navigation system screen module, connector C487, pin 2, circuit 75-GK49 (YE/GN), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the navigation system screen module and the CJB using the Wiring Diagrams. CHECK the operation of the system.
T16: CHECK THE GROUND CONNECTION OF THE NAVIGATION SYSTEM SCREEN MODULE	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.
 <p>VFE0038097</p>	<ol style="list-style-type: none"> 2 Measure the resistance between the navigation system screen module, connector C487, pin 11, circuit 91-GK49 (BK/GN), wiring harness side and ground.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the resistance between the navigation system screen module, connector C487, pin 12, circuit 91-GK49A (BK/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured in both cases? <p>→ Yes GO to T17.</p> <p>→ No</p> <ul style="list-style-type: none"> - If a resistance of more than 2 Ohms is measured in one of the measurements: LOCATE and REPAIR the break in the relevant circuit between the navigation system screen module and soldered connection S136 using the Wiring Diagrams. CHECK the operation of the system. - If a resistance of more than 2 Ohms is measured in both of the measurements: LOCATE and REPAIR the break in circuit 91-MD1 (BK/YE) between soldered connection S136 and ground connection G6 using the Wiring Diagrams. CHECK the operation of the system.

T17: CHECK FOR OPEN CIRCUIT BETWEEN THE NAVIGATION SYSTEM SCREEN MODULE AND THE DATA LINK CONNECTOR (DLC)

⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.

<p>E45692</p>	<p>1 Measure the resistance between the navigation system screen module, connector C487, pin 15, circuit 5-EC10P (BU), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to T18.</p> <p>→ No LOCATE and RECTIFY the break in circuit 5-EC10P (BU) between the navigation system screen module and soldered connection S84 using the Wiring Diagrams. CHECK the operation of the system.</p>
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DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
T18: CHECK FOR OPEN CIRCUIT BETWEEN THE NAVIGATION SYSTEM SCREEN MODULE AND THE DLC	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
<p>E45693</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the navigation system screen module, connector C487, pin 5, circuit 4-EC10P (GY), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the navigation system screen module. CHECK the operation of the system. → No LOCATE and RECTIFY the break in circuit 4-EC10P (GY) between the navigation system screen module and soldered connection S83 using the Wiring Diagrams. CHECK the operation of the system.

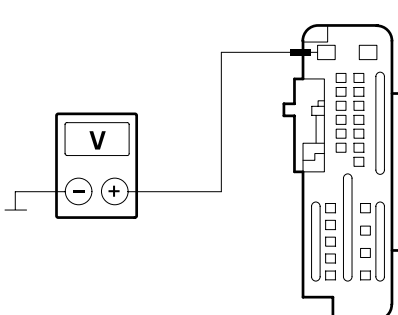
PINPOINT TEST U : NAVIGATION SYSTEM MODULE NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER - VEHICLES EQUIPPED WITH DVD NAVIGATION SYSTEM WITH TOUCH SCREEN

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
U1: CHECK COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE (GEM)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Connect the diagnostic tool. 3 Select the generic electronic module (GEM) with the diagnostic tester. <ul style="list-style-type: none"> • Is it possible to establish communication with the GEM? <ul style="list-style-type: none"> → Yes GO to U3. → No GO to Pinpoint Test AD.

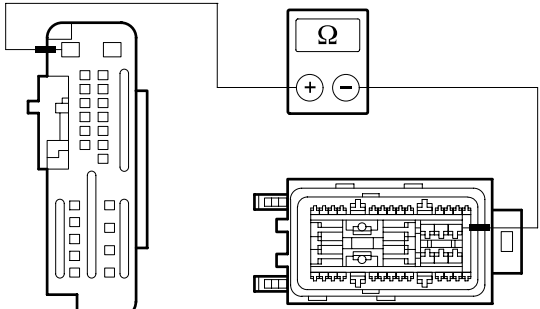
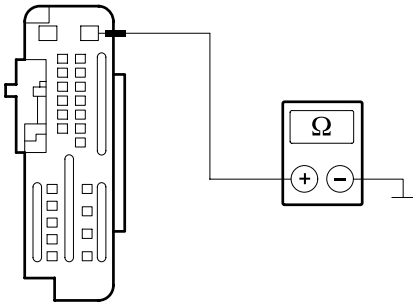
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
U2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> 1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? → Yes GO to U3. → No GO to U5.
U3: CHECK FUSE F112	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F112 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to U4. → No RENEW fuse F112 (15 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
U4: CHECK THE VOLTAGE AT FUSE F112	
	<ol style="list-style-type: none"> 1 Connect Fuse F112 (CJB). 2 Measure the voltage between fuse F112 (15 A) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to U7. → No REPAIR the voltage supply of fuse F112 using the wiring diagrams. CHECK the operation of the system.
U5: CHECK FUSE F58	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

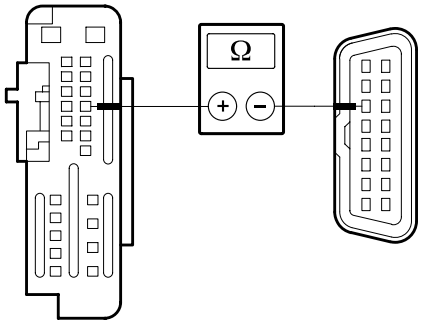
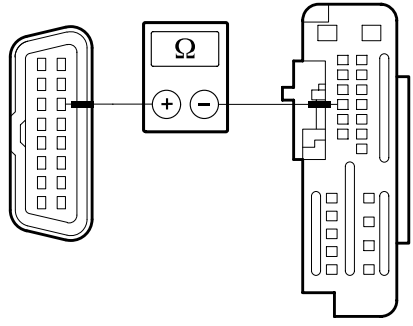
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK Fuse F58 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to U6.</p> <p>→ No RENEW fuse F58 (15 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
U6: CHECK THE VOLTAGE AT FUSE F58	
	<p>1 Connect Fuse F58 (CJB).</p> <p>2 Measure the voltage between fuse F58 (15 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to U7.</p> <p>→ No RECTIFY the voltage supply to fuse F58 using the Wiring Diagrams. CHECK the operation of the system.</p>
U7: CHECK THE VOLTAGE AT THE NAVIGATION SYSTEM MODULE	
 <p>VFE0038100</p>	<p>1 Disconnect Connector C457 from the navigation system module.</p> <p>2 Measure the voltage between the navigation system module, connector C457, pin 1, circuit 29-GK8 (OG/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to U9.</p> <p>→ No GO to U8.</p>
U8: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE NAVIGATION SYSTEM MODULE.	
	<p>1 Disconnect Connector C102 from CJB.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038101</p>	<p>2 Measure the resistance between the CJB, connector C102, pin 16, circuit 29-MD1 (OG/YE), wiring harness side and the navigation system module, connector C457, pin 1, circuit 29-GK8 (OG/GN), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the navigation system module and the CJB using the Wiring Diagrams. CHECK the operation of the system.
U9: CHECK THE GROUND CONNECTION OF THE NAVIGATION SYSTEM MODULE	
 <p>VFE0038102</p>	<p>1 Measure the resistance between the navigation system module, connector C457, pin 13, circuit 91-GK8 (BK/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to U10. → No LOCATE and REPAIR the break in the circuit between the navigation system module and ground connection G6 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

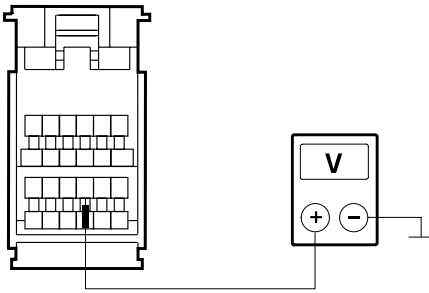
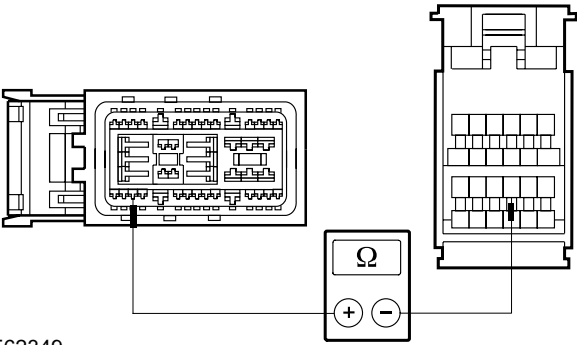
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
U10: CHECK FOR OPEN CIRCUIT BETWEEN THE NAVIGATION SYSTEM MODULE AND THE DATA LINK CONNECTOR (DLC)	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E62346</p>	<p>1 Measure the resistance between the navigation system module, connector C457, pin 17, circuit 5-EC10SE (BU), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to U11. → No LOCATE and REPAIR the break in circuit 5-EC10SE (BU) between the navigation system module and soldered connection S94 using the Wiring Diagrams. CHECK the operation of the system.
U11: CHECK FOR OPEN CIRCUIT BETWEEN THE NAVIGATION SYSTEM MODULE AND THE DLC	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E62347</p>	<p>1 Measure the resistance between the navigation system module, connector C457, pin 5, circuit 4-EC10SE (GY), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK and if necessary RENEW the navigation system module. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit 4EC10SE (GY) between the navigation system module and soldered connection S93 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

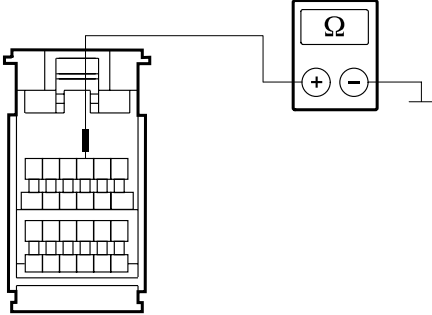
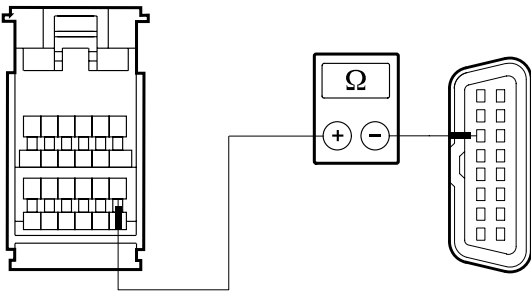
PINPOINT TEST V : CD CHANGER MODULE NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
V1: CHECK COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE (GEM)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Connect the diagnostic tool. 3 Select the generic electronic module (GEM) with the diagnostic tester. <ul style="list-style-type: none"> • Is it possible to establish communication with the GEM? → Yes GO to V3. → No GO to Pinpoint Test AD.
V2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> 1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? → Yes GO to V5. → No GO to V3.
V3: CHECK FUSE F83	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F83 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to V4. → No RENEW fuse F83 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
V4: CHECK THE VOLTAGE AT FUSE F83	
	<ol style="list-style-type: none"> 1 Connect Fuse F83 (CJB).

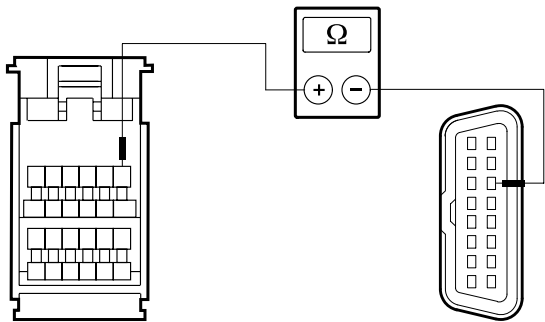
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the voltage between fuse F83 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to V5.</p> <p>→ No RECTIFY the voltage supply to fuse F83 using the Wiring Diagrams. CHECK the operation of the system.</p>
V5: CHECK THE VOLTAGE AT THE CD CHANGER MODULE	
 <p>E62348</p>	<p>1 Disconnect Connector C440 from the CD changer module.</p> <p>2 Measure the voltage between the CD changer module, connector C440, pin 9, circuit 29-MD8 (OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to V7.</p> <p>→ No GO to V6.</p>
V6: CHECK CIRCUIT BETWEEN THE CJB AND THE CD CHANGER MODULE FOR OPEN CIRCUIT	
 <p>E62349</p>	<p>1 Disconnect Connector C100 from CJB.</p> <p>2 Measure the resistance between the CJB, connector C100, pin 44, circuit 29-MD8 (OG), wiring harness side and the CD changer module, connector C440, pin 9, circuit 29-MD8 (OG), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in circuit 29-MD8 (OG) between the CD changer module and the CJB with the aid of the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
V7: CHECK THE GROUND CONNECTION OF THE CD CHANGER MODULE	
 <p>E62350</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the CD changer module, connector C440, pin 3, circuit 91-MD8 (BK/OG), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes GO to V8. → No LOCATE and RECTIFY the break in the circuit between the CD changer module and ground connection G45 (RHD vehicles: G75) using the Wiring Diagrams. CHECK the operation of the system.
V8: CHECK THE CIRCUIT BETWEEN THE CD CHANGER MODULE AND THE DATA LINK CONNECTOR (DLC) FOR OPEN CIRCUIT	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E62351</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the CD changer module, connector C440, pin 7, circuit 5-EC10R (BU), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes GO to V9. → No LOCATE and REPAIR the break in circuit 5-EC10R (BU) between the CD changer module and connector C31 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>V9: CHECK THE CIRCUIT BETWEEN THE CD CHANGER MODULE AND THE DLC FOR OPEN CIRCUIT</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E62352</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the CD changer module, connector C440, pin 1, circuit 4-EC10R (GY), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the CD changer module. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 4-EC10R (GY) between the CD changer module and connector C31 using the Wiring Diagrams. CHECK the operation of the system.

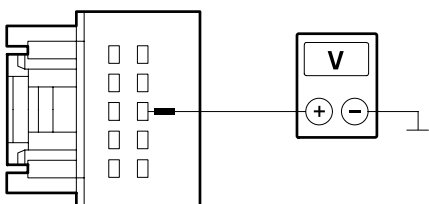
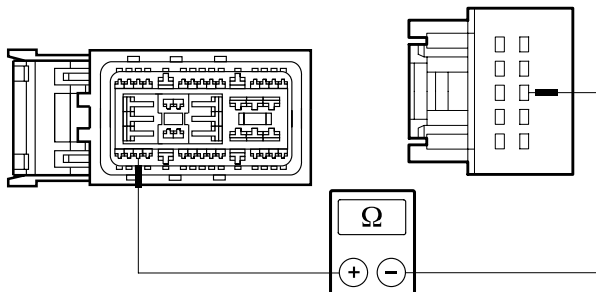
PINPOINT TEST W : REAR SEAT ENTERTAINMENT SYSTEM MODULE NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>W1: CHECK COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE (GEM)</p>	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Connect the diagnostic tool. 3 Select the generic electronic module (GEM) with the diagnostic tester. <ul style="list-style-type: none"> • Is it possible to establish communication with the GEM? <ul style="list-style-type: none"> → Yes GO to W3. → No GO to Pinpoint Test AD.

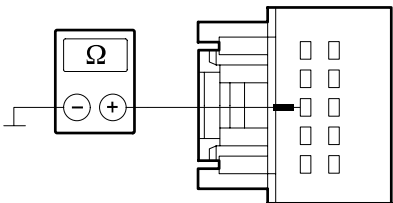
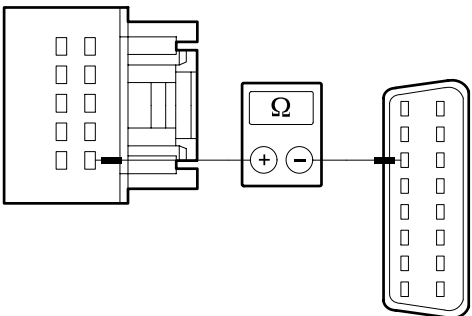
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
W2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> 1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? → Yes GO to W5. → No GO to W3.
W3: CHECK FUSE F83	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F83 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to W4. → No RENEW fuse F83 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
W4: CHECK THE VOLTAGE AT FUSE F83	
	<ol style="list-style-type: none"> 1 Connect Fuse F83 (CJB). 2 Measure the voltage between fuse F83 (10 A) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to W5. → No RECTIFY the voltage supply to fuse F83 using the Wiring Diagrams. CHECK the operation of the system.
W5: CHECK THE VOLTAGE AT THE REAR SEAT ENTERTAINMENT SYSTEM MODULE	
	<ol style="list-style-type: none"> 1 Disconnect Connector C451 from the rear seat entertainment system module.

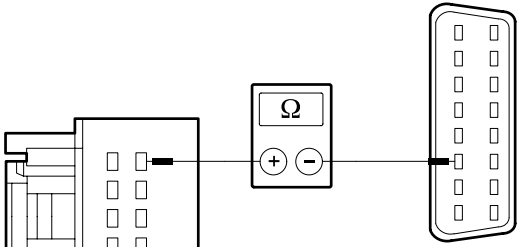
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038638</p>	<p>2 Measure the voltage between the rear seat entertainment system module, connector C451, pin 8, circuit 29-MD16B (OG/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to W7.</p> <p>→ No GO to W6.</p>
<p>W6: CHECK FOR OPEN CIRCUIT BETWEEN THE CJB AND THE REAR SEAT ENTERTAINMENT SYSTEM MODULE</p>	
 <p>E62353</p>	<p>1 Disconnect Connector C100 from CJB.</p> <p>2 Measure the resistance between the CJB, connector C100, pin 44, circuit 29-GK5 (OG/BU), wiring harness side and the rear seat entertainment system module, connector C451, pin 8, circuit 29-MD16B (OG/GN), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in the circuit between the rear seat entertainment system module and the CJB using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
W7: CHECK THE GROUND CONNECTION OF THE REAR SEAT ENTERTAINMENT SYSTEM MODULE	
 <p>VFE0038639</p>	<p>1 Measure the resistance between the rear seat entertainment system module, connector C451, pin 3, circuit 91-MD16 (BK/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to W8.</p> <p>→ No LOCATE and REPAIR the break in the circuit between the rear seat entertainment system module and ground connection G45 (RHD vehicles: Ground connection G75) using the Wiring Diagrams. CHECK the operation of the system.</p>
W8: CHECK FOR OPEN CIRCUIT BETWEEN THE REAR SEAT ENTERTAINMENT SYSTEM MODULE AND THE DATA LINK CONNECTOR (DLC)	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038641</p>	<p>1 Measure the resistance between the rear seat entertainment system module, connector C451, pin 1, circuit 5-EC3E (BU/RD), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to W9.</p> <p>→ No LOCATE and REPAIR the break in circuit 5-EC3E (BU/RD) between the rear seat entertainment system module and connector C159 using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>W9: CHECK FOR OPEN CIRCUIT BETWEEN THE REAR SEAT ENTERTAINMENT SYSTEM MODULE AND THE DLC</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038640</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the rear seat entertainment system module, connector C451, pin 6, circuit 4-EC3E (GY/RD), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK and if necessary RENEW the rear seat entertainment system module. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 4-EC3C (GY/RD) between the rear seat entertainment system module and connector C159 using the Wiring Diagrams. CHECK the operation of the system.

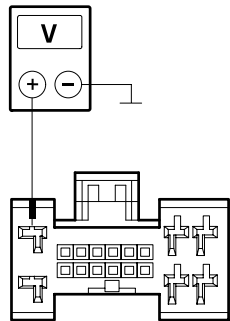
PINPOINT TEST X : LEFT-HAND FRONT DOOR MODULE NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>X1: CHECK COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE (GEM)</p>	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Connect the diagnostic tool. 3 Select the generic electronic module (GEM) with the diagnostic tester. <ul style="list-style-type: none"> • Is it possible to establish communication with the GEM? → Yes GO to X3. → No GO to Pinpoint Test AD.

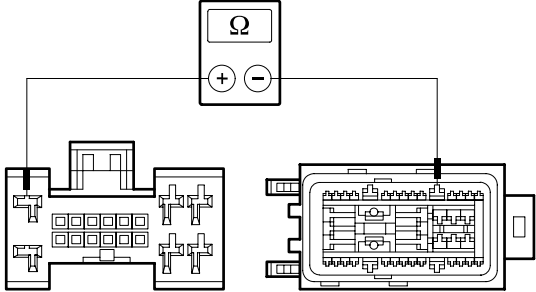
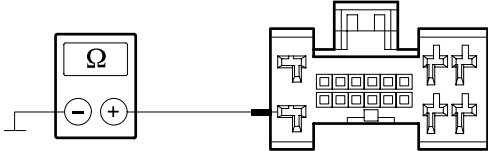
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
X2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to X3.</p> <p>→ No GO to X5.</p>
X3: CHECK FUSE F134	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F134 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to X4.</p> <p>→ No RENEW fuse F134 (20 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
X4: CHECK THE VOLTAGE AT FUSE F134	
	<p>1 Connect Fuse F134 (CJB).</p> <p>2 Measure the voltage between fuse F134 (20 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to X7.</p> <p>→ No REPAIR the voltage supply of fuse F134 using the wiring diagrams. CHECK the operation of the system.</p>
X5: CHECK FUSE F55	
	<p>1 Ignition switch in position 0.</p>

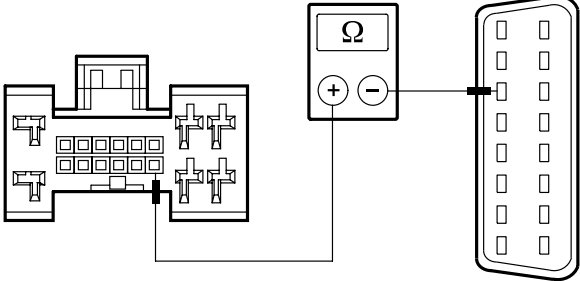
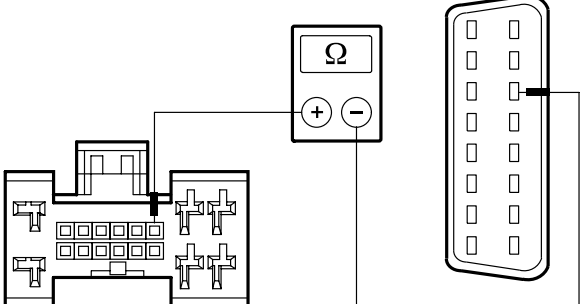
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK Fuse F55 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to X6.</p> <p>→ No RENEW fuse F55 (20 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
X6: CHECK THE VOLTAGE AT FUSE F55	
	<p>1 Connect Fuse F55 (CJB).</p> <p>2 Measure the voltage between fuse F55 (20 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to X7.</p> <p>→ No RECTIFY the voltage supply to fuse F55 using the Wiring Diagrams. CHECK the operation of the system.</p>
X7: CHECK THE VOLTAGE AT THE LEFT-HAND FRONT DOOR MODULE	
 <p>VFE0038103</p>	<p>1 Disconnect Connector C734 from the left-hand front door module.</p> <p>2 Measure the voltage between the left-hand front door module, connector C734, pin 2, circuit 29-AJ26 (OG/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to X9.</p> <p>→ No GO to X8.</p>
X8: CHECK FOR OPEN CIRCUIT BETWEEN THE LEFT-HAND FRONT DOOR MODULE AND THE CENTRAL JUNCTION BOX (CJB)	
	<p>1 Disconnect Connector C100 from CJB.</p>

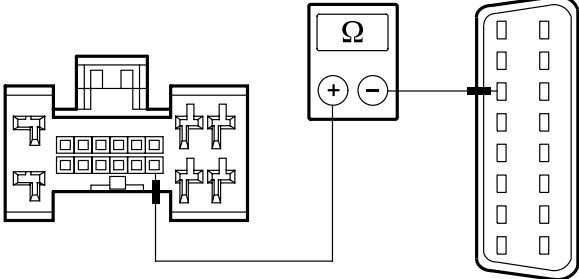
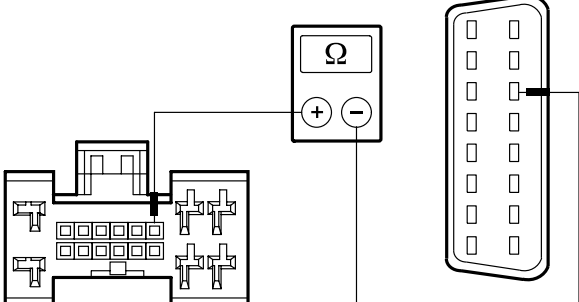
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038104</p>	<p>2 Measure the resistance between the left-hand front door module, connector C734, pin 2, circuit 29-AJ26 (OG/YE), wiring harness side and the CJB, connector C100, pin 5, circuit 29-AJ26 (OG/YE), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 29-AJ26 (OG/YE) between the left-hand front door module and the CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>X9: CHECK THE GROUND CONNECTION OF THE LEFT-HAND FRONT DOOR MODULE</p>	
 <p>VFE0038105</p>	<p>1 Measure the resistance between the left-hand front door module, connector C734, pin 13, circuit 31-DA11C (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes <ul style="list-style-type: none"> - Cabriolet: GO to X12. - All except Cabriolet: GO to X10. → No LOCATE and REPAIR the open circuit between the left-hand front door module and ground connection G12 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>X10: CHECK FOR OPEN CIRCUIT BETWEEN THE LEFT-HAND FRONT DOOR MODULE AND THE DATA LINK CONNECTOR (DLC)</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038106</p>	<p>1 Measure the resistance between the left-hand front door module, connector C734, pin 15, circuit 5-EC10B (BU/RD), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to X11. → No LOCATE and REPAIR the break in circuit 5-EC10B (BU/RD) between the left-hand front door module and connector C41 using the Wiring Diagrams. CHECK the operation of the system.
<p>X11: CHECK FOR OPEN CIRCUIT BETWEEN THE LEFT-HAND FRONT DOOR MODULE AND THE DATA LINK CONNECTOR (DLC)</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038107</p>	<p>1 Measure the resistance between the left-hand front door module, connector C734, pin 3, circuit 4-EC10B (GY/RD), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK and if necessary RENEW the left-hand front door module. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 4-EC10B (GY/RD) between the left-hand front door module and connector C41 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>X12: CHECK FOR OPEN CIRCUIT BETWEEN THE LEFT-HAND FRONT DOOR MODULE AND THE DATA LINK CONNECTOR (DLC)</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038106</p>	<p>1 Measure the resistance between the left-hand front door module, connector C729, pin 12, circuit 5-EC3B (BU/RD), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to X13. → No LOCATE and REPAIR the break in circuit 5-EC3B (BU/RD) between the left-hand front door module and connector C41 using the Wiring Diagrams. CHECK the operation of the system.
<p>X13: CHECK FOR OPEN CIRCUIT BETWEEN THE LEFT-HAND FRONT DOOR MODULE AND THE DATA LINK CONNECTOR (DLC)</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038107</p>	<p>1 Measure the resistance between the left-hand front door module, connector C729, pin 3, circuit 4-EC3B (GY/RD), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK and if necessary RENEW the left-hand front door module. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 4-EC3B (GY/RD) between the left-hand front door module and connector C41 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

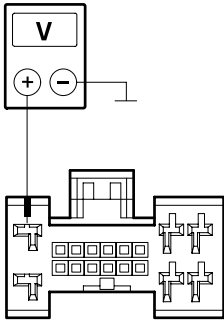
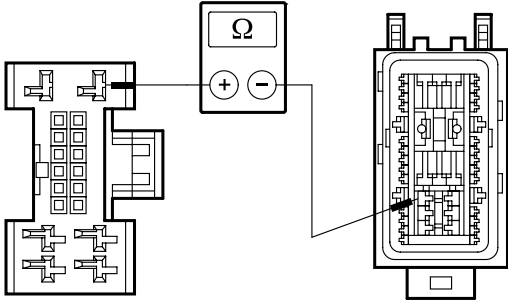
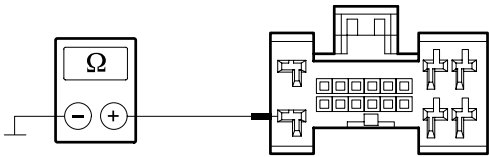
PINPOINT TEST Y : REAR LEFT-HAND DOOR MODULE NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER - ALL EXCEPT CABRIOLET.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
Y1: CHECK COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE (GEM)	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 Connect the diagnostic tool. <li> 3 Select the generic electronic module (GEM) with the diagnostic tester. <ul style="list-style-type: none"> <li>• Is it possible to establish communication with the GEM? <li>→ Yes GO to Y3. <li>→ No GO to Pinpoint Test AD.
Y2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> <li>1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> <li>• Is the location for connector C100 on the top of the CJB? <li>→ Yes GO to Y3. <li>→ No GO to Y5.
Y3: CHECK FUSE F118	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 CHECK Fuse F118 (CJB). <ul style="list-style-type: none"> <li>• Is the fuse OK? <li>→ Yes GO to Y4. <li>→ No RENEW fuse F118 (20 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
Y4: CHECK THE VOLTAGE AT FUSE F118	
	<ol style="list-style-type: none"> <li>1 Connect Fuse F118 (CJB).

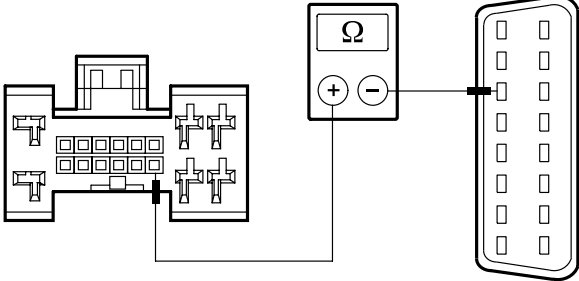
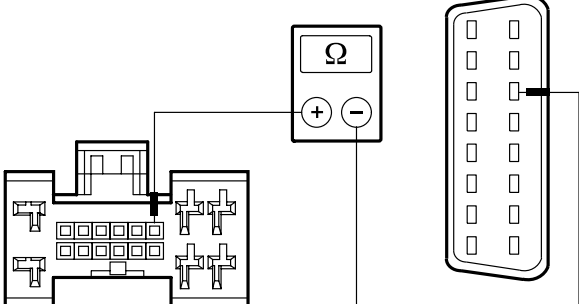
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the voltage between fuse F118 (20 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to Y7.</p> <p>→ No REPAIR the voltage supply of fuse F118 using the wiring diagrams. CHECK the operation of the system.</p>
Y5: CHECK FUSE F82	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F82 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to Y6.</p> <p>→ No RENEW fuse F82 (20 A). CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short circuit using the Wiring Diagrams.</p>
Y6: CHECK THE VOLTAGE AT FUSE F82	
	<p>1 Connect Fuse F82 (CJB).</p> <p>2 Measure the voltage between fuse F82 (20 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to Y7.</p> <p>→ No RECTIFY the voltage supply to fuse F82 using the Wiring Diagrams. CHECK the operation of the system.</p>
Y7: CHECK THE VOLTAGE AT THE LEFT-HAND REAR DOOR MODULE	
	<p>1 Disconnect Connector C730 from door module.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038103</p>	<p>2 Measure the voltage between the left-hand rear door module, connector C730, pin 9, circuit 29-AJ83 (OG/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to Y9. → No GO to Y8.
<p>Y8: CHECK FOR OPEN CIRCUIT BETWEEN THE LEFT-HAND REAR DOOR MODULE AND THE CENTRAL JUNCTION BOX (CJB)</p>	
 <p>E45724</p>	<p>1 Disconnect Connector C100 from CJB.</p> <p>2 Measure the resistance between the left-hand rear door module, connector C730, pin 9, circuit 29-AJ83 (OG/BU), wiring harness side and the CJB, connector C100, pin 27, circuit 29-AJ83 (OG/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 29-AJ83 (OG/BU) between the left-hand rear door module and the CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>Y9: CHECK THE GROUND CONNECTION OF THE LEFT-HAND REAR DOOR MODULE</p>	
 <p>VFE0038105</p>	<p>1 Measure the resistance between the left-hand rear door module, connector C730, pin 18, circuit 31-AJ83 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to Y10. → No LOCATE and REPAIR the open circuit between the left-hand rear door module and ground connection G75 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>Y10: CHECK FOR OPEN CIRCUIT BETWEEN THE LEFT-HAND REAR DOOR MODULE AND THE DATA LINK CONNECTOR (DLC)</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038106</p>	<p>1 Measure the resistance between the left-hand rear door module, connector C730, pin 12, circuit 5-EC3A (BU/RD), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to Y11. → No LOCATE and REPAIR the break in circuit 5-EC3D (BU/RD) between the left-hand rear door module and connector C45 using the Wiring Diagrams. CHECK the operation of the system.
<p>Y11: CHECK FOR OPEN CIRCUIT BETWEEN THE LEFT-HAND REAR DOOR MODULE AND THE DLC</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038107</p>	<p>1 Measure the resistance between the left-hand rear door module, connector C730, pin 3, circuit 4-EC3A (GY/RD), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK and if necessary RENEW the left-hand rear door module. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 4-EC3D (GY/RD) between the left-hand rear door module and connector C45 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

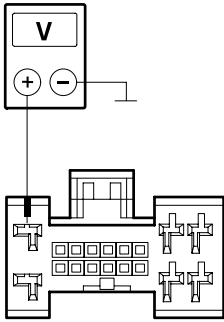
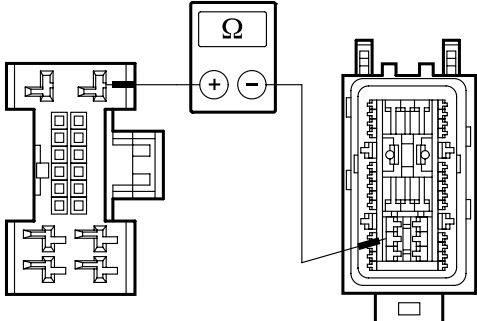
PINPOINT TEST Z : RIGHT-HAND FRONT DOOR MODULE NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
Z1: CHECK COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE (GEM)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Connect the diagnostic tool. 3 Select the generic electronic module (GEM) with the diagnostic tester. <ul style="list-style-type: none"> • Is it possible to establish communication with the GEM? → Yes GO to Z3. → No GO to Pinpoint Test AD.
Z2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> 1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? → Yes GO to Z3. → No GO to Z5.
Z3: CHECK FUSE F106	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F106 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to Z4. → No RENEW fuse F106 (20 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
Z4: CHECK THE VOLTAGE AT FUSE F106	
	<ol style="list-style-type: none"> 1 Connect Fuse F106 (CJB).

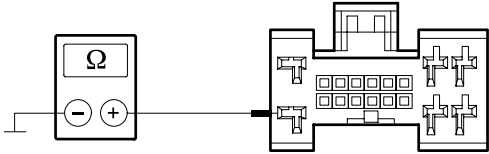
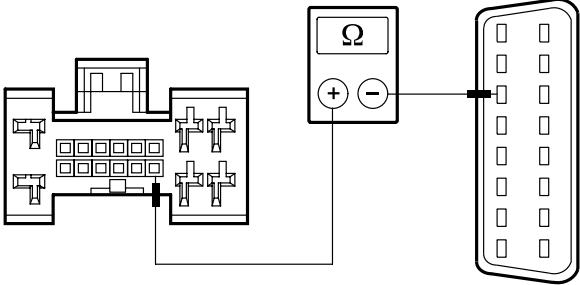
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the voltage between fuse F106 (20 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to Z7.</p> <p>→ No REPAIR the voltage supply of fuse F106 using the wiring diagrams. CHECK the operation of the system.</p>
Z5: CHECK FUSE F41	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F41 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to Z6.</p> <p>→ No RENEW fuse F41 (20 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
Z6: CHECK THE VOLTAGE AT FUSE F41	
	<p>1 Connect Fuse F41 (CJB).</p> <p>2 Measure the voltage between fuse F41 (20 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to Z7.</p> <p>→ No RECTIFY the voltage supply to fuse F41 using the Wiring Diagrams. CHECK the operation of the system.</p>
Z7: CHECK THE VOLTAGE AT THE RIGHT-HAND FRONT DOOR MODULE	
	<p>1 Disconnect Connector C735 from the right-hand front door module.</p>

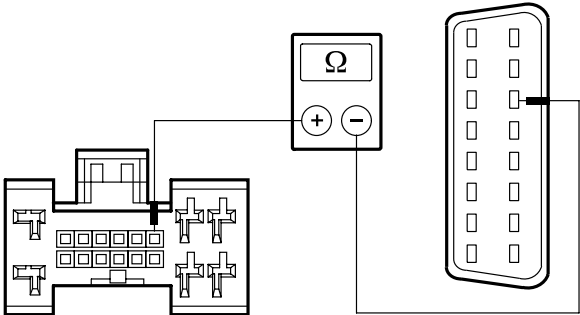
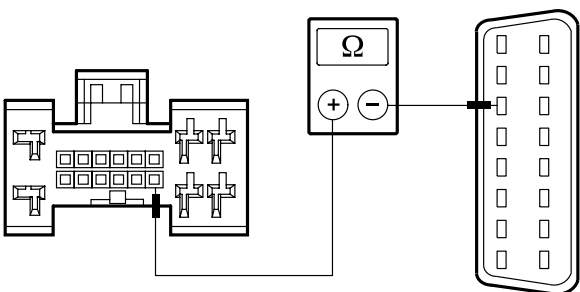
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038103</p>	<p>2 Measure the voltage between the right-hand front door module, connector C735, pin 2, circuit 29-AJ27 (OG/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to Z9.</p> <p>→ No GO to Z8.</p>
Z8: CHECK FOR OPEN CIRCUIT BETWEEN THE RIGHT-HAND FRONT DOOR MODULE AND THE CENTRAL JUNCTION BOX (CJB)	
 <p>E45725</p>	<p>1 Disconnect Connector C100 from CJB.</p> <p>2 Measure the resistance between the right-hand front door module, connector C735, pin 2, circuit 29-AJ27 (OG/WH), wiring harness side and the CJB, connector C100, pin 26, circuit 29-AJ27 (OG/WH), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in circuit 29-AJ27 (OG/WH) between the right-hand front door module and the CJB using the Wiring Diagrams. CHECK the operation of the system.</p>

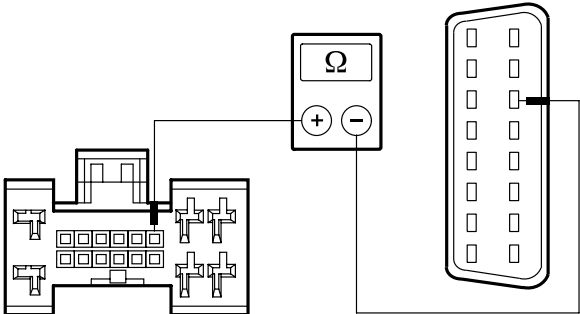
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
Z9: CHECK THE GROUND CONNECTION OF THE RIGHT-HAND FRONT DOOR MODULE	
 <p>VFE0038105</p>	<p>1 Measure the resistance between the front right-hand door module, connector C735, pin 13, circuit 31-DA12A (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured? <p>→ Yes</p> <ul style="list-style-type: none"> - Cabriolet: GO to Z10. - All except Cabriolet: GO to Z12. <p>→ No</p> <p>LOCATE and REPAIR the open circuit between the right-hand front door module and ground connection G53 using the Wiring Diagrams. CHECK the operation of the system.</p>
Z10: CHECK FOR OPEN CIRCUIT BETWEEN THE RIGHT-HAND FRONT DOOR MODULE AND THE DATA LINK CONNECTOR (DLC)	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038106</p>	<p>1 Measure the resistance between the right-hand front door module, connector C722, pin 15, circuit 5-EC10F (BU/RD), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured? <p>→ Yes</p> <p>GO to Z11.</p> <p>→ No</p> <p>LOCATE and REPAIR the break in circuit 5-EC10F (BU/RD) between the right-hand front door module and connector C43 using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>Z11: CHECK FOR OPEN CIRCUIT BETWEEN THE RIGHT-HAND FRONT DOOR MODULE AND THE DLC</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038107</p>	<p>1 Measure the resistance between the right-hand front door module, connector C722, pin 3, circuit 4-EC10F (GY/RD), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK and if necessary RENEW the right-hand front door module. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 4-EC10F (GY/RD) between the right-hand front door module and connector C43 using the Wiring Diagrams. CHECK the operation of the system.
<p>Z12: CHECK FOR OPEN CIRCUIT BETWEEN THE RIGHT-HAND FRONT DOOR MODULE AND THE DATA LINK CONNECTOR (DLC)</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038106</p>	<p>1 Measure the resistance between the right-hand front door module, connector C722, pin 12, circuit 5-EC3F (BU/RD), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to Z13. → No LOCATE and REPAIR the break in circuit 5-EC3F (BU/RD) between the right-hand front door module and connector C43 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
Z13: CHECK FOR OPEN CIRCUIT BETWEEN THE RIGHT-HAND FRONT DOOR MODULE AND THE DLC	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038107</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the right-hand front door module, connector C722, pin 3, circuit 4-EC3F (GY/RD), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the right-hand front door module. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 4-EC3F (GY/RD) between the right-hand front door module and connector C43 using the Wiring Diagrams. CHECK the operation of the system.

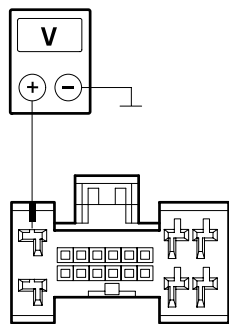
PINPOINT TEST AA : REAR RIGHT-HAND DOOR MODULE NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER - ALL EXCEPT CABRIOLET.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AA1: CHECK COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE (GEM)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Connect the diagnostic tool. 3 Select the generic electronic module (GEM) with the diagnostic tester. <ul style="list-style-type: none"> • Is it possible to establish communication with the GEM? <ul style="list-style-type: none"> → Yes GO to AA3. → No GO to Pinpoint Test AD.

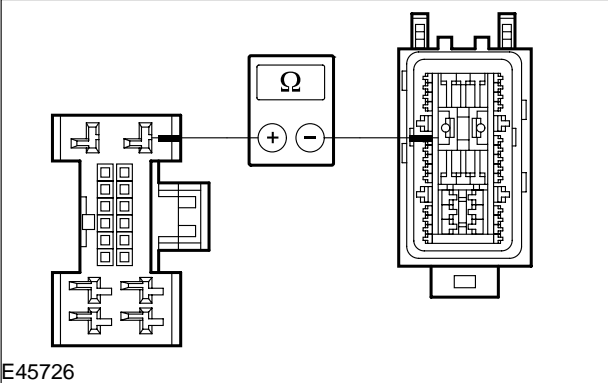
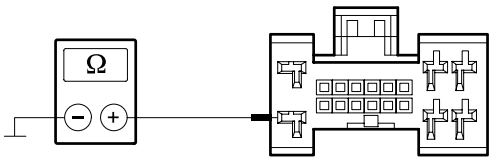
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AA2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> 1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <ul style="list-style-type: none"> → Yes GO to AA3. → No GO to AA5.
AA3: CHECK FUSE F120	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F120 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? <ul style="list-style-type: none"> → Yes GO to AA4. → No RENEW fuse F120 (20 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
AA4: CHECK THE VOLTAGE AT FUSE F120	
	<ol style="list-style-type: none"> 1 Connect Fuse F120 (CJB). 2 Measure the voltage between fuse F120 (20 A) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <ul style="list-style-type: none"> → Yes GO to AA7. → No REPAIR the voltage supply of fuse F120 using the wiring diagrams. CHECK the operation of the system.
AA5: CHECK FUSE F81	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

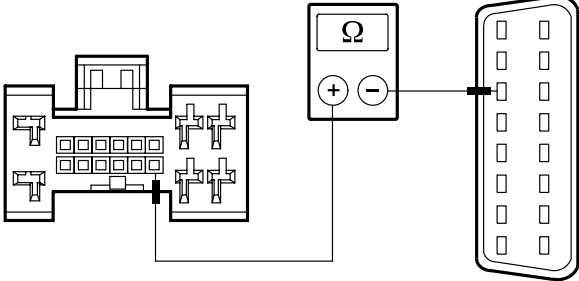
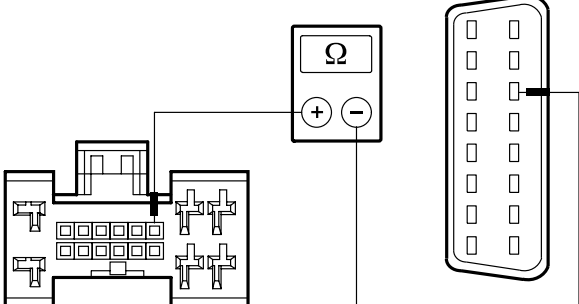
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK Fuse F81 (CJB).</p> <ul style="list-style-type: none"> Is the fuse OK? <p>→ Yes GO to AA6.</p> <p>→ No RENEW fuse F81 (20 A). CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short circuit using the Wiring Diagrams.</p>
AA6: CHECK THE VOLTAGE AT FUSE F81	
	<p>1 Connect Fuse F81 (CJB).</p> <p>2 Measure the voltage between fuse F81 (20 A) and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to AA7.</p> <p>→ No RECTIFY the voltage supply to fuse F81 using the Wiring Diagrams. CHECK the operation of the system.</p>
AA7: CHECK THE VOLTAGE AT THE RIGHT-HAND REAR DOOR MODULE	
 <p>VFE0038103</p>	<p>1 Disconnect Connector C730 from the right-hand rear door module.</p> <p>2 Measure the voltage between the right-hand rear door module, connector C730, pin 9, circuit 29-AJ83 (OG/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to AA9.</p> <p>→ No GO to AA8.</p>
AA8: CHECK FOR OPEN CIRCUIT BETWEEN THE RIGHT-HAND REAR DOOR MODULE AND THE CENTRAL JUNCTION BOX (CJB)	
	<p>1 Disconnect Connector C100 from CJB.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E45726</p>	<p>2 Measure the resistance between the right-hand rear door module, connector C730, pin 9, circuit 29-AJ83 (OG/BU), wiring harness side and the CJB, connector C100, pin 29, circuit 29-AJ84 (OG/WH), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the right-hand rear door module and the CJB using the Wiring Diagrams. CHECK the operation of the system.
AA9: CHECK THE GROUND CONNECTION OF THE RIGHT-HAND REAR DOOR MODULE	
 <p>VFE0038105</p>	<p>1 Measure the resistance between the right-hand rear door module, connector C730, pin 18, circuit 31-AJ83 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes GO to AA10. → No LOCATE and REPAIR the open circuit between the right-hand rear door module and ground connection G45 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AA10: CHECK FOR OPEN CIRCUIT BETWEEN THE RIGHT-HAND REAR DOOR MODULE AND THE DATA LINK CONNECTOR (DLC)</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038106</p>	<p>1 Measure the resistance between the right-hand rear door module, connector C730, pin 12, circuit 5-EC3A (BU/RD), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes GO to AA11. → No LOCATE and REPAIR the break in circuit 5-EC3A (BU/RD) between the right-hand rear door module and connector C46 using the Wiring Diagrams. CHECK the operation of the system.
<p>AA11: CHECK FOR OPEN CIRCUIT BETWEEN THE RIGHT-HAND REAR DOOR MODULE AND THE DLC</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038107</p>	<p>1 Measure the resistance between the right-hand rear door module, connector C730, pin 3, circuit 4-EC3A (GY/RD), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK and if necessary RENEW the right-hand rear door module. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 4-EC3A (GY/RD) between the right-hand rear door module and connector C46 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

PINPOINT TEST AB : POWERTRAIN CONTROL MODULE (PCM) NOT COMMUNICATING WITH THE DIAGNOSTIC TESTER

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AB1: CHECK THE COMMUNICATIONS WITH THE ELECTRONIC INSTRUMENT CLUSTER	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 Connect the diagnostic tool. <li> 3 Select the electronic instrument cluster with the diagnostic tester. <ul style="list-style-type: none"> <li>• Is it possible to establish communications with the electronic instrument cluster? <li>→ Yes GO to AB2. <li>→ No GO to Pinpoint Test AE.
AB2: CHECK FUSE F9	
	<ol style="list-style-type: none"> <li>1 CHECK Fuse F9 (BJB). <ul style="list-style-type: none"> <li>• Is the fuse OK? <li>→ Yes GO to AB3. <li>→ No RENEW fuse F9 (20 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
AB3: CHECK THE VOLTAGE AT FUSE F9	
	<ol style="list-style-type: none"> <li>1 Connect Fuse F9 (BJB). <li> 2 Measure the voltage between fuse F9 (20 A) and ground. <ul style="list-style-type: none"> <li>• Is battery voltage measured? <li>→ Yes <ul style="list-style-type: none"> <li>- Vehicles with 1.4L, 1.6L petrol engine or 2.0L/1.8L diesel engine: GO to AB6. <li>- Vehicles with 1.8L, 2.0L petrol engine or 1.6L diesel engine: GO to AB9. <li>- Vehicles with 2.5L Duratec-ST (VI5) engine: GO to AB4. <li>→ No RECTIFY the voltage supply to fuse F9 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AB4: CHECK FUSE F26	
	<p>1 CHECK fuse F26 (BJB).</p> <ul style="list-style-type: none"> <li>• Is the fuse OK? <p>→ Yes GO to AB5.</p> <p>→ No RENEW fuse F26 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short using the Wiring Diagrams.</p>
AB5: CHECK THE VOLTAGE AT FUSE F26	
	<p>1 Connect Fuse F26 (BJB).</p> <p>2 Measure the voltage between fuse F26 (10 A) and ground.</p> <ul style="list-style-type: none"> <li>• Is battery voltage measured? <p>→ Yes GO to AB9.</p> <p>→ No REPAIR the voltage supply to fuse F26 using the Wiring Diagrams. CHECK the operation of the system.</p>
AB6: CHECK FUSE F30	
	<p>1 CHECK Fuse F30 (BJB).</p> <ul style="list-style-type: none"> <li>• Is the fuse OK? <p>→ Yes GO to AB7.</p> <p>→ No RENEW fuse F30 (3 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
AB7: CHECK THE VOLTAGE AT FUSE F30	
	<p>1 Connect Fuse F30 (BJB).</p>

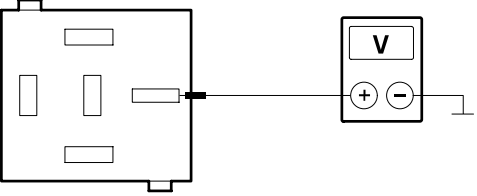
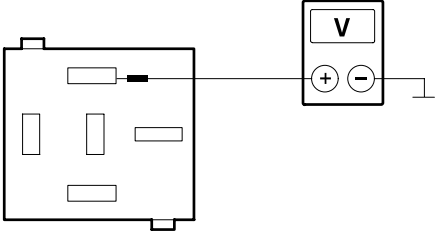
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Measure the voltage between fuse F30 (3 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to AB9.</p> <p>→ No RECTIFY the voltage supply to fuse F30 using the Wiring Diagrams. CHECK the operation of the system.</p>
AB8: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to AB9.</p> <p>→ No GO to AB11.</p>
AB9: CHECK FUSE F138	
	<p>1 CHECK Fuse F138 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to AB10.</p> <p>→ No RENEW fuse F138 (10 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
AB10: CHECK THE VOLTAGE AT FUSE F138	
	<p>1 Connect Fuse F138 (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F138 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to AB13.</p> <p>→ No REPAIR the voltage supply of fuse F138 using the wiring diagrams. CHECK the operation of the system.</p>

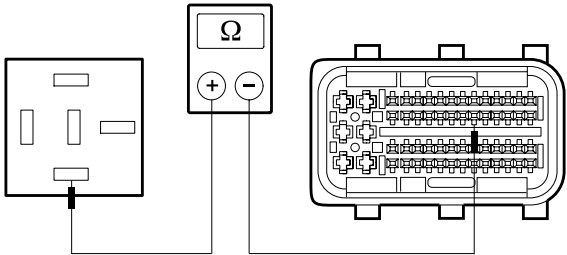
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AB11: CHECK FUSE F75	
	<p>1 CHECK Fuse F75 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to AB12.</p> <p>→ No RENEW fuse F75 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short circuit using the Wiring Diagrams.</p>
AB12: CHECK THE VOLTAGE AT FUSE F75	
	<p>1 Connect Fuse F75 (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F75 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to AB13.</p> <p>→ No RECTIFY the voltage supply to fuse F75 using the Wiring Diagrams. CHECK the operation of the system.</p>
AB13: CHECK FUSE F36	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F36 (BJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to AB14.</p> <p>→ No RENEW fuse F36 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
AB14: CHECK THE VOLTAGE AT FUSE F36	
	<p>1 Connect Fuse F36 (BJB).</p> <p>2 Ignition switch in position II.</p>

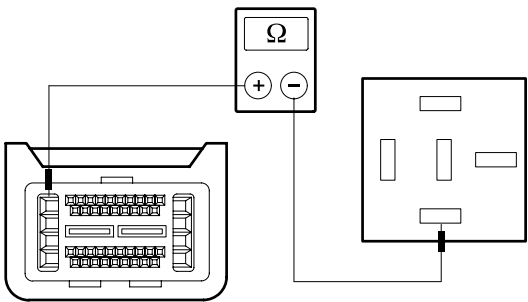
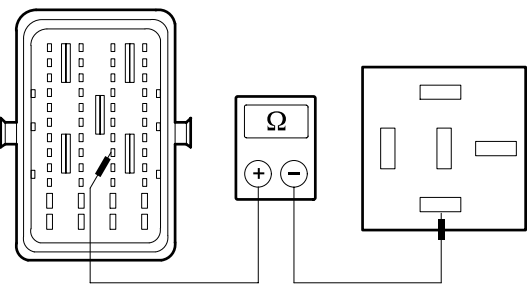
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between fuse F36 (10 A) and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes</p> <ul style="list-style-type: none"> Vehicles with 1.4l or 1.6l petrol engine GO to AB24. Vehicles with 1.8L/2.0L petrol engine: GO to AB31. Vehicles with 2.0L/1.8L diesel engine: GO to AB38. Vehicles with 1.6L diesel engine: GO to AB45. Vehicles with 2.5L Duratec-ST (V15) engine: GO to AB51. <p>→ No GO to AB15.</p>
<p>AB15: CHECK THE VOLTAGE AT THE POWER SUPPLY RELAY</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Power supply relay C1014.</p>
 <p>VFE0015930</p>	<p>3 Measure the voltage between the power supply relay, socket C1014, pin 3, circuit 30-RH10 (RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to AB16.</p> <p>→ No LOCATE and REPAIR the break in circuit 30-RH10 (RD) between the power supply relay and fuse F9 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>AB16: CHECK THE VOLTAGE AT THE POWER SUPPLY RELAY</p>	
 <p>VFE0016041</p>	<p>1 Measure the voltage between the power supply relay, socket C1014, pin 1, circuit 30-RH9 (RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to AB17.</p> <p>→ No LOCATE and REPAIR the break in circuit 30-RH9 (RD) between the power supply relay, pin 1 and pin 3 using the Wiring Diagrams. CHECK the operation of the system.</p>

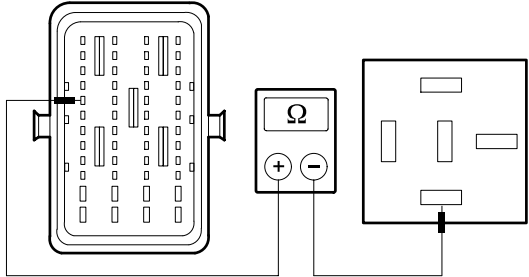
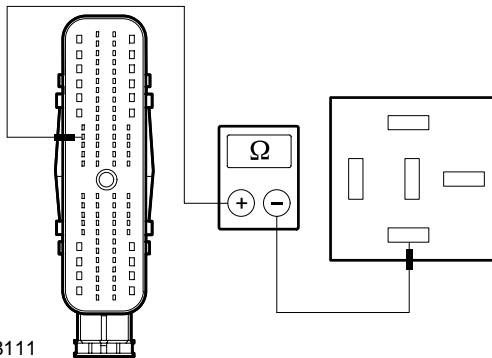
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AB17: CHECK FOR OPEN CIRCUIT BETWEEN THE POWER SUPPLY RELAY AND FUSE F36	
	<p>1 Measure the resistance between the power supply relay, socket C1014, pin 5, wiring harness side and fuse F36, wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes</p> <ul style="list-style-type: none"> - Vehicles with 1.8L/2.0L petrol engine: GO to AB19. - Vehicles with 2.0L/1.8L diesel engine: GO to AB20. - Vehicles with 1.6L diesel engine: GO to AB21. - Vehicles with 1.4l or 1.6l petrol engine: GO to AB22. - Vehicles with 2.5L Duratec-ST (VI5) engine: GO to AB18. <p>→ No</p> <p>LOCATE and REPAIR the open circuit between the power supply relay and fuse F36 using the Wiring Diagrams. CHECK the operation of the system.</p>
AB18: CHECK FOR OPEN CIRCUIT BETWEEN THE POWER SUPPLY RELAY AND THE PCM - VEHICLES WITH 2.5L DURATEC-ST (VI5) ENGINE:	
 <p>E67295</p>	<p>1 Disconnect Connector C690 from the PCM.</p> <p>2 Measure the resistance between the power supply relay, socket C1014, pin 2, circuit 91S-RH9 (BK/BU), wiring harness side and the PCM, connector C690, pin 27, circuit 91S-RH9 (BK/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes</p> <p>GO to AB23.</p> <p>→ No</p> <p>LOCATE and REPAIR the open circuit between the power supply relay and the PCM using the Wiring Diagrams. CHECK the operation of the system.</p>
AB19: CHECK FOR OPEN CIRCUIT BETWEEN THE POWER SUPPLY RELAY AND THE PCM - VEHICLES WITH 1.8L/2.0L PETROL ENGINE:	
	<p>1 Disconnect connector C690 from the PCM.</p>

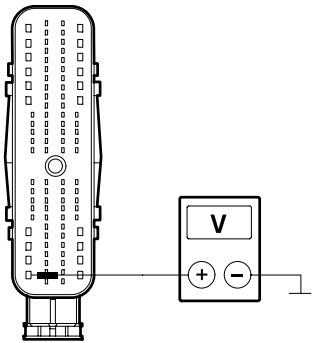
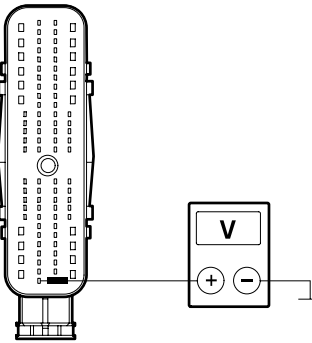
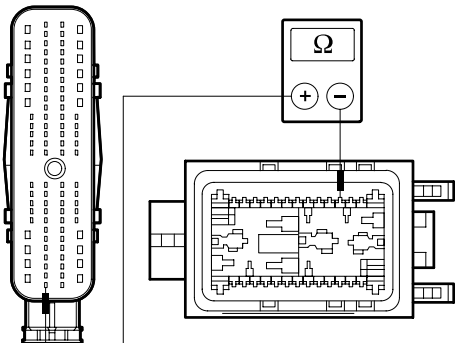
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038108</p>	<p>2 Measure the resistance between the power supply relay, socket C1014, pin 2, circuit 91S-RH9 (BK/BU), wiring harness side and PCM, connector C690, pin 35, circuit 91S-RH9A (BK/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to AB23.</p> <p>→ No LOCATE and REPAIR the open circuit between the power supply relay and the PCM using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>AB20: CHECK FOR OPEN CIRCUIT BETWEEN THE POWER SUPPLY RELAY AND THE PCM - VEHICLES WITH 2.0L/1.8L DIESEL ENGINE:</p>	
 <p>VFE0038109</p>	<p>1 Disconnect Connector C417 from the PCM.</p> <p>2 Measure the resistance between the power supply relay, socket C1014, pin 2, circuit 91S-RH9 (BK/BU), wiring harness side and PCM, connector C417, pin H3, circuit 91S-RH9B (BK/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to AB23.</p> <p>→ No LOCATE and REPAIR the break in circuit 91S-RH9 (BK/BU) between the power supply relay and the PCM using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>AB21: CHECK FOR OPEN CIRCUIT BETWEEN THE POWER SUPPLY RELAY AND THE PCM - VEHICLES WITH 1.6L DIESEL ENGINE:</p>	
	<p>1 Disconnect Connector C417 from the PCM.</p>

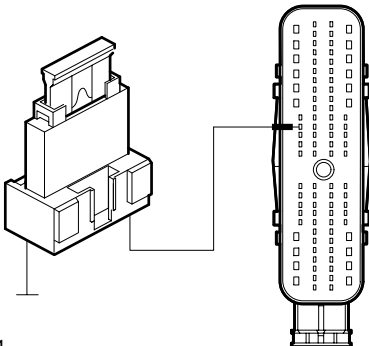
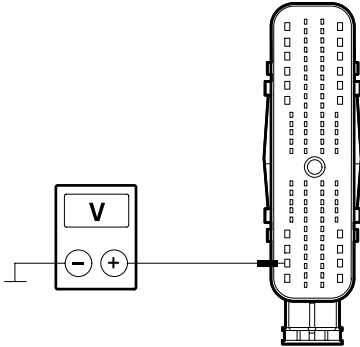
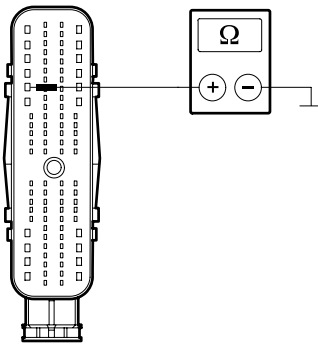
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E0038110</p>	<p>2 Measure the resistance between the power supply relay, socket C1014, pin 2, circuit 91S-RH9 (BK/BU), wiring harness side and PCM, connector C417, pin E1, circuit 91S-RH9 (BK/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to AB23.</p> <p>→ No LOCATE and REPAIR the break in circuit 91S-RH9 (BK/BU) between the power supply relay and the PCM using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>AB22: CHECK FOR OPEN CIRCUIT BETWEEN THE POWER SUPPLY RELAY AND THE PCM - VEHICLES WITH 1.4L, 1.6L PETROL ENGINE:</p>	
 <p>E0038111</p>	<p>1 Disconnect Connector C594 from the PCM.</p> <p>2 Measure the resistance between the power supply relay, socket C1014, pin 2, circuit 91S-RH9A (BK/BU), wiring harness side and PCM, connector C594, pin M8, circuit 91S-RH9A (BK/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to AB23.</p> <p>→ No LOCATE and REPAIR the open circuit between the power supply relay and the PCM using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>AB23: CHECK THE POWER SUPPLY RELAY</p>	
	<p>1 Check the power supply relay according to the Component Checks at the end of this section.</p> <ul style="list-style-type: none"> • Is the power supply relay OK? <p>→ Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No RENEW the power supply relay. CHECK the operation of the system.</p>
<p>AB24: CHECK THE VOLTAGE AT THE PCM (PIN F9)</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C594 from the PCM.</p>

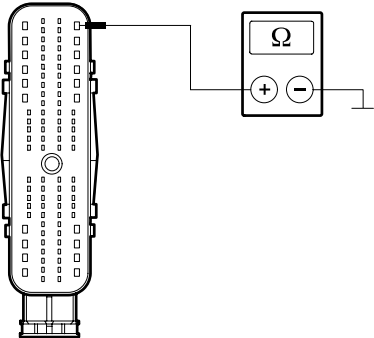
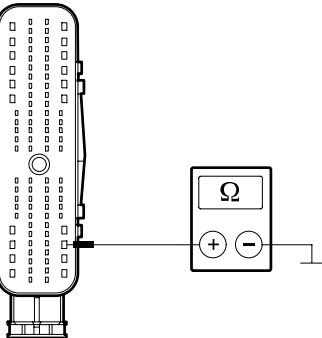
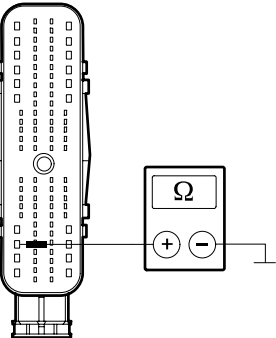
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0028935</p>	<p>3 Measure the voltage between the PCM, connector C594, pin F9, circuit 30-RE8 (RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to AB25. → No LOCATE and REPAIR the break in circuit 30-RE8 (RD) between the PCM and fuse F30 using the Wiring Diagrams. CHECK the operation of the system.
<p>AB25: CHECK THE VOLTAGE AT THE PCM (PIN F21)</p>	
 <p>VFE0028931</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the PCM, connector C594, pin F21, circuit 15-RE17 (GN/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to AB27. → No GO to AB26.
<p>AB26: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE CENTRAL JUNCTION BOX (CJB)</p>	
 <p>E0038112</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C96 from CJB.</p> <p>3 Measure the resistance between the PCM, connector C594, pin F21, circuit 15-RE17 (GN/BU), wiring harness side and the CJB, connector C96, pin 38, circuit 15-RE17 (GN/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 15-RE17 (GN/BU) between the PCM and the CJB using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AB27: CHECK THE VOLTAGE AT THE PCM (PIN F8)	
 <p>E0038114</p>	<p>1 Ignition switch in position 0.</p> <p>2 Use a fused test lead (1 A) at the PCM, connector C594, pin M8, to bridge circuit 91S-RH9A (BK/BU), wiring harness side and ground.</p>
 <p>E0038113</p>	<p>3 Measure the voltage between the PCM, connector C594, pin F8, circuit 15-RE21A (OG/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to AB28. → No LOCATE and REPAIR the open circuit between the PCM and fuse F36 using the Wiring Diagrams. CHECK the operation of the system.
AB28: CHECK THE GROUND CONNECTION OF THE PCM	
 <p>VFE0028929</p>	<p>1 Measure the resistance between the PCM, connector C594, pin M5, circuit 91-RE8A (BK/YE), wiring harness side and ground.</p>

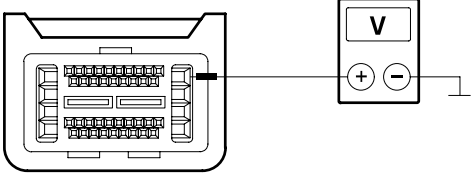
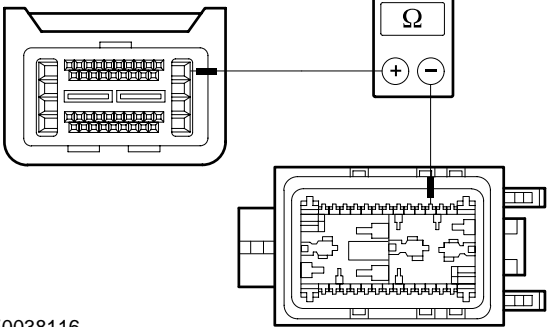
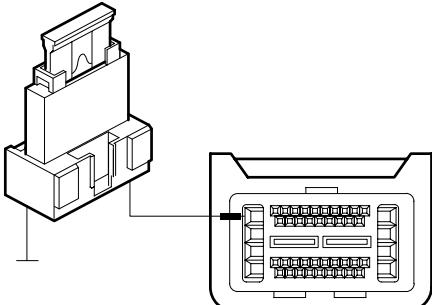
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0028928</p>	<p>2 Measure the resistance between the PCM, connector C594, pin M42, circuit 91-RE8B (BK/YE), wiring harness side and ground.</p>
 <p>VFE0028932</p>	<p>3 Measure the resistance between the PCM, connector C594, pin F40, circuit 91-RE8C (BK/YE), wiring harness side and ground.</p>
 <p>VFE0028933</p>	<p>4 Measure the resistance between the PCM, connector C594, pin F7, circuit 91-RE8D (BK/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured in all of the cases? → Yes GO to AB29. → No <ul style="list-style-type: none"> - If a resistance of more than 2 Ohms is measured in one, two and/or three of the measurements: LOCATE and REPAIR the break in the affected circuit between the PCM and soldered connection S53 using the Wiring Diagrams. CHECK the operation of the system. - Is a resistance of more than 2 Ohms measured in all of the measurements? LOCATE and REPAIR the break in circuit 91-RN2A (BK/BU) between the PCM and ground connection G68 using the Wiring Diagrams. CHECK the operation of the system.

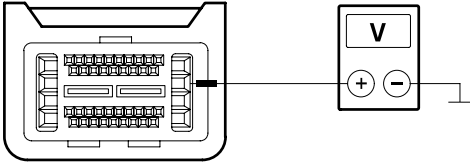
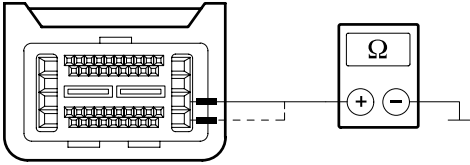
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AB29: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE DATA LINK CONNECTOR (DLC)	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
<p>E45694</p>	<p>1 Measure the resistance between the PCM, connector C594, pin F19, circuit 5-EC7C (BU/RD) (vehicles with automatic transmission: circuit 5-EC7A (BU/RD)), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes GO to AB30. → No LOCATE and REPAIR the break in the circuit between the PCM and the DLC using the Wiring Diagrams. CHECK the operation of the system.
AB30: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE DLC	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
<p>E45695</p>	<p>1 Measure the resistance between the PCM, connector C594, pin F31, circuit 4-EC7C (GY/RD) (vehicles with automatic transmission: circuit 4-EC7A (BU/RD)), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the PCM and the DLC using the Wiring Diagrams. CHECK the operation of the system.
AB31: CHECK THE VOLTAGE AT THE PCM (PIN 46)	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C690 from the PCM.</p> <p>3 Ignition switch in position II.</p>

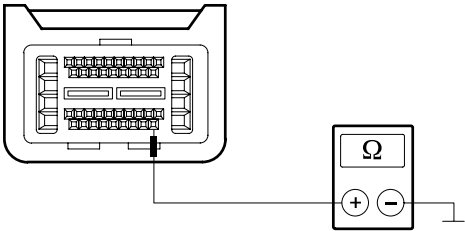
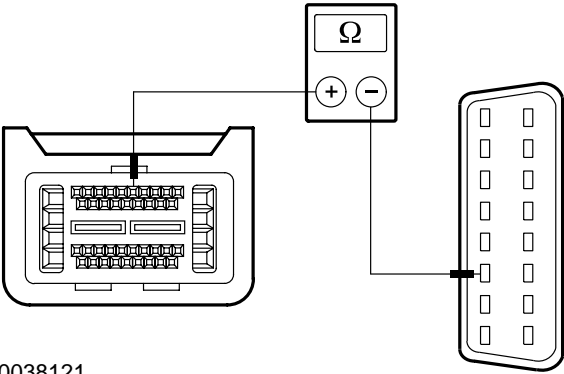
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E0038115</p>	<p>4 Measure the voltage between the PCM, connector C690, pin 46, circuit 15-RE17 (GN/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to AB33. → No GO to AB32.
AB32: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE CENTRAL JUNCTION BOX (CJB)	
 <p>E0038116</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C96 from CJB.</p> <p>3 Measure the resistance between the PCM, connector C690, pin 46, circuit 15-RE17 (GN/BU), wiring harness side and the CJB, connector C96, pin 38, circuit 15-RE17 (GN/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 15-RE17 (GN/BU) between the PCM and the CJB using the Wiring Diagrams. CHECK the operation of the system.
AB33: CHECK THE VOLTAGE AT THE PCM (PIN 34)	
 <p>E0038117</p>	<p>1 Ignition switch in position 0.</p> <p>2 Use a fused test lead (1 A) at the PCM, connector C690, pin 35, to bridge circuit 91S-RH9A (BK/BU), wiring harness side and ground.</p>

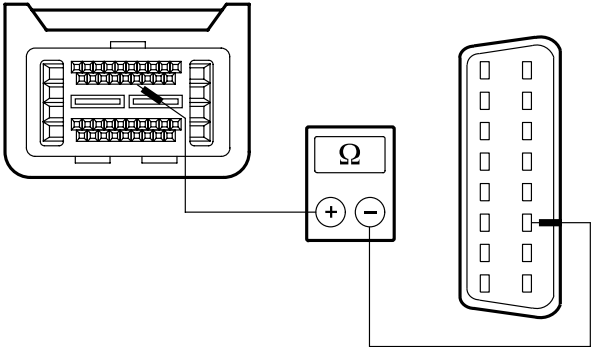
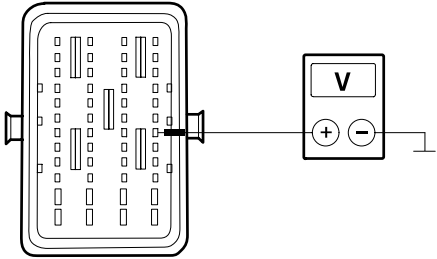
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E0038118</p>	<p>3 Measure the voltage between the PCM, connector C690, pin 34, circuit 15-RE21A (OG/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to AB34.</p> <p>→ No LOCATE and REPAIR the open circuit between the PCM and fuse F36 using the Wiring Diagrams. CHECK the operation of the system.</p>
AB34: CHECK THE GROUND CONNECTION OF THE PCM	
 <p>E0038119</p>	<p>1 Measure the resistance between the PCM, connector C690, pin 23, circuit 91-RE8A (BK/YE), wiring harness side and ground.</p>
	<p>2 Measure the resistance between the PCM, connector C690, pin 11, circuit 91-RE8B (BK/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured in both cases? <p>→ Yes GO to AB35.</p> <p>→ No</p> <ul style="list-style-type: none"> - If a resistance of more than 2 Ohms is measured in one of the measurements: LOCATE and REPAIR the break in the affected circuit between the PCM and soldered connection S53 using the Wiring Diagrams. CHECK the operation of the system. - If a resistance of more than 2 Ohms is measured in both of the measurements: LOCATE and REPAIR the break in circuit 91-RN2A (BK/BU) between soldered connection S53 and ground connection G68 using the Wiring Diagrams. CHECK the operation of the system.

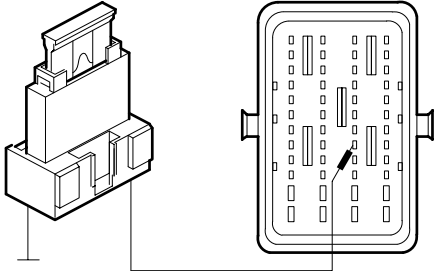
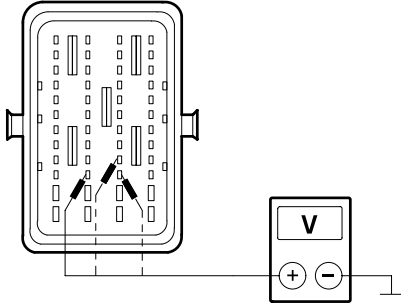
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AB35: CHECK THE GROUND CONNECTION OF THE PCM	
 <p>VFE0038120</p>	<p>1 Measure the resistance between the PCM, connector C690, pin 10, circuit 91-RE8 (BK/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to AB36. → No LOCATE and REPAIR the break in circuit 91-RE8 (BK/YE) between the PCM and ground connection G68 using the Wiring Diagrams. CHECK the operation of the system.
AB36: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE DATA LINK CONNECTOR (DLC)	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038121</p>	<p>1 Measure the resistance between the PCM, connector C690, pin 30, circuit 5-EC7D (BU/RD) (vehicles with automatic transmission: circuit 5-EC7C (BU/RD)), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes GO to AB37. → No LOCATE and REPAIR the open circuit between the PCM and soldered connection S222 using the Wiring Diagrams. CHECK the operation of the system.

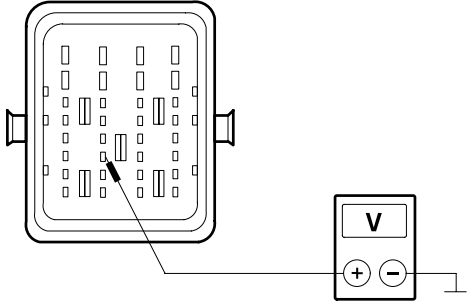
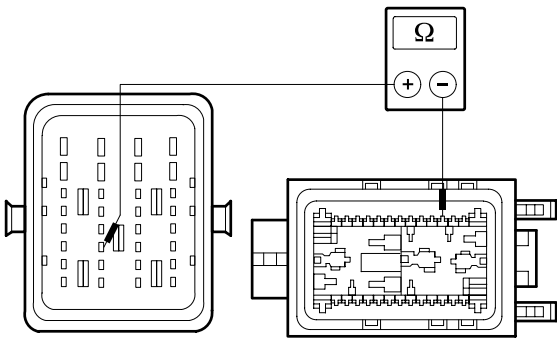
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AB37: CHECK THE CIRCUIT BETWEEN THE PCM AND THE DLC FOR OPEN CIRCUIT	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038122</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the PCM, connector C690, pin 41, circuit 4-EC7D (GY/RD) (vehicles with automatic transmission: circuit 4-EC7C (BU/RD)), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the open circuit between the PCM and soldered connection S223 using the Wiring Diagrams. CHECK the operation of the system.
AB38: CHECK THE VOLTAGE AT THE PCM (PIN G4)	
 <p>VFE0028939</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C417 from the PCM. 3 Measure the voltage between the PCM, connector C417, pin G4, circuit 30-RE8 (RD), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <ul style="list-style-type: none"> → Yes GO to AB39. → No LOCATE and REPAIR the break in circuit 30-RE8 (RD) between the PCM and fuse F30 using the Wiring Diagrams. CHECK the operation of the system.
AB39: CHECK THE VOLTAGE AT THE PCM	
	<ol style="list-style-type: none"> 1 Disconnect Connector C419 from the PCM.

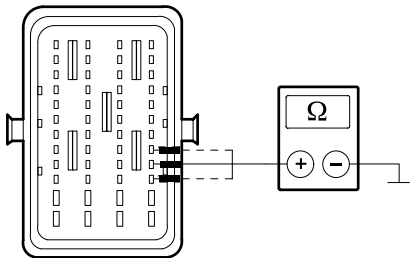
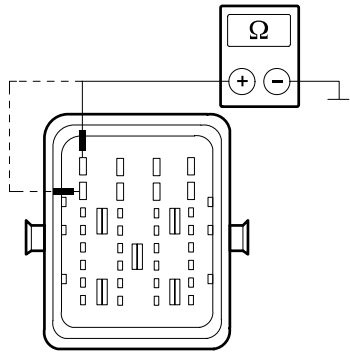
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038124</p>	<p>2 Use a fused test lead (1 A) at the PCM, connector C417, pin H3, to bridge circuit 91S-RH9B (BK/BU) (vehicles with 1.8L diesel engine: 91S-RH9 (BK/BU)), wiring harness side and ground.</p>
 <p>VFE0038123</p>	<p>3 Measure the voltage between the PCM, connector C419, pin K2, circuit 15-RJ14A (GN/YE), wiring harness side and ground.</p>
	<p>4 Measure the voltage between the PCM, connector C419, pin K3, circuit 15-RJ14B (GN/YE), wiring harness side and ground.</p>
	<p>5 Measure the voltage between the PCM, connector C419, pin J3, circuit 15-RJ14C (GN/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured in all cases? <ul style="list-style-type: none"> → Yes GO to AB40. → No <ul style="list-style-type: none"> - Battery voltage not measured in one/two cases: LOCATE and REPAIR the break in the affected circuit between the PCM and soldered connection S65 using the Wiring Diagrams. CHECK the operation of the system. - Battery voltage not measured in any case: LOCATE and REPAIR the break in the circuit between fuse F36 and soldered connection S65 using the Wiring Diagrams. CHECK the operation of the system.

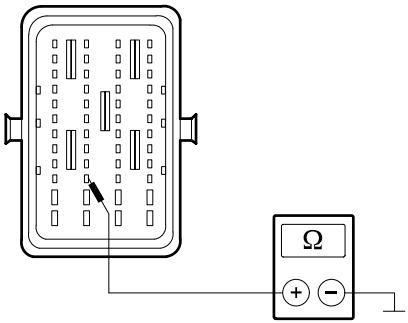
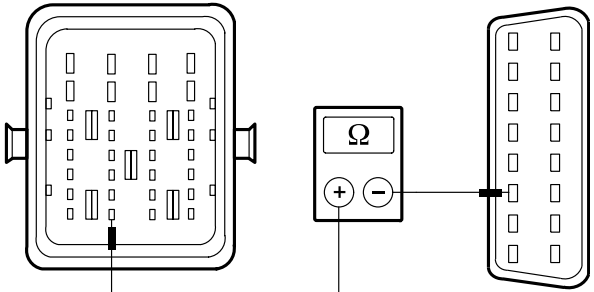
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AB40: CHECK THE VOLTAGE AT THE PCM (PIN C3)	
 <p>VFE0038125</p>	<ol style="list-style-type: none"> 1 Disconnect Connector C418 from the PCM. 2 Ignition switch in position II. 3 Measure the voltage between the PCM, connector C418, pin C3, circuit 15-RE17 (GN/BU), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to AB42. → No GO to AB41.
AB41: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE CENTRAL JUNCTION BOX (CJB)	
 <p>VFE0038126</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C96 from CJB. 3 Measure the resistance between the PCM, connector C418, pin C3, circuit 15-RE17 (GN/BU), wiring harness side and the CJB, connector C96, pin 38, circuit 15-RE17 (GN/BU), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 15-RE17 (GN/BU) between the PCM and the CJB using the Wiring Diagrams. CHECK the operation of the system.
AB42: CHECK THE GROUND CONNECTION OF THE PCM	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

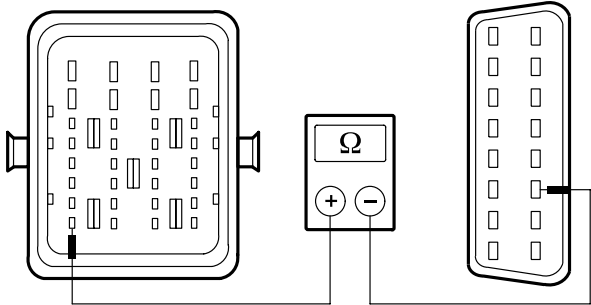
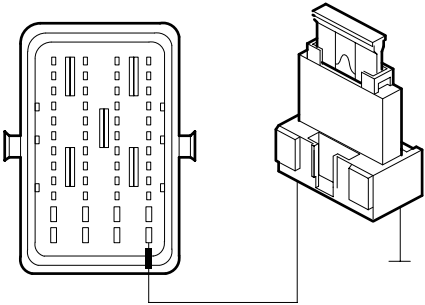
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038127</p>	<p>2 Measure the resistance between the PCM, connector C419, pin J4, circuit 91-RE8H (BK/YE)(vehicles with 1.8L diesel engine: circuit 91-RE8C (BK/YE)), wiring harness side and ground.</p>
	<p>3 Measure the resistance between the PCM, connector C419, pin H4, circuit 91-RE8J (BK/YE)(vehicles with 1.8L diesel engine: circuit 91-RE8B (BK/YE)), wiring harness side and ground.</p>
	<p>4 Measure the resistance between the PCM, connector C419, pin K4, circuit 91-RE8G (BK/YE)(vehicles with 1.8L diesel engine: circuit 91-RE8C (BK/YE)), wiring harness side and ground.</p>
 <p>VFE0038128</p>	<p>5 Measure the resistance between the PCM, connector C418, pin H4, circuit 91-RE8L (BK/YE)(vehicles with 1.8L diesel engine: circuit 91-RE8E (BK/YE)), wiring harness side and ground.</p> <p>6 Measure the resistance between the PCM, connector C418, pin G4, circuit 91-RE8M (BK/YE)(vehicles with 1.8L diesel engine: circuit 91-RE8F (BK/YE)), wiring harness side and ground.</p>

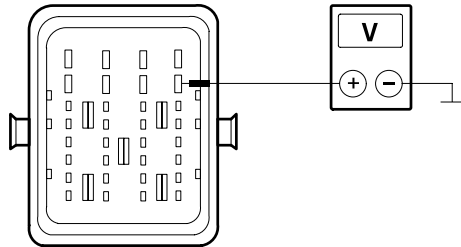
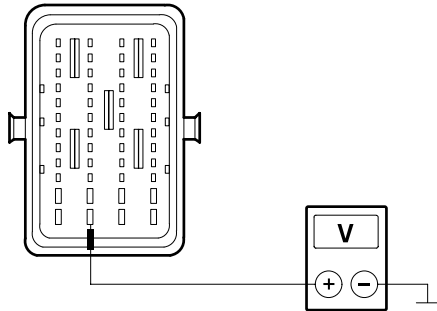
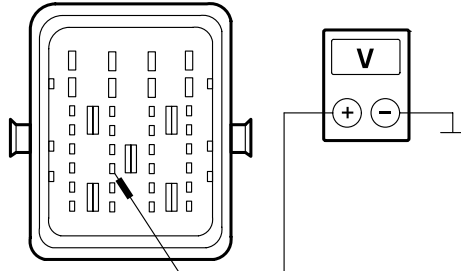
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038129</p>	<p>7 Measure the resistance between the PCM, connector C417, pin K2, circuit 91-RE8K (BK/YE)(vehicles with 1.8L diesel engine: circuit 91-RE8D (BK/YE)), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured in all cases? <p>→ Yes GO to AB43.</p> <p>→ No</p> <ul style="list-style-type: none"> - If a resistance of more than 2 Ohms is measured in one or more of the measurements: LOCATE and REPAIR the break in the affected circuit between the PCM and soldered connection S53 using the Wiring Diagrams. CHECK the operation of the system. - If a resistance of more than 2 Ohms is measured in all of the measurements: LOCATE and REPAIR the break in circuit 91-RN2 (BK/BU) between the PCM and ground connection G57 using the Wiring Diagrams. CHECK the operation of the system.
<p>AB43: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE DATA LINK CONNECTOR (DLC)</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038130</p>	<p>1 Measure the resistance between the PCM, connector C418, pin A3, circuit 5-EC7D (BU/RD)(vehicles with 1.8L diesel engine: circuit 5-EC7C (BU/RD)), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to AB44.</p> <p>→ No LOCATE and REPAIR the break in circuit 5-EC7D (BU/RD) between the PCM and the DLC using the Wiring Diagrams. CHECK the operation of the system.</p>

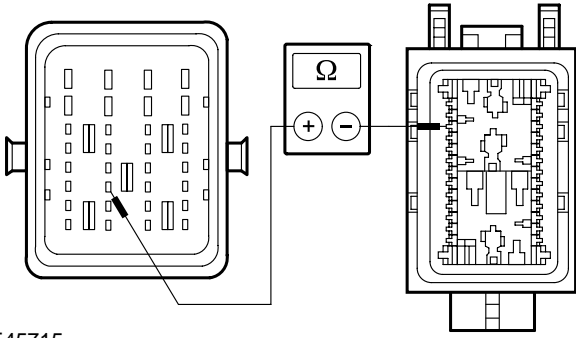
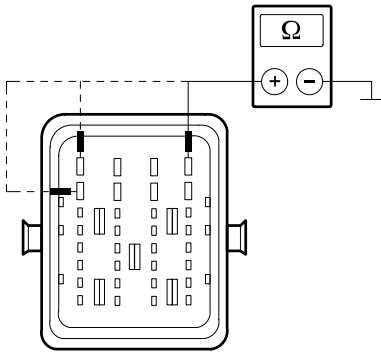
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AB44: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE DLC	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>VFE0038131</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the PCM, connector C418, pin A4, circuit 4-EC7D (GY/RD)(vehicles with 1.8L diesel engine: circuit 4-EC7C (GY/RD)), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 4-EC7D (GY/RD) between the PCM and the DLC using the Wiring Diagrams. CHECK the operation of the system.
AB45: CHECK THE VOLTAGE AT THE PCM	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C418 from the PCM. 3 Disconnect Connector C417 from the PCM.
 <p>VFE0038132</p>	<ol style="list-style-type: none"> 4 Use a fused test lead (1 A) at the PCM, connector C417, pin E1, to bridge circuit 91S-RH9 (BK/BU), wiring harness side and ground.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038133</p>	<p>5 Measure the voltage between the PCM, connector C418, pin G1, circuit 15-RE21 (GN/OG), wiring harness side and ground.</p>
 <p>VFE0038135</p>	<p>6 Measure the voltage between the PCM, connector C417, pin M2, circuit 15-RE25 (GN/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured in both cases? → Yes GO to AB46. → No If battery voltage is not measured during one measurement: LOCATE and REPAIR the break in the affected circuit between the PCM and the connector C90 using the Wiring Diagrams. CHECK the operation of the system. If battery voltage is not measured in any of the measurements: LOCATE and REPAIR the open circuit between the connector C90 and fuse F36 using the Wiring Diagrams. CHECK the operation of the system.
<p>AB46: CHECK THE VOLTAGE AT THE PCM</p>	
<p>1 Ignition switch in position II.</p>	<p>1 Ignition switch in position II.</p>
 <p>E45713</p>	<p>2 Measure the voltage between the PCM, connector C418, pin C3, circuit 15-RE17 (GN/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to AB48. → No GO to AB47.

DIAGNOSIS AND TESTING

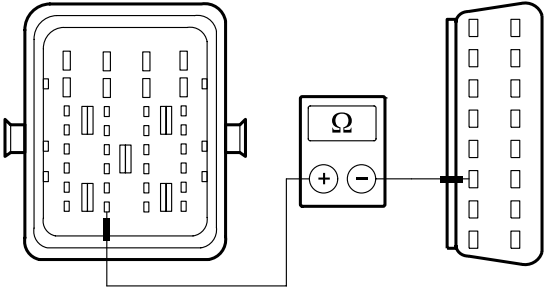
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AB47: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE CENTRAL JUNCTION BOX (CJB)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.
	<ol style="list-style-type: none"> 2 Disconnect Connector C96 from CJB.
 <p>E45715</p>	<ol style="list-style-type: none"> 3 Measure the resistance between the PCM, connector C418, pin C3, circuit 15-RE17 (GN/BU), wiring harness side and the CJB, connector C96, pin 38, circuit 15-RE17 (GN/BU), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 15-RE17 (GN/BU) between the PCM and the CJB using the Wiring Diagrams. CHECK the operation of the system.
AB48: CHECK THE GROUND CONNECTION OF THE PCM	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.
 <p>VFE0038136</p>	<ol style="list-style-type: none"> 2 Measure the resistance between the PCM, connector C418, pin H1, circuit 91-RE8N (BK/YE), wiring harness side and ground.
	<ol style="list-style-type: none"> 3 Measure the resistance between the PCM, connector C418, pin H4, circuit 91-RE8P (BK/YE), wiring harness side and ground.

DIAGNOSIS AND TESTING

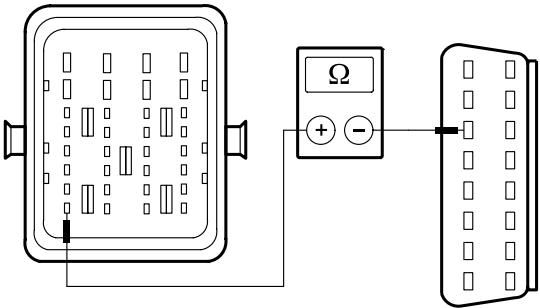
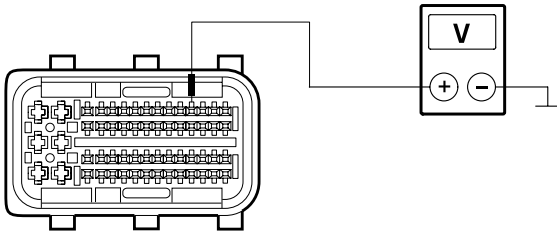
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 Measure the resistance between the PCM, connector C418, pin G4, circuit 91-RE8R (BK/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured in all cases? <p>→ Yes GO to AB49.</p> <p>→ No</p> <ul style="list-style-type: none"> If a resistance of more than 2 Ohms is measured in one or two of the measurements: LOCATE and REPAIR the break in the affected circuit between the PCM and soldered connection S53 using the Wiring Diagrams. CHECK the operation of the system. If a resistance of more than 2 Ohms is measured in all of the measurements: LOCATE and REPAIR the break in circuit 91-RN2 (BK/BU) between soldered connection S53 and ground connection G57 using the Wiring Diagrams. CHECK the operation of the system.

AB49: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE DATA LINK CONNECTOR (DLC)

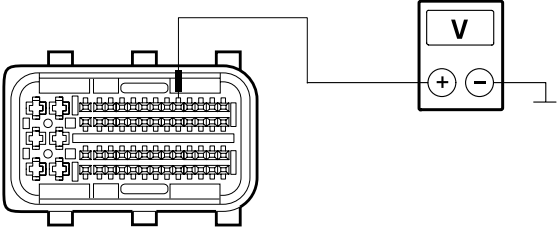
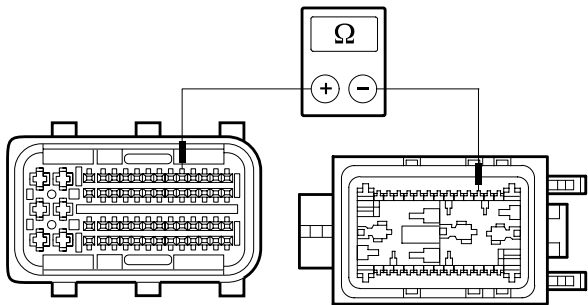
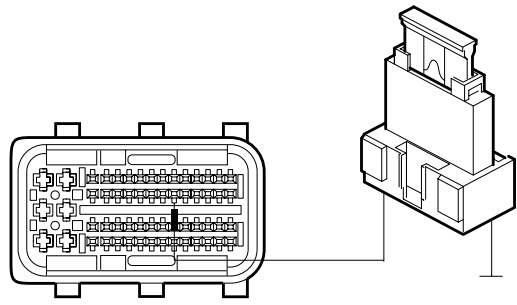
CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.

 <p>E45717</p>	<p>1 Measure the resistance between the PCM, connector C418, pin A3, circuit 5-EC7C (BU/RD), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to AB50.</p> <p>→ No LOCATE and REPAIR the break in the circuit between the PCM and the DLC using the Wiring Diagrams. CHECK the operation of the system.</p>
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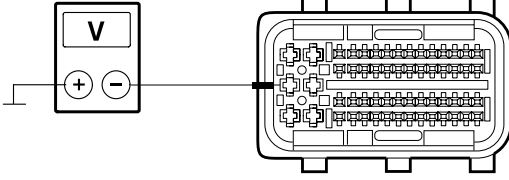
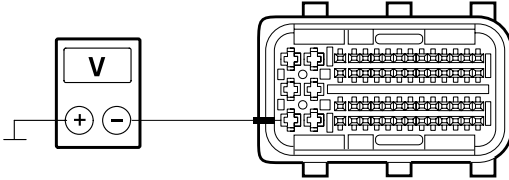
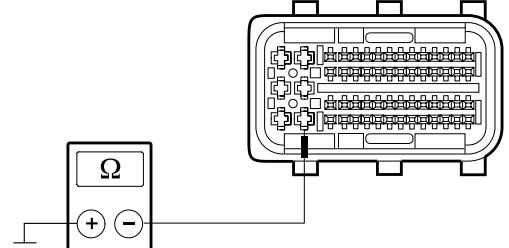
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AB50: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE DLC	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E45719</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the PCM, connector C418, pin A4, circuit 4-EC7C (GY/RD), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the PCM and the DLC using the Wiring Diagrams. CHECK the operation of the system.
AB51: CHECK THE VOLTAGE AT THE PCM (PIN 16) - VEHICLES WITH 2.5L DURATEC-ST (VI5) ENGINE	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect connector C690 from the PCM.
 <p>E67296</p>	<ol style="list-style-type: none"> 3 Measure the voltage between the PCM, connector C690, pin 16, circuit 30-RE8 (RD), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <ul style="list-style-type: none"> → Yes GO to AB52. → No LOCATE and REPAIR the open circuit between the PCM and fuse F26 using the Wiring Diagrams. CHECK the operation of the system.
AB52: CHECK THE VOLTAGE AT THE PCM (PIN 15) - VEHICLES WITH 2.5L DURATEC-ST (VI5) ENGINE	
	<ol style="list-style-type: none"> 1 Ignition switch in position II.

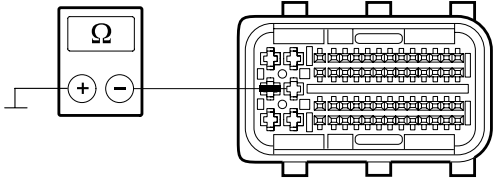
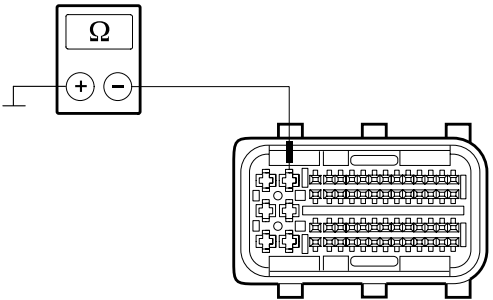
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E67297</p>	<p>2 Measure the voltage between the PCM, connector C690, pin 15, circuit 15S-RE8A (GN/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to AB54. → No GO to AB53.
<p>AB53: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE CENTRAL JUNCTION BOX (CJB) - VEHICLES WITH 2.5L DURATEC-ST (VI5) ENGINE</p>	
 <p>E67298</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C96 from CJB.</p> <p>3 Measure the resistance between the PCM, connector C690, pin 15, circuit 15S-RE8A (GN/YE), wiring harness side and the CJB, connector C96, pin 38, circuit 15-RE17 (GN/BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK the CJB and RENEW as required. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the PCM and the CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>AB54: CHECK THE VOLTAGE AT THE PCM - VEHICLES WITH 2.5L DURATEC-ST (VI5) ENGINE</p>	
 <p>E67299</p>	<p>1 Ignition switch in position 0.</p> <p>2 Use a fused test lead (1 A) at the PCM, connector C690, pin 27, to bridge circuit 91S-RH9 (BK/BU), wiring harness side and ground.</p>

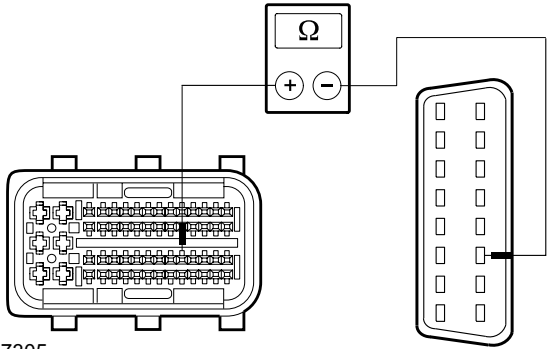
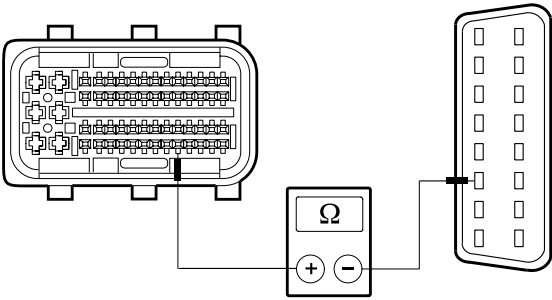
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E67300</p>	<p>3 Measure the voltage between the PCM, connector C690, pin 3, circuit 15-RE8A (GN/YE), wiring harness side and ground.</p>
 <p>E67301</p>	<p>4 Measure the voltage between the PCM, connector C690, pin 5, circuit 15-RE8 (GN/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to AB55. → No LOCATE and REPAIR the open circuit between the PCM and fuse F36 using the Wiring Diagrams. CHECK the operation of the system.
<p>AB55: CHECK THE GROUND CONNECTION OF THE PCM - VEHICLES WITH 2.5L DURATEC-ST (VI5) ENGINE</p>	
 <p>E67302</p>	<p>1 Measure the resistance between the PCM, connector C690, pin 6, circuit 91-RE8A (BK/YE), wiring harness side and ground.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E67303</p>	<p>2 Measure the resistance between the PCM, connector C690, pin 4, circuit 91-RE8B (BK/YE), wiring harness side and ground.</p>
 <p>E67304</p>	<p>3 Measure the resistance between the PCM, connector C690, pin 2, circuit 91-RE8C (BK/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured in all of the cases? → Yes GO to AB56. → No <ul style="list-style-type: none"> - If a resistance of more than 2 Ohms is measured in one or two of the measurements: LOCATE and REPAIR the break in the affected circuit between the PCM and soldered connection S53 using the Wiring Diagrams. CHECK the operation of the system. - Is a resistance of more than 2 Ohms measured in all of the measurements? LOCATE and REPAIR the break in circuit 31-RN2 (BK) between the PCM and ground connection G57 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AB56: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE DATA LINK CONNECTOR (DLC) - VEHICLES WITH 2.5L DURATEC-ST (V15) ENGINE</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E67305</p>	<p>1 Measure the resistance between the PCM, connector C690, pin 41, circuit 5-EC7C (BU/RD), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes GO to AB57. → No LOCATE and REPAIR the break in the circuit between the PCM and the DLC using the Wiring Diagrams. CHECK the operation of the system.
<p>AB57: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE DLC - VEHICLES WITH 2.5L DURATEC-ST (V15) ENGINE:</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E67306</p>	<p>1 Measure the resistance between the PCM, connector C690, pin 54, circuit 4-EC7C (GY/RD), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the PCM and the DLC using the Wiring Diagrams. CHECK the operation of the system.

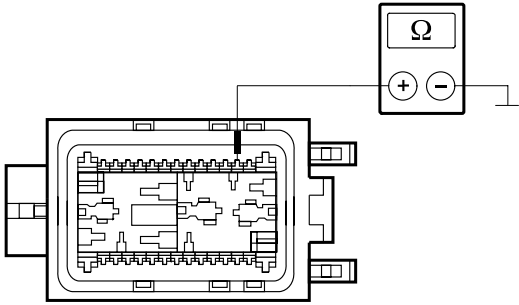
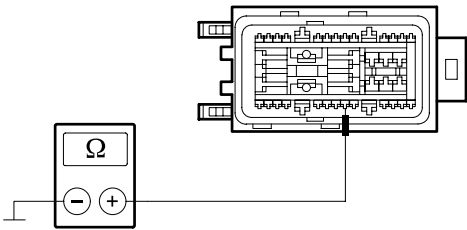
PINPOINT TEST AC : GENERIC ELECTRONIC MODULE (GEM) NOT COMMUNICATING WITH THE DIAGNOSTIC UNIT.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: The generic electronic module (GEM) is integrated into the central junction box (CJB).</p>	
<p>AC1: CHECK COMMUNICATION WITH THE RESTRAINTS CONTROL MODULE</p>	
	<p>1 Ignition switch in position 0.</p>

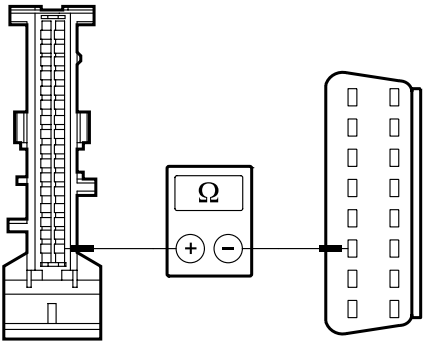
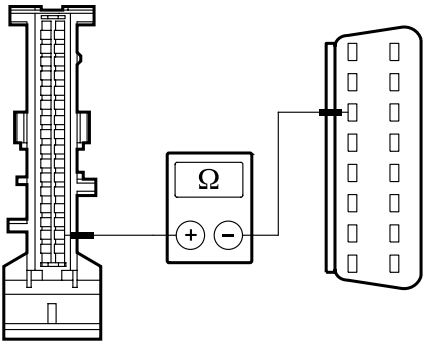
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Connect the diagnostic tool.</p> <p>3 Select the restraints control module (RCM) with the diagnostic tester.</p> <ul style="list-style-type: none"> • Is it possible to establish communication with the restraints control module (RCM)? <p>→ Yes GO to AC2.</p> <p>→ No GO to Pinpoint Test AD.</p>
AC2: CHECK FUSE F3	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F3 (BJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to AC3.</p> <p>→ No RENEW fuse F3 (60 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
AC3: CHECK THE VOLTAGE AT FUSE F3	
	<p>1 Connect Fuse F3 (BJB).</p> <p>2 Measure the voltage between fuse F3 (60 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to AC4.</p> <p>→ No RECTIFY the voltage supply to fuse F3 using the Wiring Diagrams. CHECK the operation of the system.</p>
AC4: CHECK THE GEM GROUND CONNECTION	
	<p>1 Disconnect Connector C96 from GEM.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E62354</p>	<p>2 Measure the resistance between the GEM, connector C96, pin 39, circuit 91-DK20 (BK/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured? → Yes GO to AC5. → No LOCATE and REPAIR the break in the circuit between the GEM and ground connection G20 using the Wiring Diagrams. CHECK the operation of the system.
<p>AC5: CHECK THE EQUIPMENT LEVEL</p>	
	<p>1 Compare the following systems with the equipment level of the vehicle:</p> <ul style="list-style-type: none"> Double locking. Footwell lighting. Reading lights. Anti-theft alarm. Headlamp switch-off delay. <ul style="list-style-type: none"> Is the vehicle equipped with one of the above systems? → Yes GO to AC9. → No GO to AC6.
<p>AC6: CHECK THE GEM GROUND CONNECTION</p>	
 <p>VFE0038137</p>	<p>1 Disconnect Connector C102 from GEM.</p> <p>2 Measure the resistance between the GEM, connector C102, pin 19, circuit 31-DA1 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms measured? → Yes GO to AC7. → No LOCATE and REPAIR the break in the circuit between the GEM and ground connection G20 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING


TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AC7: CHECK FOR OPEN CIRCUIT BETWEEN THE GEM AND THE DLC.	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E45722</p>	<ol style="list-style-type: none"> <li>1 Disconnect Connector C103 from GEM. <li>2 Measure the resistance between the GEM, connector C103, pin 1, circuit 4-EC10B (GY), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side. <ul style="list-style-type: none"> <li>• Is a resistance of less than 2 Ohms measured? <li>→ Yes GO to AC8. <li>→ No LOCATE and REPAIR the break in the circuit between the GEM and soldered connection S81 using the Wiring Diagrams. CHECK the operation of the system.
AC8: CHECK FOR OPEN CIRCUIT BETWEEN THE GEM AND THE DLC.	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E45723</p>	<ol style="list-style-type: none"> <li>1 Measure the resistance between the GEM, connector C103, pin 2, circuit 5-EC10B (BU), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side. <ul style="list-style-type: none"> <li>• Is a resistance of less than 2 Ohms measured? <li>→ Yes CHECK the GEM and CJB and RENEW if necessary. CHECK the operation of the system. <li>→ No LOCATE and REPAIR the break in the circuit between the GEM and soldered connection S82 using the Wiring Diagrams. CHECK the operation of the system.
AC9: CHECK FOR OPEN CIRCUIT BETWEEN THE GEM AND THE DLC.	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
	<ol style="list-style-type: none"> <li>1 Disconnect Connector C99 from GEM.

DIAGNOSIS AND TESTING

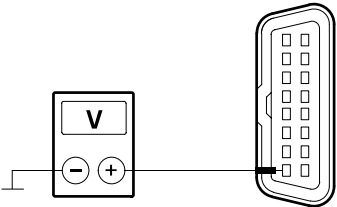
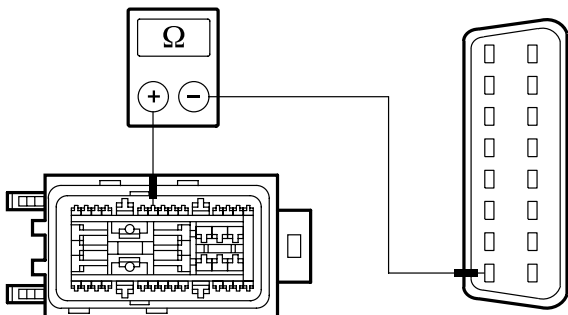
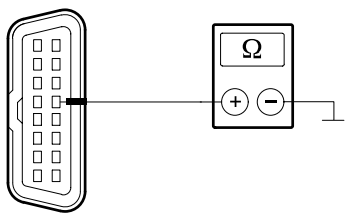
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>VFE0038138</p>	<p>2 Measure the resistance between the GEM, connector C99, pin 32 (GY), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to AC10.</p> <p>→ No LOCATE and REPAIR the break in the circuit between the GEM and soldered connection S81 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>AC10: CHECK FOR OPEN CIRCUIT BETWEEN THE GEM AND THE DLC.</p>	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
<p>VFE0038139</p>	<p>1 Measure the resistance between the GEM, connector C99, pin 16 (BU), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes CHECK the GEM and CJB and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in the circuit between the GEM and soldered connection S82 using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

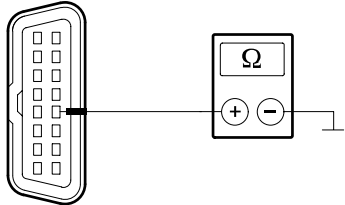
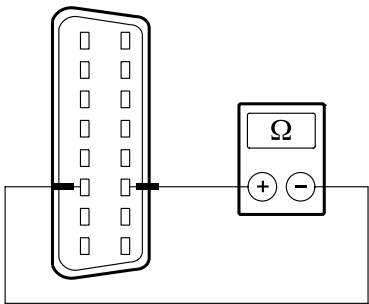



PINPOINT TEST AD : FAULTY COMMUNICATION BETWEEN THE MODULES - MS CAN BUS.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p> CAUTION: The measurements below may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
<p>NOTE: Failure of the complete CAN bus system can be caused by incorrectly engaged wiring harness connectors at the CJB or in the A-pillar area. Ensure correct locking of wiring harness connectors.</p>	
<p>AD1: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).</p>	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to AD4.</p> <p>→ No GO to AD2.</p>
<p>AD2: CHECK FUSE F44</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 CHECK Fuse F44 (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to AD3.</p> <p>→ No RENEW fuse F44 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.</p>
<p>AD3: CHECK THE VOLTAGE AT FUSE F44</p>	
	<p>1 Connect Fuse F44 (CJB).</p> <p>2 Measure the voltage between fuse F44 (10 A) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? <p>→ Yes GO to AD4.</p> <p>→ No RECTIFY the voltage supply to fuse F44 using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AD4: CHECK THE VOLTAGE AT THE DATA LINK CONNECTOR (DLC)	
 <p>VFE0028957</p>	<ol style="list-style-type: none"> 1 Measure the voltage between the DLC, connector C200, pin 16, circuit 29-RA1 (OG), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <ul style="list-style-type: none"> → Yes GO to AD6. → No GO to AD5.
AD5: CHECK FOR OPEN CIRCUIT BETWEEN THE DLC AND THE CENTRAL JUNCTION BOX (CJB)	
 <p>VFE0038140</p>	<ol style="list-style-type: none"> 1 Disconnect Connector C102 from CJB. 2 Measure the resistance between the DLC, connector C200, pin 16, circuit 29-RA1 (OG), wiring harness side and the CJB, connector C102, pin 9, circuit 29-RA1 (OG), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 29-RA1 (OG) between the DLC and the CJB using the Wiring Diagrams. CHECK the operation of the system.
AD6: CHECK THE GROUND CONNECTION OF THE DLC (PIN 4)	
 <p>VFE0028965</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Measure the resistance between the DLC, connector C200, pin 4, circuit 31-RA1 (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes GO to AD7. → No LOCATE and REPAIR the open circuit between the DLC and ground connection G20 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AD7: CHECK THE GROUND CONNECTION OF THE DLC (PIN 5)	
 <p>VFE0028964</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the DLC, connector C200, pin 5, circuit 91-RA1 (BK/OG), wiring harness side and ground. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes GO to AD8. → No LOCATE and REPAIR the break in circuit 91-RA1 (BK/OG) between the DLC and ground connection G7 using the Wiring Diagrams. CHECK the operation of the system.
AD8: CHECK THE MS CAN BUS FOR SHORT CIRCUIT	
 <p>E45952</p>	<ol style="list-style-type: none"> 1 Disconnect the ground cable from the battery. 2 Measure the resistance between the DLC, connector C200 between pin 3, circuit 4-EC10M (GY), wiring harness side and pin 11, circuit 5-EC10M (BU), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of between 55 and 65 Ohms measured? <ul style="list-style-type: none"> → Yes GO to AD9. → No If a resistance of between 115 and 125 Ohms is measured: GO to AD15. If a resistance of between 115 and 125 Ohms is not measured: GO to AD23.
AD9: PERFORM NETWORK TEST (RESTRAINTS CONTROL MODULE (RCM))	
WARNINGS:	
<p> The stored voltage must be discharged in order to prevent unintentional deployment of the airbag/belt pretensioner. After disconnecting the battery, wait at least 1 minute before starting work on the supplemental restraint system (SRS). Failure to follow these instructions may result in personal injury.</p>	
<p> Do not program any keycodes while working on the supplemental restraint system in order to prevent the risk of accidental deployment of supplemental restraint system components. Failure to follow these instructions may result in personal injury.</p>	
<p> Never probe the electrical connectors of air bag modules or any other supplemental restraint system component. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Disconnect Connector C426 from restraints control module (RCM).

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Connect Ground cable from battery.</p>
	<p>3 Connect the diagnostic tool.</p>
	<p>4 Select the vehicle with the diagnostic tester.</p> <ul style="list-style-type: none"> • Is it possible to establish communication with the GEM? → Yes CHECK and if necessary RENEW the restraints control module. CHECK the operation of the system. → No GO to AD10.

AD10: PERFORM NETWORK TEST

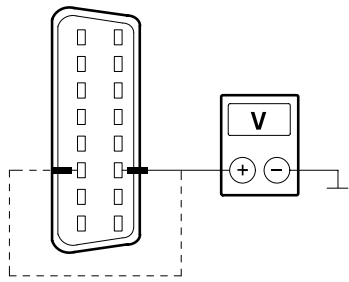
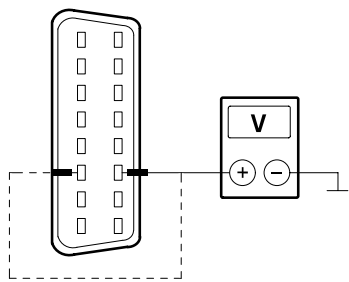
NOTE: The number of modules connected to the CAN bus depends on the equipment levels of the vehicle. Therefore, not every vehicle will have all the modules mentioned below.

	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect a listed component, then perform the following test step:</p> <ul style="list-style-type: none"> - Audio module C443 - Cabriolet folding top control unit C562 - Electronic automatic temperature control (EATC) module C540 - Navigation system module C457 - CD changer module C440 - Rear seat entertainment system module C451 - Navigation system screen module C487 - Left-hand front door module C729 - - All except Cabriolet: Rear left door module C730 - Right-hand front door module C722 - - All except Cabriolet: Rear right door module C731 - Control module for mobile electronic auxiliary equipment (PSE) C432 - Keyless vehicle module C216 - Fuel-fired booster heater/programmable fuel-fired booster heater C307 - Parking aid module C622 - Electronic instrument cluster C809

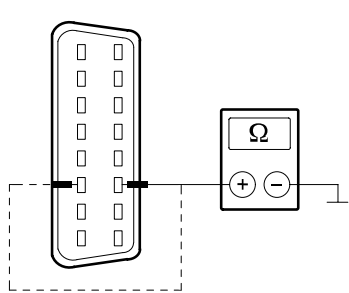
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Select the vehicle with the diagnostic tester.</p> <ul style="list-style-type: none"> • Is it possible to establish communication with the GEM? <p>→ Yes The component disconnected last is the cause of the concern, CHECK component and if necessary RENEW. CHECK the operation of the system.</p> <p>→ No</p> <ul style="list-style-type: none"> - If not all the listed components are disconnected: DISCONNECT the next component (go to test step 1). - If all the listed components are disconnected: GO to AD11.
AD11: CHECK THE EQUIPMENT LEVEL	
	<p>1 Compare the following systems with the equipment level of the vehicle:</p> <ul style="list-style-type: none"> • Double locking. • Footwell lighting. • Reading lights. • Anti-theft alarm. • Headlamp switch-off delay. <ul style="list-style-type: none"> • Is the vehicle equipped with one of the above systems? <p>→ Yes GO to AD13.</p> <p>→ No GO to AD12.</p>
AD12: CHECK THE MS CAN BUS FOR A SHORT TO VOLTAGE SUPPLY	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C103 from GEM.</p> <p>3 Ignition switch in position II.</p>

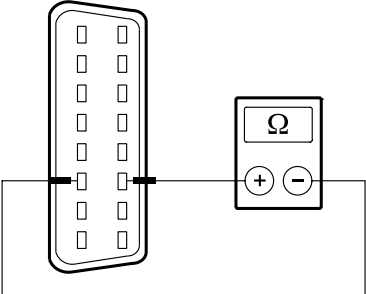
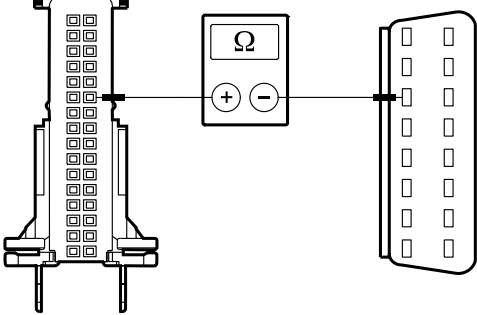
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038146</p>	<p>4 Measure the voltage between the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side and ground.</p>
	<p>5 Measure the voltage between the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a voltage measured? → Yes LOCATE and REPAIR the short to voltage in the affected circuit using the Wiring Diagrams. CHECK the operation of the system. → No GO to AD14.
<p>AD13: CHECK THE MS CAN BUS FOR A SHORT TO VOLTAGE SUPPLY</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect Connector C99 from GEM.</p>
	<p>3 Ignition switch in position II.</p>
 <p>VFE0038146</p>	<p>4 Measure the voltage between the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side and ground.</p>

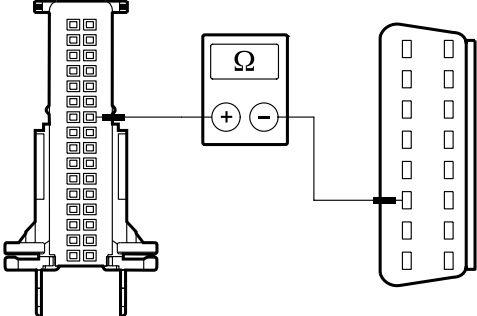
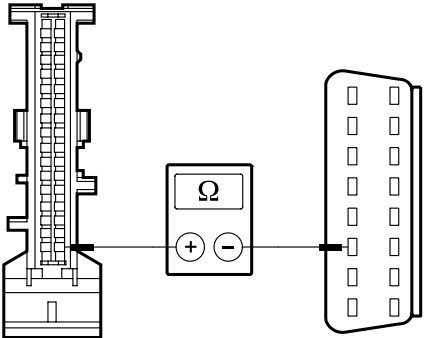
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 Measure the voltage between the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a voltage measured? → Yes LOCATE and REPAIR the short to voltage in the affected circuit using the Wiring Diagrams. CHECK the operation of the system. → No GO to AD14.
<p>AD14: CHECK THE MS CAN BUS FOR A SHORT TO GROUND</p>	
 <p>VFE0038147</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side and ground.</p>
	<p>3 Measure the resistance between the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance greater than 10,000 Ohm measured in both cases? → Yes CHECK the GEM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the short to ground in the affected circuit using the Wiring Diagrams. CHECK the operation of the system.
<p>AD15: CHECK THE MS CAN BUS FOR SHORT CIRCUIT</p>	
	<p>1 Disconnect Connector C809 from electronic instrument cluster.</p>

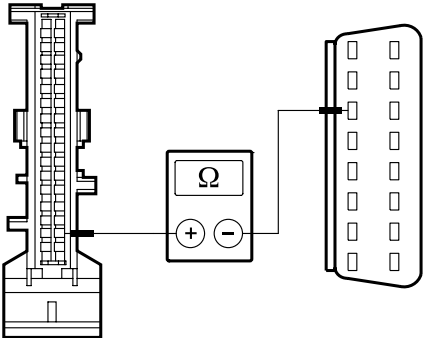
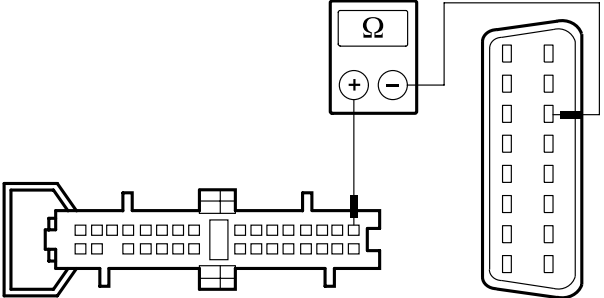
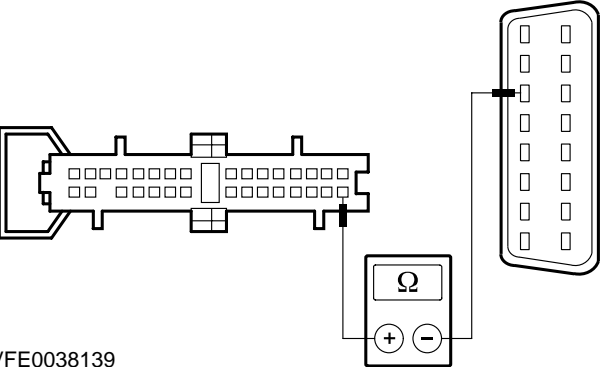
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E45952</p>	<p>2 Measure the resistance between the DLC, connector C200 between pin 3, circuit 4-EC10M (GY), wiring harness side and pin 11, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of between 115 and 120 Ohms measured? <p>→ Yes GO to AD17.</p> <p>→ No GO to AD16.</p>
<p>AD16: CHECK THE EQUIPMENT LEVEL</p>	
	<p>1 Compare the following systems with the equipment level of the vehicle:</p> <ul style="list-style-type: none"> • Double locking. • Footwell lighting. • Reading lights. • Anti-theft alarm. • Headlamp switch-off delay. <ul style="list-style-type: none"> • Is the vehicle equipped with one of the above systems? <p>→ Yes GO to AD21.</p> <p>→ No GO to AD19.</p>
<p>AD17: CHECK FOR OPEN CIRCUIT BETWEEN THE ELECTRONIC INSTRUMENT CLUSTER AND THE DATA LINK CONNECTOR (DLC)</p>	
 <p>E45720</p>	<p>1 Measure the resistance between the electronic instrument cluster, connector C809, pin 22, circuit 5-EC10 (BU), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to AD18.</p> <p>→ No LOCATE and REPAIR the break in circuit 5-EC10M (BU) between the electronic instrument cluster and the DLC using the Wiring Diagrams. CHECK the operation of the system.</p>




DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AD18: CHECK FOR OPEN CIRCUIT BETWEEN THE ELECTRONIC INSTRUMENT CLUSTER AND THE DLC	
 <p>E45721</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the electronic instrument cluster, connector C809, pin 23, circuit 4-EC10 (GY), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the electronic instrument cluster. CHECK the operation of the system. → No LOCATE and REPAIR the break in circuit 4-EC10M (GY) between the electronic instrument cluster and the DLC using the Wiring Diagrams. CHECK the operation of the system.
AD19: CHECK FOR OPEN CIRCUIT BETWEEN THE GEM AND THE DLC.	
 <p>E45722</p>	<ol style="list-style-type: none"> 1 Disconnect Connector C103 from GEM. 2 Measure the resistance between the GEM, connector C103, pin 1, circuit 4-EC10B (GY), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes GO to AD20. → No LOCATE and REPAIR the break in the circuit between the GEM and the DLC using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AD20: CHECK FOR OPEN CIRCUIT BETWEEN THE GEM AND THE DLC.	
 <p>E45723</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the GEM, connector C103, pin 2, circuit 5-EC10B (BU), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the GEM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the GEM and the DLC using the Wiring Diagrams. CHECK the operation of the system.
AD21: CHECK FOR OPEN CIRCUIT BETWEEN THE GEM AND THE DLC.	
 <p>VFE0038138</p>	<ol style="list-style-type: none"> 1 Disconnect Connector C99 from GEM. 2 Measure the resistance between the GEM, connector C99, pin 32 (GY), wiring harness side and the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes GO to AD22. → No LOCATE and REPAIR the break in the circuit between the GEM and the DLC using the Wiring Diagrams. CHECK the operation of the system.
AD22: CHECK FOR OPEN CIRCUIT BETWEEN THE GEM AND THE DLC.	
 <p>VFE0038139</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the GEM, connector C99, pin 16 (BU), wiring harness side and the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the GEM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the GEM and the DLC using the Wiring Diagrams. CHECK the operation of the system.

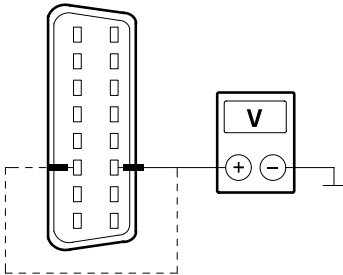
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AD23: PERFORM NETWORK TEST (RESTRAINTS CONTROL MODULE (RCM))	
WARNINGS:	
<p> The stored voltage must be discharged in order to prevent unintentional deployment of the airbag/belt pretensioner. After disconnecting the battery, wait at least 1 minute before starting work on the supplemental restraint system (SRS). Failure to follow these instructions may result in personal injury.</p>	
<p> Do not program any keycodes while working on the supplemental restraint system in order to prevent the risk of accidental deployment of supplemental restraint system components. Failure to follow these instructions may result in personal injury.</p>	
<p> Never probe the electrical connectors of air bag modules or any other supplemental restraint system component. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> <li>1 Disconnect Connector C426 from restraints control module (RCM). <li>2 Connect Ground cable from battery. <li>3 Connect the diagnostic tool. <li>4 Select the vehicle with the diagnostic tester. <ul style="list-style-type: none"> <li>• Is it possible to establish communication with the GEM? <li>→ Yes CHECK and if necessary RENEW the restraints control module. CHECK the operation of the system. <li>→ No GO to AD24.
AD24: PERFORM NETWORK TEST	
<p>NOTE: The number of modules connected to the CAN bus depends on the equipment levels of the vehicle. Therefore, not every vehicle will have all the modules mentioned below.</p>	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0.

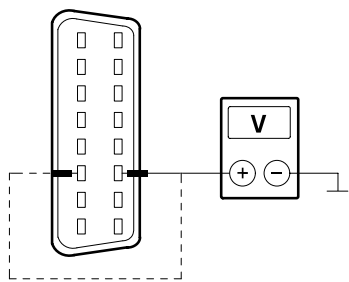
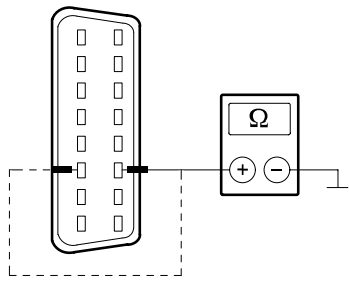
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect a listed component, then perform the following test step:</p> <ul style="list-style-type: none"> <li>– Audio module C443 <li>– Cabriolet folding top control unit C562 <li>– Electronic automatic temperature control (EATC) module C540 <li>– Navigation system module C457 <li>– CD changer module C440 <li>– Rear seat entertainment system module C451 <li>– Navigation system screen module C487 <li>– Left-hand front door module C729 <li>– All except Cabriolet: Rear left door module C730 <li>– Right-hand front door module C722 <li>– All except Cabriolet: Rear right door module C731 <li>– Control module for mobile electronic auxiliary equipment (PSE) C432 <li>– Keyless vehicle module C216 <li>– Fuel-fired booster heater/programmable fuel-fired booster heater C307 <li>– Parking aid module C622 <li>– Electronic instrument cluster C809 <p>3 Select the vehicle with the diagnostic tester.</p> <ul style="list-style-type: none"> <li>• Is it possible to establish communication with the GEM? <p>→ Yes</p> <p>The component disconnected last is the cause of the concern, CHECK component and if necessary RENEW. CHECK the operation of the system.</p> <p>→ No</p> <ul style="list-style-type: none"> <li>- If not all the listed components are disconnected: <p>DISCONNECT the next component (go to test step 1).</p> <ul style="list-style-type: none"> <li>- If all the listed components are disconnected: GO to AD25.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AD25: CHECK THE EQUIPMENT LEVEL	
	<p>1 Compare the following systems with the equipment level of the vehicle:</p> <ul style="list-style-type: none"> • Double locking. • Footwell lighting. • Reading lights. • Anti-theft alarm. • Headlamp switch-off delay. <p>• Is the vehicle equipped with one of the above systems?</p> <p>→ Yes GO to AD26.</p> <p>→ No GO to AD27.</p>
AD26: CHECK THE MS CAN BUS FOR A SHORT TO VOLTAGE SUPPLY	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Connector C99 from GEM.</p> <p>3 Ignition switch in position II.</p>
 <p>VFE0038146</p>	<p>4 Measure the voltage between the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side and ground.</p>
	<p>5 Measure the voltage between the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a voltage measured? <p>→ Yes LOCATE and REPAIR the short to voltage in the affected circuit using the Wiring Diagrams. CHECK the operation of the system.</p> <p>→ No GO to AD28.</p>

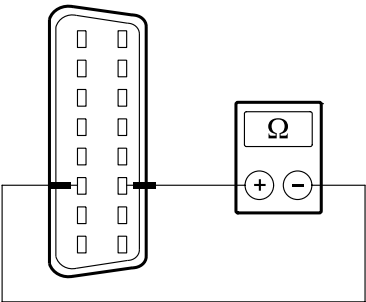
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AD27: CHECK THE MS CAN BUS FOR A SHORT TO VOLTAGE SUPPLY	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Connector C103 from GEM. 3 Ignition switch in position II.
 <p>VFE0038146</p>	<ol style="list-style-type: none"> 4 Measure the voltage between the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side and ground.
	<ol style="list-style-type: none"> 5 Measure the voltage between the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side and ground. <ul style="list-style-type: none"> • Is a voltage measured? <ul style="list-style-type: none"> → Yes LOCATE and REPAIR the short to voltage in the affected circuit using the Wiring Diagrams. CHECK the operation of the system. → No GO to AD28.
AD28: CHECK THE MS CAN BUS FOR A SHORT TO GROUND	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.
 <p>VFE0038147</p>	<ol style="list-style-type: none"> 2 Measure the resistance between the DLC, connector C200, pin 3, circuit 4-EC10M (GY), wiring harness side and ground.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the resistance between the DLC, connector C200, pin 11, circuit 5-EC10M (BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance greater than 10,000 Ohm measured in both cases? <p>→ Yes GO to AD29.</p> <p>→ No LOCATE and REPAIR the short to ground in the affected circuit using the Wiring Diagrams. CHECK the operation of the system.</p>

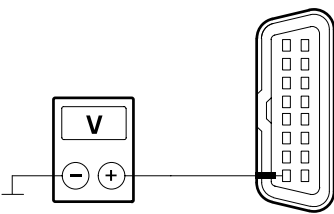
AD29: CHECK THE MS CAN BUS FOR SHORT CIRCUIT

 <p>E45952</p>	<p>1 Measure the resistance between the DLC, connector C200 between pin 3, circuit 4-EC10M (GY), wiring harness side and pin 11, circuit 5-EC10M (BU), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance greater than 10,000 Ohm measured in both cases? <p>→ Yes CHECK the GEM and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the short in the CAN bus using the Wiring Diagrams. CHECK the operation of the system.</p>
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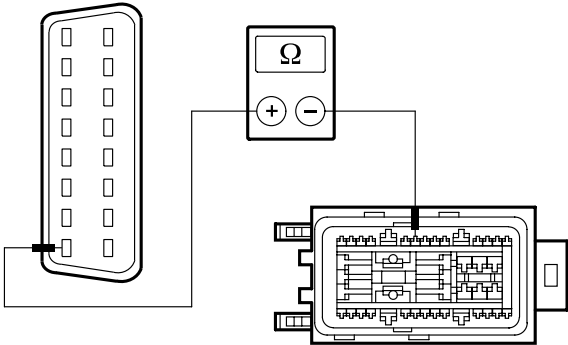
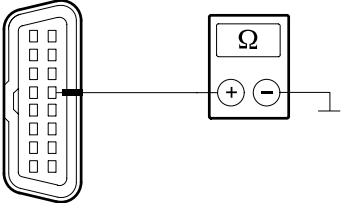
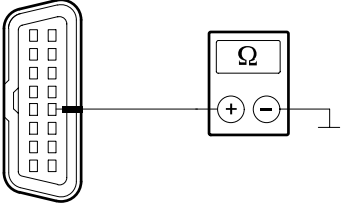
PINPOINT TEST AE : FAULTY COMMUNICATION BETWEEN THE MODULES - HS CAN BUS.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>⚠ CAUTION: The measurements below may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
<p>NOTE: Failure of the complete CAN bus system can be caused by incorrectly engaged wiring harness connectors at the CJB or in the A-pillar area. Ensure correct locking of wiring harness connectors.</p>	
<p>AE1: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).</p>	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to AE4.</p> <p>→ No GO to AE2.</p>

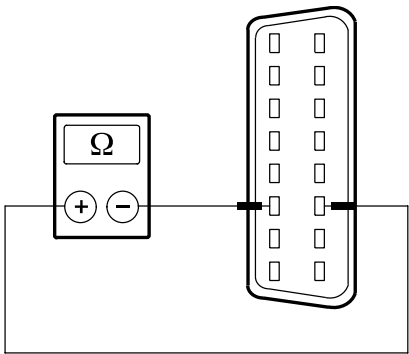
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AE2: CHECK FUSE F44	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 CHECK Fuse F44 (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to AE3. → No RENEW fuse F44 (10 A). CHECK the operation of the system. If the fuse blows again, LOCATE and REPAIR the short circuit using the Wiring Diagrams.
AE3: CHECK THE VOLTAGE AT FUSE F44	
	<ol style="list-style-type: none"> 1 Connect Fuse F44 (CJB). 2 Measure the voltage between fuse F44 (10 A) and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to AE4. → No RECTIFY the voltage supply to fuse F44 using the Wiring Diagrams. CHECK the operation of the system.
AE4: CHECK THE VOLTAGE AT THE DATA LINK CONNECTOR (DLC)	
 <p>VFE0028957</p>	<ol style="list-style-type: none"> 1 Measure the voltage between the DLC, connector C200, pin 16, circuit 29-RA1 (OG), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to AE6. → No GO to AE5.
AE5: CHECK FOR OPEN CIRCUIT BETWEEN THE DLC AND THE CENTRAL JUNCTION BOX (CJB)	
	<ol style="list-style-type: none"> 1 Disconnect Connector C102 from CJB.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038144</p>	<p>2 Measure the resistance between the DLC, connector C200, pin 16, circuit 29-RA1 (OG), wiring harness side and the CJB, connector C102, pin 9, circuit 29-RA1 (OG), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes CHECK the CJB and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the break in circuit 29-RA1 (OG) between the DLC and the CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
AE6: CHECK THE GROUND CONNECTION OF THE DLC (PIN 4)	
 <p>VFE0028965</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the DLC, connector C200, pin 4, circuit 31-RA1 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to AE7.</p> <p>→ No LOCATE and REPAIR the open circuit between the DLC and ground connection G20 using the Wiring Diagrams. CHECK the operation of the system.</p>
AE7: CHECK THE GROUND CONNECTION OF THE DLC (PIN 5)	
 <p>VFE0028964</p>	<p>1 Measure the resistance between the DLC, connector C200, pin 5, circuit 91-RA1 (BK/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to AE8.</p> <p>→ No LOCATE and REPAIR the break in circuit 91-RA1 (BK/OG) between the DLC and ground connection G7 using the Wiring Diagrams. CHECK the operation of the system.</p>
AE8: CHECK THE HS CAN BUS FOR SHORT CIRCUIT	
	<p>1 Disconnect the ground cable from the battery.</p>

DIAGNOSIS AND TESTING

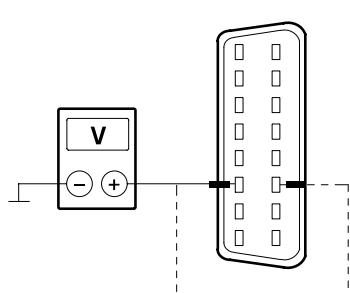
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E45951</p>	<p>2 Measure the resistance between the DLC, connector C200, between pin 6, circuit 4-EC7L (GY/RD), wiring harness side and pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of between 55 and 65 Ohms measured? → Yes GO to AE9. → No <ul style="list-style-type: none"> - A resistance of between 115 and 125 Ohms is measured: GO to AE12. - A resistance of between 115 and 125 Ohms is not measured: GO to AE23.

AE9: PERFORM NETWORK TEST

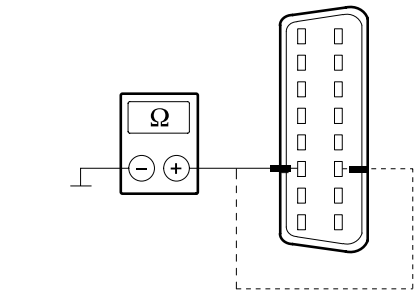
NOTE: The number of modules connected to the CAN bus depends on the equipment levels of the vehicle. Therefore, not every vehicle will have all the modules mentioned below.

	<p>1 Connect the ground cable to the battery.</p>
	<p>2 Connect the diagnostic tool.</p>
	<p>3 Disconnect a listed component, then perform the following test step:</p> <ul style="list-style-type: none"> - Electrohydraulic power steering module C794 - Vehicles with automatic transmission (CFT23): Transmission control module (TCM) C812 - Vehicles with automatic transmission: Transmission control module (TCM) C414 - Vehicles with 6-speed automatic transmission: Transmission control module (TCM) C827 - Lighting control module C838 - Fuel additive system module C985 - Vehicles with ABS: ABS module C831 - Vehicles with ESP: ESP module C830 - Additional instrument cluster C826 - Electronic instrument cluster C809

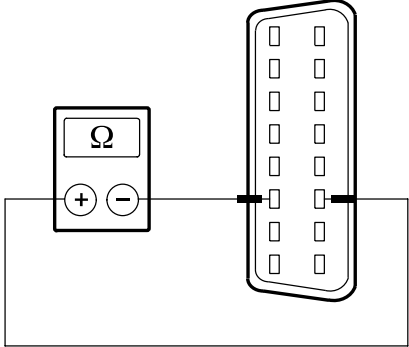
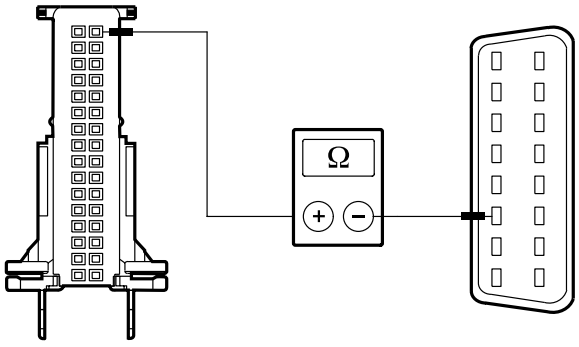
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 Select the vehicle with the diagnostic tester.</p> <ul style="list-style-type: none"> • Is it possible to establish communication with the PCM? <p>→ Yes The component disconnected last is the cause of the concern, CHECK component and if necessary RENEW. CHECK the operation of the system.</p> <p>→ No - If not all the listed components are disconnected: Key in the OFF position. DISCONNECT the next component (go to test step 3). - If all the listed components are disconnected: GO to AE10.</p>
AE10: CHECK THE HS CAN BUS FOR A SHORT TO VOLTAGE SUPPLY	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Vehicles with 1.8L/2.0L petrol engine: Connector C690 from the PCM.</p> <p>3 Disconnect Vehicles with diesel engine Connector C418 from the PCM.</p> <p>4 Disconnect Vehicles with 1.4L/1.6L petrol engine: Connector C594 from the PCM.</p> <p>5 Disconnect Vehicles with 2.5L Duratec-ST (VI5) engine: connector C690 from the PCM.</p> <p>6 Ignition switch in position II.</p>
 <p>VFE0038142</p>	<p>7 Measure the voltage between the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side and ground.</p>

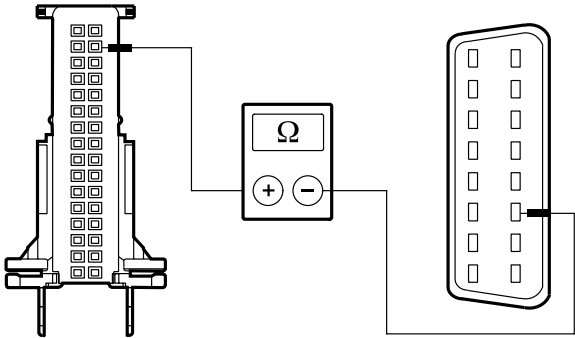
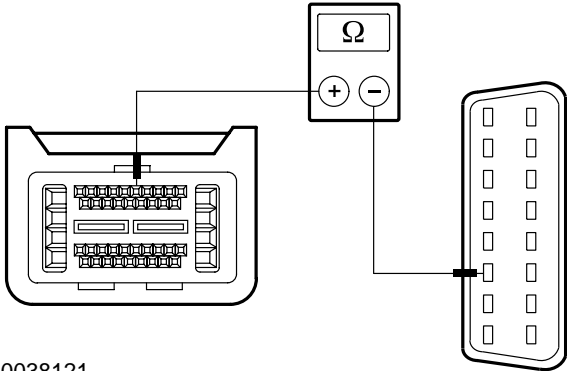
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>8 Measure the voltage between the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a voltage measured? → Yes LOCATE and REPAIR the short to voltage in the affected circuit using the Wiring Diagrams. CHECK the operation of the system. → No GO to AE11.
<p>AE11: CHECK THE HS CAN BUS FOR A SHORT TO GROUND</p>	
 <p>VFE0038143</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side and ground.</p>
	<p>3 Measure the resistance between the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance greater than 10,000 Ohm measured in both cases? → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the short to ground in the affected circuit using the Wiring Diagrams. CHECK the operation of the system.
<p>AE12: CHECK THE ELECTRONIC INSTRUMENT CLUSTER</p>	
	<p>1 Disconnect Connector C809 from electronic instrument cluster.</p>

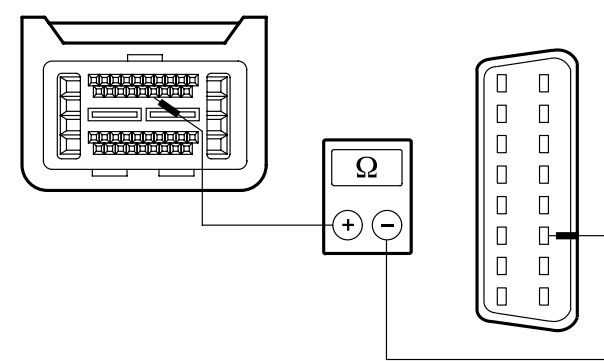
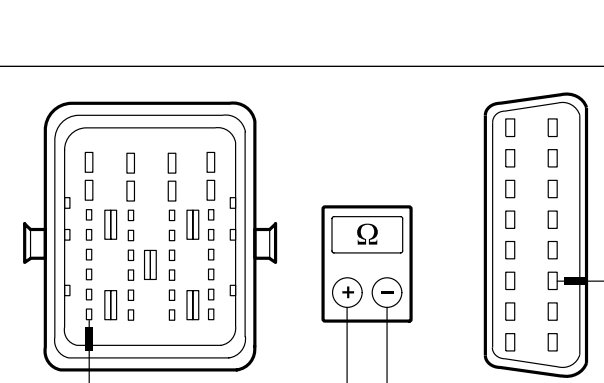
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E45951</p>	<p>2 Measure the resistance between the DLC, connector C200, between pin 6, circuit 4-EC7L (GY/RD), wiring harness side and pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of between 115 and 125 Ohms measured? <p>→ Yes GO to AE13.</p> <p>→ No</p> <ul style="list-style-type: none"> - Vehicles with 1.8L/2.0L petrol engine: GO to AE15. - Vehicles with diesel engines: GO to AE17. - Vehicles with 1.4L/1.6L petrol engine: GO to AE19. - Vehicles with 2.5L Duratec-ST (VI5) engine: GO to AE21.
<p>AE13: CHECK FOR OPEN CIRCUIT BETWEEN THE ELECTRONIC INSTRUMENT CLUSTER AND THE DLC</p>	
 <p>VFE0038091</p>	<p>1 Measure the resistance between the electronic instrument cluster, connector C809, pin 17, circuit 5-EC7H (BU/RD), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <p>→ Yes GO to AE14.</p> <p>→ No LOCATE and REPAIR the break in circuit 5-EC7H (BU/RD) between the electronic instrument cluster and the DLC using the Wiring Diagrams. CHECK the operation of the system.</p>

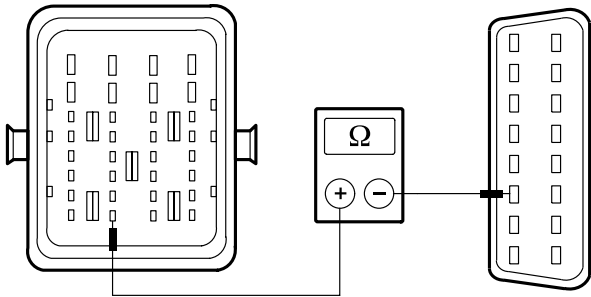
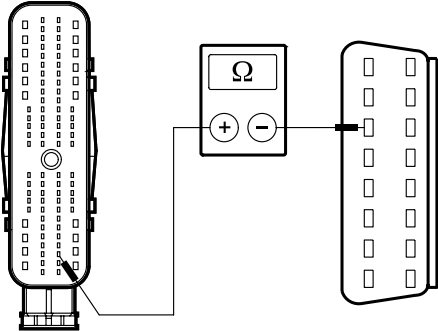
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AE14: CHECK FOR OPEN CIRCUIT BETWEEN THE ELECTRONIC INSTRUMENT CLUSTER AND THE DLC	
 <p>VFE0038092</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the electronic instrument cluster, connector C809, pin 18, circuit 4-EC7H (GY/RD), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK and if necessary RENEW the electronic instrument cluster. CHECK the operation of the system. → No LOCATE and RECTIFY the break in circuit 4-EC7H (GY/RD) between the electronic instrument cluster and the DLC using the Wiring Diagrams. CHECK the operation of the system.
AE15: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE DLC	
 <p>VFE0038121</p>	<ol style="list-style-type: none"> 1 Disconnect Connector C690 from the PCM. 2 Measure the resistance between the PCM, connector C690, pin 41, circuit 4-EC7C (vehicles with automatic transmission: 4-EC7) (GY/RD)), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes GO to AE16. → No LOCATE and REPAIR the break in the circuit between the PCM and the DLC using the Wiring Diagrams. CHECK the operation of the system.

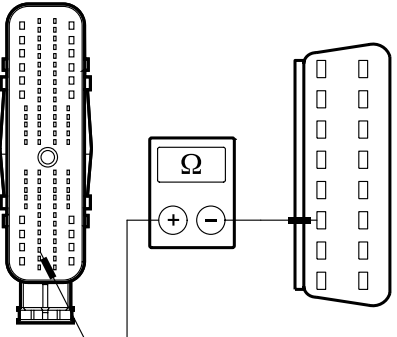
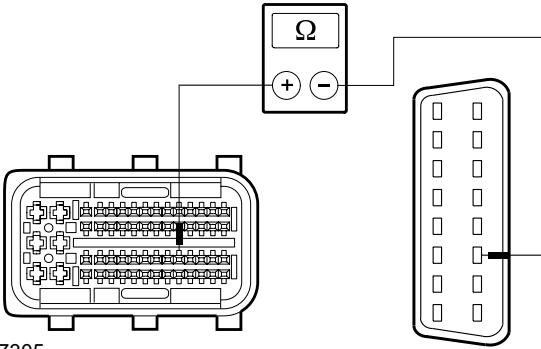
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AE16: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE DLC	
 <p>VFE0038122</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the PCM, connector C690, pin 30, circuit 5-EC7C (vehicles with automatic transmission: 5-EC7) (BU/RD)), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the PCM and the DLC using the Wiring Diagrams. CHECK the operation of the system.
AE17: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE DLC	
 <p>VFE0038131</p>	<ol style="list-style-type: none"> 1 Disconnect Connector C418 from the PCM. 2 Measure the resistance between the PCM, connector C418, pin A4, circuit 4-EC7C (vehicles with automatic transmission: 4-EC7) (GY/RD)), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes GO to AE18. → No LOCATE and REPAIR the break in the circuit between the PCM and the DLC using the Wiring Diagrams. CHECK the operation of the system.

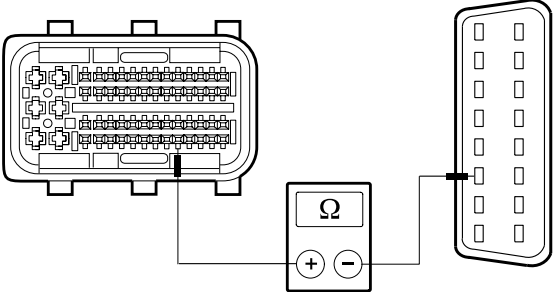
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AE18: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE DLC	
 <p>VFE0038130</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the PCM, connector C418, pin A3, circuit 5-EC7C (vehicles with automatic transmission: 5-EC7) (BU/RD)), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms measured? <ul style="list-style-type: none"> → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the PCM and the DLC using the Wiring Diagrams. CHECK the operation of the system.
AE19: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE DLC	
 <p>E45695</p>	<ol style="list-style-type: none"> 1 Disconnect Connector C594 from the PCM. 2 Measure the resistance between the PCM, connector C594, pin F31, circuit 4-EC7C (vehicles with automatic transmission: 4-EC7) (GY/RD)), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes GO to AE20. → No LOCATE and REPAIR the break in the circuit between the PCM and the DLC using the Wiring Diagrams. CHECK the operation of the system.

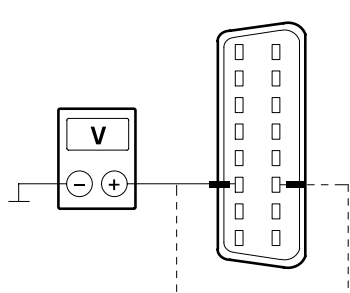
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AE20: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE DLC	
 <p>E45694</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the PCM, connector C594, pin F19, circuit 5-EC7C (vehicles with automatic transmission: 5-EC7) (BU/RD)), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the PCM and the DLC using the Wiring Diagrams. CHECK the operation of the system.
AE21: CHECK FOR OPEN CIRCUIT BETWEEN THE PCM AND THE DATA LINK CONNECTOR (DLC)	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E67305</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the PCM, connector C690, pin 41, circuit 5-EC7C (BU/RD), wiring harness side and the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes GO to AE22. → No LOCATE and REPAIR the break in the circuit between the PCM and the DLC using the Wiring Diagrams. CHECK the operation of the system.

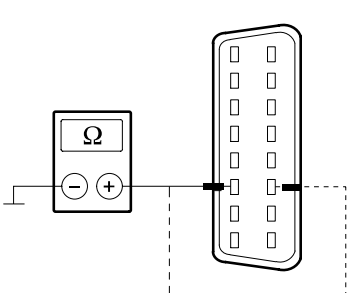
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AE22: CHECK THE CIRCUIT BETWEEN THE PCM AND THE DLC FOR OPEN CIRCUIT	
<p>⚠ CAUTION: The following measurement may only be performed using the WDS digital multimeter. Failure to observe this instruction can lead to damage.</p>	
 <p>E67306</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the PCM, connector C690, pin 54, circuit 4-EC7C (GY/RD), wiring harness side and the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system. → No LOCATE and REPAIR the break in the circuit between the PCM and the DLC using the Wiring Diagrams. CHECK the operation of the system.
AE23: PERFORM NETWORK TEST	
<p>NOTE: The number of modules connected to the CAN bus depends on the equipment levels of the vehicle. Therefore, not every vehicle will have all the modules mentioned below.</p>	
	<ol style="list-style-type: none"> 1 Connect the ground cable to the battery. 2 Connect the diagnostic tool. 3 Disconnect a listed component, then perform the following test step: <ul style="list-style-type: none"> – Electrohydraulic power steering module C794 – Vehicles with automatic transmission (CFT23): Transmission control module (TCM) C812 – Vehicles with automatic transmission Transmission control module (TCM) C414 – Vehicles with 6-speed automatic transmission: Transmission control module (TCM) C827 – Lighting control module C838 – Fuel additive system module C985 – Vehicles with ABS: ABS module C831 – Vehicles with ESP: ESP module C830 – Additional instrument cluster C826 – Electronic instrument cluster C809

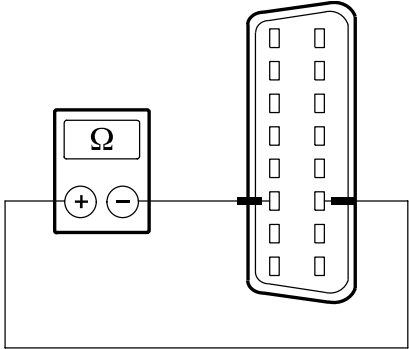
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 Select the vehicle with the diagnostic tester.</p> <ul style="list-style-type: none"> • Is it possible to establish communication with the PCM? <p>→ Yes The component disconnected last is the cause of the concern, CHECK component and if necessary RENEW. CHECK the operation of the system.</p> <p>→ No - If not all the listed components are disconnected: Key in the OFF position. DISCONNECT the next component (go to test step 3). - If all the listed components are disconnected: GO to AE24.</p>
AE24: CHECK THE HS CAN BUS FOR A SHORT TO VOLTAGE SUPPLY	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Vehicles with 1.8L/2.0L petrol engine: connector C690 from the PCM.</p> <p>3 Disconnect Vehicles with 2.5L Duratec-ST (VI5) engine: connector C690 from the PCM.</p> <p>4 Disconnect Vehicles with diesel engines: connector C418 from the PCM.</p> <p>5 Disconnect Vehicles with 1.4L/1.6L petrol engine: Engine connector C594 from the PCM.</p> <p>6 Ignition switch in position II.</p>
 <p>VFE0038142</p>	<p>7 Measure the voltage between the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side and ground.</p>

DIAGNOSIS AND TESTING

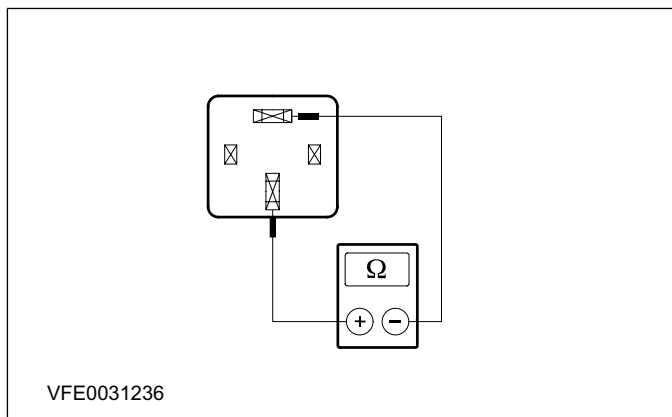
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>8 Measure the voltage between the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a voltage measured? → Yes LOCATE and REPAIR the short to voltage in the affected circuit using the Wiring Diagrams. CHECK the operation of the system. → No GO to AE25.
<p>AE25: CHECK THE HS CAN BUS FOR A SHORT TO GROUND</p>	
 <p>VFE0038143</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the DLC, connector C200, pin 6, circuit 4-EC7L (GY/RD), wiring harness side and ground.</p>
	<p>3 Measure the resistance between the DLC, connector C200, pin 14, circuit 5-EC7L (BU/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance greater than 10,000 Ohm measured in both cases? → Yes GO to AE26. → No LOCATE and REPAIR the short to ground in the affected circuit using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

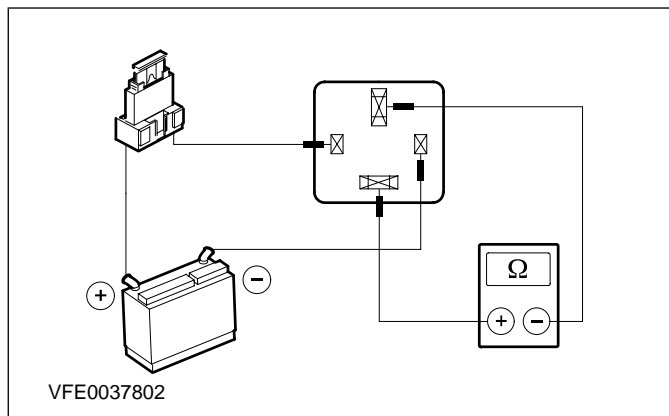
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AE26: CHECK THE HS CAN BUS FOR SHORT CIRCUIT	
 <p>E45951</p>	<p>1 Measure the resistance between the DLC, connector C200, between pin 6, circuit 4-EC7L (GY/RD), wiring harness side and pin 14, circuit 5-EC7L (BU/RD), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of more than 10,000 Ohm measured? <p>→ Yes CHECK the PCM and RENEW if necessary. CHECK the operation of the system.</p> <p>→ No LOCATE and REPAIR the short in the CAN bus using the Wiring Diagrams. CHECK the operation of the system.</p>

Component checks

Power supply relay



- Check the normally open contact in the unswitched state:
 - Measure the resistance at the power supply relay, between pin 3 and pin 5, component side.
 - Is a resistance of more than 10,000 ohms measured? If yes, go to 2. If no, RENEW the power supply relay.



- Check the normally open contact in the switched state:
 - Using a fused test cable (1 A), connect pin 1 of the power supply relay, component side, with the battery positive terminal.
 - Using a test cable, connect pin 2 of the power supply relay, component side, to the battery negative terminal.
 - Measure the resistance at the power supply relay, between pin 3 and pin 5, component side.
 - Is a resistance of less than 2 Ohms measured? If yes, the power supply relay is OK. If no, RENEW the power supply relay.



SECTION 418-01 Module Configuration

VEHICLE APPLICATION: 2008.75 Focus ST C307

CONTENTS PAGE

GENERAL PROCEDURES

Module Configuration.....	418-01-2
Programmable Module Installation.....	418-01-3



GENERAL PROCEDURES**Module Configuration**

1. **NOTE: Ensure that the most up-to-date software version is installed in WDS.**

NOTE: In the case of engine running concerns, module-reprogramming of the PCM may be required. For this purpose, a revised software version is transferred to the PCM using WDS.

Select the "Module reprogramming" submenu in the "Module programming" menu tool box and then follow the instructions.

2. **NOTE: Following installation of a wheel/tire combination, for which the tire-tread circumference does not correspond to that of standard tires, the tire size must be changed in the powertrain control module (PCM) using WDS.**

Select the "Programmable parameters" submenu in the "Module programming" menu tool box and enter the corresponding tire size under the "tire size" menu item.

GENERAL PROCEDURES

Programmable Module Installation

1. NOTE: In order to minimize module variations, different equipment levels and functionalities are incorporated in the same module. For this reason, modules must be programmed following replacement. For this purpose, the vehicle-specific data is read out of the module to be replaced using WDS and is transferred to the new module. In the process, it is also possible to replace older software versions with more up-to-date versions, for example.

NOTE: If, before replacing a module, it was not possible to read out the vehicle-specific data using WDS (the module to be replaced does not respond) then, during programming of the new module, the vehicle-specific data must be entered manually via a selection list in WDS or via a code which can be obtained from the Technical Hotline.

NOTE: Ensure that the most up-to-date software version is installed in WDS.

In order to program, select the "Install programmable module" submenu in the "Module programming" menu tool box and then follow the instructions.

2. NOTE: The number of modules installed in the vehicle can vary according to equipment level.

The following modules must be programmed after replacement:

- Anti-lock braking system module (ABS)
- Audio system module (ACM)
- CD player (CDP)
- Driver's door control unit (D-DCU)
- Passenger's door control unit (P-DCU)
- Rear left door control unit (RL-DCU)
- Rear right door control unit (RR-DCU)
- Electrical parking brake (EPB)
- Electrical power steering (EPS)
- Generic Display Module (GDM) (vehicles with DVD navigation system with touchscreen)
- Generic electronic module (GEM)
- Headlamp control module (HCM) (vehicles with gas discharge headlamps)
- Instrument cluster (IC)
- Navigation system (NAV) (vehicles with navigation system)
- Parking aid module (PAM)
- Powertrain control module (PCM)

- Restraint control module (RCM)
- Rear entertainment system module (RETM) (vehicles with rear seat entertainment system)

3. NOTE: If, before replacing a PCM, it was not possible to read out the vehicle-specific data using WDS (the PCM to be replaced does not respond), configuration of the PCM must be performed following programming. For this purpose, the vehicle-specific data must be entered manually.

In order to configure the PCM, select the "Programmable parameters" submenu in the "Module programming" menu tool box and then follow the instructions.

4. Following configuration of the GEM, module-resetting of the GEM using WDS must be performed. For this purpose, select the "Programmable parameters" submenu in the "Module programming" menu tool box and then follow the instructions under the "GEM reset" menu item.

5. For vehicles with anti-lock braking system and electronic stability program, these must also be configured using WDS following replacement of the lateral acceleration sensor, yaw rate sensor or pressure sensor. Configuration is performed in the "Programmable parameters" menu tool box.

SECTION 418-02 Wiring Harnesses

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS	
Specifications.....	418-02-2
DIAGNOSIS AND TESTING	
Wiring Harness.....	418-02-3
Inspection and Verification.....	418-02-3
REMOVAL AND INSTALLATION	
Engine Compartment Wiring Harness.....	418-02-5
Passenger Compartment Wiring Harness.....	418-02-28
Instrument Panel Wiring Harness.....	418-02-42

SPECIFICATIONS**Tightening Torques**

Description	Nm	lb-ft	lb-in
Front engine mounting bracket retaining bolts	80	59	-
Nuts, windshield wiper arms	22	16	-
Bolts for windshield wiper motor with linkage	7	-	62
Exhaust pipe, fuel powered booster heater	6	-	53
Bolt, fuel powered booster heater	6	-	53
Door check strap bolt	23	-	17
Door hinge bolts	15	-	11
Dashboard crossmember side bolts	80	59	-
Steering column bracket upper bolts	25	18	-
Steering column shaft joint bolt	28	21	-
Bolts, reinforcing element bracket	25	18	-
Dashboard crossmember inner bolts	20	15	-
Dashboard crossmember outer bolts	25	18	-

DIAGNOSIS AND TESTING

Wiring Harness

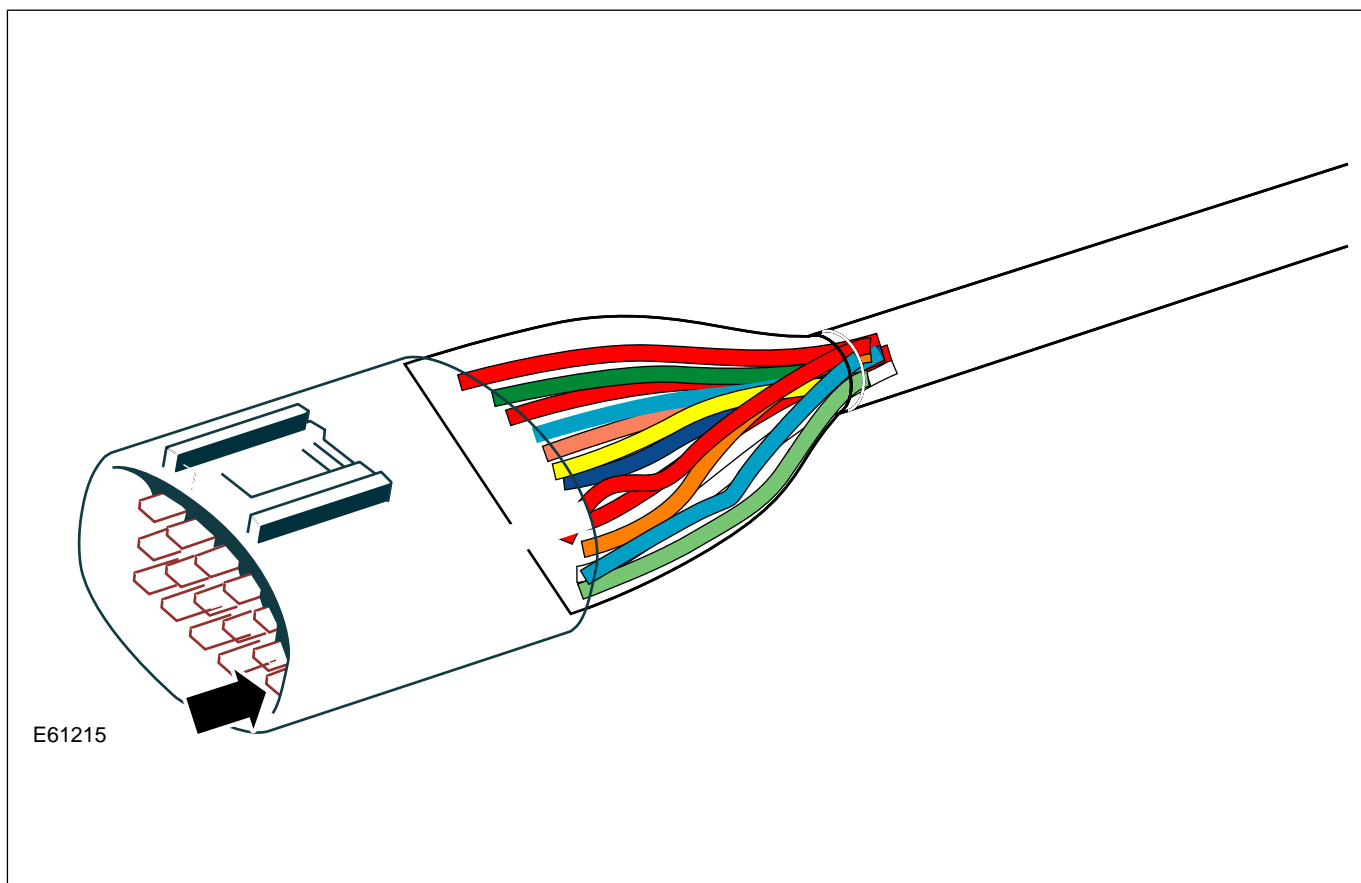
General Equipment

Ford approved diagnostic tool

Inspection and Verification

1. Verify the customer concern.

2. Check the electrical connectors for security, damage and incorrect connection. If the electrical connectors are broken, damaged or incorrectly connected, repair or replace the components as required. TEST the system for normal operation before proceeding to the next step.

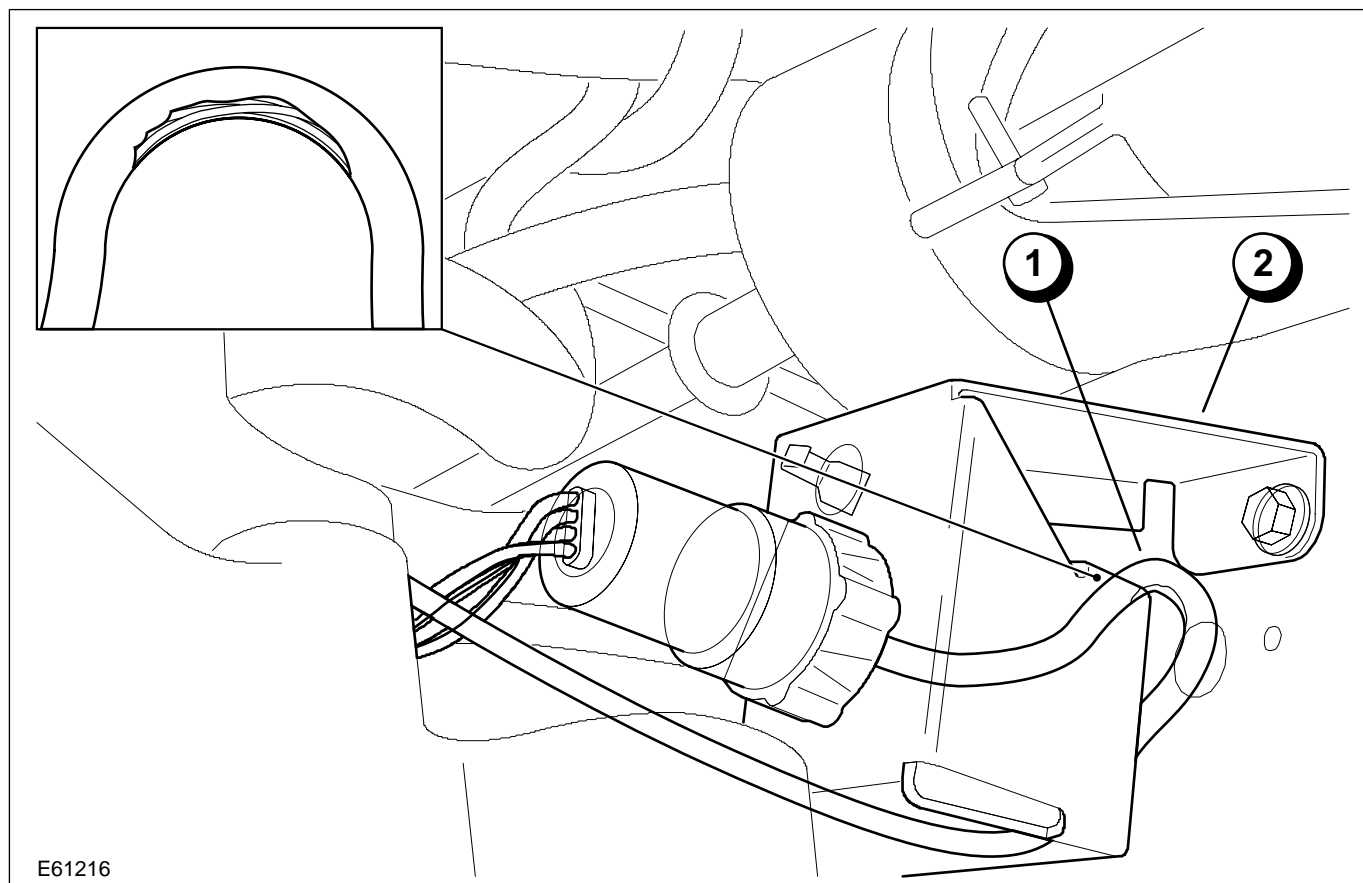


3. Disconnect the electrical connectors and check for the following:

- Moisture in the connector due to misaligned, damaged or missing seals.
- Contamination from leaking fluids in the region of the connector.

- Damaged or oxidised connector pins.
 - Disengaged connector pins (this can be checked by carefully pressing on the individual pins).
4. If any of the conditions listed are present, repair or replace the components as required. TEST the system for normal operation before proceeding to the next step.

DIAGNOSIS AND TESTING



E61216

1. Wiring harness.
2. Component.
5. Check the wiring harness for the following:
 - Incorrect routing or installed too tightly.
 - Pinched or kinked sections.
 - Chafed insulation.
 - Security and orientation of retaining clips.
 - Damage in areas where the wiring harness is subjected to noise, vibration and harshness (NVH). For example, transmission or suspension systems.
6. If any of the conditions listed are present, repair or replace the components as required. TEST the system for normal operation. If the concern persists, REFER to the digital multimeter function of the Ford approved diagnostic tool to check the integrity of the wiring harness and electrical connectors.

REMOVAL AND INSTALLATION

Engine Compartment Wiring Harness

Special Tool(s)



General Equipment

Hose clamp - coolant hose

Vehicles with fuel powered booster heater

1. Drain the cooling system. For additional information, refer to:

Cooling System Draining, Filling and Bleeding (303-03A, General Procedures),

Cooling System Draining, Filling and Bleeding (303-03B, General Procedures),

Cooling System Draining, Filling and Bleeding (303-03C, General Procedures),

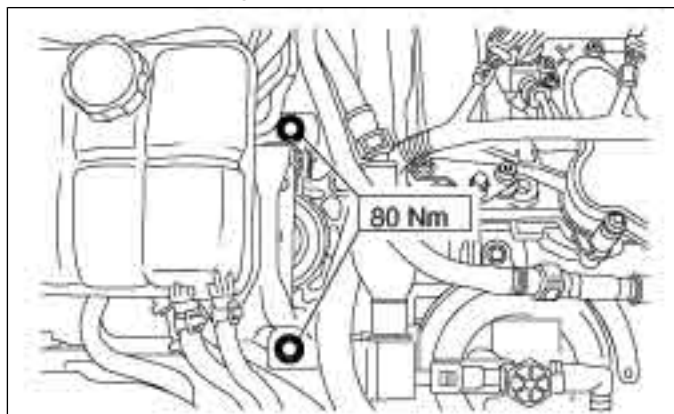
Cooling System Draining, Filling and Bleeding (303-03D, General Procedures),

Cooling System Draining, Filling and Bleeding (303-03E, General Procedures).

2. NOTE: Mark installation position of front engine mounting bracket with respect to the wheelhouse.

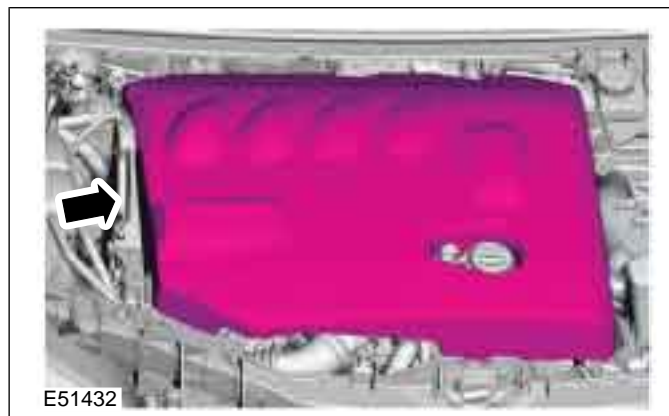
Remove the front engine mounting bracket bolts.

- Pull the engine forwards.

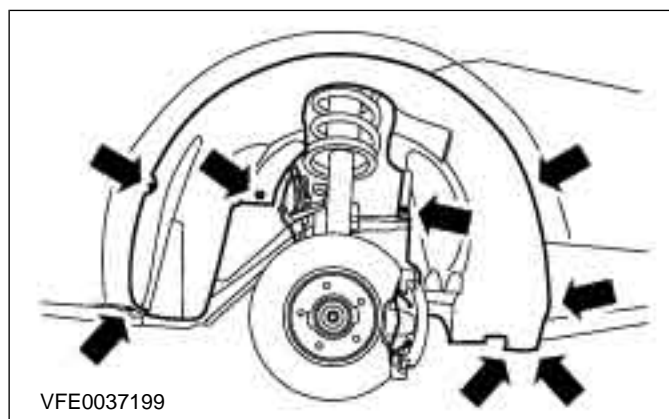


All vehicles

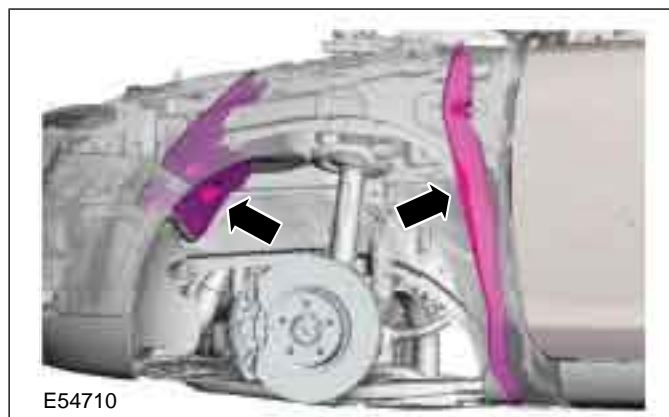
3. Remove the engine cover (2.0L diesel shown).



4. Remove the left and right front wheels.
For additional information, refer to: Wheel and Tire (204-04, Removal and Installation).
5. Remove the left and right front wheelhouse covers.



6. Remove the wheelhouse insulation.



REMOVAL AND INSTALLATION

7. Remove the front bumper cover.

For additional information, refer to:
Front Bumper Cover (501-19, Removal and Installation).

8. Empty the windshield washer reservoir.

9. Remove the front scuff plate - passenger side.

For additional information, refer to: **Front Scuff Plate Trim Panel (501-05, Removal and Installation).**

10. Remove the right and left-hand direction indicators.

- Pull turn indicators out of wing, turn bayonet type socket and pull out.

Vehicles with anti-lock brake system

11. Remove the hydraulic control unit (HCU).

For additional information, refer to:

**Anti-Lock Control (206-09A, Diagnosis and Testing),
Hydraulic Control Unit (HCU) (206-09C, Removal and Installation).**

Vehicles without anti-lock brake system

12. Remove the battery tray. For additional information, refer to: (414-01)

**Battery Tray - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel (Removal and Installation),
Battery Tray - 1.6L Duratorq-TDCi (DV) Diesel/2.0L Duratorq-TDCi (DW) Diesel (Removal and Installation).**

Vehicles with manual transaxle

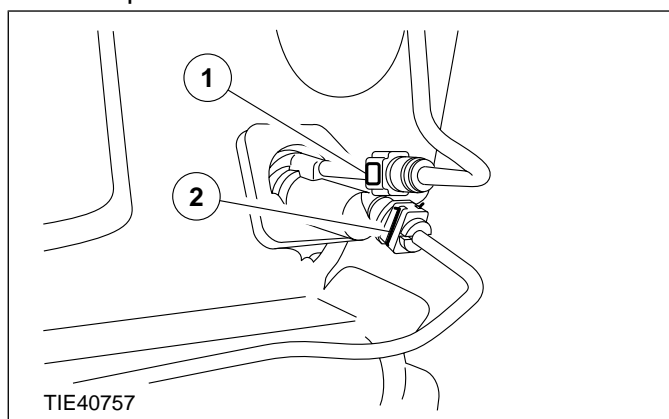
13. CAUTIONS:

⚠ If brake fluid comes into contact with the paintwork, the affected area must be washed down immediately with cold water.

⚠ Close off lines to prevent loss of brake fluid and dirt from entering.

Detach the supply hose of the clutch master cylinder and the supply line of the clutch slave cylinder from the clutch master cylinder.

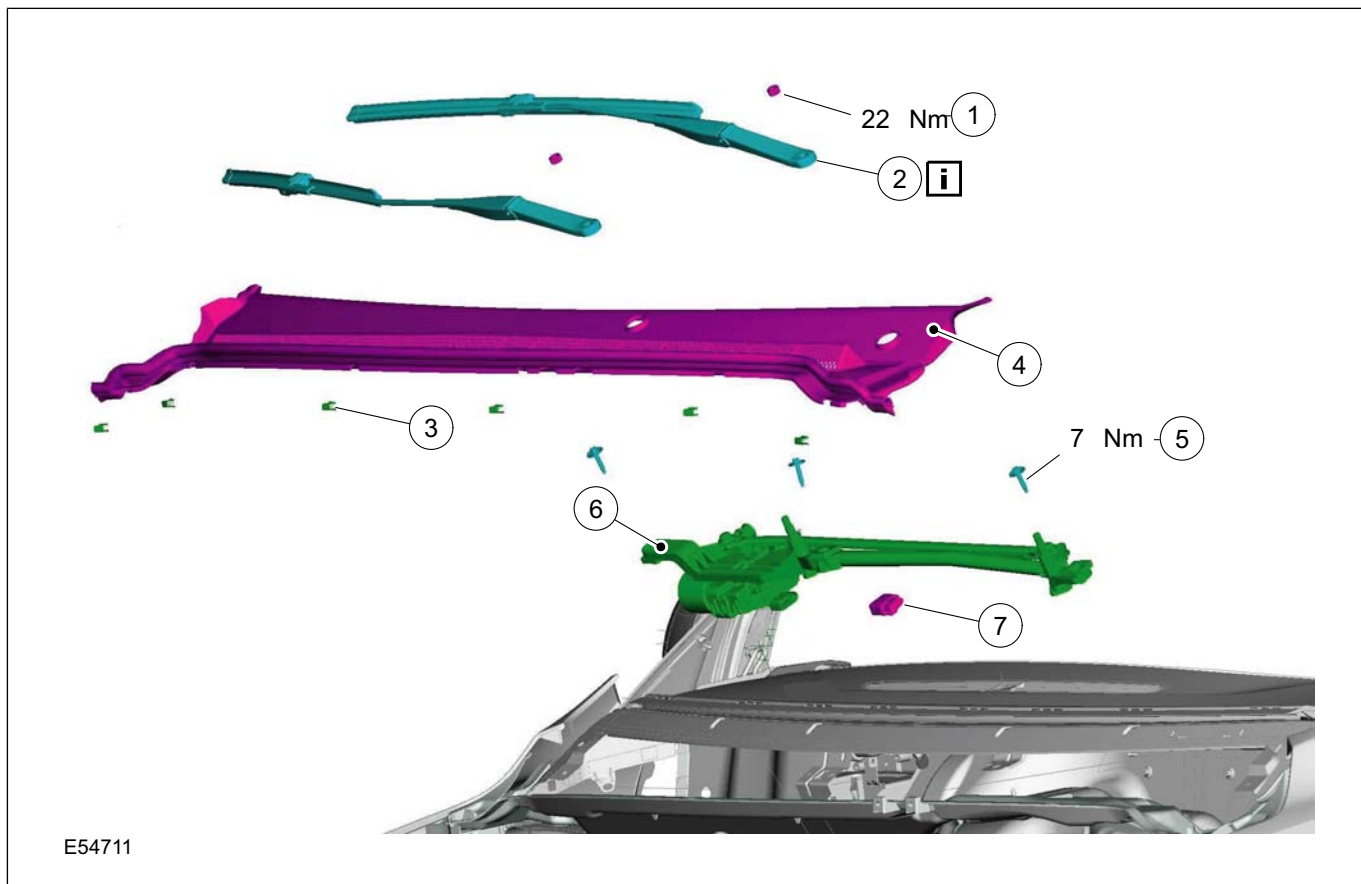
1. Release the clutch master cylinder supply hose clip.
2. Release the clutch slave cylinder supply line clip.



14. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION

⚠ CAUTION: Make sure that the windshield wiper motor is in the park position.

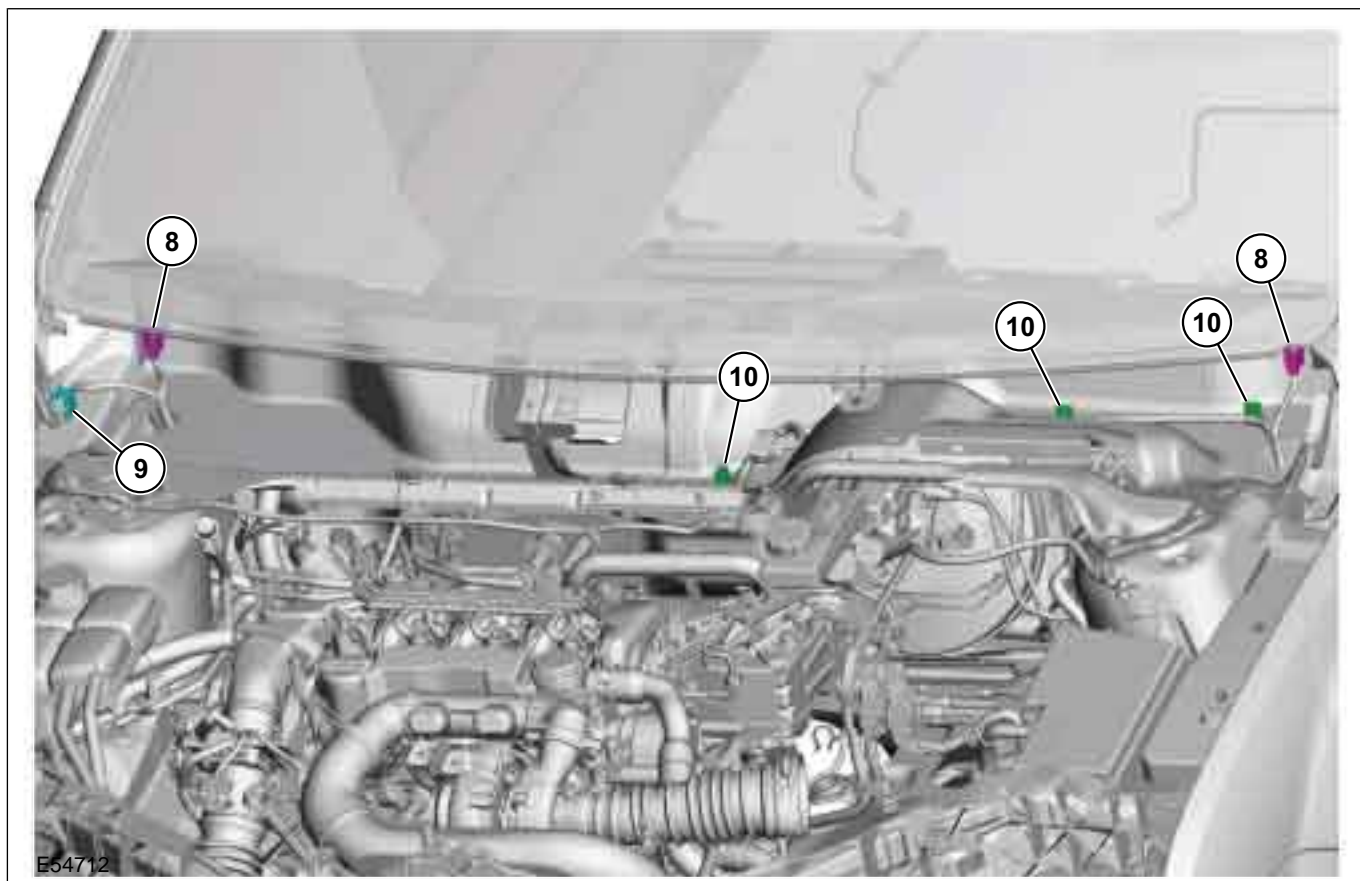


E54711

Item	Description
1	Windshield wiper arm nuts
2	Windshield wiper arms See Installation Detail
3	Clips, cowl panel grille

Item	Description
4	Cowl Panel Grille
5	Bolts for windshield wiper motor with linkage
6	Windshield wiper motor with linkage
7	Windshield wiper motor connector

REMOVAL AND INSTALLATION

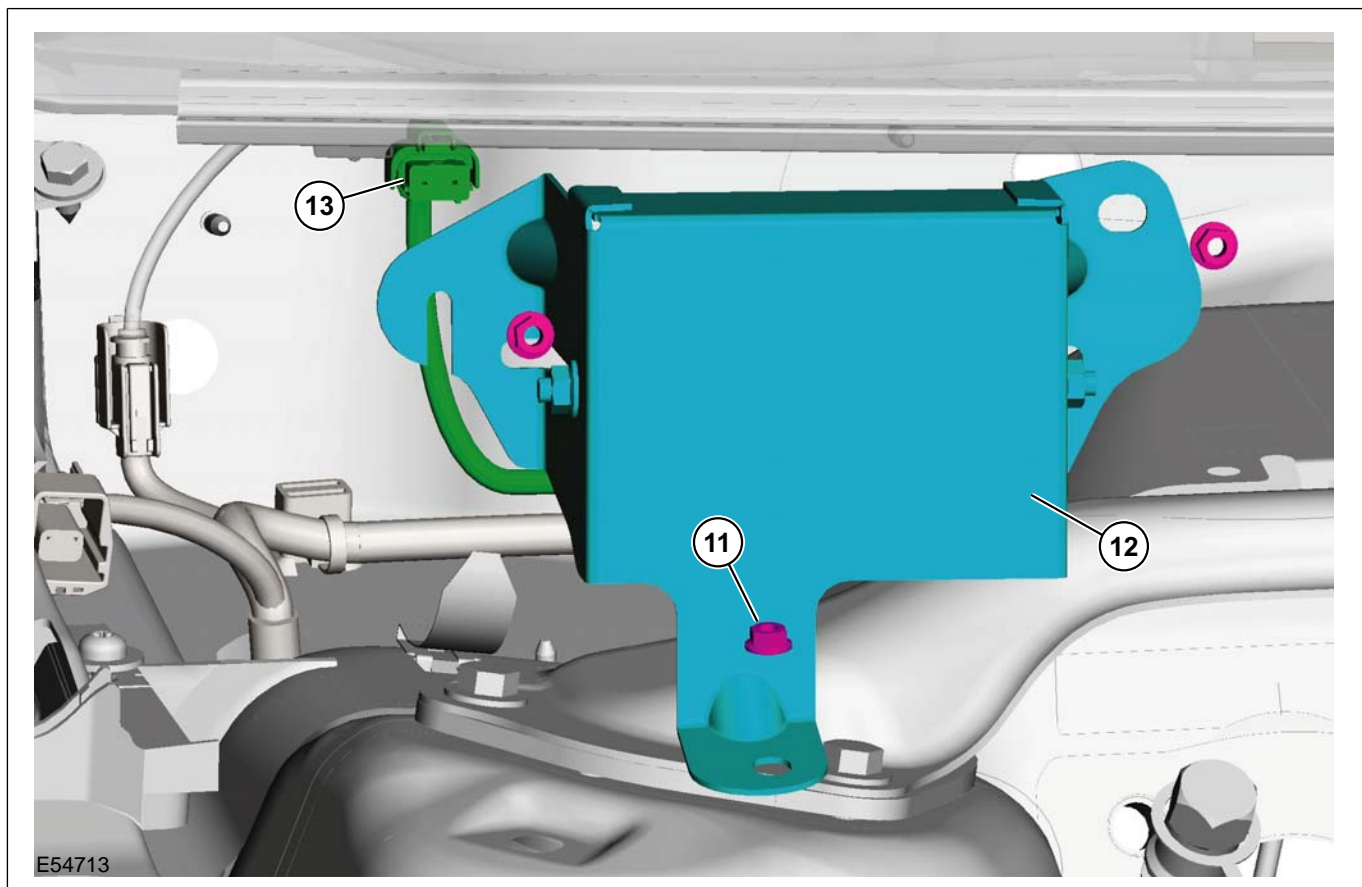


E64712

Item	Description
8	Connector - heated windshield (if fitted)
9	Connector - heated windshield washer jets (if fitted)
10	Clips - engine compartment wiring harness

REMOVAL AND INSTALLATION

NOTE: Only vehicles with anti-theft alarm horn with integral battery

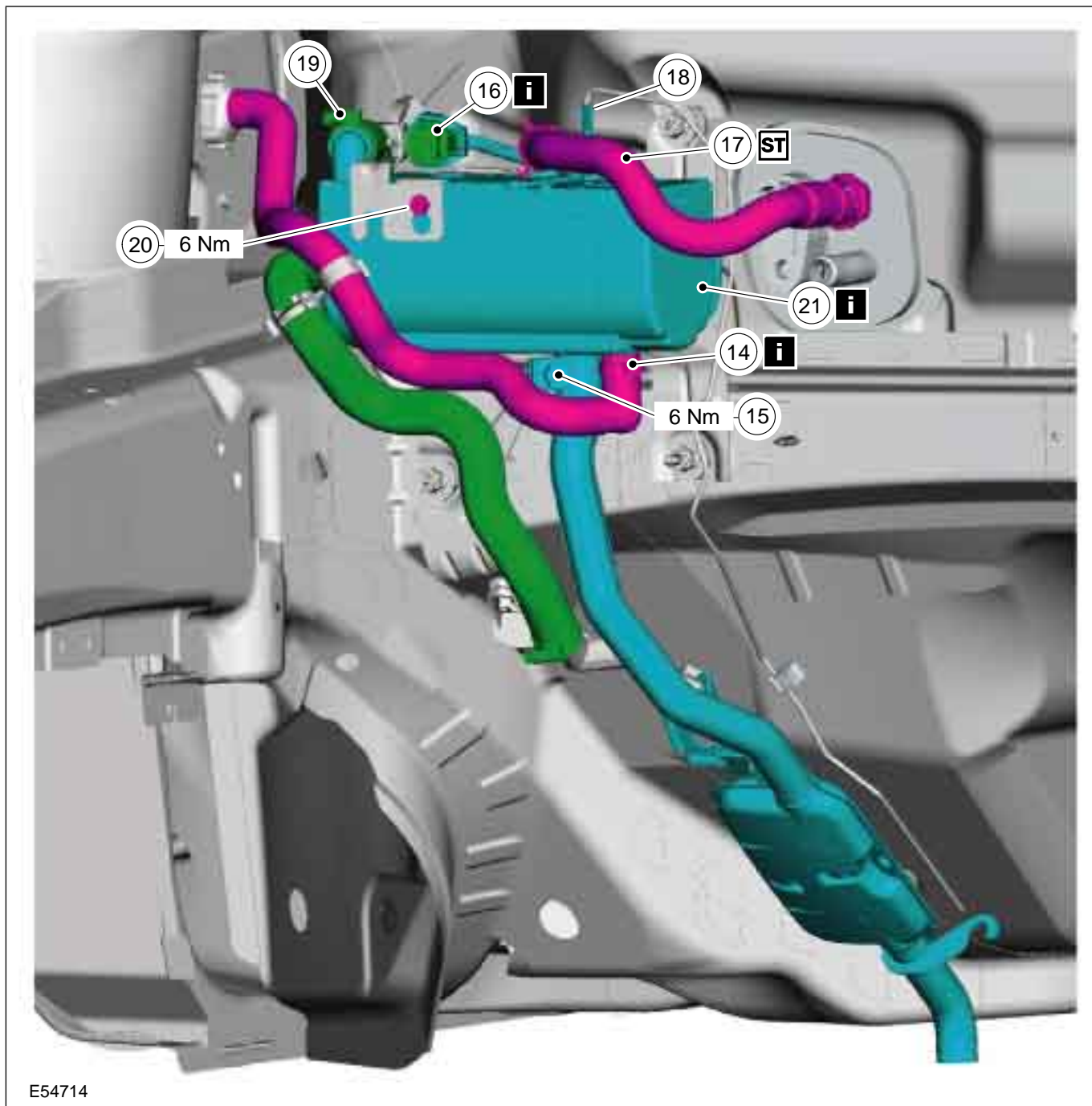


Item	Description
11	Nuts - anti-theft alarm system horn
12	Anti-theft alarm system horn
13	Connector - anti-theft alarm system horn

REMOVAL AND INSTALLATION

⚠ CAUTION: Close off the coolant hoses, fuel hose and fuel fired booster heater to stop dirt from entering.

NOTE: Only vehicles with fuel fired booster heater



E54714

Item	Description
14	Intake hose - fuel fired booster heater <i>See Removal Detail</i>
15	Exhaust pipe - fuel fired booster heater
16	Connector - fuel fired booster heater <i>See Removal Detail</i>

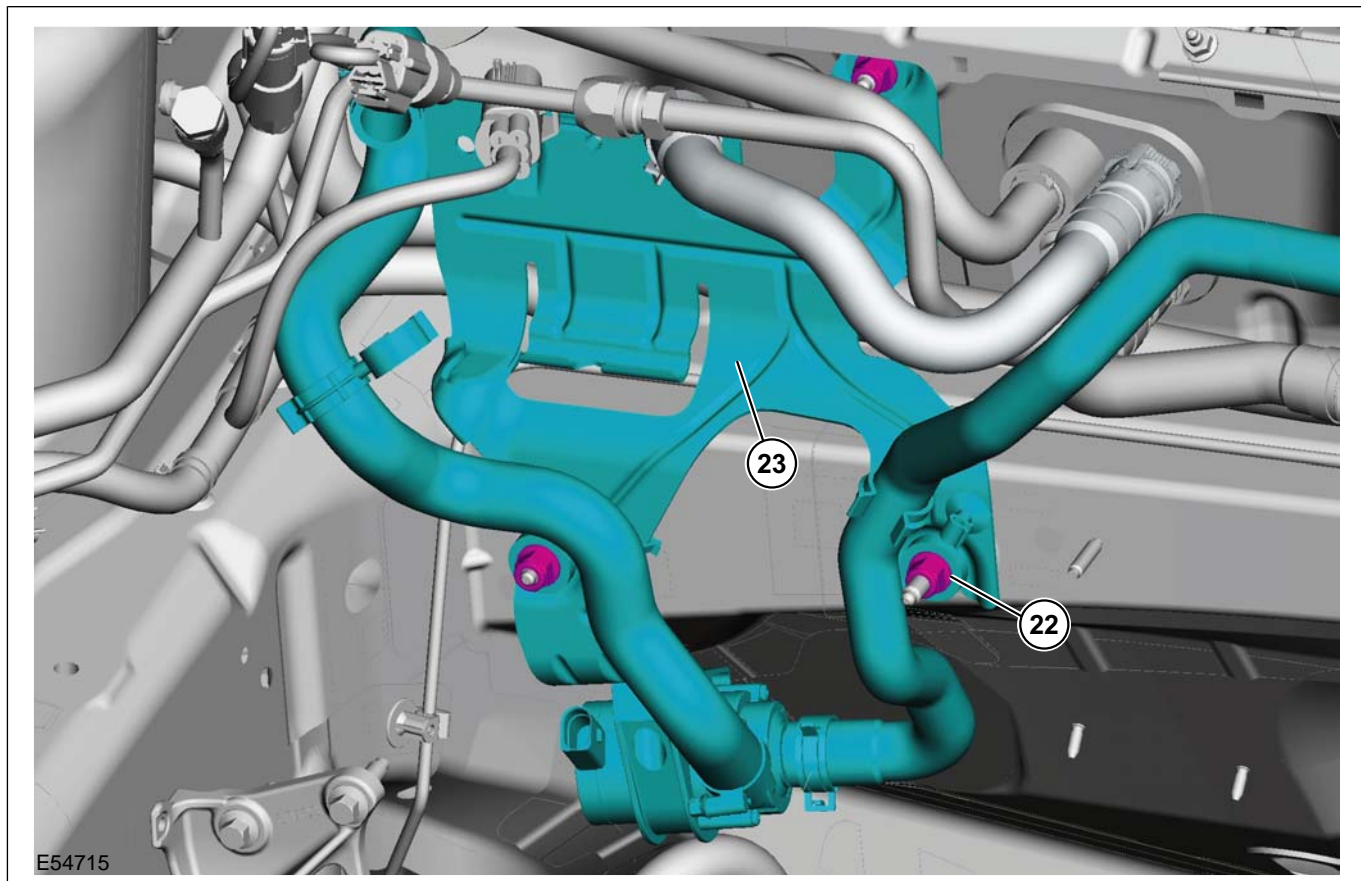
Item	Description
17	Left-hand coolant hose - fuel fired booster heater
18	Fuel hose - fuel fired booster heater
19	Right-hand coolant hose - fuel fired booster heater

REMOVAL AND INSTALLATION

Item	Description
20	Bolt - fuel fired booster heater

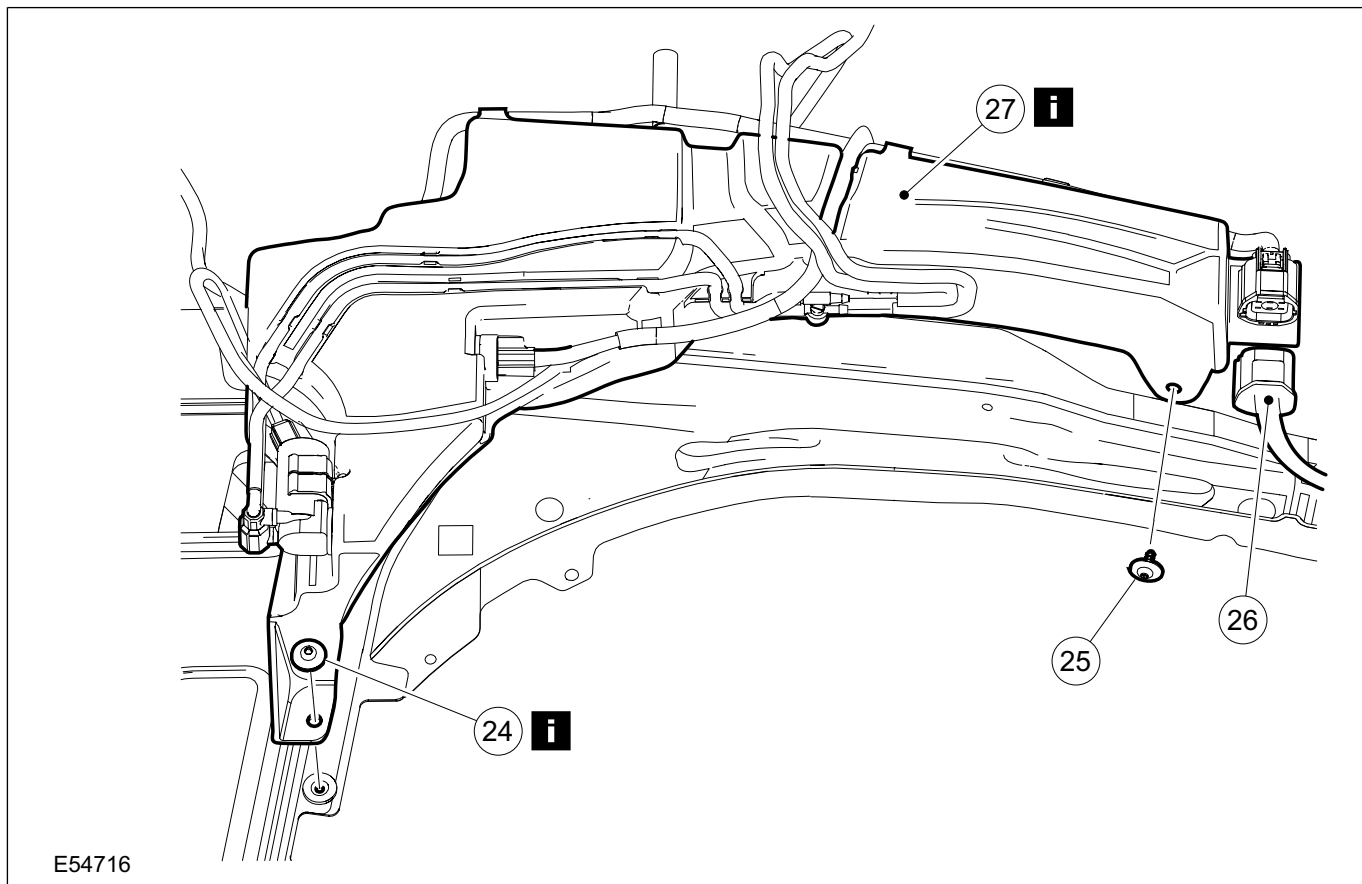
Item	Description
21	Fuel fired booster heater See Removal Detail

NOTE: Only vehicles with fuel fired booster heater



Item	Description
22	Nuts - fuel fired booster heater bracket
23	Bracket - fuel fired booster heater (secure to one side)

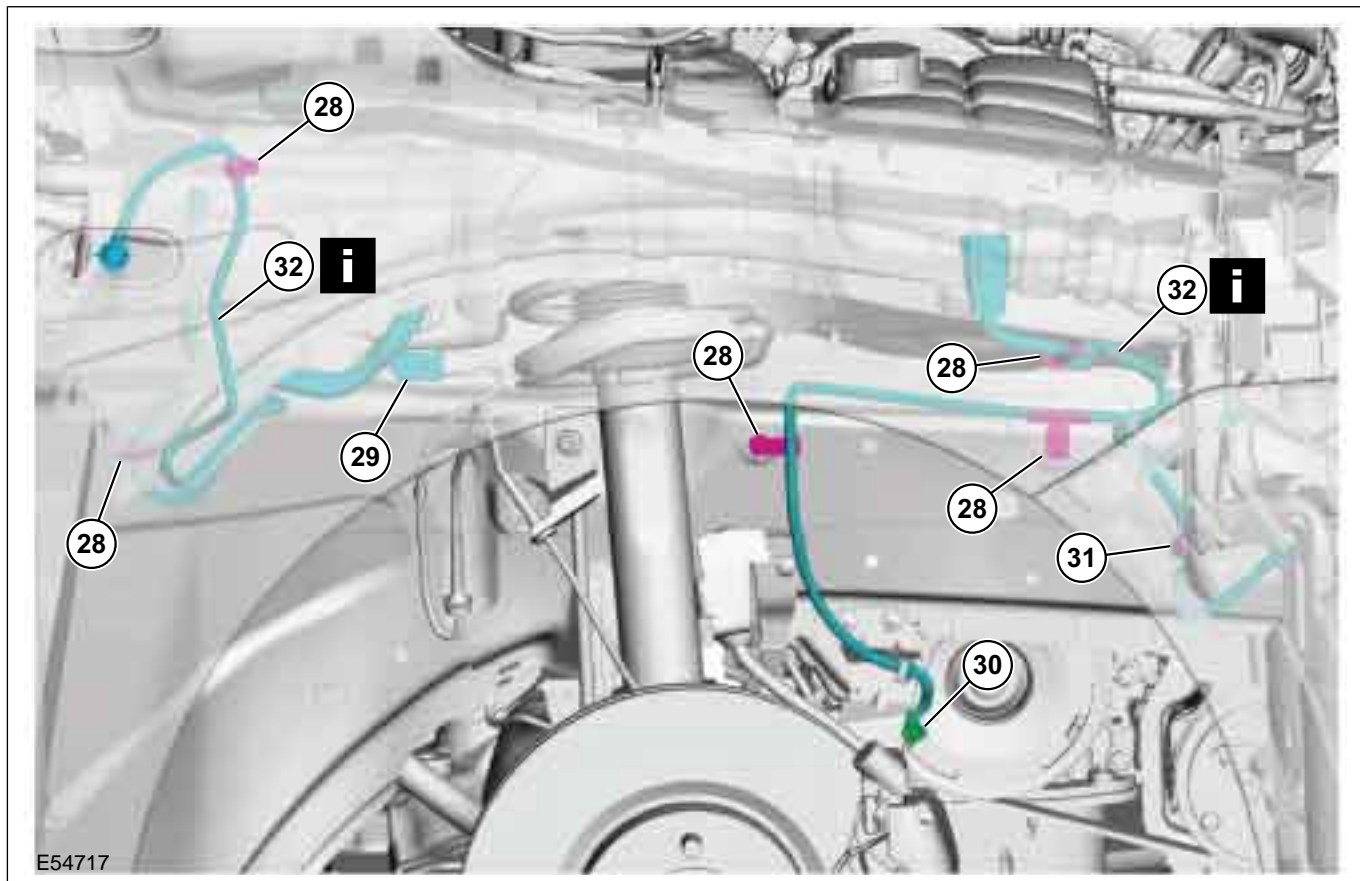
REMOVAL AND INSTALLATION



Item	Description
24	Windshield washer upper reservoir lower retaining bolt See Removal Detail
25	Windshield washer upper reservoir upper retaining bolt

Item	Description
26	Windshield washer pump connector
27	Windshield washer upper reservoir (secure to one side) See Removal Detail

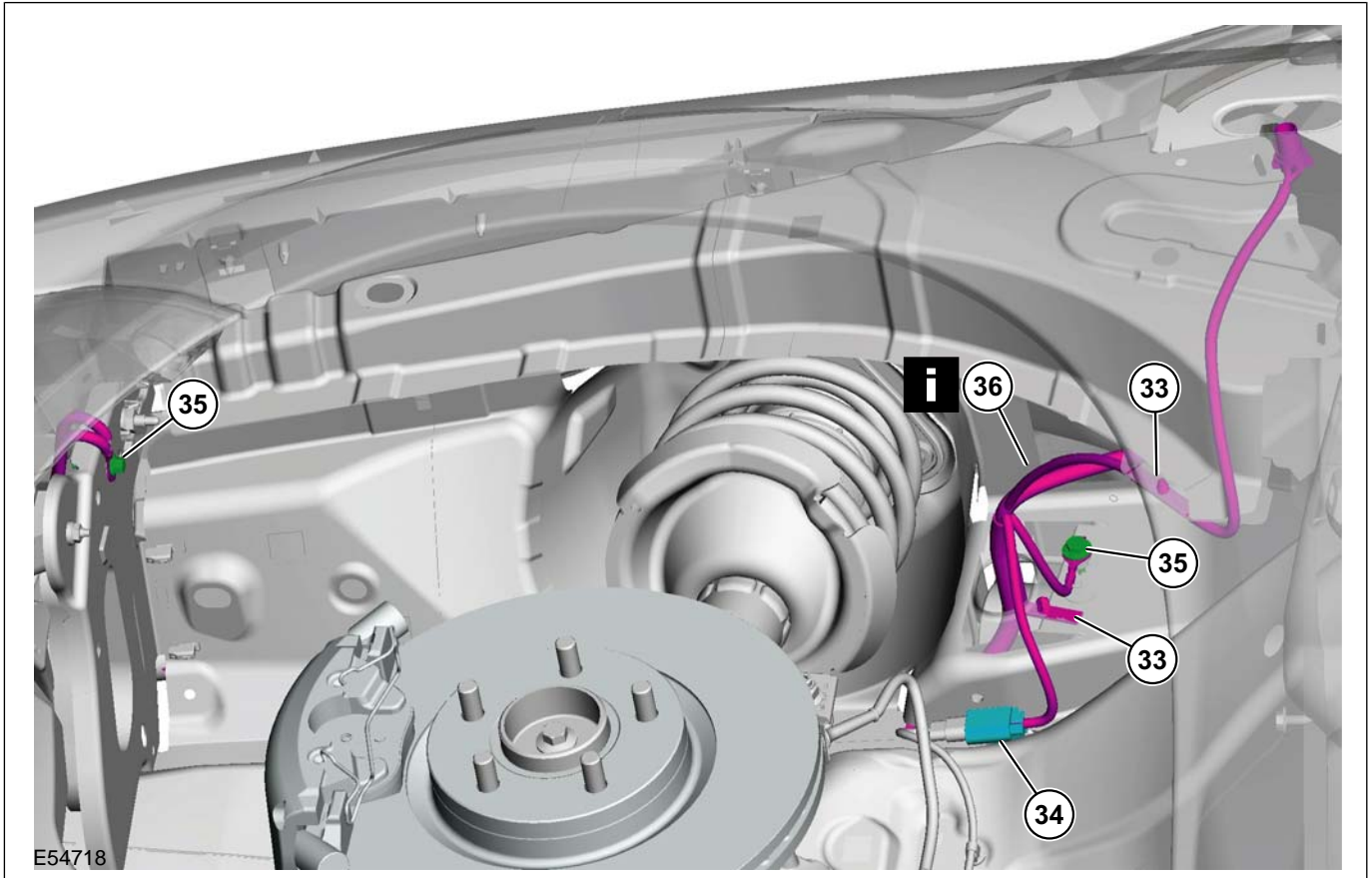
REMOVAL AND INSTALLATION



Item	Description
28	Clips - engine compartment wiring harness
29	Connector - anti-lock brake system wheel sensor

Item	Description
30	Connector - headlamp range control front sensor (if fitted)
31	Ground cable bolt
32	Engine compartment wiring harness See Removal Detail

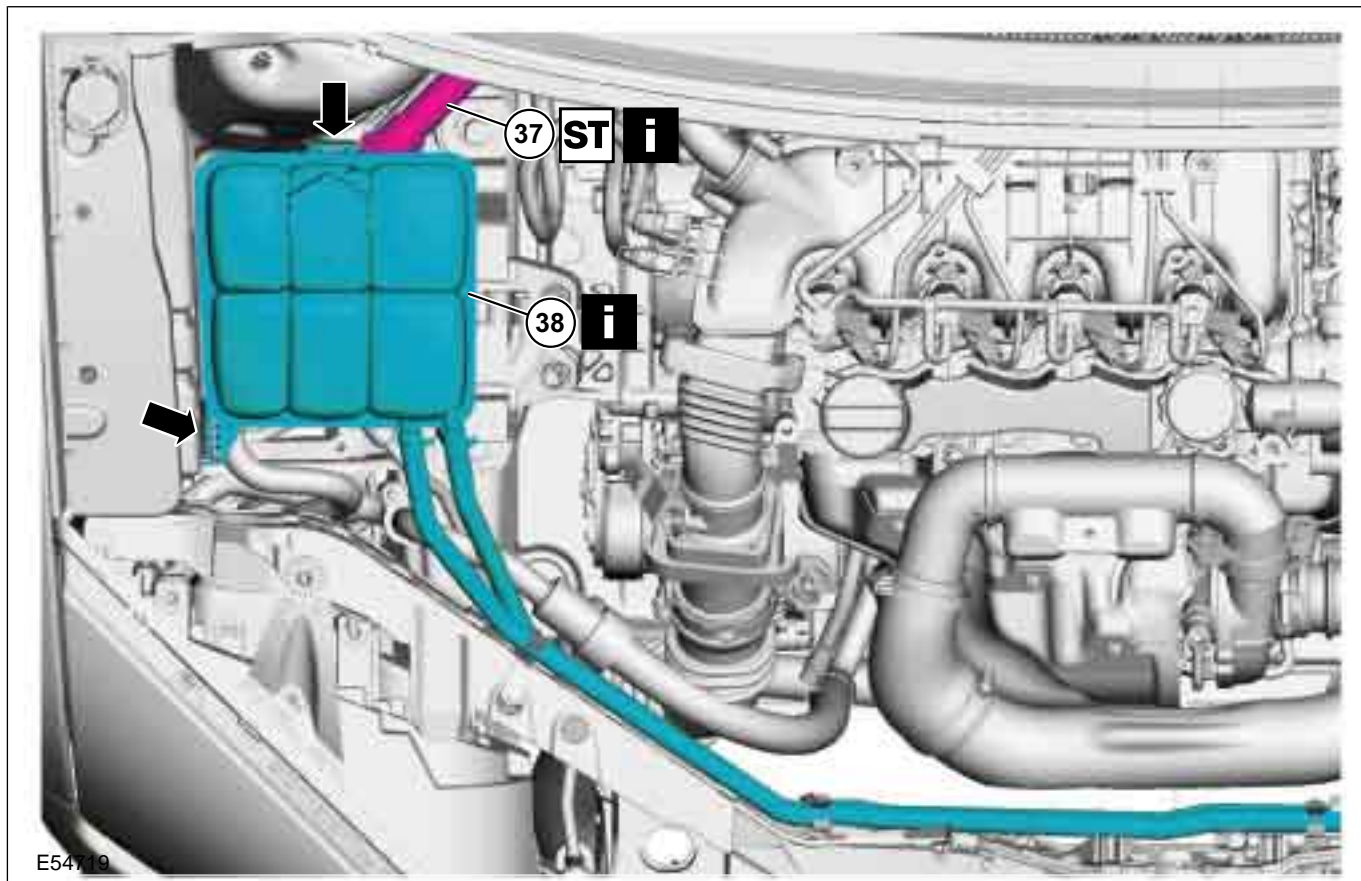
REMOVAL AND INSTALLATION



Item	Description
33	Clips - engine compartment wiring harness
34	Connector - anti-lock brake system wheel sensor

Item	Description
35	Ground cable bolts
36	Engine compartment wiring harness See Removal Detail

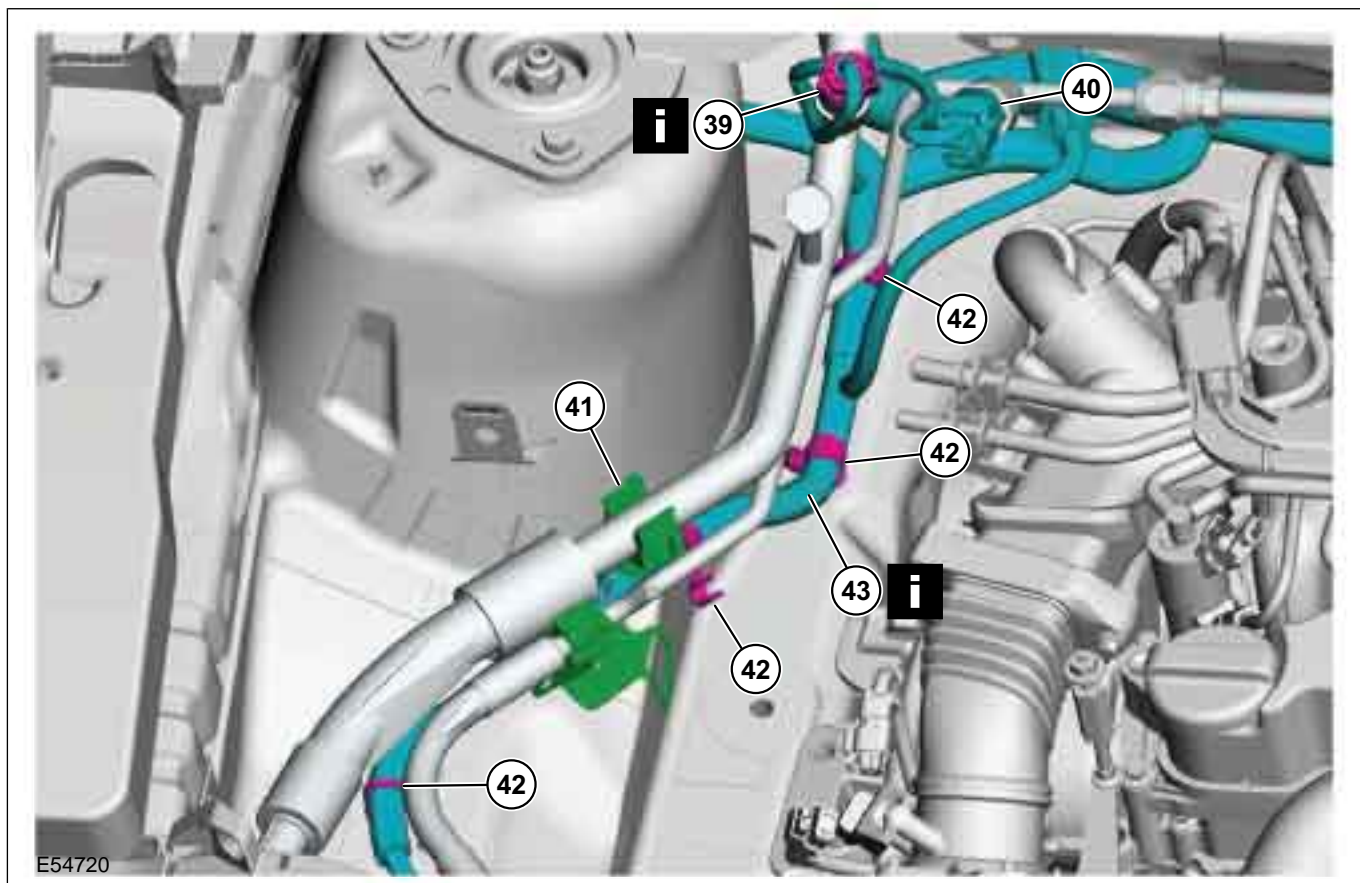
REMOVAL AND INSTALLATION



E54719

Item	Description
37	Coolant hose, coolant expansion tank (only 1.6L diesel engine) See Removal Detail
38	Coolant expansion tank See Removal Detail

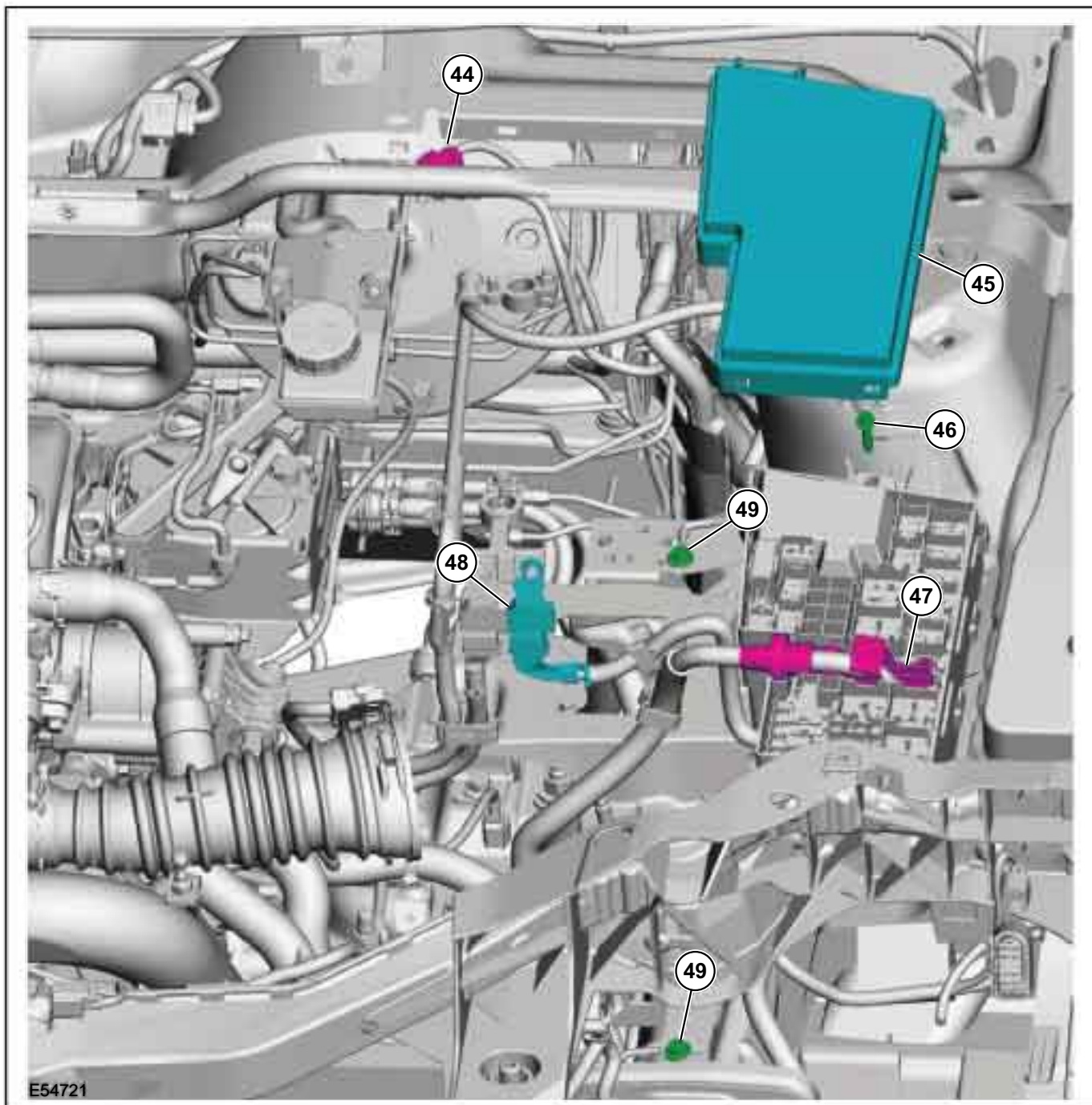
REMOVAL AND INSTALLATION



Item	Description
39	Low pressure switch connector <i>See Removal Detail</i>
40	High pressure switch connector

Item	Description
41	Bracket - evaporator refrigerant lines (unclip)
42	Clips - engine compartment wiring harness
43	Engine compartment wiring harness <i>See Removal Detail</i>

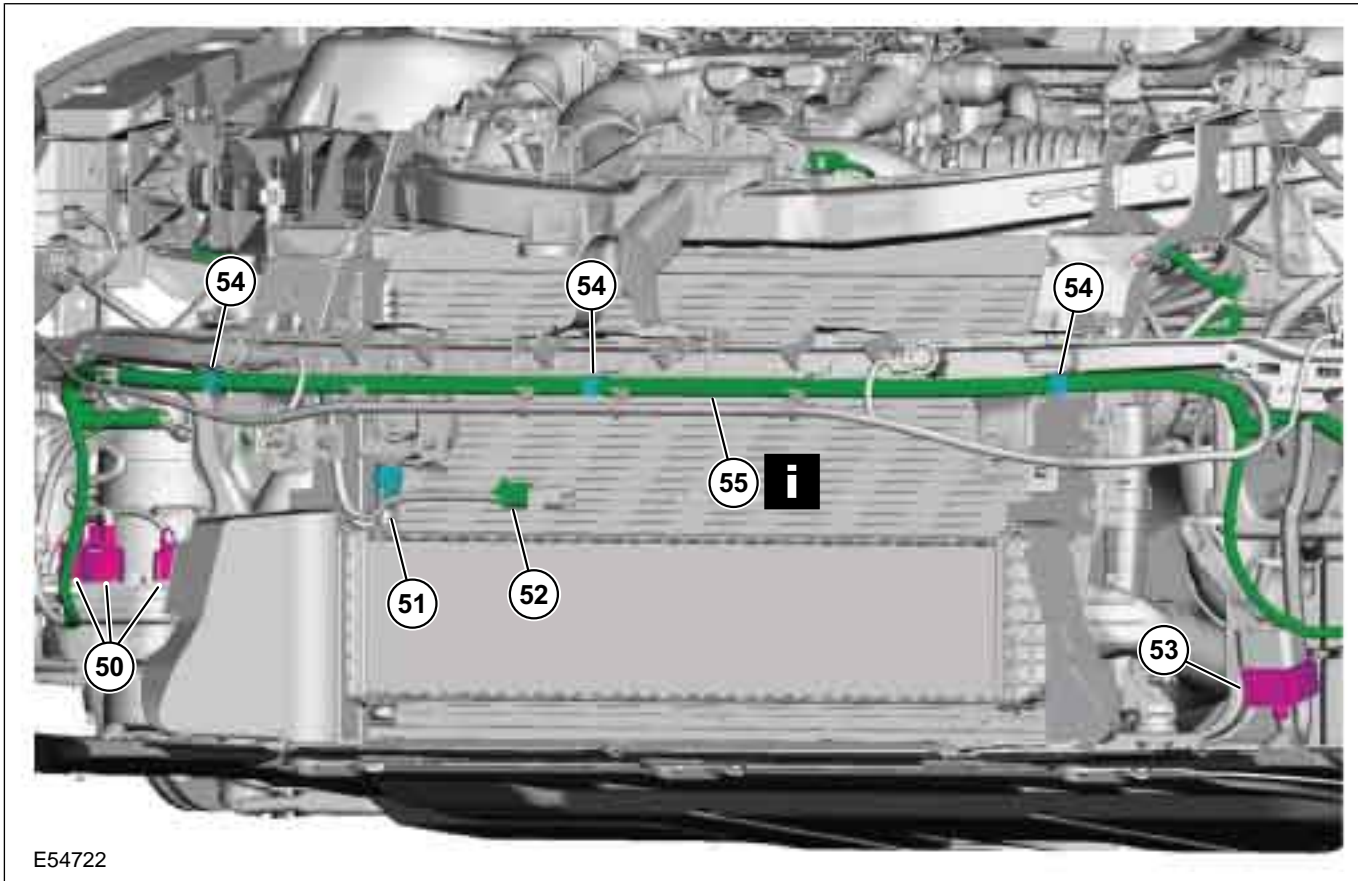
REMOVAL AND INSTALLATION



Item	Description
44	Connector - brake fluid level warning light switch
45	Battery junction box (BJB) cover
46	Bolt - BJB

Item	Description
47	Engine wiring harness connector
48	Battery positive cable
49	Ground cable bolts

REMOVAL AND INSTALLATION

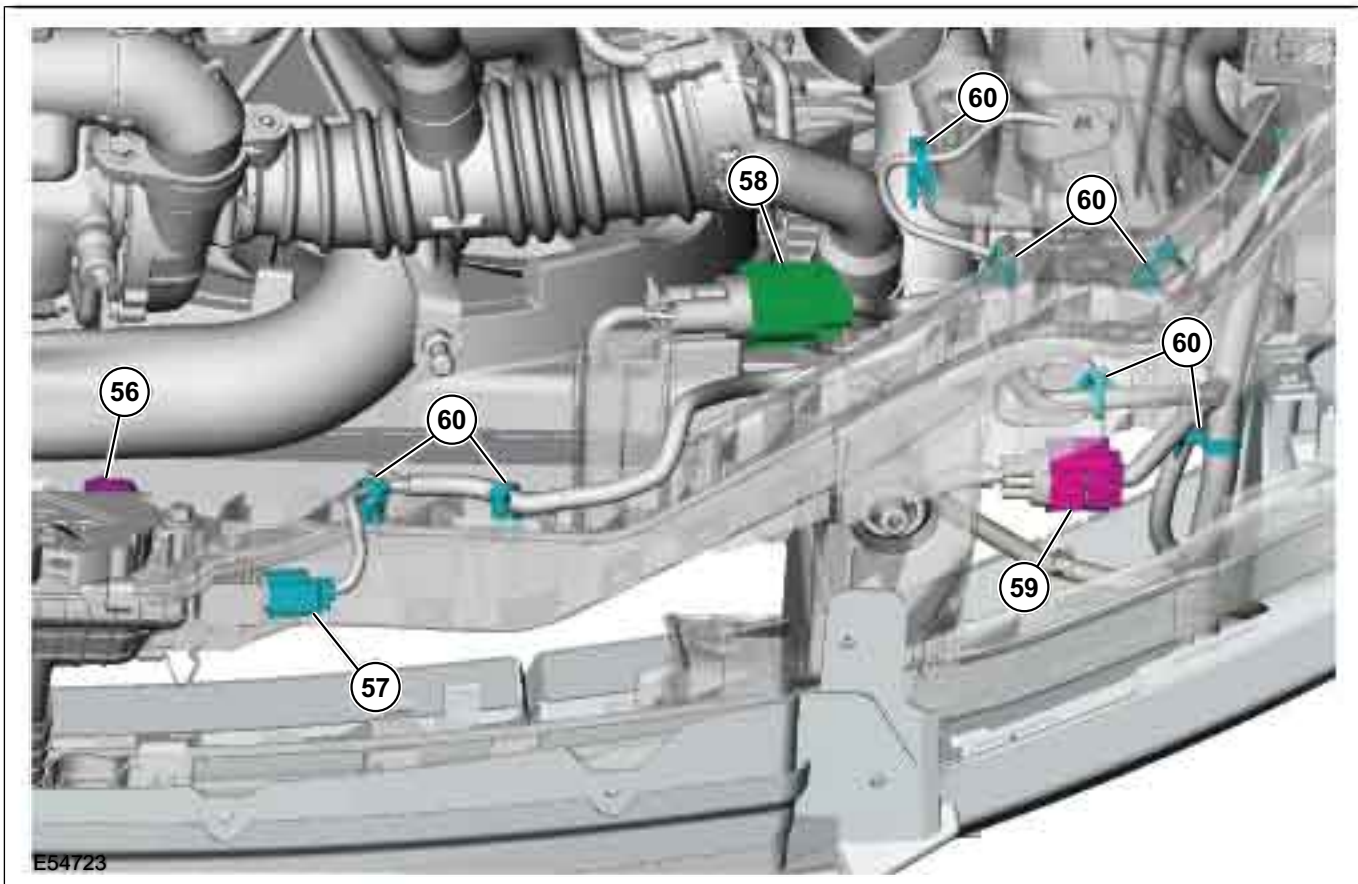


E54722

Item	Description
50	Connector - power steering pump (if fitted)
51	Horn connector
52	Ambient Air Temperature (AAT) connector

Item	Description
53	Connector - pre-glow relay (if fitted)
54	Clips - engine compartment wiring harness
55	Engine compartment wiring harness See Removal Detail

REMOVAL AND INSTALLATION

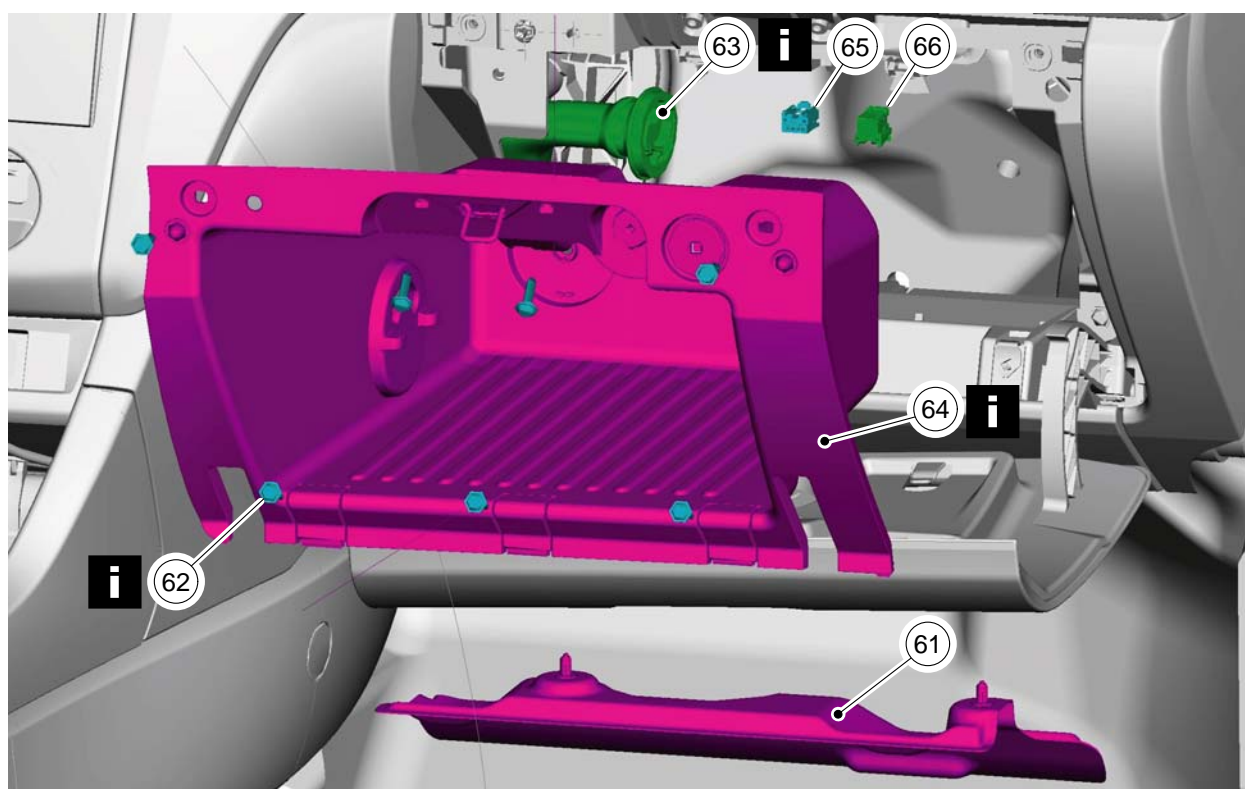


E54723

Item	Description
56	Connector - bonnet lock
57	Connector - anti-theft alarm system sensor

Item	Description
58	Connector - cooling fan
59	Connector - park position sensor
60	Clips - engine compartment wiring harness

REMOVAL AND INSTALLATION

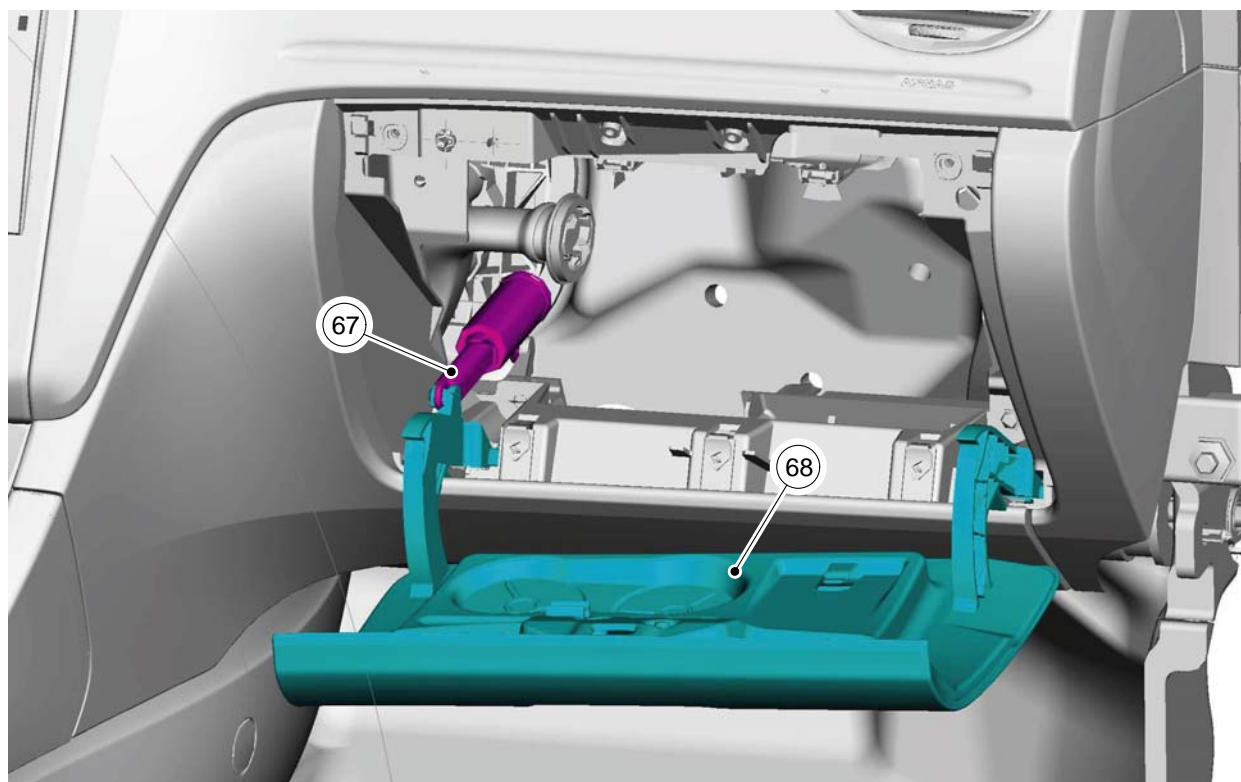


E54724

Item	Description
61	Footwell trim panel
62	Glove compartment screws See Removal Detail
63	Hose, glove compartment cooling (if equipped) See Removal Detail

Item	Description
64	Glove compartment See Removal Detail
65	Connector - audio input
66	Passenger air bag deactivation (PAD) switch electrical connector (if equipped)

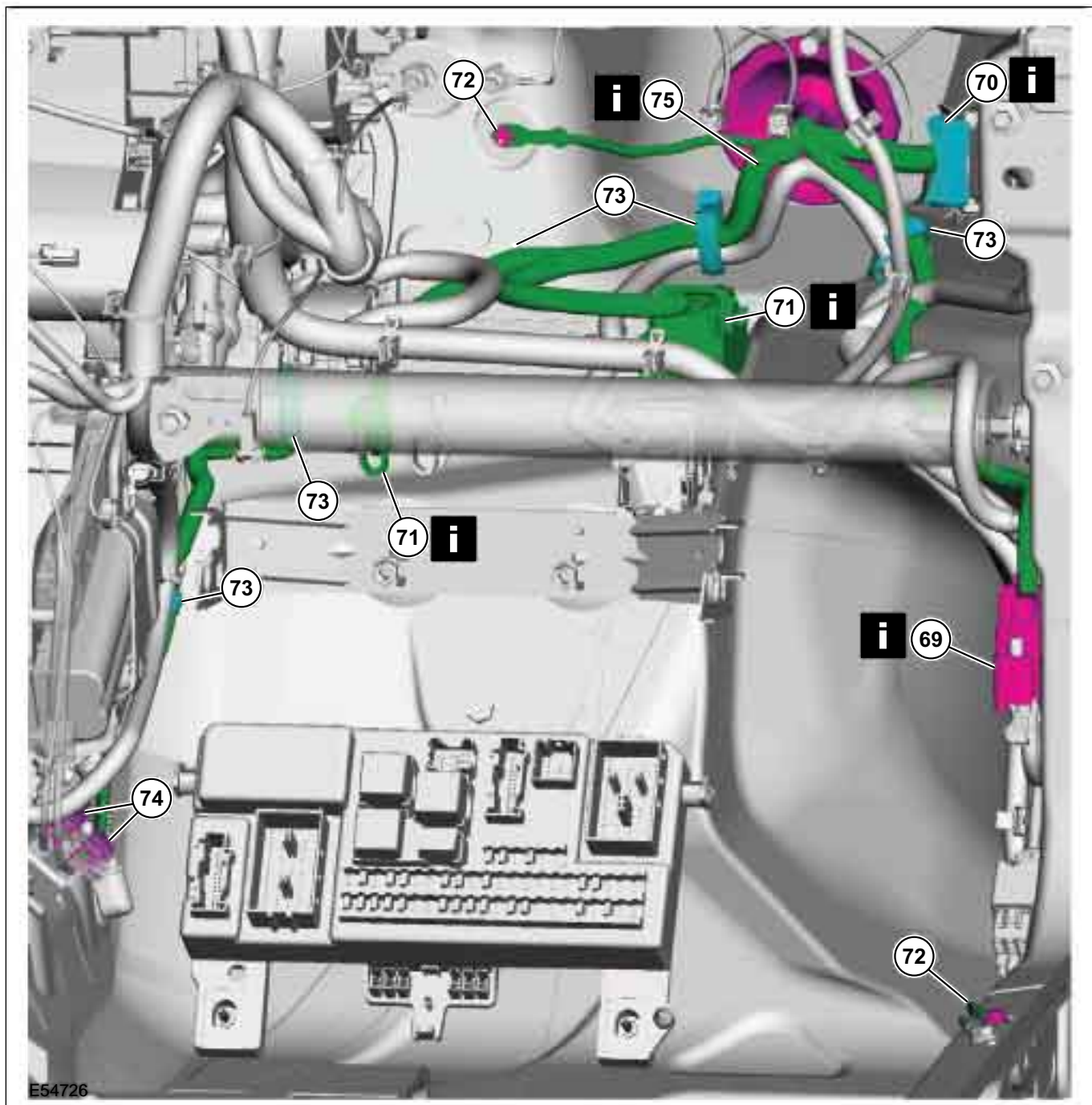
REMOVAL AND INSTALLATION



E54725

Item	Description
67	Opening damper, glove compartment cover (unhook)
68	Glove compartment cover

REMOVAL AND INSTALLATION

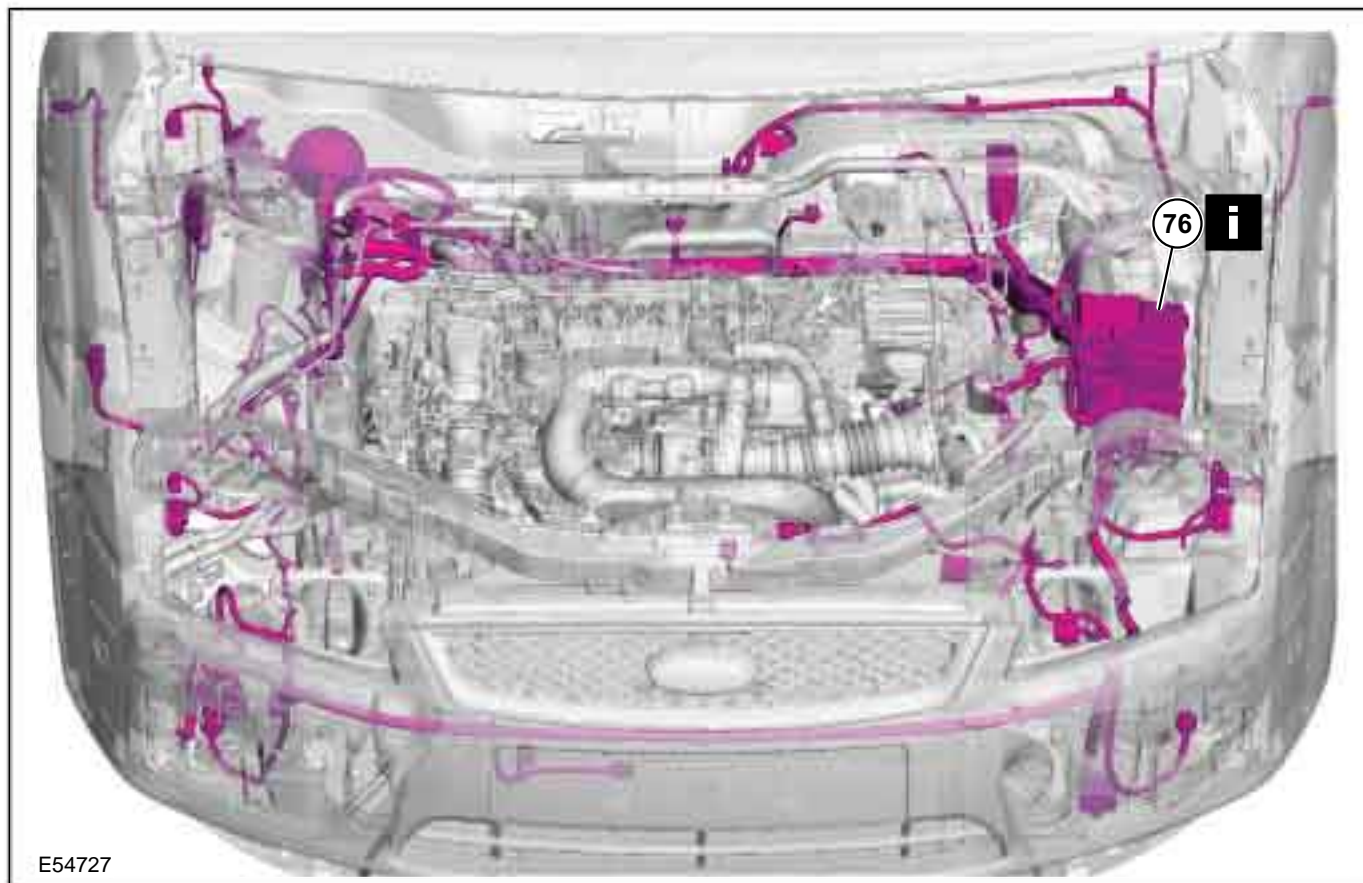


E54726

Item	Description
69	Lower connector - dashboard wiring harness See Removal Detail
70	Upper connector - dashboard wiring harness See Removal Detail
71	Connector - engine compartment wiring harness See Removal Detail

Item	Description
72	Ground cable bolts See Removal Detail
73	Clips - engine compartment wiring harness
74	Connector - electric booster heater (if equipped)
75	Engine compartment wiring harness See Removal Detail

REMOVAL AND INSTALLATION



E54727

Item	Description
76	Engine compartment wiring harness See Removal Detail

15. To install, reverse the removal procedure.

⚠ CAUTION: Ensure that the front engine mounting bracket is in the original installation position.

16. Bleed the clutch system.

For additional information, refer to: **Clutch System Bleeding (308-00, General Procedures)**.

17. Check the angle of the windshield wiper arms in relation to the windshield.

For additional information, refer to: **Windshield Wiper Blade and Pivot Arm Adjustment (501-16, General Procedures)**.

Removal Details

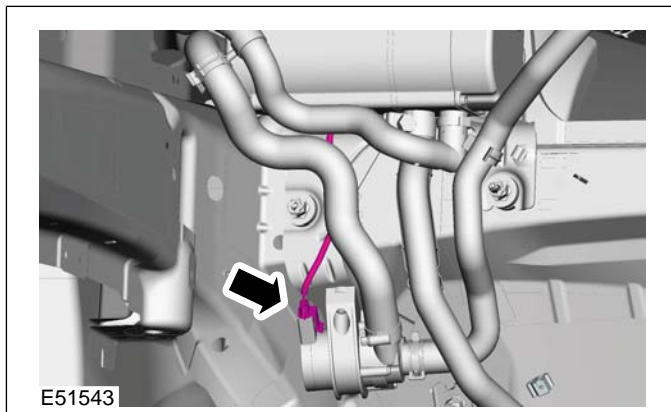
Item 14 Intake hose - fuel fired booster heater

1. Raise the vehicle.

For additional information, refer to: **Lifting (100-02, Description and Operation)**.

REMOVAL AND INSTALLATION

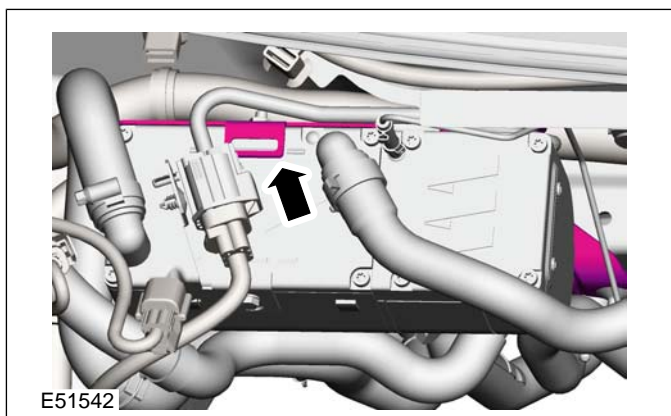
2. Disconnect the additional coolant pump electrical connector (if fitted).

**Item 16** Connector - fuel fired booster heater

1. Lower the vehicle.

Item 21 Fuel fired booster heater

1. Unclip the fuel fired booster heater from the bracket.

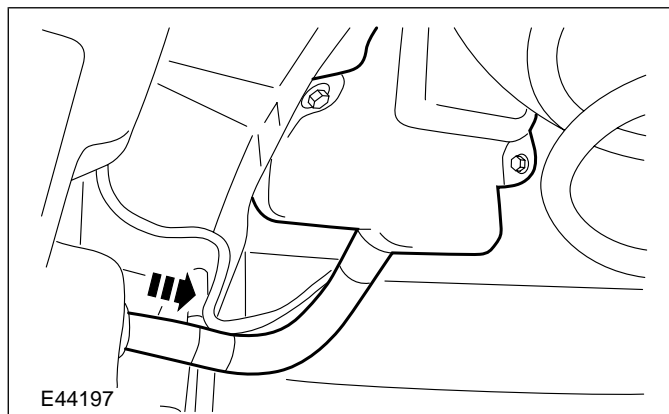
**Item 24** Windshield washer upper reservoir lower retaining bolt

1. Raise the vehicle.

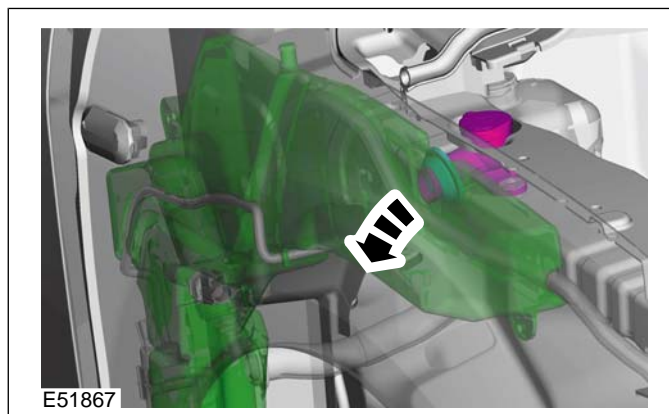
For additional information, refer to:
Lifting (100-02, Description and Operation).

Item 27 Windshield washer upper reservoir (secure to one side)

1. Pull the connecting piece of the lower reservoir from the upper reservoir.



2. Pull the reservoir from the filler neck.

**Item 32** Engine compartment wiring harness

1. Slide the wiring harness into the engine compartment.

Item 36 Engine compartment wiring harness

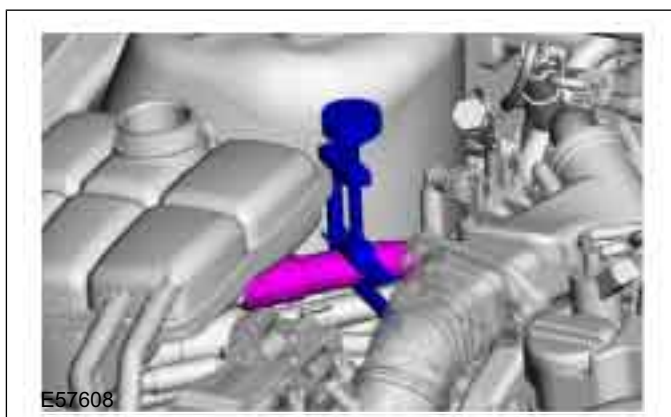
1. Slide the wiring harness into the engine compartment.

Item 37 Coolant hose, coolant expansion tank (only 1.6L diesel engine)

1. Lower the vehicle.
2. Empty the coolant expansion tank.
3. **⚠ CAUTION:** Close off the coolant hose from the expansion tank using a hose clamp, so that coolant is prevented from escaping from the coolant hose.

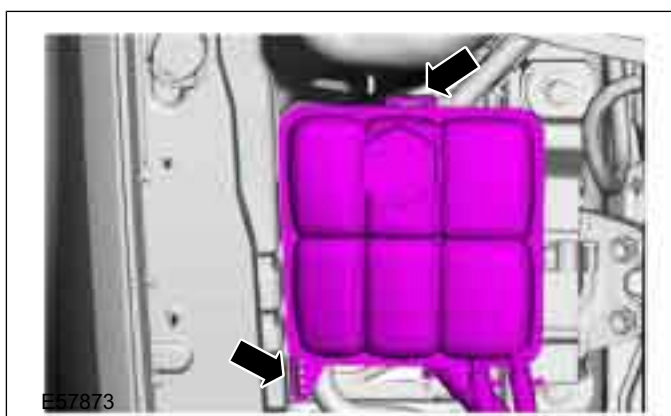
REMOVAL AND INSTALLATION

Clamp the coolant hose shut.



Item 38 Coolant expansion tank

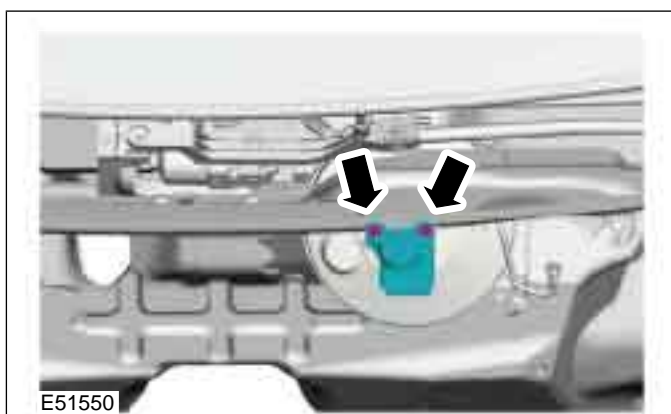
1. Unclip the coolant expansion tank and place to one side.



Item 39 Low pressure switch connector

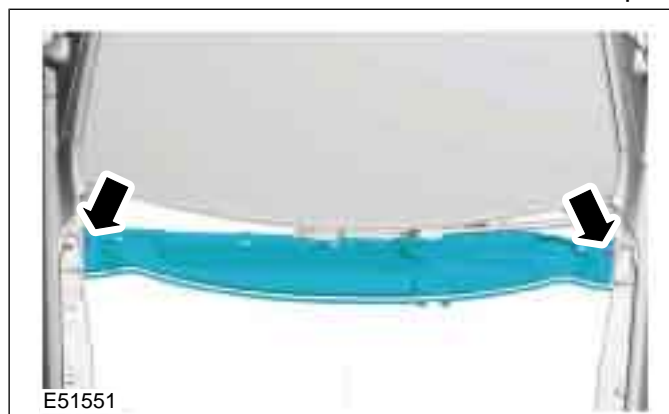
1. **CAUTION:** If brake fluid comes into contact with the paintwork, the affected area must be washed down immediately with cold water.

Detach the brake fluid reservoir from the bulkhead extension and tie it back to one side.



2. Remove the bulkhead extension.

- Pull the bulkhead extension out of the clips.



Item 43 Engine compartment wiring harness

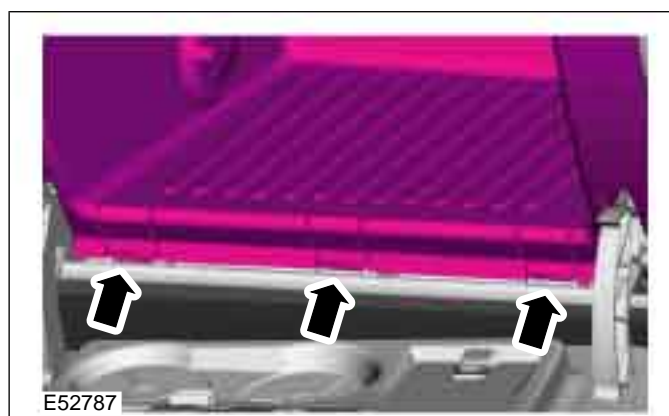
1. Pull out the wiring harness under the refrigerant lines.

Item 55 Engine compartment wiring harness

1. Slide the wiring harness into the engine compartment.

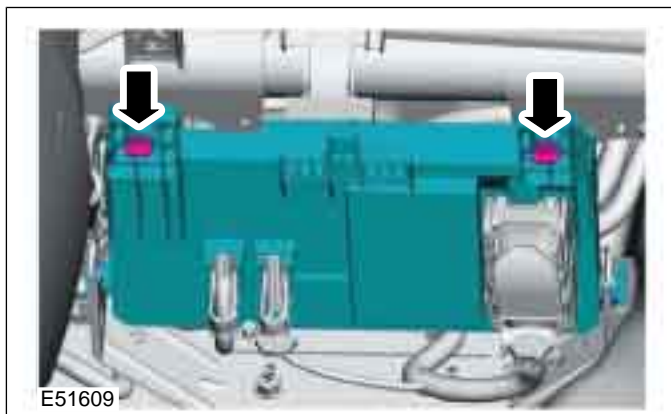
Item 62 Glove compartment screws

1. Fold down the covering caps of the screws for the glove compartment.



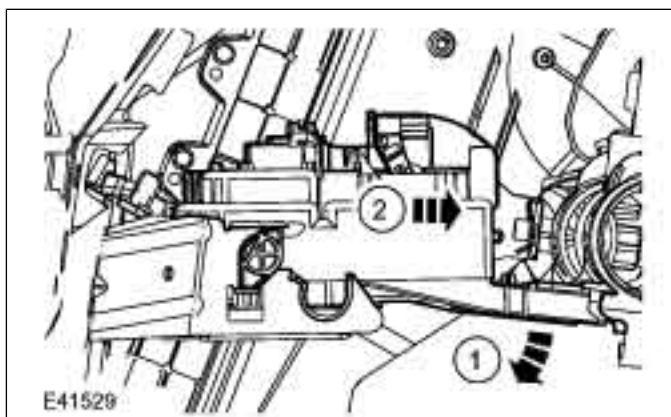
REMOVAL AND INSTALLATION

2. Detach the central junction box (CJB) from the reinforcing element.



3. Detach the CJB from the CJB bracket.

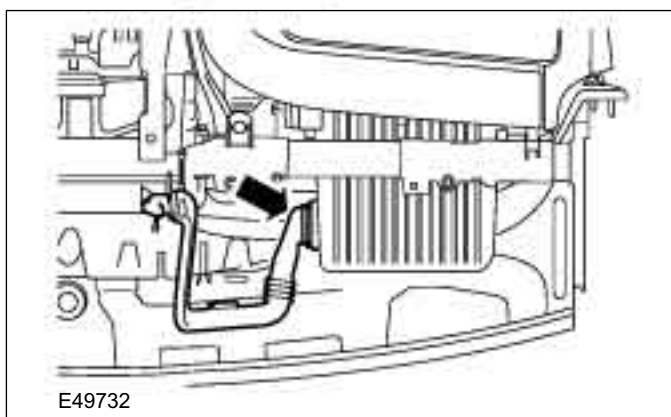
1. Turn the CJB downwards.
2. Pull out the CJB.



4. Detach the wiring harness from the CJB bracket (if fitted).

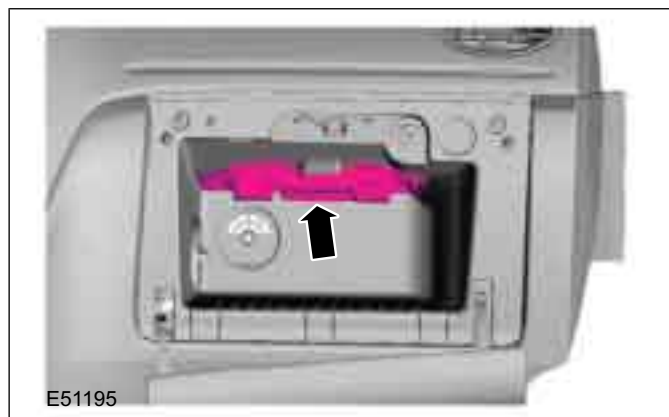
Item 63 Hose, glove compartment cooling (if equipped)

1. Detach the glove compartment cooling hose from the glove compartment.



Item 64 Glove compartment

1. Remove the access flap for the DVD drive (if equipped).



Item 69 Lower connector - dashboard wiring harness

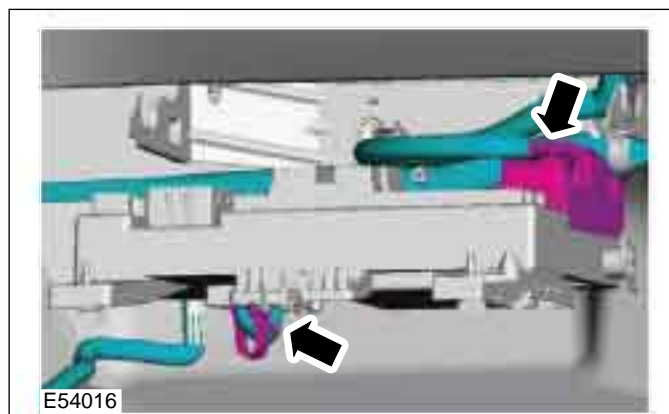
1. Detach the connector housing from the A-pillar.

Item 70 Upper connector - dashboard wiring harness

1. Push the bulkhead insulation matting to one side.
2. Detach the connector housing from the bulkhead.

Item 71 Connector - engine compartment wiring harness

1. Disconnect the engine wiring harness connector from the CJB.



Item 72 Ground cable bolts

1. Detach the wiring harness from the bulkhead.

REMOVAL AND INSTALLATION

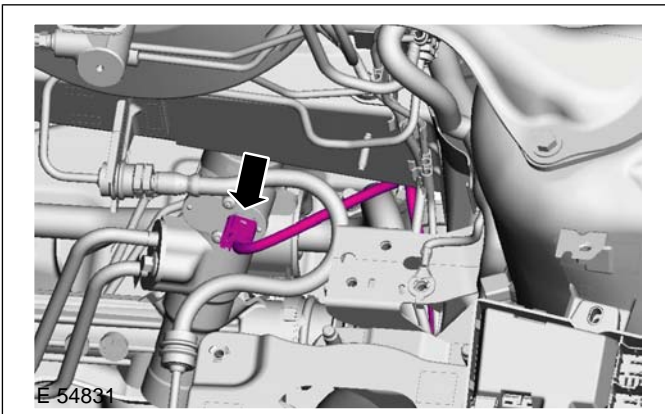
Item 75 Engine compartment wiring harness

1. Slide the engine compartment wiring harness, together with the rubber grommet, into the engine compartment.

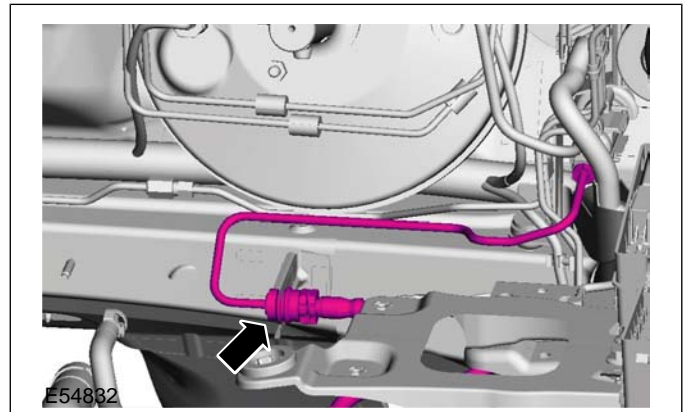
Item 76 Engine compartment wiring harness

1. **NOTE:** Only vehicles with electrohydraulic power steering

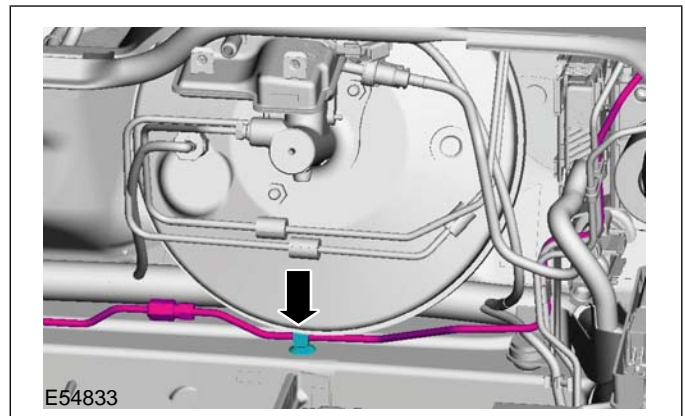
Disconnect the steer angle sensor electrical connector (if fitted).



2. Unclip the supply line of the clutch slave cylinder from the bracket.



3. Unclip the brake pipe and remove the clip.



4. Pull out the wiring harness under the refrigerant lines and the coolant lines.

Installation Details

Item 2 Windshield wiper arms

- ⚠ CAUTION:** Move the windshield wiper motor to the parked position before installing the wiper arms.

REMOVAL AND INSTALLATION

Passenger Compartment Wiring Harness

General Equipment

Wiring harness repair kit
Hot air blower

NOTE: Four M10 x 120 mm guide bolts are required for removing the dashboard together with the dashboard crossmember.

1. Open the boot lid/tailgate.

2. Raise the vehicle.

For additional information, refer to:

Lifting (100-02, Description and Operation).

3. Disconnect the connector of the rear left and right wheel sensors for the anti-lock brake system.

- Unclip the wiring harness.

4. Disconnect the rear bumper wiring harness electrical connector.

- Unclip the wiring harness.

5. Remove the metal clip of the rear right wheelhouse trim panel.

- Slide the wheelhouse trim panel to one side.

6. Disconnect the connector of the filler flap lock motor.

- Unclip the wiring harness.

7. Lower the vehicle.

8. Remove the facia crash padding.

For additional information, refer to:

Instrument panel (501-12, Removal and Installation).

9. Remove the footrest (if equipped).

10. Remove the right and left-hand front seats.

For additional information, refer to:

Front Seat (501-10, Removal and Installation).

11. Remove the rear seats.

12. Remove the A-pillar trim on the right and left-hand sides.

For additional information, refer to:

A-Pillar Trim Panel (501-05, Removal and Installation).

13. Remove the B-pillar trim on the right and left-hand sides. For additional information, refer to: **(501-05)**

B-Pillar Trim Panel - 3-Door (Removal and Installation),

B-Pillar Trim Panel - 4-Door/5-Door (Removal and Installation).

14. Remove the C-pillar trim on the right and left-hand sides. For additional information, refer to: **(501-05)**

B-Pillar Trim Panel - 3-Door (Removal and Installation),

C-Pillar Trim Panel - 4-Door/5-Door (Removal and Installation),

C-Pillar Trim Panel - Wagon (Removal and Installation).

15. Remove the D-pillar trim on the right and left-hand sides. For additional information, refer to: **(501-05)**

D-Pillar Trim Panel - 4-Door (Removal and Installation),

D-Pillar Trim Panel - 5 Door (Removal and Installation).

16. Remove the front rocker panel trim on the right and left hand sides.

For additional information, refer to: **Front Scuff Plate Trim Panel (501-05, Removal and Installation).**

17. Remove the rear rocker panel on the right and left-hand sides.

For additional information, refer to: **Rear Scuff Plate Trim Panel (501-05, Removal and Installation).**

18. Remove the load space trim panels on the right and left-hand sides. For additional information, refer to: **(501-05)**

Loadspace Trim Panel - 3-Door (Removal and Installation),

Loadspace Trim Panel - 5-Door (Removal and Installation),

Loadspace Trim Panel - Wagon (Removal and Installation).

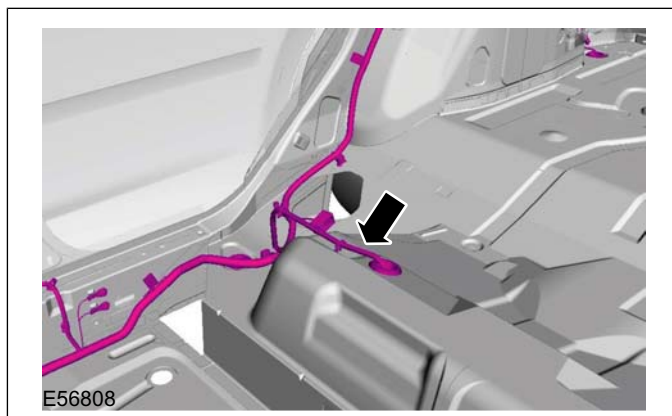
19. Remove the rear quarter trim panel. For additional information, refer to: **(501-05)**

Rear Quarter Trim Panel - 3-Door (Removal and Installation),

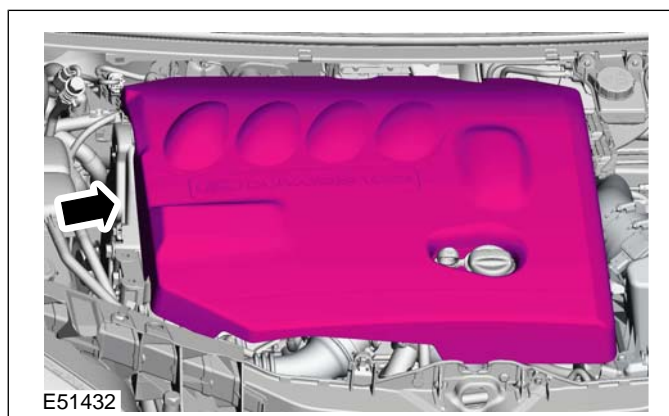
Rear Quarter Trim Panel - 5-Door/Wagon (Removal and Installation).

REMOVAL AND INSTALLATION

20. Disconnect the parking aid speaker electrical connector.
21. Remove the covers from the right and left-hand rear lamp assemblies.
22. Remove the carpets.
23. Disconnect the connector of the fuel pump module.



24. Remove the engine cover (2.0L diesel shown).



25. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



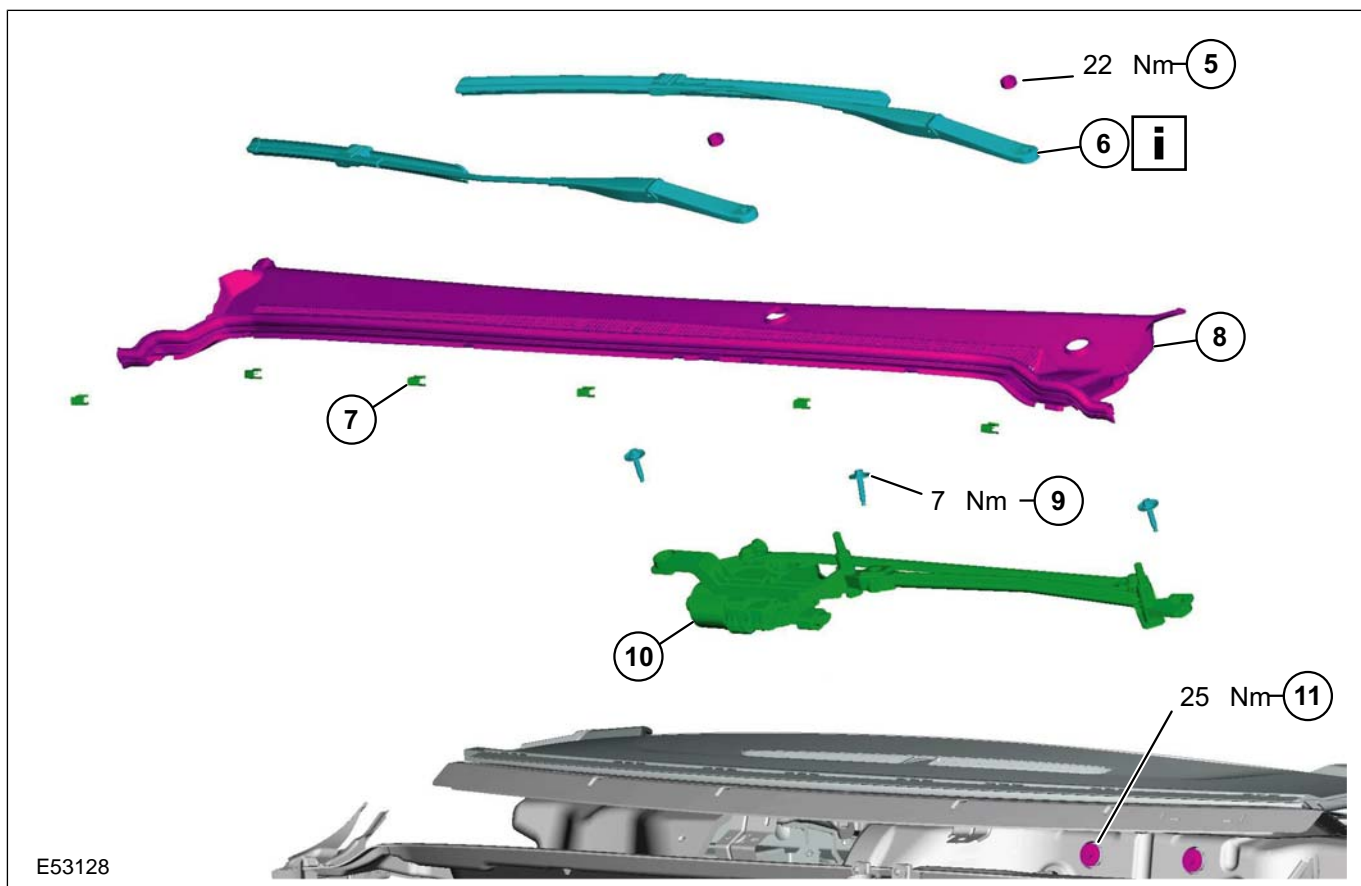
E52944

Item	Description
1	Door check strap bolt
2	Door hinge bolts See Removal Detail See Installation Detail

Item	Description
3	Front doors (driver's door shown) See Removal Detail
4	Dashboard crossmember side bolts See Removal Detail

REMOVAL AND INSTALLATION

⚠ CAUTION: Make sure that the windshield wiper motor is in the park position.

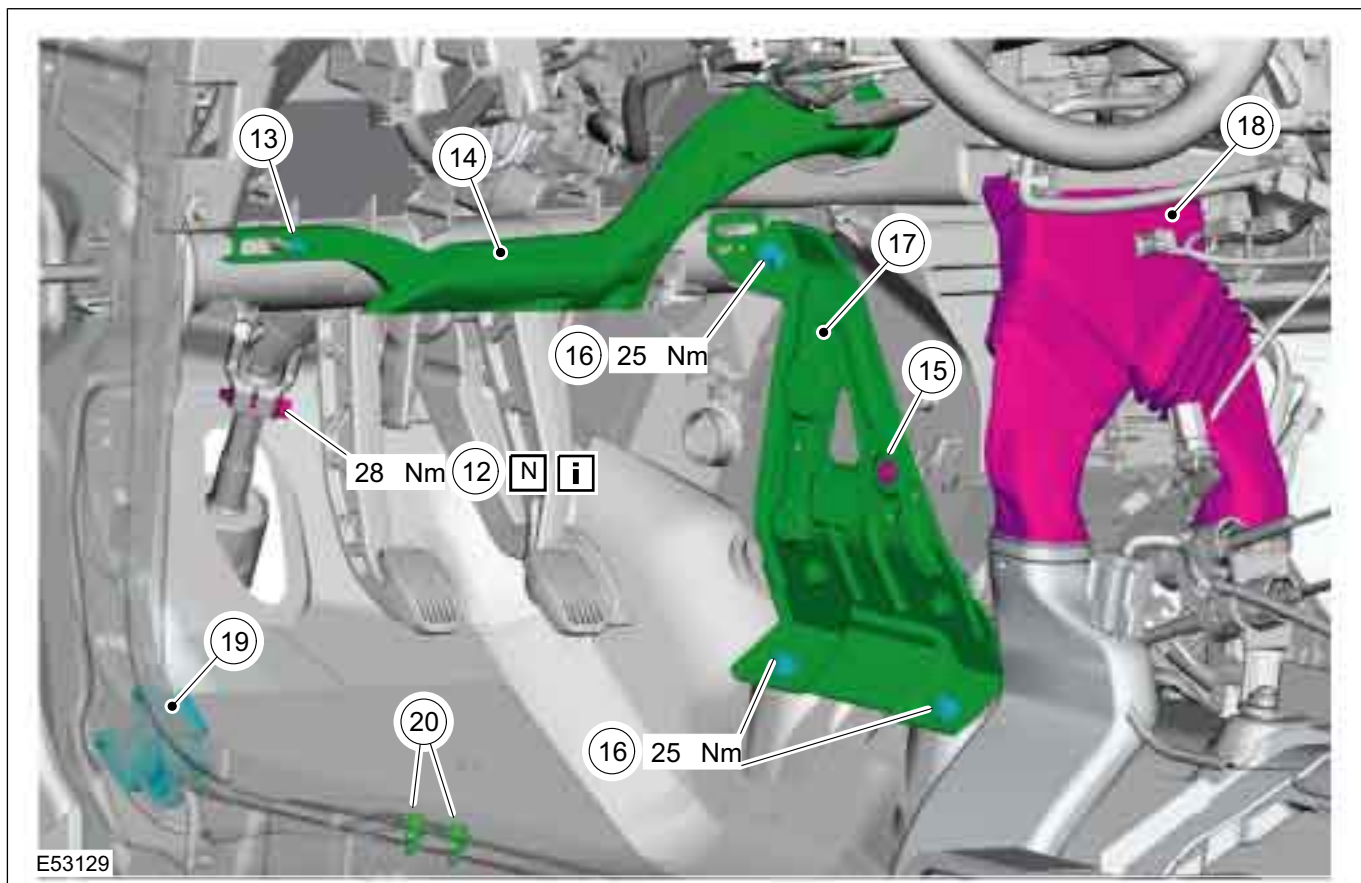


E53128

Item	Description
5	Windshield wiper arm nuts
6	Windshield wiper arms <i>See Installation Detail</i>
7	Clips, cowl panel grille
8	Cowl Panel Grille

Item	Description
9	Bolts for windshield wiper motor with linkage
10	Windshield wiper motor with linkage (secure to the side)
11	Steering column bracket upper bolts

REMOVAL AND INSTALLATION



Item	Description
12	Steering column shaft joint bolt See Installation Detail
13	Bolt, footwell air duct
14	Air duct, footwell
15	Bolt, heater core/evaporator housing

Item	Description
16	Bolts, bracket for reinforcing element
17	Bracket, reinforcing element
18	Rear footwell air duct
19	Connector - passenger compartment wiring harness
20	Ground cable bolts

REMOVAL AND INSTALLATION

▲ WARNING: Never perform work on the electric booster heater before the electric booster heater element has cooled to ambient temperature. Failure to observe this instruction can lead to injury.

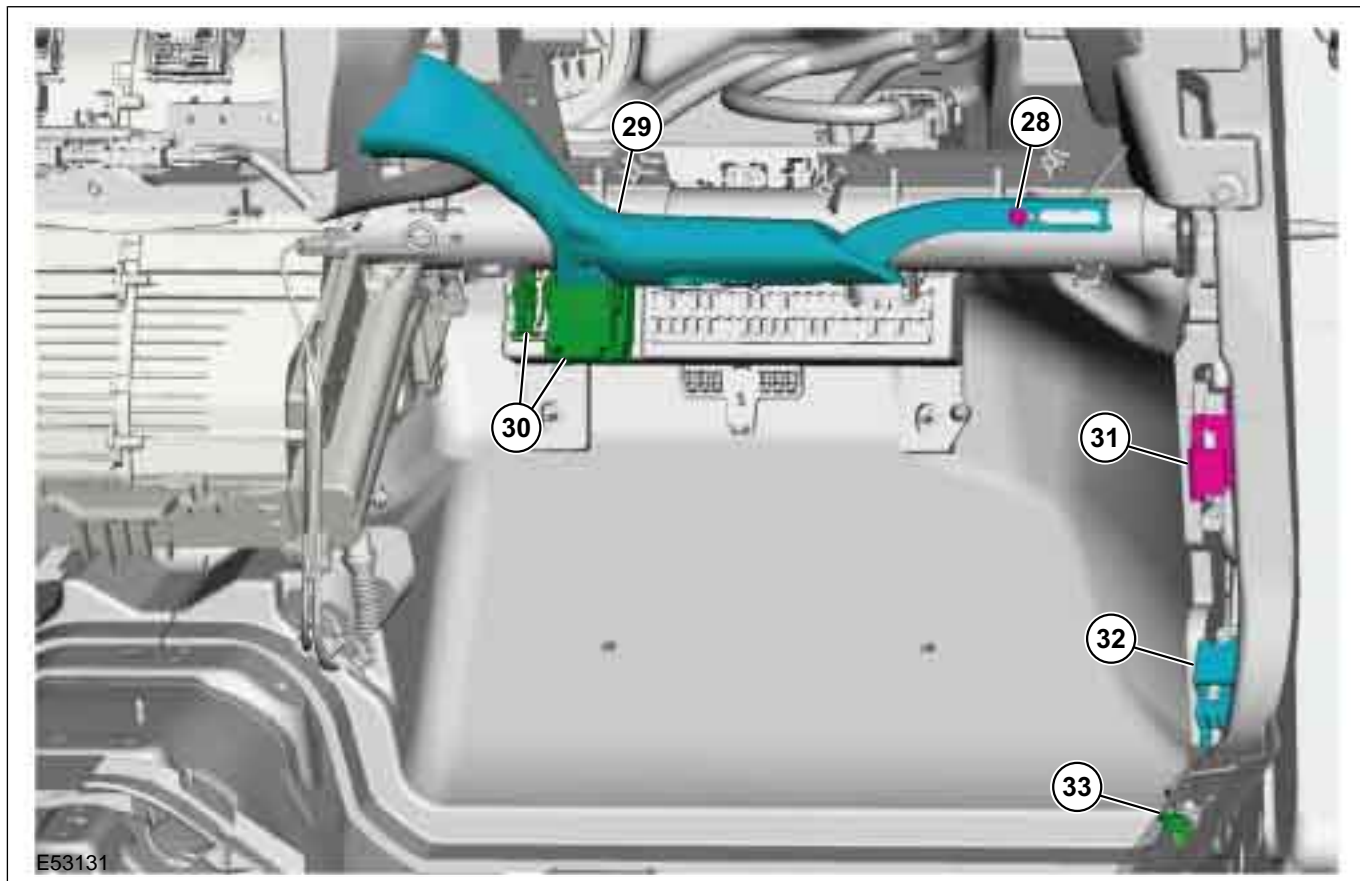


E53130

Item	Description
21	Bolt, heater core/evaporator housing
22	Retaining clips, instrument panel wiring harness
23	Ground cable bolt

Item	Description
24	Retaining clip, engine compartment wiring harness (if present)
25	Bolts, bracket for reinforcing element
26	Bracket, reinforcing element
27	Connector - electric booster heater (if equipped)

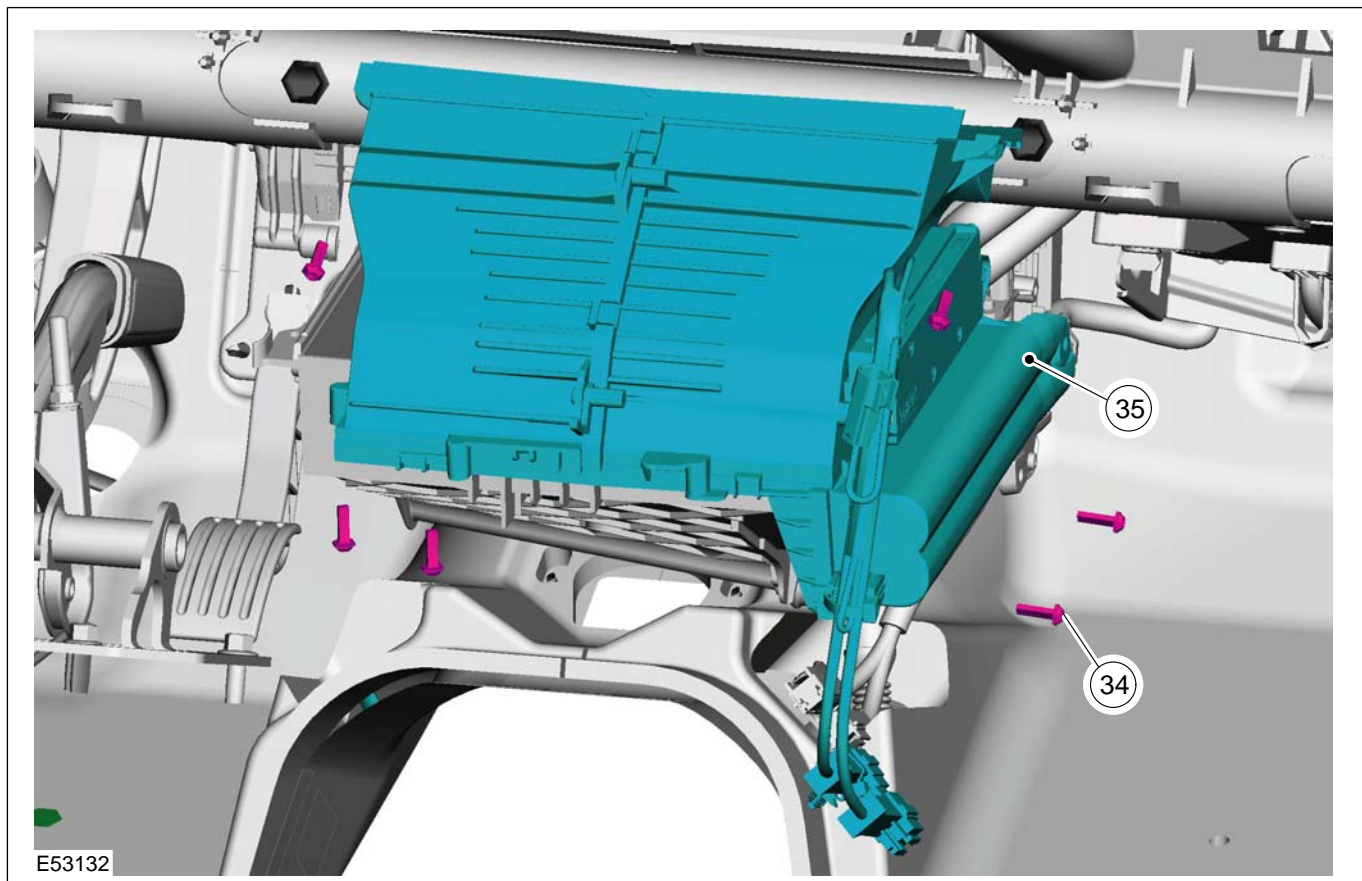
REMOVAL AND INSTALLATION



Item	Description
28	Bolt, footwell air duct
29	Air duct, footwell
30	Dashboard wiring harness connector

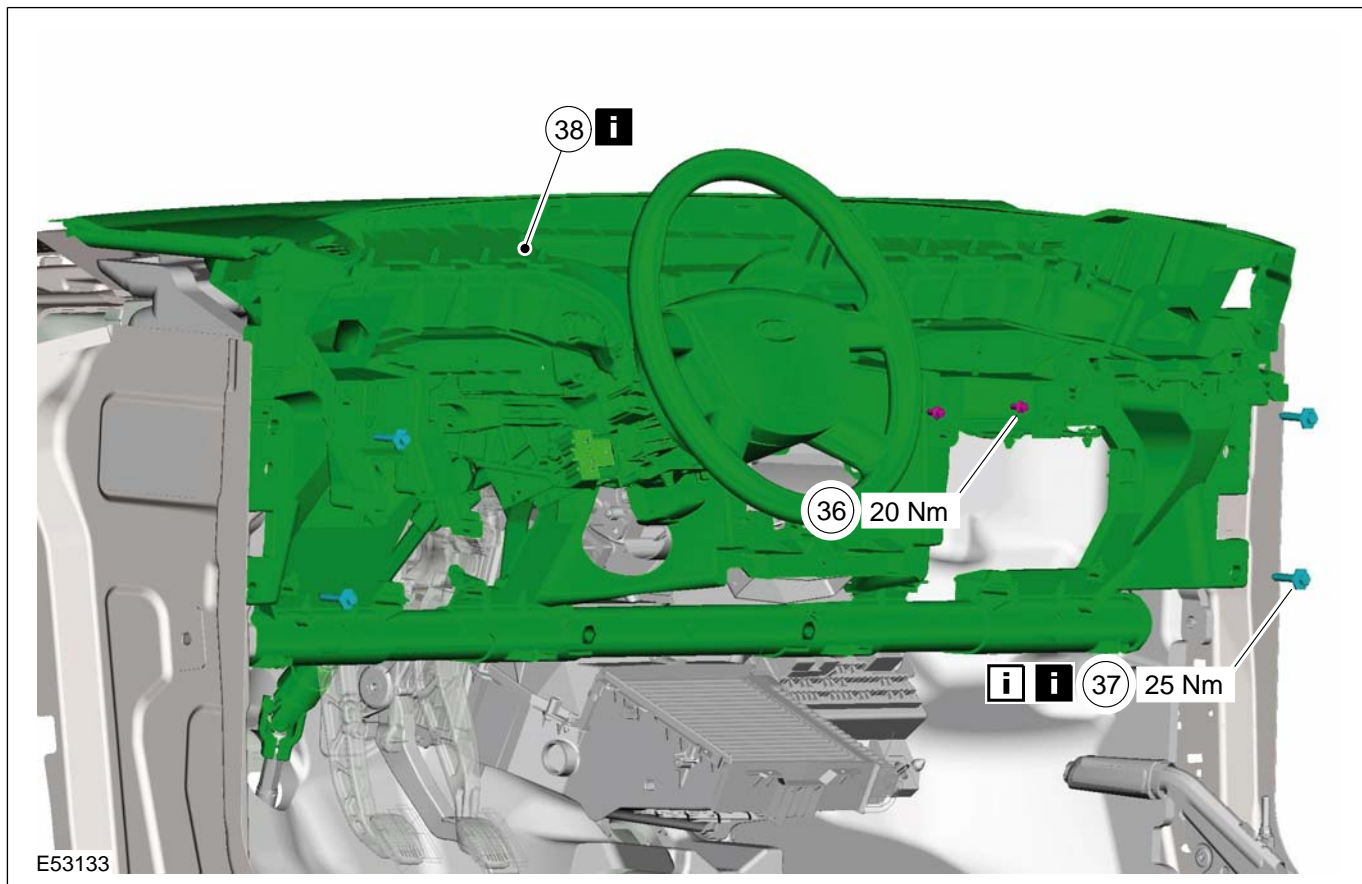
Item	Description
31	Connector - engine compartment wiring harness
32	Connector - passenger compartment wiring harness
33	Ground cable bolt

REMOVAL AND INSTALLATION



Item	Description
34	Heater core upper cover bolts
35	Heater core upper cover

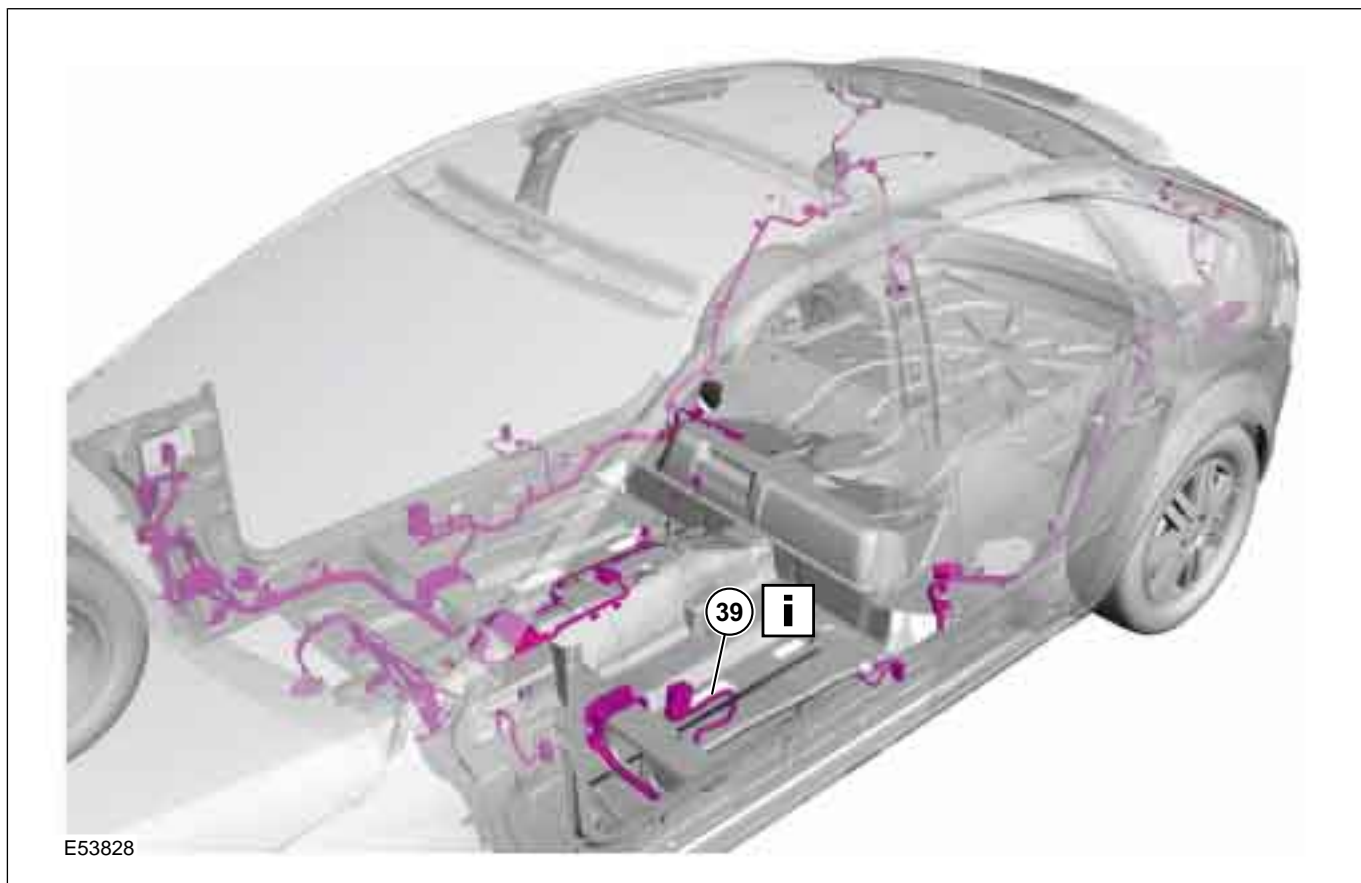
REMOVAL AND INSTALLATION



E53133

Item	Description
36	Dashboard crossmember inner bolts
37	Dashboard crossmember outer bolts See Removal Detail See Installation Detail
38	Dashboard crossmember See Removal Detail

REMOVAL AND INSTALLATION



Item	Description
39	Passenger compartment wiring harness See Installation Detail

26. To install, reverse the removal procedure.

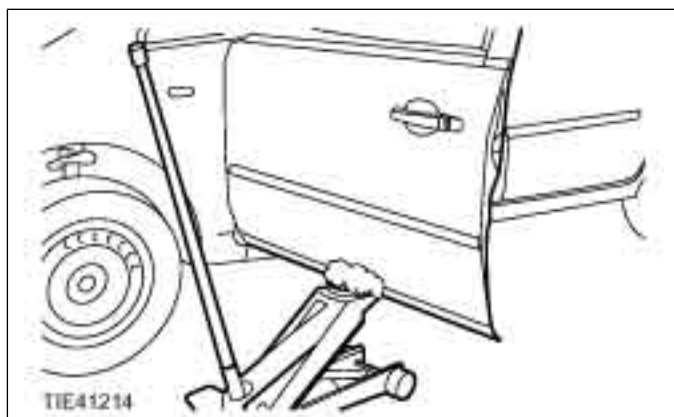
27. Check the angle of the windshield wiper arms in relation to the windshield.

For additional information, refer to: **Windshield Wiper Blade and Pivot Arm Adjustment** (501-16, General Procedures).

Removal Details

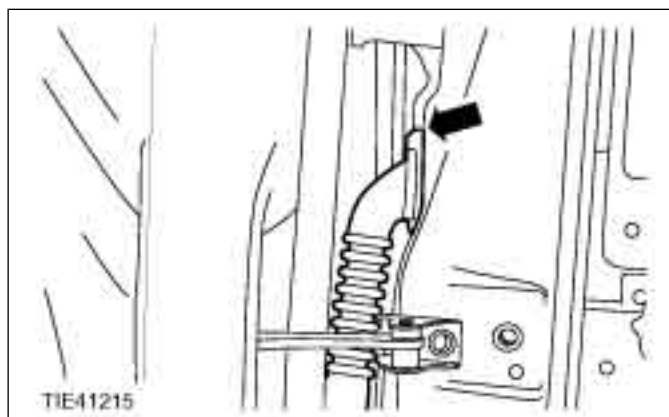
Item 2 Door hinge bolts

1. Support the door using a trolley jack with the aid of another technician.



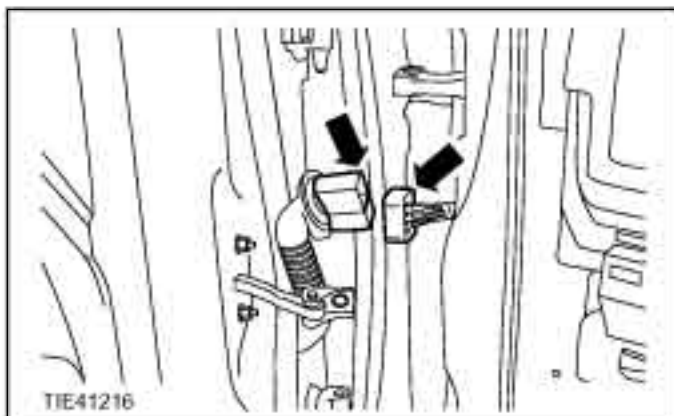
Item 3 Front doors (driver's door shown)

1. Detach the front door wiring harness connector from the A-pillar.

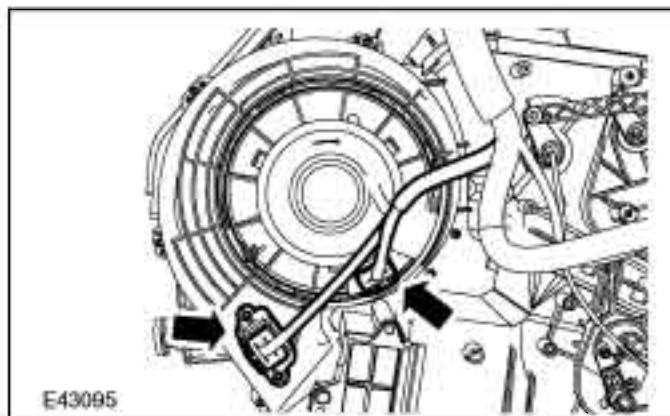


REMOVAL AND INSTALLATION

2. Detach the front door wiring harness connector.



3. Detach the blower resistor connector (if fitted) and the blower motor connector.



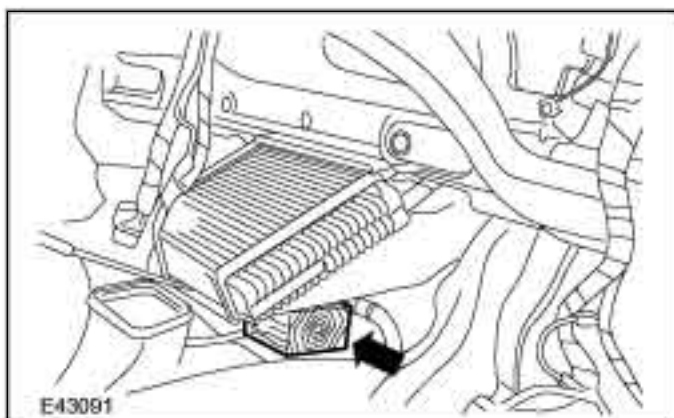
Item 4 Dashboard crossmember side bolts

1. **⚠ CAUTION:** Do not remove the dashboard crossmember side bolts.

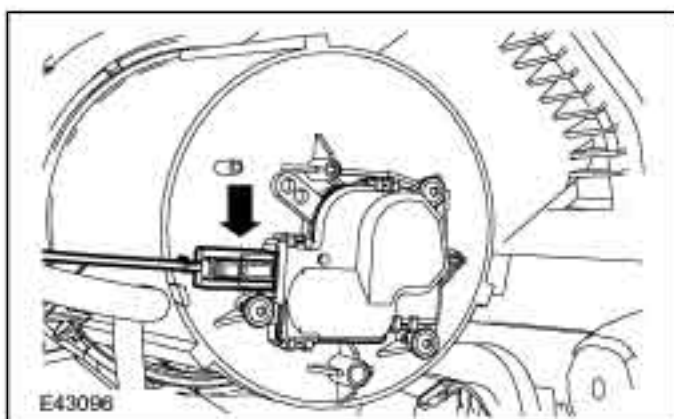
Loosen the dashboard crossmember right and left-hand side bolts.

Item 37 Dashboard crossmember outer bolts

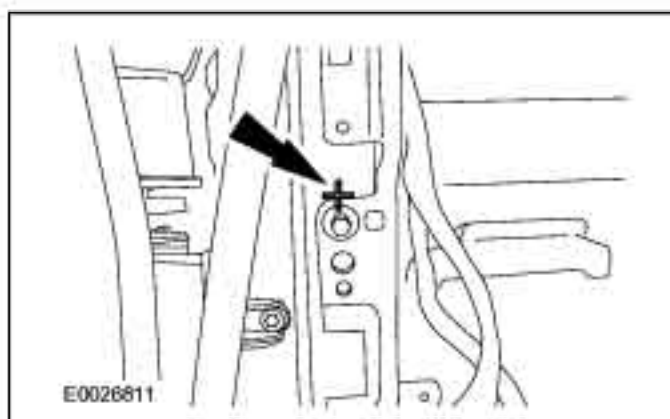
1. Support the heater housing with a wooden block.



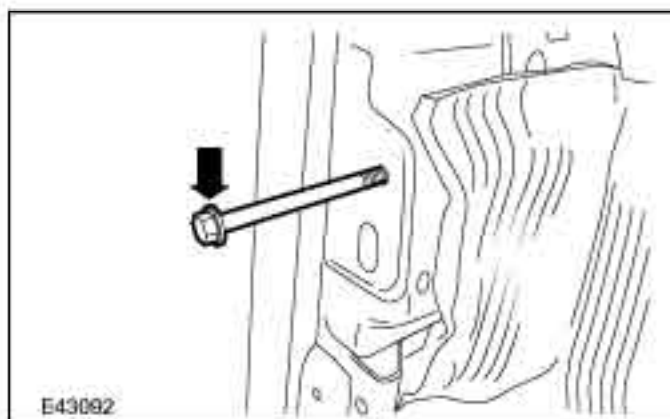
2. Detach the air recirculation flap actuator connector.



4. Mark the position of the dashboard crossmember relative to the A-pillars (left-hand side shown).



5. After removing the outer bolts of the dashboard crossmember, screw in two M10 x 120 mm guide bolts each into the right and left-hand A-pillars (shown without dashboard for a clearer view).



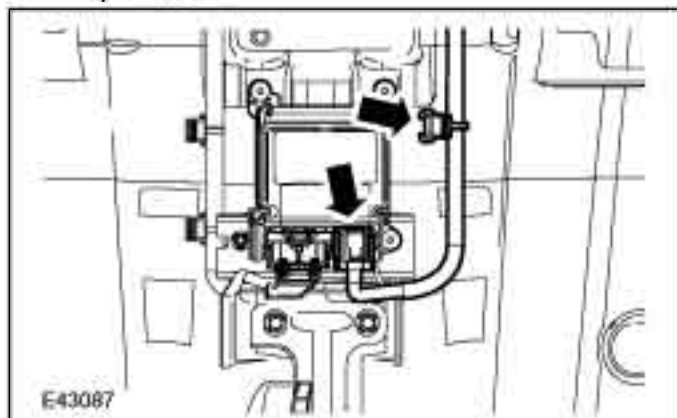
6. Remove the right and left-hand side bolts of the dashboard crossmember.

REMOVAL AND INSTALLATION

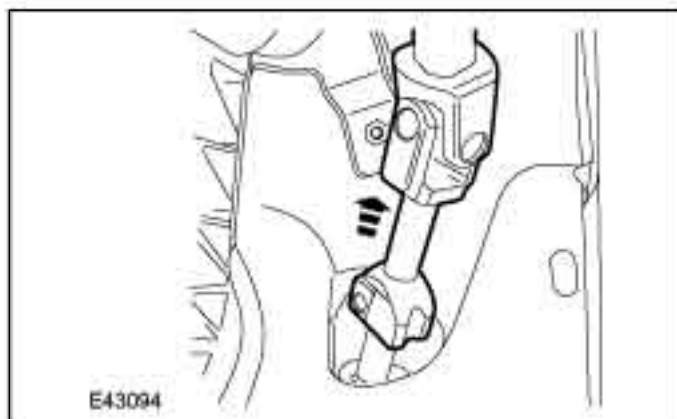
7. Pull the dashboard crossmember forwards until it reaches the stop.

**Item 38** Dashboard crossmember

1. Disconnect the connector of the restraint control module (RCM).
- Unclip the centre console wiring harness and pull it out.

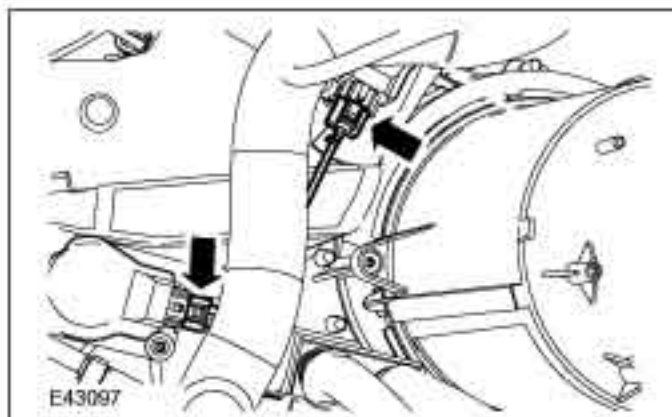


2. Detach the steering column shaft joint from the steering column shaft.



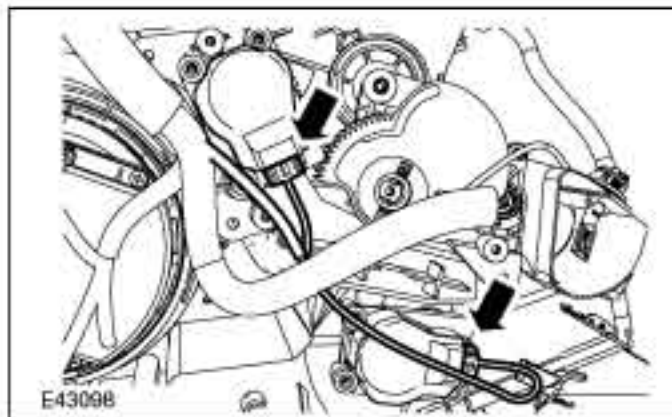
3. NOTE: Vehicles with EATC only

- Detach the right-hand temperature flap actuator connector and the defrost flap actuator connector.



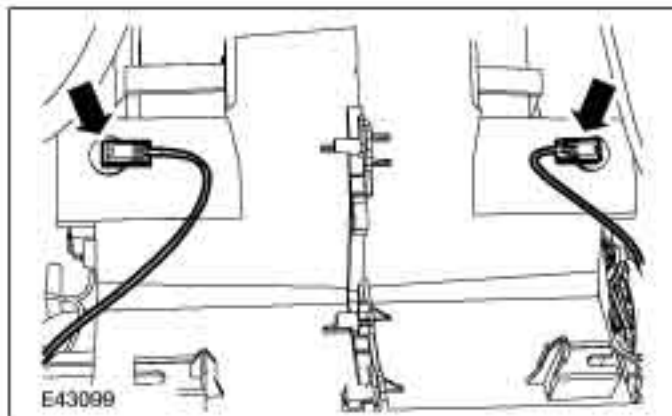
4. NOTE: Vehicles with EATC only

- Detach the left-hand temperature flap actuator connector and the air distribution flap actuator connector.



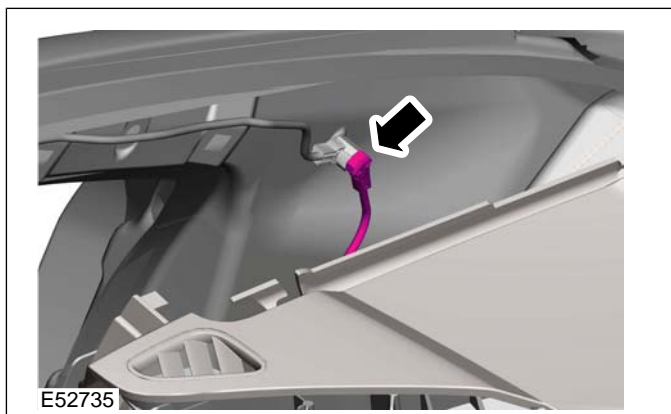
5. NOTE: Vehicles with EATC only

- Detach the air outlet temperature sensor connector.

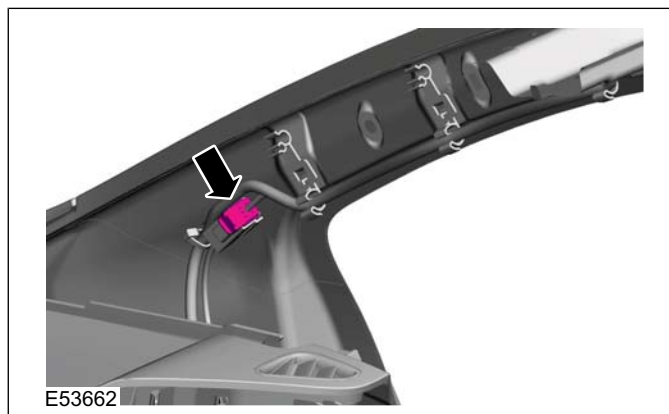


REMOVAL AND INSTALLATION

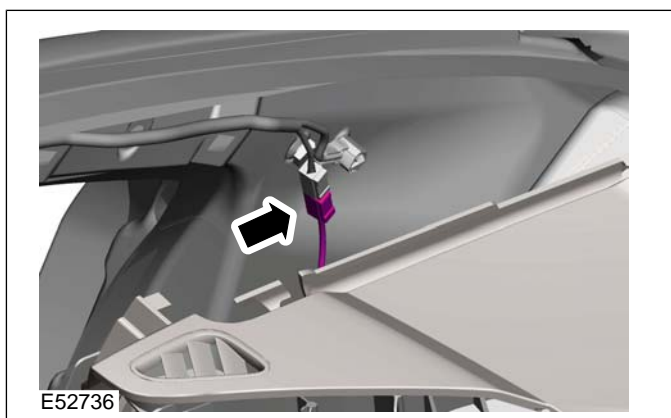
6. Separate the radio antenna cable push-fit connector.



8. Detach the overhead console wiring harness connector.



7. Separate the car telephone antenna cable push-fit connector (if equipped).



9. Remove the right and left-hand M10 x 120 mm guide bolts.

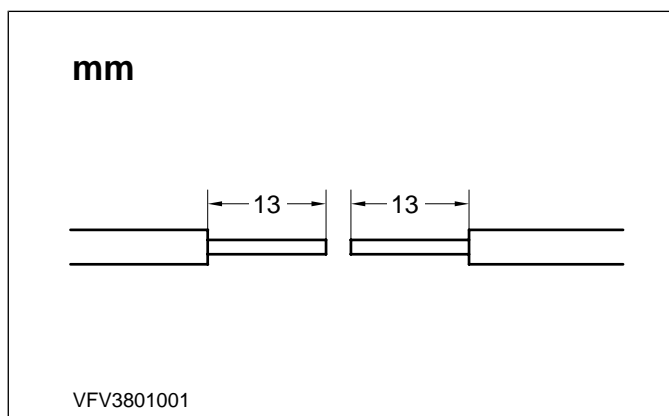
Installation Details

Item 39 Passenger compartment wiring harness

NOTE: Connect a new passenger compartment wiring harness to the disconnected connector of the fuel pump module.

1. Disconnect the fuel pump module connector from the new wiring harness.

2. Remove the insulation at both cable ends.

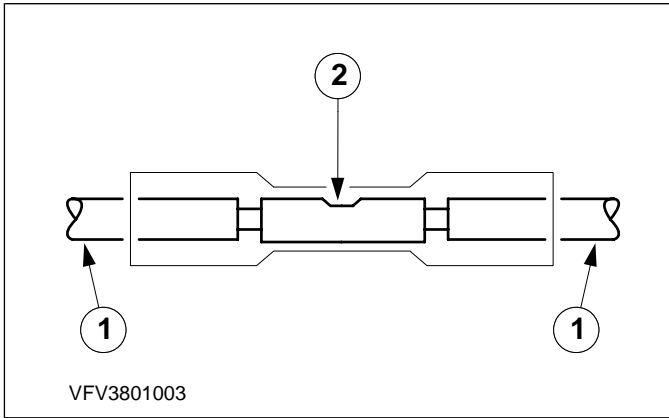


3. Insert the stripped ends of the wires into the crimp connector.

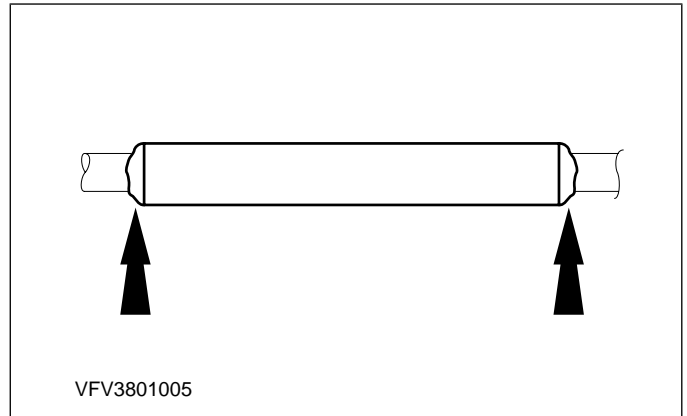
1. Stripped ends of the wires

REMOVAL AND INSTALLATION

2. Crimp connector



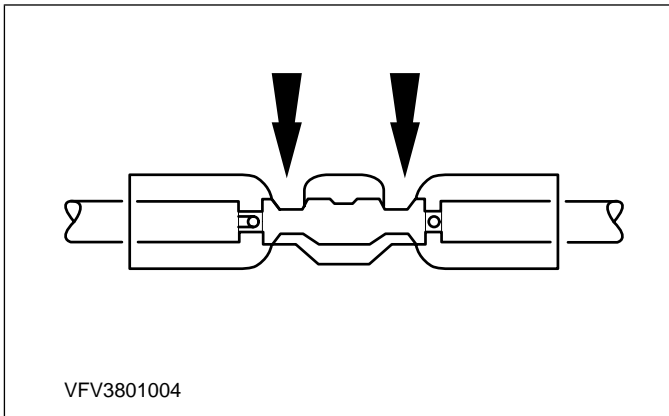
Heat the shrink sleeving.



4. **CAUTION:** When crimping the connector ensure that the cross section of the connector matches that of the cable, and that the associated opening of the crimping pliers is used.

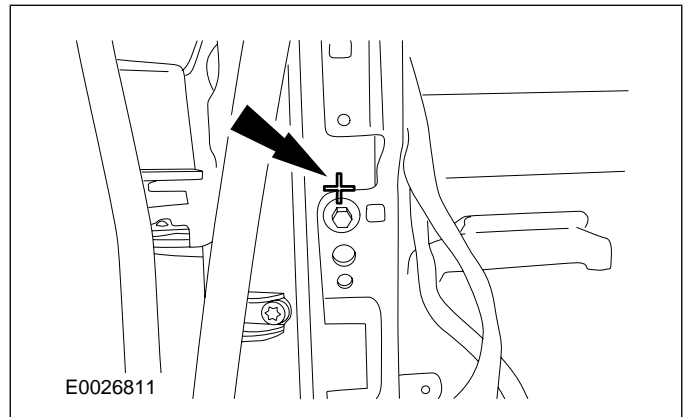
NOTE: After crimping the connection, test it by performing a pull test.

Crimp the connection with the crimping pliers.



Item 37 Dashboard crossmember outer bolts

1. Align the dashboard crossmember to the A-pillars (left-hand side shown).



Item 12 Steering column shaft joint bolt

- WARNING:** Install a new steering column shaft joint bolt. Failure to follow this instruction may result in personal injury.

Item 6 Windshield wiper arms

- CAUTION:** Move the windshield wiper motor to the parked position before installing the wiper arms.

5. **NOTE:** Using the hot air blower, heat the shrink sleeving of the crimp connector until the sleeving is tight on the connection and sealant emerges from each end.

REMOVAL AND INSTALLATION

Instrument Panel Wiring Harness

NOTE: Four M10 x 120 mm guide bolts are required for removing the dashboard together with the dashboard crossmember.

1. Disconnect the battery.

For additional information, refer to: **Battery Disconnect and Connect (414-01).**

2. Remove the facia crash padding.

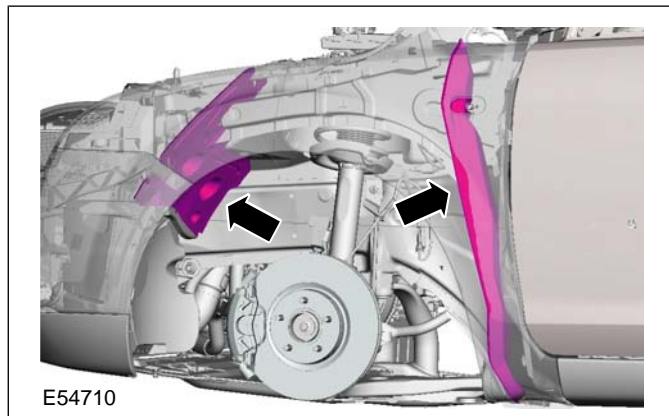
For additional information, refer to: **Instrument panel (501-12, Removal and Installation).**

3. Remove the A-pillar trim on the right and left-hand sides.

For additional information, refer to: **A-Pillar Trim Panel (501-05, Removal and Installation).**

4. Remove the front rocker panel trim on the right and left hand sides.

For additional information, refer to: **Front Scuff Plate Trim Panel (501-05, Removal and Installation).**

5. Remove the engine cover (2.0L diesel shown).**6. Remove the components in the order indicated in the following illustration(s) and table(s).**

REMOVAL AND INSTALLATION



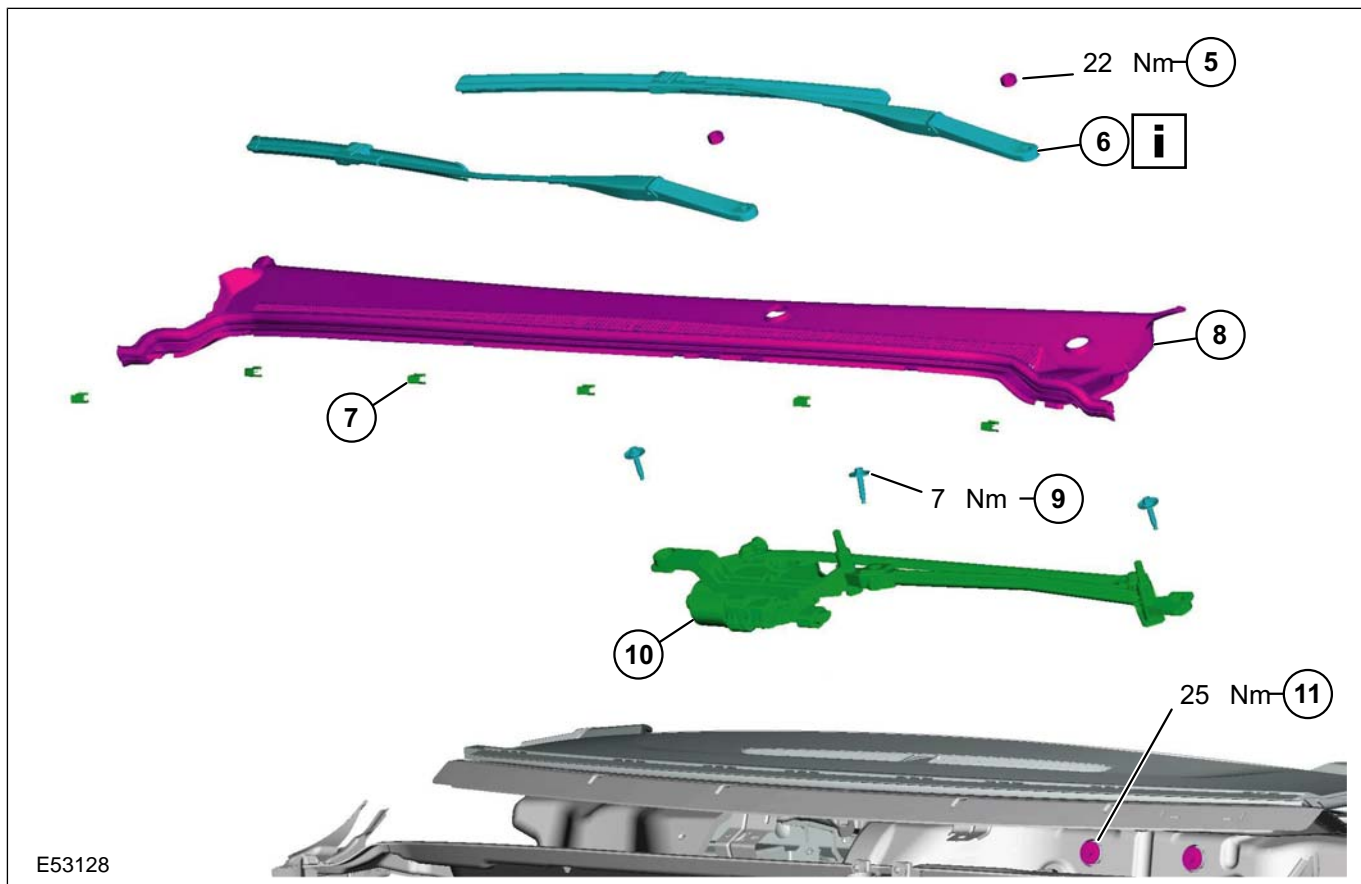
E52944

Item	Description
1	Door check strap bolt
2	Door hinge bolts See Removal Detail See Installation Detail

Item	Description
3	Front doors (driver's door shown) See Removal Detail
4	Dashboard crossmember side bolts See Removal Detail

REMOVAL AND INSTALLATION

⚠ CAUTION: Make sure that the windshield wiper motor is in the park position.

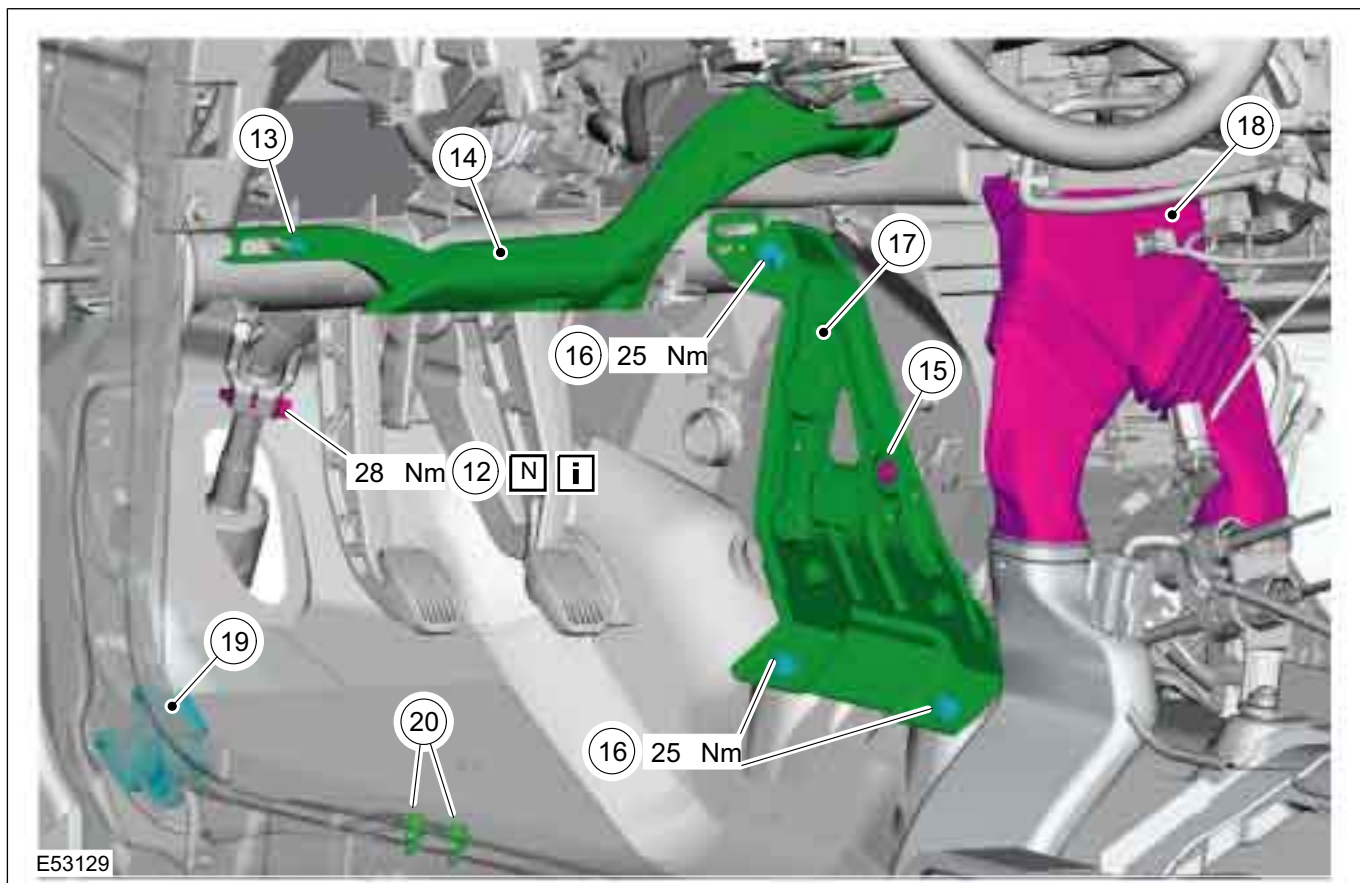


E53128

Item	Description
5	Windshield wiper arm nuts
6	Windshield wiper arms <i>See Installation Detail</i>
7	Clips, cowl panel grille
8	Cowl Panel Grille

Item	Description
9	Bolts for windshield wiper motor with linkage
10	Windshield wiper motor with linkage (secure to the side)
11	Steering column bracket upper bolts

REMOVAL AND INSTALLATION



Item	Description
12	Steering column shaft joint bolt See Installation Detail
13	Bolt, footwell air duct
14	Air duct, footwell
15	Bolt, heater core/evaporator housing

Item	Description
16	Bolts, bracket for reinforcing element
17	Bracket, reinforcing element
18	Rear footwell air duct
19	Connector - passenger compartment wiring harness
20	Ground cable bolts

REMOVAL AND INSTALLATION

▲ WARNING: Never perform work on the electric booster heater before the electric booster heater element has cooled to ambient temperature. Failure to observe this instruction can lead to injury.

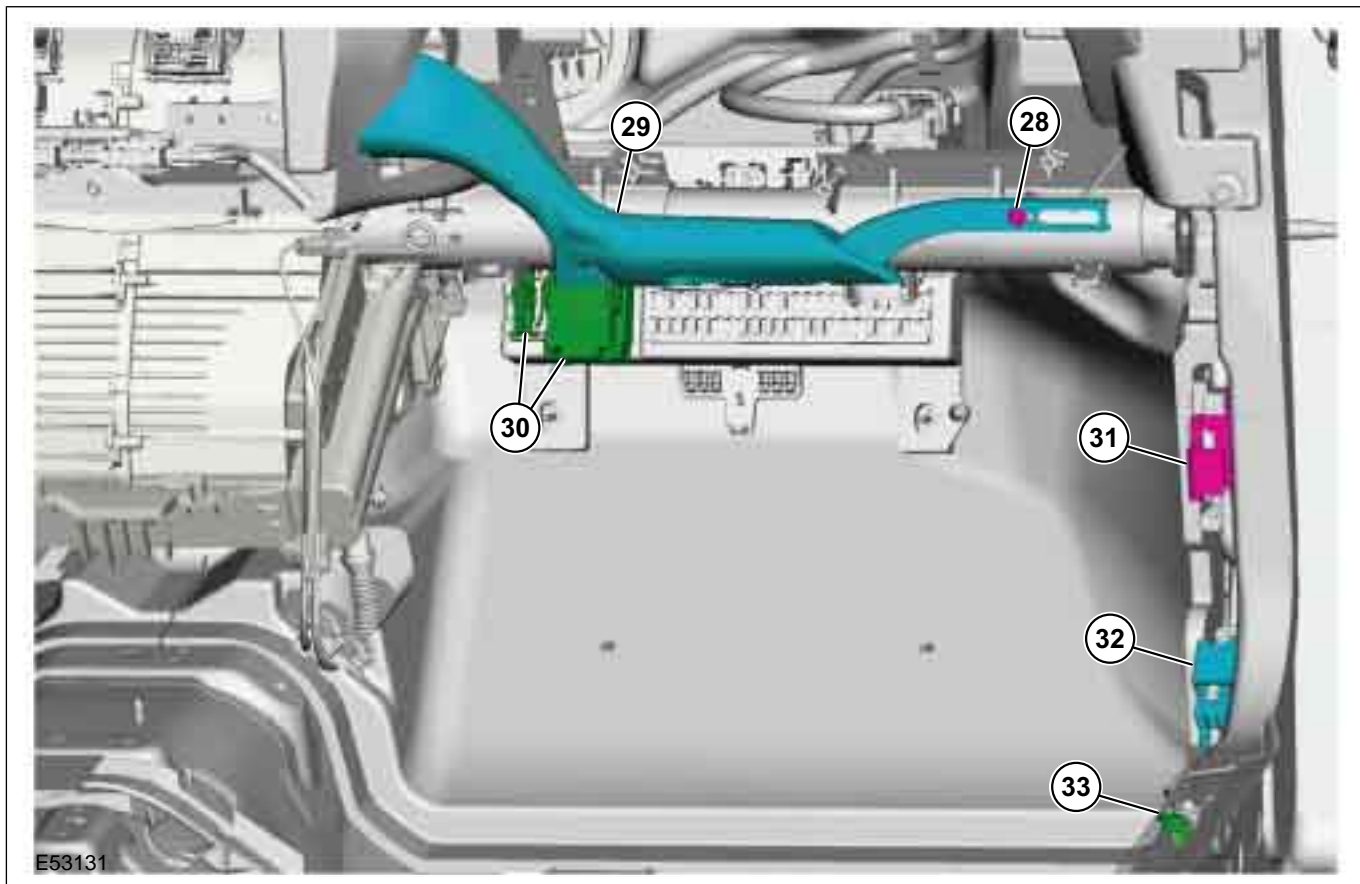


E53130

Item	Description
21	Bolt, heater core/evaporator housing
22	Retaining clips, instrument panel wiring harness
23	Ground cable bolt

Item	Description
24	Retaining clip, engine compartment wiring harness (if present)
25	Bolts, bracket for reinforcing element
26	Bracket, reinforcing element
27	Connector - electric booster heater (if equipped)

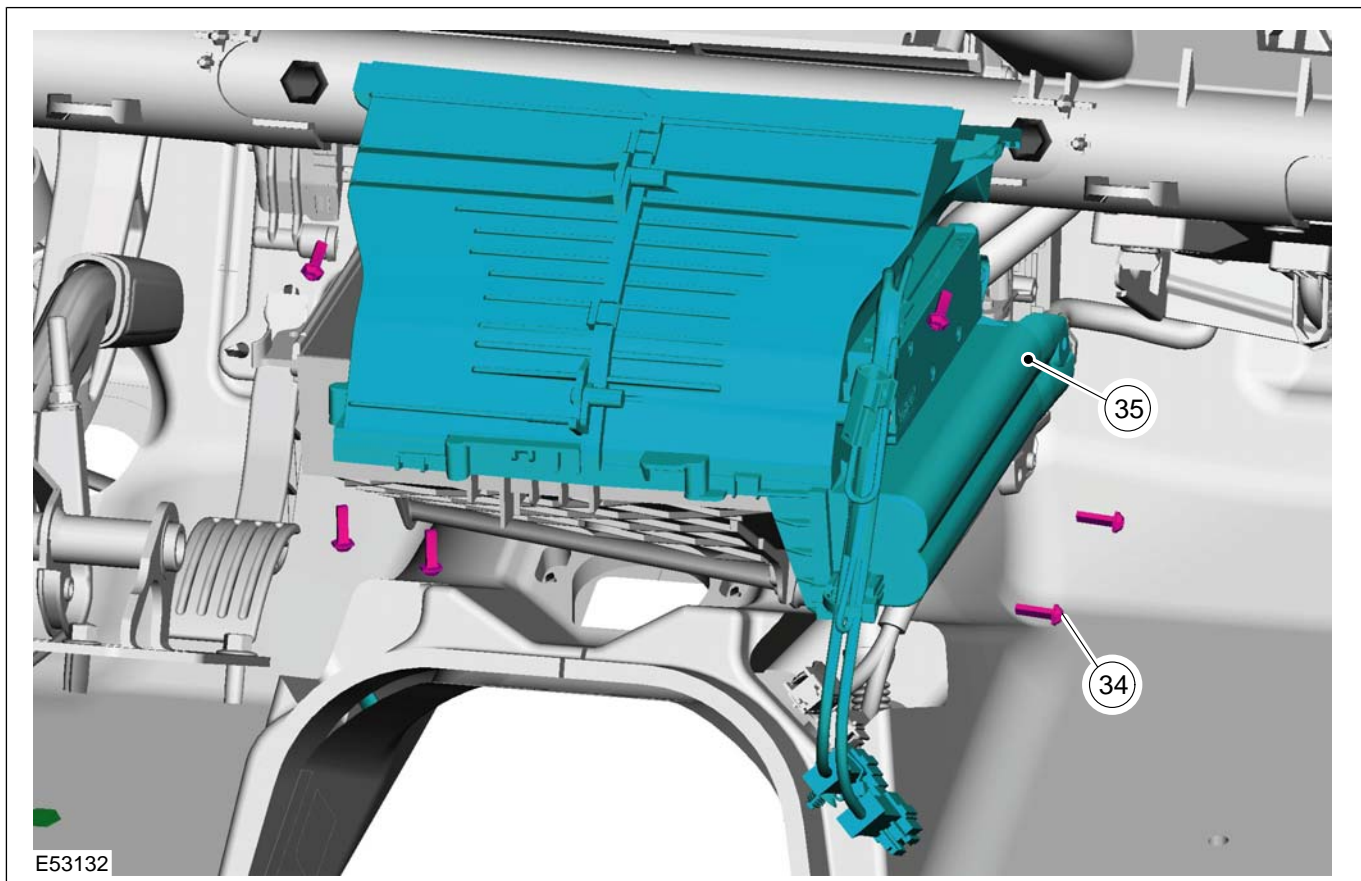
REMOVAL AND INSTALLATION



Item	Description
28	Bolt, footwell air duct
29	Air duct, footwell
30	Dashboard wiring harness connector

Item	Description
31	Connector - engine compartment wiring harness
32	Connector - passenger compartment wiring harness
33	Ground cable bolt

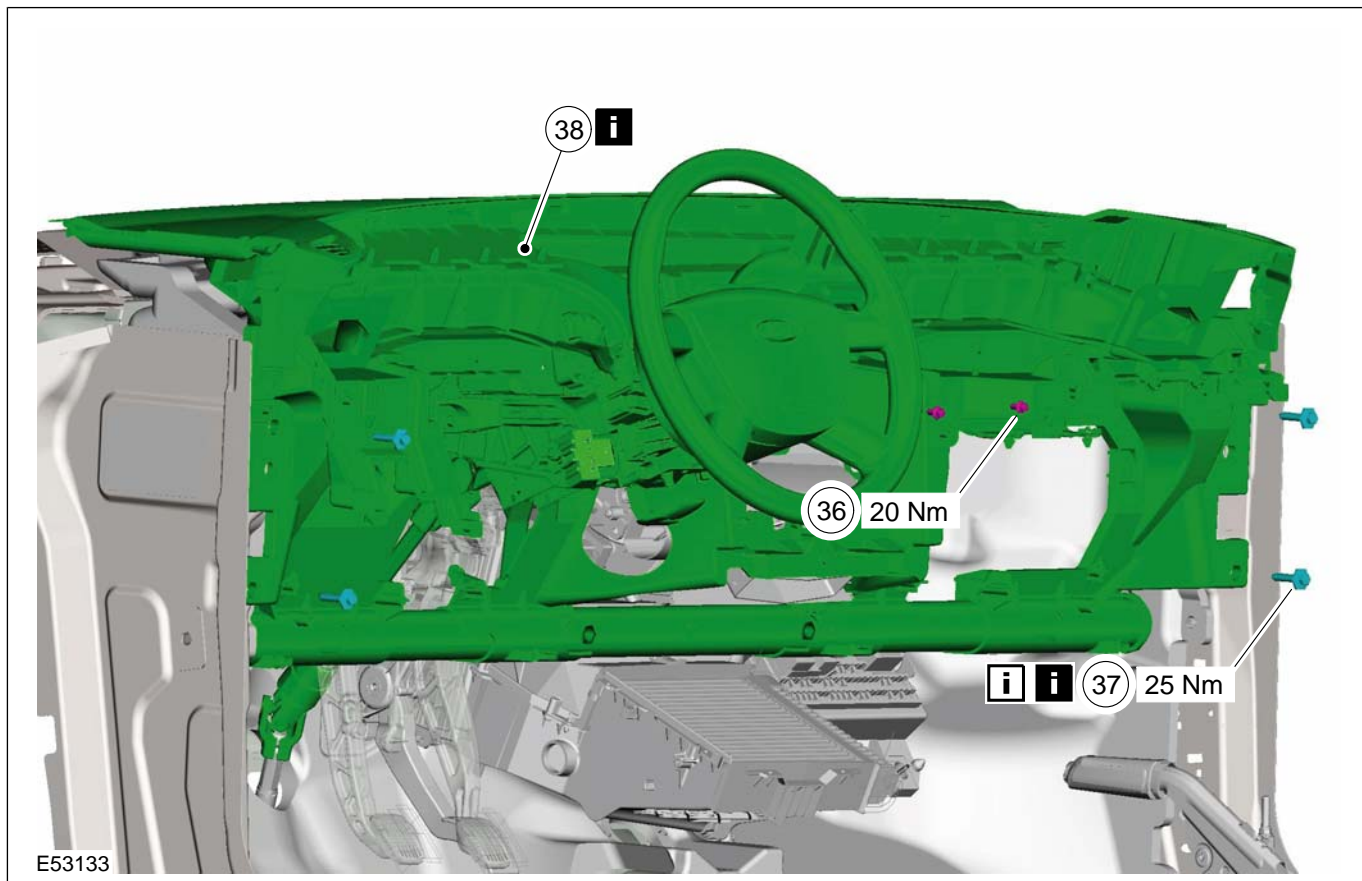
REMOVAL AND INSTALLATION



E53132

Item	Description
34	Heater core upper cover bolts
35	Heater core upper cover

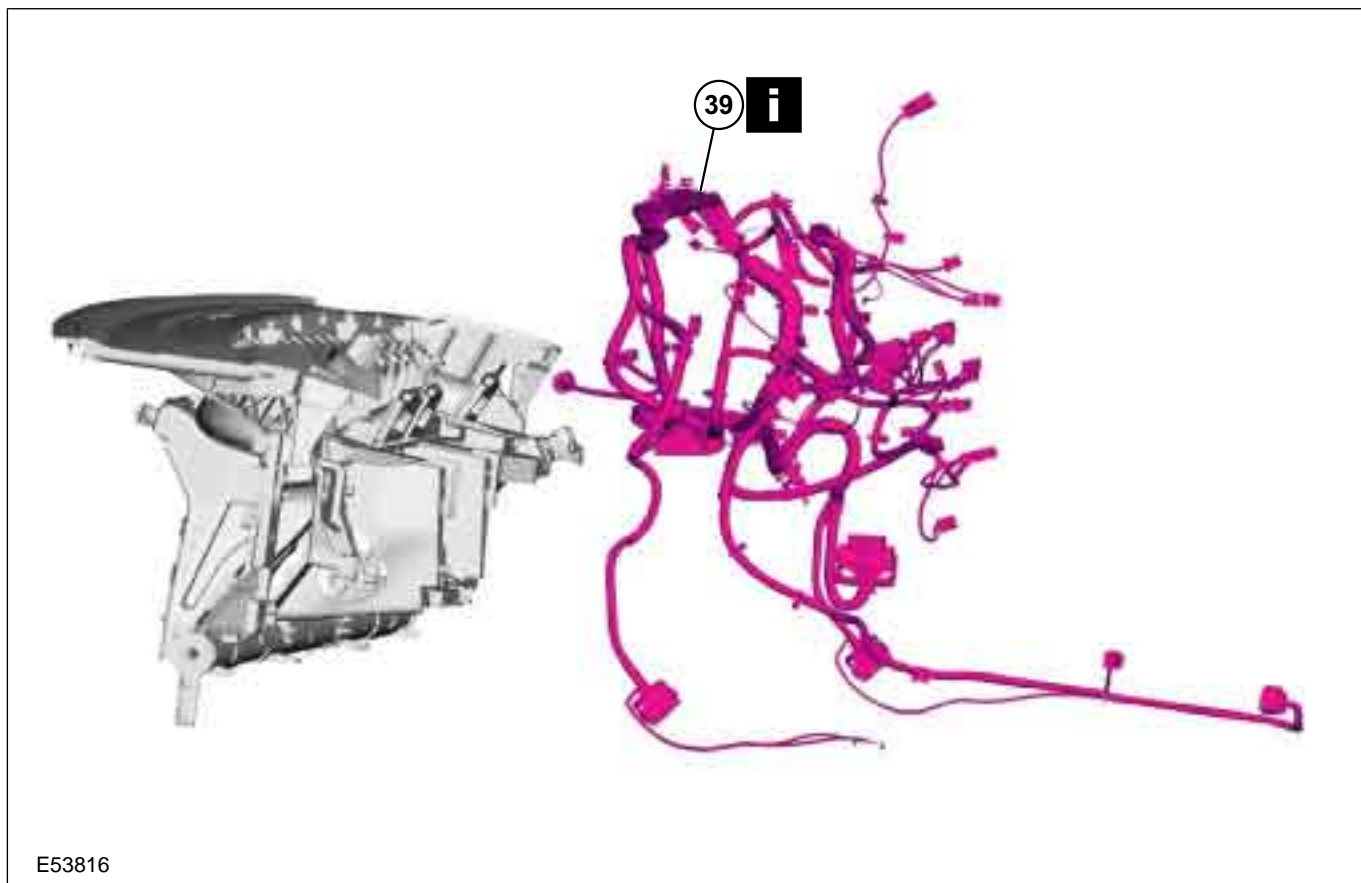
REMOVAL AND INSTALLATION



E53133

Item	Description
36	Dashboard crossmember inner bolts
37	Dashboard crossmember outer bolts See Removal Detail See Installation Detail
38	Dashboard crossmember See Removal Detail

REMOVAL AND INSTALLATION



E53816

Item	Description
39	Dashboard wiring harness See Removal Detail

7. To install, reverse the removal procedure.

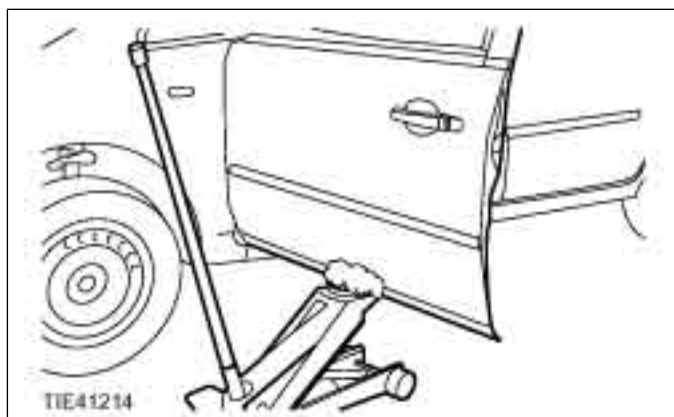
8. Check the angle of the windshield wiper arms in relation to the windshield.

For additional information, refer to: **Windshield Wiper Blade and Pivot Arm Adjustment** (501-16, General Procedures).

Removal Details

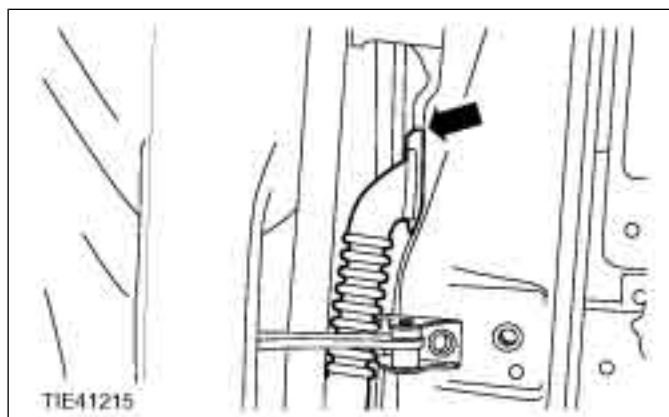
Item 2 Door hinge bolts

1. Support the door using a trolley jack with the aid of another technician.



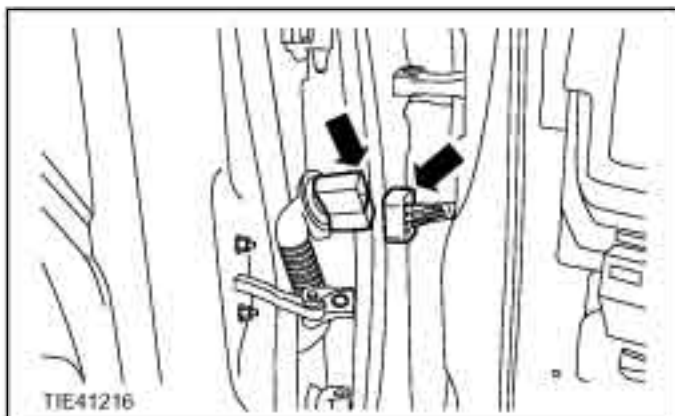
Item 3 Front doors (driver's door shown)

1. Detach the front door wiring harness connector from the A-pillar.

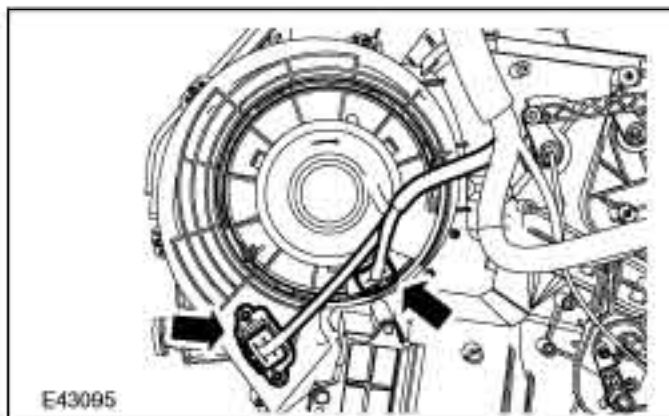


REMOVAL AND INSTALLATION

2. Detach the front door wiring harness connector.



3. Detach the blower resistor connector (if fitted) and the blower motor connector.



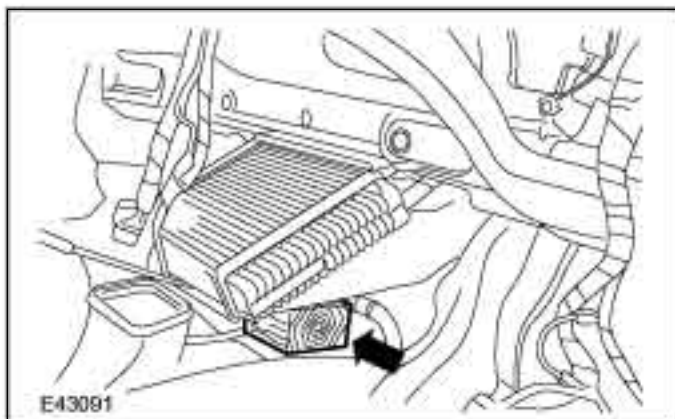
Item 4 Dashboard crossmember side bolts

1. **CAUTION:** Do not remove the dashboard crossmember side bolts.

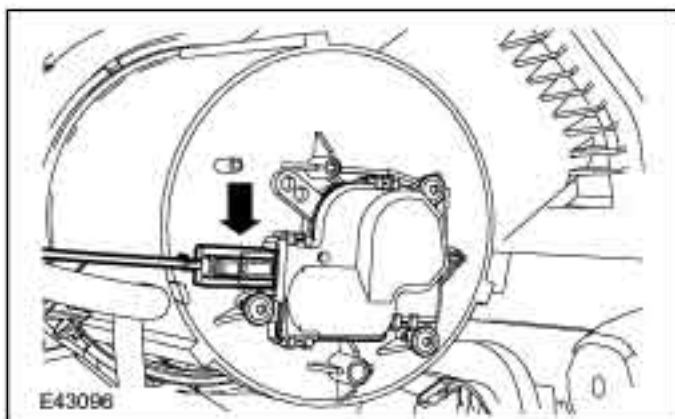
Loosen the dashboard crossmember right and left-hand side bolts.

Item 37 Dashboard crossmember outer bolts

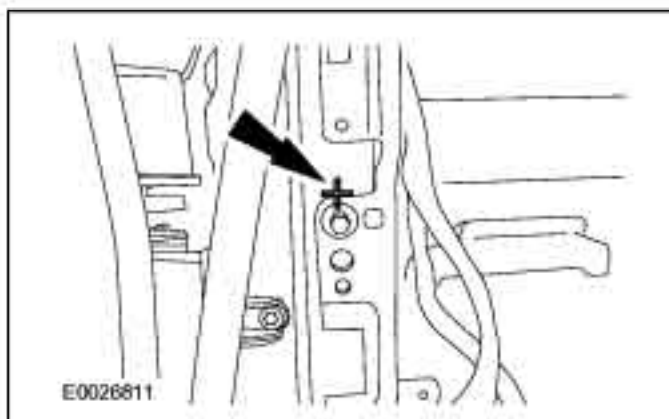
1. Support the heater housing with a wooden block.



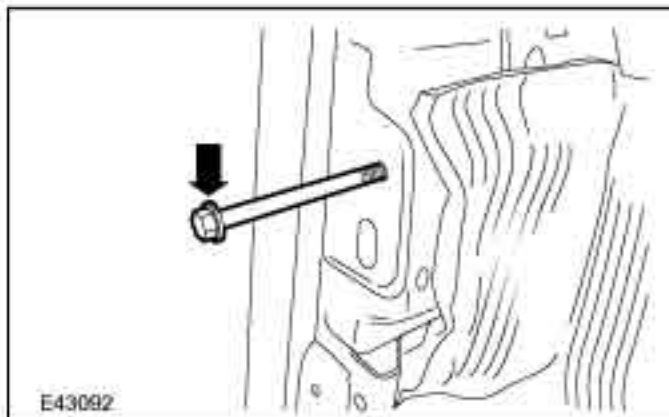
2. Detach the air recirculation flap actuator connector.



4. Mark the position of the dashboard crossmember relative to the A-pillars (left-hand side shown).



5. Screw the M10 x 120 mm guide bolts into the right and left-hand A-pillars (shown without the dashboard crossmember for clarity).



6. Remove the right and left-hand side bolts of the dashboard crossmember.

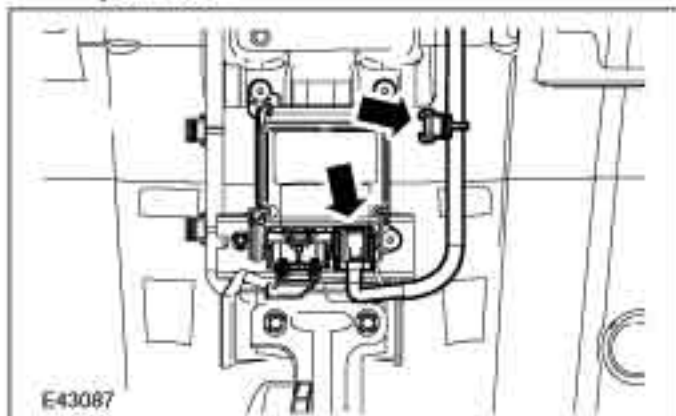
REMOVAL AND INSTALLATION

7. Pull the dashboard crossmember forwards until it reaches the stop.

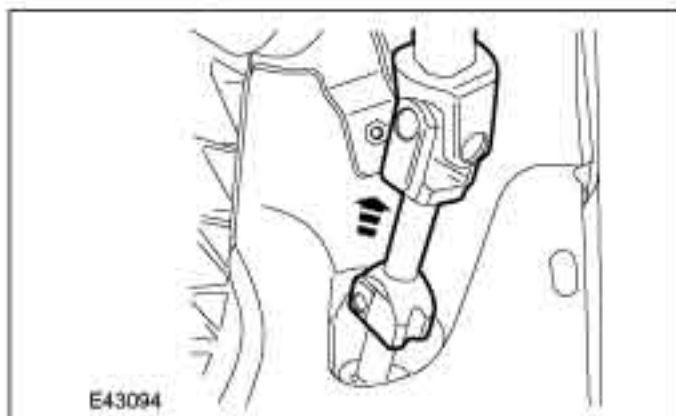


Item 38 Dashboard crossmember

1. Disconnect the connector from the airbag module.
- Unclip the centre console wiring harness and pull it out.

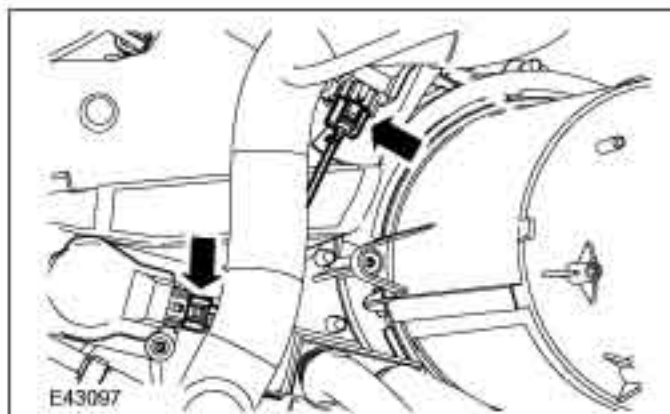


2. Detach the steering column shaft joint from the steering column shaft.



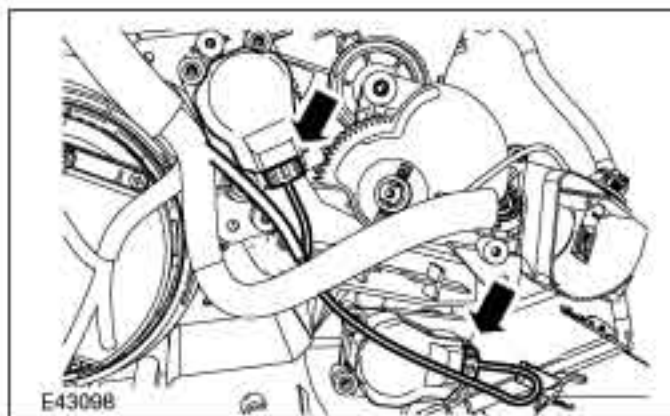
3. NOTE: Vehicles with EATC only

- Detach the right-hand temperature flap actuator connector and the defrost flap actuator connector.



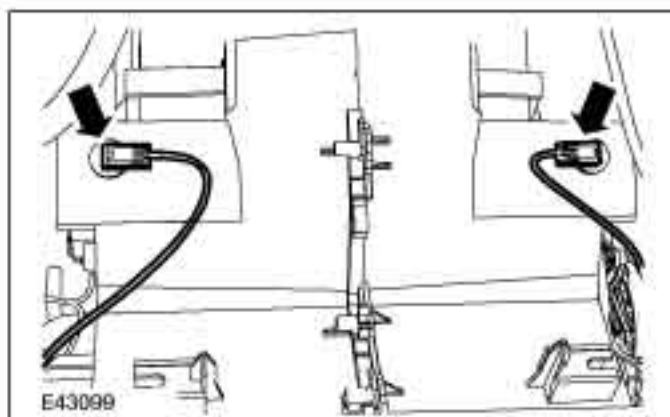
4. NOTE: Vehicles with EATC only

- Detach the left-hand temperature flap actuator connector and the air distribution flap actuator connector.



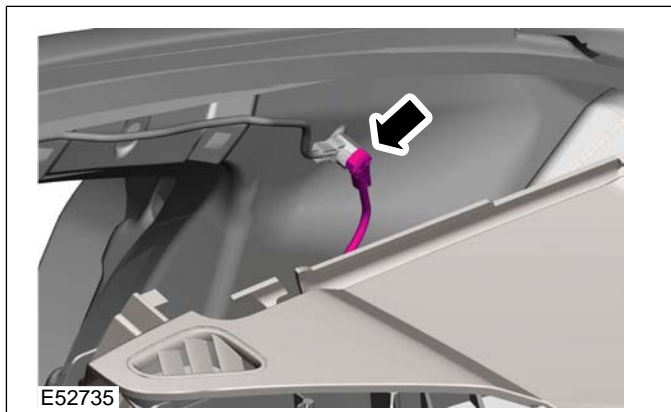
5. NOTE: Vehicles with EATC only

- Detach the air outlet temperature sensor connector.

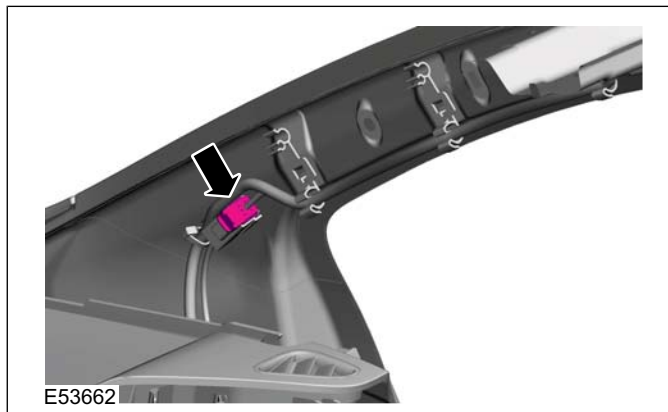


REMOVAL AND INSTALLATION

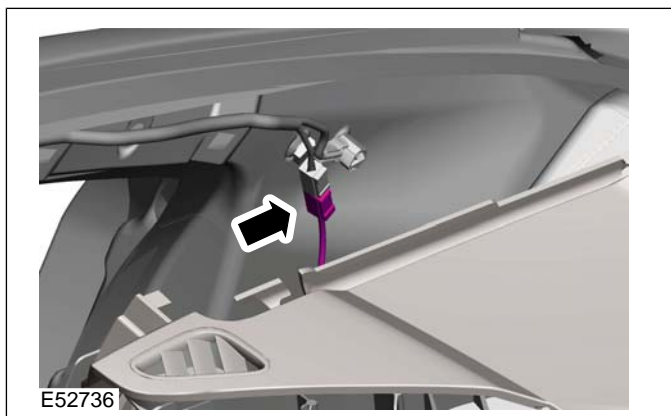
6. Separate the radio antenna cable push-fit connector.



8. Detach the overhead console wiring harness connector.



7. Separate the car telephone antenna cable push-fit connector (if equipped).

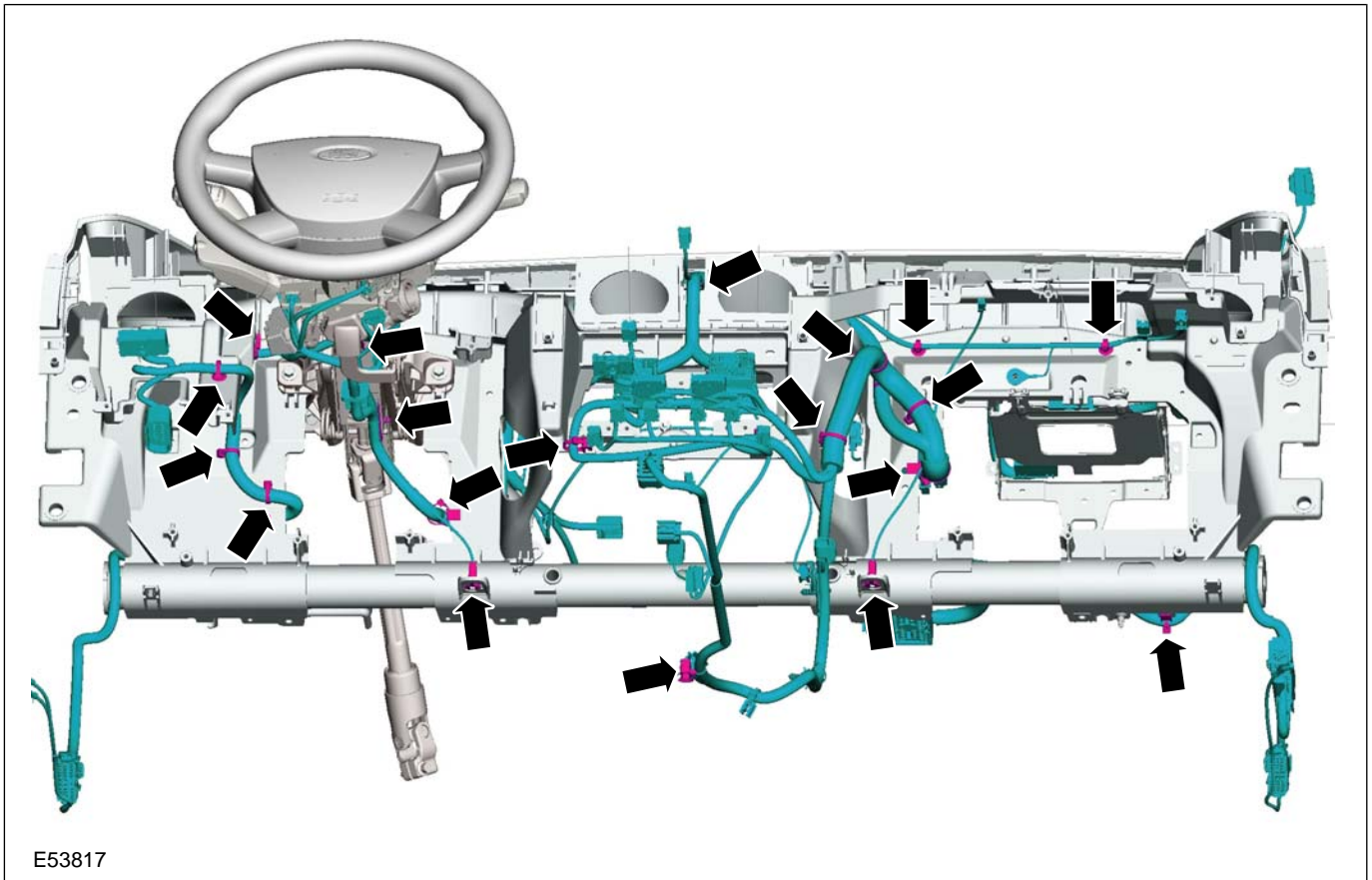


9. Remove the right and left-hand M10 x 120 mm guide bolts.

Item 39 Dashboard wiring harness

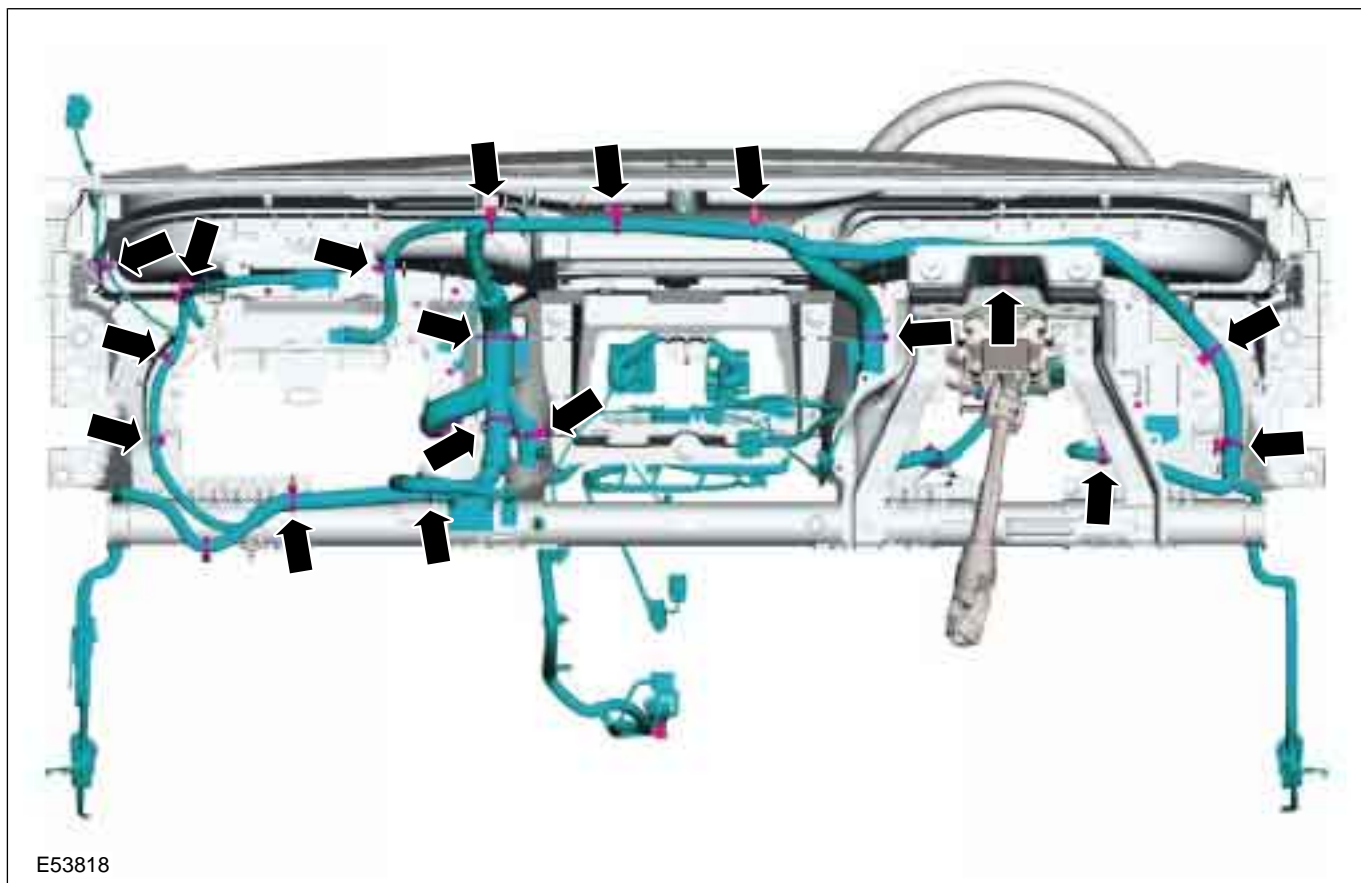
1. Detach the wiring harness from the front side of the dashboard crossmember.

REMOVAL AND INSTALLATION



2. Detach the wiring harness from the rear side of the dashboard crossmember.

REMOVAL AND INSTALLATION

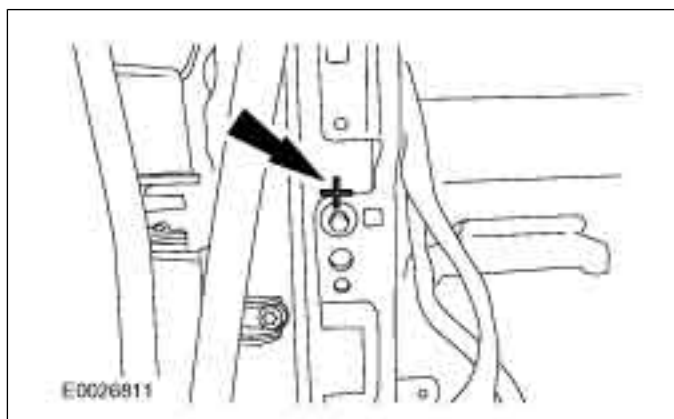


E53818

Installation Details

Item 37 Dashboard crossmember outer bolts

1. Align the dashboard crossmember to the A-pillars (left-hand side shown).



E0026911

Item 6 Windshield wiper arms

- ⚠ CAUTION:** Move the windshield wiper motor to the parked position before installing the wiper arms.

Item 2 Door hinge bolts

1. Apply thread locking compound to the door hinge bolts.

Item 12 Steering column shaft joint bolt

- ⚠ WARNING:** Install a new steering column shaft joint bolt. Failure to follow this instruction may result in personal injury.

SECTION 419-01A Anti-Theft - Active

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS	
Specifications.....	419-01A-2
DIAGNOSIS AND TESTING	
Anti-Theft - Active.....	419-01A-3
Inspection and Verification.....	419-01A-3
REMOVAL AND INSTALLATION	
Anti-Theft Alarm Horn with Integral Battery.....	419-01A-4

SPECIFICATIONS**Torque Specifications**

Item	Nm	lb-ft	lb-in
Anti-theft alarm horn retaining bolt	23	17	-
Anti-theft alarm horn with integral battery retaining bracket nut	6	-	53

DIAGNOSIS AND TESTING**Anti-Theft - Active**

Refer to Wiring Diagrams Section 419-01A, for schematic and connector information.

General Equipment

The Ford approved diagnostic tool

Inspection and Verification

1. Verify the customer concern, perform a full alarm function test
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

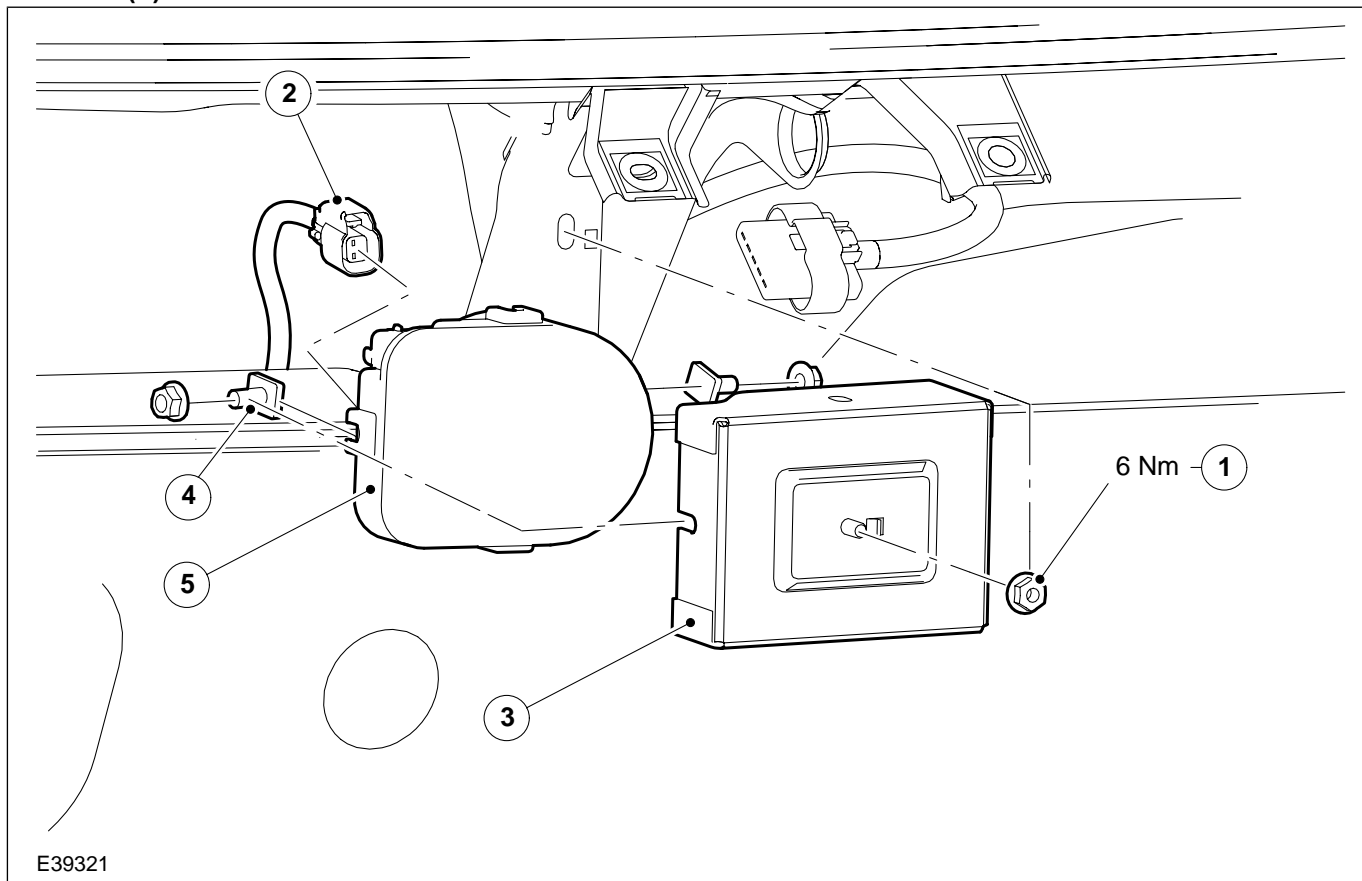
Mechanical	Electrical
– Misaligned door(s), hood or tailgate	– Fuse(s)
– Door ajar switch(es)	– Wiring harness
– Latch(es)	– Electrical connector(s)
– Cable(s)	– Relay(s)
– Lock cylinder(s)	– Generic electronic module (GEM)
– Set/reset switch(s)	– Anti-theft alarm horn
– Linkage(s)	– Anti-theft alarm horn with integral battery (if equipped)
– Remote key	
– Passive key	
– Interior scanning system	
– Interior scanning system disable button (if equipped)	

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Ford approved diagnostic tool to diagnose the system.

REMOVAL AND INSTALLATION

Anti-Theft Alarm Horn with Integral Battery

1. Remove the components in the order indicated in the following illustration(s) and table(s).



E39321

Item	Description
1	Anti-theft alarm horn with integral battery retaining bracket nut
2	Anti-theft alarm horn with integral battery electrical connector
3	Anti-theft alarm horn with integral battery retaining bracket
4	Anti-theft alarm horn with integral battery retaining stud
5	Anti-theft alarm horn with integral battery

2. To install, reverse the removal procedure.

SECTION 419-01B Anti-Theft - Passive

VEHICLE APPLICATION: 2008.75 Focus ST C307

CONTENTS	PAGE
DESCRIPTION AND OPERATION	
Anti-Theft - Passive.....	419-01B-2
passive anti-theft system (PATS).....	419-01B-2
Flash codes.....	419-01B-2
Anti-theft alarm system.....	419-01B-3
DIAGNOSIS AND TESTING	
Anti-Theft - Passive.....	419-01B-5
Inspection and Verification.....	419-01B-5
GENERAL PROCEDURES	
Key Programming Using Diagnostic Equipment..... (33 005 0)	419-01B-8
Erasing All Key Codes Using Diagnostic Equipment.....	419-01B-9
Anti-Theft Security Access..... (33 004 0)	419-01B-10
REMOVAL AND INSTALLATION	
Passive Anti-Theft System (PATS) Transceiver.....	419-01B-11

DESCRIPTION AND OPERATION**Anti-Theft - Passive****passive anti-theft system (PATS)**

The system is passive and self-priming; the driver does not need to actively do anything to protect his/her vehicle. The system is activated automatically 5 seconds after the ignition is switched off; system readiness is indicated by the PATS LED flashing every 2 seconds.

If a valid key is inserted into the ignition and turned to position "II", the system switches on the PATS LED first while the code is being read from the transponder.

If a valid code is received, the PATS LED is switched off. The engine can now be started.

If an invalid key is inserted into the ignition and turned to position "II", the system switches on the PATS LED while the code is being read from the transponder.

If the code received does not agree with any of the codes programmed into the vehicle, or if errors occur in the system, the engine cannot be started. The PATS LED will flash for one minute at a frequency of 4 Hz or will light up for one minute. Then it will flash an error code.

The system error code is a two-digit code which can be read by counting the flash signals. Each of the two numbers is output with a one second pause between them; after the second number has been output, there will be a pause of three seconds, then the error code is repeated.

Flash codes

Flash code	Meaning
11	Transceiver not connected or has no power
12	Transceiver fault
13	No key/no PATS key has been used to turn the ignition switch.
14	Incomplete key code received
15	Invalid key code received
16	CAN communications error
21	Not enough keys programmed (minimum of 2 keys)
22	Non-volatile memory configuration error (initialisation or end of line configuration missing)
23	Codes from the instrument cluster and powertrain control module (PCM) do not agree

The vehicle comes from the factory with two programmed keys; a maximum of eight keys can be programmed into the vehicle at any one time.

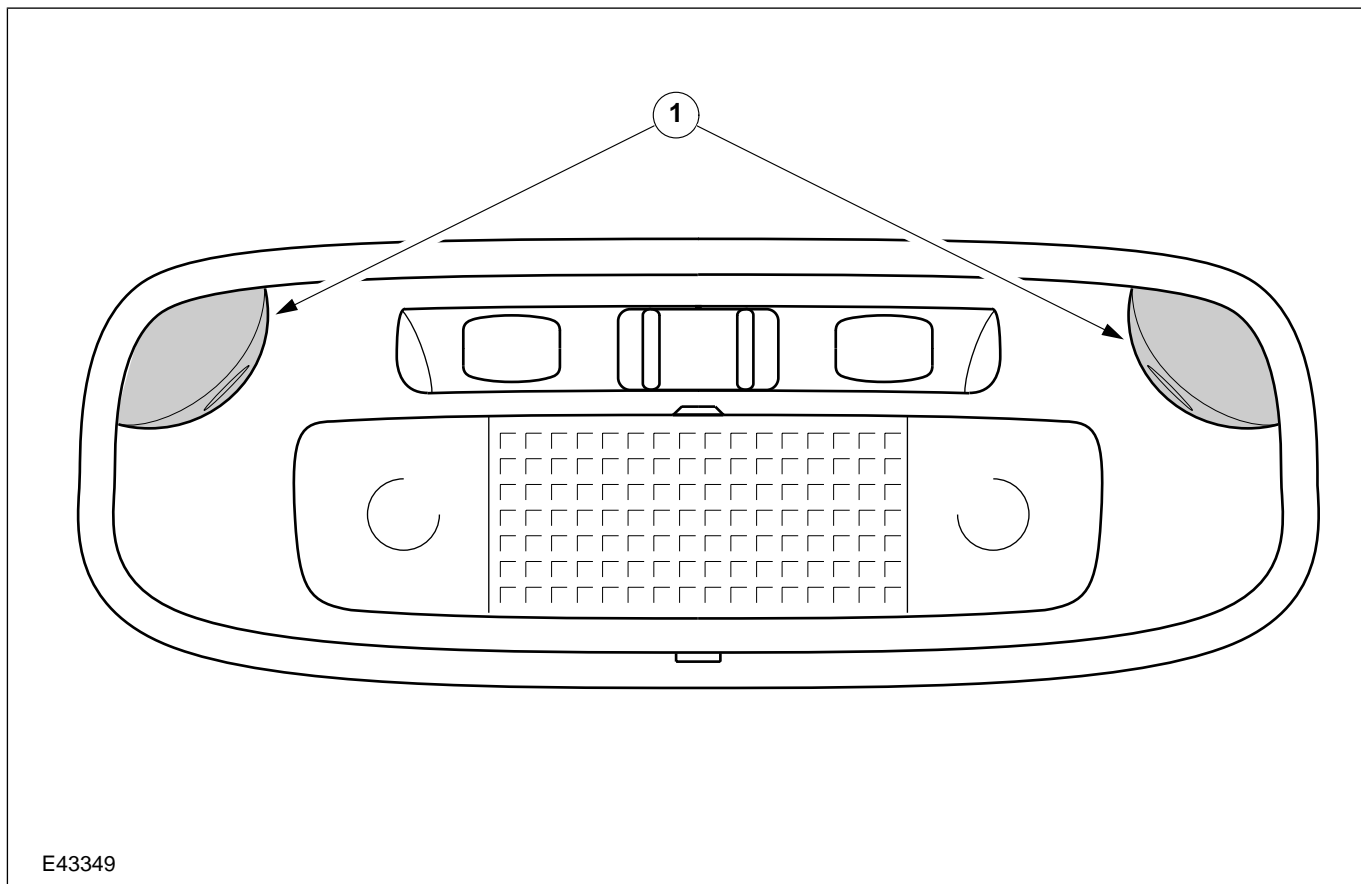
System functions are programmed as part of PCM programming. However, the instrument cluster is also a coded component which reads and programs the keys and compares them with the PCM .

Before the engine can be started, three codes must be compared with each other: the key's code, the instrument cluster code and the PCM code.

Additional keys can be programmed by the dealer using WDS.

DESCRIPTION AND OPERATION

Anti-theft alarm system



E43349

Item	Description
1	Interior monitoring sensors

Anti-theft alarm system sensors

Depending on the market and the model variant, there are three anti-theft alarm systems available:

- The system with perimeter monitoring detects if the doors, bonnet and tailgate are being opened and monitors the audio system and the ignition switch.
- The system with perimeter and interior monitoring in addition detects unauthorised access, for example, through a broken window.
- A Thatcham category I anti-theft alarm system (mainly for the British market) is fitted with a horn that has its own battery power supply; it also uses slightly different detection strategies.

The anti-theft alarm system outputs a visual and acoustic warning if unauthorised persons attempt to gain access to the vehicle, remove the radio or turn the ignition switch to positions "II" or "III" without a valid PATS key.

As a visual warning, the system switches on the hazard warning lights, whilst the acoustic warning is done with the anti-theft alarm system horn or the horn with its own battery power supply.

Once the ignition switch is in position "0", the anti-theft alarm system is activated 20 seconds after the vehicle is locked centrally or double-locked.

After a delay of 20 seconds, the bonnet, tailgate and all the doors are alarmed, provided that they are fully closed.

If the bonnet, tailgate or one of the doors is not fully closed, it can be opened without triggering the alarm.

The anti-theft alarm system can be switched off by centrally unlocking the vehicle either with the remote controls or by turning the key in one of the door locks.

NOTE: To switch off the alarm on a Thatcham category I anti-theft alarm system, the ignition switch must be turned to position "II" with a valid PATS key within 12 seconds of the door being unlocked.

DESCRIPTION AND OPERATION

If the tailgate is opened manually with a key or via the remote control, the anti-theft alarm system blocks the trigger for the alarm system or the interior monitoring (if fitted) until 20 seconds after it has been closed.

The interior monitoring facility is primed 20 seconds after the vehicle has been double-locked, if the bonnet, tailgate and all the doors remain closed. For optimum system operation, all the windows and the sliding roof must be fully closed.

NOTE: If a window or the sliding roof is not fully closed, there is a risk that a false alarm will be triggered.

The interior monitoring facility is an additional security system which triggers the alarm if unauthorised access to the vehicle is detected.

DIAGNOSIS AND TESTING

Anti-Theft - Passive

Refer to Wiring Diagrams Section 419-01B, for schematic and connector information.

General Equipment

Worldwide Diagnostic System (WDS) (418-F224)

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> - Ignition lock cylinder - Passive anti-theft system (PATS) ignition key - Use of a non-encoded PATS ignition key - More than one PATS key in close proximity of the PATS transceiver - Central junction box (CJB) - Powertrain control module (PCM) - Instrument cluster 	<ul style="list-style-type: none"> - Fuse(s) - Wiring harness - Electrical connector(s) - Relay(s) - CJB - PCM - PATS transceiver - Ignition switch - Instrument cluster

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, refer to the Diagnostic Trouble Code (DTC) Index.

Diagnostic Trouble Code (DTC) Index

DTC	Indicator Flash Code	Description/Condition	Possible Source	Action
0000	-	No DTC's, vehicle OK		
B1681	11	PATS transceiver signal is not received	PATS transceiver wiring transceiver connector, transceiver, CJB, PCM or instrument cluster	REFER to WDS.
B1232 B2103	12	PATS transceiver antenna coil fault, vehicle does not start	PATS transceiver	Install a new PATS transceiver. REFER to Passive Anti-Theft System (PATS) Transceiver - in this section.

DIAGNOSIS AND TESTING

DTC	Indicator Flash Code	Description/Condition	Possible Source	Action
B1600	13	Non-PATS key or damaged encoded ignition key, or no key code received, vehicle does not start	PATS encoded ignition key	REFER to WDS. PATS test. Follow the instructions.
B2431	13	PATS transponder programming failed crypto transponder only, vehicle does not start	Ignition key	REFER to WDS. PATS test. Follow the instructions.
B1602	14	Partial key read of PATS key, vehicle does not start	PATS encoded ignition key, transceiver	REFER to WDS. PATS test. Follow the instructions.
B1601	15	Incorrect key code, Unprogrammed PATS key (keycode format OK), vehicle does not start (20 second anti-scan invoked)	PATS encoded ignition key	REFER to WDS. PATS test. Follow the instructions.
U1147	16	Incorrect key being used, vehicle does not start	Ignition key	Use correct ignition key. REFER to WDS. PATS test. Follow the instructions.
U2510	16	CAN communication link between the PCM and instrument cluster, vehicle does not start	Circuit, PCM or instrument cluster	REFER to WDS. PATS test. Follow the instructions.
B1213	21	Number of programmed PATS encoded keys below minimum, vehicle does not start	Incorrect number of keys programmed or PATS encoded ignition key	REFER to WDS. PATS test. Follow the instructions.
B2141	22	NVM Configuration failure. No security ID exchange between PCM and instrument cluster, vehicle does not start	PCM or instrument cluster	REFER to WDS. PATS test. Follow the instructions. If the concern persists. INSTALL a new PATS system.

DIAGNOSIS AND TESTING

DTC	Indicator Flash Code	Description/Condition	Possible Source	Action
B2139	23	Data mismatch (received data does not match what was expected). Security messages do not match between PCM and instrument cluster, vehicle does not start	PCM or instrument cluster	REFER to WDS. PATS test. Follow the instructions. If the concern persists. INSTALL a new PCM. REFER to Section 303-14A [Electronic Engine Controls] / 303-14B [Electronic Engine Controls -- 2.5L Duratec-ST (VI5)] .
P1260	-	PCM disabled	PCM or instrument cluster	REFER to WDS. PATS test. Follow the instructions.

- If the cause is not visually evident, verify the symptom and refer to WDS to diagnose the system.

GENERAL PROCEDURES**Key Programming Using Diagnostic Equipment(33 005 0)****General Equipment**

Worldwide Diagnostic System (WDS) (418-F224)

NOTE: This procedure is used when a customer needs keys programmed into the system or after keys have been erased using diagnostic equipment.

NOTE: During this procedure it will be necessary to utilize the Anti-Theft System (PATS) Security Access Procedure. PATS security access must be granted to erase or program ignition keys. The anti-theft security access procedure requires access to the GSEVIN database in order to obtain the coded security access.

NOTE: This procedure will not erase programmed ignition keys from the passive anti-theft alarm system (PATS) memory.

NOTE: A maximum of eight ignition keys can be programmed to a passive anti-theft system (PATS) equipped vehicle.

- 1. Insert an ignition key into the ignition lock cylinder and turn the ignition key from the 0 position to the II position.**
- 2. From the diagnostic tool menu Select: Body/Security/PATS Functions. Follow the instructions on the screen.**
- 3. From the diagnostic tool menu Select: Ignition Key Programming. Follow the instructions on the screen.**

GENERAL PROCEDURES**Erasing All Key Codes Using Diagnostic Equipment****General Equipment**

Worldwide Diagnostic System (WDS) (418-F224)

NOTE: This procedure is used when a customer needs ignition keys programmed into the system. This procedure is also useful when programmed ignition key(s) have been lost or when the ignition lock cylinder has been replaced or when it is necessary to erase a key(s) from the passive anti-theft alarm system (PATS) memory.

NOTE: During this procedure it will be necessary to utilize the Anti-Theft System (PATS) Security Access Procedure. PATS security access must be granted to erase or program ignition keys. The anti-theft security access procedure requires access to the GSEVIN database in order to obtain the coded security access.

NOTE: This procedure will erase all programmed ignition keys from the passive anti-theft alarm system (PATS) memory and the engine will not start until two keys have been reprogrammed to the system.

For additional information, refer to Key [Programming Using Diagnostic Equipment](#) - in this section.

NOTE: Two PATS encoded keys with the correct mechanical cut must be available to carry out this procedure. One or both of them may be the original keys.

NOTE: If the remaining keys are with the customer and are not available with the vehicle, instruct the customer that the remaining keys are no longer valid to start the vehicle. If the customer wants to have these keys to be valid for the vehicle, the keys must be programmed using WDS.

For additional information, refer to Key [Programming Using Diagnostic Equipment](#) - in this section.

1. Turn the ignition lock cylinder from the 0 position to the II position.
2. From the diagnostic tool menu Select: **Body/Security/PATS Functions** from the menu. Follow the instructions on the screen.
3. From the diagnostic tool menu Select: **Ignition Key Erase**. Follow the instructions on the screen.
4. From the diagnostic tool menu Select: **Ignition Key Programming**. Follow the instructions on the screen.

GENERAL PROCEDURES**Anti-Theft Security Access(33 004 0)****General Equipment**

Worldwide Diagnostic System (WDS) (418-F224)

NOTE: Anti-Theft System (PATS) security access must be granted to erase or program ignition keys. The anti-theft security access procedure requires access to the GSEVIN database in order to obtain the coded security access.

NOTE: When installing a new instrument cluster, the following sequence must be completed:

- 1. Ignition Key Programming.
- 2. Module Initialization.

NOTE: When installing a new powertrain control module (PCM) the following must be completed:

- 1. Module Initialization.

1. Insert an ignition key into the ignition lock cylinder and turn the ignition key from the 0 position to the II position.
2. From the diagnostic tool menu Select: Body/Security/PATS Functions. Follow the instructions on the screen.

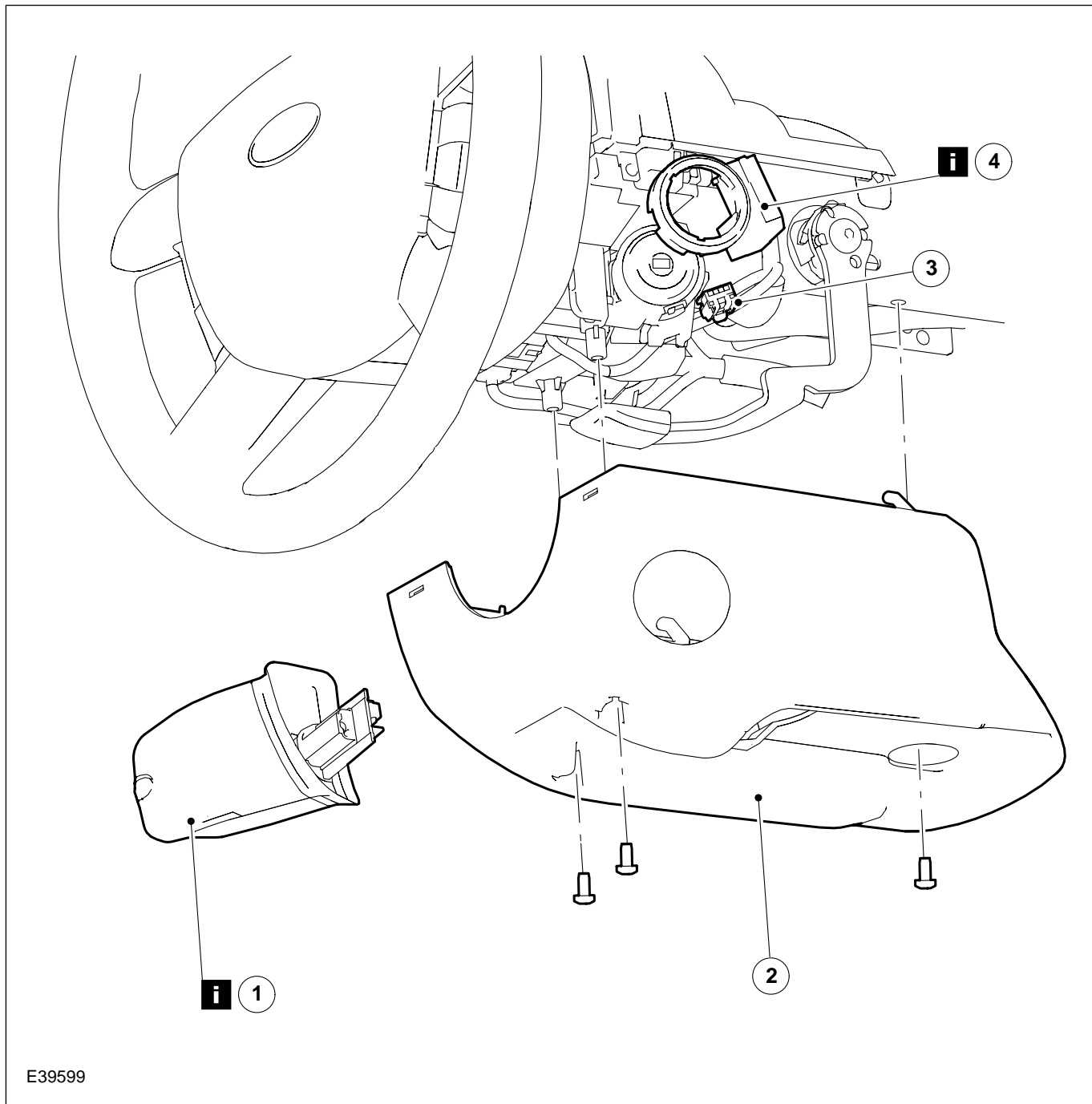
REMOVAL AND INSTALLATION

Passive Anti-Theft System (PATS) Transceiver

General Equipment

Screwdriver

1. Remove the components in the order indicated in the following illustration(s) and table(s).



E39599

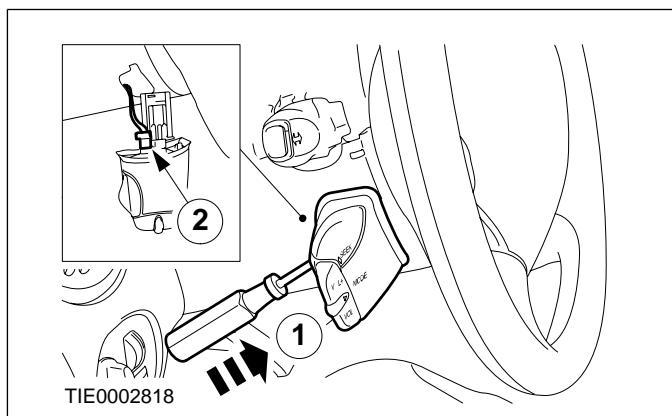
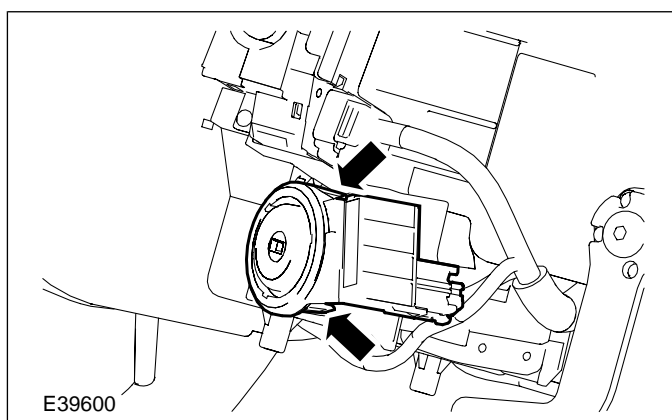
Item	Description
1	Audio control switch See Removal Detail
2	Steering column lower shroud

Item	Description
3	PATS transceiver electrical connector
4	PATS transceiver See Removal Detail

2. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION**Removal Details****Item 1 Audio control switch****1. Remove the audio control switch.**

1. Using a thin bladed screwdriver, release the locking tang.
2. Disconnect the audio control switch electrical connector.

**Item 4 PATS transceiver****1. Release the locking tangs and remove the PATS transceiver.**



SECTION 419-08 Cellular Phone

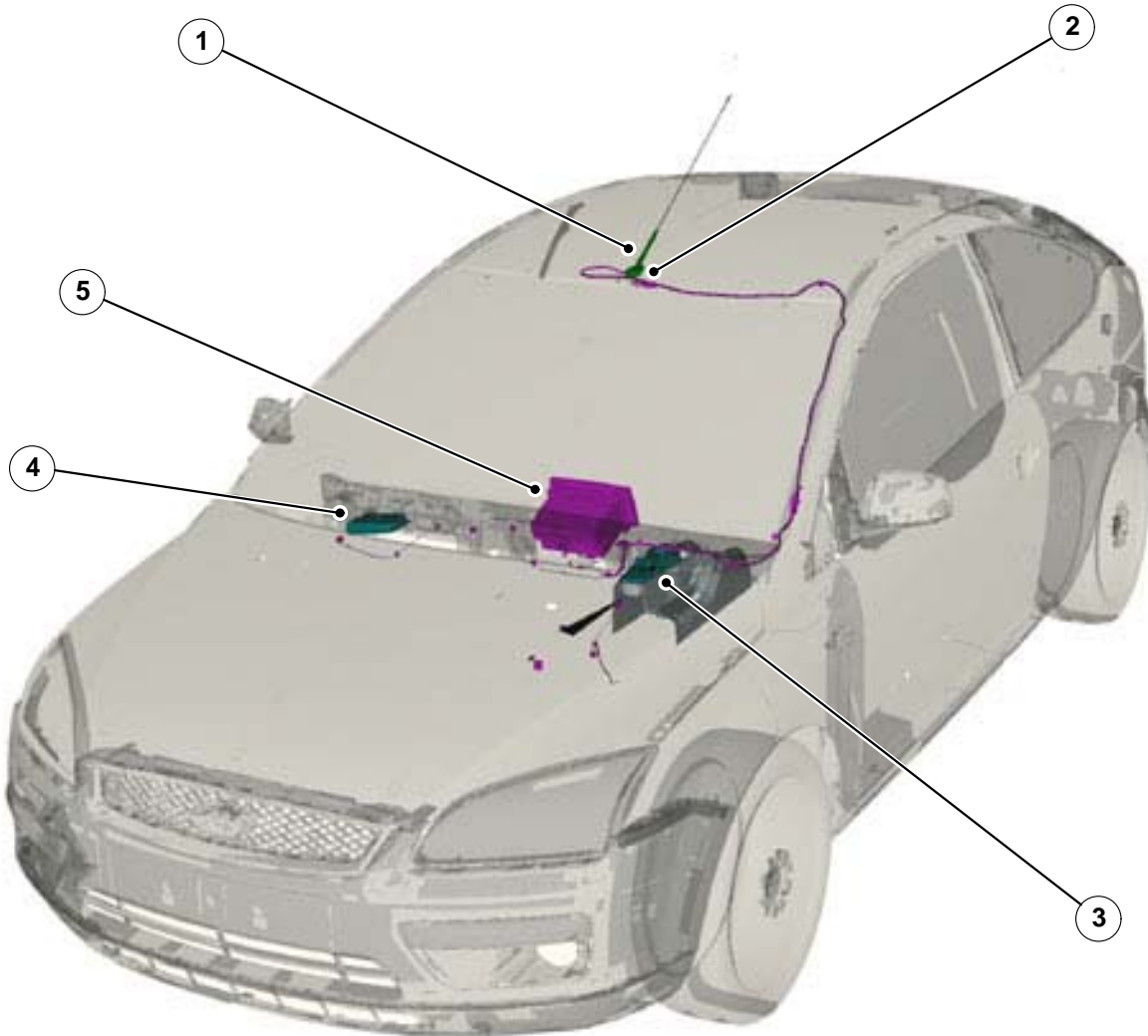
VEHICLE APPLICATION: 2008.75 Focus ST C307

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REMOVAL AND INSTALLATION	
Microphone.....	419-08-4
Portable Support Electronics (PSE) Module.....	419-08-5
Handset Holder.....	419-08-8



DESCRIPTION AND OPERATION

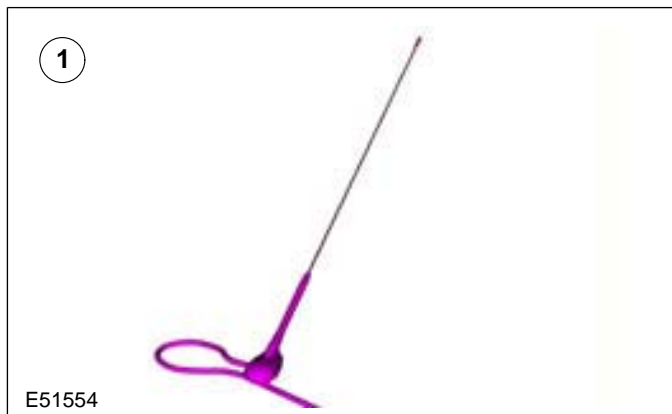
Cellular Phone



E51368

Item	Description
1	Cellular phone antenna
2	Microphone
3	Handset holder
4	Portable support electronics (PSE) module
5	Audio unit

DESCRIPTION AND OPERATION

**Cellular Phone Antenna**

The audio unit and cellular phone share the same antenna. The antenna mast can be unscrewed from the base unit which is held in place with a retaining screw.

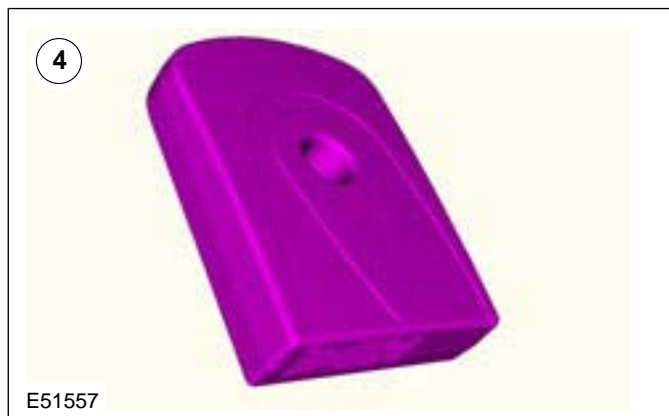
**Microphone**

The microphone is located in the overhead console and is secured by locking tangs.

For additional information, refer to: Overhead Console ([501-12 Instrument Panel and Console, Removal and Installation](#)).

**Handset Holder**

The cellular phone handset locates into the handset holder and can be removed by pressing the release buttons on either side of the handset holder adapter. The handset holder has two connections which are located under the floor console. One connection is to the PSE module and the other to the antenna.

**Portable Support Electronics (PSE) Module**

The PSE module is located behind the glove compartment and is retained by a screw. The PSE module controls the operation of the cellular phone and also relays the information to the audio unit.

**Audio Unit**

The audio unit must be cellular phone compatible. Inspect the audio unit for a PHONE select button.



REMOVAL AND INSTALLATION

Microphone

1. Remove the overhead console. For additional information, refer to Section 501-12 **[Instrument Panel and Console]**.



REMOVAL AND INSTALLATION

Portable Support Electronics (PSE) Module

NOTE: Removal steps in this procedure may contain installation details.

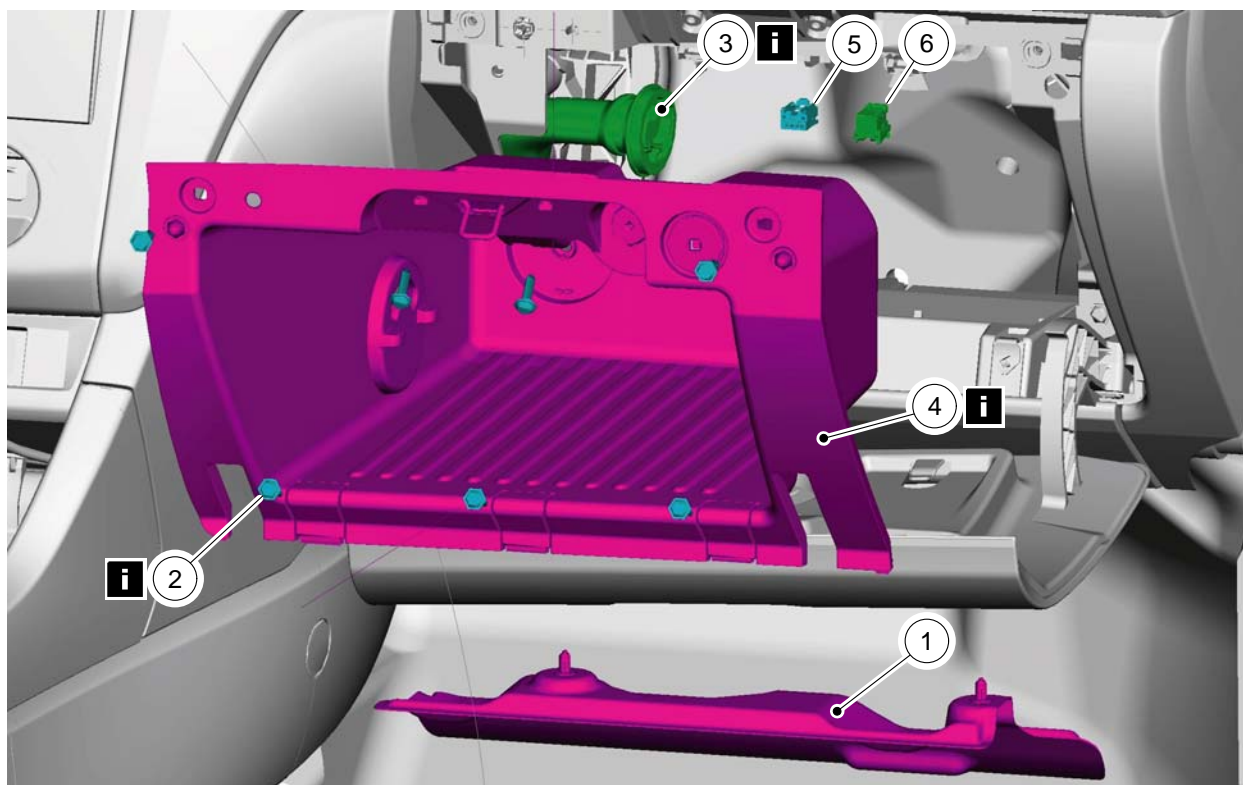
Vehicles with DVD navigation system with Touchscreen

1. Remove the navigation system digital versatile disc (DVD) unit.

For additional information, refer to:
Navigation System Digital Versatile Disc (DVD) Unit (419-07 Navigation System -

Vehicles With: Digital Versatile Disc (DVD) Navigation System, Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).

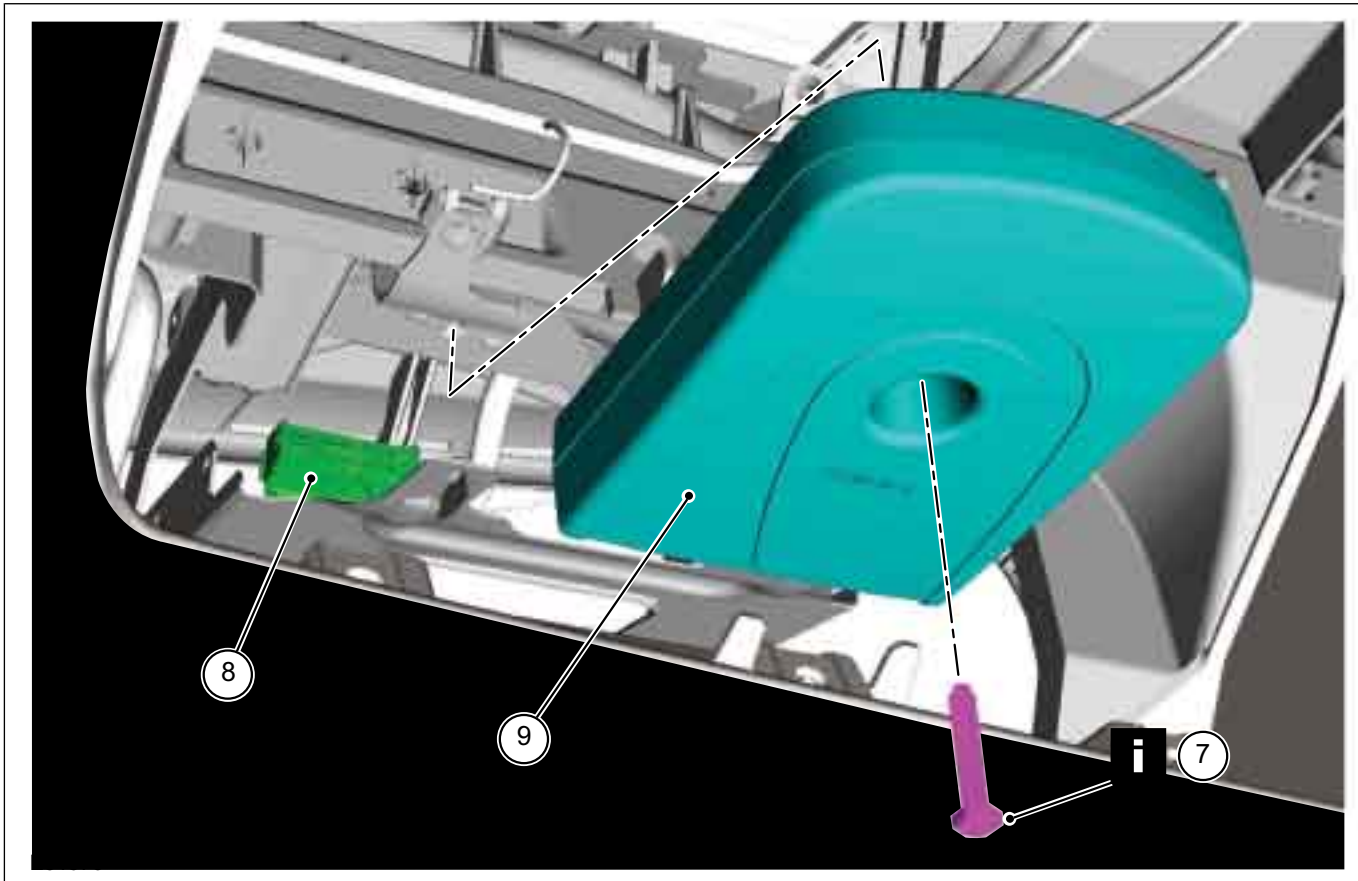


E51448

Item	Description
1	Footwell trim panel
2	Glove compartment screws See Removal Detail
3	Hose, glove compartment cooling (if equipped) See Removal Detail

Item	Description
4	Glove compartment See Removal Detail
5	Electrical connector, additional audio input
6	Passenger air bag deactivation (PAD) switch electrical connector (if equipped)

REMOVAL AND INSTALLATION

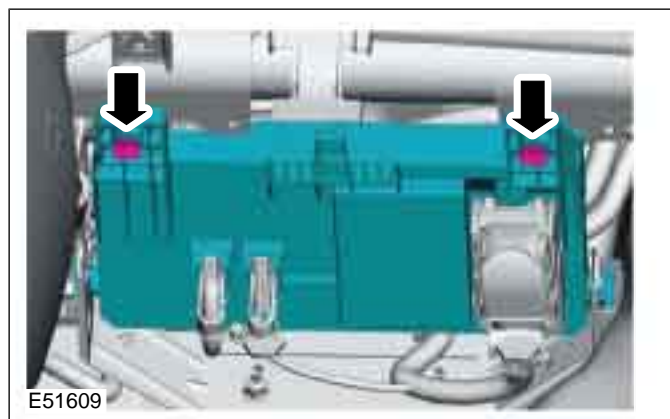
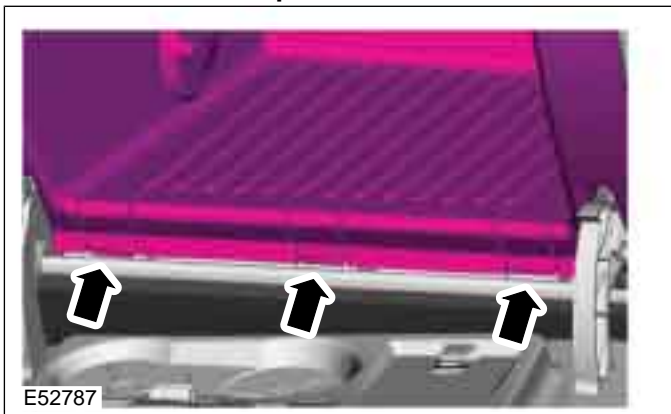


Item	Description
7	PSE module retaining bolt See Removal Detail
8	PSE module electrical connector
9	PSE module

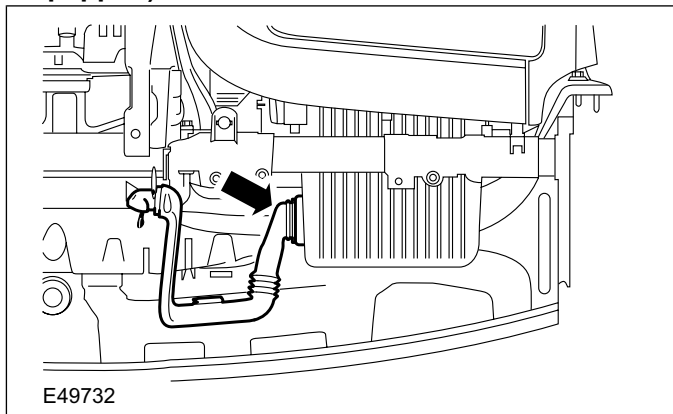
3. To install, reverse the removal procedure.

Removal Details

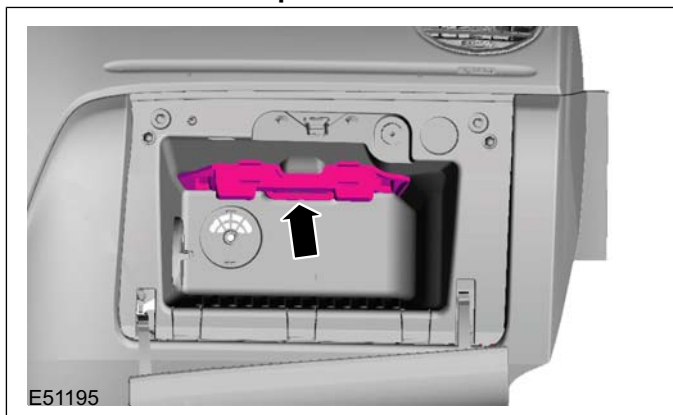
Item 2 Glove compartment screws



1. Fold down the covering caps of the screws for the glove compartment.

REMOVAL AND INSTALLATION**Item 3 Hose, glove compartment cooling (if equipped)**

1. Detach the glove compartment cooling hose from the glove compartment.

Item 4 Glove compartment

1. Remove the access flap for the DVD drive (if equipped).

Item 7 PSE module retaining bolt

- ⚠ CAUTION:** Support the PSE module to prevent excess strain being placed on the PSE module wiring harness.

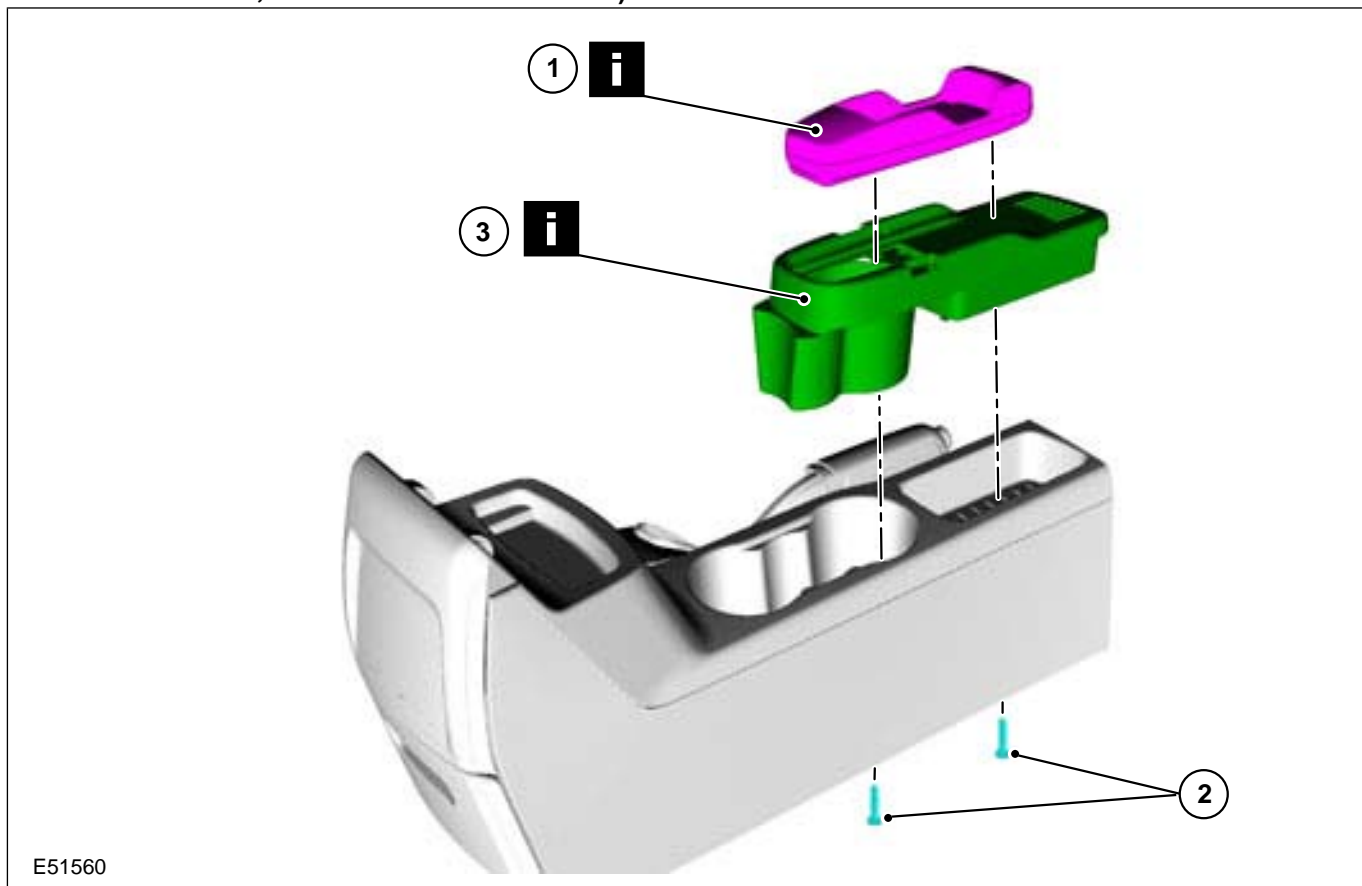
REMOVAL AND INSTALLATION

Handset Holder

1. Remove the floor console.

For additional information, refer to: Floor Console - 3-Door (501-12 Instrument Panel and Console, Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



E51560

Item	Description
1	Handset adapter See Removal Detail
2	Handset holder retaining screws
3	Handset holder See Removal Detail

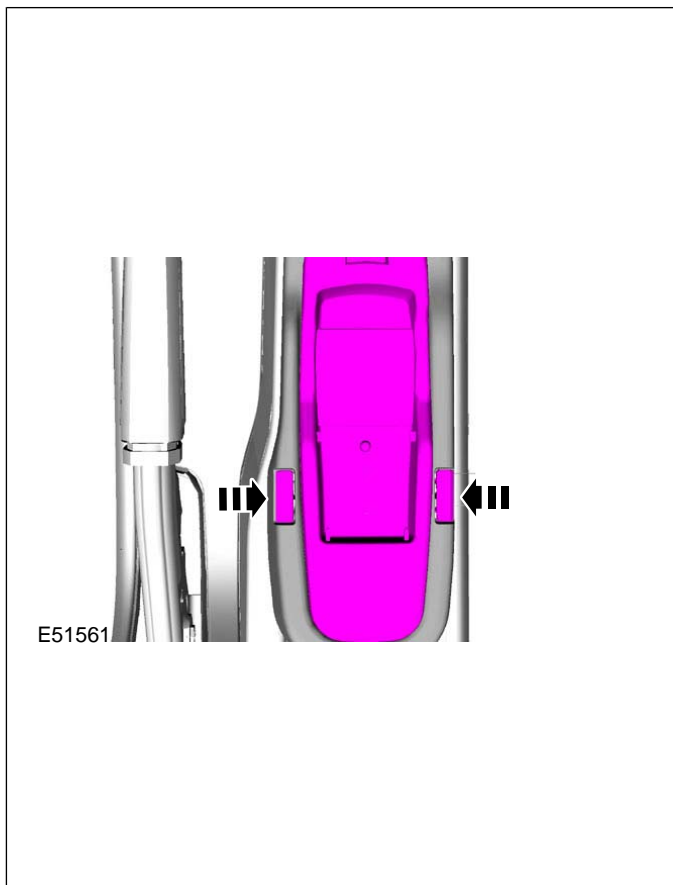
3. To install, reverse the removal procedure.

Removal Details

REMOVAL AND INSTALLATION

Item 1 Handset adapter

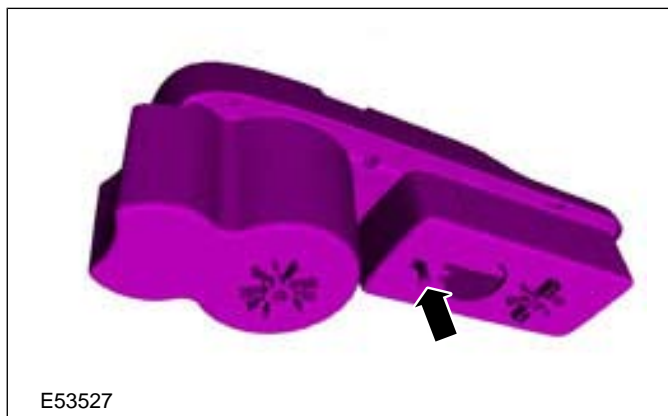
1. Press in the locking tangs to release the handset adapter.



2. Unclip the cellular phone wiring harness and antenna from the handset holder.

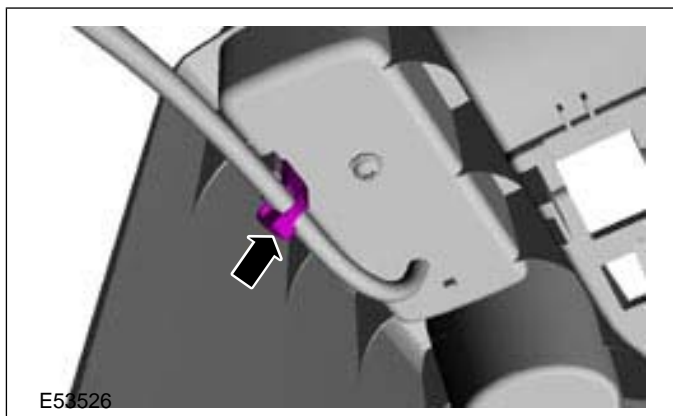


3. Release the locking clip and remove the handset holder from the floor console.



Item 3 Handset holder

1. Unclip the cellular phone wiring harness and antenna from the floor console.



SECTION 419-10 Multifunction Electronic Modules

VEHICLE APPLICATION: 2008.75 Focus ST C307

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DESCRIPTION AND OPERATION

Module Controlled Functions

Generic Electronic Module (GEM)



Item	Description
1	GEM

The GEM is installed on the passenger side underneath the dashboard.

It replaces separate components such as the central locking module, the timer relay and the fuse box in the passenger compartment.

It consists of a power distribution section (including fuses and relays) and an electronic control module, which controls the operation of most of the electronic convenience systems.

New vehicles will be fitted with different designs of GEM (depending on the equipment specification of the vehicle). Three different versions are supplied for repairs performed during servicing (keyless vehicles, vehicles with radio receivers with permissible radio frequency of 315 MHz and vehicles with radio receivers with permissible radio frequency of 434 MHz). When installing a GEM, it must be configured for the specific vehicle.

The following functions are controlled or performed by the GEM at a battery voltage of between 9 and 16 volts:

- Current distribution
- External lighting (certain external lighting functions operate via cable connections from the light switch)
- Interior lighting
- Wipers
- Heated windshield
- Speed control system (reads the speed control switches and transmits signals on the CAN bus)
- Locking and unlocking

- Anti-theft alarm
- Air conditioning controls (partial)
- Handbrake (it monitors the switch and transmits the signal on the CAN bus)
- Monitoring of the brake fluid level.
- Fuel pump (petrol engines only)
- Interrogation of the ambient temperature sensor
- Battery charging (smart charge, partially)
- Electric booster heater
- Communications via the mid-speed CAN bus
- Convertible top (convertible)

Diagnosis of the GEM can be performed using the Integrated Diagnostic System (IDS). Furthermore, an integrated service mode enables testing of the input and output signals without the need for further tools. For additional information, refer to Diagnosis and Testing - GEM.

Emergency function

In vehicles with mid to high-end equipment, the Generic Electronic Module (GEM) features a restricted emergency function.

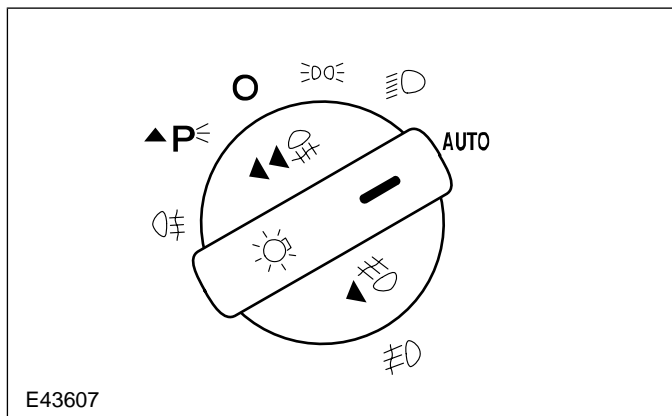
At regular intervals, the micro-controller applies a check signal to a monitoring function within the Generic Electronic Module (GEM). If the battery voltage falls below a value of approx. 7.5 volts, this check signal is not present and the Generic Electronic Module (GEM) switches to emergency function after a predetermined time.

In this case, the low beam is permanently switched on, regardless of the light switch position. The windshield wiper can only be operated in stage 1; the wiper switch must however be in the stage I or II position. The wiper park position is not recognized. Intermittent wiping is not available.

When the check signal recurs, the Generic Electronic Module (GEM) switches back to normal operation.

DESCRIPTION AND OPERATION

Autolamps



The low beams, side lamps, license plate lamps as well as the instrument cluster and instrument panel illumination are switched on automatically if all the following conditions are met:

- Ignition switch in the "II" or "III" position
- Light switch in the "AUTO" position
- Determined ambient light conditions below a stored threshold value

These are switched on and off by the GEM in accordance with the input signals from the combined rain/light sensor.

Headlamp switch-off delay

In vehicles with mid to high-end equipment, the headlamp switch-off delay uses the low beams and the peripheral lights (if equipped) for illuminating the vehicle surroundings. The function is activated by operating the high beam lever when the ignition switch is in the "0" position.

After the last door has been closed, the function remains active for a further 30 seconds and then switches off automatically.

When a door or the liftgate is open, the switch-off time is extended to 180 seconds. After the last door has been closed, the switch-off time is reset to 30 seconds.

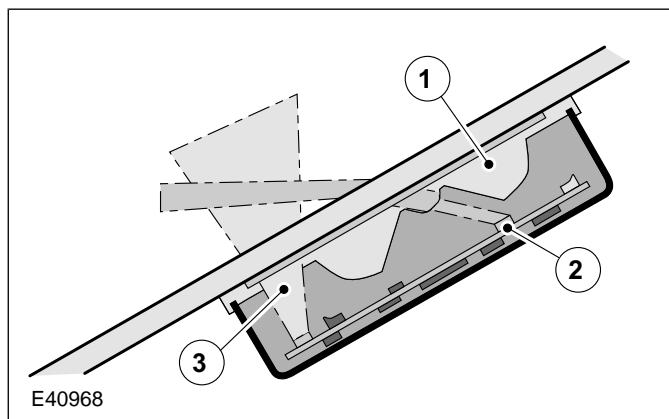
The headlamp switch-off delay can be deactivated prematurely by operating the high beam lever again or by switching on the ignition.

The switch-off time is adjusted to set values at the factory and cannot be re-programmed using IDS.

Combined rain sensor/light sensor

CAUTIONS:

- ⚠ On vehicles with autolamps, retrofitting with daytime running lamps is not permissible, as otherwise, the engine cannot be stopped when the lighting is switched on.
- ⚠ On vehicles with autolamps, the daytime running lamp fuse must not be fitted, as otherwise, the engine cannot be stopped when the lighting is switched on.



Item	Description
1	Lens
2	Front light sensor
3	Ambient light sensor

The combined rain sensor/light sensor is attached to the windshield, near to the interior rear view mirror.

The ambient light sensor determines the general light intensity. For this purpose, it records the light over as wide an angle as possible, without taking the direction of incidence into account.

The front light sensor determines the light intensity directly in front of the vehicle.

If both the ambient light sensor and the front light sensor detect a sudden reduction in light intensity at the same time, then an algorithm-based calculation is used to determine the fact that the vehicle has entered a tunnel, a multi-storey car park or a long underpass.

In this case the request for switching on the external lighting and the indicator lamps in the instrument cluster is transmitted to the GEM.

DESCRIPTION AND OPERATION

If the vehicle is suddenly thrown into the shade by a large truck, the two sensors will register different light intensities. In this case, the algorithm-based calculation will not result in the lights being switched on.

In vehicles built from 07/2004 a stepped switch-off of the low beams, side lamps, license plate lamps as well as the instrument cluster and instrument panel illumination is implemented in the GEM. If the ambient light changes from dark to bright, the GEM first switches off the low beams. The side lamps, license plate lamps as well as the instrument cluster and instrument panel illumination are switched off approx. 6 seconds after the low beams have been switched off.

Interior lighting

Depending upon vehicle specification, the interior lighting controlled by the GEM consists of:

- Left and right-hand footwell lamps
- Front and rear dome lamps (in "door contact" switch position)

Depending upon vehicle specification, the interior lamps which can be switched by the operator include:

- Front and rear dome lamps (in "On" switch position)
- Map reading lamps
- Mirror lights in sun visors
- Glove compartment lamp
- Luggage compartment lamp

The interior lighting controlled by the GEM is switched on if one of the following conditions is satisfied:

- One of the vehicle's doors is opened.
- The ignition key is in the "0" or "I" position and the vehicle is unlocked.
- The ignition key is turned from the "II" to the "I" or "0" position.

The interior lighting controlled by the GEM is switched off if all doors are closed and one of the following conditions is satisfied:

- 25 seconds have elapsed since the last door was closed.
- The ignition key is turned from the "0" or "I" to the "II" position.
- The ignition key is in the "0" or "I" position while the vehicle is locked.

The dimmer function is not used if the interior lighting is switched off via the battery protection function.

Battery saver function

In order to prevent the battery from discharging due to permanently switched on current consumers, the left and right-hand footwell lamps and the front and rear dome lamps (in "door contact" switch position) are switched off by the GEM after 10 minutes.

After 30 minutes, the interior lamps which can be switched by the operator (map reading lamps, mirror lights in the sun visors, glove compartment lamp, luggage compartment lamp) as well as the auto-dimming interior mirror (if equipped) are switched off by the power-saving relay.

In addition, all warning signals from the GEM are deactivated after 30 minutes.

The timer is activated if the ignition switch is turned to the "0" or "I" position.

If the interior lamps are switched off due to the battery protection function, they will be switched on again if any of the following conditions is satisfied:

- the ignition switch is turned to the "II" or "III" position
- a door (including the boot or liftgate) is ajar or opened.
- a lock is released.

In this case, the timer is reset again.

Furthermore, the battery protection function is activated by the GEM when the threshold value for low battery voltage is reached.

Heated windshield

The heated windshield is switched on by the GEM under the following conditions:

- The heated windshield switch has been pressed, the ignition switch is in the "II" position and the charging system warning indicator is off.
- The "defrost" function of the Electronic Automatic Temperature Control (EATC) has been activated, the ignition switch is in the "II" position and the charging system warning indicator is switched off.

DESCRIPTION AND OPERATION

- The battery voltage has exceeded 16 V for more than 20 seconds (power management strategy). Manual requests for switching off the heated windshield by pressing the switch, are ignored at this time.
- The engine was started at an outside air temperature below 4°C and an engine temperature below 65°. Manual requests to switch off the heated windshield by pressing the switch are accepted (vehicles built from 03/2007).

If the battery voltage returns to the normal range, disabling of the heated windshield is cancelled. It is then switched on, if it was previously switched on by the driver and if 4 minutes have not yet elapsed since actuation of the heated windshield switch.

The heated windshield is switched off by the GEM under the following conditions:

- If more than 4 minutes have elapsed since actuation of the heated windshield switch.
- The ignition switch is turned to the "I" or "0" position.
- The "defrost" function is deactivated or the switch for the heated windshield is pressed again while the heated windshield is still switched on.
- The charging system warning indicator is switched on.
- The battery voltage falls below the threshold value for low battery voltage for more than 20 seconds (power management strategy). Manual requests for switching on the heated windshield by pressing the switch, are ignored at this time.
- More than 4 minutes have elapsed since starting the engine (vehicles built from 03/2007).

If the battery voltage returns to the normal range, disabling of the heated windshield is cancelled. It is then switched off.

Heated rear window and heated external mirrors

NOTE: If a new GEM built after 12/2005 is installed in a vehicle built before 08/2005 during repair work, the LED in the heated rear window switch lights up. Due to this modification to the GEM, a modified heated rear window switch is installed in vehicles built from 08/2005.

The heated rear window and the heated exterior mirrors are switched on by the GEM under the following conditions.

- The switch for the heated rear window is pressed and the ignition switch is in the "II" position.
- The "defrost" function of the air conditioning is activated and the ignition switch is in the position "II".
- The battery voltage has exceeded 16 V for more than 20 seconds (power management strategy). Manual requests to switch off the heated rear window by pressing the button are ignored at this time.
- The engine was started at an outside air temperature below 4°C and an engine temperature below 65°. Manual requests for switching off the heated rear window by pressing the switch are accepted (vehicles built from 03/2007).

If the battery voltage returns to the normal range, disabling of the heated rear window is cancelled. It is then switched on, if it was previously switched on by the driver and if 14 minutes have not yet elapsed since actuation of the heated windshield switch.

On vehicles with door modules, the GEM transmits the request signal for switching on the heated exterior mirrors to the door modules via the CAN bus.

The heated rear window and the heated exterior mirrors are switched off by the GEM under the following conditions

- If more than 14 minutes have elapsed since actuation of the heated rear window switch.
- The ignition switch is turned to the "0" or "I" position.
- The switch for the heated rear window is pressed or the "defrost" function of the air conditioning is deactivated while the heated rear window is switched on.
- The battery voltage has dropped below 10.3 V for more than 20 seconds (power management strategy). Manual requests for switching on the heated rear window by pressing the switch, are ignored at this time.
- More than 14 minutes have elapsed since starting the engine (vehicles built from 03/2007).

If the battery voltage returns to the normal range then the disabling of the heated rear window is cancelled - the heated rear window is then switched off.

DESCRIPTION AND OPERATION

On vehicles with door modules, the GEM transmits the request signal for switching off the heated exterior mirrors to the door modules via the CAN bus.

Windshield wash/wipe system

Wiper functions

The windshield wash/wipe system will only operate if the ignition switch is in the "II" or "III" position.

Four wipe functions are available: "one-touch function", "speed 1", "speed 2" and "intermittent mode" or "automatic windshield wipers" (depending upon vehicle specification)".

In "Speed 1" or "Speed 2" mode, the wipers are operating continuously at either normal speed or fast speed.

When the intermittent wipe mode is switched on the windshield wipers operate at normal speed with the following wiper delays:

- Wiper delay 1: 1 second
- Wiper delay 2: 3.5 seconds
- Wiper delay 3: 6 seconds
- Wiper delay 4: 9.5 seconds
- Wiper delay 5: 15.5 seconds
- Wiper delay 6: 22 seconds

NOTE: In the event of a failure, or if the control resistor is not connected the default time for the wiper delay is 8 seconds.

When the windshield washer switch is operated, washer fluid is sprayed onto the windshield. After a short delay designed to protect the wiper blades the wipers perform 2 or 3 wipes at low speed.

If, when the windshield washer switch is activated, the windshield wipers are switched off, then a single wipe is performed 4 seconds after the wipers have returned to the rest position after performing 2 or 3 wipes.

If when the windshield washer switch is activated the wipers are in intermittent mode, and if the selected wiper delay time is longer than 6 seconds, then a single wipe is performed 6 seconds after the wipers have returned to the rest position after

performing the 2 or 3 wipes. If an interval of less than 6 seconds selected, afterwipe is not performed.

The afterwipe function on the windshield ensures that any water remaining on the windshield after washing is wiped away. It is only required if the wipers are switched off or they are set to intermittent mode.

Automatic wiper function

In vehicles built from 12/2005 without rain sensor, a speed-dependent wiper function is implemented in the GEM on the mid and high-end equipment versions.


When the windshield wipers are switched on, the GEM reduces the wiper speed by one setting if the vehicle is driven at walking speed or comes to a standstill.


When the vehicle speed is increased, the wiper speed automatically returns to the previous setting.

If the wiper lever is actuated during automatic function, the automatic wiper function is switched off and the wiper speed corresponds to the newly-selected setting.

Rain sensor

CAUTIONS:

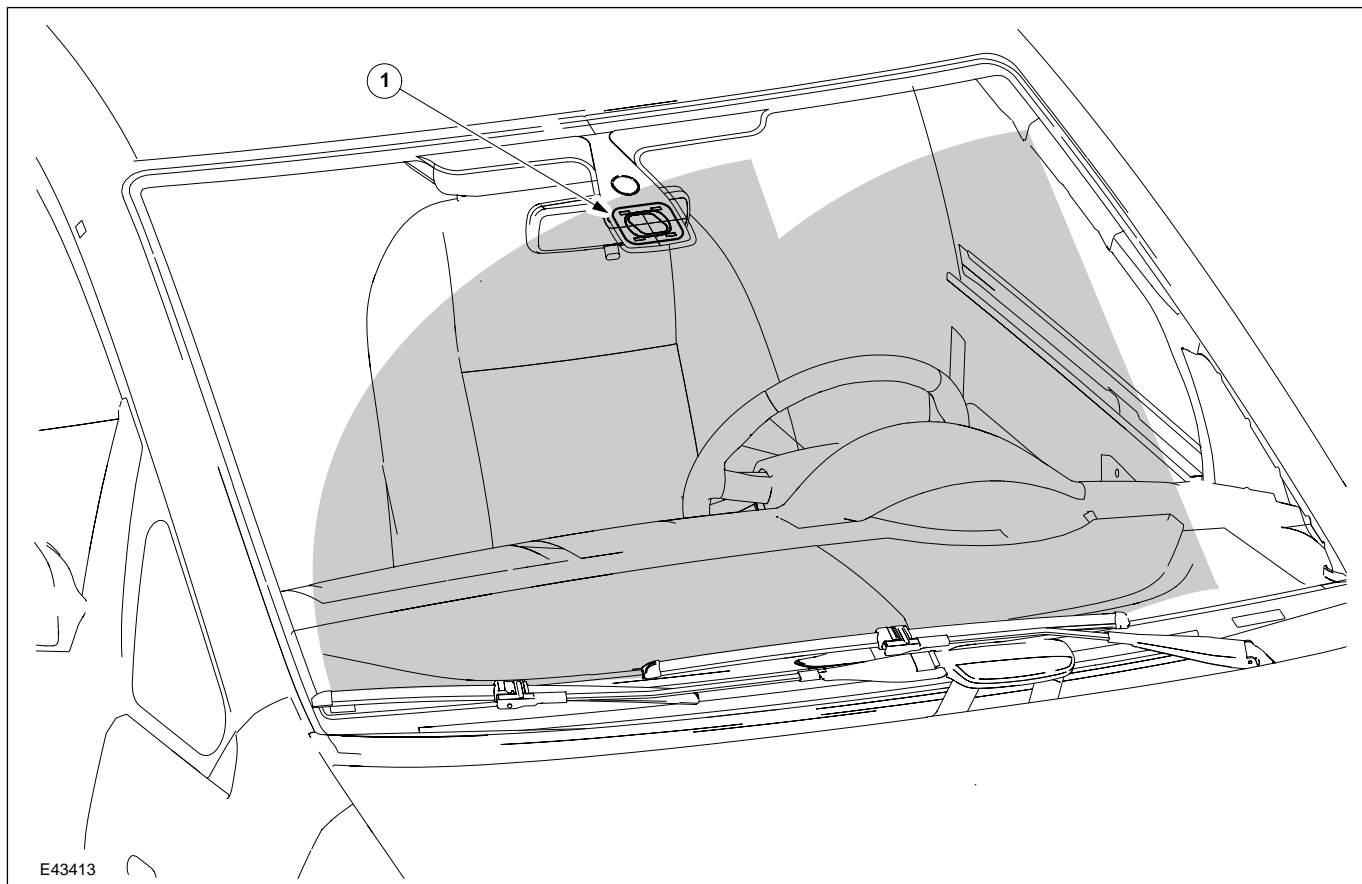
 **The automatic windshield wipers must be switched off before the vehicle is driven into a car wash.**

 **If the windshield is iced up, the wipers may only be activated by the rain sensor after the windshield has been completely defrosted.**

NOTE: The rain sensor is an optical measuring instrument. Contamination such as oil, grease or dust impair its correct function. Before switching on the automatic windshield wipers, the windshield must be clean in the area of the rain sensor.

The rain sensor is built into a housing which is mounted behind the rear view mirror on the windshield.

DESCRIPTION AND OPERATION

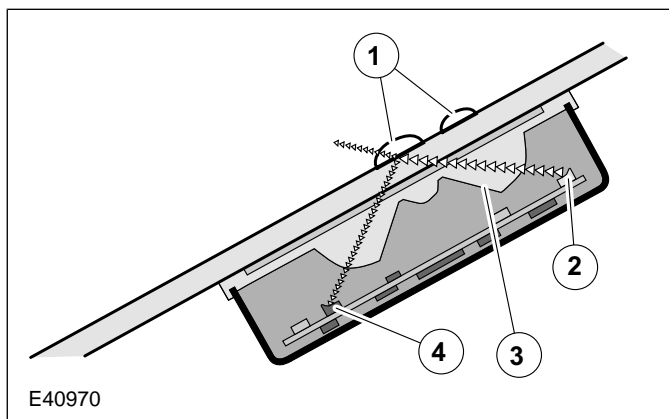


E43413

The rain sensor (1) consists of an opto-electronic measuring and evaluation circuit. The sensor can calculate the amount of precipitation falling on the windshield and request that the windshield wipers are switched on.

On the basis of the information provided by the rain sensor, the windshield wipers are then set to the required wipe speed by the generic electronic module (GEM).

Mode of operation of the rain sensor



E40970

Item	Description
1	Raindrop
2	LED
3	Lens
4	Photodiode

DESCRIPTION AND OPERATION

The rain sensor consists of three optical components:

- an LED
- a photodiode
- the lens

The photodiode emits an infrared light beam of known intensity; the emitted light exits through the lens and is reflected by the windshield.

The reflected light beam returns through the lens and reaches the photodiode. The corresponding value taken without moisture on the windshield is used as the reference value for the automatic calibration procedure.

Subsequent deviations from this value cause the windshield wipers to be switched on.

If rain falls on the windshield, then the light reflected by the windshield has a lower intensity. This loss of intensity is registered by the photodiode and, proportionally to the loss of intensity, the module switches on the windshield wipers with the required wipe speed (in intermittent or continuous mode).

When the automatic windshield wipers are switched on (wiper switch set to intermittent mode) the rain sensor is switched on and performs an automatic calibration according to the current conditions at the windshield.

To perform the automatic calibration, the windshield wipers perform a single wipe regardless of whether the windshield is wet or dry.

If the windshield remains dry after this wipe then the windshield wipers stop until moisture is registered on the windshield above the sensor.

On vehicles built from 12/2005, automatic calibration only takes place if the wiper switch was not set to the rain sensing function before the ignition was switched on.

The sensitivity of the rain sensor can be changed by adjusting the control resistor for the intermittent mode of the windshield wipers.

- Adjusting ring position - narrow symbol: high sensitivity
 - The wipers wipe even if only a small amount of water has been measured on the windshield.
- Adjusting ring position - broad symbol: low sensitivity
 - The wipers only wipe if a large amount of water has been measured on the windshield.

Rear window wash/wipe system

The rear window wash/wipe system will only operate if the ignition switch is in the "II" position.

The GEM changes the wipe interval of the rear window wiper depending upon the windshield wiper switch position.

If the windshield wiper switch is in the "Off", "intermittent mode" or "automatic windshield wiper" (no wiping or low speed) position, then the wipe interval of the rear window wiper is 10 seconds.

If the windshield wiper switch is in the "normal speed", "high speed" or "automatic windshield wiper" (wiping at high speed) position, then the wipe interval of the rear window wiper is 6 seconds.


If the switch for the rear window washer is pressed, then washer fluid is sprayed onto the rear window, and the wiper operates continuously at low speed. When the switch is released the rear window wiper performs another 2-3 wipes.

If the switch for the rear window washer fails while switched ON, or if it is continuously operated for more than 60 seconds, then the switch signal is ignored by the GEM, the wiper returns to the park position and a trouble code is stored for the switch. In the event of the switch sticking in the switched on position, the washer system pump continues to run constantly.

If reverse gear is engaged and the windshield wiper switch is in the normal, high speed or automatic windshield wiper (wiping at high speed) position, the rear window wiper operates continuously until the gearshift lever is moved back to the neutral position.

If reverse gear is engaged and the windshield wiper switch is in the "intermittent mode" or "automatic windshield wiper" (no wiping or low speed) position, then the rear window wiper follows the movement of the windshield wipers. If the wipers windshield wipers leave the rest position, then the rear window wiper also performs a wiping movement.

Headlamp washer system

 **CAUTION: Do not operate the headlamp washer system for more than 10 seconds, and never with an empty fluid reservoir.**

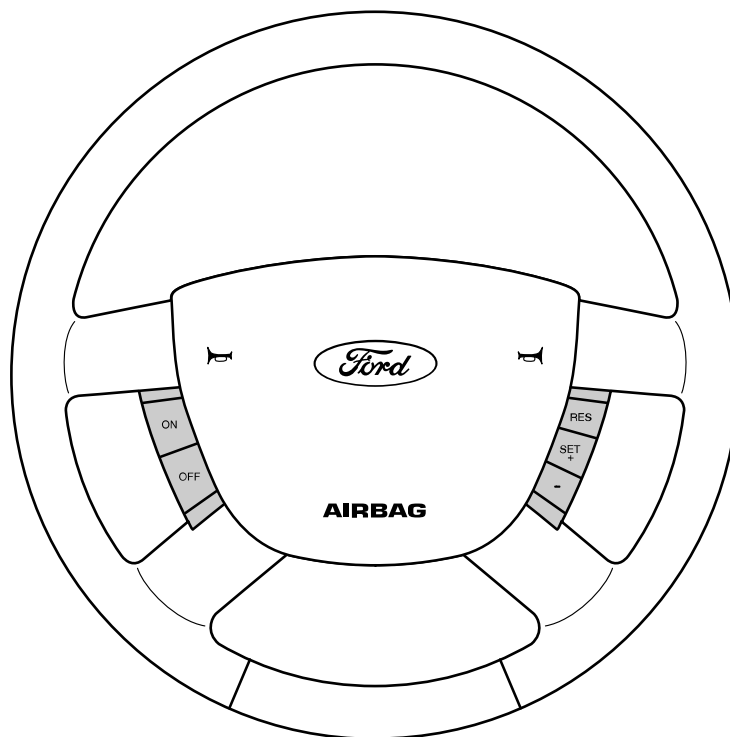
The headlamp washer system operates when the windshield washers are actuated if, at the same time, the light switch is set to "low beam" or if the "autolamp" function has switched on the

DESCRIPTION AND OPERATION

headlamps. Electrical control is performed by the headlamp washer system relay which itself is controlled by the generic electronic module (GEM).

In order to prevent excessive washer water consumption in vehicles built from 12/2005, the headlamp washer system is only activated on every

fourth actuation of the windshield washer switch, provide that 10 minutes have not elapsed since the first actuation of the headlamp washer system. If the windshield washer switch is actuated again after 10 minutes, the headlamp washer system is activated and the timer is restarted.

Speed control

E44059

The speed control system consists of a switch unit which is part of the steering wheel component group. The switch unit has a direct interface to the GEM, which in turn communicates with the Powertrain Control Module (PCM).

The signals from the switches of the speed control system are received by the GEM as analogue input voltage signals. The output voltage of the switches of the speed control system is determined by the relevant resistances of the individual switches installed in the switch unit.

The GEM transmits the relevant information as a message to the instrument cluster on the mid-speed CAN bus. From there, the message is forwarded to the PCM on the high-speed CAN bus.

The PCM adjusts the power output of the engine in order to maintain the selected vehicle speed.

Central locking**Locking/unlocking - central locking**

The central locking system locks all doors, the liftgate and the tank flap, so that none of these can be opened from the outside of the vehicle. The locking of the tank flap is linked to the locking/unlocking of the driver's door.

On vehicles with door modules, all door lock motors and door lock switches are controlled via the door lock modules. The door ajar switch signals are transmitted directly to the GEM.

On vehicles without door modules, all locking/unlocking functions are controlled via the GEM.

DESCRIPTION AND OPERATION

Vehicles with door modules can be identified by means of the two-stage window control switch.

The central locking is actuated if one of the following conditions is satisfied:

- A key is inserted into one of the door locks and turned to the "locking" position.
- The locking button on the remote control is pressed once.
- The "locking" button in the passenger compartment is pressed (if equipped).
- The interior door handle is pressed (if equipped) (only on the driver side in vehicles built from 03/2007).

If one of the front doors is not fully closed during the central locking procedure, all doors are locked and then unlocked again. This procedure is signaled acoustically.

If one of the rear doors, the liftgate or the hood (on vehicles with anti-theft alarm system) are not completely closed, all the doors are nevertheless locked centrally.

Once the open door, the open liftgate and/or hood (on vehicles with anti-theft alarm system) is closed, the central locking is confirmed by the turn signals flashing briefly twice.

Locking/unlocking - double locking

The double locking system locks all doors so that they cannot be opened from outside the vehicle. In addition to the central locking function, the double locking function also disconnects the inside door handles from the locking mechanism, as a result of which it is also no longer possible to open the doors from inside the vehicle.

The double locking will only operate if the ignition lock is in the position "0" or "I".

The double locking is activated if one of the following conditions is satisfied:

- A key is inserted into a door lock and turned to the "locking" position twice within 3 seconds.
- The "locking" button on the remote control is pressed once (provided the vehicle has been configured for activation of the double locking after a single press of the locking button on the remote control).

- The "locking" button on the remote control is pressed twice within 3 seconds (if the vehicle has not been configured for activation of the double locking after a single press of the locking button on the remote control).
- Vehicles with convertible top (convertibles) are programmed for double locking after a single press of the locking button on the remote control. When the convertible top and windows open and there is no one in the interior of the vehicle, the vehicle should always be double locked as otherwise the doors can be opened by pulling the interior door handles, leading to unlocking of the luggage compartment lid, which can then also be opened.

If the ignition lock has been turned to the position "II" or one of the rear doors is not fully closed then the vehicle is centrally locked but not double locked.

If, on a double-locked vehicle, the ignition switch is turned to the "II" or "III" position and a valid PATS signal is transmitted, the system switches from double locking to central locking.

Double locking is confirmed by two short flashes of the turn signal lamps. No flashing takes place for central locking on a vehicle with double locking.

Locking/unlocking - central unlocking

The central unlocking system unlocks all of the doors on the vehicle including the tank flap.

The central unlocking is activated if one of the following conditions is satisfied:

- The door lock is turned to the "unlocking" position.
- The "unlocking" button on the remote control is pressed once (if the vehicle has not been configured for unlocking via the driver's door lock).
- The "unlocking" button on the remote control is pressed twice within 3 seconds (if the vehicle has been configured for unlocking via the driver's door lock).
- On a centrally locked vehicle the internal door handle is pulled to the "unlocking" position.
- The "unlocking" button in the passenger compartment is pressed.

If the vehicle has been configured for unlocking via the driver's door lock and the "unlocking" button on the remote control is only pressed once, then just the driver's door and the tank flap are unlocked.

DESCRIPTION AND OPERATION

If the "unlocking" button on the remote control is then pressed again within 3 seconds the remaining doors are unlocked via the central unlocking function.

If the vehicle was double locked beforehand, then the other doors are centrally locked, whereas the driver's door is unlocked.

Unlocking of the vehicle with the ignition switched off, is confirmed by one long flash of the turn signal lamps.

Locking/unlocking - automatic re-locking

The automatic re-locking function returns the locking system of the vehicle to its last status if it was centrally locked or double locked and the following conditions are satisfied:

- The vehicle is unlocked via remote control.
- Neither a door nor the liftgate has been opened within 45 seconds.
- The ignition is not switched on.

Liftgate

The liftgate unlocking mechanism unlocks the liftgate if the ignition switch is either in position "0" or position "1" and one of the following conditions is met:

- The exterior liftgate release button on the vehicle is pressed with the driver door unlocked.
- The liftgate release button on the radio remote control is pressed twice within 3 seconds.

The liftgate unlocking function unlocks the liftgate if the ignition switch is in either position "II" or "III" and the vehicle speed is below 7 km/h and one of the following conditions is satisfied:

- The exterior liftgate release button on the vehicle is pressed (vehicles built up to 03/2007).
- A vehicle door has been opened and the exterior liftgate release button on the vehicle is pressed (vehicles built from 03/2007). In this case, the vehicle must have exceeded the vehicle speed of 7 km/h at least once.
- The liftgate release button on the radio remote control is pressed twice within 3 seconds.

When installing a new GEM, the internal receiver in the GEM must be enabled using the IDS on vehicles with radio remote control. It should be

noted that different GEMs must be used, depending on the permissible radio frequency (315 MHz or 434 MHz) in the relevant country.

Key-free vehicle system

A key-free vehicle system is optionally available, in which receivers on both front door handles, in the rear section and in the interior check whether a valid "passive key", which is programmed to the vehicle, is within the detection area in order to prepare the locking mechanism for opening the doors and then to enable the ignition lock, following actuation of the clutch pedal (vehicles with manual transmission) or brake pedal (vehicles with automatic transmission).

The reception signals are transmitted to the key-free vehicle system module, which then controls all further locking/unlocking functions.

After leaving the vehicle, it can be locked via sensors on the front door handles or on the liftgate handle (press once) or double locked (press twice). In this case, a request signal (lock/unlock) is transmitted by the key-free vehicle system module to the GEM via the mid-speed CAN bus. The GEM then actuates the door modules via the mid-speed CAN bus, which unlock or lock the vehicle.

All door opening/closing functions can also be performed via the remote control buttons on the "passive key". In addition, there is an emergency key in the "passive key" which, together with an adapter, serves to open and start the vehicle in an emergency.

On keyless vehicles, there is no internal receiver for the locking system in the GEM. Consequently, only the receiver in the interior is used.

Smart Charge system

In addition to the familiar functions, the Smart Charge system also performs the following functions:

- Automatic deactivation of non-critical high power electrical consumers when the battery voltage is low in order to reduce the level of current drawn.
- Automatic activation of non-critical high power electrical consumers when the battery voltage is excessively high in order to protect components which are sensitive to increased voltages.

DESCRIPTION AND OPERATION

The battery charging current is optimized through continuous calculation of the battery temperature and monitoring of the alternator output voltage.

The alternator load is signaled to the PCM in order to provide it with an early indication when an electric component is to be switched on or off, thereby also providing information about imminent changes to the amount of torque demanded by the alternator. By evaluating this information the PCM is capable of increasing the stability of the engine under idling.

The two remaining functions of the Smart Charge system are controlled by the GEM.

Electrical consumers are switched off when the battery voltage is low if the GEM determines (as a result of the message received from the PCM on the CAN bus via the instrument cluster) that the battery voltage has dropped below the threshold value.

If the threshold value for low battery voltage is reached, the GEM automatically deactivates the following consumers, in this sequence and with a 5-second time interval:

- Heated windshield
- Heated rear window
- Electric booster heater (vehicles with diesel engines)
- Air conditioning

If the battery voltage then increases above the lower threshold value, the disabling of all previously-deactivated electrical consumers is cancelled by the GEM. They then have switched off status and must be switched back on by the driver.

Electrical consumers are switched on when the battery voltage is excessively high if the GEM determines that the battery voltage has increased above the threshold for overvoltage and the charging system warning indicator has come on.

If the threshold value is reached, the GEM automatically activates the following consumers, in this sequence and with a 5-second time interval:

- Heated rear window
- Heated windshield

If the battery voltage again falls below the threshold value, the heated rear window and the heated windshield are automatically deactivated by the GEM. However, if they were switched on by the driver before the automatic activation, they will then be switched on again in turn with a 5-second time interval.

Ambient air temperature

The outside air temperature sensor is connected to the GEM via two wires. It measures the outside air temperature to an accuracy of around ± 0.5 °C. The GEM transmits the outside air temperature via the mid-speed CAN bus, where it can be evaluated by various systems.

Ignition overload protection

The ignition overload protection intermittently disconnects certain circuits in order to restrict the current being drawn from the battery while the starter motor is operating.

The position of the ignition switch is transmitted by the instrument cluster via the mid-speed CAN bus.

The ignition overload protection relay which is integrated in the battery junction box is activated by the GEM if the message "ignition switch in position III" is received from the instrument cluster.

The activated ignition overload protection then switches off the following electrical consumers:

- Fog lamps
- Windshield/rear window wash/wipe systems
- Reversing lights
- Heated washer nozzles
- Heating blower motor
- Heated seats
- Power windows (vehicles without door modules)

Power windows**Vehicles with and without door modules**

To operate the power windows, the ignition key must be in the "II" or "III" position. The power windows open or close the door windows when the switch is moved to the corresponding position.

The movement of the glass stops if the window regulator button is released or if the ignition key is turned from the "II" or "III" position to "I" or "0".

The driver door window can only be operated via the driver door switch; the other windows can be opened and closed via the driver door switch panel or the relevant door switch.

DESCRIPTION AND OPERATION**Vehicles with door modules**

If the front passenger door window or one of the rear door windows is operated via the switch on the driver door switch panel, then the driver's door module receives the wire-transmitted signal from the switch and forwards it to the relevant door module via the CAN bus, which then moves the window glass in the appropriate direction.

A switch is provided on the driver door switch panel to disable the window regulator switches of the rear doors.

Brake fluid level

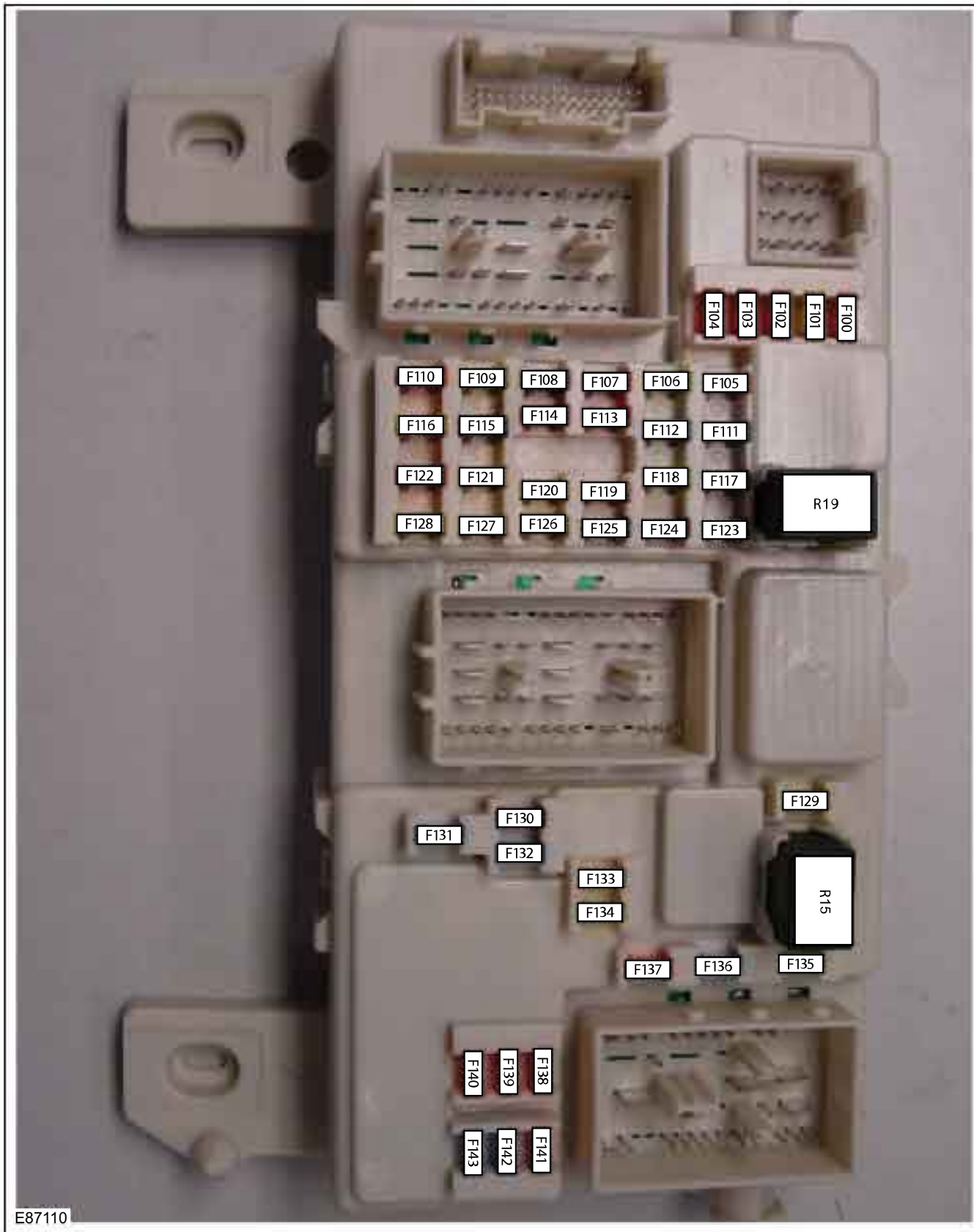
For normal brake fluid levels, the brake fluid level switch is closed and switches a ground signal to the GEM via a wire.

If the brake fluid level falls below the threshold value and the level switch opens for more than two seconds, the GEM generates a CAN signal and transmits it to the instrument cluster.

Change in fuse designation

With the introduction of the new GEM generation 7M5T-14A073-XX, the fuse designations have been changed.

DESCRIPTION AND OPERATION



Old fuses	New fuses	Ampere rating	Circuits protected
F37	F140	10	Left-hand high beam

DESCRIPTION AND OPERATION

Old fuses	New fuses	Ampere rating	Circuits protected
F38	F139	10	Right-hand high beam
F39	F109	20	Cigar lighter, rear socket
F40	F101	20	Power roof opening panel, driver power seat, convertible top (convertible)
F41	F106	20	not assigned
F42	F123	7.5	Heated exterior mirrors
F43	F102	10	Heater control, steering lock module, diesel particulate filter, keyless vehicle system, DVD player
F44	discontinued		
F45	F113	10	Daytime running lamps (parking lamps)
F46	F107	10	Instrument cluster, OBD
F47	F136	15	Windshield washer pump, heated washer nozzles
F48	F135	20	Daytime Running Lights
F49	F103	10	Light switch
F50	F129	20	Windscreen wipers
F51	F111	15	fuel pump
F52	F105	25	Heated rear window
F53	F124	7.5	Parking light, side lamp, rear lamps, left-hand
F54	F125	7.5	Parking light, side lamps, rear lamps, right-hand
F55	F134	20	Central locking system, door module (driver side)
F56	F126	20	Keyless vehicle system
F57	F137	10	Electric folding exterior mirror, anti-theft alarm horn with integrated battery
F58	F112	15	Audio units, mobile phone
F59	F119	20	Towbar module, rear socket
F60	F142	15	Left-hand low beam
F61	F143	15	Right-hand low beam
F62	discontinued		
F63	F127	25	Power windows (except convertible), cooling unit
F64	F128	20	not assigned
F65	F122	10	Airbag control module
F66	F115	7.5	Light switch
F67	F114	10	Instrument cluster, passive anti-theft system
F68	F108	7.5	Accessories (instrument cluster, audio units)

DESCRIPTION AND OPERATION

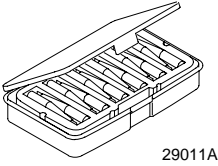
Old fuses	New fuses	Ampere rating	Circuits protected
F69	F116	20	Front fog lamps, rear fog lamp
F70	F100	10	Voltage supply for electronic control modules, heated windshield, heated rear window, heated seats
F71	F110	10	Daytime Running Lights
F72	discontinued		
F73	F117	7.5	Number plate lamp
F74	F132	15	Stoplamps
F75	F138	10	Powertrain control module (PCM), accelerator pedal position
F76	F130	7.5	Four-wheel drive module
F77	F133	25	Central locking system relay, door module (passenger side)
F78	F131	15	Rear window wiper
F79	discontinued		
F80	F104	10	Battery saver device, interior lighting
F81	F120	20	Rear right-hand door module
F82	F118	20	Rear left-hand door module
F83	discontinued		
F84	F141	10	Reversing lamp, rear window wiper, electrically adjustable exterior mirrors (except convertible)
F85	discontinued		
F86	F121	20	Heated seats

DIAGNOSIS AND TESTING

Generic Electronic Module (GEM)

Refer to Wiring Diagrams Section 419-10, for schematic and connector information.

Special Tool(s)

 <p>29011A</p>	<p>Terminal Probe Kit 418-S035</p>
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General Equipment

Digital multimeter
Ford approved diagnostic tool

Description of operation

A diagnosis of the generic electronic module (GEM) can be performed with the Ford approved diagnostic tool. Furthermore, an integrated service mode enables testing of the input and output signals without the need for further tools. To enable activation of service mode:

- Switch off the ignition
- Switch off all other electrical consumers
- Apply the handbrake
- Shift to neutral
- Close the doors.

Activate service mode

Proceed as follows to activate service mode:

- PRESS and HOLD the switch of the heated rear window
- SWITCH ON the ignition.
- RELEASE the switch of the heated rear window

A signal sounds and the turn signal lamps illuminate to indicate that service mode has been successfully activated.

NOTE: If the alarm is activated (in vehicles fitted with an anti-theft alarm system), service mode cannot be activated.

Input signals

SWITCH the windshield wiper switch to the "Off" position to test the input signals. The following is a list of the switch signals to be tested, in no particular order:

- Turn signals (right, left, hazard warning lights)
- Windshield wiper stage I
- Windshield wiper stage II
- Windshield washer system
- Rear window wiper
- Rear window washer system
- Doors open/closed
- Remote control for central locking with double locking
- Hood up/down (in vehicles fitted with anti-theft alarm system)
- Tailgate open/closed
- A/C request signal
- Heated windshield (if fitted)
- Parking brake
- Brake fluid level
- Cruise control system
- Autolamps
- Dipped beam
- Main beam
- Headlamp flasher
- Side lights
- Reversing lamp
- Tailgate release
- Ignition switch, terminal 15 (turn key to 0 position, then turn key to II position.)

An acoustic signal sounds and the turn signal lamps flash to indicate receipt of each input signal by the generic electronic module.

Test the windshield wiper "intermittent mode" stage input signal (only vehicles with adjustable intermittent mode)

The windshield wiper switch must be switched to "intermittent mode" in order to test the input signal. The delay times of the input signals can then be tested by operating the rotary switch. Each change of the rotary switch position is indicated by an acoustic signal and illumination of the turn signals.

Output signals

SWITCH the wiper switch to the "intermittent" position to test the output signals. PRESSING the heated rear window switch activates the output signals in the following order:

- a. Left-hand turn signal
- b. Right-hand turn signal

DIAGNOSIS AND TESTING

- c. Main beam
- d. Dipped beam
- e. Windshield wiper stage I
- f. Windshield wiper stage II
- g. Heated rear windshield
- h. Heater blower motor
- i. Headlamp washer system (vehicles with HID headlamps)
- j. Electric booster heater (if fitted)
- k. Autolamps (if fitted)
- l. Alarm horn (vehicles with alarm system)
- m. Rear window wiper
- n. Heated rear window relay

When the heated rear window switch is pressed again, the test of the relevant signal is terminated. When the heated rear window switch is pressed once more, the test for the next signal in the list is started.

End service mode

The GEM automatically ends service mode 20 seconds after the last input or at a driving speed of over 7km/h. However, service mode can be manually ended at any time by proceeding as follows:

- PRESS and HOLD the switch of the heated rear window
- SWITCH OFF the ignition.
- RELEASE the switch of the heated rear window

3 signals sound and the turn signal lamps illuminate to indicate that service mode has ended.

Reset service mode

If, after completion of service mode, some functions do not operate or do not operate properly, check the following functions:

- Instrument cluster illumination, side marker lamps (side lights) and licence plate lamp in automatic headlamps mode
- Rear wiper
- Headlamp washer assembly
- Electric booster heater
- Alarm horn
- Heated windshield

If one or more of the listed functions is not OK, it's possible that the cause of the fault is due to not exiting service mode properly. To reactivate the functions correctly, perform the following steps:

1. Switch off the ignition.

2. SWITCH OFF the switch for the windscreen wash/wipe system
3. OPERATE the switch of the heated rear window and HOLD IT THERE
4. SWITCH ON the ignition.
5. RELEASE the heated rear window switch (an acoustic signal will sound if activation has been performed correctly)
6. SWITCH the windscreen wash/wipe switch to the "Intermittent wipe" position
7. OPERATE the heated rear window switch 6 times (the main beam headlamps switch on and off automatically)
8. SWITCH OFF the switch for the windscreen wash/wipe system
9. OPERATE the switch of the heated rear window and HOLD IT THERE
10. Switch off the ignition.
11. RELEASE the heated rear window switch (three acoustic signals will sound if activation has been performed correctly)

After completion of the work, check all the functions.

Inspection and Checking

NOTE: The generic electronic module (GEM) is integrated into the central junction box (CJB).

1. VERIFY customer concern.
2. Visually CHECK for any obvious mechanical or electrical damage.

NOTE: Ensure correct locking of the wiring harness connector.

Visual Inspection

Electrical
Fuses
Wiring harness
Connectors

3. RECTIFY any obvious causes for a concern found during the visual inspection before performing any further tests. CHECK the operation of the system.
4. If the concern persists after the visual inspection, PERFORM a fault diagnosis with the Ford approved diagnostic tool and RECTIFY any displayed faults in accordance with the displayed fault description. CHECK the operation of the system.

DIAGNOSIS AND TESTING

5. For vehicles with no stored fault(s), PROCEED in accordance with the Symptom Chart according to the fault symptom.
6. Following checking or elimination of the fault and after completion of operations, the fault memories of all vehicle modules must be READ OUT and any stored faults must be DELETED. READ OUT all fault memories again following a road test.

Fault Code Table

DTC	Description	Action
B1217	Circuit of anti-theft horn relay faulty	REFER to: Anti-Theft - Active (419-01 Anti-Theft - Active, Diagnosis and Testing).
B1300	Circuit of central locking switch faulty	REFER to: Locks, Latches and Entry Systems (501-14 Handles, Locks, Latches and Entry Systems, Diagnosis and Testing).
B1311	Circuit of door lock unlock switch faulty	REFER to: Locks, Latches and Entry Systems (501-14 Handles, Locks, Latches and Entry Systems, Diagnosis and Testing).
B1317	Battery voltage too high (greater than 16.5 V)	REFER to: Charging System (414-00 Charging System - General Information, Diagnosis and Testing).
B1318	Battery voltage too low (less than 7.5 V)	REFER to: Charging System (414-00 Charging System - General Information, Diagnosis and Testing).
B1320	Circuit of driver side door contact switch faulty (open circuit)	REFER to: Interior Lighting (417-02 Interior Lighting, Diagnosis and Testing).
B1331	Circuit of tailgate contact switch faulty (open circuit)	REFER to: Interior Lighting (417-02 Interior Lighting, Diagnosis and Testing).
B1342	Module error	RENEW the central junction box (CJB).
B1345	Circuit of rear window heater switch faulty (short to ground)	REFER to: (501-11 Glass, Frames and Mechanisms) Glass, Frames and Mechanisms - Vehicles Without: Global Closing (Diagnosis and Testing), Glass, Frames and Mechanisms - Vehicles With: Global Closing (Diagnosis and Testing).

DIAGNOSIS AND TESTING

DTC	Description	Action
B1350	Circuit of heated rear window relay faulty	REFER to: (501-11 Glass, Frames and Mechanisms) Glass, Frames and Mechanisms - Vehicles Without: Global Closing (Diagnosis and Testing), Glass, Frames and Mechanisms - Vehicles With: Global Closing (Diagnosis and Testing).

DIAGNOSIS AND TESTING

DTC	Description	Action
B1447	Circuit of windshield wiper limit switch (park position) faulty (short to ground)	REFER to: Wipers and Washers (501-16 Wipers and Washers, Diagnosis and Testing).
B1502	Circuit of left-hand turn signal lamp faulty (short to ground)	REFER to: Turn Signal and Hazard Lamps (417-01 Exterior Lighting, Diagnosis and Testing).
B1506	Circuit of right-hand turn signal lamp faulty (short to ground)	REFER to: Turn Signal and Hazard Lamps (417-01 Exterior Lighting, Diagnosis and Testing).
B1510	Circuit of flash-to-pass switch faulty (short to ground)	REFER to: Headlamps (417-01 Exterior Lighting, Diagnosis and Testing).
B1520	Circuit of hood contact switch faulty (open circuit)	REFER to: Anti-Theft - Active (419-01 Anti-Theft - Active, Diagnosis and Testing).
B1570	Circuit of high beam switch faulty (short to ground)	REFER to: Headlamps (417-01 Exterior Lighting, Diagnosis and Testing).
B1577	Circuit of headlight switch (side light) faulty (short to voltage)	REFER to: Headlamps (417-01 Exterior Lighting, Diagnosis and Testing).
B1614	Circuit of rear window wiper switch faulty (short to ground)	REFER to: Wipers and Washers (501-16 Wipers and Washers, Diagnosis and Testing).
B1792	Circuit of headlight switch (Autolamps) faulty (short to voltage) - vehicles with auto-on system for exterior lighting	REFER to: Headlamps (417-01 Exterior Lighting, Diagnosis and Testing).
B1796	Circuit of headlight switch (dipped beam) faulty (short to voltage)	REFER to: Headlamps (417-01 Exterior Lighting, Diagnosis and Testing).
B1812	Circuit of reversing light switch faulty (short to voltage)	REFER to: Reversing Lamps (417-01 Exterior Lighting, Diagnosis and Testing).
B1838	Circuit of power saving function relay faulty	Refer to the Ford approved diagnostic tool.

DIAGNOSIS AND TESTING

DTC	Description	Action
B1873	Circuit of hazard warning light switch faulty (short to ground)	REFER to: Turn Signal and Hazard Lamps (417-01 Exterior Lighting, Diagnosis and Testing).
B1966	Circuit of auxiliary heater faulty (short to voltage)	REFER to: Electric Booster Heater (412-02 Auxiliary Heating, Diagnosis and Testing).
B2094	Circuit of heated windshield relay faulty	REFER to: (501-11 Glass, Frames and Mechanisms) Glass, Frames and Mechanisms - Vehicles Without: Global Closing (Diagnosis and Testing), Glass, Frames and Mechanisms - Vehicles With: Global Closing (Diagnosis and Testing).
B2113	Circuit of windshield heater switch faulty (short to ground)	REFER to: (501-11 Glass, Frames and Mechanisms) Glass, Frames and Mechanisms - Vehicles Without: Global Closing (Diagnosis and Testing), Glass, Frames and Mechanisms - Vehicles With: Global Closing (Diagnosis and Testing).

DIAGNOSIS AND TESTING

DTC	Description	Action
B2114	Circuit of windshield washer system switch faulty (short to ground)	REFER to: Wipers and Washers (501-16 Wipers and Washers, Diagnosis and Testing).
B2115	Circuit of rear window washer system switch faulty (short to ground)	REFER to: Wipers and Washers (501-16 Wipers and Washers, Diagnosis and Testing).
B2175	Circuit of A/C system ON/OFF switch faulty (short to ground)	REFER to: Climate Control System (412-00 Climate Control System - General Information, Diagnosis and Testing).
B2177	Circuit of interior monitoring sensor faulty	REFER to: Anti-Theft - Active (419-01 Anti-Theft - Active, Diagnosis and Testing).
B2179	Circuit of front windshield wash/wipe system switch (Intermittent switch position) faulty (short to ground)	REFER to: Wipers and Washers (501-16 Wipers and Washers, Diagnosis and Testing).
B2180	Circuit of windshield wiper switch (switch position 2) faulty (short to ground)	REFER to: Wipers and Washers (501-16 Wipers and Washers, Diagnosis and Testing).
B2181	Circuit of windshield wiper switch (switch position 3) faulty (short to ground)	REFER to: Wipers and Washers (501-16 Wipers and Washers, Diagnosis and Testing).
B2258	Circuit of headlamp wash/wipe system relay faulty	REFER to: Wipers and Washers (501-16 Wipers and Washers, Diagnosis and Testing).
B2477	Faulty module configuration	CONFIGURE the GEM again using the Ford approved diagnostic tool. If the fault occurs again, RENEW the CJB.

DIAGNOSIS AND TESTING

DTC	Description	Action
B2478	Circuit of anti-theft alarm system deactivation switch faulty (short to ground)	REFER to: Anti-Theft - Active (419-01 Anti-Theft - Active, Diagnosis and Testing).
B2515	Circuit of blower motor relay faulty	REFER to: Climate Control System (412-00 Climate Control System - General Information, Diagnosis and Testing).
B2665	Circuit of alarm horn with battery faulty (short to voltage)	REFER to: Anti-Theft - Active (419-01 Anti-Theft - Active, Diagnosis and Testing).
B2667	Circuit of tailgate unlock switch faulty (short to ground)	REFER to: Locks, Latches and Entry Systems (501-14 Handles, Locks, Latches and Entry Systems, Diagnosis and Testing).
B2671	Circuit of tailgate unlock motor faulty	REFER to: Locks, Latches and Entry Systems (501-14 Handles, Locks, Latches and Entry Systems, Diagnosis and Testing).
B2898	Circuit of right-hand turn signal lamp faulty	REFER to: Instrument Cluster (413-01 Instrument Cluster, Diagnosis and Testing).
B2899	Circuit of left-hand turn signal lamp faulty	REFER to: Instrument Cluster (413-01 Instrument Cluster, Diagnosis and Testing).
B2902	Circuit of tailgate contact switch faulty	REFER to: Locks, Latches and Entry Systems (501-14 Handles, Locks, Latches and Entry Systems, Diagnosis and Testing).
B2947	Circuit of global closing function faulty (short to ground /open circuit)	REFER to: Glass, Frames and Mechanisms - Vehicles With: Global Closing (501-11 Glass, Frames and Mechanisms, Diagnosis and Testing).
B2949	Circuit of global closing function faulty (short to voltage)	REFER to: Glass, Frames and Mechanisms - Vehicles With: Global Closing (501-11 Glass, Frames and Mechanisms, Diagnosis and Testing).
C1327	Circuit of brake fluid reservoir switch faulty (open circuit)	REFER to: Brake System (206-00 Brake System - General Information, Diagnosis and Testing).

DIAGNOSIS AND TESTING

DTC	Description	Action
C1751	Circuit of vehicle speed sensor faulty (short to voltage) - vehicles with sliding roof and without ABS	REFER to: Electronic Engine Controls (303-14 Electronic Engine Controls, Diagnosis and Testing).
C1752	Circuit of vehicle speed sensor faulty (short to ground /open circuit) - vehicles with sliding roof and without ABS	REFER to: Electronic Engine Controls (303-14 Electronic Engine Controls, Diagnosis and Testing).
P0071	Circuit of ambient temperature sensor faulty	Refer to the Ford approved diagnostic tool.
P0565	Circuit of cruise control switch faulty (ON switch)	REFER to: Speed Control (310-03 Speed Control, Diagnosis and Testing).
P0566	Circuit of cruise control switch faulty (OFF switch)	REFER to: Speed Control (310-03 Speed Control, Diagnosis and Testing).
P0567	Circuit of cruise control switch faulty (Resume switch)	REFER to: Speed Control (310-03 Speed Control, Diagnosis and Testing).
P0568	Circuit of cruise control switch faulty (Acceleration switch)	REFER to: Speed Control (310-03 Speed Control, Diagnosis and Testing).
P0569	Circuit of speed control switch faulty (Deceleration switch)	REFER to: Speed Control (310-03 Speed Control, Diagnosis and Testing).
P0579	Circuit of speed control switch faulty	REFER to: Speed Control (310-03 Speed Control, Diagnosis and Testing).
P0581	Circuit of speed control switch faulty	REFER to: Speed Control (310-03 Speed Control, Diagnosis and Testing).

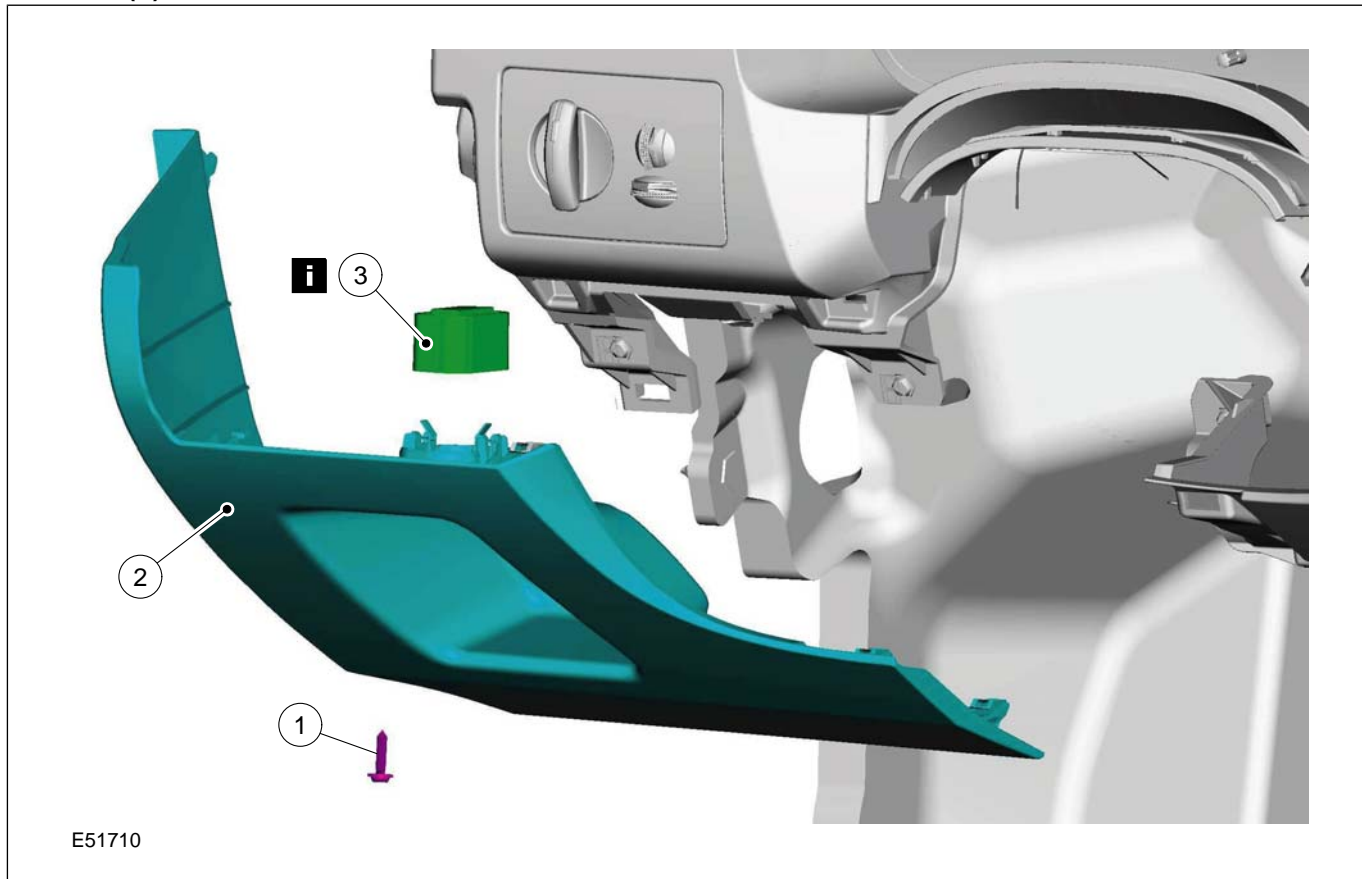
Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Generic electronic module (GEM) not communicating with the diagnostic unit 	<ul style="list-style-type: none"> Fuse(s). Circuit(s). Generic electronic module (GEM). 	<ul style="list-style-type: none"> REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).
<ul style="list-style-type: none"> Various functions of the generic electronic module are not working 	<ul style="list-style-type: none"> The self-test was not ended correctly. 	<ul style="list-style-type: none"> See Reset service mode.

REMOVAL AND INSTALLATION

Lighting Control Module (LCM)

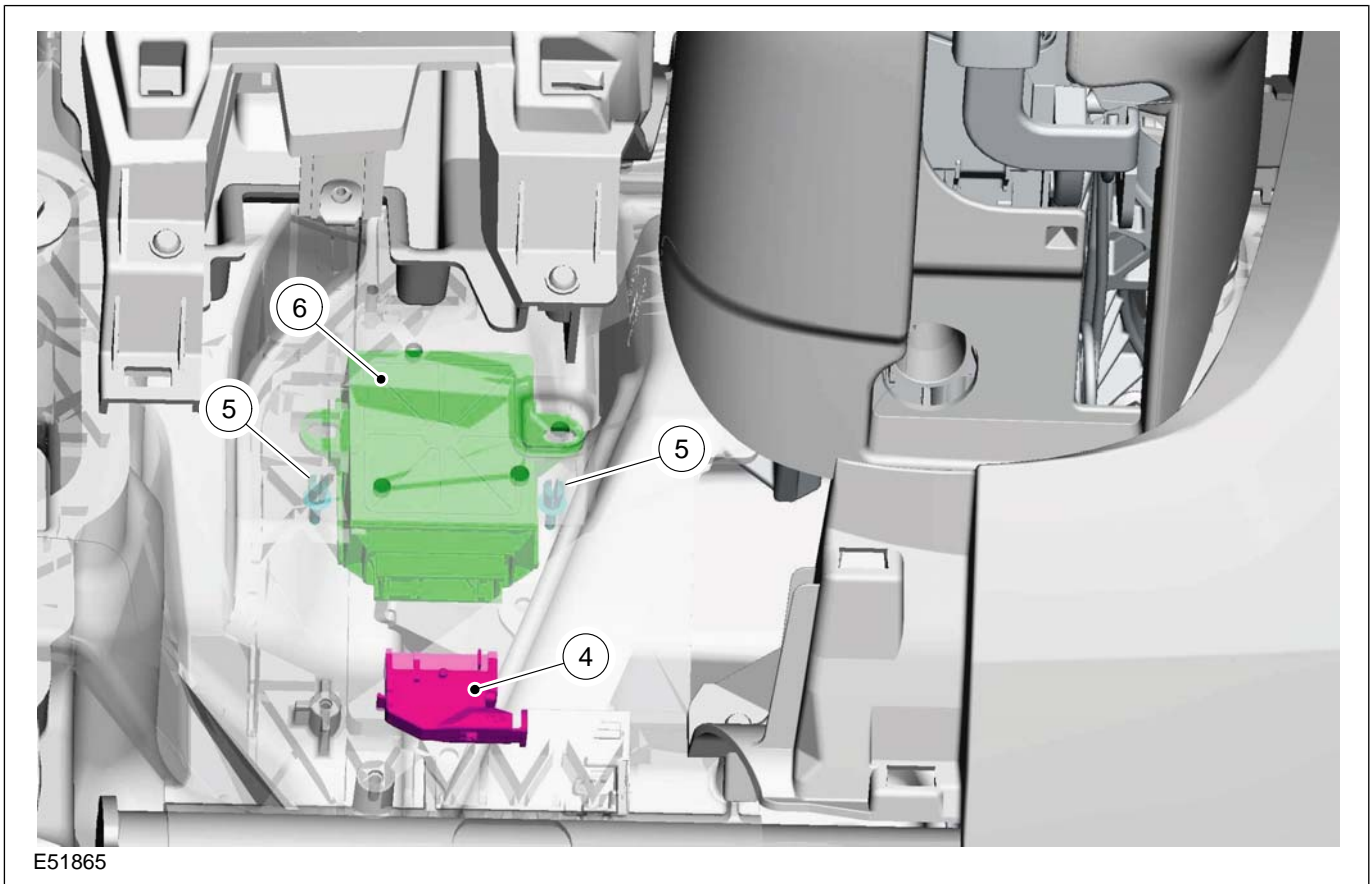
1. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Bolt, lower dashboard cover
2	Lower dashboard cover
3	Data link connector (DLC) See Removal Detail

REMOVAL AND INSTALLATION

NOTE: The LCM is mounted on the rear side of the dashboard, above the dashboard crossmember.



Item	Description
4	LCM connector
5	LCM clips
6	LCM

2. To install, reverse the removal procedure.

NOTE: Following replacement of the LCM, configure the headlamp leveling system using WDS.

NOTE: Following installation of the LCM, calibrate the headlamp leveling system using WDS.

3. NOTE: Only vehicles with xenon headlamps
Align the headlamps.

For additional information, refer to:
Headlamp Adjustment (417-01 Exterior
Lighting, General Procedures).

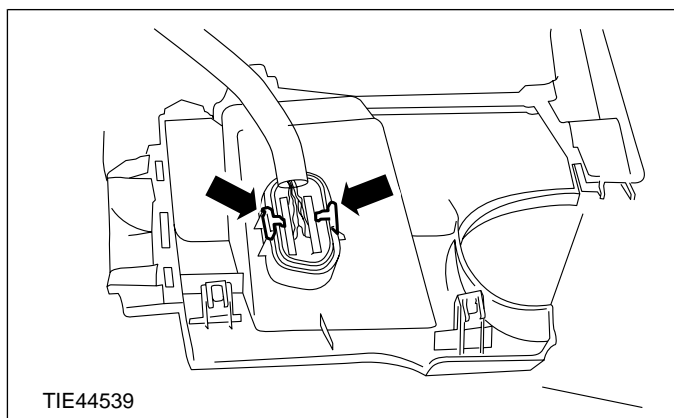
4. NOTE: Only vehicles with dynamic cornering
headlamps

Perform an operating check on the dynamic
cornering headlamps.

Removal Details

REMOVAL AND INSTALLATION**Item 3 Data link connector (DLC)**







1. Detach the DLC from the lower dashboard cover.



REMOVAL AND INSTALLATION

Generic Electronic Module (GEM)

CAUTIONS:

-  Never swap the GEM between two vehicles.
-  Compare the number of relays and fuses in the defective GEM and the new GEM. Transfer from the defective GEM any relays and fuses which are not in the new GEM. In doing so, pay attention that fuses with the correct Ampere rating are used, by referring to the wiring diagrams.
-  When installing a new GEM on vehicles with daytime running lamps, make sure that fuses F110 (10A) and F113 (10A) are fitted as part of the repair.
-  When installing a new GEM on vehicles with electrically folding exterior mirrors and on vehicles with an alarm system horn with integral battery, make sure that fuses F137 (10A) are fitted as part of the repair.
-  When installing a new GEM on vehicles with a petrol engine, make sure that fuse F111 (15A) and relay R19 are fitted as part of the repair.
-  When installing a new GEM on vehicles built from 03/2007, make sure that the revised fuse designation is provided in the Owner's Handbook.

NOTE: The GEM is integrated into the central junction box (CJB) and cannot be removed individually.

1. **NOTE:** This step only needs to be carried out when changing the GEM.

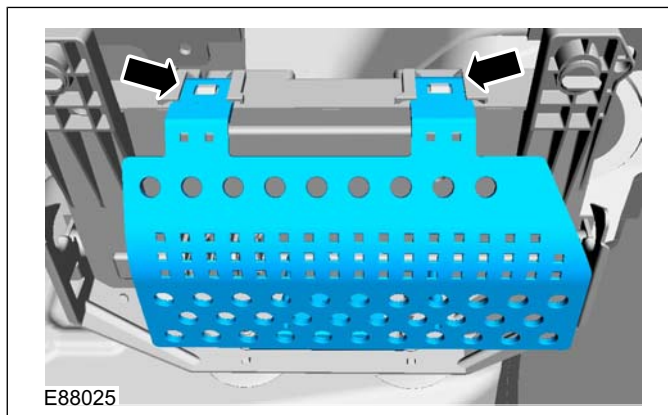
Read the vehicle-specific data from the GEM using the diagnostic tester.

For additional information, refer to:

Programmable Module Installation (418-01 Module Configuration, General Procedures).

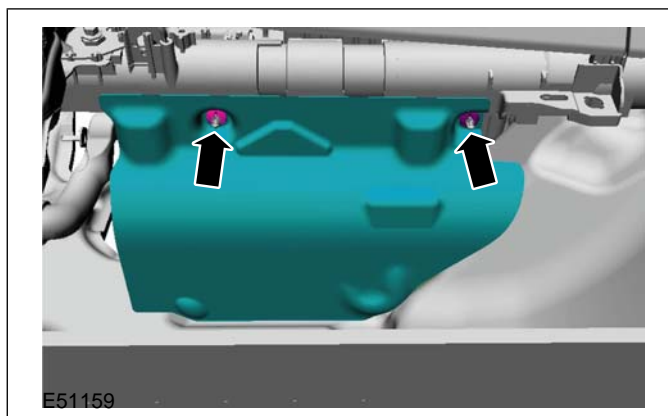
2. **NOTE:** This operation is only required on vehicles with low equipment levels.

Remove the passenger's side footwell trim.



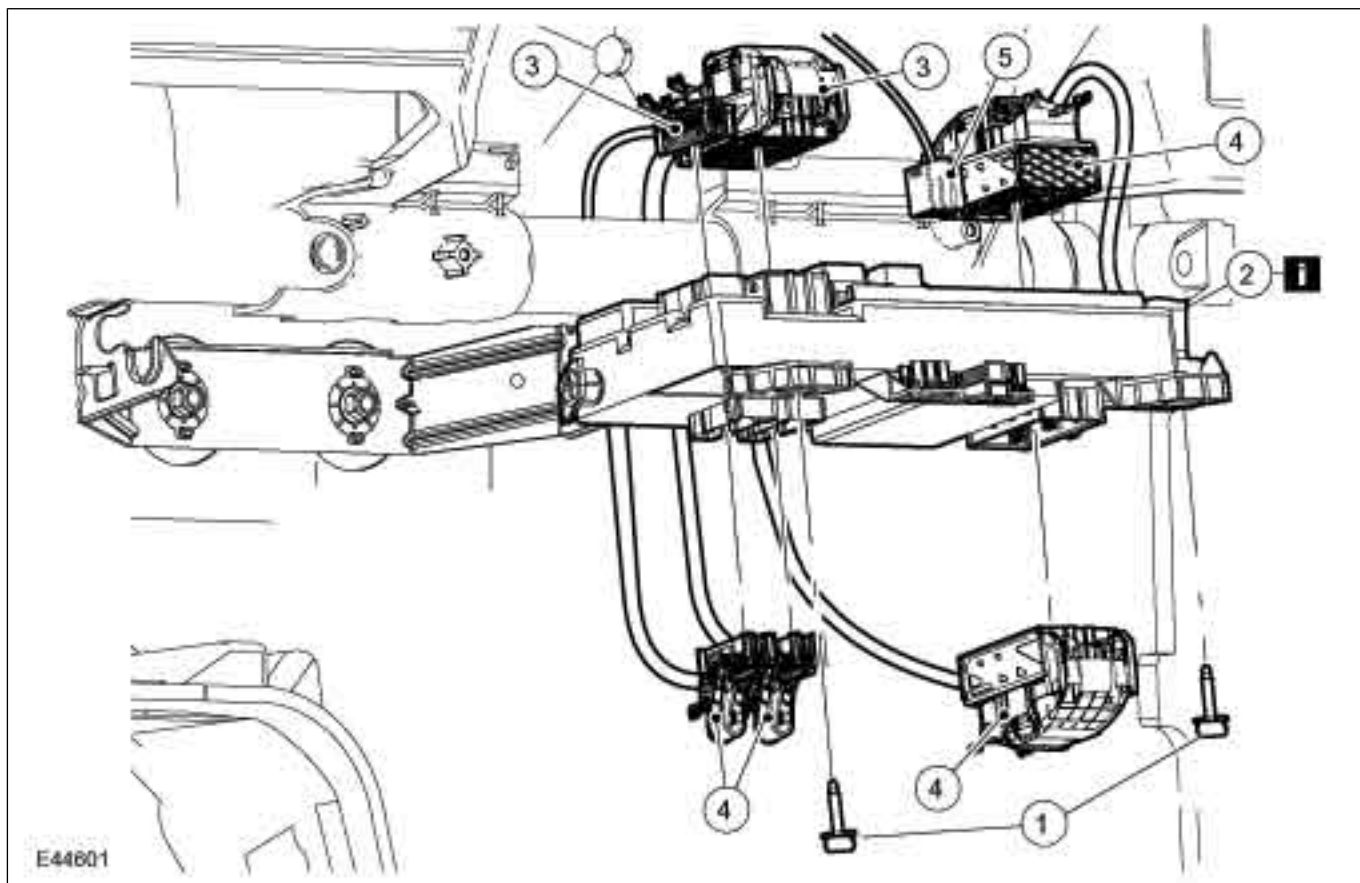
3. **NOTE:** This operation is only required on vehicles with high equipment levels.

Remove the passenger's side footwell trim.



4. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



Item	Description
1	CJB bolts
2	CJB See Removal Detail
3	Instrument panel wiring harness connector
4	Engine wiring harness connector See Removal Detail
5	Overhead console wiring harness connector

5. To install, reverse the removal procedure.

6. Programme the GEM.

For additional information, refer to: **Programmable Module Installation** (418-01 Module Configuration, General Procedures).

7. **NOTE:** This operation is only required on vehicles with remote control and without the keyless vehicle system.

Program the remote control receiver with the diagnostic tester.

8. Program remote transmitter.

For additional information, refer to: **Remote Transmitter Programming** (501-14 Handles, Locks, Latches and Entry Systems, General Procedures).

Removal Details

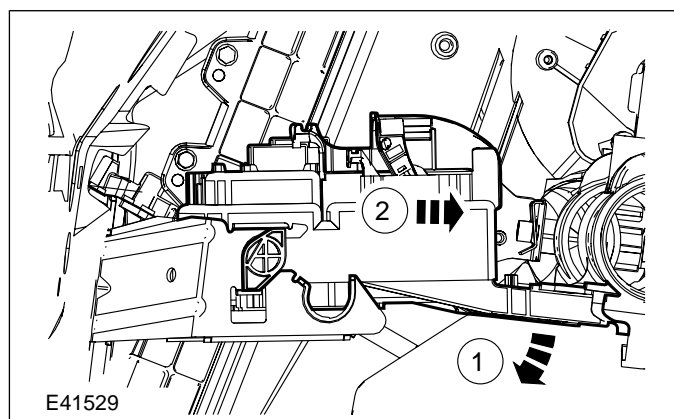
Item 2 CJB

1. Detach the CJB from the CJB bracket.

1. Turn the CJB downwards.

REMOVAL AND INSTALLATION

2. Remove the CJB.

**Item 4 Engine wiring harness connector**

NOTE: On vehicles built from 01/2007, the position of the engine wiring loom connector (C100) changes from the underside of the GEM to the top side.

GROUP

5

Body and Paint

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SECTION 501-02 Front End Body Panels

VEHICLE APPLICATION: 2008.75 Focus ST C307

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REMOVAL AND INSTALLATION	
Cowl Panel Grille.....	501-02-4
Fender.....	501-02-6



GENERAL PROCEDURES

Hood Alignment(41 213 0)

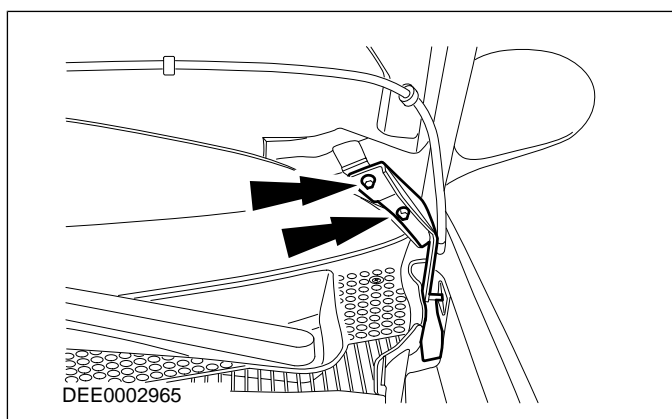
Adjustment

1. **NOTE:** Adjust the hood without the hood latch.

Remove the hood latch. For additional information, refer to Section 501-14 [Handles, Locks, Latches and Entry Systems].

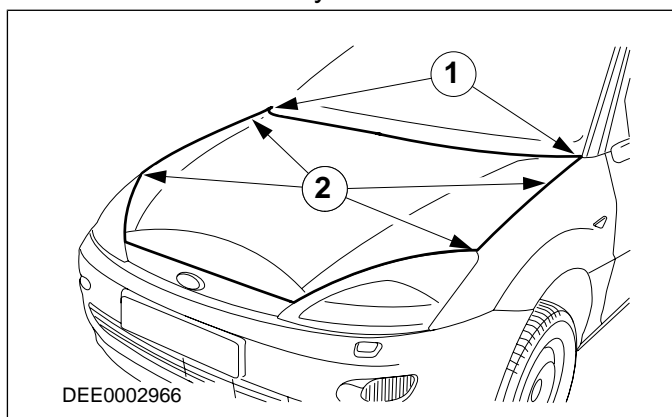
2. **NOTE:** It is not possible to adjust the rear of the hood to the height of the fender.

Slacken the screws of the hood hinge approximately half a turn.



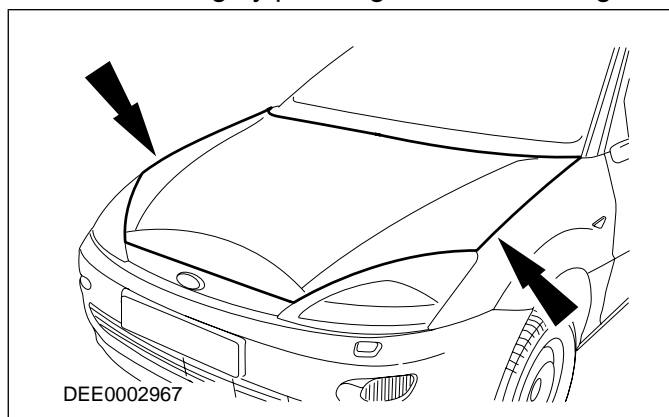
3. **Adjust the hood in the longitudinal direction.**

1. Adjust the hood so that the rear edges of the fender and the edge of the hood line up.
2. Check that the clearances with the left and right-hand fenders run parallel and correct them if necessary.

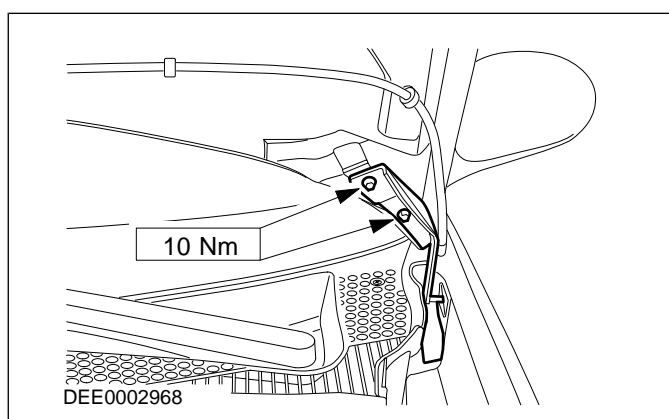


4. **Adjust the clearances with the left and right-hand fenders.**

- The clearances with the fenders must be the same width on the left and right-hand sides. The clearances can be equalized by opening the hood on the hood support rod and correcting by pressing it to the left or right.



5. **Tighten the screws.**

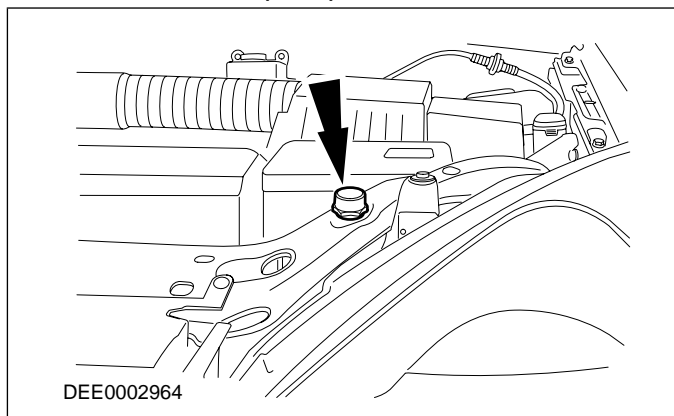


6. **NOTE:** The hood must rest uniformly on both bump stop rubbers.

Adjust the front of the hood to the height of the fenders.

GENERAL PROCEDURES

- Adjust the hood to the height of the fenders with the bump stop rubbers.



- 7. NOTE: The clearances and edge alignment must be correct before the hood latch is installed.**

Install the hood latch.

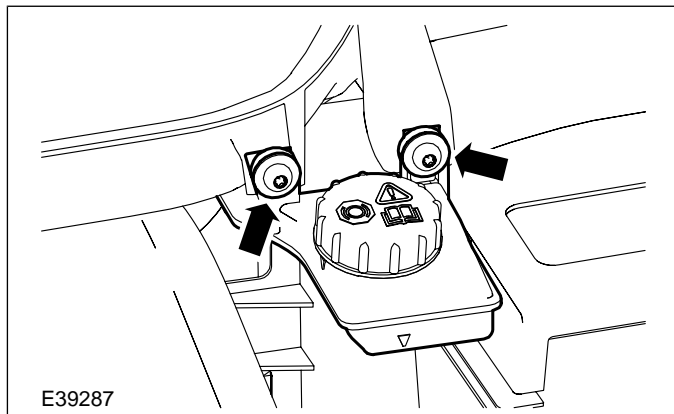
- The hood latch must be installed so that the hood engages without stress and the clearances on the left and right-hand sides are not changed.

REMOVAL AND INSTALLATION

Cowl Panel Grille

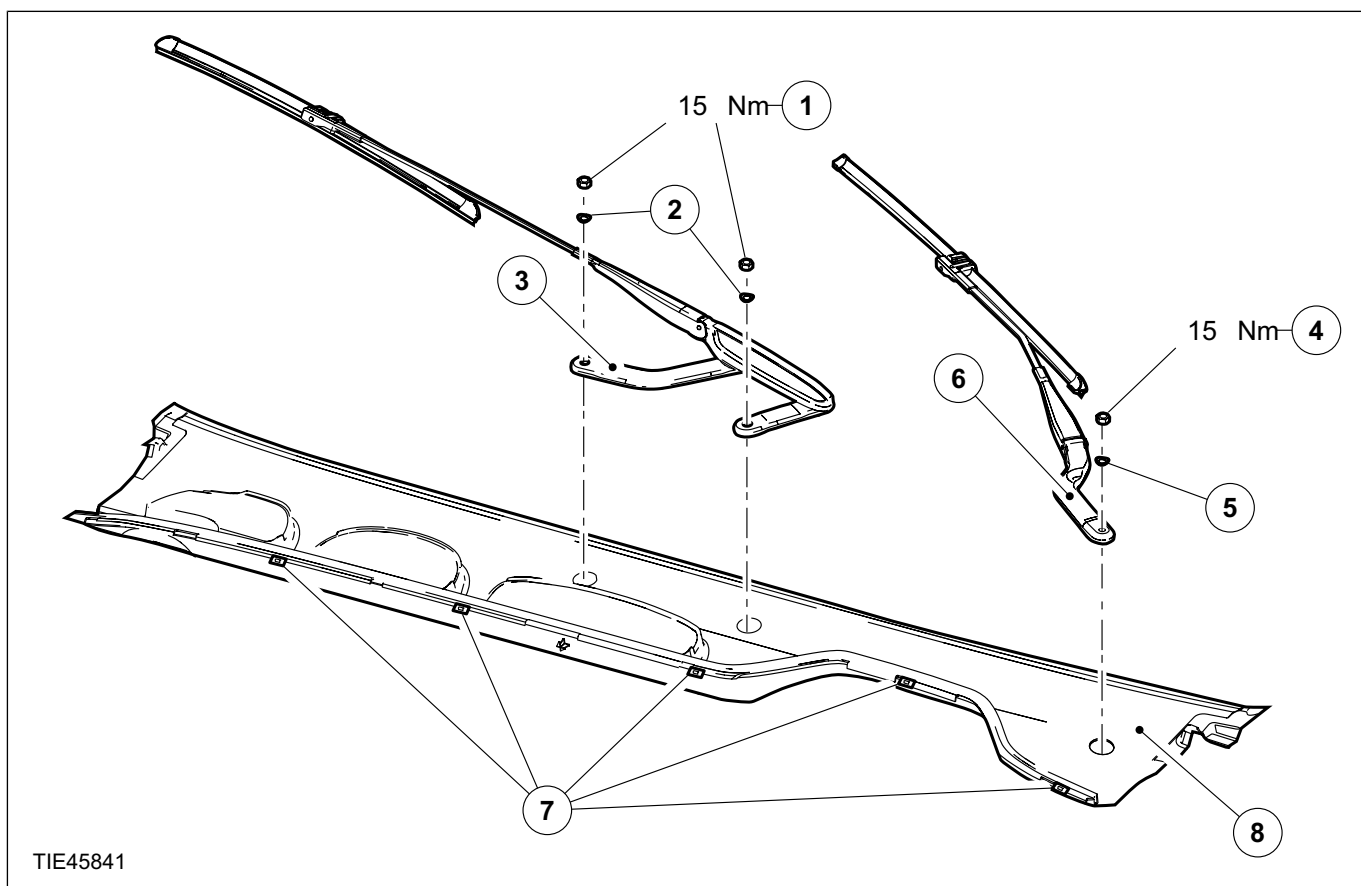
1. Remove the brake fluid reservoir from the cowl panel.

2. Remove the components in the order indicated in the following illustration(s) and table(s).



CAUTION: Ensure that the wiper motor is in the park position.

NOTE: Left-hand side shown.



Item	Description
1	Windshield wiper arm bolts (passenger side)
2	Windshield wiper arm washer (passenger side)

Item	Description
3	Windshield wiper arm (passenger side)
4	Windshield wiper arm bolts (driver side)
5	Windshield wiper arm washer (driver side)
6	Windshield wiper arm (driver side)

REMOVAL AND INSTALLATION

Item	Description
7	Cowl panel clips
8	Cowl panel

3. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Fender

Removal

NOTE: Removal steps in this procedure may contain installation details.

1. Detach the wheel and tire.

Refer to: [Wheel and Tire \(204-04 Wheels and Tires, Removal and Installation\)](#).

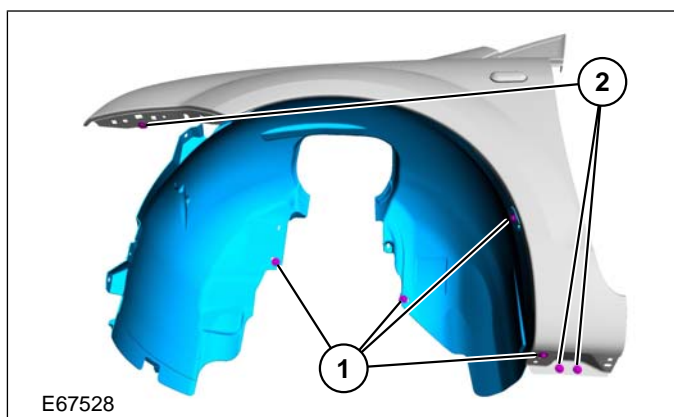
2. Detach the front bumper cover.

Refer to: [Front Bumper Cover - 3-Door \(501-19 Bumpers, Removal and Installation\)](#).

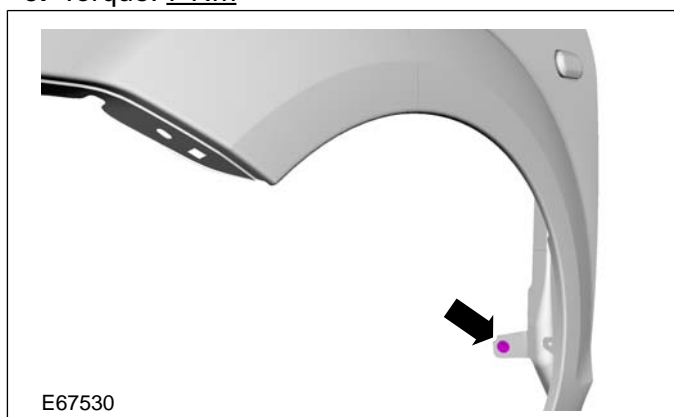
3. Remove the cowl panel grille.

Refer to: [Cowl Panel Grille \(501-02 Front End Body Panels, Removal and Installation\)](#).

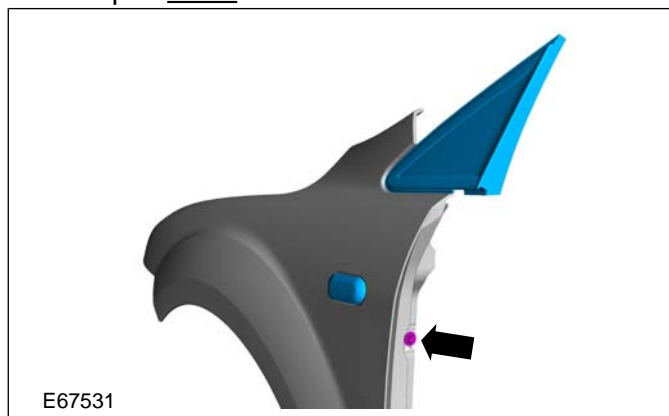
4. 1. Torque: 5 Nm
2. Torque: 7 Nm



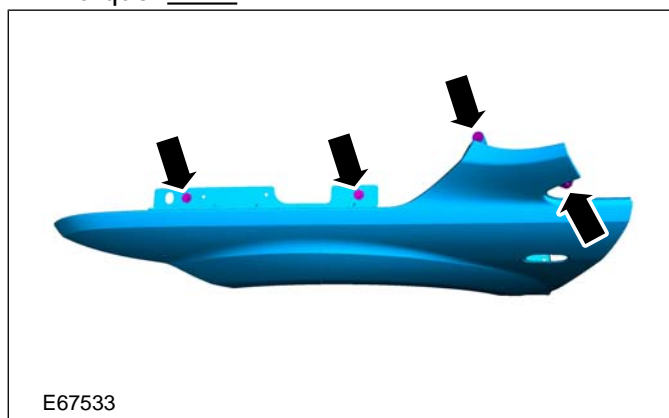
5. Torque: 7 Nm



6. Torque: 7 Nm



7. Torque: 7 Nm



Installation

1. To install, reverse the removal procedure.



SECTION 501-03 Body Closures

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS**Lubricants, Fluids, Sealers and Adhesives**

	Specifications
Adhesive - Loctite 243	WSK-M2G349-A7

Torque Specifications

Item	Nm	lb-ft	lb-in
Door hinge center retaining bolt	15	11	-
Door hinge to body retaining screws	30	22	-
Door hinge to door retaining screws	48	35	-
Door check strap to body retaining screw	23	17	-
Door check strap to door retaining nuts	11	8	-
Door latch to door retaining screws	8	-	71
Door striker to body retaining screws	20	15	-
Liftgate hinge to body retaining screw	23	17	-
Liftgate hinge to liftgate retaining screws	23	17	-
Liftgate latch to liftgate retaining bolts	20	15	-
Liftgate striker to body retaining screws	25	18	-
Hood hinge to body retaining nuts	23	17	-
Hood hinge to hood retaining nuts	9	-	80
Luggage compartment lid striker retaining bolts	25	18	-
Luggage compartment hinge to luggage compartment lid retaining bolts	23	17	-
Luggage compartment lid hinge to body retaining bolts	23	17	-
Luggage compartment lid hinge mechanism to luggage compartment lid retaining screws - Convertible	25	18	-
Luggage compartment lid latch to luggage compartment lid retaining screws - Convertible	25	18	-
Luggage compartment lid side latch to luggage compartment lid retaining screws - Convertible	10	7	-
Luggage compartment lid side latch motor to luggage compartment lid retaining screws - Convertible	10	7	-
Luggage compartment lid lift cylinder lower pin retaining nut - Convertible	7	-	62
Luggage compartment lid lift cylinder bracket retaining nuts - Convertible	10	7	-
Luggage compartment lid hinge mechanism retaining screws - Convertible	25	18	-

501-03-3

Body Closures

501-03-3

SPECIFICATIONS

Item	Nm	lb-ft	lb-in
Luggage compartment lid side latch striker retaining screws - Convertible	4	-	35
Luggage compartment lid hinge mechanism latch to body retaining screws - Convertible	25	18	-
Luggage compartment lid hinge mechanism latch to luggage compartment lid hinge mechanism retaining screws - Convertible	4	-	35
Luggage compartment cover bracket cover bolts - Convertible	3	-	27
Convertible top module electrical connector cover nuts	2.2	-	20
Convertible top hydraulic pump bracket nuts	25	18	-

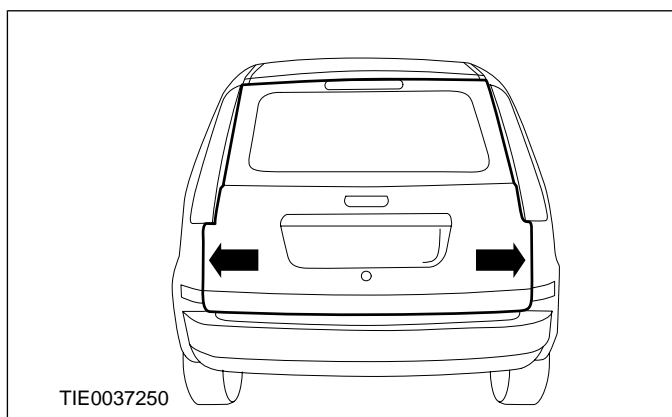
GENERAL PROCEDURES

Liftgate Alignment(41 653 0)

1. Make sure that the liftgate is in the fully closed position.

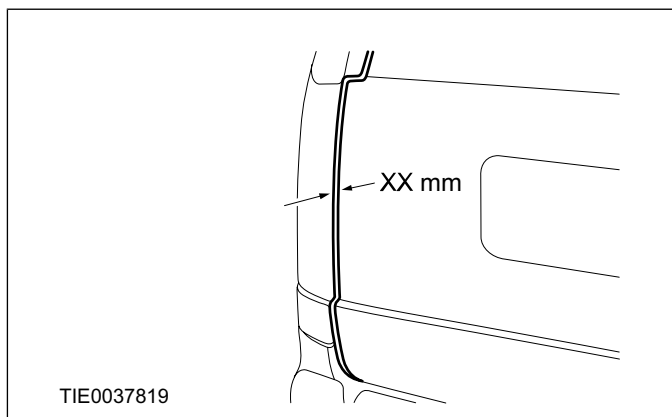
2. **NOTE:** The liftgate must be positioned centrally in the liftgate opening.

Check and note any misalignment of the liftgate in relation to the liftgate opening.



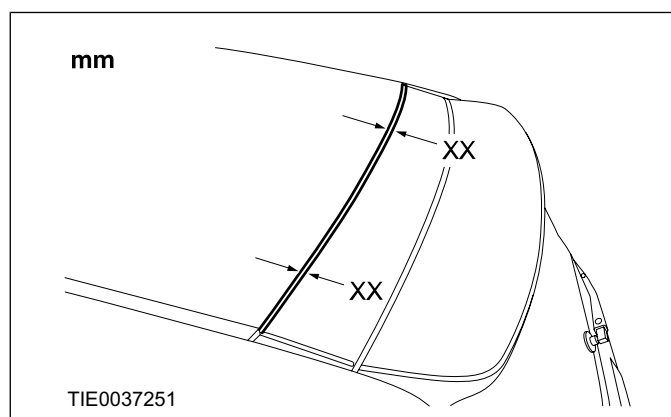
3. Check and note any misalignment of the liftgate in relation to the rear body panel on both sides (left hand side shown).

• $XX = -1.0 \text{ mm} \pm 1.0 \text{ mm}$.



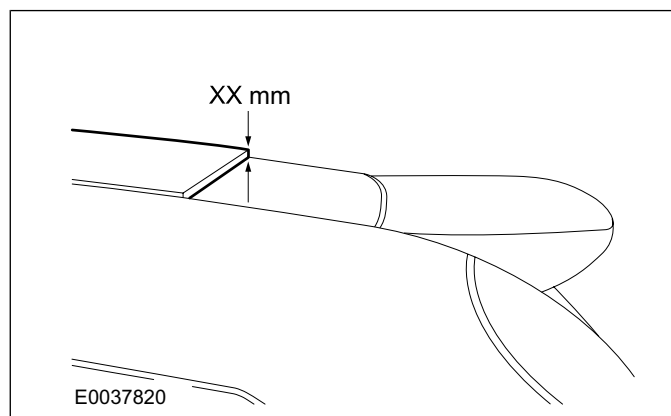
4. Check and note any misalignment of the liftgate in relation to the roof panel.

• $XX = 4.0 \text{ mm} \pm 1.0 \text{ mm}$.

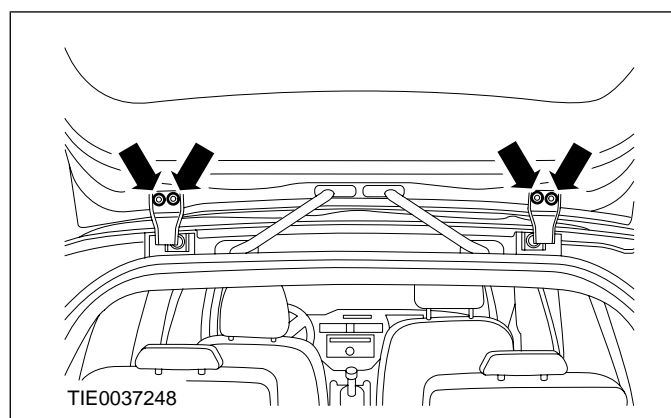


5. Check and note any misalignment of the liftgate in relation to the roof panel.

• $XX = -1.0 \text{ mm} \pm 1.0 \text{ mm}$.

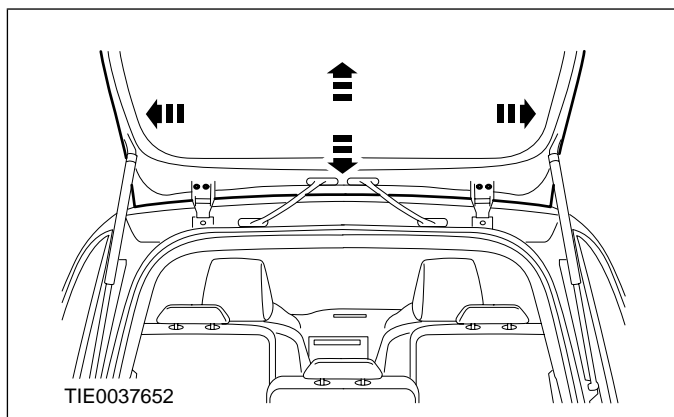


6. If adjustment is required, open the liftgate and loosen the liftgate hinge to liftgate retaining screws one complete turn.

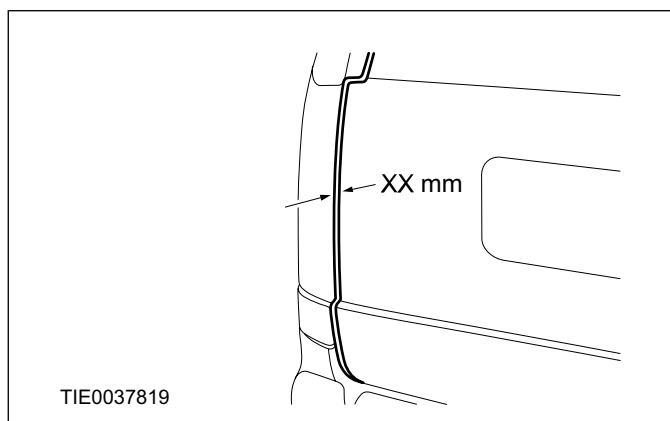


GENERAL PROCEDURES

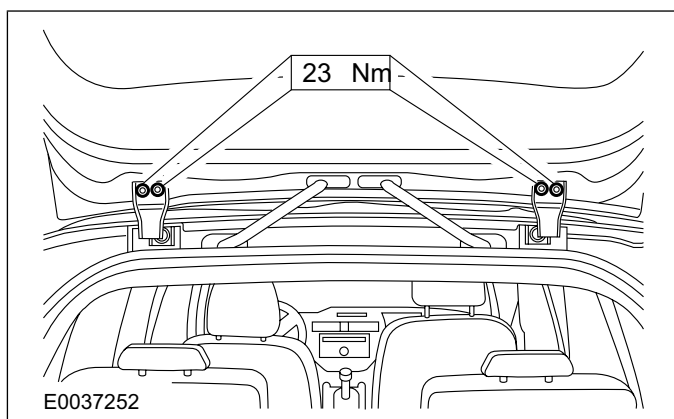
7. Adjust the liftgate as necessary.



• $XX = -1.0 \text{ mm} \pm 1.0 \text{ mm}$.

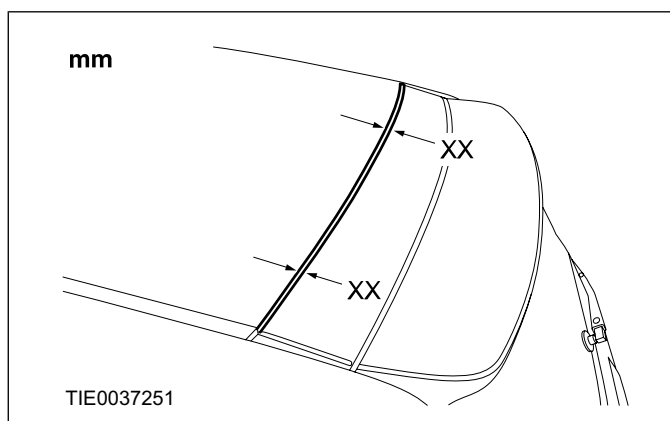


8. Tighten the liftgate hinge to liftgate retaining screws.



12. Check and note any misalignment of the liftgate in relation to the roof panel.

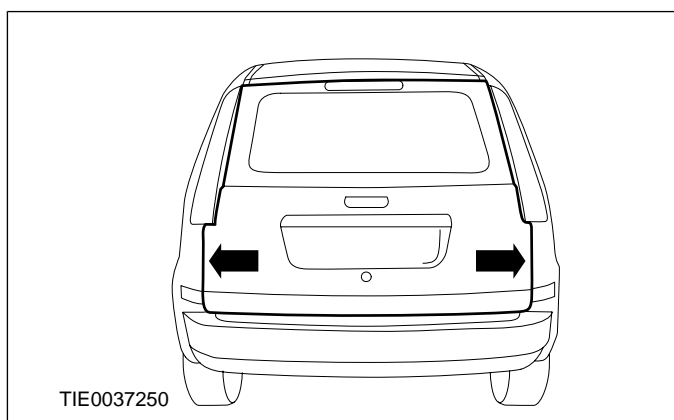
• $XX = 4.0 \text{ mm} \pm 1.0 \text{ mm}$.



9. Make sure that the liftgate is in the fully closed position.

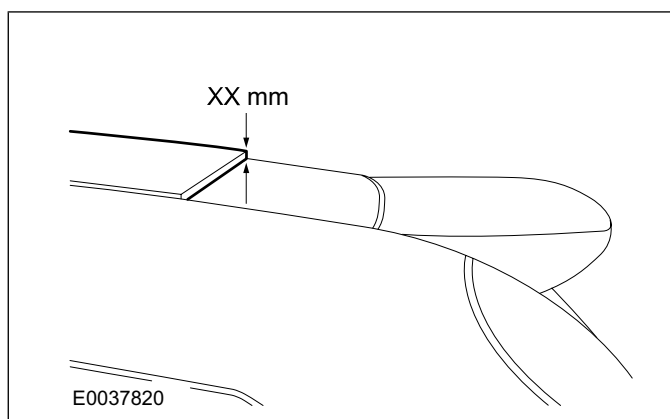
10. NOTE: The liftgate must be positioned centrally in the liftgate opening.

Check and note any misalignment of the liftgate in relation to the liftgate opening.



13. Check and note any misalignment of the liftgate in relation to the roof panel.

• $XX = -1.0 \text{ mm} \pm 1.0 \text{ mm}$.



11. Check and note any misalignment of the liftgate in relation to the rear body panel on both sides (left hand side shown).

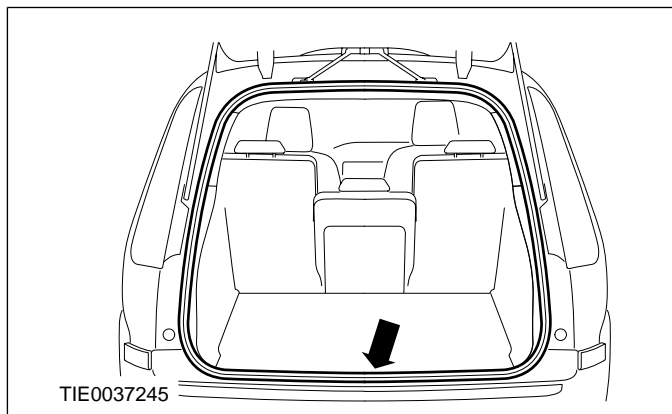
14. NOTE: If the liftgate alignment cannot be achieved at the liftgate hinges to liftgate, adjustment must be carried out at the liftgate hinges to body.

NOTE: If adjustment of the liftgate hinges to body is required the headliner must be removed.

GENERAL PROCEDURES

Open the liftgate.

15. Remove the liftgate opening weatherstrip.

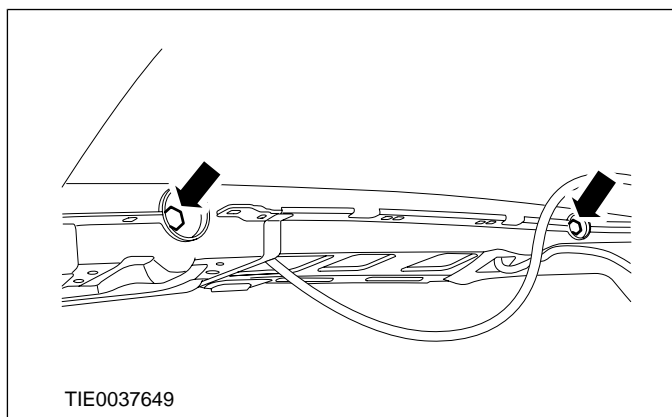


16. Remove the headliner.

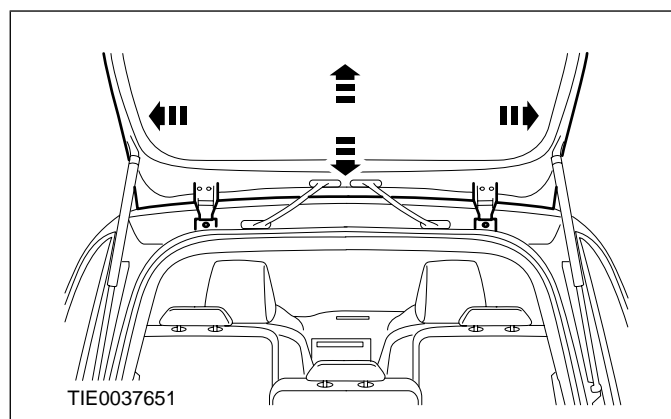
For additional information, refer to:
Headliner - 3-Door, Vehicles With: Sliding Roof Opening Panel (501-05 Interior Trim and Ornamentation, Removal and Installation)

/ Headliner - 3-Door, Vehicles Without: Sliding Roof Opening Panel (501-05 Interior Trim and Ornamentation, Removal and Installation).

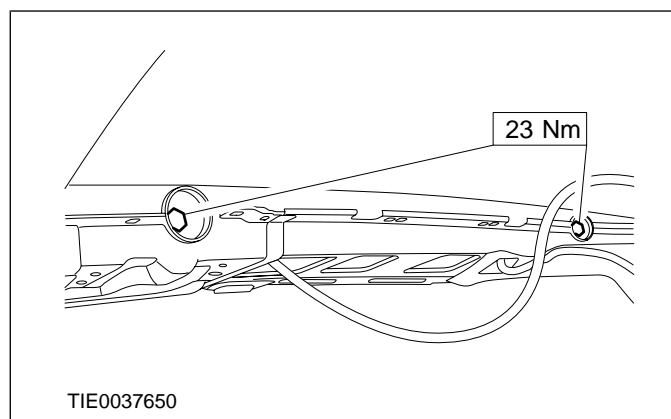
17. Loosen the liftgate hinge to body retaining screws one complete turn.



18. Adjust the liftgate as necessary.



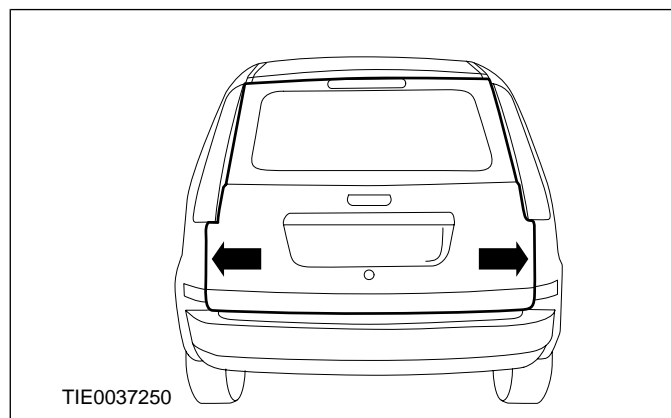
19. Tighten the liftgate hinge to body retaining screws.



20. Make sure that the liftgate is in the fully closed position.

21. **NOTE:** The liftgate must be positioned centrally in the liftgate opening.

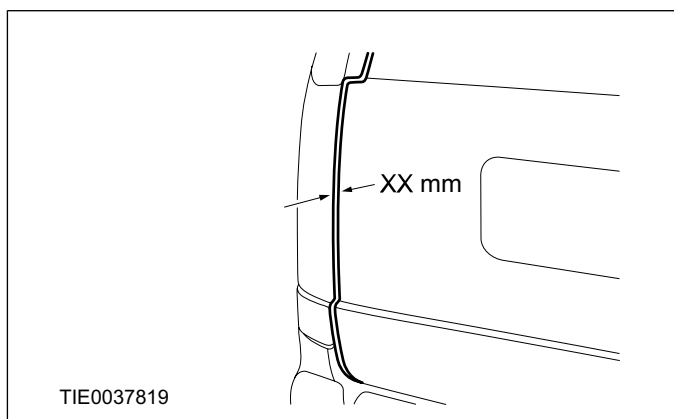
Check and note any misalignment of the liftgate in relation to the liftgate opening.



22. Check and note any misalignment of the liftgate in relation to the rear body panel on both sides (left hand side shown).

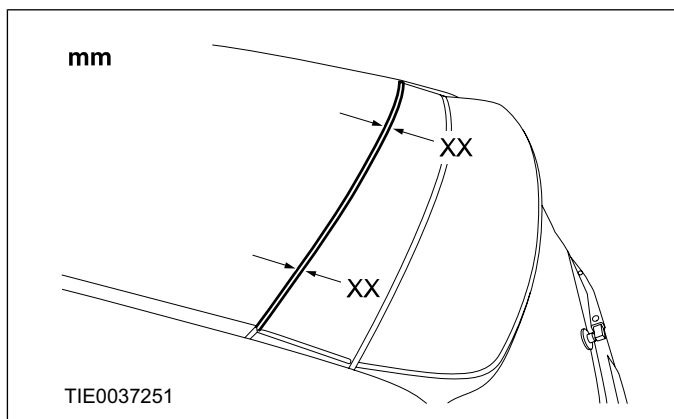
GENERAL PROCEDURES

- $XX = -1.0 \text{ mm} \pm 1.0 \text{ mm}$.



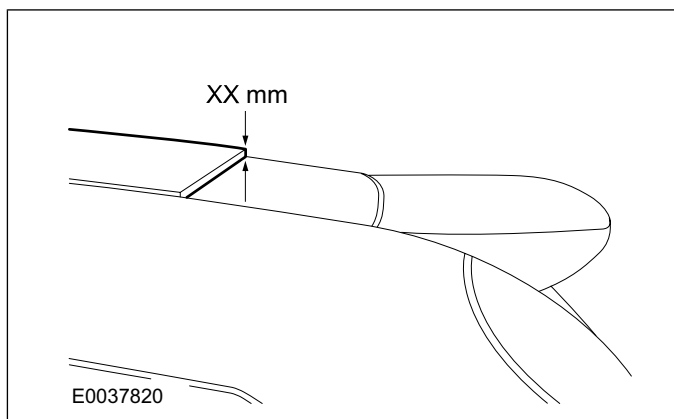
23. Check and note any misalignment of the liftgate in relation to the roof panel.

- $XX = 4.0 \text{ mm} \pm 1.0 \text{ mm}$.



24. Check and note any misalignment of the liftgate in relation to the roof panel.

- $XX = -1.0 \text{ mm} \pm 1.0 \text{ mm}$.



25. If further adjustment is required repeat the liftgate hinge to body adjustment.

26. If no further adjustment is required open the liftgate.

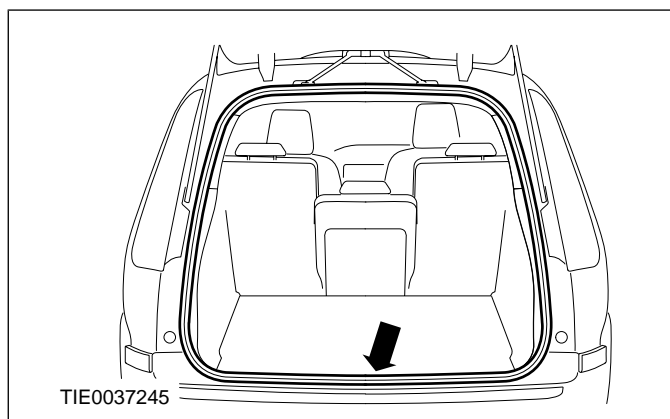
27. Install the headliner.

For additional information, refer to:

Headliner - 3-Door, Vehicles With: Sliding Roof Opening Panel (501-05 Interior Trim and Ornamentation, Removal and Installation)

/ Headliner - 3-Door, Vehicles Without: Sliding Roof Opening Panel (501-05 Interior Trim and Ornamentation, Removal and Installation).

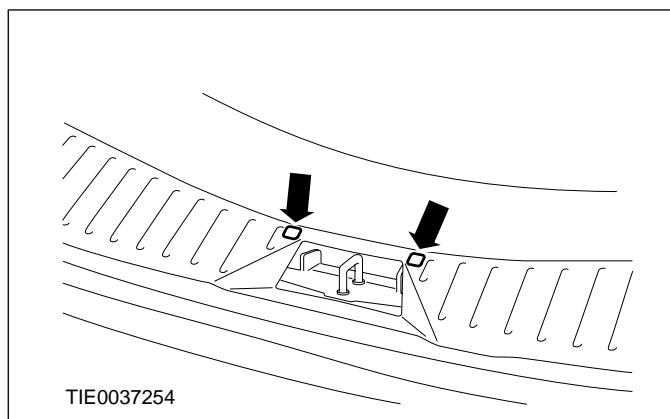
28. Install the liftgate opening weatherstrip.



29. With the aid of another technician on the inside of the vehicle, check and note any misalignment of the liftgate latch striker plate in relation to the liftgate latch.

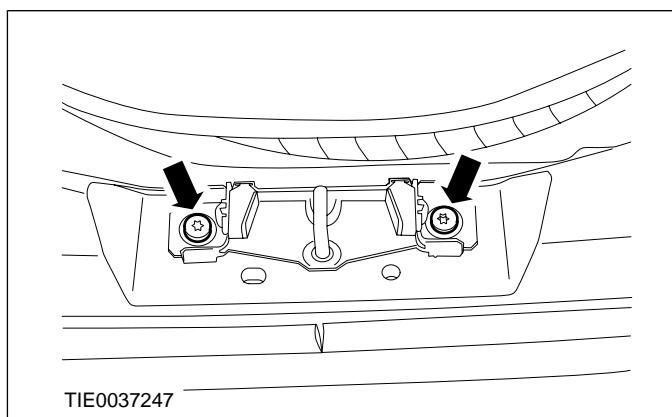
30. Open the liftgate.

31. Remove the liftgate latch striker plate retaining screw covers.

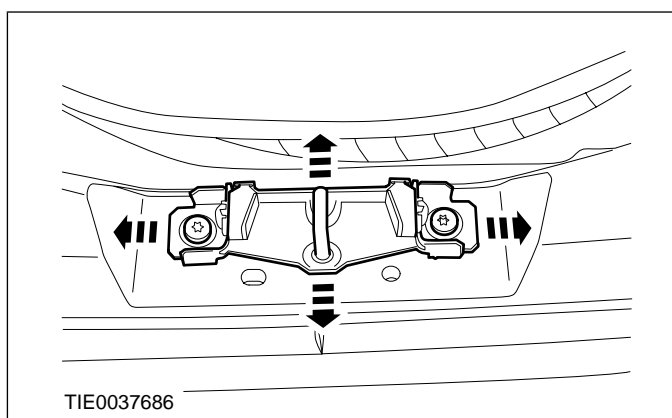


GENERAL PROCEDURES

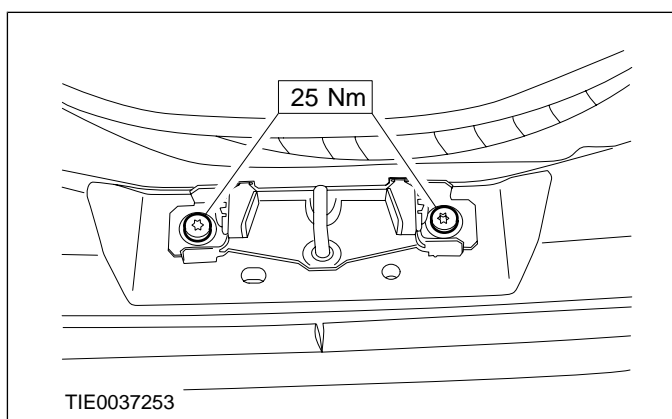
32. Loosen the liftgate latch striker plate retaining screws one half turn (liftgate opening scuff plate removed for clarity).



33. Adjust the liftgate latch striker plate as necessary (liftgate opening scuff plate removed for clarity).



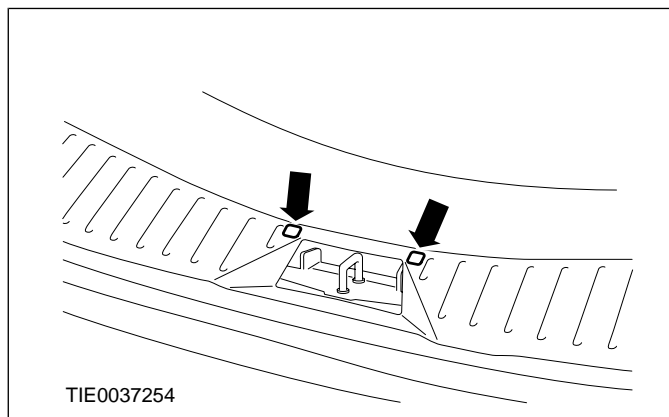
34. Tighten the liftgate latch striker plate retaining screws (liftgate opening scuff plate removed for clarity).



35. With the aid of another technician on the inside of the vehicle, check and note any misalignment of the liftgate latch striker plate in relation to the liftgate latch.

36. If further adjustment is required repeat the liftgate latch striker plate adjustment.

37. If no further adjustment is required, install the liftgate latch striker plate retaining screw covers.



GENERAL PROCEDURES

Door Alignment — 3-Door

General Equipment

Transmission jack

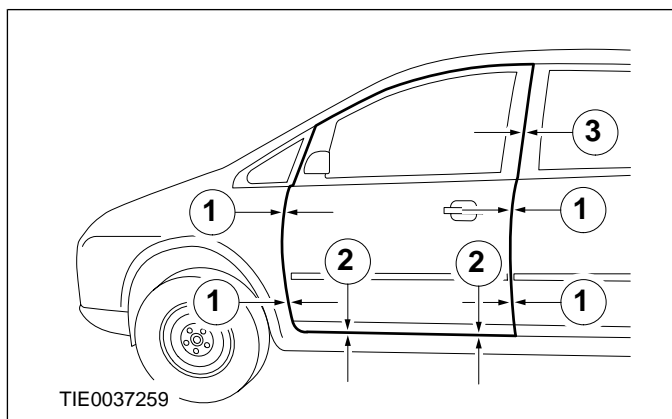
Materials

Name	Specification
Adhesive - Loctite 243	WSK-M2G349-A7

1. **NOTE:** Make sure that the door is in the fully closed position.

Check and note any misalignment of the door in relation to the door frame.

1. 3.5 mm \pm 1.0 mm.
2. 6.0 mm \pm 2.0 mm.
3. 4.5 mm \pm 1.5 mm.



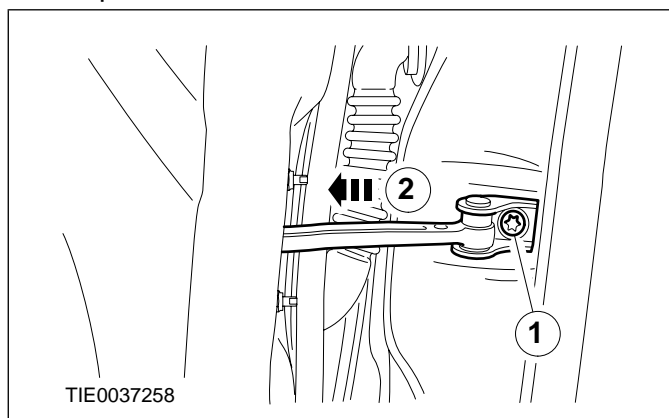
2. If adjustment is required open the door and mark the position of the door hinges, to use as reference points as necessary.

3. **NOTE:** Due to limited access to the door hinge retaining screws on the A-pillar, the door must be removed.

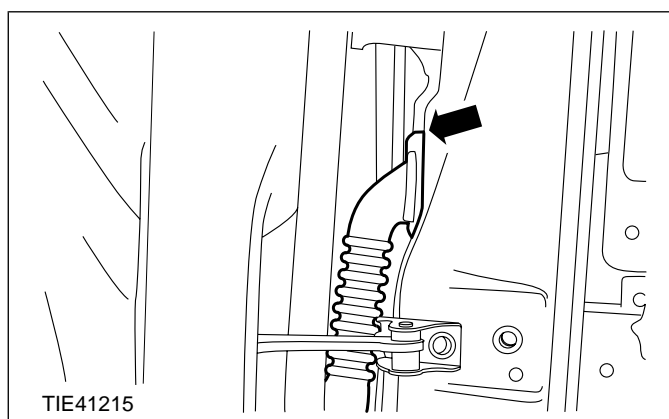
Detach the door check strap from the A-pillar.

1. Remove the retaining screw.

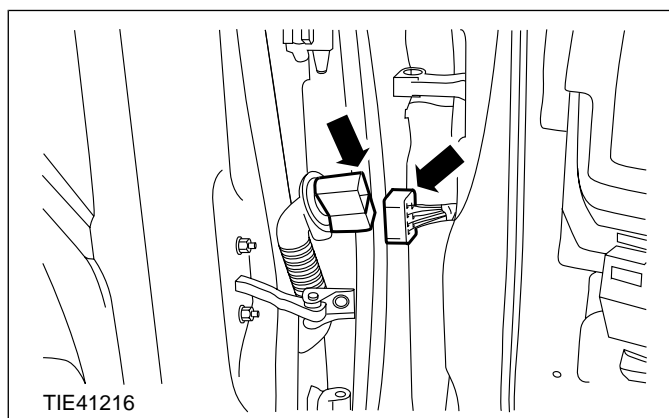
2. Push the check strap to the fully closed position.



4. Detach the electrical connector from the A-pillar.



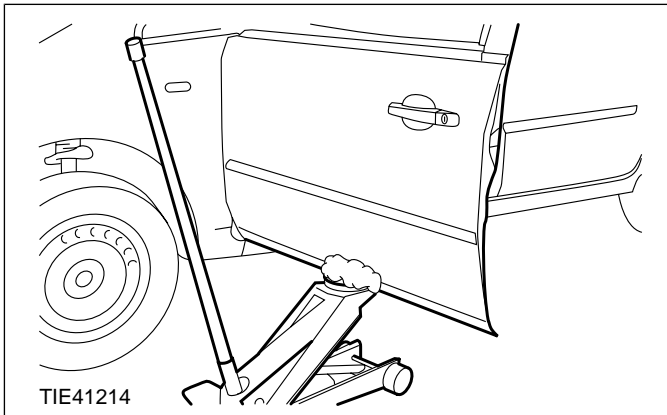
5. Disconnect the electrical connector.



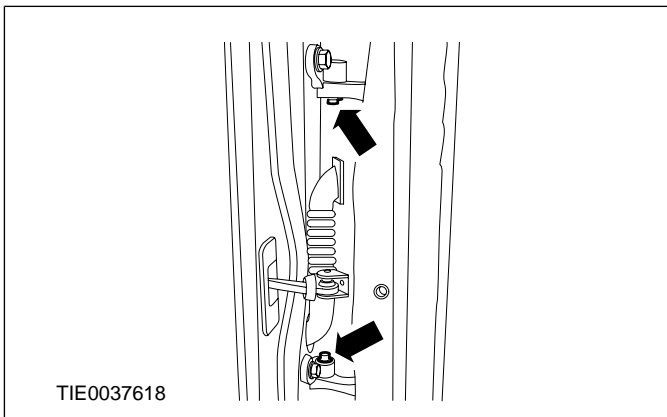
6. **CAUTION:** Protect the door using a soft cloth to prevent damage.

GENERAL PROCEDURES

With the aid of another technician and a suitable transmission **jack**, support the door.



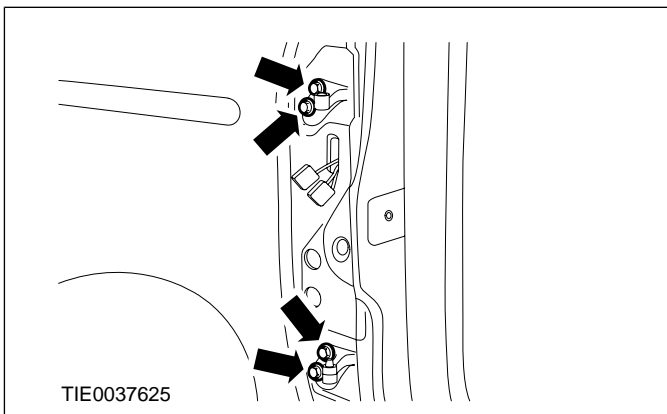
7. Remove and discard the door hinge center retaining bolts.



8. **CAUTION:** Take care when moving the door upwards as considerable force may be required to separate the door hinges from the door hinge cones.

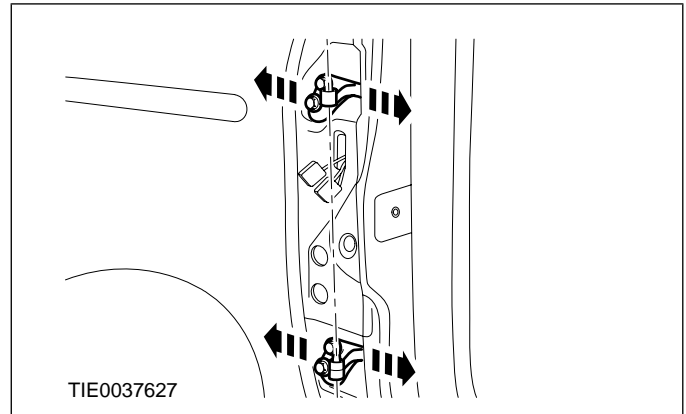
With the aid of another technician remove the door.

9. Loosen the door hinge to A-pillar retaining screws one half turn.



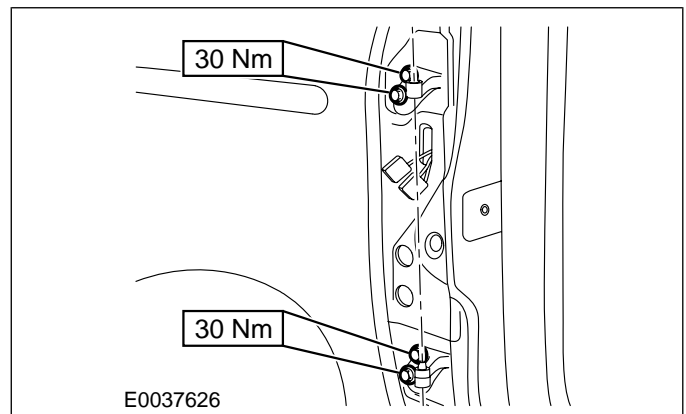
10. **CAUTION:** Make sure that the door hinges maintain a common pivot center line.

Adjust the door hinges as necessary.



11. **CAUTION:** Make sure that the door hinges maintain a common pivot center line.

Tighten the door hinge to A-pillar retaining screws.



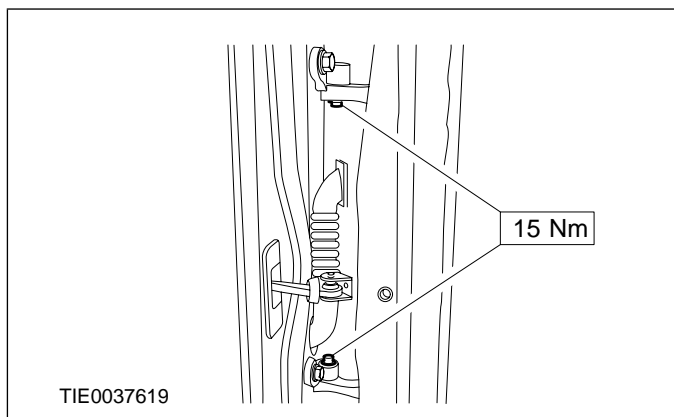
12. Install the door.

- Make sure that the door hinge cones are correctly located.

13. **NOTE:** Do not apply adhesive at this stage.

GENERAL PROCEDURES

Install new door hinge center retaining bolts.

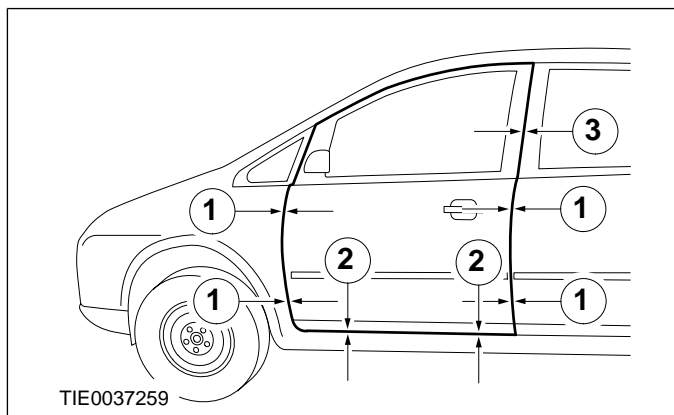


14. Close the door.

15. **NOTE:** Make sure that the door is in the fully closed position.

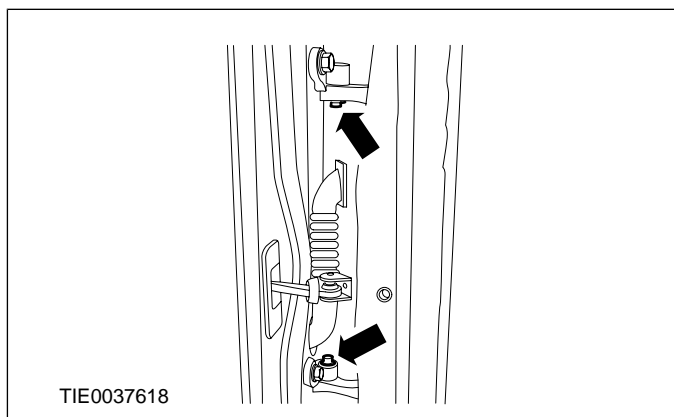
Check and note any misalignment of the door in relation to the door frame.

- 1. 3.5 mm ± 1.0 mm.
- 2. 6.0 mm ± 2.0 mm.
- 3. 4.5 mm ± 1.5 mm.



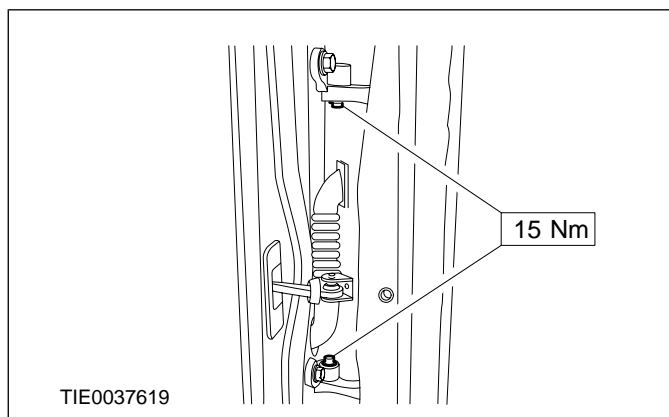
16. If further adjustment is required repeat the door hinge to A-pillar adjustment.

17. If no further adjustment is required, remove the door hinge center retaining bolts.



18. Apply a coating of adhesive to the door hinge center retaining bolts.

19. Install the door hinge center retaining bolts.

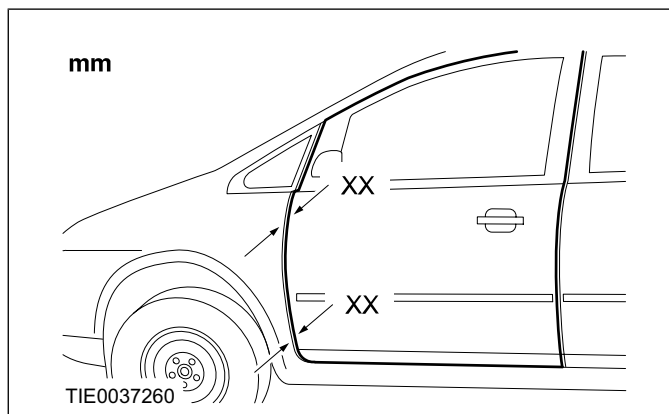


20. Close the door.

21. **NOTE:** Make sure that the door is in the fully closed position.

Check and note any misalignment of the door in relation to the fender.

- XX = -1.0 mm +1.0 mm to -2.0 mm.

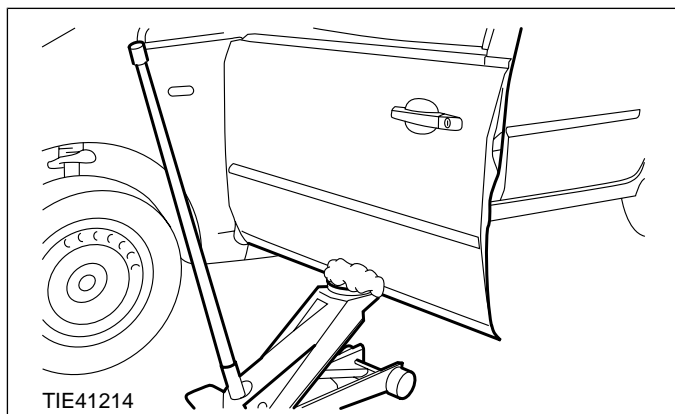


22. Open the door.

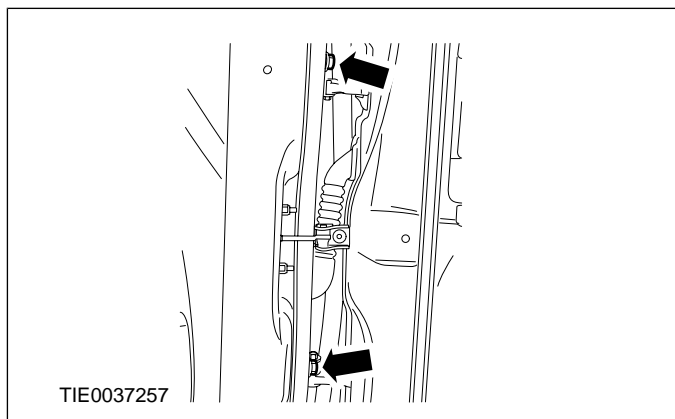
23. **CAUTION:** Protect the door using a soft cloth to prevent damage.

GENERAL PROCEDURES

With the aid of another technician and a suitable transmission jack, support the door.

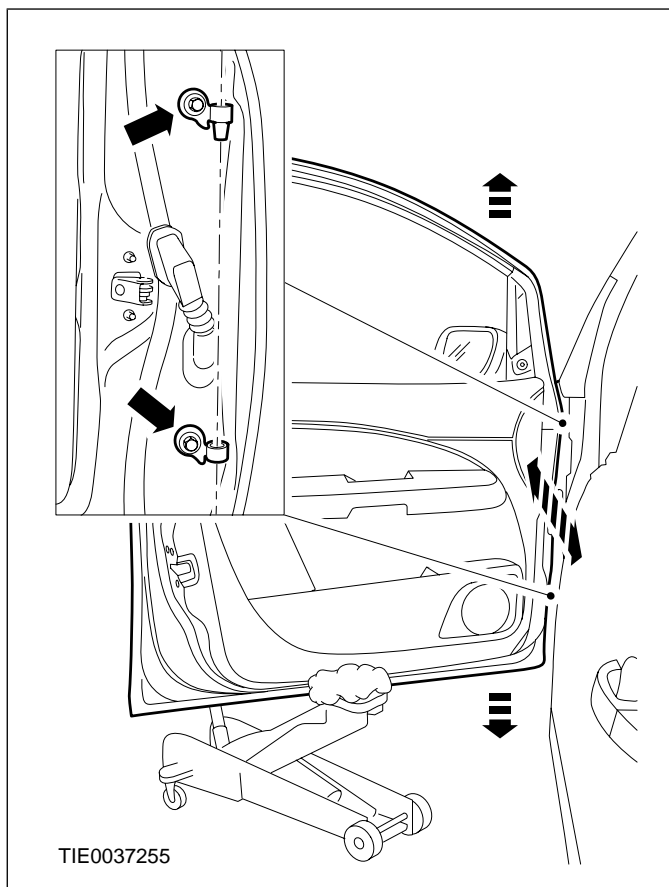


24. Loosen the door hinge to door retaining screws one complete turn.



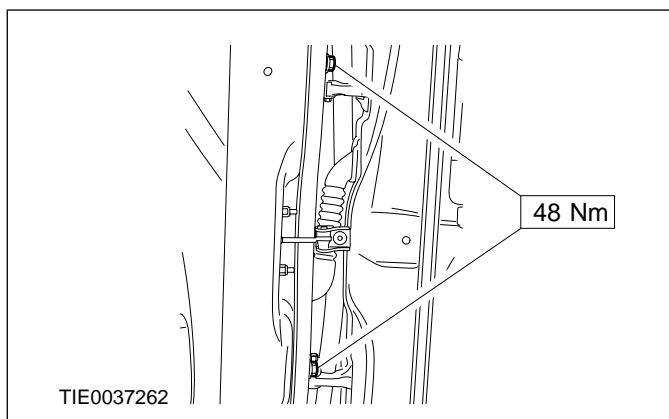
25. **⚠ CAUTION:** Make sure that the door hinge cones are correctly located and have a common pivot center line.

Adjust the door hinges as necessary.



26. **⚠ CAUTION:** Make sure that the door hinge cones are correctly located and have a common pivot center line.

Tighten the door hinge to door retaining screws.



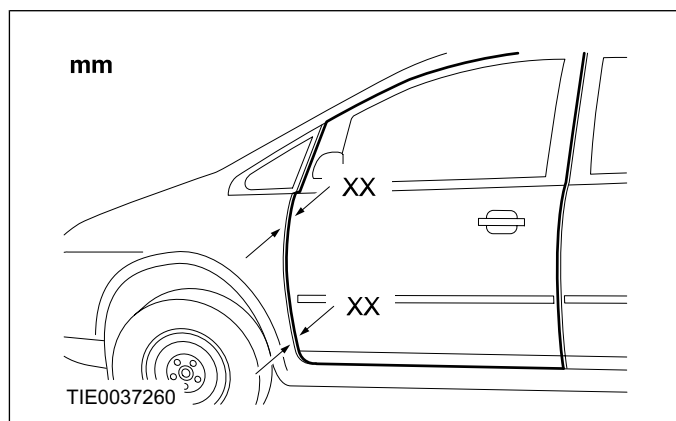
27. Close the door.

28. **NOTE:** Make sure that the door is in the fully closed position.

Check and note any misalignment of the door in relation to the fender.

GENERAL PROCEDURES

- XX = -1.0 mm +1.0 mm to -2.0 mm.

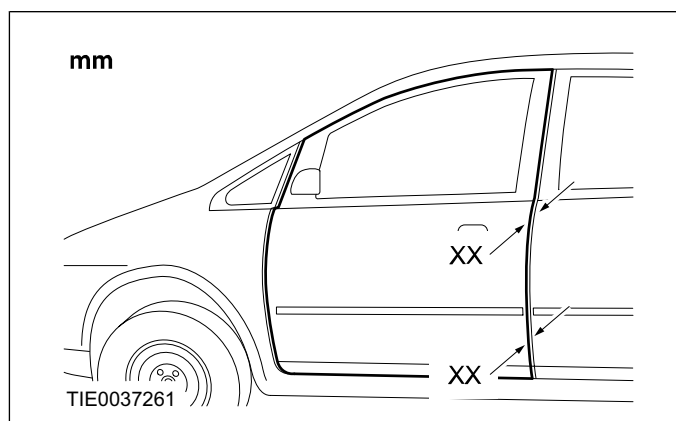


29. If further adjustment is required repeat the door hinge to door adjustment.

30. NOTE: Make sure that the door is in the fully closed position.

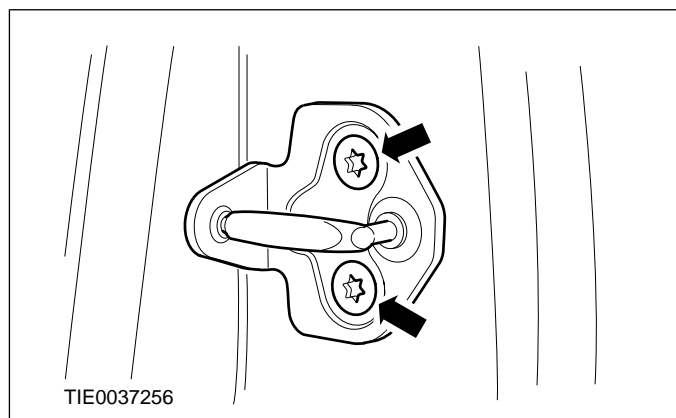
If no further adjustment is required check and note any misalignment of the door in relation to the body side panel.

- XX = 0.0 mm +1.0 mm to -0.0 mm.



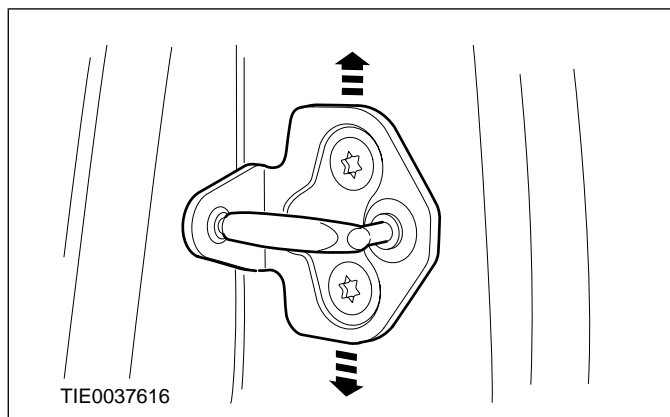
31. Open the door and mark the position of the door latch striker plate, to use as reference points as necessary.

32. Loosen the striker plate retaining screws one half turn.

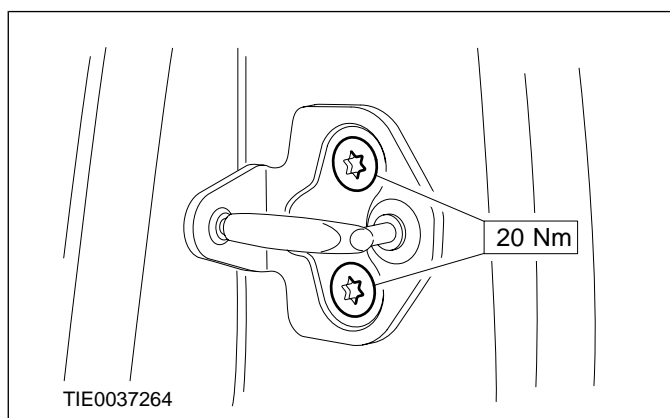


33. **CAUTION:** Protect the B-pillar using a soft cloth to prevent damage.

Using a suitable soft faced hammer, adjust the striker plate as necessary.



34. Tighten the striker plate retaining screws.

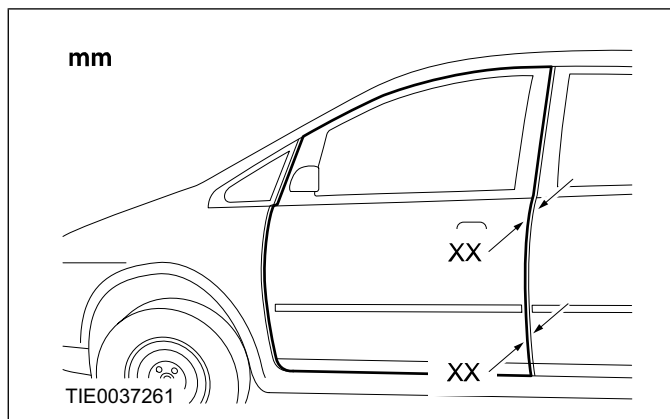


35. Close the door.

36. NOTE: Make sure that the door is in the fully closed position.

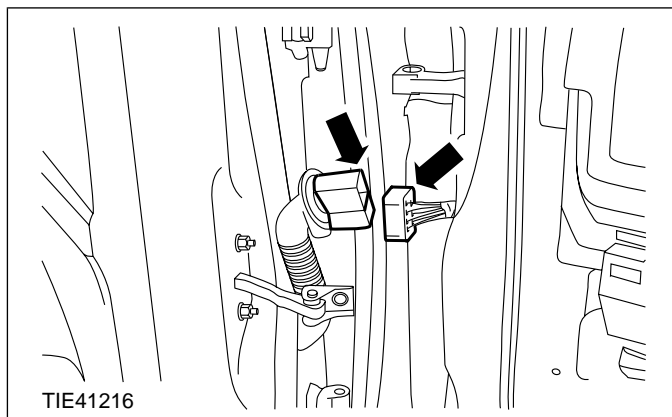
Check and note any misalignment of the door in relation to the body side panel.

- XX = 0.0 mm +1.0 mm to -0.0 mm.

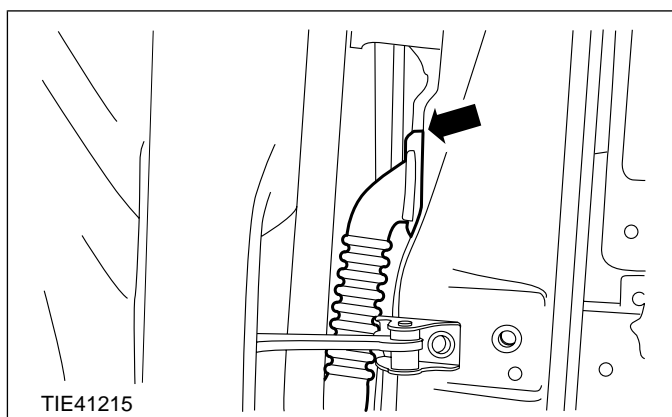


GENERAL PROCEDURES

37. If further adjustment is required repeat the door latch striker plate to B-pillar adjustment.
38. If no further adjustment is required open the door.
39. Connect the electrical connector.



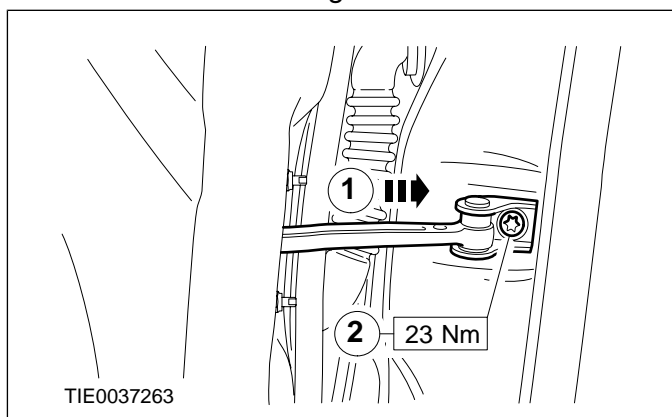
40. Attach the electrical connector to the A-pillar.



41. **⚠ CAUTION:** Make sure that the door check strap is correctly aligned.

Attach the door check strap to the A-pillar.

1. Pull the check strap to the open position.
2. Install the retaining screw.



GENERAL PROCEDURES

Front Door Alignment — 4-Door/5-Door/Wagon

General Equipment

Transmission jack

Materials

Name	Specification
Adhesive - Loctite 243	WSK-M2G349-A7

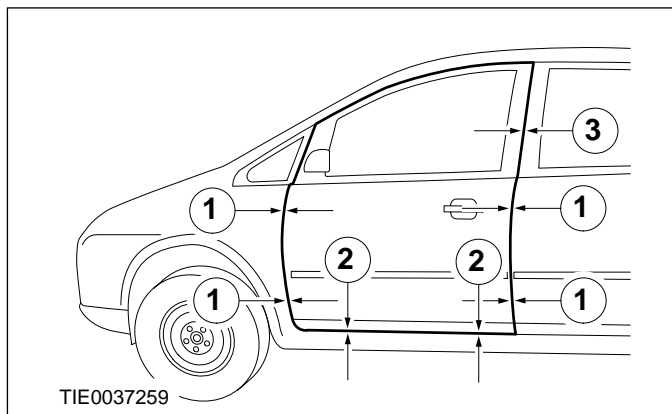
NOTE: The rear door alignment must be carried out before carrying out front door alignment.

For additional information, refer to: **Rear Door Alignment** (501-03 Body Closures, General Procedures).

1. NOTE: Make sure that the front and rear doors are in the fully closed position.

Check and note any misalignment of the front door in relation to the door frame and the front edge of the rear door.

1. 3.5 mm ± 1.0 mm.
2. 6.0 mm ± 2.0 mm.
3. 4.5 mm ± 1.5 mm.



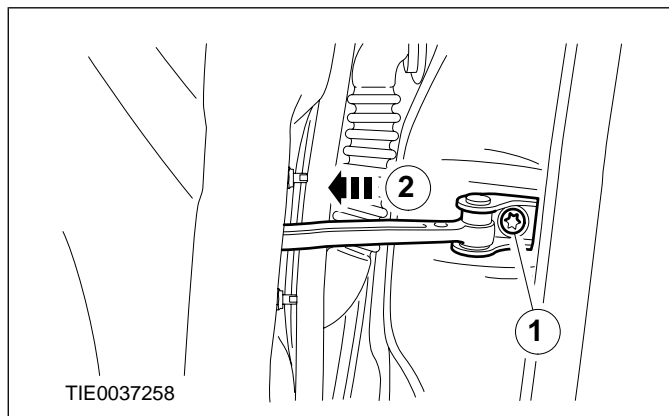
2. If adjustment is required open the front door and mark the position of the front door hinges, to use as reference points as necessary.

3. NOTE: Due to limited access to the front door hinge retaining screws on the A-pillar, the front door must be removed.

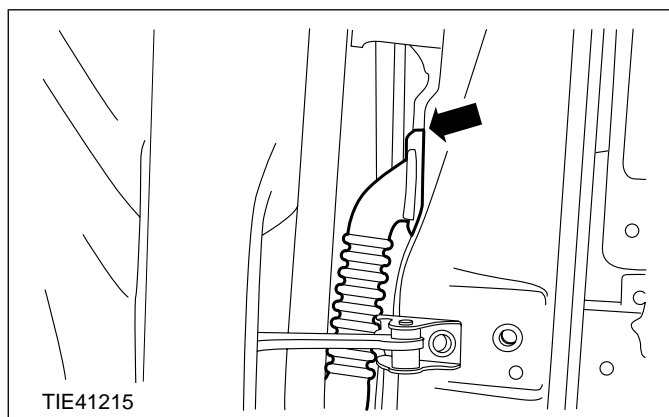
Detach the door check strap from the A-pillar.

1. Remove the retaining screw.

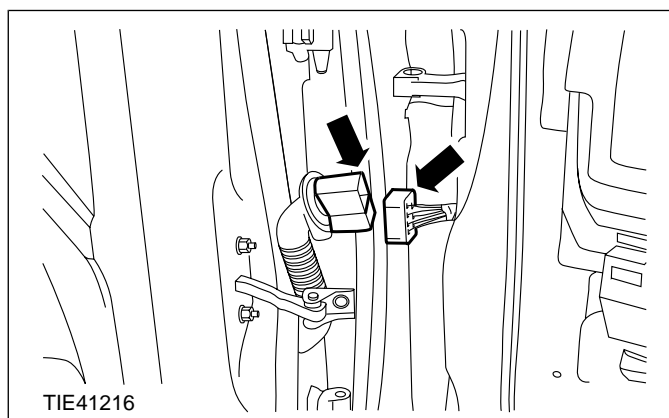
2. Push the check strap to the fully closed position.



4. Detach the electrical connector from the A-pillar.



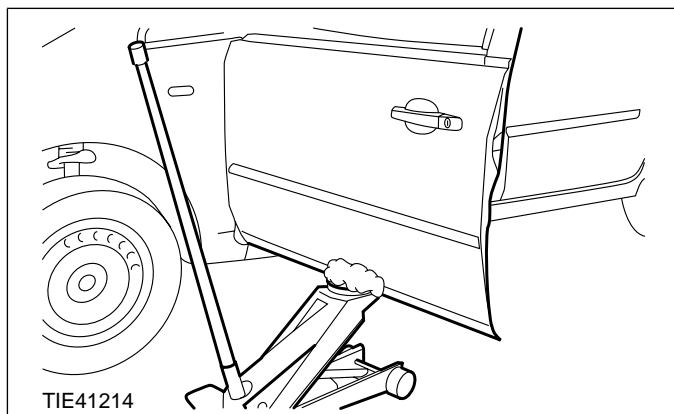
5. Disconnect the electrical connector.



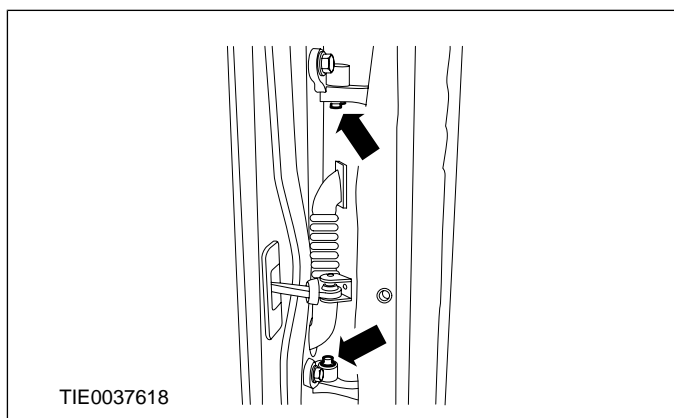
6. ⚠ CAUTION: Protect the door using a soft cloth to prevent damage.

GENERAL PROCEDURES

With the aid of another technician and a suitable transmission jack, support the door.



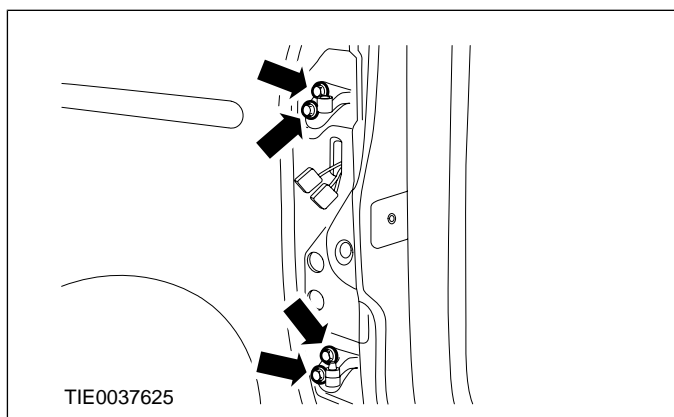
7. Remove and discard the door hinge center retaining bolts.



8. **CAUTION:** Take care when moving the door upwards as considerable force may be required to separate the door hinges from the door hinge cones.

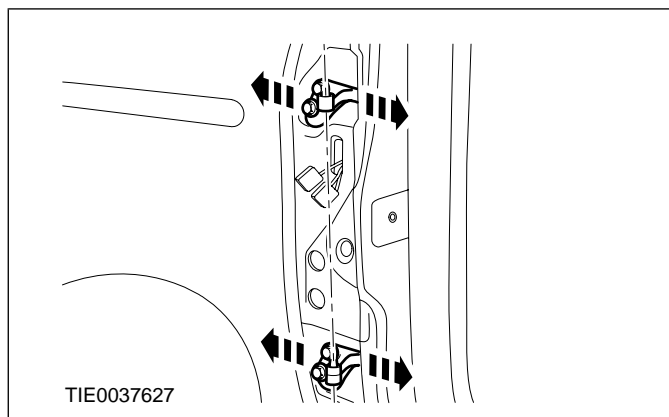
With the aid of another technician remove the front door.

9. Loosen the door hinge to A-pillar retaining screws one half turn.



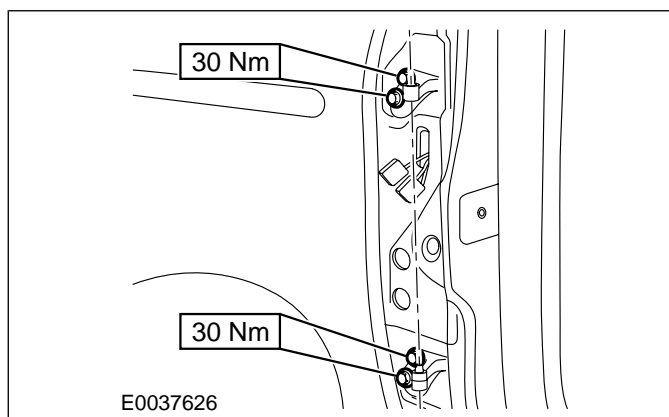
10. **CAUTION:** Make sure that the door hinges maintain a common pivot center line.

Adjust the door hinges as necessary.



11. **CAUTION:** Make sure that the door hinges maintain a common pivot center line.

Tighten the door hinge to A-pillar retaining screws.



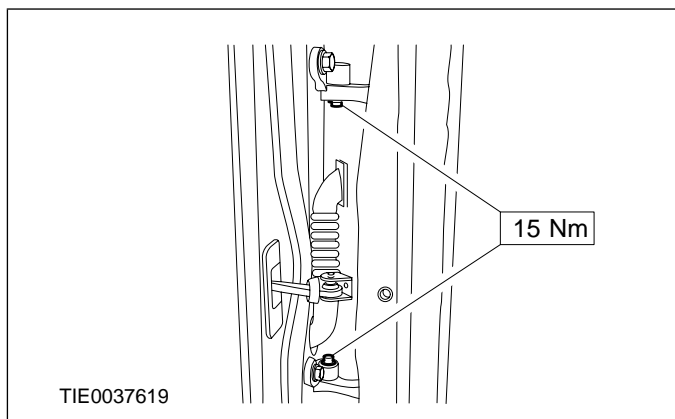
12. Install the front door.

- Make sure that the door hinge cones are correctly located.

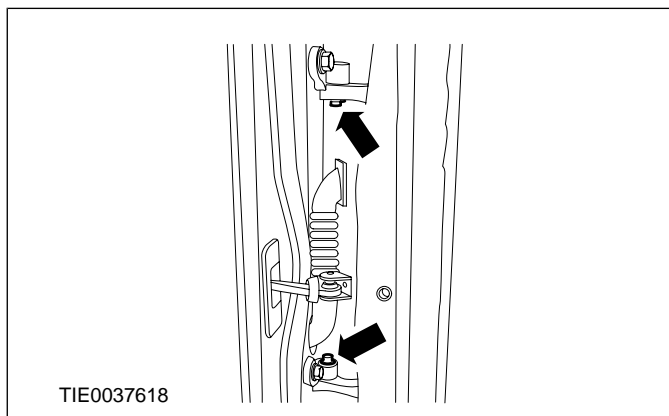
13. **NOTE:** Do not apply adhesive at this stage.

GENERAL PROCEDURES

Install new door hinge center retaining bolts.



17. If no further adjustment is required, remove the door hinge center retaining bolts.

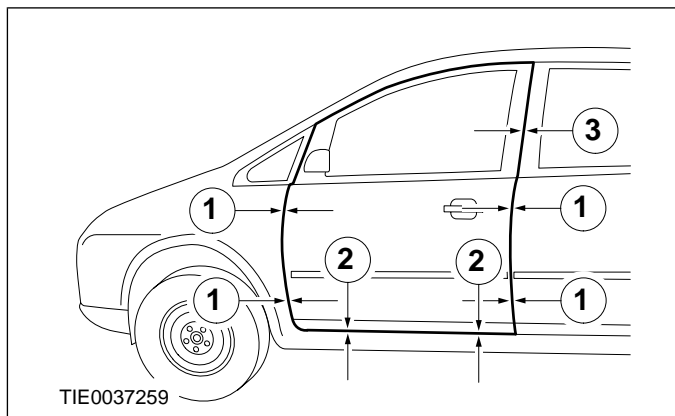


14. Close the front door.

15. **NOTE:** Make sure that the front and rear doors are in the fully closed position.

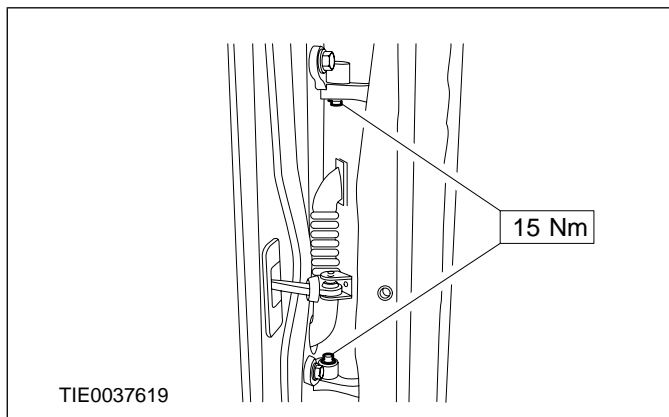
Check and note any misalignment of the front door in relation to the door frame and the front edge of the rear door.

1. 3.5 mm ± 1.0 mm.
2. 6.0 mm ± 2.0 mm.
3. 4.5 mm ± 1.5 mm.



18. Apply a coating of adhesive to the door hinge center retaining bolts.

19. Install the door hinge center retaining bolts.

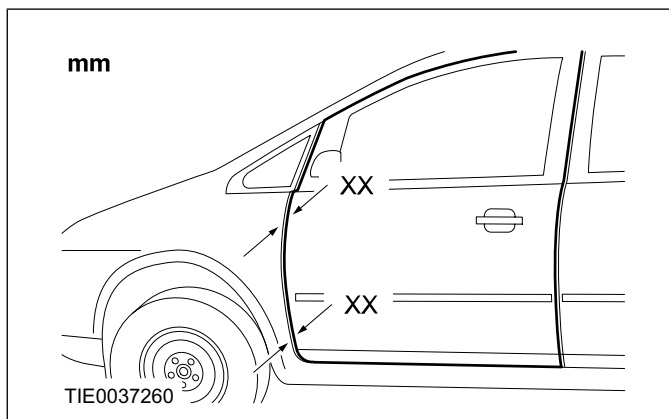


20. Close the front door.

21. **NOTE:** Make sure that the front door is in the fully closed position.

Check and note any misalignment of the front door in relation to the fender.

- XX = -1.0 mm +1.0 mm to -2.0 mm.



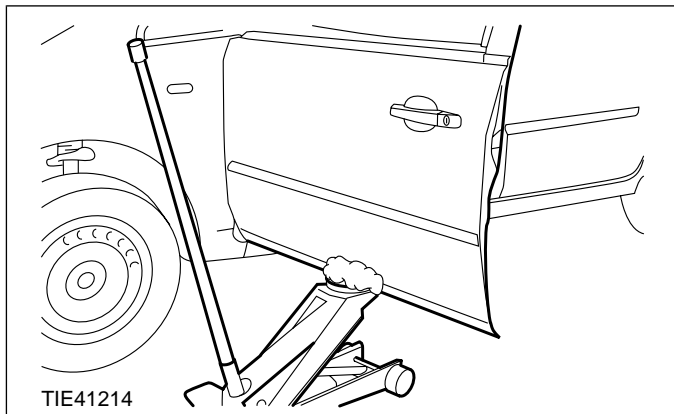
16. If further adjustment is required repeat the door hinge to A-pillar adjustment.

22. Open the front door.

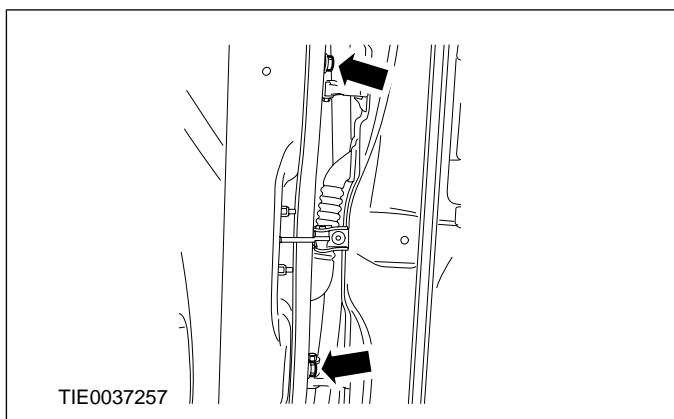
GENERAL PROCEDURES

23. **⚠ CAUTION:** Protect the door using a soft cloth to prevent damage.

With the aid of another technician and a suitable transmission jack, support the door.

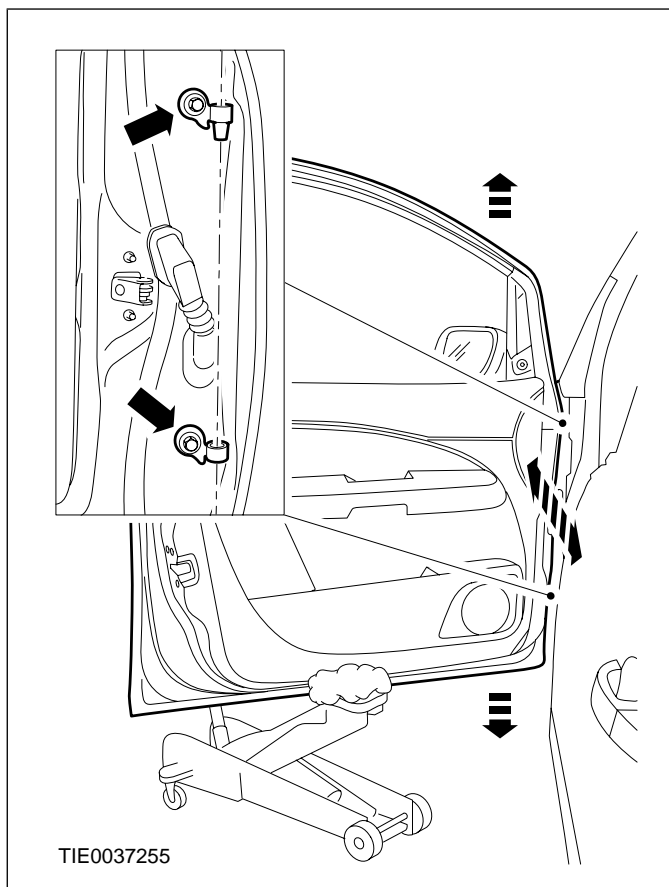


24. Loosen the door hinge to door retaining screws one complete turn.



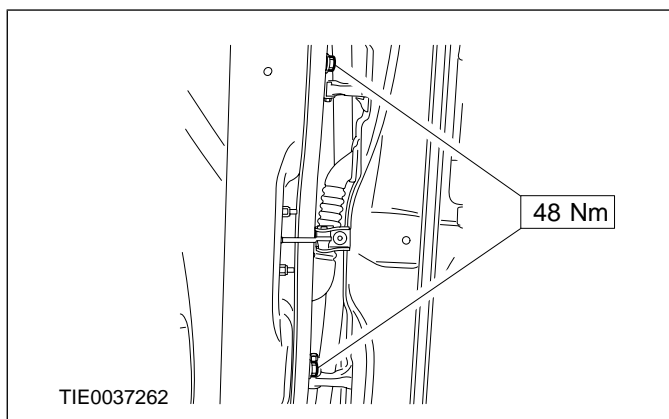
25. **⚠ CAUTION:** Make sure that the door hinge cones are correctly located and have a common pivot center line.

Adjust the door hinges as necessary.



26. **⚠ CAUTION:** Make sure that the door hinge cones are correctly located and have a common pivot center line.

Tighten the door hinge to door retaining screws.



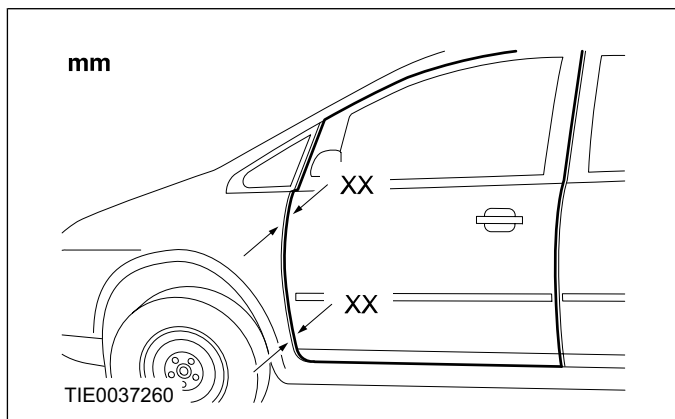
27. Close the front door.

28. **NOTE:** Make sure that the front door is in the fully closed position.

Check and note any misalignment of the front door in relation to the fender.

GENERAL PROCEDURES

- XX = -1.0 mm +1.0 mm to -2.0 mm.

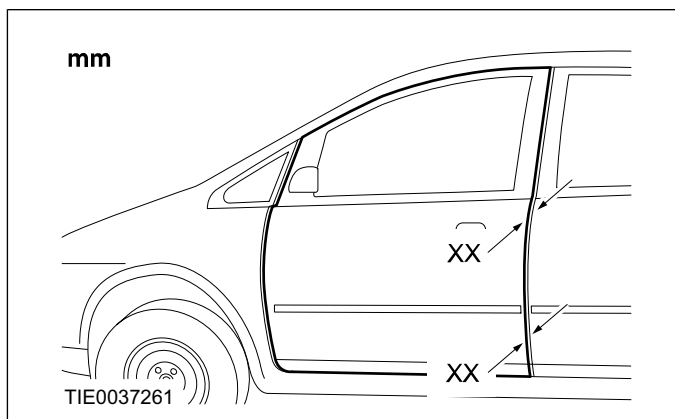


29. If further adjustment is required repeat the door hinge to door adjustment.

30. NOTE: Make sure that the front and rear doors are in the fully closed position.

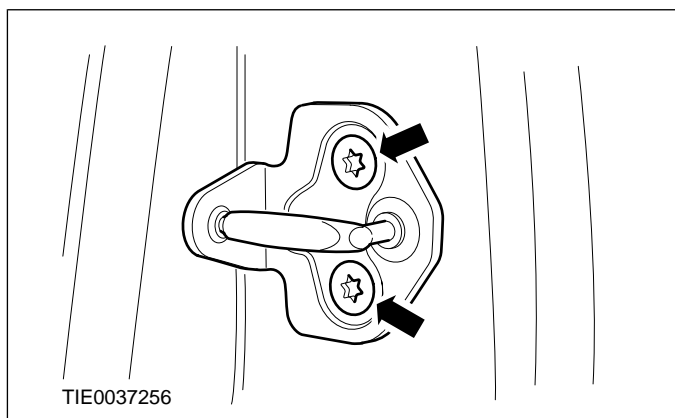
If no further adjustment is required check and note any misalignment of the front door in relation to the rear door.

- XX = 0.0 mm +1.0 mm to -0.0 mm.



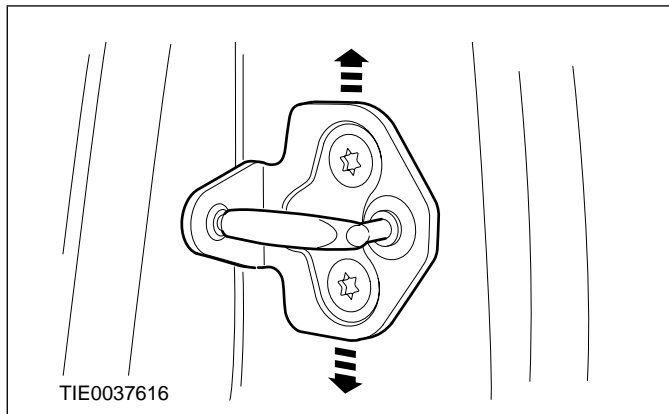
31. Open the front door and mark the position of the front door latch striker plate, to use as reference points as necessary.

32. Loosen the striker plate retaining screws one half turn.

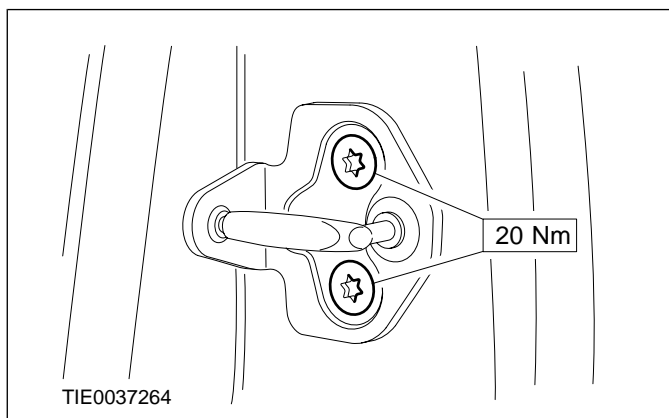


33. **CAUTION:** Protect the B-pillar using a soft cloth to prevent damage.

Using a suitable soft faced hammer, adjust the striker plate as necessary.



34. Tighten the striker plate retaining screws.

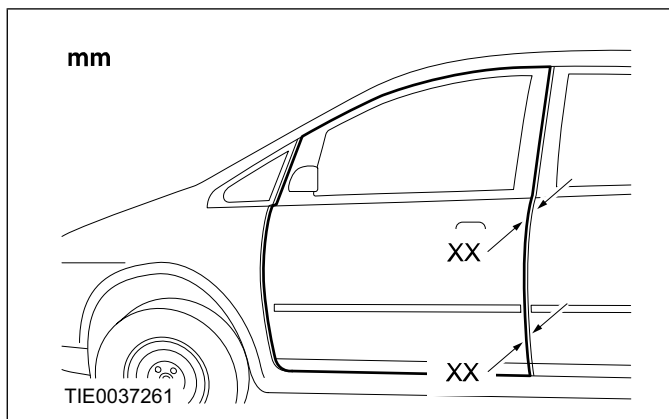


35. Close the front door.

36. NOTE: Make sure that the front and rear doors are in the fully closed position.

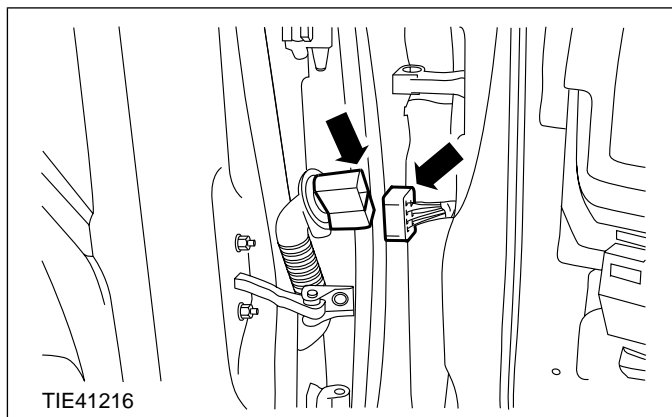
Check and note any misalignment of the front door in relation to the rear door.

- XX = 0.0 mm +1.0 mm to -0.0 mm.

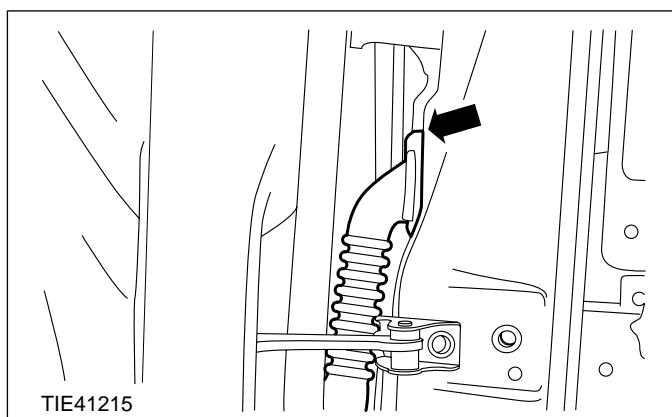


GENERAL PROCEDURES

37. If further adjustment is required repeat the front door latch striker plate to B-pillar adjustment.
38. If no further adjustment is required open the front door.
39. Connect the electrical connector.



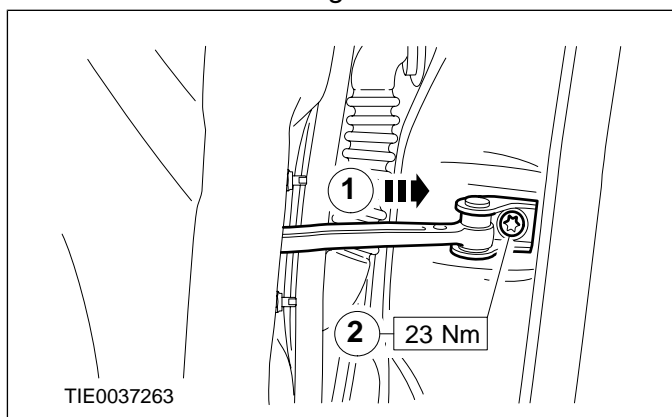
40. Attach the electrical connector to the A-pillar.



41. **⚠ CAUTION:** Make sure that the door check strap is correctly aligned.

Attach the door check strap to the A-pillar.

1. Pull the check strap to the open position.
2. Install the retaining screw.



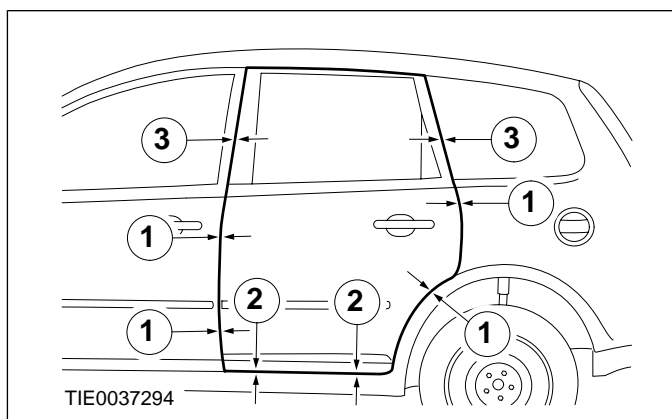
GENERAL PROCEDURES

Rear Door Alignment

1. **NOTE:** Make sure that the front and rear doors are in the fully closed position.

Check and note any misalignment of the rear door in relation to the door frame and the rear edge of the front door.

1. 3.5 mm ± 1.0 mm.
2. 6.0 mm ± 2.0 mm.
3. 4.5 mm ± 1.5 mm.

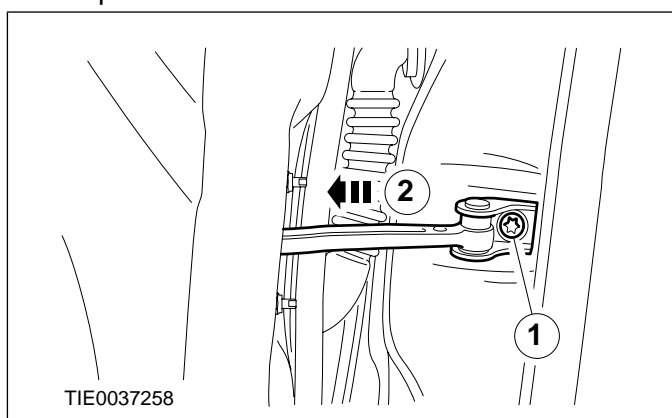


2. If adjustment is required open the front door and mark the position of the rear door hinges, to use as reference points as necessary.

3. Open the rear door.

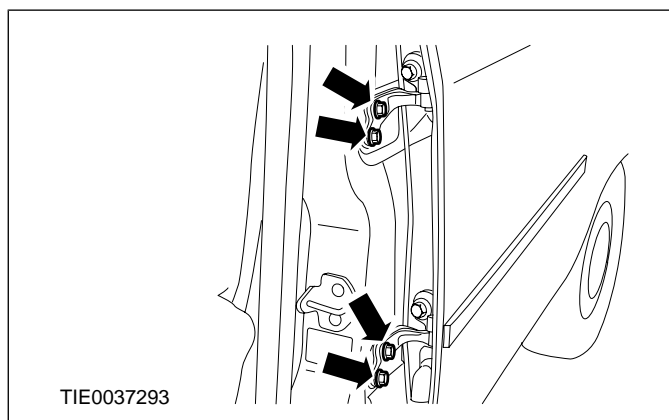
4. Detach the door check strap from the B-pillar.

1. Remove the retaining screw.
2. Push the check strap to the fully closed position.

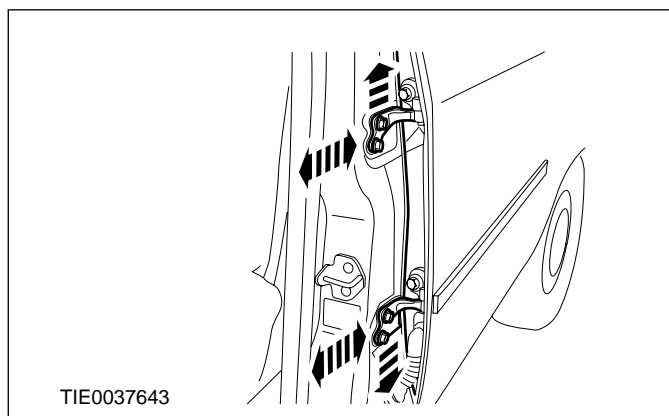


5. Close the rear door.

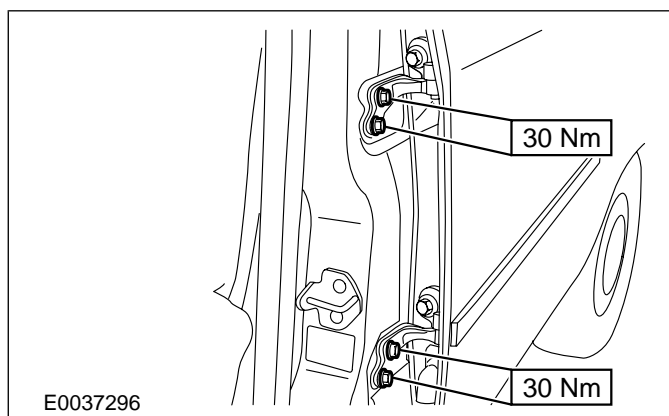
6. Loosen the door hinge to B-pillar retaining screws one half turn.



7. Adjust the door hinges as necessary.



8. Tighten the door hinge to B-pillar retaining screws.



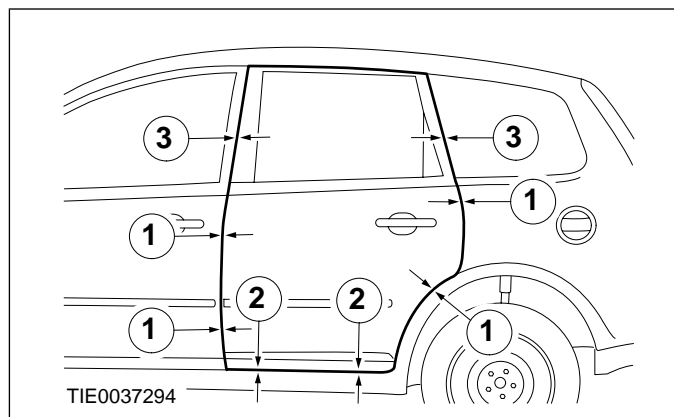
9. Close the front door.

10. **NOTE:** Make sure that the front and rear doors are in the fully closed position.

GENERAL PROCEDURES

Check and note any misalignment of the rear door in relation to the door frame and the rear edge of the front door.

1. 3.5 mm \pm 1.0 mm.
2. 6.0 mm \pm 2.0 mm.
3. 4.5 mm \pm 1.5 mm.

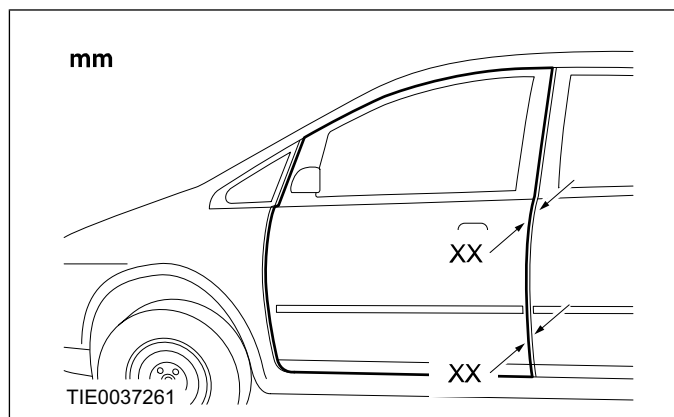


11. If further adjustment is required repeat the door hinge to B-pillar adjustment.

12. **NOTE:** Make sure that the front and rear doors are in the fully closed position.

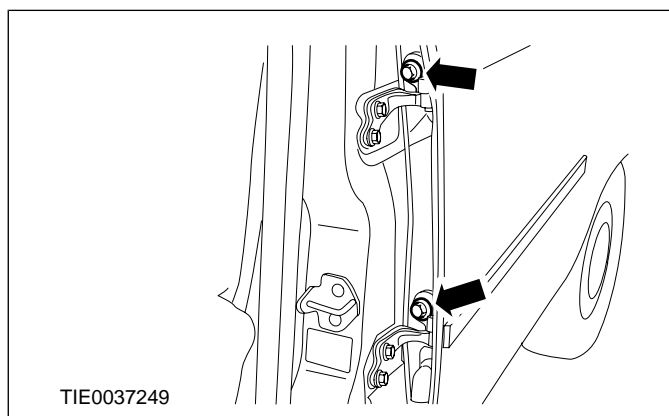
If no further adjustment is required check and note any misalignment of the rear door in relation to the front door.

- XX = 0.0 mm + 0.0 mm to - 1.0 mm.

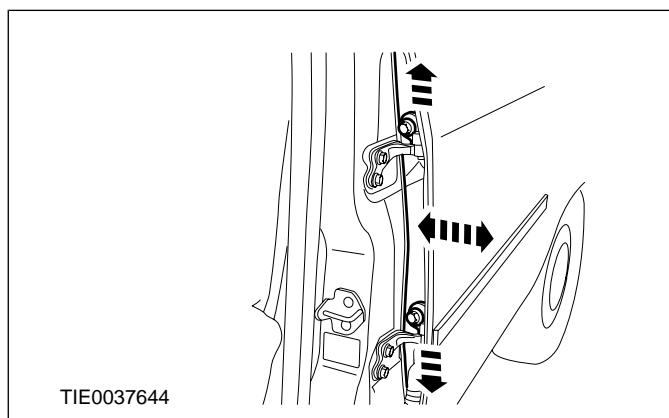


13. Open the front door.

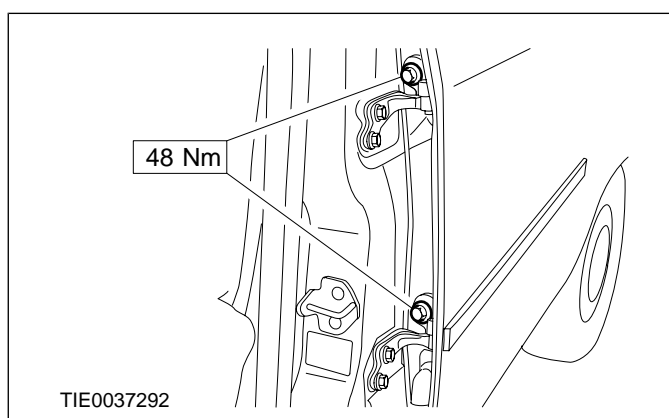
14. Loosen the rear door hinge to door retaining screws one complete turn.



15. Adjust the door hinges to door as necessary.



16. Tighten the door hinge to door retaining screws.



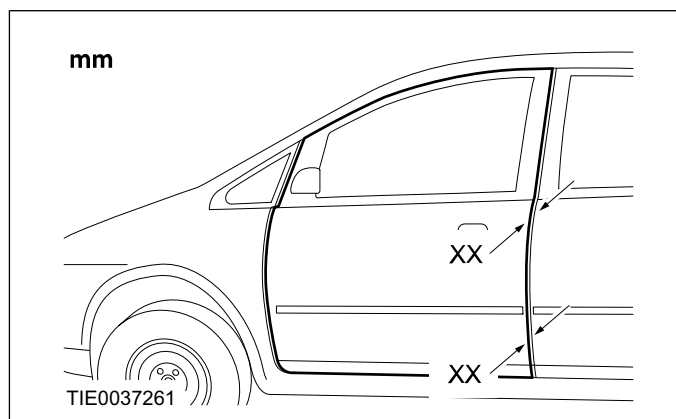
17. Close the front door.

18. **NOTE:** Make sure that the front and rear doors are in the fully closed position.

Check and note any misalignment of the rear door in relation to the front door.

GENERAL PROCEDURES

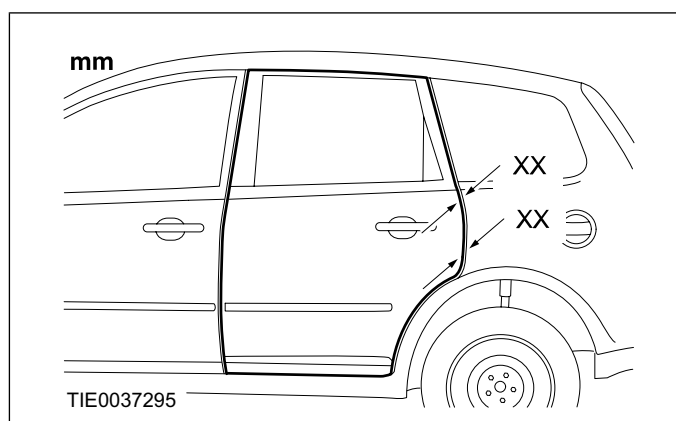
- XX = 0.0 mm + 0.0 mm to - 1.0 mm.



19. If further adjustment is required repeat the door hinge to door adjustment.

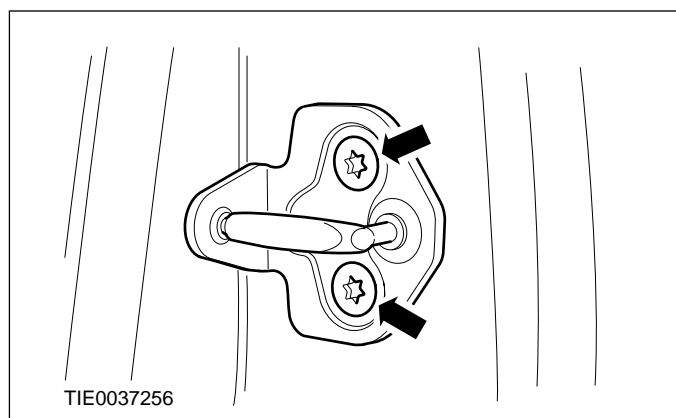
20. If no further adjustment is required check and note any misalignment of the rear door in relation to the rear body panel.

- XX = 0.0 mm + 1.0 mm to - 0.0 mm.



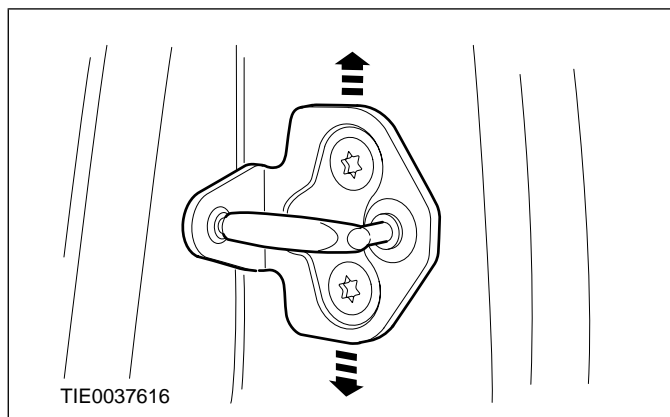
21. Open the rear door and mark the position of the rear door latch striker plate, to use as reference points as necessary.

22. Loosen the striker plate retaining screws one half turn.

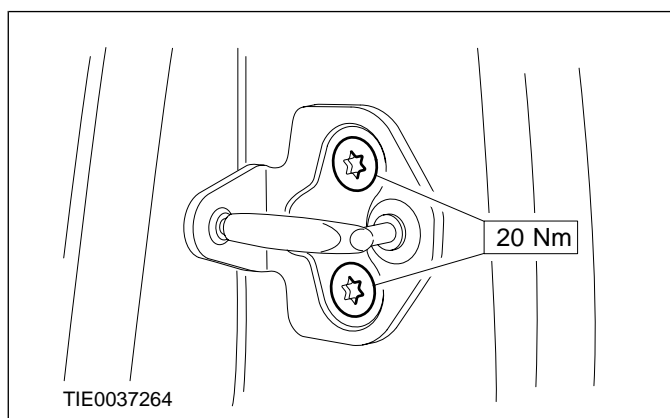


23. **CAUTION:** Protect the C-pillar using a soft cloth to prevent damage.

Using a suitable soft faced hammer, adjust the striker plate as necessary.



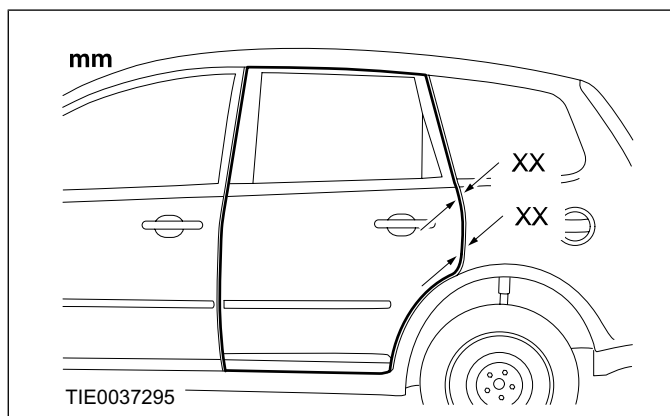
24. Tighten the striker plate retaining screws.



25. Close the rear door.

26. Check and note any misalignment of the rear door in relation to the rear body panel.

- XX = 0.0 mm + 1.0 mm to - 0.0 mm.



27. If further adjustment is required repeat the rear door latch striker plate to C-pillar adjustment.

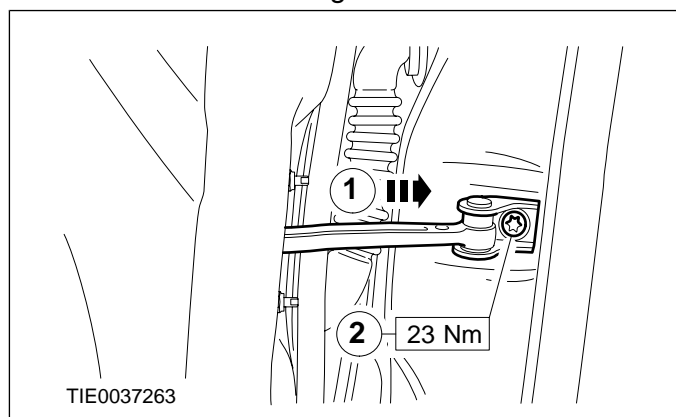
GENERAL PROCEDURES

28. If no further adjustment is required open the rear door.

29. **⚠ CAUTION:** Make sure that the door check strap is correctly aligned.

Attach the door check strap to the B-pillar.

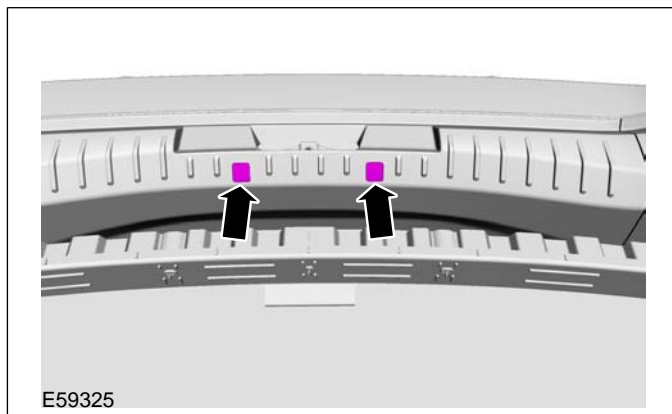
1. Pull the check strap to the open position.
2. Install the retaining screw.



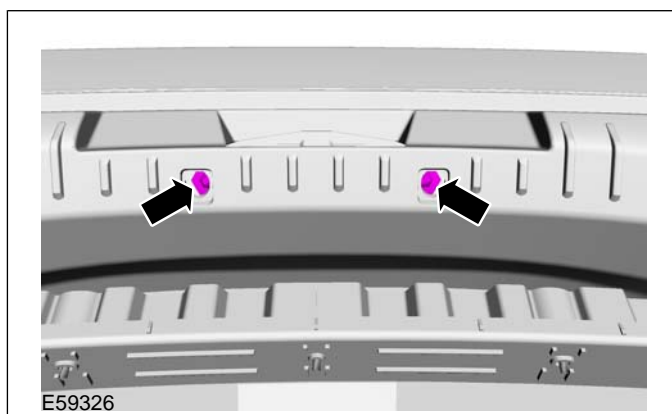
GENERAL PROCEDURES

Luggage Compartment Lid Alignment

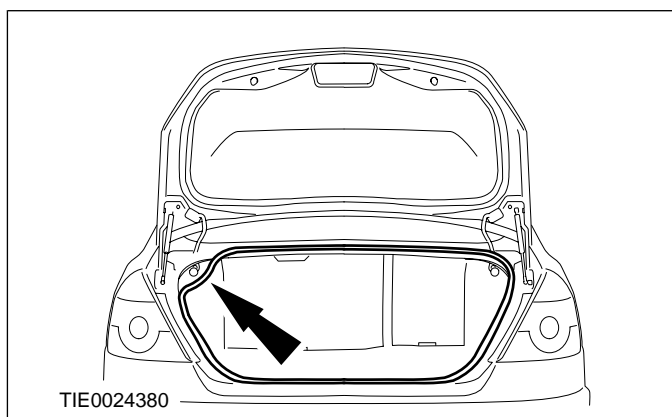
1. Open the luggage compartment lid.
2. Remove the luggage compartment lid striker retaining bolt covers.



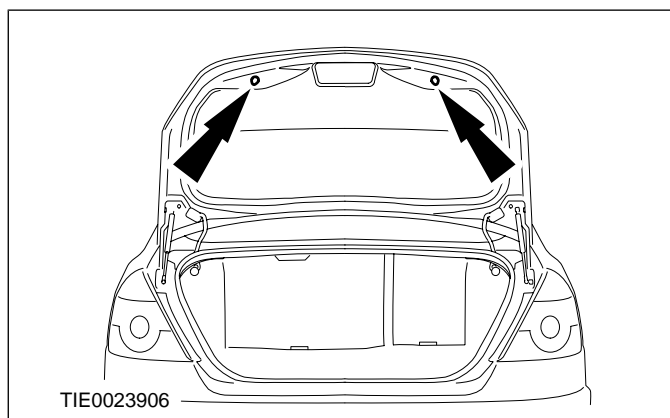
3. Loosen the luggage compartment lid striker retaining bolts.



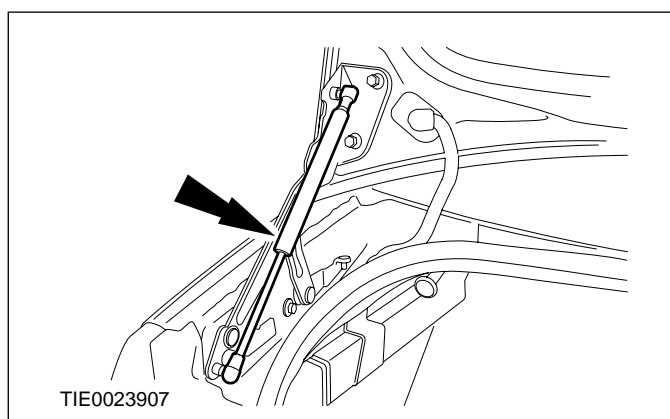
4. Remove the luggage compartment lid weatherstrip.



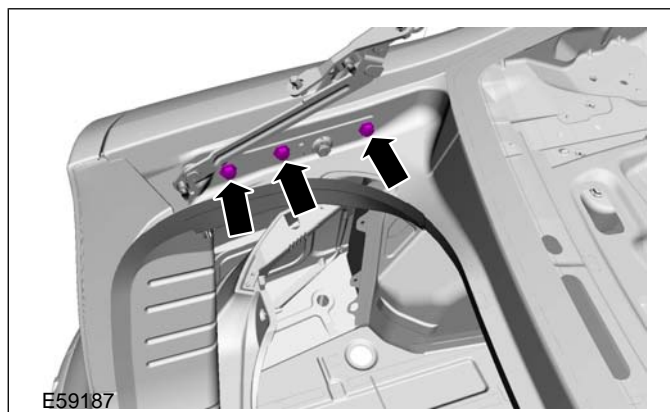
5. Remove the luggage compartment lid bump stops.



6. Support the luggage compartment lid and remove the support strut on both sides.



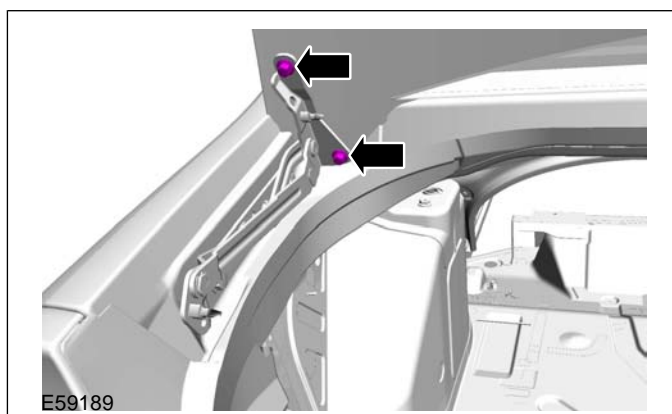
7. Loosen the luggage compartment lid hinge to body retaining bolts 2 complete turns on both sides (luggage compartment lid shown removed for clarity).



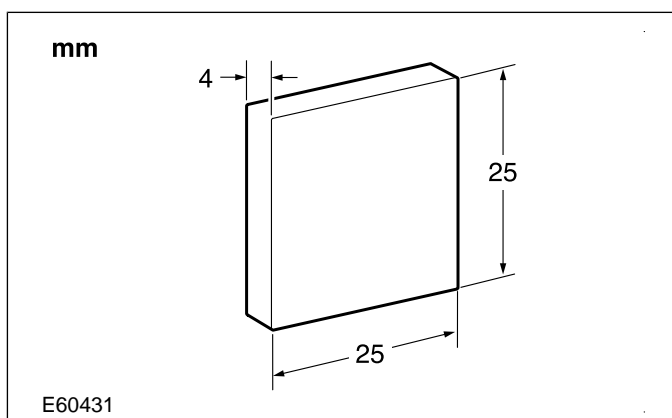
8. **CAUTION:** Protect the luggage compartment lid and vehicle body using soft cloth(s) to prevent damage.

GENERAL PROCEDURES

Loosen the luggage compartment lid hinge to luggage compartment lid retaining bolts 2 complete turns on both sides.

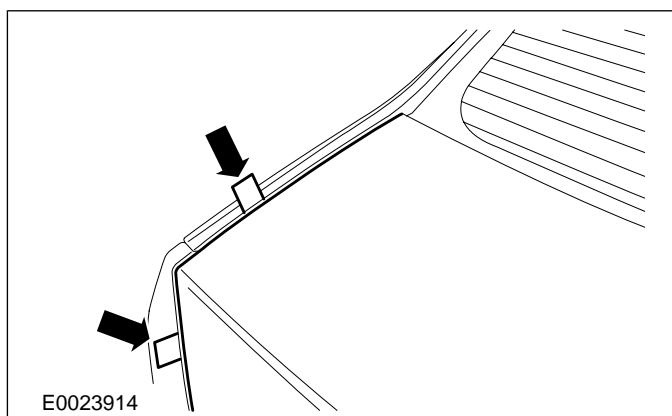


9. Using plastic material, fabricate 4 spacers.



10. NOTE: Make sure that the luggage compartment lid is in the fully closed position.

Insert the spacers between the outer edges of the luggage compartment lid and the rear quarter panels on both sides.

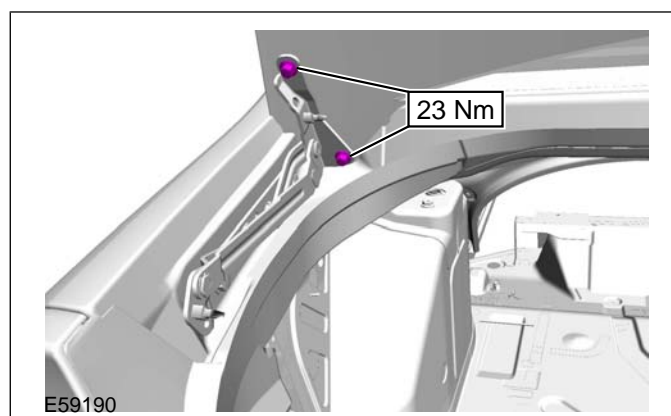


11. Push down in the luggage compartment lid hinge area until the luggage compartment lid is 2 mm below flush with the rear quarter panel on both sides.

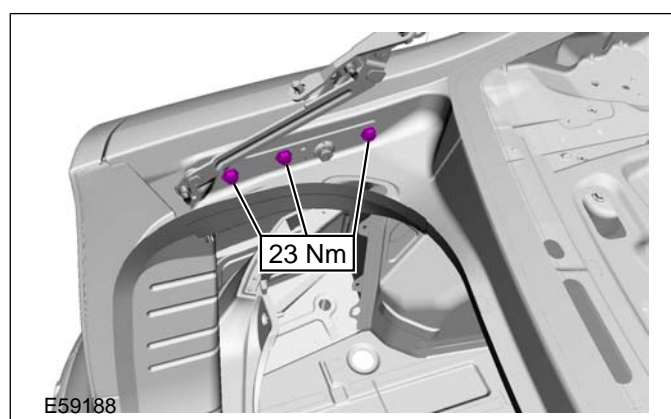
12. Remove the spacers.

13. NOTE: Make sure that the luggage compartment lid does not move on the luggage compartment lid hinges.

Carefully open the luggage compartment lid and tighten the luggage compartment lid hinge to luggage compartment lid retaining bolts on both sides.



14. Tighten the luggage compartment lid hinge to body retaining bolts on both sides (luggage compartment lid shown removed for clarity).



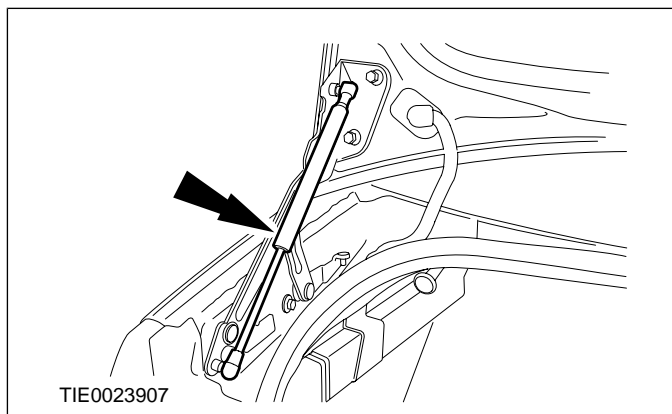
501-03-27

Body Closures

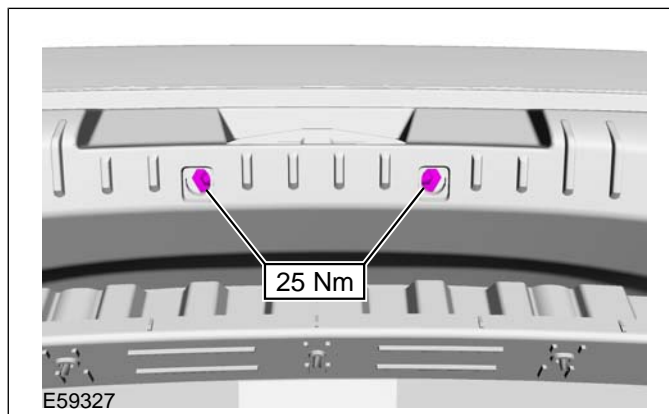
501-03-27

GENERAL PROCEDURES

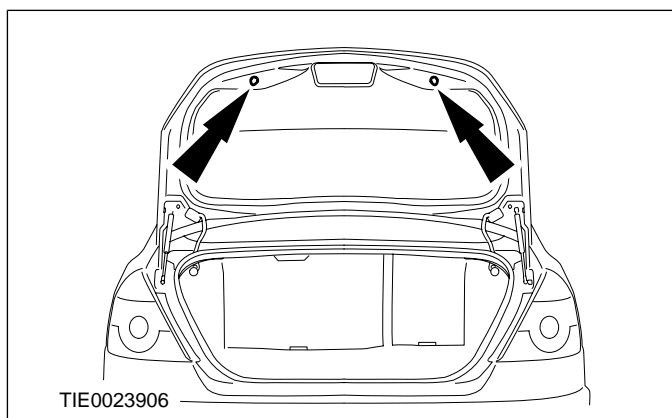
15. Install the luggage compartment lid support strut on both sides.



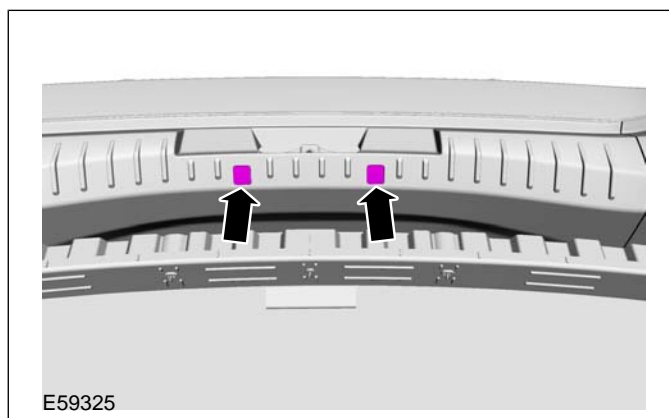
18. Tighten the luggage compartment lid striker retaining bolts.



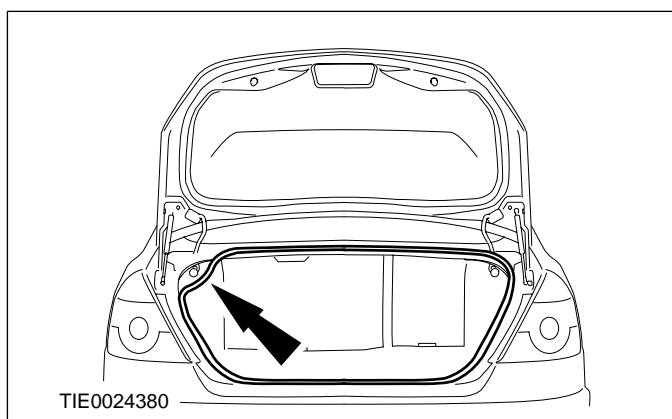
16. Install the luggage compartment lid bump stops.



19. Install the luggage compartment lid striker retaining bolt covers.



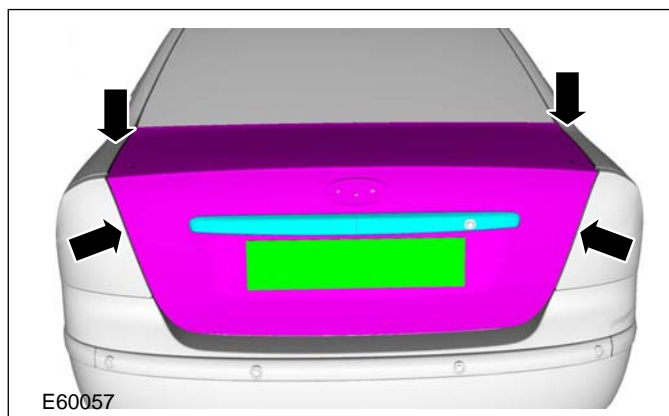
17. Install the luggage compartment lid weatherstrip.



20. NOTE: Make sure that the luggage compartment lid is in the fully closed position.

Close the luggage compartment lid.

21. Check that the luggage compartment lid is flush with the rear quarter panel on both sides. Repeat the luggage compartment lid alignment procedure if necessary.



SECTION 501-05 Interior Trim and Ornamentation

VEHICLE APPLICATION: 2008.75 Focus ST C307

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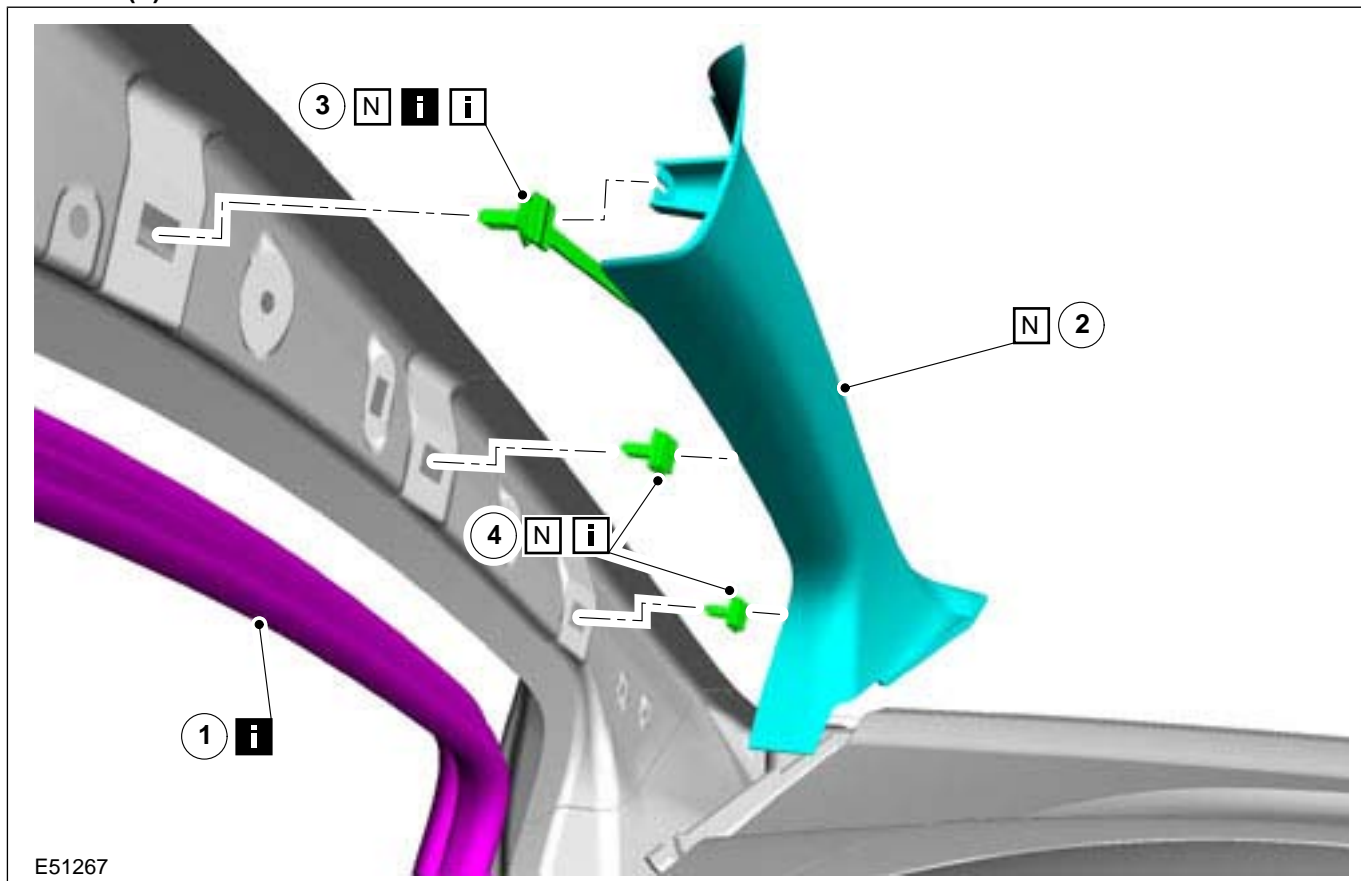
SPECIFICATIONS**Torque Specifications**

Description	Nm	lb-ft	lb-in
Front seat belt lower anchor retaining bolt	38	28	-
Rear seat belt lower anchor retaining bolt	38	28	-
Front door trim panel retaining bolts	8	-	71
Rear door trim panel retaining bolts	8	-	71

REMOVAL AND INSTALLATION

A-Pillar Trim Panel

1. Remove the components in the order indicated in the following illustration(s) and table(s).



E51267

Item	Description
1	Front door opening weatherstrip See Removal Detail
2	A-pillar trim panel

Item	Description
3	A-pillar trim panel security strap See Removal Detail See Installation Detail
4	A-pillar trim panel retaining clips See Installation Detail

2. To install, reverse the removal procedure.

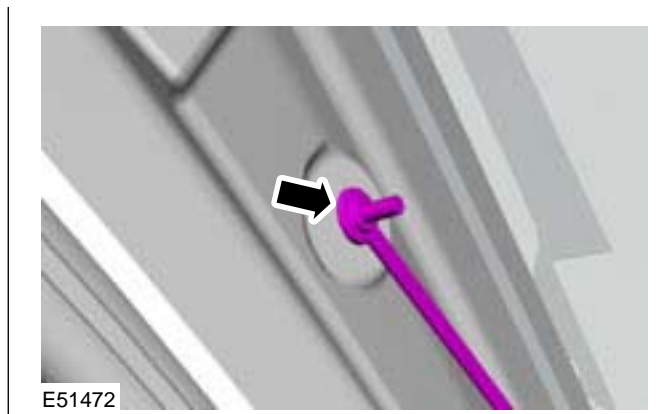
Removal Details

Item 1 Front door opening weatherstrip

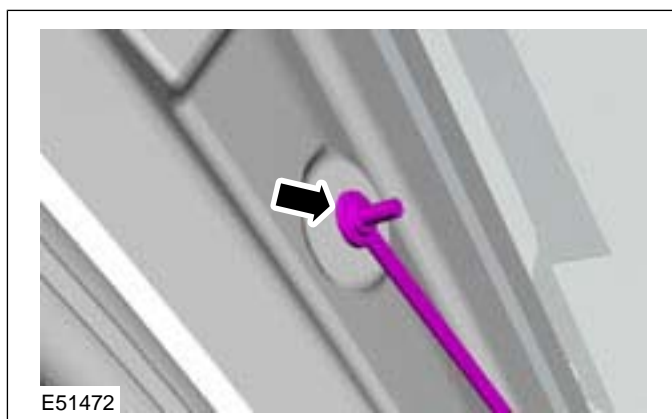
1. Detach the front door opening weatherstrip.

REMOVAL AND INSTALLATION**Item 3 A-pillar trim panel security strap**

1. Remove the security strap from the A-pillar.

**Installation Details****Item 3 A-pillar trim panel security strap**

1. Install the A-pillar trim panel security strap to the A-pillar.

**Item 4 A-pillar trim panel retaining clips**

1. Install the A-pillar trim panel retaining clips to the A-pillar trim panel.

REMOVAL AND INSTALLATION

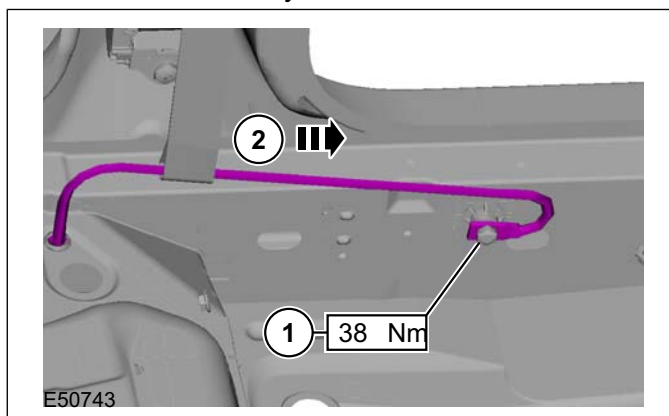
B-Pillar Trim Panel — 3-Door

⚠ CAUTION: The bolt securing the safety belt anchor is held captive by a metal washer. The bolt, spacer and metal washer must remain on the safety belt anchor at all times when the safety belt is detached or removed.

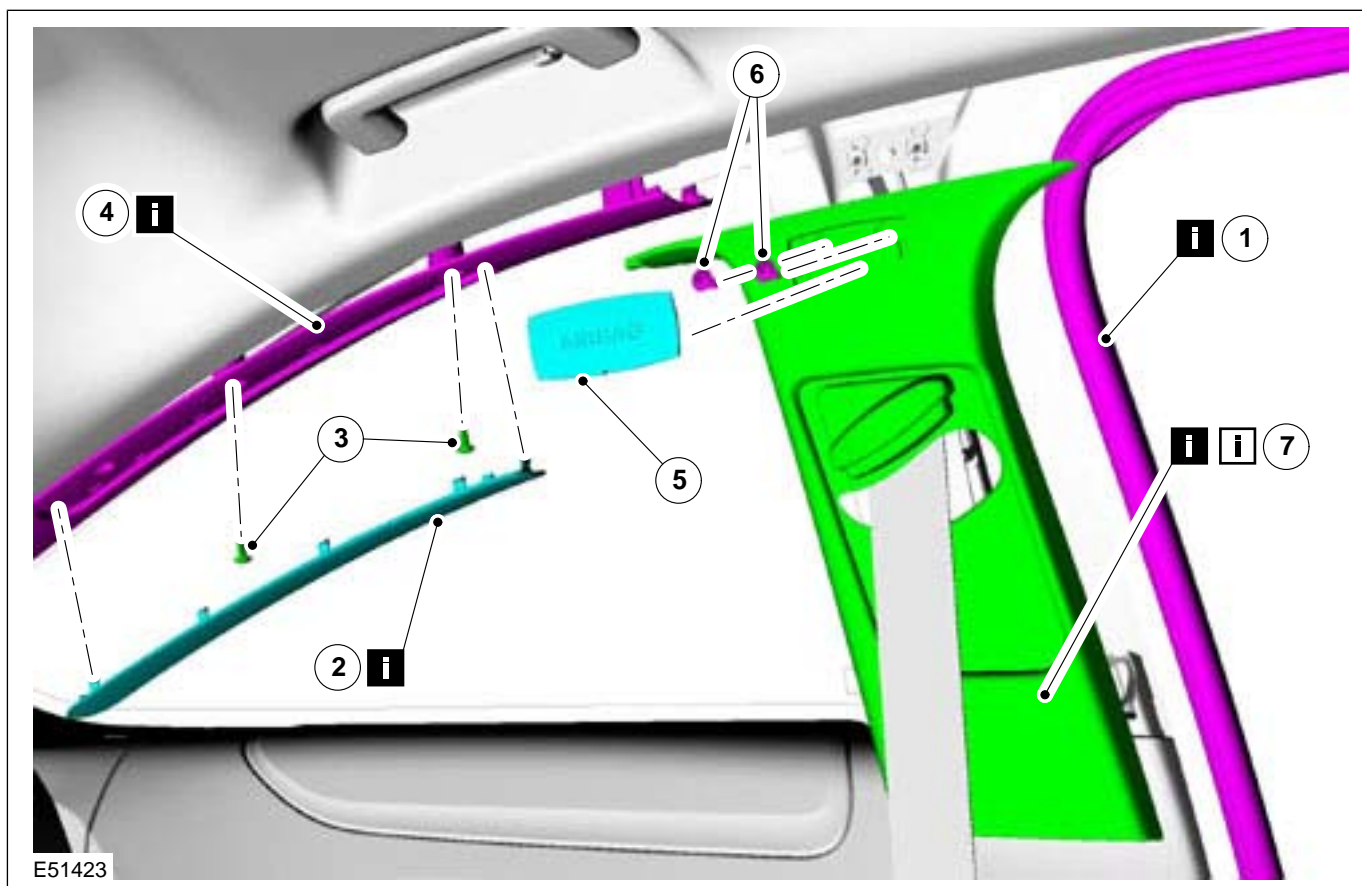
1. Detach the safety belt lower anchor.

1. Remove the front safety belt lower anchor retaining bolt.

2. Slide the safety belt off the anchor rail.



2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Front door opening weatherstrip See Removal Detail
2	Rear quarter glass trim panel retaining screw trim cover See Removal Detail

Item	Description
3	Rear quarter glass trim panel retaining screws
4	Rear quarter glass trim panel See Removal Detail
5	B-pillar trim panel retaining screw cover

REMOVAL AND INSTALLATION

Item	Description
6	B-pillar trim panel retaining screws
7	B-pillar trim panel See Removal Detail

Item	Description
	See Installation Detail

3. To install, reverse the removal procedure.

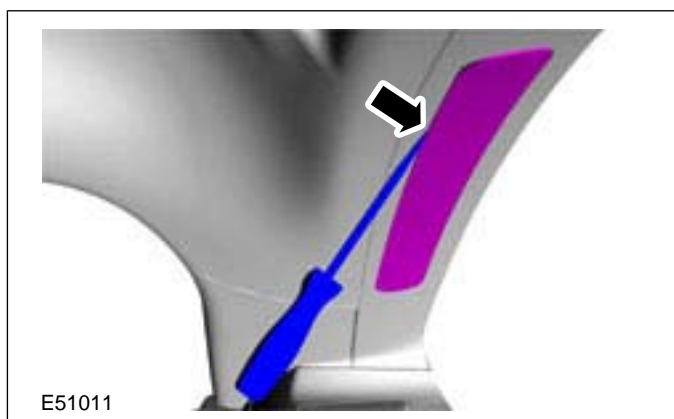
Removal Details

Item 1 Front door opening weatherstrip

1. Detach the front door opening weatherstrip.

Item 2 Rear quarter glass trim panel retaining screw trim cover

1. Using a suitable flat blade screwdriver, lever out the rear quarter glass trim panel retaining screw trim cover.

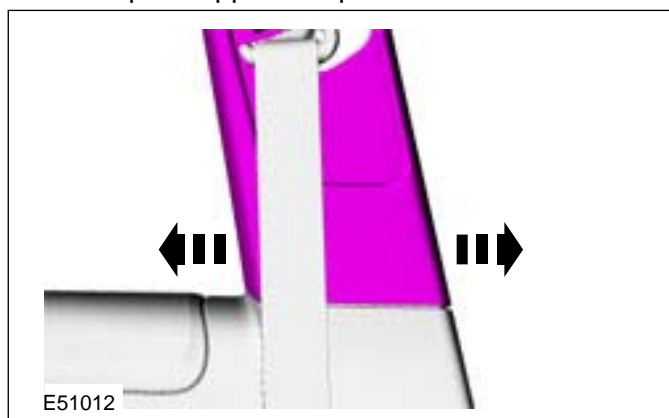
**Item 4** Rear quarter glass trim panel

1. Detach the rear quarter glass trim panel.

Item 7 B-pillar trim panel

1. Detach the B-pillar trim panel.

- Feed the safety belt webbing through the B-pillar upper trim panel.

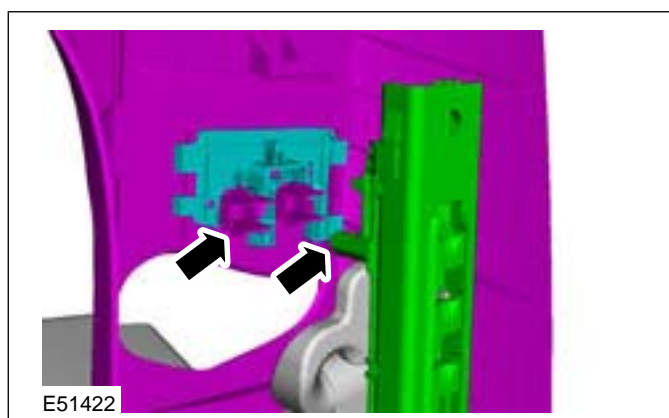


Installation Details

Item 7 B-pillar trim panel

1. Feed the safety belt webbing through the B-pillar upper trim panel before installation.
2. **NOTE:** Make sure the B-pillar seatbelt height adjustment lever is in alignment with the seatbelt height adjustment mechanism.

Install the B-pillar trim panel.



REMOVAL AND INSTALLATION**B-Pillar Trim Panel — 4-Door/5-Door**

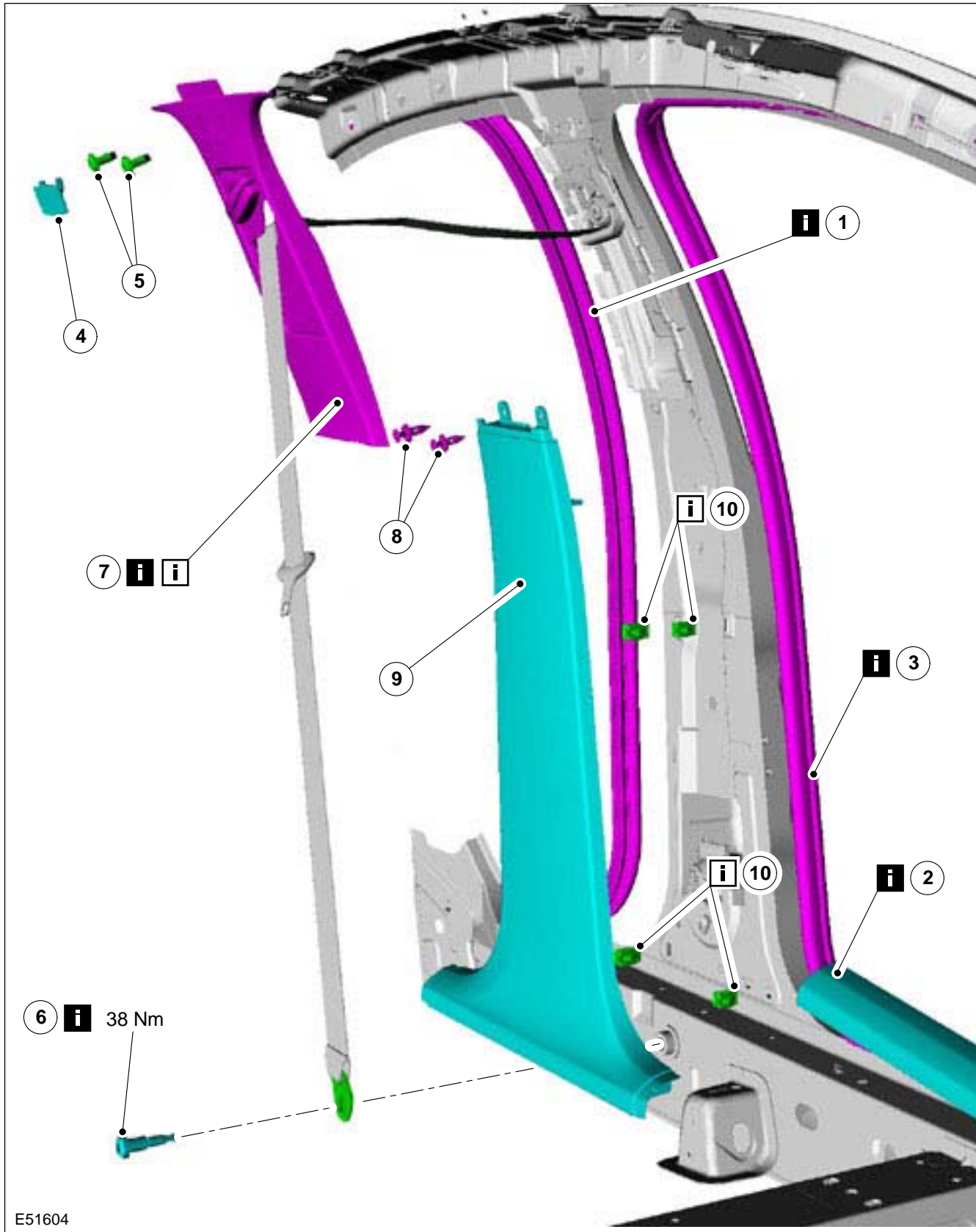
1. Remove the Rear Scuff Plate Trim Panel.

For additional information, refer to: **Rear Scuff Plate Trim Panel (501-05 Interior Trim and Ornamentation, Removal and Installation).**

2. Remove the components in the order indicated in the following illustration(s) and table(s).



REMOVAL AND INSTALLATION



E51604



REMOVAL AND INSTALLATION

Item	Description
1	Rear door opening weatherstrip See Removal Detail
2	Front Scuff Plate Trim Panel See Removal Detail
3	Front door opening weatherstrip See Removal Detail
4	B-pillar upper trim panel retaining screws cover
5	B-pillar upper trim panel retaining screws

Item	Description
6	Front safety belt lower anchor See Removal Detail See Installation Detail
7	Upper B-pillar trim panel See Removal Detail See Installation Detail
8	Lower B-pillar trim panel retaining clips
9	Lower B-pillar trim panel
10	lower B-pillar trim panel retaining clips See Installation Detail

3. To install, reverse the removal procedure.

Removal Details

Item 1 Rear door opening weatherstrip

1. Detach the rear door opening weatherstrip.


Item 2 Front Scuff Plate Trim Panel

1. Detach the front scuff plate trim panel.

Item 3 Front door opening weatherstrip

1. Detach the front door opening weatherstrip.

Item 6 Front safety belt lower anchor

-  **CAUTION:** The bolt securing the safety belt anchor is held captive by a metal washer. The bolt, spacer and metal washer must remain on the safety belt anchor at all times when the safety belt is detached or removed.

Item 7 Upper B-pillar trim panel

1. Remove the upper B-pillar trim panel.

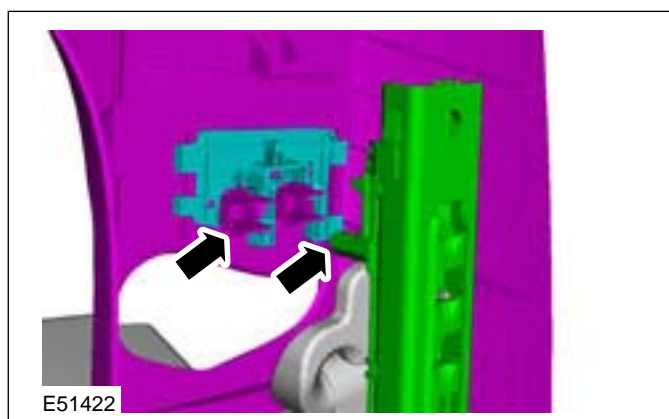
- Feed the safety belt webbing through the B-pillar upper trim panel.

Installation Details

Item 7 Upper B-pillar trim panel

1. Feed the safety belt webbing through the upper B-pillar trim panel before installation.
2. **NOTE:** Make sure the B-pillar safety belt height adjustment lever is in alignment with the safety belt height adjustment mechanism.

Install the B-pillar trim panel.





REMOVAL AND INSTALLATION

Item 10 lower B-pillar trim panel retaining clips

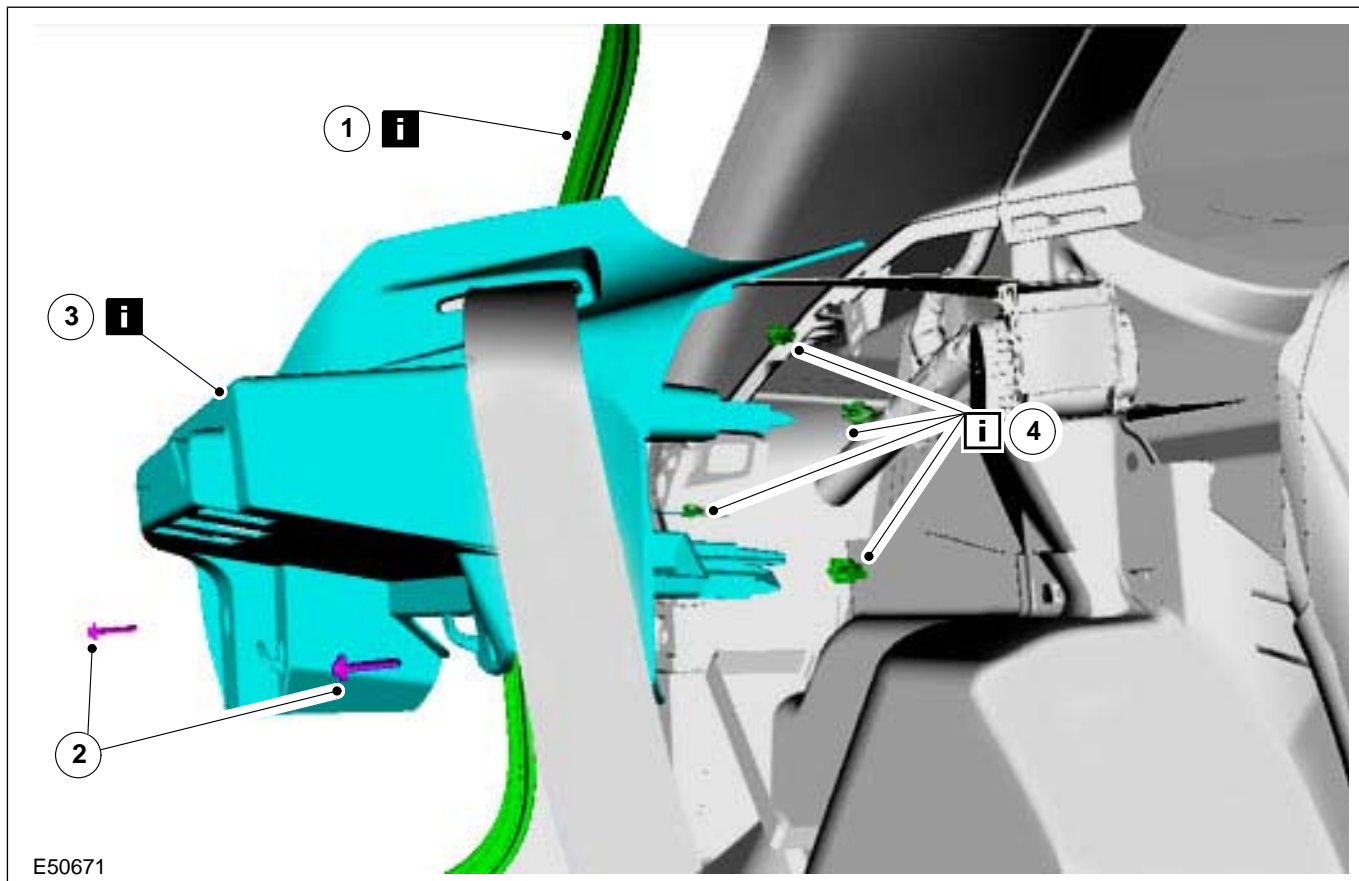
1. Install the lower B-pillar trim panel retaining clips to the lower B-pillar trim panel before installation.



REMOVAL AND INSTALLATION

C-Pillar Trim Panel — 3-Door

1. Remove the rear parcel shelf.
2. Tilt the rear seat backrest forward.
3. Remove the components in the order indicated in the following illustration(s) and table(s).

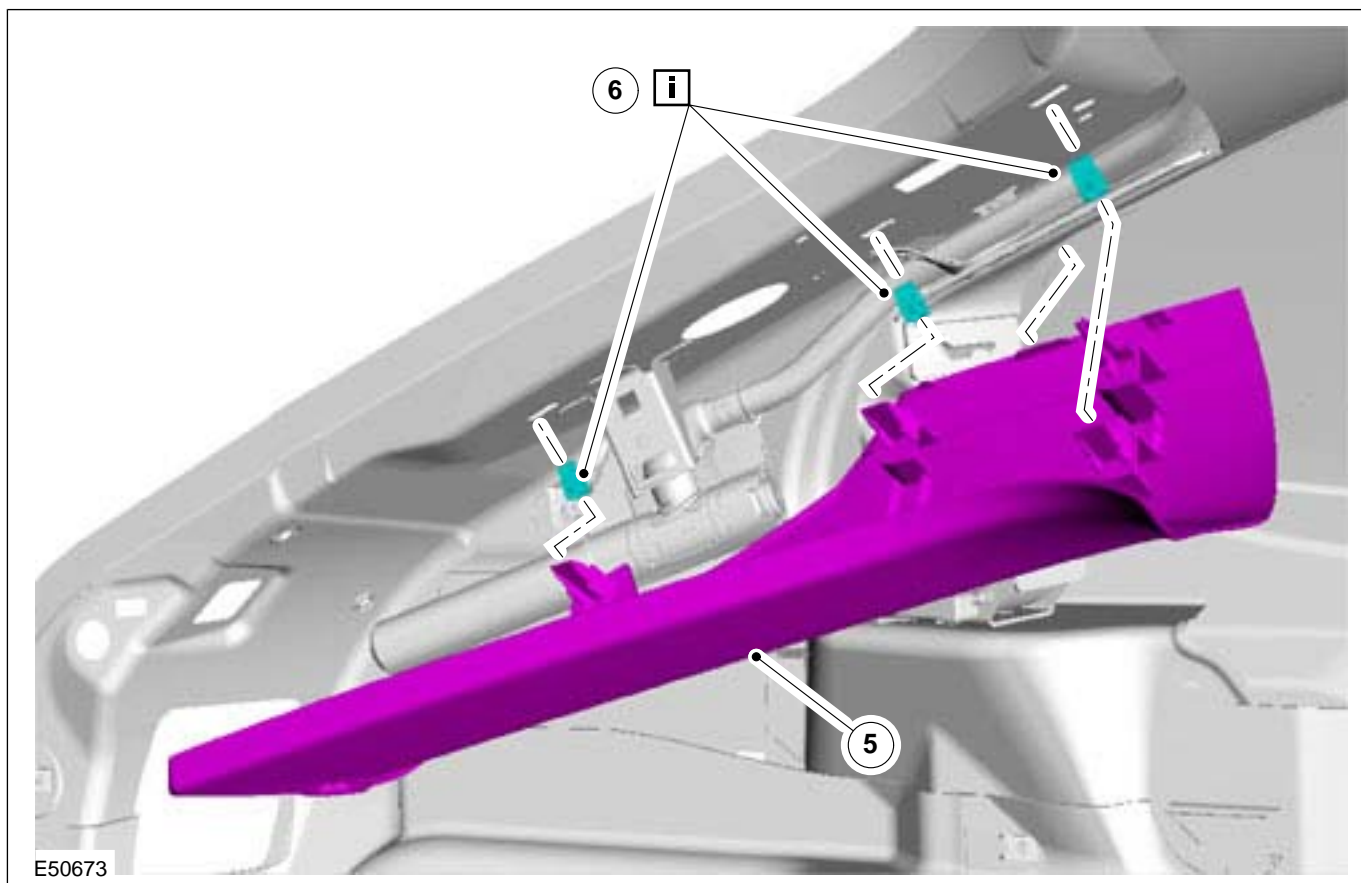


E50671

Item	Description
1	Liftgate opening weatherstrip See Removal Detail
2	Rear parcel shelf support trim panel retaining screws

Item	Description
3	Rear parcel shelf support trim panel See Removal Detail
4	Rear parcel shelf support trim panel retaining clips See Installation Detail

REMOVAL AND INSTALLATION



E50673

Item	Description
5	C-pillar trim panel
6	C-pillar trim panel retaining clips See Installation Detail

4. To install, reverse the removal procedure.

Removal Details

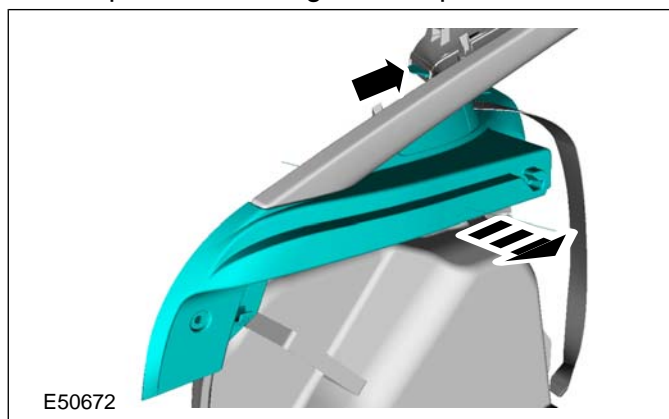
Item 1 Liftgate opening weatherstrip

1. Detach the liftgate opening weatherstrip.

Item 3 Rear parcel shelf support trim panel

1. Detach the rear parcel shelf support trim panel.

- Pull the rear parcel shelf support trim panel away from the rear quarter body panel to release the retaining tang from the rear quarter window glass trim panel.



E50672

REMOVAL AND INSTALLATION**Installation Details****Item 6 C-pillar trim panel retaining clips**

1. Install the C-pillar trim panel retaining clips to the C-pillar trim panel before the C-pillar trim panel is installed to the vehicle.

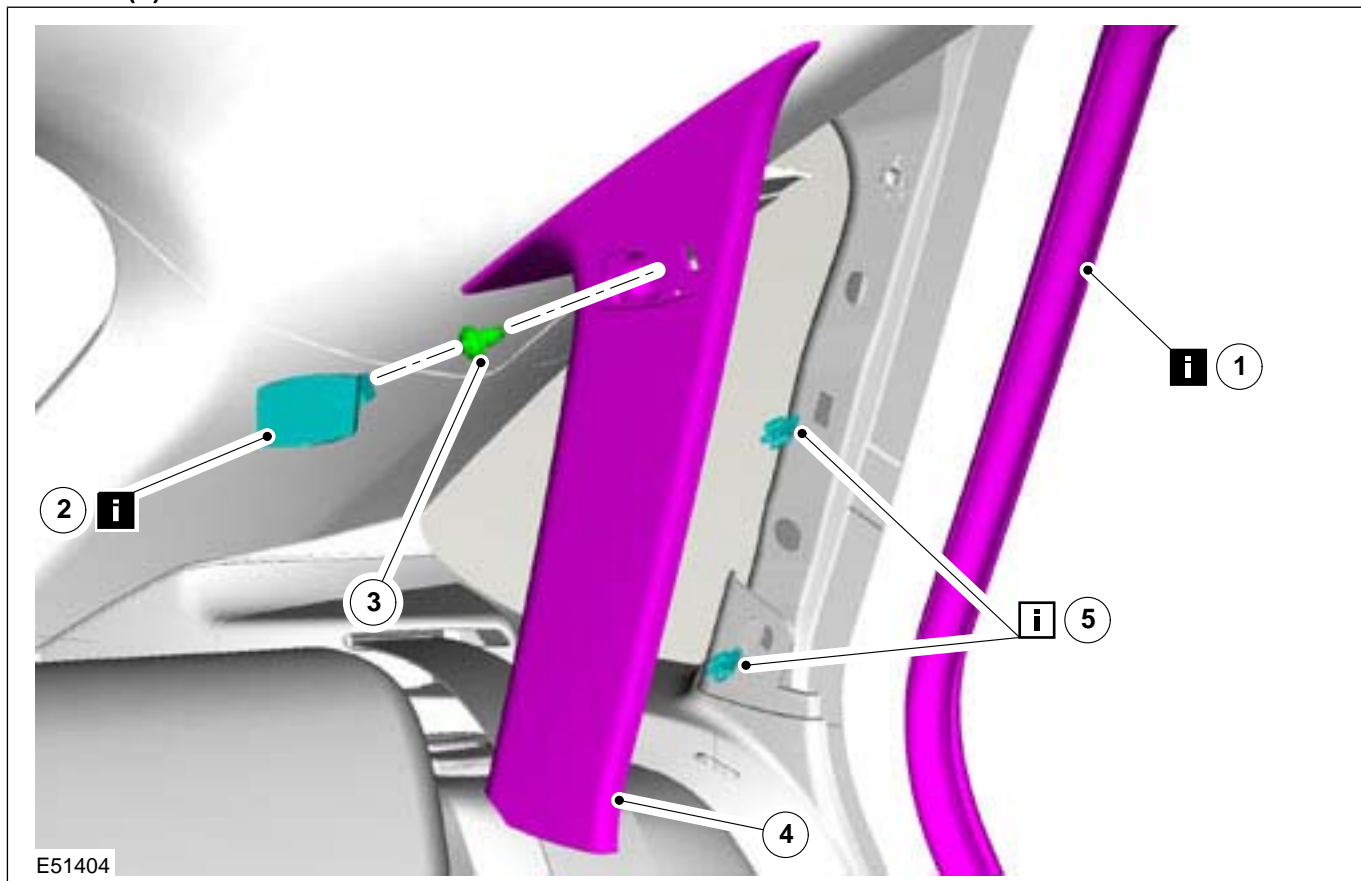
Item 4 Rear parcel shelf support trim panel retaining clips

1. Install the rear parcel shelf support trim panel retaining clips to the rear parcel shelf support trim panel before the rear parcel shelf support trim panel is installed to the vehicle.

REMOVAL AND INSTALLATION

C-Pillar Trim Panel — 4-Door/5-Door

1. Remove the components in the order indicated in the following illustration(s) and table(s).



E51404

Item	Description
1	Rear door opening weatherstrip <i>See Removal Detail</i>
2	C-pillar trim panel retaining screw cover <i>See Removal Detail</i>
3	C-pillar trim panel retaining screw

Item	Description
4	C-pillar trim panel
5	C-pillar trim panel retaining clips <i>See Installation Detail</i>

2. To install, reverse the removal procedure.

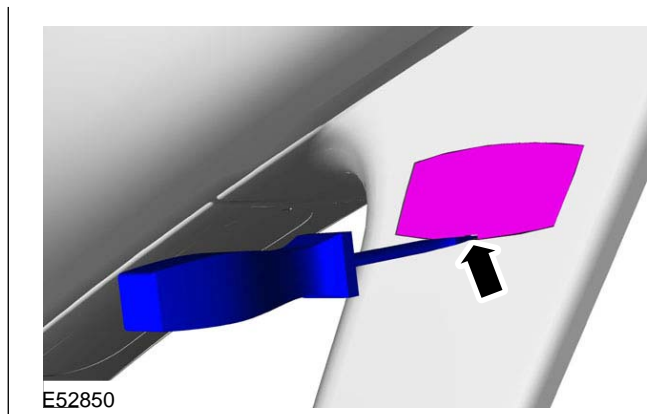
Removal Details

Item 1 Rear door opening weatherstrip

1. Detach the rear door opening weatherstrip.

REMOVAL AND INSTALLATION**Item 2 C-pillar trim panel retaining screw cover**

1. Using a suitable flat blade screwdriver, remove the C-pillar retaining screw cover.

**Installation Details****Item 5 C-pillar trim panel retaining clips**

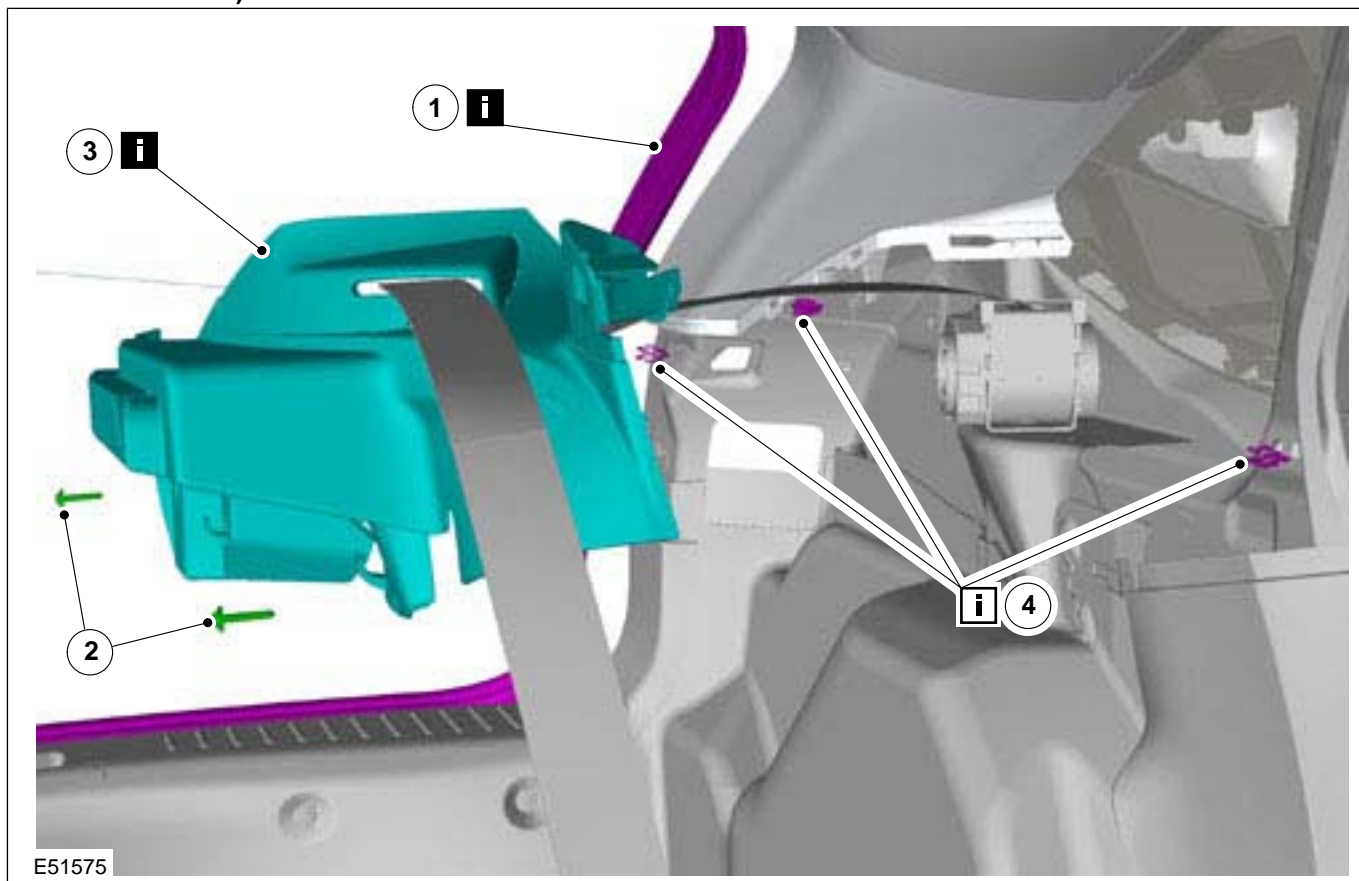
1. Install the C-pillar trim panel retaining clips to the trim panel before installation to the vehicle.

REMOVAL AND INSTALLATION

D-Pillar Trim Panel — 5-Door

1. Remove the Package tray trim panel.
2. Tilt the rear seat backrest forward.
3. Remove the C-pillar trim.
4. Remove the components in the order indicated in the following illustration(s) and table(s).

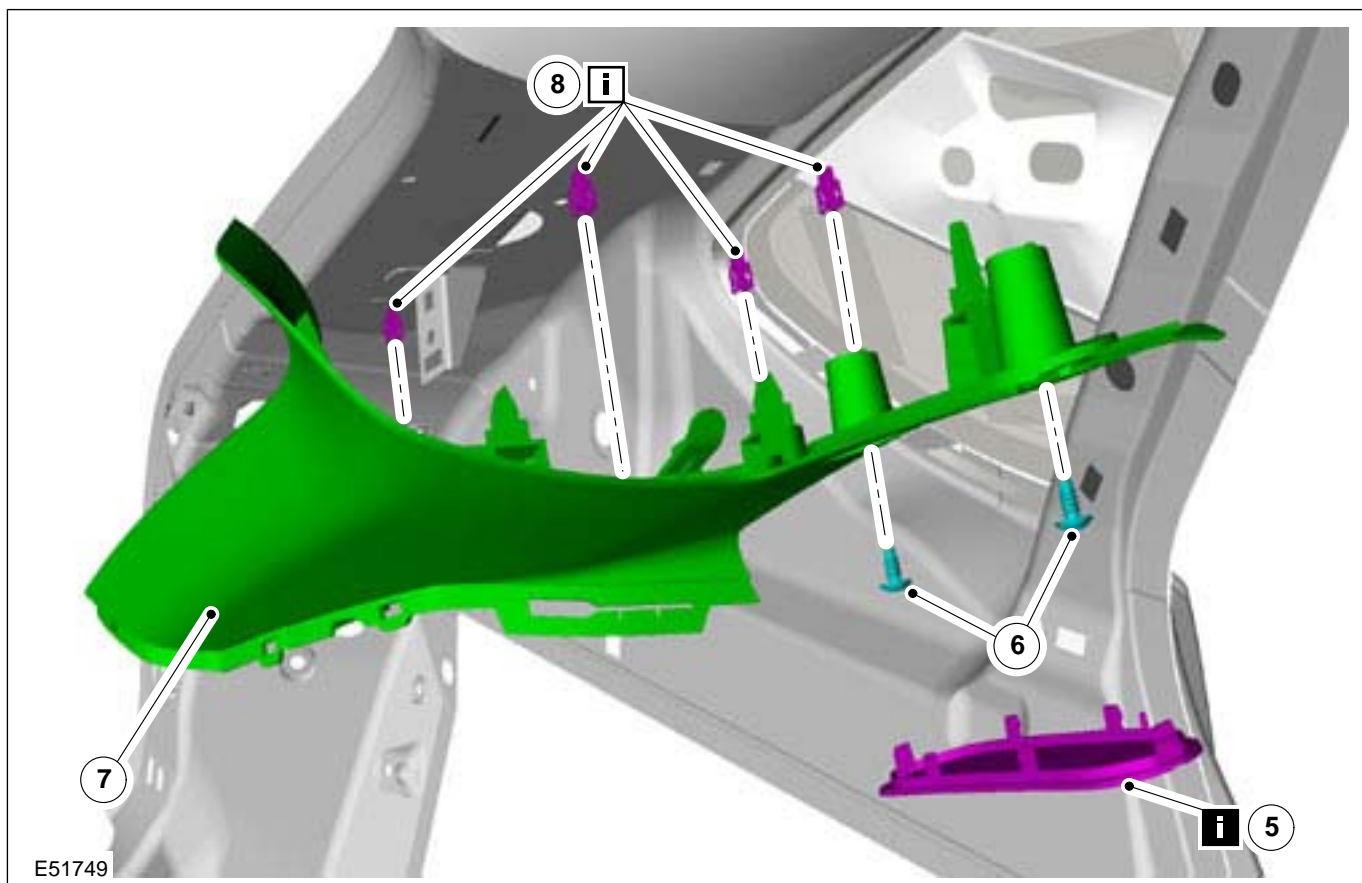
For additional information, refer to: C-Pillar Trim Panel - 4-Door/5-Door (501-05 Interior Trim and Ornamentation, Removal and Installation).



Item	Description
1	Liftgate opening weatherstrip See Removal Detail
2	Package tray support trim panel retaining screws

Item	Description
3	Package tray support trim panel See Removal Detail
4	Package tray support trim panel retaining clips See Installation Detail

REMOVAL AND INSTALLATION



Item	Description
5	D-pillar trim panel retaining screw cover See Removal Detail
6	D-pillar trim panel retaining screws.

Item	Description
7	D-pillar trim panel
8	D-pillar trim panel retaining clips See Installation Detail

5. To install, reverse the removal procedure.

Removal Details

Item 1 Liftgate opening weatherstrip

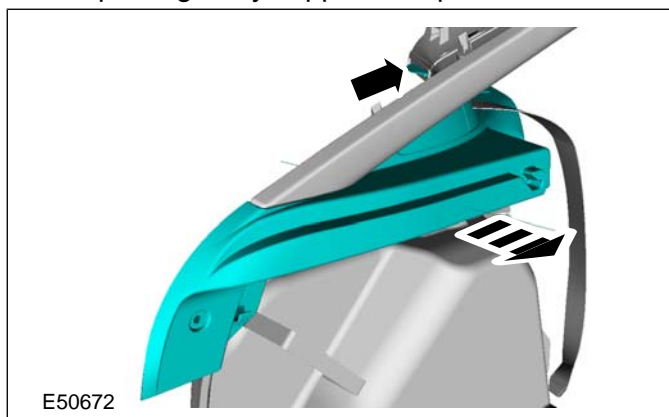
1. Detach the liftgate opening weatherstrip.

Item 3 Package tray support trim panel

1. Detach the package tray support trim panel.

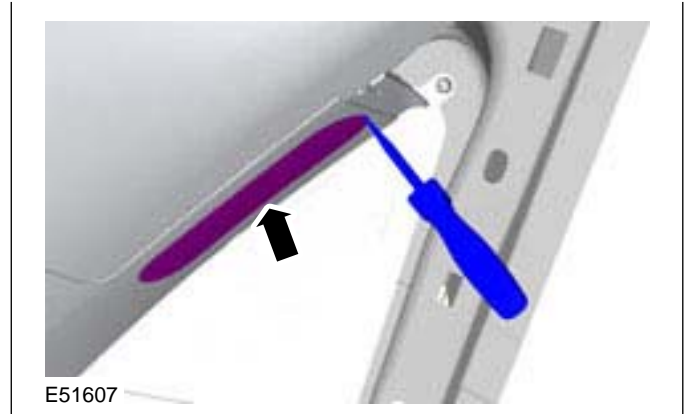
- Pull the package tray support trim panel away from the rear quarter body panel to release the retaining tang from the D-pillar trim panel.

- Feed the rear seatbelt harness through the package tray support trim panel.



REMOVAL AND INSTALLATION**Item 5 D-pillar trim panel retaining screw cover**

1. Remove the D-pillar trim panel retaining screw cover.

**Installation Details****Item 4 Package tray support trim panel retaining clips**

1. Install the package tray support trim panel retaining clips to the trim panel before the trim panel is installed to the vehicle.

Item 8 D-pillar trim panel retaining clips

1. Install the D-pillar trim panel retaining clips trim panel before the trim panel is installed to the vehicle.

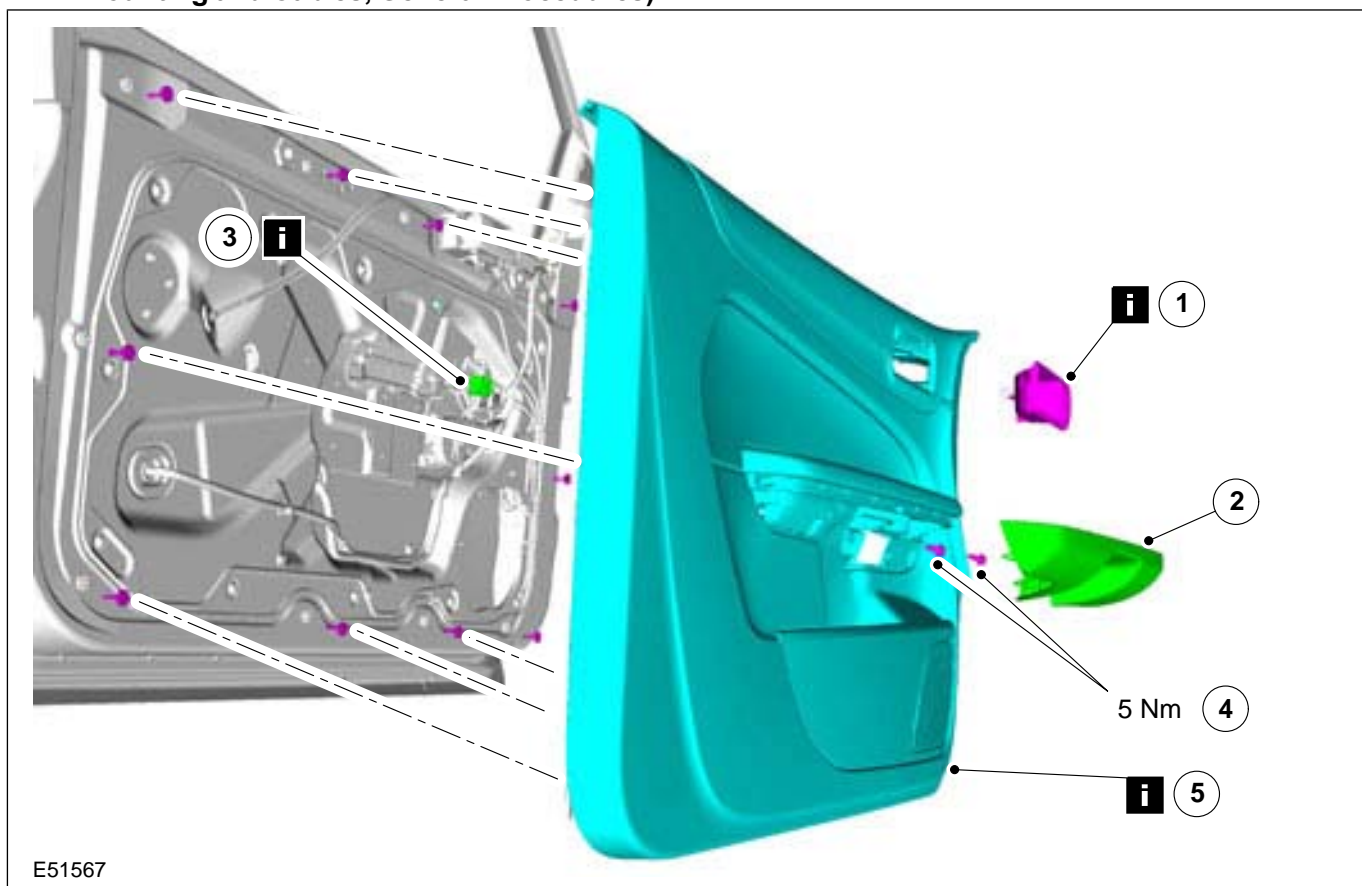
REMOVAL AND INSTALLATION

Front Door Trim Panel — 3-Door

1. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).**

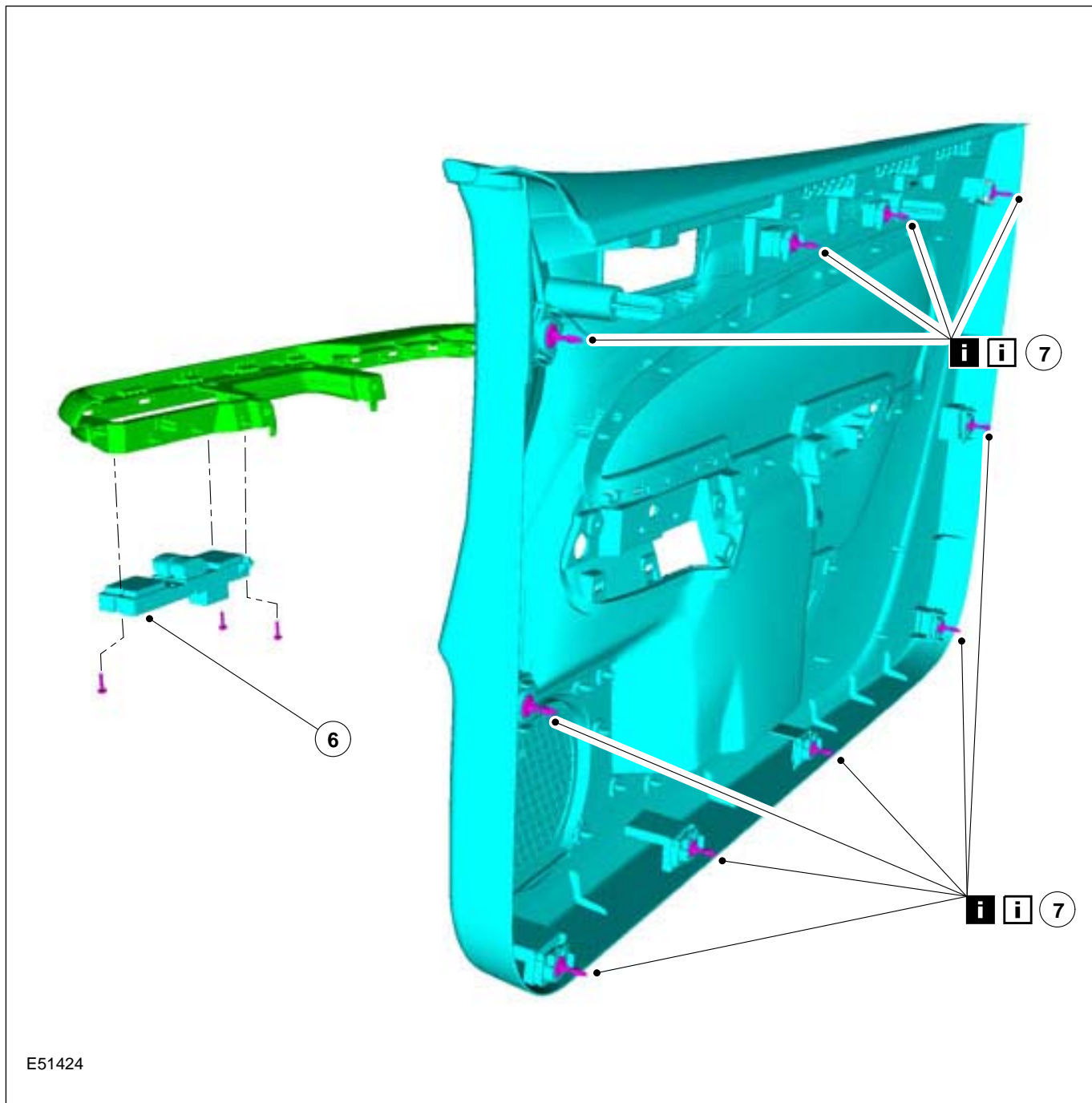
2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Front door latch remote control handle bezel See Removal Detail
2	Front door pull handle cover

Item	Description
3	Front door power window control unit electrical connector See Removal Detail
4	Front door pull handle retaining bolts
5	Front door trim panel See Removal Detail

REMOVAL AND INSTALLATION



E51424

Item	Description
6	Power window control unit
7	Front door trim panel retaining clips See Removal Detail See Installation Detail

3. To install, reverse the removal procedure.

4. Initialize the door window motors.

For additional information, refer to: Door Window Motor Initialization (501-11 Glass, Frames and Mechanisms, General Procedures).

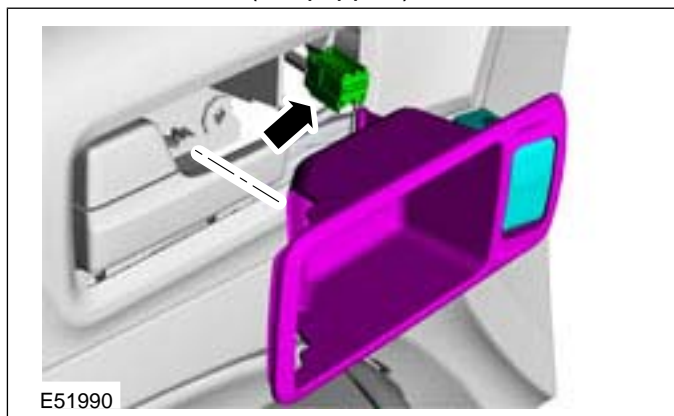
Removal Details

REMOVAL AND INSTALLATION

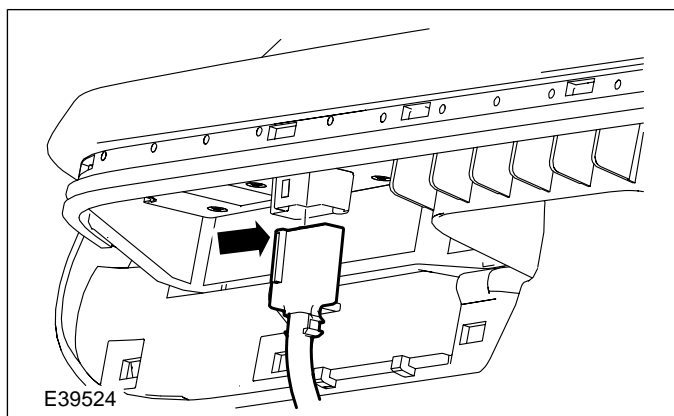
Item 1 Front door latch remote control handle bezel

1. Remove the front door latch remote control bezel.

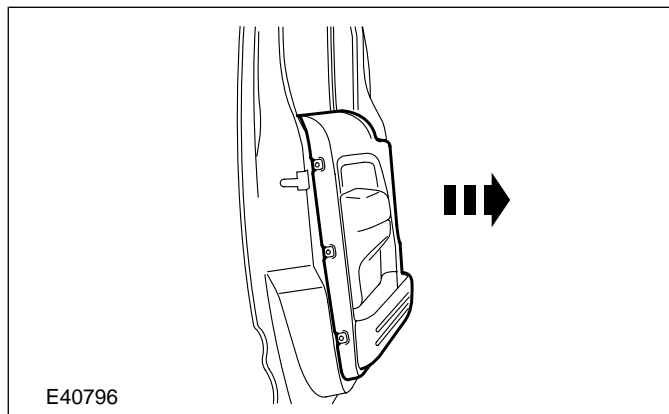
- Disconnect the remote keyless entry door lock button (if equipped).

**Item 3** Front door power window control unit electrical connector

1. Disconnect the front door power window control unit electrical connector.

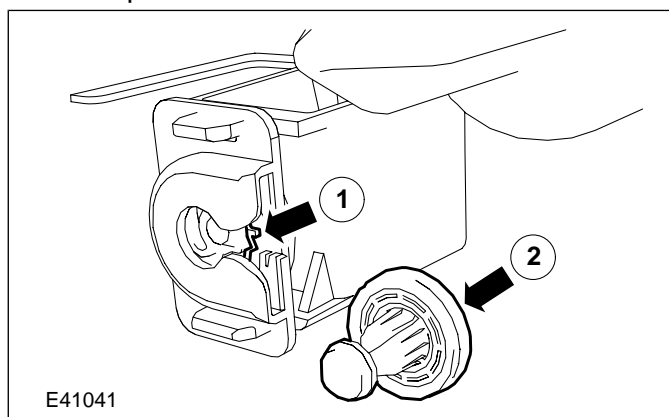
**Item 5** Front door trim panel

1. Remove the front door trim panel.

**Item 7** Front door trim panel retaining clips

1. Remove the front door trim panel retaining clips.

1. Release the front door trim panel retaining clip locking tang.
2. Remove the front door trim panel retaining clip.



Installation Details

Item 7 Front door trim panel retaining clips

1. Install the front door trim retaining clips to the front door trim panel.

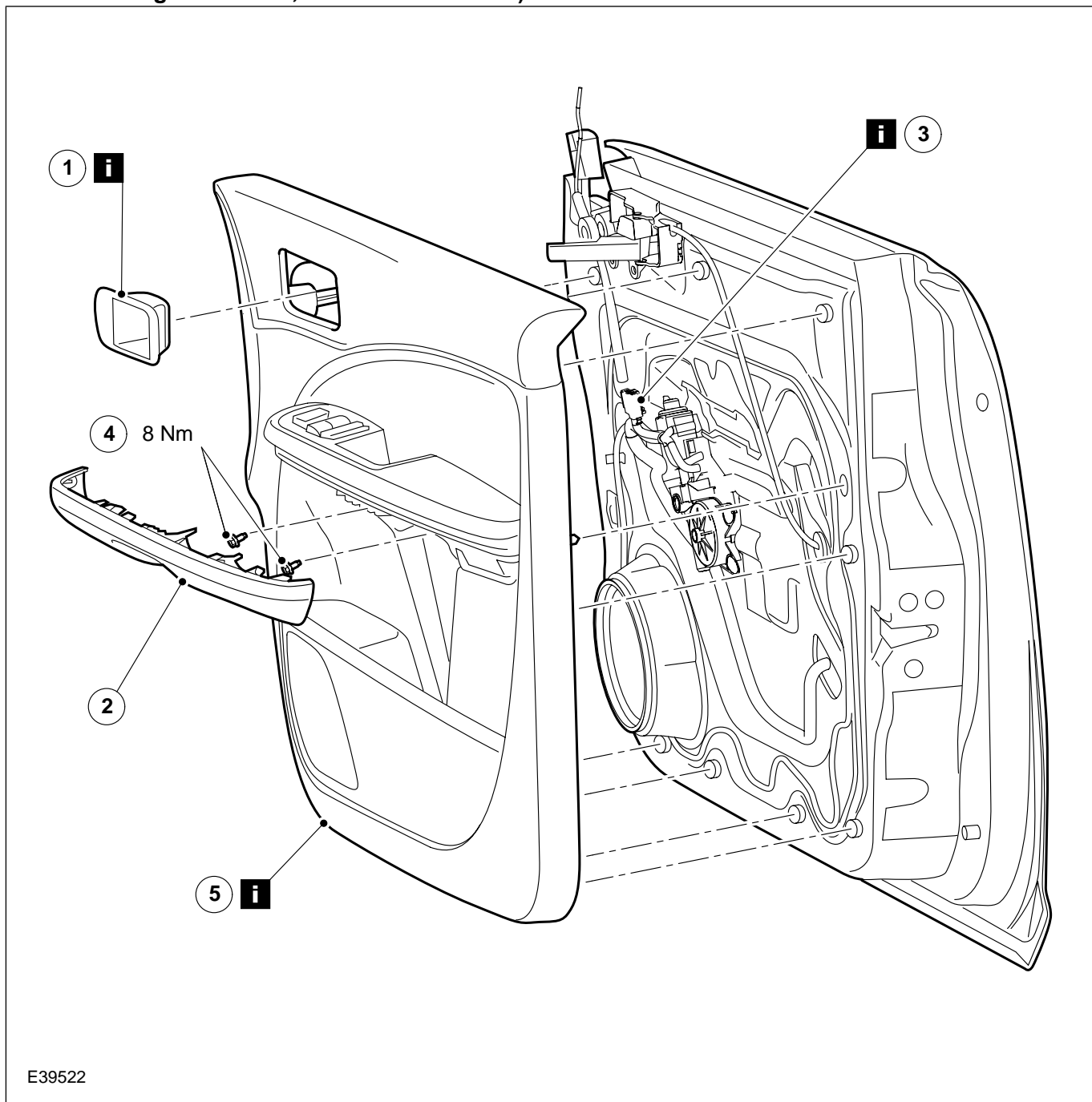
REMOVAL AND INSTALLATION

Front Door Trim Panel — 4-Door/5-Door/Wagon

1. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).**

2. Remove the components in the order indicated in the following illustration(s) and table(s).



E39522

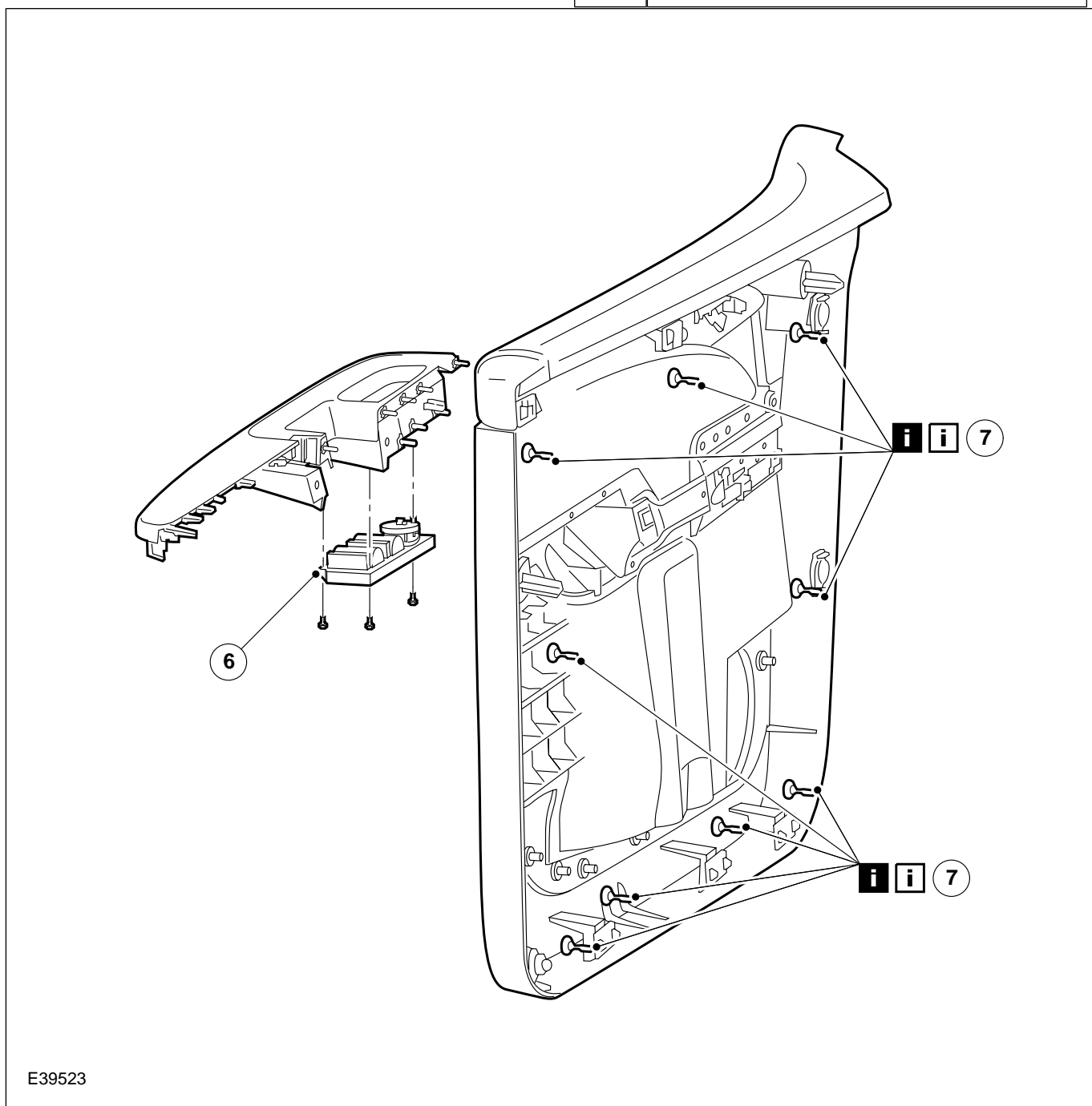
Item	Description
1	Front door latch remote control handle bezel See Removal Detail
2	Front door pull handle cover

Item	Description
3	Front power window control unit electrical connector See Removal Detail

REMOVAL AND INSTALLATION

Item	Description
4	Front door pull handle retaining bolts

Item	Description
5	Front door trim panel See Removal Detail



E39523

Item	Description
6	Front door power window control unit bezel (front door trim panel pull handle shown removed for clarity)
7	Front door trim panel retaining clips See Removal Detail See Installation Detail

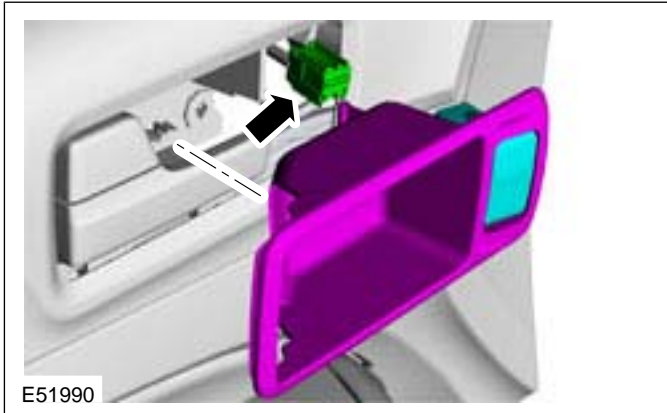
3. To install, reverse the removal procedure.

4. Initialize the door window motors.

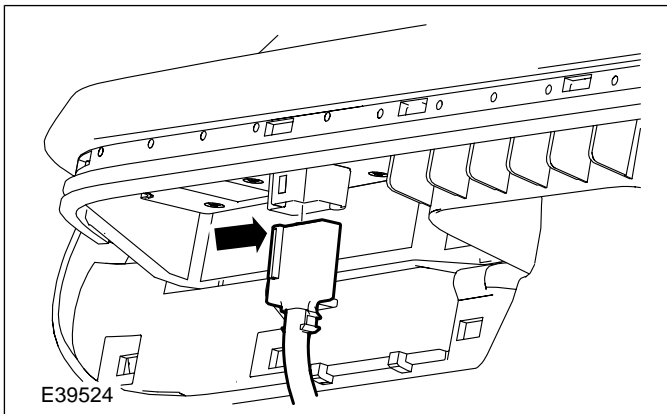
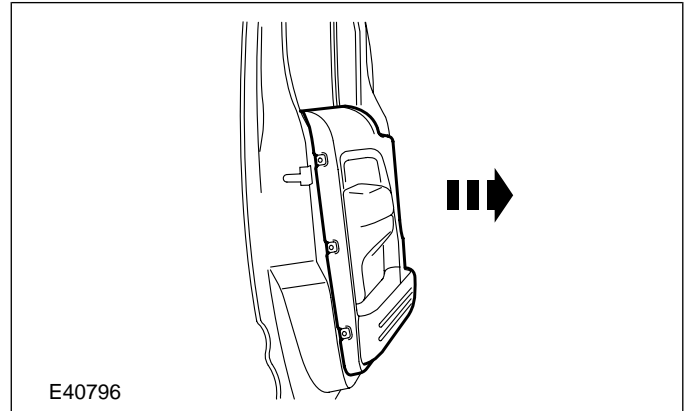
For additional information, refer to: **Door Window Motor Initialization (501-11 Glass, Frames and Mechanisms, General Procedures).**

REMOVAL AND INSTALLATION

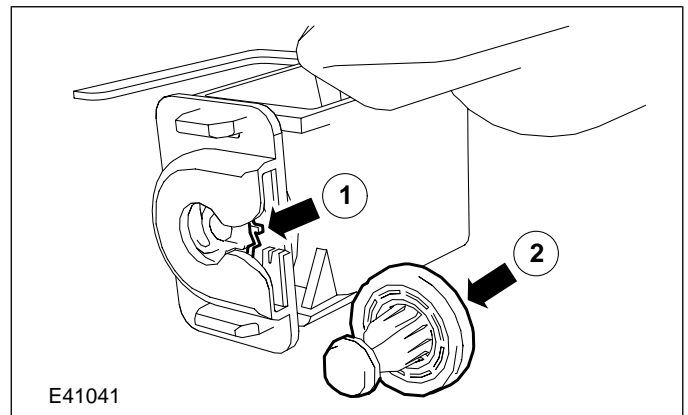
Removal Details

Item 1 Front door latch remote control handle bezel**1. Remove the front door latch remote control bezel.**

- Disconnect the remote keyless entry door lock button (if equipped).

Item 3 Front power window control unit electrical connector**1. Disconnect the front door power window control unit electrical connector.****Item 5 Front door trim panel****1. Remove the front door trim panel.****Item 7 Front door trim panel retaining clips****1. Remove the front door trim panel retaining clips.**

1. Release the front door trim panel retaining clip locking tang.
2. Remove the front door trim panel retaining clip.



Installation Details

Item 7 Front door trim panel retaining clips**1. Install the front door trim panel retaining clips to the front door trim panel.**

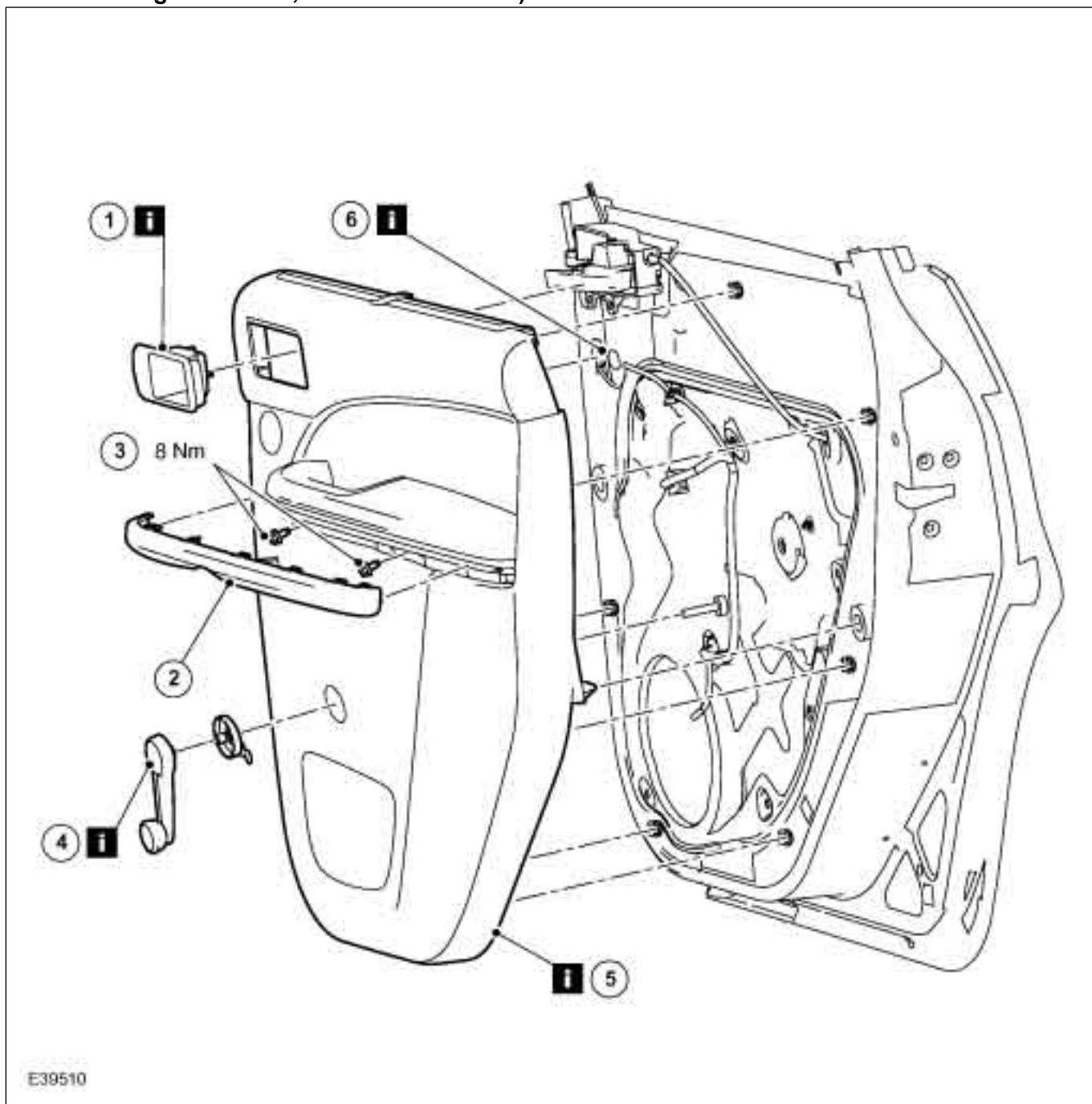
REMOVAL AND INSTALLATION

Rear Door Trim Panel — Vehicles With: Manual Windows

1. Disconnect the battery ground cable.

For additional information, refer to: Battery **Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



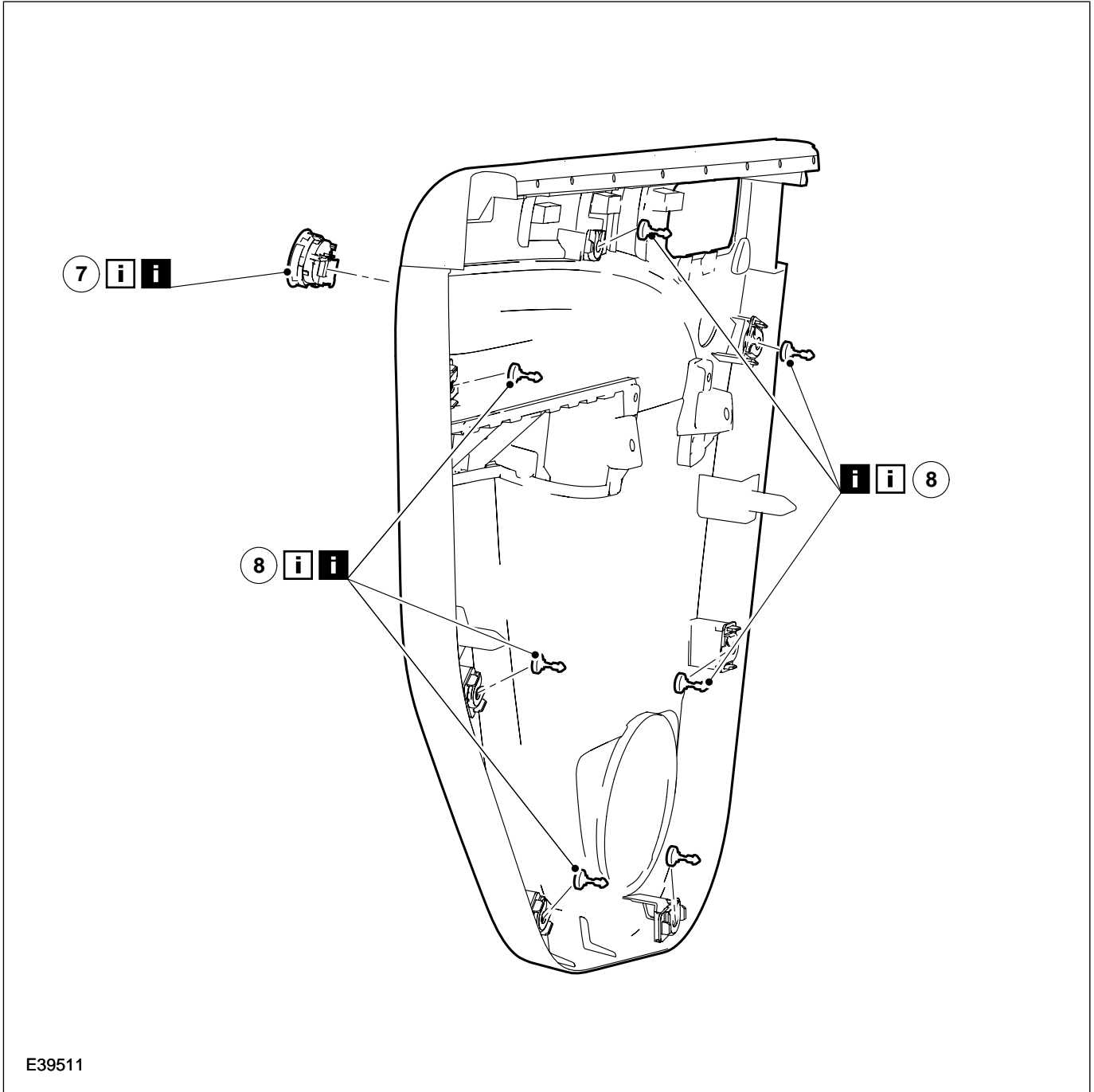
Item	Description
1	Rear door trim panel latch remote control handle bezel See Removal Detail
2	Rear door trim panel pull handle cover

Item	Description
3	Rear door trim panel pull handle retaining bolts

REMOVAL AND INSTALLATION

Item	Description
4	Rear door trim panel window regulator handle See Removal Detail

Item	Description
5	Rear door trim panel See Removal Detail
6	Rear door trim panel tweeter speaker electrical connector See Removal Detail



E39511

REMOVAL AND INSTALLATION

Item	Description
7	Rear door trim panel tweeter speaker See Removal Detail See Installation Detail
8	Rear door trim panel retaining clips See Removal Detail See Installation Detail

3. To install, reverse the removal procedure.

4. Initialize the door window motors.

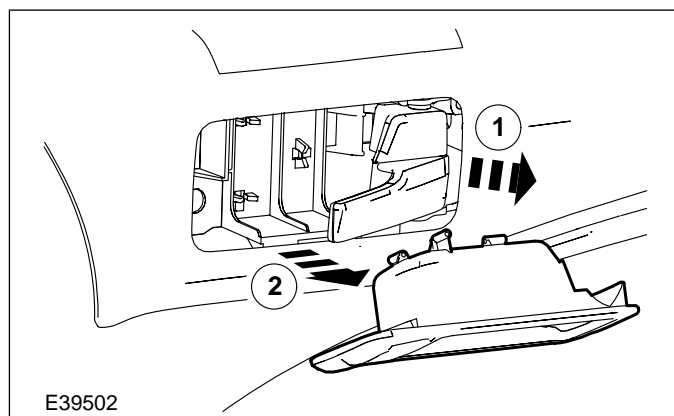
For additional information, refer to: Door **Window Motor Initialization** (501-11 Glass, Frames and Mechanisms, General Procedures).

Removal Details

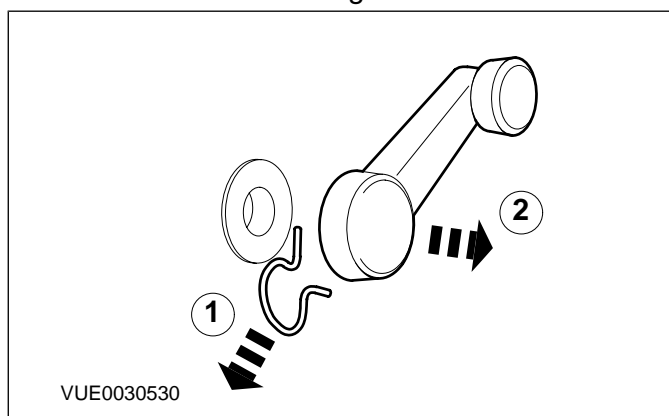
Item 1 Rear door trim panel latch remote control handle bezel

1. Remove the rear door trim panel latch remote control bezel.

1. Operate the rear door trim panel latch remote control release handle.
2. Remove the rear door latch remote control bezel from the rear door latch remote control.



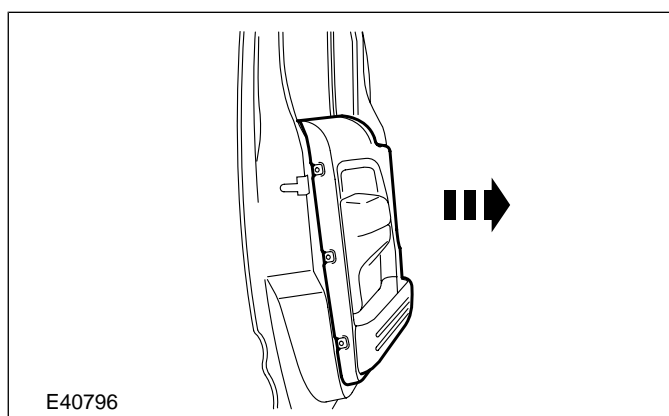
2. Remove window regulator handle.

**Item 5** Rear door trim panel

1. **NOTE:** Detach the rear door trim panel starting from the top front corner down to the bottom rear corner of the door before the rear door trim panel is completely detached.

NOTE: Do not place excessive strain on the rear door trim panel tweeter speaker wiring harness.

Detach the rear door trim panel.



501-05-28

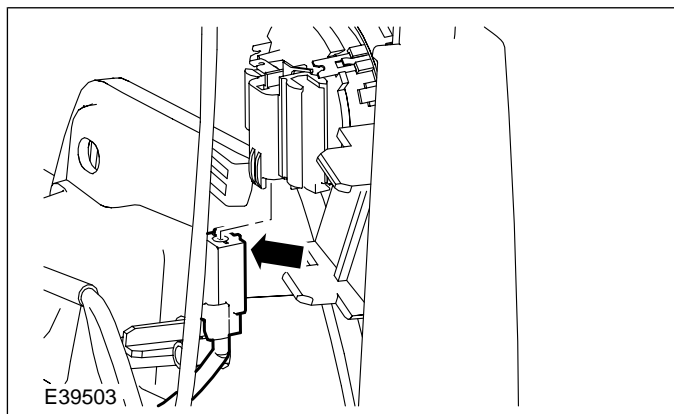
Interior Trim and Ornamentation

501-05-28

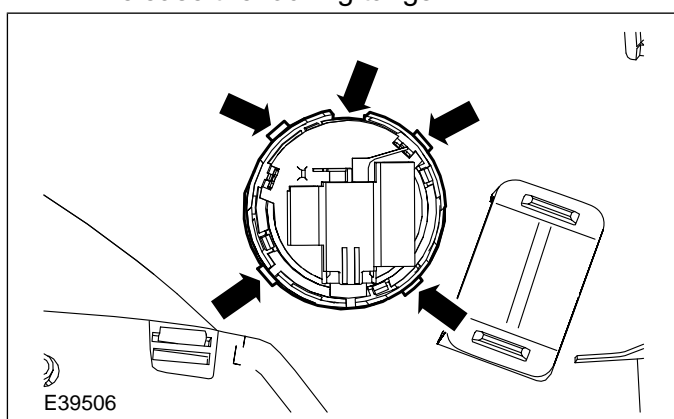
REMOVAL AND INSTALLATION

Item 6 Rear door trim panel tweeter speaker electrical connector

1. Disconnect the rear door trim panel tweeter speaker electrical connector.

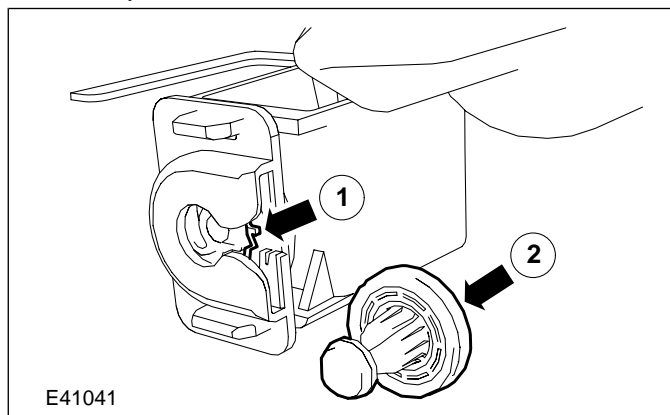
**Item 7** Rear door trim panel tweeter speaker

1. Remove the rear door trim panel tweeter speaker.
 - Release the locking tangs.

**Item 8** Rear door trim panel retaining clips

1. Remove the rear door trim panel retaining clips.

1. Release the rear door trim panel retaining clip retainer locking tang.
2. Remove the rear door trim panel retaining clip.



Installation Details

Item 8 Rear door trim panel retaining clips

1. **NOTE:** Make sure that the rear door trim panel retaining clips are in the closed position.

Install the rear door trim panel retaining clips to the rear door trim panel retaining clip retainer.

door trim panel groove. Failure to follow this instruction may cause damage to the rear door trim panel.

Install the rear door trim panel tweeter speaker.

Item 7 Rear door trim panel tweeter speaker

1. **CAUTION:** Make sure that the locating tang on the top of the rear door tweeter speaker is correctly aligned with the rear

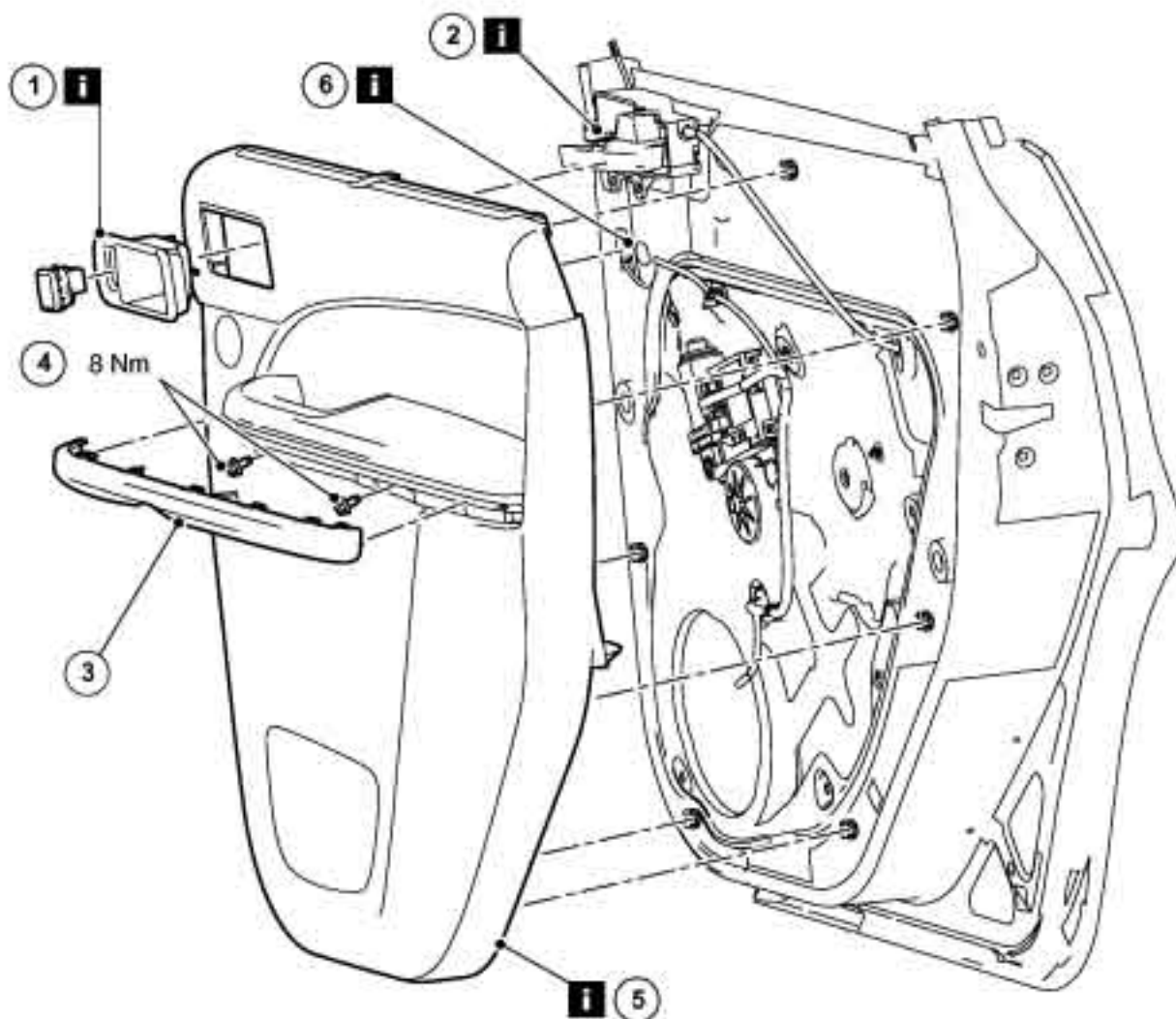
REMOVAL AND INSTALLATION

Rear Door Trim Panel — Vehicles With: Power Windows

1. Disconnect the battery ground cable.

For additional information, refer to: Battery **Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

2. Remove the components in the order indicated in the following illustration(s) and table(s).

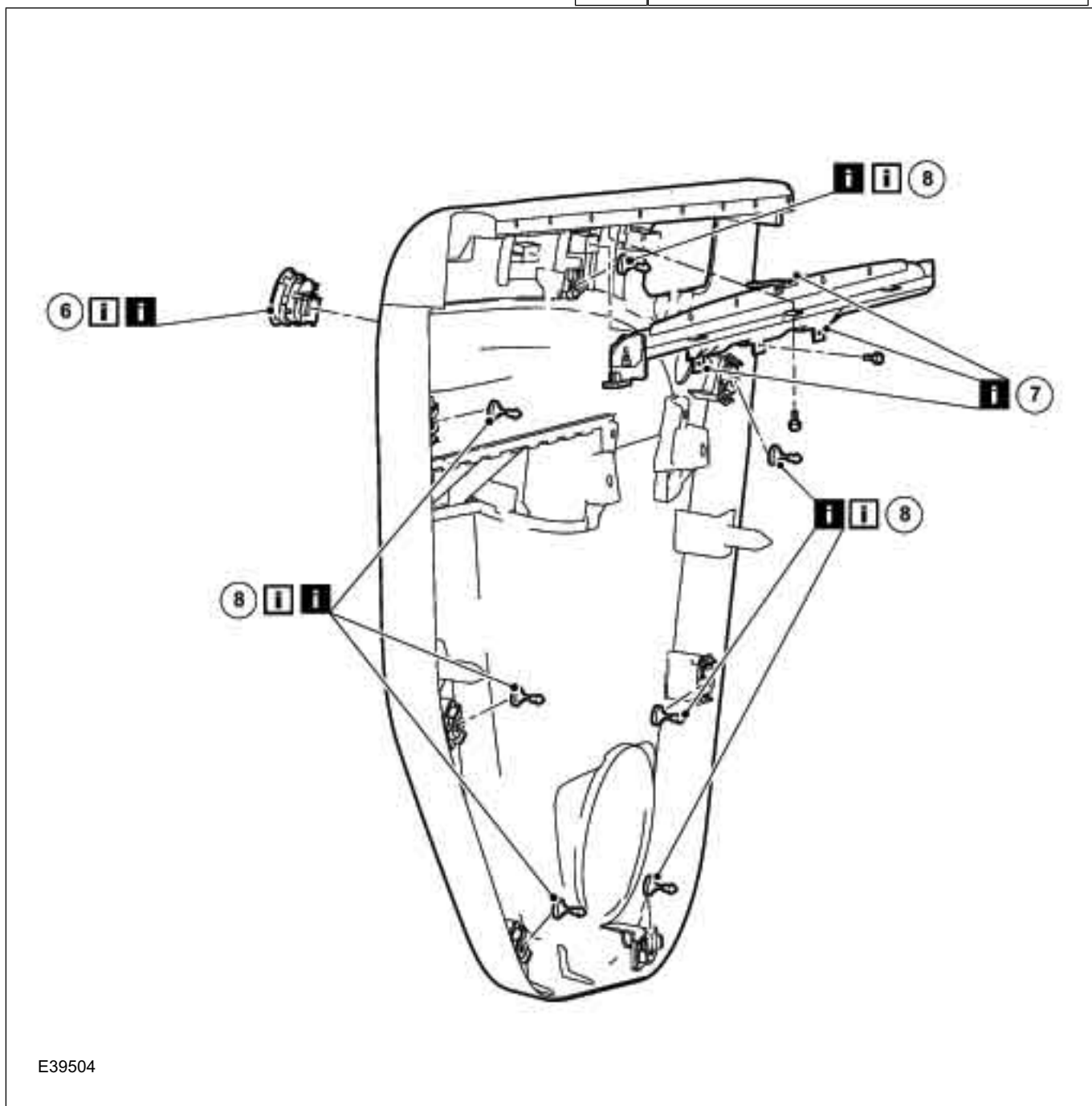


E39500

REMOVAL AND INSTALLATION

Item	Description
1	Rear door trim panel latch remote control handle bezel See Removal Detail
2	Rear door trim panel power window switch See Removal Detail
3	Rear door trim panel pull handle cover

Item	Description
4	Rear door trim panel pull handle retaining bolts
5	Rear door trim panel See Removal Detail
6	Rear door trim panel tweeter speaker electrical connector See Removal Detail



REMOVAL AND INSTALLATION

Item	Description
6	Rear door trim panel tweeter speaker See Removal Detail See Installation Detail
7	Rear door trim panel blind assembly See Removal Detail
8	Rear door trim panel retaining clips See Removal Detail

Item	Description
	See Installation Detail

3. To install, reverse the removal procedure.

4. Initialize the door window motors.

For additional information, refer to: Door Window Motor Initialization (501-11 Glass, Frames and Mechanisms, General Procedures).

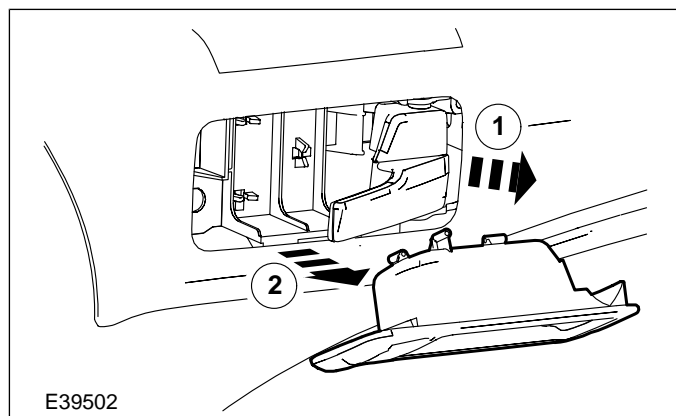
Removal Details

Item 1 Rear door trim panel latch remote control handle bezel

1. **NOTE:** Do not place excessive strain on the rear door trim panel power window switch wiring harness).

Detach the rear door trim panel latch release handle bezel (rear door trim panel power window switch shown removed for clarity).

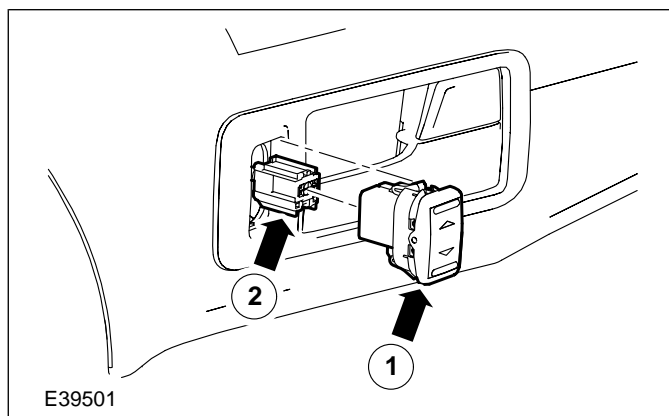
1. Operate the Rear door latch release handle.
2. Detach the rear door latch release handle bezel from the rear door latch release handle.

**Item 2** Rear door trim panel power window switch

1. Remove the rear door trim panel power window switch.

1. Detach the power window switch from the rear door trim panel latch remote control handle bezel.

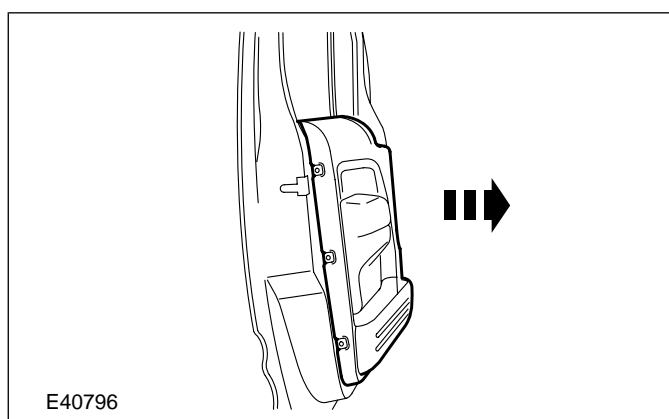
2. Disconnect the rear door power window switch electrical connector.

**Item 5** Rear door trim panel

1. **NOTE:** Detach the rear door trim panel starting from the top front corner down to the bottom rear corner of the door before the rear door trim panel is completely detached.

NOTE: Do not place excessive strain on the rear door trim panel tweeter speaker wiring harness.

Detach the rear door trim panel.



501-05-32

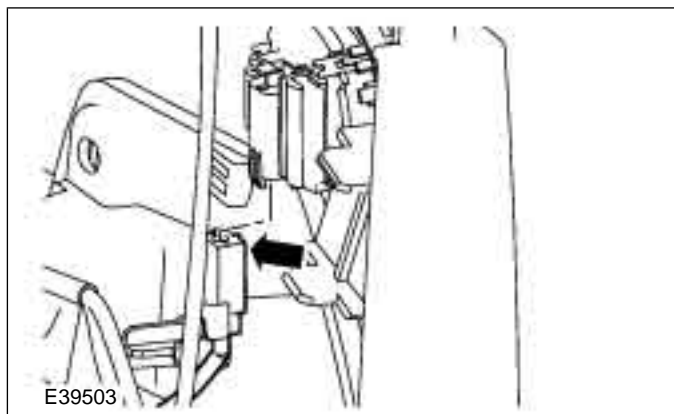
Interior Trim and Ornamentation

501-05-32

REMOVAL AND INSTALLATION

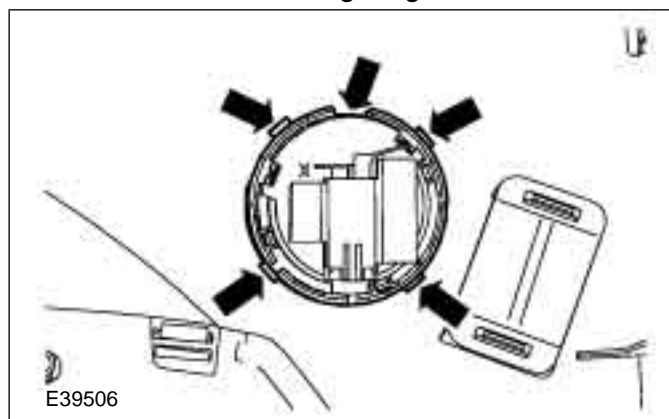
Item 6 Rear door trim panel tweeter speaker electrical connector

1. Disconnect the rear door trim panel tweeter speaker electrical connector.

**Item 6** Rear door trim panel tweeter speaker

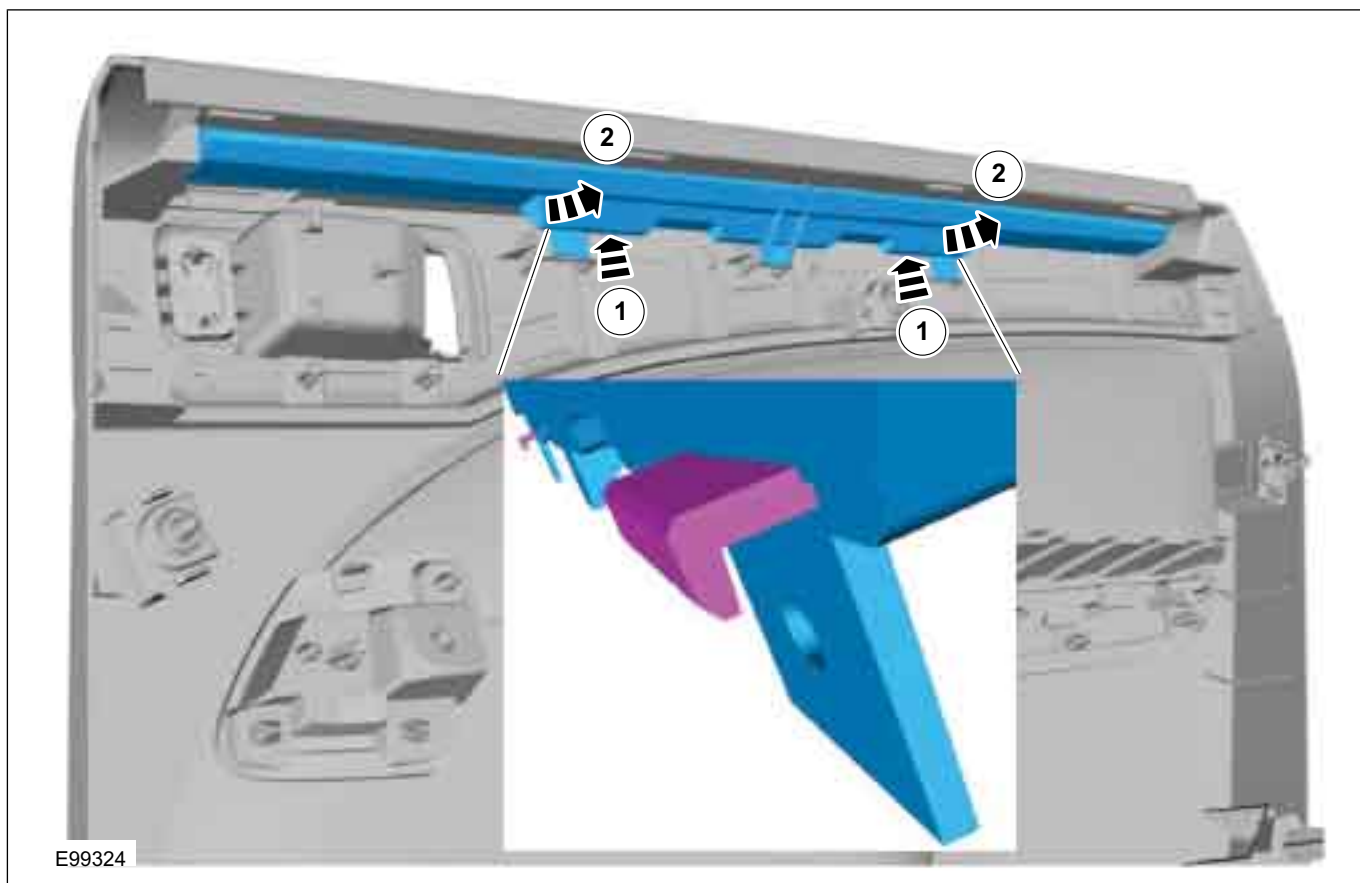
1. Remove the rear door trim panel tweeter speaker.

- Release the locking tangs.

**Item 7** Rear door trim panel blind assembly

1. **CAUTION:** Take extra care not to damage the clips.

Detach the rear door trim panel blind assembly from the rear door trim panel.

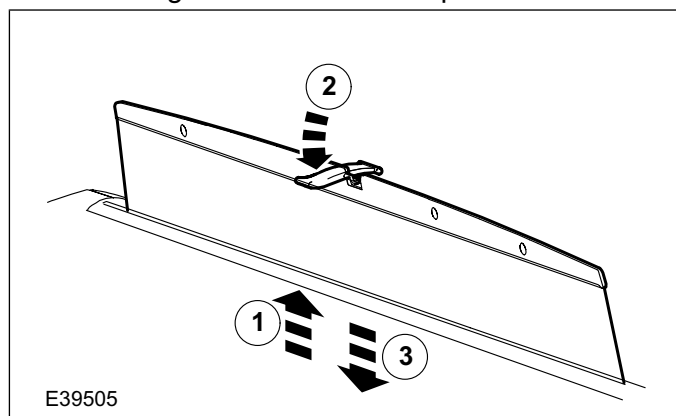


2.

1. Raise the rear door trim panel blind.
2. Move the rear door trim panel blind clip to the vertical position.

REMOVAL AND INSTALLATION

3. Lower the rear door trim panel blind and feed through the rear door trim panel.

**Item 8** Rear door trim panel retaining clips

1. Remove the rear door trim panel retaining clips.

Installation Details

Item 8 Rear door trim panel retaining clips

1. **NOTE:** Make sure that the rear door trim panel retaining clips are in the closed position.

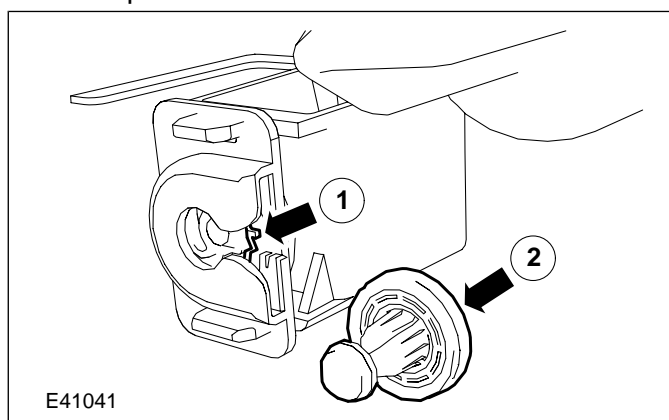
Install the rear door trim panel retaining clips to the rear door trim panel retaining clip retainer.

Item 6 Rear door trim panel tweeter speaker

1. **CAUTION:** Make sure that the locating tang on the top of the rear door tweeter speaker is correctly aligned with the rear door trim panel groove. Failure to follow this instruction may cause damage to the rear door trim panel.

Install the rear door trim panel tweeter speaker.

1. Release the rear door trim panel retaining clip retainer locking tang.
2. Remove the rear door trim panel retaining clip.



501-05-34

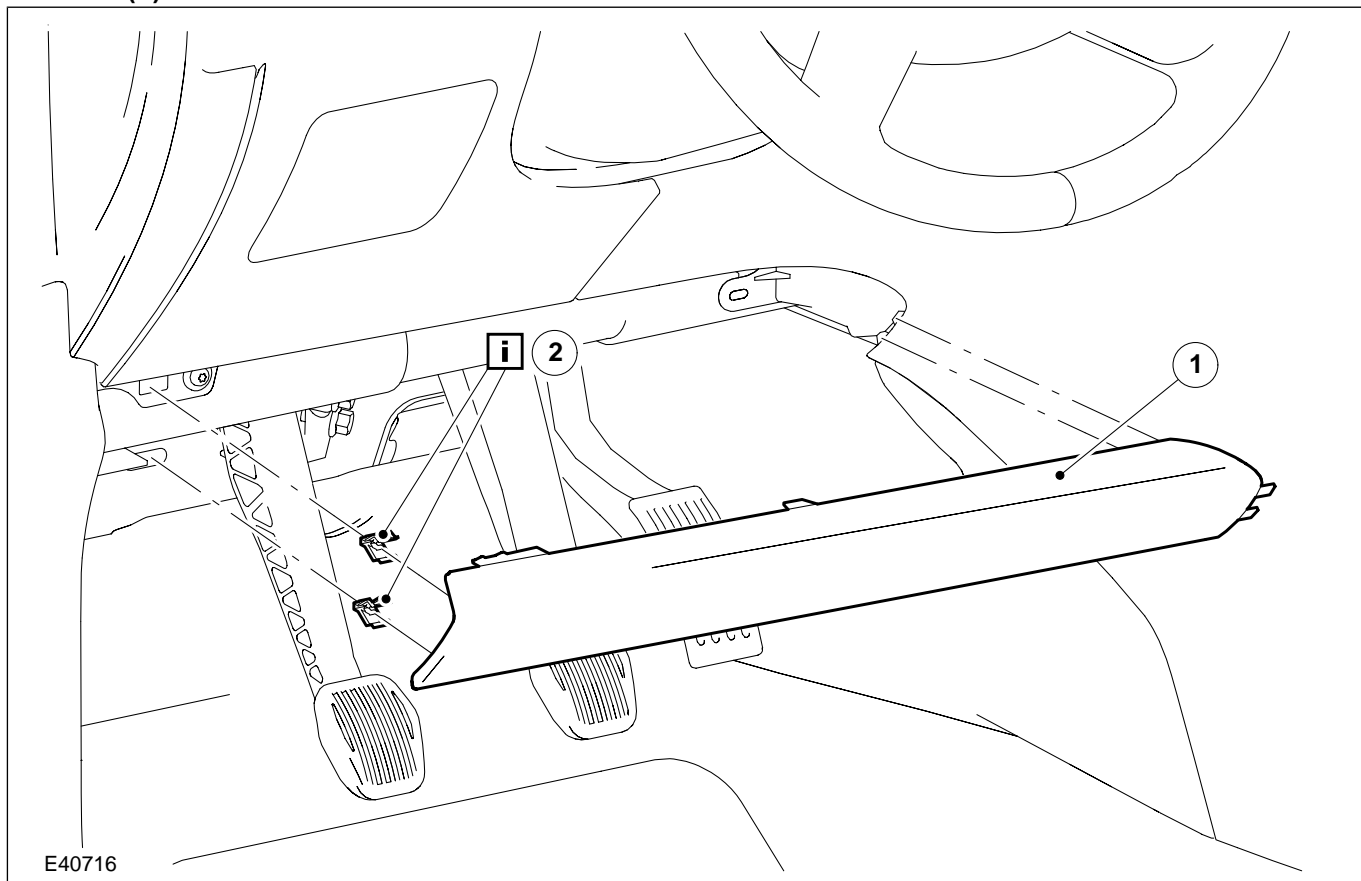
Interior Trim and Ornamentation

501-05-34

REMOVAL AND INSTALLATION

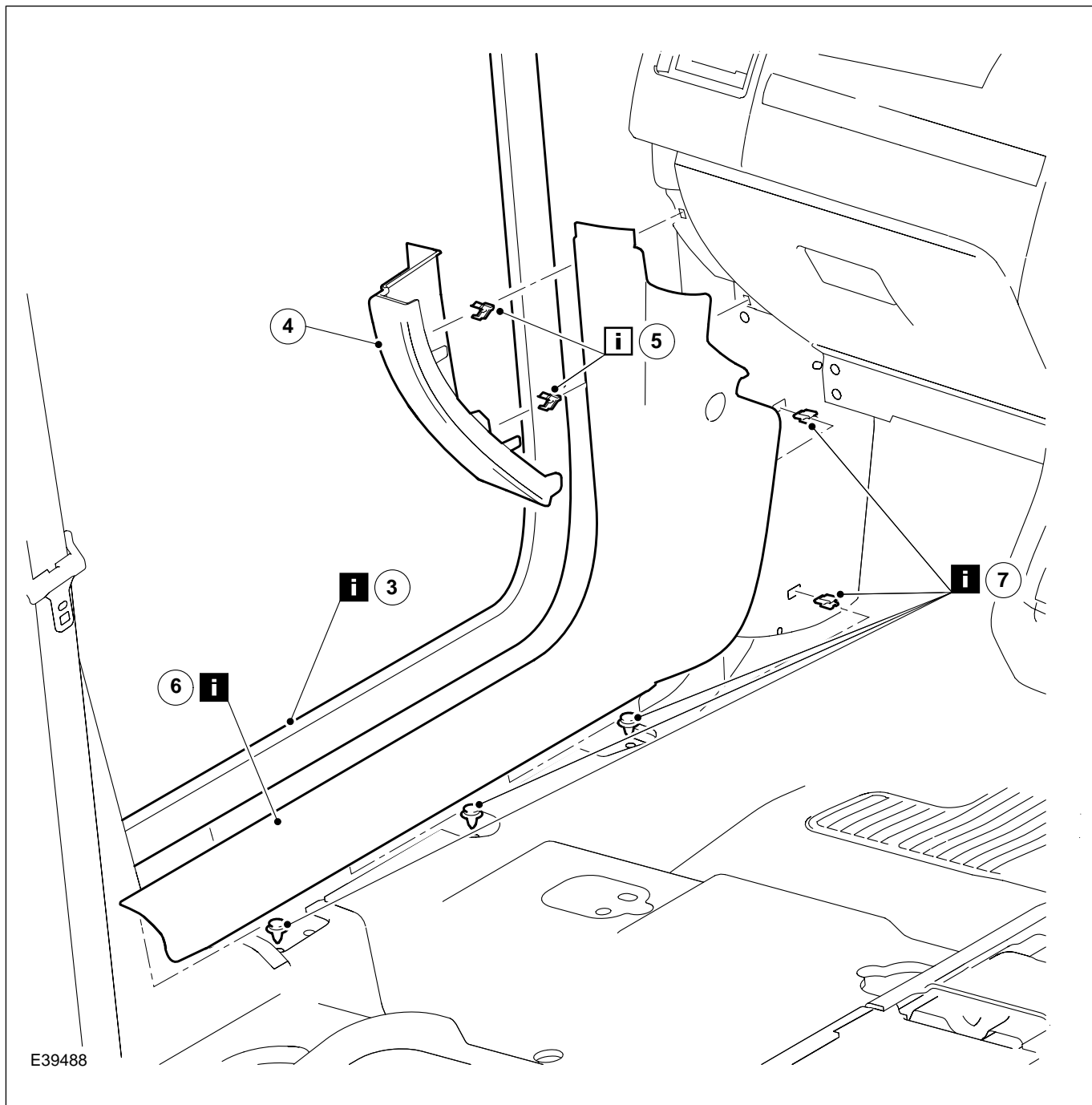
Front Scuff Plate Trim Panel

1. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Instrument panel lower trim panel
2	Instrument panel lower trim panel retaining clips See Installation Detail

REMOVAL AND INSTALLATION



E39488

Item	Description
3	Front door opening weatherstrip See Removal Detail
4	Instrument panel side trim panel
5	Instrument panel side trim panel retaining clips See Installation Detail

Item	Description
6	Front scuff plate trim panel See Removal Detail
7	Front scuff plate trim panel retaining clips See Installation Detail

2. To install, reverse the removal procedure.

Removal Details

501-05-36

Interior Trim and Ornamentation

501-05-36

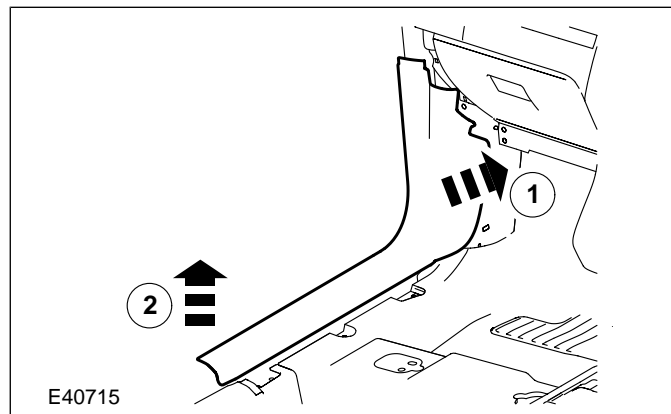
REMOVAL AND INSTALLATION

Item 3 Front door opening weatherstrip

1. locally Detach the front door weatherstrip.

Item 6 Front scuff plate trim panel

1. Remove the front scuff plate trim panel.



Installation Details

Item 7 Front scuff plate trim panel retaining clips

1. Install the front scuff plate trim panel retaining clips to the front scuff plate trim panel.

Item 5 Instrument panel side trim panel retaining clips

1. Install the instrument panel side trim panel retaining clips to the instrument panel side trim panel.

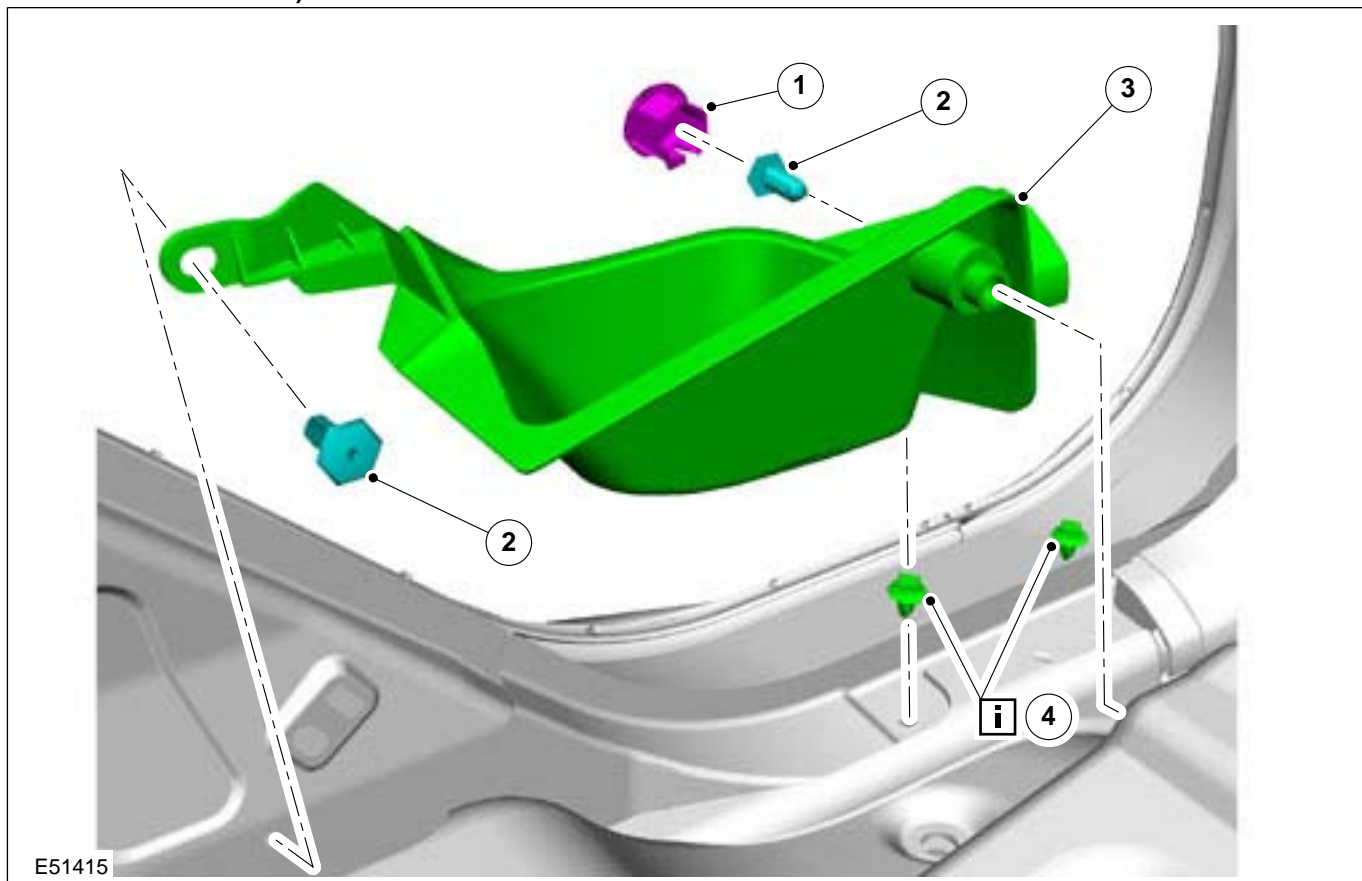
REMOVAL AND INSTALLATION

Rear Scuff Plate Trim Panel

1. Remove the rear quarter trim panel,

For additional information, refer to: **Rear Quarter Trim Panel - 5-Door/Wagon** (501-05 Interior Trim and Ornamentation, Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Rear scuff plate trim panel retaining clip cover
2	Rear scuff plate trim panel retaining clips

Item	Description
3	Rear scuff plate trim panel
4	Rear scuff plate trim panel retaining clips See Installation Detail

3. To install, reverse the removal procedure.

Installation Details

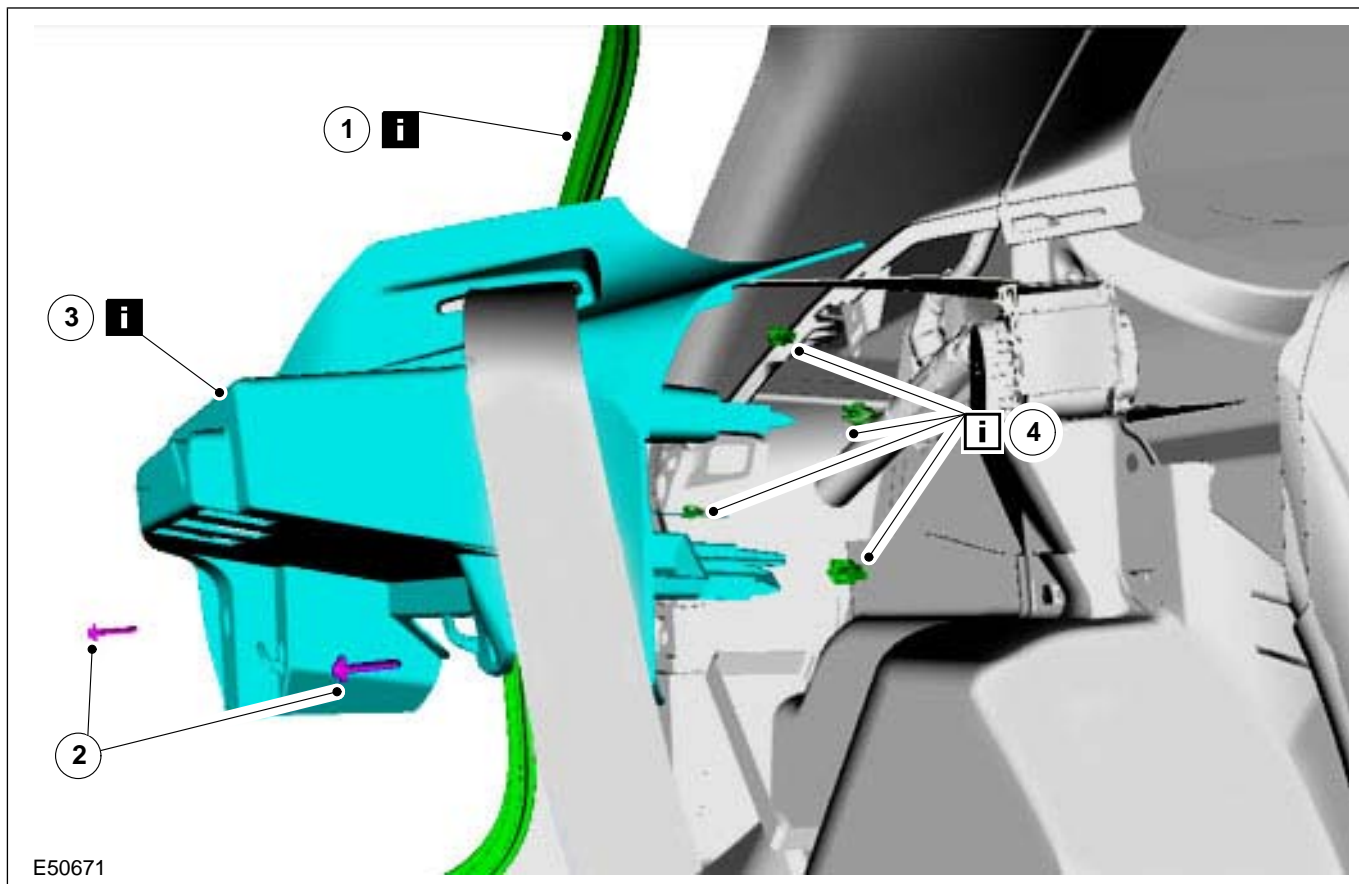
Item 4 Rear scuff plate trim panel retaining clips

1. Install the rear scuff plate trim panel retaining clips to the rear scuff plate trim panel before the trim panel is installed to the vehicle.

REMOVAL AND INSTALLATION

Loadspace Trim Panel — 3-Door

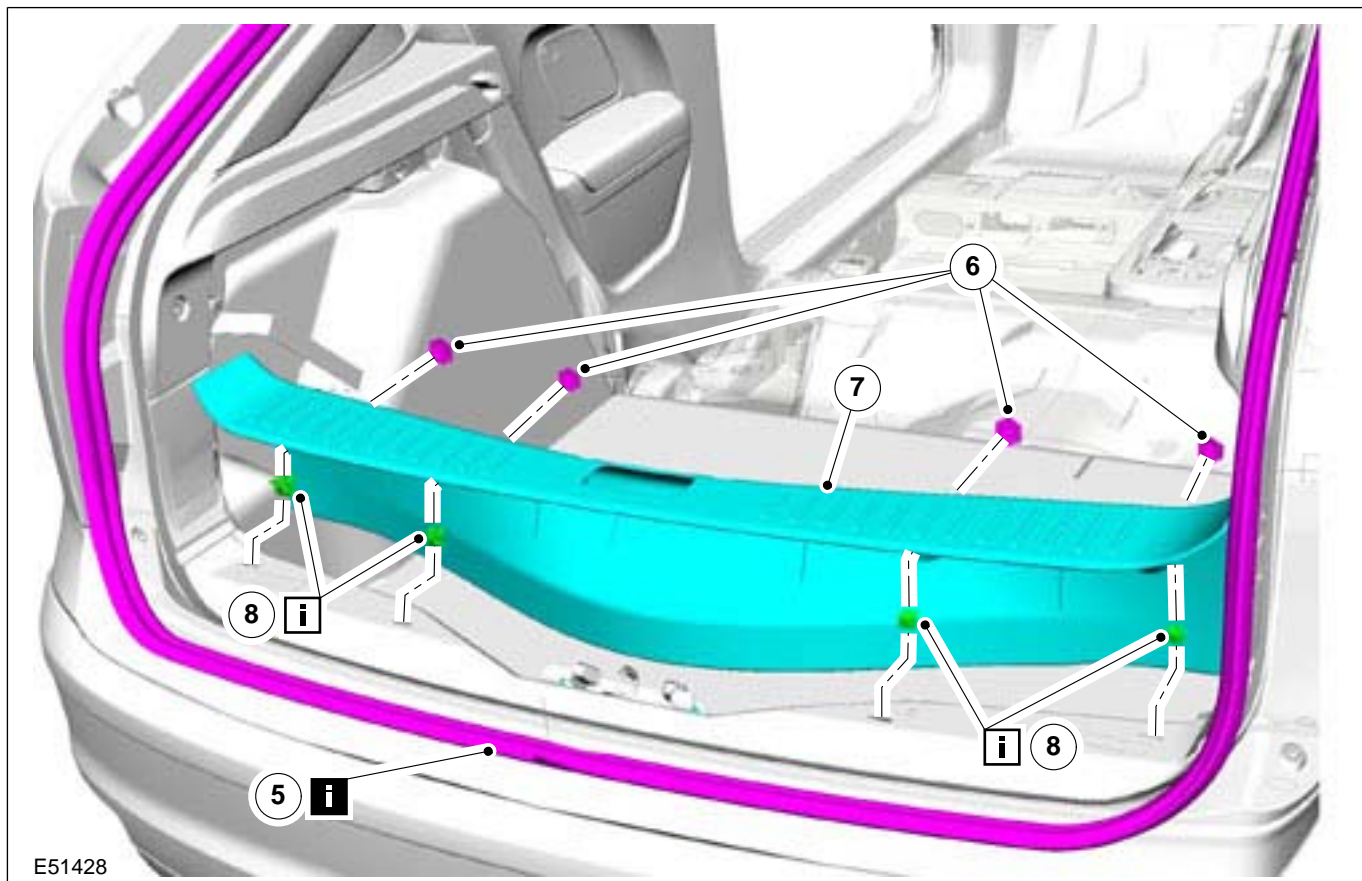
1. Remove the rear parcel shelf trim panel.
2. Remove the loadspace floor covering.
3. Tilt the rear seat cushion forward.
4. Tilt the rear seat backrest forward.
5. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Liftgate opening weatherstrip See Removal Detail
2	Rear parcel shelf support trim panel retaining screws

Item	Description
3	Rear parcel shelf support trim panel See Removal Detail
4	Rear parcel shelf support trim panel retaining clips See Installation Detail

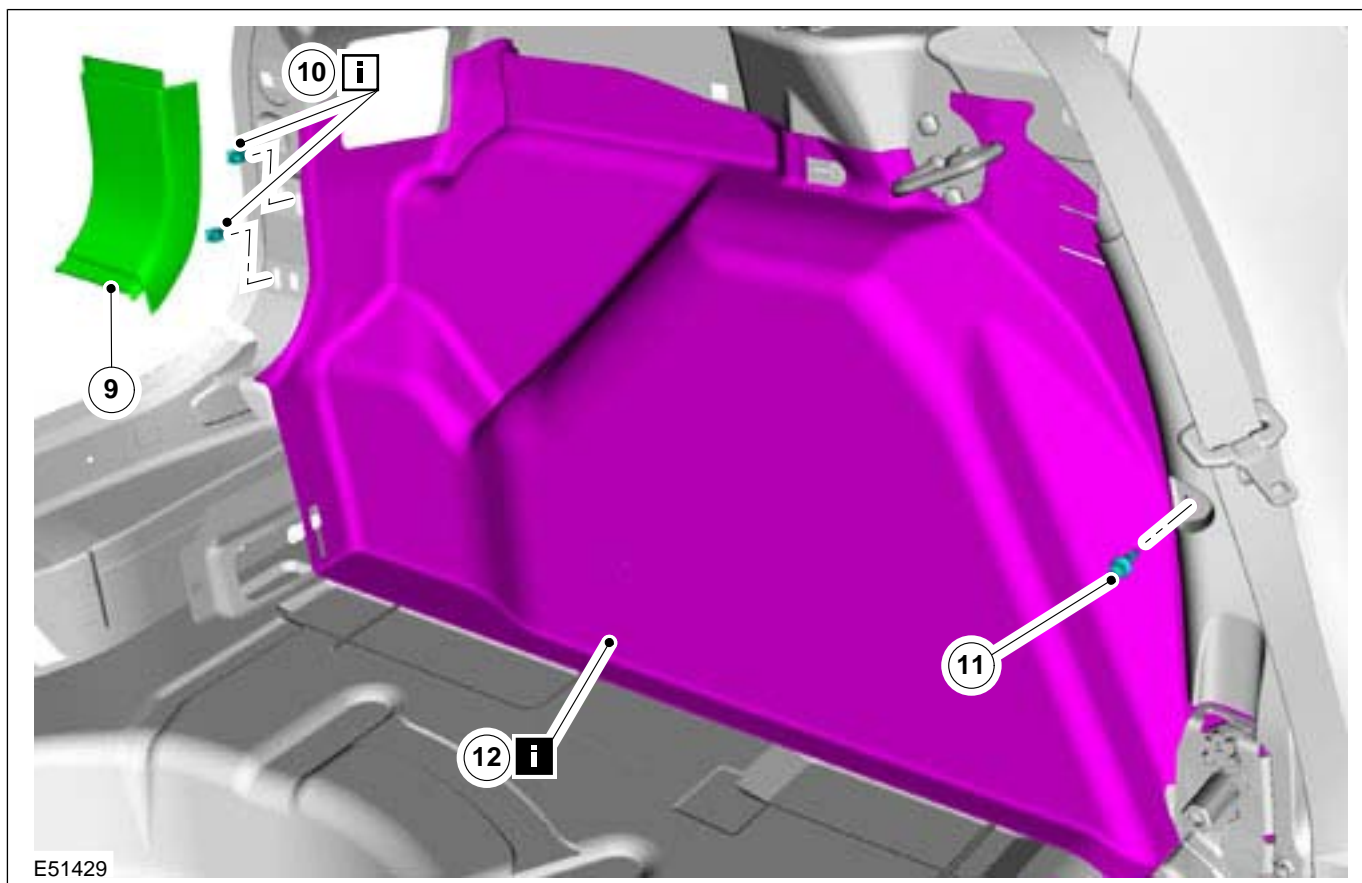
REMOVAL AND INSTALLATION



Item	Description
5	Liftgate opening weatherstrip <i>See Removal Detail</i>
6	Loadspace scuff plate trim panel retaining clips

Item	Description
7	Loadspace scuff plate trim panel
8	Loadspace scuff plate trim panel retaining clips <i>See Installation Detail</i>

REMOVAL AND INSTALLATION



E51429

Item	Description
9	Loadspace scuff plate trim panel extension trim panel
10	Loadspace scuff plate trim panel extension trim panel retaining clips See Installation Detail

Item	Description
11	Rear quarter trim panel retaining clip
12	Loadspace trim panel See Removal Detail

6. To install, reverse the removal procedure.

Removal Details

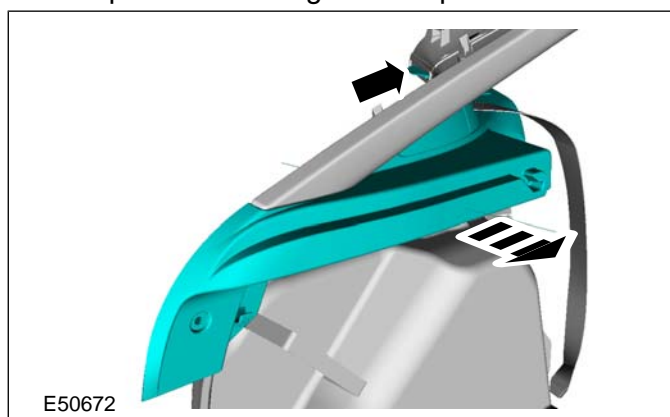
Item 1 Liftgate opening weatherstrip

1. Detach the liftgate opening weatherstrip.

Item 3 Rear parcel shelf support trim panel

1. Detach the rear parcel shelf support trim panel.

- Pull the rear parcel shelf support trim panel away from the rear quarter body panel to release the retaining tang from the rear quarter window glass trim panel.



E50672

REMOVAL AND INSTALLATION**Item 5** Liftgate opening weatherstrip

1. Locally detach the liftgate opening weatherstrip.

Item 12 Loadspace trim panel

1. Gently Pull the rear quarter trim panel towards the center of the vehicle to allow the loadspace trim panel to be removed.

Installation Details**Item 10** Loadspace scuff plate trim panel extension trim panel retaining clips

1. Install the loadspace scuff plate trim panel extension trim panel retaining clips to the loadspace scuff plate trim panel extension trim panel before the loadspace scuff plate trim panel extension trim panel is installed to the vehicle.

Item 8 Loadspace scuff plate trim panel retaining clips

1. Install the loadspace scuff plate trim panel retaining clips to the loadspace scuff plate trim panel before the loadspace scuff plate trim panel is installed to the vehicle.

Item 4 Rear parcel shelf support trim panel retaining clips

1. Install the rear parcel shelf support trim panel retaining clips to the rear parcel shelf support trim panel before the rear parcel shelf support trim panel is installed to the vehicle.

REMOVAL AND INSTALLATION

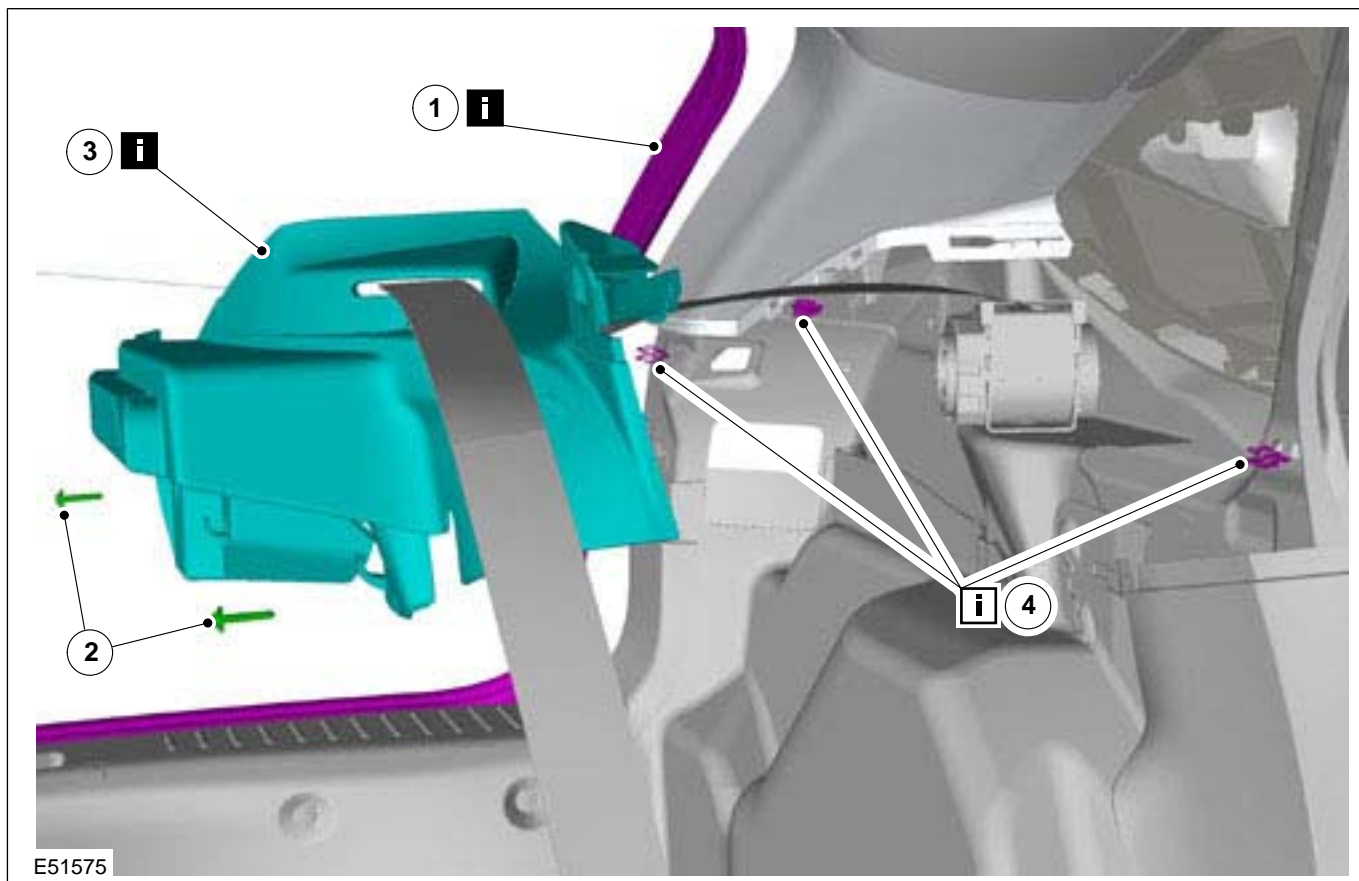
Loadspace Trim Panel — 5-Door

1. Remove the rear parcel shelf.
2. Remove the loadspace floor covering.
3. Tilt the rear seat cushion forward.
4. Tilt the rear seat backrest forward.

5. Remove the C-pillar trim panel.

For additional information, refer to: **C-Pillar Trim Panel - 4-Door/5-Door** (501-05 Interior Trim and Ornamentation, Removal and Installation).

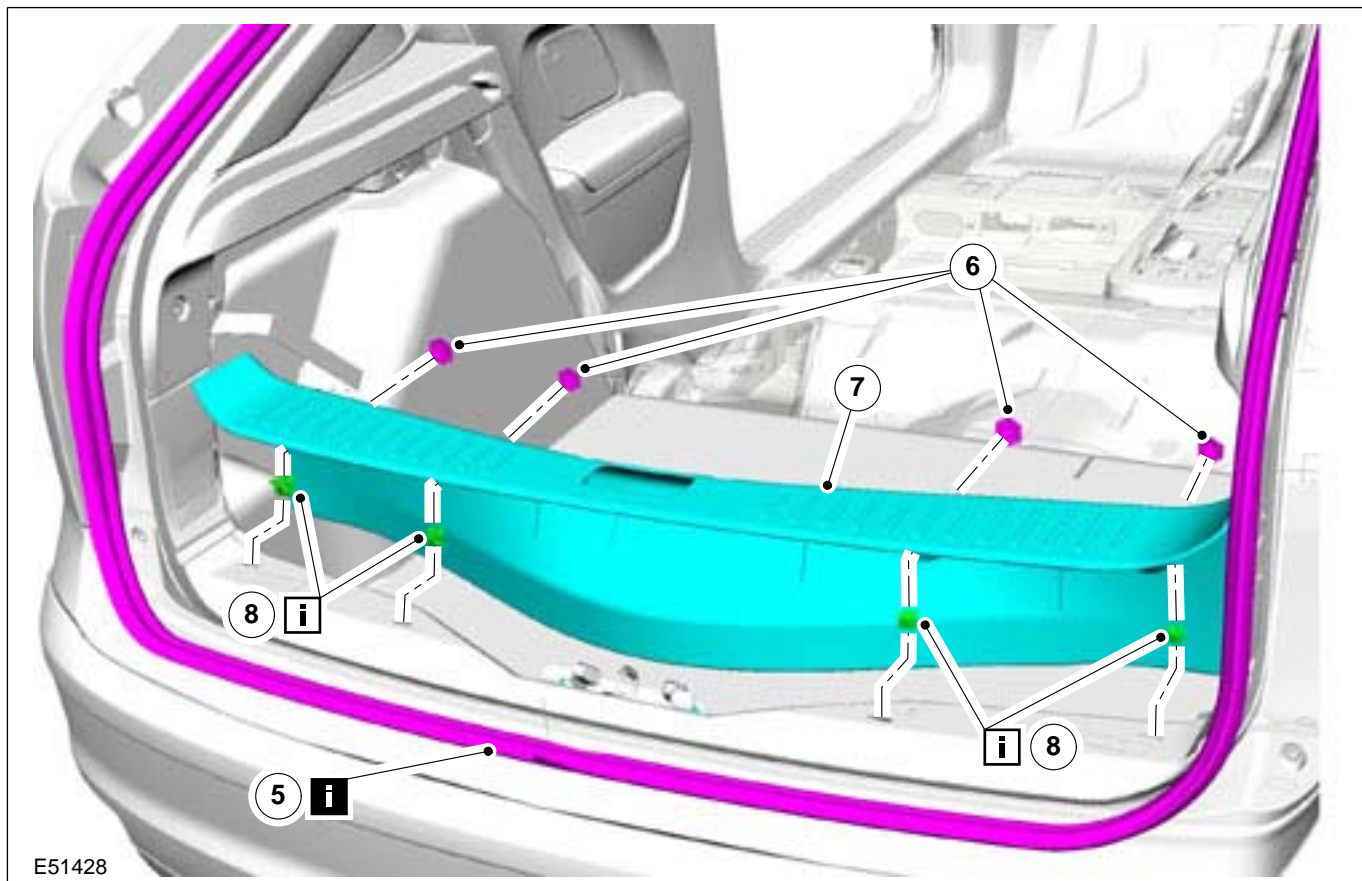
6. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Liftgate opening weatherstrip See Removal Detail
2	Rear parcel shelf support trim panel retaining screws

Item	Description
3	Rear parcel shelf support trim panel See Removal Detail
4	Rear parcel shelf support trim panel retaining clips See Installation Detail

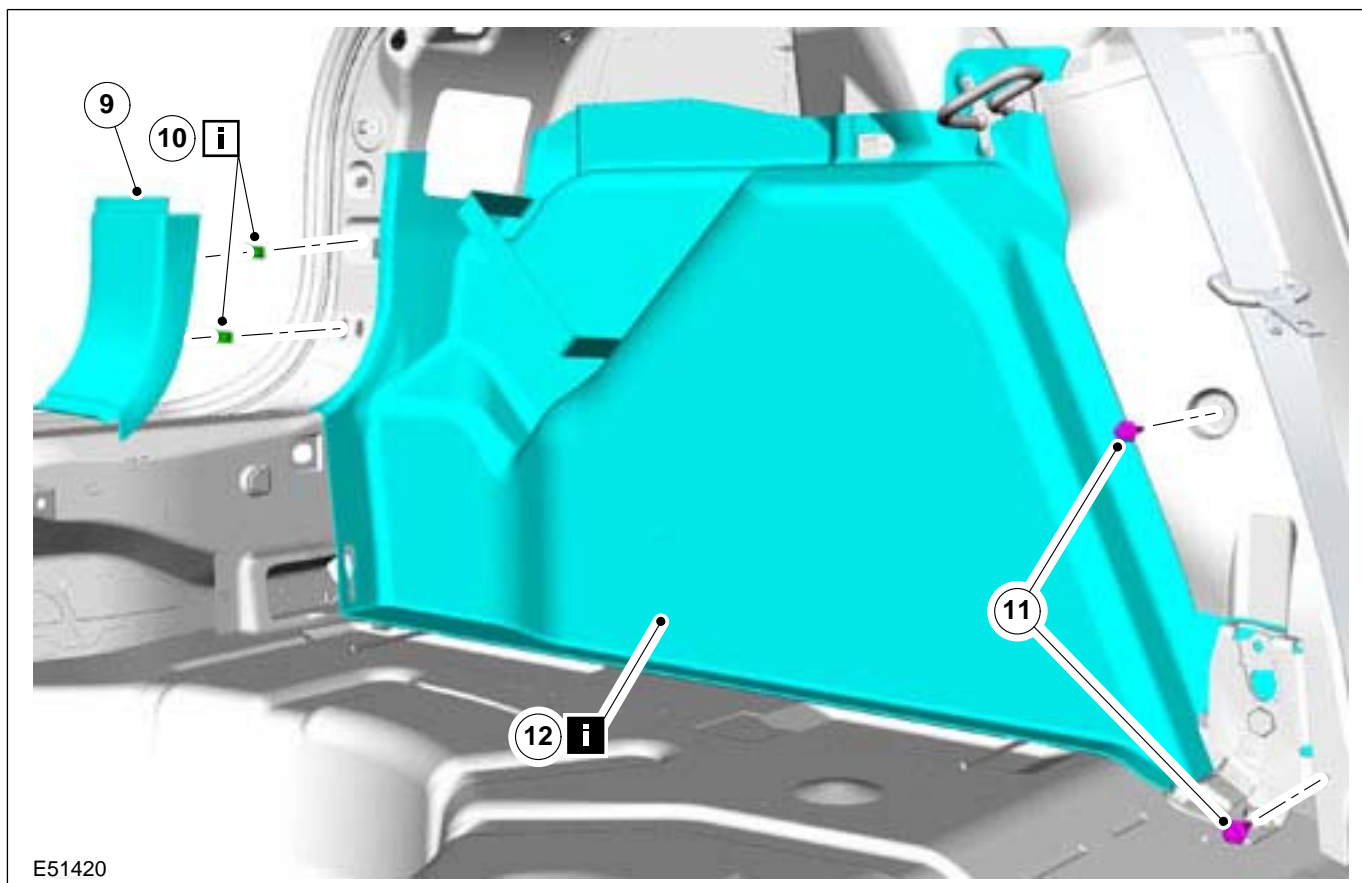
REMOVAL AND INSTALLATION



Item	Description
5	Liftgate opening weatherstrip <i>See Removal Detail</i>
6	Loadspace scuff plate trim panel retaining clips

Item	Description
7	Loadspace scuff plate trim panel
8	Loadspace scuff plate trim panel retaining clips <i>See Installation Detail</i>

REMOVAL AND INSTALLATION



E51420

Item	Description
9	Loadspace scuff plate trim panel extension trim panel
10	Loadspace scuff plate trim panel extension trim panel retaining clips See Installation Detail

Item	Description
11	Rear quarter trim panel retaining clips
12	Loadspace trim panel See Removal Detail

7. To install, reverse the removal procedure.

Removal Details

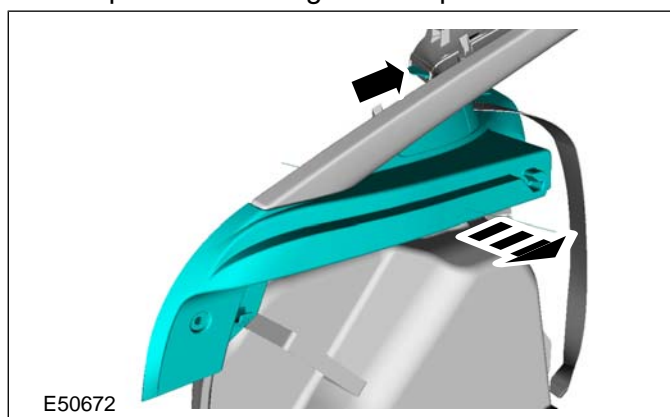
Item 1 Liftgate opening weatherstrip

1. Detach the liftgate opening weatherstrip.

Item 3 Rear parcel shelf support trim panel

1. Detach the rear parcel shelf support trim panel.

- Pull the rear parcel shelf support trim panel away from the rear quarter body panel to release the retaining tang from the rear quarter window glass trim panel.



E50672

REMOVAL AND INSTALLATION**Item 5** Liftgate opening weatherstrip

1. Detach the liftgate opening weatherstrip.

Item 12 Loadspace trim panel

1. Gently pull the rear quarter trim panel towards the center of the vehicle to allow the loadspace trim panel to be removed.

Installation Details**Item 10** Loadspace scuff plate trim panel extension trim panel retaining clips

1. Install the loadspace scuff plate trim panel extension trim panel retaining clips to the loadspace scuff plate trim panel extension trim panel before the loadspace scuff plate trim panel extension trim panel is installed.

Item 8 Loadspace scuff plate trim panel retaining clips

1. Install the loadspace scuff plate trim panel retaining clips to the loadspace scuff plate trim panel before the loadspace scuff plate trim panel is installed.

Item 4 Rear parcel shelf support trim panel retaining clips

1. Install the rear parcel shelf support trim panel retaining clips to the rear parcel shelf support trim panel before the rear parcel shelf support trim panel is installed to the vehicle.

REMOVAL AND INSTALLATION

Headliner — 3-Door, Vehicles With: Sliding Roof Opening Panel

General Equipment

Draw cord

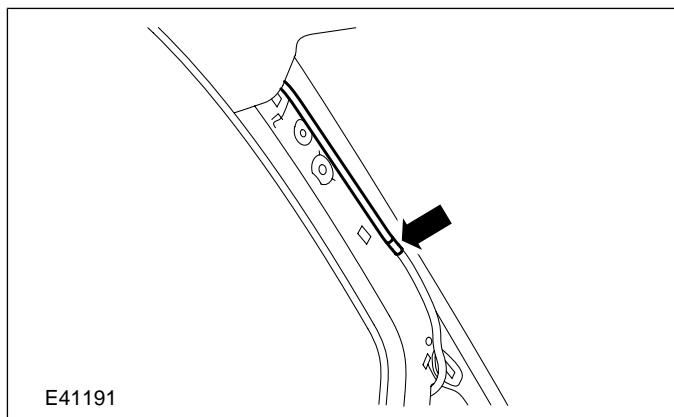
1. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures)**.

2. Remove the A-pillar trim panels.

For additional information, refer to: **A-Pillar Trim Panel (501-05 Interior Trim and Ornamentation, Removal and Installation)**.

3. Disconnect the rear window washer tube.



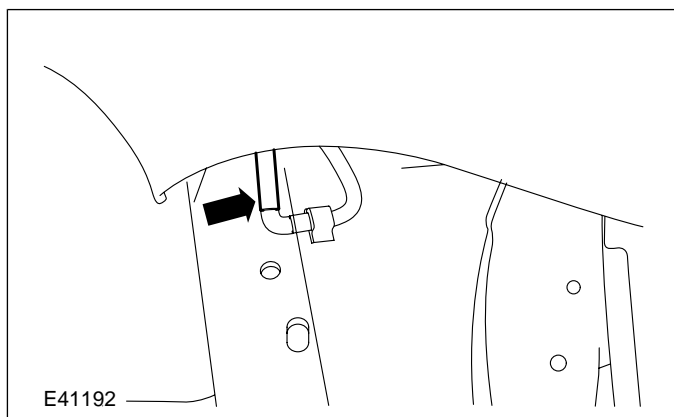
4. Remove the overhead console.

For additional information, refer to: **Overhead Console (501-12 Instrument Panel and Console, Removal and Installation)**.

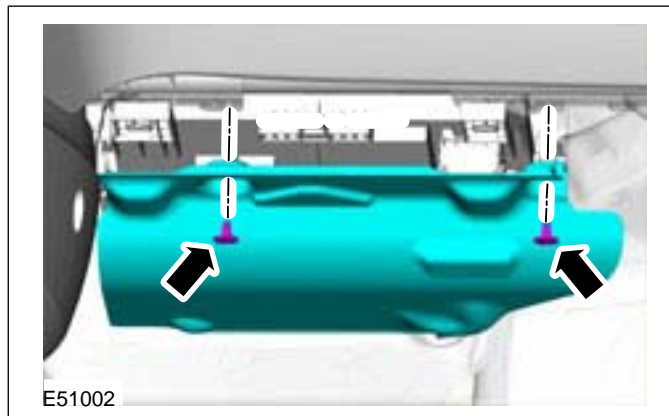
5. Remove the C-pillar trim panels.

For additional information, refer to: **C-Pillar Trim Panel - 3-Door (501-05 Interior Trim and Ornamentation, Removal and Installation)**.

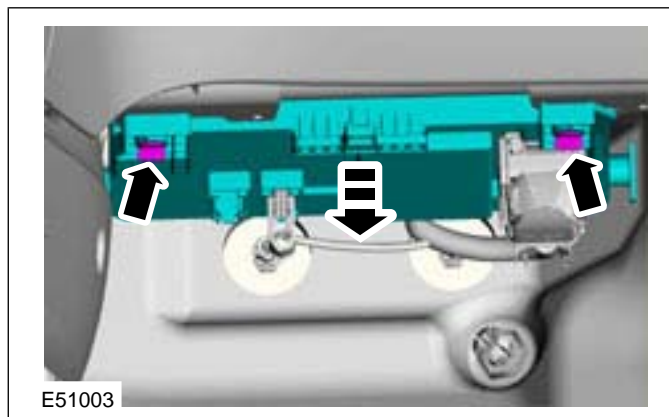
6. Disconnect the rear window washer tube.



7. Remove the instrument panel passenger side lower trim panel.

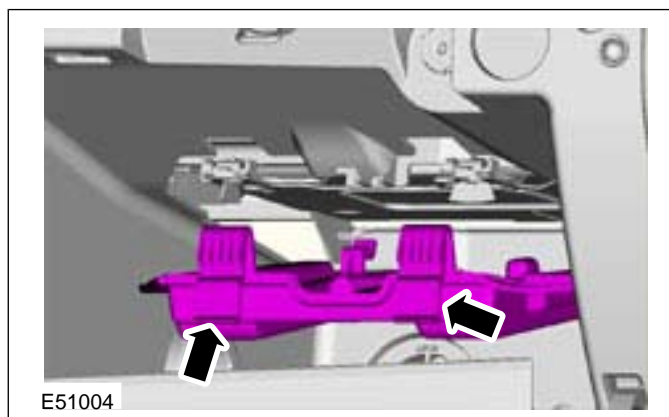


8. Lower the central junction box (CJB).



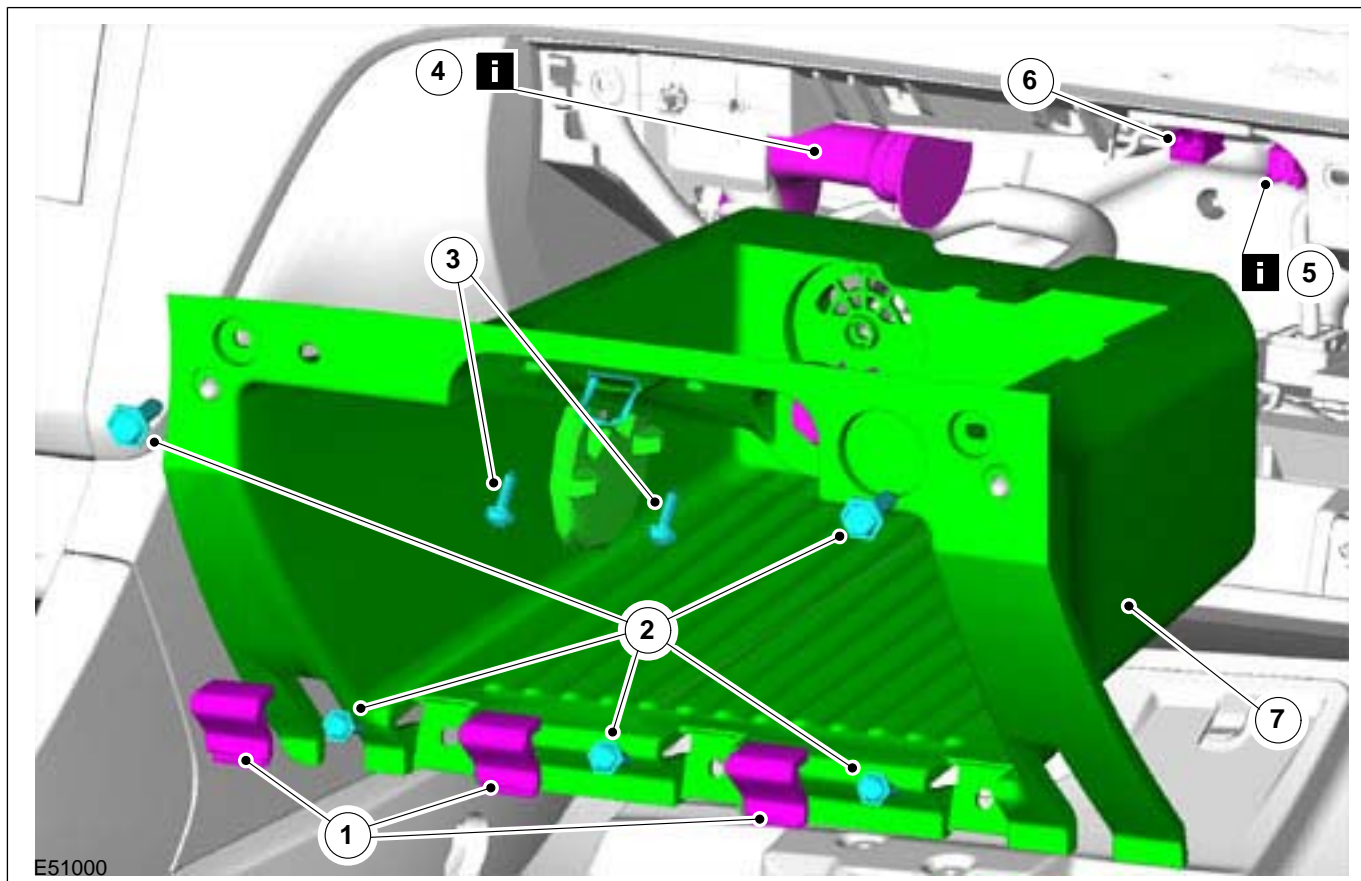
9. Open the glove compartment lid.

10. Remove the navigation system Digital Versatile Disc (DVD) unit access cover (if equipped).



11. Remove the components in the order indicated in the following illustration(s) and table(s).

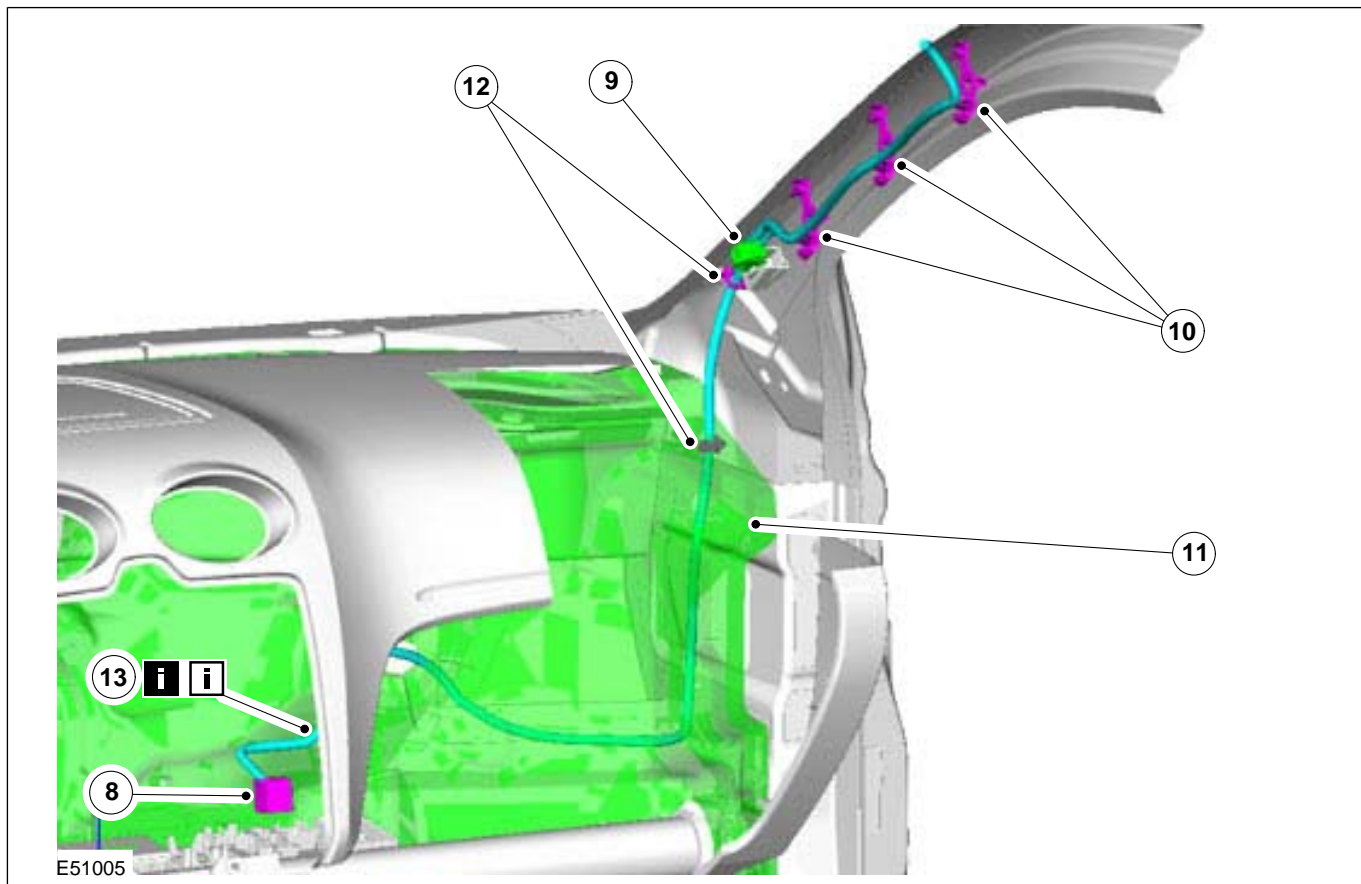
REMOVAL AND INSTALLATION



Item	Description
1	Glove compartment retaining screw covers
2	Glove compartment retaining screws
3	Glove compartment lid striker retaining screws
4	Glove compartment cooling hose See Removal Detail

Item	Description
5	Moving pictures experts group audio layer 3 (MP3) auxiliary connector electrical connector. (If equipped) See Removal Detail
6	Passenger airbag deactivation switch electrical connector. (If equipped)
7	Glove compartment housing

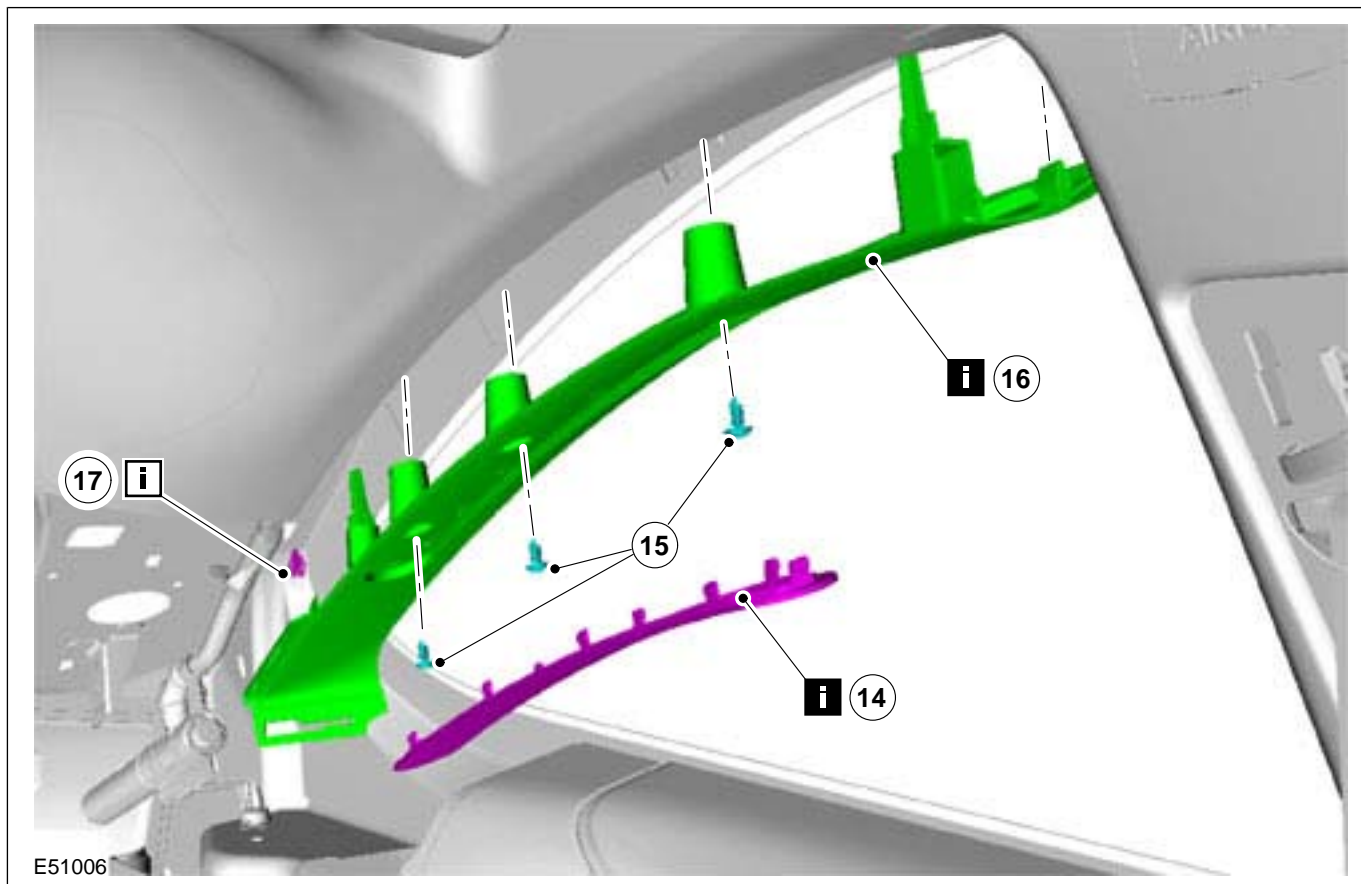
REMOVAL AND INSTALLATION



Item	Description
8	Roof wiring harness to CJB electrical connector
9	Roof wiring harness electrical connector
10	Roof wiring harness to A-pillar retaining clips

Item	Description
11	Noise, vibration and harshness (NVH) material See Removal Detail See Installation Detail
12	Roof wiring harness retaining clips
13	Roof wiring harness See Removal Detail See Installation Detail

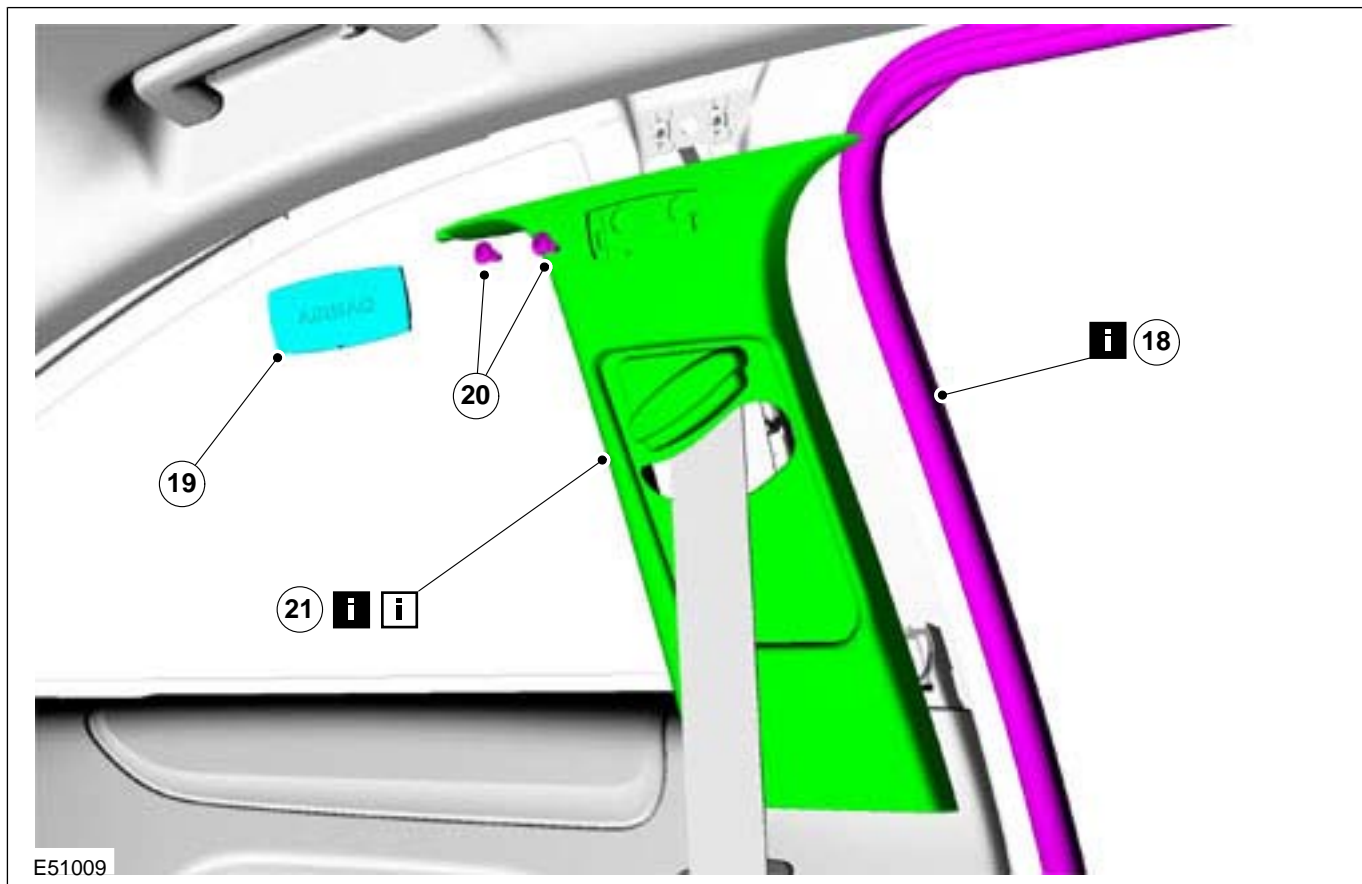
REMOVAL AND INSTALLATION



Item	Description
14	Rear quarter window glass trim panel retaining screw trim covers See Removal Detail
15	Rear quarter window glass trim panel retaining screws

Item	Description
16	Rear quarter window glass trim panels See Removal Detail
17	Rear quarter window glass trim panel retaining clips See Installation Detail

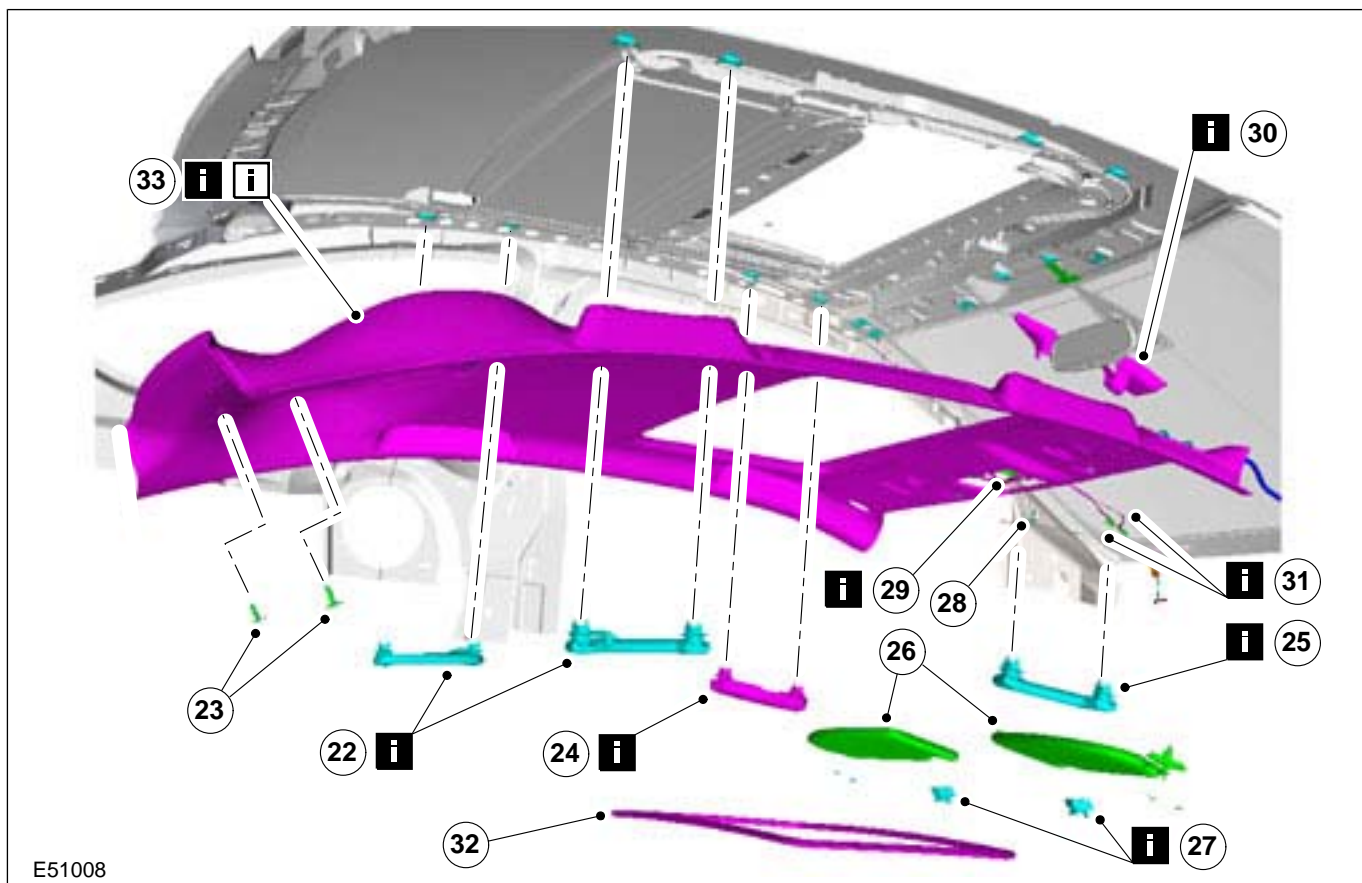
REMOVAL AND INSTALLATION



Item	Description
18	Door opening weatherstrips <i>See Removal Detail</i>
19	B-pillar trim panel retaining screw trim covers

Item	Description
20	B-pillar trim panel retaining screws
21	B-pillar trim panels <i>See Removal Detail</i> <i>See Installation Detail</i>

REMOVAL AND INSTALLATION

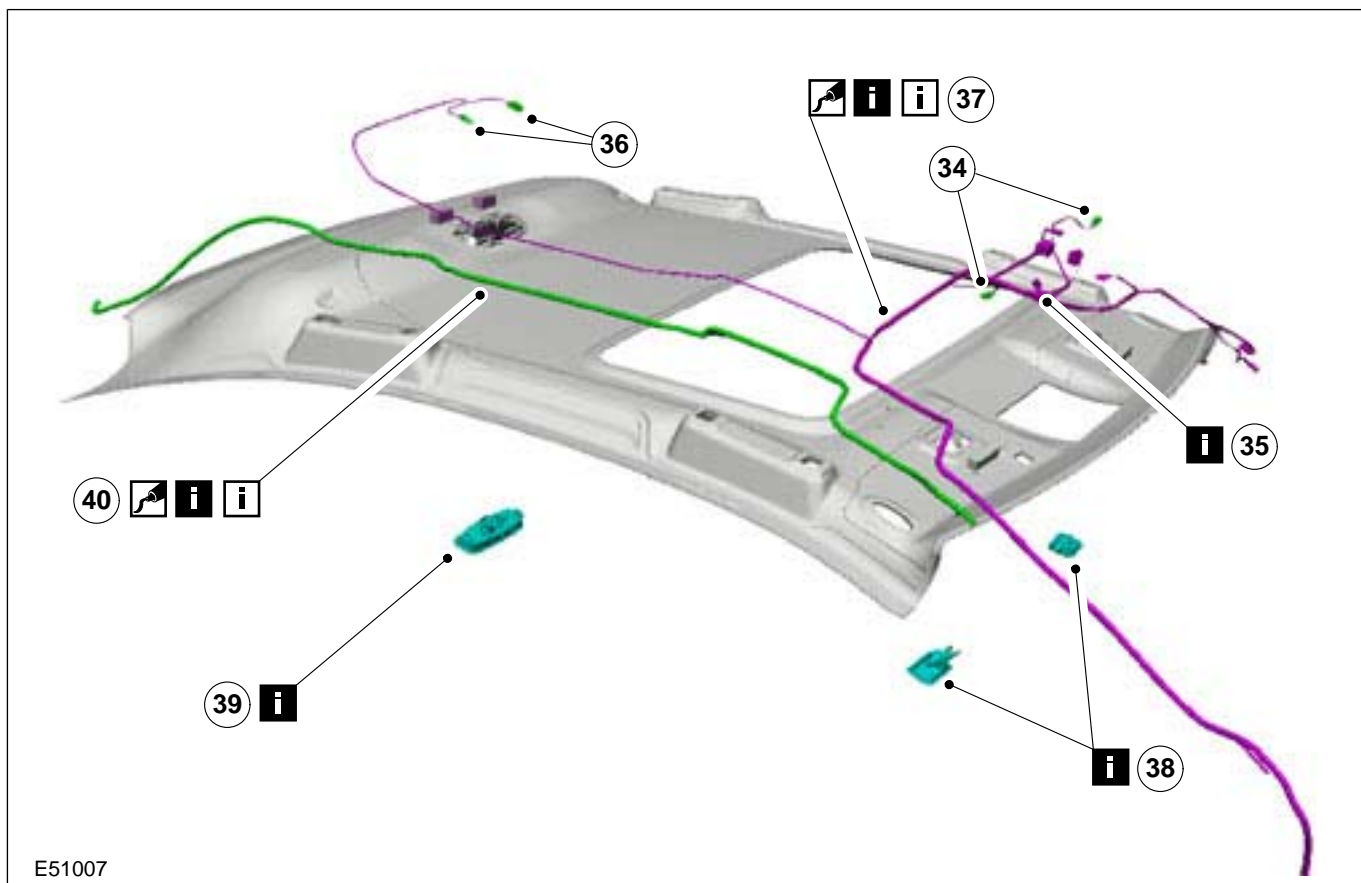


E51008

Item	Description
22	Rear passenger assist handles See Removal Detail
23	Headliner retaining clips
24	Glasses holder See Removal Detail
25	Front passenger assist handle See Removal Detail
26	Sun-visors
27	Sun-visor retaining clips See Removal Detail
28	Roof wiring harness ground connection retaining bolt See Removal Detail

Item	Description
29	Sliding roof opening panel motor electrical connector See Removal Detail
30	Auto-dimming interior mirror trim covers See Removal Detail
31	Auto-dimming interior mirror and rain sensor electrical connectors See Removal Detail
32	Sliding roof opening panel trim
33	Headliner trim panel See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION



E51007

Item	Description
34	Sun visor illumination lamp electrical connectors
35	Radio frequency (RF) receiver See Removal Detail
36	Rear interior lamp electrical connector
37	Roof wiring harness See Removal Detail See Installation Detail
38	Sun visor illumination lamps See Removal Detail

Item	Description
39	Rear interior lamp See Removal Detail
40	Rear window washer tube See Removal Detail See Installation Detail

- 12. To install, reverse the removal procedure.
- 13. Vehicles with global closing, initialize the door window motors.

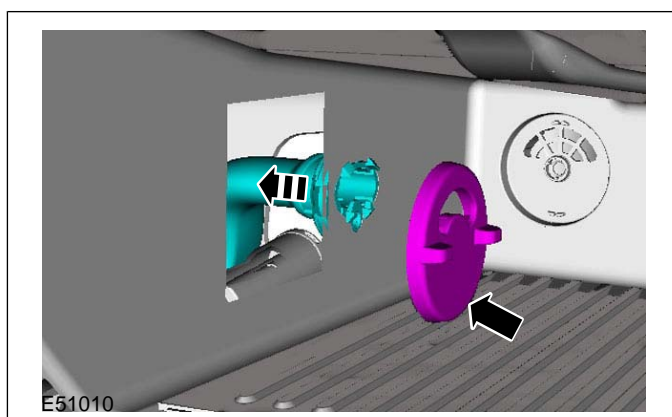
For additional information, refer to: **Door Window Motor Initialization** (501-11 Glass, Frames and Mechanisms, General Procedures).

Removal Details

REMOVAL AND INSTALLATION

Item 4 Glove compartment cooling hose

1. Detach the glove compartment cooling hose from the glove compartment cooling vent.

**Item 5 Moving pictures experts group audio layer 3 (MP3) auxiliary connector electrical connector. (If equipped)**

- ⚠ CAUTION:** Do not place excessive strain on the electrical wiring harness when detaching the glove compartment.

1. Reposition the glove compartment and disconnect the MP3 auxiliary connector electrical connector. If equipped.

Item 11 Noise, vibration and harshness (NVH) material

1. Detach the NVH material from the upper A-pillar area to gain access to the roof wiring harness retaining clip.

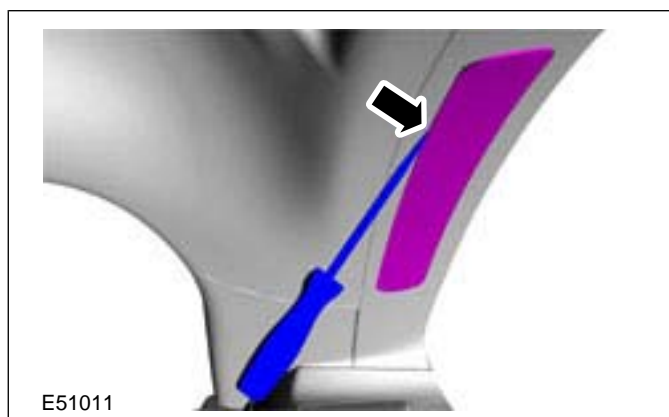
Item 13 Roof wiring harness

1. Attach a draw cord to the roof wiring harness and CJB electrical connector. Feed the wiring harness through the NVH material to above the instrument panel A-pillar area.

Item 14 Rear quarter window glass trim panel retaining screw trim covers

- ⚠ CAUTION:** Care must be taken not to damage the rear quarter window glass trim panels and retaining screw trim covers.

1. Using a suitable flat blade screwdriver, lever out the rear quarter window glass trim panel retaining screw trim cover.

**Item 16 Rear quarter window glass trim panels**

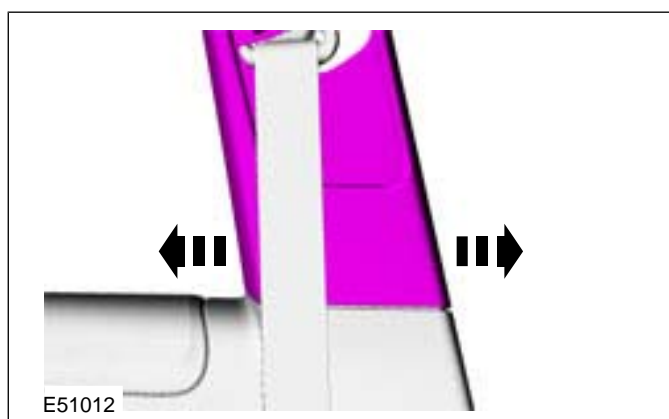
1. Detach the rear quarter window glass trim panel to B-pillar trim panel retaining clip.

Item 18 Door opening weatherstrips

1. Detach the door opening weatherstrip from the door opening upper area.

Item 21 B-pillar trim panels

1. Detach the B-pillar trim panel and position to one side.



501-05-54

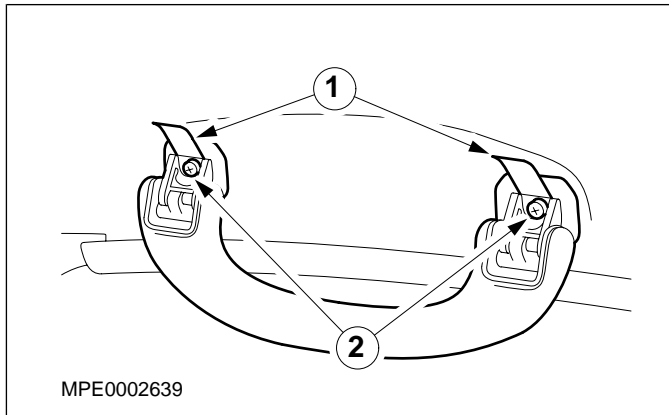
Interior Trim and Ornamentation

501-05-54

REMOVAL AND INSTALLATION

Item 22 Rear passenger assist handles

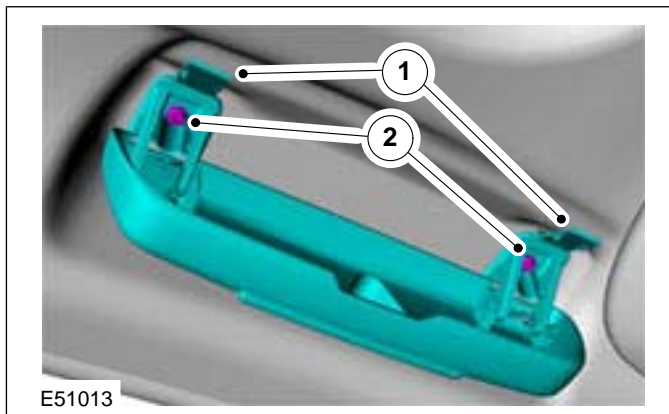
1. Lever open the rear passenger assist handle screw covers.



2. Remove the rear passenger assist handle retaining screws.

Item 24 Glasses holder

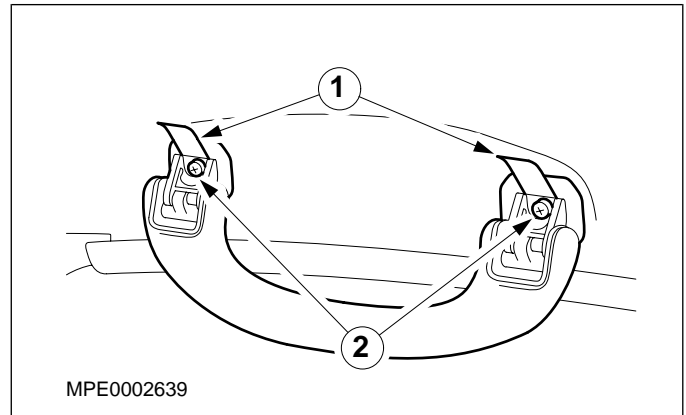
1. Lever open the glasses holder retaining screw covers.



2. Remove the glasses holder retaining screws.

Item 25 Front passenger assist handle

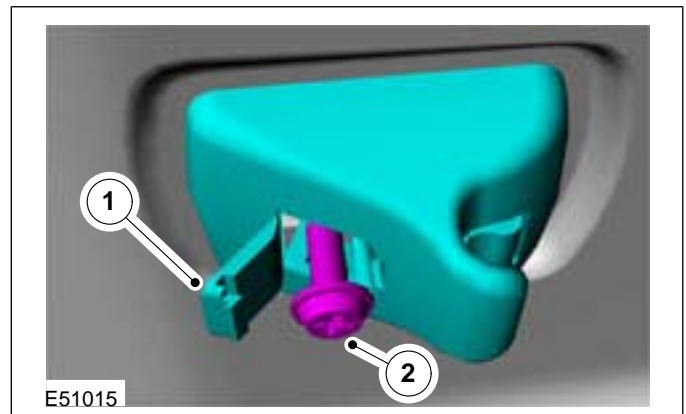
1. Lever open the front passenger assist handle retaining screw covers.



2. Remove the front passenger assist handle retaining screws.

Item 27 Sun-visor retaining clips

1. Lever open the sun visor retaining clips retaining screw cover.



2. Remove the sun visor retaining clips retaining screw.

501-05-55

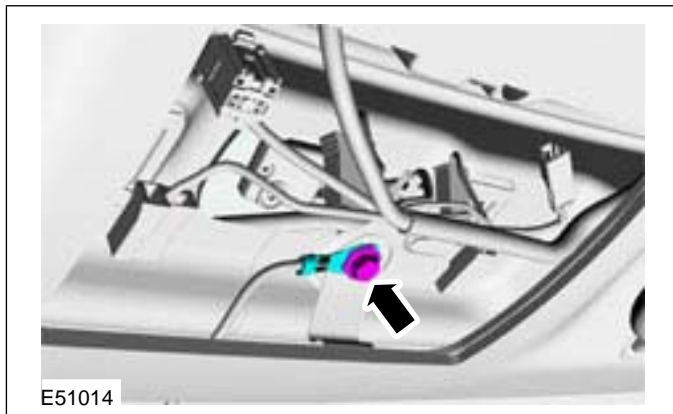
Interior Trim and Ornamentation

501-05-55

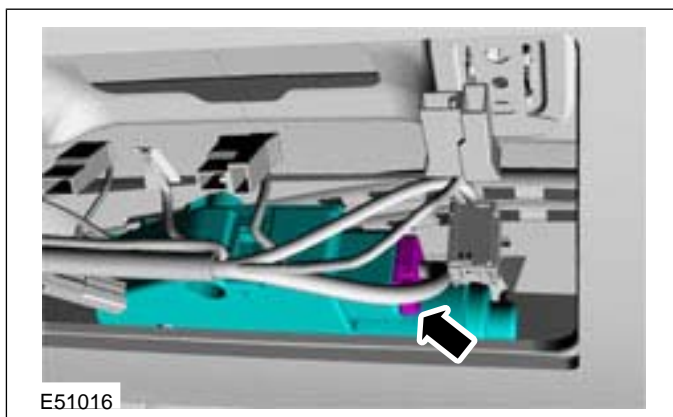
REMOVAL AND INSTALLATION

Item 28 Roof wiring harness ground connection retaining bolt

1. Detach the roof wiring harness and windscreen ground electrical connectors.

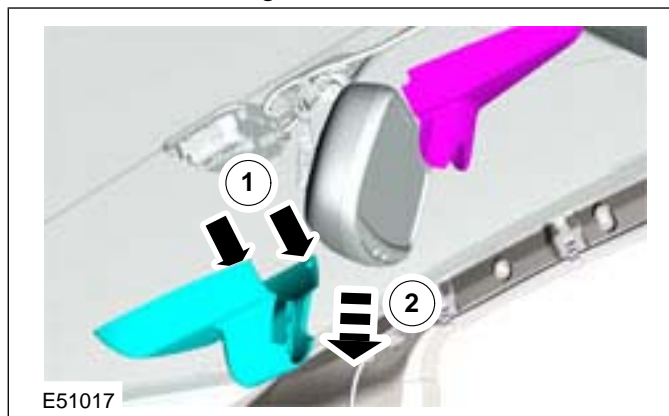
**Item 29** Sliding roof opening panel motor electrical connector

1. Disconnect the sliding roof opening panel motor electrical connector.

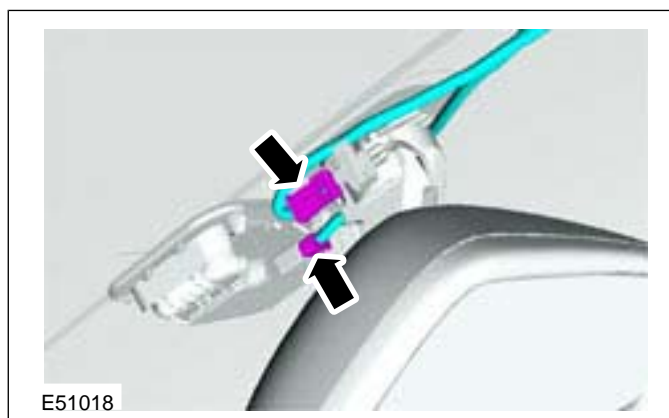
**Item 30** Auto-dimming interior mirror trim covers

1. Remove the auto-dimming interior mirror and rain sensor trim covers.
 1. Release the locking clips.

2. Slide the rain sensor trim cover off the auto-dimming interior mirror trim cover.

**Item 31** Auto-dimming interior mirror and rain sensor electrical connectors

1. Disconnect the auto-dimming interior mirror and rain sensor electrical connectors.

**Item 33** Headliner trim panel

1. Tilt the front seats forward.
2. With the aid of another technician, remove the headliner through the liftgate opening.

Item 35 Radio frequency (RF) receiver

NOTE: Make a note of the position of the RF receiver to make sure that it is installed in exactly the same position as when removed.

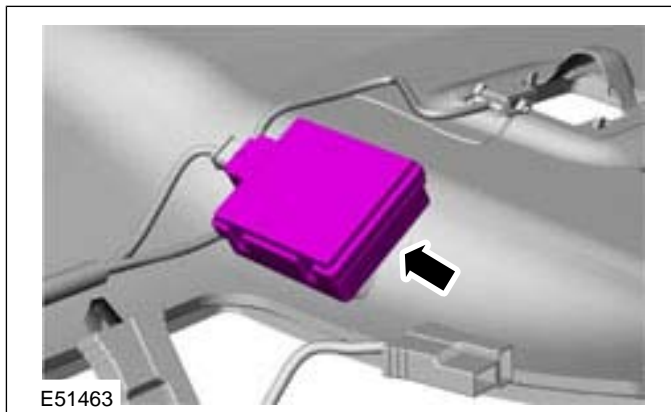
501-05-56

Interior Trim and Ornamentation

501-05-56

REMOVAL AND INSTALLATION

1. Using a suitable knife, detach the RF receiver from the headliner.



Item 37 Roof wiring harness

CAUTIONS:

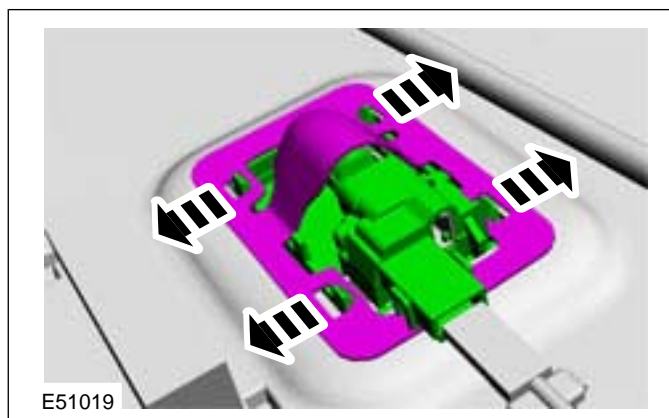
- ⚠ Take care not to damage the insulation of the roof wiring harness.
- ⚠ The roof wiring harness must be cut off of the headliner and not pulled or ripped. Failure to follow this instruction could result in the incorrect function of electrical components.

NOTE: Make a note of the position of the roof wiring harness to make sure that it is installed in exactly the same position as when removed.

1. Using a suitable knife, remove the roof wiring harness from the headliner.

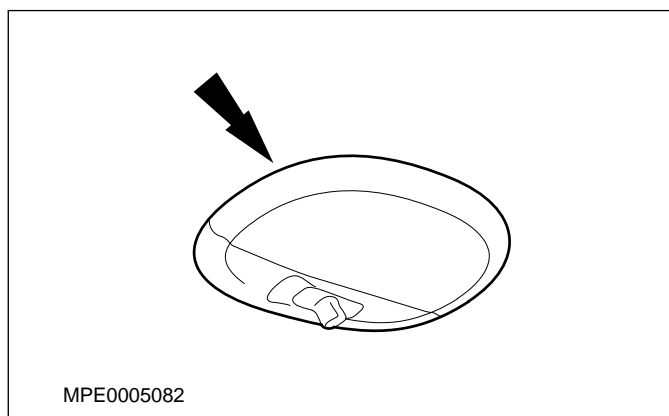
Item 38 Sun visor illumination lamps

1. Release the sunvisor illumination lamp retaining clips.



Item 39 Rear interior lamp

1. Lever out the rear interior lamp.



Item 40 Rear window washer tube

- ⚠ **CAUTION:** Take care not to damage the rear window washer tube. Failure to follow this instruction could result in damage to the headliner.

NOTE: Make a note of the position of the rear window washer tube to make sure that it is installed in exactly the same position as when removed.

1. Using a suitable knife, remove the rear window washer tube from the headliner.

Installation Details

Item 40 Rear window washer tube

- ⚠ **CAUTION:** The rear window washer tube must be installed in the same position as when removed.

1. Using a suitable adhesive, bond the rear window washer tube to the headliner.

REMOVAL AND INSTALLATION**Item 37** Roof wiring harness

CAUTION: The roof wiring harness must be installed in the same position as when removed.

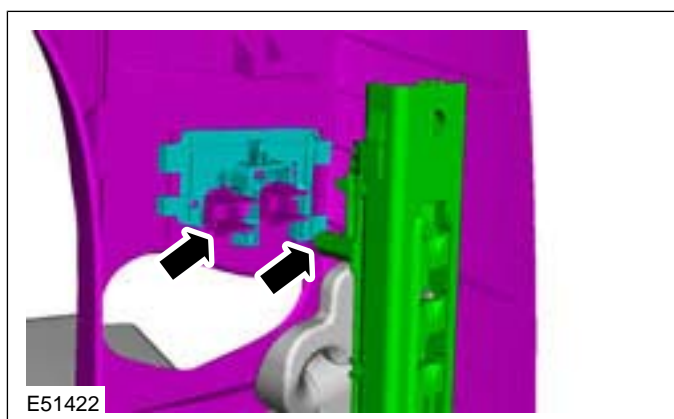
1. Using a suitable adhesive, bond the roof wiring harness to the headliner.

Item 33 Headliner trim panel

1. With the aid of another technician, install the headliner.

Item 21 B-pillar trim panels

NOTE: Make sure the B-pillar safety belt height adjustment lever is aligned with the safety belt height adjustment mechanism.

**Item 17** Rear quarter window glass trim panel retaining clips

1. Install the rear quarter window glass trim panel retaining clips to the rear quarter window glass trim panel.

Item 13 Roof wiring harness

1. Using the draw cord, feed the roof wiring harness through the NVH material.

Item 11 Noise, vibration and harshness (NVH) material

1. Reposition the NVH material.

REMOVAL AND INSTALLATION

Headliner — 5-Door, Vehicles With: Sliding Roof Opening Panel

General Equipment

Draw cord

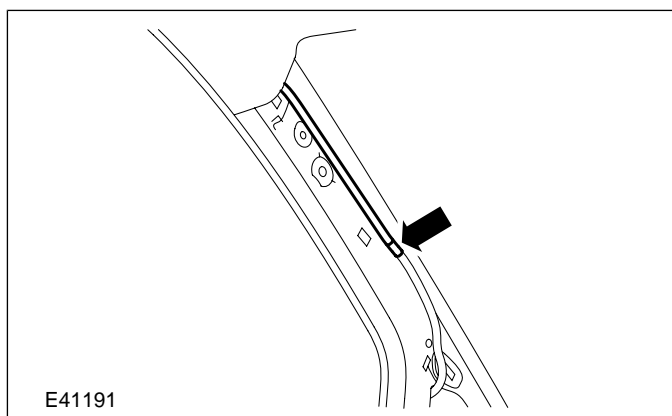
1. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures)**.

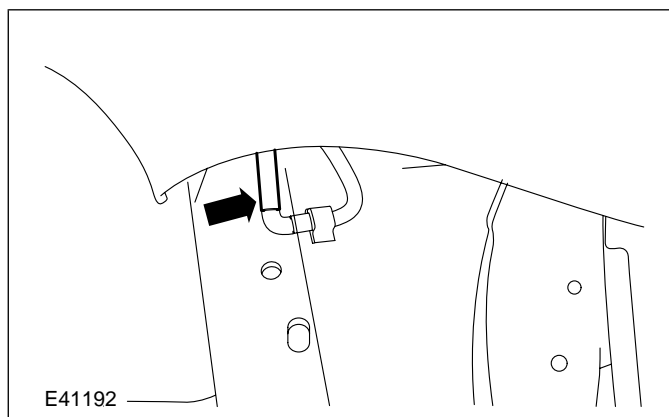
2. Remove the A-pillar trim panels.

For additional information, refer to: **A-Pillar Trim Panel (501-05 Interior Trim and Ornamentation, Removal and Installation)**.

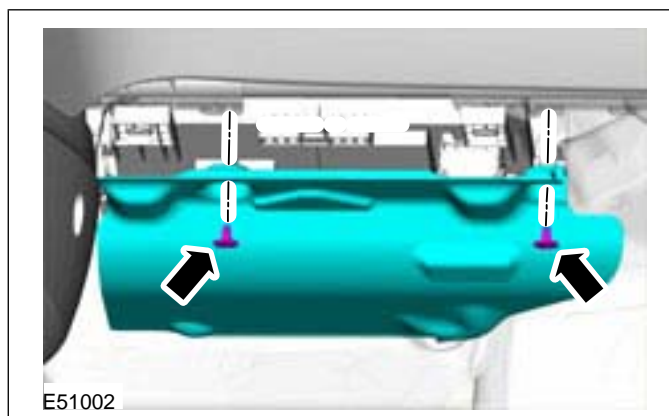
3. Disconnect the rear window washer tube.



7. Disconnect the rear window washer tube.



8. Remove the instrument panel passenger side lower trim panel.



4. Remove the overhead console.

For additional information, refer to: **Overhead Console (501-12 Instrument Panel and Console, Removal and Installation)**.

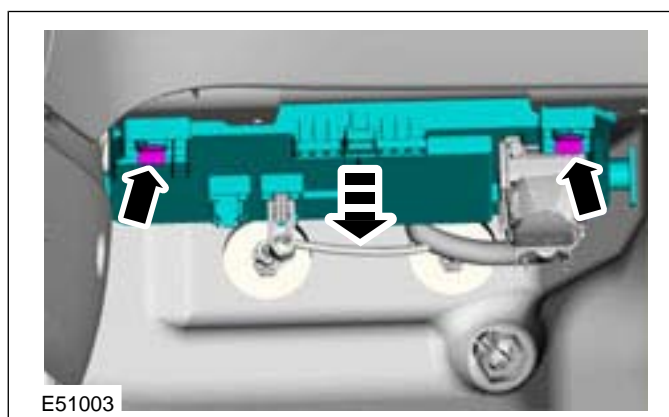
5. Remove the C-pillar trim panels.

For additional information, refer to: **C-Pillar Trim Panel - 4-Door/5-Door (501-05 Interior Trim and Ornamentation, Removal and Installation)**.

6. Remove the D-pillar trim panels.

For additional information, refer to: **D-Pillar Trim Panel - 5-Door (501-05 Interior Trim and Ornamentation, Removal and Installation)**.

9. Lower the central junction box (CJB).

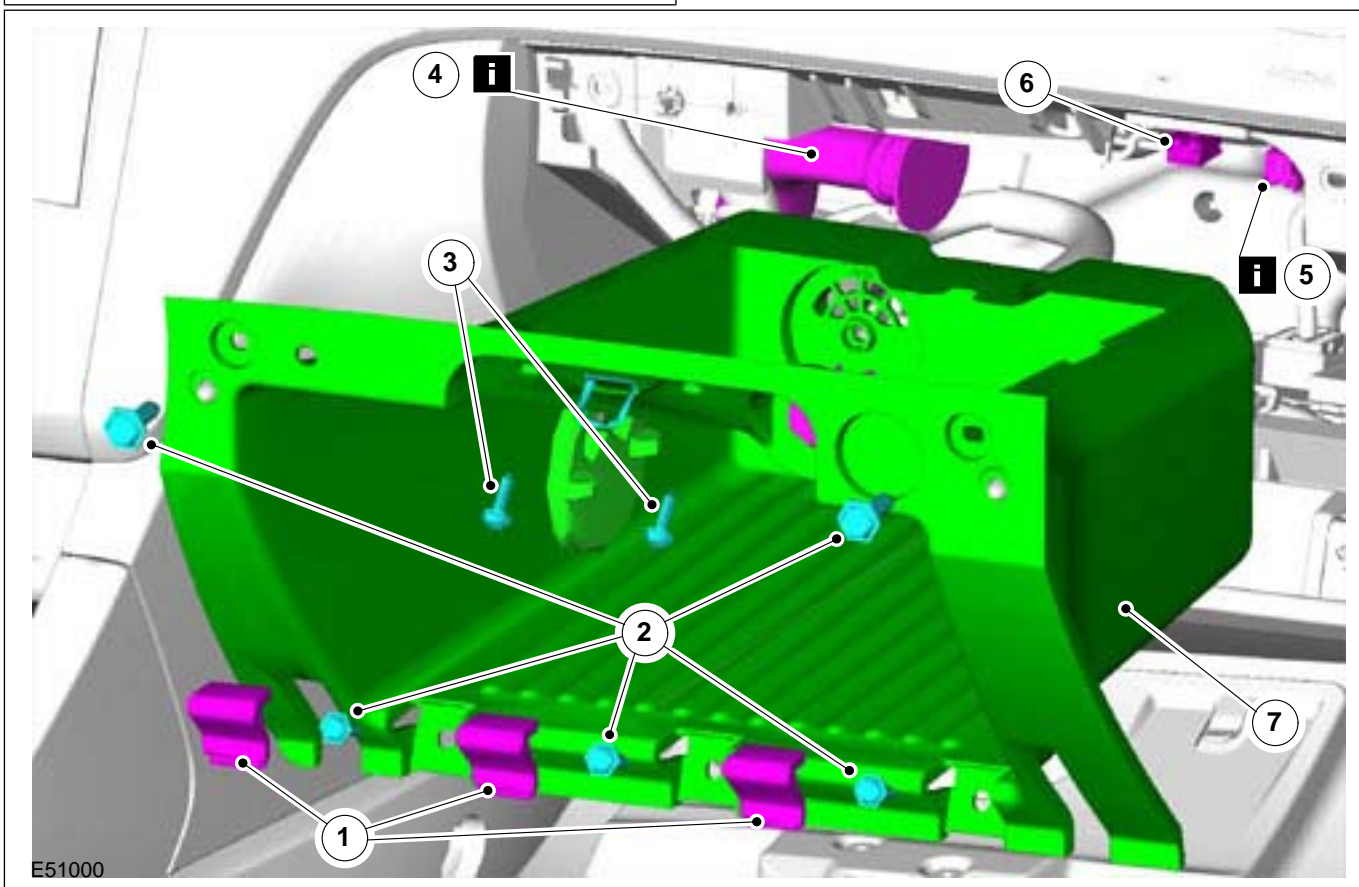
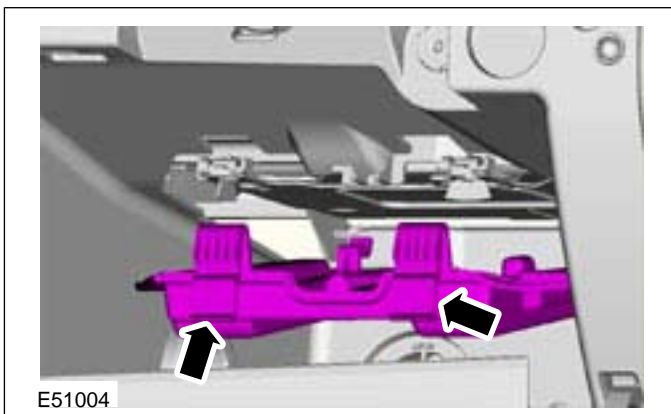


10. Open the glove compartment lid.

REMOVAL AND INSTALLATION

11. Remove the navigation system digital versatile disc (DVD) unit access cover (if equipped).

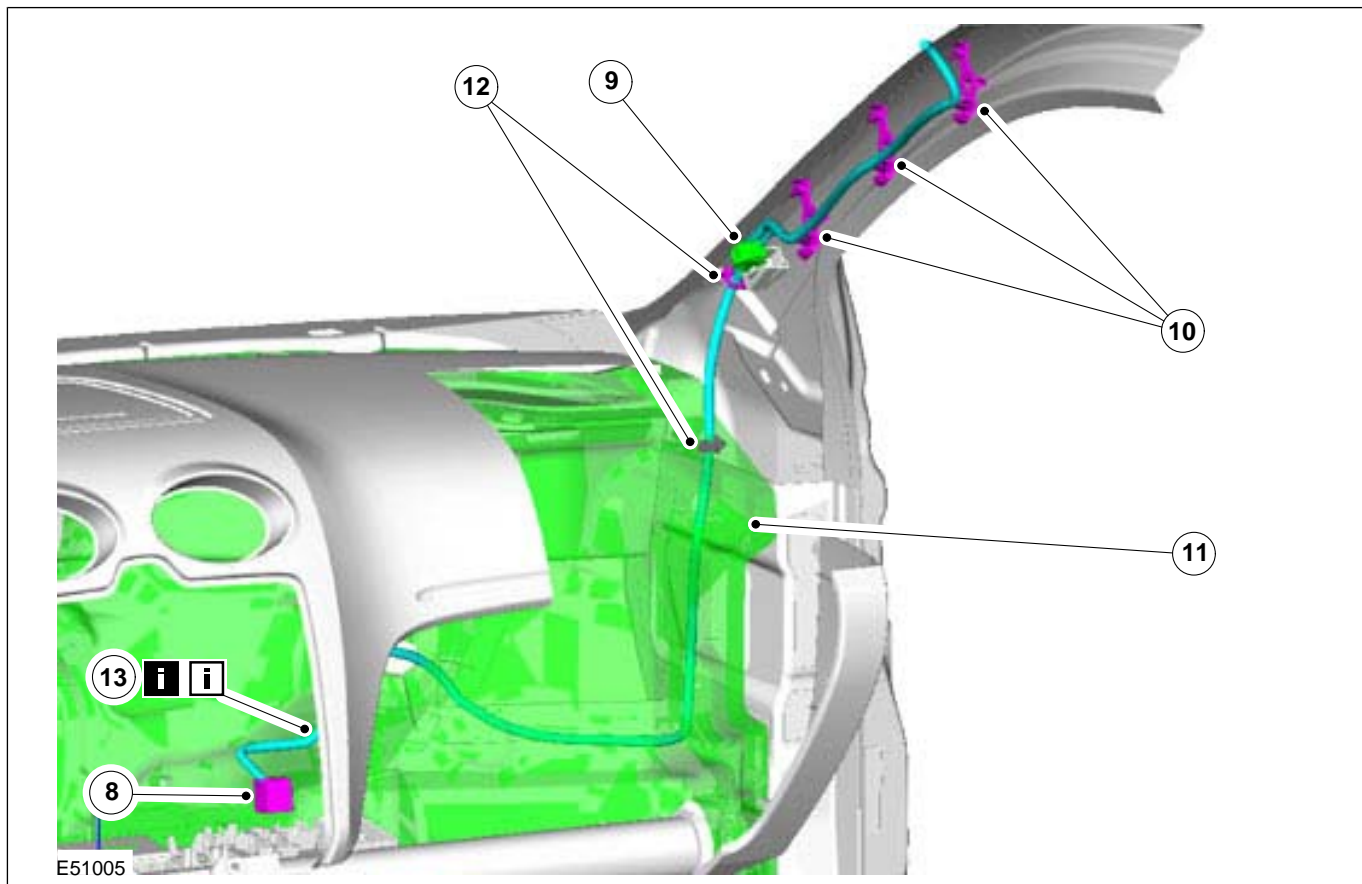
12. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Glove compartment retaining screw covers
2	Glove compartment retaining screws
3	Glove compartment lid striker retaining screws
4	Glove compartment cooling hose <i>See Removal Detail</i>

Item	Description
5	Moving pictures experts group audio layer 3 (MP3) auxiliary connector electrical connector <i>See Removal Detail</i>
6	Passenger airbag deactivation switch electrical connector
7	Glove compartment housing

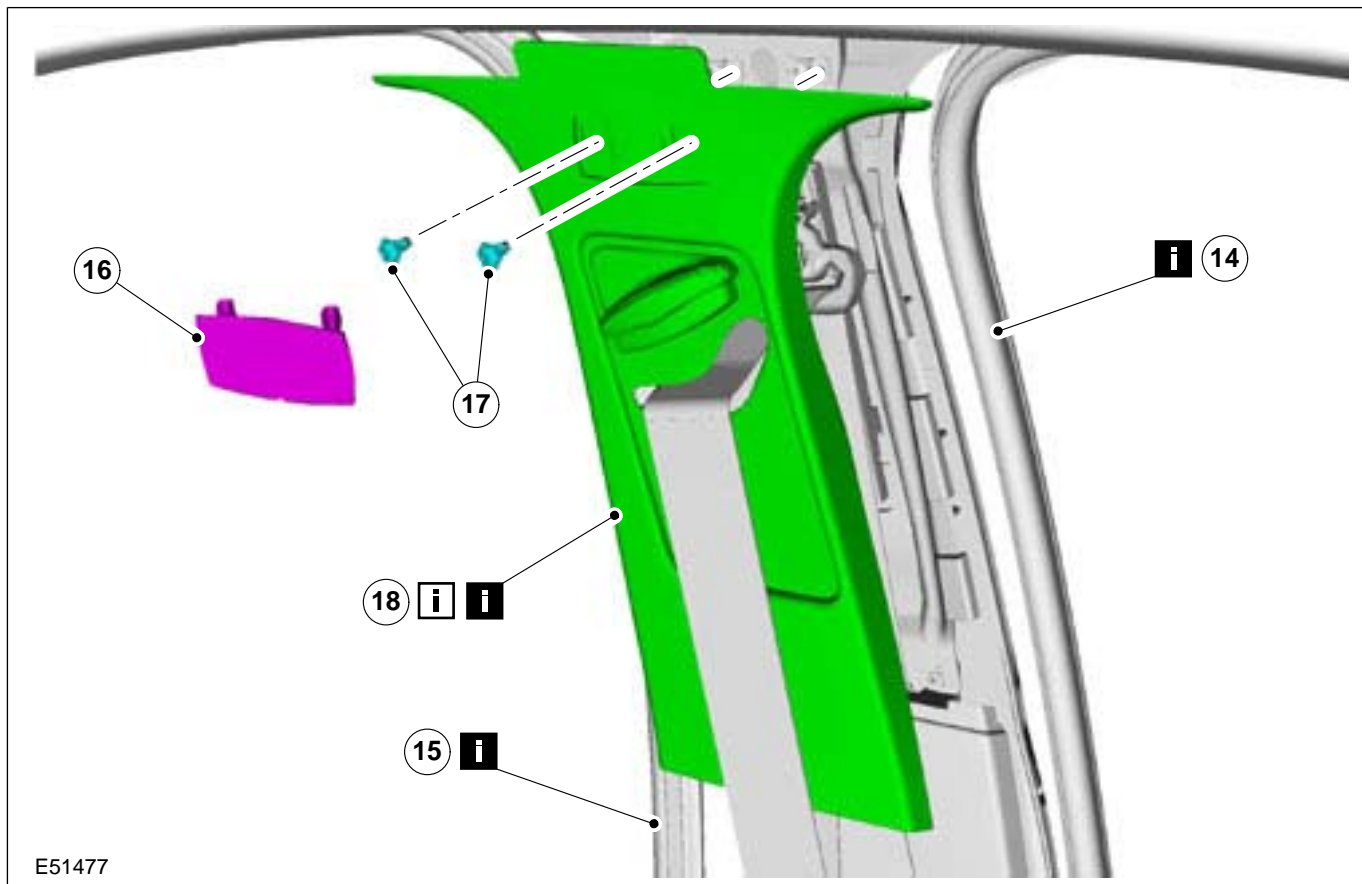
REMOVAL AND INSTALLATION



Item	Description
8	Roof wiring harness to CJB electrical connector
9	Roof wiring harness electrical connector
10	Roof wiring harness retaining clips

Item	Description
11	Noise, vibration and harshness (NVH) material See Removal Detail See Installation Detail
12	Roof wiring harness retaining clips
13	Roof wiring harness See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION

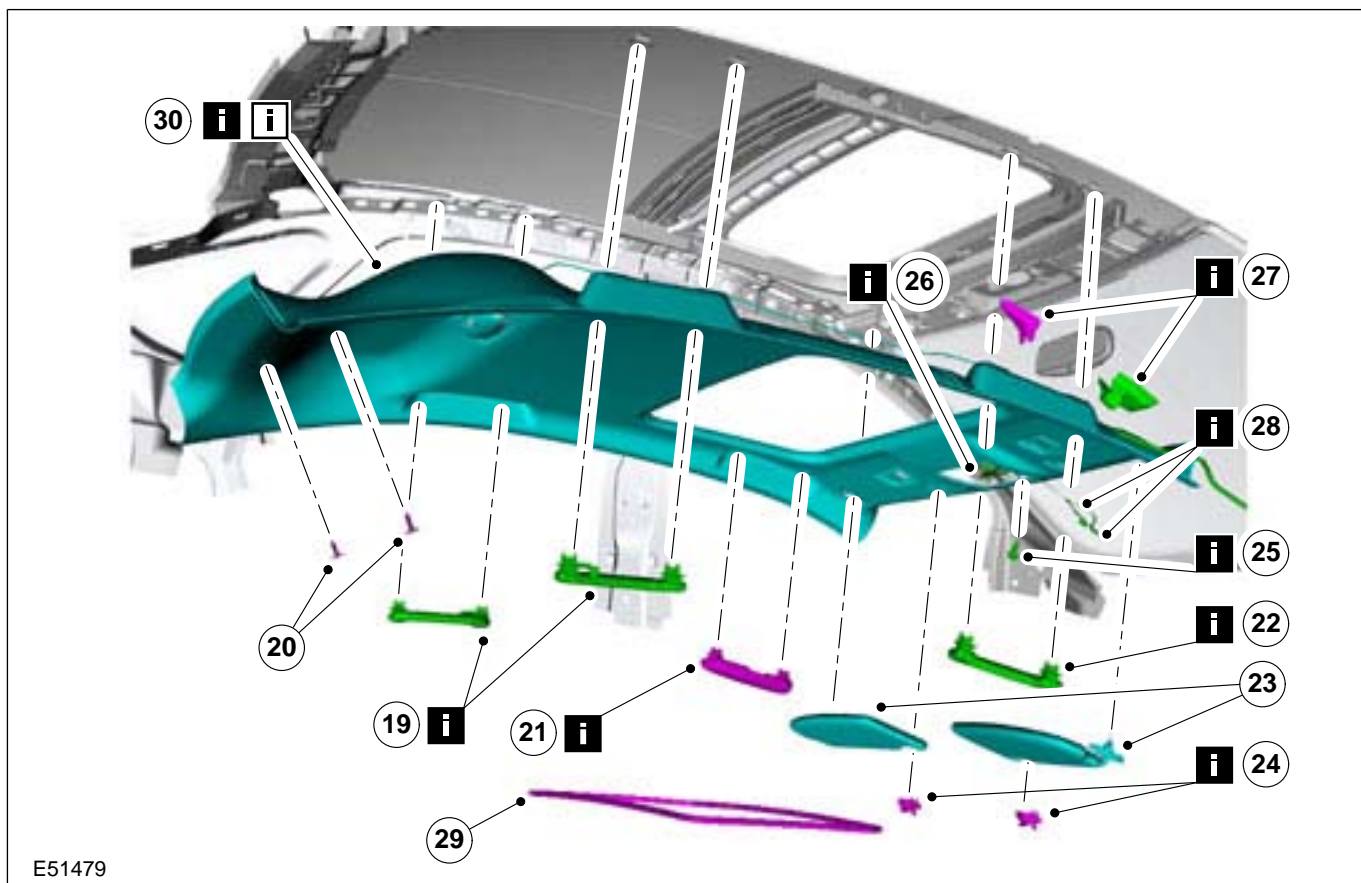


E51477

Item	Description
14	Front door opening weatherstrips See Removal Detail
15	Rear door opening weatherstrips See Removal Detail

Item	Description
16	B-pillar trim panel retaining screw trim covers
17	B-pillar trim panel retaining screws
18	B-pillar trim panels See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION

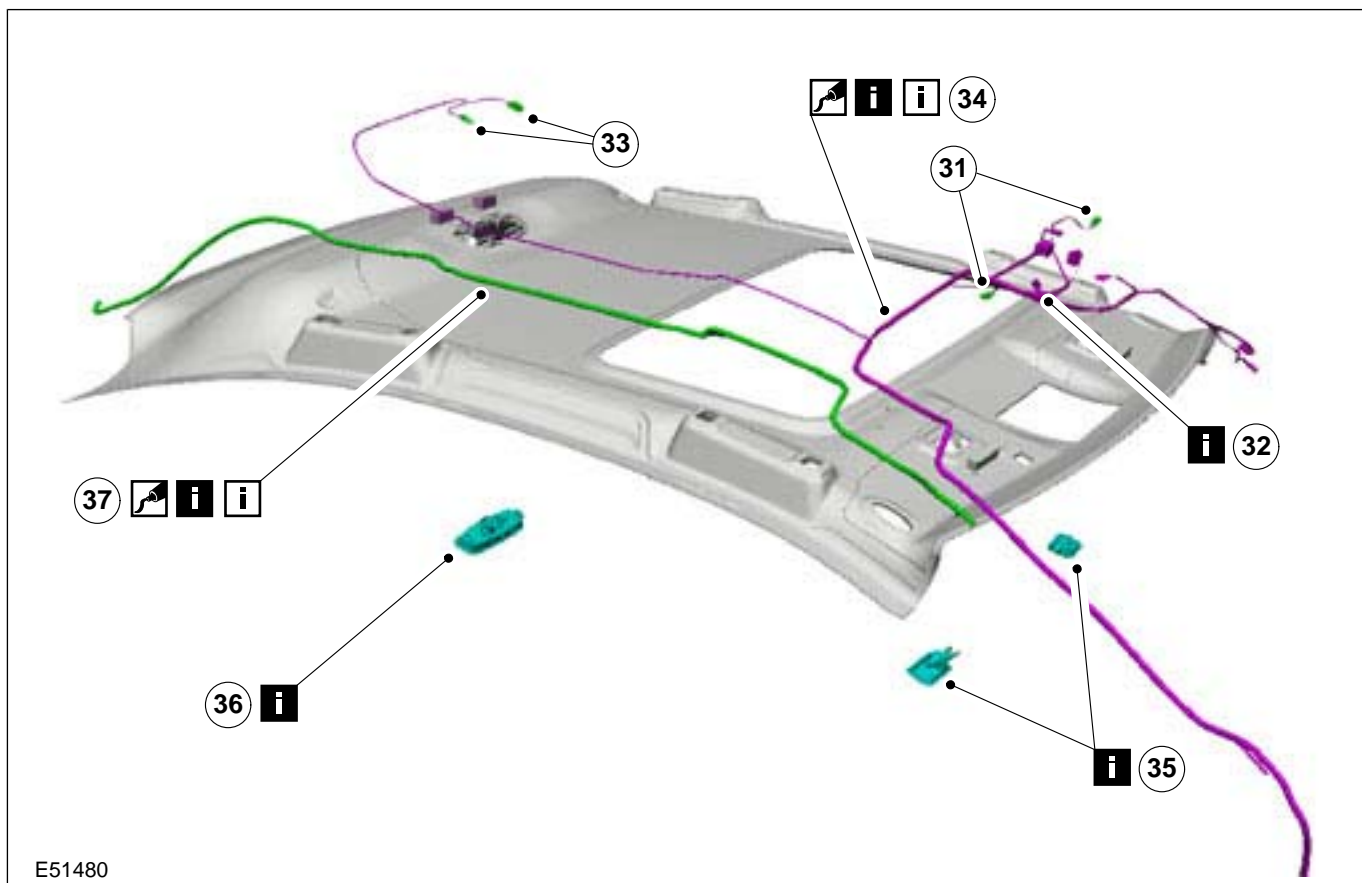


E51479

Item	Description
19	Rear passenger assist handles See Removal Detail
20	Headliner retaining clips
21	Glasses holder See Removal Detail
22	Front passenger assist handle See Removal Detail
23	Sun visors
24	Sun visor retaining clips See Removal Detail
25	Roof wiring harness ground connection retaining bolt See Removal Detail

Item	Description
26	Sliding roof opening panel motor electrical connector See Removal Detail
27	Auto-dimming interior mirror trim covers See Removal Detail
28	Auto-dimming interior mirror and rain sensor electrical connectors See Removal Detail
29	Sliding roof opening panel trim See Installation Detail
30	Headliner trim panel See Removal Detail

REMOVAL AND INSTALLATION



E51480

Item	Description
31	Sunvisor illumination lamp electrical connectors
32	Radio frequency (RF) receiver See Removal Detail
33	Rear interior lamp electrical connector
34	Roof wiring harness See Removal Detail See Installation Detail
35	Sunvisor illumination lamps See Removal Detail

Item	Description
36	Rear interior lamp See Removal Detail
37	Rear window washer tube See Removal Detail See Installation Detail

- 13. To install, reverse the removal procedure.
- 14. Vehicles with global closing, initialize the door window motors.

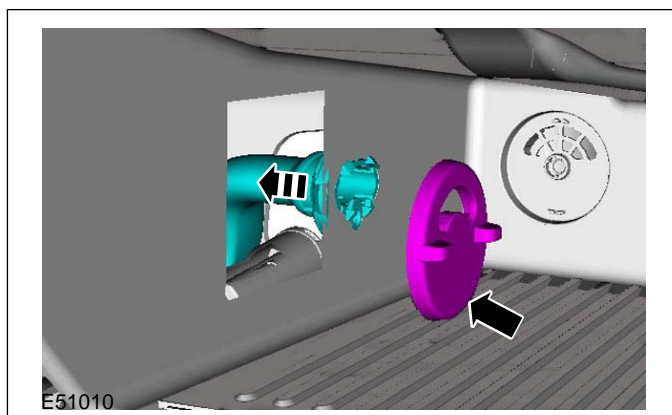
For additional information, refer to: **Door Window Motor Initialization** (501-11 Glass, Frames and Mechanisms, General Procedures).

Removal Details

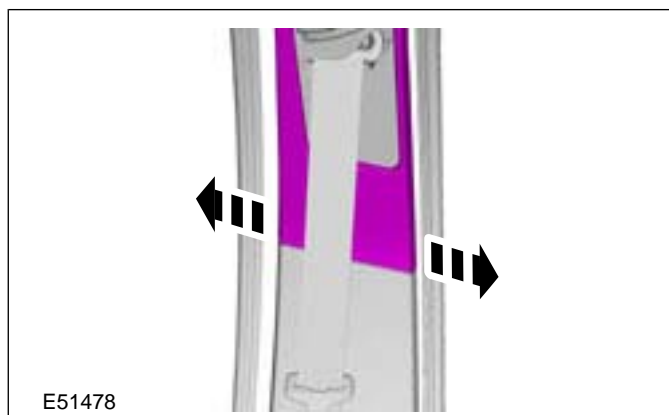
REMOVAL AND INSTALLATION

Item 4 Glove compartment cooling hose

1. Detach the glove compartment cooling hose from the glove compartment cooling vent.

**Item 18** B-pillar trim panels

1. Detach the B-pillar trim panels and position them to one side.

**Item 5** Moving pictures experts group audio layer 3 (MP3) auxiliary connector electrical connector

⚠ CAUTION: Do not place excessive strain on the electrical wiring harness when detaching the glove compartment.

1. Reposition the glove compartment and disconnect the MP3 auxiliary connector electrical connector.

Item 11 Noise, vibration and harshness (NVH) material

1. Detach the NVH material from the upper A-pillar area to gain access to the roof wiring harness retaining clip.

Item 13 Roof wiring harness

1. Attach a draw cord to the roof wiring harness and CJB electrical connector. Feed the wiring harness through the NVH material to above the instrument panel A-pillar area.

Item 14 Front door opening weatherstrips

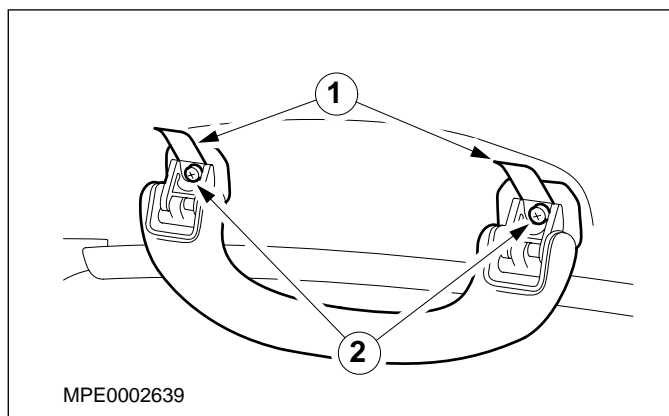
1. Detach the front door opening weatherstrip from the front door upper opening area.

Item 15 Rear door opening weatherstrips

1. Detach the rear door opening weatherstrip from the rear door upper opening area.

Item 19 Rear passenger assist handles

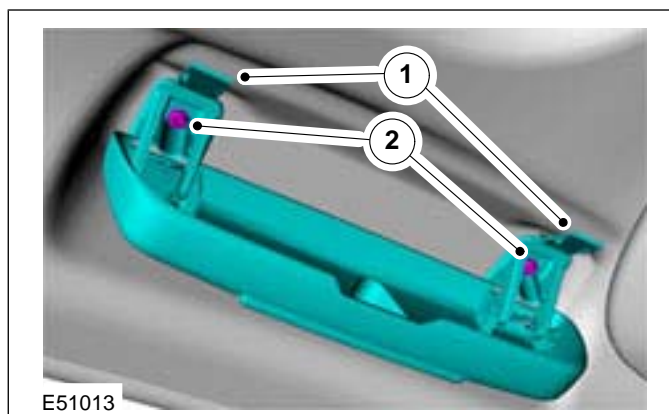
1. Lever open the rear passenger assist handle screw covers.



2. Remove the rear passenger assist handle retaining screws.

Item 21 Glasses holder

1. Lever open the glasses holder retaining screw covers.



501-05-65

Interior Trim and Ornamentation

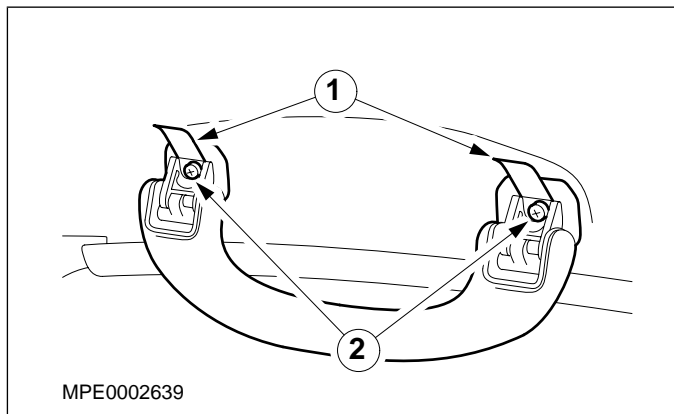
501-05-65

REMOVAL AND INSTALLATION

2. Remove the glasses holder retaining screws.

Item 22 Front passenger assist handle

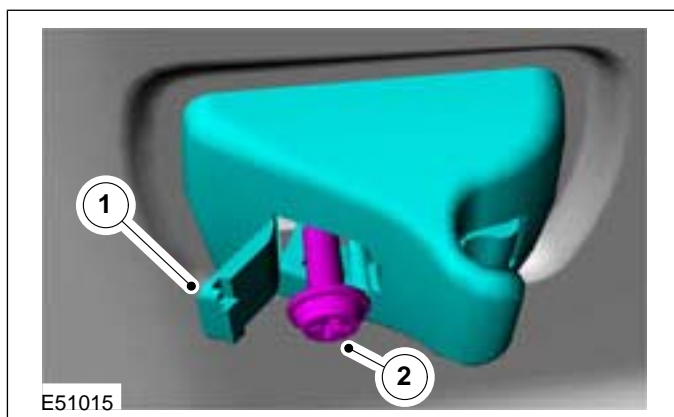
1. Lever open the front passenger assist handle retaining screw covers.



2. Remove the front passenger assist handle retaining screws.

Item 24 Sun visor retaining clips

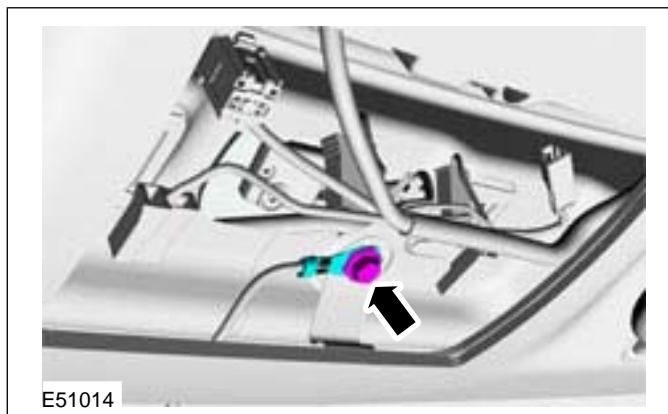
1. Lever open the sun visor retaining clips retaining screw cover.



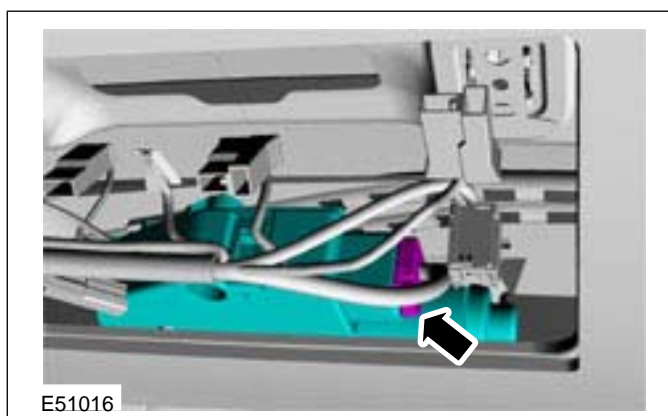
2. Remove the sun visor retaining clips retaining screw.

Item 25 Roof wiring harness ground connection retaining bolt

1. Detach the roof wiring harness and windscreen ground electrical connectors.

**Item 26** Sliding roof opening panel motor electrical connector

1. Disconnect the sliding roof opening panel motor electrical connector.

**Item 27** Auto-dimming interior mirror trim covers

1. Remove the auto-dimming interior mirror and rain sensor trim covers.

1. Release the locking clips.

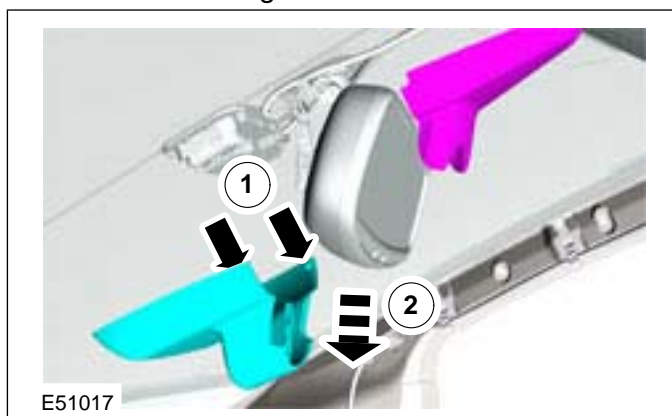
501-05-66

Interior Trim and Ornamentation

501-05-66

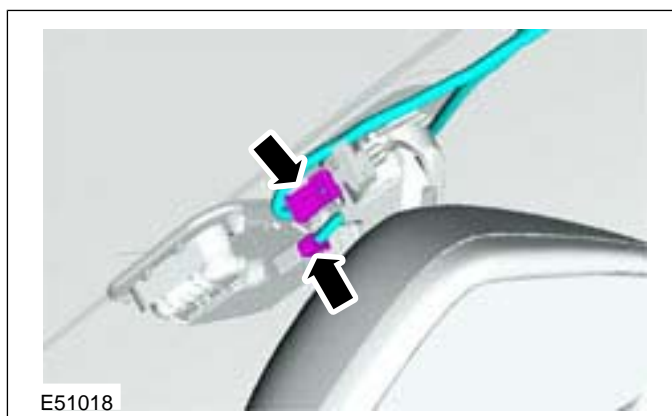
REMOVAL AND INSTALLATION

- Slide the rain sensor trim cover off the auto-dimming interior mirror trim cover.



Item 28 Auto-dimming interior mirror and rain sensor electrical connectors

- Disconnect the auto-dimming interior mirror and rain sensor electrical connectors.



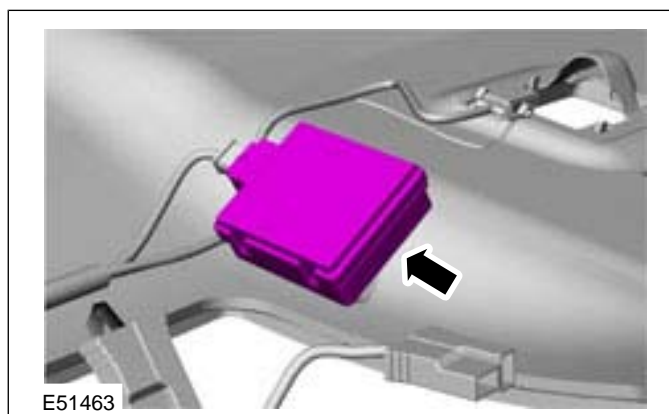
Item 30 Headliner trim panel

- Tilt the front seats forward.
- With the aid of another technician, remove the headliner through the liftgate opening.

Item 32 Radio frequency (RF) receiver

NOTE: Make a note of the position of the RF receiver to make sure that it is installed in exactly the same position as when removed.

- Using a suitable knife, detach the RF receiver from the headliner.



Item 34 Roof wiring harness

CAUTIONS:

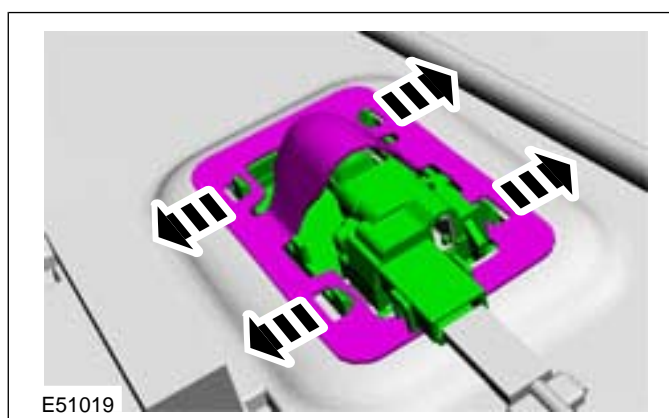
- Take care not to damage the insulation of the roof wiring harness.
- The roof wiring harness must be cut off of the headliner and not pulled or ripped. Failure to follow this instruction could result in the incorrect function of electrical components.

NOTE: Make a note of the position of the roof wiring harness to make sure that it is installed in exactly the same position as when removed.

- Using a suitable knife, remove the roof wiring harness from the headliner.

Item 35 Sunvisor illumination lamps

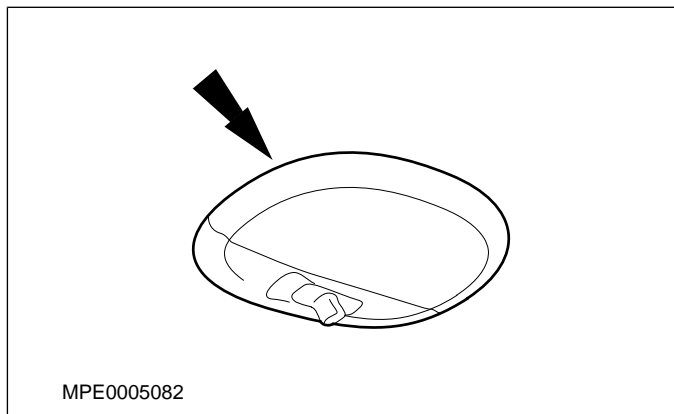
- Release the sunvisor illumination lamp retaining clips.



REMOVAL AND INSTALLATION

Item 36 Rear interior lamp

1. Lever out the rear interior lamp.

**Item 37** Rear window washer tube

- CAUTION:** Take care not to damage the rear window washer tube. Failure to follow this instruction could result in damage to the headliner.

NOTE: Make a note of the position of the rear window washer tube to make sure that it is installed in exactly the same position as when removed.

1. Using a suitable knife, remove the rear window washer tube from the headliner.

Installation Details

Item 37 Rear window washer tube

- CAUTION:** The rear window washer tube must be installed in the same position as when removed.

1. Using a suitable adhesive, bond the rear window washer tube to the headliner.

Item 34 Roof wiring harness

- CAUTION:** The roof wiring harness must be installed in the same position as when removed.

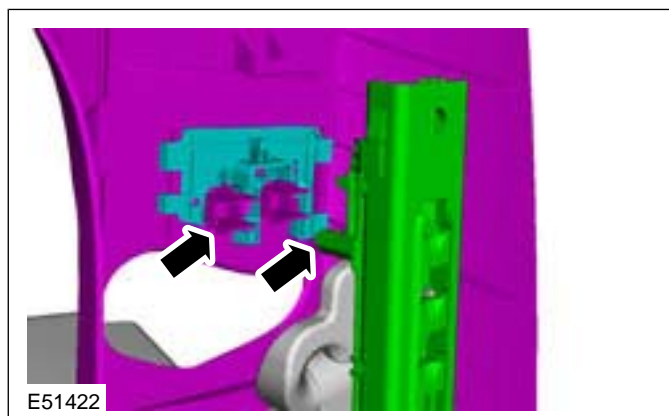
1. Using a suitable adhesive, bond the roof wiring harness to the headliner.

Item 29 Sliding roof opening panel trim

1. With the aid of another technician, install the headliner.

Item 18 B-pillar trim panels

NOTE: Make sure the B-pillar safety belt height adjustment lever is aligned with the safety belt height adjustment mechanism.

**Item 13** Roof wiring harness

1. Using the draw cord, feed the roof wiring harness through the NVH material.

Item 11 Noise, vibration and harshness (NVH) material

1. Reposition the NVH material.

REMOVAL AND INSTALLATION

Headliner — 3-Door, Vehicles Without: Sliding Roof Opening Panel

General Equipment

Draw cord

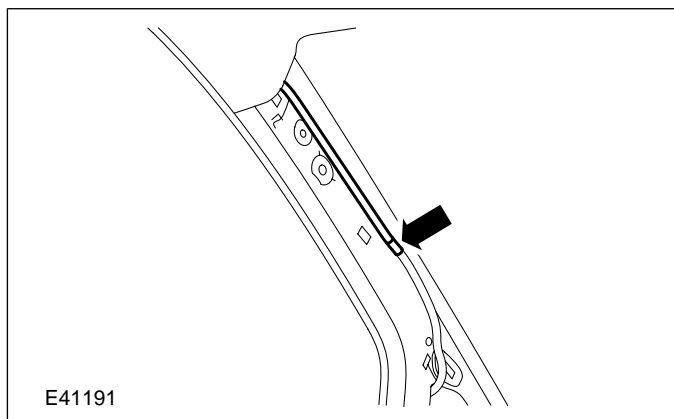
1. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

2. Remove the A-pillar trim panels.

For additional information, refer to: **A-Pillar Trim Panel** (501-05 Interior Trim and Ornamentation, Removal and Installation).

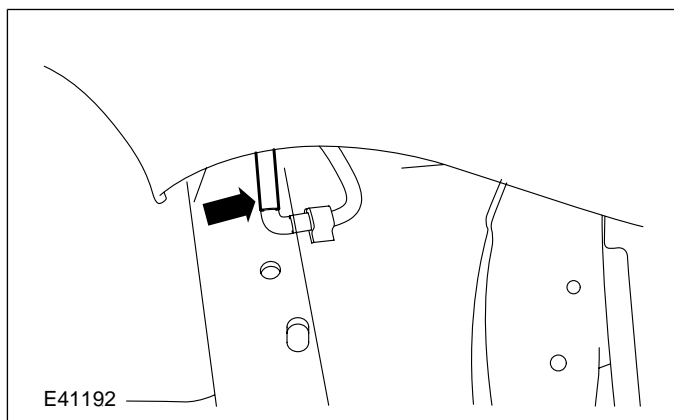
3. Disconnect the rear window washer tube.



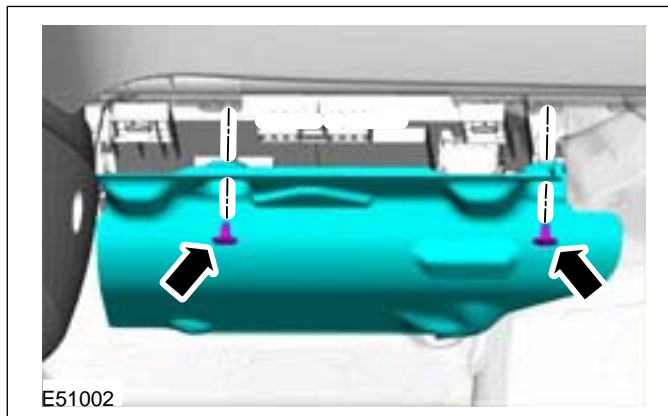
4. Remove the overhead console.

For additional information, refer to: **Overhead Console** (501-12 Instrument Panel and Console, Removal and Installation).

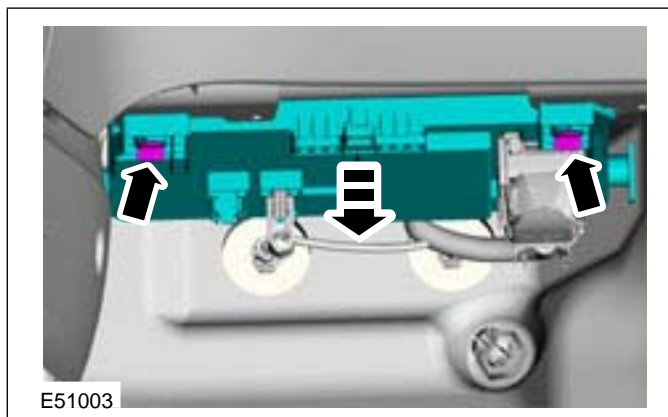
5. Disconnect the rear window washer tube.



6. Remove the instrument panel passenger side lower trim panel.

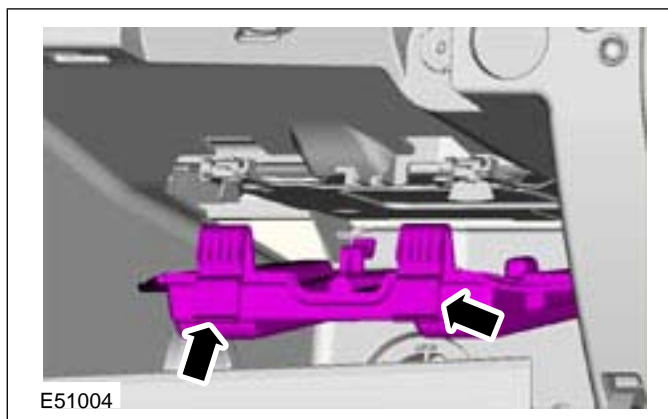


7. Lower the central junction box (CJB).



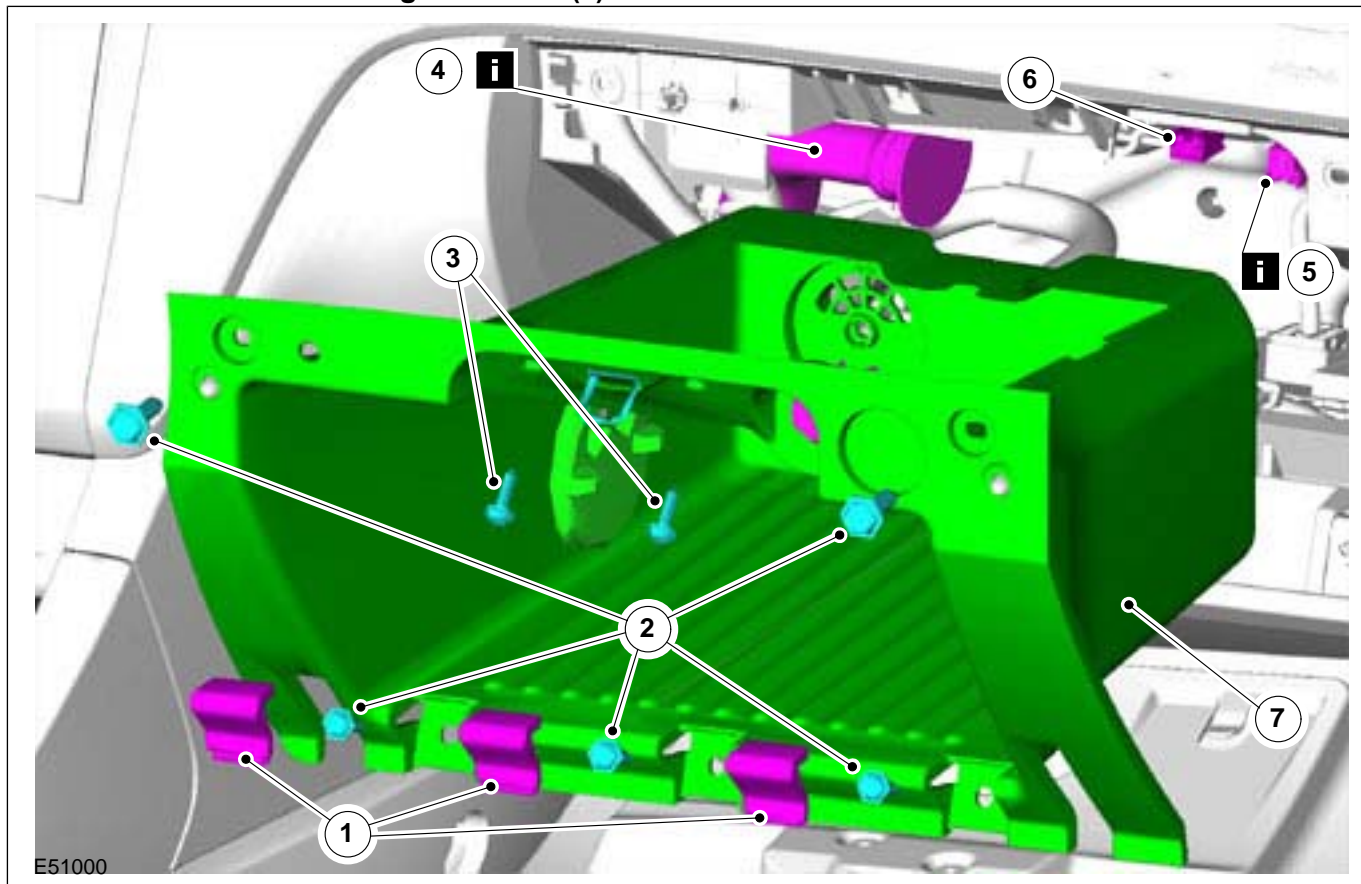
8. Open the glove compartment lid.

9. Remove the navigation system digital versatile disc (DVD) unit access cover (if equipped).



REMOVAL AND INSTALLATION

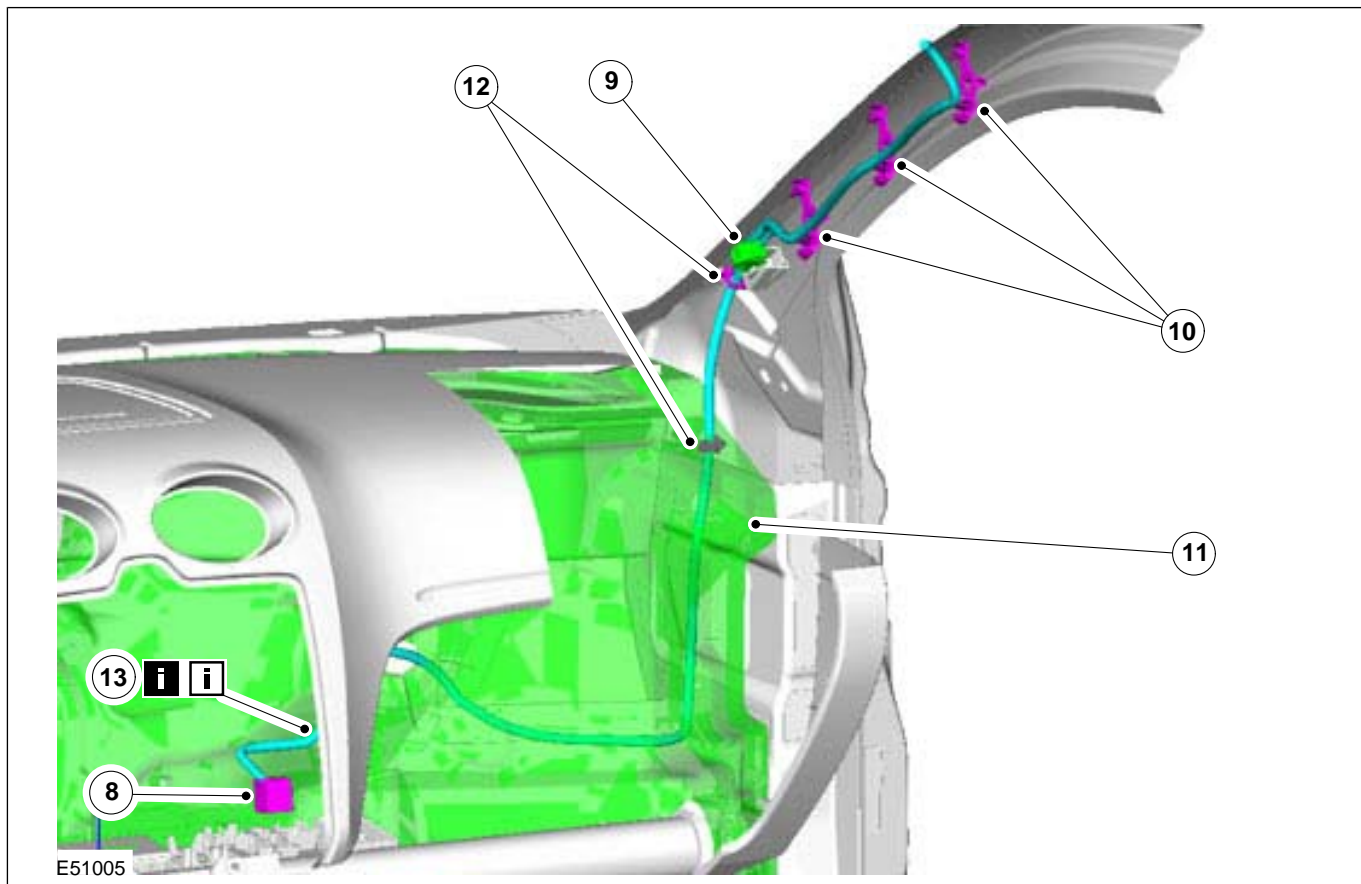
10. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Glove compartment retaining screw covers
2	Glove compartment retaining screws
3	Glove compartment lid striker retaining screws
4	Glove compartment cooling hose <i>See Removal Detail</i>

Item	Description
5	Moving pictures experts group audio layer 3 (MP3) auxiliary connector electrical connector <i>See Removal Detail</i>
6	Passenger airbag deactivation switch electrical connector
7	Glove compartment housing

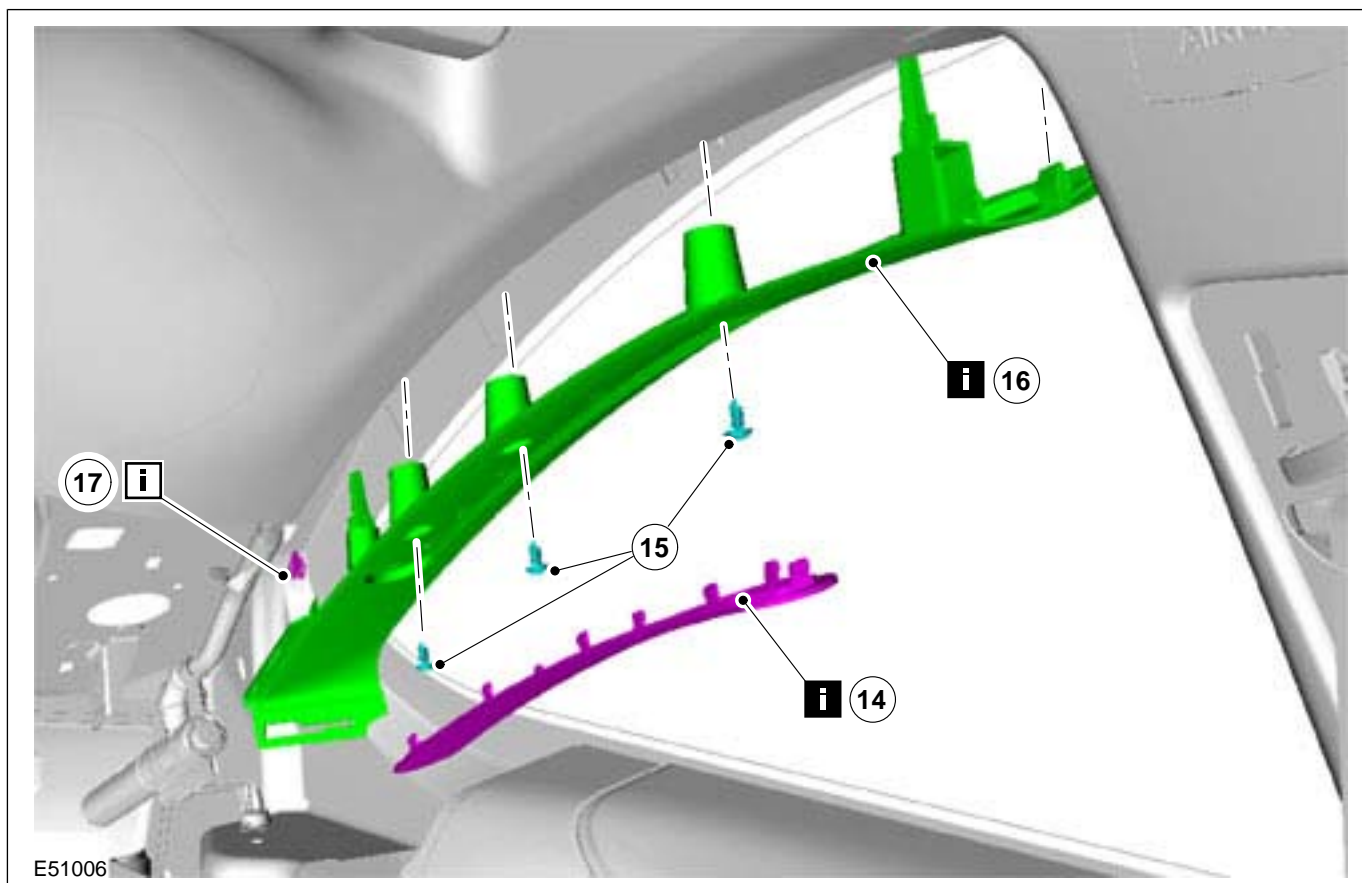
REMOVAL AND INSTALLATION



Item	Description
8	Roof wiring harness to CJB electrical connector
9	Roof wiring harness electrical connector
10	Roof wiring harness to A-pillar retaining clips

Item	Description
11	Noise, vibration and harshness (NVH) material See Removal Detail See Installation Detail
12	Roof wiring harness retaining clips
13	Roof wiring harness See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION

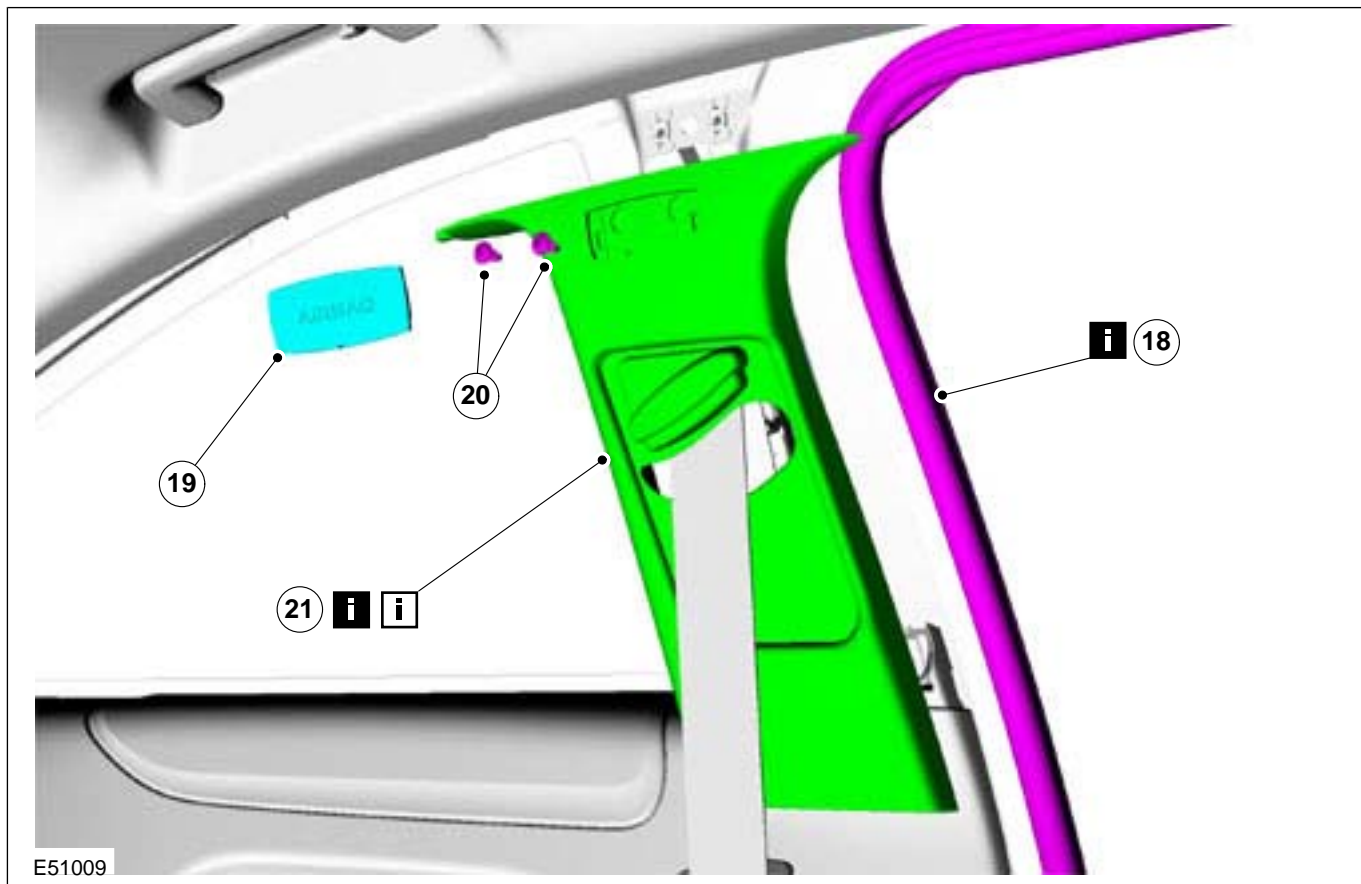


E51006

Item	Description
14	Rear quarter window glass trim panel retaining screw trim covers See Removal Detail
15	Rear quarter window glass trim panel retaining screws

Item	Description
16	Rear quarter window glass trim panels See Removal Detail
17	Rear quarter window glass trim panel retaining clips See Installation Detail

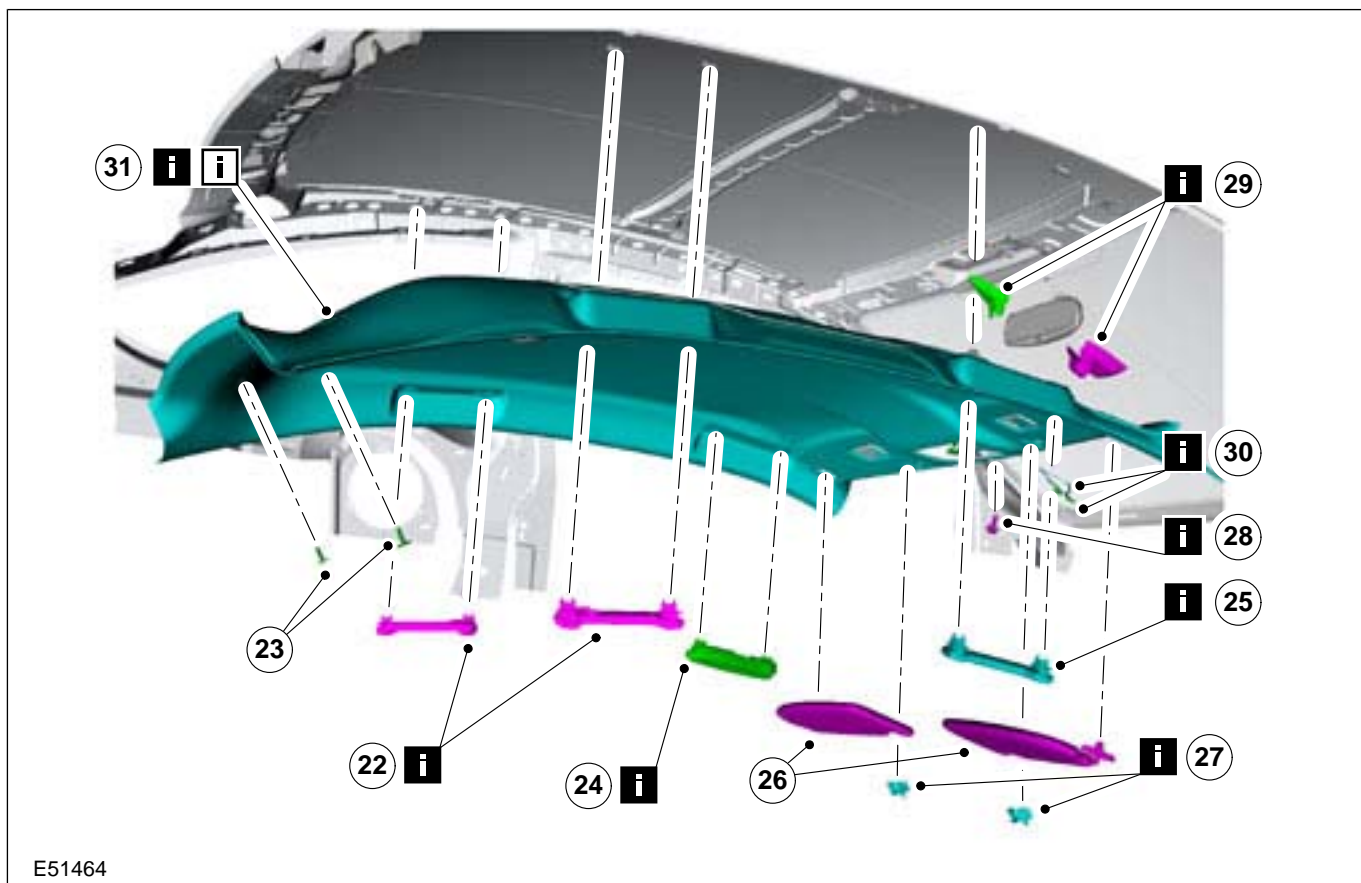
REMOVAL AND INSTALLATION



Item	Description
18	Door opening weatherstrips <i>See Removal Detail</i>
19	B-pillar trim panel retaining screw trim covers

Item	Description
20	B-pillar trim panel retaining screws
21	B-pillar trim panels <i>See Removal Detail</i> <i>See Installation Detail</i>

REMOVAL AND INSTALLATION

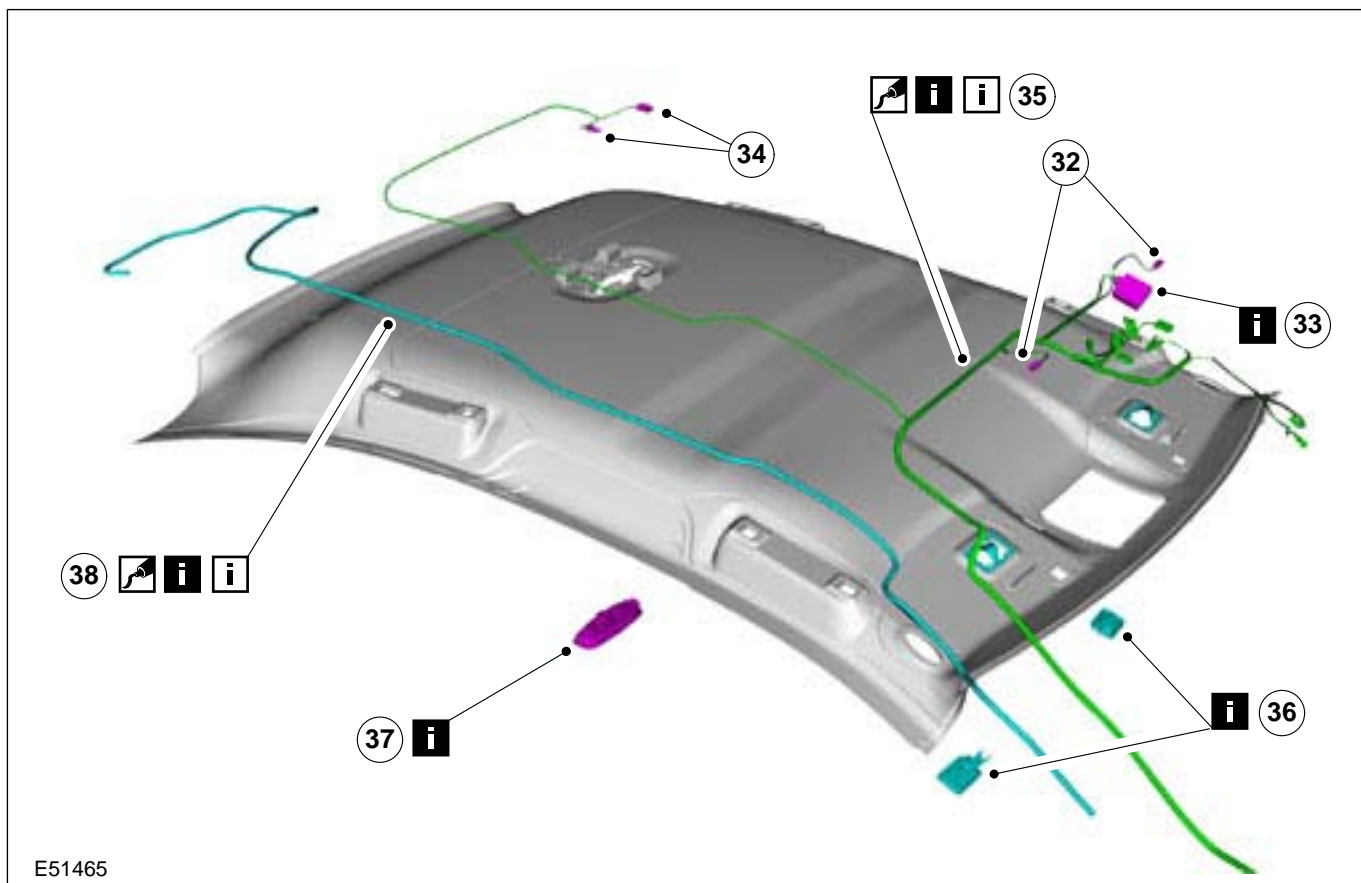


E51464

Item	Description
22	Rear passenger assist handles See Removal Detail
23	Headliner retaining clips
24	Glasses holder See Removal Detail
25	Front passenger assist handle See Removal Detail
26	Sun visors
27	Sun visor retaining clips See Removal Detail

Item	Description
28	Roof wiring harness ground connection retaining bolt See Removal Detail
29	Auto-dimming interior mirror trim covers See Removal Detail
30	Auto-dimming interior mirror and rain sensor electrical connectors
31	Headliner trim panel See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION



E51465

Item	Description
32	Sunvisor illumination lamp electrical connectors See Installation Detail
33	Radio frequency (RF) receiver See Removal Detail
34	Rear interior lamp electrical connectors
35	Roof wiring harness See Removal Detail See Installation Detail
36	Sunvisor illumination lamps See Removal Detail

Item	Description
37	Rear interior lamp See Removal Detail
38	Rear window washer tube See Removal Detail See Installation Detail

11. To install, reverse the removal procedure.
12. Vehicles with global closing, initialize the door window motors.

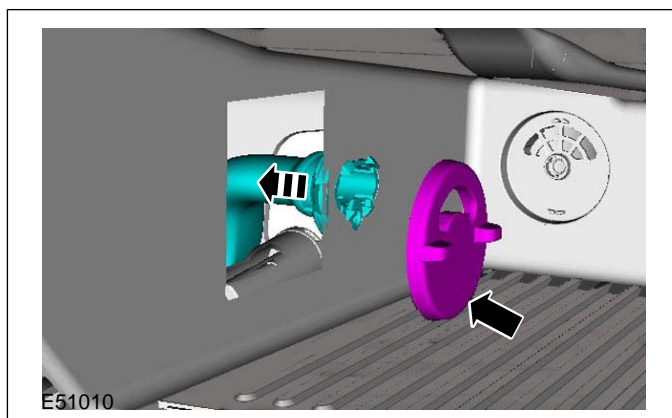
For additional information, refer to: Door **Window Motor Initialization** (501-11 Glass, Frames and Mechanisms, General Procedures).

Removal Details

REMOVAL AND INSTALLATION

Item 4 Glove compartment cooling hose

1. Detach the glove compartment cooling hose from the glove compartment cooling vent.

**Item 5** Moving pictures experts group audio layer 3 (MP3) auxiliary connector electrical connector

- ⚠ CAUTION:** Do not place excessive strain on the electrical wiring harness when detaching the glove compartment.

1. Reposition the glove compartment and disconnect the MP3 auxiliary connector electrical connector.

Item 11 Noise, vibration and harshness (NVH) material

1. Detach the NVH material from the upper A-pillar area to gain access to the roof wiring harness retaining clip.

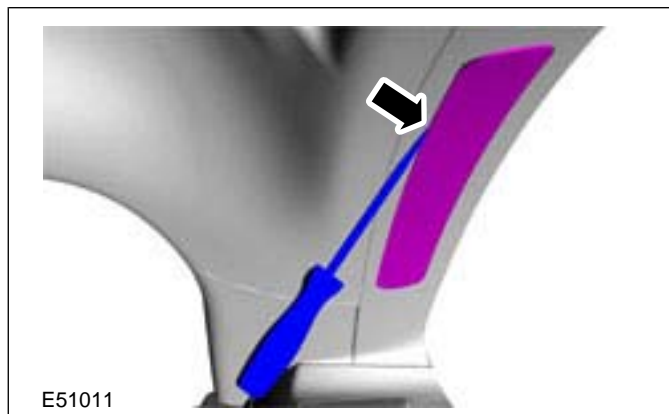
Item 13 Roof wiring harness

1. Attach a draw cord to the roof wiring harness and CJB electrical connector. Feed the wiring harness through the NVH material to above the instrument panel A-pillar area.

Item 14 Rear quarter window glass trim panel retaining screw trim covers

- ⚠ CAUTION:** Care must be taken not to damage the rear quarter window glass trim panels and retaining screw trim covers.

1. Using a suitable flat blade screwdriver, lever out the rear quarter window glass trim panel retaining screw trim covers.

**Item 16** Rear quarter window glass trim panels

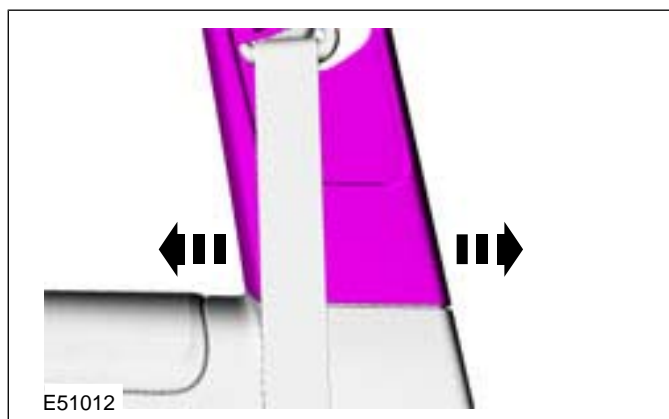
1. Detach the rear quarter window glass trim panel to B-pillar trim panel retaining clip.

Item 18 Door opening weatherstrips

1. Detach the door opening weatherstrips from the door opening upper area.

Item 21 B-pillar trim panels

1. Detach the B-pillar trim panels and position them to one side.



501-05-76

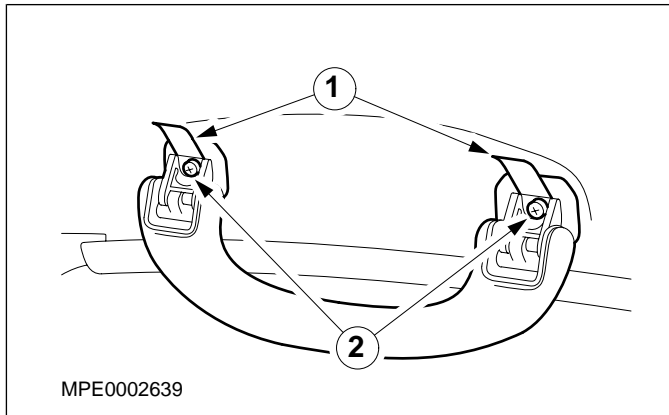
Interior Trim and Ornamentation

501-05-76

REMOVAL AND INSTALLATION

Item 22 Rear passenger assist handles

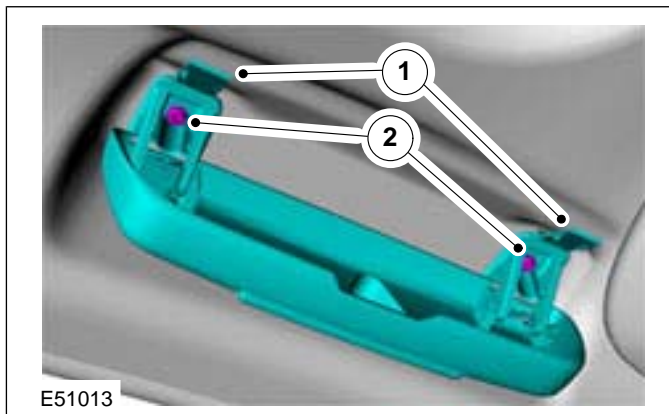
1. Lever open the rear passenger assist handle screw covers.



2. Remove the rear passenger assist handle retaining screws.

Item 24 Glasses holder

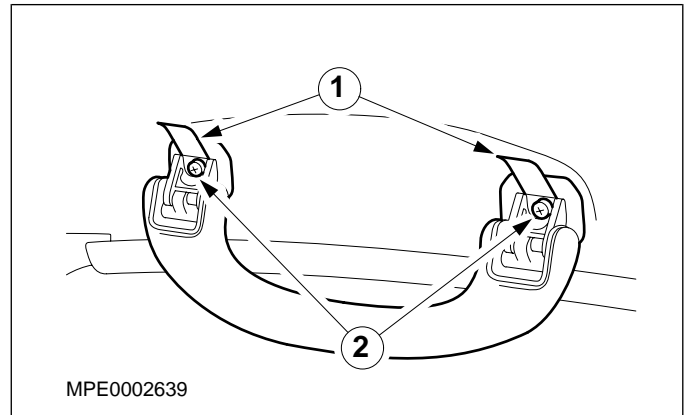
1. Lever open the glasses holder retaining screw covers.



2. Remove the glasses holder retaining screws.

Item 25 Front passenger assist handle

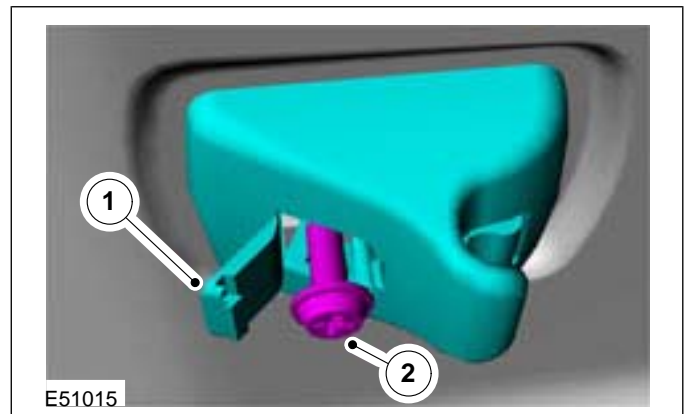
1. Lever open the front passenger assist handle retaining screw covers.



2. Remove the front passenger assist handle retaining screws.

Item 27 Sun visor retaining clips

1. Lever open the sun visor retaining clip retaining screw cover.

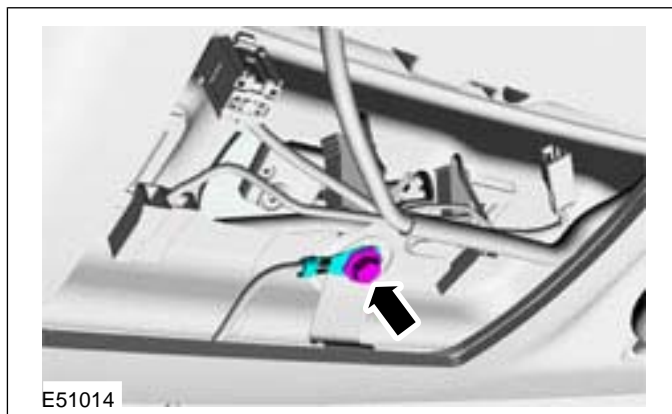


2. Remove the sun visor retaining clip retaining screw.

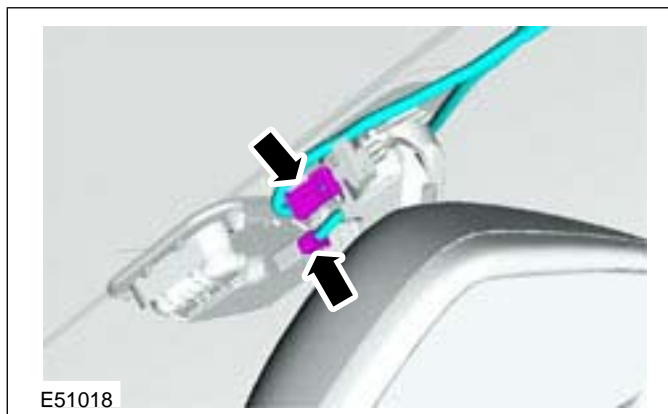
REMOVAL AND INSTALLATION

Item 28 Roof wiring harness ground connection retaining bolt

1. Detach the roof wiring harness and windscreen ground electrical connectors.

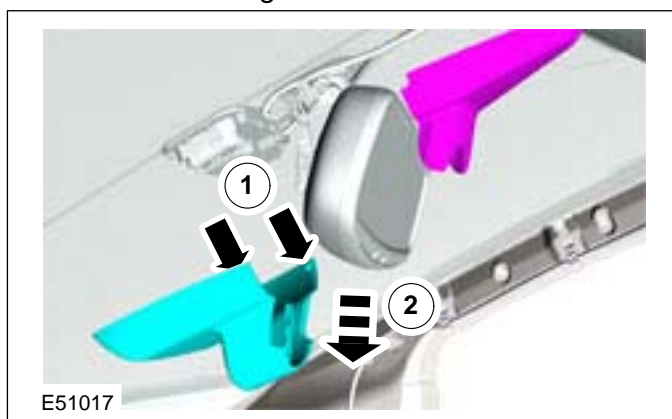
**Item 30** Auto-dimming interior mirror and rain sensor electrical connectors

1. Disconnect the auto-dimming interior mirror and rain sensor electrical connectors.

**Item 29** Auto-dimming interior mirror trim covers

1. Remove the auto-dimming interior mirror and rain sensor trim covers.

1. Release the locking clips.
2. Slide the rain sensor trim cover off the auto-dimming interior mirror trim cover.

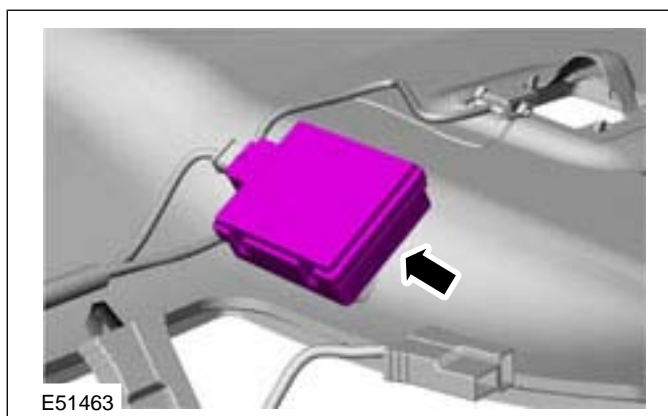
**Item 31** Headliner trim panel

1. Tilt the front seats forward.
2. With the aid of another technician, remove the headliner through the liftgate opening.

Item 33 Radio frequency (RF) receiver

NOTE: Make a note of the position of the RF receiver to make sure that it is installed in exactly the same position as when removed.

1. Using a suitable knife, detach the RF receiver from the headliner.

**Item 35** Roof wiring harness**CAUTIONS:**

- ⚠ Take care not to damage the insulation of the roof wiring harness.

501-05-78

Interior Trim and Ornamentation

501-05-78

REMOVAL AND INSTALLATION

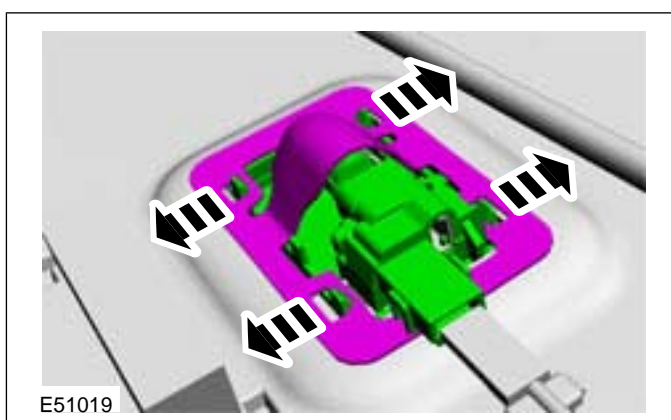
- ⚠** The roof wiring harness must be cut off the headliner and not pulled or ripped. Failure to follow this instruction could result in the incorrect function of electrical components.

NOTE: Make a note of the position of the roof wiring harness to make sure that it is installed in exactly the same position as when removed.

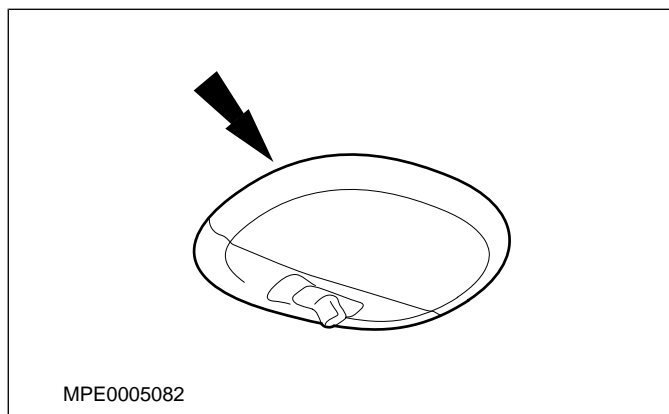
1. Using a suitable knife, remove the roof wiring harness from the headliner.

Item 36 Sunvisor illumination lamps

1. Release the sun visor illumination lamp retaining clips.

**Item 37** Rear interior lamp

1. Lever out the rear interior lamp.

**Item 38** Rear window washer tube

- ⚠ CAUTION:** Take care not to damage the rear window washer tube. Failure to follow this instruction could result in damage to the headliner.

NOTE: Make a note of the position of the rear window washer tube to make sure that it is installed in exactly the same position as when removed.

1. Using a suitable knife, remove the rear window washer tube from the headliner.

Installation Details

Item 38 Rear window washer tube

- ⚠ CAUTION:** The rear window washer tube must be installed in the same position as when removed.

1. Using a suitable adhesive, bond the rear window washer tube to the headliner.

Item 35 Roof wiring harness

- ⚠ CAUTION:** The roof wiring harness must be installed in the same position as when removed.

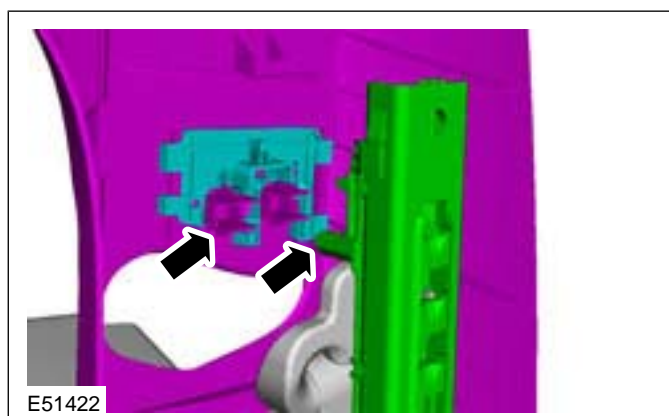
1. Using a suitable adhesive, bond the roof wiring harness to the headliner.

Item 31 Headliner trim panel

1. With the aid of another technician, install the headliner.

Item 21 B-pillar trim panels

NOTE: Make sure the B-pillar safety belt height adjustment lever is aligned with the safety belt height adjustment mechanism.



REMOVAL AND INSTALLATION

Item 17 Rear quarter window glass trim panel retaining clips

1. Install the rear quarter window glass trim panel retaining clips to the rear quarter window glass trim panel.

Item 13 Roof wiring harness

1. Using the draw cord, feed the roof wiring harness through the NVH material.

Item 11 Noise, vibration and harshness (NVH) material

1. Reposition the NVH material.

REMOVAL AND INSTALLATION

Headliner — 5-Door, Vehicles Without: Sliding Roof Opening Panel

General Equipment

Draw cord

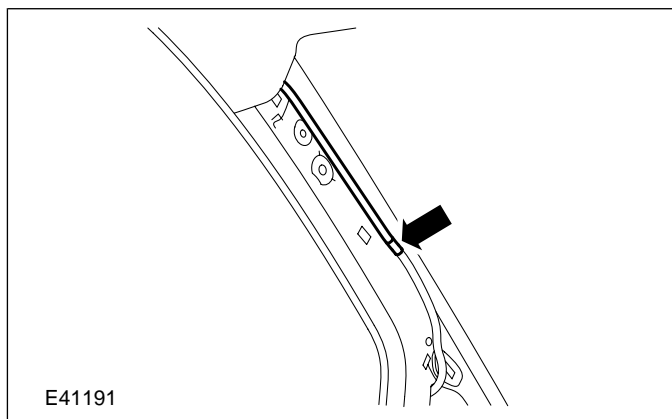
1. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

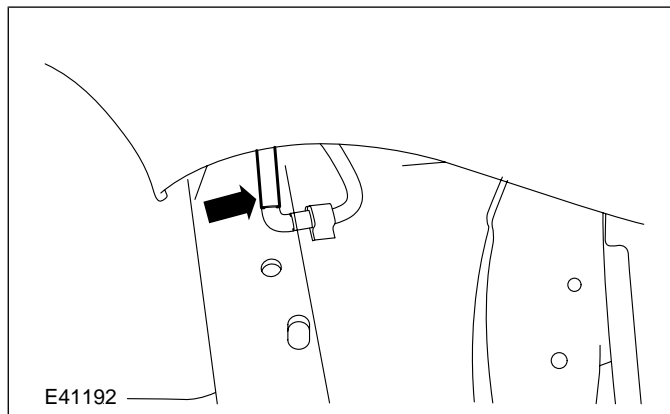
2. Remove the A-pillar trim panels.

For additional information, refer to: **A-Pillar Trim Panel** (501-05 Interior Trim and Ornamentation, Removal and Installation).

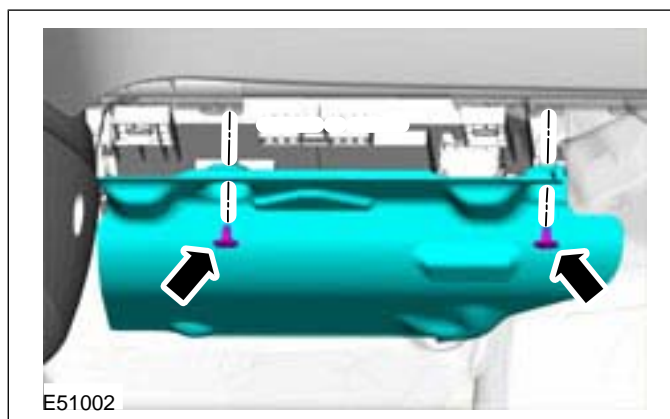
3. Disconnect the rear window washer tube.



7. Disconnect the rear window washer tube.



8. Remove the instrument panel passenger side lower trim panel.



4. Remove the overhead console.

For additional information, refer to: **Overhead Console** (501-12 Instrument Panel and Console, Removal and Installation).

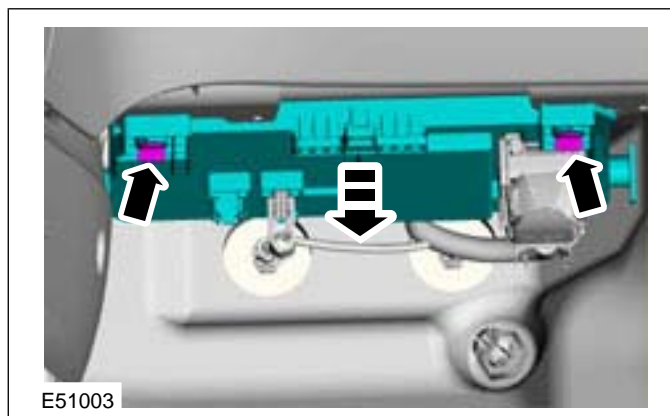
5. Remove the C-pillar trim panels.

For additional information, refer to: **C-Pillar Trim Panel - 4-Door/5-Door** (501-05 Interior Trim and Ornamentation, Removal and Installation).

6. Remove the D-pillar trim panels.

For additional information, refer to: **D-Pillar Trim Panel - 5-Door** (501-05 Interior Trim and Ornamentation, Removal and Installation).

9. Lower the central junction box (CJB).

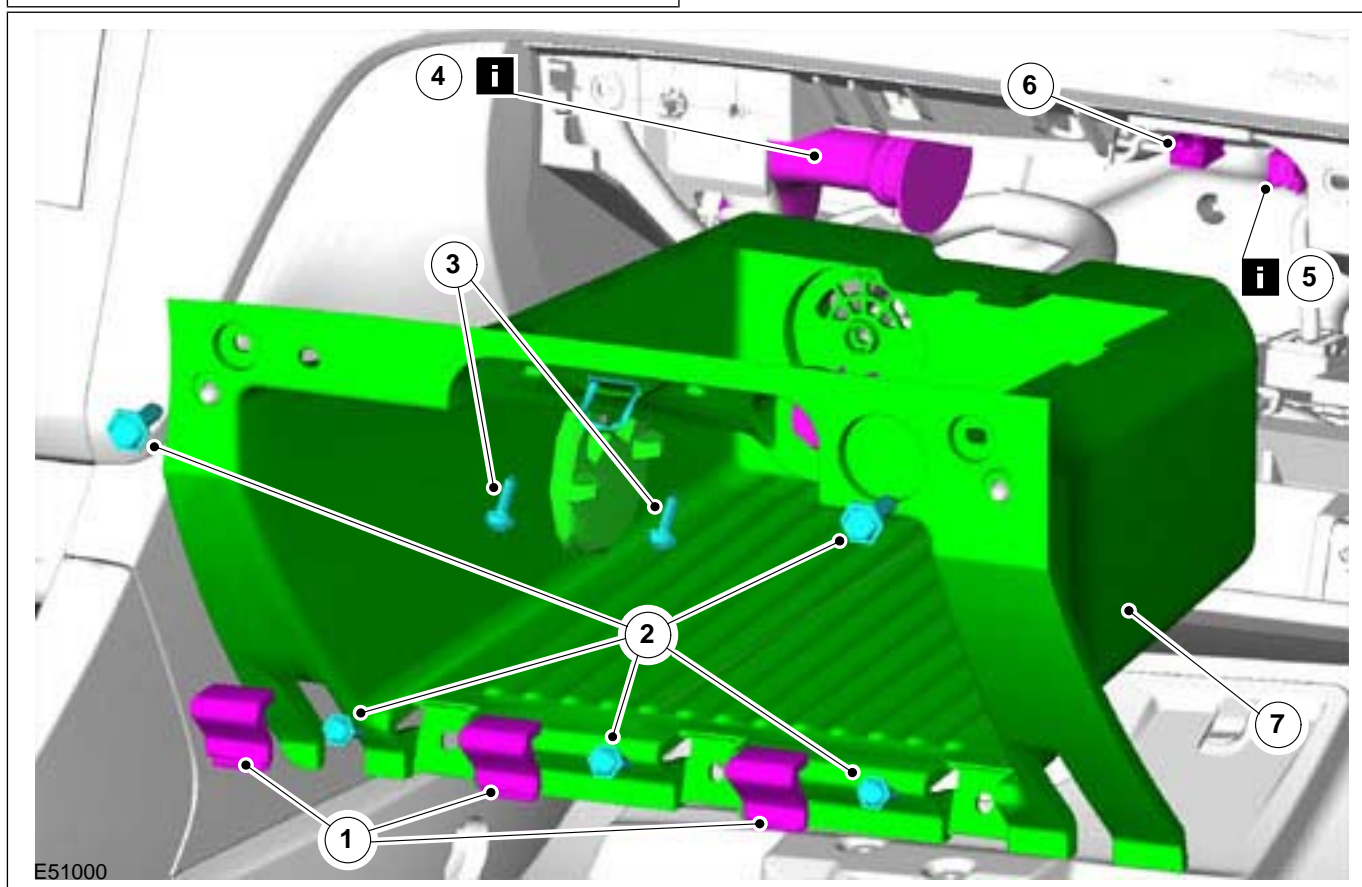
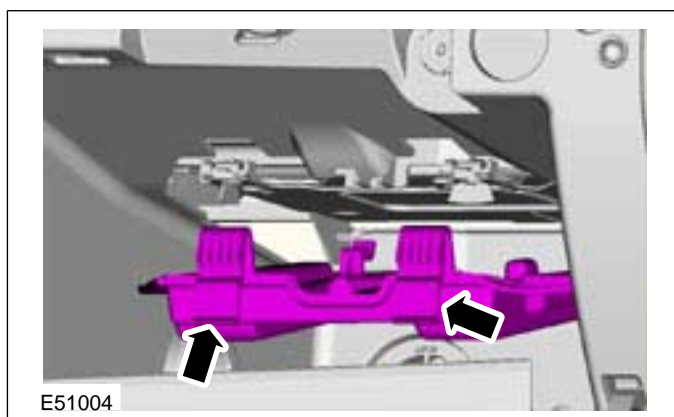


10. Open the glove compartment lid.

REMOVAL AND INSTALLATION

11. Remove the navigation system digital versatile disc (DVD) unit access cover (if equipped).

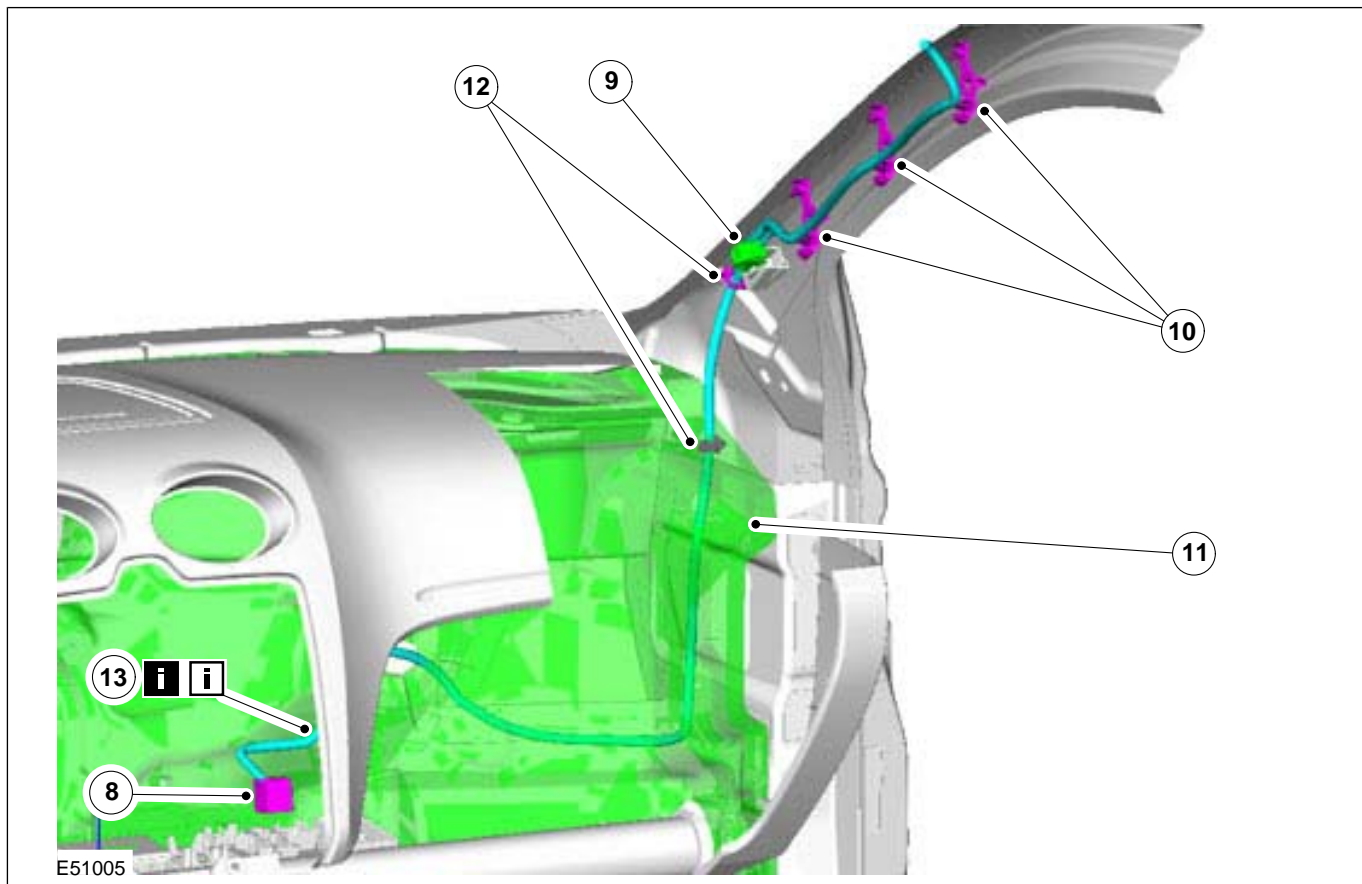
12. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Glove compartment retaining screw covers
2	Glove compartment retaining screws
3	Glove compartment lid striker retaining screws
4	Glove compartment cooling hose <i>See Removal Detail</i>

Item	Description
5	Moving pictures experts group audio layer 3 (MP3) auxiliary connector electrical connector <i>See Removal Detail</i>
6	Passenger airbag deactivation switch electrical connector
7	Glove compartment housing

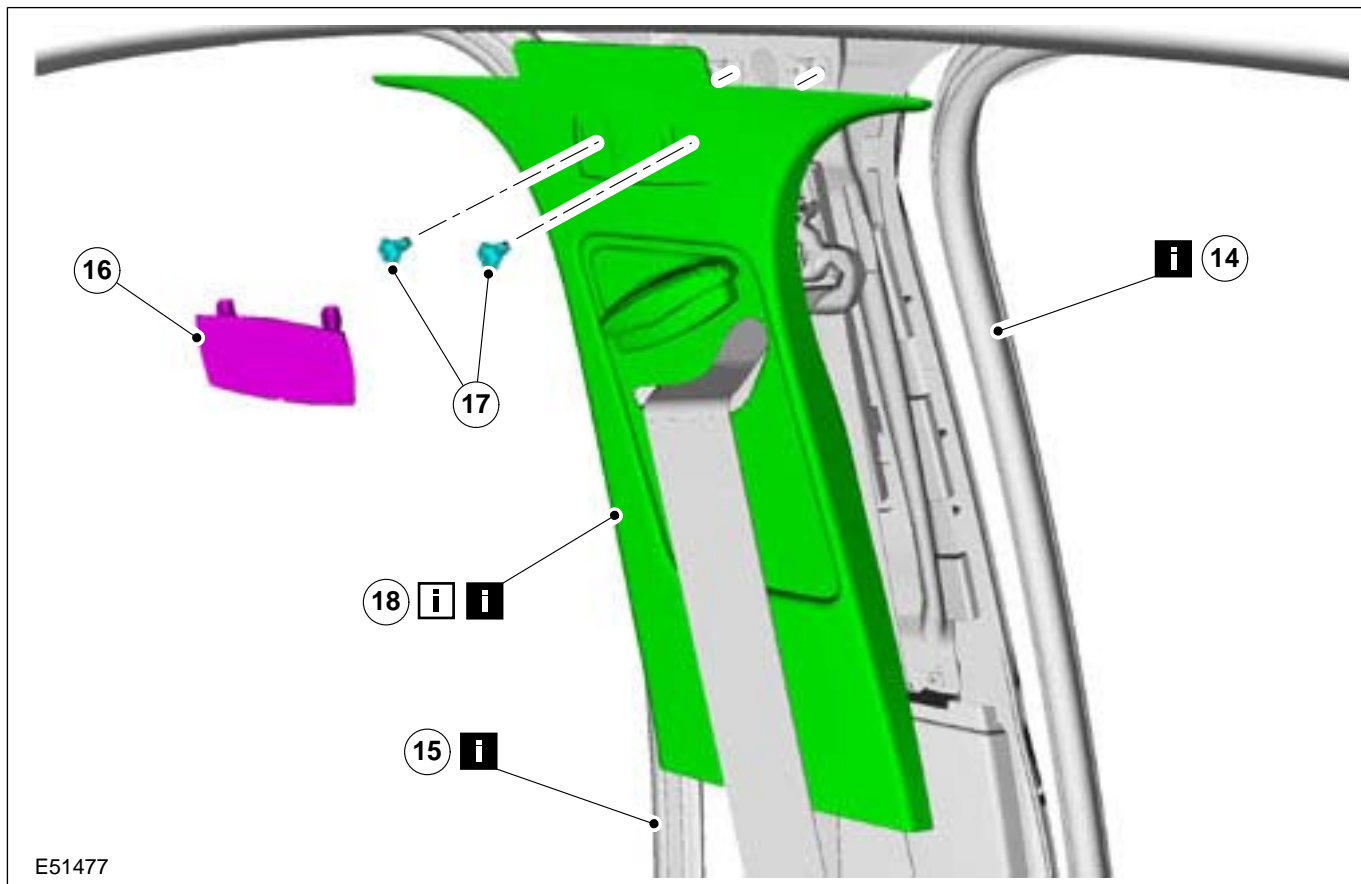
REMOVAL AND INSTALLATION



Item	Description
8	Roof wiring harness to CJB electrical connector
9	Roof wiring harness electrical connector
10	Roof wiring harness to A-pillar retaining clips

Item	Description
11	Noise, vibration and harshness (NVH) material <i>See Removal Detail</i> <i>See Installation Detail</i>
12	Roof wiring harness retaining clips
13	Roof wiring harness <i>See Removal Detail</i> <i>See Installation Detail</i>

REMOVAL AND INSTALLATION

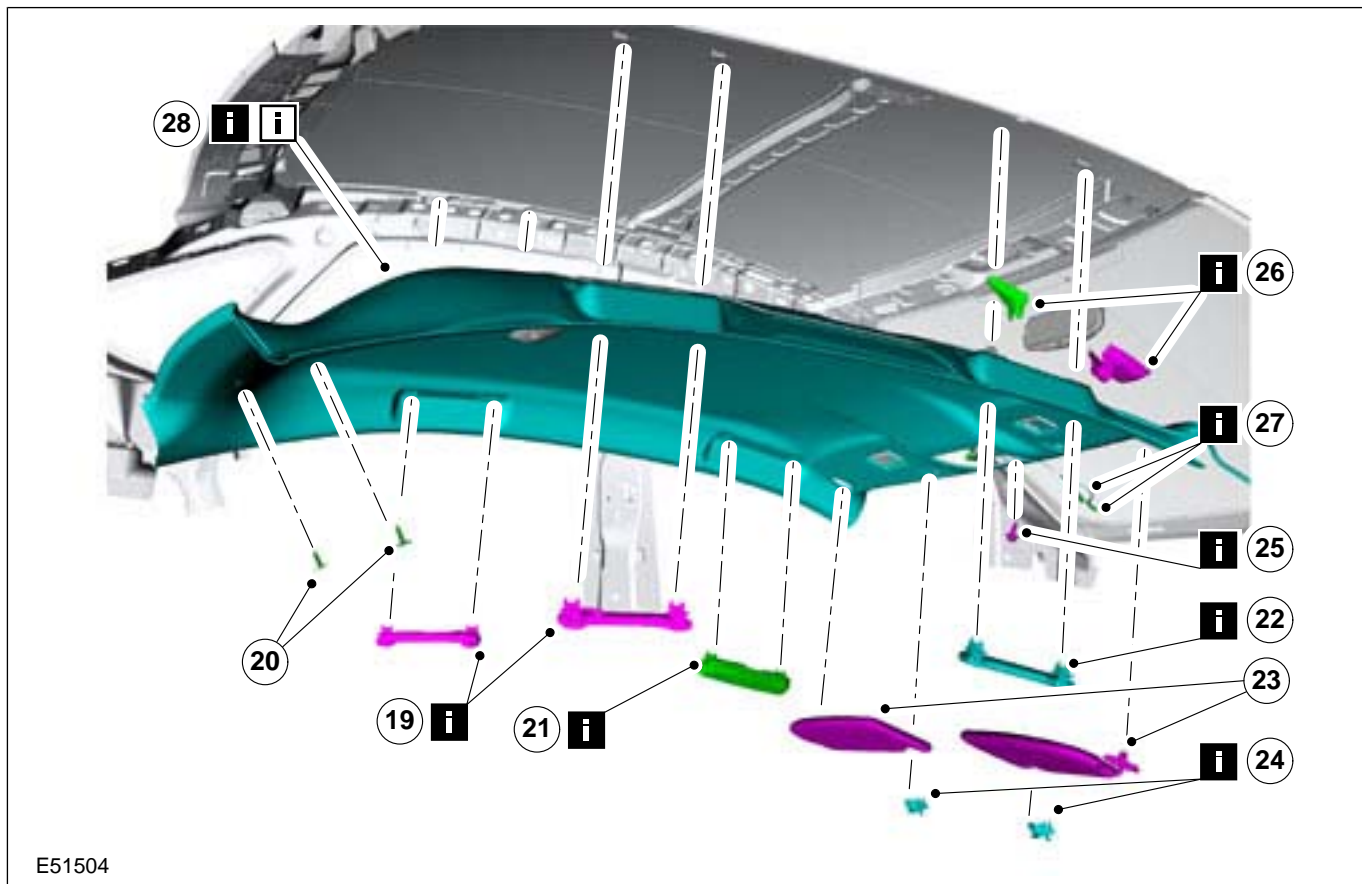


E51477

Item	Description
14	Front door opening weatherstrips See Removal Detail
15	Rear door opening weatherstrips See Removal Detail

Item	Description
16	B-pillar trim panel retaining screw trim covers
17	B-pillar trim panel retaining screws
18	B-pillar trim panels See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION

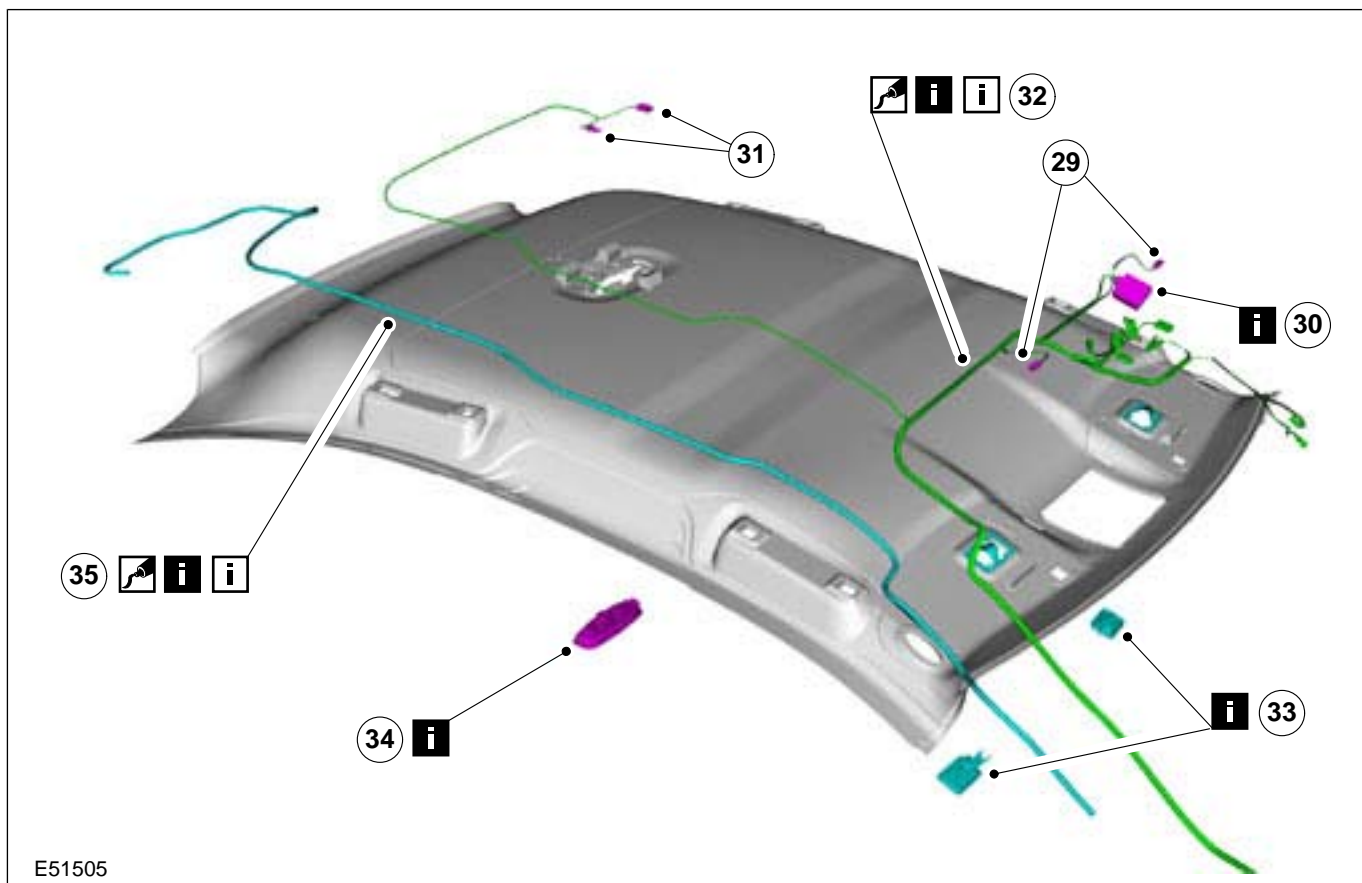


E51504

Item	Description
19	Rear passenger assist handles See Removal Detail
20	Headliner trim panel retaining clips
21	Glasses holder See Removal Detail
22	Front passenger assist handle See Removal Detail
23	Sun visors
24	Sun visor retaining clips See Removal Detail

Item	Description
25	Roof wiring harness ground connection retaining bolt See Removal Detail
26	Auto-dimming interior mirror trim covers See Removal Detail
27	Auto-dimming interior mirror and rain sensor electrical connectors See Removal Detail
28	Headliner trim panel See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION



E51505

Item	Description
29	Sun-visor illumination lamp electrical connectors
30	Radio frequency (RF) receiver See Removal Detail
31	Rear interior lamp electrical connectors
32	Roof wiring harness See Removal Detail See Installation Detail
33	Sun-visor illumination lamps See Removal Detail

Item	Description
34	Rear interior lamp See Removal Detail
35	Rear window washer tube See Removal Detail See Installation Detail

- 13. To install, reverse the removal procedure.
- 14. Vehicles with global closing, initialize the door window motors.

For additional information, refer to: **Door Window Motor Initialization** (501-11 Glass, Frames and Mechanisms, General Procedures).

Removal Details

501-05-86

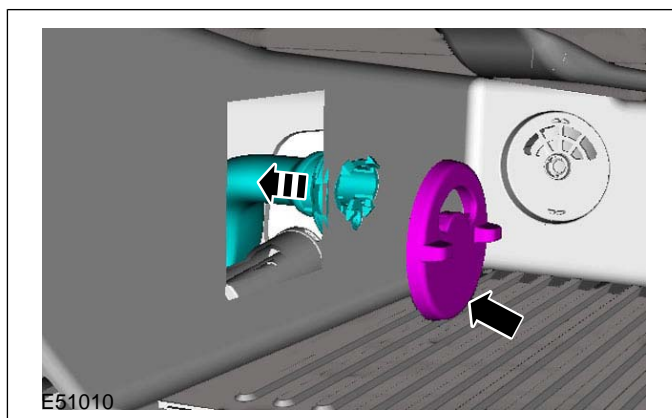
Interior Trim and Ornamentation

501-05-86

REMOVAL AND INSTALLATION

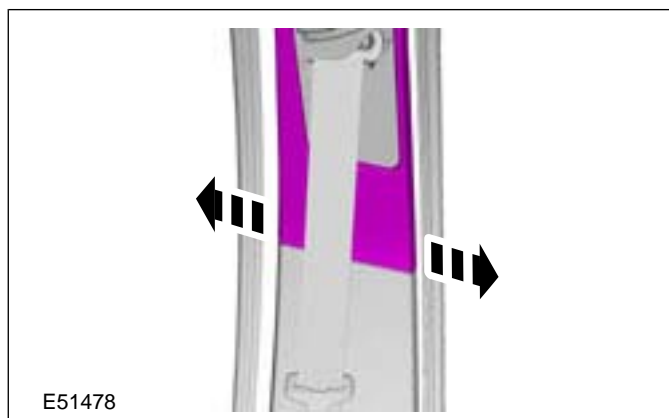
Item 4 Glove compartment cooling hose

1. Detach the glove compartment cooling hose from the glove compartment cooling vent.



Item 18 B-pillar trim panels

1. Detach the B-pillar trim panels and position them to one side.



Item 5 Moving pictures experts group audio layer 3 (MP3) auxiliary connector electrical connector

⚠ CAUTION: Do not place excessive strain on the electrical wiring harness when detaching the glove compartment.

1. Reposition the glove compartment and disconnect the MP3 auxiliary connector electrical connector.

Item 11 Noise, vibration and harshness (NVH) material

1. Detach the NVH material from the upper A-pillar area to gain access to the roof wiring harness retaining clip.

Item 13 Roof wiring harness

1. Attach a draw cord to the roof wiring harness and CJB electrical connector. Feed the wiring harness through the NVH material to above the instrument panel A-pillar area.

Item 14 Front door opening weatherstrips

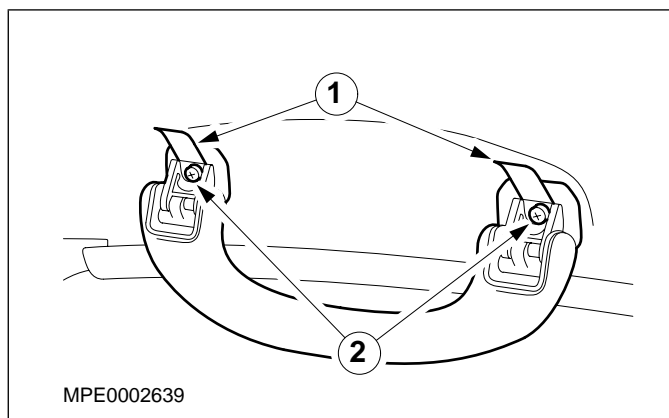
1. Detach the front door opening weatherstrips from the front door upper opening area.

Item 15 Rear door opening weatherstrips

1. Detach the rear door opening weatherstrips from the rear door upper opening area.

Item 19 Rear passenger assist handles

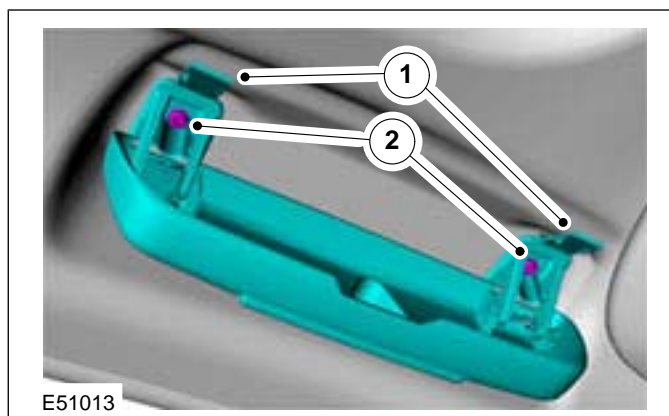
1. Lever open the rear passenger assist handle screw covers.



2. Remove the rear passenger assist handle retaining screws.

Item 21 Glasses holder

1. Lever open the glasses holder retaining screw covers.

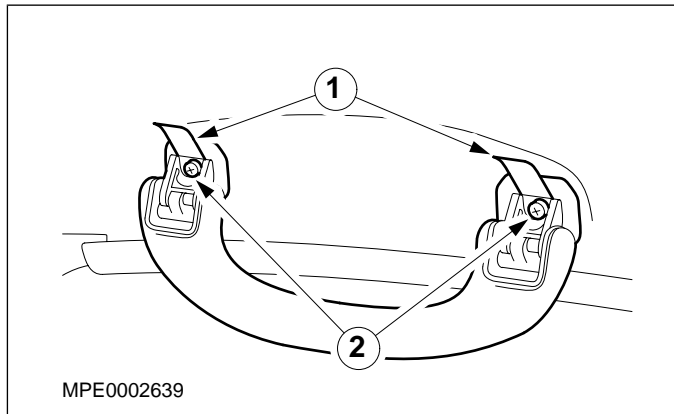


REMOVAL AND INSTALLATION

2. Remove the glasses holder retaining screws.

Item 22 Front passenger assist handle

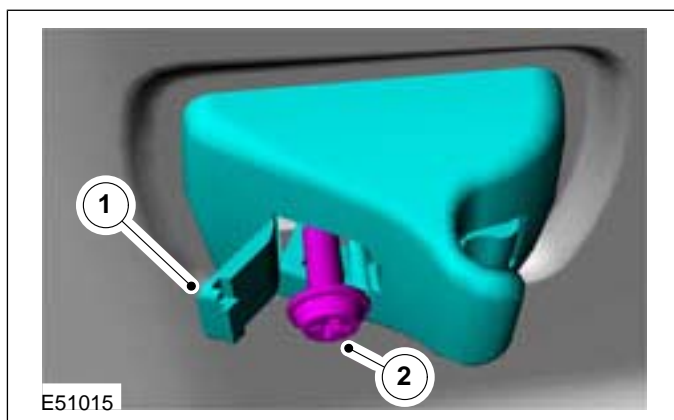
1. Lever open the front passenger assist handle retaining screw covers.



2. Remove the front passenger assist handle retaining screws.

Item 24 Sun visor retaining clips

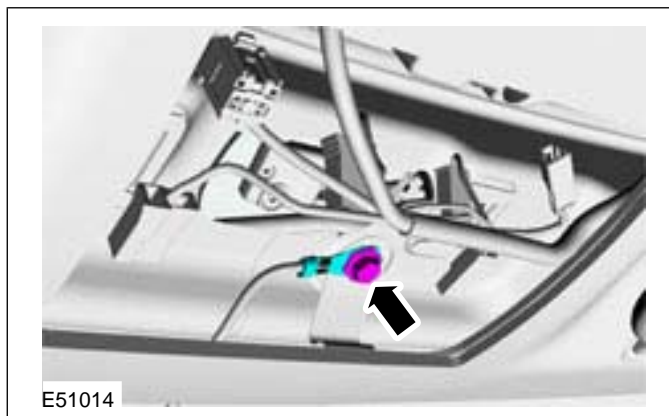
1. Lever open the sun-visor retaining clips retaining screw cover.



2. Remove the sun-visor retaining clips retaining screw.

Item 25 Roof wiring harness ground connection retaining bolt

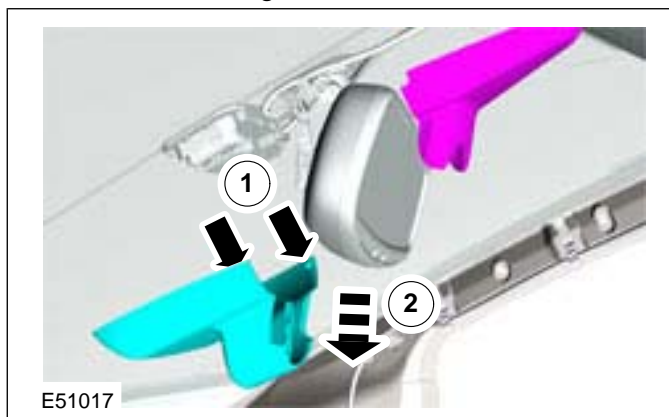
1. Detach the roof wiring harness and windscreen ground electrical connectors.



Item 26 Auto-dimming interior mirror trim covers

1. Remove the auto-dimming interior mirror and rain sensor trim covers.

1. Release the locking clips.
2. Slide the rain sensor trim cover off the auto-dimming interior mirror trim cover.



501-05-88

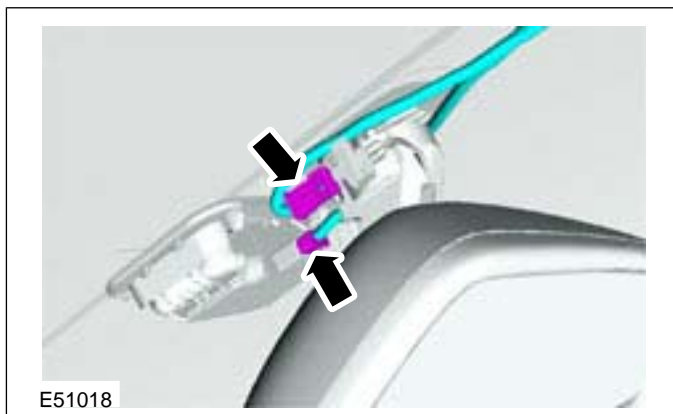
Interior Trim and Ornamentation

501-05-88

REMOVAL AND INSTALLATION

Item 27 Auto-dimming interior mirror and rain sensor electrical connectors

1. Disconnect the auto-dimming interior mirror and rain sensor electrical connectors.

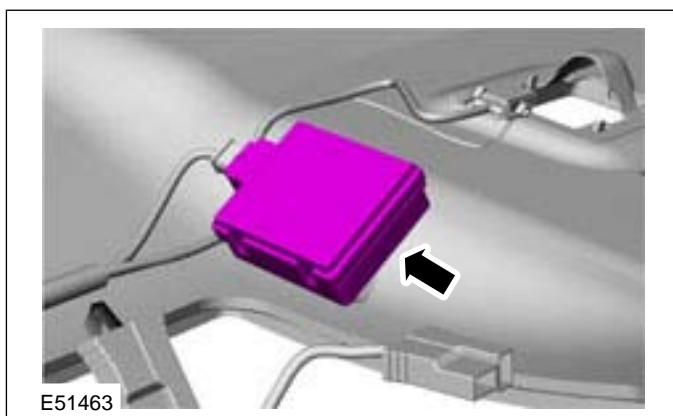
**Item 28** Headliner trim panel

1. Tilt the front seats forward.
2. With the aid of another technician, remove the headliner through the liftgate opening.

Item 30 Radio frequency (RF) receiver

NOTE: Make a note of the position of the RF receiver to make sure that it is installed in exactly the same position as removed.

1. Using a suitable knife, detach the RF receiver from the headliner.

**Item 32** Roof wiring harness**CAUTIONS:**

- ⚠** Take care not to damage the insulation of the roof wiring harness.

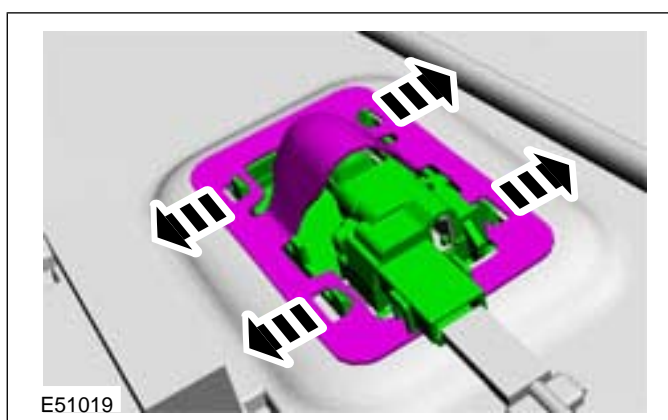
- ⚠** The roof wiring harness must be cut off the headliner and not pulled or ripped. Failure to follow this instruction could result in the incorrect function of electrical components.

NOTE: Make a note of the position of the roof wiring harness to make sure that it is installed in exactly the same position as removed.

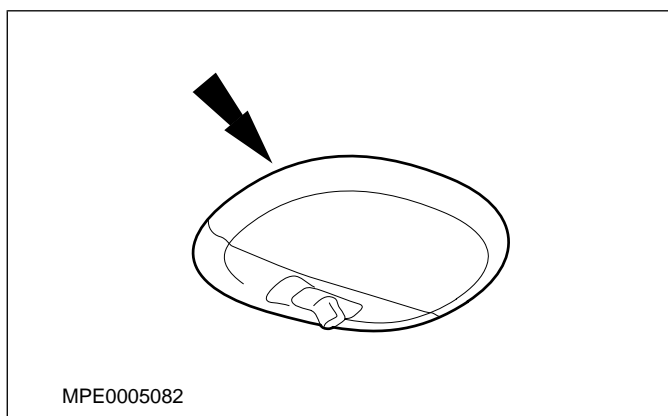
1. Using a suitable knife, remove the roof wiring harness from the headliner.

Item 33 Sun-visor illumination lamps

1. Release the sunvisor illumination lamp retaining clips.

**Item 34** Rear interior lamp

1. Lever out the rear interior lamp.

**Item 35** Rear window washer tube

- ⚠ CAUTION:** Take care not to damage the rear window washer tube. Failure to follow this instruction could result in damage to the headliner.

NOTE: Make a note of the position of the rear window washer tube to make sure that it is installed in exactly the same position as removed.

REMOVAL AND INSTALLATION

1. Using a suitable knife, remove the rear window washer tube from the headliner.

Installation Details**Item 35** Rear window washer tube

CAUTION: The rear window washer tube must be installed in the same position as removed.

1. Using a suitable adhesive, bond the rear window washer tube to the headliner.

Item 32 Roof wiring harness

CAUTION: The roof wiring harness must be installed in the same position as removed.

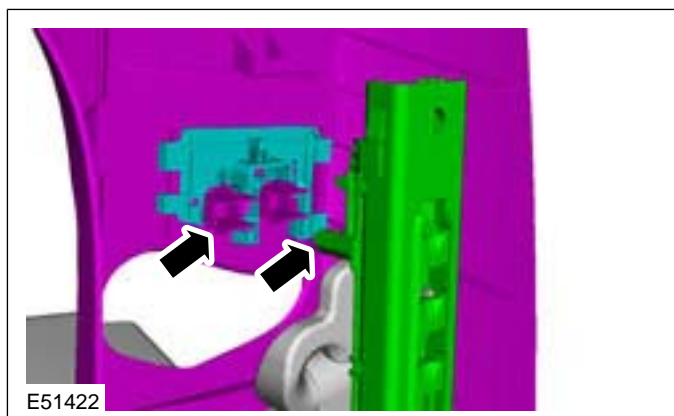
1. Using a suitable adhesive, bond the roof wiring harness to the headliner.

Item 28 Headliner trim panel

1. With the aid of another technician, install the headliner.

Item 18 B-pillar trim panels

NOTE: Make sure the B-pillar safety belt height adjustment lever is aligned with the safety belt height adjustment mechanism.

**Item 13** Roof wiring harness

1. Using the Draw cord, feed the roof wiring harness through the NVH material.

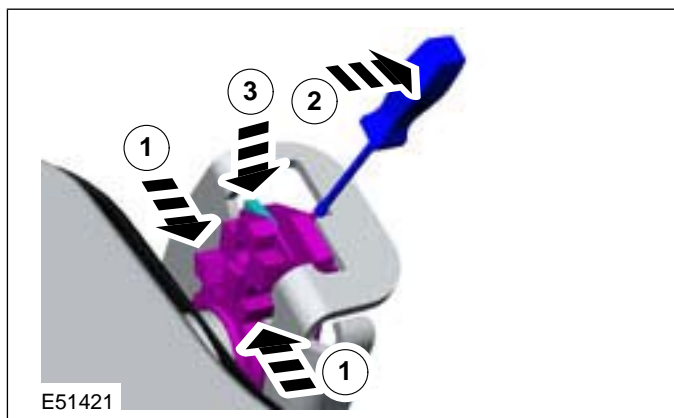
Item 11 Noise, vibration and harshness (NVH) material

1. Reposition the NVH material.

REMOVAL AND INSTALLATION

Rear Quarter Trim Panel — 3-Door

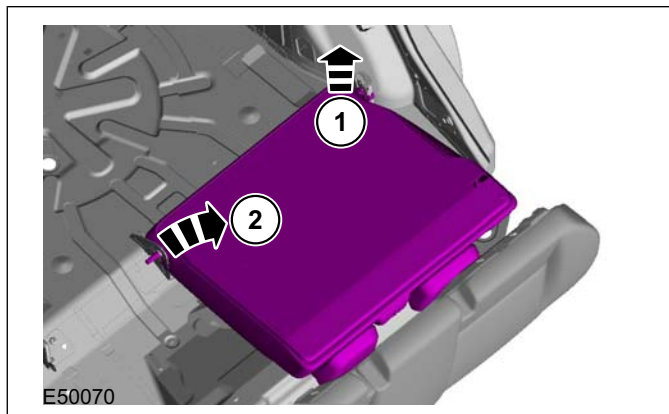
1. Remove the parcel shelf trim panel.
2. Tilt the rear seat cushion forward.
3. Tilt the rear seat backrest forward.
4. Release the rear seat backrest outer pivot retaining lock.
 1. Using a suitable pair of long nose pliers, press in the retaining clips.
 2. Using a suitable flat blade screwdriver, release the outer locking clip.
 3. Using a suitable flat blade screwdriver, rotate the outer mounting bracket pivot locking latch.



5. **CAUTION:** The rear seat backrest inner pivot pin has radial grooves. Take care not to damage the backrest inner pivot bush.

Remove the rear seat backrest.

1. Detach the rear seat backrest outer pivot pin from the outer mounting bracket.
2. Slide the backrest from the center mounting bracket.

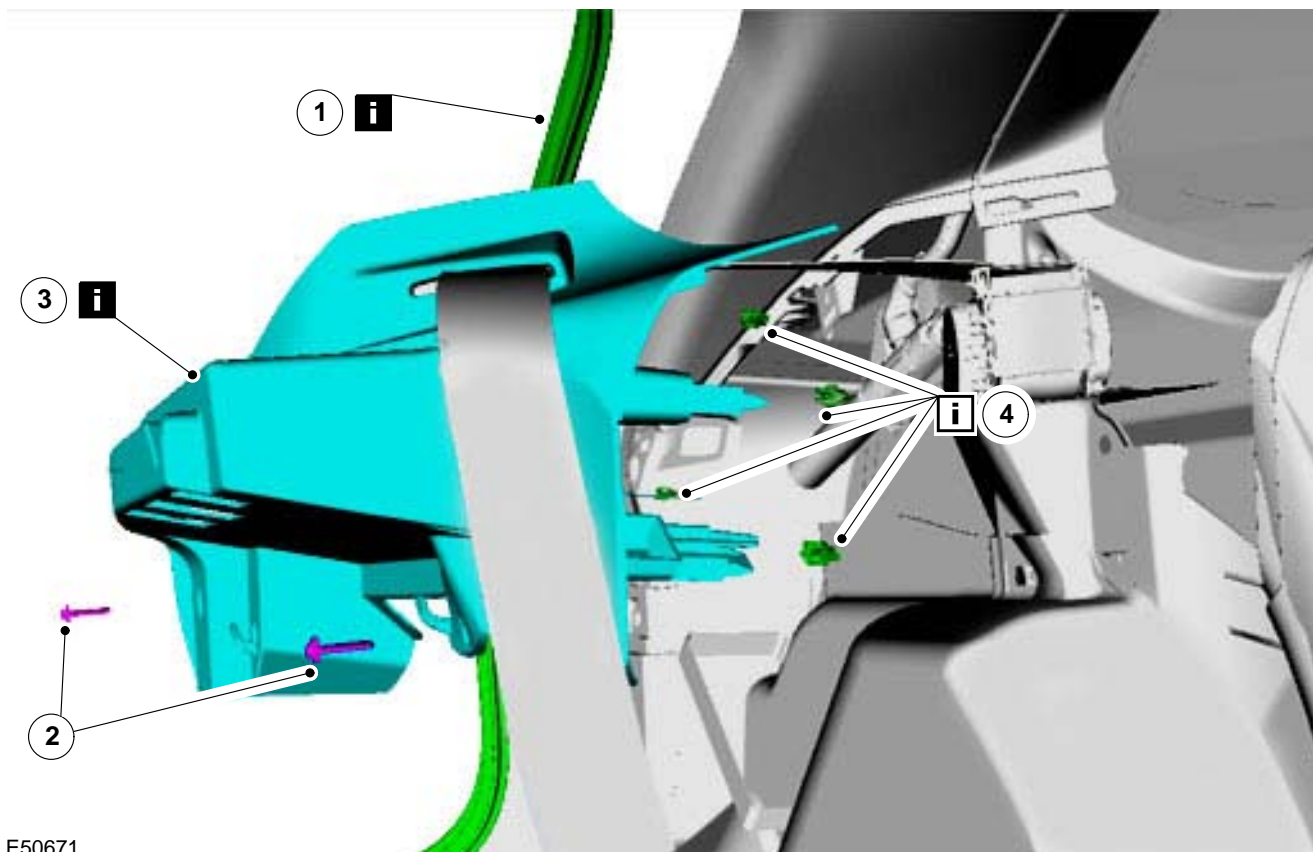


6. Remove the B-pillar trim panel.

For additional information, refer to: **B-Pillar Trim Panel - 3-Door** (501-05 Interior Trim and Ornamentation, Removal and Installation).

7. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION

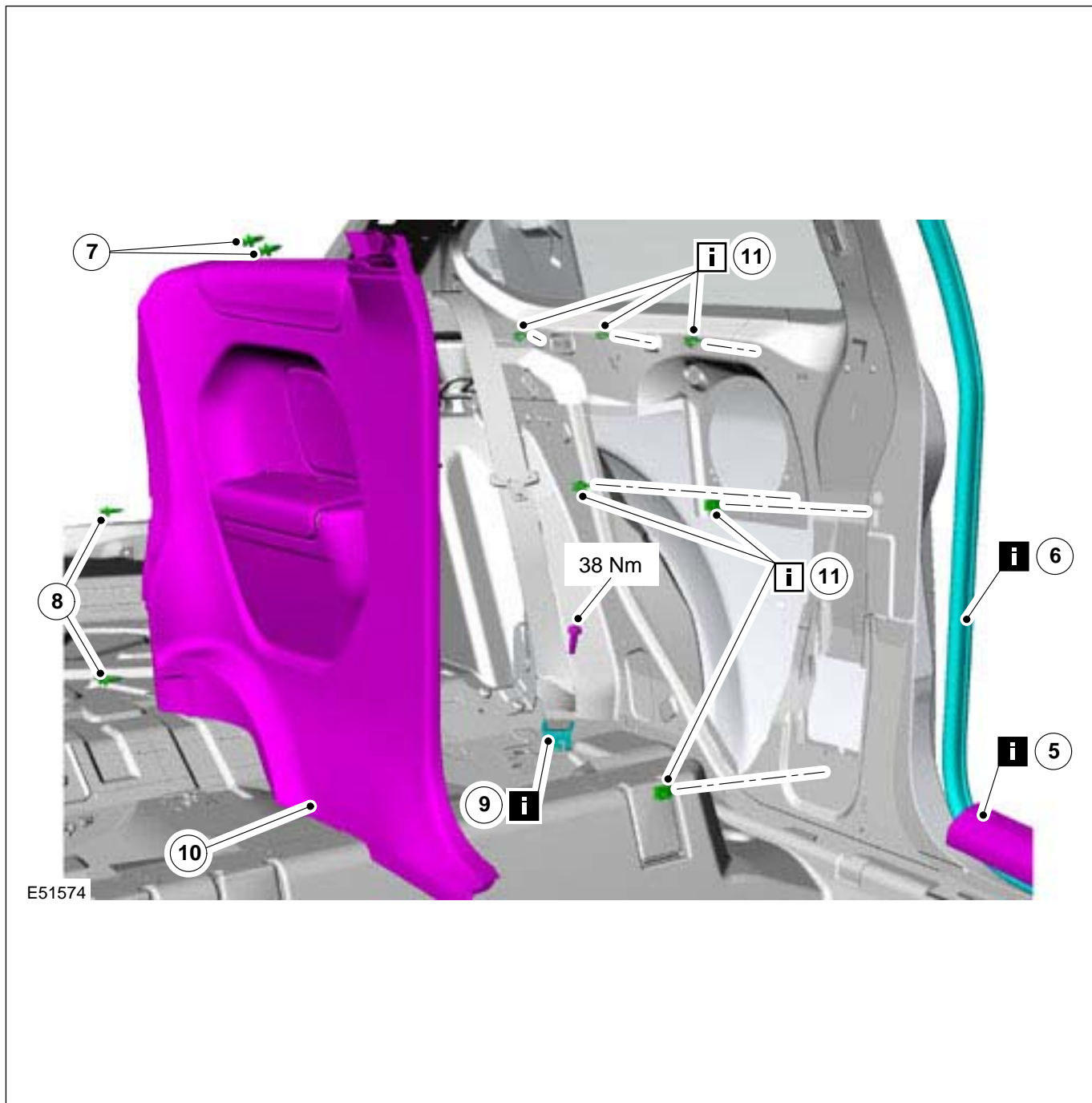


E50671

Item	Description
1	Liftgate opening weatherstrip See Removal Detail
2	Parcel shelf support trim panel retaining screws

Item	Description
3	Parcel shelf tray support trim panel See Removal Detail
4	Parcel shelf support trim panel retaining clips See Installation Detail

REMOVAL AND INSTALLATION



Item	Description
5	Front scuff plate See Removal Detail
6	Front door opening weatherstrip See Removal Detail
7	Rear quarter trim panel upper retaining clips
8	Rear quarter trim panel lower retaining clips

Item	Description
9	Rear safety belt lower anchor See Removal Detail
10	Rear quarter trim panel
11	Rear quarter trim panel retaining clips See Installation Detail

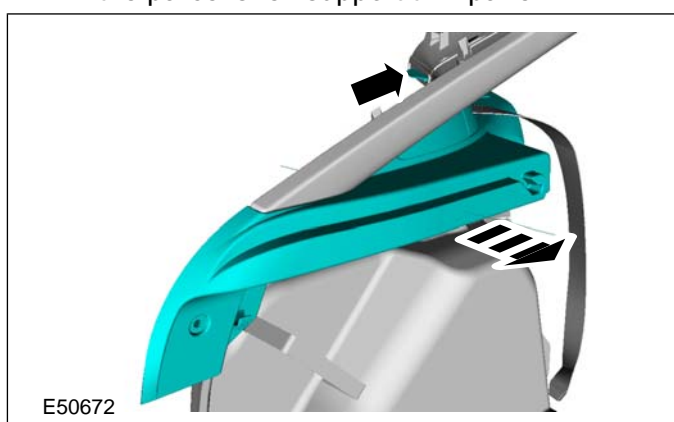
8. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION**Removal Details****Item 1** Liftgate opening weatherstrip

1. Detach the liftgate opening weatherstrip.

Item 3 Parcel shelf tray support trim panel

1. Detach the parcel shelf support trim panel.
 - Pull the parcel shelf support trim panel away from the rear quarter body panel to release the retaining tang from the rear quarter glass trim panel.
 - Feed the rear safety belt harness through the parcel shelf support trim panel.

**Item 5** Front scuff plate

1. Detach the front scuff plate.

Item 6 Front door opening weatherstrip

1. Detach the front door opening weatherstrip.

Item 9 Rear safety belt lower anchor

1. Detach the rear safety belt lower anchor.

Installation Details**Item 11** Rear quarter trim panel retaining clips

1. Install the rear quarter trim panel retaining clips to the trim panel before the trim panel is installed to the vehicle.

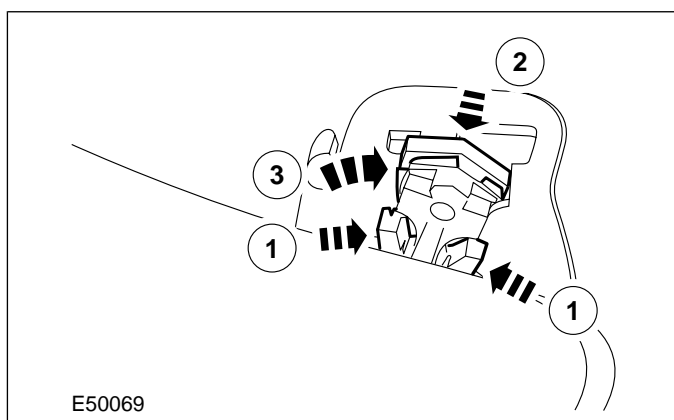
Item 4 Parcel shelf support trim panel retaining clips

1. Install the parcel shelf support trim panel retaining clips to the trim panel before the trim panel is installed to the vehicle.

REMOVAL AND INSTALLATION

Rear Quarter Trim Panel — 5-Door/Wagon

1. Tilt the rear seat cushion forward.
2. Tilt the rear seat backrest forward.
3. Release the rear seat backrest outer pivot retaining lock.
 1. Using a suitable pair of long nose pliers, press in the retaining clips.
 2. Using a suitable flat blade screwdriver, release the outer locking clip.
 3. Using a suitable flat blade screwdriver, rotate the outer mounting bracket pivot locking latch.



4. **⚠ CAUTION:** The left-hand rear seat backrest inner pivot pin has radial grooves. Take care not to damage the backrest inner pivot bushing.

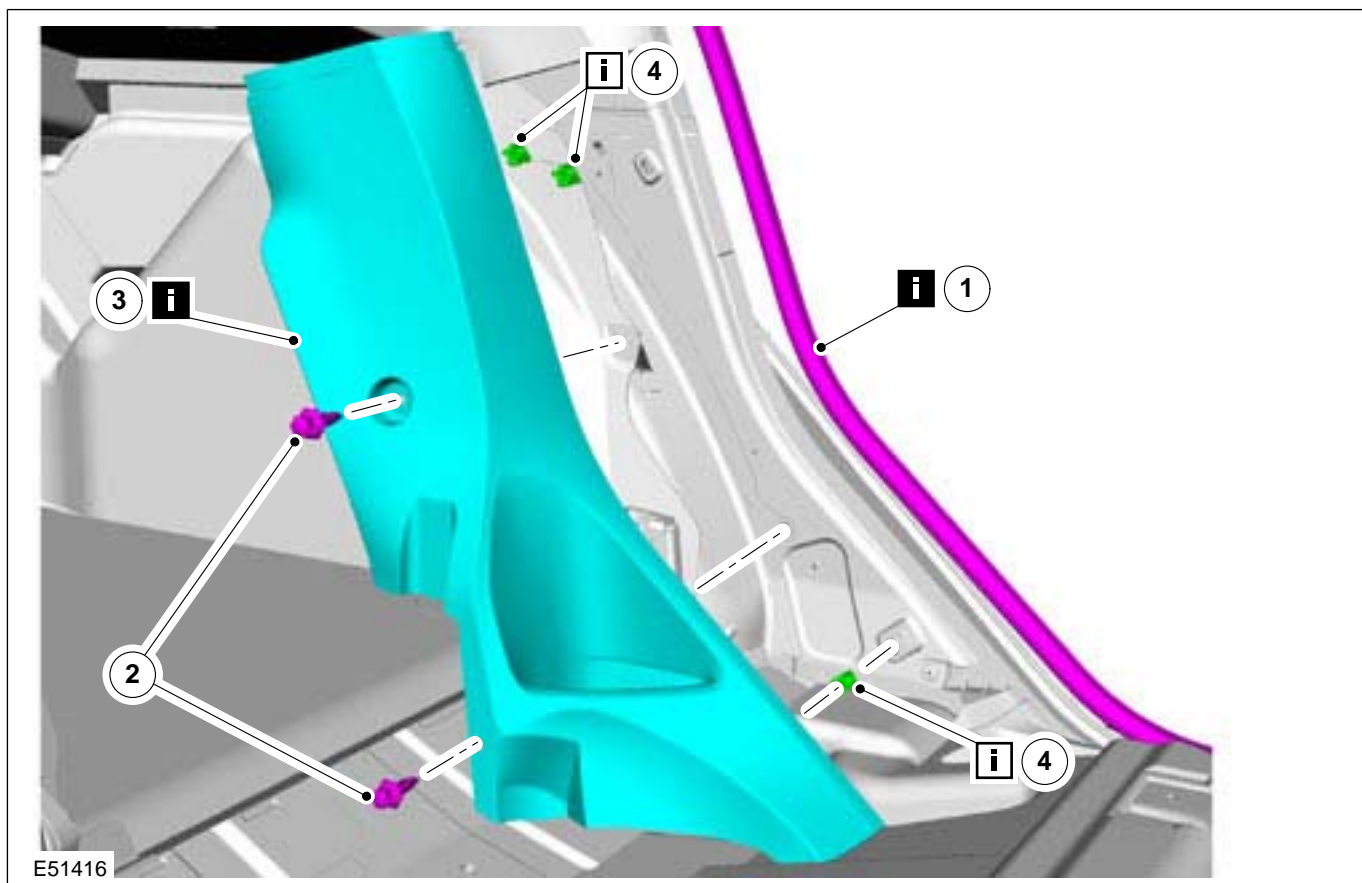
Remove the rear seat backrest.

1. Detach the rear seat backrest outer pivot pin from the outer mounting bracket.
2. Slide the backrest from the center mounting bracket.



5. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



E51416

Item	Description
1	Rear door opening weatherstrip See Removal Detail
2	Rear quarter trim panel retaining clips

Item	Description
3	Rear quarter trim panel See Removal Detail
4	Rear quarter trim panel retaining clips See Installation Detail

6. To install, reverse the removal procedure.

Removal Details

Item 1 Rear door opening weatherstrip

1. Detach the rear door opening weatherstrip.

Item 3 Rear quarter trim panel

⚠ CAUTION: When removing the rear quarter trim panel from under the rear parcel shelf support trim panel, do not place excessive strain on the rear quarter trim panel retaining clip mouldings.

Installation Details



REMOVAL AND INSTALLATION

Item 4 Rear quarter trim panel retaining clips

1. Install the rear quarter trim panel retaining clips to the rear quarter trim panel before the rear quarter trim panel is installed to the vehicle.





SECTION 501-08 Exterior Trim and Ornamentation

VEHICLE APPLICATION: 2008.75 Focus ST C307

CONTENTS	PAGE
REMOVAL AND INSTALLATION	
Rear Spoiler — 2.5L Duratec-ST (V15).....	501-08-2
Rocker Panel Moulding.....	501-08-3

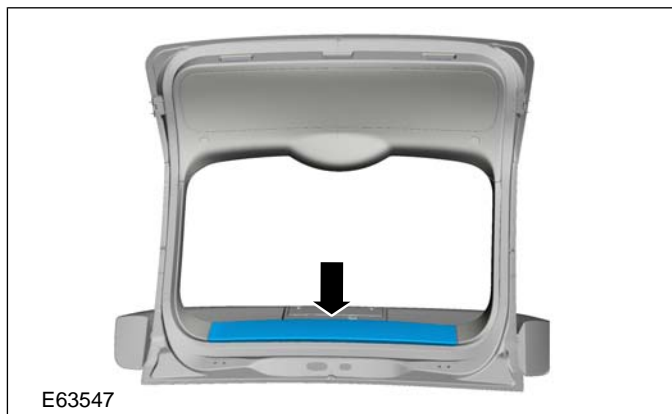


REMOVAL AND INSTALLATION

Rear Spoiler — 2.5L Duratec-ST (VI5)

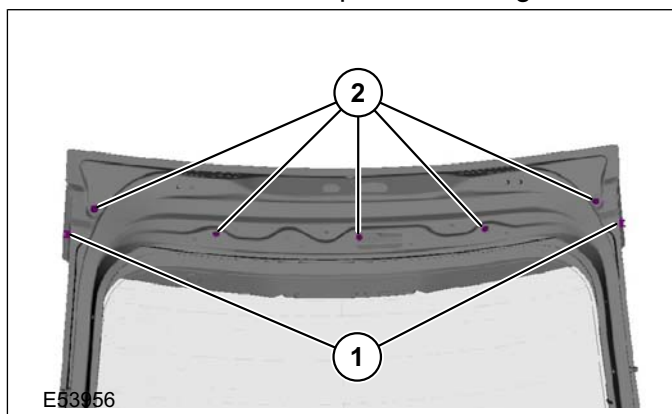
Removal

1. Raise the liftgate.
2. Remove the liftgate upper trim panel.



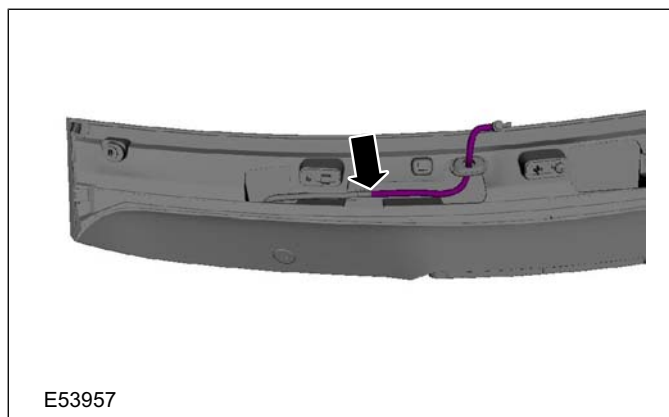
3. Detach the rear spoiler from the liftgate.

1. Remove the rear spoiler retaining clips.
2. Remove the rear spoiler retaining screws.



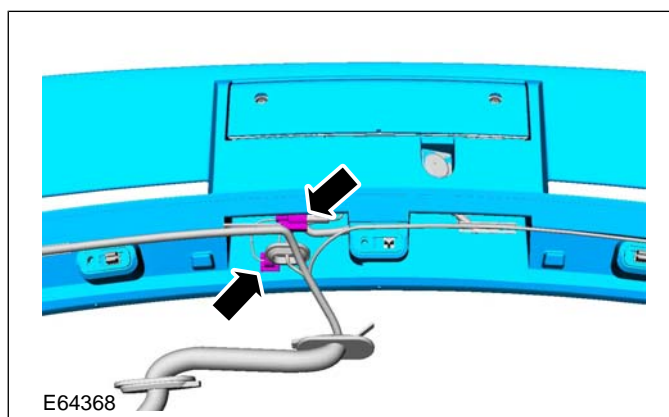
4. Lower the liftgate.
5. Detach the liftgate glass washer nozzle hose from the rear spoiler.

- Disconnect the liftgate glass washer nozzle hose from the washer nozzle.



6. Remove the rear spoiler.

- Disconnect the high mounted stoplamp electrical connector.



Installation

1. To Install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Rocker Panel Moulding

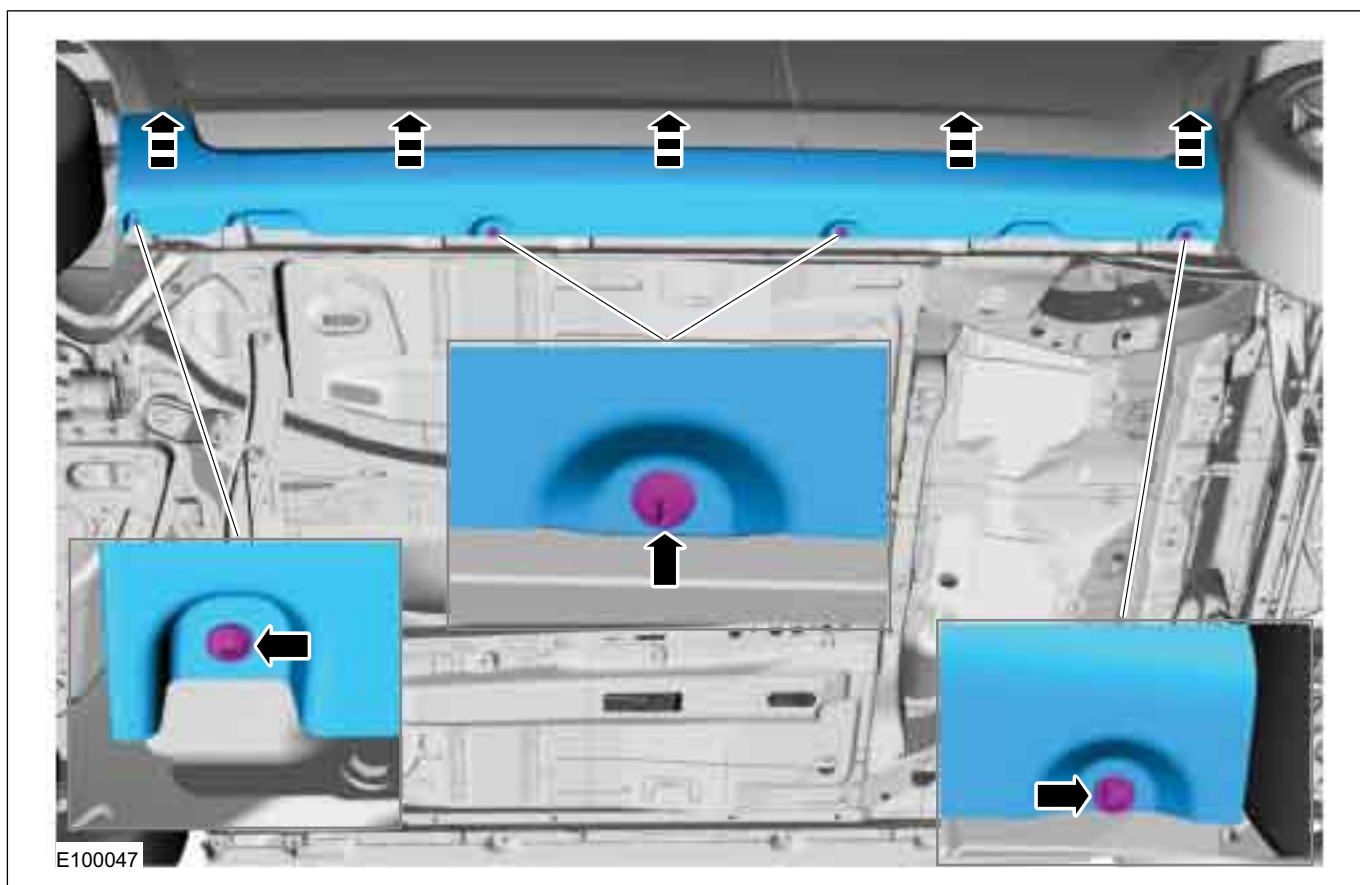
Removal

1. Refer to: **Health and Safety Precautions** (100-00 General Information, Description and Operation).

Refer to: **Specifications** (501-25 Body Repairs - General Information, Specifications).

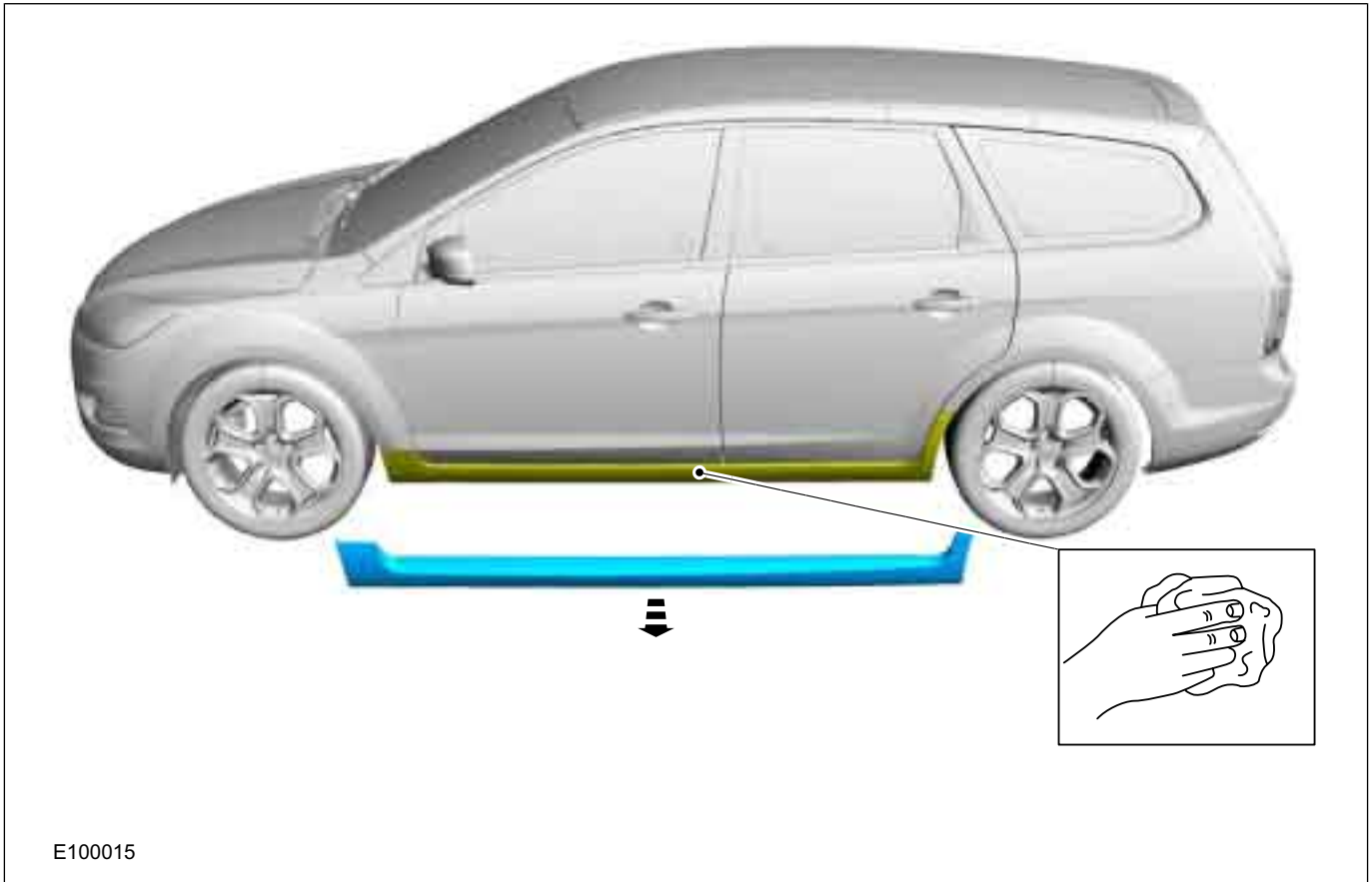
Refer to: **Lifting** (100-02 Jacking and Lifting, Description and Operation).

2.

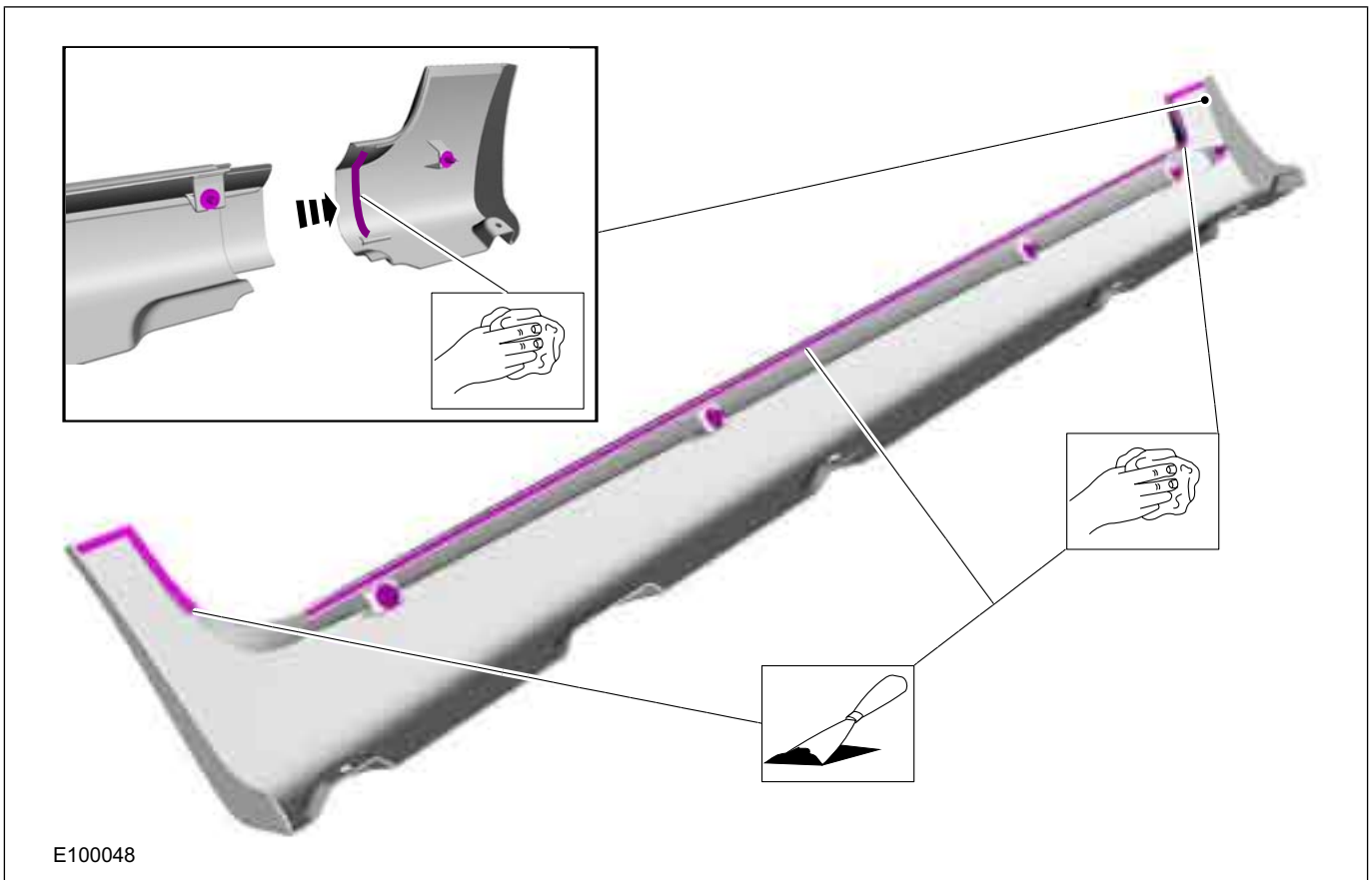


3.

REMOVAL AND INSTALLATION



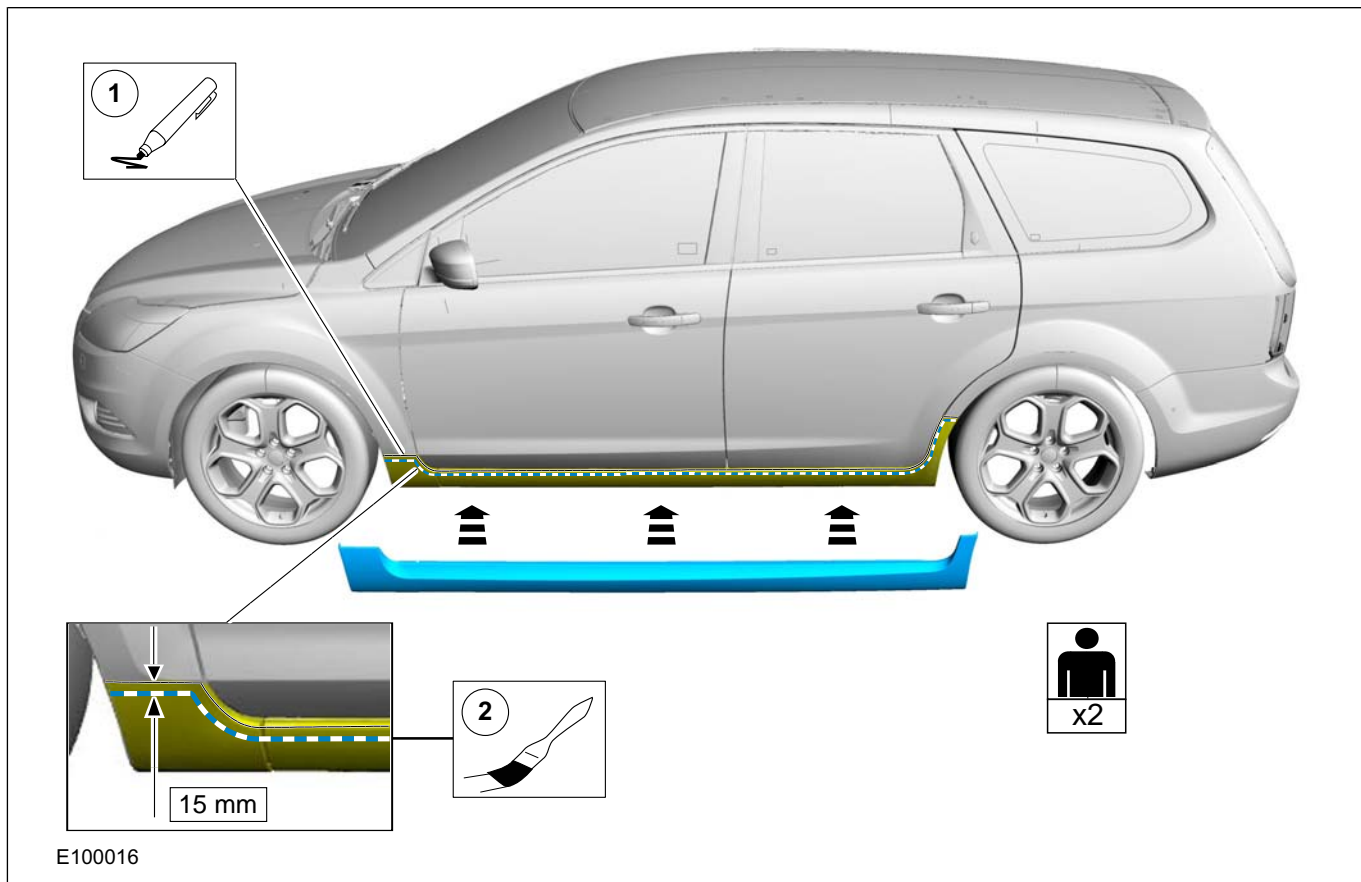
4.



REMOVAL AND INSTALLATION

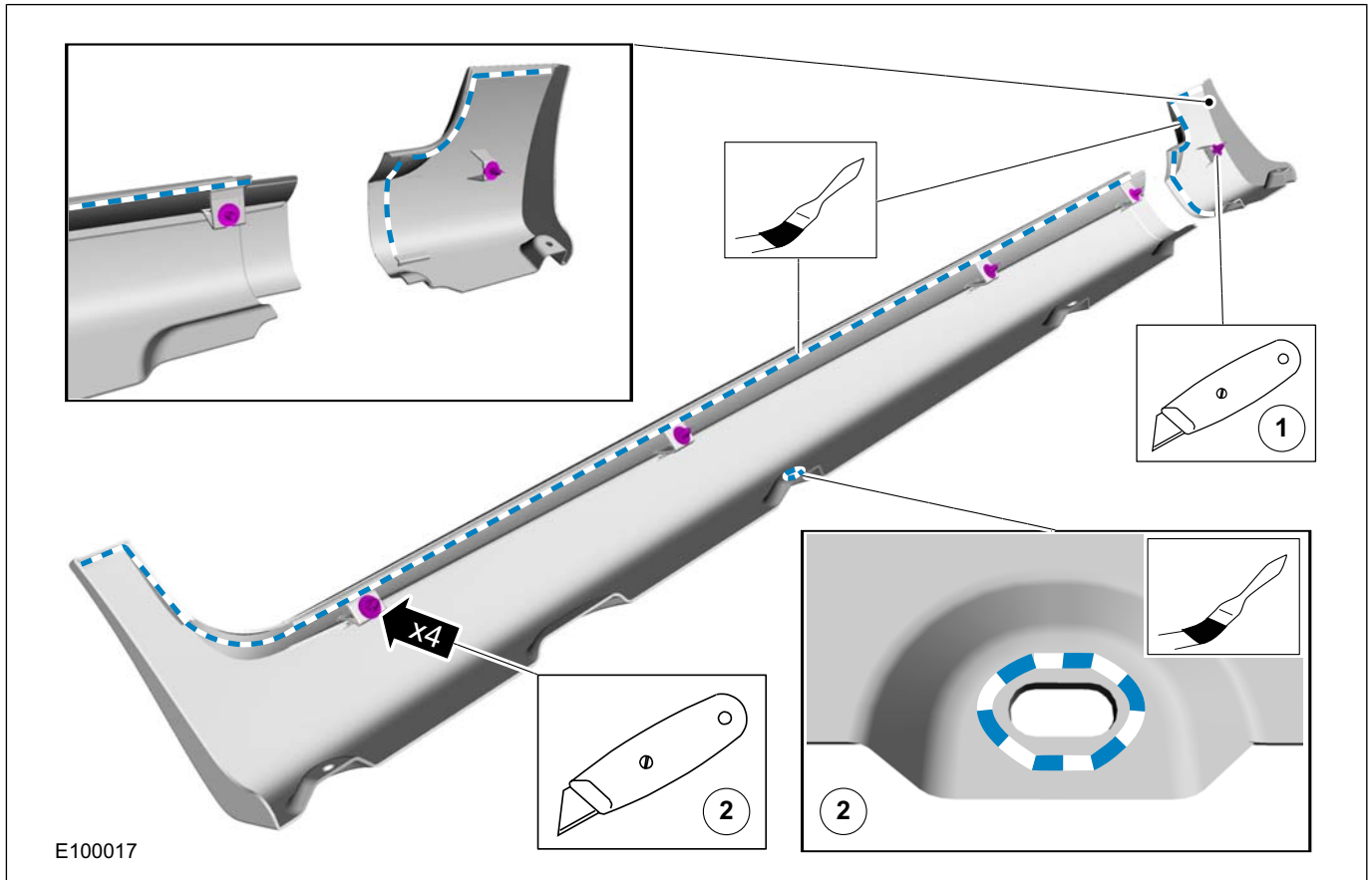
Installation

1.



2. 1. If a service fender without fixing hole is fitted.
2. If a service rocker without fixing holes is fitted.

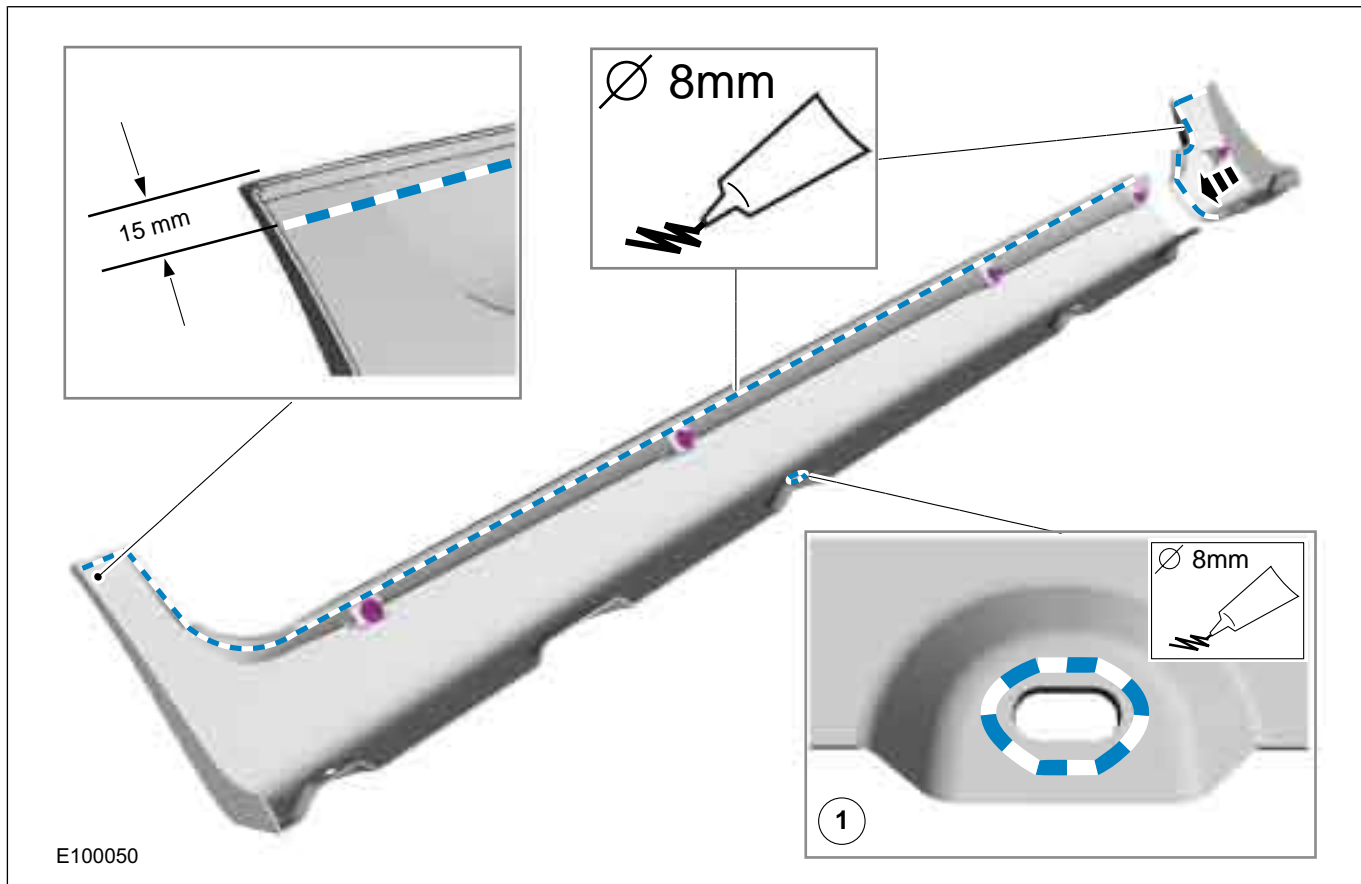
REMOVAL AND INSTALLATION



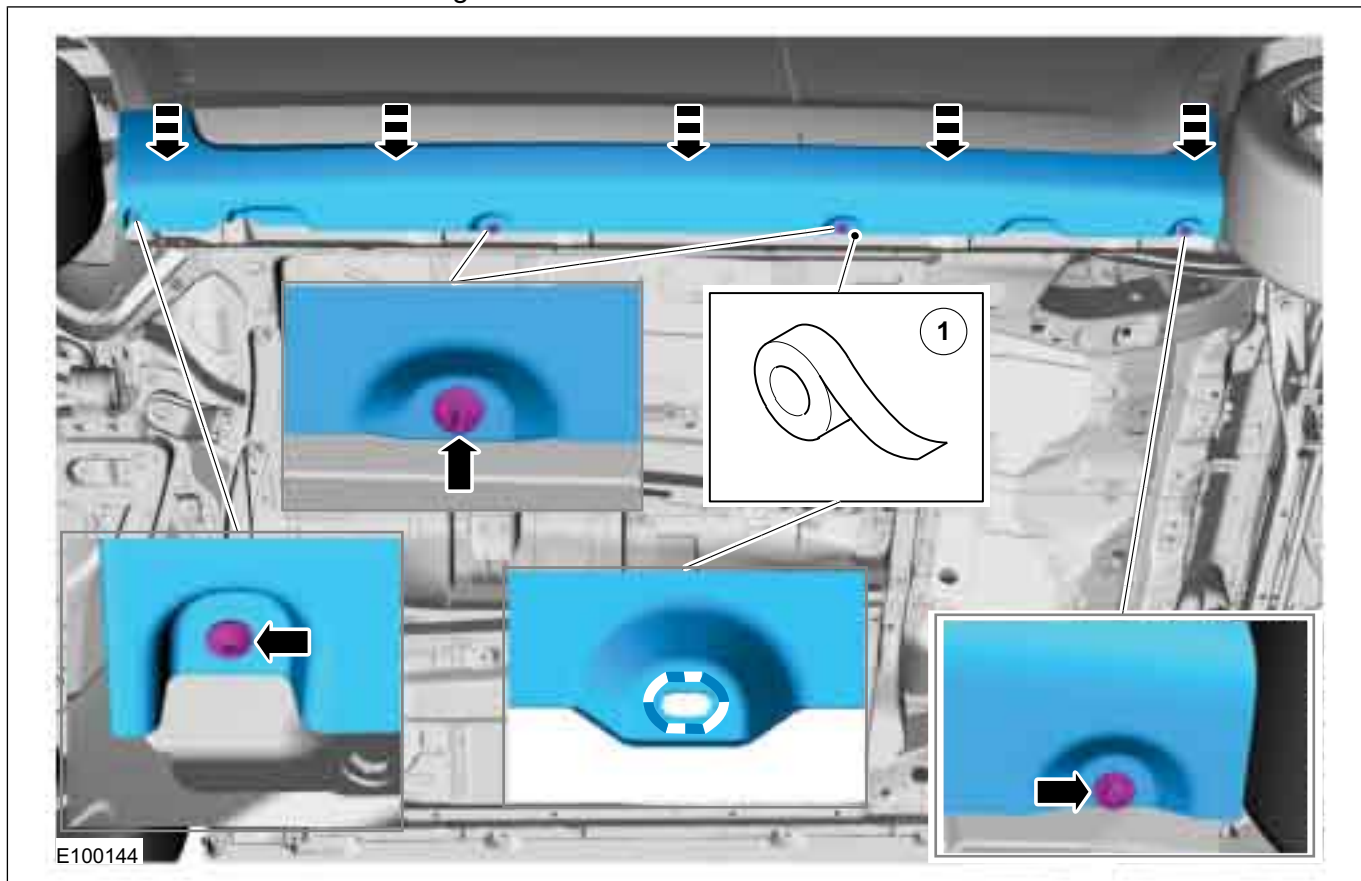
3. 1. If a service rocker without fixing holes is fitted.



REMOVAL AND INSTALLATION



4. If a service rocker without fixing holes is fitted.



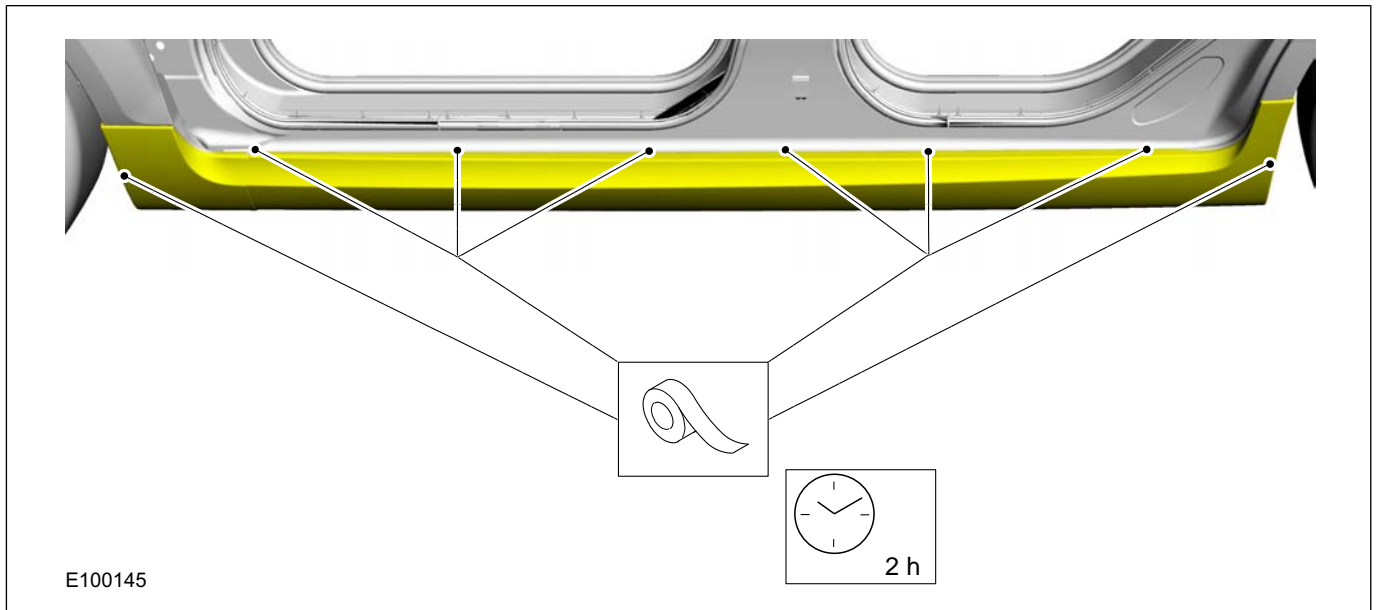
501-08-8

Exterior Trim and Ornamentation

501-08-8

REMOVAL AND INSTALLATION

5. Observe a speed limit of 100 km/h for 12 hours. 6. Do not wash the car within 48 hours.



SECTION 501-09 Rear View Mirrors

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Auto-dimming Interior Mirror.....	501-09-3
Exterior Mirror Foldback Relay.....	501-09-3
DIAGNOSIS AND TESTING	
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Inspection and Verification.....	501-09-4
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Pinpoint Tests.....	501-09-5
Rear View Mirrors — Vehicles With: Global Closing.....	501-09-20
Inspection and Verification.....	501-09-20
REMOVAL AND INSTALLATION	
Exterior Mirror.....	501-09-24
Auto-Dimming Interior Mirror.....	501-09-26

SPECIFICATIONS**Torque Specifications**

Item	Nm	lb-ft	lb-in
Exterior mirror retaining bolt	10	-	89

DESCRIPTION AND OPERATION**Rear View Mirrors****Auto-dimming Interior Mirror**

When the ignition is switched on the auto-dimming interior mirror will darken automatically depending on the amount of light shining into the vehicle through the rear window glass. The auto-dimming feature will turn off when reverse gear is selected.

The auto-dimming feature on the interior rear view mirror will not operate correctly if light through the rear window glass is obstructed.

Exterior Mirror Foldback Relay

NOTE: On left-hand drive vehicles, the exterior mirror foldback relay is positioned on the left-hand side of the vehicle under the rear seat cushion. On right-hand drive vehicles, the exterior mirror foldback relay is positioned on the right-hand side of the vehicle under the rear seat cushion.

To gain access to the exterior mirror foldback relay, the C-pillar lower trim panel and the rear scuff plate trim panel must be removed to allow the carpet to be detached from the floor panel.



DIAGNOSIS AND TESTING

Rear View Mirrors — Vehicles Without: Global Closing

Refer to Wiring Diagrams Section 501-09, for schematic and connector information.

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> • Exterior mirror(s) • Auto-dimming interior mirror 	<ul style="list-style-type: none"> • Fuse(s) • Relay • Electrical connector(s) • Exterior mirror control switch • Heated rear window control switch

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Symptom Chart

Symptom Chart

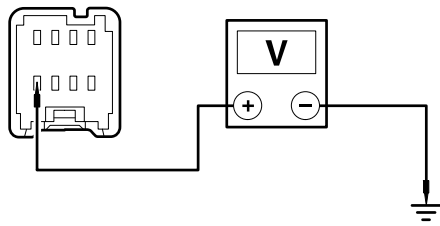
Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • The exterior mirrors are inoperative 	<ul style="list-style-type: none"> • Exterior mirror control switch. 	<ul style="list-style-type: none"> • CARRY OUT the Exterior Mirror Control Switch Component Test. REFER to the Wiring Diagrams.
	<ul style="list-style-type: none"> • Circuit(s). 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.
<ul style="list-style-type: none"> • A single exterior mirror is inoperative 	<ul style="list-style-type: none"> • Exterior mirror control switch. 	<ul style="list-style-type: none"> • CARRY OUT the Exterior Mirror Control Switch Component Test. REFER to the Wiring Diagrams.
	<ul style="list-style-type: none"> • Exterior mirror motor(s). • Circuit(s). 	<ul style="list-style-type: none"> • GO to Pinpoint Test B.
<ul style="list-style-type: none"> • A single exterior mirror does not function with switch logic 	<ul style="list-style-type: none"> • Exterior mirror control switch. 	<ul style="list-style-type: none"> • CARRY OUT the Exterior Mirror Control Switch Component Test. REFER to the Wiring Diagrams.
	<ul style="list-style-type: none"> • Exterior mirror motor(s). • Circuit(s). 	<ul style="list-style-type: none"> • GO to Pinpoint Test C.
<ul style="list-style-type: none"> • The heated exterior mirror is inoperative 	<ul style="list-style-type: none"> • Heated rear window control switch. 	<ul style="list-style-type: none"> • CARRY OUT the Heated Rear Window Control Switch Component Test. REFER to the Wiring Diagrams.
	<ul style="list-style-type: none"> • Relay. • Heated mirror element(s). • Circuit(s). 	<ul style="list-style-type: none"> • GO to Pinpoint Test D.

DIAGNOSIS AND TESTING

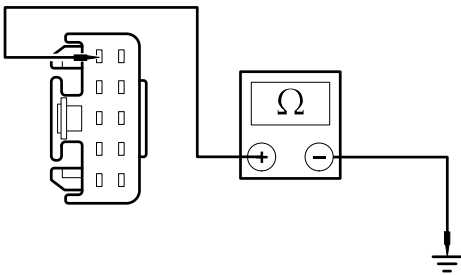
Symptom	Possible Sources	Action
<ul style="list-style-type: none"> The auto-dimming interior mirror does not operate correctly 	<ul style="list-style-type: none"> Auto-dimming interior mirror. Circuit(s). 	<ul style="list-style-type: none"> GO to Pinpoint Test E.

Pinpoint Tests

PINPOINT TEST A : THE EXTERIOR MIRRORS ARE INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: Use a digital multimeter for all electrical measurements.</p>	
<p>A1: CHECK THE INTERIOR LAMP DELAY FUNCTION</p>	
	<p>1 CHECK the interior lamp delay function.</p> <ul style="list-style-type: none"> Does the interior lamp delay function operate correctly? <p>→ Yes GO to A2.</p> <p>→ No CHECK the battery saver relay operation. REFER to: Interior Lighting (417-02 Interior Lighting, Diagnosis and Testing).</p>
<p>A2: CHECK THE VOLTAGE TO THE EXTERIOR MIRROR CONTROL SWITCH CIRCUIT</p>	
	<p>1 Disconnect Exterior Mirror Control Switch C741.</p> <p>2 Ignition switch in position II.</p>
 <p>TIE0037297</p>	<p>3 Measure the voltage between the exterior mirror control switch C741 pin 1, circuit 29-AD12 (OG/YE), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <p>→ Yes GO to A3.</p> <p>→ No REPAIR circuit 29-AD12 (OG/YE). TEST the system for normal operation.</p>
<p>A3: CHECK THE EXTERIOR MIRROR CONTROL SWITCH GROUND CIRCUIT FOR CONTINUITY</p>	
<p>NOTE: The circuit number changes at soldered joint S197.</p>	
<p>NOTE: The exterior mirror control switch and the driver side exterior window control switch have a common ground circuit.</p>	
	<p>1 Ignition switch in position 0.</p>

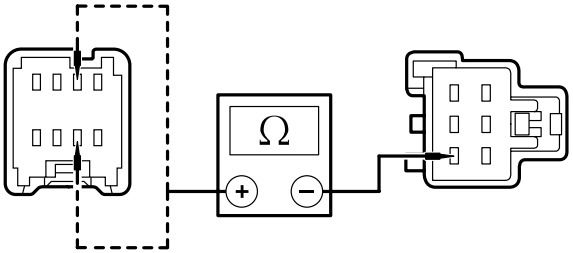
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<ol style="list-style-type: none"> 2 Disconnect Driver Side Exterior Window Control Switch C488.
 <p>TIE0023402</p>	<ol style="list-style-type: none"> 3 Measure the resistance between the driver side exterior mirror control switch C488 pin 1, circuit 31-AJ7 (BK), harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes VERIFY the customer concern. → No REPAIR circuit 31-AJ7 (BK). TEST the system for normal operation.

PINPOINT TEST B : A SINGLE EXTERIOR MIRROR IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: Use a digital multimeter for all electrical measurements.</p>	
<p>B1: CHECK FOR CONTINUITY BETWEEN THE EXTERIOR MIRROR CONTROL SWITCH AND THE INOPERATIVE EXTERIOR MIRROR</p>	
	<ol style="list-style-type: none"> 1 Disconnect Exterior Mirror Control Switch C741. 2 Disconnect Inoperative Exterior Mirror C808 or C822.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E0037298</p>	<p>3 Measure the resistance between the:</p> <p>Left-hand drive vehicles</p> <ul style="list-style-type: none"> Exterior mirror control switch C741 pin 7, circuit 32-AD6 (WH), harness side and the driver side exterior mirror C808 pin 3, circuit 32-AD6 (WH), harness side. Exterior mirror control switch C741 pin 3, circuit 32-AD9 (WH/GN), harness side and the passenger side exterior mirror C822 pin 3, circuit 32-AD9 (WH/GN), harness side. <p>Right-hand drive vehicles</p> <ul style="list-style-type: none"> Exterior mirror control switch C741 pin 3, circuit 32-AD6C (WH), harness side and the driver side exterior mirror C808 pin 3, circuit 32-AD6C (WH), harness side. Exterior mirror control switch C741 pin 7, circuit 32-AD9C (WH/GN), harness side and the passenger side exterior mirror C822 pin 3, circuit 32-AD9 (WH/GN), harness side. <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new exterior mirror. REFER to: Exterior Mirror (501-09 Rear View Mirrors, Removal and Installation). TEST the system for normal operation. → No REPAIR circuit 32-AD6 (WH), or circuit 32-AD6C (WH), or circuit 32-AD9 (WH/GN) or circuit 32-AD9C (WH/GN). TEST the system for normal operation.

PINPOINT TEST C : A SINGLE EXTERIOR MIRROR DOES NOT FUNCTION WITH SWITCH LOGIC

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: Use a digital multimeter for all electrical measurements.</p>	
<p>C1: CHECK THE EXTERIOR MIRROR FUNCTIONS WITH SWITCH LOGIC</p>	
	<p>1 Ignition switch in position II.</p>

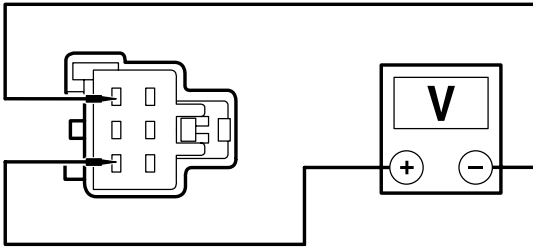
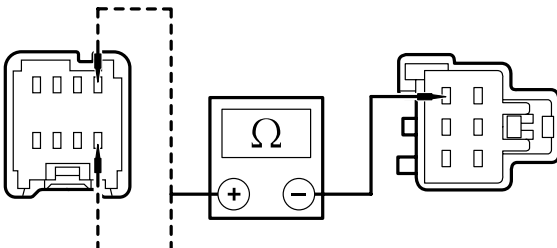


DIAGNOSIS AND TESTING

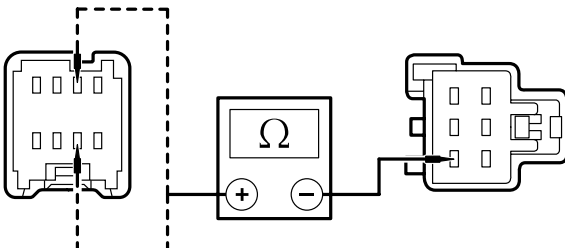
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Operate the exterior mirror control switch.</p> <ul style="list-style-type: none"> • Does the exterior mirror function with switch logic? <p>→ Yes VERIFY the customer concern.</p> <p>→ No Driver side exterior mirror UP/DOWN inoperative - GO to C2. Driver side exterior mirror LEFT/RIGHT inoperative - GO to C5. Passenger side exterior mirror UP/DOWN inoperative - GO to C8. Passenger side exterior mirror LEFT/RIGHT inoperative - GO to C11.</p>
<p>C2: CHECK THE DRIVER SIDE EXTERIOR MIRROR UP/DOWN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Driver Side Exterior Mirror C808.</p> <p>3 Ignition switch in position II.</p> <p>4 Select the driver side exterior mirror. While operating the exterior mirror control switch UP and DOWN, measure the voltage between the:</p>



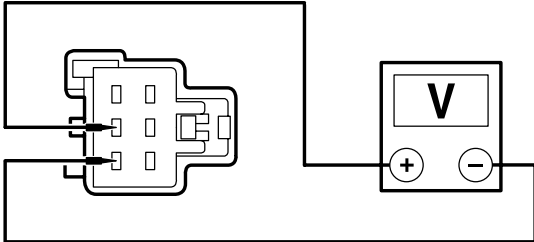
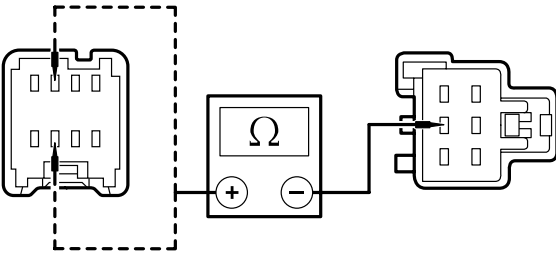
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E55391</p>	<p>Left-hand drive vehicles</p> <ul style="list-style-type: none"> • Driver side exterior mirror C808 pin 1, circuit 34-AD7 (BU/RD), harness side and the driver side exterior mirror C808 pin 3, circuit 32-AD6 (WH), harness side. <p>Right-hand drive vehicles</p> <ul style="list-style-type: none"> • Driver side exterior mirror C808 pin 1, circuit 34-AD7C (BU/RD), harness side and the driver side exterior mirror C808 pin 3, circuit 32-AD6C (WH), harness side. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts when the exterior mirror control switch is moved to the UP position and is the polarity reversed when moved to the DOWN position? <p>→ Yes INSTALL a new driver side exterior mirror. REFER to: Exterior Mirror (501-09 Rear View Mirrors, Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to C3.</p>
<p>C3: CHECK CIRCUIT 34-AD7 (BU/RD) FOR CONTINUITY</p>	
 <p>E0037300</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Exterior Mirror Control Switch C741. 3 Measure the resistance between the: <ul style="list-style-type: none"> Left-hand drive vehicles <ul style="list-style-type: none"> • Exterior mirror control switch C741 pin 8, circuit 34-AD7 (BU/RD), harness side and the driver side exterior mirror C808 pin 1, circuit 34-AD7 (BU/RD), harness side. Right-hand drive vehicles <ul style="list-style-type: none"> • Exterior mirror control switch C741 pin 4, circuit 34-AD7C (BU/RD), harness side and the driver side exterior mirror C822 pin 1, circuit 34-AD7C (BU/RD), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes GO to C4.</p> <p>→ No REPAIR circuit 34-AD7 (BU/RD) or circuit 34-AD7C (BU/RD). TEST the system for normal operation.</p>

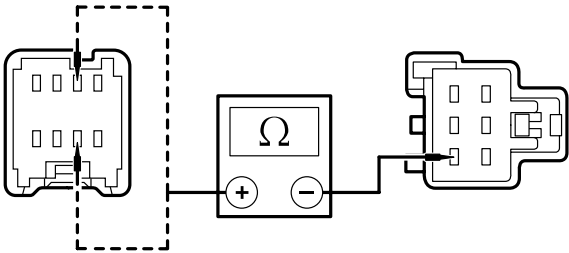
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C4: CHECK CIRCUIT 32-AD6 (WH) FOR CONTINUITY	
 <p>E0037298</p>	<p>1 Measure the resistance between the:</p> <p>Left-hand drive vehicles</p> <ul style="list-style-type: none"> Exterior mirror control switch C741 pin 7, circuit 32-AD6 (WH), harness side and the driver side exterior mirror C808 pin 3, circuit 32-AD6 (WH), harness side. <p>Right-hand drive vehicles</p> <ul style="list-style-type: none"> Exterior mirror control switch C741 pin 3, circuit 32-AD6C (WH), harness side and the driver side exterior mirror C808 pin 3, circuit 32-AD6C (WH), harness side. <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new driver side exterior mirror. REFER to: Exterior Mirror (501-09 Rear View Mirrors, Removal and Installation). TEST the system for normal operation. → No REPAIR circuit 32-AD6 (WH) or circuit 32-AD6C (WH). TEST the system for normal operation.
C5: CHECK THE DRIVER SIDE EXTERIOR MIRROR LEFT/RIGHT CIRCUIT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Driver Side Exterior Mirror C808.</p> <p>3 Ignition switch in position II.</p>

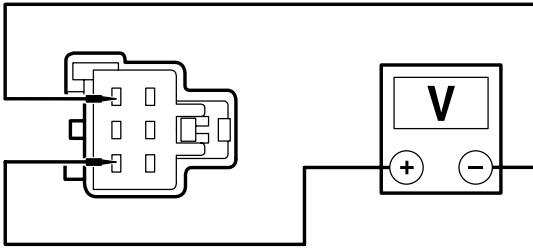
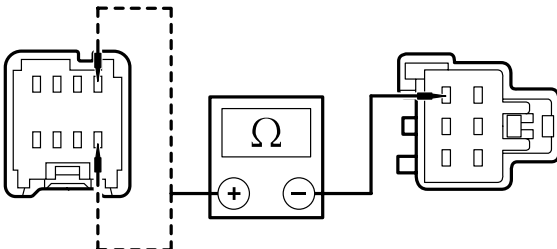
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E0037449</p>	<p>4 Select the driver side exterior mirror. While operating the exterior mirror control switch LEFT and RIGHT, measure the voltage between the:</p> <p>Left-hand drive vehicles</p> <ul style="list-style-type: none"> • Driver side exterior mirror C808 pin 2, circuit 33-AD8 (YE/BU), harness side and the driver side exterior mirror C808 pin 3, circuit 32-AD6 (WH), harness side. <p>Right-hand drive vehicles</p> <ul style="list-style-type: none"> • Driver side exterior mirror C808 pin 2, circuit 33-AD8C (YE/BU), harness side and the driver side exterior mirror C808 pin 3, circuit 32-AD6C (WH), harness side. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts when the exterior mirror control switch is moved to the LEFT position and is the polarity reversed when moved to the RIGHT position? <p>→ Yes INSTALL a new driver side exterior mirror. REFER to: Exterior Mirror (501-09 Rear View Mirrors, Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to C6.</p>
C6: CHECK CIRCUIT 33-AD8 (YE/BU) FOR CONTINUITY	
	<p>1 Ignition switch in position 0.</p>
 <p>E0037302</p>	<p>3 Measure the resistance between the:</p> <p>Left-hand drive vehicles</p> <ul style="list-style-type: none"> • Exterior mirror control switch C741 pin 6, circuit 33-AD8 (YE/BU), harness side and the driver side exterior mirror C808 pin 2, circuit 33-AD8 (YE/BU), harness side. <p>Right-hand drive vehicles</p> <ul style="list-style-type: none"> • Exterior mirror control switch C741 pin 2, circuit 33-AD8C (YE/BU), harness side and the driver side exterior mirror C808 pin 2, circuit 33-AD8C (YE/BU), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes GO to C7.</p> <p>→ No REPAIR circuit 33-AD8 (YE/BU) or circuit 33-AD8C (YE/BU). TEST the system for normal operation.</p>

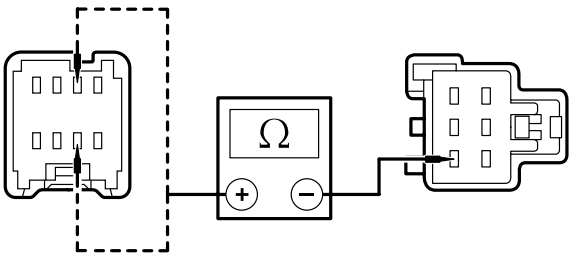
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C7: CHECK CIRCUIT 32-AD6 (WH) FOR CONTINUITY	
 <p>E0037298</p>	<p>1 Measure the resistance between the:</p> <p>Left-hand drive vehicles</p> <ul style="list-style-type: none"> Exterior mirror control switch C741 pin 7, circuit 32-AD6 (WH), harness side and the driver side exterior mirror C808 pin 3, circuit 32-AD6 (WH), harness side. <p>Right-hand drive vehicles</p> <ul style="list-style-type: none"> Exterior mirror control switch C741 pin 3, circuit 32-AD6C (WH), harness side and the driver side exterior mirror C808 pin 3, circuit 32-AD6C (WH), harness side. <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new driver side exterior mirror. REFER to: Exterior Mirror (501-09 Rear View Mirrors, Removal and Installation). TEST the system for normal operation. → No REPAIR circuit 32-AD6 (WH) or circuit 32-AD6 (WH). TEST the system for normal operation.
C8: CHECK THE PASSENGER SIDE MIRROR UP/DOWN CIRCUIT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Passenger Side Exterior Mirror C822.</p> <p>3 Ignition switch in position II.</p>

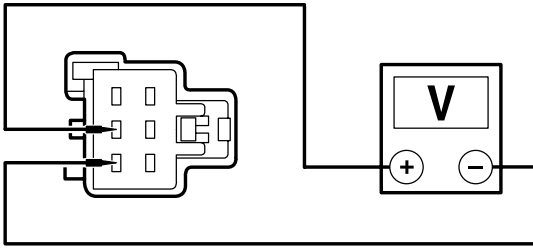
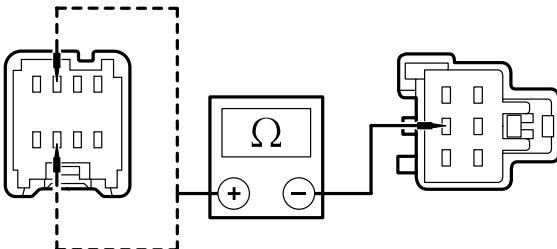
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E55391</p>	<p>4 Select the passenger side exterior mirror. While operating the exterior mirror control switch UP and DOWN, measure the voltage between the passenger side exterior mirror C822 pin 1, circuit 34-AD10 (BU/YE), harness side and the passenger side exterior mirror C822 pin 3, circuit 32-AD9 (WH/GN), harness side.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts when the exterior mirror control switch is moved to the UP position and is the polarity reversed when moved to the DOWN position? <p>→ Yes INSTALL a new passenger side exterior mirror.</p> <p>REFER to: Exterior Mirror (501-09 Rear View Mirrors, Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to C9.</p>
<p>C9: CHECK CIRCUIT 34-AD10 (BU/YE) FOR CONTINUITY</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Exterior Mirror Control Switch C741.</p>
 <p>E0037300</p>	<p>3 Measure the resistance between the:</p> <p>Left-hand drive vehicles</p> <ul style="list-style-type: none"> Exterior mirror control switch C741 pin 4, circuit 34-AD10 (BU/YE), harness side and the passenger side exterior mirror C822 pin 1, circuit 34-AD10 (BU/YE), harness side. <p>Right-hand drive vehicles</p> <ul style="list-style-type: none"> Exterior mirror control switch C741 pin 8, circuit 34-AD10C (BU/YE), harness side and the passenger side exterior mirror C822 pin 1, circuit 34-AD10 (BU/YE), harness side.
	<ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes GO to C10.</p> <p>→ No REPAIR circuit 34-AD10 (BU/YE) or circuit 34-AD10C (BU/YE). TEST the system for normal operation.</p>

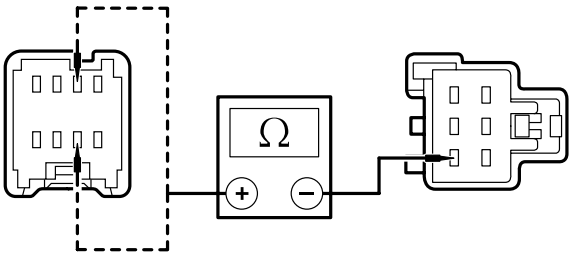
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C10: CHECK CIRCUIT 32-AD9 (WH/GN) FOR CONTINUITY	
 <p>E0037298</p>	<p>1 Measure the resistance between the:</p> <p>Left-hand drive vehicles</p> <ul style="list-style-type: none"> Exterior mirror control switch C741 pin 3, circuit 32-AD9 (WH/GN), harness side and the passenger side exterior mirror C822 pin 3, circuit 32-AD9 (WH/GN), harness side. <p>Right-hand drive vehicles</p> <ul style="list-style-type: none"> Exterior mirror control switch C741 pin 7, circuit 32-AD9C (WH/GN), harness side and the passenger side exterior mirror C822 pin 3, circuit 32-AD9 (WH/GN), harness side. <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new passenger side exterior mirror. REFER to: Exterior Mirror (501-09 Rear View Mirrors, Removal and Installation). TEST the system for normal operation. → No REPAIR circuit 32-AD9 (WH/GN) or circuit 32-AD9C (WH/GN). TEST the system for normal operation.
C11: CHECK THE PASSENGER SIDE EXTERIOR MIRROR LEFT/RIGHT CIRCUIT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Passenger Side Exterior Mirror C822.</p> <p>3 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E0037449</p>	<p>4 Select the passenger side exterior mirror. While operating the exterior mirror control switch LEFT and RIGHT, measure the voltage between the passenger side exterior mirror C822 pin 2, circuit 33-AD11 (YE/VT), harness side and the passenger side exterior mirror C822 pin 3, circuit 32-AD9 (WH/GN), harness side.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts when the exterior mirror control switch is moved to the LEFT position and is the polarity reversed when moved to the RIGHT position. <p>→ Yes INSTALL a new passenger side exterior mirror.</p> <p>REFER to: Exterior Mirror (501-09 Rear View Mirrors, Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to C12.</p>
<p>C12: CHECK CIRCUIT 33-AD11 (YE/VT) FOR CONTINUITY</p>	
 <p>E0037302</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Exterior Mirror Control Switch C741.</p> <p>3 Measure the resistance between the:</p> <p>Left-hand drive vehicles</p> <ul style="list-style-type: none"> Exterior mirror control switch C741 pin 2, circuit 33-AD11 (YE/VT), harness side and the passenger side exterior mirror C822 pin 2, circuit 33-AD11 (YE/VT), harness side. <p>Right-hand drive vehicles</p> <ul style="list-style-type: none"> Exterior mirror control switch C741 pin 6, circuit 33-AD11C (YE/VT), harness side and the passenger side exterior mirror C822 pin 2, circuit 33-AD11 (YE/VT), harness side.
	<ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes GO to C13.</p> <p>→ No REPAIR circuit 33-AD11 (YE/VT) or circuit 33-AD11C (YE/VT). TEST the system for normal operation.</p>

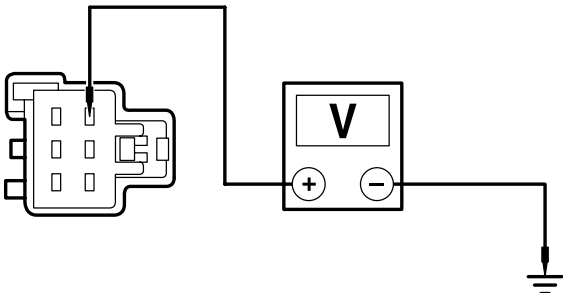
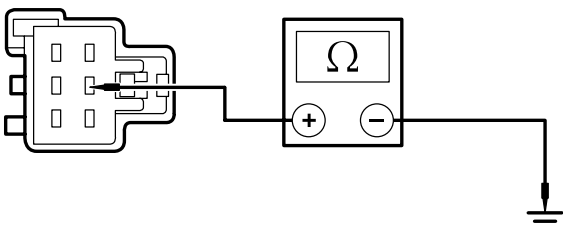
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C13: CHECK CIRCUIT 32-AD9 (WH/GN) FOR CONTINUITY	
 <p>E0037298</p>	<p>1 Measure the resistance between the:</p> <p>Left-hand drive vehicles</p> <ul style="list-style-type: none"> Exterior mirror control switch C741 pin 3, circuit 32-AD9 (WH/GN), harness side and the passenger side exterior mirror C822 pin 3, circuit 32-AD9 (WH/GN), harness side. <p>Right-hand drive vehicles</p> <ul style="list-style-type: none"> Exterior mirror control switch C741 pin 7, circuit 32-AD9C (WH/GN), harness side and the passenger side exterior mirror C822 pin 3, circuit 32-AD9 (WH/GN), harness side. <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new passenger side exterior mirror. REFER to: Exterior Mirror (501-09 Rear View Mirrors, Removal and Installation). TEST the system for normal operation. → No REPAIR circuit 32-AD9 (WH/RD) or circuit 32-AD9C (WH/RD). TEST the system for normal operation.

PINPOINT TEST D : THE HEATED EXTERIOR MIRROR IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
NOTE: Use a digital multimeter for all electrical measurements.	
D1: CHECK THE OPERATION OF THE HEATED REAR WINDOW	
	<p>1 Ignition switch in position II.</p> <p>2 Operate the heated rear window control switch.</p> <ul style="list-style-type: none"> Does the heated rear window function correctly? <ul style="list-style-type: none"> → Yes GO to D2. → No REPAIR the heated rear window. REFER to: (501-11 Glass, Frames and Mechanisms) Glass, Frames and Mechanisms - 3-Door, Vehicles With: Global Closing (Diagnosis and Testing), Glass, Frames and Mechanisms - 3-Door, Vehicles With: Global Closing (Diagnosis and Testing).

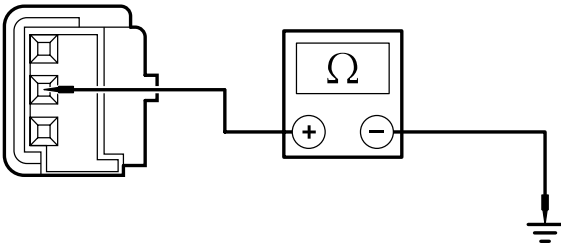
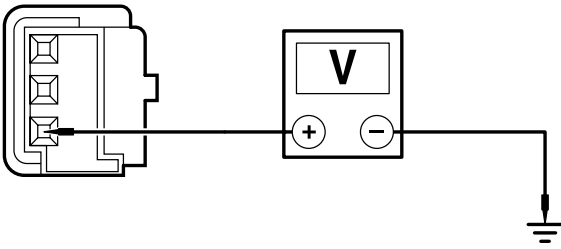
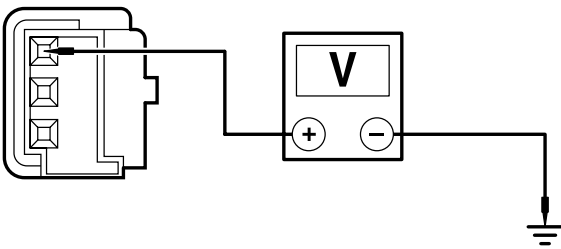
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D2: CHECK THE VOLTAGE TO THE INOPERATIVE EXTERIOR MIRROR	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Inoperative Exterior Mirror C808 or C822. 3 Ignition switch in position II. 4 Operate the heated rear window control switch.
 <p>E55392</p>	<ol style="list-style-type: none"> 5 Measure the voltage between the: <ul style="list-style-type: none"> • Driver side exterior mirror C808 pin 4, circuit 15S-HB35 (GN/BK), harness side and ground. • Passenger side exterior mirror C822 pin 4, circuit 15S-HB36 (GN/OG), harness side and ground. • Is the voltage greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to D3. → No REPAIR circuit 15S-HB35 (GN/BK) or circuit 15S-HB36 (GN/OG). TEST the system for normal operation.
D3: CHECK THE INOPERATIVE EXTERIOR MIRROR GROUND CIRCUIT FOR CONTINUITY	
 <p>E55393</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Measure the resistance between the: <ul style="list-style-type: none"> • Driver side exterior mirror C808 pin 5, circuit 31-HB35 (BK), harness side and ground. • Passenger side exterior mirror C822 pin 5, circuit 31-HB36 (BK), harness side and ground. • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new heated exterior mirror glass. TEST the system for normal operation. → No REPAIR circuit 31-HB35 (BK) or circuit 31-HB36 (BK). TEST the system for normal operation.

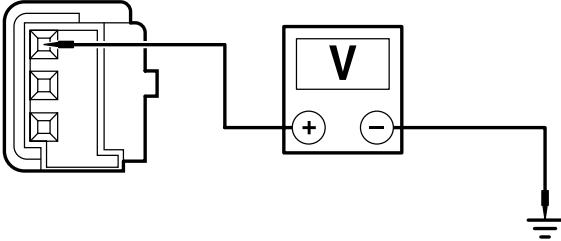
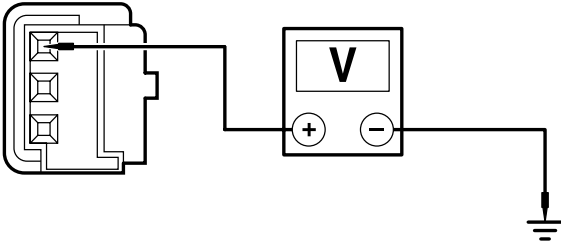
PINPOINT TEST E : THE AUTO-DIMMING INTERIOR MIRROR DOES NOT OPERATE CORRECTLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
NOTE: Use a digital multimeter for all electrical measurements.	
E1: CHECK FOR CONTINUITY BETWEEN THE AUTO-DIMMING INTERIOR MIRROR AND GROUND	
	<ol style="list-style-type: none"> 1 Disconnect Auto-dimming Interior Mirror C742.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E55394</p>	<p>2 Measure the resistance between the auto-dimming interior mirror C742 pin 2, circuit 91-AD15 (BK/OG), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes GO to E2.</p> <p>→ No REPAIR circuit 91-AD15 (BK/OG). TEST the system for normal operation.</p>
<p>E2: CHECK THE VOLTAGE TO THE AUTO-DIMMING INTERIOR MIRROR</p>	
 <p>E55395</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the auto-dimming interior mirror C742 pin 1, circuit 29-AD15 (OG), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <p>→ Yes GO to E3.</p> <p>→ No REPAIR circuit 29-AD15 (OG). TEST the system for normal operation.</p>
<p>E3: CHECK THE REVERSE CUT-OUT VOLTAGE TO THE AUTO-DIMMING INTERIOR MIRROR</p>	
 <p>E55396</p>	<p>NOTE: Make sure the selector lever is in the 'N' (NEUTRAL) position.</p> <p>1 Measure the voltage between the auto-dimming interior mirror C742 pin 3, circuit 15S-AD15 (GN/RD), harness side and ground.</p> <ul style="list-style-type: none"> • Is any voltage present? <p>→ Yes GO to E4.</p> <p>→ No GO to E5.</p>
<p>E4: CHECK FOR VOLTAGE TO THE AUTO-DIMMING INTERIOR MIRROR</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Transmission Switch C864 or Transmission Switch C866 or Reversing Lamps Relay C1003.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E55396</p>	<p>3 Ignition switch in position II.</p> <p>4 Measure the voltage between the auto-dimming interior mirror C742 pin 3, circuit 15S-AD15 (GN/RD), harness side and ground.</p> <ul style="list-style-type: none"> • Is any voltage present? → Yes INSTALL a new transmission switch or reversing lamp relay. TEST the system for normal operation. → No REPAIR circuit 15S-AD15 (GN/RD). TEST the system for normal operation.
E5: CHECK THE REVERSE CUT-OUT VOLTAGE TO THE AUTO-DIMMING INTERIOR MIRROR	
 <p>E55396</p>	<p>1 Select R (REVERSE).</p> <p>2 Measure the voltage between the auto-dimming interior mirror C742 pin 3, circuit 15S-AD15 (GN/RD), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes INSTALL a new auto-dimming interior mirror. REFER to: Auto-dimming Interior Mirror (501-09 Rear View Mirrors, Removal and Installation). TEST the system for normal operation. → No REPAIR circuit 15S-AD15 (GN/RD). TEST the system for normal operation.

DIAGNOSIS AND TESTING

Rear View Mirrors — Vehicles With: Global Closing

Refer to Wiring Diagrams Section 501-09, for schematic and connector information.

General Equipment

Worldwide Diagnostic System (WDS)

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> • Exterior mirror(s) 	<ul style="list-style-type: none"> • Fuse(s) • Relay • Electrical connector(s) • Switch

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

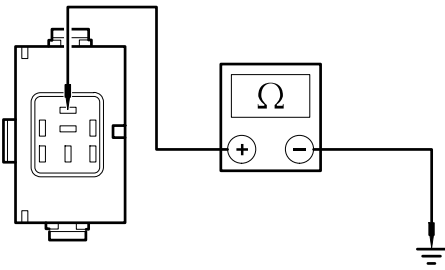
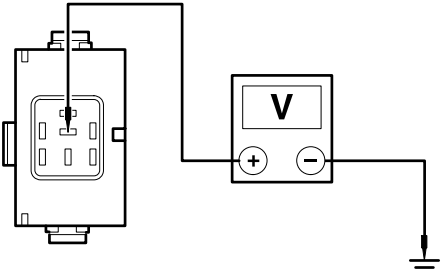
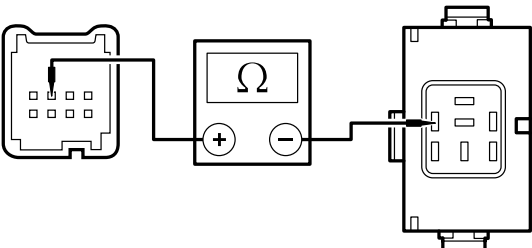
Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • The mirrors are inoperative 	<ul style="list-style-type: none"> • Exterior mirror control switch. • Circuit(s). 	<ul style="list-style-type: none"> • REFER to WDS.
<ul style="list-style-type: none"> • A single mirror is inoperative 	<ul style="list-style-type: none"> • Exterior mirror control switch. • Circuit(s). • Exterior mirror motor(s). 	<ul style="list-style-type: none"> • REFER to WDS.
<ul style="list-style-type: none"> • A single mirror does not function with switch logic 	<ul style="list-style-type: none"> • Exterior mirror control switch. • Circuit(s). • Exterior mirror motor(s). 	<ul style="list-style-type: none"> • REFER to WDS.
<ul style="list-style-type: none"> • The heated exterior mirror does not defrost 	<ul style="list-style-type: none"> • Heated rear window control switch. • Relay. • Circuit(s). • Heated mirror element(s). 	<ul style="list-style-type: none"> • REFER to WDS.
<ul style="list-style-type: none"> • The power folding mirrors do not operate 	<ul style="list-style-type: none"> • Power fold mirror control switch. • Circuit(s). 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.
<ul style="list-style-type: none"> • The power folding mirrors do not operate correctly 	<ul style="list-style-type: none"> • Power fold mirror(s). • Power fold mirror control switch. • Circuit(s). 	<ul style="list-style-type: none"> • GO to Pinpoint Test B.

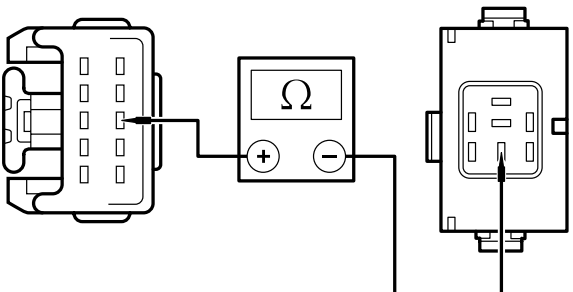
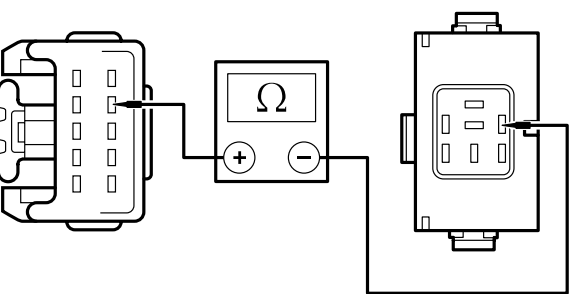
PINPOINT TEST F : THE POWER FOLDING MIRRORS DO NOT OPERATE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK THE POWER FOLDING MIRROR MODULE GROUND CIRCUIT FOR CONTINUITY	
	<ol style="list-style-type: none"> 1 Disconnect Power Folding Mirror Module C743.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0024495</p>	<p>2 Measure the resistance between the power folding mirror module C743 pin 5, circuit 31-AD27 (BK), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes GO to A2. → No REPAIR circuit 31-AD27 (BK). TEST the system for normal operation.
<p>A2: CHECK THE VOLTAGE TO THE POWER FOLDING MIRROR MODULE</p>	
 <p>TIE0024535</p>	<p>1 Measure the voltage between the power folding mirror module C743 pin 4, circuit 29-AD27 (OG/BK), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes GO to A3. → No REPAIR circuit 29-AD27 (OG). TEST the system for normal operation.
<p>A3: CHECK FOR CONTINUITY BETWEEN THE POWER FOLDING MIRROR CONTROL SWITCH AND THE POWER FOLDING MIRROR MODULE</p>	
 <p>E53185</p>	<p>1 Disconnect Power Fold Mirror Control Switch C222.</p> <p>2 Measure the resistance between the power folding mirror control switch C222 pin 2, circuit 91S-AD24 (BK/RD), harness side and the power folding mirror module C743 pin 2, circuit 31S-AD24 (BK/RD), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes GO to A4. → No REPAIR circuit 31S-AD24 (BK/RD) or circuit 91S-AD24 (BK/RD). TEST the system for normal operation.

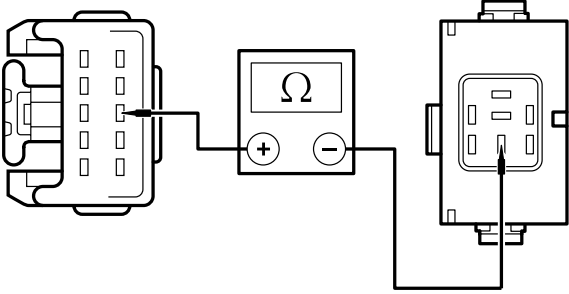
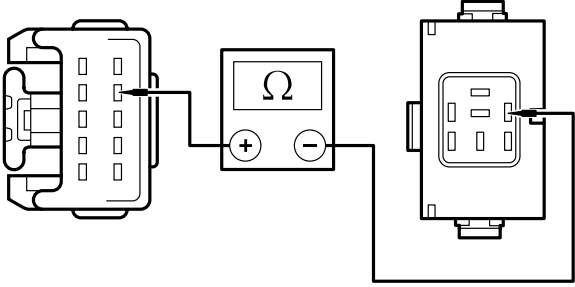
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A4: CHECK FOR CONTINUITY BETWEEN THE POWER FOLDING MIRROR MODULE AND THE DRIVER POWER FOLDING MIRROR MOTOR	
 <p>E53186</p>	<p>1 Measure the resistance between the driver power folding mirror motor C807 pin 8, circuit 32-AD27 (WH/GN), harness side and the power folding mirror module C743 pin 3, circuit 32-AD27 (WH/GN), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? → Yes GO to A5. → No REPAIR circuit 32-AD27 (WH/GN). TEST the system for normal operation.
A5: CHECK FOR CONTINUITY BETWEEN THE POWER FOLDING MIRROR MODULE AND THE DRIVER POWER FOLDING MIRROR MOTOR	
 <p>E53187</p>	<p>1 Measure the resistance between the driver power folding mirror motor C807 pin 9, circuit 33-AD27 (YE/GN), harness side and the power folding mirror module C743 pin 1, circuit 33-AD27 (YE/GN), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? → Yes INSTALL a new power folding mirror module. TEST the system for normal operation. → No REPAIR circuit 33-AD27 (YE/GN). TEST the system for normal operation.

PINPOINT TEST G : THE POWER FOLDING MIRRORS DO NOT OPERATE CORRECTLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK FOR CONTINUITY BETWEEN THE POWER FOLDING MIRROR MODULE AND THE INOPERATIVE POWER FOLDING MIRROR MOTOR	
	<p>1 Disconnect Inoperative Power Folding Mirror Motor C807 or C821.</p> <p>2 Disconnect Power Folding Mirror Module C743.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E53186</p>	<p>3 Measure the resistance between the:</p> <ul style="list-style-type: none"> • Driver power folding mirror - power folding mirror motor C807 pin 8, circuit 32-AD27 (WH/GN), harness side and the power folding mirror module C743 pin 3, circuit 32-AD27 (WH/GN), harness side. • Passenger power folding mirror - power folding mirror motor C821 pin 8, circuit 32-AD28 (WH/GN), harness side and the power folding mirror module C743 pin 3, circuit 32-AD28 (WH/GN), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes GO to B2. → No REPAIR circuit 32-AD27 (WH/GN) or circuit 32-AD28 (WH/GN). TEST the system for normal operation.
<p>B2: CHECK FOR CONTINUITY BETWEEN THE POWER FOLDING MIRROR MODULE AND THE INOPERATIVE POWER FOLDING MIRROR MOTOR</p>	
 <p>E53187</p>	<p>1 Measure the resistance between the:</p> <ul style="list-style-type: none"> • Driver power folding mirror - power folding mirror motor C807 pin 9, circuit 33-AD27 (YE/GN), harness side and the power folding mirror module C743 pin 1, circuit 33-AD27 (YE/GN), harness side. • Passenger power folding mirror - power folding mirror motor C821 pin 9, circuit 33-AD28 (YE/GN), harness side and the power folding mirror module C743 pin 1, circuit 33-AD28 (YE/GN), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new power folding exterior mirror. REFER to: Exterior Mirror (501-09 Rear View Mirrors, Removal and Installation). TEST the system for normal operation. → No REPAIR circuit 33-AD27 (YE/GN) or circuit 33-AD28 (YE/GN). TEST the system for normal operation.

501-09-24

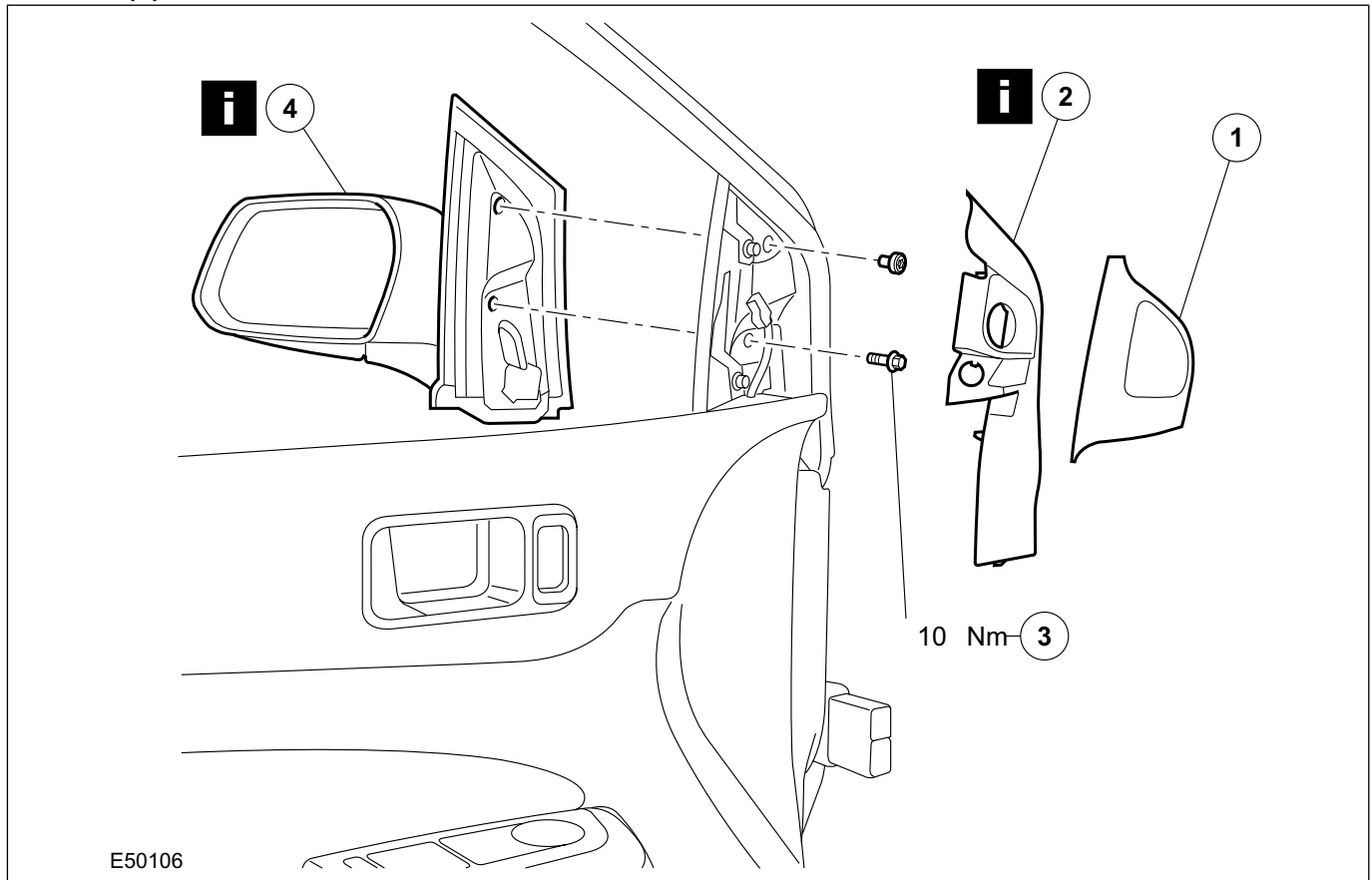
Rear View Mirrors

501-09-24

REMOVAL AND INSTALLATION

Exterior Mirror

1. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Speaker cover
2	Exterior mirror trim panel See Removal Detail

Item	Description
3	Exterior mirror retaining bolt
4	Exterior mirror See Removal Detail

2. To install, reverse the removal procedure.

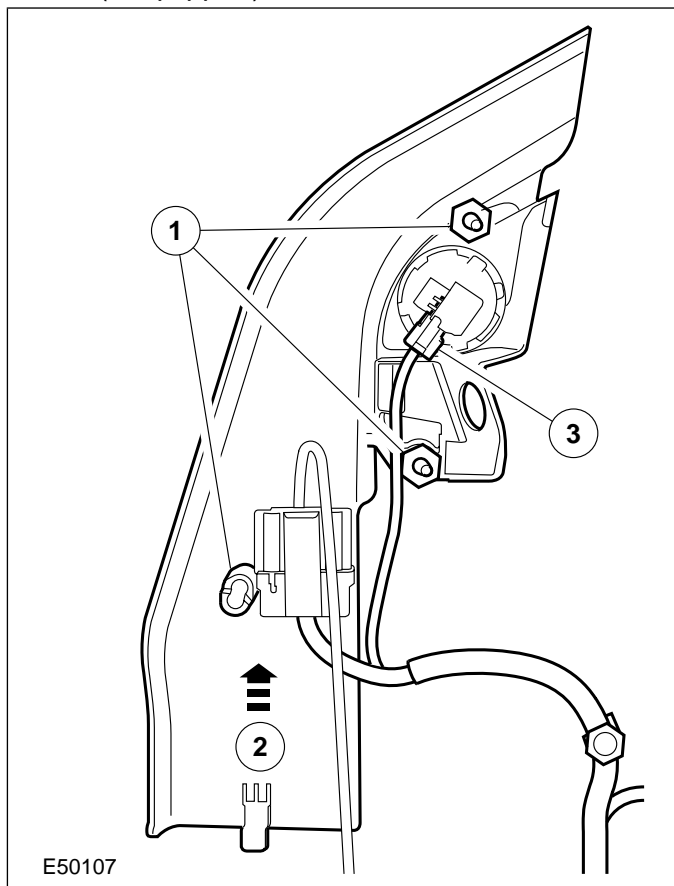
Removal Details

Item 2 Exterior mirror trim panel

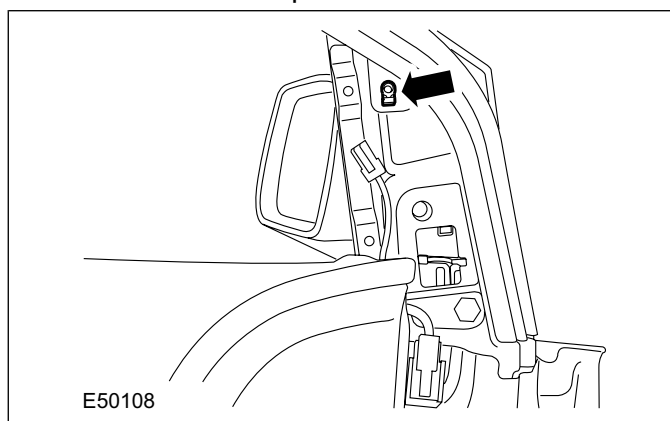
1. Detach the exterior mirror trim panel from the door panel.
1. Detach the clips.
 2. Detach the trim panel.

REMOVAL AND INSTALLATION

3. Disconnect the speaker electrical connector (if equipped).

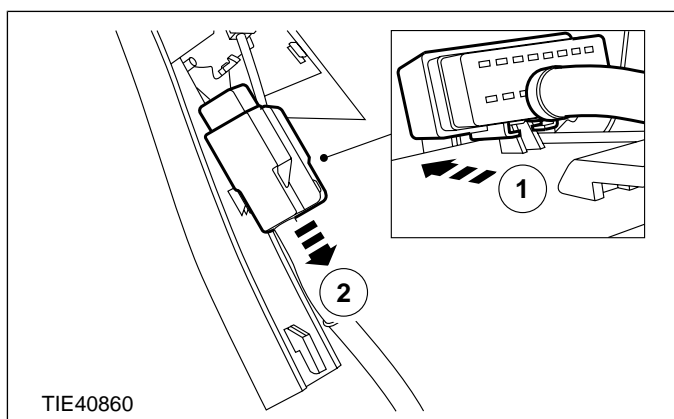


- Release the clip.



2. Remove the exterior mirror trim panel.

1. Detach the mirror electrical connector from the trim panel.
2. Disconnect the mirror electrical connector.



Item 4 Exterior mirror

1. Remove the exterior mirror.

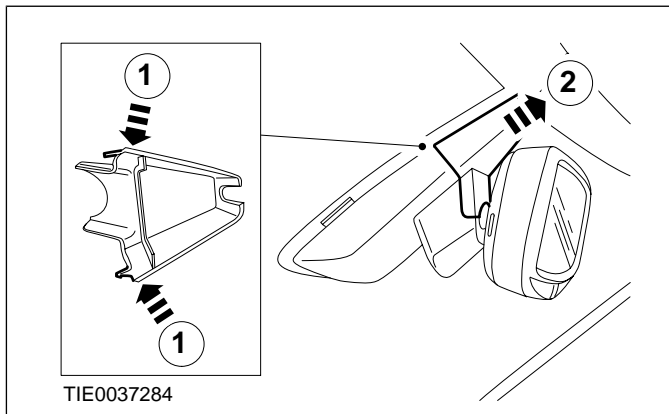
REMOVAL AND INSTALLATION

Auto-Dimming Interior Mirror

Removal

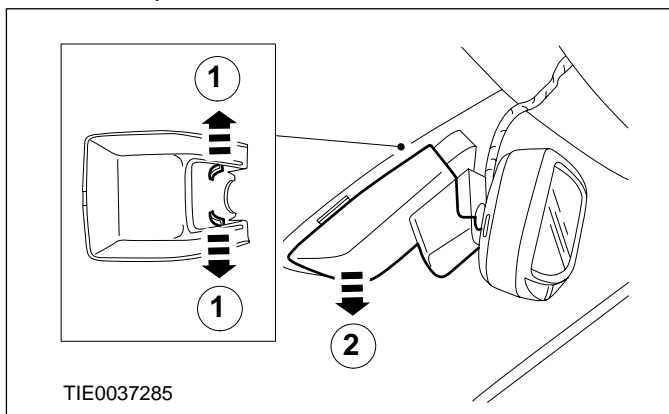
1. Remove the auto-dimming interior mirror upper trim panel.

1. Release the clips.
2. Pull the auto-dimming interior mirror upper trim panel rearwards.

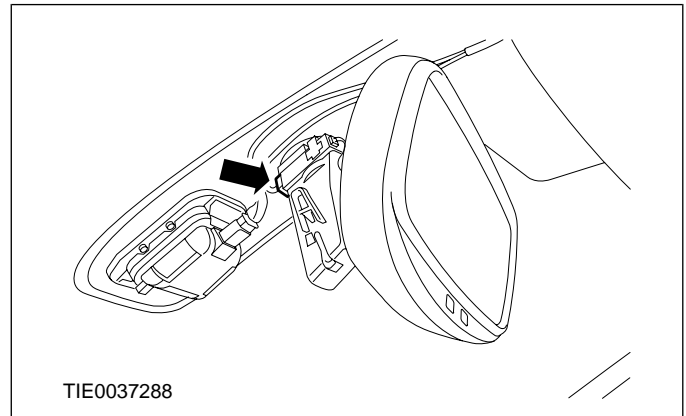


2. Remove the auto-dimming interior mirror lower trim panel.

1. Release the clips.
2. Pull the auto-dimming interior mirror lower trim panel downwards.

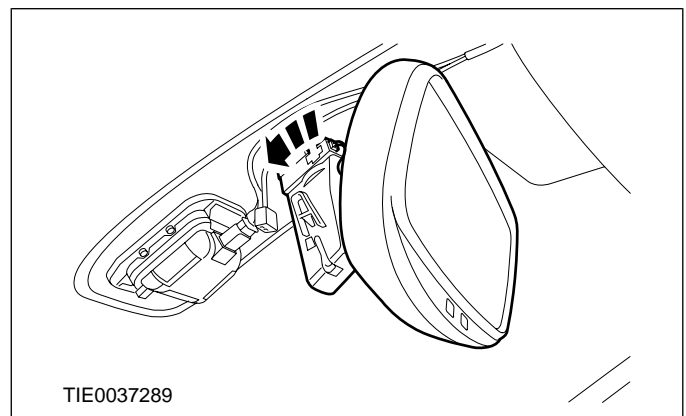


3. Disconnect the auto-dimming interior mirror electrical connector.



4. Remove the auto-dimming interior mirror.

- Rotate the mirror bracket 60 degrees counterclockwise.



Installation

1. To install, reverse the removal procedure.

SECTION 501-10 Seating

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS**Torque Specifications**

Item	Nm	lb-ft	lb-in
Front seat retaining bolts	35	26	-
Front seat cushion base retaining bolts	23	17	-
Front seat backrest retaining bolts	27	20	-
Front seat safety belt buckle and pretensioner retaining bolt	47	35	-
Rear seat cushion retaining bolts	25	18	-
Rear seat backrest hinge retaining bolts	35	26	-
Rear seat backrest striker retaining bolts	25	18	-
Rear seat backrest outer pivot pin bush retaining bolt	35	26	-
Rear seat backrest latch retaining bolts	23	17	-
Rear center safety belt lower anchor and buckle assembly retaining bolt	55	41	-
Front seat height adjustment link retaining screw	10	-	89
Front seat backrest recliner motor retaining bolt	5	-	44
Rear seat backrest retaining screws - Convertible	22	16	-

DIAGNOSIS AND TESTING

Seats

Refer to Wiring Diagrams Section 501-10, for schematic and connector information.

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> • Damaged switch(es) 	<ul style="list-style-type: none"> • Fuse(s) • Wiring harness • Electrical connector(s) • Motor(s) • Switch(es)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Symptom Chart

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • The power seat is inoperative 	<ul style="list-style-type: none"> • Seat control switch. 	<ul style="list-style-type: none"> • CARRY OUT the Seat Control Switch Component Test. REFER to the Wiring Diagrams.
	<ul style="list-style-type: none"> • Motor(s). • Circuit(s). 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.
<ul style="list-style-type: none"> • The power seat does not move vertically 	<ul style="list-style-type: none"> • Seat control switch. 	<ul style="list-style-type: none"> • CARRY OUT the Seat Control Switch Component Test. REFER to the Wiring Diagrams.
	<ul style="list-style-type: none"> • Motor(s). • Circuit(s). 	<ul style="list-style-type: none"> • GO to Pinpoint Test B.
<ul style="list-style-type: none"> • The power seat does not recline 	<ul style="list-style-type: none"> • Seat control switch. 	<ul style="list-style-type: none"> • CARRY OUT the Seat Control Switch Component Test. REFER to the Wiring Diagrams.
	<ul style="list-style-type: none"> • Motor. • Circuit(s). 	<ul style="list-style-type: none"> • GO to Pinpoint Test C.
<ul style="list-style-type: none"> • The power seat does not move horizontally 	<ul style="list-style-type: none"> • Seat control switch. 	<ul style="list-style-type: none"> • CARRY OUT the Seat Control Switch Component Test. REFER to the Wiring Diagrams.
	<ul style="list-style-type: none"> • Motor. • Circuit(s). 	<ul style="list-style-type: none"> • GO to Pinpoint Test D.

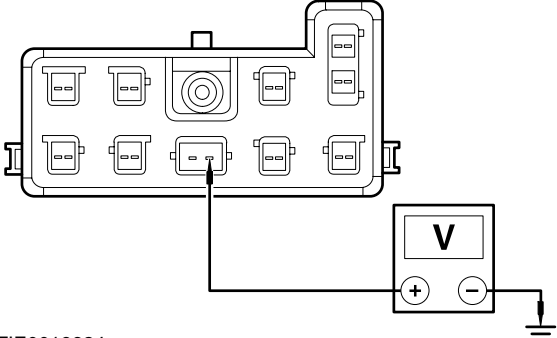
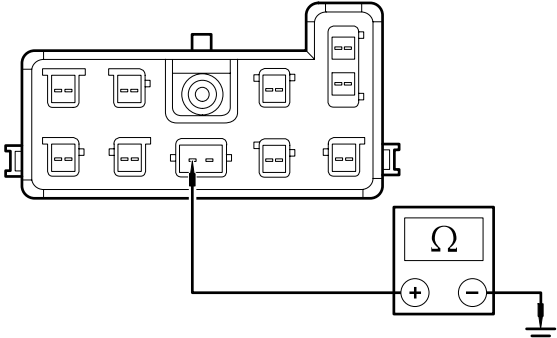
DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> The heated seat is inoperative 	<ul style="list-style-type: none"> Heated seat control switch(es). 	<ul style="list-style-type: none"> CARRY OUT the Heated Seat Control Switch Component Test. REFER to the Wiring Diagrams.
	<ul style="list-style-type: none"> Circuit(s). 	<ul style="list-style-type: none"> GO to Pinpoint Test E.

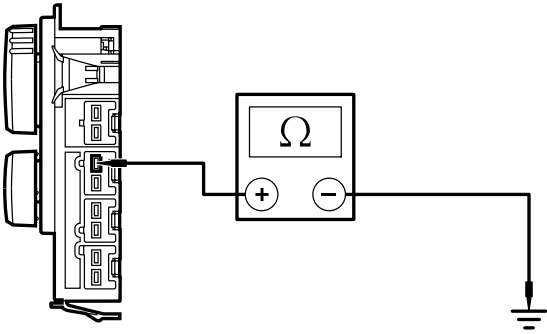
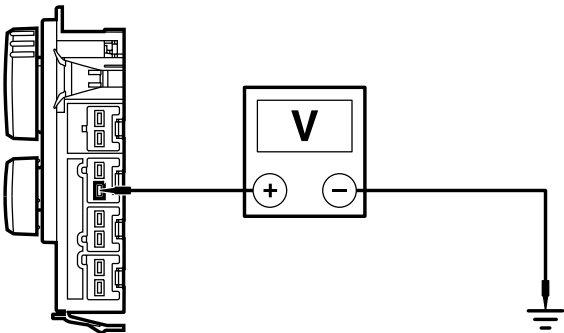
Pinpoint Tests

NOTE: Use a digital multimeter for all electrical measurements.

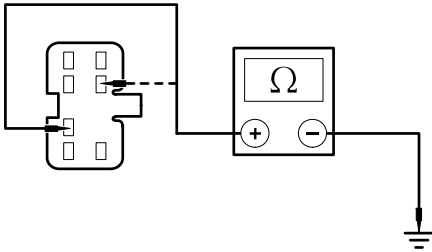
PINPOINT TEST A : THE POWER SEAT IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK FOR VOLTAGE TO THE DRIVER POWER SEAT	
 <p>TIE0019624</p>	<ol style="list-style-type: none"> 1 Disconnect Driver Power Seat Underseat Connector C30. 2 Ignition switch in position II.
	<ol style="list-style-type: none"> 3 Measure the voltage between the driver power seat C30 pin 15, circuit 29-AH35 (OG/YE), harness side and ground. <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to A2. → No REPAIR circuit 29-AH35 (OG/YE). TEST the system for normal operation.
A2: CHECK THE DRIVER POWER SEAT GROUND CIRCUIT FOR CONTINUITY	
 <p>TIE0019625</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0.
	<ol style="list-style-type: none"> 2 Measure the resistance between the driver power seat C30 pin 16, circuit 31-DA14 (BK), harness side and ground. <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes Vehicles with 6-way power seats GO to A3. Vehicles with 2-way power seats GO to A5. → No REPAIR circuit 31-DA14 (BK). TEST the system for normal operation.

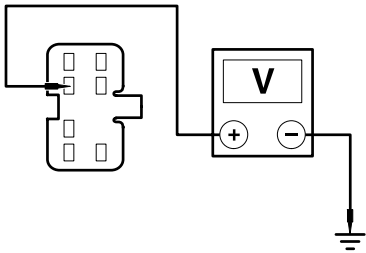
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A3: CHECK THE DRIVER POWER SEAT CONTROL SWITCH GROUND CIRCUIT FOR CONTINUITY	
 <p>E51577</p>	<ol style="list-style-type: none"> 1 Connect Driver Power Seat Underseat Connector C30. 2 Disconnect Driver Power Seat Control Switch C755. 3 Measure the resistance between the driver power seat control switch C755 pin 1, circuit 31-DA14 (BK), harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes GO to A4. → No REPAIR circuit 31-DA14 (BK). TEST the system for normal operation.
A4: CHECK THE DRIVER POWER SEAT CONTROL SWITCH POWER CIRCUIT FOR CONTINUITY	
 <p>E51578</p>	<ol style="list-style-type: none"> 1 Ignition switch in position II. 2 Measure the voltage between the driver power seat control switch C755 pin 2, circuit 29-AH35 (OG/YE), harness side and ground. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes VERIFY the customer concern. → No REPAIR circuit 29-AH35 (OG/YE). TEST the system for normal operation.
A5: CHECK THE DRIVER POWER SEAT CONTROL SWITCH GROUND CIRCUIT FOR CONTINUITY	
	<ol style="list-style-type: none"> 1 Connect Driver Power Seat Underseat Connector C30. 2 Disconnect Driver Power Seat Control Switch C715.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0014346</p>	<p>3 Measure the resistance between the:</p> <ul style="list-style-type: none"> • driver power seat control switch C715 pin 3, circuit 31-AH35 (BK), harness side and ground. • driver power seat control switch C715 pin 6, circuit 31-AH35A (BK), harness side and ground. <p>• Are the resistances less than 5 ohms?</p> <p>→ Yes GO to A6.</p> <p>→ No REPAIR circuit 31-AH35 (BK) or circuit 31-AH35A (BK). TEST the system for normal operation.</p>

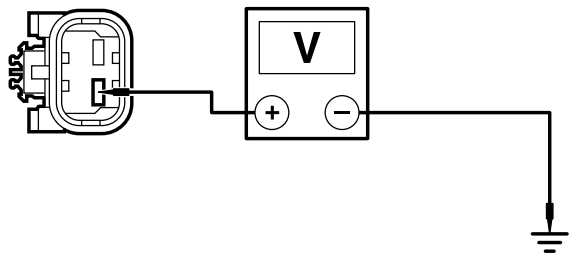
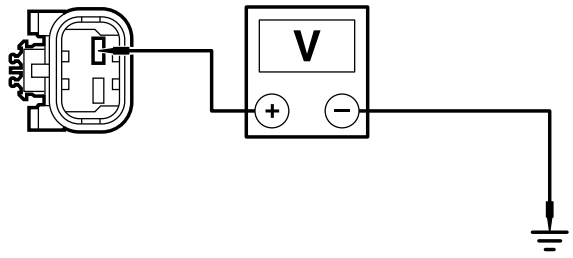
A6: CHECK THE DRIVER POWER SEAT CONTROL SWITCH POWER CIRCUIT FOR CONTINUITY

	<p>1 Ignition switch in position II.</p>
 <p>TIE0014348</p>	<p>2 Measure the voltage between the driver power seat control switch C715 pin 2, circuit 29-AH35 (OG/YE), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <p>→ Yes VERIFY the customer concern.</p> <p>→ No REPAIR circuit 29-AH35 (OG/YE). TEST the system for normal operation.</p>

PINPOINT TEST B : THE POWER SEAT DOES NOT MOVE VERTICALLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK THE DOWN VOLTAGE TO THE SEAT HEIGHT ADJUSTMENT MOTOR	
	<p>1 Detach the seat assembly from the floor panel.</p> <p>2 Disconnect Seat Height Adjustment Motor C759.</p> <p>3 Ignition switch in position II.</p>

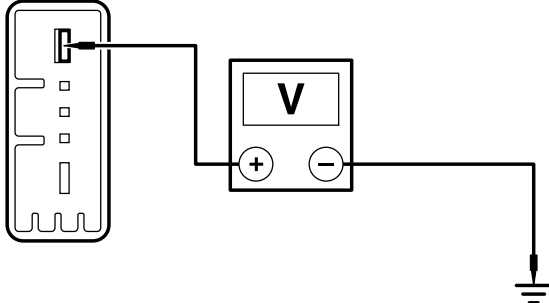
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E51579</p>	<p>4 Operate the power seat height control switch to the DOWN position and measure the voltage between the seat height adjustment motor C759 pin 1, circuit 33-AH38 (YE/BK), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <p>→ Yes GO to B2.</p> <p>→ No REPAIR circuit 33-AH38 (YE/BK). TEST the system for normal operation.</p>
<p>B2: CHECK THE UP VOLTAGE TO THE SEAT HEIGHT ADJUSTMENT MOTOR</p>	
 <p>E51580</p>	<p>1 Operate the power seat height control switch to the UP position and measure the voltage between the seat height adjustment motor C759 pin 2, circuit 32-AH38 (WH/BK), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <p>→ Yes INSTALL a new front seat height adjustment motor.</p> <p>REFER to: Front Seat Height Adjustment Motor (501-10 Seating, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR circuit 32-AH38 (WH/BK). TEST the system for normal operation.</p>

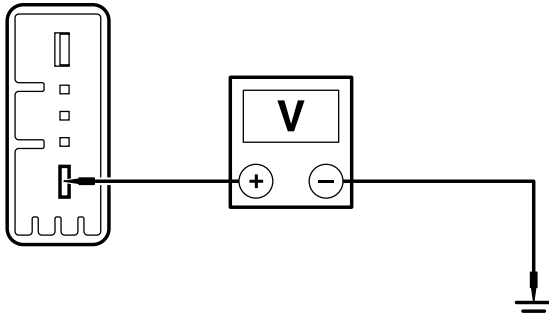
PINPOINT TEST C : THE POWER SEAT DOES NOT RECLINE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>C1: CHECK THE REARWARD VOLTAGE TO THE SEAT BACKREST MOVEMENT MOTOR</p>	
	<p>1 Detach the seat assembly from the floor panel.</p> <p>2 Disconnect Seat Backrest Motor C760.</p> <p>3 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E51581</p>	<p>4 Operate the power seat backrest control switch to the REARWARD position and measure the voltage between the seat backrest movement motor C760 pin 5, circuit 33-AH36 (YE/RD), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes GO to C2. → No REPAIR circuit 33-AH36 (YE/RD). TEST the system for normal operation.

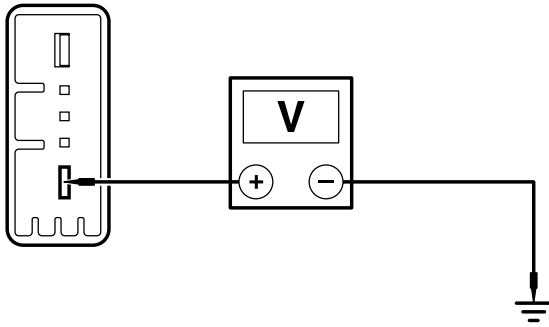
C2: CHECK THE FORWARD VOLTAGE TO THE SEAT BACKREST MOVEMENT MOTOR

 <p>E51582</p>	<p>1 Operate the power seat backrest control switch to the FORWARD position and measure the voltage between the seat backrest movement motor C760 pin 1, circuit 32-AH36 (WH/RD), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes INSTALL a new seat backrest movement motor. REFER to: Front Seat Backrest - 3-Door (501-10 Seating, Disassembly and Assembly) / Front Seat Backrest - 4-Door/5-Door/Wagon (501-10 Seating, Disassembly and Assembly). TEST the system for normal operation. → No REPAIR circuit 32-AH36 (WH/RD). TEST the system for normal operation.
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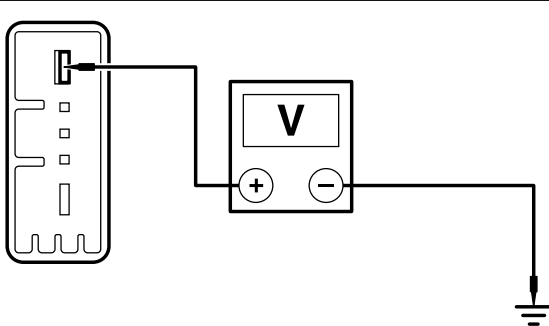
PINPOINT TEST D : THE POWER SEAT DOES NOT MOVE HORIZONTALLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: CHECK THE REARWARD VOLTAGE TO THE FRONT SEAT TRACK MOTOR	
	<p>1 Detach the seat assembly from the floor panel.</p> <p>2 Disconnect Front Seat Track Motor C761.</p> <p>3 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E51582</p>	<p>4 Operate the front seat track motor control switch to the REARWARD position and measure the voltage between the front seat track motor C761 pin 1, circuit 33-AH37 (YE/GN), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes GO to D2. → No REPAIR circuit 33-AH37 (YE/GN). TEST the system for normal operation.

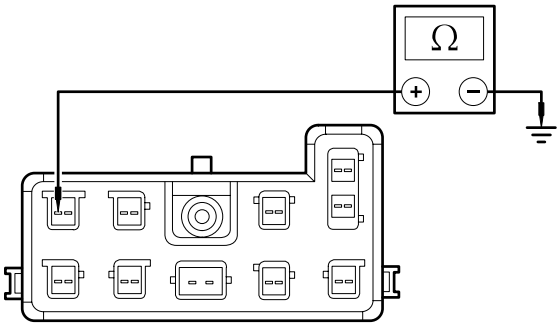
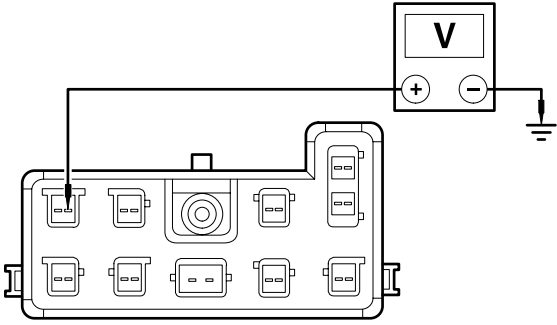
D2: CHECK THE FORWARD VOLTAGE TO THE FRONT SEAT TRACK MOTOR

 <p>E51581</p>	<p>1 Operate the front seat track motor control switch to the FORWARD position and measure the voltage between the front seat track motor C761 pin 5, circuit 32-AH37 (WH/GN), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes INSTALL a new front seat track motor. REFER to: Front Seat Track Motor (501-10 Seating, Removal and Installation). TEST the system for normal operation. → No REPAIR circuit 32-AH37 (WH/GN). TEST the system for normal operation.
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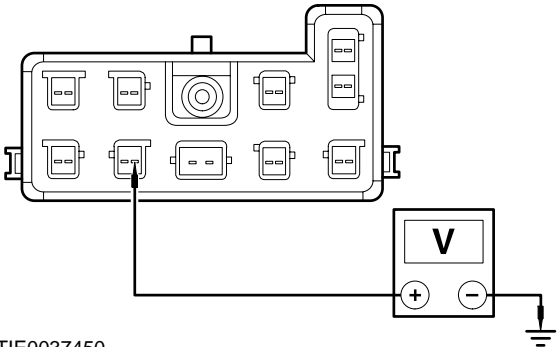
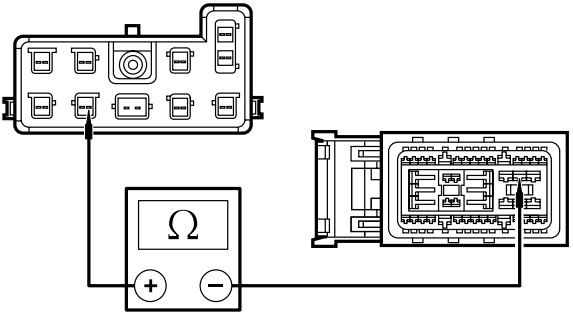
PINPOINT TEST E : THE HEATED SEAT IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>E1: CHECK THE INOPERATIVE HEATED SEAT GROUND CIRCUIT</p>	
	<p>1 Disconnect Inoperative Heated Seat C30 or C31.</p>

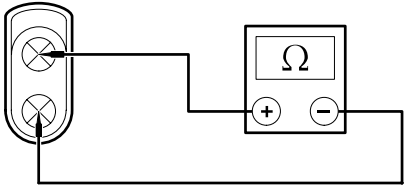
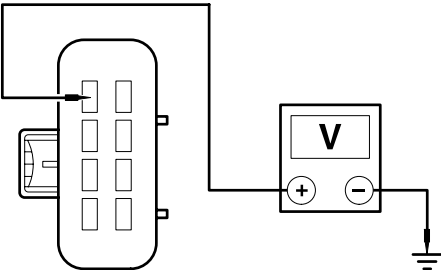
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0037451</p>	<p>2 Measure the resistance between the:</p> <ul style="list-style-type: none"> - Left-hand drive vehicles • driver heated seat C30 pin 10, circuit 31-HC8 (BK), harness side and ground. • passenger heated seat C31 pin 10, circuit 31-HC11 (BK), harness side and ground. - Right-hand drive vehicles • driver heated seat C30 pin 10, circuit 31-HC11 (BK), harness side and ground. • passenger heated seat C31 pin 10, circuit 31-HC8 (BK), harness side and ground. <p>• Is the resistance less than 5 ohms?</p> <p>→ Yes GO to E2.</p> <p>→ No REPAIR circuit 31-HC8 (BK) or circuit 31-HC11 (BK). TEST the system for normal operation.</p>
<p>E2: CHECK FOR BATTERY VOLTAGE TO THE INOPERATIVE HEATED SEAT</p>	
 <p>TIE0019634</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the:</p> <ul style="list-style-type: none"> - Left-hand drive vehicles • driver heated seat C30 pin 9, circuit 15-HC8 (GN/RD), harness side and ground. • passenger heated seat C31 pin 9, circuit 15-HC11 (GN/WH), harness side and ground. - Right-hand drive vehicles • driver heated seat C30 pin 9, circuit 15-HC11 (GN/WH), harness side and ground. • passenger heated seat C31 pin 9, circuit 15-HC8 (GN/RD), harness side and ground. <p>• Is the voltage greater than 10 volts?</p> <p>→ Yes GO to E3.</p> <p>→ No REPAIR circuit 15-HC8 (GN/RD) or circuit 15-HC11 (GN/WH). TEST the system for normal operation.</p>
<p>E3: CHECK FOR SWITCH VOLTAGE TO THE INOPERATIVE HEATED SEAT</p>	
	<p>1 Operate the heated seat control switch.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0037450</p>	<p>2 Measure the voltage between the:</p> <ul style="list-style-type: none"> - Left-hand drive vehicles <ul style="list-style-type: none"> • driver heated seat C30 pin 17, circuit 15S-HC8 (GN/RD), harness side and ground. • passenger heated seat C31 pin 17, circuit 15S-HC11 (GN/WH), harness side and ground. - Right-hand drive vehicles <ul style="list-style-type: none"> • driver heated seat C30 pin 17, circuit 15S-HC11 (GN/WH), harness side and ground. • passenger heated seat C31 pin 17, circuit 15S-HC8 (GN/RD), harness side and ground. <p>• Is the voltage greater than 10 volts?</p> <p>→ Yes GO to E4.</p> <p>→ No GO to E6.</p>
<p>E4: CHECK THE HEATED SEAT SUPPLY CIRCUIT FOR CONTINUITY</p>	
<p>1 Disconnect Fuse 70.</p> <p>2 Disconnect Passenger Junction Box C102.</p>	<p>1 Disconnect Fuse 70.</p> <p>2 Disconnect Passenger Junction Box C102.</p>
 <p>E52019</p>	<p>3 Measure the resistance between the passenger junction box C102 pin 5, circuit 15-DA4 (GN/BK), harness side and the driver heated seat C30 pin 17, circuit 15S-HC8 (GN/RD), harness side.</p> <p>• Is the resistance between 2,600 and 7,800 ohms?</p> <p>→ Yes GO to E5.</p> <p>→ No INSTALL a new heated seat control switch. REFER to: Heated Seat Switch (501-10 Seating, Removal and Installation). TEST the system for normal operation.</p>
<p>E5: CHECK THE HEATED SEAT BACKREST HEATER MAT FOR CONTINUITY</p>	
<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Inoperative Heated Seat Backrest.</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Inoperative Heated Seat Backrest.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0013081</p>	<p>3 Measure the resistance between the heated seat backrest pins 1 and 2, component side.</p> <ul style="list-style-type: none"> Is the resistance less than 9 ohms? <p>→ Yes INSTALL a new heated seat cushion heater mat and heater module. TEST the system for normal operation.</p> <p>→ No INSTALL a new heated seat backrest heater mat.</p> <p>REFER to: Front Seat Backrest - 3-Door (501-10 Seating, Disassembly and Assembly) / Front Seat Backrest - 4-Door/5-Door/Wagon (501-10 Seating, Disassembly and Assembly). TEST the system for normal operation.</p>
<p>E6: CHECK FOR VOLTAGE TO THE HEATED SEAT CONTROL SWITCH</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect Inoperative Heated Seat Control Switch C694 or C695.</p>
	<p>3 Ignition switch in position II.</p>
 <p>TIE0019639</p>	<p>4 Measure the voltage between the:</p> <ul style="list-style-type: none"> inoperative left-hand heated seat control switch C694 pin 4, circuit 15-HC14 (GN/YE), harness side and ground. inoperative right-hand heated seat control switch C695 pin 4, circuit 15-HC9 (GN/BK), harness side and ground. <p>Is the voltage greater than 10 volts?</p> <p>→ Yes REPAIR circuit 15S-HC8 (GN/RD) or circuit 15S-HC11 (GN/WH). TEST the system for normal operation.</p> <p>→ No REPAIR circuit 15-HC9 (GN/BK) or circuit 15-HC14 (GN/YE). TEST the system for normal operation.</p>

REMOVAL AND INSTALLATION

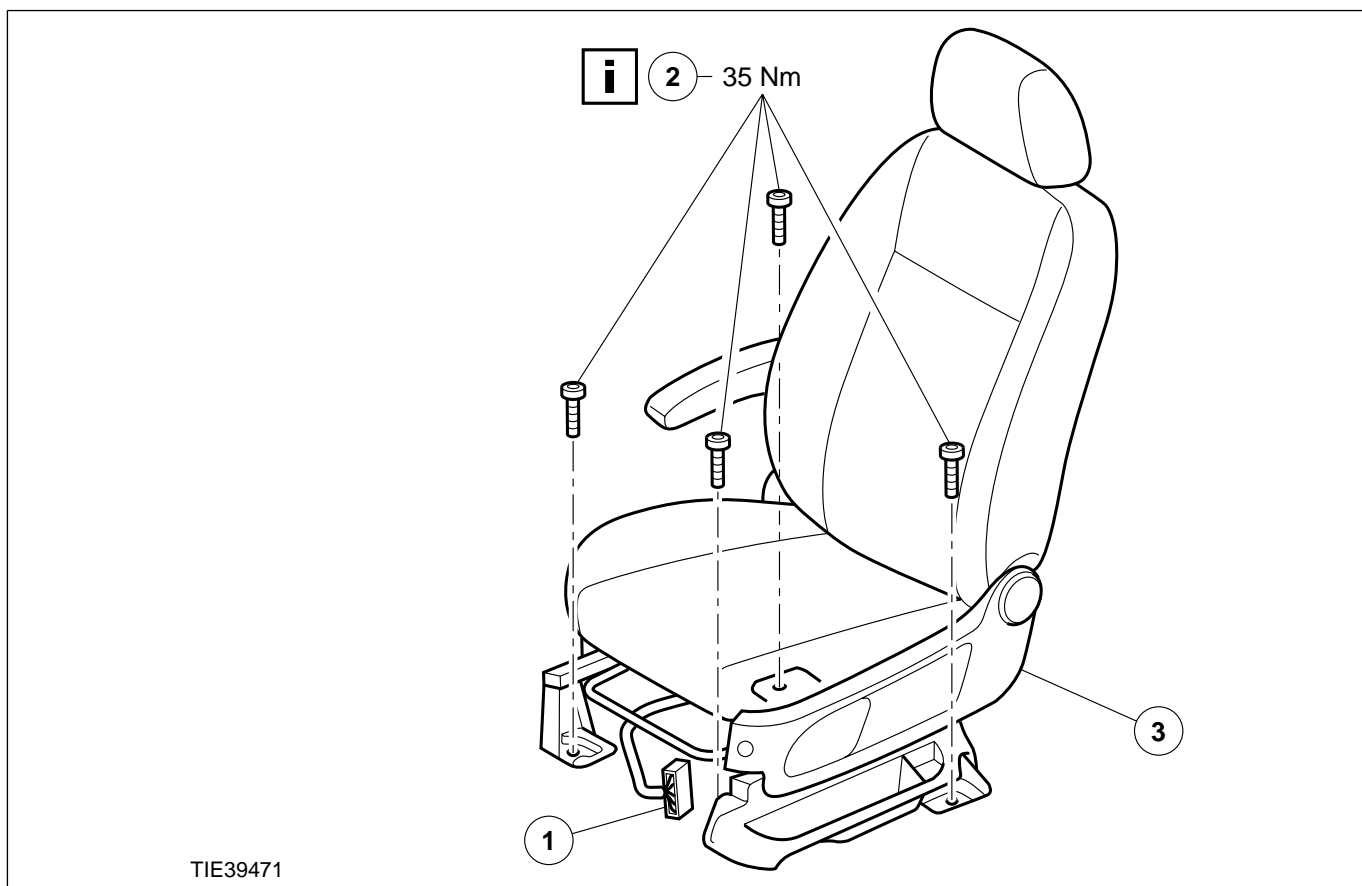
Front Seat

WARNINGS:

▲ To avoid accidental deployment, the air bag control module backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the supplemental restraint system (SRS), or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.

▲ Note the position of the wiring harnesses, to aid installation. An incorrectly routed wiring harness could become damaged when the seat is moved. Failure to follow this instruction may result in personal injury.

1. Disconnect the battery ground cable. For additional information, refer to Section 414-01 [Battery, Mounting and Cables].
2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Underseat connector
2	Front seat retaining bolts <i>See Installation Detail</i>
3	Front seat

All vehicles

3. To install, reverse the removal procedure.

Vehicles with front and rear power windows

4. Initialize the door window motors. For additional information, refer to Section 501-11 [Glass, Frames and Mechanisms].

REMOVAL AND INSTALLATION**Installation Details****Item 2 Front seat retaining bolts****1. Install the front seat retaining bolts in the following sequence.**

1. Rear inner retaining bolt.
2. Rear outer retaining bolt.
3. Front outer retaining bolt.
4. Front inner retaining bolt.

REMOVAL AND INSTALLATION

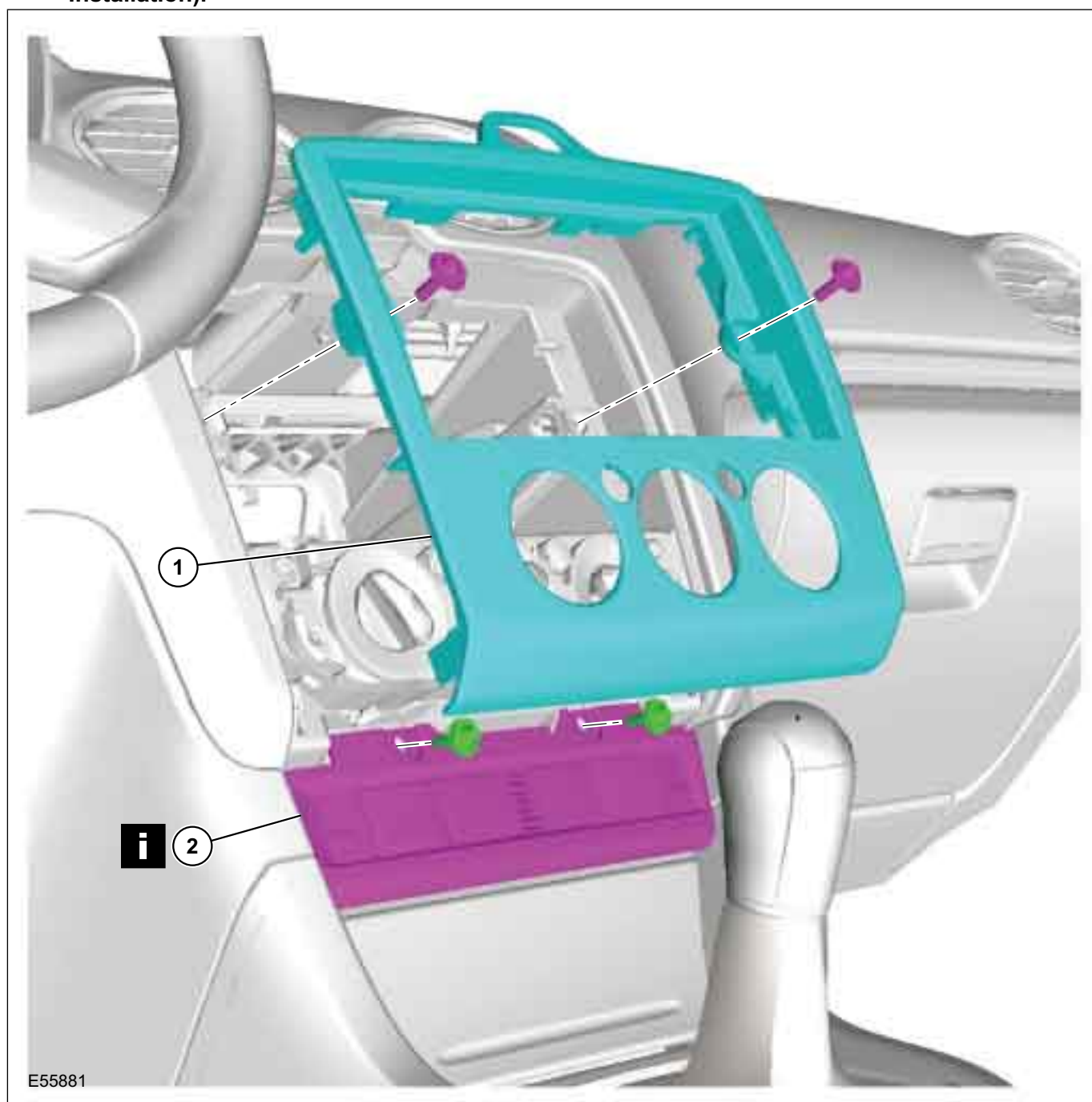
Heated Seat Switch

1. Remove the audio unit. For additional information, refer to: (415-01 Audio Unit)

**Audio Unit - Vehicles Built Up To: 01/2008,
Vehicles With: Digital Versatile Disc (DVD)
Navigation System (Removal and
Installation),**

**Audio Unit - Vehicles Built Up To: 01/2008,
Vehicles With: Digital Versatile Disc (DVD)
Navigation System (Removal and
Installation).**

2. Remove the components in the order indicated in the following illustration(s) and table(s).



REMOVAL AND INSTALLATION

Item	Description
1	Instrument panel console
2	Instrument panel console switch panel assembly

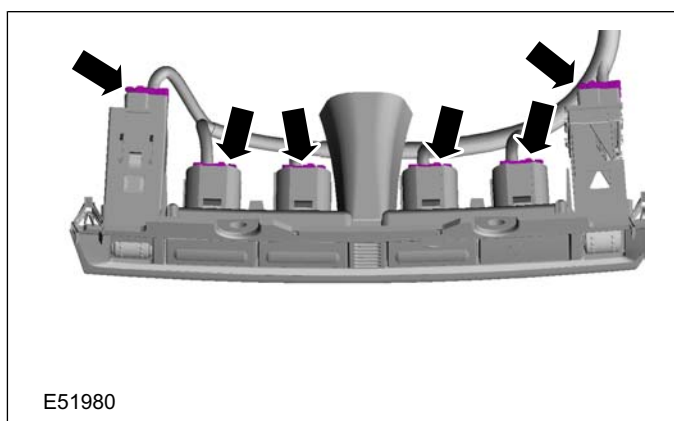
Item	Description
	See Removal Detail

3. To install, reverse the removal procedure.

Removal Details

Item 2 Instrument panel console switch panel assembly

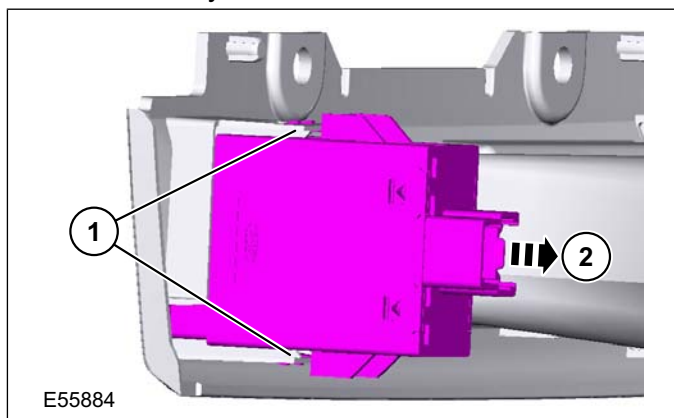
1. Disconnect the instrument panel console switch panel assembly electrical connectors.



E51980

2. Remove the heated seat switch.

1. Release the retaining clips.
2. Slide the heated seat switch out of the instrument panel console switch panel assembly.



E55884

REMOVAL AND INSTALLATION

Front Seat Height Adjustment Motor

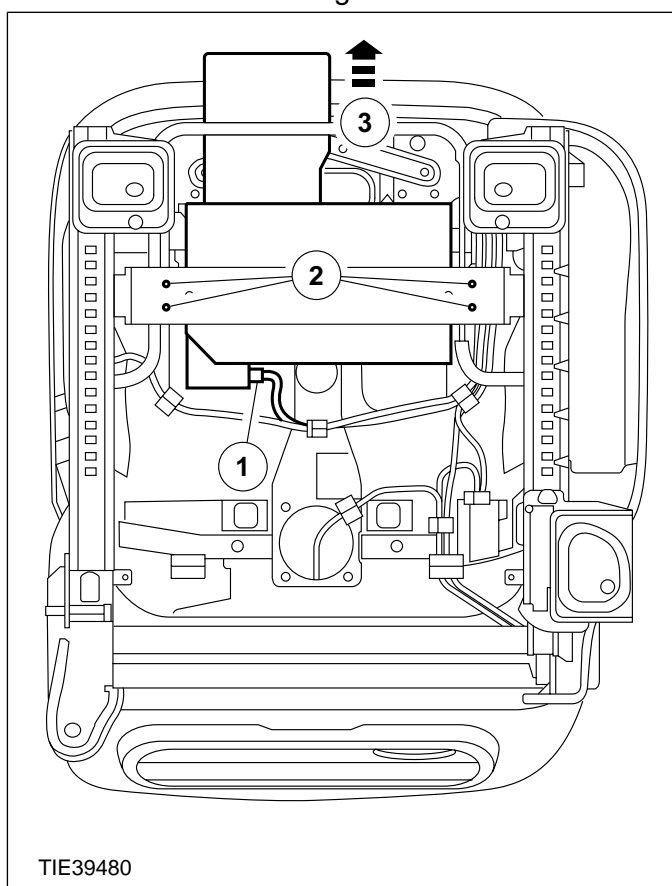
General Equipment

Electric hand drill
Blind rivet hand-gun

Removal

1. Remove the compact disc (CD) changer (if equipped).

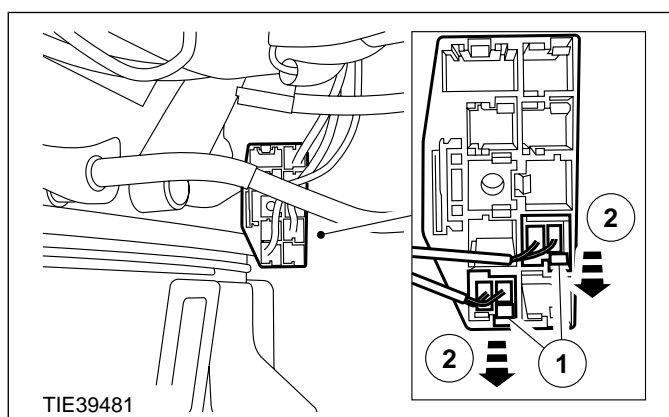
1. Disconnect the CD changer electrical connector.
2. Using a suitable electric hand drill, remove the rivets.
3. Slide the CD changer forwards.



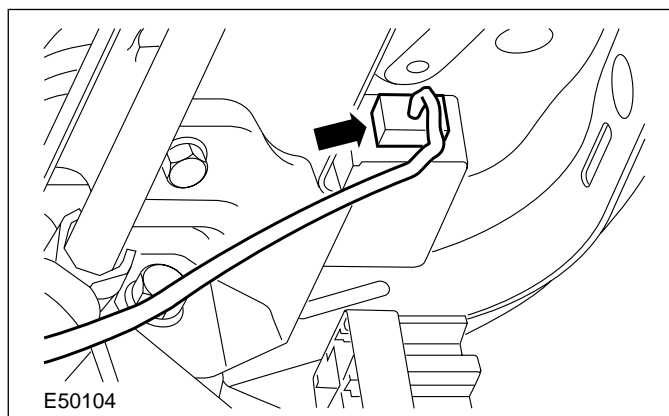
2. Detach the heater mat electrical connectors from the underside of the seat (if equipped).

1. Using a suitable screwdriver, depress the locking tangs.

2. Detach the electrical connectors.



3. Detach the heated seat module electrical connector (if equipped).

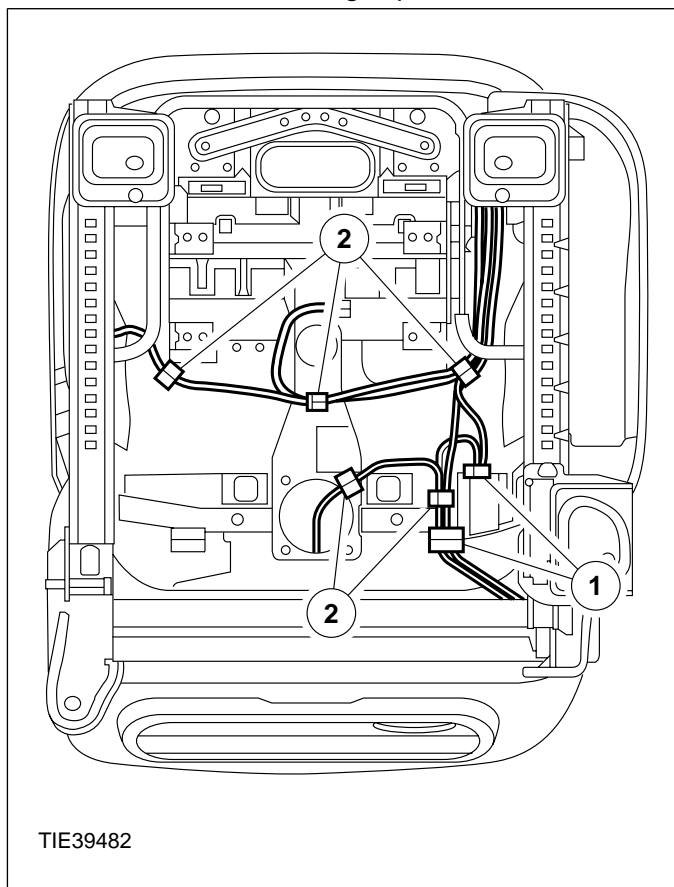


4. Detach the electrical harnesses from the underside of the front seat cushion.

1. Disconnect the electrical connectors.

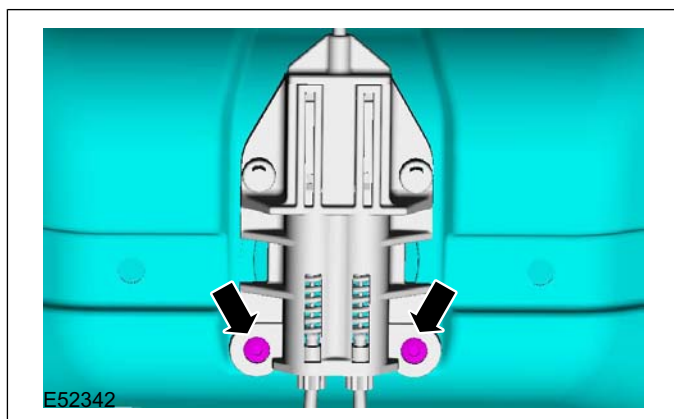
REMOVAL AND INSTALLATION

2. Detach the retaining clips.

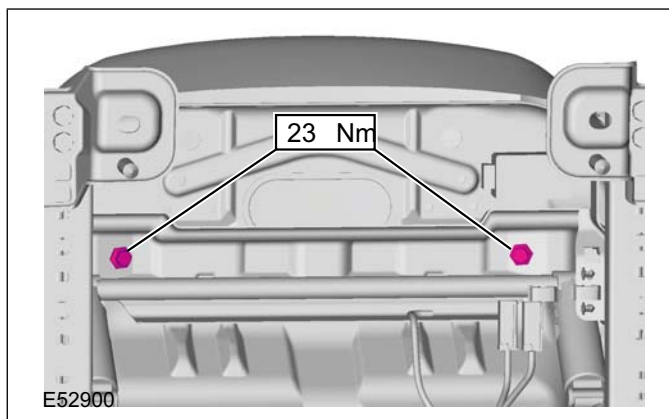


5. Detach the seat track release cable assembly from the underside of the front seat cushion (if equipped).

- Using a suitable electric hand drill, remove the rivets.



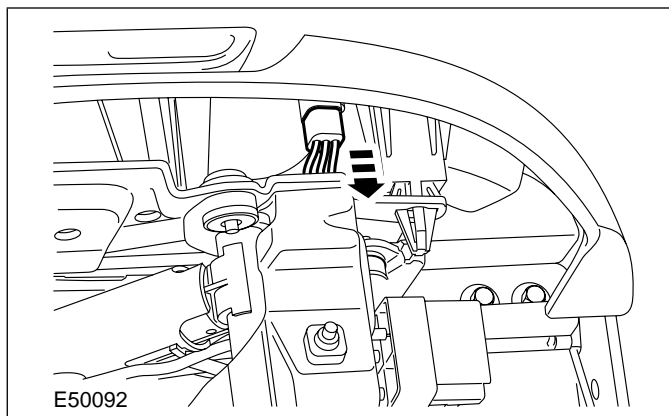
6. Remove the front seat cushion.



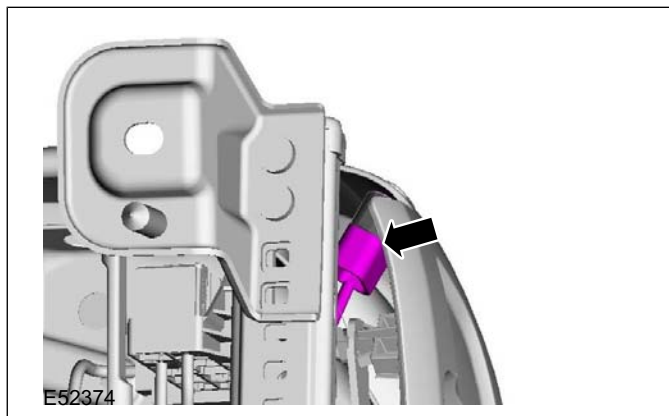
7. **CAUTION:** To avoid damage to the front seat backrest recliner handwheel, even pressure must be applied to the opposite sides of the handwheel.

Remove the front seat backrest recliner handwheel (if equipped).

8. Disconnect the front seat position adjustment switch electrical connector(s).



9. Disconnect the adjustable clutch pedal and adjustable brake pedal switch electrical connector (if equipped).



501-10-19

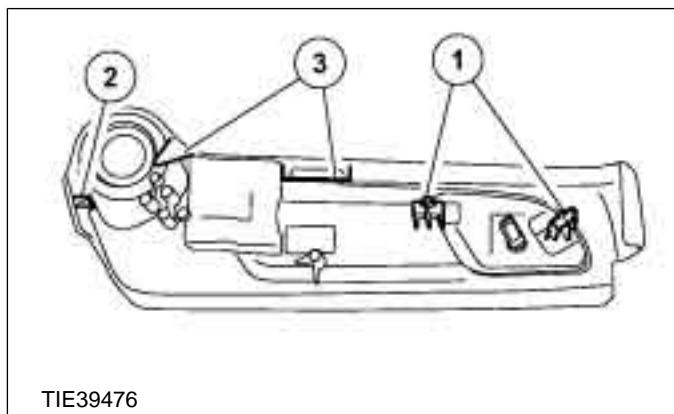
Seating

501-10-19

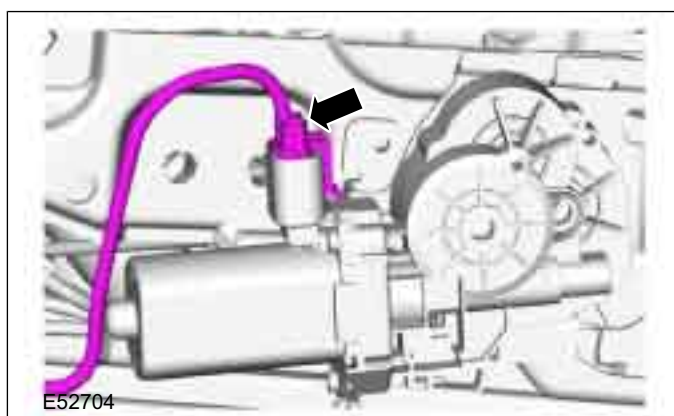
REMOVAL AND INSTALLATION

10. Remove the seat track outer side trim panel.

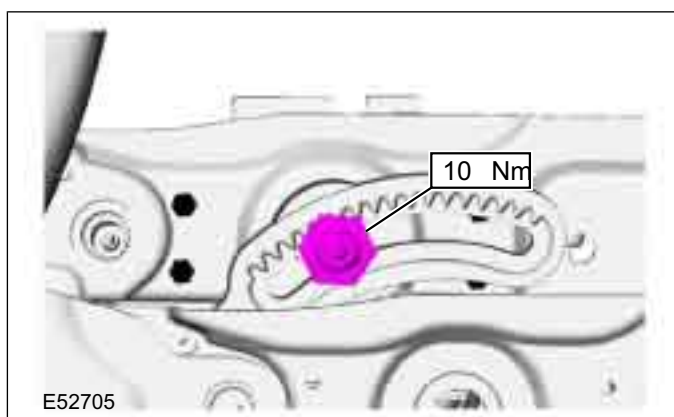
- Release the retaining clips in the sequence shown.



11. Disconnect the front seat height adjustment motor electrical connector.

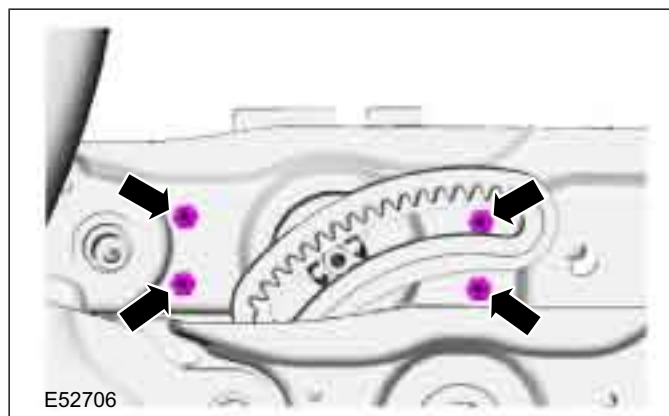


12. Remove the front seat height adjustment motor regulator retaining screw and washer.



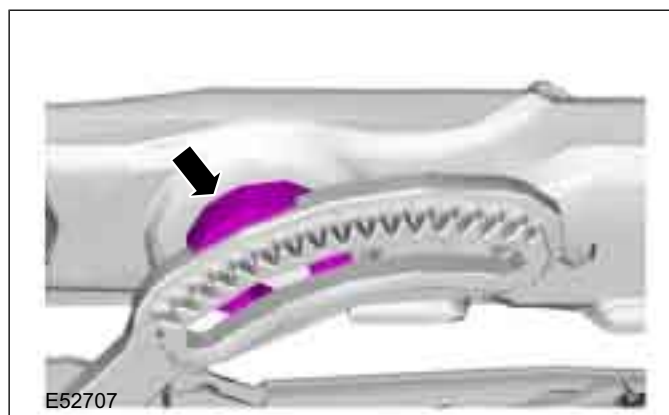
13. Remove the front seat height adjustment motor.

- Using a suitable electric hand drill, remove the rivets.



14. NOTE: Note the position of the front seat height adjustment motor spacer, to aid installation.

Remove the front seat height adjustment motor spacer.



Installation

- NOTE: Using a suitable blind rivet hand-gun, install new rivets.

To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

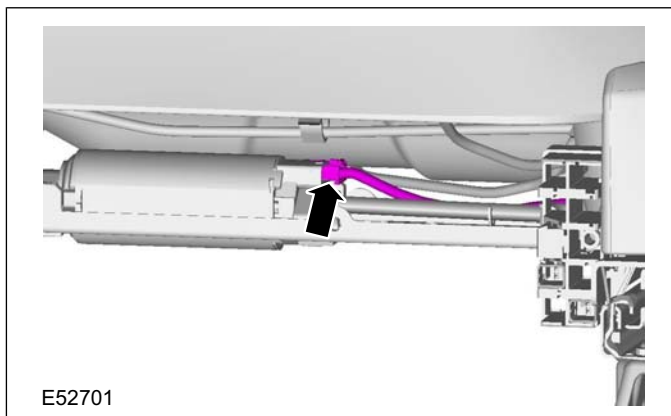
Front Seat Track Motor

Removal

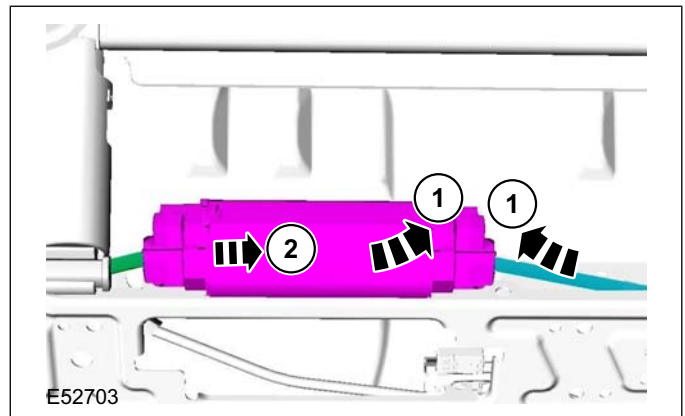
1. Remove the front seat.

For additional information, refer to: **Front Seat (501-10 Seating, Removal and Installation)**.

2. Disconnect the front seat track motor electrical connector.



2. Detach the front seat track motor from the short front seat track operating cable.

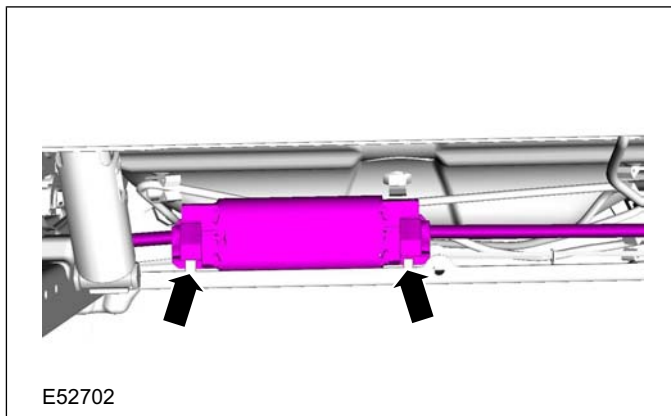


Installation

1. To install, reverse the removal procedure.

3. Detach the front seat track motor from the front seat track motor retaining bracket.

- Release the retaining clips on both sides.



4. Remove the front seat track motor.

1. Detach the front seat track motor from the long front seat track operating cable.

REMOVAL AND INSTALLATION

Front Seat Backrest Cover — 2.5L Duratec-ST (VI5)

Removal

All vehicles

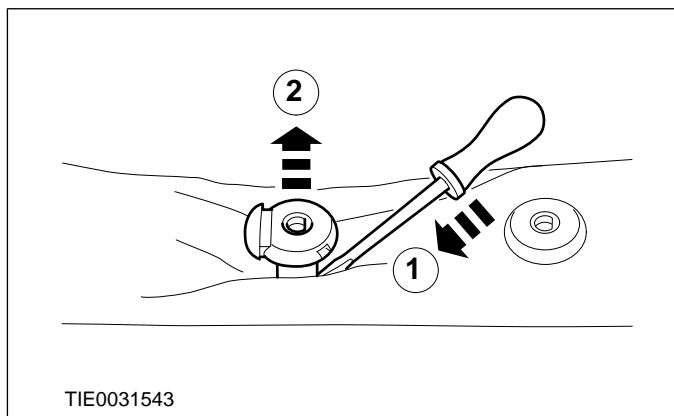
CAUTION: Take extra care not to damage the wiring harnesses.

NOTE: Removal steps in this procedure may contain installation details.

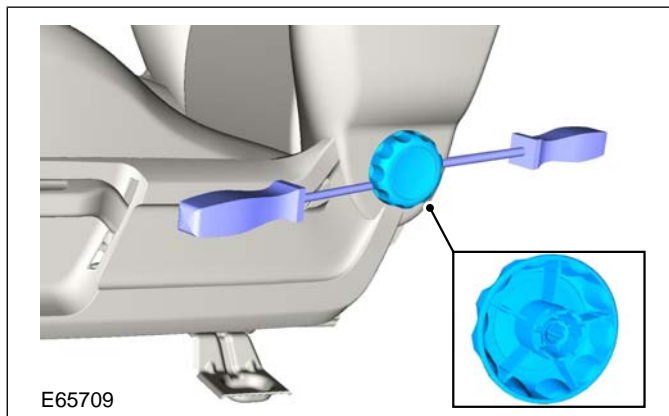
1.



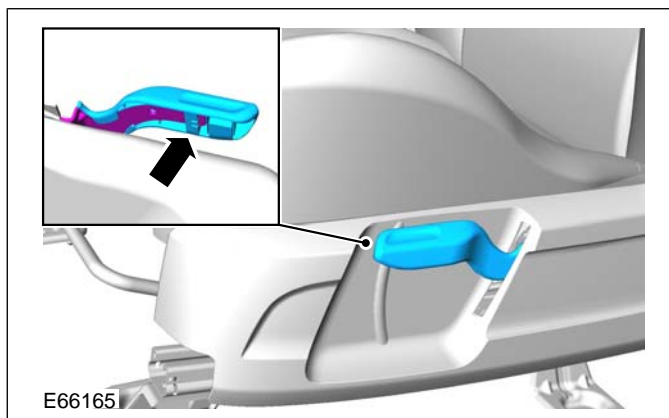
2.



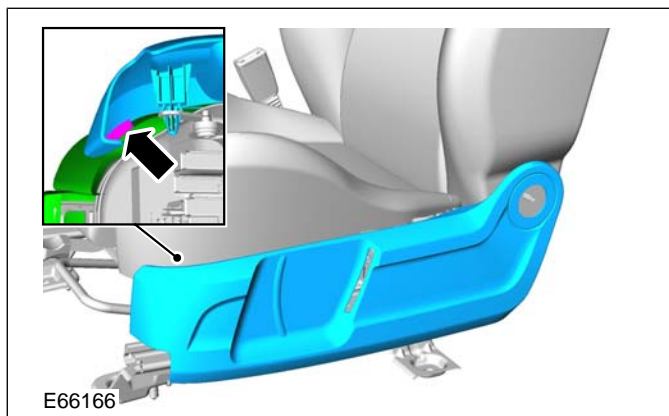
3.



4.



5.



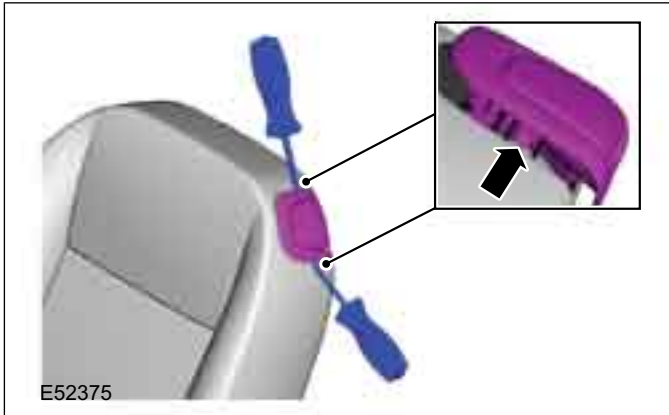


REMOVAL AND INSTALLATION

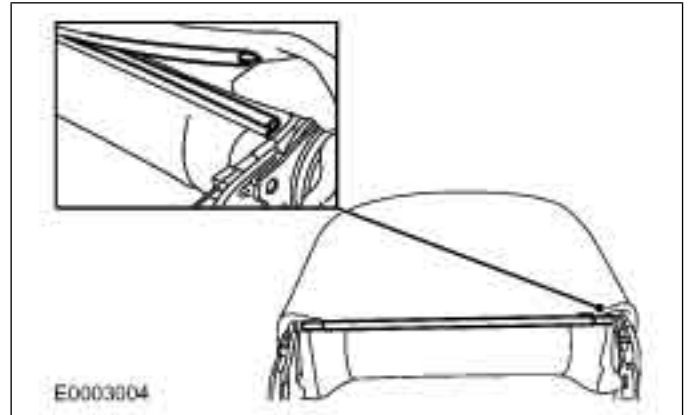
3-door

All vehicles

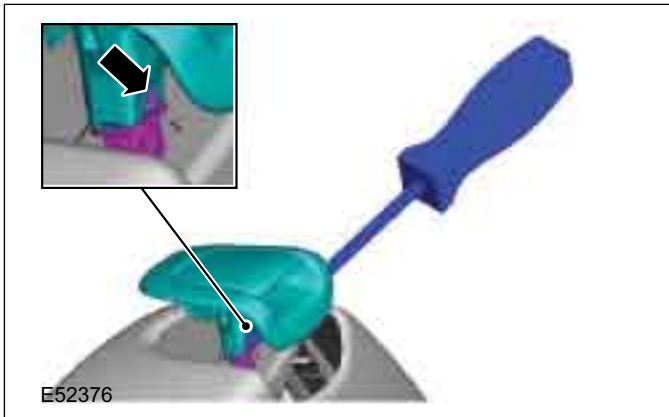
6.



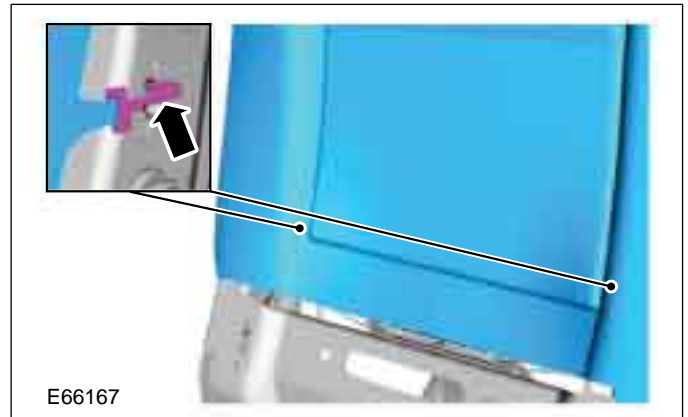
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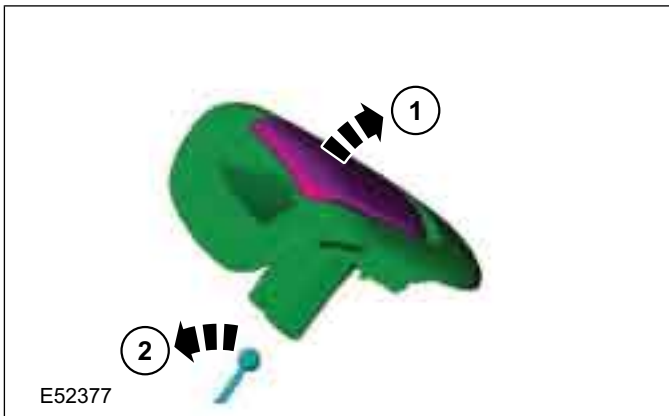
7.



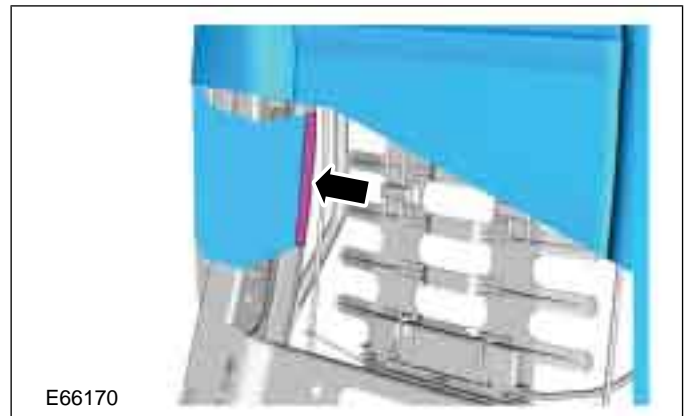
10.



8.

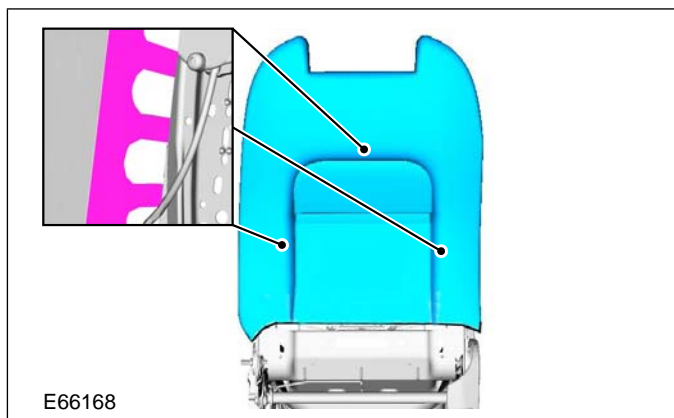


11.



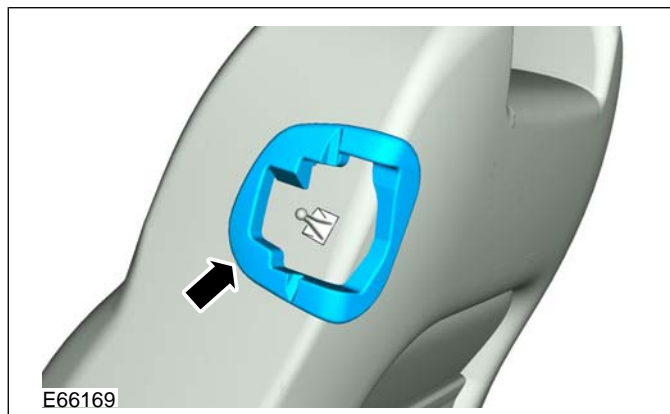
REMOVAL AND INSTALLATION

12

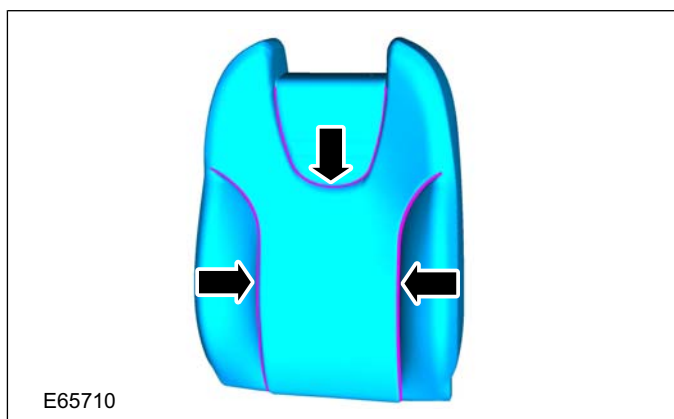


3-door

15.



13. **CAUTION:** Equal pressure should be applied to both surfaces of the hook loop tape.

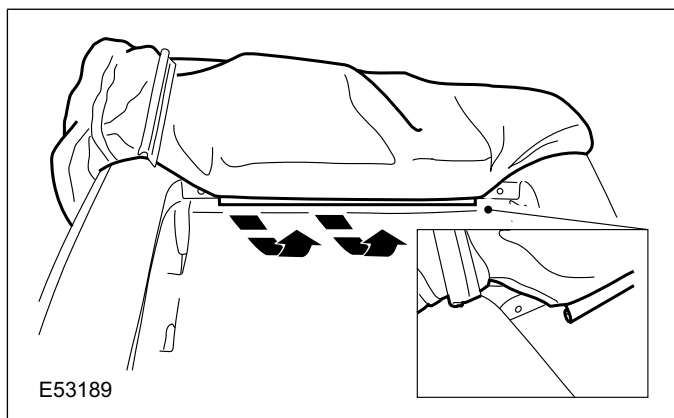


Installation

WARNING: Make sure that the seat backrest heater mat (if equipped) is correctly located with the seat backrest cover hook loop tape.

1. To install, reverse the removal procedure.

14.



REMOVAL AND INSTALLATION

Front Seat Cushion Cover — 2.5L Duratec-ST (VI5)

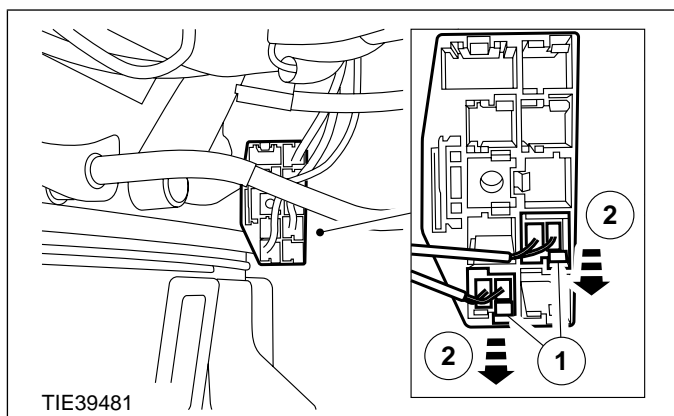
Removal

All vehicles

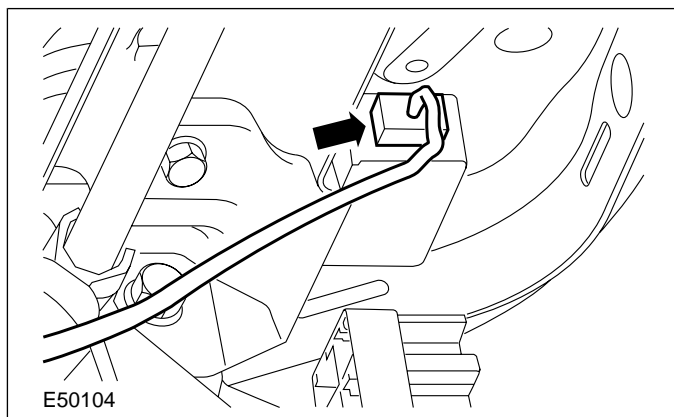
CAUTION: Take extra care not to damage the wiring harnesses.

NOTE: Removal steps in this procedure may contain installation details.

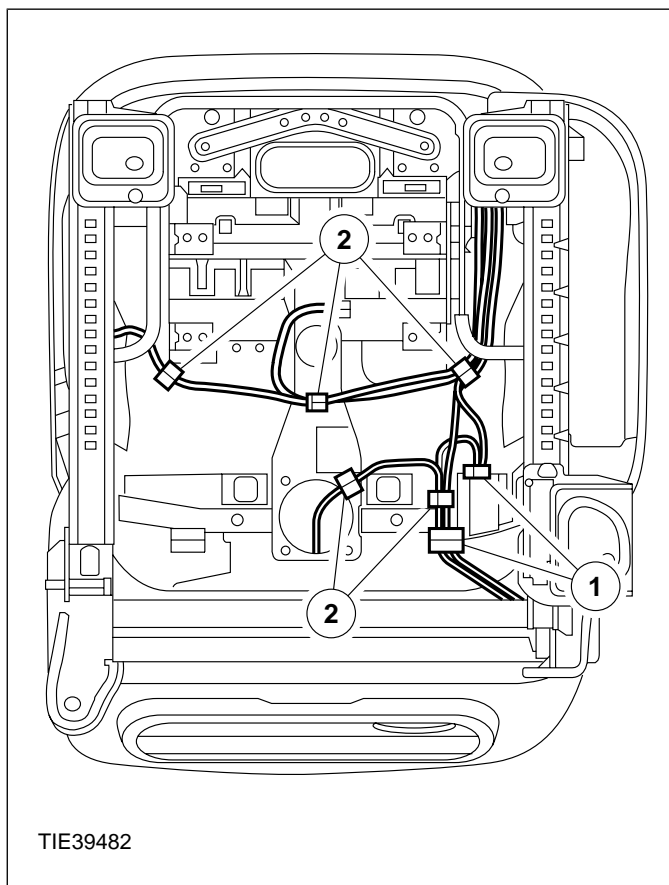
1.



2.

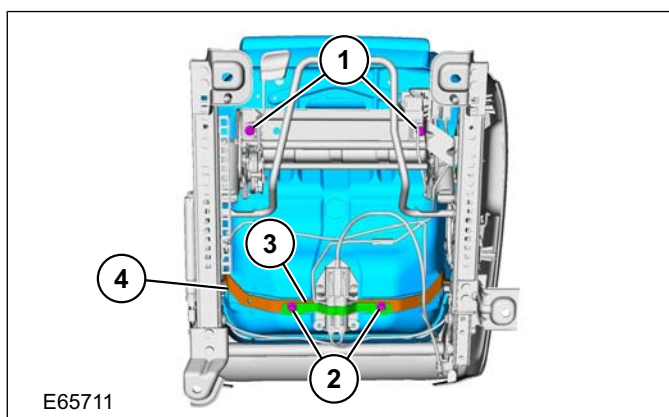


3.



3-door

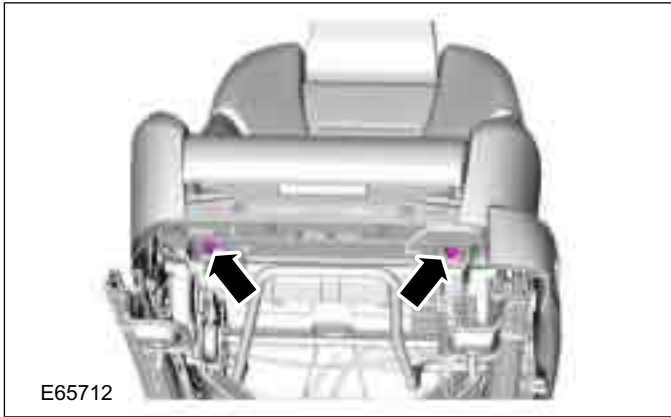
4. 1. Torque: 23 Nm



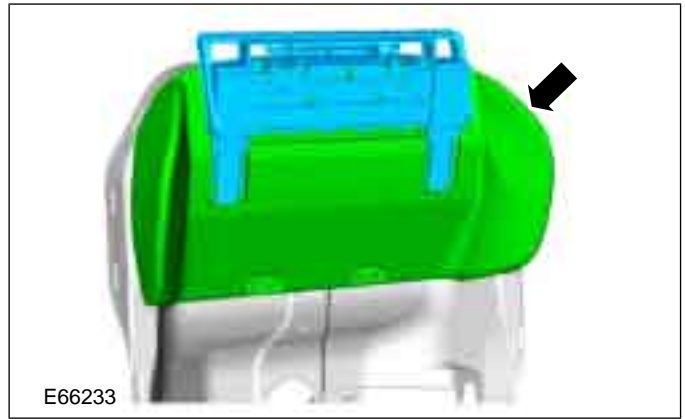
REMOVAL AND INSTALLATION

5-door

5. Torque: 23 Nm

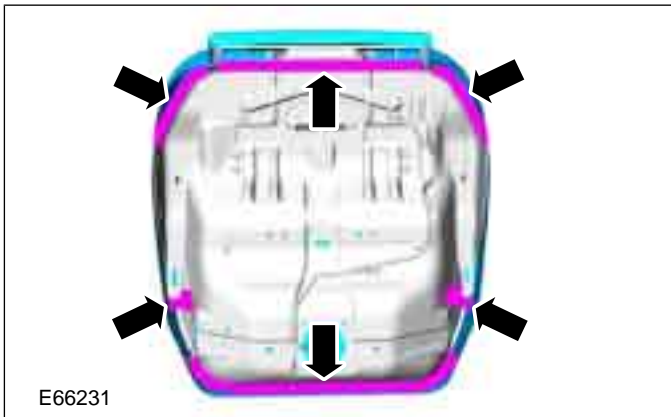


8.

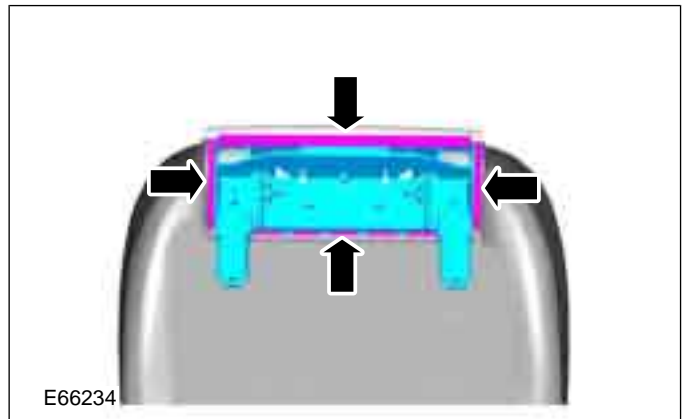


All vehicles

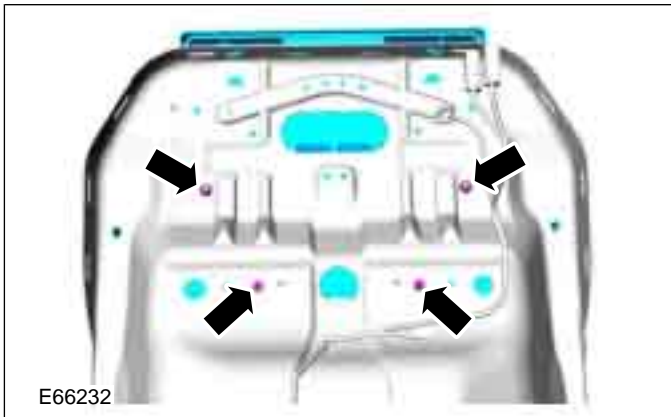
6.



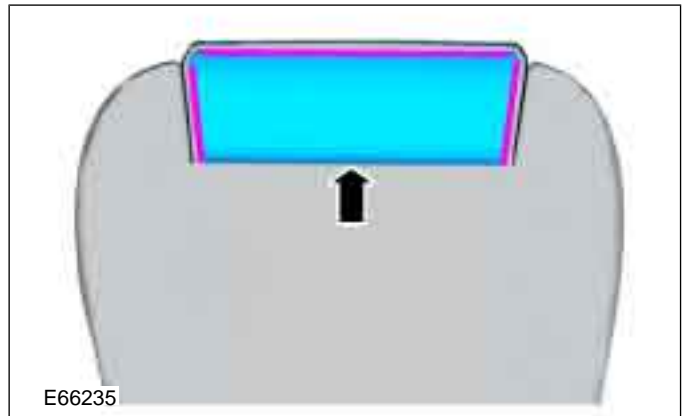
9.




7.

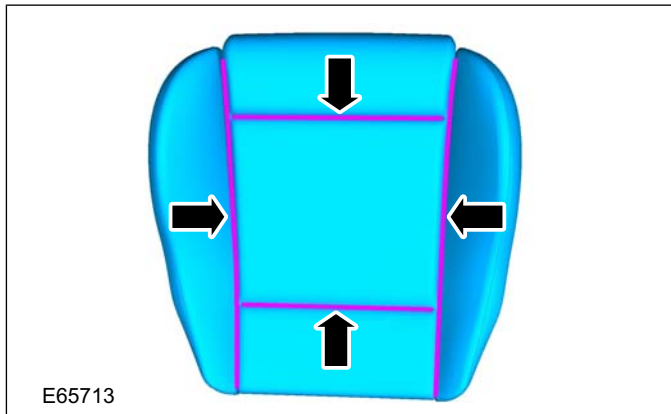


10.

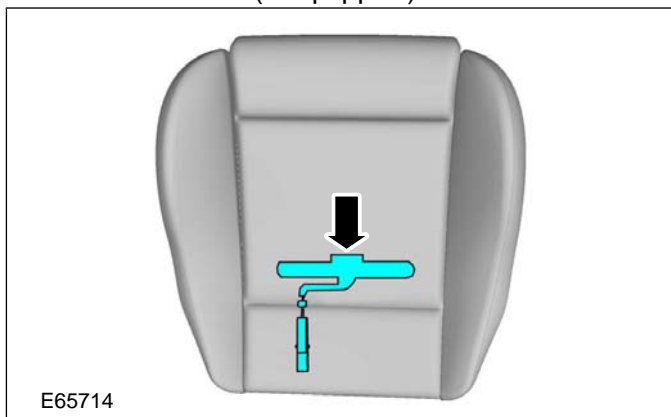




REMOVAL AND INSTALLATION

11.  **CAUTION:** Equal pressure must be applied to both surfaces of the hook and loop tape.



- 12 Remove the front passenger seat safety belt minder sensor (if equipped).

**Installation****1. WARNINGS:**

-  Make sure that the safety belt minder sensor (if equipped) is correctly located with the seat cushion cover and the seat cushion heater mat (if equipped).
-  Make sure that the seat cushion heater mat (if equipped) is correctly located with the seat cushion cover hook and loop tape.

To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

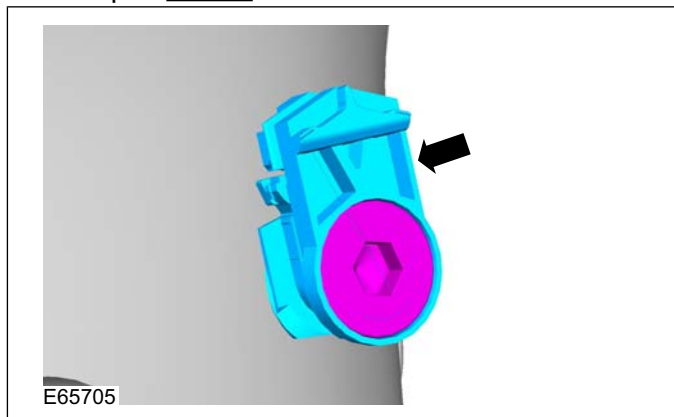
Rear Seat Backrest Cover — 2.5L Duratec-ST (VI5)

Removal

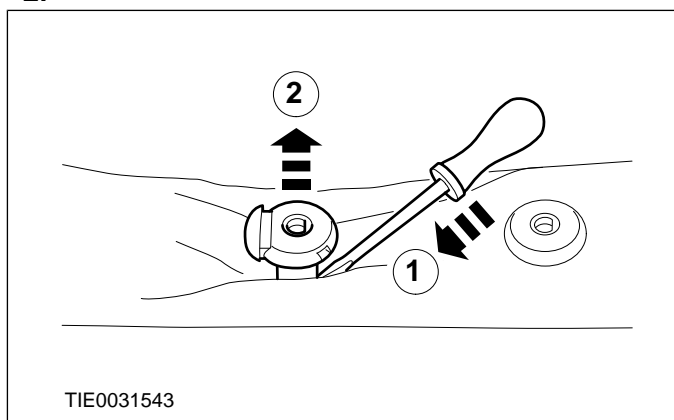
NOTE: Removal steps in this procedure may contain installation details.

All vehicles

1. Torque: 35 Nm

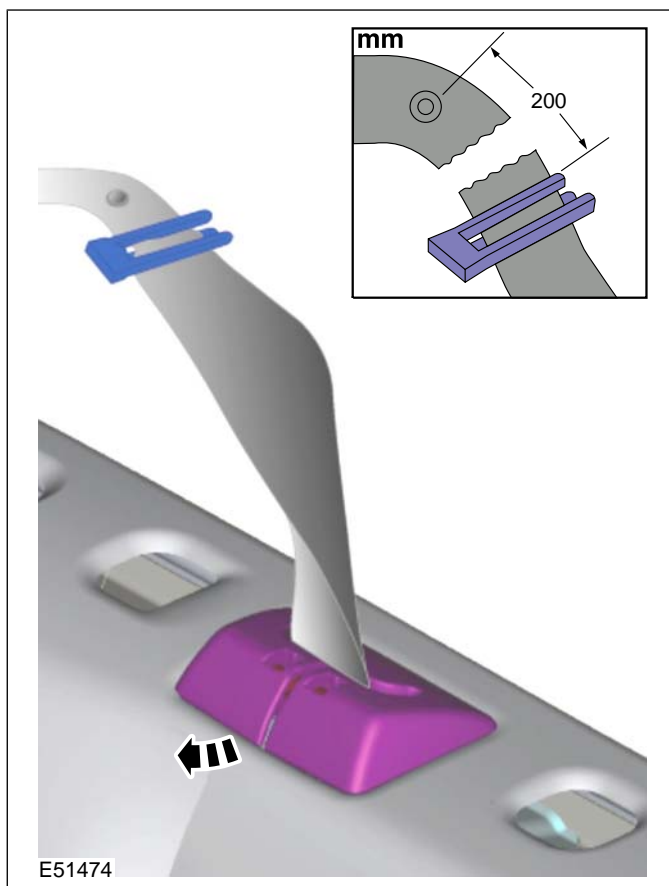


2.

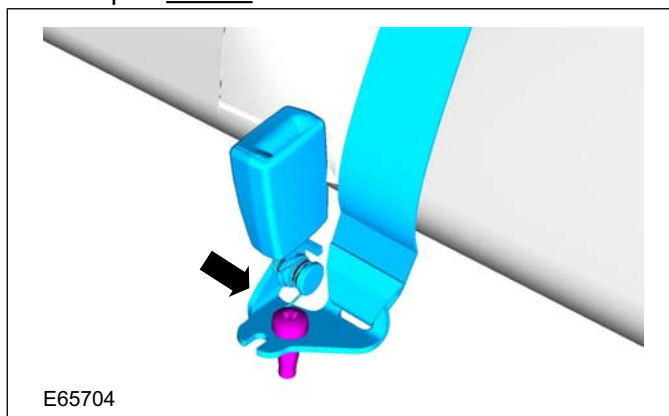


Vehicles with seat mounted safety belt retractors

3. **NOTE:** If the safety belt webbing retracts further than the safety belt webbing stop, a new safety belt retractor must be installed.



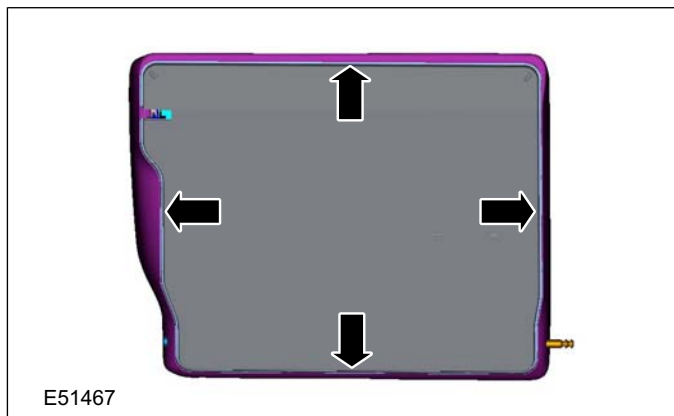
4. Torque: 55 Nm



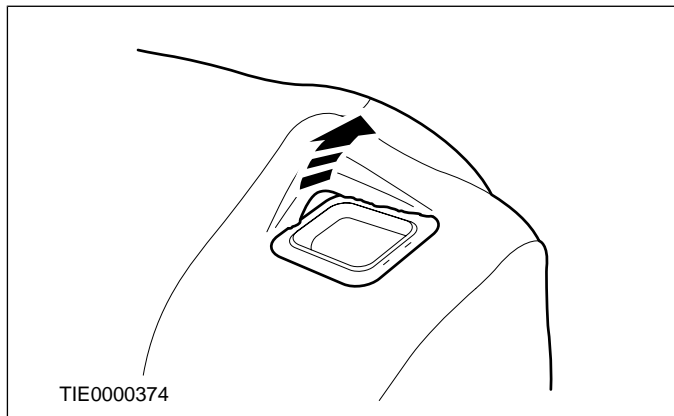
REMOVAL AND INSTALLATION

All vehicles

5.

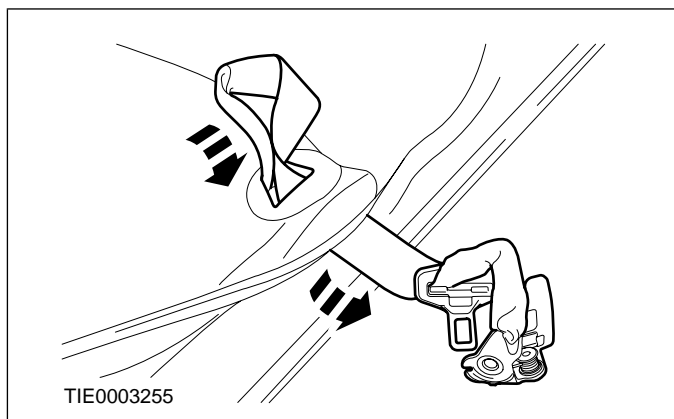


6.

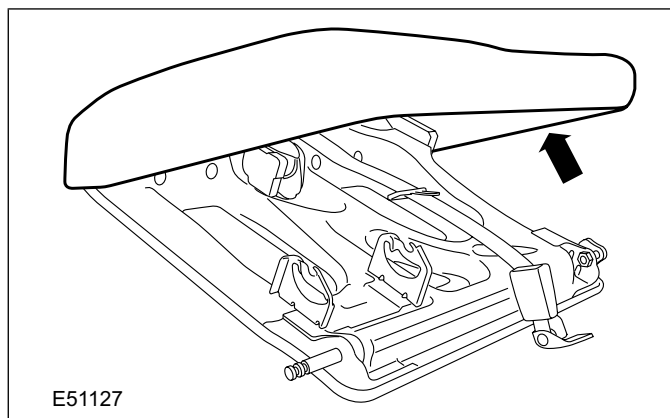


Vehicles with seat mounted safety belt retractors

7.

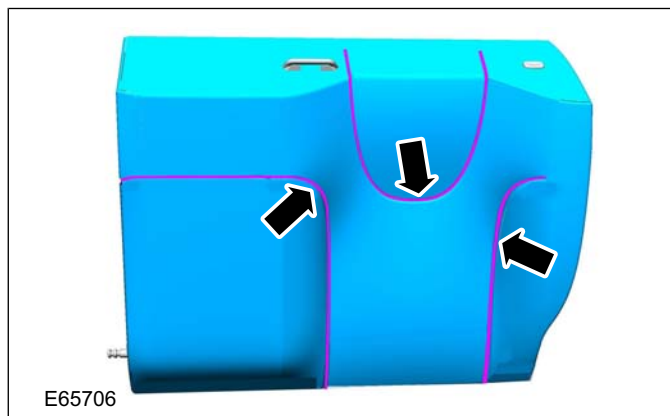


8.



All vehicles

9. **CAUTION:** Equal pressure should be applied to both surfaces of the hook and loop tape.



Installation

- NOTE:** Use the original rear seat backrest cover as a template.
Cut out the holes for the head restraint guides and rear center safety belt webbing trim panel.
- To install, reverse the removal procedure.



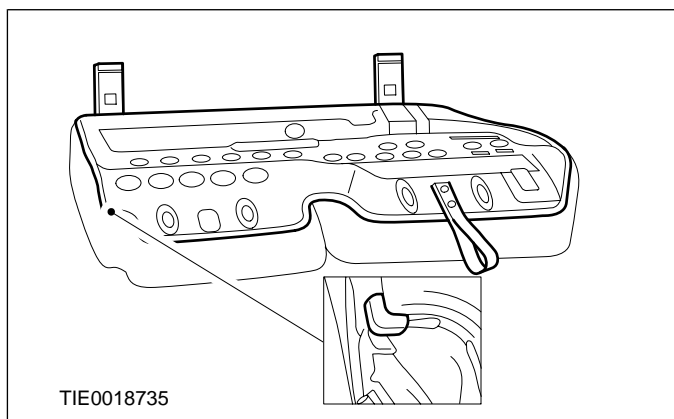
REMOVAL AND INSTALLATION

Rear Seat Cushion Cover — 2.5L Duratec-ST (VI5)

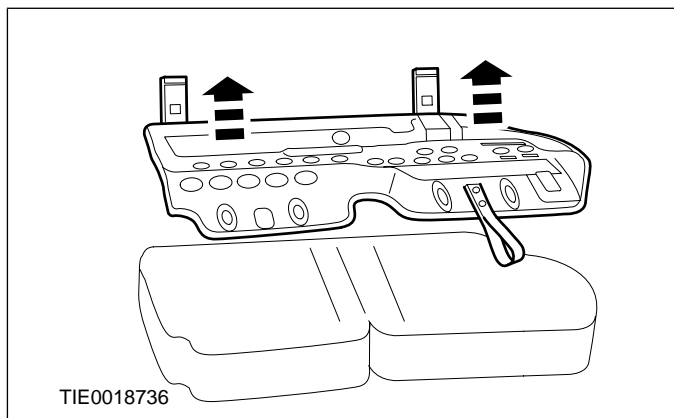
Removal

NOTE: Removal steps in this procedure may contain installation details.

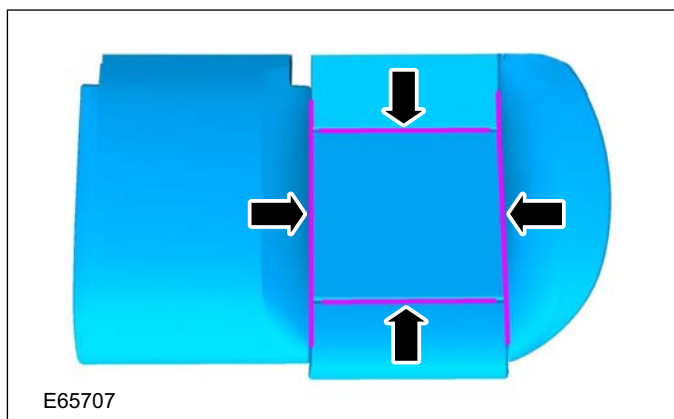
1.



2.



3. **CAUTION:** Equal pressure should be applied to both surfaces of the hook loop tape.



Installation

1. To install, reverse the removal procedure.



DISASSEMBLY AND ASSEMBLY

Rear Seat Cushion

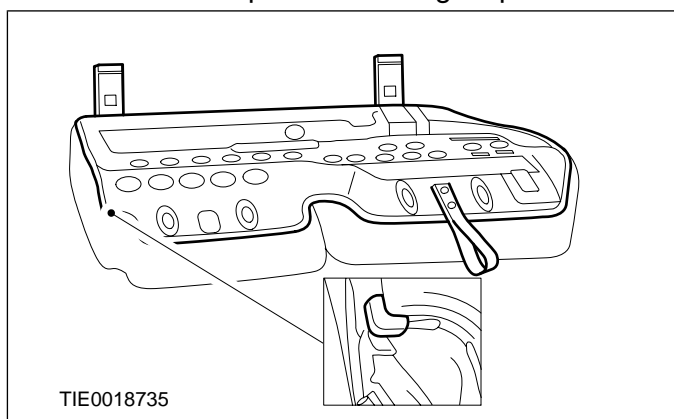
Disassembly

NOTE: The rear seat double cushion is shown in the procedure. The single cushion is similar.

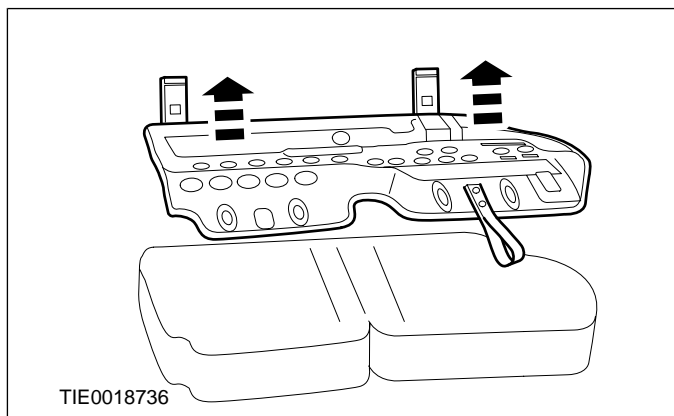
1. **NOTE: Retain the corner protector.**

Detach the seat cushion cover from the seat base.

- Detach the plastic retaining strip.



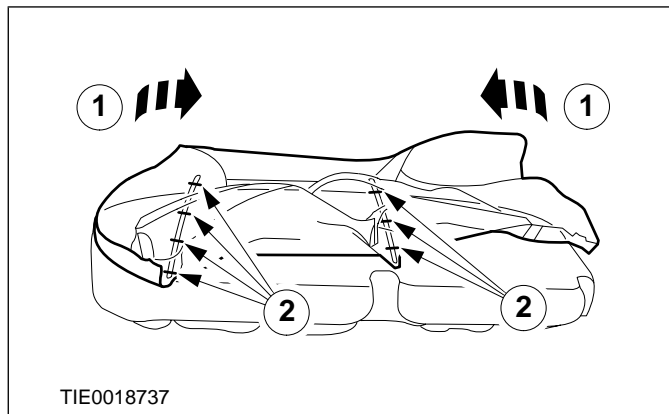
2. Remove the seat base.



3. Detach the cushion cover from each side of the cushion.

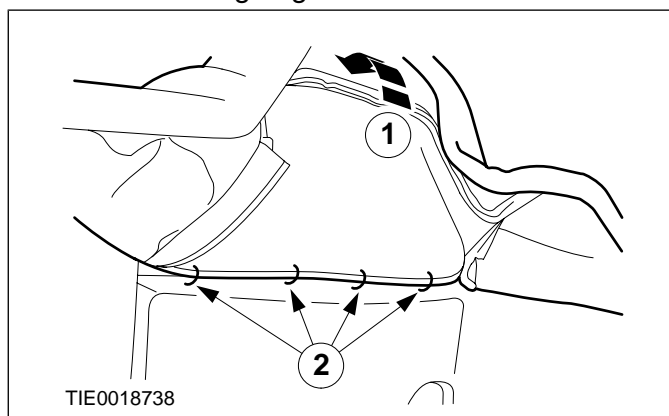
1. Roll the cushion cover towards the center to access the pleating hog rings.

2. Cut the hog rings.



4. Remove the cushion cover.

1. Roll the cushion cover back to access the pleating hog rings.
2. Cut the hog rings.



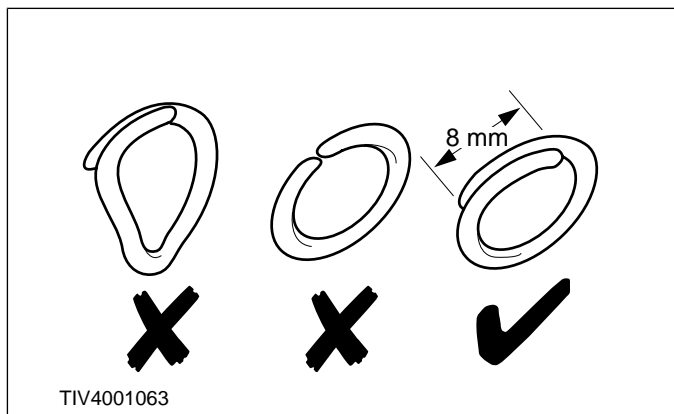
Assembly

1. **NOTE: Use hog ring pliers to close the hog rings. Do not use any other tool. The hog rings must be closed to overlap 8 mm as illustrated.**



DISASSEMBLY AND ASSEMBLY

To assemble, reverse the disassembly procedure.



DISASSEMBLY AND ASSEMBLY

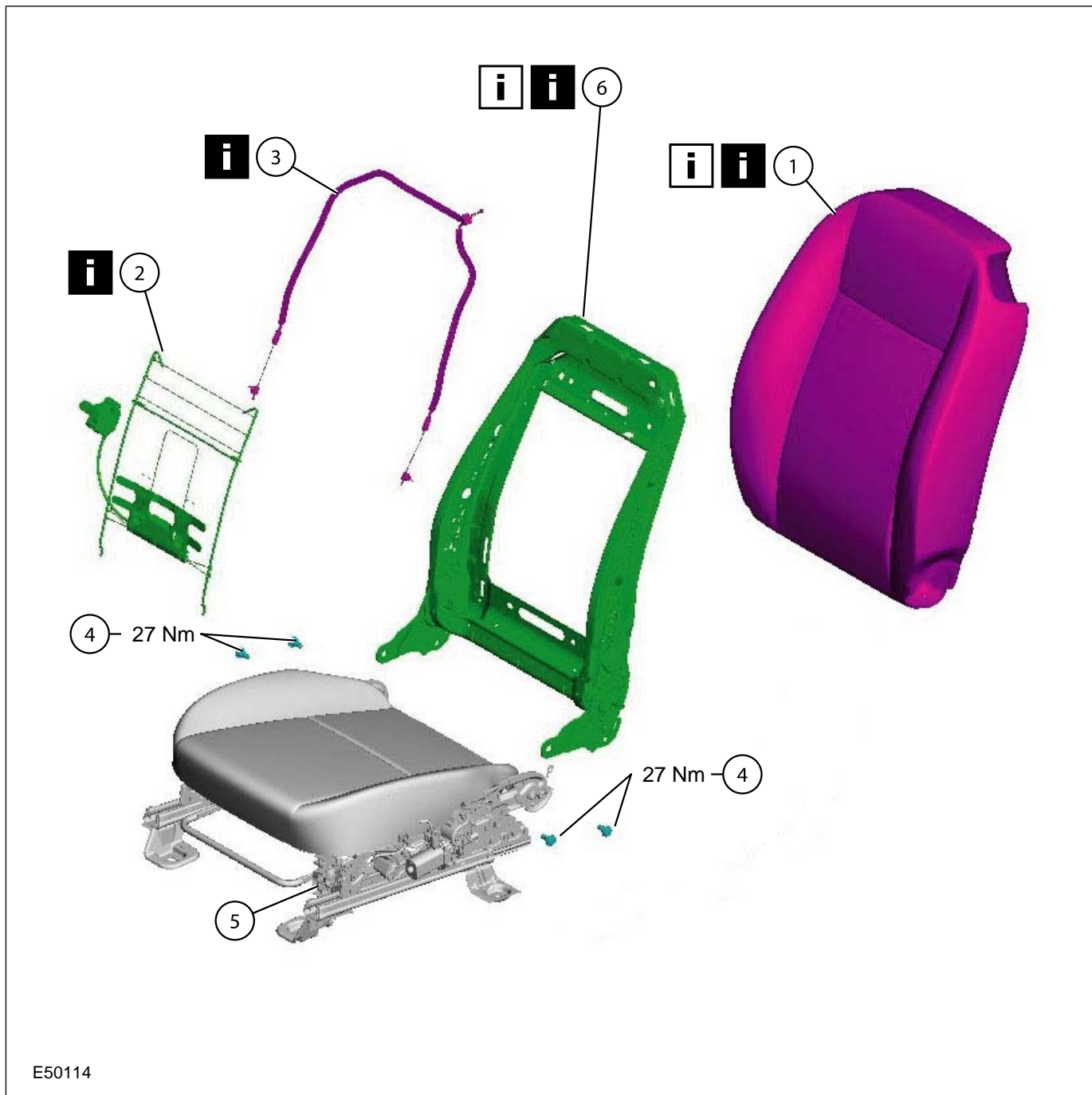
Front Seat Backrest — 3-Door

▲ WARNING: Note the position of the wiring harnesses, to aid installation. An incorrectly routed wiring harness could become damaged when the front seat is moved. Failure to follow this instruction may result in personal injury.

1. Remove the side air bag module.

For additional information, refer to: **Side Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation)**.

2. Disassemble the components in the order indicated in the following illustration(s) and table(s).



E50114

DISASSEMBLY AND ASSEMBLY

Item	Description
1	Front seat backrest pad See Disassembly Detail See Assembly Detail
2	Front seat backrest lumbar support (if equipped) See Disassembly Detail
3	Front seat backrest release lever cable assembly See Disassembly Detail

Item	Description
4	Front seat backrest frame retaining bolts
5	Front seat frame
6	Front seat backrest frame See Disassembly Detail See Assembly Detail

3. To assemble, reverse the disassembly procedure.

Disassembly Details

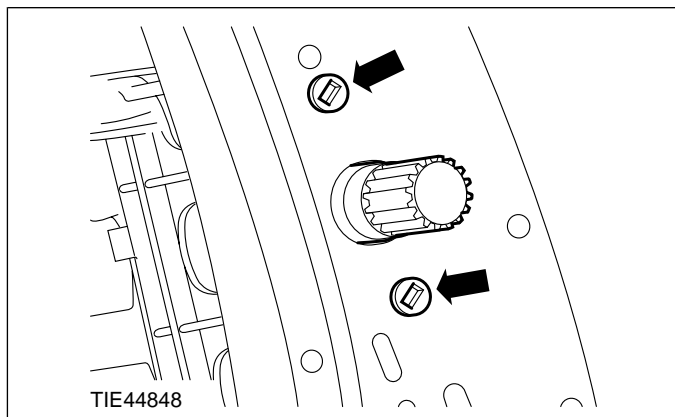
Item 1 Front seat backrest pad

NOTE: Note the position of the front seat backrest anti-squeak mat to aid assembly.

Item 2 Front seat backrest lumbar support (if equipped)

1. Detach the front seat backrest lumbar support adjuster from the front seat backrest frame.

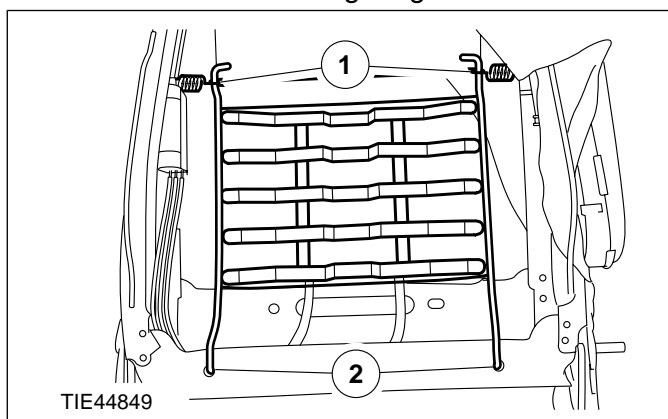
- Remove the screws.



2. Remove the front seat backrest lumbar support.

1. Detach the retaining springs.

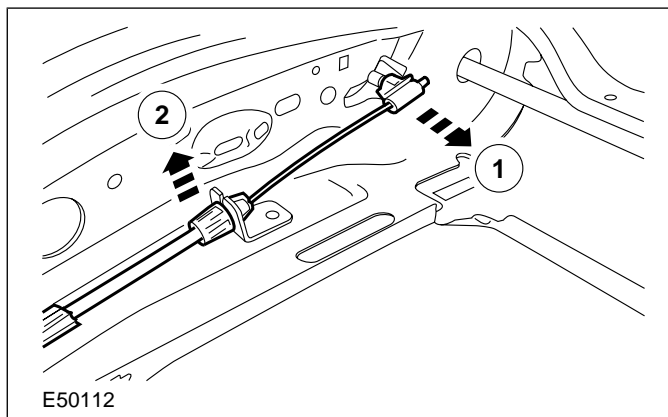
2. Detach the retaining tangs.



Item 3 Front seat backrest release lever cable assembly

1. Detach the front seat backrest release lever cables from the lower end of the front seat backrest on both sides.

1. Detach the inner cable from the release catch.
2. Detach the outer cable from the front seat backrest frame.



DISASSEMBLY AND ASSEMBLY

Item 6 Front seat backrest frame

1. Detach the front seat track release cable from the lower end of the front seat backrest frame.



Assembly Details

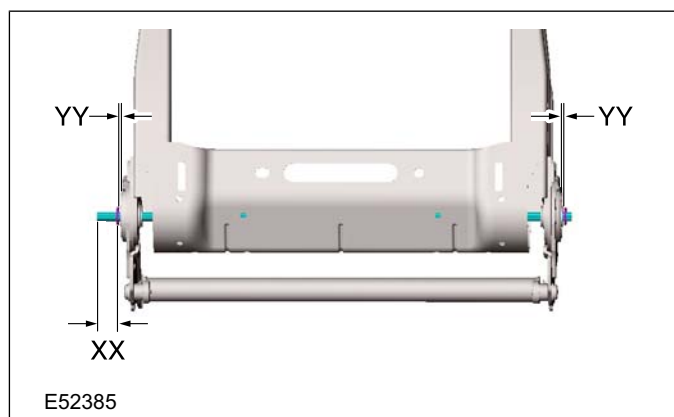
Item 6 Front seat backrest frame

- ⚠ CAUTION:** After installation check for correct operation of the front seat track release cable.

1. **NOTE:** If installing a new front seat backrest frame that is equipped with a front seat backrest recliner handwheel, the front seat backrest recliner handwheel drive shaft is to be aligned.

Align the front seat backrest recliner handwheel drive shaft.

- Front seat backrest recliner handwheel drive shaft end protusion at the outer side of the backrest frame XX = 25 mm.
- Clearance between the front seat backrest frame and the front seat backrest recliner handwheel drive shaft retaining clips YY = 2 mm.



positioned around the side air bag module. Failure to follow this instruction may result in personal injury.

Item 1 Front seat backrest pad

- ⚠ WARNING:** Side air bag deployment may be impaired if the front seat backrest pad and anti-squeak mat are not correctly



DISASSEMBLY AND ASSEMBLY

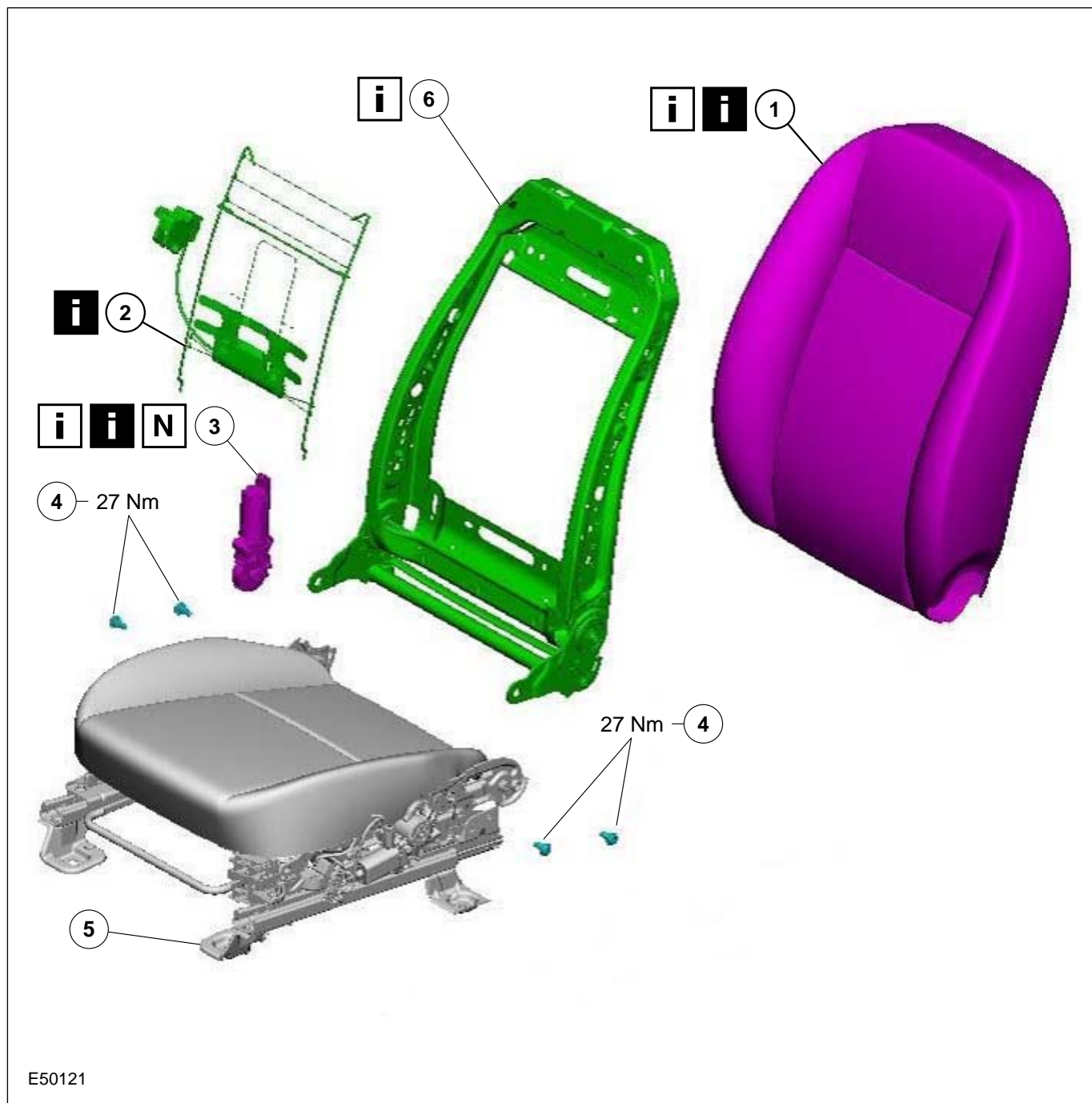
Front Seat Backrest — 4-Door/5-Door/Wagon

▲ WARNING: Note the position of the wiring harnesses, to aid installation. An incorrectly routed wiring harness could become damaged when the front seat is moved. Failure to follow this instruction may result in personal injury.

1. Remove the side air bag module.

For additional information, refer to: **Side Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation)**.

2. Disassemble the components in the order indicated in the following illustration(s) and table(s).



E50121



DISASSEMBLY AND ASSEMBLY

Item	Description
1	Front seat backrest pad See Disassembly Detail See Assembly Detail
2	Front seat backrest lumbar support (if equipped) See Disassembly Detail
3	Front seat backrest recliner motor (if equipped) See Disassembly Detail See Assembly Detail

Item	Description
4	Front seat backrest frame retaining bolts
5	Front seat frame
6	Front seat backrest frame See Assembly Detail

3. To assemble, reverse the disassembly procedure.

Disassembly Details

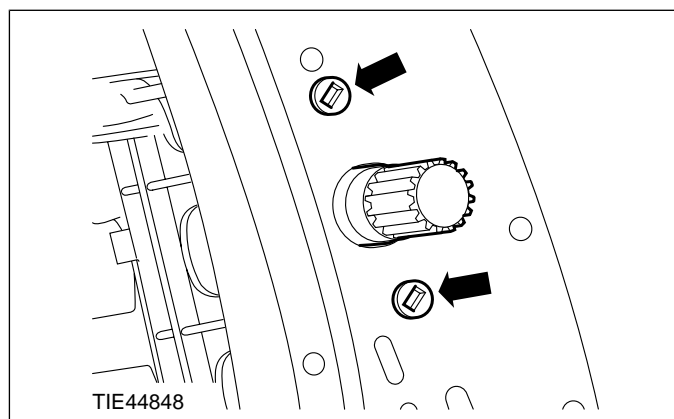
Item 1 Front seat backrest pad

NOTE: Note the position of the front seat backrest anti-squeak mat to aid assembly.

Item 2 Front seat backrest lumbar support (if equipped)

1. Detach the front seat lumbar support adjuster from the front seat backrest frame.

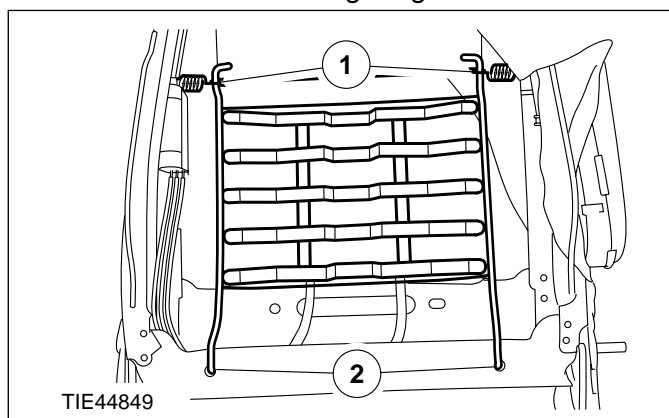
- Remove the screws.



2. Remove the front seat backrest lumbar support.

- Detach the retaining springs.

2. Detach the retaining tangs.



Item 3 Front seat backrest recliner motor (if equipped)

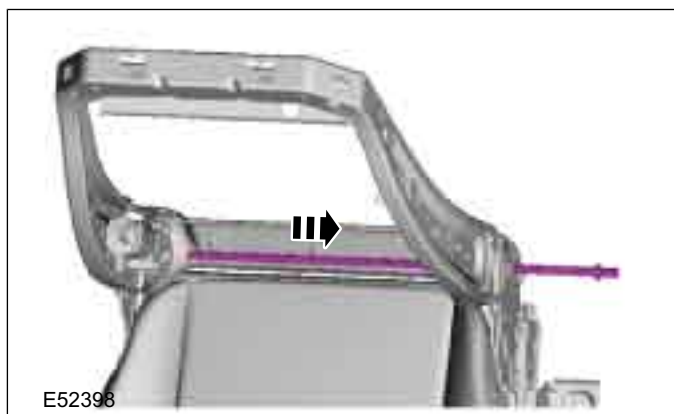
1. Remove the front seat backrest recliner motor drive shaft inner retaining clip.

- Discard the retaining clip.



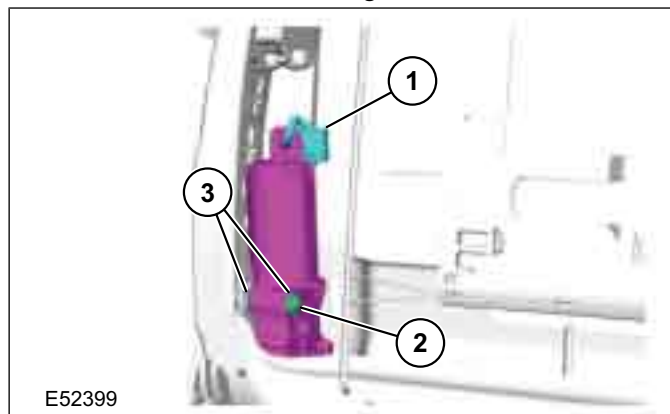
DISASSEMBLY AND ASSEMBLY

2. Detach the front seat backrest recliner motor drive shaft from the motor.



3. Remove the front seat backrest recliner motor.

1. Disconnect the electrical connector.
2. Remove the retaining bolt.
3. Remove the retaining bolt bushes.



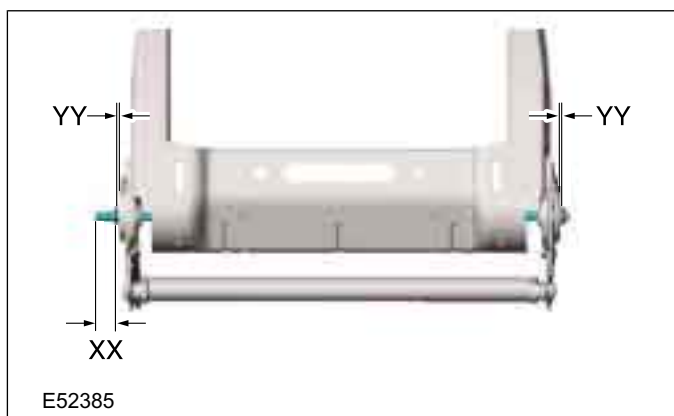
Assembly Details

Item 6 Front seat backrest frame

1. **NOTE:** If installing a new front seat backrest frame that is equipped with a front seat backrest recliner handwheel, the front seat backrest recliner handwheel drive shaft is to be aligned.

Align the front seat backrest recliner handwheel drive shaft.

- Front seat backrest recliner handwheel drive shaft end protusion at the outer side of the backrest frame $XX = 25$ mm.
- Clearance between the front seat backrest frame and the front seat backrest recliner handwheel drive shaft retaining clips $YY = 2$ mm.



Item 3 Front seat backrest recliner motor (if equipped)

NOTE: Install a new front seat backrest recliner motor drive shaft inner retaining clip.

Item 1 Front seat backrest pad

WARNING: Side air bag deployment may be impaired if the front seat backrest pad and anti-squeak mat are not correctly positioned around the side air bag module. Failure to follow this instruction may result in personal injury.

SECTION 501-11 Glass, Frames and Mechanisms

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS

Lubricants, Fluids, Sealers and Adhesives

	Specifications
Cleaner	WSK-M2G342-A
Primer	WSK-M2G343-A

	Specifications
2K Adhesive	WSK-M11P57-A
2K Hardener	WSK-M2G322-B2

Torque Specifications

Item	Nm	lb-ft	lb-in
Door window regulator motor retaining screws	6	-	53
Front door window regulator motor retaining screws - Convertible	6	-	53
Front door window regulator upper retaining screws - Convertible	6	-	53
Front door window regulator lower retaining screws - Convertible	12	9	-
Door inner panel retaining screws	8	-	71
Door latch retaining screws	8	-	71
Door window glass clamp retaining bolts	8	-	71
Front door window glass clamp retaining screws - Convertible	5	-	44
Rear quarter window glass clamp retaining screws - Convertible	5	-	44
Rear quarter window regulator upper retaining screw - Convertible	6	-	53
Rear quarter window regulator upper retaining nut - Convertible	6	-	53
Rear quarter window regulator lower retaining nuts - Convertible	12	9	-
Windshield wiper arm retaining nut	15	11	-
Heated windshield glass ground cable retaining nut	11	8	-

DESCRIPTION AND OPERATION

Glass, Frames and Mechanisms

Fixed Glass

Fixed window glass is directly glazed to the window opening flange by means of a polyurethane (PU) adhesive bead. In addition to fixing the glass to the opening flange, the adhesive bead also forms a water tight seal around the inner edge of the glass.

All vehicles have a heated rear window, a heated windshield is available as an option.

Moving Glass - 3-Door, 4-Door, 5-Door and Wagon

The front power windows have a one-touch down and a one-touch up function, combined with anti-trap protection, which is active whenever the window is closing. The anti-trap function will automatically deactivate if operated more than twice consecutively. The anti-trap function will reset automatically when the window is closed, after 10 seconds, or if the ignition is switched OFF then ON.

Front power windows are installed as standard.

Global closing of the front power windows is standard. Global closing on the front power windows can only be operated by using the remote key.

Rear power windows do not have anti-trap functionality and are not part of global closing.

Vehicles equipped with front and rear power windows require an initialization process to be carried out on each window motor. The initialization process is carried out before the vehicle leaves the production plant. However the initialization process will need to be carried out again whenever the power supply has been disconnected.

The multiple switch on the driver door incorporates a safety switch which, when operated, prevents the rear power windows from being opened by the rear power window switches. However, the rear power windows can still be operated from the driver switch.

Moving Glass - Convertible

The front power windows have a one-touch down and a one-touch up function, combined with anti-trap protection, which is active whenever the window is closing. The anti-trap function will automatically deactivate if operated more than twice consecutively. The anti-trap function will reset automatically when the window is closed, after 10 seconds, or if the ignition is switched OFF then ON.

Front and rear quarter power windows are installed as standard.

Global closing of the front power windows is standard. Global closing on the front power windows can only be operated by using the remote key.

Rear quarter power windows do not have anti-trap functionality and are not part of global closing.

Vehicles require an initialization process to be carried out on each window motor. The initialization process is carried out before the vehicle leaves the production plant. However the initialization process will need to be carried out again whenever the power supply has been disconnected.

The multiple switch on the driver door incorporates a safety switch which, when operated, prevents the rear quarter power windows from being opened by the rear quarter power window switches. However, the rear quarter power windows can still be operated from the driver switch.

When the convertible roof is opened, the front and rear quarter power windows have a drop movement. When the convertible roof is closed, the front and rear quarter power windows move upwards to a fully closed position after the convertible roof has locked.

DIAGNOSIS AND TESTING

Glass, Frames and Mechanisms — Vehicles Without: Global Closing

Refer to Wiring Diagrams Section 501-11, for schematic and connector information.

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> • Window seal • Door window frame 	<ul style="list-style-type: none"> • Fuse(s) • Electrical connector(s) • Switch(es) • Grid wire(s) • Circuit(s)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Symptom Chart

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • All power windows are inoperative - front power windows 	<ul style="list-style-type: none"> • Circuit(s). 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.
<ul style="list-style-type: none"> • The left or right power window is inoperative - driver side 	<ul style="list-style-type: none"> • Driver side power window control switch. 	<ul style="list-style-type: none"> • CARRY OUT the Driver Side Power Window Control Switch Component Test. REFER to the Wiring Diagrams.
	<ul style="list-style-type: none"> • Driver side front door window regulator motor. • Circuit(s). 	<ul style="list-style-type: none"> • GO to Pinpoint Test B.
<ul style="list-style-type: none"> • The left or right power window is inoperative - passenger side 	<ul style="list-style-type: none"> • Passenger side power window control switch. 	<ul style="list-style-type: none"> • CARRY OUT the Passenger Side Power Window Control Switch Component Test. REFER to the Wiring Diagrams.
	<ul style="list-style-type: none"> • Driver side power window control switch. 	<ul style="list-style-type: none"> • CARRY OUT the Driver Side Power Window Control Switch Component Test. REFER to the Wiring Diagrams.
	<ul style="list-style-type: none"> • Passenger side front door window regulator motor. • Circuit(s). 	<ul style="list-style-type: none"> • GO to Pinpoint Test C.
<ul style="list-style-type: none"> • The one-touch down feature is inoperative - front power windows 	<ul style="list-style-type: none"> • Driver side power window control switch. 	<ul style="list-style-type: none"> • CARRY OUT the Driver Side Power Window Control Switch Component Test. REFER to the Wiring Diagrams.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> The defrost system is inoperative 	<ul style="list-style-type: none"> Central Junction Box (CJB). 	<ul style="list-style-type: none"> For additional information, REFER to WDS.
	<ul style="list-style-type: none"> Heated windshield glass relay. 	<ul style="list-style-type: none"> For additional information, REFER to WDS.
	<ul style="list-style-type: none"> Heated windshield glass control switch. 	<ul style="list-style-type: none"> CARRY OUT the Heated Windshield Glass Control Switch Component Test. REFER to the Wiring Diagrams.
	<ul style="list-style-type: none"> Heated rear window glass relay. 	<ul style="list-style-type: none"> For additional information, REFER to WDS.
	<ul style="list-style-type: none"> Heated rear window glass control switch. 	<ul style="list-style-type: none"> CARRY OUT the Heated Rear Window Glass Control Switch Component Test. REFER to the Wiring Diagrams.
	<ul style="list-style-type: none"> Heated rear window glass grid wire. Circuit(s). 	<ul style="list-style-type: none"> For additional information, REFER to WDS.
<ul style="list-style-type: none"> The defrost system will not shut off automatically 	<ul style="list-style-type: none"> Central Junction Box (CJB). Heated windshield glass relay. Heated rear window glass relay. 	<ul style="list-style-type: none"> For additional information, REFER to WDS.

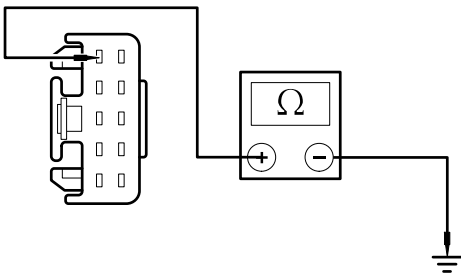
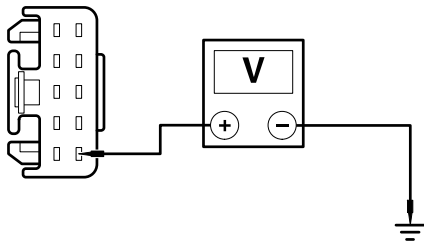
Pinpoint Tests

NOTE: Use a digital multimeter for all electrical measurements.

PINPOINT TEST A : ALL POWER WINDOWS ARE INOPERATIVE - FRONT POWER WINDOWS

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK FOR VOLTAGE TO THE POWER WINDOW CONTROL SWITCHES	
	<ol style="list-style-type: none"> Ignition switch in position II. <ul style="list-style-type: none"> Do the power window control switch LEDs illuminate? <ul style="list-style-type: none"> → Yes VERIFY the customer concern. → No GO to A2.
A2: CHECK FOR CONTINUITY BETWEEN THE DRIVER SIDE POWER WINDOW CONTROL SWITCH AND GROUND	
	<ol style="list-style-type: none"> Ignition switch in position 0. Disconnect Driver Side Power Window Control Switch C488.

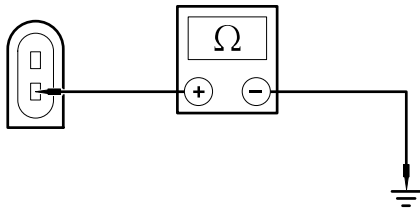
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0023402</p>	<p>3 Measure the resistance between the driver side power window control switch C488 pin 1, circuit 31-AJ7 (BK), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? → Yes GO to A3. → No REPAIR circuit 31-AJ7 (BK). TEST the system for normal operation.
<p>A3: CHECK FOR VOLTAGE TO THE DRIVER SIDE POWER WINDOW CONTROL SWITCH</p>	
 <p>TIE0023403</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the driver side power window control switch C488 pin 10, circuit 15-AJ7 (GN/BU), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? → Yes VERIFY the customer concern. → No REPAIR circuit 15-AJ7 (GN/BU). TEST the system for normal operation.

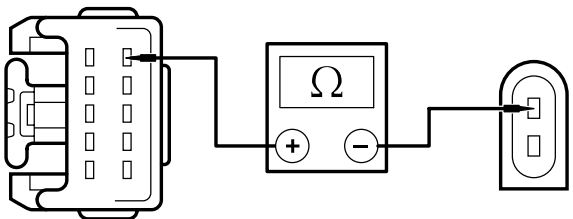
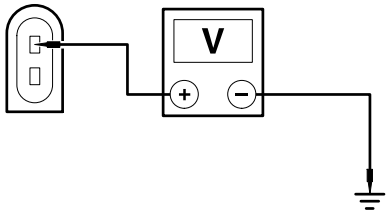
PINPOINT TEST B : THE LEFT OR RIGHT POWER WINDOW IS INOPERATIVE - DRIVER SIDE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: Use a digital multimeter for all electrical measurements.</p>	
<p>B1: CHECK FOR VOLTAGE TO THE DRIVER SIDE POWER WINDOW CONTROL SWITCH</p>	
	<p>1 Ignition switch in position II.</p> <ul style="list-style-type: none"> Does the driver side power window control switch LED illuminate? → Yes Left-hand drive vehicles – 3-door or right-hand drive vehicles – 4-door/5-door GO to B2. Left-hand drive vehicles – 4-door/5-door or right-hand drive vehicles – 3-door GO to B5. → No GO to B8.

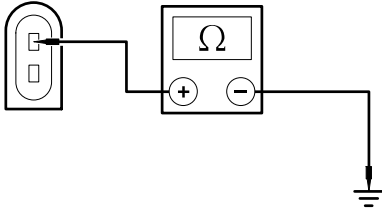
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>B2: CHECK FOR CONTINUITY BETWEEN THE DRIVER SIDE FRONT DOOR WINDOW REGULATOR MOTOR AND GROUND - LEFT-HAND DRIVE VEHICLES 3-DOOR AND RIGHT-HAND DRIVE VEHICLES 4-DOOR/5-DOOR</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Driver Side Front Door Window Regulator Motor C782 or Driver Side Front Door Window Regulator Motor C783.</p>
 <p>TIE0010881</p>	<p>3 Measure the resistance between the:</p> <p>Left-hand drive vehicles – 3-door</p> <ul style="list-style-type: none"> • Driver side front door window regulator motor C782 pin 2, circuit 33-AJ26B (YE), harness side and ground. <p>Right-hand drive vehicles – 4-door/5-door</p> <ul style="list-style-type: none"> • Driver side front door window regulator motor C783 pin 2, circuit 33-AJ26A (YE), harness side and ground. • Is the resistance less than 5 ohms? <p>→ Yes GO to B3.</p> <p>→ No REPAIR circuit 33-AJ26A (YE) or circuit 33-AJ26B (YE). TEST the system for normal operation.</p>
<p>B3: CHECK FOR CONTINUITY BETWEEN THE DRIVER SIDE WINDOW CONTROL SWITCH AND THE DRIVER SIDE FRONT DOOR WINDOW REGULATOR MOTOR - LEFT-HAND DRIVE VEHICLES 3-DOOR AND RIGHT-HAND DRIVE VEHICLES 4-DOOR/5-DOOR</p>	
	<p>1 Disconnect Driver Side Power Window Control Switch C488.</p>

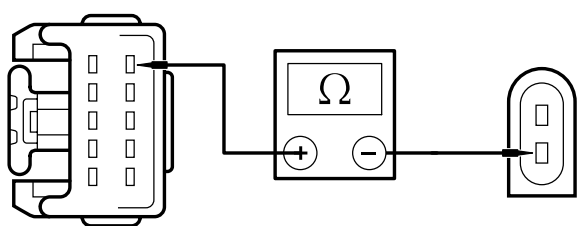
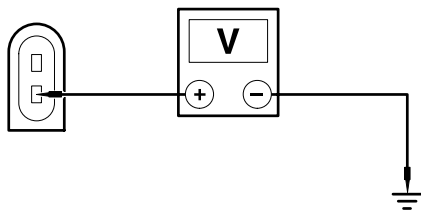
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E52014</p>	<p>2 Measure the resistance between the:</p> <p>Left-hand drive vehicles – 3-door</p> <ul style="list-style-type: none"> • Driver side power window control switch, C488 pin 6, circuit 32-AJ26B (WH), harness side and the driver side front door window regulator motor C782 pin 1, circuit 32-AJ26B (WH) harness side. <p>Right-hand drive vehicles – 4-door/5-door</p> <ul style="list-style-type: none"> • Driver side power window control switch, C488 pin 6, circuit 32-AJ26A (WH), harness side and the driver side front door window regulator motor C783 pin 1, circuit 32-AJ26A (WH), harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes GO to B4.</p> <p>→ No REPAIR circuit 32-AJ26A (WH) or circuit 32-AJ26B (WH). TEST the system for normal operation.</p>
<p>B4: CHECK FOR VOLTAGE TO THE DRIVER SIDE FRONT DOOR WINDOW REGULATOR MOTOR - LEFT-HAND DRIVE VEHICLES 3-DOOR AND RIGHT-HAND DRIVE VEHICLES 4-DOOR/5-DOOR</p>	
	<p>1 Connect Driver Side Power Window Control Switch C488.</p> <p>2 Ignition switch in position II.</p> <p>3 Operate the driver side power window control switch to the DOWN position.</p>
 <p>TIE0029413</p>	<p>4 Measure the voltage between the:</p> <p>Left-hand drive vehicles – 3-door</p> <ul style="list-style-type: none"> • Driver side front door window regulator motor C782 pin 1, circuit 32-AJ26B (WH), harness side and ground. <p>Right-hand drive vehicles – 4-door/5-door</p> <ul style="list-style-type: none"> • Driver side front door window regulator motor C783 pin 1, circuit 32-AJ26A (WH), harness side and ground. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <p>→ Yes Install a new driver side front door window regulator motor. TEST the system for normal operation.</p> <p>→ No Install a new driver side power window control switch. TEST the system for normal operation.</p>

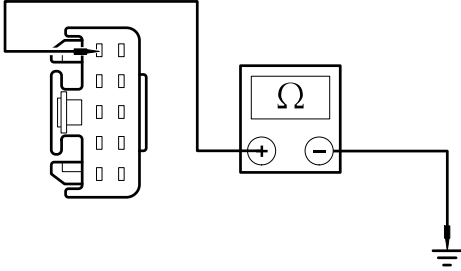
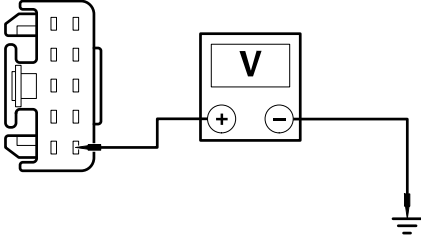
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>B5: CHECK FOR CONTINUITY BETWEEN THE DRIVER SIDE FRONT DOOR WINDOW REGULATOR MOTOR AND GROUND - LEFT-HAND DRIVE VEHICLES 4-DOOR/5-DOOR AND RIGHT-HAND DRIVE VEHICLES 3-DOOR</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Driver Side Front Door Window Regulator Motor C782 or Driver Side Front Door Window Regulator Motor C783.</p>
 <p>TIE0014344</p>	<p>3 Measure the resistance between the:</p> <p>Left-hand drive vehicles – 4-door/5-door</p> <ul style="list-style-type: none"> • Driver side front door window regulator motor C782 pin 1, circuit 33-AJ26 (YE), harness side and ground. <p>Right-hand drive vehicles – 3-door</p> <ul style="list-style-type: none"> • Driver side front door window regulator motor C783 pin 1, circuit 33-AJ26C (YE), harness side and ground. <p>• Is the resistance less than 5 ohms?</p>
	<p>→ Yes GO to B6.</p> <p>→ No REPAIR circuit 33-AJ26 (YE) or circuit 33-AJ26C (YE). TEST the system for normal operation.</p>
<p>B6: CHECK FOR CONTINUITY BETWEEN THE DRIVER SIDE POWER WINDOW CONTROL SWITCH AND THE DRIVER SIDE FRONT DOOR WINDOW REGULATOR MOTOR - LEFT-HAND DRIVE VEHICLES 4-DOOR/5-DOOR AND RIGHT-HAND DRIVE VEHICLES 3-DOOR</p>	
	<p>1 Disconnect Driver Side Power Window Control Switch C488.</p>

DIAGNOSIS AND TESTING

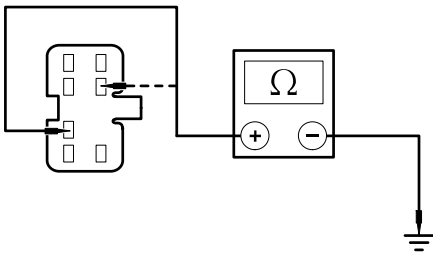
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E52015</p>	<p>2 Measure the resistance between the:</p> <p>Left-hand drive vehicles – 4-door/5-door</p> <ul style="list-style-type: none"> • Driver side power window control switch, C488 pin 6, circuit 32-AJ26 (WH), harness side and the driver side front door window regulator motor C782 pin 2, circuit 32-AJ26 (WH) harness side. <p>Right-hand drive vehicles – 3-door</p> <ul style="list-style-type: none"> • Driver side power window control switch, C488 pin 6, circuit 32-AJ26B (WH), harness side and the driver side front door window regulator motor C783 pin 2, circuit 32-AJ26B (WH), harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes GO to B7.</p> <p>→ No REPAIR circuit 32-AJ26A (WH) or circuit 32-AJ26B (WH). TEST the system for normal operation.</p>
<p>B7: CHECK FOR VOLTAGE TO THE DRIVER SIDE FRONT DOOR WINDOW REGULATOR MOTOR - LEFT-HAND DRIVE VEHICLES 4-DOOR/5-DOOR AND RIGHT-HAND DRIVE VEHICLES 3-DOOR</p>	
	<p>1 Connect Driver Side Power Window Control Switch C488.</p> <p>2 Ignition switch in position II.</p> <p>3 Operate the driver side power window control switch to the DOWN position.</p>
 <p>E0024115</p>	<p>4 Measure the voltage between the:</p> <p>Left-hand drive vehicles – 4-door/5-door</p> <ul style="list-style-type: none"> • Driver side front door window regulator motor C782 pin 2, circuit 32-AJ26 (WH), harness side and ground. <p>Right-hand drive vehicles – 3-door</p> <ul style="list-style-type: none"> • Driver side front door window regulator motor C783 pin 2, circuit 32-AJ26C (WH), harness side and ground. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <p>→ Yes Install a new driver side front door window regulator motor. TEST the system for normal operation.</p> <p>→ No Install a new driver side power window control switch. TEST the system for normal operation.</p>

DIAGNOSIS AND TESTING

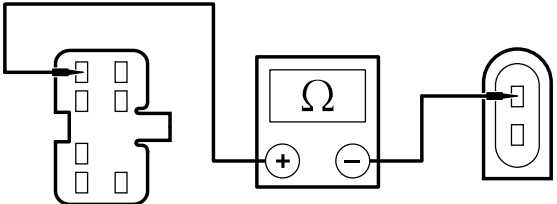
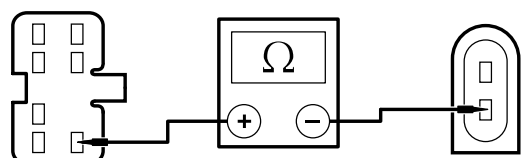
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B8: CHECK THE DRIVER SIDE POWER WINDOW CONTROL SWITCH FOR CONTINUITY TO GROUND	
 <p>TIE0023402</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Driver Side Power Window Control Switch C488. 3 Measure the resistance between the driver side power window control switch C488 pin 1, circuit 31-AJ7 (BK), harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes GO to B9. → No REPAIR circuit 31-AJ7 (BK). TEST the system for normal operation.
B9: CHECK FOR VOLTAGE TO THE DRIVER SIDE POWER WINDOW CONTROL SWITCH	
 <p>TIE0023403</p>	<ol style="list-style-type: none"> 1 Ignition switch in position II. 2 Measure the voltage between the driver side power window control switch C488 pin 10, circuit 15-AJ7 (GN/BU), harness side and ground. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes VERIFY the customer concern. → No REPAIR circuit 15-AJ7 (GN/BU). TEST the system for normal operation.

DIAGNOSIS AND TESTING

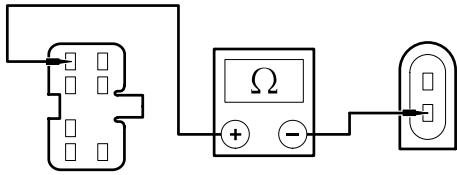
PINPOINT TEST C : THE LEFT OR RIGHT POWER WINDOW IS INOPERATIVE - PASSENGER SIDE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: Use a digital multimeter for all electrical measurements.</p>	
<p>C1: CHECK FOR VOLTAGE TO THE PASSENGER SIDE POWER WINDOW CONTROL SWITCH</p>	
	<p>1 Ignition switch in position II.</p> <ul style="list-style-type: none"> Does the passenger side power window control switch LED illuminate? <p>→ Yes GO to C2.</p> <p>→ No GO to C7.</p>
<p>C2: CHECK THE PASSENGER SIDE POWER WINDOW CONTROL SWITCH GROUND CIRCUITS</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Passenger Side Power Window Control Switch C489.</p>
 <p>TIE0014346</p>	<p>3 Measure the resistance between the:</p> <ul style="list-style-type: none"> Passenger side power window control switch C489 pin 3, circuit 32-AJ18 (WH/VT), harness side and ground. Passenger side power window control switch C489 pin 6, circuit 33-AJ18 (YE/VT), harness side and ground. <ul style="list-style-type: none"> Are the resistances less than 5 ohms? <p>→ Yes Left-hand drive vehicles – 3-door or right-hand drive vehicles – 4-door/5-door GO to C3. Left-hand drive vehicles – 4-door/5-door or right-hand drive vehicles – 3-door GO to C5.</p> <p>→ No Repair circuit 32-AJ18 (WH/VT) or circuit 33-AJ18 (YE/VT). TEST the system for normal operation.</p>
<p>C3: CHECK FOR CONTINUITY BETWEEN THE PASSENGER SIDE POWER WINDOW CONTROL SWITCH DOWN CIRCUIT AND THE PASSENGER SIDE FRONT DOOR WINDOW REGULATOR MOTOR - LEFT-HAND DRIVE VEHICLES 3-DOOR AND RIGHT-HAND DRIVE VEHICLES 4-DOOR/5-DOOR</p>	
	<p>1 Disconnect Passenger Side Front Door Window Regulator Motor C782 or Passenger Side Front Door Window Regulator Motor C783.</p>

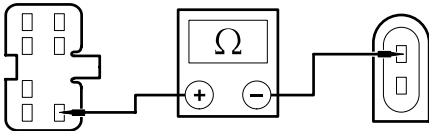
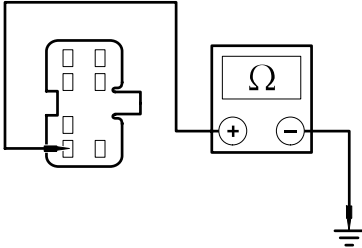
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E51963</p>	<p>2 Measure the resistance between the:</p> <p>Left-hand drive vehicles – 3-door</p> <ul style="list-style-type: none"> • Passenger side power window control switch C489 pin 1, circuit 33-AJ17B (YE/VT), harness side and the passenger side front door window regulator motor C783 pin 1, circuit 33-AJ17B (YE/VT), harness side. <p>Right-hand drive vehicles – 4-door/5-door</p> <ul style="list-style-type: none"> • Passenger side power window control switch C489 pin 1, circuit 33-AJ17A (YE/VT), harness side and the passenger side front door window regulator motor C782 pin 1, circuit 33-AJ17A (YE/VT), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes GO to C4.</p> <p>→ No REPAIR circuit 33-AJ17A (YE/VT) or circuit 33-AJ17B (YE/VT). TEST the system for normal operation.</p>
<p>C4: CHECK FOR CONTINUITY BETWEEN THE PASSENGER SIDE POWER WINDOW CONTROL SWITCH UP CIRCUIT AND THE PASSENGER SIDE FRONT DOOR WINDOW REGULATOR MOTOR - LEFT-HAND DRIVE VEHICLES 3-DOOR AND RIGHT-HAND DRIVE VEHICLES 4-DOOR/5-DOOR</p>	
 <p>E51964</p>	<p>1 Measure the resistance between the:</p> <p>Left-hand drive vehicles – 3-door</p> <ul style="list-style-type: none"> • Passenger side power window control switch C489 pin 7, circuit 32-AJ17B (WH/VT), harness side and the passenger side front door window regulator motor C783 pin 2, circuit 32-AJ17B (WH/VT), harness side. <p>Right-hand drive vehicles – 4-door/5-door</p> <ul style="list-style-type: none"> • Passenger side power window control switch C489 pin 7, circuit 32-AJ17A (WH/VT), harness side and the passenger side front door window regulator motor C782 pin 2, circuit 32-AJ17A (WH/VT), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new passenger side front door window regulator motor. TEST the system for normal operation.</p> <p>→ No REPAIR circuit 32-AJ17A (WH/VT) or circuit 32-AJ17B (WH/VT). TEST the system for normal operation.</p>

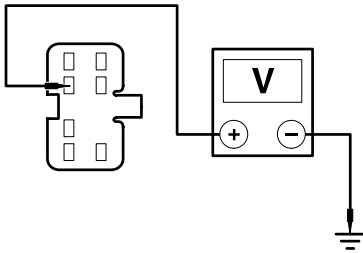
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C5: CHECK FOR CONTINUITY BETWEEN THE PASSENGER SIDE POWER WINDOW CONTROL SWITCH DOWN CIRCUIT AND THE PASSENGER SIDE FRONT DOOR WINDOW REGULATOR MOTOR - LEFT-HAND DRIVE VEHICLES 4-DOOR/5-DOOR AND RIGHT-HAND DRIVE VEHICLES 3-DOOR	
	<p>1 Disconnect Passenger Side Front Door Window Regulator Motor C782 or Passenger Side Front Door Window Regulator Motor C783.</p>
 <p>TIE0014347</p>	<p>2 Measure the resistance between the:</p> <p>Left-hand drive vehicles – 4-door/5-door</p> <ul style="list-style-type: none"> Passenger side power window control switch C489 pin 1, circuit 33-AJ17 (YE/VT), harness side and the passenger side front door window regulator motor C783 pin 2, circuit 33-AJ17 (YE/VT), harness side. <p>Right-hand drive vehicles – 3-door</p> <ul style="list-style-type: none"> Passenger side power window control switch C489 pin 1, circuit 33-AJ17C (YE/VT), harness side and the passenger side front door window regulator motor C782 pin 2, circuit 33-AJ17C (YE/VT), harness side. <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes GO to C6. → No REPAIR circuit 33-AJ17 (YE/VT) or circuit 33-AJ17C (YE/VT). TEST the system for normal operation.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>C6: CHECK FOR CONTINUITY BETWEEN THE PASSENGER SIDE POWER WINDOW CONTROL SWITCH UP CIRCUIT AND THE PASSENGER SIDE FRONT DOOR WINDOW REGULATOR MOTOR - LEFT-HAND DRIVE VEHICLES 4-DOOR/5-DOOR AND RIGHT-HAND DRIVE VEHICLES 3-DOOR</p>	
 <p>TIE0014345</p>	<p>1 Measure the resistance between the:</p> <p>Left-hand drive vehicles – 4-door/5-door</p> <ul style="list-style-type: none"> Passenger side power window control switch C489 pin 7, circuit 32-AJ17 (WH/VT), harness side and the passenger side front door window regulator motor C783 pin 1, circuit 32-AJ17 (WH/VT), harness side. <p>Right-hand drive vehicles – 3-door</p> <ul style="list-style-type: none"> Passenger side power window control switch C489 pin 7, circuit 32-AJ17C (WH/VT), harness side and the passenger side front door window regulator motor C782 pin 1, circuit 32-AJ17C (WH/VT), harness side. <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new passenger side front door window regulator motor. TEST the system for normal operation. → No REPAIR circuit 32-AJ17 (WH/VT) or circuit 32-AJ17C (WH/VT). TEST the system for normal operation.
<p>C7: CHECK THE PASSENGER SIDE POWER WINDOW CONTROL SWITCH GROUND CIRCUIT</p>	
 <p>TIE0014349</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Passenger Side Power Window Control Switch C489.</p> <p>3 Measure the resistance between the passenger side power window control switch C489 pin 4, circuit 31-LH31 (BK), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes GO to C8. → No REPAIR circuit 31-LH31 (BK). TEST the system for normal operation.
<p>C8: CHECK FOR VOLTAGE TO THE PASSENGER SIDE POWER WINDOW CONTROL SWITCH</p>	
	<p>1 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0014348</p>	<p>2 Measure the voltage between the passenger side power window control switch C489 pin 2, circuit 15-AJ18 (GN/WH), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes VERIFY the customer concern. → No REPAIR circuit 15-AJ18 (GN/WH). TEST the system for normal operation.

DIAGNOSIS AND TESTING**Glass, Frames and Mechanisms — Vehicles With: Global Closing**

Refer to Wiring Diagrams Section 501-11, for schematic and connector information.

General Equipment

Worldwide diagnostic system (WDS)

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> • Window seal • Door window frame 	<ul style="list-style-type: none"> • Fuse(s) • Electrical connector(s) • Switch(es) • Circuit(s)

3. Initialize the door window motors.
REFER to **Door Window Motor Initialization** - in this section.
4. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
5. If the cause is not visually evident, verify the symptom and refer to WDS.

GENERAL PROCEDURES**Door Window Motor Initialization**

▲ WARNING: The door window anti-trap function will not operate during the door window motor initialization procedure. Make sure that the door window opening is free of all foreign material. Failure to follow this instruction may result in personal injury.

NOTE: After the battery has been disconnected it is necessary to initialize each door window motor separately.

NOTE: If a single door window motor has been disconnected, it is necessary to initialize that door window motor.

NOTE: If the fuse for a front or rear door window motor has been disconnected, it is necessary to initialize that door window motor.

NOTE: If the battery junction box (BJB) fuse for the front power windows has been disconnected, it is necessary to initialize both front door window motors.

NOTE: If the battery junction box (BJB) fuse for the rear power windows has been disconnected, it is necessary to initialize both rear door window motors.

NOTE: Leave a period of at least one minute before connecting the battery, fuse or door window motor(s).

All vehicles

- 1. Press and hold the power window control switch close button until the door window is fully closed.**
- 2. Release the power window control switch close button and press again for three seconds.**
- 3. Briefly press the power window control switch open button to the second detent and release the button.**
 - The door window should open automatically.
- 4. Briefly press the power window control switch close button to the second detent and release the button.**
 - If the door window does not close automatically, repeat the complete procedure.
- 5. Repeat the door window motor initialization for each door window motor.**

Convertible

- 6. Press and hold the convertible top switch CLOSE button until the convertible top is fully closed. Hold the switch closed for three seconds.**

REMOVAL AND INSTALLATION

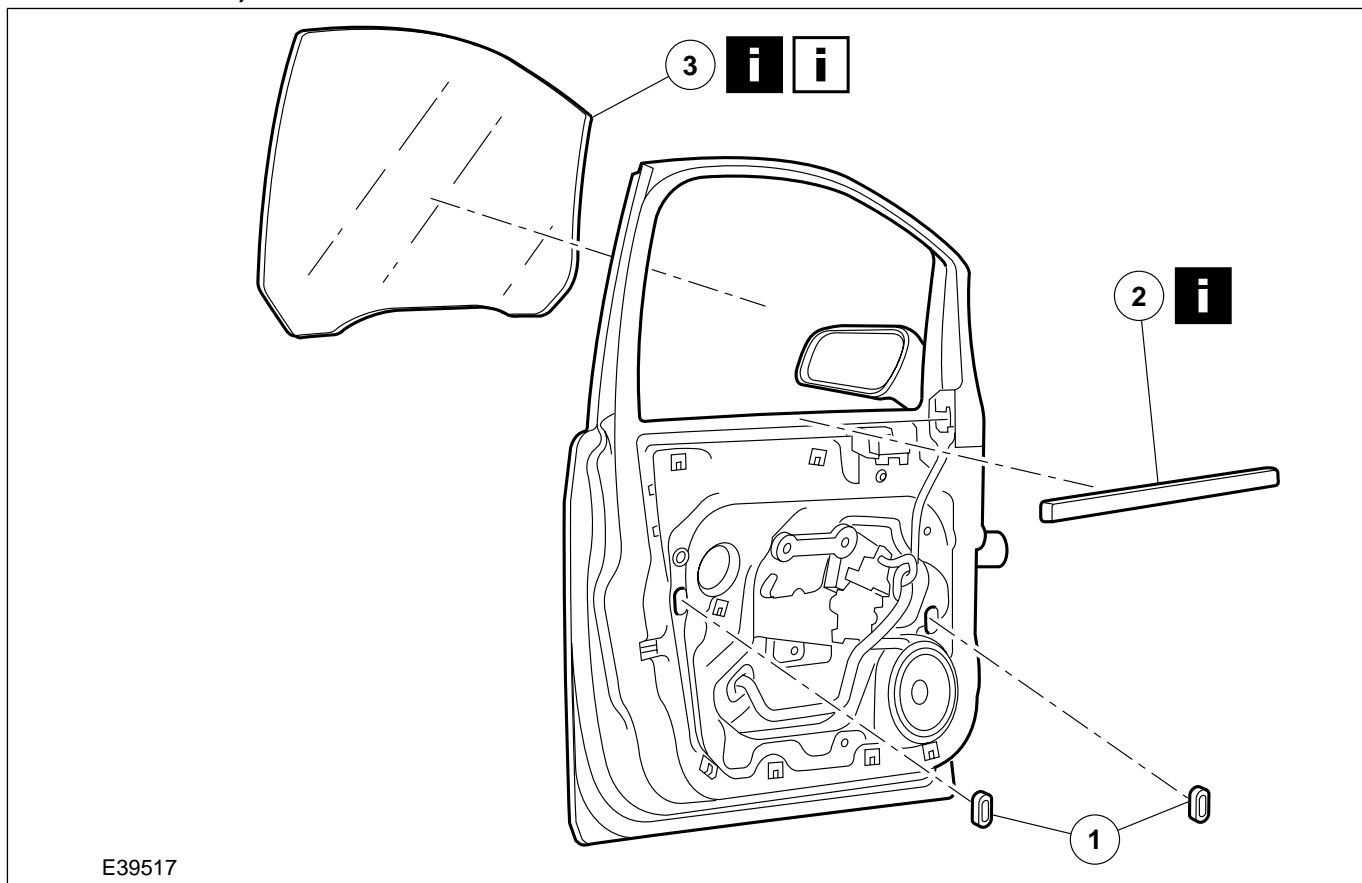
Front Door Window Glass

1. Remove the front door trim panel. For additional information, refer to: (501-05 Interior Trim and Ornamentation)

Front Door Trim Panel - 3-Door (Removal and Installation),

Front Door Trim Panel - 4-Door/5-Door/Wagon (Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Front door panel grommets
2	Front door interior weatherstrip <i>See Removal Detail</i>
3	Front door window glass <i>See Removal Detail</i> <i>See Installation Detail</i>

3. To install, reverse the removal procedure.

Removal Details

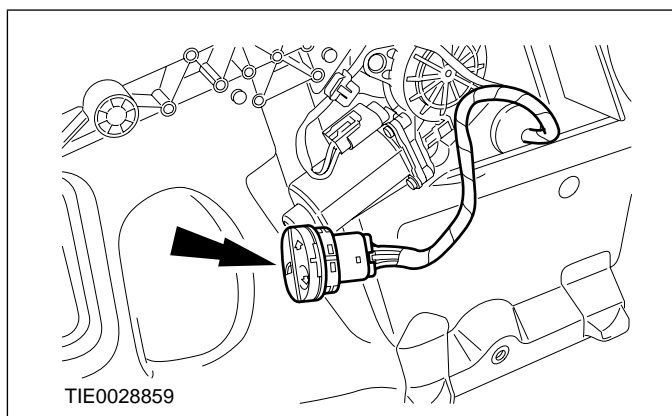
REMOVAL AND INSTALLATION

Item 2 Front door interior weatherstrip

CAUTION: To avoid damage, care must be taken when removing the front door interior weatherstrip.

Item 3 Front door window glass

1. Connect the front door power window control switch electrical connector.

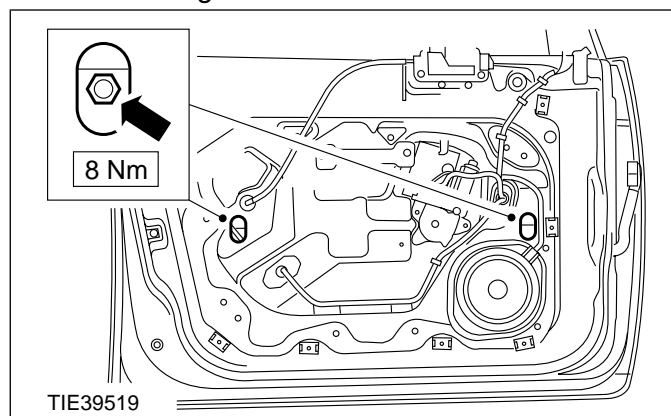


2. Connect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

3. Loosen the front door window glass clamp retaining bolts by two turns.

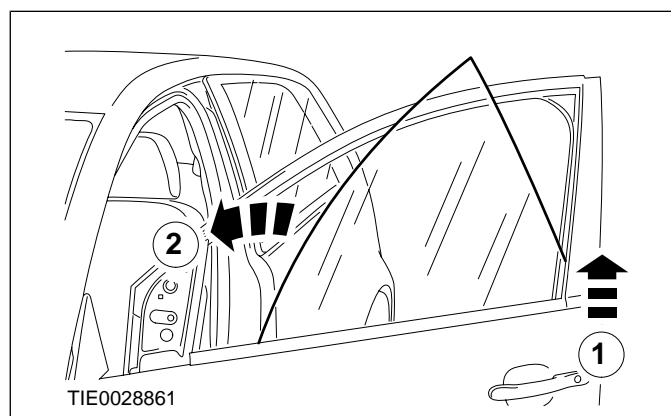
- Align the front door window glass clamp retaining bolts with the access holes.



4. **NOTE:** The front door window glass must be removed towards the outside of the window opening.

Remove the front door window glass.

1. Lift the front door window glass.
2. Tip the front door window glass forwards and remove it from the front door.



Installation Details

Item 3 Front door window glass

NOTE: The front door window glass must be installed from the outside of the window opening.

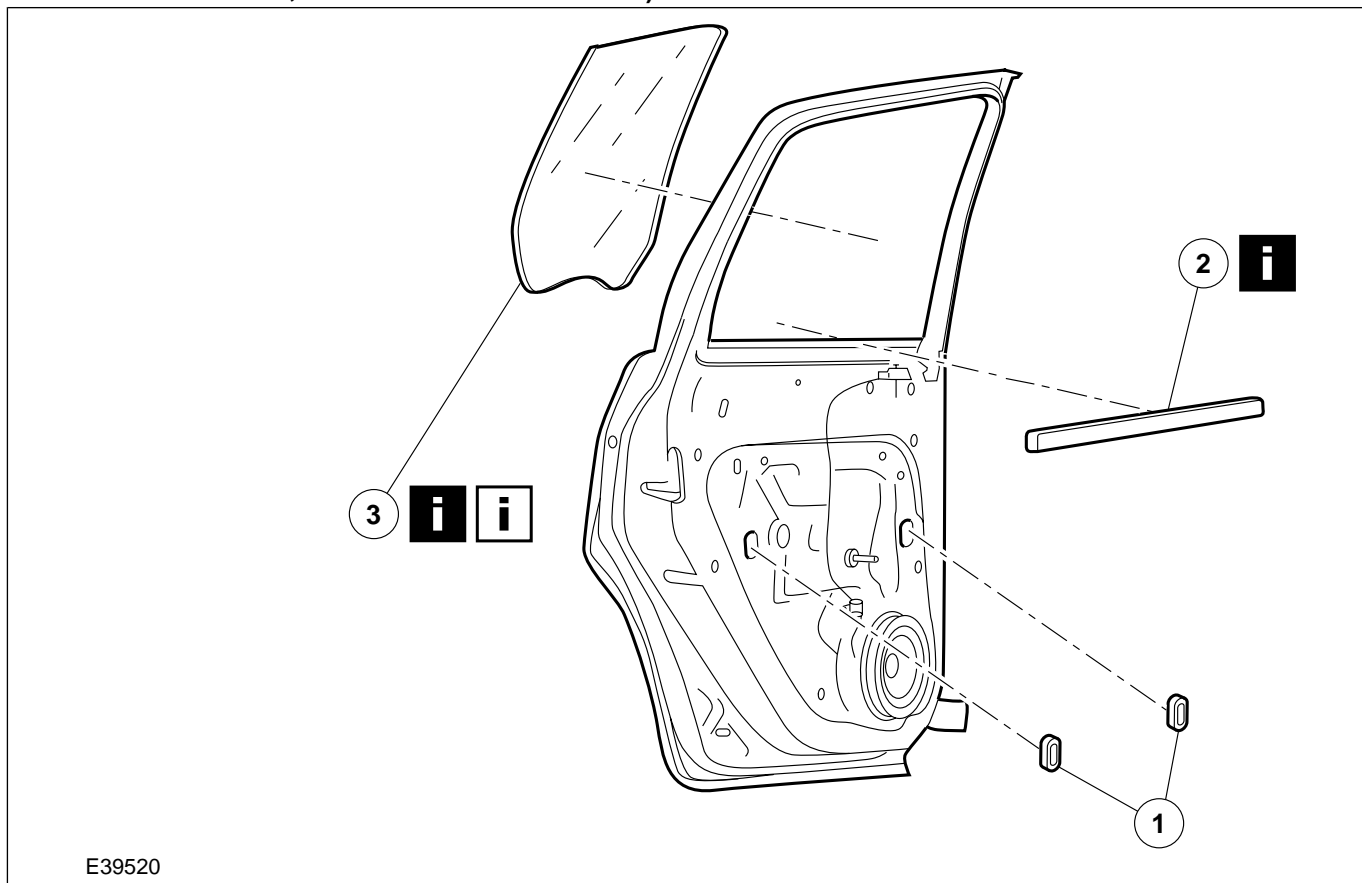
REMOVAL AND INSTALLATION

Rear Door Window Glass — Vehicles With: Manual Windows

1. Remove the rear door trim panel.

For additional information, refer to: Rear Door Trim Panel - Vehicles With: Manual Windows (501-05 Interior Trim and Ornamentation, Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



E39520

Item	Description
1	Grommets
2	Interior weatherstrip See Removal Detail
3	Window glass See Removal Detail See Installation Detail

3. To install, reverse the removal procedure.

Removal Details

Item 2 Interior weatherstrip

⚠ CAUTION: Carefully remove the interior weatherstrip to avoid damage.

501-11-22

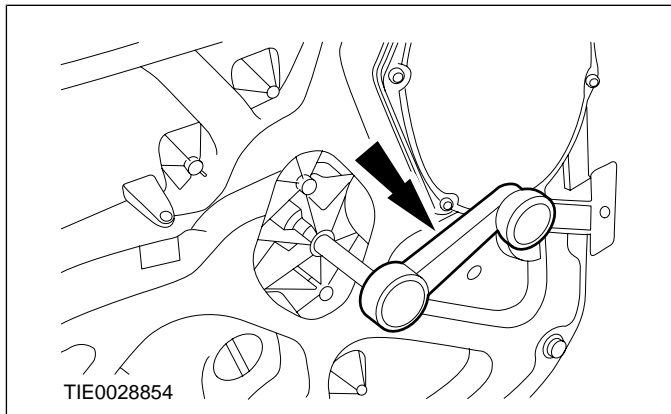
Glass, Frames and Mechanisms

501-11-22

REMOVAL AND INSTALLATION

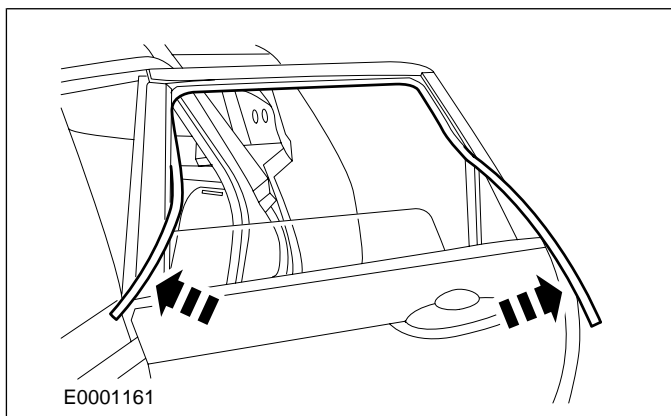
Item 3 Window glass

1. Install the window regulator handle.



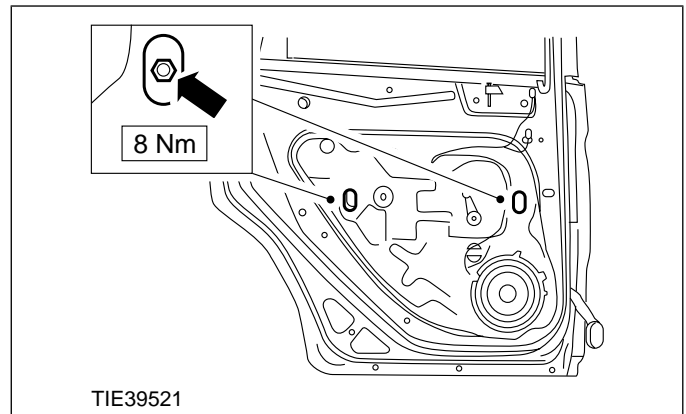
2. Fully lower the window glass.

3. Position the lower part of the door glass top run outside the door.



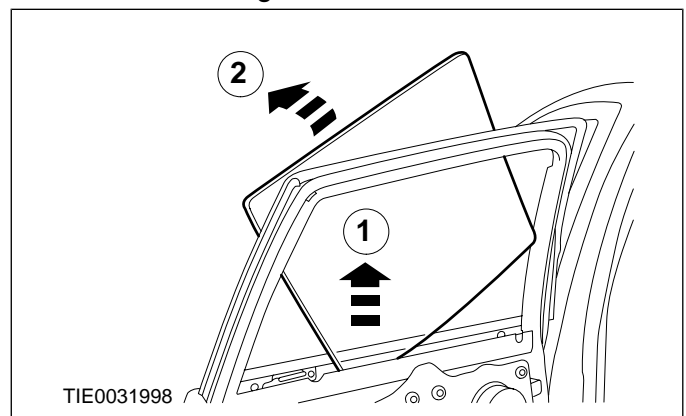
4. Loosen the rear door window glass clamp retaining bolts two complete turns.

- Align the window glass clamp retaining bolts with the access holes.

5. **NOTE:** The rear door window glass must be removed towards the outside of the window opening.

Remove the rear door window glass.

- Lift the window glass.
- Tip the window glass outwards and remove the window glass from the rear door.



Installation Details

Item 3 Window glass

NOTE: The rear door window glass must be installed from the outside of the window opening.

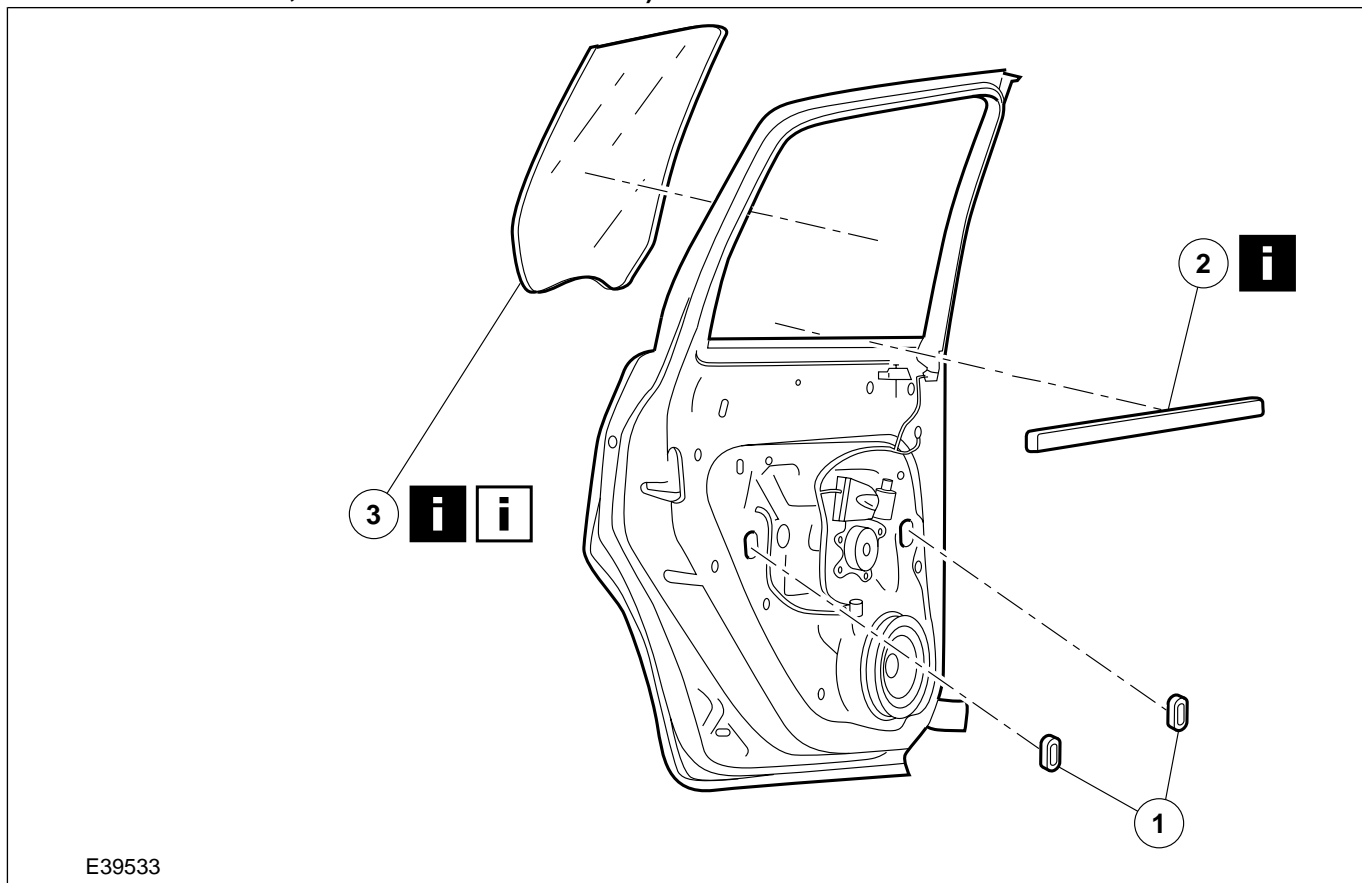
REMOVAL AND INSTALLATION

Rear Door Window Glass — Vehicles With: Power Windows

1. Remove the rear door trim panel.

For additional information, refer to: **Rear Door Trim Panel - Vehicles With: Power Windows (501-05 Interior Trim and Ornamentation, Removal and Installation).**

2. Remove the components in the order indicated in the following illustration(s) and table(s).



E39533

Item	Description
1	Grommets
2	Interior weatherstrip See Removal Detail
3	Window glass See Removal Detail See Installation Detail

3. To install, reverse the removal procedure.

Removal Details

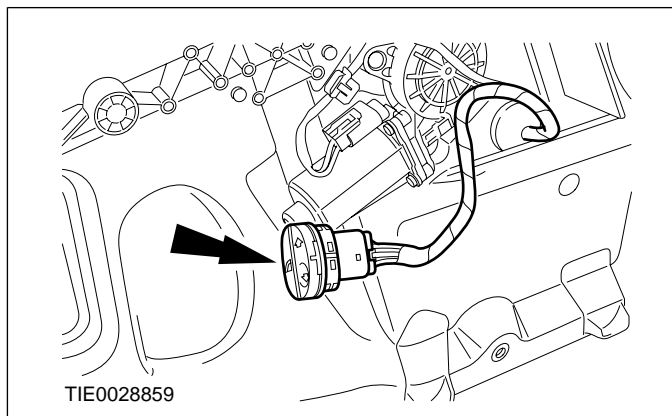
Item 2 Interior weatherstrip

⚠ CAUTION: Carefully remove the interior weatherstrip to avoid damage.

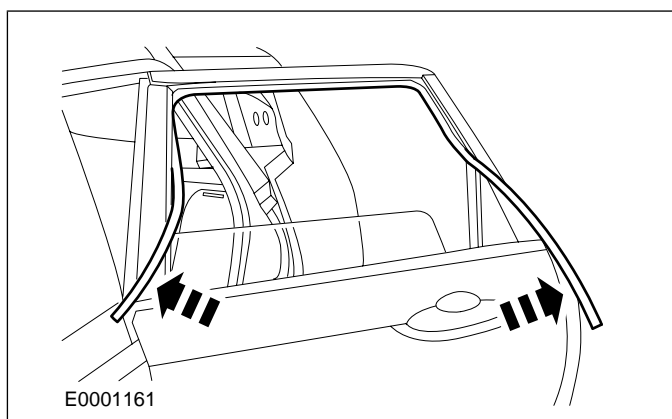
REMOVAL AND INSTALLATION

Item 3 Window glass

1. Connect the power window control switch electrical connector.

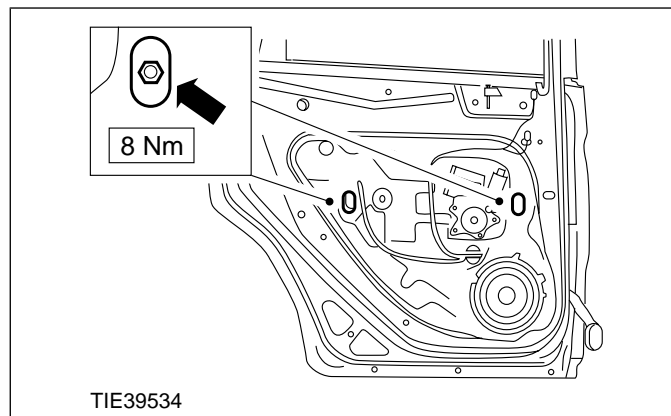


2. Fully lower the window glass.
3. Position the lower part of the door glass top run outside the door.



4. Loosen the rear door window glass clamp retaining bolts two complete turns.

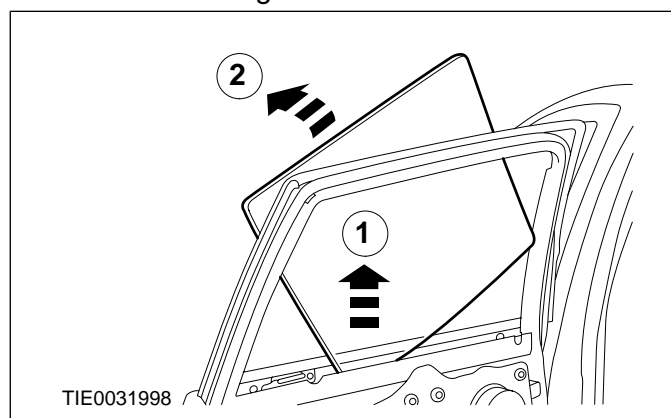
- Align the window glass clamp retaining bolts with the access holes.



5. **NOTE:** The rear door window glass must be removed towards the outside of the window opening.

Remove the rear door window glass.

1. Lift the window glass.
2. Tip the window glass outwards and remove the window glass from the rear door.



Installation Details

Item 3 Window glass

NOTE: The rear door window glass must be installed from the outside of the window opening.

REMOVAL AND INSTALLATION

Rear Quarter Window Glass — 3-Door/5-Door(42 514 0)

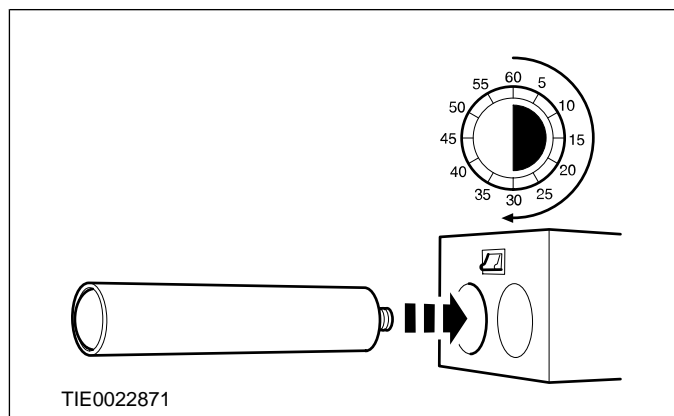
General Equipment

Hot air gun
Direct glazing cutter for bonded glass
Direct glazing adhesive kit
Direct glazing adhesive oven
Glazing suction cups

Removal

All vehicles

1. Remove the polyurethane (PU) adhesive cap and heat the PU adhesive for a minimum of 30 minutes.



3-door

2. Remove the B-pillar trim panel.

For additional information, refer to: **B-Pillar Trim Panel - 3-Door (501-05 Interior Trim and Ornamentation, Removal and Installation)**.

3. **WARNING:** Wear gloves and eye protection when working with the glass cutting tool as the cutting operation may produce splinters. When using the cutter wear ear protectors. Failure to follow these instructions may result in personal injury.

CAUTIONS:

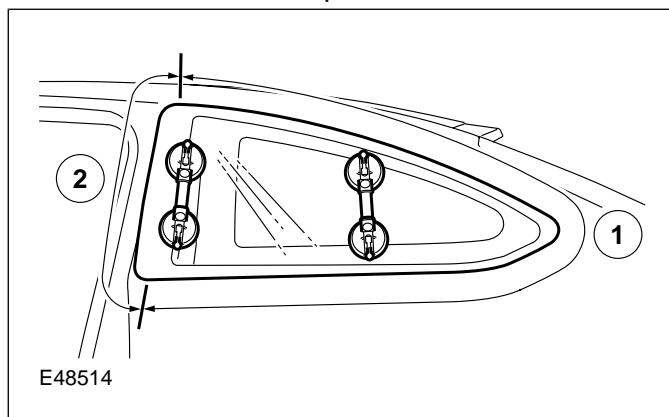
- WARNING:** Place a suitable piece of flexible plastic card between the direct glazing cutter blade and vehicle body to avoid damage to the vehicle body when cutting from outside the vehicle.

- WARNING:** Make sure the cutting blades are changed where the cutting depth changes to avoid damage to the body and trim panels when cutting from inside the vehicle.

NOTE: Some resistance may be encountered when cutting through the glass locating pegs in the corners of the glass.

Using a suitable direct glazing cutter, cut the PU adhesive and, with the aid of another technician, use glazing suction cups to remove the rear quarter window glass.

1. From outside the vehicle, cut the PU adhesive.
2. From inside the vehicle, cut the PU adhesive to a maximum depth of 55 mm.



5-door

4. Remove the C-pillar trim panel.

For additional information, refer to: **C-Pillar Trim Panel - 3-Door (501-05 Interior Trim and Ornamentation, Removal and Installation)**.

5. **WARNING:** Wear gloves and eye protection when working with the glass cutting tool as the cutting operation may produce splinters. When using the cutter wear ear protectors. Failure to follow these instructions may result in personal injury.

CAUTIONS:

- WARNING:** Place a suitable piece of flexible plastic card between the direct glazing cutter blade and vehicle body to avoid damage to the vehicle body when cutting from outside the vehicle.

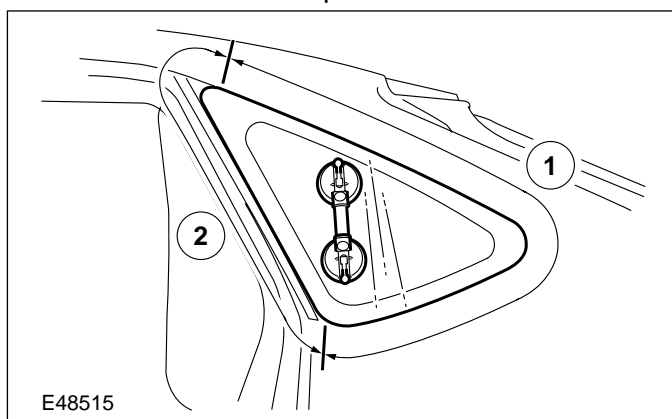
REMOVAL AND INSTALLATION

- ⚠** Make sure the cutting blades are changed where the cutting depth changes to avoid damage to the body and trim panels when cutting from inside the vehicle.

NOTE: Some resistance may be encountered when cutting through the glass locating pegs in the corners of the glass.

Using a suitable direct glazing cutter, cut the PU adhesive and, with the aid of another technician, use glazing suction cups to remove the rear quarter window glass.

1. From outside the vehicle, cut the PU adhesive.
2. From inside the vehicle, cut the PU adhesive to a maximum depth of 25 mm.

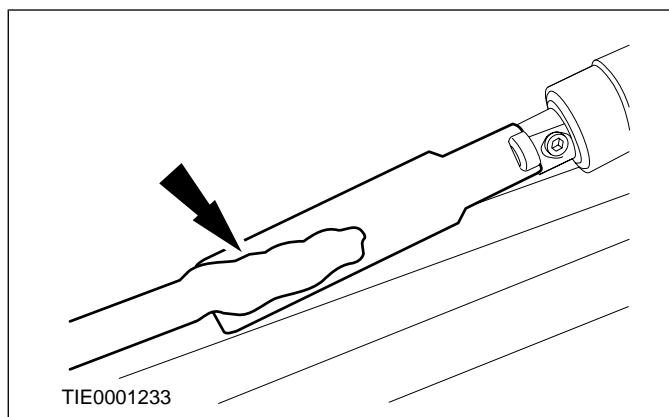


Installation

All vehicles

1. Carefully remove the remaining part of the locating pegs from the rear quarter window glass flange.
2. **⚠ CAUTION:** Do not touch the adhesive surface as re-bonding will be impaired.

Carefully trim the remaining PU adhesive from the rear quarter window glass flange to leave approximately 1 mm of trimmed PU adhesive adhered to the flange.



3. Check the rear quarter window glass flange for damaged sheet metal, rust or foreign material which may have caused, or may cause, glass breakage.

4. **⚠ CAUTION:** To make sure that the PU adhesive cures, it is essential that all bonding surfaces are free of moisture.

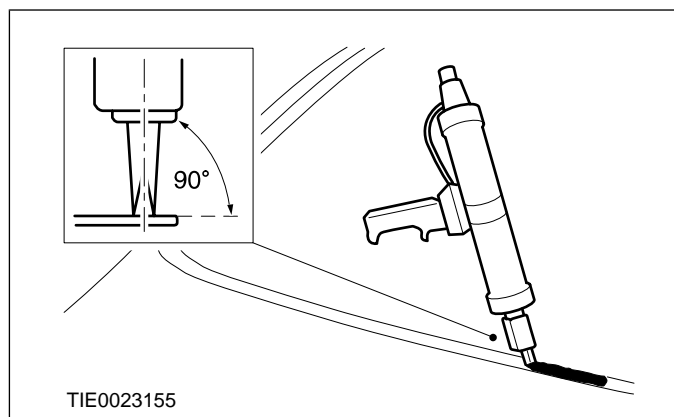
Using a hot air gun, apply warm air (25°C) to the rear quarter window glass flange and glass bond line to remove all traces of moisture.

5. Prepare the glass, rear quarter window glass flange and trimmed PU adhesive in accordance with the instructions supplied with the PU adhesive kit.
6. **NOTE:** Discard the first 100 mm of PU adhesive as this may have a reduced working time.

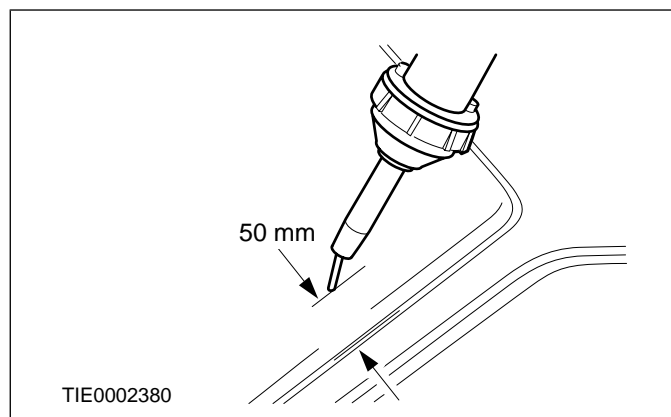
NOTE: To avoid water leaks, any breakage in the continuous bead should be overlapped by 20 mm.

REMOVAL AND INSTALLATION

Apply the PU adhesive in a continuous bead of between 8 and 10 mm in height to the rear quarter window glass flange along the bond line.

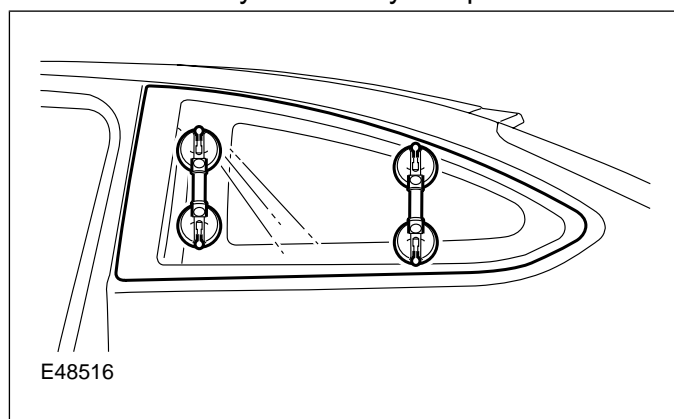


9. If the ambient temperature falls below 10°C, use a hot air gun and apply warm air (25°C) continuously for 15 minutes (inside or outside the vehicle).



7. Use glazing suction cups to install the rear quarter window glass (3 door shown).

- Press firmly and evenly into position.



8. **CAUTION:** During the curing period of the PU adhesive, the door windows must be left open to avoid a build up of pressure when the doors are opened and closed.

Using suitable tape, secure the rear quarter window glass in the correct position until the PU adhesive has cured.

3-door

10. Install the B-pillar trim panel.

For additional information, refer to: **B-Pillar Trim Panel - 3-Door (501-05 Interior Trim and Ornamentation, Removal and Installation).**

5-door

11. Install the C-pillar trim panel.

For additional information, refer to: **C-Pillar Trim Panel - 3-Door (501-05 Interior Trim and Ornamentation, Removal and Installation).**

REMOVAL AND INSTALLATION

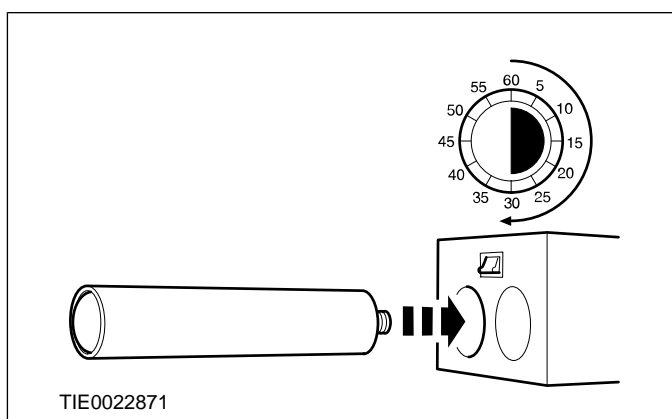
Liftgate Window Glass — 3-Door/5-Door

General Equipment

Hot air gun
Direct glazing cutter for bonded glass
Direct glazing adhesive kit
Direct glazing adhesive oven
Glazing suction cups

Removal

1. Remove the polyurethane (PU) adhesive cap and heat the PU adhesive for a minimum of 30 minutes.



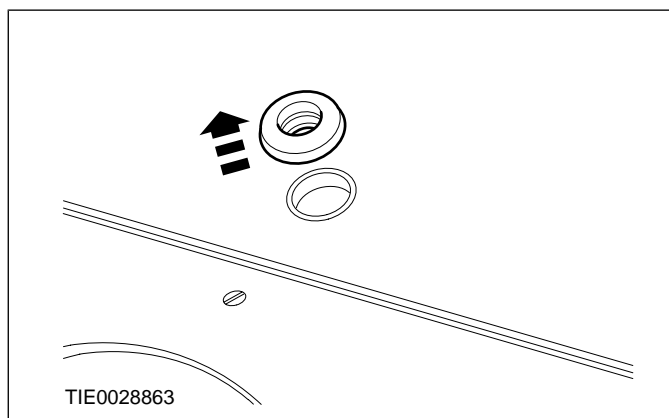
2. Remove the rear spoiler.

For additional information, refer to: **Rear Spoiler (501-08 Exterior Trim and Ornamentation, Removal and Installation)**.

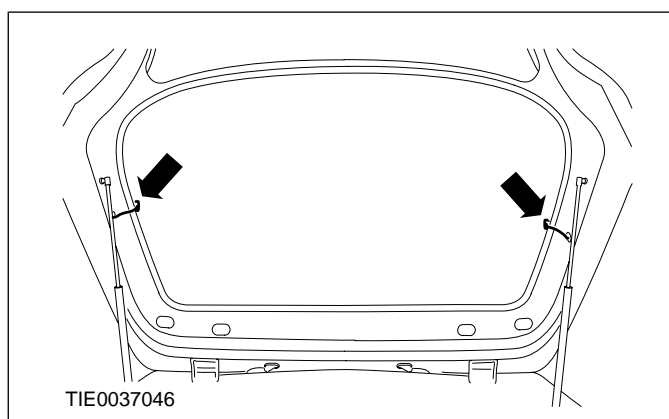
3. Remove the rear window wiper motor.

For additional information, refer to: **Rear Window Wiper Motor (501-16 Wipers and Washers, Removal and Installation)**.

4. Remove the rear window wiper motor spindle grommet.



5. Disconnect the heated liftgate window glass electrical connectors.



6. **WARNING:** Wear gloves and eye protection when working with the glass cutting tool as the cutting operation may produce splinters. When using the cutter wear ear protectors. Failure to follow these instructions may result in a personal injury.

CAUTION: Make sure the cutting blades are changed where the cutting depth changes to avoid damage to the body and trim panels.

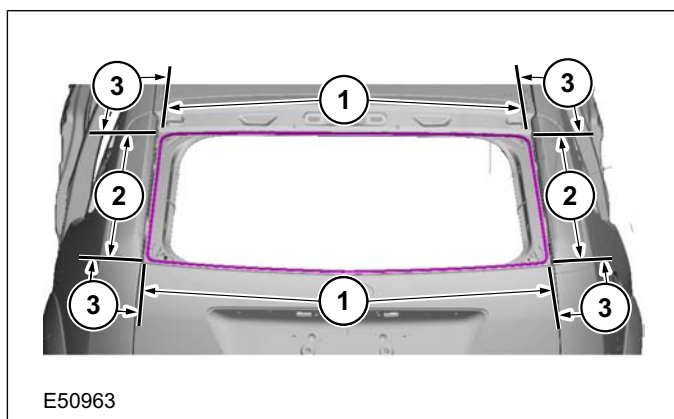
NOTE: Some resistance may be encountered when cutting through the glass locating pegs in the corners of the glass.

From inside the vehicle using a suitable direct glazing cutter, cut the PU adhesive to the given maximum depths.

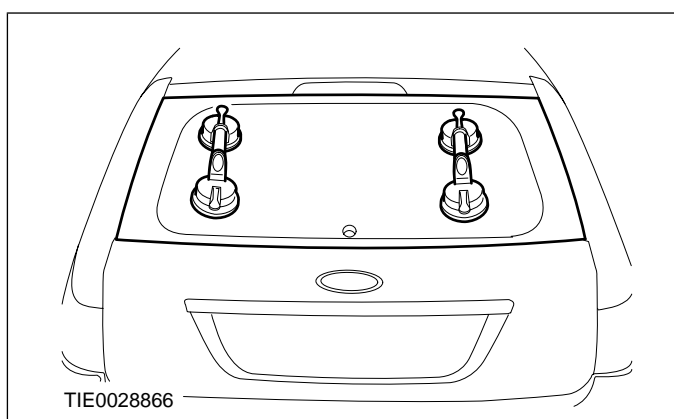
1. 25 mm.
2. 60 mm.

REMOVAL AND INSTALLATION

3. 110 mm.



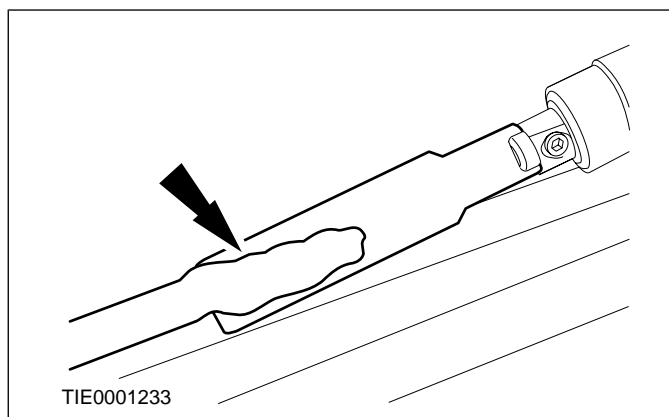
7. With the aid of another technician, use glazing suction cups to remove the liftgate window glass.



Installation

1. Carefully remove the remaining part of the locating pegs from the liftgate window glass flange.
2. **CAUTION:** Do not touch the adhesive surface as re-bonding will be impaired.

Carefully trim the remaining polyurethane (PU) adhesive from the liftgate window glass flange to leave approximately 1 mm of trimmed PU adhesive adhered to the flange.



3. Check the liftgate window glass flange for damaged sheet metal, rust or foreign material which may have caused, or may cause, glass breakage.

4. **CAUTION:** To make sure that the PU adhesive cures, it is essential that all the bonding surfaces are free of moisture.

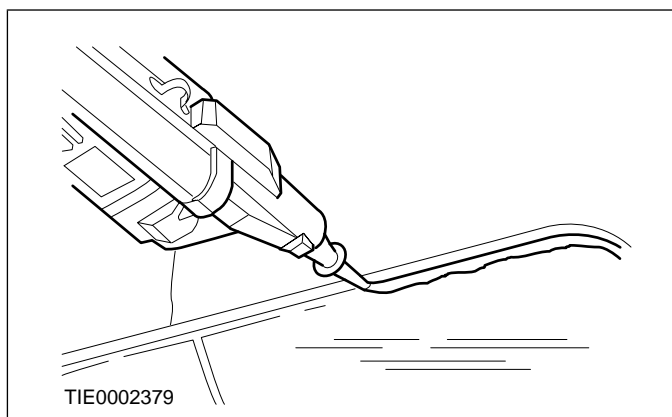
Using a hot air gun, apply warm air (25°C) to the liftgate window glass flange and glass bond line to remove all traces of moisture.

5. Prepare the glass, liftgate window glass flange and trimmed PU adhesive in accordance with the instructions supplied with the PU adhesive kit.
6. **NOTE:** Discard the first 100 mm of PU adhesive as this may have a reduced working time.

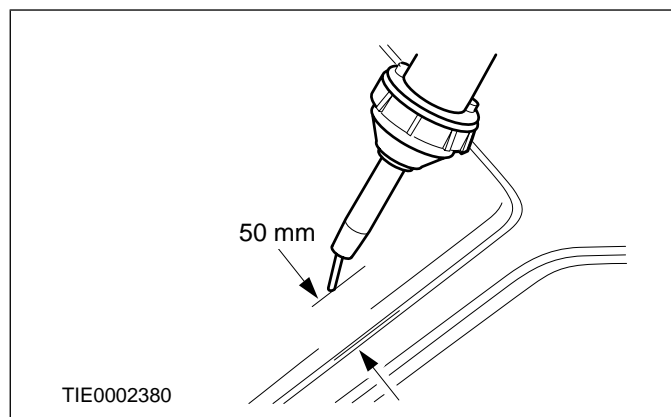
NOTE: To avoid water leaks, any breakage in the continuous bead must be overlapped by 20 mm.

REMOVAL AND INSTALLATION

Apply the PU adhesive in a continuous bead of between 8 and 10 mm in height to the liftgate window glass flange along the bond line.

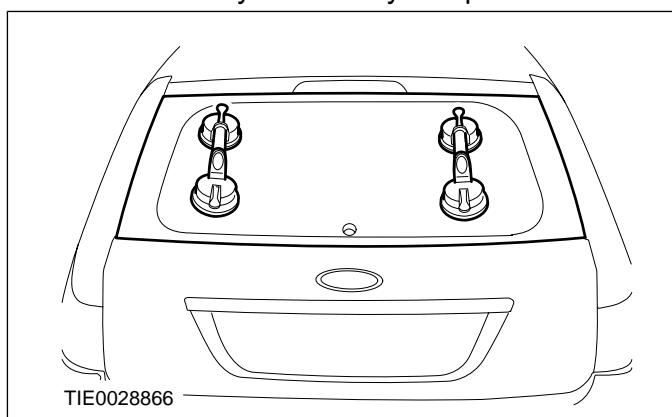


9. If the ambient temperature falls below 10°C, use a hot air gun and apply warm air (25°C) continuously for 15 minutes (inside or outside the vehicle).

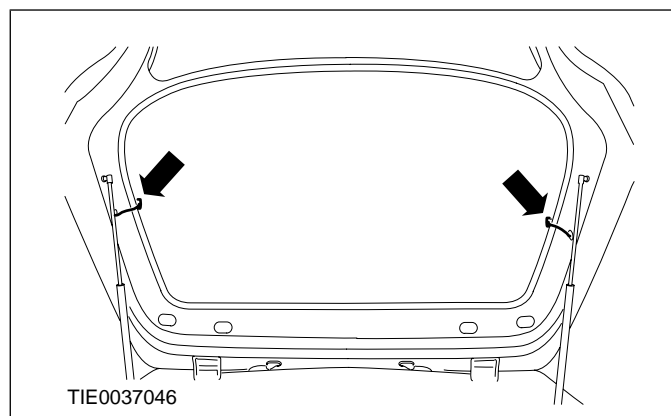


7. With the aid of another technician, use glazing suction cups to install the liftgate window glass.

- Press firmly and evenly into position.



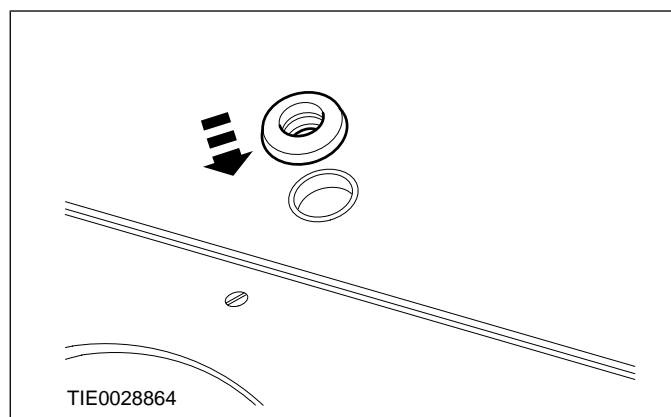
10. Connect the heated liftgate window glass electrical connectors.



8. **CAUTION:** During the curing period of the PU adhesive, the door windows must be left open to avoid a build up of pressure when the doors are opened and closed.

Using suitable tape, secure the liftgate window glass in the correct position until the PU adhesive has cured.

11. Install the rear window wiper motor spindle grommet.



12. Install the rear spoiler.

For additional information, refer to: **Rear Spoiler (501-08 Exterior Trim and Ornamentation, Removal and Installation).**

REMOVAL AND INSTALLATION

13. Install the rear window wiper motor.

For additional information, refer to: **Rear Window Wiper Motor (501-16 Wipers and Washers, Removal and Installation)**.

REMOVAL AND INSTALLATION

Front Door Window Regulator — 3-Door

General Equipment

Electric hand drill

Blind rivet gun-hand

Materials

Name	Specification
Adhesive - Loctite 243	WSK-M2G349-A7

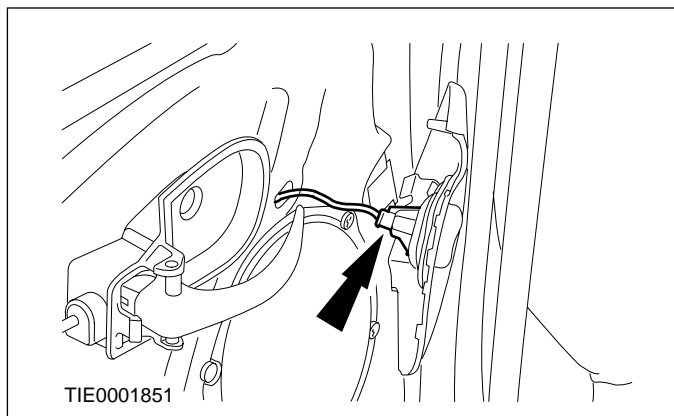
1. Remove the front door window glass.

For additional information, refer to: **Front Door Window Glass (501-11 Glass, Frames and Mechanisms, Removal and Installation)**.

2. Remove the front door window regulator motor.

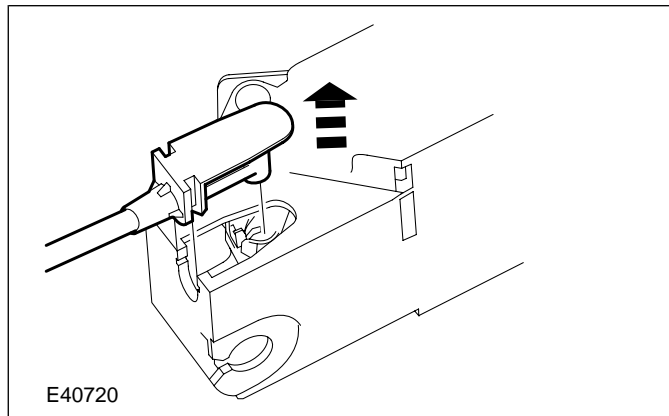
For additional information, refer to: **Front Door Window Regulator Motor - Vehicles With: Global Closing (501-11 Glass, Frames and Mechanisms, Removal and Installation) / Front Door Window Regulator Motor - Vehicles With: Global Closing (501-11 Glass, Frames and Mechanisms, Removal and Installation)**.

3. Disconnect the power window control switch electrical connector.



4. Disconnect the door latch remote control cable from the door latch remote control.

- Operate the door latch remote control handle lock to the lock position.

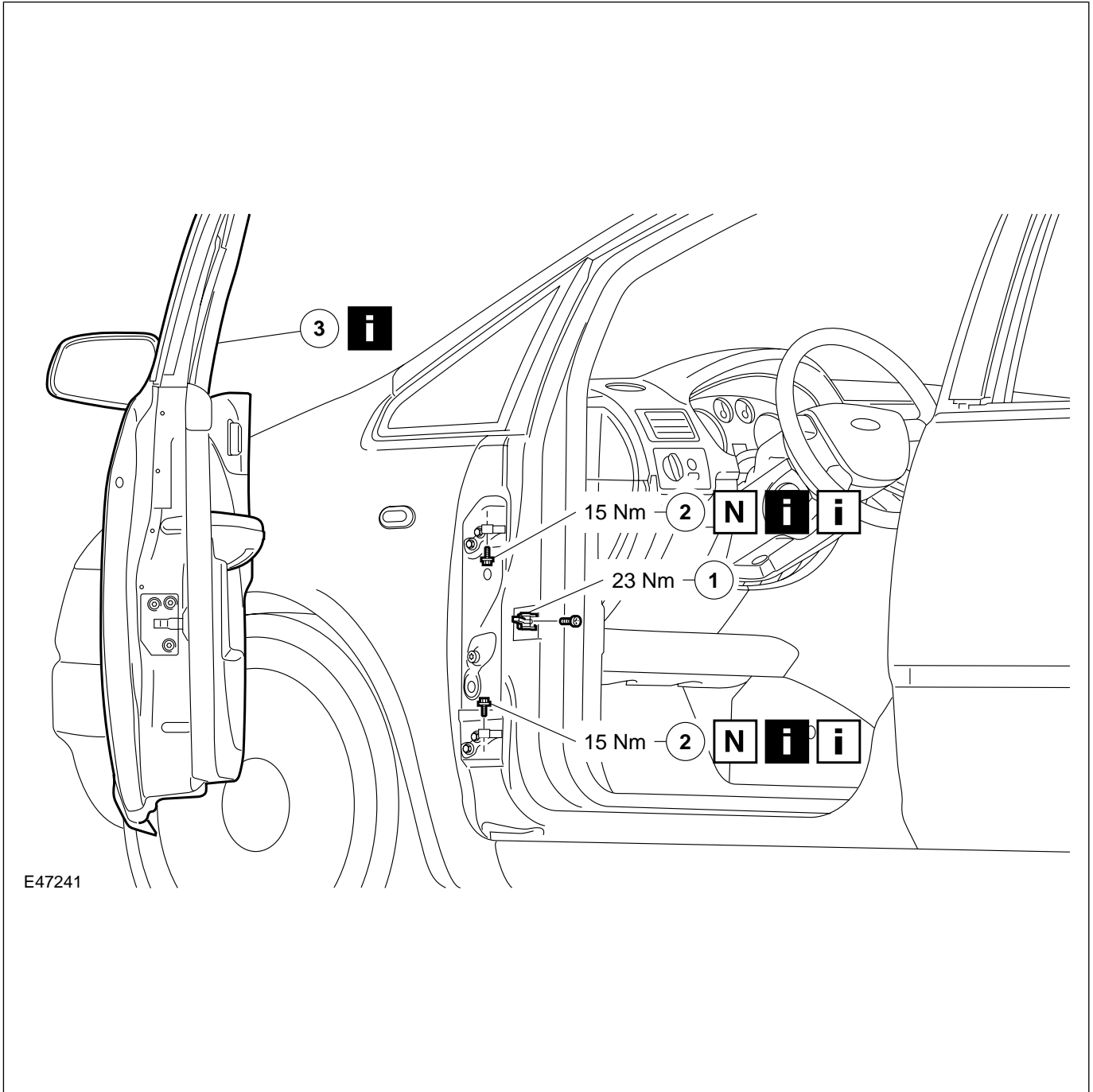


5. Remove the exterior front door handle.

For additional information, refer to: **Exterior Front Door Handle (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation)**.

6. Remove the components in the order indicated in the following illustration(s) and table(s).

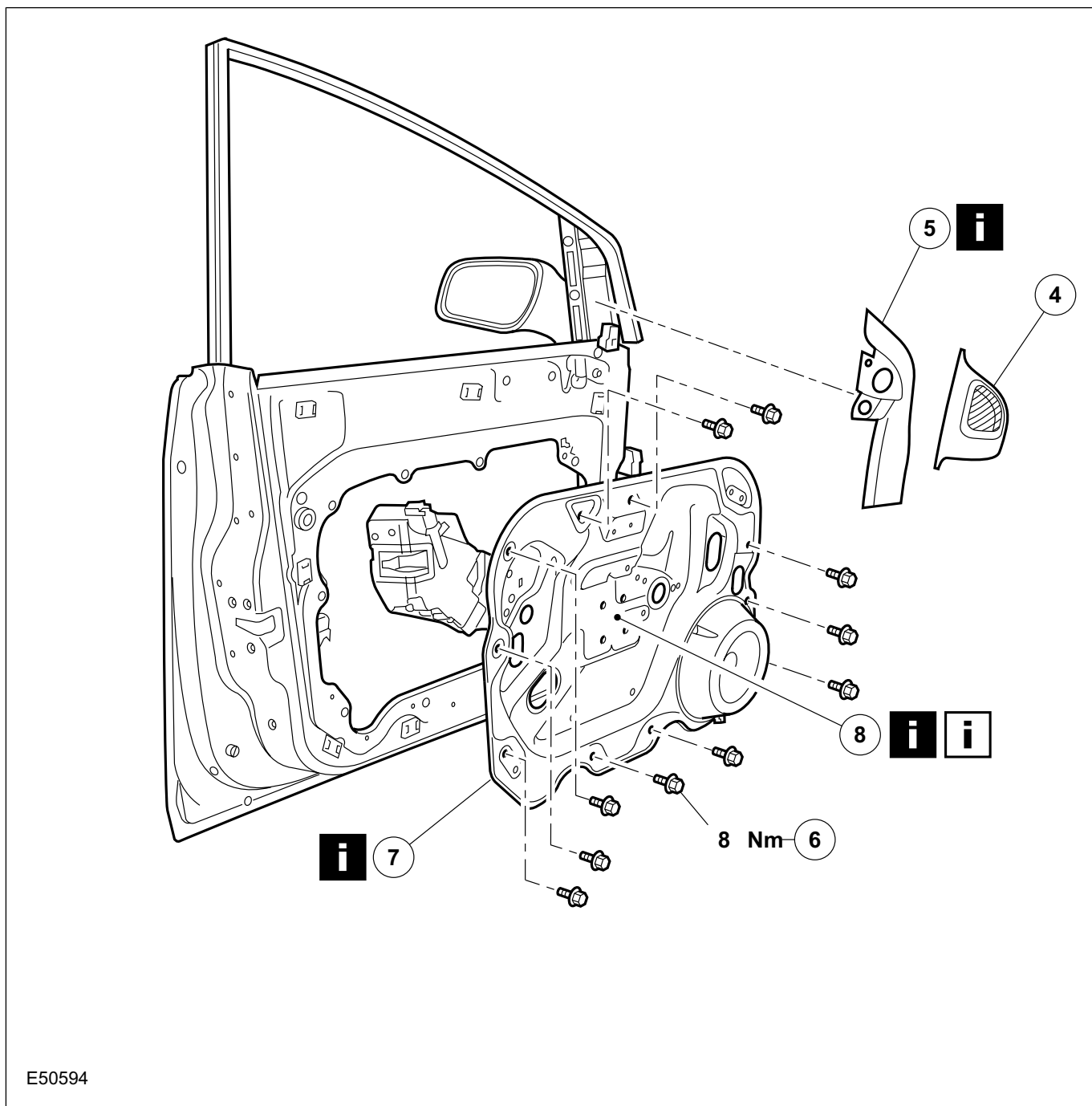
REMOVAL AND INSTALLATION



E47241

Item	Description
1	Door check strap
2	Door hinge center retaining bolts See Removal Detail See Installation Detail
3	Door (left-hand door shown) See Removal Detail

REMOVAL AND INSTALLATION



E50594

Item	Description
4	Speaker cover
5	Exterior mirror trim panel <i>See Removal Detail</i>
6	Door inner panel retaining bolts

Item	Description
7	Door inner panel <i>See Removal Detail</i>
8	Front door window regulator <i>See Removal Detail</i> <i>See Installation Detail</i>

7. To install, reverse the removal procedure.

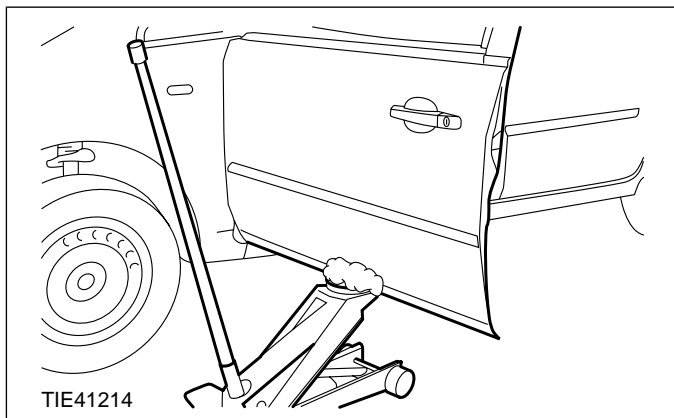
Removal Details

REMOVAL AND INSTALLATION

Item 2 Door hinge center retaining bolts

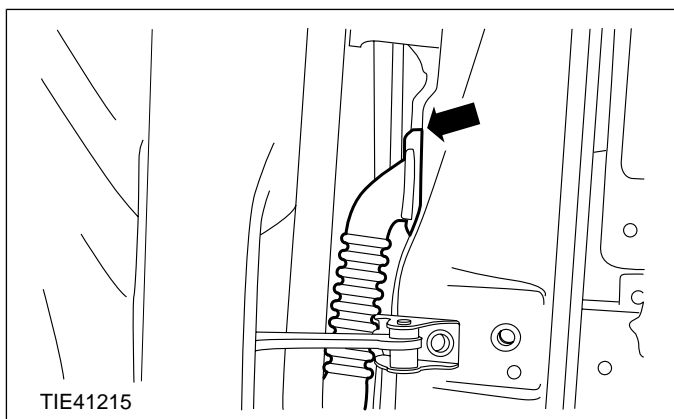
1. **CAUTION:** Protect the door using a soft cloth to prevent damage.

With the aid of another technician and a suitable trolley jack, support the door.



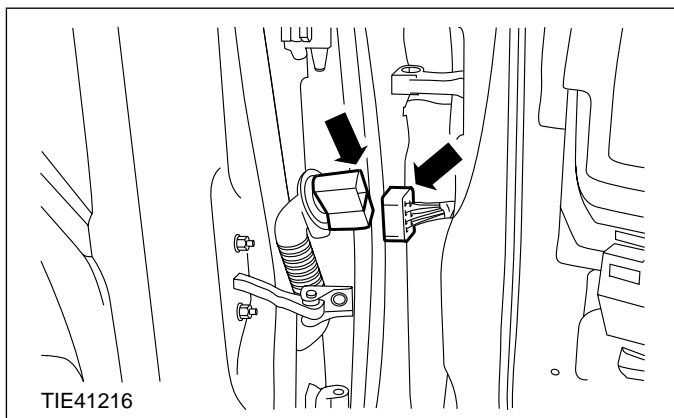
Item 3 Door (left-hand door shown)

1. Detach the electrical connector from the A-pillar.

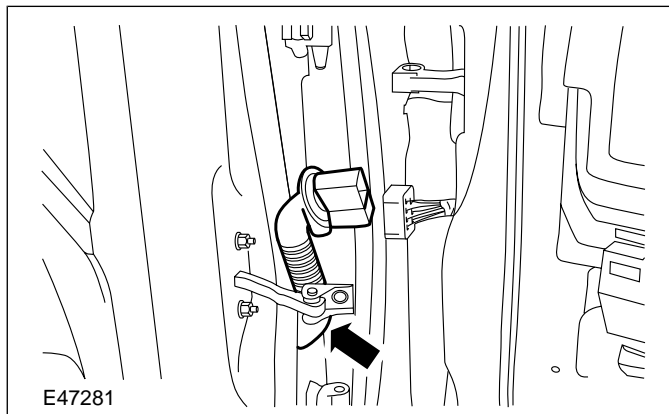


2. Remove the front door.

- Disconnect the electrical connector.



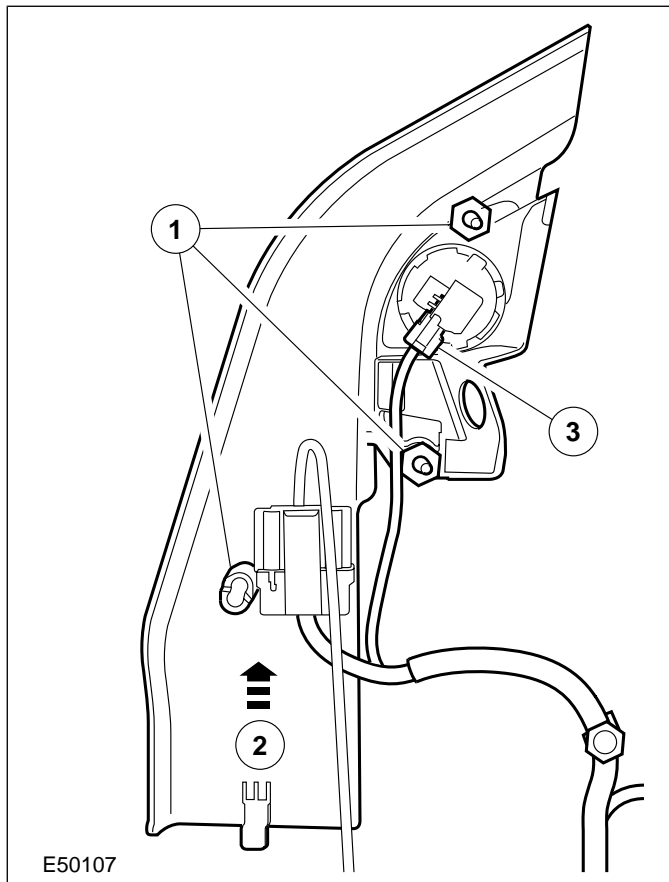
3. Push the front door wiring harness into the door.



Item 5 Exterior mirror trim panel

1. Detach the exterior mirror trim panel from the door panel.

1. Detach the clips.
2. Detach the trim panel.
3. Disconnect the speaker electrical connector (if equipped).

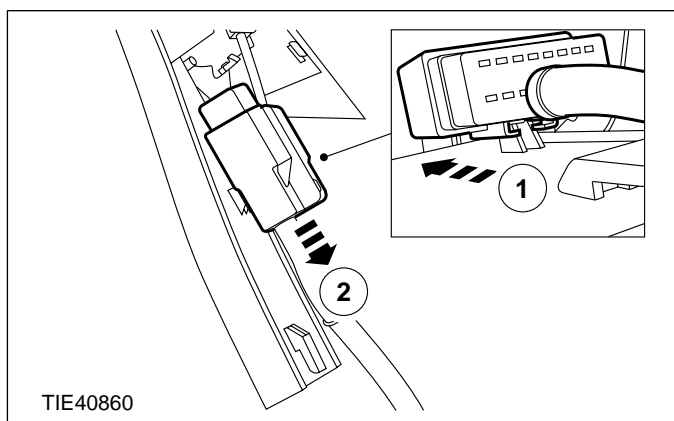


2. Remove the exterior mirror trim panel.

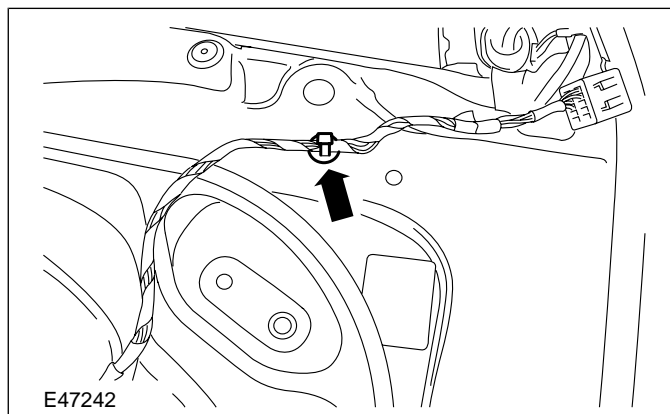
1. Detach the mirror electrical connector from the trim panel.

REMOVAL AND INSTALLATION

2. Disconnect the mirror electrical connector.

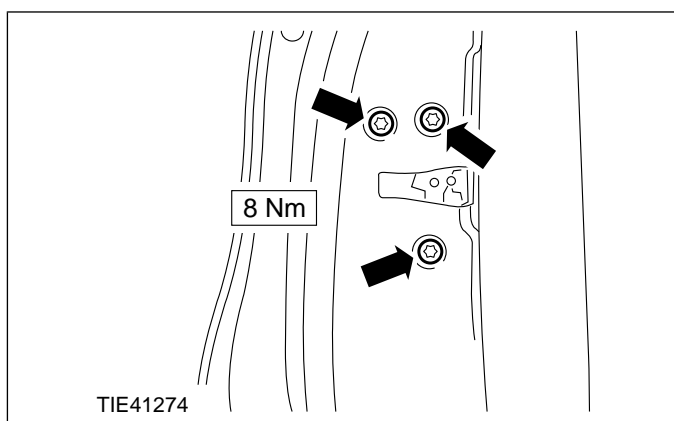


3. Detach the exterior mirror wiring harness retaining clip.



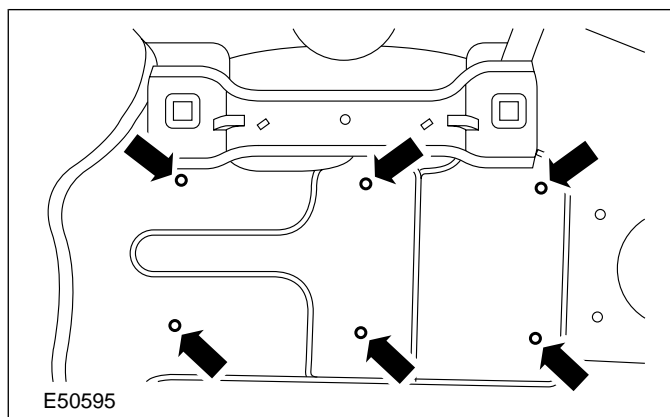
Item 7 Door inner panel

1. Remove the front door latch retaining screws.

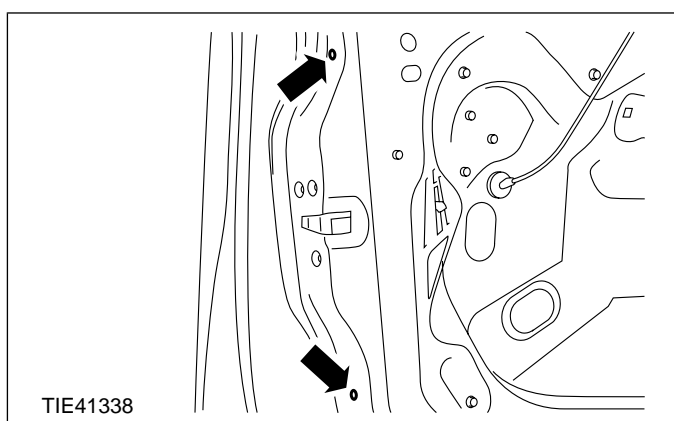


Item 8 Front door window regulator

1. Using a suitable electric hand drill, remove the rivets.



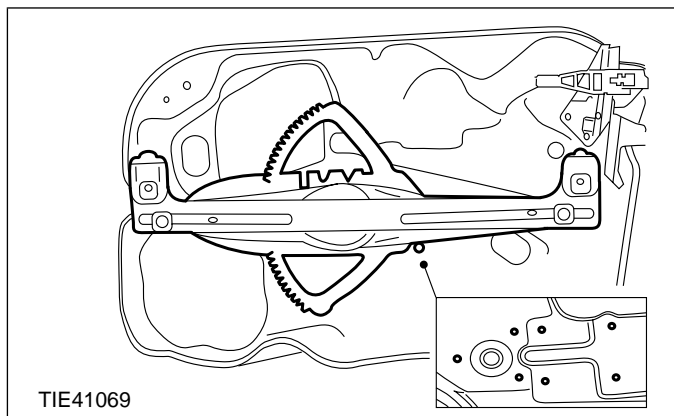
2. Remove the front door latch bracket retaining screws.



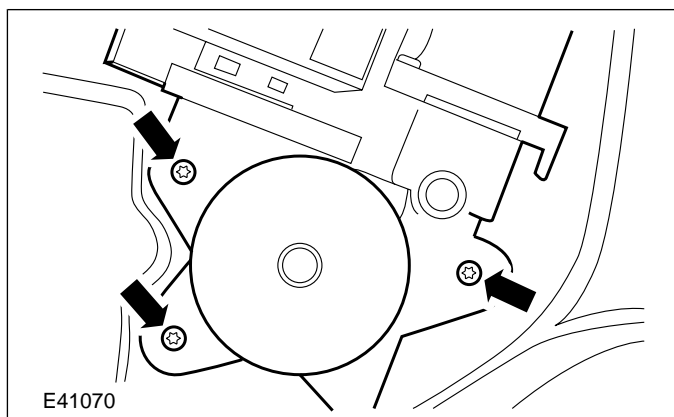
Installation Details

REMOVAL AND INSTALLATION**Item 8 Front door window regulator**

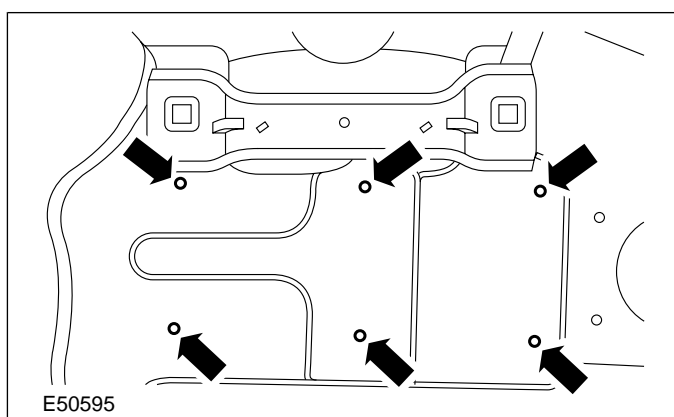
1. Align the window regulator with the window regulator motor retaining screw holes and rivet holes in the door inner panel.



2. Install the window regulator motor.



3. Using a suitable blind rivet gun-hand, install new rivets in a diagonally opposed pattern.

**Item 2 Door hinge center retaining bolts**

1. Apply a coating of adhesive to the door hinge center retaining bolts.

REMOVAL AND INSTALLATION

Front Door Window Regulator — 4-Door/5-Door/Wagon

General Equipment

Electric hand drill

Blind rivet gun-hand

Materials

Name	Specification
Adhesive - Loctite 243	WSK-M2G349-A7

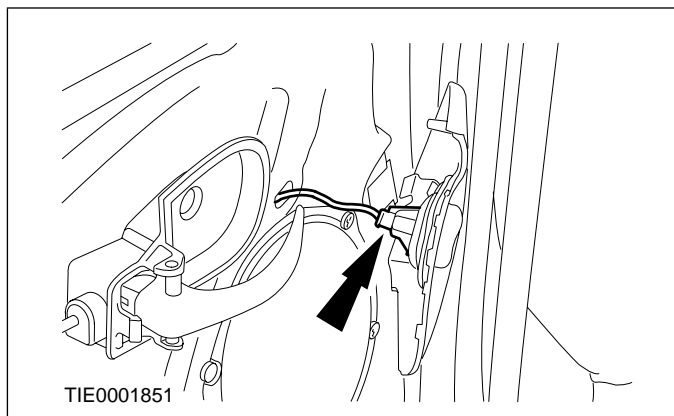
1. Remove the front door window glass.

For additional information, refer to: **Front Door Window Glass (501-11 Glass, Frames and Mechanisms, Removal and Installation)**.

2. Remove the front door window regulator motor.

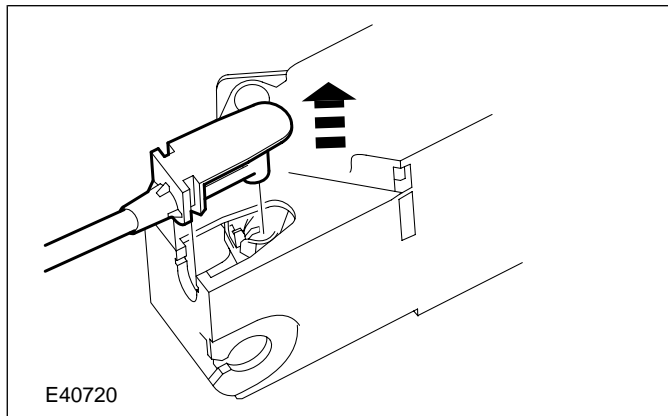
For additional information, refer to: **Front Door Window Regulator Motor - Vehicles With: Global Closing (501-11 Glass, Frames and Mechanisms, Removal and Installation) / Front Door Window Regulator Motor - Vehicles With: Global Closing (501-11 Glass, Frames and Mechanisms, Removal and Installation)**.

3. Disconnect the power window control switch electrical connector.



4. Disconnect the door latch remote control cable from the door latch remote control.

- Operate the door latch remote control handle lock to the lock position.

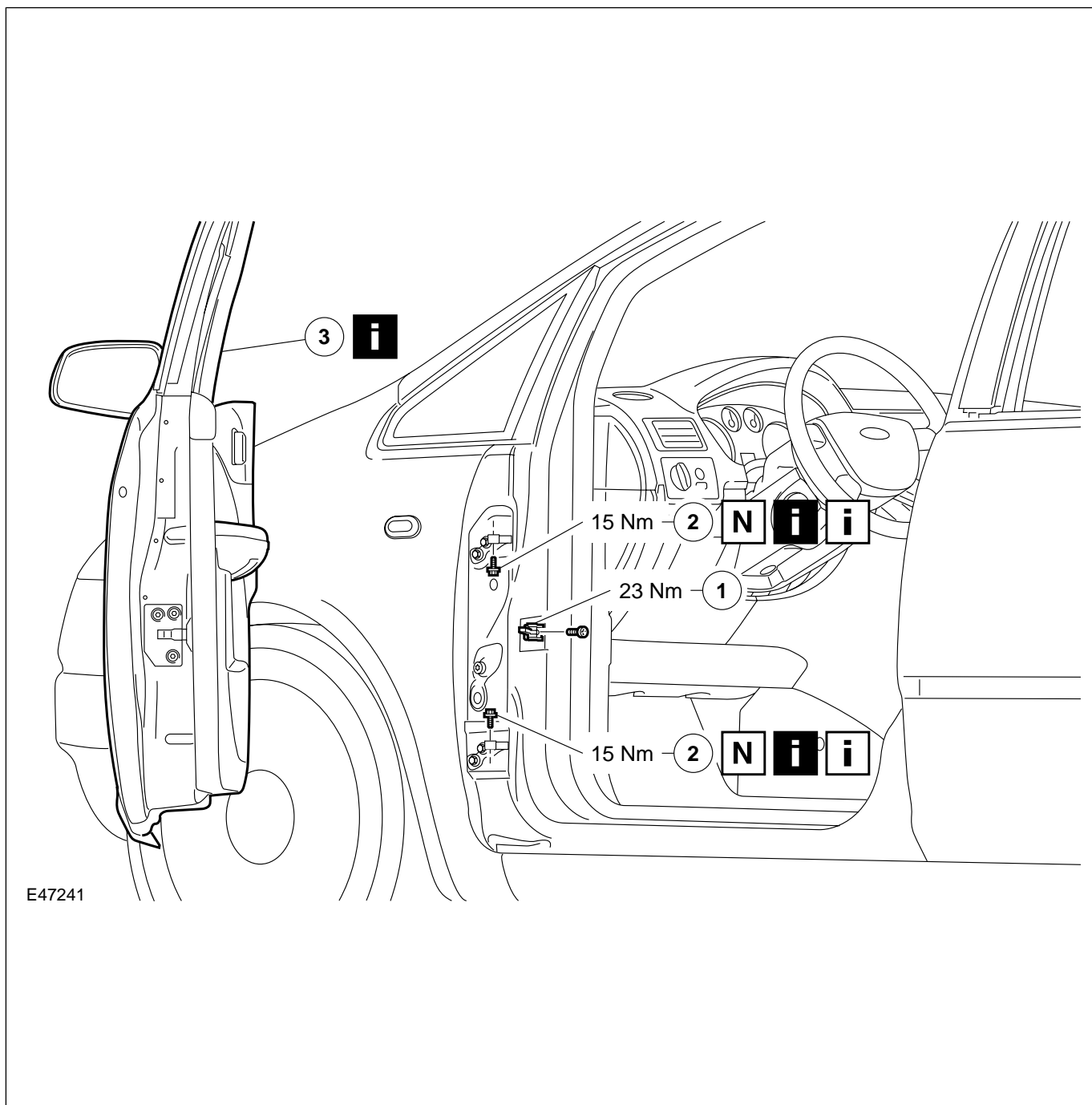


5. Remove the exterior front door handle.

For additional information, refer to: **Exterior Front Door Handle (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation)**.

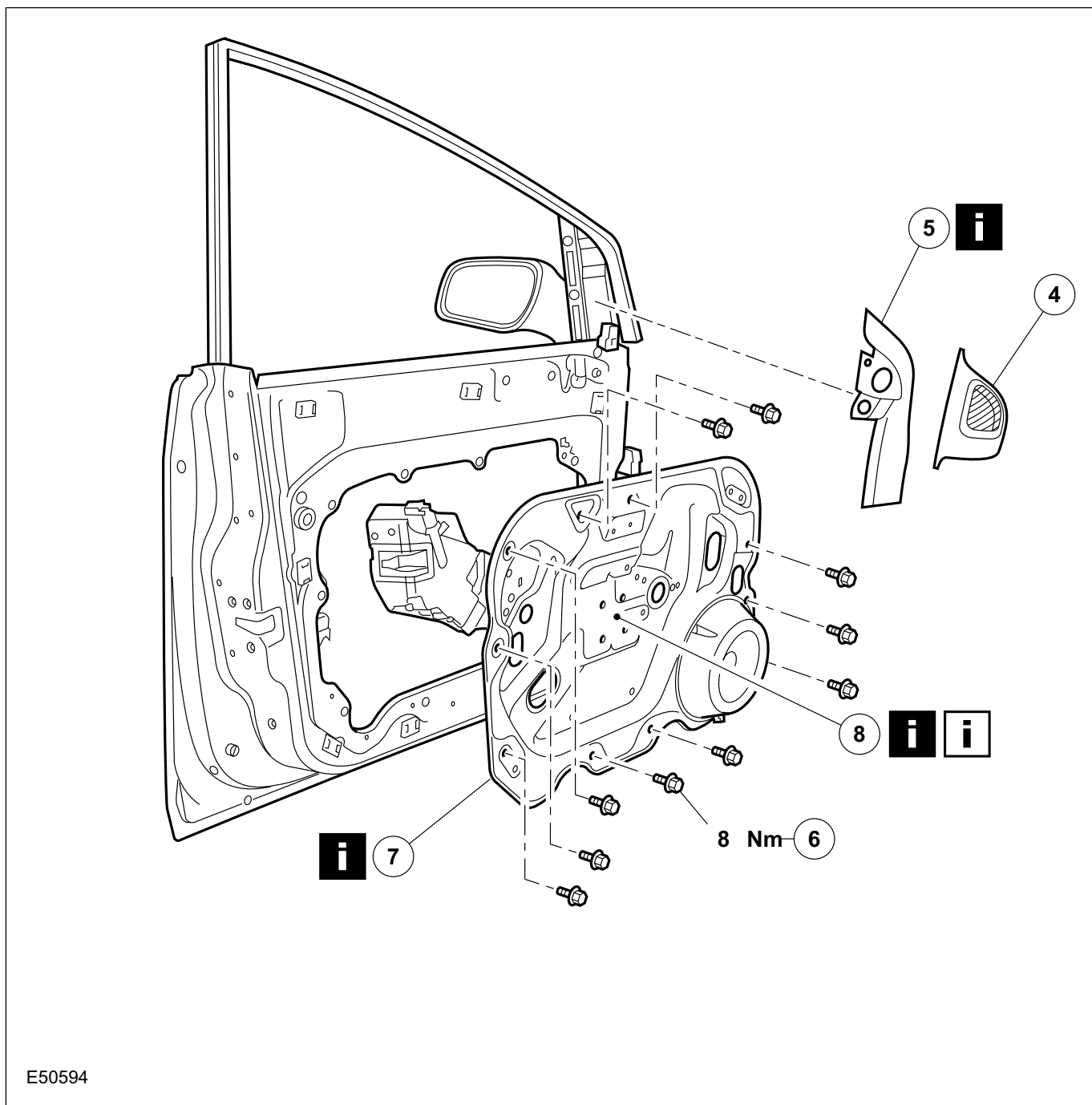
6. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



Item	Description
1	Door check strap
2	Door hinge center retaining bolts <i>See Removal Detail</i> <i>See Installation Detail</i>
3	Door (left-hand door shown) <i>See Removal Detail</i>

REMOVAL AND INSTALLATION



E50594

Item	Description
4	Speaker cover
5	Exterior mirror trim panel <i>See Removal Detail</i>
6	Door inner panel retaining bolts

Item	Description
7	Door inner panel <i>See Removal Detail</i>
8	Front door window regulator <i>See Removal Detail</i> <i>See Installation Detail</i>

7. To install, reverse the removal procedure.

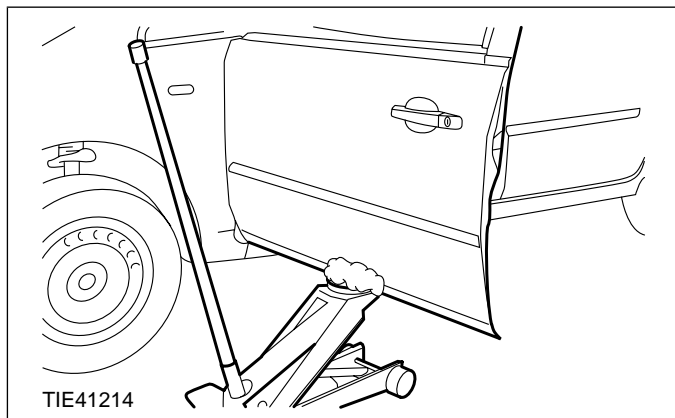
Removal Details

REMOVAL AND INSTALLATION

Item 2 Door hinge center retaining bolts

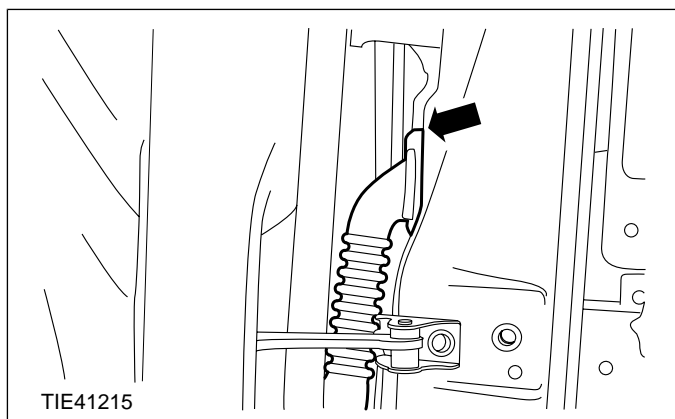
1. **CAUTION:** Protect the door using a soft cloth to prevent damage.

With the aid of another technician and a suitable trolley jack, support the door.



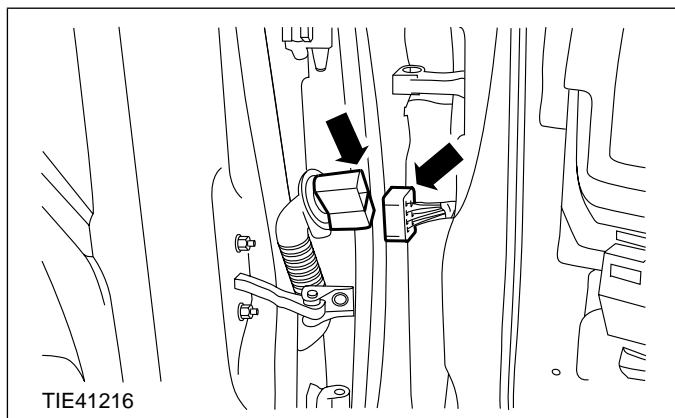
Item 3 Door (left-hand door shown)

1. Detach the electrical connector from the A-pillar.

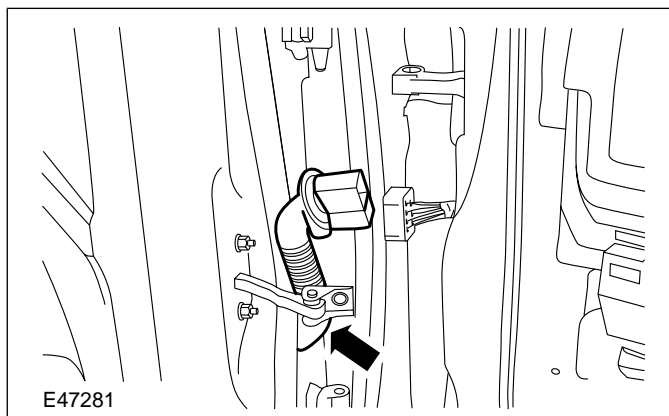


2. Remove the front door.

- Disconnect the electrical connector.



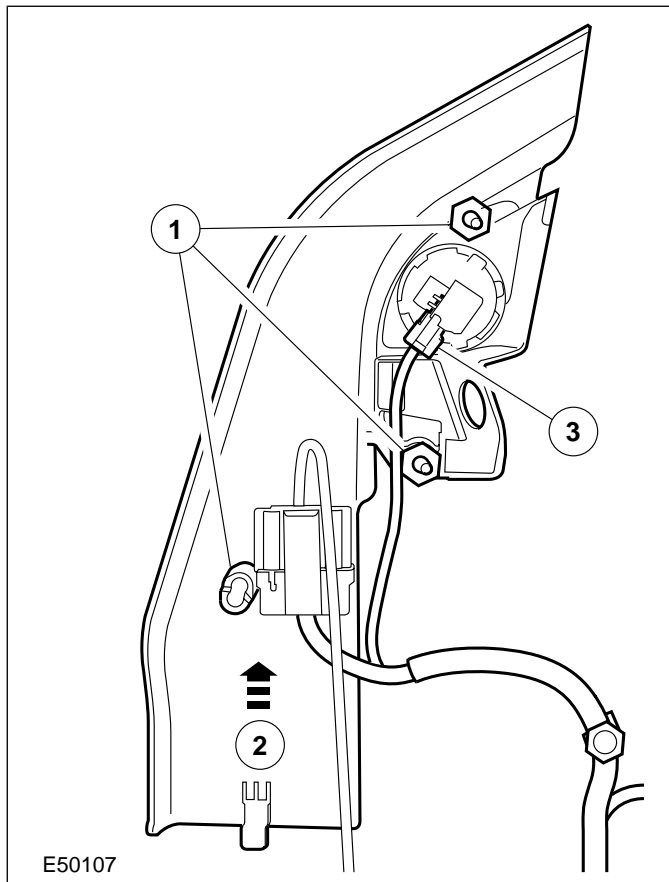
3. Push the front door wiring harness into the door.



Item 5 Exterior mirror trim panel

1. Detach the exterior mirror trim panel from the door panel.

1. Detach the clips.
2. Detach the trim panel.
3. Disconnect the speaker electrical connector (if equipped).

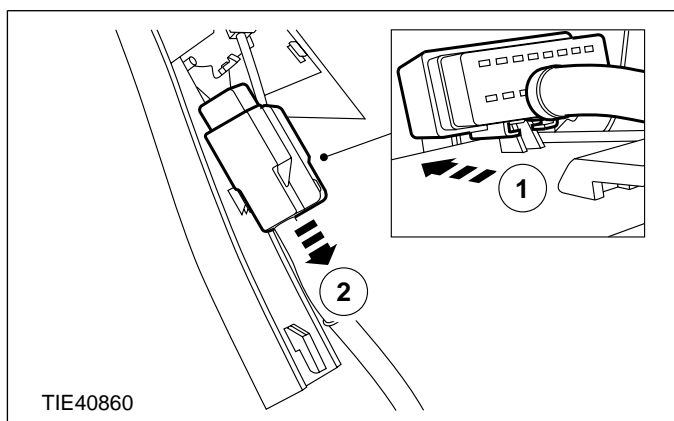


2. Remove the exterior mirror trim panel.

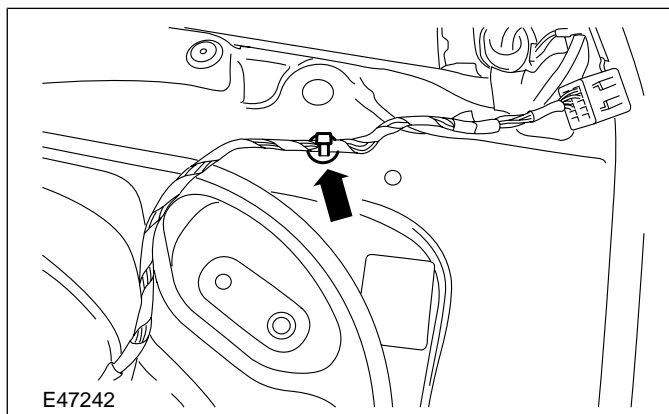
1. Detach the mirror electrical connector from the trim panel.

REMOVAL AND INSTALLATION

2. Disconnect the mirror electrical connector.

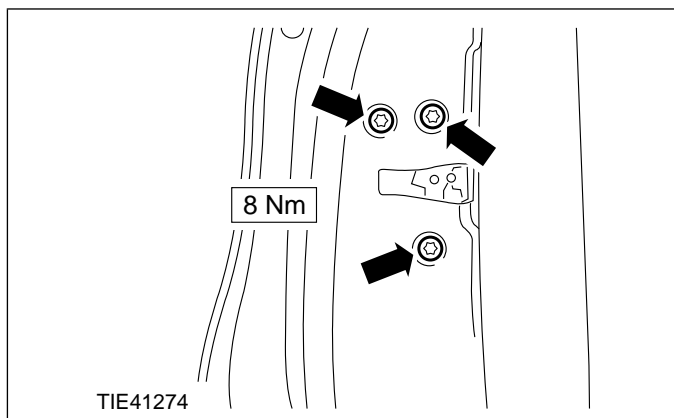


3. Detach the exterior mirror wiring harness retaining clip.



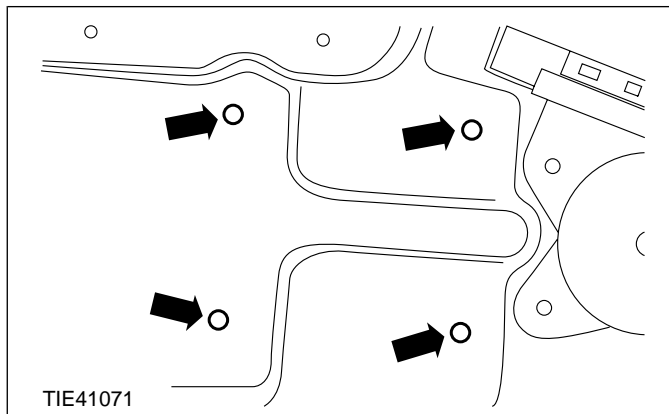
Item 7 Door inner panel

1. Remove the front door latch retaining screws.

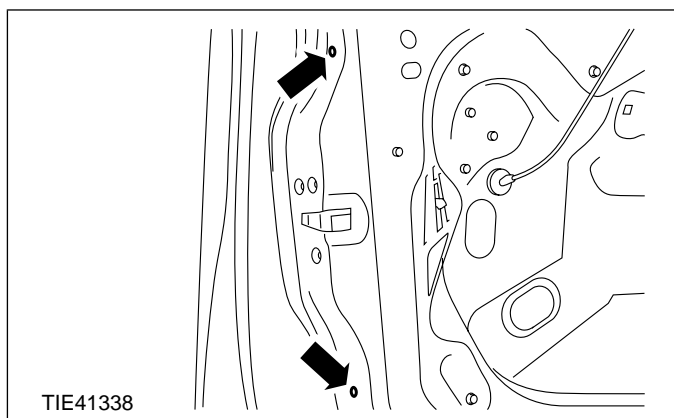


Item 8 Front door window regulator

1. Using a suitable electric hand drill, remove the rivets.



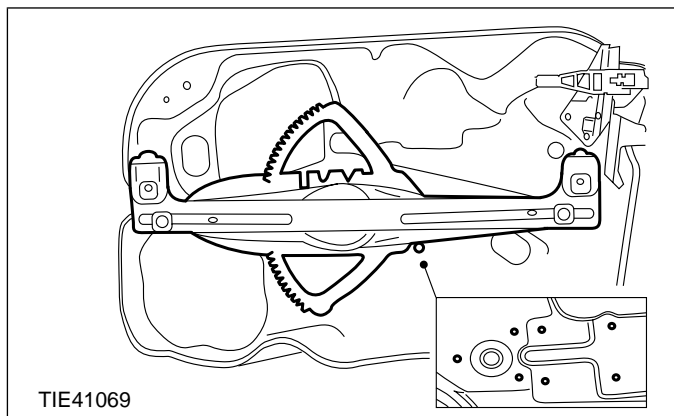
2. Remove the front door latch bracket retaining screws.



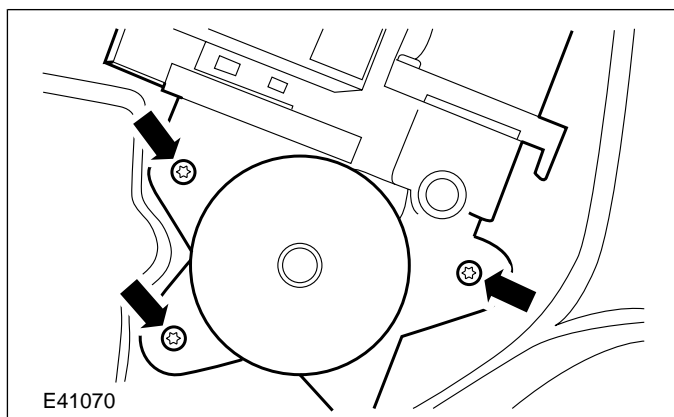
Installation Details

REMOVAL AND INSTALLATION**Item 8 Front door window regulator**

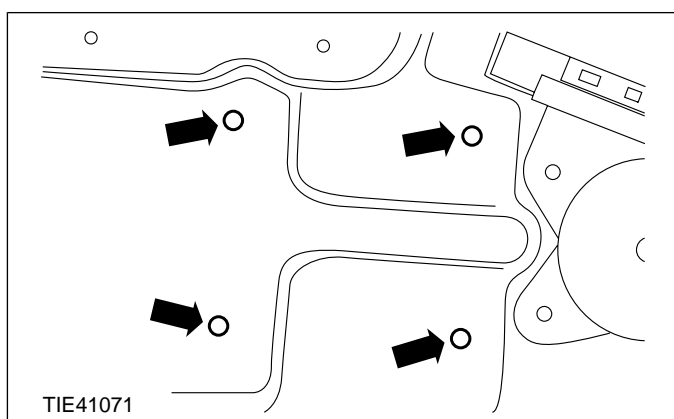
1. Align the window regulator with the window regulator motor retaining screw holes and rivet holes in the door inner panel.



2. Install the window regulator motor.



3. Using a suitable blind rivet gun-hand, install new rivets in a diagonally opposed pattern.

**Item 2 Door hinge center retaining bolts**

1. Apply a coating of adhesive to the door hinge center retaining bolts.

REMOVAL AND INSTALLATION

Rear Door Window Regulator — Vehicles With: Power Windows

General Equipment

Electric hand drill

Blind rivet gun-hand

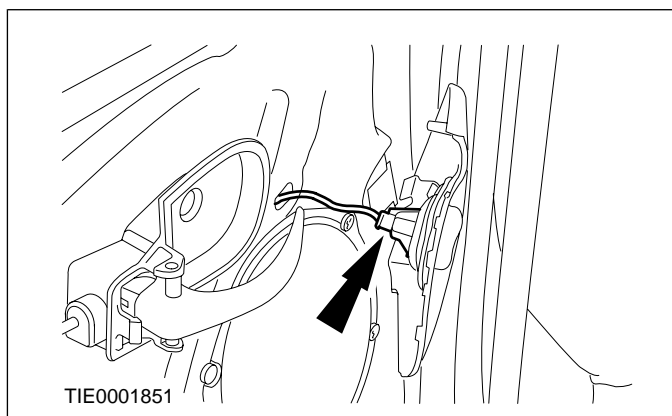
1. Remove the rear door window glass.

For additional information, refer to: **Rear Door Window Glass - Vehicles With: Power Windows (501-11 Glass, Frames and Mechanisms, Removal and Installation)**.

2. Remove the rear door window regulator motor.

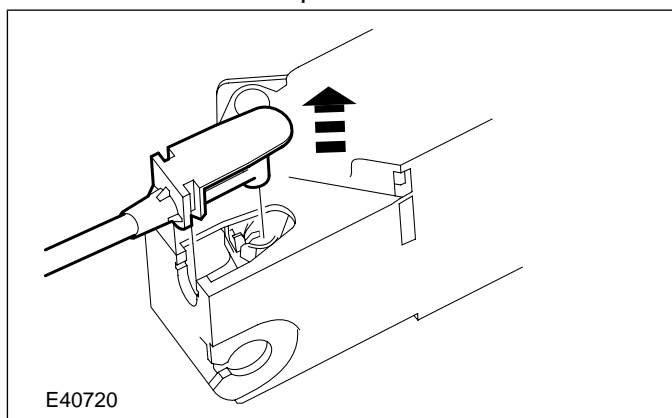
For additional information, refer to: **Rear Door Window Regulator Motor (501-11 Glass, Frames and Mechanisms, Removal and Installation)**.

3. Disconnect the power window control switch electrical connector.



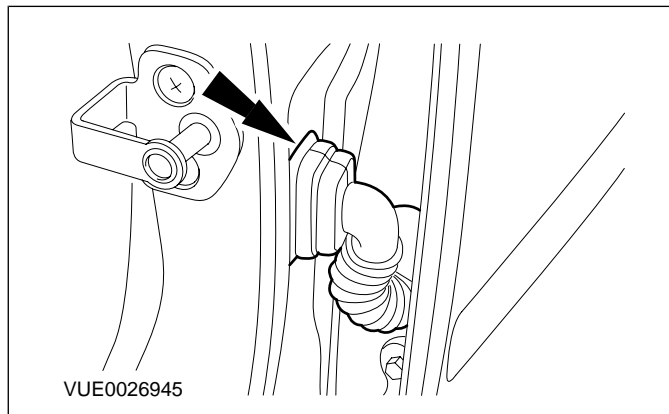
4. Disconnect the door latch remote control cable from the door latch remote control.

- Operate the door latch remote control handle lock to the lock position.

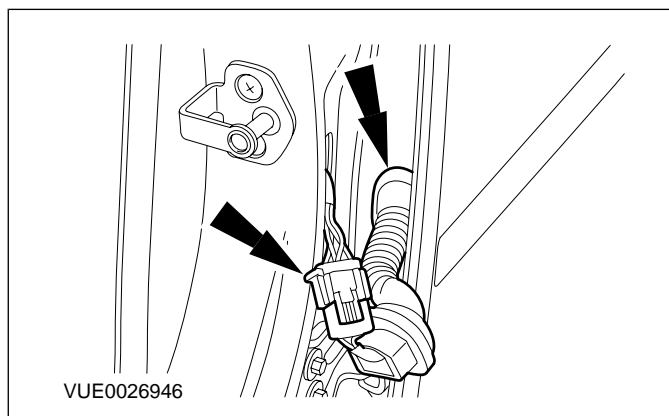


5. Close the rear door.

6. Detach the wiring harness from the B-pillar.



7. Disconnect the wiring harness at the B-pillar and push it into the door.



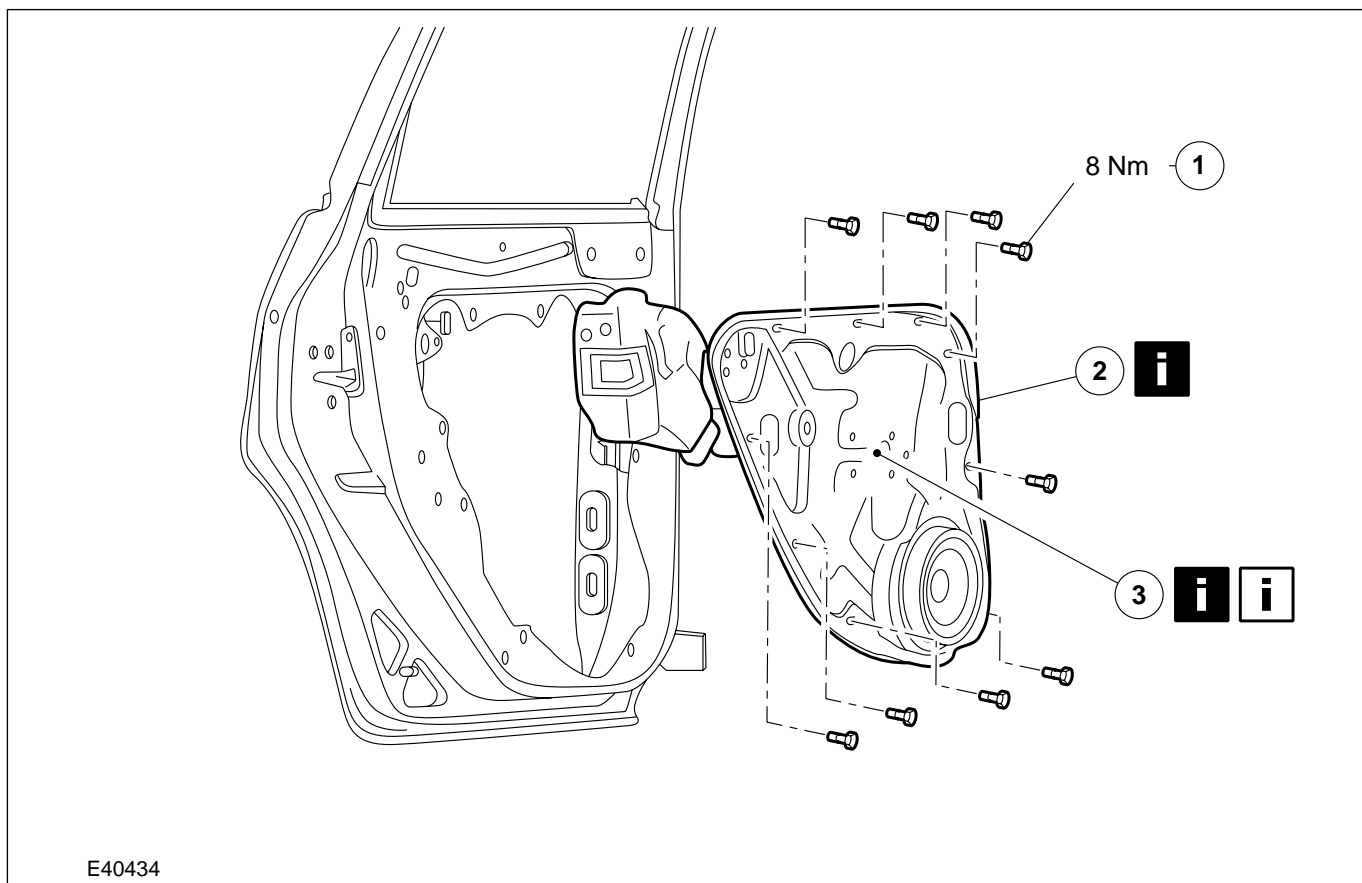
8. Open the rear door.

9. Remove the exterior rear door handle.

For additional information, refer to: **Exterior Rear Door Handle (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation)**.

10. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



E40434

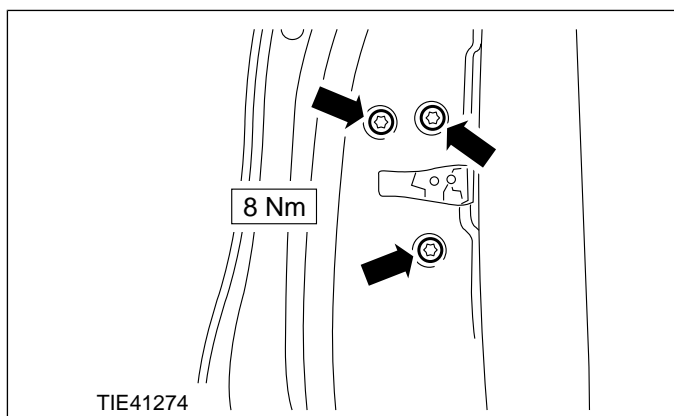
Item	Description
1	Door inner panel retaining bolts
2	Door inner panel <i>See Removal Detail</i>
3	Rear door window regulator <i>See Removal Detail</i> <i>See Installation Detail</i>

11. To install, reverse the removal procedure.

Removal Details

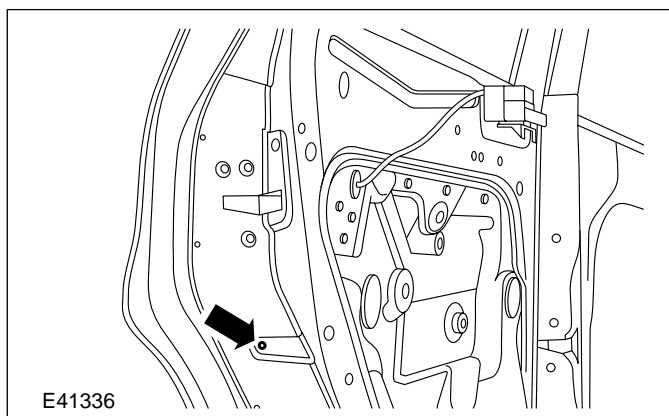
Item 2 Door inner panel

1. Remove the rear door latch retaining screws.



TIE41274

2. Remove the rear door latch bracket retaining screw.

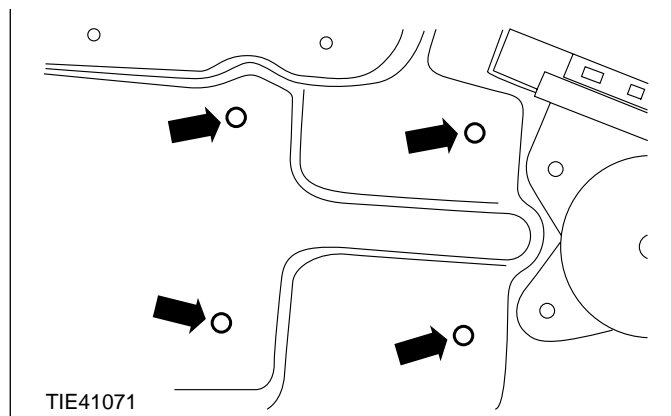


E41336

REMOVAL AND INSTALLATION

Item 3 Rear door window regulator

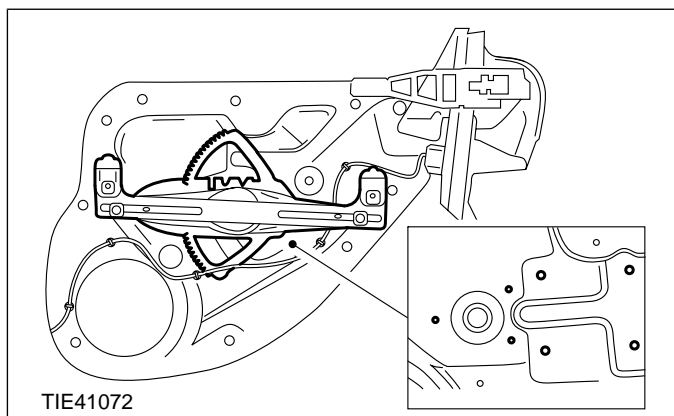
1. Using a suitable electric hand drill, remove the rivets.



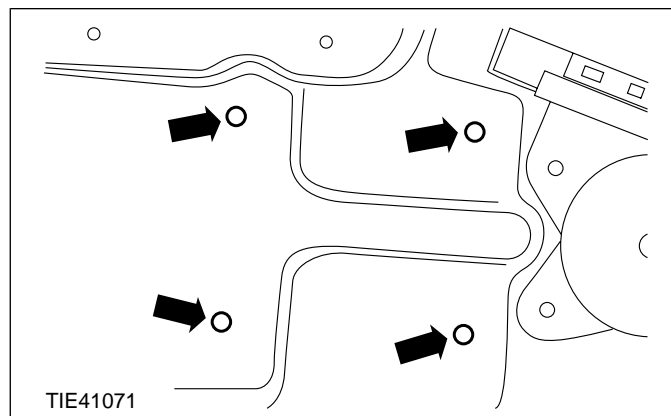
Installation Details

Item 3 Rear door window regulator

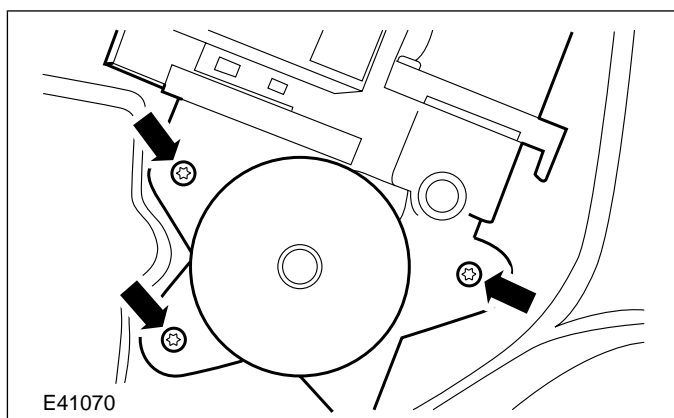
1. Align the window regulator with the window regulator motor retaining screw holes and rivet holes in the door inner panel.



3. Using a suitable blind rivet gun-hand, install new rivets in a diagonally opposed pattern.



2. Install the window regulator motor.



REMOVAL AND INSTALLATION

Rear Door Window Regulator — Vehicles With: Manual Windows

General Equipment

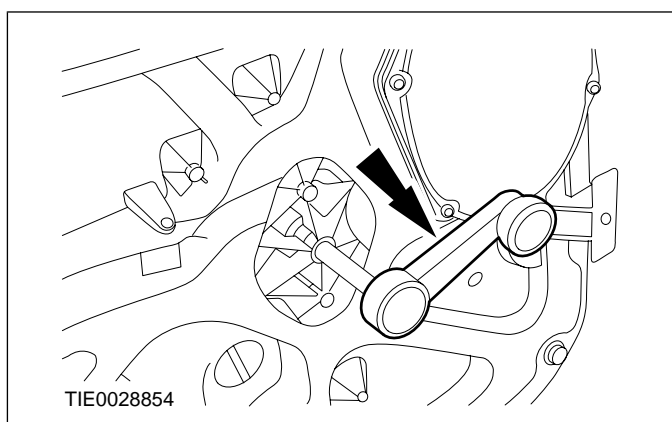
Electric hand drill

Blind rivet gun-hand

1. Remove the rear door window glass.

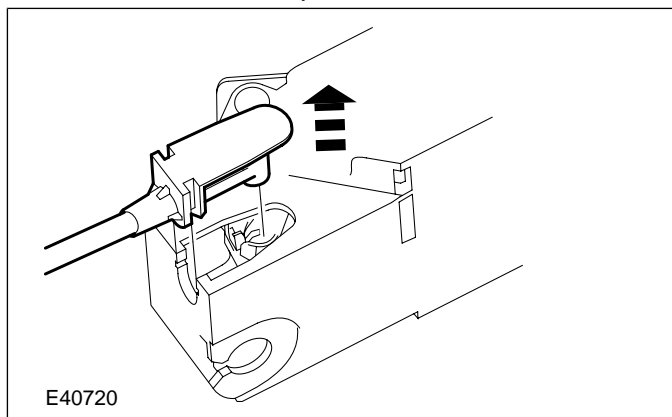
For additional information, refer to: **Rear Door Window Glass - Vehicles With: Manual Windows (501-11 Glass, Frames and Mechanisms, Removal and Installation).**

2. Remove the window regulator handle.



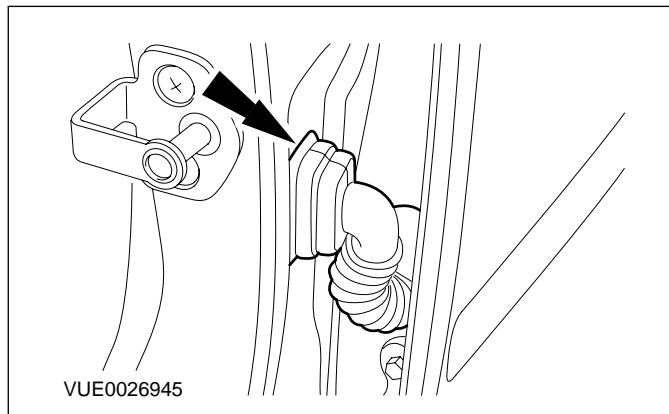
3. Disconnect the door latch remote control cable from the door latch remote control.

- Operate the door latch remote control handle lock to the lock position.

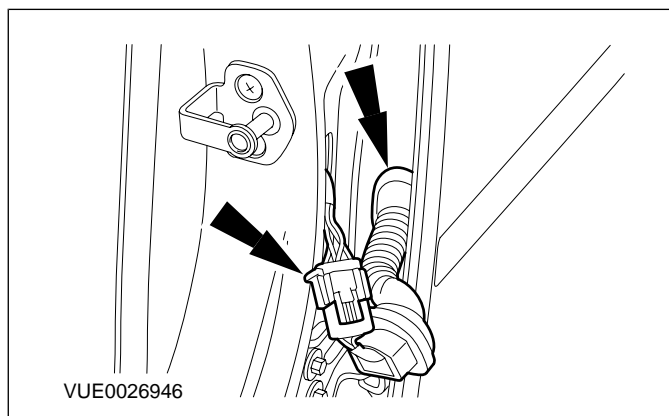


4. Close the rear door.

5. Detach the wiring harness from the B-pillar.



6. Disconnect the wiring harness at the B-pillar and push it into the door.



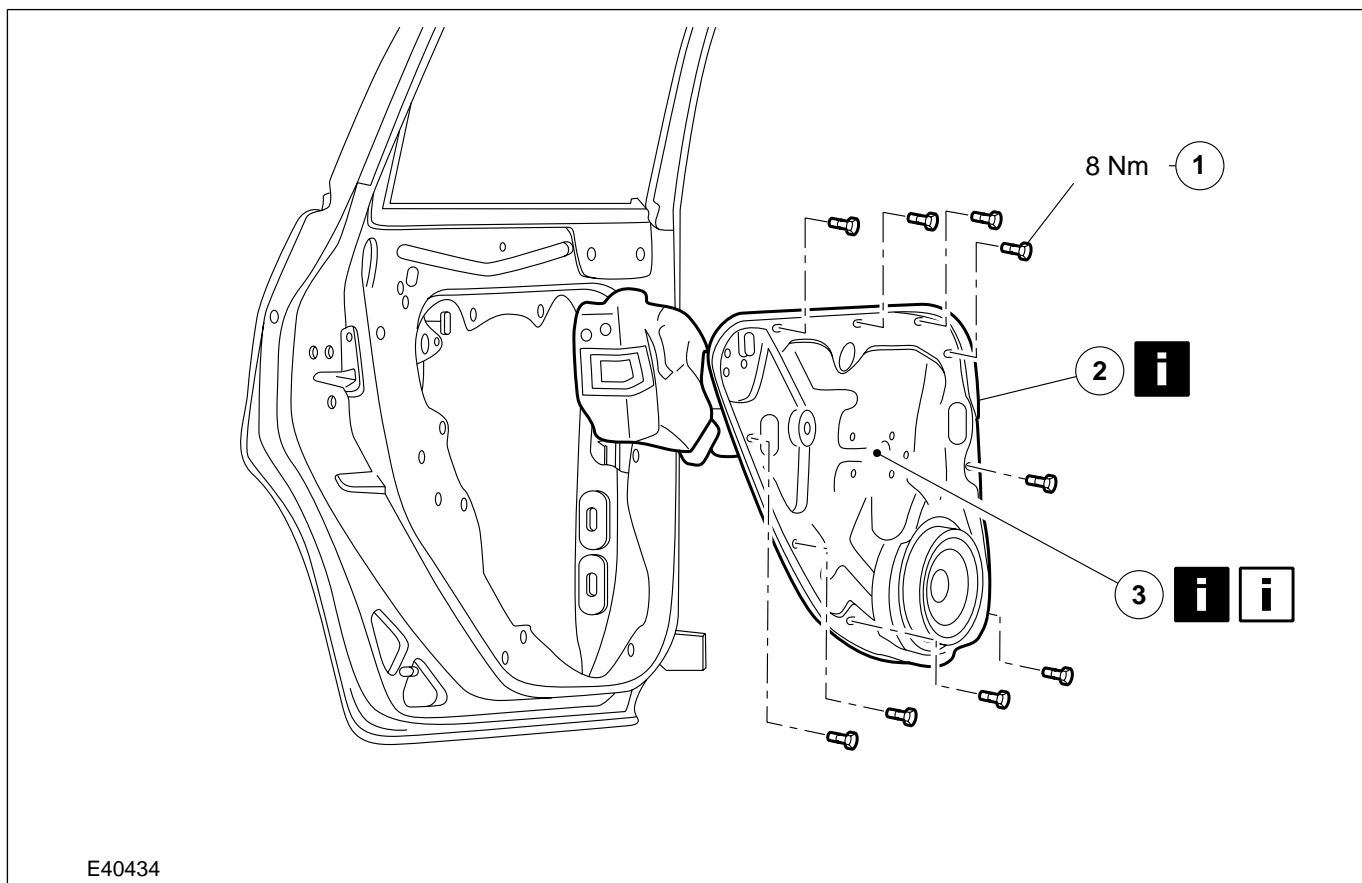
7. Open the rear door.

8. Remove the exterior rear door handle.

For additional information, refer to: **Exterior Rear Door Handle (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).**

9. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



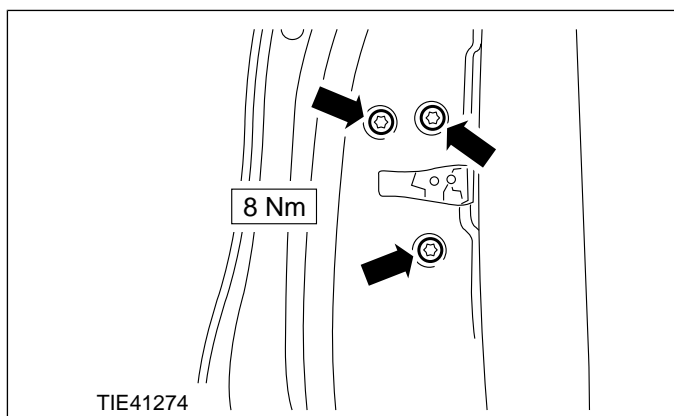
Item	Description
1	Door inner panel retaining bolts
2	Door inner panel <i>See Removal Detail</i>
3	Rear door window regulator <i>See Removal Detail</i> <i>See Installation Detail</i>

10. To install, reverse the removal procedure.

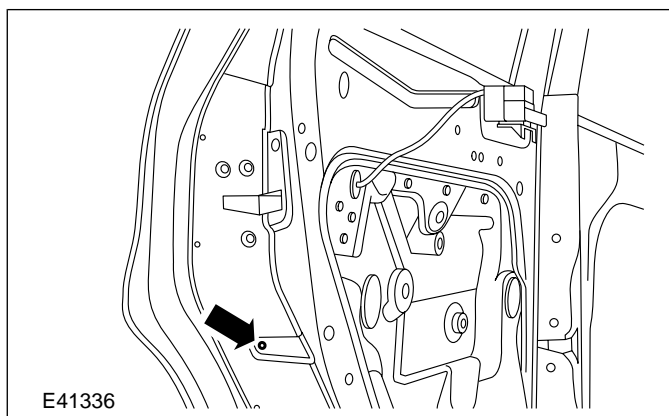
Removal Details

Item 2 Door inner panel

1. Remove the rear door latch retaining screws.



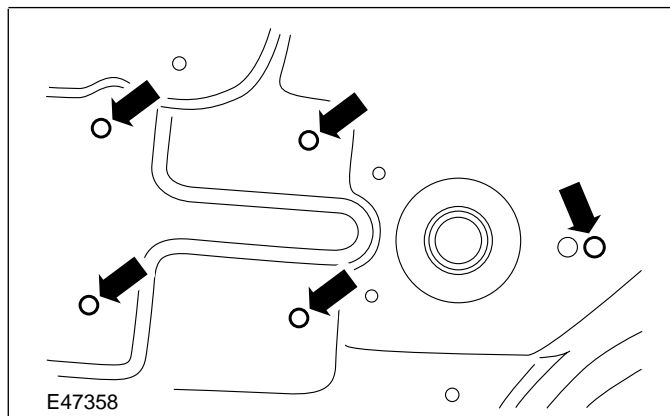
2. Remove the rear door latch bracket retaining screws.



REMOVAL AND INSTALLATION

Item 3 Rear door window regulator

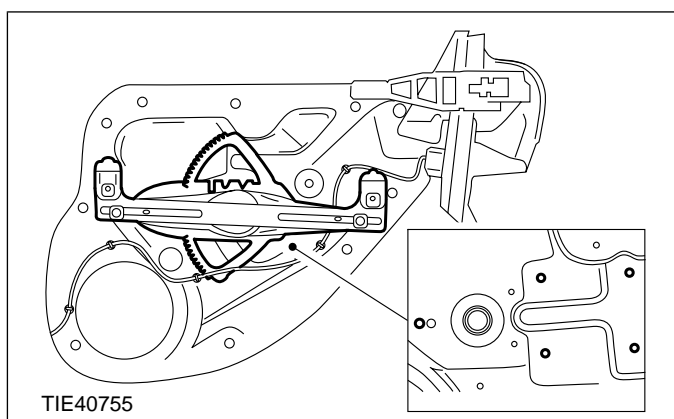
1. Using a suitable electric hand drill, remove the rivets.



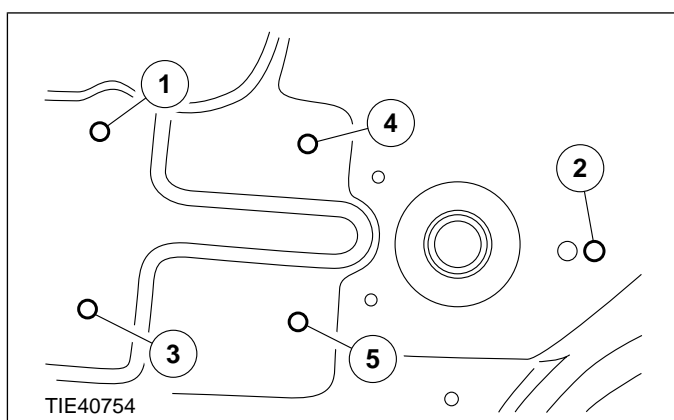
Installation Details

Item 3 Rear door window regulator

1. Align the window regulator with the rivet holes in the door inner panel.



2. Using a suitable blind rivet gun-hand, install new rivets in the sequence shown.



REMOVAL AND INSTALLATION

Front Door Window Regulator Motor — Vehicles With: Global Closing

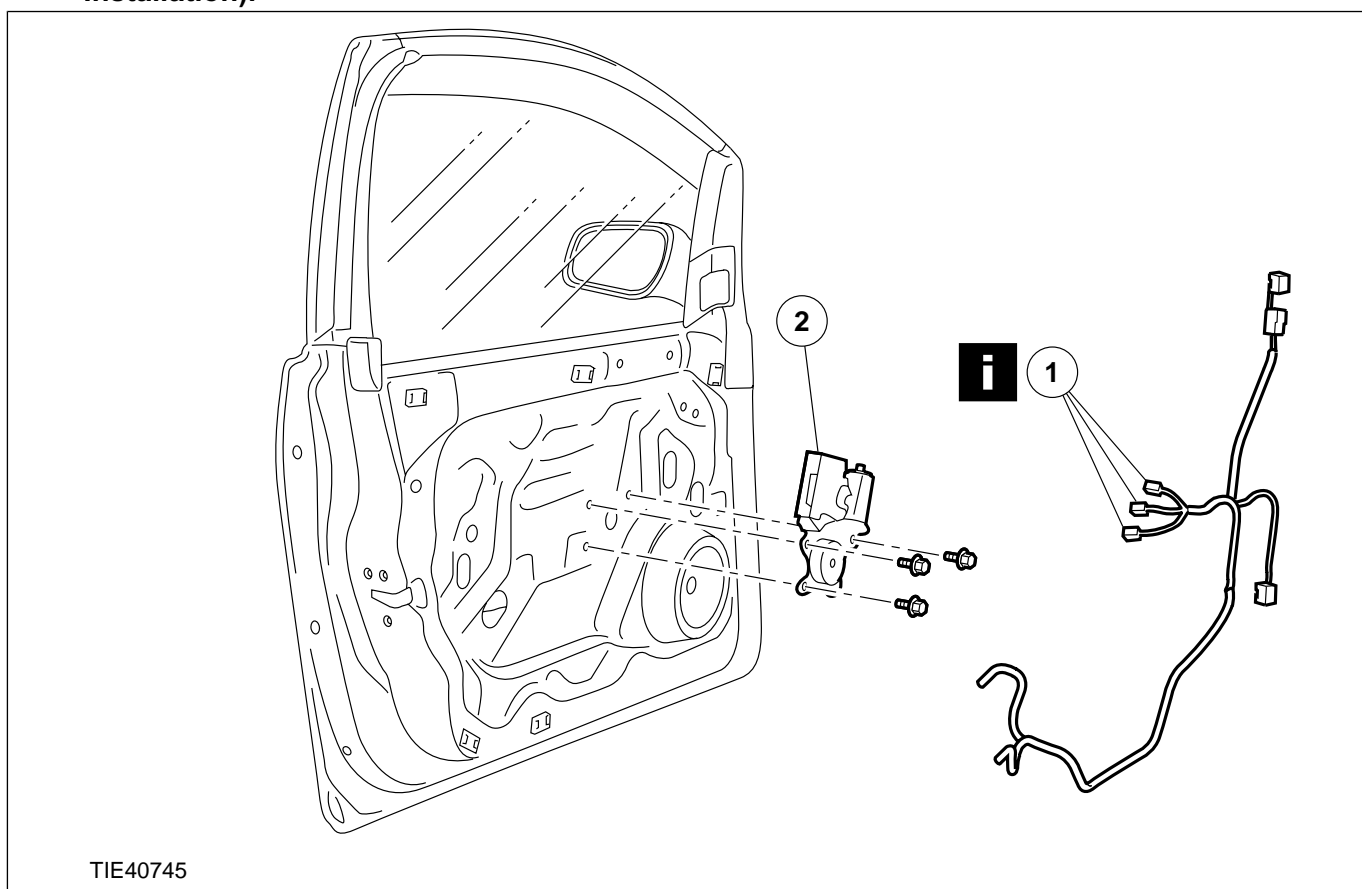
General Equipment

Worldwide diagnostic system (WDS)

2. Remove the components in the order indicated in the following illustration(s) and table(s).

1. Remove the front door trim panel. For additional information, refer to: (501-05 Interior Trim and Ornamentation)

Front Door Trim Panel - 3-Door (Removal and Installation),
Front Door Trim Panel - 4-Door/5-Door/Wagon (Removal and Installation).



Item	Description
1	Front door window regulator motor electrical connectors See Removal Detail
2	Front door window regulator motor

Configure the front door window regulator motor control module using WDS.

5. Initialize the door window motors.

For additional information, refer to: Door **Window Motor Initialization** (501-11 Glass, Frames and Mechanisms, General Procedures).

3. To install, reverse the removal procedure.

4. NOTE: This step must be carried out if installing a new front door window regulator motor.

REMOVAL AND INSTALLATION

Removal Details

**Item 1 Front door window regulator motor
electrical connectors**

NOTE: The driver side front door window regulator motor has three electrical connectors, the passenger side front door window regulator motor has two.

REMOVAL AND INSTALLATION

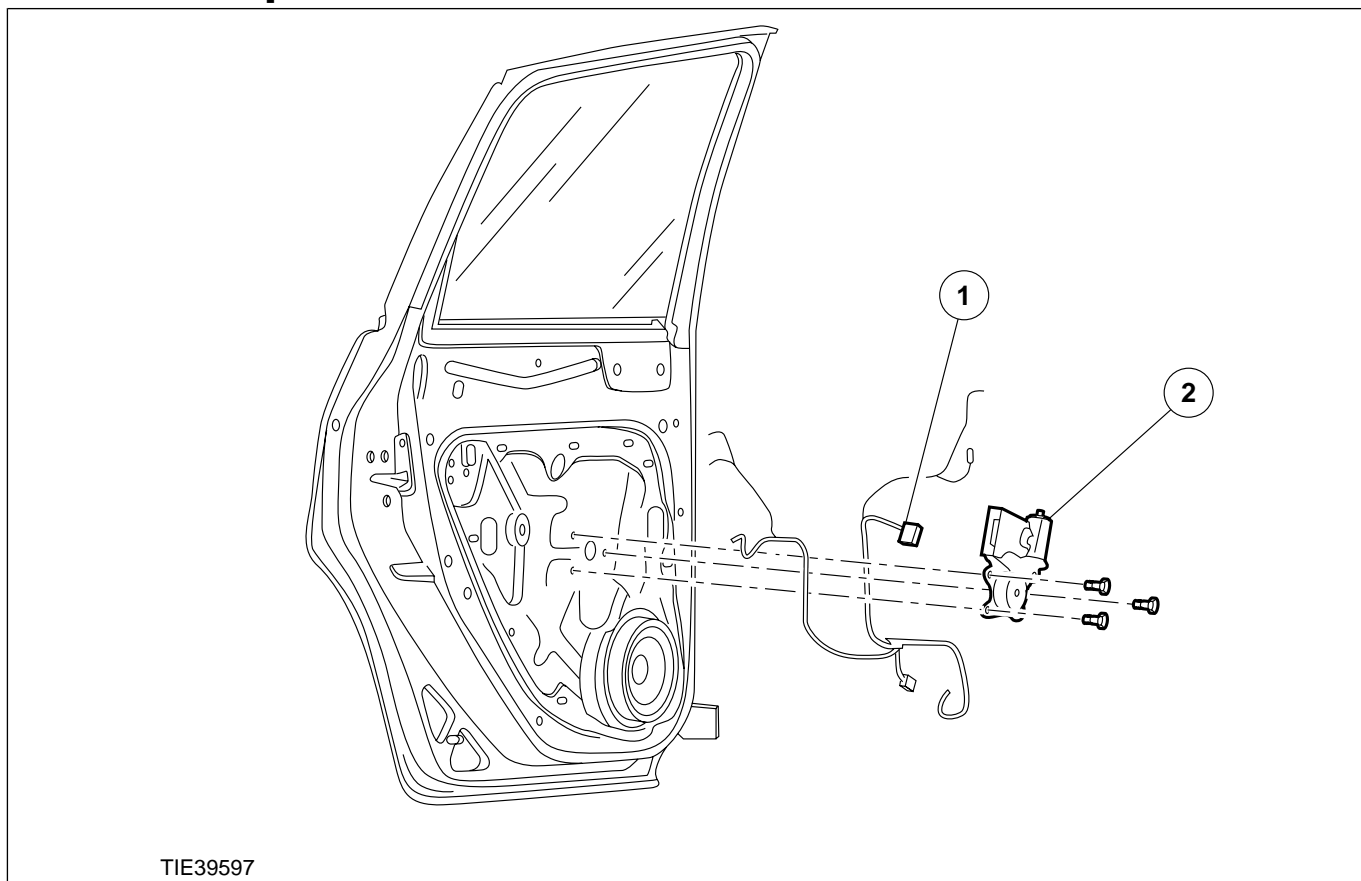
Rear Door Window Regulator Motor

General Equipment

Worldwide diagnostic system (WDS)

1. Remove the rear door trim panel. For additional information, refer to Section **501-05 [Interior Trim and Ornamentation]**.

2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Window regulator motor electrical connector
2	Window regulator motor

3. To install, reverse the removal procedure.
4. **NOTE:** This step should only be carried out if installing a new window regulator motor.
Configure the window regulator motor control module using worldwide diagnostic system (WDS).
5. Initialize the door window motors.
For additional information, refer to Door **Window Motor Initialization in this section.**

REMOVAL AND INSTALLATION

Windshield Glass

General Equipment

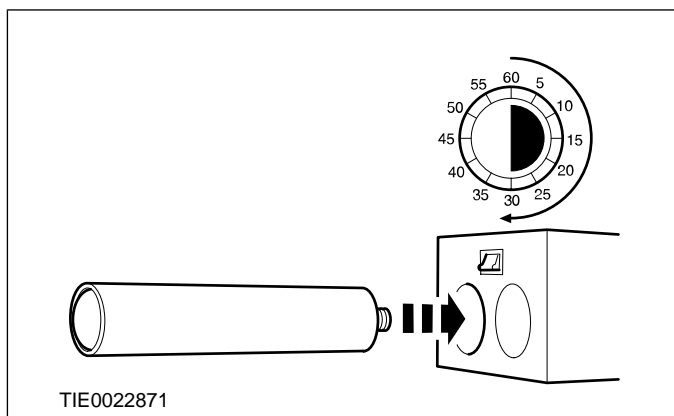
Hot air gun
Direct glazing cutter for bonded glass
Mixer/applicator gun
Direct glazing adhesive oven
Glazing suction cups

Materials

Name	Specification
Windshield Adhesive Kit	WSK-M11P57-A1

All vehicles

1. Remove the polyurethane (PU) adhesive cap and heat the PU adhesive for a minimum of 30 minutes.



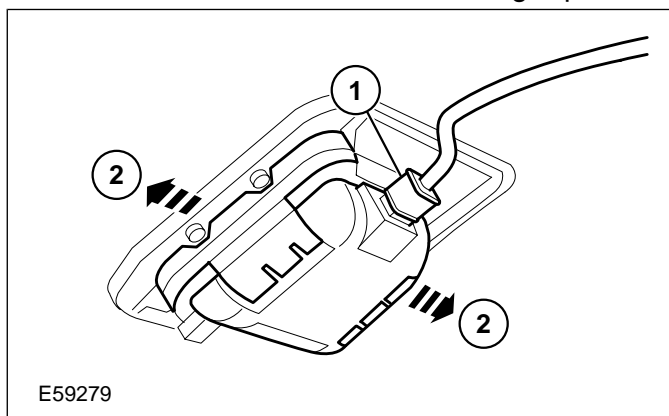
Vehicles with auto-dimming interior mirror

2. Remove the auto-dimming interior mirror.

For additional information, refer to:
Auto-Dimming Interior Mirror (501-09 Rear View Mirrors, Removal and Installation).

3. Remove the rain sensor (if equipped).
 1. Disconnect the rain sensor electrical connector.

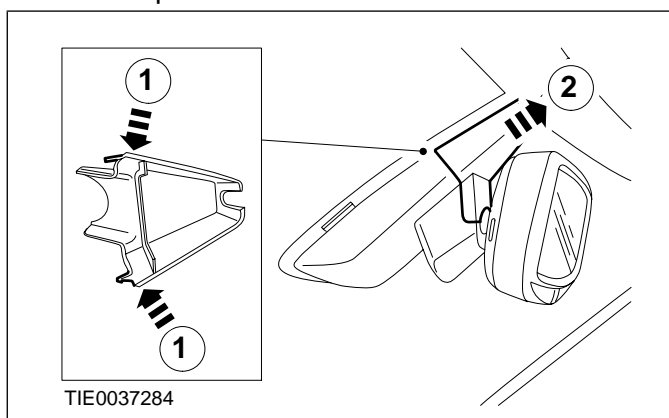
2. Release the rain sensor retaining clips.



Vehicles with manual dimming interior mirror with rain sensor

4. Remove the manual dimming interior mirror upper trim panel.

1. Release the manual dimming interior mirror upper trim panel retaining clips.
2. Pull the manual dimming interior mirror upper trim panel rearwards.

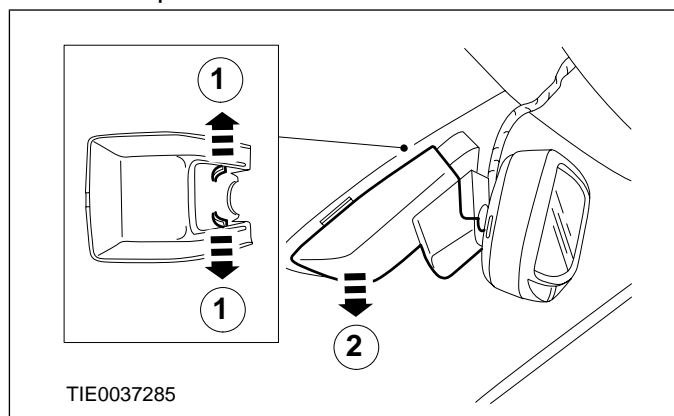


5. Remove the manual dimming interior mirror lower trim panel.

1. Release the manual dimming interior mirror lower trim panel retaining clips.

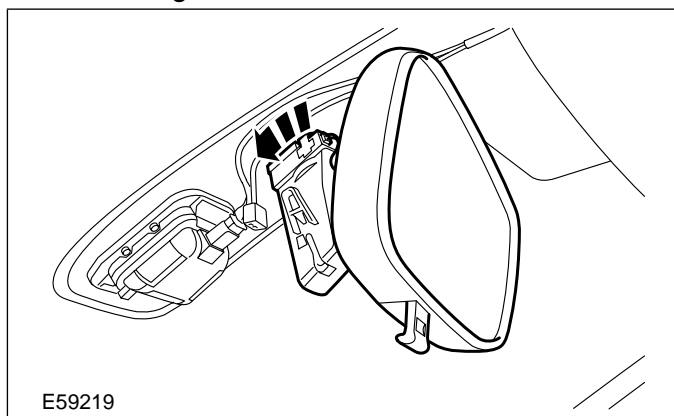
REMOVAL AND INSTALLATION

- Pull the manual dimming interior mirror lower trim panel downwards.



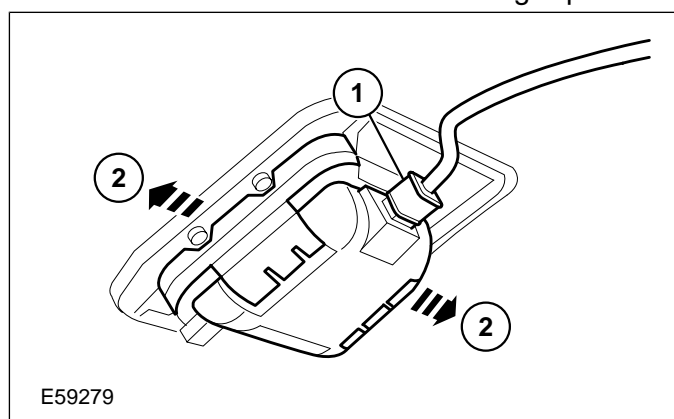
6. Remove the manual dimming interior mirror.

- Rotate the manual dimming interior mirror 60 degrees counterclockwise.



7. Remove the rain sensor.

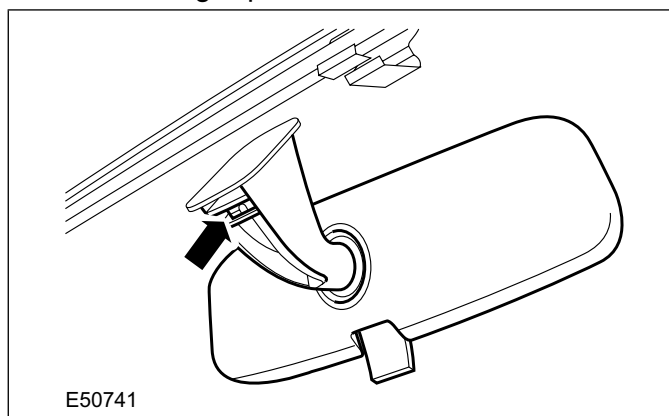
- Disconnect the rain sensor electrical connector.
- Release the rain sensor retaining clips.



Vehicles with manual dimming interior mirror

8. Remove the manual dimming interior mirror.

- Using a thin bladed screwdriver, release the retaining clip.



All vehicles

9. Remove the A-pillar trim panels.

For additional information, refer to: **A-Pillar Trim Panel** (501-05 Interior Trim and Ornamentation, Removal and Installation).

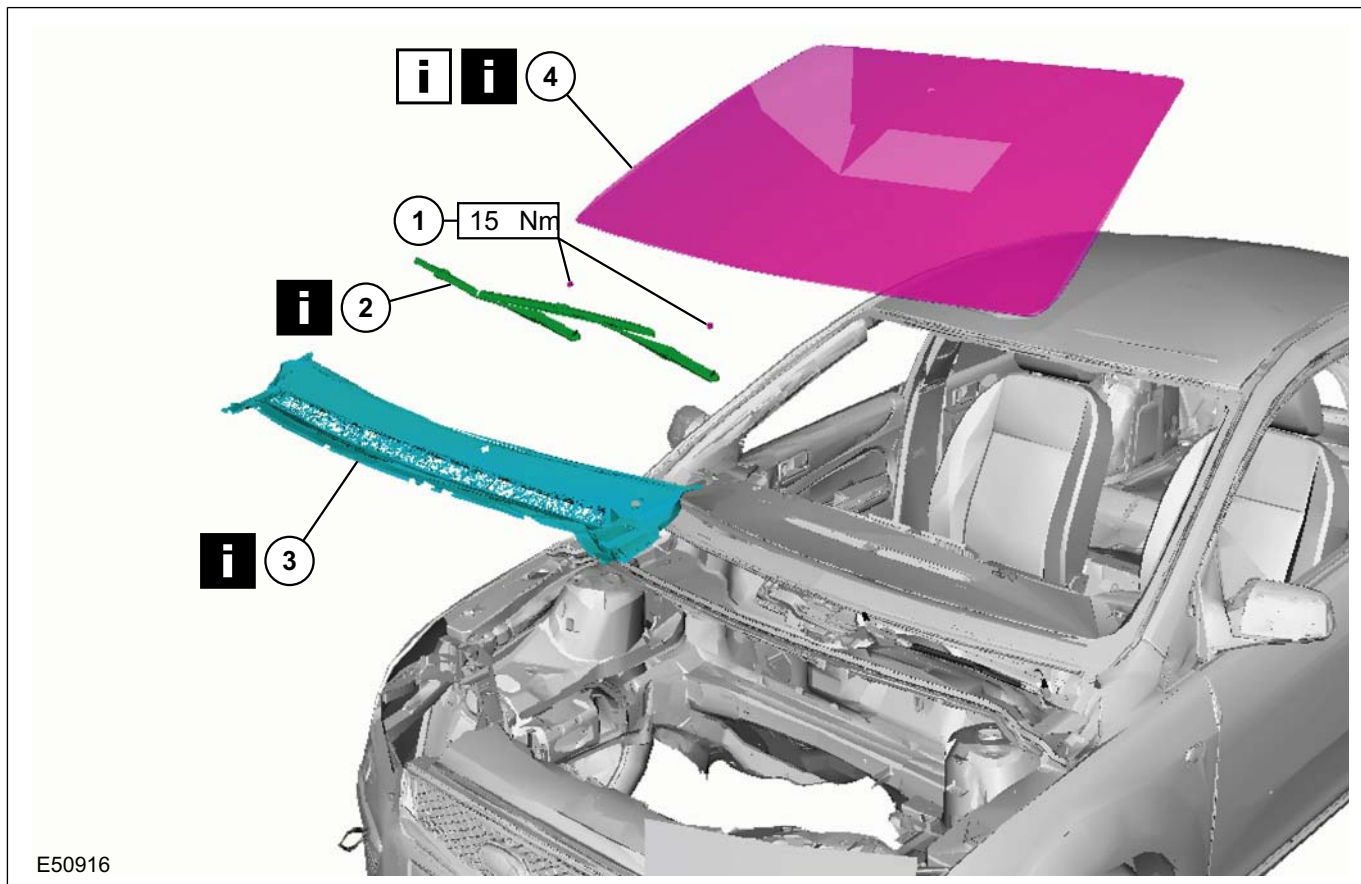
10. Remove the overhead console.

For additional information, refer to: **Overhead Console** (501-12 Instrument Panel and Console, Removal and Installation).

11. Raise the hood.

12. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



E50916

Item	Description
1	Windshield wiper arm retaining nuts
2	Windshield wiper arms See Removal Detail

Item	Description
3	Cowl panel grille See Removal Detail
4	Windshield glass See Removal Detail See Installation Detail

13. To install, reverse the removal procedure.

Removal Details

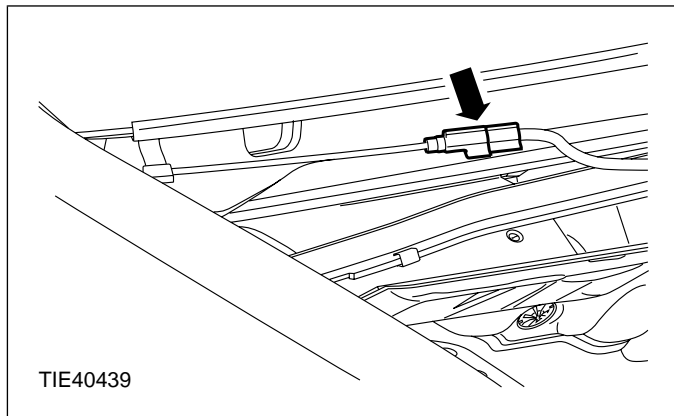
Item 2 Windshield wiper arms

NOTE: Make sure that the windshield wiper motor is in the park position.

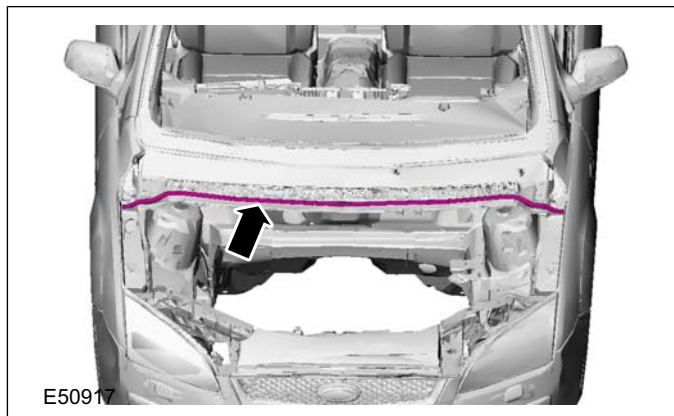
REMOVAL AND INSTALLATION

Item 3 Cowl panel grille

1. Disconnect the heated windshield glass electrical connector on both sides (if equipped).

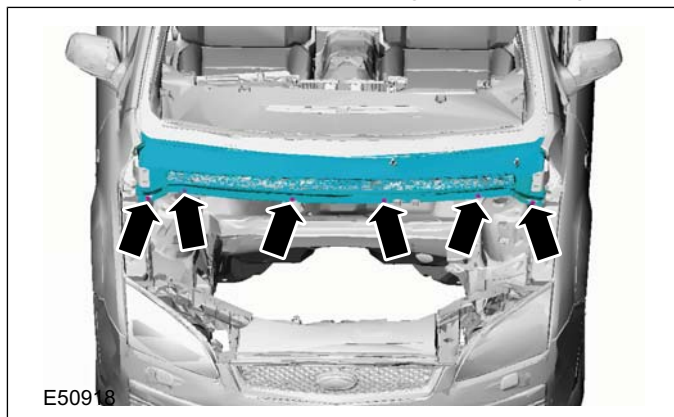


2. Remove the cowl panel grille weatherstrip.



3. Remove the cowl panel grille.

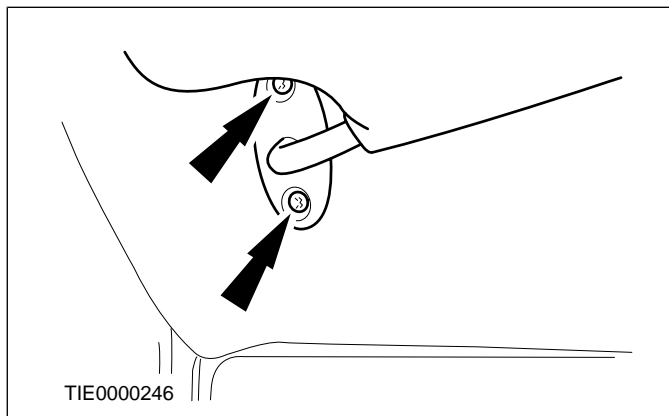
- Release the cowl panel grille retaining clips.



4. Lower the hood.

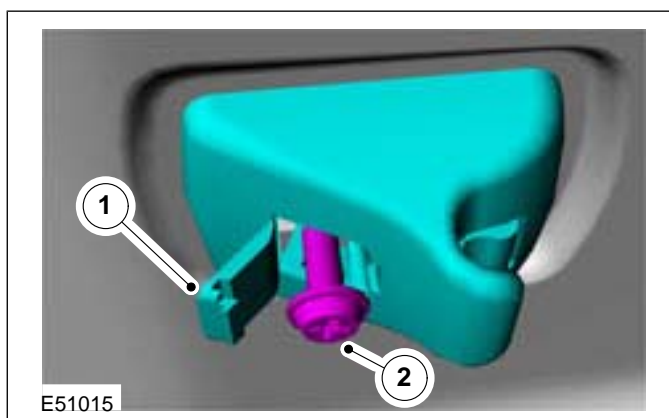
Item 4 Windshield glass

1. Remove the sun visors.

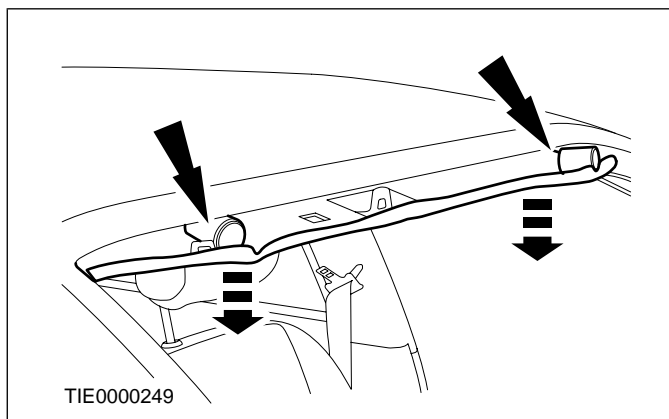


2. Remove the sun visor retaining clip on both sides.

1. Lever open the sun visor retaining clip retaining screw cover.
2. Remove the sun visor retaining clip retaining screw.

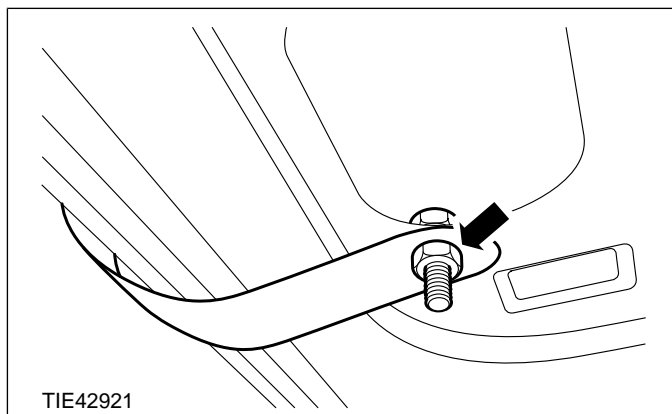


3. Detach the leading edge of the headliner and place two blocks of suitable material between the headliner and the roof panel to act as spacers.



REMOVAL AND INSTALLATION

4. Disconnect the heated windshield glass ground cable (if equipped).



5. **WARNING:** Wear gloves and eye protection when working with the direct glazing cutter for bonded glass as the cutting operation may produce splinters. When using the direct glazing cutter for bonded glass wear ear protectors. Failure to follow these instructions may result in personal injury.

CAUTIONS:

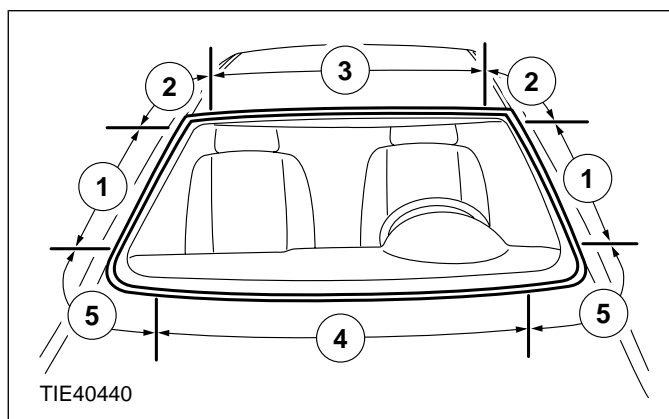
- !** Make sure that the direct glazing for bonded glass cutting blades are changed where the cutting depth changes to avoid damage to the body and trim panels.
- !** If installing the original windshield glass, take care not to damage the windshield glass electrical connectors when cutting the PU adhesive.

NOTE: Some resistance may be encountered when cutting through the windshield glass locating pegs in the lower corners of the windshield glass.

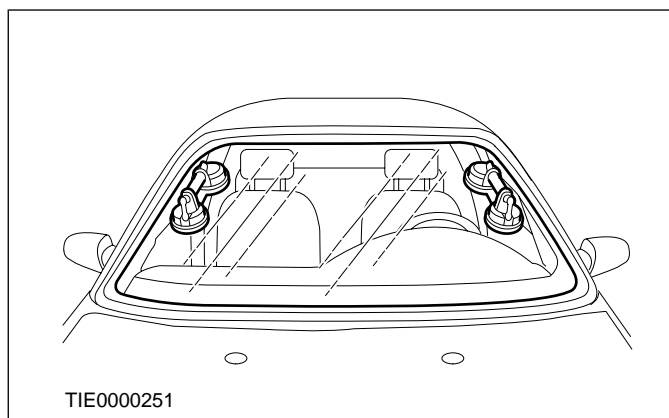
From inside the vehicle, using a direct glazing cutter for bonded glass, cut the PU adhesive to the given maximum depths.

1. 20 mm.
2. 30 mm.
3. 40 mm.
4. 120 mm.

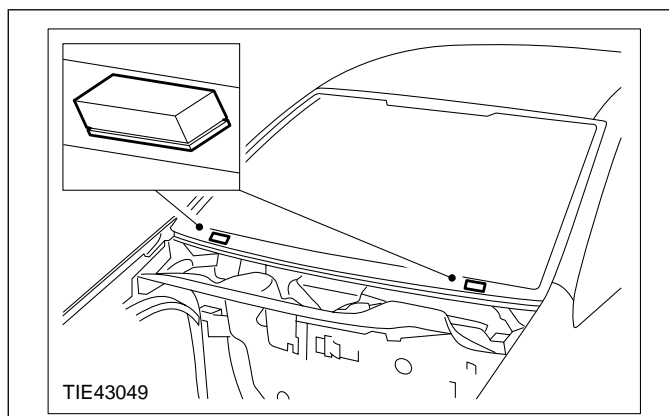
5. 130 mm.



6. With the aid of another technician, using glazing suction cups, remove the windshield glass.



7. **NOTE:** Make a note of the position of the windshield glass spacers to aid installation. Remove and discard the windshield glass spacers.



Installation Details

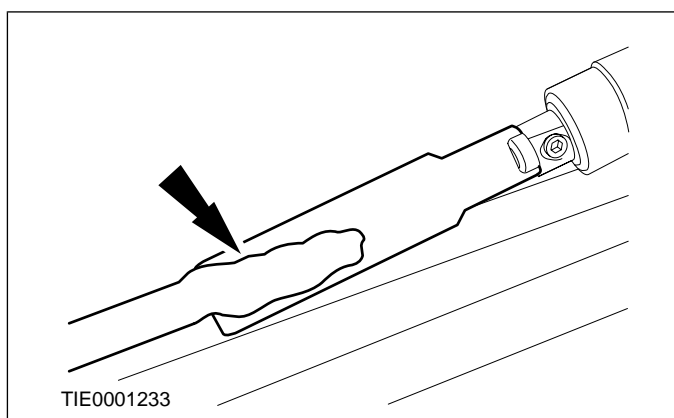
REMOVAL AND INSTALLATION

Item 4 Windshield glass

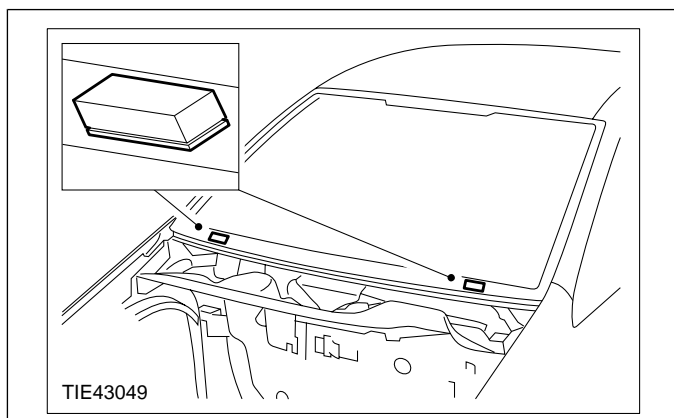
1. Carefully remove the remaining part of the windshield glass locating pegs from the windshield glass flange.

2. **⚠ CAUTION:** Do not touch the adhesive surface as re-bonding will be impaired.

Carefully trim the remaining PU adhesive from the windshield glass flange to leave approximately 1 mm of trimmed PU adhesive adhered to the flange.



3. Install new windshield glass spacers.



4. Check the windshield glass flange for damaged sheet metal, rust or foreign material which may have caused, or may cause, glass breakage.

5. **⚠ CAUTION:** To make sure that the PU adhesive cures, it is essential that all bonding surfaces are free of moisture.

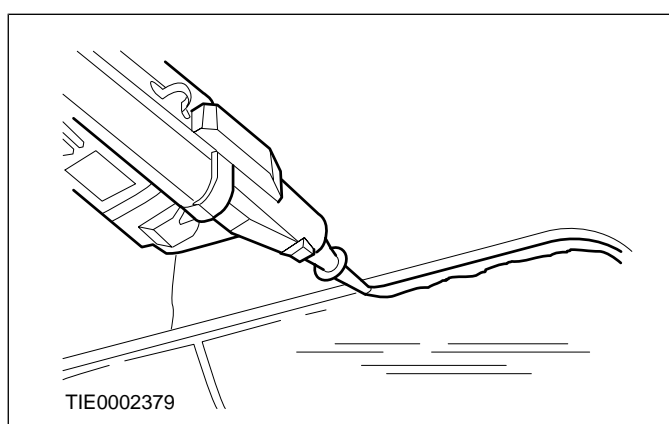
Using a hot air gun, apply warm air (25°C) to the windshield glass flange and glass bond line to remove all traces of moisture.

6. Prepare the windshield glass, windshield glass flange and trimmed PU adhesive in accordance with the instructions supplied with the adhesive kit.

7. **NOTE:** Discard the first 100 mm of PU adhesive as this may have a reduced working time.

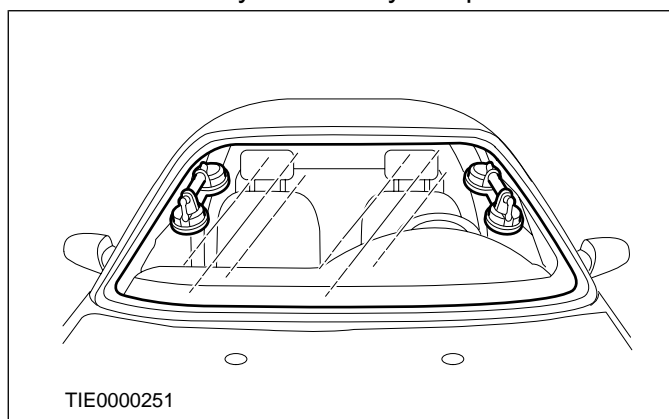
NOTE: To avoid water leaks, any breakage in the continuous bead must be overlapped by 20 mm.

Using the mixer/applicator gun apply the PU adhesive in a continuous bead of between 8 and 10 mm in height to the windshield glass flange along the bond line.



8. With the aid of another technician, using glazing suction cups, install the windshield glass.

- Press firmly and evenly into position.

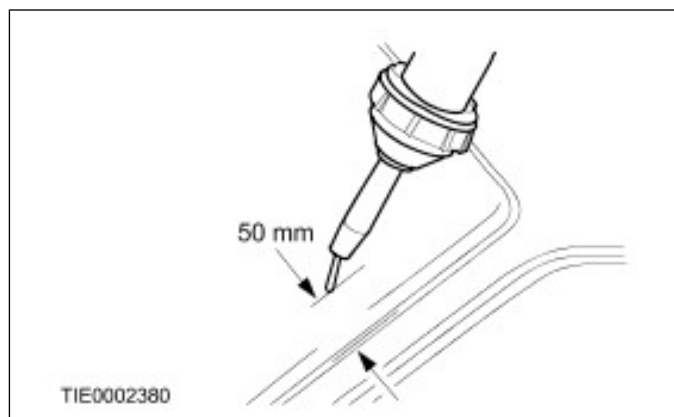


9. **⚠ CAUTION:** During the curing period of the PU adhesive, the door windows must be left open to avoid a build up of pressure when the doors are opened and closed.

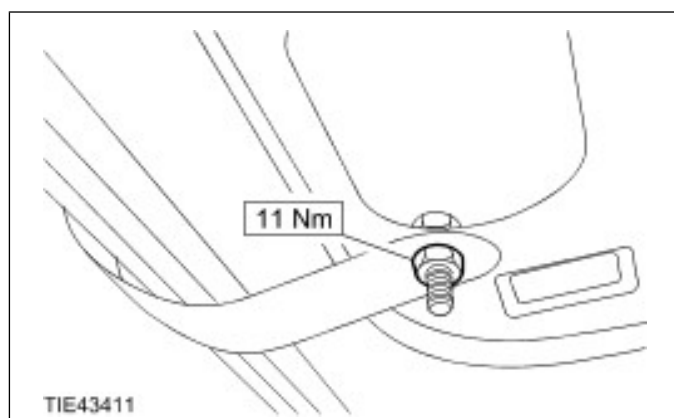
Using tape, secure the windshield glass in the correct position until the PU adhesive has cured.

REMOVAL AND INSTALLATION

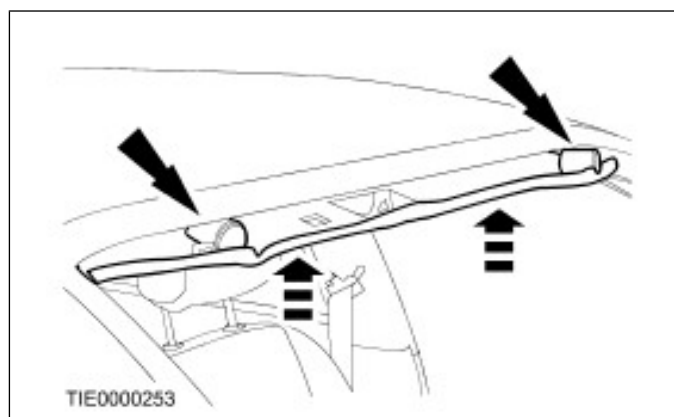
10. If the ambient temperature falls below 10°C, using a hot air gun, apply warm air (25°C) continuously for 15 minutes (inside or outside the vehicle).



11. Connect the heated windshield glass ground cable (if equipped).



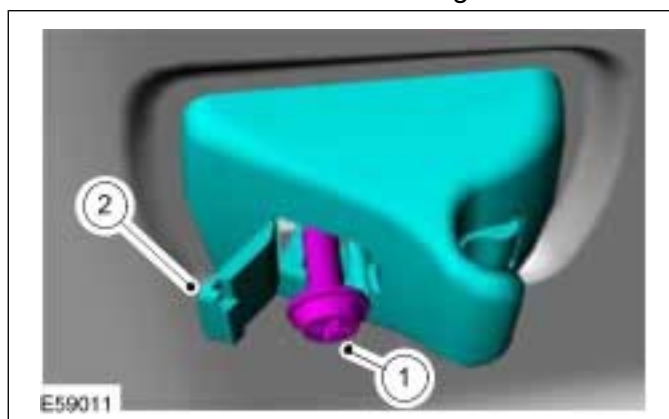
12. Remove the spacers and attach the leading edge of the headliner to the roof panel.



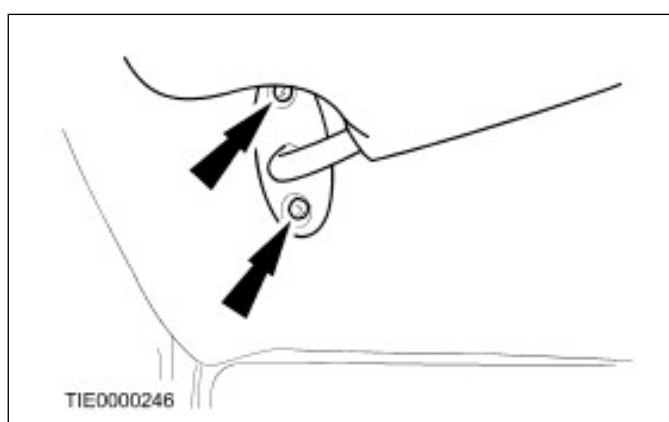
13. Install the sun visor retaining clip on both sides.

1. Install the sun visor retaining clip retaining screw.

2. Close the sun visor retaining screw cover.



14. Install the sun visors.



SECTION 501-12 Instrument Panel and Console

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Floor Console.....	501-12-17

SPECIFICATIONS**Torque Specifications**

Item	Nm	lb-ft	lb-in
Passenger airbag module retaining bolts	8	-	71
Steering column retaining bolts	25	18	-

REMOVAL AND INSTALLATION

Instrument Panel

All vehicles

1. Remove the floor console.

For additional information, refer to: **Floor Console - 3-Door (501-12 Instrument Panel and Console, Removal and Installation).**

Vehicles built up to 04/2006

2. Remove the passenger air bag module.

For additional information, refer to: **Passenger Air Bag Module - 3-Door (501-20 Supplemental Restraint System, Removal and Installation).**

Vehicles built 04/2006 onwards

WARNINGS:

▲ The supplemental restraint system (SRS) is active for a certain length of time after the power supply has been disconnected. Wait for a minimum of 3 minutes before disconnecting or removing any SRS components.

▲ Wear safety goggles.

▲ Do not probe supplemental restraint system (SRS) electrical connectors.

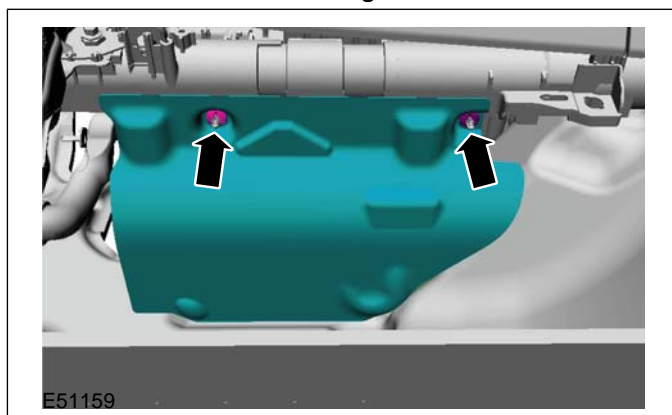
3. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).**

Vehicles with air conditioning

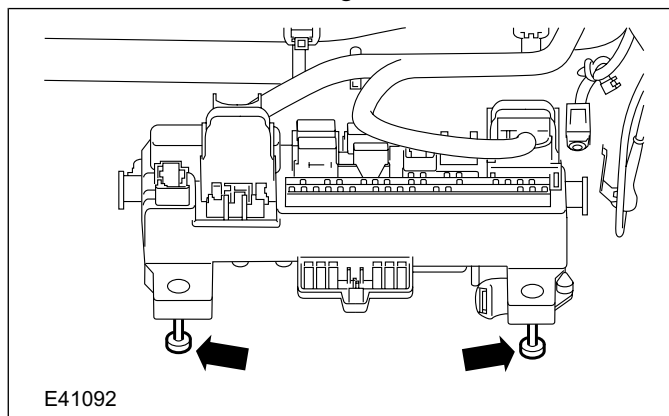
4. Remove the central junction box (CJB) cover.

- Remove the retaining screws.

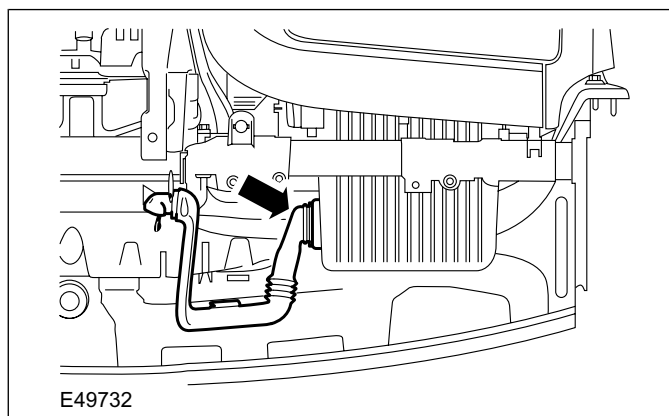


5. Detach the CJB from the in-vehicle crossbeam.

- Rotate the retaining screws clockwise.

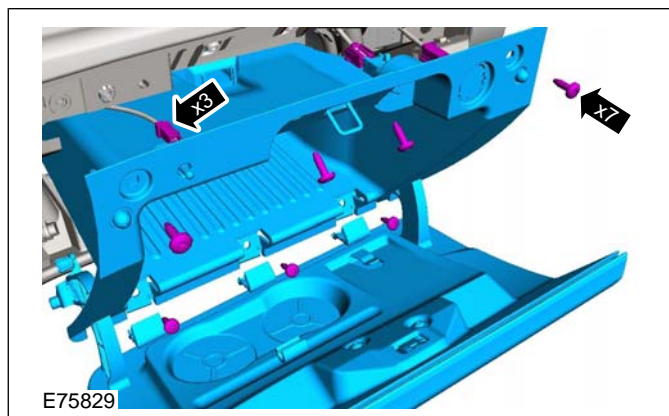


6. Disconnect the glove compartment cooling hose from the glove compartment.



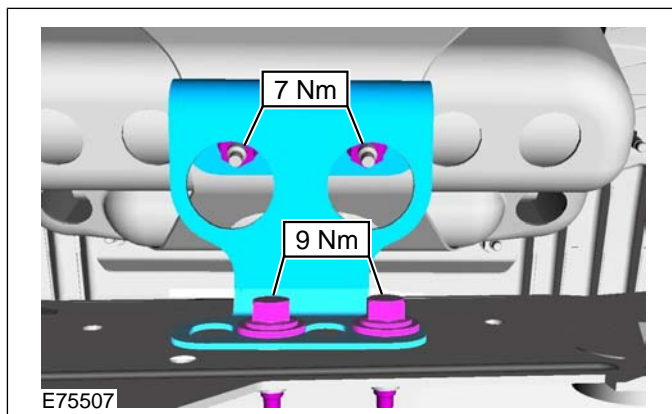
Vehicles built 04/2006 onwards

7. Remove the glove compartment.

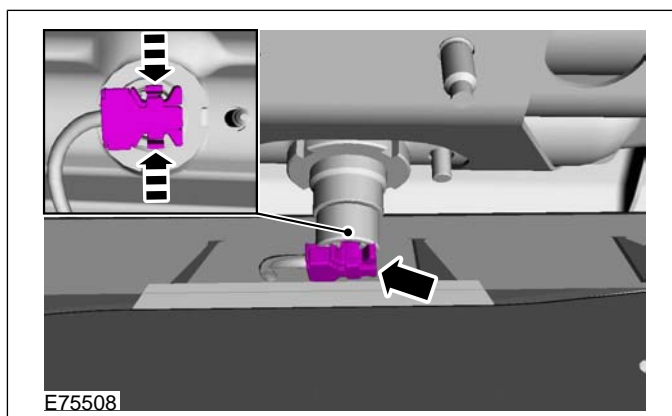


REMOVAL AND INSTALLATION

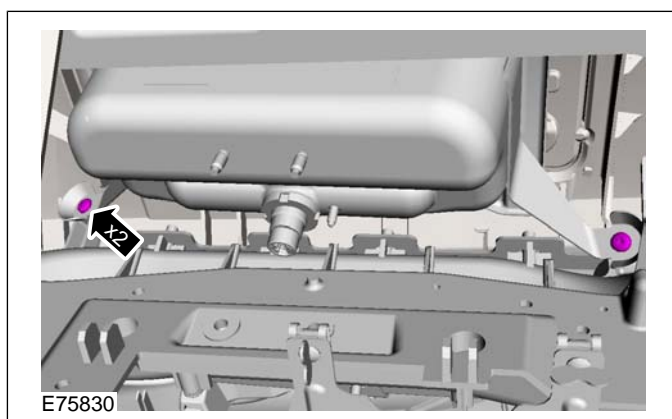
8. Remove passenger air bag module support bracket.



9. Disconnect passenger air bag module electrical connector.



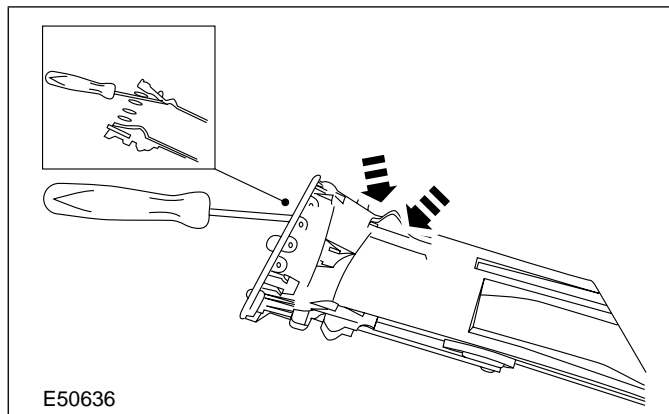
10. Remove the passenger air bag module outer retaining bolts.



11. NOTE: The registers are retained by four locking tangs. Releasing the upper locking tangs will provide enough movement to release the lower locking tangs.

Remove the passenger side inner register.

- Using a suitable thin bladed screwdriver, release the upper locking tangs.



All vehicles

- WARNING:** When removing or installing the instrument panel, care must be taken not to scratch or damage the instrument panel surface.

12. Remove the climate control assembly. For additional information, refer to: (412-04 Control Components)

Climate Control Assembly - Vehicles With: Manual Temperature Control (Removal and Installation),

Climate Control Assembly - Vehicles With: Automatic Temperature Control (Removal and Installation),

Climate Control Assembly - Vehicles With: Digital Versatile Disc (DVD) Navigation System (Removal and Installation).

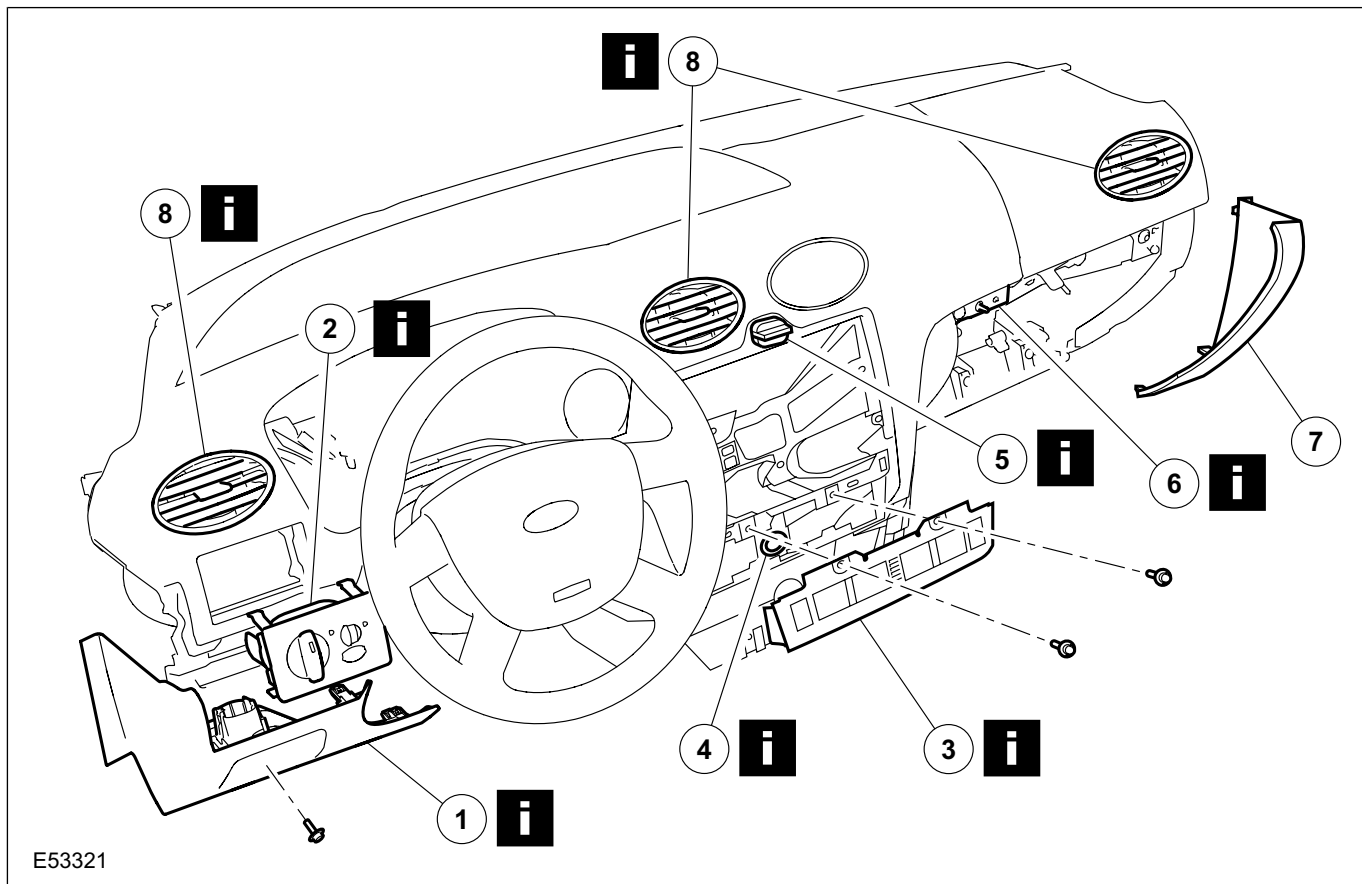
13. Remove the instrument cluster.

For additional information, refer to:

Instrument Cluster (413-01 Instrument Cluster, Removal and Installation).

14. Remove the components in the order indicated in the following illustration(s) and table(s).

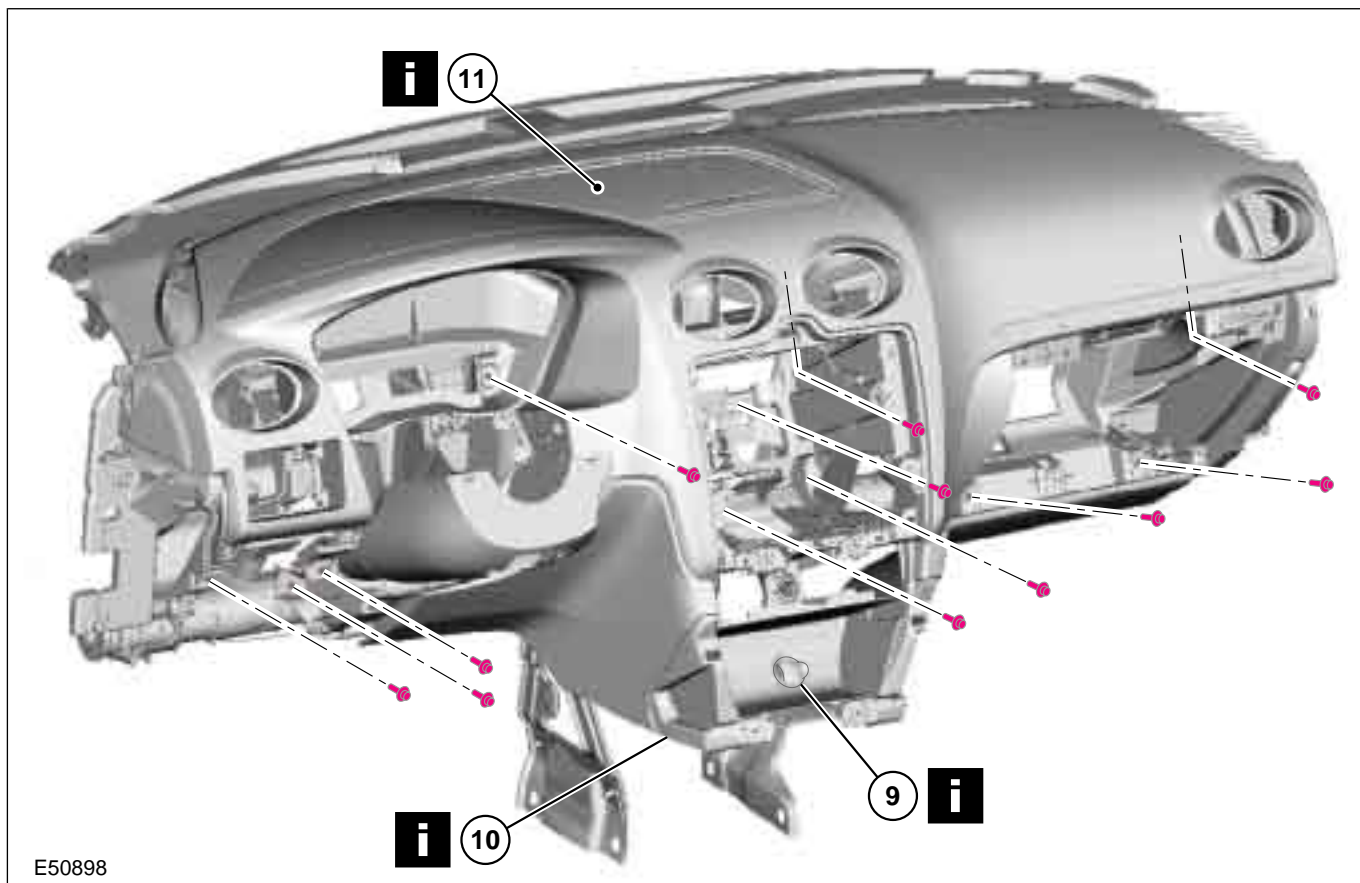
REMOVAL AND INSTALLATION



Item	Description
1	Instrument panel driver side lower panel See Removal Detail
2	Headlamp switch See Removal Detail
3	Instrument panel console switch panel See Removal Detail
4	In-vehicle temperature sensor See Removal Detail

Item	Description
5	Hazard flasher switch See Removal Detail
6	Glove compartment lamp switch See Removal Detail
7	Instrument panel passenger side outer trim panel
8	Registers See Removal Detail

REMOVAL AND INSTALLATION



E50898

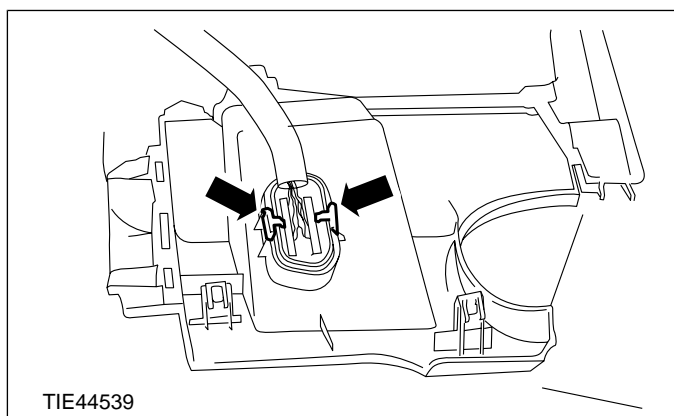
Item	Description
9	Cigar lighter <i>See Removal Detail</i>
10	Keyless entry module (if equipped) <i>See Removal Detail</i>
11	Instrument panel <i>See Removal Detail</i>

15. To install, reverse the removal procedure.

Removal Details

Item 1 Instrument panel driver side lower panel

1. Disconnect the data link connector (DLC).



TIE44539

Item 2 Headlamp switch

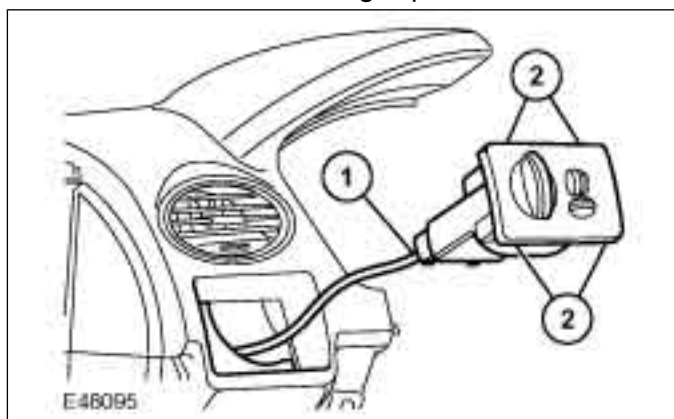
1. NOTE: Access to the headlamp switch is from behind the instrument panel.

Remove the headlamp switch.

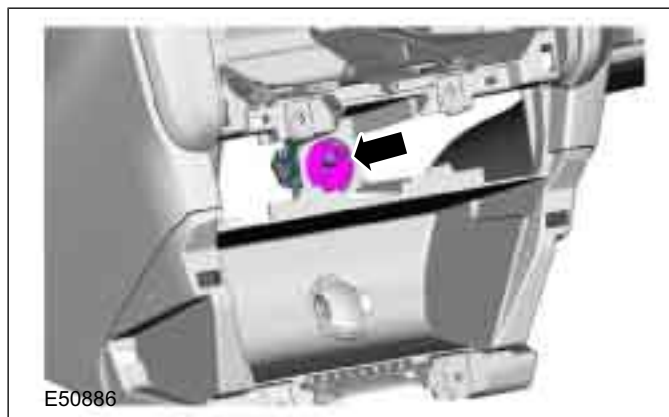
1. Disconnect the electrical connector.

REMOVAL AND INSTALLATION

2. Release the retaining clips.

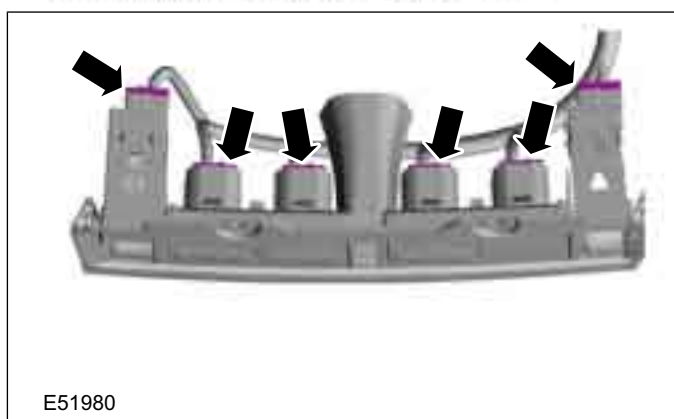


Remove the in-vehicle temperature sensor.



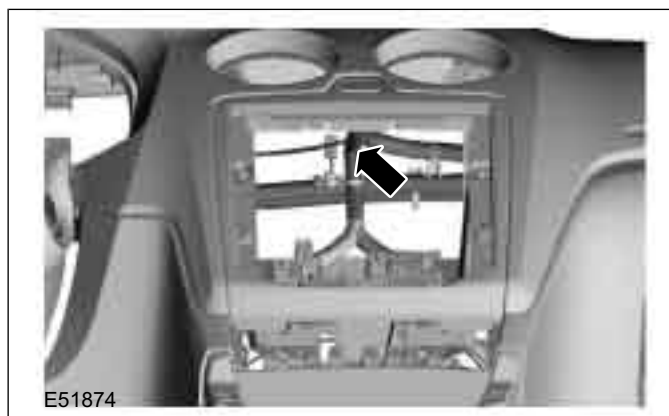
Item 3 Instrument panel console switch panel

1. Disconnect the instrument panel console switch panel electrical connectors.



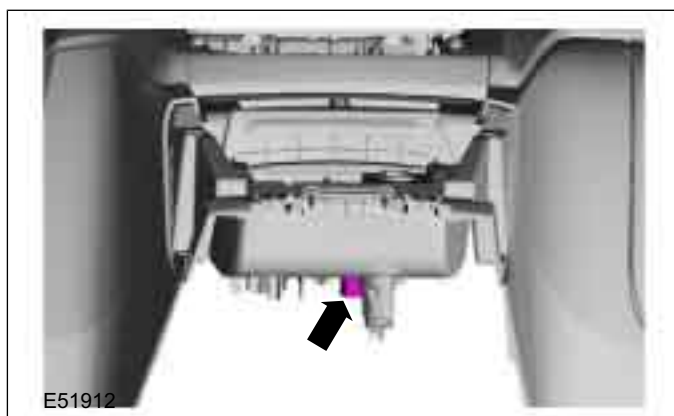
Item 5 Hazard flasher switch

1. Disconnect the hazard flasher switch electrical connector.



Item 4 In-vehicle temperature sensor

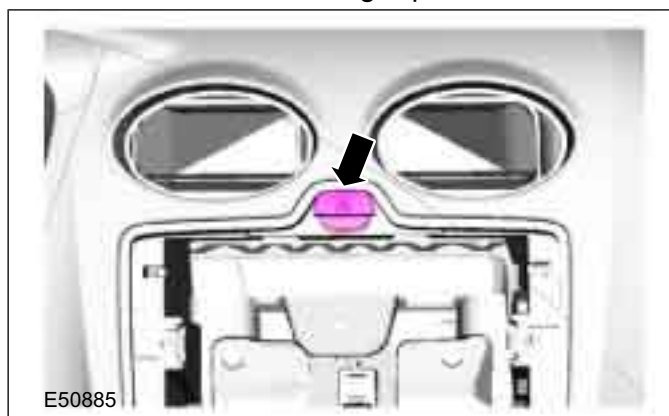
1. Disconnect the in-vehicle temperature sensor electrical connector.



2. NOTE: This step is only necessary if installing a new instrument panel.

Remove the hazard flasher switch.

- Release the retaining clips.

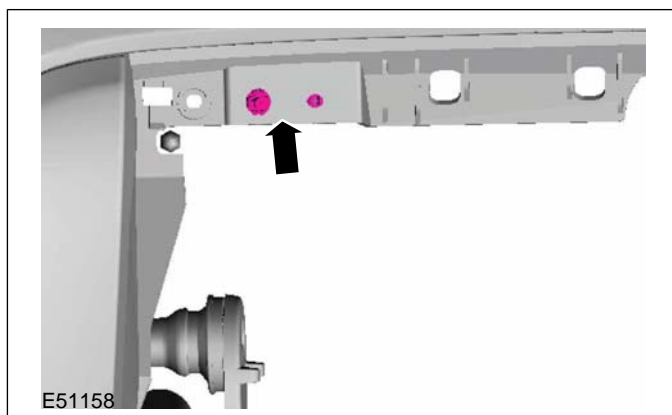


2. NOTE: This step is only necessary if installing a new instrument panel.

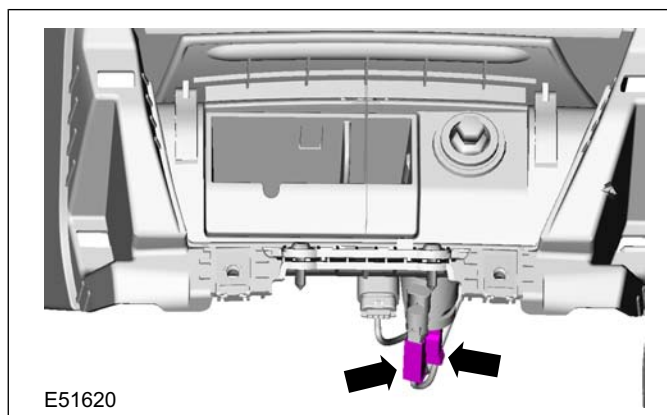
REMOVAL AND INSTALLATION

Item 6 Glove compartment lamp switch

1. Detach the glove compartment lamp switch from the instrument panel.

**Item 9** Cigar lighter

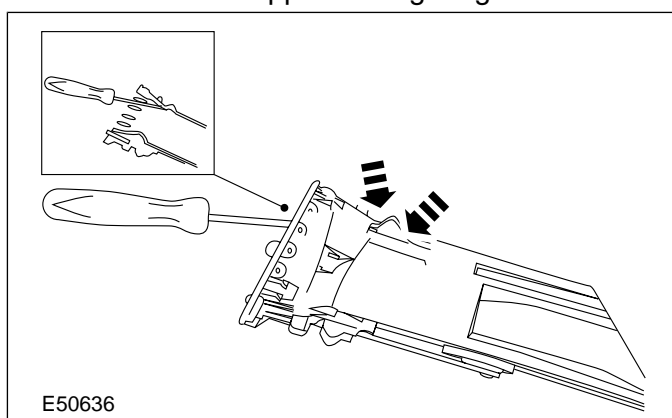
1. Disconnect the cigar lighter electrical connectors.

**Item 8** Registers

1. **NOTE:** The registers are retained by four locking tangs. Releasing the upper locking tangs will provide enough movement to release the lower locking tangs.

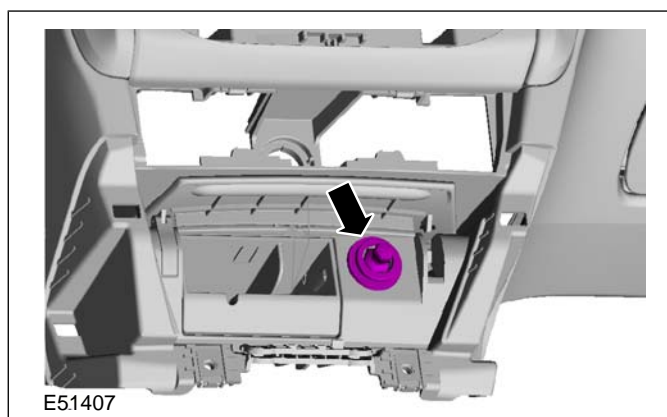
Remove the registers.

- Using a suitable thin bladed screwdriver, release the upper locking tangs.

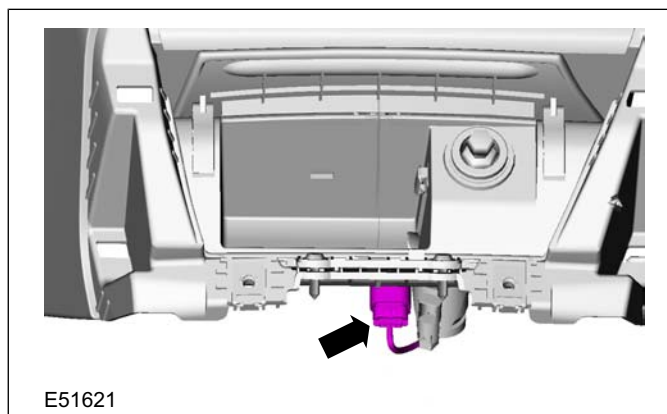


2. **NOTE:** This step is only necessary if installing a new instrument panel.

Remove the cigar lighter.

**Item 10** Keyless entry module (if equipped)

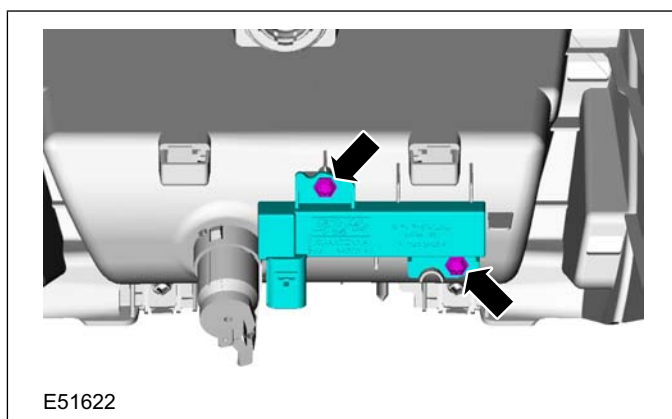
1. Disconnect the keyless entry module electrical connector.



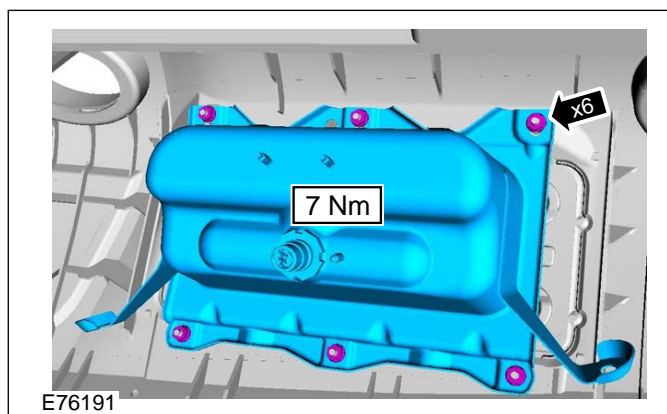
2. **NOTE:** This step is only necessary if installing a new instrument panel.

REMOVAL AND INSTALLATION

Remove the keyless entry module.

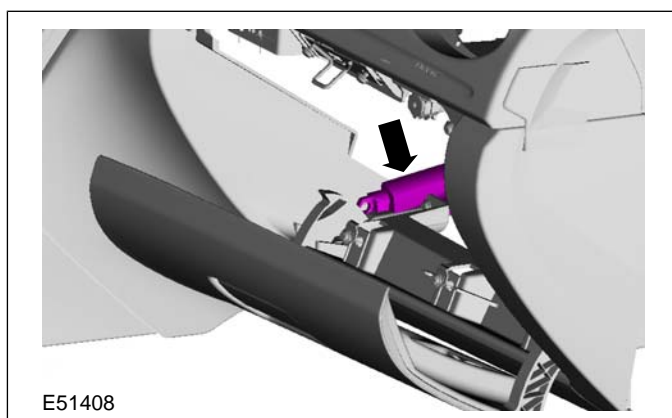


3. Remove the passenger air bag module (if equipped).



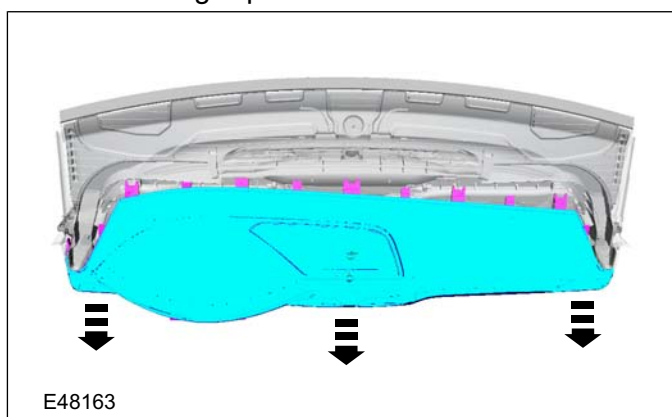
Item 11 Instrument panel

1. Detach the glove compartment lid damper from the glove compartment lid.



2. Remove the instrument panel.

- Pull the instrument panel rearwards away from the extension panel to release the retaining clips.



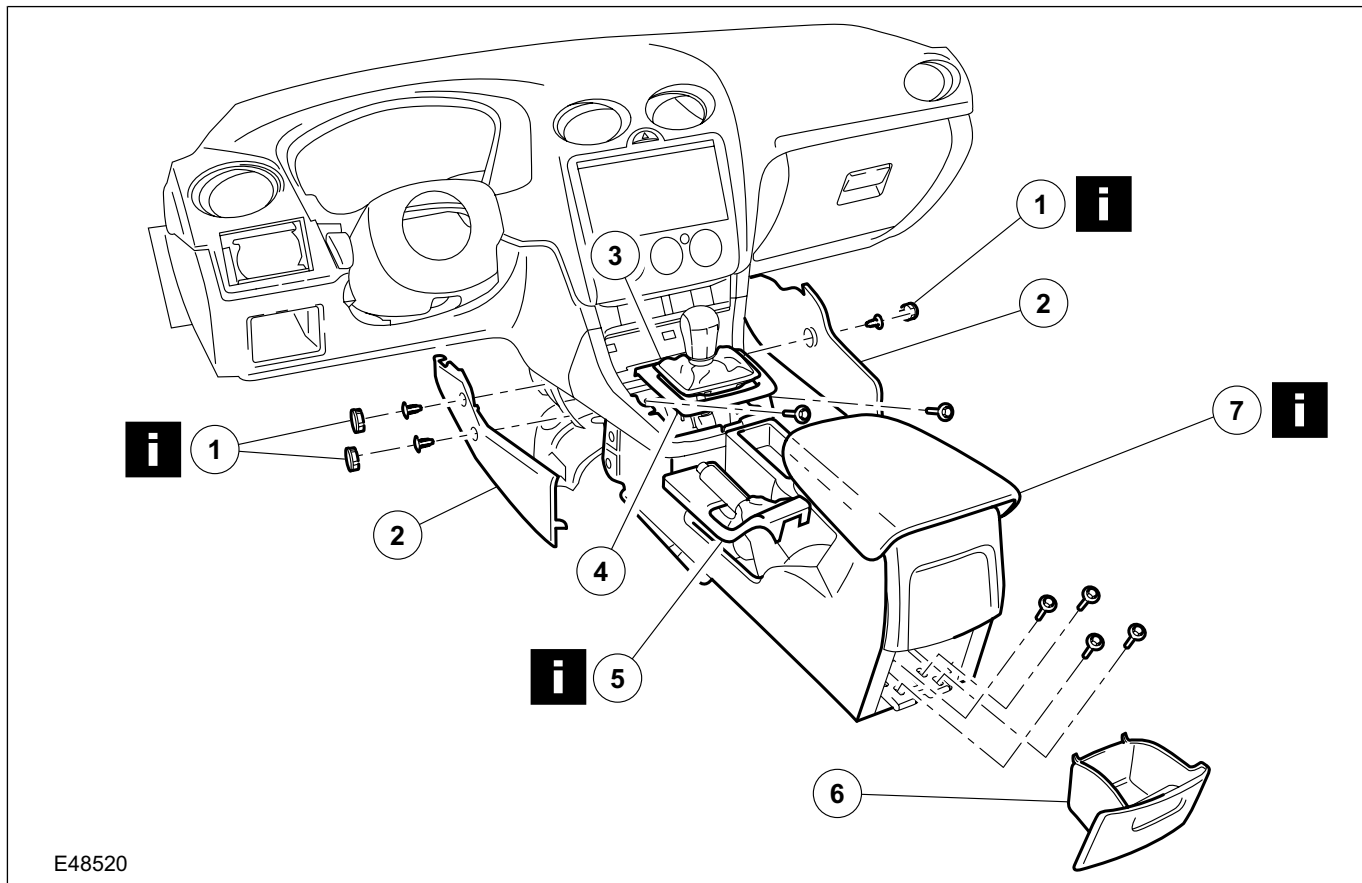
REMOVAL AND INSTALLATION

Floor Console — Vehicles Built Up To: 03/2007

General Equipment

Trim clip remover

1. Remove the components in the order indicated in the following illustration(s) and table(s).



E48520

Item	Description
1	Floor console extension panel retaining screw covers See Removal Detail
2	Floor console extension panels
3	Gearshift lever boot
4	Gearshift lever trim panel

Item	Description
5	Parking brake control trim panel See Removal Detail
6	Rear stowage compartment
7	Floor console See Removal Detail

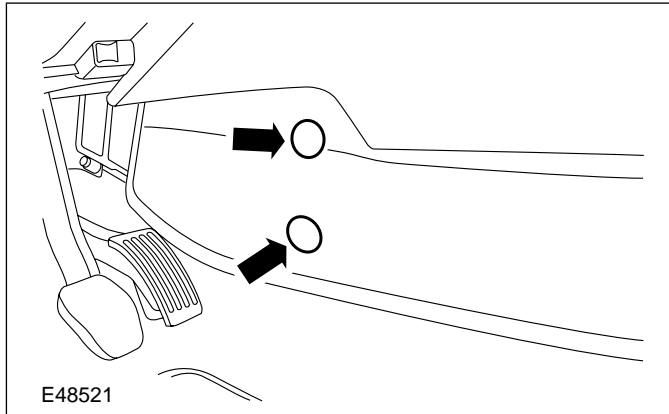
2. To install, reverse the removal procedure.

Removal Details

REMOVAL AND INSTALLATION

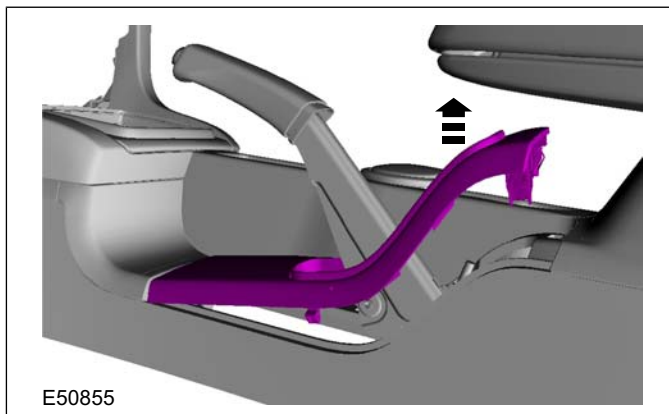
Item 1 Floor console extension panel retaining screw covers

- Using a suitable trim clip remover, remove the floor console extension panel retaining screw covers.

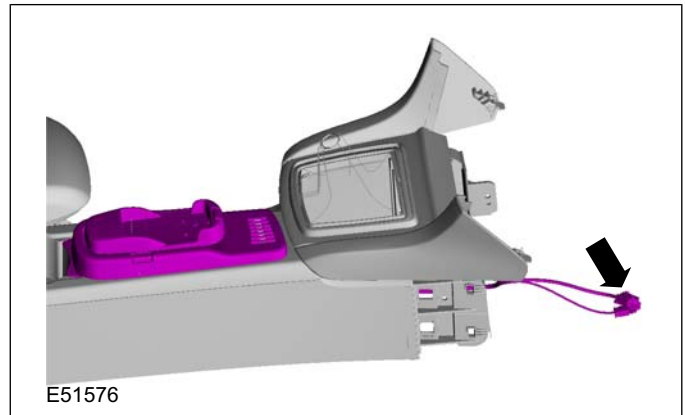
**Item 5** Parking brake control trim panel

- CAUTION:** Detach the rear of the parking brake control trim panel first to prevent damage to the front retaining clips.

Remove the parking brake control trim panel from the floor console.

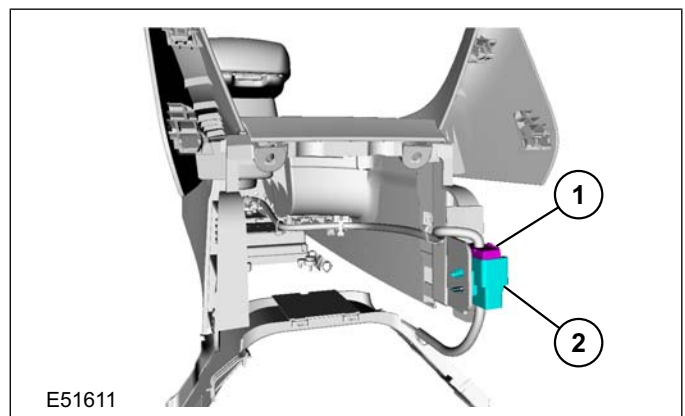
**Item 7** Floor console

- Disconnect the cellular phone electrical connectors (if equipped).



- Detach the floor console wiring harness from the floor console.

- Disconnect the electrical connector.
- Detach the electrical connector from the floor console.

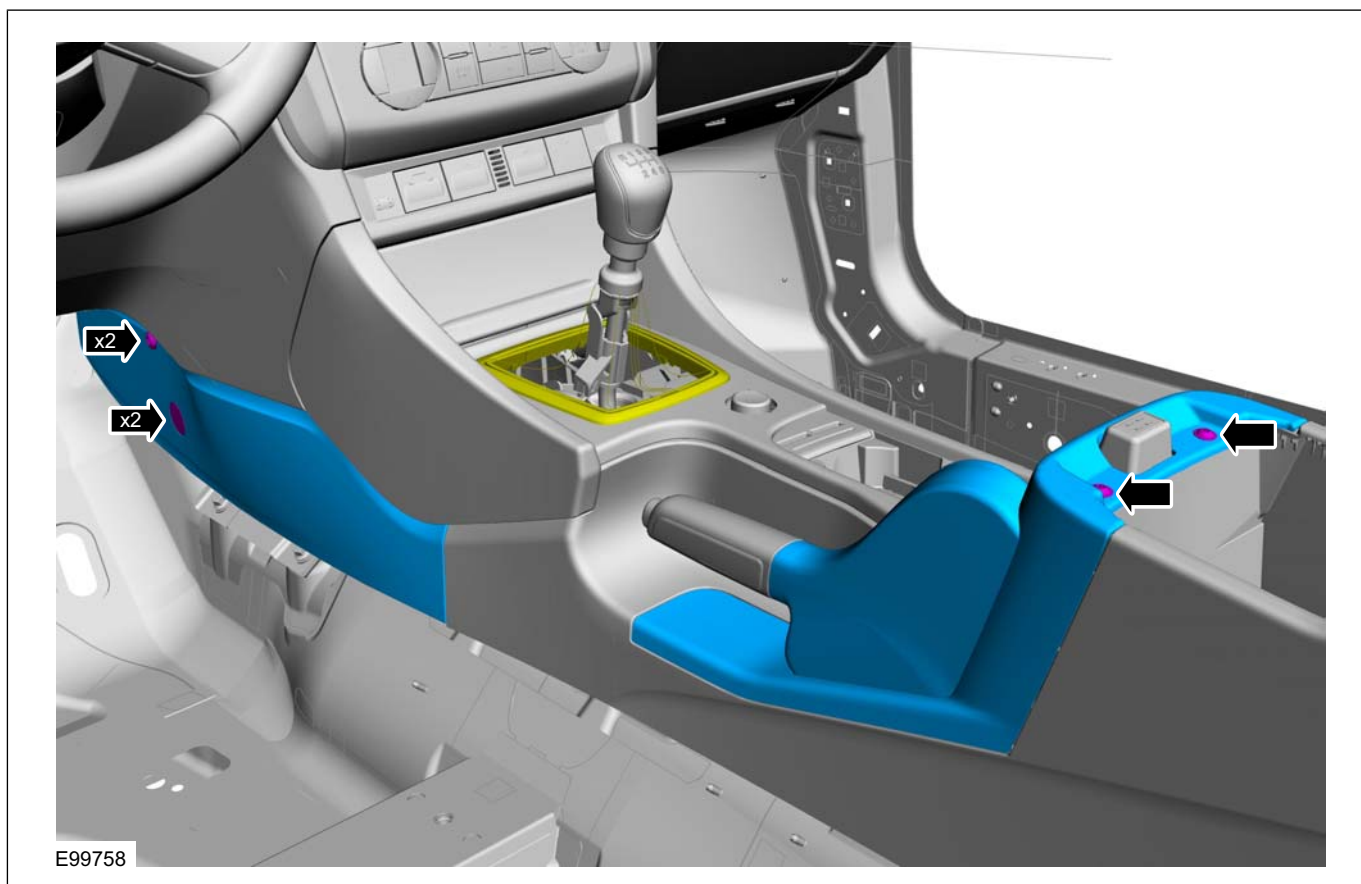


REMOVAL AND INSTALLATION

Floor Console — Vehicles Built From: 03/2007

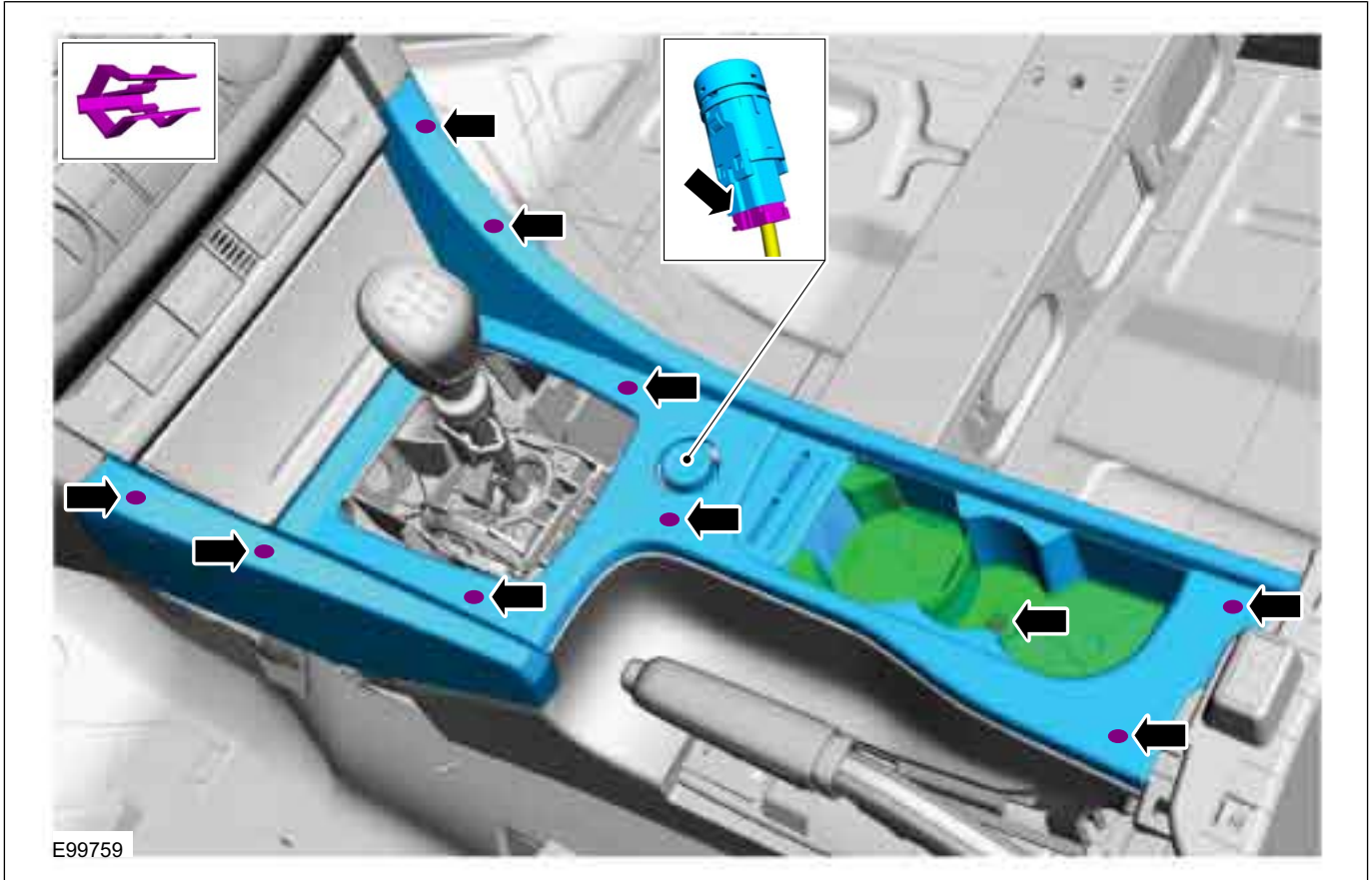
Removal

1.

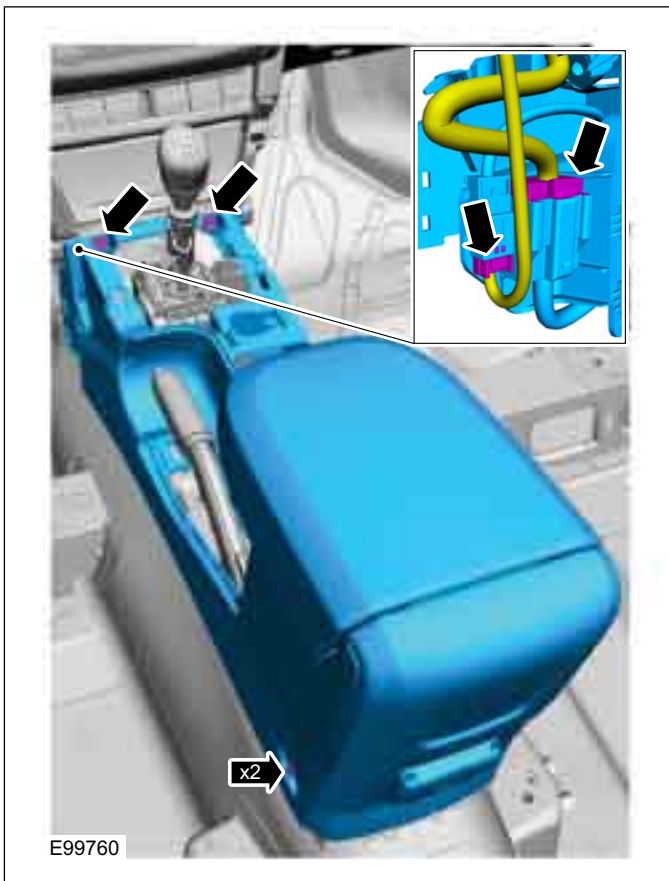


2.

REMOVAL AND INSTALLATION



3.



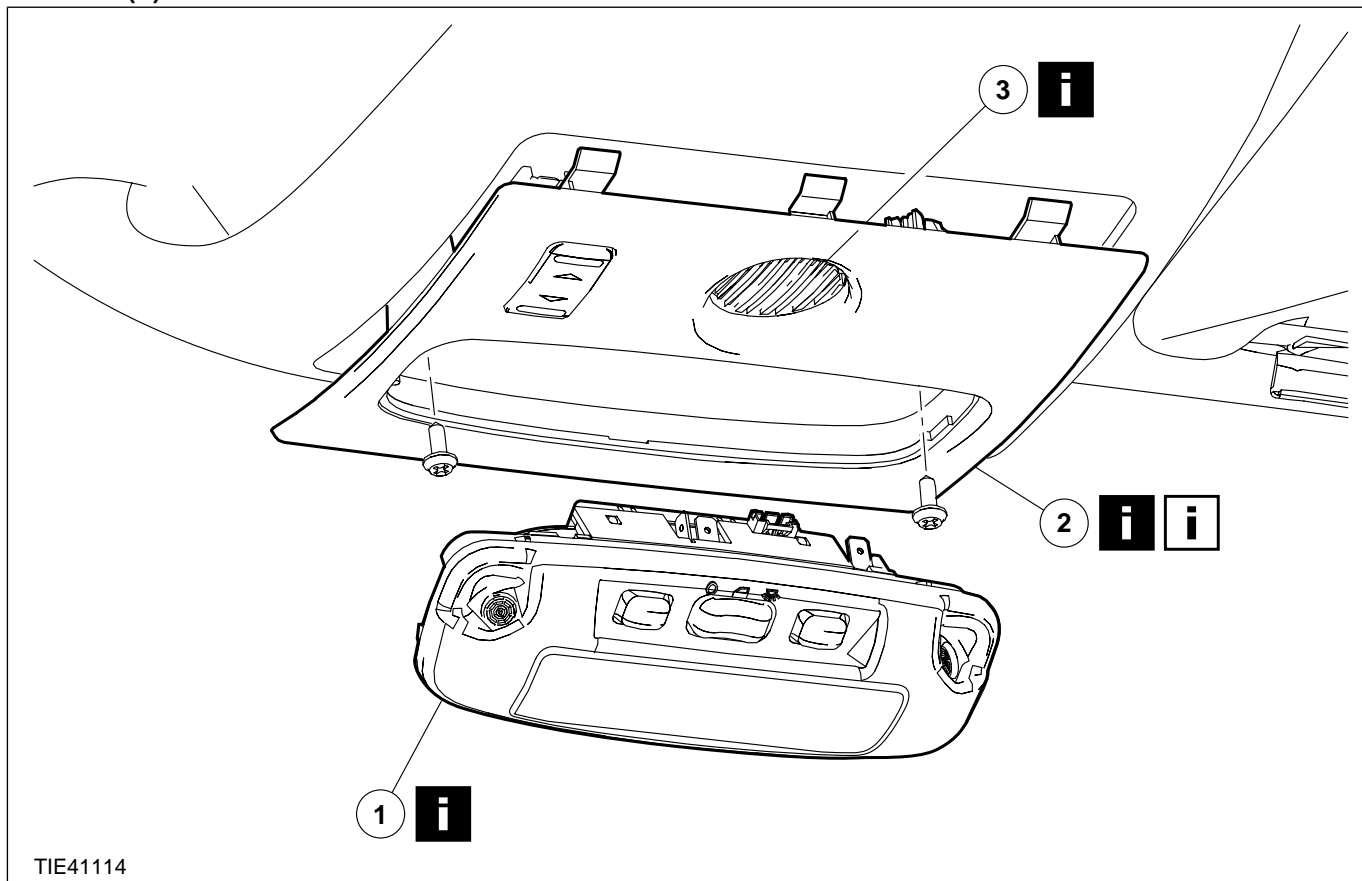
Installation

1. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Overhead Console

1. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Interior lamp <i>See Removal Detail</i>
2	Overhead console <i>See Removal Detail</i> <i>See Installation Detail</i>
3	Microphone (if equipped) <i>See Removal Detail</i>

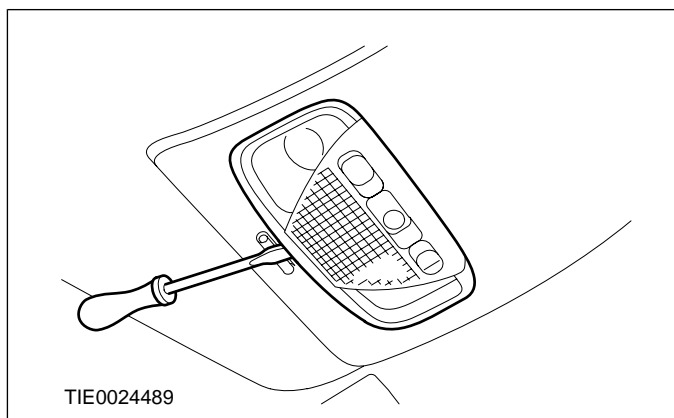
2. To install, reverse the removal procedure.

Removal Details

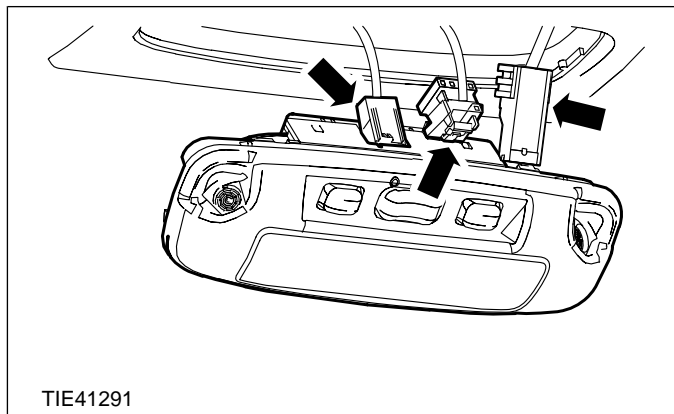
REMOVAL AND INSTALLATION

Item 1 Interior lamp

1. Using a suitable screwdriver, detach the interior lamp from the overhead console.

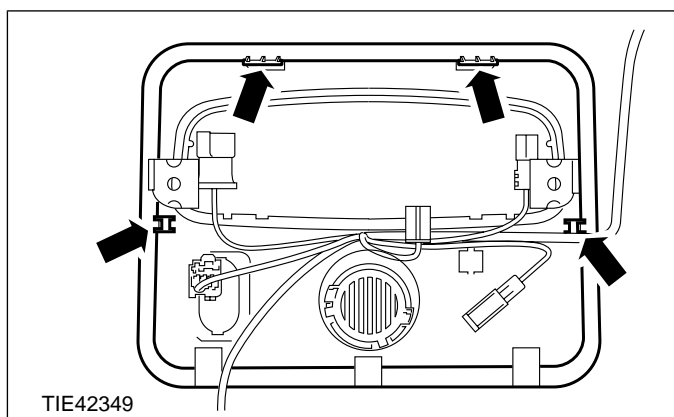


2. Disconnect the electrical connectors and remove the interior lamp.



Item 2 Overhead console

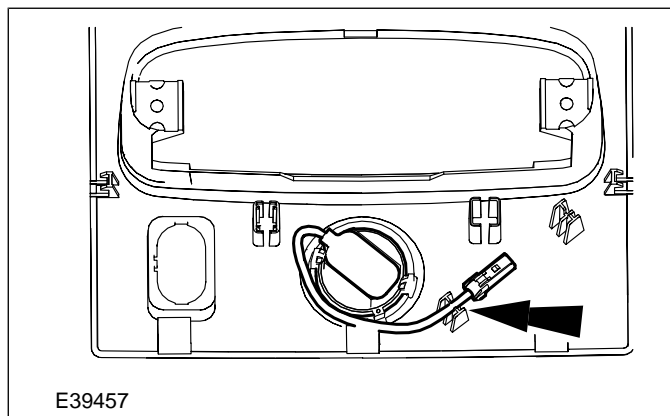
1. Detach the overhead console from the overhead console reinforcement.



2. Disconnect the power roof opening panel control switch electrical connector.
3. Disconnect the microphone electrical connector (if equipped).

Item 3 Microphone (if equipped)

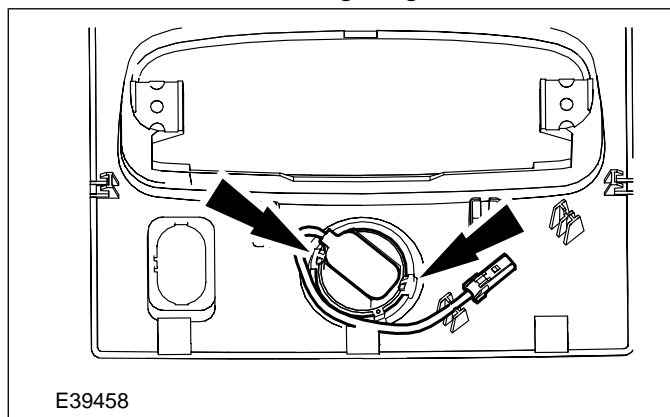
1. Detach the microphone wiring harness from the overhead console.



2. **NOTE:** Note the position of the microphone to aid installation.

Remove the microphone.

- Release the locking tangs.



Installation Details



REMOVAL AND INSTALLATION

Item 2 Overhead console

NOTE: Make sure the overhead console retaining clips are fully engaged to the overhead console opening reinforcement.



DISASSEMBLY AND ASSEMBLY

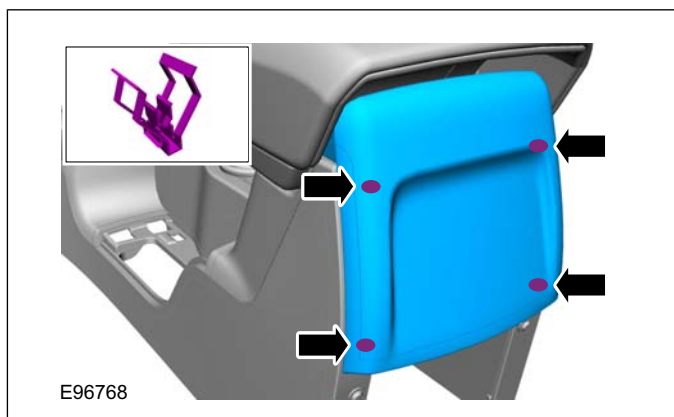
Floor Console

General Equipment

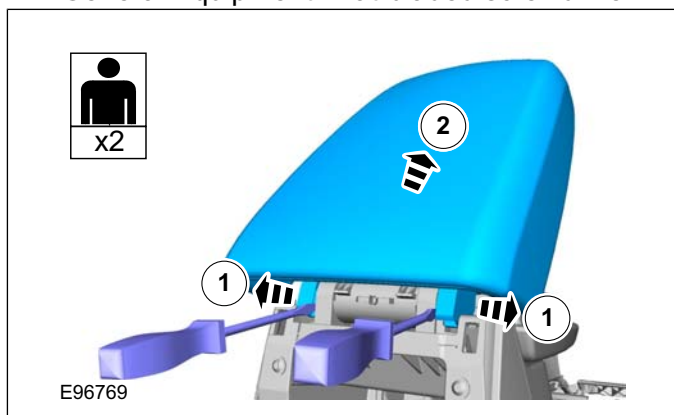
Flat-bladed screwdriver

Disassembly

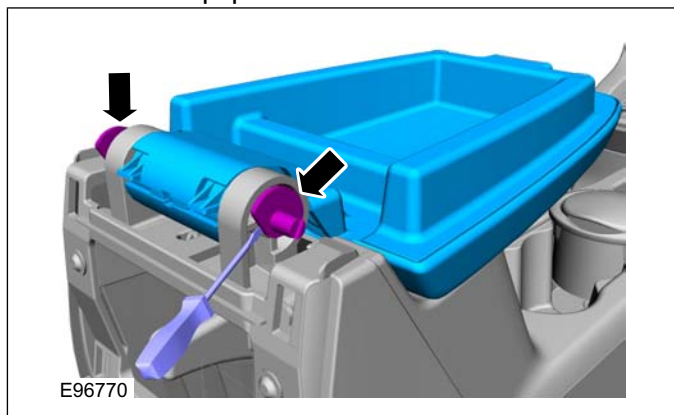
1.



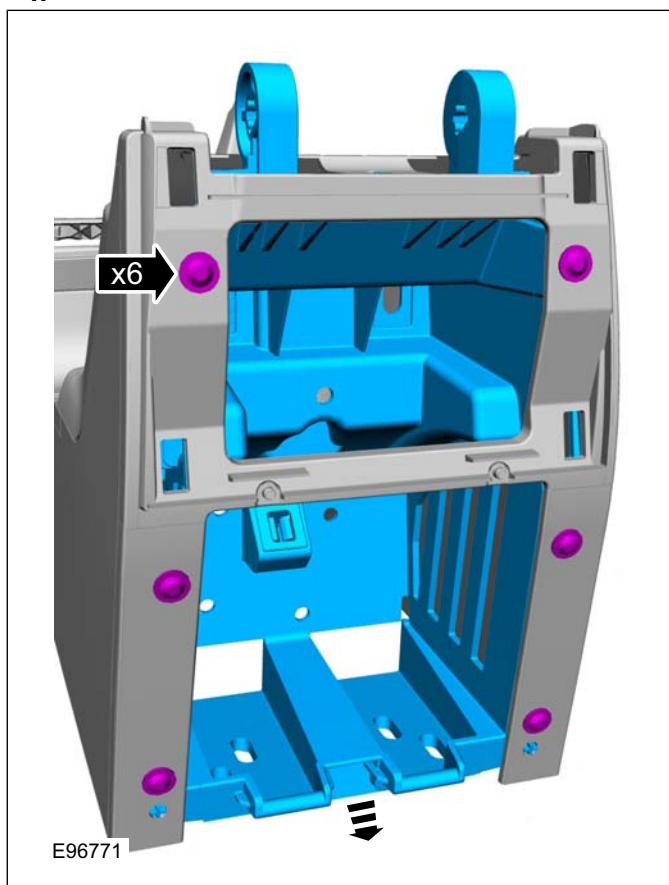
2. General Equipment: Flat-bladed screwdriver



3. General Equipment: Flat-bladed screwdriver



4.



Assembly

5. To assemble, reverse the disassembly procedure.

SECTION 501-14 Handles, Locks, Latches and Entry Systems

VEHICLE APPLICATION: 2008.75 Focus ST C307

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DISASSEMBLY AND ASSEMBLY

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SPECIFICATIONS

Description	Nm	lb-ft	lb-in
Hood latch retaining bolts	9	-	80
Hood latch striker retaining bolts	11	8	-
Front door inner panel retaining bolts	8	-	71
Front door latch retaining bolts	8	-	71
Front door lock retaining bolt	1	-	9
Rear door inner panel retaining bolts	8	-	71
Rear door latch retaining bolts	8	-	71
Liftgate latch retaining bolts	20	15	-
Liftgate release handle retaining bolts	3	-	27
Front door window glass clamp retaining bolt	8	-	71
Front door hinge retaining bolts	15	11	-

DESCRIPTION AND OPERATION

Handles, Locks, Latches and Entry Systems

Vehicles with Central Locking

A base level locking system is available which has central locking function only.

This system consists of hard wired door latches, linked to the central junction box (CJB).

The key position signal is sent from the driver door lock cylinder to the CJB. The CJB operates the lock or unlock relays, reversing the polarity of the door latch central locking motors.

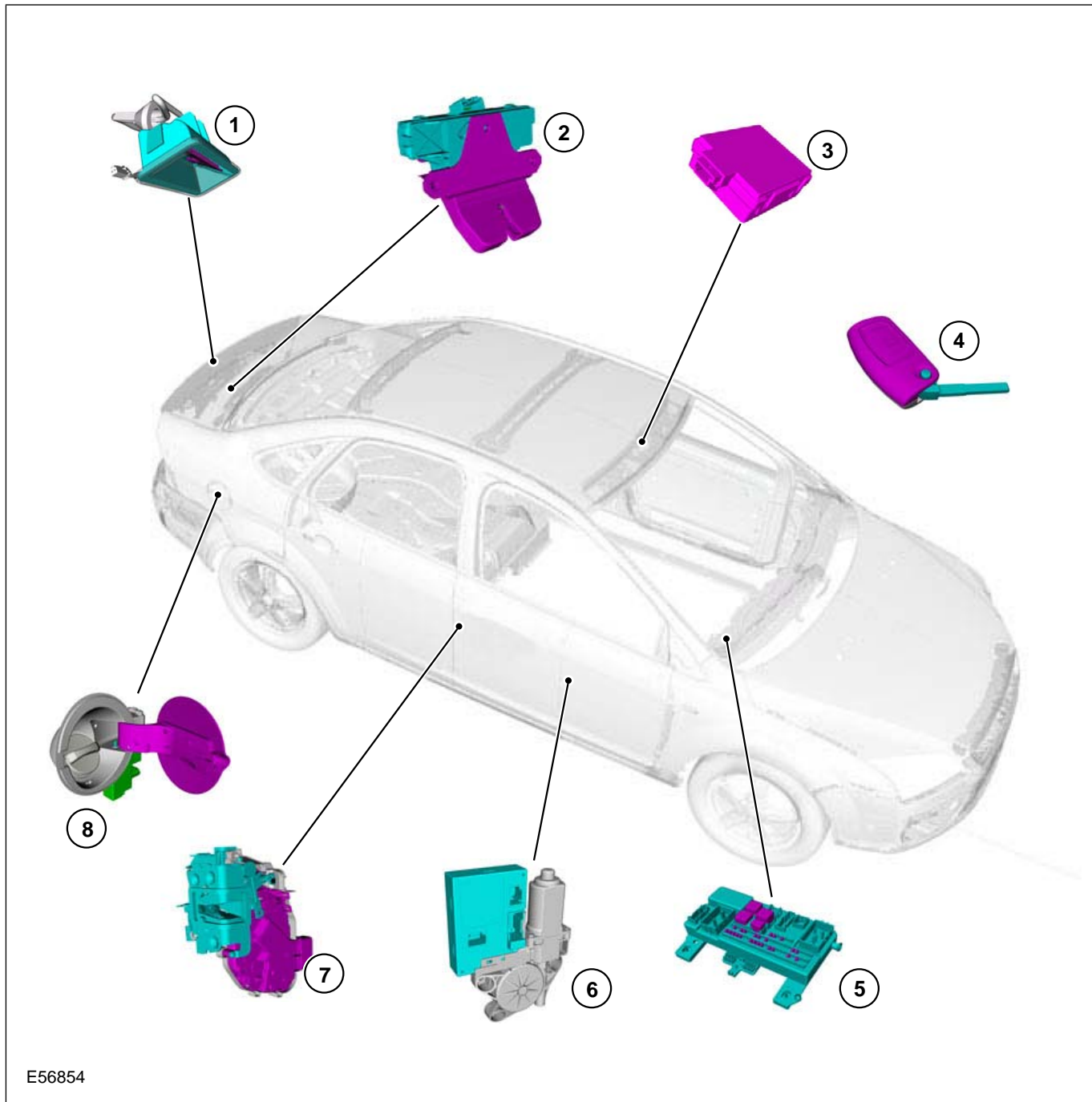
Liftgate/luggage compartment lid latch release operation is by a switch ground signal to the CJB and a pulsed output voltage from the CJB to the liftgate latch.

The fuel filler door lock is parallel wired to the driver door latch central locking motor.

DESCRIPTION AND OPERATION

Vehicles with Remote Keyless Entry (RKE) System

General



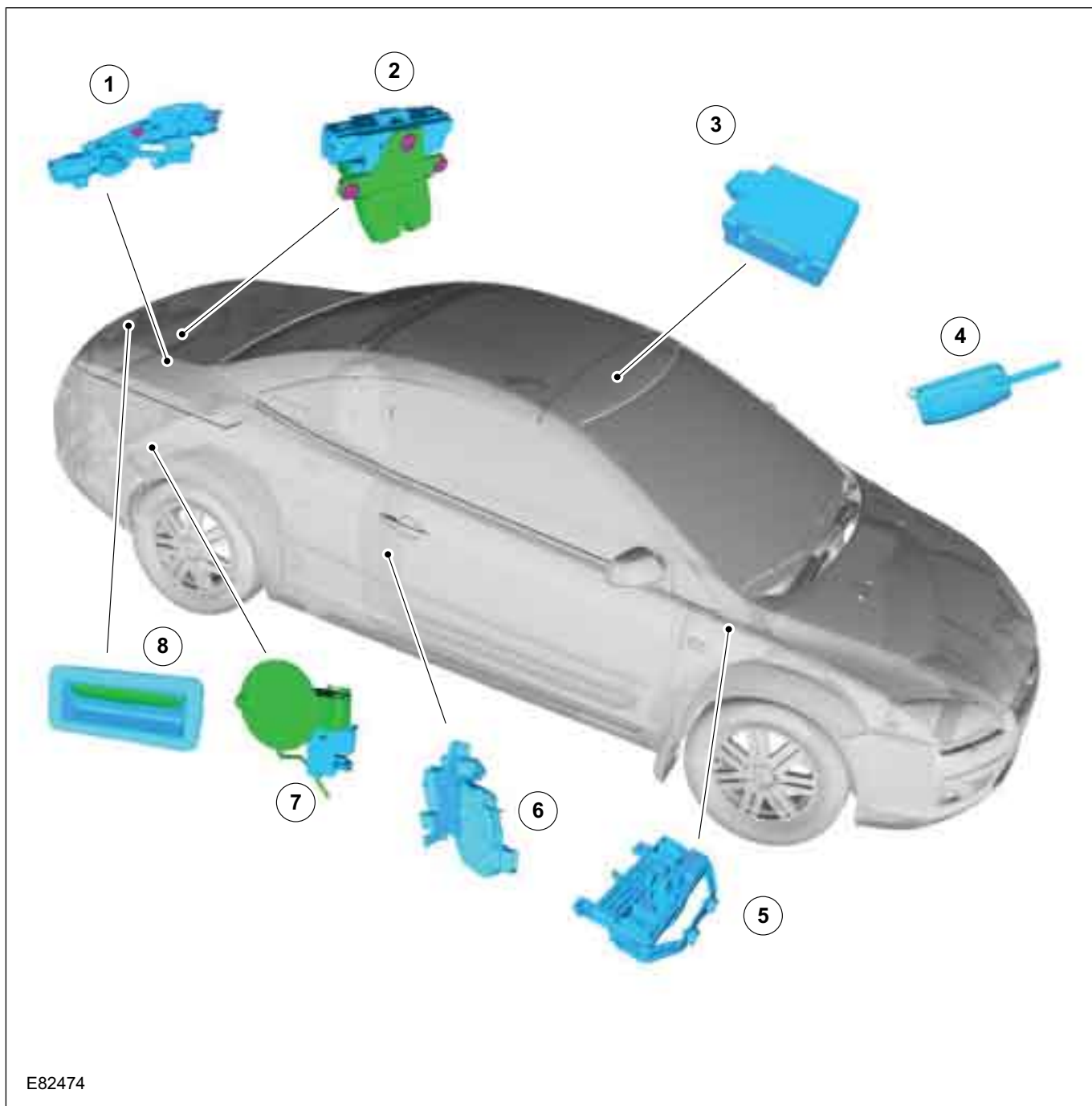
E56854

Item	Description
1	Liftgate/luggage compartment lid release switch
2	Liftgate/luggage compartment lid latch
3	Radio frequency (RF) receiver
4	RKE ignition key

Item	Description
5	Central junction box (CJB)
6	Door control module
7	Door latch
8	Fuel filler door lock

DESCRIPTION AND OPERATION

Convertible



E82474

Item	Description
1	Luggage compartment lid latch actuator
2	Luggage compartment lid latch
3	Radio frequency (RF) receiver
4	RKE ignition key
5	Central junction box (CJB)
6	Door latch

Item	Description
7	Fuel filler door lock
8	Luggage compartment lid release switch

RKE systems use mechanical/electrical door latches individually controlled by the corresponding door control module.

Door control modules send and receive commands between each other and the CJB using the central area network (CAN) bus.

DESCRIPTION AND OPERATION

When a key is turned in the door lock cylinder, a lock or unlock signal is sent to the associated door control module. The door control module sends a signal to the CJB. The CJB issues a signal to the remaining door control modules, which in turn command the latches to operate.

RKE is achieved by the transmission of a coded RF signal from a transmitter contained in the vehicle key. The signal is received by the RF receiver located above the headliner in the vicinity of the overhead console. The received signal is passed onto the CJB where it is decoded. If the coded signal is valid, the CJB will issue a command on the CAN bus circuit to operate the door latches or liftgate/luggage compartment lid release.

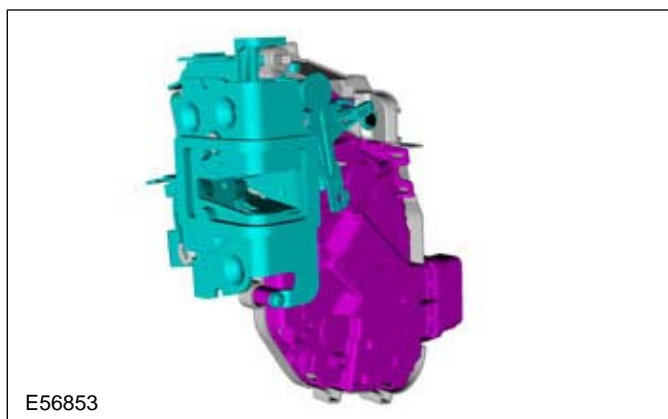
The signals received by the CJB from the RF antenna or the door control modules is also used to arm and disarm the vehicle security systems, illuminate the interior lights and operate the global closing functions.

Liftgate/Luggage Compartment Lid Latch

The liftgate/luggage compartment lid latch is a mechanical latch with a electric motor to drive the latch release. The liftgate/luggage compartment lid latch has no remote mechanical release facility.

The command to open the liftgate/luggage compartment lid latch is sent by the CJB. But the input command to the CJB can be issued by the exterior liftgate/luggage compartment lid release switch, the interior liftgate/luggage compartment lid release switch or the RF receiver.

When the liftgate/luggage compartment lid is closed, the latch is automatically locked.

Door latch

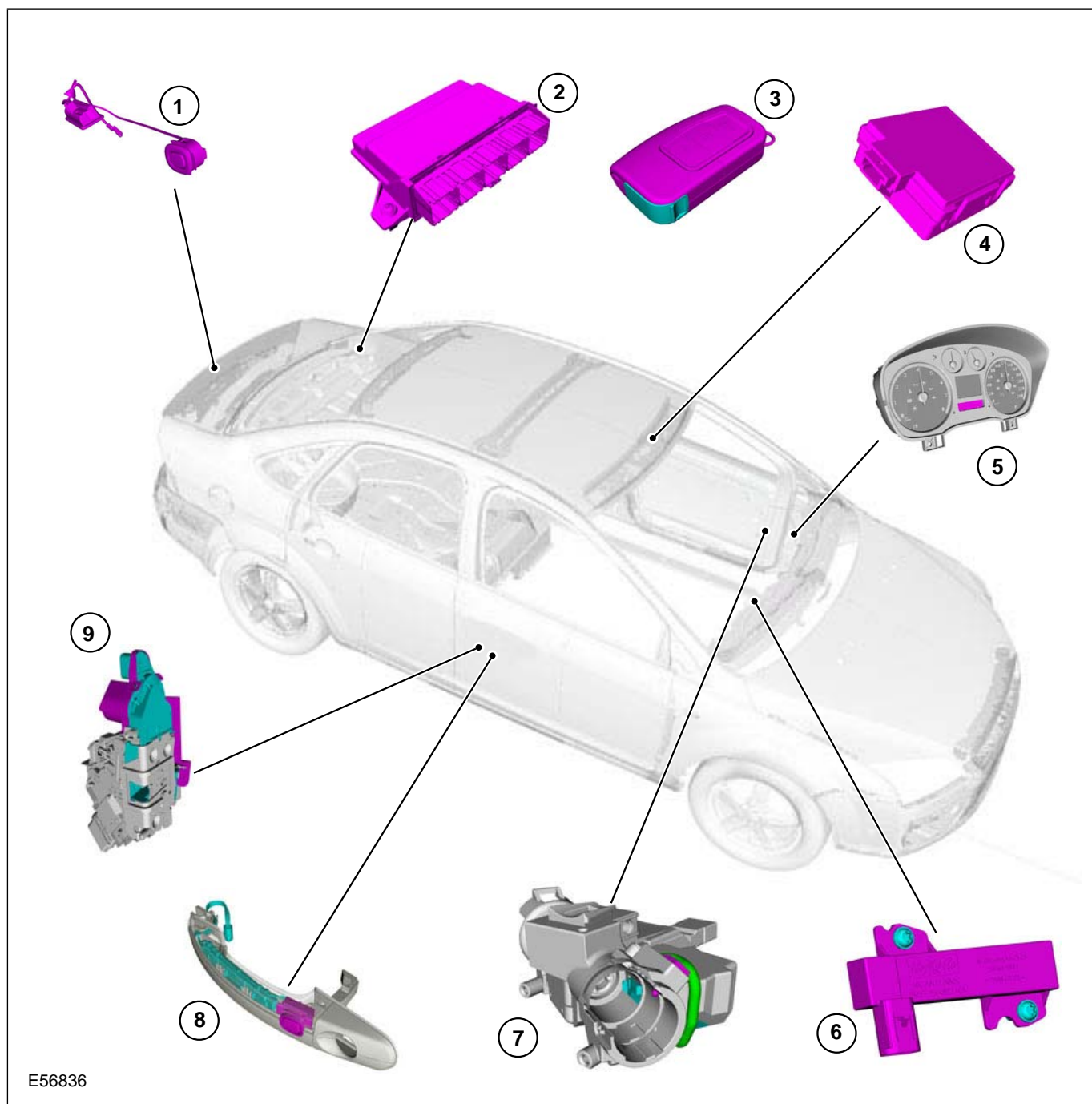
Door latches have mechanical latch release with electric motor operated locking and double locking function.

When the door latch is locked, the exterior door handle is disengaged from the door latch.

Incorporated within the door latch is a door ajar switch. The door ajar switch monitors the latch position and supplies information to the door control module. This information is sent to the CJB for use in warning systems, locking functions and alarm system.

DESCRIPTION AND OPERATION

Vehicles with Keyless Vehicle System



E56836

Item	Description
1	Liftgate/luggage compartment lid lock switch
2	Keyless vehicle module
3	Keyless vehicle passive key
4	Radio frequency (RF) receiver

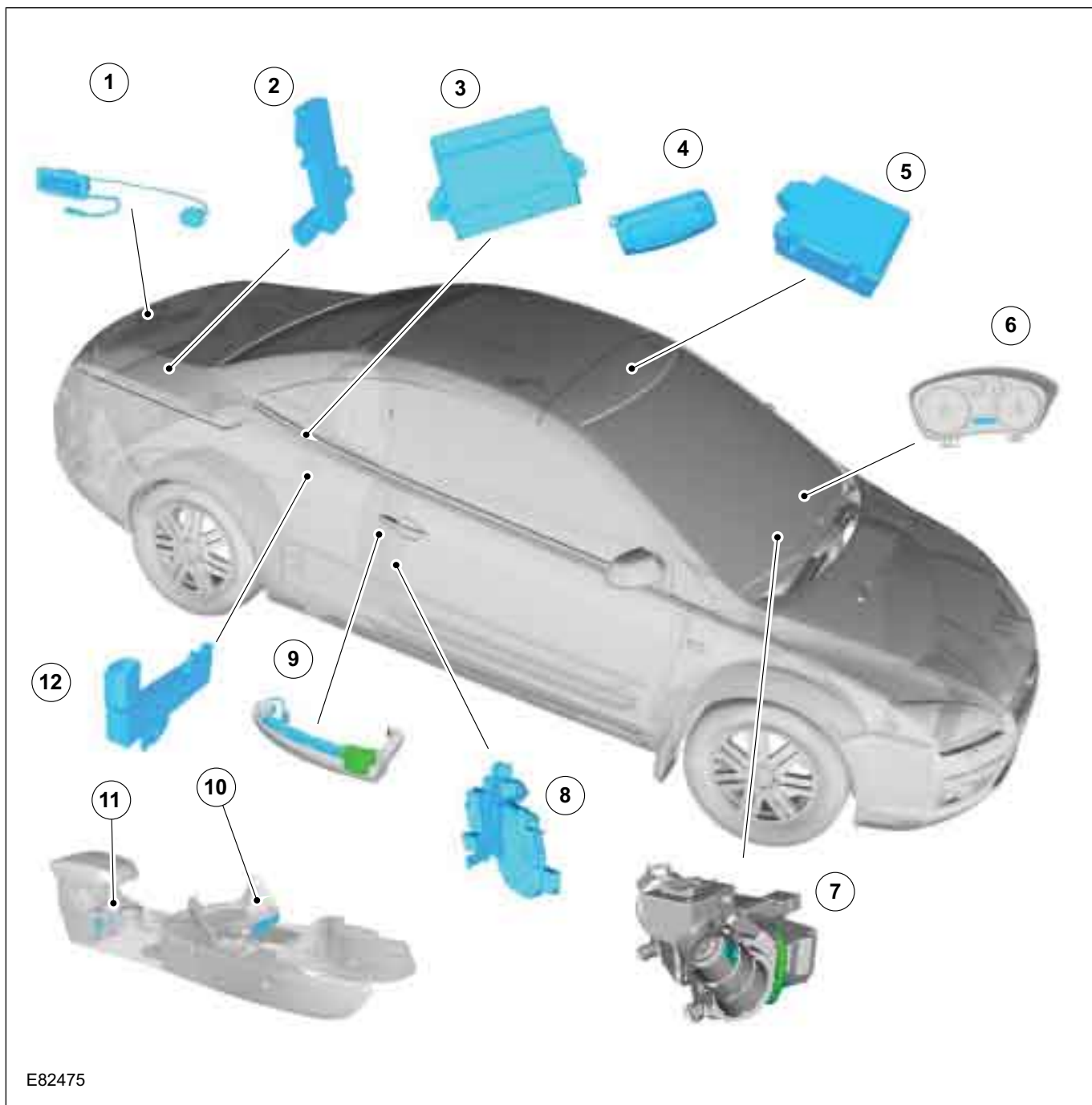
Item	Description
5	Instrument cluster
6	Keyless vehicle antenna (interior)
7	Steering column lock control unit
8	Exterior door handle, keyless vehicle antenna and lock switch
9	Door latch

501-14-9 Handles, Locks, Latches and Entry Systems

501-14-9

DESCRIPTION AND OPERATION

Convertible



E82475

Item	Description
1	Luggage compartment lid lock switch
2	Keyless vehicle luggage compartment antenna
3	Keyless vehicle module
4	Keyless vehicle passive key
5	Radio frequency (RF) receiver
6	Instrument cluster

Item	Description
7	Steering column lock control unit
8	Door latch
9	Exterior door handle, keyless vehicle antenna and lock switch
10	Keyless vehicle front antenna
11	Keyless vehicle center antenna
12	Keyless vehicle rear antenna

DESCRIPTION AND OPERATION**General**

The system is designed to eliminate the need to use any form of key.

The basic function of the system is to allow the operator to gain entry to and operate the vehicle without the turning of keys or the pressing of buttons. This must be achieved without compromising the security or safety of the vehicle.

To gain access to the vehicle, a passive vehicle key must be about the person that is trying to gain access. At a distance of approximately 2 meters from the keyless antenna built into the exterior door handle or the rear exterior keyless antenna located behind the rear bumper cover, the passive vehicle key can receive a low frequency (LF) challenge to confirm its identity.

The vehicle system will not attempt to challenge the coded passive vehicle key, until a door handle is pulled or the liftgate/luggage compartment lid release switch is pressed. This reduces the current drain on the vehicle battery during the armed condition.

To lock the vehicle, all doors must be closed and a passive vehicle key coded to the vehicle must be in range of the exterior keyless vehicle antenna before the lock button on the exterior door handle or liftgate/luggage compartment lid is pressed.

To minimize the risk of scanning during the use of the passive key, the system is equipped with a rolling code. This means that the code received by the keyless vehicle module changes after each successful operation.

The start function is also controlled by the passive vehicle key. If the clutch pedal on manual vehicles or brake pedal for automatic vehicles is pressed, the keyless vehicle module will challenge the passive vehicle key using the interior keyless antenna and allow the steering column lock control unit to release. This allows the operator to rotate the ignition switch turning knob and start the engine.

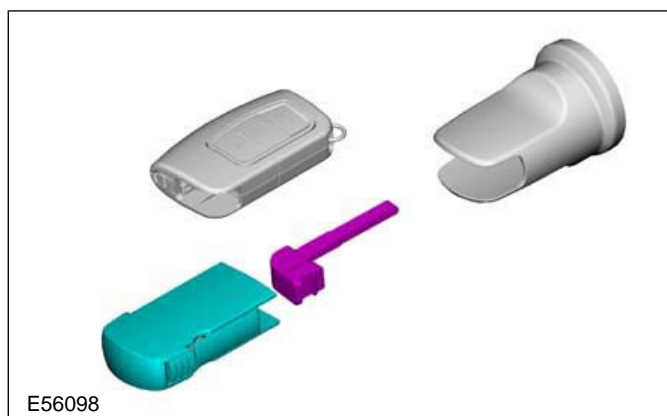
The passive anti theft system (PATS) is disarmed when the passive vehicle key emergency key transponder is read by the PATS transceiver during the starting function.

Passive vehicle Key

E56103

The passive vehicle key is designed to be unobtrusive and robust.

The primary function of the passive vehicle key is to receive requests from and transmit coded signal to the keyless vehicle module. Concealed within the passive vehicle key, is an emergency mechanical key.



E56098

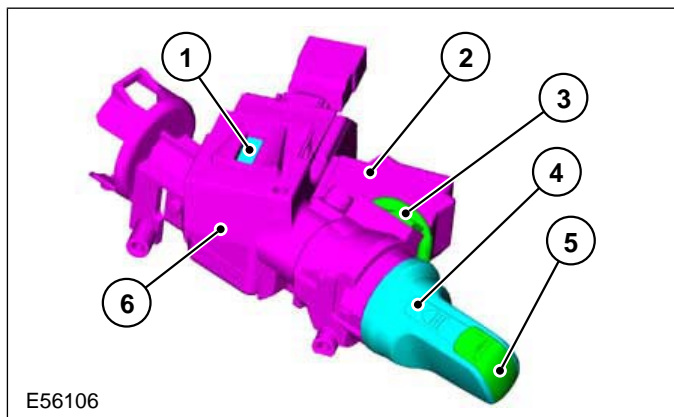
The mechanical key when removed from the passive vehicle key can be used to open the driver door to gain access to the vehicle. The mechanical key must be assembled to the ignition switch turning knob insert before it can then be used to release the steering lock and start the engine.

The passive vehicle key also has remote keyless entry (RKE) functionality.

RKE permits the operator to unlock and lock the vehicle and release the liftgate/luggage compartment lid from a location remote from the vehicle.

DESCRIPTION AND OPERATION

Steering Column Lock Control Unit



Item	Description
1	Steering column lock pin
2	Steering lock cylinder release solenoid
3	Mechanical key insertion detection switch
4	Ignition switch turning knob
5	Ignition switch turning knob insert
6	Steering column lock

The steering column lock control unit operates the same as the standard key operated steering lock but also has the added functionality of a solenoid operated ignition lock cylinder release.

Under the correct conditions, the ignition lock cylinder will be released and allowed to rotate to the accessory, run and start positions.

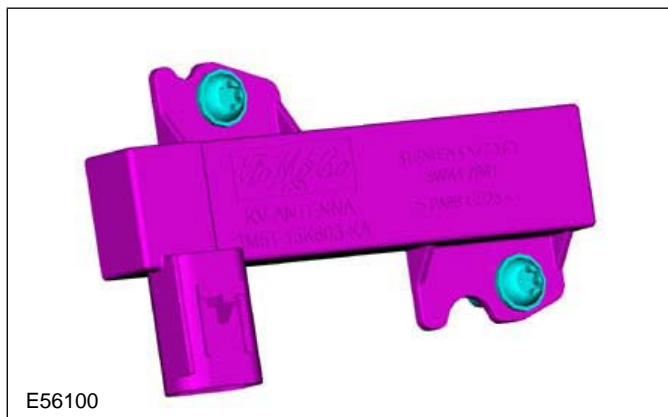
To achieve the correct conditions,

- A valid passive vehicle key must be detected by the keyless vehicle module within the vehicle
- The brake pedal in automatic transmission vehicles must be pressed and the clutch pedal in manual transmission vehicles must be pressed
- The ignition switch turning knob must be pressed in

Only when all of these conditions are met, can the ignition switch turning knob be rotated, so rotating the ignition lock cylinder and releasing the steering lock.

If the emergency key is inserted into the ignition switch turning knob, the steering column lock control unit detects the key and the keyless vehicle system is disabled.

Interior Keyless Antenna



The interior keyless vehicle antenna function is to transmit a LF signal to the passive vehicle key while it is inside the vehicle passenger compartment.

If at any time the passive vehicle key leaves the passenger compartment while the vehicle is unlocked or the ignition switch turning knob is in the accessory, run or start position, the interior keyless vehicle antenna will lose the signal from the passive vehicle key and the keyless vehicle module will indicate in the instrument cluster warning display, that no passive key is present in the vehicle.

There are 4 keyless vehicle antennas installed within the vehicle. They are located in the front and rear of the floor console, behind the rear seat backrest and in the loadspace rear panel.

Liftgate/Luggage Compartment Lid Lock Switch

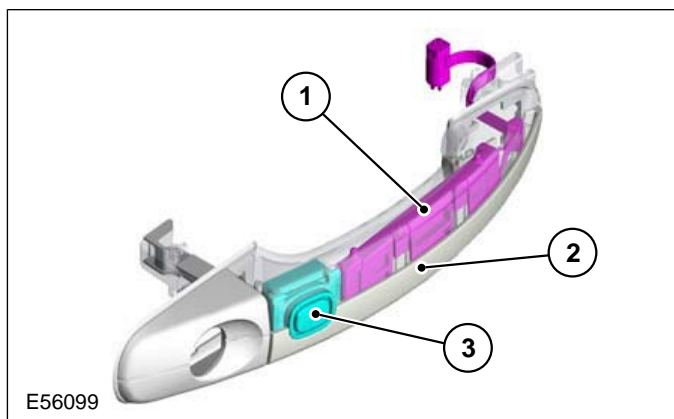


The liftgate/luggage compartment lid lock switch is located in the licence plate illumination panel and can be used to lock the entire vehicle.

DESCRIPTION AND OPERATION

When the liftgate/luggage compartment lid lock switch is pressed, a challenge is sent to the passive vehicle key, if the passive vehicle key is valid, a signal triggers the keyless module to initiate the central locking.

Exterior Door Handle Keyless Vehicle Antenna and Lock Switch



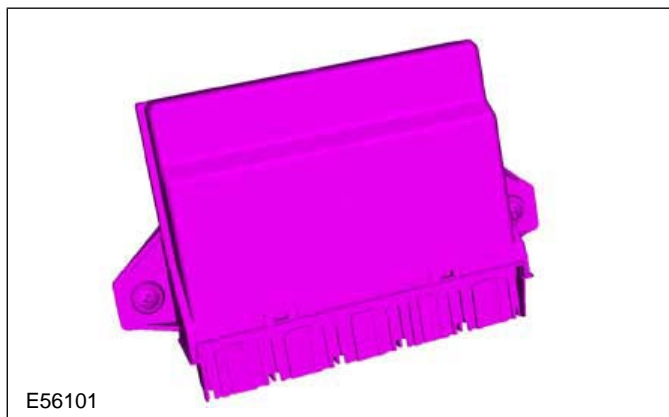
Item	Description
1	Exterior keyless vehicle antenna
2	Exterior front door handle
3	Exterior keyless vehicle system lock button

The exterior door handle keyless vehicle antenna and lock switch is a combined unit that is seen simply as the exterior door handle lock switch.

The function of the lock switch is to send a signal to the keyless vehicle module to indicate the intent to lock the vehicle.

The function of the exterior door handle keyless vehicle antenna is to challenge the passive vehicle key within a pre-defined area of the front exterior door handle.

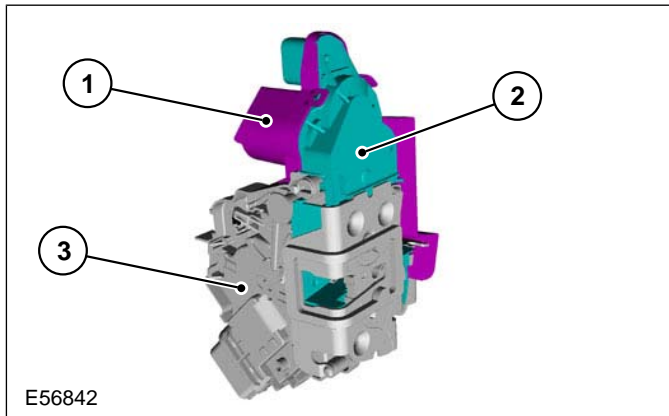
Keyless Vehicle Module



The keyless vehicle module is located in the loadspace trim panel area. Its function is to interface with the components that comprise the keyless vehicle system. These include:

- Door latches and integral motors
- Instrument cluster liquid crystal display (LCD)
- Exterior door handle keyless vehicle antenna
- Exterior door lock buttons
- Interior door lock button
- Liftgate/luggage compartment lid lock switch
- Interior keyless vehicle antennas
- Steering column lock control unit

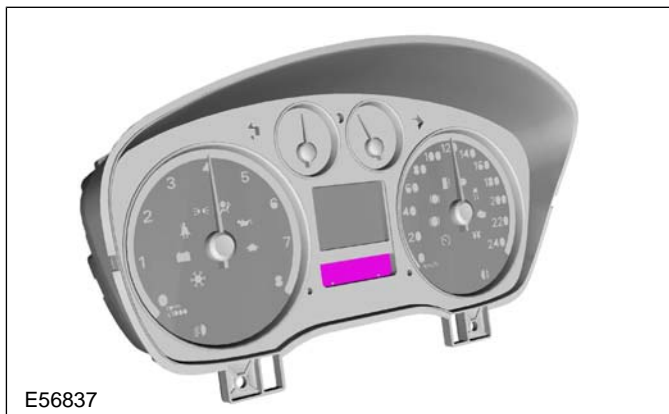
Communication between the component and the keyless vehicle module is predominantly by hard wire as this reduces the delay in communication between components. But the medium speed central area network (CAN) bus is used where it is adequate.

DESCRIPTION AND OPERATION**Door Latch**

Item	Description
1	Door latch release electric motor
2	Door latch
3	Door latch central and double locking electric motors

Keyless vehicle door latches incorporate an extra electric motor to replace the exterior door handle mechanical latch release function during keyless vehicle system operation.

In the event of mechanical key operation, the normal latch exterior door handle linkage will be utilized.

Instrument Cluster

The instrument cluster displays the keyless vehicle system state in the LCD warning display.

The instrument cluster also acts as the interface between the PATS transceiver, powertrain control module (PCM) and keyless vehicle module.

DIAGNOSIS AND TESTING**Locks, Latches and Entry Systems****General Equipment**

Worldwide Diagnostic System (WDS)

Principles of Operation (Vehicles with Central Locking)**Central locking system overview**

This system consists of mechanical/electrical operated latches. The latch motors are interlinked by solid wiring. Central locking is achieved with mechanical switching in the door latch by key or remote handle.

When a key is rotated in the door lock cylinder or an interior remote handle is operated, switching contacts within the door latch supply ground signals to the central junction box (CJB) electronic control, which in turn controls central locking relays. The relays supply battery voltage and ground to the door latch motors. By reversing the battery voltage and ground connections at the central locking relays, the door latches can be locked or unlocked.

The liftgate or luggage compartment lid is opened when the vehicle is in the unlocked mode by a ground signal from the liftgate/luggage compartment lid release switch to the CJB control. The CJB will then supply a voltage to the liftgate/luggage compartment lid latch motor.

If the vehicle is locked, the input from the liftgate/luggage compartment lid release switch to the CJB will be ignored.

Principles of Operation (Vehicles with Remote Keyless Entry (RKE))**RKE locking system overview**

This system consists of mechanical/electrical operated door latches driven by inputs from electronic door control modules. The system uses a radio frequency (RF) transmitter and receiver to operate the remote lock/unlock functions and normal key or remote door handle inputs for standard central and double locking functions.

When a key is rotated in the door lock cylinder or an interior remote handle is operated, switching contacts within the door latch supply a command signal to the door control module. The door control

module communicates with the CJB using the central area network (CAN) bus circuit. Dependant upon the current state of the locking system, commands are then sent to all of the door control modules, which in turn allow battery voltage to be applied to the door latch motors.

The fuel filler door lock function is controlled by the CJB. The CJB receives the lock command from the door control module. The CJB operates the lock relay which supplies a voltage to the fuel filler door lock motor. To unlock the fuel filler door, the supplied voltage is reversed using the driver door/fuel filler door unlock relay.

The liftgate or luggage compartment lid is opened when the vehicle is in the unlocked mode by a ground signal from the liftgate/luggage compartment lid release switch to the CJB. The CJB will supply a voltage to the liftgate or luggage compartment lid latch motor.

If the vehicle is locked, the input from the liftgate/luggage compartment lid release switch will be ignored.

The RKE functions are operated by sending a radio frequency (RF) signal from the key transmitter. The signal is received by the vehicle remote RF receiver. The signal received is transferred as a data signal to the CJB, where the transmitted signal is validated and control commands are sent to the door control modules on the CAN bus circuit and to the liftgate/luggage compartment lid latch motor by direct wiring.

Inspection and Verification (Vehicles with Remote Keyless Entry (RKE))

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

DIAGNOSIS AND TESTING

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> - Misaligned door(s), hood, liftgate, tailgate, luggage compartment and hood - Door latch(es) - Liftgate latch - Luggage compartment lid latch - Hood latch - Actuating Cable(s) - Exterior door handle(s) - Door latch remote control(s) - Door lock cylinder(s) - Liftgate lock cylinder 	<ul style="list-style-type: none"> - Fuse(s) - Relay(s) - Wiring harness - Electrical connector(s) - Door latch(s) - Remote transmitter batteries - Vehicle battery - Remote transmitter - RF receiver - Liftgate exterior release switch - Luggage compartment lid release switch - Door control module(s) - CJB

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, connect WDS to the data link connector.
5. Select the **Generic Electronic Module** menu.
6. Retrieve the diagnostic trouble codes (DTCs) and refer to the Diagnostic Trouble Code (DTC) Index - CJB.

Principles of Operation (Vehicles with Keyless vehicle system)

Keyless Component Installation, Programing and Initialization

If new components for the keyless vehicle system have been installed, dependant upon which component is installed, programing using **WDS** will be required.

NOTE: Before any programing or initialization for the keyless vehicle system components can be carried out, an operational valid passive anti-theft system (PATS) emergency key must be present in the ignition switch turning knob.

Passive Key programing

Passive key programing can only be carried out using WDS. To program a new passive key, clear passive keys or count passive keys follow the WDS menu sequence:

- Vehicle communication
- Toolbox
- Body
- Security
- Remote Keyless Entry

From the Remote Keyless Entry screen you can choose to:

- Add Keys
- Clear Keys
- Count Keys

Steering column lock control unit initialization

If a new steering column lock control unit is installed, the only procedure required providing the original steering lock barrel has been installed and the original emergency key is used, is **Initialize System** using the following WDS menu sequence:

- Vehicle communication
- Toolbox
- Body
- Security
- Remote Keyless Entry
- Initialize System

Keyless vehicle module programing

If a new keyless vehicle module is installed, the following programing sequence must be followed using WDS.

- Keyless Vehicle Module (KVM) programing. (From the module programing menu)
- Initialize System
- Add Keys

Instrument cluster programing

If a new instrument cluster is installed, the following programing sequence must be followed using WDS.

- Instrument cluster module programing. (From the module programing menu).
- PATS key learning. (From the PATS menu)

DIAGNOSIS AND TESTING

- Initialize with the powertrain control module. (From the PATS menu)
- Initialize with the keyless vehicle module. (From the Remote Keyless Entry menu)

Keyless Vehicle System Overview

The keyless vehicle system also incorporates RKE functions, however the main purpose of the system is to allow the operator of the vehicle to gain access to and operate the vehicle without carrying out any actions with a key or remote buttons.

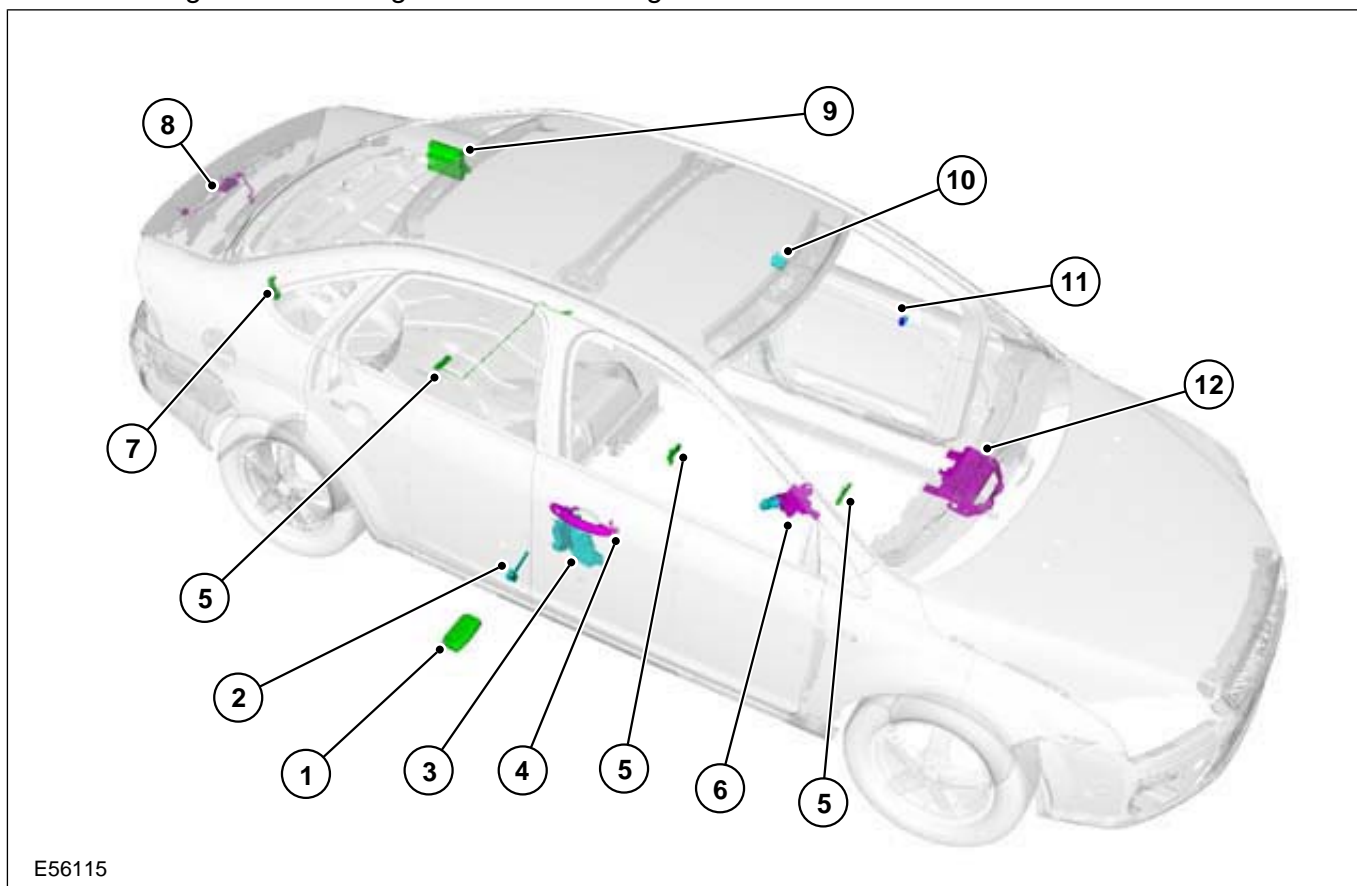
The keyless vehicle system can be turned off to give basic key operation if required.

To isolate the keyless vehicle system, the emergency key must be inserted into the ignition switch turning knob and the ignition switch turning

knob rotated to position II. It is now possible to select the KEY FREE ON or KEY FREE OFF from the instrument cluster liquid crystal display (LCD) using the remote steering column stalk control. In the OFF mode, the RKE functions still work.

Vehicles equipped with keyless vehicle systems, will be delivered from production in shipping mode. Shipping mode reduces the vehicle battery drain to a minimum to extend the period of time the vehicle can remain dormant without discharging the vehicle battery.

To exit the shipping mode, the emergency key must be inserted into the ignition switch turning knob and rotated to position II. The shipping mode can now be deselected from the instrument cluster LCD display using the steering column stalk control.



E56115

Item	Description
1	Passive vehicle key
2	Emergency key
3	Door latch
4	Door exterior handle keyless vehicle antenna and lock switch

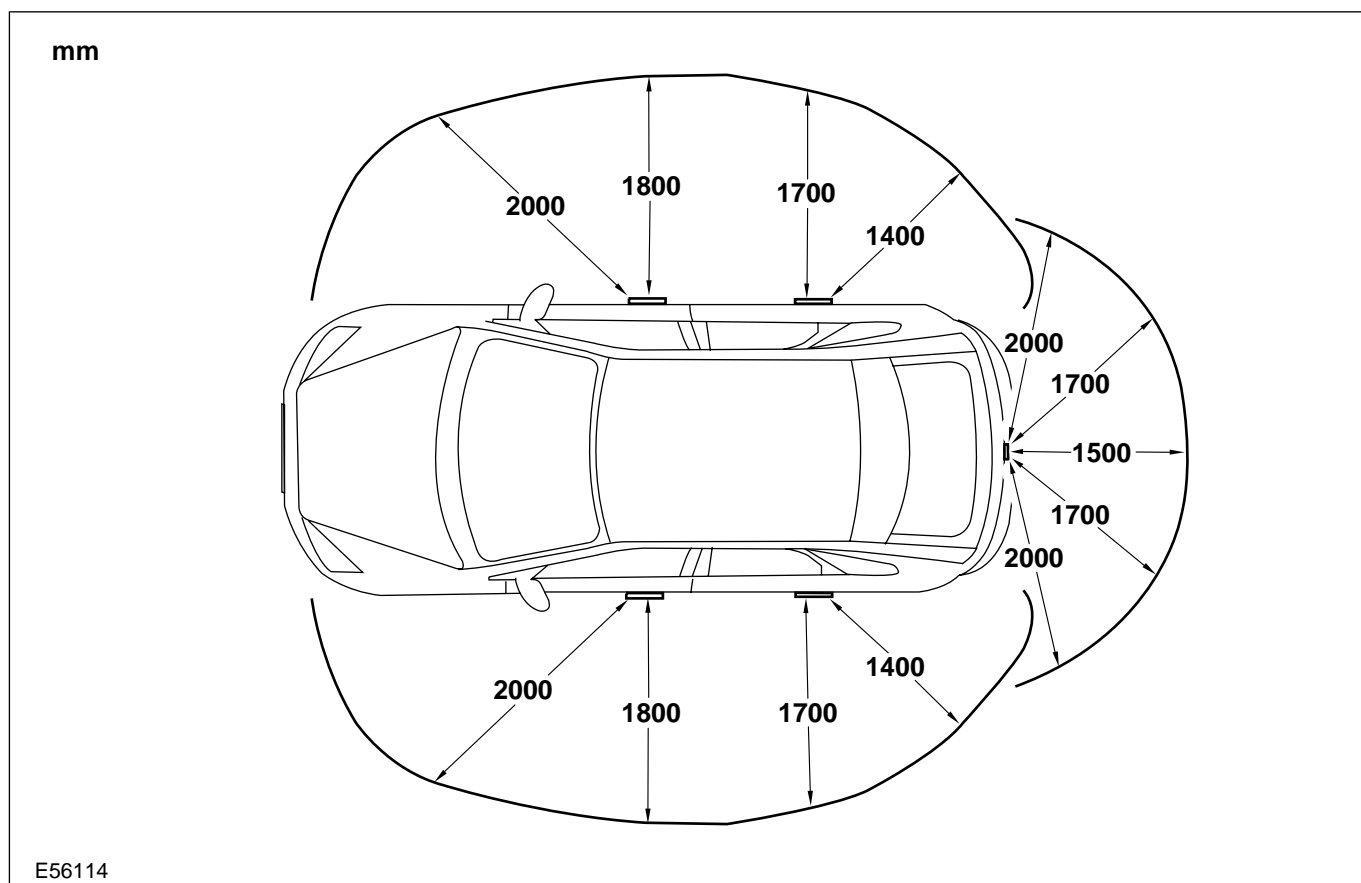
Item	Description
5	Interior keyless vehicle antennas
6	Steering column lock control unit
7	Rear exterior keyless vehicle antenna
8	Liftgate/luggage compartment lid lock switch

DIAGNOSIS AND TESTING

Item	Description
9	Keyless vehicle module
10	RKE antenna

Item	Description
11	Interior unlock button
12	Central junction box

Passive Key



The passive vehicle key can receive an identification challenge from the vehicle door exterior handle keyless vehicle antennas within a range of approximately 1.5 meters to 2.0 meters. The challenge from the rear exterior keyless vehicle antenna will be received at up to 1.5 meters from the center rear of the vehicle. On receiving the identification challenge, the passive vehicle key will emit a coded radio frequency (RF) signal to the RF receiver. No RF signal will be emitted if the passive vehicle key does not recognize the coded low frequency challenge from the keyless vehicle module.

If the system is functioning correctly, the operator will be able to open the vehicle doors, liftgate or luggage compartment lid, as long as a valid passive key is within the defined areas.

If a valid passive vehicle key detects a low frequency challenge from the interior keyless antenna and emits a valid RF coded signal, the keyless vehicle module will switch on the passive go functionality.

If a valid passive vehicle key is left in the vehicle and the vehicle is locked using a second valid passive vehicle key. The instrument cluster will indicate the presence of a valid key in the vehicle and the passive vehicle key left in the vehicle will be disabled. The disabled passive vehicle key can only be reactivated by starting the vehicle with the emergency key.

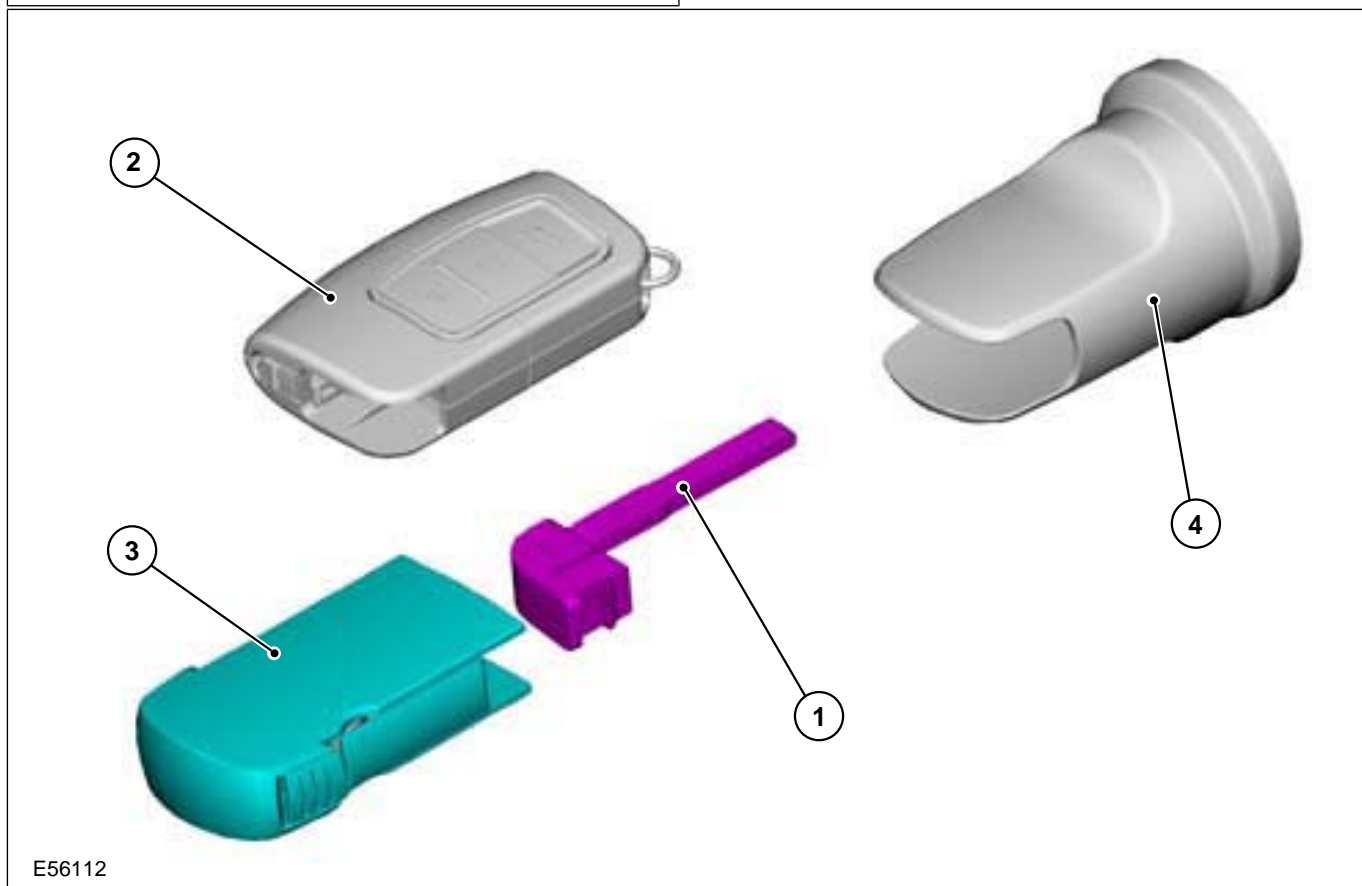
Up to 8 passive vehicle keys can be programmed to one keyless vehicle module. Passive vehicle keys can only be programmed using the **Teach Keys** menu in WDS.

DIAGNOSIS AND TESTING



E56103

The passive vehicle key is equipped with RKE function buttons. When an RKE function button is pressed, the RF signal emitted is received by the RF receiver within the vehicle. Data is sent from the RF receiver to the keyless vehicle module. The keyless vehicle module will validate the transmitted signal and if valid, operate the relevant function.



E56112

Item	Description
1	Emergency mechanical key
2	Passive vehicle key
3	Ignition switch turning knob insert
4	Ignition switch turning knob

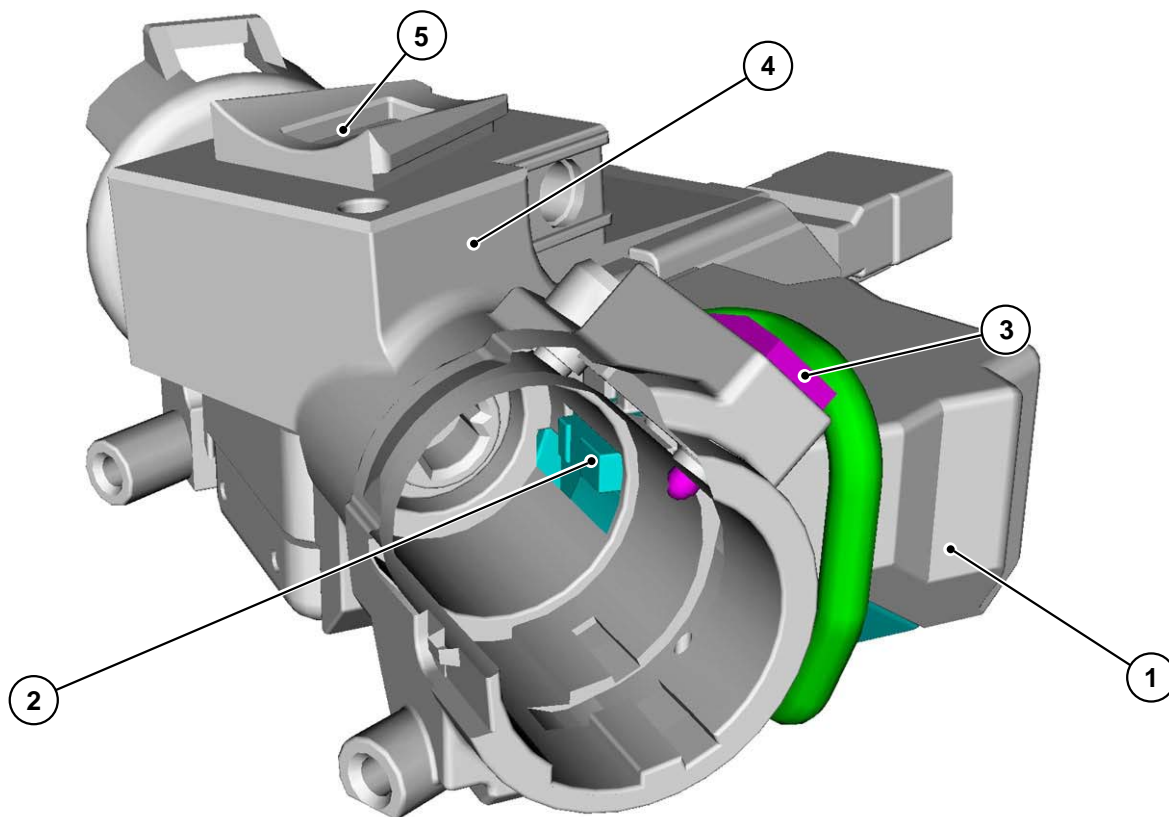
Within the passive vehicle key is concealed a emergency mechanical key. The mechanical key can be used to open the drivers door and start the vehicle. The mechanical key is equipped with a passive anti-theft system (PATS) transducer.

To start the vehicle with the emergency key, it must first be assembled to the ignition switch turning knob insert. When the assembled key is inserted into the ignition switch turning knob, the key insertion detection switch sends a signal to the keyless vehicle module indicating a key has been inserted. The keyless vehicle module will then switch off the passive go and revert to standard PATS functionality.

The emergency key will override the ignition lock cylinder electrical locking function.

DIAGNOSIS AND TESTING

Steering Column Lock Control Unit



E56113

Item	Description
1	Ignition lock cylinder release solenoid
2	Ignition lock cylinder rotation lock
3	Mechanical key insertion detection switch
4	Steering column lock
5	Steering column lock pin

The steering column lock control unit still carries out the same function as the standard steering column lock, but now it has the added functionality of a solenoid operated ignition lock cylinder release.

For the steering column lock to release in keyless vehicle mode, certain criteria must be fulfilled:

- vehicles with automatic transmissions must have the brake pedal pressed
- vehicles with manual transmissions must have the clutch pedal pressed
- a valid passive vehicle key must be within the detection range of the interior keyless vehicle antenna

When the brake or clutch pedal is pressed, the keyless vehicle module is triggered to search for a valid passive vehicle key. If a valid passive vehicle key is detected, the ignition lock cylinder solenoid releases and the ignition switch turning knob can be pressed in. This will release the steering lock and allow the ignition switch turning knob to be rotated to positions I, II and III.

To lock the steering column, the ignition switch turning knob must be turned to the 0 position and pulled out by approximately 5mm.

The PATS function is armed until the ignition switch turning knob has reached position II. When the ignition switch turning knob is in position II, the keyless vehicle module receives a request from the steering column lock control unit to identify the passive key PATS transducer. The keyless vehicle module then sends a command on the medium speed CAN bus to the instrument cluster. The instrument cluster verifies the validity of the passive vehicle key PATS transducer and in turn communicates with the powertrain control module (PCM) and allows the vehicle to start.

DIAGNOSIS AND TESTING

If a new steering column lock control unit is installed to a vehicle, before it will function, it must be initialized using the **Initialize System** menu in WDS.

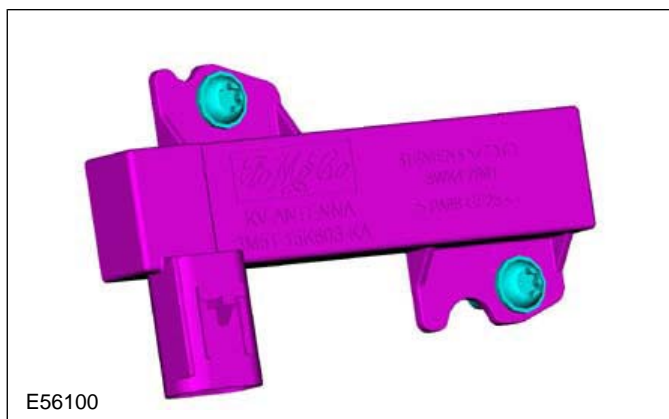
Liftgate/Luggage Compartment Lid Lock Button

E56178

The liftgate/luggage compartment lid lock button is located in the licence plate illumination panel.

If the liftgate/luggage compartment lid is closed and the exterior lock button is pressed while a valid passive vehicle key in the loadspace area, the keyless vehicle module will request that the external keyless vehicle antennas issue a passive vehicle key challenge. If no valid passive vehicle key signal is detected by the RF receiver, the liftgate/luggage compartment lid will be automatically opened. If a valid passive vehicle key signal is detected by the exterior keyless vehicle antennas, the passive vehicle key in the

loadspace area will be deactivated and the vehicle allowed to lock in the normal way. The deactivated passive vehicle key will be reactivated after the ignition switch turning knob has been turned to position II with either a valid passive vehicle key or a mechanical emergency key.

Interior Keyless Vehicle Antenna

E56100

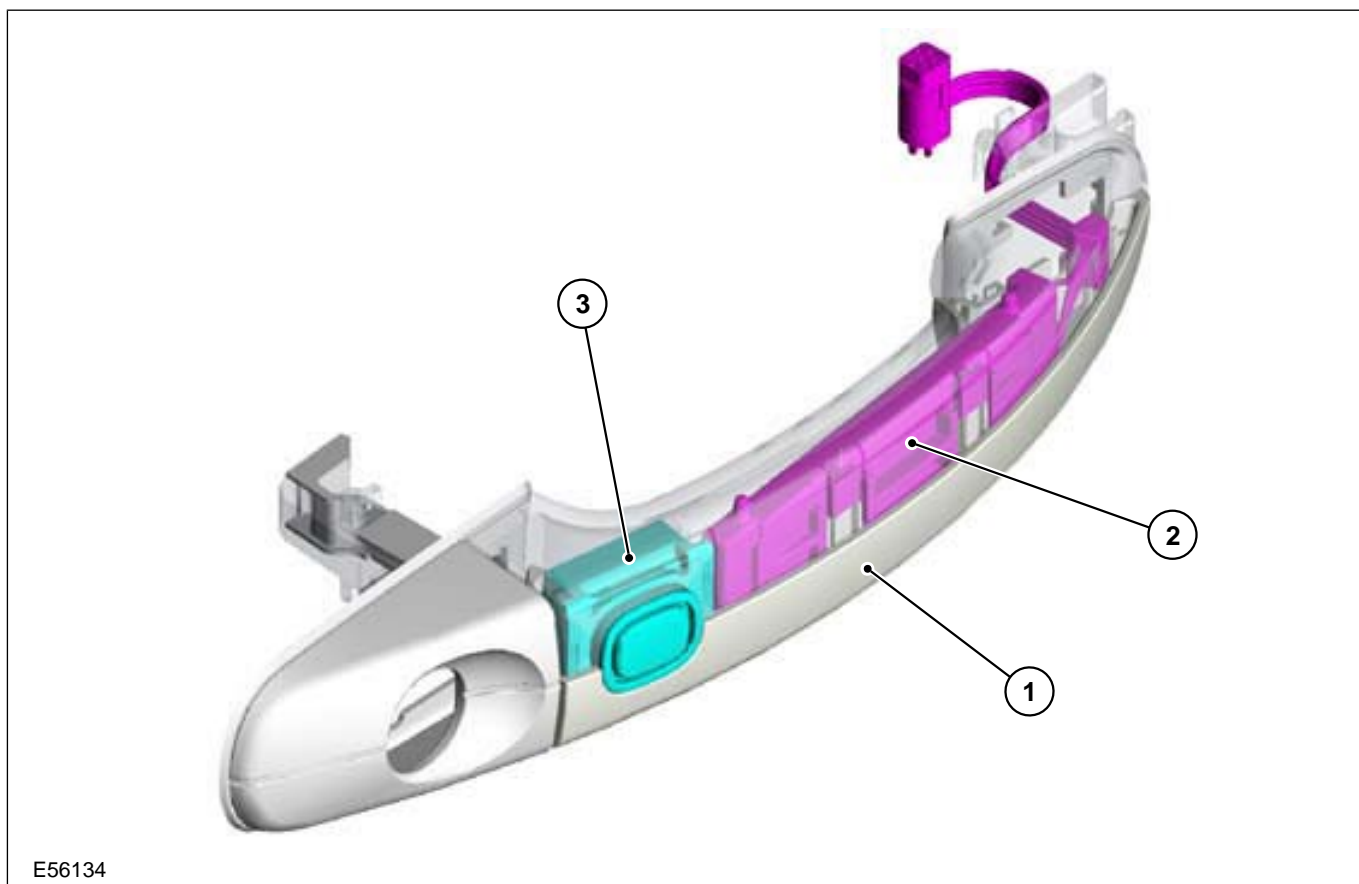
The interior keyless vehicle antenna function is to issue a low frequency challenge to the passive vehicle key while it is in the passenger compartment.

The vehicle is equipped with two interior keyless vehicle antennas in the passenger compartment area and one in the loadspace area.

The loadspace keyless vehicle antenna is fitted to prevent the possibility of accidentally locking the passive vehicle key in the loadspace area.

DIAGNOSIS AND TESTING

Exterior Door Handle Antenna and Lock Switch



E56134

Item	Description
1	Exterior door handle
2	Exterior keyless vehicle antenna
3	Exterior door lock switch

With the vehicle locked and the keyless vehicle system active, the exterior keyless vehicle antennas are dormant and do not scan for a valid passive vehicle key. The exterior keyless vehicle antenna will only wake up and issue a challenge for a valid passive vehicle key when the operator has begun to pull the exterior door handle.

In the time it takes to open a door, the signal determining handle movement is sent to the keyless vehicle module, a request of the exterior keyless vehicle antenna to detect a valid passive vehicle key, the receiving and validation of the passive vehicle key code and the command to the door latch to unlock has occurred. This whole process takes approximately 150 ms.

The only time this function will be impaired is if the vehicle has been left standing for at least 5 days. The keyless vehicle module will then enter a state of reduced energy consumption and when the

vehicle door handle is pulled, it will take a noticeably increased period for the keyless system to wake up and unlock the door(s).

When the operator exits the vehicle, the vehicle is locked by pressing the lock button fitted into the exterior door handle.

With all doors and liftgate/luggage compartment lid closed, the exterior door lock button will initiate a request from the keyless vehicle module to scan the interior and exterior of the vehicle around the pressed lock button for valid passive vehicle key. If a valid passive vehicle key is detected on the exterior of the vehicle only, the door latches will be locked. The door latches will remain locked for a period of 3 seconds to allow for the operator to pull the exterior door handle to check if the door is locked. After 3 seconds, if the exterior door handle is pulled, the door latch will release as in a normal keyless vehicle entry. If a valid passive vehicle key is detected in the interior of the vehicle and not on the exterior, the latches will not be locked. The vehicle will also not be locked if the ignition switch turning knob is in the II position. Passive vehicle locking will be confirmed by the operation of the vehicles turn signal lamps.

DIAGNOSIS AND TESTING

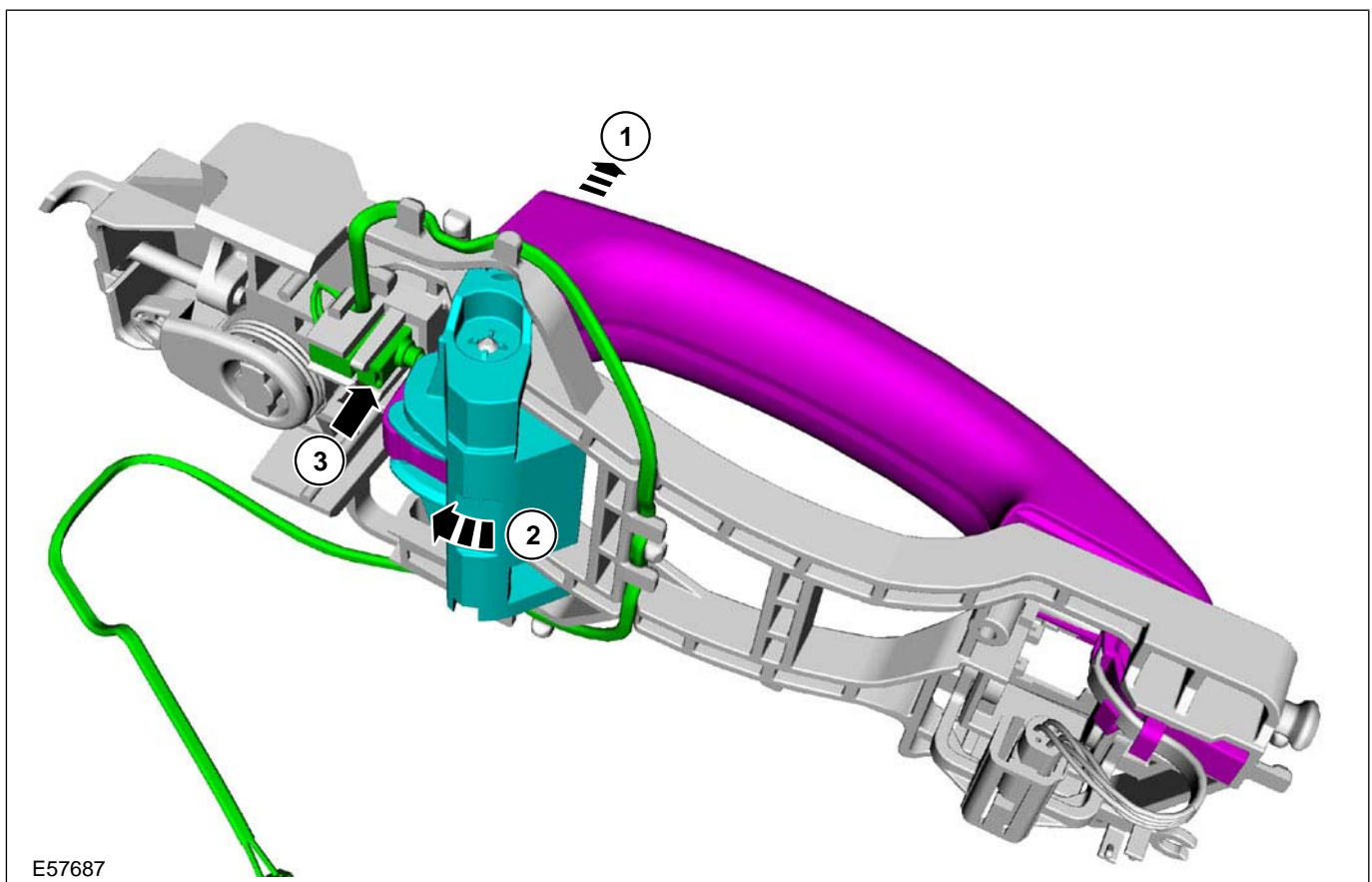
If the ignition turning knob is in position I or 0 and the steering column lock is not engaged, the keyless vehicle module will allow the locking to operate. A warning chime will sound and a warning **ENGAGE STEERING LOCK** will be displayed in the instrument cluster LCD area if driver's door is opened.

To double lock the vehicle, requires the exterior lock button to be pressed twice. The second pressing of the exterior lock button must occur within 3 seconds of it first being pressed.

To operate the global closing feature, requires the exterior lock button on the drivers door only, to be pressed and held pressed for a period of 2 seconds.

The keyless vehicle central unlocking function can be programed to operate the drivers door only or all the doors. To set the desired function, the lock and unlock button at the passive key has to be pressed in parallel for 4 seconds. If a rear exterior door handle or passenger exterior door handle is pulled when the keyless vehicle system is in driver door unlock mode, all doors will remain locked. If the driver exterior door handle is pulled when the keyless vehicle system is in driver door unlock mode, only the driver door will unlock and the door handle passive entry for the rear doors and passenger door will be inoperative.

In driver door unlock mode, the passenger doors can only be unlocked using the interior keyless vehicle system unlock button.

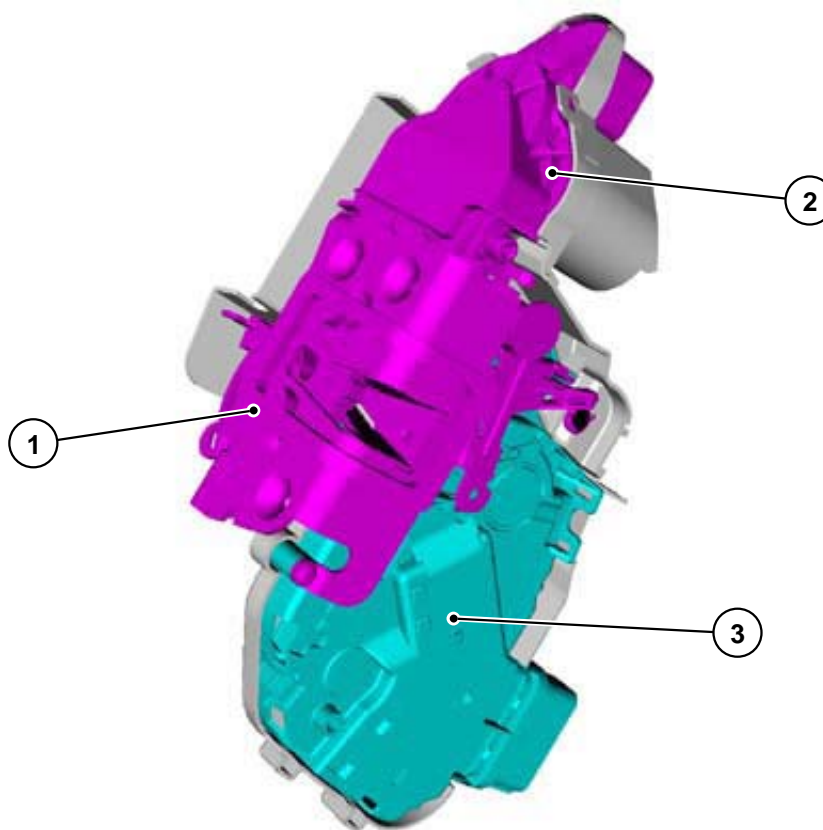
Exterior Door Handle Pull Switch

Item	Description
1	Exterior door handle
2	Door latch actuator
3	Exterior door handle pull switch

The exterior door handle switch is operated from a cam lobe attached to the door latch actuator. As the exterior door handle is pulled, the door latch actuator rotates and operates the exterior door handle pull switch.

DIAGNOSIS AND TESTING

Door Latch



E56150

Item	Description
1	Door latch
2	Door latch unlatch motor
3	Central/double locking motor

The keyless vehicle locking system requires unique door latches.

The door latches are equipped with electric motors that replace the mechanical unlatch function of the exterior door handle when the vehicle is in keyless vehicle system mode. This is because the exterior door handle is already in a semi pulled state before the latch unlatch command is received by the latch lock motors, the latch linkage is not in a position to engage with the exterior door handle.

If the emergency key is used to enter the vehicle, the standard mechanical latch linkage is utilized.

Central and double locking is still controlled by the door control modules, however the commands to lock and unlock are relayed through the keyless vehicle module on the high-speed CAN bus circuit.

Interior Unlock Switch

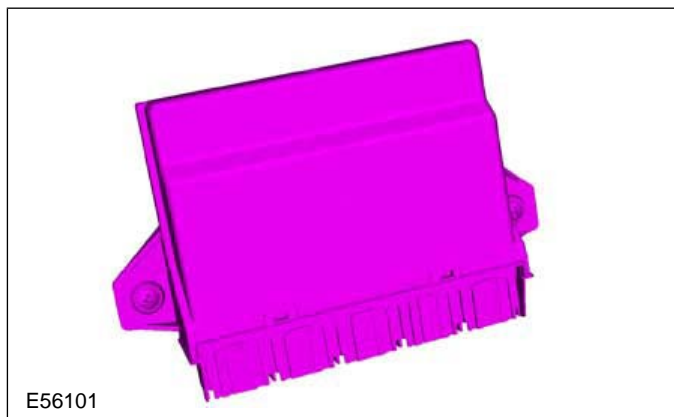


E56179

The interior unlock switches function, is to unlock the rear doors and passenger door locks when the vehicle has been entered using the passive entry system in drivers unlock mode.

DIAGNOSIS AND TESTING

Keyless Vehicle Module



The keyless vehicle module is at the heart of the keyless vehicle system. It communicates with the PJB and with the instrument cluster on the medium speed CAN bus circuit. The keyless vehicle module stores the passive vehicle key codes. If a new keyless vehicle module is installed in a vehicle, the following sequence must be followed before the system can function.

- Using WDS Program Module routine, program the keyless vehicle module.
- Using the Initialize System routine, initialize the keyless vehicle module to the CJB and to the steering column lock control unit.
- Using the Teach Key function, teach the minimum number of passive keys required.

Inspection and Verification (Vehicles with Keyless Entry)

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> – Misaligned door(s), hood, liftgate, tailgate, luggage compartment and hood – Door latch(es) – Liftgate latch – Luggage compartment lid latch – Hood latch – Actuating Cable(s) – Exterior door handle(s) – Door latch remote control(s) – Door lock cylinder 	<ul style="list-style-type: none"> – Fuse(s) – Relay(s) – Wiring harness – Electrical connector(s) – Door latch motor(s) – Vehicle battery – Liftgate lock switch – Luggage compartment lid lock switch – Passive vehicle key – Keyless vehicle module – Keyless vehicle interior antenna(s) – Keyless vehicle exterior antenna(s) – RF receiver – Ignition lock cylinder key insert switch – Ignition lock cylinder release solenoid – Liftgate exterior release switch – Luggage compartment lid release switch

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, connect WDS to the data link connector.
5. Select the **Remote Keyless Entry** menu.
6. Retrieve the diagnostic trouble codes (DTC) and refer to the Diagnostic Trouble Code (DTC) Index - Keyless Vehicle Module.
7. If no DTC(s) are stored in the keyless vehicle module, retrieve the DTC(s) from the CJB and refer to the DTC index - CJB.

DIAGNOSIS AND TESTING

Diagnostic Trouble Code (DTC) Index - Keyless Vehicle Module

DTC	Description	Possible Source	Action
B2477	Keyless vehicle module configuration failure	<ul style="list-style-type: none"> Keyless vehicle module programming Keyless vehicle module 	<p>Using WDS, Program Module menu.</p> <p>PROGRAM the keyless vehicle module. TEST the system for normal operation. If the DTC is repeated, INSTALL a new keyless vehicle module.</p> <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).</p> <p>Using WDS, Remote Keyless Entry, Initialize System menu.</p> <p>INITIALIZE the keyless entry system. TEST the system for normal operation</p>
B1342	Keyless vehicle module failure	Keyless vehicle module	<p>INSTALL a new keyless vehicle module.</p> <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).</p> <p>Using WDS, Remote Keyless Entry, Initialize System menu.</p> <p>INITIALIZE the keyless entry system. TEST the system for normal operation</p>
B1096	Communication failure between keyless vehicle module and steering column lock control unit	<ul style="list-style-type: none"> Wiring harness Keyless vehicle module Steering column lock control unit 	GO to Pinpoint Test A.

DIAGNOSIS AND TESTING

DTC	Description	Possible Source	Action
B1095	Steering column lock control unit failure	Steering column lock control unit	INSTALL a new steering column lock control unit. REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). Using WDS, Remote Keyless Entry, Initialize System menu. INITIALIZE the keyless entry system. TEST the system for normal operation
B1094	Steering column lock control unit identification not stored	Steering column lock control unit initialization	Using WDS, Remote Keyless Entry, Initialize System menu. INITIALIZE the keyless entry system. Test the system for normal operation
B1093	Steering column lock control unit identification does not match stored data	Steering column lock control unit initialization	Using WDS, Remote Keyless Entry, Initialize System menu. INITIALIZE the keyless entry system. TEST the system for normal operation
B1092	Steering column lock control unit to keyless vehicle module wiring harness short to battery positive	<ul style="list-style-type: none"> • Wiring harness • Steering column lock control unit • Keyless vehicle module 	GO to Pinpoint Test B.
B1069	Keyless vehicle module secure identification missing	Keyless vehicle module initialization	Using WDS, Remote Keyless Entry, Initialize System menu. INITIALIZE the keyless entry system. TEST the system for normal operation
B2090	RF antenna data circuit, short to battery or short to ground	<ul style="list-style-type: none"> • RF antenna harness • RF antenna • Keyless vehicle module • Central junction box 	GO to Pinpoint Test C.

DIAGNOSIS AND TESTING

DTC	Description	Possible Source	Action
B2091	RF antenna data circuit, open circuit	<ul style="list-style-type: none"> RF antenna harness RF antenna Keyless vehicle module Central junction box 	GO to Pinpoint Test D.
B1087	Passenger side rear door latch clutch switch active without door handle unlock pull switch functioning	<ul style="list-style-type: none"> Passenger side rear door latch wiring harness Passenger side rear door latch Passenger side rear door unlock switch 	For LHD vehicles, GO to Pinpoint Test E.
B1088	Drivers side rear door latch clutch switch active without door handle unlock pull switch functioning	<ul style="list-style-type: none"> Drivers side rear door latch wiring harness Drivers side rear door latch Drivers side rear door unlock switch 	GO to Pinpoint Test F.
B1089	Passenger side front door latch clutch switch active without door handle unlock pull switch functioning	<ul style="list-style-type: none"> Passenger side front door latch wiring harness Passenger side front door latch Passenger side front door unlock switch 	GO to Pinpoint Test G.
B1090	Drivers side front door latch clutch switch active without door handle unlock pull switch functioning	<ul style="list-style-type: none"> Drivers side front door latch wiring harness Drivers side front door latch Drivers side front door unlock switch 	GO to Pinpoint Test H.
B1078	Drivers side door exterior keyless antenna circuit, short to battery positive	<ul style="list-style-type: none"> Drivers side door exterior keyless vehicle antenna wiring harness Drivers side door exterior keyless vehicle antenna Key-free module 	GO to Pinpoint Test I.

DIAGNOSIS AND TESTING

DTC	Description	Possible Source	Action
B1079	Passengers side door exterior keyless vehicle antenna circuit, short to battery positive	<ul style="list-style-type: none"> Passengers side door exterior keyless vehicle antenna wiring harness Passengers side door exterior keyless vehicle antenna Keyless vehicle module 	GO to Pinpoint Test J.
B1080	Liftgate/luggage compartment lid exterior keyless vehicle antenna circuit, short to battery positive	<ul style="list-style-type: none"> Liftgate/luggage compartment lid exterior keyless vehicle antenna wiring harness Liftgate/luggage compartment lid exterior keyless vehicle antenna Keyless vehicle module 	GO to Pinpoint Test K.
B1081	Interior passenger area keyless vehicle antenna circuit, short to battery positive	<ul style="list-style-type: none"> Interior keyless vehicle antenna wiring harness Interior keyless vehicle antenna(s) Keyless vehicle module 	<ul style="list-style-type: none"> Using the Passive Key Detection Test, in this section, Identify the inoperative keyless vehicle interior antenna. If the front interior keyless vehicle antenna is inoperative, GO to Pinpoint Test L. If the center interior keyless vehicle antenna is inoperative, GO to Pinpoint Test M.
B1082	Interior loadspace keyless vehicle antenna circuit, short to battery positive	<ul style="list-style-type: none"> Interior loadspace keyless vehicle antenna wiring harness Interior loadspace keyless vehicle antenna keyless vehicle module 	GO to Pinpoint Test N.

DIAGNOSIS AND TESTING

DTC	Description	Possible Source	Action
B1077	Drivers side door exterior keyless vehicle antenna circuit, short to ground	<ul style="list-style-type: none"> Drivers side door exterior keyless vehicle antenna wiring harness Drivers side door exterior keyless vehicle antenna Keyless vehicle module 	GO to Pinpoint Test O.
B1083	Passenger side door exterior keyless vehicle antenna circuit, short to ground	<ul style="list-style-type: none"> Passengers side door exterior keyless vehicle antenna wiring harness Passengers side door exterior keyless vehicle antenna Keyless vehicle module 	GO to Pinpoint Test P.
B1086	Liftgate/luggage compartment lid exterior keyless vehicle antenna circuit, short to ground	<ul style="list-style-type: none"> Liftgate/luggage compartment lid exterior keyless vehicle antenna wiring harness Liftgate/luggage compartment exterior keyless vehicle antenna Keyless vehicle module 	GO to Pinpoint Test Q.
B1070	Interior passenger area keyless vehicle antenna circuit, short to ground	<ul style="list-style-type: none"> Interior keyless vehicle antenna wiring harness Interior keyless vehicle antenna(s) Keyless vehicle module 	<ul style="list-style-type: none"> Using the Passive Key Detection Test, Identify the inoperative keyless vehicle interior antenna. If the front interior keyless vehicle antenna is inoperative, GO to Pinpoint Test R. If the center interior keyless vehicle antenna is inoperative, GO to Pinpoint Test S.

DIAGNOSIS AND TESTING

DTC	Description	Possible Source	Action
B1071	Interior loadspace keyless vehicle antenna circuit, short to ground	<ul style="list-style-type: none"> Interior loadspace keyless vehicle antenna wiring harness Interior loadspace keyless vehicle antenna keyless vehicle module 	GO to Pinpoint Test T.
B1072	Drivers side door exterior keyless vehicle antenna circuit, open circuit	<ul style="list-style-type: none"> Drivers side door exterior keyless vehicle antenna wiring harness Drivers side door exterior keyless vehicle antenna keyless vehicle module 	GO to Pinpoint Test U.
B1073	Passenger side door exterior keyless vehicle antenna circuit, open circuit	<ul style="list-style-type: none"> Passengers side door exterior keyless vehicle antenna wiring harness Passengers side door exterior keyless vehicle antenna keyless vehicle module 	GO to Pinpoint Test V.
B1074	Liftgate/luggage compartment lid exterior keyless vehicle antenna circuit, open circuit	<ul style="list-style-type: none"> Liftgate/luggage compartment lid exterior keyless vehicle antenna wiring harness Liftgate/luggage compartment lid exterior keyless vehicle antenna keyless vehicle module 	GO to Pinpoint Test W.

DIAGNOSIS AND TESTING

DTC	Description	Possible Source	Action
B1075	Interior passenger area keyless vehicle antenna circuit, open circuit	<ul style="list-style-type: none"> Interior keyless vehicle antenna wiring harness Interior keyless vehicle antenna(s) keyless vehicle module 	<ul style="list-style-type: none"> Using the Passive Key Detection Test, Identify the inoperative keyless vehicle interior antenna. If the front interior keyless vehicle antenna is inoperative, GO to Pinpoint Test X. If the center interior keyless vehicle antenna is inoperative, GO to Pinpoint Test Y.
B1076	Interior loadspace keyless vehicle antenna circuit, open circuit	<ul style="list-style-type: none"> Interior loadspace keyless vehicle antenna wiring harness Interior loadspace keyless vehicle antenna keyless vehicle module 	GO to Pinpoint Test Z.
B1091	Passive vehicle key programming error	Less than minimum number of passive vehicle keys known to the keyless vehicle module	Using WDS, Remote Keyless Entry, Clear Keys menu, CLEAR all programmed passive keys. Using the Add Keys menu, PROGRAM the minimum required number of passive keys to the keyless vehicle module. TEST the system for normal operation.

Diagnostic Trouble Code (DTC) Index - CJB

DTC	Description	Possible Source	Action
B1311 - Vehicles with keyless vehicle system only.	Unlock switch circuit open circuit	<ul style="list-style-type: none"> Unlock switch wiring harness Unlock switch 	GO to Pinpoint Test AE.

DIAGNOSIS AND TESTING

DTC	Description	Possible Source	Action
B1320 - All vehicles.	Drivers side front door ajar switch circuit open circuit	<ul style="list-style-type: none"> Drivers side front door latch wiring harness Drivers side front door latch 	GO to Pinpoint Test AF.
B1331 - All vehicles.	Liftgate/luggage compartment lid latch ajar switch circuit short to ground	<ul style="list-style-type: none"> Liftgate/luggage compartment lid latch ajar switch wiring harness Liftgate/luggage compartment lid latch ajar switch 	GO to Pinpoint Test AG.
B2090 - Vehicles without keyless vehicle system.	<ul style="list-style-type: none"> RF receiver data circuit, short circuit RF receiver data circuit, short to battery positive 	<ul style="list-style-type: none"> RF receiver wiring harness RF receiver CJB 	GO to Pinpoint Test AA.
B2091 - Vehicles without keyless vehicle system.	<ul style="list-style-type: none"> RF receiver data circuit, open circuit No communication between RF receiver and CJB 	<ul style="list-style-type: none"> RF receiver wiring harness RF receiver CJB 	GO to Pinpoint Test AB.
B2094 - Vehicles without keyless vehicle system.	RKE transmitter low battery	RKE transmitter battery	INSTALL a new RKE transmitter battery. Refer to the owners handbook. TEST the system for normal operation
B2425 - Vehicles without keyless vehicle system.	RKE transmitter out of synchronization	RKE transmitter	CHECK that all known RKE keys function correctly. CLEAR the DTC. TEST the system for normal operation.
B2894 - All vehicles.	<ul style="list-style-type: none"> Liftgate/luggage compartment lid release output circuit, short to ground Liftgate/luggage compartment lid release output circuit, open circuit 	<ul style="list-style-type: none"> Liftgate/luggage compartment lid latch wiring harness liftgate/luggage compartment lid latch motor CJB 	GO to Pinpoint Test AC.

DIAGNOSIS AND TESTING

DTC	Description	Possible Source	Action
B2970 - All vehicles.	liftgate/luggage compartment lid exterior release switch circuit, short to ground	<ul style="list-style-type: none"> liftgate/luggage compartment lid exterior release switch wiring harness liftgate/luggage compartment lid exterior release switch CJB 	GO to Pinpoint Test AD.
U1900	CAN bus communication error	<ul style="list-style-type: none"> Instrument cluster CJB Keyless vehicle module CAN bus circuit 	<p>If this code is related to the keyless vehicle system, the RKE functions and central door locking functions will not operate. To continue the diagnostic,</p> <p>REFER to: Communications Network - 3-Door (418-00 Module Communications Network, Diagnosis and Testing).</p>

Keyless Vehicle Service Test Procedure(s)

To carry out a passive key detection test or keyless vehicle actuator test, the keyless vehicle module diagnosis entry procedure must be carried out first.

Keyless Vehicle Module Passive key Diagnosis Entry

1. **NOTE: Test mode entry possible on drivers door only (No entry if drivers door lock button is defect.**

Insert the emergency mechanical key into the ignition lock cylinder.

- Rotate the emergency key to position II.
- Pull, and hold the driver-side front exterior door handle.
- Press the driver-side front exterior door handle lock button 10 times.
- Rotate the emergency mechanical key to position 0.
- Remove the emergency mechanical key from the ignition lock cylinder.

The keyless vehicle module is now in passive key diagnosis mode. The module will remain in diagnosis mode for 30 seconds or until the ignition lock cylinder is rotated to position II.

Passive Key Detection Test

After each activation of a keyless vehicle system function, the 30 second time out will be restarted.

- Press the driver-side front exterior door handle lock button.
- Position the passive vehicle key in the defined reception area of the driver-side front exterior door handle keyless vehicle antenna. For every successful detection of the passive vehicle key, the vehicle indicator lights will flash once.
- Press the passenger-side front exterior door handle lock button.
- Position the passive vehicle key in the defined reception area of the passenger side front exterior door handle keyless vehicle antenna. For every successful detection of the passive vehicle key, the vehicle indicator lights will flash once.
- Press the liftgate or luggage compartment lid lock button.

DIAGNOSIS AND TESTING

6. Position the passive vehicle key in the defined reception area of the rear bumper keyless vehicle antenna. For every successful detection of the passive vehicle key, the vehicle indicator lights will flash once.
7. Push in the ignition switch turning knob.
8. Position the passive vehicle key in the front of the passenger compartment. For every successful detection of the passive vehicle key by the front interior keyless vehicle antenna, the vehicle indicator lights will flash once.
9. Position the passive vehicle key towards the center rear of the passenger compartment. For every successful detection of the passive vehicle key by the center interior keyless vehicle antenna, the vehicle indicator lights will flash once.
10. Position the passive vehicle key in the luggage compartment area of the vehicle. For every successful detection of the passive vehicle key by the luggage compartment keyless vehicle antenna, the vehicle indicator lights will flash once.

The interior keyless vehicle antenna can also be activated for testing by pressing the clutch pedal once, if equipped.

If the vehicle indicator lights do not flash, a fault is indicated with the antenna or antenna circuit(s).

**Keyless Vehicle Module Actuator test
Diagnosis Entry**

NOTE: To carry out a keyless vehicle actuator test, the keyless vehicle module diagnosis entry procedure must be carried out first.

NOTE: Test mode entry possible on drivers door only (No entry if drivers door lock button is defect).

1. Insert the emergency mechanical key into the ignition lock cylinder.
2. Rotate the emergency key to position II and back to position I.
3. Pull, and hold the driver-side front exterior door handle.
4. Press the driver-side front exterior door handle lock button 10 times.
5. Rotate the emergency mechanical key to position 0.
6. Remove the emergency mechanical key from the ignition lock cylinder.

The keyless vehicle module is now in Actuator test diagnosis mode. The module will remain in diagnosis mode for 30 seconds.

Keyless Vehicle Actuator Test

After each activation of a keyless vehicle system function, the 30 second time out will be restarted.

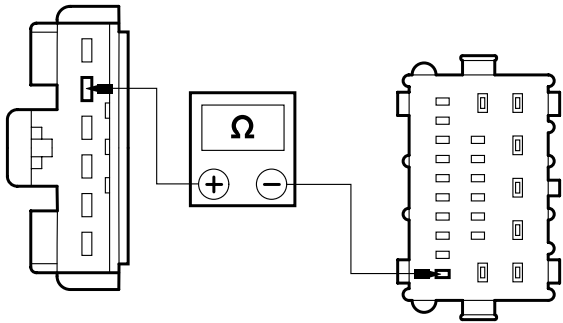
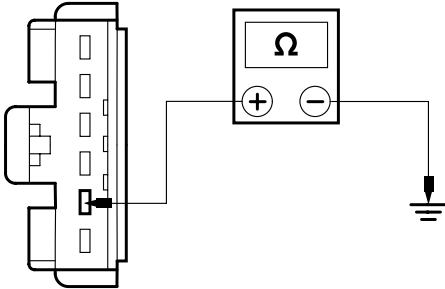
1. Press the driver-side front exterior door handle lock button. The vehicle indicator lights will flash once.
2. Press the passenger-side front exterior door handle lock button. The vehicle indicator lights will flash once.
3. Pull the driver-side front exterior door handle. The vehicle indicator lights will flash once.
4. Pull the passenger-side front exterior door handle. The vehicle indicator lights will flash once.
5. Pull the passenger-side rear exterior door handle. The vehicle indicator lights will flash once.
6. Pull the driver-side rear exterior door handle. The vehicle indicator lights will flash once.
7. Press the liftgate or luggage compartment lid exterior release switch. The vehicle indicator lights will flash once.
8. Press the liftgate or luggage compartment lid lock switch. The vehicle indicator lights will flash once.
9. Press the clutch pedal (if equipped). The vehicle indicator lights will flash once.
10. Press the brake pedal. The vehicle indicator lights will flash once.
11. Push in the ignition switch turning knob. The vehicle indicator lights will flash once.
12. Pull out the ignition switch turning knob. The vehicle indicator lights will flash once.
13. Insert the emergency key into the ignition lock cylinder. The vehicle indicator lights will flash once.
14. Press the interior unlock switch. The vehicle indicator lights will flash once.

If the vehicle indicator lights do not flash, a fault is indicated with the the component or circuit(s) of the operated component.

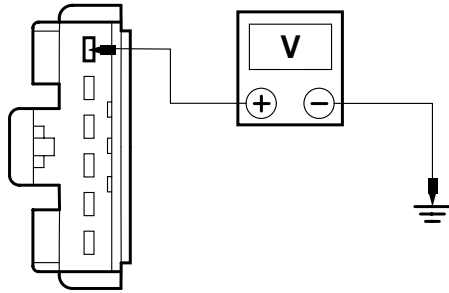
DIAGNOSIS AND TESTING

Pinpoint Test (Vehicles with Keyless Vehicle System)

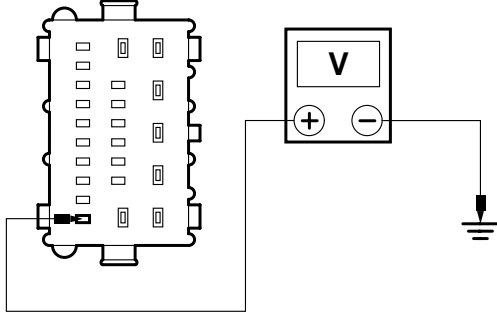
PINPOINT TEST A : DTC: B1096

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK CIRCUIT 8-AB33 (WH/BK) FOR OPEN CIRCUIT	
 <p>E57183</p>	<ol style="list-style-type: none"> 1 Disconnect Steering Column Lock Control Unit C233. 2 Disconnect Keyless Vehicle Module C216. 3 Measure the resistance between the steering column lock control unit C233 pin 5, circuit 8-AB33 (WH/BK), harness side and the keyless vehicle module C216 pin 14, circuit 8-AB33 (WH/BK), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes GO to A2. → No REPAIR circuit 8-AB33 (WH/BK). TEST the system for normal operation.
A2: CHECK CIRCUIT 91-AB33 (BK/RD) FOR OPEN CIRCUIT	
 <p>E57184</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the steering column lock control unit C233 pin 2, circuit 91-AB33 (BK/RD), harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes GO to A3. → No REPAIR circuit 91-AB33 (BK/RD). TEST the system for normal operation.
A3: CHECK CIRCUIT 30-AB33 (RD) FOR VOLTAGE	
	<ol style="list-style-type: none"> 1 Insert the vehicle emergency mechanical key into the ignition switch turning knob. 2 Ignition switch in position II.

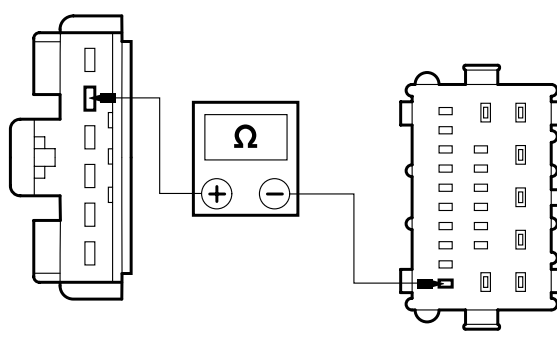
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57185</p>	<p>3 Measure the voltage between the steering column lock control unit C233 pin 6, circuit 30-AB33 (RD), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <p>→ Yes INSTALL a new steering column lock control unit. TEST the system for normal operation. If the concern is still evident, INSTALL a new keyless vehicle module.</p> <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR circuit 30-AB33 (RD). TEST the system for normal operation.</p>

PINPOINT TEST B : DTC: B1092

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>B1: CHECK CIRCUIT 8-AB33 (WH/BK) FOR SHORT TO BATTERY VOLTAGE</p>	
 <p>E57186</p>	<p>1 Disconnect Keyless Vehicle Module C216.</p> <p>2 Insert the vehicle emergency mechanical key into the ignition switch turning knob.</p> <p>3 Ignition switch in position II.</p> <p>4 Measure the voltage between the keyless vehicle module C216 pin 14, circuit 8-AB33 (WH/BK), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <p>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module.</p> <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to B2.</p>
<p>B2: CHECK THE STEERING COLUMN LOCK CONTROL UNIT FOR SHORT TO BATTERY VOLTAGE</p>	
	<p>1 Ignition switch in position 0.</p>

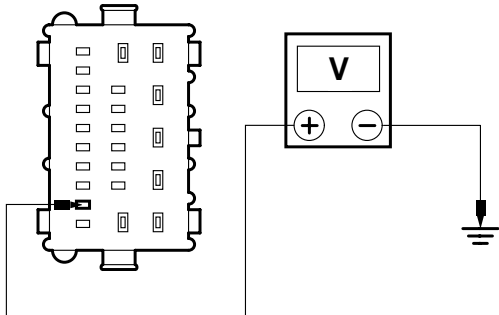
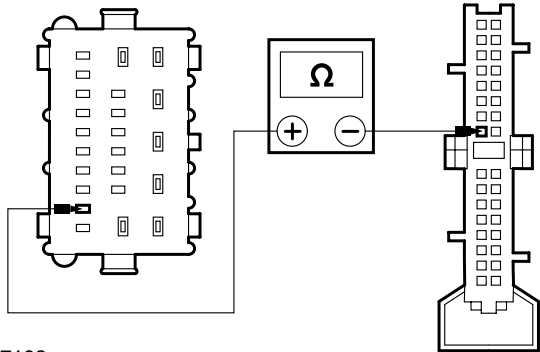
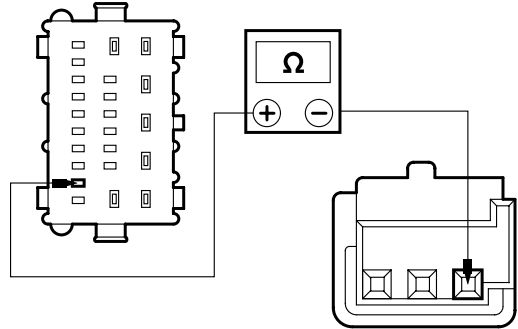
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect Steering Column Lock Control Unit C233.</p> <p>3 Ignition switch in position II.</p>
 <p>E57183</p>	<p>4 Measure the resistance between the keyless vehicle module C216 pin 14, circuit 8-AB33 (WH/BK), and Steering Column Lock Control Unit C233 pin 5.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes INSTALL a new steering column lock control unit. TEST the system for normal operation. → No REPAIR circuit 8-AB33 (WH/BK). TEST the system for normal operation.

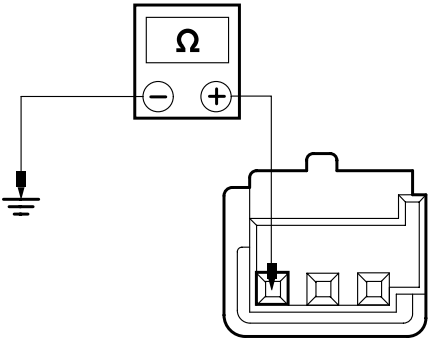
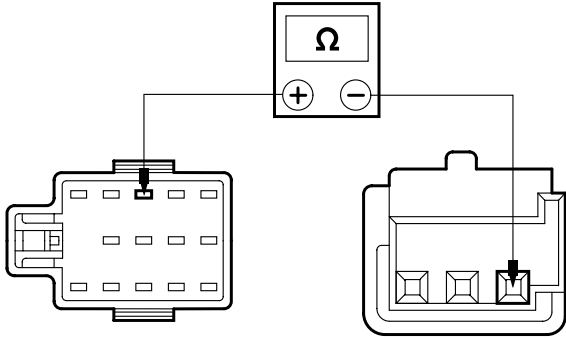
PINPOINT TEST C : DTC: B2090

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? → Yes GO to C7. → No GO to C8.
C2: CHECK CIRCUIT 8-AB22 (WH/GN) FOR SHORT TO GROUND	
	<p>1 Disconnect Keyless Vehicle Module C216.</p> <p>2 Insert the vehicle emergency mechanical key into the ignition switch turning knob.</p> <p>3 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57188</p>	<p>4 Measure the voltage between the keyless vehicle module C216 pin 15, circuit 8-AB22 (WH/GN), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <p>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module.</p> <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to C3.</p>
C3: CHECK CIRCUIT 8-AB22 (WH/GN) FOR SHORT TO GROUND	
 <p>E57192</p>	<p>1 Disconnect CJB C99.</p> <p>2 Measure the resistance between the keyless vehicle module C216 pin 15, circuit 8-AB22 (WH/GN), harness side and CJB C99 pin 25, circuit 8-AB22 (WH/GN), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes GO to C4.</p> <p>→ No REPAIR circuit 8-AB22 (WH/GN). TEST the system for normal operation.</p>
C4: CHECK THE RF RECEIVER DATA LINE TO KEYLESS VEHICLE MODULE	
 <p>E74068</p>	<p>1 Disconnect RF Receiver C390.</p> <p>2 Measure the resistance between the RF Receiver C390 pin 1, circuit 8-AA57 (WH), and keyless vehicle module C216 pin 15, circuit 8-AB22 (WH/GN).</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes GO to C5.</p> <p>→ No GO to C6.</p>

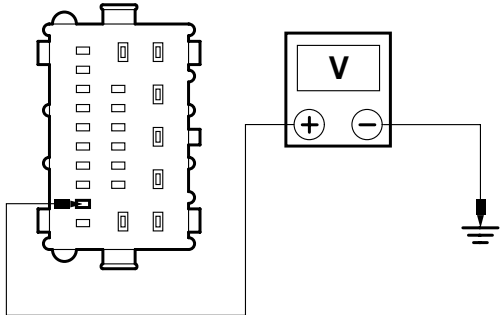
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C5: CHECK CIRCUIT 8-AA57 (WH) FOR POWER	
 <p>E74069</p>	<ol style="list-style-type: none"> <li>1 Disconnect RF Receiver C390. <li>2 Measure the voltage between the RF Receiver C390 pin 3, circuit 29-AA57 (OG/YE), harness side and ground. <ul style="list-style-type: none"> <li>• Is the voltage greater than 10 volts? <ul style="list-style-type: none"> <li>→ Yes INSTALL a new RF receiver. TEST the system for normal operation. <li>→ No GO to C8.
C6: CHECK CIRCUIT 8-AA57 FOR RESISTANCE	
 <p>E57473</p>	<ol style="list-style-type: none"> <li>1 Disconnect CJB C98. <li>2 Measure the resistance between the CJB C98 pin 6, circuit 8-AA57 (WH), and RF Receiver C390 pin 1, circuit 8-AA57 (WH). <ul style="list-style-type: none"> <li>• Is the resistance less than 5 ohms? <ul style="list-style-type: none"> <li>→ Yes INSTALL a new CJB. REFER to: Generic Electronic Module (GEM) (419-10 Multifunction Electronic Modules, Removal and Installation). TEST the system for normal operation. <li>→ No REPAIR circuit 8-AA57 (WH). TEST the system for normal operation.
C7: CHECK CJB FUSE F102(10A)	
	<ol style="list-style-type: none"> <li>1 Check Fuse F102(10A) at CJB. <ul style="list-style-type: none"> <li>• Is the fuse OK? <ul style="list-style-type: none"> <li>→ Yes INSTALL a new CJB. REFER to: Generic Electronic Module (GEM) (419-10 Multifunction Electronic Modules, Removal and Installation). TEST the system for normal operation. <li>→ No INSTALL a new Fuse. TEST the System for normal operation.

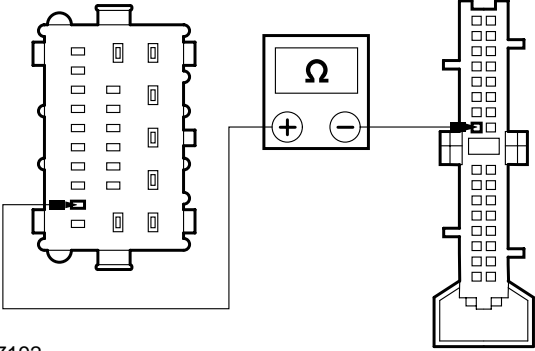
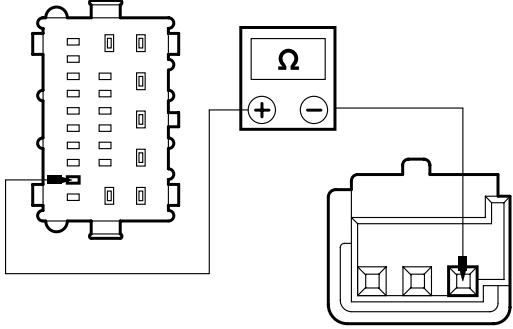
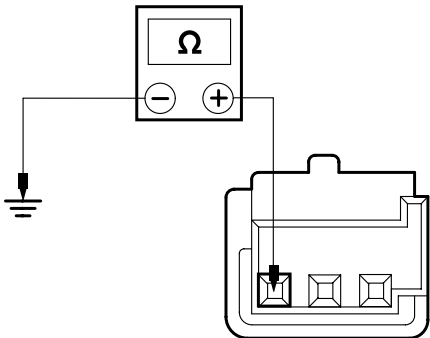
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C8: CHECK CJB FUSE F43 (10A)	
	<ol style="list-style-type: none"> 1 Check Fuse F43 (10A) at CJB. <ul style="list-style-type: none"> • Is the Fuse OK? → Yes INSTALL a new CJB. REFER to: Generic Electronic Module (GEM) (419-10 Multifunction Electronic Modules, Removal and Installation). TEST the system for normal operation. → No INSTALL a new Fuse. TEST the System for normal operation.

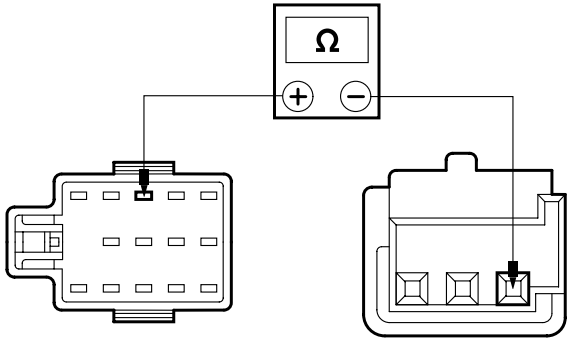
PINPOINT TEST D : DTC: B2091

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: CHECK CIRCUIT 8-AB22 (WH/GN) FOR OPEN CIRCUIT	
 <p>E57188</p>	<ol style="list-style-type: none"> 1 Disconnect Keyless Vehicle Module C216. 2 Ignition switch in position II. 3 Measure the voltage between the keyless vehicle module C216 pin 15, circuit 8-AB22 (WH/GN), harness side and ground. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? → Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present. REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation. → No GO to D2.
D2: CHECK CIRCUIT 8-AB22 (WH/GN) FOR SHORT TO GROUND	
	<ol style="list-style-type: none"> 1 Disconnect CJB C99.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57192</p>	<p>2 Measure the resistance between the keyless vehicle module C216 pin 15, circuit 8-AB22 (WH/GN), harness side and CJB C99 pin 25, circuit 8-AB22 (WH/GN), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? → Yes GO to D3. → No REPAIR circuit 8-AB22 (WH/GN). TEST the system for normal operation.
<p>D3: CHECK CIRCUIT 8-AA57 (WH) FOR OPEN CIRCUIT</p>	
 <p>E74068</p>	<p>1 Disconnect RF Receiver C390.</p> <p>2 Measure the resistance between the RF Receiver C390 pin 1, circuit 8-AA57 (WH), and keyless vehicle module C216 pin 15, circuit 8-AB22 (WH/GN).</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? → Yes GO to D4. → No GO to D5.
<p>D4: CHECK RF RECEIVER POWER SUPPLY 8-AA57</p>	
 <p>E74069</p>	<p>1 Measure the voltage between the RF Receiver C390 pin 3, circuit 29-AA57 (OG/YE), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? → Yes INSTALL a new RF receiver. TEST the system for normal operation. → No GO to D6.
<p>D5: CHECK CIRCUIT 8-AA57 FOR RESISTANCE</p>	
	<p>1 Disconnect CJB C98..</p>

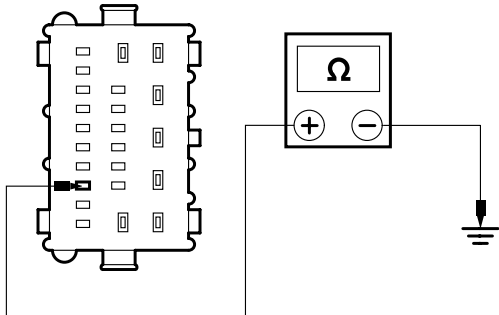
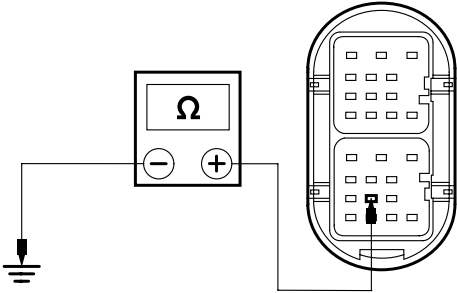
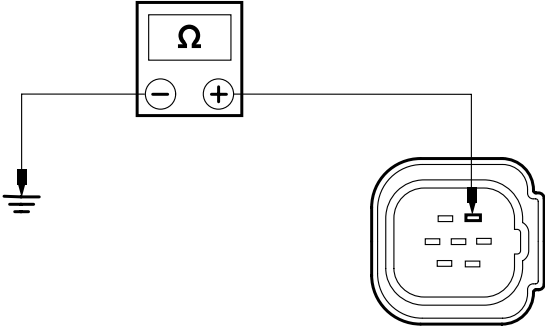
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57473</p>	<p>2 Measure the resistance between the CJB C98 pin 6, circuit 8-AA57 (WH), and RF Receiver C390 pin 1, circuit 8-AA57 (WH).</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new CJB. REFER to: Generic Electronic Module (GEM) (419-10 Multifunction Electronic Modules, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR circuit 8-AA57 (WH). TEST the system for normal operation.</p>
D6: CHECK CJB FUSEF43 (10A)	
	<p>1 Check Fuse F43 (10A) at CJB</p> <ul style="list-style-type: none"> Is the Fuse OK? <p>→ Yes INSTALL a new CJB. REFER to: Generic Electronic Module (GEM) (419-10 Multifunction Electronic Modules, Removal and Installation). TEST the system for normal operation.</p> <p>→ No INSTALL a new Fuse. TEST the System for normal operation.</p>

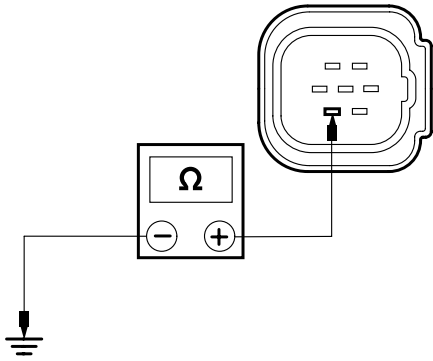
PINPOINT TEST E : DTC: B1087

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: CHECK FUNCTIONALITY OF SUB-SYSTEM	
	<p>1 Disconnect Keyless Vehicle Module C218.</p>

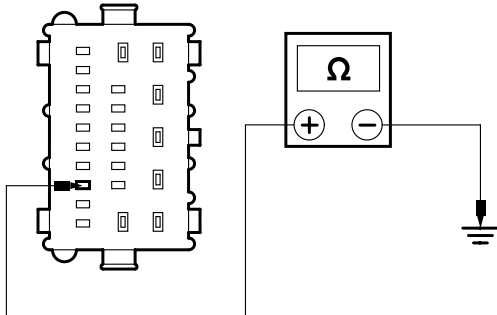
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57475</p>	<p>2 Measure the resistance between the keyless vehicle module C218 pin 16, circuit 91S-AB29 (BK/GN), harness side and ground during the passengers rear door handle is pulled.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module.</p> <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to E2.</p>
E2: CHECK THE WIRING TO RR-UNLOCK SWITCH	
 <p>E74070</p>	<p>1 Disconnect Passenger door connector C55 .</p> <p>2 Measure the resistance between C45 pin 21, circuit 91S-AB18 (BK/GN), component side and ground, during the passengers rear door handle is pulled.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 91S-AB29 (BK/GN). TEST the system for normal operation.</p> <p>→ No GO to E3.</p>
E3: CHECK DOOR WIRING TO RR UNLOCK PULL SWITCH	
 <p>E74072</p>	<p>1 Disconnect Right Hand Rear Door Latch C208.</p> <p>2 Measure the resistance between the right-hand rear exterior door handle switch C208 pin 3, circuit 91S-AB18 (BK/GN), component side and ground during the right rear door handle is pulled.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 91S-AB18 (BK/GN). TEST the system for normal operation.</p> <p>→ No GO to E4.</p>

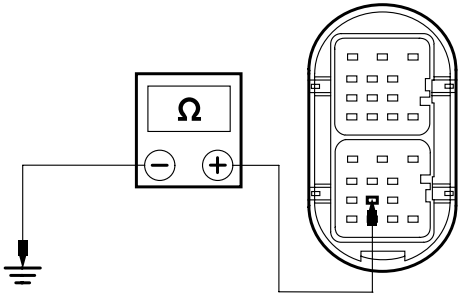
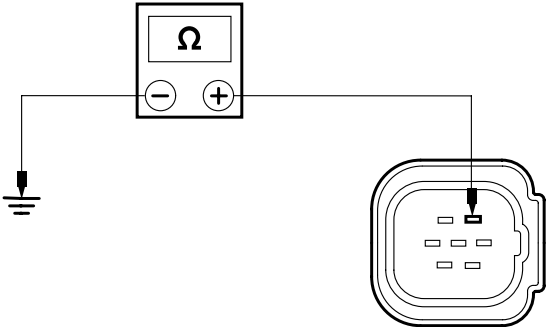
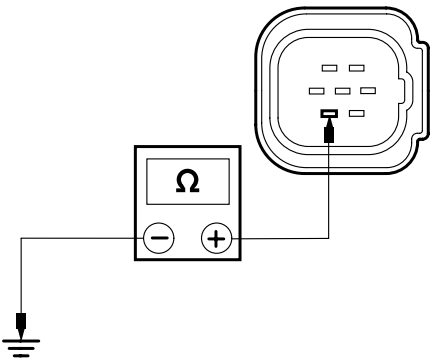
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E4: CHECK DOOR WIRING TO GROUND	
 <p>E74071</p>	<ol style="list-style-type: none"> <li>1 Measure the resistance between the right-hand rear exterior door handle switch C208 pin 5, circuit 91S-AB18 (BK/GN), component side and ground. <ul style="list-style-type: none"> <li>• Is the resistance less than 5 ohms? <li>→ Yes INSTALL a new right-hand rear exterior door handle. <li>REFER to: Exterior Rear Door Handle (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation. <li>→ No REPAIR circuit 91-AB18 (BK/GN). TEST the system for normal operation.

PINPOINT TEST F : DTC: B1088

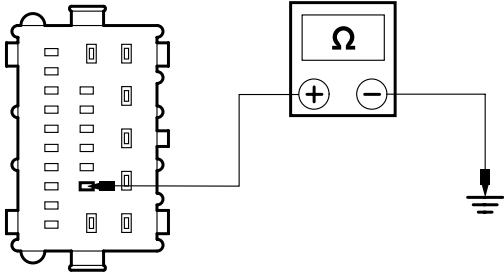
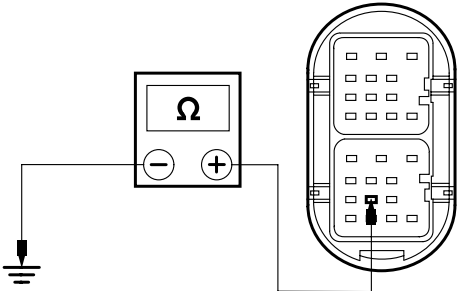
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F1: CHECK FUNCTIONALITY OF SUB-SYSTEM	
 <p>E57475</p>	<ol style="list-style-type: none"> <li>1 Disconnect Keyless Vehicle Module C215. <li>2 Measure the resistance between the keyless vehicle module C215 pin 16, circuit 91S-AB18 (BK/GN), harness side and ground during the passengers rear door handle is pulled. <ul style="list-style-type: none"> <li>• Is the resistance less than 5 ohms? <li>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module. <li>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation. <li>→ No GO to F2.
F2: CHECK THE WIRING TO RR-UNLOCK SWITCH	
	<ol style="list-style-type: none"> <li>1 Disconnect Door connector C53 for LHD vehicles or C55 for RHD vehicles..

DIAGNOSIS AND TESTING

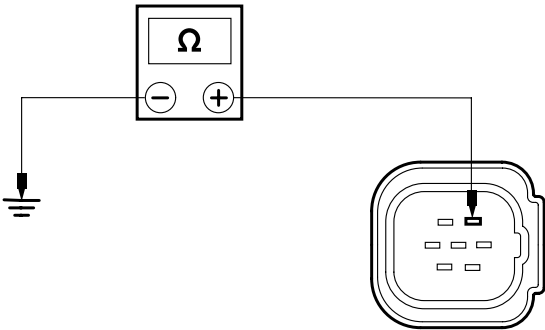
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E74070</p>	<p>2 Measure the resistance between C45 pin 21, circuit 91S-AB18 (BK/GN), component side and ground, during the passengers rear door handle is pulled.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 91S-AB18 (BK/GN). TEST the system for normal operation.</p> <p>→ No GO to F3.</p>
F3: CHECK DOOR WIRING TO RR UNLOCK PULL SWITCH	
 <p>E74072</p>	<p>1 Disconnect Left-Hand Rear Door Latch C208.</p> <p>2 Measure the resistance between the left-hand rear exterior door handle switch C208 pin 3, circuit 91S-AB18 (BK/GN), component side and ground during the right rear door handle is pulled.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 91S-AB18 (BK/GN). TEST the system for normal operation.</p> <p>→ No GO to F4.</p>
F4: CHECK DOOR WIRING TO GROUND	
 <p>E74071</p>	<p>1 Disconnect Left-Hand Rear Exterior Door Handle Switch C208.</p> <p>2 Measure the resistance between the left hand rear exterior door handle switch C208 pin 5, circuit 91-AB18 (BK/GN), component side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new left-hand rear exterior door handle. REFER to: Exterior Rear Door Handle (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR circuit 91-AB18 (BK/GN). TEST the system for normal operation.</p>

DIAGNOSIS AND TESTING

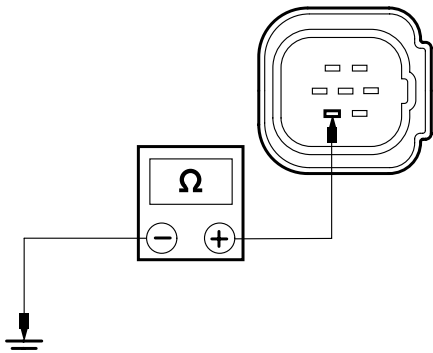
PINPOINT TEST G : DTC: B1089

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
G1: CHECK FUNCTIONALITY OF SUB-SYSTEM	
 <p>E57481</p>	<p>1 Disconnect Keyless Vehicle Module C218.</p> <p>2 Measure the resistance between the keyless vehicle module C218 pin 8, circuit 91S-AB24 (BK/GN), harness side and ground during the passengers front door handle is pulled.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module.</p> <p>REFER to: Exterior Rear Door Handle (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to G2.</p>
G2: CHECK THE WIRING TO RR-UNLOCK SWITCH	
 <p>E74070</p>	<p>1 Disconnect Door connector C51 for LHD vehicles or C47 for RHD vehicles..</p> <p>2 Measure the resistance between C43 pin 21, circuit 91S-AB24 (BK/GN), component side and ground, during the passengers front door handle is pulled.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 91S-AB24 (BK/GN). TEST the system for normal operation.</p> <p>→ No GO to G3.</p>
G3: CHECK DOOR WIRING TO RR UNLOCK PULL SWITCH	
	<p>1 Disconnect Right-Hand Front Door Latch C204.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E74072</p>	<p>2 Measure the resistance between the right-hand front exterior door handle switch C204 pin 3, circuit 91S-AB24(BK/GN), component side and ground during the right front door handle is pulled.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 91S-AB24 (BK/GN). TEST the system for normal operation.</p> <p>→ No GO to G4.</p>

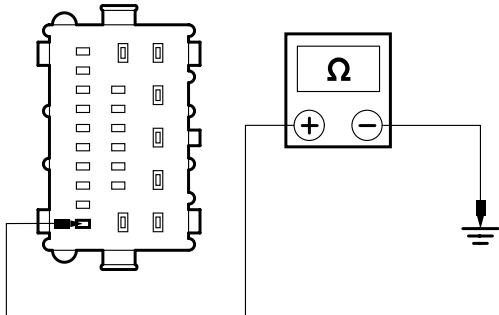
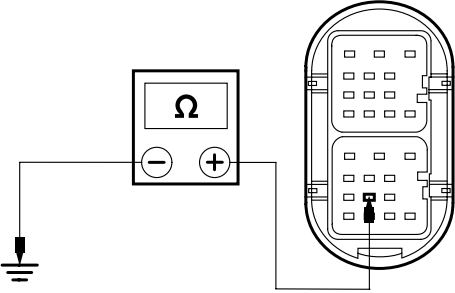
G4: CHECK DOOR WIRING TO GROUND

	<p>1 Disconnect Right Hand Front Door Latch C204.</p>
 <p>E74071</p>	<p>2 Measure the resistance between the right-hand front exterior door handle switch C204 pin 5, circuit 91-AB24 (BK/GN), component side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new right-hand front exterior door handle.</p> <p>REFER to: Exterior Front Door Handle - Vehicles With: Keyless Vehicle System (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR circuit 91-AB24 (BK/GN). TEST the system for normal operation.</p>

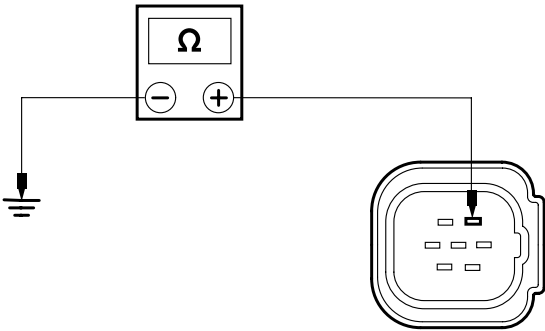
PINPOINT TEST H : DTC: B1090

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>H1: CHECK CIRCUIT 91S-AB14 (BK/RD) FOR SHORT CIRCUIT TO GROUND</p>	
	<p>1 Disconnect Keyless Vehicle Module C215.</p>

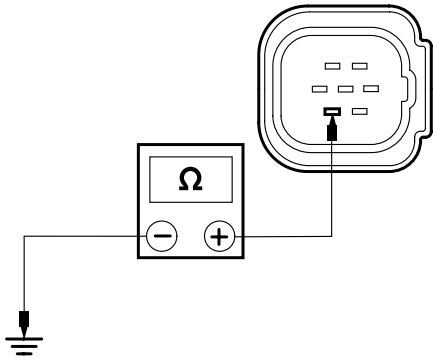
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57508</p>	<p>2 Measure the resistance between the keyless vehicle module C215 pin 14, circuit 91S-AB13 (BK/GN), harness side and ground during the driver front door handle is pulled.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new right-hand front exterior door handle.</p> <p>REFER to: Exterior Front Door Handle - Vehicles With: Keyless Vehicle System (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to H2.</p>
<p>H2: CHECK THE WIRING TO RR-UNLOCK SWITCH</p>	
 <p>E74070</p>	<p>1 Disconnect Door connector C47 for LHD vehicles or C51 for RHD vehicles..</p> <p>2 Measure the resistance between C41 pin 21, circuit 91S-AB13 (BK/GN), component side and ground, during the driver front door handle is pulled.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module.</p> <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR circuit 91S-AB13 (BK/GN). TEST the system for normal operation. GO to H3.</p>
<p>H3: CHECK DOOR WIRING TO RR UNLOCK PULL SWITCH</p>	
	<p>1 Disconnect Left-Hand Front Door Latch C212.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E74072</p>	<p>2 Measure the resistance between the left-hand front exterior door handle switch C212 pin 3, circuit 91S-AB13 (BK/GN), component side and ground during the left front door handle is pulled.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 91S-AB13 (BK/GN). TEST the system for normal operation.</p> <p>→ No GO to H4.</p>

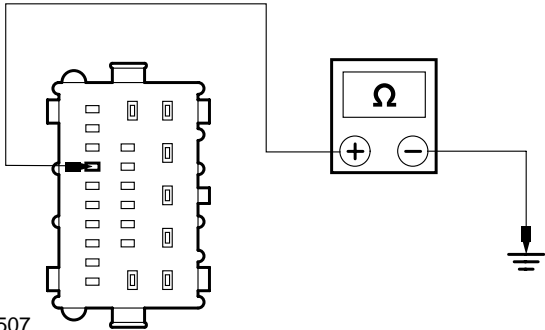
H4: CHECK DOOR WIRING TO GROUND

	<p>1 Disconnect Left-Hand Front Exterior Door Handle Switch C212.</p>
 <p>E74071</p>	<p>2 Measure the resistance between the left hand front exterior door handle switch C212 pin 5, circuit 91-AB13 (BK/GN), component side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new left-hand front exterior door handle. REFER to: Exterior Front Door Handle - Vehicles With: Keyless Vehicle System (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR circuit 91-AB13 (BK/GN). TEST the system for normal operation.</p>

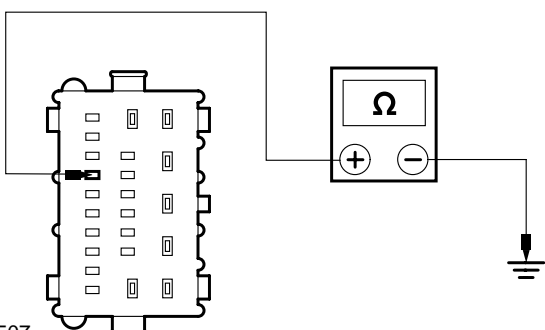
PINPOINT TEST I : DTC: B1078

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>I1: CHECK CIRCUIT 1/2-AB16 (WH/RD) FOR SHORT TO GROUND</p>	
	<p>1 Disconnect keyless Vehicle Module C218.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57507</p>	<p>2 Measure the resistance between the keyless vehicle module C218 pin 20, circuit 1-AB16 (WH/RD), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 1-AB16 (BK/RD) or 2-AB16 (GY/RD). TEST the system for normal operation.</p> <p>→ No GO to I2.</p>

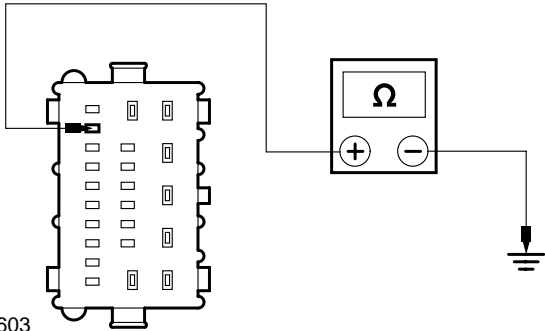
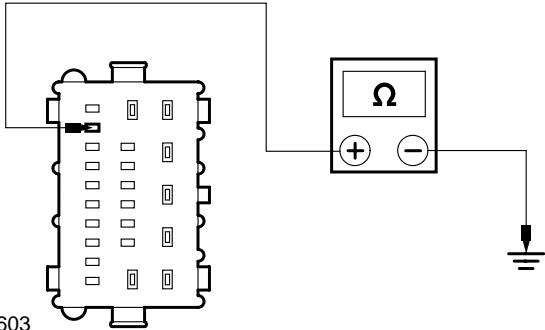
I2: CHECK CIRCUIT 2-AB16 (GY/RD) FOR SHORT TO BATTERY POSITIVE

 <p>E57507</p>	<p>1 Measure the resistance between the keyless vehicle module C218 pin 20, circuit 1-AB16 (WH/RD), harness side and battery positive.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 1-AB16 (BK/RD) or 2-AB16 (GY/RD). TEST the system for normal operation.</p> <p>→ No Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module.</p> <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p>
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PINPOINT TEST J : DTC: B1079

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>J1: CHECK CIRCUIT 1/2-AB16 (WH/RD) FOR SHORT TO GROUND</p>	
	<p>1 Disconnect Keyless Vehicle Module C218.</p>

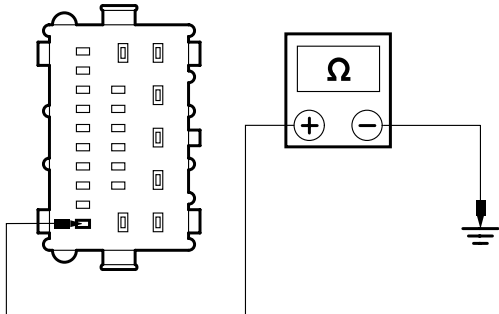
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57603</p>	<p>2 Measure the resistance between the keyless vehicle module C218 pin 22, circuit 1-AB27 (WH/RD), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 1-AB27 (BK/RD) or 2-AB27 (GY/RD). TEST the system for normal operation.</p> <p>→ No GO to J2.</p>
<p>J2: CHECK CIRCUIT 2-AB27 (GY/RD) FOR SHORT TO BATTERY POSITIVE</p>	
 <p>E57603</p>	<p>1 Measure the resistance between the keyless vehicle module C218 pin 22, circuit 1-AB16 (WH/RD), harness side and battery positive.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 1-AB27 (BK/RD) or 2-AB27 (GY/RD). TEST the system for normal operation.</p> <p>→ No Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module.</p> <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p>

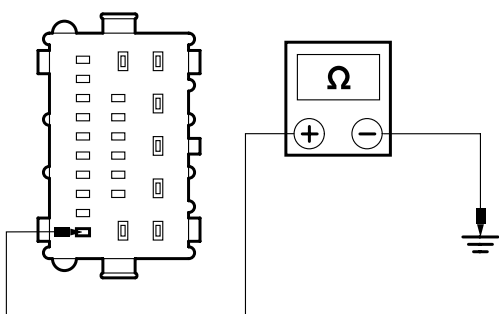
PINPOINT TEST K : DTC: B1080

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>K1: CHECK CIRCUIT 1/2-AB10 (WH) FOR SHORT TO GROUND</p>	
	<p>1 Disconnect Keyless Vehicle Module C219.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57508</p>	<p>2 Measure the resistance between the keyless vehicle module C219 pin 14, circuit 1-AB10 (WH), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 1-AB10 (WH) or 2-AB10 (GY). TEST the system for normal operation.</p> <p>→ No GO to K2.</p>

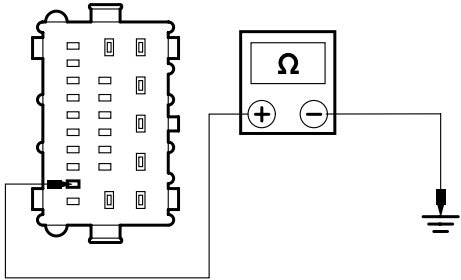
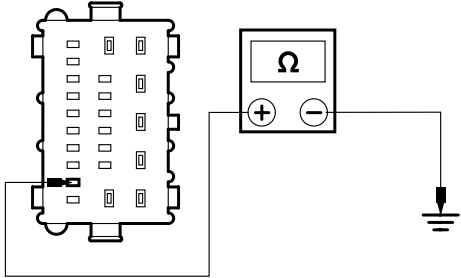
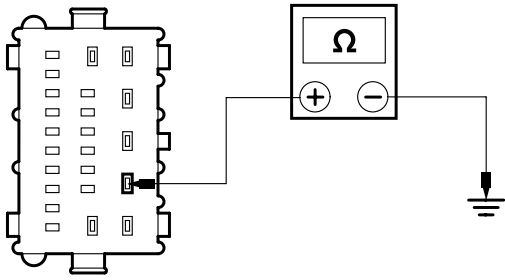
K2: CHECK CIRCUIT 1/2-AB16 (GY/RD) FOR SHORT TO BATTERY POSITIVE

 <p>E57508</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 14, circuit 1-AB10 (WH), harness side and battery positive.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 1-AB10 (WH) or 2-AB10 (GY). TEST the system for normal operation.</p> <p>→ No Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module.</p> <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p>
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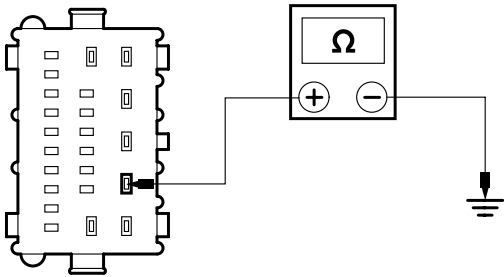
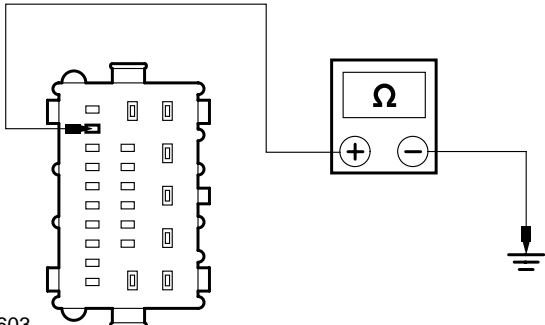
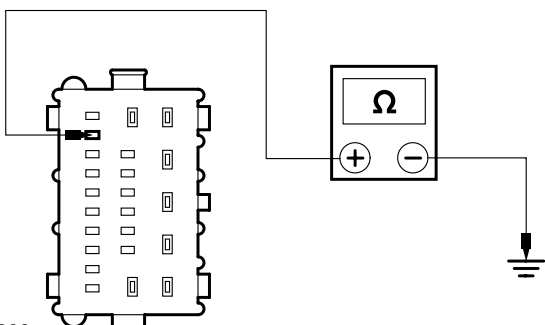
PINPOINT TEST L : DTC: B1081

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>L1: CHECK CIRCUIT 1/2-AB35 (WH/BU) FOR SHORT TO GROUND</p>	
	<p>1 Disconnect Keyless Vehicle Module C219.</p>

DIAGNOSIS AND TESTING

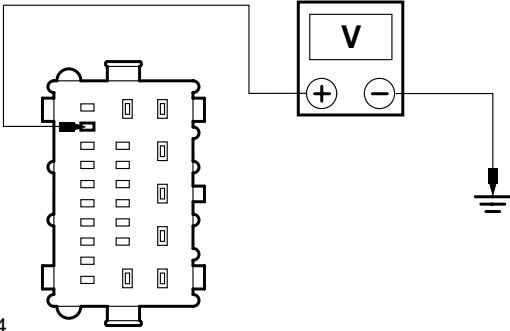
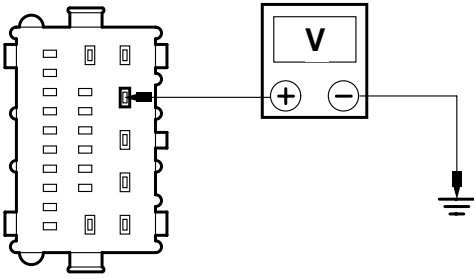
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E74073</p>	<p>2 Measure the resistance between the keyless vehicle module C219 pin 18, circuit 1-AB35 (WH/BU), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? → Yes REPAIR circuit 1-AB35 (WH/BU) or 2-AB35 (GY/VT). TEST the system for normal operation. → No GO to L2.
<p>L2: CHECK CIRCUIT 1/2-AB35 (GY/RD) FOR SHORT TO BATTERY POSITIVE</p>	
 <p>E74073</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 18, circuit 1-AB35 (WH/BU), harness side and battery positive.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? → Yes REPAIR circuit 1-AB35 (WH/BU) or 2-AB35 (GY/VT). TEST the system for normal operation. → No GO to L3.
<p>L3: CHECK CIRCUIT 1/2-AB35 (WH/BU) FOR SHORT TO GROUND</p>	
 <p>E57502</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 2, circuit 1-AB35A (WH/BU), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? → Yes REPAIR circuit 1-AB35A (WH/BU) or 2-AB35A (GY/VT). TEST the system for normal operation. → No GO to L4.

DIAGNOSIS AND TESTING

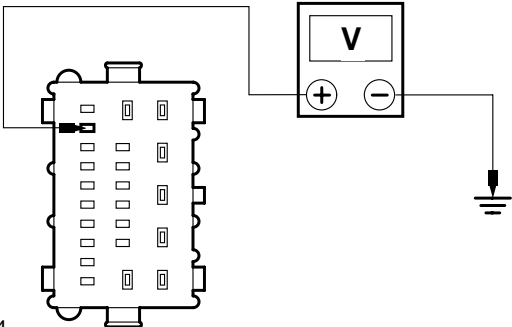
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
L4: CHECK CIRCUIT 1/2-AB35 (GY/RD) FOR SHORT TO BATTERY POSITIVE	
 <p>E57502</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 2, circuit 1-AB35A (WH/BU), harness side and battery positive.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes REPAIR circuit 1-AB35A (WH/BU) or 2-AB35A (GY/VT). TEST the system for normal operation. → No GO to L5.
L5: CHECK CIRCUIT 1/2-AB36B (GY/OG) FOR SHORT TO GROUND	
 <p>E57603</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 22, circuit 1-AB36A (GY/OG), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes REPAIR circuit 1-AB36A (GY/OG) or 2-AB36A (WH/GN). TEST the system for normal operation. → No GO to L6.
L6: CHECK CIRCUIT 1/2-AB35 (GY/RD) FOR SHORT TO BATTERY POSITIVE	
 <p>E57603</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 22, circuit 1-AB36A (WH/GN), harness side and battery positive.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes REPAIR circuit 1-AB36A (GY/OG) or 2-AB36A (WH/GN). TEST the system for normal operation. → No Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module. <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p>

DIAGNOSIS AND TESTING

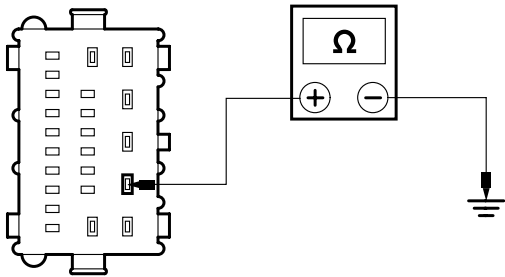
PINPOINT TEST M : DTC: 1081

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
M1: CHECK CIRCUIT 1-AB36B (WH/GN) FOR SHORT TO BATTERY POSITIVE	
	<ol style="list-style-type: none"> 1 Disconnect Keyless Vehicle Module C219. 2 Ignition switch in position II.
 <p>E57504</p>	<ol style="list-style-type: none"> 3 Measure the voltage between the keyless vehicle module C219 pin 22, circuit 1-AB36B (WH/GN), harness side and ground. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to M2. → No Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module. <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p>
M2: CHECK CIRCUIT 2-AB36B (GY/OG) FOR SHORT TO BATTERY POSITIVE	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Passenger Compartment Center Keyless Vehicle Antenna C226. 3 Ignition switch in position II.
 <p>E57503</p>	<ol style="list-style-type: none"> 4 Measure the voltage between the keyless vehicle module C219 pin 4, circuit 2-AB36B (GY/OG), harness side and ground. <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <ul style="list-style-type: none"> → Yes REPAIR circuit 2-AB36B (GY/OG). TEST the system for normal operation. → No GO to M3.

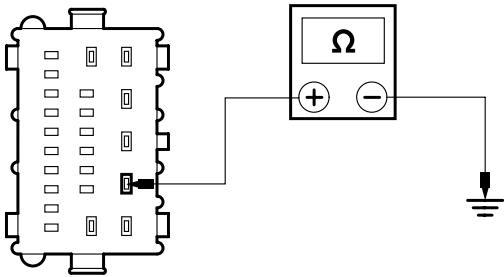
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
M3: CHECK CIRCUIT 1-AB36B (WH/BU) FOR SHORT TO BATTERY POSITIVE	
 <p>E57504</p>	<ol style="list-style-type: none"> <li>1 Measure the voltage between the keyless vehicle module C219 pin 22, circuit 1-AB36B (WH/BU), harness side and ground. <ul style="list-style-type: none"> <li>• Is the voltage greater than 0 volts? <ul style="list-style-type: none"> <li>→ Yes REPAIR circuit 1-AB36B (WH/BU). TEST the system for normal operation. <li>→ No INSTALL a new passenger compartment center keyless vehicle antenna. TEST the system for normal operation.

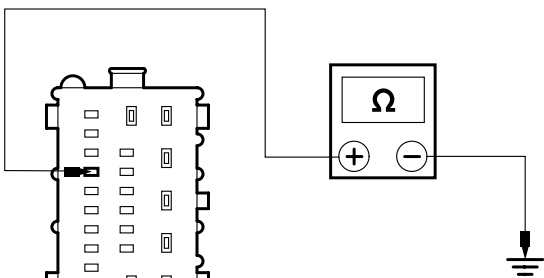
PINPOINT TEST N : DTC: B1082

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
N1: CHECK CIRCUIT 1/2-AB34 (WH/RD) FOR SHORT TO GROUND	
 <p>E57502</p>	<ol style="list-style-type: none"> <li>1 Disconnect Keyless Vehicle Module C219. <li>2 Measure the resistance between the keyless vehicle module C219 pin 2, circuit 1-AB34 (WH/RD), harness side and ground. <ul style="list-style-type: none"> <li>• Is the resistance less than 5 ohms? <ul style="list-style-type: none"> <li>→ Yes REPAIR circuit 1-AB34 (WH/RD) or 2-AB34 (GY/RD). TEST the system for normal operation. <li>→ No GO to N2.

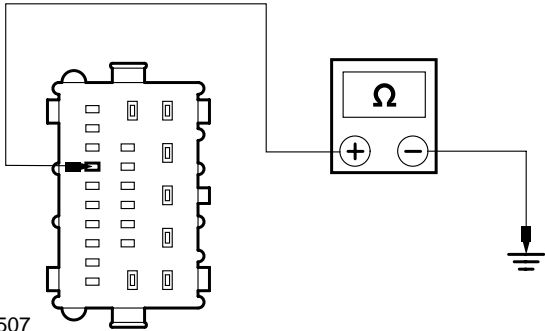
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
N2: CHECK CIRCUIT 2-AB34 (GY/RD) FOR SHORT TO BATTERY POSITIVE	
 <p>E57502</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 2, circuit 1-AB34 (WH/RD), harness side and battery positive.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 1-AB34 (WH/RD) or 2-AB34 (GY/RD). TEST the system for normal operation.</p> <p>→ No Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module.</p> <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p>

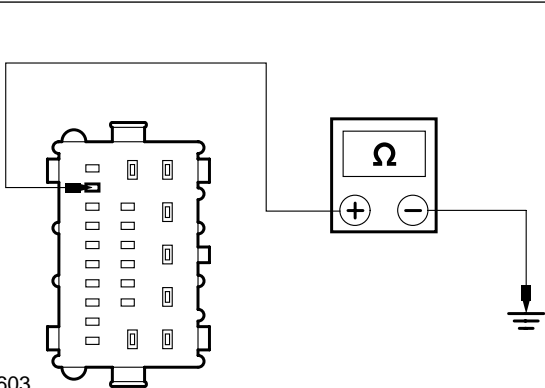
PINPOINT TEST O : DTC: B1077

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
O1: CHECK CIRCUIT 1/2-AB16 (WH/RD) FOR SHORT TO GROUND	
 <p>E57507</p>	<p>1 Disconnect Keyless Vehicle Module C218.</p> <p>2 Measure the resistance between the keyless vehicle module C218 pin 20, circuit 1-AB16 (WH/RD), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 1-AB16 (WH/RD) or 2-AB16 (GY/RD). TEST the system for normal operation.</p> <p>→ No GO to O2.</p>

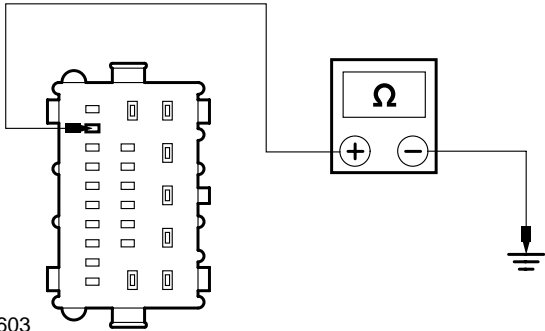
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
O2: CHECK CIRCUIT 1/2-AB16 (WH/RD) FOR SHORT TO BATTERY POSITIVE	
 <p>E57507</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the keyless vehicle module C218 pin 20, circuit 1-AB16 (WH/RD), harness side and battery positive. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes REPAIR circuit 1-AB16 (WH/RD) or 2-AB16 (GY/RD). TEST the system for normal operation. → No Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module. <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p>

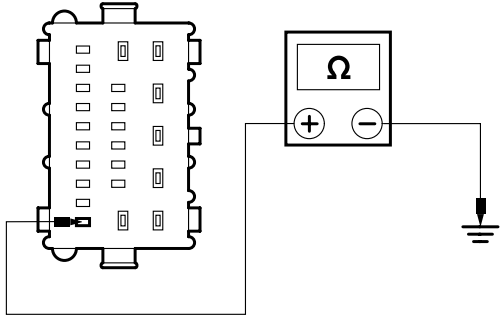
PINPOINT TEST P : DTC: B1083

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
P1: CHECK CIRCUIT 1-AB27 (WH/RD) FOR SHORT CIRCUIT TO GROUND	
 <p>E57603</p>	<ol style="list-style-type: none"> 1 Disconnect Keyless Vehicle Module C218. 2 Measure the resistance between the keyless vehicle module C218 pin 22, circuit 1-AB27 (WH/RD), harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes REPAIR circuit 1-AB27 (WH/RD) or 2-AB27 (GY/RD). TEST the system for normal operation. → No GO to P2.
P2: CHECK CIRCUIT 2-AB27 (GY/RD) FOR SHORT CIRCUIT TO GROUND	
	<ol style="list-style-type: none"> 1 Disconnect Passenger Side Exterior Front Door Handle C203.

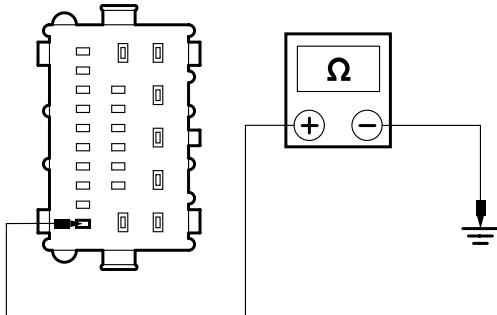
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57603</p>	<p>2 Measure the resistance between the keyless vehicle module C218 pin 22, circuit 1-AB27 (WH/RD), harness side and battery positive.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? <p>→ Yes REPAIR circuit 1-AB27 (WH/RD) or 2-AB27 (GY/RD). TEST the system for normal operation.</p> <p>→ No Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module.</p> <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p>

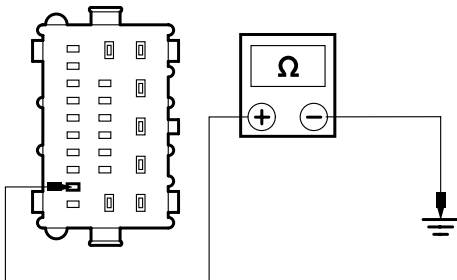
PINPOINT TEST Q : DTC: B1086

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>Q1: CHECK CIRCUIT 1/2-AB10 (WH) FOR SHORT TO GROUND</p>	
 <p>E57508</p>	<p>1 Disconnect Keyless Vehicle Module C219.</p> <p>2 Measure the resistance between the keyless vehicle module C219 pin 14, circuit 1-AB10 (WH), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 1-AB10 (WH) or 2-AB10 (GY). TEST the system for normal operation.</p> <p>→ No GO to Q2.</p>

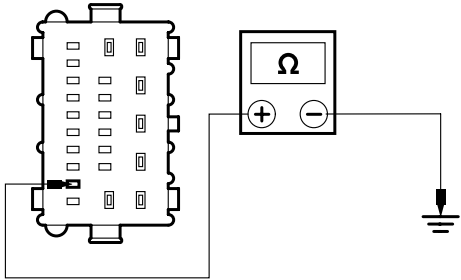
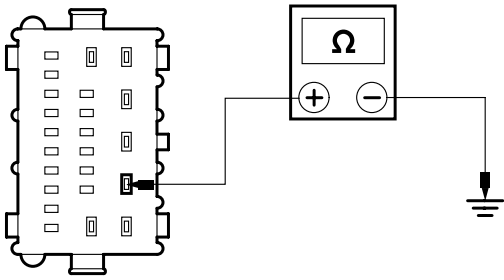
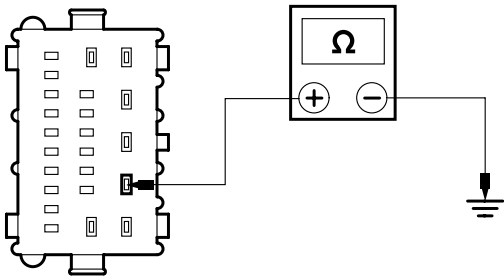
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
Q2: CHECK CIRCUIT 1/2-AB16 (GY/RD) FOR SHORT TO BATTERY POSITIVE	
 <p>E57508</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 14, circuit 1-AB10 (WH), harness side and battery positive.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 1-AB10 (WH) or 2-AB10 (GY). TEST the system for normal operation.</p> <p>→ No Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module.</p> <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p>

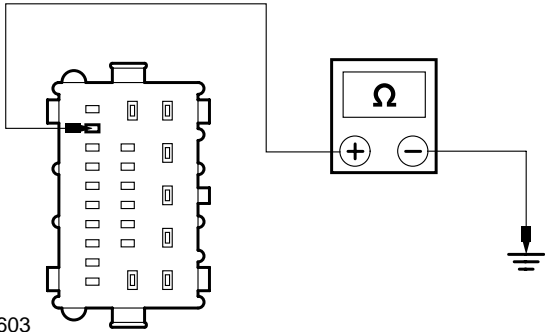
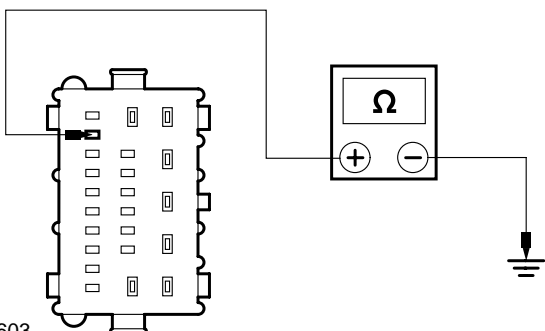
PINPOINT TEST R : DTC: B1070

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
R1: CHECK CIRCUIT 1/2-AB35 (WH/BU) FOR SHORT TO GROUND	
 <p>E74073</p>	<p>1 Disconnect Keyless Vehicle Module C219.</p> <p>2 Measure the resistance between the keyless vehicle module C219 pin 18, circuit 1-AB35 (WH/BU), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 1-AB35 (WH/BU) or 2-AB35 (GY/VT). TEST the system for normal operation.</p> <p>→ No GO to R2.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
R2: CHECK CIRCUIT 1/2-AB35 (GY/RD) FOR SHORT TO BATTERY POSITIVE	
 <p>E74073</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 18, circuit 1-AB35 (WH/BU), harness side and battery positive.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes REPAIR circuit 1-AB35 (WH/BU) or 2-AB35 (GY/VT). TEST the system for normal operation. → No GO to R3.
R3: CHECK CIRCUIT 1/2-AB35 (WH/BU) FOR SHORT TO GROUND	
 <p>E57502</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 2, circuit 1-AB35A (WH/BU), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes REPAIR circuit 1-AB35A (WH/BU) or 2-AB35A (GY/VT). TEST the system for normal operation. → No GO to R4.
R4: CHECK CIRCUIT 1/2-AB35 (GY/RD) FOR SHORT TO BATTERY POSITIVE	
 <p>E57502</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 2, circuit 1-AB35A (WH/BU), harness side and battery positive.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes REPAIR circuit 1-AB35A (WH/BU) or 2-AB35A (GY/VT). TEST the system for normal operation. → No GO to R5.

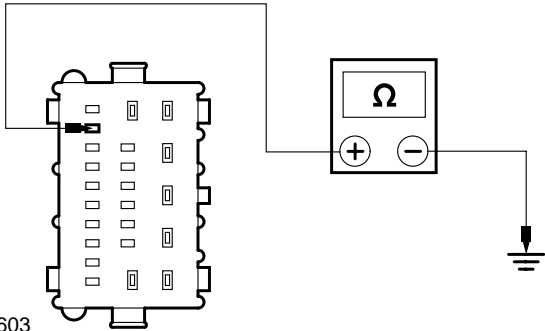
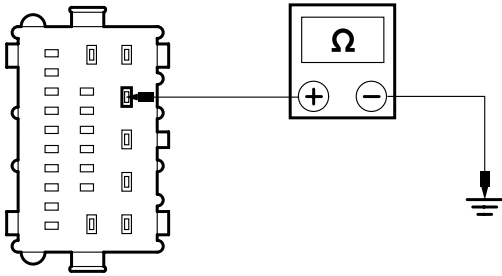
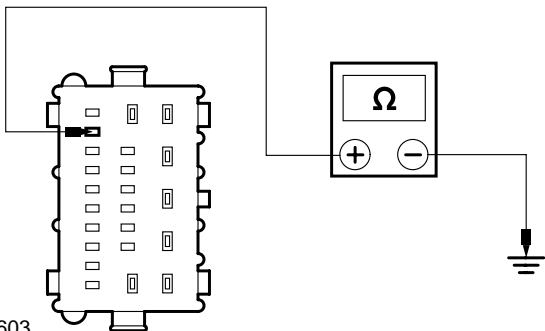
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
R5: CHECK CIRCUIT 1/2-AB36B (GY/OG) FOR SHORT TO GROUND	
 <p>E57603</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 22, circuit 1-AB36A (GY/OG), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 1-AB36A (GY/OG) or 2-AB36A (WH/GN). TEST the system for normal operation.</p> <p>→ No GO to R6.</p>
R6: CHECK CIRCUIT 1/2-AB35 (GY/RD) FOR SHORT TO BATTERY POSITIVE	
 <p>E57603</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 22, circuit 1-AB36A (WH/GN), harness side and battery positive.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REPAIR circuit 1-AB36A (GY/OG) or 2-AB36A (WH/GN). TEST the system for normal operation.</p> <p>→ No Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module.</p> <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p>

PINPOINT TEST S : DTC: B1070

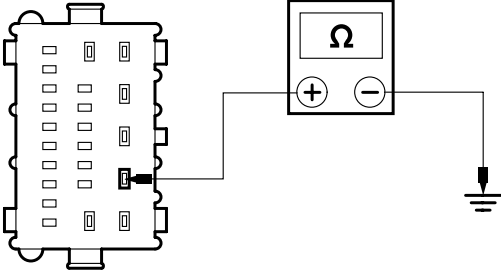
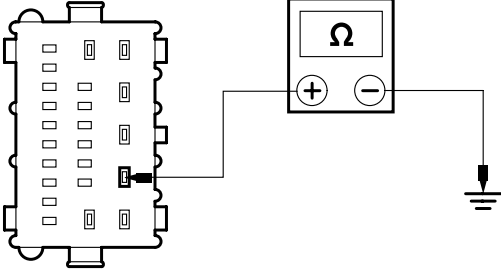
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
S1: CHECK CIRCUIT 1-AB36B (WH/GN) FOR SHORT CIRCUIT TO GROUND	
	<p>1 Disconnect Keyless Vehicle Module C219.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57603</p>	<p>2 Measure the resistance between the keyless vehicle module C219 pin 22, circuit 1-AB36B (WH/GN), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? → Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module. REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation. → No GO to S2.
<p>S2: CHECK CIRCUIT 2-AB36B (GY/OG) FOR SHORT CIRCUIT TO GROUND</p>	
 <p>E57602</p>	<p>1 Disconnect Passenger Compartment Center Keyless Vehicle Antenna C226.</p> <p>2 Measure the resistance between the keyless vehicle module C219 pin 4, circuit 2-AB36B (GY/OG), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? → Yes GO to S3. → No REPAIR circuit 2-AB36B (GY/OG). TEST the system for normal operation.
<p>S3: CHECK CIRCUIT 1-AB36B (WH/GN) FOR SHORT CIRCUIT TO GROUND</p>	
 <p>E57603</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 22, circuit 1-AB36B (WH/GN), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? → Yes INSTALL a new passenger compartment center keyless vehicle antenna. TEST the system for normal operation. → No REPAIR circuit 1-AB36B (WH/GN). TEST the system for normal operation.

DIAGNOSIS AND TESTING

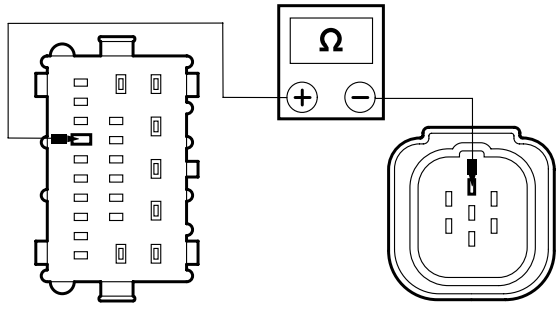
PINPOINT TEST T : DTC: B1071

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
T1: CHECK CIRCUIT 1-AB34 (WH/RD) FOR SHORT CIRCUIT TO GROUND	
 <p>E57502</p>	<ol style="list-style-type: none"> <li>1 Disconnect Keyless Vehicle Module C219. <li>2 Measure the resistance between the keyless vehicle module C219 pin 2, circuit 1-AB34 (WH/RD), harness side and ground. <ul style="list-style-type: none"> <li>• Is the resistance less than 5 ohms? <li>→ Yes REPAIR circuit 1-AB34 (WH/RD) or 2-AB34 (GY/RD). TEST the system for normal operation. <li>→ No GO to T2.
T2: CHECK CIRCUIT 1/2-AB34 (WH/RD) FOR SHORT TO BATTERY POSITIVE	
 <p>E57502</p>	<ol style="list-style-type: none"> <li>1 Measure the resistance between the keyless vehicle module C219 pin 2, circuit 1-AB34 (WH/RD), harness side and battery positive. <ul style="list-style-type: none"> <li>• Is the resistance less than 5 ohms? <li>→ Yes REPAIR circuit 1-AB34 (WH/RD) or 2-AB34 (GY/RD). TEST the system for normal operation. <li>→ No Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new keyless vehicle module. <p>REFER to: Keyless Vehicle Module (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p>

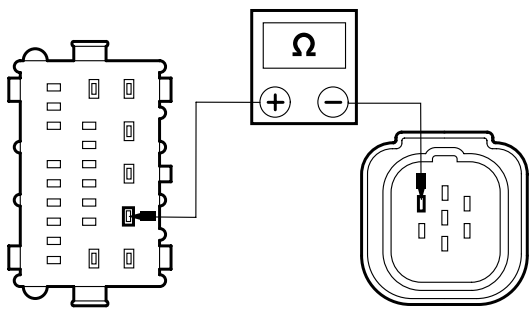
PINPOINT TEST U : DTC: B1072

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
U1: CHECK CIRCUIT 1-AB16 FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> <li>1 Disconnect Keyless Vehicle Module C218. <li>2 Disconnect Driver Side Exterior Front Door Handle Keyless Vehicle Antenna C211.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E74074</p>	<p>3 Measure the resistance between the keyless vehicle module C218 pin 20, circuit 1-AB16 (WH/RD), harness side and the driver side exterior front door handle keyless vehicle antenna C211 pin 1, circuit 1-AB16 (WH/RD), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes GO to U2.</p> <p>→ No REPAIR circuit 1-AB16 (WH/RD). TEST the system for normal operation.</p>

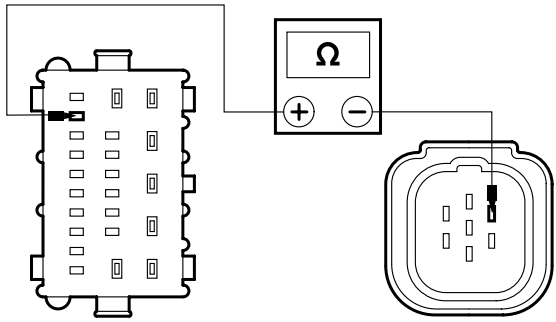
U2: CHECK CIRCUIT 2-AB16 (GY/RD) FOR OPEN CIRCUIT

 <p>E74075</p>	<p>1 Measure the resistance between the keyless vehicle module C218 pin 2, circuit 2-AB16 (GY/RD), harness side and the driver side exterior front door handle keyless vehicle antenna C211 pin 2, circuit 2-AB16 (GY/RD), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new driver side exterior front door handle.</p> <p>REFER to: Exterior Front Door Handle - Vehicles With: Keyless Vehicle System (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).</p> <p>→ No REPAIR circuit 2-AB16 (GY/RD). TEST the system for normal operation.</p>
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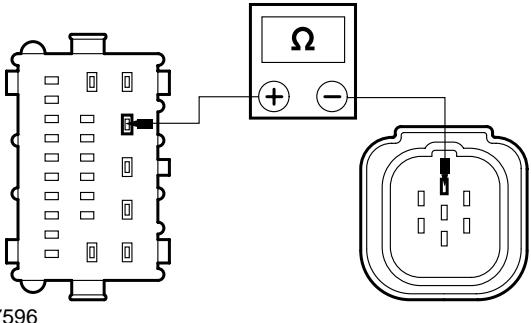
PINPOINT TEST V : DTC: B1073

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>V1: CHECK CIRCUIT 1-AB27 (WH/RD) FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect Keyless Vehicle Module C218.</p> <p>2 Disconnect Passenger Side Exterior Front Door Handle Keyless Vehicle Antenna C203.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57597</p>	<p>3 Measure the resistance between the keyless vehicle module C218 pin 22, circuit 1-AB27 (WH/RD), harness side and the passenger side exterior front door handle keyless vehicle antenna C203 pin 1, circuit 1-AB27 (WH/RD), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes GO to V2.</p> <p>→ No REPAIR circuit 1-AB27 (WH/RD). TEST the system for normal operation.</p>

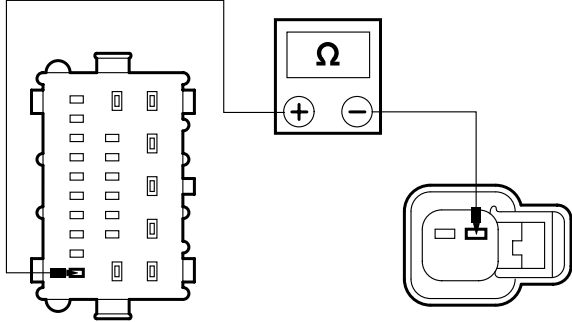
V2: CHECK CIRCUIT 2-AB27 (GY/RD) FOR OPEN CIRCUIT

 <p>E57596</p>	<p>1 Measure the resistance between the keyless vehicle module C218 pin 4, circuit 2-AB27 (GY/RD), harness side and the passenger side exterior front door handle keyless vehicle antenna C203 pin 2, circuit 2-AB27 (GY/RD), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new passenger side exterior front door handle.</p> <p>REFER to: Exterior Front Door Handle - Vehicles With: Keyless Vehicle System (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).</p> <p>→ No REPAIR circuit 2-AB27 (GY/RD). TEST the system for normal operation.</p>
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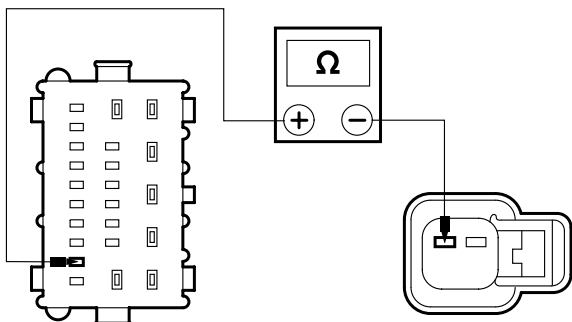
PINPOINT TEST W : DTC: B1074

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>W1: CHECK CIRCUIT 1-AB10 (WH) FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect Keyless Vehicle Module C219.</p> <p>2 Disconnect Rear Bumper Keyless Vehicle Antenna C227.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57595</p>	<p>3 Measure the resistance between the keyless vehicle module C219 pin 14, circuit 1-AB10 (WH), harness side and the rear bumper keyless vehicle antenna C227 pin 1, circuit 1-AB10 (WH), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes GO to W2.</p> <p>→ No REPAIR circuit 1-AB10 (WH). TEST the system for normal operation.</p>

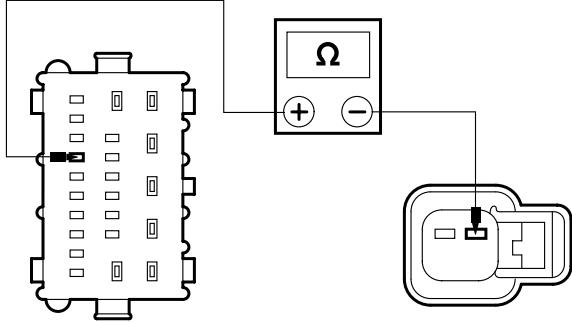
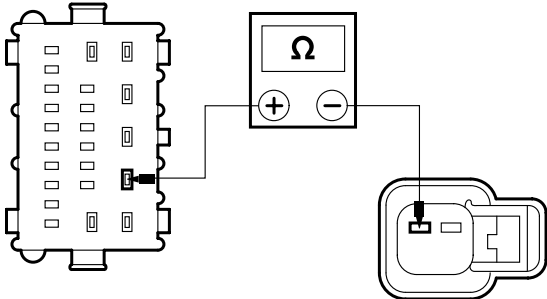
W2: CHECK CIRCUIT 2-AB10 (GY) FOR OPEN CIRCUIT

 <p>E57594</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 15, circuit 2-AB10 (GY), harness side and the rear bumper keyless vehicle antenna C227 pin 2, circuit 2-AB10 (GY), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new rear bumper keyless vehicle antenna. TEST the system for normal operation.</p> <p>→ No REPAIR circuit 2-AB10 (GY). TEST the system for normal operation.</p>
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PINPOINT TEST X : DTC: B1075

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>X1: CHECK CIRCUIT 1-AB35 (WH/BU) FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect Keyless Vehicle Module C219.</p> <p>2 Disconnect Passenger Compartment Front Keyless Vehicle Antenna C226.</p>

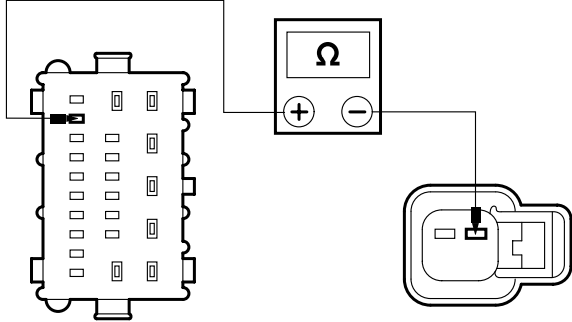
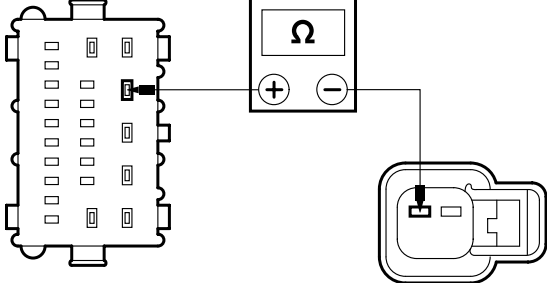
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57593</p>	<p>3 Measure the resistance between the keyless vehicle module C219 pin 20, circuit 1-AB35 (WH/BU), harness side and the passenger compartment front keyless vehicle antenna C226 pin 2, circuit 1-AB35 (WH/BU), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes GO to X2.</p> <p>→ No REPAIR circuit 1-AB35 (WH/BU). TEST the system for normal operation.</p>
<p>X2: CHECK CIRCUIT 2-AB35 (GY/VT) FOR OPEN CIRCUIT</p>	
 <p>E57592</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 2, circuit 2-AB35 (GY/VT), harness side and the passenger compartment front keyless vehicle antenna C226 pin 1, circuit 2-AB35 (GY/VT), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new passenger compartment front keyless vehicle antenna. TEST the system for normal operation.</p> <p>→ No REPAIR circuit 2-AB35 (GY/VT). TEST the system for normal operation.</p>

PINPOINT TEST Y : DTC: B1075

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>Y1: CHECK CIRCUIT 1-AB36B (WH/GN) FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect Keyless Vehicle Module C219.</p> <p>2 Disconnect Passenger Compartment Center Keyless Vehicle Antenna C221.</p>

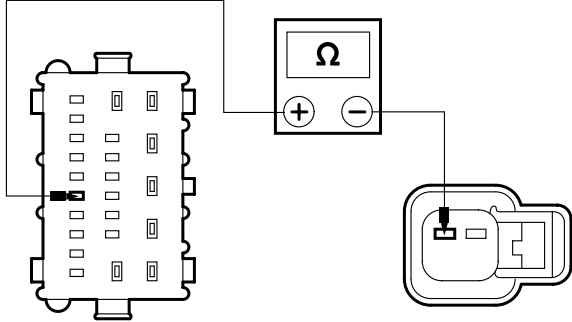
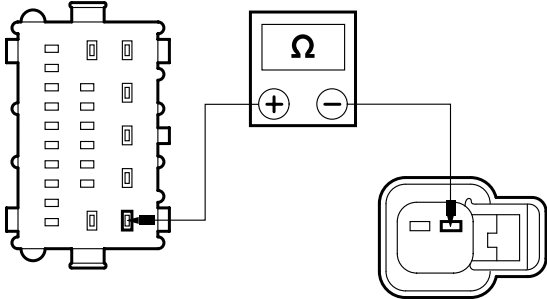
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57590</p>	<p>3 Measure the resistance between the keyless vehicle module C219 pin 22, circuit 1-AB36B (WH/GN), harness side and the passenger compartment center keyless vehicle antenna C221 pin 2, circuit 1-AB36B (WH/GN), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes GO to Y2.</p> <p>→ No REPAIR circuit 1-AB36B (WH/GN). TEST the system for normal operation.</p>
<p>Y2: CHECK CIRCUIT 2-AB36B (GY/OG) FOR OPEN CIRCUIT</p>	
 <p>E57591</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 4, circuit 2-AB36B (GY/OG), harness side and the passenger compartment center keyless vehicle antenna C221 pin 1, circuit 2-AB36B (GY/OG), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new passenger compartment center keyless vehicle antenna. TEST the system for normal operation.</p> <p>→ No REPAIR circuit 2-AB36B (GY/OG). TEST the system for normal operation.</p>

PINPOINT TEST Z : DTC: B1076

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>Z1: CHECK CIRCUIT 1-AB34 (WH-RD) FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect Keyless Vehicle Module C219.</p> <p>2 Disconnect Luggage Compartment Keyless Vehicle Antenna C224.</p>

DIAGNOSIS AND TESTING

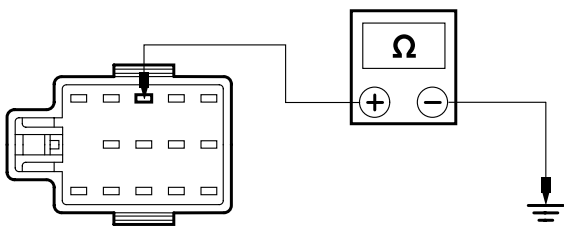
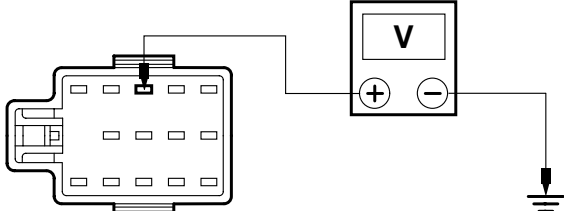
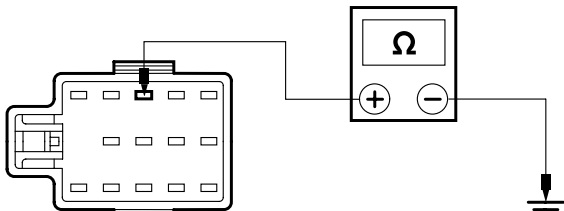
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57685</p>	<p>3 Measure the resistance between the keyless vehicle module C219 pin 18, circuit 1-AB34 (WH/RD), harness side and the luggage compartment keyless vehicle antenna C224 pin 1, circuit 1-AB34 (WH/RD), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes GO to Z2.</p> <p>→ No REPAIR circuit 1-AB34 (WH/RD). TEST the system for normal operation.</p>
<p>Z2: CHECK CIRCUIT 2-AB34 (GY/RD) FOR OPEN CIRCUIT</p>	
 <p>E57686</p>	<p>1 Measure the resistance between the keyless vehicle module C219 pin 1, circuit 2-AB34 (GY/RD), harness side and the luggage compartment keyless vehicle antenna C224 pin 2, circuit 2-AB34 (GY/RD), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new luggage compartment keyless vehicle antenna. REFER. TEST the system for normal operation.</p> <p>→ No REPAIR circuit 2-AB34 (GY/RD). TEST the system for normal operation.</p>

Pinpoint Test (vehicles with RKE)

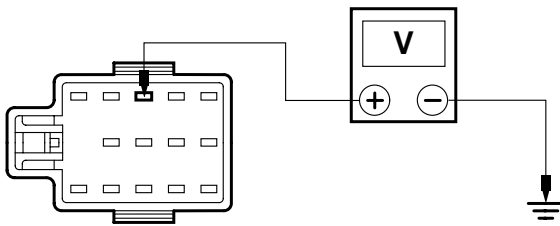
PINPOINT TEST AA : DTC: B2090

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AA1: CHECK CIRCUIT 8-AA57 (WH) FOR SHORT CIRCUIT TO GROUND</p>	
	<p>1 Disconnect CJB C98.</p>

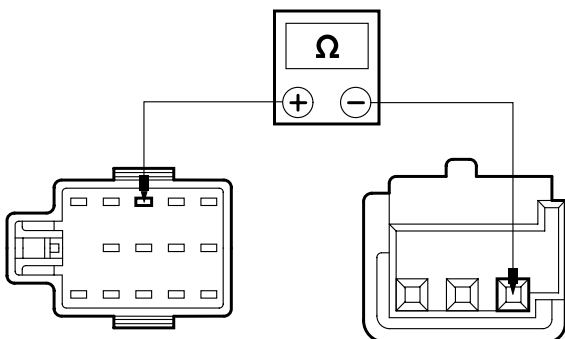
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57189</p>	<p>2 Measure the resistance between the CJB C98 pin 6, circuit 8-AA57 (WH), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? → Yes GO to AA2. → No GO to AA3.
<p>AA2: CHECK CIRCUIT 8-AA57 (WH) FOR SHORT CIRCUIT TO BATTERY POSITIVE</p>	
 <p>E57190</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the CJB C98 pin 6, circuit 8-AA57 (WH), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage 0 volts? → Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new CJB. REFER to: Generic Electronic Module (GEM) (419-10 Multifunction Electronic Modules, Diagnosis and Testing). TEST the system for normal operation. → No GO to AA4.
<p>AA3: CHECK THE RF RECEIVER FOR SHORT CIRCUIT TO GROUND</p>	
 <p>E57189</p>	<p>1 Disconnect RF Receiver C390.</p> <p>2 Measure the resistance between the CJB C98 pin 6, circuit 8-AA57 (WH), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? → Yes INSTALL a new RF receiver. TEST the system for normal operation. → No REPAIR circuit 8-AA57 (WH). TEST the system for normal operation.

DIAGNOSIS AND TESTING

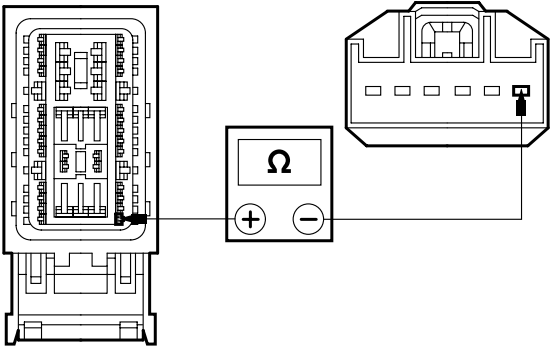
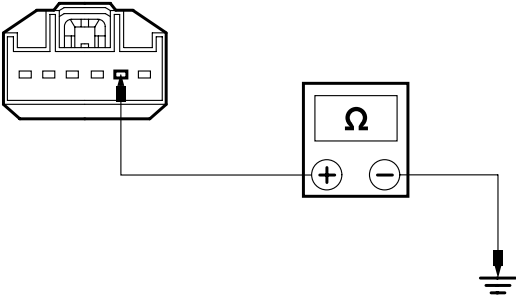
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AA4: CHECK THE RF RECEIVER FOR SHORT TO BATTERY POSITIVE	
	1 Ignition switch in position 0.
	2 Disconnect RF Receiver C390.
	3 Ignition switch in position II.
 <p>E57190</p>	<p>4 Measure the voltage between the CJB C98 pin 6, circuit 8-AA57 (WH), harness side and ground.</p> <ul style="list-style-type: none"> • Is the voltage 0 volts? → Yes INSTALL a new RF receiver. TEST the system for normal operation. → No REPAIR circuit 8-AA57 (WH). TEST the system for normal operation.

PINPOINT TEST AB : DTC: B2091

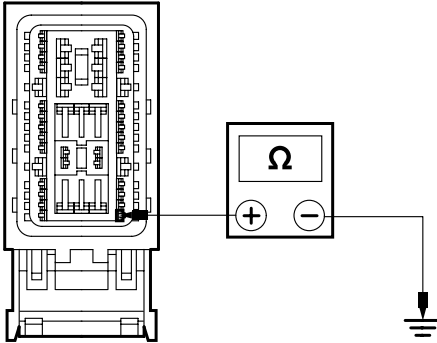
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AB1: CHECK CIRCUIT 8-AA57 (WH) FOR OPEN CIRCUIT	
	1 Disconnect CJB C98.
 <p>E57473</p>	2 Disconnect RF Receiver C390.
	<p>3 Measure the resistance between the CJB C98 pin 6, circuit 8-AA57 (WH), harness side and the RF receiver C390 pin 1, circuit 8-AA57 (WH), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new RF receiver. TEST the system for normal operation. If the DTC is repeated, INSTALL a new CJB. REFER to: Generic Electronic Module (GEM) (419-10 Multifunction Electronic Modules, Diagnosis and Testing). TEST the system for normal operation. → No REPAIR circuit 8-AA57 (WH). TEST the system for normal operation.

DIAGNOSIS AND TESTING

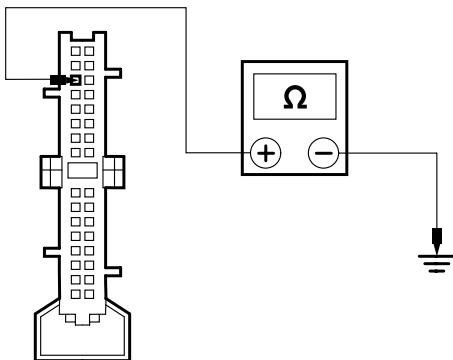
PINPOINT TEST AC : DTC: B2894

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AC1: CHECK CIRCUIT 32-AA27 (WH/GN) FOR OPEN CIRCUIT	
 <p>E57856</p>	<ol style="list-style-type: none"> 1 Disconnect CJB C100. 2 Disconnect Liftgate/Luggage Compartment Lid Latch C798. 3 Measure the resistance between the CJB C100 pin 46, circuit 32-AA27 (WH/GN), harness side and the liftgate/luggage compartment lid latch C798 pin 1, circuit 32-AA27 (BK), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes GO to AC2. → No REPAIR circuit 32-AA27 (WH/GN) or circuit 32-AA27 (BK). TEST the system for normal operation.
AC2: CHECK CIRCUIT 31-GL20 (BK) FOR OPEN CIRCUIT	
 <p>E57855</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the lift-gate/luggage compartment lid latch C798 pin 2, circuit 31-GL20 (BK), harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes GO to AC3. → No REPAIR circuit 31-GL20 (BK). TEST the system for normal operation.

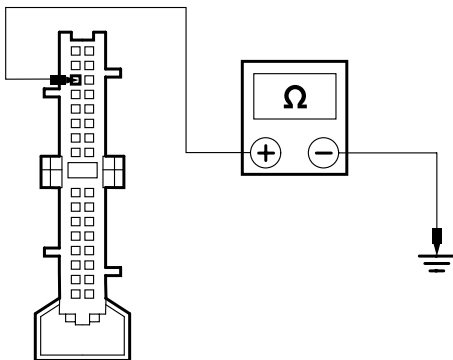
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AC3: CHECK CIRCUIT 32-AA27 (WH/GN) FOR SHORT CIRCUIT TO GROUND	
 <p>E57854</p>	<p>1 Measure the resistance between the CJB C100 pin 46, circuit 32-AA27 (WH/GN), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? <p>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new liftgate/luggage compartment lid latch.</p> <p>REFER to: Liftgate Latch - 3-Door/5-Door (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation) / Liftgate Latch - Wagon (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR circuit 32-AA27 (WH/GN) or circuit 32-AA27 (BK). TEST the system for normal operation.</p>

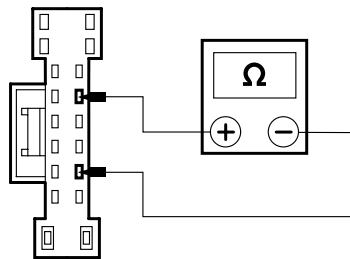
PINPOINT TEST AD : DTC: B2970

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AD1: CHECK CIRCUIT 31S-AA30 (BK/YE) FOR SHORT CIRCUIT TO GROUND	
 <p>E57853</p>	<p>1 Disconnect CJB C99.</p> <p>2 Measure the resistance between the CJB C99 pin 30, circuit 31S-AA30 (BK/YE), harness side and ground.</p> <ul style="list-style-type: none"> With the liftgate or luggage compartment lid closed, is the resistance greater than 10,000 ohms? <p>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new CJB.</p> <p>REFER to: Generic Electronic Module (GEM) (419-10 Multifunction Electronic Modules, Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to AD2.</p>

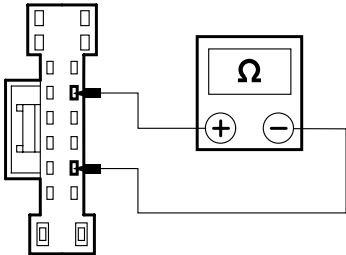
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AD2: CHECK THE LIFTGATE/LUGGAGE COMPARTMENT LID EXTERIOR RELEASE SWITCH FOR CLOSED CIRCUIT	
 <p>E57853</p>	<ol style="list-style-type: none"> 1 Disconnect Liftgate/Luggage Compartment Lid Exterior Release Switch C799.
	<ol style="list-style-type: none"> 2 Measure the resistance between the CJB C99 pin 30, circuit 31S-AA30 (BK/YE), harness side and ground. <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new liftgate/luggage compartment lid exterior release switch. TEST the system for normal operation. → No REPAIR circuit circuit 31S-AA30 (BK/YE). TEST the system for normal operation.

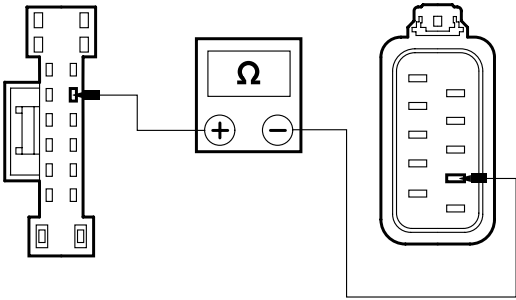
PINPOINT TEST AE : DTC: B1311

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
NOTE: The door latches must be in the locked mode to conduct this test.	
AE1: CHECK CIRCUIT 91S-AA64 (BK/GN) FOR OPEN CIRCUIT	
 <p>E57852</p>	<ol style="list-style-type: none"> 1 Disconnect Right-Hand Side Front Door Control Module C722.
	<ol style="list-style-type: none"> 2 Measure the resistance between the right-hand front door control module C722 pin 13, circuit 91S-AA64 (BK/GN), harness side and the right-hand front door control module C722 pin 16, circuit 91-AA58 (BK/YE), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes GO to AE2. → No GO to AE3.
AE2: CHECK CIRCUIT 91S-AA64A (BK/GN) FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Disconnect Left-Hand Side Front Door Control Module C729.

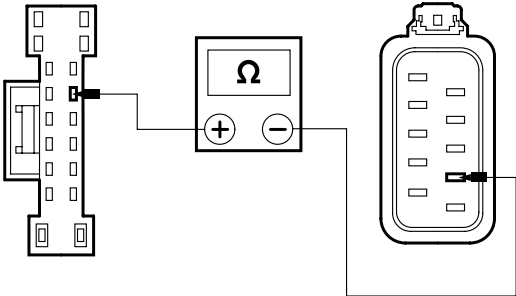
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57852</p>	<p>2 Measure the resistance between the left-hand side front door control module C729 pin 13, circuit 91S-AA64A (BK/GN), harness side and the left-hand side front door control module C729 pin 16, circuit 91-AA58A (BK/YE), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new left-hand side front door control module. CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new right-hand side front door control module. CLEAR the DTC. TEST the system for normal operation.</p> <p>→ No GO to AE4.</p>
<p>AE3: CHECK THE RIGHT-HAND FRONT DOOR LATCH UNLOCK SWITCH FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect Right-Hand Side Front Door Latch C149.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57851</p>	<p>2 Measure the resistance between the right-hand side front door control module C722 pin 13, circuit 91S-AA64 (BK/GN), harness side and the right-hand side front door latch C149 pin 9, circuit 91S-AA64 (BK/GN), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new right-hand side front door latch.</p> <p>REFER to: Front Door Latch - 3-Door (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation) / Front Door Latch - 3-Door, Vehicles With: Keyless Vehicle System (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation) / Front Door Latch - 4-Door/5-Door/Wagon (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation) / Front Door Latch - 4-Door/5-Door/Wagon, Vehicles With: Keyless Vehicle System (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR circuit 91S-AA64 (BK/GN). TEST the system for normal operation.</p>

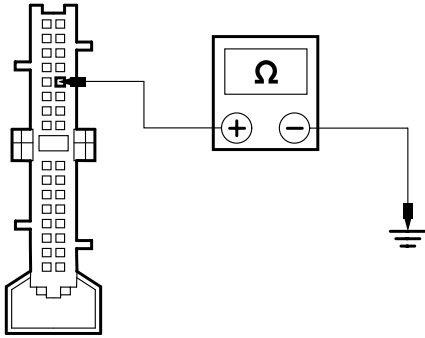
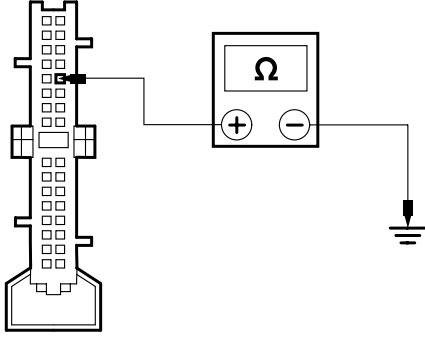
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AE4: CHECK THE LEFT-HAND FRONT DOOR LATCH UNLOCK SWITCH FOR OPEN CIRCUIT	
 <p>E57851</p>	<p>1 Measure the resistance between the left-hand side front door control module C729 pin 13, circuit 91S-AA64A (BK/GN), harness side and the left-hand side front door latch C148 pin 9, circuit 91S-AA64A (BK/GN), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes INSTALL a new left-hand side front door latch. REFER to: Front Door Latch - 3-Door (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation) / Front Door Latch - 3-Door, Vehicles With: Keyless Vehicle System (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation) / Front Door Latch - 4-Door/5-Door/Wagon (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation) / Front Door Latch - 4-Door/5-Door/Wagon, Vehicles With: Keyless Vehicle System (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR circuit 91S-AA64A (BK/GN). TEST the system for normal operation.</p>

PINPOINT TEST AF : DTC: B1320

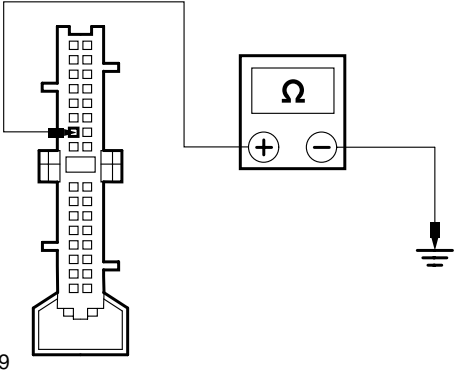
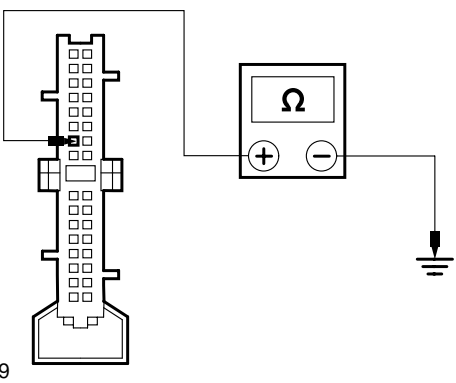
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: The door latch must be in the open position to conduct this test.</p>	
<p>AF1: CHECK CIRCUIT 31S-GL9A (BK/YE) FOR OPEN CIRCUIT</p>	
	<p>1 Disconnect CJB C99.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E57850</p>	<p>2 Measure the resistance between the CJB C99 pin 12, circuit 31S-GL9A (BK/YE), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? <p>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new CJB.</p> <p>REFER to: Generic Electronic Module (GEM) (419-10 Multifunction Electronic Modules, Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to AF2.</p>
AF2: CHECK CIRCUIT 31S-GL9A (BK/YE) FOR SHORT CIRCUIT TO GROUND	
 <p>E57850</p>	<p>1 Disconnect Driver Side Front Door Latch C148.</p> <p>2 Measure the resistance between the CJB C99 pin 12, circuit 31S-GL9A (BK/YE), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? <p>→ Yes INSTALL a new driver side front door latch.</p> <p>REFER to: Front Door Latch - 3-Door (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation) / Front Door Latch - 3-Door, Vehicles With: Keyless Vehicle System (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation) / Front Door Latch - 4-Door/5-Door/Wagon (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation) / Front Door Latch - 4-Door/5-Door/Wagon, Vehicles With: Keyless Vehicle System (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p> <p>→ No REPAIR circuit 31S-GL9A (BK/YE). TEST the system for normal operation.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST AG : DTC: B1331

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>NOTE: The door latch must be in the open position to conduct this test.</p>	
<p>AG1: CHECK CIRCUIT 31S-GL20 (BK/RD) FOR OPEN CIRCUIT</p>	
 <p>E57849</p>	<p>1 Disconnect CJB C99.</p> <p>2 Measure the resistance between the CJB C99 pin 26, circuit 31S-GL20 (BK/RD), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? <p>→ Yes Using WDS, CLEAR the DTC. TEST the system for normal operation. If the DTC is still present, INSTALL a new CJB.</p> <p>REFER to: Generic Electronic Module (GEM) (419-10 Multifunction Electronic Modules, Removal and Installation). TEST the system for normal operation.</p> <p>→ No GO to AG2.</p>
<p>AG2: CHECK CIRCUIT 31S-GL20 (BK/RD) FOR SHORT TO GROUND</p>	
 <p>E57849</p>	<p>1 Disconnect Liftgate/Luggage Compartment Lid C58.</p> <p>2 Measure the resistance between the CJB C99 pin 26, circuit 31S-GL20 (BK/RD), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? <p>→ Yes INSTALL a new liftgate/luggage compartment lid latch.</p> <p>REFER to: Liftgate Latch - 3-Door/5-Door (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation) / Liftgate Latch - Wagon (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation). TEST the system for normal operation.</p> <p>→ No Repair circuit 31S-GL20 (BK/RD). TEST the system for normal operation.</p>

GENERAL PROCEDURES**Remote Transmitter Programming(41 004 0)**

- 1. NOTE: A maximum of eight keyless entry remote transmitters can be programmed to the Central Junction Box (CJB). Programming must be done at the same time for all the transmitters.**

NOTE: To enter programming mode, first make sure that the vehicle battery is fully charged and the anti-theft system is not armed or triggered (if equipped).

NOTE: Make sure the turn signal indicators are in the OFF position.

Fasten the safety belts and close all doors to make sure conflicting chimes do not sound during programming.

- 2. NOTE: The ignition must be turned to position II exactly four times during remote transmitter programming.**

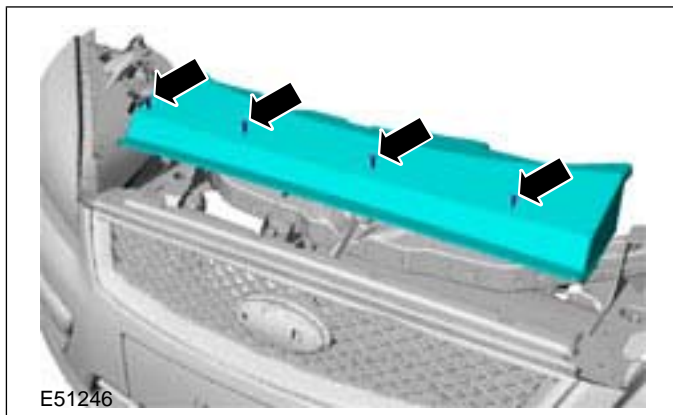
Turn the ignition switch from position I to position II four times exactly within six seconds.

- 3. Turn the ignition switch to position 0.**
- 4. An audible chime will be heard to indicate that it is now possible to programme the keys for ten seconds.**
- 5. Press and hold one of the buttons on the remote transmitter until a chime sounds. This indicates a new transmitter code has been successfully received.**
- 6. To program additional transmitters, repeat step 5.**
- 7. The system will leave the learning mode after the ignition switch is turned to either position II, or if no new transmitter is programmed during the 10 seconds, or if eight remote transmitters have been programmed.**

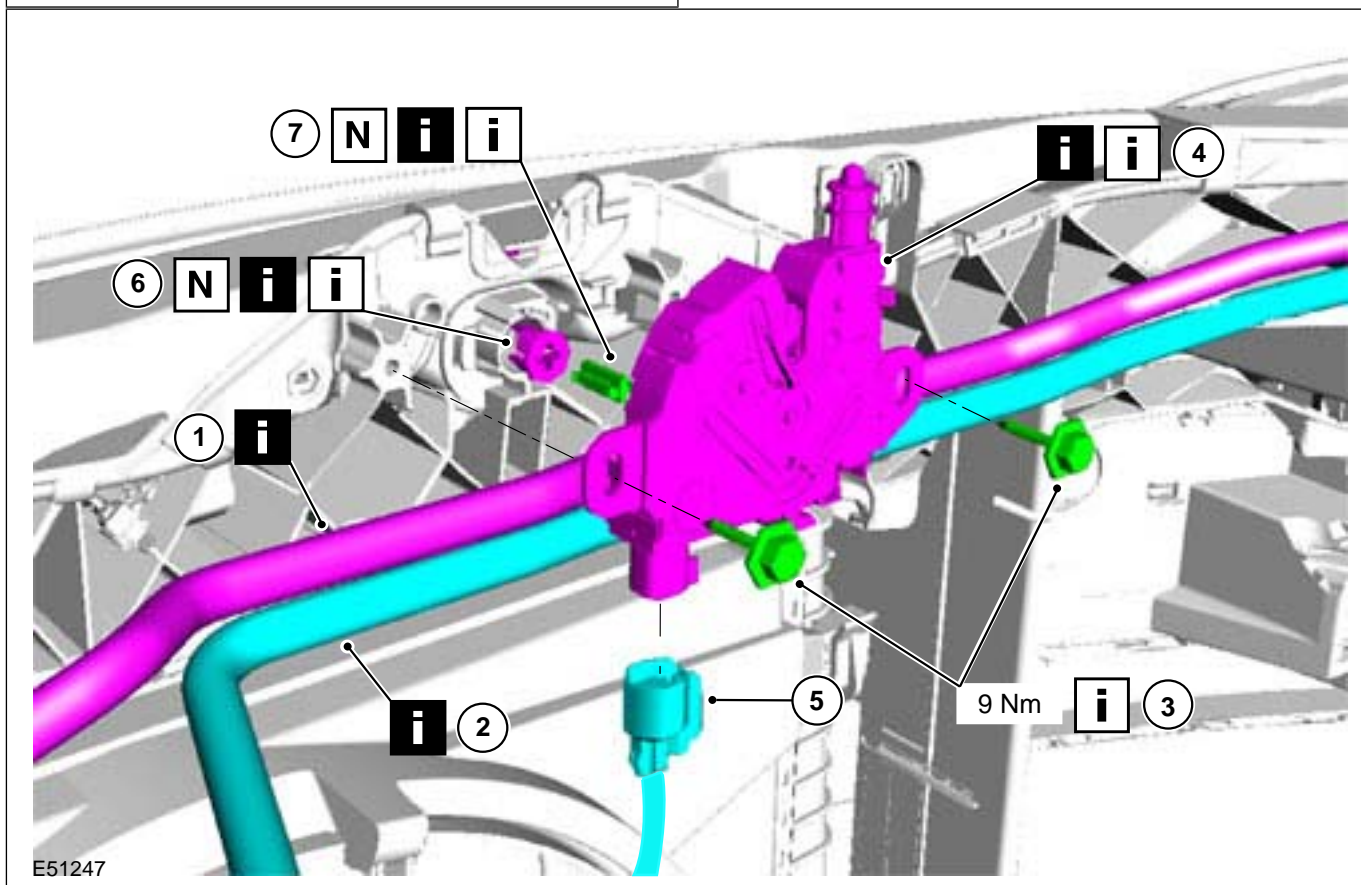
REMOVAL AND INSTALLATION

Hood Latch

1. Remove the air deflector.



2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Coolant expansion tank to radiator hose <i>See Removal Detail</i>
2	Coolant expansion tank to coolant outlet connector hose <i>See Removal Detail</i>
3	Hood latch retaining bolts <i>See Installation Detail</i>

Item	Description
4	Hood latch <i>See Removal Detail</i> <i>See Installation Detail</i>
5	Hood latch electrical connector

REMOVAL AND INSTALLATION

Item	Description
6	Hood lock cylinder connecting clip See Removal Detail See Installation Detail
7	Hood lock cylinder connecting shaft

Item	Description
	See Removal Detail See Installation Detail

3. To install, reverse the removal procedure.

Removal Details

Item 1 Coolant expansion tank to radiator hose

1. Detach the coolant expansion tank to radiator hose from the coolant hose retaining clamp.

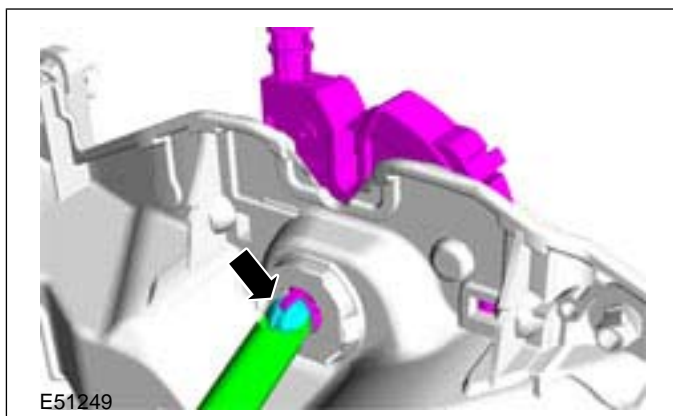
Item 2 Coolant expansion tank to coolant outlet connector hose

1. Detach the coolant expansion tank to coolant outlet connector hose from the hose retaining clamp.

Item 4 Hood latch

1. NOTE: Make a note of the position and orientation of the hood lock cylinder connecting clip.

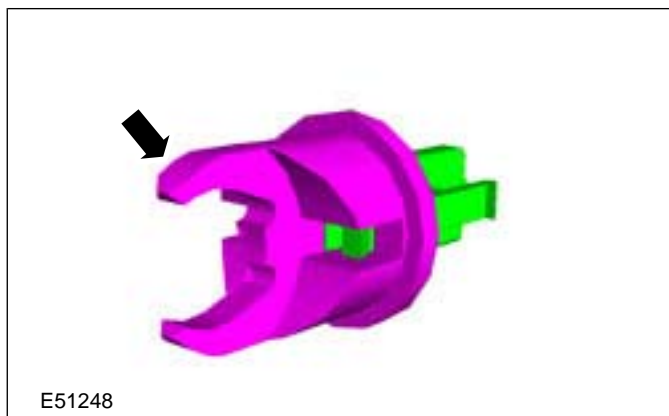
Detach the hood lock cylinder to hood latch rod swivel joint from the hood latch connecting clip.



Item 6 Hood lock cylinder connecting clip

1. NOTE: Make a note of the position and orientation of the hood lock cylinder connecting shaft.

Remove the hood lock cylinder connecting clip from the hood lock cylinder connecting shaft (hood latch shown removed for clarity).

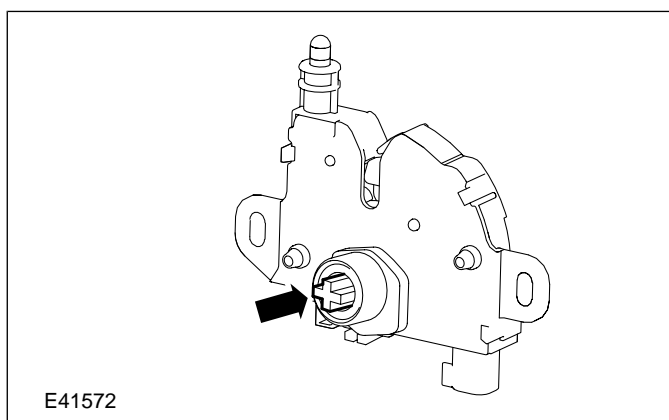


Item 7 Hood lock cylinder connecting shaft

1. NOTE: Make a note of the position and orientation of the hood lock cylinder connecting shaft.

Remove the hood lock cylinder connecting shaft from the hood latch.

- Discard the hood lock cylinder connecting shaft.



Installation Details

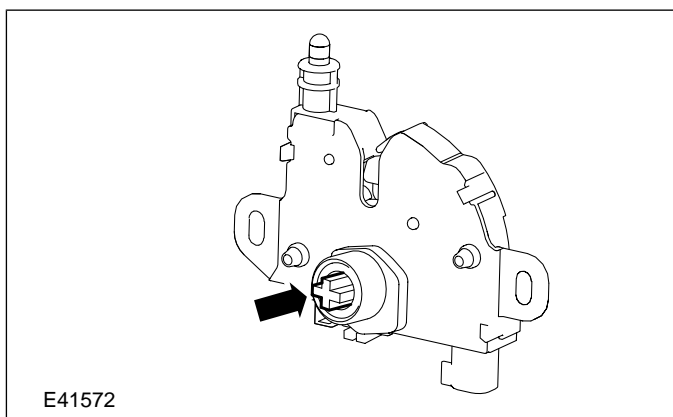
REMOVAL AND INSTALLATION

Item 7 Hood lock cylinder connecting shaft

- NOTE:** Make sure that the hood lock cylinder connecting shaft is installed in the same position and alignment as removed.

NOTE: Make sure that the hood lock cylinder connecting shaft clips are facing the correct way. The long clips of the hood lock cylinder connecting shaft should be installed into the hood latch.

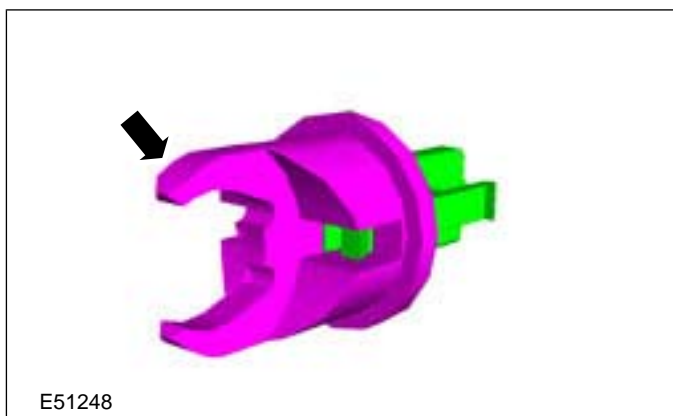
Install the hood lock cylinder connecting shaft to the hood latch.

**Item 6 Hood lock cylinder connecting clip**

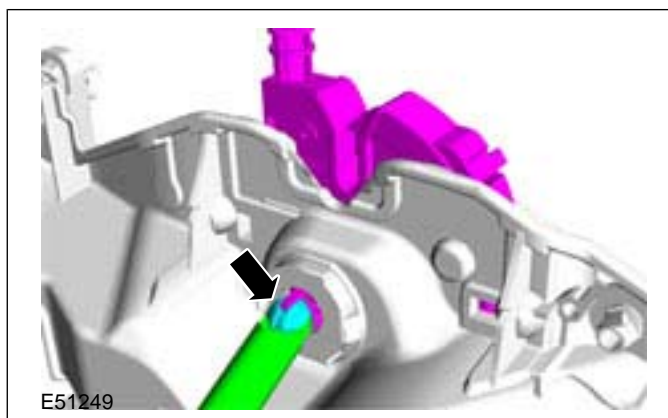
- NOTE:** Make sure that the hood lock cylinder connecting shaft clips are facing the correct way. The short clips of the hood lock cylinder connecting shaft should be installed into the hood lock cylinder connecting clip.

NOTE: The hood lock cylinder connecting shaft clips must be compressed before being installed into the hood lock cylinder connecting clip.

Using a suitable flat bladed screwdriver, install the hood lock cylinder connecting clip to the hood lock cylinder connecting shaft (hood latch shown removed for clarity).

**Item 4 Hood latch**

- Connect the hood lock cylinder shaft swivel joint to the hood latch connecting clip.

**Item 3 Hood latch retaining bolts**

- Tighten the hood latch retaining bolts.**

- Adjust the hood latch so that the hood alignment is correct.

For additional information, refer to: Hood Alignment (501-02 Front End Body Panels, General Procedures).

REMOVAL AND INSTALLATION

Front Door Latch — 3-Door

General Equipment

Electric hand drill
Rivet gun

Materials	
Name	Specification
Adhesive - Loctite 243	WSK-M2G349-A7

1. Remove the front door trim panel.

For additional information, refer to: **Front Door Trim Panel - 3-Door** (501-05 Interior Trim and Ornamentation, Removal and Installation).

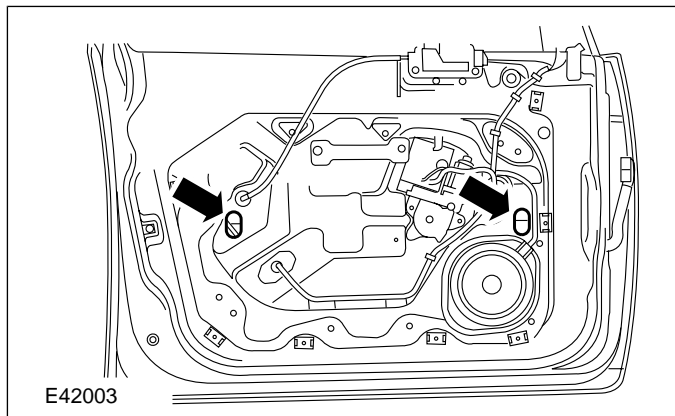
2. Remove the exterior front door handle.

For additional information, refer to: **Exterior Front Door Handle** (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).

3. Connect the battery ground cable.

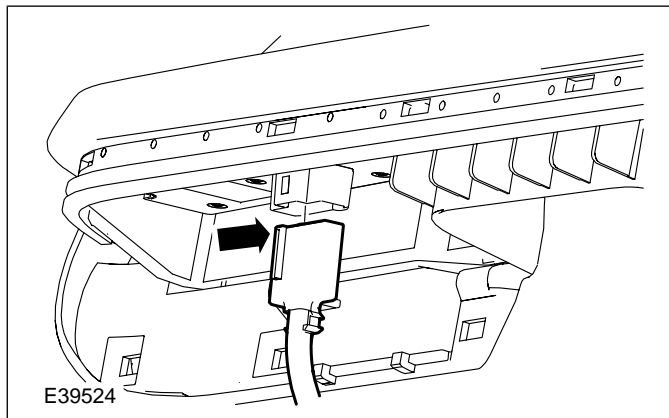
For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

4. Remove the front door window regulator grommets.

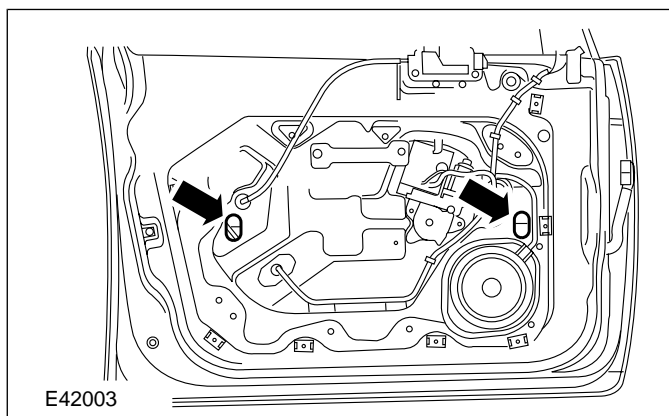


5. **NOTE:** Support the front door power window control unit.

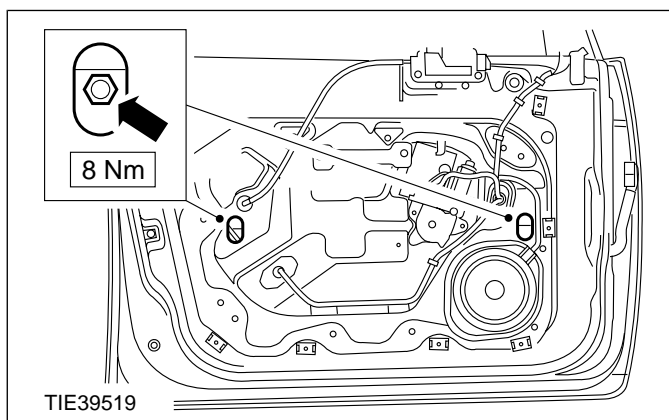
Connect the front door power window control switch electrical connector.



6. Using the front door power window control switch, align the window glass clamp retaining bolts with the access holes.



7. Loosen the front door window glass clamp retaining bolts.



8. Raise the front door window glass.

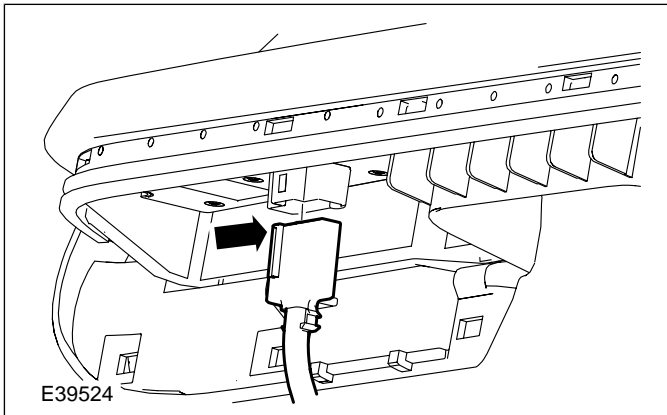
501-14-86

Handles, Locks, Latches and Entry Systems

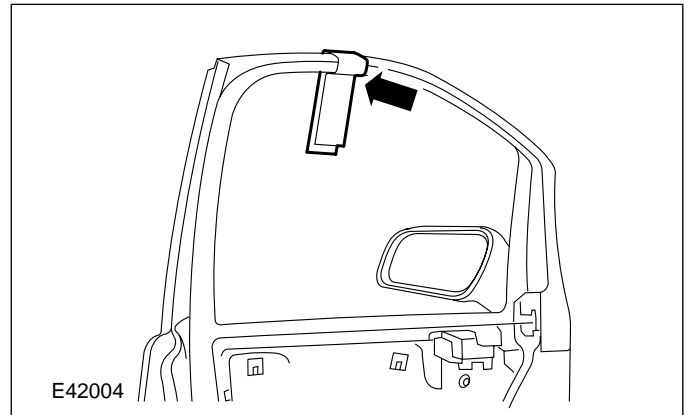
501-14-86

REMOVAL AND INSTALLATION

9. Disconnect the front door power window control switch electrical connector.



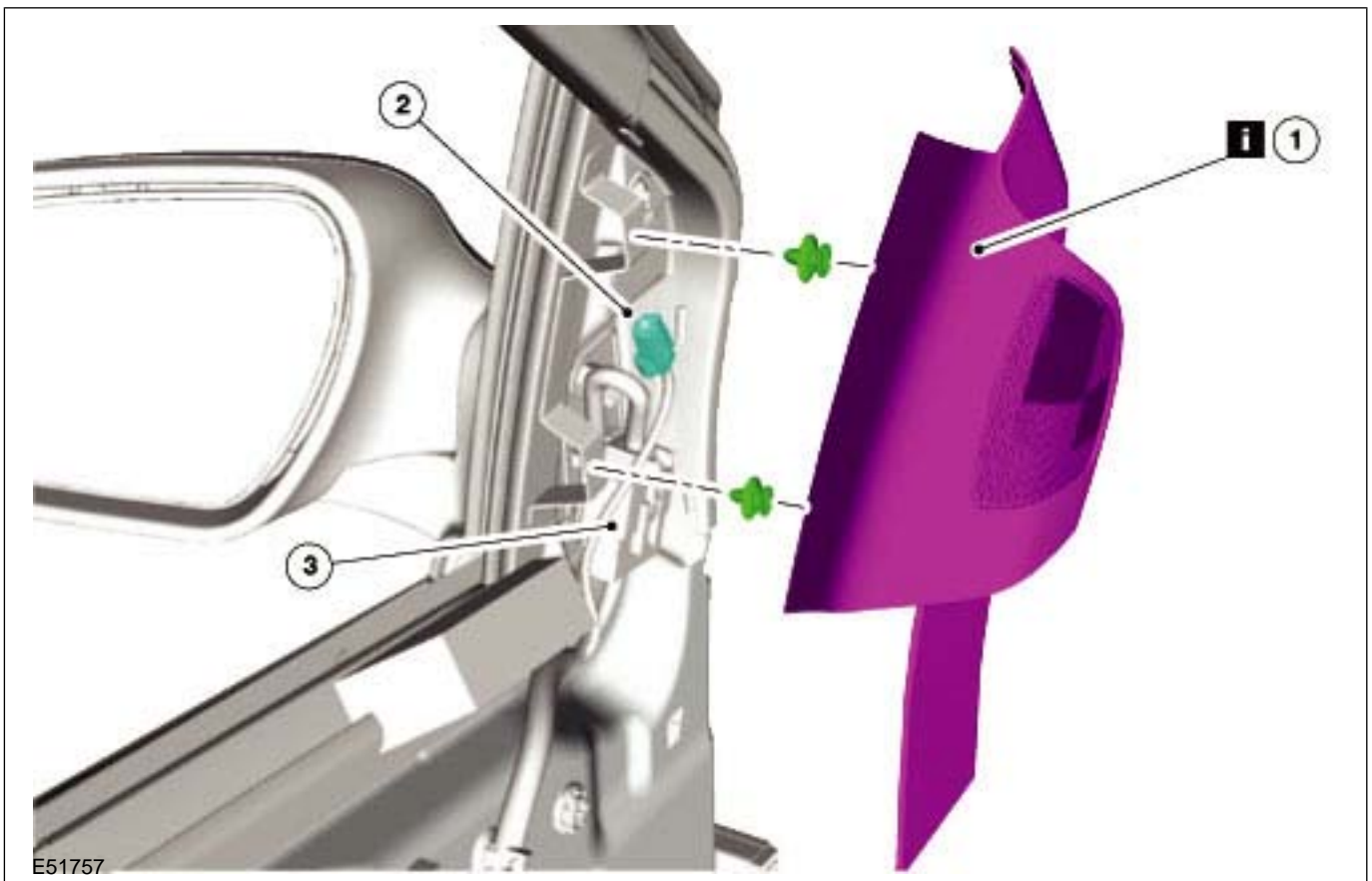
10. Using suitable tape, secure the front door window glass to the front door.



11. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

12. Remove the components in the order indicated in the following illustration(s) and table(s).



501-14-87

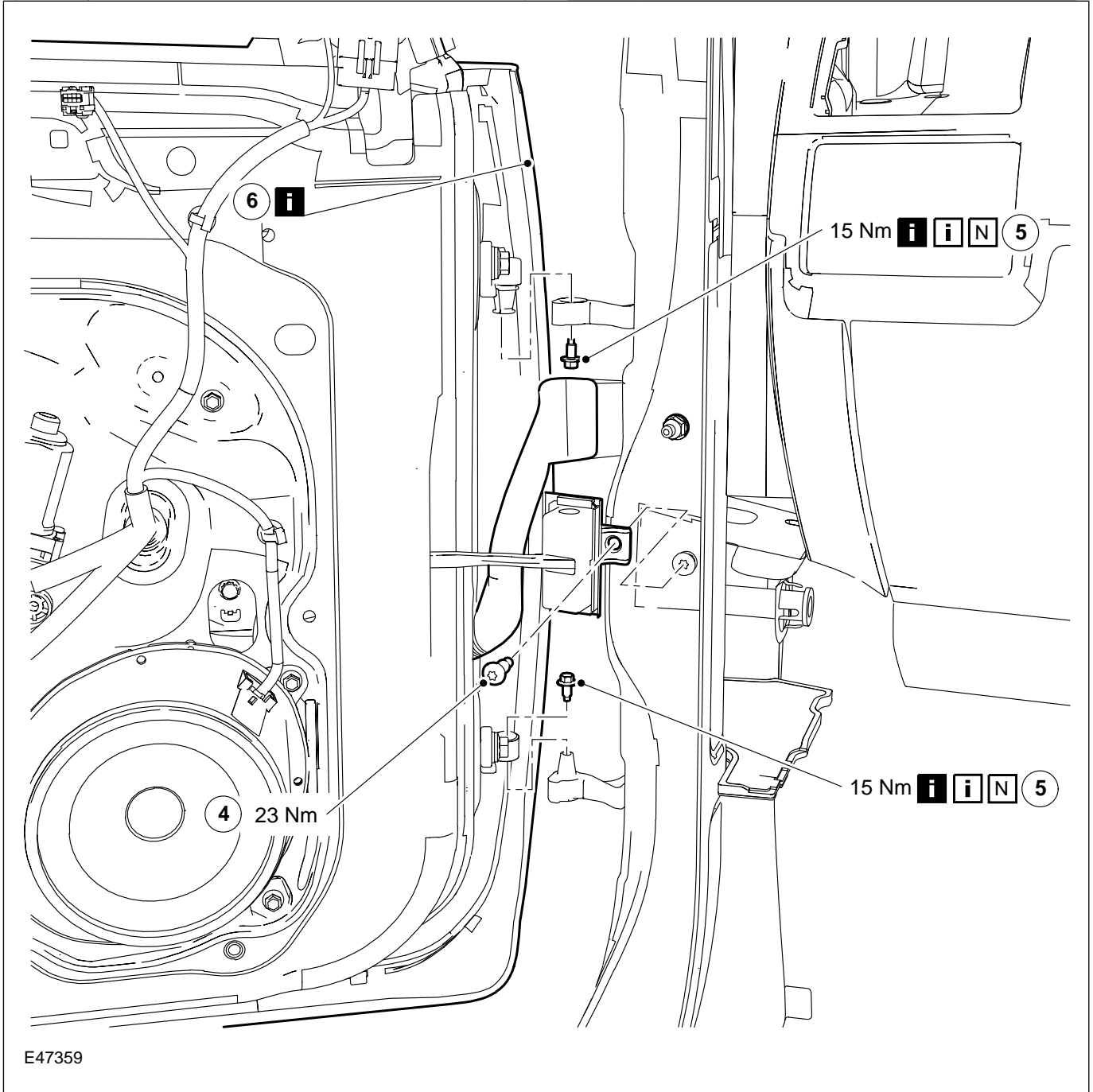
Handles, Locks, Latches and Entry Systems

501-14-87

REMOVAL AND INSTALLATION

Item	Description
1	Exterior mirror interior trim panel See Removal Detail
2	Front door tweeter speaker electrical

Item	Description
	connector
3	Exterior mirror electrical connector (if equipped)

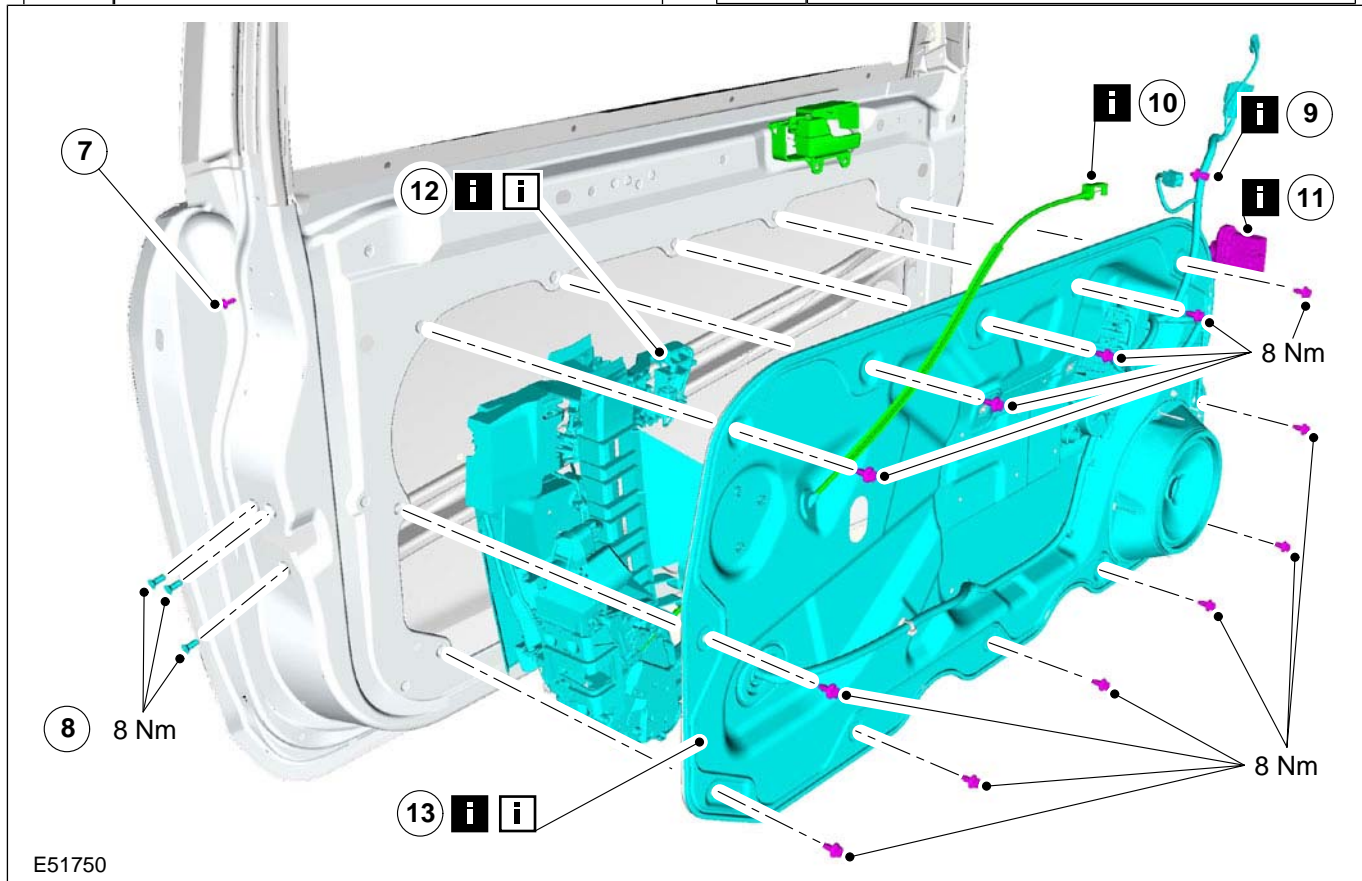


E47359

REMOVAL AND INSTALLATION

Item	Description
4	Door check strap retaining bolt
5	Door hinge retaining bolts See Removal Detail

Item	Description
	See Installation Detail
6	Door (left-hand door shown) See Removal Detail

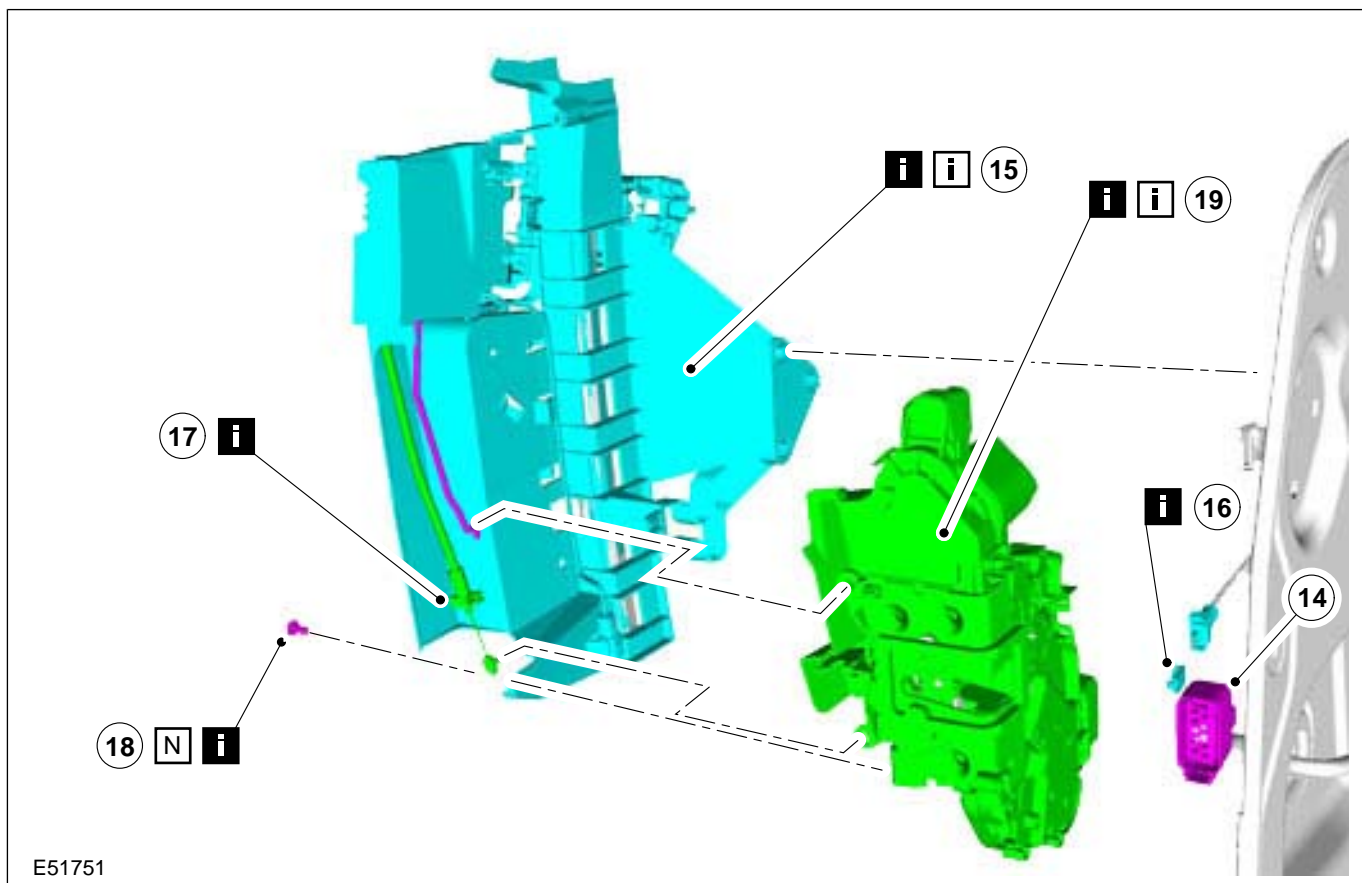


E51750

Item	Description
7	Front door handle, lock and latch retaining bracket retaining screw
8	Front door latch retaining bolts
9	Front door wiring harness retaining clip See Removal Detail
10	Front door latch remote control cable See Removal Detail

Item	Description
11	Front door wiring harness See Removal Detail
12	Front door lock actuator retaining screw See Removal Detail See Installation Detail
13	Front door inner panel See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION



E51751

Item	Description
14	Front door latch electrical connector
15	Front door handle, lock and latch retaining bracket <i>See Removal Detail</i> <i>See Installation Detail</i>
16	Front door latch remote control cable <i>See Removal Detail</i>
17	Front exterior door handle remote control cable <i>See Removal Detail</i>

Item	Description
18	Front door latch retaining bracket retaining rivet <i>See Removal Detail</i>
19	Front door latch <i>See Removal Detail</i> <i>See Installation Detail</i>

13. To install, reverse the removal procedure.

14. Vehicles with global closing, initialize the door window motors.

For additional information, refer to: Door Window Motor Initialization.

Removal Details

Item 1 Exterior mirror interior trim panel

⚠ CAUTION: Do not place excessive strain on the exterior mirror and front door tweeter speaker wiring harness.

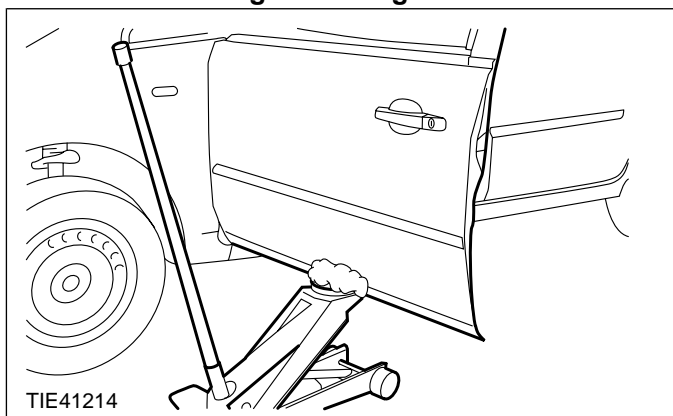
501-14-90

Handles, Locks, Latches and Entry Systems

501-14-90

REMOVAL AND INSTALLATION

Item 5 Door hinge retaining bolts

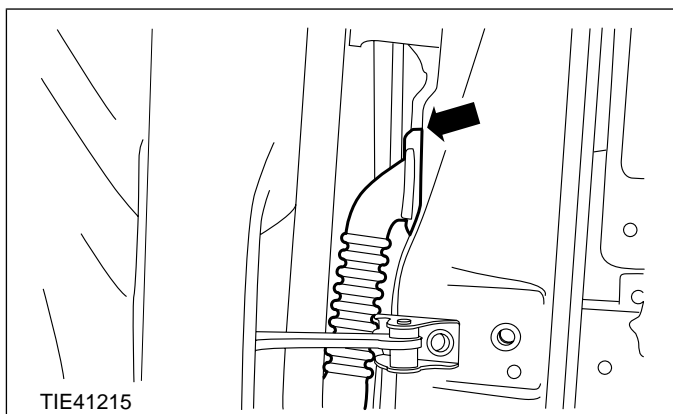


1. **CAUTION:** Protect the door using a soft cloth to prevent damage to the front door.

With the aid of another technician and a suitable trolley jack, support and detach the front door from the front door hinges.

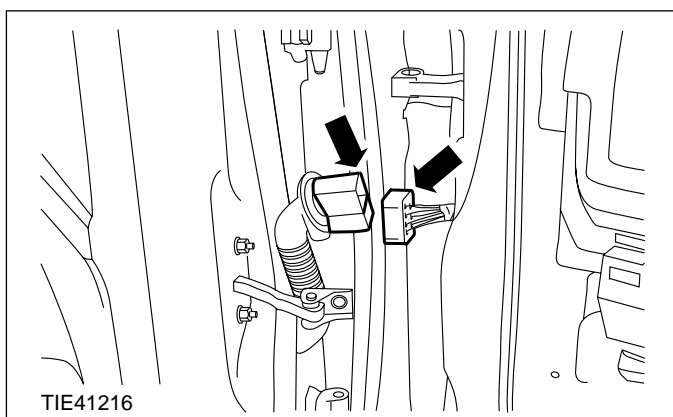
Item 6 Door (left-hand door shown)

1. Detach the electrical connector from the A-pillar.



2. Remove the front door.

- Disconnect the electrical connector.

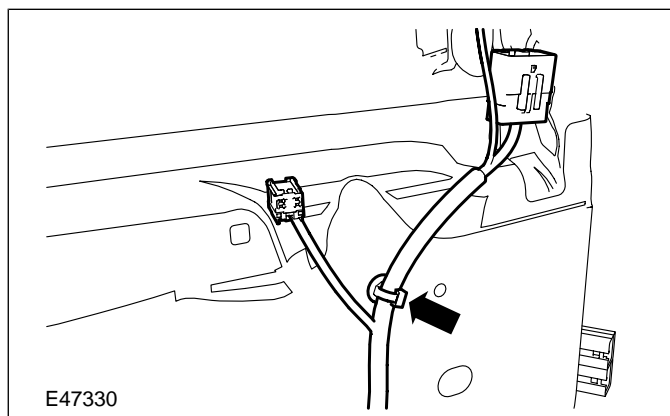


3. **CAUTION:** After the front door wiring harness electrical connector has been disconnected, position the front door back onto the front door hinges. Failure to follow this instruction may cause damage to the front door.

Position the front door onto the front door hinges.

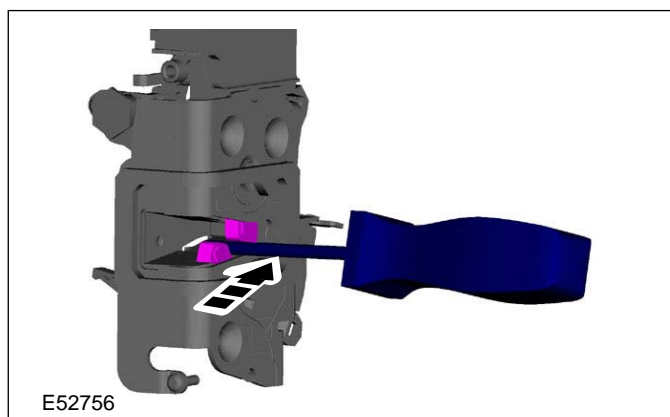
Item 9 Front door wiring harness retaining clip

1. Detach the front door wiring harness retaining clip from the front door.



Item 10 Front door latch remote control cable

1. Using a suitable screwdriver, latch the front door lock into the closed position.

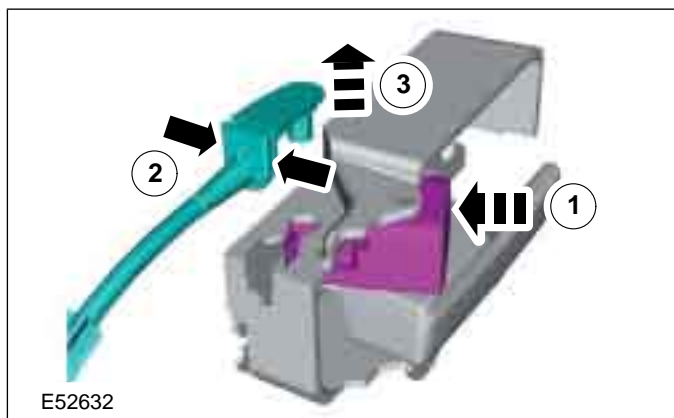


2. Detach the front door latch remote control cable from the front door latch remote control handle.

1. Operate the door latch remote control handle lock to the lock position.
2. Release the remote control cable retaining clips.

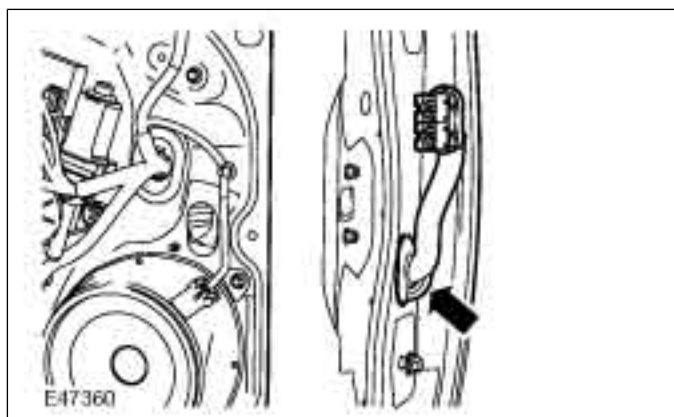
REMOVAL AND INSTALLATION

3. Detach the inner remote control cable from the remote control handle lock lever.



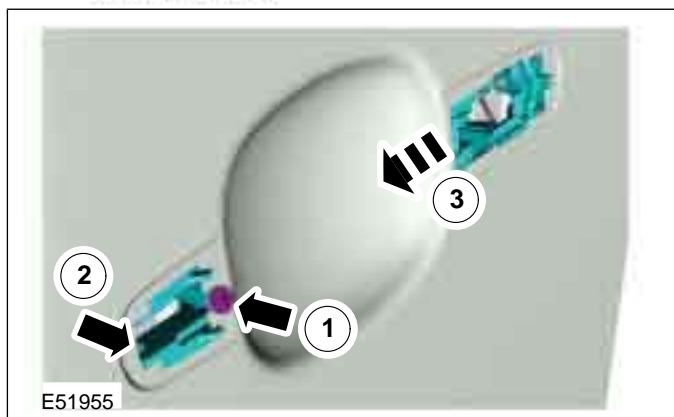
Item 11 Front door wiring harness

1. Detach and push the front door wiring harness into the front door.



Item 12 Front door lock actuator retaining screw

1. Detach the front door lock actuator.
 1. Loosen the door lock actuator retaining screw.
 2. Release the door lock actuator retaining clip.
 3. Slide the door lock actuator towards the front of the vehicle.

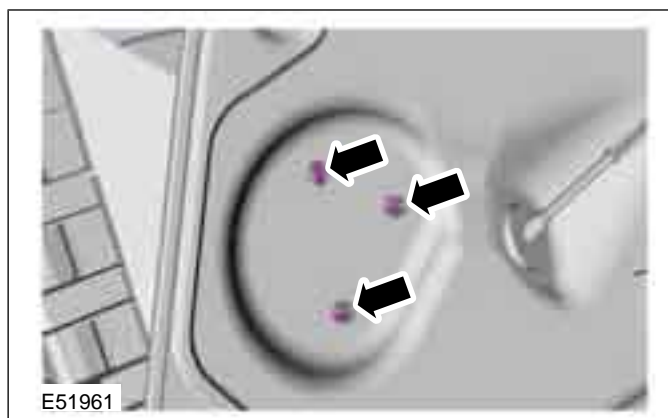


Item 13 Front door inner panel

- CAUTION:** When removing the front door inner panel, care must be taken that the door wiring harness is not trapped or placed under excessive strain.

Item 15 Front door handle, lock and latch retaining bracket

1. Press in the centers of the front door handle, lock and latch retaining bracket retaining clip locking pins.



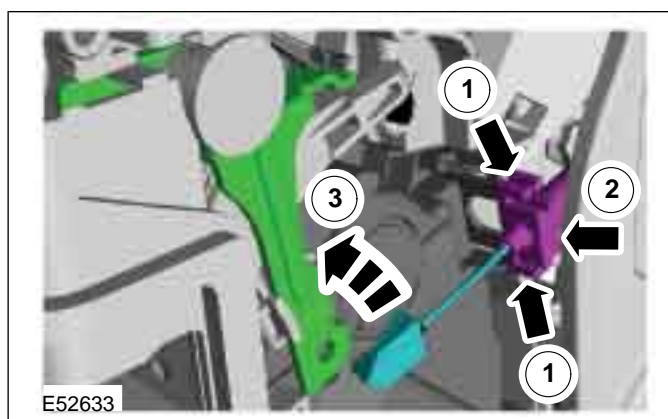
Item 16 Front door latch remote control cable

1. **NOTE:** Do not kink the front door latch remote control cable.

NOTE: In order to remove the front door latch remote control cable from the front door latch lever the cable must be rotated.

Disconnect the front door latch remote control cable from the front door latch.

1. Using a suitable screwdriver, release the front door latch remote control cable locking tangs from the front door latch.
2. Detach the front door latch remote control outer cable from the front door latch.
3. Rotate the front door latch remote control cable.



REMOVAL AND INSTALLATION

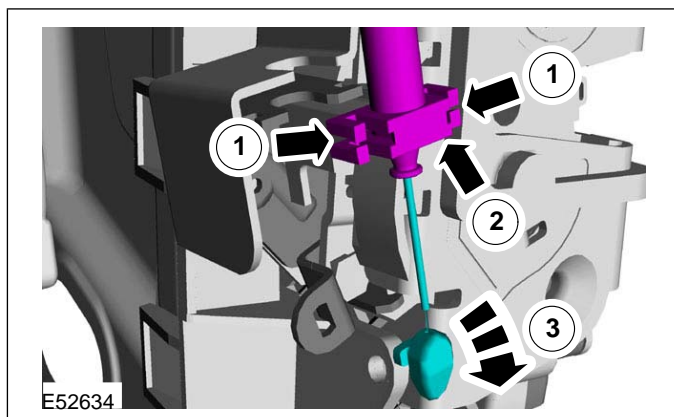
Item 17 Front exterior door handle remote control cable

1. **NOTE: Do not kink the front exterior door handle remote control cable.**

NOTE: In order to remove the front exterior door handle remote control cable from the front door latch lever the cable must be rotated.

Disconnect the front exterior door handle remote control cable from the front door latch.

1. Using a suitable screwdriver, release the front exterior door handle remote control outer cable locking tangs from the front door latch.
2. Detach the front exterior door handle remote control cable from the front door latch.
3. Rotate the front exterior door handle remote control cable.

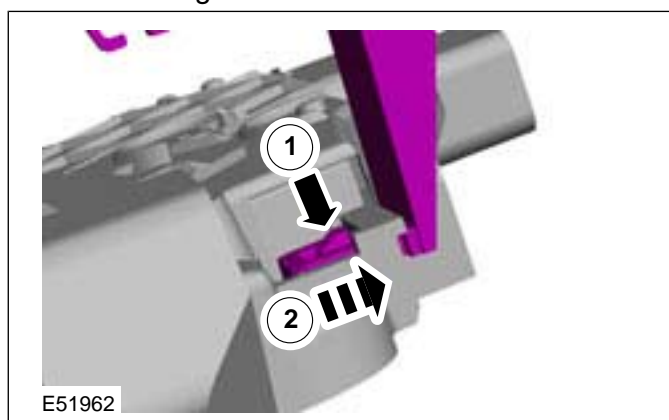
**Item 18** Front door latch retaining bracket retaining rivet

1. Using a suitable Electric hand drill remove and discard the door latch retaining bracket retaining rivet.

Item 19 Front door latch

1. Detach the front door latch actuator from the front door handle, lock and latch retaining bracket.

1. Press the front door handle, lock and latch retaining bracket release clip.
2. Slide the front door handle, lock and latch retaining bracket out of the front door latch.



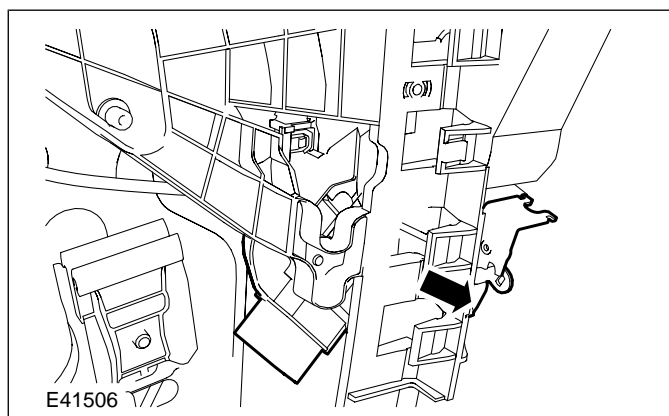
2. Detach the front door lock cylinder actuator rod from the front door latch.

Installation Details

Item 19 Front door latch

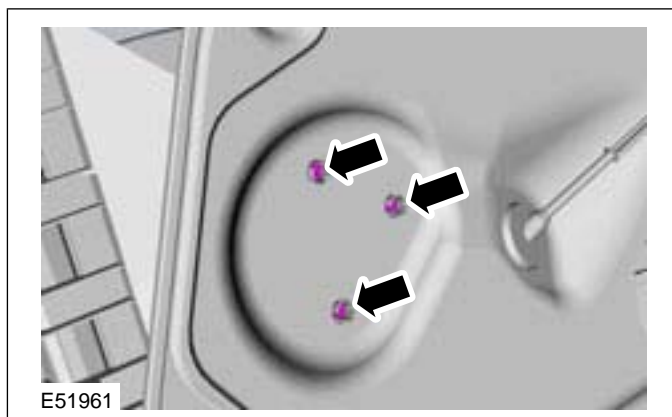
1. Connect the front door lock cylinder actuator rod to the front door latch.
2. Install the front door latch.

- Using a suitable Rivet gun install a new front door latch rivet.



REMOVAL AND INSTALLATION**Item 15** Front door handle, lock and latch retaining bracket

1. Install the front door handle, lock and latch retaining bracket to the door inner panel.
2. From the back of the front door handle, lock and latch retaining bracket press in the retaining clip locking pins.

**Item 13** Front door inner panel

1. Before installing the front door inner panel retaining bolts, feed the door wiring harness electrical connector through the front door wiring harness hole.

Item 12 Front door lock actuator retaining screw

1. Install the front door lock actuator to the front door.
2. Tighten the front door lock actuator retaining screw.

Item 5 Door hinge retaining bolts

1. Apply a coating of adhesive to the door hinge center retaining bolts.

501-14-94

Handles, Locks, Latches and Entry Systems

501-14-94

REMOVAL AND INSTALLATION

Front Door Latch — 3-Door, Vehicles With: Keyless Vehicle System

General Equipment

Electric hand drill

Rivet gun

Materials

Name	Specification
Adhesive - Loctite 243	WSK-M2G349-A7

1. Remove the front door trim panel.

For additional information, refer to: **Front Door Trim Panel - 3-Door** (501-05 Interior Trim and Ornamentation, Removal and Installation).

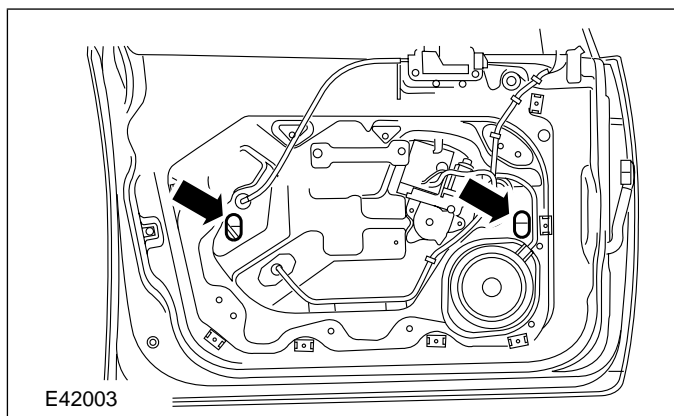
2. Remove the exterior front door handle.

For additional information, refer to: **Exterior Front Door Handle - Vehicles With: Keyless Vehicle System** (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).

3. Connect the battery ground cable.

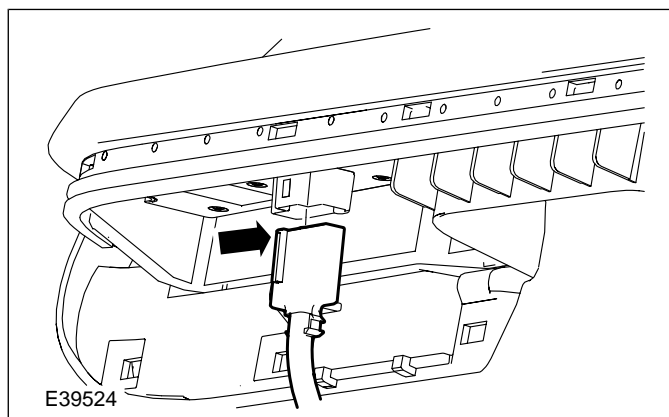
For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

4. Remove the front door window regulator grommets.

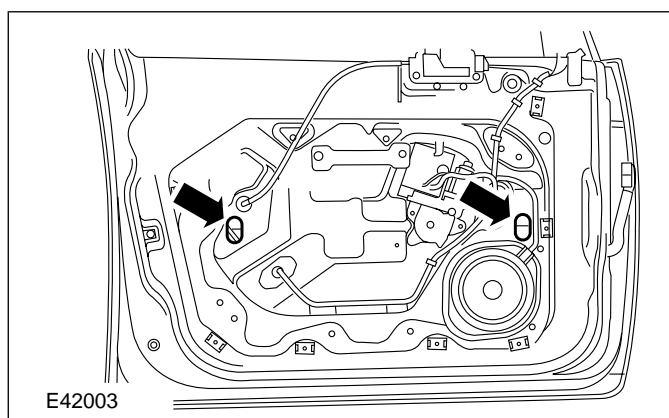


5. NOTE: Support the front door power window control unit.

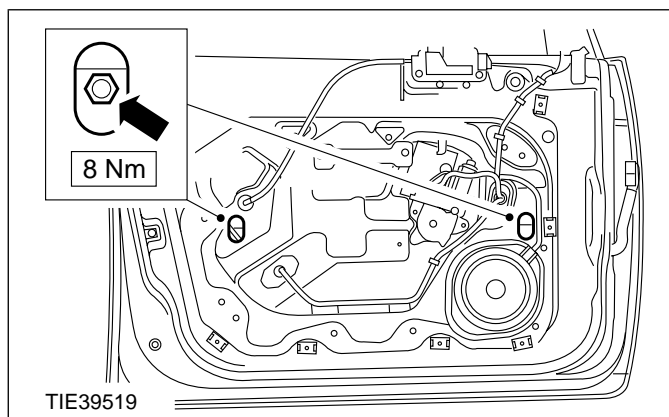
Connect the front door power window control switch electrical connector.



6. Using the front door power window control switch, align the window glass clamp retaining bolts with the access holes.



7. Loosen the front door window glass clamp retaining bolts.



8. Raise the front door window glass.

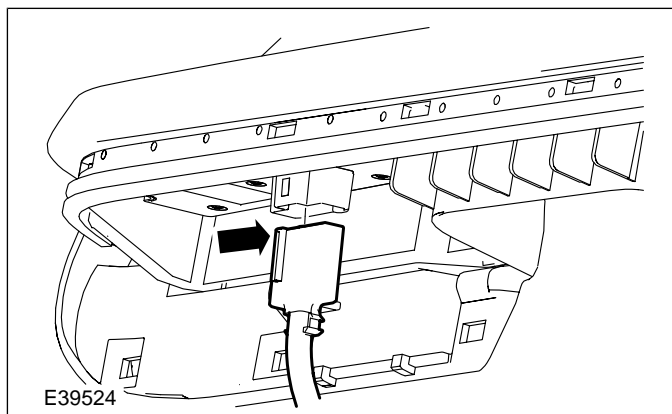
501-14-95

Handles, Locks, Latches and Entry Systems

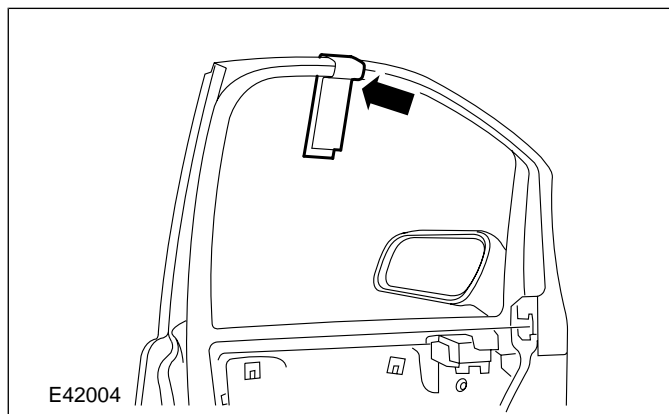
501-14-95

REMOVAL AND INSTALLATION

9. Disconnect the front door power window control switch electrical connector.



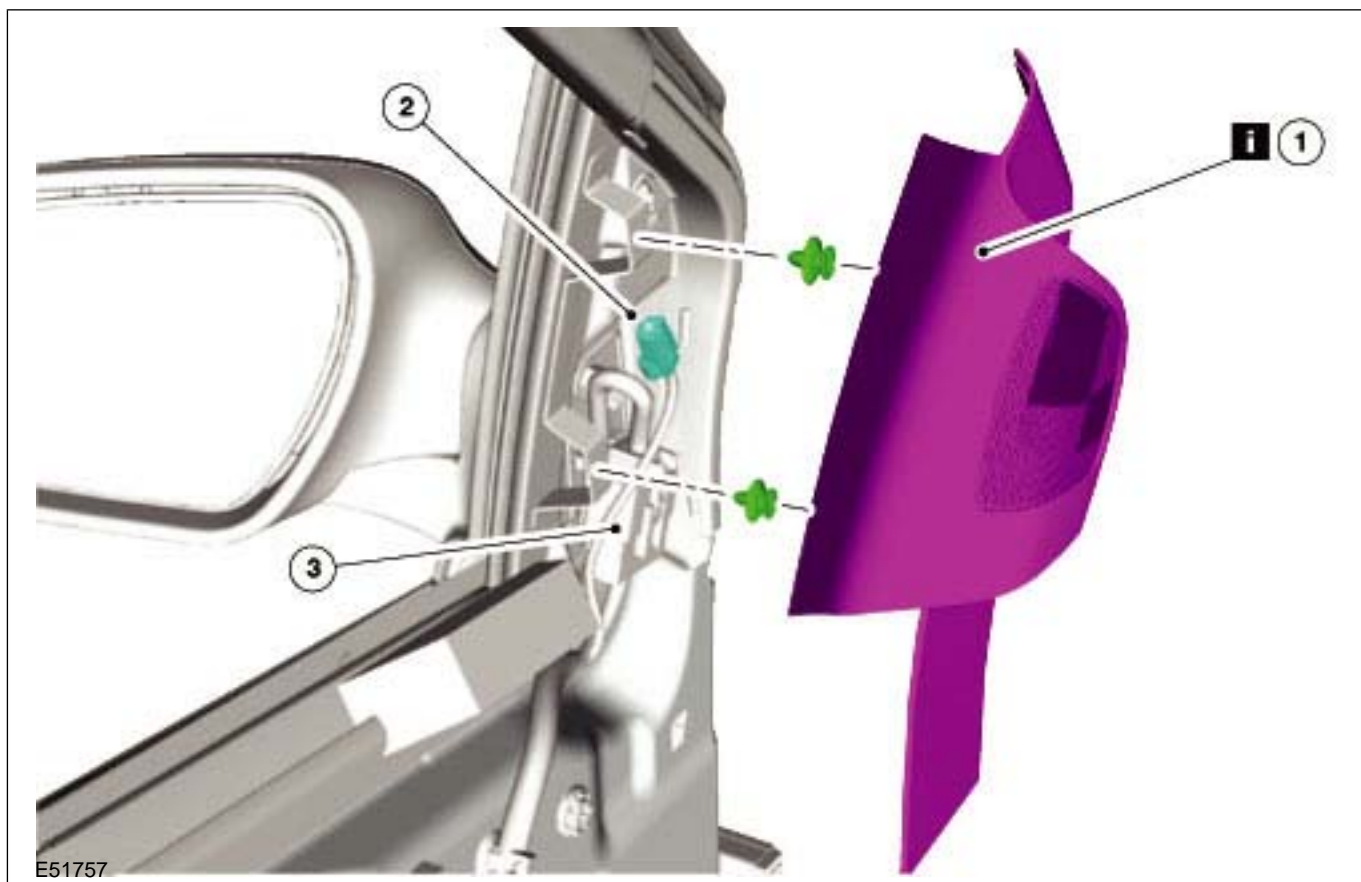
10. Using suitable tape, secure the front door window glass to the front door.



11. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

12. Remove the components in the order indicated in the following illustration(s) and table(s).



501-14-96

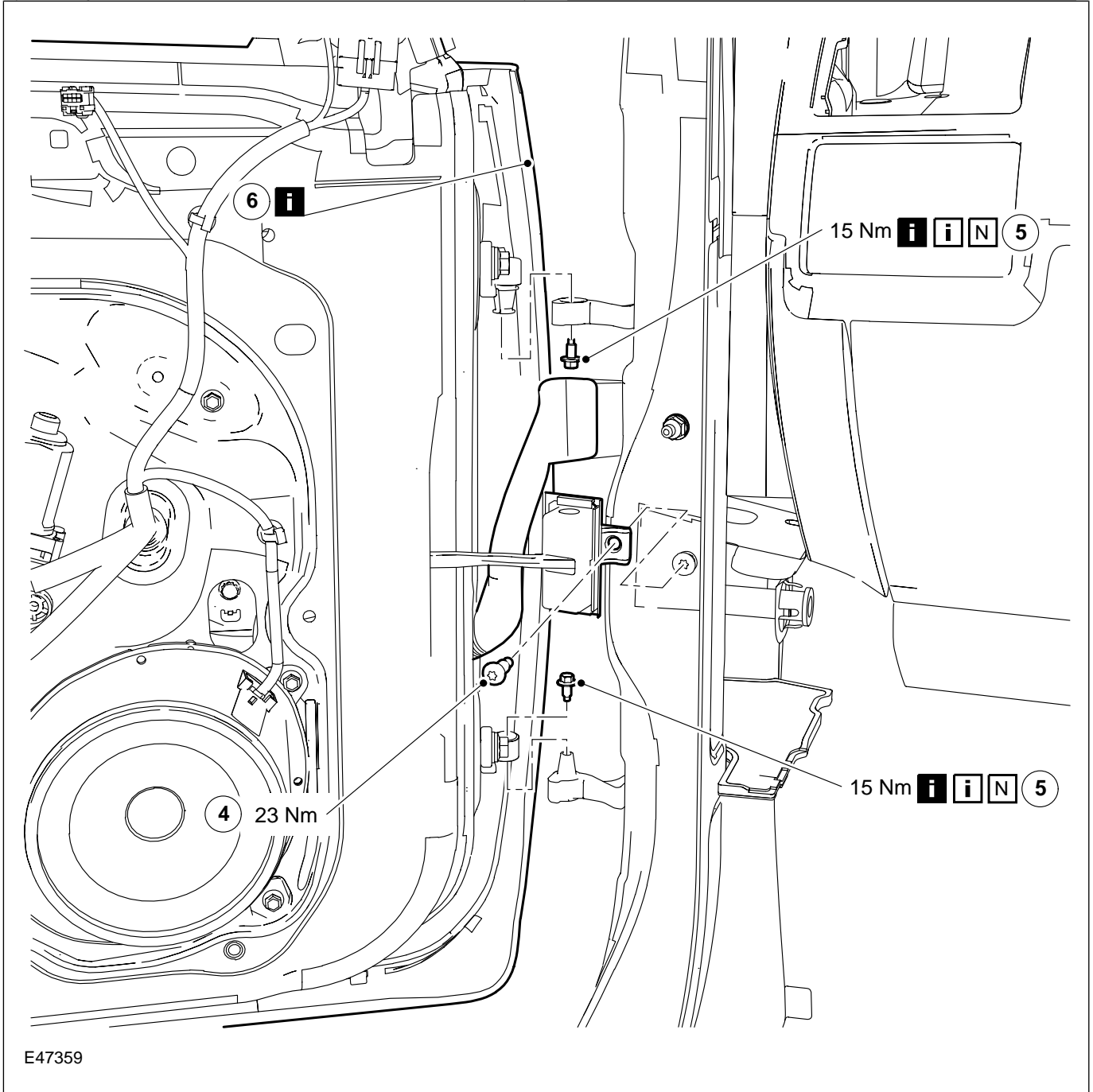
Handles, Locks, Latches and Entry Systems

501-14-96

REMOVAL AND INSTALLATION

Item	Description
1	Exterior mirror interior trim panel See Removal Detail
2	Front door tweeter speaker electrical

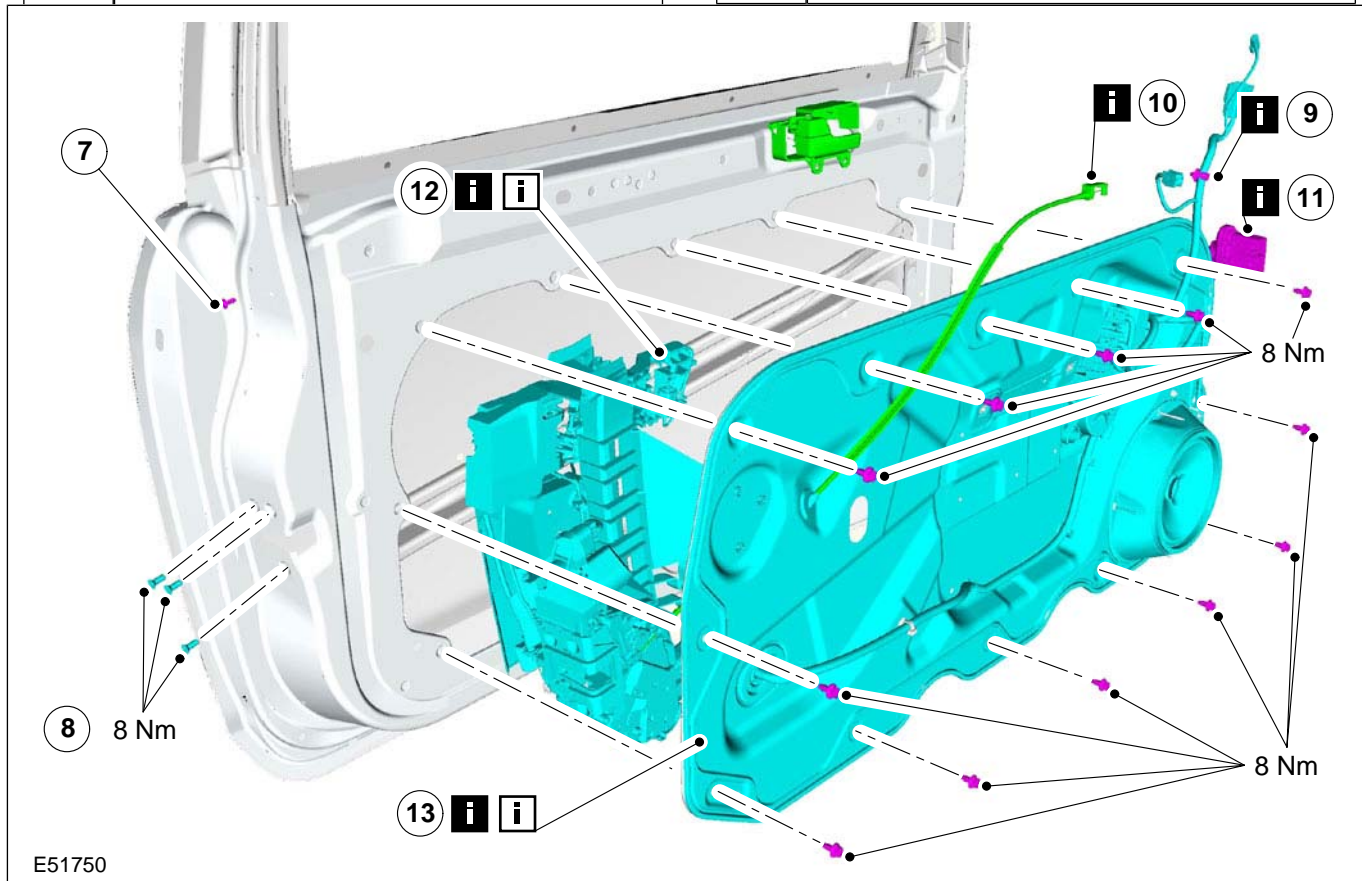
Item	Description
	connector
3	Exterior mirror electrical connector (if equipped)



REMOVAL AND INSTALLATION

Item	Description
4	Door check strap retaining bolt
5	Door hinge retaining bolts See Removal Detail

Item	Description
	See Installation Detail
6	Door (left-hand door shown) See Removal Detail

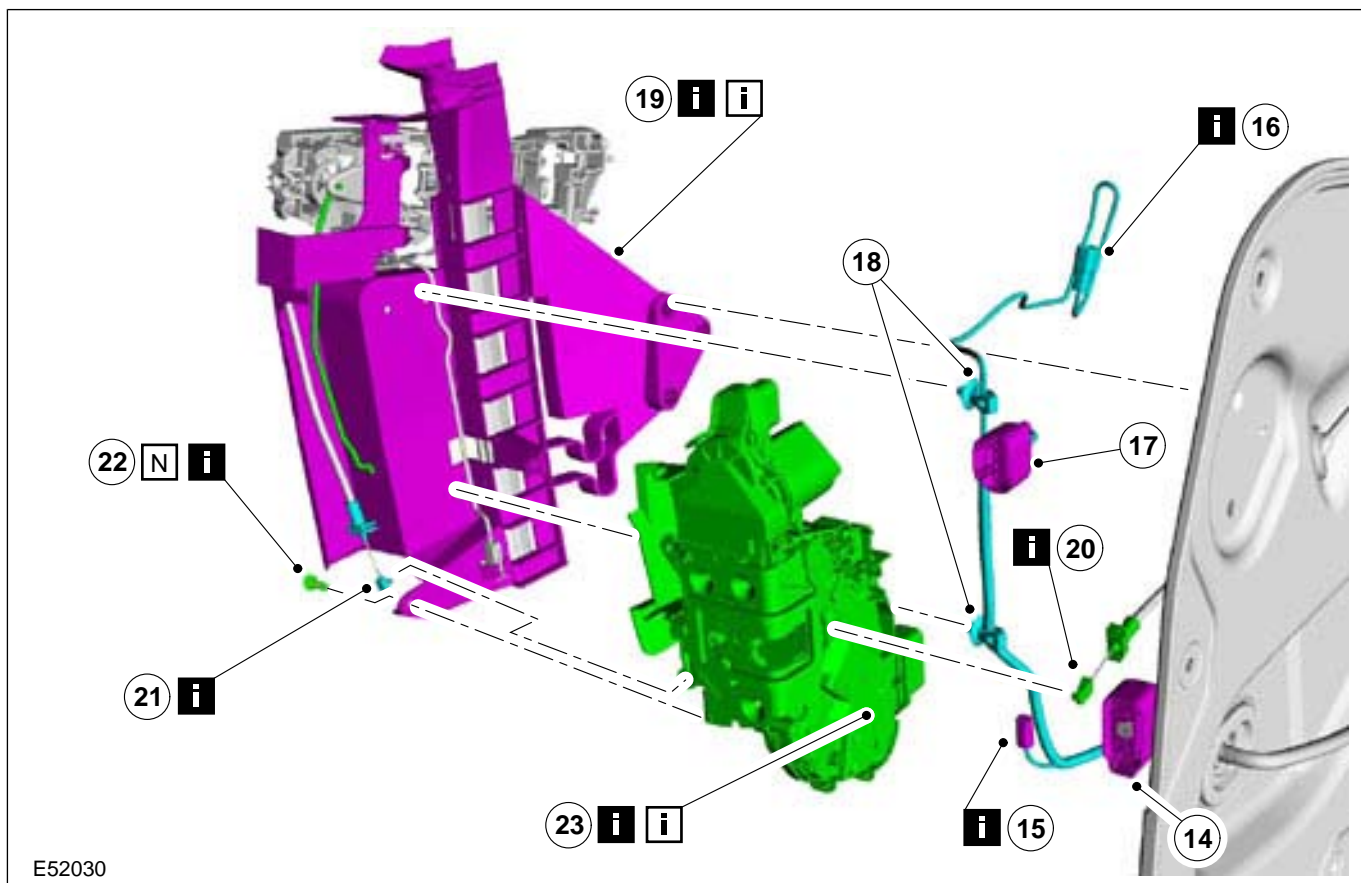


E51750

Item	Description
7	Front door handle, lock and latch retaining bracket retaining screw
8	Front door latch retaining bolts
9	Front door wiring harness retaining clip See Removal Detail
10	Front door latch remote control cable See Removal Detail

Item	Description
11	Front door wiring harness See Removal Detail
12	Front door lock actuator retaining screw See Removal Detail See Installation Detail
13	Front door inner panel See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION



E52030

Item	Description
14	Front door latch electrical connector
15	Front door lock cylinder position sensor electrical connector <i>See Removal Detail</i>
16	Exterior front door handle RKE electrical connector <i>See Removal Detail</i>
17	Front door latch RKE electrical connector
18	Exterior front door handle RKE wiring harness retaining clips
19	Front door handle, lock and latch retaining bracket <i>See Removal Detail</i> <i>See Installation Detail</i>

Item	Description
20	Front door latch remote control cable <i>See Removal Detail</i>
21	Front exterior door handle remote control cable <i>See Removal Detail</i>
22	Front door latch retaining bracket retaining rivet <i>See Removal Detail</i>
23	Front door latch <i>See Removal Detail</i> <i>See Installation Detail</i>

13. To install, reverse the removal procedure.

14. Vehicles with global closing, initialize the door window motors.

For additional information, refer to: Door Window Motor Initialization.

Removal Details

501-14-99

Handles, Locks, Latches and Entry Systems

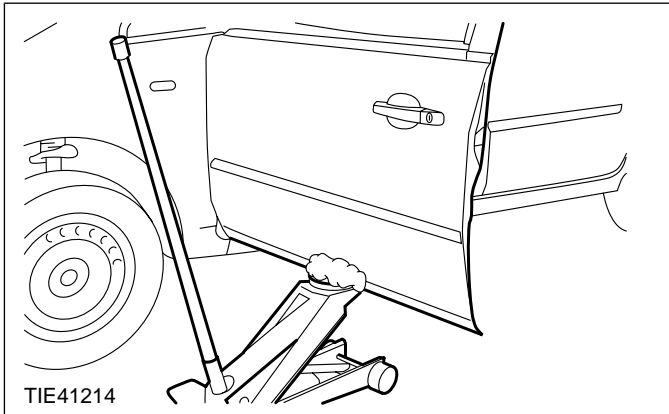
501-14-99

REMOVAL AND INSTALLATION

Item 1 Exterior mirror interior trim panel

- ⚠ CAUTION:** Do not place excessive strain on the exterior mirror and front door tweeter speaker wiring harness.

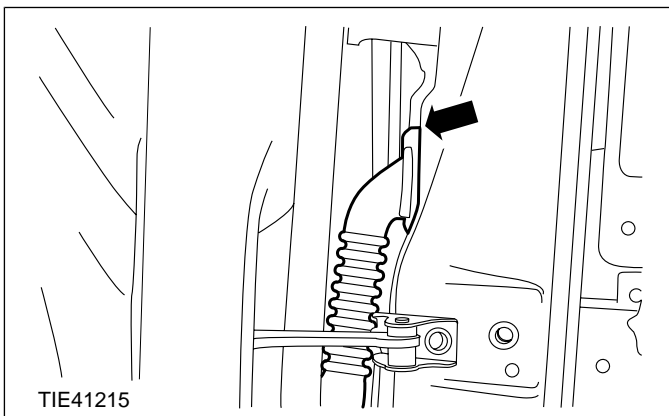
Item 5 Door hinge retaining bolts



- ⚠ CAUTION:** Protect the door using a soft cloth to prevent damage to the front door.
With the aid of another technician and a suitable trolley jack, support and detach the front door from the front door hinges.

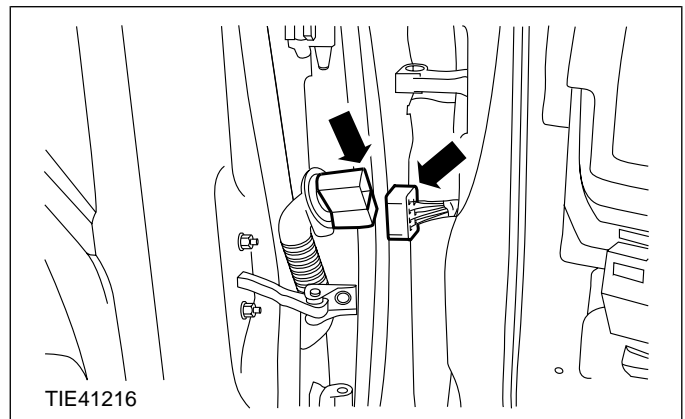
Item 6 Door (left-hand door shown)

- Detach the electrical connector from the A-pillar.



- Remove the front door.

- Disconnect the electrical connector.

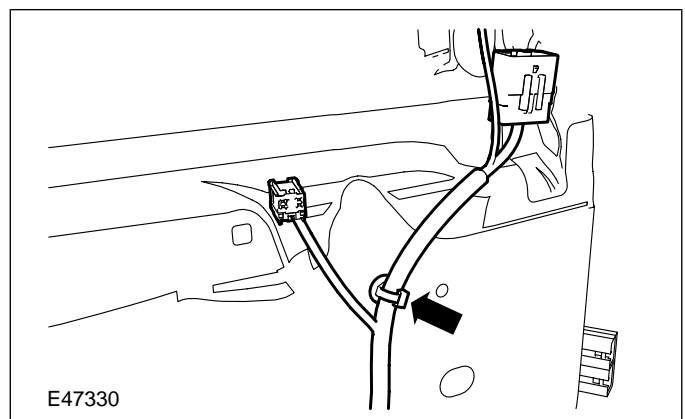


- ⚠ CAUTION:** After the front door wiring harness electrical connector has been disconnected, position the front door back onto the front door hinges. Failure to follow this instruction may cause damage to the front door.

Position the front door onto the front door hinges.

Item 9 Front door wiring harness retaining clip

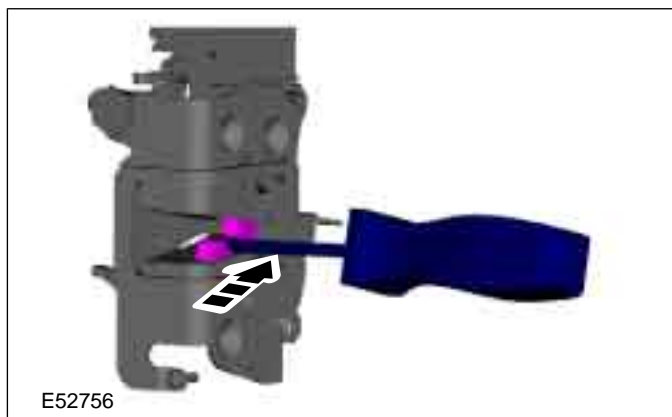
- Detach the front door wiring harness retaining clip from the front door.



REMOVAL AND INSTALLATION

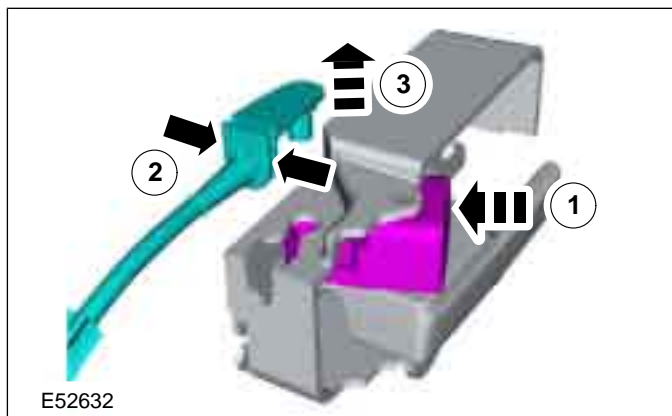
Item 10 Front door latch remote control cable

1. Using a suitable screwdriver, latch the front door lock into the closed position.

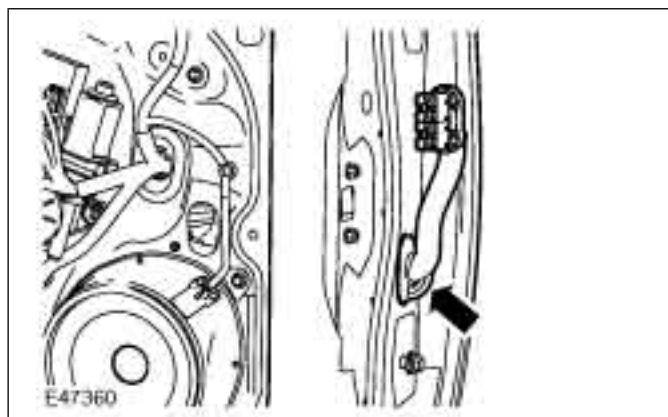


2. Detach the front door latch remote control cable from the front door latch remote control handle.

1. Operate the door latch remote control handle lock to the lock position.
2. Release the remote control cable retaining clips.
3. Detach the inner remote control cable from the remote control handle lock lever.

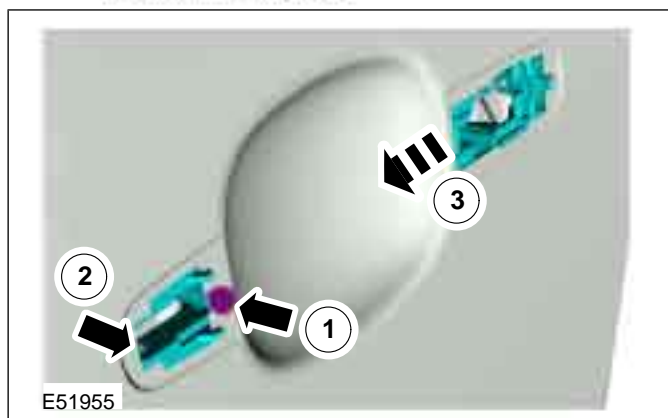
**Item 11** Front door wiring harness

1. Detach and push the front door wiring harness into the front door.

**Item 12** Front door lock actuator retaining screw

1. Detach the front door lock actuator.

1. Loosen the front door lock actuator retaining screw.
2. Release the front door lock actuator retaining clip.
3. Slide the front door lock actuator towards the front of the vehicle.

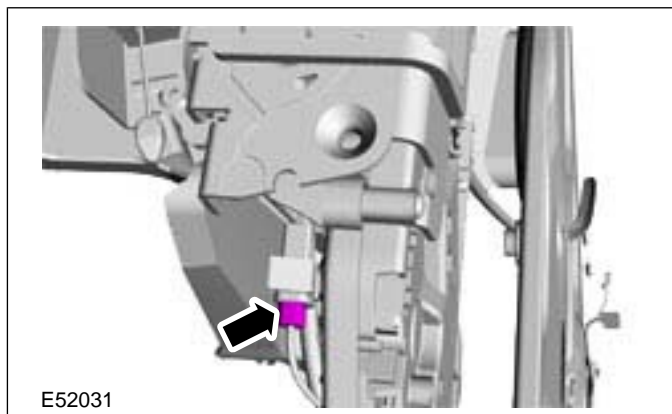
**Item 13** Front door inner panel

- ⚠ CAUTION:** When removing the front door inner panel, care must be taken that the door wiring harness is not trapped or placed under excessive strain.

REMOVAL AND INSTALLATION

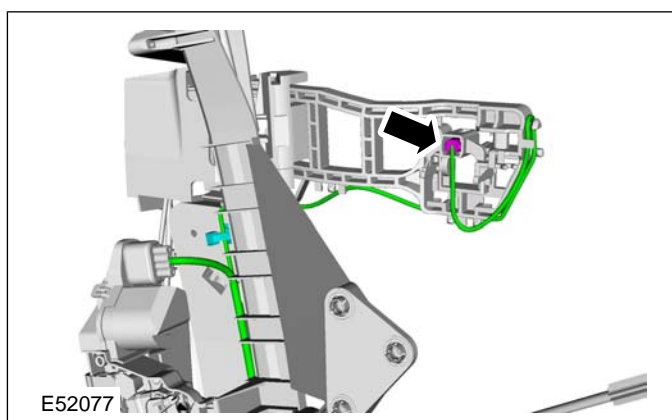
Item 15 Front door lock cylinder position sensor electrical connector

1. Disconnect the front door lock cylinder position sensor electrical connector.

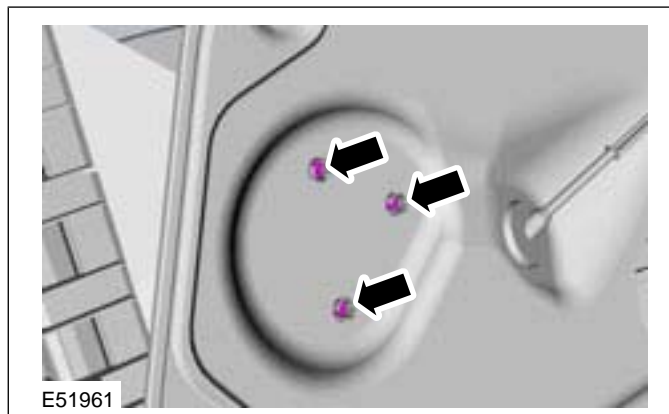
**Item 16** Exterior front door handle RKE electrical connector

NOTE: Make a note of the clipping position of the exterior front door handle RKE harness.

1. Detach the exterior front door handle RKE electrical connector and harness from the front door handle reinforcement.

**Item 19** Front door handle, lock and latch retaining bracket

1. Press in the centers of the front door handle, lock and latch retaining bracket retaining clip locking pins.

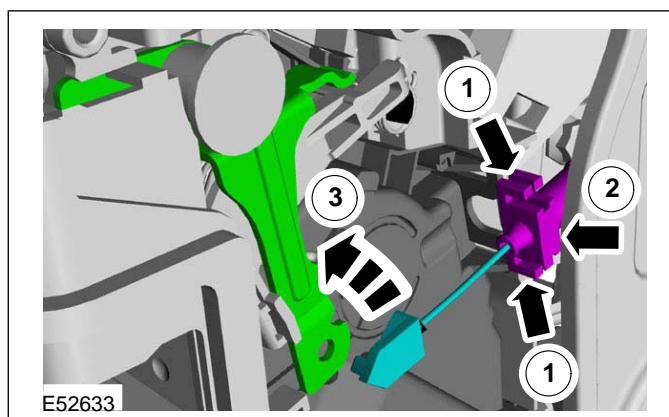
**Item 20** Front door latch remote control cable

1. **NOTE: Do not kink the front door latch remote control cable.**

NOTE: In order to remove the front door latch remote control cable from the front door latch lever the cable must be rotated.

Disconnect the front door latch remote control cable from the front door latch.

1. Using a suitable screwdriver, release the front door latch remote control cable locking tangs from the front door latch.
2. Detach the front door latch remote control outer cable from the front door latch.
3. Rotate the front door latch remote control cable.

**Item 21** Front exterior door handle remote control cable

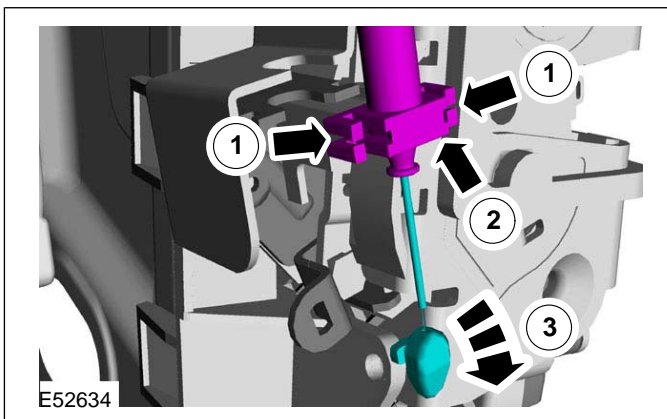
1. **NOTE: Do not kink the front exterior door handle remote control cable.**

REMOVAL AND INSTALLATION

NOTE: In order to remove the front exterior door handle remote control cable from the front door latch lever the cable must be rotated.

Disconnect the front exterior door handle remote control cable from the front door latch.

1. Using a suitable screwdriver, release the front exterior door handle remote control outer cable locking tangs from the front door latch.
2. Detach the front exterior door handle remote control cable from the front door latch.
3. Rotate the front exterior door handle remote control cable.



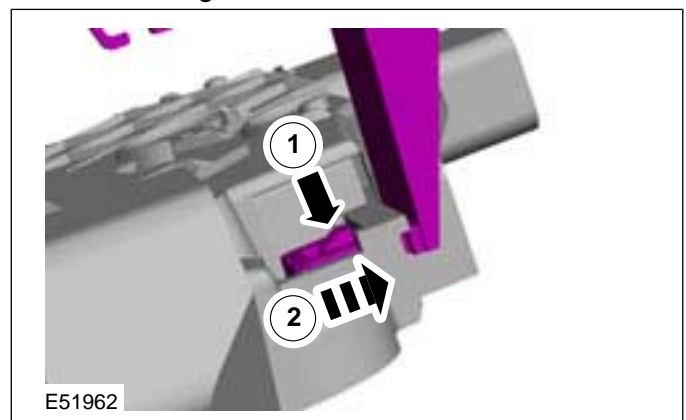
Item 22 Front door latch retaining bracket retaining rivet

1. Using a suitable Electric hand drill remove and discard the door latch retaining bracket retaining rivet.

Item 23 Front door latch

1. Detach the front door latch actuator from the front door handle, lock and latch retaining bracket.

1. Press the front door handle, lock and latch retaining bracket release clip.
2. Slide the front door handle, lock and latch retaining bracket out of the front door latch.

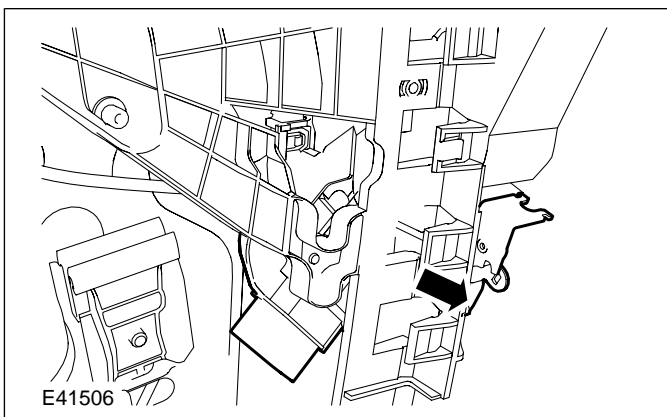


2. Detach the front door lock cylinder actuator rod from the front door latch.

Installation Details

Item 23 Front door latch

1. Connect the front door lock cylinder actuator rod to the front door latch.
2. Install the front door latch.
 - Using a suitable Rivet gun install a new front door latch rivet.

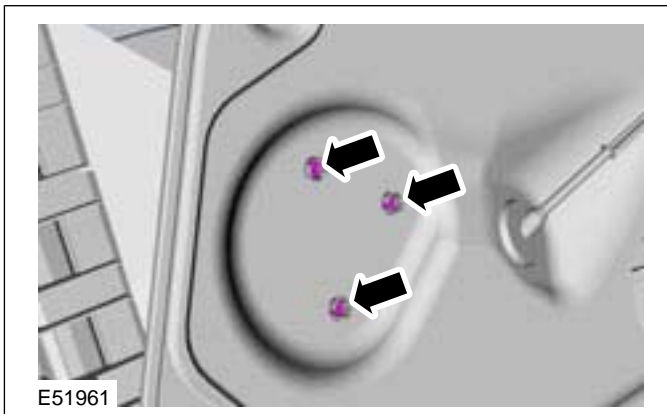


Item 19 Front door handle, lock and latch retaining bracket

1. Install the front door handle, lock and latch retaining bracket to the door inner panel.

REMOVAL AND INSTALLATION

2. From the back of the front door handle, lock and latch retaining bracket press in the retaining clip locking pins.

**Item 13 Front door inner panel**

1. Before installing the front door inner panel retaining bolts, feed the door wiring harness electrical connector through the front door wiring harness hole.

Item 12 Front door lock actuator retaining screw

1. Install the front door lock actuator to the front door.
2. Tighten the front door lock actuator retaining screw.

Item 5 Door hinge retaining bolts

1. Apply a coating of adhesive to the door hinge center retaining bolts.

REMOVAL AND INSTALLATION

Front Door Latch — 4-Door/5-Door/Wagon

General Equipment

Hand drill
Rivet gun
Trolley jack

Materials

Name	Specification
Adhesive - Loctite 243	WSK-M2G349-A7

1. Remove the front door trim panel.

For additional information, refer to: **Front Door Trim Panel - 4-Door/5-Door/Wagon** (501-05 Interior Trim and Ornamentation, Removal and Installation).

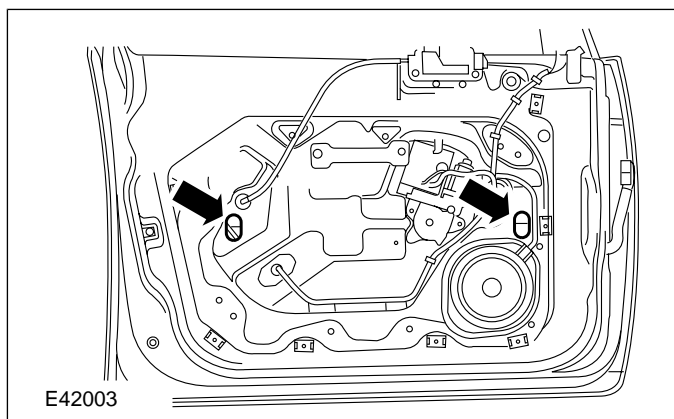
2. Remove the exterior front door handle.

For additional information, refer to: **Exterior Front Door Handle** (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).

3. Connect the battery ground cable.

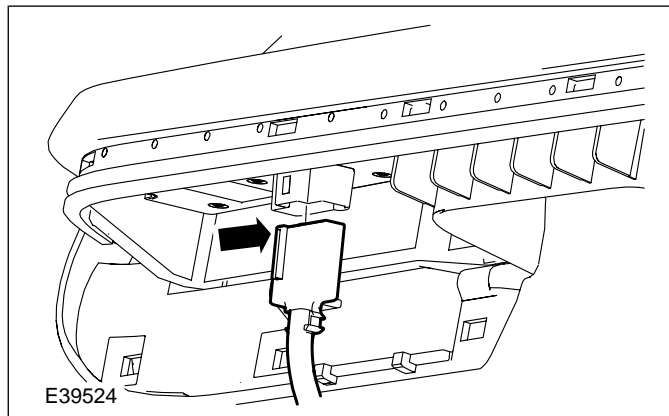
For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

4. Remove the front door window regulator grommets.

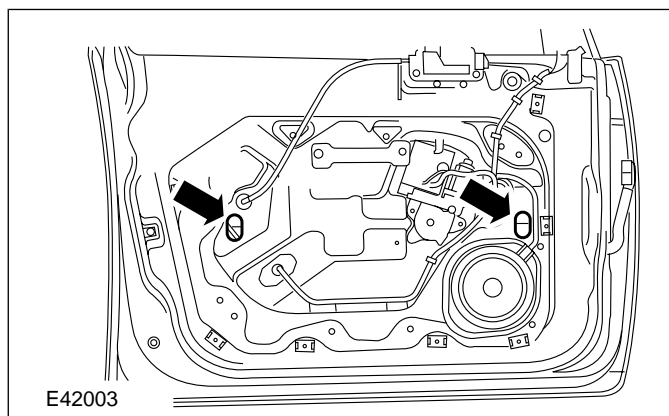


5. NOTE: Support the front door power window control unit.

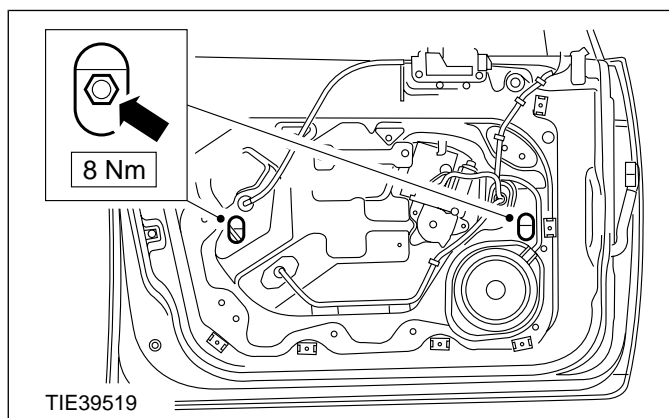
Connect the front door power window control unit electrical connector.



6. Using the front door power window control unit, align the front door window glass clamp retaining bolts with the access holes.

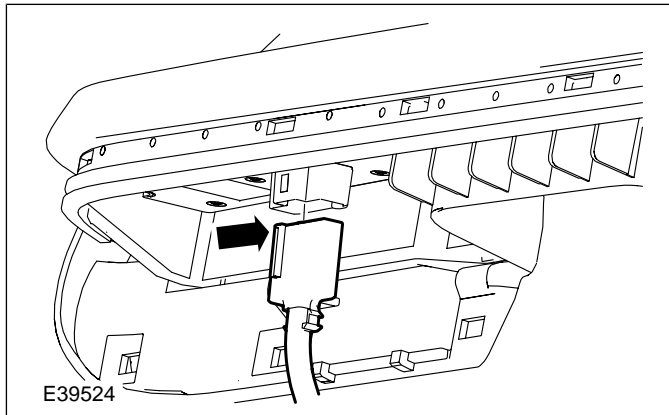


7. Loosen the front door window glass clamp retaining bolts.

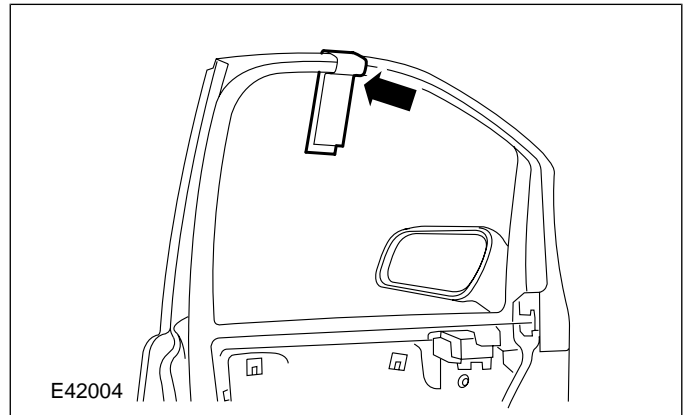


REMOVAL AND INSTALLATION

8. Disconnect the front door power window control unit electrical connector.



10. Using suitable tape, secure the front door window glass to the front door.

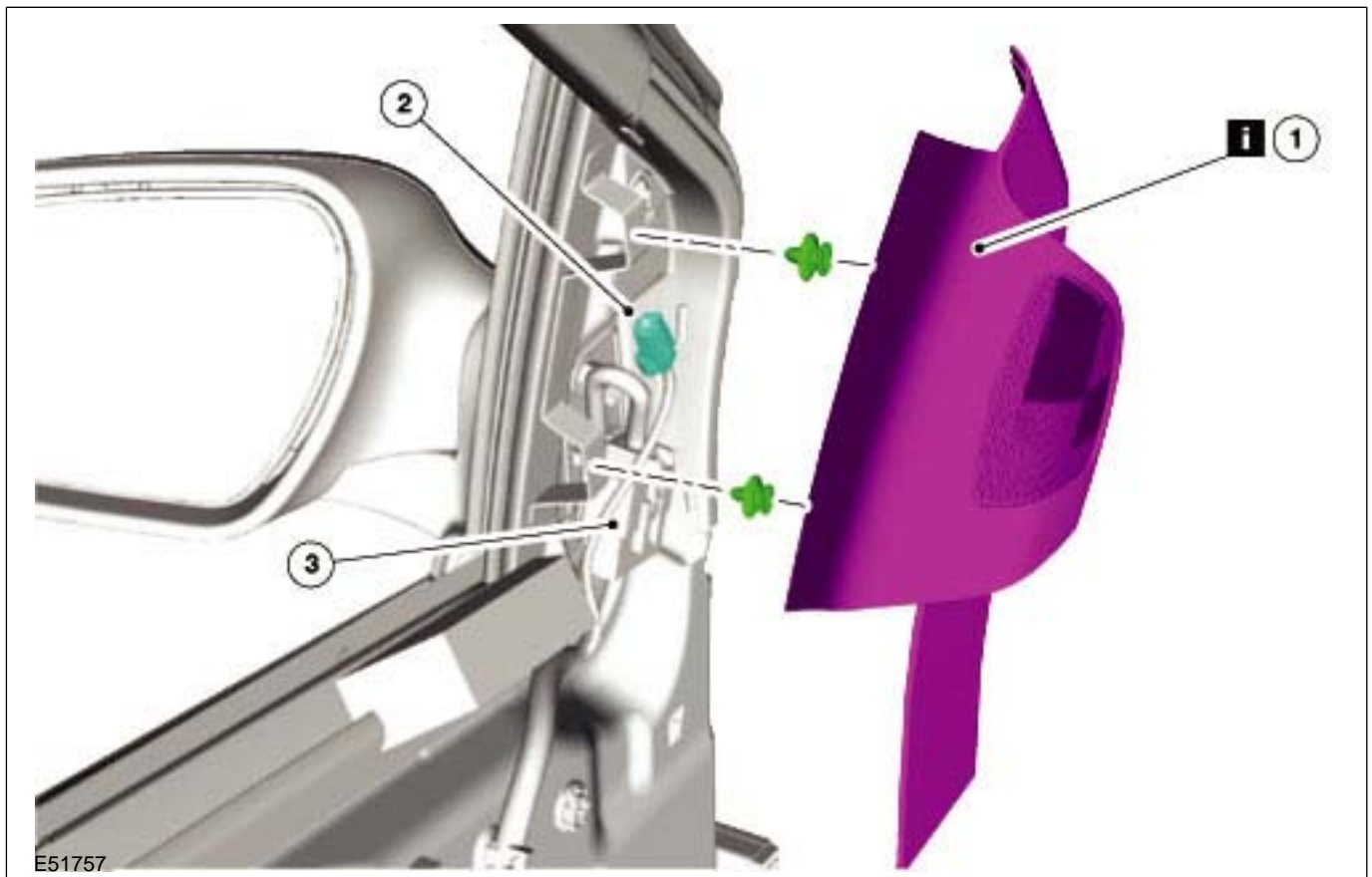


9. Raise the front door window glass.

11. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

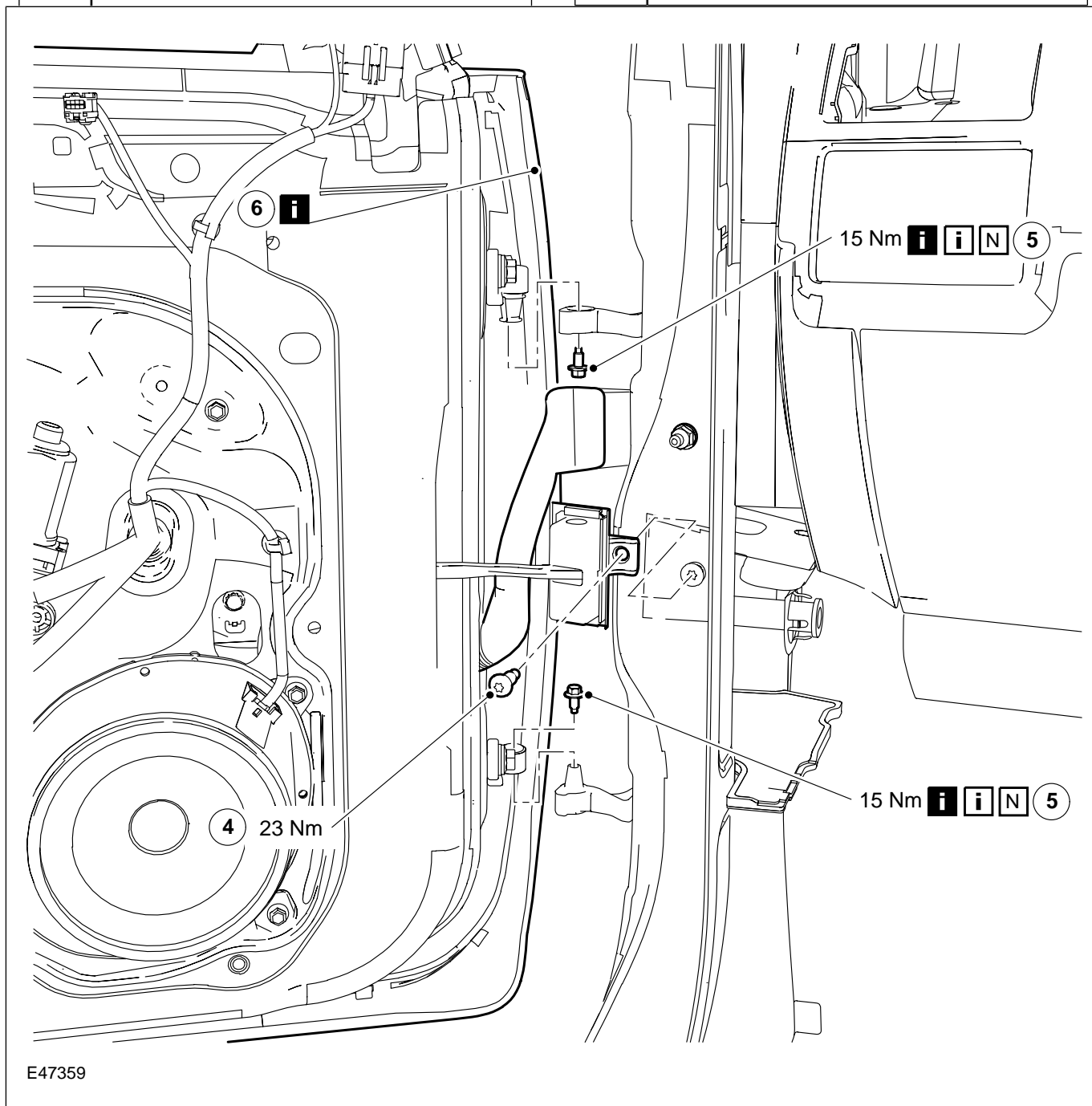
12. Remove the components in the order indicated in the following illustration(s) and table(s).



REMOVAL AND INSTALLATION

Item	Description
1	Exterior mirror interior trim panel See Removal Detail
2	Front door tweeter speaker electrical

Item	Description
	connector
3	Exterior mirror electrical connector (if equipped)

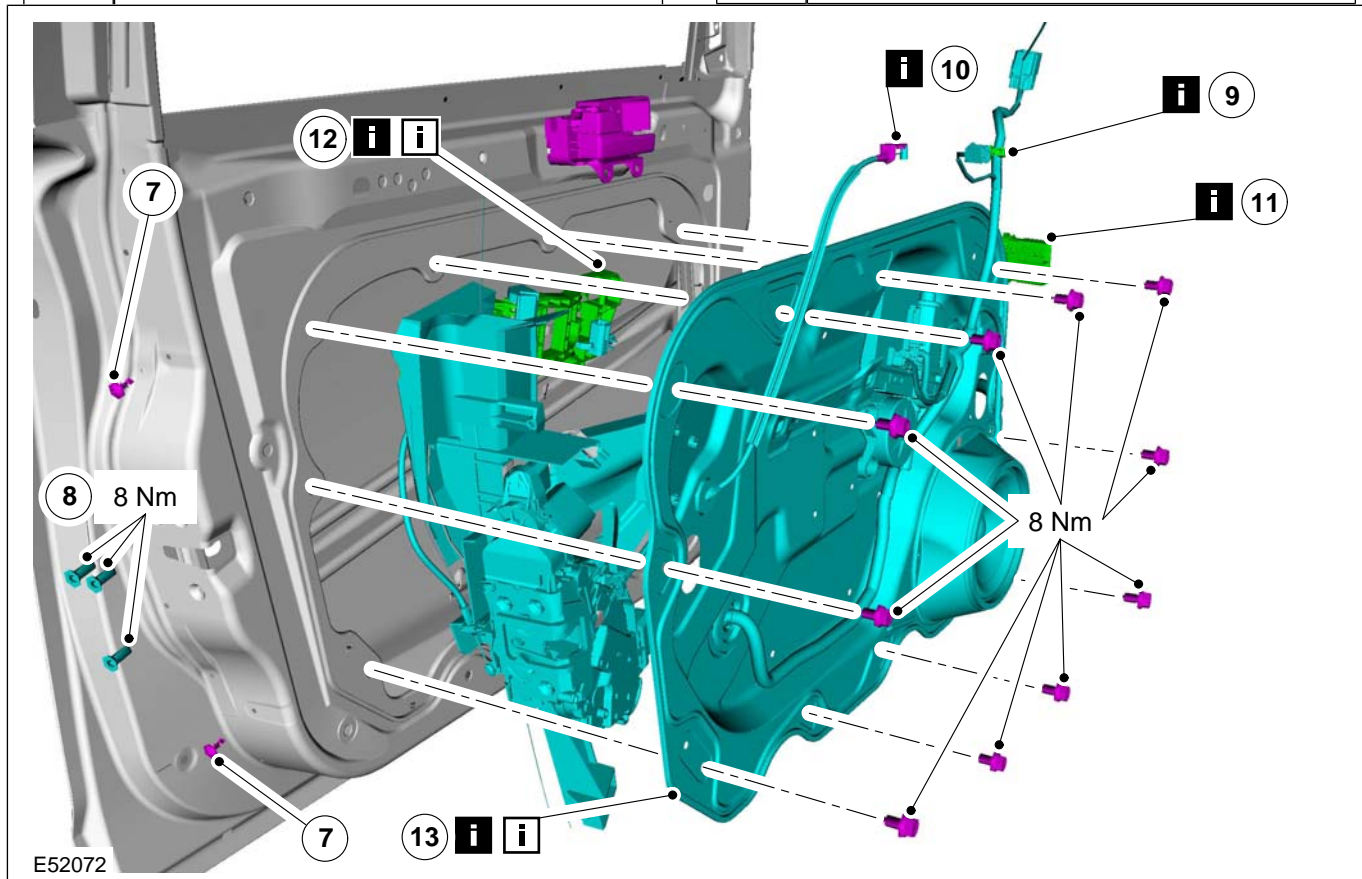


E47359

REMOVAL AND INSTALLATION

Item	Description
4	Door check strap
5	Door hinge retaining bolts See Removal Detail

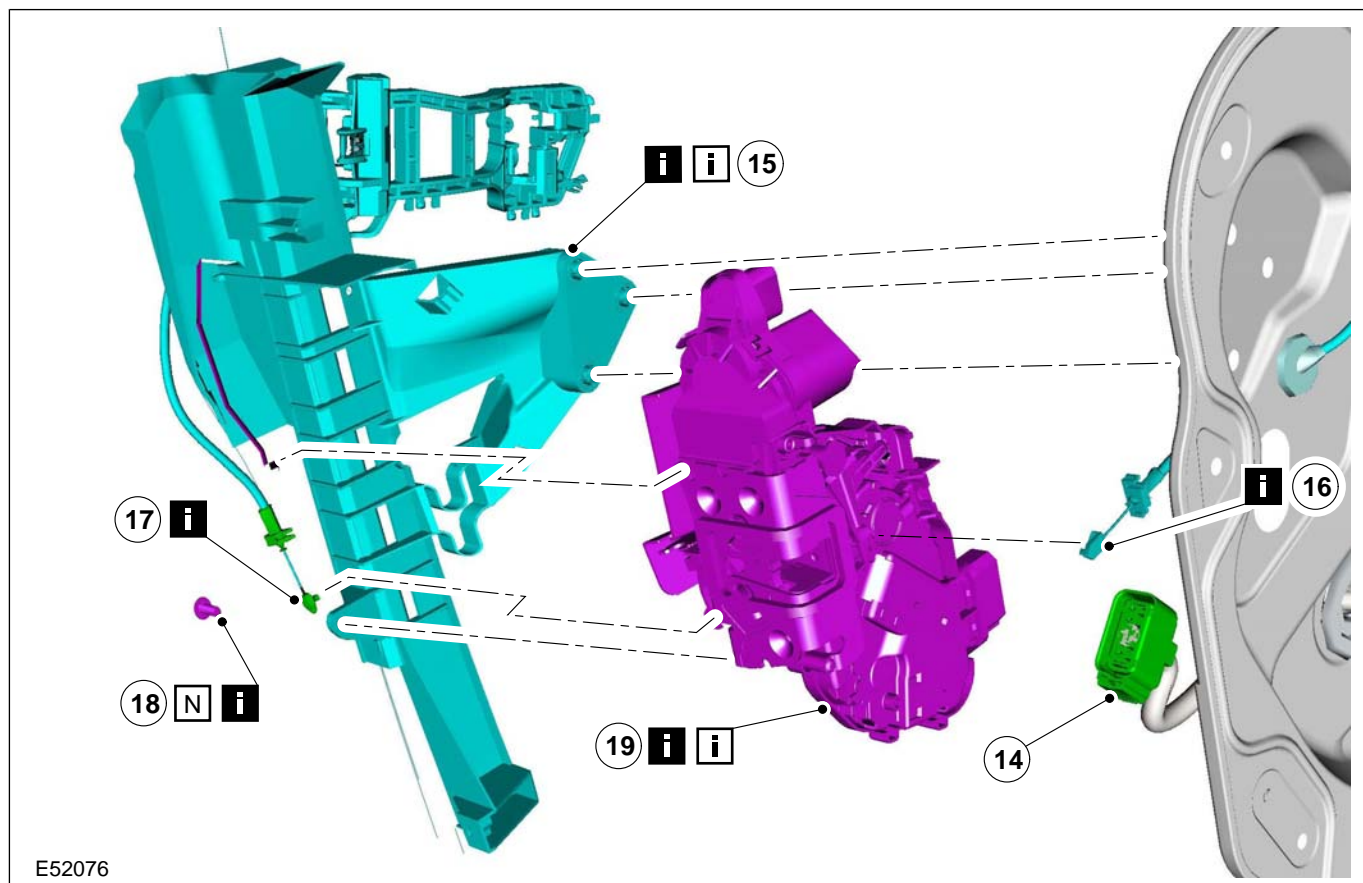
Item	Description
	See Installation Detail
6	Door See Removal Detail



Item	Description
7	Front door handle, lock and latch retaining bracket retaining screws
8	Front door latch retaining bolts
9	Front door wiring harness retaining clip See Removal Detail
10	Front door latch remote control cable See Removal Detail

Item	Description
11	Front door wiring harness See Removal Detail
12	Door lock actuator retaining screw See Removal Detail See Installation Detail
13	Front door inner panel See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION



E52076

Item	Description
14	Exterior front door latch electrical connector
15	Front door handle, lock and latch retaining bracket See Removal Detail See Installation Detail
16	Front door latch remote control cable See Removal Detail
17	Exterior front door handle remote control cable See Removal Detail

Item	Description
18	Front door latch retaining bracket retaining rivet See Removal Detail
19	Front door latch See Removal Detail See Installation Detail

13. To install, reverse the removal procedure.

14. Vehicles with global closing, initialize the door window motors.

For additional information, refer to: Door Window Motor Initialization.

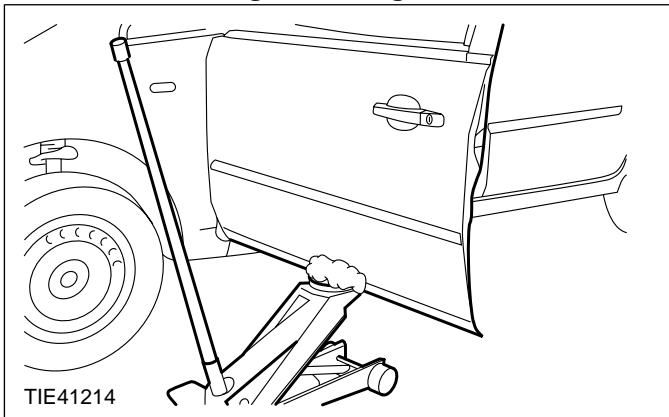
Removal Details

Item 1 Exterior mirror interior trim panel

⚠ CAUTION: Do not place excessive strain on the exterior mirror and front door tweeter speaker wiring harness.

REMOVAL AND INSTALLATION

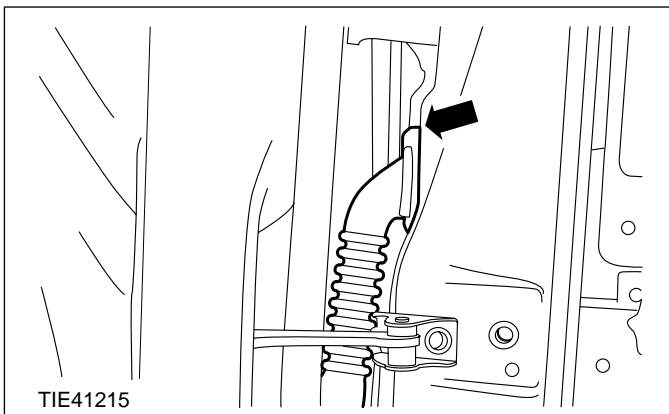
Item 5 Door hinge retaining bolts



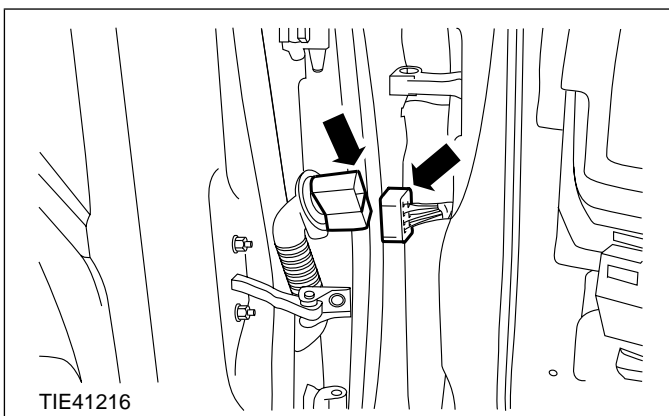
1. **CAUTION:** Protect the door using a soft cloth to prevent damage to the front door.
With the aid of another technician and a suitable trolley jack, support and detach the front door from the front door hinges.

Item 6 Door

1. Detach the front door wiring harness from the A-pillar.



2. Disconnect the front door wiring harness electrical connector.

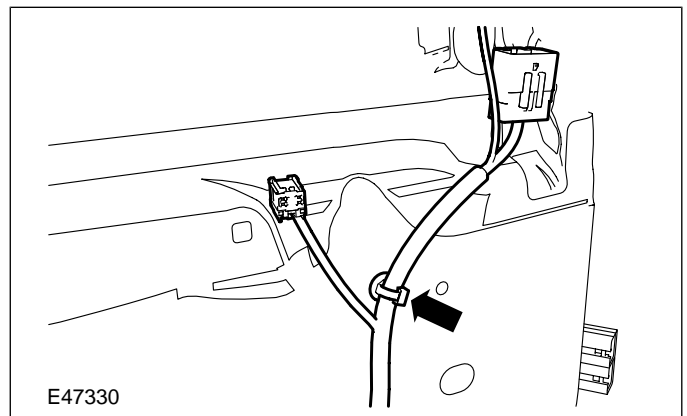


3. **CAUTION:** After the front door wiring harness electrical connector has been disconnected, position the front door back onto the front door hinges. Failure to follow this instruction may cause damage to the front door.

Position the front door onto the front door hinges.

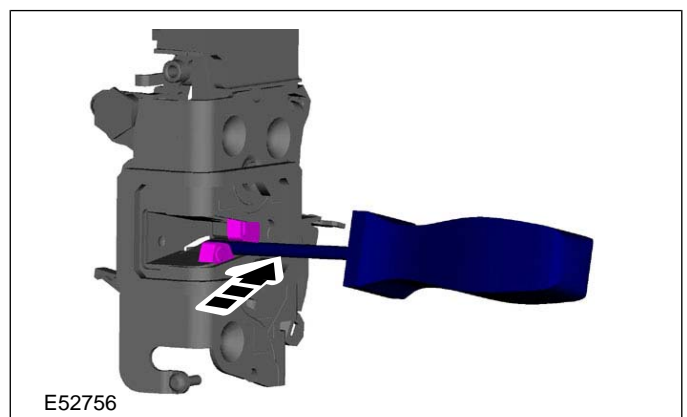
Item 9 Front door wiring harness retaining clip

1. Detach the front door wiring harness retaining clip from the front door.



Item 10 Front door latch remote control cable

1. Using a suitable screwdriver, latch the front door lock into the closed position.

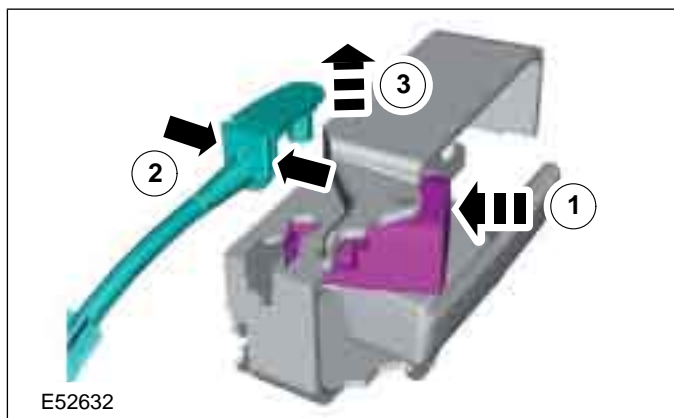


2. Detach the front door latch remote control cable from the front door latch remote control handle.

1. Operate the door latch remote control handle lock to the lock position.
2. Release the remote control cable retaining clips.

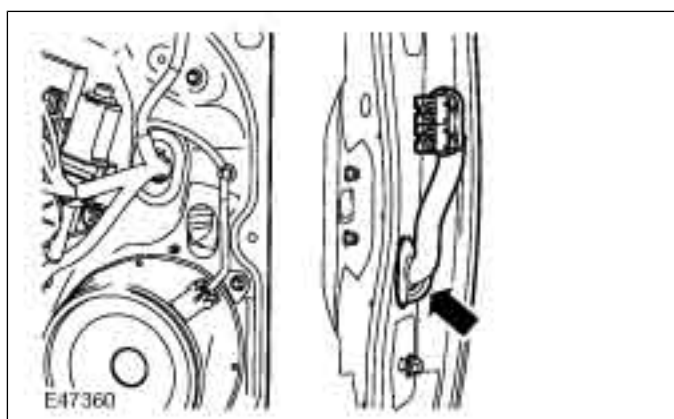
REMOVAL AND INSTALLATION

- Detach the inner remote control cable from the remote control handle lock lever.



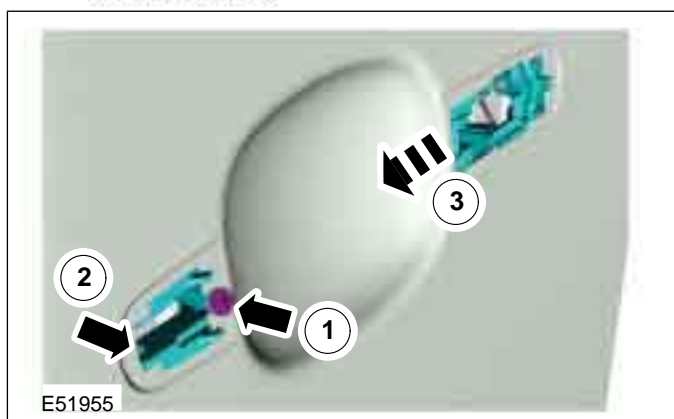
Item 11 Front door wiring harness

- Detach and push the front door wiring harness into the front door.



Item 12 Door lock actuator retaining screw

- Detach the front door lock actuator.
 - Loosen the door lock actuator retaining screw.
 - Release the door lock actuator retaining clip.
 - Slide the door lock actuator towards the front of the vehicle.

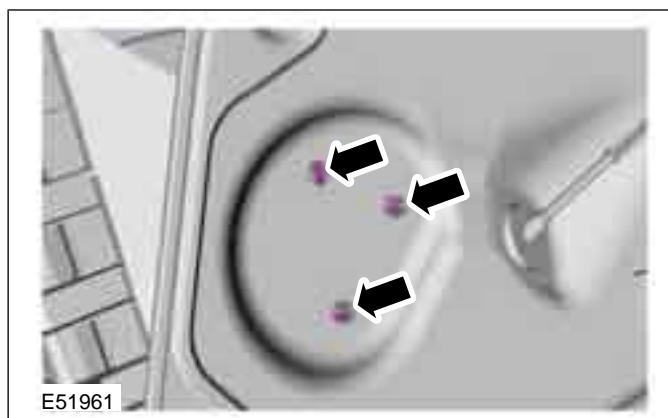


Item 13 Front door inner panel

CAUTION: When removing the front door inner panel, care must be taken that the door wiring harness is not trapped or placed under excessive strain.

Item 15 Front door handle, lock and latch retaining bracket

- Press in the centers of the front door handle, lock and latch retaining bracket retaining clip locking pins.



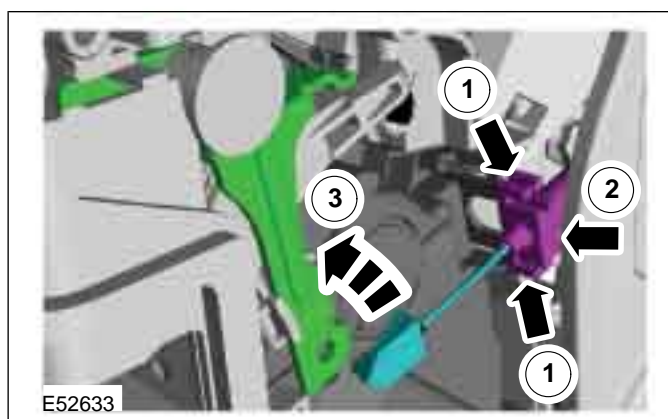
Item 16 Front door latch remote control cable

- NOTE:** Do not kink the front door latch remote control cable.

NOTE: In order to remove the front door latch remote control cable from the front door latch lever the cable must be rotated.

Disconnect the front door latch remote control cable from the front door latch.

- Using a suitable screwdriver, release the front door latch remote control cable locking tangs from the front door latch.
- Detach the front door latch remote control outer cable from the front door latch.
- Rotate the front door latch remote control cable.



REMOVAL AND INSTALLATION

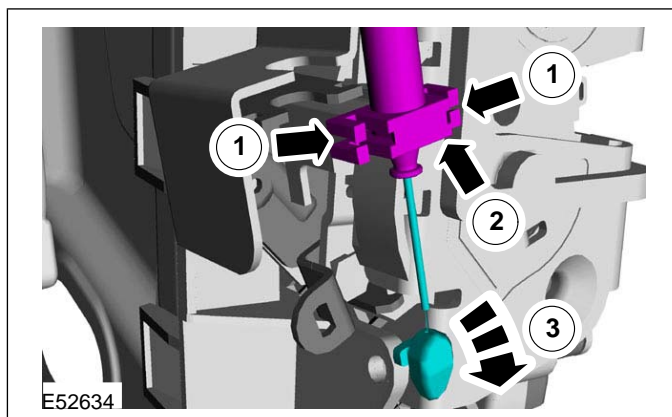
Item 17 Exterior front door handle remote control cable

1. **NOTE: Do not kink the exterior front door handle remote control cable.**

NOTE: In order to remove the exterior front door handle remote control cable from the front door latch lever the cable must be rotated.

Disconnect the exterior front door handle remote control cable from the front door latch.

1. Using a suitable screwdriver, release the exterior front door handle remote control outer cable locking tangs from the front door latch.
2. Detach the exterior front door handle remote control cable from the front door latch.
3. Rotate the exterior front door handle remote control cable.

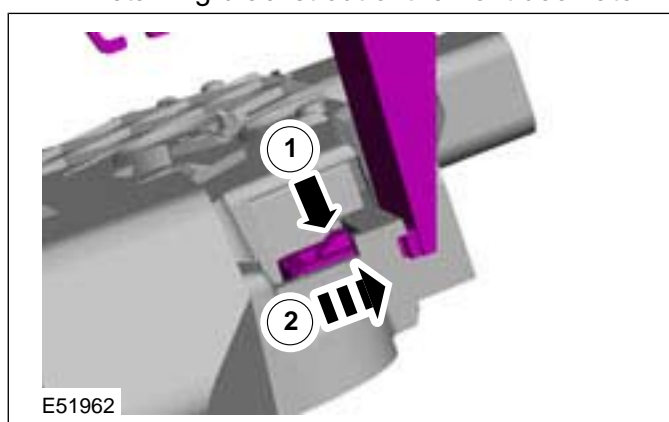
**Item 18 Front door latch retaining bracket retaining rivet**

1. Using a suitable hand drill remove and discard the door latch retaining bracket retaining rivet.

Item 19 Front door latch

1. Detach the front door lock actuator from the front door handle, lock and latch retaining bracket.

1. Press the front door handle, lock and latch retaining bracket release clip.
2. Slide the front door handle, lock and latch retaining bracket out of the front door latch.



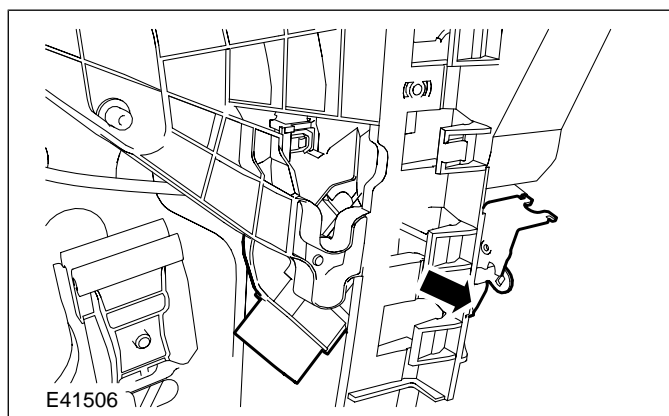
2. Detach the door lock cylinder actuator rod from the front door latch.

Installation Details

Item 19 Front door latch

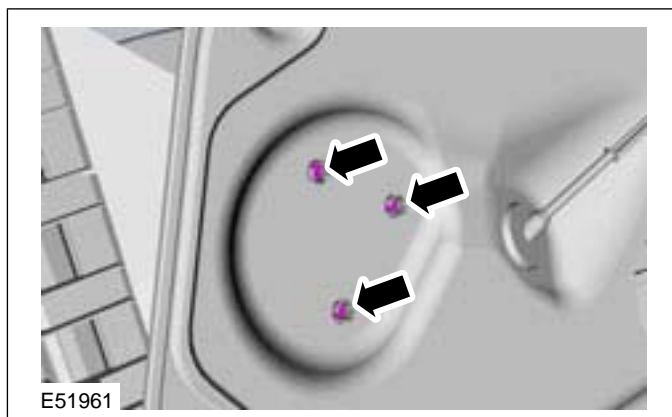
1. Connect the door lock cylinder actuator rod to the front door latch.
2. Install the front door latch.

- Using a suitable Rivet gun install a new front door latch rivet.



REMOVAL AND INSTALLATION**Item 15** Front door handle, lock and latch retaining bracket

1. Install the front door handle, lock and latch retaining bracket to the door inner panel.
2. From the back of the front door handle, lock and latch retaining bracket press in the retaining clip locking pins.

**Item 13** Front door inner panel

1. Before installing the front door inner panel retaining bolts, feed the door wiring harness electrical connector through the front door wiring harness hole.

Item 12 Door lock actuator retaining screw

1. Install the front door lock actuator to the front door.
2. Tighten the front door lock actuator retaining screw.

Item 5 Door hinge retaining bolts

1. Apply a coating of adhesive to the door hinge retaining bolts.

REMOVAL AND INSTALLATION

Front Door Latch — 4-Door/5-Door/Wagon, Vehicles With: Keyless Vehicle System

General Equipment

Electric hand drill
Rivet gun

Materials

Name	Specification
Adhesive - Loctite 243	WSK-M2G349-A7

1. Remove the front door trim panel.

For additional information, refer to: **Front Door Trim Panel - 4-Door/5-Door/Wagon (501-05 Interior Trim and Ornamentation, Removal and Installation)**.

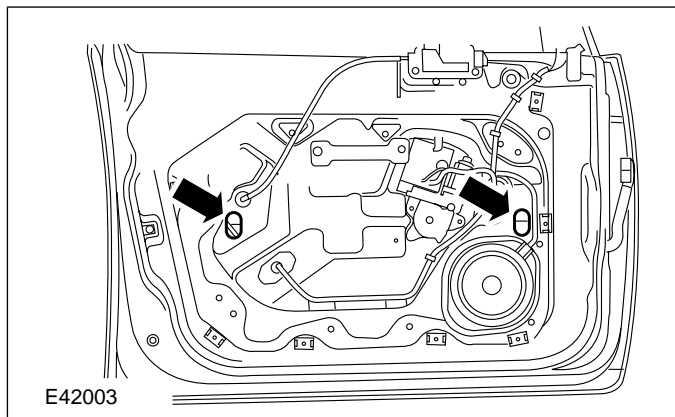
2. Remove the exterior front door handle.

For additional information, refer to: **Exterior Front Door Handle - Vehicles With: Keyless Vehicle System (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation)**.

3. Connect the battery ground cable.

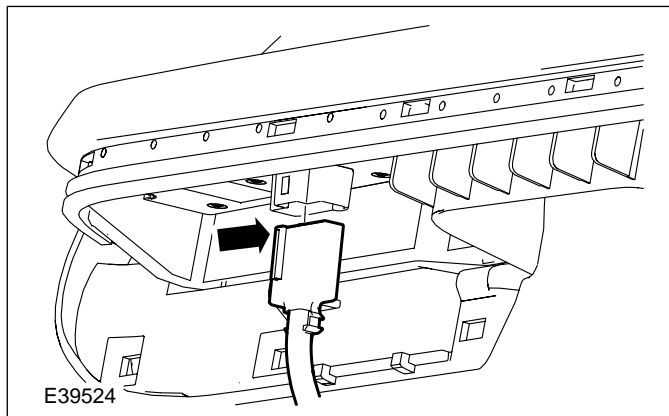
For additional information, refer to: **Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures)**.

4. Remove the front door window regulator grommets.

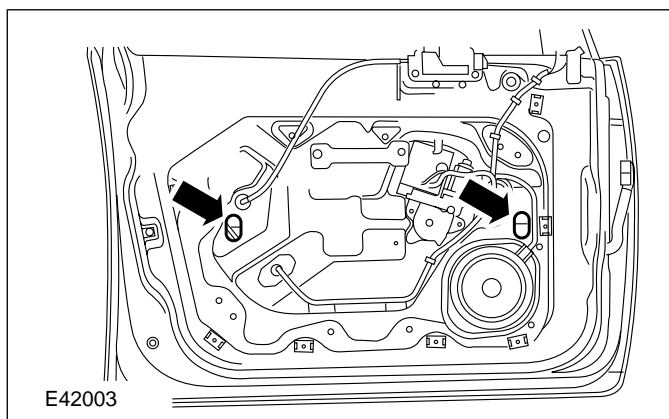


5. NOTE: Support the front door power window control unit.

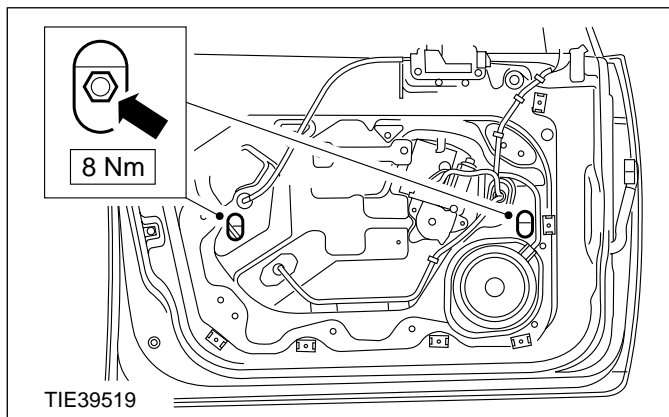
Connect the front door power window control switch electrical connector.



6. Using the front door power window control switch, align the window glass clamp retaining bolts with the access holes.



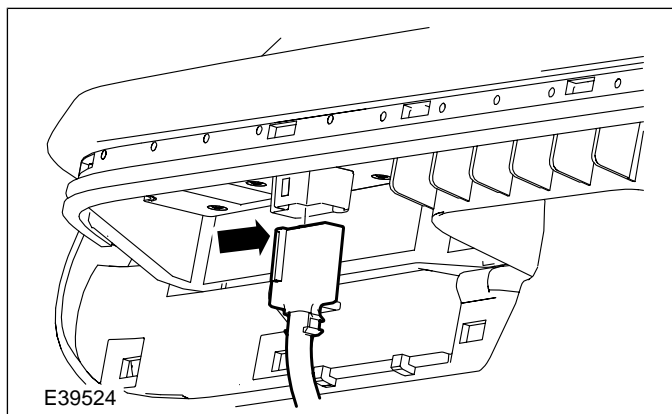
7. Loosen the front door window glass clamp retaining bolts.



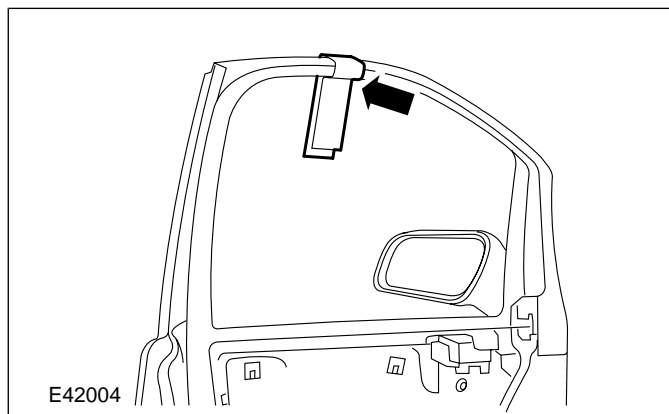
8. Raise the front door window glass.

REMOVAL AND INSTALLATION

9. Disconnect the front door power window control switch electrical connector.



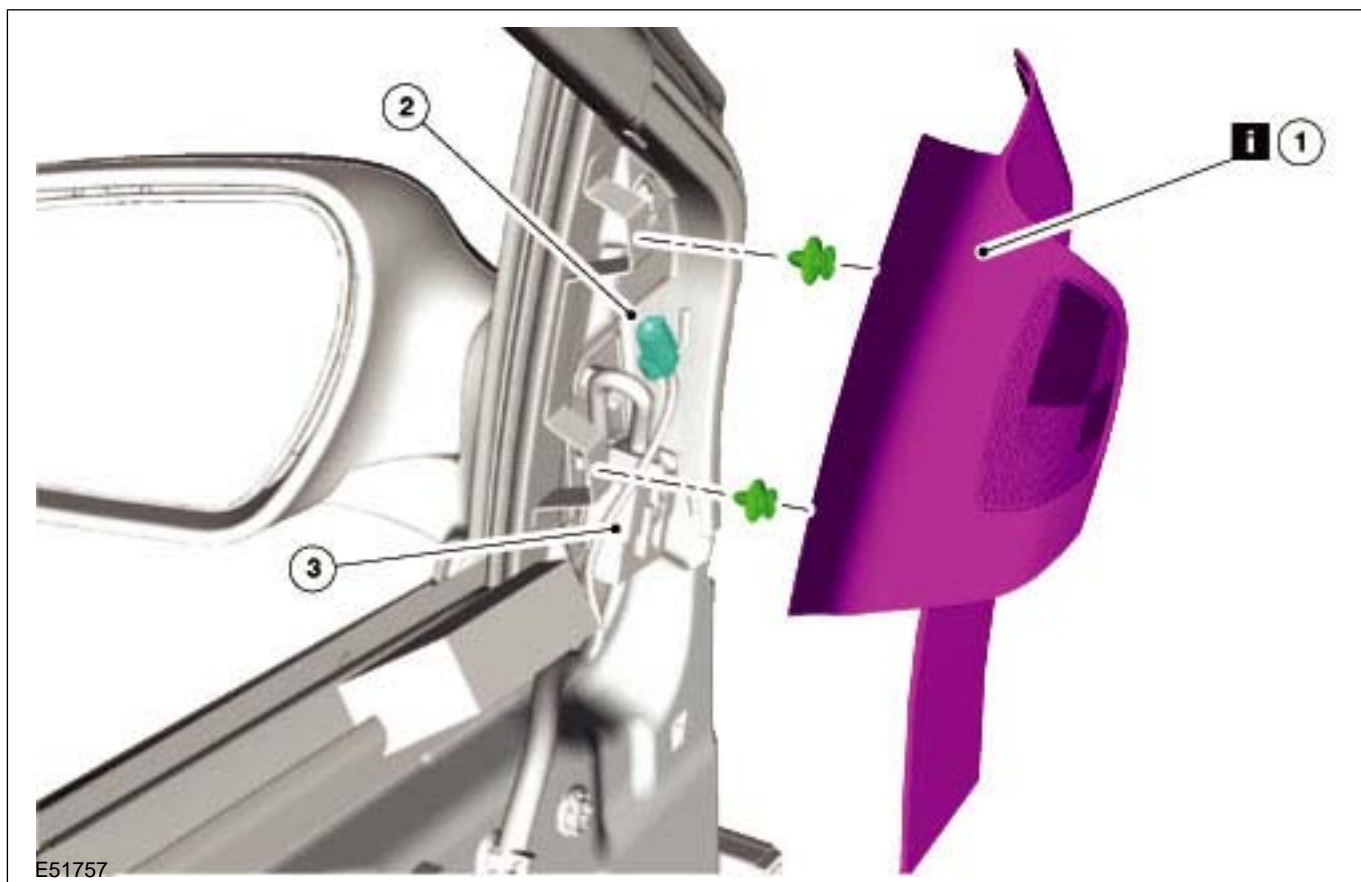
10. Using suitable tape, secure the front door window glass to the front door.



11. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

12. Remove the components in the order indicated in the following illustration(s) and table(s).



501-14-115

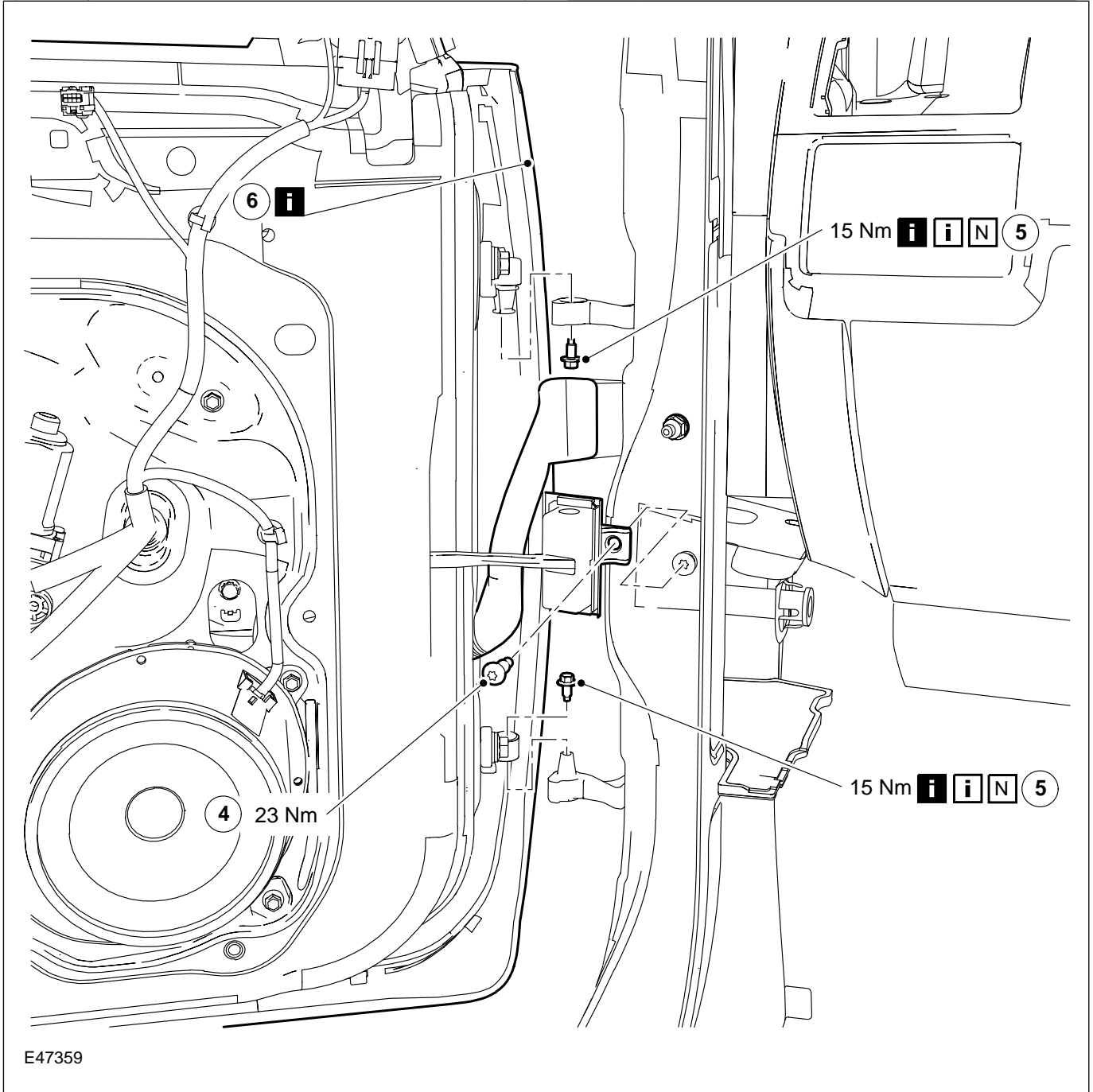
Handles, Locks, Latches and Entry Systems

501-14-115

REMOVAL AND INSTALLATION

Item	Description
1	Exterior mirror interior trim panel See Removal Detail
2	Front door tweeter speaker electrical

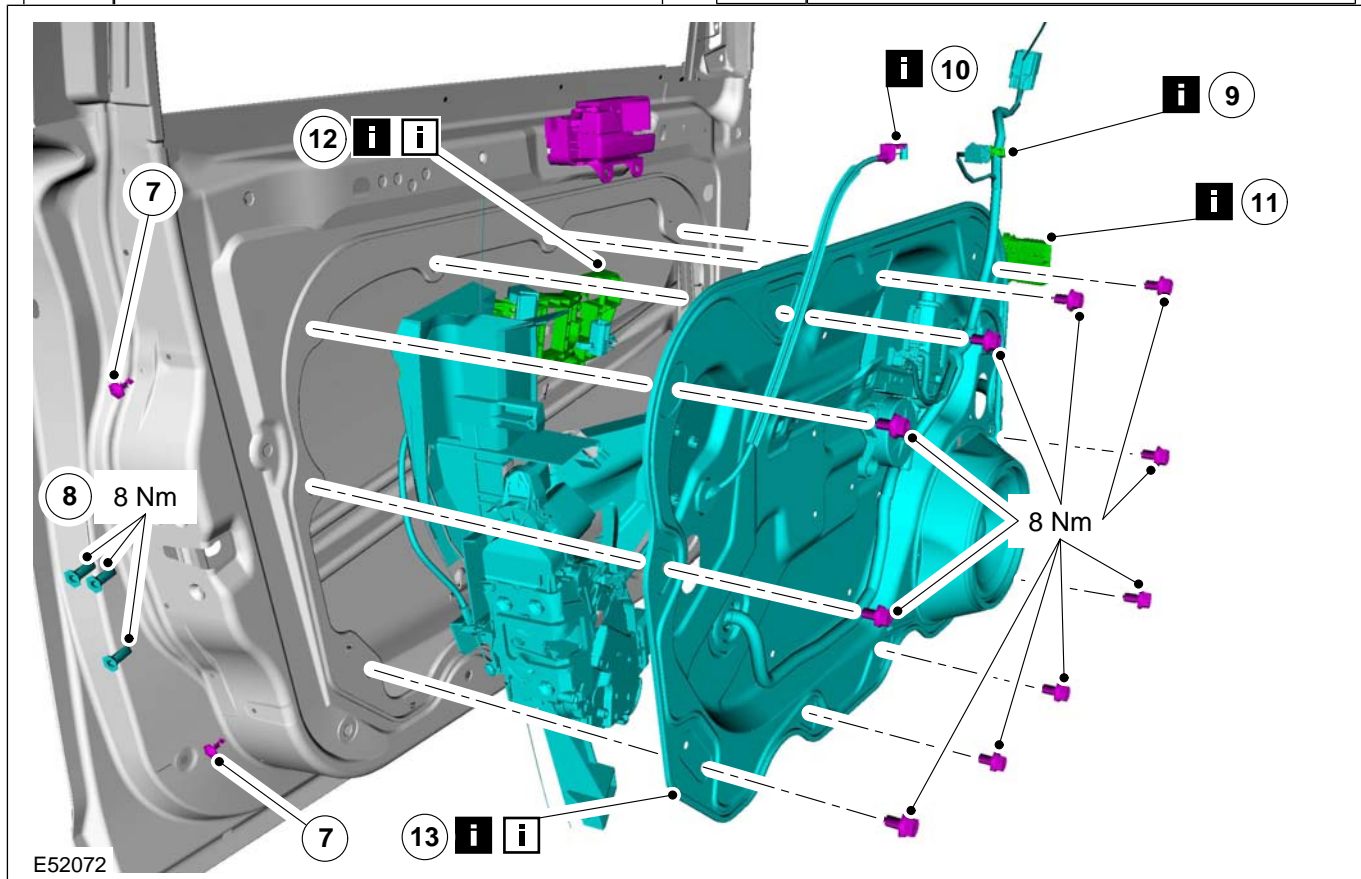
Item	Description
	connector
3	Exterior mirror electrical connector (if equipped)



REMOVAL AND INSTALLATION

Item	Description
4	Door check strap retaining bolt
5	Door hinge retaining bolts See Removal Detail

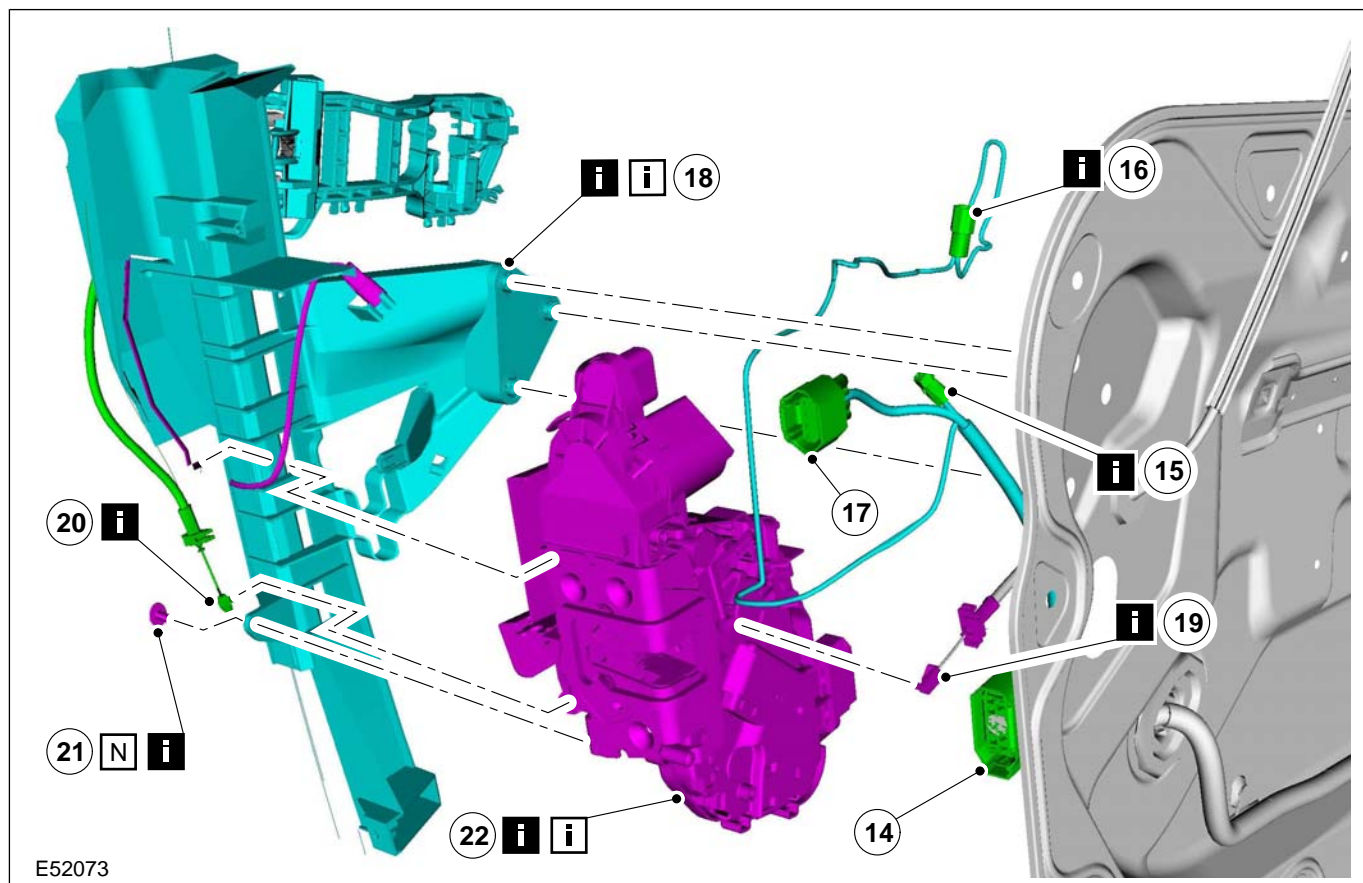
Item	Description
	See Installation Detail
6	Door (left-hand door shown) See Removal Detail



Item	Description
7	Front door handle, lock and latch retaining bracket retaining screws
8	Front door latch retaining bolts
9	Front door wiring harness retaining clip See Removal Detail
10	Front door latch remote control cable See Removal Detail

Item	Description
11	Front door wiring harness See Removal Detail
12	Front door lock actuator retaining screw See Removal Detail See Installation Detail
13	Front door inner panel See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION



E52073

Item	Description
14	Front door latch electrical connector
15	Front door lock cylinder position sensor electrical connector See Removal Detail
16	Exterior front door handle RKE electrical connector See Removal Detail
17	Front door latch RKE electrical connector
18	Front door handle, lock and latch retaining bracket See Removal Detail See Installation Detail
19	Front door latch remote control cable See Removal Detail

Item	Description
20	Front exterior door handle remote control cable See Removal Detail
21	Front door latch retaining bracket retaining rivet See Removal Detail
22	Front door latch See Removal Detail See Installation Detail

13. To install, reverse the removal procedure.

14. Vehicles with global closing, initialize the door window motors.

For additional information, refer to: **Door Window Motor Initialization.**

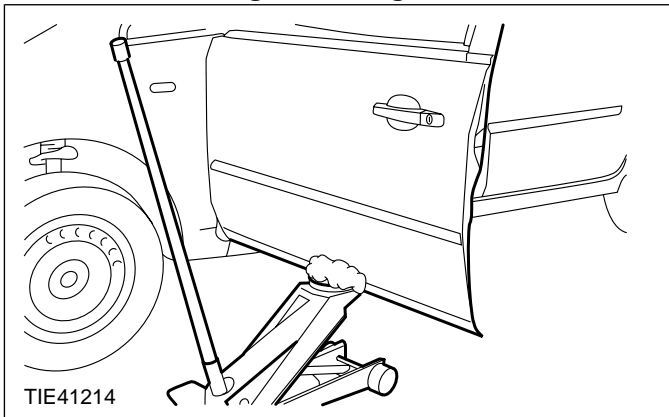
Removal Details

Item 1 Exterior mirror interior trim panel

⚠ CAUTION: Do not place excessive strain on the exterior mirror and front door tweeter speaker wiring harness.

REMOVAL AND INSTALLATION

Item 5 Door hinge retaining bolts

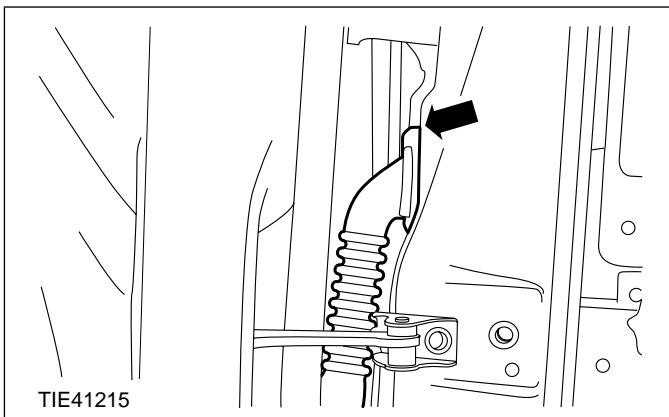


1. **CAUTION:** Protect the door using a soft cloth to prevent damage to the front door.

With the aid of another technician and a suitable trolley jack, support and detach the front door from the front door hinges.

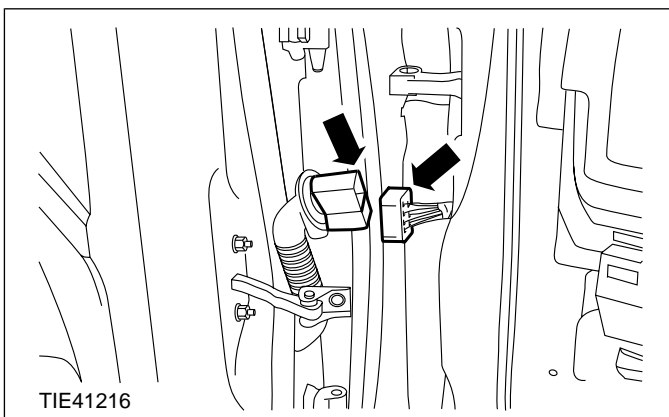
Item 6 Door (left-hand door shown)

1. Detach the electrical connector from the A-pillar.



2. Remove the front door.

- Disconnect the electrical connector.

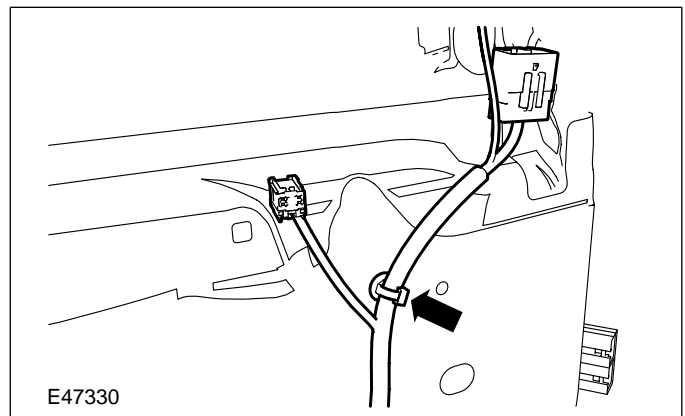


3. **CAUTION:** After the front door wiring harness electrical connector has been disconnected, position the front door back onto the front door hinges. Failure to follow this instruction may cause damage to the front door.

Position the front door onto the front door hinges.

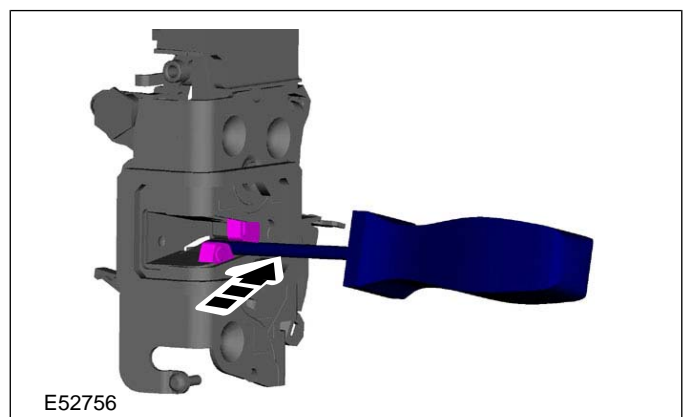
Item 9 Front door wiring harness retaining clip

1. Detach the front door wiring harness retaining clip from the front door.



Item 10 Front door latch remote control cable

1. Using a suitable screwdriver, latch the front door lock into the closed position.

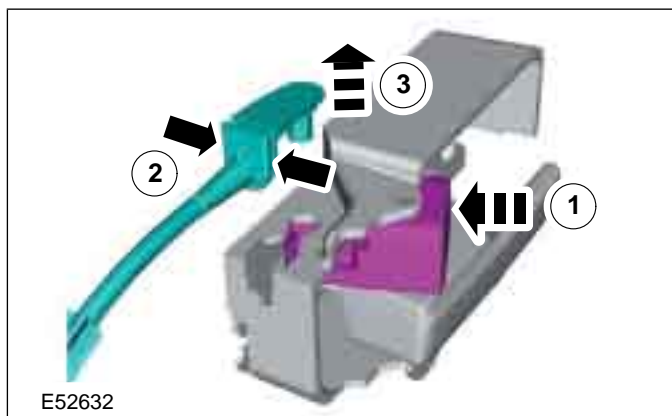


2. Detach the front door latch remote control cable from the front door latch remote control handle.

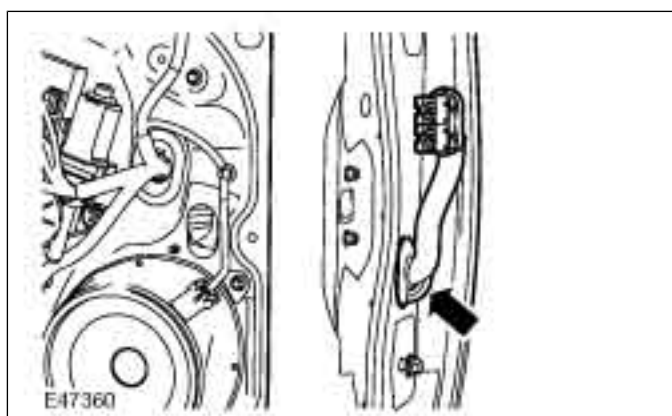
1. Operate the door latch remote control handle lock to the lock position.
2. Release the remote control cable retaining clips.

REMOVAL AND INSTALLATION

- Detach the inner remote control cable from the remote control handle lock lever.

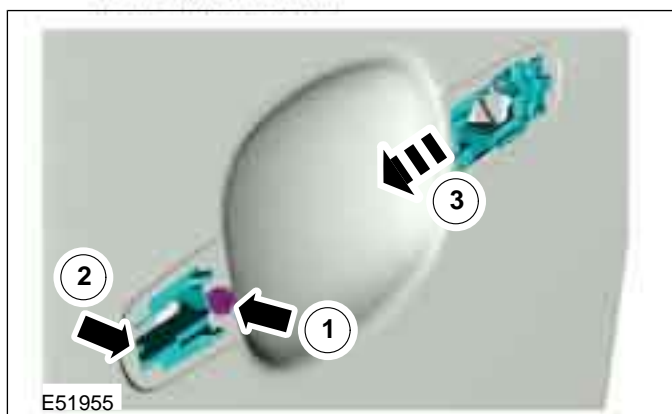
**Item 11 Front door wiring harness**

- Detach and push the front door wiring harness into the front door.

**Item 12 Front door lock actuator retaining screw**

- Detach the front door lock actuator.

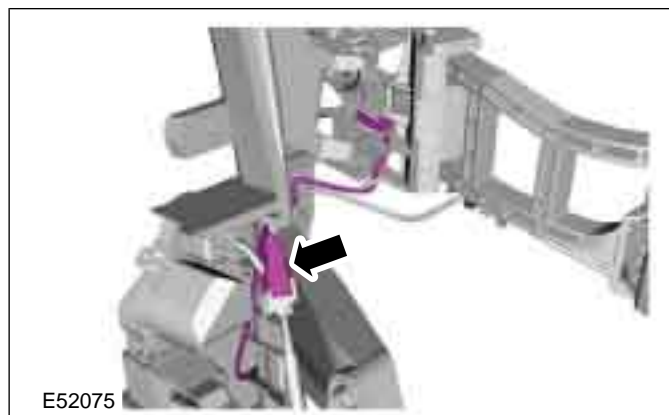
- Loosen the front door lock actuator retaining screw.
- Release the front door lock actuator retaining clip.
- Slide the front door lock actuator towards the front of the vehicle.

**Item 13 Front door inner panel**

- CAUTION:** When removing the front door inner panel, care must be taken that the door wiring harness is not trapped or placed under excessive strain.

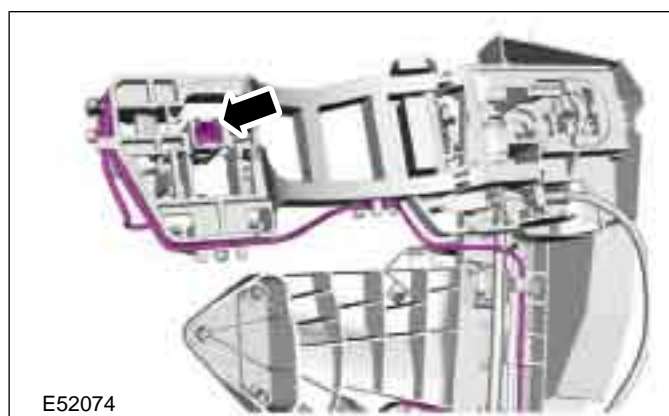
Item 15 Front door lock cylinder position sensor electrical connector

- Disconnect the front door lock cylinder position sensor electrical connector.

**Item 16 Exterior front door handle RKE electrical connector**

- NOTE:** Make a note of the clipping position of the exterior front door handle RKE harness.

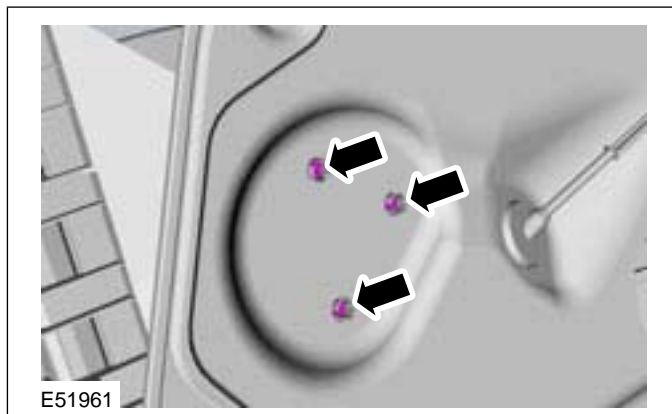
- Detach the exterior front door handle RKE electrical connector and harness from the front door handle reinforcement.



REMOVAL AND INSTALLATION

Item 18 Front door handle, lock and latch retaining bracket

1. Press in the centers of the front door handle, lock and latch retaining bracket retaining clip locking pins.

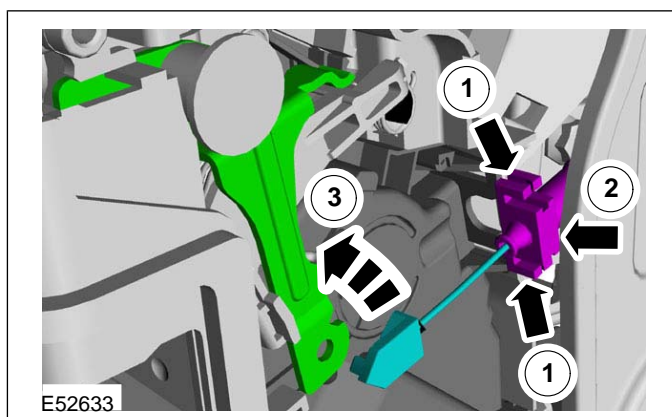
**Item 19** Front door latch remote control cable

1. **NOTE: Do not kink the front door latch remote control cable.**

NOTE: In order to remove the front door latch remote control cable from the front door latch lever the cable must be rotated.

Disconnect the front door latch remote control cable from the front door latch.

1. Using a suitable screwdriver, release the front door latch remote control cable locking tangs from the front door latch.
2. Detach the front door latch remote control outer cable from the front door latch.
3. Rotate the front door latch remote control cable.

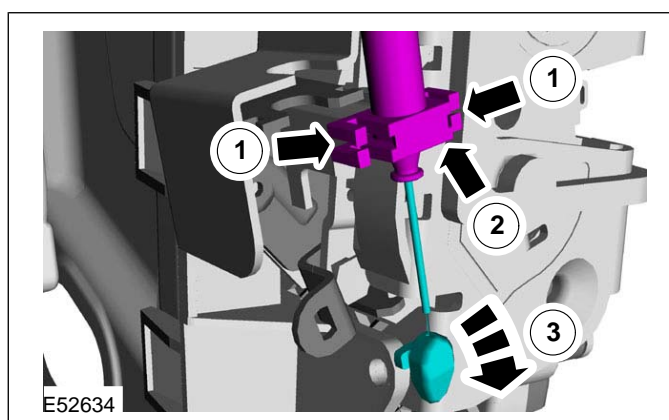
**Item 20** Front exterior door handle remote control cable

1. **NOTE: Do not kink the front exterior door handle remote control cable.**

NOTE: In order to remove the front exterior door handle remote control cable from the front door latch lever the cable must be rotated.

Disconnect the front exterior door handle remote control cable from the front door latch.

1. Using a suitable screwdriver, release the front exterior door handle remote control outer cable locking tangs from the front door latch.
2. Detach the front exterior door handle remote control cable from the front door latch.
3. Rotate the front exterior door handle remote control cable.

**Item 21** Front door latch retaining bracket retaining rivet

1. Using a suitable Electric hand drill remove and discard the door latch retaining bracket retaining rivet.

Item 22 Front door latch

1. Detach the front door latch actuator from the front door handle, lock and latch retaining bracket.

1. Press the front door handle, lock and latch retaining bracket release clip.

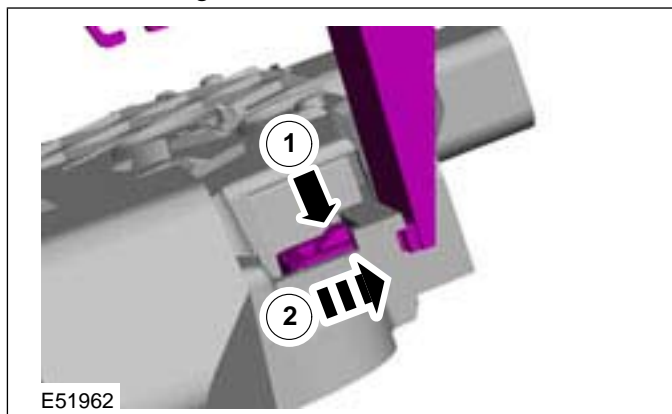
501-14-121

Handles, Locks, Latches and Entry Systems

501-14-121

REMOVAL AND INSTALLATION

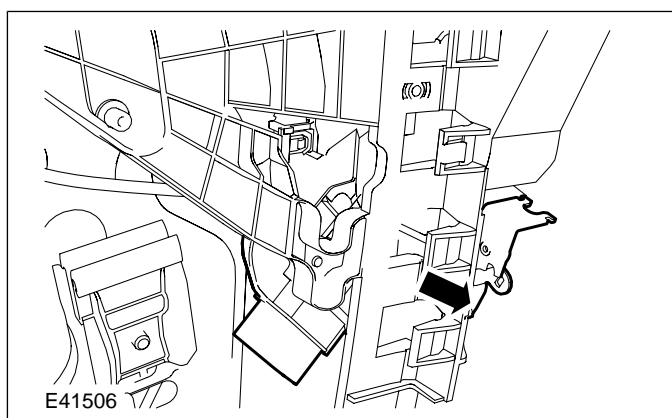
- Slide the front door handle, lock and latch retaining bracket out of the front door latch.



- Detach the front door lock cylinder actuator rod from the front door latch.

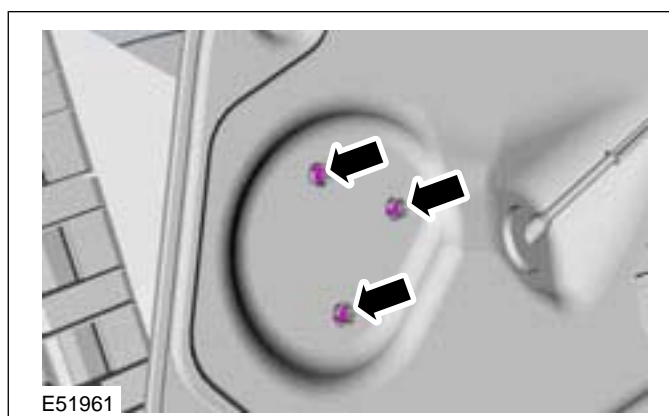
Installation Details**Item 22 Front door latch**

- Connect the front door lock cylinder actuator rod to the front door latch.
- Install the front door latch.
 - Using a suitable Rivet gun install a new front door latch rivet.

**Item 18 Front door handle, lock and latch retaining bracket**

- Install the front door handle, lock and latch retaining bracket to the door inner panel.

- From the back of the front door handle, lock and latch retaining bracket press in the retaining clip locking pins.

**Item 13 Front door inner panel**

- Before installing the front door inner panel retaining bolts, feed the door wiring harness electrical connector through the front door wiring harness hole.

Item 12 Front door lock actuator retaining screw

- Install the front door lock actuator to the front door.
- Tighten the front door lock actuator retaining screw.

Item 5 Door hinge retaining bolts

- Apply a coating of adhesive to the door hinge center retaining bolts.

REMOVAL AND INSTALLATION

Front Door Lock Actuator — 3-Door

Materials	
Name	Specification
Adhesive - Loctite 243	WSK-M2G349-A7

1. Remove the front door trim panel.

For additional information, refer to: **Front Door Trim Panel - 3-Door (501-05 Interior Trim and Ornamentation, Removal and Installation)**.

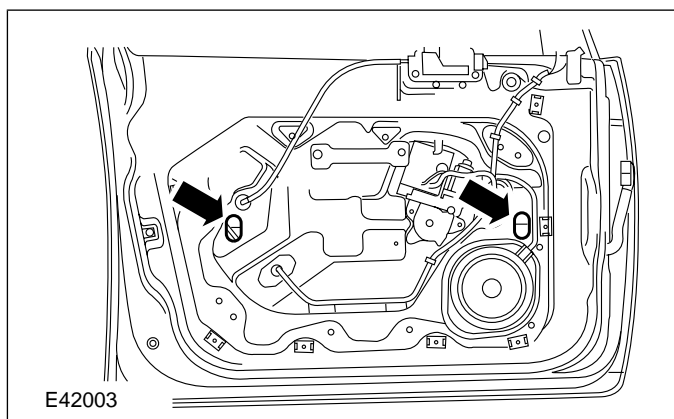
2. Remove the exterior front door handle.

For additional information, refer to: **Exterior Front Door Handle (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation)**.

3. Connect the battery ground cable.

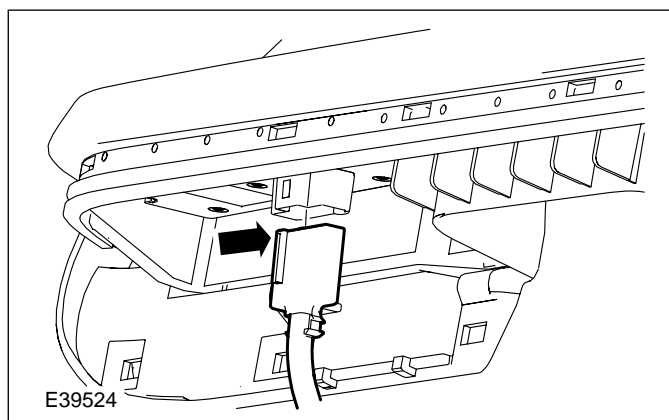
For additional information, refer to: **Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures)**.

4. Remove the front door window regulator grommets.

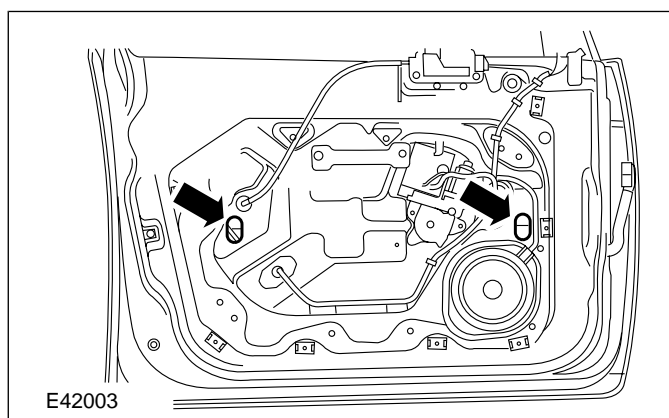


5. NOTE: Support the front door power window control unit.

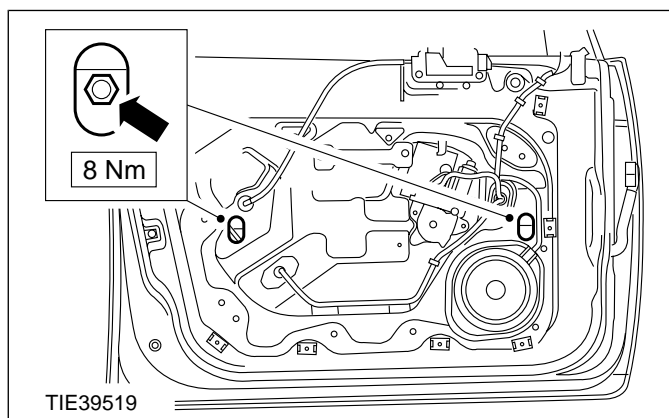
Connect the front door power window control switch electrical connector.



6. Using the front door power window control switch, align the window glass clamp bolts with the access holes.



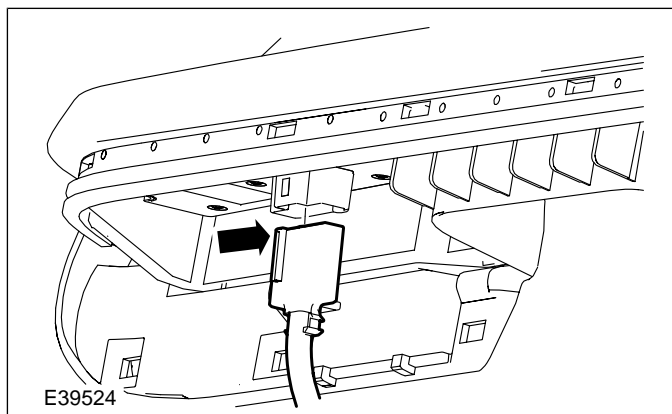
7. Loosen the front door window glass clamp retaining bolts.



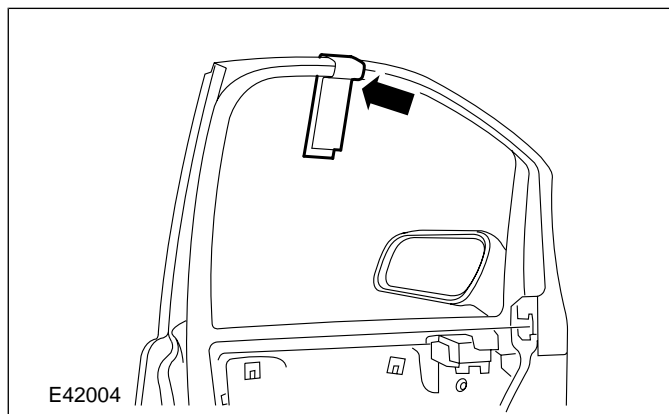
8. Raise the front door window glass.

REMOVAL AND INSTALLATION

9. Disconnect the front door power window control unit electrical connector.



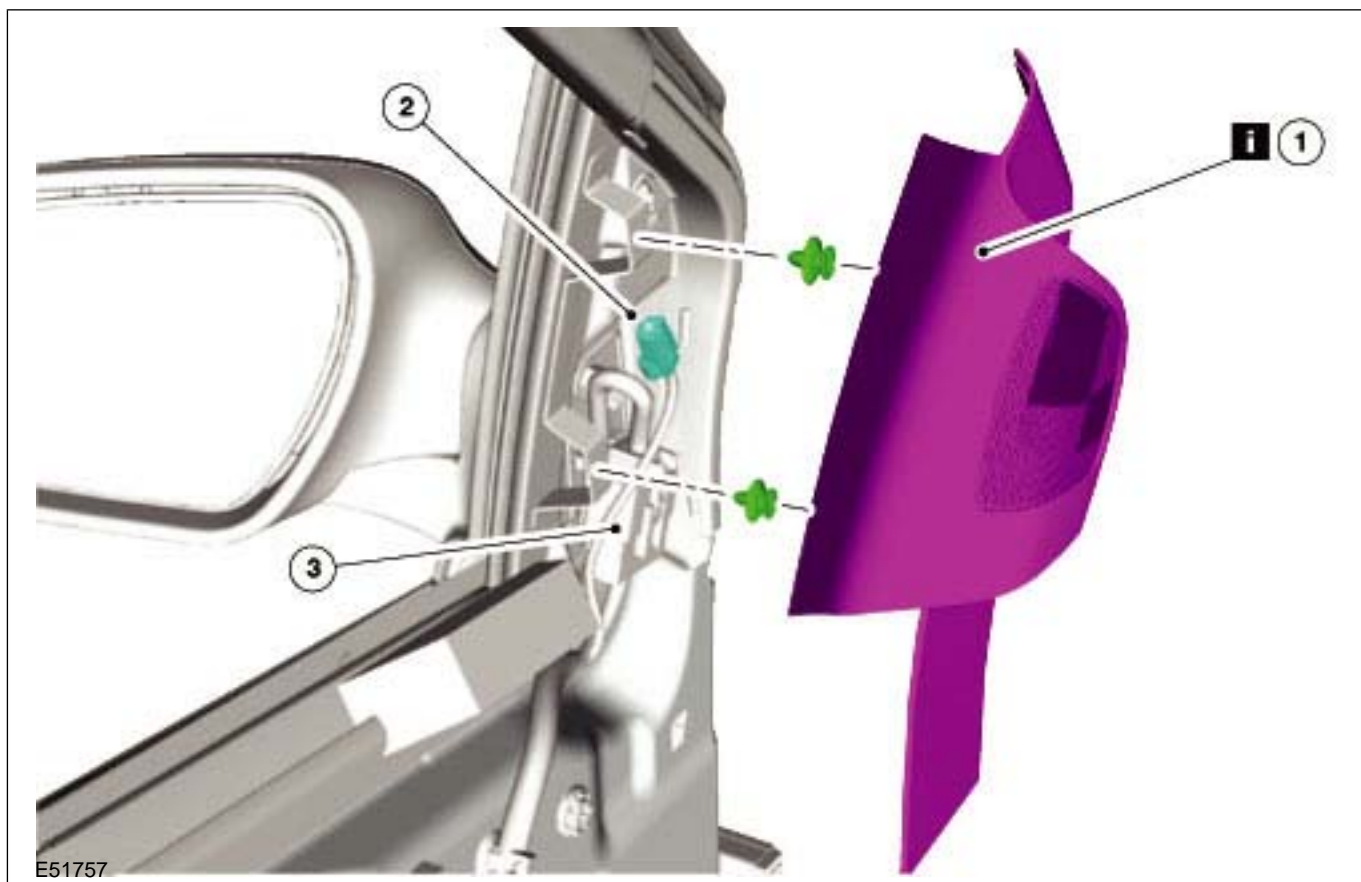
10. Using suitable tape, secure the front door window glass to the front door.



11. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

12. Remove the components in the order indicated in the following illustration(s) and table(s).

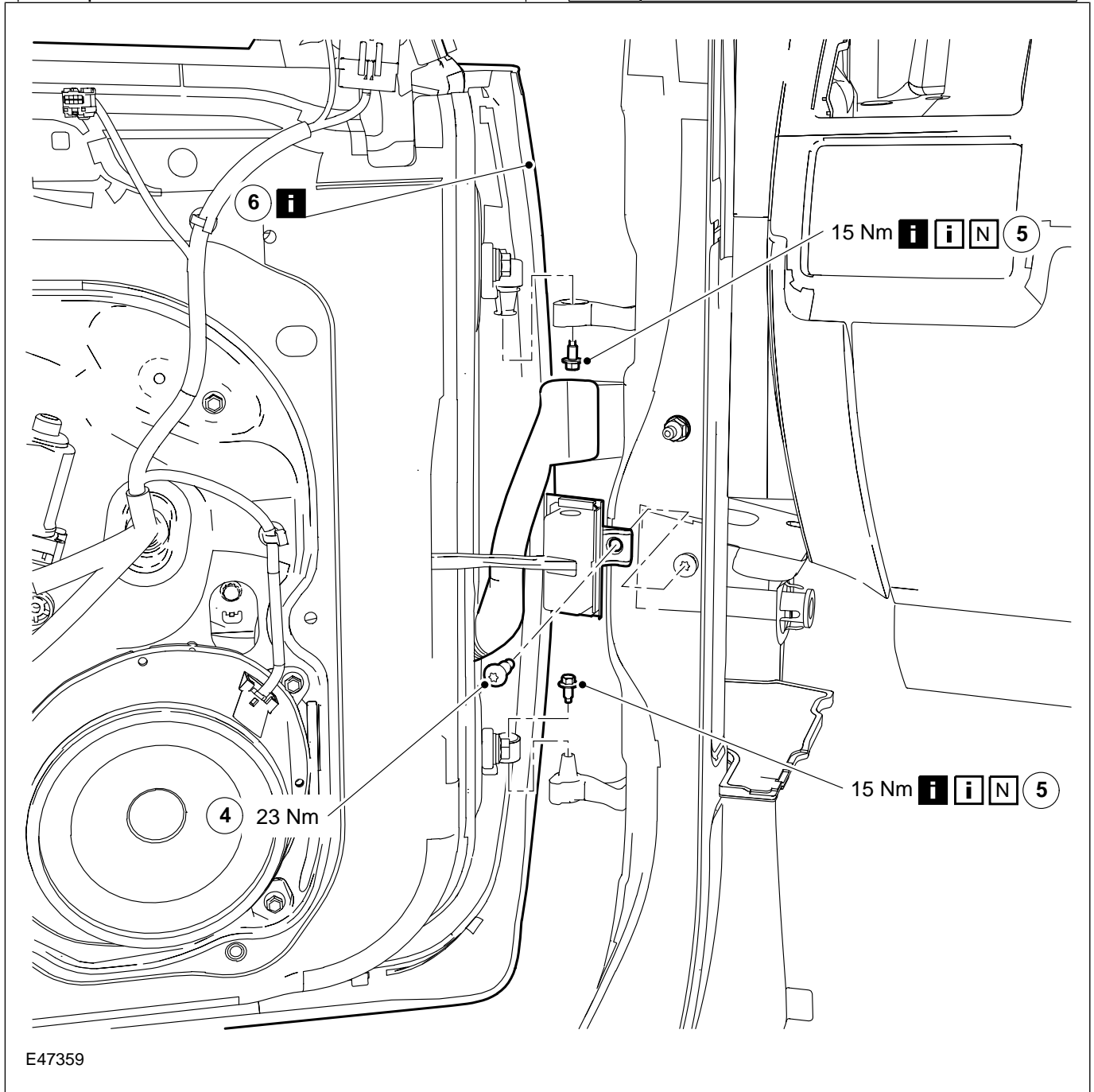




REMOVAL AND INSTALLATION

Item	Description
1	Exterior mirror interior trim panel See Removal Detail
2	Front door tweeter speaker electrical

Item	Description
	connector
3	Exterior mirror electrical connector (if equipped)



E47359



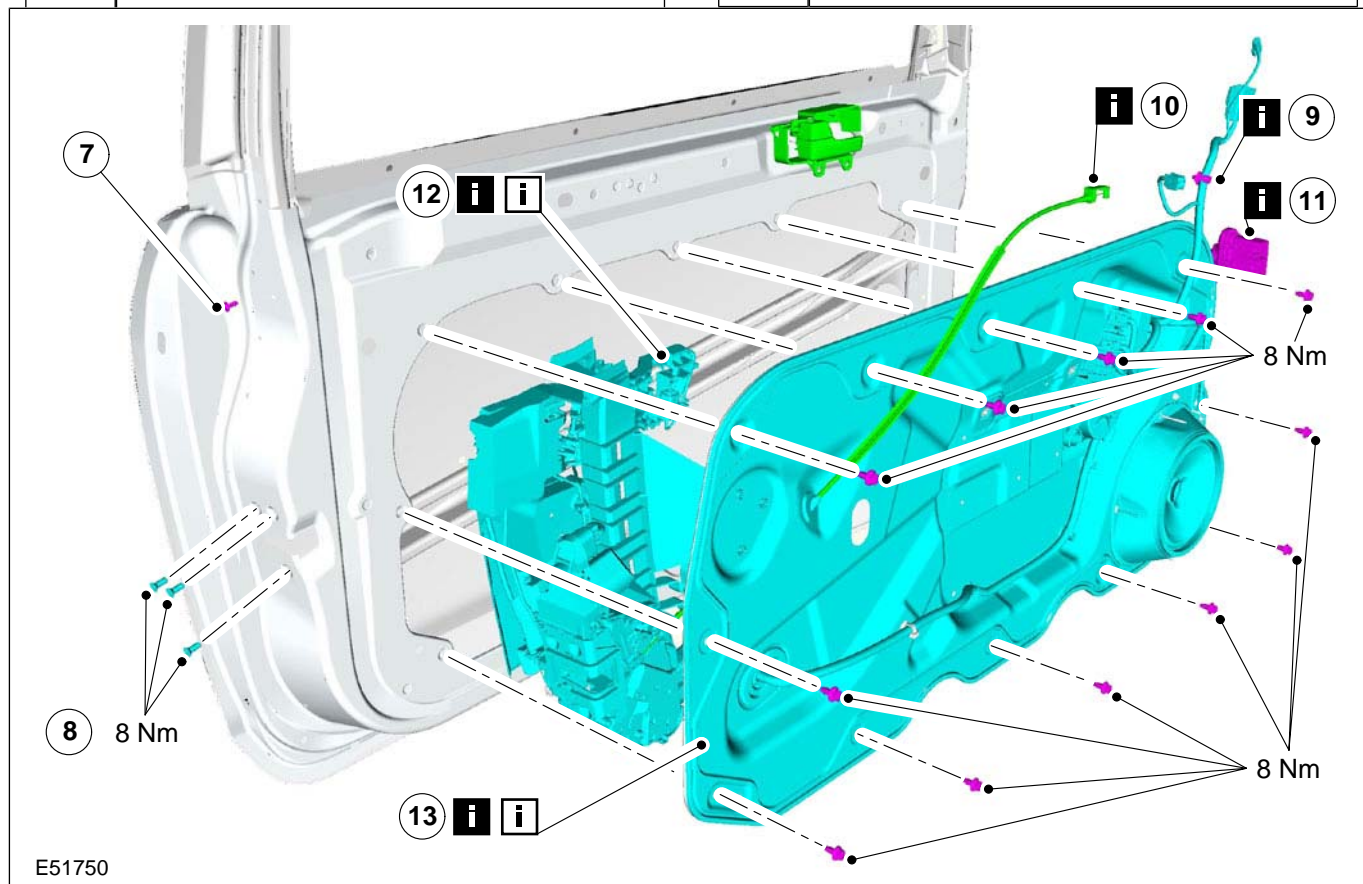
501-14-125 Handles, Locks, Latches and Entry Systems

501-14-125

REMOVAL AND INSTALLATION

Item	Description
4	Door check strap
5	Door hinge retaining bolts See Removal Detail

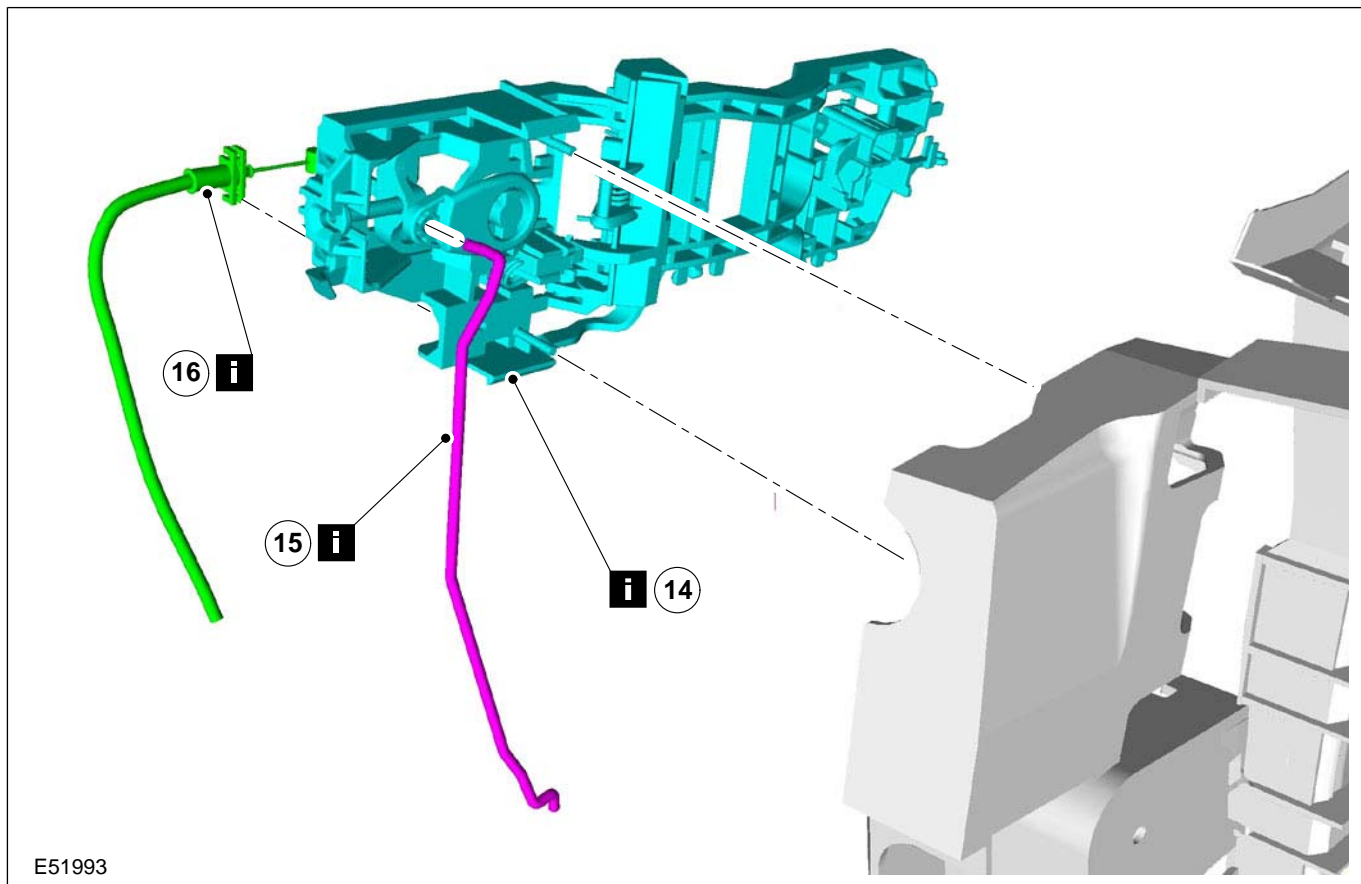
Item	Description
	See Installation Detail
6	Door (left-hand door shown) See Removal Detail



Item	Description
7	Front door handle, lock and latch retaining bracket retaining screw
8	Front door latch retaining bolts
9	Front door wiring harness retaining clip See Removal Detail
10	Front door latch remote control cable See Removal Detail

Item	Description
11	Front door wiring harness See Removal Detail
12	Front door lock actuator retaining screw See Removal Detail See Installation Detail
13	Front door inner panel See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION



E51993

Item	Description
14	Front door handle reinforcement See Removal Detail
15	Front door lock cylinder actuator rod See Removal Detail
16	Front door exterior handle remote control cable See Removal Detail

13. To install, reverse the removal procedure.

14. Vehicles with global closing, initialize the door window motors.

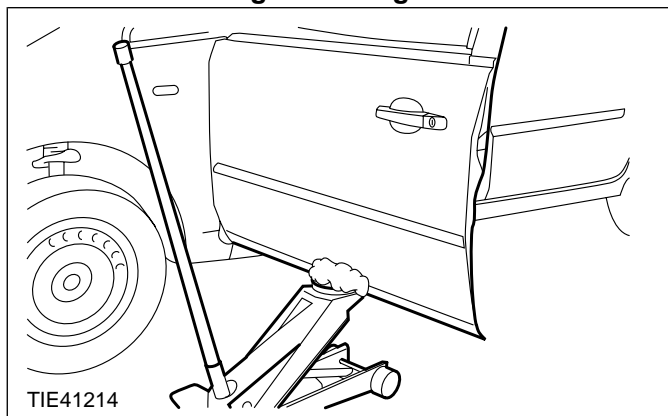
For additional information, refer to: **Door Window Motor Initialization.**

Removal Details

Item 1 Exterior mirror interior trim panel

CAUTION: Do not place excessive strain on the exterior mirror and front door tweeter speaker wiring harness.

Item 5 Door hinge retaining bolts



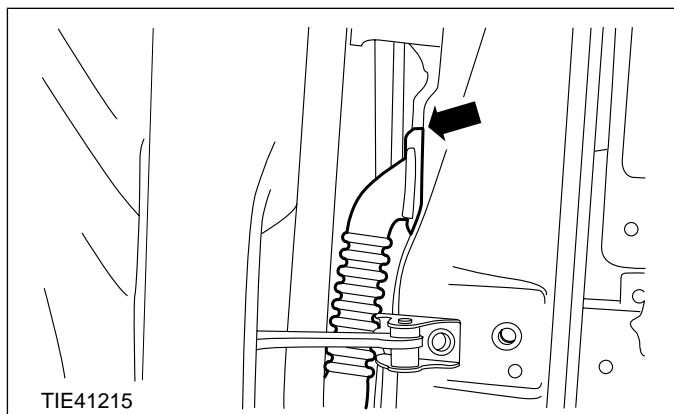
REMOVAL AND INSTALLATION

1. **⚠ CAUTION:** Protect the door using a soft cloth to prevent damage to the front door.

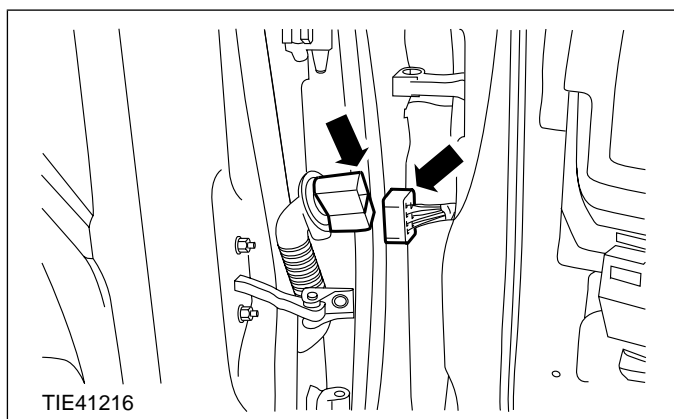
With the aid of another technician and a suitable trolley jack, support and detach the front door from the front door hinges.

Item 6 Door (left-hand door shown)

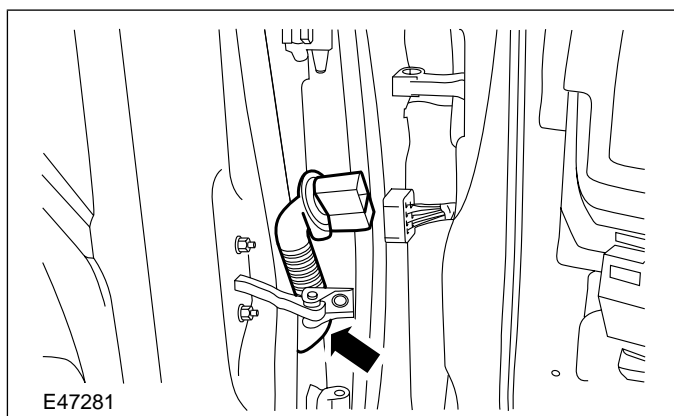
1. Detach the electrical connector from the A-pillar.



2. Remove the front door.
 - Disconnect the electrical connector.



3. Push the front door wiring harness into the door.

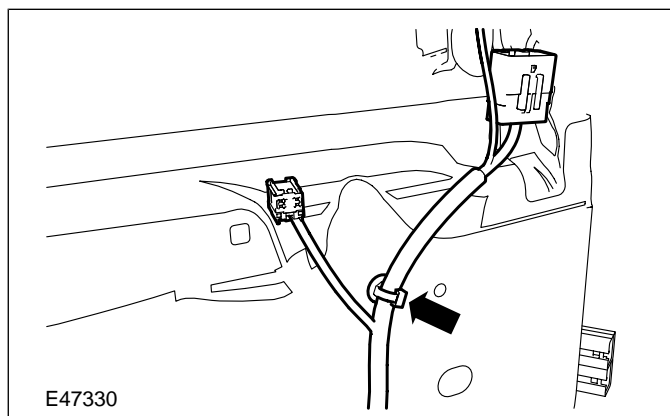


4. **⚠ CAUTION:** After the front door wiring harness electrical connector has been disconnected, position the front door back onto the front door hinges. Failure to follow this instruction may cause damage to the front door.

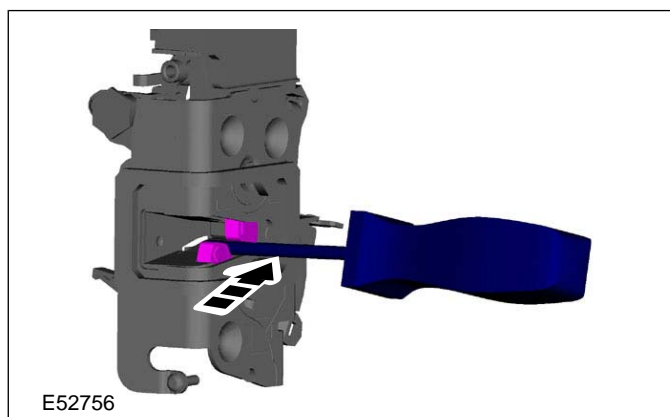
Position the front door onto the front door hinges.

Item 9 Front door wiring harness retaining clip

1. Detach the front door wiring harness retaining clip from the front door.

**Item 10 Front door latch remote control cable**

1. Using a suitable screwdriver, latch the front door lock into the closed position.



2. Detach the front door latch remote control cable from the front door latch remote control handle.

1. Operate the door latch remote control handle lock to the lock position.
2. Release the remote control cable retaining clips.

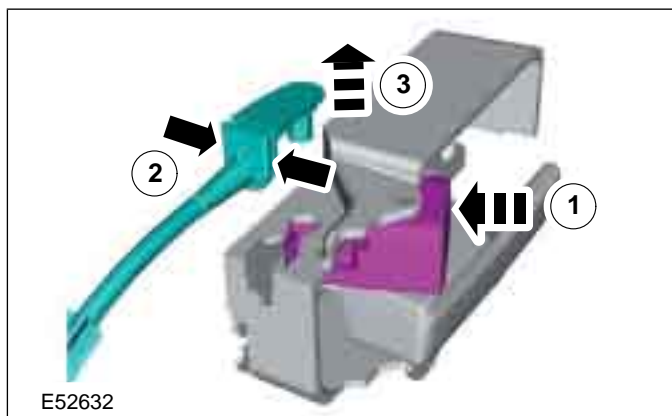
501-14-128

Handles, Locks, Latches and Entry Systems

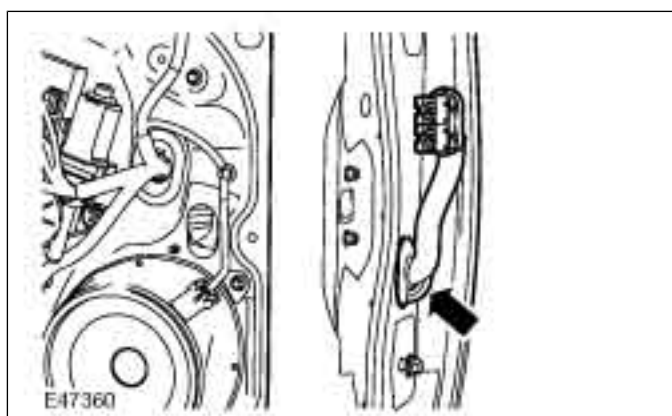
501-14-128

REMOVAL AND INSTALLATION

- Detach the inner remote control cable from the remote control handle lock lever.

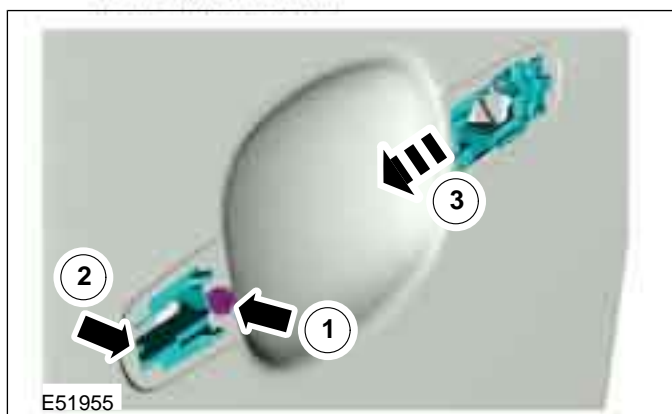
**Item 11** Front door wiring harness

- Detach and push the front door wiring harness into the front door.

**Item 12** Front door lock actuator retaining screw

- Detach the front door lock actuator.

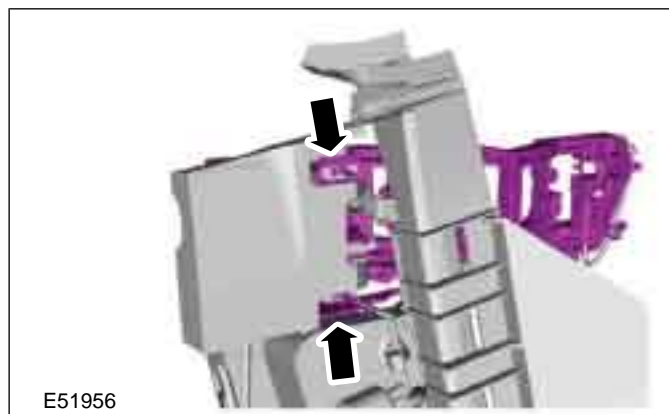
- Loosen the front door lock actuator retaining screw.
- Release the front door lock actuator retaining clip.
- Slide the front door lock actuator towards the front of the vehicle.

**Item 13** Front door inner panel

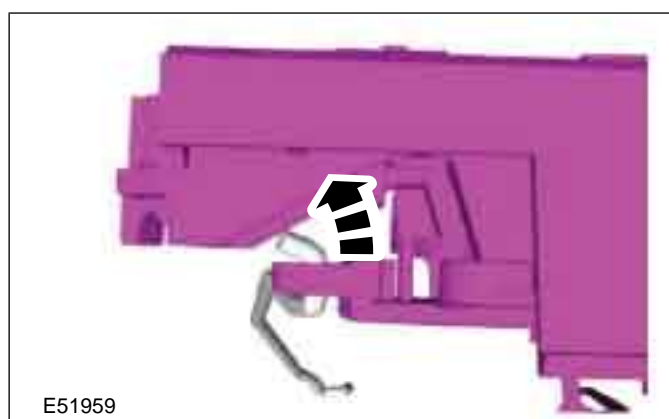
- CAUTION:** When removing the front door inner panel, care must be taken that the door wiring harness is not trapped or placed under excessive strain.

Item 14 Front door handle reinforcement

- Detach the front door handle reinforcement from the front door handle, lock and latch retaining bracket.

**Item 15** Front door lock cylinder actuator rod

- Detach the front door lock cylinder actuator rod from the front door handle reinforcement.

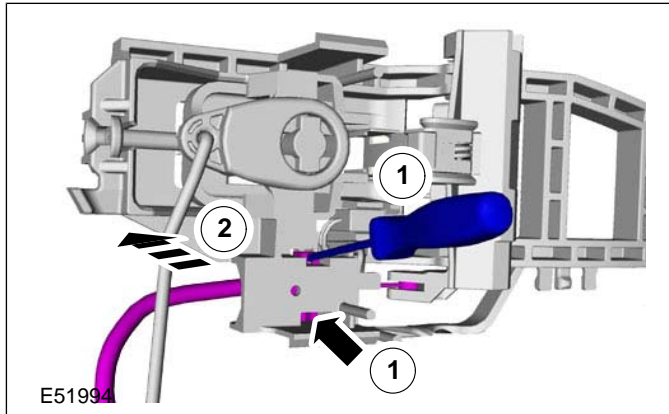
**Item 16** Front door exterior handle remote control cable

- Detach the front door exterior handle remote control cable from the front door handle reinforcement.

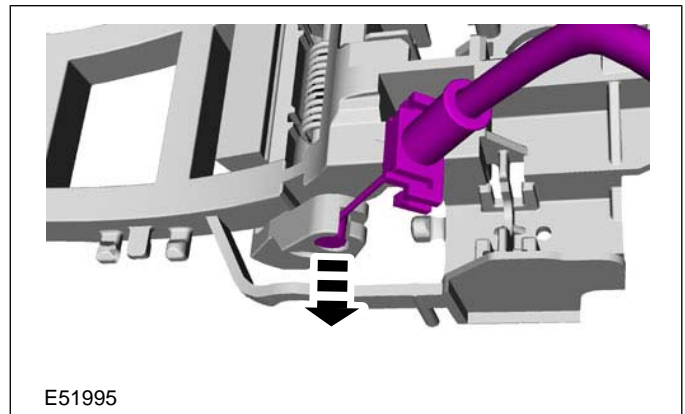
- Using a suitable flat blade screwdriver, release the front door exterior handle remote control cable retaining clips.

REMOVAL AND INSTALLATION

- Slide the front door exterior handle remote control cable off of the front door handle reinforcement retainers.



- Align the front door exterior handle remote control inner cable with the slot in the front door handle reinforcement and remove.

**Installation Details****Item 13 Front door inner panel**

- Before installing the front door inner panel retaining bolts, feed the door wiring harness electrical connector through the front door wiring harness hole.

Item 12 Front door lock actuator retaining screw

- Install the front door lock actuator to the front door.
- Tighten the front door lock actuator retaining screw.

Item 5 Door hinge retaining bolts

- Apply a coating of adhesive to the door hinge retaining bolts.

REMOVAL AND INSTALLATION

Front Door Lock Actuator — 3-Door, Vehicles With: Keyless Vehicle System

Materials	
Name	Specification
Adhesive - Loctite 243	WSK-M2G349-A7

1. Remove the front door trim panel.

For additional information, refer to: **Front Door Trim Panel - 3-Door** (501-05 Interior Trim and Ornamentation, Removal and Installation).

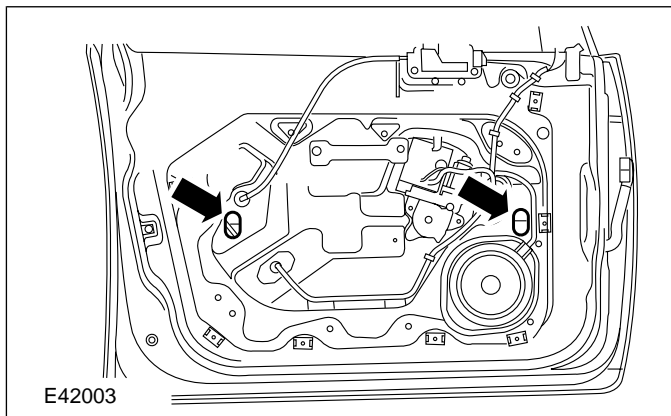
2. Remove the exterior front door handle.

For additional information, refer to: **Exterior Front Door Handle - Vehicles With: Keyless Vehicle System** (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).

3. Connect the battery ground cable.

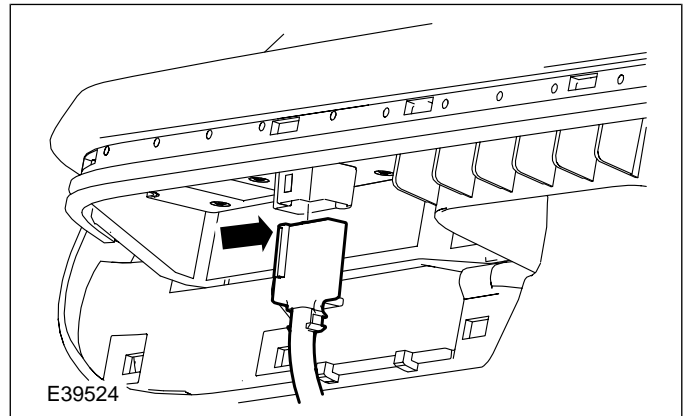
For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

4. Remove the front door window regulator grommets.

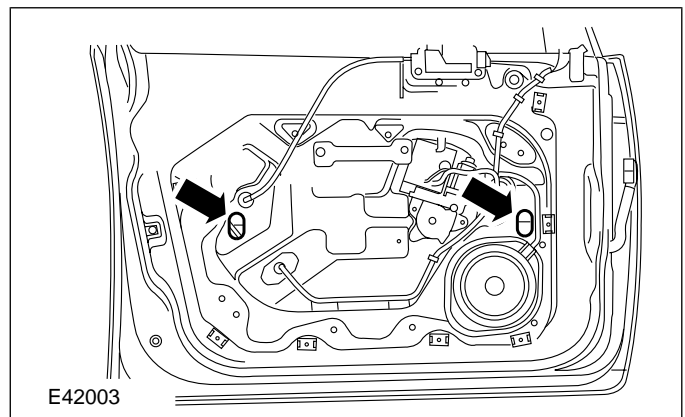


5. NOTE: Support the front door power window control unit.

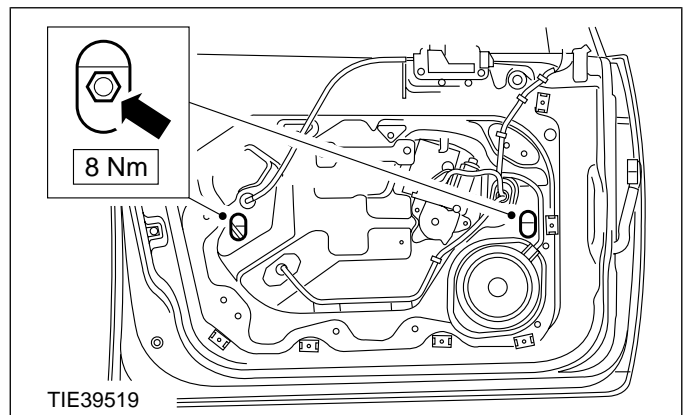
Connect the front door power window control switch electrical connector.



6. Using the front door power window control switch, align the window glass clamp bolts with the access holes.



7. Loosen the front door window glass clamp retaining bolts.



8. Raise the front door window glass.

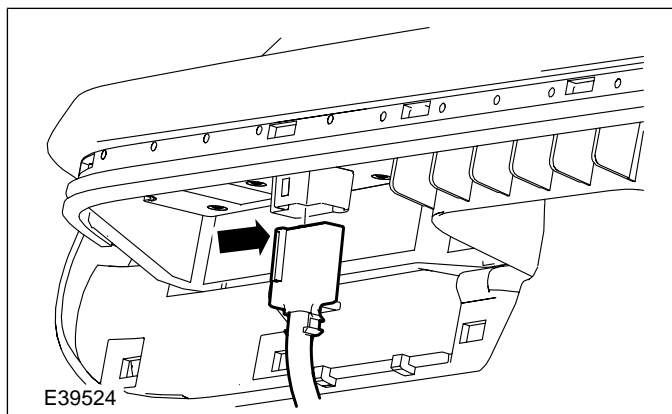
501-14-131

Handles, Locks, Latches and Entry Systems

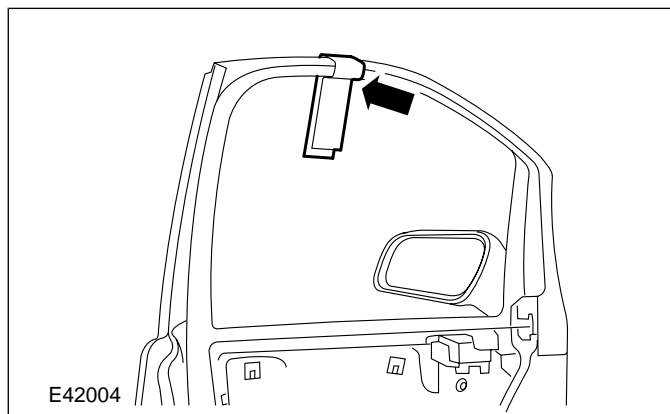
501-14-131

REMOVAL AND INSTALLATION

9. Disconnect the front door power window control switch electrical connector.



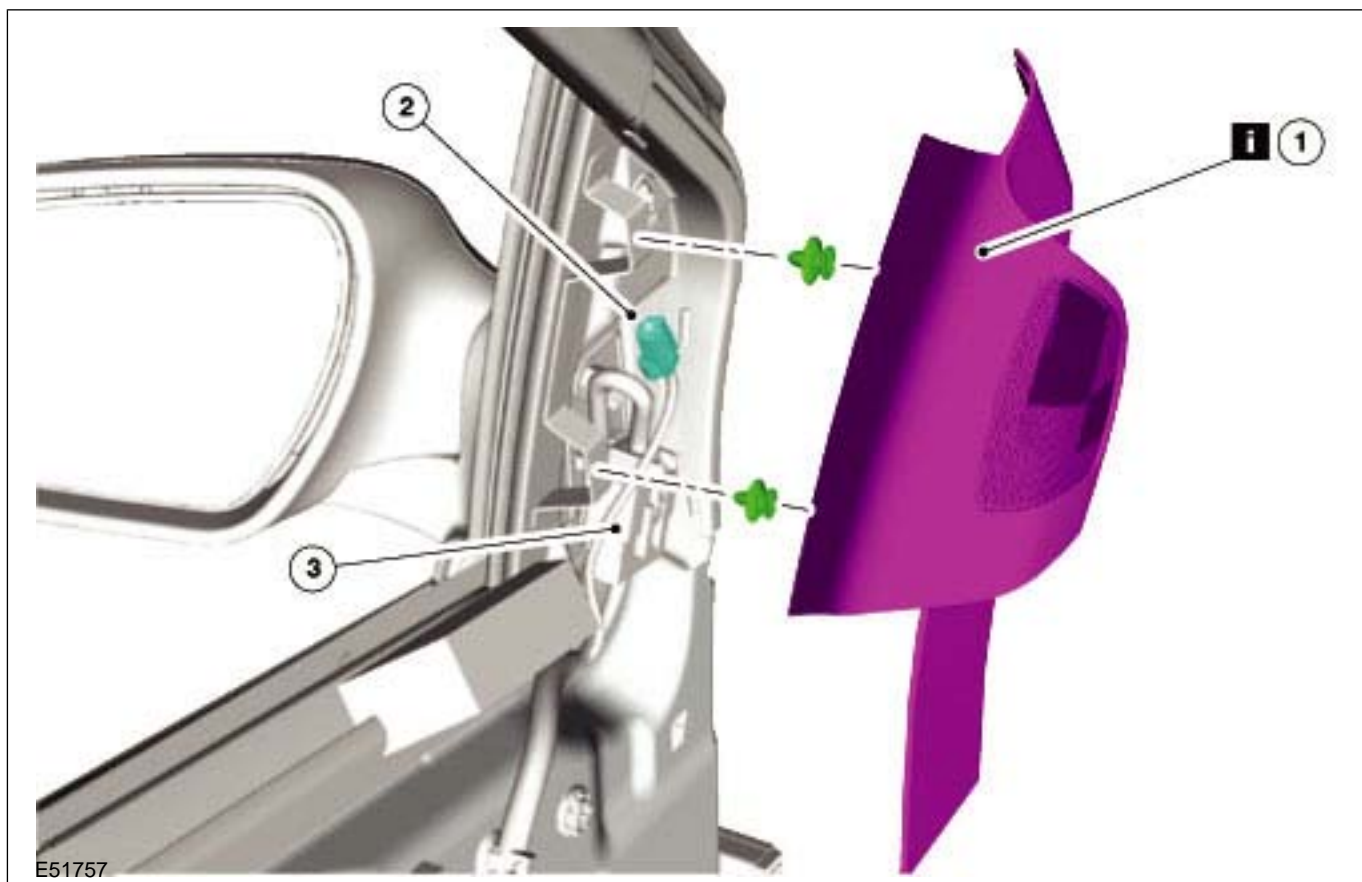
10. Using suitable tape, secure the front door window glass to the front door.



11. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

12. Remove the components in the order indicated in the following illustration(s) and table(s).



501-14-132

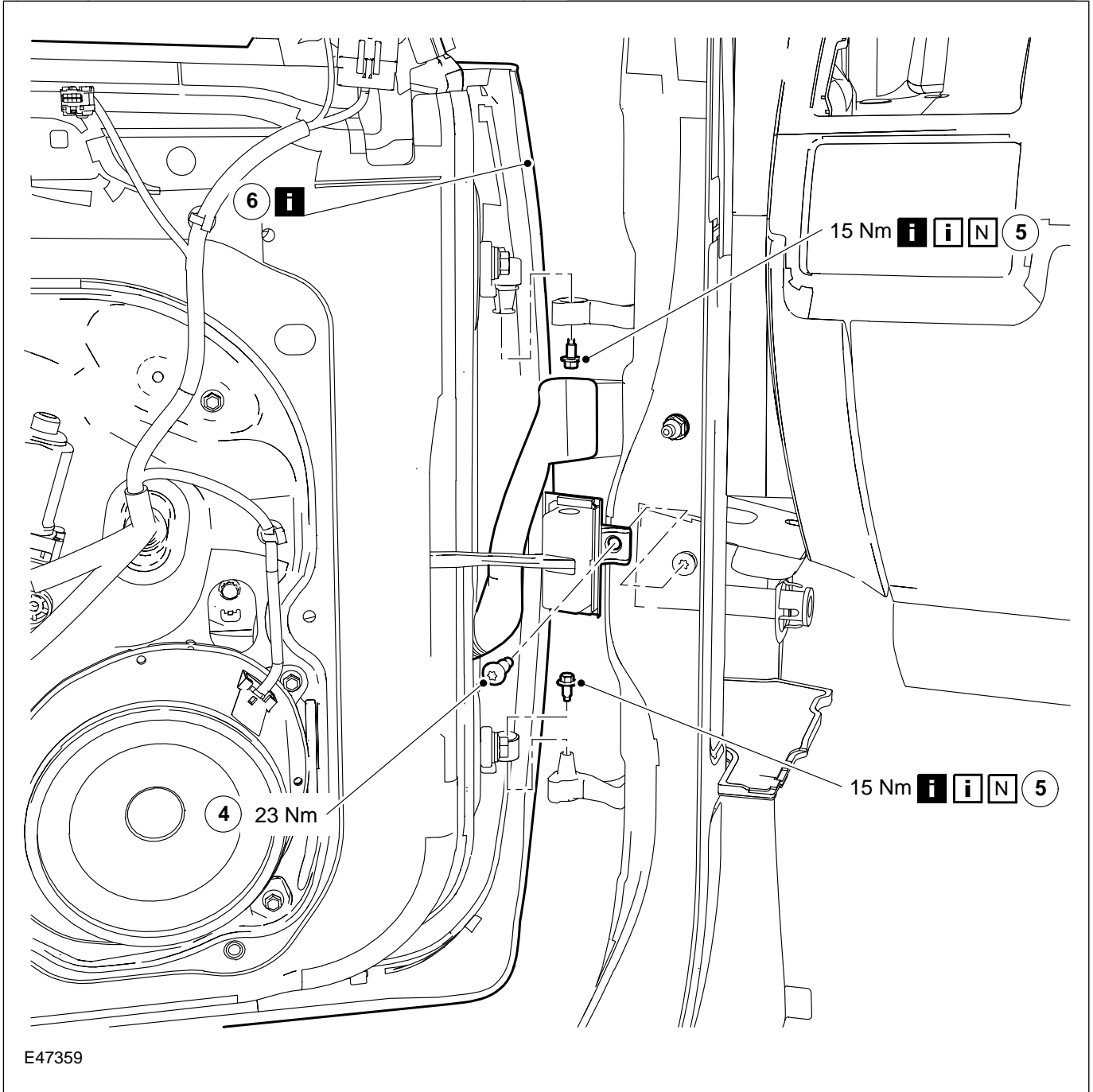
Handles, Locks, Latches and Entry Systems

501-14-132

REMOVAL AND INSTALLATION

Item	Description
1	Exterior mirror interior trim panel See Removal Detail
2	Front door tweeter speaker electrical

Item	Description
	connector
3	Exterior mirror electrical connector (if equipped)



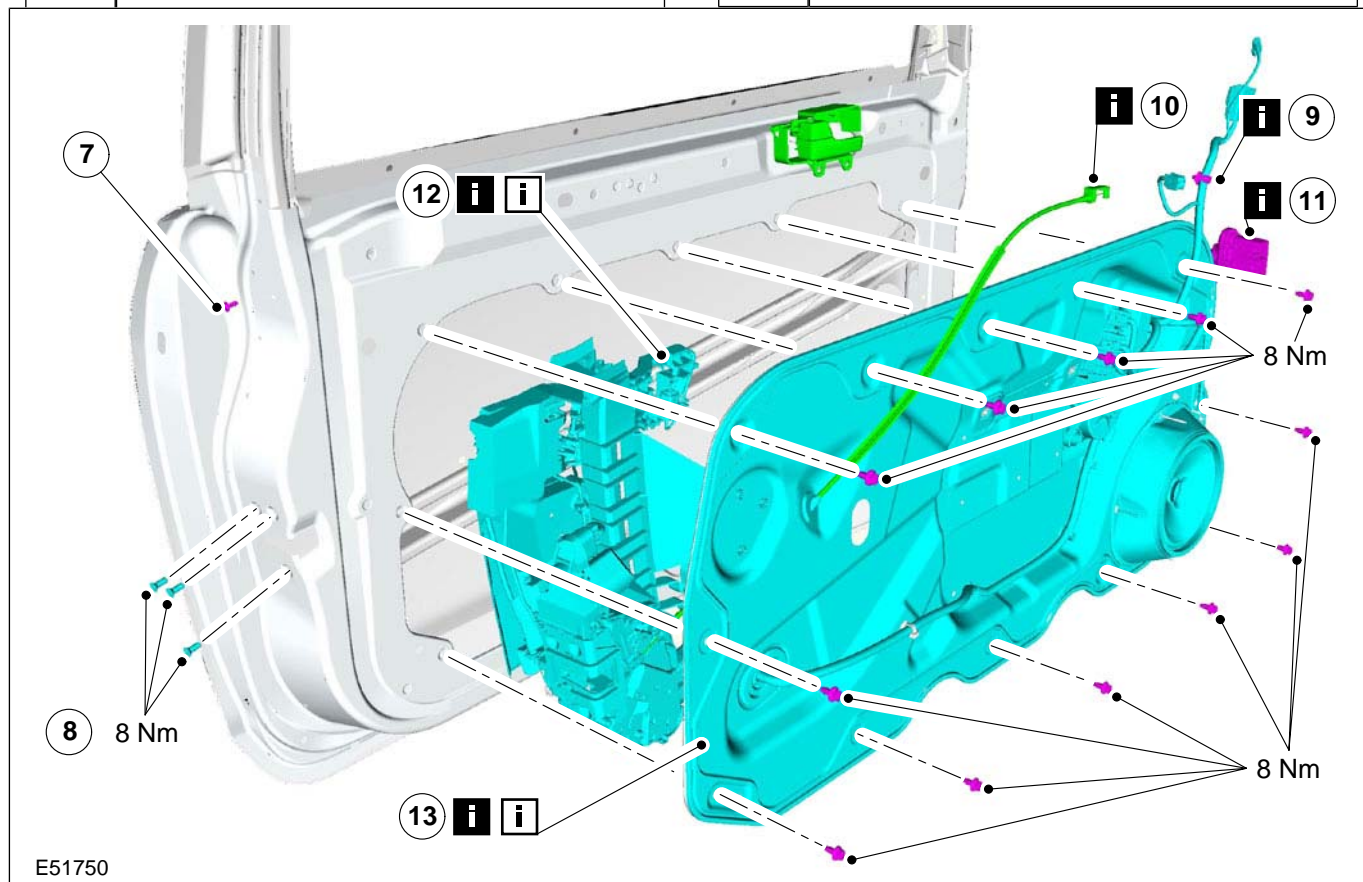
501-14-133 Handles, Locks, Latches and Entry Systems

501-14-133

REMOVAL AND INSTALLATION

Item	Description
4	Door check strap
5	Door hinge retaining bolts. See Removal Detail

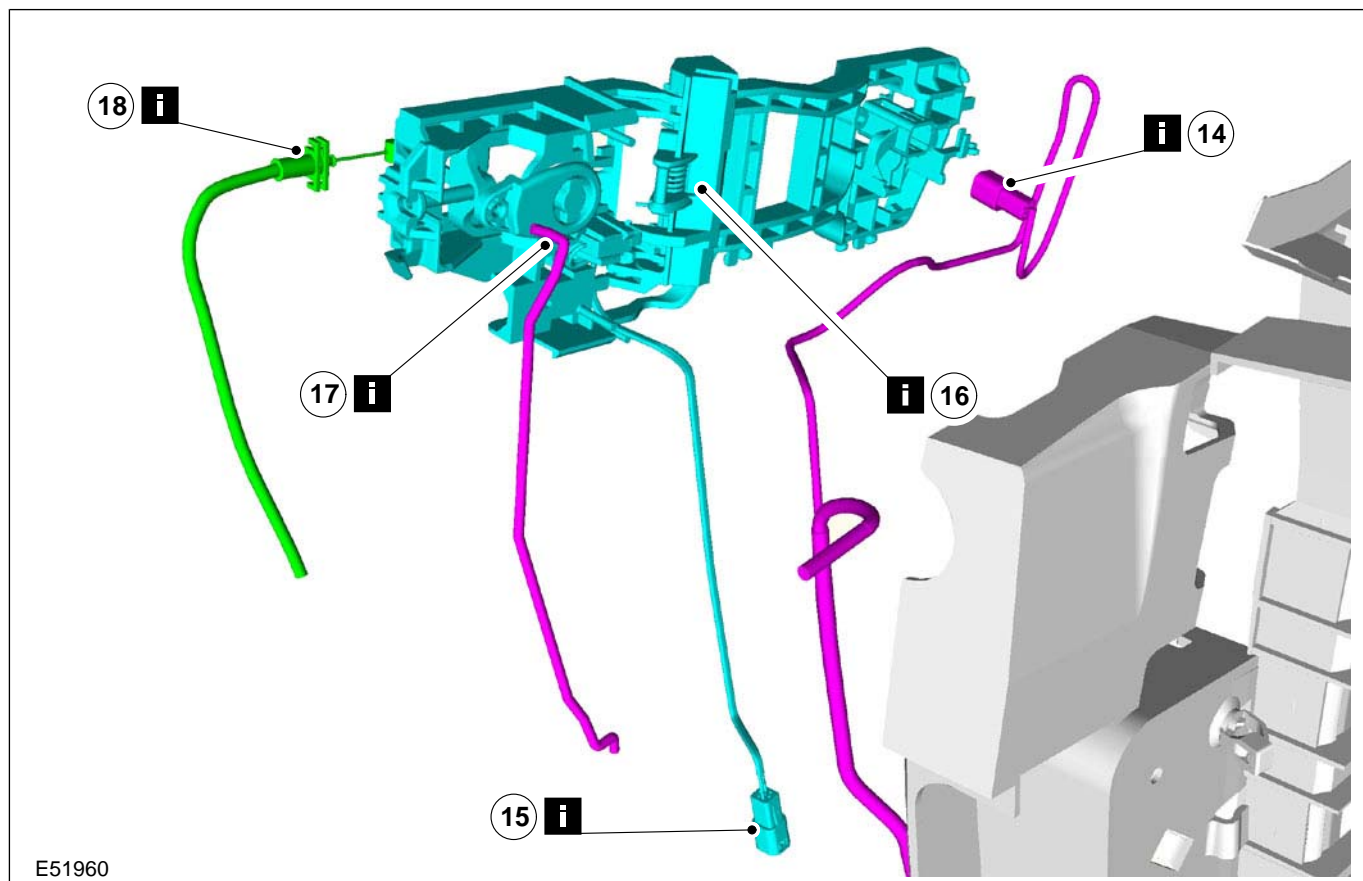
Item	Description
	See Installation Detail
6	Door (left-hand door shown) See Removal Detail



Item	Description
7	Front door handle, lock and latch retaining bracket retaining screw
8	Front door latch retaining bolts
9	Front door wiring harness retaining clip See Removal Detail
10	Front door latch remote control cable See Removal Detail

Item	Description
11	Front door wiring harness See Removal Detail
12	Front door lock actuator retaining screw See Removal Detail See Installation Detail
13	Front door inner panel See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION



E51960

Item	Description
14	Exterior front door handle RKE electrical connector See Removal Detail
15	Front door lock cylinder position sensor electrical connector See Removal Detail
16	Front door handle reinforcement See Removal Detail

Item	Description
17	Front door lock cylinder actuator rod See Removal Detail
18	Front door exterior handle remote control cable See Removal Detail

13. To install, reverse the removal procedure.
14. Vehicles with global closing, initialize the door window motors.

For additional information, refer to: Door Window Motor Initialization.

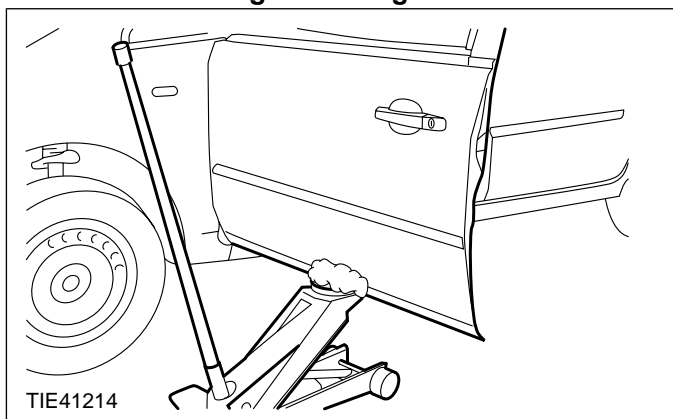
Removal Details

Item 1 Exterior mirror interior trim panel

- ⚠ CAUTION:** Do not place excessive strain on the exterior mirror and front door tweeter speaker wiring harness.

REMOVAL AND INSTALLATION

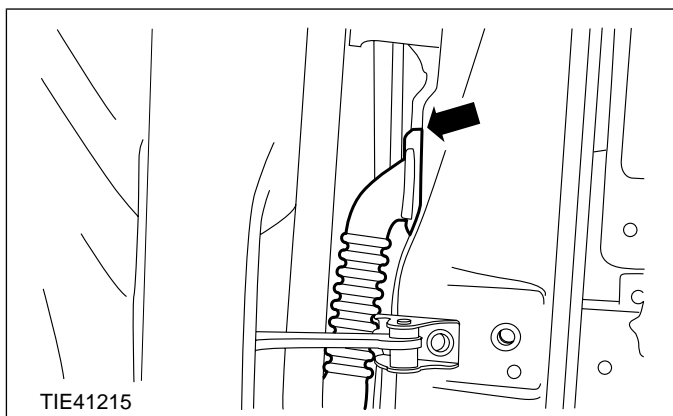
Item 5 Door hinge retaining bolts.



1. **CAUTION:** Protect the door using a soft cloth to prevent damage to the front door. With the aid of another technician and a suitable trolley jack, support and detach the front door from the front door hinges.

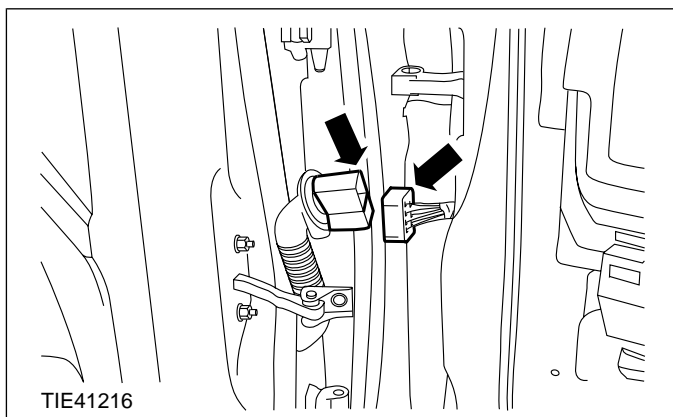
Item 6 Door (left-hand door shown)

1. Detach the electrical connector from the A-pillar.

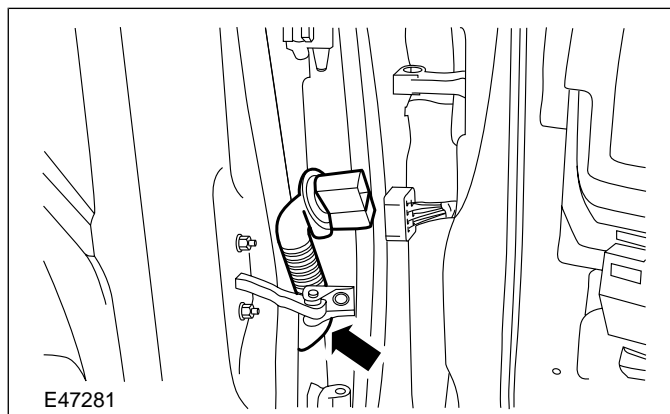


2. Remove the front door.

- Disconnect the electrical connector.



3. Push the front door wiring harness into the door.

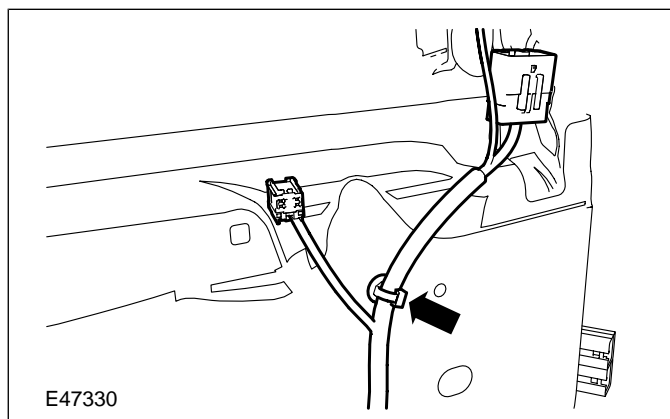


4. **CAUTION:** After the front door wiring harness electrical connector has been disconnected, position the front door back onto the front door hinges. Failure to follow this instruction may cause damage to the front door.

Position the front door onto the front door hinges.

Item 9 Front door wiring harness retaining clip

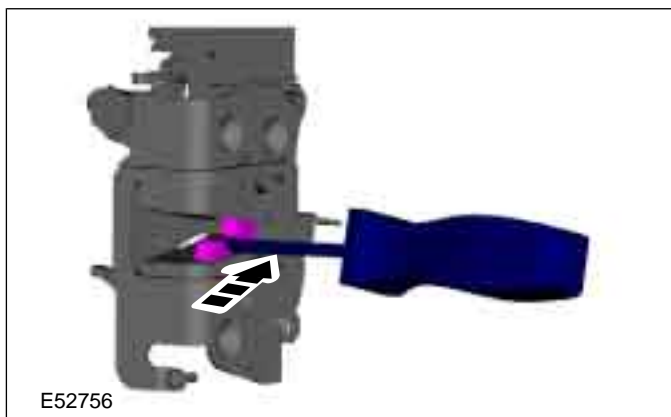
1. Detach the front door wiring harness retaining clip from the front door.



REMOVAL AND INSTALLATION

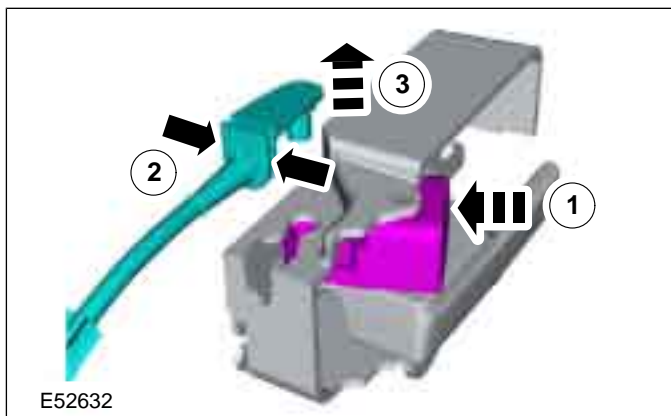
Item 10 Front door latch remote control cable

1. Using a suitable screwdriver, latch the front door lock into the closed position.

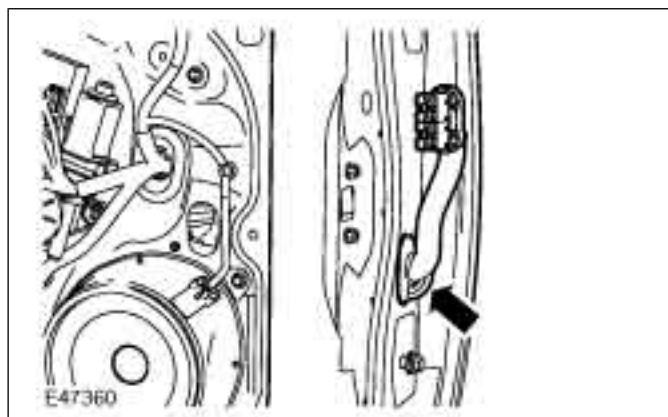


2. Detach the front door latch remote control cable from the front door latch remote control handle.

1. Operate the door latch remote control handle lock to the lock position.
2. Release the remote control cable retaining clips.
3. Detach the inner remote control cable from the remote control handle lock lever.

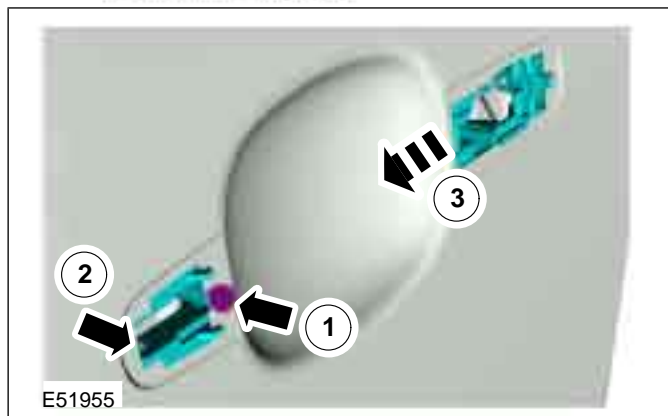
**Item 11** Front door wiring harness

1. Detach and push the front door wiring harness into the front door.

**Item 12** Front door lock actuator retaining screw

1. Detach the front door lock actuator.

1. Loosen the front door lock actuator retaining screw.
2. Release the front door lock actuator retaining clip.
3. Slide the front door lock actuator towards the front of the vehicle.

**Item 13** Front door inner panel

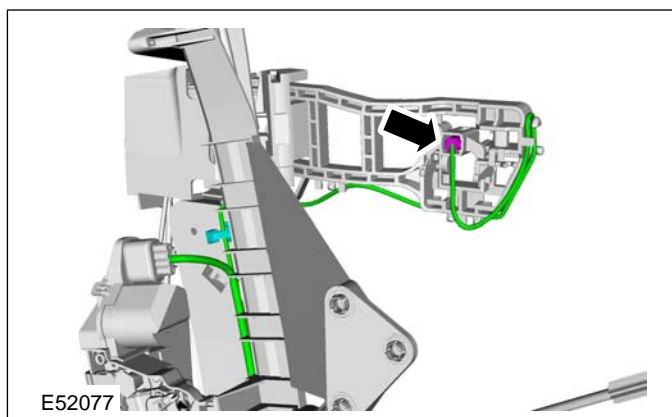
- ⚠ CAUTION:** When removing the front door inner panel, care must be taken that the door wiring harness is not trapped or placed under excessive strain.

Item 14 Exterior front door handle RKE electrical connector

- NOTE:** Make a note of the clipping position of the exterior front door handle RKE harness.

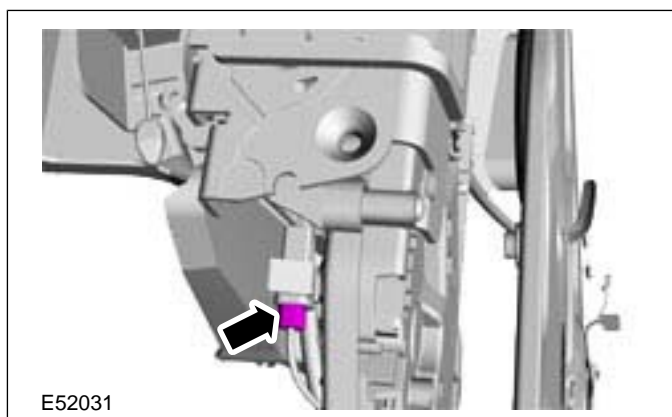
REMOVAL AND INSTALLATION

1. Disconnect the front door handle RKE electrical connector and detach the wiring harness from the front door handle reinforcement.



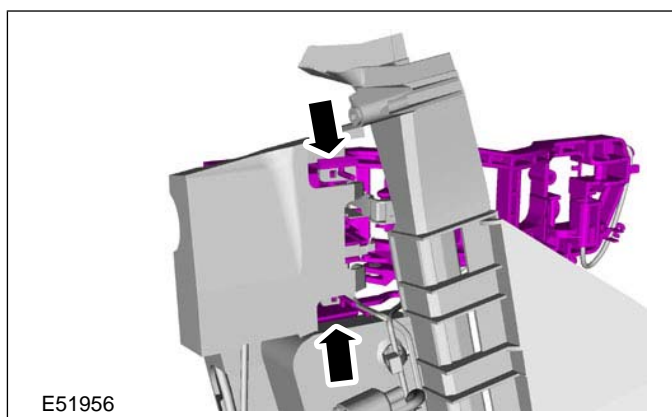
Item 15 Front door lock cylinder position sensor electrical connector

1. Disconnect the front door lock cylinder position sensor electrical connector.



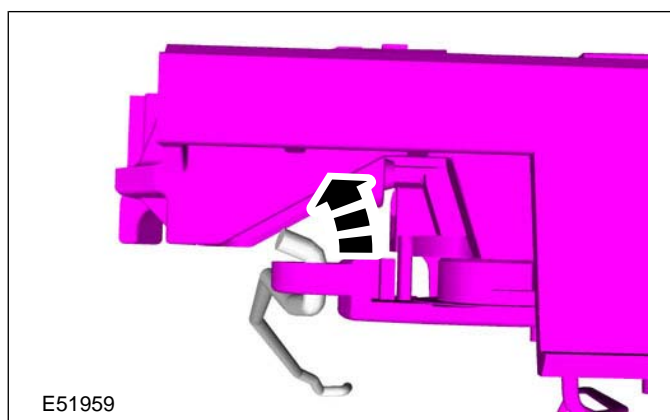
Item 16 Front door handle reinforcement

1. Detach the front door handle reinforcement from the front door handle, lock and latch retaining bracket.



Item 17 Front door lock cylinder actuator rod

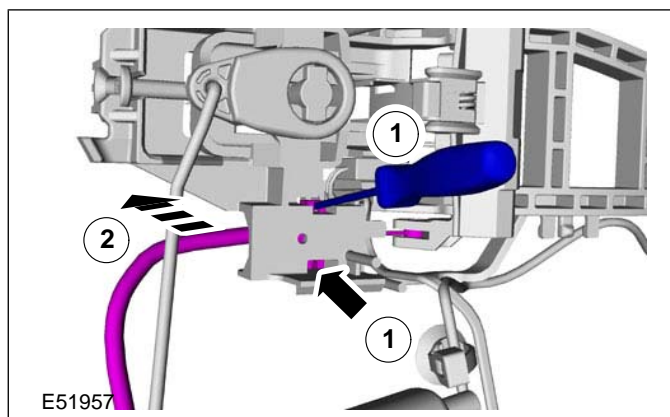
1. Detach the front door lock cylinder actuator rod from the front door handle reinforcement.



Item 18 Front door exterior handle remote control cable

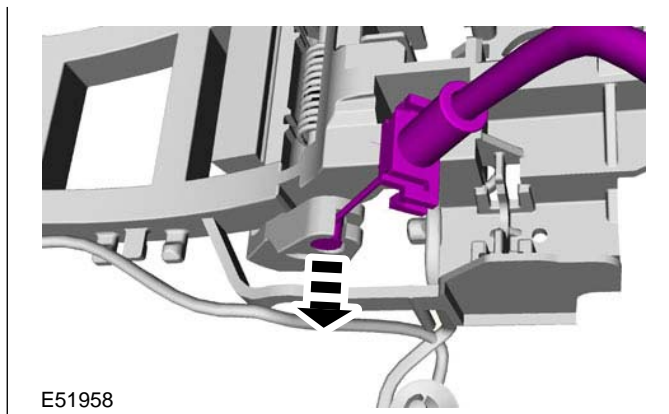
1. Detach the front door exterior handle remote control cable from the front door handle reinforcement.

1. Using a suitable flat blade screwdriver, release the front door exterior handle remote control cable retaining clips.
2. Slide the front door exterior handle remote control cable off of the front door handle reinforcement retainers.



REMOVAL AND INSTALLATION

2. Align the front door exterior handle remote control inner cable with the slot in the front door handle reinforcement and remove.

**Installation Details****Item 13 Front door inner panel**

1. Before installing the front door inner panel retaining bolts, feed the door wiring harness electrical connector through the front door wiring harness hole.

Item 12 Front door lock actuator retaining screw

1. Install the front door lock actuator to the front door.
2. Tighten the front door lock actuator retaining screw.

Item 5 Door hinge retaining bolts.

1. Apply a coating of adhesive to the door hinge retaining bolts.

REMOVAL AND INSTALLATION

Front Door Lock Actuator — 4-Door/5-Door/Wagon

General Equipment

Trolley jack

Materials

Name	Specification
Adhesive - Loctite 243	WSK-M2G349-A7

1. Remove the front door trim panel.

For additional information, refer to: **Front Door Trim Panel - 4-Door/5-Door/Wagon** (501-05 Interior Trim and Ornamentation, Removal and Installation).

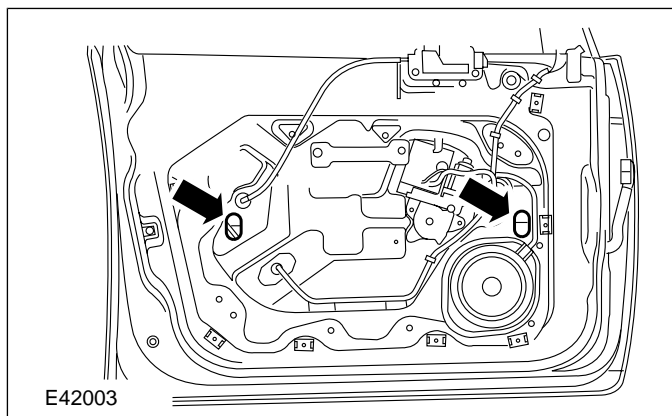
2. Remove the exterior front door handle.

For additional information, refer to: **Exterior Front Door Handle** (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).

3. Connect the battery ground cable.

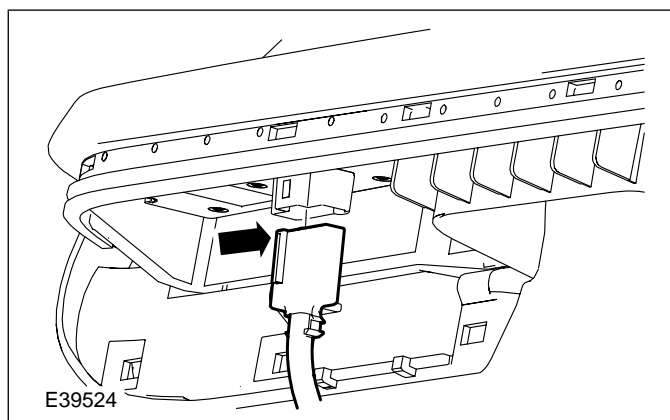
For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

4. Remove the front door window regulator grommets.

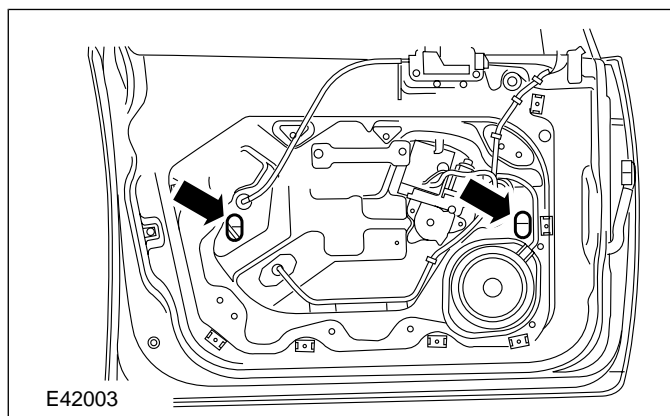


5. NOTE: Support the front door power window control unit.

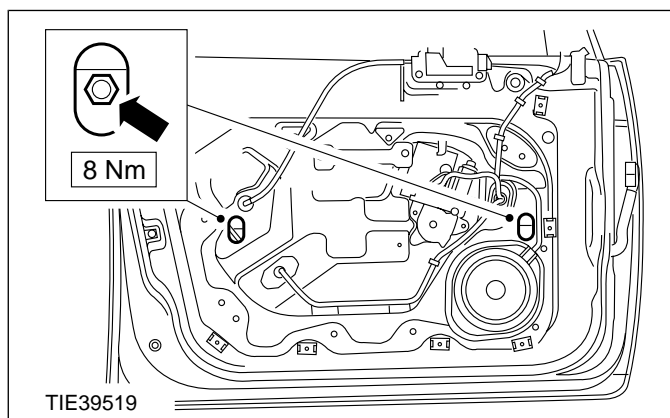
Connect the front door power window control unit electrical connector.



6. Using the front door power window control unit, align the front door window glass clamp bolts with the access holes.



7. Loosen the front door window glass clamp retaining bolts.



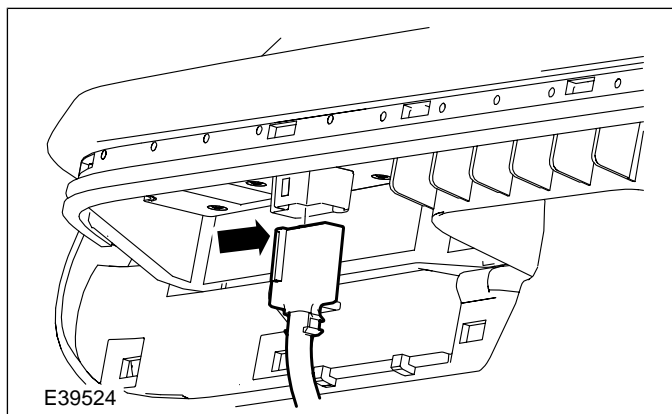
501-14-140

Handles, Locks, Latches and Entry Systems

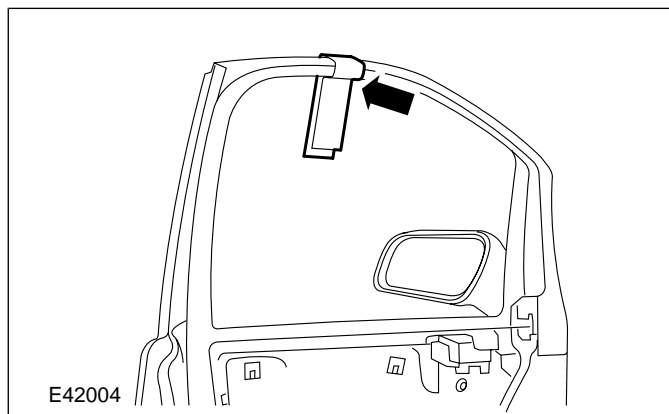
501-14-140

REMOVAL AND INSTALLATION

8. Disconnect the front door power window control unit electrical connector.



10. Using suitable tape, secure the front door window glass to the front door.

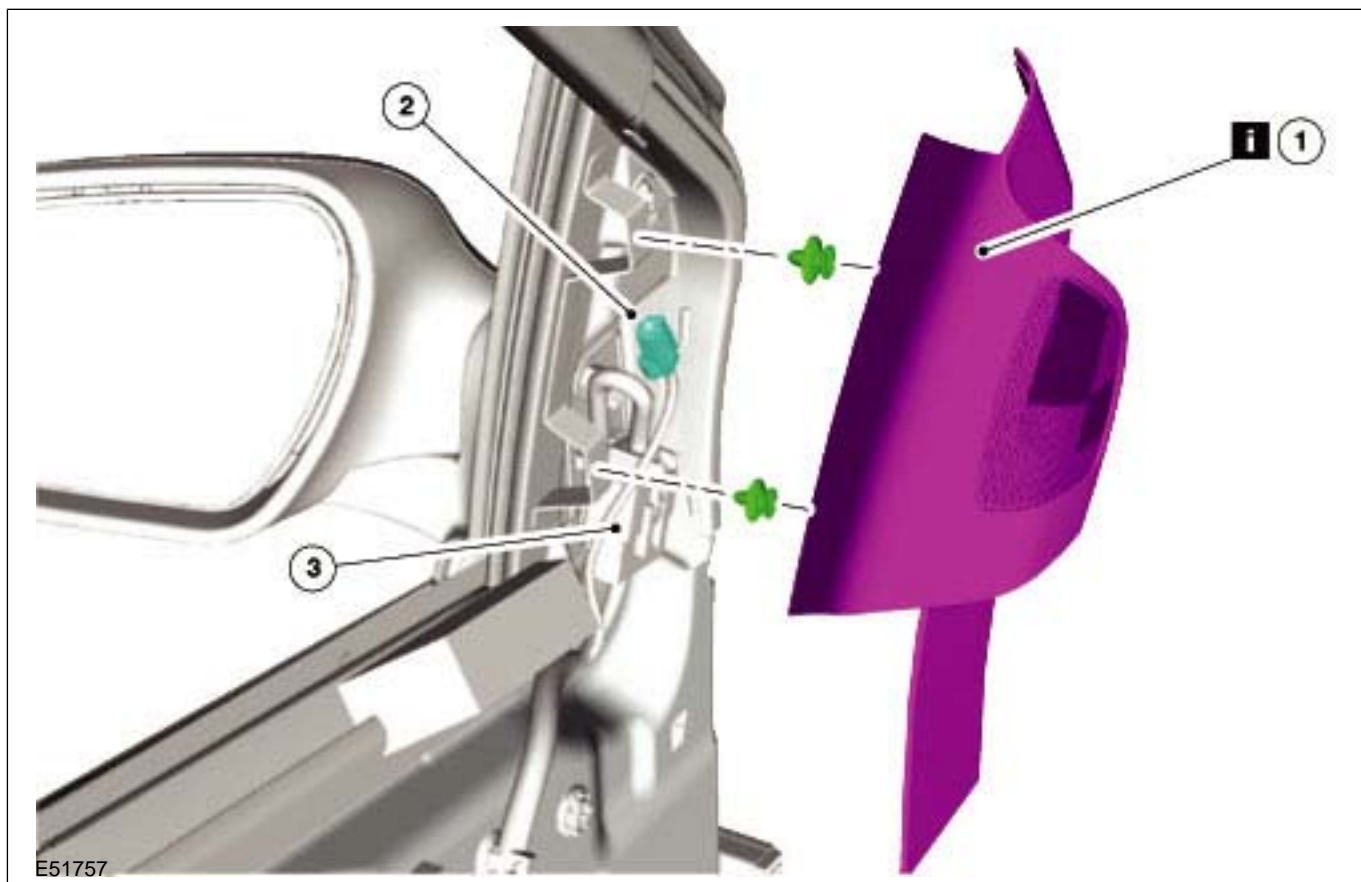


9. Raise the front door window glass.

11. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

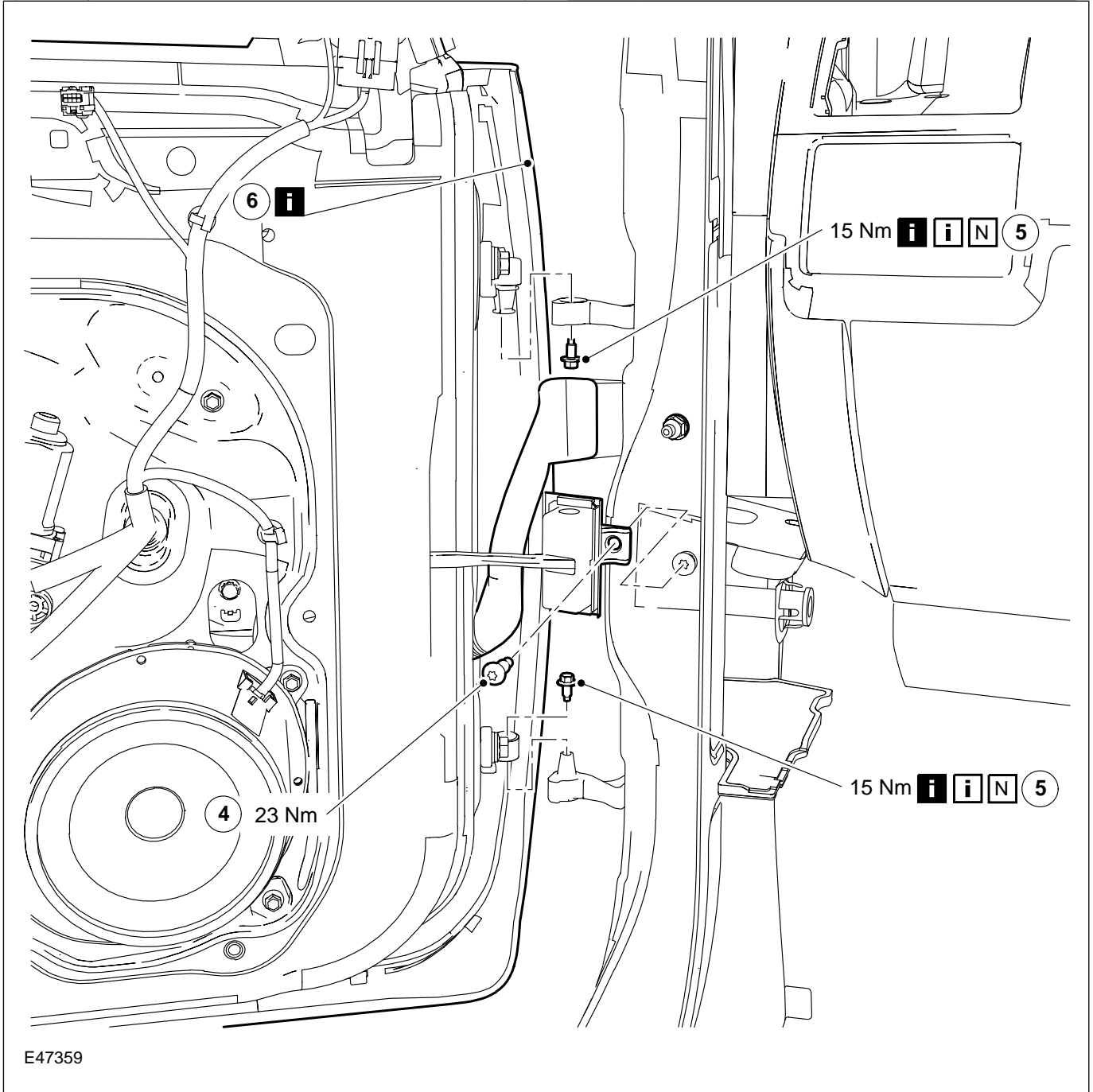
12. Remove the components in the order indicated in the following illustration(s) and table(s).



REMOVAL AND INSTALLATION

Item	Description
1	Exterior mirror interior trim panel See Removal Detail
2	Front door tweeter speaker electrical

Item	Description
	connector
3	Exterior mirror electrical connector (if equipped)

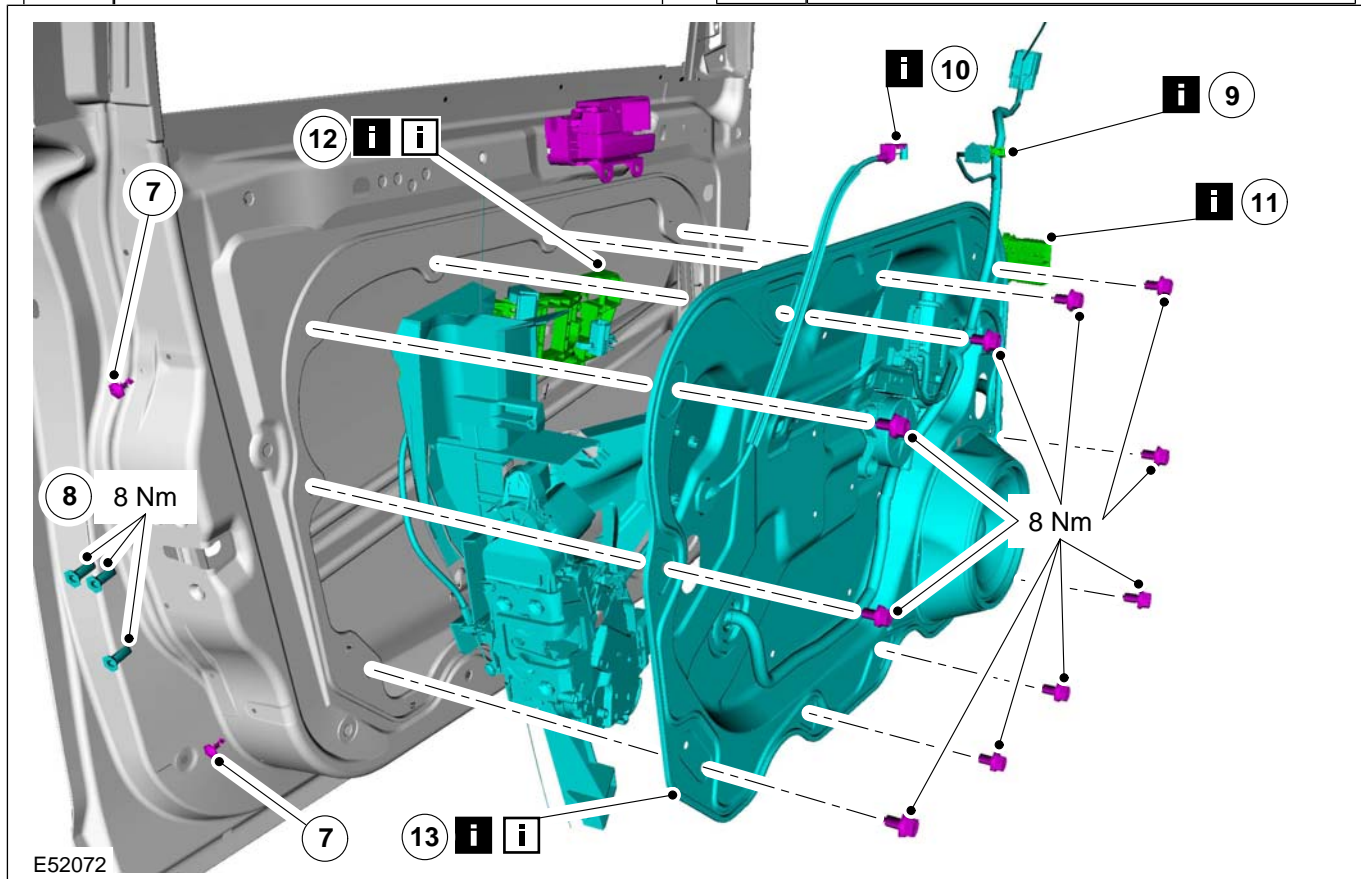


E47359

REMOVAL AND INSTALLATION

Item	Description
4	Door check strap
5	Door hinge retaining bolts See Removal Detail

Item	Description
	See Installation Detail
6	Door See Removal Detail

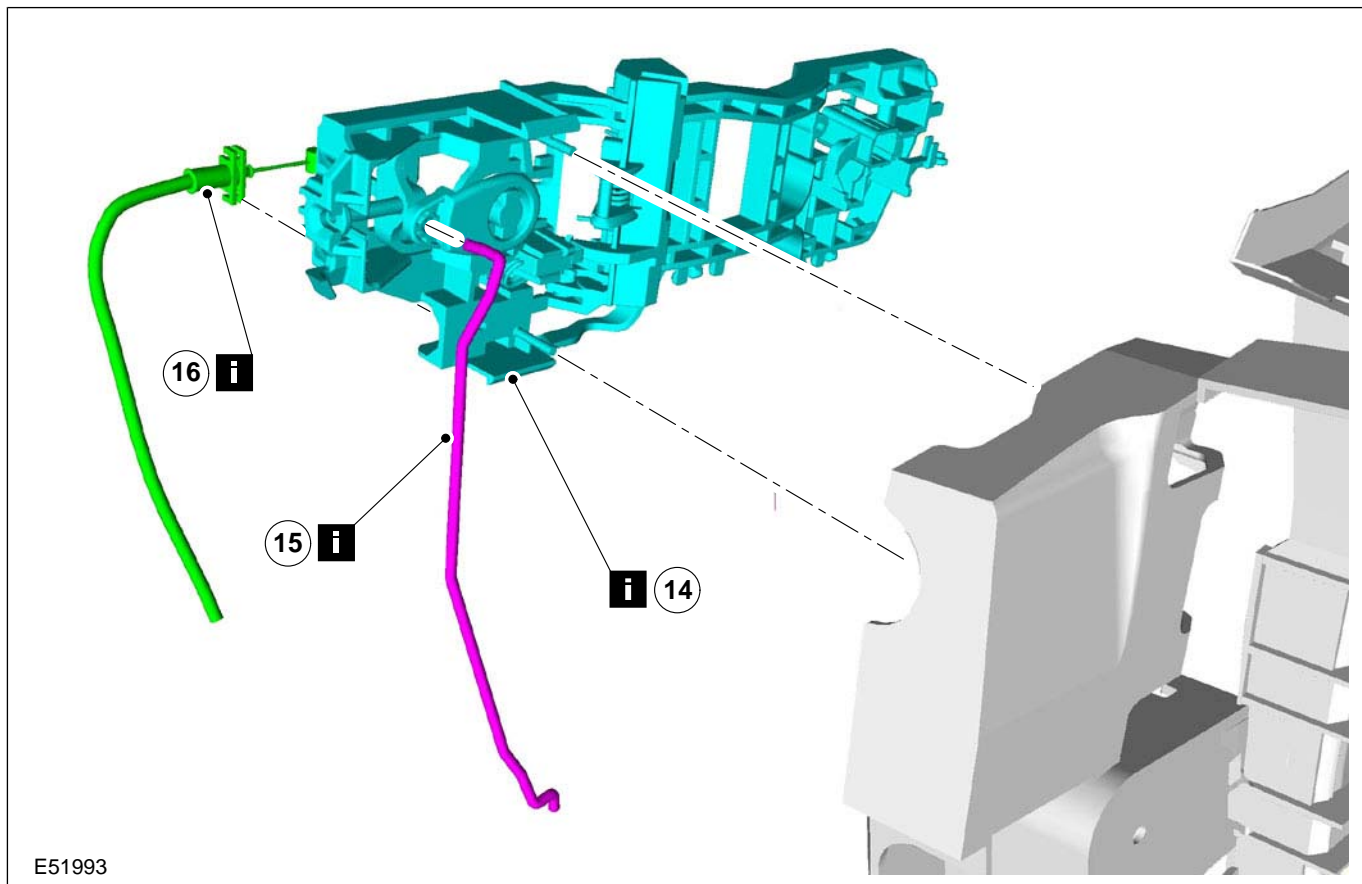


E52072

Item	Description
7	Front door handle, lock and latch retaining bracket retaining screws
8	Front door latch retaining bolts
9	Front door wiring harness retaining clip See Removal Detail
10	Front door latch remote control cable See Removal Detail

Item	Description
11	Front door wiring harness See Removal Detail
12	Front door lock actuator retaining screw See Removal Detail See Installation Detail
13	Front door inner panel See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION



E51993

Item	Description
14	Front door lock actuator <i>See Removal Detail</i>
15	Front door lock cylinder actuator rod <i>See Removal Detail</i>
16	Front door exterior handle remote control cable <i>See Removal Detail</i>

13. To install, reverse the removal procedure.

14. Vehicles with global closing, initialize the door window motors.

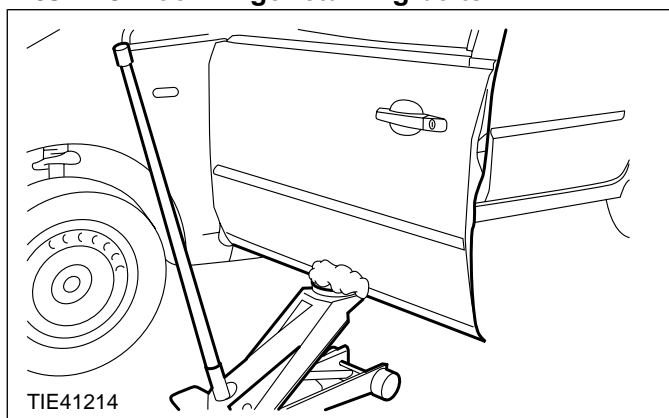
For additional information, refer to: Door Window Motor Initialization.

Removal Details

Item 1 Exterior mirror interior trim panel

CAUTION: Do not place excessive strain on the exterior mirror and front door tweeter speaker wiring harness.

Item 5 Door hinge retaining bolts

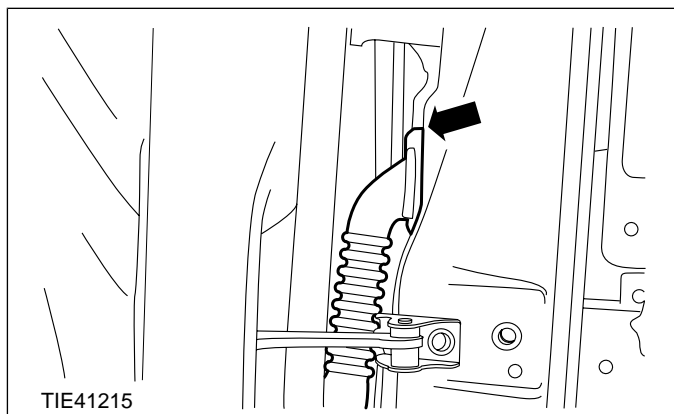


REMOVAL AND INSTALLATION

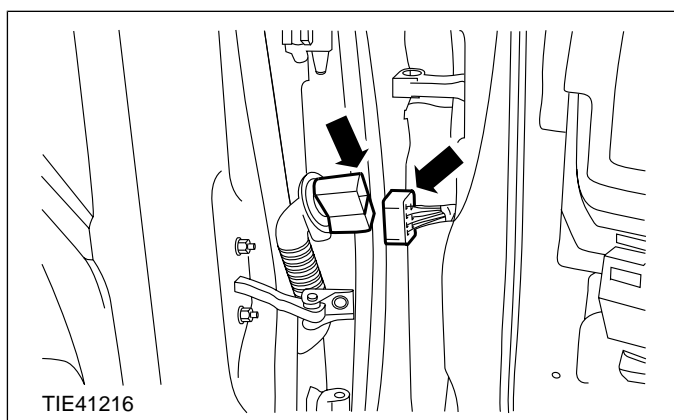
1. **⚠ CAUTION:** Protect the door using a soft cloth to prevent damage to the front door.
With the aid of another technician and a suitable trolley jack, support and detach the front door from the front door hinges.

Item 6 Door

1. Detach the front door wiring harness from the A-pillar.



2. Disconnect the front door wiring harness electrical connector.

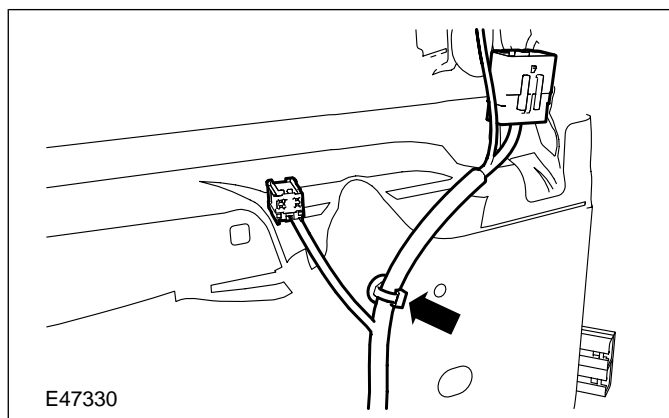


3. **⚠ CAUTION:** After the front door wiring harness electrical connector has been disconnected, position the front door back onto the front door hinges. Failure to follow this instruction may cause damage to the front door.

Position the front door onto the front door hinges.

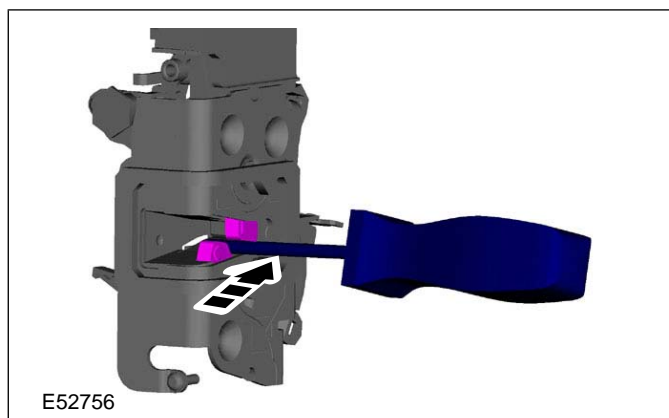
Item 9 Front door wiring harness retaining clip

1. Detach the front door wiring harness retaining clip from the front door.



Item 10 Front door latch remote control cable

1. Using a suitable screwdriver, latch the front door lock into the closed position.



2. Detach the front door latch remote control cable from the front door latch remote control handle.

1. Operate the door latch remote control handle lock to the lock position.
2. Release the remote control cable retaining clips.

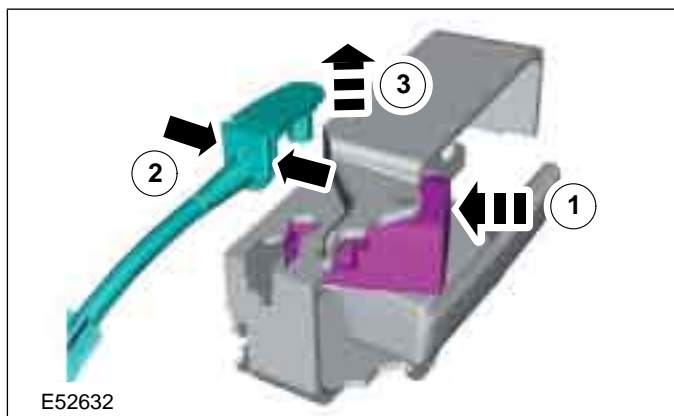
501-14-145

Handles, Locks, Latches and Entry Systems

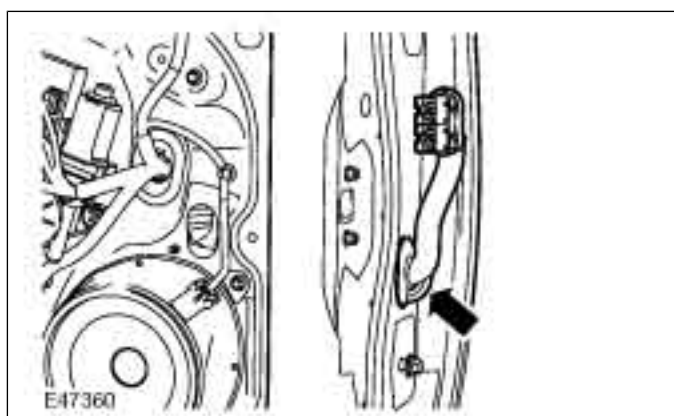
501-14-145

REMOVAL AND INSTALLATION

- Detach the inner remote control cable from the remote control handle lock lever.

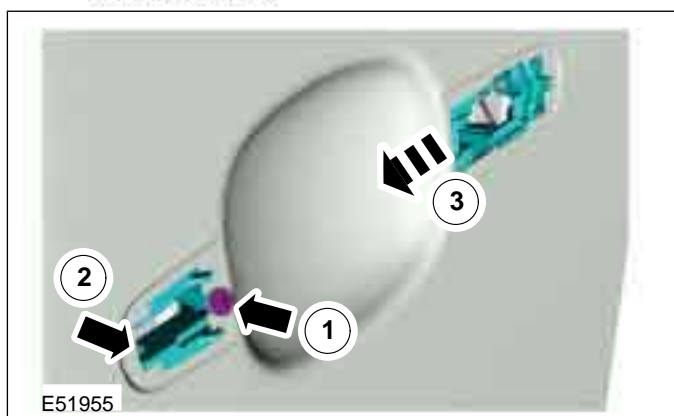
**Item 11** Front door wiring harness

- Detach and push the front door wiring harness into the front door.

**Item 12** Front door lock actuator retaining screw

- Detach the front door lock actuator .

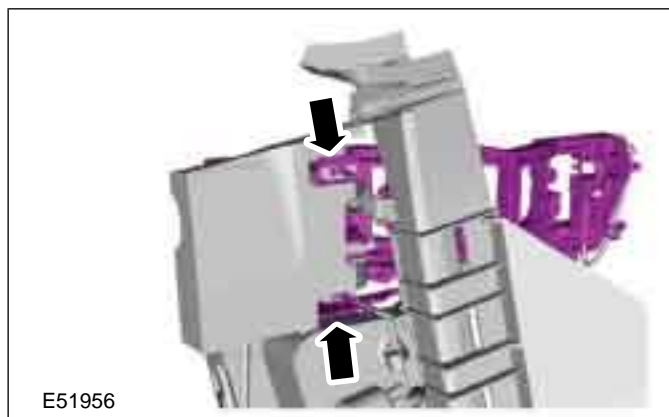
- Loosen the door lock actuator retaining screw.
- Release the door lock actuator retaining clip.
- Slide the door lock actuator towards the front of the vehicle.

**Item 13** Front door inner panel

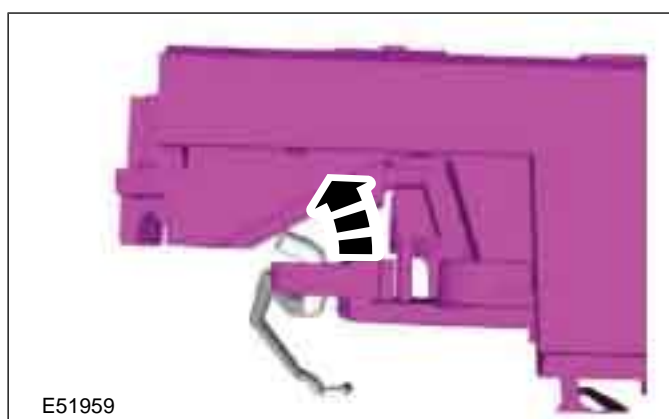
- CAUTION:** When removing the front door inner panel, care must be taken that the door wiring harness is not trapped or placed under excessive strain.

Item 14 Front door lock actuator

- Detach the front door lock actuator from the front door handle, lock and latch retaining bracket.

**Item 15** Front door lock cylinder actuator rod

- Detach the front door lock cylinder actuator rod from the front door lock actuator.

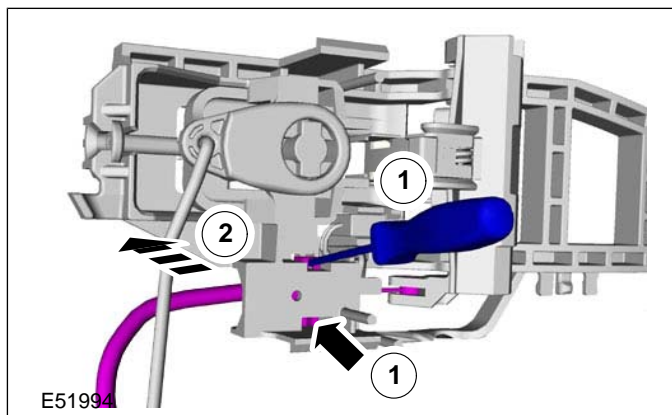
**Item 16** Front door exterior handle remote control cable

- Detach the front exterior door handle remote control cable from the front door lock actuator.

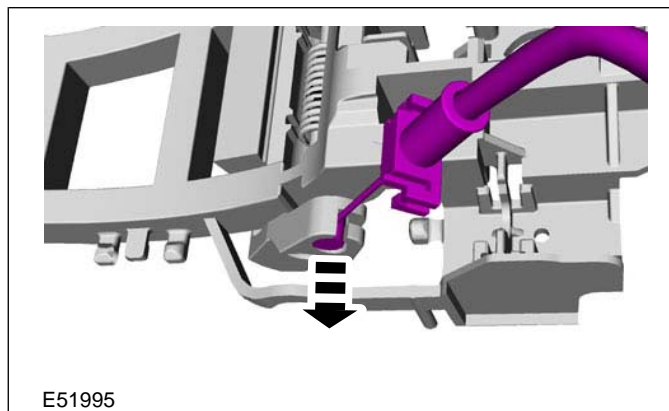
- Using a suitable flat blade screwdriver, release the exterior front door handle remote control cable retaining clips.

REMOVAL AND INSTALLATION

- Slide the exterior front door handle remote control cable off of the front door lock actuator.



- Align the exterior front door handle remote control inner cable with the slot in the front door lock actuator and remove.

**Installation Details****Item 13 Front door inner panel**

- Before installing the front door inner panel retaining bolts, feed the door wiring harness electrical connector through the front door wiring harness hole.

Item 12 Front door lock actuator retaining screw

- Install the front door lock actuator to the front door.
- Tighten the front door lock actuator retaining screw.

Item 5 Door hinge retaining bolts

- Apply a coating of adhesive to the door hinge retaining bolts.

REMOVAL AND INSTALLATION

Front Door Lock Actuator — 4-Door/5-Door/Wagon, Vehicles With:
Keyless Vehicle System

Materials	
Name	Specification
Adhesive - Loctite 243	WSK-M2G349-A7

1. Remove the front door trim panel.

For additional information, refer to: **Front Door Trim Panel - 4-Door/5-Door/Wagon** (501-05 Interior Trim and Ornamentation, Removal and Installation).

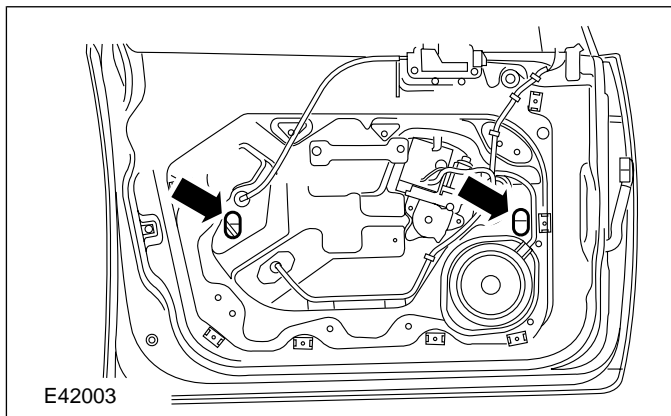
2. Remove the exterior front door handle.

For additional information, refer to: **Exterior Front Door Handle - Vehicles With: Keyless Vehicle System** (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).

3. Connect the battery ground cable.

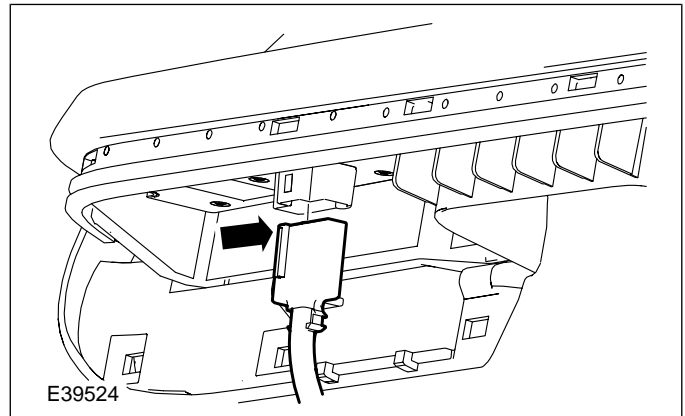
For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

4. Remove the front door window regulator grommets.

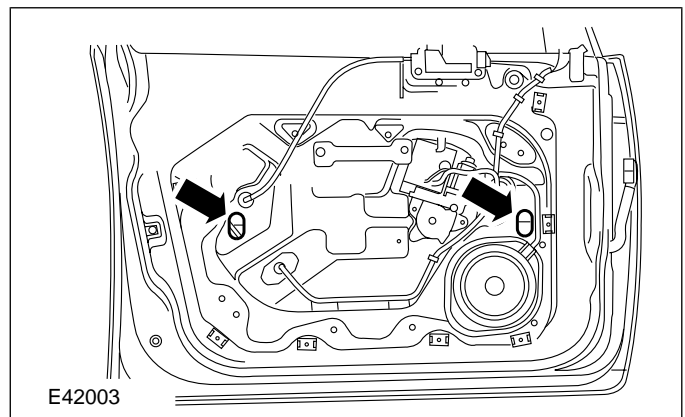


5. NOTE: Support the front door power window control unit.

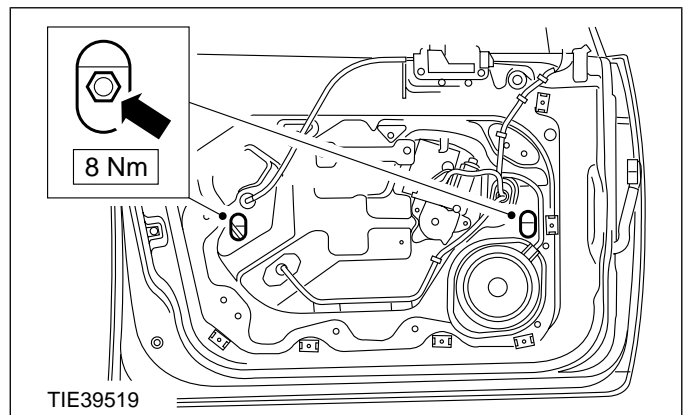
Connect the front door power window control switch electrical connector.



6. Using the front door power window control switch, align the window glass clamp bolts with the access holes.



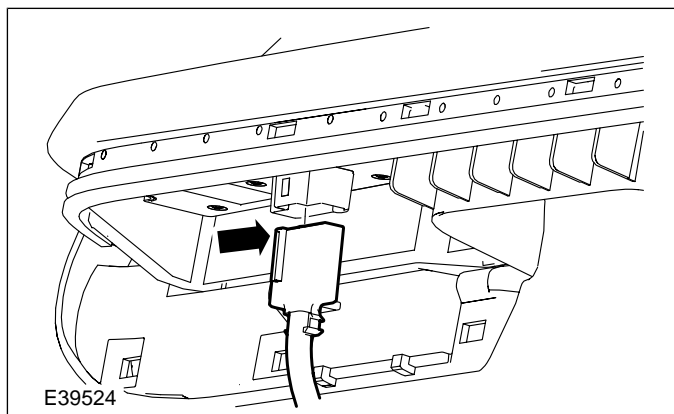
7. Loosen the front door window glass clamp retaining bolts.



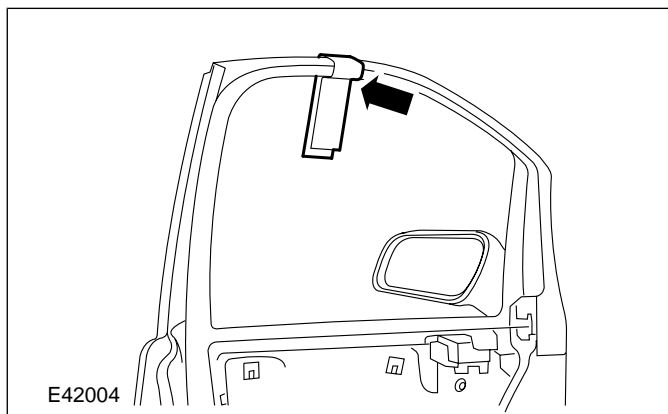
8. Raise the front door window glass.

REMOVAL AND INSTALLATION

9. Disconnect the front door power window control switch electrical connector.



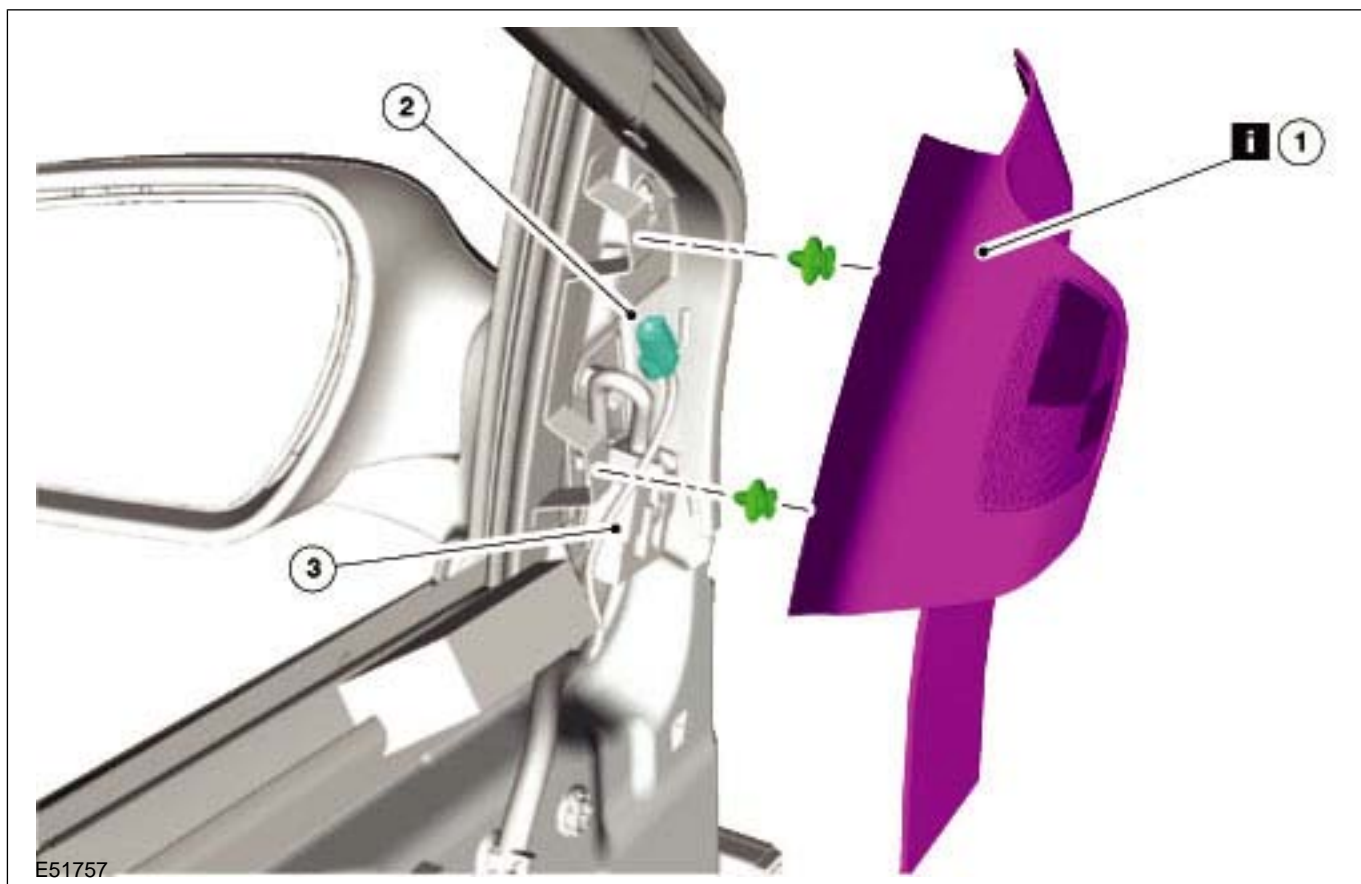
10. Using suitable tape, secure the front door window glass to the front door.



11. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

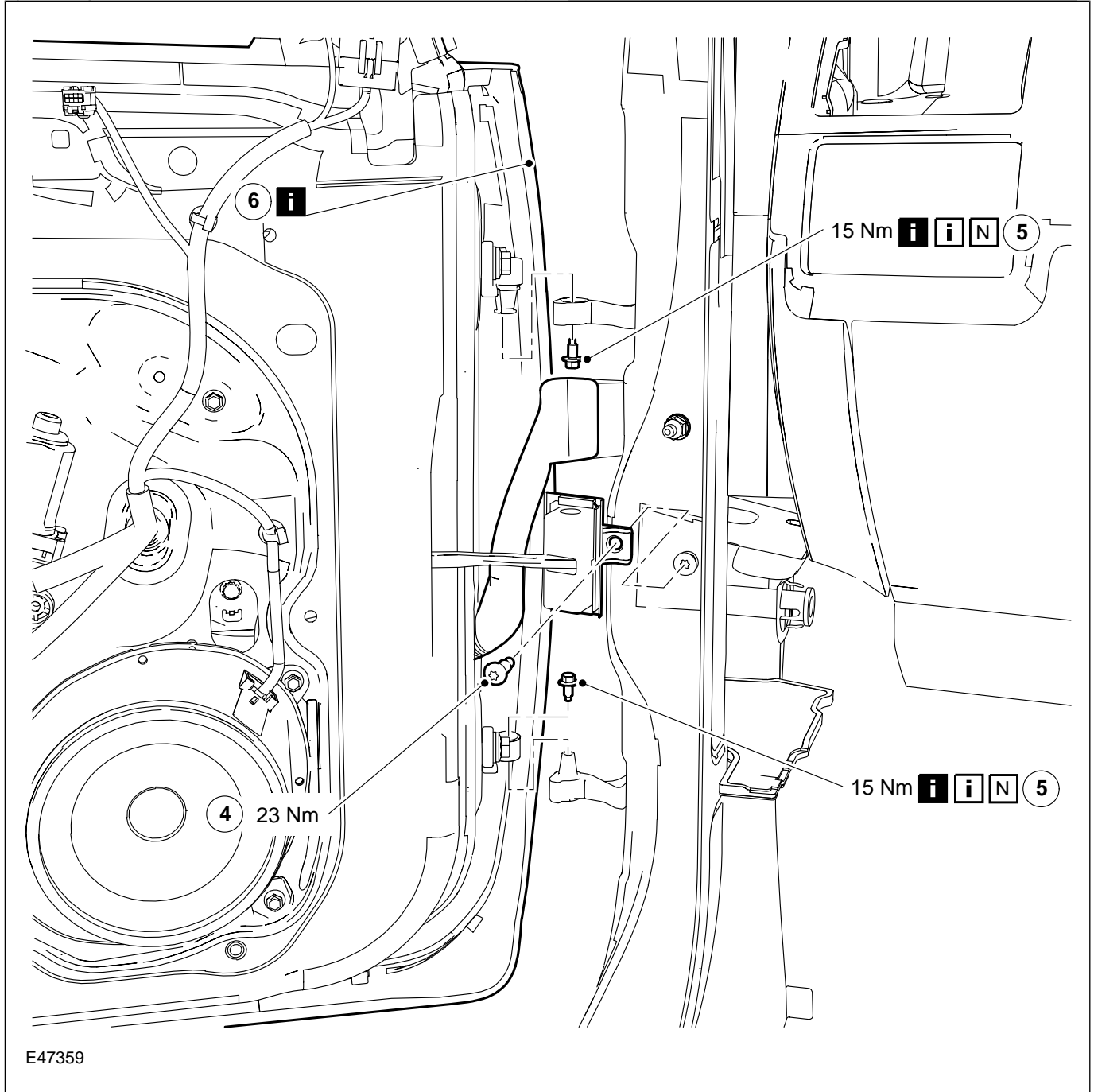
12. Remove the components in the order indicated in the following illustration(s) and table(s).



REMOVAL AND INSTALLATION

Item	Description
1	Exterior mirror interior trim panel See Removal Detail
2	Front door tweeter speaker electrical

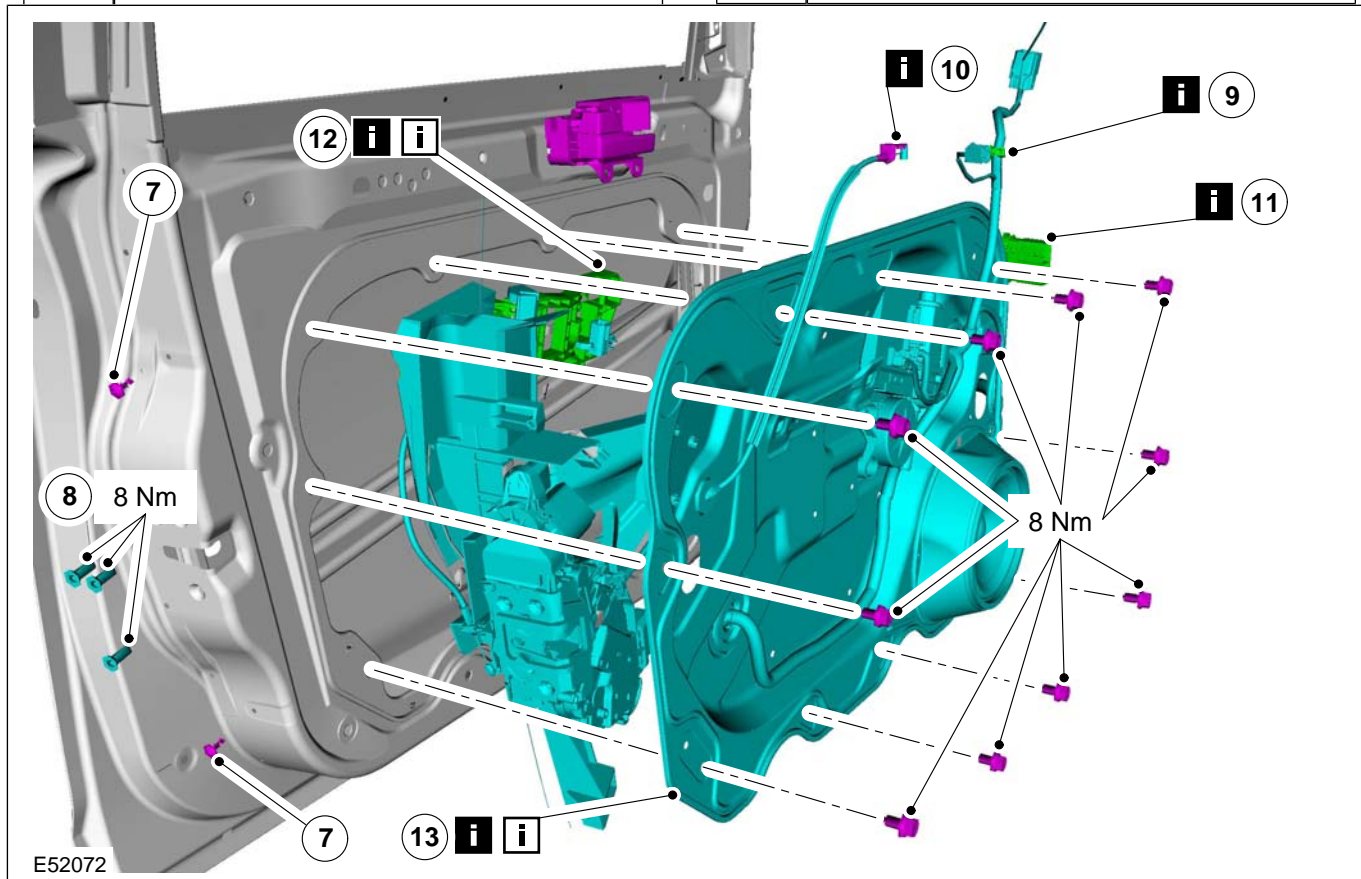
Item	Description
	connector
3	Exterior mirror electrical connector (if equipped)



REMOVAL AND INSTALLATION

Item	Description
4	Door check strap
5	Door hinge retaining bolts See Removal Detail

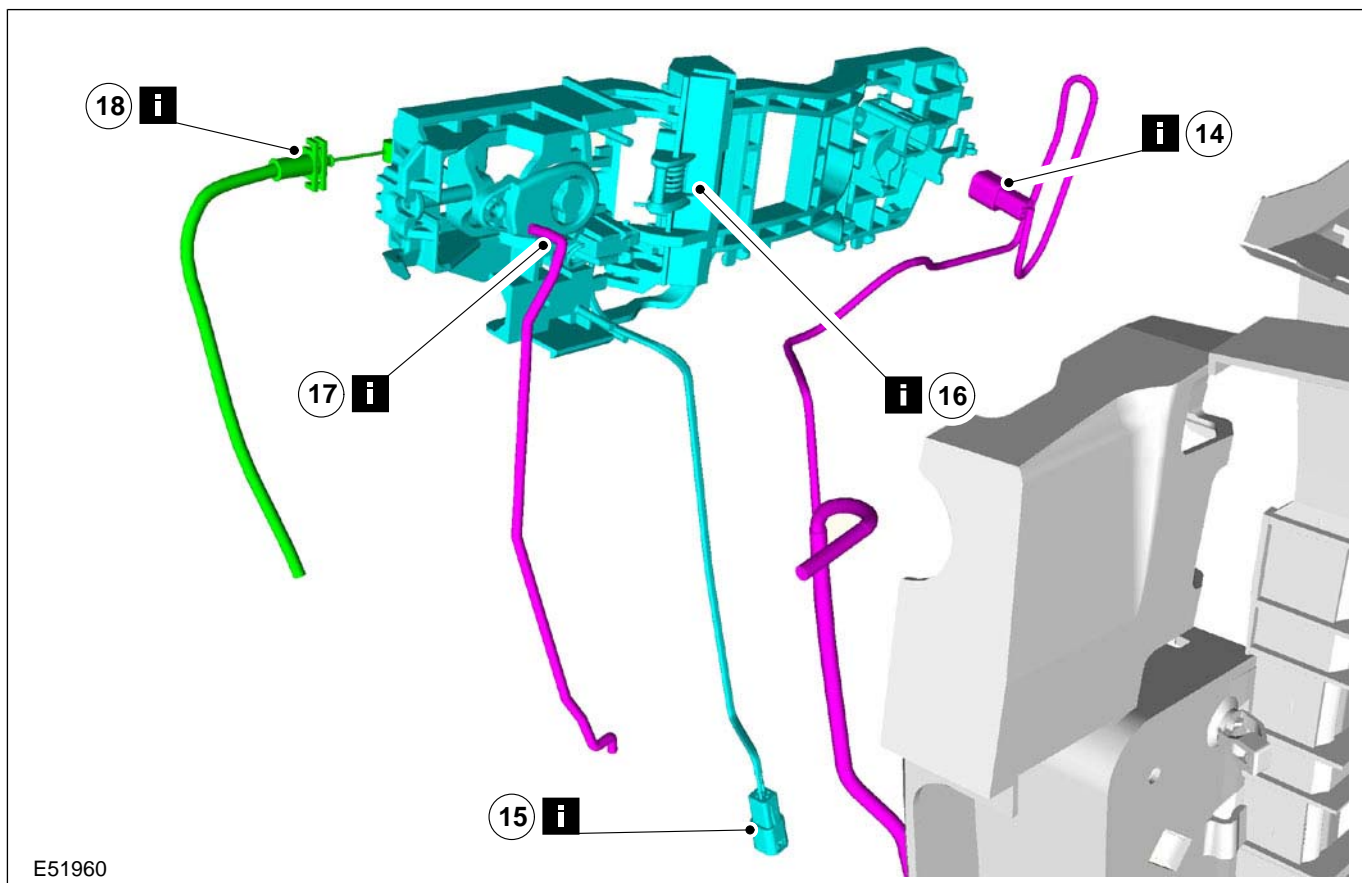
Item	Description
	See Installation Detail
6	Door (left-hand door shown) See Removal Detail



Item	Description
7	Front door handle, lock and latch retaining bracket retaining screw
8	Front door latch retaining bolts
9	Front door wiring harness retaining clip See Removal Detail
10	Front door latch remote control cable See Removal Detail

Item	Description
11	Front door wiring harness See Removal Detail
12	Front door lock actuator retaining screw See Removal Detail See Installation Detail
13	Front door inner panel See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION



E51960

Item	Description
14	Exterior front door handle RKE electrical connector See Removal Detail
15	Front door lock cylinder position sensor electrical connector See Removal Detail
16	Front door handle reinforcement See Removal Detail

Item	Description
17	Front door lock cylinder actuator rod See Removal Detail
18	Front door exterior handle remote control cable See Removal Detail

13. To install, reverse the removal procedure.

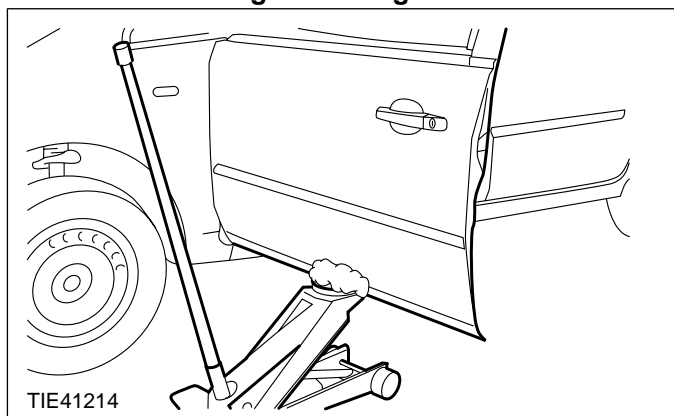
Removal Details

Item 1 Exterior mirror interior trim panel

⚠ CAUTION: Do not place excessive strain on the exterior mirror and front door tweeter speaker wiring harness.

REMOVAL AND INSTALLATION

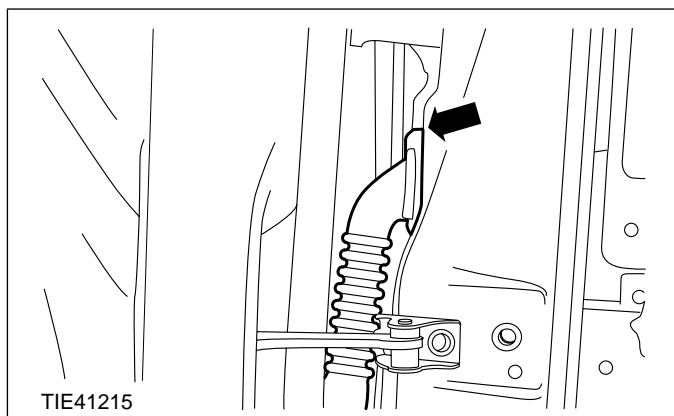
Item 5 Door hinge retaining bolts



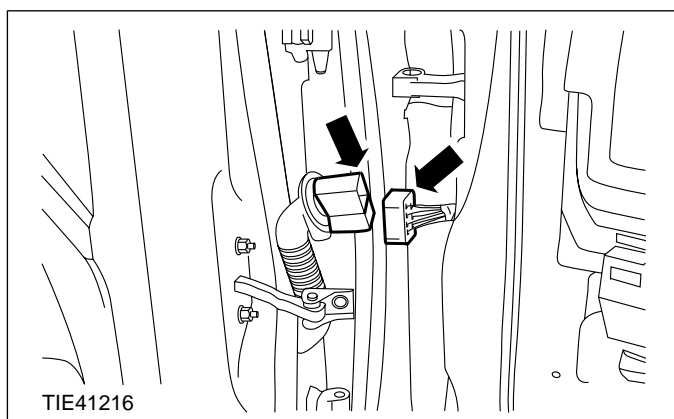
1. **⚠ CAUTION:** Protect the door using a soft cloth to prevent damage to the front door.
With the aid of another technician and a suitable trolley jack, support and detach the front door from the front door hinges.

Item 6 Door (left-hand door shown)

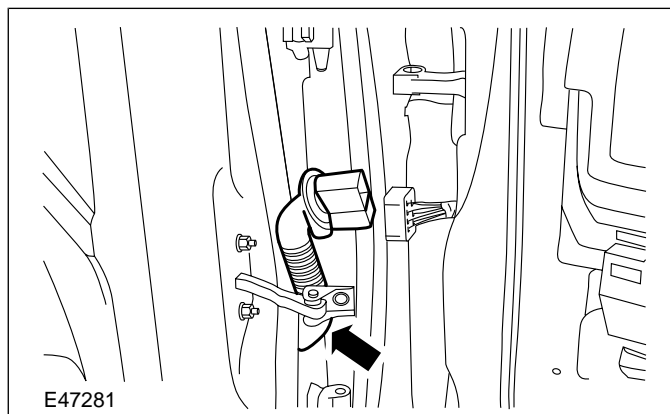
1. Detach the electrical connector from the A-pillar.



2. Remove the front door.
 - Disconnect the electrical connector.



3. Push the front door wiring harness into the door.

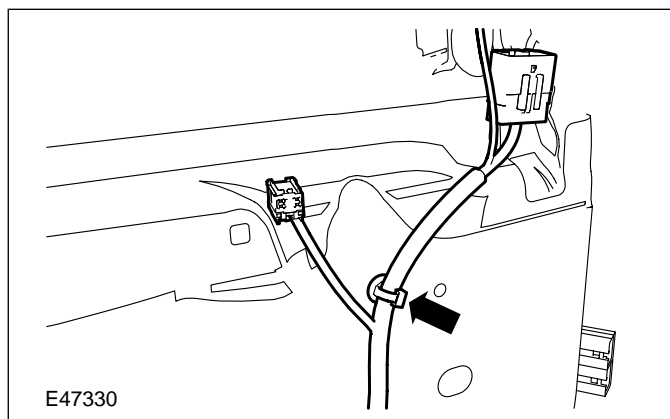


4. **⚠ CAUTION:** After the front door wiring harness electrical connector has been disconnected, position the front door back onto the front door hinges. Failure to follow this instruction may cause damage to the front door.

Position the front door onto the front door hinges.

Item 9 Front door wiring harness retaining clip

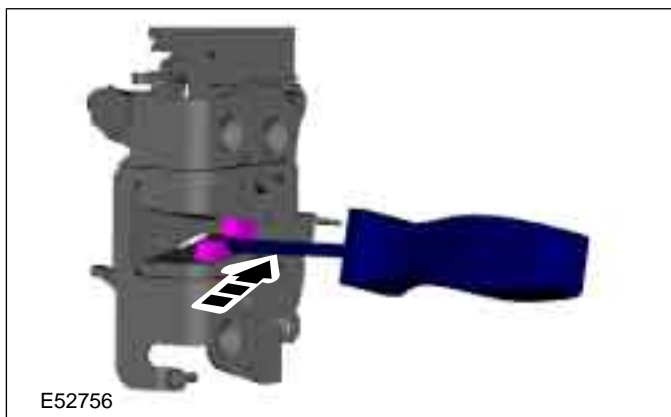
1. Detach the front door wiring harness retaining clip from the front door.



REMOVAL AND INSTALLATION

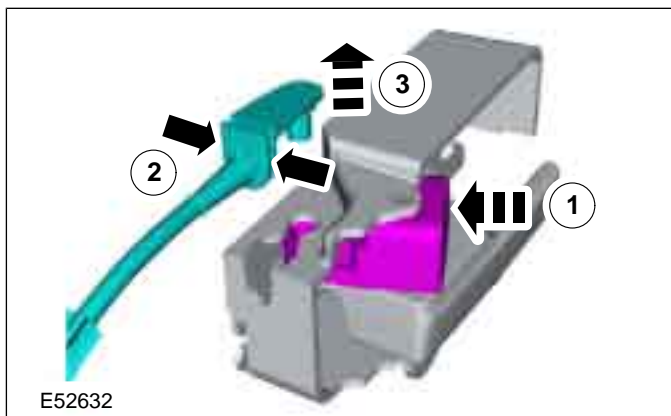
Item 10 Front door latch remote control cable

1. Using a suitable screwdriver, latch the front door lock into the closed position.

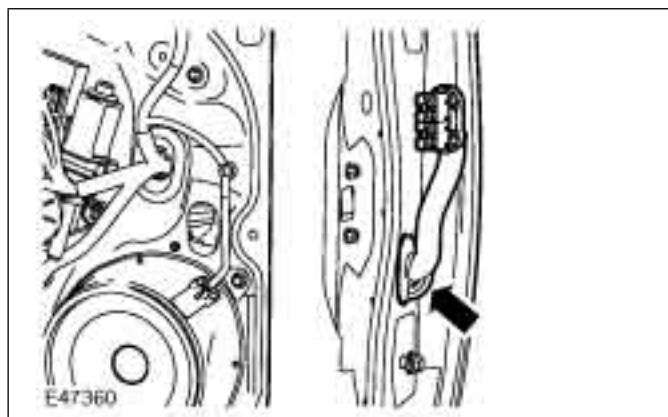


2. Detach the front door latch remote control cable from the front door latch remote control handle.

1. Operate the door latch remote control handle lock to the lock position.
2. Release the remote control cable retaining clips.
3. Detach the inner remote control cable from the remote control handle lock lever.

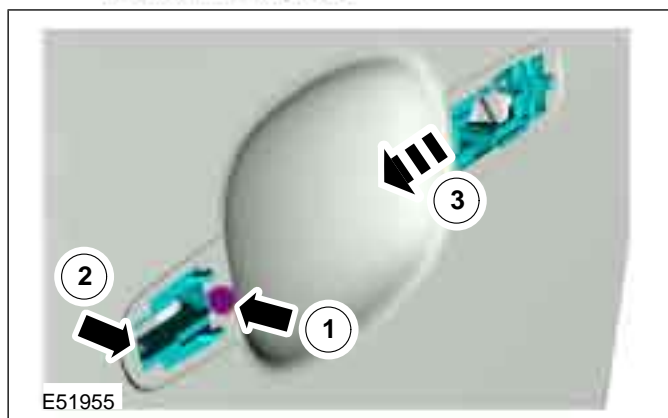
**Item 11** Front door wiring harness

1. Detach and push the front door wiring harness into the front door.

**Item 12** Front door lock actuator retaining screw

1. Detach the front door lock actuator.

1. Loosen the front door lock actuator retaining screw.
2. Release the front door lock actuator retaining clip.
3. Slide the front door lock actuator towards the front of the vehicle.

**Item 13** Front door inner panel

- ⚠ CAUTION:** When removing the front door inner panel, care must be taken that the door wiring harness is not trapped or placed under excessive strain.

Item 14 Exterior front door handle RKE electrical connector

- NOTE:** Make a note of the clipping position of the exterior front door handle RKE harness.

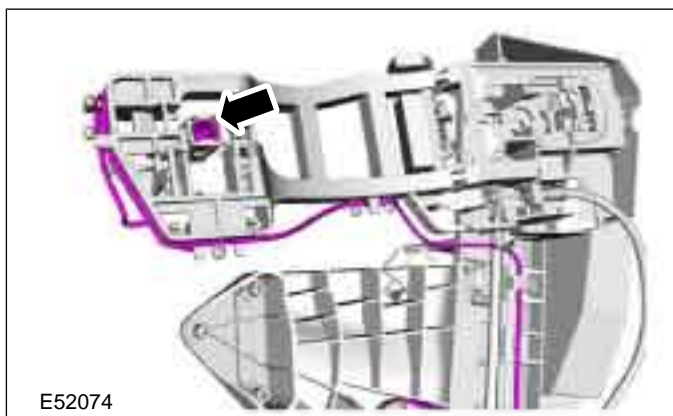
501-14-154

Handles, Locks, Latches and Entry Systems

501-14-154

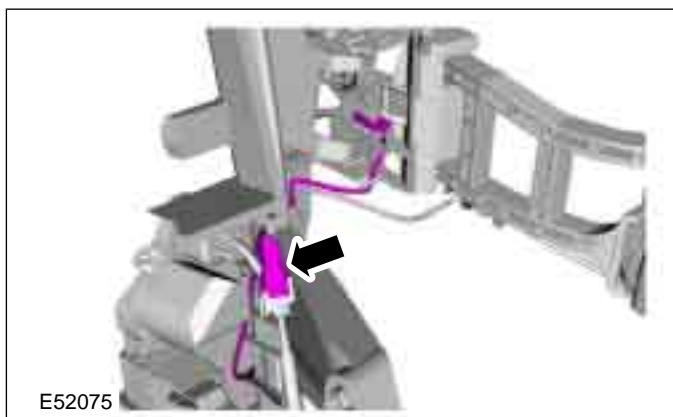
REMOVAL AND INSTALLATION

1. Disconnect the front door handle RKE electrical connector and detach the wiring harness from the front door handle reinforcement.



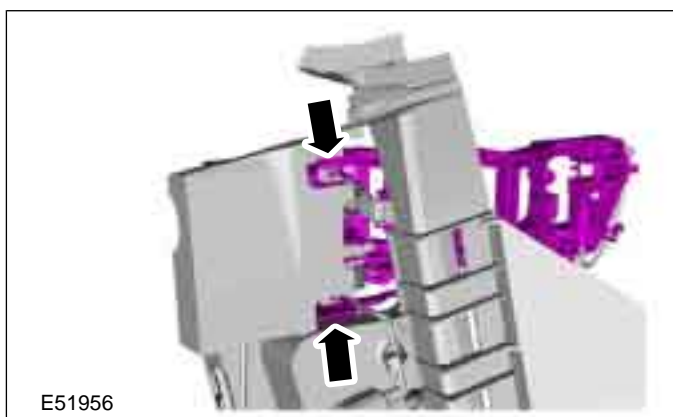
Item 15 Front door lock cylinder position sensor electrical connector

1. Disconnect the front door lock cylinder position sensor electrical connector and detach the sensor harness from the retaining clips.



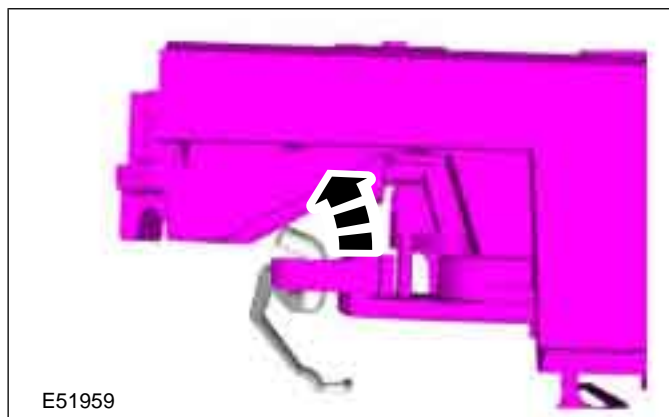
Item 16 Front door handle reinforcement

1. Detach the front door handle reinforcement from the front door handle, lock and latch retaining bracket.



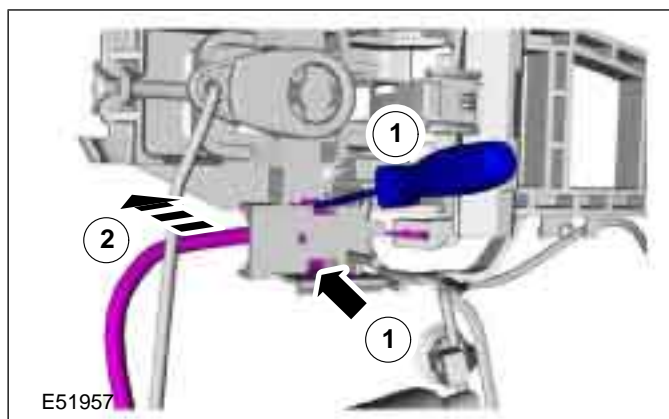
Item 17 Front door lock cylinder actuator rod

1. Detach the front door lock cylinder actuator rod from the front door handle reinforcement.



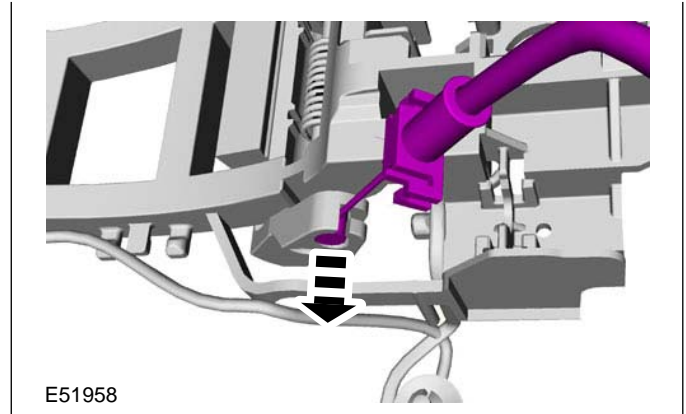
Item 18 Front door exterior handle remote control cable

1. Detach the front door exterior handle remote control cable from the front door handle reinforcement.
 1. Using a suitable flat blade screwdriver, release the front door exterior handle remote control cable retaining clips.
 2. Slide the front door exterior handle remote control cable off of the front door handle reinforcement retainers.



REMOVAL AND INSTALLATION

2. Align the front door exterior handle remote control inner cable with the slot in the front door handle reinforcement and remove.

**Installation Details****Item 13 Front door inner panel**

1. Before installing the front door inner panel retaining bolts, feed the door wiring harness electrical connector through the front door wiring harness hole.

Item 12 Front door lock actuator retaining screw

1. Install the front door lock actuator to the front door.
2. Tighten the front door lock actuator retaining screw.

Item 5 Door hinge retaining bolts

1. Apply a coating of adhesive to the door hinge retaining bolts.

REMOVAL AND INSTALLATION

Rear Door Lock Actuator

All vehicles

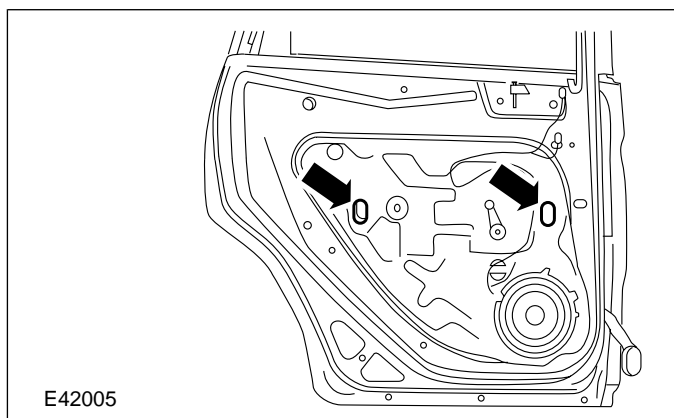
1. Remove the rear door trim panel.

For additional information, refer to: **Rear Door Trim Panel - Vehicles With: Manual Windows (501-05 Interior Trim and Ornamentation, Removal and Installation)** / **Rear Door Trim Panel - Vehicles With: Power Windows (501-05 Interior Trim and Ornamentation, Removal and Installation).**

2. Remove the exterior rear door handle.

For additional information, refer to: **Exterior Rear Door Handle (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).**

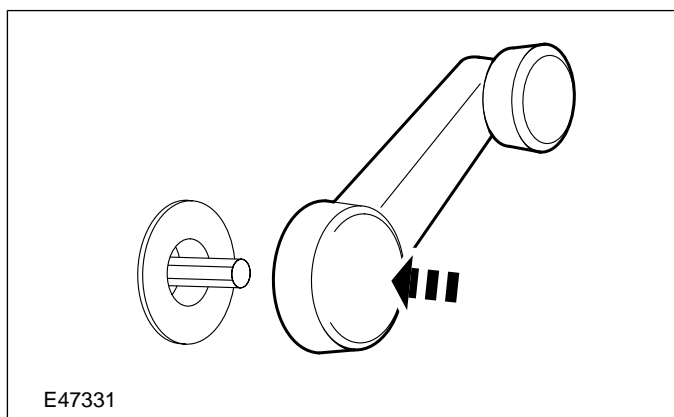
3. Remove the rear door window regulator grommets.



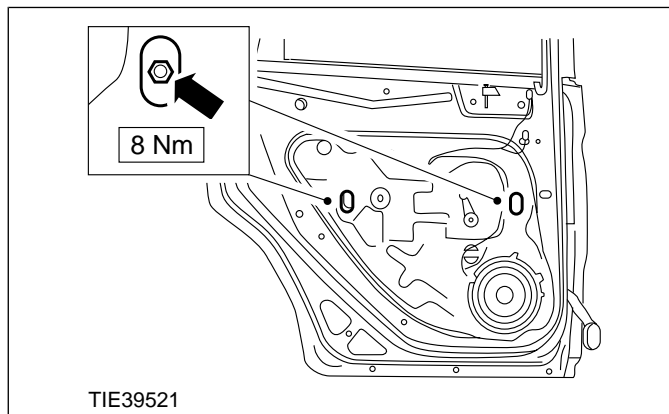
Vehicles with manual windows

4. Install the window regulator handle.

- Using the rear door window regulator handle, align the window glass clamp bolts with the access holes.

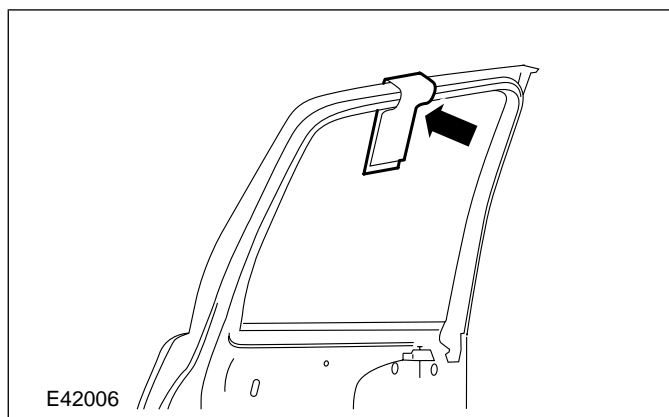


5. Loosen the rear door window glass clamp bolts.



6. Raise the rear door window glass.

7. Using suitable tape, secure the rear door window glass to the rear door.



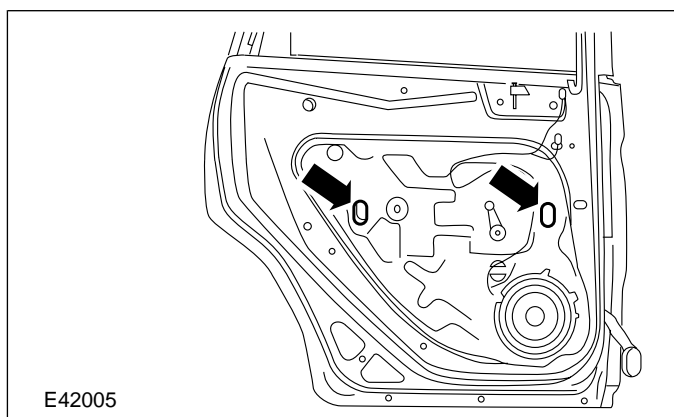
Vehicles with power windows

8. Connect the battery ground cable.

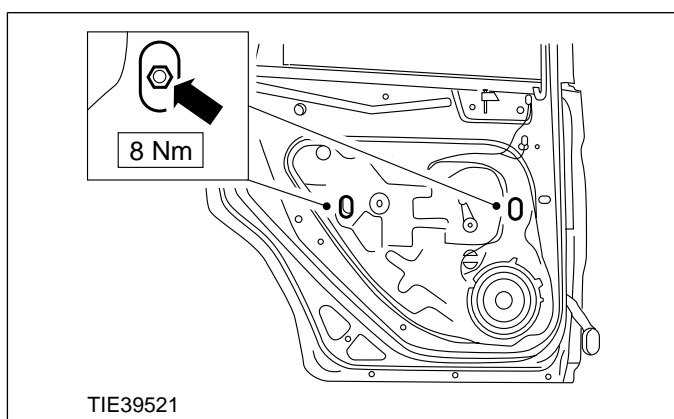
For additional information, refer to: **Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).**

REMOVAL AND INSTALLATION

9. Using the front door power window control unit, align the rear door window glass clamp bolts with the access holes.

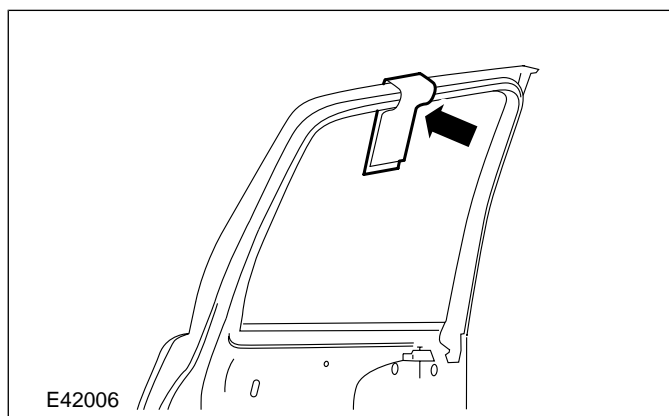


10. Loosen the rear door window glass clamp bolts.



11. Raise the rear door window glass.

12. Using suitable tape, secure the rear door window glass to the rear door.

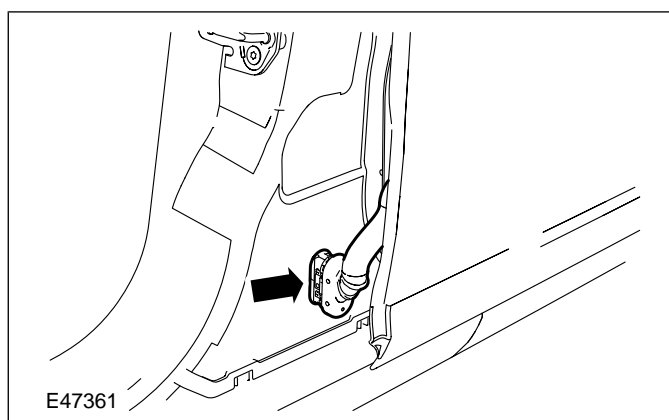


13. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

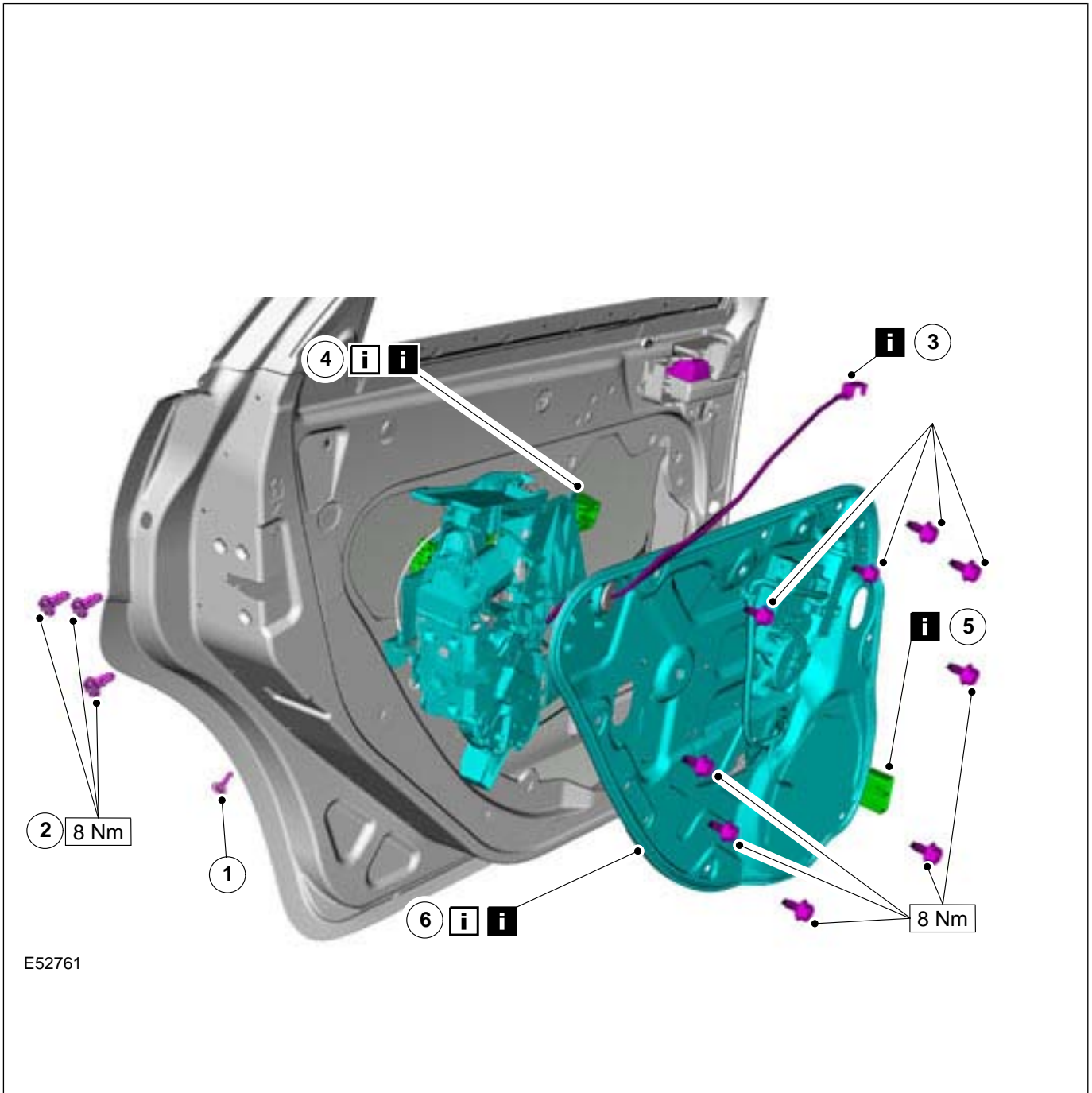
All vehicles

14. Detach and disconnect the rear door wiring harness.



15. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION

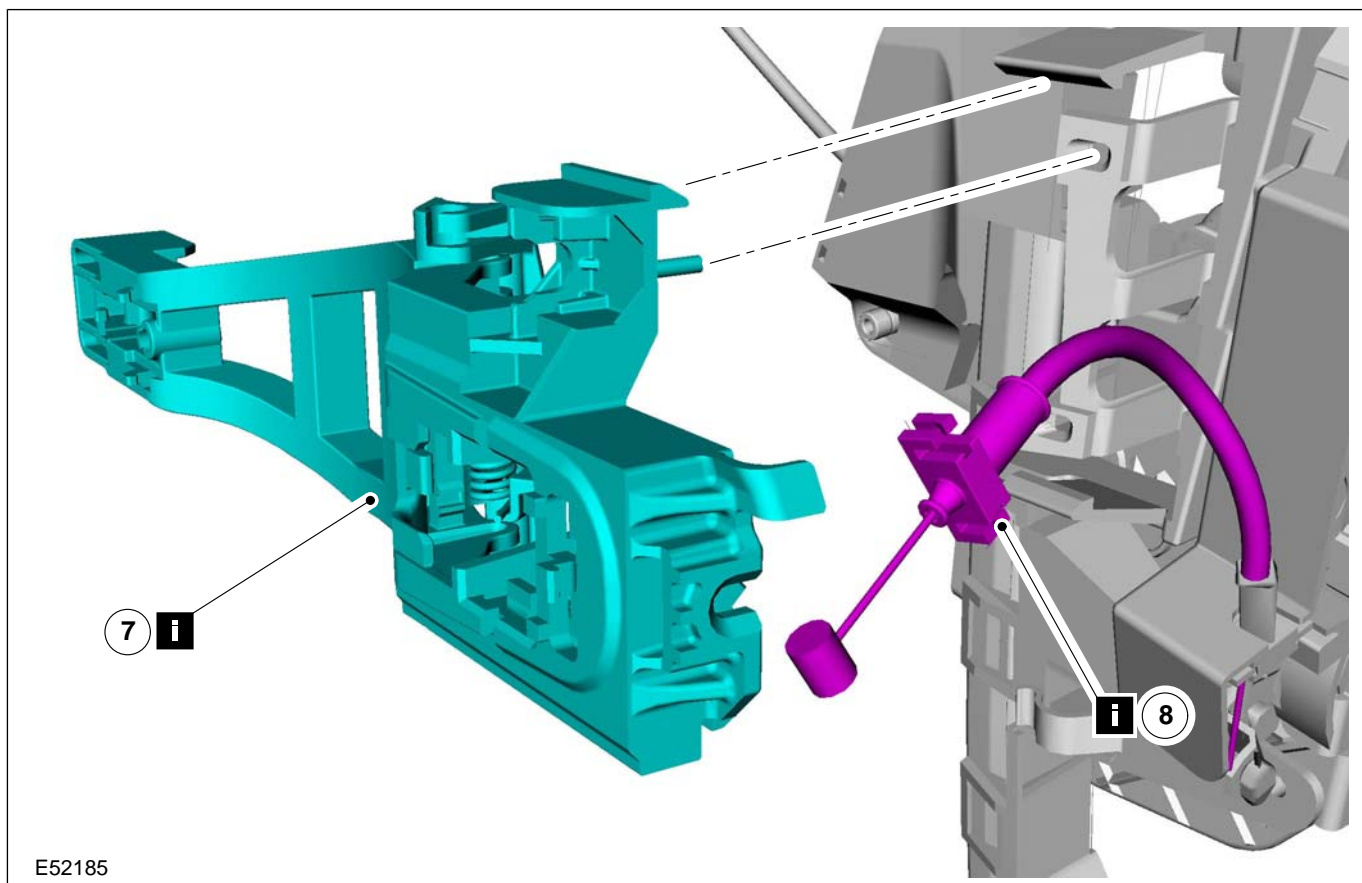


E52761

Item	Description
1	Rear door latch bracket retaining screw
2	Rear door latch retaining bolts
3	Rear door latch remote control cable <i>See Removal Detail</i>
4	Rear door lock actuator retaining screw <i>See Removal Detail</i> <i>See Installation Detail</i>

Item	Description
5	Rear door wiring harness <i>See Removal Detail</i>
6	Rear door inner panel <i>See Removal Detail</i> <i>See Installation Detail</i>

REMOVAL AND INSTALLATION



E52185

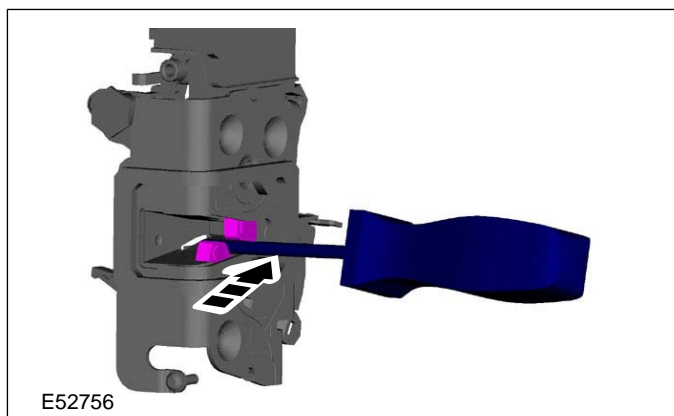
Item	Description
7	Rear door lock actuator See Removal Detail
8	Exterior rear door handle remote control cable See Removal Detail

16. To install, reverse the removal procedure.

Removal Details

Item 3 Rear door latch remote control cable

1. Using a suitable screwdriver, latch the rear door lock into the closed position.



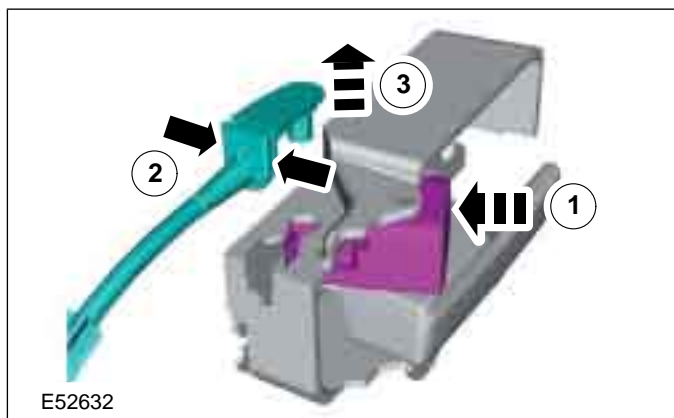
E52756

2. Detach the rear door latch remote control cable from the rear door latch remote control handle.

1. Operate the door latch remote control handle lock to the lock position.
2. Release the remote control cable retaining clips.

REMOVAL AND INSTALLATION

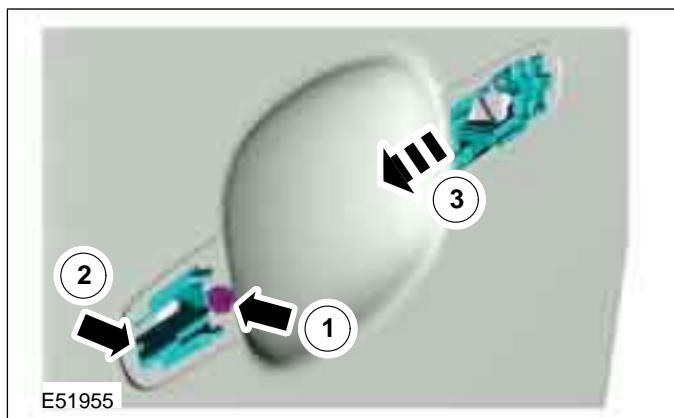
3. Detach the inner remote control cable from the remote control handle lock lever.



Item 4 Rear door lock actuator retaining screw

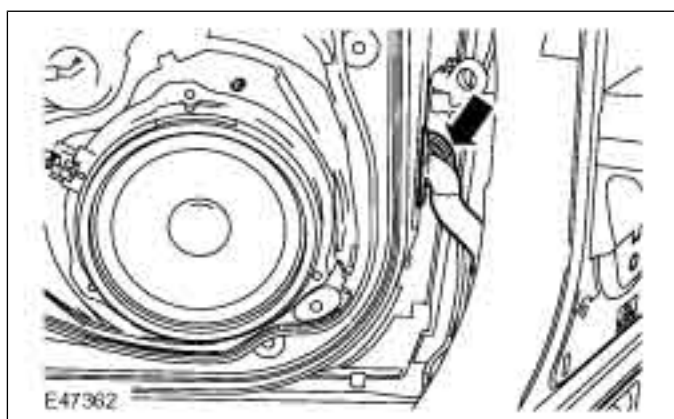
1. Detach the rear door lock actuator.

1. Loosen the door lock actuator retaining screw.
2. Release the door lock actuator retaining clip.
3. Slide the door lock actuator towards the front of the vehicle.



Item 5 Rear door wiring harness

1. Detach and push the rear door wiring harness into the rear door.



Item 6 Rear door inner panel

CAUTION: When removing the front door inner panel, do not trap or place excessive strain on the door wiring harness.

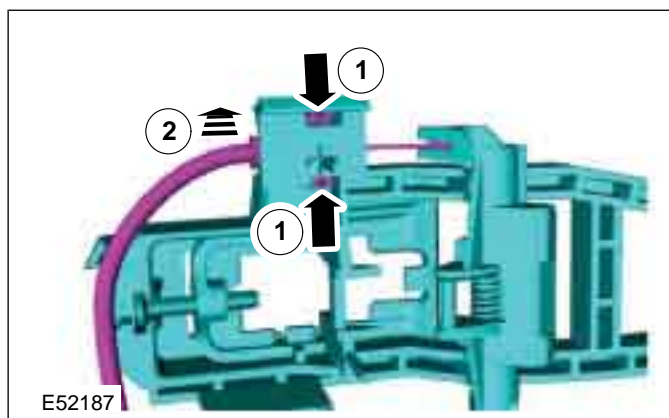
Item 7 Rear door lock actuator

1. Detach the rear door lock actuator from the latch support bracket.

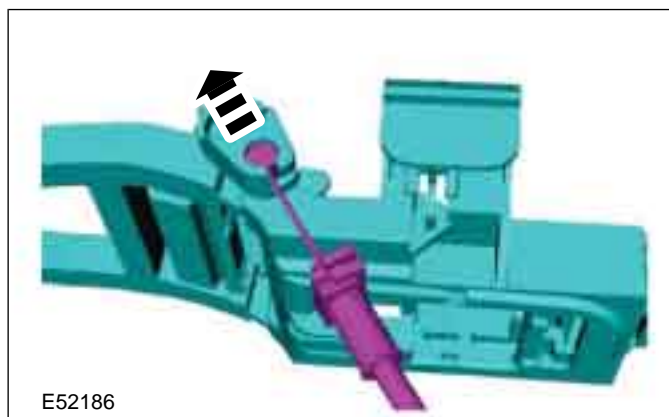
Item 8 Exterior rear door handle remote control cable

1. Detach the exterior rear door handle remote control cable from the rear door lock actuator.

1. Using a suitable flat blade screwdriver, release the exterior rear door handle remote control cable retaining clips.
2. Slide the exterior rear door handle remote control cable off the rear door lock actuator retainers.



2. Align the exterior rear door handle remote control inner cable with the slot in the door lock actuator and remove.



REMOVAL AND INSTALLATION**Installation Details****Item 6** Rear door inner panel

1. Before installing the rear door inner panel retaining bolts, feed the door wiring harness electrical connector through the rear door wiring harness hole.

Item 4 Rear door lock actuator retaining screw

1. Install the rear door lock actuator to the rear door.
2. Tighten the rear door lock actuator retaining screw.

REMOVAL AND INSTALLATION

Rear Door Latch

General Equipment

Electric hand drill

Rivet gun

All vehicles

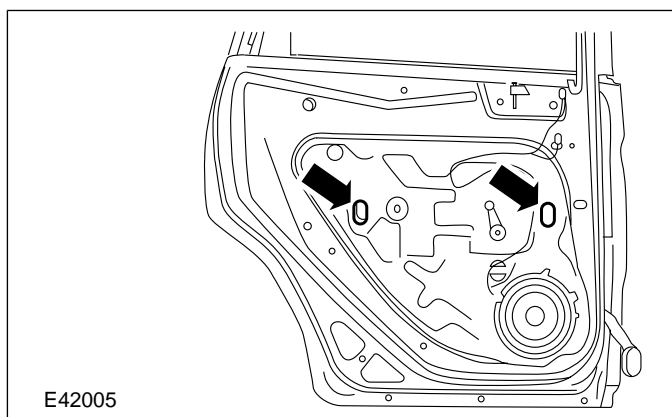
1. Remove the rear door trim panel.

For additional information, refer to: **Rear Door Trim Panel - Vehicles With: Manual Windows (501-05 Interior Trim and Ornamentation, Removal and Installation)** / **Rear Door Trim Panel - Vehicles With: Power Windows (501-05 Interior Trim and Ornamentation, Removal and Installation).**

2. Remove the exterior rear door handle.

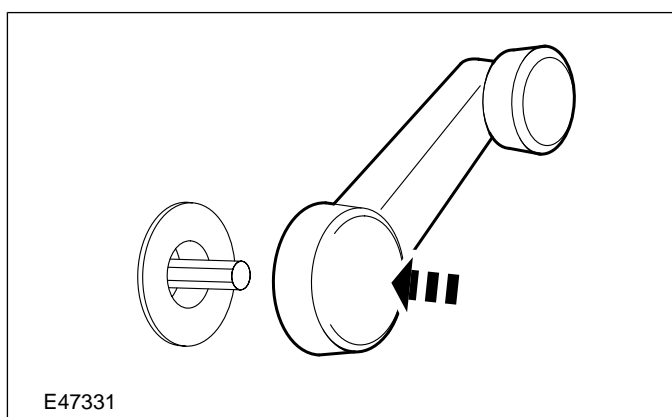
For additional information, refer to: **Exterior Rear Door Handle (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).**

3. Remove the rear door window regulator grommets.



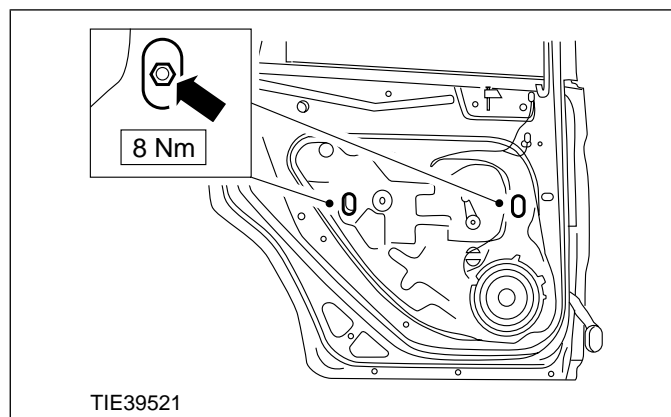
Vehicles with manual windows

4. Install the window regulator handle.



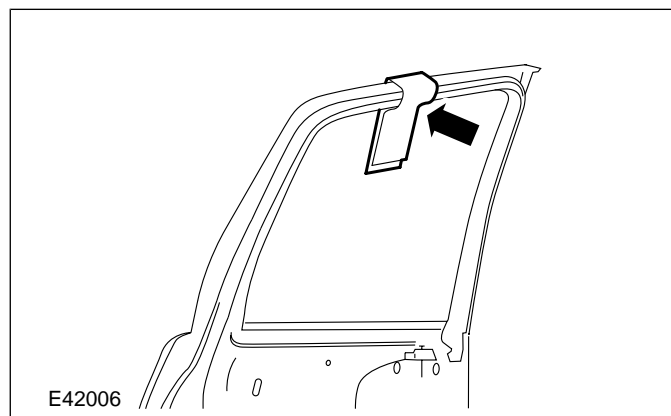
5. Loosen the rear door window glass clamp bolts.

- Using the rear door window regulator handle, align the window glass clamp bolts with the access holes.



6. Raise the rear door window glass.

7. Using suitable tape, support the rear door window glass to the rear door.



Vehicles with power windows

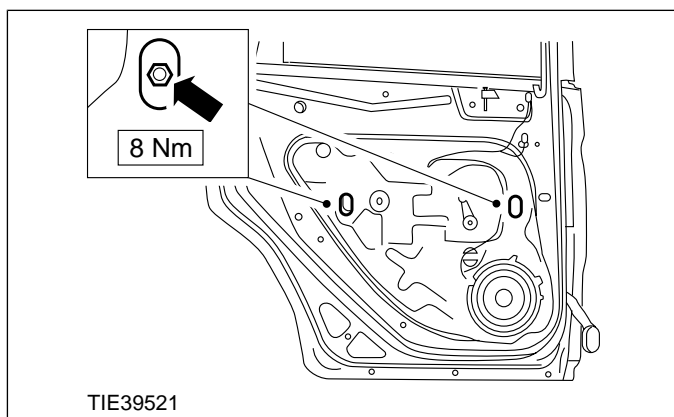
8. Connect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).**

9. Loosen the rear door window glass clamp bolts.

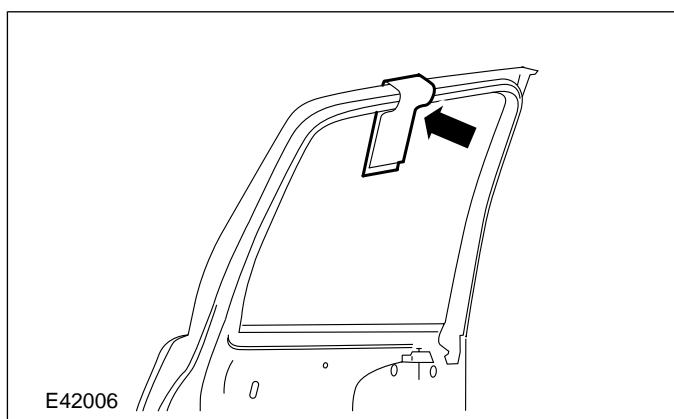
REMOVAL AND INSTALLATION

- Using the front door power window control unit, align the window glass clamp bolts with the access holes.



10. Raise the rear door window glass.

11. Using suitable tape, support the rear door window glass to the rear door.

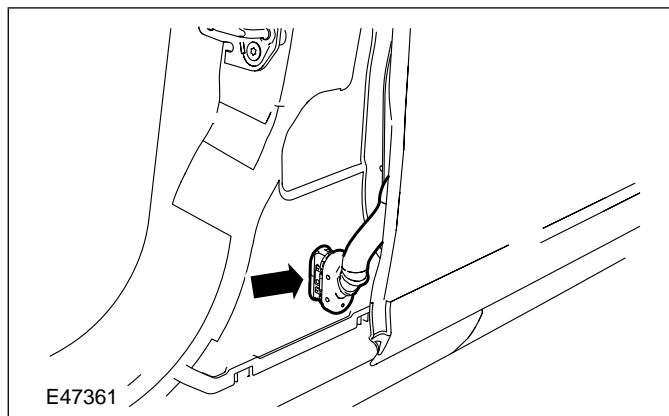


12. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

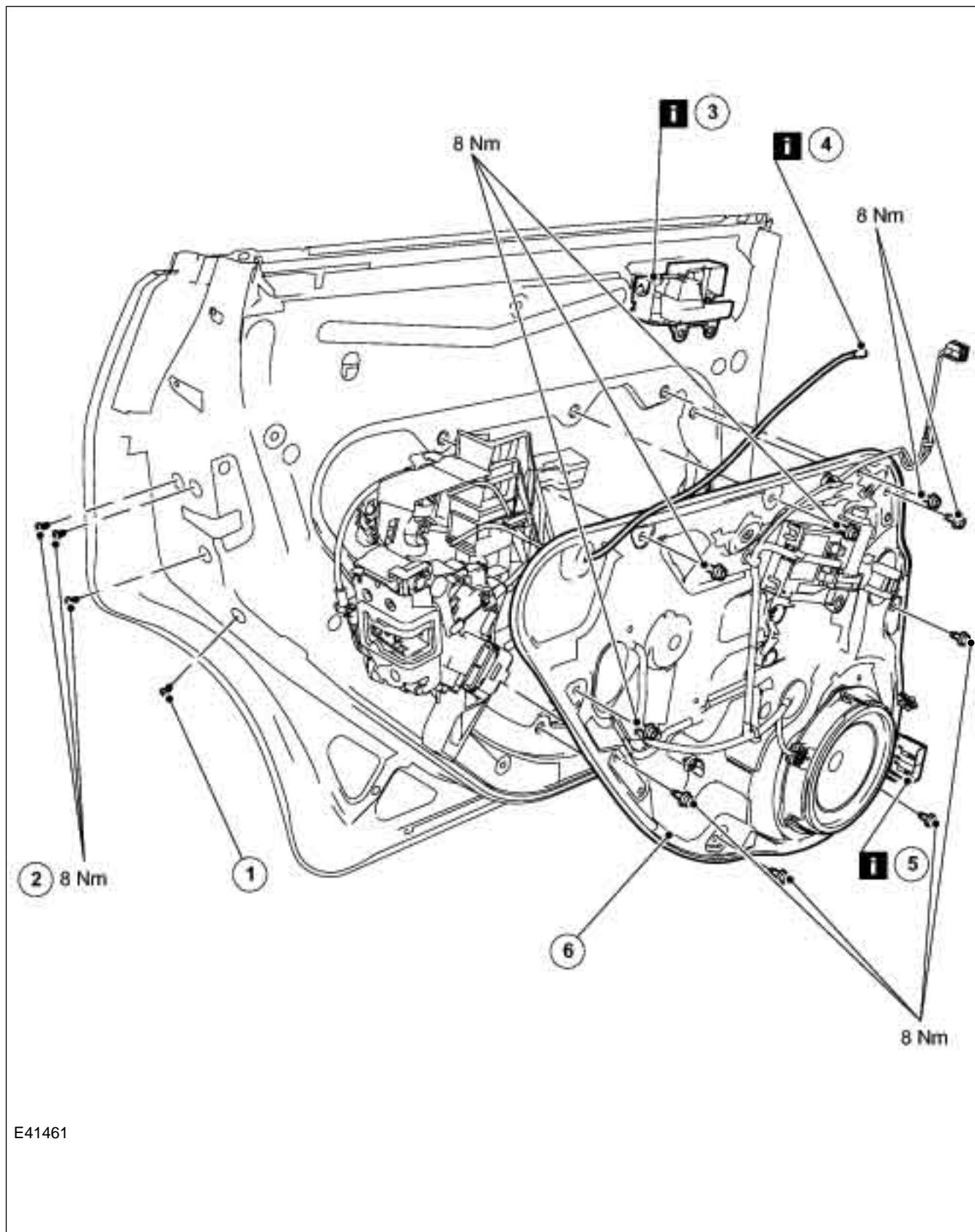
All vehicles

13. Detach and disconnect the rear door wiring harness.



14. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



E41461

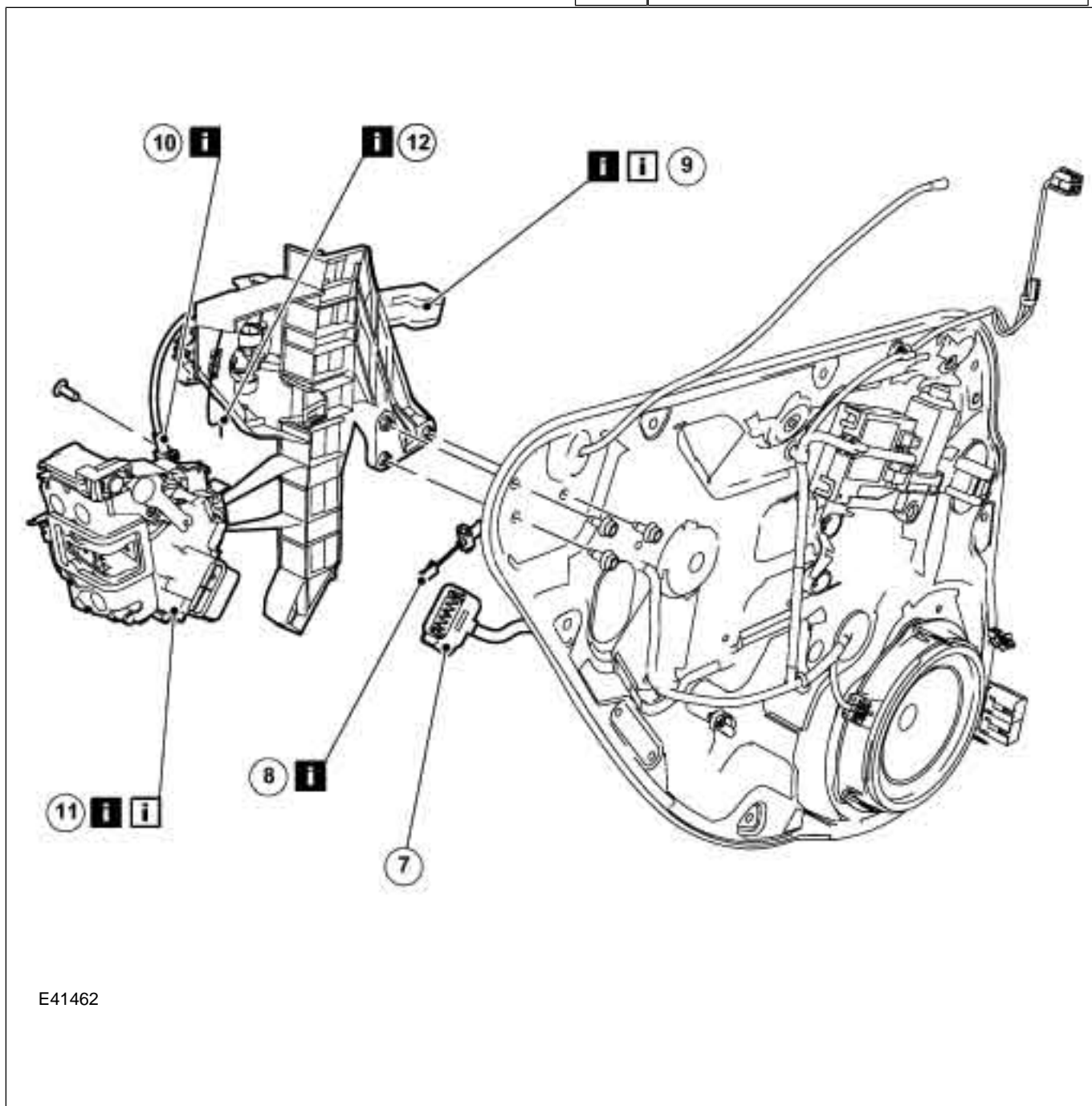
Item	Description
1	Rear door latch bracket retaining screw
2	Rear door latch retaining bolts

Item	Description
3	Rear door latch remote control handle lock See Removal Detail

REMOVAL AND INSTALLATION

Item	Description
4	Rear door latch remote control cable See Removal Detail

Item	Description
5	Rear door wiring harness See Removal Detail
6	Rear door inner panel



Item	Description
7	Rear door latch electrical connector
8	Rear door latch remote control cable See Removal Detail

Item	Description
9	Rear door handle, lock and latch retaining bracket See Removal Detail See Installation Detail
10	Rear exterior door handle remote control See Removal Detail

REMOVAL AND INSTALLATION

Item	Description
11	Rear door latch See Removal Detail See Installation Detail
12	Rear door latch remote control handle actuator rod See Removal Detail

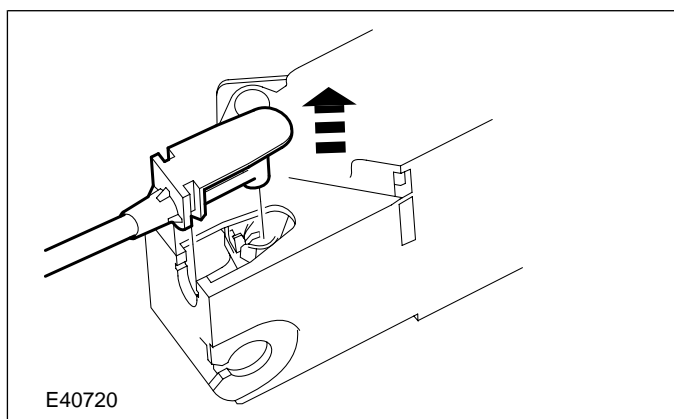
Removal Details

Item 3 Rear door latch remote control handle lock

1. Operate the door latch remote control handle lock to the lock position.

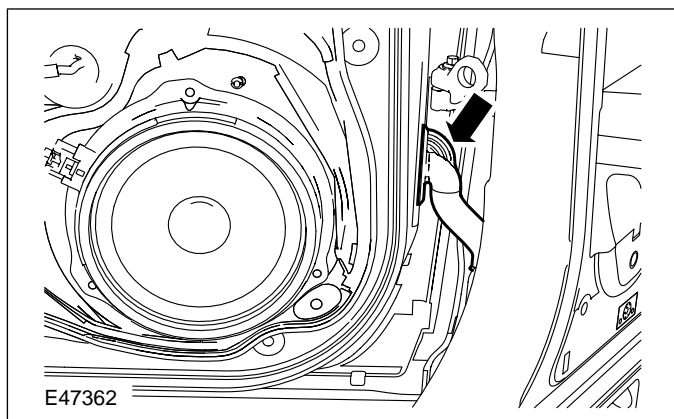
Item 4 Rear door latch remote control cable

1. Disconnect the rear door latch remote control cable from the rear door latch remote control.



Item 5 Rear door wiring harness

1. Detach and push the rear door wiring harness into the rear door.



15. To install, reverse the removal procedure.
16. Initialize the door window motors.

For additional information, refer to: **Door Window Motor Initialization** (501-11 Glass, Frames and Mechanisms, General Procedures).

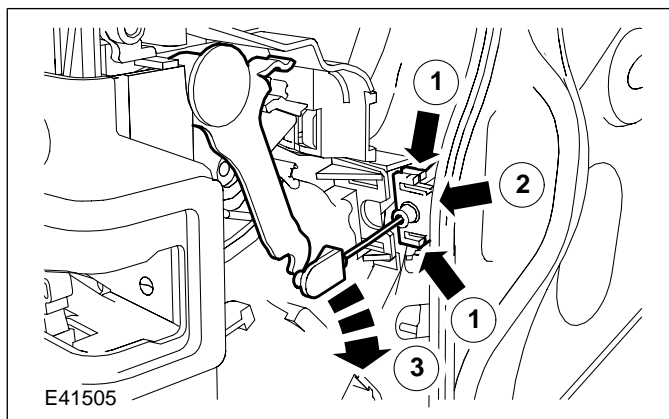
Item 8 Rear door latch remote control cable

1. **NOTE:** Do not kink the rear door latch remote control cable.

NOTE: In order to remove the rear door latch remote control cable from the rear door latch lever the cable must be rotated.

Disconnect the rear door latch remote control cable from the rear door latch.

1. Using a suitable screwdriver, detach the rear door latch remote control cable locking tangs from the rear door latch.
2. Detach the rear door latch remote control outer cable from the rear door latch.
3. Rotate the rear door latch remote control cable.



Item 9 Rear door handle, lock and latch retaining bracket

1. Using a suitable Electric hand drill remove the rear door handle, lock and latch retaining bracket rivets.

Item 10 Rear exterior door handle remote control

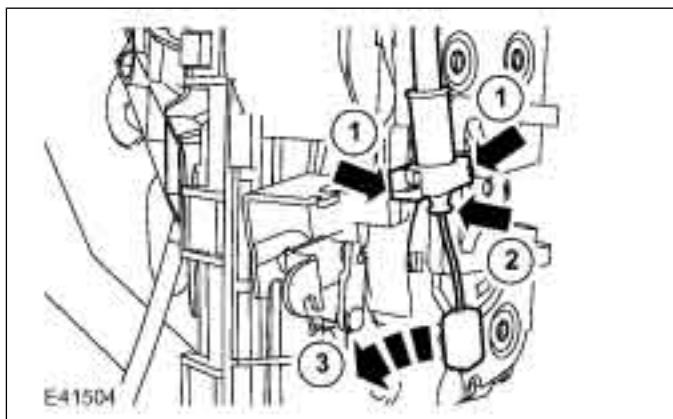
1. **NOTE:** Do not kink the rear exterior door handle remote control cable.

REMOVAL AND INSTALLATION

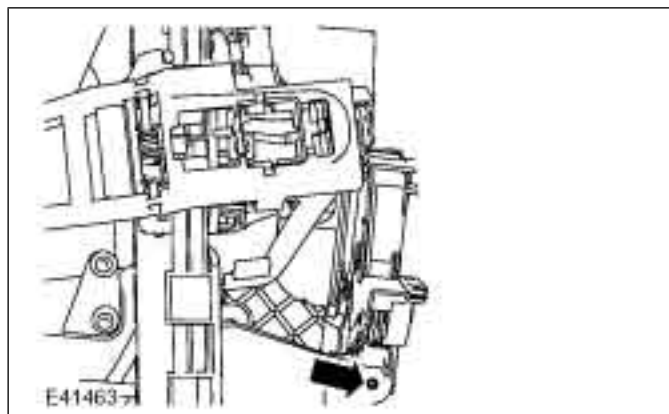
NOTE: In order to remove the rear exterior door handle remote control cable from the rear door latch lever the cable must be rotated.

Disconnect the rear exterior door handle remote control cable from the rear door latch.

1. Using a suitable screwdriver, detach the rear exterior door handle remote control outer cable locking tangs from the rear door latch.
2. Detach the rear exterior door handle remote control cable from the rear door latch.
3. Rotate the rear exterior door handle remote control cable.

**Item 11 Rear door latch****1. Detach the rear door latch.**

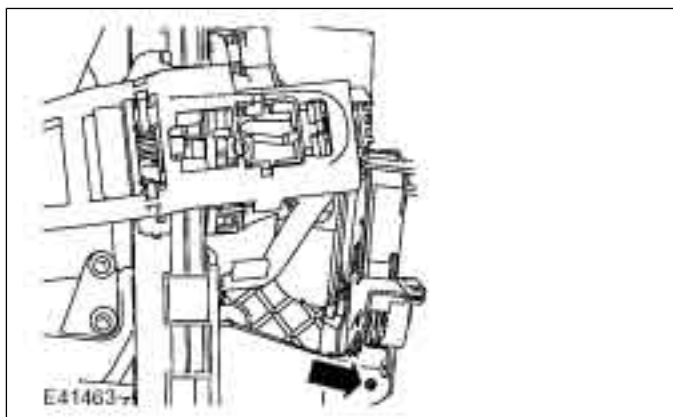
- Using a suitable Electric hand drill remove the rear door latch rivet.

**Item 12 Rear door latch remote control handle actuator rod****1. Remove the rear door latch.**

1. Detach the rear door latch remote control handle actuator rod from the front door latch.

Installation Details**Item 11 Rear door latch****1. Install the rear door latch.**

- Using a suitable Rivet gun install the rear door latch rivet.

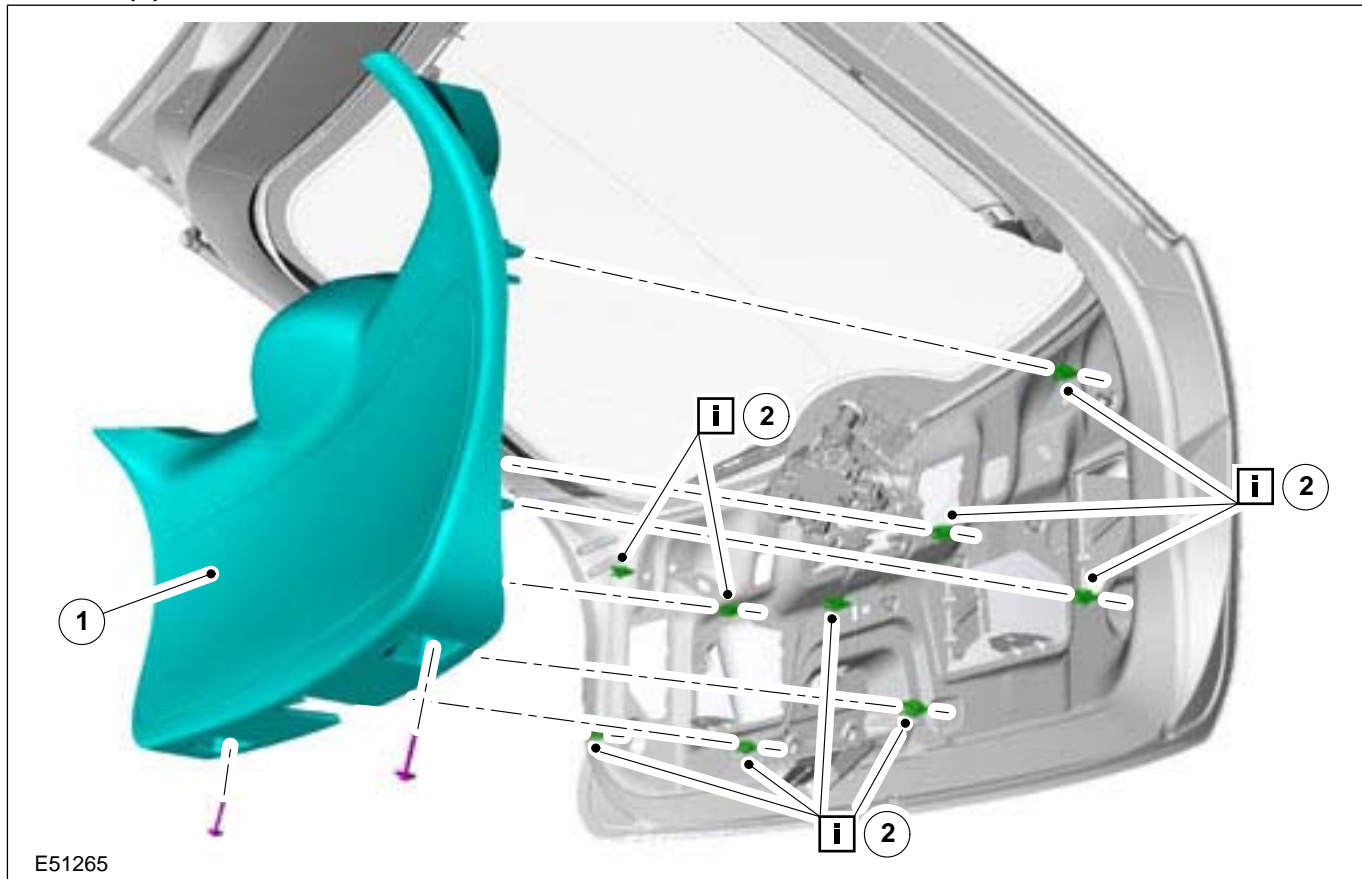
**Item 9 Rear door handle, lock and latch retaining bracket**

1. Align the rear door handle, lock and latch retaining bracket to the rear door inner panel.

REMOVAL AND INSTALLATION

Liftgate Latch — 3-Door/5-Door

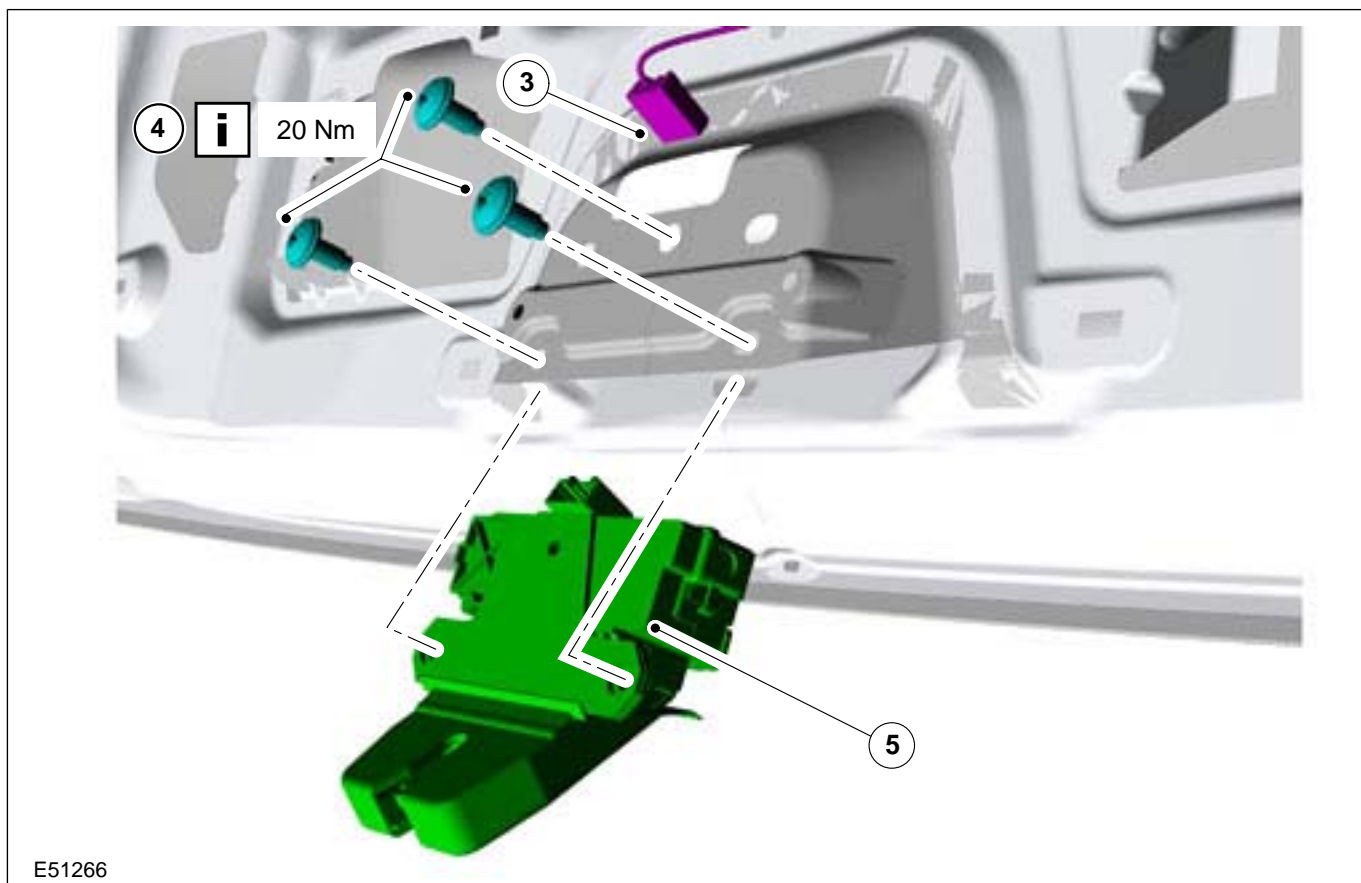
1. Remove the components in the order indicated in the following illustration(s) and table(s).



E51265

Item	Description
1	Liftgate trim panel
2	Liftgate trim panel retaining clips See Installation Detail

REMOVAL AND INSTALLATION



E51266

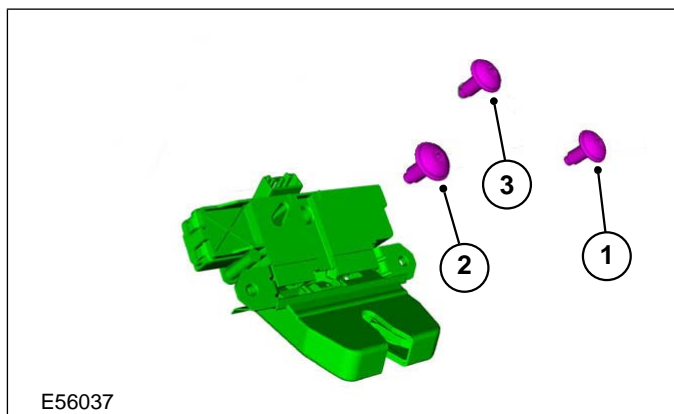
Item	Description
3	Liftgate latch electrical connector
4	Liftgate latch retaining bolts See Installation Detail
5	Liftgate latch

2. To install, reverse the removal procedure.

Installation Details

Item 4 Liftgate latch retaining bolts

1. Install the liftgate latch retaining bolts finger tight in the order shown.



E56037

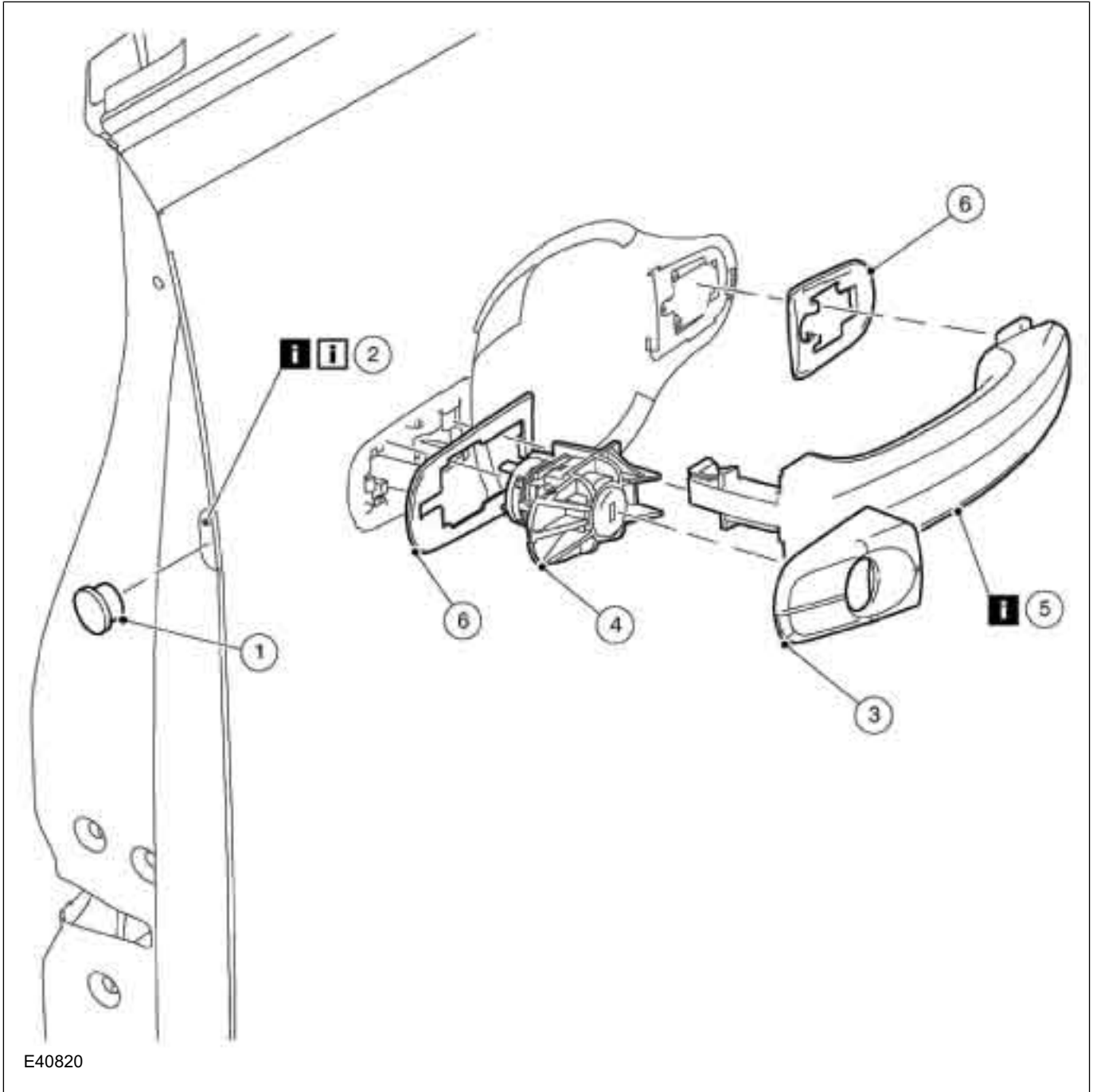
Item 2 Liftgate trim panel retaining clips

1. Install the liftgate trim panel retaining clips to the liftgate trim panel before installing to the liftgate.

REMOVAL AND INSTALLATION

Exterior Front Door Handle

1. Remove the components in the order indicated in the following illustration(s) and table(s).



E40820

Item	Description
1	Exterior front door handle retaining screw grommet
2	Exterior front door handle retaining screw See Removal Detail See Installation Detail

Item	Description
3	Exterior front door handle trim
4	Door lock cylinder

REMOVAL AND INSTALLATION

Item	Description
5	Exterior front door handle See Removal Detail

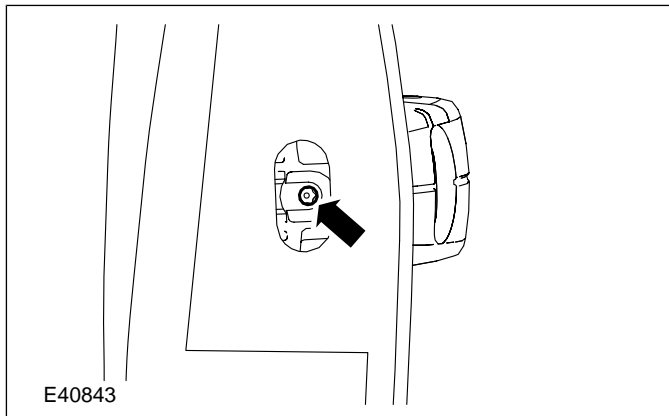
Item	Description
6	Exterior front door handle seals

2. To install, reverse the removal procedure.

Removal Details

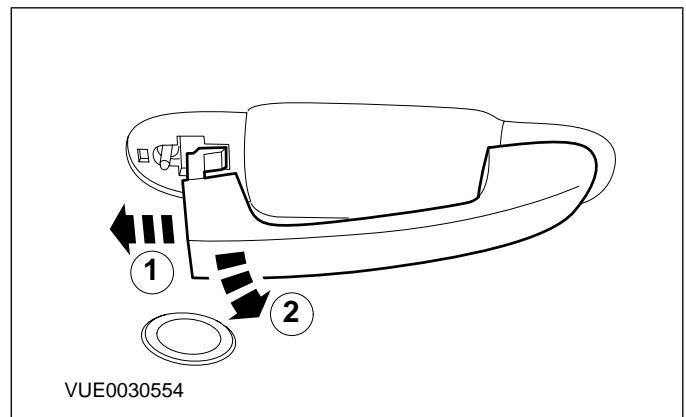
Item 2 Exterior front door handle retaining screw

1. Loosen the exterior front door handle retaining screw.

**Item 5 Exterior front door handle**

1. Remove the exterior front door handle.

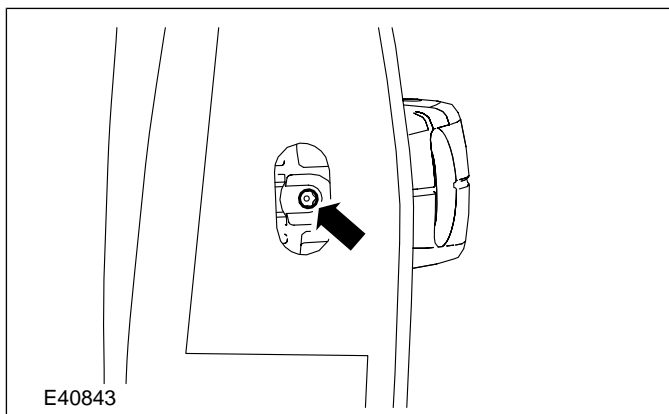
- Slide the exterior front door handle rearwards to disengage it from the exterior front door handle bracket.
- Remove the exterior front door handle.



Installation Details

Item 2 Exterior front door handle retaining screw

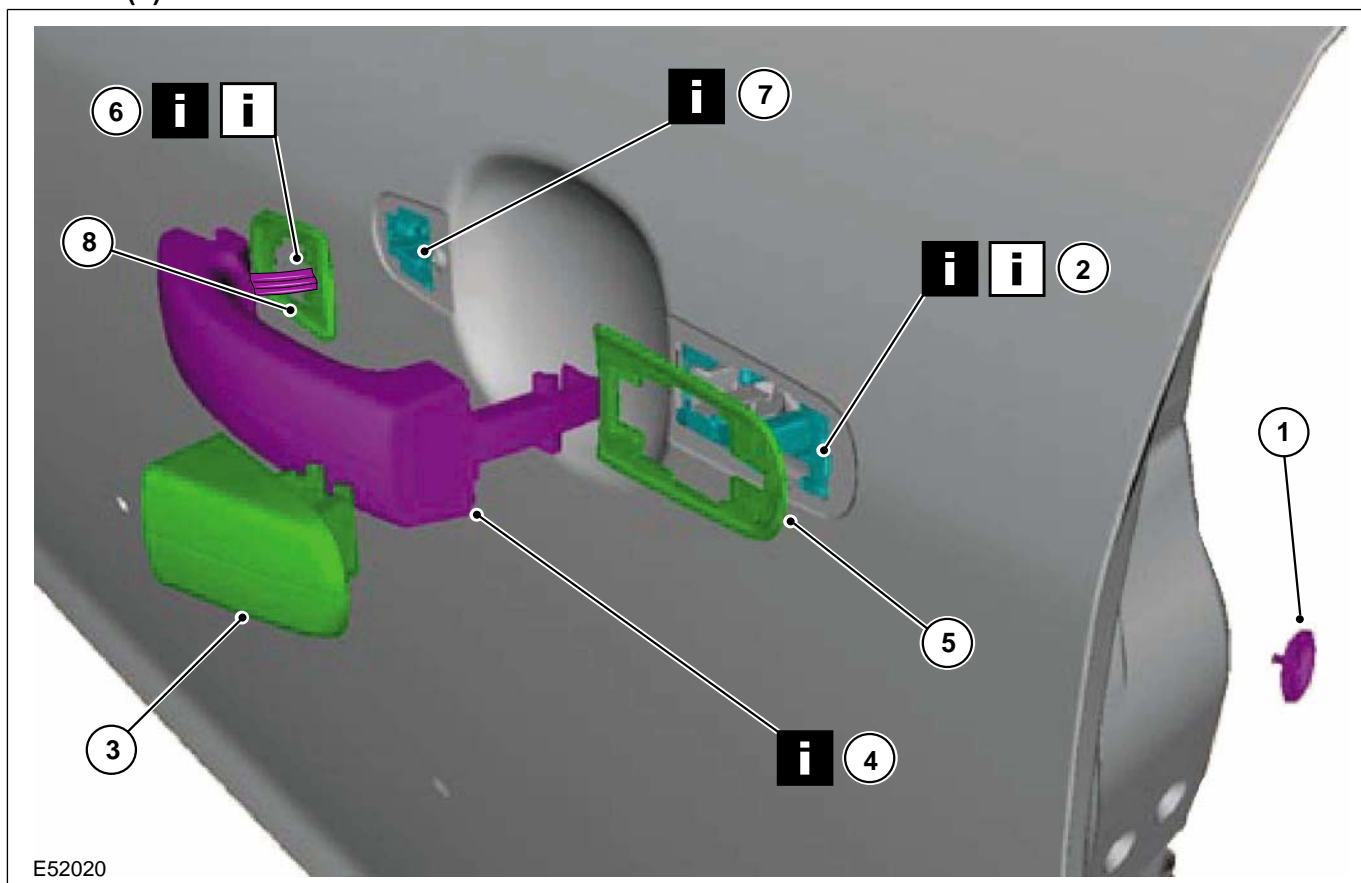
1. Tighten the exterior front door handle retaining screw.



REMOVAL AND INSTALLATION

Exterior Front Door Handle — Vehicles With: Keyless Vehicle System

1. Remove the components in the order indicated in the following illustration(s) and table(s).



E52020

Item	Description
1	Exterior front door handle retaining screw grommet
2	Exterior front door handle retaining screw See Removal Detail See Installation Detail
3	Exterior front door handle bezel
4	Exterior front door handle See Removal Detail
5	Exterior front door handle gasket

Item	Description
6	Exterior front door handle antenna wiring harness See Removal Detail See Installation Detail
7	Exterior front door handle antenna electrical connector See Removal Detail
8	Exterior front door handle seal

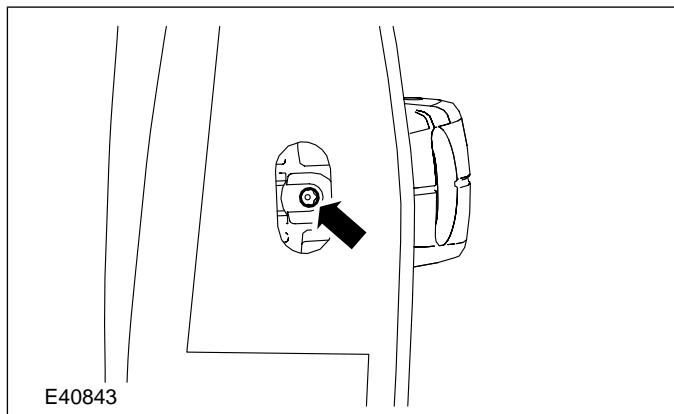
2. To install, reverse the removal procedure.

Removal Details

REMOVAL AND INSTALLATION

Item 2 Exterior front door handle retaining screw

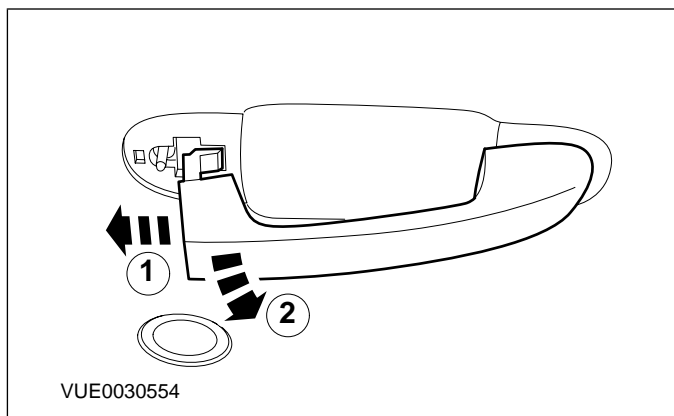
1. Loosen the exterior front door handle retaining screw until the exterior front door handle bezel can be removed.

**Item 4** Exterior front door handle

1. **NOTE:** Do not place excessive strain on exterior front door handle antenna wiring harness.

Detach the exterior front door handle.

1. Slide the exterior front door handle rearwards to disengage it from the exterior front door handle bracket.
2. Detach the exterior front door handle.

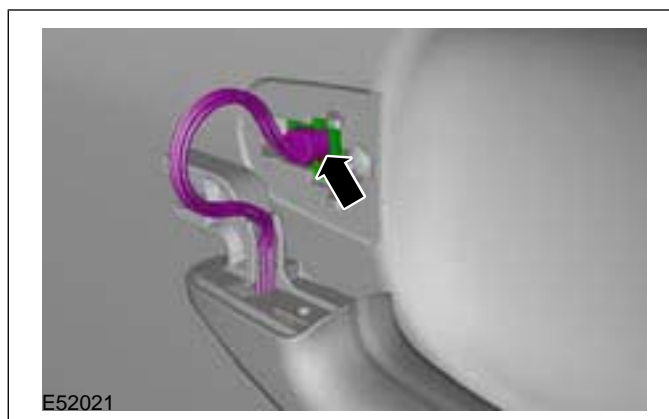
**Item 6** Exterior front door handle antenna wiring harness

NOTE: Do not place excessive strain on the exterior front door handle antenna wiring harness.

1. Pull the exterior front door handle antenna wiring harness until an audible click is heard and the exterior front door handle antenna wiring harness electrical connector is in the horizontal position.

Item 7 Exterior front door handle antenna electrical connector

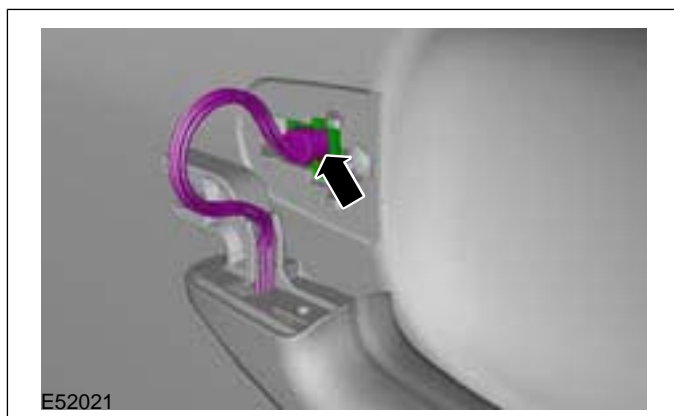
1. Disconnect the exterior front door handle antenna electrical connector from the exterior front door handle antenna electrical connector and holder.



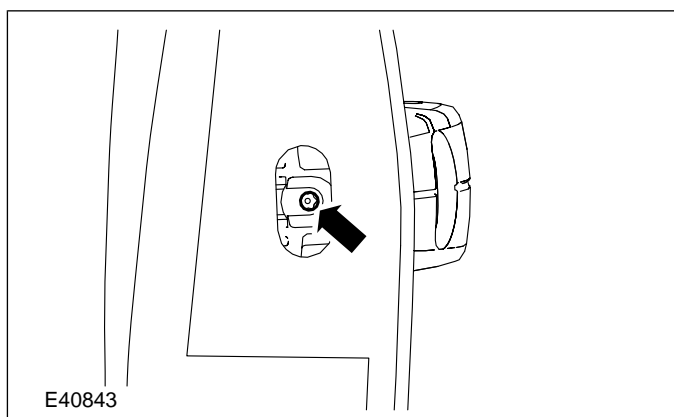
Installation Details

REMOVAL AND INSTALLATION**Item 6 Exterior front door handle antenna wiring harness**

1. Lift and push the exterior front door handle antenna wiring harness electrical into the exterior front door handle antenna electrical connector and holder.

**Item 2 Exterior front door handle retaining screw**

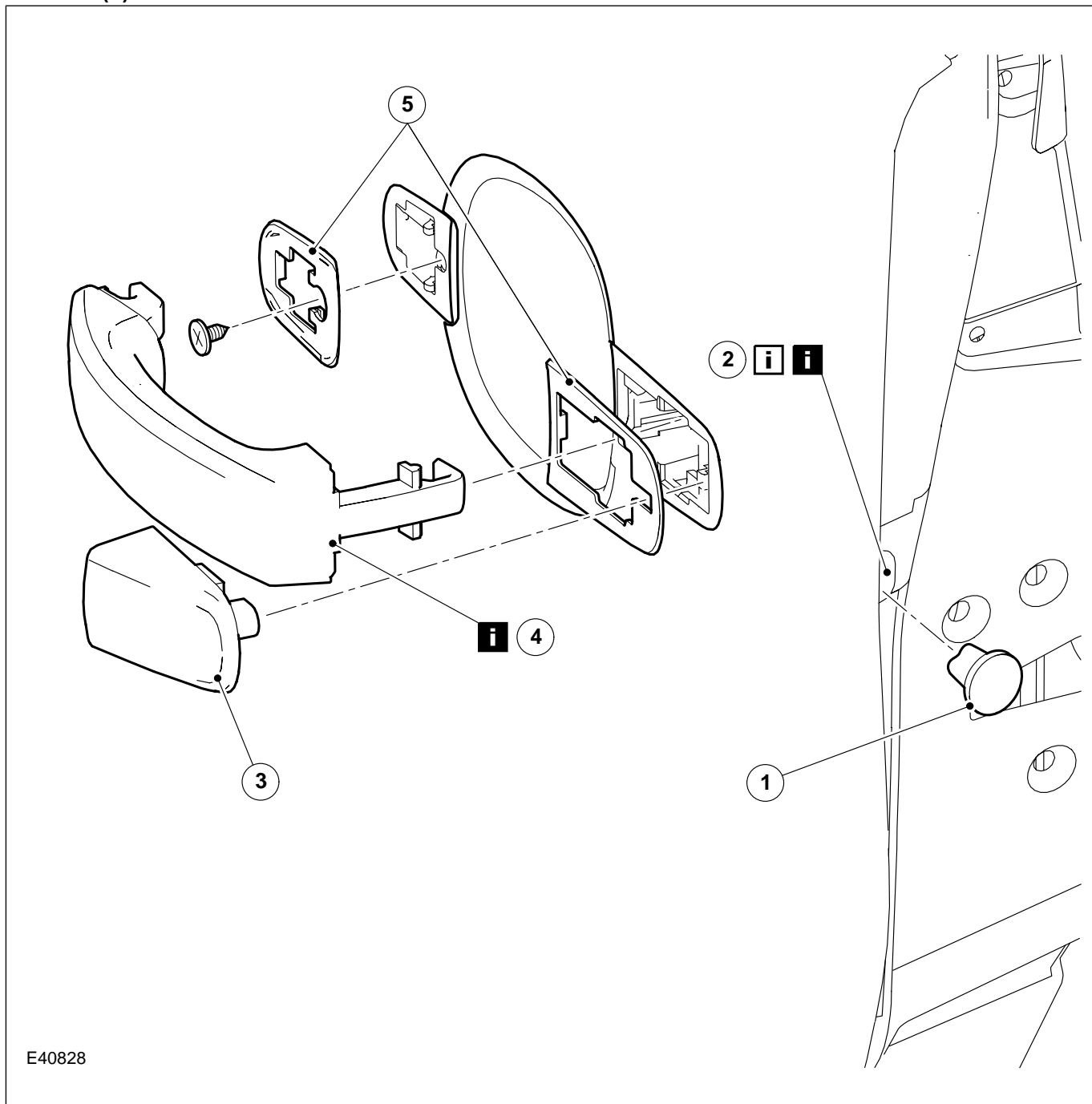
1. Tighten the exterior front door handle retaining screw.



REMOVAL AND INSTALLATION

Exterior Rear Door Handle

1. Remove the components in the order indicated in the following illustration(s) and table(s).



E40828

Item	Description
1	Exterior rear door handle retaining screw grommet
2	Exterior rear door handle retaining screw See Removal Detail See Installation Detail

Item	Description
3	Exterior rear door handle trim
4	Exterior rear door handle See Removal Detail
5	Exterior front door handle seals

2. To install, reverse the removal procedure.

501-14-176

Handles, Locks, Latches and Entry Systems

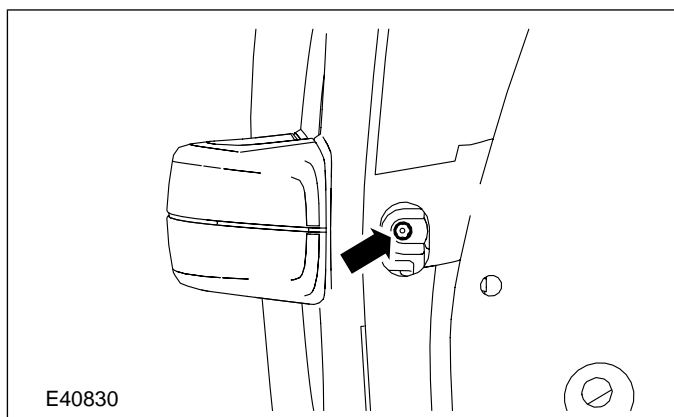
501-14-176

REMOVAL AND INSTALLATION

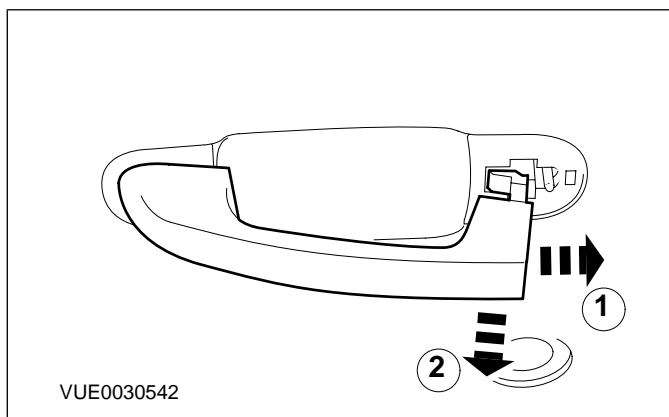
Removal Details

Item 2 Exterior rear door handle retaining screw

1. Loosen the exterior rear door handle retaining screw.



1. Slide the exterior rear door handle towards the rear of the vehicle to disengage it from the exterior rear door handle bracket.
2. Remove the exterior rear door handle.

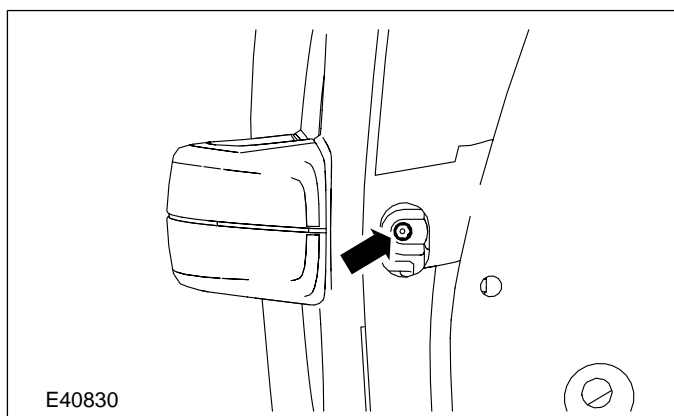
**Item 4 Exterior rear door handle**

1. Remove the exterior rear door handle.

Installation Details

Item 2 Exterior rear door handle retaining screw

1. Tighten the exterior rear door handle retaining screw.

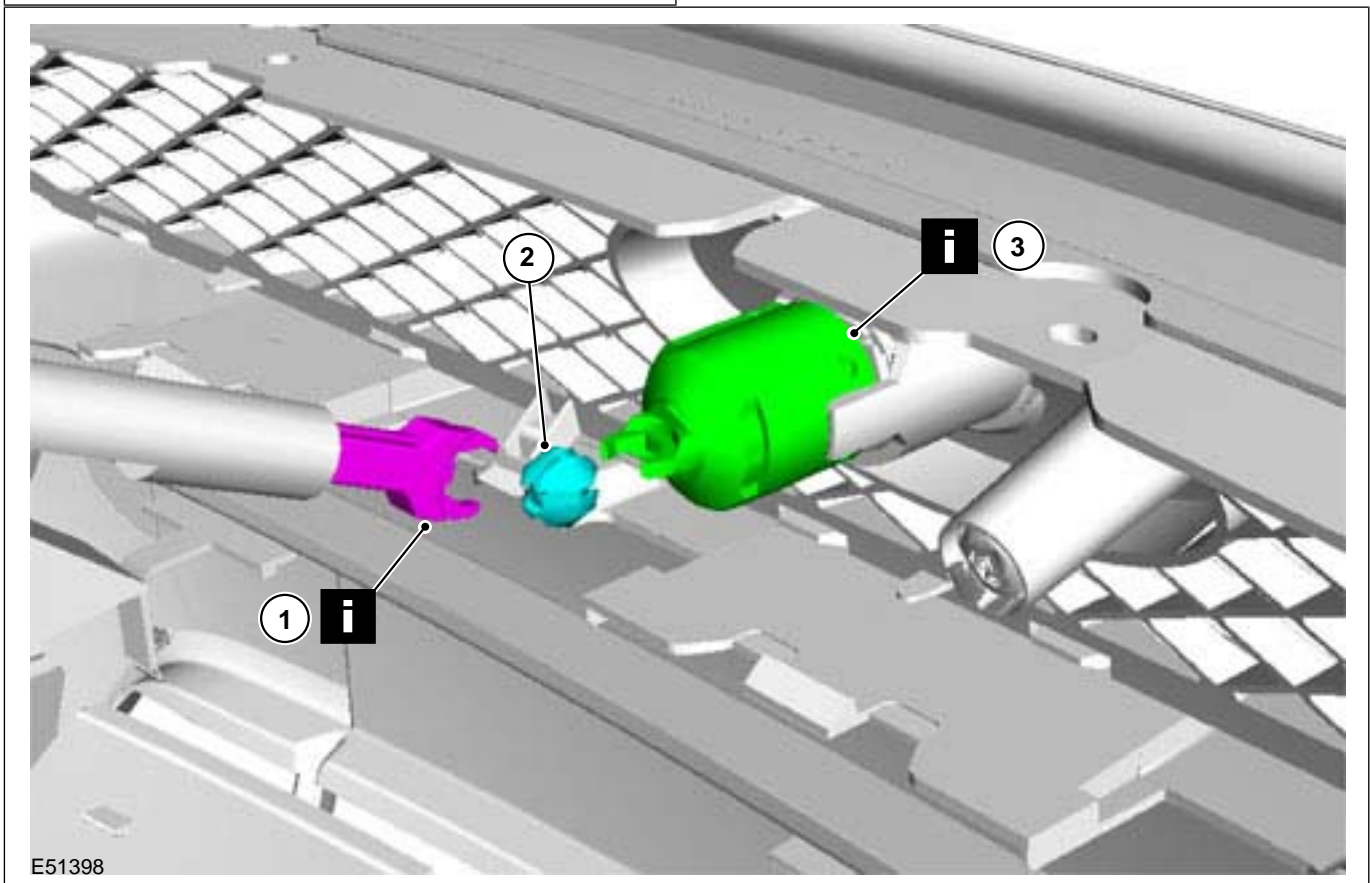
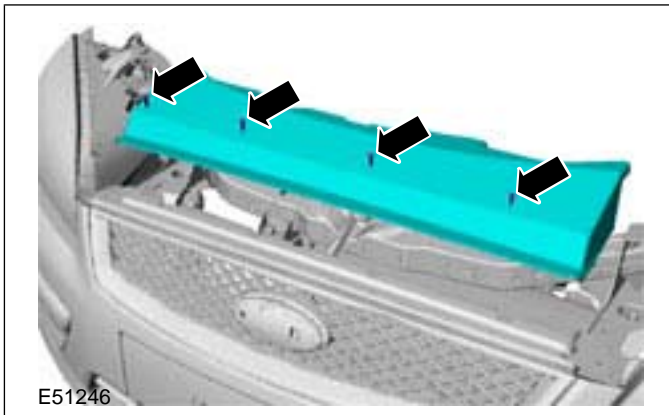


REMOVAL AND INSTALLATION

Hood Lock Cylinder

1. Remove the air deflector.

2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Hood lock cylinder to hood latch connecting rod <i>See Removal Detail</i>
2	Hood lock cylinder rod swivel joint
3	Hood lock cylinder <i>See Removal Detail</i>

3. To install, reverse the removal procedure.

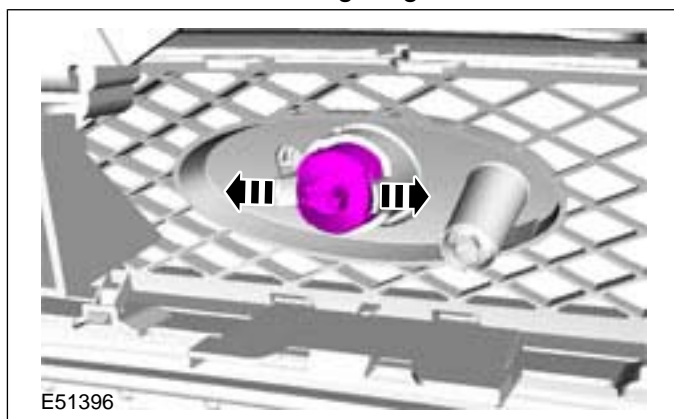
REMOVAL AND INSTALLATION**Removal Details****Item 1 Hood lock cylinder to hood latch connecting rod**

1. **NOTE:** Make a note of the position and orientation of the hood lock cylinder to hood latch connecting rod.

Disconnect the hood lock cylinder to hood latch connecting rod from the hood lock cylinder swivel joint.

Item 3 Hood lock cylinder

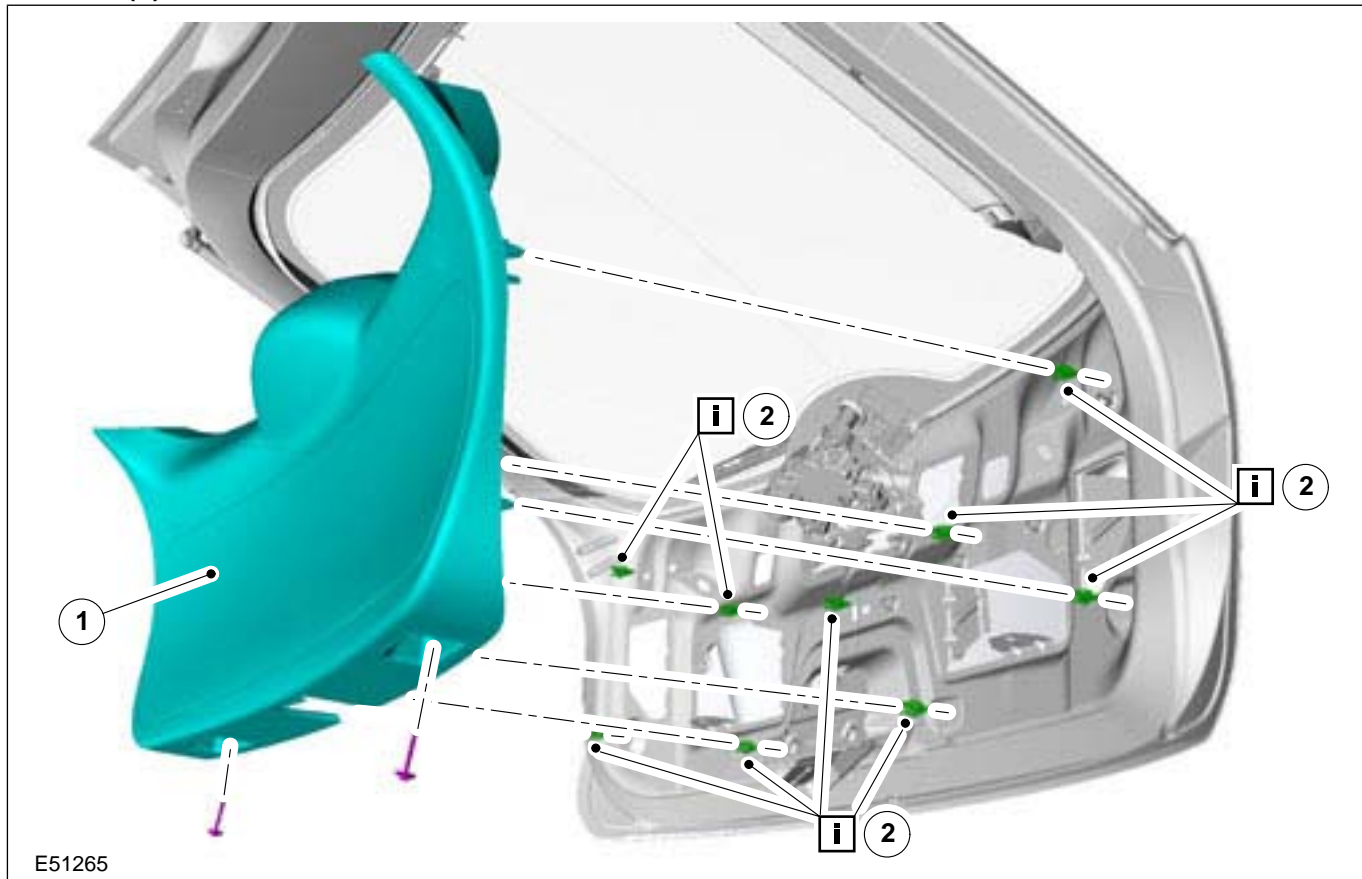
1. Detach the hood lock cylinder from the radiator grille.
 - Release the locking tangs.



REMOVAL AND INSTALLATION

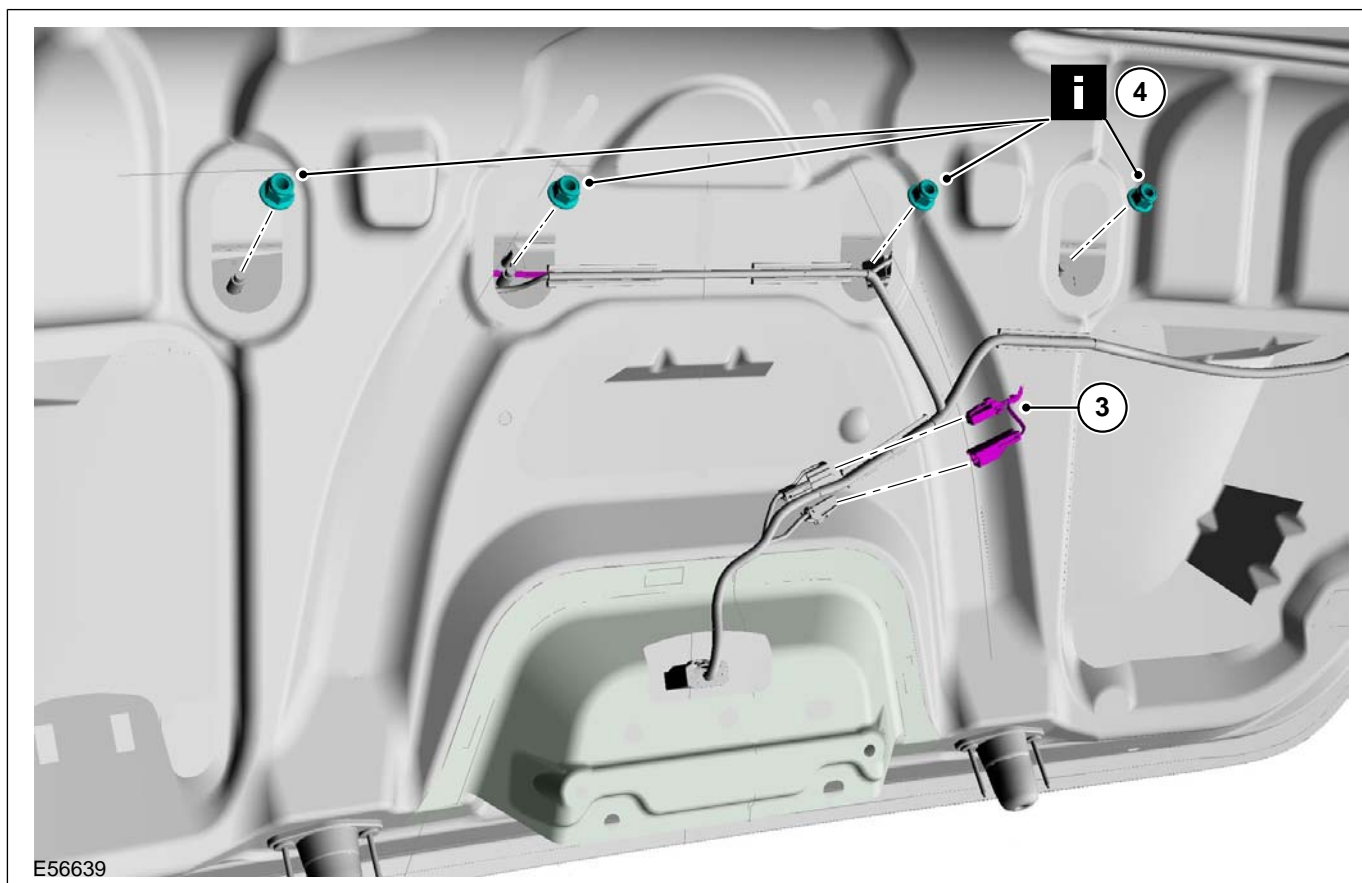
Exterior Liftgate Release Switch — 3-Door/5-Door

1. Remove the components in the order indicated in the following illustration(s) and table(s).



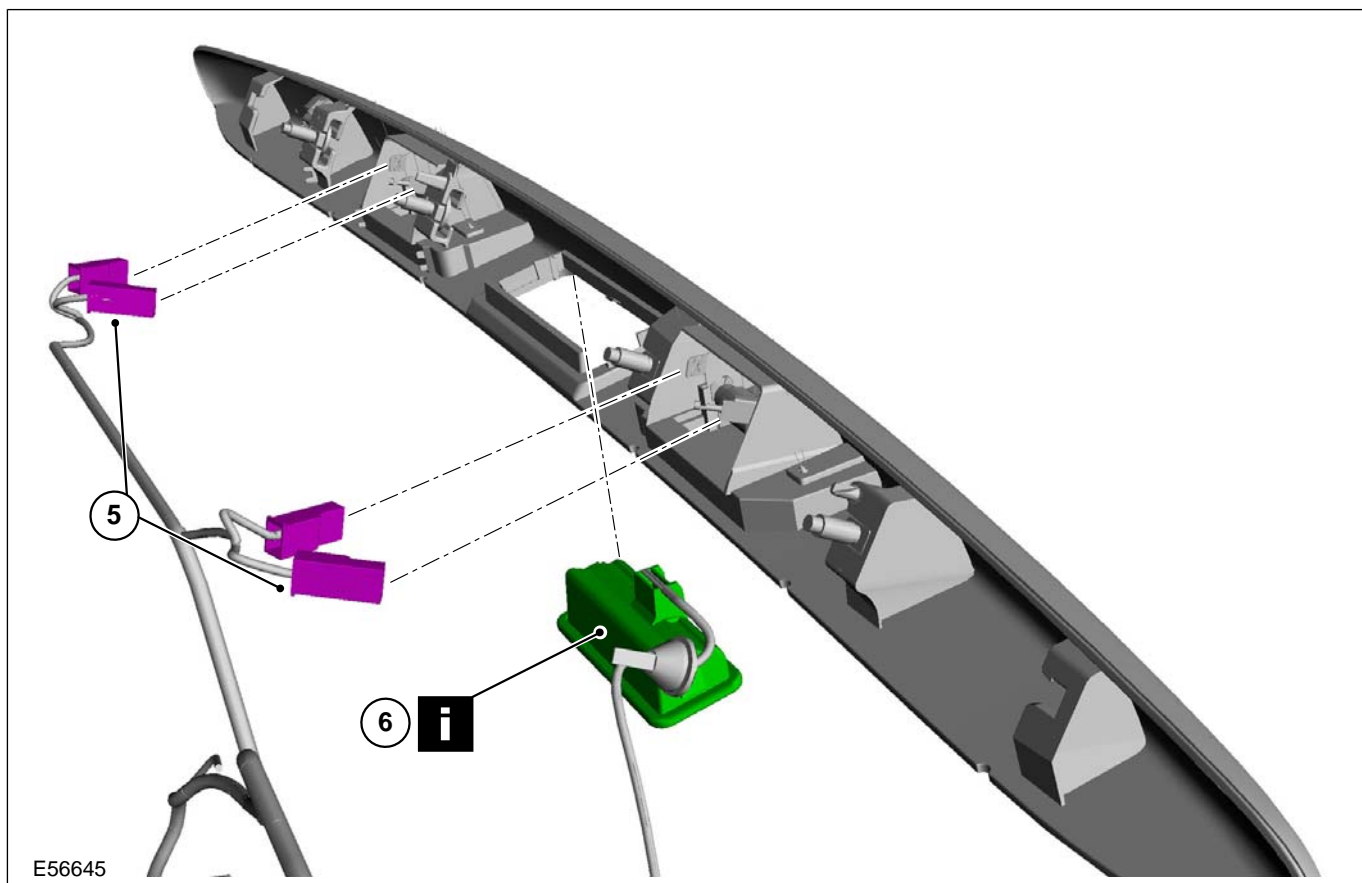
Item	Description
1	Liftgate trim panel
2	Liftgate trim panel retaining clips See Installation Detail

REMOVAL AND INSTALLATION



Item	Description
3	Exterior liftgate release switch electrical connectors
4	Licence plate illumination panel retaining nuts See Removal Detail

REMOVAL AND INSTALLATION



Item	Description
5	Licence plate illumination electrical connectors
6	Exterior liftgate release switch See Removal Detail

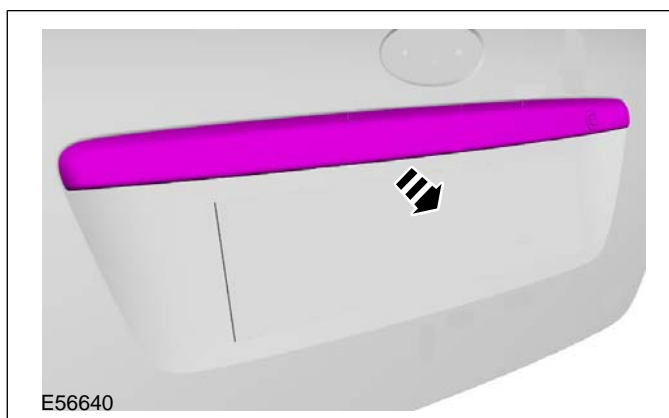
2. To install, reverse the removal procedure.

Removal Details

Item 4 Licence plate illumination panel retaining nuts

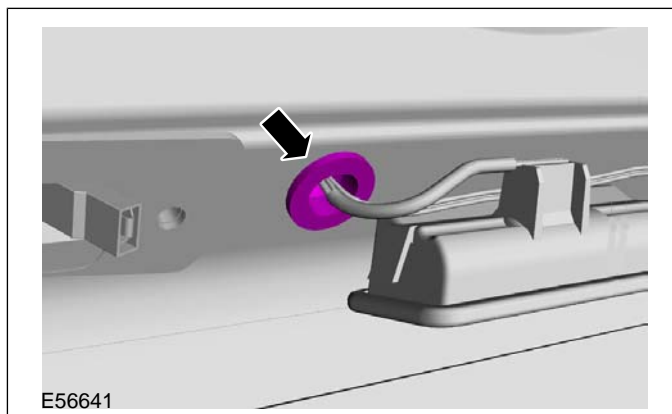
1. **⚠ CAUTION:** Make sure that excessive strain is not placed on the licence plate illumination panel electrical connectors and wiring harnesses.

Detach the licence plate illumination panel from the liftgate.

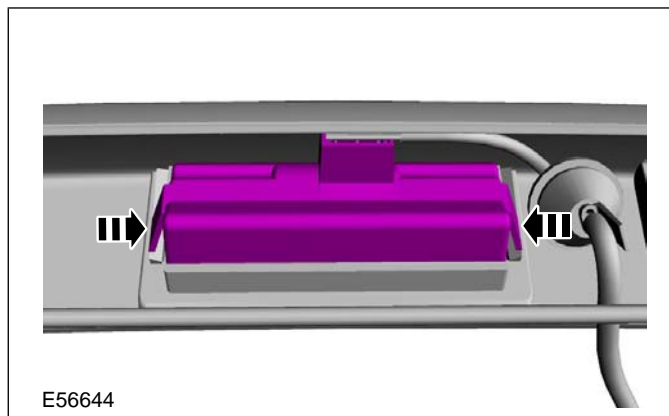


REMOVAL AND INSTALLATION

2. Detach the exterior liftgate release switch wiring harness grommet from the liftgate.

**Item 6 Exterior liftgate release switch**

1. Press the clips and remove the exterior liftgate release switch from the licence plate illumination panel.

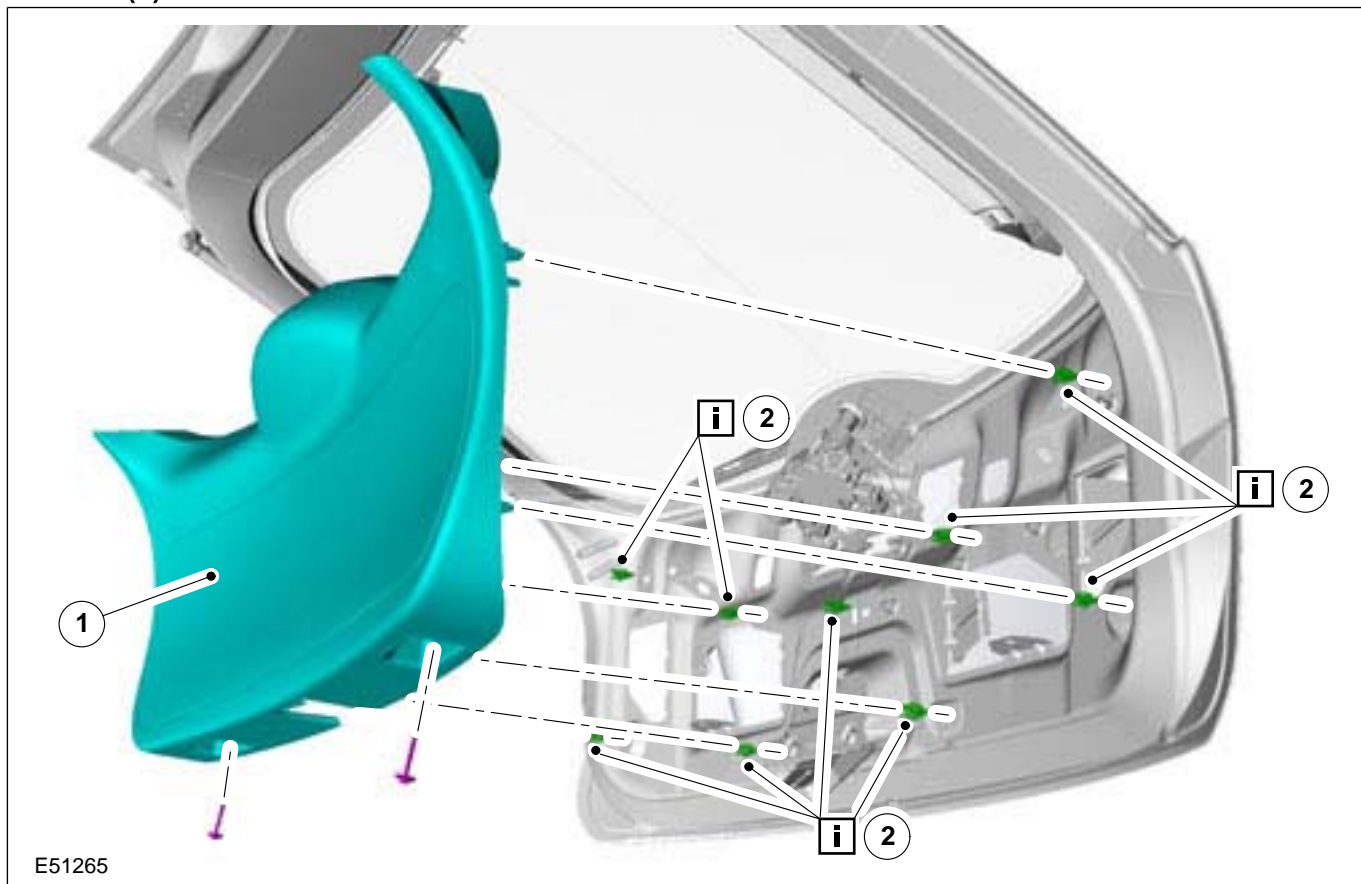
**Installation Details****Item 2 Liftgate trim panel retaining clips**

1. Install the liftgate trim panel retaining clips to the liftgate trim panel before installation to the liftgate.

REMOVAL AND INSTALLATION

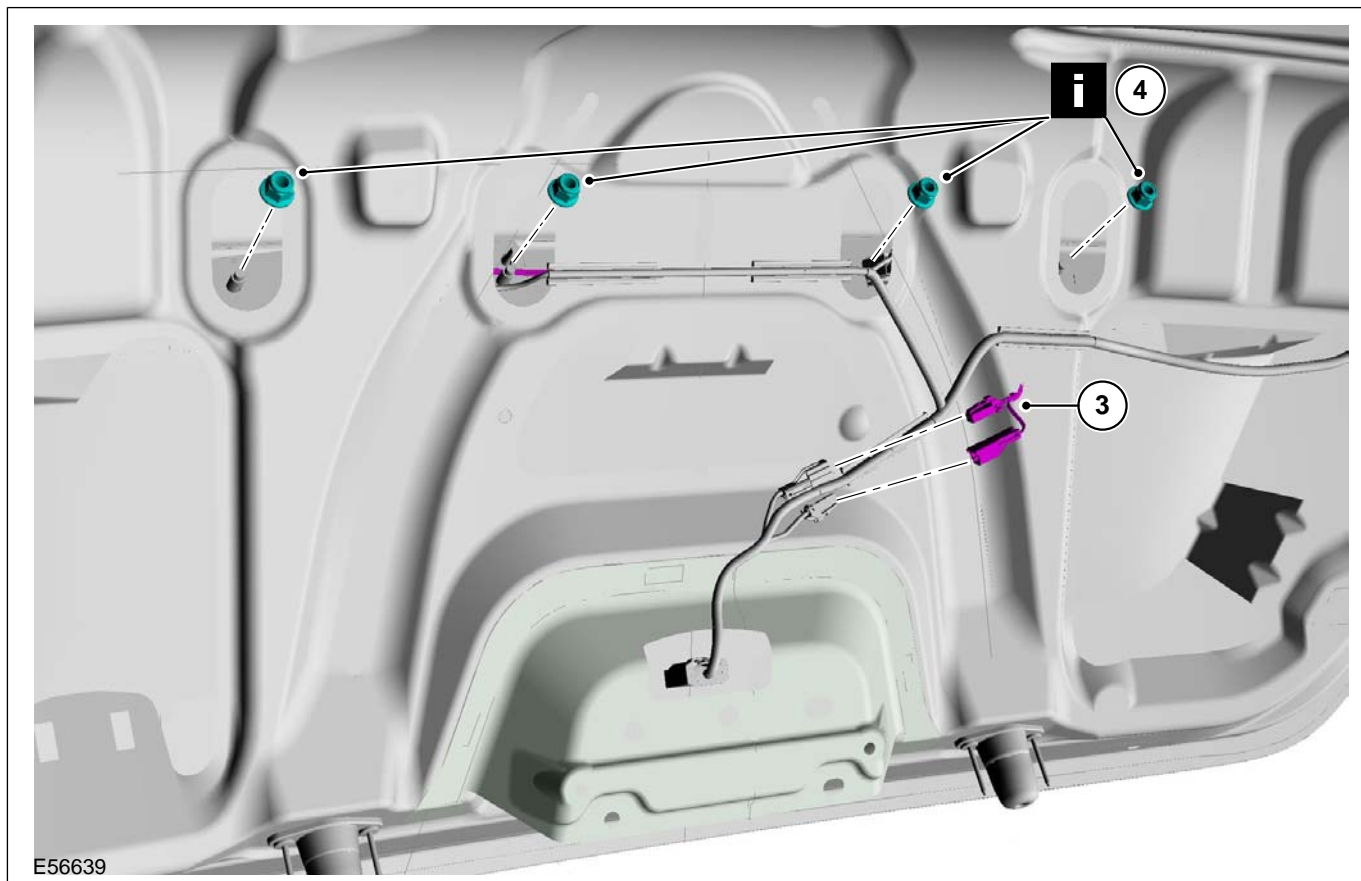
Exterior Liftgate Release Switch — 3-Door/5-Door, Vehicles With:
Keyless Vehicle System

1. Remove the components in the order indicated in the following illustration(s) and table(s).



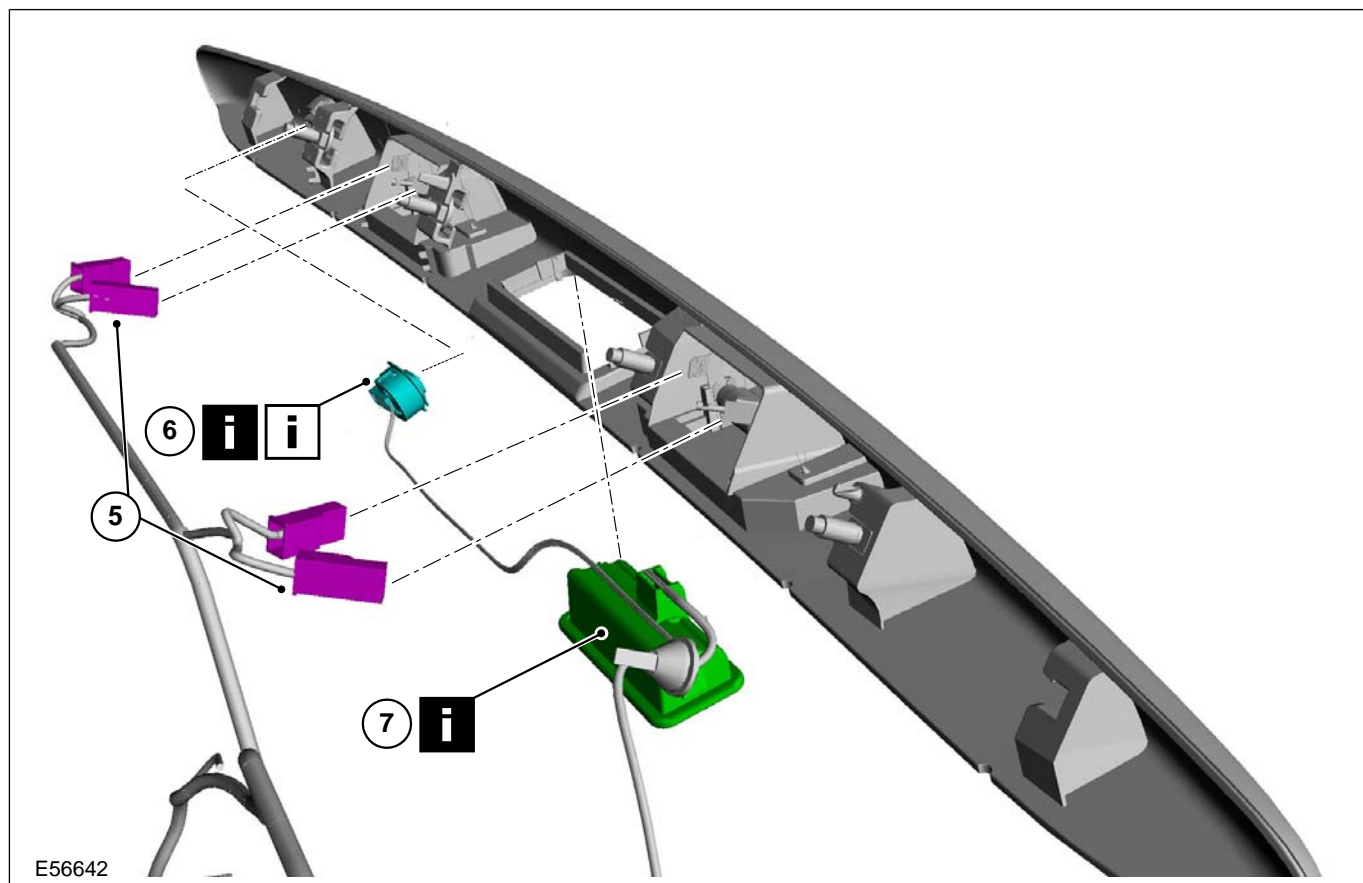
Item	Description
1	Liftgate trim panel
2	Liftgate trim panel retaining clips See Installation Detail

REMOVAL AND INSTALLATION



Item	Description
3	Exterior liftgate release switch electrical connectors
4	Licence plate illumination panel retaining nuts See Removal Detail

REMOVAL AND INSTALLATION



E56642

Item	Description
5	Licence plate illumination electrical connectors
6	Keyless vehicle liftgate lock button See Removal Detail See Installation Detail
7	Exterior liftgate release switch See Removal Detail

2. To install, reverse the removal procedure.

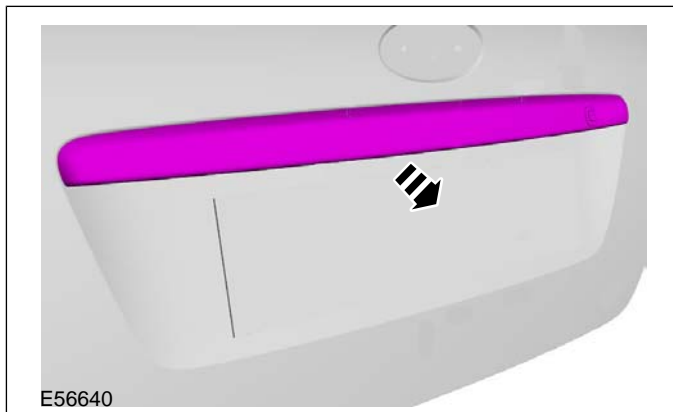
Removal Details

Item 4 Licence plate illumination panel retaining nuts

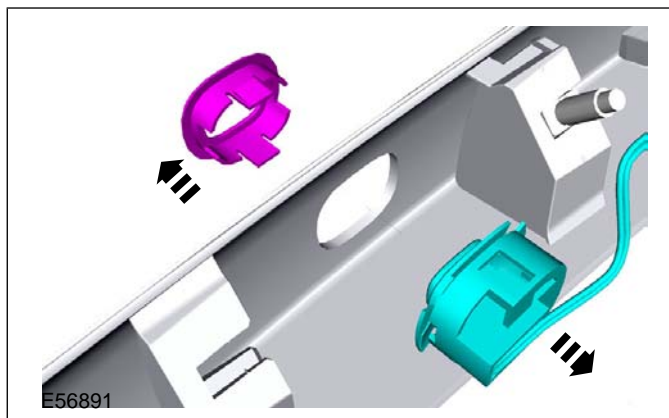
- CAUTION:** Make sure that excessive strain is not placed on the licence plate illumination panel electrical connectors and wiring harnesses.

REMOVAL AND INSTALLATION

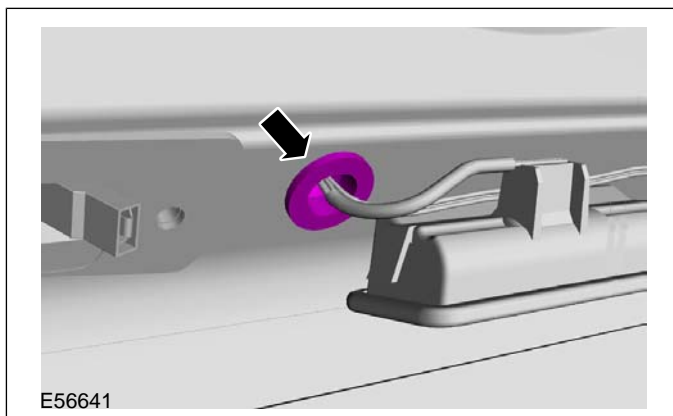
Detach the licence plate illumination panel from the liftgate.



2. Remove the keyless vehicle liftgate lock button and keyless vehicle liftgate lock button retainer from the licence plate illumination panel.

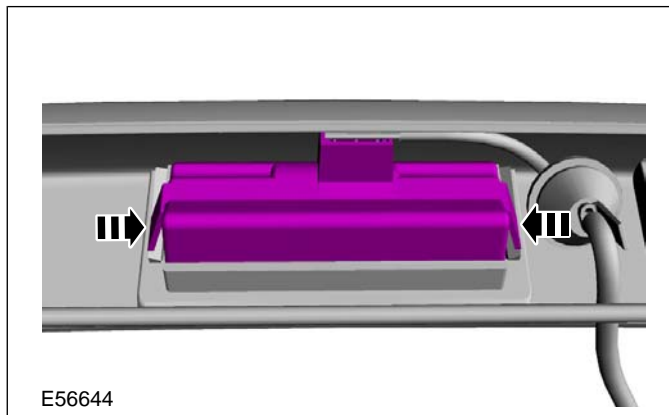


2. Detach the exterior liftgate release switch wiring harness grommet from the liftgate.



Item 7 Exterior liftgate release switch

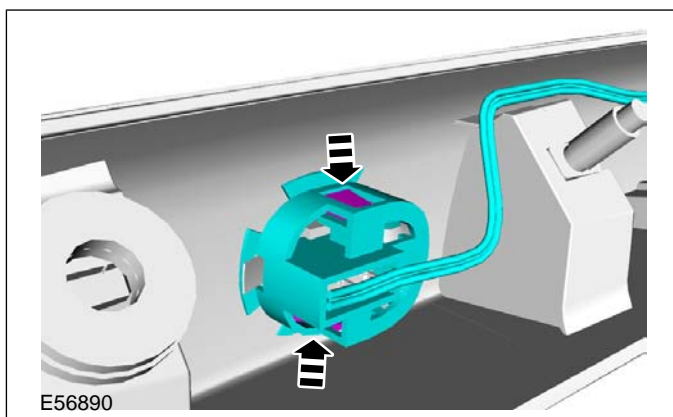
1. Press the clips and remove the exterior liftgate release switch from the licence plate illumination panel.




Item 6 Keyless vehicle liftgate lock button

1. **NOTE:** Make a note of the routing of the keyless vehicle liftgate lock button wiring harness.

Detach the keyless vehicle liftgate lock button from the keyless vehicle liftgate lock button retainer.



REMOVAL AND INSTALLATION**Installation Details****Item 6 Keyless vehicle liftgate lock button**

 **CAUTION:** Make sure the routing of the keyless vehicle liftgate lock button wiring harness is the same as when removed. Failure to follow this instruction may result in damage to the wiring harness.

Item 2 Liftgate trim panel retaining clips

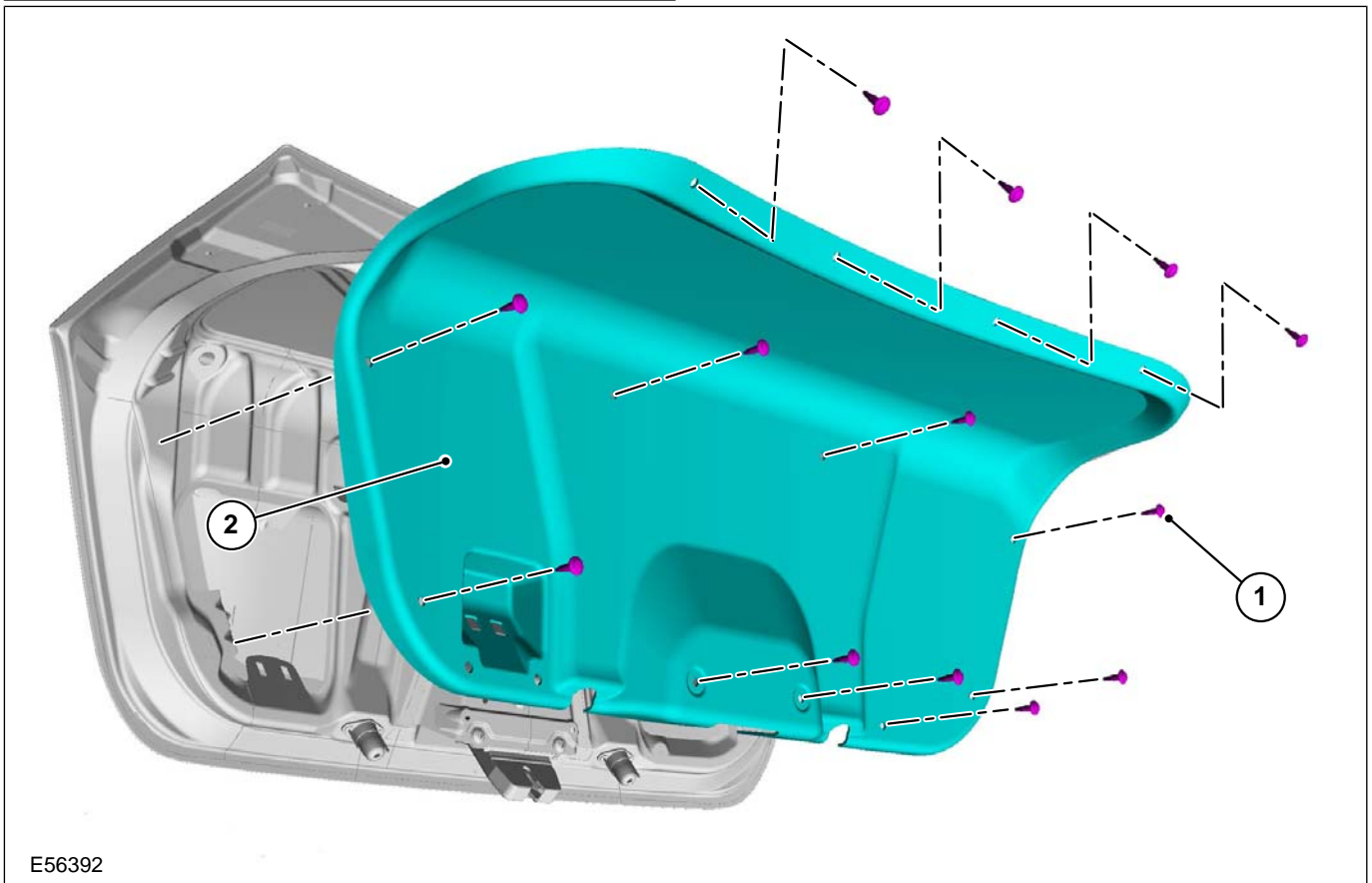
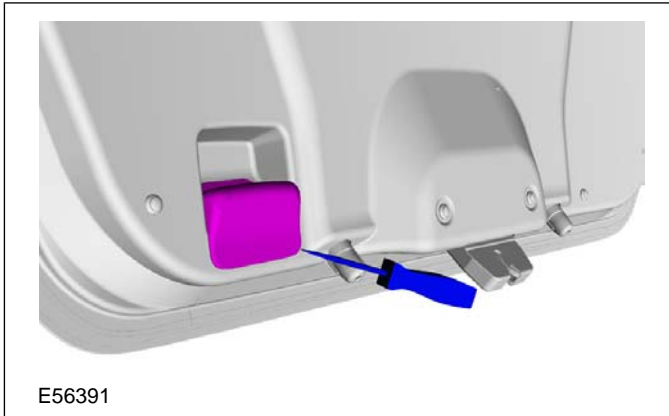
1. Install the liftgate trim panel retaining clips to the liftgate trim panel before installation to the liftgate.

REMOVAL AND INSTALLATION

Exterior Luggage Compartment Lid Release Switch

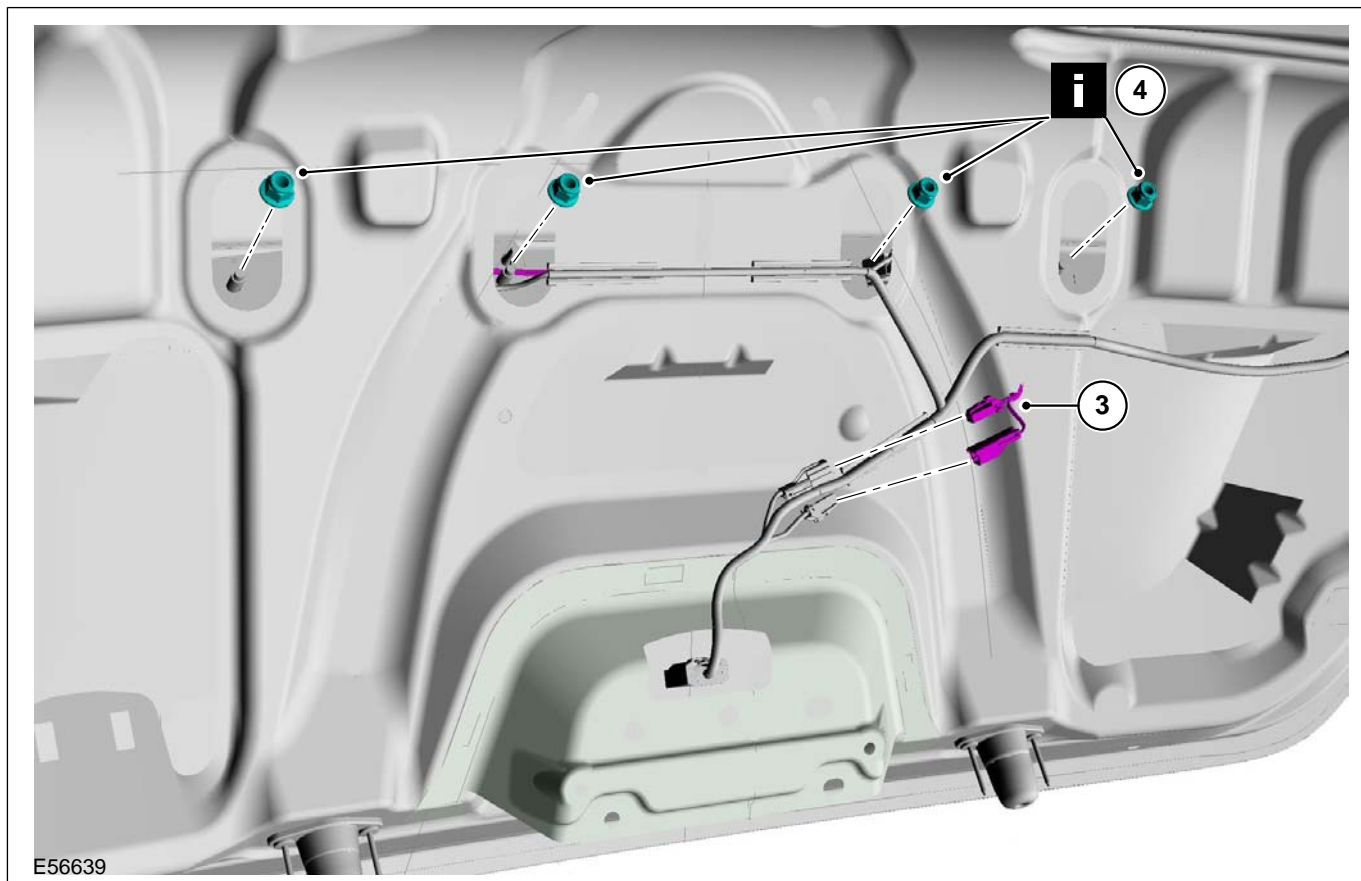
1. Using a suitable flat blade screwdriver, remove the luggage compartment lid trim panel handle from the luggage compartment lid trim panel.

2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Luggage compartment lid trim panel retaining clips
2	Luggage compartment lid trim panel

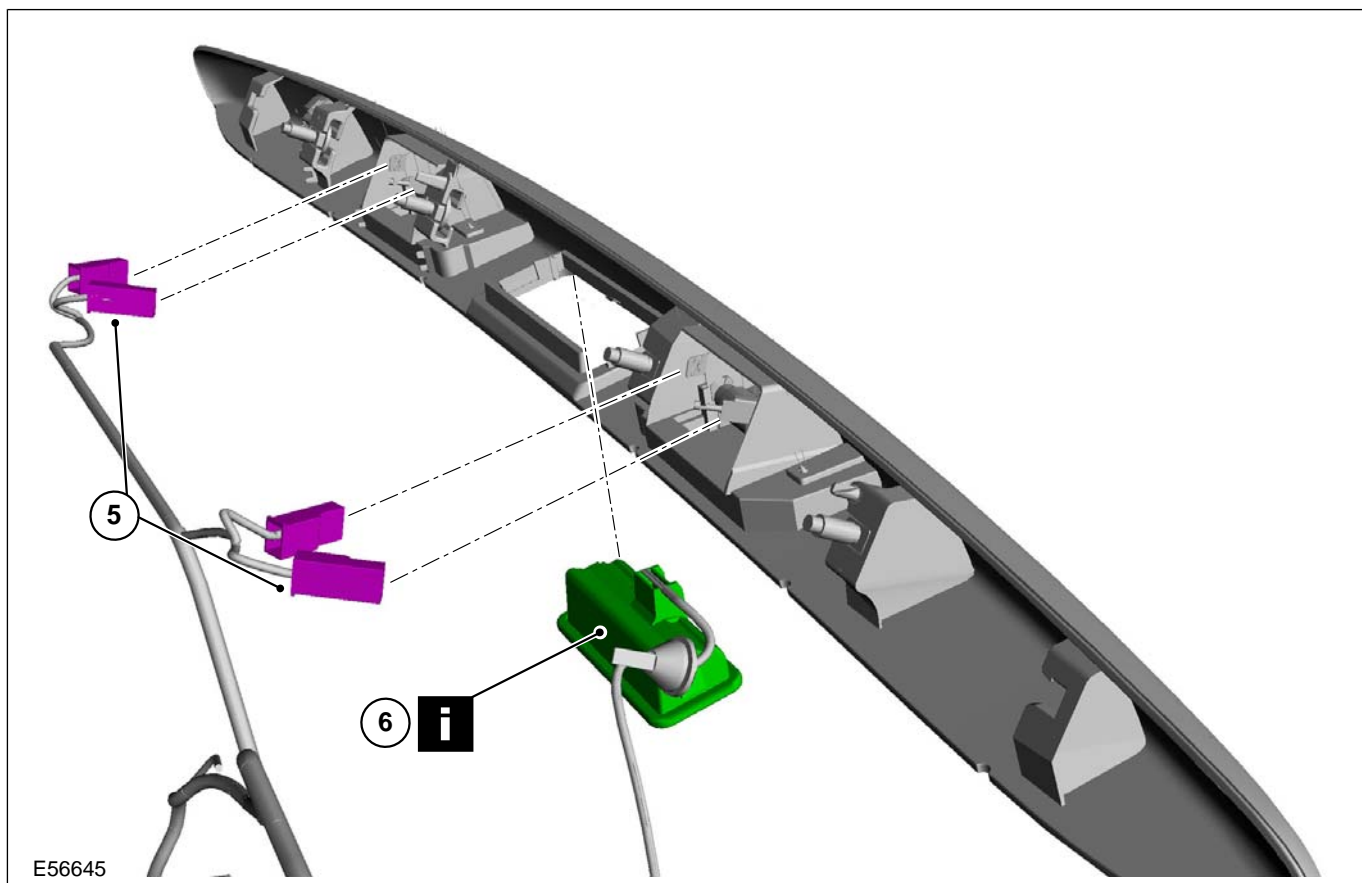
REMOVAL AND INSTALLATION



E56639

Item	Description
3	Exterior luggage compartment lid release switch electrical connectors
4	Licence plate illumination panel retaining nuts See Removal Detail

REMOVAL AND INSTALLATION



Item	Description
5	Licence plate illumination panel electrical connectors
6	Exterior luggage compartment lid release switch See Removal Detail

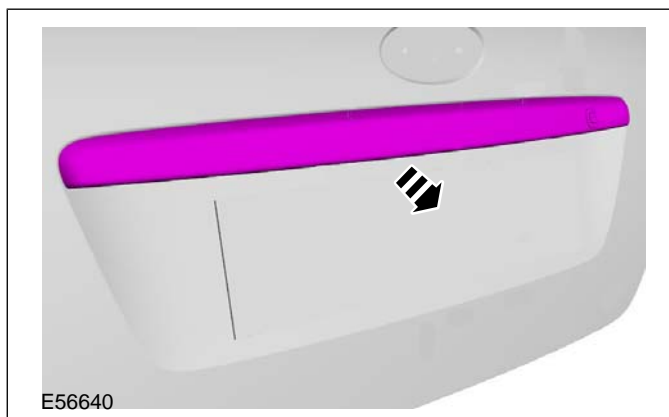
3. To install, reverse the removal procedure.

Removal Details

Item 4 Licence plate illumination panel retaining nuts

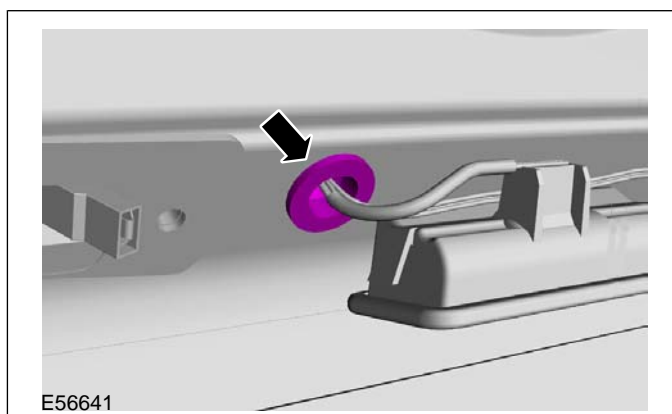
1. **CAUTION:** Make sure that excessive strain is not placed on the licence plate illumination panel electrical connectors and wiring harnesses.

Detach the licence plate illumination panel from the luggage compartment lid.

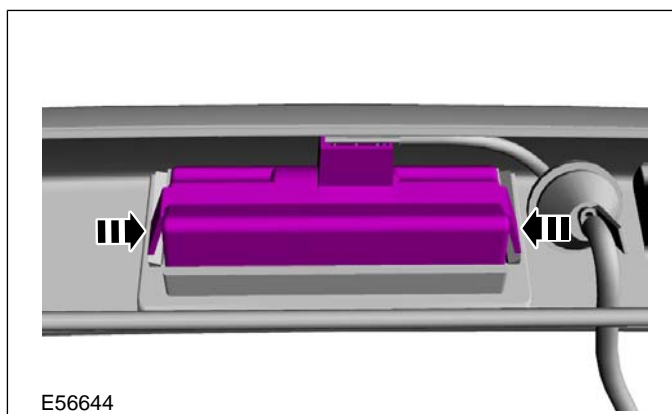


REMOVAL AND INSTALLATION

2. Detach the exterior luggage compartment lid release switch wiring harness grommet from the luggage compartment lid.

**Item 6 Exterior luggage compartment lid release switch**

1. Press the clips and remove the luggage compartment lid release switch from the licence plate illumination panel.

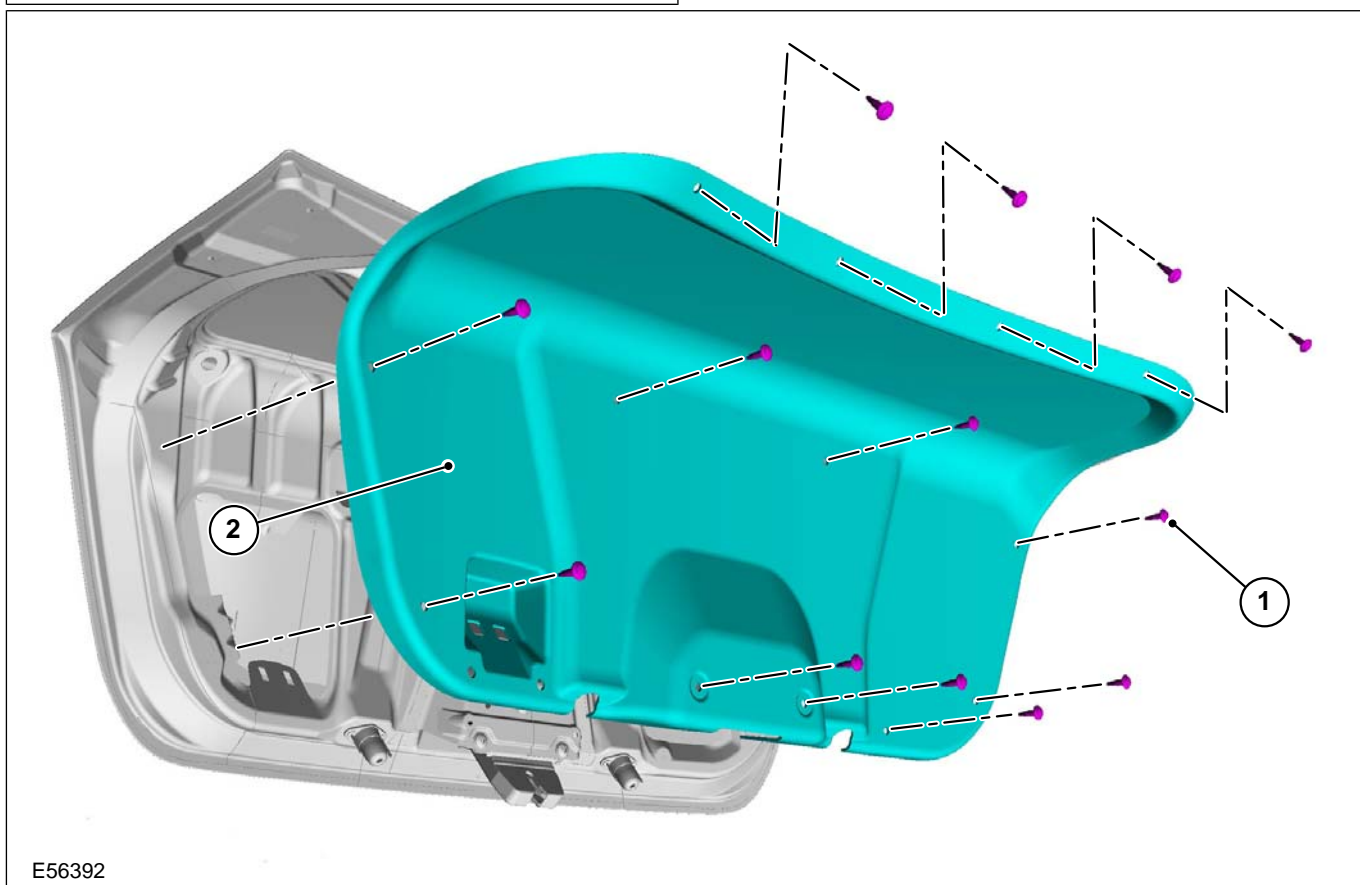
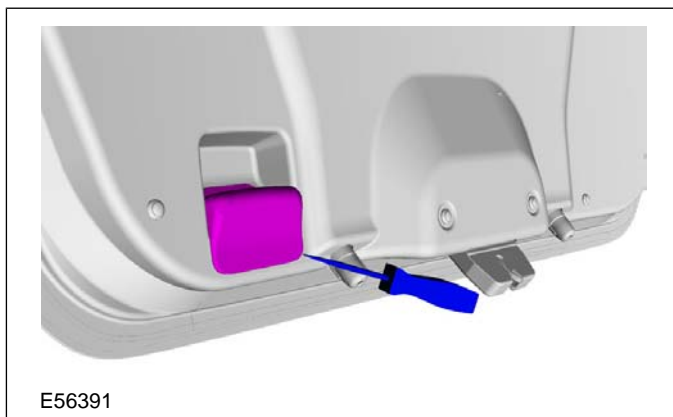


REMOVAL AND INSTALLATION

Exterior Luggage Compartment Lid Release Switch — Vehicles With: Keyless Vehicle System

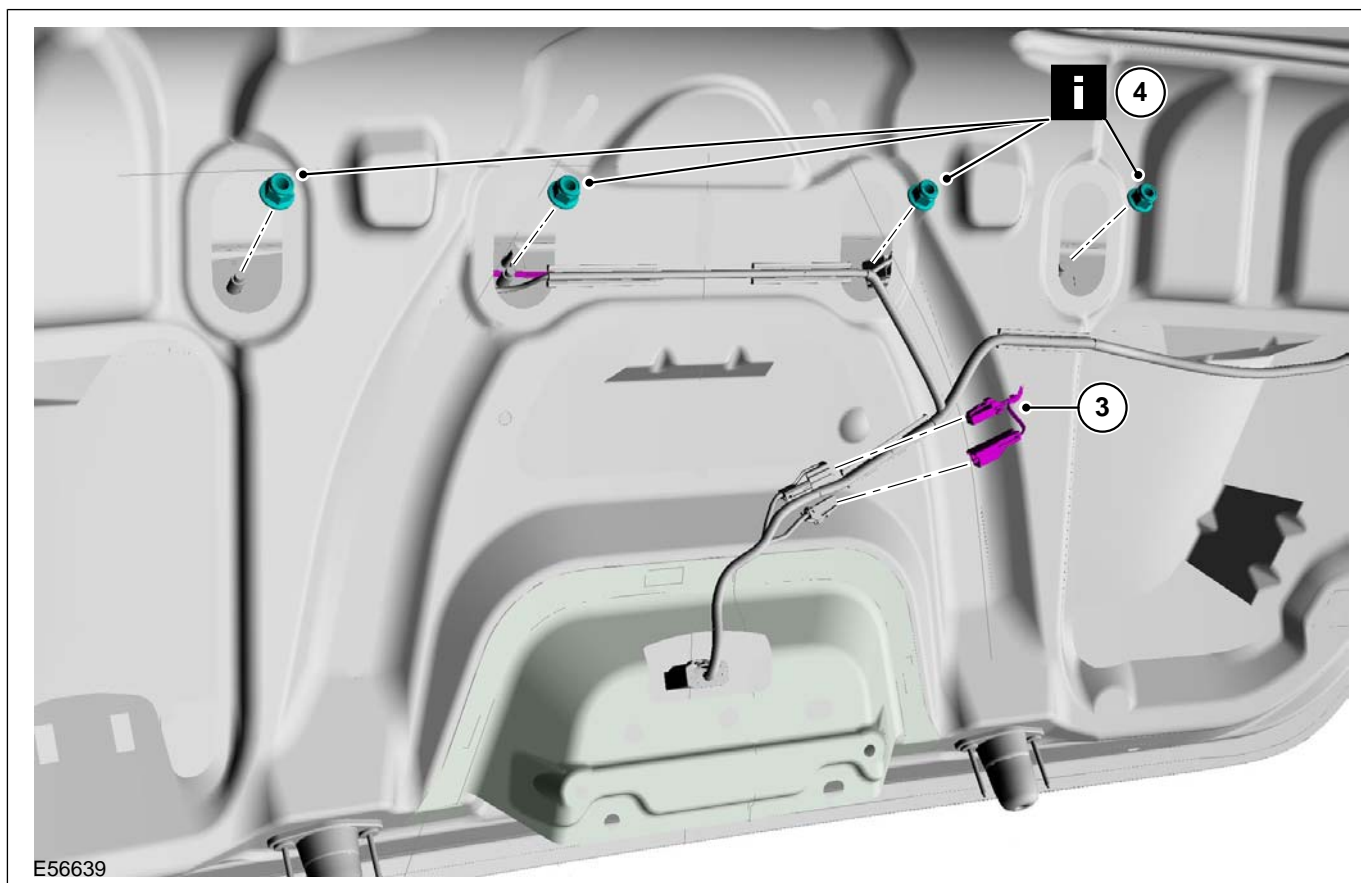
1. Using a suitable flat blade screwdriver, remove the luggage compartment lid trim panel handle from the luggage compartment lid trim panel.

2. Remove the components in the order indicated in the following illustration(s) and table(s).



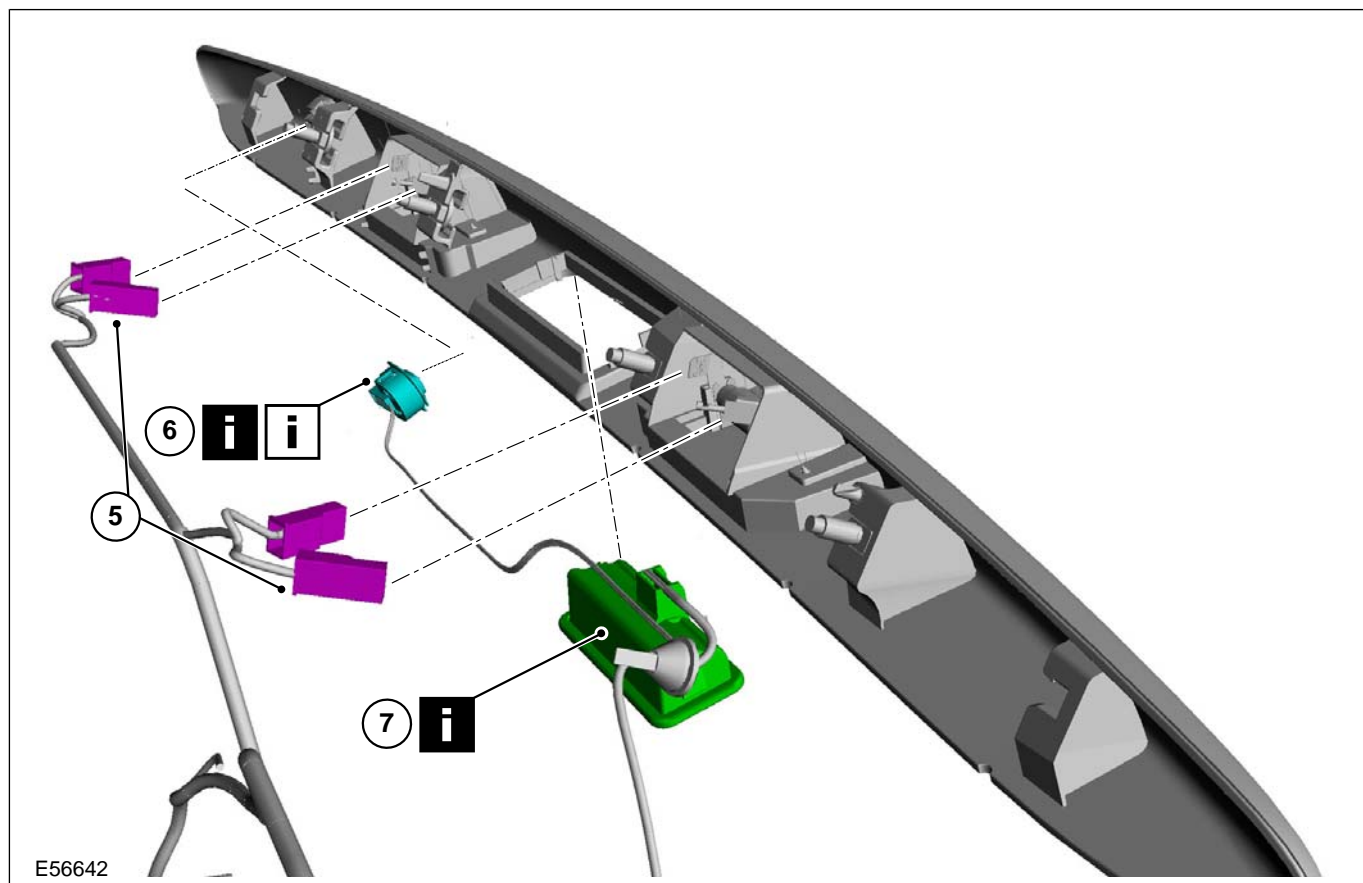
Item	Description
1	Luggage compartment lid trim panel retaining clips
2	Luggage compartment lid trim panel

REMOVAL AND INSTALLATION



Item	Description
3	Exterior luggage compartment lid release switch electrical connectors
4	Licence plate illumination panel retaining nuts See Removal Detail

REMOVAL AND INSTALLATION



E56642

Item	Description
5	Licence plate illumination panel electrical connectors
6	Keyless vehicle luggage compartment lid lock button See Removal Detail See Installation Detail
7	Exterior luggage compartment lid release handle See Removal Detail

3. To install, reverse the removal procedure.

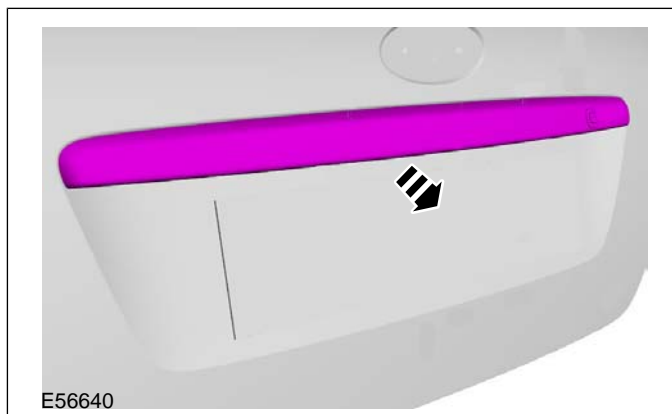
Removal Details

Item 4 Licence plate illumination panel retaining nuts

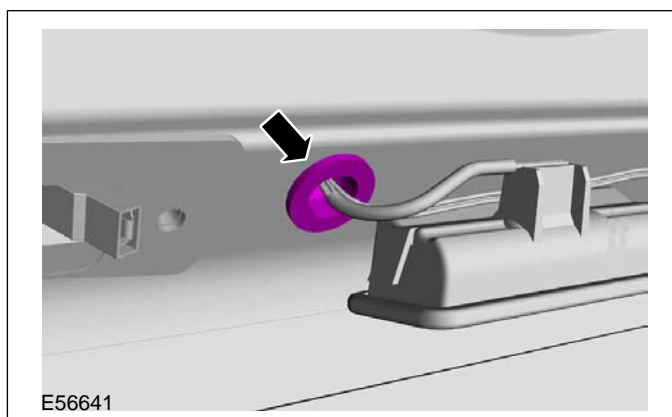
1. **⚠ CAUTION:** Make sure that excessive strain is not placed on the licence plate illumination panel electrical connectors and wiring harnesses.

REMOVAL AND INSTALLATION

Detach the licence plate illumination panel from the luggage compartment lid.



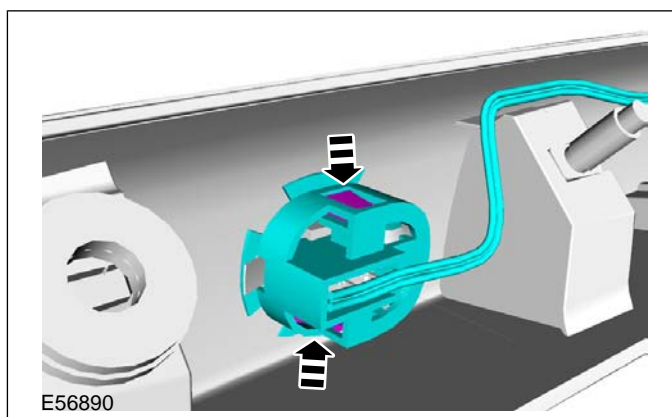
2. Detach the exterior luggage compartment release switch wiring harness grommet from the luggage compartment lid.



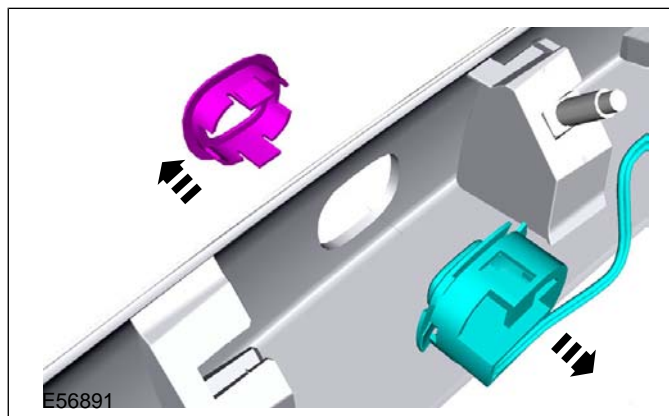
Item 6 Keyless vehicle luggage compartment lid lock button

1. **NOTE:** Make a note of the routing of the keyless vehicle liftgate lock button wiring harness.

Detach the keyless vehicle luggage compartment lid lock button from the keyless vehicle luggage compartment lock button retainer.

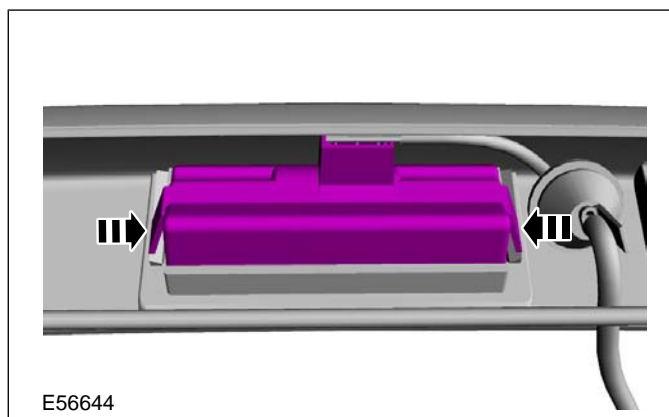


2. Remove the keyless vehicle luggage compartment lid lock button and keyless vehicle luggage compartment lid lock button retainer from the licence plate illumination panel.



Item 7 Exterior luggage compartment lid release handle


1. Press the clips and remove the luggage compartment lid release switch from the licence plate illumination panel.



REMOVAL AND INSTALLATION

Installation Details

Item 6 Keyless vehicle luggage compartment lid lock button

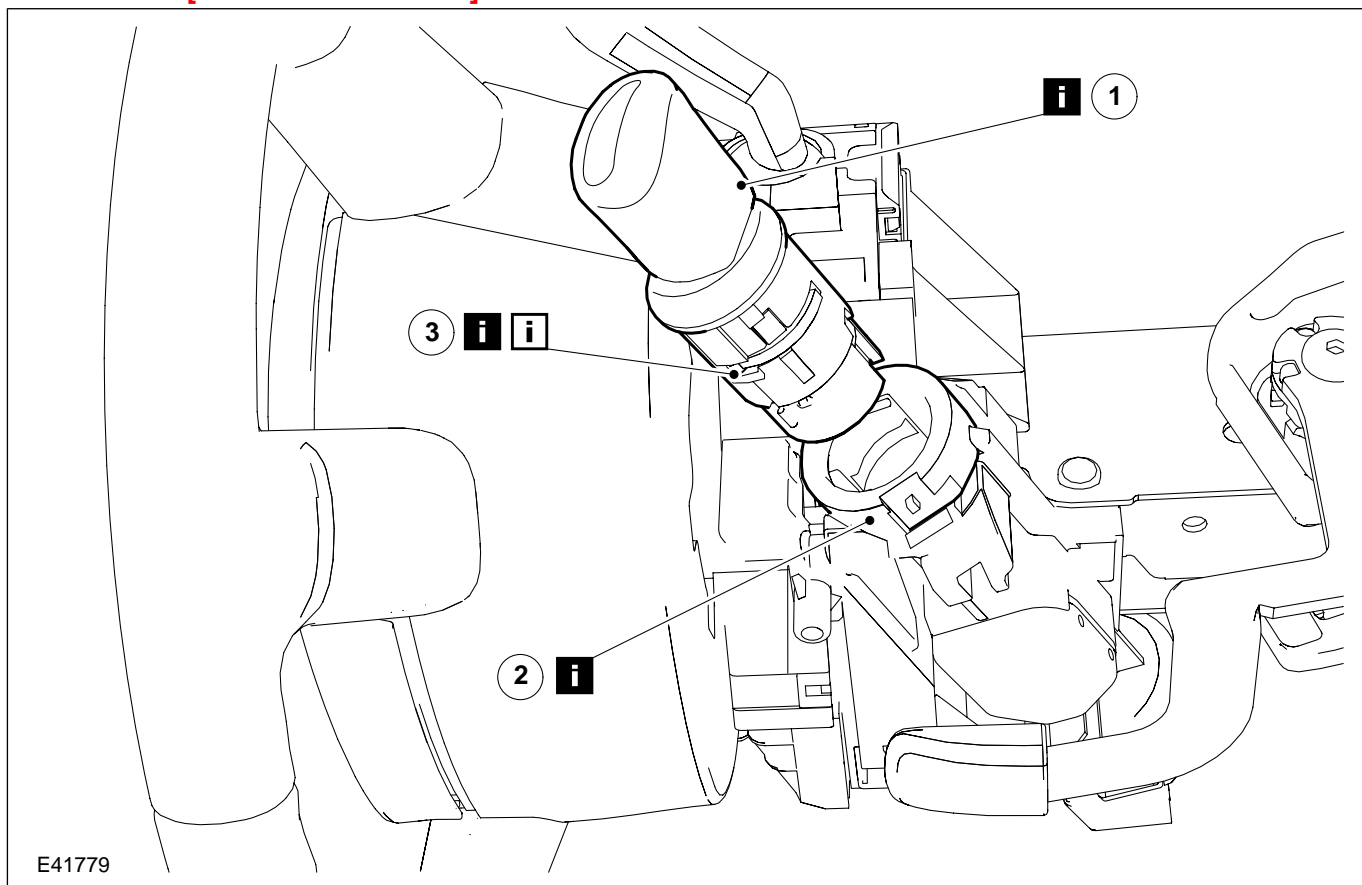
 **CAUTION:** Make sure the routing of the keyless vehicle luggage compartment lid lock button wiring harness is the same as when removed. Failure to follow this instruction may result in damage to the wiring harness.

REMOVAL AND INSTALLATION

Ignition Lock Cylinder

1. Remove the passive anti-theft system (PATS) transceiver. For additional information, refer to Section **419-01A [Anti-Theft - Active]** / **419-01B [Anti-Theft - Passive]**.

2. Remove the components in the order indicated in the following illustration(s) and table(s).



E41779

Item	Description
1	Ignition key <i>See Removal Detail</i>
2	Ignition lock cylinder locking button <i>See Removal Detail</i>
3	Ignition lock cylinder <i>See Removal Detail</i> <i>See Installation Detail</i>

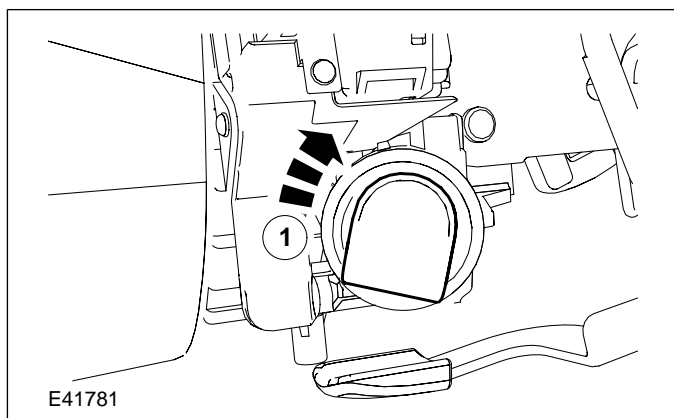
3. To install, reverse the removal procedure.

Removal Details

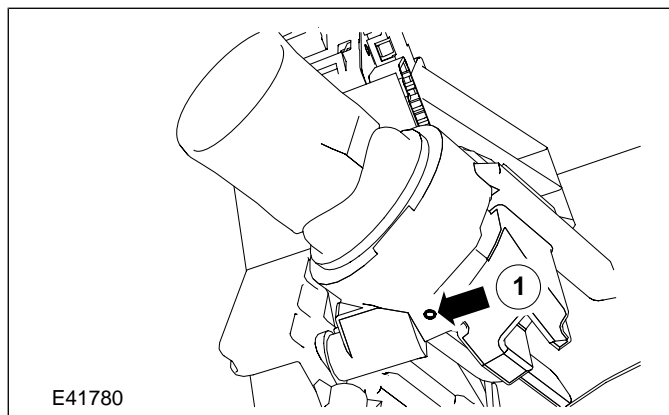
REMOVAL AND INSTALLATION

Item 1 Ignition key

1. Turn the ignition key to the **ACCESSORY** position.

**Item 2 Ignition lock cylinder locking button**

1. Using a suitable punch press the ignition lock cylinder locking button until the ignition lock cylinder is released from the steering column.

**Item 3 Ignition lock cylinder**

1. **NOTE:** Make sure the ignition lock cylinder locking button is released before the removal of the ignition lock cylinder.

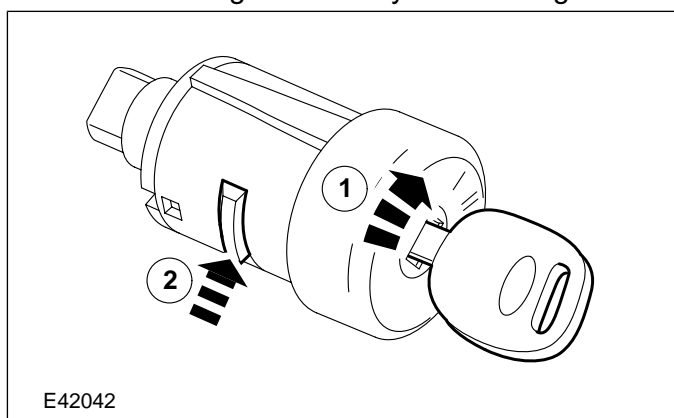
Remove the ignition lock cylinder and ignition key.

Installation Details

Item 3 Ignition lock cylinder

1. Install the ignition lock cylinder.

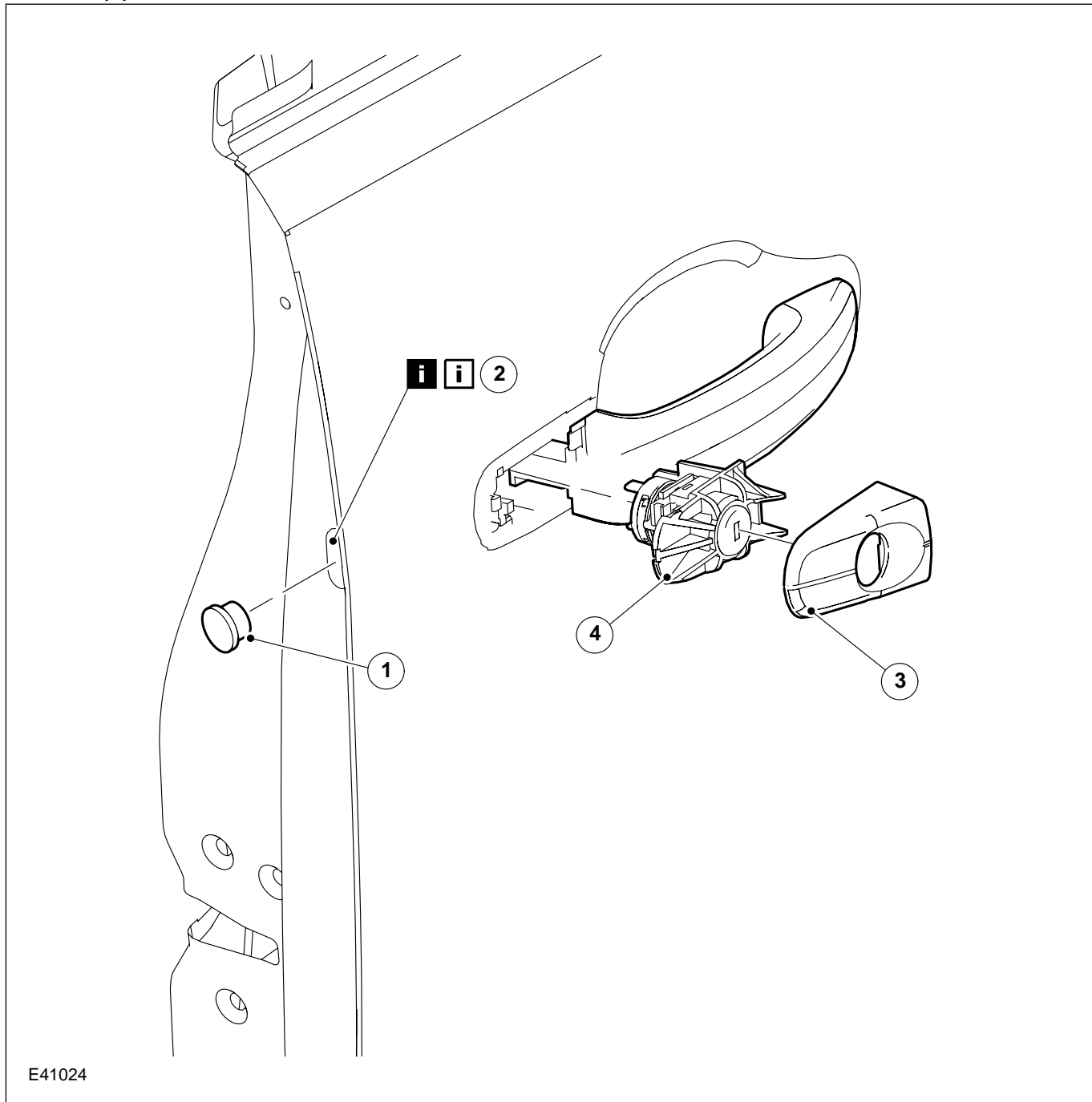
1. Turn the ignition key to the **ACCESSORY** position.
2. Press the ignition lock cylinder locking button.



REMOVAL AND INSTALLATION

Door Lock Cylinder

1. Remove the components in the order indicated in the following illustration(s) and table(s).



E41024

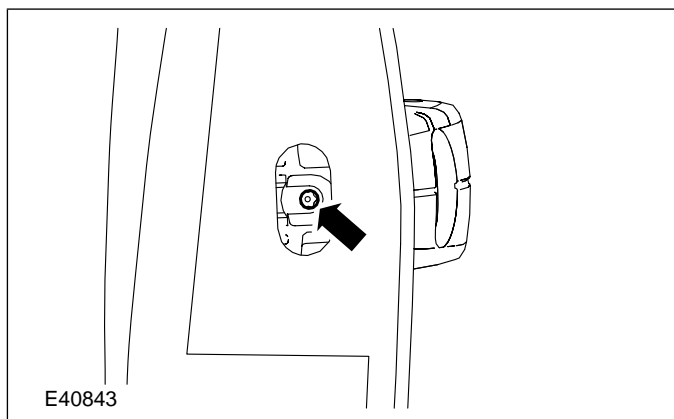
Item	Description
1	Exterior front door handle retaining screw grommet
2	Exterior front door handle retaining screw See Removal Detail See Installation Detail

Item	Description
3	Exterior front door handle trim
4	Door lock cylinder

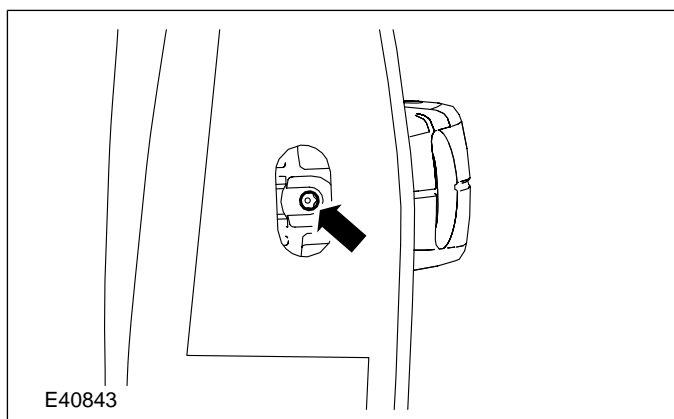
2. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION**Removal Details****Item 2 Exterior front door handle retaining screw**

1. Loosen the exterior front door handle retaining screw.

**Installation Details****Item 2 Exterior front door handle retaining screw**

1. Tighten the exterior front door handle retaining screw.

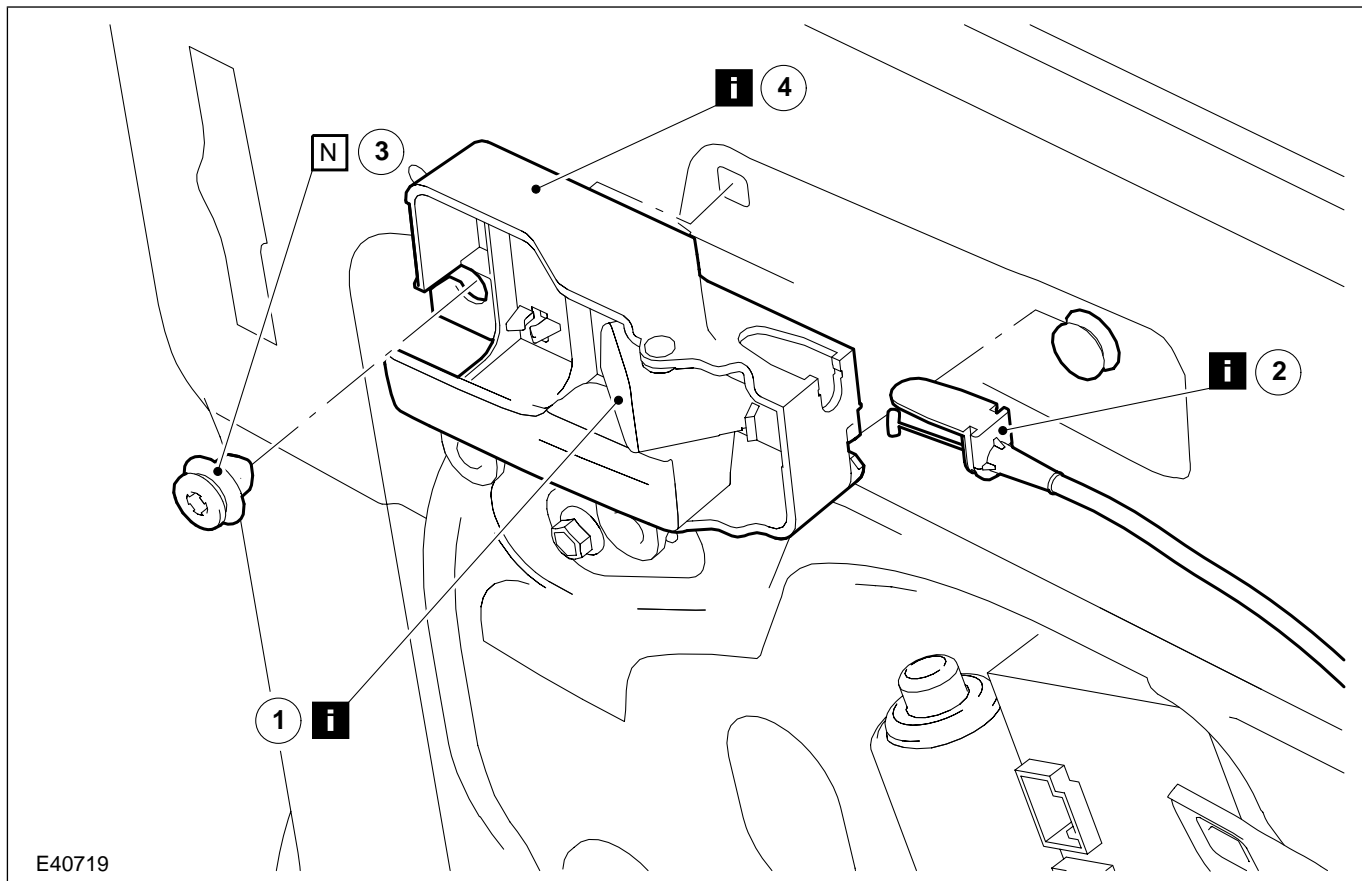


REMOVAL AND INSTALLATION

Door Latch Remote Control

1. Remove the door trim panel. For additional information, refer to Section 501-05 [Interior Trim and Ornamentation].

2. Remove the components in the order indicated in the following illustration(s) and table(s).



E40719

Item	Description
1	Door latch remote control handle lock See Removal Detail
2	Door latch remote control cable See Removal Detail

Item	Description
3	Door latch remote control retaining clip
4	Door latch remote control See Removal Detail

3. To install, reverse the removal procedure.

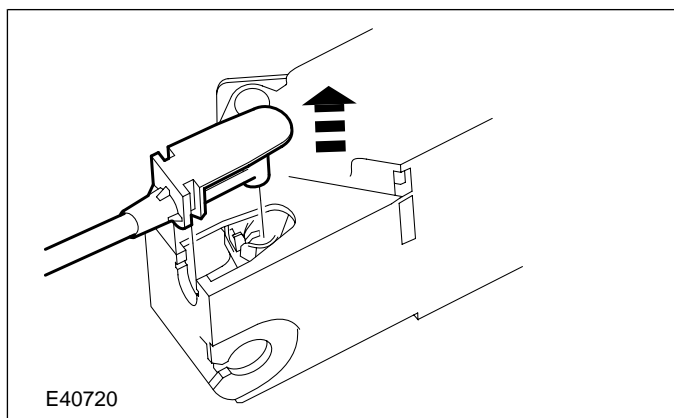
Removal Details

Item 1 Door latch remote control handle lock

1. Operate the door latch remote control handle lock to the lock position.

REMOVAL AND INSTALLATION**Item 2 Door latch remote control cable**

1. Disconnect the door latch remote control cable from the door latch remote control.

**Item 4 Door latch remote control**

1. Slide the door latch remote control away from the door latch remote control retaining clip.

REMOVAL AND INSTALLATION

Keyless Vehicle Module

General Equipment

Worldwide Diagnostic System (WDS)

Removal

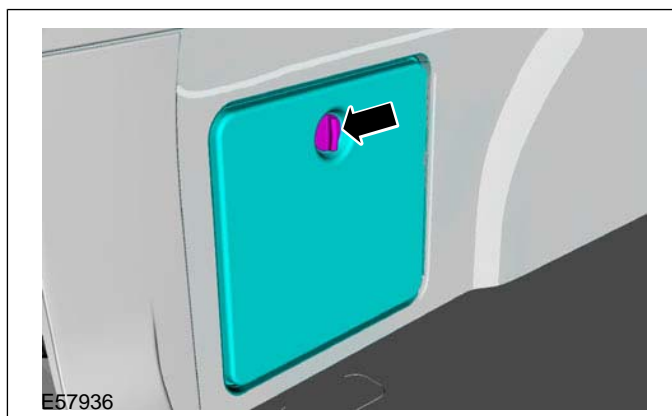
All vehicles

1. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

Wagon

2. Open the loadspace storage compartment lid.

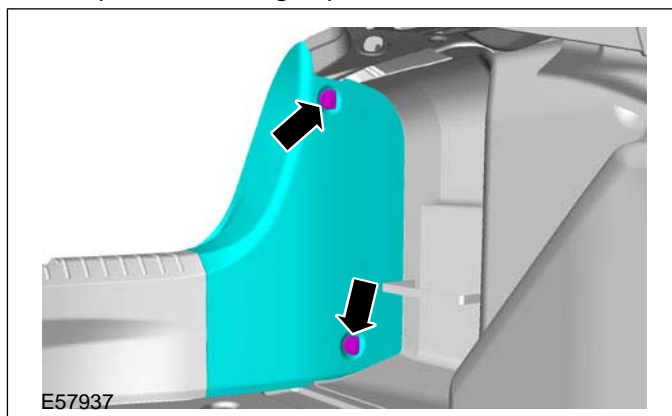


4-door

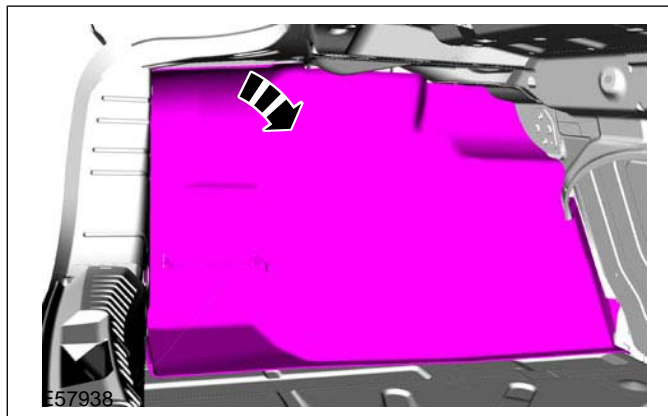
3. Remove the loadspace floor covering.

4. Remove the rear lamp assembly access trim panel.

- Remove the rear lamp assembly access trim panel retaining clips.



5. Detach the loadspace trim panel to gain access to the keyless vehicle module.



3-door and 5-door

6. Remove the loadspace floor covering.

7. Tilt the rear seat cushion forward.

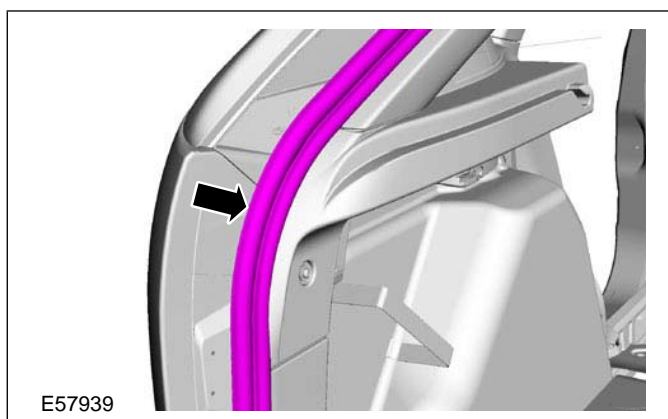
8. Tilt the rear seat backrest forward.

9. Remove the C-pillar trim.

For additional information, refer to: **C-Pillar Trim Panel - 4-Door/5-Door** (501-05 Interior Trim and Ornamentation, Removal and Installation)

/ **C-Pillar Trim Panel - 4-Door/5-Door** (501-05 Interior Trim and Ornamentation, Removal and Installation).

10. Detach the liftgate opening weather strip.

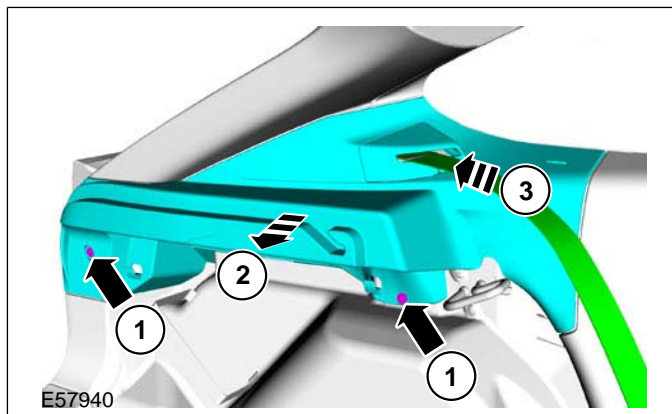


11. Detach the parcel shelf support trim panel. (3 door vehicle shown, 5 door vehicle similar).

- Remove the parcel shelf support trim panel retaining screws.

REMOVAL AND INSTALLATION

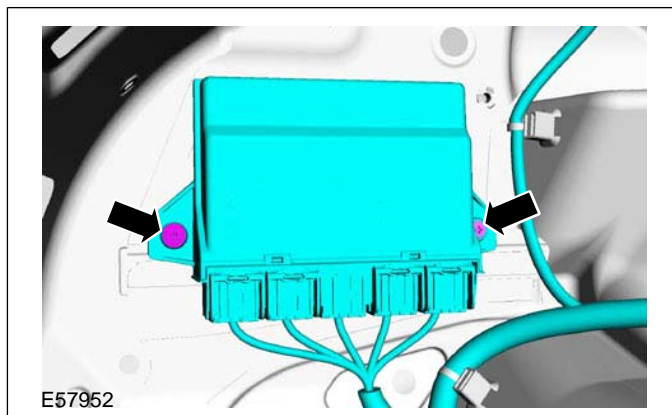
2. Pull the parcel shelf support trim panel away from the body panel to disengage the locking clips between the D-pillar trim panel and the parcel shelf support trim panel.
3. Feed the rear seat safety belt through the parcel shelf support trim panel and position the parcel shelf trim panel to one side.



All vehicles

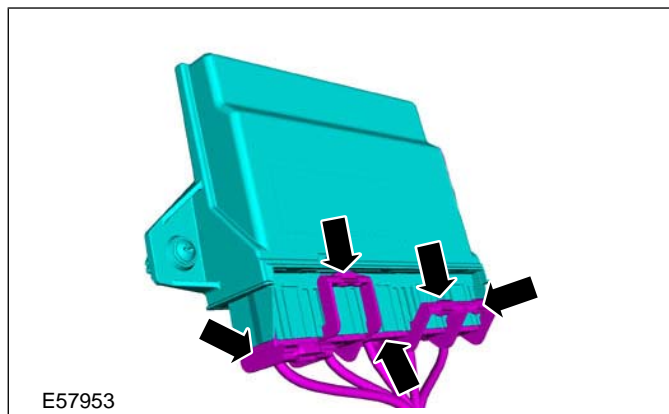
12. Detach the keyless vehicle module. (3 door vehicle shown, 5 door, 4 door and wagon vehicles similar).

- Remove the keyless vehicle module retaining screws.



13. Remove the keyless vehicle module.

- Disconnect the keyless vehicle module electrical connectors.



Installation

All vehicles

1. To install, reverse the removal procedure.
2. If a new keyless vehicle module is installed, program the new keyless vehicle module using the WDS Program Module routine.
3. If a new keyless vehicle module is installed, initialize the new keyless vehicle module to the central junction box (CJB) and the steering column lock control unit, using the WDS Initialize System routine.
4. If a new keyless vehicle module is installed, teach the minimum required number of keys to the keyless vehicle module, using the WDS Teach Key function.

Vehicles with global closing

5. Initialize the door window motors.

For additional information, refer to: **Door Window Motor Initialization** (501-11 Glass, Frames and Mechanisms, General Procedures).

DISASSEMBLY AND ASSEMBLY

Hood Lock Cylinder

General Equipment

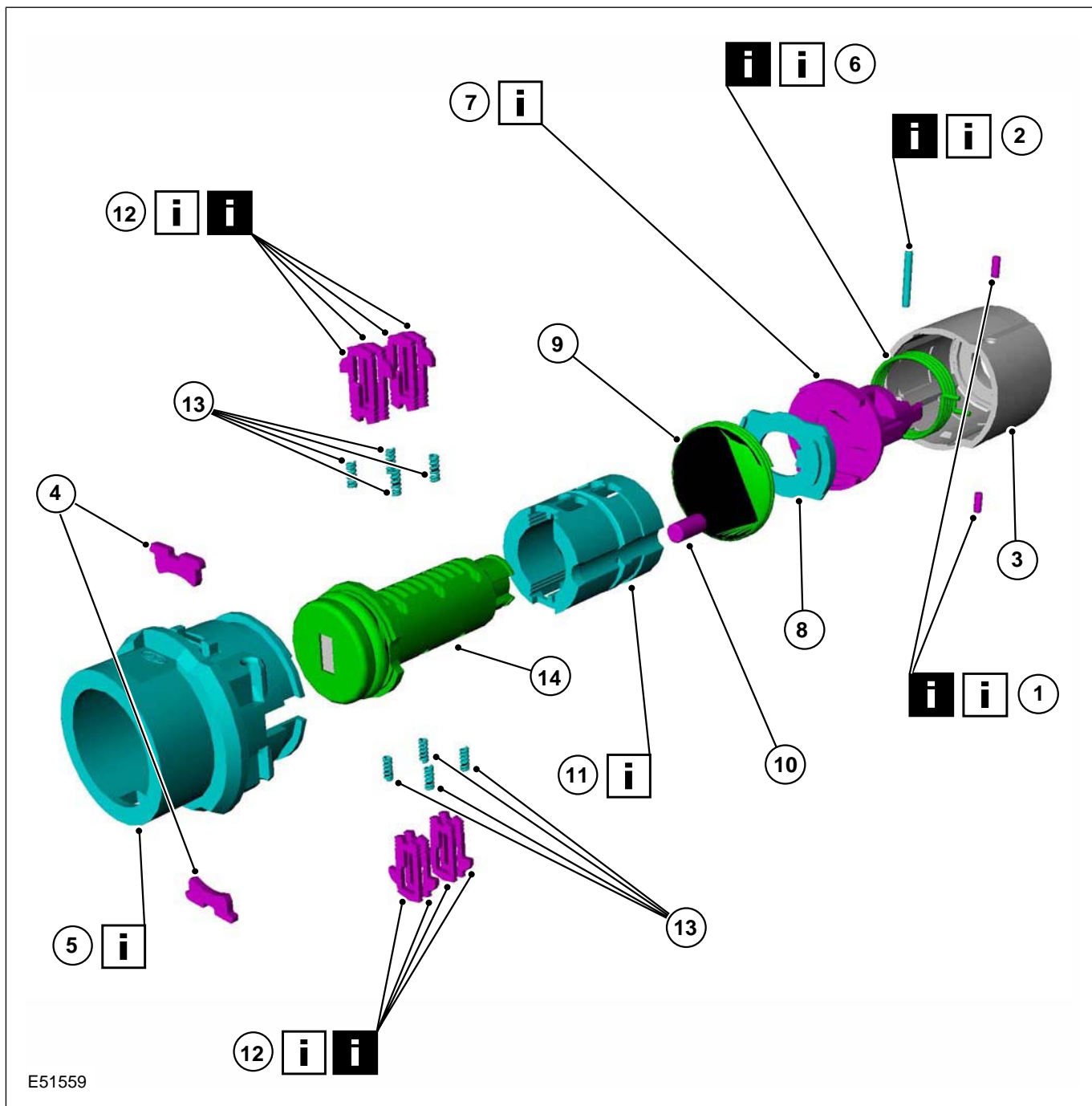
Punch

NOTE: To obtain the key code, please use either the driver door lock cylinder, ignition lock cylinder or tailgate lock cylinder. The hood lock cannot be used, because two of the ten tumblers have been removed from the hood lock cylinder.

1. Remove the hood lock cylinder.

For additional information, refer to: **Hood Lock Cylinder (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).**

2. Disassemble the components in the order indicated in the following illustration(s) and table(s).



E51559

DISASSEMBLY AND ASSEMBLY

Item	Description
1	Hood lock cylinder locking pins <i>See Disassembly Detail</i> <i>See Assembly Detail</i>
2	Hood lock cylinder locking pin <i>See Disassembly Detail</i> <i>See Assembly Detail</i>
3	Hood lock cylinder housing
4	Hood lock cylinder barrel cover locking clips <i>See Disassembly Detail</i>
5	Hood lock cylinder barrel cover <i>See Assembly Detail</i>
6	Hood lock cylinder return spring <i>See Disassembly Detail</i> <i>See Assembly Detail</i>

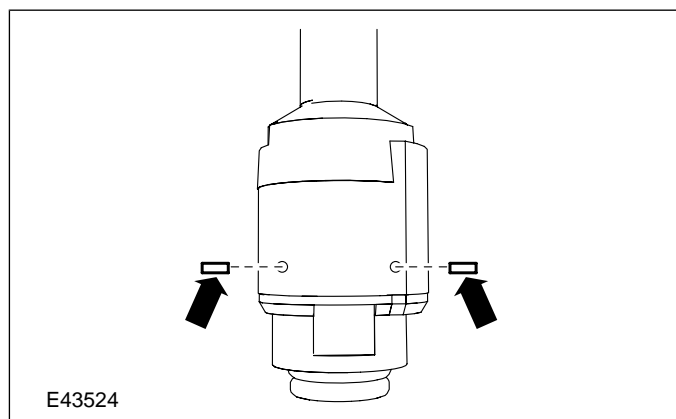
Item	Description
7	Hood lock cylinder connecting clip <i>See Assembly Detail</i>
8	Hood lock cylinder washer
9	Hood lock cylinder spring
10	Hood lock cylinder roll pin
11	Hood lock cylinder barrel cover <i>See Disassembly Detail</i> <i>See Assembly Detail</i>
12	Hood lock cylinder barrel tumblers <i>See Disassembly Detail</i> <i>See Assembly Detail</i>
13	Hood lock cylinder barrel tumbler springs
14	Hood lock cylinder barrel

3. To assemble, reverse the disassembly procedure.

Disassembly Details

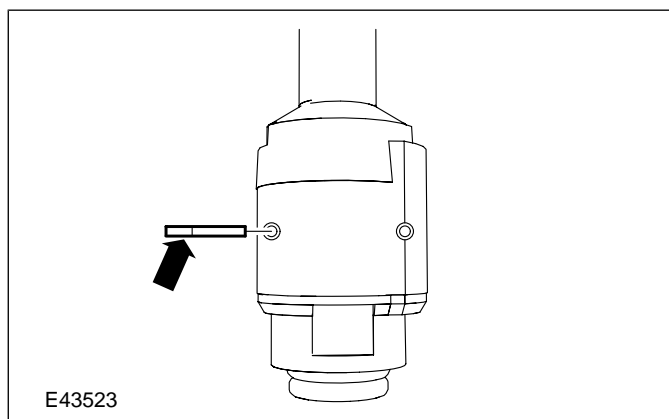
Item 1 Hood lock cylinder locking pins

1. Using a suitable Punch, remove the hood lock cylinder locking pins.



Item 2 Hood lock cylinder locking pin

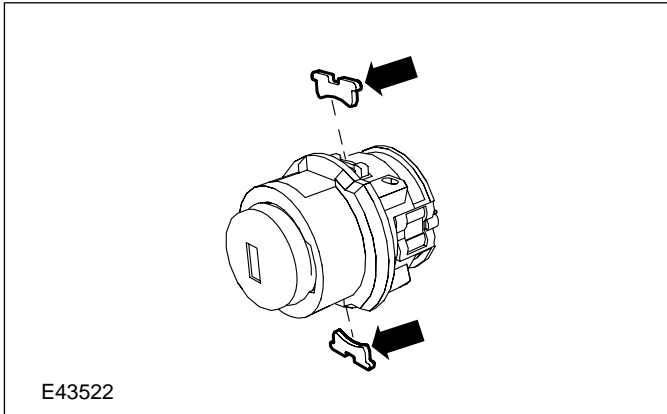
1. Using a suitable Punch, remove the hood lock cylinder locking pin.



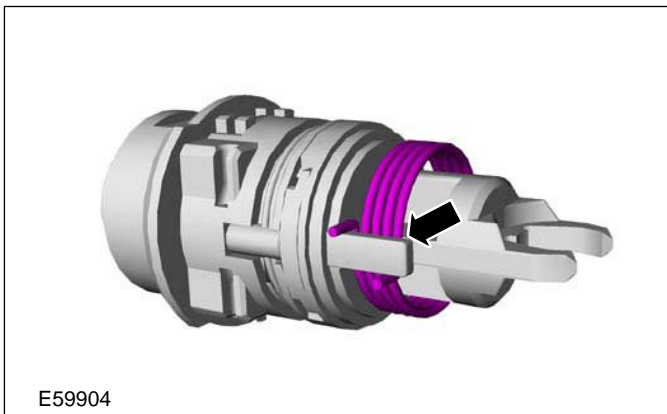
DISASSEMBLY AND ASSEMBLY

Item 4 Hood lock cylinder barrel cover locking clips

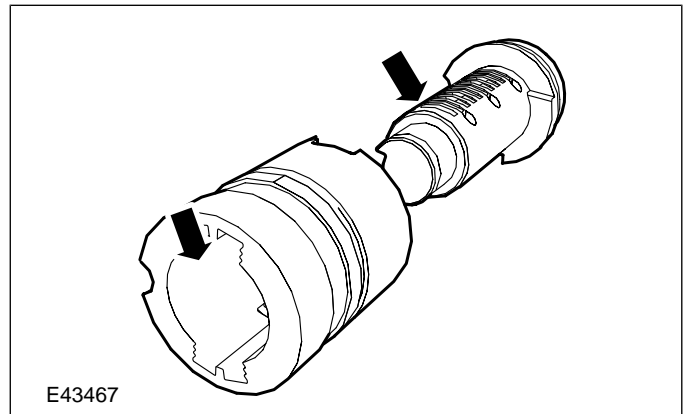
1. Using a suitable tool, remove the hood lock cylinder barrel cover locking clips.

**Item 6 Hood lock cylinder return spring**

1. **NOTE:** Make a note of the position of the hood lock cylinder return spring.
Remove the hood lock cylinder return spring.

**Item 11 Hood lock cylinder barrel cover**

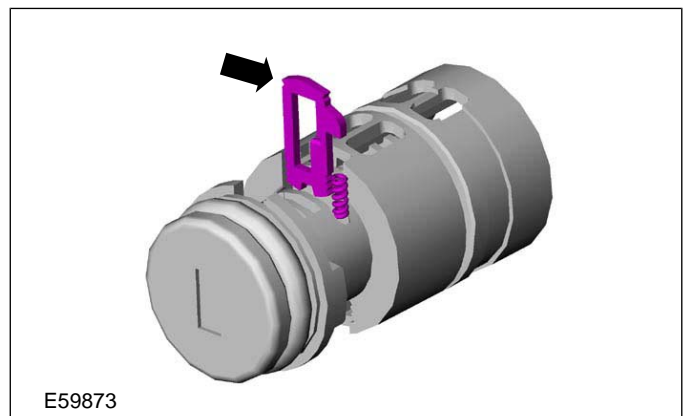
1. Remove the hood lock cylinder barrel guide.

**Item 12 Hood lock cylinder barrel tumblers**

1. **NOTE:** Make sure to read the key code from the key entry to the end of the lock barrel in sequence.

NOTE: Make a note of the position and orientation of the hood lock cylinder barrel tumblers.

Remove the hood lock cylinder barrel tumblers in the correct order.



Assembly Details

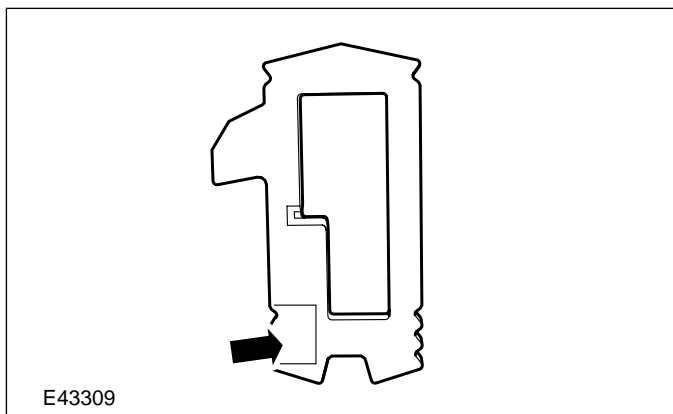
Item 12 Hood lock cylinder barrel tumblers

1. **NOTE:** Make sure to read the key code from the key entry to the end of the lock barrel in sequence.

NOTE: One group of tumblers is signed with a one digit number (1 to 5), the other group of tumblers is signed with a two digit number (11 to 15).

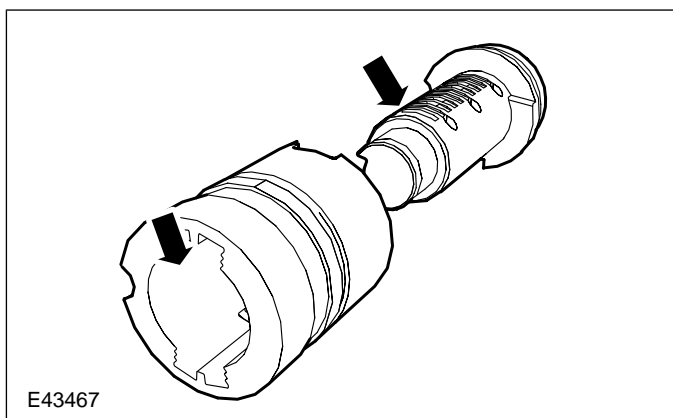
DISASSEMBLY AND ASSEMBLY

Assemble the hood lock cylinder barrel tumblers in the correct order.



Item 11 Hood lock cylinder barrel cover

NOTE: Make sure that the hood lock cylinder cover guide indents align with the hood lock cylinder barrel.

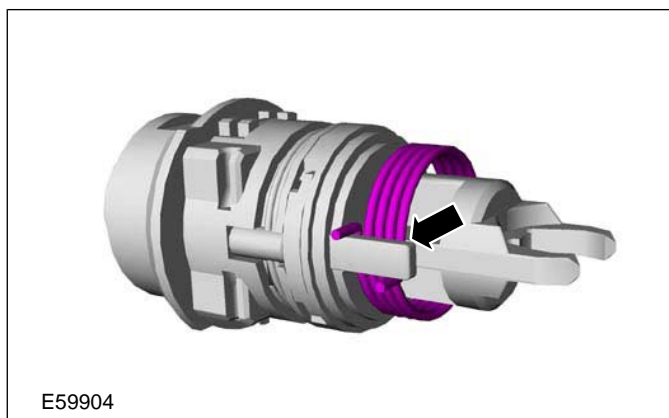


Item 7 Hood lock cylinder connecting clip

NOTE: An audible click can be heard when the hood lock cylinder return spring cap is installed correctly.

Item 6 Hood lock cylinder return spring

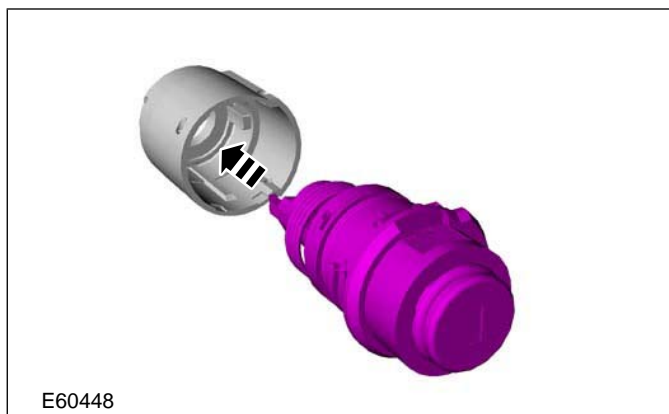
1. Install the hood lock cylinder return spring in the same position as removed.



Item 5 Hood lock cylinder barrel cover

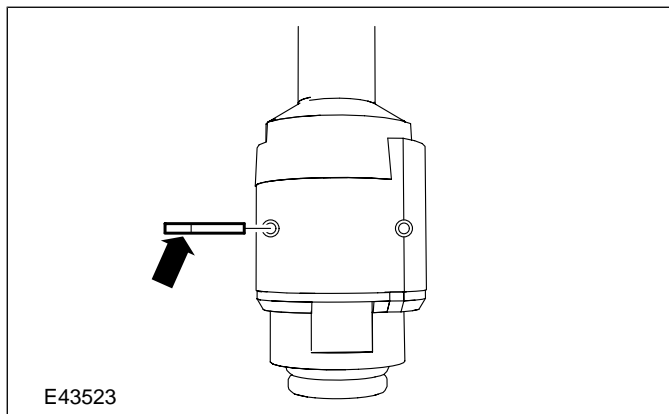
1. **NOTE:** The hood lock cylinder can only be installed to the hood lock cylinder housing in one position.

Install the hood lock cylinder barrel cover into the hood lock cylinder housing.



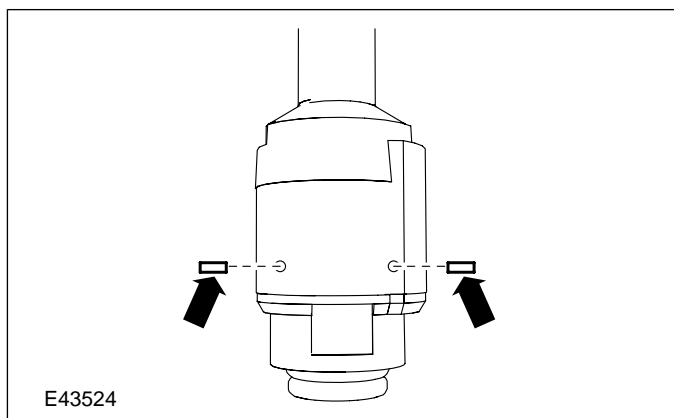
Item 2 Hood lock cylinder locking pin

1. Using a suitable Punch, install the hood lock cylinder locking pin.



DISASSEMBLY AND ASSEMBLY**Item 1 Hood lock cylinder locking pins**

1. Using a suitable Punch, install the hood lock cylinder locking pins.



DISASSEMBLY AND ASSEMBLY

Ignition Lock Cylinder

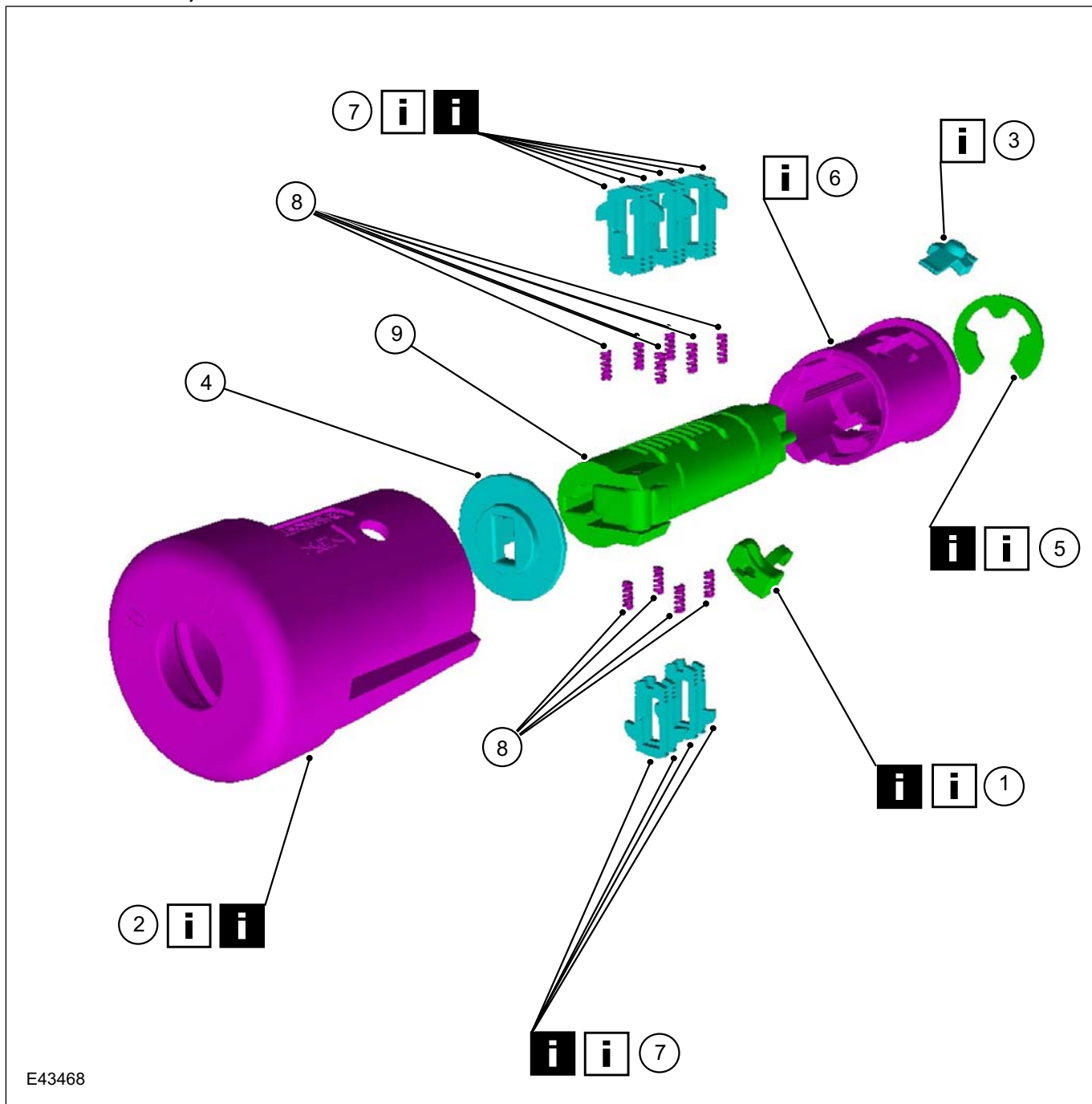
General Equipment

Flat-bladed screwdriver

2. Disassemble the components in the order indicated in the following illustration(s) and table(s).

1. Remove the ignition lock cylinder.

For additional information, refer to: Ignition Lock Cylinder (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).



E43468

DISASSEMBLY AND ASSEMBLY

Item	Description
1	Ignition lock cylinder locking button <i>See Disassembly Detail</i> <i>See Assembly Detail</i>
2	Ignition lock cylinder housing <i>See Disassembly Detail</i> <i>See Assembly Detail</i>
3	Ignition lock cylinder retaining clip <i>See Assembly Detail</i>
4	Ignition lock cylinder barrel cover
5	Ignition lock cylinder retaining clip <i>See Disassembly Detail</i> <i>See Assembly Detail</i>
6	Ignition lock cylinder barrel guide <i>See Assembly Detail</i>

Item	Description
7	Ignition lock cylinder barrel tumblers <i>See Disassembly Detail</i> <i>See Assembly Detail</i>
8	Ignition lock cylinder barrel tumbler springs
9	Ignition lock cylinder barrel

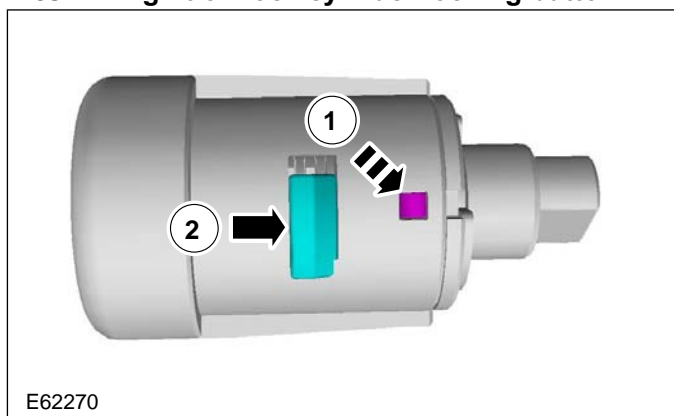
3. To assemble, reverse the disassembly procedure.

4. Install the ignition lock cylinder.

For additional information, refer to: Ignition Lock Cylinder (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).

Disassembly Details

Item 1 Ignition lock cylinder locking button



1. Remove the ignition lock cylinder locking button.

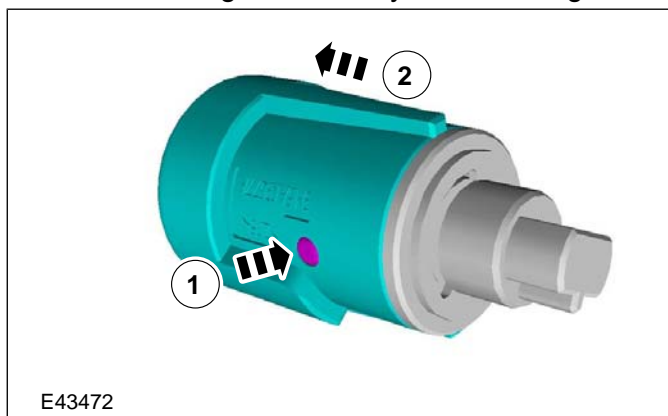
- Using a suitable tool, release the ignition lock cylinder locking button leaf spring and remove the ignition lock cylinder locking button leaf spring.
- Detach the ignition lock cylinder locking button from the ignition lock cylinder housing and remove the ignition lock cylinder locking button.

Item 2 Ignition lock cylinder housing

1. Remove the ignition lock cylinder housing.

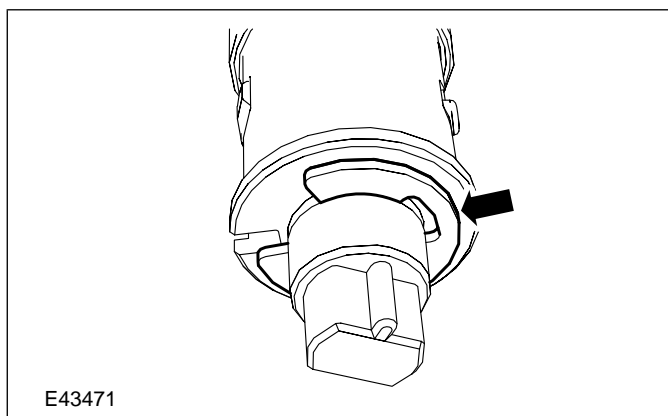
- Operate the ignition lock cylinder retaining clip.

2. Slide the ignition lock cylinder housing away from the ignition lock cylinder barrel guide.



Item 5 Ignition lock cylinder retaining clip

1. Using a suitable Flat-bladed screwdriver remove the ignition lock cylinder retaining clip.



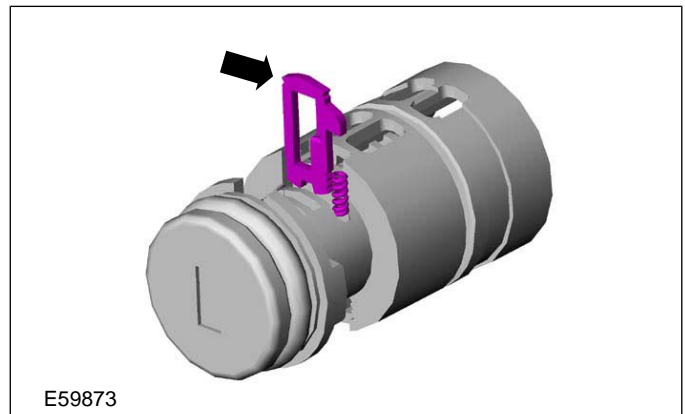
DISASSEMBLY AND ASSEMBLY

Item 7 Ignition lock cylinder barrel tumblers

- NOTE:** Make sure to read the key code from the key entry to the end of the lock barrel in sequence.

NOTE: Make a note of the position and orientation of the ignition lock cylinder barrel tumblers.

Remove the ignition lock cylinder barrel tumblers and springs in the correct order.



Assembly Details

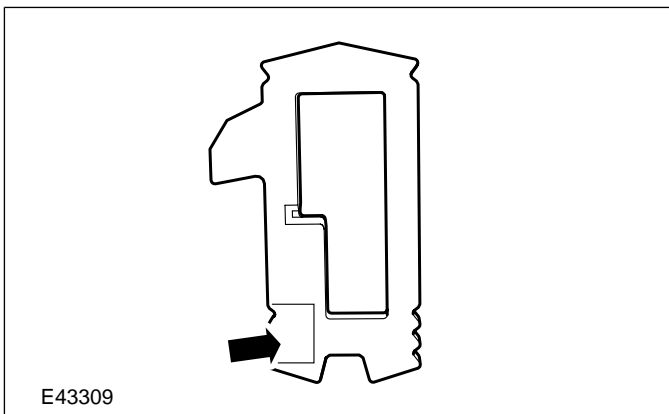
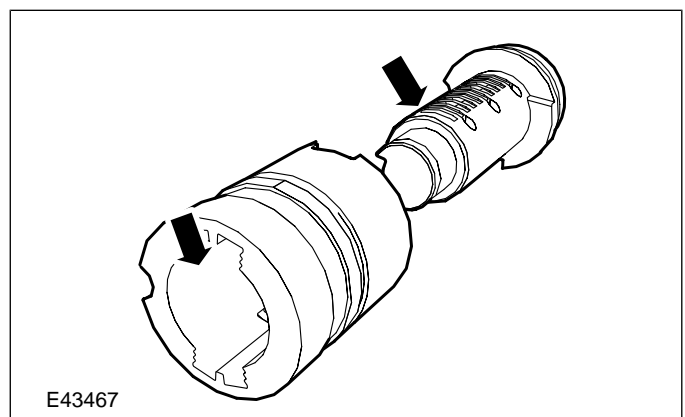
Item 7 Ignition lock cylinder barrel tumblers

- NOTE:** Make sure to read the key code from the key entry to the end of the lock barrel in sequence.

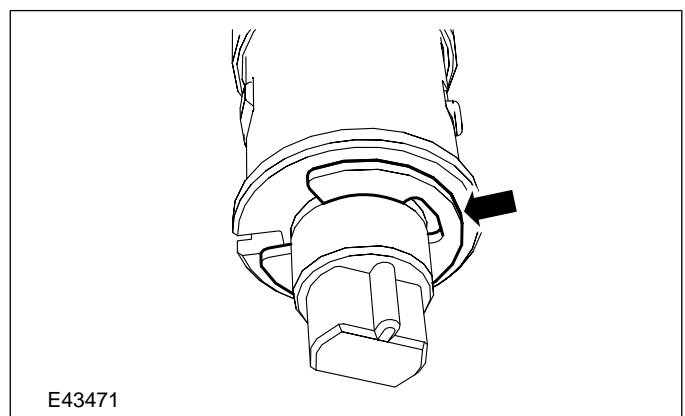
NOTE: One group of tumblers is signed with a one digit number (1 to 5), the other group of tumblers is signed with a two digit number (11 to 15).

Assemble the ignition lock cylinder barrel tumblers and springs in the correct order.

Install the key and the assembled lock cylinder barrel into the ignition lock cylinder barrel guide and remove the key.

**Item 5 Ignition lock cylinder retaining clip**

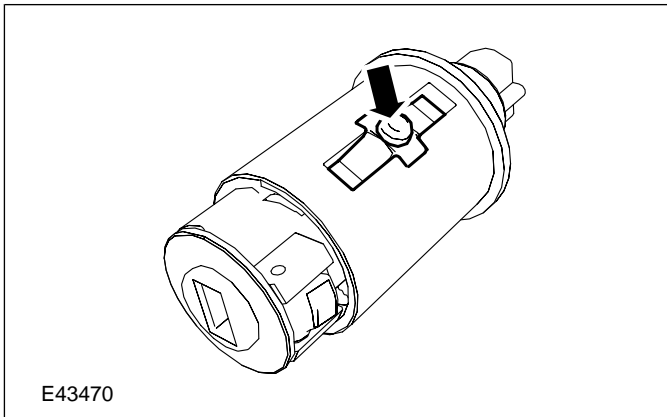
- Install the ignition lock cylinder retaining clip.

**Item 6 Ignition lock cylinder barrel guide**

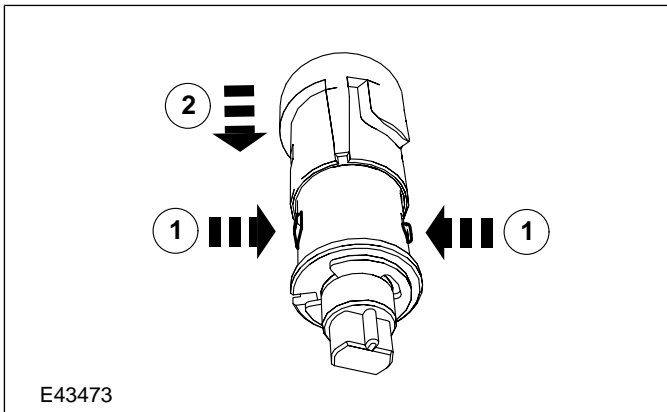
- NOTE:** Make sure that the ignition lock cylinder barrel guide indents align with the ignition lock cylinder barrel guide.

DISASSEMBLY AND ASSEMBLY**Item 3 Ignition lock cylinder retaining clip**

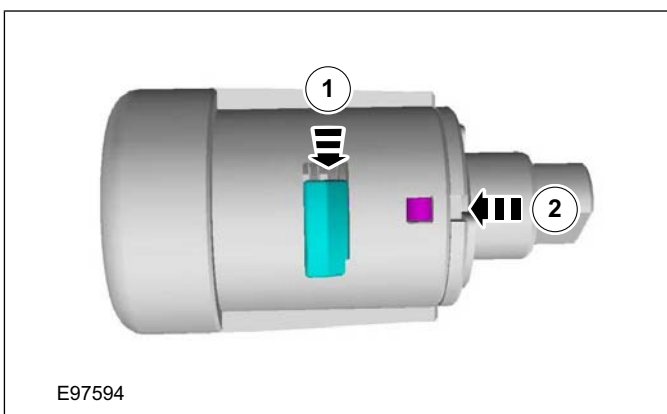
1. Install the ignition lock cylinder retaining clip in the position shown.

**Item 2 Ignition lock cylinder housing**

1. Install the ignition lock cylinder housing.
 1. Operate the ignition lock cylinder retaining spring and locking button.
 2. Slide the ignition lock cylinder housing onto from the ignition lock cylinder barrel guide.

**Item 1 Ignition lock cylinder locking button**

1. Assemble the ignition lock cylinder locking button and leaf spring and install in the position shown.



DISASSEMBLY AND ASSEMBLY

Door Lock Cylinder

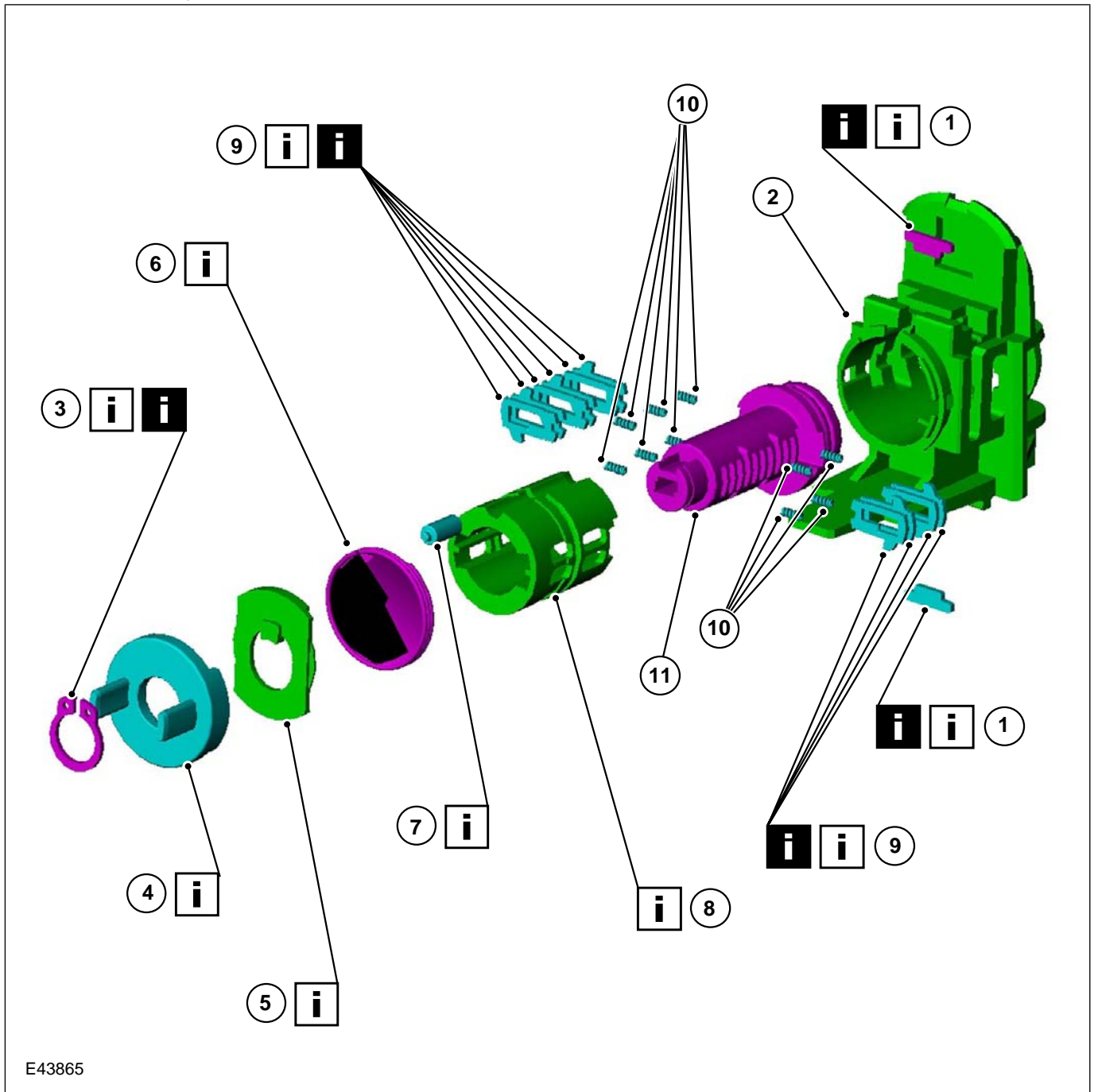
General Equipment

Punch

2. Disassemble the components in the order indicated in the following illustration(s) and table(s).

1. Remove the door lock cylinder.

For additional information, refer to: Door Lock Cylinder (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).



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DISASSEMBLY AND ASSEMBLY

Item	Description
1	Door lock cylinder barrel locking pins <i>See Disassembly Detail</i> <i>See Assembly Detail</i>
2	Door lock cylinder barrel housing
3	Door lock cylinder retaining clip <i>See Disassembly Detail</i> <i>See Assembly Detail</i>
4	Door lock cylinder latch actuator <i>See Assembly Detail</i>
5	Door lock cylinder latch actuator driver <i>See Assembly Detail</i>
6	Door lock cylinder guide pin retaining spring <i>See Assembly Detail</i>
7	Door lock cylinder guide pin <i>See Assembly Detail</i>

Item	Description
8	Door lock cylinder barrel guide <i>See Assembly Detail</i>
9	Door lock cylinder barrel tumblers <i>See Disassembly Detail</i> <i>See Assembly Detail</i>
10	Door lock cylinder barrel tumbler springs
11	Door lock cylinder barrel

3. To assemble, reverse the disassembly procedure.

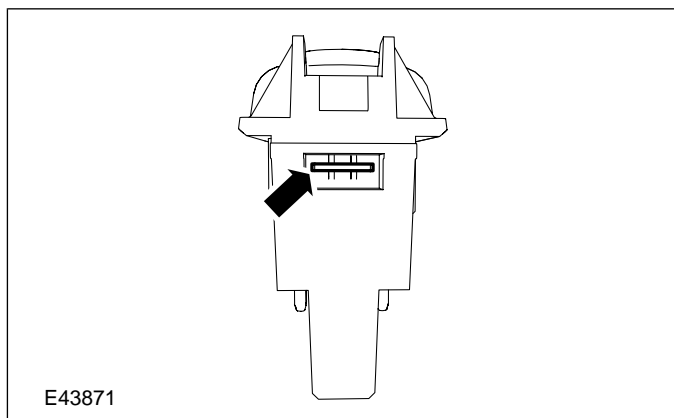
4. Install the door lock cylinder.

For additional information, refer to: **Door Lock Cylinder** (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).

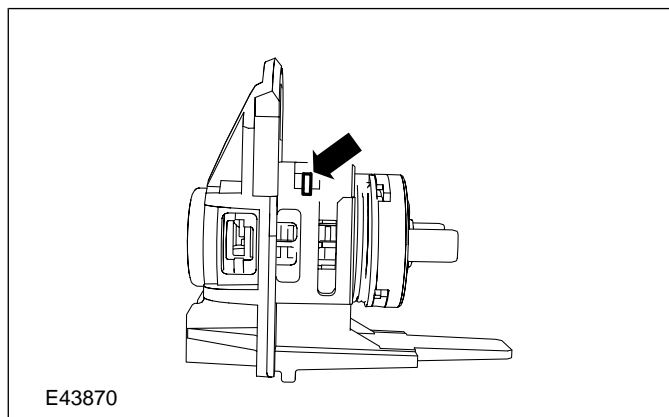
Disassembly Details

Item 1 Door lock cylinder barrel locking pins

1. Remove the door lock cylinder lower retaining pin.



2. Using a suitable Punch, remove door lock cylinder upper retaining pin.



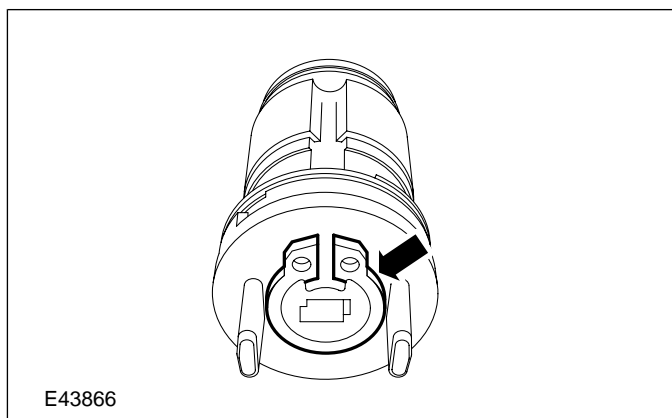
501-14-216

Handles, Locks, Latches and Entry Systems

501-14-216

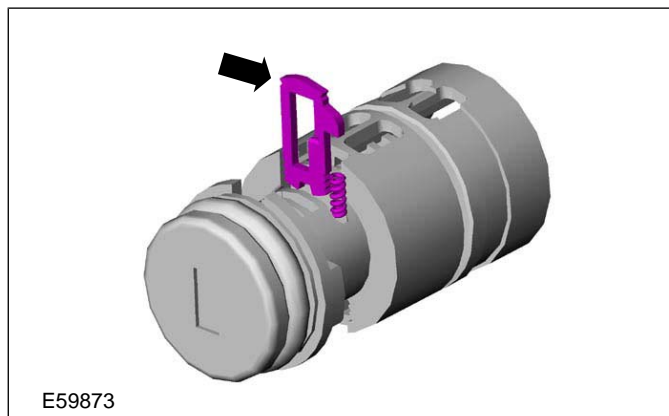
DISASSEMBLY AND ASSEMBLY**Item 3 Door lock cylinder retaining clip**

1. Remove the door lock cylinder retaining clip from the door lock cylinder.



NOTE: Make a note of the position and orientation of the door lock cylinder barrel tumblers.

Remove the door lock cylinder barrel tumblers and springs in the correct order.

**Item 9 Door lock cylinder barrel tumblers**

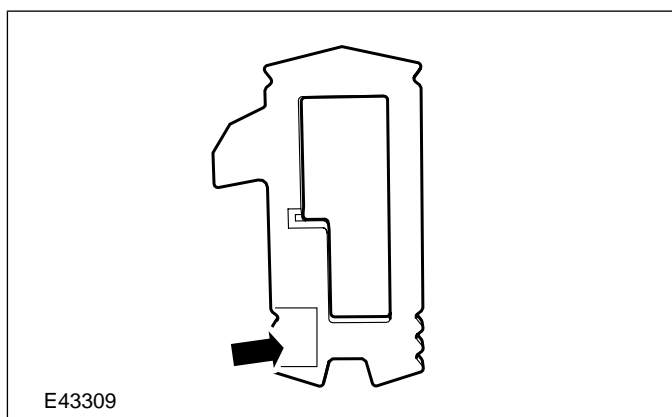
1. **NOTE:** Make sure to read the key code from the key entry to the end of the lock barrel in sequence.

Assembly Details**Item 9 Door lock cylinder barrel tumblers**

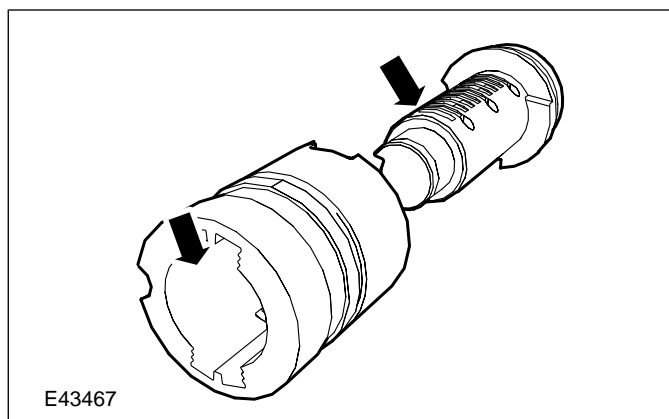
1. **NOTE:** Make sure to read the key code from the key entry to the end of the lock barrel in sequence.

NOTE: One group of tumblers is signed with a one digit number (1 to 5), the other group of tumblers is signed with a two digit number (11 to 15).

Assemble the door lock cylinder barrel tumblers and springs in the correct order.



Install the key and the assembled lock cylinder barrel into the door lock cylinder barrel guide and remove the key.

**Item 8 Door lock cylinder barrel guide**

1. **NOTE:** Make sure that the door lock cylinder cover guide indents align with the door lock cylinder barrel.

501-14-217

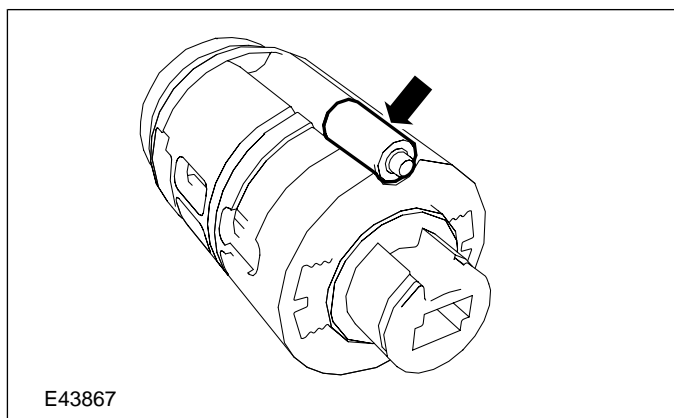
Handles, Locks, Latches and Entry Systems

501-14-217

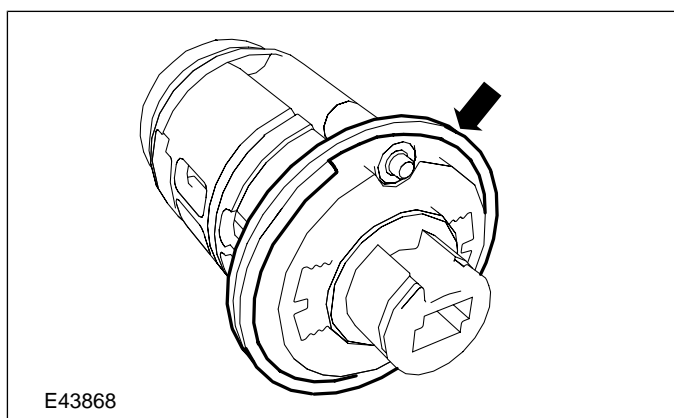
DISASSEMBLY AND ASSEMBLY

Item 7 Door lock cylinder guide pin

1. Place the door lock cylinder guide pin in the door lock cylinder barrel guide recess.

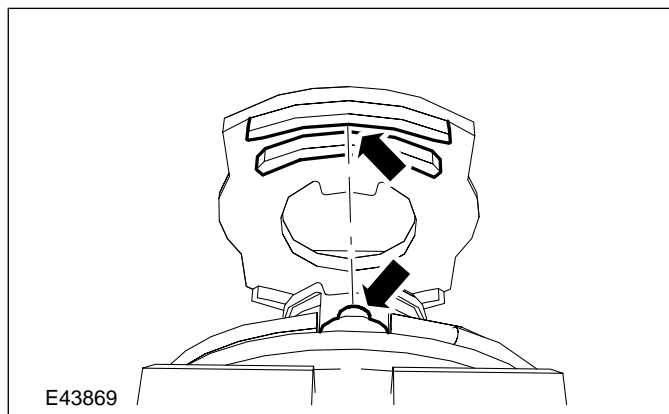
**Item 6** Door lock cylinder guide pin retaining spring

1. Assemble the door lock cylinder guide pin retaining spring on to the door lock cylinder barrel guide.

**Item 5** Door lock cylinder latch actuator driver

1. **NOTE:** Make sure that the door lock cylinder guide pin retaining spring is located in the door lock cylinder latch actuator driver groove.

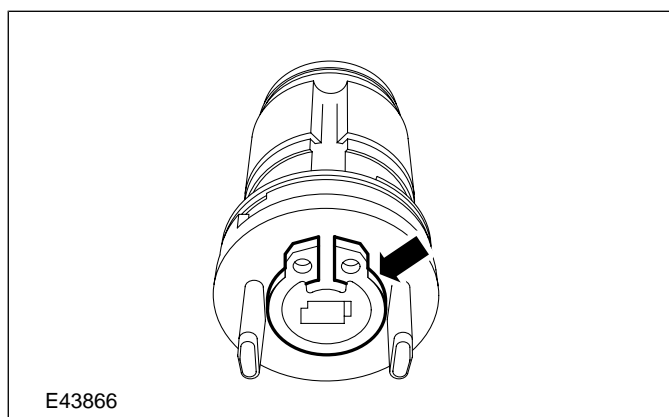
Install the door lock cylinder latch actuator driver.

**Item 4** Door lock cylinder latch actuator

NOTE: An audible click can be heard when the door lock cylinder latch actuator is installed correctly.

Item 3 Door lock cylinder retaining clip

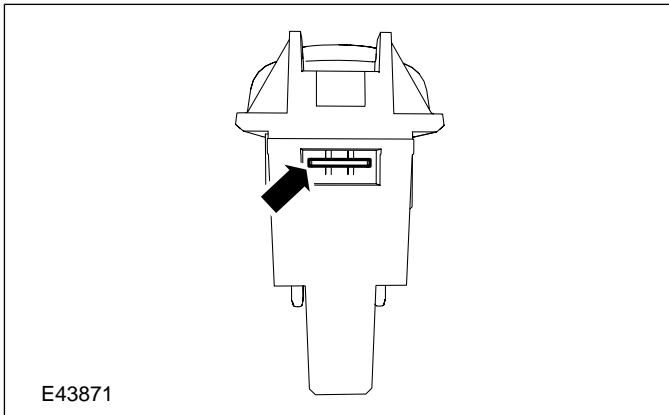
1. Install the door lock cylinder retaining clip.

**Item 1** Door lock cylinder barrel locking pins

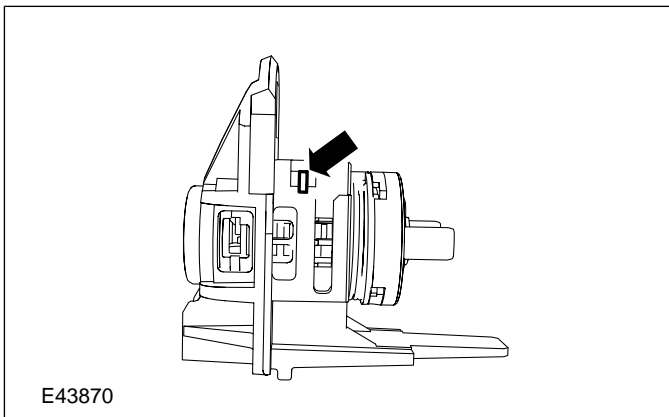
1. **NOTE:** After the door lock cylinder lower retaining pin has been installed the door lock cylinder housing locking pins must be knocked down, locking the door lock cylinder lower retaining pin in place.

DISASSEMBLY AND ASSEMBLY

Install the door lock cylinder barrel retaining pin.



2. Install the door lock cylinder barrel retaining pin.



SECTION 501-16 Wipers and Washers

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS**Settings for wiper arms**

	Degrees
Angle of wiper arms to windscreen, driver's side (LHD/RHD)	5 ±1
Angle of wiper arms to windscreen, passenger side (LHD/RHD)	4 ±1

Setting for rear wiper arm

	Degrees
Angle between the wiper arm and the rear window, wagon variant	5 ±1
Angle between the wiper arm and the rear window, 3-/5-door variant (not adjustable)	3 ±1

Torque Specifications



Description	Nm	lb-ft	lb-in
Rear window wiper motor bracket retaining bolts	7	-	62
Rear window wiper arm retaining nut	15	11	-
Nuts, windshield wiper arms	22	16	-
Bolts for windshield wiper motor with linkage	7	-	62
Front wiper motor retaining screws	9	-	80

DESCRIPTION AND OPERATION

Wipers and Washers

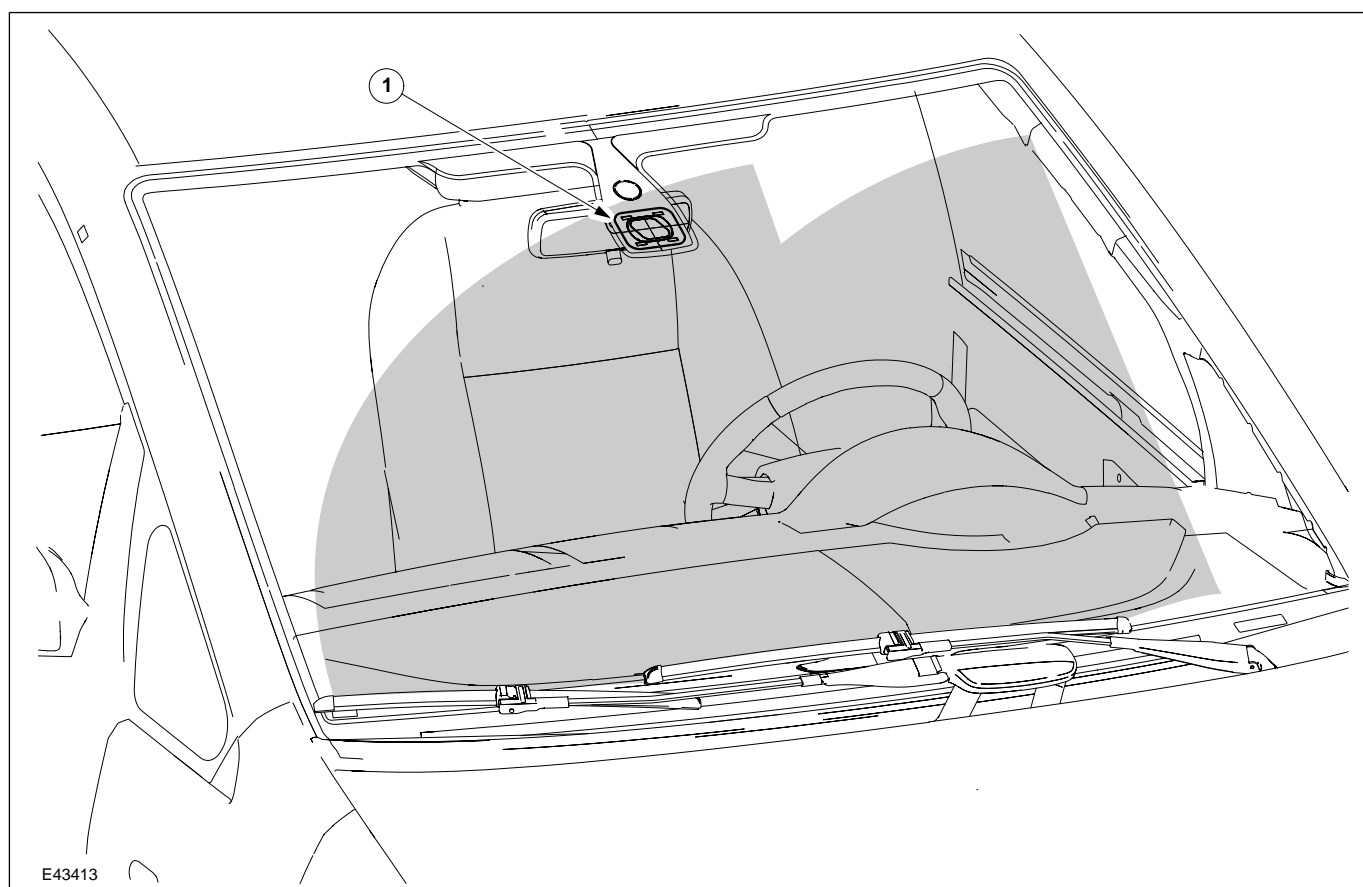
Rain sensor

CAUTIONS:

-  **The automatic windshield wipers must be switched off before the vehicle is driven into a car wash.**
-  **If the windshield is iced up, the wipers may only be activated by the rain sensor after the windshield has been completely defrosted.**

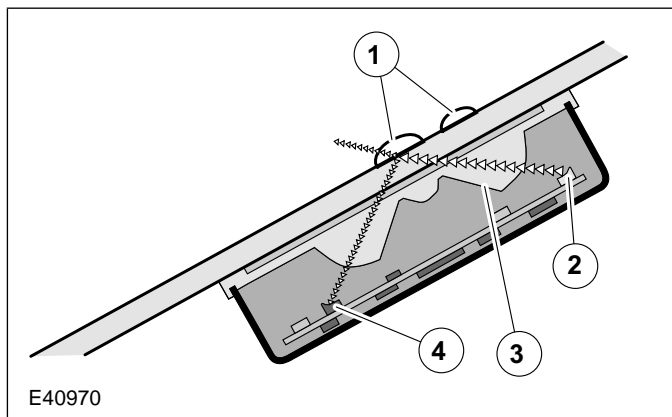
NOTE: The rain sensor is an optical measuring instrument. Contamination such as oil, grease or dust impair its correct function. Before switching on the automatic windshield wipers, the windshield must be clean in the area of the rain sensor.

The rain sensor is built into a housing which is mounted behind the rear view mirror on the windshield.



The rain sensor (1) consists of an opto-electronic measuring and evaluation circuit. The sensor can calculate the amount of precipitation falling on the windshield and request that the windshield wipers are switched on.

On the basis of the information provided by the rain sensor, the windshield wipers are then set to the required wipe speed by the generic electronic module (GEM).

DESCRIPTION AND OPERATION**Mode of operation of the rain sensor**

Item	Description
1	Raindrop
2	LED
3	Lens
4	Photodiode

The rain sensor consists of three optical components:

- an LED
- a photodiode
- the lens

The photodiode emits an infrared light beam of known intensity; the emitted light passes through the lens and is reflected by the windshield.

The reflected light beam enters back through the lens and then reaches the photodiode. The corresponding value taken without moisture on the windshield is used as the reference value for the automatic calibration process.

Subsequent deviations from this value cause the windshield wipers to be switched on.

If rain lands on the windshield then the light reflected by the windshield has a lower intensity. This loss of intensity is registered by the photodiode and, proportionally to the loss of intensity, the module switches on the windshield wipers with the required wipe speed (in intermittent or continuous mode).

When the automatic windshield wipers are switched on (wiper switch set to intermittent mode) the rain sensor is switched on and performs an automatic calibration according to the current conditions at the windshield.

To perform the automatic calibration, the windshield wipers perform a single wipe regardless of whether the windshield is wet or dry.

If the windshield remains dry after this wipe then the windshield wipers stop until moisture is registered on the windshield above the sensor.

On vehicles built from 12/2005, automatic calibration only takes place if the wiper switch was not set to the rain sensing function before the ignition was switched on.

The sensitivity of the rain sensor can be changed by adjusting the control resistor for the intermittent mode of the windshield wipers.

- Adjusting ring position 1: high sensitivity
 - The wipers wipe even if only a small amount of water has been measured on the windshield.
- Adjusting ring position 6: low sensitivity:
 - The wipers only wipe if a large amount of water has been measured on the windshield.

Windshield wash/wipe system**Wiper functions**

The windshield wash/wipe system will only operate if the ignition switch is in the position "I" or "II".

Five wash functions are available: "Off", "Flick-wipe", "Speed 1", "Speed 2" and "Intermittent" or "Automatic wipe" (depending on the vehicle specification).

In "Speed 1" or "Speed 2" mode, the wipers are operating continuously at either normal speed or fast speed.

When the intermittent wipe mode is switched on the windshield wipers operate at normal speed with the following wiper delays:

- Wiper delay 1: 1 second
- Wiper delay 2: 3.5 seconds
- Wiper delay 3: 6 seconds
- Wiper delay 4: 9.5 seconds
- Wiper delay 5: 15.5 seconds
- Wiper delay 6: 22 seconds

NOTE: In the event of a failure, or if the control resistor is not connected the default time for the wiper delay is 8 seconds.

DESCRIPTION AND OPERATION

When the windshield washer switch is operated washer fluid is sprayed onto the windshield. After a short delay designed to protect the wiper blades the wipers perform 2 or 3 wipes at low speed.

If when the windshield washer switch is activated the windshield wipers are switched off, then a single wipe is performed 4 seconds after the wipers have returned to the home position after performing the 2 or 3 wipes.

If when the windshield washer switch is activated the wipers are in intermittent mode, and if the selected wiper delay time is longer than 6 seconds, then a single wipe is performed 6 seconds after the wipers have returned to the home position after performing the 2 or 3 wipes. If the selected delay time is less than 6 seconds then no post wipe is required.

The post wipe function on the windshield ensures that any water remaining on the windshield after washing is wiped away. It is only required if the wipers are switched off or they are set to intermittent mode.

Automatic wiper function

In vehicles built from 12/2005 without rain sensor, a speed-dependent wiper function is implemented in the GEM on the mid and high-end equipment versions.

When the windshield wipers are switched on, the GEM reduces the wiper speed by one setting if the vehicle is driven at walking speed or comes to a standstill.

When the vehicle speed is increased, the wiper speed automatically returns to the previous setting.

If the wiper lever is actuated during automatic function, the automatic wiper function is switched off and the wiper speed corresponds to the newly-selected setting.

Rear window wash/wipe system

The rear window wash/wipe system will only operate if the ignition switch is in the position "II".

The GEM changes the wiper delay time of the rear window wiper according to the switch setting of the windshield wipers.

If the wiper switch is in the "OFF" position, or in "intermittent" mode or the "automatic wipe" setting (no wiping or low speed wiping), then the wiper delay time for the rear window is 10 seconds.

If the wiper switch is in the "normal speed" position, "fast speed" position or the "automatic wipe" setting (high speed wiping), then the wiper delay time for the rear window is 6 seconds.


If the switch for the rear window washer is pressed, then washer fluid is sprayed onto the rear window, and the wiper operates continuously at low speed. When the switch is released the rear window wiper performs another 2-3 wipes.

If the switch for the rear window washer fails while switched ON, or if it is continuously operated for more than 60 seconds, then the switch signal is ignored by the GEM, the wiper returns to the park position and a trouble code is stored for the switch.

If reverse gear is engaged and the windshield wiper switch is in the normal, high speed or automatic windshield wiper (wiping at high speed) position, the rear window wiper operates continuously until the gearshift lever is moved back to the neutral position.

If reverse gear is engaged and the windshield wiper switch is in the "intermittent mode" or "automatic windshield wiper" (no wiping or low speed) position, then the rear window wiper follows the movement of the windshield wipers. When the wipers leave the park position the rear window wiper also performs a wipe.

Headlamp washer system

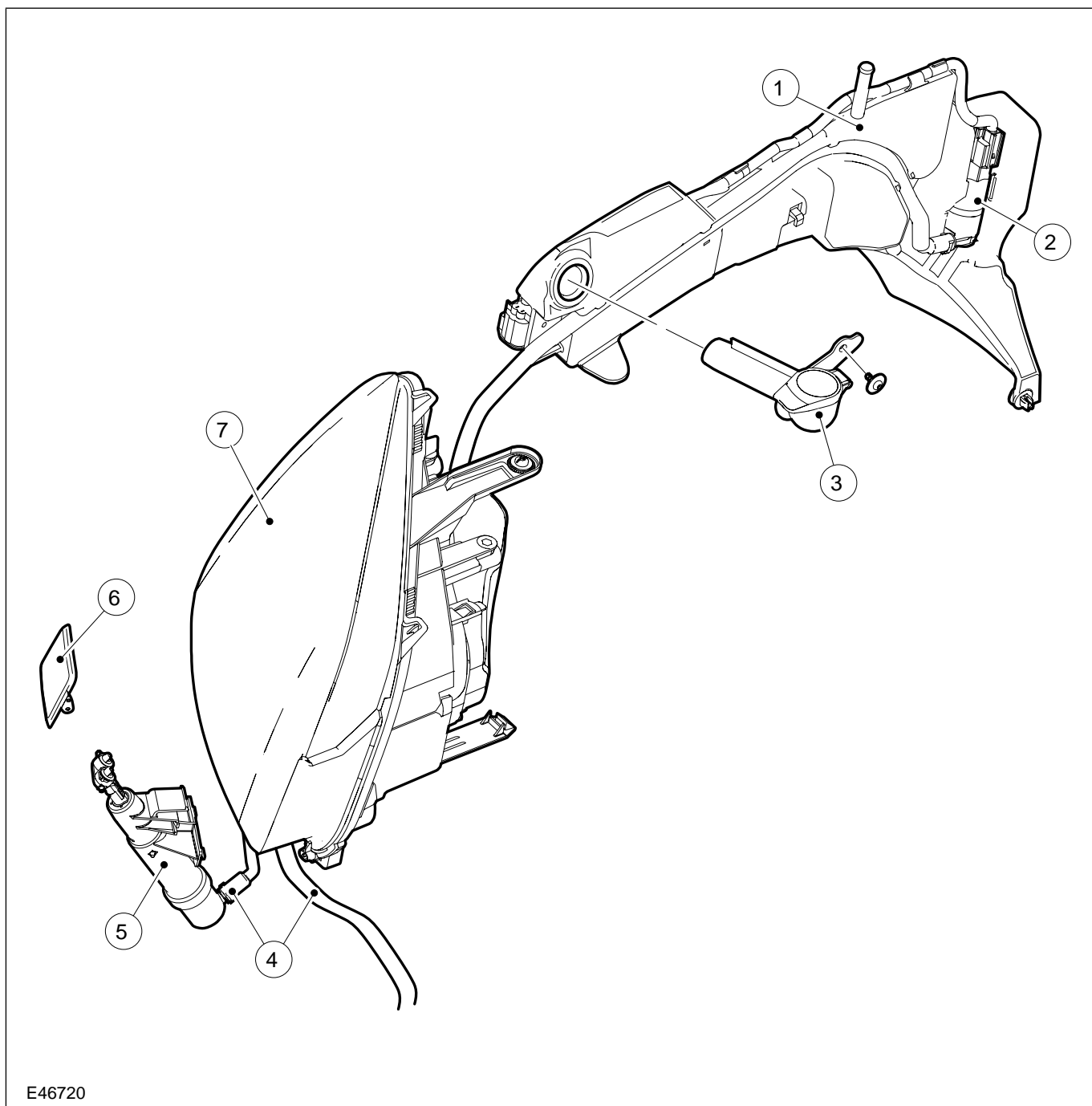
 **CAUTION: Do not operate the headlamp washer system for more than 10 seconds, and never with an empty fluid reservoir.**

The headlamp washer system operates when the windshield washers are actuated if, at the same time, the light switch is set to "low beam" or if the "autolamp" function has switched on the headlamps. The system is controlled electrically by the headlamp washer relay, which is actuated by the GEM.

In order to prevent excessive washer water consumption in vehicles built from 12/2005, the headlamp washer system is only activated on every fourth actuation of the windshield washer switch, provide that 10 minutes have not elapsed since the first actuation of the headlamp washer system. If the windshield washer switch is actuated again after 10 minutes, the headlamp washer system is activated and the timer is restarted.

DESCRIPTION AND OPERATION

Overview



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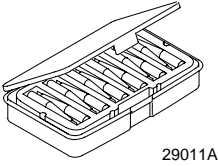
Item	Description
1	Windshield washer reservoir
2	Pump - headlamp washer system
3	Windshield washer reservoir filler neck
4	Hoses - headlamp washer system
5	Headlamp washer system nozzle

Item	Description
6	Cover, headlamp washer system nozzle
7	Headlamp

DIAGNOSIS AND TESTING**Wipers and Washers**

Refer to Wiring Diagrams Section 501-16, for schematic and connector information.

Special Tool(s)

 <p>29011A</p>	<p>Terminal Probe Kit 29-011A</p>
---	---------------------------------------

General Equipment

Digital multimeter
The Ford approved diagnostic tool

Description of operation

A diagnosis of the generic electronic module (GEM) can be performed with the Ford approved diagnostic tool. Furthermore, an integrated service mode enables testing of the input and output signals without the need for further tools. To enable activation of service mode:

- switch off the ignition,
- switch off all other electrical consumers,
- apply the handbrake,
- shift to neutral
- and close the doors.

Activating the service mode

Proceed as follows to activate the service mode:

- OPERATE the switch of the heated rear window and HOLD IT THERE
- Turn on the ignition.
- RELEASE the switch of the heated rear window

A signal sounds and the turn signal lamps come on to indicate that service mode has been successfully activated.

NOTE: If the alarm is activated (in vehicles fitted with an anti-theft alarm system), service mode cannot be activated.

Inputs

SWITCH the windshield wiper switch to the "OFF" position to test the input signals. The following is a list of the switch signals to be tested, in no particular order:

- Turn signals (right, left, hazard warning lights)
- Windshield wiper stage I
- Windshield wiper stage II
- Windshield washer system
- Rear window wiper
- Rear window washer system
- Doors open/closed
- Remote control for central locking with double locking
- Hood open/closed (in vehicles equipped with an anti-theft alarm system)
- Tailgate open/closed
- A/C request signal
- Heated windscreen (if fitted)
- Parking Brake
- Brake reservoir fluid level
- Speed control system
- Autolamps
- Low beam
- High beam
- Headlamp flasher
- Marker Lamps
- Reversing lamp
- Liftgate release
- Ignition switch, terminal 15 (turn key to 0 position, then turn key to II position.)

An acoustic signal sounds and the turn signal lamps flash to indicate receipt of each input signal by the generic electronic module.

Test the windshield wiper "intermittent mode" stage input signal (only vehicles with adjustable intermittent mode)

The windshield wiper switch must be switched to "intermittent mode" in order to test the input signal. The delay times of the input signals can then be tested by operating the rotary switch. Each change of the rotary switch position is indicated by an acoustic signal and illumination of the turn signals.

Output signals

SWITCH the wiper switch to the "intermittent" position to test the output signals. PRESSING the heated rear window switch activates the output signals in the following order:

- a. Turn Indicator Left Hand
- b. Turn Indicator Right Hand

DIAGNOSIS AND TESTING

- c. High beam
- d. Low beam
- e. Windshield wiper stage I
- f. Windshield wiper stage II
- g. Heated rear window
- h. Heater blower motor
- i. Headlamp washer (vehicles with gas discharge headlamps)
- j. Electric booster heater (if fitted)
- k. Autolamps (if fitted)
- l. Alarm horn (vehicles with alarm system)
- m. Rear window wiper
- n. Rear heated window relay

When the heated rear window switch is pressed again, the test of the relevant signal is terminated. When the heated rear window switch is pressed once more, the test for the next signal in the list is started.

Ending the service mode

The GEM automatically ends service mode 20 seconds after the last input or at a driving speed of over 7 km/h. However, service mode can be manually ended at any time by proceeding as follows:

- OPERATE the switch of the heated rear window and HOLD IT THERE
- SWITCH OFF the ignition
- RELEASE the switch of the heated rear window

3 signals sound and the turn signal lamps illuminate to indicate that service mode has ended.

Reset service mode

If, after completion of service mode, some functions do not operate or do not operate properly, check the following functions:

- Instrument cluster illumination, side lamps and license plate lamp in autolamps mode
- Rear wiper
- Headlamp Washers
- Electric booster heater
- Active anti-theft sounder
- Heated windshield

If one or more of the listed functions is not OK, it's possible that the cause of the fault is due to not exiting service mode properly. To reactivate the functions correctly, perform the following steps:

1. SWITCH OFF the ignition

2. SWITCH OFF the switch for the windscreen wash/wipe system
3. OPERATE the switch of the heated rear window and HOLD IT THERE
4. Turn on the ignition.
5. RELEASE the heated rear window switch (an acoustic signal will sound if activation has been performed correctly)
6. SWITCH the windscreen wash/wipe switch to the "Intermittent wipe" position
7. OPERATE the heated rear window switch 6 times (the main beam headlamps switch on and off automatically)
8. SWITCH OFF the switch for the windscreen wash/wipe system
9. OPERATE the switch of the heated rear window and HOLD IT THERE
10. SWITCH OFF the ignition
11. RELEASE the heated rear window switch (three acoustic signals will sound if activation has been performed correctly)

After completion of the work, check all the functions.

Inspection and Checking

NOTE: The generic electronic module (GEM) forms part of the central junction box (CJB).

NOTE: If the generic electronic module (GEM) is changed, the new one must be reinitialized. For this purpose, the vehicle-specific data is read out of the module to be replaced using the Ford approved diagnostic tool and is transferred to the new module. REFER to:

Module Configuration (418-01 Module Configuration, General Procedures), Generic Electronic Module (GEM) (419-10 Multifunction Electronic Modules, Diagnosis and Testing).

NOTE: Before reading out the vehicle-specific data, remake all the electrical connections to the module to be removed, so that communication between the module and the Ford approved diagnostic tool is ensured.

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical and electrical damage:

NOTE: Ensure correct engagement of the wiring harness connectors.

DIAGNOSIS AND TESTING

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> Wiper blade(s) Wiper arm shaft Washer reservoir Hose(s) Nozzles Check the passenger-side wiper blade for residue-free wiping in the vicinity of the rain sensor. Check the adhesive pad between the rain sensor and the windshield for trapped air. Clean wax residues from the windshield in the vicinity of the rain sensor. Check the windshield for damage/cracks in the vicinity of the rain sensor. Check that the rain sensor retaining frame is correctly attached to the windshield. 	<ul style="list-style-type: none"> Fuse(s) Connector Wiring harness Washer pump motor Headlamp cleaning system pump Headlamp cleaning system relay Front/rear window wiper motor Wash/wipe system switch Central junction box (CJB) Battery junction box (BJB)

- Resolve any obvious causes or concerns found during the visual inspection before carrying out any further tests.
- If the concern persists after the visual inspection, PERFORM a fault diagnosis on the generic electronic module (GEM) using the Ford approved diagnostic tool and RESOLVE the fault(s) displayed according to the fault description. CHECK the operation of the system.
- On a vehicle without stored fault(s), continue according to the Symptom Chart and the corresponding symptom.
- After checking or rectifying the fault(s) and finishing the work, READ OUT the fault memory in the generic electronic module (GEM) and DELETE any saved faults. After performing a road test and CHECKING the system, READ OUT the fault memories again.

Trouble Code Table - Generic Electronic Module (GEM)

Trouble Code Table - Generic Electronic Module (GEM)

DTC	Description	Action
B1447	Circuit of windshield wiper limit switch (park position) faulty (short to ground)	GO to Pinpoint Test G.
B1614	Circuit of rear window wiper switch faulty (short to ground)	GO to Pinpoint Test C.
B2114	Circuit of windshield washer system switch faulty (short to ground)	GO to Pinpoint Test J.
B2115	Circuit of rear window washer system switch faulty (short to ground)	GO to Pinpoint Test J.
B2179	Circuit of front windshield wash/wipe system switch (Intermittent switch position) faulty (short to ground)	GO to Pinpoint Test F.

DIAGNOSIS AND TESTING

DTC	Description	Action
B2180	Circuit of windshield wiper switch (switch position 2) faulty (short to ground)	GO to Pinpoint Test B.
B2181	Circuit of windshield wiper switch (switch position 3) faulty (short to ground)	GO to Pinpoint Test B.
B2258	Circuit of headlamp wash/wipe system relay faulty	GO to Pinpoint Test L.

Symptom Chart

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Wipers inoperative 	<ul style="list-style-type: none"> Fuse Circuit(s) Wash/wipe system switch Front wiper motor Rear wiper motor Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test A.
<ul style="list-style-type: none"> Brief wipe is inoperative (slow wipe OK) 	<ul style="list-style-type: none"> Wash/wipe system switch 	<ul style="list-style-type: none"> RENEW the wash/wipe system switch. CHECK the operation of the system.
<ul style="list-style-type: none"> The rear window wiper is inoperative when the windshield wiper is switched on and reverse gear engaged (normal wipe function OK). 	<ul style="list-style-type: none"> Circuit(s) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> CHECK the GEM using the Ford approved diagnostic tool, RENEW if necessary. CHECK the operation of the system. If the concern persists: REFER to: Reversing Lamps - 3-Door (417-01 Exterior Lighting, Diagnosis and Testing).
<ul style="list-style-type: none"> The windshield wiper runs constantly at a slow wipe speed with the ignition switched off. 	<ul style="list-style-type: none"> Central junction box (CJB) 	<ul style="list-style-type: none"> RENEW the central junction box (CJB). CHECK the operation of the system.
<ul style="list-style-type: none"> The windshield wiper runs continuously 	<ul style="list-style-type: none"> Circuit(s) Wash/wipe system switch Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
<ul style="list-style-type: none"> The rear window wiper runs continuously 	<ul style="list-style-type: none"> Circuit(s) Wash/wipe system switch Central junction box (CJB) Generic Electronic Module (GEM) Rear wiper motor 	<ul style="list-style-type: none"> GO to Pinpoint Test C.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Slow/fast wipe not working. 	<ul style="list-style-type: none"> Circuit(s) Wash/wipe system switch Front wiper motor Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test D.
<ul style="list-style-type: none"> Intermittent wipe mode of windshield wiper inoperative, vehicles with and without rain sensor (fast/slow wipe OK) 	<ul style="list-style-type: none"> Circuit(s) Wash/wipe system switch Central junction box (CJB) Generic Electronic Module (GEM) Rain sensor 	<ul style="list-style-type: none"> GO to Pinpoint Test E.
<ul style="list-style-type: none"> The windshield wiper runs continuously in intermittent mode 	<ul style="list-style-type: none"> Circuit(s) Wash/wipe system switch Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test F.
<ul style="list-style-type: none"> The windshield wiper motor does not return to the park position after being switched off 	<ul style="list-style-type: none"> Circuit(s) Front wiper motor Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test G.
<ul style="list-style-type: none"> The rear window wiper motor does not return to the park position after being switched off 	<ul style="list-style-type: none"> Fuse Circuit(s) Rear wiper motor Central junction box (CJB) Rear wiper relay 	<ul style="list-style-type: none"> GO to Pinpoint Test H.
<ul style="list-style-type: none"> The front and rear wash/wipe functions are inoperative (wipe and intermittent function OK) 	<ul style="list-style-type: none"> Fuse Circuit(s) Wash/wipe system switch Central junction box (CJB) Generic Electronic Module (GEM) 	<ul style="list-style-type: none"> GO to Pinpoint Test I.
<ul style="list-style-type: none"> Wash and wipe function (front or rear) in continuous operation for 60 seconds 	<ul style="list-style-type: none"> Wash/wipe system switch 	<ul style="list-style-type: none"> GO to Pinpoint Test J.
<ul style="list-style-type: none"> The front wash/wipe function is inoperative (rear wash/wipe function OK) 	<ul style="list-style-type: none"> Wash/wipe system switch 	<ul style="list-style-type: none"> RENEW the wash/wipe system switch. CHECK the operation of the system.
<ul style="list-style-type: none"> The rear wash/wipe function is inoperative (front wash/wipe function OK) 	<ul style="list-style-type: none"> Wash/wipe system switch 	<ul style="list-style-type: none"> RENEW the wash/wipe system switch. CHECK the operation of the system.
<ul style="list-style-type: none"> Washer system is inoperative 	<ul style="list-style-type: none"> Circuit(s) Washer pump motor, front/rear Central junction box (CJB) 	<ul style="list-style-type: none"> GO to Pinpoint Test K.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Headlamp washer system is inoperative 	<ul style="list-style-type: none"> Fuse Circuit(s) Central junction box (CJB) Generic Electronic Module (GEM) Battery junction box (BJB) Headlamp cleaning system pump Headlamp cleaning system relay 	<ul style="list-style-type: none"> GO to Pinpoint Test L.
<ul style="list-style-type: none"> Headlamp washer system operates continuously 	<ul style="list-style-type: none"> Fuse Circuit(s) Headlamp cleaning system relay Central junction box (CJB) Generic Electronic Module (GEM) Battery junction box (BJB) 	<ul style="list-style-type: none"> GO to Pinpoint Test M.
<ul style="list-style-type: none"> Windshield washer nozzle heater is inoperative 	<ul style="list-style-type: none"> Circuit(s) Left/right windshield washer nozzle heater. 	<ul style="list-style-type: none"> GO to Pinpoint Test N.

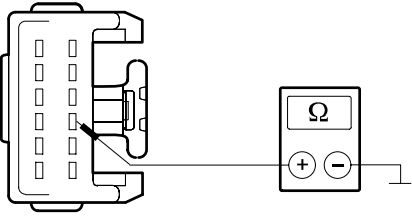
System Check

NOTE: Use a digital multimeter for all electrical measurements.

PINPOINT TEST A : WIPERS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: DETERMINE THE FAULT CONDITION	
	<ol style="list-style-type: none"> Ignition switch in position II. SWITCH ON windshield wiper. SWITCH ON rear window wiper. <ul style="list-style-type: none"> Are both windshield wipers inoperative? <ul style="list-style-type: none"> → Yes GO to A2. → No <ul style="list-style-type: none"> - Windshield wipers inoperative: GO to A4. - Rear window wiper inoperative: GO to A12. - Rear window wiper not returning to the park position: GO to Pinpoint Test H.
A2: CHECK THE GROUND CONNECTION OF THE WASH/WIPE SYSTEM SWITCH FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> Ignition switch in position 0. Disconnect wash/wipe system switch from connector C441.

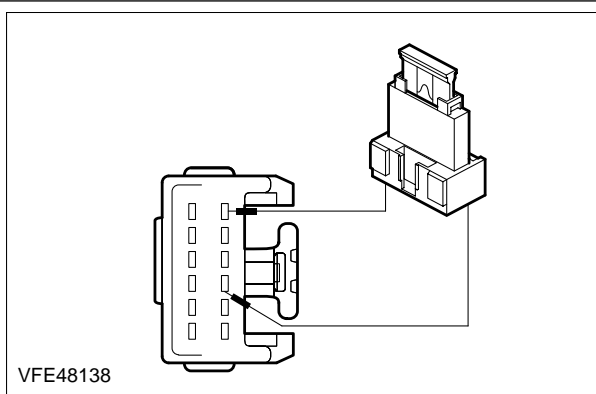
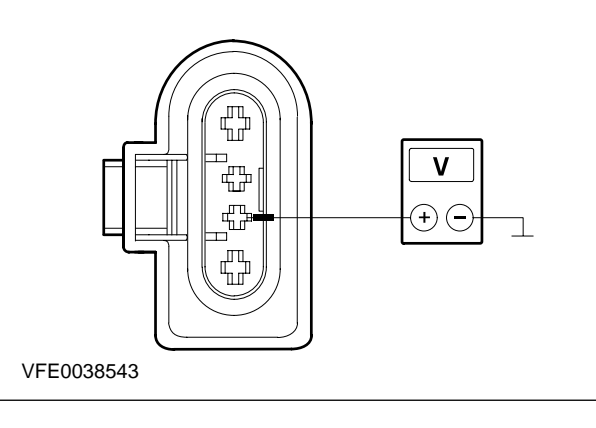
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038540</p>	<p>3 Measure resistance between wash/wipe system switch, connector C441, pin 3, circuit 91-KA12 (BK/WH), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes RENEW the wash/wipe system switch. CHECK the operation of the system. If the concern is not rectified, INSTALL A NEW GEM. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the wash/wipe system switch and soldered connection S12 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>A3: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).</p>	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to A4.</p> <p>→ No GO to A6.</p>
<p>A4: CHECK FUSE F129 (20 A) (CJB)</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse F129 (20 A) (CJB).</p> <p>3 CHECK Fuse F129 (20 A) (CJB).</p> <ul style="list-style-type: none"> Is the fuse OK? <p>→ Yes GO to A5.</p> <p>→ No RENEW fuse F129 (20 A) (CJB) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>A5: CHECK THE VOLTAGE SUPPLY TO FUSE F129 (20 A) (CJB) FOR OPEN CIRCUIT</p>	
	<p>1 Connect Fuse F129 (20 A) (CJB).</p> <p>2 Ignition switch in position II.</p>

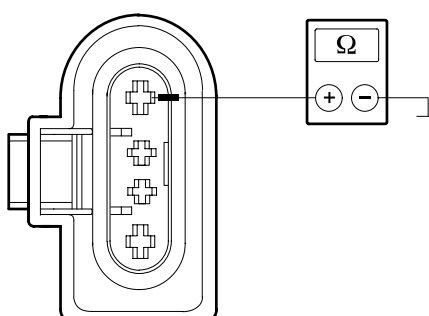
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between fuse F129 (20 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to A8.</p> <p>→ No RENEW the CJB. CHECK the operation of the system.</p>
A6: CHECK FUSE F50 (20 A) (CJB).	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect fuse F50 (20 A) (CJB).</p> <p>3 CHECK fuse F50 (20 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to A7.</p> <p>→ No RENEW fuse F50 (20 A) (CJB) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
A7: CHECK THE VOLTAGE SUPPLY TO FUSE F50 (20A) (CJB) FOR OPEN CIRCUIT	
	<p>1 Connect fuse F50 (20 A) (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F50 (20 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to A8.</p> <p>→ No RENEW the CJB. CHECK the operation of the system.</p>
A8: CHECK THE WASH/WIPE SYSTEM SWITCH.	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect wash/wipe system switch from connector C441.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE48138</p>	<p>3 Connect a fused jumper wire (10 A) at the wash/wipe system switch, connector C441, pin 6, circuit 91S-KA10 (BK/GN) and pin 3, circuit 91-KA12 (BK/WH), wiring harness side.</p>
	<p>4 Ignition switch in position II.</p> <ul style="list-style-type: none"> • Does the windshield wiper motor run continuously at slow wipe speed? → Yes RENEW the wash/wipe system switch. CHECK the operation of the system. → No GO to A9.
<p>A9: CHECK VOLTAGE AT THE WINDSHIELD WIPER MOTOR</p>	
<p>NOTE: The fused jumper wire used in the previous test step is still connected to the wash/wipe system switch.</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect windshield wiper motor from connector C848.</p> <p>3 Ignition switch in position II.</p>
 <p>VFE0038543</p>	<p>4 Measure the voltage between the front windshield wiper motor, connector C848, pin 2, circuit 32-KA10 (WH/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to A10. → No INSTALL a new GEM. CHECK the operation of the system.
<p>A10: CHECK THE GROUND CONNECTION OF THE FRONT WIPER MOTOR FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p>

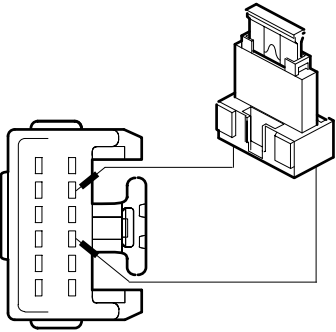
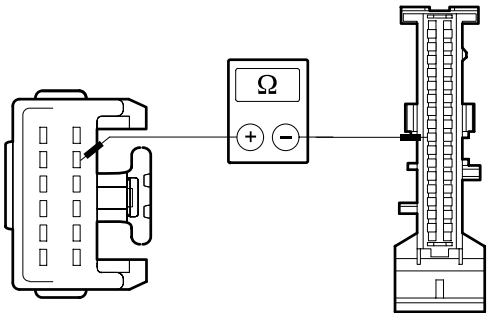
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038544</p>	<p>2 Measure the resistance between the front windscreen wiper motor, connector C848, pin 4, circuit 31-KA9B (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes RENEW the windshield wiper motor. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the front wiper motor and soldered connection S111 using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>A11: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).</p>	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <p>→ Yes GO to A12.</p> <p>→ No GO to A14.</p>
<p>A12: CHECK FUSE F131 (15 A) (CJB)</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse F131 (15 A) (CJB).</p> <p>3 CHECK Fuse F131 (15 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to A13.</p> <p>→ No RENEW fuse F131 (15 A) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>A13: CHECK THE VOLTAGE SUPPLY TO FUSE F131 (15 A) (CJB) FOR OPEN CIRCUIT</p>	
	<p>1 Connect Fuse F131 (15 A) (CJB).</p> <p>2 Ignition switch in position II.</p>

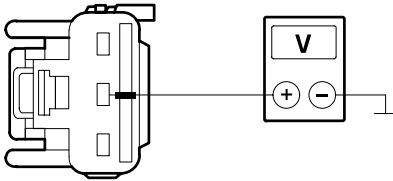
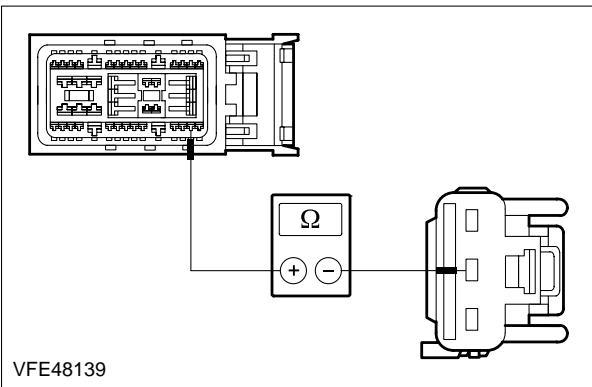
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between fuse F131 (15 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to A16.</p> <p>→ No RENEW the CJB. CHECK the operation of the system.</p>
A14: CHECK FUSE F78 (15 A) (CJB).	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect fuse F78 (15 A) (CJB).</p> <p>3 CHECK fuse F78 (15 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to A15.</p> <p>→ No RENEW fuse F78 (15 A) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
A15: CHECK THE VOLTAGE SUPPLY TO FUSE F78 (15A) (CJB) FOR OPEN CIRCUIT	
	<p>1 Connect fuse F78 (15 A) (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F78 (15 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to A16.</p> <p>→ No RENEW the CJB. CHECK the operation of the system.</p>
A16: CHECK THE WASH/WIPE SYSTEM SWITCH.	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect wash/wipe system switch from connector C441.</p>

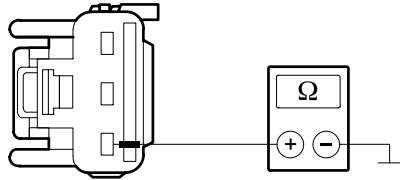
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038542</p>	<p>3 Connect a fused jumper wire (10 A) at the wash/wipe system switch, connector C441, pin 5, circuit 91S-KA35 (BK/BU) and pin 3, circuit 91-KA12 (BK/WH), wiring harness side.</p>
	<p>4 Ignition switch in position II.</p> <ul style="list-style-type: none"> • Is the rear window wiper motor running in intermittent wipe mode? → Yes RENEW the wash/wipe system switch. CHECK the operation of the system. → No GO to A17.
<p>A17: CHECK CIRCUIT 91S-KA35 (BK/BU) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR BREAKS</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C103.</p>
 <p>VFE0038545</p>	<p>3 Measure the resistance between the wash/wipe system switch, connector C441, pin 5, circuit 91S-KA35 (BK/BU), wiring harness side and the CJB, connector C103, pin 24, circuit 91S-KA35 (BK/BU), CJB side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes GO to A18. → No LOCATE and RECTIFY the break in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>A18: CHECK VOLTAGE AT THE REAR WINDOW WIPER MOTOR</p>	
<p>NOTE: The minimum measurement duration is 20 seconds.</p>	
	<p>1 Connect Wash/wipe system switch to connector C441.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<ol style="list-style-type: none"> 2 Connect CJB to connector C103. 3 Disconnect rear window wiper motor from connector C971. 4 Ignition switch in position II. 5 SWITCH ON rear window wiper.
 <p>VFE0038546</p>	<ol style="list-style-type: none"> 6 Measure the voltage between the rear window wiper motor, connector C971, pin 2, circuit 32-KA28 (BK), wiring harness side and ground. <ul style="list-style-type: none"> • Is battery voltage measured approximately every 10 seconds? <ul style="list-style-type: none"> → Yes GO to A20. → No GO to A19.
<p>A19: CHECK CIRCUIT 32-KA28 (WH/RD OR BK) BETWEEN CENTRAL JUNCTION BOX (CJB) AND REAR WINDOW WIPER MOTOR FOR OPEN CIRCUIT</p>	
 <p>VFE48139</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect CJB from connector C100. 3 Measure the resistance between the CJB, connector C100, pin 14, circuit 32-KA28 (WH/RD), wiring harness side and rear window wiper motor, connector C971, pin 2, circuit 32-KA28 (BK), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes INSTALL a new GEM. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between CJB and the rear window wiper motor using the Wiring Diagrams. CHECK the operation of the system.
<p>A20: CHECK THE GROUND CONNECTION OF THE REAR WIPER MOTOR FOR OPEN CIRCUIT</p>	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

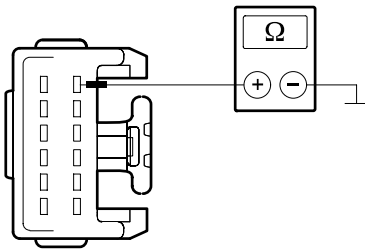
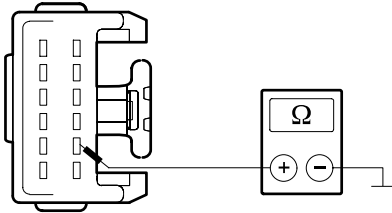
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038547</p>	<p>2 Measure the resistance between the rear window wiper motor, connector C971, pin 3, circuit 31-KA28 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes INSTALL a new rear window wiper motor. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the rear wiper motor and soldered connection S196 using the Wiring Diagrams. CHECK the operation of the system.</p>

PINPOINT TEST B : THE WINDSHIELD WIPER RUNS CONTINUOUSLY

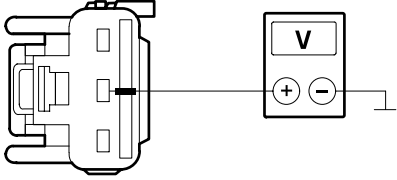
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: DETERMINE THE FAULT CONDITION	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect wash/wipe system switch from connector C441.</p> <p>3 Ignition switch in position II.</p> <ul style="list-style-type: none"> • Does the windscreen wiper motor run continuously? <p>→ Yes</p> <ul style="list-style-type: none"> - The windscreen wiper motor runs continuously at slow wipe speed. GO to B2. - The windscreen wiper motor runs continuously at fast wipe speed. GO to B3. <p>→ No RENEW the wash/wipe system switch. CHECK the operation of the system.</p>
B2: CHECK CIRCUIT 91S-KA10 (BK/GN) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR SHORT TO GROUND	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C103.</p>

DIAGNOSIS AND TESTING

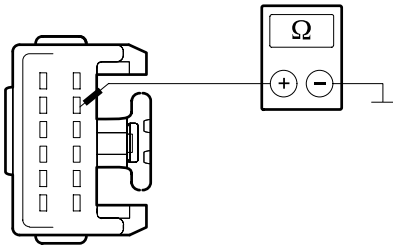
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038549</p>	<p>3 Measure resistance between wash/wipe system switch, connector C441, pin 6, circuit 91S-KA10 (BK/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 Ohms? <ul style="list-style-type: none"> → Yes INSTALL a new GEM. CHECK the operation of the system. → No LOCATE and RECTIFY the short to ground in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>B3: CHECK CIRCUIT 91S-KA11 (BK/RD) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR SHORT TO GROUND</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect CJB from connector C103.</p>
 <p>VFE0038550</p>	<p>3 Measure resistance between wash/wipe system switch, connector C441, pin 2, circuit 91S-KA11 (BK/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 Ohms? <ul style="list-style-type: none"> → Yes GO to B4. → No LOCATE and RECTIFY the short to ground in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>B4: CHECK CIRCUIT 32-KA11 (WH/BK) BETWEEN CENTRAL JUNCTION BOX (CJB) AND FRONT WIPER MOTOR FOR SHORT TO BATTERY VOLTAGE</p>	
	<p>1 Disconnect CJB from connector C96.</p>
	<p>2 Ignition switch in position II.</p> <ul style="list-style-type: none"> • Does the windshield wiper motor run continuously at fast wipe speed? <ul style="list-style-type: none"> → Yes LOCATE and RECTIFY short to battery voltage in circuit 32-KA11 (WH/BK) between CJB and the front wiper motor using the Wiring Diagrams. CHECK the operation of the system. → No INSTALL a new GEM. CHECK the operation of the system.

DIAGNOSIS AND TESTING

PINPOINT TEST C : THE REAR WINDOW WIPER RUNS CONTINUOUSLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: DETERMINE THE FAULT CONDITION	
	<p>1 Ignition switch in position II.</p> <ul style="list-style-type: none"> • Does the rear window wiper motor run continuously in intermittent wipe mode? <p>→ Yes GO to C3.</p> <p>→ No</p> <ul style="list-style-type: none"> - The rear window wiper motor runs continuously (not in intermittent mode) when the front windscreen wiper is switched off: GO to C2. - The rear window wiper motor runs continuously (not in intermittent mode) when the front wiper is switched on: <p>REFER to: Reversing Lamps - 3-Door (417-01 Exterior Lighting, Diagnosis and Testing).</p>
C2: CHECK THE CJB	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect rear window wiper motor from connector C971.</p> <p>3 Ignition switch in position II.</p>
 <p>VFE0038546</p>	<p>4 Measure the voltage between the rear window wiper motor, connector C971, pin 2, circuit 32-KA28 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes INSTALL a new GEM. CHECK the operation of the system.</p> <p>→ No INSTALL a new rear window wiper motor. CHECK the operation of the system.</p>
C3: CHECK THE WASH/WIPE SYSTEM SWITCH.	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect wash/wipe system switch from connector C441.</p>

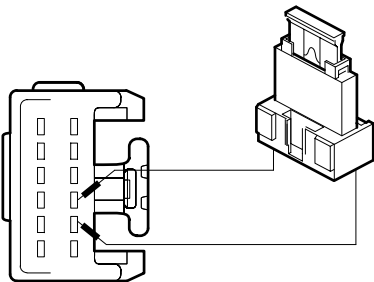
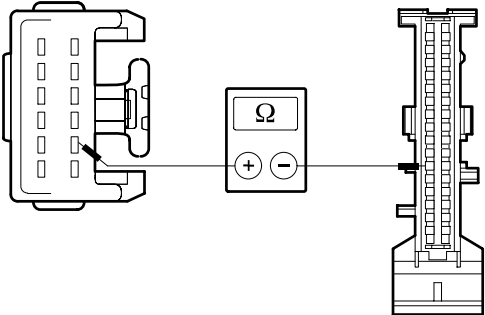
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Ignition switch in position II.</p> <ul style="list-style-type: none"> Is the rear window wiper motor running in intermittent wipe mode? <p>→ Yes GO to C4.</p> <p>→ No RENEW the wash/wipe system switch. CHECK the operation of the system.</p>
<p>C4: CHECK CIRCUIT 91S-KA35 (BK/BU) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR SHORT TO GROUND</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect CJB from connector C103.</p>
 <p>VFE0038551</p>	<p>3 Measure resistance between wash/wipe system switch, connector C441, pin 5, circuit 91S-KA35 (BK/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 Ohms? <p>→ Yes INSTALL a new GEM. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the short to ground in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.</p>

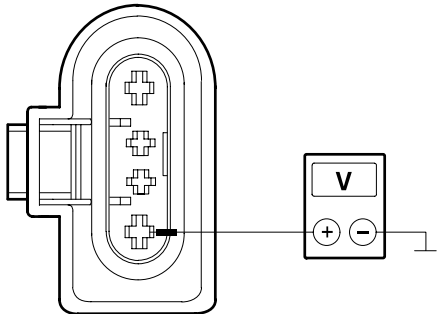
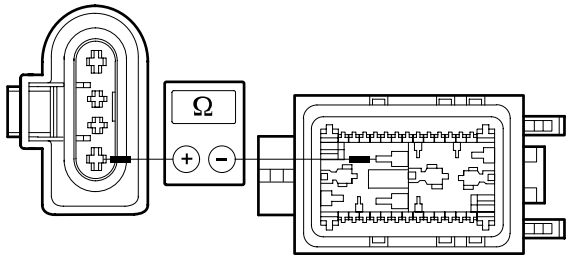
PINPOINT TEST D : SLOW/FAST WIPE NOT WORKING.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>D1: DETERMINE THE FAULT CONDITION</p>	
	<p>1 Ignition switch in position II.</p> <p>2 SWITCH ON slow wipe speed.</p> <p>3 SWITCH ON fast wipe speed.</p> <p>4 CHECK windshield wipers.</p> <ul style="list-style-type: none"> Do the windshield wipers operate at slow speed? <p>→ Yes Fast wipe speed inoperative. GO to D2.</p> <p>→ No Slow wipe speed inoperative. GO to D6.</p>

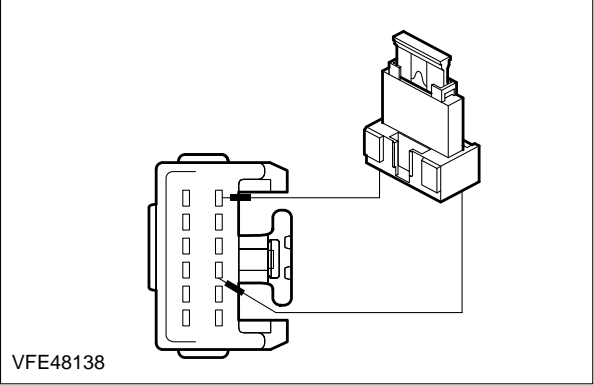
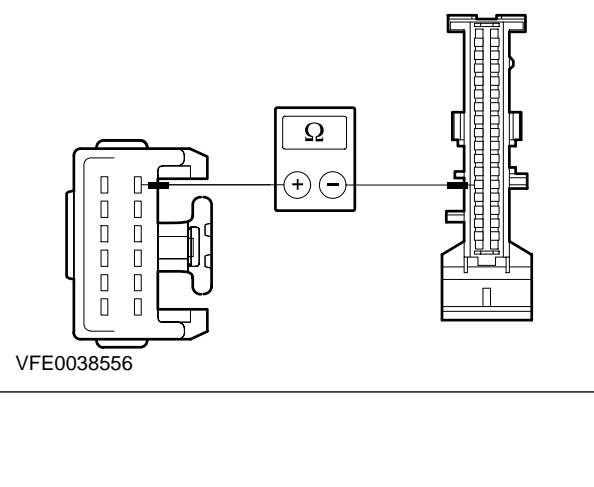
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D2: CHECK THE WASH/WIPE SYSTEM SWITCH.	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.
 <p>VFE0038552</p>	<ol style="list-style-type: none"> 2 Disconnect wash/wipe system switch from connector C441. 3 Connect a fused jumper wire (10 A) at the wash/wipe system switch, connector C441, pin 2, circuit 91S-KA11 (BK/RD) and pin 3, circuit 91-KA12 (BK/WH), wiring harness side.
	<ol style="list-style-type: none"> 4 Ignition switch in position II. <ul style="list-style-type: none"> • Do the wipers operate at fast speed? <ul style="list-style-type: none"> → Yes RENEW the wash/wipe system switch. CHECK the operation of the system. → No GO to D3.
D3: CHECK CIRCUIT 91S-KA11 (BK/RD) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR BREAKS	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.
 <p>VFE0038553</p>	<ol style="list-style-type: none"> 2 Disconnect CJB from connector C103. 3 Measure the resistance between the wash/wipe system switch, connector C441, pin 2, circuit 91S-KA11 (BK/RD), wiring harness side and the CJB, connector C103, pin 22, circuit 91S-KA11 (BK/RD), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm registered? <ul style="list-style-type: none"> → Yes GO to D4. → No LOCATE and RECTIFY the break in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.

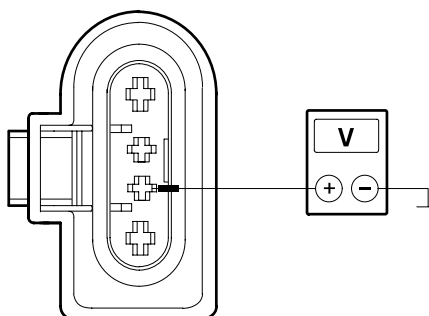
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D4: CHECK VOLTAGE AT THE WINDSHIELD WIPER MOTOR	
	<ol style="list-style-type: none"> 1 Connect Wash/wipe system switch to connector C441. 2 Connect CJB to connector C103. 3 Disconnect windshield wiper motor from connector C848. 4 Ignition switch in position II. 5 SWITCH ON fast wipe speed.
 <p>VFE0038554</p>	<ol style="list-style-type: none"> 6 Measure the voltage between the front windshield wiper motor, connector C848, pin 1, circuit 32-KA11 (WH/BK), wiring harness side and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes RENEW the windshield wiper motor. CHECK the operation of the system. → No GO to D5.
D5: CHECK CIRCUIT 32-KA11 (WH/BK) BETWEEN CENTRAL JUNCTION BOX (CJB) AND FRONT WIPER MOTOR FOR BREAKS	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect CJB from connector C96.
 <p>VFE0038555</p>	<ol style="list-style-type: none"> 3 Measure the resistance between the CJB, connector C96, pin 23, circuit 32-KA11 (WH/BK), wiring harness side and rear window wiper motor, connector C848, pin 1, circuit 32-KA11 (WH/BK), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes INSTALL a new GEM. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between CJB and the windshield wiper motor using the Wiring Diagrams. CHECK the operation of the system.
D6: CHECK THE WASH/WIPE SYSTEM SWITCH.	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

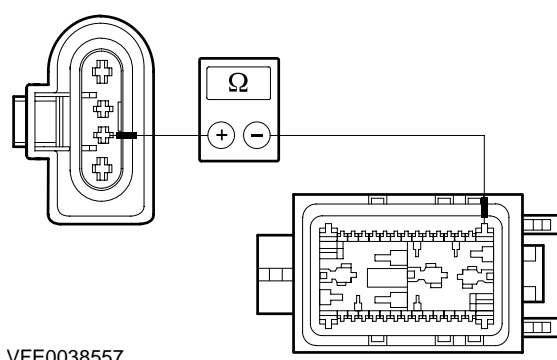
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect wash/wipe system switch from connector C441.</p>
 <p>VFE48138</p>	<p>3 Connect a fused jumper wire (10 A) at the wash/wipe system switch, connector C441, pin 6, circuit 91S-KA10 (BK/GN) and pin 3, circuit 91-KA12 (BK/WH), wiring harness side.</p>
	<p>4 Ignition switch in position II.</p> <ul style="list-style-type: none"> • Do the windshield wipers operate at slow speed? → Yes RENEW the wash/wipe system switch. CHECK the operation of the system. → No GO to D7.
<p>D7: CHECK CIRCUIT 91S-KA10 (BK/GN) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR BREAKS</p>	
	<p>1 Ignition switch in position 0.</p>
 <p>VFE0038556</p>	<p>2 Disconnect CJB from connector C103.</p> <p>3 Measure the resistance between the wash/wipe system switch, connector C441, pin 6, circuit 91S-KA10 (BK/GN), wiring harness side and the CJB, connector C103, pin 21, circuit 91S-KA10 (BK/GN), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes GO to D8. → No LOCATE and RECTIFY the break in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>D8: CHECK VOLTAGE AT THE WINDSHIELD WIPER MOTOR</p>	
	<p>1 Connect Wash/wipe system switch to connector C441.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<ol style="list-style-type: none"> 2 Connect CJB to connector C103. 3 Disconnect windshield wiper motor from connector C848. 4 SWITCH ON slow wipe speed. 5 Ignition switch in position II.
 <p>VFE0038543</p>	<ol style="list-style-type: none"> 6 Measure the voltage between the front windscreen wiper motor, connector C848, pin 2, circuit 32-KA10 (WH/GN), wiring harness side and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes RENEW the windshield wiper motor. CHECK the operation of the system. → No GO to D9.

D9: CHECK CIRCUIT 32-KA10 (WH/GN) BETWEEN CENTRAL JUNCTION BOX (CJB) AND FRONT WIPER MOTOR FOR BREAKS

	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect CJB from connector C96.
 <p>VFE0038557</p>	<ol style="list-style-type: none"> 3 Measure the resistance between the front windscreen wiper motor, connector C848, pin 2, circuit 32-KA10 (WH/GN), wiring harness side and the CJB, connector C96, pin 41, circuit 32-KA10 (WH/GN), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes INSTALL a new GEM. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between CJB and the windshield wiper motor using the Wiring Diagrams. CHECK the operation of the system.

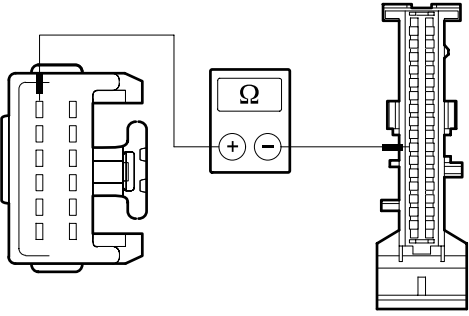
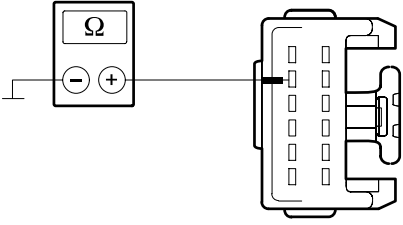
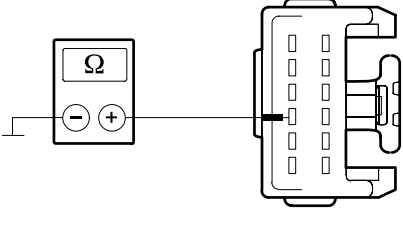
PINPOINT TEST E : INTERMITTENT WIPE MODE OF WINDSHIELD WIPER INOPERATIVE, VEHICLES WITH AND WITHOUT RAIN SENSOR (FAST/SLOW WIPE OK)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: DETERMINE THE FAULT CONDITION	
	<ol style="list-style-type: none"> 1 Ignition switch in position II.

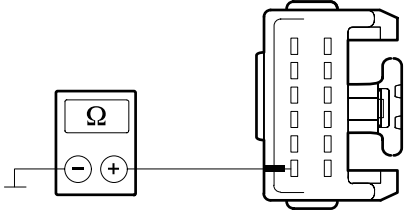
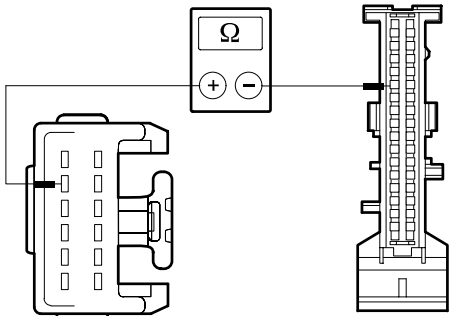
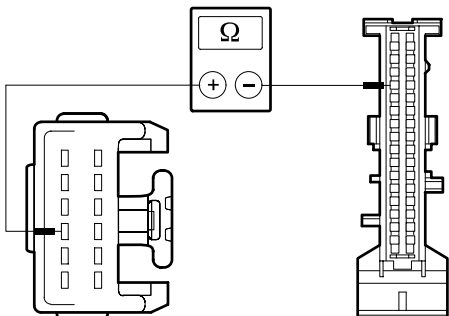
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 SWITCH ON slow wipe speed.</p> <p>3 SWITCH OFF slow wipe speed.</p> <ul style="list-style-type: none"> • Does the windshield wiper return to the park position? <p>→ Yes GO to E2.</p> <p>→ No GO to Pinpoint Test G.</p>
E2: NARROW DOWN THE FAULT CONDITION	
NOTE: For vehicles with rain sensor, wet the windshield several times with water in the vicinity of the rain sensor, in order to check whether the windshield wiper motor runs in intermittent wipe mode.	
	<p>1 SWITCH ON intermittent mode at the wash/wipe system switch.</p> <ul style="list-style-type: none"> • Does the front wiper perform a different wipe cycle to the one set with the wash/wipe switch? <p>→ Yes GO to E5.</p> <p>→ No</p> <ul style="list-style-type: none"> - Windshield wiper mode is inoperative: GO to E3. - Vehicles with rain sensor: The windshield wiper motor performs a wipe cycle every six seconds: GO to E12.
E3: CHECK THE WASH/WIPE SYSTEM SWITCH.	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect wash/wipe system switch from connector C441.</p> <p>3 CHECK the wash/wipe system switch according to the component check at the end of this section.</p> <ul style="list-style-type: none"> • Is the wash/wipe system switch OK? <p>→ Yes GO to E4.</p> <p>→ No RENEW the wash/wipe system switch. CHECK the operation of the system.</p>
E4: CHECK CIRCUIT 10-KA8 (GY/RD) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR BREAKS	
	<p>1 Disconnect CJB from connector C103.</p>

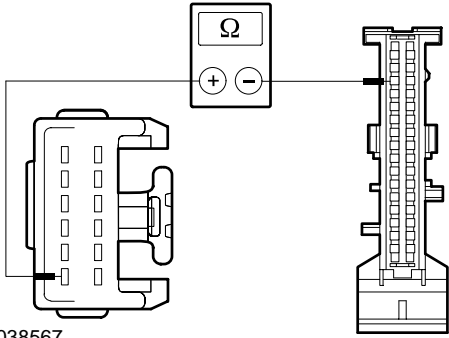
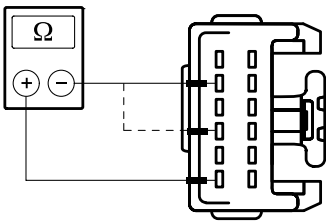
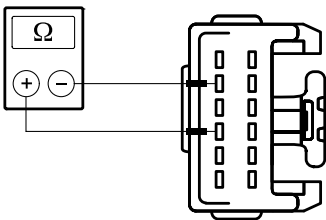
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038558</p>	<p>2 Measure the resistance between the wash/wipe system switch, connector C441, pin 12, circuit 91S-KA8 (GY/RD), wiring harness side and the CJB, connector C103, pin 23, circuit 10-KA8 (GY/RD), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes INSTALL a new GEM. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>E5: CHECK CIRCUIT 8-KA47 (WH/GN) FOR SHORT TO GROUND</p>	
 <p>VFE0038562</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C103.</p> <p>3 Measure resistance between wash/wipe system switch, connector C441, pin 11, circuit 8-KA47 (WH/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 Ohms? → Yes GO to E6. → No LOCATE and RECTIFY the short to ground in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>E6: CHECK CIRCUIT 8-KA46 (WH/BU) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR SHORT TO GROUND</p>	
 <p>VFE0038563</p>	<p>1 Measure resistance between wash/wipe system switch, connector C441, pin 9, circuit 8-KA46 (WH/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 Ohms? → Yes GO to E7. → No LOCATE and RECTIFY the short to ground in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.

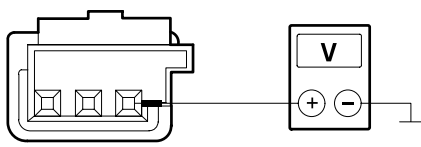
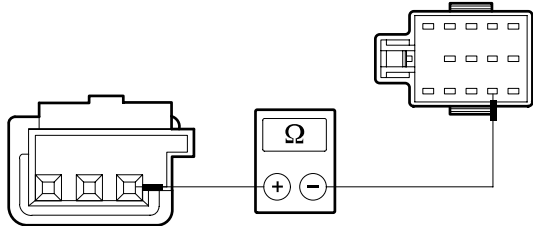
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>E7: CHECK CIRCUIT 8-KA45 (WH/RD) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR SHORT TO GROUND</p>	
 <p>VFE0038564</p>	<p>1 Measure resistance between wash/wipe system switch, connector C441, pin 7, circuit 8-KA45 (WH/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 Ohms? <p>→ Yes GO to E8.</p> <p>→ No LOCATE and RECTIFY the short to ground in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>E8: CHECK CIRCUIT 8-KA47 (WH/GN) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR BREAKS</p>	
 <p>VFE0038565</p>	<p>1 Measure the resistance between the wash/wipe system switch, connector C441, pin 11, circuit 8-KA47 (WH/GN), wiring harness side and the CJB, connector C103, pin 28, circuit 8-KA47 (WH/GN), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes GO to E9.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>E9: CHECK CIRCUIT 8-KA46 (WH/BU) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR BREAKS</p>	
 <p>VFE0038566</p>	<p>1 Measure the resistance between the wash/wipe system switch, connector C441, pin 9, circuit 8-KA46 (WH/BU), wiring harness side and the CJB, connector C103, pin 29, circuit 8-KA46 (WH/BU), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes GO to E10.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.</p>

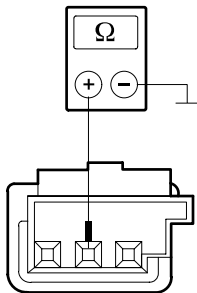
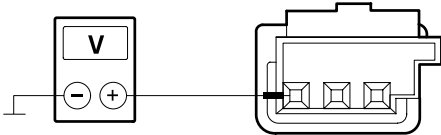
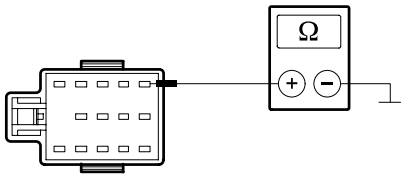
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E10: CHECK CIRCUIT 8-KA45 (WH/RD) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR BREAKS	
 <p>VFE0038567</p>	<p>1 Measure the resistance between the wash/wipe system switch, connector C441, pin 7, circuit 8-KA45 (WH/RD), wiring harness side and the CJB, connector C103, pin 30, circuit 8-KA45 (WH/RD), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes GO to E11.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
E11: CHECK CONTROL WIRES FOR SHORT AGAINST EACH OTHER	
 <p>VFE56585</p>	<p>1 Measure the resistance between the wash/wipe system switch, connector C441, pin 7, circuit 8-KA45 (WH/RD) and pin 11, circuit 8-KA47 (WH/GN) and between pin 7, circuit 8-KA45 (WH/RD) and pin 9, circuit 8-KA46 (WH/BU), wiring harness side.</p>
 <p>VFE56586</p>	<p>2 Measure the resistance between the wash/wipe system switch, connector C441, pin 9, circuit 8-KA46 (WH/BU), and pin 11, circuit 8-KA47 (WH/GN), wiring harness side.</p> <ul style="list-style-type: none"> Is the resistance in all the measurements more than 10,000 Ohms? <p>→ Yes INSTALL a new GEM. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the short in the circuits between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
E12: CHECK VOLTAGE SUPPLY TO RAIN SENSOR FOR OPEN CIRCUIT	
	<p>1 Ignition switch in position 0.</p>

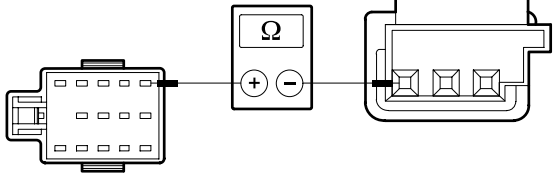
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect rain sensor from connector C526.</p> <p>3 Ignition switch in position II.</p>
 <p>VFE0038444</p>	<p>4 Measure the voltage between rain sensor, connector C526, pin 1:</p> <ul style="list-style-type: none"> - Vehicles with sliding sunroof: circuit 15-KA41 (GN/BK), wiring harness side and ground. - Vehicles without sliding sunroof: circuit 15-AG12B (GN/BK), wiring harness side and ground. <p>• Does the meter display battery voltage?</p> <p>→ Yes GO to E14.</p> <p>→ No GO to E13.</p>
E13: CHECK THE CJB	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C98.</p>
 <p>VFE0038568</p>	<p>3 Measure resistance between CJB, connector C98, pin 11:</p> <ul style="list-style-type: none"> - Vehicles with sliding sunroof: circuit 15-AG12A (GN/BK), wiring harness side and rain sensor, connector C526, pin 1, circuit 15-KA41 (GN/BK), wiring harness side. - Vehicles without sliding sunroof: circuit 15-AG12B (GN/BK), wiring harness side and rain sensor, connector C526, pin 1, circuit 15-AG12B (GN/BK), wiring harness side. <p>• Is the resistance less than 2 ohms?</p> <p>→ Yes RENEW the CJB. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between CJB and the rain sensor using the Wiring Diagrams. CHECK the operation of the system.</p>
E14: CHECK THE GROUND CONNECTION OF THE RAIN SENSOR FOR OPEN CIRCUIT	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038446</p>	<p>2 Measure resistance between rain sensor, connector C526, pin 2, circuit 91-KA41 (GN/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 2 ohms? → Yes GO to E15. → No LOCATE and RECTIFY the break in the circuit between the rain sensor and soldered connection S203 using the Wiring Diagrams. CHECK the operation of the system.
<p>E15: CHECK SIGNAL CABLE OF RAIN SENSOR FOR SHORT TO BATTERY VOLTAGE</p>	
 <p>VFE0038449</p>	<p>1 Disconnect CJB from connector C98.</p> <p>2 Ignition switch in position II.</p> <p>3 Measure voltage between rain sensor, connector C526, pin 3, circuit 8-KA41 (WH/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes LOCATE and RECTIFY the short to battery voltage in the circuit between CJB and the rain sensor using the Wiring Diagrams. CHECK the operation of the system. → No GO to E16.
<p>E16: CHECK SIGNAL CABLE OF RAIN SENSOR FOR SHORT TO GROUND</p>	
 <p>VFE0038450</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure resistance between the CJB, connector C98, pin 12, circuit 8-KA41 (WH/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 Ohms? → Yes GO to E17. → No LOCATE and RECTIFY the short to ground in the circuit between CJB and the rain sensor using the Wiring Diagrams. CHECK the operation of the system.

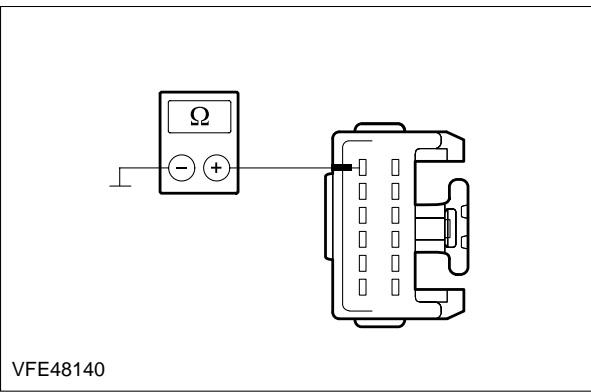
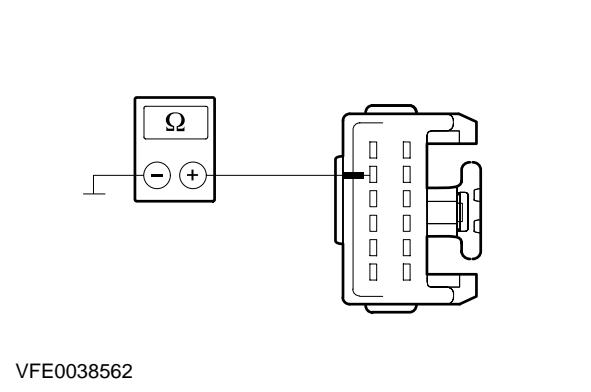
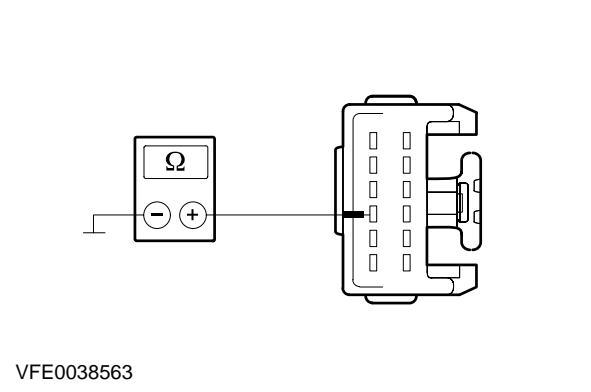
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E17: CHECK SIGNAL CABLE OF RAIN SENSOR FOR OPEN CIRCUIT	
 <p>VFE0038451</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the CJB, connector C98, pin 12, circuit 8-KA41 (WH/GN), wiring harness side and the rain sensor, connector C526, pin 3, circuit 8-KA41 (WH/GN), wiring harness side. <ul style="list-style-type: none"> • Is the resistance less than 2 ohms? <ul style="list-style-type: none"> → Yes RENEW the rain sensor. CHECK the operation of the system. If the concern is not rectified, INSTALL A NEW GEM. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between CJB and the rain sensor using the Wiring Diagrams. CHECK the operation of the system.

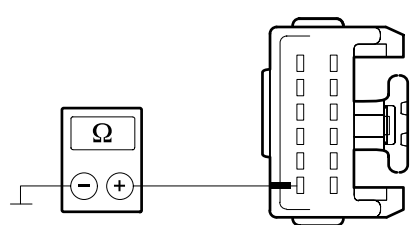
PINPOINT TEST F : THE WINDSHIELD WIPER RUNS CONTINUOUSLY IN INTERMITTENT MODE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F1: CHECK THE WASH/WIPE SYSTEM SWITCH.	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect wash/wipe system switch from connector C441. 3 CHECK the wash/wipe system switch according to the component check at the end of this section. <ul style="list-style-type: none"> • Is the wash/wipe system switch OK? <ul style="list-style-type: none"> → Yes GO to F2. → No RENEW the wash/wipe system switch. CHECK the operation of the system.
F2: CHECK CIRCUIT 10-KA8 (GY/RD) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR SHORT TO GROUND	
	<ol style="list-style-type: none"> 1 Disconnect CJB from connector C103.

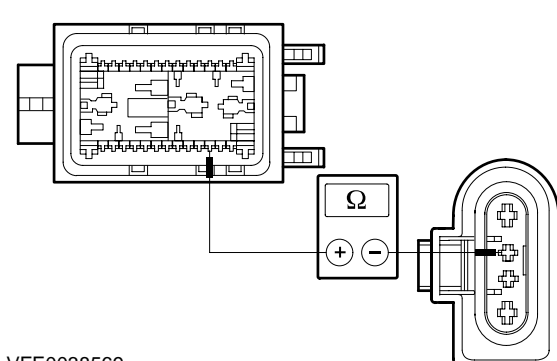
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE48140</p>	<p>2 Measure the resistance between the wash/wipe system switch, connector C441, pin 12, circuit 10-KA8 (GY/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 Ohms? <p>→ Yes GO to F3.</p> <p>→ No LOCATE and RECTIFY the short to ground in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>F3: CHECK CIRCUIT 8-KA47 (WH/GN) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR SHORT TO GROUND</p>	
 <p>VFE0038562</p>	<p>1 Measure resistance between wash/wipe system switch, connector C441, pin 11, circuit 8-KA47 (WH/GN), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 Ohms? <p>→ Yes GO to F4.</p> <p>→ No LOCATE and RECTIFY the short to ground in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>F4: CHECK CIRCUIT 8-KA46 (WH/BU) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR SHORT TO GROUND</p>	
 <p>VFE0038563</p>	<p>1 Measure resistance between wash/wipe system switch, connector C441, pin 9, circuit 8-KA46 (WH/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 Ohms? <p>→ Yes GO to F5.</p> <p>→ No LOCATE and RECTIFY the short to ground in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.</p>

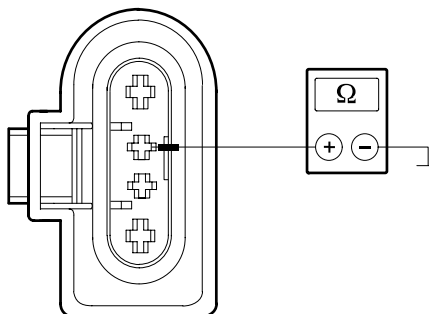
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F5: CHECK CIRCUIT 8-KA45 (WH/RD) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR SHORT TO GROUND	
 <p>VFE0038564</p>	<ol style="list-style-type: none"> 1 Measure resistance between wash/wipe system switch, connector C441, pin 7, circuit 8-KA45 (WH/RD), wiring harness side and ground. <ul style="list-style-type: none"> • Is the resistance greater than 10,000 Ohms? <ul style="list-style-type: none"> → Yes INSTALL a new GEM. CHECK the operation of the system. → No LOCATE and RECTIFY the short to ground in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.

PINPOINT TEST G : THE WINDSHIELD WIPER MOTOR DOES NOT RETURN TO THE PARK POSITION AFTER BEING SWITCHED OFF

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
G1: CHECK CIRCUIT 31S-KA9 (BK/OG) BETWEEN FRONT WIPER MOTOR AND CENTRAL JUNCTION BOX (CJB) FOR BREAKS	
 <p>VFE0038569</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect windshield wiper motor from connector C848. 3 Disconnect CJB from connector C96. 4 Measure the resistance between the front windscreen wiper motor, connector C848, pin 3, circuit 31S-KA9 (BK/OG), wiring harness side and the CJB, connector C96, pin 12, circuit 31S-KA9 (BK/OG), wiring harness side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes GO to G2. → No LOCATE and RECTIFY the break in the circuit between windshield wiper motor and the CJB using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
G2: CHECK CIRCUIT 31S-KA9 (BK/OG) BETWEEN CENTRAL JUNCTION BOX (CJB) AND FRONT WIPER MOTOR FOR SHORT TO GROUND	
 <p>VFE0038570</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the front windscreen wiper motor, connector C848, pin 3, circuit 31S-KA9 (BK/OG), wiring harness side and ground. <ul style="list-style-type: none"> • Is the resistance greater than 10,000 Ohms? <ul style="list-style-type: none"> → Yes CHECK the front wiper motor according to the component test at the end of this section and RENEW as necessary. CHECK the operation of the system. If the concern is not rectified, INSTALL A NEW GEM. CHECK the operation of the system. → No LOCATE and RECTIFY the short to ground in the circuit between CJB and the windshield wiper motor using the Wiring Diagrams. CHECK the operation of the system.

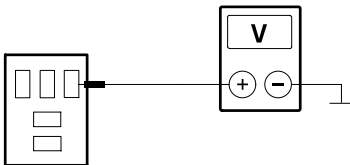
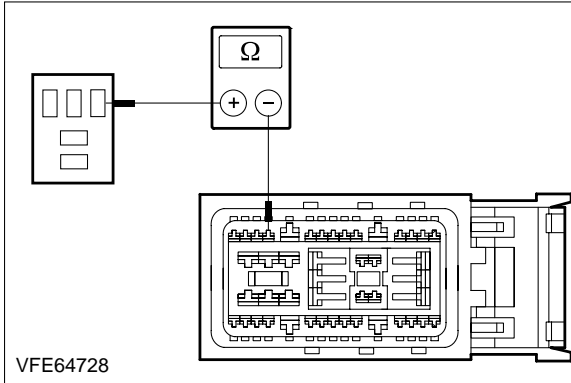
PINPOINT TEST H : THE REAR WINDOW WIPER MOTOR DOES NOT RETURN TO THE PARK POSITION AFTER BEING SWITCHED OFF

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
H1: DETERMINE THE BUILD YEAR	
	<ol style="list-style-type: none"> 1 Check the build date via the chassis number. <ul style="list-style-type: none"> • Was the vehicle built before 03/2005? <ul style="list-style-type: none"> → Yes GO to H13. → No GO to H2.
H2: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).	
	<ol style="list-style-type: none"> 1 Unfasten the CJB and fold it down. <ul style="list-style-type: none"> • Is the location for connector C100 on the top of the CJB? <ul style="list-style-type: none"> → Yes GO to H3. → No GO to H5.
H3: CHECK FUSE F141 (10 A) (CJB)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.
	<ol style="list-style-type: none"> 2 Disconnect Fuse F141 (10 A) (CJB).

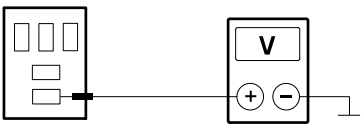
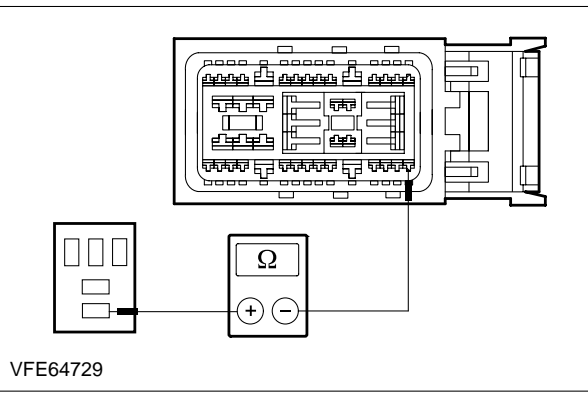
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 CHECK Fuse F141 (10 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK? <p>→ Yes GO to H4.</p> <p>→ No RENEW fuse F141 (10 A) (CJB) and CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.</p>
H4: CHECK THE VOLTAGE SUPPLY TO FUSE F141 (10 A) (CJB) FOR OPEN CIRCUIT	
	<p>1 Connect Fuse F141 (10 A) (CJB).</p> <p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F141 (10 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? <p>→ Yes GO to H7.</p> <p>→ No RENEW the CJB. CHECK the operation of the system.</p>
H5: CHECK FUSE F84 (10 A) (CJB).	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse F84 (10 A) (CJB).</p> <p>3 CHECK Fuse F84 (10 A) (CJB).</p> <ul style="list-style-type: none"> • Is the fuse OK.? <p>→ Yes GO to H6.</p> <p>→ No RENEW fuse F84 (10 A) (CJB) and CHECK the operation of the system. If fuse blows again, LOCATE and REMEDY the short to ground with the aid of the wiring diagrams. CHECK the operation of the system.</p>
H6: CHECK THE VOLTAGE SUPPLY TO FUSE F84 (10A) (CJB) FOR OPEN CIRCUIT	
	<p>1 Connect Fuse F84 (10 A) (CJB).</p> <p>2 Ignition switch in position II.</p>

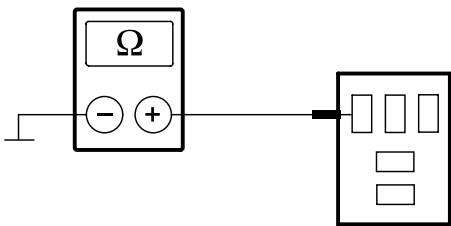
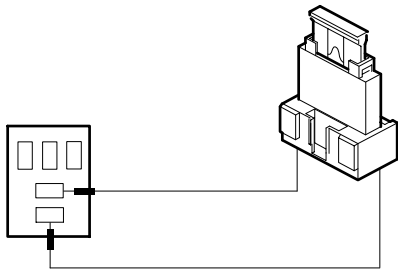
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Measure the voltage between fuse F84 (10 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to H7. → No RENEW the CJB. CHECK the operation of the system.
<p>H7: CHECK VOLTAGE SUPPLY TO REAR WIPER RELAY FOR OPEN CIRCUIT (PIN 1)</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Rear wiper relay from socket C1100.</p> <p>3 Ignition switch in position II.</p>
 <p>E0036110</p>	<p>4 Measure the voltage between the rear wiper relay, socket C1100, pin 1, circuit 15S-KA28 (GN/BU), socket side and ground.</p> <ul style="list-style-type: none"> • Is battery voltage measured? → Yes GO to H9. → No GO to H8.
<p>H8: CHECK CIRCUIT 15S-KA28 (GN/BU) BETWEEN CENTRAL JUNCTION BOX (CJB) AND REAR WIPER RELAY (PIN 1) FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C100.</p>
 <p>VFE64728</p>	<p>3 Measure the resistance between the CJB, connector C100, pin 35, circuit 15S-KA28 (GN/BU), wiring harness side and the rear wiper relay, socket C1100, pin 1, circuit 15S-KA28 (GN/BU), socket side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohm registered? → Yes RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and the rear wiper relay using the Wiring Diagrams. CHECK the operation of the system.

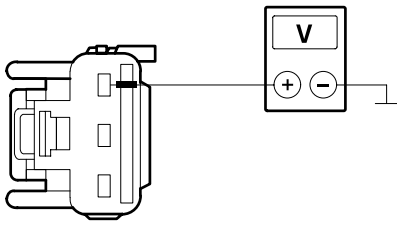
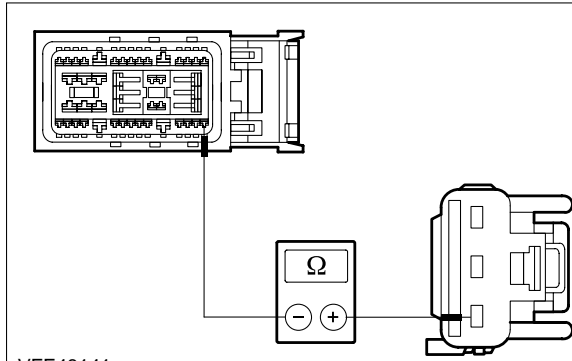
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
H9: CHECK VOLTAGE SUPPLY TO REAR WIPER RELAY FOR OPEN CIRCUIT (PIN 3)	
 <p>VFE0016103</p>	<ol style="list-style-type: none"> 1 Measure the voltage between the rear wiper relay, socket C1100, pin 3, circuit 29-KA28 (OG/BU), socket side and ground. <ul style="list-style-type: none"> • Is battery voltage measured? <ul style="list-style-type: none"> → Yes GO to H11. → No GO to H10.
H10: CHECK CIRCUIT 29-KA28 (OG/BU) BETWEEN CENTRAL JUNCTION BOX (CJB) AND REAR WIPER RELAY (PIN 3) FOR OPEN CIRCUIT	
 <p>VFE64729</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect CJB from connector C100. 3 Measure the resistance between the CJB, connector C100, pin 15, circuit 29-KA28 (OG/BU), wiring harness side and the rear wiper relay, socket C1100, pin 3, circuit 29-KA28 (OG/BU), socket side. <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <ul style="list-style-type: none"> → Yes RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and the rear wiper relay using the Wiring Diagrams. CHECK the operation of the system.
H11: CHECK THE GROUND CONNECTION OF THE REAR WIPER RELAY FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0016108</p>	<p>2 Measure the resistance between the rear wiper relay, socket C1100, pin 2, circuit 31-KA28 (BK), socket side and ground.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohm registered? → Yes GO to H12. → No LOCATE and RECTIFY the break in the circuit between the rear window wiper relay and soldered connection S216 using the Wiring Diagrams. CHECK the operation of the system.
<p>H12: CHECK THE REAR WIPER RELAY</p>	
 <p>VFE0008746</p>	<p>1 Connect a fused bridging cable (15 A) to the rear wiper relay, socket C1100, pin 3, circuit 29-KA28 (OG/BU) and pin 5, circuit 29S-KA28 (OG/BU), socket side.</p>
	<p>2 Ignition switch in position II.</p>
	<p>3 SWITCH the rear wiper ON and OFF.</p>
	<p>4 CHECK the rear wiper.</p> <ul style="list-style-type: none"> Does the rear wiper return to the park position? → Yes RENEW the rear wiper relay. CHECK the operation of the system. → No GO to H13.
<p>H13: CHECK THE VOLTAGE SUPPLY TO THE REAR WIPER MOTOR</p>	
<p>NOTE: Only for vehicles built from 03/2005: The fused bridging cable used in the previous step is still connected to the rear wiper relay.</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect rear window wiper motor from connector C971.</p>
	<p>3 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038571</p>	<p>4 Measure the voltage between the rear window wiper motor, connector C971, pin 1, circuit 29-KA28 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? → Yes INSTALL a new rear window wiper motor. CHECK the operation of the system. → No <ul style="list-style-type: none"> Vehicles built from 03/2005: LOCATE and RECTIFY the break in the circuit between the rear wiper relay and the rear wiper motor using the Wiring Diagrams. CHECK the operation of the system. Vehicles built before 03/2005: GO to H14.
<p>H14: CHECK CIRCUIT 29-KA28 (OG/BU AND BK) BETWEEN CENTRAL JUNCTION BOX (CJB) AND REAR WINDOW WIPER MOTOR FOR OPEN CIRCUIT</p>	
 <p>VFE48141</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the CJB, connector C100, pin 15, circuit 29-KA28 (OG/BU), wiring harness side and rear window wiper motor, connector C971, pin 1, circuit 29-KA28 (BK), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? → Yes RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between CJB and the rear window wiper motor using the Wiring Diagrams. CHECK the operation of the system.

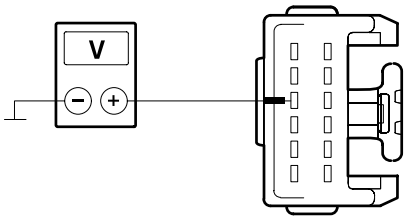
PINPOINT TEST I : THE FRONT AND REAR WASH/WIPE FUNCTIONS ARE INOPERATIVE (WIPE AND INTERMITTENT FUNCTION OK)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>I1: DETERMINE THE EQUIPMENT LEVEL OF THE CENTRAL JUNCTION BOX (CJB).</p>	
	<p>1 Unfasten the CJB and fold it down.</p> <ul style="list-style-type: none"> Is the location for connector C100 on the top of the CJB? → Yes GO to I2. → No GO to I4.

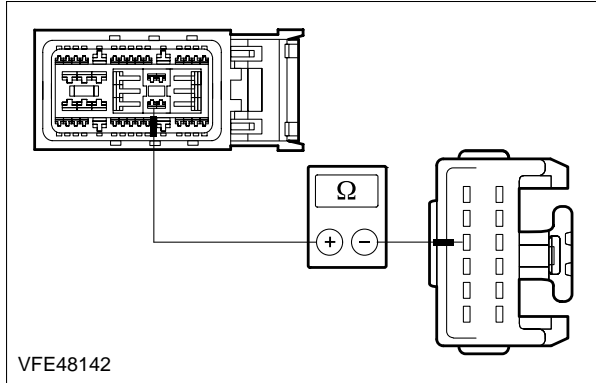
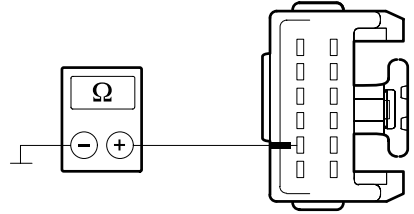
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
I2: CHECK FUSE F136 (15 A) (CJB)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.
	<ol style="list-style-type: none"> 2 Disconnect Fuse F136 (15 A) (CJB).
	<ol style="list-style-type: none"> 3 CHECK Fuse F136 (15 A) (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to I3. → No RENEW fuse F136 (15 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.
I3: CHECK THE VOLTAGE SUPPLY TO FUSE F136 (CJB) FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Connect Fuse F136 (15 A) (CJB).
	<ol style="list-style-type: none"> 2 Ignition switch in position II.
	<ol style="list-style-type: none"> 3 Measure the voltage between fuse F136 (15 A) (CJB) and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to I6. → No RENEW the CJB. CHECK the operation of the system.
I4: CHECK FUSE F47 (15 A) (CJB).	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.
	<ol style="list-style-type: none"> 2 Disconnect fuse F47 (15 A) (CJB).
	<ol style="list-style-type: none"> 3 CHECK fuse F47 (15 A) (CJB). <ul style="list-style-type: none"> • Is the fuse OK? → Yes GO to I5. → No RENEW fuse F47 (15 A) (CJB). CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.
I5: CHECK THE VOLTAGE SUPPLY TO FUSE F47 (CJB) FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Connect fuse F47 (15 A) (CJB).

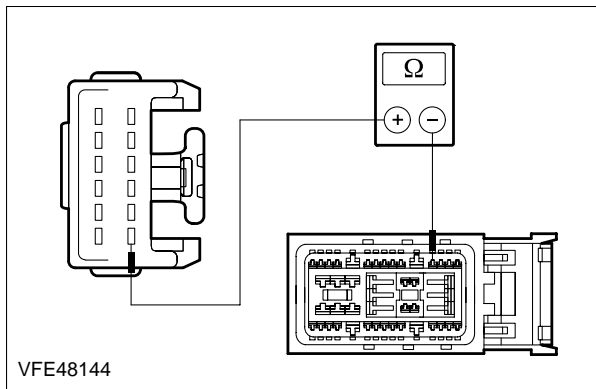
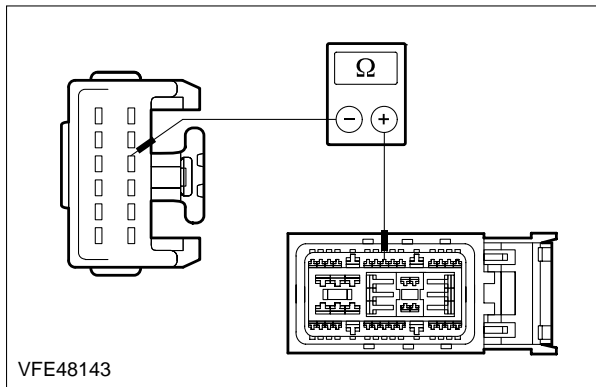
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Ignition switch in position II.</p> <p>3 Measure the voltage between fuse F47 (15 A) (CJB) and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to I6. → No RENEW the CJB. CHECK the operation of the system.
I6: CHECK VOLTAGE AT THE WASH/WIPE SYSTEM SWITCH.	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect wash/wipe system switch from connector C441.</p> <p>3 Ignition switch in position II.</p>
 <p>VFE0038573</p>	<p>4 Measure voltage between wiper/washer switch, connector C441, pin 10, circuit 15-KA19 (GN/OG), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to I8. → No GO to I7.
I7: CHECK THE CJB	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C102.</p>

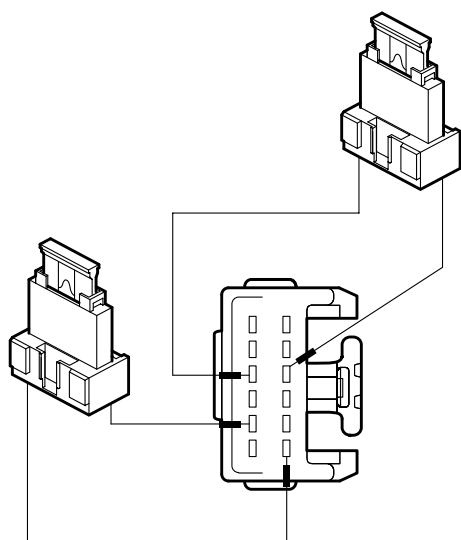
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE48142</p>	<p>3 Measure resistance between CJB, connector C102, pin 20, circuit 15-KA19 (GN/OG), wiring harness side and wash/wipe system switch, connector C441, pin 10, circuit 15-KA19 (GN/OG), wiring harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 2 ohms? → Yes RENEW the CJB. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the CJB and the wash/wipe system switch using the Wiring Diagrams. CHECK the operation of the system.
<p>I8: CHECK THE GROUND CONNECTION OF THE WASH/WIPE SYSTEM SWITCH FOR OPEN CIRCUIT</p>	
 <p>VFE0038575</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the wash/wipe system switch, connector C441, pin 8, circuit 31-KA36 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? → Yes GO to I9. → No LOCATE and RECTIFY the break in the circuit between the wash/wipe system switch and soldered connection S6 using the Wiring Diagrams. CHECK the operation of the system.
<p>I9: CHECK CIRCUIT 32-KA34 (WH/BK) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR BREAKS</p>	
	<p>1 Disconnect CJB from connector C102.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE48144</p>	<p>2 Measure the resistance between the wash/wipe system switch, connector C441, pin 1, circuit 32-KA34 (WH/BK), wiring harness side and the CJB, connector C102, pin 43, circuit 32-KA34 (WH/BK), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes GO to I10.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>I10: CHECK CIRCUIT 33-KA34 (YE/BK) BETWEEN WASH/WIPE SWITCH AND CENTRAL JUNCTION BOX (CJB) FOR BREAKS</p>	
 <p>VFE48143</p>	<p>1 Measure the resistance between the wash/wipe system switch, connector C441, pin 4, circuit 33-KA34 (YE/BK), wiring harness side and the CJB, connector C102, pin 39, circuit 33-KA34 (YE/BK), wiring harness side.</p> <ul style="list-style-type: none"> • Is a resistance of less than 2 Ohms registered? <p>→ Yes GO to I11.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between the wash/wipe system switch and CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>I11: CHECK THE WASH/WIPE SYSTEM SWITCH.</p>	
	<p>1 Connect CJB to connector C102.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE49131</p>	<p>2 Two fused jumper wires (10 A) at the wash/wipe system switch, connector C441:</p> <ul style="list-style-type: none"> - Connect pin 8, circuit 31-KA36 (BK) and Pin 1, circuit 32-KA34 (WH/BK), wiring harness side. - Connect pin 10, circuit 15-KA19 (GN/OG) and Pin 4, circuit 33-KA34 (YE/BK), wiring harness side.
	<p>3 Ignition switch in position II.</p> <ul style="list-style-type: none"> • Is the front wash/wipe function operative? <ul style="list-style-type: none"> → Yes RENEW the wash/wipe system switch. CHECK the operation of the system. → No RENEW the CJB. CHECK the operation of the system.

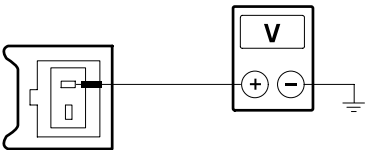
PINPOINT TEST J : WASH AND WIPE FUNCTION (FRONT OR REAR) IN CONTINUOUS OPERATION FOR 60 SECONDS

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
J1: DETERMINE THE FAULT CONDITION	
	<p>1 Ignition switch in position II.</p>

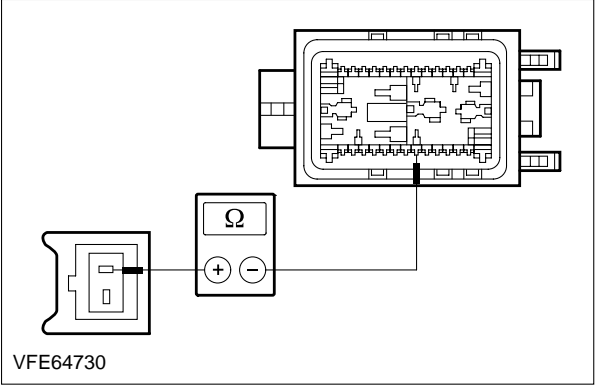

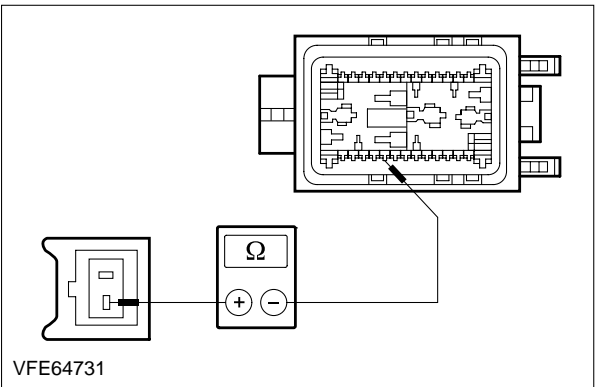
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK the front or rear wash/wipe function.</p> <ul style="list-style-type: none"> Is the wash/wipe function (front) in continuous operation for 60 seconds and then automatically switched off? <p>→ Yes RENEW the wash/wipe system switch. CHECK the operation of the system.</p> <p>→ No Wash and wipe function (rear) in continuous operation for 60 seconds: RENEW the wash/wipe switch. CHECK the operation of the system.</p>

PINPOINT TEST K : WASHER SYSTEM IS INOPERATIVE

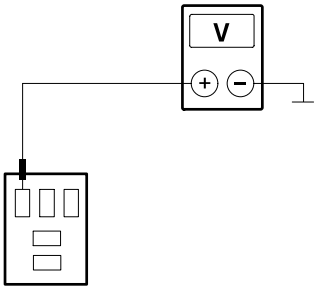
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>K1: CHECK THE VOLTAGE AT THE FRONT/REAR WASHER PUMP MOTOR</p>	
<p>NOTE: Wash/wipe system switch in the OFF position</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect front/rear washer pump motor from connector C828.</p> <p>3 Ignition switch in position II.</p>
 <p>VFE0008568</p>	<p>4 Measure the voltage between the front/rear washer pump motor, connector C828, pin 1, circuit 33-KA34(A) (YE/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is battery voltage measured? <p>→ Yes GO to K3.</p> <p>→ No GO to K2.</p>
<p>K2: CHECK CIRCUIT 33-KA34(A) (YE/BK) BETWEEN FRONT/REAR WASHER PUMP MOTOR AND CENTRAL JUNCTION BOX (CJB) FOR BREAKS</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect CJB from connector C96.</p>

DIAGNOSIS AND TESTING

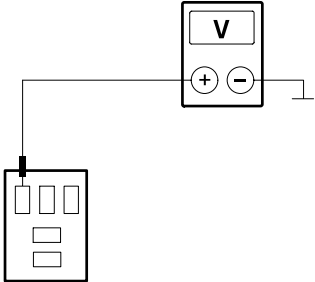
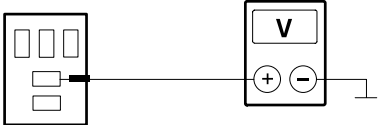
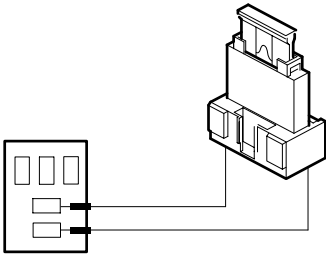
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE64730</p>	<p>3 Measure the resistance between the front/rear washer pump motor, connector C828, pin 1, circuit 33-KA34(A) (YE/BK), wiring harness side and the CJB, connector C96, pin 9, circuit 33-KA34(A) (YE/BK), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes RENEW the CJB. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between front/rear washer pump motor and the CJB using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>K3: CHECK THE VOLTAGE AT THE WASHER PUMP MOTOR</p>	
 <p>VFE0015948</p>	<p>1 Measure the voltage between the front/rear washer pump motor, connector C828, pin 2, circuit 32-KA34(A) (WH/BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes INSTALL A NEW front/rear washer pump motor. CHECK the operation of the system.</p> <p>→ No GO to K4.</p>
<p>K4: CHECK CIRCUIT 32-KA34(A) (WH/BK) BETWEEN FRONT/REAR WASHER PUMP MOTOR AND CENTRAL JUNCTION BOX (CJB) FOR BREAKS</p>	
 <p>VFE64731</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the front/rear washer pump motor, connector C828, pin 2, circuit 32-KA34(A) (WH/BK), wiring harness side and the CJB, connector C96, pin 6, circuit 32-KA34(A) (WH/BK), wiring harness side.</p> <ul style="list-style-type: none"> Is a resistance of less than 2 Ohms registered? <p>→ Yes RENEW the CJB. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY the break in the circuit between front/rear washer pump motor and the CJB using the Wiring Diagrams. CHECK the operation of the system.</p>

DIAGNOSIS AND TESTING

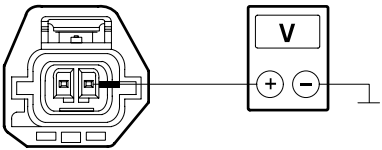
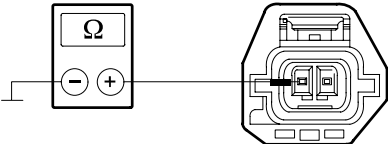
PINPOINT TEST L : HEADLAMP WASHER SYSTEM IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
L1: CHECK FUSE F23 (30 A) (BJB)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect fuse F23 (30 A) (BJB). 3 CHECK fuse F23 (30 A) (BJB). <ul style="list-style-type: none"> • Is the fuse OK? <ul style="list-style-type: none"> → Yes GO to L2. → No RENEW fuse F23 (30 A) (BJB) CHECK the operation of the system. If the fuse blows again, LOCATE and RECTIFY the short to ground using the Wiring Diagrams. CHECK the operation of the system.
L2: CHECK THE VOLTAGE SUPPLY TO FUSE F23 (30 A) (BJB) FOR OPEN CIRCUIT	
	<ol style="list-style-type: none"> 1 Connect fuse F23 (30 A) (BJB). 2 Measure the voltage between fuse F23 (30 A) (BJB) and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes GO to L3. → No CHECK BJB and if necessary RENEW. CHECK the operation of the system.
L3: CHECK CIRCUIT 31S-KA24 (BK/RD) BETWEEN THE HEADLAMP WASHER RELAY AND THE GEM FOR SHORT TO BATTERY VOLTAGE.	
	<ol style="list-style-type: none"> 1 Disconnect headlamp cleaning system relay from socket C1009. 2 Ignition switch in position II.
 <p>VFE0016132</p>	<ol style="list-style-type: none"> 3 Measure the voltage between the headlamp washer relay, socket C1009, pin 2, circuit 31S-KA24 (BK/RD), BJB side and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes GO to L4. → No GO to L5.

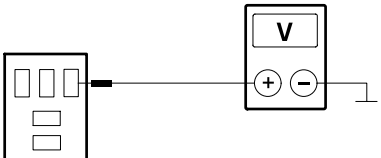
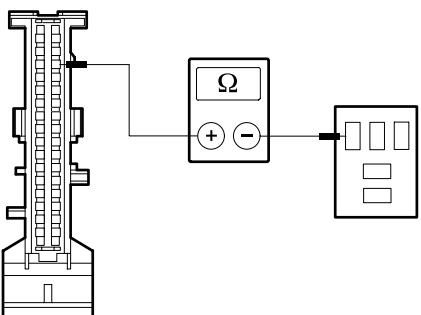
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
L4: CHECK CIRCUIT 31S-KA24 (BK/RD) BETWEEN THE HEADLAMP WASHER RELAY AND THE CJB FOR SHORT TO BATTERY VOLTAGE.	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 Disconnect CJB from connector C95.
 <p>VFE0016132</p>	<ol style="list-style-type: none"> <li>3 Measure the voltage between the headlamp washer relay, socket C1009, pin 2, circuit 31S-KA24 (BK/RD), BJB side and ground. <ul style="list-style-type: none"> <li>• Does the meter display battery voltage? <ul style="list-style-type: none"> <li>→ Yes LOCATE and RECTIFY the short to battery voltage in the circuit between the headlamp washer relay and the CJB with the aid of the Wiring Diagrams. CHECK the operation of the system. <li>→ No INSTALL a new GEM. CHECK the operation of the system.
L5: CHECK VOLTAGE SUPPLY OF HEADLAMP CLEANING SYSTEM RELAY FOR OPEN CIRCUIT	
 <p>VFE0019862</p>	<ol style="list-style-type: none"> <li>1 Measure the voltage between the headlamp cleaning system relay, socket C1009, pin 5, circuit 30-KA25 (RD), BJB side and ground. <ul style="list-style-type: none"> <li>• Does the meter display battery voltage? <ul style="list-style-type: none"> <li>→ Yes GO to L6. <li>→ No LOCATE and RECTIFY the break in the circuit between fuse F23 (BJB) and the headlamp cleaning system relay using the Wiring Diagrams. CHECK the operation of the system.
L6: CHECK HEADLAMP RELAY	
 <p>VFE0019865</p>	<ol style="list-style-type: none"> <li>1 Connect a fused jumper wire (30 A) at the headlamp cleaning system relay, socket C1009, between pin 5 and pin 3, BJB side. <ul style="list-style-type: none"> <li>• Does the headlamp cleaning system pump run? <ul style="list-style-type: none"> <li>→ Yes GO to L9. <li>→ No GO to L7.

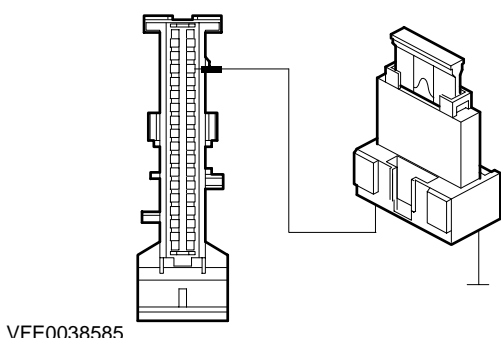
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>L7: CHECK CIRCUIT 15S-KA21(A) (GN/YE) BETWEEN THE HEADLAMP CLEANING SYSTEM RELAY AND THE HEADLAMP CLEANING SYSTEM PUMP FOR OPEN CIRCUIT</p>	
<p>NOTE: The fused jumper wire used in the previous test step is still connected to the headlamp cleaning system relay.</p>	
 <p>VFE0038583</p>	<p>1 Disconnect headlamp cleaning system pump from connector C745.</p> <p>2 Measure the voltage between the headlamp washer pump, connector C745, pin 1, circuit 15S-KA21(A) (GN/YE), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to L8. → No LOCATE and RECTIFY the break in the circuit between the headlamp cleaning system relay and the headlamp cleaning system pump using the Wiring Diagrams. CHECK the operation of the system.
<p>L8: CHECK GROUND SUPPLY OF HEADLAMP CLEANING SYSTEM PUMP FOR OPEN CIRCUIT</p>	
 <p>VFE0038584</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the headlamp washer pump, connector C745, pin 2, circuit 31-KA21(A) (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 2 ohms? → Yes RENEW the headlamp cleaning system pump. CHECK the operation of the system. → No LOCATE and RECTIFY the break in the circuit between the headlamp cleaning system pump and soldered connection S109 using the Wiring Diagrams. CHECK the operation of the system.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
L9: CHECK VOLTAGE SUPPLY OF HEADLAMP CLEANING SYSTEM RELAY (CONTROL CIRCUIT) FOR OPEN CIRCUIT	
 <p>VFE0016104</p>	<ol style="list-style-type: none"> 1 Measure the voltage between the headlamp cleaning system relay, socket C1009, pin 1, circuit 15-KA24 (GN/OG), BJB side and ground. <ul style="list-style-type: none"> • Does the meter display battery voltage? <ul style="list-style-type: none"> → Yes GO to L10. → No LOCATE and RECTIFY the break in the circuit between soldered connection S164 and the headlamp cleaning system relay using the Wiring Diagrams. CHECK the operation of the system.
L10: CHECK CONTROL CIRCUIT OF HEADLAMP CLEANING SYSTEM RELAY FOR OPEN CIRCUIT	
 <p>VFE0038586</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect CJB from connector C95. 3 Measure the resistance between the headlamp cleaning system relay, socket C1009, pin 2, circuit 31S-KA24 (BK/RD), BJB side and CJB, connector C95, pin 14, circuit 31S-KA24 (BK/RD), wiring harness side. <ul style="list-style-type: none"> • Is the resistance less than 2 ohms? <ul style="list-style-type: none"> → Yes GO to L11. → No LOCATE and RECTIFY the break in the circuit between the headlamp cleaning system relay and CJB using the Wiring Diagrams. CHECK the operation of the system.
L11: CHECK HEADLAMP CLEANING SYSTEM RELAY	
	<ol style="list-style-type: none"> 1 Connect headlamp cleaning system relay to socket C1009. 2 Ignition switch in position II.

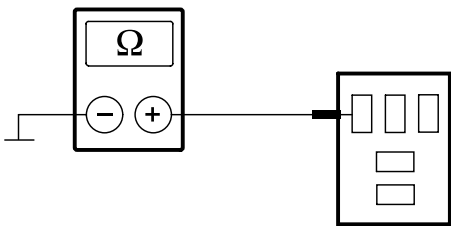
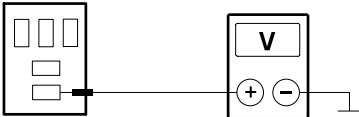
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0038585</p>	<p>3 Use a fused jumper wire (10 A) to connect to the CJB, connector C95, pin 14, circuit 31S-KA24 (BK/RD) and ground.</p> <ul style="list-style-type: none"> • Does the headlamp cleaning system pump run? → Yes INSTALL a new GEM. CHECK the operation of the system. → No RENEW the headlamp cleaning system relay. CHECK the operation of the system.

PINPOINT TEST M : HEADLAMP WASHER SYSTEM OPERATES CONTINUOUSLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
M1: NARROW DOWN THE FAULT CONDITION	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect CJB from connector C95.</p> <p>3 Ignition switch in position II.</p> <p>4 CHECK headlamp cleaning system pump.</p> <ul style="list-style-type: none"> • Does the headlamp cleaning system pump run continuously? → Yes GO to M2. → No INSTALL a new GEM. CHECK the operation of the system.
M2: CHECK HEADLAMP CLEANING SYSTEM RELAY	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect headlamp cleaning system relay from socket C1009.</p>


DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0016108</p>	<p>3 Measure the resistance between the headlamp cleaning system relay, socket C1009, pin 2, circuit 31S-KA24 (BK/RD), BJB side and ground.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 Ohms? → Yes GO to M3. → No LOCATE and RECTIFY the short to ground in the circuit between headlamp cleaning system relay and the CJB using the Wiring Diagrams. CHECK the operation of the system.
<p>M3: CHECK CIRCUIT 15S-KA21 (GN/YE) BETWEEN HEADLAMP CLEANING SYSTEM RELAY AND HEADLAMP CLEANING SYSTEM PUMP FOR SHORT TO BATTERY VOLTAGE</p>	
 <p>VFE0016103</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the headlamp cleaning system relay, socket C1009, pin 3, circuit 15S-KA21 (GN/YE), BJB side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? → Yes LOCATE and RECTIFY the short to battery voltage in circuit 15S-KA21 (GN/YE) between the headlamp cleaning system relay and the headlamp cleaning system pump using the Wiring Diagrams. CHECK the operation of the system. → No RENEW the headlamp cleaning system relay. CHECK the operation of the system.


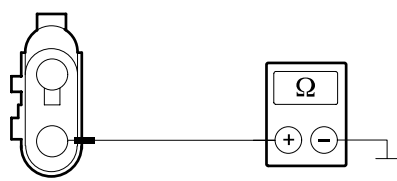
PINPOINT TEST N : WINDSHIELD WASHER NOZZLE HEATER IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>N1: DETERMINE THE FAULT CONDITION</p>	
	<p>1 Ignition switch in position II.</p>


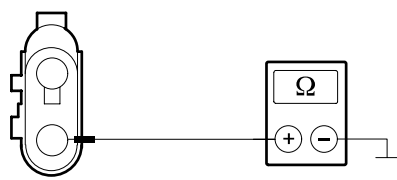
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 DETERMINE which windshield washer nozzle heater is inoperative.</p> <ul style="list-style-type: none"> Are both windshield washer nozzle heaters inoperative? <p>→ Yes GO to N2.</p> <p>→ No</p> <ul style="list-style-type: none"> Left windscreen washer nozzle heater is inoperative: GO to N3. Right windscreen washer nozzle heater is inoperative: GO to N5.
<p>N2: CHECK VOLTAGE SUPPLY TO WINDSHIELD WASHER NOZZLE HEATER FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Left-hand windshield washer nozzle heater from connector C721.</p> <p>3 Ignition switch in position II.</p>
 <p>VFE0016017</p>	<p>4 Measure voltage between left-hand windshield washer nozzle heater, connector C721, pin 1, circuit 15-HB13 (GN/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? <p>→ Yes LOCATE and RECTIFY break in circuit 31-HB1 (BK), between soldered connection S122 and soldered connection S109 using the Wiring Diagrams. CHECK the operation of the system.</p> <p>→ No LOCATE and RECTIFY break in circuit 15-HB1 (GN/BU), between soldered connection S123 and fuse F47 (CJB) using the Wiring Diagrams. CHECK the operation of the system.</p>
<p>N3: CHECK VOLTAGE SUPPLY TO LEFT WINDSHIELD WASHER NOZZLE HEATER FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Left-hand windshield washer nozzle heater from connector C721.</p> <p>3 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0016017</p>	<p>4 Measure voltage between left-hand windshield washer nozzle heater, connector C721, pin 1, circuit 15-HB13 (GN/BU), wiring harness side and ground.</p> <ul style="list-style-type: none"> Does the meter display battery voltage? → Yes GO to N4. → No LOCATE and RECTIFY break in circuit between soldered connection S123 and left-hand windshield washer nozzle heater using the Wiring Diagrams. CHECK the operation of the system.
<p>N4: CHECK GROUND SUPPLY TO LEFT WINDSHIELD WASHER NOZZLE HEATER FOR OPEN CIRCUIT</p>	
 <p>VFE0022794</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the left-hand windshield washer nozzle heater, connector C721, pin 2, circuit 31-HB13 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 2 ohms? → Yes RENEW the left-hand windshield washer nozzle heater. CHECK the operation of the system. → No LOCATE and RECTIFY break in circuit between left-hand windshield washer nozzle heater and soldered connection S122 using the Wiring Diagrams. CHECK the operation of the system.
<p>N5: CHECK VOLTAGE SUPPLY TO RIGHT WINDSHIELD WASHER NOZZLE HEATER FOR OPEN CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Right-hand windshield washer nozzle heater from connector C720.</p> <p>3 Ignition switch in position II.</p>

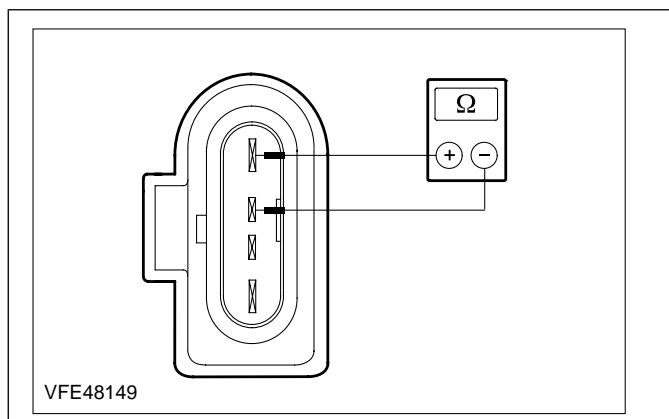
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VFE0016017</p>	<p>4 Measure voltage between right-hand windshield washer nozzle heater, connector C720, pin 1, circuit 15-HB26 (GN/RD), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Does the meter display battery voltage? → Yes GO to N6. → No LOCATE and RECTIFY break in circuit between soldered connection S123 and right-hand windshield washer nozzle heater using the Wiring Diagrams. CHECK the operation of the system.
<p>N6: CHECK GROUND SUPPLY TO RIGHT WINDSHIELD WASHER NOZZLE HEATER FOR OPEN CIRCUIT</p>	
 <p>VFE0022794</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the right-hand windshield washer nozzle heater, socket C720, pin 2, circuit 31-HB26 (BK), wiring harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 2 ohms? → Yes RENEW the right-hand windshield washer nozzle heater. CHECK the operation of the system. → No LOCATE and RECTIFY break in circuit between right-hand windshield washer nozzle heater and soldered connection S122 using the Wiring Diagrams. CHECK the operation of the system.

Component Tests

Front wiper motor

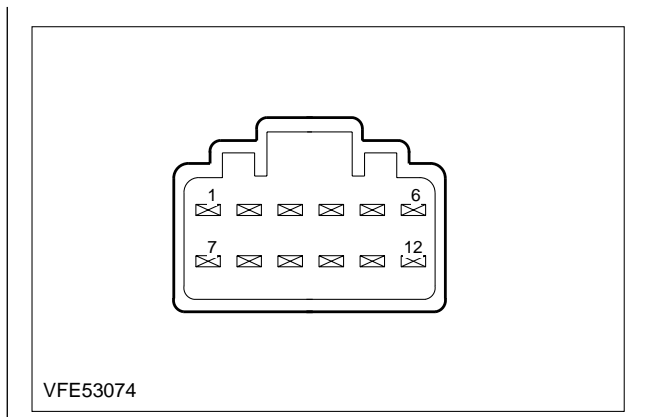
1. TEST the front windshield wiper motor in park position:
 - Measure the resistance at the front windscreen wiper motor between pin 3 and pin 4 (or the housing of the wiper motor).
 - Is the resistance less than 2 ohms?
 - If yes then the wiper motor is OK.
 - If not, RENEW the wiper motor.



DIAGNOSIS AND TESTING

Wash/wipe system switch

Pin assignment:

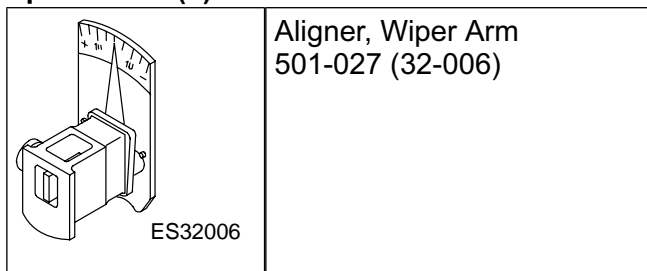


Circuit to test	Connect ohmmeter to the following terminal pins	Set the switch to the following position	The switch is OK if
Intermittent	3 and 12	Intermittent	Circuit closed
Variable delay	3 and 7	Intermittent level 1	Circuit closed
	3 and 9	Intermittent level 1	Circuit open
	3 and 11	Intermittent level 1	Circuit open
Variable delay	3 and 7	Intermittent level 2	Circuit closed
	3 and 9	Intermittent level 2	Circuit closed
	3 and 11	Intermittent level 2	Circuit open
Variable delay	3 and 7	Intermittent level 3	Circuit open
	3 and 9	Intermittent level 3	Circuit closed
	3 and 11	Intermittent level 3	Circuit open
Variable delay	3 and 7	Intermittent level 4	Circuit open
	3 and 9	Intermittent level 4	Circuit closed
	3 and 11	Intermittent level 4	Circuit closed
Variable delay	3 and 7	Intermittent level 5	Circuit closed
	3 and 9	Intermittent level 5	Circuit closed
	3 and 11	Intermittent level 5	Circuit closed
Variable delay	3 and 7	Intermittent level 6	Circuit closed
	3 and 9	Intermittent level 6	Circuit open
	3 and 11	Intermittent level 6	Circuit closed

GENERAL PROCEDURES

Windshield Wiper Blade and Pivot Arm Adjustment

Special Tool(s)



General Equipment

Aero-Wiper Measuring and Adjusting Tools AWPE 02 (Order No. 511 5124 001 00)

Vehicles without beam blade wipers

1. **CAUTION:** Make sure that the wiper motor is in the park position.

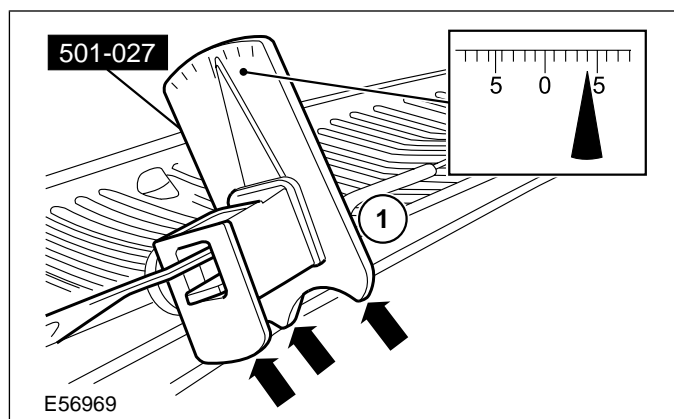
Remove the wiper blade.

2. Insert the wiper arm in the special tool and place the special tool on the windshield.
3. **NOTE:** All three support points of the special tool must be in contact with the glass.

NOTE: The angle of the wiper on the scale must point from the zero center line to the center of the windshield/rear window. Ignore the sign (+/-) on the alignment tool.

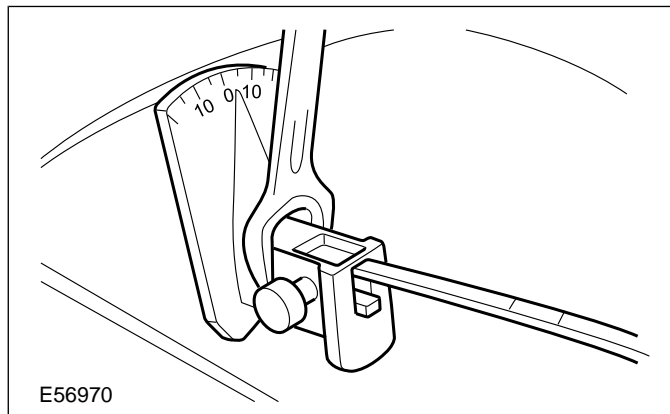
Using the special tool, read off the angle between the wiper arm and the windshield.

1. Center of windshield



4. **NOTE:** Lift the special tool away from the glass when correcting the angle, in order to prevent damage.

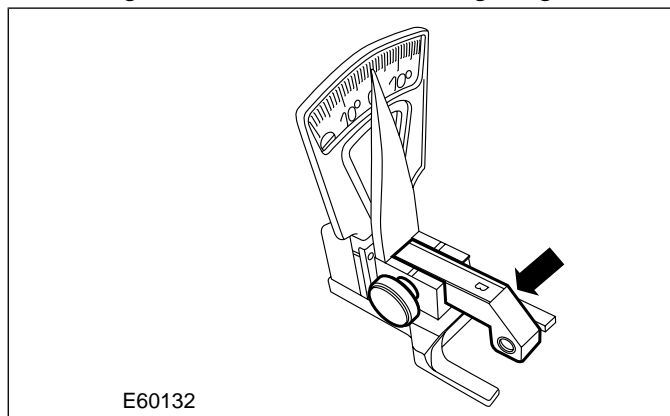
Using an open-ended wrench on the special tool, adjust the wiper arm. For additional information, refer to Specifications.



5. Remove the special tool.
6. Install the wiper blade.

Vehicles with beam blade wipers

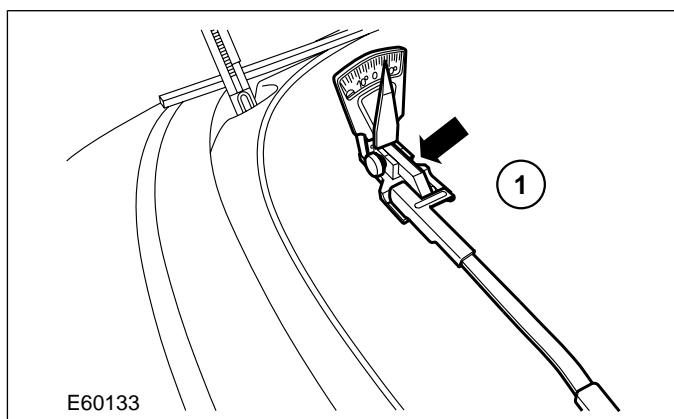
1. Connect the adapter "B" with the angle measuring instrument.
 - Tighten the knurled screw finger tight.



2. **CAUTION:** Make sure that the wiper motor is in the park position.
Remove the wiper blade.
3. Insert the wiper arm in the angle measuring instrument and place the angle measuring instrument on the windshield.

GENERAL PROCEDURES

1. Center of windshield



6. Remove the angle measuring instrument.

7. Install the wiper blade.

4. NOTE: All three support points of the angle measuring instrument must be in contact with the glass.

NOTE: The angle of the wiper on the scale must point from the zero center line to the center of the windshield/rear window. Ignore the sign (+/-) on the alignment tool.

Using the angle measuring instrument, read off the angle between the wiper arm and the windshield.

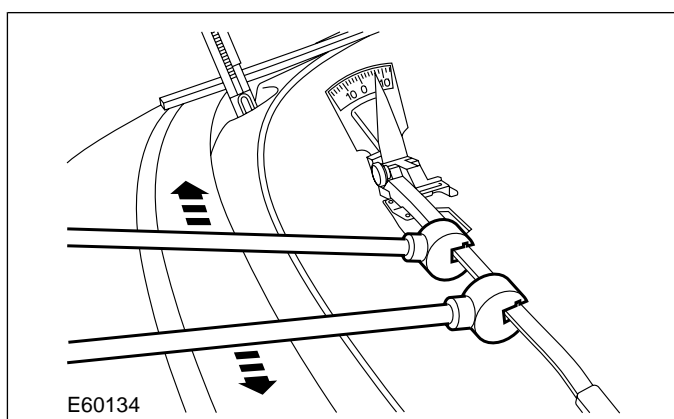
5. CAUTIONS:

⚠ Make sure that no mechanical force is applied to the wiper blade holder while adjusting the angle.

⚠ The wiper arm must not be adjusted by more than three degrees. If a bigger adjustment is necessary, check the wiper arm for damage, replace if necessary.

NOTE: Lift the angle measuring instrument away from the glass when correcting the angle, in order to prevent damage.

Using the adjusting tool and the counter holder, adjust the wiper arm. For additional information, refer to Specifications.

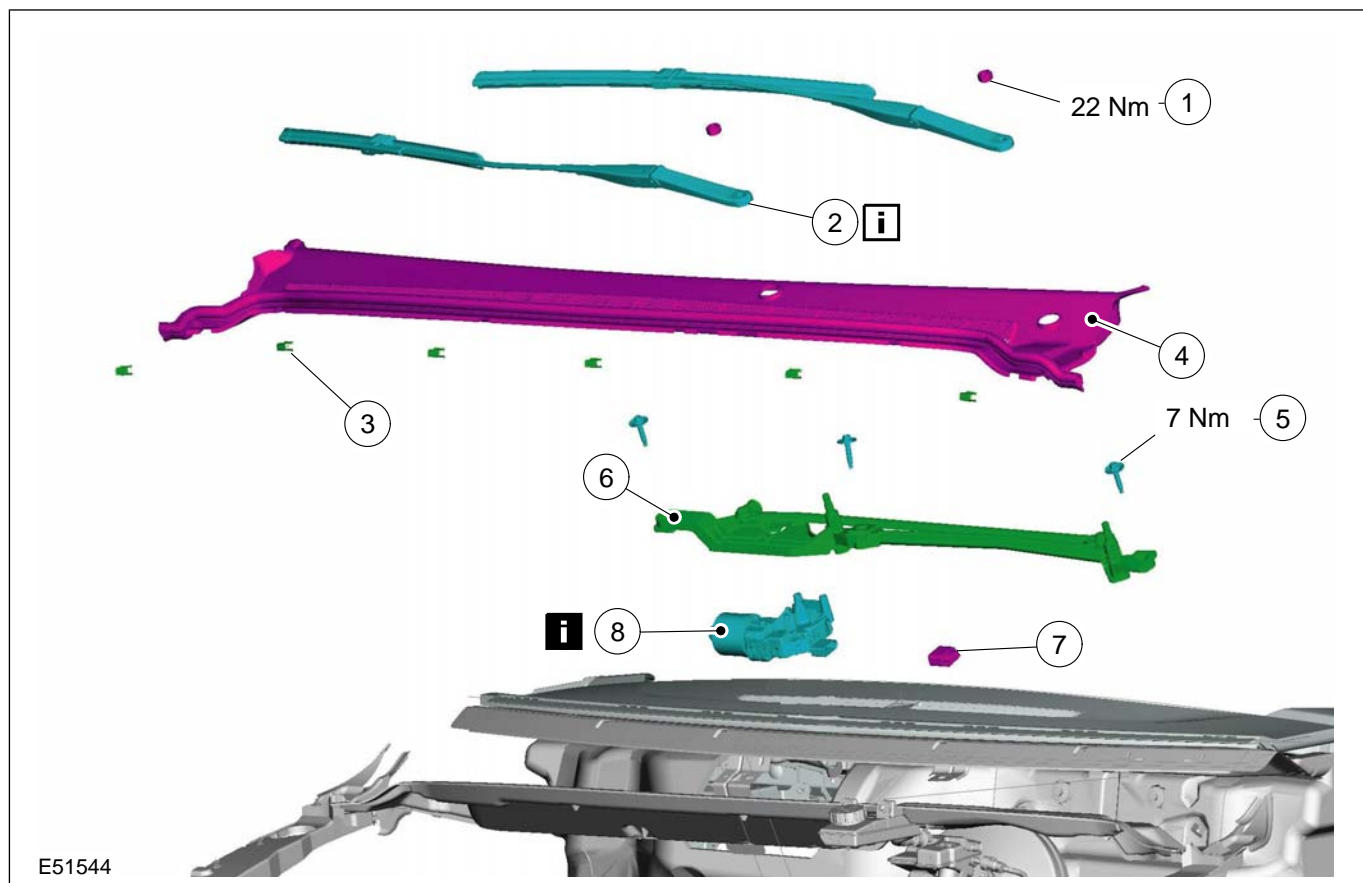


REMOVAL AND INSTALLATION

Windshield Wiper Motor

1. Remove the components in the order indicated in the following illustration(s) and table(s).

CAUTION: Make sure that the windshield wiper motor is in the park position.



E51544

Item	Description
1	Windshield wiper arm nuts
2	Windshield wiper arms See Installation Detail
3	Clips, cowl panel grille
4	Cowl panel grille
5	Bolts for windshield wiper motor with linkage
6	Front wiper linkage

Item	Description
7	Windshield wiper motor connector
8	Windshield wiper motor See Removal Detail

2. To install, reverse the removal procedure.

3. Check the angle of the windshield wiper arms in relation to the windshield.

For additional information, refer to: **Windshield Wiper Blade and Pivot Arm Adjustment (501-16, General Procedures)**.

Removal Details

501-16-63

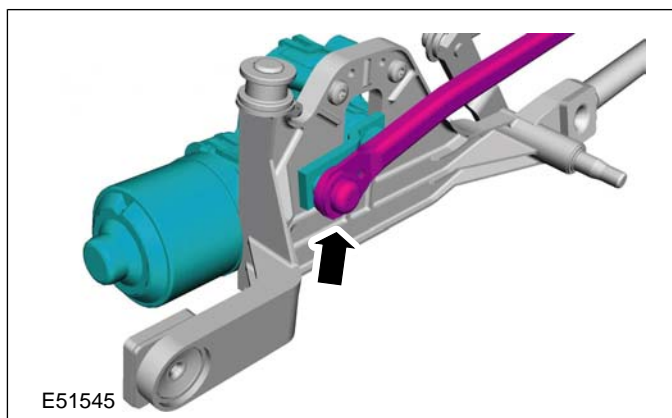
Wipers and Washers

501-16-63

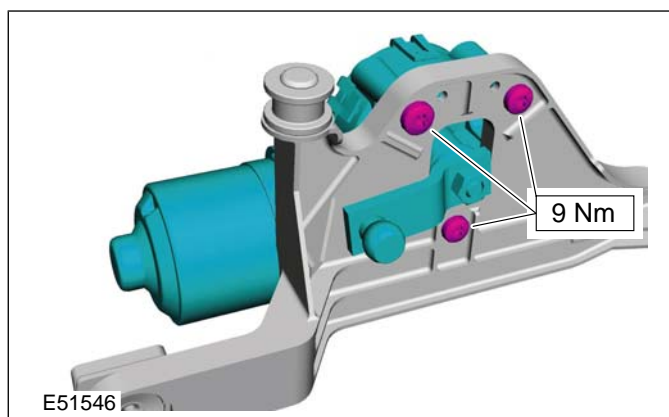
REMOVAL AND INSTALLATION

Item 8 Windshield wiper motor

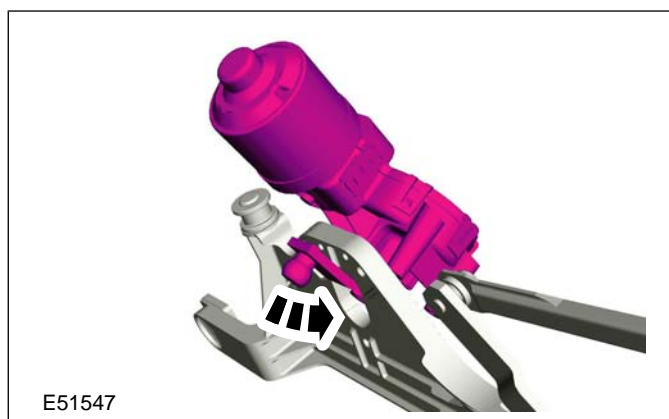
1. Detach the wiper linkage from the Windshield wiper motor lever arm.



2. Remove the windshield wiper motor bolts.



3. Pull windshield wiper motor from the wiper motor bracket.



Installation Details

Item 2 Windshield wiper arms

- ⚠ CAUTION:** Move the windshield wiper motor to park position before installing the windshield wiper arms.

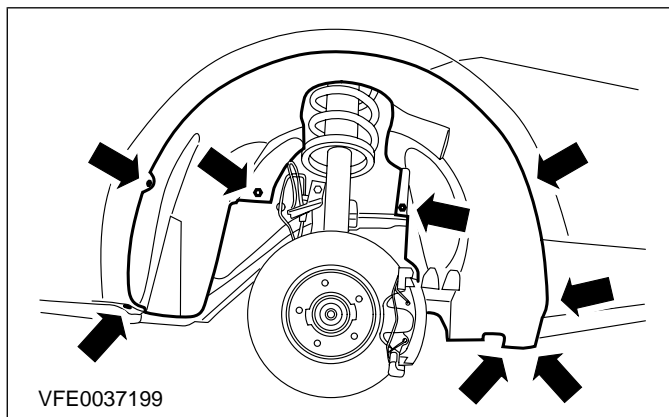
REMOVAL AND INSTALLATION

Windshield Washer Pump(32 624 0)

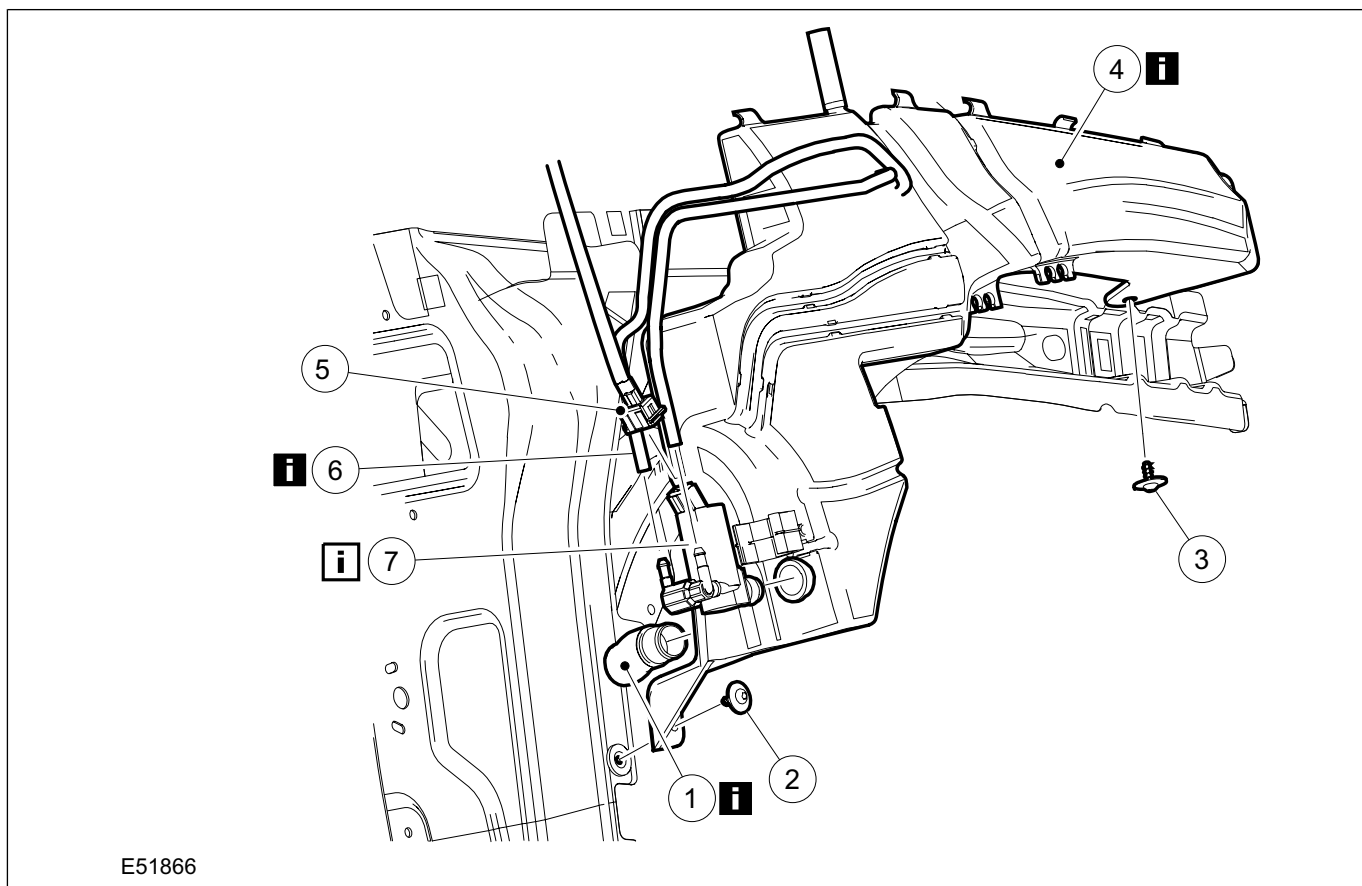
1. Empty the windshield washer reservoir.
2. Detach the right-hand front wheel.

For additional information, refer to: Wheel and Tire (204-04, Removal and Installation).

3. Remove the right-hand wheelhouse cover.



4. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Front windscreen washer lower reservoir connecting piece See Removal Detail
2	Windshield washer upper reservoir lower retaining bolt

Item	Description
3	Windshield washer upper reservoir upper retaining bolt
4	Windshield washer upper reservoir See Removal Detail
5	Front windscreen washer pump connector

REMOVAL AND INSTALLATION

Item	Description
6	Windshield washer pump hoses. See Removal Detail
7	Windshield washer pump

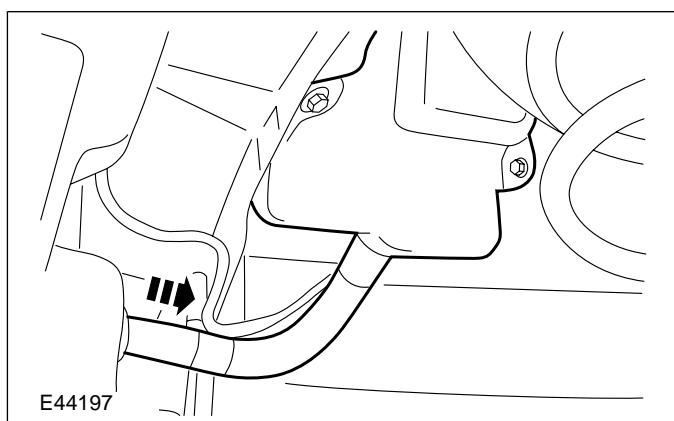
Item	Description
	See Installation Detail

5. To install, reverse the removal procedure.

Removal Details

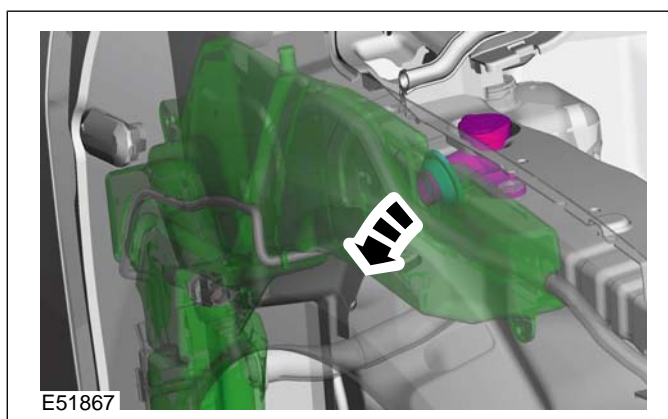
Item 1 Front windscreen washer lower reservoir connecting piece

1. Pull the connecting piece of the lower reservoir from the upper reservoir.



Item 4 Windshield washer upper reservoir

1. Pull the reservoir from the filler neck.



Item 6 Windshield washer pump hoses.

1. Unclip the reservoir hoses.

Installation Details

Item 7 Windshield washer pump

1. Coat the pump rubber seal – on the front windscreen washer with soap prior to installation.

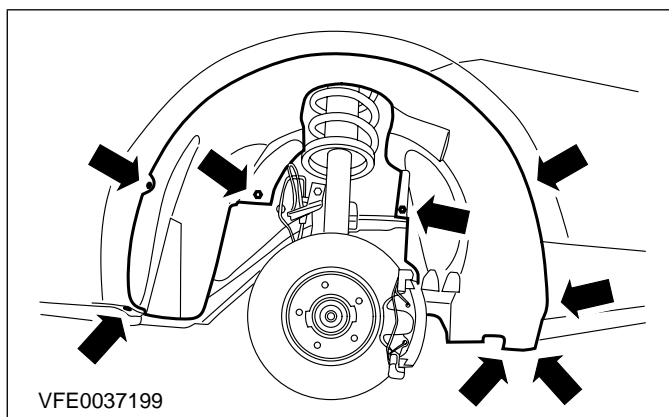
REMOVAL AND INSTALLATION

Windshield Washer Pump and Reservoir

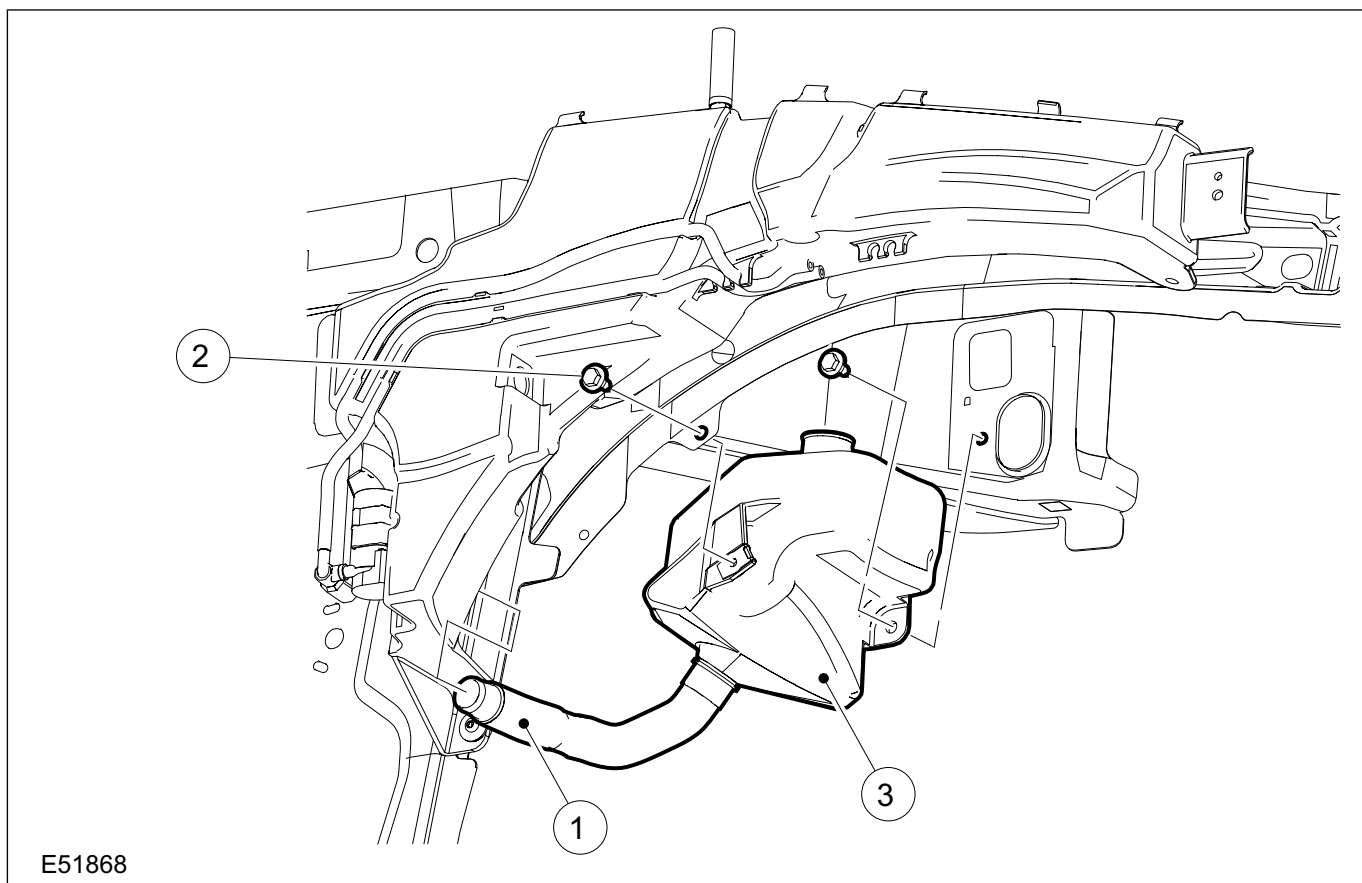
1. Empty the windshield washer reservoir.
2. Detach the right-hand front wheel.

For additional information, refer to: **Wheel and Tire** (204-04 Wheels and Tires, Removal and Installation).

3. Remove the right-hand wheelhouse cover.



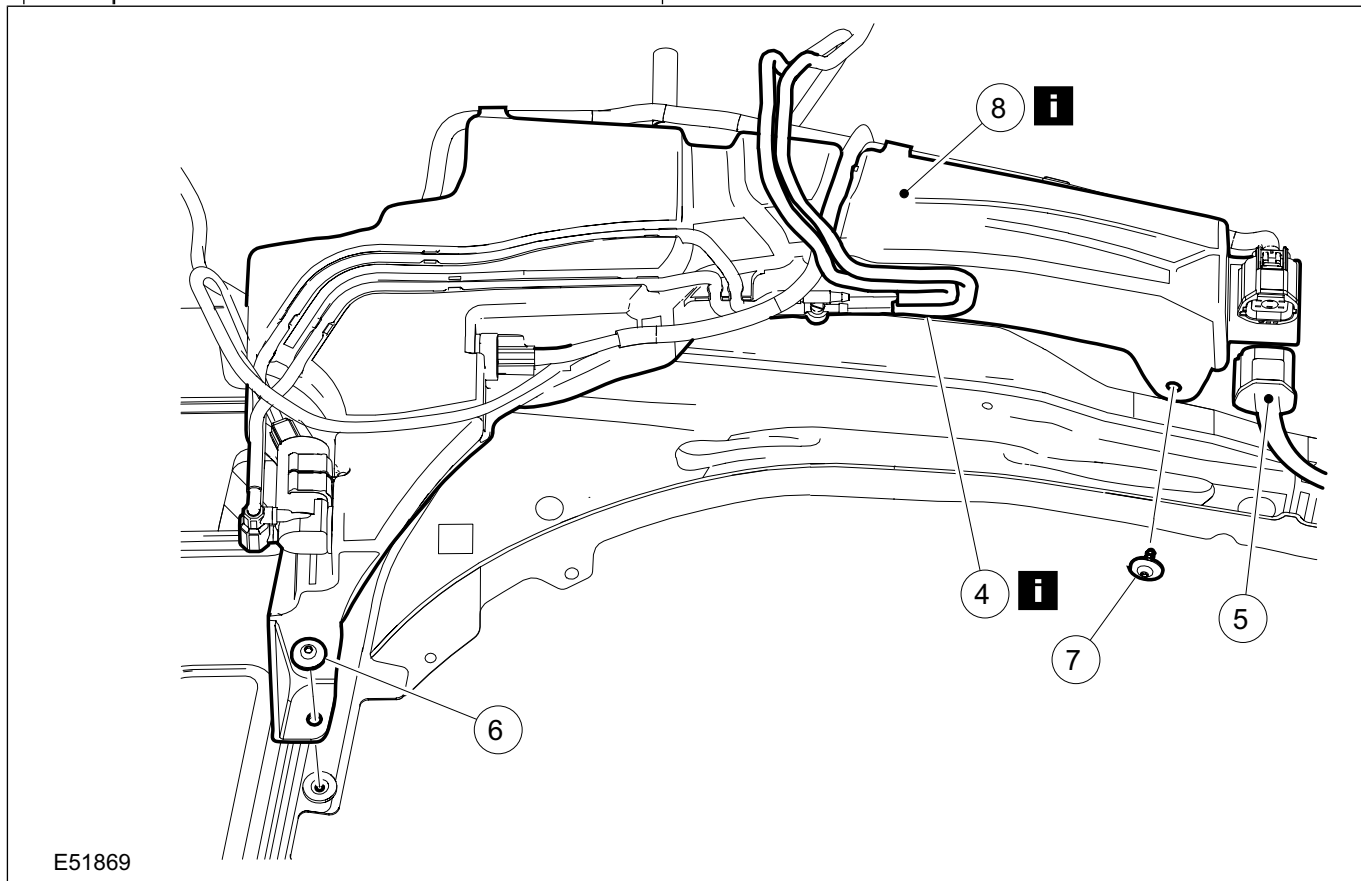
4. Remove the components in the order indicated in the following illustration(s) and table(s).



REMOVAL AND INSTALLATION

Item	Description
1	Front windscreen washer lower reservoir connecting piece
2	Front windscreen washer lower reservoir

Item	Description
	retaining bolts
3	Front windscreen washer lower reservoir



E51869

Item	Description
4	Windshield washer pump hoses. See Removal Detail
5	Front windscreen washer upper reservoir wiring harness connector
6	Windshield washer upper reservoir lower retaining bolt

Item	Description
7	Windshield washer upper reservoir upper retaining bolt
8	Windshield washer upper reservoir See Removal Detail

5. To install, reverse the removal procedure.

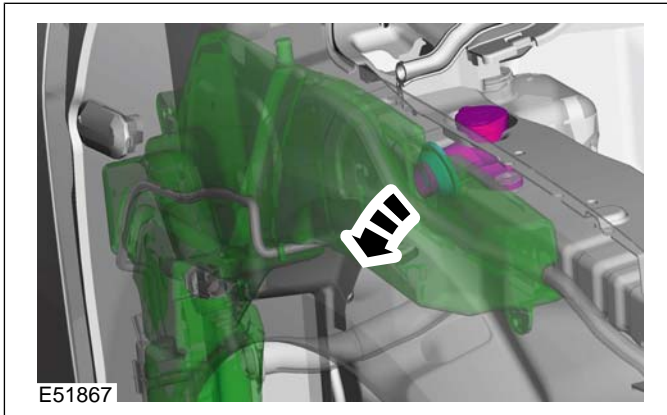
Removal Details

Item 4 Windshield washer pump hoses.

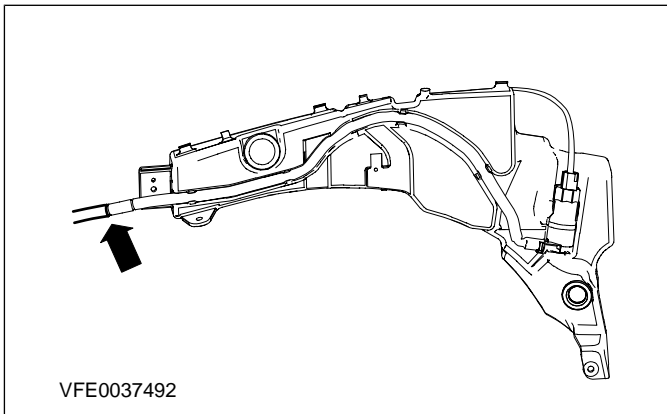
1. Unclip the reservoir hoses.

REMOVAL AND INSTALLATION**Item 8 Windshield washer upper reservoir**

1. Pull the reservoir from the filler neck.



2. Disconnect windshield washer pump hose (if fitted).

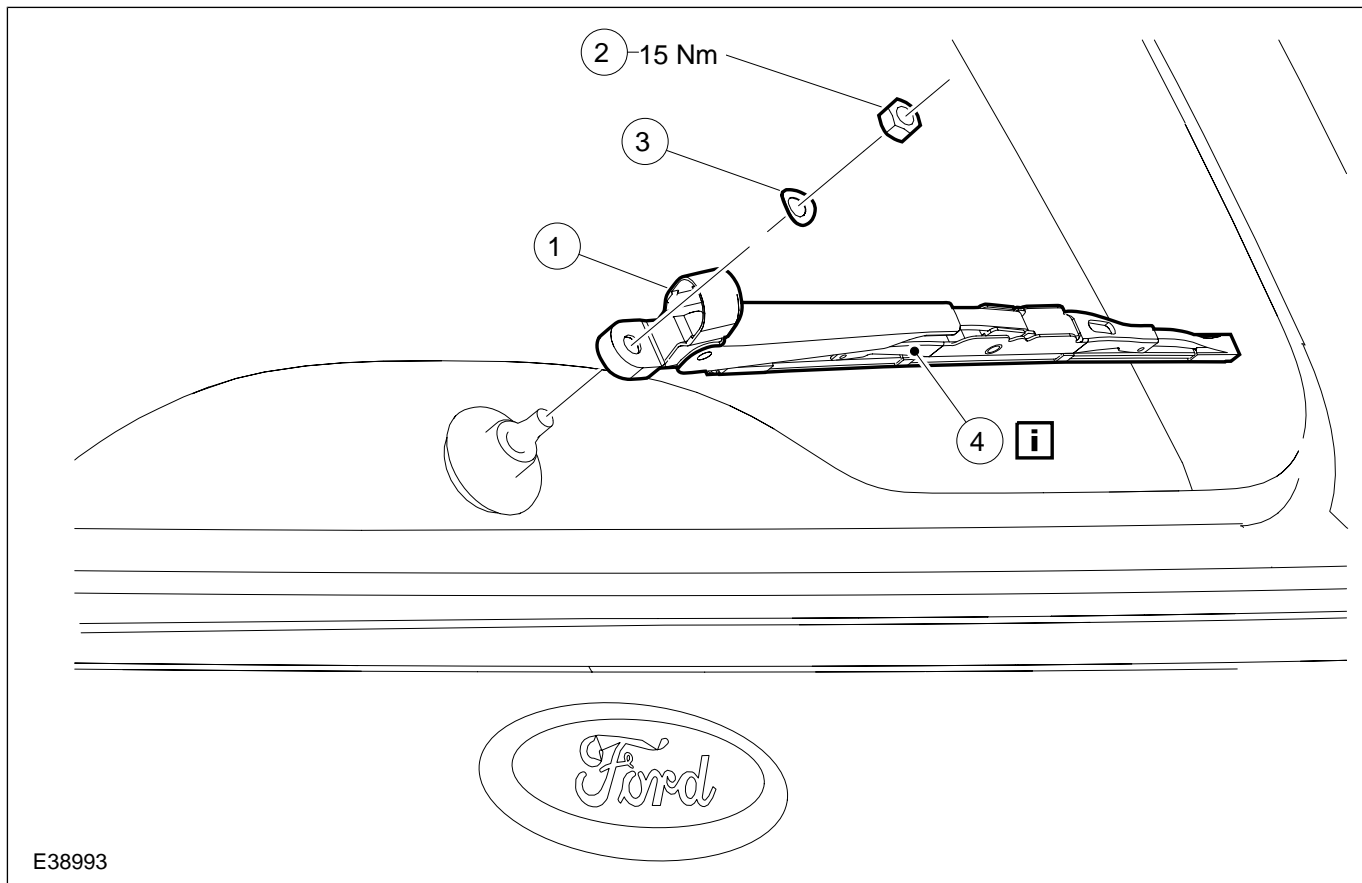


REMOVAL AND INSTALLATION

Rear Window Wiper Motor

⚠ CAUTION: Ensure that the wiper motor is in the park position.

1. Remove the components in the order indicated in the following illustration(s) and table(s).

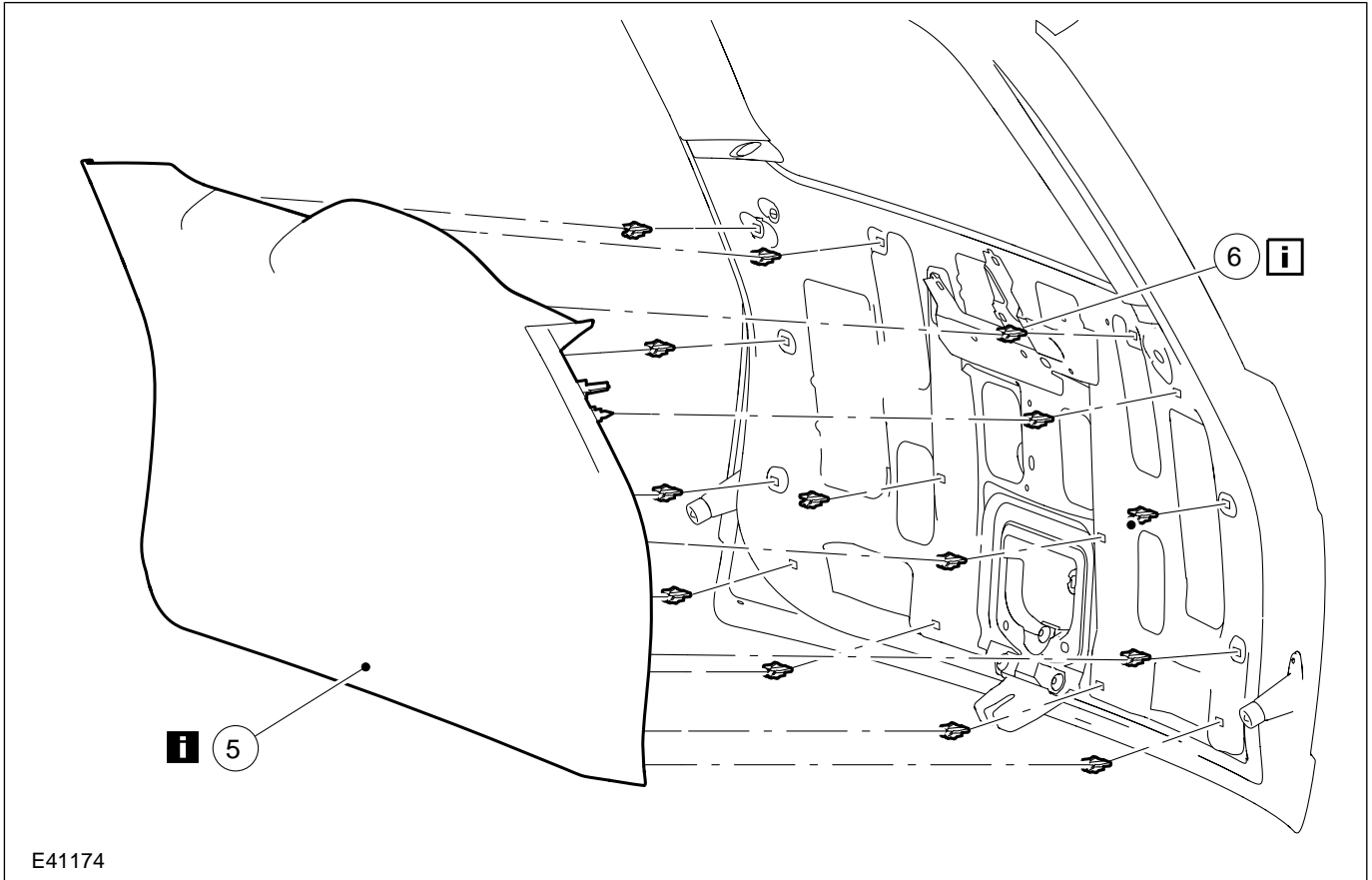


E38993

Item	Description
1	Cap of rear window wiper arm nut
2	Nut of rear window wiper arm

Item	Description
3	Washer of rear window wiper arm
4	Rear window wiper arm See Installation Detail

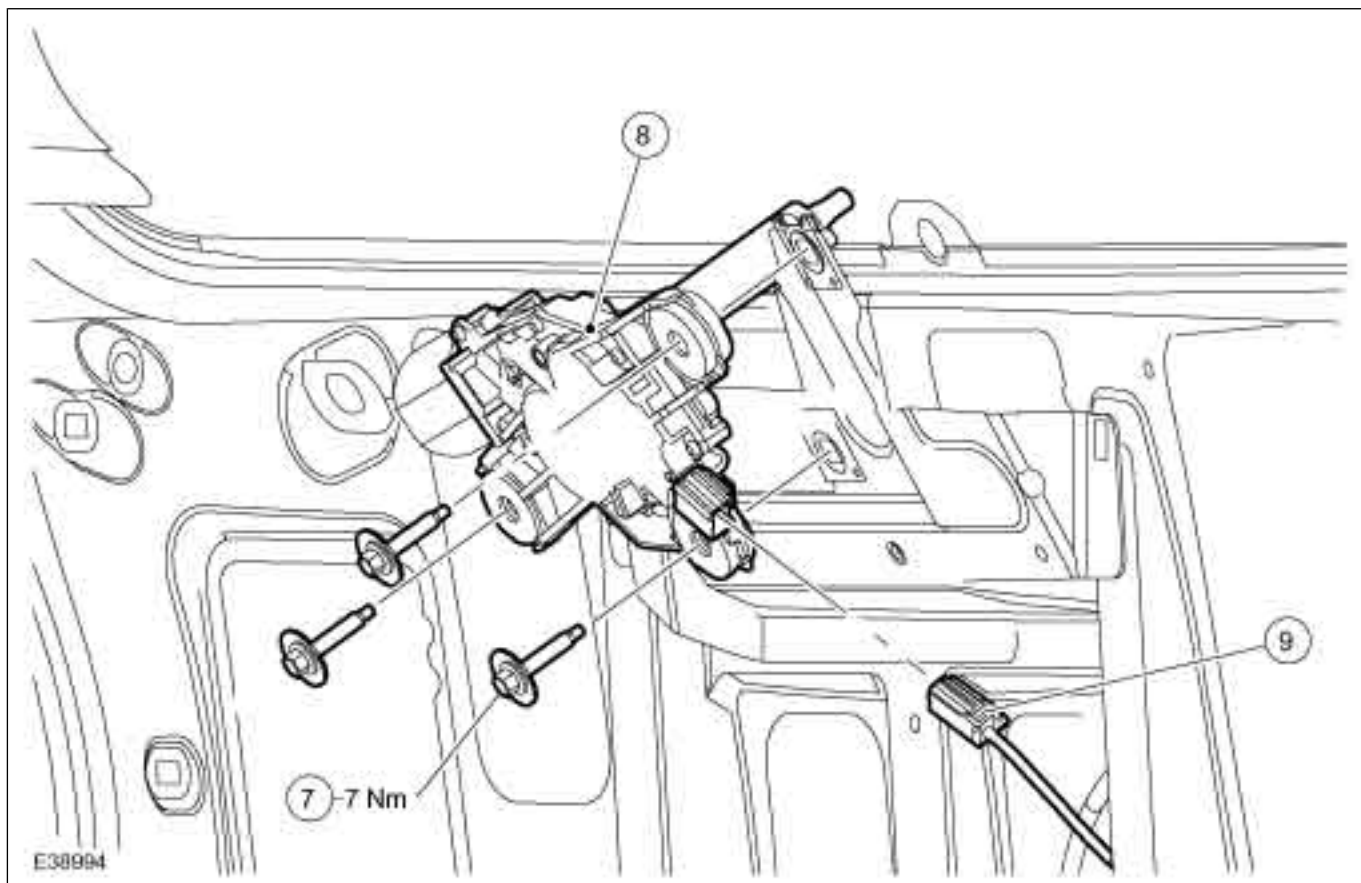
REMOVAL AND INSTALLATION



E41174

Item	Description
5	Liftgate trim panel <i>See Removal Detail</i>
6	Liftgate trim panel retaining clips <i>See Installation Detail</i>

REMOVAL AND INSTALLATION



Item	Description
7	Rear window wiper motor bolts
8	Rear window wiper motor
9	Rear window wiper motor connector

2. To install, reverse the removal procedure.


Removal Details

Item 5 Liftgate trim panel

1. Remove the liftgate trim panel bolts.



REMOVAL AND INSTALLATION**Installation Details****Item 4** Rear window wiper arm

 **CAUTION:** Move the rear window wiper motor to the park position before installing the rear window wiper arm.

Item 6 Liftgate trim panel retaining clips

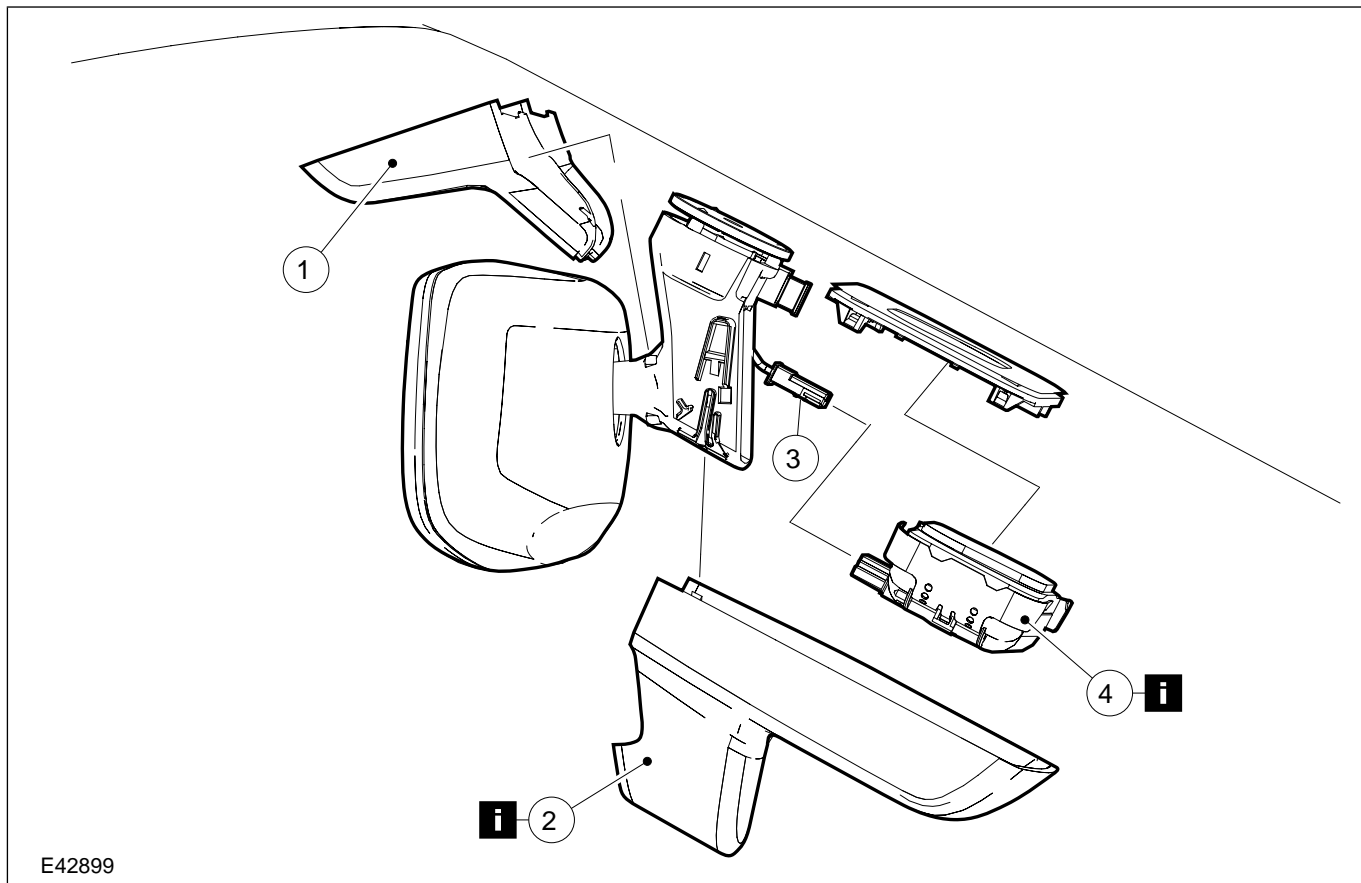
1. Install the liftgate trim panel retaining clips.

REMOVAL AND INSTALLATION

Rain Sensor

⚠ CAUTION: Do not touch the optical sensor silicon pads in order to prevent damage and dirt ingress.

1. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Upper mirror bracket cover
2	Lower mirror bracket cover See Removal Detail

Item	Description
3	Rain sensor connector
4	Rain sensor See Removal Detail

2. To install, reverse the removal procedure.

Removal Details

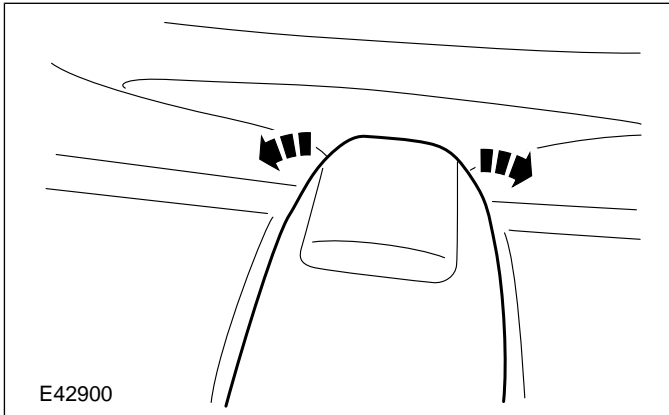
501-16-74

Wipers and Washers

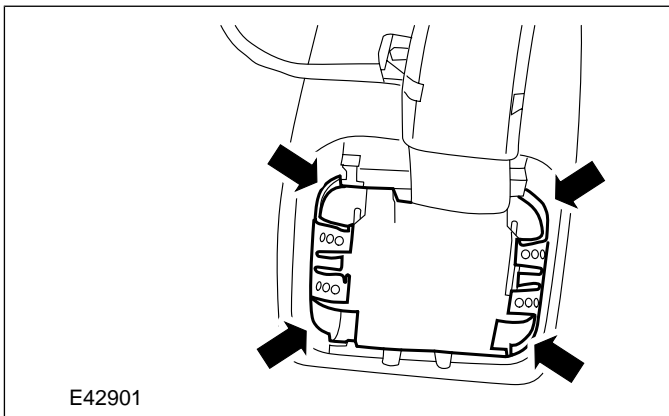
501-16-74

REMOVAL AND INSTALLATION**Item 2 Lower mirror bracket cover**

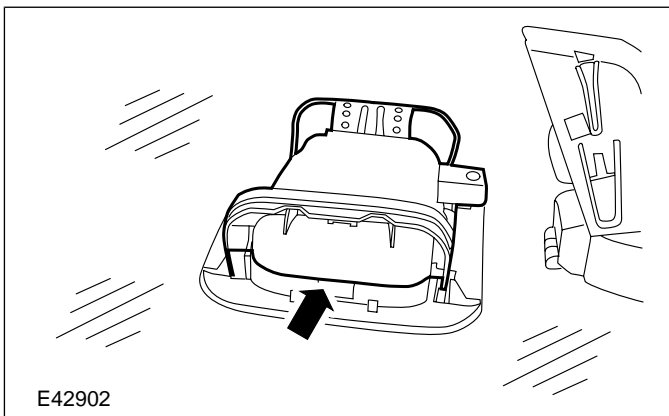
1. Unclip the lower mirror bracket cover.

**Item 4 Rain sensor**

1. Release the catches.



2. Unclip the rain sensor (right-hand side shown).



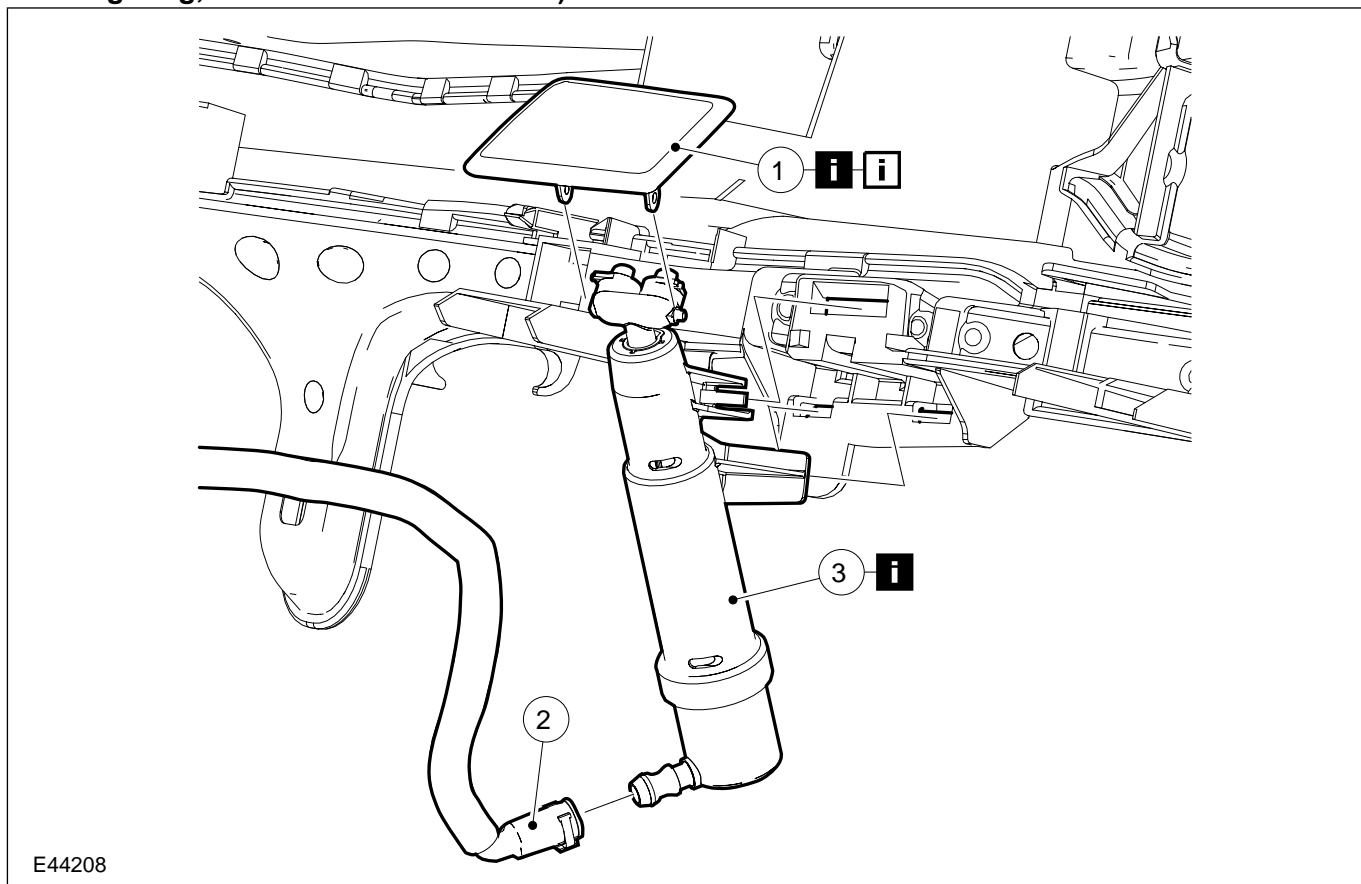
REMOVAL AND INSTALLATION

Headlamp Washer Jet(32 678 0)

1. Remove the headlamp assembly.

For additional information, refer to:
Headlamp Assembly (417-01 Exterior Lighting, Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



E44208

Item	Description
1	Cover, headlamp washer system nozzle See Removal Detail See Installation Detail
2	Headlamp washer jet pressure hose
3	Headlamp washer jet See Removal Detail

3. To install, reverse the removal procedure.

Removal Details

501-16-76

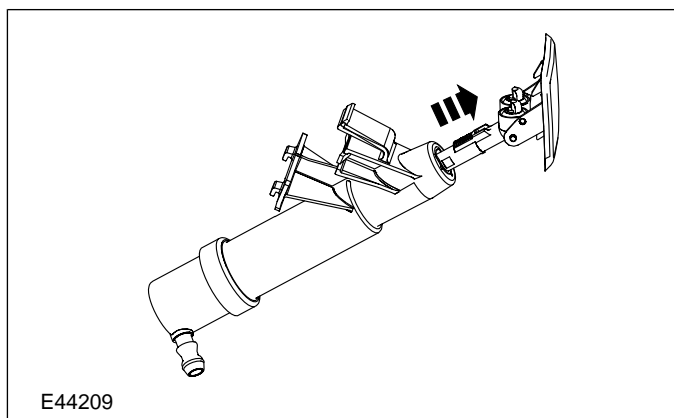
Wipers and Washers

501-16-76

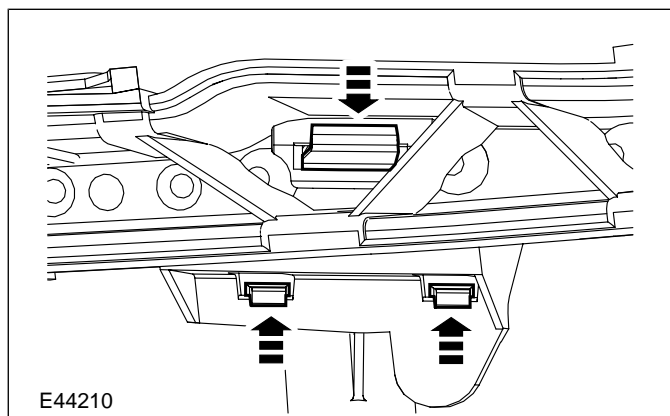
REMOVAL AND INSTALLATION

Item 1 Cover, headlamp washer system nozzle

1. Pull out and hold the headlamp washer jet telescopic rod.

**Item 3** Headlamp washer jet

1. Unclip the headlamp washer jet from behind.



Installation Details

Item 1 Cover, headlamp washer system nozzle

1. Push the headlamp washer jet cover together with the telescopic rod to the stop on the bumper cover.

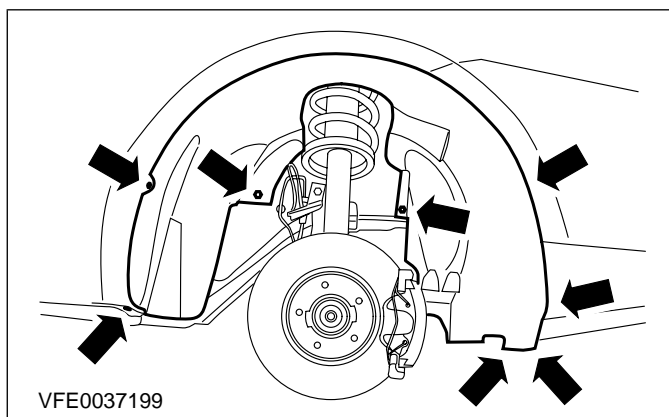
REMOVAL AND INSTALLATION

Headlamp Washer Pump

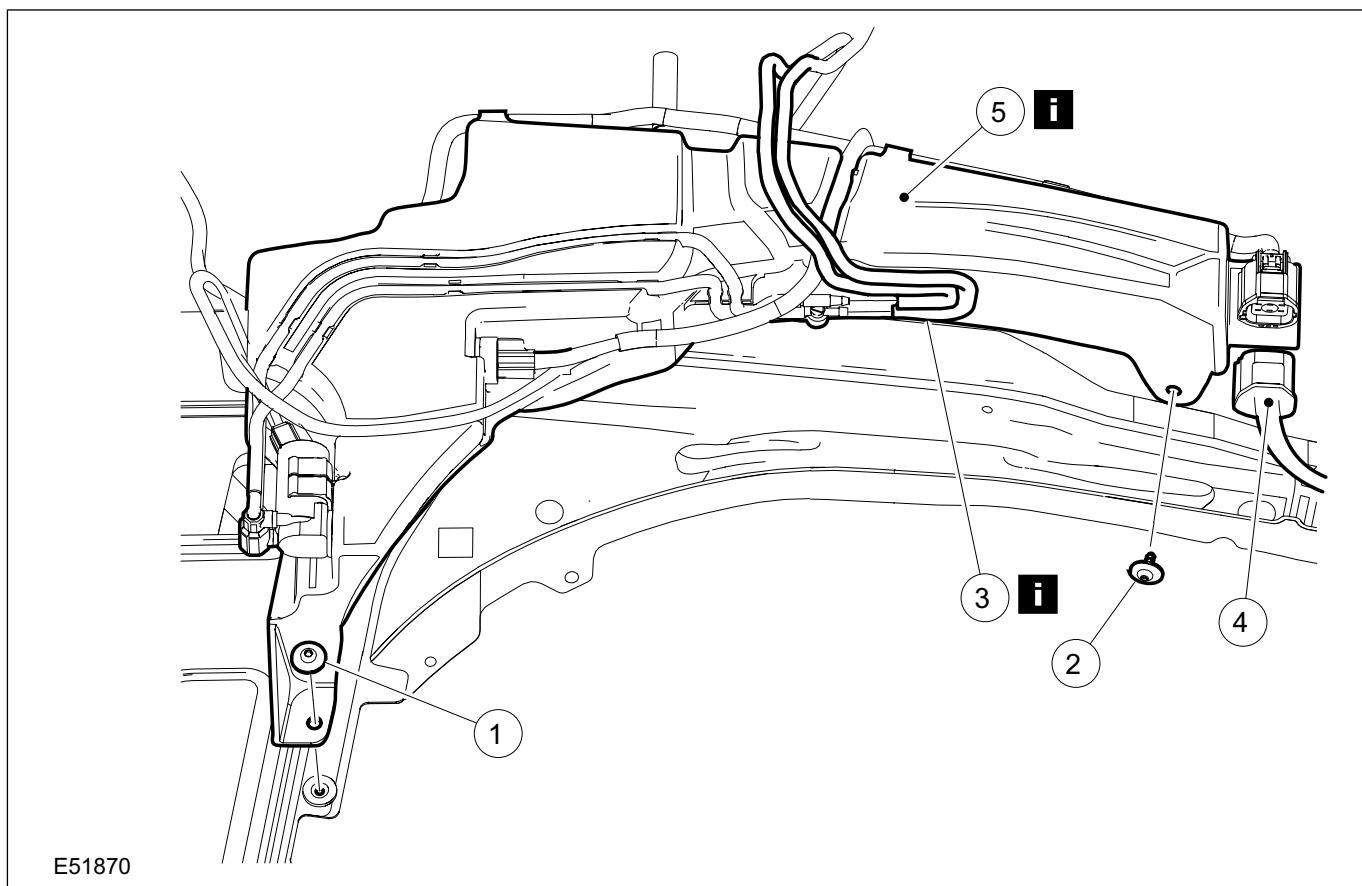
1. Empty the windshield washer reservoir.
2. Detach the right-hand front wheel.

For additional information, refer to: **Wheel and Tire (204-04** Wheels and Tires, Removal and Installation).

3. Remove the right-hand wheel arch trim panel.



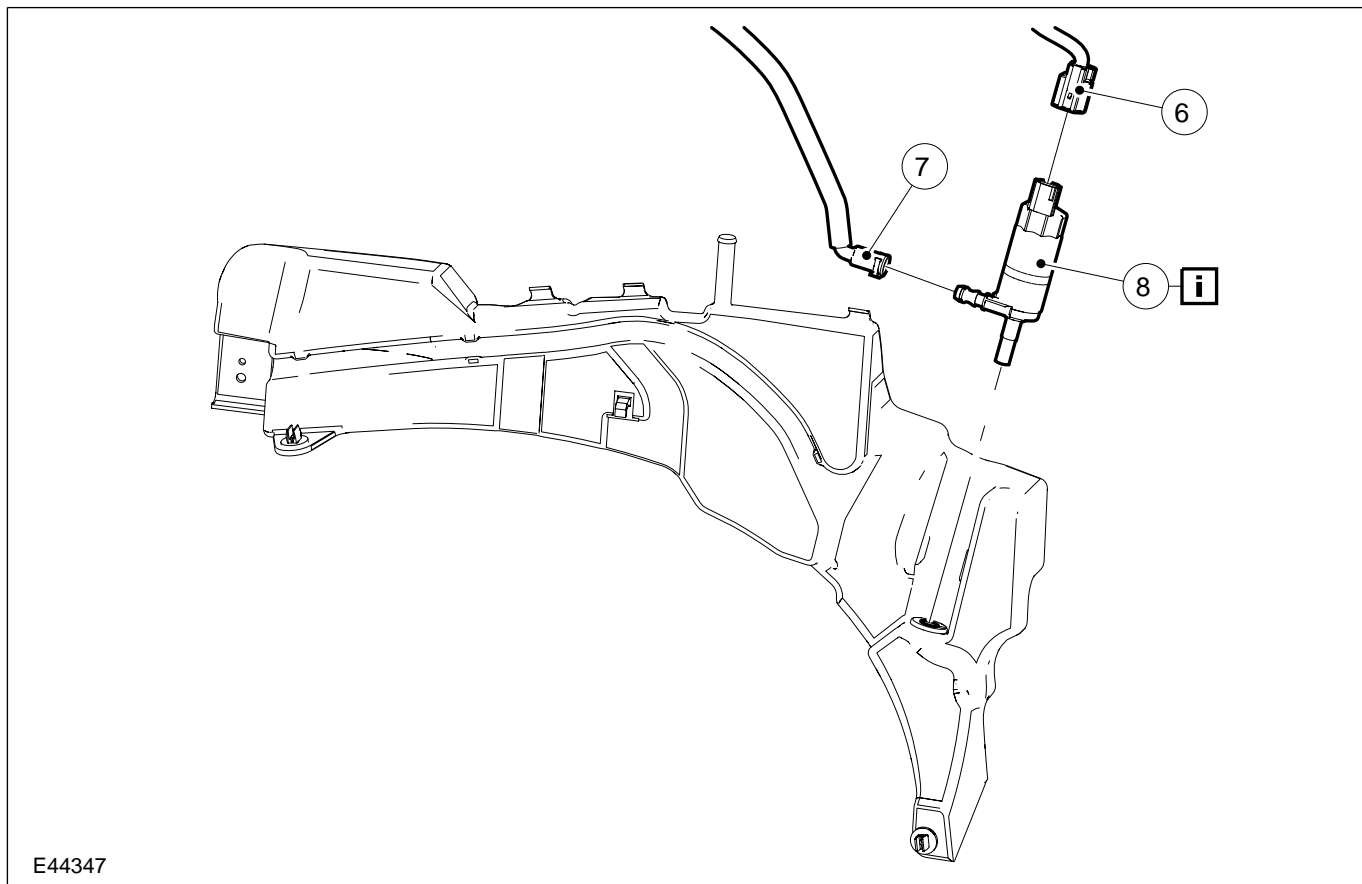
4. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Windshield washer upper reservoir lower retaining bolt
2	Windshield washer upper reservoir upper retaining bolt

Item	Description
3	Windshield washer pump hoses. See Removal Detail
4	Front windscreen washer pump connector
5	Windshield washer upper reservoir See Removal Detail

REMOVAL AND INSTALLATION



E44347

Item	Description
6	Headlamp washer pump connector
7	Headlamp washer pump hose –
8	Headlamp washer pump – See Installation Detail

5. To install, reverse the removal procedure.

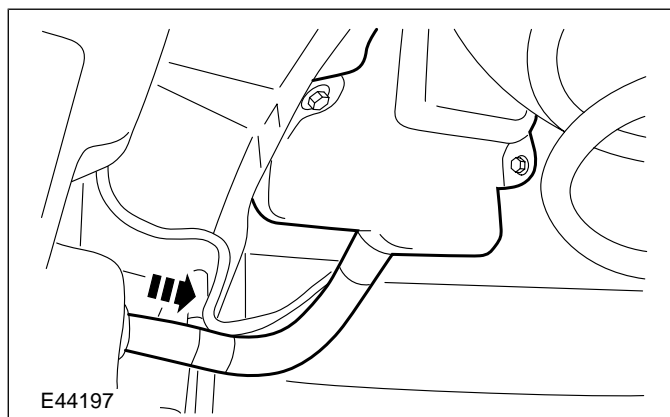
Removal Details

Item 3 Windshield washer pump hoses.

1. Unclip the reservoir hoses.

Item 5 Windshield washer upper reservoir

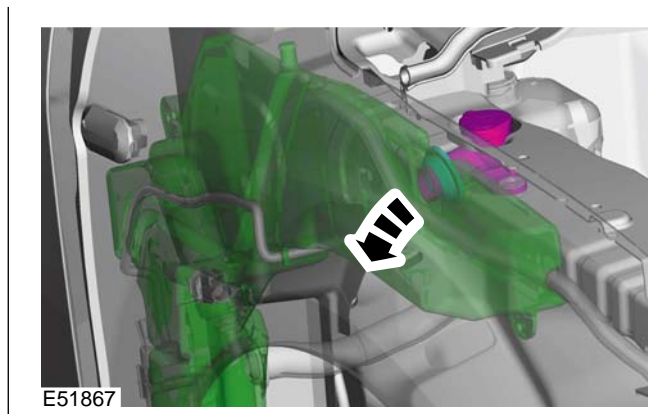
1. Pull the connecting piece of the lower reservoir from the upper reservoir.



E44197

REMOVAL AND INSTALLATION

2. Pull the reservoir from the filler neck.

**Installation Details****Item 8 Headlamp washer pump –**

1. Coat the pump rubber seal on the headlamp washer with soap solution prior to installation.

SECTION 501-17 Roof Opening Panel

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Passenger Side Roof Opening Panel Front Drain Hose.....	501-17-31

SPECIFICATIONS**Torque Specifications**

Item	Nm	lb-ft	lb-in
Roof opening panel frame retaining screws	6	-	53
Roof opening panel frame locking clamp retaining screws	6	-	53
Roof opening panel motor retaining screws	3	-	27
Roof opening panel glass retaining screws	3	-	27

DIAGNOSIS AND TESTING

Roof Opening Panel

General Equipment

Worldwide diagnostic system (WDS)

Roof Opening Panel

Refer to Wiring Diagrams Section 501-17, for schematic and connector information.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> • Roof opening panel • Seal(s) • Weatherstrip • Alignment 	<ul style="list-style-type: none"> • Fuse(s) • Electrical connector(s)

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Symptom Chart

Symptom Chart

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • The roof opening panel leaks 	<ul style="list-style-type: none"> • Drain tubes. 	<ul style="list-style-type: none"> • CHECK the drain tubes for blockage or obstruction. CARRY OUT the Water Drainage System Check and Water Leak Corrections. <p>REFER to: Water Drainage System Check and Water Leak Corrections (501-17 Roof Opening Panel, General Procedures).</p>
<ul style="list-style-type: none"> • The roof opening panel rattles 	<ul style="list-style-type: none"> • Headliner. 	<ul style="list-style-type: none"> • CHECK the headliner for security. <p>REFER to: Headliner - 3-Door, Vehicles With: Sliding Roof Opening Panel (501-05 Interior Trim and Ornamentation, Removal and Installation).</p>
	<ul style="list-style-type: none"> • Guides and track. 	<ul style="list-style-type: none"> • CHECK for worn or damaged components. CARRY OUT the Roof Opening Panel Alignment. <p>REFER to: Roof Opening Panel Alignment (501-17 Roof Opening Panel, General Procedures).</p>

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> The roof opening panel is noisy during operation 	<ul style="list-style-type: none"> Guides and track. Motor. Roof Opening Panel Glass. 	<ul style="list-style-type: none"> CHECK for worn or damaged components. CARRY OUT the Roof Opening Panel Alignment. REFER to: Roof Opening Panel Alignment (501-17 Roof Opening Panel, General Procedures).
<ul style="list-style-type: none"> The roof opening panel does not open or close 	<ul style="list-style-type: none"> Switch. 	<ul style="list-style-type: none"> CARRY OUT the Roof Opening Panel Control Switch Component Test in this section.
	<ul style="list-style-type: none"> Motor. 	<ul style="list-style-type: none"> CARRY OUT the Roof Opening Panel Motor Initialization. REFER to: Roof Opening Panel Motor Initialization (501-17 Roof Opening Panel, General Procedures).
	<ul style="list-style-type: none"> Circuits. 	<ul style="list-style-type: none"> GO to Pinpoint Test A.
<ul style="list-style-type: none"> The roof opening panel does not stop in flush from any position 	<ul style="list-style-type: none"> Guides and track. 	<ul style="list-style-type: none"> CHECK for worn or damaged components. CARRY OUT the Roof Opening Panel Alignment. REFER to: Roof Opening Panel Alignment (501-17 Roof Opening Panel, General Procedures).
	<ul style="list-style-type: none"> Motor. 	<ul style="list-style-type: none"> CARRY OUT the Roof Opening Panel Motor Initialization. REFER to: Roof Opening Panel Motor Initialization (501-17 Roof Opening Panel, General Procedures).
<ul style="list-style-type: none"> The roof opening panel shows unexpected bounce back at high speed 	<ul style="list-style-type: none"> Motor. Circuit(s). 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
<ul style="list-style-type: none"> No communication with the global closing module 	<ul style="list-style-type: none"> Global closing module. Motor. Circuit. 	<ul style="list-style-type: none"> GO to Pinpoint Test C.

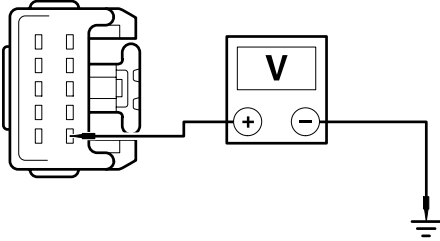
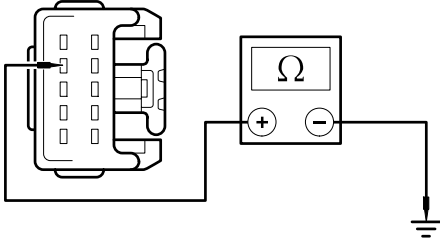
Pinpoint Tests

NOTE: Use a digital multimeter for all electrical measurements.

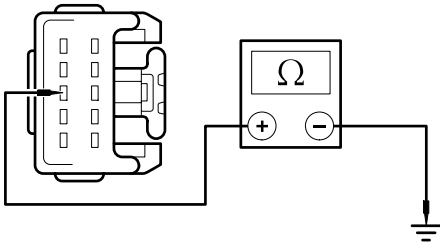
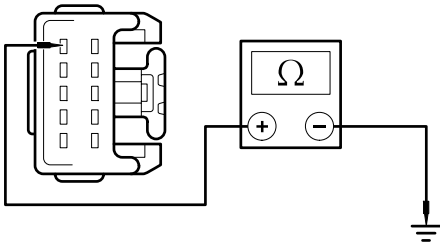
PINPOINT TEST A : THE ROOF OPENING PANEL DOES NOT OPEN OR CLOSE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK FOR VOLTAGE TO THE ROOF OPENING PANEL CONTROL SWITCH	
	1 Ignition switch in position II.

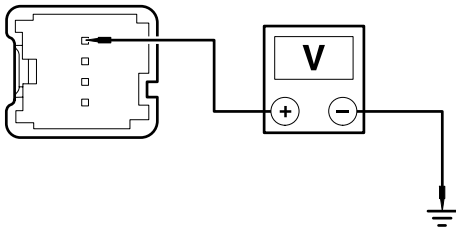
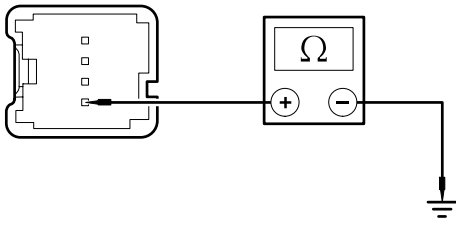
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 CHECK the operation of the roof opening panel control switch lamp.</p> <ul style="list-style-type: none"> Does the roof opening panel control switch lamp illuminate? <p>→ Yes GO to A2.</p> <p>→ No GO to A6.</p>
<p>A2: CHECK THE SUPPLY VOLTAGE TO THE ROOF OPENING PANEL CONTROL UNIT, CIRCUIT 29-AG12 (OG/BK)</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Fuse 40 (20A).</p> <p>3 Disconnect Roof Opening Panel Control Unit C525.</p> <p>4 Connect Fuse 40 (20A).</p>
 <p>TIE0020841</p>	<p>5 Measure the voltage between the roof opening panel control unit C525 pin 1, circuit 29-AG12 (OG/BK), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <p>→ Yes GO to A3.</p> <p>→ No REPAIR circuit 29-AG12 (OG/BK). TEST the system for normal operation.</p>
<p>A3: CHECK THE ROOF OPENING PANEL CONTROL SWITCH DOWN/OPEN GROUND CIRCUIT</p>	
	<p>1 Operate the roof opening panel control switch to the DOWN/OPEN position and keep it pressed.</p>
 <p>TIE0020843</p>	<p>2 Measure the resistance between the roof opening panel control unit C525 pin 9, circuit 31S-AG27 (BK/WH), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 100 ohms? <p>→ Yes GO to A4.</p> <p>→ No REPAIR circuit 31S-AG27 (BK/WH). TEST the system for normal operation.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A4: CHECK THE ROOF OPENING PANEL CONTROL SWITCH UP/CLOSE GROUND CIRCUIT	
 <p>TIE0020842</p>	<ol style="list-style-type: none"> 1 Operate the roof opening panel control switch to the UP/CLOSE position and keep it pressed. 2 Measure the resistance between the roof opening panel control unit C525 pin 8, circuit 31S-AG7 (BK/BU), harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 100 ohms? → Yes GO to A5. → No REPAIR circuit 31S-AG7 (BK/BU). TEST the system for normal operation.
A5: CHECK THE ROOF OPENING PANEL CONTROL UNIT GROUND CIRCUIT	
 <p>TIE0020846</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the roof opening panel control unit C525 pin 10, circuit 31-AG12 (BK), harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes INSTALL a new roof opening panel motor. REFER to: Roof Opening Panel Motor (501-17 Roof Opening Panel, Removal and Installation). TEST the system for normal operation. → No REPAIR circuit 31-AG12 (BK). TEST the system for normal operation.
A6: CHECK THE VOLTAGE TO THE ROOF OPENING PANEL CONTROL SWITCH LAMP, CIRCUIT 15-AG7 (GN/BU)	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Roof Opening Panel Control Switch C522. 3 Ignition switch in position II.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0037447</p>	<p>4 Measure the voltage between the roof opening panel control switch C522 pin 1, circuit 15-AG7 (GN/BU), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <ul style="list-style-type: none"> → Yes GO to A7. → No REPAIR circuit 15-AG7 (GN/BU). TEST the system for normal operation.
A7: CHECK THE ROOF OPENING PANEL CONTROL SWITCH GROUND CIRCUIT	
 <p>TIE0037448</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the roof opening panel control switch C522 pin 4, circuit 31-AG7 (BK), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes VERIFY the customer concern. → No REPAIR circuit 31-AG7 (BK). TEST the system for normal operation.

PINPOINT TEST B : THE ROOF OPENING PANEL SHOWS UNEXPECTED BOUNCE BACK AT HIGH SPEED

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK THE OPERATION OF THE MULTIFUNCTION DISPLAY	
	<p>1 Drive the vehicle.</p> <p>2 Observe the multi-function display 'Average speed' function.</p> <ul style="list-style-type: none"> Does the display operate correctly? <ul style="list-style-type: none"> → Yes GO to B2. → No REFER to: Instrument Cluster (413-01 Instrument Cluster, Diagnosis and Testing).
B2: CHECK FOR A SHORT TO GROUND	
	<p>1 Disconnect Roof Opening Panel Control Unit C525.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect Central Junction Box C98.</p> <p>3 Measure the resistance between the roof opening panel control unit C525 pin 6, circuit 8-GB8 (WH/BU), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? → Yes GO to B3. → No REPAIR circuit 8-GB8 (WH/BU). TEST the system for normal operation.

B3: CHECK FOR CONTINUITY BETWEEN THE CENTRAL JUNCTION BOX (CJB) AND THE ROOF OPENING PANEL CONTROL UNIT

	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the central junction box C98 pin 8, circuit 8-GB8 (WH/BU), harness side and the roof opening panel control unit C525 pin 6, circuit 8-GB8 (WH/BU), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes Install a new roof opening panel motor. REFER to: Roof Opening Panel Motor (501-17 Roof Opening Panel, Removal and Installation). TEST the system for normal operation. → No REPAIR circuit 8-GB8 (WH/BU). TEST the system for normal operation.

PINPOINT TEST C : NO COMMUNICATION WITH THE GLOBAL CLOSING MODULE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: CHECK OPERATION OF THE GLOBAL CLOSING	
	<p>1 Operate the global closing function.</p> <ul style="list-style-type: none"> • Do the door windows close? → Yes GO to C2. → No Refer to WDS.
C2: CHECK FOR A SHORT TO GROUND	
	<p>1 Disconnect Roof Opening Panel Control Unit C525.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect Central Junction Box C98.</p> <p>3 Measure the resistance between the roof opening panel control unit C525 pin 2, circuit 8-AG12 (WH/GN), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? → Yes GO to C3. → No REPAIR circuit 8-AG12 (WH/GN). TEST the system for normal operation.
<p>C3: CHECK FOR CONTINUITY BETWEEN THE CENTRAL JUNCTION BOX (CJB) AND THE ROOF OPENING PANEL CONTROL UNIT</p>	
	<p>1 Measure the resistance between the central junction box C98 pin 2, circuit 8-AG12 (WH/GN), harness side and the roof opening panel control unit C525 pin 2, circuit 8-AG12 (WH/GN), harness side.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes Install a new roof opening panel motor. REFER to: Roof Opening Panel Motor (501-17 Roof Opening Panel, Removal and Installation). → No REPAIR circuit 8-AG12 (WH/GN). TEST the system for normal operation.

Components Tests

Roof Opening Panel Control Switch

1. Measure the resistance between the following:

Roof Opening Panel Control Switch Position	Roof Opening Panel Control Switch Terminals		Measurements
	Multimeter Positive Lead	Multimeter Negative Lead	
Neutral	1	2	Greater than 10,000 ohms
Neutral	1	3	Greater than 10,000 ohms
Neutral	1	4	Less than 100 ohms
Neutral	4	1	Greater than 10,000 ohms
First detente Up/Close	2	4	Less than 5 ohms

DIAGNOSIS AND TESTING

Roof Opening Panel Control Switch Position	Roof Opening Panel Control Switch Terminals		Measurements
	Multimeter Positive Lead	Multimeter Negative Lead	
Fully Up/Close	2	4	Less than 5 ohms
First detente Down/Open	2	4	Greater than 10,000 ohms
Fully Down/Open	2	4	Less than 5 ohms
First detente Down/Open	3	4	Less than 5 ohms
Fully Down/Open	3	4	Less than 5 ohms
First detente Up/Close	3	4	Greater than 10,000 ohms
Fully Up/Close	3	4	Less than 5 ohms

- If all measurements of the roof opening panel control switch are as noted, return to the Pinpoint Test. Otherwise install a new roof opening panel control switch.

GENERAL PROCEDURES**Water Drainage System Check and Water Leak
Corrections(41 002 0)**

1. If a drain hose blockage or obstruction is suspected, check the drain hoses by pouring 500 ml of water into the drain trough and checking the flow from under the vehicle rocker panels. Attempt to clear any blockage or obstruction using a drain clearing wire (nylon). If the blockage or obstruction cannot be cleared the drain hose must be removed.

For additional information, refer to Roof
**Opening Panel Front Drain Hose -
/ Roof Opening Panel Rear Drain Hose -** in
this section.

2. If a drain hose leak is suspected the drain hose must be removed and inspected for cracks or splits.

For additional information, refer to Roof
**Opening Panel Front Drain Hose -
/ Roof Opening Panel Rear Drain Hose -** in
this section.

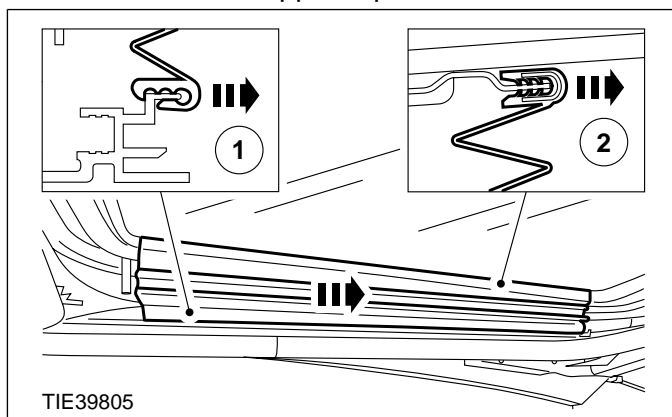
GENERAL PROCEDURES

Roof Opening Panel Alignment(41 113 0)

1. **NOTE:** The roof opening panel must be in the closed position for alignment.

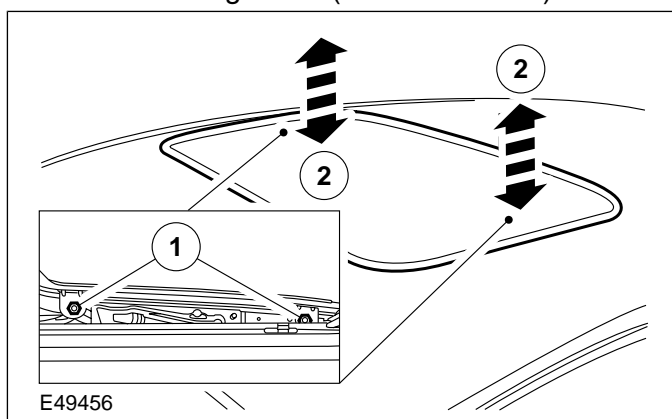
Starting at the rear of the roof opening panel, remove the roof opening panel guide arm covers (left-hand side shown).

1. Release the lower clip.
2. Release the upper clip.



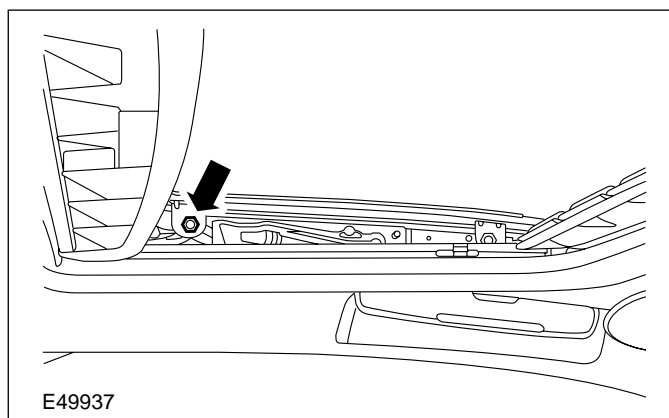
2. **Adjust the rear edge of the roof opening panel glass.**

1. Loosen the retaining screws on both sides (left-hand side shown).
2. Push the rear edge up or down to give the correct alignment (flush to + 1 mm).



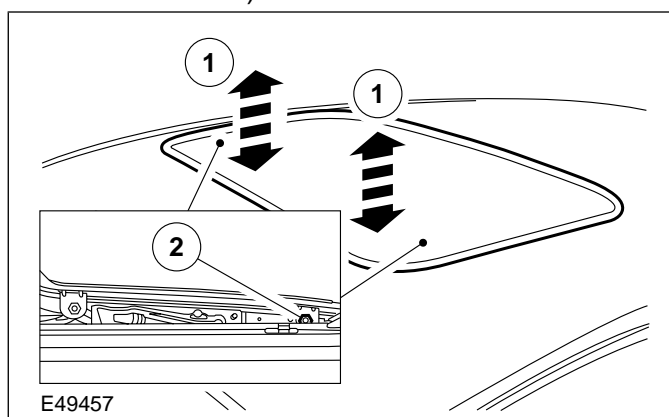
3. **Make sure that the roof opening panel glass is located centrally in the roof panel opening.**

4. **Tighten the roof opening panel glass rear retaining screws (left-hand side shown).**



5. **Adjust the front edge of the roof opening panel glass.**

1. Push the front edge up or down to give the correct alignment (flush to -1 mm).
2. Tighten the front retaining screws (left-hand side shown).



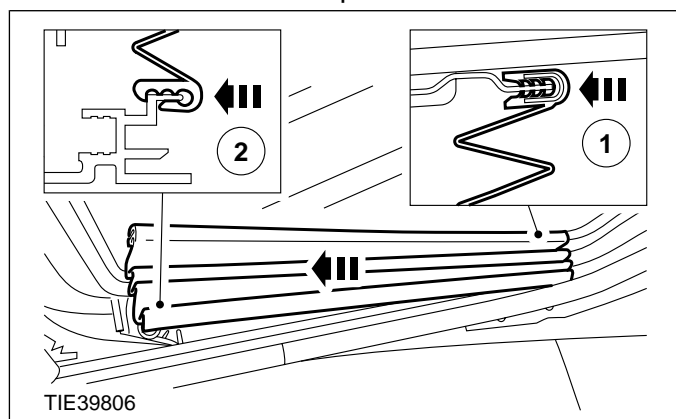
6. **NOTE:** An audible click can be heard when the lower edge of the guide arm cover is correctly located.

Starting at the front of the roof opening panel, install the roof opening panel guide arm covers (left-hand side shown).

1. Install the upper clip.

GENERAL PROCEDURES

2. Install the lower clip.



7. Operate the roof opening panel and check the alignment.

GENERAL PROCEDURES

Roof Opening Panel Motor Initialization

Updating Roof Opening Panel Motor Initialization

WARNING: The roof opening panel anti-trap function will not operate during the updating roof opening panel motor initialization procedure. Make sure that the roof opening panel opening is free of all foreign material. Failure to follow this instruction may result in personal injury.

NOTE: This procedure should only be carried out when the roof opening panel motor has not been disconnected.

NOTE: The roof opening panel alignment must be carried out prior to carrying out roof opening panel motor initialization.

For additional information, refer to: [Roof Opening Panel Alignment](#) (501-17 Roof Opening Panel, General Procedures).

1. Operate the roof opening panel control switch to the up/close position until the roof opening panel is in the fully vent position.
2. Release the roof opening panel control switch.
3. Operate the roof opening panel control switch to the up/close position and hold for 30 seconds until there is a small movement (approximately 2 mm) and the roof opening panel motor stops.
4. Release the roof opening panel control switch.
5. **NOTE:** In one complete cycle the roof opening panel will close, fully open and return to the fully closed position.

Operate the roof opening panel control switch to the up/close position again within 3 seconds until the roof opening panel stops (one complete cycle).

Initial Roof Opening Panel Motor Initialization

WARNING: The roof opening panel anti-trap function will not operate during the updating roof opening panel motor initialization procedure. Make sure that the roof opening panel opening is free of all foreign material. Failure to follow this instruction may result in personal injury.

NOTE: This procedure must be carried out when installing any roof opening panel motor or roof opening panel.

NOTE: The roof opening panel alignment must be carried out prior to carrying out roof opening panel motor initialization.

For additional information, refer to: [Roof Opening Panel Alignment](#) (501-17 Roof Opening Panel, General Procedures).

1. Operate the roof opening panel control switch to the up/close position.
2. Release the roof opening panel control switch.
3. **NOTE:** In one complete cycle the roof opening panel will close, fully open and return to the fully closed position.

Operate the roof opening panel control switch to the up/close position again within 3 seconds until the roof opening panel stops (one complete cycle).

Erasing Roof Opening Panel Motor Initialization

NOTE: The erasing procedure is to be carried out only when the roof opening panel motor has been detached from the roof opening panel.

NOTE: This procedure must be carried out before installing a previously used roof opening panel motor.

1. Operate the roof opening panel control switch to the up/close position until the roof opening panel motor stops.
2. Release the roof opening panel control switch.
3. Operate the roof opening panel control switch again to the up/close position and hold for 30 seconds. With the roof opening panel control switch held, the roof opening panel motor will rotate in one direction.
4. Release the roof opening panel control switch.
5. Operate the roof opening panel control switch to the down/open position. If the roof opening panel motor does not rotate, the erasing procedure has been carried out successfully.

GENERAL PROCEDURES

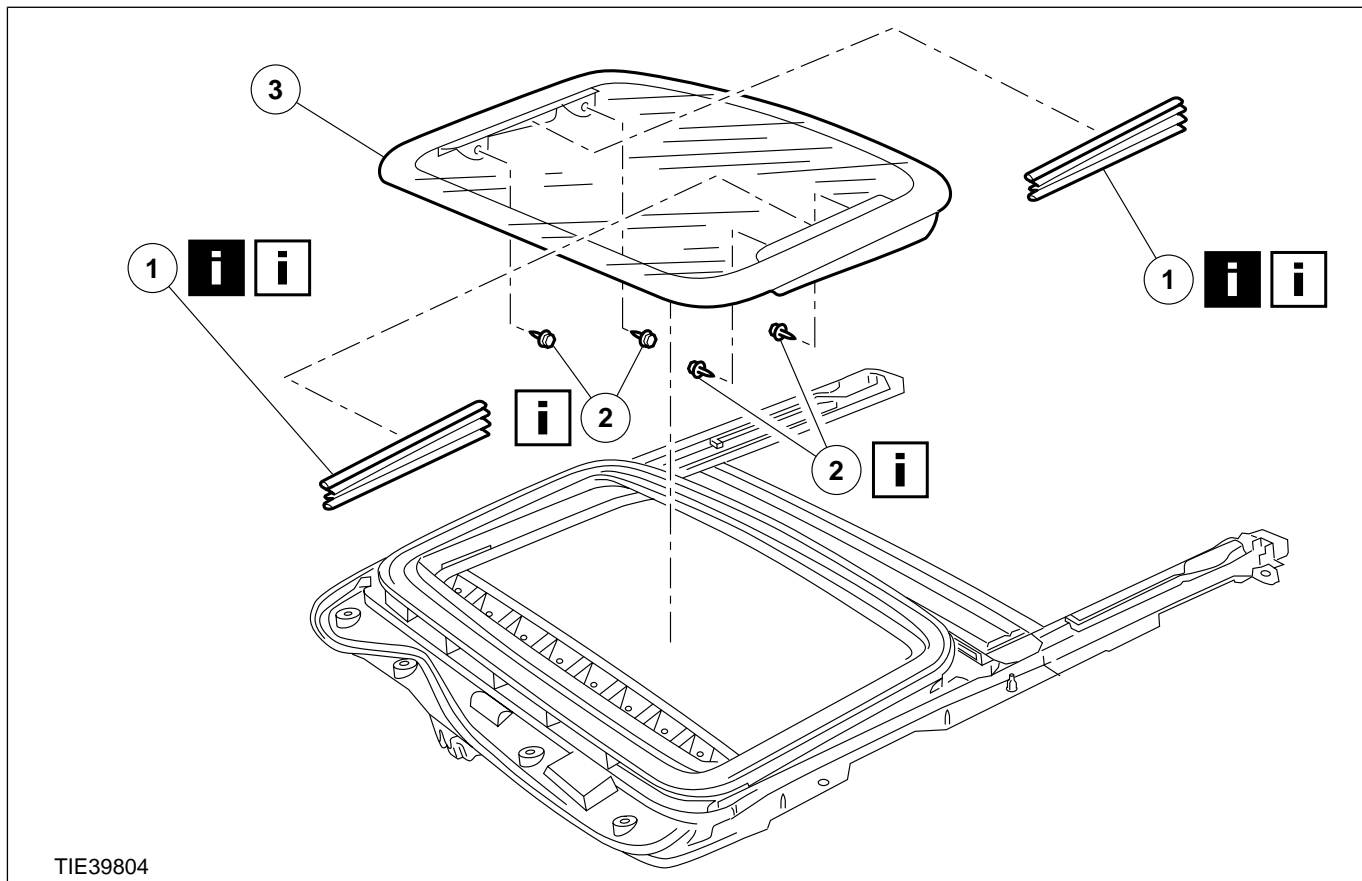
6. If the roof opening panel motor rotates (with the roof opening panel control switch in the down/open position), repeat the procedure.

REMOVAL AND INSTALLATION

Roof Opening Panel Glass

1. Move the roof opening panel shield rearwards.

2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Roof opening panel guide arm covers See Removal Detail See Installation Detail
2	Roof opening panel glass retaining screws See Installation Detail
3	Roof opening panel glass

3. To install, reverse the removal procedure.

Removal Details

Item 1 Roof opening panel guide arm covers

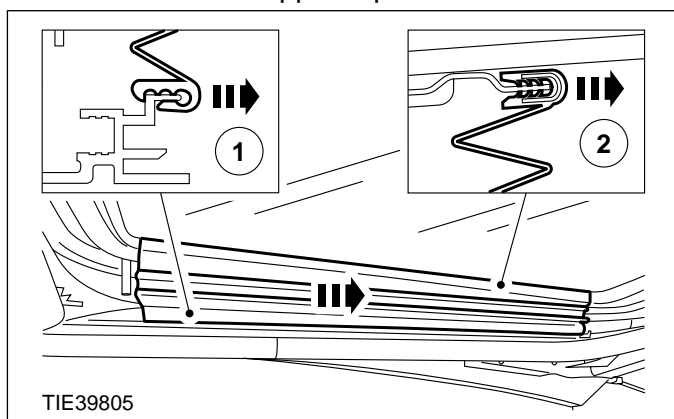
1. **NOTE:** Make sure the roof opening panel is in the closed position.

Starting at the rear of the roof opening panel, remove the roof opening panel guide arm covers (left-hand side shown).

1. Release the lower clip.

REMOVAL AND INSTALLATION

2. Release the upper clip.

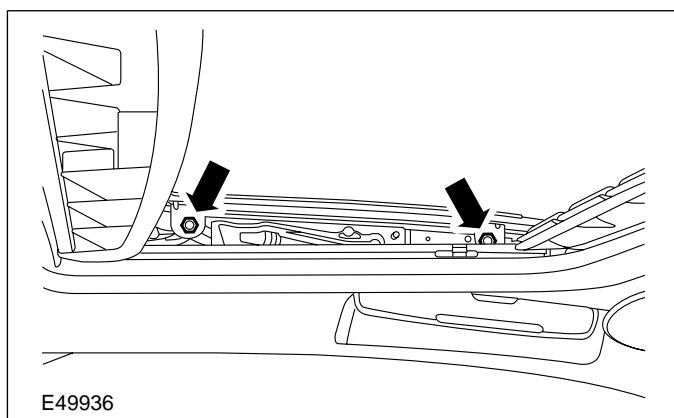


Installation Details

Item 2 Roof opening panel glass retaining screws

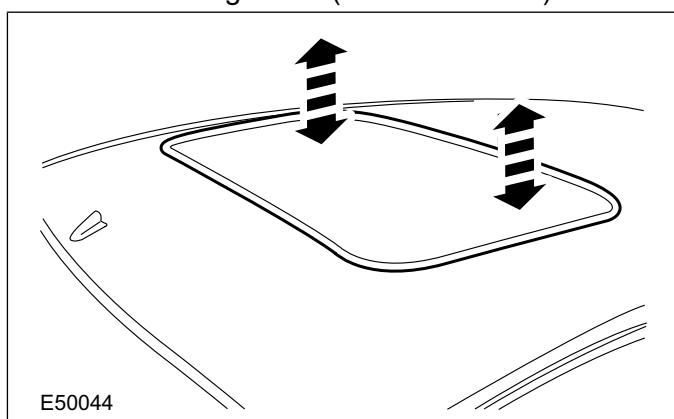
1. **NOTE:** Do not fully tighten the retaining screws at this stage.

Install the roof opening panel glass retaining screws on both sides (left-hand side shown).



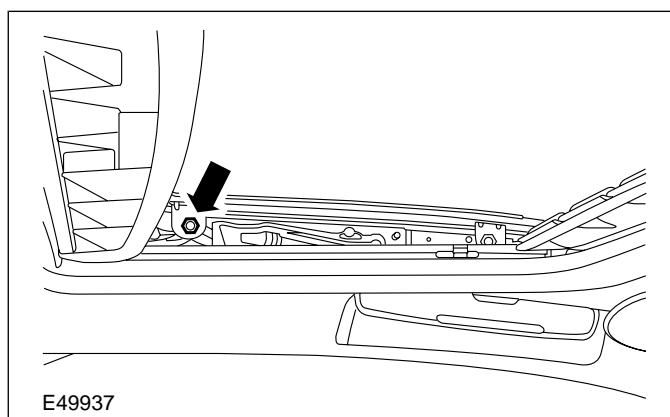
2. **Adjust the rear edge of the roof opening panel glass.**

- Push the rear edge up or down to give the correct alignment (flush to + 1 mm).



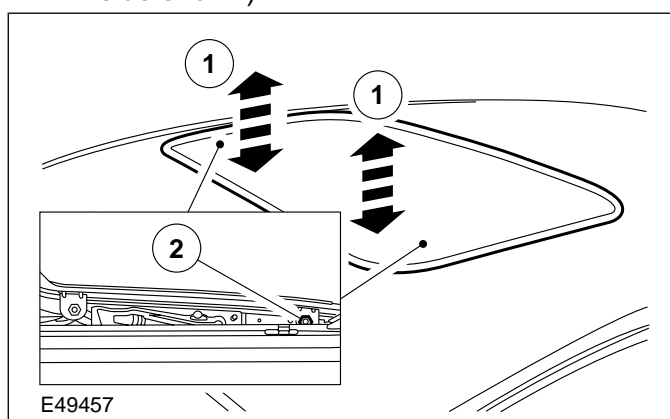
3. **Make sure that the roof opening panel glass is located centrally in the roof panel opening.**

4. **Tighten the roof opening panel glass rear retaining screws (left-hand side shown).**



5. **Adjust the front edge of the roof opening panel glass.**

1. Push the front edge up or down to give the correct alignment (flush to -1 mm).
2. Tighten the front retaining screws (left-hand side shown).



REMOVAL AND INSTALLATION

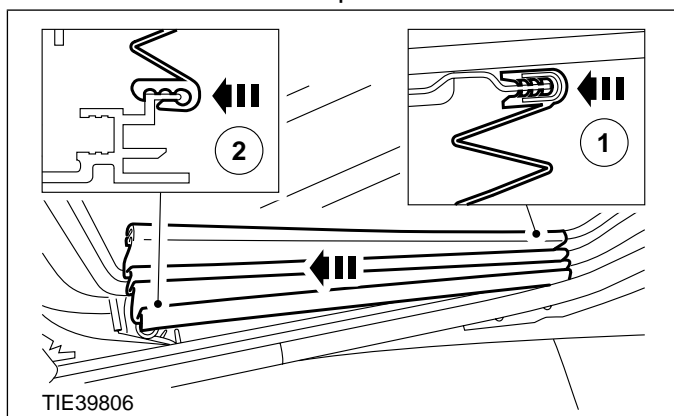
6. Operate the roof opening panel and check the alignment.

Item 1 Roof opening panel guide arm covers

1. **NOTE:** An audible click can be heard when the lower edge of the guide arm cover is correctly located.

Starting at the front of the roof opening panel, install the roof opening panel guide arm covers (left-hand side shown).

1. Install the upper clip.
2. Install the lower clip.



REMOVAL AND INSTALLATION

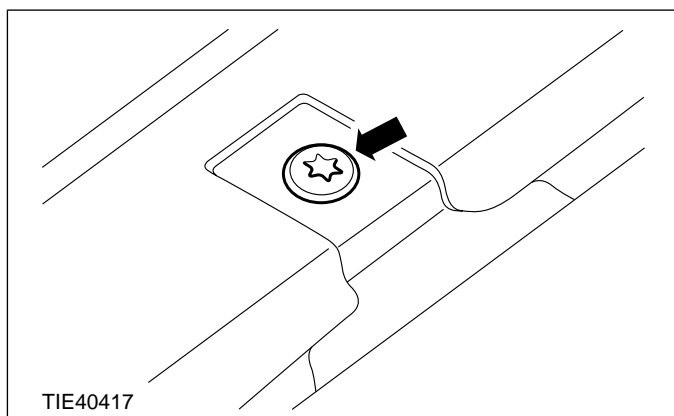
Roof Opening Panel Shield(41 123 0)

Removal

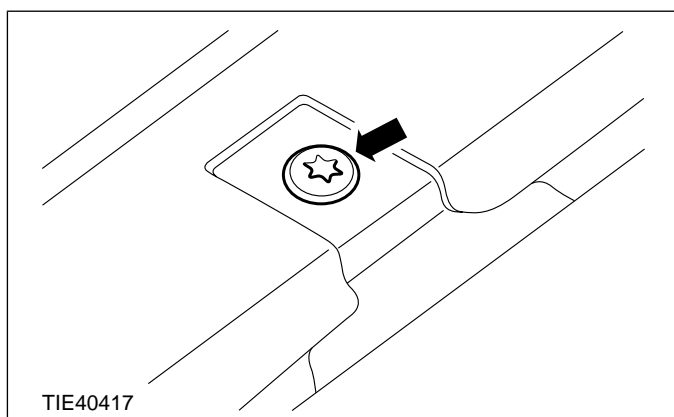
1. Remove the roof opening panel glass.

For additional information, refer to: **Roof Opening Panel Glass** (501-17 Roof Opening Panel, Removal and Installation).

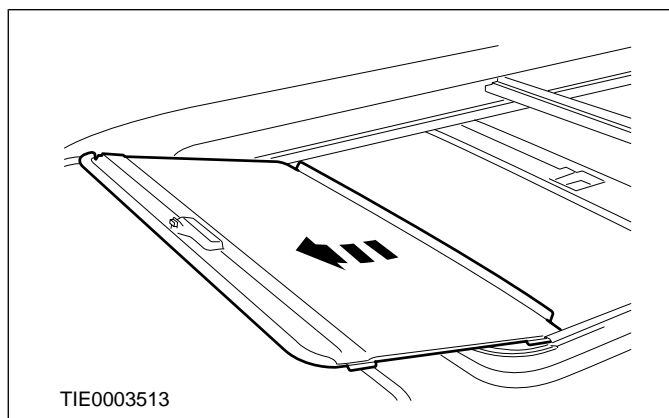
2. Close the roof opening panel shield.
3. Remove the roof opening panel shield front retaining screws on both sides.



4. Move the roof opening panel shield forwards to gain access to the roof opening panel shield rear retaining screws.
5. Remove the roof opening panel shield rear retaining screws on both sides.



6. Remove the roof opening panel shield.



Installation

1. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Roof Opening Panel

NOTE: Make sure the roof opening panel is in the closed position.

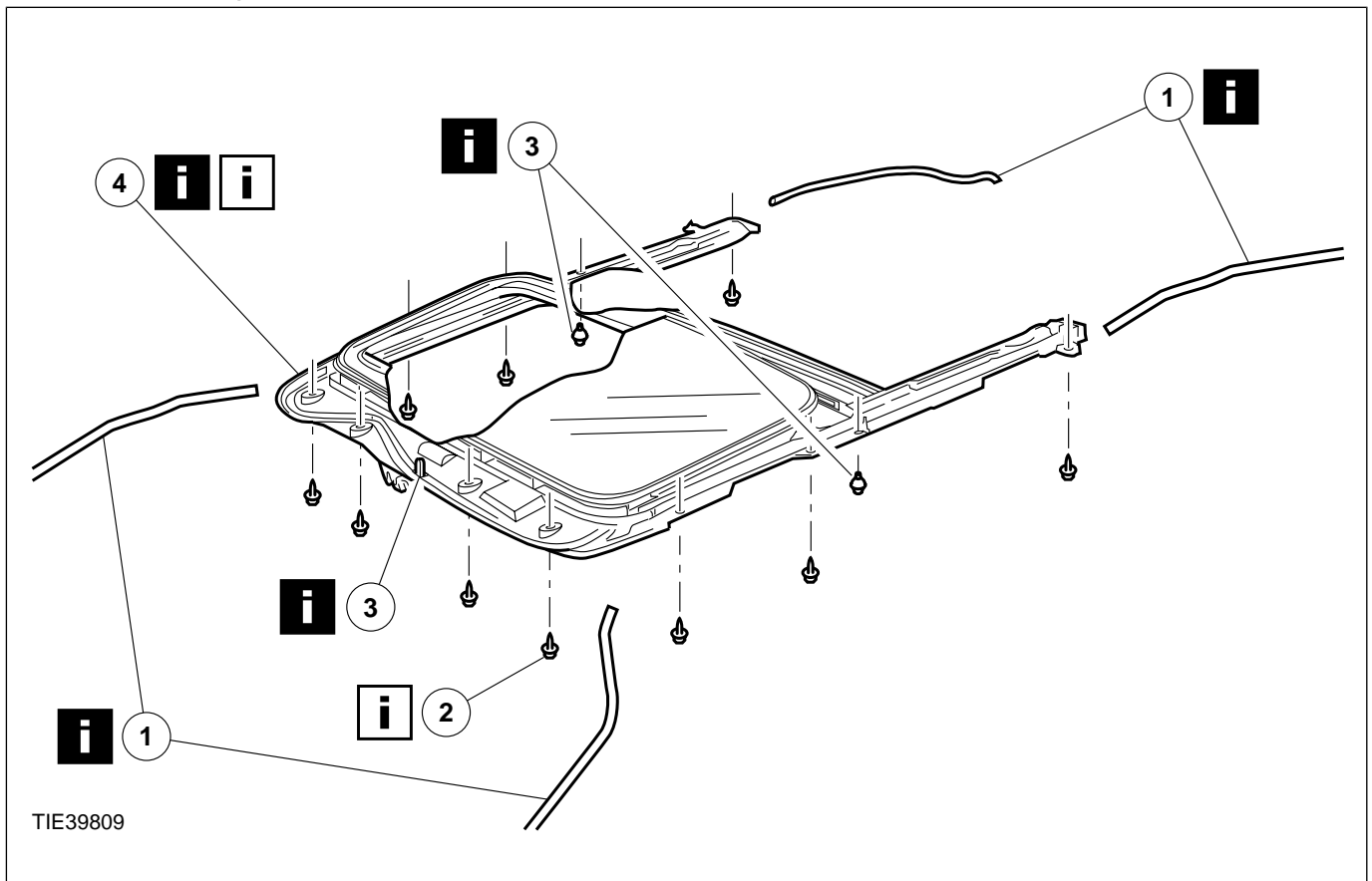
1. Remove the headliner. For additional information, refer to: (501-05 Interior Trim and Ornamentation)

Headliner - 3-Door, Vehicles With: Sliding Roof Opening Panel (Removal and Installation),

Headliner - 5-Door, Vehicles With: Sliding Roof Opening Panel (Removal and Installation),

Headliner - Wagon, Vehicles With: Sliding Roof Opening Panel (Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



TIE39809

Item	Description
1	Roof opening panel drain hoses See Removal Detail
2	Roof opening panel retaining bolts See Installation Detail

Item	Description
3	Roof opening panel retaining clips See Removal Detail
4	Roof opening panel See Removal Detail See Installation Detail

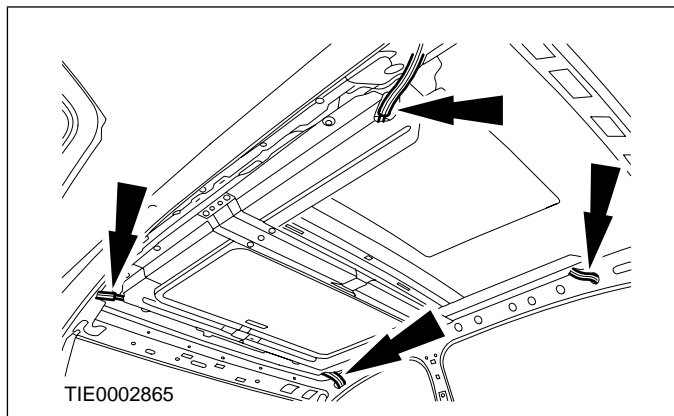
3. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

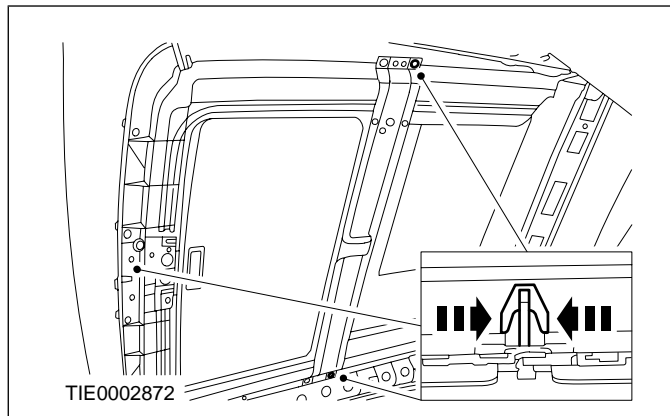
Removal Details

Item 1 Roof opening panel drain hoses

1. Detach the roof opening panel drain hoses from the roof opening panel.



With the aid of another technician, compress the legs of the roof opening panel retaining clips and lower the roof opening panel.

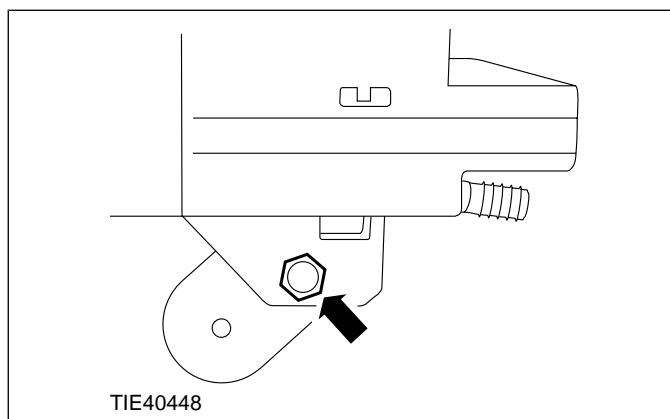


Item 3 Roof opening panel retaining clips

1. **CAUTION:** The roof opening panel front retaining clip is fixed to the roof opening panel frame and is not a service item.

Item 4 Roof opening panel

1. Loosen the roof opening panel locking clamp retaining bolt by two turns on both sides.

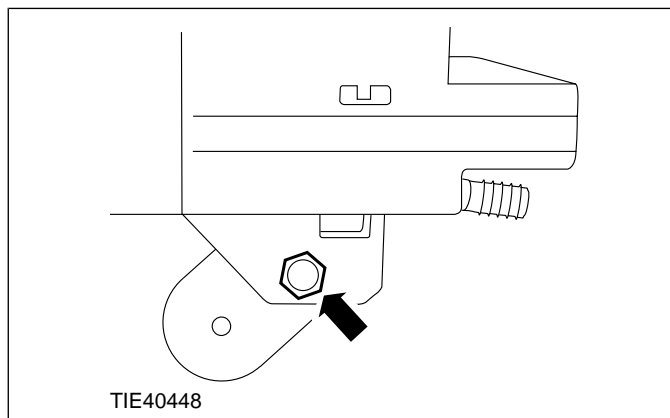


Installation Details

Item 4 Roof opening panel

1. **NOTE:** This step should only be carried out if installing a new roof opening panel.

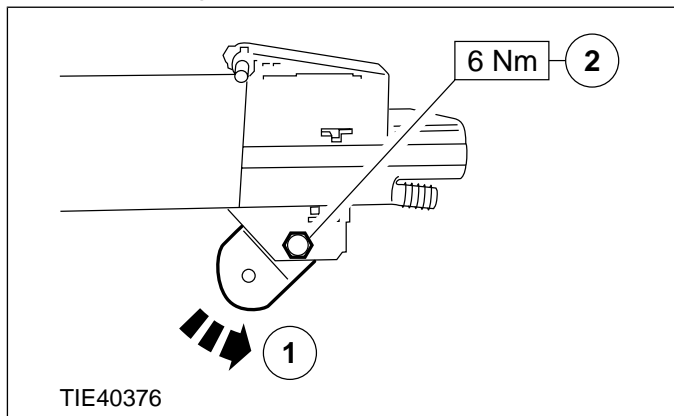
Loosen the roof opening panel locking clamp retaining bolt by two turns on both sides.



REMOVAL AND INSTALLATION

2. Tighten the roof opening panel locking clamp retaining bolt on both sides.

1. Position the roof opening panel locking clamp.
2. Tighten the roof opening panel locking clamp retaining bolt.

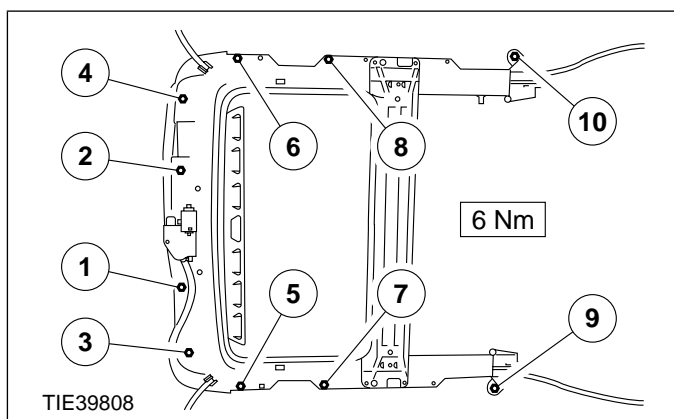
**Item 2 Roof opening panel retaining bolts**

1. **NOTE: Do not fully tighten the roof opening panel retaining bolts at this stage.**

NOTE: The roof opening panel must be correctly located on the retaining clips before tightening the roof opening panel retaining bolts.

With the aid of another technician, install the roof opening panel.

2. **Tighten the roof opening panel retaining bolts in the sequence shown.**



REMOVAL AND INSTALLATION

Roof Opening Panel Motor

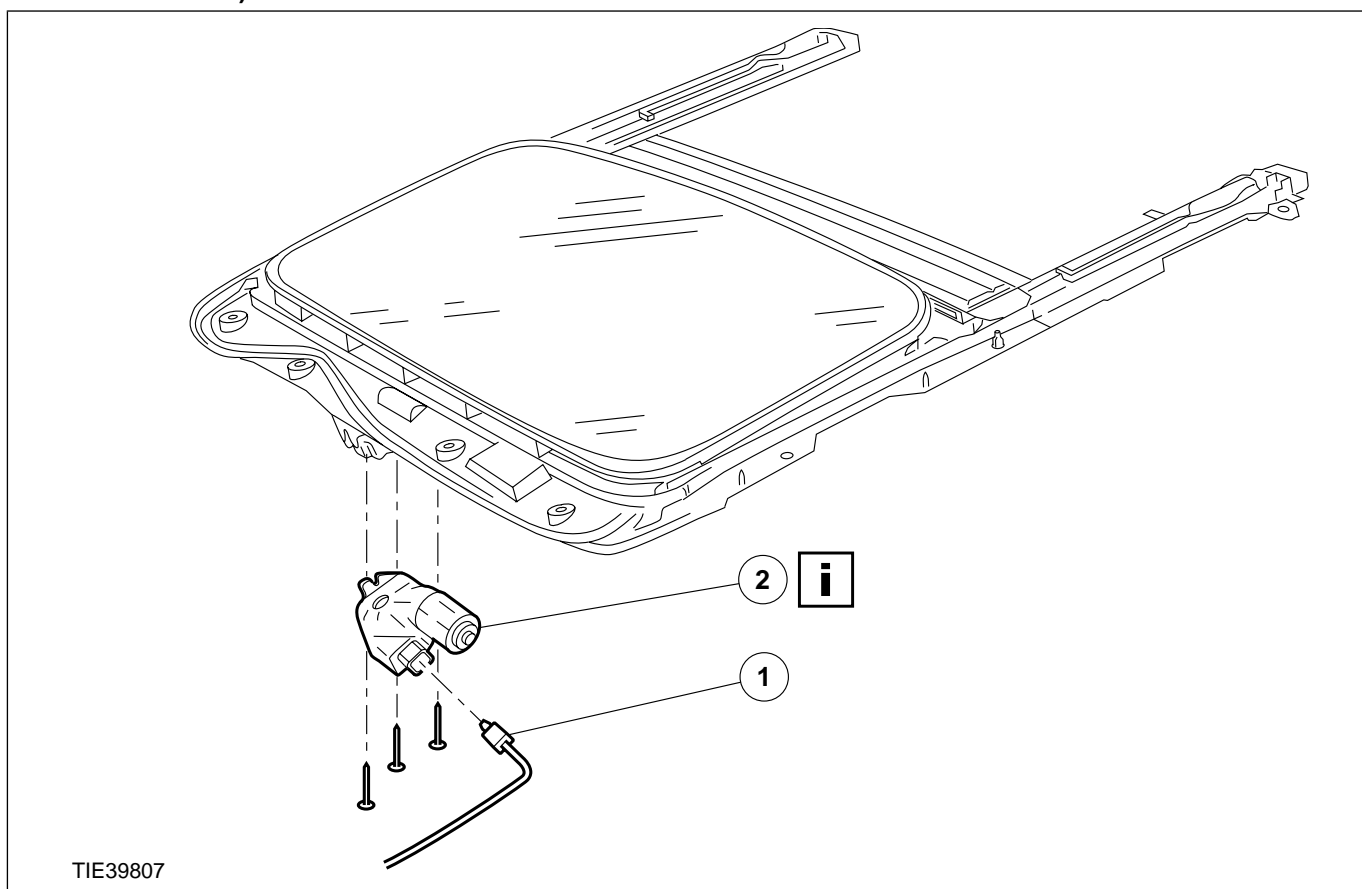
1. Remove the headliner. For additional information, refer to: (501-05 Interior Trim and Ornamentation)

Headliner - 3-Door, Vehicles With: Sliding Roof Opening Panel (Removal and Installation),

Headliner - 5-Door, Vehicles With: Sliding Roof Opening Panel (Removal and Installation),

Headliner - Wagon, Vehicles With: Sliding Roof Opening Panel (Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Roof opening panel motor electrical connector
2	Roof opening panel motor See Installation Detail

3. To install, reverse the removal procedure.

4. Carry out the initial roof opening panel motor initialization procedure.

For additional information, refer to: **Roof Opening Panel Motor Initialization (501-17 Roof Opening Panel, General Procedures).**

Installation Details

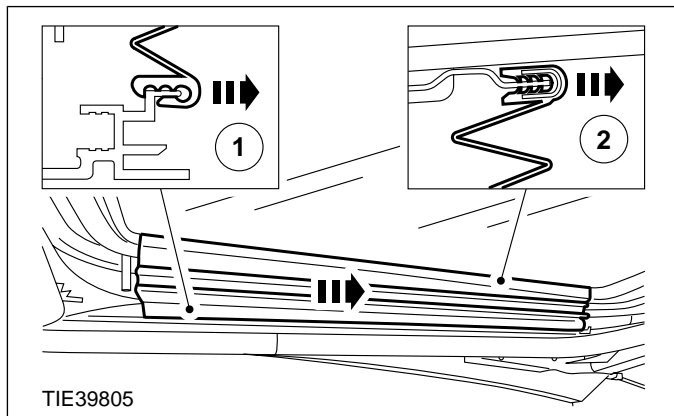
REMOVAL AND INSTALLATION

Item 2 Roof opening panel motor

CAUTION: The roof opening panel motor must not be installed at this stage.

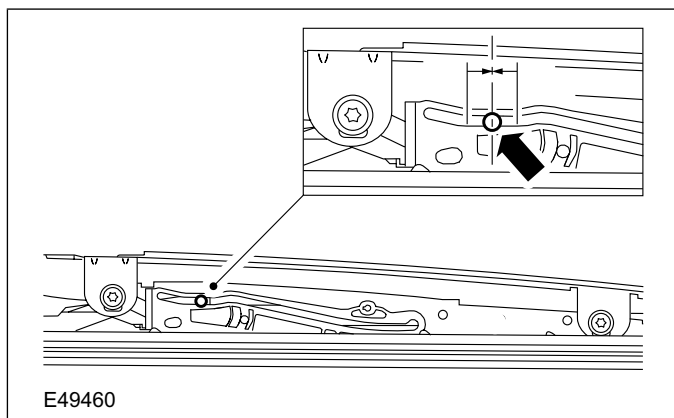
1. Starting at the rear of the roof opening panel, remove the roof opening panel guide arm covers (left-hand side shown).

1. Release the roof opening panel guide arm cover lower clip.
2. Release the roof opening panel guide arm cover upper clip.



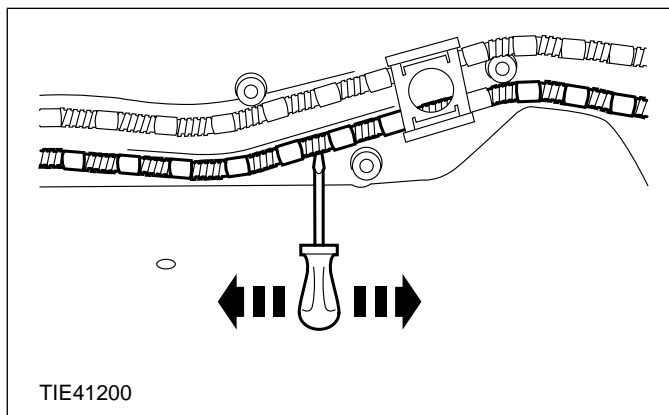
2. **CAUTION:** The roof opening panel guide pins must be aligned centrally in the flat area of the roof opening panel guide arm as shown.

Check the alignment of the left-hand and right-hand roof opening panel guide pins (left-hand side shown).



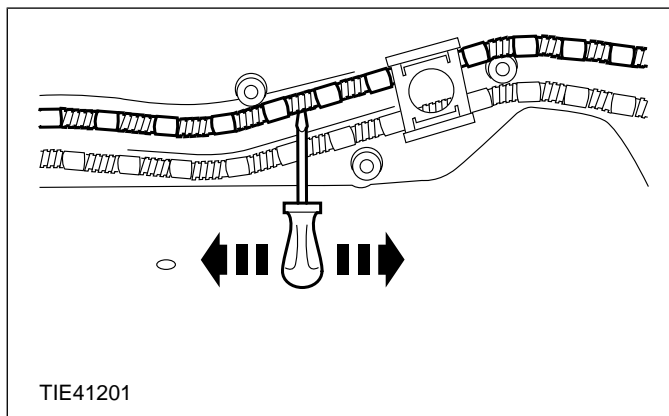
3. Adjust the left-hand roof opening panel guide pin if necessary.

- Using a suitable screwdriver, move the roof opening panel operating cable in the required direction.



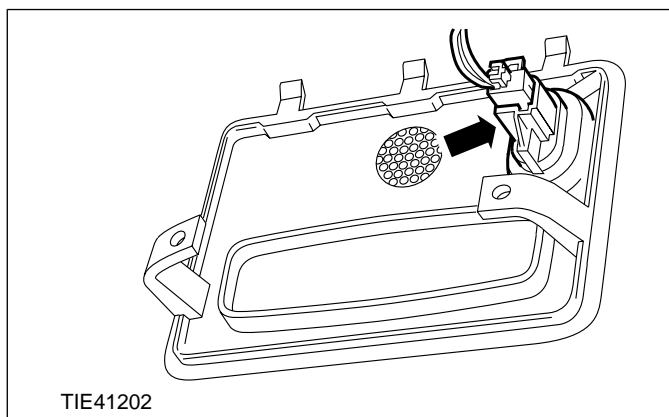
4. Adjust the right-hand roof opening panel guide pin if necessary.

- Using a suitable screwdriver, move the roof opening panel operating cable in the required direction.



5. **NOTE:** This step is not necessary when installing a new roof opening panel motor.

With the aid of another technician, support the overhead console and connect the roof opening panel control switch electrical connector.



REMOVAL AND INSTALLATION

6. **NOTE:** This step is not necessary when installing a new roof opening panel motor.

Connect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures)**.

7. **CAUTION:** This step must be carried out if installing a previously used roof opening panel motor.

NOTE: This step is not necessary when installing a new roof opening panel motor.

Carry out the erasing roof opening panel motor initialization procedure.

For additional information, refer to: **Roof Opening Panel Motor Initialization (501-17 Roof Opening Panel, General Procedures)**.

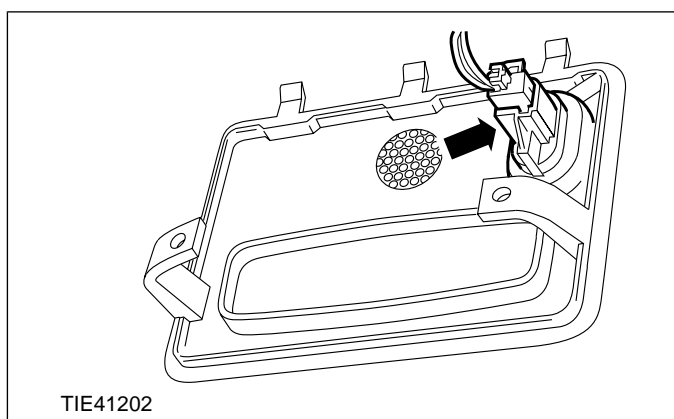
8. **NOTE:** This step is not necessary when installing a new roof opening panel motor.

Disconnect the battery ground cable.

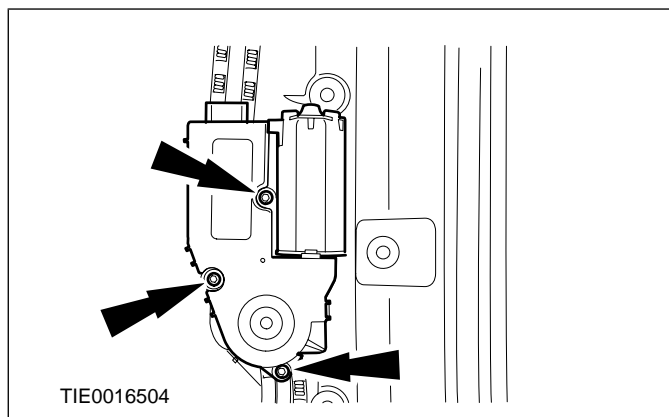
For additional information, refer to: **Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures)**.

9. **NOTE:** This step is not necessary when installing a new roof opening panel motor.

Disconnect the roof opening panel control switch electrical connector.



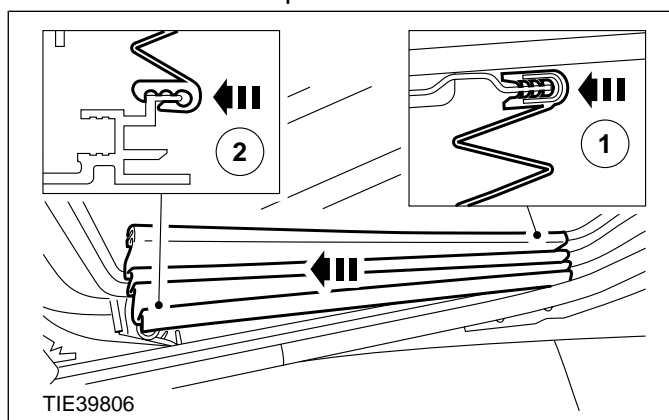
10. Install the roof opening panel motor.



11. **NOTE:** An audible click can be heard when the lower edge of the roof opening panel guide arm cover is correctly located.

Starting at the front of the roof opening panel, install the roof opening panel guide arm covers (left-hand side shown).

1. Install the roof opening panel guide arm cover upper clip.
2. Install the roof opening panel guide arm cover lower clip.



REMOVAL AND INSTALLATION

Roof Opening Panel Rear Drain Hose — 3-Door/5-Door

Removal

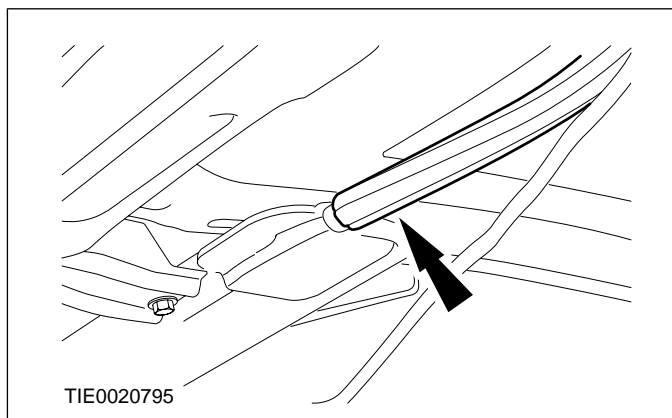
1. Remove the headliner.

For additional information, refer to: **Headliner - 3-Door, Vehicles With: Sliding Roof Opening Panel (501-05 Interior Trim and Ornamentation, Removal and Installation) / Headliner - 5-Door, Vehicles With: Sliding Roof Opening Panel (501-05 Interior Trim and Ornamentation, Removal and Installation).**

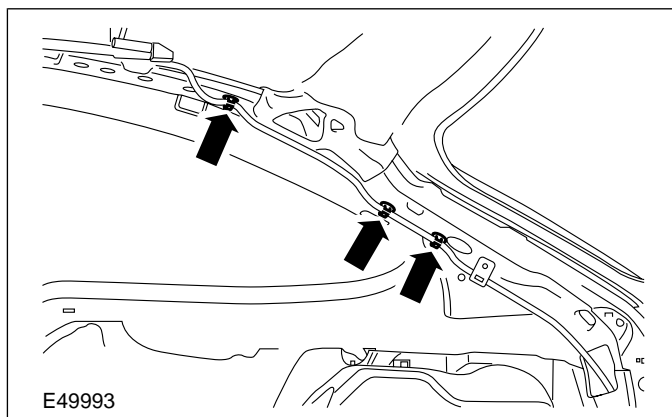
2. Remove the load space trim panel.

For additional information, refer to: **Loadspace Trim Panel - 3-Door (501-05 Interior Trim and Ornamentation, Removal and Installation) / Loadspace Trim Panel - 5-Door (501-05 Interior Trim and Ornamentation, Removal and Installation).**

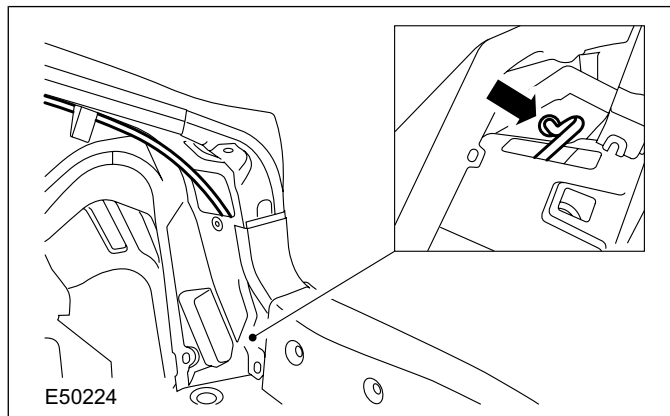
3. Detach the roof opening panel rear drain hose from the roof opening panel.



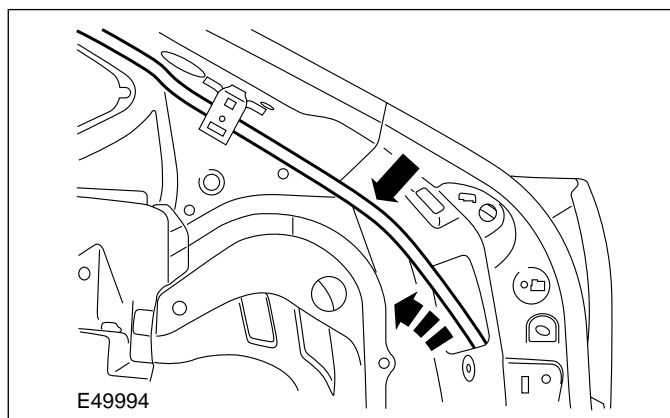
4. Detach the roof opening panel rear drain hose from the retaining clips (3 door shown).



5. Detach the roof opening panel rear drain hose from the drain bung.



6. Remove the roof opening panel rear drain hose.



Installation

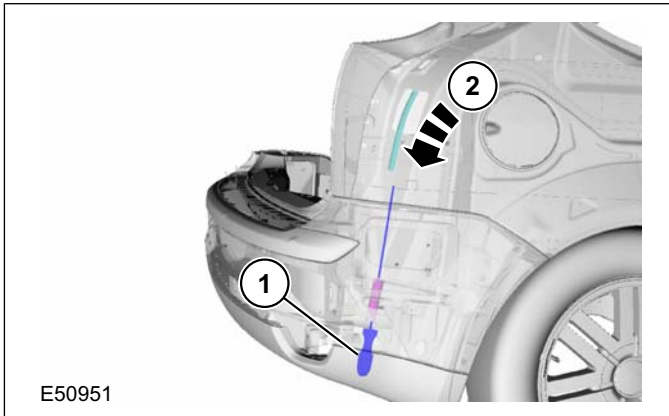
1. **NOTE:** Make sure that the drain bung is free of foreign material before installing the roof opening panel rear drain hose.

Attach the roof opening panel rear drain hose to the drain bung.

1. With the aid of another technician, position a suitable long bladed screwdriver in the drain bung from the underside of the vehicle.
2. Push the drain hose over the screwdriver to position it in the drain bung.

REMOVAL AND INSTALLATION

- Remove the screwdriver.



2. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

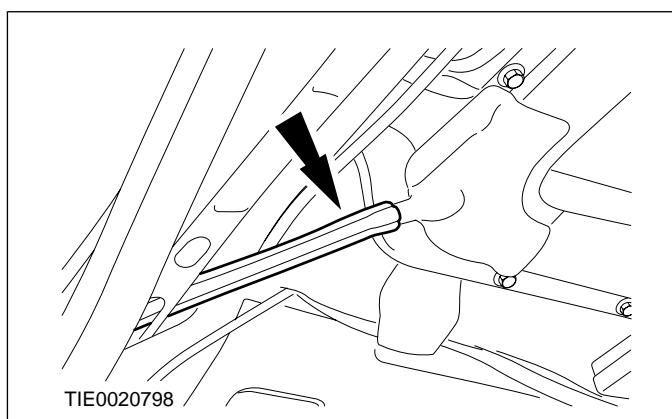
Driver Side Roof Opening Panel Front Drain Hose

Removal

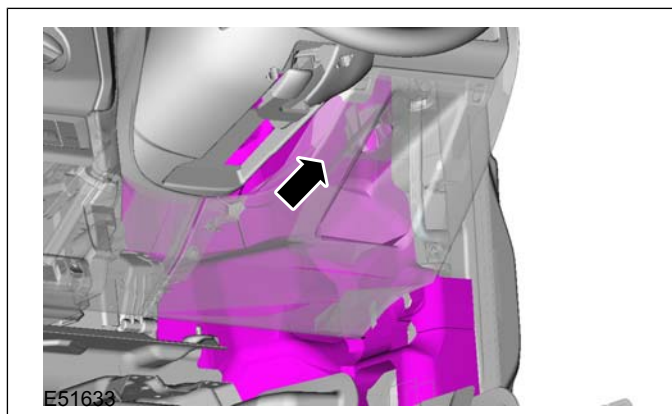
1. Remove the headliner.

For additional information, refer to: Headliner - 3-Door, Vehicles With: Sliding Roof Opening Panel (501-05 Interior Trim and Ornamentation, Removal and Installation) / Headliner - 5-Door, Vehicles With: Sliding Roof Opening Panel (501-05 Interior Trim and Ornamentation, Removal and Installation) / Headliner - Wagon, Vehicles With: Sliding Roof Opening Panel (501-05 Interior Trim and Ornamentation, Removal and Installation).

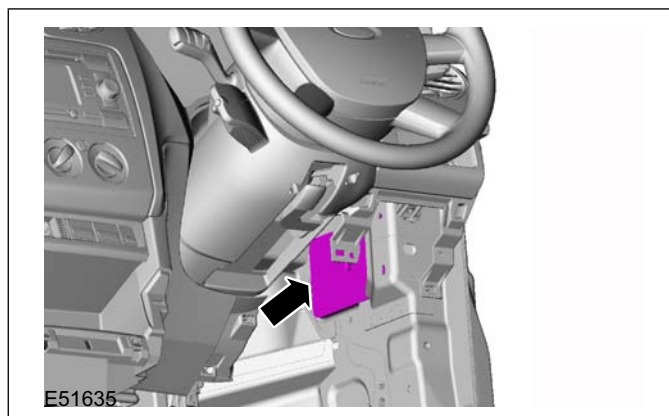
2. Detach the roof opening panel front drain hose from the roof opening panel.



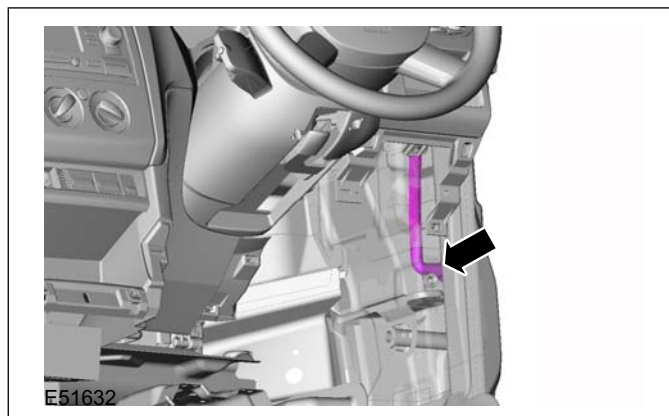
3. Detach the driver side footwell noise, vibration and harshness (NVH) insulation material from the A-pillar to gain access to the A-pillar access hole.



4. Remove the NVH insulation material from the A-pillar access hole (part of instrument panel removed for clarity).



5. Detach the roof opening panel front drain hose and drain hose valve from the A-pillar and position them in the A-pillar access hole (part of the instrument panel removed for clarity).

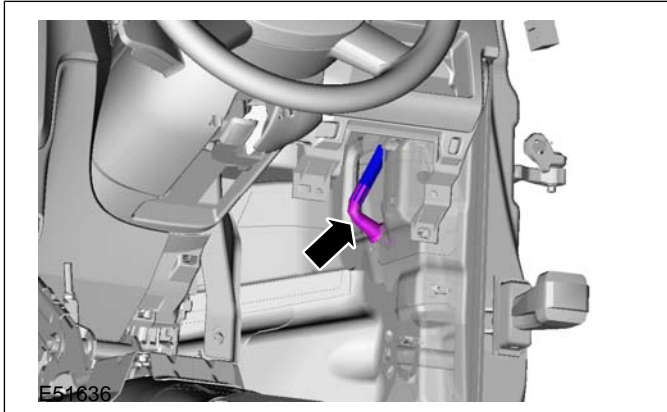


6. NOTE: Do not remove the roof opening panel front drain hose at this stage.

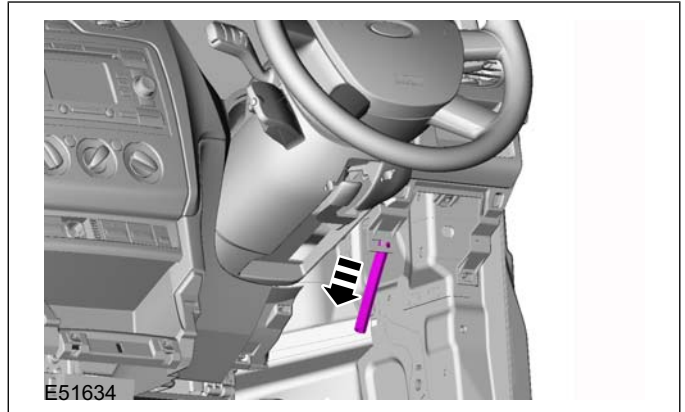
NOTE: The new and the original roof opening panel drain hoses must be connected before the original roof opening panel front drain hose is removed from the A-pillar, to aid installation.

REMOVAL AND INSTALLATION

Remove the drain hose valve (part of the instrument panel removed for clarity).



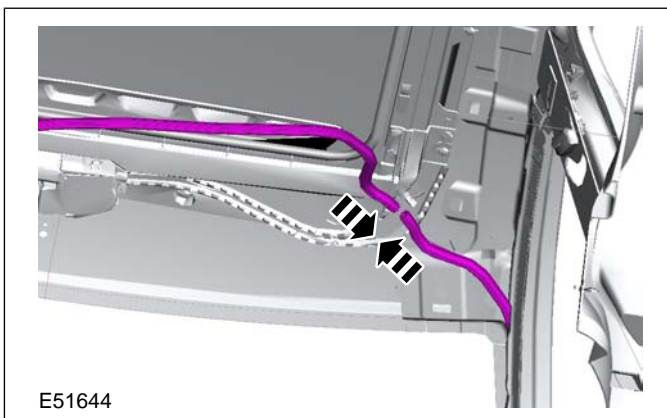
- Pull the drain hose into the driver footwell through the A-pillar access hole.



Installation

1. **NOTE:** Apply a suitable lubricant to the new roof opening panel front drain hose, to aid installation.

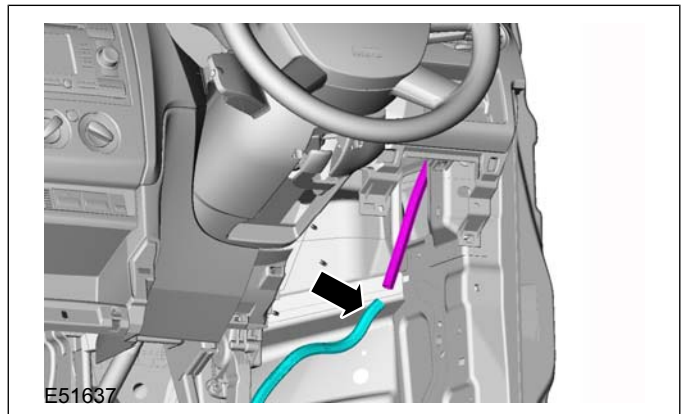
Using suitable tape, attach the new roof opening panel front drain hose to the original roof opening panel front drain hose at the roof opening panel.



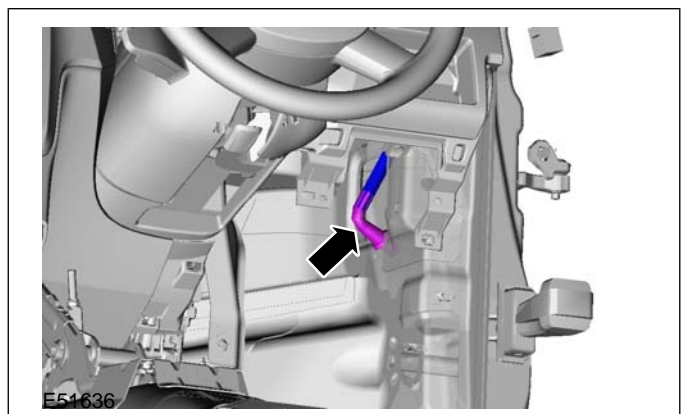
2. **NOTE:** Make sure that a minimum of 200 mm of the new roof opening panel front drain hose remains at the roof opening panel.

With the aid of another technician, detach the original roof opening panel front drain hose from the A-pillar (part of the instrument panel removed for clarity).

3. Remove the original roof opening panel front drain hose (part of the instrument panel removed for clarity).



4. Attach the drain hose valve to the roof opening panel front drain hose (part of the instrument panel removed for clarity).



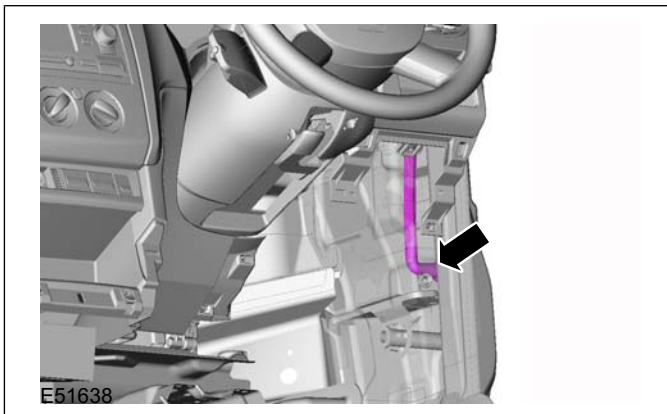
501-17-30

Roof Opening Panel

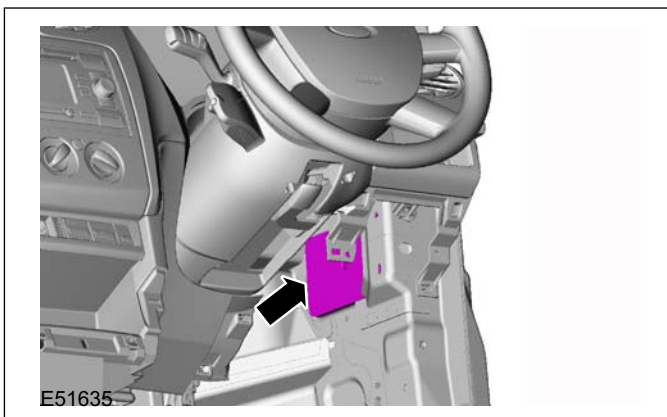
501-17-30

REMOVAL AND INSTALLATION

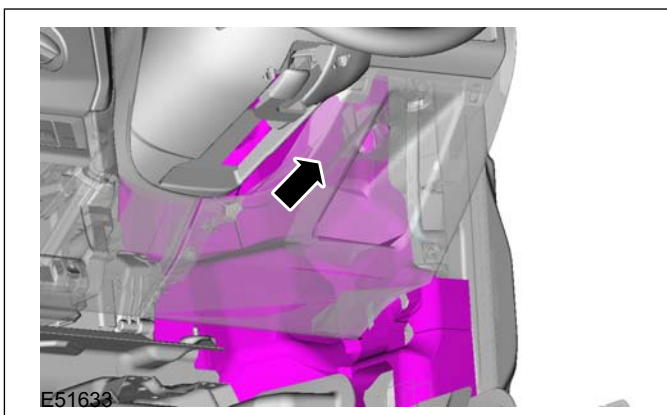
5. Install the roof opening panel front drain hose and drain hose valve (part of the instrument panel removed for clarity).



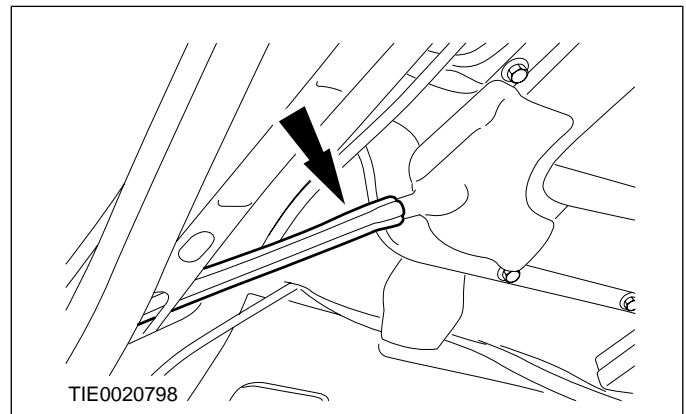
6. Install the NVH insulation material to the A-pillar access hole (part of the instrument panel removed for clarity).



7. Attach the driver side footwell NVH insulation material to the A-pillar.



8. Attach the roof opening panel front drain hose to the roof opening panel.



9. Install the headliner.

For additional information, refer to: Headliner - **3-Door, Vehicles With: Sliding Roof Opening Panel** (501-05 Interior Trim and Ornamentation, Removal and Installation) / Headliner - **5-Door, Vehicles With: Sliding Roof Opening Panel** (501-05 Interior Trim and Ornamentation, Removal and Installation) / Headliner - **Wagon, Vehicles With: Sliding Roof Opening Panel** (501-05 Interior Trim and Ornamentation, Removal and Installation).

REMOVAL AND INSTALLATION

Passenger Side Roof Opening Panel Front Drain Hose

Removal

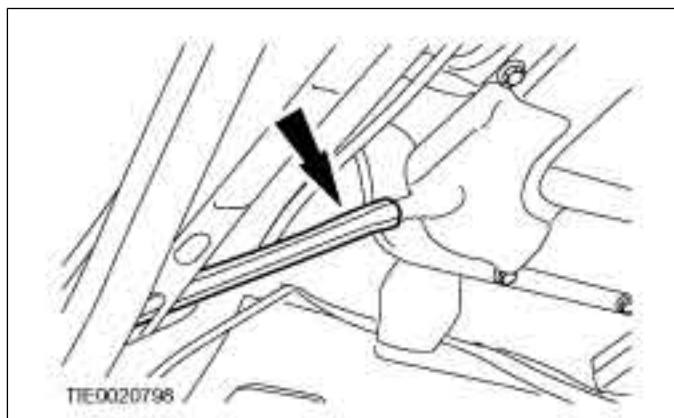
1. Remove the headliner. For additional information, refer to: (501-05 Interior Trim and Ornamentation)

Headliner - 3-Door, Vehicles With: Sliding Roof Opening Panel (Removal and Installation),

Headliner - 5-Door, Vehicles With: Sliding Roof Opening Panel (Removal and Installation),

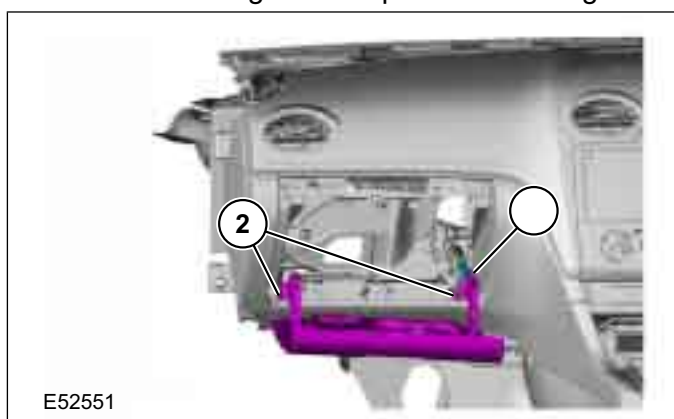
Headliner - Wagon, Vehicles With: Sliding Roof Opening Panel (Removal and Installation).

2. Detach the roof opening panel front drain hose from the roof opening panel.

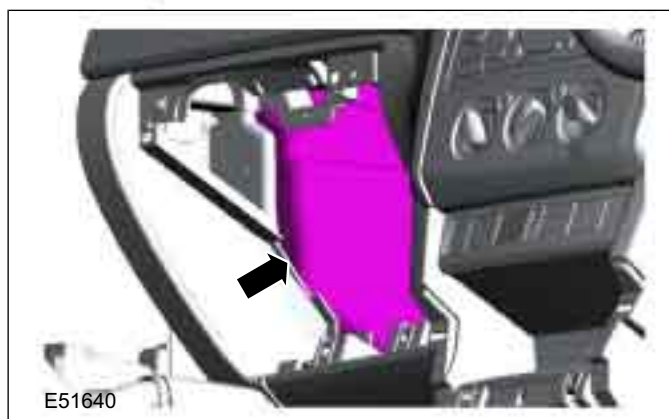


3. Remove the glove compartment lid.

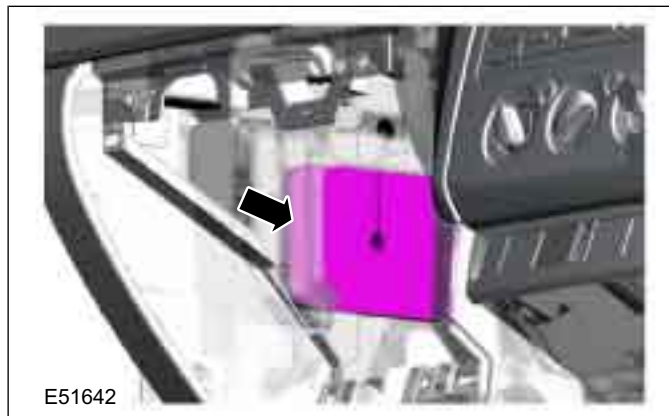
1. Detach the glove compartment lid damper from the glove compartment lid hinge (if equipped).
2. Detach the glove compartment lid hinges.



4. Detach the passenger side footwell noise, vibration and harshness (NVH) insulation material from the A-pillar to gain access to the A-pillar access hole.



5. Remove the NVH insulation material from the A-pillar access hole.



6. Detach the roof opening panel front drain hose and roof opening panel front drain hose valve from the A-pillar and position them in the A-pillar access hole.

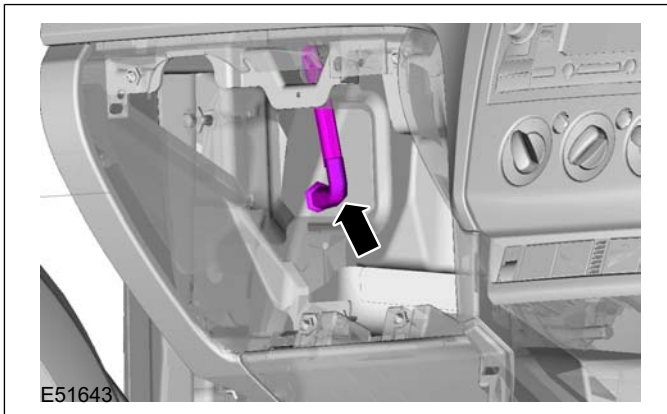


REMOVAL AND INSTALLATION

7. NOTE: Do not remove the roof opening panel front drain hose at this stage.

NOTE: The new and the original roof opening panel drain hoses must be connected together before the original roof opening panel front drain hose is removed from the A-pillar, to aid installation.

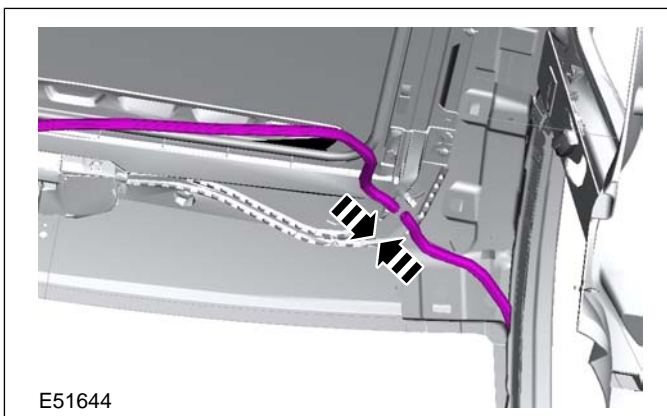
Remove the roof opening panel front drain hose valve.



Installation

1. NOTE: Apply a suitable lubricant to the new roof opening panel front drain hose, to aid installation.

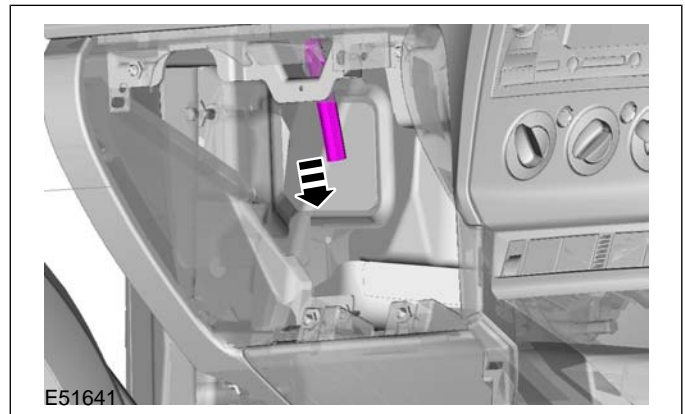
Using suitable tape, attach the new roof opening panel front drain hose to the original roof opening panel front drain hose at the roof opening panel.



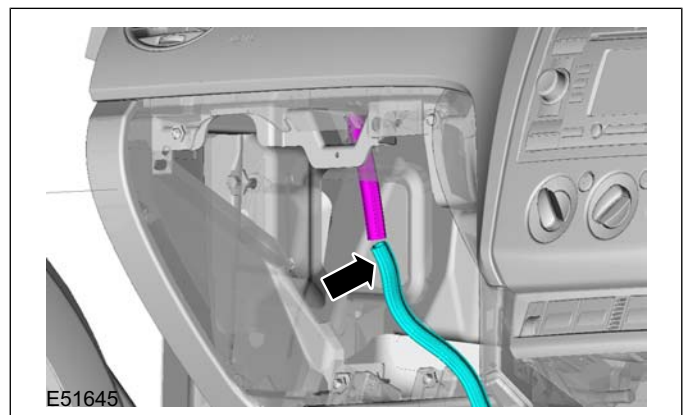
2. NOTE: Make sure that a minimum of 200 mm of the new roof opening panel front drain hose remains at the roof opening panel.

With the aid of another technician, detach the original roof opening panel front drain hose from the A-pillar.

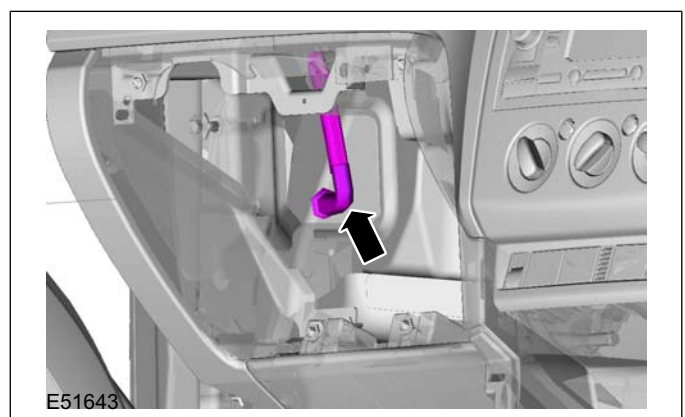
- Pull the roof opening panel front drain hose into the passenger footwell through the A-pillar access hole.



3. Remove and discard the original roof opening panel front drain hose and tape.



4. Install the roof opening panel front drain hose valve.



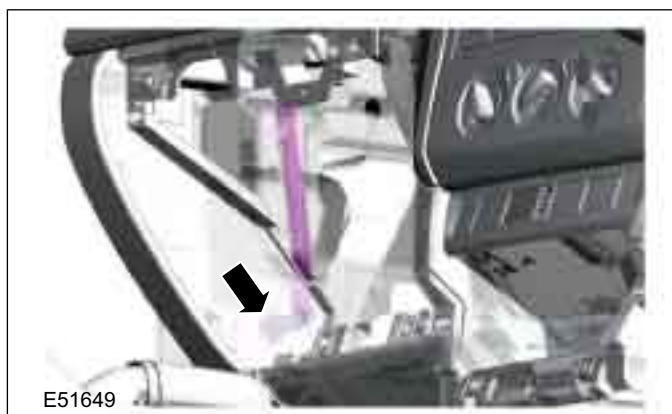
501-17-33

Roof Opening Panel

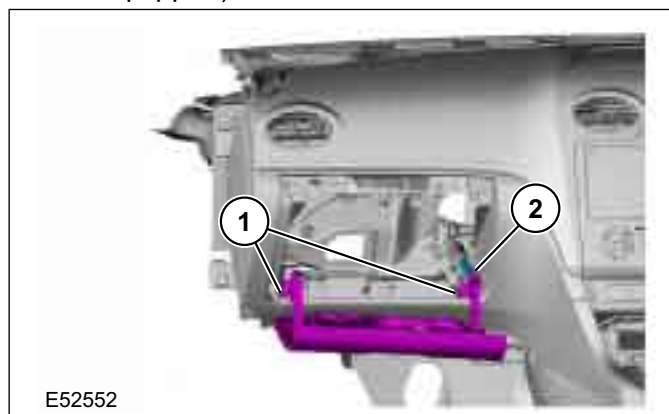
501-17-33

REMOVAL AND INSTALLATION

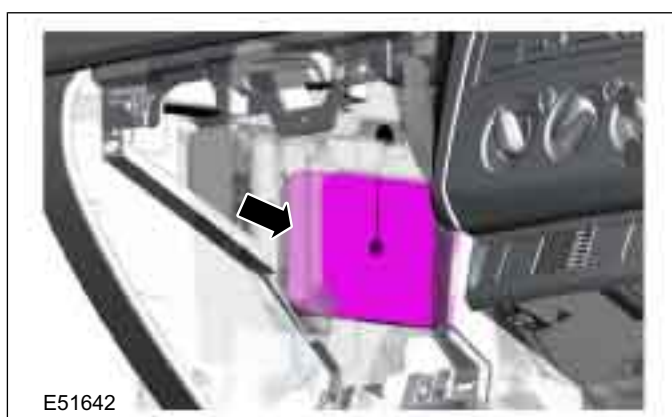
- Attach the roof opening panel front drain hose and roof opening panel front drain hose valve to the A-pillar.



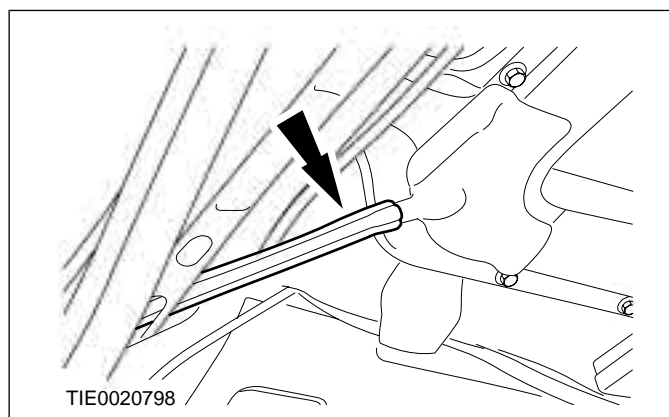
- Attach the glove compartment lid damper to the glove compartment lid hinge (if equipped).



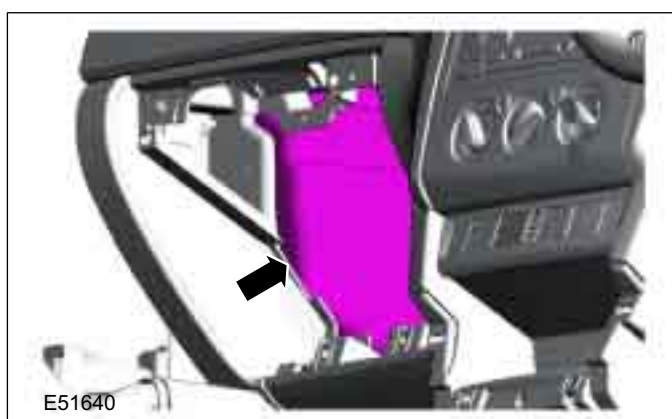
- Install the NVH insulation material to the A-pillar access hole.



- Attach the roof opening panel front drain hose to the roof opening panel.



- Attach the passenger side footwell NVH insulation material to the A-pillar.



- Install the headliner. For additional information, refer to: (501-05 Interior Trim and Ornamentation)

Headliner - 3-Door, Vehicles With: Sliding Roof Opening Panel (Removal and Installation),

Headliner - 5-Door, Vehicles With: Sliding Roof Opening Panel (Removal and Installation),

Headliner - Wagon, Vehicles With: Sliding Roof Opening Panel (Removal and Installation).

- Install the glove compartment lid.

- Attach the glove compartment lid hinges.

SECTION 501-19 Bumpers

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS**Torque Specifications**

Item	Nm	lb-ft	lb-in
Front bumper retaining bolts	25	18	-
Rear bumper retaining bolts	20	15	-
Radiator support bracket retaining bolts	25	18	-
Radiator grille opening panel reinforcement retaining bolts	23	17	-
Horn bracket retaining bolt	25	18	-
Intake air resonator retaining bolt	9	-	80

REMOVAL AND INSTALLATION

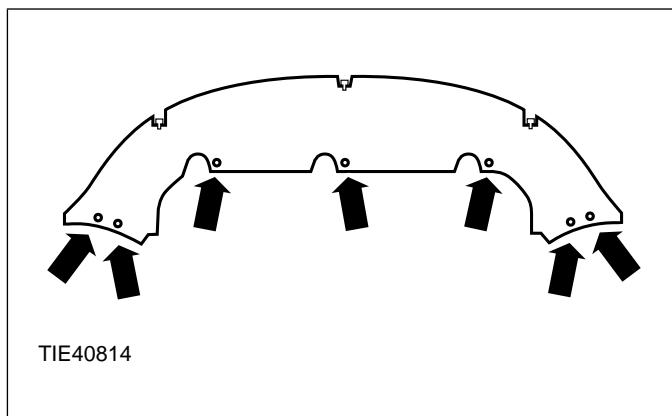
Front Bumper(43 423 0)

Removal

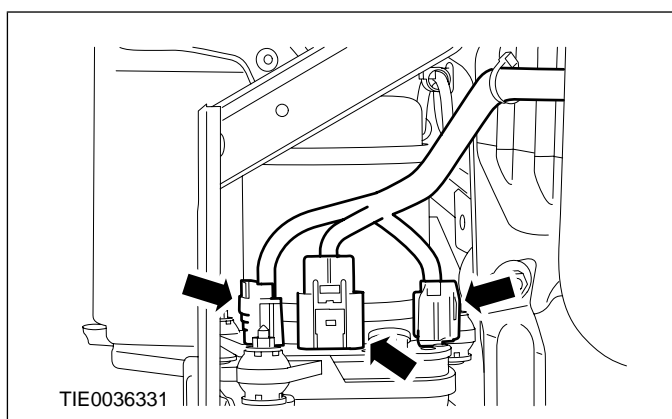
1. Remove the front bumper cover.

For additional information, refer to Front Bumper Cover - in this section.

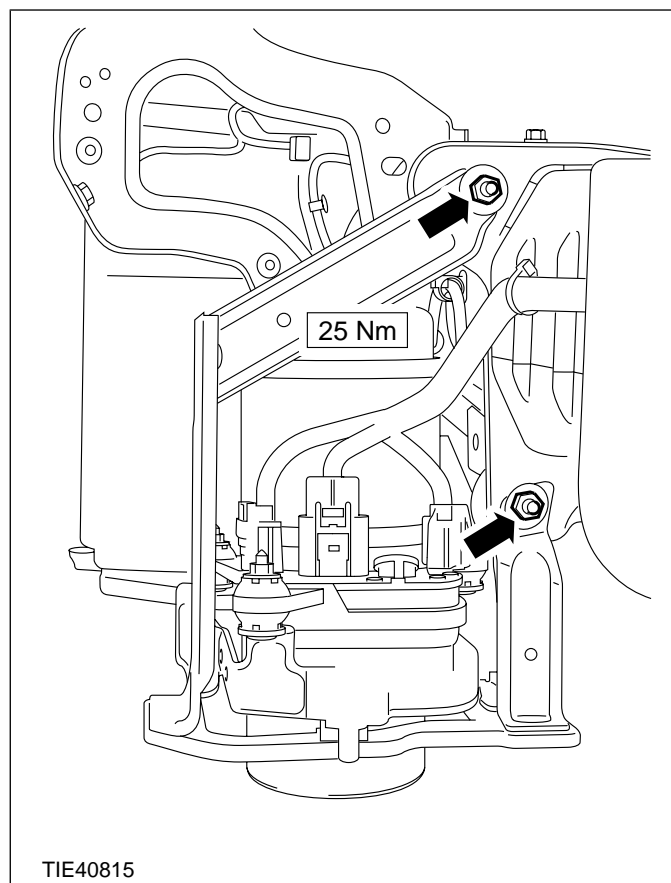
2. Remove the radiator splash shield.



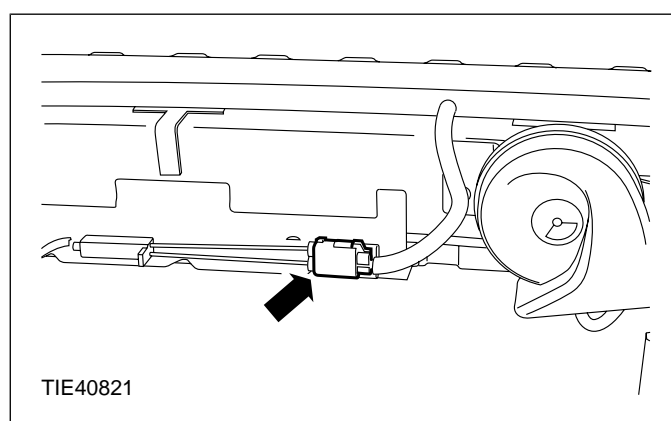
3. Disconnect the power steering pump electrical connectors.



4. Detach the power steering pump support bracket from the bumper.



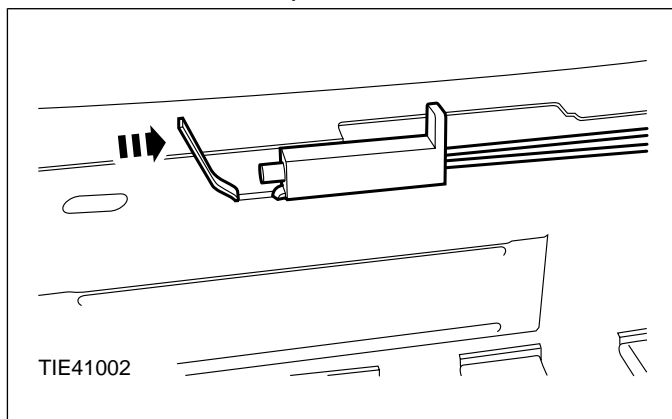
5. Disconnect the air temperature sensor electrical connector.



6. Remove the air temperature sensor.

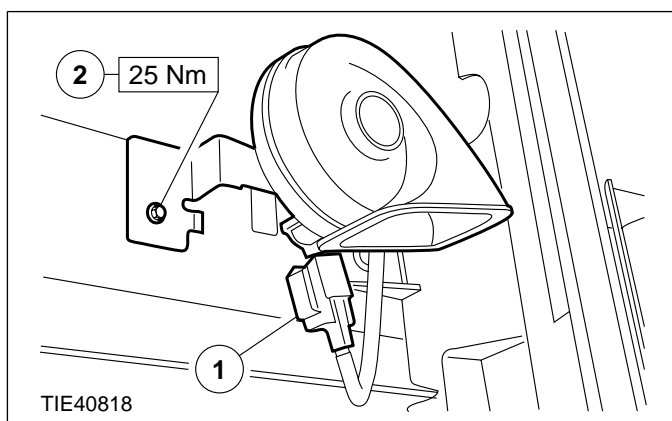
REMOVAL AND INSTALLATION

- Release the clip.



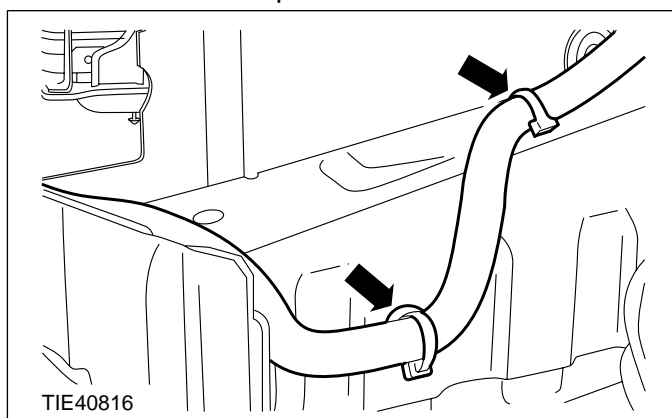
7. Remove the horn and bracket assembly.

1. Disconnect the electrical connector.
2. Remove the bolt.

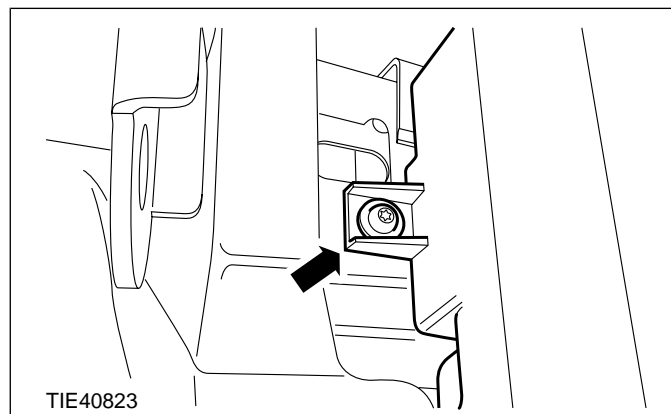


8. Detach the wiring harness from the bumper on both sides (left-hand side shown).

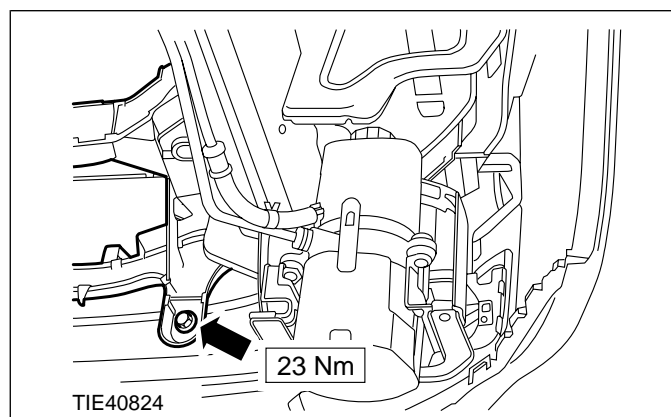
- Detach the clips.



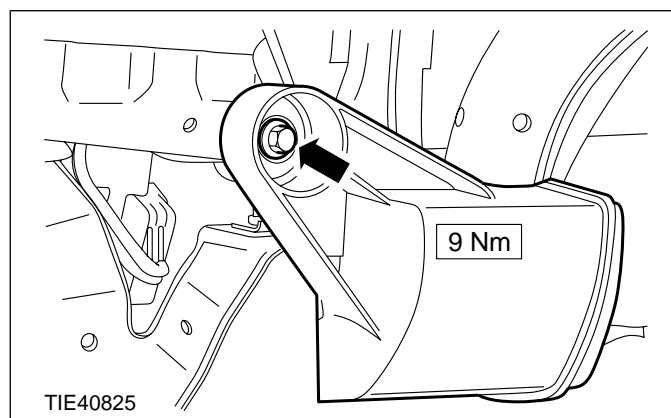
9. Remove the air deflector on both sides (left-hand side shown).



10. Detach the radiator grille opening panel reinforcement from the bumper on both sides (right-hand side shown).



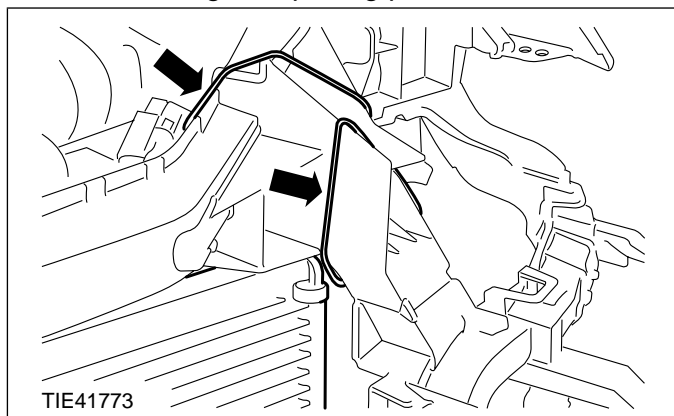
11. Detach the intake air resonator from the bumper.



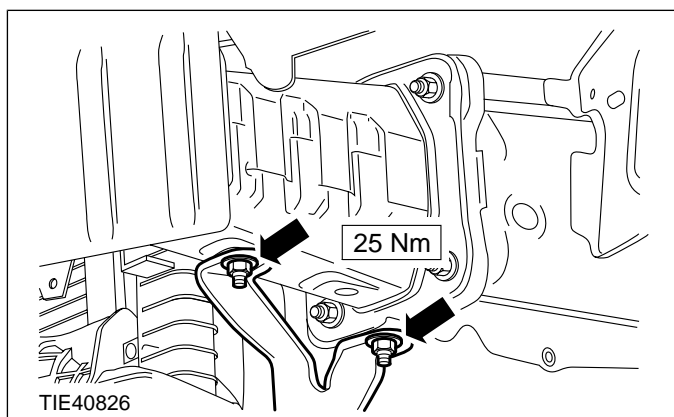
12. Support the radiator on both sides (left-hand side shown).

REMOVAL AND INSTALLATION

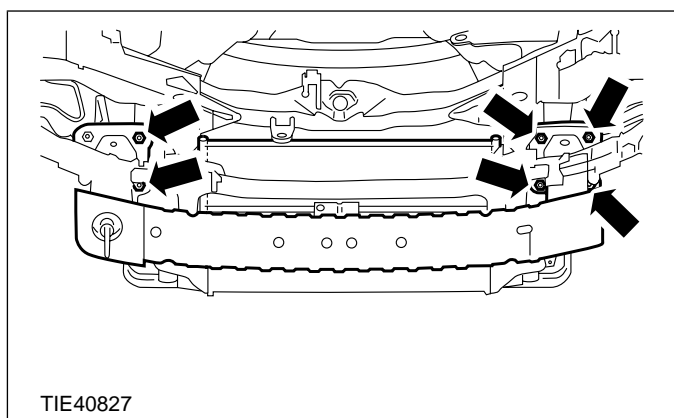
- Using cable ties, secure the radiator to the radiator grille opening panel reinforcement.



13. Detach the radiator support bracket from the bumper on both sides (left-hand side shown).



14. Remove the bumper.

**Installation**

1. To install, reverse the removal procedure.



REMOVAL AND INSTALLATION

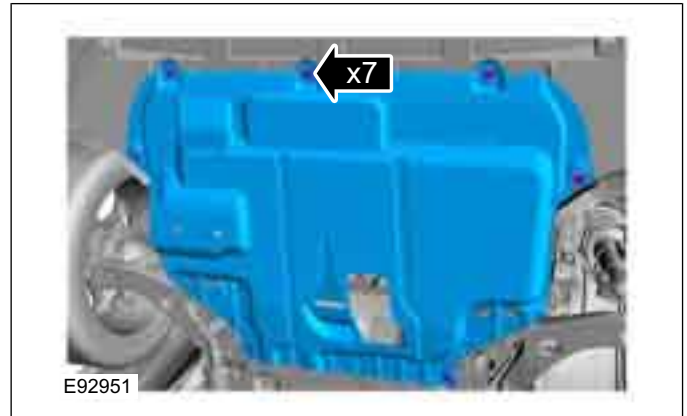
Front Bumper Cover — Vehicles Built From: 12/2007

Removal

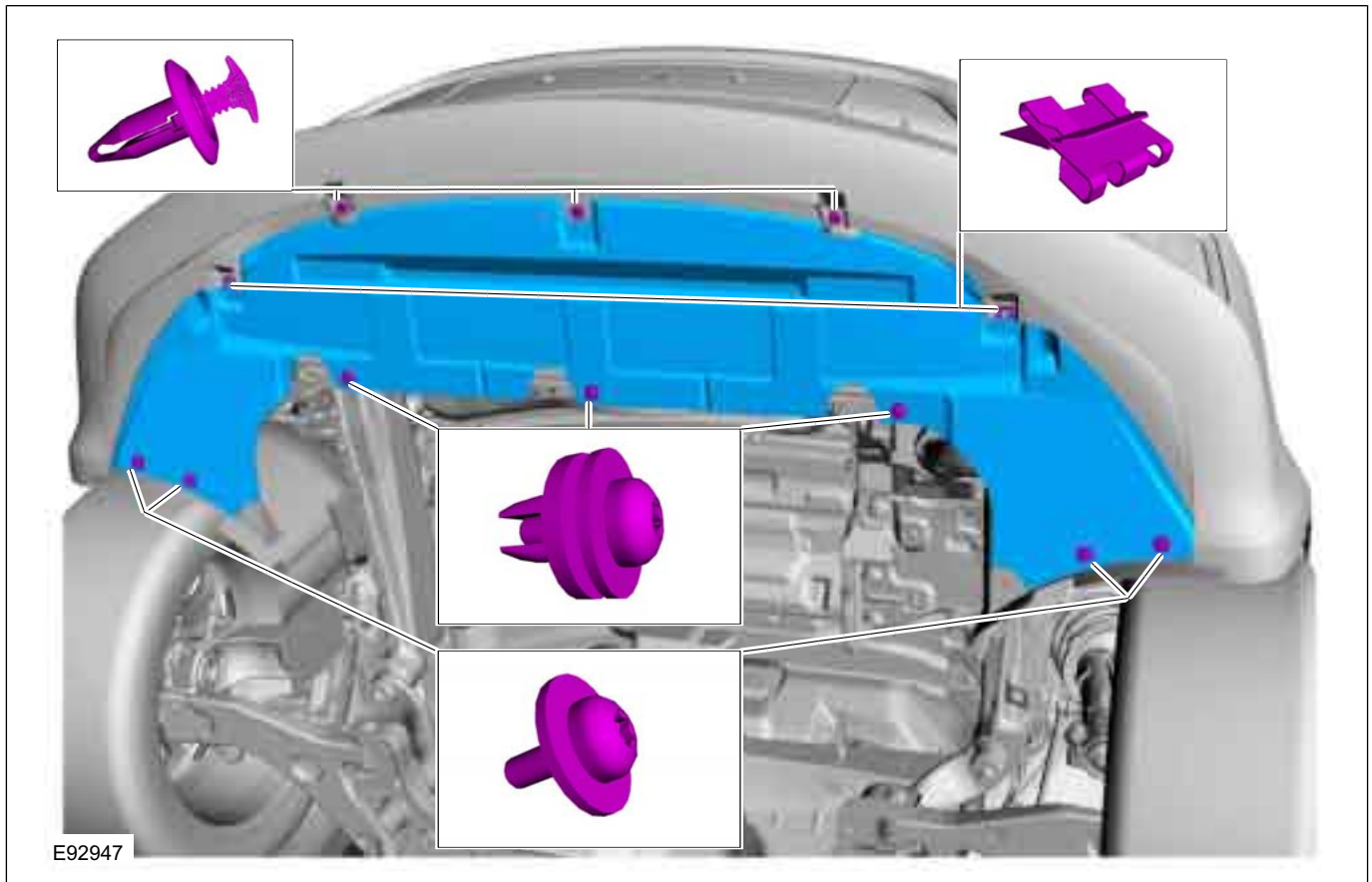
NOTE: Removal steps in this procedure may contain installation details.

1. Refer to: **Lifting (100-02 Jacking and Lifting, Description and Operation).**

2.



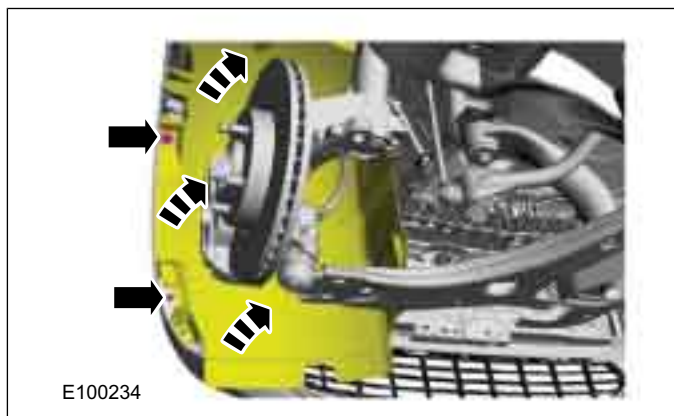
3.



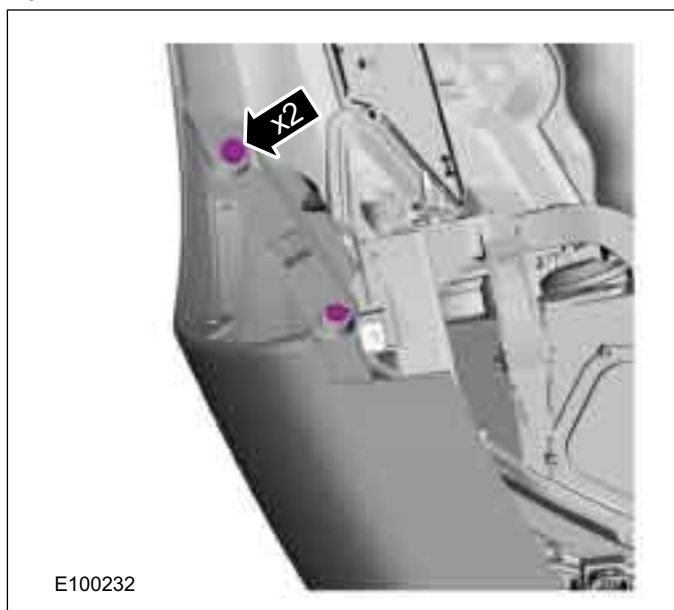
REMOVAL AND INSTALLATION

4. Refer to: **Front Fog Lamp - Vehicles Built From: 12/2007** (417-01 Exterior Lighting, Removal and Installation).

5.

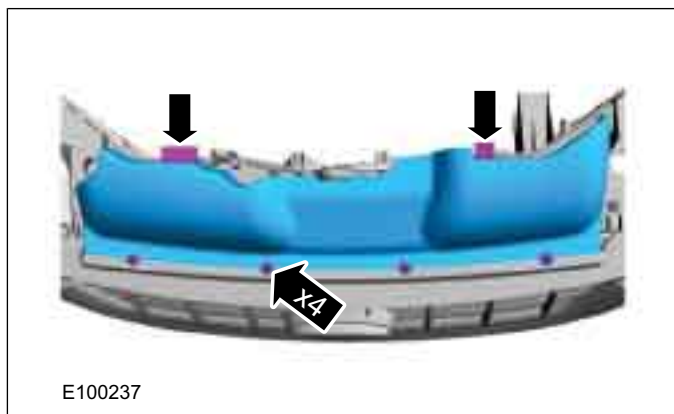


6.

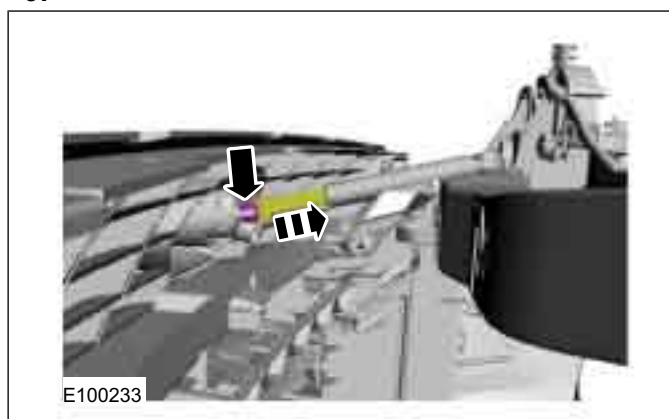


7. Refer to: **Headlamp Assembly** (417-01 Exterior Lighting, Removal and Installation).

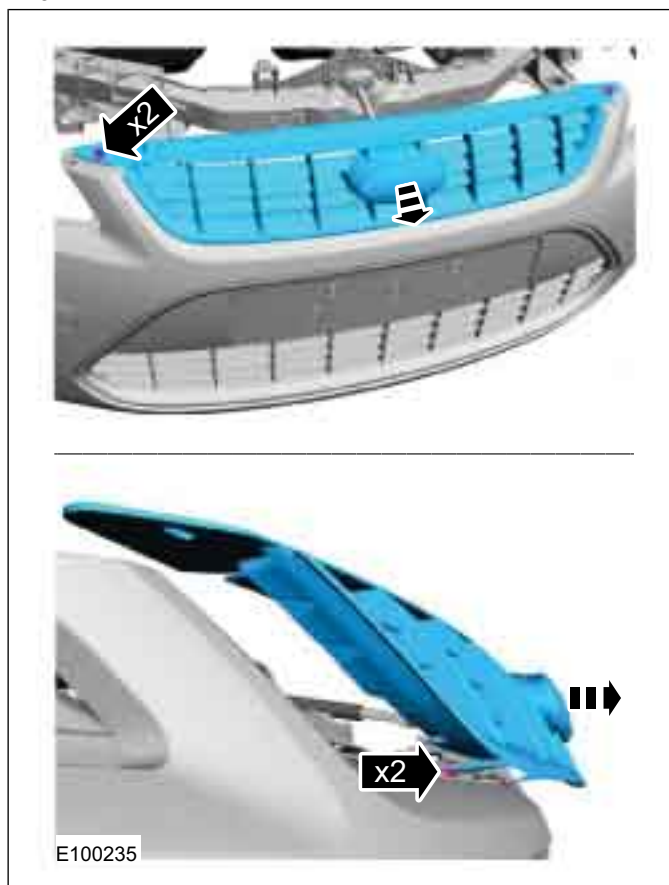
8.



9.

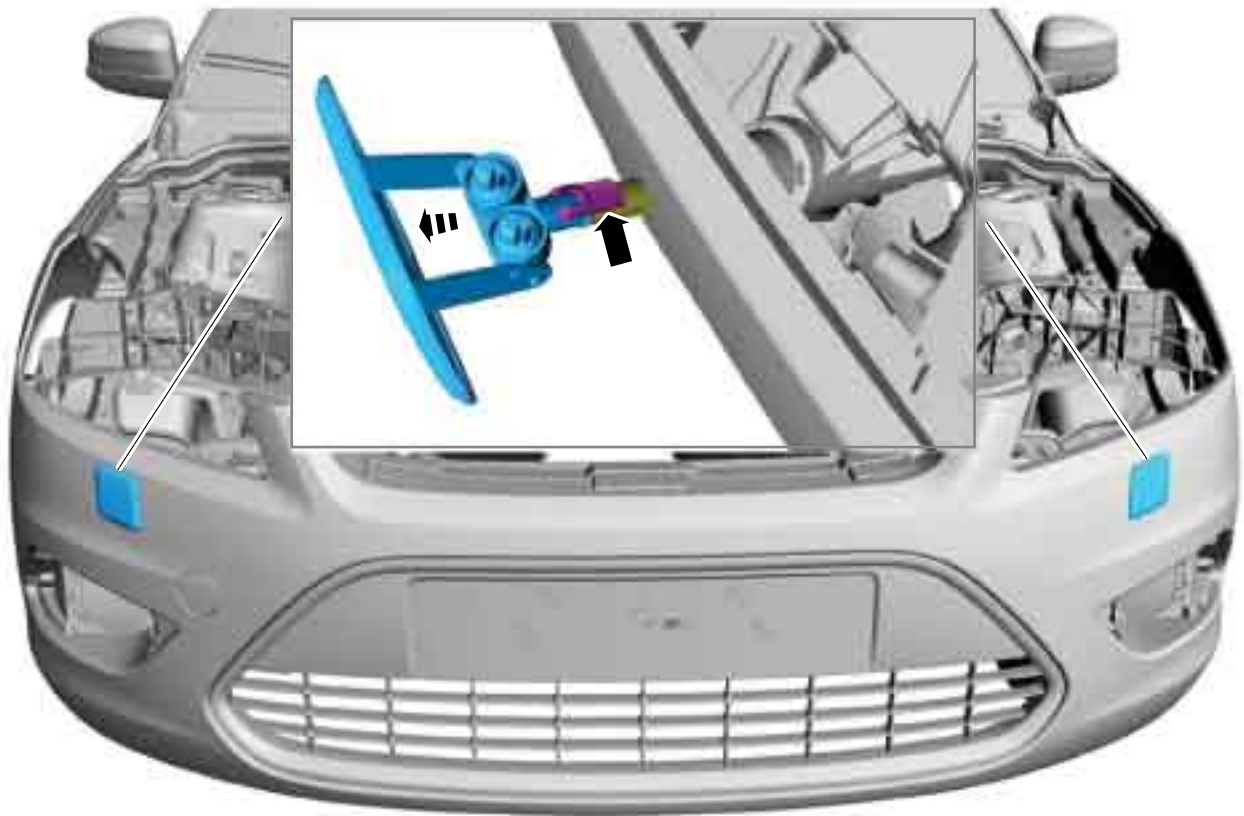


10.



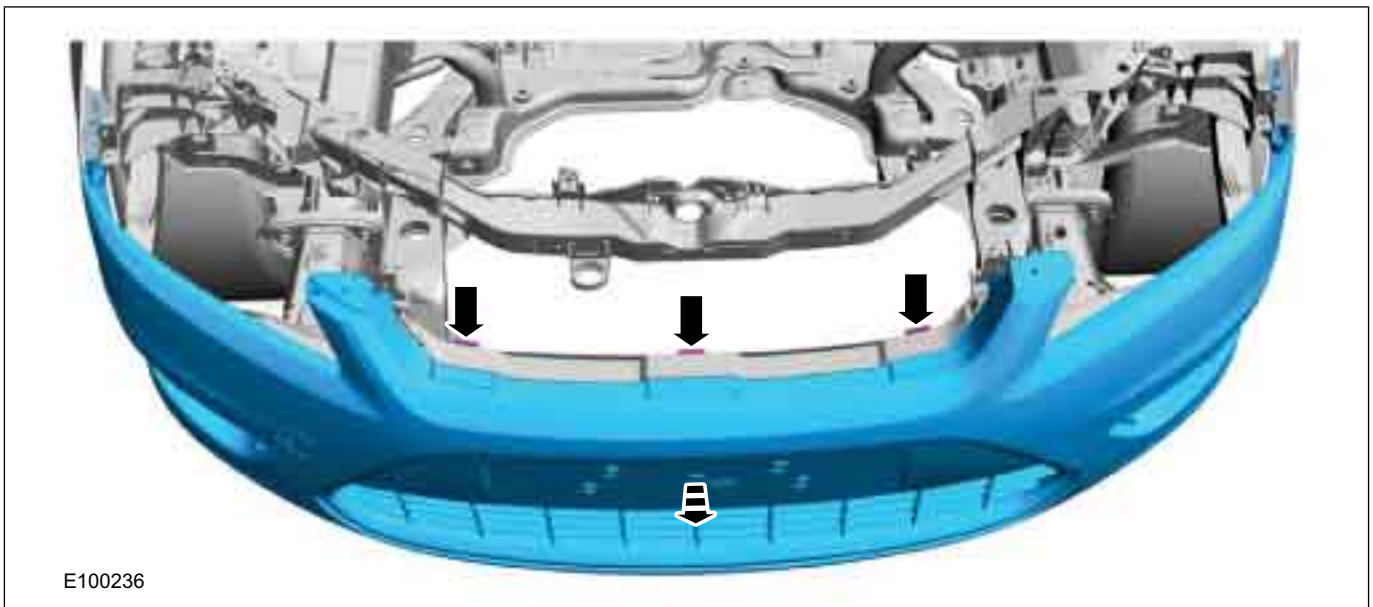
11.

REMOVAL AND INSTALLATION



E100231

12



E100236

Installation

1. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

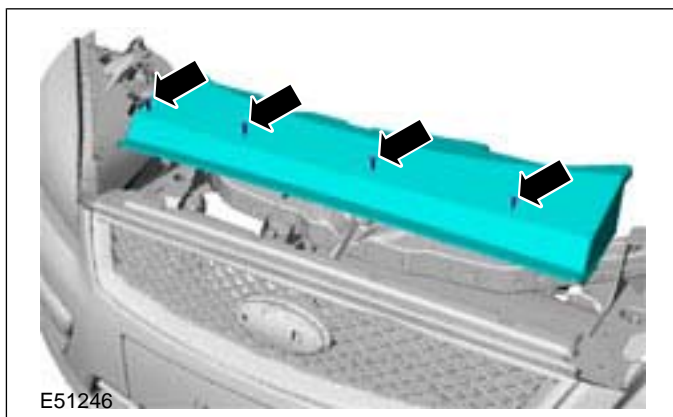
Front Bumper Cover — 2.5L Duratec-ST (VI5)

Removal

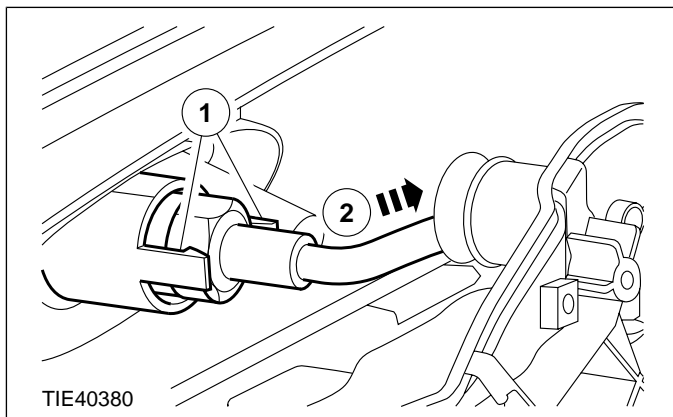
NOTE: Removal steps in this procedure may contain installation details.

1. Remove the headlamp assemblies.
Refer to: **Headlamp Assembly** (417-01 Exterior Lighting, Removal and Installation).

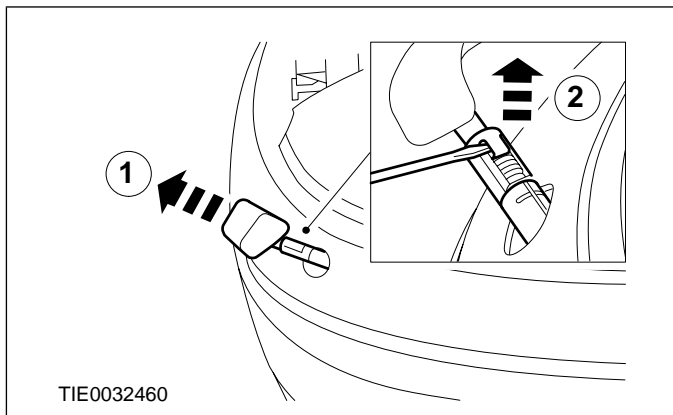
2.



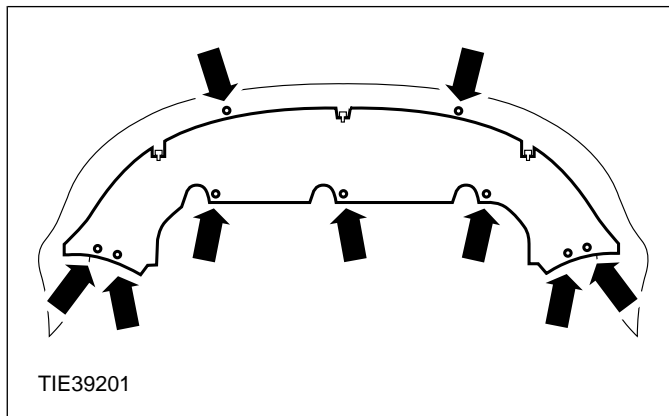
3.



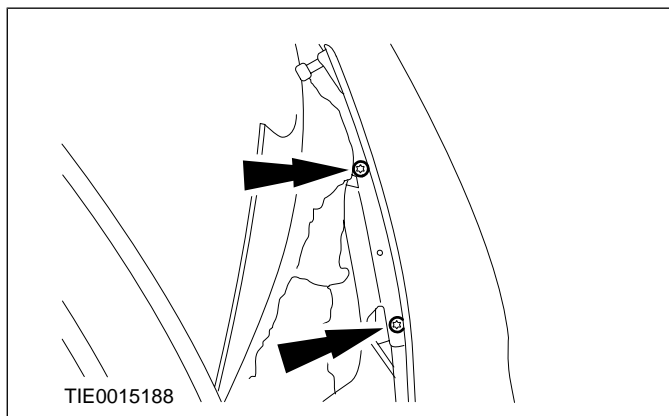
4.



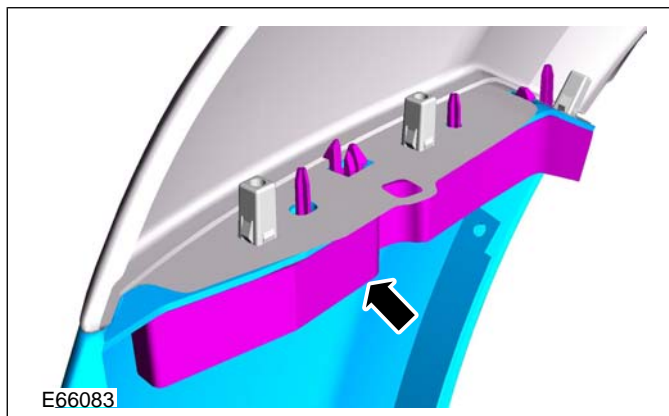
5.



6.



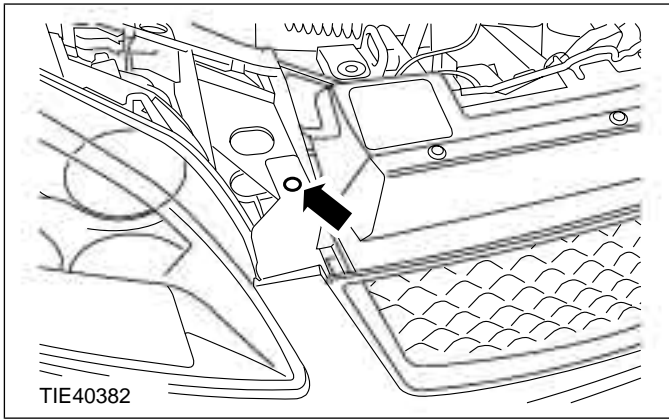
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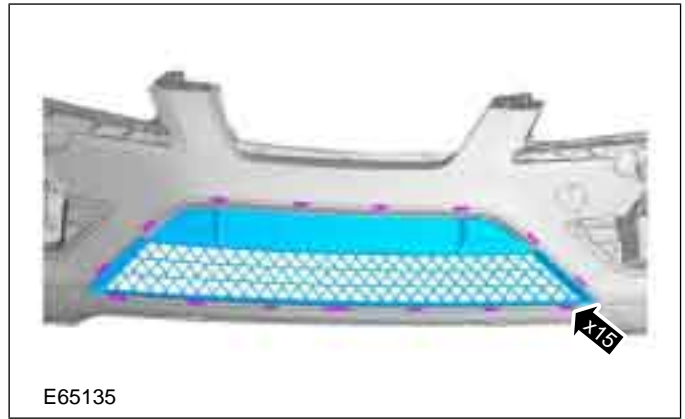


REMOVAL AND INSTALLATION

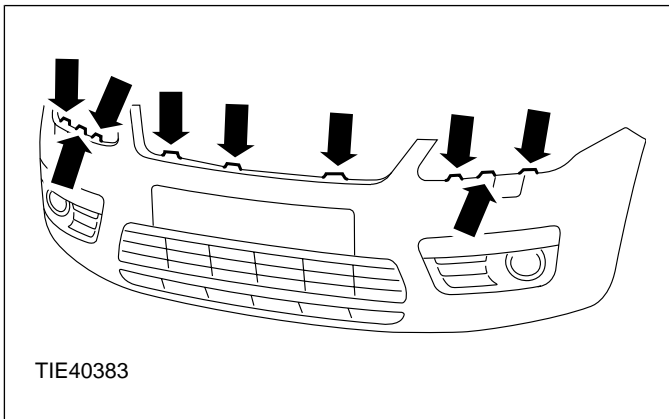
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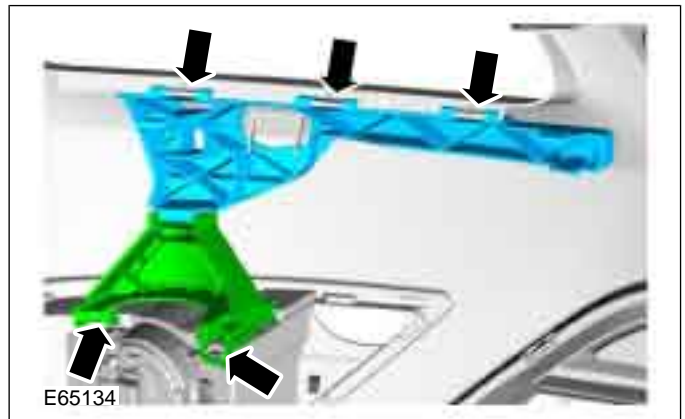
11.



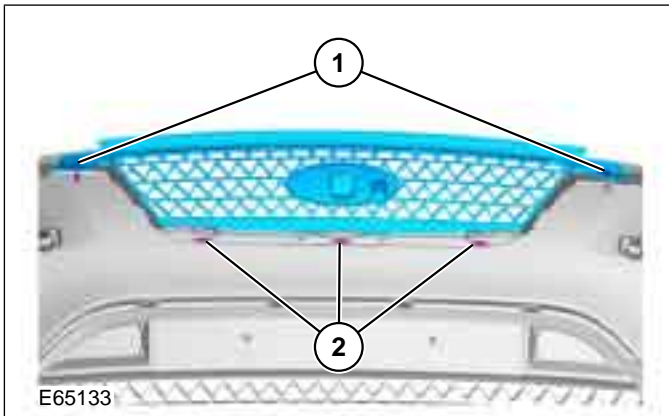
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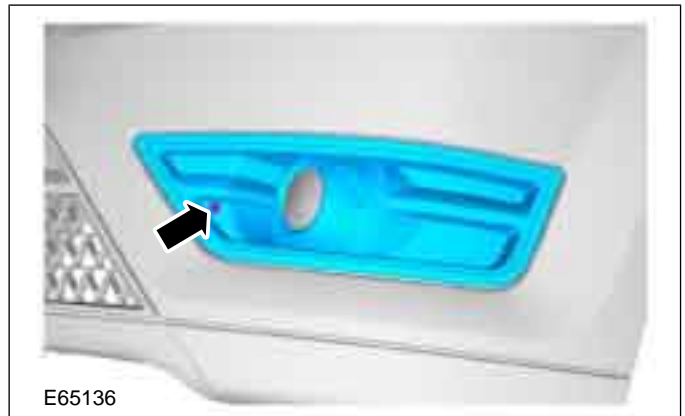
12.



10.

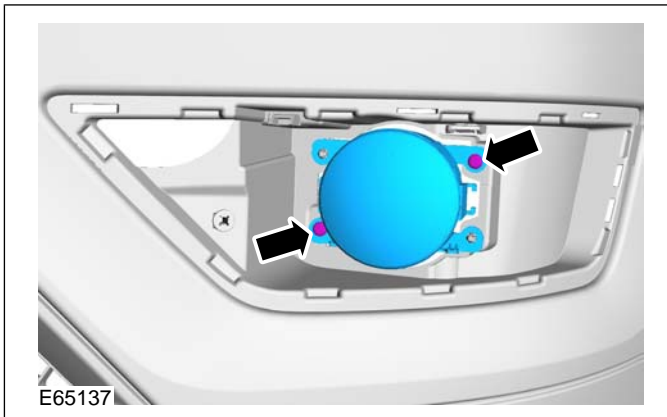


13.



REMOVAL AND INSTALLATION

14.



Installation

1. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Rear Bumper Cover — 3-Door/5-Door

General Equipment

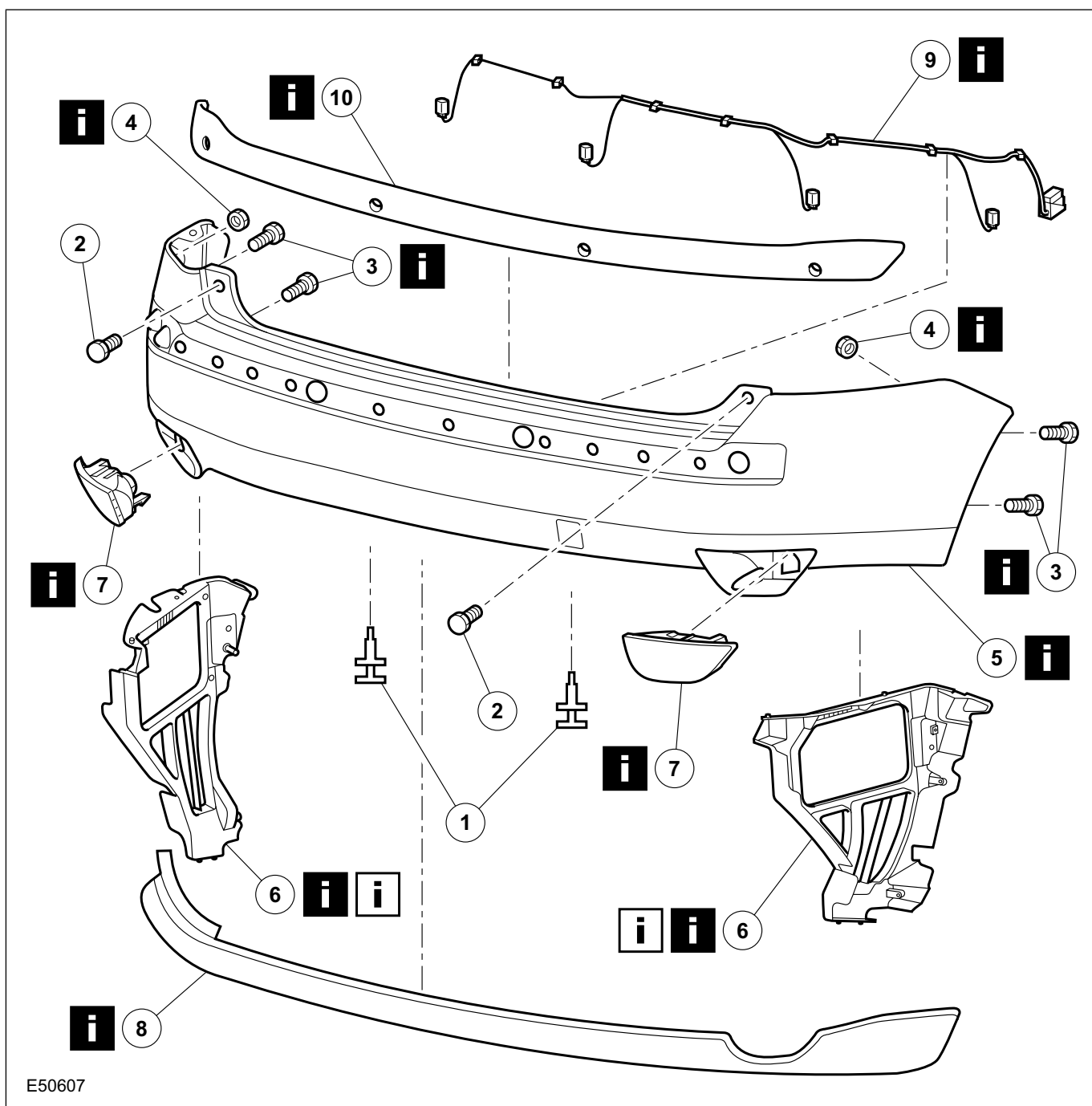
Electric hand drill
Drill bit 5 mm
Blind rivet gun-hand

1. Raise and support the vehicle.

For additional information, refer to: **Jacking** (100-02 Jacking and Lifting, Description and Operation)

/ Lifting (100-02 Jacking and Lifting, Description and Operation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



E50607

REMOVAL AND INSTALLATION

Item	Description
1	Bumper cover lower retaining screws
2	Bumper cover upper retaining screws
3	Fender splash shield retaining screws See Removal Detail
4	Bumper cover retaining nuts See Removal Detail
5	Bumper cover See Removal Detail
6	Bumper cover side padding See Removal Detail See Installation Detail

Item	Description
7	Rear fog lamp and reversing lamp See Removal Detail
8	Bumper cover extension panel See Removal Detail
9	Parking aid sensors (if equipped) See Removal Detail
10	Bumper cover trim panel See Removal Detail

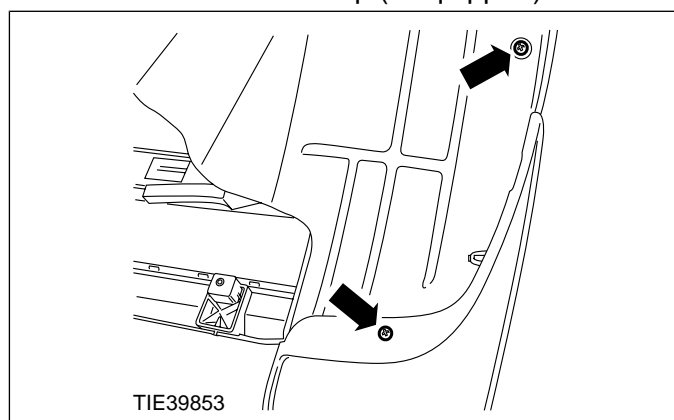
3. To install, reverse the removal procedure.

Removal Details

Item 3 Fender splash shield retaining screws

1. Detach the bumper cover from the fender splash shield on both sides (left-hand side shown).

- Remove the mudflap (if equipped).

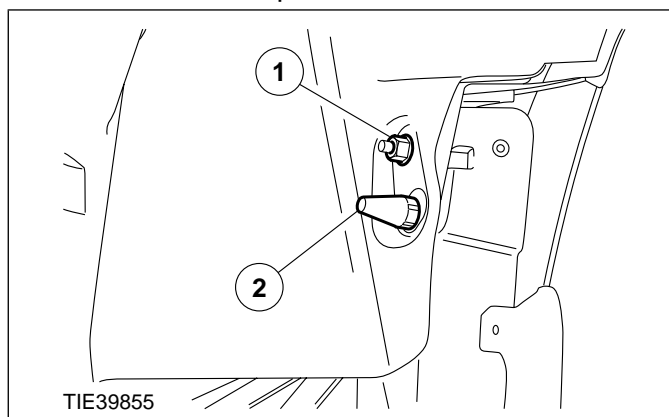


Item 4 Bumper cover retaining nuts

1. Detach the bumper cover from the fender on both sides (left-hand side shown).

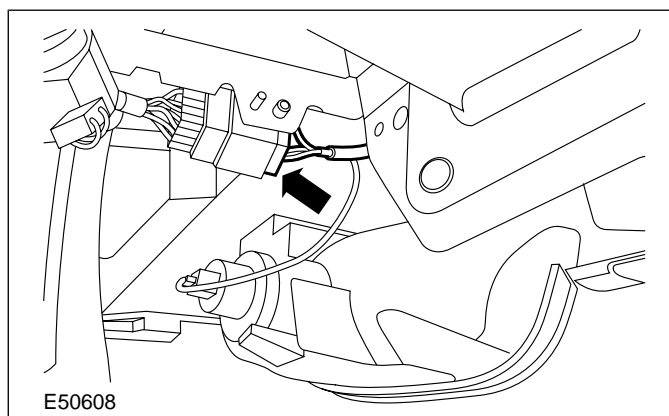
- Remove the retaining nut.

2. Detach the clip.



Item 5 Bumper cover

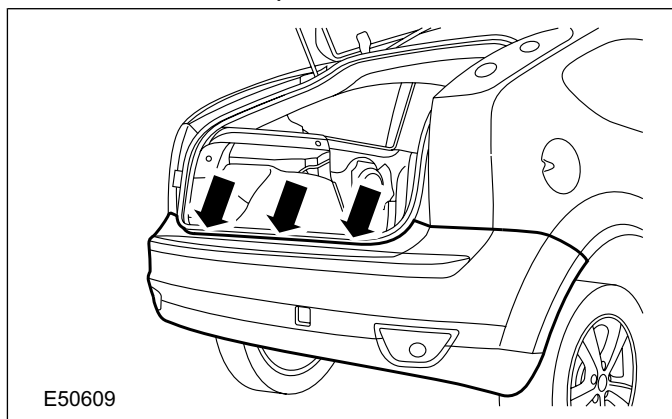
1. Disconnect the rear bumper wiring harness electrical connector.



2. Remove the bumper cover.

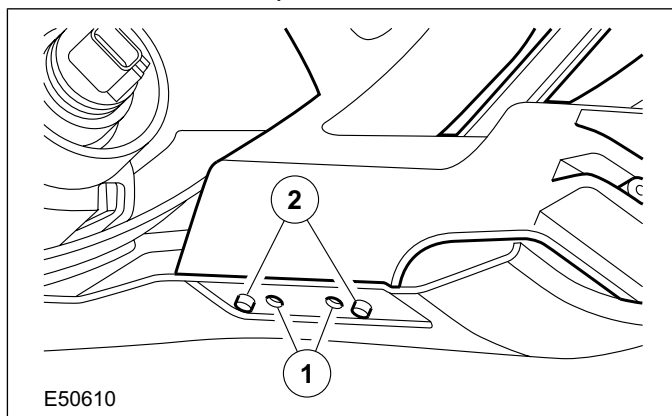
REMOVAL AND INSTALLATION

- Detach the clips.

**Item 6 Bumper cover side padding**

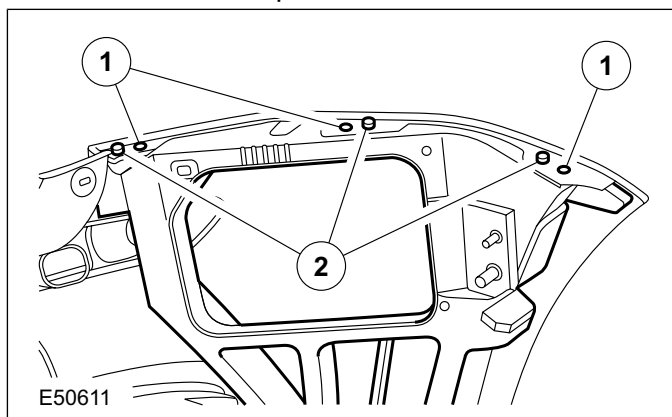
1. Detach the bumper cover side padding from the bumper cover extension panel on both sides (left-hand side shown).

1. Using a suitable electric hand drill and a drill bit 5 mm, remove the rivets.
2. Detach the clips.



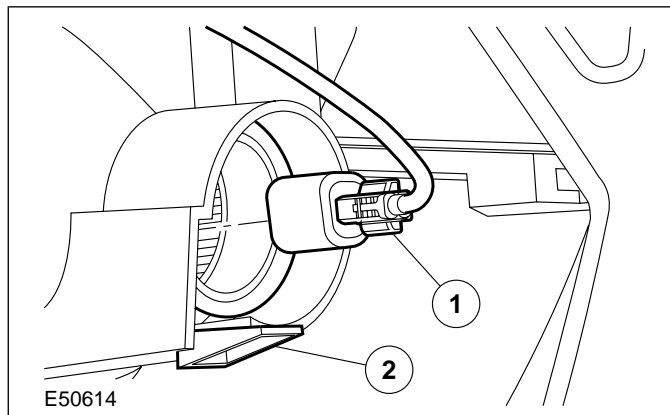
2. Remove the bumper cover side padding on both sides (left-hand side shown).

1. Using a suitable electric hand drill and a drill bit 5 mm, remove the rivets.
2. Detach the clips.

**Item 7 Rear fog lamp and reversing lamp**

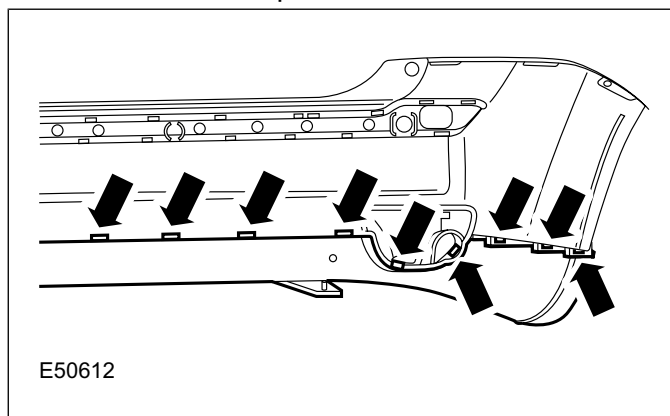
1. Remove the rear fog lamp and reversing lamp (left-hand lamp shown).

1. Disconnect the electrical connector.
2. Detach the clip.

**Item 8 Bumper cover extension panel**

1. Remove the bumper cover extension panel (left-hand side shown).

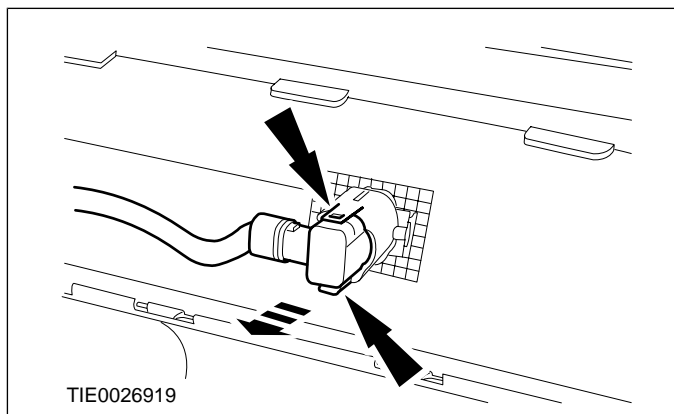
- Detach the clips.

**Item 9 Parking aid sensors (if equipped)**

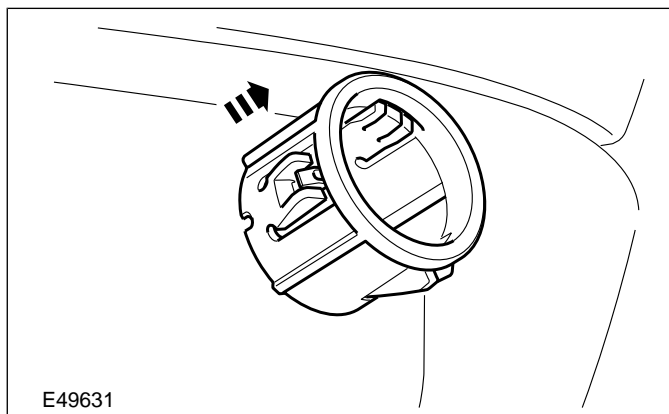
1. **⚠ CAUTION:** Do not apply pressure to the outer face of the parking aid sensors.

REMOVAL AND INSTALLATION

Detach the parking aid sensors from the bumper cover trim panel.

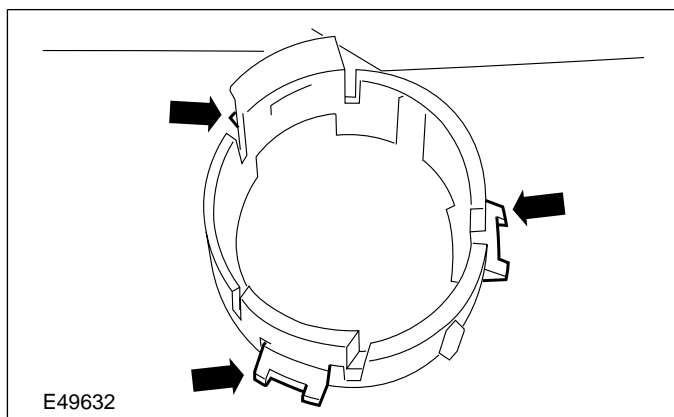


2. Remove the parking aid sensor housing (if equipped).



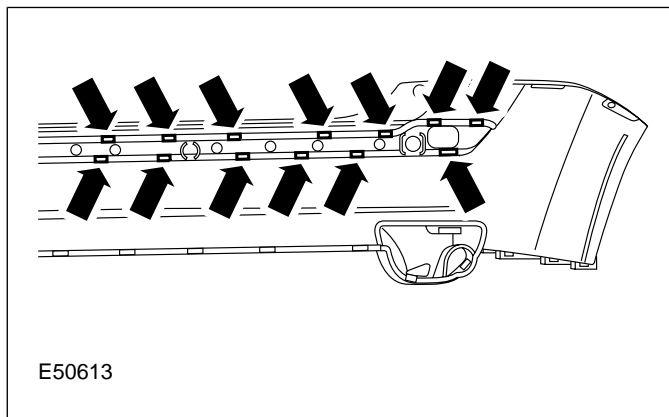
Item 10 Bumper cover trim panel

1. Release the parking aid sensor housing locking tangs (if equipped).



3. Remove the bumper cover trim panel (left-hand side shown).

- Detach the clips.



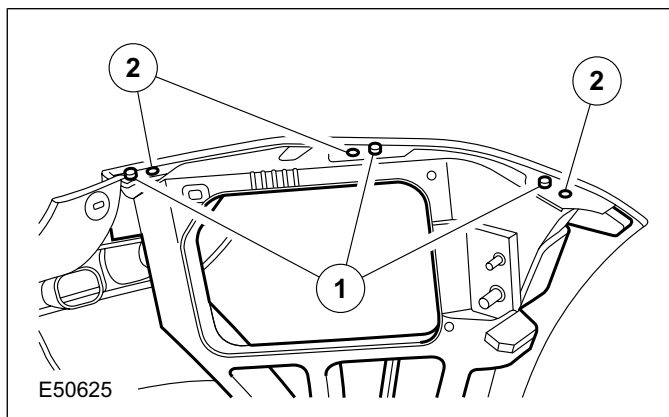
Installation Details

Item 6 Bumper cover side padding

1. Attach the bumper cover side padding to the bumper cover on both sides (left-hand side shown).

1. Attach the clips.

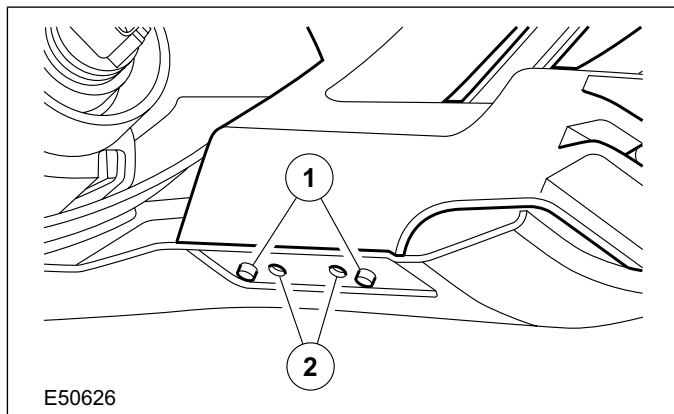
2. Using a suitable blind rivet gun-hand, install new rivets.



2. Attach the bumper cover side padding to the bumper cover extension panel on both sides (left-hand side shown).

REMOVAL AND INSTALLATION

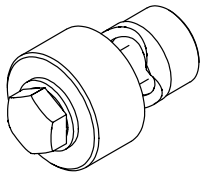
1. Attach the clips.
2. Using a suitable blind rivet gun-hand, install new rivets.



REMOVAL AND INSTALLATION

Rear Bumper Cover — Vehicles Built From: 12/2007, 5-Door

Special Tool(s)

 <p>E92959</p>	<p>Punching Tool, Parking Aid Sensor 501-135</p>
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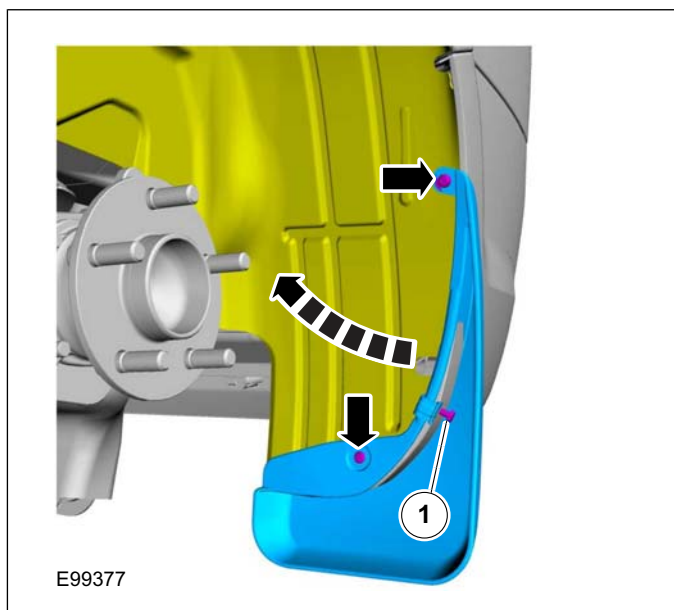
General Equipment

5 mm drill bit
Electric drill
Blind rivet gun
12 mm drill bit
Flat file

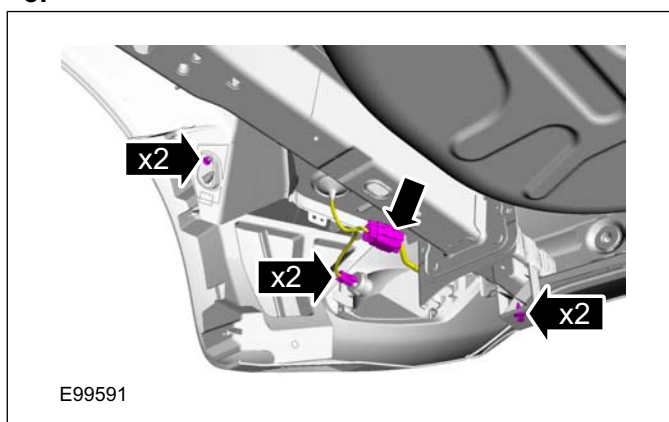
Removal

NOTE: Removal steps in this procedure may contain installation details.

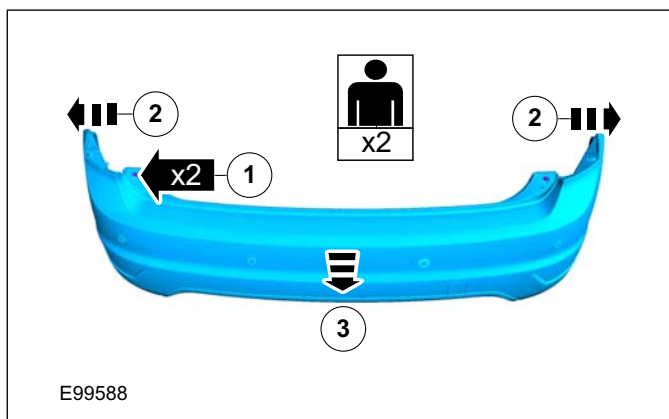
1. Refer to: **Lifting (100-02 Jacking and Lifting, Description and Operation)**.
2. 1. If equipped
2. On both sides.



3.



4.

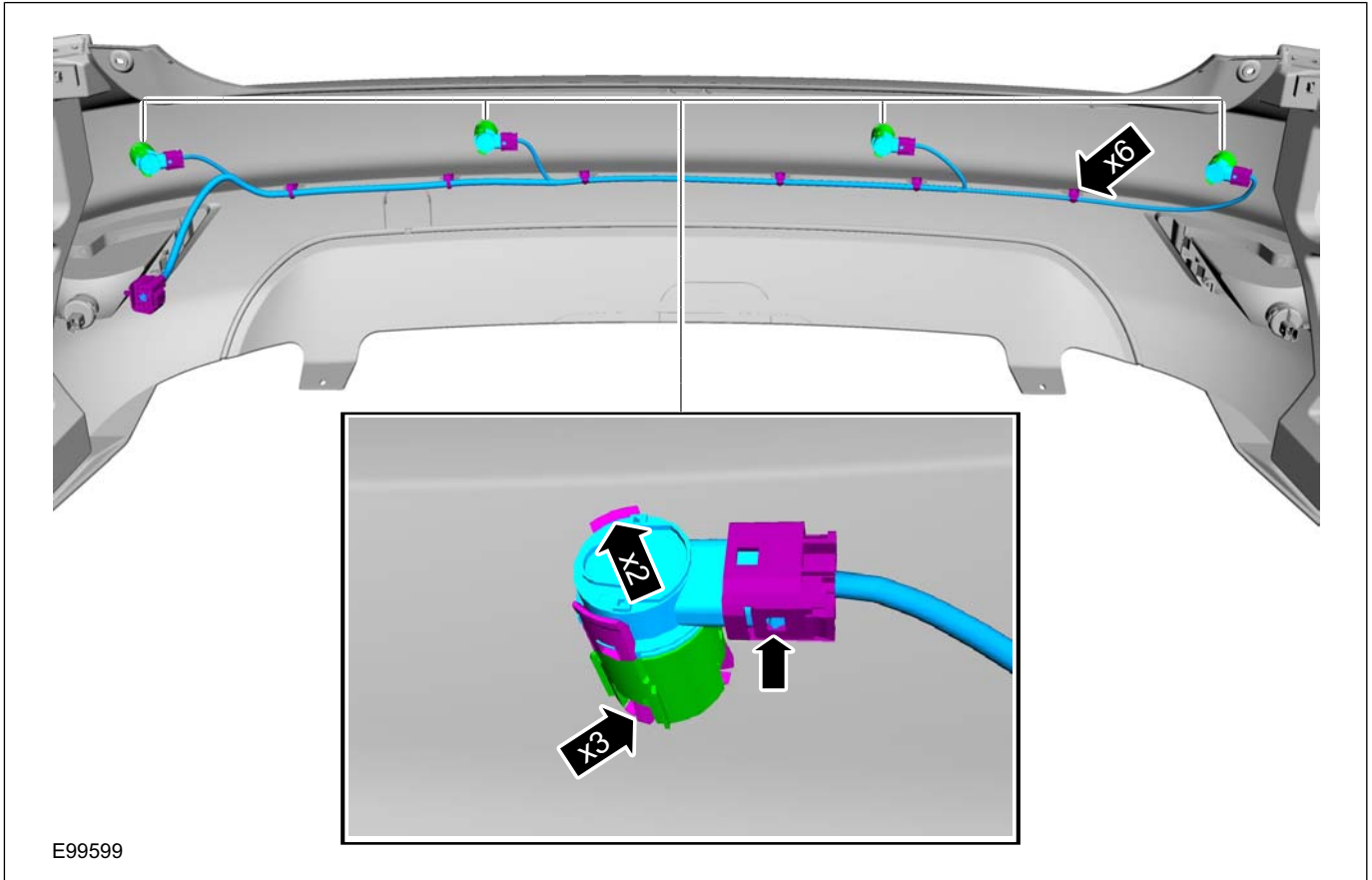


Vehicles with parking aid

5.

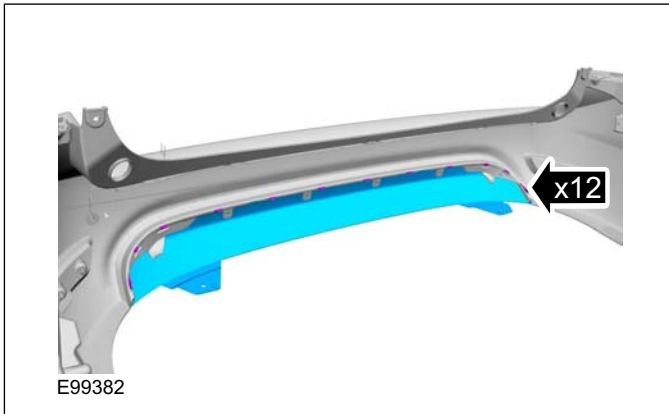


REMOVAL AND INSTALLATION



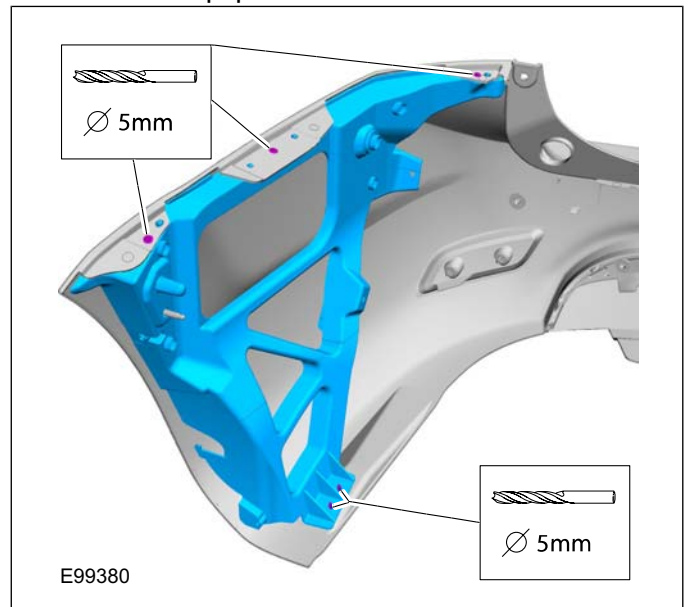
Vehicles with 2.5L engine

6.



All vehicles

7. General Equipment: 5 mm drill bit
General Equipment: Electric drill

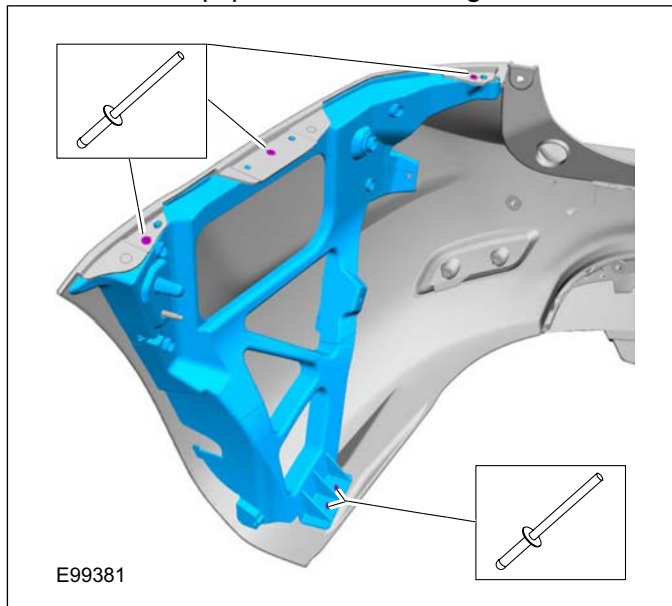


REMOVAL AND INSTALLATION

Installation

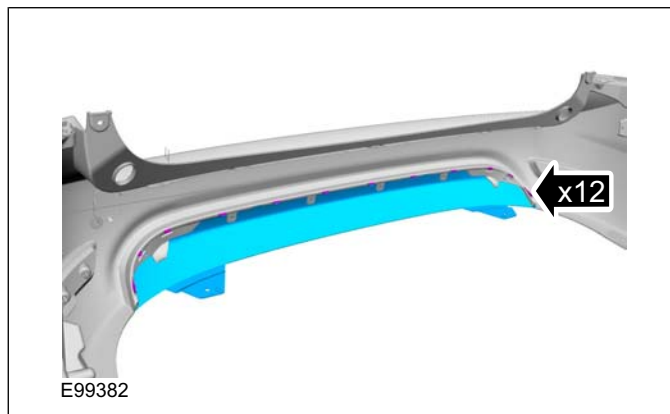
All vehicles

1. General Equipment: Blind rivet gun



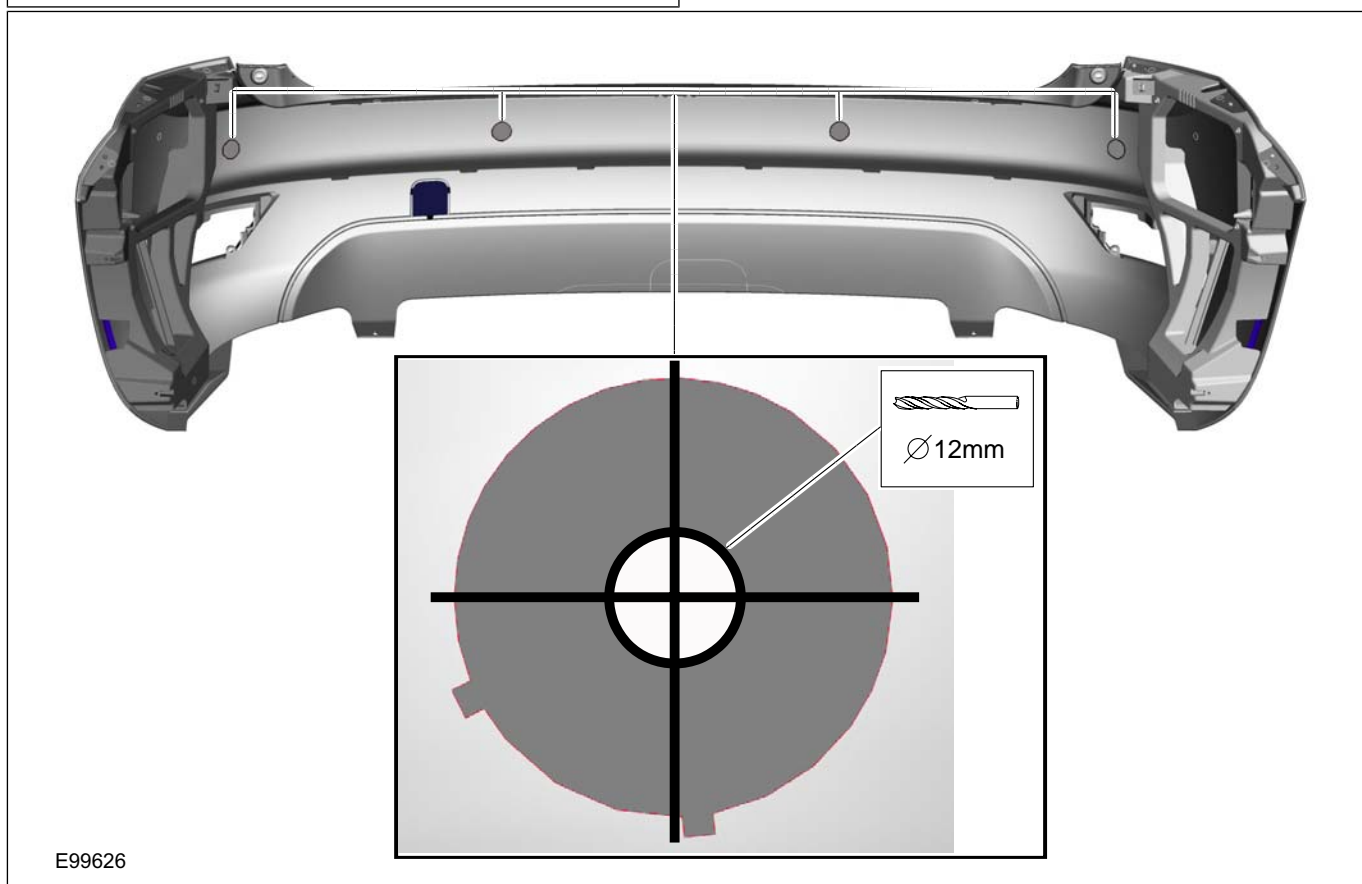
Vehicles with 2.5L engine

2.



Vehicles with parking aid

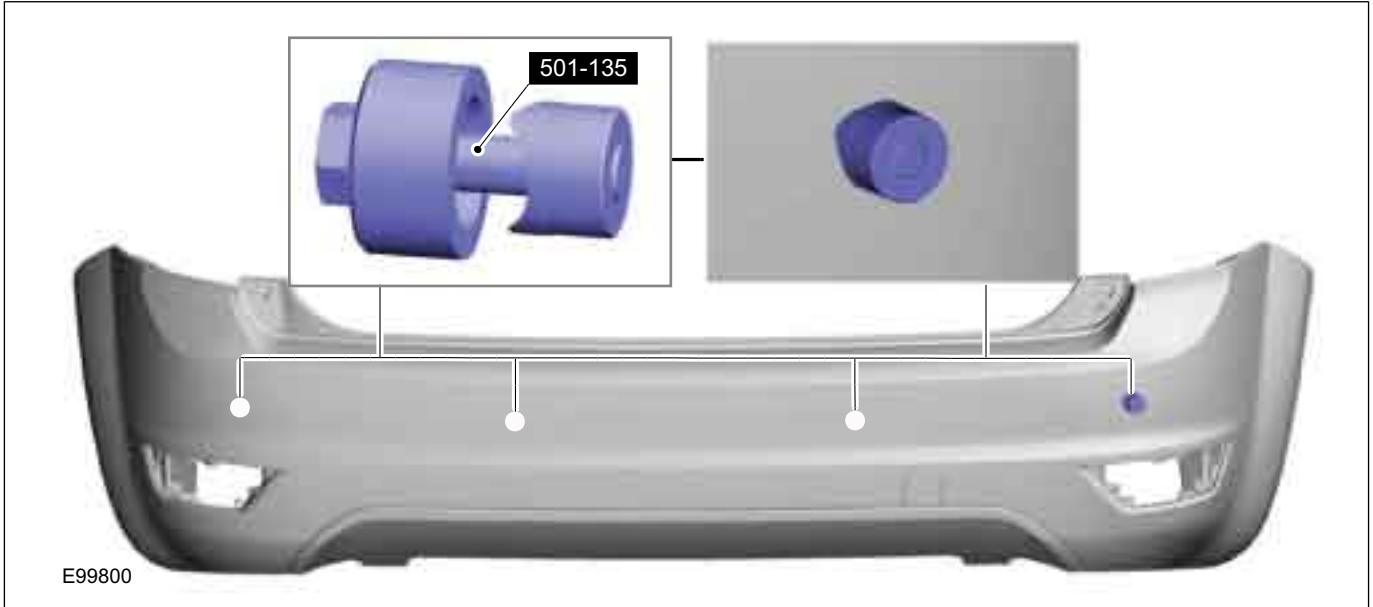
3. General Equipment: 12 mm drill bit



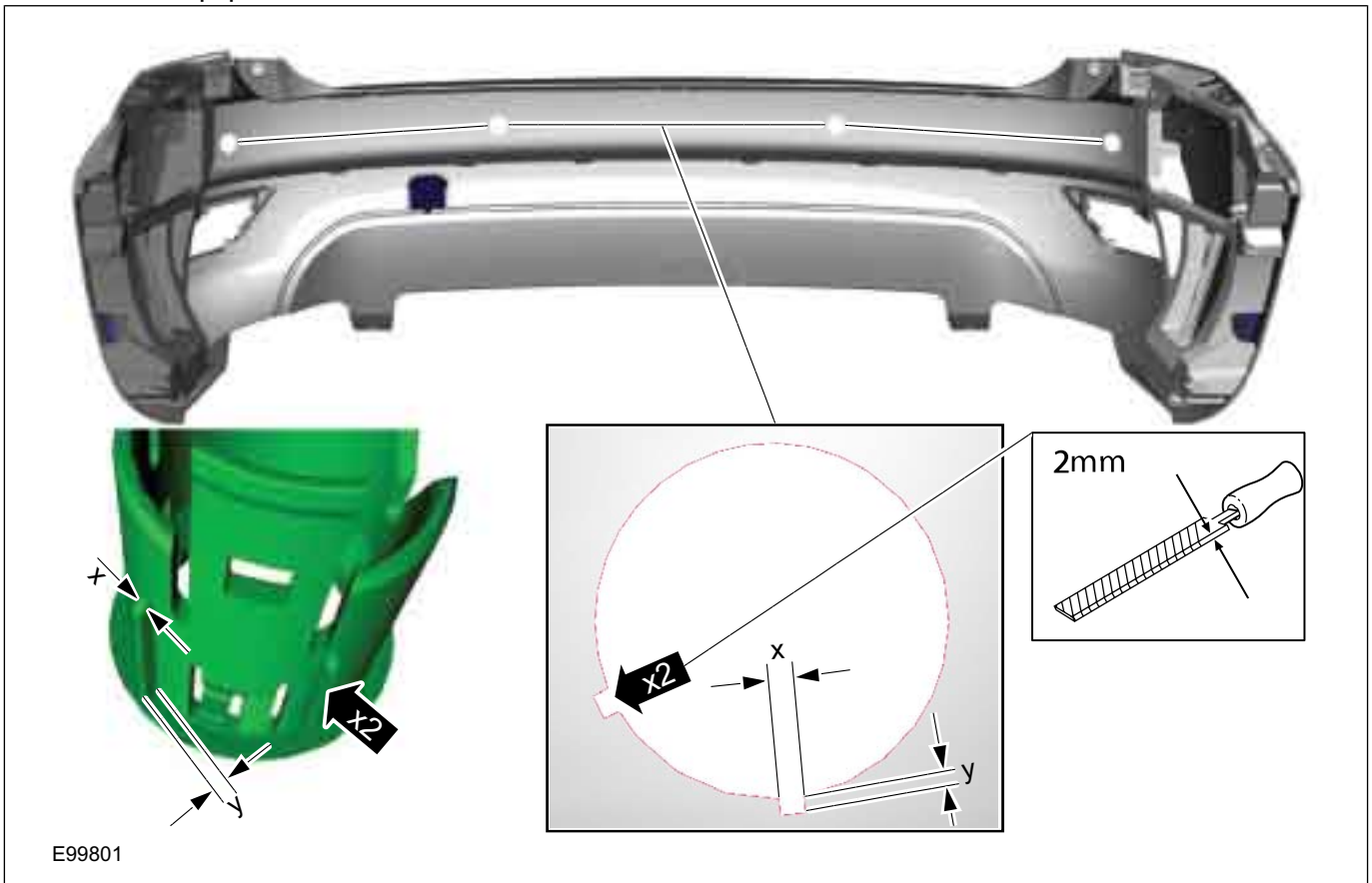
4. Special Tool(s): 501-135



REMOVAL AND INSTALLATION



5. General Equipment: Flat file



6. To install, reverse the removal procedure.



REMOVAL AND INSTALLATION

Rear Bumper Cover — 2.5L Duratec-ST (VI5)

General Equipment

Electric drill
5 mm drill bit

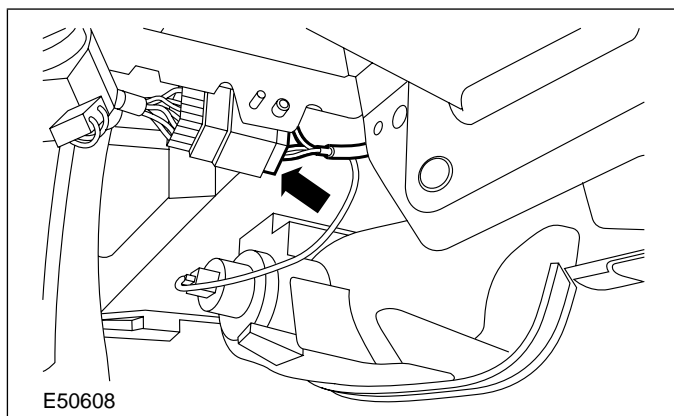
General Equipment

Blind rivet gun

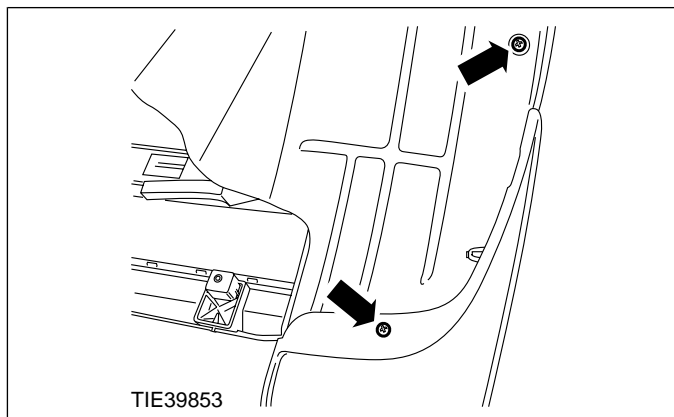
Removal

NOTE: Removal steps in this procedure may contain installation details.

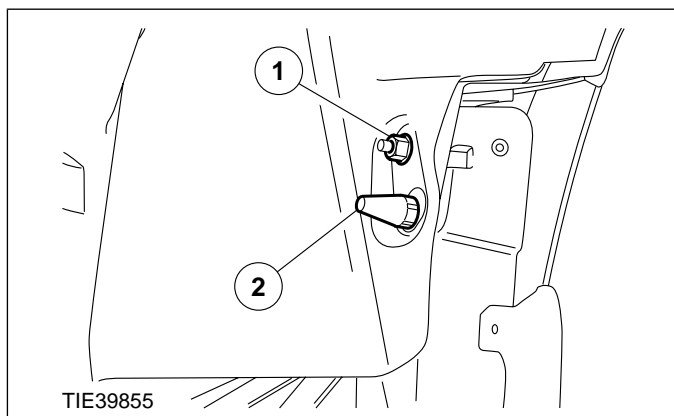
1.



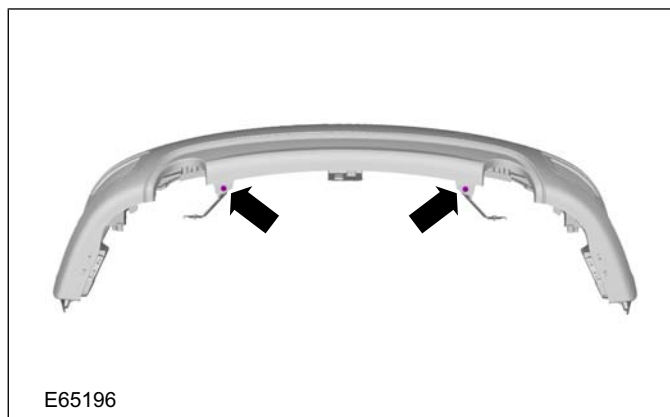
2.



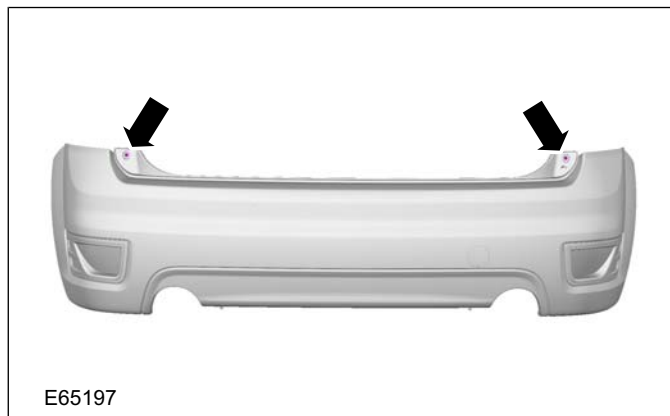
3.



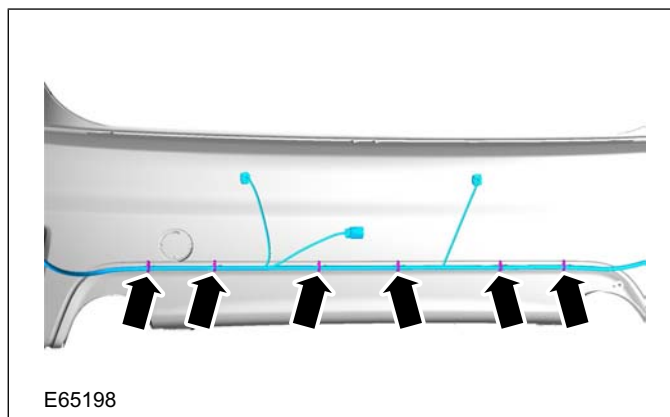
4.



5.



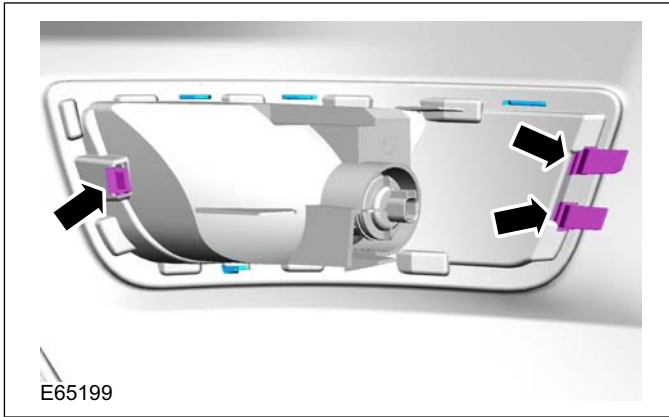
6.



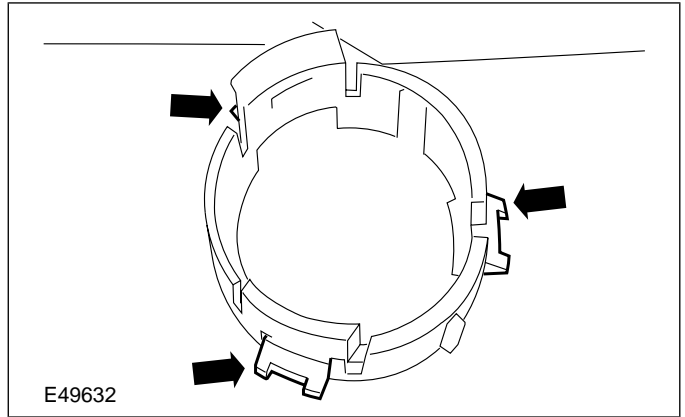


REMOVAL AND INSTALLATION

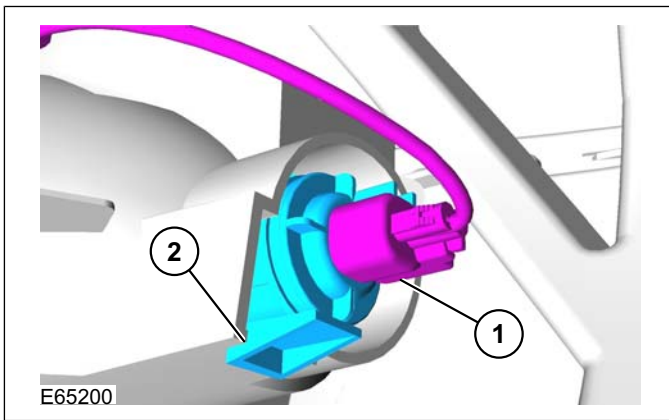
7.



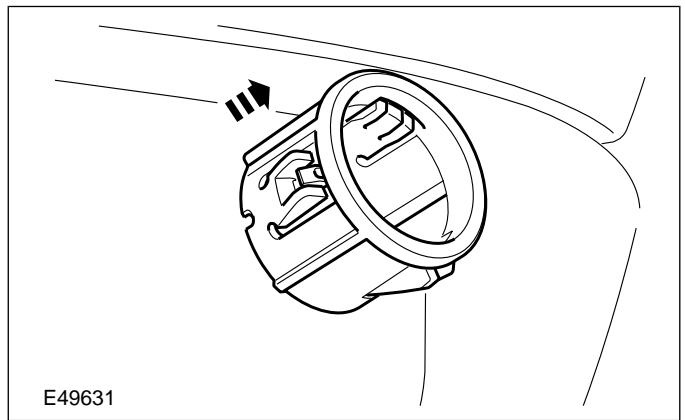
10.



8.

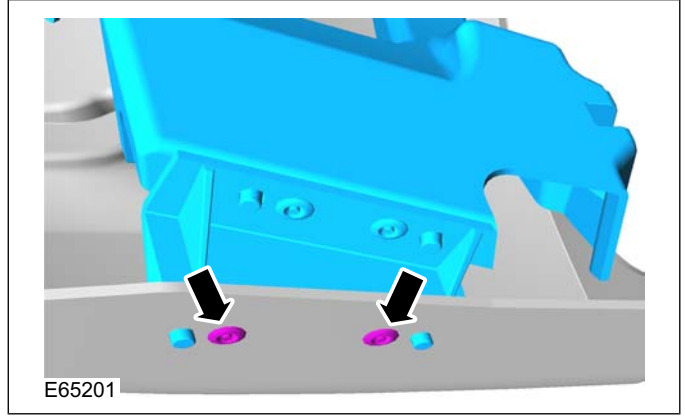
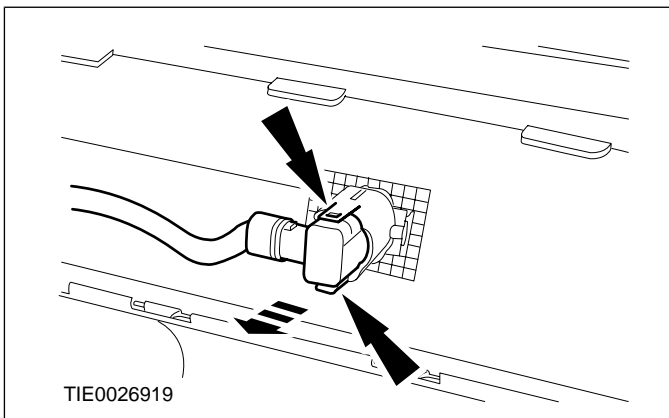


11.



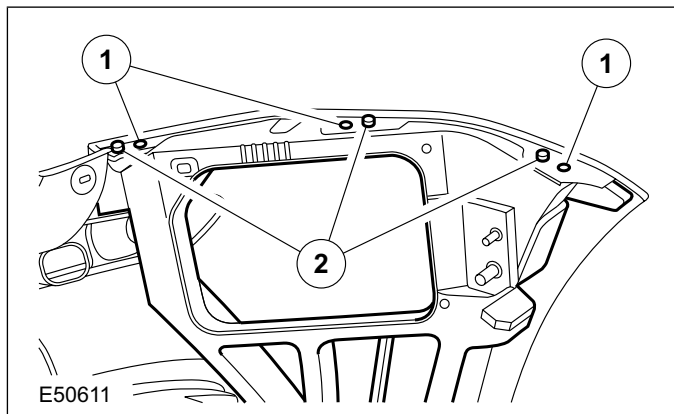
9.  **CAUTION: Pressure must not be applied to the outer face of the parking aid sensor.**

12 General Equipment: Electric drill
General Equipment: 5 mm drill bit
General Equipment: Blind rivet gun



REMOVAL AND INSTALLATION

1. General Equipment: Electric drill
General Equipment: 5 mm drill bit
General Equipment: Blind rivet gun

**Installation**

1. To install, reverse the removal procedure.

SECTION 501-20A Safety Belt System

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Safety Belt System.....	501-20A-3
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Safety Belt System.....	501-20A-4
Principles of Operation.....	501-20A-4
Inspection and Verification.....	501-20A-4
Symptom Chart.....	501-20A-5
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Vehicle Motion Sensor Test.....	501-20A-5
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Test Method 2 (turning circle).....	501-20A-5
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REMOVAL AND INSTALLATION	
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Front Safety Belt Retractor — 4-Door/5-Door/Wagon.....	501-20A-11
Rear Safety Belt Retractor — 3-Door/5-Door/Wagon.....	501-20A-13
Rear Center Safety Belt Retractor.....	501-20A-15
Safety Belt Shoulder Height Adjuster..... (40 225 0)	501-20A-20
Safety Belt Buckle and Pretensioner..... (40 232 0)	501-20A-22

SPECIFICATIONS**Torque Specifications**

Item	Nm	lb-ft	lb-in
Front safety belt upper anchor retaining bolt	35	26	-
Front safety belt lower anchor retaining bolt	38	28	-
Front safety belt retractor retaining bolt	35	26	-
Rear outer safety belt retractor retaining bolt	40	30	-
Rear outer safety belt lower anchor retaining bolt	38	28	-
Rear center safety belt retractor retaining bolt	35	26	-
Rear center safety belt lower anchor retaining bolt	55	41	-
Rear center safety belt buckle retaining bolt	55	41	-
Safety belt shoulder height adjuster retaining bolt	35	26	-
Safety belt buckle and pretensioner retaining bolt	47	35	-
Safety belt upper anchor retaining bolt - vehicles with convertible top	40	30	-
Safety belt lower anchor retaining bolt - vehicles with convertible top	40	30	-
Safety belt retractor retaining bolt - vehicles with convertible top	40	30	-
Rear safety belt buckle retaining bolt - vehicles with convertible top	40	30	-

DESCRIPTION AND OPERATION

Safety Belt System

System overview

- WARNING:** All safety belt components including retractors, buckles, child safety seat tether brackets and attaching hardware in use during a collision must be removed and new components installed. New safety belt components should also be installed where safety belts not in use during a collision, are inspected and found to be damaged or operate incorrectly. Failure to follow these instructions may result in personal injury.



- WARNING:** All vehicles equipped with a passenger air bag have a **WARNING** sticker attached to the instrument panel **PROHIBITING** the use of rear facing child seats in the front seating positions. Failure to follow this instruction may result in personal injury.
- CAUTION:** Do not attempt to repair or lubricate the retractor / buckle mechanisms or modify the belts.

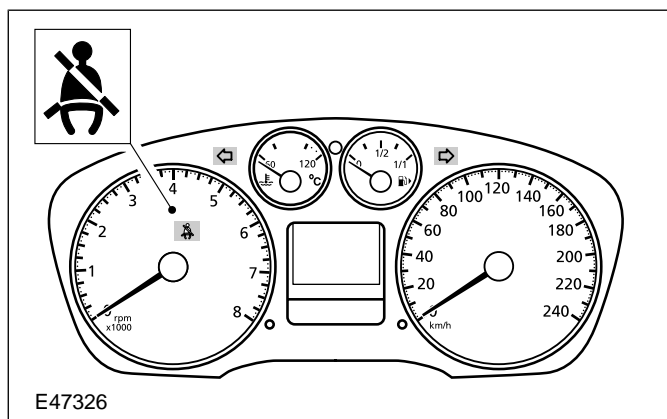
The safety belt system utilizes three-point lap and diagonal safety belts in all seat positions.

The front safety belt retractors incorporate a load limiting device, which allows progressive payout of additional safety belt webbing when the force exerted exceeds a predetermined limit.

The front safety belt upper anchors are connected to safety belt shoulder height adjusters mounted in the B-pillar.

The front seat safety belt buckles incorporate pretensioners and on the driver side a safety belt buckle switch. Both the safety belt buckle switch and the safety belt buckle pretensioner are connected to the air bag control module. The air

bag control module monitors both circuits and if a fault is detected will illuminate the air bag warning indicator located in the instrument cluster. The belt pretensioner is not deployed in any side, rear or minor frontal collisions.



When the vehicle speed exceeds 7 km/h (4 mph) and the driver safety belt is unfastened, the safety belt minder will provide the driver with an audible and visual warning. The warning will continue for up to ten minutes by sounding a chime and illuminating a warning indicator located in the instrument cluster.

The safety belt buckle pretensioners have a lower deployment threshold than that required by the air bags. Hence it is possible during a minor collision, which exceeds the deployment threshold, that only the safety belt pretensioners will deploy.

The additional safety belt minder feature can be disabled. For additional information, refer to Section 413-09.

The rear centre seat belt retractor is fitted in the roof and is engaged into the smaller belt buckle to the right of the centre seat and can be left there when the seat is not in use. The larger chrome buckle is engaged to the standard buckle to the left of the seat.

Rear seat safety belt retractors and buckles are of the conventional type.

DIAGNOSIS AND TESTING

Safety Belt System

Principles of Operation

▲ WARNING: All safety belt components including retractors, buckles, child safety seat tether brackets and attaching hardware in use during a collision must be removed and new components installed. New safety belt components should also be installed where safety belts not in use during a collision, are inspected and found to be damaged or operate incorrectly. Failure to follow these instructions may result in personal injury.

The occupant restraint system utilizes three-point lap and diagonal safety belts in all seat positions.

Front seats are equipped with safety belt buckle pretensioners, which are controlled as part of the supplemental restraint system (SRS). For additional information,

REFER to: **Air Bag and Safety Belt Pretensioner Supplemental Restraint System (SRS) (501-20 Supplemental Restraint System, Description and Operation).**

The rear seat safety belt buckles are mounted directly to the floor panel.

The safety belt retractor, mounted within the base of the B-pillar, incorporates a torsion bar load limiting device. The device consists of a retractor reel which is mounted onto a spindle (torsion bar) which, once the sensor has locked the retractor reel and predetermined load is applied, twists and pays out additional webbing into the system. The deceleration force required to initiate this sequence is approximately the same as that required to initiate air bag deployment. The torsion bar load limiting device will only react if the safety belt is in use at the time of impact.

Rear seat safety belt retractors do not use this type of retractor, they are equipped with a conventional retractor.

Emergency Locking Retractor (ELR)

The retractors in all seat positions feature ELR. The ELR is part of the safety belt system that in normal operation allows free movement of the

belted occupant. In an emergency the ELR will lock, preventing webbing payout and hence forward movement of the occupant. Locking may be achieved by one of two mechanisms:

Vehicle Motion Sensor (VMS)

VMS is operated by sudden deceleration of the vehicle or excessive tilt. Once operated the VMS causes a locking pawl to be engaged, thus locking the retractor, preventing webbing payout. When the vehicle is stationary, the VMS stabilizes, causing the pawl to disengage and unlock the retractor, allowing webbing payout.

Webbing Motion Sensor (WMS)

The ELR WMS is operated by rapid acceleration of the webbing. Once operated, it causes a locking pawl to be engaged thus locking the retractor. Webbing payout is prevented in the same manner as VMS.

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical and electrical damage.

Visual Inspection Chart

Mechanical
<ul style="list-style-type: none"> • Safety belt retractor • Safety belt buckle and pretensioner • Safety belt buckle

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

DIAGNOSIS AND TESTING**Symptom Chart**

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> Normal mode - occupant restraint system inoperative 	<ul style="list-style-type: none"> Safety belt retractor. 	<ul style="list-style-type: none"> CARRY OUT the Safety Belt Component Test in this section.

Component Test**Poor Retraction**

If a safety belt does not retract correctly, check that the anchor covers and trim bezels are correctly installed and not rubbing against the safety belt webbing. Where necessary, check that the safety belt webbing is not rubbing at one end of the retractor cover slot and, if so, correct by loosening the retaining bolt, aligning the retractor to centralize the safety belt webbing and retighten the bolt.

The safety belts are "dual sensitive" which means that they have:

- a vehicle motion sensor, which locks the safety belt webbing under braking, cornering, on steep hills and in adverse camber conditions.
- a webbing motion sensor, which locks when the safety belt webbing is quickly extracted.

Both systems should be fully operational and can be checked by the tests below:

Vehicle Motion Sensor Test

Either of the following two procedures may be used to check correct operation of the vehicle motion sensor. Both methods require two technicians but note that technicians of larger than normal build should not be asked to conduct these tests. This is to avoid the possibility of a fully unrolled safety belt webbing being mistaken for a correctly locked safety belt retractor.

Test Method 1 (braking)

▲ WARNING: It is important that during this test, the driver and passenger allow the safety belts to provide the restraint and do not attempt to anticipate the sudden deceleration. The steering wheel should not be used as a brace. However, both driver and passenger should prepare themselves for the possibility that the safety belt will not lock. The passenger should hold their hands in front of them,

just clear of the instrument panel or front seat backrest, depending on which safety belt is being tested. Failure to follow these instructions may result in personal injury.

- Select for this test a quiet or private stretch of road. Make sure that the road is clear and that full visibility is maintained at all times.
- Both driver and passenger should adopt a normal, comfortable seating position. Both occupants should wear the safety belts and the safety belt webbing must be correctly adjusted, with no slack.
- Proceed at a speed of 10 km/h (6 mph). Do not exceed 10 km/h (6 mph) for this test.
- Apply the foot brake sharply to stop the vehicle. If the vehicle motion sensitive lock mechanism is operating correctly, the safety belt webbing will lock and restrain the wearer.
- Conduct the test twice in each front and rear passenger seat position.
- Any safety belt retractor which does not restrain the wearer during this test must not be reused. A new safety belt must be installed.

Test Method 2 (turning circle)

This method requires a flat open area of private road, sufficient for the vehicle to be driven in a continuous circle on full steering lock.

- The driver should wear the safety belt provided and the belt webbing must be correctly adjusted, with no slack.
- The passenger should occupy a rear seat with the safety belt correctly adjusted, with no slack.
- Start the engine and, with the steering on full right-hand lock, drive the vehicle in a continuous circle at 16 km/h (10 mph). Do not exceed 16 km/h (10 mph) for this test.

DIAGNOSIS AND TESTING

- When the speed is stable, the passenger should attempt to slowly extract the safety belt webbing from each safety belt retractor in turn. If the vehicle motion sensitive lock mechanism is operating correctly, it will not be possible to extract the webbing.
- Any safety belt retractor from which it is possible to extract the webbing during this test must not be used. A new safety belt must be installed.

Static Test

With the vehicle stationary and on level ground take firm hold of the safety belt webbing (on the tongue side of the upper safety belt anchor) and pull out quickly. The retractor should lock within 0.25 meter (10 inches), preventing further webbing payout. Any safety belt retractor from which it is possible to extract further webbing must not be used. A new safety belt must be installed.

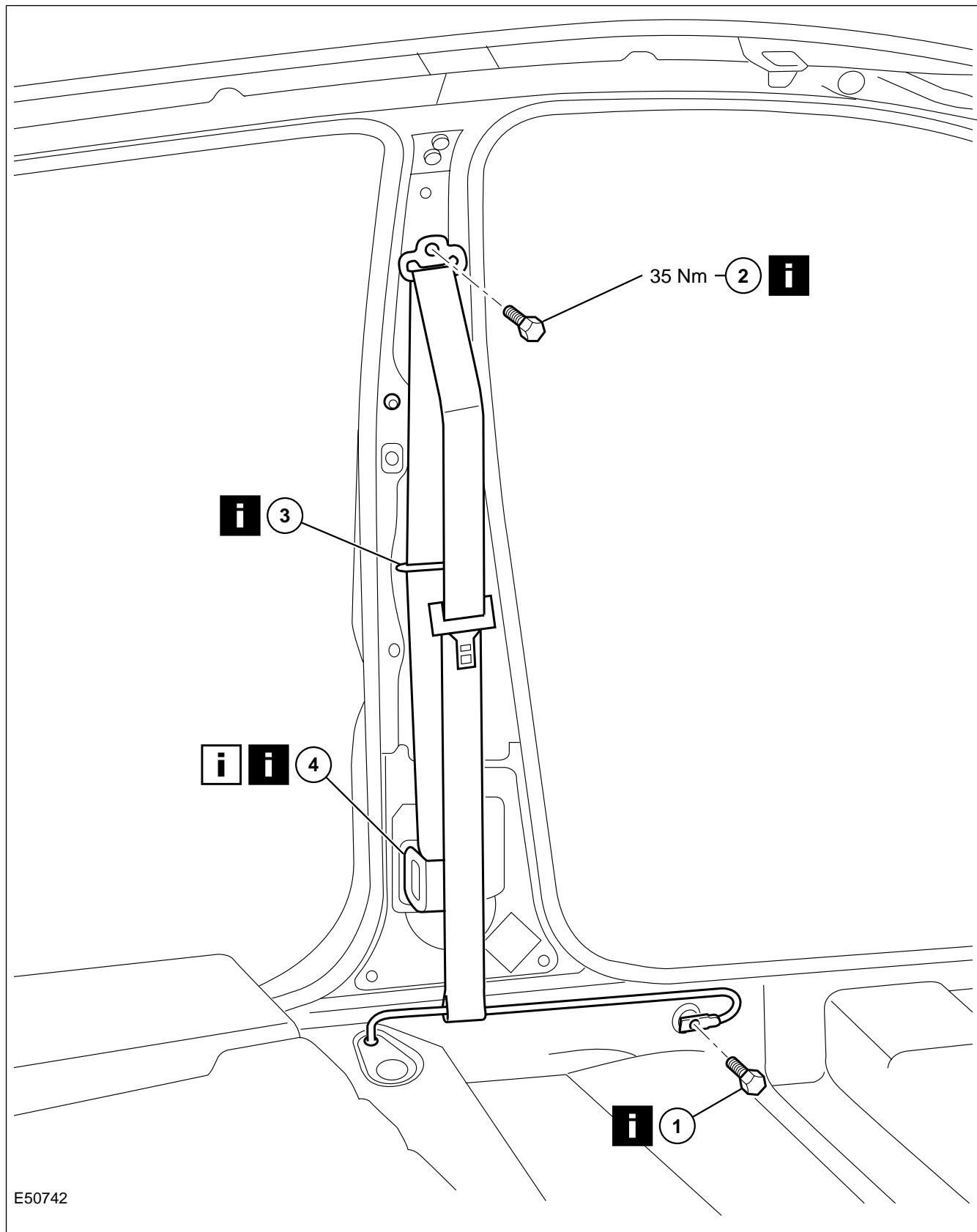
REMOVAL AND INSTALLATION**Front Safety Belt Retractor — 3-Door**

1. Remove the B-pillar trim panel.

For additional information, refer to: **B-Pillar Trim Panel - 3-Door** (501-05 Interior Trim and Ornamentation, Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



REMOVAL AND INSTALLATION

Item	Description
1	Safety belt lower anchor See Removal Detail
2	Safety belt upper anchor See Removal Detail

Item	Description
3	Guide loop See Removal Detail
4	Safety belt retractor See Removal Detail See Installation Detail

3. To install, reverse the removal procedure.

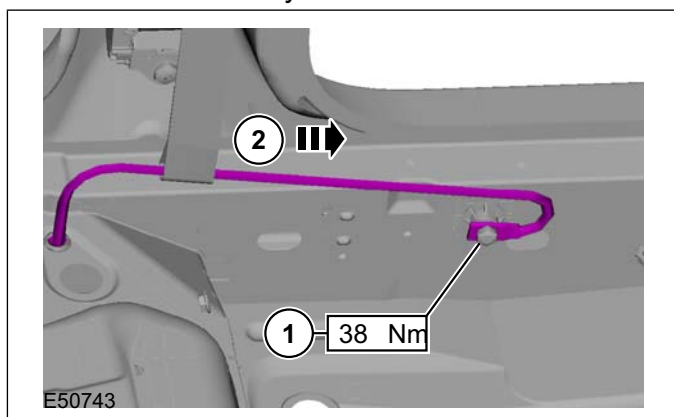
Removal Details

Item 1 Safety belt lower anchor

CAUTION: The bolt securing the safety belt anchor is held captive by a metal washer. The bolt, spacer and metal washer must remain on the safety belt anchor at all times when the safety belt is detached or removed.

1. Detach the safety belt lower anchor.

1. Remove the Torx bolt from the anchor rail.
2. Slide the safety belt off the anchor rail.



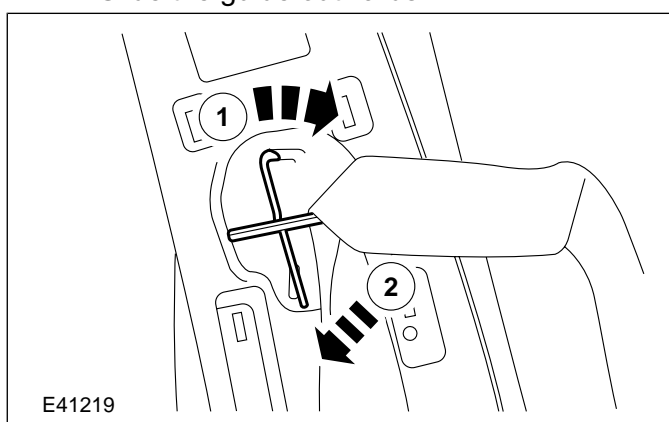
Item 2 Safety belt upper anchor

CAUTION: The bolt securing the safety belt anchor is held captive by a metal washer. The bolt, spacer and metal washer must remain on the safety belt anchor at all times when the safety belt is detached or removed.

Item 3 Guide loop

1. Detach the guide loop from the B-pillar.

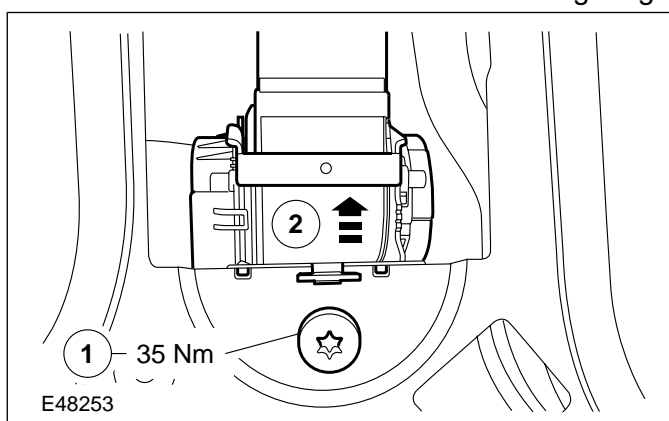
1. Rotate the guide in a clockwise direction.
2. Slide the guide outwards.



Item 4 Safety belt retractor

1. Remove the front safety belt retractor.

1. Remove the bolt.
2. Lift the retractor to detach the locating tang.



Installation Details



REMOVAL AND INSTALLATION

Item 4 Safety belt retractor

 **CAUTION:** Make sure the safety belt retractor locating tang is correctly located.



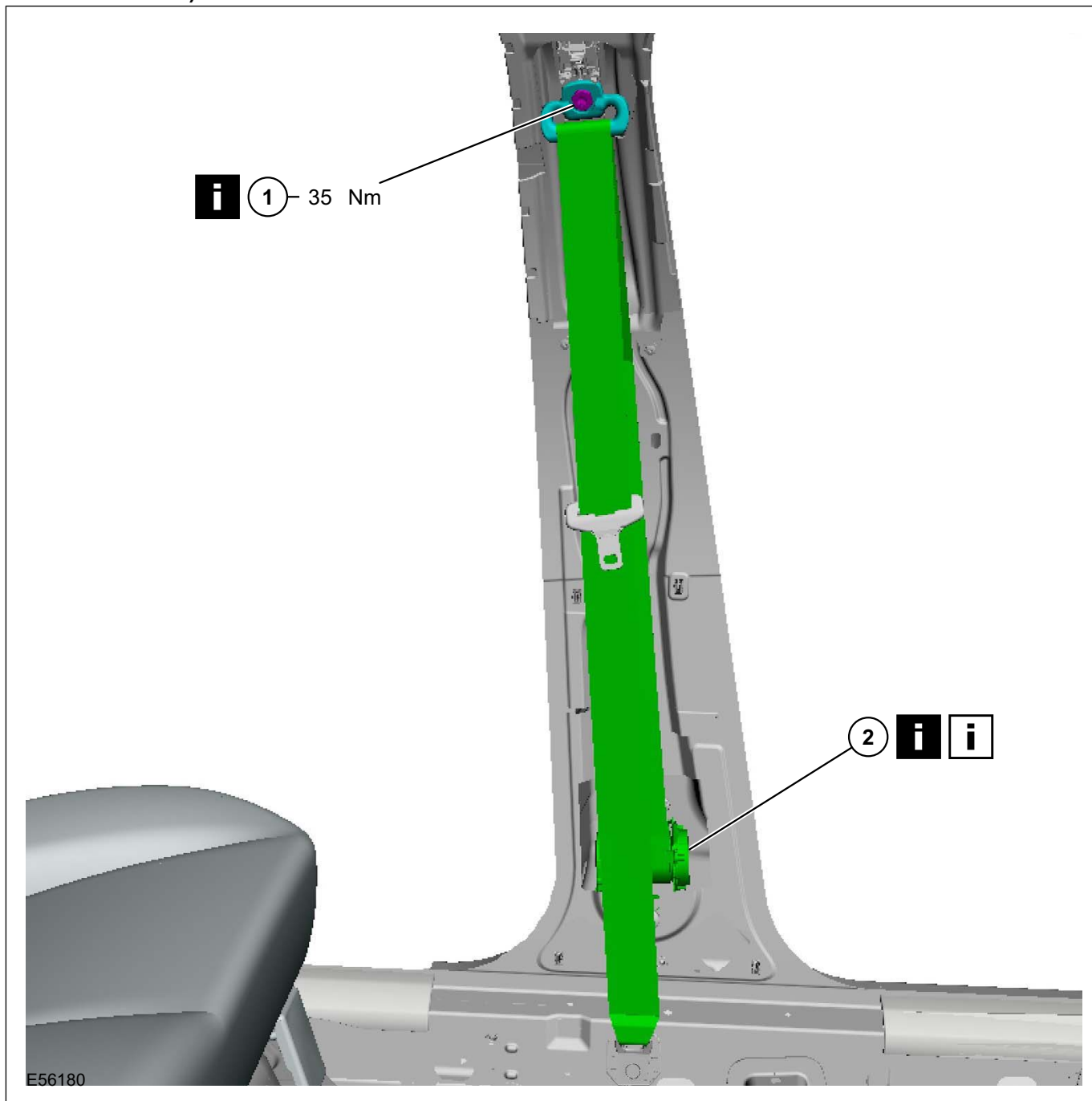
REMOVAL AND INSTALLATION

Front Safety Belt Retractor — 4-Door/5-Door/Wagon

1. Remove the B-pillar trim panel.

For additional information, refer to: **B-Pillar Trim Panel - 4-Door/5-Door** (501-05 Interior Trim and Ornamentation, Removal and Installation).

2. Remove the components in the order indicated in the following illustration(s) and table(s).



REMOVAL AND INSTALLATION

Item	Description
1	Front safety belt upper anchor retaining bolt See Removal Detail
2	Front safety belt retractor

Item	Description
	See Removal Detail See Installation Detail

3. To install, reverse the removal procedure.

Removal Details

Item 1 Front safety belt upper anchor retaining bolt

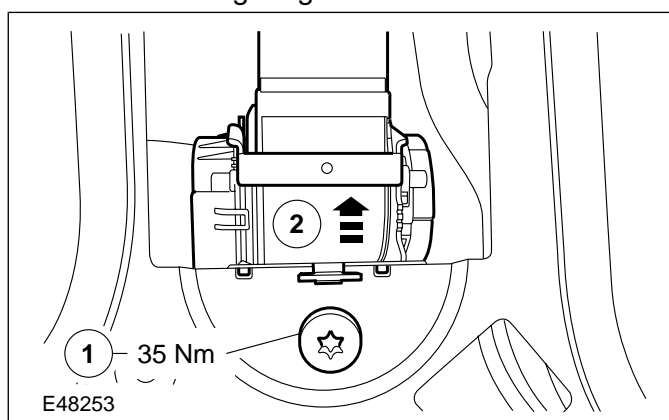
- CAUTION:** The bolt securing the front safety belt upper anchor is held captive by a metal washer. The bolt, spacer and metal washer must remain on the front safety belt upper anchor at all times when the front safety belt is detached or removed.

Detach the front safety belt upper anchor from the front safety belt shoulder height adjuster.

Item 2 Front safety belt retractor

- Remove the front safety belt retractor.

- Remove the front safety belt retractor retaining bolt.
- Lift the front safety belt retractor to detach the locating tang.



Installation Details

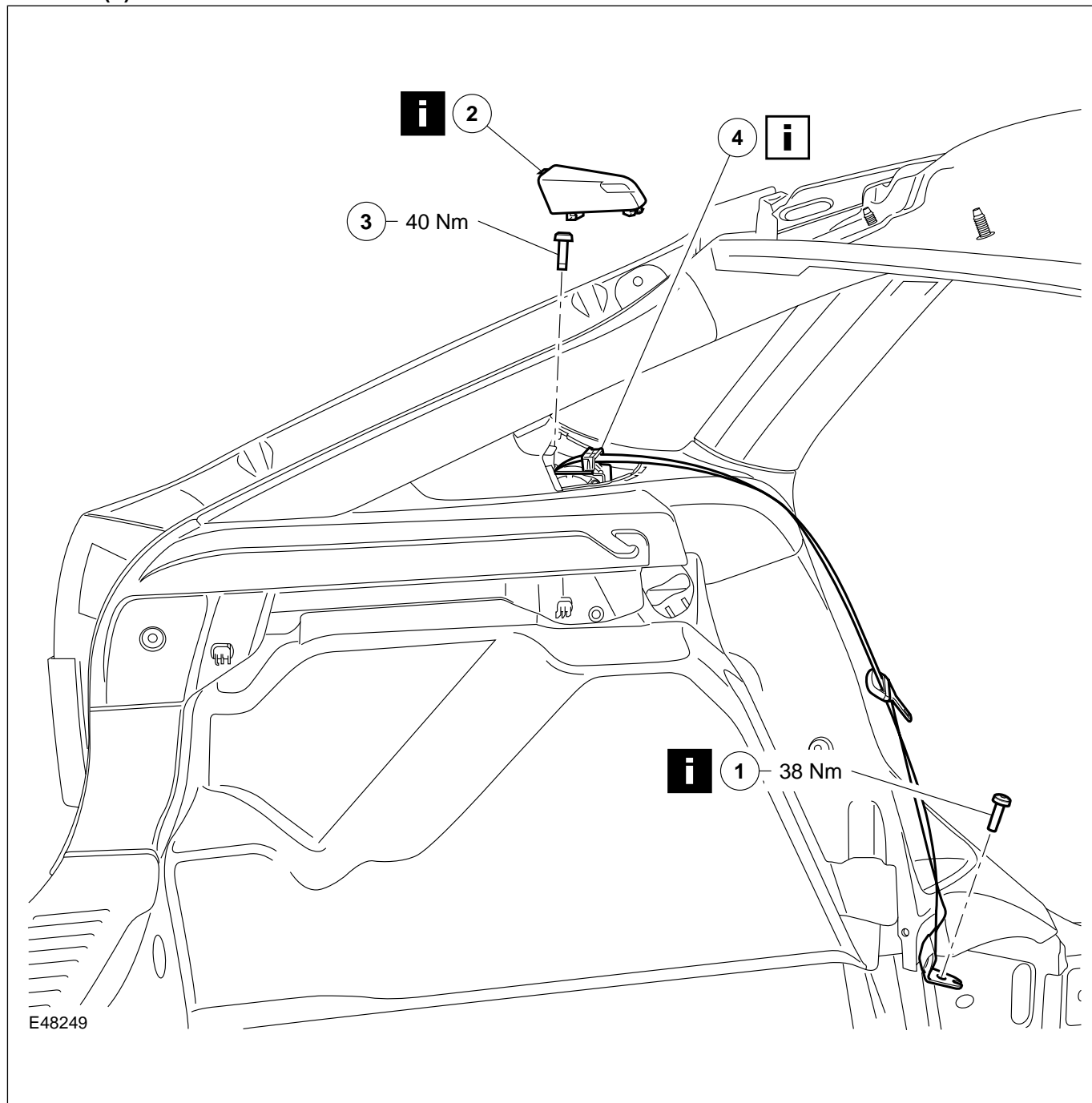
Item 2 Front safety belt retractor

- CAUTION:** Make sure that the front safety belt retractor locating tang is correctly located.

REMOVAL AND INSTALLATION

Rear Safety Belt Retractor — 3-Door/5-Door/Wagon

1. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Safety belt lower anchor retaining bolt <i>See Removal Detail</i>
2	Safety belt retractor cover <i>See Removal Detail</i>

Item	Description
3	Safety belt upper anchor retaining bolt
4	Safety belt retractor <i>See Installation Detail</i>

2. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

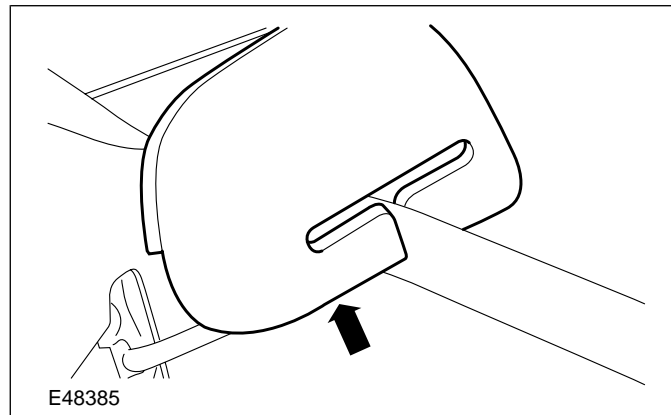
Removal Details

Item 1 Safety belt lower anchor retaining bolt

1. Fold the rear seat cushion forward, to gain access to the rear safety belt lower anchor retaining bolt.

Item 2 Safety belt retractor cover

1. Remove the rear safety belt retractor cover.

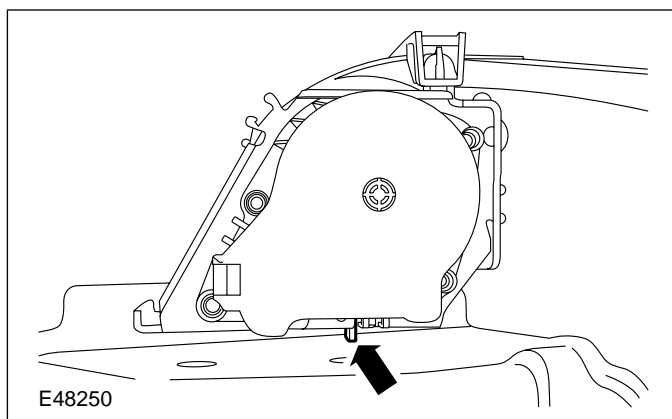


Installation Details

Item 4 Safety belt retractor

1. **⚠ CAUTION:** Make sure the rear safety belt retractor locating tang is correctly located.

Install the rear safety belt retractor.



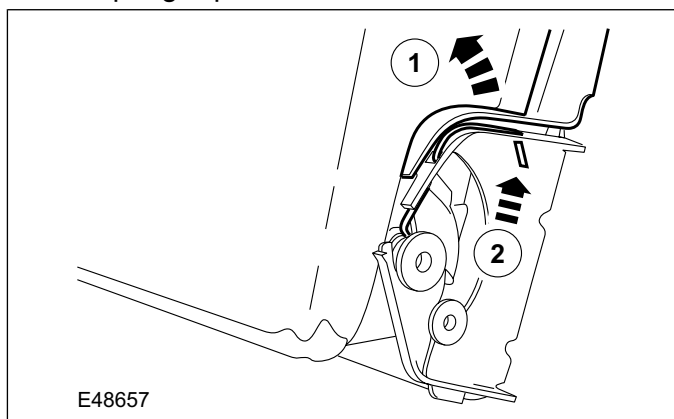
REMOVAL AND INSTALLATION

Rear Center Safety Belt Retractor

Materials	
Name	Specification
Cleaner	WSK-M5B401-A1
Adhesive	WSK-M2G402-A4

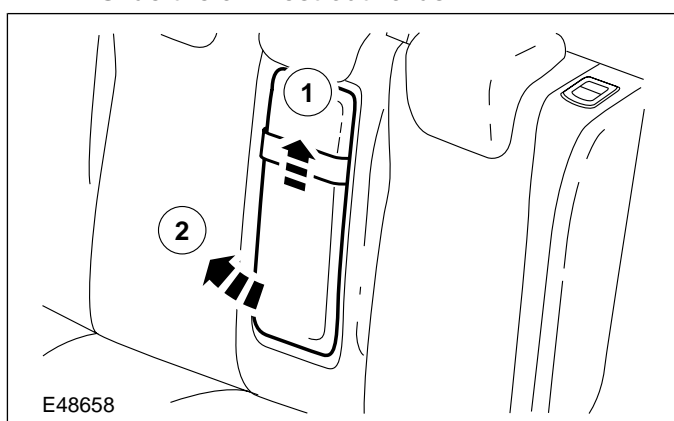
1. Detach the armrest pivot pins from the armrest retaining bracket on both sides (if equipped).

1. Pull the outer edge of the armrest backing panel upwards to gain access to the spring clip.
2. Using a thin bladed screwdriver, release the spring clip.



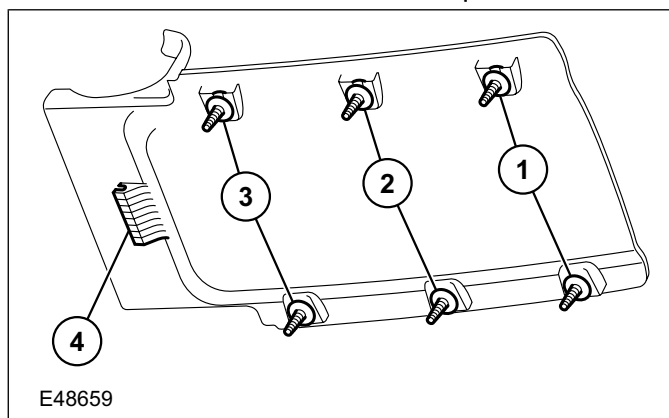
2. Remove the armrest (if equipped).

1. Slide the armrest upwards.
2. Slide the armrest outwards.



3. Remove the armrest backing panel (if equipped).

1. Detach the retaining clips from the left hand rear seat backrest in the sequence shown.



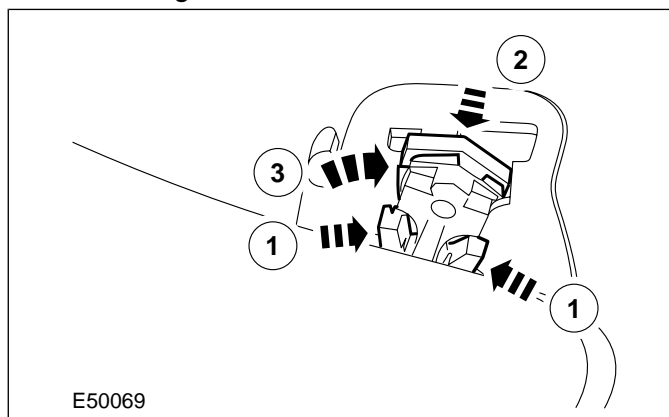
4. Fold the rear seat cushions forwards.

5. Release the rear seat backrest upper latch on both sides.

6. Fold the rear seat backrests forwards.

7. Release the rear seat backrest from the outer mounting bracket on both sides.

1. Using a suitable pair of long nose pliers, depress the clips.
2. Push the clip inwards.
3. Using a suitable screwdriver, release the locking latch.



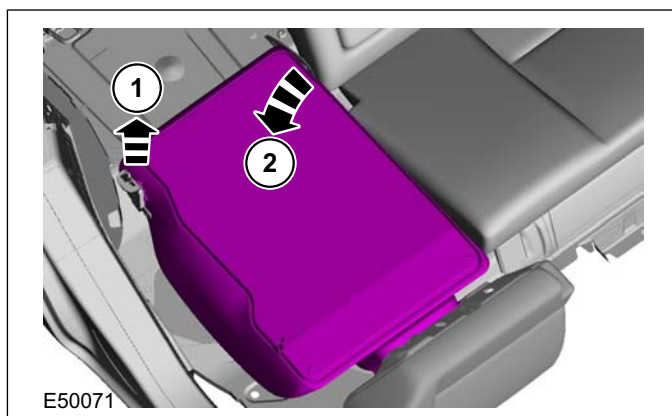
8. **CAUTION:** The left-hand rear seat backrest inner pivot pin has radial grooves. Take care not to damage the right-hand seat backrest inner pivot bush.

Remove the right-hand rear seat backrest.

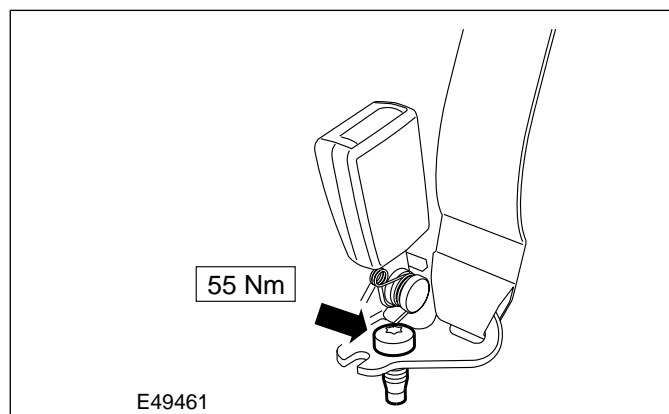
1. Detach the outer pivot pin from the mounting bracket.

REMOVAL AND INSTALLATION

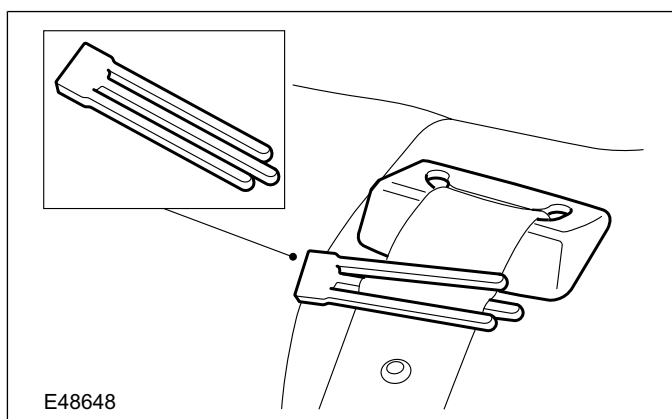
2. Detach the right-hand seat backrest from the left-hand seat backrest.



- Remove the rear center safety belt lower anchor retaining bolt.



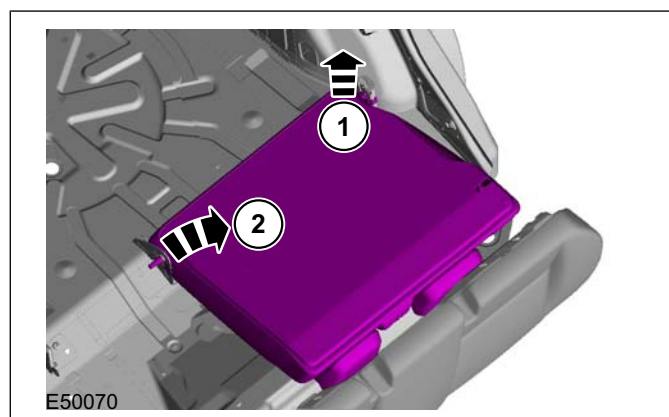
9. **CAUTION:** Make sure a webbing retainer is installed at least 200 mm towards the safety belt retractor from the webbing stop. Install the safety belt webbing retainer.



11. **CAUTION:** The left-hand rear seat backrest inner pivot pin has radial grooves. Take care not to damage the center hinge pivot bush.

Remove the left-hand rear seat backrest.

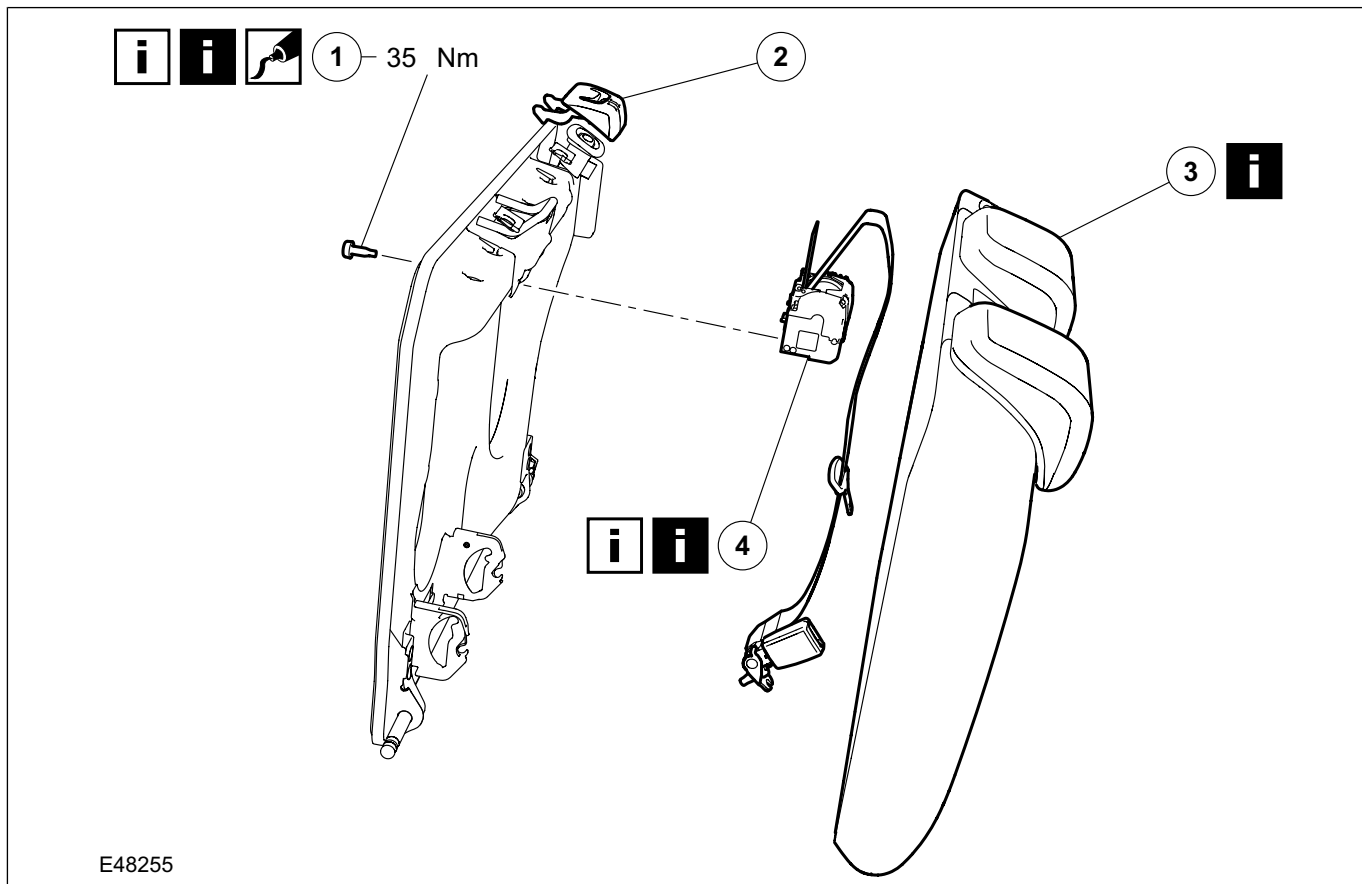
1. Detach the outer pivot pin from the outer mounting bracket.
2. Slide the backrest from the center mounting bracket.



10. **CAUTION:** The bolt securing the safety belt anchor is held captive by a metal washer. The bolt, spacer and metal washer must remain on the safety belt anchor at all times when the safety belt is detached or removed.

12. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



E48255

Item	Description
1	Rear center safety belt retractor upper anchor retaining bolt See Removal Detail See Installation Detail
2	Rear center safety belt webbing trim panel

Item	Description
3	Left-hand backrest cover and pad See Removal Detail
4	Rear center safety belt retractor See Removal Detail See Installation Detail

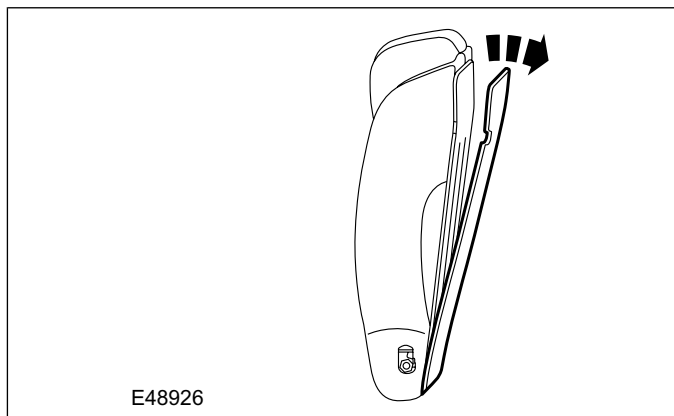
13. To install, reverse the removal procedure.

Removal Details

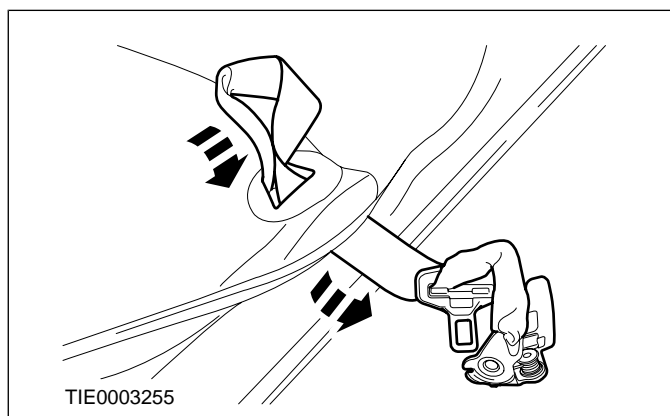
REMOVAL AND INSTALLATION

Item 1 Rear center safety belt retractor upper anchor retaining bolt

1. Detach the rear seat backrest carpet from the left-hand rear seat backrest.

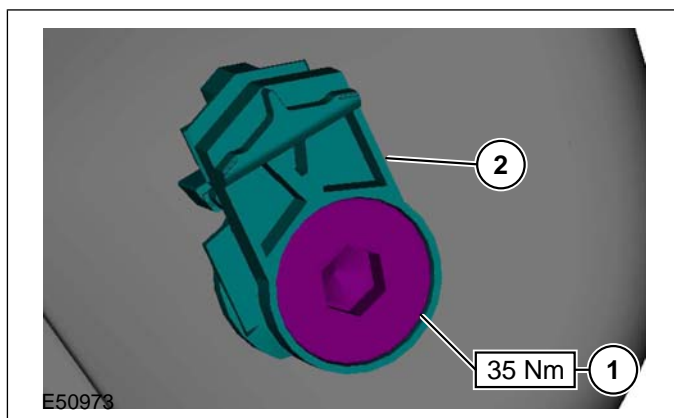


3. Feed the rear center seat safety belt and anchor through the rear seat cover and pad.

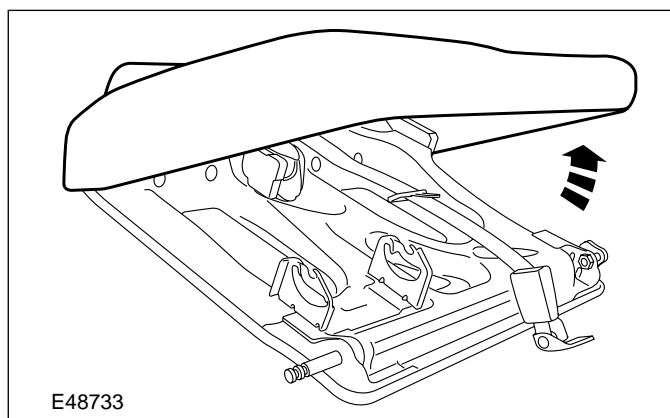


Item 3 Left-hand backrest cover and pad

1. Remove the backrest outer pivot pin bush.
 1. Remove the pivot pin bush retaining bolt.
 2. Remove the bush.



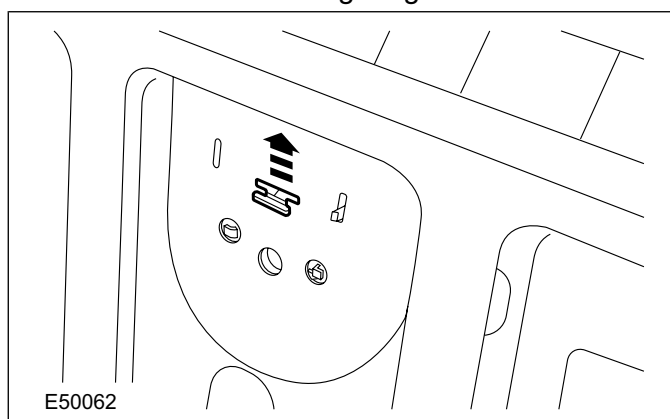
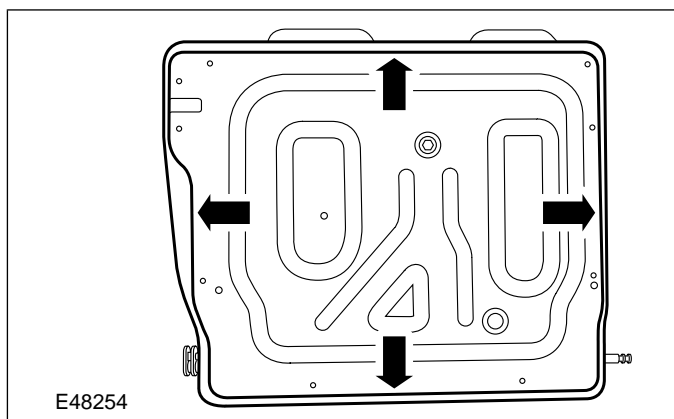
4. Raise the rear seat cover and pad to gain access to the rear center safety belt retractor.



Item 4 Rear center safety belt retractor

1. Remove the rear seat center safety belt retractor.
 - Release the locking tang.

2. Detach the rear seat cover and pad from the rear seat backrest.



REMOVAL AND INSTALLATION**Installation Details****Item 4 Rear center safety belt retractor**

1.  **CAUTION:** Make sure the rear center safety belt retractor locating tang is correctly located.

Install the rear center seat belt retractor.

1. Locate the locking tang.
2. Install the retaining bolt.

**Item 1 Rear center safety belt retractor upper anchor retaining bolt**

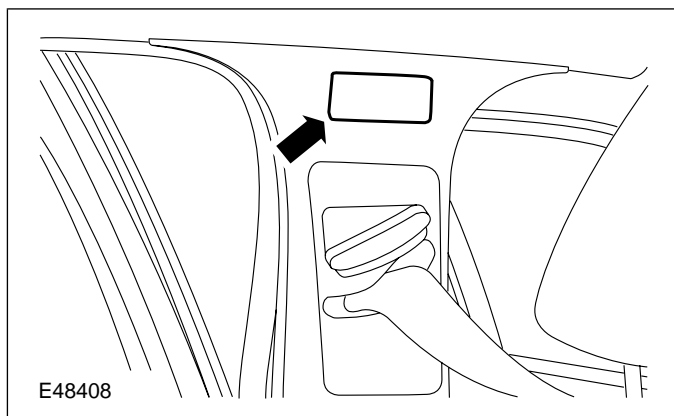
1. Using a suitable cleaner, remove the old adhesive from the rear seat backrest.
2. Using a suitable adhesive, attach the rear seat backrest carpet to the rear seat backrest.

REMOVAL AND INSTALLATION

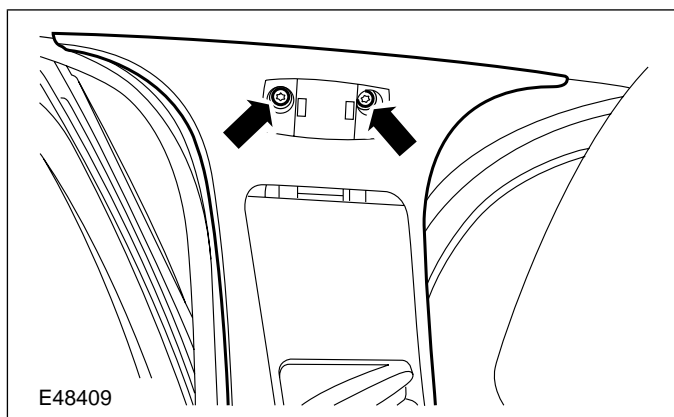
Safety Belt Shoulder Height Adjuster(40 225 0)

Removal

1. Using a thin bladed screwdriver, remove the B-pillar upper trim panel retaining screws cover.

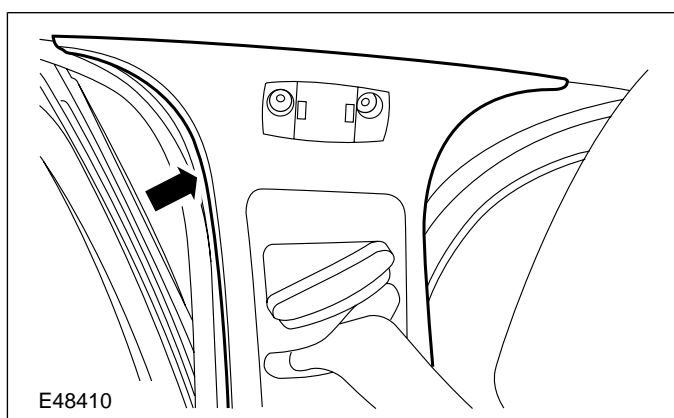


2. Remove the B-pillar upper trim panel retaining screws.



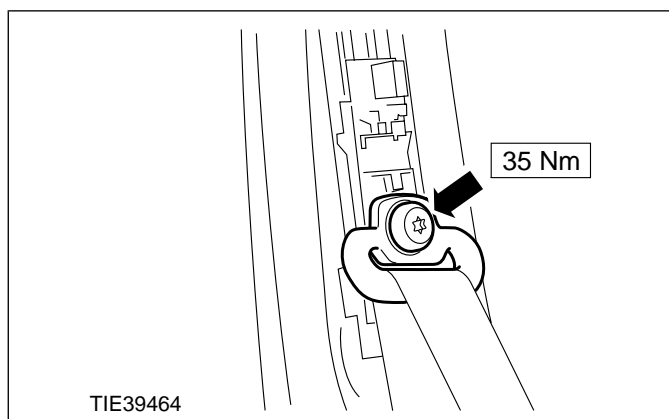
3. Locally detach the front and rear door weatherstrips.

4. Detach the B-pillar upper trim panel from the B-pillar.

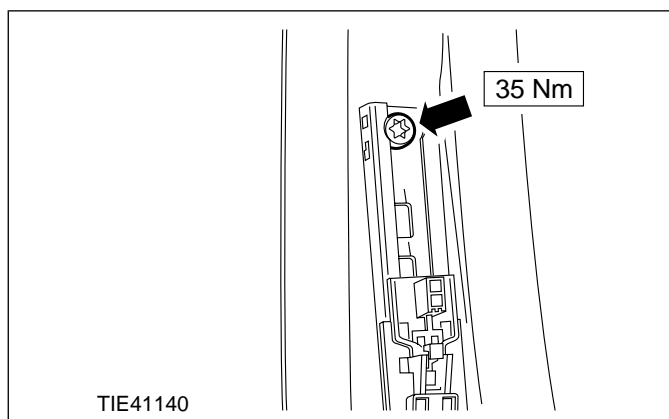


5. **⚠ CAUTION:** The bolt securing the safety belt anchor is held captive by a metal washer. The bolt, spacer and metal washer must remain on the safety belt anchor at all times when the safety belt is detached or removed.

Detach the safety belt upper anchor from the safety belt shoulder height adjuster.



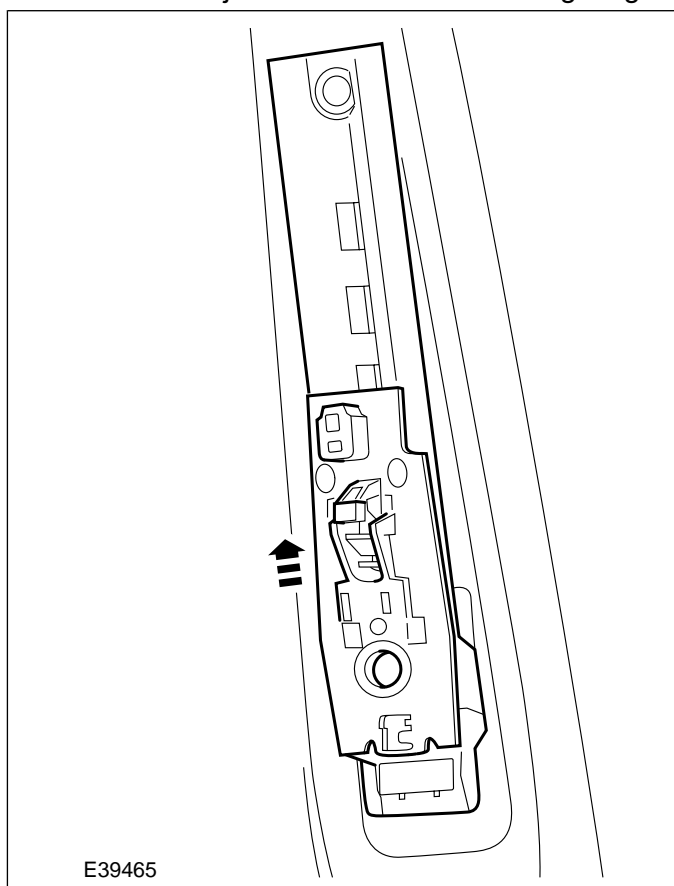
6. Remove the safety belt shoulder height adjuster retaining bolt.



7. Remove the safety belt shoulder height adjuster.

REMOVAL AND INSTALLATION

- Lift the adjuster to detach the locating tangs.



E39465

Installation

1. **⚠ CAUTION:** Make sure the safety belt shoulder height adjuster locating tangs are correctly located.

NOTE: Make sure the safety belt shoulder height adjuster locking control is correctly located on the safety belt shoulder height adjuster.

To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Safety Belt Buckle and Pretensioner(40 232 0)

Removal

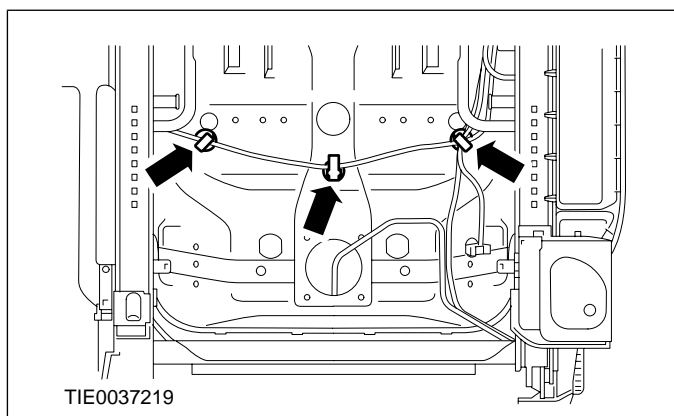
▲ WARNING: Never probe the electrical connectors of air bag modules or any other supplemental restraint system component. Failure to follow this instruction may result in personal injury.

1. Remove the front seat.

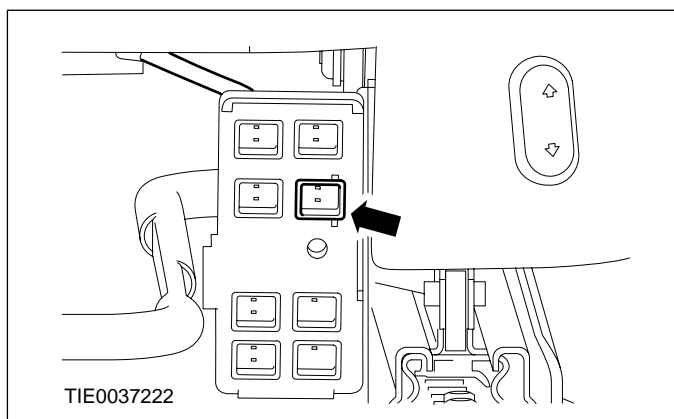
For additional information, refer to: **Front Seat (501-10 Seating, Removal and Installation).**

2. **▲ CAUTION:** Note the position and routing of the safety belt buckle pretensioner wiring harnesses to aid installation. An incorrectly routed wiring harness may lead to the wiring harness becoming damaged on the seat mechanism.

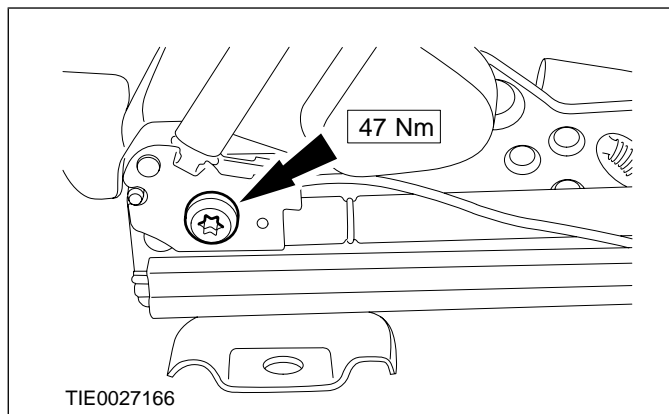
Detach the safety belt buckle pretensioner wiring harness from the seat.



3. Detach the safety belt buckle pretensioner electrical connector from the seat frame.



4. Remove the safety belt buckle and pretensioner.



Installation

▲ WARNING: Never probe the electrical connectors of air bag modules or any other supplemental restraint system component. Failure to follow this instruction may result in personal injury.

1. To install, reverse the removal procedure.

SECTION 501-20B Supplemental Restraint System

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS**Special Tool Usage**

Description	Simulator	Test and Deployment Lead (Part of Test and Deployment Lead, Air Bag/Pyrotechnic Safety Belt [418-S055])
Driver air bag module	501-073A	418-525
Passenger air bag module	501-073A	418-525
Side air curtain module	501-073A	418-525
Side air bag module	501-077	418-555
Safety belt buckle pretensioner	501-077	418-555

Torque Specifications

Item	Nm	lb-ft	lb-in
Passenger air bag module bracket retaining bolts	8	-	71
Side air bag module retaining nuts	5	-	44
Restraints control module retaining bolts	10	-	89
Side impact sensor retaining bolt	9	-	80
Crash sensor retaining bolt	9	-	80
Side air curtain retaining bolts	11	8	-
Roll over protection unit bolts	25	18	-
Torsion wall upper trim panel	25	18	-

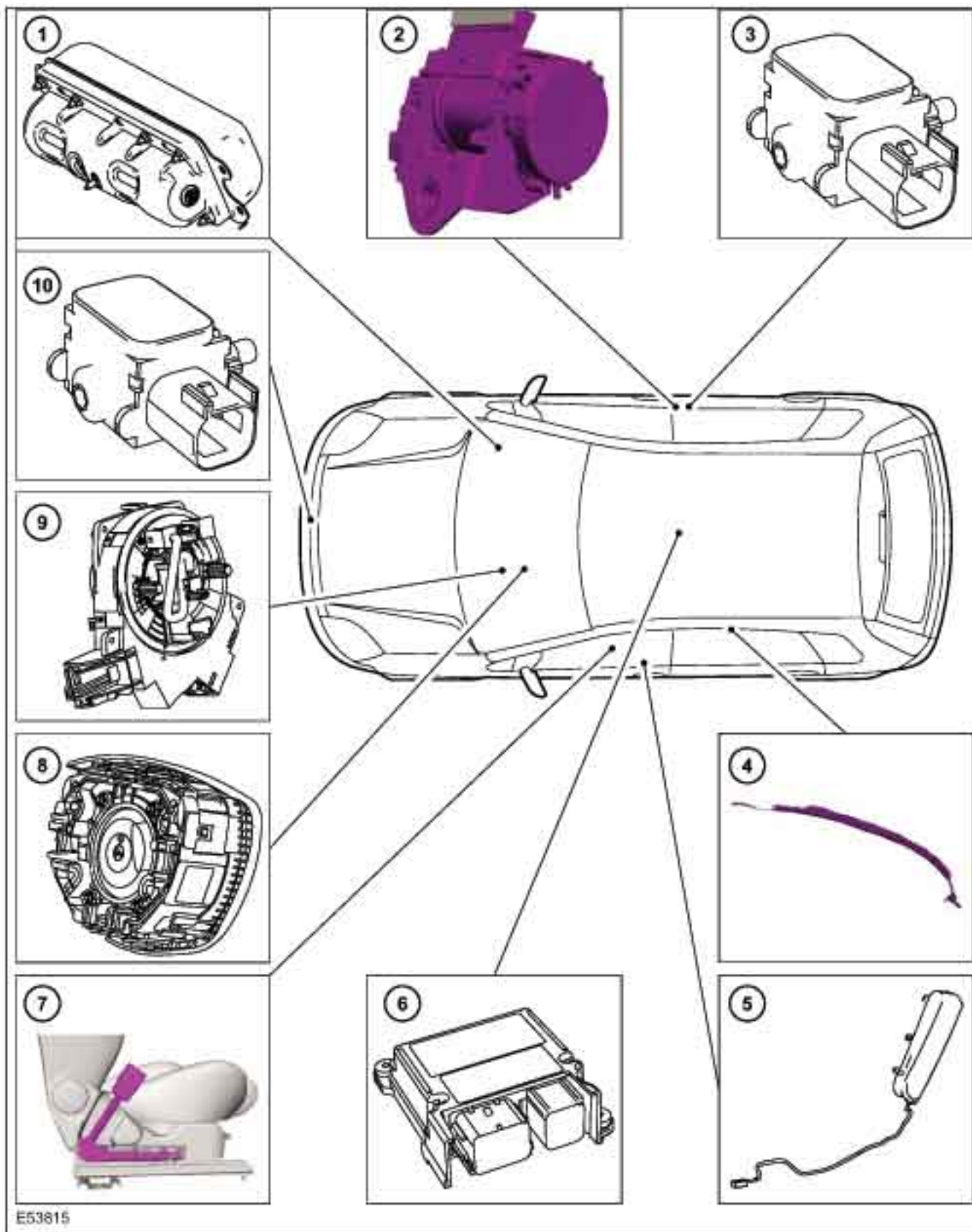


DESCRIPTION AND OPERATION

Air Bag and Safety Belt Pretensioner Supplemental Restraint System (SRS)

System overview





E53815

Item	Description
1	Passenger air bag module
2	Safety belt retractor

Item	Description
3	Side impact sensor
4	Side air curtain module

501-20B-6

Supplemental Restraint System

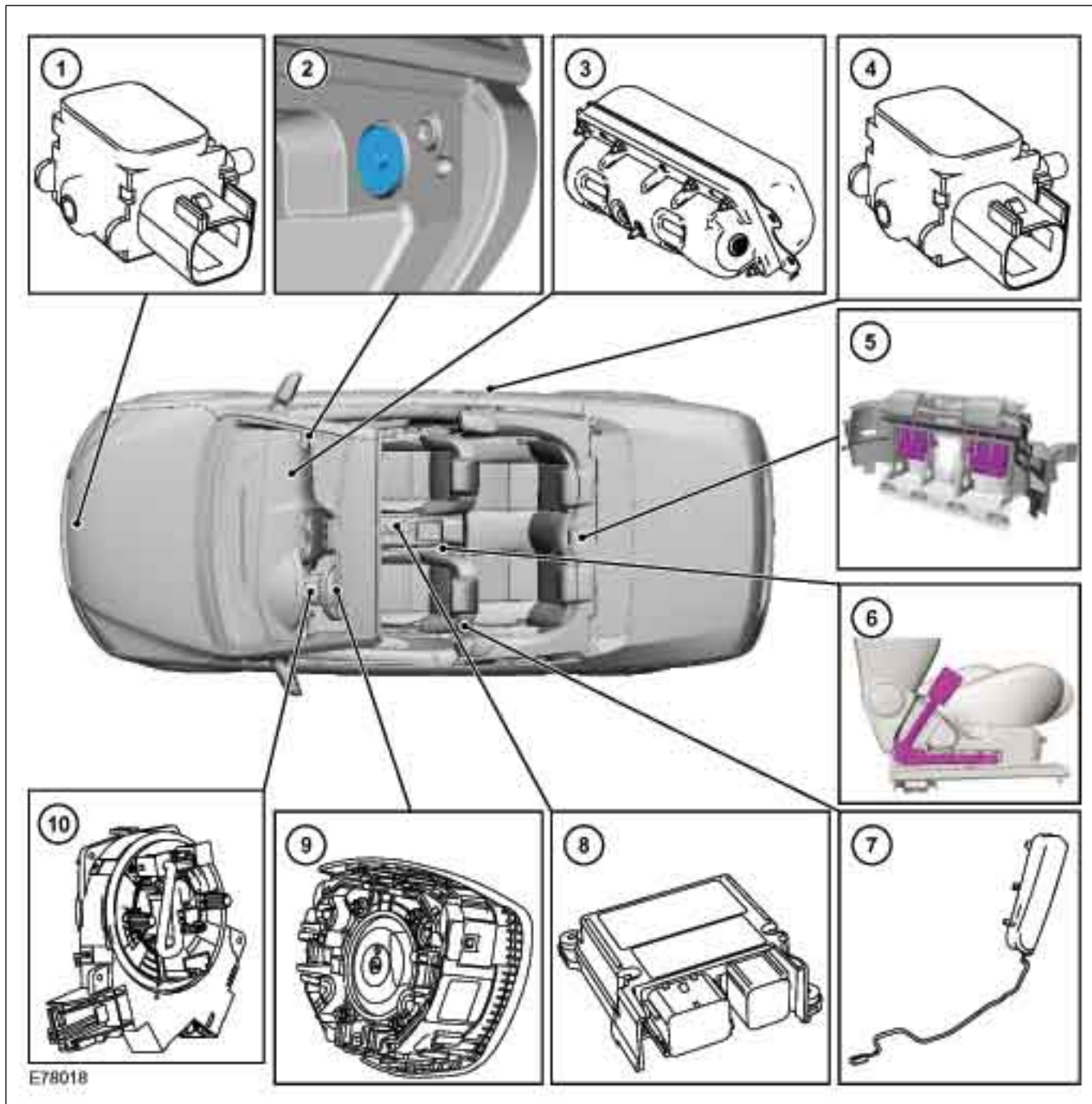
501-20B-6

DESCRIPTION AND OPERATION

Item	Description
5	Side air bag module
6	Restraints control module (RCM)
7	Safety belt buckle and pretensioner

Item	Description
8	Driver air bag module
9	Clockspring
10	Crash sensor

Vehicles with a convertible top



Item	Description
1	Crash sensor
2	Passenger air bag module deactivation (PAD) switch

Item	Description
3	Passenger air bag module
4	Side impact sensor
5	Torsion wall and roll over protection units

DESCRIPTION AND OPERATION

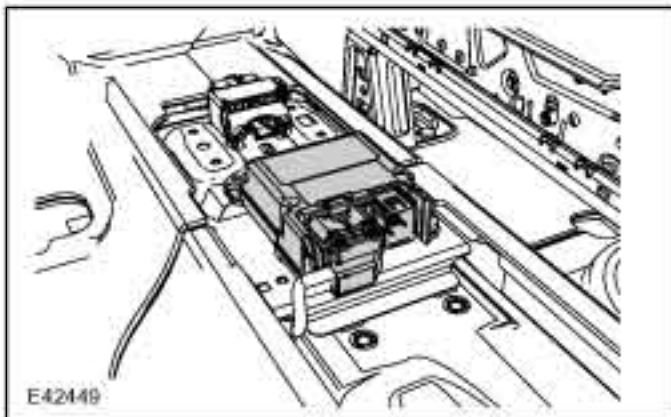
Item	Description
6	Safety belt buckle and pretensioner
7	Side air bag module
8	RCM
9	Driver air bag module
10	Clockspring

System Structure

The following components form part of the supplemental restraint system (SRS):

- RCM
- Single-stage driver and passenger air bag modules
- Side air bag modules
- Side air curtain modules - except vehicles with convertible top
- Crash sensor
- Side impact sensors
- Clockspring
- Front safety belts with front safety belt buckle switch on driver side and front safety belt pretensioners
- Safety belt retractors
- Air bag warning indicator
- Passenger Air Bag Deactivation (PAD) switch (optional)
- Roll over protection unit - vehicles with convertible top

RCM



The RCM is located under the floor console, near to the gearshift lever. Installation marks on the module are to make sure it is aligned correctly.

Micromechanical sensors are incorporated into the RCM; this measures the vehicle's acceleration/deceleration in the event of a collision. The calculated value is evaluated by the RCM to determine the severity of the impact.

The RCM compares the values it receives from the crash sensor (if equipped), the side impact sensors and the internal micromechanical sensors. If the deceleration due to a frontal or side impact exceeds a stored value then the RCM triggers the air bag modules and safety belt pretensioners as required.

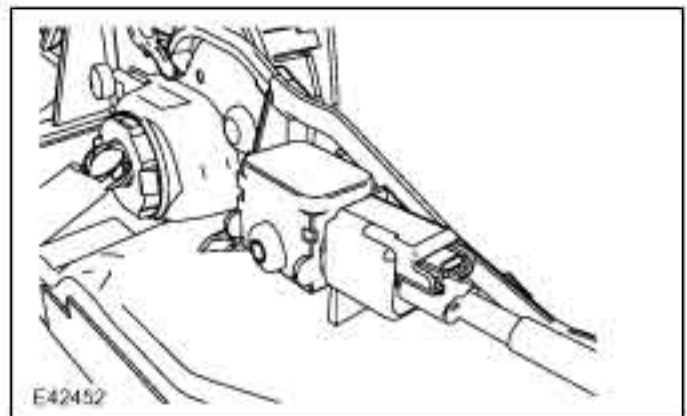
If the vehicle battery is destroyed in the collision, a voltage hold circuit in the RCM will still enable the air bag modules to be triggered up to 150 ms after the start of the impact.

If a system fault is detected by the RCM, the air bag warning lamp is illuminated. The fault can be located by carrying out a diagnostics check using the Worldwide Diagnostic System (WDS).

The RCM can be used again after a collision for up to 5 times, provided that the RCM is not physically damaged and that it passes a self-test.

The air bag modules are triggered by a direct current signal.

Crash Sensor - Vehicles built up to 05/2005



All vehicles, except vehicles with a convertible top, built 05/2005 onwards are not equipped with a crash sensor.

The crash sensor is installed at the front of the vehicle, behind the radiator grille. Data from the crash sensor is evaluated by the RCM to assess the severity of a frontal impact. The crash sensor transmits digitally encoded acceleration information to the RCM.

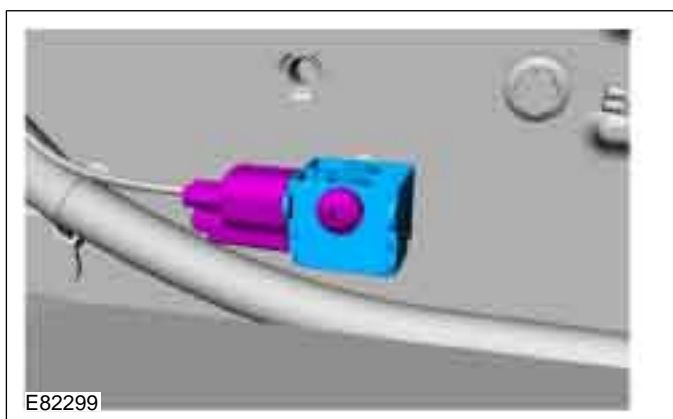
DESCRIPTION AND OPERATION

Power is supplied to the crash sensor by the RCM. If a crash sensor fails, the RCM stores a Diagnostic Trouble Code (DTC).

Continued use of the crash sensor is permissible provided it has not been physically damaged and it passes a self-test.

The external shape of the crash sensor prevents it from being installed incorrectly.

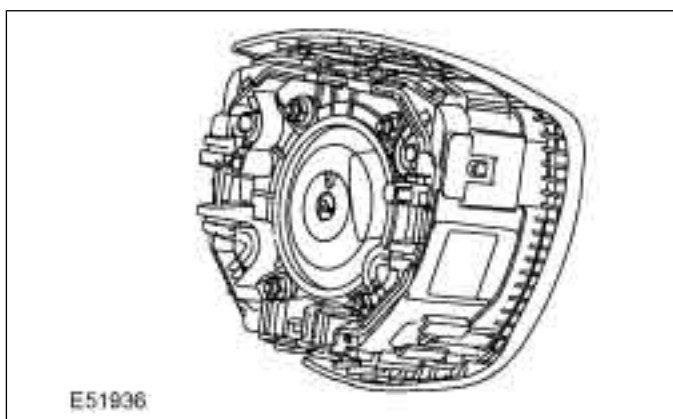
Side Impact Sensors



The side impact sensors are located at the bottom of the B-pillars and transmit digitally encoded acceleration information to the RCM.

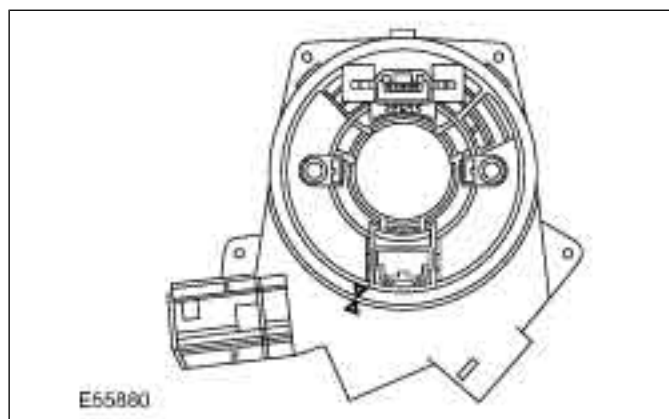
Continued use of the side impact sensor is permissible provided it has not been physically damaged and it passes a self-test.

Driver and Passenger Air Bag Modules



The driver and passenger air bags are single-stage air bags.

Clockspring



The clockspring is designed to carry signals between the RCM and the driver air bag module. The clockspring is installed on the steering column, and consists of fixed and moving parts connected by a coiled Mylar tape with internal conducting tracks. The Mylar tape is able to 'wind up' and 'unwind' as the steering wheel is rotated, maintaining electrical contact at all times between the RCM and the driver air bag module.

Vehicles with stability assist have a steering wheel rotation sensor as an integral part of the clockspring.

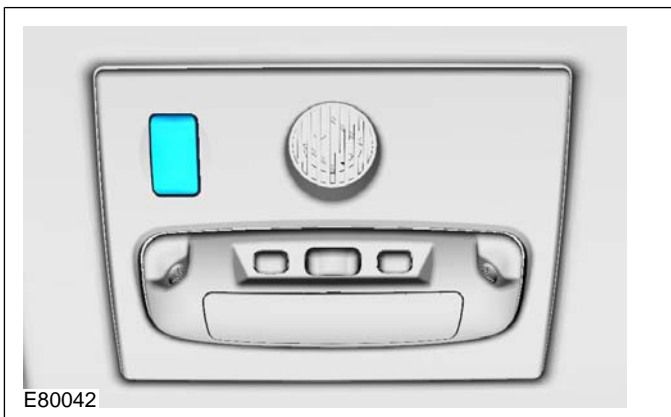
Passenger Air Bag Deactivation



A passenger air bag deactivation (PAD) switch can be fitted by the dealer as an optional extra; the PAD switch is installed in the glove box. The driver can operate the PAD switch with a key to deactivate the passenger air bag module.

When the ignition is switched on, a warning lamp in the instrument panel indicates to the driver and passenger that the passenger air bag module has been deactivated.

DESCRIPTION AND OPERATION



Side Air Bags

The side air bags are incorporated in the front seat backrests; a sewn-on label on the respective backrest indicates the vehicle is equipped with side air bag modules.

When a side air bag is deployed, the seam of the seat cover tears open enabling the side air bag to inflate unhindered from the front seat backrest.

For vehicles with a convertible top, the PAD warning lamp is located in the overhead console.

After installing a PAD switch kit, the RCM must be re-configured using WDS.

Side Air Curtain Modules and Side Air Bag Modules

Side Air Curtains



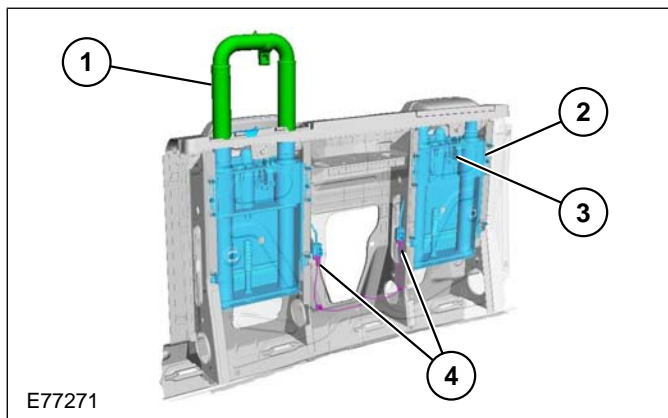
The side air curtain modules are located in the roof rail between the A-pillar and C-pillar. They are attached to the upper part of the side panel and are hidden behind the vehicle trim panels.

The electrical connections for the 3-door are located at the base of the C-pillar, 4-door/ 5-door are located at the base of the D-pillar in the rear luggage compartment. The electrical connection for the Wagon is located in the roof in front of the liftgate.

In the event of a side impact the relevant side air curtain is deployed and forms a protective cushion between the corresponding side window and the head of the person(s) sat on the front and rear seat.

The side air curtains are deployed simultaneously with the side air bags.

Roll Over Protection Unit - Convertible

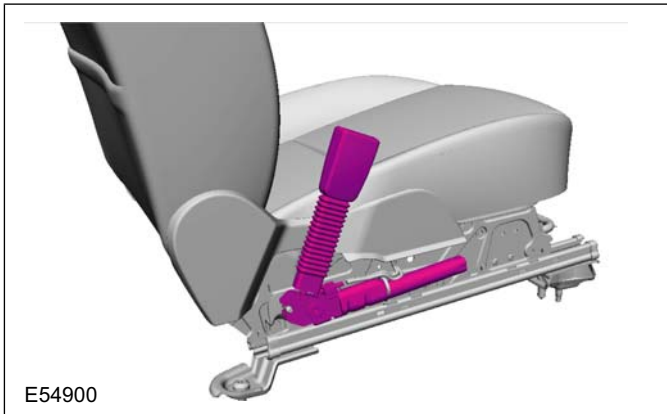


Item	Description
1	Roll over bar deployed
2	Roll over protection unit
3	Roll over bar lock
4	Roll over protection unit electrical connector

Sensors within the RCM monitor the vehicle for roll over in the event of a collision. If the roll over exceeds the stored value the RCM will trigger the roll over protection units.

When a signal is sent from the RCM to the rollover protection unit, the roll over bar lock is released, the roll over bar is deployed by spring pressure and is then locked in its fully extended position.

After a roll over protection unit is deployed the torsion wall and the roll over protection units are to be renewed.

DESCRIPTION AND OPERATION**Safety Belt Buckle and Pretensioners**

The pyrotechnic pretensioners for the driver and front passenger safety belts are incorporated into the safety belt buckle stalks.

The driver's safety belt buckle has a switch for the safety belt monitoring facility, which is required by law in some markets.

The switch is connected to the RCM by means of a wiring harness.

In the event of a collision, the safety belt pretensioners can be deployed in one of two ways:

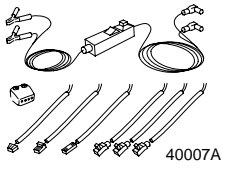
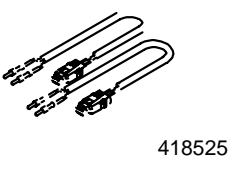
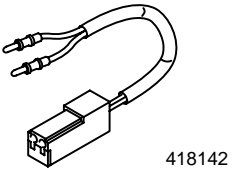
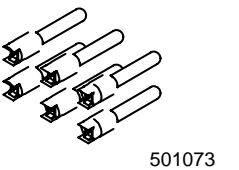
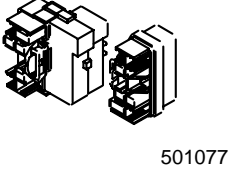
- On their own
- Simultaneously with the front air bag module(s)

DIAGNOSIS AND TESTING

Air Bag and Safety Belt Pretensioner Supplemental Restraint System (SRS)

Refer to Wiring Diagrams Section 501-20B, for schematic and connector information.

Special Tool(s)

 <p>40007A</p>	<p>Test and Deployment Lead, Air Bag/Pyrotechnic Safety Belt 418-S055</p>
 <p>418525</p>	<p>Test and Deployment Lead; Driver, Passenger and Side Air Curtain Module 418-525</p>
 <p>418142</p>	<p>Test and Deployment Lead, Side Air Bag Module 418-555</p>
 <p>501073</p>	<p>Simulator, Driver and Passenger Air Bags and Side Air Curtains 501-073A</p>
 <p>501077</p>	<p>Simulator, Occupant Restraint Systems 501-077</p>

General Equipment

Worldwide Diagnostic System (WDS)

Diagnosing Customer Concerns Without Hard DTCs

▲ WARNING: To avoid accidental deployment, the restraints control module (RCM) backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the supplemental restraint system (SRS), or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.

NOTE: Following the pinpoint tests when a diagnostic trouble code (DTC) is not present, or the air bag warning lamp is not permanently illuminated, will result in needless replacement of air bag system components and repeat repairs.

Speak with the customer to determine if a particular set of conditions must be met in order for a fault to occur. If an illuminated air bag warning lamp is reported by the customer but is not present when the vehicle comes in for repair, pinpoint test diagnostics cannot be used.

Diagnosing Customer Concerns with Hard DTCs

▲ WARNING: Do not use substitute air bag simulators when working on the SRS. Use only the appropriate tool. Failure to follow these instructions may result in personal injury.

Most air bag system diagnostic procedures require the use of system deactivation and system reactivation procedures. These procedures require the air bag module(s) and safety belt buckle pretensioners to be disconnected from the SRS, thereby removing the risk of air bag deployment while diagnostics are carried out.

Air bag simulators are required to carry out diagnosis and testing of the air bag system. The simulator contains a resistor, used to simulate an air bag module connection to the system. It is not acceptable to short-circuit the air bag module connections with a 0 ohm jumper wire. If a 0 ohm jumper wire is used to short-circuit the air bag

DIAGNOSIS AND TESTING

module connections, an illuminated air bag warning lamp will be displayed and a DTC logged by the RCM.

Deactivation

▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.

1. Disconnect the battery ground cable.

REFER to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

2. Wait at least one minute for the backup power supply in the RCM to deplete its stored energy.

▲ WARNING: To minimize the possibility of premature deployment, live air bag modules must only be placed on work benches which have been ground bonded and with the trim cover facing up. Failure to follow these instructions may result in personal injury.

3. Remove the driver air bag module from the vehicle.

REFER to: **Driver Air Bag Module** (501-20 Supplemental Restraint System, Removal and Installation).

4. Connect the driver air bag simulator to the sub-harness in place of the driver air bag module at the top of the steering column.
5. Disconnect the passenger air bag module electrical connector.
REFER to: **Passenger Air Bag Module - 3-Door** (501-20 Supplemental Restraint System, Removal and Installation).
6. Connect the passenger air bag simulator to the wiring harness in place of the passenger air bag module.

7. Disconnect the side air curtain module electrical connector on both sides. REFER to: (501-20 Supplemental Restraint System)

Side Air Curtain Module - 3-Door/5-Door (Removal and Installation),

Side Air Curtain Module - 4-Door (Removal and Installation),
Side Air Curtain Module - Wagon (Removal and Installation).

8. Connect the side air curtain simulators to the wiring harnesses in place of the side air curtain modules.
9. Disconnect the driver side underseat occupant restraint systems electrical connector.
10. Connect the occupant restraint systems simulator to the driver side underseat occupant restraint systems electrical connector in place of the safety belt pretensioner and side air bag module.
11. Disconnect the passenger side underseat occupant restraint systems electrical connector.
12. Connect the occupant restraint systems simulator to the passenger side underseat occupant restraint systems electrical connector in place of the safety belt pretensioner and side air bag module.
13. Connect the battery ground cable.
REFER to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

Reactivation

▲ WARNING: The air bag simulators must be removed and the air bag modules reconnected when reactivated to avoid non-deployment in a collision. Failure to follow this instruction may result in personal injury.

1. Disconnect the battery ground cable.

REFER to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

2. Wait at least one minute for the backup power supply in the RCM to deplete its stored energy.
3. Remove the driver air bag simulator from the sub-harness at the top of the steering column.
4. Connect and install the driver air bag module.

REFER to: **Driver Air Bag Module** (501-20 Supplemental Restraint System, Removal and Installation).

DIAGNOSIS AND TESTING

5. Remove the passenger air bag simulator from the passenger air bag module wiring harness.
6. Connect and install the passenger air bag module.

REFER to: **Passenger Air Bag Module - 3-Door** (501-20 Supplemental Restraint System, Removal and Installation).

7. Remove the side air curtain simulators from the side air curtain module wiring harnesses.
8. Connect and install the side air curtain modules. REFER to: (501-20 Supplemental Restraint System)

Side Air Curtain Module - 3-Door/5-Door (Removal and Installation),

Side Air Curtain Module - 4-Door (Removal and Installation),

Side Air Curtain Module - Wagon (Removal and Installation).

9. Remove the driver side underseat occupant restraint systems simulator.
10. Connect the driver side underseat occupant restraint systems electrical connector.
11. Remove the passenger side underseat occupant restraint systems simulator.
12. Connect the passenger side underseat occupant restraint systems electrical connector.
13. Connect the battery ground cable.

REFER to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

14. Prove out the system.

Glossary**Air Bag Simulator**

Air bag simulators are used to simulate air bag module connections to the system.

Deactivate the System

Deactivate the system means to carry out the deactivation procedure. REFER to Deactivation in this procedure.

Prove Out the System

The air bag warning indicator will illuminate for three seconds. If there is a fault condition, the air bag warning indicator will stay illuminated or illuminate after a five second delay.

Reactivate the System

Reactivate the system means to carry out the reactivation procedure. REFER to Reactivation in this procedure.

Principles of Operation**SRS Operation**

The vehicle is equipped with a DC fired sensing system.

In the event of a severe frontal or three-quarter frontal impact, in excess of a predetermined limit, the driver and passenger front air bags and safety belt buckle pretensioners will deploy.

In the event of a severe full side impact, in excess of a predetermined limit, either the driver or passenger side air bag, side air curtain (if equipped) and both safety belt buckle pretensioners will deploy.

Air bag deployment will only occur, in the event of a severe collision, when the ignition key is in the RUN position. The passenger air bag deactivation (PAD) switch (if equipped) will deactivate the passenger air bag, passenger safety belt buckle pretensioner and passenger side air bag in the event of a severe frontal or side impact; it will not deactivate the passenger side air curtain.

RCM

The RCM retains full control of the whole system, providing continual system checks and full diagnostic capabilities. The non-volatile memory stores the diagnostic trouble codes, which can then be downloaded through the data link connector (DLC) to WDS.

In the event of a failure in the vehicle supply during an accident, the RCM provides a backup power supply, sufficient to deploy the air bag(s) for a minimum of 150 ms. The backup power supply is discharged by the RCM within 60 seconds of the battery ground cable being disconnected.

RCM - Vehicles built up to 05/2005

The RCM contains electronic acceleration sensors which measure the longitudinal acceleration and the lateral acceleration and provide both signals to the micro-controller proportional to the amount of acceleration measured. When these sensors sense an impact in excess of a predetermined limit,

DIAGNOSIS AND TESTING

and the crash sensor or side impact sensor sends a signal to the RCM, the RCM initiates the circuit to deploy the air bag(s). The RCM also contains a safing sensor which enables the front air bags and the safety belt buckle pretensioners in the event of a front impact. The safing sensor also prevents unintentional deployment of the front air bags and safety belt buckle pretensioners in the event of a fault in the electronic acceleration sensor(s).

RCM - Vehicles built from 05/2005

The RCM contains two electronic acceleration sensors which measure longitudinal acceleration and one electronic acceleration sensor which measures lateral acceleration. One longitudinal acceleration sensor replaces the crash sensor as a safing sensor. Longitudinal and lateral signals, proportional to the amount of acceleration measured, are fed to a safing micro-controller. The second longitudinal acceleration sensor and the side impact sensors also feed signals, proportional to the amount of acceleration, to a micro-controller. When both micro-controllers sense an impact in excess of a predetermined limit the RCM initiates the circuit to deploy the air bag(s). The safing micro-controller enables the front air bags and the safety belt buckle pretensioners in the event of a front impact. The safing micro-controller also prevents unintentional deployment of the front air bags and safety belt buckle pretensioners in the event of a fault in the electronic acceleration sensor(s).

Crash Sensor – Vehicles built up to 05/2005

NOTE: From 05/2005 onwards the vehicle will not be equipped with a crash sensor.

The crash sensor contains an acceleration sensor, filter, amplifier and an application specific integrated circuit for signal transmitting and is mounted on the radiator grille opening panel reinforcement. The crash sensor sends a signal at a level determined by the crash severity to the RCM. The RCM will evaluate the signal against stored data and deploy the frontal air bags and safety belt buckle pretensioners if required. Both the crash sensor and the internal RCM longitudinal acceleration sensor must exceed a preset limit to initiate the air bag.

Side Impact Sensor

The side impact sensors are mounted at the base of the B-pillar on either side of the vehicle, to facilitate remote lateral impact sensing. Each side impact sensor contains an acceleration sensor, filter, amplifier and an application specific integrated circuit for signal transmitting. In the event of an impact, in excess of a predetermined limit, the side impact sensor sends a signal at a level determined by the crash severity to the RCM. The RCM will evaluate the signal against stored data and deploy the side air bag on the side the deployment request was initiated. Both the side impact sensor and the internal RCM lateral acceleration sensor must exceed a preset limit to initiate the air bag. The RCM retains control of the side air bags, side air curtains and safety belt buckle pretensioners.

Air Bag Warning Indicator

The air bag warning indicator is incorporated into the instrument cluster, together with the automatic detach detect circuit. The air bag warning indicator illuminates for three seconds at key ON. If the system self-tests OK the indicator extinguishes, if there is a fault condition, the air bag warning indicator will stay illuminated or illuminate after a five second delay.

The system is designed to illuminate the air bag warning indicator continuously if the RCM circuit is broken, either by loss of power, ground supply, module disconnect or CAN BUS failure. The RCM retaining bolts are the ground circuit.

Diagnostic evaluation of the SRS can be made through the DLC and WDS to establish the nature of the concern. Once the DTC is known the appropriate course of action can be selected from the Symptom Chart.

Inspection and Verification

1. Verify the customer concern by operating the system.
2. Visually inspect for obvious signs of mechanical or electrical damage.

DIAGNOSIS AND TESTING**Visual Inspection Chart**

Electrical
<ul style="list-style-type: none"> • Fuse(s) • Electrical connector(s) • Circuit(s) • Wiring harness • Air bag module(s)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, connect WDS to the DLC and select the vehicle to be tested from the WDS menu.
5. Retrieve the DTCs and refer to the Symptom Chart.

Symptom Chart

NOTE: It is only allowed to repair circuits between connectors. If damage has occurred within a connector a connector replacement kit, if available, must be installed. If a connector replacement kit is not available a new wiring harness must be installed. Connectors must not be disassembled.

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> • No communication with the module 	<ul style="list-style-type: none"> • DLC. • RCM. • Circuit(s). 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.
<ul style="list-style-type: none"> • DTC B1046: Driver side air curtain cross link to another firing circuit 	<ul style="list-style-type: none"> • Circuit(s). 	<p>NOTE: Check for a matching 'cross link to another firing circuit' DTC before carrying out the pinpoint test.</p> <ul style="list-style-type: none"> • GO to Pinpoint Test B.
<ul style="list-style-type: none"> • DTC B1047: Driver side air bag cross link to another firing circuit 	<ul style="list-style-type: none"> • Circuit(s). 	<p>NOTE: Check for a matching 'cross link to another firing circuit' DTC before carrying out the pinpoint test.</p> <ul style="list-style-type: none"> • GO to Pinpoint Test C.
<ul style="list-style-type: none"> • DTC B1048: Passenger air bag cross link to another firing circuit 	<ul style="list-style-type: none"> • Circuit(s). 	<p>NOTE: Check for a matching 'cross link to another firing circuit' DTC before carrying out the pinpoint test.</p> <ul style="list-style-type: none"> • GO to Pinpoint Test D.
<ul style="list-style-type: none"> • DTC B1049: Passenger safety belt pretensioner cross link to another firing circuit 	<ul style="list-style-type: none"> • Circuit(s). 	<p>NOTE: Check for a matching 'cross link to another firing circuit' DTC before carrying out the pinpoint test.</p> <ul style="list-style-type: none"> • GO to Pinpoint Test E.
<ul style="list-style-type: none"> • DTC B104B: Driver side impact sensor cross link to another sensor 	<ul style="list-style-type: none"> • Circuit(s). 	<p>NOTE: Check for a matching 'cross link to another sensor' DTC before carrying out the pinpoint test.</p> <ul style="list-style-type: none"> • GO to Pinpoint Test F.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> DTC B104C: Passenger side impact sensor cross link to another sensor 	<ul style="list-style-type: none"> Circuit(s). 	<p>NOTE: Check for a matching 'cross link to another sensor' DTC before carrying out the pinpoint test.</p> <ul style="list-style-type: none"> GO to Pinpoint Test G.
<ul style="list-style-type: none"> DTC B104D: Front crash sensor cross link to another sensor 	<ul style="list-style-type: none"> Circuit(s). 	<p>NOTE: Check for a matching 'cross link to another sensor' DTC before carrying out the pinpoint test.</p> <ul style="list-style-type: none"> GO to Pinpoint Test H.
<ul style="list-style-type: none"> DTC B104E: Driver side impact sensor short to ground or battery 	<ul style="list-style-type: none"> Circuit(s). 	<ul style="list-style-type: none"> GO to Pinpoint Test I.
<ul style="list-style-type: none"> DTC B104F: Passenger side impact sensor internal fault 	<ul style="list-style-type: none"> Side impact sensor. 	<ul style="list-style-type: none"> INSTALL a new side impact sensor. REFER to: Side Impact Sensor (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs.
<ul style="list-style-type: none"> DTC B1050: Passenger side impact sensor short to ground or battery 	<ul style="list-style-type: none"> Circuit(s). 	<ul style="list-style-type: none"> GO to Pinpoint Test J.
<ul style="list-style-type: none"> DTC B1051: Driver side impact sensor internal fault 	<ul style="list-style-type: none"> Side impact sensor. 	<ul style="list-style-type: none"> INSTALL a new side impact sensor. REFER to: Side Impact Sensor (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs.
<ul style="list-style-type: none"> DTC B1052: Passenger safety belt buckle switch cross link to another circuit 	<ul style="list-style-type: none"> Circuit(s). 	<ul style="list-style-type: none"> GO to Pinpoint Test K.
<ul style="list-style-type: none"> DTC B1053: Driver safety belt buckle switch cross link to another circuit 	<ul style="list-style-type: none"> Circuit(s). 	<ul style="list-style-type: none"> GO to Pinpoint Test L.
<ul style="list-style-type: none"> DTC B1054: Driver safety belt pretensioner cross link to another firing circuit 	<ul style="list-style-type: none"> Circuit(s). 	<p>NOTE: Check for a matching 'cross link to another firing circuit' DTC before carrying out the pinpoint test.</p> <ul style="list-style-type: none"> GO to Pinpoint Test M.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
<ul style="list-style-type: none"> DTC B1055: Passenger side air bag cross link to another firing circuit 	<ul style="list-style-type: none"> Circuit(s). 	<p>NOTE: Check for a matching 'cross link to another firing circuit' DTC before carrying out the pinpoint test.</p> <ul style="list-style-type: none"> GO to Pinpoint Test N.
<ul style="list-style-type: none"> DTC B1056: Passenger side air curtain cross link to another firing circuit 	<ul style="list-style-type: none"> Circuit(s). 	<p>NOTE: Check for a matching 'cross link to another firing circuit' DTC before carrying out the pinpoint test.</p> <ul style="list-style-type: none"> GO to Pinpoint Test O.
<ul style="list-style-type: none"> DTC B1057: Driver air bag cross link to another firing circuit 	<ul style="list-style-type: none"> Circuit(s). 	<p>NOTE: Check for a matching 'cross link to another firing circuit' DTC before carrying out the pinpoint test.</p> <ul style="list-style-type: none"> GO to Pinpoint Test P.
<ul style="list-style-type: none"> DTC B105A: Restraints control module (RCM) crash counter full 	<ul style="list-style-type: none"> RCM. 	<ul style="list-style-type: none"> INSTALL a new RCM. <p>REFER to: Restraints Control Module (RCM) (501-20 Supplemental Restraint System, Removal and Installation).</p> <p>REPEAT the self-test, CLEAR the DTCs.</p>
<ul style="list-style-type: none"> DTC B1231: Longitudinal acceleration threshold exceeded 	<ul style="list-style-type: none"> Crash data memory full. 	<p>NOTE: The data memory can be cleared a maximum of five times.</p> <ul style="list-style-type: none"> Clear the data memory using WDS. REPEAT the self-test, CLEAR the DTCs.
<ul style="list-style-type: none"> DTC B1317: Battery voltage high 	<ul style="list-style-type: none"> Charging system. 	<ul style="list-style-type: none"> Check the charging system. <p>REFER to: Charging System (414-00 Charging System - General Information, Diagnosis and Testing).</p> <p>REPEAT the self-test, CLEAR the DTCs.</p>
<ul style="list-style-type: none"> DTC B1318: Battery voltage low 	<ul style="list-style-type: none"> Battery. Charging system. Circuit. 	<ul style="list-style-type: none"> GO to Pinpoint Test Q.
<ul style="list-style-type: none"> DTC B1342: Restraints control module (RCM) is defective 	<ul style="list-style-type: none"> RCM. 	<ul style="list-style-type: none"> INSTALL a new RCM. <p>REFER to: Restraints Control Module (RCM) (501-20 Supplemental Restraint System, Removal and Installation).</p> <p>REPEAT the self-test, CLEAR the DTCs.</p>

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Symptom	Possible Sources	Action
• DTC B1868: Air bag warning indicator lamp circuit failure	• Instrument cluster.	• Check the instrument cluster. REFER to: Instrument Cluster (413-01 Instrument Cluster, Removal and Installation). REPEAT the self-test, CLEAR the DTCs.
• DTC B1871: Passenger air bag deactivation (PAD) module fault	• Mismatch between PAD indicator and PAD switch circuit.	• GO to Pinpoint Test R.
• DTC B1877: Driver safety belt pretensioner open circuit	• Driver safety belt pretensioner. • Circuit(s).	• GO to Pinpoint Test S.
• DTC B1878: Driver safety belt pretensioner short to battery	• Driver safety belt pretensioner. • Circuit(s).	• GO to Pinpoint Test T.
• DTC B1879: Driver safety belt pretensioner short to ground	• Driver safety belt pretensioner. • Circuit(s).	• GO to Pinpoint Test U.
• DTC B1881: Passenger safety belt pretensioner open circuit	• Passenger safety belt pretensioner. • Circuit(s).	• GO to Pinpoint Test V.
• DTC B1882: Passenger safety belt pretensioner short to battery	• Passenger safety belt pretensioner. • Circuit(s).	• GO to Pinpoint Test W.
• DTC B1883: Passenger safety belt pretensioner short to ground	• Passenger safety belt pretensioner. • Circuit(s).	• GO to Pinpoint Test X.
• DTC 1884: Passenger air bag deactivation (PAD) indicator inoperative	• RCM. • PAD indicator. • Circuit(s).	• GO to Pinpoint Test Y.
• DTC B1885: Driver safety belt pretensioner low resistance	• Driver safety belt pretensioner. • Circuit(s).	• GO to Pinpoint Test Z.
• DTC B1886: Passenger safety belt pretensioner low resistance	• Passenger safety belt pretensioner. • Circuit(s).	• GO to Pinpoint Test AA.
• DTC B1890: Passenger air bag deactivation (PAD) indicator short to battery	• PAD indicator. • Circuit(s).	• GO to Pinpoint Test AB.
• DTC B1916: Driver air bag short to battery	• Clockspring. • Circuit(s).	• GO to Pinpoint Test AC.
• DTC B1921: Air bag diagnostic monitor ground circuit open	• RCM internal fault.	• GO to Pinpoint Test AD.
• DTC B1925: Passenger air bag short to battery	• Circuit(s).	• GO to Pinpoint Test AE.
• DTC B1932: Driver air bag open circuit	• Driver air bag module. • Clockspring. • Circuit(s).	• GO to Pinpoint Test AF.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
• DTC B1933: Passenger air bag open circuit	• Passenger air bag module. • Circuit(s).	• GO to Pinpoint Test AG.
• DTC B1934: Driver air bag circuit low resistance	• Driver air bag module. • Clockspring. • Circuit(s).	• GO to Pinpoint Test AH.
• DTC B1935: Passenger air bag circuit low resistance	• Passenger air bag module. • Circuit(s).	• GO to Pinpoint Test AI.
• DTC B1936: Driver air bag circuit short to ground	• Driver air bag module. • Clockspring. • Circuit(s).	• GO to Pinpoint Test AJ.
• DTC B1938: Passenger air bag circuit short to ground	• Passenger air bag module. • Circuit(s).	• GO to Pinpoint Test AK.
• DTC B1992: Driver side air bag circuit short to battery	• Driver side air bag module. • Circuit(s).	• GO to Pinpoint Test AL.
• DTC B1993: Driver side air bag circuit short to ground	• Driver side air bag module. • Circuit(s).	• GO to Pinpoint Test AM.
• DTC B1994: Driver side air bag circuit open circuit	• Driver side air bag module. • Circuit(s).	• GO to Pinpoint Test AN.
• DTC B1995: Driver side air bag circuit low resistance	• Driver side air bag module. • Circuit(s).	• GO to Pinpoint Test AO.
• DTC B1996: Passenger side air bag circuit short to battery	• Passenger side air bag module. • Circuit(s).	• GO to Pinpoint Test AP.
• DTC B1997: Passenger side air bag circuit short to ground	• Passenger side air bag module. • Circuit(s).	• GO to Pinpoint Test AQ.
• DTC B1998: Passenger side air bag circuit open circuit	• Passenger side air bag module. • Circuit(s).	• GO to Pinpoint Test AR.
• DTC B1999: Passenger side air bag circuit low resistance	• Passenger side air bag module. • Circuit(s).	• GO to Pinpoint Test AS.
• DTC B2226: Front crash sensor internal fault	• Crash sensor.	• INSTALL a new crash sensor. REFER to: Crash Sensor (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs.
• DTC B2227: Front crash sensor communications fault	• Crash sensor. • RCM. • Circuit(s).	• GO to Pinpoint Test AT.
• DTC B2433: Driver safety belt buckle switch circuit short to battery	• Driver safety belt buckle switch. • Circuit(s).	• GO to Pinpoint Test AU.
• DTC B2437: Passenger safety belt buckle switch circuit short to battery	• Passenger safety belt buckle switch. • Circuit(s).	• GO to Pinpoint Test AV.

DIAGNOSIS AND TESTING

Symptom	Possible Sources	Action
• DTC B2477: Restraints control module (RCM) configuration failure	• New RCM incorrectly configured.	• CHECK model option content. CONFIGURE the RCM. For additional information, REFER to WDS.
• DTC B2773: Driver side air curtain circuit low resistance	• Driver side air curtain module. • Circuit(s).	• GO to Pinpoint Test AW.
• DTC B2774: Driver side air curtain circuit open circuit	• Driver side air curtain module. • Circuit(s).	• GO to Pinpoint Test AX.
• DTC B2775: Driver side air curtain circuit short to ground	• Driver side air curtain module. • Circuit(s).	• GO to Pinpoint Test AY.
• DTC B2776: Driver side air curtain circuit short to battery	• Circuit(s).	• GO to Pinpoint Test AZ.
• DTC B2777: Passenger side air curtain circuit low resistance	• Passenger side air curtain module. • Circuit(s).	• GO to Pinpoint Test BA.
• DTC B2778: Passenger side air curtain circuit open circuit	• Passenger side air curtain module. • Circuit(s).	• GO to Pinpoint Test BB.
• DTC B2779: Passenger side air curtain circuit short to ground	• Passenger side air curtain module. • Circuit(s).	• GO to Pinpoint Test BC.
• DTC B2780: Passenger side air curtain circuit short to battery	• Circuit(s).	• GO to Pinpoint Test BD.
• DTC B2855: Front crash sensor circuit short to battery or ground	• Circuit(s).	• GO to Pinpoint Test BE.
• DTC B2856: Front crash sensor to restraints control module (RCM) mismatch	• Incorrect new crash sensor installed.	• INSTALL the correct crash sensor. REFER to: Crash Sensor (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs.
• DTC B2886: Passenger side impact sensor to restraints control module (RCM) mismatch	• Incorrect new side impact sensor installed.	• INSTALL the correct side impact sensor. REFER to: Side Impact Sensor (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs.

DIAGNOSIS AND TESTING

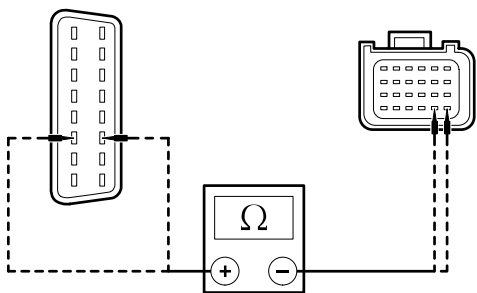
Symptom	Possible Sources	Action
<ul style="list-style-type: none"> DTC B2887: Driver side impact sensor to restraints control module (RCM) mismatch 	<ul style="list-style-type: none"> Incorrect new side impact sensor installed. 	<ul style="list-style-type: none"> INSTALL the correct side impact sensor. REFER to: Side Impact Sensor (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs.
<ul style="list-style-type: none"> DTC U0073: Restraints control module (RCM) communication bus off 	<ul style="list-style-type: none"> Circuit(s). 	<ul style="list-style-type: none"> GO to Pinpoint Test BF.
<ul style="list-style-type: none"> DTC U1900: CAN communication bus fault 	<ul style="list-style-type: none"> Circuit(s). 	<ul style="list-style-type: none"> GO to Pinpoint Test BG.
<ul style="list-style-type: none"> DTC U2017: Driver side impact sensor communications fault 	<ul style="list-style-type: none"> Driver side impact sensor. RCM. Circuit(s). 	<ul style="list-style-type: none"> GO to Pinpoint Test BH.
<ul style="list-style-type: none"> DTC U2018: Passenger side impact sensor communications fault 	<ul style="list-style-type: none"> Passenger side impact sensor. RCM. Circuit(s). 	<ul style="list-style-type: none"> GO to Pinpoint Test BI.

Pinpoint Tests

PINPOINT TEST A : NO COMMUNICATION WITH THE MODULE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK THE AIR BAG WARNING INDICATOR	
	<ol style="list-style-type: none"> Ignition switch in position II. The air bag warning indicator should illuminate when the ignition is in the ON position for three seconds then go out. If a fault is present, the air bag warning indicator will illuminate after five seconds. <ul style="list-style-type: none"> Does the air bag warning indicator illuminate after five seconds? <ul style="list-style-type: none"> → Yes INSTALL a new RCM. REFER to: Restraints Control Module (RCM) (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No GO to A2.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A2: CHECK THE DLC CIRCUIT	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Deactivate the SRS.</p> <p>3 Disconnect RCM C426.</p>
 <p>TIE0036828</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> DLC C200 pin 3, circuit 4-EC10 (GY) and the RCM C426 pin 19, circuit 4-EC10N (GY), harness side. DLC C200 pin 11, circuit 5-EC10 (BU) and the RCM C426 pin 20, circuit 5-EC10N (BU), harness side. <p>• Are the resistances less than 5 ohms?</p> <p>→ Yes INSTALL a new RCM. REFER to: Restraints Control Module (RCM) (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 4-EC10N (GY) or circuit 5-EC10N (BU). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST B : DTC B1046: DRIVER SIDE AIR CURTAIN CROSS LINK TO ANOTHER FIRING CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK THE DRIVER SIDE AIR CURTAIN CIRCUITS	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect RCM C429.</p> <p>3 Disconnect Driver Side Air Curtain Module Simulator.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 Disconnect Inoperative Air Bag Module Simulator.</p> <p>NOTE: Refer to the Wiring Diagrams for pin detail.</p> <p>5 Measure the resistance between the:</p> <ul style="list-style-type: none"> • RCM C429 pin 1, circuit 91S-JA50 (BK/RD), harness side and the inoperative air bag module circuits. • RCM C429 pin 2, circuit 15S-JA50 (GN/OG), harness side and the inoperative air bag module circuits. • Are the resistances greater than 10,000 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR the circuits. REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>


PINPOINT TEST C : DTC B1047: DRIVER SIDE AIR BAG CROSS LINK TO ANOTHER FIRING CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: CHECK THE DRIVER SIDE AIR BAG CIRCUITS	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect RCM C429.</p> <p>3 Disconnect Driver Side Underseat Occupant Restraint Systems Simulator.</p> <p>4 Disconnect Inoperative Air Bag Module Simulator.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>NOTE: Refer to the Wiring Diagrams for pin detail.</p> <p>5 Measure the resistance between the:</p> <ul style="list-style-type: none"> • RCM C429 pin 19, circuit 91S-JA37 (BK/GN), harness side and the inoperative air bag module circuits. • RCM C429 pin 20, circuit 15S-JA37 (GN/BK), harness side and the inoperative air bag module circuits. <p>• Are the resistances greater than 10,000 ohms?</p> <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR the circuits. REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>


PINPOINT TEST D : DTC B1048: PASSENGER AIR BAG CROSS LINK TO ANOTHER FIRING CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: CHECK THE PASSENGER AIR BAG CIRCUITS	
<p> WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect RCM C426.</p> <p>3 Disconnect Passenger Air Bag Module Simulator.</p> <p>4 Disconnect Inoperative Air Bag Module Simulator.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>NOTE: Refer to the Wiring Diagrams for pin detail.</p> <p>5 Measure the resistance between the:</p> <ul style="list-style-type: none"> • RCM C426 pin 9, circuit 15S-JA31 (GN/WH), harness side and the inoperative air bag module circuits. • RCM C426 pin 10, circuit 91S-JA31 (BK/WH), harness side and the inoperative air bag module circuits. <ul style="list-style-type: none"> • Are the resistances greater than 10,000 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR the circuits. REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

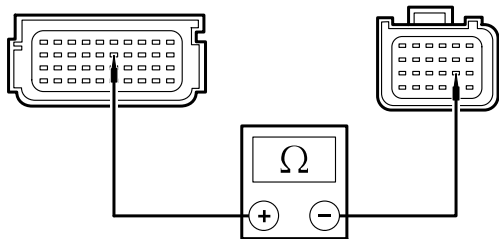
PINPOINT TEST E : DTC B1049: PASSENGER SAFETY BELT PRETENSIONER CROSS LINK TO ANOTHER FIRING CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: CHECK THE PASSENGER SAFETY BELT PRETENSIONER CIRCUITS	
<p> WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect RCM C429.</p> <p>3 Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator.</p> <p>4 Disconnect Inoperative Air Bag Module Simulator.</p>

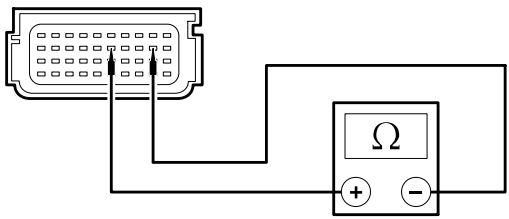
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>NOTE: Refer to the Wiring Diagrams for pin detail.</p> <p>5 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C429 pin 9, circuit 91S-JA34 (BK/RD), harness side and the inoperative air bag module circuits. RCM C429 pin 10, circuit 15S-JA34 (GN/OG), harness side and the inoperative air bag module circuits. <p>• Are the resistances greater than 10,000 ohms?</p> <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR the circuits. REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST F : DTC B104B: DRIVER SIDE IMPACT SENSOR CROSS LINK TO ANOTHER SENSOR

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>F1: CHECK FOR A CROSS LINK BETWEEN THE CRASH SENSOR AND THE DRIVER SIDE IMPACT SENSOR</p>	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect RCM C426.</p> <p>3 Disconnect RCM C429.</p> <p>4 Disconnect Crash Sensor C420.</p> <p>5 Disconnect Driver Side Impact Sensor C427.</p>
 <p>E64733</p>	<p>6 Measure the resistance between the RCM C426 pin 14, circuit 8-JA49 (WH), harness side and the RCM C429 pin 26, circuit 8-JA39 (WH), harness side.</p> <p>• Is the resistance greater than 10,000 ohms?</p> <p>→ Yes GO to F2.</p> <p>→ No REPAIR circuit 8-JA39 (WH) and circuit 8-JA49 (WH). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

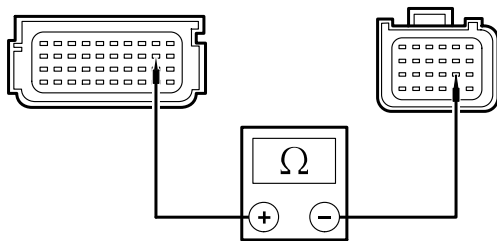
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F2: CHECK FOR A CROSS LINK BETWEEN THE DRIVER SIDE IMPACT SENSOR CIRCUIT AND THE PASSENGER SIDE IMPACT SENSOR CIRCUIT	
 <p>E64734</p>	<ol style="list-style-type: none"> 1 Disconnect Passenger Side Impact Sensor C428. 2 Measure the resistance between the RCM C429 pin 26, circuit 8-JA39 (WH), harness side and the RCM C429 pin 29, circuit 8-JA40 (WH/VT), harness side. <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? <ul style="list-style-type: none"> → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 8-JA39 (WH) and circuit 8-JA40 (WH/VT). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

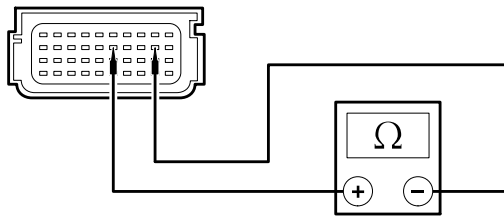
PINPOINT TEST G : DTC B104C: PASSENGER SIDE IMPACT SENSOR CROSS LINK TO ANOTHER SENSOR

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
G1: CHECK FOR A CROSS LINK BETWEEN THE CRASH SENSOR AND THE PASSENGER SIDE IMPACT SENSOR	
<p>⚠ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Disconnect RCM C426. 3 Disconnect RCM C429. 4 Disconnect Crash Sensor C420. 5 Disconnect Passenger Side Impact Sensor C428.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E64840</p>	<p>6 Measure the resistance between the RCM C426 pin 14, circuit 8-JA49 (WH), harness side and the RCM C429 pin 29, circuit 8-JA40 (WH/VT), harness side.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? <p>→ Yes GO to G2.</p> <p>→ No REPAIR circuit 8-JA40 (WH/VT) and circuit 8-JA49 (WH). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

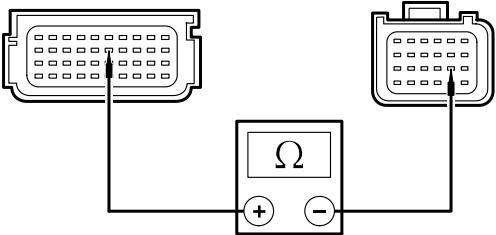
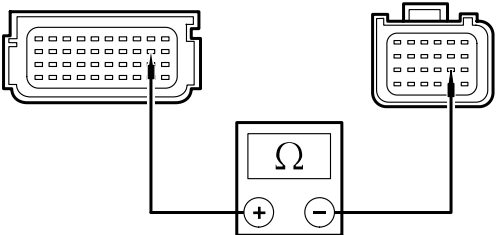
G2: CHECK FOR A CROSS LINK BETWEEN THE DRIVER SIDE IMPACT SENSOR CIRCUIT AND THE PASSENGER SIDE IMPACT SENSOR CIRCUIT

 <p>E64734</p>	<p>1 Disconnect Driver Side Impact Sensor C427.</p> <p>2 Measure the resistance between the RCM C429 pin 26, circuit 8-JA39 (WH), harness side and the RCM C429 pin 29, circuit 8-JA40 (WH/VT), harness side.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 8-JA39 (WH) and circuit 8-JA40 (WH/VT). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>
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PINPOINT TEST H : DTC B104D: FRONT CRASH SENSOR CROSS LINK TO ANOTHER SENSOR

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>H1: CHECK FOR A CROSS LINK BETWEEN THE CRASH SENSOR AND THE DRIVER SIDE IMPACT SENSOR</p>	
<p>WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect RCM C426.</p> <p>3 Disconnect RCM C429.</p> <p>4 Disconnect Crash Sensor C420.</p> <p>5 Disconnect Driver Side Impact Sensor C427.</p>

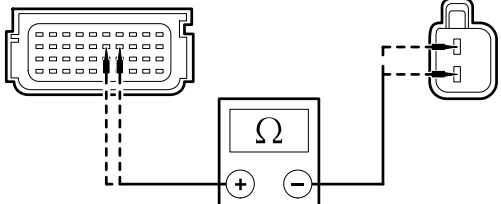
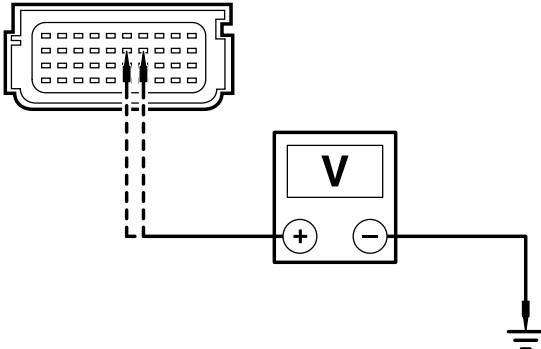
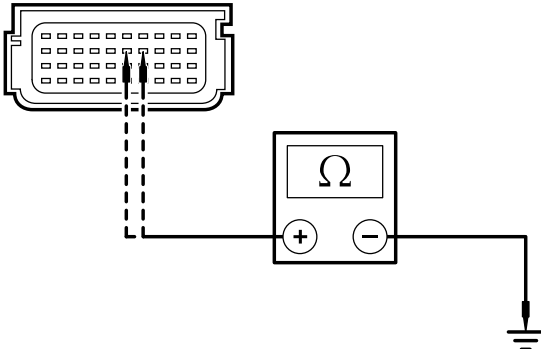
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E64733</p>	<p>6 Measure the resistance between the RCM C426 pin 14, circuit 8-JA49 (WH), harness side and the RCM C429 pin 26, circuit 8-JA39 (WH), harness side.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? → Yes GO to H2. → No REPAIR circuit 8-JA39 (WH) and circuit 8-JA49 (WH). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
<p>H2: CHECK FOR A CROSS LINK BETWEEN THE CRASH SENSOR AND THE PASSENGER SIDE IMPACT SENSOR</p>	
 <p>E64840</p>	<p>1 Disconnect Passenger Side Impact Sensor C428.</p> <p>2 Measure the resistance between the RCM C426 pin 14, circuit 8-JA49 (WH), harness side and the RCM C429 pin 29, circuit 8-JA40 (WH/VT), harness side.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 8-JA40 (WH/VT) and circuit 8-JA49 (WH). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

PINPOINT TEST I : DTC B104E: DRIVER SIDE IMPACT SENSOR SHORT TO GROUND OR BATTERY

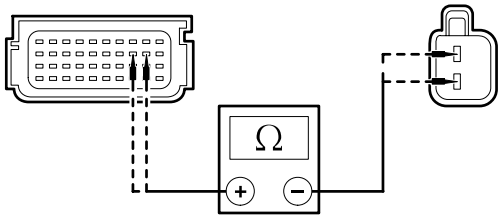
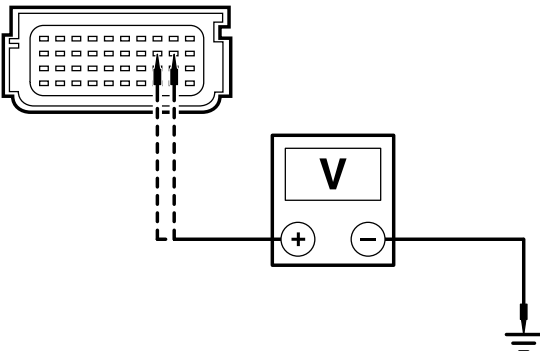
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>I1: DTC B104E: CHECK THE DRIVER SIDE IMPACT SENSOR CIRCUITS</p>	
<p>WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect RCM C429.</p> <p>3 Disconnect Driver Side Impact Sensor C427.</p>

DIAGNOSIS AND TESTING

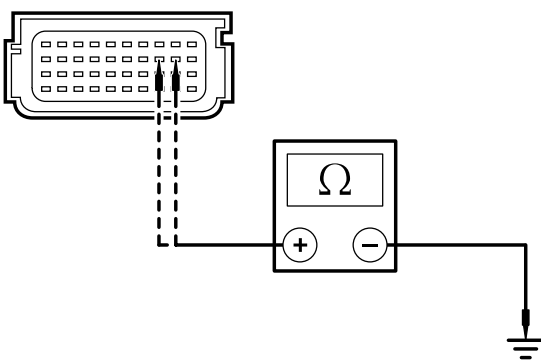
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0036518</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C429 pin 26, circuit 8-JA39 (WH), harness side and the driver side impact sensor C427 pin 1, circuit 8-JA39 (WH), harness side. RCM C429 pin 27, circuit 9-JA39 (BN), harness side and the driver side impact sensor C427 pin 2, circuit 9-JA39 (BN), harness side. <ul style="list-style-type: none"> Are the resistances less than 5 ohms? <p>→ Yes GO to I2.</p> <p>→ No REPAIR circuit 8-JA39 (WH) or circuit 9-JA39 (BN). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>
<p>I2: CHECK THE DRIVER SIDE IMPACT SENSOR FOR SHORT TO BATTERY</p>	
 <p>E51133</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the:</p> <ul style="list-style-type: none"> RCM C429 pin 26, circuit 8-JA39 (WH), harness side and ground. RCM C429 pin 27, circuit 9-JA39 (BN), harness side and ground. <ul style="list-style-type: none"> Is any voltage present? <p>→ Yes REPAIR circuit 8-JA39 (WH) or circuit 9-JA39 (BN). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No GO to I3.</p>
<p>I3: CHECK THE DRIVER SIDE IMPACT SENSOR FOR SHORT TO GROUND</p>	
 <p>E51134</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C429 pin 26, circuit 8-JA39 (WH), harness side and ground. RCM C429 pin 27, circuit 9-JA39 (BN), harness side and ground. <ul style="list-style-type: none"> Are the resistances less than 5 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 8-JA39 (WH) or circuit 9-JA39 (BN). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST J : DTC B1050: PASSENGER SIDE IMPACT SENSOR SHORT TO GROUND OR BATTERY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
J1: CHECK THE PASSENGER SIDE IMPACT SENSOR CIRCUITS	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Disconnect RCM C429. 3 Disconnect Passenger Side Impact Sensor C428.
 <p>TIE0036519</p>	<ol style="list-style-type: none"> 4 Measure the resistance between the: <ul style="list-style-type: none"> • RCM C429 pin 28, circuit 9-JA40 (BN/WH), harness side and the driver side impact sensor C428 pin 2, circuit 9-JA40 (BN/WH), harness side. • RCM C429 pin 29, circuit 8-JA40 (WH/VT), harness side and the driver side impact sensor C428 pin 1, circuit 8-JA40 (WH/VT), harness side. • Are the resistances less than 5 ohms? <ul style="list-style-type: none"> → Yes GO to J2. → No REPAIR circuit 8-JA40 (WH/VT) or circuit 9-JA40 (BN/WH). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
J2: CHECK THE PASSENGER SIDE IMPACT SENSOR FOR SHORT TO BATTERY	
 <p>E51135</p>	<ol style="list-style-type: none"> 1 Ignition switch in position II. 2 Measure the voltage between the: <ul style="list-style-type: none"> • RCM C429 pin 28, circuit 9-JA40 (BN/WH), harness side and ground. • RCM C429 pin 29, circuit 8-JA40 (WH/VT), harness side and ground. • Is any voltage present? <ul style="list-style-type: none"> → Yes REPAIR circuit 8-JA40 (WH/VT) or circuit 9-JA40 (BN/WH). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No GO to J3.

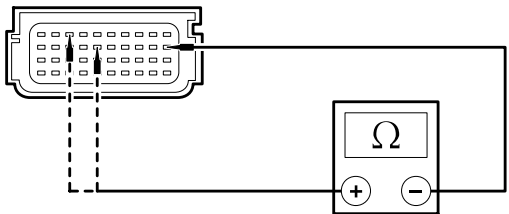
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
J3: CHECK THE PASSENGER SIDE IMPACT SENSOR FOR SHORT TO GROUND	
 <p>E51136</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Measure the resistance between the: <ul style="list-style-type: none"> • RCM C429 pin 28, circuit 9-JA40 (BN/WH), harness side and ground. • RCM C429 pin 29, circuit 8-JA40 (WH/VT), harness side and ground. <ul style="list-style-type: none"> • Are the resistances less than 5 ohms? <ul style="list-style-type: none"> → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 8-JA40 (WH/VT) or circuit 9-JA40 (BN/WH). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

PINPOINT TEST K : DTC B1052: PASSENGER SAFETY BELT BUCKLE SWITCH CROSS LINK TO ANOTHER CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
K1: CHECK THE PASSENGER SAFETY BELT BUCKLE SWITCH CIRCUITS	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Disconnect RCM C429. 3 Disconnect Driver Side Underseat Occupant Restraint Systems Simulator. 4 Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator.

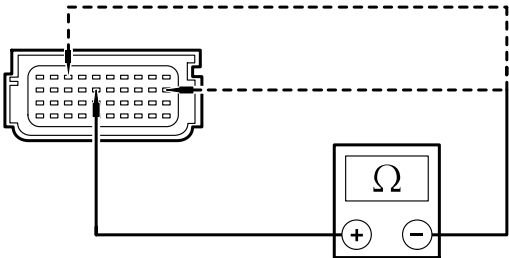
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E64735</p>	<p>5 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C429 pin 25, circuit 8-JA54 (WH), harness side and the RCM C429 pin 30, circuit 8-JA55 (WH/BK), harness side. RCM C429 pin 30, circuit 8-JA55 (WH/BK), harness side and the RCM C429 pin 33, circuit 8-JA52 (WH/GN), harness side. <ul style="list-style-type: none"> Are the resistances greater than 10,000 ohms? <ul style="list-style-type: none"> → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 8-JA52 (WH/GN) or circuit 8-JA54 (WH) or circuit 8-JA55 (WH/BK). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

PINPOINT TEST L : DTC B1053: DRIVER SAFETY BELT BUCKLE SWITCH CROSS LINK TO ANOTHER CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
L1: CHECK THE DRIVER SAFETY BELT BUCKLE SWITCH CIRCUITS	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> Deactivate the SRS. Disconnect RCM C429. Disconnect Driver Side Underseat Occupant Restraint Systems Simulator. Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E64841</p>	<p>5 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C429 pin 25, circuit 8-JA54 (WH), harness side and the RCM C429 pin 30, circuit 8-JA55 (WH/BK), harness side. RCM C429 pin 25, circuit 8-JA54 (WH), harness side and the RCM C429 pin 33, circuit 8-JA52 (WH/GN), harness side. <ul style="list-style-type: none"> Are the resistances greater than 10,000 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 8-JA52 (WH/GN) or circuit 8-JA54 (WH) or circuit 8-JA55 (WH/BK). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>


PINPOINT TEST M : DTC B1054: DRIVER SAFETY BELT PRETENSIONER CROSS LINK TO ANOTHER FIRING CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>M1: CHECK THE DRIVER SAFETY BELT PRETENSIONER CIRCUITS</p>	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect RCM C429.</p> <p>3 Disconnect Driver Side Underseat Occupant Restraint Systems Simulator.</p> <p>4 Disconnect Inoperative Air Bag Module Simulator.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>NOTE: Refer to the Wiring Diagrams for pin detail.</p> <p>5 Measure the resistance between the:</p> <ul style="list-style-type: none"> • RCM C429 pin 17, circuit 15S-JA33 (GN/BU), harness side and the inoperative air bag module circuits. • RCM C429 pin 18, circuit 91S-JA33 (BK/BU), harness side and the inoperative air bag module circuits. <ul style="list-style-type: none"> • Are the resistances greater than 10,000 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR the circuits. REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>


PINPOINT TEST N : DTC B1055: PASSENGER SIDE AIR BAG CROSS LINK TO ANOTHER FIRING CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
N1: CHECK THE PASSENGER SIDE AIR BAG CIRCUITS	
<p> WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect RCM C429.</p> <p>3 Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator.</p> <p>4 Disconnect Inoperative Air Bag Module Simulator.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>NOTE: Refer to the Wiring Diagrams for pin detail.</p> <p>5 Measure the resistance between the:</p> <ul style="list-style-type: none"> • RCM C429 pin 7, circuit 15S-JA38 (GN/OG), harness side and the inoperative air bag module circuits. • RCM C429 pin 8, circuit 91S-JA38 (BK/RD), harness side and the inoperative air bag module circuits. <ul style="list-style-type: none"> • Are the resistances greater than 10,000 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR the circuits. REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>


PINPOINT TEST O : DTC B1056: PASSENGER SIDE AIR CURTAIN CROSS LINK TO ANOTHER FIRING CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
O1: CHECK THE PASSENGER SIDE AIR CURTAIN CIRCUITS	
<p> WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect RCM C429.</p> <p>3 Disconnect Passenger Side Air Curtain Module Simulator.</p> <p>4 Disconnect Inoperative Air Bag Module Simulator.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>NOTE: Refer to the Wiring Diagrams for pin detail.</p> <p>5 Measure the resistance between the:</p> <ul style="list-style-type: none"> • RCM C429 pin 11, circuit 91S-JA51 (BK/BU), harness side and the inoperative air bag module circuits. • RCM C429 pin 12, circuit 15S-JA51 (GN/BU), harness side and the inoperative air bag module circuits. <ul style="list-style-type: none"> • Are the resistances greater than 10,000 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR the circuits. REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST P : DTC B1057: DRIVER AIR BAG CROSS LINK TO ANOTHER FIRING CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>P1: CHECK THE DRIVER AIR BAG CIRCUITS</p>	
<p> WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect RCM C426.</p> <p>3 Disconnect Driver Air Bag Module Simulator.</p> <p>4 Disconnect Inoperative Air Bag Module Simulator.</p>

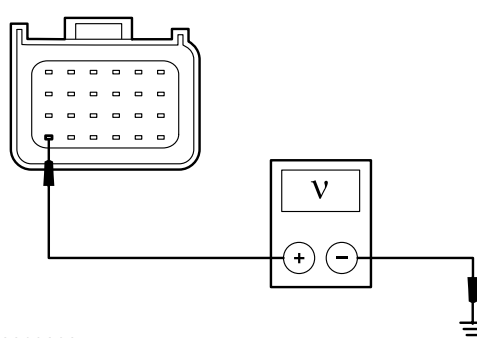
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>NOTE: Refer to the Wiring Diagrams for pin detail.</p> <p>5 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C426 pin 3, circuit 15S-JA8 (GN/RD), harness side and the inoperative air bag module circuits. RCM C426 pin 4, circuit 91S-JA8 (BK/OG), harness side and the inoperative air bag module circuits. <ul style="list-style-type: none"> Are the resistances greater than 10,000 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR the circuits. REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST Q : DTC B1318: BATTERY VOLTAGE LOW

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
Q1: CHECK THE BATTERY VOLTAGE	
	<p>1 Ignition switch in position II.</p> <p>2 Check the battery voltage with the ignition in the ON position.</p> <ul style="list-style-type: none"> Is the battery voltage greater than 8 volts? <p>→ Yes GO to Q2.</p> <p>→ No CHECK the battery and charging system. REFER to: Charging System (414-00 Charging System - General Information, Diagnosis and Testing). REPEAT the self-test, CLEAR the DTCs.</p>
Q2: CHECK THE RCM SUPPLY CIRCUIT	
<p>WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Deactivate the SRS.</p> <p>3 Disconnect RCM C426.</p> <p>4 Ignition switch in position II.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VUE0029820</p>	<p>5 Measure the voltage between the RCM C426 pin 24, circuit 15-JA10 (GN/OG), harness side and ground.</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? <p>→ Yes GO to Q3.</p> <p>→ No REPAIR circuit 15-JA10 (GN/OG). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

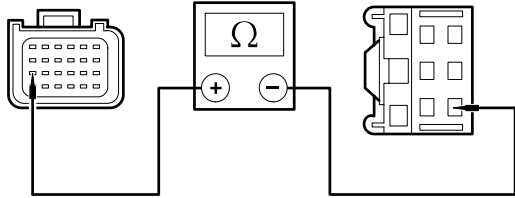
Q3: CHECK THE RCM SUPPLY CIRCUIT

	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect Fuse 65.</p>
	<p>3 Measure the resistance between the RCM C426 pin 24, circuit 15-JA10 (GN/OG), harness side and fuse 65, harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 15-JA10 (GN/OG). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

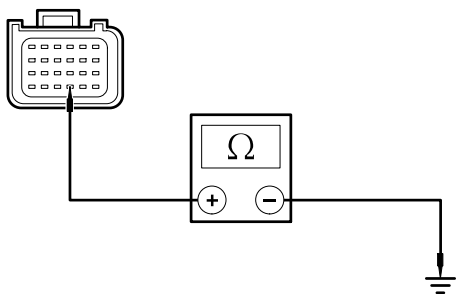
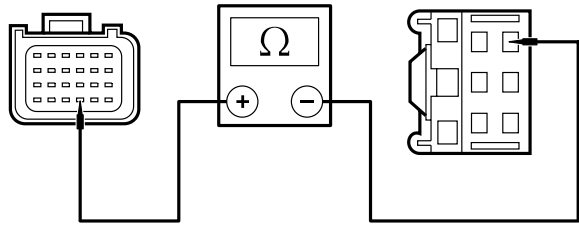
PINPOINT TEST R : DTC B1871: PASSENGER AIR BAG DEACTIVATION (PAD) MODULE FAULT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>R1: CHECK FOR VOLTAGE TO THE PAD CONTROL SWITCH</p>	
	<p>1 Ignition switch in position II.</p>
	<p>2 Operate the PAD control switch to the OFF position.</p> <ul style="list-style-type: none"> Does the PAD indicator LED illuminate? <p>→ Yes GO to R2.</p> <p>→ No GO to R3.</p>

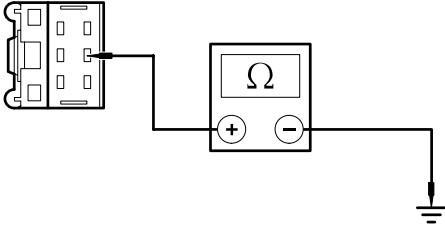
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
R2: CHECK FOR CONTINUITY BETWEEN THE RCM AND THE PAD CONTROL SWITCH	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Deactivate the SRS. 3 Disconnect RCM C426. 4 Disconnect PAD Switch C619.
 <p>TIE0036491</p>	<ol style="list-style-type: none"> 5 Measure the resistance between the RCM C426 pin 18, circuit 31S-JA31 (BK/WH), harness side and the PAD control switch C619 pin 6, circuit 31S-JA31 (BK/WH), harness side. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <ul style="list-style-type: none"> → Yes INSTALL a new PAD control switch. REFER to: Passenger Air Bag Deactivation (PAD) Switch (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 31S-JA31 (BK/WH). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
R3: CHECK FOR CONTINUITY BETWEEN THE RCM AND GROUND	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Deactivate the SRS. 3 Disconnect RCM C426. 4 Operate the PAD switch to the ON position.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0030702</p>	<p>5 Measure the resistance between the RCM C426 pin 21, circuit 31S-JA47 (BK/OG), harness side and ground.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes CONFIGURE the PAD switch, REFER to WDS. CLEAR the DTCs. REACTIVATE the system. If the concern remains, INSTALL a new RCM.</p> <p>REFER to: Restraints Control Module (RCM) (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No GO to R4.</p>
<p>R4: CHECK FOR CONTINUITY BETWEEN THE RCM AND THE PAD SWITCH</p>	
 <p>E0036492</p>	<p>1 Disconnect PAD switch C619.</p> <p>2 Measure the resistance between the RCM C426 pin 21, circuit 31S-JA47 (BK/OG), harness side and the PAD switch C619 pin 4, circuit 31S-JA47 (BK/OG), harness side.</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? <p>→ Yes GO to R5.</p> <p>→ No REPAIR circuit 31S-JA47 (BK/OG). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

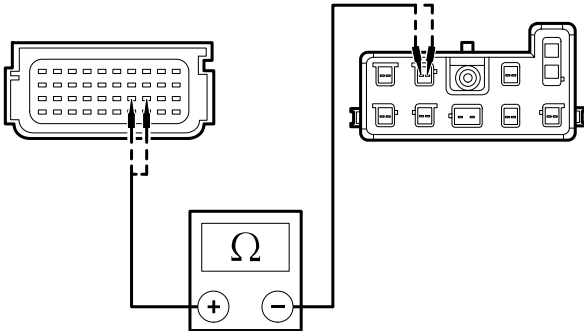
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
R5: CHECK FOR CONTINUITY BETWEEN THE PAD SWITCH AND GROUND	
 <p>TIE0030703</p>	<ol style="list-style-type: none"> 1 Measure the resistance between the PAD switch C619 pin 5, circuit 31-JA47 (BK), harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes INSTALL a new PAD switch. REFER to: Passenger Air Bag Deactivation (PAD) Switch (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 31-JA47 (BK). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

PINPOINT TEST S : DTC B1877: DRIVER SAFETY BELT PRETENSIONER OPEN CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
S1: CHECK THE DRIVER SAFETY BELT PRETENSIONER CIRCUIT	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Ignition switch in position II. 3 Carry out the self-test with the simulators installed. <ul style="list-style-type: none"> • Does the system prove out correctly? → Yes GO to S2. → No GO to S3.
S2: PROVE OUT THE DRIVER SAFETY BELT PRETENSIONER CIRCUIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Driver Side Underseat Occupant Restraint Systems Simulator. 3 Connect Driver Side Underseat Occupant Restraint Systems Electrical Connector C30. 4 Ignition switch in position II.

DIAGNOSIS AND TESTING

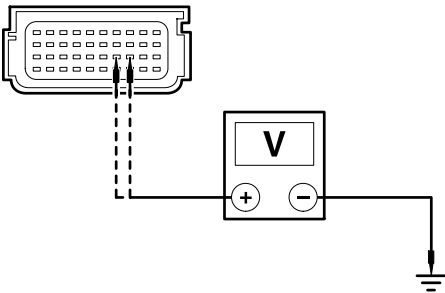
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 Carry out the self-test.</p> <ul style="list-style-type: none"> Does the system prove out correctly? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No INSTALL a new driver safety belt buckle and pretensioner. REFER to: Safety Belt Buckle and Pretensioner (501-20 Safety Belt System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>
<p>S3: CHECK THE DRIVER SAFETY BELT PRETENSIONER FOR OPEN CIRCUIT OR HIGH RESISTANCE</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect RCM C429.</p> <p>3 Disconnect Driver Side Underseat Occupant Restraint Systems Simulator.</p>
 <p>E57098</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C429 pin 17, circuit 15S-JA33 (GN/BU), harness side and the driver side underseat occupant restraint systems electrical connector C30 pin 7, circuit 15S-JA33 (GN/BU), harness side. RCM C429 pin 18, circuit 91S-JA33 (BK/BU), harness side and the driver side underseat occupant restraint systems electrical connector C30 pin 8, circuit 91S-JA33 (BK/BU), harness side.
	<ul style="list-style-type: none"> Are the resistances less than 5 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 15S-JA33 (GN/BU) or circuit 91S-JA33 (BK/BU). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST T : DTC B1878: DRIVER SAFETY BELT PRETENSIONER SHORT TO BATTERY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
T1: CHECK THE DRIVER SAFETY BELT PRETENSIONER CIRCUIT	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> <li>1 Deactivate the SRS. <li>2 Ignition switch in position II. <li> 3 Carry out the self-test with the simulators installed. <ul style="list-style-type: none"> <li>• Does the system prove out correctly? <li>→ Yes GO to T2. <li>→ No GO to T3.
T2: PROVE OUT THE DRIVER SAFETY BELT PRETENSIONER CIRCUIT	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 Disconnect Driver Side Underseat Occupant Restraint Systems Simulator. <li>3 Connect Driver Side Underseat Occupant Restraint Systems Electrical Connector C30. <li>4 Ignition switch in position II. <li> 5 Carry out the self-test. <ul style="list-style-type: none"> <li>• Does the system prove out correctly? <li>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. <li>→ No INSTALL a new driver safety belt buckle and pretensioner. REFER to: Safety Belt Buckle and Pretensioner (501-20 Safety Belt System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
T3: CHECK THE DRIVER SAFETY BELT PRETENSIONER CIRCUIT FOR A SHORT TO BATTERY	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 Disconnect RCM C429.

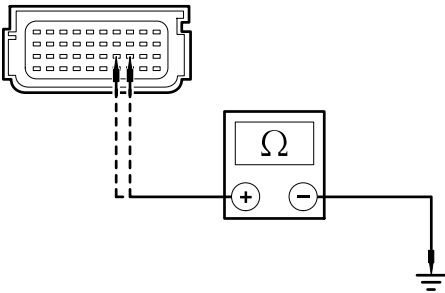
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Disconnect Driver Side Underseat Occupant Restraint Systems Simulator.</p> <p>4 Ignition switch in position II.</p>
 <p>TIE0021890</p>	<p>5 Measure the voltage between the:</p> <ul style="list-style-type: none"> • RCM C429 pin 17, circuit 15S-JA33 (GN/BU), harness side and ground. • RCM C429 pin 18, circuit 91S-JA33 (BK/BU), harness side and ground. <p>• Is any voltage present?</p> <p>→ Yes REPAIR circuit 15S-JA33 (GN/BU) or circuit 91S-JA33 (BK/BU) and circuit 15-JA10 (GN/OG). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST U : DTC B1879: DRIVER SAFETY BELT PRETENSIONER SHORT TO GROUND

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>U1: CHECK THE DRIVER SAFETY BELT PRETENSIONER CIRCUIT</p>	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Ignition switch in position II.</p> <p>3 Carry out the self-test with the simulators installed.</p> <ul style="list-style-type: none"> • Does the system prove out correctly? <p>→ Yes GO to U2.</p> <p>→ No GO to U3.</p>
<p>U2: PROVE OUT THE DRIVER SAFETY BELT PRETENSIONER CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Driver Side Underseat Occupant Restraint Systems Simulator.</p> <p>3 Connect Driver Side Underseat Occupant Restraint Systems Electrical Connector C30.</p>

DIAGNOSIS AND TESTING

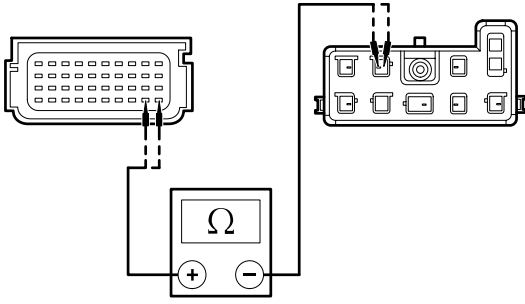
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>4 Ignition switch in position II.</p> <p>5 Carry out the self-test.</p> <ul style="list-style-type: none"> • Does the system prove out correctly? → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No INSTALL a new driver safety belt buckle and pretensioner. REFER to: Safety Belt Buckle and Pretensioner (501-20 Safety Belt System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
<p>U3: CHECK THE DRIVER SAFETY BELT PRETENSIONER CIRCUIT FOR A SHORT TO GROUND</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect RCM C429.</p> <p>3 Disconnect Driver Side Underseat Occupant Restraint Systems Simulator.</p>
 <p>TIE0021891</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> • RCM C429 pin 17, circuit 15S-JA33 (GN/BU), harness side and ground. • RCM C429 pin 18, circuit 91S-JA33 (BK/BU), harness side and ground. <ul style="list-style-type: none"> • Are the resistances greater than 10,000 ohms? → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 15S-JA33 (GN/BU) or circuit 91S-JA33 (BK/BU) and circuit 91-JA10 (BK/RD). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

DIAGNOSIS AND TESTING

PINPOINT TEST V : DTC 1881: PASSENGER SAFETY BELT PRETENSIONER OPEN CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
V1: CHECK THE PASSENGER SAFETY BELT PRETENSIONER CIRCUIT	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Ignition switch in position II. 3 Carry out the self-test with the simulators installed. <ul style="list-style-type: none"> • Does the system prove out correctly? → Yes GO to V2. → No GO to V3.
V2: PROVE OUT THE PASSENGER SAFETY BELT PRETENSIONER CIRCUIT	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator. 3 Connect Passenger Side Underseat Occupant Restraint Systems Electrical Connector C31. 4 Ignition switch in position II. 5 Carry out the self-test. <ul style="list-style-type: none"> • Does the system prove out correctly? → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No INSTALL a new passenger safety belt buckle and pretensioner. REFER to: Safety Belt Buckle and Pretensioner (501-20 Safety Belt System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
V3: CHECK THE PASSENGER SAFETY BELT PRETENSIONER FOR OPEN CIRCUIT OR HIGH RESISTANCE	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect RCM C429.

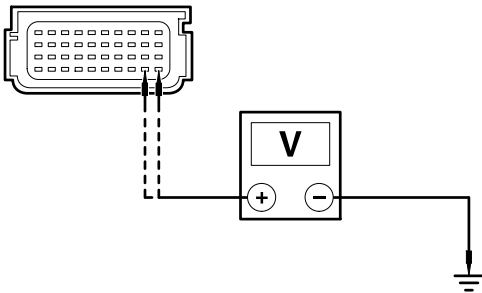
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator.</p>
 <p>TIE0036493</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> • RCM C429 pin 9, circuit 91S-JA34 (BK/RD), harness side and the passenger side underseat occupant restraint systems electrical connector C31 pin 8, 91S-JA34 (BK/RD), harness side. • RCM C429 pin 10, circuit 15S-JA34 (GN/OG), harness side and the passenger side underseat occupant restraint systems electrical connector C31 pin 7, 15S-JA34 (GN/OG), harness side. <p>• Are the resistances less than 5 ohms?</p> <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 15S-JA34 (GN/OG) or circuit 91S-JA34 (BK/RD). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST W : DTC B1882: PASSENGER SAFETY BELT PRETENSIONER SHORT TO BATTERY


TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
W1: CHECK THE PASSENGER SAFETY BELT PRETENSIONER CIRCUIT	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Ignition switch in position II.</p> <p>3 Carry out the self-test with the simulators installed.</p> <ul style="list-style-type: none"> • Does the system prove out correctly? <p>→ Yes GO to W2.</p> <p>→ No GO to W3.</p>
W2: PROVE OUT THE PASSENGER SAFETY BELT PRETENSIONER CIRCUIT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator.</p>

DIAGNOSIS AND TESTING

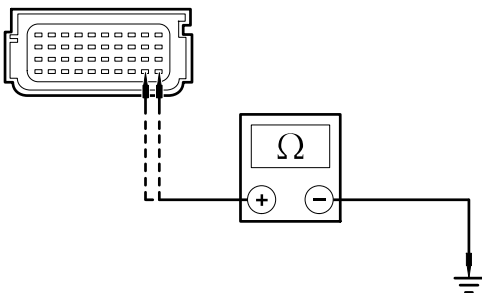
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Connect Passenger Side Underseat Occupant Restraint Systems Electrical Connector C31.</p> <p>4 Ignition switch in position II.</p> <p>5 Carry out the self-test.</p> <ul style="list-style-type: none"> • Does the system prove out correctly? → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No INSTALL a new passenger safety belt buckle and pretensioner. REFER to: Safety Belt Buckle and Pretensioner (501-20 Safety Belt System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
<p>W3: CHECK THE PASSENGER SAFETY BELT PRETENSIONER CIRCUIT FOR A SHORT TO BATTERY</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect RCM C429.</p> <p>3 Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator.</p> <p>4 Ignition switch in position II.</p>
 <p>TIE0036494</p>	<p>5 Measure the voltage between the:</p> <ul style="list-style-type: none"> • RCM C429 pin 9, circuit 91S-JA34 (BK/RD), harness side and ground. • RCM C429 pin 10, circuit 15S-JA34 (GN/OG), harness side and ground. <ul style="list-style-type: none"> • Is any voltage present? → Yes REPAIR circuit circuit 15S-JA34 (GN/OG) or circuit 91S-JA34 (BK/RD) and circuit 15-JA10 (GN/OG). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPEAT self-test. CLEAR the DTCs. REACTIVATE the system.

DIAGNOSIS AND TESTING

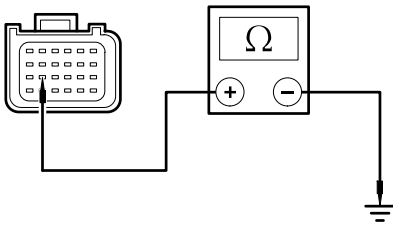
PINPOINT TEST X : DTC B1883: PASSENGER SAFETY BELT PRETENSIONER SHORT TO GROUND

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
X1: CHECK THE PASSENGER SAFETY BELT PRETENSIONER CIRCUIT	
<p> WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> <li>1 Deactivate the SRS. <li>2 Ignition switch in position II. <li>3 Carry out the self-test with the simulators installed. <ul style="list-style-type: none"> <li>• Does the system prove out correctly? <li>→ Yes GO to X2. <li>→ No GO to X3.
X2: PROVE OUT THE PASSENGER SAFETY BELT PRETENSIONER CIRCUIT	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator. <li>3 Connect Passenger Side Underseat Occupant Restraint Systems Electrical Connector C31. <li>4 Ignition switch in position II. <li>5 Carry out the self-test. <ul style="list-style-type: none"> <li>• Does the system prove out correctly? <li>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. <li>→ No INSTALL a new passenger safety belt buckle and pretensioner. REFER to: Safety Belt Buckle and Pretensioner (501-20 Safety Belt System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
X3: CHECK THE PASSENGER SAFETY BELT PRETENSIONER CIRCUIT FOR A SHORT TO GROUND	
	<ol style="list-style-type: none"> <li>1 Ignition switch in position 0. <li>2 Disconnect RCM C429.

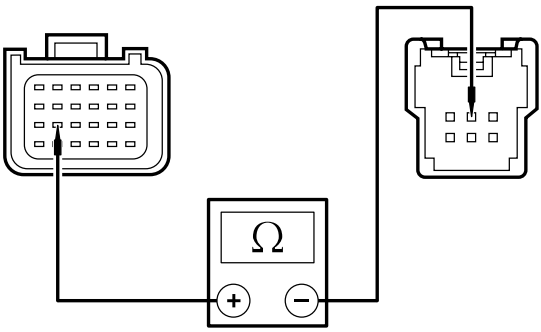
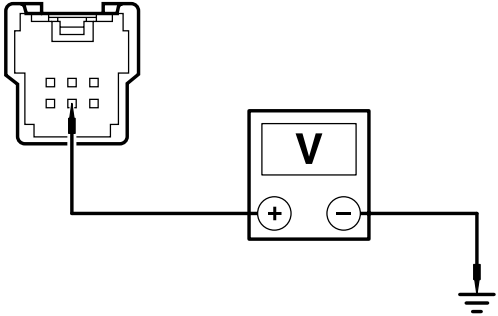
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator.</p>
 <p>TIE0036495</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> • RCM C429 pin 9, circuit 91S-JA34 (BK/RD), harness side and ground. • RCM C429 pin 10, circuit 15S-JA34 (GN/OG), harness side and ground. <ul style="list-style-type: none"> • Are the resistances greater than 10,000 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 15S-JA34 (GN/OG) or circuit 91S-JA34 (BK/RD) and circuit 91-JA10 (BK/RD). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST Y : DTC B1884: PASSENGER AIR BAG DEACTIVATION (PAD) INDICATOR INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>Y1: CHECK FOR CONTINUITY BETWEEN THE RCM AND GROUND</p>	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect RCM C426.</p> <p>3 Disconnect PAD Indicator C453.</p>
 <p>TIE0038192</p>	<p>4 Measure the resistance between the RCM C426 pin 17, circuit 91S-JA56 (BK/RD), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? <p>→ Yes GO to Y2.</p> <p>→ No REPAIR circuit 91S-JA56 (BK/RD). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
Y2: CHECK FOR CONTINUITY BETWEEN THE RCM AND THE PAD INDICATOR	
 <p>E49412</p>	<ol style="list-style-type: none"> <li>1 Measure the resistance between the RCM C426 pin 17, circuit 91S-JA56 (BK/RD), harness side and the PAD indicator C453 pin 2, circuit 91S-JA56 (BK/RD), harness side. <ul style="list-style-type: none"> <li>• Is the resistance less than 5 ohms? <li>→ Yes GO to Y3. <li>→ No REPAIR circuit 91S-JA56 (BK/RD). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
Y3: CHECK THE PAD INDICATOR SUPPLY CIRCUIT	
 <p>E49413</p>	<ol style="list-style-type: none"> <li>1 Ignition switch in position II. <li>2 Measure the voltage between the PAD indicator C453 pin 5, circuit 15-JA56 (GN/OG), harness side and ground. <ul style="list-style-type: none"> <li>• Is the voltage greater than 10 volts? <li>→ Yes INSTALL a new PAD indicator. REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. <li>→ No REPAIR circuit 15-JA56 (GN/OG). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

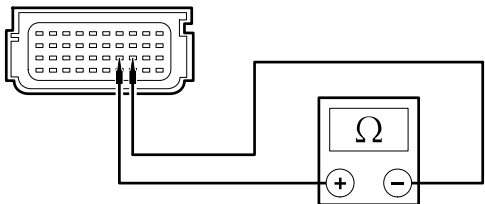
PINPOINT TEST Z : DTC B1885: DRIVER SAFETY BELT PRETENSIONER LOW RESISTANCE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
Z1: CHECK THE DRIVER SAFETY BELT PRETENSIONER CIRCUIT	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> <li>1 Deactivate the SRS. <li>2 Ignition switch in position II.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Carry out the self-test with the simulators installed.</p> <ul style="list-style-type: none"> • Does the system prove out correctly? <p>→ Yes GO to Z2.</p> <p>→ No GO to Z3.</p>
Z2: PROVE OUT THE DRIVER SAFETY BELT PRETENSIONER CIRCUIT	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Driver Side Underseat Occupant Restraint Systems Simulator.</p> <p>3 Connect Driver Side Underseat Occupant Restraint Systems Electrical Connector C30.</p> <p>4 Ignition switch in position II.</p> <p>5 Carry out the self-test.</p> <ul style="list-style-type: none"> • Does the system prove out correctly? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No INSTALL a new driver safety belt buckle and pretensioner. REFER to: Safety Belt Buckle and Pretensioner (501-20 Safety Belt System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>
Z3: CHECK THE DRIVER SAFETY BELT PRETENSIONER CIRCUIT FOR LOW RESISTANCE	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect RCM C429.</p> <p>3 Disconnect Driver Side Underseat Occupant Restraint Systems Simulator.</p>

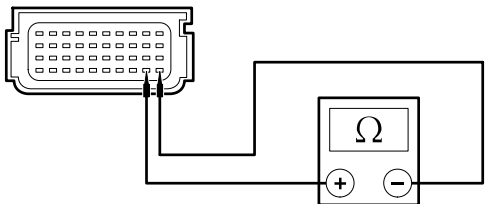
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0033427</p>	<p>4 Measure the resistance between the RCM C429 pin 17, circuit 15S-JA33 (GN/BU), harness side and the RCM C429 pin 18, circuit 91S-JA33 (BK/BU), harness side.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 15S-JA33 (GN/BU) and circuit 91S-JA33 (BK/BU). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

PINPOINT TEST AA : DTC B1886: PASSENGER SAFETY BELT PRETENSIONER LOW RESISTANCE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AA1: CHECK THE PASSENGER SAFETY BELT PRETENSIONER CIRCUIT</p>	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Ignition switch in position II.</p> <p>3 Carry out the self-test with the simulators installed.</p> <ul style="list-style-type: none"> Does the system prove out correctly? → Yes GO to AA2. → No GO to AA3.
<p>AA2: PROVE OUT THE PASSENGER SAFETY BELT PRETENSIONER CIRCUIT</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator.</p> <p>3 Connect Passenger Side Underseat Occupant Restraint Systems Electrical Connector C31.</p> <p>4 Ignition switch in position II.</p>

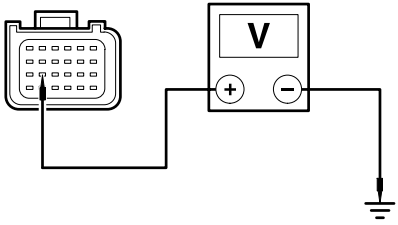
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>5 Carry out the self-test.</p> <ul style="list-style-type: none"> Does the system prove out correctly? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No INSTALL a new passenger safety belt buckle and pretensioner.</p> <p>REFER to: Safety Belt Buckle and Pretensioner (501-20 Safety Belt System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>
<p>AA3: CHECK THE PASSENGER SAFETY BELT PRETENSIONER CIRCUIT FOR LOW RESISTANCE</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect RCM C429.</p> <p>3 Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator.</p>
 <p>TIE0036496</p>	<p>4 Measure the resistance between the RCM C429 pin 9, circuit 91S-JA34 (BK/RD), harness side and the RCM C429 pin 10, circuit 15S-JA34 (GN/OG), harness side.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 15S-JA34 (GN/OG) and circuit 91S-JA34 (BK/RD). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

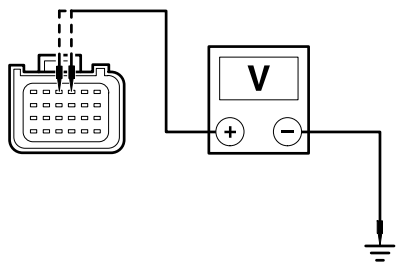
PINPOINT TEST AB : DTC B1890: PASSENGER AIR BAG DEACTIVATION (PAD) INDICATOR SHORT TO BATTERY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AB1: CHECK THE PAD INDICATOR TO RCM CIRCUIT</p>	
<p>WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect PAD Indicator C453.</p>

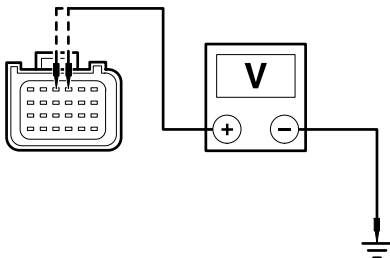
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0036497</p>	<p>3 Disconnect RCM C426.</p> <p>4 Measure the voltage between the RCM C426 pin 17, circuit 91S-JA56 (BK/RD), harness side and ground.</p> <ul style="list-style-type: none"> Is any voltage present? <p>→ Yes REPAIR circuit 91S-JA56 (BK/RD). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No INSTALL a new PAD indicator. REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

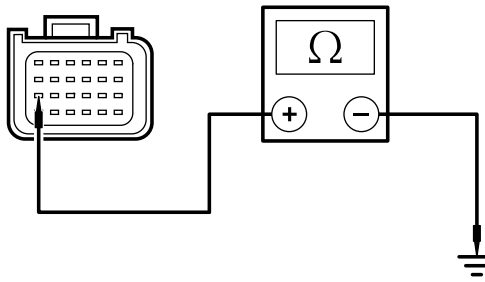
PINPOINT TEST AC : DTC B1916: DRIVER AIR BAG SHORT TO BATTERY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AC1: CHECK THE DRIVER AIR BAG WIRING HARNESS FOR A SHORT TO BATTERY</p>	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect Driver Air Bag Module Simulator.</p> <p>3 Disconnect RCM C426.</p> <p>4 Ignition switch in position II.</p>
 <p>TIE0020913</p>	<p>5 Measure the voltage between the:</p> <ul style="list-style-type: none"> RCM C426 pin 3, circuit 15S-JA8 (GN/RD), harness side and ground. RCM C426 pin 4, circuit 91S-JA8 (BK/OG), harness side and ground. <ul style="list-style-type: none"> Is any voltage present? <p>→ Yes GO to AC2.</p> <p>→ No CONNECT the driver air bag module simulator and the RCM C426. REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>
<p>AC2: CHECK THE CLOCKSPRING FOR A SHORT TO BATTERY</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Clockspring C896.</p>

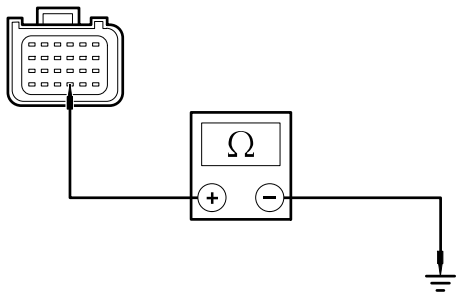
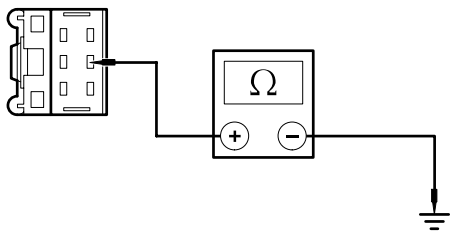
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0020913</p>	<p>3 Ignition switch in position II.</p>
	<p>4 Measure the voltage between the:</p> <ul style="list-style-type: none"> RCM C426 pin 3, circuit 15S-JA8 (GN/RD) harness side and ground. RCM C426 pin 4, circuit 91S-JA8 (BK/OG) harness side and ground. <p>• Is any voltage present?</p> <p>→ Yes REPAIR circuit 15S-JA8 (GN/RD) or circuit 91S-JA8 (BK/OG) and circuit 15-JA10 (GN/OG). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No INSTALL a new clockspring. REFER to: Clockspring (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST AD : DTC B1921: AIR BAG DIAGNOSTIC MONITOR GROUND CIRCUIT OPEN

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AD1: CHECK THE RCM GROUND CIRCUIT - PASSENGER AIR BAG ACTIVATED</p>	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
<p>NOTE: CHECK that the PAD switch is in the air bag live position before carrying out this test.</p>	
 <p>E51216</p>	<p>1 Deactivate the SRS.</p>
	<p>2 Disconnect RCM C426.</p> <p>3 Measure the resistance between the RCM C426 pin 18, circuit 31S-JA31 (BK/WH), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? <p>→ Yes GO to AD2.</p> <p>→ No GO to AD3.</p>

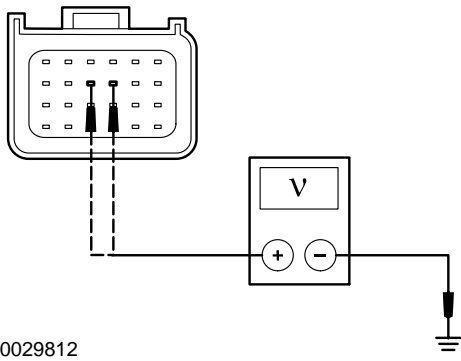
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AD2: CHECK THE RCM GROUND CIRCUIT - PASSENGER AIR BAG DE-ACTIVATED	
 <p>TIE0030702</p>	<ol style="list-style-type: none"> 1 Operate the PAD switch to the OFF position. 2 Measure the resistance between the RCM C426 pin 21, circuit 31S-JA47 (BK/OG), harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes VERIFY the customer concern. → No GO to AD3.
AD3: CHECK THE PAD SWITCH GROUND CIRCUIT	
 <p>TIE0030703</p>	<ol style="list-style-type: none"> 1 Disconnect PAD Switch C619. 2 Measure the resistance between the PAD Switch C619 pin 5, circuit 31-JA47 (BK), harness side and ground. <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? → Yes INSTALL a new PAD switch. REFER to: Passenger Air Bag Deactivation (PAD) Switch (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 31-JA47 (BK). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

PINPOINT TEST AE : DTC B1925: PASSENGER AIR BAG SHORT TO BATTERY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AE1: CHECK THE PASSENGER AIR BAG CIRCUIT FOR A SHORT TO BATTERY	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Disconnect Passenger Air Bag Module Simulator.

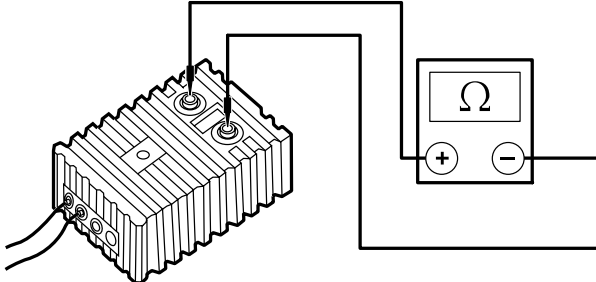
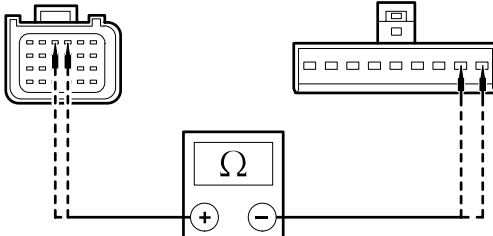
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Disconnect RCM C426.</p>
	<p>4 Ignition switch in position II.</p>
 <p>VUE0029812</p>	<p>5 Measure the voltage between the:</p> <ul style="list-style-type: none"> • RCM C426 pin 9, circuit 15S-JA31 (GN/WH) harness side and ground. • RCM C426 pin 10, circuit 91S-JA31 (BK/WH) harness side and ground. <p>• Is any voltage present?</p> <p>→ Yes REPAIR circuit 15S-JA31 (GN/WH) or circuit 91S-JA31 (BK/WH). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No CONNECT the passenger air bag module simulator and the RCM C426. REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST AF : DTC B1932: DRIVER AIR BAG OPEN CIRCUIT

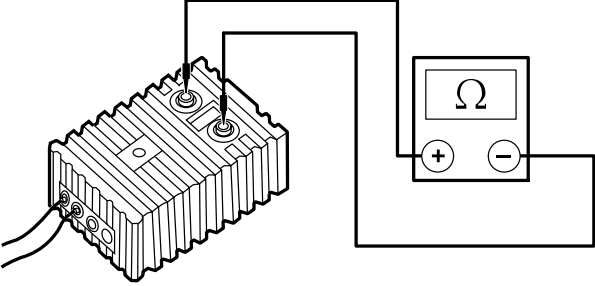
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AF1: CHECK THE DRIVER AIR BAG CIRCUIT RESISTANCE</p>	
<p>WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Ignition switch in position II.</p> <p>3 Carry out the self-test with the simulators installed.</p> <p>• Does the system prove out correctly?</p> <p>→ Yes GO to AF2.</p> <p>→ No GO to AF3.</p>
<p>AF2: CHECK THE DRIVER AIR BAG MODULE SQUIB RESISTANCE</p>	
<p>WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
	<p>1 Connect the test and deployment lead to the driver air bag module.</p> <p>2 Select DMM specific on WDS.</p>

DIAGNOSIS AND TESTING

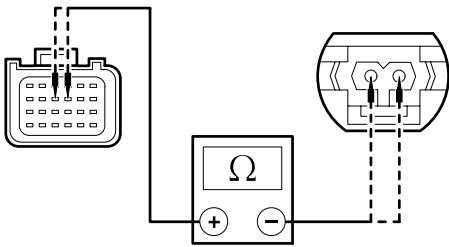
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE39388</p>	<p>3 Connect the test and deployment lead to WDS.</p> <p>4 Measure the resistance of the driver air bag module squib.</p> <ul style="list-style-type: none"> Is the resistance between 2 and 3 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No INSTALL a new driver air bag module.</p> <p>REFER to: Driver Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>
<p>AF3: CHECK THE CLOCKSRING FOR OPEN CIRCUIT OR HIGH RESISTANCE</p>	
 <p>TIE0036499</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect RCM C426.</p> <p>3 Disconnect Clockspring C896.</p> <p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C426 pin 3, circuit 15S-JA8 (GN/RD), harness side and the clockspring C896 pin 1, circuit 15S-JA8 (GN/RD), harness side. RCM C426 pin 4, circuit 91S-JA8 (BK/OG), harness side and the clockspring C896 pin 2, circuit 91S-JA8 (BK/OG), harness side. <ul style="list-style-type: none"> Are the resistances less than 5 ohms? <p>→ Yes Install a new clockspring.</p> <p>REFER to: Clockspring (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 15S-JA8 (GN/RD) or circuit 91S-JA8 (BK/OG). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST AG : DTC B1933: PASSENGER AIR BAG OPEN CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AG1: CHECK THE PASSENGER AIR BAG CIRCUIT RESISTANCE	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Ignition switch in position II. 3 Carry out the self-test with the simulators installed. <ul style="list-style-type: none"> • Does the system prove out correctly? → Yes GO to AG2. → No GO to AG3.
AG2: CHECK THE PASSENGER AIR BAG MODULE SQUIB RESISTANCE	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Connect the test and deployment lead to the passenger air bag module. 2 Select DMM specific on WDS. 3 Connect the test and deployment lead to WDS.
 <p>TIE39388</p>	<ol style="list-style-type: none"> 4 Measure the resistance of the passenger air bag module squib. <ul style="list-style-type: none"> • Is the resistance between 2 and 3 ohms? → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No INSTALL a new passenger air bag module. REFER to: Passenger Air Bag Module - 3-Door (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
AG3: CHECK THE PASSENGER AIR BAG WIRING HARNESS FOR OPEN CIRCUIT OR HIGH RESISTANCE	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect RCM C426.

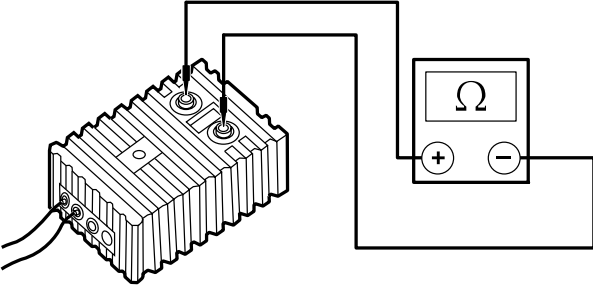
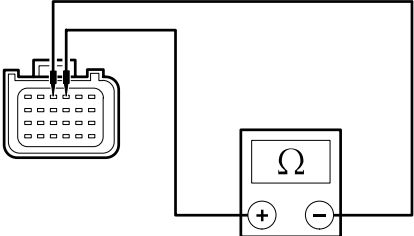
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Disconnect Passenger Air Bag Module Simulator.</p>
 <p>TIE0036500</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> • RCM C426 pin 9, circuit 15S-JA31 (GN/WH), harness side and the passenger air bag module C425 pin 1, circuit 15S-JA31 (GN/WH), harness side. • RCM C426 pin 10, circuit 91S-JA31 (BK/WH), harness side and the passenger air bag module C425 pin 2, circuit 91S-JA31 (BK/WH), harness side. <p>• Are the resistances less than 5 ohms?</p> <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 15S-JA31 (GN/WH) or circuit 91S-JA31 (BK/WH). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST AH : DTC B1934: DRIVER AIR BAG CIRCUIT LOW RESISTANCE

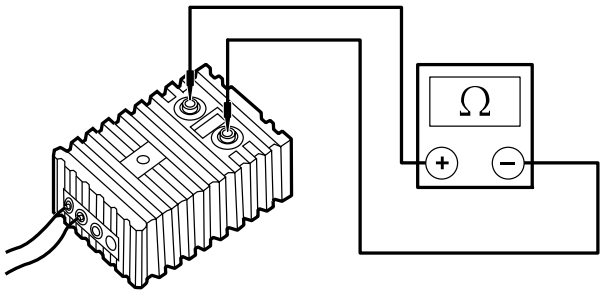
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AH1: CHECK THE DRIVER AIR BAG CIRCUIT RESISTANCE</p>	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Ignition switch in position II.</p> <p>3 Carry out the self-test with the simulators installed.</p> <ul style="list-style-type: none"> • Does the system prove out correctly? <p>→ Yes GO to AH2.</p> <p>→ No GO to AH3.</p>
<p>AH2: CHECK THE DRIVER AIR BAG MODULE SQUIB RESISTANCE</p>	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
	<p>1 Connect the test and deployment lead to the driver air bag module.</p>

DIAGNOSIS AND TESTING

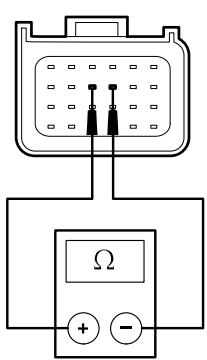
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Select DMM specific on WDS.</p> <p>3 Connect the test and deployment lead to WDS.</p>
 <p>TIE39388</p>	<p>4 Measure the resistance of the driver air bag module squib.</p> <ul style="list-style-type: none"> • Is the resistance between 2 and 3 ohms? → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No INSTALL a new driver air bag module. <p>REFER to: Driver Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>
<p>AH3: CHECK THE CLOCKSPRING FOR LOW RESISTANCE</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect RCM C426.</p> <p>3 Disconnect Clockspring C896.</p>
 <p>TIE0020915</p>	<p>4 Measure the resistance between the RCM C426 pin 3, circuit 15S-JA8 (GN/RD), harness side and the RCM C426 pin 4, circuit 91S-JA8 (BK/OG), harness side.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? → Yes INSTALL a new clockspring. REFER to: Clockspring (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 15S-JA8 (GN/RD) and circuit 91S-JA8 (BK/OG). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

DIAGNOSIS AND TESTING

PINPOINT TEST AI : DTC B1935: PASSENGER AIR BAG CIRCUIT LOW RESISTANCE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AI1: CHECK THE PASSENGER AIR BAG CIRCUIT RESISTANCE	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Ignition switch in position II. 3 Carry out the self-test with the simulators installed. <ul style="list-style-type: none"> • Does the system prove out correctly? → Yes GO to AI2. → No GO to AI3.
AI2: CHECK THE PASSENGER AIR BAG MODULE SQUIB RESISTANCE	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Connect the test and deployment lead to the passenger air bag module. 2 Select DMM specific on WDS. 3 Connect the test and deployment lead to WDS.
 <p>TIE39388</p>	<ol style="list-style-type: none"> 4 Measure the resistance of the passenger air bag module squib. <ul style="list-style-type: none"> • Is the resistance between 2 and 3 ohms? → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No INSTALL a new passenger air bag module. REFER to: Passenger Air Bag Module - 3-Door (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
AI3: CHECK THE PASSENGER AIR BAG CIRCUIT FOR LOW RESISTANCE	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Passenger Air Bag Module Simulator.

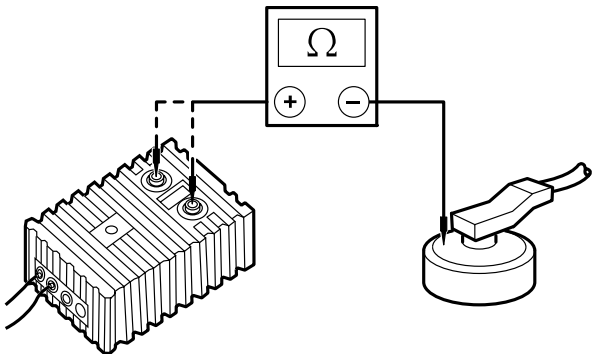
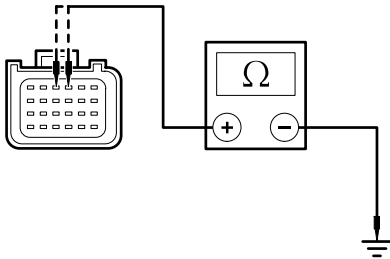
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>VUE0029823</p>	<p>3 Disconnect RCM C426.</p>
	<p>4 Measure the resistance between the RCM C426 pin 9, circuit 15S-JA31 (GN/WH), harness side and the RCM C426 pin 10, circuit 91S-JA31 (BK/WH), harness side.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 15S-JA31 (GN/WH) and circuit 91S-JA31 (BK/WH). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

PINPOINT TEST AJ : DTC B1936: DRIVER AIR BAG CIRCUIT SHORT TO GROUND

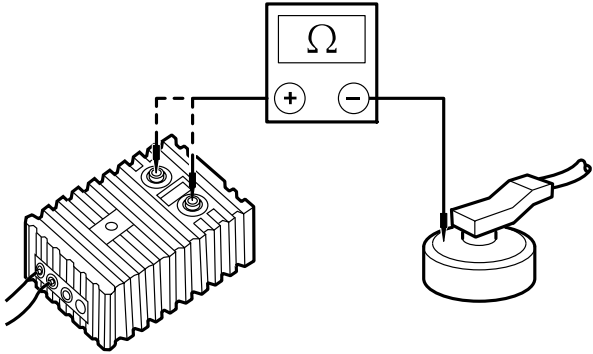
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AJ1: CHECK THE DRIVER AIR BAG CIRCUIT</p>	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p>
	<p>2 Ignition switch in position II.</p>
	<p>3 Carry out the self-test with the simulators installed.</p> <ul style="list-style-type: none"> • Does the system prove out correctly? → Yes GO to AJ2. → No GO to AJ3.
<p>AJ2: CHECK THE DRIVER AIR BAG MODULE</p>	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
	<p>1 Connect the test and deployment lead to the driver air bag module.</p>
	<p>2 Select DMM specific on WDS.</p>
	<p>3 Connect the test and deployment lead to WDS.</p>

DIAGNOSIS AND TESTING

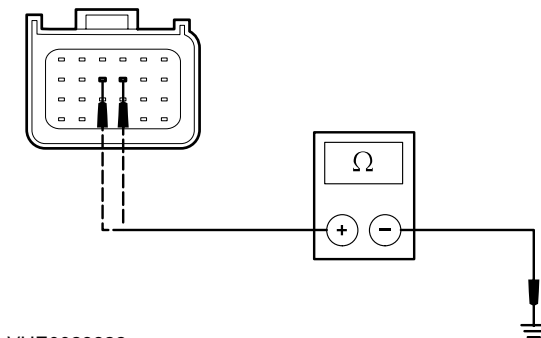
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>E39389</p>	<p>4 Measure the resistance between each of the terminals and the air bag module casing.</p> <ul style="list-style-type: none"> Are the resistances greater than 10,000 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No INSTALL a new driver air bag module.</p> <p>REFER to: Driver Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>
<p>AJ3: CHECK THE CLOCKSPRING FOR A SHORT TO GROUND</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect RCM C426.</p>
	<p>3 Disconnect Clockspring C896.</p>
 <p>TIE0020912</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C426 pin 3, circuit 15S-JA8 (GN/RD), harness side and ground. RCM C426 pin 4, circuit 91S-JA8 (BK/OG), harness side and ground. <ul style="list-style-type: none"> Are the resistances greater than 10,000 ohms? <p>→ Yes INSTALL a new clockspring.</p> <p>REFER to: Clockspring (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 15S-JA8 (GN/RD) or circuit 91S-JA8 (BK/OG). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST AK : DTC B1938: PASSENGER AIR BAG CIRCUIT SHORT TO GROUND

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AK1: CHECK THE PASSENGER AIR BAG CIRCUIT RESISTANCE	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Ignition switch in position II. 3 Carry out the self-test with the simulators installed. <ul style="list-style-type: none"> • Does the system prove out correctly? → Yes GO to AK2. → No GO to AK3.
AK2: CHECK THE PASSENGER AIR BAG MODULE	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
 <p>E39389</p>	<ol style="list-style-type: none"> 1 Connect the test and deployment lead to the passenger air bag module. 2 Select DMM specific on WDS. 3 Connect the test and deployment lead to WDS. 4 Measure the resistance between each of the terminals and the passenger air bag module casing. <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No INSTALL a new passenger air bag module. REFER to: Passenger Air Bag Module - 3-Door (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
AK3: CHECK THE PASSENGER AIR BAG MODULE WIRING HARNESS FOR A SHORT TO GROUND	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect RCM C426.

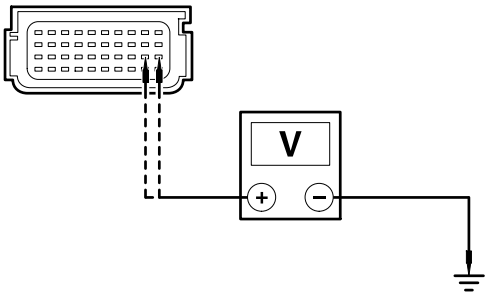
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Disconnect Passenger Air Bag Module Simulator.</p>
 <p>VUE0029822</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> • RCM C426 pin 9, circuit 15S-JA31 (GN/WH), harness side and ground. • RCM C426 pin 10, circuit 91S-JA31 (BK/WH), harness side and ground. <p>• Are the resistances greater than 10,000 ohms?</p> <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 15S-JA31 (GN/WH) or circuit 91S-JA31 (BK/WH). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST AL : DTC B1992: DRIVER SIDE AIR BAG CIRCUIT SHORT TO BATTERY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AL1: CHECK THE DRIVER SIDE AIR BAG CIRCUIT</p>	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Ignition switch in position II.</p> <p>3 Carry out the self-test with the simulators installed.</p> <p>• Does the system prove out correctly?</p> <p>→ Yes INSTALL a new driver side air bag module. REFER to: Side Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No GO to AL2.</p>
<p>AL2: CHECK THE DRIVER SIDE AIR BAG CIRCUIT FOR A SHORT TO BATTERY</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect RCM C429.</p>

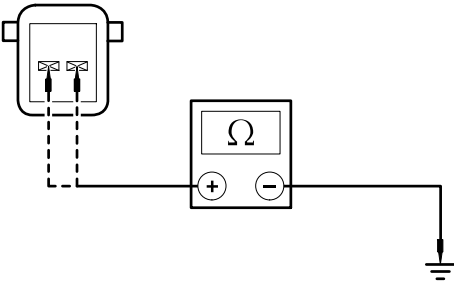
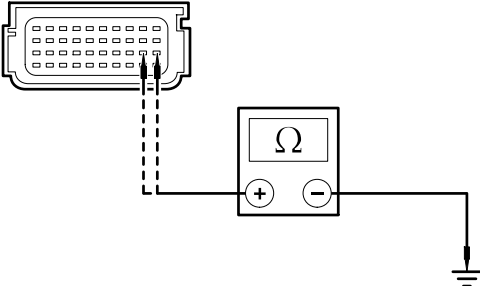
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Disconnect Driver Side Underseat Occupant Restraint Systems Simulator.</p> <p>4 Ignition switch in position II.</p>
 <p>TIE0022427</p>	<p>5 Measure the voltage between the:</p> <ul style="list-style-type: none"> RCM C429 pin 19, circuit 91S-JA37 (BK/GN), harness side and ground. RCM C429 pin 20, circuit 15S-JA37 (GN/BK), harness side and ground. <p>• Is any voltage present?</p> <p>→ Yes REPAIR circuit 15S-JA37 (GN/BK) or circuit 91S-JA37 (BK/GN). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST AM : DTC B1993: DRIVER SIDE AIR BAG CIRCUIT SHORT TO GROUND.

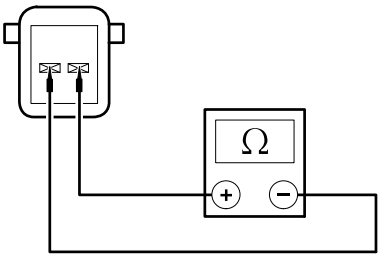
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AM1: CHECK THE DRIVER SIDE AIR BAG CIRCUIT</p>	
<p>WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Ignition switch in position II.</p> <p>3 Carry out the self-test with the simulators installed.</p> <p>• Does the system prove out correctly?</p> <p>→ Yes GO to AM2.</p> <p>→ No GO to AM3.</p>
<p>AM2: CHECK THE DRIVER SIDE AIR BAG MODULE</p>	
<p>WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Select DMM specific on WDS.</p>

DIAGNOSIS AND TESTING

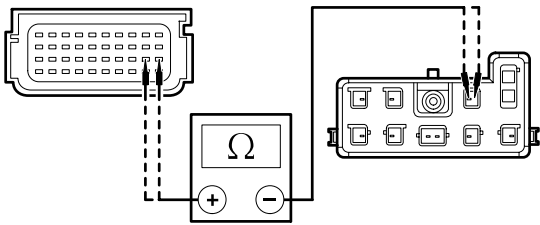
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0020905</p>	<p>3 Measure the resistance between the:</p> <ul style="list-style-type: none"> • Driver side air bag module underseat connector C331 pin 1, circuit 15S-JA37 (GN/BK) component side and ground. • Driver side air bag module underseat connector C331 pin 2, circuit 91S-JA37 (BK/GN) component side and ground. <p>• Are the resistances greater than 10,000 ohms?</p> <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No INSTALL a new driver side air bag module. REFER to: Side Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>
<p>AM3: CHECK THE DRIVER SIDE AIR BAG CIRCUIT FOR A SHORT TO GROUND.</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect RCM C429.</p> <p>3 Disconnect Driver Side Underseat Occupant Restraint Systems Simulator.</p>
 <p>TIE0022428</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> • RCM C429 pin 19, circuit 91S-JA37 (BK/GN), harness side and ground. • RCM C429 pin 20, circuit 15S-JA37 (GN/BK), harness side and ground. <p>• Are the resistances greater than 10,000 ohms?</p> <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 15S-JA37 (GN/BK) or circuit 91S-JA37 (BK/GN). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST AN : DTC B1994: DRIVER SIDE AIR BAG CIRCUIT OPEN CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AN1: CHECK THE DRIVER SIDE AIR BAG CIRCUIT	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Ignition switch in position II. 3 Carry out the self-test with the simulators installed. <ul style="list-style-type: none"> • Does the system prove out correctly? → Yes GO to AN2. → No GO to AN3.
AN2: CHECK THE DRIVER SIDE AIR BAG MODULE	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
 <p>TIE0020909</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Select DMM specific on WDS. 3 Measure the resistance between the driver side air bag module underseat connector C331 pin 1, circuit 15S-JA37 (GN/BK), component side and the driver side air bag module underseat connector C331 pin 2, circuit 91S-JA37 (BK/GN), component side. <ul style="list-style-type: none"> • Is the resistance between 2 and 3 ohms? → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No INSTALL a new driver side air bag module. REFER to: Side Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
AN3: CHECK THE DRIVER SIDE AIR BAG FOR OPEN CIRCUIT OR HIGH RESISTANCE	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect RCM C429.

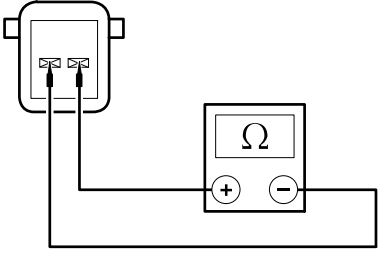
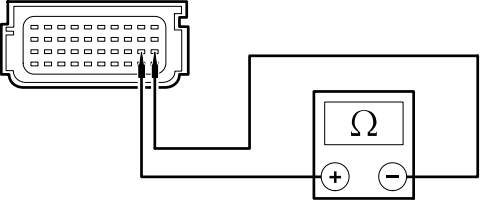
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>3 Disconnect Driver Side Underseat Occupant Restraint Systems Simulator.</p>
 <p>TIE0036501</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> • RCM C429 pin 19, circuit 91S-JA37 (BK/GN), harness side and the driver side underseat occupant restraint systems connector C30 pin 6, circuit 91S-JA37 (BK/GN), harness side. • RCM C429 pin 20, circuit 15S-JA37 (GN/BK), harness side and the driver side underseat occupant restraint systems connector C30 pin 5, circuit 15S-JA37 (GN/BK), harness side. <p>• Are the resistances less than 5 ohms?</p> <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 15S-JA37 (GN/BK) or circuit 91S-JA37 (BK/GN). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST AO : DTC B1995: DRIVER SIDE AIR BAG CIRCUIT LOW RESISTANCE

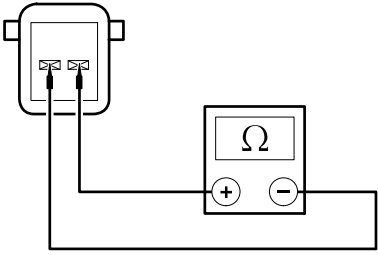
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AO1: CHECK THE DRIVER SIDE AIR BAG CIRCUIT</p>	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Ignition switch in position II.</p> <p>3 Carry out the self-test with the simulators installed.</p> <ul style="list-style-type: none"> • Does the system prove out correctly? <p>→ Yes GO to AO2.</p> <p>→ No GO to AO3.</p>
<p>AO2: CHECK THE DRIVER SIDE AIR BAG MODULE</p>	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
	<p>1 Ignition switch in position 0.</p>

DIAGNOSIS AND TESTING

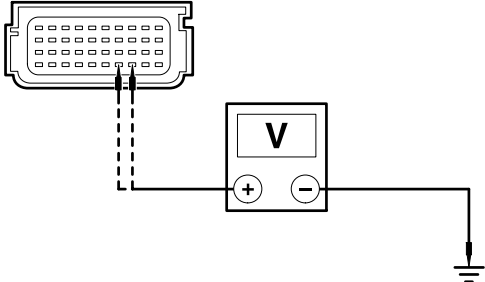
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0020909</p>	<p>2 Select DMM specific on WDS.</p> <p>3 Measure the resistance between the driver side air bag module underseat connector C331 pin 1, circuit 15S-JA37 (GN/BK), component side and the driver side air bag module underseat connector C331 pin 2, circuit 91S-JA37 (BK/GN), component side.</p> <ul style="list-style-type: none"> Is the resistance between 2 and 3 ohms? <ul style="list-style-type: none"> → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No INSTALL a new driver side air bag module. REFER to: Side Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
<p>AO3: CHECK THE DRIVER SIDE AIR BAG CIRCUIT FOR LOW RESISTANCE</p>	
 <p>TIE0036502</p>	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect RCM C429.</p> <p>3 Disconnect Driver Side Underseat Occupant Restraint Systems Simulator.</p> <p>4 Measure the resistance between the RCM C429 pin 19, circuit 91S-JA37 (BK/GN), harness side and the RCM C429 pin 20, circuit 15S-JA37 (GN/BK), harness side.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? <ul style="list-style-type: none"> → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 15S-JA37 (GN/BK) and circuit 91S-JA37 (BK/GN). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

DIAGNOSIS AND TESTING

PINPOINT TEST AP : DTC B1996: PASSENGER SIDE AIR BAG CIRCUIT SHORT TO BATTERY.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AP1: CHECK THE PASSENGER SIDE AIR BAG CIRCUIT	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Ignition switch in position II. 3 Carry out the self-test with simulators installed. <ul style="list-style-type: none"> • Does the system prove out correctly? <ul style="list-style-type: none"> → Yes GO to AP2. → No GO to AP3.
AP2: CHECK THE PASSENGER SIDE AIR BAG MODULE	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
 <p>TIE0020909</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Select DMM specific on WDS. 3 Measure the resistance between the passenger side air bag module underseat connector C341 pin 1, circuit 15S-JA38 (GN/OG), component side and the passenger side air bag module underseat connector C341 pin 2, circuit 91S-JA38 (BK/RD), component side. <ul style="list-style-type: none"> • Is the resistance between 2 and 3 ohms? <ul style="list-style-type: none"> → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No INSTALL a new passenger side air bag module. REFER to: Side Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
AP3: CHECK THE PASSENGER SIDE AIR BAG CIRCUIT FOR A SHORT TO BATTERY	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

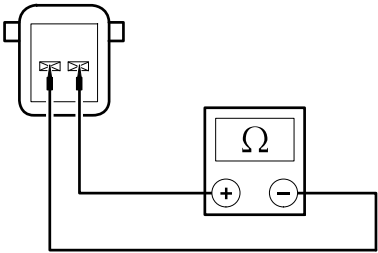
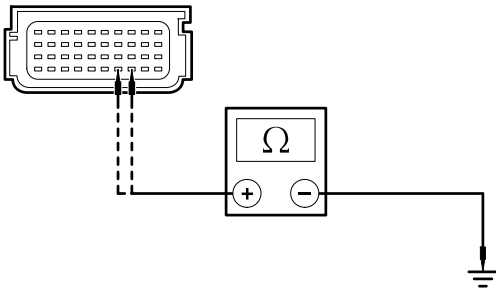
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect RCM C429.</p>
	<p>3 Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator.</p>
	<p>4 Ignition switch in position II.</p>
 <p>TIE0036503</p>	<p>5 Measure the voltage between the:</p> <ul style="list-style-type: none"> RCM C429 pin 7, circuit 15S-JA38 (GN/OG), harness side and ground. RCM C429 pin 8, circuit 91S-JA38 (BK/RD), harness side and ground. <ul style="list-style-type: none"> Is any voltage present? <p>→ Yes REPAIR circuit 15S-JA38 (GN/OG) or circuit 91S-JA38 (BK/RD). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>
	<p>→ No REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST AQ : DTC B1997: PASSENGER SIDE AIR BAG CIRCUIT SHORT TO GROUND

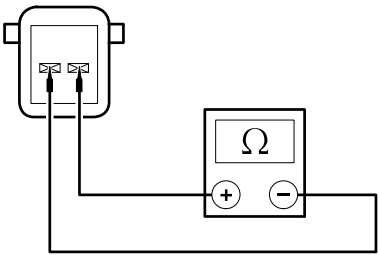
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AQ1: CHECK THE PASSENGER SIDE AIR BAG CIRCUIT</p>	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Ignition switch in position II.</p> <p>3 Carry out the self-test with simulators installed.</p> <ul style="list-style-type: none"> Does the system prove out correctly? <p>→ Yes GO to AQ2.</p> <p>→ No GO to AQ3.</p>
<p>AQ2: CHECK THE PASSENGER SIDE AIR BAG MODULE</p>	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Select DMM specific on WDS.</p>

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0020909</p>	<p>3 Measure the resistance between the passenger side air bag module underseat connector C341 pin 1, circuit 15S-JA38 (GN/OG), component side and the passenger side air bag module underseat connector C341 pin 2, circuit 91S-JA38 (BK/RD), component side.</p> <ul style="list-style-type: none"> Is the resistance between 2 and 3 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No INSTALL a new passenger side air bag module.</p> <p>REFER to: Side Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>
<p>AQ3: CHECK THE PASSENGER SIDE AIR BAG FOR A SHORT TO GROUND</p>	
	<p>1 Ignition switch in position 0.</p>
	<p>2 Disconnect RCM C429.</p>
	<p>3 Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator.</p>
 <p>TIE0036504</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C429 pin 7, circuit 15S-JA38 (GN/OG), harness side and ground. RCM C429 pin 8, circuit 91S-JA38 (BK/RD), harness side and ground. <ul style="list-style-type: none"> Are the resistances greater than 10,000 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 15S-JA38 (GN/OG) or circuit 91S-JA38 (BK/RD). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST AR : DTC B1998: PASSENGER SIDE AIR BAG CIRCUIT OPEN CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AR1: CHECK THE PASSENGER SIDE AIR BAG CIRCUIT	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Ignition switch in position II. 3 Carry out the self-test with the simulators installed. <ul style="list-style-type: none"> • Does the system prove out correctly? → Yes GO to AR2. → No GO to AR3.
AR2: CHECK THE PASSENGER SIDE AIR BAG MODULE	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury</p>	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Select DMM specific on WDS.
 <p>TIE0020909</p>	<ol style="list-style-type: none"> 3 Measure the resistance between the passenger side air bag module underseat connector C341 pin 1, circuit 15S-JA38 (GN/OG), component side and the passenger side air bag module underseat connector C341 pin 2, circuit 91S-JA38 (BK/RD), component side. <ul style="list-style-type: none"> • Is the resistance between 2 and 3 ohms? → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No INSTALL a new passenger side air bag module. REFER to: Side Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
AR3: CHECK THE PASSENGER SIDE AIR BAG FOR OPEN CIRCUIT OR HIGH RESISTANCE	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0.

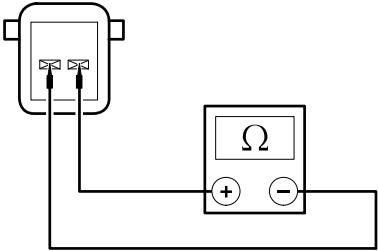
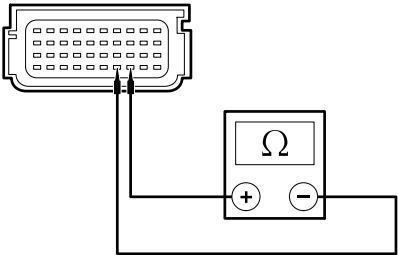
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Disconnect RCM C429.</p> <p>3 Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator.</p>
<p>TIE0036505</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C429 pin 7, circuit 15S-JA38 (GN/OG), harness side and the passenger side underseat occupant restraint systems electrical connector C31 pin 5, circuit 15S-JA38 (GN/OG), harness side. RCM C429 pin 8, circuit 91S-JA38 (BK/RD), harness side and the passenger side underseat occupant restraint systems electrical connector C31 pin 6, circuit 91S-JA38 (BK/RD), harness side.
	<ul style="list-style-type: none"> Are the resistances less than 5 ohms? <ul style="list-style-type: none"> → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 15S-JA38 (GN/OG) or circuit 91S-JA38 (BK/RD). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

PINPOINT TEST AS : DTC B1999: PASSENGER SIDE AIR BAG CIRCUIT LOW RESISTANCE

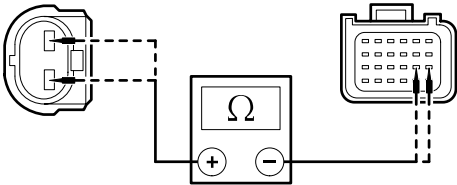
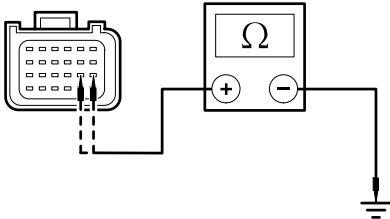
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AS1: CHECK THE PASSENGER SIDE AIR BAG CIRCUIT</p>	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Ignition switch in position II.</p> <p>3 Carry out the self-test with the simulators installed.</p> <ul style="list-style-type: none"> Does the system prove out correctly? <ul style="list-style-type: none"> → Yes GO to AS2. → No GO to AS3.

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AS2: CHECK THE PASSENGER SIDE AIR BAG MODULE	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
 <p>TIE0020909</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Select DMM specific on WDS. 3 Measure the resistance between the passenger side air bag module underseat connector C341 pin 1, circuit 15S-JA38 (GN/OG), component side and the passenger side air bag module underseat connector C341 pin 2, circuit 91S-JA38 (BK/RD), component side. <ul style="list-style-type: none"> • Is the resistance between 2 and 3 ohms? <ul style="list-style-type: none"> → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No INSTALL a new passenger side air bag module. REFER to: Side Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
AS3: CHECK THE PASSENGER SIDE AIR BAG FOR LOW RESISTANCE	
 <p>TIE0036506</p>	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect RCM C429. 3 Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator. 4 Measure the resistance between the RCM C429 pin 7, circuit 15S-JA38 (GN/OG), harness side and the RCM C429 pin 8, circuit 91S-JA38 (BK/RD), harness side. <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? <ul style="list-style-type: none"> → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 15S-JA38 (GN/OG) and circuit 91S-JA38 (BK/RD). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

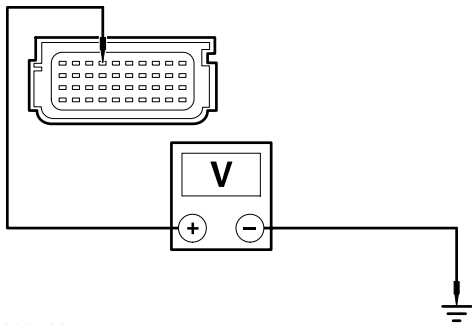
DIAGNOSIS AND TESTING

PINPOINT TEST AT : DTC B2227: FRONT CRASH SENSOR COMMUNICATIONS FAULT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AT1: CHECK THE CRASH SENSOR CIRCUIT	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
<p>1 Deactivate the SRS.</p> <p>2 Disconnect Crash Sensor C420.</p> <p>3 Disconnect RCM C426.</p>	
 <p>TIE0036507</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C426 pin 13, circuit 9-JA49 (BN), harness side and the crash sensor C420 pin 2, circuit 9-JA49 (BN), harness side. RCM C426 pin 14, circuit 8-JA49 (WH), harness side and the crash sensor C420 pin 1, circuit 8-JA49 (WH), harness side. <p>• Are the resistances less than 5 ohms?</p> <p>→ Yes GO to AT2.</p> <p>→ No REPAIR circuit 8-JA49 (WH) and circuit 9-JA49 (BN). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>
AT2: CHECK THE CRASH SENSOR FOR A SHORT TO GROUND	
 <p>TIE0020920</p>	<p>1 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C426 pin 13, circuit 9-JA49 (BN), harness side and ground. RCM C426 pin 14, circuit 8-JA49 (WH), harness side and ground. <p>• Are the resistances greater than 10,000 ohms?</p> <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 8-JA49 (WH) or circuit 9-JA49 (BN). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

DIAGNOSIS AND TESTING

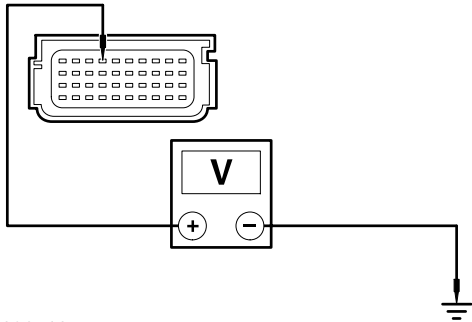
PINPOINT TEST AU : DTC B2433: DRIVER SAFETY BELT BUCKLE SWITCH CIRCUIT SHORT TO BATTERY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AU1: CHECK THE DRIVER SAFETY BELT BUCKLE SWITCH CIRCUIT FOR A SHORT TO BATTERY	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Disconnect RCM C429. 3 Disconnect Driver Side Underseat Occupant Restraint Systems Simulator. 4 Ignition switch in position II. 	
 <p>TIE0036510</p>	<ol style="list-style-type: none"> 5 Measure the voltage between the: <ul style="list-style-type: none"> * Vehicles built up to 11/2004 <ul style="list-style-type: none"> • RCM C429 pin 34, circuit 9-JA54 (BN), harness side and ground. * Vehicles built from 11/2004 <ul style="list-style-type: none"> • RCM C429 pin 34, circuit 9-JA10 (BN/YE), harness side and ground. • Is any voltage present? <ul style="list-style-type: none"> → Yes REPAIR circuit 9-JA10 (BN/YE) or circuit 9-JA54 (BN). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

PINPOINT TEST AV : DTC B2437: PASSENGER SAFETY BELT BUCKLE SWITCH CIRCUIT SHORT TO BATTERY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AV1: CHECK THE PASSENGER SAFETY BELT BUCKLE SWITCH CIRCUIT FOR A SHORT TO BATTERY	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Disconnect RCM C429. 3 Disconnect Passenger Side Underseat Occupant Restraint Systems Simulator. 	

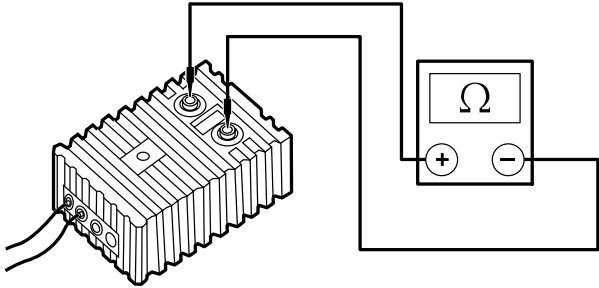
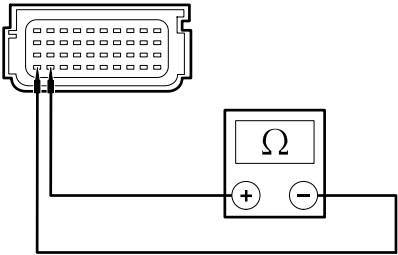
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0036510</p>	<p>4 Ignition switch in position II.</p> <p>5 Measure the voltage between the RCM C429 pin 34, circuit 9-JA10 (BN/YE), harness side and ground.</p> <ul style="list-style-type: none"> • Is any voltage present? → Yes REPAIR circuit 9-JA10 (BN/YE). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

PINPOINT TEST AW : DTC B2773: DRIVER SIDE AIR CURTAIN CIRCUIT LOW RESISTANCE

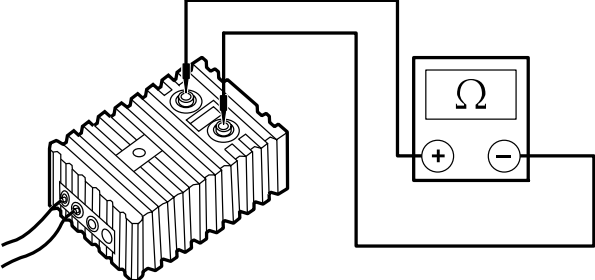
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AW1: CHECK THE DRIVER SIDE AIR CURTAIN MODULE CIRCUIT RESISTANCE	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Ignition switch in position II.</p> <p>3 Carry out the self-test with the simulators installed.</p> <ul style="list-style-type: none"> • Does the system prove out correctly? → Yes GO to AW2. → No GO to AW3.
AW2: CHECK THE DRIVER SIDE AIR CURTAIN MODULE SQUIB RESISTANCE	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
	<p>1 Connect the test and deployment lead to the driver side air curtain module.</p> <p>2 Select DMM specific on WDS.</p> <p>3 Connect the test and deployment lead to WDS.</p>

DIAGNOSIS AND TESTING

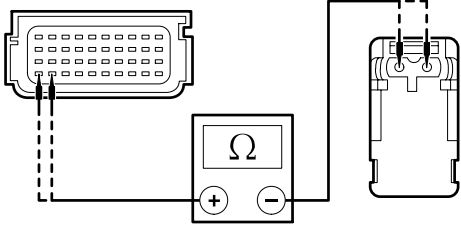
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE39388</p>	<p>4 Measure the resistance of the driver side air curtain module squib.</p> <ul style="list-style-type: none"> Is the resistance between 2 and 3 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No INSTALL a new driver side air curtain module. REFER to: (501-20 Supplemental Restraint System)</p> <p>Side Air Curtain Module - 3-Door/5-Door (Removal and Installation), Side Air Curtain Module - 4-Door (Removal and Installation), Side Air Curtain Module - Wagon (Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>
<p>AW3: CHECK THE DRIVER SIDE AIR CURTAIN WIRING HARNESS FOR LOW RESISTANCE</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect Driver Side Air Curtain Module Simulator.</p> <p>3 Disconnect RCM C429.</p>
 <p>TIE0020884</p>	<p>4 Measure the resistance between the RCM C429 pin 1, circuit 91S-JA50 (BK/RD), harness side and the RCM C429 pin 2, circuit 15S-JA50 (GN/OG), harness side.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 15S-JA50 (GN/OG) and circuit 91S-JA50 (BK/RD). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST AX : DTC B2774: DRIVER SIDE AIR CURTAIN CIRCUIT OPEN CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AX1: CHECK THE DRIVER SIDE AIR CURTAIN CIRCUIT RESISTANCE</p>	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Ignition switch in position II. 3 Carry out the self-test with the simulators installed. <ul style="list-style-type: none"> • Does the system prove out correctly? → Yes GO to AX2. → No GO to AX3.
<p>AX2: CHECK THE DRIVER SIDE AIR CURTAIN MODULE SQUIB RESISTANCE</p>	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Connect the test and deployment lead to the driver side air curtain module. 2 Select DMM specific on WDS. 3 Connect the test and deployment lead to WDS.
 <p>TIE39388</p>	<ol style="list-style-type: none"> 4 Measure the resistance of the driver side air curtain module squib. <ul style="list-style-type: none"> • Is the resistance between 2 and 3 ohms? → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No INSTALL a new driver side air curtain module. REFER to: (501-20 Supplemental Restraint System)
	<p>Side Air Curtain Module - 3-Door/5-Door (Removal and Installation), Side Air Curtain Module - 4-Door (Removal and Installation), Side Air Curtain Module - Wagon (Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

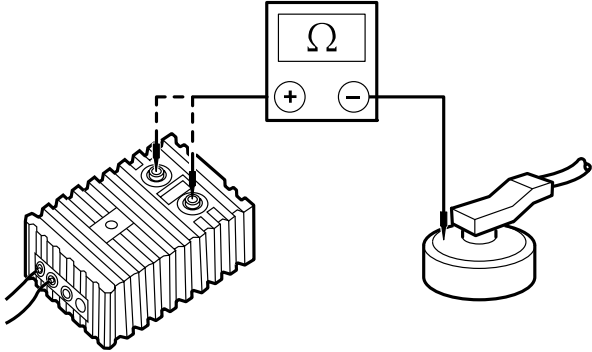
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AX3: CHECK THE DRIVER SIDE AIR CURTAIN WIRING HARNESS FOR OPEN CIRCUIT OR HIGH RESISTANCE	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect RCM C429. 3 Disconnect Driver Side Air Curtain Module Simulator.
 <p>TIE0036512</p>	<ol style="list-style-type: none"> 4 Measure the resistance between the: <ul style="list-style-type: none"> • RCM C429 pin 1, circuit 91S-JA50 (BK/RD), harness side and the driver side air curtain module C710 pin 2, circuit 91S-JA50 (BK/RD), harness side. • RCM C429 pin 2, circuit 15S-JA50 (GN/OG), harness side and the driver side air curtain module C710 pin 1, circuit 15S-JA50 (GN/OG), harness side. <ul style="list-style-type: none"> • Are the resistances less than 5 ohms? <ul style="list-style-type: none"> → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 15S-JA50 (GN/OG) or circuit 91S-JA50 (BK/RD). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

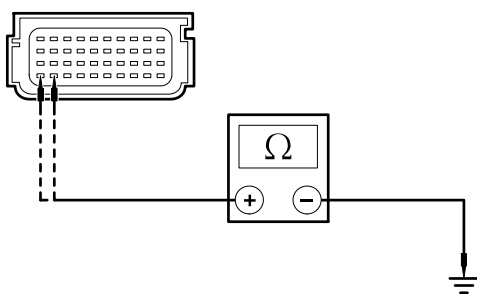
PINPOINT TEST AY : DTC B2775: DRIVER SIDE AIR CURTAIN CIRCUIT SHORT TO GROUND

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AY1: CHECK THE DRIVER SIDE AIR CURTAIN CIRCUIT	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Ignition switch in position II. 3 Carry out the self-test with the simulators installed. <ul style="list-style-type: none"> • Does the system prove out correctly? <ul style="list-style-type: none"> → Yes GO to AY2. → No GO to AY3.

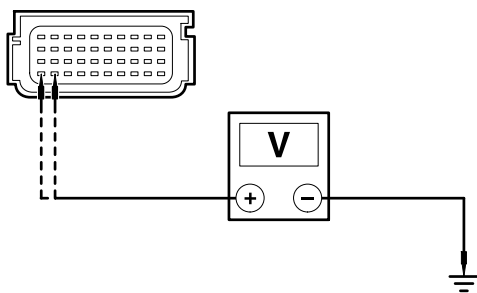
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
AY2: CHECK THE DRIVER SIDE AIR CURTAIN MODULE	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Connect the test and deployment lead to the driver side air curtain module. 2 Select DMM specific on WDS. 3 Connect the test and deployment lead to WDS.
 <p>E39389</p>	<ol style="list-style-type: none"> 4 Measure the resistance between each of the terminals and the side air curtain module casing. <ul style="list-style-type: none"> • Are the resistances greater than 10,000 ohms? <ul style="list-style-type: none"> → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No INSTALL a new driver side air curtain module. REFER to: (501-20 Supplemental Restraint System)
<p>Side Air Curtain Module - 3-Door/5-Door (Removal and Installation), Side Air Curtain Module - 4-Door (Removal and Installation), Side Air Curtain Module - Wagon (Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>	
AY3: CHECK THE DRIVER SIDE AIR CURTAIN WIRING HARNESS FOR A SHORT TO GROUND	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect RCM C429. 3 Disconnect Driver Side Air Curtain Module Simulator.

DIAGNOSIS AND TESTING

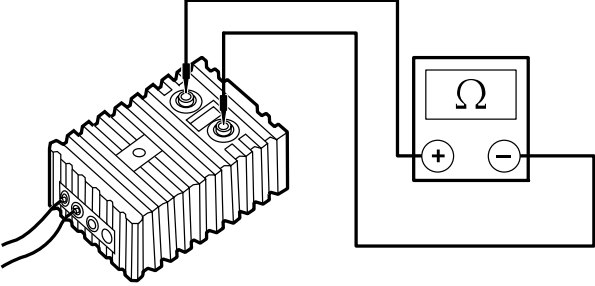
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0020907</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C429 pin 1, circuit 91S- JA50 (BK/RD), harness side and ground. RCM C429 pin 2, circuit 15S-JA50 (GN/OG), harness side and ground. <ul style="list-style-type: none"> Are the resistances greater than 10,000 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 15S-JA50 (GN/OG) or circuit 91S-JA50 (BK/RD). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST AZ : DTC B2776: DRIVER SIDE AIR CURTAIN CIRCUIT SHORT TO BATTERY

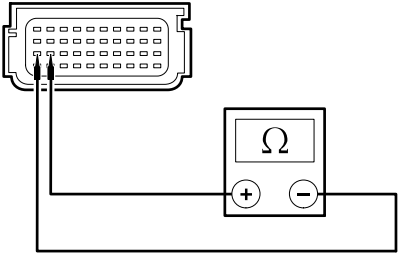
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>AZ1: CHECK THE DRIVER SIDE AIR CURTAIN WIRING HARNESS FOR A SHORT TO BATTERY OR IGNITION</p>	
<p>WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect Driver Side Air Curtain Module Simulator.</p> <p>3 Disconnect RCM C429.</p> <p>4 Ignition switch in position II.</p>
 <p>TIE0020904</p>	<p>5 Measure the voltage between the:</p> <ul style="list-style-type: none"> RCM C429 pin 1, circuit 91S- JA50 (BK/RD), harness side and ground. RCM C429 pin 2, circuit 15S-JA50 (GN/OG), harness side and ground. <ul style="list-style-type: none"> Is any voltage present? <p>→ Yes REPAIR circuit 15S-JA50 (GN/OG) or circuit 91S-JA50 (BK/RD). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No CONNECT the driver side air curtain module simulator and the RCM C429. REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST BA : DTC B2777: PASSENGER SIDE AIR CURTAIN CIRCUIT LOW RESISTANCE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
BA1: CHECK THE PASSENGER SIDE AIR CURTAIN MODULE CIRCUIT RESISTANCE	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Ignition switch in position II. 3 Carry out the self-test with the simulators installed. <ul style="list-style-type: none"> • Does the system prove out correctly? → Yes GO to BA2. → No GO to BA3.
BA2: CHECK THE PASSENGER SIDE AIR CURTAIN MODULE SQUIB RESISTANCE	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Connect the test and deployment lead to the passenger side air curtain module. 2 Select DMM specific on WDS. 3 Connect the test and deployment lead to WDS.
 <p>TIE39388</p>	<ol style="list-style-type: none"> 4 Measure the resistance of the passenger side air curtain module squib. <ul style="list-style-type: none"> • Is the resistance between 2 and 3 ohms? → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No INSTALL a new passenger side air curtain module. REFER to: (501-20 Supplemental Restraint System)
	<p>Side Air Curtain Module - 3-Door/5-Door (Removal and Installation), Side Air Curtain Module - 4-Door (Removal and Installation), Side Air Curtain Module - Wagon (Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

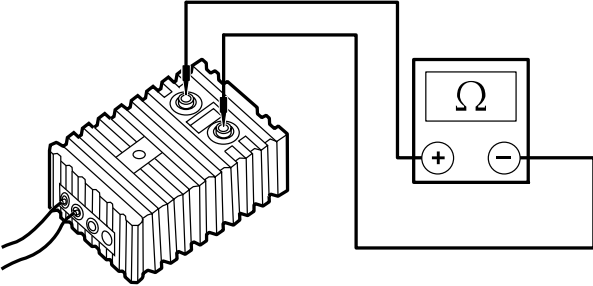
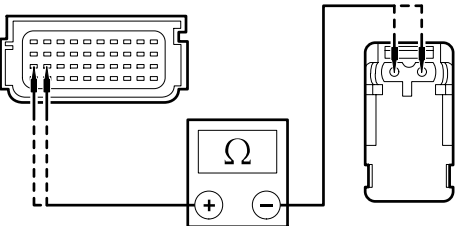
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
BA3: CHECK THE PASSENGER SIDE AIR CURTAIN WIRING HARNESS FOR LOW RESISTANCE	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect Passenger Side Air Curtain Module Simulator. 3 Disconnect RCM C429.
 <p>TIE0036513</p>	<ol style="list-style-type: none"> 4 Measure the resistance between the RCM C429 pin 11, circuit 91S-JA51 (BK/BU), harness side and the RCM C429 pin 12, circuit 15S-JA51 (GN/BU), harness side. <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? <ul style="list-style-type: none"> → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 15S-JA51 (GN/BU) and circuit 91S-JA51 (BK/BU). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

PINPOINT TEST BB : DTC B2778: PASSENGER SIDE AIR CURTAIN CIRCUIT OPEN CIRCUIT

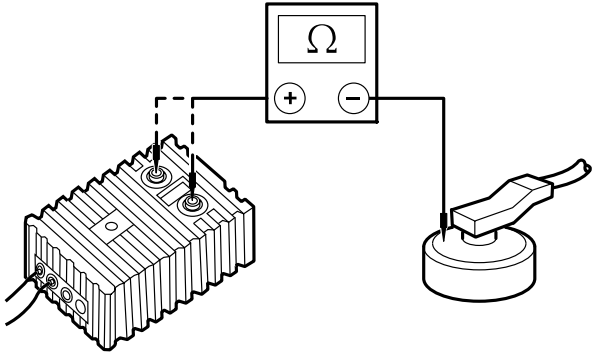
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
BB1: CHECK THE PASSENGER SIDE AIR CURTAIN CIRCUIT RESISTANCE	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Ignition switch in position II. 3 Carry out the self-test with the simulators installed. <ul style="list-style-type: none"> • Does the system prove out correctly? <ul style="list-style-type: none"> → Yes GO to BB2. → No GO to BB3.
BB2: CHECK THE PASSENGER SIDE AIR CURTAIN MODULE SQUIB RESISTANCE	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Connect the test and deployment lead to the passenger side air curtain module.

DIAGNOSIS AND TESTING

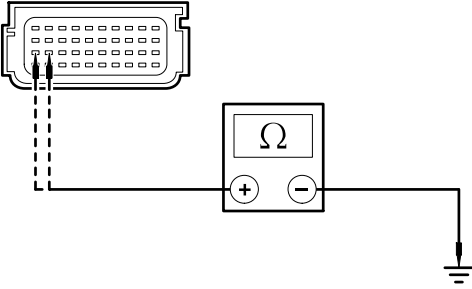
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	<p>2 Select DMM specific on WDS.</p> <p>3 Connect the test and deployment lead to WDS.</p>
 <p>TIE39388</p>	<p>4 Measure the resistance of the passenger side air curtain module squib.</p> <ul style="list-style-type: none"> Is the resistance between 2 and 3 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No INSTALL a new passenger side air curtain module. REFER to: (501-20 Supplemental Restraint System)</p> <p>Side Air Curtain Module - 3-Door/5-Door (Removal and Installation), Side Air Curtain Module - 4-Door (Removal and Installation), Side Air Curtain Module - Wagon (Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>
<p>BB3: CHECK THE PASSENGER SIDE AIR CURTAIN WIRING HARNESS FOR OPEN CIRCUIT OR HIGH RESISTANCE</p>	
	<p>1 Ignition switch in position 0.</p> <p>2 Disconnect RCM C429.</p> <p>3 Disconnect Passenger Side Air Curtain Module Simulator.</p>
 <p>TIE0036514</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C429 pin 11, circuit 91S-JA51 (BK/BU), harness side and the passenger side air curtain module C711 pin 2, circuit 91S-JA51 (BK/BU), harness side. RCM C429 pin 12, circuit 15S-JA51 (GN/BU), harness side and the passenger side air curtain module C711 pin 1, circuit 15S-JA51 (GN/BU), harness side. <ul style="list-style-type: none"> Are the resistances less than 5 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 15S-JA51 (GN/BU) or circuit 91S-JA51 (BK/BU). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST BC : DTC B2779: PASSENGER SIDE AIR CURTAIN CIRCUIT SHORT TO GROUND

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
BC1: CHECK THE PASSENGER SIDE AIR CURTAIN CIRCUIT	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Ignition switch in position II. 3 Carry out the self-test with the simulators installed. <ul style="list-style-type: none"> • Does the system prove out correctly? → Yes GO to BC2. → No GO to BC3.
BC2: CHECK THE PASSENGER SIDE AIR CURTAIN MODULE	
<p>▲ WARNING: Do not proceed with this test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Connect the test and deployment lead to the passenger side air curtain module. 2 Select DMM specific on WDS. 3 Connect the test and deployment lead to WDS.
 <p>E39389</p>	<ol style="list-style-type: none"> 4 Measure the resistance between each of the terminals and the passenger side air curtain module casing. <ul style="list-style-type: none"> • Are the resistances greater than 10,000 ohms? → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No INSTALL a new passenger side air curtain module. REFER to: (501-20 Supplemental Restraint System)
	<p>Side Air Curtain Module - 3-Door/5-Door (Removal and Installation), Side Air Curtain Module - 4-Door (Removal and Installation), Side Air Curtain Module - Wagon (Removal and Installation). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

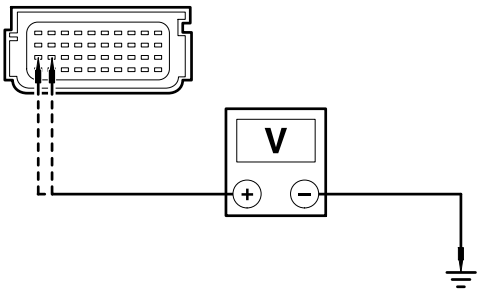
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
BC3: CHECK THE PASSENGER SIDE AIR CURTAIN WIRING HARNESS FOR A SHORT TO GROUND	
	<ol style="list-style-type: none"> 1 Ignition switch in position 0. 2 Disconnect RCM C429. 3 Disconnect Passenger Side Air Curtain Module Simulator.
 <p>TIE0036515</p>	<ol style="list-style-type: none"> 4 Measure the resistance between the: <ul style="list-style-type: none"> • RCM C429 pin 11, circuit 91S- JA51 (BK/BU), harness side and ground. • RCM C429 pin 12, circuit 15S-JA51 (GN/BU), harness side and ground. <ul style="list-style-type: none"> • Are the resistances greater than 10,000 ohms? <ul style="list-style-type: none"> → Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → No REPAIR circuit 15S-JA51 (GN/BU) or circuit 91S-JA51 (BK/BU). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

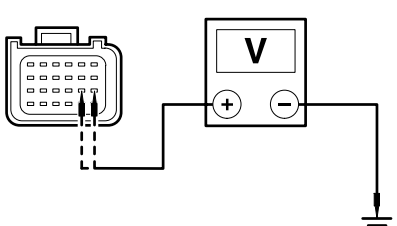
PINPOINT TEST BD : DTC B2780: PASSENGER SIDE AIR CURTAIN CIRCUIT SHORT TO BATTERY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
BD1: CHECK THE PASSENGER SIDE AIR CURTAIN WIRING HARNESS FOR A SHORT TO BATTERY OR IGNITION	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<ol style="list-style-type: none"> 1 Deactivate the SRS. 2 Disconnect Passenger Side Air Curtain Module Simulator. 3 Disconnect RCM C429. 4 Ignition switch in position II.

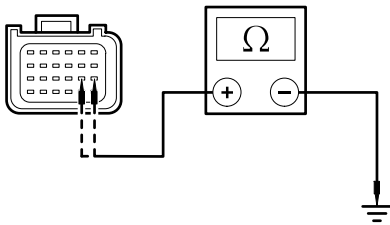
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 <p>TIE0036516</p>	<p>5 Measure the voltage between the:</p> <ul style="list-style-type: none"> RCM C429 pin 11, circuit 91S- JA51 (BK/BU), harness side and ground. RCM C429 pin 12, circuit 15S-JA51 (GN/BU), harness side and ground. <p>• Is any voltage present?</p> <p>→ Yes REPAIR circuit 15S-JA51 (GN/BU) or circuit 91S-JA51 (BK/BU). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No CONNECT the passenger side air curtain module simulator and the RCM C429. REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

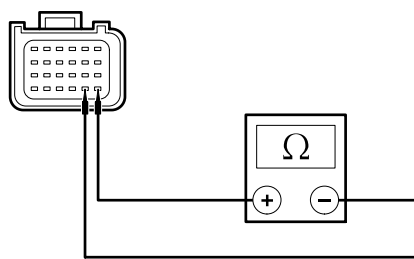
PINPOINT TEST BE : DTC B2855: FRONT CRASH SENSOR CIRCUIT SHORT TO BATTERY OR GROUND

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>BE1: CHECK THE CRASH SENSOR FOR A SHORT TO BATTERY</p>	
<p>WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect Crash Sensor C420.</p> <p>3 Disconnect RCM C426.</p> <p>4 Ignition switch in position II.</p>
 <p>TIE0020921</p>	<p>5 Measure the voltage between the:</p> <ul style="list-style-type: none"> RCM C426 pin 13, circuit 9-JA49 (BN), harness side and ground. RCM C426 pin 14, circuit 8-JA49 (WH), harness side and ground. <p>• Is any voltage present?</p> <p>→ Yes REPAIR circuit 8-JA49 (WH) or circuit 9-JA49 (BN) and circuit 15-JA10 (GN/OG). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No GO to BE2.</p>

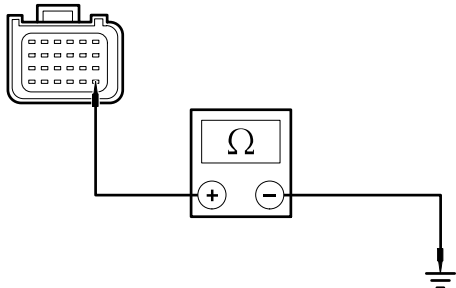
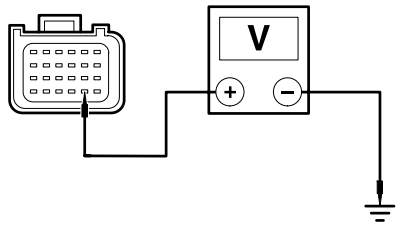
DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
BE2: CHECK THE CRASH SENSOR FOR A SHORT TO GROUND	
 <p>TIE0020920</p>	<p>1 Ignition switch in position 0.</p> <p>2 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C426 pin 13, circuit 9-JA49 (BN), harness side and ground. RCM C426 pin 14, circuit 8-JA49 (WH), harness side and ground. <ul style="list-style-type: none"> Are the resistances greater than 10,000 ohms? <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 8-JA49 (WH) or circuit 9-JA49 (BN). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST BF : DTC U0073: RESTRAINTS CONTROL MODULE COMMUNICATION BUS OFF

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
BF1: CHECK THE RCM COMMUNICATION BUS CIRCUIT FOR A SHORT CIRCUIT	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
 <p>TIE0037880</p>	<p>1 Deactivate the SRS.</p> <p>2 Disconnect RCM C426.</p> <p>3 Measure the resistance between the RCM C426 pin 19, circuit 4-EC10N (GY), harness side and the RCM C426 pin 20, circuit 5-EC10N (BU), harness side.</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? <p>→ Yes GO to BF2.</p> <p>→ No REPAIR circuits 4-EC10N (GY) and 5-EC10N (BU). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

DIAGNOSIS AND TESTING

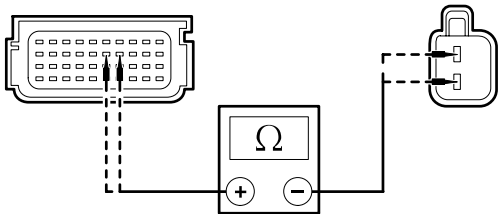
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
BF2: CHECK THE RCM COMMUNICATION BUS CIRCUIT FOR A SHORT TO GROUND	
 <p>TIE0020987</p>	<p>1 Measure the resistance between the RCM C426 pin 19, circuit 4-EC10N (GY), harness side and ground.</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? <p>→ Yes GO to BF3.</p> <p>→ No REPAIR circuit 4-EC10N (GY). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>
BF3: CHECK THE RCM COMMUNICATION BUS CIRCUIT FOR A SHORT CIRCUIT TO BATTERY OR IGNITION	
 <p>TIE0037881</p>	<p>1 Ignition switch in position II.</p> <p>2 Measure the voltage between the RCM C426 pin 20, circuit 5-EC10N (BU), harness side and ground.</p> <ul style="list-style-type: none"> • Is any voltage present? <p>→ Yes REPAIR circuit 5-EC10N (BU). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST BG : DTC U1900: CAN COMMUNICATION BUS FAULT

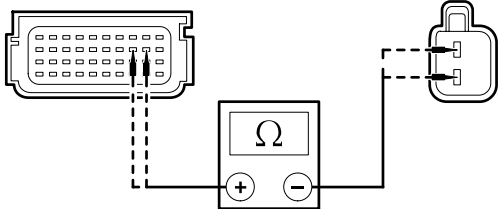
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
BG1: CHECK THE CAN BUS CIRCUIT	
	<p>1 Select an alternative system to address.</p> <ul style="list-style-type: none"> Is WDS able to communicate with the instrument cluster? <p>→ Yes REPAIR circuit 4-EC10N (GY) or circuit 5-EC10N (BU). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No CHECK the CAN bus.</p> <p>REFER to: Communications Network - 3-Door (418-00 Module Communications Network, Diagnosis and Testing). CLEAR the DTCs. REACTIVATE the system.</p>

PINPOINT TEST BH : DTC U2017: DRIVER SIDE IMPACT SENSOR COMMUNICATIONS FAULT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
BH1: CHECK THE DRIVER SIDE IMPACT SENSOR CIRCUIT	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect Driver Side Impact Sensor C427.</p> <p>3 Disconnect RCM C429.</p>
 <p>TIE0036518</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> RCM C429 pin 26, circuit 8-JA39 (WH), harness side and the driver side impact sensor C427 pin 1, circuit 8-JA39 (WH), harness side. RCM C429 pin 27, circuit 9-JA39 (BN), harness side and the driver side impact sensor C427 pin 2, circuit 9-JA39 (BN), harness side. <p>• Are the resistances less than 5 ohms?</p> <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 8-JA39 (WH) or circuit 9-JA39 (BN). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

DIAGNOSIS AND TESTING

PINPOINT TEST BI : DTC U2018: PASSENGER SIDE IMPACT SENSOR COMMUNICATIONS FAULT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
BI1: CHECK THE PASSENGER SIDE IMPACT SENSOR CIRCUIT	
<p>▲ WARNING: To avoid accidental deployment, the RCM backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.</p>	
	<p>1 Deactivate the SRS.</p> <p>2 Disconnect Passenger Side Impact Sensor C428.</p> <p>3 Disconnect RCM C429.</p>
 <p>TIE0036519</p>	<p>4 Measure the resistance between the:</p> <ul style="list-style-type: none"> • RCM C429 pin 28, circuit 9-JA40 (BN/WH), harness side and the passenger side impact sensor C428 pin 2, circuit 9-JA40 (BN/WH), harness side. • RCM C429 pin 29, circuit 8-JA40 (WH/VT), harness side and the passenger side impact sensor C428 pin 1, circuit 8-JA40 (WH/VT), harness side. <p>• Are the resistances less than 5 ohms?</p> <p>→ Yes REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p> <p>→ No REPAIR circuit 8-JA40 (WH/VT) or circuit 9-JA40 (BN/WH). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.</p>

GENERAL PROCEDURES**Deployed Air Bag Disposal**

▲ WARNING: After deployment, the air bag module surface may contain deposits of sodium hydroxide, a product of the gas generate combustion, that is irritating to the skin. Use protective gloves when handling any deployed air bag module. Failure to follow this instruction may result in personal injury.

1. Remove the deployed air bag module(s). For additional information, refer to the relevant procedure in this section.
2. Seal the deployed air bag module(s) in the packaging from the new air bag module(s) or a suitable polythene bag, and then dispose of in accordance with local contaminated waste regulations.

GENERAL PROCEDURES

Unserviceable Air Bag Disposal

1. WARNINGS:

▲ To minimize the possibility of injury in the event of premature deployment, always carry a live air bag module with the bag and trim cover pointed away from the body. Failure to follow this instruction may result in personal injury.

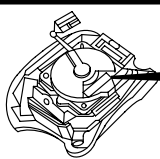

▲ To prevent premature deployment, live air bag modules must only be placed on work benches which have been ground bonded. Failure to follow this instruction may result in personal injury.

NOTE: All unserviceable air bag modules have been placed on the Mandatory Return List. All discolored or damaged air bag modules should be treated the same as any unserviceable live air bag module being returned.

Remove the unserviceable air bag module. For additional information, refer to the relevant procedure in this section.

NOTE: A prepaid, return postcard is provided with the new air bag module. The new air bag module serial number and the vehicle identification number (VIN) must be recorded on the air bag module verification card.

2. Before installing the air bag module, record the necessary information. Return the air bag module verification card to Ford Motor Company (driver air bag module verification card shown).

AIR BAG MODULE VERIFICATION	
VEHICLE SERIAL NO.	<input type="text"/>
ATTENTION INSTALLER	
Please complete and mail this postcard with your Airbag Module Serial Number (see sample below) and Vehicle Identification Number (VIN) of the vehicle in which you are installing this module.	
LOOK FOR YOUR AIR BAG MODULE SERIAL NUMBER AT THE LOCATION SHOWN IN THIS SAMPLE AND ENTER IT IN THE SPACE PROVIDED BELOW.	
	
SAMPLE	
AIR BAG MODULE SERIAL NO.	★ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> ★
TIE44531	

3. ▲ WARNING: Under no circumstances is an unserviceable air bag module(s) to be returned through the local mailing system. Failure to follow this instruction may result in personal injury.

Seal the unserviceable air bag module(s) in the packaging from the new air bag module(s) and address to the appropriate manufacturer. The package should then be forwarded to the Exchange Plan Center (as appointed through the national sales company) who will arrange forwarding to the manufacturer.

4. NOTE: Autoliv air bag modules and seat belt pretensioners.

Autoliv Gmbh, Theodor Heuss Strasse 2, 85221, Dachau, Germany.

5. NOTE: TRW air bag modules.

TRW Occupant Restraint Systems, FAO Rene Getto, Industriestr 20, 73551, Aldorf, Germany.

6. NOTE: TRW seat belt pretensioners.

TRW Occupant Restraint Systems, FAO Helmut Goss, Industriestr 20, 73551, Aldorf, Germany.

7. NOTE: Takata Petri air bag modules.

Takata Petri AG, Grossostheimer Strasse 223, D-63741 Aschaffenburg, (Supplier Code P790M) Germany.

GENERAL PROCEDURES

Scrapped Vehicle Undeployed Air Bag Disposal

Special Tool(s)



General Equipment

12 volt battery

All vehicles

WARNINGS:

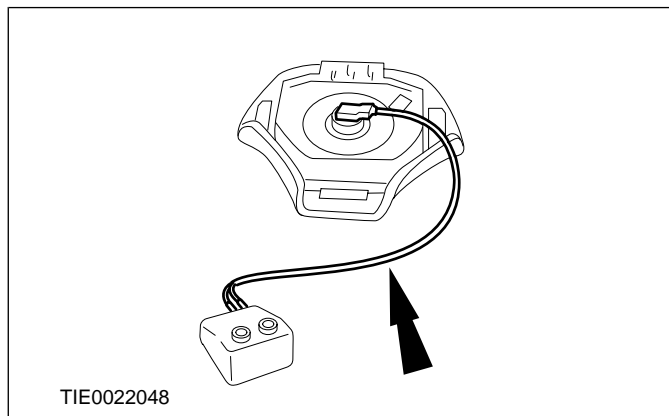
▲ To minimize the possibility of injury in the event of premature deployment, always carry a live air bag module with the bag and trim cover pointed away from the body. Failure to follow this instruction may result in personal injury.

▲ To minimize the possibility of premature deployment, live air bag modules must only be placed on work benches which have been ground bonded. Failure to follow this instruction may result in personal injury.

1. Disconnect the battery ground cable. For additional information, refer to Section 414-01 [Battery, Mounting and Cables].
2. Remove the air bag module(s) to be deployed. For additional information, refer to the relevant procedure(s) in this section.

Single stage air bag modules

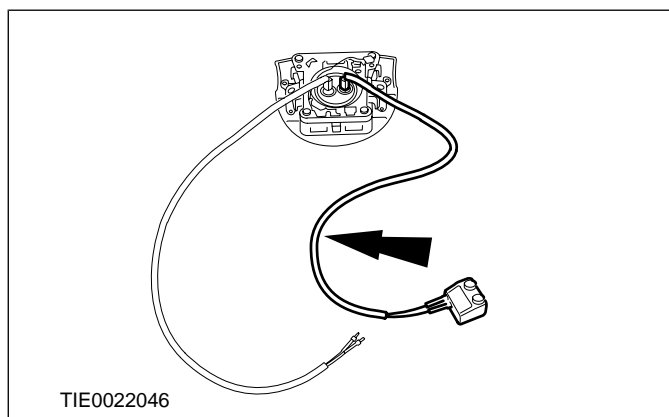
3. Connect the test lead to the air bag module and the adapter (driver air bag module shown).



Two stage air bag modules

4. **▲ CAUTION:** Do not connect both test leads to the adapter. Both air bag module inflators must be deployed separately.

Connect two test leads to the air bag module and the other end of one of the test leads to the adapter (driver air bag module shown).

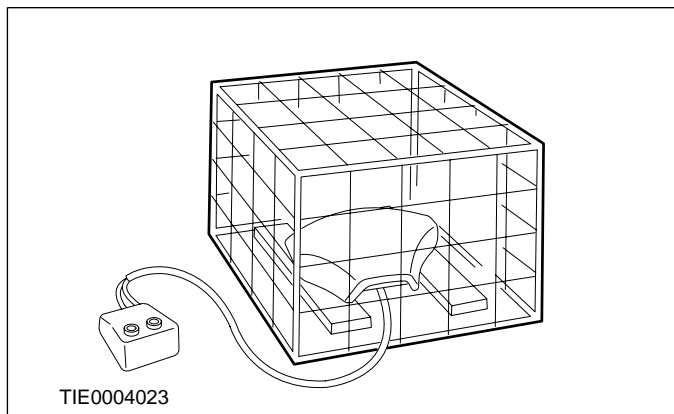


All air bag modules

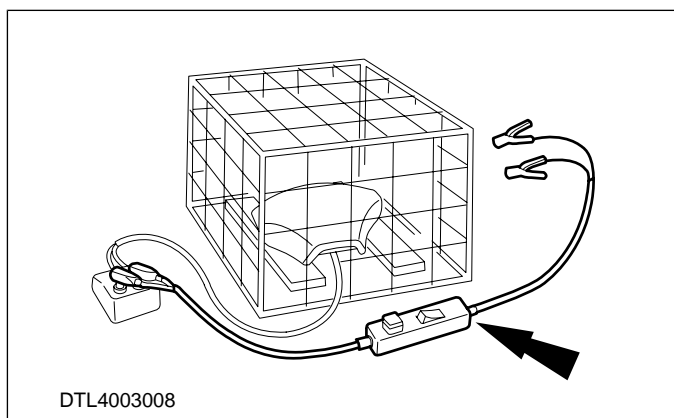
5. **▲ CAUTION:** To protect the test lead electrical connector(s) from damage during deployment, raise the air bag module off the ground on two wooden blocks.

GENERAL PROCEDURES

Place the air bag module inside a suitable rigid wire cage with the air bag module cover uppermost.

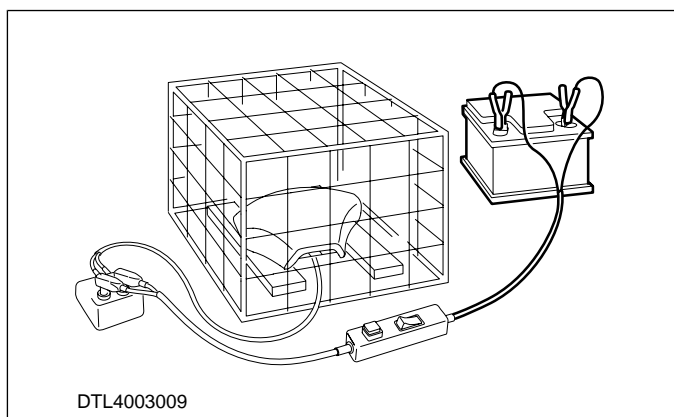


6. Connect the deployment lead to the adapter.



7. **▲WARNING:** Before proceeding make sure that all personnel in the vicinity are aware that a loud noise (bang) is about to occur. Do not let anybody approach closer than six meters. Failure to follow this instruction may result in personal injury.

Move as far away as possible from the air bag module and connect the deployment lead to the battery.

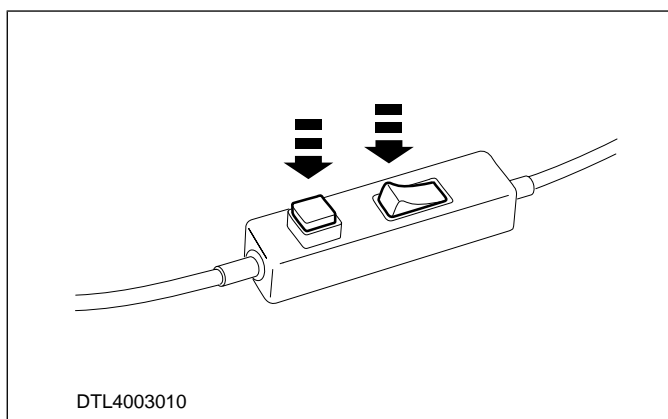


8. CAUTIONS:

▲ The air bag module should not be handled immediately following deployment as the air bag module will be very hot.

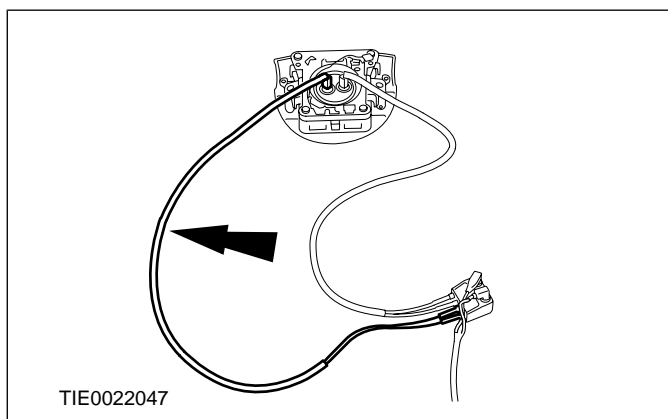
▲ After deployment, the air bag module surface may contain deposits of sodium hydroxide, a product of the gas generate combustion, that is irritating to the skin. Use protective gloves when handling any deployed air bag module.

Depress both switches to deploy the air bag.



Two stage air bag modules

9. Connect the second test lead to the adapter.



10. **▲WARNING:** Before proceeding make sure that all personnel in the vicinity are aware that a loud noise (bang) is about to occur. Do not let anybody approach closer than six meters. Failure to follow this instruction may result in personal injury.

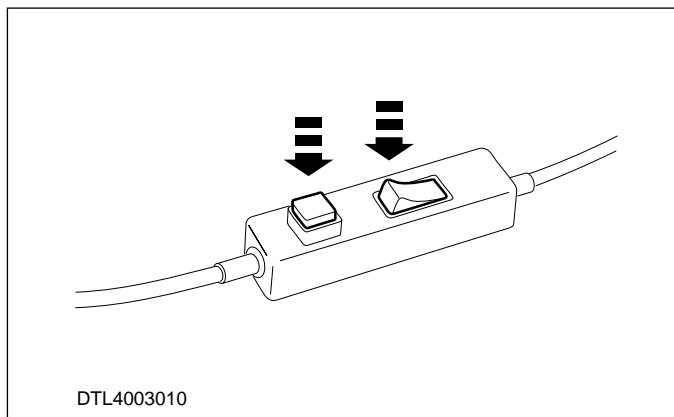
CAUTIONS:

▲ The air bag module should not be handled immediately following deployment as the air bag module will be very hot.

GENERAL PROCEDURES

- ⚠** After deployment, the air bag module surface may contain deposits of sodium hydroxide, a product of the gas generate combustion, that is irritating to the skin. Use protective gloves when handling any deployed air bag module.

Depress both switches to deploy the air bag.



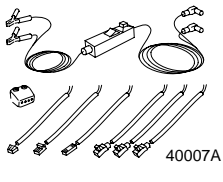
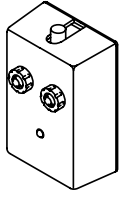
All air bag modules

- 11. Deployed air bag module(s) should be sealed in a suitable bag and then disposed of in accordance with local contaminated waste regulations.**

GENERAL PROCEDURES

Scrapped Vehicle Air Bag and Safety Belt Pretensioner Disposal
- In-Vehicle Disposal

Special Tool(s)

	<p>Test and Deployment Lead, Air Bag/Pyrotechnic Safety Belt 418-S055C (40-007D)</p>
	<p>Adapter Box (AC) 418-143 (40-007-10)</p>

General Equipment

12 volt battery

1. This procedure must only be carried out by authorised scrap vehicle dismantlers.

WARNINGS:

- ▲ To avoid accidental deployment, the restraints control module (RCM) backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the supplemental restraint system (SRS), or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.
- ▲ To minimize the possibility of premature deployment, do not use radio key code savers when working on the SRS. Failure to follow this instruction may result in personal injury.
- ▲ Before deploying the air bag module or safety belt pretensioner pyrotechnic make sure that all personnel in the vicinity are aware that a loud noise (bang) is about to occur. Do not let anybody approach closer than 6 meters. Failure to follow this instruction may result in personal injury.
- ▲ The air bag module or the safety belt pretensioner should not be handled immediately following deployment as the

air bag module will be very hot. Failure to follow this instruction may result in personal injury.

- ▲ After deployment, the inflator(s) becomes inert, direct contact to the skin or eyes of any free pyrotechnic residues should be avoided. Failure to follow this instruction may result in personal injury.
- ▲ Always wear gloves and safety glasses when handling deployed air bag modules and safety belt pretensioners, Failure to follow this instruction may result in personal injury.
- ▲ If the air bag module or safety belt pretensioner pyrotechnic residue should contact the eyes, wash the eyes with clean water and seek medical assistance. Failure to follow this instruction may result in personal injury.
- ▲ If a large amount of air bag or safety belt pretensioner pyrotechnic residue is inhaled, seek medical assistance. Failure to follow this instruction may result in personal injury.

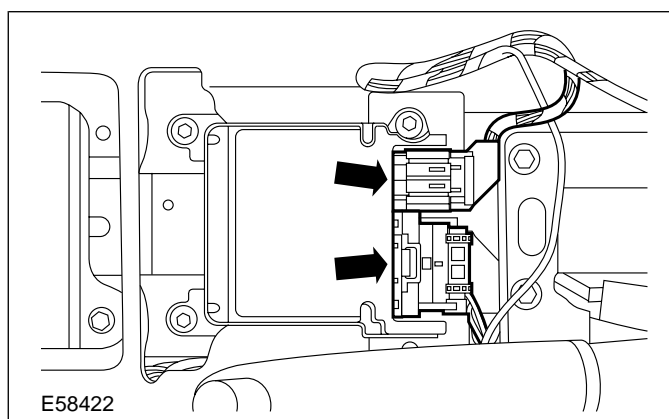
2. Disconnect the battery ground cable.

For additional information, refer to: Battery **Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

3. Remove the floor console.

For additional information, refer to: Floor **Console - 3-Door** (501-12 Instrument Panel and Console, Removal and Installation).

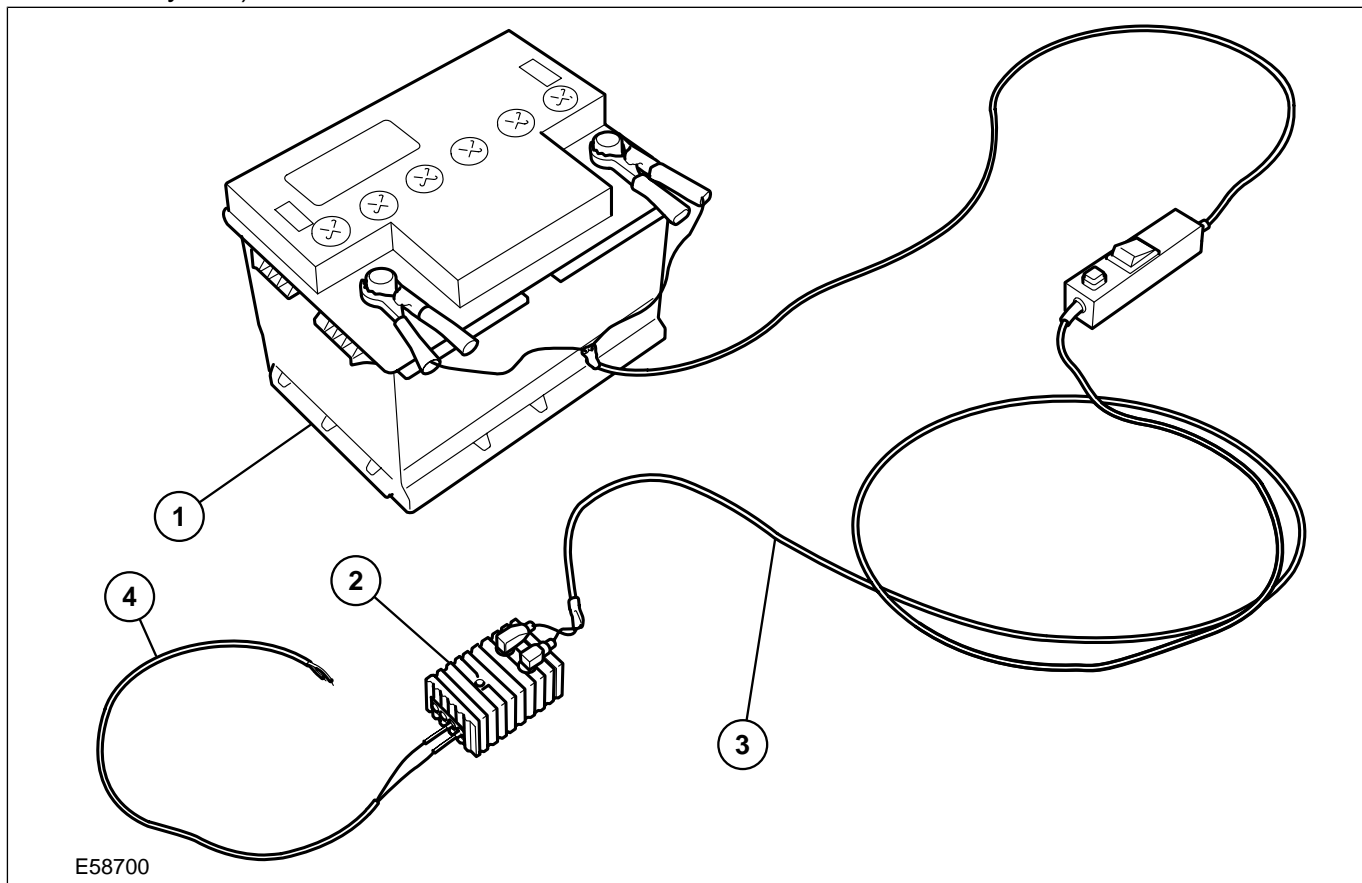
4. Disconnect the RCM electrical connectors.



5. Connect the special tools as shown.

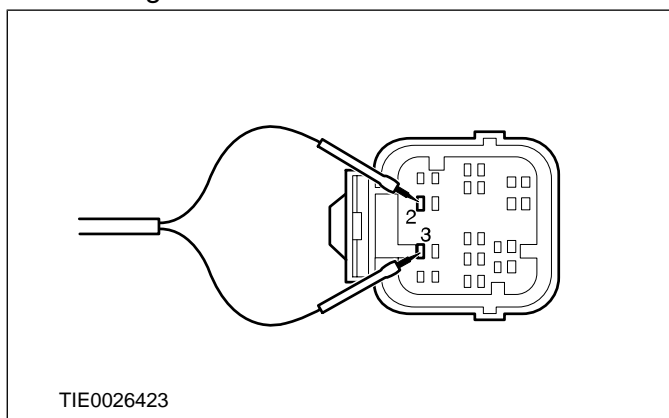
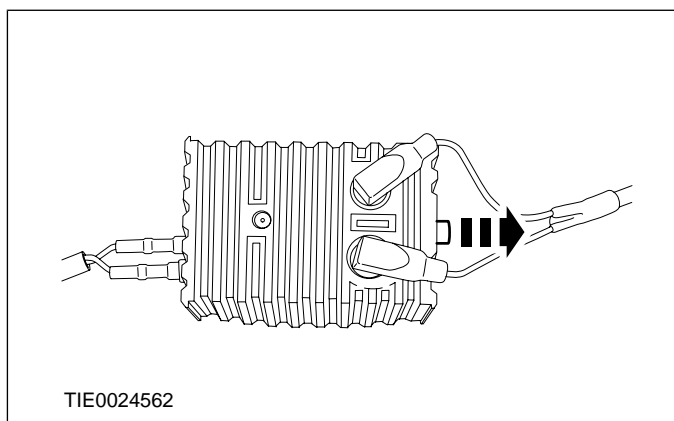
GENERAL PROCEDURES

1. 12 volt battery.
2. Adapter box (AC).
3. Deployment lead (part of Test and Deployment Lead, Air Bag/Pyrotechnic Safety Belt).
4. Deployment lead (part of Test and Deployment Lead, Air Bag/Pyrotechnic Safety Belt).



6. Release the adapter box AC button.

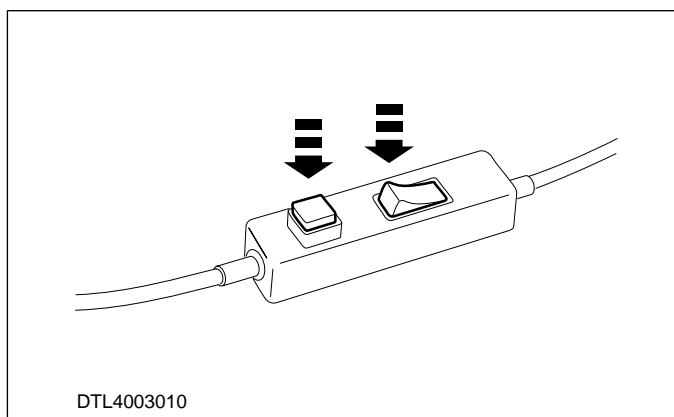
- For the pin numbers, refer to the special tool usage table below.



7. To deploy an air bag or safety belt pretensioner, connect the deployment leads to the RCM electrical connector.

GENERAL PROCEDURES

8. Move as far away as possible from the vehicle and depress both switches to deploy the air bag or safety belt pretensioner.



9. To deploy the remaining air bags and safety belt pretensioners, refer to the special tool usage table below for the RCM electrical connector pin numbers.

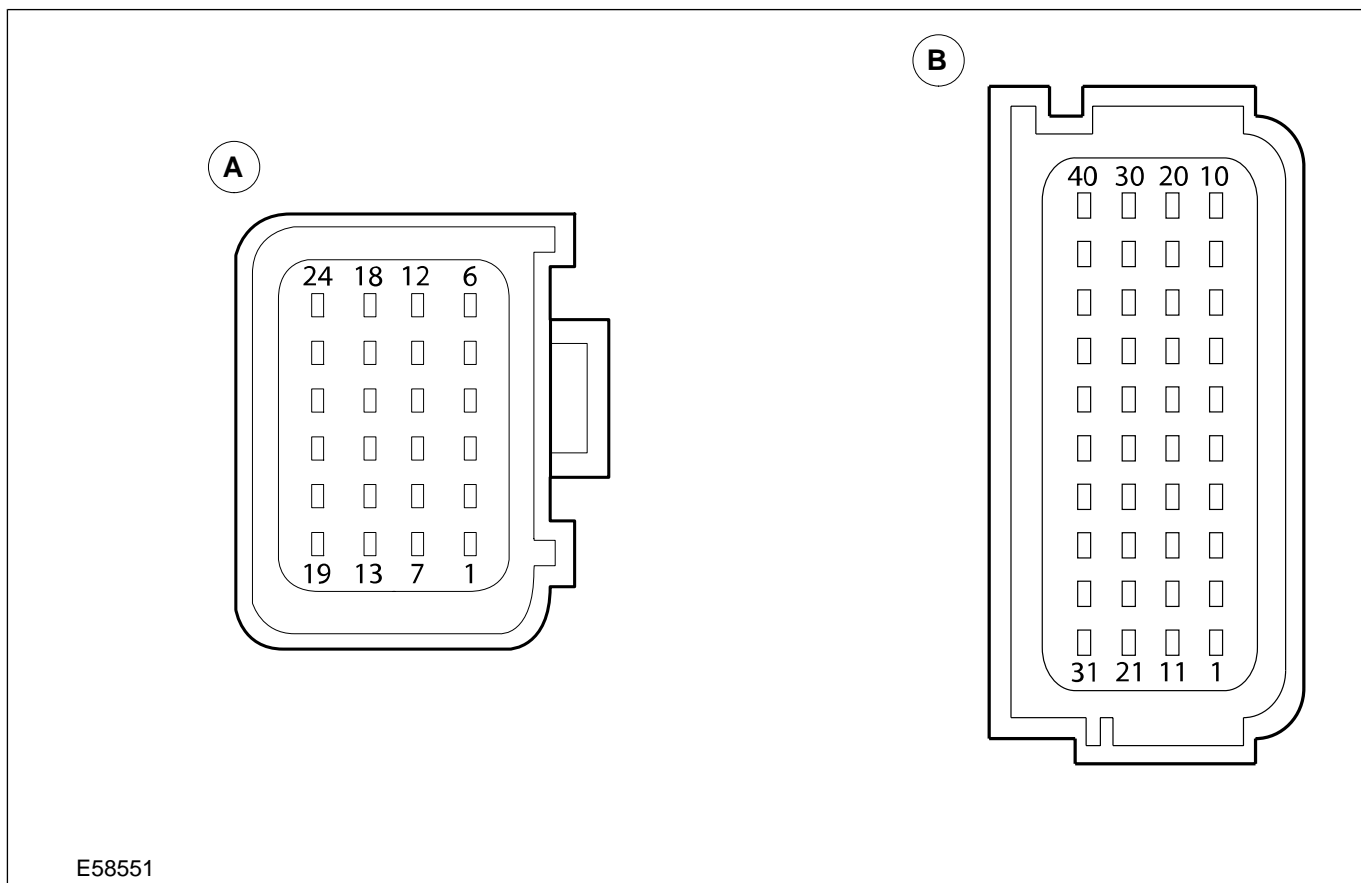
- Repeat steps six and seven.

Special Tool Usage

Description	Test and Deployment Lead (Part of Test and Deployment Lead, Air Bag/Pyrotechnic Safety Belt [418-S055C])	Electrical connector	Red Deployment Lead	Black Deployment Lead
Driver air bag module	40-007-15	A	Pin 3	Pin 4
Passenger air bag module	40-007-15	A	Pin 9	Pin 10
Side air bag module - driver side	40-007-15	B	Pin 20	Pin 19
Side air bag module - passenger side	40-007-15	B	Pin 7	Pin 8
Safety belt buckle and pretensioner - driver side	40-007-15	B	Pin 17	Pin 18
Safety belt buckle and pretensioner - passenger side	40-007-15	B	Pin 10	Pin 9
Side air curtain - driver side	40-007-15	B	Pin 1	Pin 2
Side air curtain - passenger side	40-007-15	B	Pin 12	Pin 11

10. RCM electrical connectors.

GENERAL PROCEDURES

**All air bag modules**

1. Deployed air bag module(s) and safety belt pretensioners should be sealed in suitable bags and then disposed of in accordance with local contaminated waste regulations.
2. NOTE: All unserviceable air bag modules have been placed on the Mandatory Return List. All discolored or damaged air bag modules should be treated the same as any unserviceable live air bag module being returned.

If an air bag module or safety belt pretensioner fails to deploy, remove the component. For additional information, refer to:

- Safety Belt Buckle and Pretensioner** (501-20 Safety Belt System, Removal and Installation),
- Driver Air Bag Module** (501-20 Supplemental Restraint System, Removal and Installation),
- Passenger Air Bag Module - 3-Door** (501-20 Supplemental Restraint System, Removal and Installation),
- Side Air Bag Module** (501-20 Supplemental Restraint System, Removal and Installation),
- Side Air Curtain Module - 3-Door/5-Door** (501-20 Supplemental Restraint System, Removal and Installation),
- Side Air Curtain Module - Wagon** (501-20 Supplemental Restraint System, Removal and Installation),
- Side Air Curtain Module - 4-Door** (501-20 Supplemental Restraint System, Removal and Installation).

GENERAL PROCEDURES

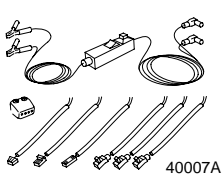
3. **▲WARNING:** Under no circumstances is an unserviceable air bag module or safety belt pretensioner to be returned through the local mailing system. Failure to follow this instruction may result in personal injury.

If an air bag module or safety belt pretensioner fails to deploy, seal the unserviceable air bag module or safety belt pretensioner in suitable packaging and return to the Exchange Plan Center, as appointed through the local National Sales Company.

GENERAL PROCEDURES

Air Bag and Safety Belt Pretensioner Disposal

Special Tool(s)

	Test and Deployment Lead, Air Bag/Pyrotechnic Safety Belt 418-S055 (40-007A)
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General Equipment

12 volt battery
Wooden blocks

All vehicles

WARNINGS:

- ▲ To minimize the possibility of injury in the event of premature deployment, always carry a live air bag module with the bag and trim cover pointed away from the body. Failure to follow this instruction may result in personal injury.
- ▲ To minimize the possibility of premature deployment, live air bag modules must only be placed on benches which have been ground bonded and with the trim cover facing up. Failure to follow these instructions may result in personal injury.
- ▲ Air bag modules and safety belt pretensioners must be deployed in well ventilated areas. Failure to follow this instruction may result in personal injury.
- ▲ Before deploying the air bag module or safety belt buckle pretensioner, make sure that all personnel in the vicinity are aware that a loud noise (bang) is about to occur. Do not let anybody approach closer than six meters. Failure to follow this instruction may result in personal injury.

▲ The air bag module or the safety belt pretensioner should not be handled immediately following deployment as the air bag module or safety belt pretensioner will be hot. Failure to follow this instruction may result in personal injury.

▲ After deployment, the inflator(s) become inert, direct contact with the skin or eyes of any free pyrotechnic residues should be avoided. Failure to follow this instruction may result in personal injury.

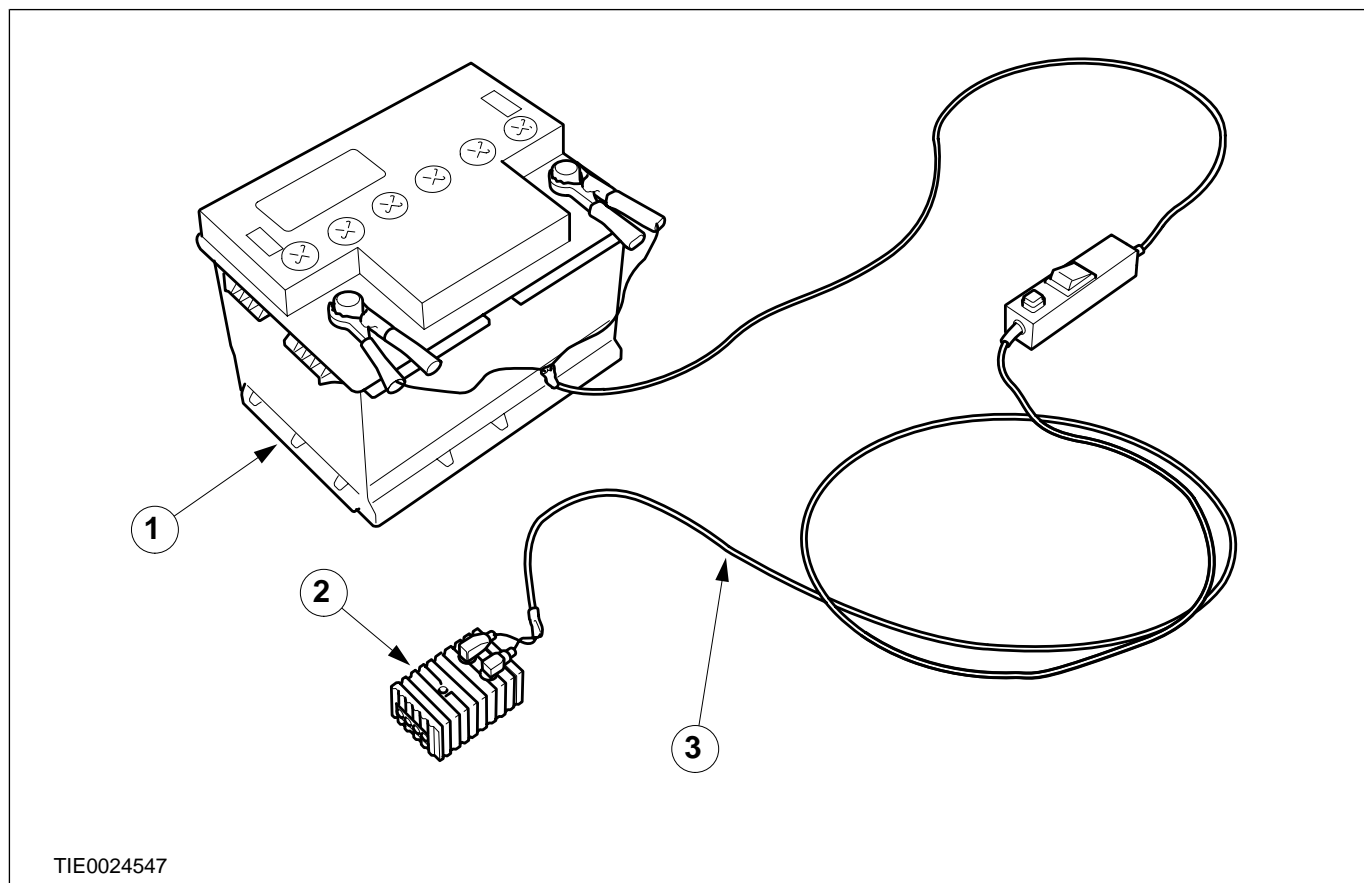
▲ Always wear gloves and safety glasses when handling deployed air bag modules and safety belt pretensioners. Failure to follow this instruction may result in personal injury.

▲ If the air bag module or safety belt pretensioner pyrotechnic residue should contact the eyes immediately, wash the eyes thoroughly with clean water and seek medical assistance. Failure to follow this instruction may result in personal injury.

▲ If a large amount of air bag module or safety belt pretensioner pyrotechnic residue is inhaled, seek medical assistance. Failure to follow this instruction may result in personal injury.

1. Remove the air bag module(s) to be deployed. For additional information, refer to the relevant procedure(s) in this section.
2. Connect the special tools as shown.
 1. 12 volt battery.
 2. Adapter box (AC) (Part of Test and Deployment lead, Air Bag/Pyrotechnic Safety Belt).
 3. Deployment lead (Part of Test and Deployment lead, Air Bag/Pyrotechnic Safety Belt).

GENERAL PROCEDURES

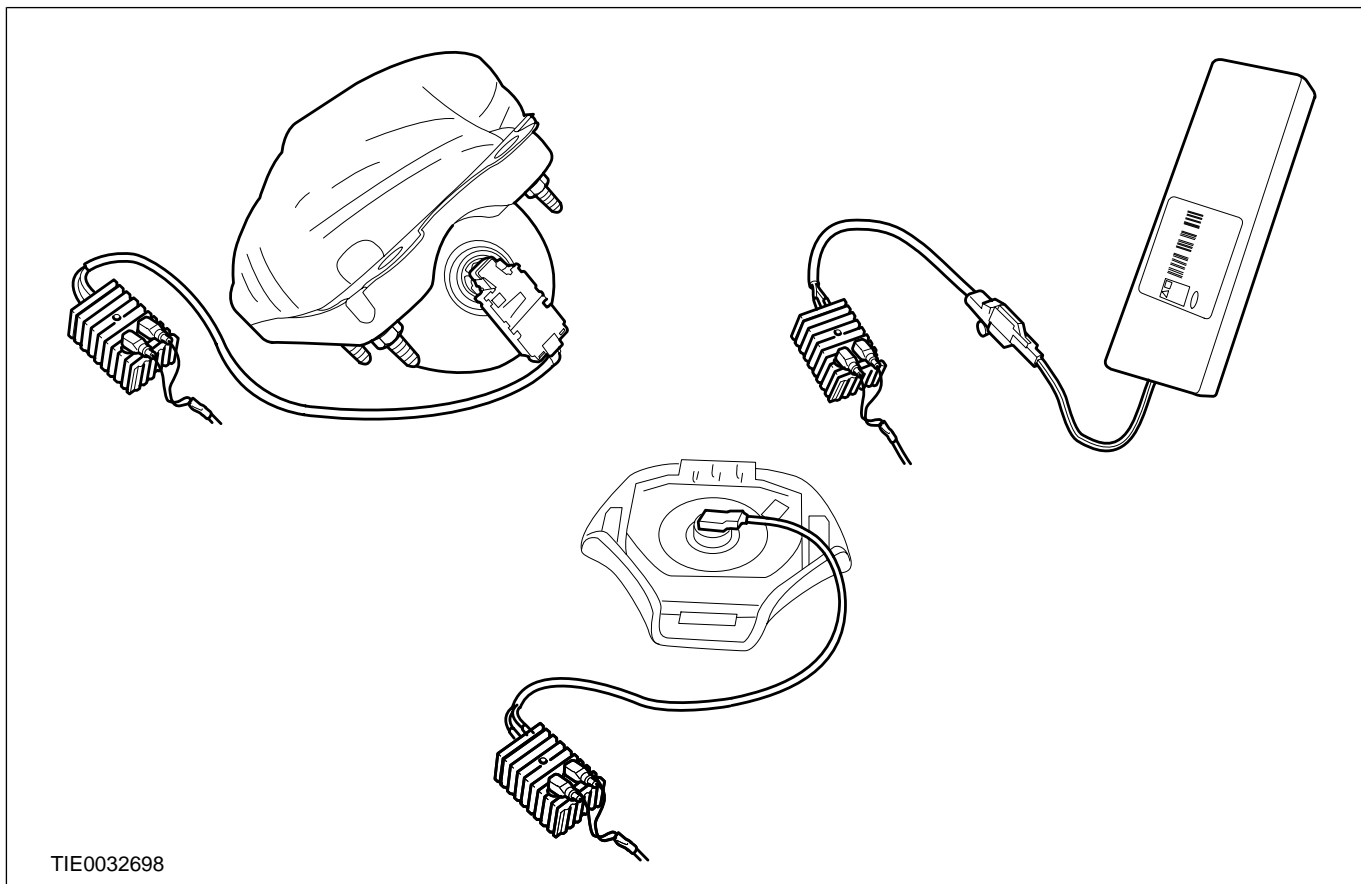


Single stage air bag modules

3. Connect the test lead to the air bag module and the adapter.

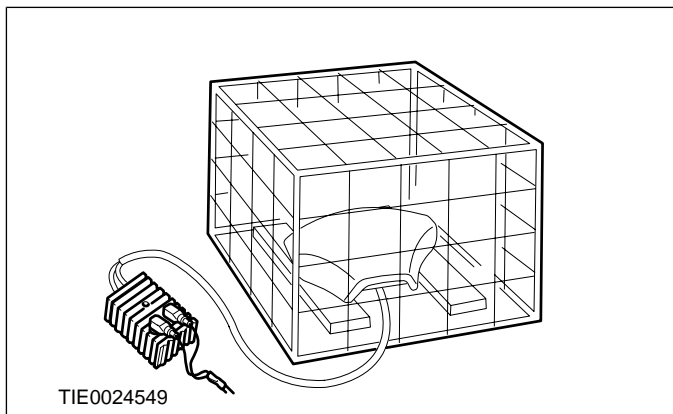
For additional information, refer to **Specifications** in this section.

GENERAL PROCEDURES

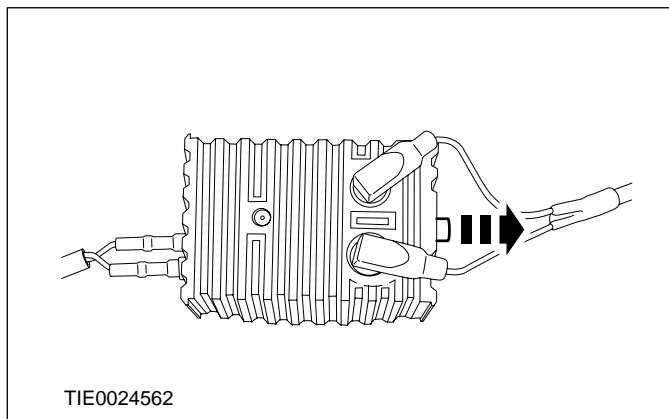


4. **⚠ CAUTION:** To protect the test lead electrical connectors from damage during deployment, raise the air bag off the ground on two wooden blocks.

Place the air bag module inside a suitable rigid wire cage with the air bag module cover upper most (driver air bag shown).

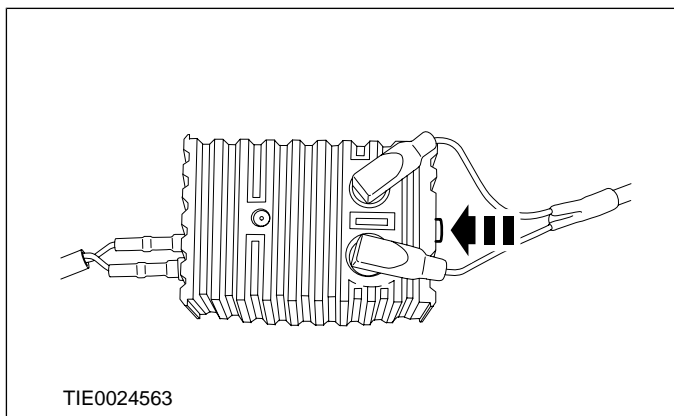


5. To deploy the driver or passenger air bag module, release the adapter box AC button.

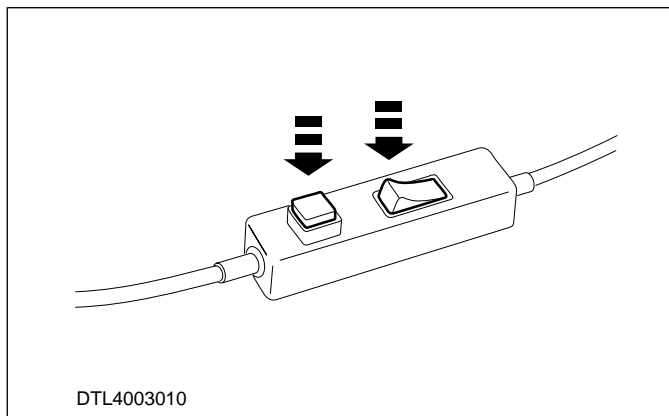


GENERAL PROCEDURES

6. To deploy the side air bag module, depress the adapter box AC button.



7. Move as far away from the air bag module and depress both switches to deploy the air bag module.

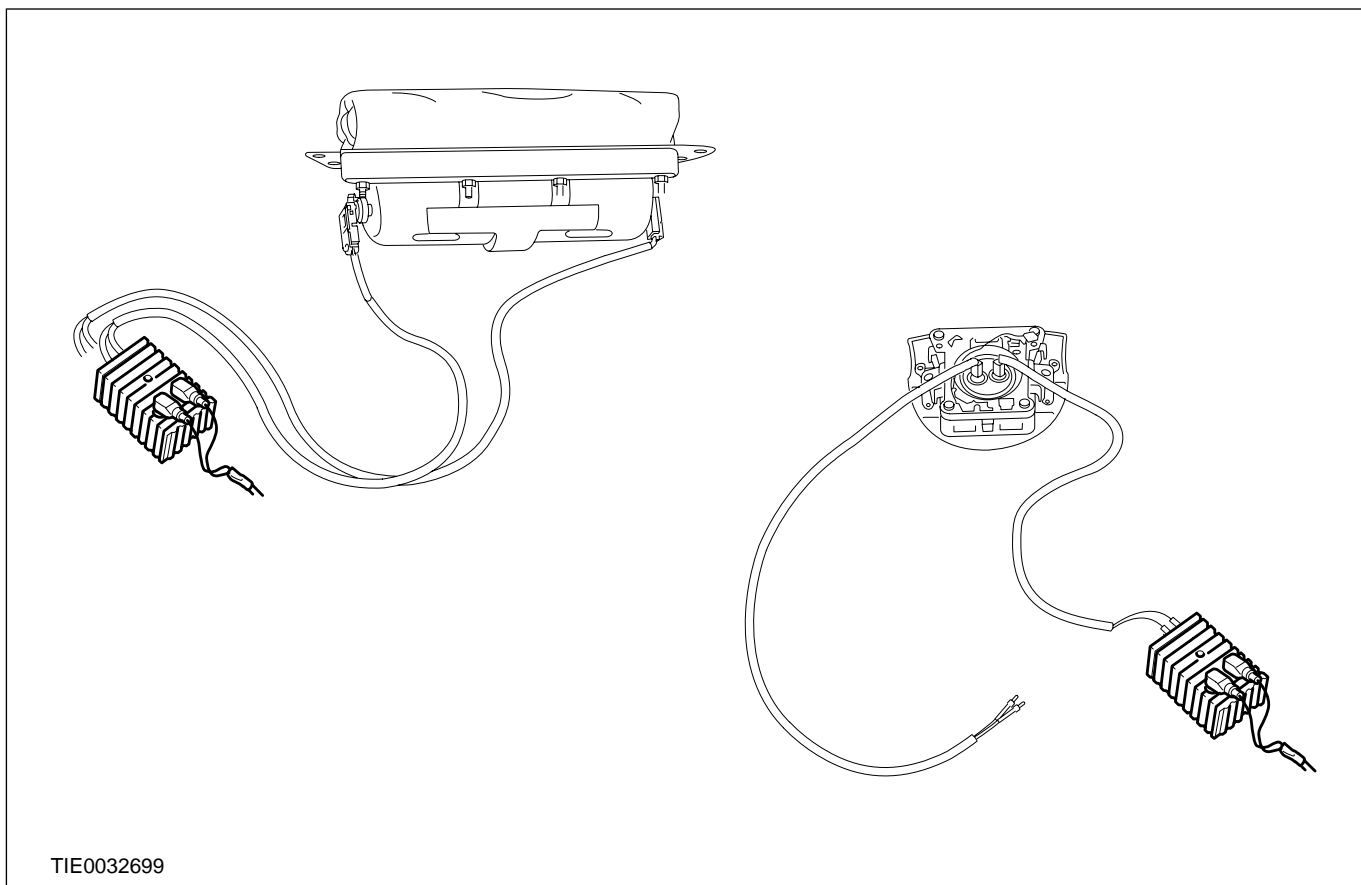


Two stage air bag modules

8. **▲WARNING: DO not connect both test leads to the adapter at this stage. Each inflator must be deployed separately. Failure to follow this instruction may result in personal injury.**

Connect the test leads to the air bag module and one of the test leads to the adapter.

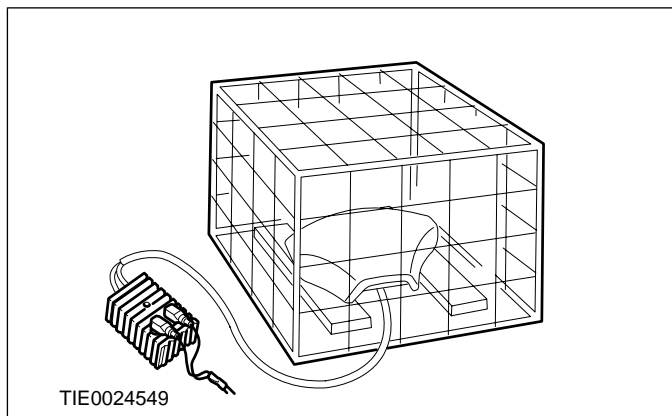
For additional information, refer to **Specifications** in this section.



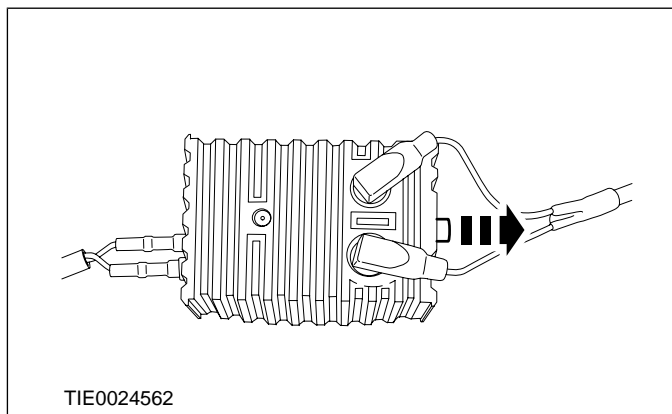
GENERAL PROCEDURES

9. **⚠ CAUTION:** To protect the test lead electrical connectors from damage during deployment, raise the air bag off the ground on two wooden blocks.

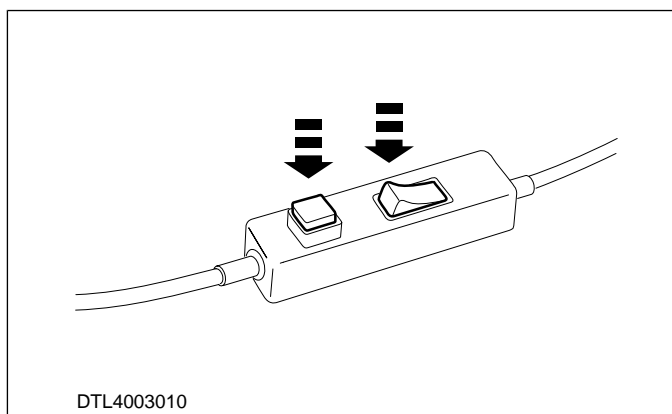
Place the air bag module inside a suitable rigid wire cage with the air bag module cover upper most (driver air bag shown).



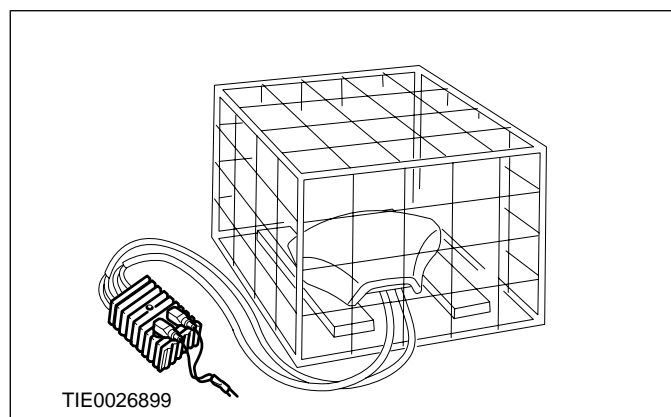
10. To deploy the driver or passenger air bag module first inflator, release the adapter box AC button.



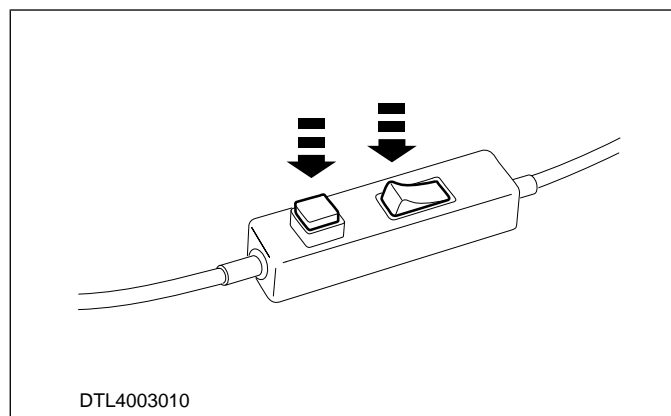
11. Move as far away as possible from the air bag module and depress both switches to deploy the air bag module.



12. To deploy the driver or passenger air bag module second inflator, connect the second test lead to the adapter.



13. Move as far away as possible from the air bag module and depress both switches to deploy the air bag module.



Vehicles with safety belt buckle pretensioners

14. **NOTE:** Certain vehicles require the removal of the front seat to access the safety belt buckle pretensioner electrical connector.

Remove the front seat (if necessary). For additional information, refer to Section **501-10 [Seating]**.

15. Detach the safety belt buckle pretensioner electrical connector from the front seat.

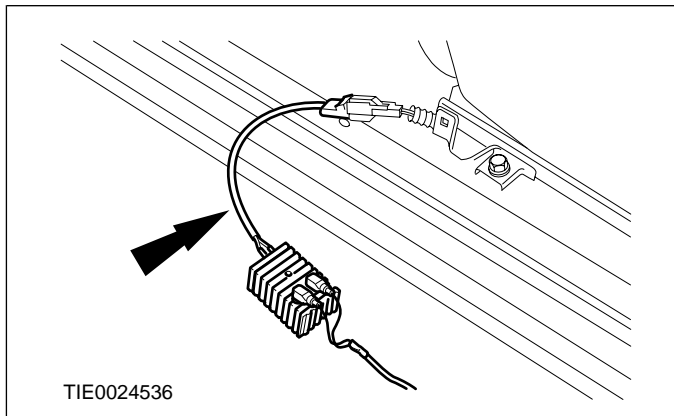
16. Install the front seat (if necessary). For additional information, refer to Section **501-10 [Seating]**.

17. **⚠ CAUTION:** Make sure the front seat mounting bolts are installed.

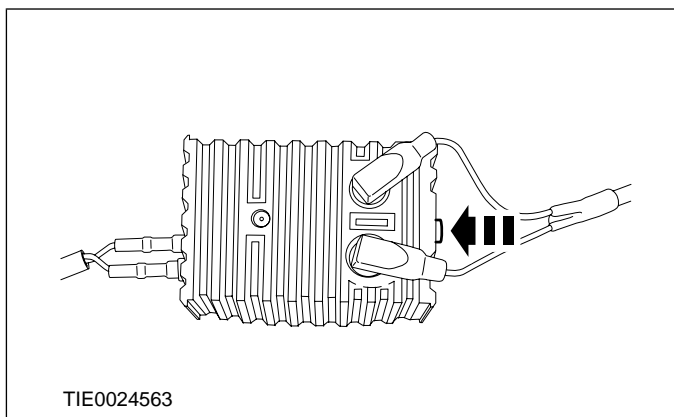
GENERAL PROCEDURES

Connect the test lead to the safety belt buckle pretensioner electrical connector.

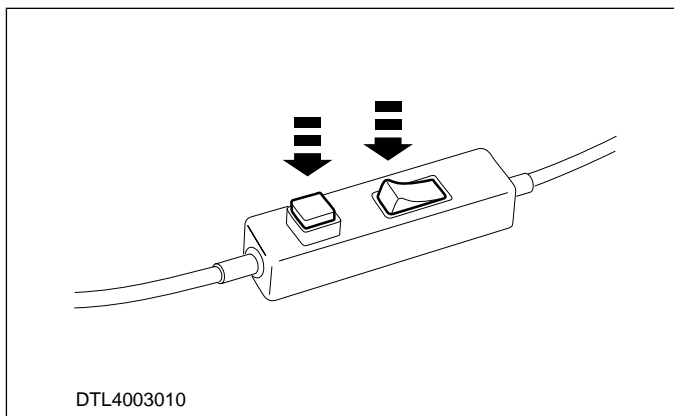
For additional information, refer to **Specifications** in this section.



18. To deploy the safety belt buckle pretensioner, depress the adapter box AC button.



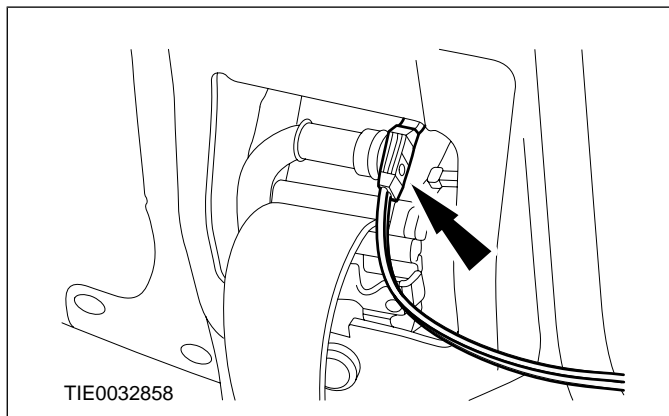
19. Move as far away as possible from the vehicle and depress both switches to deploy the safety belt buckle pretensioner.



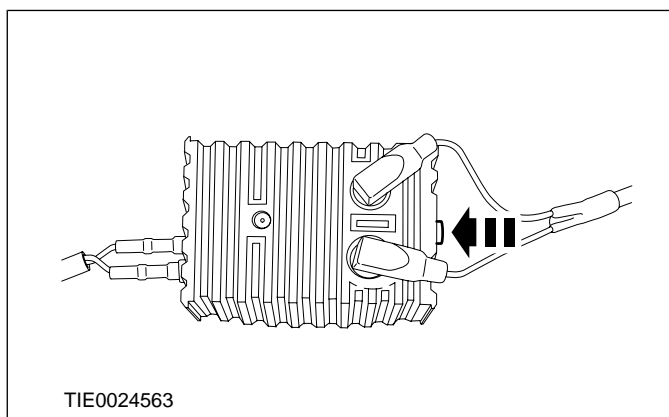
Vehicles with safety belt retractor pretensioners

20. Connect the test lead to the safety belt retractor pretensioner electrical connector.

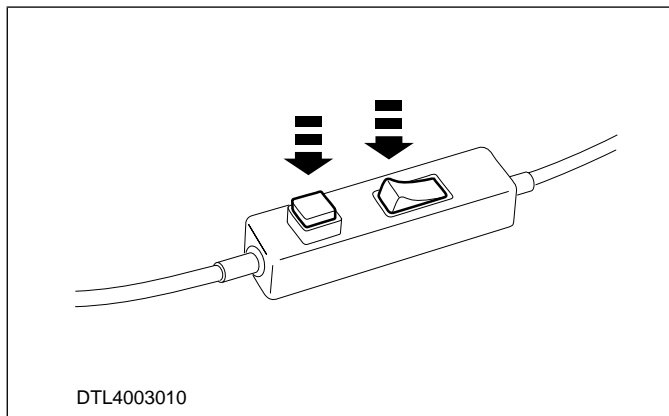
For additional information, refer to **Specifications** in this section.



21. To deploy the safety belt retractor pretensioner, depress the adapter box AC button.



22. Move as far away as possible from the vehicle and depress both switches to deploy the safety belt retractor pretensioner.



GENERAL PROCEDURES

All vehicles

23. Deployed air bag module(s) and safety belt pretensioners should be sealed in suitable bags and then disposed of in accordance with local contaminated waste regulations.

24. WARNINGS:

▲ Under no circumstances is an unserviceable air bag module or safety belt buckle pretensioner to be returned through the local mailing system. Failure to follow this instruction may result in personal injury.

▲ Never probe the electrical connectors of air bag modules or any other supplemental restraint system electrical component. Failure to follow this instruction may result in personal injury.

NOTE: All unserviceable air bag modules have been placed on the Mandatory Return List. All discolored or damaged air bag modules should be treated the same as any unserviceable live air bag module being returned.

If an air bag module or safety belt buckle pretensioner fails to deploy, seal the unserviceable air bag module or safety belt buckle pretensioner in suitable packaging and return to the Exchange Plan Center, as appointed through the local National Sales Company.

REMOVAL AND INSTALLATION

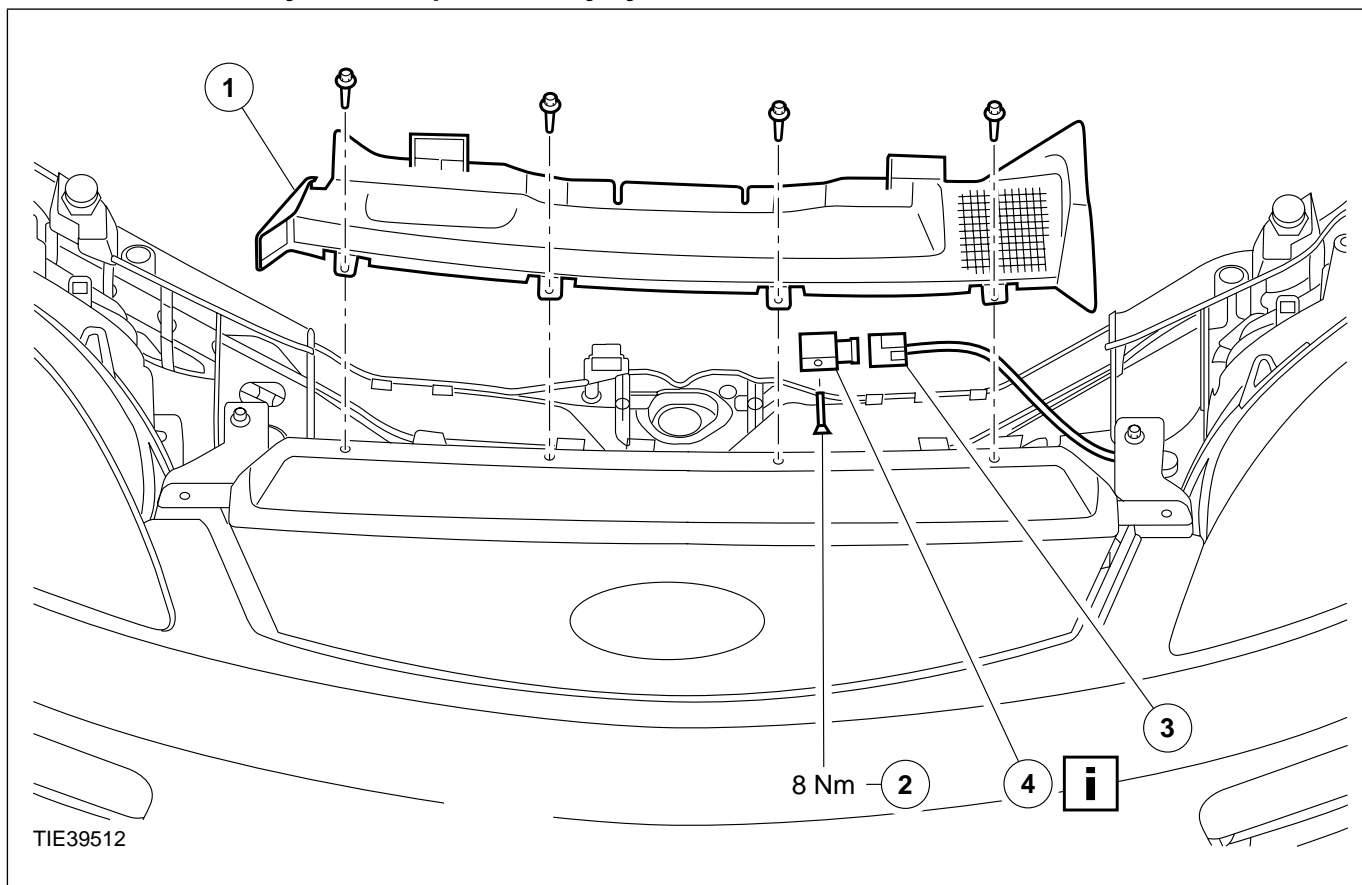
Crash Sensor

WARNINGS:

- ▲ To avoid accidental deployment, the restraints control module backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the supplemental restraint system (SRS), or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.
- ▲ To minimize the possibility of premature deployment, do not use radio key code savers when working on the supplemental restraint system. Failure to follow this instruction may result in personal injury.

▲ Never probe the electrical connectors of air bag modules or any other supplemental restraint system component. Failure to follow this instruction may result in personal injury.

1. Disconnect the battery ground cable.
For additional information, refer to: Battery **Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).
2. Remove the components in the order indicated in the following illustration(s) and table(s).



TIE39512

Item	Description
1	Radiator air deflector
2	Crash sensor retaining bolt
3	Crash sensor electrical connector
4	Crash sensor See Installation Detail

All vehicles

3. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Vehicles with global closing


4. Initialize the door window motors.

For additional information, refer to: Door

Window Motor Initialization (501-11 Glass, Frames and Mechanisms, General Procedures).

Installation Details

Item 4 Crash sensor

 **WARNING:** Make sure the crash sensor locating tang is correctly located in the grille opening panel. Failure to follow this instruction may result in personal injury.

REMOVAL AND INSTALLATION

Side Impact Sensor

WARNINGS:

- ▲ To avoid accidental deployment, the restraints control module backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the supplemental restraint system (SRS), or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.
- ▲ To minimize the possibility of premature deployment, do not use radio key code savers when working on the supplemental restraint system. Failure to follow this instruction may result in personal injury.

- ▲ Never probe the electrical connectors of air bag modules or any other supplemental restraint system component. Failure to follow this instruction may result in personal injury.

1. Disconnect the battery ground cable.

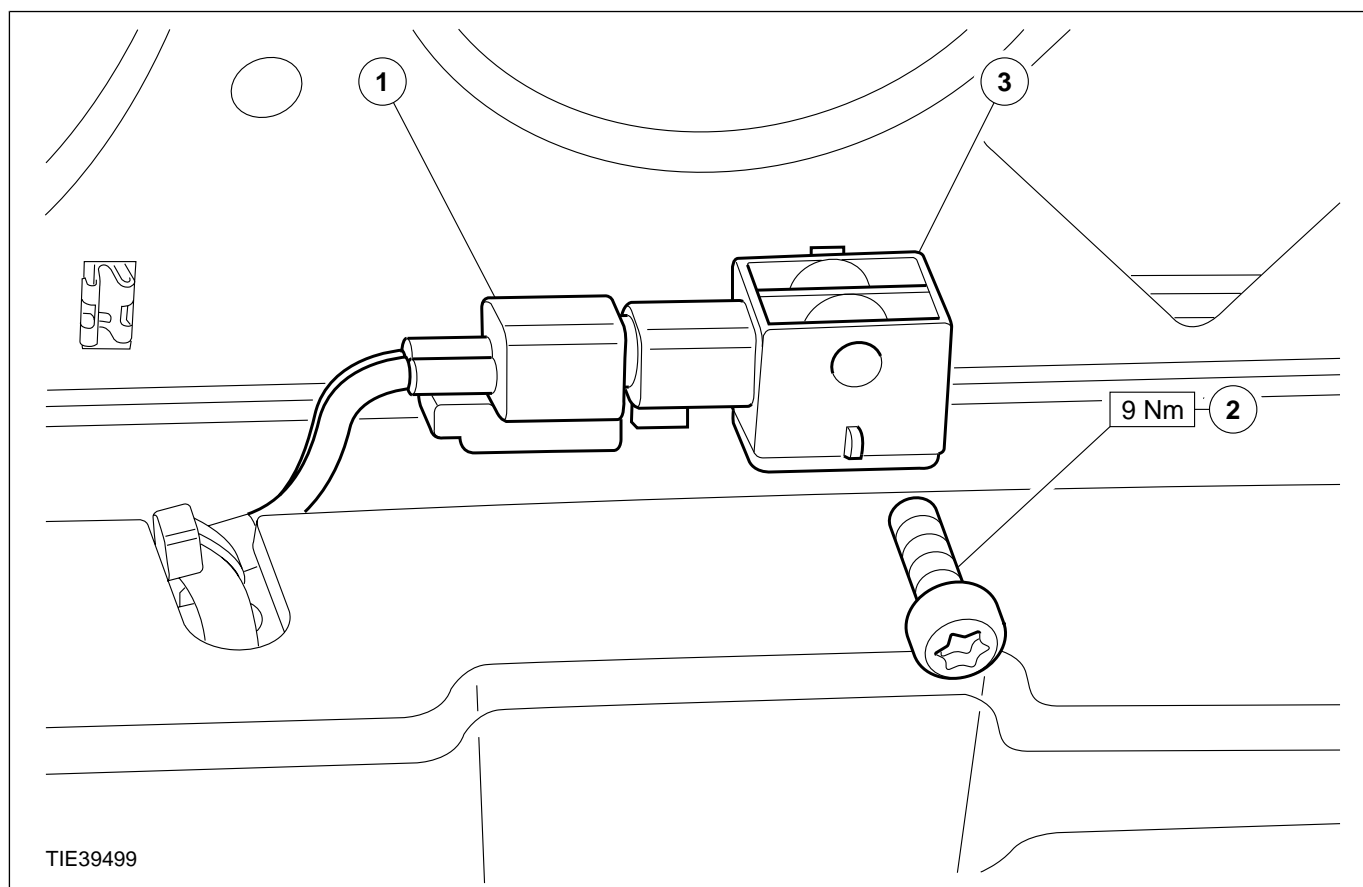
For additional information, refer to: Battery **Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

2. Remove the B-pillar trim panel. For additional information, refer to: (501-05 Interior Trim and Ornamentation)

B-Pillar Trim Panel - 3-Door (Removal and Installation),

B-Pillar Trim Panel - 4-Door/5-Door (Removal and Installation).


3. Remove the components in the order indicated in the following illustration(s) and table(s).



REMOVAL AND INSTALLATION

Item	Description
1	Side impact sensor electrical connector
2	Side impact sensor retaining bolt
3	Side impact sensor

All vehicles

 **WARNING:** Make sure the side impact sensor locating tangs are correctly located into the floor pan. Failure to follow this instruction may result in personal injury.

4. To install, reverse the removal procedure.

Vehicles with global closing

5. Initialize the door window motors.

For additional information, refer to: **Door Window Motor Initialization (501-11 Glass, Frames and Mechanisms, General Procedures).**

REMOVAL AND INSTALLATION

Restraints Control Module (RCM)

General Equipment

Worldwide diagnostic system (WDS)

WARNINGS:

- ▲ To avoid accidental deployment, the restraints control module (RCM) backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the supplemental restraint system (SRS), or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.
- ▲ To minimize the possibility of premature deployment, do not use radio key code savers when working on the supplemental restraint system. Failure to follow this instruction may result in personal injury.

- ▲ Never probe the electrical connectors of air bag modules or any other supplemental restraint system component. Failure to follow this instruction may result in personal injury.

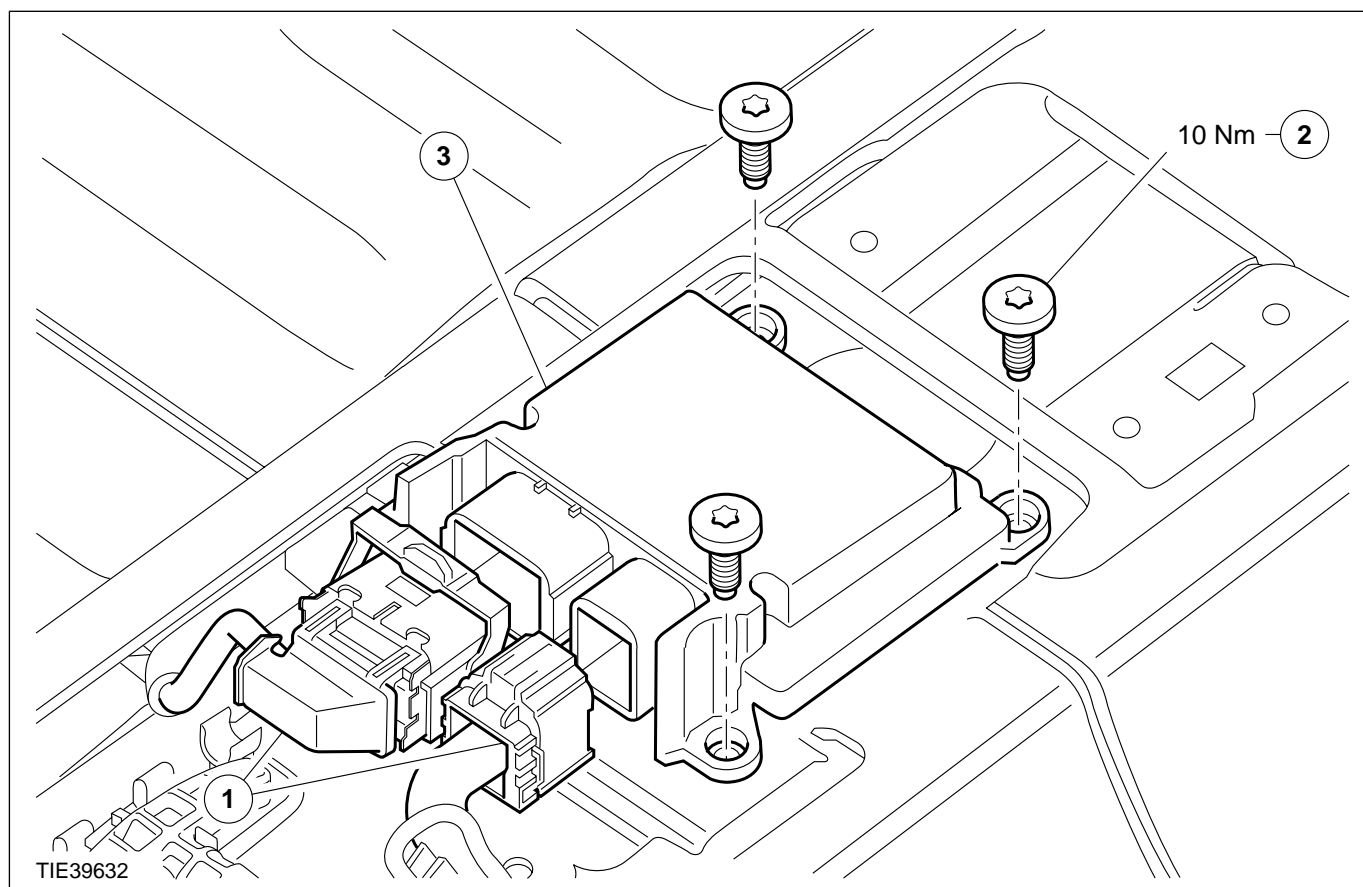
1. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

2. Remove the floor console. For additional information, refer to: (501-12 Instrument Panel and Console)

Floor Console - Vehicles Built Up To: 03/2007 (Removal and Installation),
Floor Console (Removal and Installation),
Floor Console - Vehicles Built Up To: 03/2007 (Removal and Installation).

3. Remove the components in the order indicated in the following illustration(s) and table(s).



REMOVAL AND INSTALLATION

Item	Description
1	Electrical connectors
2	Retaining bolts
3	Restraints control module

All vehicles

4. To install, reverse the removal procedure.
5. **▲WARNING:** A new restraints control module must be configured following installation. Failure to follow this instruction may result in personal injury.

When a new restraints control module is installed, configure the restraints control module using WDS.

Vehicles with global closing

6. Initialize the door window motors.

For additional information, refer to: Door **Window Motor Initialization** (501-11 Glass, Frames and Mechanisms, General Procedures).

REMOVAL AND INSTALLATION

Driver Air Bag Module

WARNINGS:

- ▲ To avoid accidental deployment, the restraints control module (RCM) backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the supplemental restraint system (SRS), or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.
- ▲ Always wear safety glasses when working on an air bag equipped vehicle and when handling an air bag module. Failure to follow this instruction may result in personal injury.
- ▲ To minimize the possibility of premature deployment, do not use radio key code savers when working on the SRS. Failure to follow this instruction may result in personal injury.
- ▲ To minimize the possibility of injury in the event of premature deployment, always carry a live air bag module with the bag and trim cover pointed away from the body. Failure to follow this instruction may result in personal injury.

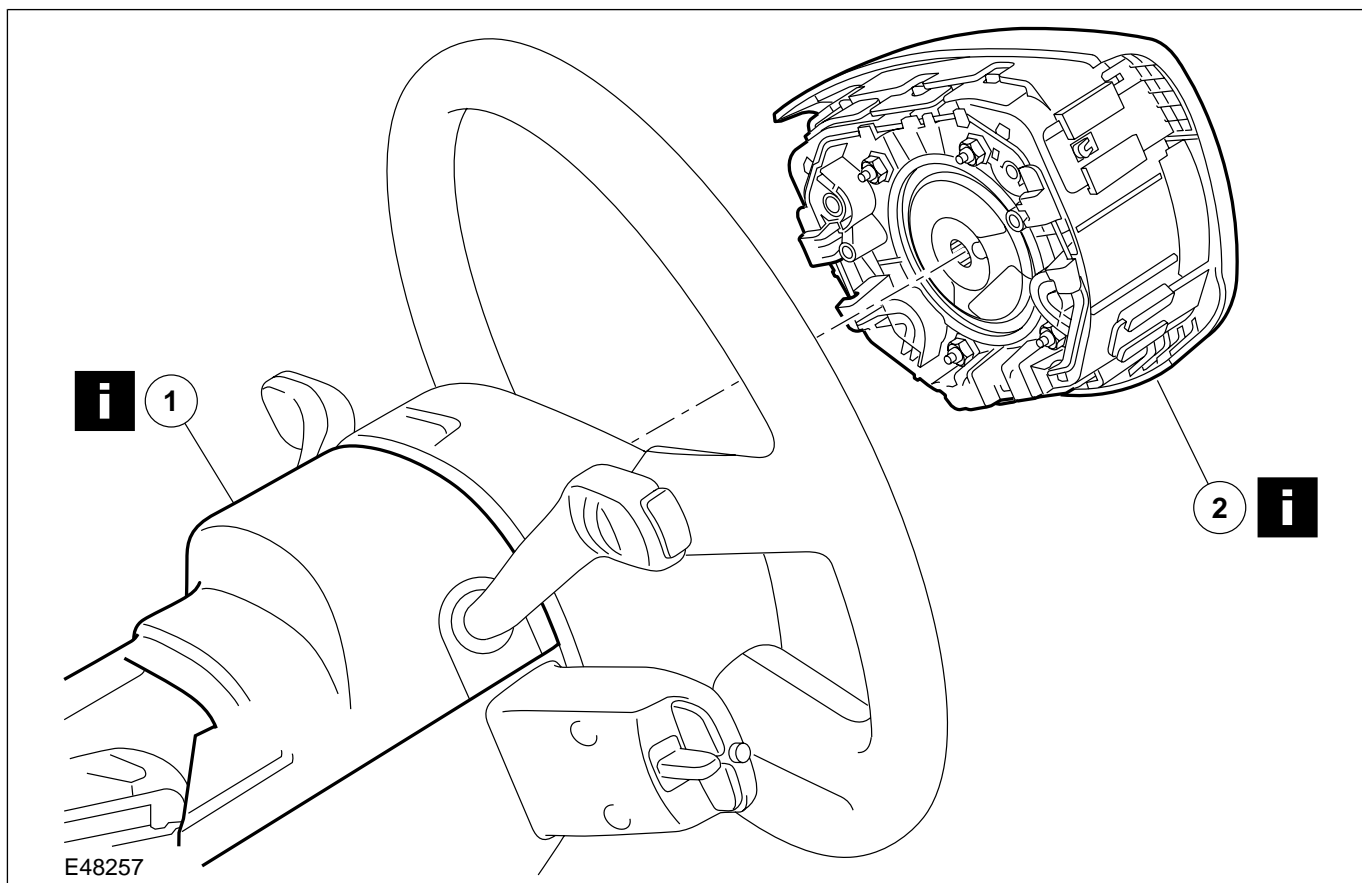
- ▲ To minimize the possibility of premature deployment, live air bag modules must only be placed on work benches which have been ground bonded and with the trim cover facing up. Failure to follow these instructions may result in personal injury.
- ▲ Never probe the electrical connectors of air bag modules or any other SRS component. Failure to follow this instruction may result in personal injury.
- ▲ Painting over the driver air bag module trim cover or instrument panel could lead to deterioration of the trim cover and air bags. Do not for any reason attempt to paint discolored or damaged air bag module trim covers or instrument panel. Install a new component. Failure to follow this instruction may result in personal injury.

1. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

2. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



Item	Description
1	Steering column upper shroud See Removal Detail
2	Driver air bag module See Removal Detail

Vehicles with global closing

4. Initialize the door window motors.

For additional information, refer to: [Door Window Motor Initialization \(501-11 Glass, Frames and Mechanisms, General Procedures\)](#).

All vehicles

3. To install, reverse the removal procedure.

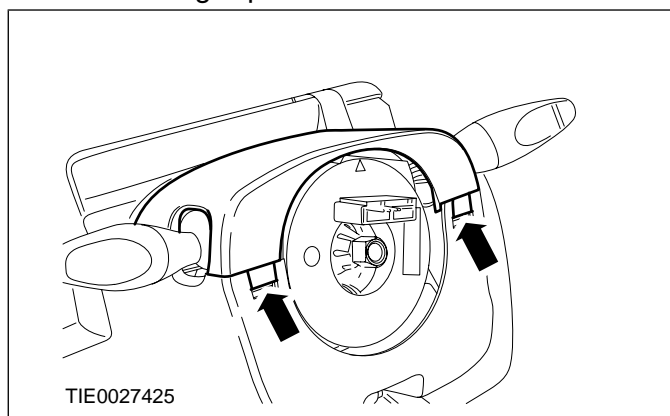
Removal Details

Item 1 Steering column upper shroud

1. NOTE: Turn the steering wheel to access the steering column upper shroud retaining clips.

Remove the steering column upper shroud (steering wheel shown removed for clarity).

- Using a thin bladed screwdriver, release the retaining clips.



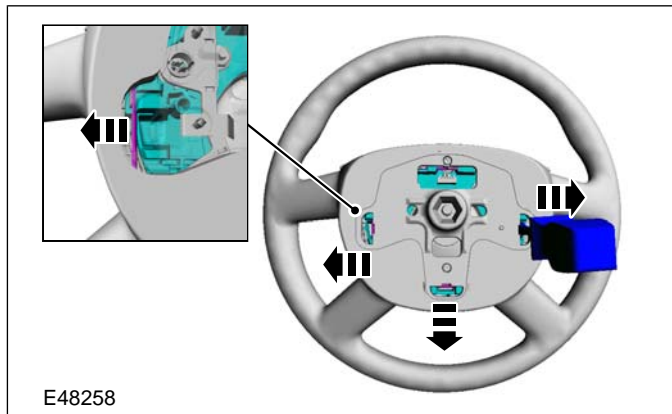
REMOVAL AND INSTALLATION

Item 2 Driver air bag module

- NOTE: Turn the steering wheel to access the driver air bag module retaining clips.

Using a thin bladed screwdriver, detach the driver air bag module from the steering wheel (steering wheel shown removed for clarity).

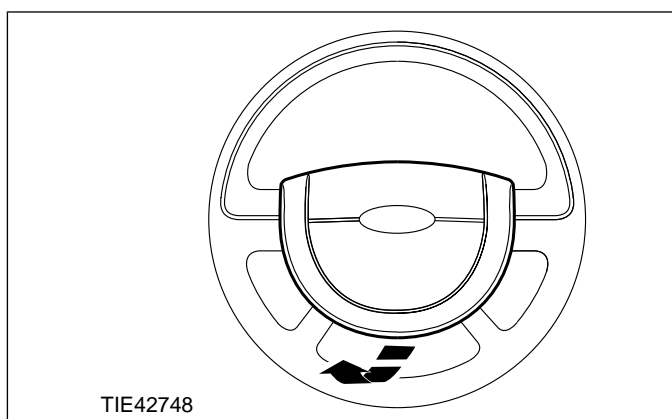
- Release the spring clip.



E48258

- WARNING:** The driver air bag module should only be inverted long enough to disconnect the driver air bag module electrical connector. Handle with extreme care making sure that, if for any reason this procedure is interrupted, the driver air bag module is turned the correct way up, with the trim cover side uppermost. Failure to follow these instructions may result in personal injury.

Invert the driver air bag module to access the driver air bag module wiring harness.

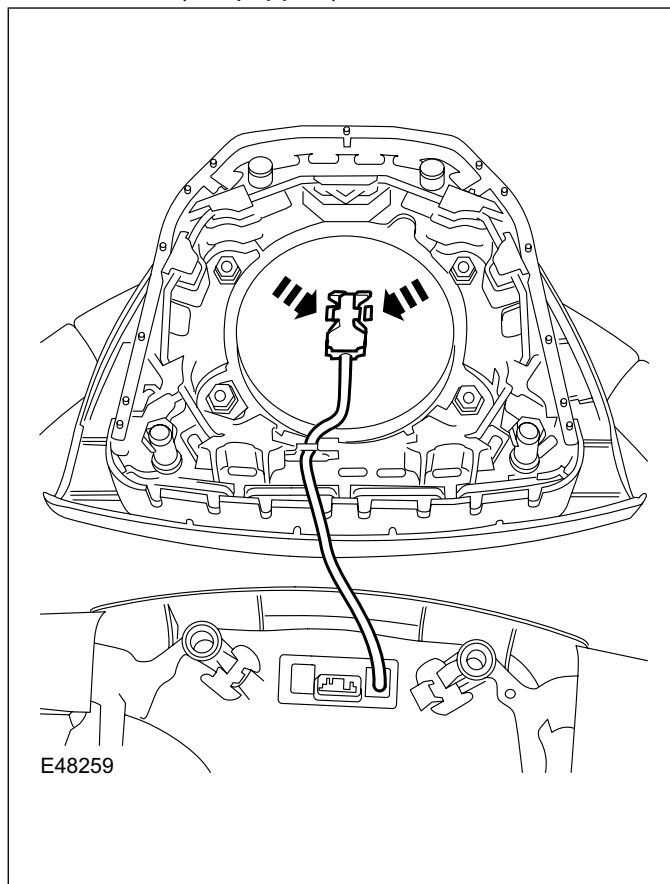


TIE42748

- NOTE: It may be necessary to use a pair of pointed nose pliers to release the driver air bag module electrical connector locking tangs.

Disconnect the driver air bag module electrical connector.

- Disconnect the driver air bag module ground cable (if equipped).



E48259

REMOVAL AND INSTALLATION

Passenger Air Bag Module — Vehicles Built Up To: 04/2006

WARNINGS:

- ▲ To avoid accidental deployment, the restraints control module backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the supplemental restraint system (SRS), or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.
- ▲ Always wear safety glasses when working on an air bag equipped vehicle and when handling an air bag module. Failure to follow this instruction may result in personal injury.
- ▲ To minimize the possibility of premature deployment, do not use radio key code savers when working on the supplemental restraint system. Failure to follow this instruction may result in personal injury.
- ▲ To minimize the possibility of injury in the event of premature deployment, always carry a live air bag module with the bag and trim cover pointed away from the body. Failure to follow this instruction may result in personal injury.
- ▲ To minimize the possibility of premature deployment, live air bag modules must only be placed on work benches which have been ground bonded and with the trim cover facing up. Failure to follow these instructions may result in personal injury.
- ▲ Never probe the electrical connectors of air bag modules or any other supplemental restraint system component. Failure to follow this instruction may result in personal injury.
- ▲ Painting over the driver air bag module trim cover or instrument panel could lead to deterioration of the trim cover and air bags. Do not for any reason attempt to paint discolored or damaged air bag module trim covers or instrument panel. Install a new component. Failure to follow this instruction may result in injury.

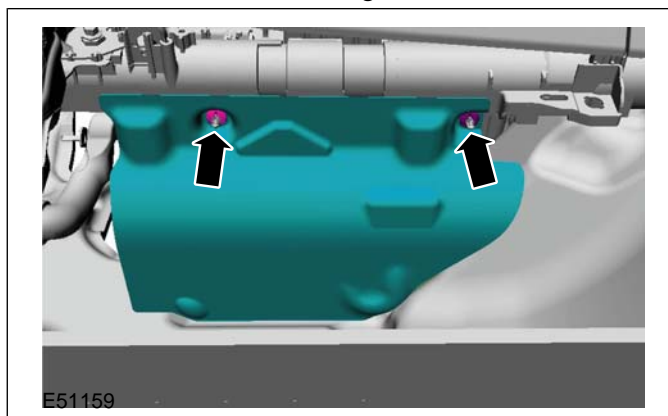
All vehicles

1. Disconnect the battery ground cable.

For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

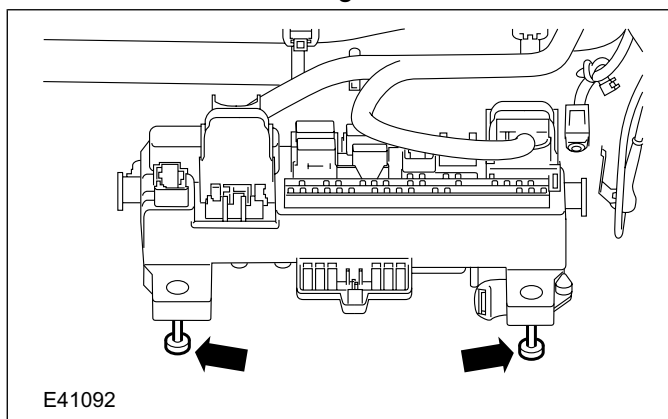
Vehicles with air conditioning

2. Remove the central junction box (CJB) cover.
 - Remove the retaining screws.



3. Detach the CJB from the in-vehicle crossbeam

- Rotate the retaining screws clockwise.



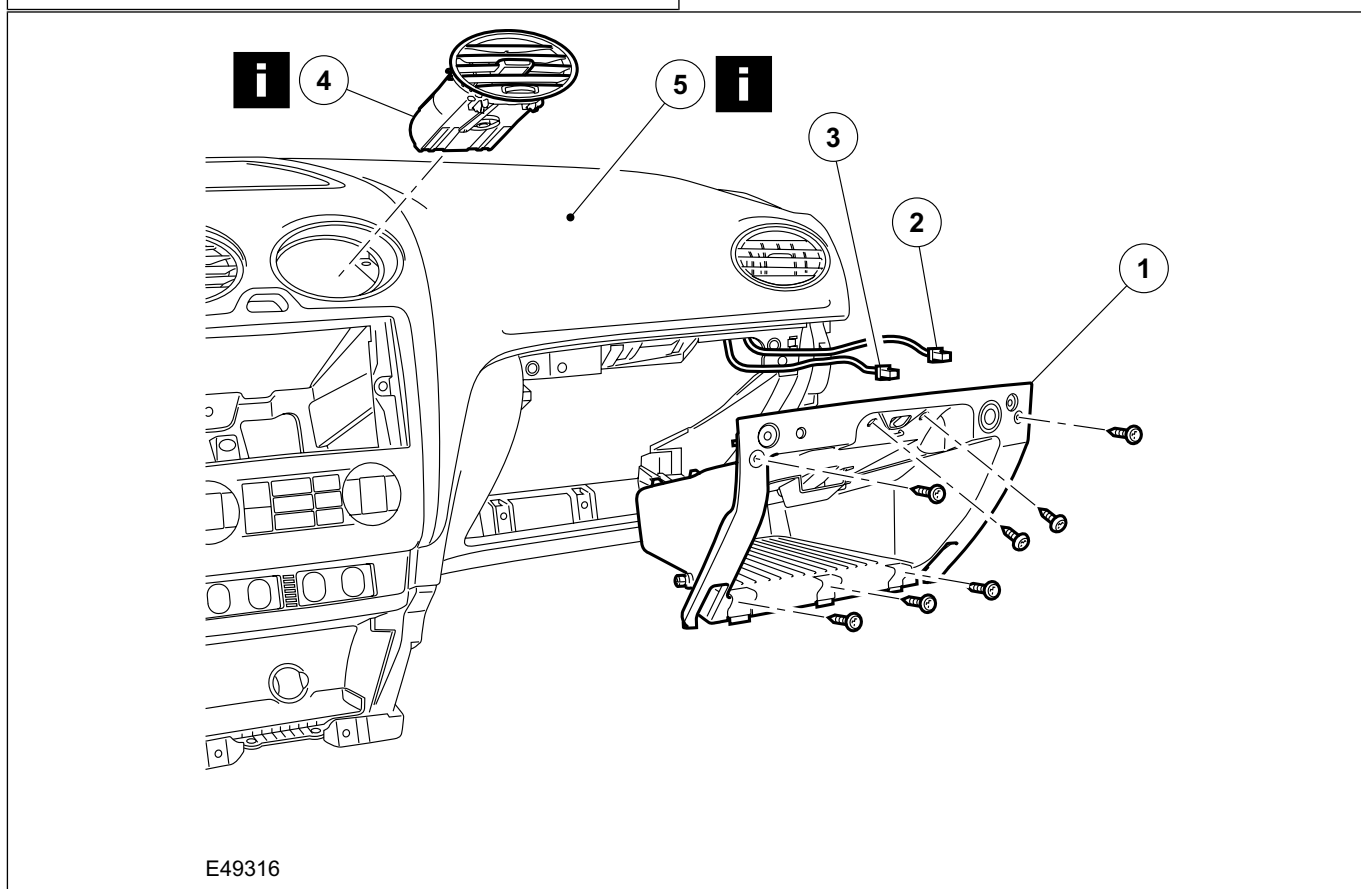
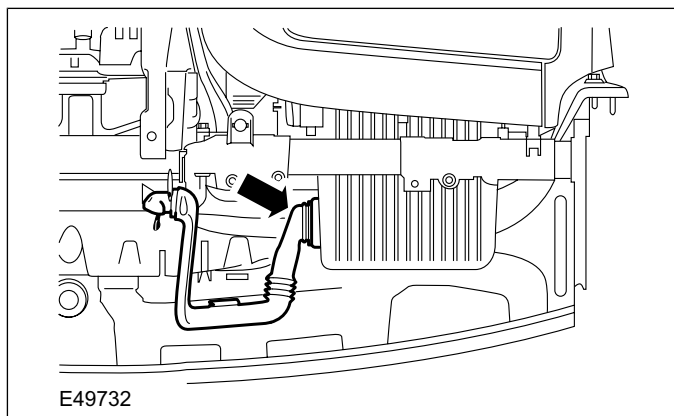
REMOVAL AND INSTALLATION

4. Disconnect the glove compartment cooling hose from the glove compartment.

All vehicles

5. Open the glove compartment lid.

6. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Glove compartment
2	MP3 auxiliary connector (if equipped)
3	Passenger air bag module deactivation (PAD) switch electrical connector (if equipped) See Removal Detail

Item	Description
4	Inner register See Removal Detail
5	Passenger air bag module See Removal Detail

All vehicles

7. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Vehicles with global closing

8. Initialize the door window motors.

For additional information, refer to: Door

Window Motor Initialization (501-11 Glass, Frames and Mechanisms, General Procedures).

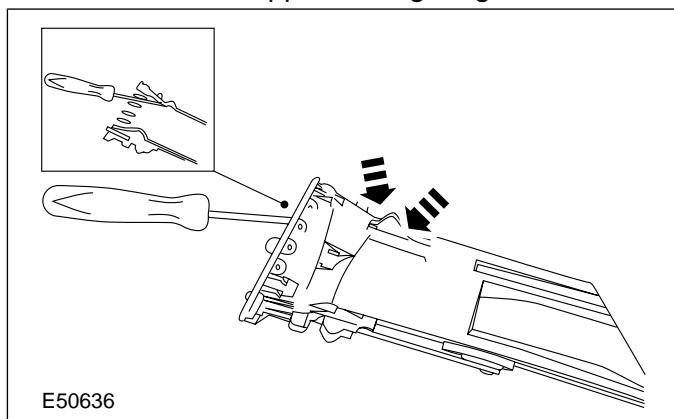
Removal Details

Item 4 Inner register

- NOTE:** The register is retained by four locking tangs. Releasing the upper locking tangs will provide enough movement to release the lower locking tangs.

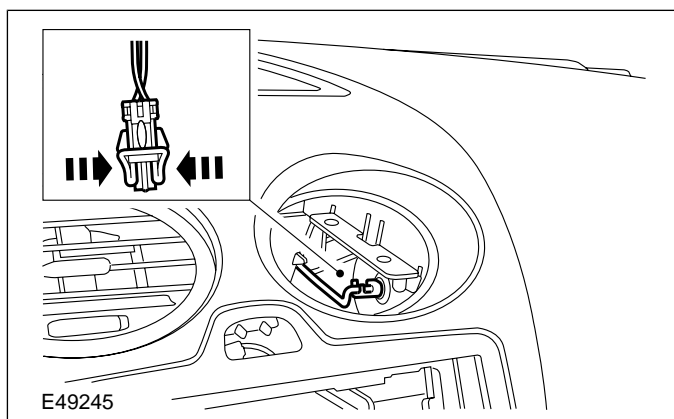
Remove the inner register.

- Using a suitable thin bladed screwdriver, release the upper locking tangs.

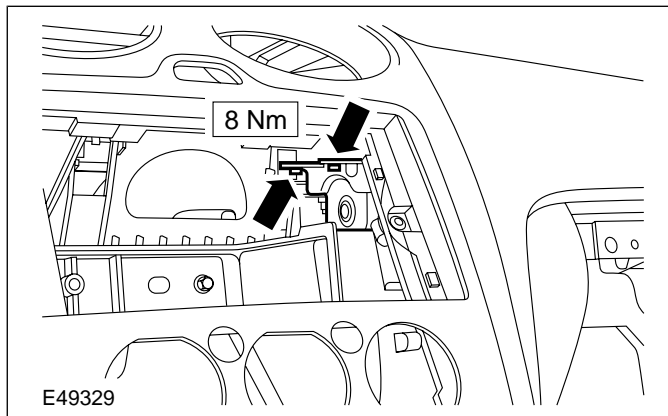


Item 5 Passenger air bag module

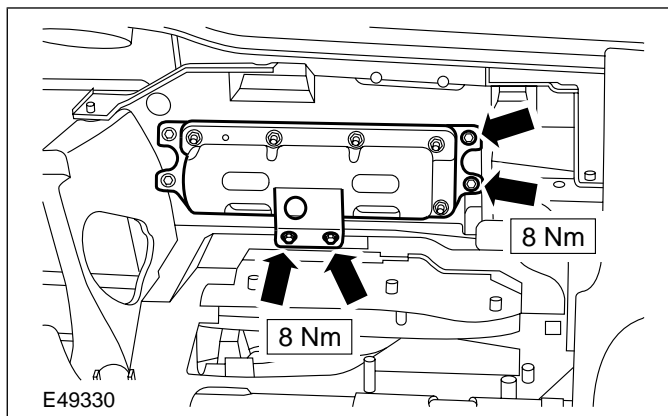
- Disconnect the passenger air bag module electrical connector.**



- Remove the passenger air bag module inner retaining bolts.**



- Remove the passenger air bag module.**



REMOVAL AND INSTALLATION

Passenger Air Bag Module — Vehicles Built From: 04/2006

Removal

WARNINGS:

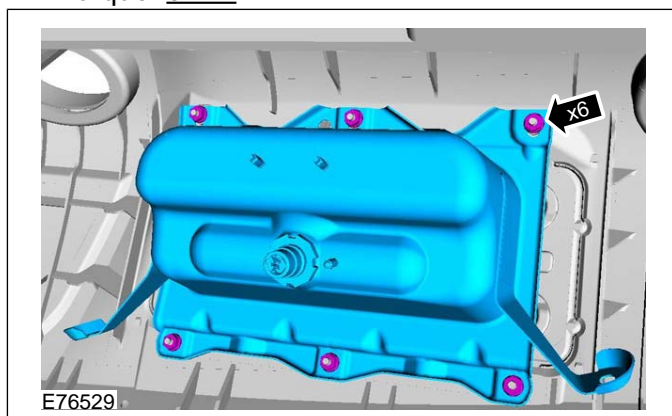
- ▲ The supplemental restraint system (SRS) is active for a certain length of time after the power supply has been disconnected. Wait for a minimum of 3 minutes before disconnecting or removing any SRS components.
- ▲ Wear safety goggles.
- ▲ Make sure that the vehicle electrical system is fully depowered and no other power source is connected.
- ▲ Do not probe supplemental restraint system (SRS) electrical connectors.
- ▲ Refer to: **Supplemental Restraint System (SRS) Health and Safety Precautions (100-00 General Information, Description and Operation)**.

NOTE: Removal steps in this procedure may contain installation details.

1. Remove the instrument panel.

Refer to: Instrument Panel (501-12 Instrument Panel and Console, Removal and Installation).

2. Torque: 8 Nm



Installation

1. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Side Air Bag Module

WARNINGS:

- ▲ Always wear safety glasses when working on an air bag equipped vehicle and when handling an air bag module. Failure to follow this instruction may result in personal injury.
- ▲ To minimize the possibility of premature deployment, do not use radio key code savers when working on the supplemental restraint system. Failure to follow this instruction may result in personal injury.
- ▲ To minimize the possibility of injury in the event of premature deployment, always carry a live air bag module with the bag and trim cover pointed away from the body. Failure to follow this instruction may result in personal injury.
- ▲ To minimize the possibility of premature deployment, live air bag modules must only be placed on work benches which have been ground bonded and with the trim cover facing up. Failure to follow these instructions may result in personal injury.

- ▲ Never probe the electrical connectors of air bag modules or any other supplemental restraint system component. Failure to follow this instruction may result in personal injury.

1. Disconnect the battery ground cable.

For additional information, refer to: Battery **Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

2. Remove the front seat backrest cover. For additional information, refer to: (501-10 Seating)

Front Seat Backrest Cover - 3-Door (Removal and Installation),

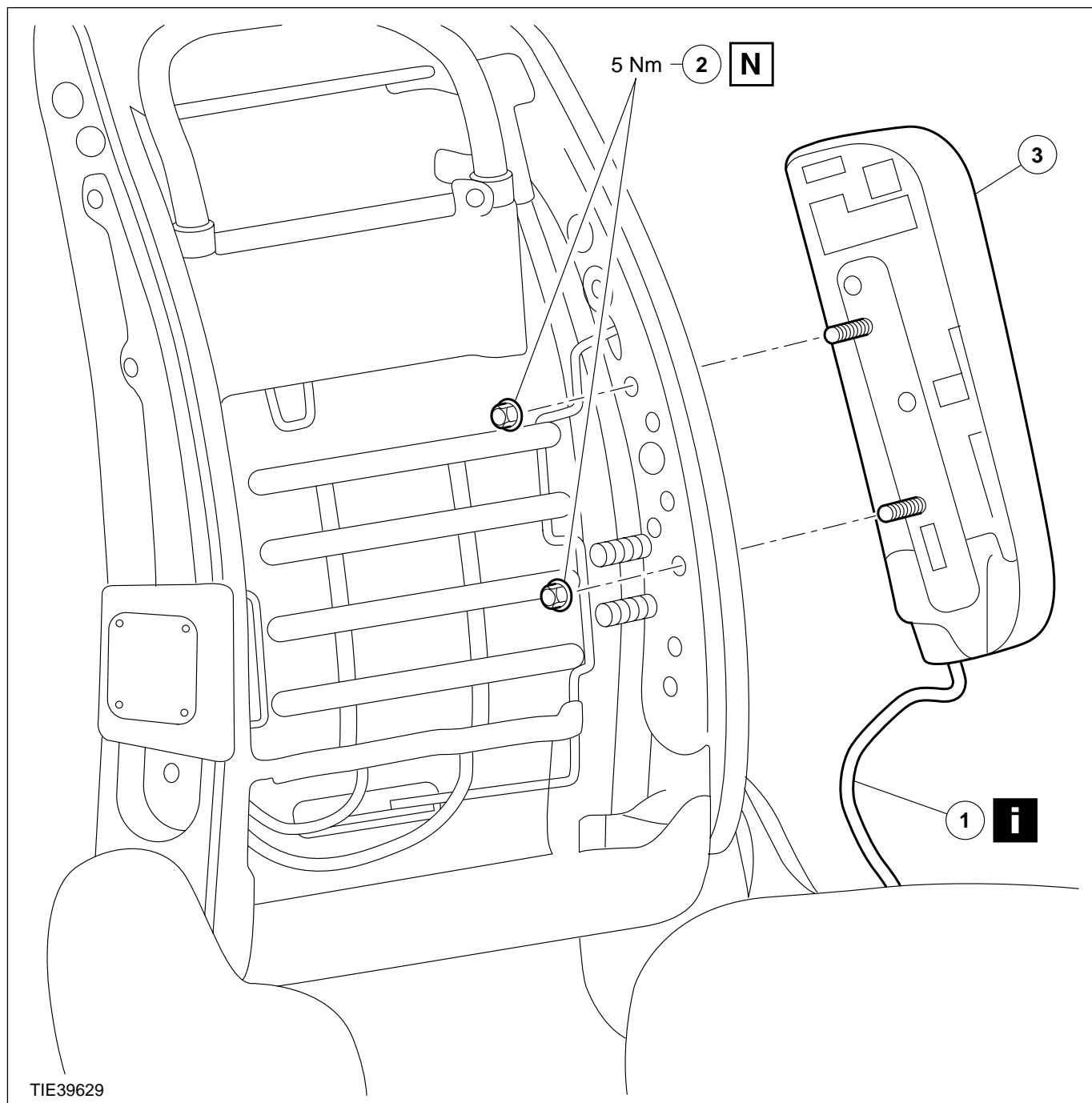
Front Seat Backrest Cover - 4-Door/5-Door/Wagon (Removal and Installation),

Front Seat Backrest Cover - 4-Door/5-Door/Wagon, Vehicles With: 6-Way Power Seats (Removal and Installation),

Front Seat Backrest Cover - 2.5L Duratec-ST (VI5) (Removal and Installation).

3. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



Item	Description
1	Side air bag module wiring harness See Removal Detail
2	Side air bag module retaining nuts
3	Side air bag module

Vehicles with global closing

5. Initialize the door window motors.

For additional information, refer to: Door Window Motor Initialization (501-11 Glass, Frames and Mechanisms, General Procedures).

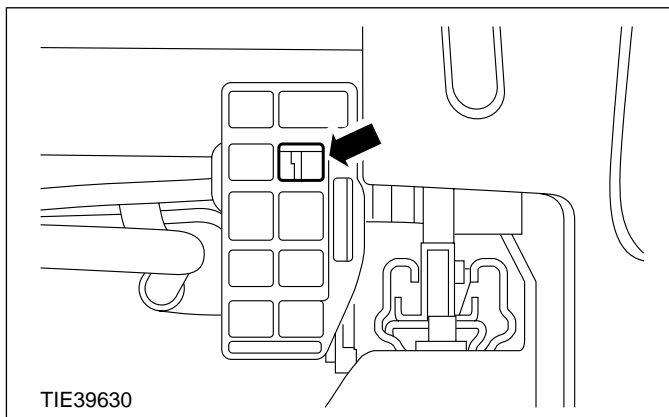
All vehicles

4. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION**Removal Details****Item 1 Side air bag module wiring harness**

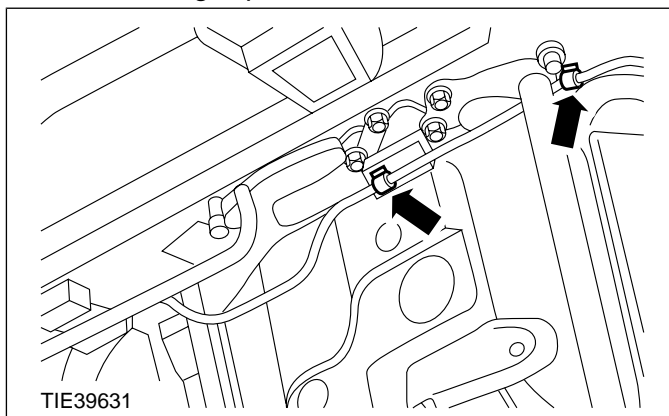
1. **▲WARNING:** Note the position of the wiring harness, to aid installation. An incorrectly routed wiring harness could become damaged when the seat is moved. Failure to follow this instruction may result in personal injury.

Detach the side air bag electrical connector from the connector block.



2. **Detach the side air bag module wiring harness from the seat frame.**

- Use a trim tool to carefully release the retaining clips.



REMOVAL AND INSTALLATION

Side Air Curtain Module — 3-Door/5-Door

WARNINGS:

▲ To avoid accidental deployment, the restraints control module backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the supplemental restraint system (SRS), or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.

▲ Always wear safety glasses when working on an air bag equipped vehicle and when handling an air bag module. Failure to follow this instruction may result in personal injury.

▲ To minimize the possibility of premature deployment, do not use radio key code savers when working on the supplemental restraint system. Failure to follow this instruction may result in personal injury.

▲ To minimize the possibility of injury in the event of premature deployment, always carry a live air bag module with the bag and trim cover pointed away from the body. Failure to follow this instruction may result in personal injury.

▲ To minimize the possibility of premature deployment, live air bag modules must only be placed on work benches which have been ground bonded and with the trim cover facing up. Failure to follow these instructions may result in personal injury.

▲ Never probe the electrical connectors of air bag modules or any other supplemental restraint system component. Failure to follow this instruction may result in personal injury.

1. Disconnect the battery ground cable.

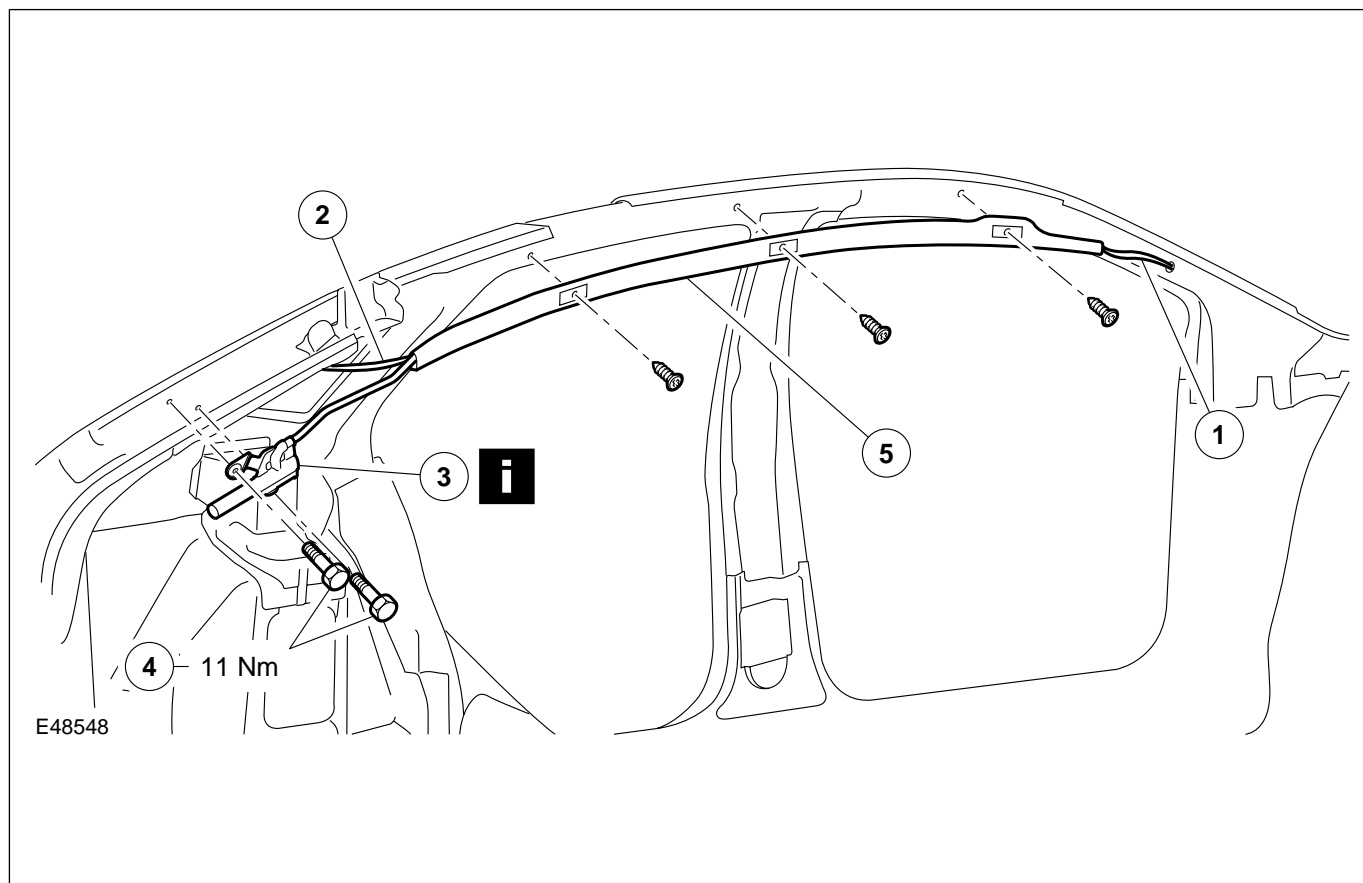
For additional information, refer to: **Battery Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).

2. Remove the headliner.

For additional information, refer to: **Headliner - 3-Door, Vehicles With: Sliding Roof Opening Panel** (501-05 Interior Trim and Ornamentation, Removal and Installation) / **Headliner - Vehicles Without: Sliding Roof Opening Panel** (501-05 Interior Trim and Ornamentation, Removal and Installation).

3. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



Item	Description
1	Front retaining cord
2	Rear retaining cord (if equipped)
3	Side air curtain module electrical connector See Removal Detail
4	Side air curtain module retaining bolts
5	Side air curtain module

All vehicles

4. To install, reverse the removal procedure.

Vehicles with global closing

5. Initialize the door window motors.

For additional information, refer to: **Door Window Motor Initialization** (501-11 Glass, Frames and Mechanisms, General Procedures).

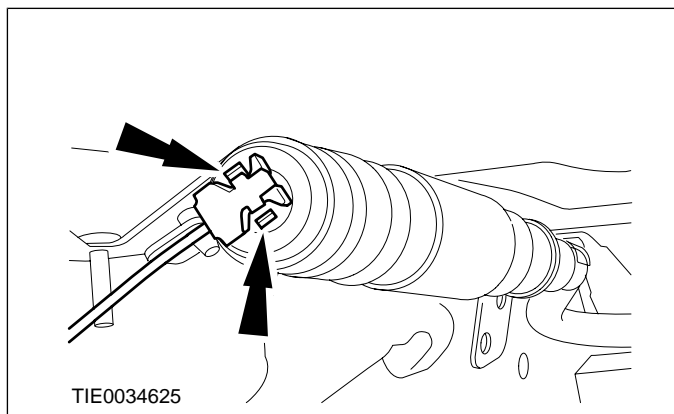
Removal Details

Item 3 Side air curtain module electrical connector

- NOTE:** It may be necessary to use a pair of pointed nose pliers to release the electrical connector locking tangs.

REMOVAL AND INSTALLATION

Disconnect the side air curtain module electrical connector.



REMOVAL AND INSTALLATION

Clockspring

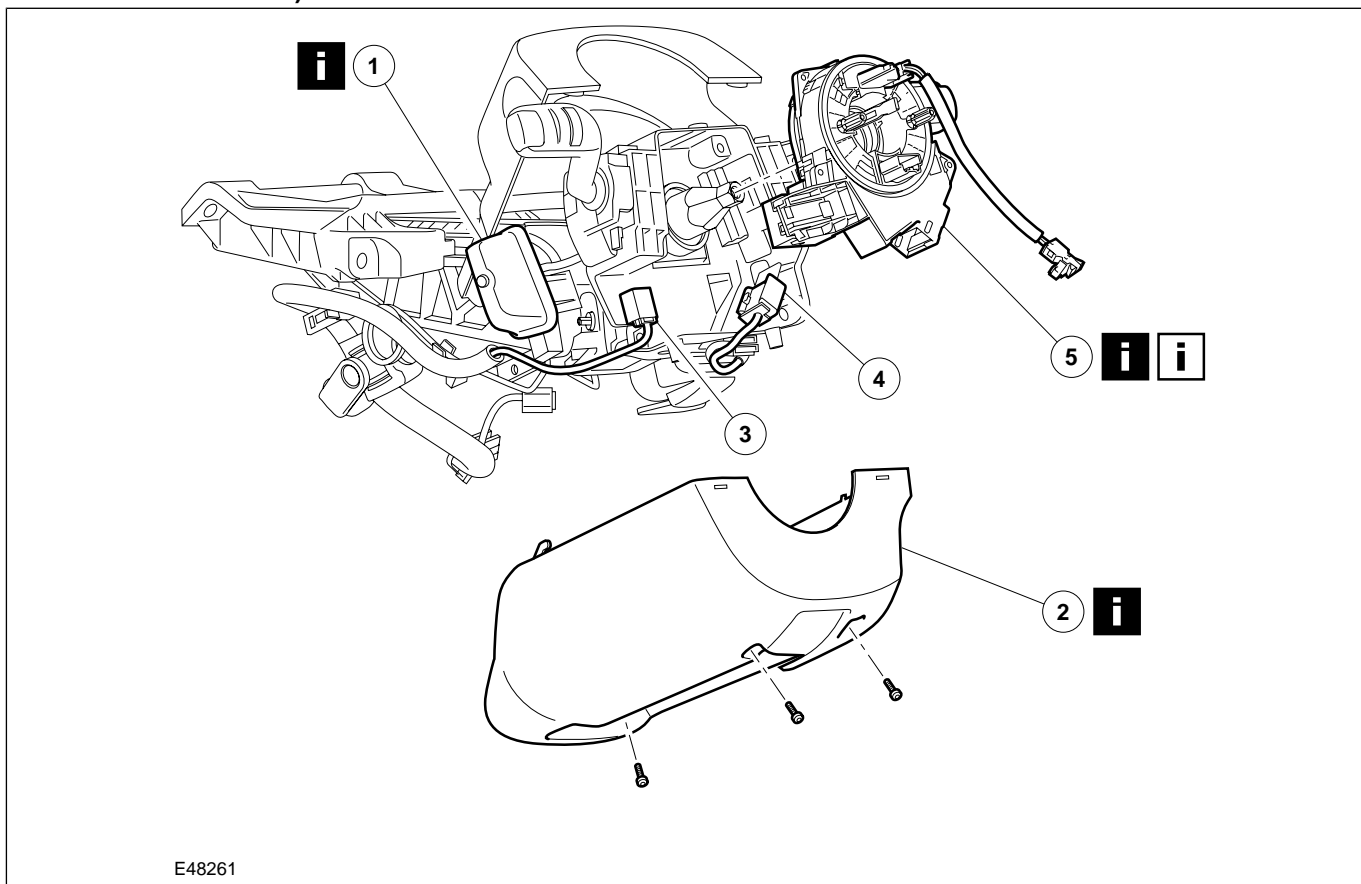
General Equipment

Worldwide diagnostic system (WDS)

2. Remove the components in the order indicated in the following illustration(s) and table(s).

1. Remove the steering wheel.

For additional information, refer to: **Steering Wheel (211-04 Steering Column, Removal and Installation).**



E48261

Item	Description
1	Audio control switch (if equipped) See Removal Detail
2	Steering column lower shroud See Removal Detail
3	Steering wheel rotation sensor electrical connector (if equipped)
4	Clockspring electrical connector
5	Clockspring See Removal Detail See Installation Detail

All vehicles

3. To install, reverse the removal procedure.

Vehicles with stability assist

4. **▲WARNING:** The electronic stability program must be re-configured. Failure to follow this instruction may result in personal injury.

Configure the stability assist program using WDS.

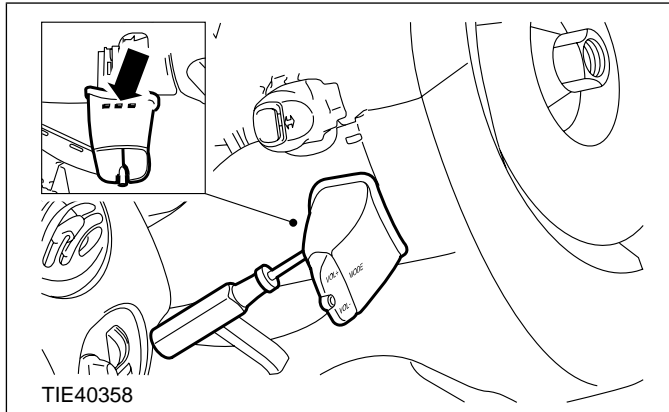
Removal Details

REMOVAL AND INSTALLATION

Item 1 Audio control switch (if equipped)

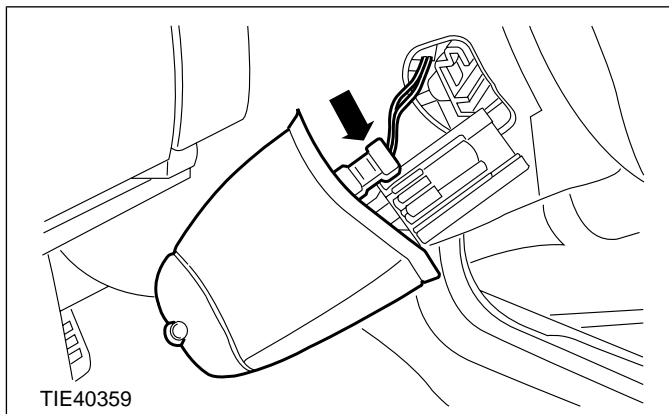
1. Detach the audio control switch from the steering column lower shroud.

- Using a thin bladed screwdriver, release the locking tang.



2. Remove the audio control switch.

- Disconnect the electrical connector.



Item 2 Steering column lower shroud

1. Release the steering column locking lever to aid the removal of the steering column lower shroud.

Installation Details

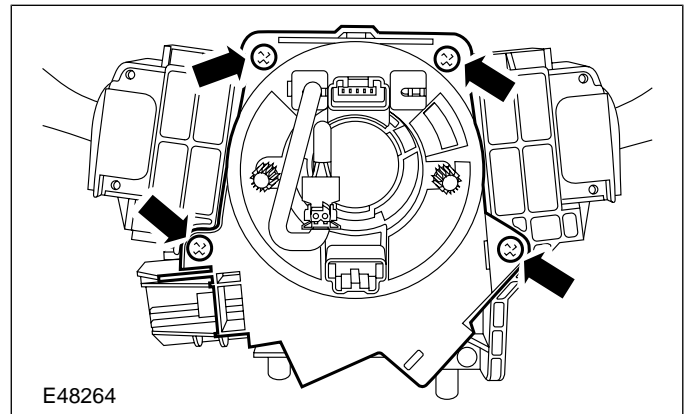
Item 5 Clockspring

WARNINGS:

- ▲ If installing a new clockspring, do not remove the clockspring locking key at this stage. Failure to follow this instruction may result in personal injury.

Item 5 Clockspring

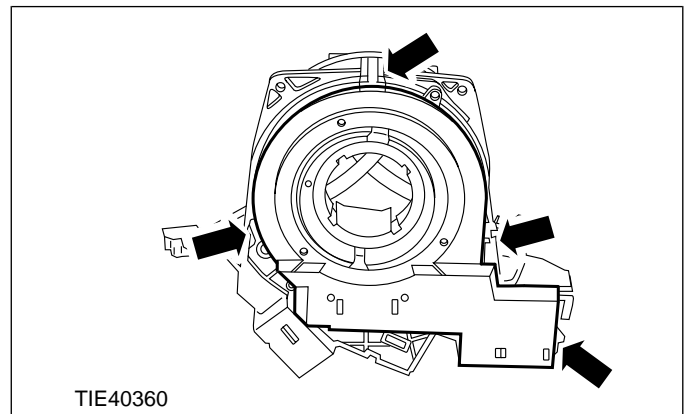
1. Remove the clockspring.



2. ▲ CAUTION: Make sure the clockspring to steering wheel rotation sensor retaining clips do not get damaged.

Remove the steering wheel rotation sensor (if equipped).

- Release the locking tangs from the clockspring.



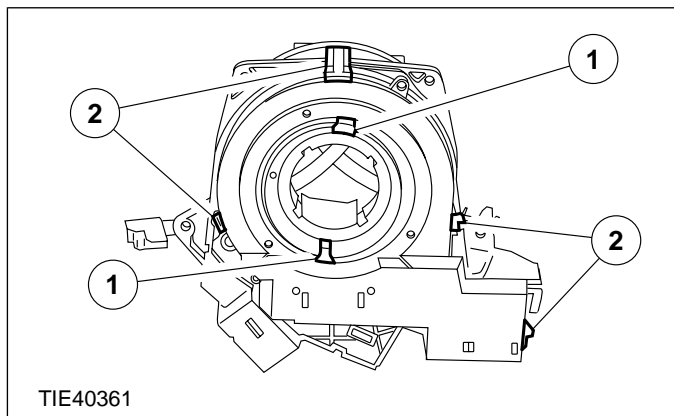
- ▲ If installing the original clockspring, do not remove the tape securing the clockspring at this stage. Failure to follow this instruction may result in personal injury.

1. ▲ CAUTION: Make sure the clockspring to steering wheel rotation sensor retaining clips do not get damaged.

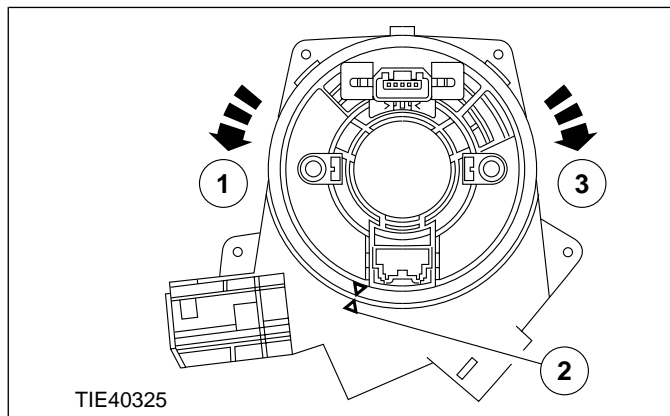
Install the steering wheel rotation sensor (if equipped).

REMOVAL AND INSTALLATION

1. Align the steering wheel rotation sensor locating tangs to the clockspring.
2. Make sure the retaining clips lock into position on the steering wheel rotation sensor.



2. Turn the clockspring in a clockwise direction, until the arrow marked on the rotor of the clockspring aligns with the raised 'V' section on the outer cover of the clockspring at approximately the 195 degrees position.
3. Turn the clockspring in a clockwise direction three turns.



2. **CAUTION:** Make sure the road wheels are in the straight ahead position.

NOTE: Make sure the turn signal lamp switch is in the off position.

Install the clockspring.

3. WARNINGS:

▲ If there is a break between installing the clockspring and installing the steering wheel, or the vehicle is left unattended by the technician, the centralizing procedure **MUST** be carried out.

▲ Incorrect centralization may result in premature component failure. If in doubt when centralizing the clockspring, repeat the centralizing procedure. Failure to follow this instruction may result in personal injury.

CAUTIONS:

- ▲** The clockspring must not be rotated more than three turns in a clockwise direction after the clockspring has been centralized.
- ▲** Make sure the road wheels are in the straight ahead position.
- ▲** When carrying out the clockspring centralizing procedure, the first turns must be in the counterclockwise direction.

Centralize the clockspring.

1. Turn the clockspring in a counterclockwise direction until a resistance is felt.

REMOVAL AND INSTALLATION

Roll Over Protection Unit

Removal

WARNINGS:

▲ The supplemental restraint system (SRS) is active for a certain length of time after the power supply has been disconnected. Wait for a minimum of 3 minutes before disconnecting or removing any SRS components.

▲ Wear safety goggles.

▲ Do not probe supplemental restraint system (SRS) electrical connectors.

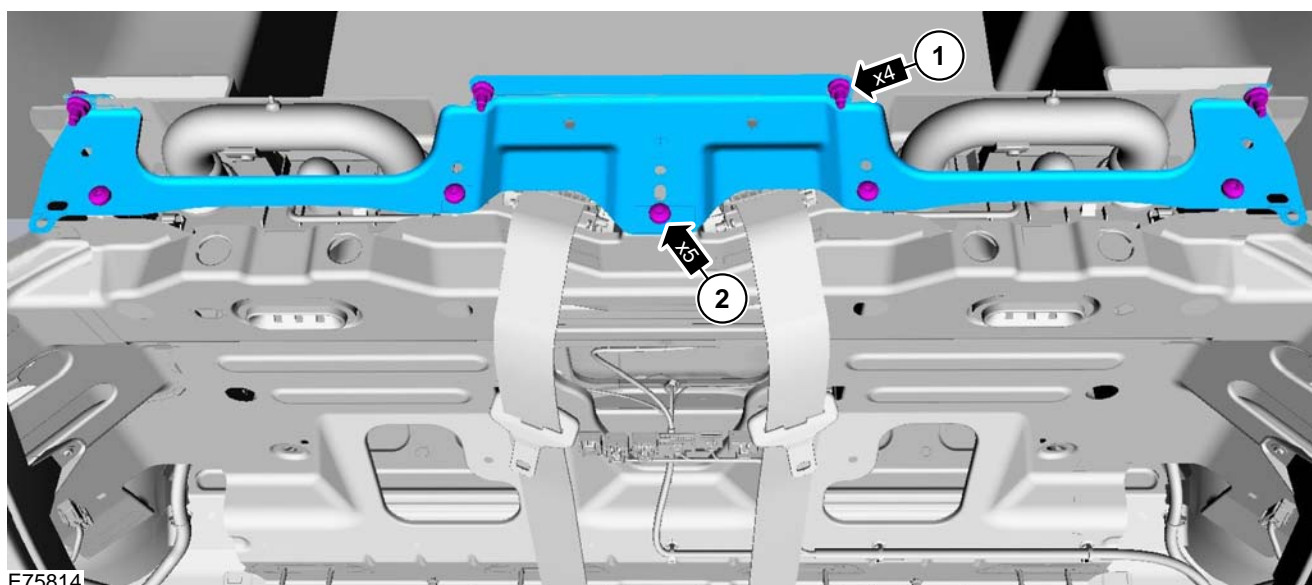
NOTE: Removal steps in this procedure may contain installation details.

1. Remove both rear quarter trim panels.

Refer to: **Rear Quarter Trim Panel - Convertible** (501-05 Interior Trim and Ornamentation, Removal and Installation).

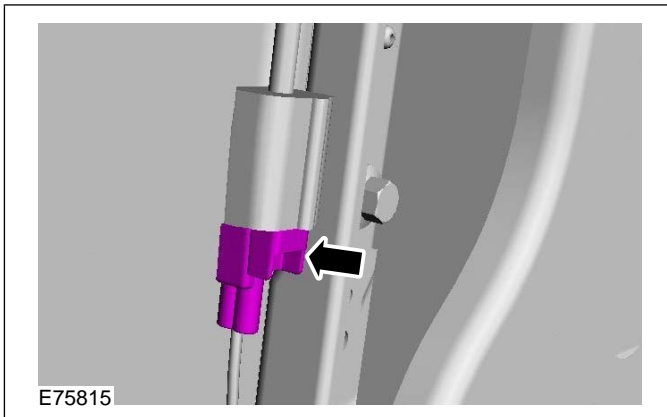
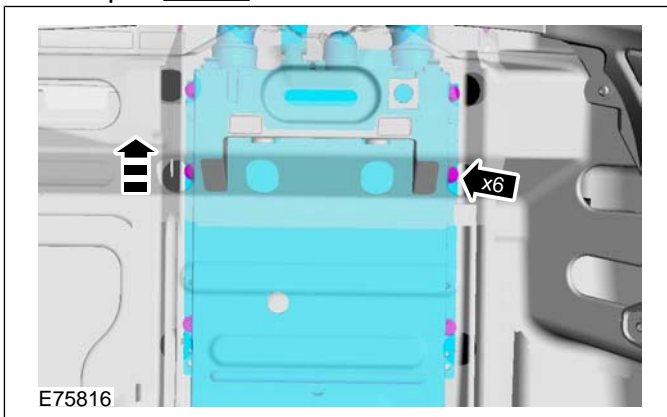
2. 1. Torque: 25 Nm

2. Torque: 25 Nm



REMOVAL AND INSTALLATION

3.

4. Torque: 25 Nm

Installation

1. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

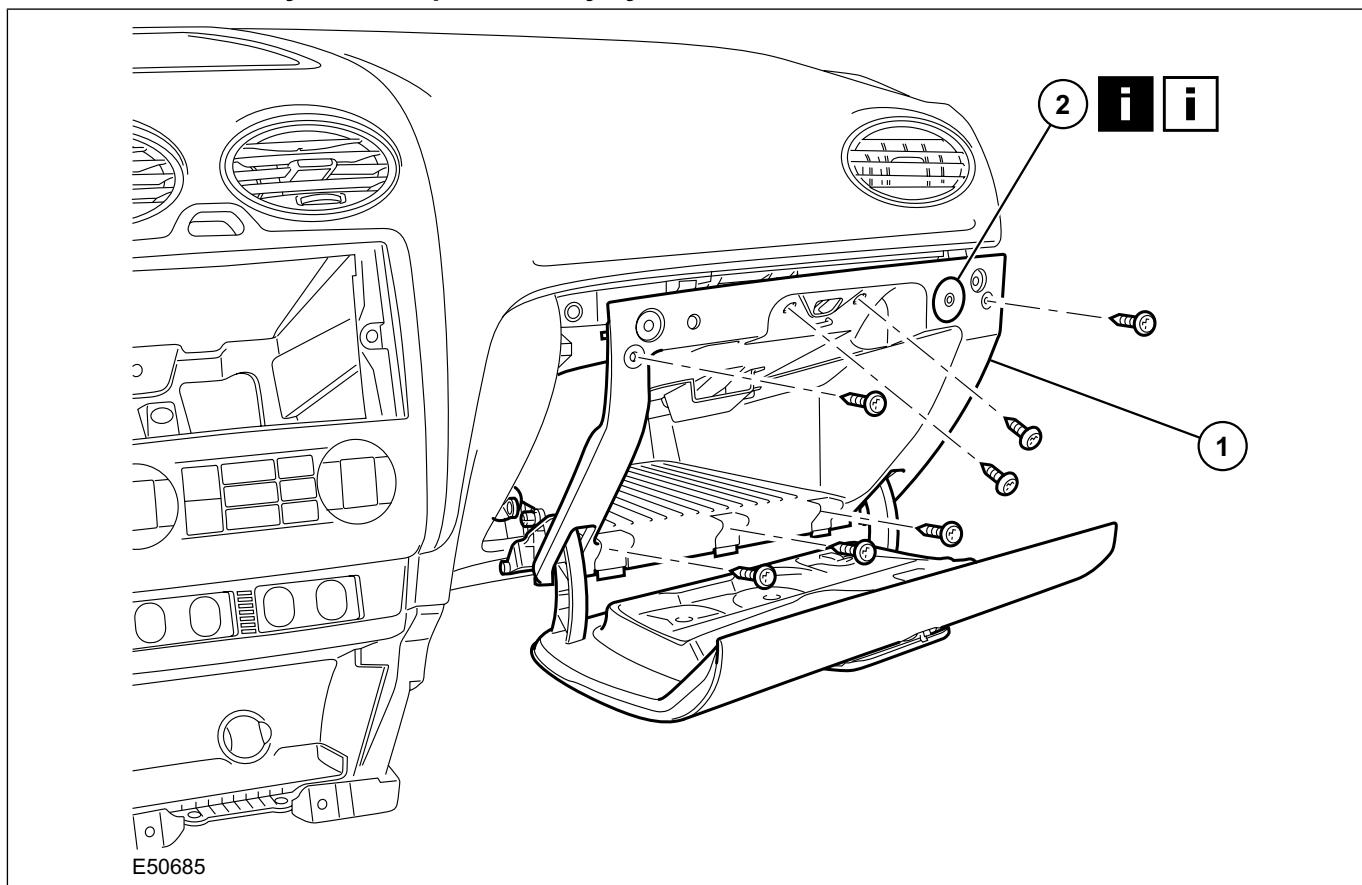
Passenger Air Bag Deactivation (PAD) Switch

WARNINGS:

- ▲ To avoid accidental deployment, the restraints control module backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the supplemental restraint system (SRS), or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.
- ▲ To minimize the possibility of premature deployment, do not use radio key code savers when working on the supplemental restraint system. Failure to follow this instruction may result in personal injury.

▲ Never probe the electrical connectors of air bag modules or any other supplemental restraint system component. Failure to follow this instruction may result in personal injury.

1. Disconnect the battery ground cable.
For additional information, refer to: Battery **Disconnect and Connect** (414-01 Battery, Mounting and Cables, General Procedures).
2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Glove compartment
2	Passenger air bag deactivation (PAD) switch See Removal Detail See Installation Detail

All vehicles

3. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Vehicles with global closing

4. Initialize the door window motors.

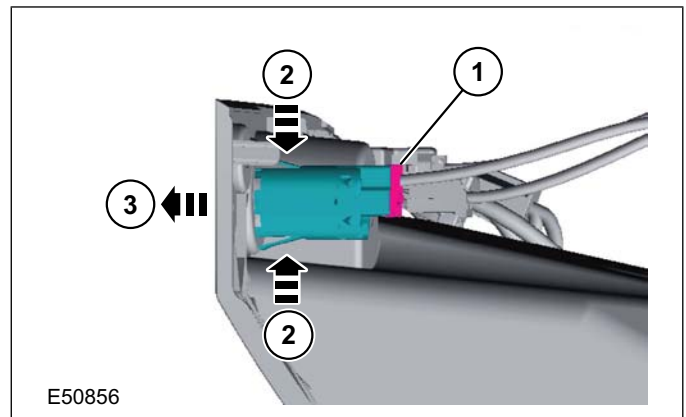
For additional information, refer to: Door

Window Motor Initialization (501-11 Glass, Frames and Mechanisms, General Procedures).

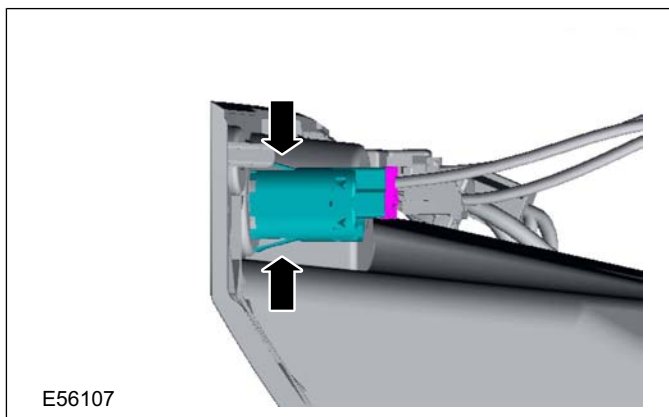
Removal Details**Item 2 Passenger air bag deactivation (PAD) switch****1. Remove the PAD switch.**

1. Disconnect the PAD switch electrical connector.
2. Depress the PAD switch locking tangs.

3. Pull the PAD switch out of the glove compartment.

**Installation Details****Item 2 Passenger air bag deactivation (PAD) switch**

1. Make sure that the PAD switch locking tangs are fully engaged in the glove compartment.



SECTION 501-25 Body Repairs - General Information

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS

Description	Finis Code	Specification
Underbody protection	5 030 492	-
Anti-corrosion wax	1 219 834	WSK-M7C89-A
Cavity wax	5 030 081	-
Profiled butyl seal	1 128 983	S-M3G4620-A
Weld primer	1 205 996	-
Clinched flange protection	1 136 479	WSK-M4G245-B
Seam sealing compound	1 205 817	WSS-M4G364-A
Body sealing compound	1 143 255	-
Metal adhesive kit	1 203 241	-
Windshield sealant	1 613 838	WSK-M4G329-A
Adhesive spoiler set	1 219 837	-

DESCRIPTION AND OPERATION

Description and Usage of Body Repair Literature

The purpose of this document is to inform the vehicle body specialist of the latest technology and also the materials and repair techniques currently used in body making. It provides information on workshop equipment and tools and on the most fundamental body repair methods.

Vehicle specific information is provided in the FordEtis workshop manual. In addition, ongoing information will be provided in the Technical Service Bulletins.

The Ford Service Organization offers basic and more in-depth training on much of the content of this general manual. As well as the practical part of the training, a further component is the Student Information document, which offers supplementary information in the form of a brochure.

You will find an overview of the complete range of training offered in the Ford Service Organization Brochure, which is published yearly.

The general section is divided into the following chapters:

- **Specification** lists technical information about the various materials used in current body applications.
- The chapter **Description and Operation** provides information on the fundamentals of vehicle body construction and materials. In addition you will also find there notes about tools, materials as well about fundamental body repair methods.

DESCRIPTION AND OPERATION

Symbols

Various symbols, signs, instructions and illustrations are used in this literature. Warnings and cautions have different meanings and require different ways of proceeding. Diagrammatic representations are provided with instructional signs for improved clarity.

When reading this handbook, you will come across the points WARNING, CAUTION AND NOTE. These points are always immediately before a single job step or a series of job steps.

These are briefly explained below:

WARNING: This caption is used when failure to follow instructions exactly or failure to follow them at all may result in a hazard to persons or in persons being injured.

CAUTION: This caption is used when incorrectly following the test procedures or instructions or failure to follow them at all could lead to damage to the vehicle or components.

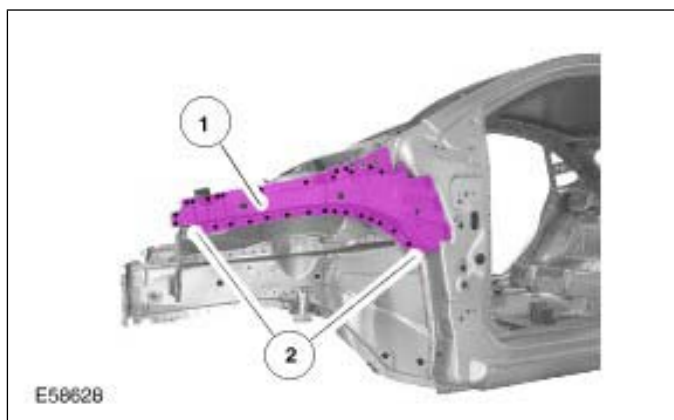
NOTE: This heading is used when the technician should be made aware of special or extra information.

Item numbers

Item numbers are inserted into a diagram when details need to be emphasized.

Item numbers with one indicator line

An item number and an indicator line point to a special location or a component. In this diagram a component and a row of spot welds are indicated.



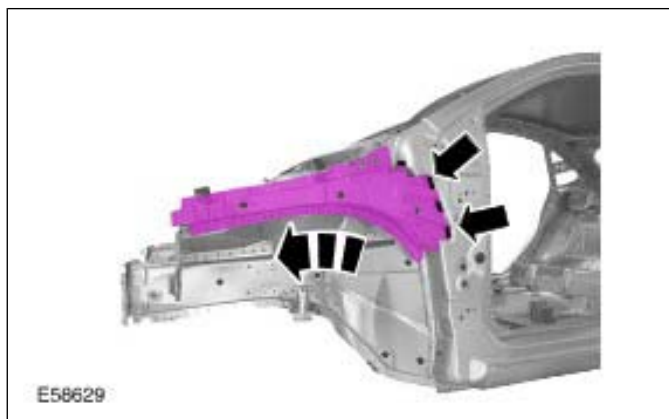
Item	Description
1	Apron panel reinforcement
2	Spot welds

Item numbers with two indicator lines

If two indicator lines lead away from one item number, then an area is being referred to. In this case the area with the spot welds to be separated is shown.

Black arrows

If the illustration of a detail is unambiguous, or there is only one detail shown, then no item number is used. A black arrow is used for this.



Broken arrows

Broken arrows represent movement. In this case the component must be removed in the direction given.

Enlargement/detail

If a detail cannot be clearly seen in the illustration because of its size or location, it is shown enlarged in a separate window. In this case a detail on the back of the B-pillar cannot be seen, and is therefore shown separately.

DESCRIPTION AND OPERATION

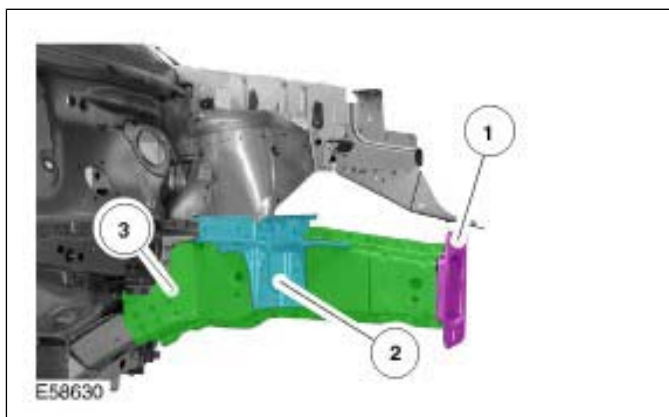


illustration is shown in turquoise and a third component is shown in dark green. Spot welds, weld seams and cut lines are shown in black.

This principle also applies to line drawings. In these, illustrations under the same topic will always show the same colors for the same components.

Different colors or shading

Different colors or shading are used to depict special areas. In an assembly operation, the colors show the sequence of removal steps.



Item	Description
1	Magenta - 1st stage
2	Turquoise - 2nd stage
3	Dark green - 3rd stage

In the repair specifications, the first component or the first partial replacement component is always shown in magenta. The second component in an

DESCRIPTION AND OPERATION**Health and Safety Precautions****General**

Appropriate repair methods and carrying out repairs correctly are particularly important for the operating safety of vehicles and for the safety of people.

▲ WARNING: There is danger of injury through:

- High voltage when electrical welding.
 - Do not perform welding work in a damp environment or on a wet substrate. Use suitable insulation underneath.
- Flammable substances in the welding area.
 - Remove flammable substances from the danger area. Remove the fuel tank and components which supply fuel. When welding in the battery area, the battery must be completely removed.
- Welding fumes, which are harmful to health.
 - Ventilate the workplace well and use the welding fumes extraction system.
- Welding spatter and UV radiation.
 - Wear protective clothing, gloves and welding mask or welding goggles.
- Pyrotechnic components.
 - Disconnect the battery negative clamp and cover the battery terminal. Remove any airbag components.

All the regulations governing Health and Safety at Work must be complied with during body repairs.

Personal protection

Welding gases and grinding dusts can be harmful to the health. For this reason, make sure that rooms are well ventilated and work using the welding fumes extraction system.

Sealants, underbody protection and paint residues must not be burnt down with an unshielded flame, as this will produce gases which are damaging to health. A dedicated extraction system must always be used when welding or brazing.

When working with substances containing solvents, good ventilation must be provided, respiratory protection must be worn and an extraction system must be used.

Do not weld in damp areas, if necessary use an insulation mat.

Welding and grinding work near the battery presents the danger of explosion. For this reason, it must be removed before the work is started.

Cutting, grinding and alignment work on metal panels can cause a noise level of 85 to 90 dB (A) or even more. For this reason, you must always wear ear defenders.

The various body areas are subject to very high forces during realignment work. Should any component suddenly become detached during this process, there is a very great danger of injury. For this reason, pulling chains and pulling shackles must be secured with arrester cables.

NOTE: Work on airbag systems may only be performed by persons who have a relevant certificate of competence.

Some special instructions must be followed when working on airbag systems:

- Always stand to the side of it when removing or installing an airbag.
- Always store an airbag or an airbag/steering wheel with the airbag side pointing upwards and in a safe place.
- Only install the airbag again when the vehicle is fully repaired and the complete electrical systems has been tested.
- Take into account the location of air curtains and shoulder airbags.

Protection of the vehicle

Protect affected areas from weld spatter and dust during all welding and grinding work on the vehicle. If metallic dust stays on the vehicle for some time, there is the likelihood of film rust formation. Grinding or sanding work produce tiny spots of damage to the paint surface, which may cause corrosion.

For this reason, make sure to:

- Use carbon fibre blankets to protect the vehicle body.
- Use covering film to protect the vehicle body from sanding dust and metal dust.

Use suitable protective measures to protect the interior when performing repair operations which relate to the inside of the vehicle.

DESCRIPTION AND OPERATION

Carbon fibre blankets are used directly around the working area. They offer maximum protection to the areas of the vehicle.

In addition, take into account:

- Remove fuel supply components as necessary.
- Protect working areas which are in danger of catching fire with a fireproof blanket.
- The welding must not cause components of the air conditioning system to become heated.
- Removal of any attached components in the space adjoining the repair area.
- Use covering paper to protect the interior from grinding dust.
- Create a definite barrier between the work area and the interior by using a carbon fibre blanket.

- Never connect the negative cable of the welder near an airbag or a control module.
- Connect the negative cable of the welder close to the location of the weld.

Protective equipment

The following protective equipment must always be used:

- Protective helmet or welding mask.
- Ear defenders and breathing protection.
- Protective gloves and safety boots.
- Welding fume extraction.

Electronic components

Increased use of comfort and safety electronics in modern motor vehicles also requires the greatest attention to be paid during body work.

Overvoltages produced during welding and in alignment work during bodyshell rectification may cause electronic systems to be damaged. In particular, the safety instructions for performing welding work on vehicles with airbag systems must be adhered to.

NOTE: After disconnecting the power supply and before performing further work, a wait time of up to 15 minutes must be maintained, depending on the vehicle. Work on airbag systems may only be performed by persons who have a relevant certificate of competence.

Pay attention to the following points:

- Disconnect the battery negative clamp and cover the battery terminal.
- Disconnect the electrical connector at the airbag control module.
- If welding is to be performed directly near a control module, it must be removed beforehand.

DESCRIPTION AND OPERATION

Environmental Regulations

Orderly and responsible waste management is not only very important for the protection of health and the environment, but it also has great importance where saving natural resources is concerned.

In body repair shops, since the introduction of the EU directives on the avoidance of vehicle waste and the promotion of return, re-use and recycling of vehicles and their components (2000/53/EU), more rigorous attention than before is also paid to avoidance and recycling of waste materials.

NOTE: The organization of disposal in the operation must comply with the country specific waste regulations:

In this respect, body repair shops must take into account and comply with the following requirements:

- Separate waste according to its recycling and disposal methods.
- Produce evidence for the correct transport and disposal of waste.

NOTE: The organization of disposal in the plant must comply with the requirements of the Waste Avoidance and Management Act.

The avoidance and recycling of waste must always take priority. However, despite all measures which may be taken, waste cannot be completely avoided.

NOTE: Useable waste which is not allowed in household rubbish, must be disposed of as special waste

All remaining waste must be treated as commercial waste and disposed of according to the local requirements.

DESCRIPTION AND OPERATION**Body Construction****General**

Two design principles have prevailed in body design. The body design can either be an integral body-frame or a frame with all attached superstructures. Mixed versions are also possible, with the design significantly increasing the stability of the frame. In all versions, the passenger cell must be preserved in the event of an accident. To this end, the front and rear ends are designed so that they absorb the energy of the impact via crumple zones.

The use of modern design and manufacturing methods, and the use of body panels whose reshaping and strength properties have been finely balanced, mean that despite the reduced weight, all safety-related aspects and requirements can be met.

Integral body-frame

In the car market, the integral safety body-frame is the result of this technological development and manufacturing technology.



E59084

NOTE: Always follow the repair instructions published in the existing workshop literature, particularly for repairs in the crumple zone. All of the specified safety requirements must be met after the work has been carried out.

The integral body-frame is completed with ancillary components, such as doors, hood, bumpers and other components. The advantages of this are:

- Maximum passive safety due to the stable passenger cell.
- Defined deformation behavior at the front and rear.

- High torsional rigidity and high flexural strength.
- Weight reduction.
- Economical manufacturing technology.

The safety of the driver and passengers is paramount for every body design. There are two key safety aspects in the body:

- Safety body cell.
- Crumple zone.

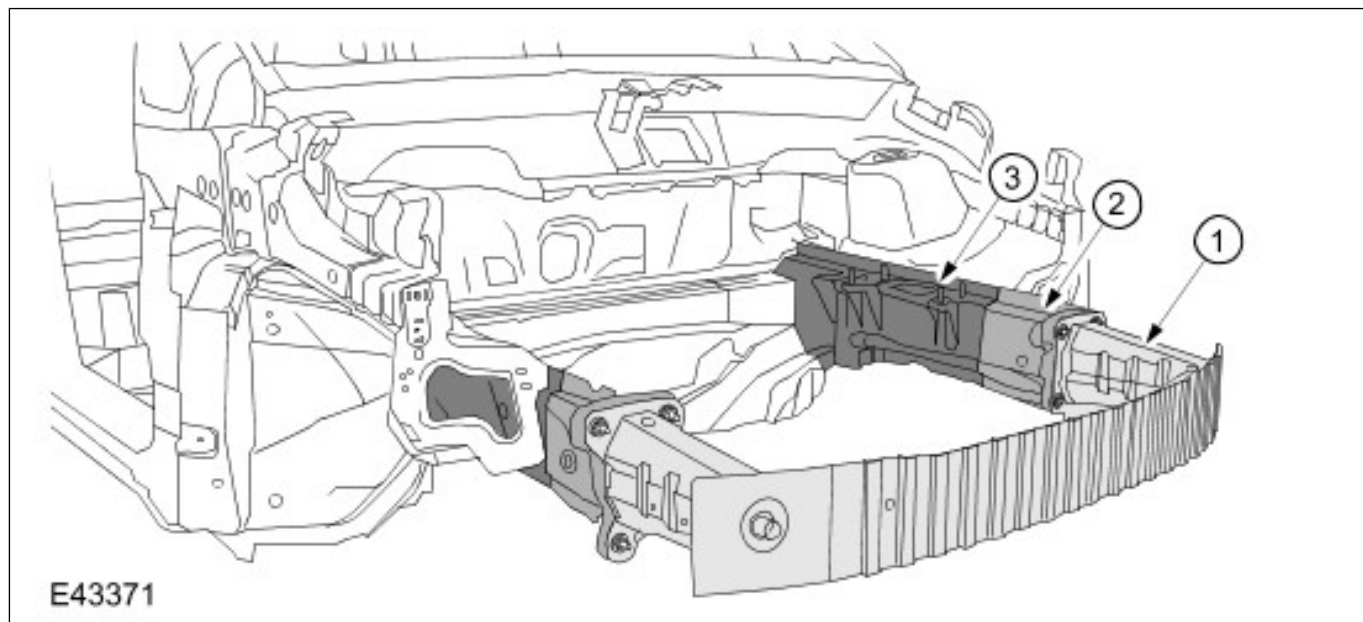
The safety body cell is characterized by the following design features:

DESCRIPTION AND OPERATION

- Stable pillars, door sills and door profiles.
- Integrated side impact protection in the doors.
- The doors are designed to open even in the event of extreme deformation.

Deformation behavior

Different materials and design features lead to staged deformation of the front and rear of the vehicle in an accident. The passenger cell remains undamaged, and the driver and passengers are not shut in.



Item	Description
1	Bolted sheet metal crash element
2	Front side member
3	Rear side member

NOTE: For more information on types of steel, please refer to the section on body materials.

The bolted crash element is made of high-strength steel. Built-in pre-determined folding points prevent damage to the cross member during gentle impacts. The use of bolts means that this can be quickly and cheaply replaced.

Side members can be manufactured from panels of different thicknesses. These are joined together through laser welding. These panels are called tailored blanks.

NOTE: Please note the model-specific instructions when repairing tailored blanks.

The rear of the vehicle, like the front of the vehicle, has structures which protect the passenger cell through staged deformation in the event of an accident. The design layouts, however, are adapted to the requirements of the rear area.

MPVs

The body of an MPV has largely the same design layout as a passenger car body. However, due to the different requirements of an MPV, the floor pan in particular had to be designed in a more stable manner. It is therefore produced as a frame construction with particularly high torsional rigidity and flexural strength.

If repair is required, the process is similar to the process for a passenger car body.

Convertible

The body of a convertible differs from the principle of the integral body-frame of a saloon due to the lack of a roof construction. To guarantee the high safety requirements, particular design changes are required within the floor pan structure.

These are:

DESCRIPTION AND OPERATION

- Reinforcements of the floor pan, in particular in the sill area.
- Reinforcements in the pillar area.
- Due to the lack of a roof construction, the so-called bridge design principle used in saloons cannot be applied here. Longitudinal and torsional rigidity must therefore be provided by other components.

Frame structures

Frame structures are used for off-road vehicles and light commercial vehicles. With these structures, a distinction is made between a separate frame structure, as on an off-road vehicle, and the composite structure of a light commercial vehicle.

The entire body structure of the commercial vehicle body differs fundamentally from that of the saloon car. The requirements of such a body cannot be compared with a passenger car body. The payload is paramount here. Accordingly, the stability requirements must also be taken into account in the body design.

These are:

- Floor pan as frame structure with high torsional rigidity and flexural strength.
- Thicker materials and greater reinforcements in the frame area.
- Partly large surface panels and high volume shaped parts.
- Side panels only make a small contribution to the overall stability of the body.
- Longitudinal crimping, reinforcements and bonded connections prevent the panel surfaces from oscillating during drive mode.

Off-road vehicles

The body designs of off-road vehicles are not subject to the principle of the integral body-frame. Their basic construction corresponds to a chassis frame with an attached body.

This stable chassis structure has significant advantages for off-road vehicles:

- High torsional rigidity for off-road use.
- High payload and large trailer capacity.
- High ground clearance.
- Stable attachment possibilities for all drive assemblies.

If repairs are to be carried out, a different repair technique is required for this body and frame structure.

A deformed frame structure requires high suction power during straightening repairs. Frequently, the body also has to be detached from the frame structure in order to carry out separate repair.

Due to the very stable frame structure, please note that the straightening behavior is completely different to that of a passenger vehicle. The frame and the attached body must be repaired independently of each other.

DESCRIPTION AND OPERATION

Diagnosis and Damage Evaluation

In order to correctly determine the extent of the damage caused by an accident, in-depth technical knowledge, practical experience with the technical equipment and the testing and measuring devices is required.

Assessment of the extent of the damage includes visual inspection and dimensional inspection of the vehicle. If damage to the chassis geometry is visible even during the visual inspection, the vehicle is to be inspected on an axle alignment jig.

Visual recording of the damage

From a profitability perspective, the possibility of a sectional replacement must be taken into consideration when assessing the damage to a vehicle damaged in an accident.

NOTE: Training courses are offered on this subject. For an overview, please refer to the Ford Service Organisation's training course brochure.

Positive accidental damage assessment can only be achieved if the service technician is able to reconstruct the effect of an impact on the body structure.

For example:

If the impact occurs on the front left-hand side member, the right-hand side member will usually also have been damaged. Often the length of this side member will not have changed, but because of the rigid body design, it may have become deformed. This damage can be detected through the size of the gap between the door and fender or by measuring the vehicle.

In the case of more severe impacts, in which the front part of the vehicle cannot absorb all of the impact energy, the passenger cell is also used to absorb the energy. Here, the energy is transferred via the A pillar and distributed there. This results in deformations in the roof and the door sill.

NOTE: In order to determine the damage as accurately as possible, it may be necessary to remove ancillary components, such as bumpers and inner fenders.

It is possible to draw conclusions about the extent of the damage through a visual inspection of the external damage. In general, the following areas are to be checked during the visual inspection:

- Outer panel including seam seals for cracks or flakes in the paint caused by the accident.
- Size of the gap on doors and hoods for evenness.
- The vehicle roof for folds (gap measurement on vehicles with sunroof)
- Dotted flange in door section for deformation and cracked weld spots.
- The side members and crash components for crumpling and folding.
- Trunk floor and floor pan from above and below for crumpling.

Hidden damage

In addition to external indicators, such as flaked off paint or cracks in the underbody protection, it is vital to check for deformations that are not visible from the outside (hidden body damage) during a damage assessment. Unless ancillary components are removed, it is often impossible to achieve accurate diagnosis of the underlying body parts.

Particular attention must be paid to the following components:

- The A, B and C pillars in the roof area.
- Floor pan.
- Rear ancillary components, such as bumper, lights, etc.
- Trunk floor, spare wheel cavity.
- Rear coverings, such as interior trim, carpet, etc.
- Lower rubber seals, e.g. in door area (welded flange).
- Area under the rear seat.
- Attachment points of transmission system, steering, engine, drive shafts, front and rear axles.
- Electrical components, e.g. radio (damage through shaking).

Light commercial vehicles and off-road vehicles

The basic body design of light commercial vehicles and off-road vehicles corresponds to a chassis frame with an attached body.

DESCRIPTION AND OPERATION

Therefore, both vehicle components, the frame and the body, must be checked thoroughly during damage assessment.

As with all vehicles, it is important to inspect the impact area and the shock absorbing areas closely for damage.

With these vehicles too, simple inspections can also reveal indicators of possible deformations.

In addition, you must check for the following for vehicles with frame structures:

- Cracks in the paint on the frame welds.
- Traces of deformation on frame components.
- Check attachment points (silent blocks) for position changes and damage.
- Changed position of rubber seals.
- Fit and function of the ancillary components.

Convertible-specific crash characteristics

Due to the convertible design, the deformation paths arising during an impact are larger than the actual permanent deformations.

In the case of severe impacts to the front or rear end, deformations may even extensively deform the passenger cell with no recognizable permanent damage. This is referred to as a large compression characteristic.

NOTE: Visual and functional inspections of the doors and convertible roof must be performed during damage assessment.

Adjacent mechanical components may nevertheless be damaged owing to these deformations. The following should particularly be inspected:

- Doors and door hinges.
- Lock pins and door guides.
- Cover mechanism.

DESCRIPTION AND OPERATION

Body Sheet Metal

Types of steel

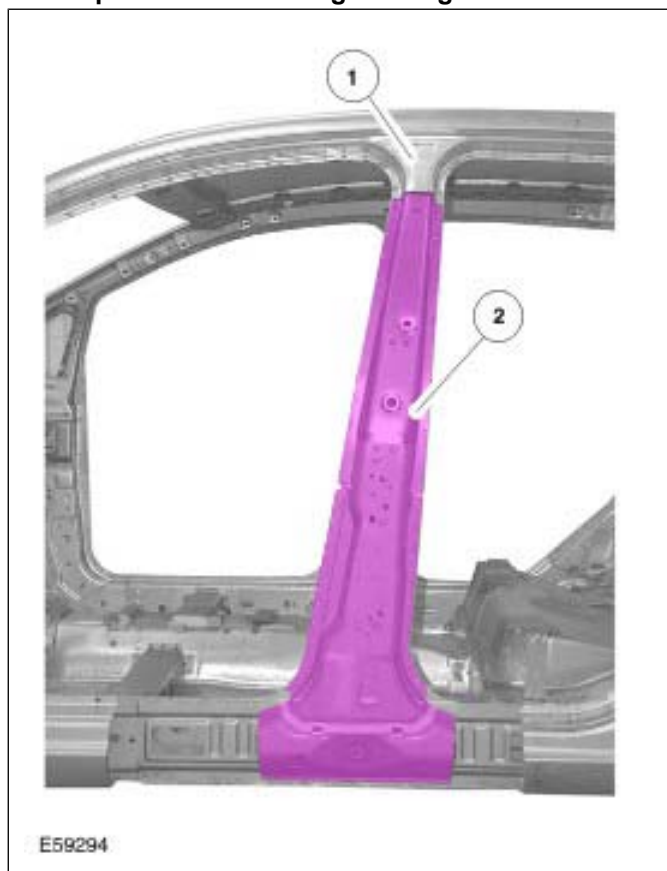
Steel body panels are still the most important materials used in the fabrication of stressed skin vehicle bodies. In addition to the familiar types of steel, reinforced high-strength and also ultra-high-strength special steels are used in vehicle body construction.

Types of steels are classified by their properties of strength and elasticity.

- Normal strength steel has a minimum yield strength of up to about 210 N/mm².
- High strength steels have a minimum yield strength of about 150 to 600 N/mm².
- Ultra-high-strength steels have a minimum yield strength of about 400 to 1200 N/mm².

High-strength and ultra-high-strength steels are mostly installed in safety relevant locations (structural components). Among others, these are side members, pillars, roof frames.

Example of the use of high-strength steel



Item	Description
1	Normal strength steel
2	High strength steel

Normal strength steels

Normal strength steels are most often used in body construction. They are relatively soft and are therefore particularly suitable for the deep drawing processes used in body manufacturing. As well as very good reshaping properties, the panels also have a relatively high rigidity.

High strength steel panels

The strength of the material and the nature of the surface can be changed as required by different engineering processes. In order to achieve suitable configuration and a good match between

DESCRIPTION AND OPERATION

construction specifications and what is possible in production, a large range of high strength panels is available.

The range of the minimum yield strength is from 180 N/mm² to 460 N/mm². High strength thin steel panels usually have a surface finish. Electrolytic surface sealing is preferred.

Within the group of high strength steels, various types of steel are used in body construction:

- **Micro-alloyed high strength steels** for very difficult drawn components such as fenders, the internal components of doors, hoods and luggage compartment lids or load bearing components such as sidemembers, crossmembers etc.
- **Bake-hardening steels** and **phosphorus alloyed steels** for external panel components with higher draw depth and subject to higher operational demands.
- **Isotropic materials** for flat shaped outer steel panels on doors, hoods, luggage compartment lids, roofs.

Ultra-high-strength steels

These steels are predominately used for body structural components which are relevant to safety. Despite the reduced thicknesses of the panels used, weight reduction is often achieved together with greater strength.

As with high-strength steels, special types of steel are used in the ultra-high-strength steels group:

- **Complex phase steels** are used for door side impact carriers, bumper carriers and body components relevant to crashes. Besides high strength, they have good cold reshaping properties and are easily welded.
- **Dual phase steels** have the same properties as complex phase steels. Because of their high strengthening properties they are suitable for body reinforcements.
- **Residual austenite steels** and **martensite phase steels** have very high strength levels of up to 1200 N/mm² and are mostly used in body structures relevant to crashes.

Because of the use of such steels, some special points must be taken into account during body repair:

- Increased force required during straightening.
- Strong springback tendency during alignment work.

- Cutting tools have a shorter useful life.
- **NOTE:** High-strength and ultra-high-strength steel panels must not be heated during straightening work.

Work without applying heat when carrying out straightening work. Losses of strength will occur at temperatures as low as 400°C.

The basic working methods and the tools to be used are the same however.

Coated steel panels

In a similar way to high-strength steel panels, coated steel panels are finding more applications because of the better corrosion protection which they offer. There are basically two different process which are used to apply a zinc layer:

- Hot dip zinc coating (no longer used in vehicle construction).
- Electrolytic zinc plating.

The following points must be noted when welding:

NOTE: Welding fumes are harmful to health. Make certain that the workspace is well ventilated and use welding fume extraction.

- Zinc starts to melt at about 420°C.
- The zinc vaporizes at a temperature of about 900°C.
- The amount of heating determines the damage to the zinc coating, and therefore to the corrosion protection.
- **NOTE:** Coated panels have a higher electrical resistance, but this can be compensated for by increasing the welding current by 10 - 20% .
Resistance spot welding is particularly suitable for welding zinc-coated panels, because no widespread warming occurs.
- With electrolytically zinc-plated panels there is no need for any special preparation because the zinc coating does not need to be removed.

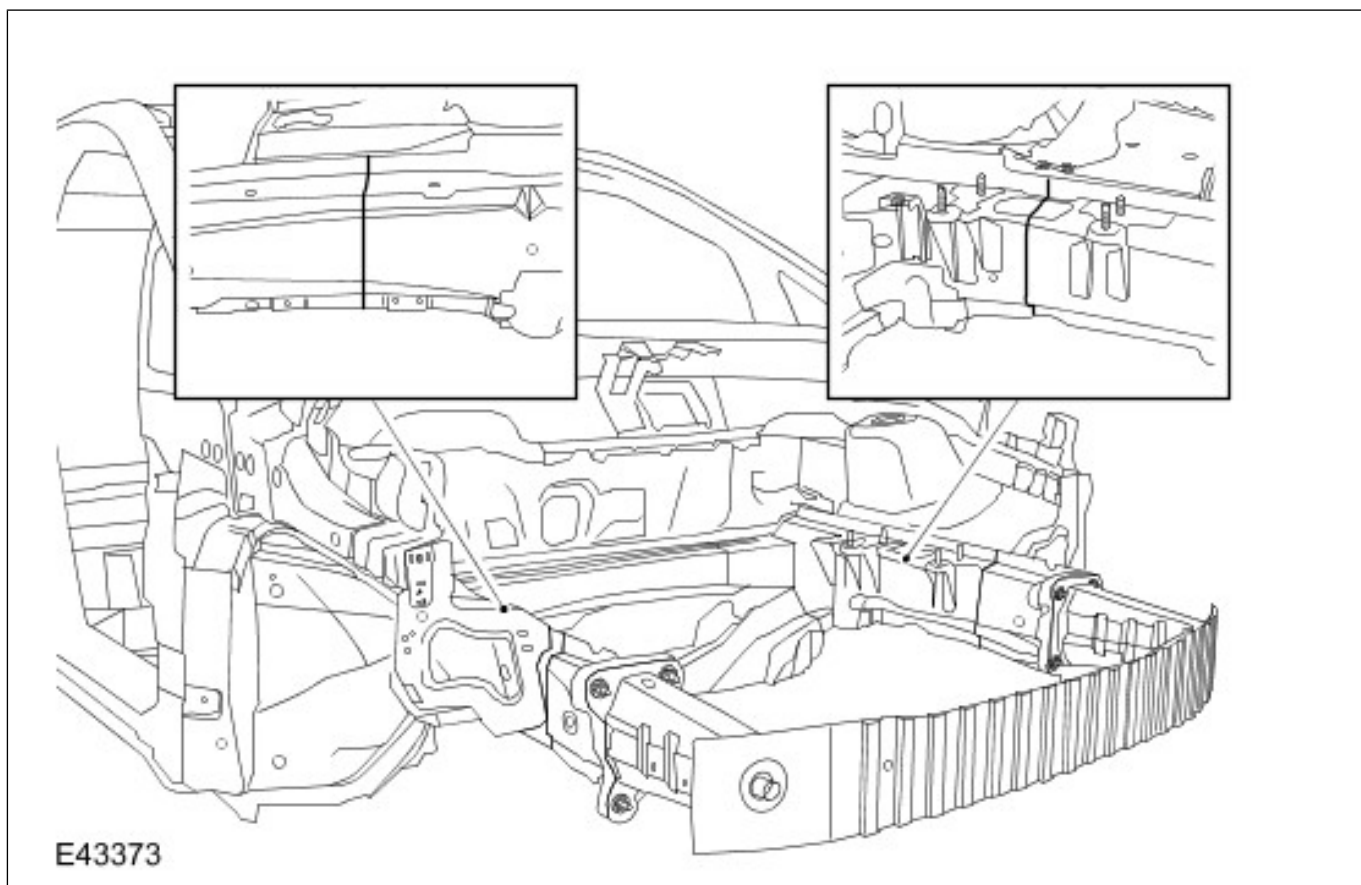
Tailored blanks

Tailored blanks are panels which are made up of at least two separate panels with different material thicknesses and/or material properties. The panels are joined together by a laser weld seam and then shaped in a press.

DESCRIPTION AND OPERATION

This technique allows panel shapes to be produced which meet special requirements with regard to **Laser weld seams at the sidemember**

deformation behavior, strength and weight.



NOTE: No cutting, no welding and therefore no sectional repairs are permitted in the immediate area of the laser weld seams. The model specific requirements are documented in the respective Body Repair Manuals.

Typical examples of application are:

- Sidemember.
- Door inner reinforcement/door frames.
- Wheelhouses.
- Rocker panel inner reinforcement.
- Roof rail inner reinforcement.

When repairing the vehicle body, pay special attention that such a connection is never separated. The possible cut line locations are given in the respective repair manuals.

Aluminum

Aluminum is becoming ever more important in body construction because of the trend to reduce weight. Doors, hoods and body outer panels are increasingly being made of aluminum alloy panels.

Although at the time of publication of this document, Ford of Europe has not yet introduced any aluminum body or aluminum body components, this topic is briefly described in this section.

NOTE: Fine aluminum dust may catch fire if a flame or spark touches it. All persons working in the workshop should pay special attention to this danger.

All the tools needed for body repair must be suitable for working aluminum, and they must be only used on aluminum.

The main properties of aluminum are:

- Low weight.
- High resistance to corrosion.
- High strength.
- High deformation rigidity.
- Very good heat conductivity.
- Very good electrical conductivity.

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NOTE: When working aluminum components pay particular attention to avoid the danger of contact induced corrosion. The workplace must be free of steel swarf, and tools which have worked steel panels must not be used.

In the electrochemical potential series, aluminum has a negative potential of 1.23V in relation to steel. Because of this, when aluminum and steel touch and an electrolyte is present, contact corrosion occurs.

The following points should therefore be noted:

- Use only checked and coated connecting components (bolts, nuts, washers etc.).
- Always use new bolts.
- Use adhesives and sealants which are tolerant towards aluminum.
- No steel swarf in the workplace. Clean the workplace and pay attention to any steel-sanding dust from neighboring workplaces.
- Use a separate set of aluminum working tools.
- Use wire and rotating brushes made of stainless steel.

NOTE: In-depth knowledge and skill in panel beating techniques are the basic requirements for the repair of aluminum panels.

In the main, aluminum panels can be worked using the same processes as used for steel panels. There are however some special features to pay attention to:

- Do not use steel hammers or sharp-edged panel beating tools.
- Only use hammers with smooth surfaces.
- Working cold aluminum leads quickly to embrittlement. For this reason, perform more extensive mechanical deformation removal under exact temperature controlled heating.

NOTE: If uncontrolled heating is used on an aluminum panel, it will very quickly be destroyed, and a new one must then be installed. The necessary specialist knowledge cannot be given in theory, special courses must be attended instead.

In contrast to steel, aluminum does not display any surface color change when heated. This therefore means that the level of heating of the material cannot be seen.

Only once the material is overheated does a change in the material structure of the surface occur. By the time this has occurred, the structure of the material is already seriously damaged, and its strength very much reduced.

Overheated aluminum components must always be replaced.

Aluminum welding

Aluminum welding requires a welder which is specially designed to meet these requirements.

NOTE: As a rule, vehicle manufacturers require that persons who wish to weld aluminum must show evidence of having completed special training in aluminum welding. Please study the guidelines.

Both repair welding processes are based on fusion welding.

- MIG welding (metal-inert gas welding).
- MAG welding (metal-active gas welding).

Success of aluminum welding partly depends on how well the surface oxidation can be removed. Because aluminum oxide remains solid at the melting point of pure aluminum, it is important to remove it before welding.

- Melting point of aluminum (approx. 660 °C).
- Melting point of aluminum oxide (approx. 2040 °C).

The aluminum surface must be cleaned before welding. Cleaning improves the later fusion penetration and prevents contamination of the welding wire.

NOTE: If a stainless steel brush is used, it must never come into contact with steel components, so that it does not become contaminated.

The following three steps are to be performed in preparation:

- Clean the surface. Use a chemical cleaner to remove all traces of wax and other contaminants.
- Remove the oxide. This can be done using abrasive paper or a stainless steel brush.
- Wipe the oxide dust away with a lint-free cloth.

Aluminum oxide forms very quickly, therefore steps 2 and 3 should be performed immediately before welding.

Before working on the vehicle body, create a test seam on scrap which is made of identical material. Test the test piece visually and destructively, to

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make certain that all welding parameters are correctly set, and an acceptable weld seam can be achieved.

An optimum weld can be recognized by the following quality features:

- All visible weld surfaces are clean, light and have the same profile.
- The weld seam should have the same height and width over its complete length.
- There must have been complete melting between the surfaces of the work piece and the weld metal.
- The correct penetration has been achieved when a thin continuous line can be seen on the reverse side.

DESCRIPTION AND OPERATION

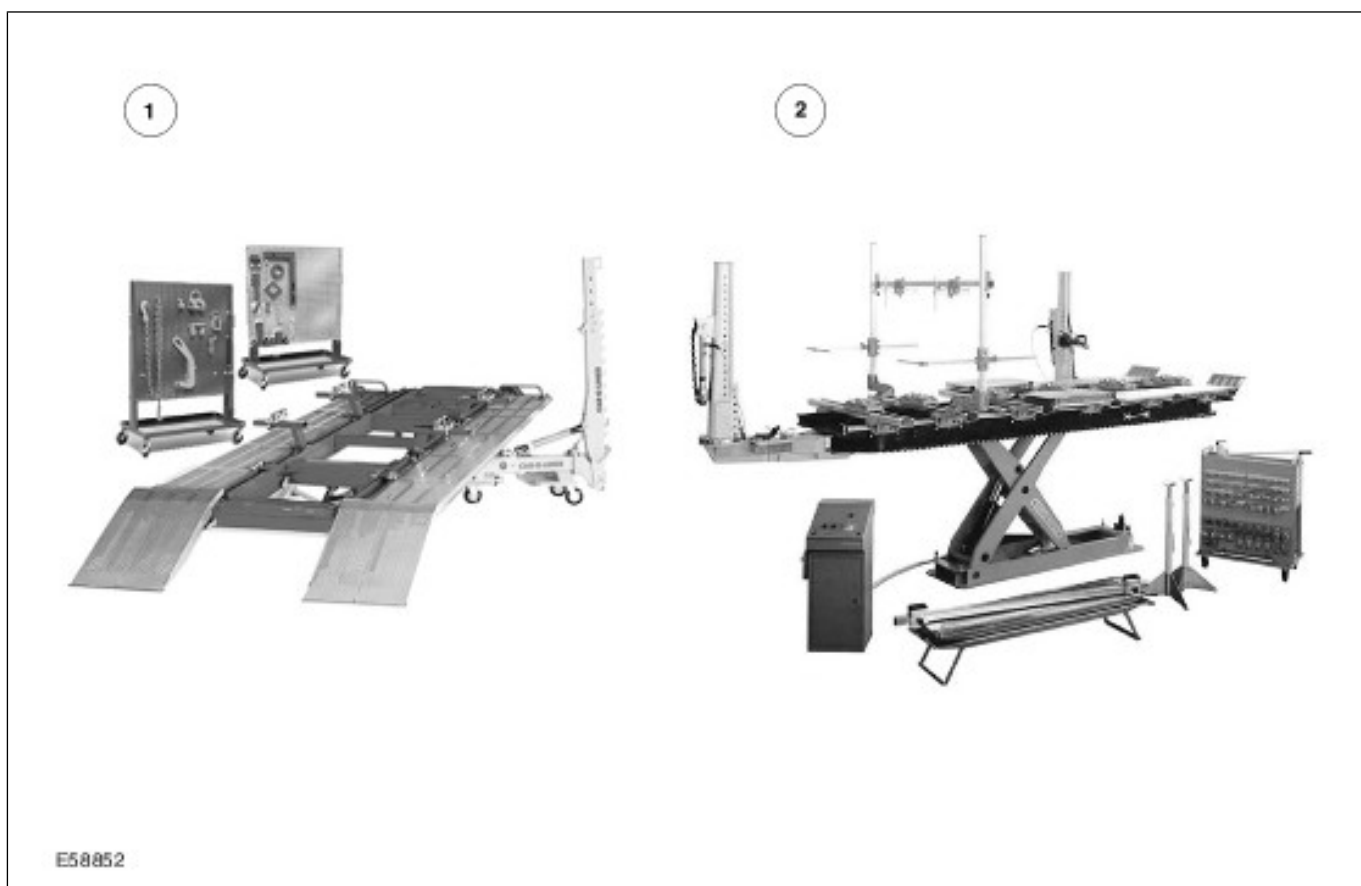
Tools and Equipment for Body Repairs

Alignment systems

NOTE: Please refer to the Ford Service Equipment Catalog for information on the body tools recommended by Ford.

Straightening and alignment repairs are often required to restore a vehicle body to its original shape after accident damage.

Universal aligning and measuring systems and universal alignment angle systems are suitable for this work.



Item	Description
1	Universal aligning and measuring system
2	Universal alignment angle system

Basically, the aligning and measuring system must satisfy the following requirements:

- Universally applicable to all types of passenger car. Can also be used on light commercial and off-road vehicles.
- Accepts the forces involved during straightening.
- High stability and mobility.
- Can accept all or part of the weight of the vehicle.
- Quick to set up.

- Simple to use.
 - Stationary design with drive-on ramp.
 - Height-adjustable aligning platform.
 - Universal gauge extensions with fast anchoring ability around the whole circumference of the aligning platform.
- Facility to test individual body measurement points, with or without aggregates being removed.

Alignment angle devices survey the vehicle at several points on the body. These are usually points which are also used in production. In addition, a recording over the rocker panels is possible. A measuring system is not needed, because the necessary body points are specified with gauges. For this purpose, vehicle specific or universal gauges are available.

DESCRIPTION AND OPERATION

Universal alignment systems consist of a vehicle mounting (universal clamps at the rocker panels) and a pulling device. In addition, a measuring system is required.

NOTE: Because universal clamps are used, the rocker panel area must be reworked for optical and corrosion protection reasons after the repair is completed.

Pay attention to the following points:

- Clean the attachment areas.
- Anchor the vehicle free of stress on the relevant system.
- Support the aggregates to take strain off the body.

Measuring systems

In order to exactly diagnose a damaged vehicle body, measuring systems are required. Depending on the measuring method, the systems vary in having mechanical, optical and acoustic measuring devices. In some cases, hybrid versions of particular systems are found.

NOTE: When working with each measuring system, the manufacturer's instructions provided in the description of the measuring equipment must be followed.

Basically, the measuring systems must meet the following requirements:

- Universally applicable to all types of passenger car. Also can be used on light commercial and off-road vehicles.
- Suitable for all accident damage.
- Fast capture of body measurement points in the underfloor and external areas.
- Data catalog to record all measurement points (length, width and height) both with and without the aggregates being installed.

NOTE: Basic and in-depth training is offered on the following topics. You will find an overview of the complete range of training offered in the Ford Service Organization training brochure.

Beam compass

The beam compass is a very practical and straightforward aid for measuring bodywork and especially floor assemblies. The beam compass can be used to detect dimensional variations across the length and the width by means of comparison measurements and diagonal measurements.

As a basic principal, body reference points should be chosen which are shown in the body frame measurement data sheet.

NOTE: To be able to determine difference in measurements, the same reference points must always be chosen on both sides. For this purpose the beam compass must be positioned symmetrically.

Comparison measurements can also be made on the outside of the body. Depending on the damage, left/right measurements (symmetry measurements) and diagonal measurements can be made using the beam compass, telescopic rod or a measuring tape.

Laser measuring systems

These systems use laser beams which are projected in one or more planes.



By the use of two parallel laser heads which can be turned, symmetrical points of a vehicle body can be tested and compared. Using the linear scales which are attached to the measuring points, the measurement data is read off with the aid of the projected laser beams.

The integral inclination gauge also allows differences in height to be quickly checked.

Mechanical measuring system

The use of mechanical measuring equipment is an easy and effective way to check a vehicle frame and chassis assembly quickly, exactly and reliably.

In many cases an assessment of the damage can be made with the help of this system, without the need for elaborate setting up.

DESCRIPTION AND OPERATION



Measuring systems which are firmly mounted on an aligning platform require more work in setting them up. They are used to constantly check measurements during alignment work.

This type of mechanical measuring system has measuring scales and measuring slides in three measuring axes. So that the body can be measured, the vehicle is secured on the aligning platform base frame using four universal chassis clamps. The exact fixing points are given in each respective data sheet.

Because of its self-centering mount, measurement can be carried out by one person.

Further advantages:

- Fast deployment.
- Simple to use.
- Can be extended using adapters, measuring probes and measuring tubes.

Acoustic-electronic measuring systems

These measuring systems can be combined with all current aligning platforms. In addition these measuring systems can be used independently of an aligning platform by using a vehicle lift or suitable support stands.



Item	Description
1	Ultrasound measuring instrument
2	Mechanical-electronic measuring system

Acoustic measuring systems use ultrasonic emitters and sensors to survey a body.

To do this, ultrasonic emitters are mounted on the vehicle using special attachments. During the measuring process the ultrasonic emitters constantly send out signals which are received by sensors (microphones) and then passed to a computer. The measurements are displayed on

DESCRIPTION AND OPERATION

the computer screen and are compared with the required values supplied by the vehicle manufacturer.

Mechanical-electronic measuring system

The ways in which mechanical-electronic measuring systems can be used are similar to those of the acoustic measuring systems. They can also be set up on a suitable understructure, without an alignment jig.

After this system has been arranged under the vehicle floor and adjusted to three undamaged vehicle measuring points, the measuring arm is brought up to the required measuring points and the readings compared with the reference values.

The data is transmitted to a computer where it is evaluated and the results displayed on a screen.

Panel beating tools

Depending on the type and extent of the damage to the vehicle body, very different tools may be needed to repair it. The most usual tools and the way they are used are described below.



Item	Description
1	Aluminum hammer
2	Tapered hammer
3	Universal hand dolly
4	Box file
5	Pulling lever and spoon
6	Caulkers
7	Body plane

Item	Description
8	Body file
9	Gas torch
10	Soft soldering equipment
11	Shape gauge
12	External dent remover/puller

DESCRIPTION AND OPERATION**Aluminum hammer**

The aluminum hammer is the most important and most commonly used tool during body panel repair. The most usual areas of application are:

- Straightening of a dent from the inside without a counterhold (hollow leveling).
- Working a panel from outside with or without a counterhold.

Tapered hammer

The tapered hammer is chiefly used to rectify small high-spots.

Universal hand dolly

Because of its versatile shape, the universal hand dolly can be used as a counterhold in almost all areas of the vehicle body.

It is particularly suitable for use as a counterhold when rectifying material excess.

Because of its weight, the universal hand dolly can also be used as a hammer to straighten a dent from inside without counterhold (hollow leveling).

Box file

The box file is mainly used as counterhold in fine straightening work with the aluminum hammer. It is available in various shapes and sizes.

The corrugated surface (file-cut) prevents the panel from stretching during fine straightening work (barb effect).

Using the file-cut imprint on the panel surface, the effect and extent of the blows from the panel beating hammer can be judged.

Pulling lever and spoon

If access to the rear of the damage with the panel beating hammer is not possible, a panel beating lever can be employed.

Once the worst of the damage is rectified, work continues with the spoon. This also allows short striking movements to be made in inaccessible areas.

A spoon is often used as a counterhold in work with the panel beating hammer.

Caulkers

A caulker is mostly used in edge areas. In this case the caulker is inserted on the inside of the damaged area.

Selected blows on the shaft of the tool allow the damaged edge area to be reworked.

Caulkers can however also be used for straightening small areas which can only be reached from the back through small openings.

Body plane

The body plane consists of the two-faced plane blade and the solid plane body, which prevents pressure deformation of the plane blade.

The body plane is available in half-round and flat versions. The main application areas are:

- Recognition of surface high spots by creation of a so-called plane image.
- Removal of excess solder after its application to uneven areas.

Body file

The body file is used solely during heat treatment working of dents.

Because of the solid body of the file, it can absorb much heat. It stabilizes repair areas which are being straightened by warming. It does this by rapid removal of heat from the repair area, which has the effect of stabilizing the body panel.

Body files are graded by the size of their teeth (file-cut):

- The zero-cut file grade is used in the first working operation to remove the paint layer.
- The finer 1st and 2nd cut grades are used in the second working operation to remove as little material as possible from the panel.

Gas torch

The main area of use of the gas torch is heat working of small and mild dents. It is also suitable for soft soldering work on body panels.

The ready-to-use gas torch consists of the following parts:

- Gas canister with fixing.
- Burner with self-light facility.
- Small and large burner heads.

Compare with oxy-acetylene equipment, the gas burner has the advantage of easier handling due to its lower weight and shorter set-up times because of the quick-change burner heads.

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Soft soldering equipment

Despite good panel beating technique, it is not always possible to rectify all unevenness. For that reason, application of filling solder is an important part of surface treatment. Similarly the surface of weld seams created during partial repairs can be optimized.

NOTE: New wooden paddles must be soaked in clean engine oil before use, so that the filling solder does not attach to the wooden block.

A complete soft soldering kit consists of tinning paste, soft solder and brush. In addition, a set of wooden paddles with a variety of shapes and a lint free cloth rag are needed.

NOTE: Since 07/2003, no lead compounds are permitted to be used in production. In the workshop suitable lead-free solder must also be used.

Shape gauge

The shape gauge is used to check the contours of the area to be reshaped, when there is no other way of recognizing and checking the basic shape.

There are various designs of shape gauge. The short design made of steel is used for smaller repair areas. Because its segments are very thin, it allows a very exact fit at a contour. The longer design made of plastic is applied to larger areas. Because of its wider segments, it is better suited to large surface contours.

External dent remover/puller

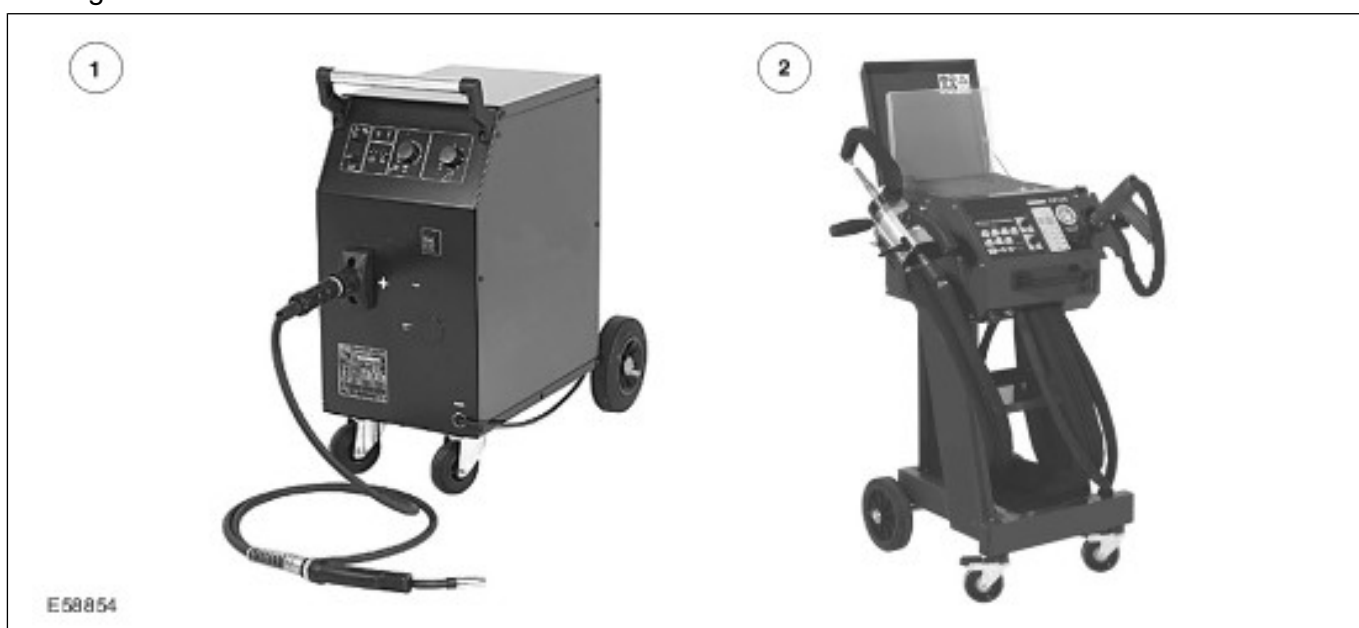
Because of their multi-purpose nature, external dent removers and pullers are very useful in achieving an economical repair to a vehicle body outer skin. These repair methods are used on vehicle body components which are inaccessible from the inside. Small dents such as those caused during parking and larger areas of damage such as on the side panel, rocker panel etc. can be rectified.

Basically there are three different methods:

- Straightening using a slide hammer attached to U-washers, pull bits or corrugated wire.
- Straightening using the slide hammer attached to a pull electrode.
- Straightening using a pulling assembly and fulcrum.

Welding gear

As in the past, the dominant process in body construction is resistance welding, in particular spot welding. Depending on body type, up to 5000 spot welds are applied, either by welding robots or in the multi-point welding machine.



Item	Description
1	MIG welding machine
2	Resistance spot welding machine

During repairs the resistance spot welds used in production must be re-created accordingly.

DESCRIPTION AND OPERATION

NOTE: If a suitably powerful welding machine is not available and multi-layer panel joints with a total thickness of over 3 mm need to be made, puddle welding must be used.

Although in principle high-strength panels are adequately- or well-suited to resistance spot welding, problems may arise, especially where large panel thicknesses or three layers of panel need to be welded together in the workshop, but these problems can be overcome.

In particular, older welding equipment does not have the latest welding technology nor welding power and therefore cannot reliably join panel thicknesses greater than 3 mm.

Modern equipment with inverter technology allows better spot weld quality because of a constant high welding current. In addition the high welding current makes shorter welding times possible and the electrodes therefore have a longer working life.

In the case of resistance spot welded connections, faults in the weld are difficult to see from the outside. It is therefore absolutely vital to know the particular properties of the welding machine being used. A test weld with subsequent peeling test will provide information on the quality of the weld. The spot weld itself must not separate, it must tear away leaving a hole.

In the production of vehicle bodies, MIG welding plays a minor role as a joining technique. It is used for components subject to high demands, such as threaded plates for axle mountings, or at locations which cannot be spot welded for access reasons.

Separating tools

NOTE: Without exception, before starting work you must read the safety and warning instructions in the chapter "Safety Instructions". In addition, pay attention to the warning instructions of the particular equipment manufacturer.

A variety of tools are available to the body specialist for the separation of body components. The use of the different tools depends on the joining technique involved and the access available to the repair location.

Spot weld milling tool

The spot weld milling tool is suitable for releasing spot welded connections.



In contrast to a normal drill, the milling depth can be set. This prevents the underlying panel from being damaged. In addition a safety fixing system prevents the milling cutter from slipping while working.

Rod sander

Spot welds which are not accessible to the spot weld milling tool can be ground out using the rod sander.



It is also suitable for releasing MIG spot welds and MIG seam welds.

Short stroke saw

The short stroke saw is most often used to separate vehicle body components.



DESCRIPTION AND OPERATION

It is also very flexible in its ability to access hard-to-reach areas.

Orbital saw

Among other things the orbital saw is suitable for the creation of narrow and straight cuts.



In addition the cut can be made to an exact depth limit. This prevents damage to underlying components.

After any work with swarf producing machines, all swarf must always be removed from cavities, otherwise there is the danger of corrosion.

DESCRIPTION AND OPERATION**Establish Repair Method****General**

Before starting an accident repair, a sequence plan must be compiled, containing an outline of the individual job steps.

Similarly, the availability and preparation of all the necessary materials, spare parts, tools, workshop equipment such as alignment and measuring systems must also be checked.

Planning

NOTE: The body interconnection is to be maintained if possible. Repair is preferred to renewal of body components. Furthermore, check if it is possible to perform a partial repair.

During planning the following job steps must be observed and adhered to:

- Determine the direction of the main impact and the extent of the damage.
- Establish the repair method.
- Work out which repair components will be needed and obtain them.
- Establish what disassembly work is needed.
- Check for specific features such as airbags, route of water drain hoses, electric cables and the location of NVH elements.
- Cut out the old parts (only when the new parts are waiting ready).
- Install the new parts.
- Apply solder/seal the repair location.
- Recreate the corrosion protection.
- Constantly check all the job steps.

After the scope of the work has been determined, before making the repair, check all own technical prerequisites:

- All tools required must be to hand.
- The same applies to materials, replacement parts, sealants and adhesives.
- You must have the knowledge needed to use all the necessary technology.
- Look for additional information in eTIS.

Chronological sequence of repair

The actual sequence of repair can be divided into the following steps:

NOTE: Refer to each vehicle specific chapter in the workshop literature for details on the individual points.

Job steps:

- Establish separating cuts and mark them.
 - Take into account the requirements given in the repair instructions.
 - Place the new part ready for use and include it in the repair plan.
 - Decide on the joining method.
- Separate and remove the old part.
 - Take into account the special features particular to the vehicle.
- Prepare the joint locations.
 - Sand and align the weld flanges.
 - Offer up the new part.
 - Apply corrosion protection measures.
- Weld the new part into place.
- Perform sealing and corrosion protection measures.
- Create an outer surface ready for painting.
- Insert cavity protection.
- Perform a quality control check.

DESCRIPTION AND OPERATION

Alignment Check

General

If there is concern that the body has been deformed, the body must be measured. Several measuring procedures and tools can be used for this purpose.

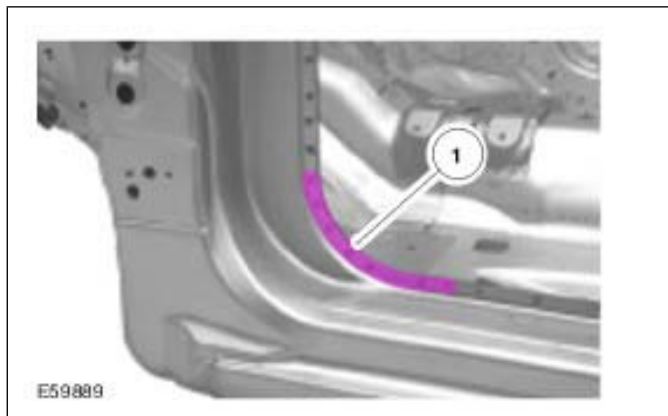
With simple measuring systems, it is possible in most cases to draw a conclusion about the extent of the damage through a quick measurement without time-consuming assembly work (straightening jig).

NOTE: For the floor pan and the exterior of the vehicle, measuring data is contained in the vehicle-specific repair instructions for each vehicle. Manufacturers of measuring and straightening jigs create corresponding measurement sheets for each vehicle.

Data sheets with the body frame dimensions for body measurement are specified in the model-specific repair instructions in each case.

All dimensions were measured with the aggregates removed, starting from the center of the hole, using an electronic measuring system and are specified in mm.

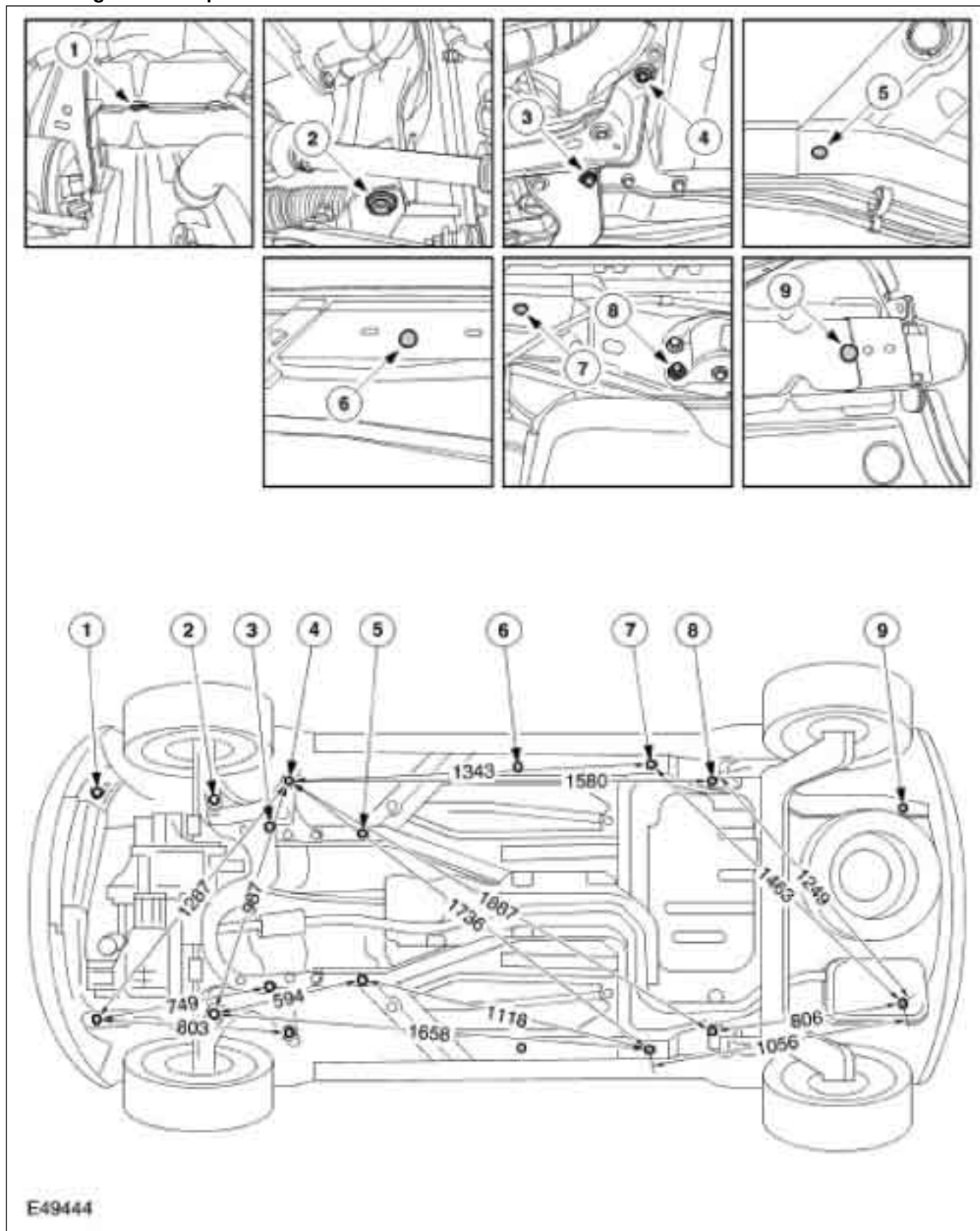
A tolerance of ± 3 mm applies to all specified dimensions. All detailed illustrations correspond to the left-hand side of the vehicle.



Measuring points that are specified in a curve are to be measured so that the greatest distance from the opposite measuring point is reflected.

DESCRIPTION AND OPERATION

Measuring data example



For exact determination of the measuring points, enlarged sections are shown.

DESCRIPTION AND OPERATION

Straightening

General

Straightening repairs are often required to restore the original body shape.

NOTE: Basic and advanced training courses are offered for the following contents. For an overview of all training courses offered, please refer to the Ford Service Organisation training course brochure.

For damaged bodies, straightening is to be considered as the process of pulling out the deformed body parts up to cutting out the parts that need replacing. As soon as straightening work is carried out on body parts, this is referred to as repair work.

Straightening with pulling equipment

In order to restore the damaged body to its original shape, the deformed part must remain on the body during the straightening repairs.

NOTE: Check dimensions and gaps continuously during straightening.

While the deformed parts remain on the body, the pulling equipment can be attached anywhere. Only in this way can damaged parts of the body which have to be straightened be pulled into the original position without problems.

Straightening sequence

Body straightening requires practice and experience. Before starting, the exact direction of impact must be determined.

The straightening force must have the exact opposite direction of the impact force. Only in this way can it be guaranteed that the original shape will be achieved again.

The pulling forces only work with their full impact if the pulling direction is direct. Using the wrong pulling direction could lead to additional deformation, which is difficult to correct afterwards.

Please note the following points:

- Secure the pulling unit with a safety cable.
- Do not remove bonded glass prior to straightening.
- Never apply heat during straightening.

- If necessary, open doors or hoods/lids/liftgates during straightening.
- Check dimensions and gaps continuously during straightening.
- High-strength steel panels have a stronger tendency to retain their deformed shape.
- During the straightening repairs, monitor the attachment of the pulling unit to the vehicle.
- Carry out the straightening work in several stages, never in one pulling process. This prevents the risk of overstretching and of joints tearing out.

During individual straightening steps (under a pulling load), relieve tension by striking the deformed areas with an aluminum hammer while they are still under tension.

Off-road vehicles

Straightening repairs on off-road vehicles are different to repairs on normal bodies due to the two-part construction of the vehicle.

This means there are two areas that must be taken into consideration separately:

- Straightening the body.
- Straightening the body with chassis frame.

Straightening the body

If only the body is damaged in an accident, light straightening repairs can be carried out.

NOTE: With strong straightening forces, these bolted connections may be damaged. Monitor the bolted connections continuously during the straightening work.

If a straightening jig is used for straightening work, the holding clamps or alignment angles must be attached directly to the chassis frame. During the straightening work, the pulling forces must not become too high. The bolted connections are to be monitored continuously.

Straightening the body and chassis frame

NOTE: High-strength steels must not be heated.

DESCRIPTION AND OPERATION

If the body and chassis frame have to be straightened, they must first be separated from each other.

The following conditions must be met:

- The repair must be economically justified.
- The quality and stability of a frame after production must be restored after carrying out the repair.
- In principle, the driving and operating safety of the vehicle is paramount.
- Cold straightening of deformed areas with sharp edged folds cannot be carried out.
- Straightening with the application of heat (welding torch) requires much experience and accurate knowledge of the behavior of steel panels when heated.
- The temperature and duration of application of the heat are to be considered in particular.
- Individual components of the frame, such as cross members, brackets, etc. can be replaced.

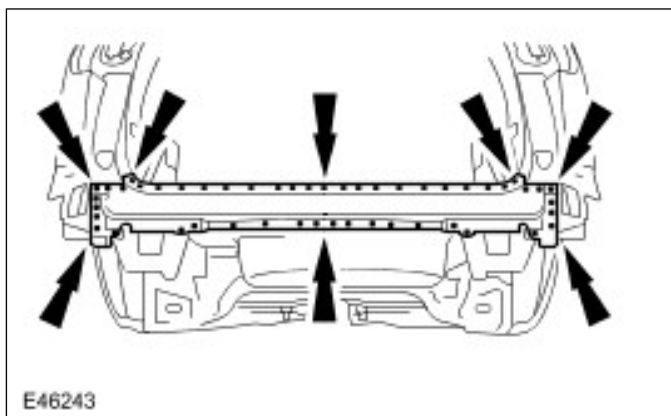
DESCRIPTION AND OPERATION

Complete Panel Replacement/Partial Replacement

Repairs always mean intervention in the body shell structure and thus also intervention in the vehicle's passive security system. The use of complete replacement or sectional replacement as the best solution must always be weighed up before starting a repair.

Complete replacement

In a complete replacement, the original connections are largely reused.



A complete replacement is advantageous if the damaged body part can be detached from its original connections and a completely new part can be fitted without creating additional joints (e.g. liftgate).

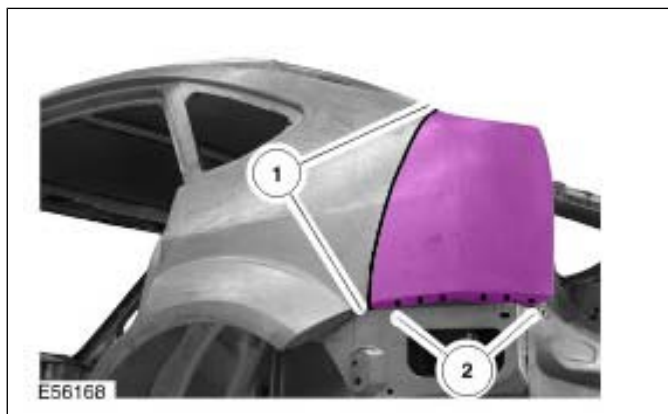
A complete replacement is necessary if there is no sectional replacement solution.

Sectional replacement

Sectional replacement (sectional repair) means the replacement of a section of the body shell structure.

NOTE: Basic and advanced training is offered for the following contents. For an overview of all training courses offered, please refer to the Ford Service Organisation's training course brochure.

Sectional repairs fulfill their purpose above all if the replacement of a complete part is too time-consuming and thus not economical.



Item	Description
1	Join area
2	Original welding

Approved sectional repairs are clearly defined in the model-specific body literature. These requirements must be complied with.

Advantages of sectional repair

Sectional repair offers many advantages for correct repair of accidental damage.

- Repairs can be made both in the outer panel area (e.g. side frame) and in the inner areas (e.g. structural member, trunk floor).
- The repair can be limited to the actual damaged area.
- Reduction of repair costs, as aggregates and other components can usually remain in the vehicle.

For the sectional repairs approved by the factory and described in the model-specific body workshop literature/technician's information, some spare parts (service parts) specially prepared for sectional repairs are offered via the spare parts sales department.

Decision-making criteria

Depending on the type and extent of the damage, the advantages of carrying out sectional replacement in the area concerned must be weighed up against complete replacement.

The following are always crucial for the decision:

DESCRIPTION AND OPERATION

- How economical the repair is.
- Retention of the original join.

In addition, Ford must have given its approval for a sectional replacement solution in the damaged area.

Depending on the damaged areas, further facts are to be taken into account when deciding for or against sectional repair:

- Severance cuts should be as short as possible.
- The effort for follow-on work on the connections must not be too great.
- It must be possible to reproduce the optical path of visible edges on door openings.
- Inner reinforcement panels must not restrict the straightening repair.
- Inner reinforcement profiles in the pillar areas must allow for separation.
- The Ford regulations on sectional repairs on supporting frame sections must be taken into account.
- The large surface welding seams at the connections must be restored.

DESCRIPTION AND OPERATION

Corrosion Prevention

The corrosion protection provided in production must be carefully maintained and reproduced during body repair work, in order to ensure the long-term warranty for Ford vehicles.

NOTE: Please take the notes in the model-specific repair descriptions into account. Please also note the manufacturer's instructions when handling the different anti-corrosion agents.

Only Ford original bodywork components and Ford approved repair materials are to be used for body repairs. The Ford logo is stamped onto every Ford original spare part.

All Ford bodywork components have a cathodic primer. Moreover, most parts are zinc-plated on one or both sides. If possible, these protective layers must not be damaged.

Corrosion protection measures during repair work

All new components must be inspected for transport or storage damage. Eliminate any existing damage, such as dents and scratches. Depending on the damage, different operations are to be carried out.

Scratches in new component:

- Sand out scratches.
- Finely sand the surrounding surfaces.
- Clean thoroughly with a metal cleaning agent and wipe dry.
- Apply corrosion protection primer to bare areas.

Damaged new component:

- Beat out the dented area and sand down to bare metal.
- Apply and work polyester filler.
- Apply fine filler.
- Lightly sand the whole component.
- Clean thoroughly with a silicone remover and wipe dry.
- Apply corrosion protection primer to bare areas.

If the new component is not damaged, any grease and wax must be thoroughly removed with a silicone remover.

During repair work, body panels are often heated at very high temperatures, which results in the destruction of the corrosion protection. Reworking of the affected areas is therefore vital.

Interior surfaces of the new body components which are no longer accessible after installation must be primed.

Before welding

The joint areas are not always accessible from inside later. Therefore, prepare these areas so that no soot is produced by burning paint during welding.

NOTE: In order to ensure that the corrosion protection produced in production is not destroyed, the working area must be kept as small as possible.

In the case of butt joints with a metal insert, soot from the burning paint prevents coating of the panel with cavity wax. With this connection technique, the welding area is to be prepared more thoroughly, as it is to be assumed that more heat will be applied here.

NOTE: Do not touch cleaned, bare metal. The humidity of your hands will corrode the metal.

Procedure:

- Remove the primer in the welding area using a tress wire brush to prevent the formation of soot from the paint.
- Thoroughly clean the welding area with a metal cleaning agent and rub dry.
- Coat the welding flange with welding primer on all sides and let the welding primer dry.
- **NOTE:** During puddle welding, the direct welding area is not coated.

Directly after welding, coat the gap between the still warm metal panel flanges with wax using a brush. Capillary attraction forces the liquid corrosion protection wax deep into the gap between the metal panel flanges.

After welding

The corrosion protection previously applied is partially damaged after the welding, so some reworking is required.

NOTE: Too much metal cleaner forces its way between the flanges and washes the corrosion protection wax out. Soak a cloth with metal cleaner and use it to clean the metal panel flanges.

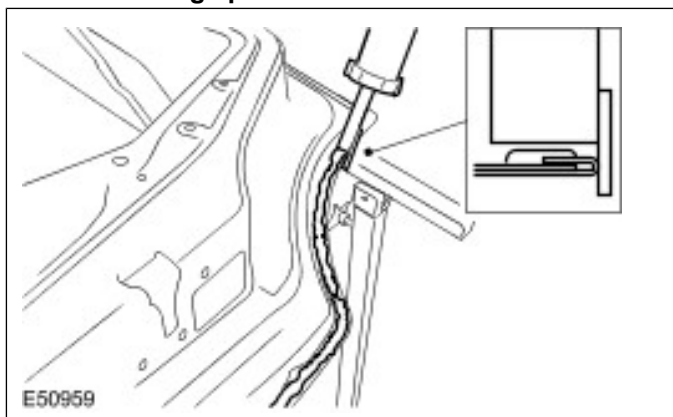
DESCRIPTION AND OPERATION

- Sand the welding seams and clean thoroughly with silicone remover. Dry with a lint-free cloth.
- In the join area, sand the transition area to the paint so that a good paint bond of the anti-corrosion primer is guaranteed.
- Carefully apply two coats of anti-rust primer to all the cleaned bare metal areas using a brush and allow to dry.

Sealing work

Depending on the vehicle, the clinched flanges on the hood, doors, tailgate and trunk lid must be sealed with clinched flange sealer.

Clinched flange protection with flat nozzle

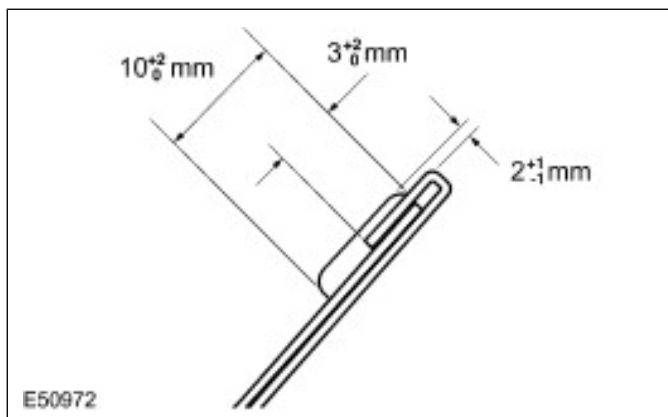


NOTE: The primer must be dry before the sealing compound or the underbody protection are applied. Do not use thinner to apply the sealing compound, as the sealing compound will not dry completely.

Likewise, the sealing compound used in production is to be renewed in the area of a repair weld. The sealing compound is to be applied so that it matches the original condition visually.

- When the primer has dried, apply clinched flange protection to the clinched flange with the aid of the flat nozzle provided.
 - The flat nozzle allows the sealant to be applied to the correct width and thickness and at the same time ensures easy guidance along the outer edge through the side guide stop. The clinched flange must be covered with an overlap of at least 3 mm.
 - Where areas cannot be reached due to the shape or position of the clinched flange, cut the guide stop off the flat nozzle to get at these areas.
 - In corners, coat the seal using a clean finger.
- Cover the metal panel flanges completely with sealing compound.

Clinched flange protection applied to the correct width and thickness.



Underbody protection

The underbody protection is used as corrosion protection and must also be applied such that it matches the original condition, from a visual perspective.

Two main application methods are used in production:

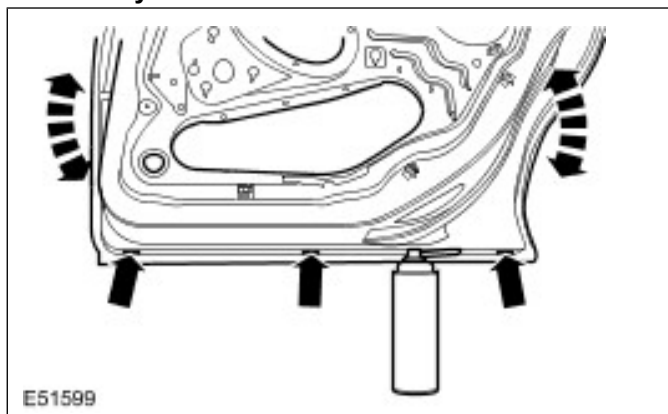
- The underbody protection is applied as a sprayable sealing compound.
- In the area around the structural members, the underbody protection is sprayed on and spread across a wide area.

Cavity protection

After painting, treat all cavities in the repair area with cavity protection. Please pay particular attention to the welded seams.

In the case of butt joints with a metal insert, the wax is to be applied so that the metal insert is also reached.

Wax entry



DESCRIPTION AND OPERATION

Seal the inner flanges with the corrosion protection wax as far as possible. To do this, ensure the doors are upright and spray the corrosion protection wax into the water discharge holes in both directions for at least 10 seconds. Then tilt and turn the component to spread the wax over the whole flange.

Noise Insulation

Noise insulation mats and cavity insulation applied during production must be applied again.

DESCRIPTION AND OPERATION

Corrosion Damage/Corrosion Repair

Modern vehicle bodies are protected from corrosion by elaborate measures. Multilayer coatings on the panel surface prevent direct contact between the metal and oxygen, and so protect it from corrosion.

NOTE: Basic and in-depth training is offered on the following topics. You will find an overview of the complete range of training in the Training Brochure issued by the Ford Service Organization.

If the protective layers become damaged, electrochemical conversion processes are initiated, which allow the metal to oxidize. This leads to the formation of corrosion.

The following factors lead to corrosion:

- Damaged protective layers.
- Damp interiors.
- Salt and dirt.
- Insufficient corrosion protection after repairs.

In order to maintain long-term corrosion protection, the vehicle must be checked at regular intervals.

In doing so, the follow areas must be inspected and any damage rectified:

- Damage to the paint surface cause by scratches or stone impact must be suitably rectified according to the specifications.
- Damage to the PVC underbody protection or the PU stone chip protection must be refinished.
- Incomplete or damaged sealing at clinched flanges must be renewed.
- Check the cavity protection and renew it if incomplete.
- Poorly installed or damaged covers and stone chip protection fixtures must always be renewed.
- Check seals and seal carriers for wear and correct mounting. Any damaged seals must be renewed.
- All rubber grommets and blanking plugs must be present and correctly installed.
- A damp or wet floor inside the vehicle indicates that there are leaks in the bodywork. The interior must be dried out and the leaks must be completely rectified.

The corrosion formation can vary in extent.

With rust film or edge rust formation, the surface of the paint has small traces of corrosion present.

The traces of corrosion can be removed in such cases by polishing the paint surfaces.

If this is not possible however, the traces of corrosion must be rectified by using a touch-up technique.

If rust is already under the paint finish to the steel panel, then the whole paint finish in the affected area must be sanded away.

Furthermore, the existing traces of corrosion in the body panel must be carefully and completely removed.

Finally a new paint finish must be applied in this area.

In the case of rusting through, the affected body panel is already completely destroyed. Such damage requires complete or at least partial replacement.

NOTE: In the general section there are several chapters which present the techniques necessary for a professional corrosion repair.

The outcome of this is the following repair sequence:

- Remove the rusted-through part.
- Remove the remaining traces of corrosion.
- Offer up the new part.
- Prepare the joint areas.
- Weld the new part into place.
- Produce the corrosion protection.

For a professional repair it is essential to reproduce the corrosion protection during and after the repair.

DESCRIPTION AND OPERATION

Sealer, Underbody Protection Material and Adhesives

Sealants, adhesives, cavity wax and underbody protection materials are used during the various body repairs. In this area Ford offers a range of products which have been tested and matched to each other.

⚠ CAUTION: Always be extremely careful when handling solvents, sealants and adhesives. Some products contain substances harmful to health or give off harmful or poisonous vapors. Always follow the manufacturer's instructions. If there is any doubt as to whether a particular solvent is suitable, it must NOT be used.

Clinched flange protection

This is a 1-component PU adhesive sealant applied through a flat nozzle. It is fast setting and is very resistant to ageing. After application it is easily sanded and stretched and it can also be painted over.

Seam sealant T Anthracite

This is a 1-component sealant material for sealing joints and seams. It is also suitable for gluing HVH elements into position in their respective body areas. It is a solvent-free, odourless adhesive which does not contain silicone or isocyanate.

Body sealant T beige

This sealant, which contains solvent and has a long service life, is particularly suitable for visible seams. It can be painted after it has set.

Underbody protection

Underbody protection is necessary for permanently elastic corrosion protection of vehicle underbodies. It is very durable and has good resistance to abrasion,

Cavity wax

This touch-proof, transparent corrosion protection wax is used for the preservation of cavities and flange joints.

Anti-corrosion wax

Anti-corrosion wax is a coating material which can be applied in fine spray, forming a very thin and grease-like protective film, therefore offering very good corrosion protection.

Metal adhesive

For joining metal to metal and plastic to metal. The adhesive reduces droning noises and improves corrosion protection.

1-component window glass adhesive kit

For direct glazing. The vehicle is ready to drive after 6 hours (passenger airbag). Prevents contact corrosion.

2-component window glass adhesive kit

For direct glazing. The vehicle is ready to drive after 1 hour (passenger airbag). The adhesive is not an electrical conductor and permits interference-free radio reception. Prevents contact corrosion. Using a 150ml additional cartridge, the adhesive can also be used for large windows or to produce a double seam of adhesive.

DESCRIPTION AND OPERATION

Cutting Technique

NOTE: Without exception, before starting work you must read the safety and warning instructions in the chapter "Safety Instructions". In addition, pay attention to the warning instructions of the particular equipment manufacturer.

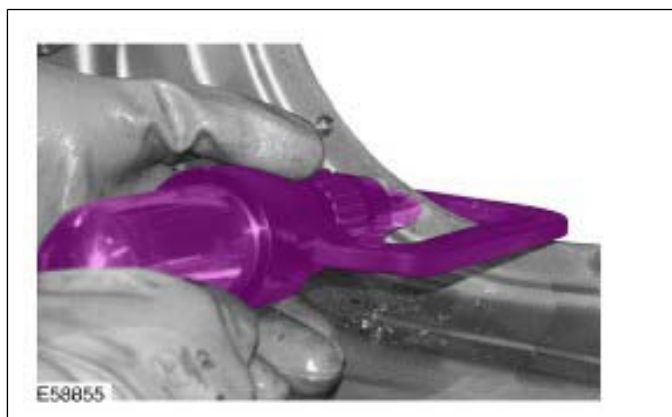
NOTE: After all separation work, make certain that the metal swarf is completely removed from the vehicle body.

Depending on the separating tools used, there are some fundamental points to bear in mind:

- Only start the cutting work once the new part is to hand.
- Compare the new part with the old part for shape and size.
- The straightening work must be completed before any body components to be replaced are cut out.
- Before separation work is started, all welded connections which cannot be seen must be freed of underbody protection, sealant etc.

Spot weld milling tool

Resistance spot welds are best separated using a spot weld drilling machine or a spot weld milling tool.



NOTE: Steplessly variable machines increase the working life of the cutting tool. Use of a suitable lubricant can increase this even further.

The spot weld milling tool is particularly useful. It usually has an adjustable depth stop and a safety fixing system. These prevent the machine from drilling too deep and the cutter from slipping while working.

When using an ordinary drill, the depth of the drilled hole must be judged by the operator. Because of this, there is the danger of injury and also the danger of drilling right through the workpiece.

Rod sander

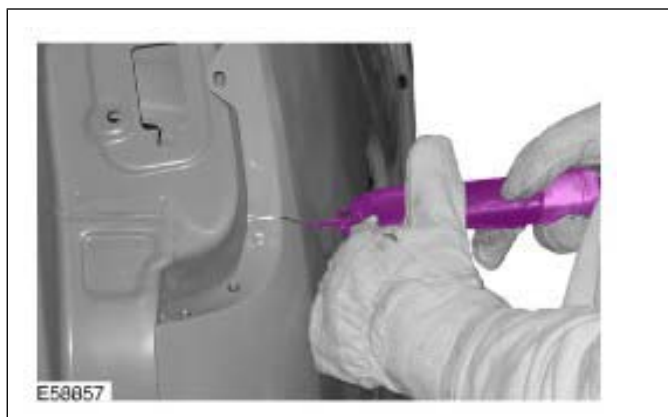
Another option for separating resistance spot welds is to use the rod sander.



For welded connections which have a large diameter, or are difficult to reach using the spot weld milling tool, the rod sander offers a useful alternative. MIG weld seams can be worked using this machine.

Short stroke saw

The short stroke saw is suitable for separating vehicle body components and for making a separating cut for partial repairs.



NOTE: In order not to damage panels, wiring harnesses, hoses or similar components which lie behind, remove them beforehand as necessary.

DESCRIPTION AND OPERATION

The narrow design of the saw blade permits cutting in tight curves. Straight cuts require a relatively great deal of practice.

Orbital saw

Where use of the short stroke saw is difficult because of the body construction, the orbital saw can be used.



The cutting depth of the orbital saw can be set. This allows separating cuts to be made, despite panels or other components lying in danger behind. Straight cut lines can be more easily made using the orbital saw.

DESCRIPTION AND OPERATION

Panel Beating Technique and Smart Repairs

General

Smaller scale body repairs, where damaged panels do not need to be replaced, can often be carried out by realignment work. Whether the repair is economical however, often depends on the accessibility of the affected body area.

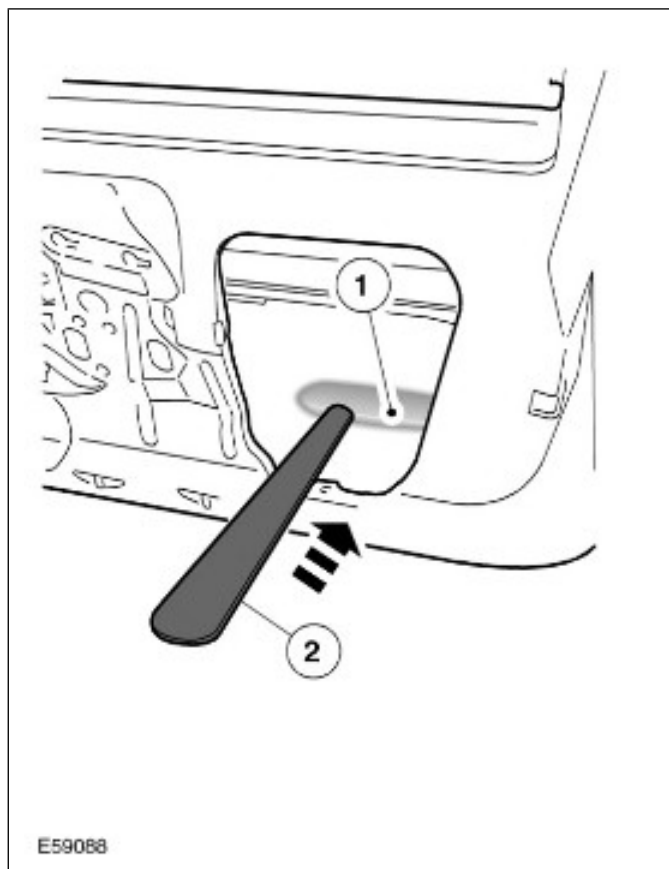
NOTE: Basic and in-depth training courses are offered on the topics which follow. An overview of the complete range of training offered is provided by the Ford Service Organization Training brochure.

During damage assessment, the following technical points must be taken into account:

- Small mild dents (without damage to the paint), which are in areas that make access from the inside possible, can be rectified using undamaged paint panel beating.
- If the inner side of the damaged area (with paint damage) can be accessed, then conventional panel beating techniques can be used.
- If the damaged area has no access from inside, then it can only be rectified using outside panel beating techniques.

Hollow leveling (removing dent without a dolly)

Hollow leveling can only be used on areas which are accessible from the rear.



Item	Description
1	Center of dent
2	Spoon

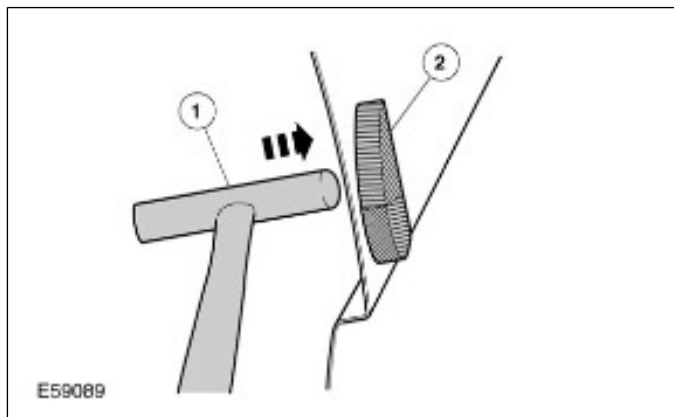
During hollow leveling, the dent is removed from the inside using suitable panel beating tool and applying knocking or pressing movements. High spots around the edge of the dent area are flattened with blows from the aluminum or wooden headed hammer.

The usual tools are for instance hammers of various designs, dollies, levering irons and various spoon irons. The correct choice of tool is made depending on the shape of the dent and the access which is possible.

Dent removal using hammer and dolly

Panel beating can only be performed using a hammer and dolly if access can be gained from the rear side.

DESCRIPTION AND OPERATION



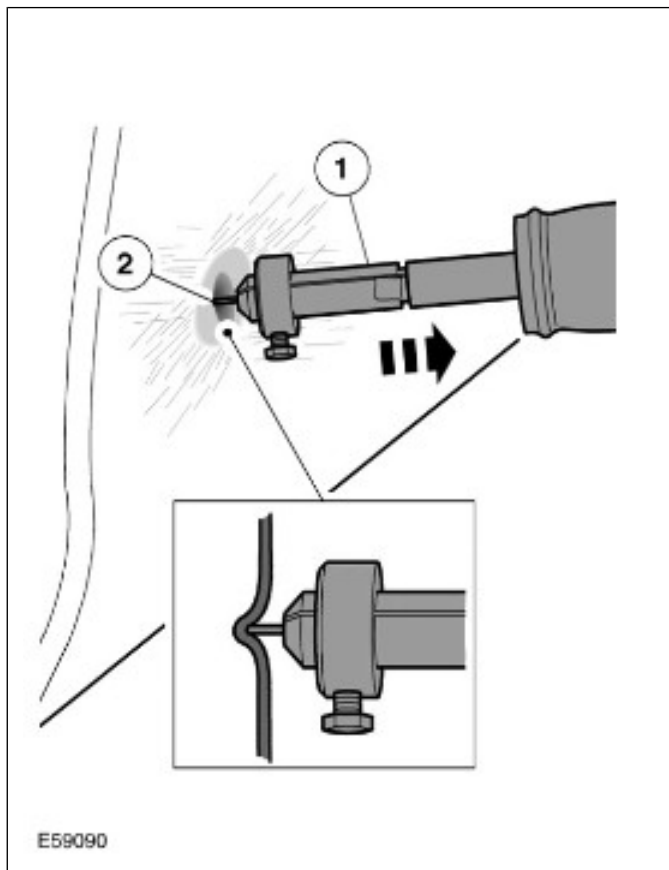
Item	Description
1	Aluminum hammer
2	Box file

The purpose of the dolly in this case is to transfer the force of the impacts from the hammer to the steel panel which is in between. As this is done, the deformed body panel is smoothed (dressed) and the tension fields in the body panel are removed.

The favored tool for this repair process is the aluminum hammer and as opposite support the universal hand dolly. To rectify minor panel damage, the box file should be used as opposite support. Because of its serrated surface, the box file prevents normal stretching of the body panel which would otherwise occur.

Dent removal from the outside using the slide hammer

The slide hammer technique is mostly used when a dent is not accessible from the rear, or a relatively large amount of disassembly would be needed to make it accessible.



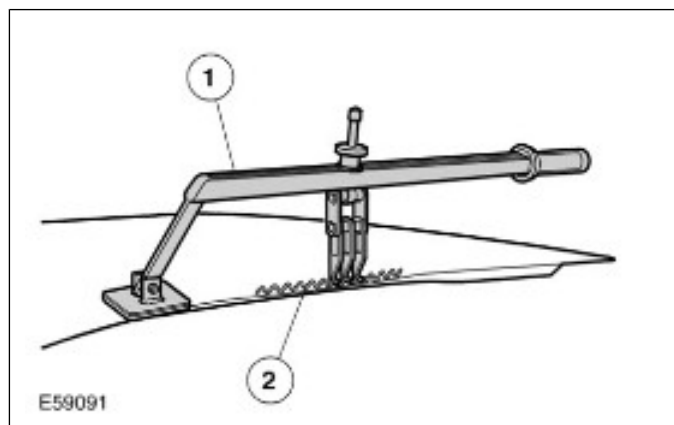
Item	Description
1	Slide hammer
2	Pulling electrode

By welding pulling rings or pulling electrodes into position using a special welding gun, dents can be removed from outside using the slide hammer.

Dynamic puller with counter bearing

The repair possibilities are much greater than with the slide hammer method. Because of the versatile puller and the variable counter bearing, a wide variety of damage can be worked and rectified using this repair method.

DESCRIPTION AND OPERATION



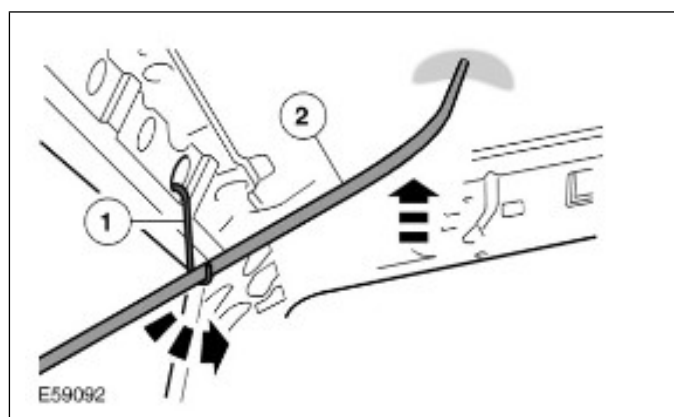
Item	Description
1	Puller with counter bearing
2	Corrugated wire as counter bearing

Because of the mechanical lever operation, the variable counter bearing and the optimum controlled application of power, this external dent removal system allows dents in almost all vehicle body areas to be pulled out.

Depending on the application area and the damage, the fixing options to the panel being worked can be corrugated wire, pulling bits or U-washers which are spot welded into position.

Dent removal using special panel beating levers

This panel beating technique with pressure is mainly used to rectify smaller dents as a result of hail impact, transportation or parking, without the paint being damaged.



Item	Description
1	Deflection by a hook arrangement
2	Pressure tool

Small dents are removed from the inside of the body panel by pushing them outwards in a mechanical process using panel beating levers.

Because of the great variety of shapes of these levers, it is possible to use this panel beating technique on almost all areas of the vehicle body.

Heat working of panels

This repair method allows small and mild dents to be rectified without additional panel beating.

During the repair process, a flame is used to selectively warm areas of the panel to relieve the stresses in the metal. This can cause the dented area to return to its correct shape.

NOTE: Before this method is used, for economy reasons you should check whether it is in fact possible to use the undamaged paint pressure techniques to rectify the problem.

This method can only be used when the dent:

- is not too large and sharp edged.
- shows no signs of the material having stretched.
- is in a surface of the body which curves outwards.
- is not in a repair area which is too structurally solid.

Heat-induced material shrinking

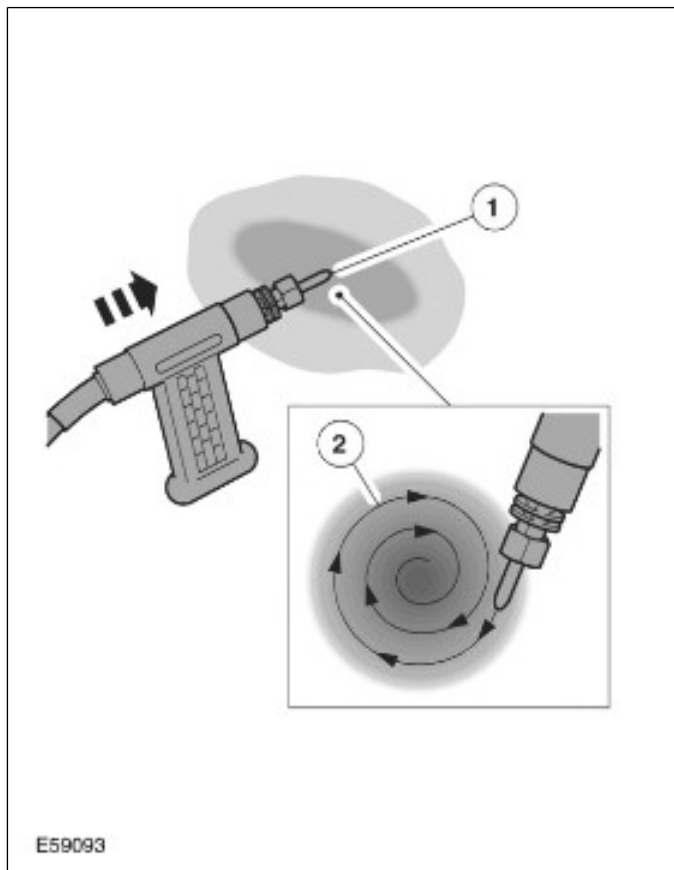
Material shrinking, also called settling in, can be performed in a variety of ways depending on the extent of the damage and the access to the repair area.

These repair processes differ depending on the type of heating and subsequent working of the heated surface. They sub-divide into two basic processes:

- Heating using a carbon electrode.
- Heating using the oxy-acetylene torch.

In the carbon electrode process the working is done exclusively by warming. In this case the access to the repair position is only from the outside.

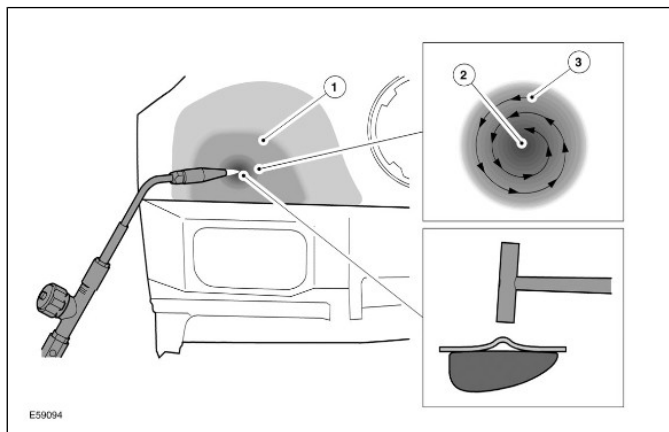
DESCRIPTION AND OPERATION



Item	Description
1	Carbon electrode
2	Spiral shaped heating pattern

If the damage is concentrated in a spot and is in the form of a more rigid raised area, then the carbon electrode must be replaced by a copper electrode. As heat is applied, slightly more pressure is applied to the raised area.

In the method using heating by the oxy-acetylene torch, material shrinking is achieved by a combination of heat and mechanical working of the damaged area.



Item	Description
1	Overstretched area
2	Point heating using the oxy-acetylene torch
3	Spiral shaped knocking back with dolly

The repair area must always be accessible from both sides, so that the heated area can be properly worked mechanically.

The combination of heating and mechanical working is very effective.

As soon as the warm point is established, hammering is immediately started using the aluminum hammer together with a suitable dolly on the inside of the repair surface, working in spiral movements towards the warm point. This causes material to build up in the center of the warmed area.

Lead loading

Despite good external panel beating techniques, it is not always possible to rectify every surface unevenness. For this reason, application of lead loading is an important part of panel beating.

NOTE: You will find additional important advice on the topic of lead loading in the joining techniques section.

For corrosion protection and adhesion reasons, on body components subject to more demands, such as doors or hoods, it is preferable to apply lead loading rather than stopper.

In addition, lead loading application is suitable for creation of surface contours when the options for panel beating are limited.

Typical application areas:

DESCRIPTION AND OPERATION

- Body components with limited or no access from the rear.
- Body components with very narrow cross-section.
- Body components which are particularly exposed or which can move.
- Weld seams of partial repairs.
- Rocker panel areas, wheel arch edges, side panel areas.
- Doors, hood, luggage compartment lid.
- Swage lines and joint areas.

DESCRIPTION AND OPERATION

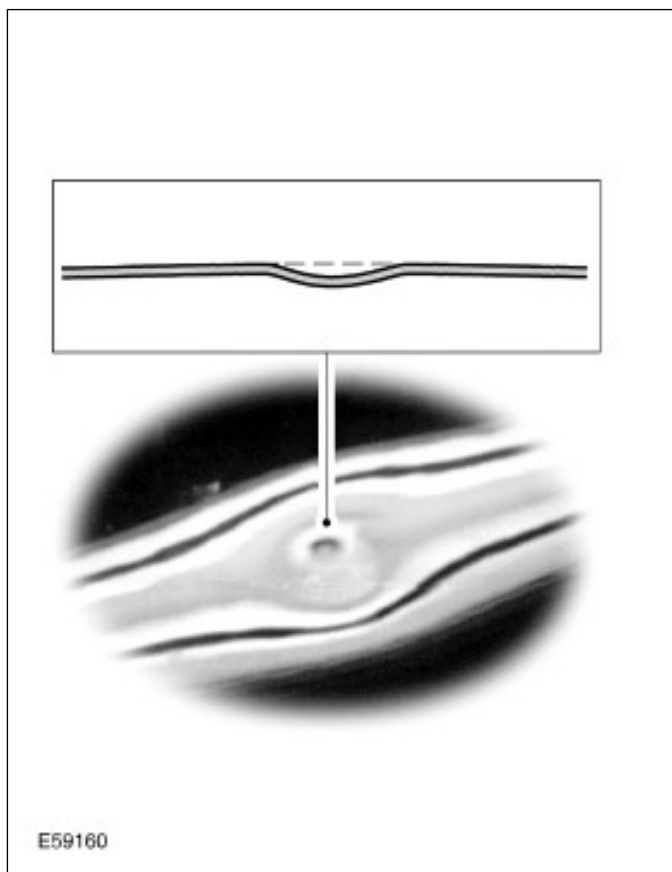
Paintless Dent Removal

NOTE: Basic and in-depth training is offered on the following topics. You will find an overview of the complete range listed in the Training brochure published by the Ford Service Organization.

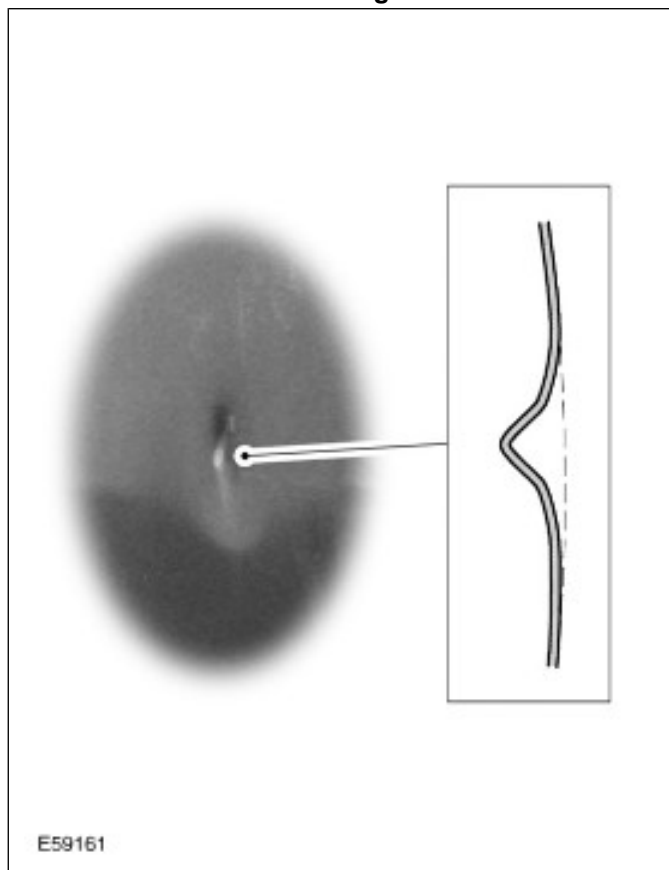
General

In the past all damage to body surfaces had to be rectified by time-consuming and cost-intensive repair work. New techniques allow small mild dents without paint damage to be corrected.

Using special levering tools (pressure tools) the dent is worked from the inside in such a way that the damaged area can be returned to its original shape.

Mild dent

If strong and direct force during the damage process causes the material to stretch in the middle of a dent, then the result is a small and sharp edged dent. Such damage cannot be rectified without visible deformation.

Dent with material stretching

Preconditions for a successful repair are a definite diagnosis and the correct allocation of repair method.

Furthermore, sufficient experience in the use of special tools and knowledge of materials are also requirements for a successful repair.

- Application is restricted to body surfaces which are accessible from both sides. This repair technique is seldom feasible on double-skinned body components or closed body profiles.
- The same applies to edge areas, swage lines and seams on body components, which are very dimensionally stable.
- Satisfactory repair results are only possible on mild dents with little depth and small deformation radii. Therefore this repair method is particularly suitable for hail, parking and transportation damage.

The following characteristics must be present for a dent to be satisfactorily removed:

- The diameter must be no more than 50 mm.
- No material stretching in the centre of the dent.
- Repair area must be accessible

DESCRIPTION AND OPERATION

The economic viability of undamaged paint dent removal must be considered in addition to whether it is possible practically. This depends on:

- Surface dimensions and depth of the dent.
- Inherent stability of the repair area.
- Material condition.
- Number of dents, in relation to a particular body surface.
- If applicable, any paint damage already present.

While carrying out the repair, the following itemized repair route and process flow must be complied with:

1. Damage diagnosis
2. Repair preparations
3. Perform repair
4. Paint finishing, corrosion protection and quality control

In order to ensure corrosion protection, all inner areas of the repair must be treated afterwards. Where it is possible, the paint is repaired. In every case the inner area of the repair must be treated with cavity wax.

DESCRIPTION AND OPERATION

Joining Techniques

Welding

Before welding work is performed on a vehicle body, all safety measures for the protection of people, modules and electrical components must be observed.

NOTE: Before beginning the work, please refer to the safety instructions and warnings in the chapter Safety Instructions. Please also note the warnings of the respective equipment manufacturer.

In body construction, the main type of welding used is resistance spot welding. In the course of repair work, this must be restored accordingly.

However, there are also fields of application for MIG welds.

MIG welding

Fields of application

- Any joints that are MIG welded in production must also be replaced by MIG welds.
- Puddle welding may be used in certain cases, if there is insufficient access.
- If the overall panel thickness is greater than 3 mm, without correspondingly powerful spot welding equipment, puddle welding should be used.
- At present, MIG brazes must still be replaced by MIG welds. See chapter MIG Brazing.

NOTE: The increased application of heat during MIG welding destroys the corrosion protection layers over a much larger area than during resistance spot welding. For this reason, greater care must be taken when applying the corrosion protection afterwards.

Welding repairs can only be carried out properly if the equipment is set up correctly and all welding-related preparations are complied with accurately.

- Please note the instructions of the respective welding equipment manufacturer.
- The hose assembly must be untwisted.
- The core must be free of abraded rod particles.
- The gas and current nozzles must be free of slag and scale residue.
- Pay attention to the quality of the welding rod and the throughput of gas.

- Ensure that the joint surface is perfect.
- Prepare a bare metal joint surface.
- Maintain the correct gaps (root formation).
- Produce a test weld.

Full seam

A welded joint with a full seam is suitable for joining highly profiled body parts. Pillar and sill areas are typical application areas.



Item	Description
1	Full seam

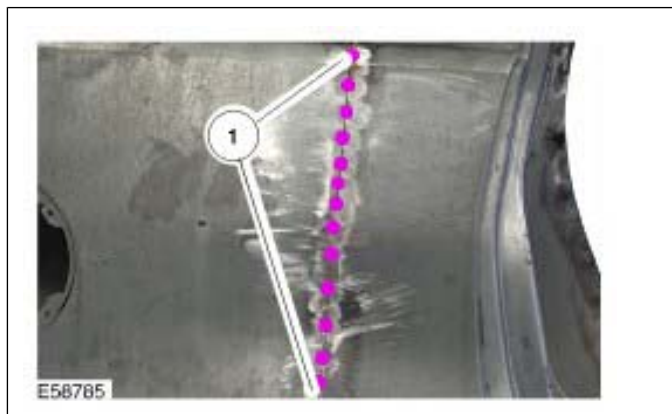
Before the welding process, you must carry out the following operations:

- Both parts of the panel must be bare on both sides over a width of 5 mm.
- Align the parts precisely with clamps.
- To prevent the panel from warping, tack longer joints before welding them.

Interrupted weld seam - intermittent seam

The intermittent seam is used for offset joint surfaces or for butt joints with a metal insert. This form of seam is mainly used on the external panel area for sectional repairs.

DESCRIPTION AND OPERATION



Item	Description
1	Intermittent seam

Please note the following welding parameters:

- Weld gap.
- Spot weld interval.
- Apply alternate tack welding across the entire length of the seam. This keeps warping to a minimum.

Puddle weld.

Puddle welding is used as a substitute if no spot welding equipment that is sufficiently powerful for the thickness of the panel is available. This welding method is also used if the welding position cannot be accessed with a spot welding gun.

NOTE: A test weld should always be carried out to ensure that the welded joint is not just a surface connection.

Please note the following welding parameters:

- The panels to be joined must lie perfectly flat to one another.
- The panel flanges must be bare at the welding position. Treat other areas with corrosion protection.
- Prepare the holes depending on the thickness and number of the panels. The hole size should be 6-10 mm, or match the original weld spot.
- Start the welding procedure on the panel at the bottom so that the hole is filled completely.

Resistance spot welding.

The basic principle for repair welds is to restore the original welded joint as far as possible.

NOTE: Before starting the work, please refer to the chapter on safety instructions.



The repair welds must have the same number of weld spots as the welds used in production with the correct diameters.

This requires that:

- The panels to be welded overlap.
- The weld spot is accessible on both sides for the electrodes.
- The shape and alignment of the weld electrodes is correct.
- The resistance welding equipment is powerful enough to reproduce the spot weld diameter used in production.

NOTE: The welding equipment settings and the adjustment of the individual parameters are to be made in accordance with the device manufacturer's specifications.

Well-prepared welding flanges are a prerequisite for a problem-free welded joint. This means:

- The welding flanges must lie perfectly flat to one another.
- The welding flanges must be clean and free of oil or grease on both sides.
- Welding primer (zinc-coated and conductive) must be applied as corrosion prevention.

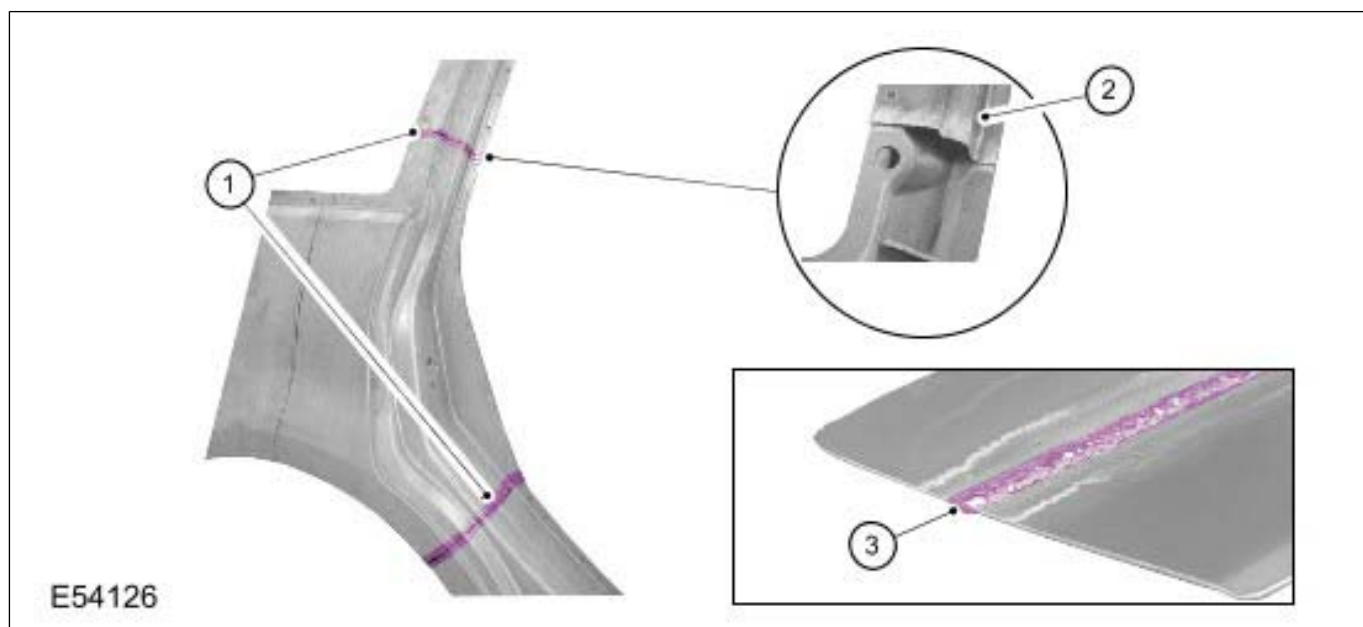
DESCRIPTION AND OPERATION

Only in limited cases can welding errors in resistance spot weld joints be detected from the outside. Therefore, a test weld should be carried out before each repair weld. The peel test carried out after the welding gives information on the quality of the welding. The spot weld must not flake off.

Joining techniques

Butt joints

The butt joint is a joining technique frequently used in body repairs. The butt joint is typically used for repairs in the pillar and rocker panel area.



Item	Description
1	Join areas
2	Profile
3	Full seam

Areas that are suitable for the use of the butt joint:

- short seam lengths.
- highly profiled structures.
- mostly thin panel thicknesses.

The edges of the panels to be joined are placed against each other and are joined with a full seam whilst maintaining a required welding gap (welding gap same as panel thickness).

NOTE: The butt joint requires a high degree of accuracy and care when trimming and cutting. For correct execution of the welding, an exact, even welding gap must be maintained.

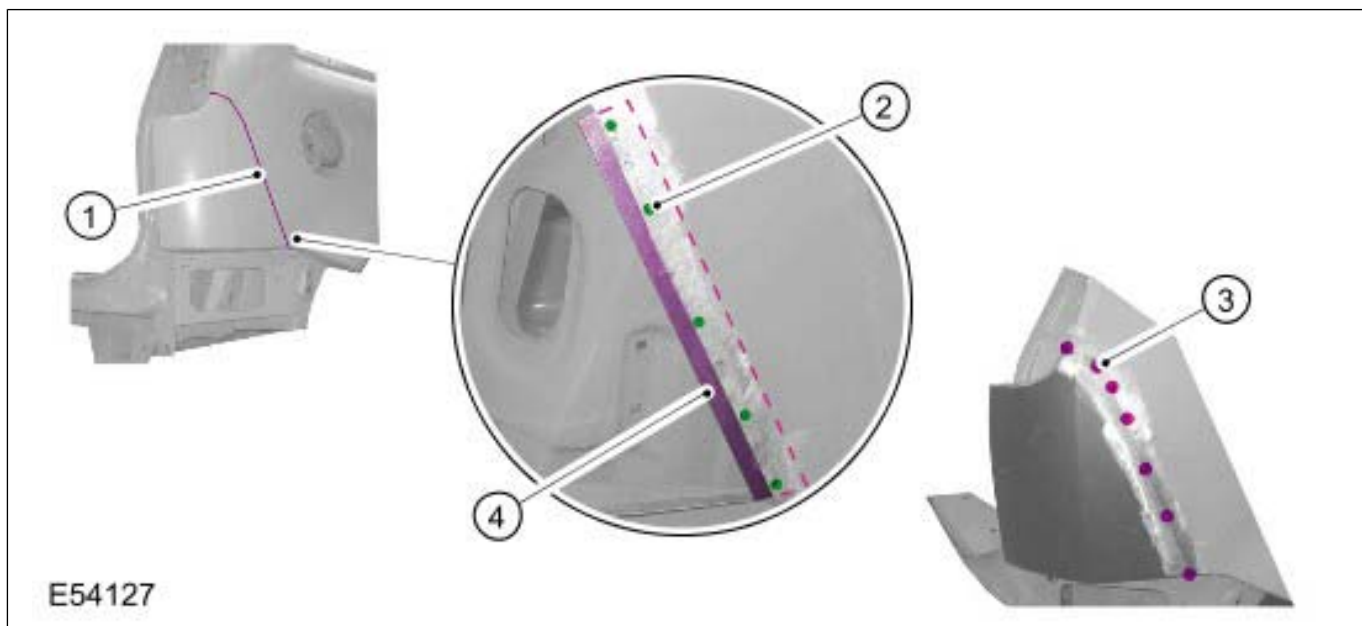
Preparation of the joint areas includes:

- Sanding the connection areas bare on both sides.
- Removal of the zinc layer in the welding area.
- Carrying out welding tests on an equivalent sample panel before the actual welding, if necessary.
- Tack welding in the join area: From the edges to the centre, then check the shape.
- Joining new and old parts with a full seam weld.

Butt joint with panel strip

As with the butt joint without a panel strip, the panels to be joined are pushed together, but are joined with an intermittent seam. A panel strip placed beneath the area to be joined stabilizes the welding area.

DESCRIPTION AND OPERATION



E54127

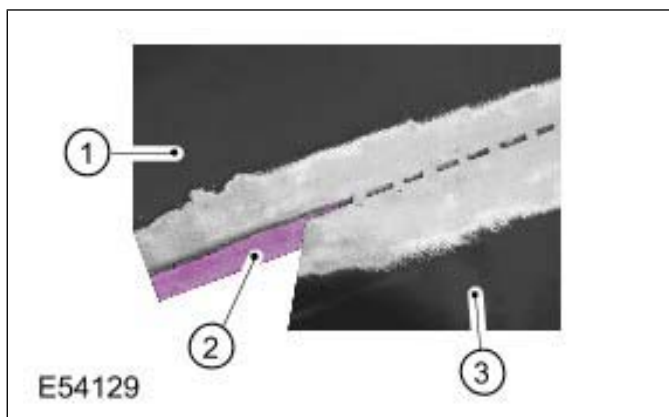
Item	Description
1	Join area
2	Tack welding
3	Spot welding
4	Panel strip

Preparation of the joint areas includes:

- Preparation of a panel strip approx. 30 mm wide.
- Grinding the joint areas and the panel strip to bare metal on both sides.
- Removal of the zinc layer in the welding area.
- Carrying out welding tests on an equivalent sample panel before the actual welding, if necessary.
- Tacking the panel strip to the old part with several resistance spot welds.
- Joining the new and old panel with an intermittent seam.
- Lead loading the weld seam.

Joggled joint

The joggled joint variant is restricted to body areas with a good surface condition without beads/swage lines or profiles. A sectional replacement with a joggled joint is welded with an intermittent seam. This procedure is used, for example, at the transition from the side panel to the rocker panel (3-door vehicles).



E54129

Item	Description
1	Body part
2	Joggled area
3	New panel

The amount of reworking required is kept to a minimum, by avoiding the use of a full seam. Other advantages are:

- Heat-induced warping caused by the welding procedure is low, as intermittent seam welding only applies a little heat.
- When cutting the new part, slight measuring tolerances are permitted, as these are covered by the joggled area.

Preparation of the joint areas includes:

- Sanding the connection areas bare on both sides.
- Removal of the zinc layer in the welding area.
- Preparation of a joggled strip.

DESCRIPTION AND OPERATION

- Carrying out welding tests on an equivalent sample panel before the actual welding, if necessary.
- Joining the new and old panel with intermittent seam welding.
- Lead loading the weld seam.

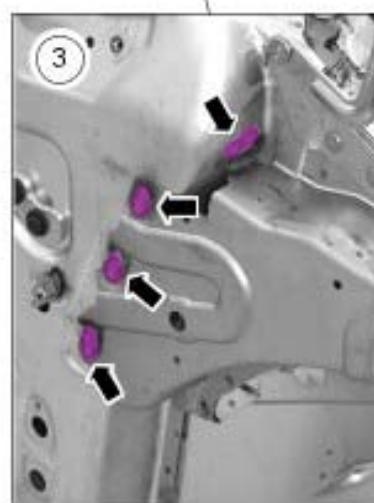
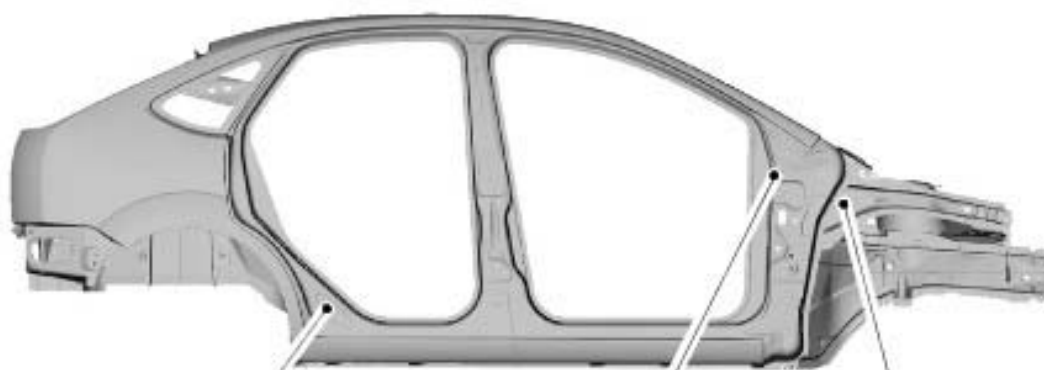
MIG brazes

Metal Inert Gas (MIG) brazing is increasingly used in production for certain body areas.

In areas in which resistance spot welding is not possible due to limited space or higher strength requirements, MIG welding was previously used.

Increasingly, these MIG welded seams are being replaced by MIG brazes.

NOTE: At the time of printing, MIG brazing has still not been approved for repair in the workshop. Please find out the current status.



E56064

DESCRIPTION AND OPERATION

Item	Description
1	Outer wheelhouse / rocker panel reinforcement (inner)
2	A-pillar reinforcement / A-pillar inner panel (inner)
3	Bulkhead reinforcement / A-pillar (outer)

MIG brazed connections are partly used in production for the following areas: Inner fender reinforcement to A-pillar, A-pillar reinforcement to A-pillar inner panel and outer wheelhouse to rocker panel reinforcement.

The temperature range used during MIG brazing is significantly lower. This keeps the damage to the anti-corrosion zinc layer on zinc-coated panels to a minimum.

This results in the following advantages of the MIG brazed seam:

- No corrosion of the brazed seam.
- Low erosion of the zinc coating in the joining area.
- Minimal destruction of the coating on the reverse side of the panel.
- Low level of heating and thus little warping.
- Easy finishing of the brazed seam.
- Good for bridging gaps.

NOTE: MIG welds must not be carried out on or near existing MIG brazed seams as even the smallest amount of brazing solder can result in a reduction in the strength of the weld seam.

Alternative repair methods are specified in the model-specific body literature.

MIG brazing requires a new generation of welding equipment and training in the technique. For this reason, MIG brazed joints must be replaced by MIG welds at another place if a repair is performed.

When carrying out these repairs, the requirements in the corresponding repair instructions must be taken into consideration.

Rivets

With riveting, two or more panels are joined together using a joining element (rivet). In body construction, pop rivets and punched rivets are used.

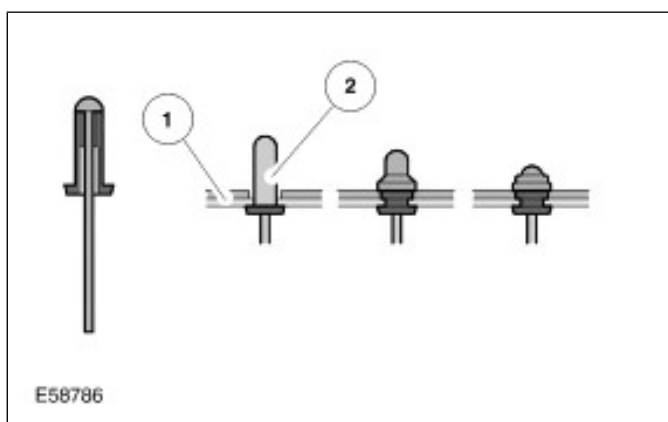
Advantages of riveted connections:

- Metallic and non-metallic materials can be joined together.
- Different thicknesses of materials can be used.
- The material does not have to be heated, and therefore does not warp.
- Low level of preparation required.

NOTE: For detailed instructions on the procedure, please refer to the equipment manufacturer's operating manual.

Disadvantage:

- During dismantling procedures, swarf/rivet remains can fall into inaccessible cavities, which can lead to rattling and rusting.



Item	Description
1	Panels
2	Pop rivet

Pop rivets are used if only one side of the panel is accessible. In this process, overlapping panels are drilled and connected with a pop rivet.

Pop rivets can be inserted pneumatically, hydraulically or manually with rivet guns.

Brazed connections

Brazing is a procedure for connecting metallic materials using a further melted metal.

The melting point of the brazing material is lower than that of the basic material. The basic material is covered with the brazing material and not melted.

As the material is heated to a lesser extent than during welding, brazing is particularly suitable for parts that are sensitive to warping, oxidization and heating. Brazing means it is possible to join together all common metals.

Brazed connections can be detached again through heating.

DESCRIPTION AND OPERATION

Brazed parts have a limited strength, low thermal resistance and a certain risk of corrosion due to the difference between the basic materials used and the brazing material (difference in potential).

NOTE: All connections that are brazed in production must also be brazed if a repair is performed.

Watertight, permanent connections must be produced at the transitions between A or C pillars and the roof. Continuous welded seams in visible areas require time-consuming finishing. For this reason, such connections are not welded, but brazed.

Brazed connections are:

- Very stable and yet elastic.
- Watertight.
- Easy in surface processing.

NOTE: Brazed connections require careful preparation. It is extremely important that the joint surfaces are exactly aligned and that a bare metal joint surface is prepared.

This means:

- Thorough cleaning of the surfaces to be brazed.
- Close contact of the panels at the brazing position.
- The connection/repair position is heated to the melting temperature of the brazing material (approx. 900° C).
- The brazing material is applied to the connection area and heated on the panel to the melting temperature.
- The liquid brazing material is drawn between the panels through capillary action.
- The materials join together at the edges of the panels (alloy formation).

Lead loading

Lead loading with tin is the best repair method for smoothing joints on sectional replacements or for rectifying small uneven areas on the panel surface. Tin has the following advantages:

- Excellent bonding on bare metal surfaces.
- Good moulding properties.
- Good properties for the production of shapes and contours.
- Permanent shape.
- Heat expansion is the same as steel.

▲ WARNING: Brazes are metal alloys (usually lead and tin). Poisonous gases and dust can be produced during processing. Use an extraction unit and, if required, a protective mask.

NOTE: Since 07/2003, lead compounds have been ruled out for production. In the workshop too, lead-free tin solders must be used.

For correct repair, the panel is beaten out almost to the original shape and then the rest is smoothed out through lead loading. First, the panel to be lead loaded must be properly prepared.

To create a basis for the actual lead loading process, a lead loading paste is first applied to the panel. The paste is then heated and wiped away with a cloth. Now the tin can be applied and moulded with a brazing block.

After the repair site has cooled slowly, it is worked with the body plane until the surface is smooth and has no visible joints.

Bonding

Bonded connections are used more and more in modern body designs. Here, a distinction is made between bonds for stabilization purposes and bonds for adhesive strength. Bonds for stabilization purposes are found on clinched flanges and on cross beams in doors or on the roof.

▲ WARNING: Risk of poisoning! Adhesive can be harmful to health. Ventilate rooms well and use breathing protection. Where possible, work with an extraction unit.

NOTE: Adhesives are chemical products and are subject to the safety regulations of the manufacturer.

The repair adhesive is an elastic 1K adhesive on a polyurethane basis. Bonds that rely on adhesive strength are used instead of conventional metal connections. Here, the hardening 1K epoxy resin is used.

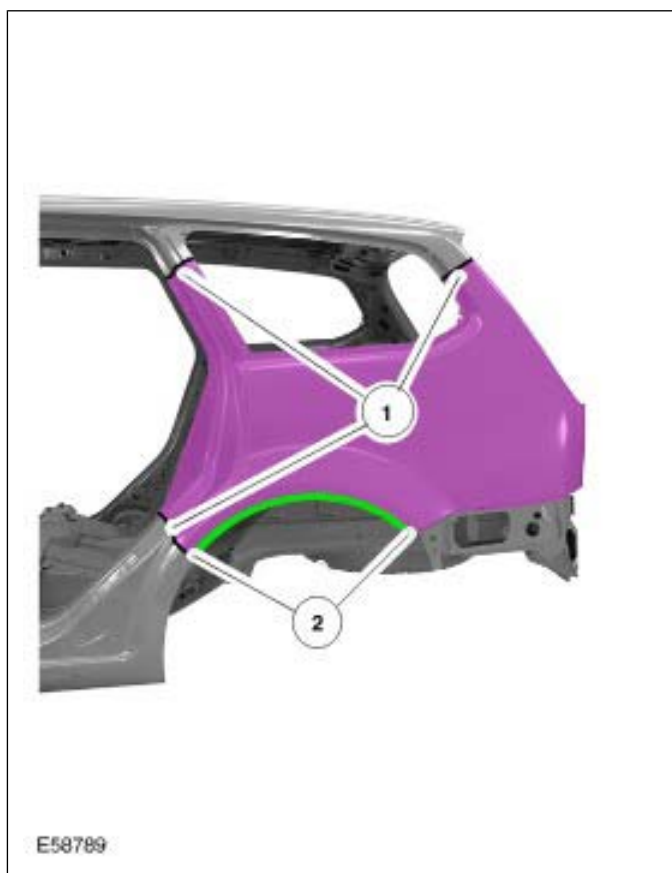
Bonded connections have the advantage over conventional connection procedures that no heating is required. This means it is not necessary to remove heat-sensitive parts, such as the fuel tank, electronic modules or plastic parts.

In addition, bonded connections have further advantages:

- They are air and watertight.
- High corrosion protection

DESCRIPTION AND OPERATION

- Different materials can be connected.
- Bonding can be combined with resistance spot welding.



Item	Description
1	Butt joints
2	Bonded connection

NOTE: The quality of the bonded connection is largely dependent on the care taken during preparatory work.

Different adhesives are used in body repairs. Please refer to the repair instructions for the specific adhesive to be used. Please also take into consideration the instructions of the adhesive manufacturer.

Body bonding requires the following steps:

- The processing temperature of the parts to be processed must comply with the adhesive manufacturer's specifications.
- The connection surfaces must be even and perfectly flat to one another.
- Sand the connection surfaces bare. Use only completely dirt and grease-free tools to do this.

- Clean the connection surfaces with the special cleaner provided by the adhesive manufacturer. Do not use thinner, petroleum ether or other cleaning agents.
- Leave the connection surfaces to dry.
- **NOTE:** Use protective gloves when applying the adhesive.

Apply the adhesive to one or both surfaces to be bonded, according to the manufacturer's instructions, using a suitable tool.

- Join the parts as precisely as possible immediately after applying the adhesive so that only minor corrections are necessary.
- Fix the parts in the final position with clamps.
- Depending on the adhesive, the hardening process can be accelerated using a hot air blower.
- Finally, clean the area that has been bonded of leftover adhesive.

Bonding and welding

On some vehicle models, (such as the Ford Ka), bonding is combined with resistance spot welding. This connection technique has the following advantages:

- Tight, anti-corrosion connection seam.
- High strength due to additional resistance weld spots.

Please note the following points during the repair work:

- Only use adhesive suitable for welding (conductive).
- Carry out resistance spot welding on the connection flanges before the adhesive hardening process.
- Carry out test welding with the adhesive applied.
- If MIG welding is carried out during a sectional repair on a connection flange with adhesive material, the adhesive material must be applied at a distance of approx. 10 mm from the weld spot.

Bonding and riveting

As with welding, bonding can also be combined with riveting. This connection technique has additional advantages. These are:

DESCRIPTION AND OPERATION

- Metallic and non-metallic materials can be joined together.
- Different thicknesses of materials can be used.
- The material does not have to be heated, and therefore does not warp.
- The rivet connection stabilizes the connected components during the adhesive hardening phase.

DESCRIPTION AND OPERATION

Plastic Repairs

General

The proportion of plastics used in vehicle construction continues to rise. Up to now damaged plastic components often had to be replaced. In the meantime plastic repair is becoming more and more accepted because of rising costs.

NOTE: Plastic adhesives are chemical products and are subject to the safety instructions of the manufacturer.

Because of the various compositions of plastics, repair work to plastic parts involves a variety of repair methods.

The following methods are used:

- Thermoplastic straightening.
- Plastic welding.
- Plastic adhesive bonding.
- Plastic lamination techniques.

In repair work, the material properties of plastics are highly significant. There are two main groups:

Plastics used by Ford

Identifier	Description
PA	Polyamide
PC	Polycarbonate
PP	Polypropylene
PP/EPDM	Polypropylene/ethylene propylene diene copolymer
PC/PBT	Polycarbonate/polybutylene terephthalate
PBT/PC	Polybutylene terephthalate/polycarbonate
PUR	Polyurethane
GRP	Glass reinforced plastic

Plastic identification

Normally the identifier is marked on the plastic components used in vehicle construction.

NOTE: The identification of the type of plastic is necessary for the plastic welding process in order to determine the correct welding rod (welding material) to use.

If none is present, it can be determined using two different procedures/methods:

- Thermoplastics.
- Thermosets.

NOTE: Elastomers make up a third group of plastics. These are not mentioned below because they have no plastics repair applications.

Thermoplastics

Heat causes thermoplastics (also called TP polymers) to transform from the solid state into the thermoelastic state and then into the thermoplastic state. When thermoplastics are cooled, they return to solid state.

Thermosets

Thermosets (also called TS polymers) are much harder and more brittle than thermoplastics. Their strength remains largely unchanged when they are heated. Thermosets are destroyed when heated above the critical temperature. Also, the original state will no longer be restored on cooling.

- Visual Inspection
- Mechanical Check

Visual Inspection

Visual inspections mainly serve to identify PUR and GRP materials. Thermoplastic components are often painted and are therefore difficult to identify.

Identification characteristics:

DESCRIPTION AND OPERATION

- When PUR cracks or similar damage occurs, pores of foam can be seen.
- GRP can be recognized by the glass fiber structure on the inside.

⚠ CAUTION: Danger of poisoning! When burned, most plastics release vapors harmful to health. Ventilate the room well and use respiratory protection. Where possible work using an extraction system.

A burning test allows the plastic to be determined more exactly. This involves burning a small piece of the plastic material and observing the behavior of the flame, the smoke characteristics and the dripping behavior.

Characteristics of plastics:

Plastic	Flame behavior	Smoke characteristic	Dripping behavior
ABS	No way to distinguish from other copolymers	Blackish	-
PA	Bluish, transparent flame with yellow edge	No smoke	Drips with blistering
PC, PC/PBT, PBT/PC	Yellow, very sooty flame with black-brown fire areas	Yellow-white plumes of smoke	-
PP, EPDM	Calm flame, similar to a candle	No smoke	Melts
PUR	Agitated flame	Intense sooty plumes	Hardly drips
GRP	Yellow-red, intense sooty flame	Whitish plumes of smoke	-

Another method to determine the plastic group is the sanding test. In this a place is chosen which will not be visible later, and the finger belt sander is used to sand the plastic.

The plastic group can be determined using the pattern of the dust:

- Thermosets produce a white dust.
- Thermoplastics smear and do not produce dust.

Mechanical Check

The plastic group can be determined by a sound test:

- Degree of hardness - the higher-pitched the sound, the harder the plastic.
- Elasticity - the more muffled the sound, the higher the elasticity of the plastic.

Safety instructions

In addition to the general safety instructions, the relevant regulations and accident prevention legislation must be observed.

NOTE: Without exception, before starting work you must read the safety and warning instructions in the chapter "Safety Instructions". In addition, pay attention to the warning instructions of the particular equipment manufacturer.

Information sheets, safety notices and guidelines for the processing of adhesives containing isocyanate, polyester resin, adhesives, solvent and thinners provide more details on their use.

The following instructions must always be followed:

- Polyester resin, adhesive, solvents and thinners are inflammable and must not be used near naked fire or flames.
- Sawing and grinding operations must only be carried out in rooms equipped with extraction systems.
- If no rooms with extraction systems are available, only use tools with extraction equipment.
- Protective equipment such as gloves, protective goggles, aprons and breathing masks are essential.

DESCRIPTION AND OPERATION

Plastic welding

Splits formed in plastic bumpers are typical possible plastic repairs.

NOTE: Do not carry out plastic welding in the area of fixed foam backing. The foam backing will usually be destroyed and the function of the component is then no longer guaranteed.

If repair using adhesive methods is not possible because of unfavorable conditions at the rear of the repair location, plastic welding is a possible repair process.

There are two methods of welding: hot air draw welding and hot air fanning welding.

Plastic welding set



Item	Description
1	Various welding rods
2	Scraper (heart-shaped)
3	Hot air blower (approx. 1500 W)
4	Clamps
5	Welding nozzles

In addition to the components listed, plastic welding requires tools already found in the workshop such as scrapers, sanders, face cutters etc.

As with all other welding processes, only certain material combinations can be joined together using plastic welding.

NOTE: Basic and in-depth training is offered on the following topics. You will find an overview of the complete range listed in the Training brochure published by the Ford Service Organization.

Repair sequence during plastic welding:

NOTE: The manufacturer's data must be taken into account when choosing welding materials and the correct temperature setting of the hot air gun.

- To prepare the location for welding, remove paint residues and sand the weld area.
- Drill out the ends of the split to stop it spreading further. Shape the location to be welded into a V-shaped joint.
- Perform the welding. Hot air draw welding or hot air fanning welding.
- Rework the weld seam. After cooling, sand the raised weld seam.
- Clean the sanded repair surface using plastic cleaner. Apply plastic primer thinly to the repair surface and paint it.

Despite good preparation and the correct choice of welding materials, weld faults may occur. The correct choice of temperature is important for the success of the repair.

Possible causes of weld faults:

- Deformation caused by overheating of the repair area or tensions in the material while welding the component. Plastic material too thin.
- Poor weld joint because the weld temperature was too low or the welding speed was too fast. Welding different materials together.
- Weld seam dropped because the split gap was too wide or the welding temperature was too high.

Adhesive bonding of plastics

Adhesive bonding of plastics has some advantages over welding methods:

- Within the group of thermoelastic plastics, all semi-rigid ancillary components (such as bumpers, front grilles, etc.) can be repaired without identification.
- A two-component polyurethane based adhesive is used for all thermoplastic parts.
- Reinforcement strips can be attached behind splits (split length up to max. 100mm) and openings to ensure the original strength properties.

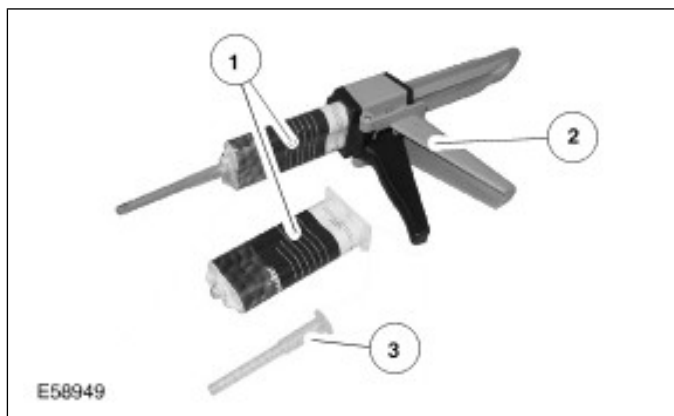
Tools and equipment also familiar from paint repairs can be used in making adhesive repairs to thermoplastic components.

Angle grinders and belt sanders can be used to grind out scratches and splits. Orbital sanders with extractors are used for fine sanding.

The infrared heater is used to provide fast and secure drying throughout.

DESCRIPTION AND OPERATION

Plastic adhesive set



Item	Description
1	2-component adhesive
2	Cartridge gun
3	Venturi tube

Apart from the components shown, other materials may be needed to bond plastics, depending on the repair position.

For large scale repairs, it may be necessary to insert reinforcement panel strips and reinforcement matting as fixing aids.

Repair sequence during plastic adhesive bonding:

NOTE: Follow the manufacturer's guidelines when using adhesives.

- Prepare the location of the bond. Remove paint residues and sand the area to be bonded. Drill out the ends of the split to stop it spreading further. Prepare the bond location into a V-shape and clean it with plastic cleaner.
- Apply the adhesive. The two-component adhesive is applied to the cleaned and primed repair location using a hand gun. Spread and smooth the adhesive using a flexible plastic spatula.
- Rework the bond location. After cooling, sand the raised adhesive. Clean the sanded repair surface using plastic cleaner. Apply plastic primer thinly to the repair surface. Apply paint.

GRP repairs

GRP material is hard and brittle in its strength properties. Because of these material properties, splits and openings often result in cases of serious damage.

The stability of GRP parts is impaired if the glass fiber reinforcement is cracked. The component must be replaced in cases of serious damage that affect the structure.

Minor damage (such as abrasion, splits up to 80mm, holes up to approx. 60mm diameter, etc.) can be repaired to a technically and visually perfect standard, provided that the damage does not occur in heavily used or hard-to-reach areas.

To ensure perfect repair results, observe the following points:

- The room temperature should be at least 15°C and the air should be as dry as possible.
- The repair location must be thoroughly dry and clean.
- Before the repair, the GRP part being repaired must be dried using an infrared heater or in a drying oven.
- In cases of large splits and fractures, the strength of the outer skin can be re-established by backing with a reinforcement material.

Tools and equipment from the paint shop can be used to carry out repairs to GRP parts. Angle grinders and belt sanders can be used to grind out scratches and splits. Orbital sanders with extractors are used for fine sanding.

GRP repair set



Item	Description
1	Polyester resin
2	Glass fiber mats
3	Hardener

Scissors, paintbrush and cleaning materials are other materials which will be needed to perform a GRP repair.

NOTE: Follow the manufacturer's instructions when using the repair materials.

DESCRIPTION AND OPERATION

The repair process for a GRP repair is as follows:

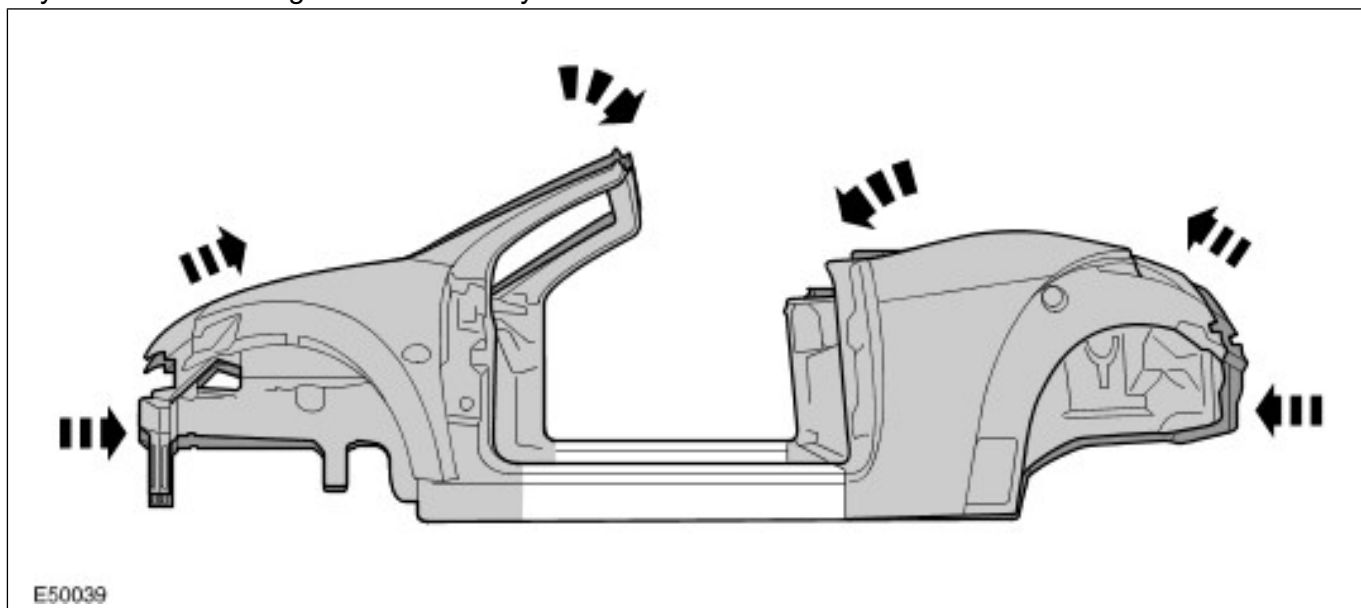
- Prepare the repair location. Remove paint residues and sand the repair area.
- Drill out the ends of the split to stop it spreading further.
- The repair location must be sanded by hand. If machine working is attempted, the resin will be heated so much that the surface structure will be changed. The result is inadequate adhesion.
- Perform the GRP repair. Apply polyester resin thinly to the repair location. Lay the glass fiber mat in place and apply polyester resin over it again.
- Rework the location of the repair. Sand away any polyester resin which stands proud after it has hardened.
- Clean the sanded repair surface using plastic cleaner. Apply plastic primer thinly to the repair surface and after it has dried apply the paint finish.

DESCRIPTION AND OPERATION

Special Repair Techniques

Cabriolet vehicles

The body of a cabriolet vehicle is different to the self-supporting body of a saloon car because of the special roof construction (folding top). The stability requirements must therefore be ensured by construction changes within the body structure.



These are for instance:

- Longitudinal and torsional reinforcing components which compensate for the lack of the roof.
- Reinforcements to the floor assembly, particularly in the rocker panel area.
- Reinforcements in the pillar areas.
- High-strength and ultra-high-strength steel panels with single panel thicknesses of up to 2.5 mm, which in combination can become up to 6mm thick (e.g. reinforcements in the floor area, rocker panels).

If deformation to load carrying components occurs, the stability of the whole body shell can be adversely affected.

On a cabriolet, accident damage repair to the components mentioned above is considerably different in certain aspects compared with the usual repairs (closed body construction):

- A model specific alignment angle system must always be used during straightening and repair work, securing using clamps at the rocker panel area is not always adequate for the cabriolet.
- To avoid damage to the doors, they must always be open during straightening work. In the case of more severe damage, additional tension and compression spindles must be used to stabilize the door cut-outs (between the A- and B-pillars).
- In load bearing areas such as the rocker panels, side members and floor pan, increased straightening forces are necessary due to the additional reinforcements.
- **NOTE:** Additional information on welding can be found in the section Welding Equipment and Joining Techniques.
High-power welding equipment for panel thicknesses in overall combination of up to 6 mm total material thickness.
- The fitting accuracy and longitudinal rigidity of the affected component is especially important to ensure that the doors, door windows and the roof fit and close correctly.

DESCRIPTION AND OPERATION

Liquefied gas vehicles

Alternative fuel vehicles often require special handling in the workshop area. Above all, assembly operations to some extent require particular knowledge when dealing with the special technology and the safety regulations.

NOTE: Only fully trained personnel are permitted to work on alternative fuel vehicles.

These special requirements must be understood and taken into account in the body shop as well.

⚠ CAUTION: Danger of fire and explosion. The safety instructions must always be followed when performing service work on fuel/gas systems. Failure to follow these instructions may result in personal injury.

If the smell of liquefied petroleum gas (LPG) or compressed natural gas (CNG) is noticed in the workshop, instruct everyone present as follows:

- No smoking and extinguish all naked flames.
- Shut off all electrical and air powered equipment.
- Evacuate the area.
- Ventilate the area.
- Contact the fire control authorities.
- Move the vehicle to a dedicated, well ventilated area.

Alternative fuels require special handling:

- Handle them in a specially dedicated, well ventilated area, which is only accessible to authorized persons.
- Identify the designated area with new warning notices.
- If possible close the main shut-off valve and run the vehicle on alternative fuel until it switches automatically to petrol operation. Only then is it allowed to drive the vehicle into the workshop or service area.
- If possible do not allow any liquefied gas (LPG) to escape.
- The ambient temperatures must not exceed 40°C. For this reason the LPG and CNG fuel tanks must be removed on vehicles with LPG or CNG operation before using a drying oven to dry the paint where the temperature exceeds 40°C.

Avoid situations in which fuel from an LPG or CNG fuel tank can escape. These include:

- Extremely hot ambient temperatures.
- Parking near a heating device.
- Raising the vehicle near a ceiling heater.

Refrigerated conversion vehicles

Apart from the special materials used in building the structure of the refrigerated compartment, such vehicles have special energy and refrigeration systems which require special handling during repair.

CAUTIONS:

⚠ Danger of injury. Work on the 230<SP>volt system of the refrigeration equipment must only be carried out by trained specialist personnel.

⚠ The refrigeration system is filled with refrigerant R134a. This can cause frostbite if it contacts the skin. Pay attention to the corresponding warning notices and instructions in the chapter Air Conditioning Systems.

NOTE: Work on the refrigerant circuit may only be performed by persons who have a relevant certificate of competence.

Vehicles with a refrigerated compartment are often used to transport foodstuffs. For this reason, additional hygiene regulations must be complied with during repair work.

Aluminum and plastic are used to construct the two different types of compartment found on refrigerated vehicles.

The aluminum conversion is a very stable and technically perfect variant. However, against this the relatively high production costs and a lower payload must be taken into account, because of the weight of the aluminum conversion itself.

NOTE: Basic and in-depth training is offered on the following topics. You will find an overview of the complete range listed in the Training brochure published by the Ford Service Organization.

The plastic conversion has developed into a light, clean and economical alternative because of constant further development of materials and working techniques.

NOTE: The material combinations, the workmanship and the working methods must comply with the current food hygiene regulations.

DESCRIPTION AND OPERATION

For this reason, service and repair work on the refrigerated conversion may only be performed by authorized and specially trained technicians.

Refrigerated compartment constructions are often made using both materials. The floor pan is made of structured, slip-proof aluminum panels and the wall and ceiling cladding is made of smooth surfaced plastic elements.

⚠ CAUTION: PUR hard foam is flammable. If PUR hard foam is overheated, it will burn on its own with a brilliant yellowish flame. It produces unpleasant choking and toxic fumes. Special measures must be taken when welding the vehicle body.

Polyurethane wall and ceiling elements are manufactured using a sandwich principle. An insulating polyurethane core is coated with food grade ABS plastic on one side.

PUR hard foam does not decompose, is rot resistant and is odorless. These properties make it suitable for use as insulation.

Because of its closed cell structure, water uptake by PUR hard foam is for the most part only a problem at edges. Cut edges or other mechanically worked surfaces must however be sealed with the greatest care.

The conversion to a refrigerated vehicle is performed as made-to-order production. The large surfaces of the wall and ceiling cladding can be changed and are particularly easy to repair.

If access to the back of a body panel section is needed because of body straightening work, in some circumstances it is cheaper to perform a cut-out repair instead of removing an element.

The repair process is fully described in the Student Information booklet Refrigeration System Technology, Transit 2000.5 Freshline.

DESCRIPTION AND OPERATION

Impact of Insufficient Repair Quality

Body repairs usually require a significant level of intervention in the existing body shell structure. The corrosion protection, seals and NVH components are destroyed and must be replaced.

To prevent the vehicle quality from being reduced due to an insufficient repair quality, all repairs carried out in all repair sections must be inspected during and after the accident repair.

Simply checking the vehicle at the time of delivery is not sufficient to guarantee the repair quality. Rather, continuous checking of the work carried out is recommended.

NOTE: Logs of the acceptance of individual operations are a useful tool for quality assurance. A comprehensive final inspection can be carried out based on a final acceptance log.

In the process, the entire repair sequence must be split into reasonable sections, with the creation of check points to which particular attention must be paid.

The following are some possible sections:

- Completion of the body repairs.
- Completion of the paint repairs.
- Final assembly, ancillary components, functional tests.
- Vehicle delivery.

NOTE: The following points offer an indication of possible test logs. They can be combined and supplemented differently, depending on the individual operating procedures.

Completion of the body repairs

After completion of the body repairs, the following areas should be checked:

- Manufacturing inspection for functionality and originality in the accident area.
- Check snug fitting of metal panel parts (welding and screw connections).
- Check snug fitting of ancillary components (doors, hoods, glazing).
- Check surface condition of the welded seams.
- Check seals, blanking plugs, NVH components.
- Check corrosion prevention measures
- Check that the repair work is in the correct condition for painting.

Completion of the paint repairs

The following points should be noted when checking the paint repairs:

- Originality of the paintwork.
- Transitions to the adjacent paintwork.
- Leftover paint and paint traces.
- Leftover masking materials and dirt.
- Underbody protection and cavity protection.

Final assembly, ancillary components, functional tests

After final assembly, not only a visual inspection is required, but also the functionality of many components must be checked:

- Check repair area for originality.
- Check ancillary components for correct installation.
- Check precision fitting of all parts.
- Check that the doors and flaps are working correctly.
- Check that all mechanical parts, such as the window winder are working correctly.
- Check for leaks in the repair area.

Vehicle delivery

Vehicle delivery again offers the opportunity of checking the repair quality. In the process, the following points are to be checked again:

- Check the accident area for originality.
- Visual inspection of the transitions and gaps.
- Check for corrosion prevention measures, insulation mats and rubber seals.
- Check for traces of leftover paint.
- Check the cleanliness of the vehicle.
- Functional check of the mechanical and electrical components.
- Road test the vehicle.
- Check for noise, vibration and harshness (NVH).
- Check for wind noise.

After repair work on the body and vehicle, not only the visual restoration of the damaged vehicle, but also the functional restoration must be guaranteed.

Customers are making increasingly high demands of vehicles, particularly in terms of driving comfort. Customers find noise, vibrations and harshness (NVH) as well as squeaking and rattling annoying,

DESCRIPTION AND OPERATION

particularly after repair work. It is therefore important that the condition of the vehicle at the time of production be restored after an accident repair.

After body repairs, the entire repair area must be checked for any water leaks. It is crucial that a leak test be carried out as part of the final inspection so that water leaks can be detected and eliminated even before delivery of the vehicle to the customer.

The requirements of the vehicle manufacturer are to be taken into consideration during all inspections. Only in this way can it be guaranteed that the vehicle quality is not reduced through insufficient repair quality.

DESCRIPTION AND OPERATION

Water Leaks

Water leaks can occur after body repair work, but can also occur on new vehicles. The test methods described below allow the various causes to be identified. In all cases, a systematic and logical procedure is required to locate water leaks.

General

When searching for faults, it must be taken into account that water can enter the vehicle passenger compartment in various ways and under different conditions. Therefore, it is sometimes not sufficient to perform a water test on a stationary vehicle.

Before beginning extensive checks, a thorough visual inspection must be carried out. The following points are to be taken into account in the process:

- Check the clearance and accurate fit of ancillary components such as the trunk lid and doors.
- Check for correct installation and possible damage to sealing elements such as blanking plugs, seals and rubber door seals.
- Check that the water discharge are not blocked.

Testers

NOTE: Further test methods and testers are set out in the "Wind noise" chapter.

Water leaks and wind noise can have similar causes. This means that test methods and testers can be used for both types of problem. The alternative tests are as follows:

- Stethoscope.
- Smoke pipe.
- Ultrasonic detector.
- Powder test.

Test method

Water leaks in the vehicle passenger compartment cannot usually be located at the first go, as the water frequently distributes itself across larger areas. For this reason, the passenger compartment must be dried before the leak tests. Any ancillary components that block the view must be removed.

Water test

During the water test, the vehicle is sprayed with water at the suspected location of the leak. At the same time, a second person checks the passenger compartment for places where water enters the vehicle.

- Start in the lower area and spray the whole area, working upwards in stages.
- Use a water spray nozzle with a variable water jet.
- In difficult cases, improve the free flowing of the water by adding a small amount of rinsing agent.
- Use a special mirror in areas with poor visibility.
- If necessary, use a contrast agent and UV lamp.

Washer test

Certain leak problems only appear in a car wash or can only be simulated there. The concerned area of the passenger compartment should be inspected with a torch during the wash procedure.

Road Test

Some leaks only appear when the vehicle is moving. If no leaks are detected during the above-mentioned tests, road tests should be carried out on wet roads.

- At various speeds.
- On various road surfaces (asphalt to cobbles).
- With loaded or unloaded vehicle.
- Driving through puddles (splash water).

Test with UV lamp

As already indicated in the water test section, a leak test can be executed with a UV lamp and a special contrast agent. The advantages of using contrast agent are:

- No need to dry out wet areas beforehand.
- The water entry and its subsequent path can be seen more clearly.
- No need to remove most ancillary components from the vehicle.

DESCRIPTION AND OPERATION

NOTE: The equipment manufacturer's instructions must be followed when using a UV lamp and contrast agent.

Procedure for using a UV lamp.

- Wet the test area with clear water from the outside.
- Prepare test liquid and apply it from the outside using a suitable water sprayer.
- Illuminate the relevant area from the inside using the UV lamp. The test liquid will make the leak visible.

Chalk/powder test

In this test, the contact area of the seal is checked.

To do this, the door seal is coated with powder or brushed with chalk. A thin layer of grease is applied to the contact area of the seal. The door must then be slowly closed and reopened.

The width and continuity of the imprint can now be checked on the door seal.

Smoke test

This test can be used to detect leaks visually. The process is as follows:

- Set the ventilation blower in the passenger compartment to the highest setting.
- Close all doors so that a slight overpressure can build up in the passenger compartment.
- Move the smoke pipe along the outside of the body to the areas to be checked.
- Leaks can be detected through the irregular movement of the smoke.

Stethoscope test

This procedure is very similar to the smoke test. Instead of the smoke pipe, move a stethoscope past the areas of the body that are at risk. Leaks can now be detected acoustically.

Ultrasonic detection

With this test, a leak can be found electronically. The procedure is as follows:

- Place the ultrasonic transmitter in the vehicle.
- Completely close the vehicle.
- Search the exterior of the vehicle using the detector.
- The detector provides a simple indication of a leak.

Sequence

St age	Testing	Re sult	Action
1st	Ask customer for a detailed list of possible reasons for the water entry. Does this information allow the cause of the leak to be identified?	Ye s	Dry out the vehicle and repair the damage. Perform a water test as a check (see test method).
		No	Step 2.
2nd	Perform an initial visual inspection on the vehicle. Look for signs of water entry. Can the cause of the leak be identified immediately?	Ye s	Dry out vehicle. Repair damage. Perform a water test as a check (see test method).
		No	Step 3.
3rd	Is it possible that water is getting into the vehicle through a seal (door seal, trunk lid seal)?	Ye s	Check the seal for damage. Check the creation of the seal using the chalk test (see test methods). Step 4.
		No	Step 5.

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Stage	Testing	Result	Action
4th	Is the contact area for the seal adequate?	Yes	Step 5.
		No	Perform work as described under Areas with possible water leaks - Door seals. Dry out vehicle. Repair damage. Perform a water test as a check (see test method).
5th	Before starting any further work, use the VIN to look for model-specific information in eTIS. Perform Oasis query and check TSIs. Does this information allow the cause of the leak to be identified?	Yes	Dry out vehicle. Repair the damage using the information found. Perform a water test as a check (see test method).
		No	Step 6.
6th	Establish the extent of the damage. To do this, expose wet areas. Remove parts. Investigate the suspected area for signs of water. Does an investigation of the suspected area allow the cause of the leak to be identified?	Yes	Dry out vehicle. Repair leak. Perform a water test as a check (see test method).
		No	Step 7.
7th	Check exterior areas (seals, seal welds). Check interior areas: Signs of water, plugs, seal welds. Can the cause of the leak be identified?	Yes	Dry out vehicle. Repair leak. Perform a water test as a check (see test method).
		No	Step 8.
8th	Perform water test or ultrasound test. Can the cause of the leak be found?	Yes	Dry out vehicle. Repair leak. Perform a water test as a check (see test method).
		No	The water entry may only occur under dynamic driving conditions. This requires intensive tests to be repeated with the corresponding climatic influences (rain).

Possible complaints and corrective actions

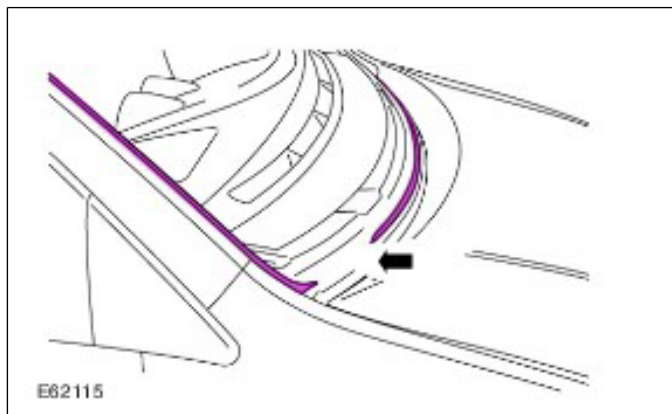
NOTE: Water leaks and changed vehicle acoustics can have similar causes. For this reason, information from the Wind noise or Noise, vibrations, roughness chapters may be useful in identifying the fault.

An outline of the possible complaints due to water leaks is provided below. The causes of water leaks and the possible remedies are presented using selected examples. They are intended to provide troubleshooting tips and suggestions for the user but do not represent an exhaustive faults list.

Glued windows

A broken pasted seam can cause water to enter around the window. A broken pasted seam can be located using a water test or by carefully blowing compressed air onto the inside of the window seal.

DESCRIPTION AND OPERATION

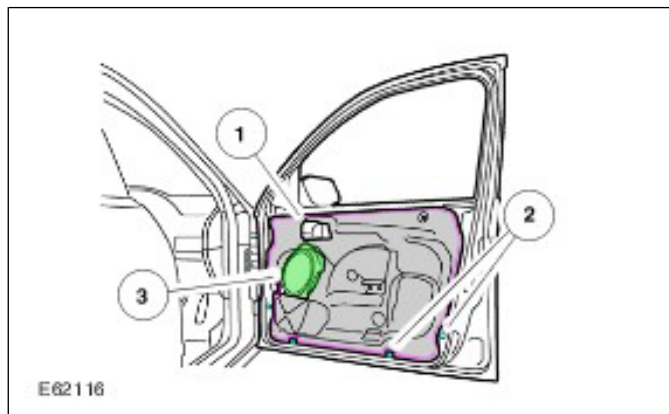
**Corrective action**

Broken pasted seams **-Arrow-** can be sealed from inside using PU adhesive.

If this seal does not resolve the problem or the broken pasted seam is too extensive, it is necessary to remove the window and glue it back into place.

Door seals

If water appears at the bottom of the door, it is possible that the door seal behind the door trim is damaged. If the door is intact, water can enter through the window weatherstrip and flow out through gaps on the underside of the door. If the door seal adhesion is faulty or the door seal is damaged, water can get into the interior.



Item	Description
1	Seal/adhesion
2	Clips
3	Door speaker

Fastening bolts could be loose or clips incorrectly positioned on door modules.

Corrective action

Depending on the door seals used, different sealing methods can be used.

NOTE: The drainage holes on the underside of the door may not be blocked - if they are, clean them. Defective films and foam seals must be replaced.

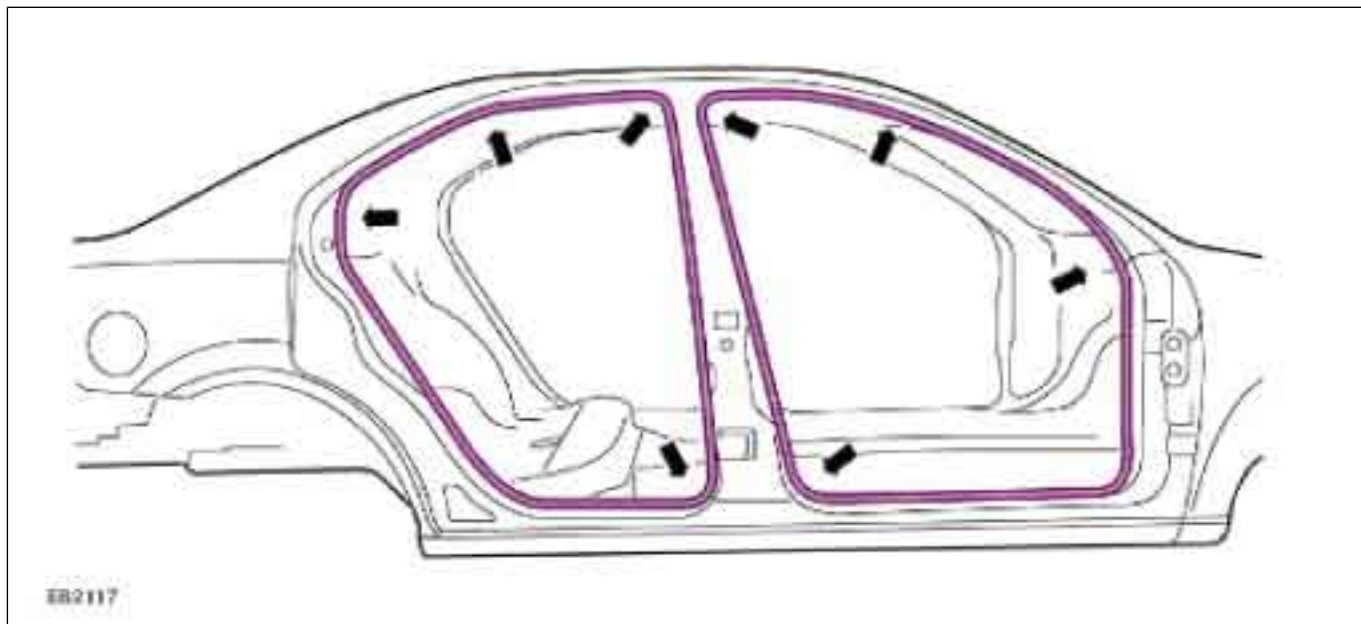
Once the adhesive surfaces have been cleaned, plastic films must be stuck with double-sided adhesive tape or replaced.

Leaky foam seals are sealed with Butyl tape or replaced.

Plastic door modules are fitted with a weatherstrip, which cannot be replaced. Seal the leaky point with Butyl tape or replace the part.

DESCRIPTION AND OPERATION

Door weatherstrip



Leaks can be caused by badly fitted seals. In particular, areas with radii **-Arrow-** must be thoroughly checked.

Door seals can develop leaks due to:

- Damaged or expanded seals.
- Ageing.
- Insufficient contact pressure.
- Inadequate contact area for seal on body part.
- Uneven welding flange thickness.
- Kinks.

The contact pressure of a seal can be determined using a strip of paper. If a strip of paper trapped in the closed door can be pulled out easily, the contact pressure is too low.

Corrective action

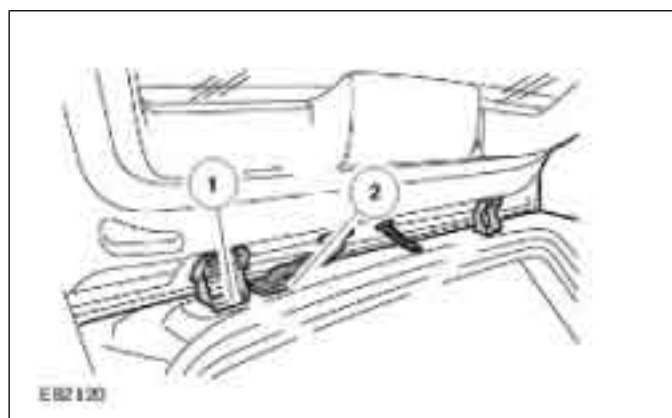
Replace damaged or aged seals. Prevent kinks.

The contact pressure can be changed by adjusting the catch bolt or correcting the panel flange.

Realign uneven welding flange thicknesses. Properly repair any paint damage that occurs.

Rubber grommets / plugs

Rubber grommets or plugs are fitted at numerous points on the body. They are frequently used as seals for cables, hoses or actuating links. Rubber plugs are frequently used for gaps caused during production.



Item	Description
1	Hinge seal
2	Cable duct

Leaks can be caused by badly fitted or damaged rubber grommets and plugs.

Damaged cable insulation can also cause leaks.

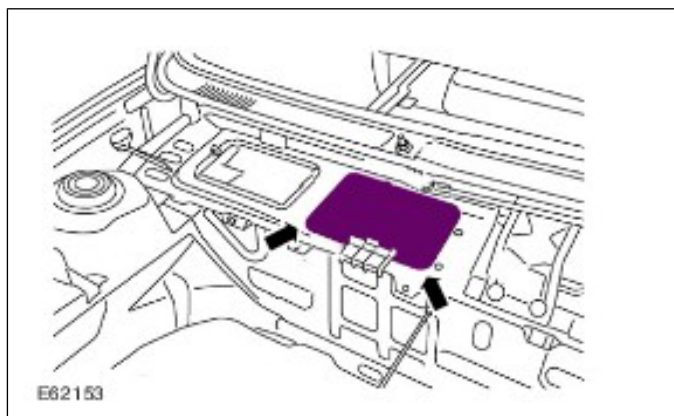
Where components are bolted on, water can enter if there are inadequate seals at the connection point.

Corrective action

Correctly fit rubber grommets / plugs. During fitting, ensure that the sealing lips are not trapped and are applied properly. The contact area of the rubber grommets / plugs can also be sealed with PU sealing compound. Replace damaged rubber grommets and repair damaged cable insulation.

DESCRIPTION AND OPERATION**Heater housing/ventilation**

Loose Butyl sealing strips, damaged sealing surfaces or a trapped carpet can cause leaks around the heater housing / ventilation **-Arrow-**. Badly positioned or badly fitted hoses can also be responsible for water entry. Water drains must not be blocked.

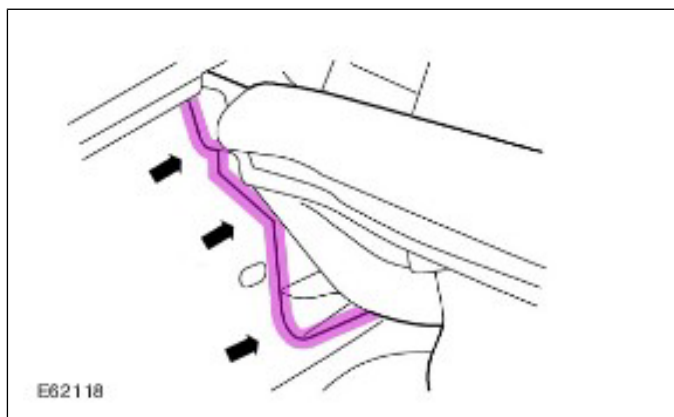


NOTE: A large quantity of water flows through the water tank. If there are leaks in this area, it is essential to ensure that the water drainage mechanisms function correctly. Drainage openings may not be blocked or stuck. Leaves and other dirt must be removed before troubleshooting.

Corrective action

Before the actual repair, make sure that the water drains are not blocked or stuck.

Remove the heater housing / ventilation and fit a new Butyl sealing strip. Damaged sealing surfaces must first be adjusted. A trapped carpet must be removed.

Seal welds

PU seal welds are applied to welded or riveted connections **-Arrows-** to seal the interior of the vehicle. Incorrectly applied or damaged seal welds

can allow moisture to penetrate into the interior of the vehicle. It is also possible that seal welds that visually appear to be intact in terms of their shape and size actually have poor adhesion.

Corrective action

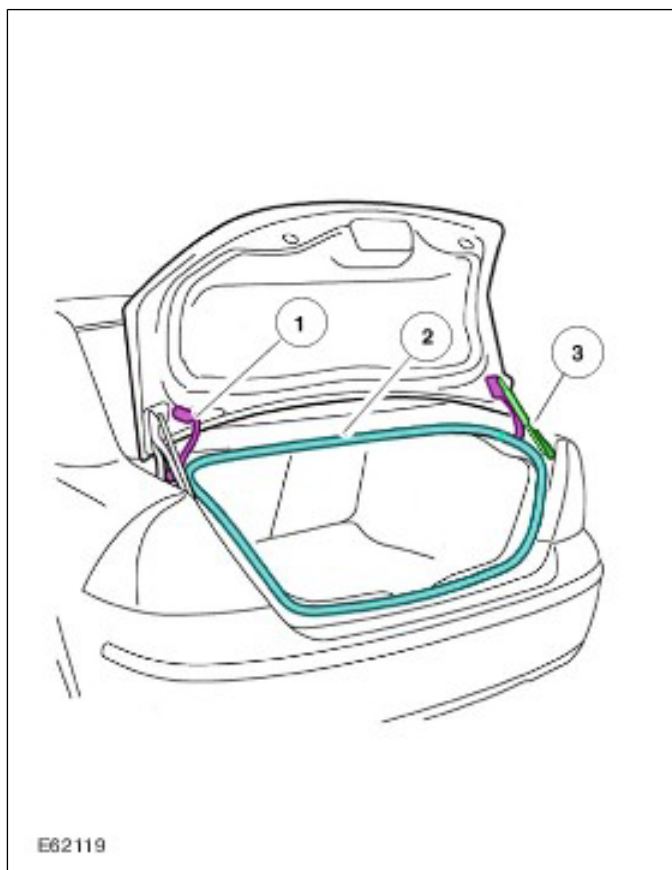
Incomplete seal welds must be supplemented with PU sealing compound. Damaged seal welds must be removed and re-applied properly. Make sure that any residual moisture is effectively removed before a new seal is applied.

Attached parts

The add-on parts include:

- Exterior mirrors, handles, controls.
- Mouldings, roof mouldings, lettering.
- Roof aerial, roof rack or connections for roof rack systems.
- Bumper mountings.
- Injection nozzles, door contact switches, bump stop rubber.
- Control unit seals.
- Tail lamps.
- All kind of screwed connections (pedal block, door and tailgate hinges)

DESCRIPTION AND OPERATION



E62119

Item	Description
1	Cable duct
2	Gasket
3	Screw connection

Add-on body parts must be fitted with seals, grommets or sealing compound to prevent water entry. However, even when a sealing system is fitted, the screw thread may still cause leaks.

Corrective action

Seals must be tested and, if necessary, replaced. Check contact surface and adjust if necessary. Points sealed with sealing compound must be thoroughly cleaned and the seal replaced. Check grommets and replace if necessary. At all screwed connections, seal the thread with an appropriate sealing material.

DESCRIPTION AND OPERATION

Wind Noise

Wind noise and noises in general are dealt with under the label Noise, Vibration, Harshness, or NVH in short.

NOTE: Basic and advanced training is offered for the following contents. For an overview of all training courses offered, please refer to the Ford Service Organisation's training course brochure.

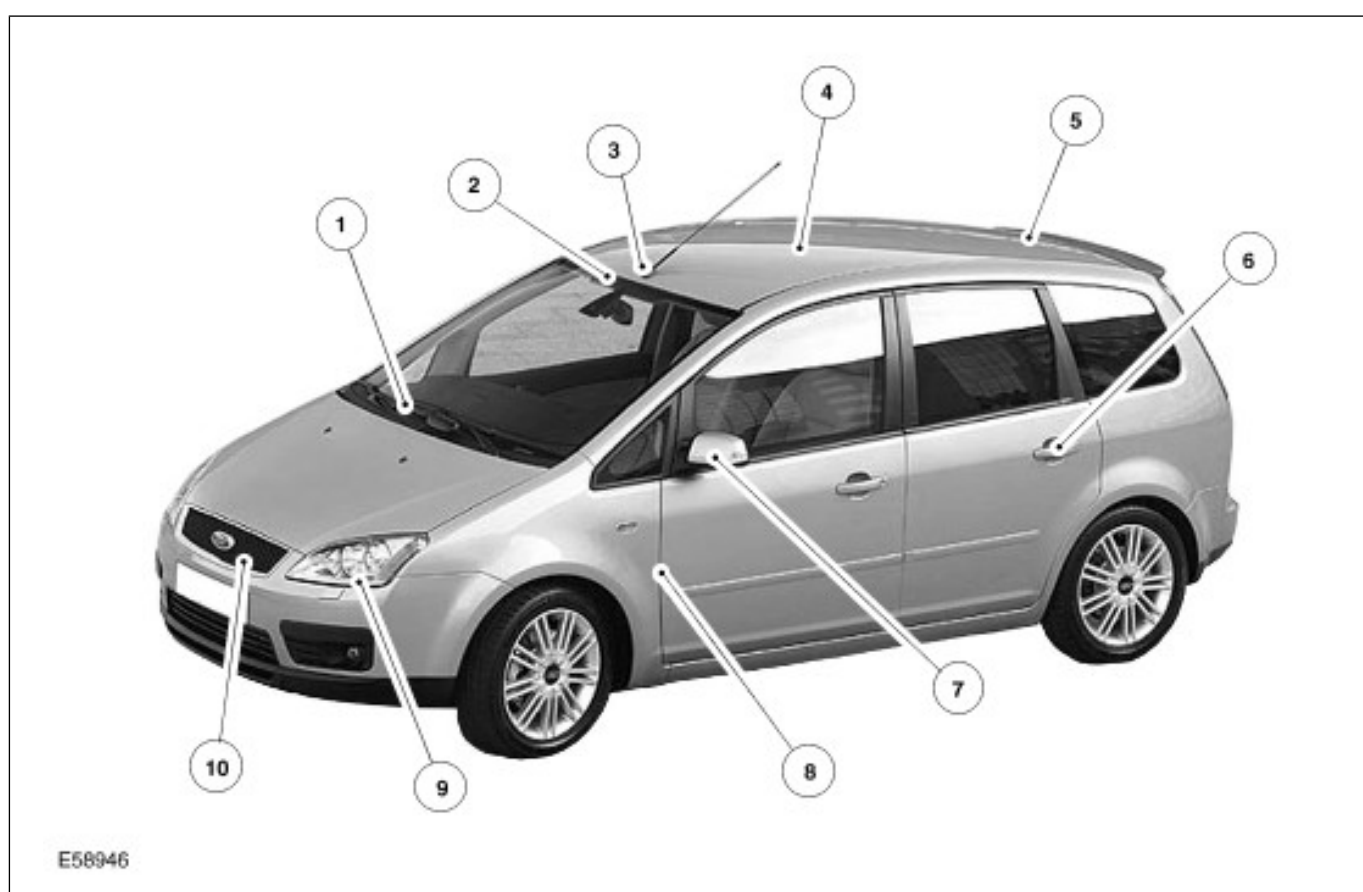
Due to the continuous reduction in drive noises, wind noise has come to the fore in the vehicle and is perceived to a greater extent by the customer.

There are various causes of wind noise. They can be due to the design of the vehicle, or they can occur after a repair. They are mostly caused by poorly mounted components, which must be located and installed in the correct position.

Diagnosis

In order to carry out targeted diagnosis, it is important to know the basics of noise formation and sound transmission.

Potential areas of wind noise



Item	Description
1	Wiper arms
2	Windscreen seal
3	Antenna/antenna base
4	Sun roof
5	Liftgate
6	Door handles
7	Rear view mirrors

Item	Description
8	Door seals
9	Headlamps
10	Radiator grille

Normal air flow noises are caused by air blowing against even, flat vehicle surfaces, such as the roof, doors and side windows. When the vehicle is moving fast, air films (turbulence) form, which cause variations in air pressure. These variations

DESCRIPTION AND OPERATION

in air pressure spread in the form of sound waves and are transferred to the vehicle interior via the side windows and seals.

If air flows over an edge on a vehicle, the air flow cannot follow the shape of the surface, but separates at the edge. Eddies are formed, which collapse again after a certain time or distance. The associated variations in air pressure create a corresponding sound wave.

Streaming noise occurs if there are leaks in the sealing system to the vehicle passenger compartment. The noise is caused when stationary air mixes with moving air. As a result, the noise increases as the streaming speed increases.

Cavity noises are noises that occur when the air column is caused to oscillate.

Workshop diagnosis

Before carrying out repair work, a visual inspection of the vehicle must be carried out. The gaps in the doors, the sunroof and at all other body parts must be checked in particular.

When the doors are adjusted to fit exactly, development of wind noise can often be eliminated at high speeds (lifting of doors off the seals).

The following points are also to be checked:

- Check that windows are completely closed.
- Check air ducts and vents for correct installation.
- Check protruding trims or plastic parts.
- Check that all blanking plugs are present.

Road tests

Wind noise can usually only be located through road tests.

NOTE: There should always be two people present during test drives to find noises. A driver who reconstructs the situation causing the noise, and a person to carry out the checks.

The following points should be taken into account for such test drives:

- Check that the tire pressure is correct.
- Remove non-standard ancillary components from the vehicle.
- Choose a dry, flat road with as little traffic as possible.
- Carry out the road test in all speed ranges. Use a high gear so that the engine noise is low.

If it is difficult to detect the noise sources, the search can be made easier by masking potential areas.

Sequence

A basic prerequisite for a problem description with subsequent diagnosis is the performance of a test drive with the customer.

Only once the customer's problem description is clear should the service technician begin with the diagnosis of the problem.

The service technician should carry out specific road tests to achieve further containment of the problem.

Sequence (schematic):

1. Customer concern

- What is the customer concern and what details can he supply about the wind noise?
- Under which conditions does the wind noise appear?

2a. Diagnosis and corrective measures **Sequence**

A: The diagnosis is possible based on the information supplied by the customer.

- Carry out corrective measures to remedy the wind noise.
- Road test the vehicle to check that the concern is resolved. The vehicle must be driven in exactly same way as when the wind noise was produced earlier.
- The corrective measure performed based on the information supplied by the customer was not successful. Further fault finding must now be carried out in the workshop (see Sequence B).

2b. Diagnosis and corrective measures **Sequence**

B: The diagnosis is not possible based on the information supplied by the customer.

- Test for faults, referring to any TSB (Technical Service Bulletin) which may be relevant.
- Visually check external seals, check gaps.
- Visually check the vehicle for traces of accident repair and retrospectively attached ancillary components.
- Perform a diagnosis based on the road test.
- Carry out corrective measures based on the diagnosis.

DESCRIPTION AND OPERATION

- Perform another road test. The vehicle must be driven in exactly same way as when the wind noise was produced earlier.
- If this road test does not show that the work has been successful, additional techniques such as powder testing, stethoscope testing or ultrasonic detection must be employed.

The vehicle acoustics do not always make it possible to draw up a clear diagnosis. It is therefore all the more necessary to use all methods of detecting and suppressing NVH problems.

3. Comparison of vehicles constructed in the same way.

If no clear diagnosis is possible based on a customer concern, a comparison test drive should be carried out on a vehicle constructed in the same way.

Test equipment

Diagnosis of wind noise requires good hearing, basic knowledge of acoustics and experience. Tools can provide assistance for the diagnosis and reduce the fault finding times.

Stethoscope

Here, the tightness of the vehicle passenger compartment is checked. The ventilator blower is set to the highest setting and the doors and windows are closed. There is now a corresponding overpressure in the passenger compartment.

The stethoscope is now used to listen to the door and window seals. The sound of the streaming air can be heard at the leaks.

Smoke pipe

The preparatory work is the same as for the stethoscope test. By scanning past the seal areas with the smoke pipe, a leak can be visually detected based on the changed smoke path.

Ultrasonic detector

The ultrasonic detector is a further method of finding leaks in the vehicle passenger compartment. Here, an ultrasonic noise generator is placed in the passenger compartment. The

closed vehicle is then inspected from outside with the corresponding detector. The detector will show any leaks present.

Powder

Door seals that do not make close contact can be detected by coating the contact surface of the door seal with white powder. To do this, the door is carefully closed and re-opened. In this way, the door seals which do not touch will be visible.

DESCRIPTION AND OPERATION**Noise, Vibration and Harshness**

Noises means noises caused by the vehicle that are audible both inside and outside the vehicle.

Vibrations are oscillations that are palpable and noticeable in the vehicle passenger compartment.

Harshness means noises caused by the vehicle that are audible, palpable and noticeable inside the vehicle.

These terms are grouped together under the label Noise, Vibration, Harshness, or NVH in short.

The task of vehicle development and production is to ensure that noises caused by the vehicle do not disturb the driver and passengers. Moreover, the the external noises emitted by the vehicle must not exceed the thresholds set by law.

The following section gives an overview of how noise, vibration and harshness can occur in the vehicle and what remedial action is possible.

NOTE: Basic and advanced training courses are offered for the following contents. For an overview of all courses offered, please refer to the Ford Service Organisation's training course brochure.

Noise types and causes

Noises in and around the vehicle are assigned specific descriptions:

- Humming and droning are perceived as low tones.
- Buzzing and whirring are middle tones.
- Howling, whistling, squeaking are assigned to the high tones.

Low to middle tones are considered to be unpleasant. They are palpable and noticeable as oscillations and vibrations throughout the body. Loud howling and whistling is painful to the ears.

Where the different notes come from in a vehicle:

- Low notes are mostly produced by the engine.
- Low tones can also be produced by the roadbed, particularly on rough surfaces. This is a form of droning which can be felt by the vehicle occupants as vibration or roughness.

- High tones however, which are experienced as howling or whistling noises, are often air currents (wind noise) or come from ancillary components such as the generator, power steering pump or drivebelt.
- There are also clattering noises which can occur when driving over an uneven road. These jerking noises are produced by, for example, the shock absorbers, chassis components or loose articles inside the vehicle.

A noise usually consists of a superimposition of different tones which spread as oscillations.

Each of these oscillations has a specific oscillating time and can be measured in frequencies. The frequency describes the number of oscillations per second. The frequency unit is specified in Hertz (Hz).

The human ear can perceive frequencies between 20 and 20000 Hz.

Noises can already be contained where they occur or, if this is not possible, can be confined with suitable measures. The basic procedures are the damping of oscillating parts, the insulation of components or the absorption of the noises through appropriate materials.

Damping

If a damper is installed next to an oscillating mass, the characteristic of the damper will reduce the movement of this mass accordingly (e.g. bumper on chassis).

Damping affects the resonance of an object or system.

Isolation

In oscillation technology, the term isolation means decoupling (separation) of components and systems.

An engine is mounted in sprung elements, so that as little oscillation as possible is passed to the vehicle.

In automotive technology, the isolation technique used is nearly always rubber mounting. The elasticity of the rubber acts like a spring.

DESCRIPTION AND OPERATION

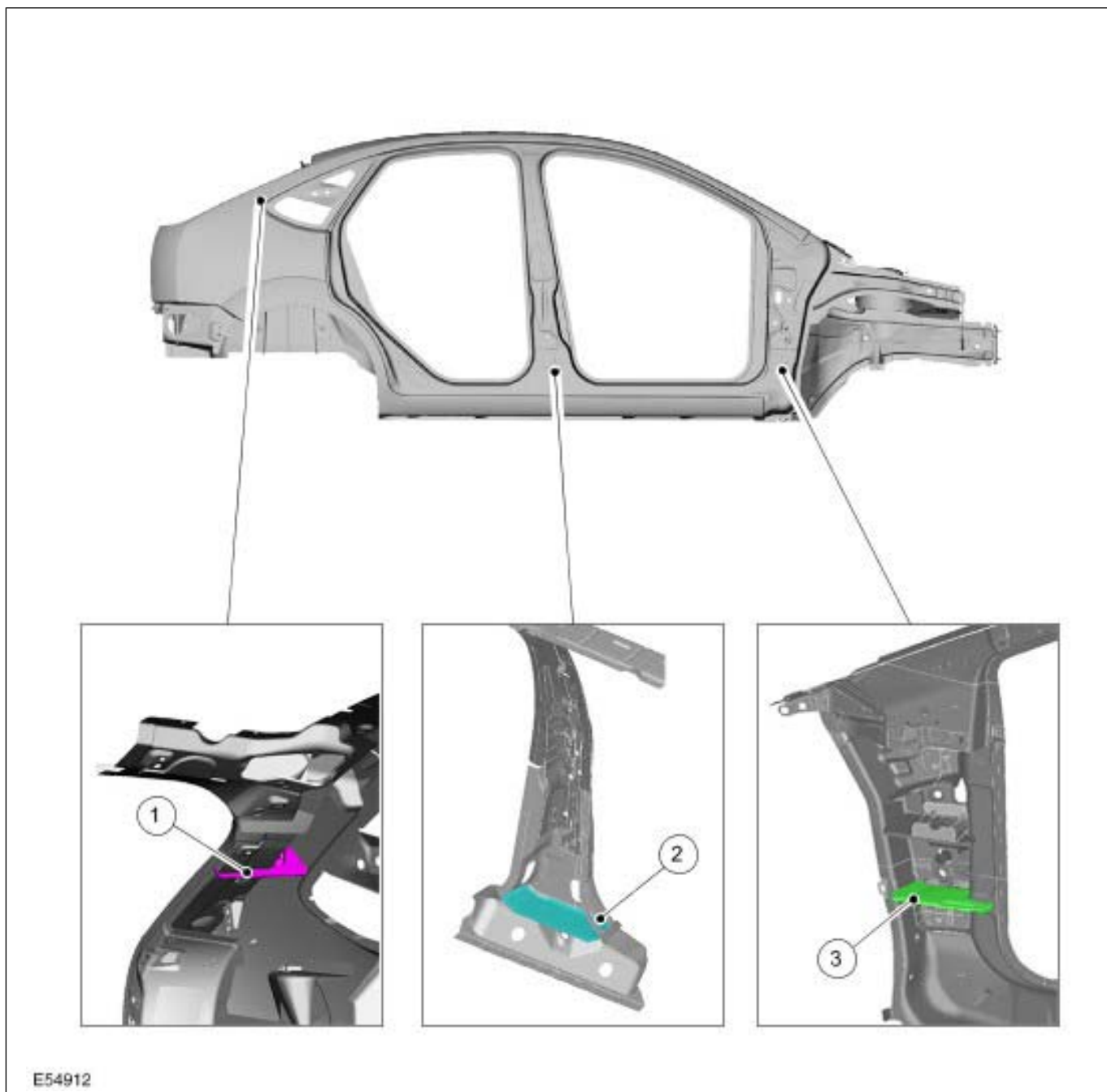
Absorption

Sound waves are reflected from hard surfaces. Through the use of absorption material, sound waves hit soft surfaces and are absorbed by them. The composition and thickness of the material used plays an important role here.

A soft surface, depending on its composition, absorbs the sound waves and reduces their energy.

NVH elements

NVH elements are installed to prevent airborne sound transfers to the passenger compartment in different body cavities.



E54912

Item	Description
1	C-pillar area
2	B-pillar area
3	A-pillar area

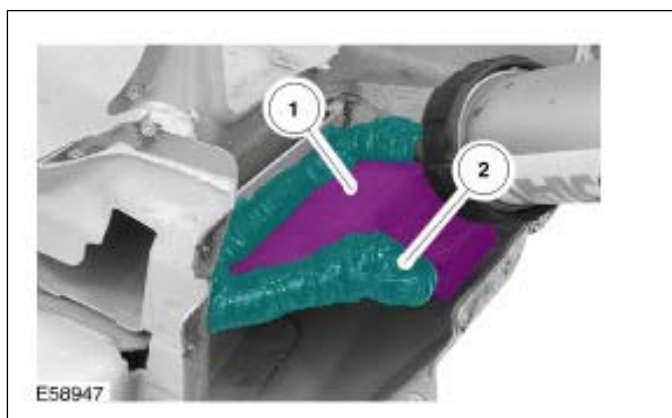
On the Focus 2004.75 (07/2004-) these elements are located in the cavities of the A, B and C pillars. On the estate version, they are also located in the D pillars.

DESCRIPTION AND OPERATION

The NVH elements consist of a carrier plate with a compressed isolation material at the edges. In the drying system of the painting equipment used in production, the body is heated to approx. 170° C. At this temperature, the isolation material expands, completely sealing the gap between the carrier plate and the bodywork.

NOTE:

- NVH elements must not be damaged during work on the vehicle body.
- NVH elements deformed through impact must always be replaced.
- PU adhesive must always be applied to the edges of new and reused NVH elements during repair work.



Item	Description
1	NVH element
2	PU adhesive

For the exact installation position of an NVH element, please refer to the vehicle-specific repair instructions.

If an NVH element is to be reused, the bonding on the body panel must be detached. To do this, the body panel must be heated in the area around the NVH element. The bonding can be detached at approx. 170° C. The damaged panel part can now be carefully dismantled.

Before installing the new panel part, PU adhesive must be applied to the contact areas between the panel and the NVH element.

Test techniques, measuring devices

The shortest route to an accurate diagnosis results from:

- general information on the problem vehicle and a comparison test with a vehicle of the same construction, without NVH problems.
- vehicle history, including repair history and usage patterns.
- condition history, especially any relationship to repairs or sudden change.
- knowledge of probable causes.
- application of diagnosis procedures in which the vehicle is split into corresponding areas.

The diagnosis and correction of noise, vibration and harshness concerns requires:

- a road or system test to determine the exact nature of the concern.
- analysis of probable causes.
- checking of the cause and elimination of the faults found.
- a road test or system test to make sure the concern has been corrected or brought back to within an acceptable range.

It is often very difficult to locate noises that are audible in the passenger compartment based on the problem description provided by the customer and the road tests performed. The direction of the noise can be detected subjectively, but the source of the noise cannot be found.

NOTE: For a selection of simple test tools, see the wind noises section.

Stethoscope

Using the stethoscope, you can listen to the entire vehicle passenger compartment to locate noise sources more easily. This test procedure can be carried out either while the vehicle is moving, or with the engine running and the vehicle stationary, depending on the concern. The noise source can be assumed to be where the stethoscope identifies the highest noise radiation.

NOTE: For safety reasons, only the passenger should carry out the stethoscope testing while the vehicle is moving.

Application examples:

- For very frequent noises in the passenger compartment.
- For engine noises that penetrate through the dashboard into the passenger compartment.
- Wind noise.
- Noise outside the vehicle that is routed inside, such as roadway, tire or water spray noises.

DESCRIPTION AND OPERATION

NOTE: With the stethoscope it is possible to locate medium and high frequency noise paths (caused by leaks) while the vehicle is moving. The stethoscope is not suitable for diagnosis of low frequency droning problems.

Ultrasonic measuring device

The ultrasonic detector is a good and reliable test method for acoustic problems. It is used in a similar way to the stethoscope. In principle, it is suitable for all high frequency interior noises and for leaks in the body seals.

The device consists of an ultrasonic transmitter and a receiver. During use, the transmitter sends an ultrasonic signal which is received at the problem zones by the receiver.

Electronic NVH tester

The measuring device described below is used for diagnosis of the solid-borne sound and solid-borne sound transmission paths. The device is particularly suitable for medium and high frequency noise analyses. In order to obtain a positive diagnosis of droning problems (low frequency noises) and their sources, you must have sufficient experience of how to use this measuring device.

NOTE: In the NVH area, diagnosis of droning problems is one of the most difficult tasks and sets high requirements of the service technicians.

The device works according to the following operating principle: Accelerometers (transmitters) are fitted on various vehicle components or body areas. The signals recorded here can be listened to one after the other on headphones or speakers via the different channels. Simultaneous illustration of several or all measuring channels (for comparison) is only possible visually on the display of the measuring device.

NOTE: Before using the NVH tester in the service, the service technician should take part in an NVH training course to ensure effective use of this device during the road test. A description of the function and application of the NVH tester is enclosed with the device.

Layout and operation:

- There is an amplifier on the test device with which the signal strength and the corresponding channel can be set.
 - Only the noises from a transmitter are transferred to the headphones.
 - All connected cables can be visually illustrated individually or simultaneously on the display.
 - The test device saves the recorded data.
 - The recorded data can be imported to a PC and evaluated.
- The test device has six different channels for noise diagnosis.
 - Each channel is marked in color on the terminal, cable and test device.
 - The solid-borne sound recorded is transmitted to the test device or the headphones by the magnetic accelerometers (transmitters).

SECTION 501-26 Body Repairs - Vehicle Specific Information and Tolerance Checks

VEHICLE APPLICATION: 2008.75 Focus ST C307

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**Body Repairs - Vehicle Specific Information
and Tolerance Checks**

501-26-2

501-26-2

SPECIFICATIONS**Anti-corrosion protection for body work**

Description	Part number	Specification
Underbody protection	5 030 492	-
Cavity wax	5 030 081	-
Anti-corrosion wax	1 219 834	WSK-M7 C89 A
Clinched flange protection	1 136 479	WSK-M4 G245 B
Weld primer	1 205 996	-

DESCRIPTION AND OPERATION

Body and Frame

Introduction

The new Focus 2004.75 (07/2004-) is offered as a 3-, 4- or 5-door saloon and as a wagon.

Design features

Many of the body components (e.g. the floor pan) have been carried over from the Focus C-MAX 2003.75 (06/2003-). The model specific structure is made on this floor pan. The wagon is also based on this floor pan up to the C-pillars. The rear components of the floor pan, such as the luggage compartment floor panel, the sidemembers and the crossmember are specific to the wagon however.

The safety passenger cell corresponds to the structure of the Focus C-MAX 2003.75 (06/2003-).

At the front of the vehicle there is a steel plate crash element connected to the side member by threaded connections. This crash element can absorb light impacts of up to about 15 km/hr. Because of the threaded connections, the crash element can be changed very quickly.

NOTE: Deformed crash elements must not be straightened or repaired.

Heavier impacts which can no longer be absorbed by the crash element must be absorbed by the side members or the floor pan structure. Depending on the extent of the damage, the side members can be replaced in whole or in part (see subsection 501-27).

A steel cross member is also installed at the rear of the vehicle using threaded connections. This forms a connection between the ends of the two side members and therefore contributes to an increase in passive safety in the event of rear end impact. This bolted-on crossmember absorbs the impact energy of minor impacts and thus prevents deformation of the side members and therefore the body structure. The crash element can be changed very quickly because of the threaded connections.

More severe impacts at the rear are absorbed by the rear panel, side members and the luggage compartment floor panel. It is possible to only partially replace the side members and the luggage compartment floor panel (see subsection 501-30).

Laser weld seams

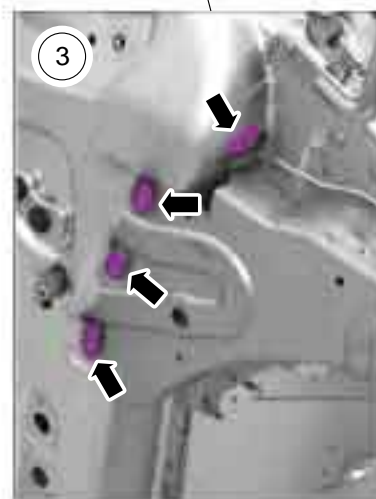
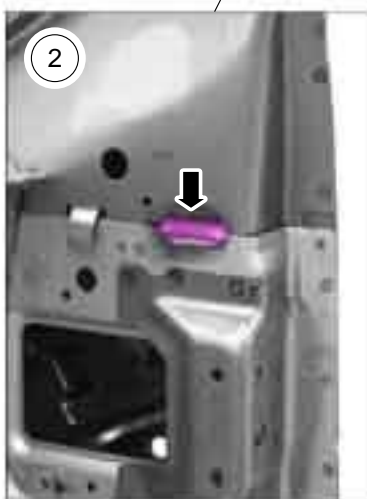
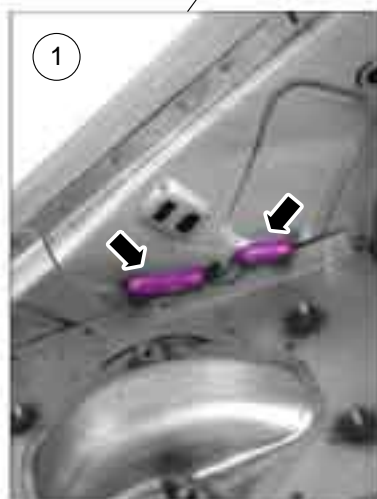
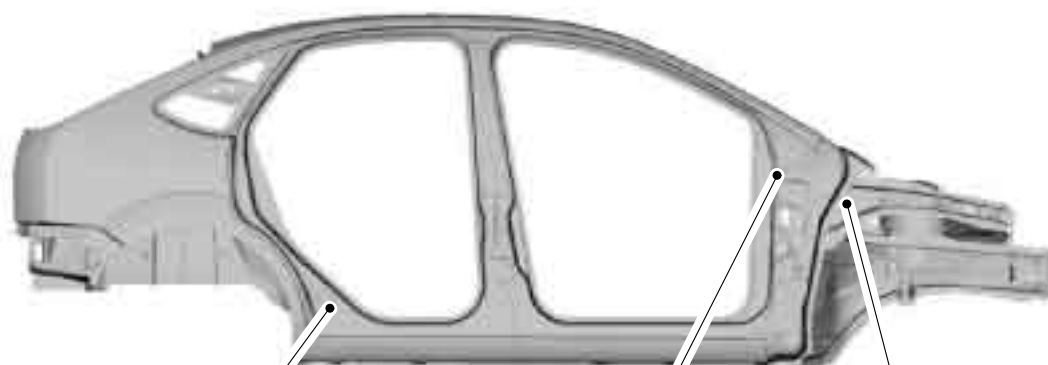
As on Focus C-MAX 2003.75 (06/2003-), there are laser weld seams on the front and rear side members.

NOTE: In the event of damage or repair work in these areas, the corresponding requirements in subsection 501-27 and 501-30 must be taken into account.

MIG brazed joints

MIG brazed joints are used on all model variants in the areas of the bulkhead reinforcement to A-pillar, A-pillar reinforcement to A-pillar inner panel and outer wheelhouse to door sill reinforcement.

DESCRIPTION AND OPERATION



E56064

MIG brazed areas

Item	Description
1	Outer wheelhouse / door sill reinforcement (inner)
2	A-pillar reinforcement / A-pillar inner panel (inner)
3	Bulkhead reinforcement / A-pillar (outer)

These MIG brazed joints must be replaced by MIG welds at another place if a repair is performed.

NOTE:

- These MIG welds must not be carried out on or near existing MIG brazed seams as even the smallest amount of brazing material can result in a reduction in the strength of the weld seams.
- When performing these repairs, the corresponding requirements is subsection 501-27, 501-29 and 501-30 must be observed.

High-strength steel parts

High strength steel parts are used even more on the new Focus.

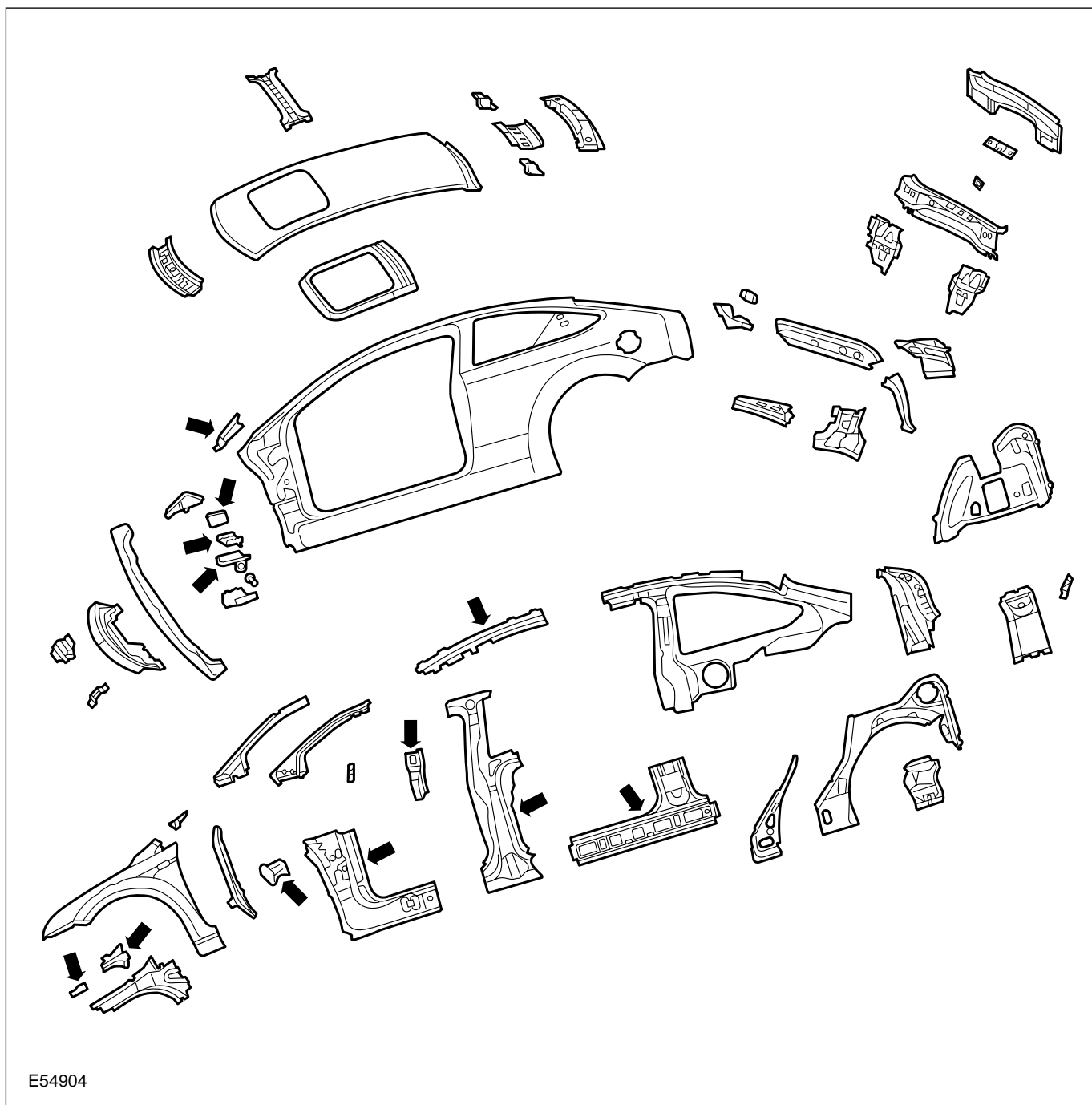
**Body Repairs - Vehicle Specific Information
and Tolerance Checks**

501-26-5

501-26-5

DESCRIPTION AND OPERATION

NOTE: The instructions for working on high strength steel panels given in subsection 501-25 must be followed during body repair work.
3-door variant - components overview, the high strength steel panels are marked with arrows.



E54904

**Body Repairs - Vehicle Specific Information
and Tolerance Checks**

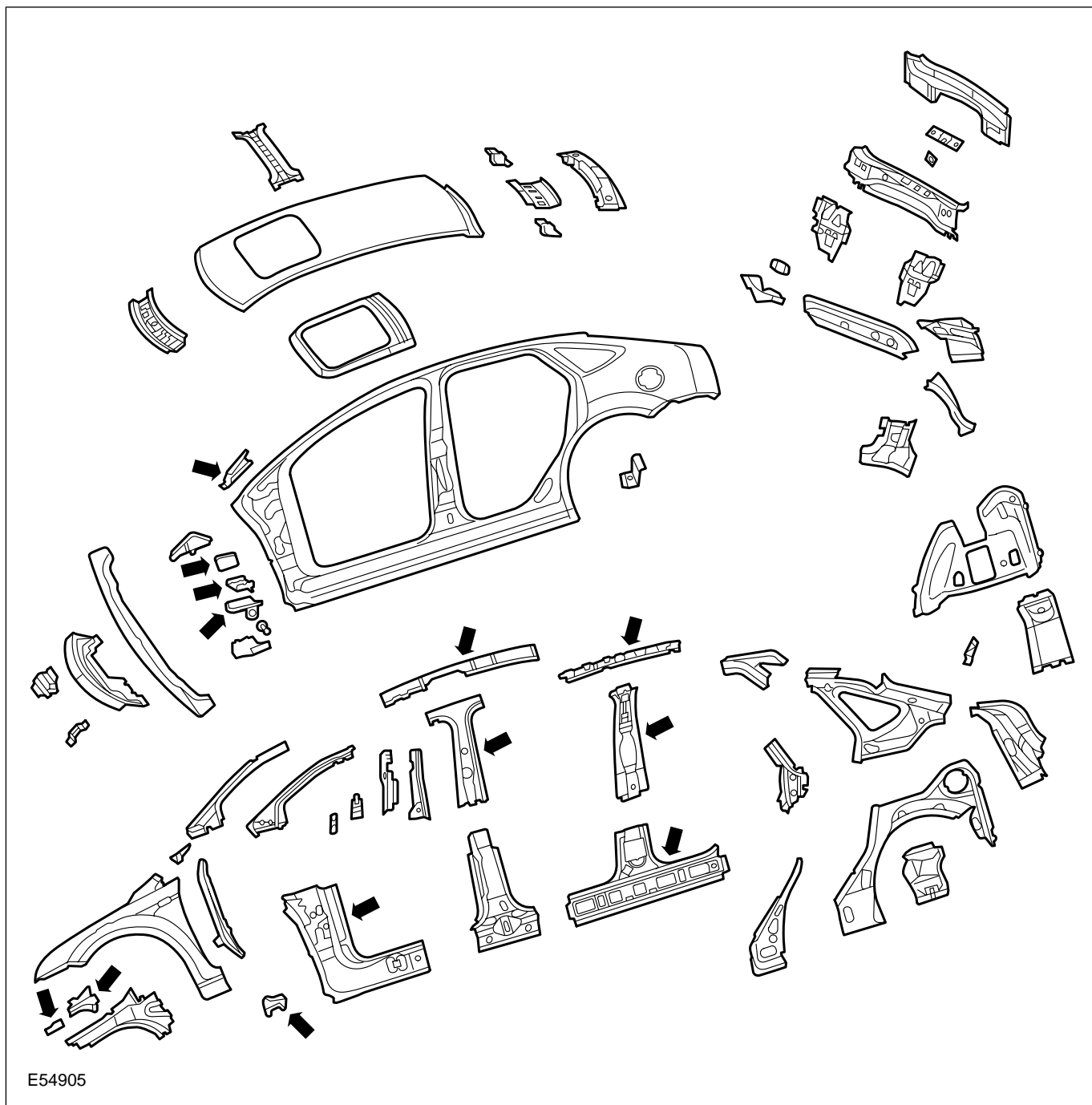
501-26-6

501-26-6

DESCRIPTION AND OPERATION

4-door and 5-door variants - components overview, the high strength steel panels are marked with arrows.

NOTE: Illustration E54905 shows the body panels of the 5-door variant. Because the 4-door and the 5-door variants are identical in design up to the B-pillars, the parts shown also apply for the 4-door variant.



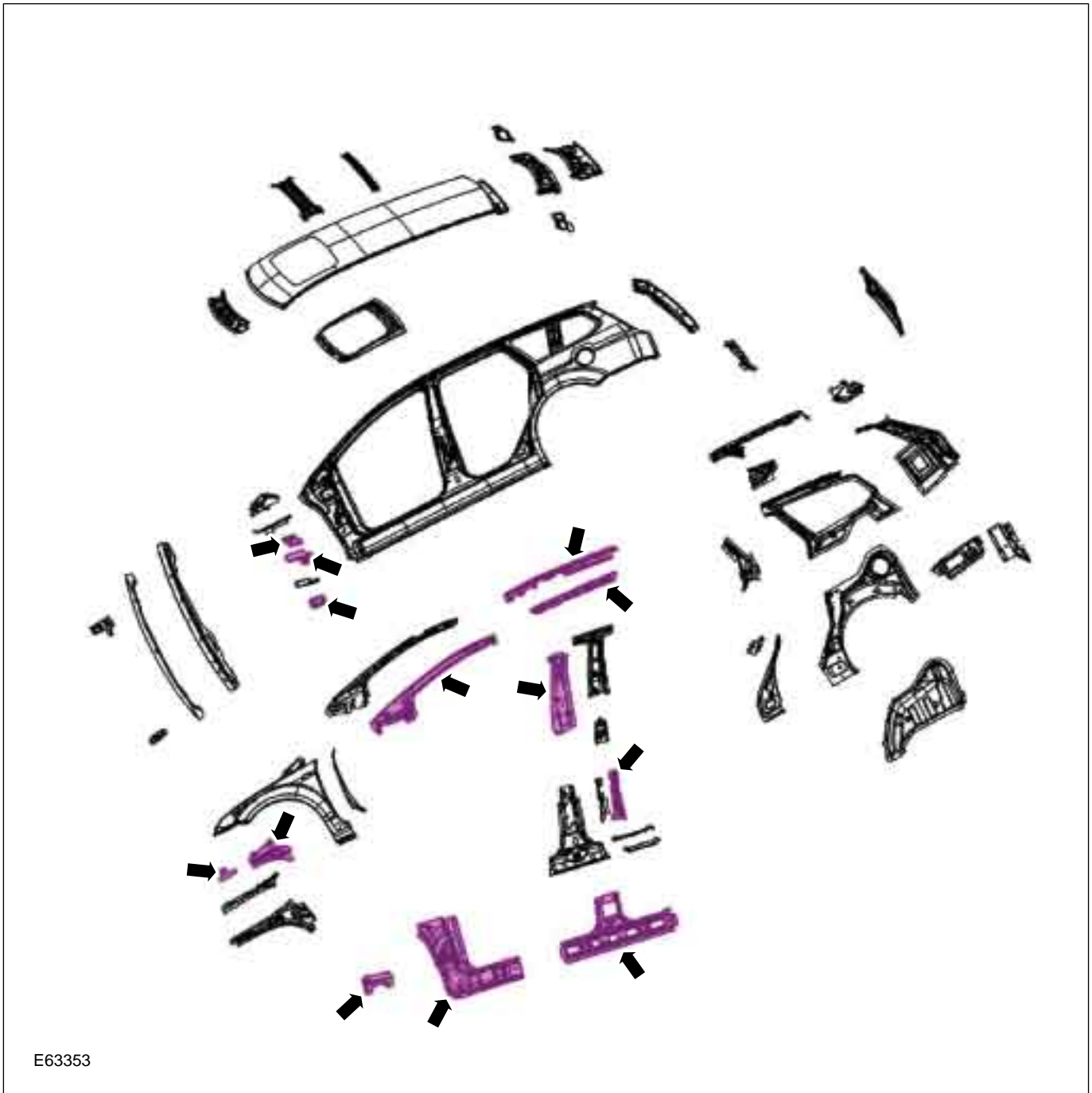
**Body Repairs - Vehicle Specific Information
and Tolerance Checks**

501-26-7

501-26-7

DESCRIPTION AND OPERATION

Wagon variant - components overview, the high strength steel panels are marked with arrows.



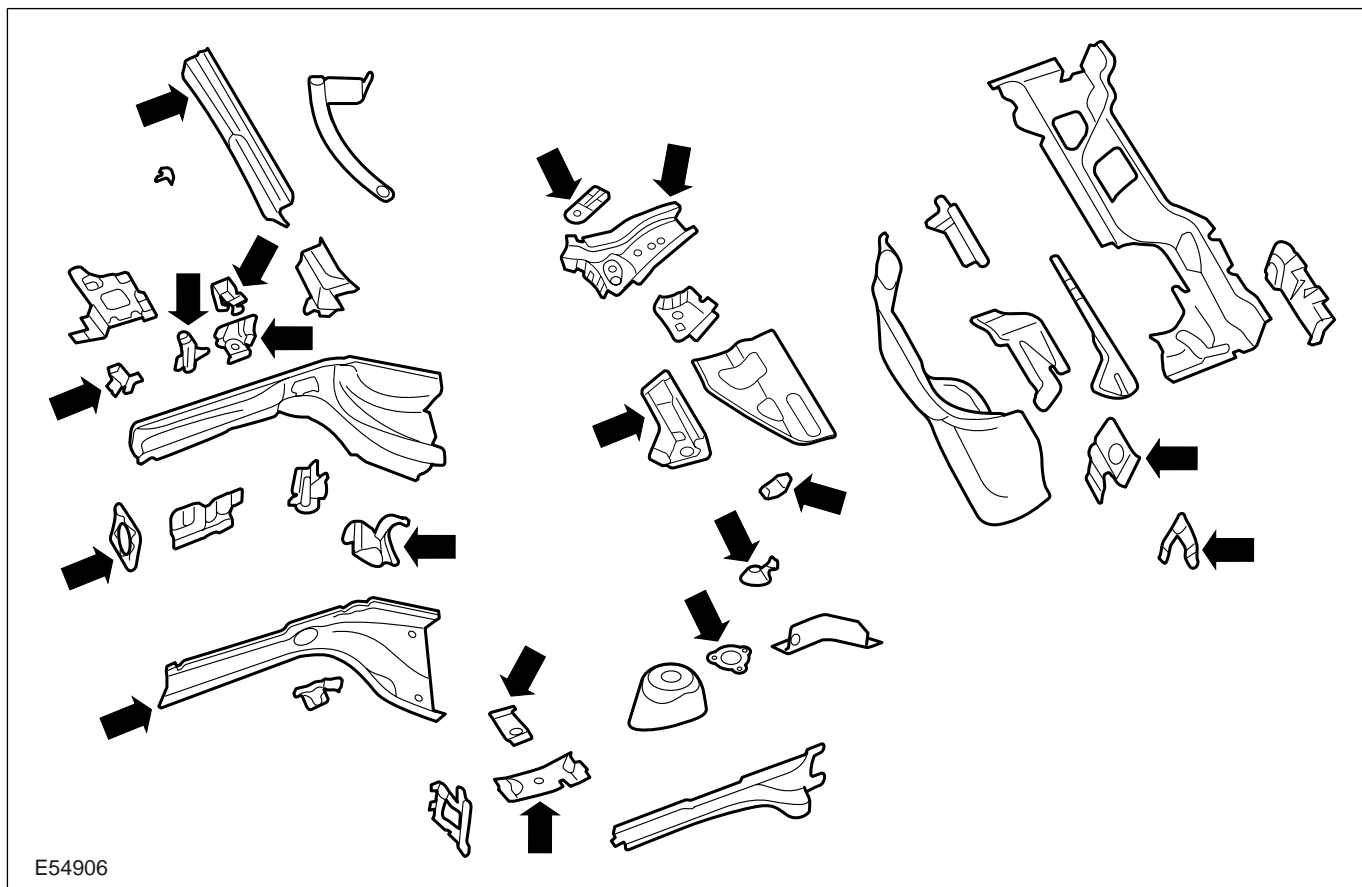
Body Repairs - Vehicle Specific Information and Tolerance Checks

501-26-8

501-26-8

DESCRIPTION AND OPERATION

Front floor pan (all models) - components overview, the high strength steel panels are marked with arrows.



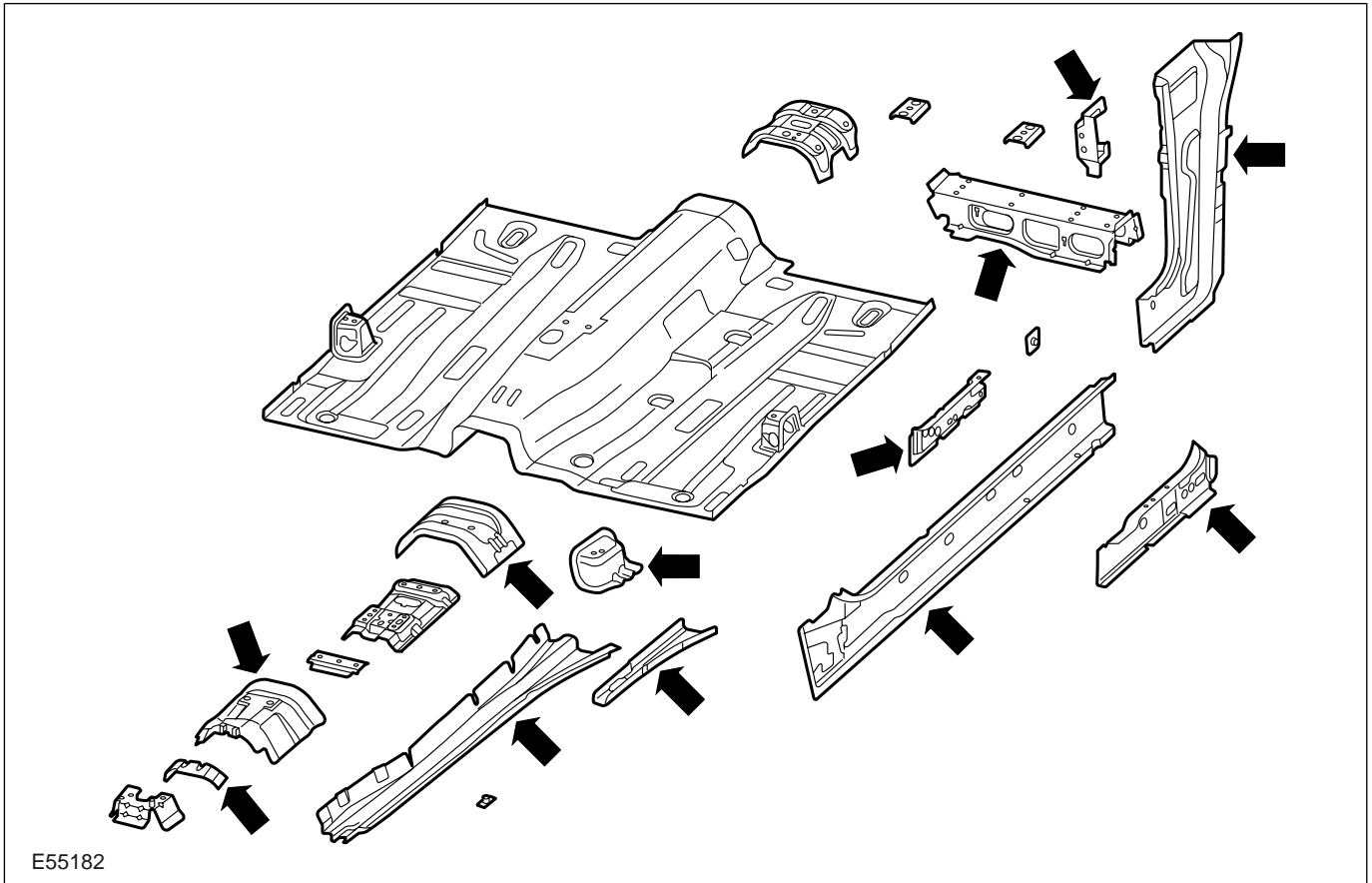
Body Repairs - Vehicle Specific Information and Tolerance Checks

501-26-9

501-26-9

DESCRIPTION AND OPERATION

Middle floor pan (all models) - components overview, the high strength steel panels are marked with arrows.



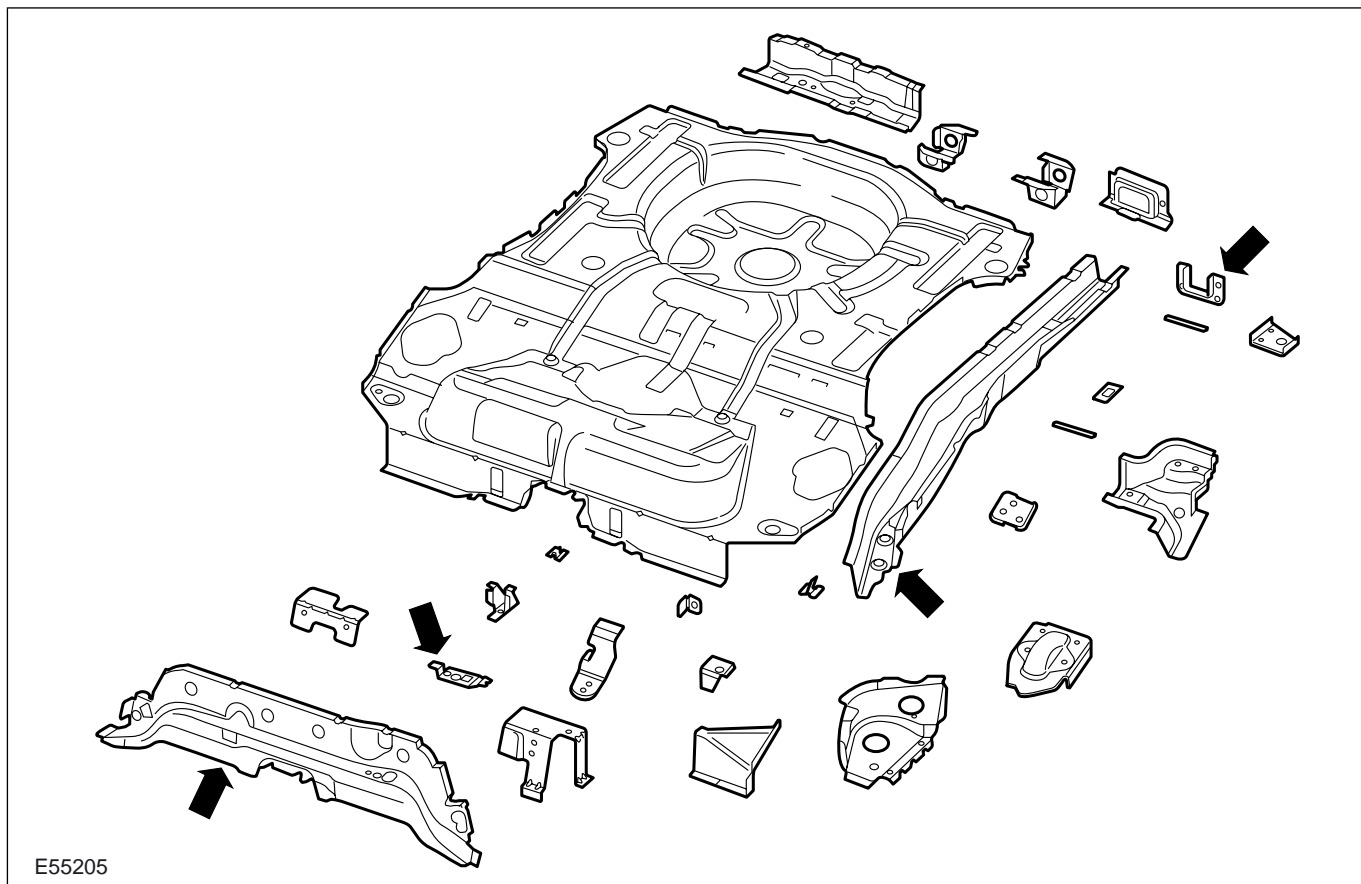
**Body Repairs - Vehicle Specific Information
and Tolerance Checks**

501-26-10

501-26-10

DESCRIPTION AND OPERATION

Rear floor pan - 3-door, 4-door and 5-door variants - components overview, the high strength steel panels are marked with arrows.



DESCRIPTION AND OPERATION

Rear floor pan (wagon) - components overview, the high strength steel panels are marked with arrows.

**Corrosion prevention measures**

On the new Focus 2004.75 (07/2004-), all external and corrosion prone steel body panels are zinc plated on both sides.

The roof and some internal reinforcement panels on the floor pan and on the A-, B- and C-pillars are not zinc plated.

NOTE: The instructions for working on zinc plated steel panels given in subsection 501-25 must be followed during body repair work.

Further corrosion protection measures

Hoods, doors, tailgates and luggage compartment lids supplied as replacement parts do not have clinched flange sealing. Sealant must be applied to the dip primer in the dealership before painting. In doing so, make certain that the cut edge of the external panel is covered by at least a 3 mm overlap of clinched flange protection. More than 5 hours drying time may be needed, depending on the thickness of application. Air drying overnight is therefore recommended.

**Body Repairs - Vehicle Specific Information
and Tolerance Checks**

501-26-12

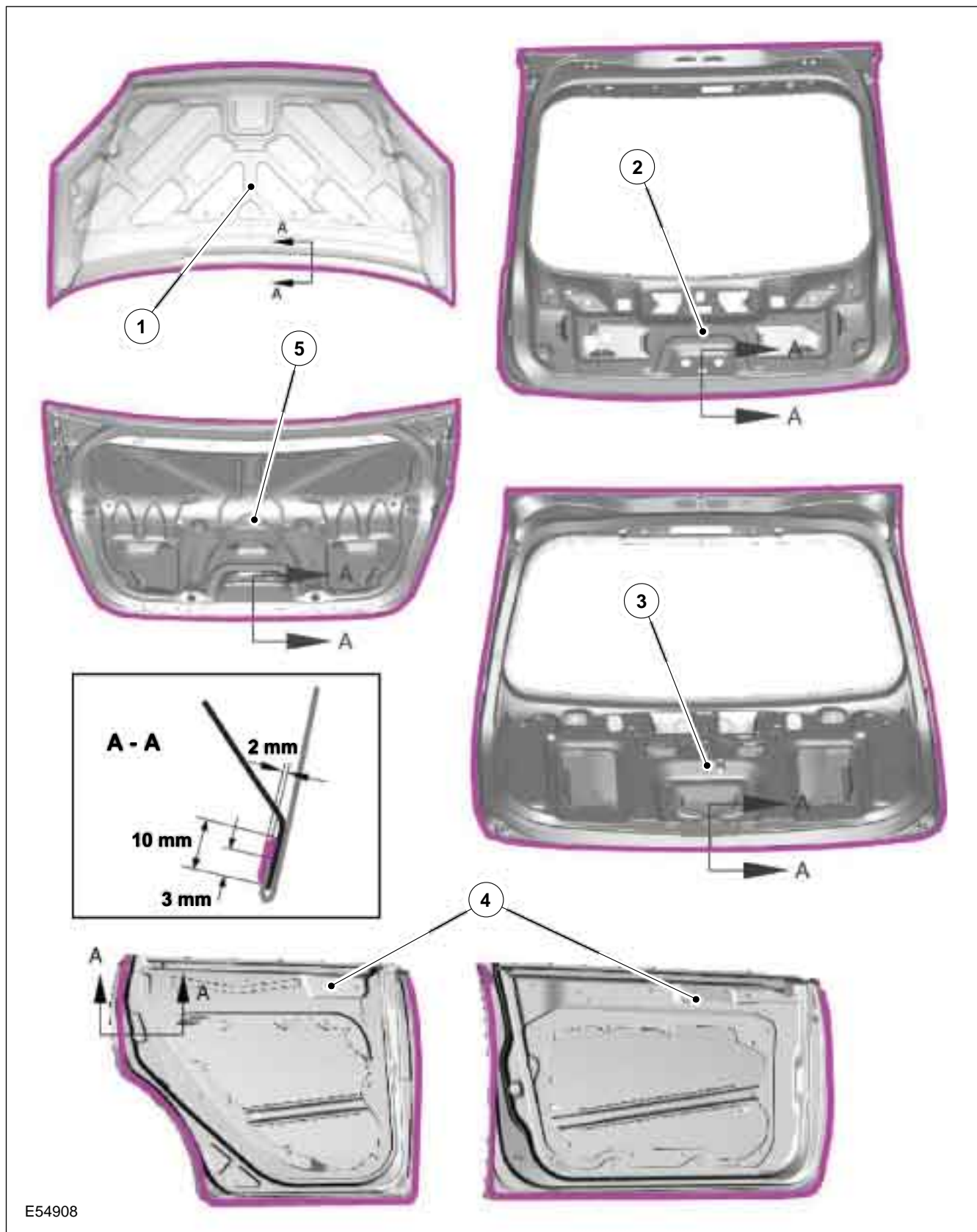
501-26-12

DESCRIPTION AND OPERATION

NOTE: When body repairs are performed or if these components are renewed, this procedure must be observed.

Further corrosion protection measures are performed on the bodywork.

NOTE: The original corrosion protection must be re-created after working on the bodywork.



E54908

**Body Repairs - Vehicle Specific Information
and Tolerance Checks**

501-26-13

501-26-13

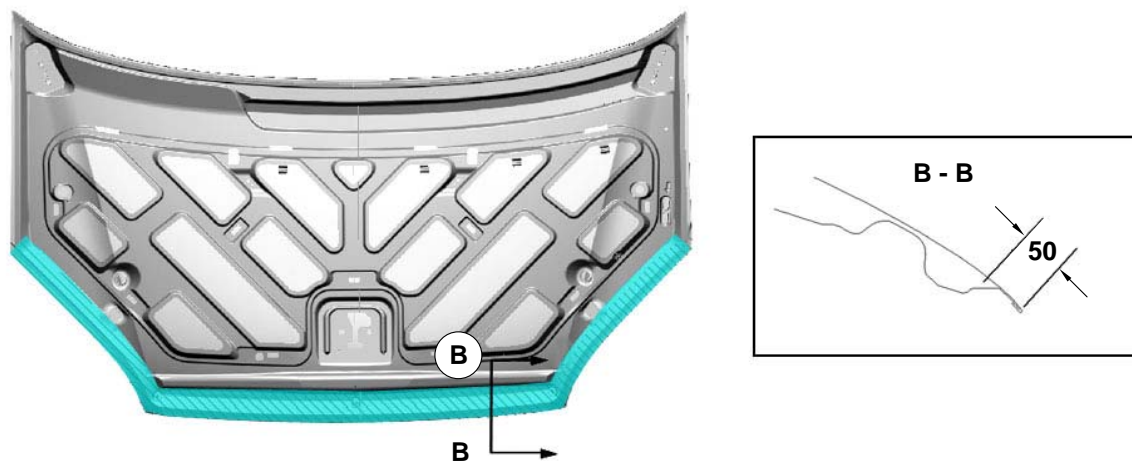
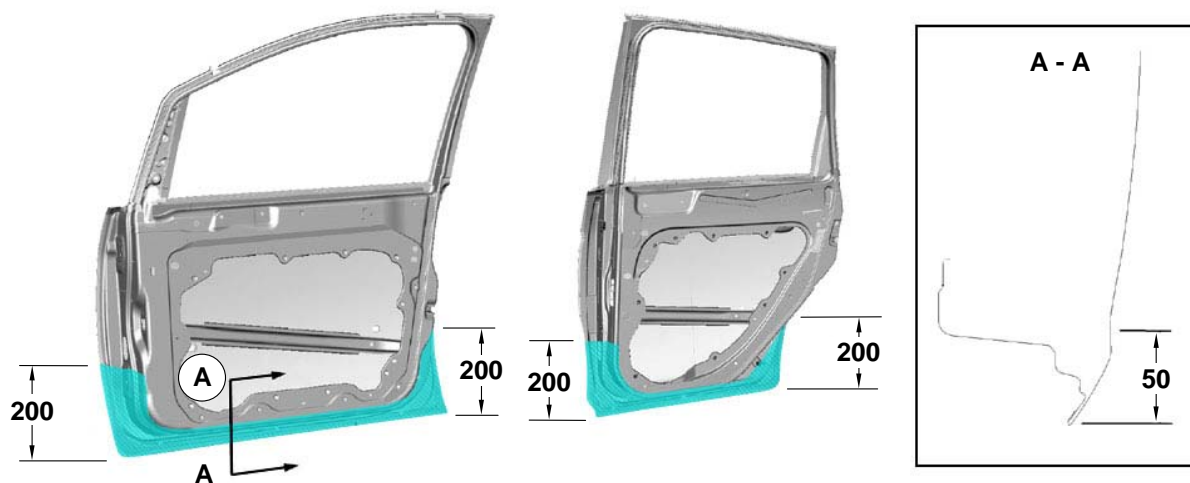
DESCRIPTION AND OPERATION

Clinched flange sealing

Item	Description
1	Hood
2	Luggage compartment lid, 3- and 5-door
3	Tailgate, wagon

Item	Description
4	Door front and rear
5	Luggage compartment lid, 4-door
A - A	Sectional view of the clinched flange sealing (minimum height and width indicated)

mm



E61897

Body Repairs - Vehicle Specific Information and Tolerance Checks

501-26-14

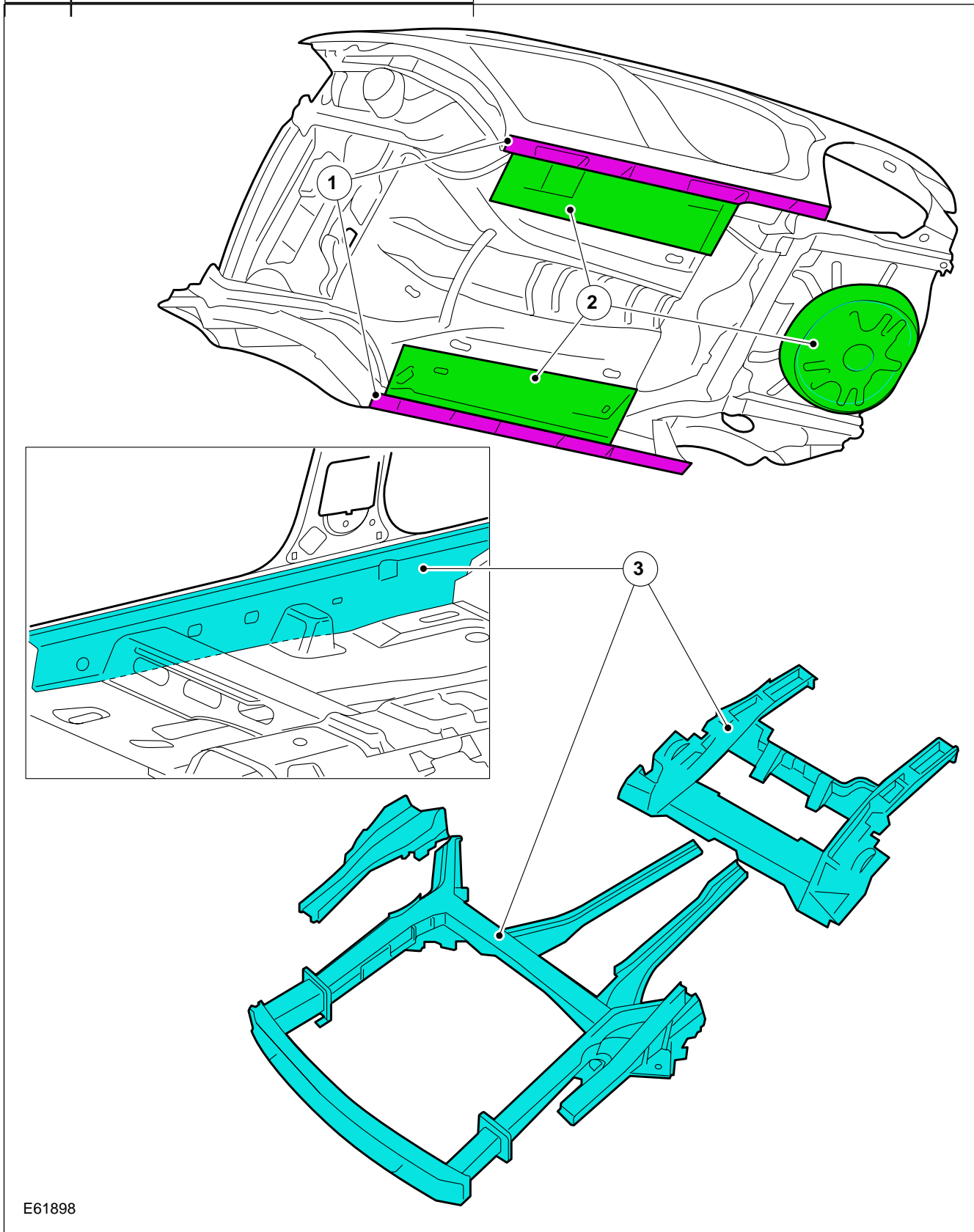
501-26-14

DESCRIPTION AND OPERATION

Cavity wax injection at the doors and engine hood

Item	Description
A - A	Sectional view of doors (application area indicated)

Item	Description
B - B	Sectional view of engine hood (application area indicated)



E61898

**Body Repairs - Vehicle Specific Information
and Tolerance Checks**

501-26-15

501-26-15

DESCRIPTION AND OPERATION

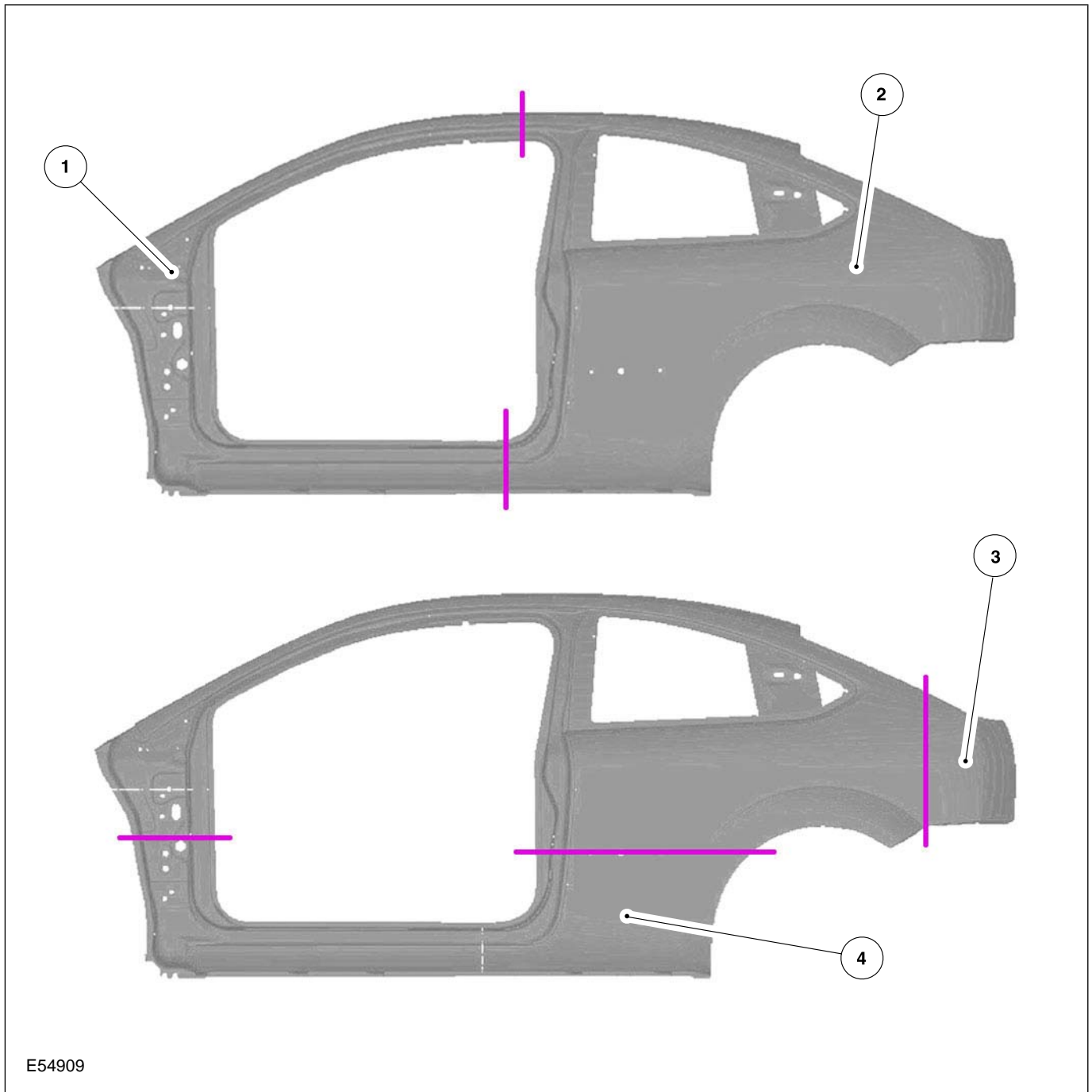
Corrosion protection at the floor pan

Item	Description
1	PU stone deflector
2	PVC underbody protection
3	Cavity wax injection

Sheet metal parts for partial replacement

Various service sheet metal parts are available for sectional replacement.

3-door component overview (side)



E54909

Item	Description
1	Front quarter panel
2	Rear quarter panel

Item	Description
3	Repair panel, rear quarter panel
4	Rocker panel

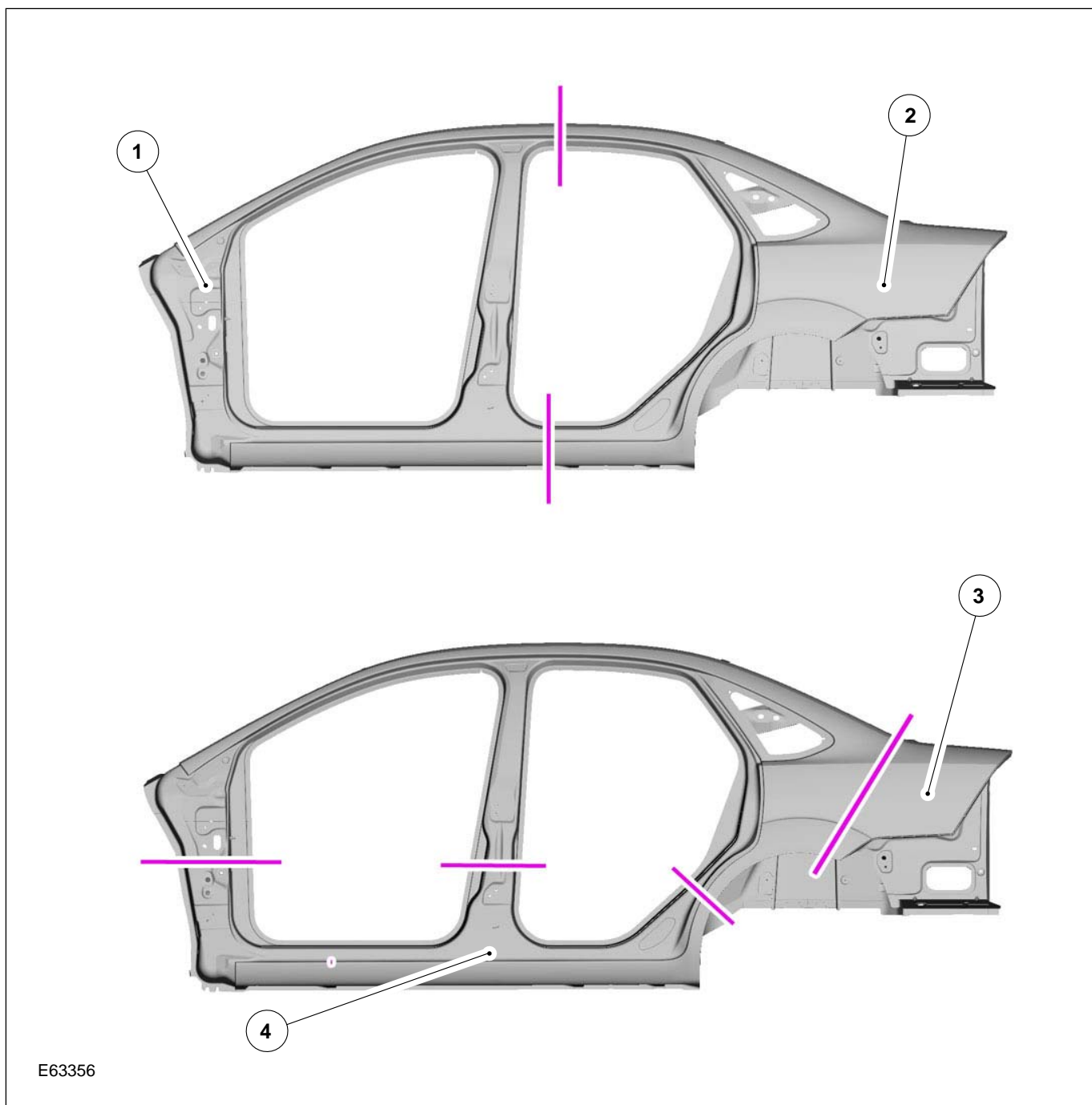
**Body Repairs - Vehicle Specific Information
and Tolerance Checks**

501-26-16

501-26-16

DESCRIPTION AND OPERATION

4-door component overview (side)

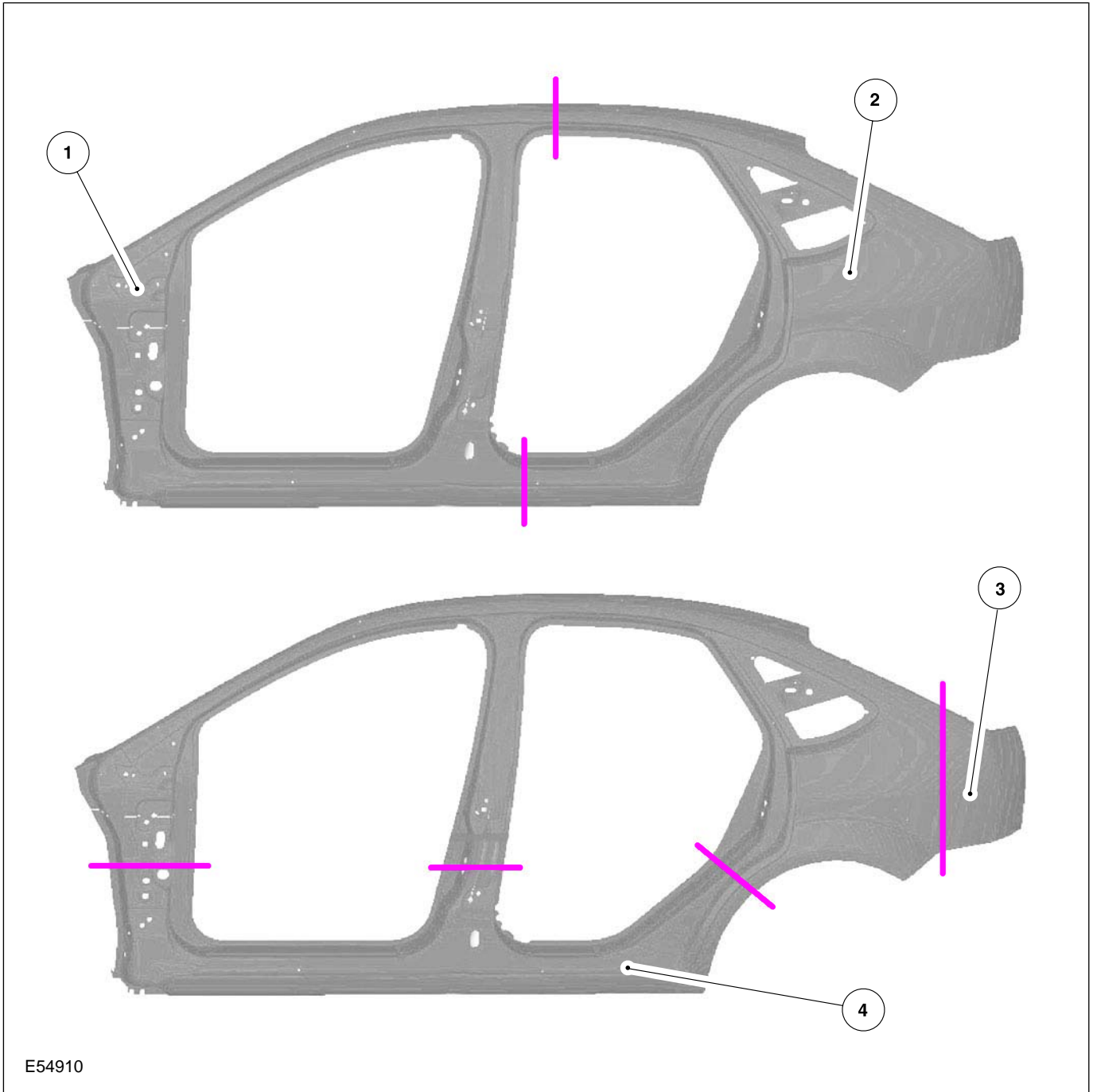


Item	Description
1	Front quarter panel
2	Rear quarter panel

Item	Description
3	Repair panel, rear quarter panel
4	Rocker panel

DESCRIPTION AND OPERATION

5-door component overview (side)



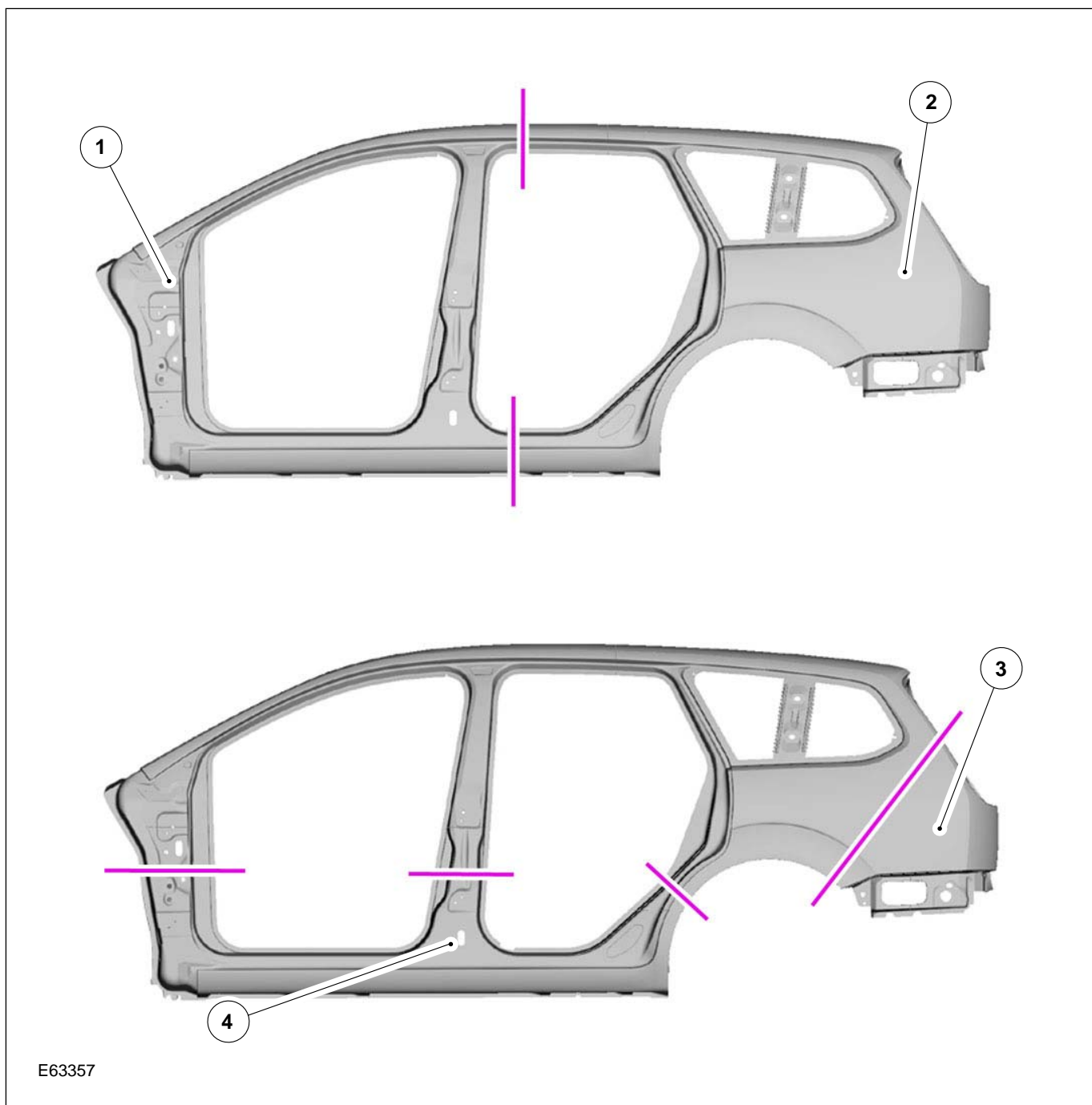
E54910

Item	Description
1	Front quarter panel
2	Rear quarter panel

Item	Description
3	Repair panel, rear quarter panel
4	Rocker panel

DESCRIPTION AND OPERATION

Wagon component overview (side)

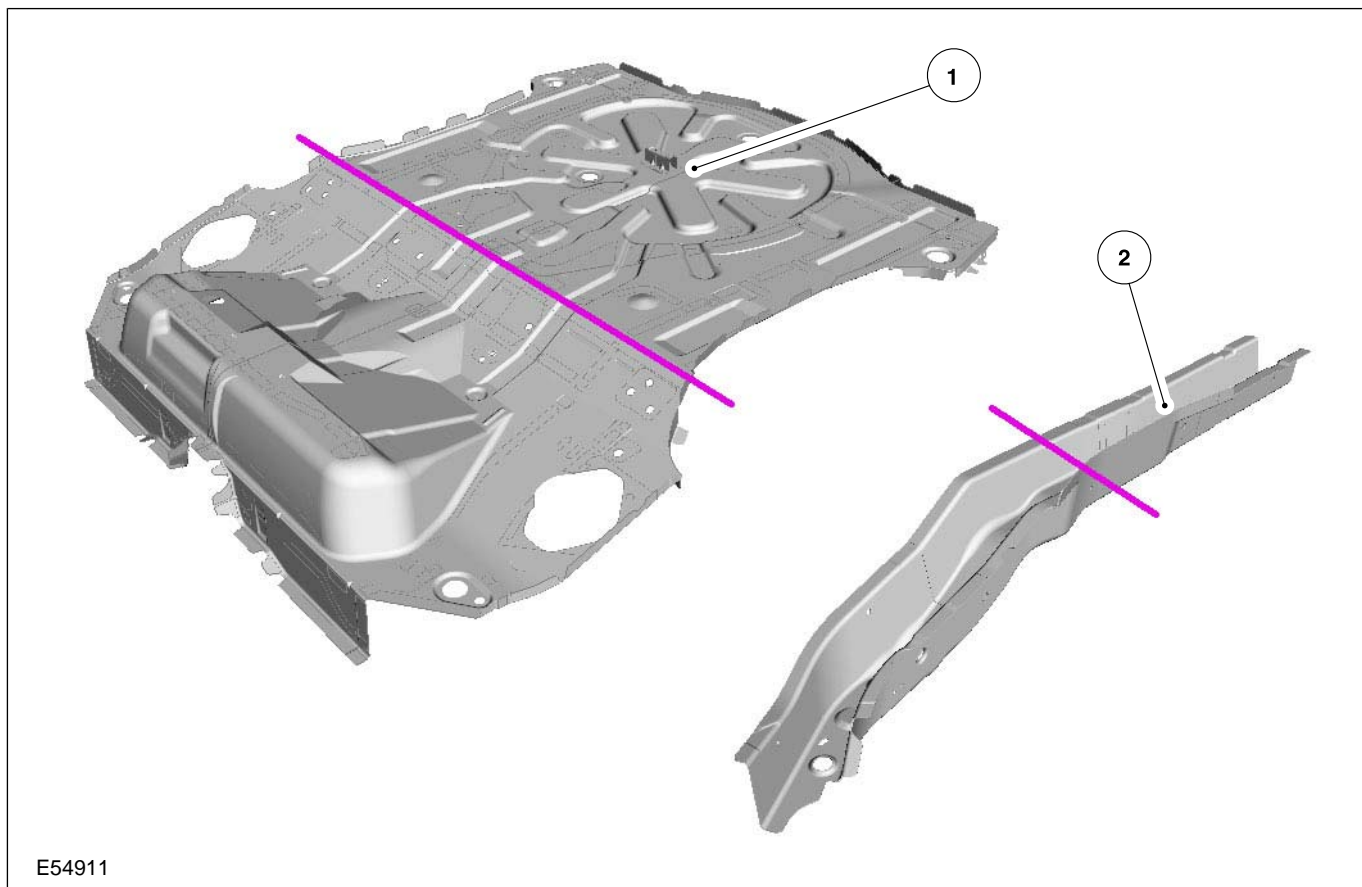


Item	Description
1	Front quarter panel
2	Rear quarter panel

Item	Description
3	Repair panel, rear quarter panel
4	Rocker panel

DESCRIPTION AND OPERATION

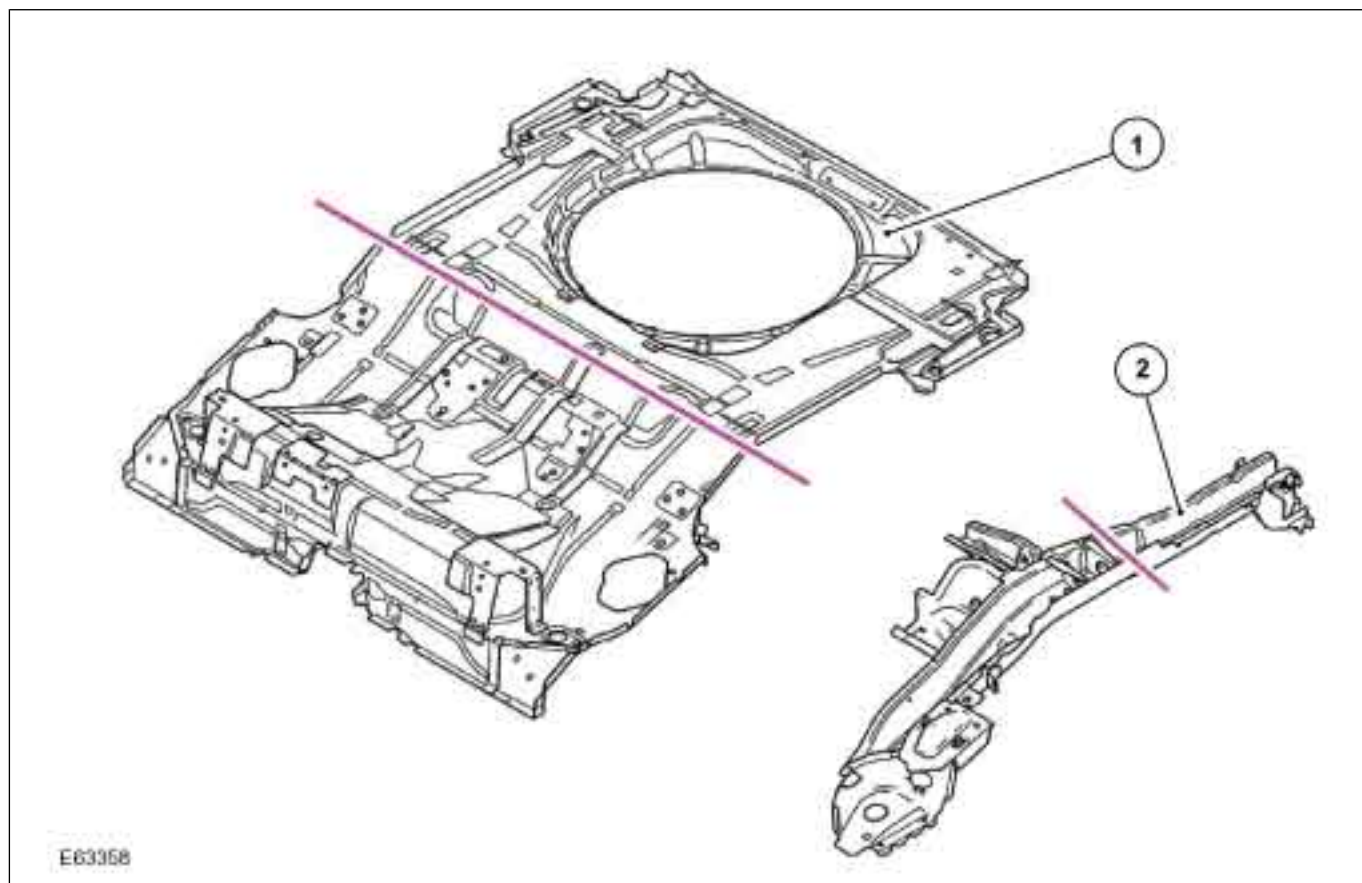
Component overview 3-, 4- and 5-door variants (rear floor pan)



Item	Description
1	Luggage compartment floor panel
2	Rear side member

DESCRIPTION AND OPERATION

Component overview, wagon (rear floor pan)



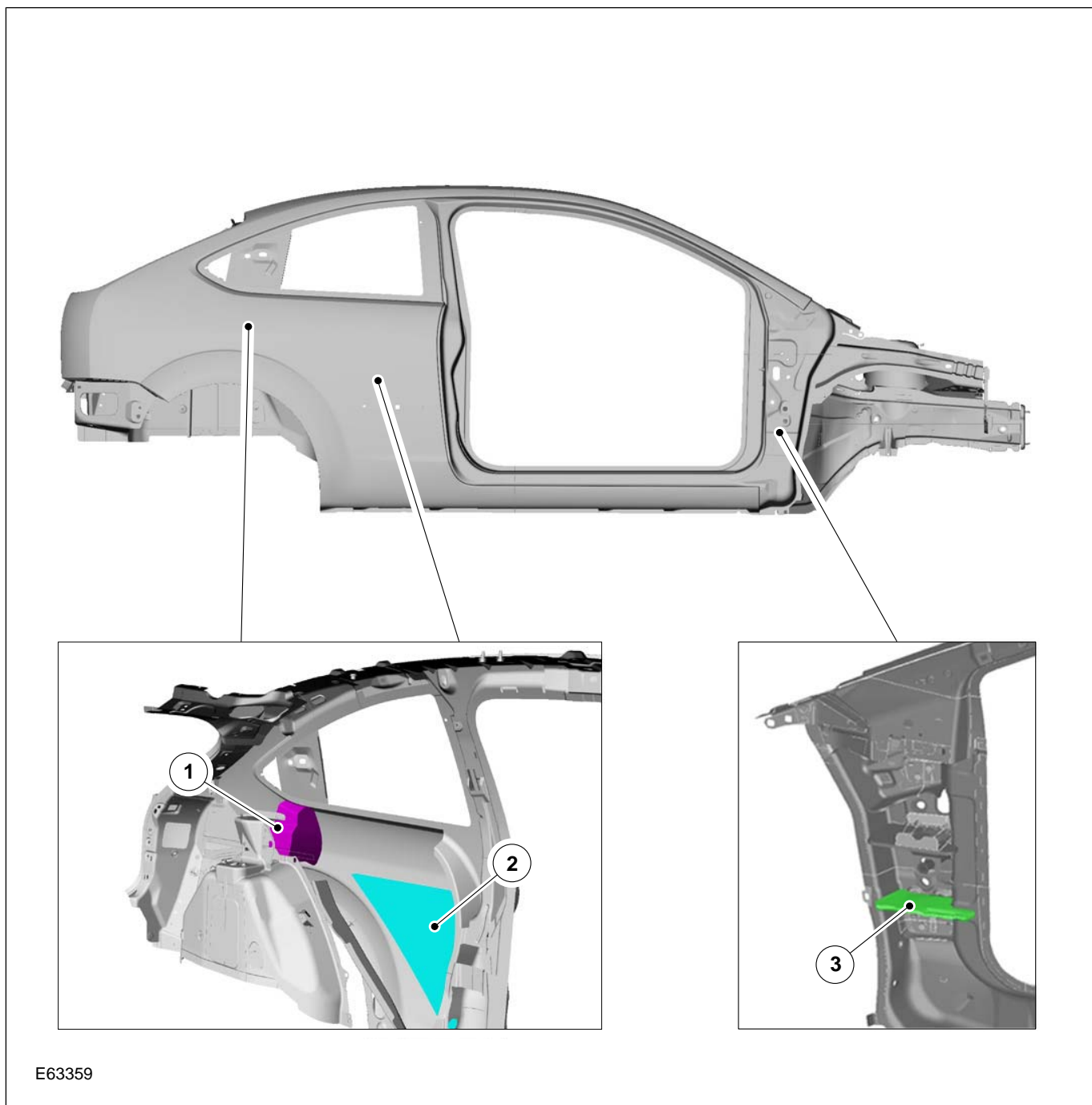
Item	Description
1	Luggage compartment floor panel
2	Rear side member

NOTE: NVH elements must not be damaged during work on the vehicle body. In the event of repair work in these areas, the corresponding requirements in subsections 501-27 to 501-30 must be taken into account. Deformed NVH elements must always be renewed.

NVH elements

NVH elements are used in various body cavities to prevent the transfer of noise to the vehicle interior.

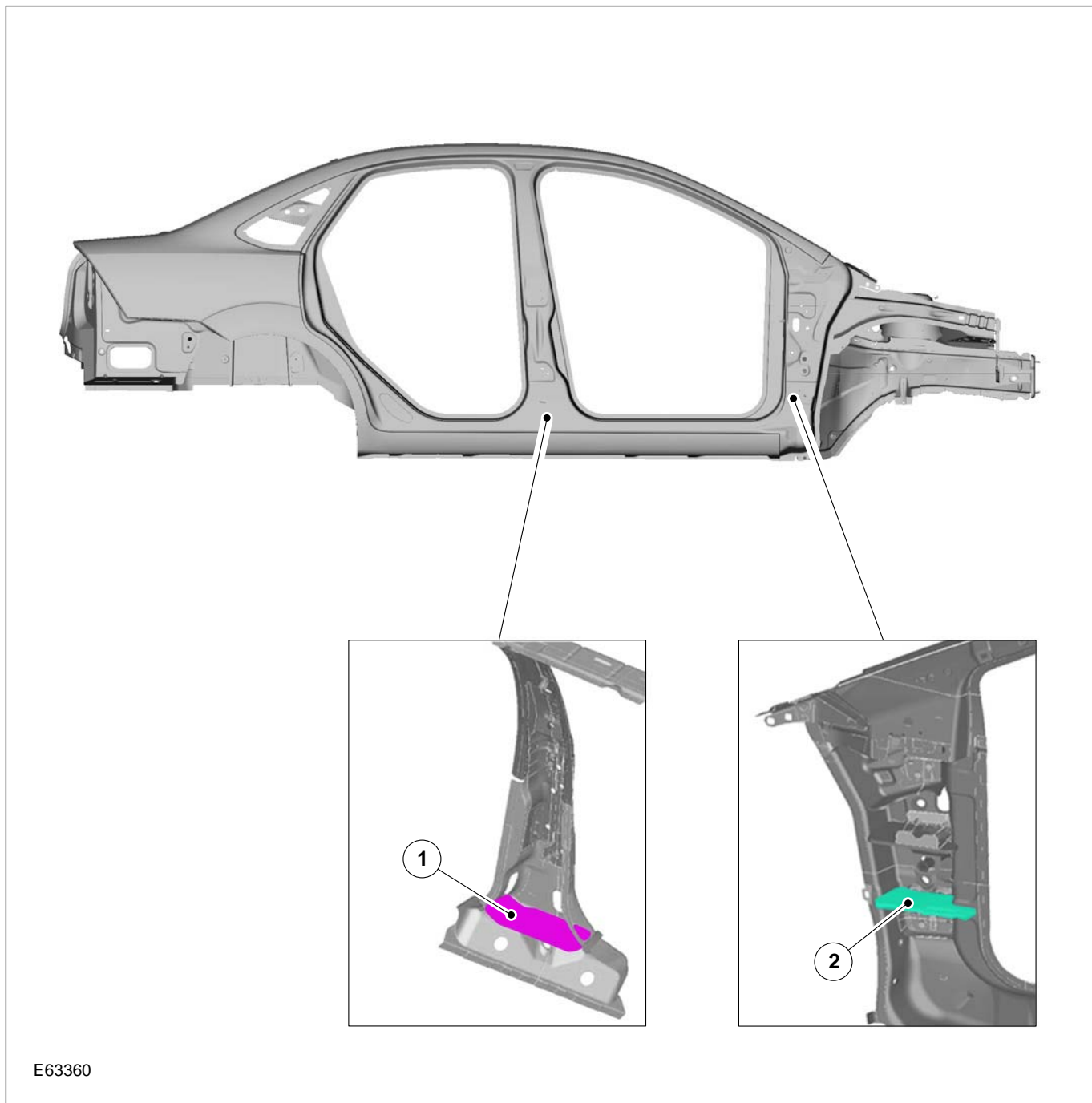
DESCRIPTION AND OPERATION



Installation positions on the 3-door (interior view)

Item	Description
1	Side panel / wheelhouse
2	Side panel (damping film)
3	A-pillar

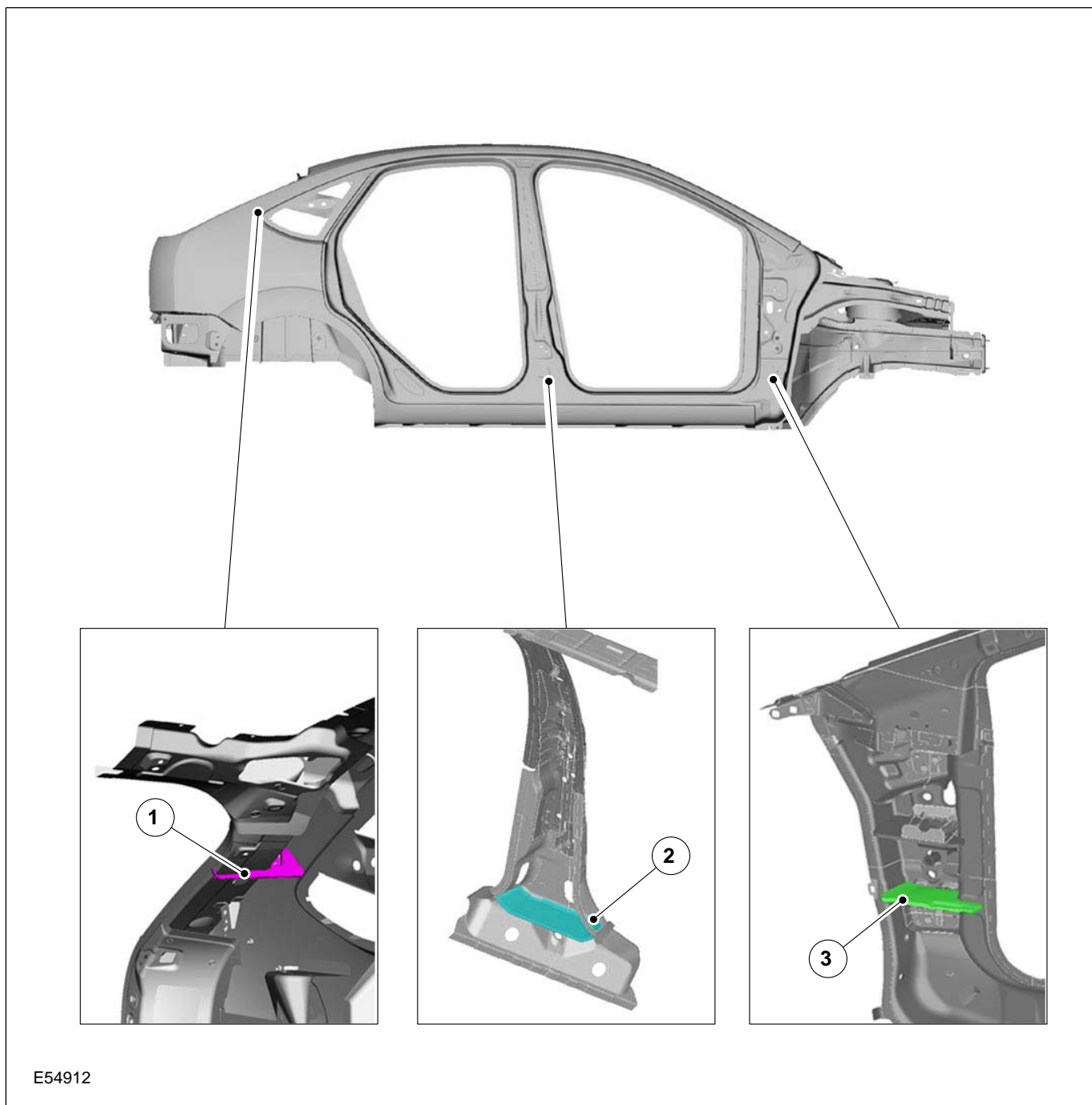
DESCRIPTION AND OPERATION



Installation positions on the 4-door (interior view)

Item	Description
1	B-pillar
2	A-pillar

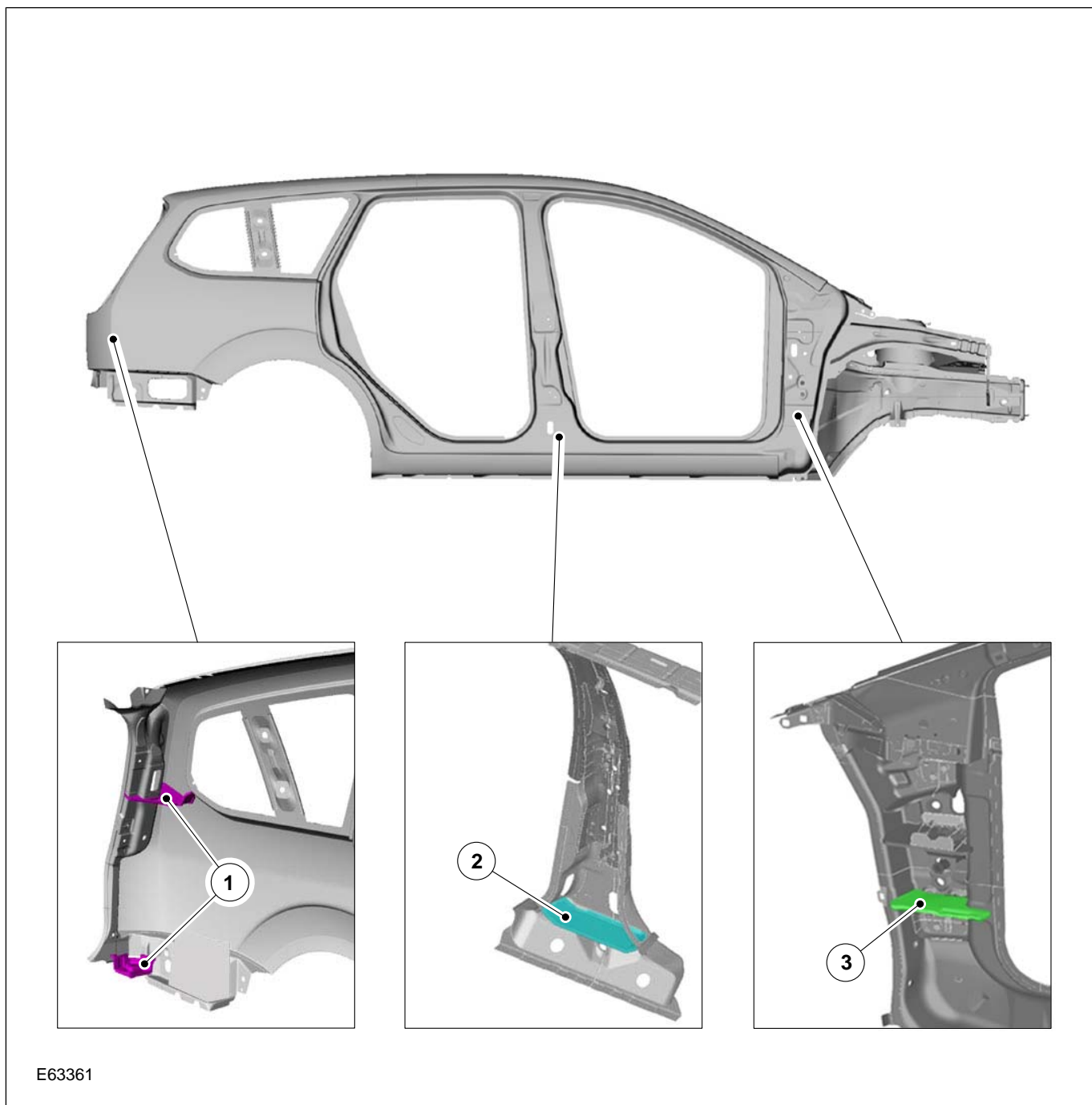
DESCRIPTION AND OPERATION



Installation positions on the 5-door (interior view)

Item	Description
1	D-pillar
2	B-pillar
3	A-pillar

DESCRIPTION AND OPERATION



Installation positions on the wagon (interior view)

Item	Description
1	D-pillar
2	B-pillar
3	A-pillar

GENERAL PROCEDURES

Underbody Tolerance Check

1. Body dimensions, 3-, 4- and 5-door (quick measurements using the Allvis system)

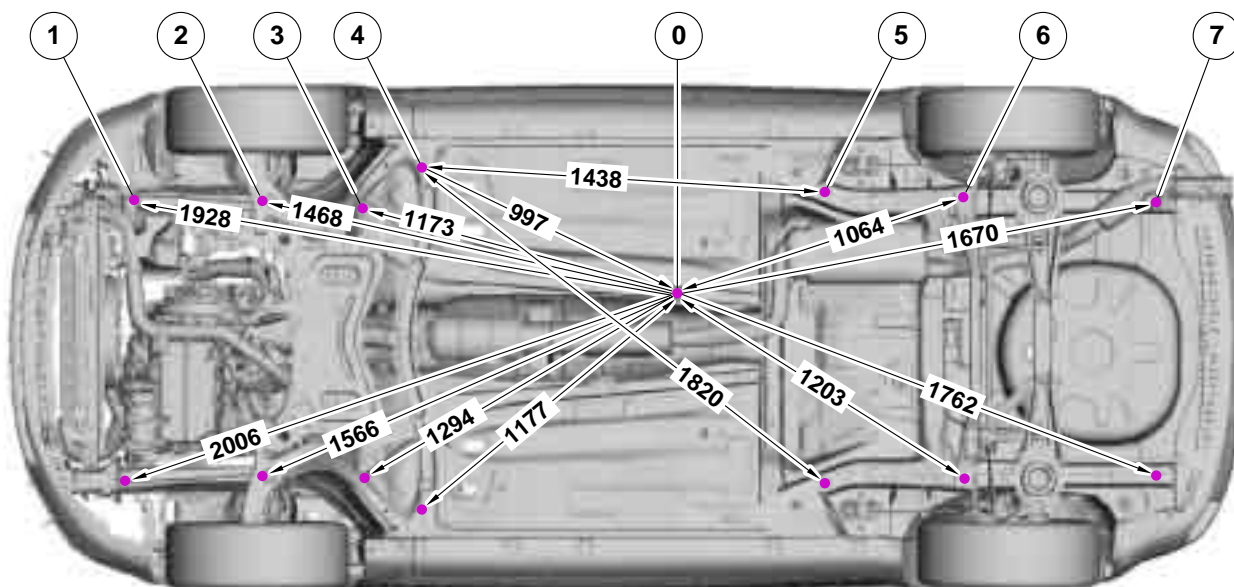
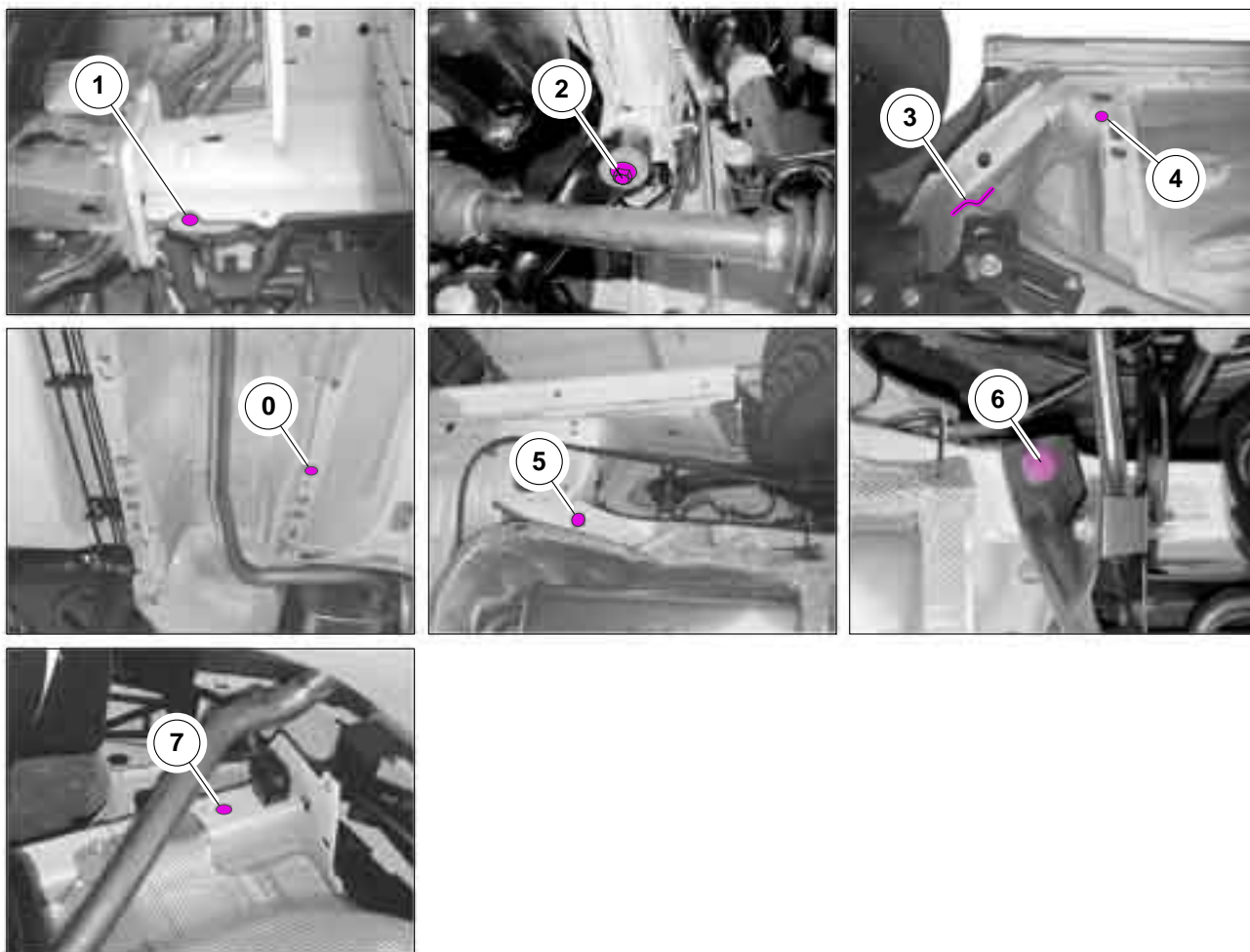
- All dimensions are measured from the middle of the hole or bolt head or from the edge of the panel, using the Allvis system, with component assemblies installed.

- A tolerance of ± 3 mm applies to all specified dimensions. All detailed illustrations correspond to the left-hand side of the vehicle.

Allvis specifications

Point of measurement	Adaptor	Height setting of the test probes
1	25 mm (probe)	350 mm
2	25 mm (probe)	240 mm
3	25 mm (probe)	160 mm
4	25 mm (probe)	110 mm
5	35 mm (probe)	50 mm
6	25 mm (probe)	240 mm
7	25 mm (probe)	310 mm

GENERAL PROCEDURES



E55020

2. Body dimensions, 3-, 4- and 5-door

- All dimensions are measured starting from the centre of each hole, using an electronic measuring system and with the assemblies removed.

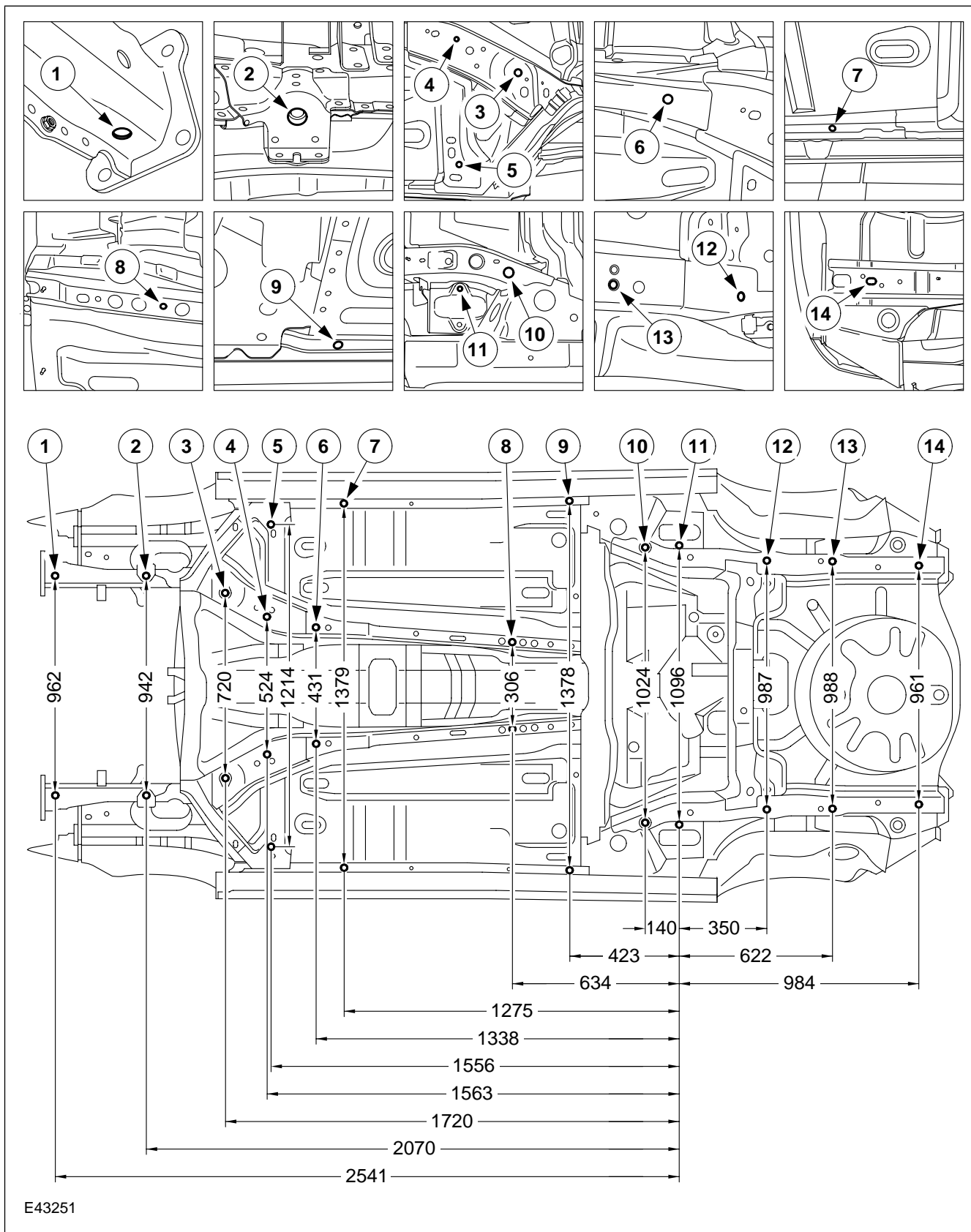
Body Repairs - Vehicle Specific Information and Tolerance Checks

501-26-27

501-26-27

GENERAL PROCEDURES

- A tolerance of ± 3 mm applies to all specified dimensions. All detailed illustrations correspond to the left-hand side of the vehicle.



3. Body dimensions, wagon (quick measurements using the Allvis system)

Body Repairs - Vehicle Specific Information and Tolerance Checks

501-26-28

501-26-28

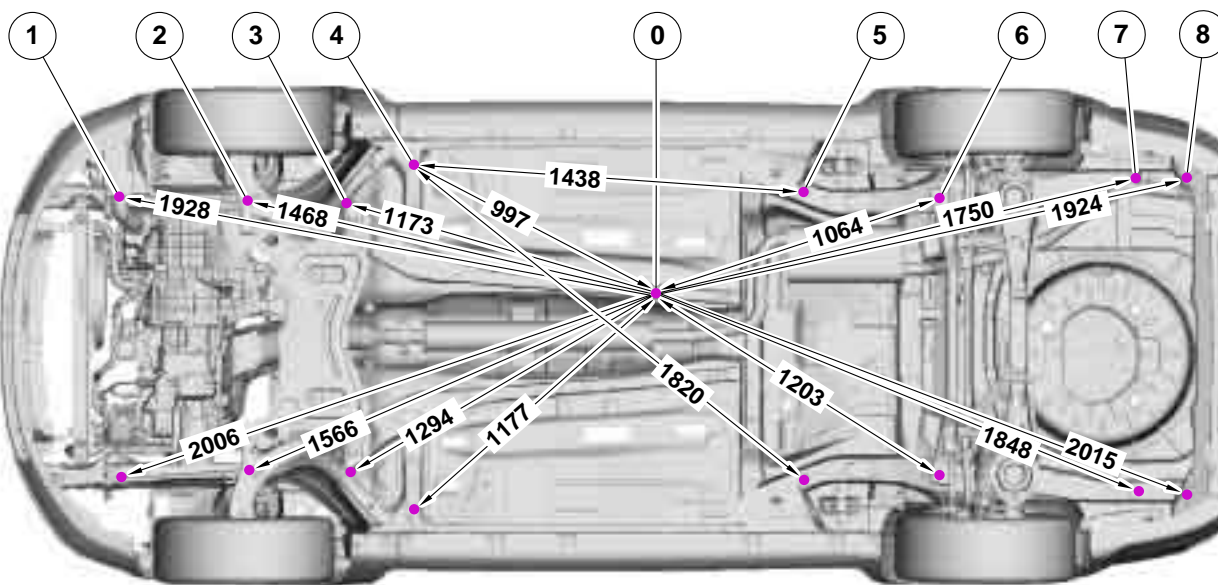
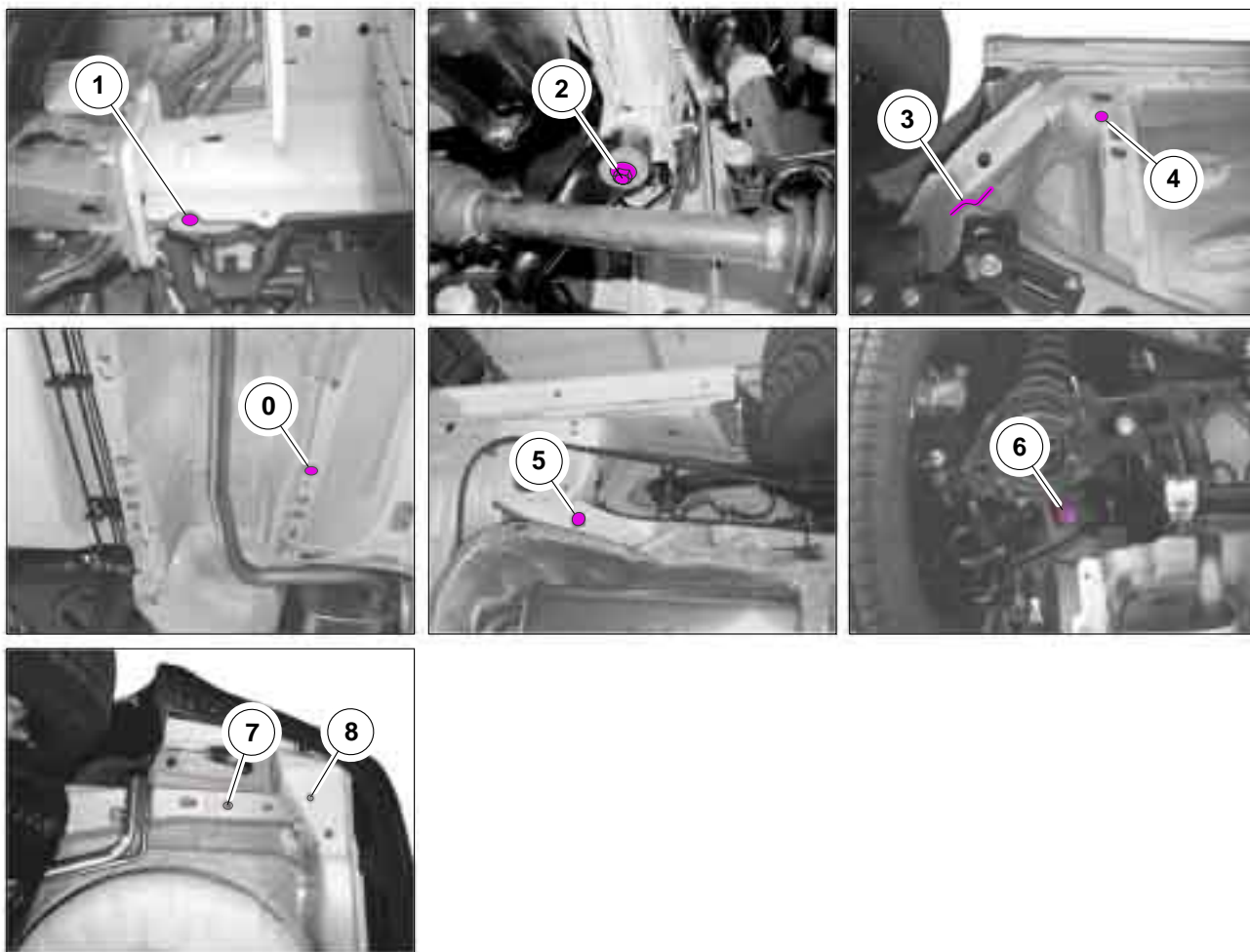
GENERAL PROCEDURES

- All dimensions are measured from the middle of the hole or bolt head or from the edge of the panel, using the Allvis system, with component assemblies installed.
- A tolerance of ± 3 mm applies to all measurements given. All detailed illustrations correspond to the left-hand side of the vehicle.

Allvis specifications

Point of measurement	adapter	Height setting of the test probes
1	25 mm (probe)	350 mm
2	25 mm (probe)	240 mm
3	25 mm (probe)	160 mm
4	25 mm (probe)	110 mm
5	35 mm (probe)	50 mm
6	25 mm (probe)	260 mm
7	25 mm (probe)	400 mm
8	25 mm (probe)	400 mm

GENERAL PROCEDURES



E62636

Body dimensions, wagon

4. NOTE: The body dimensions of the front floor pan are the same as for the 3-, 4- and 5-door and can be taken from illustration E43251.

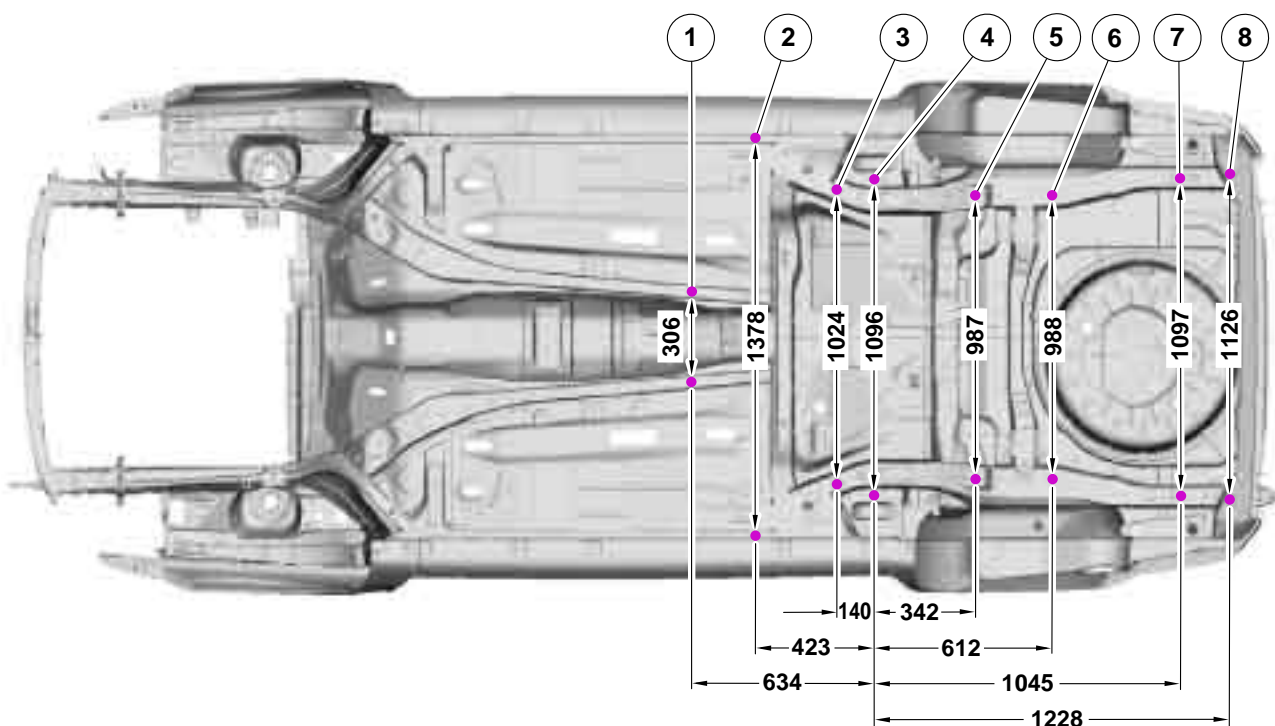
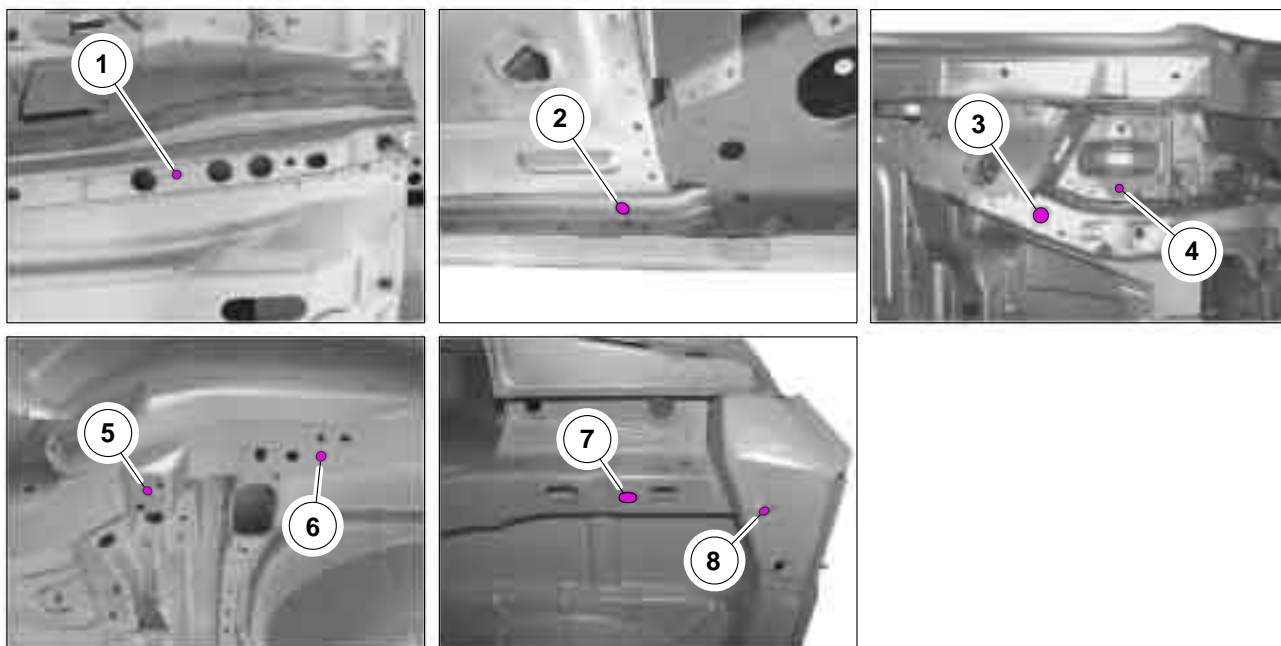
Body Repairs - Vehicle Specific Information and Tolerance Checks

501-26-30

501-26-30

GENERAL PROCEDURES

- All dimensions are measured starting from the centre of each hole, using an electronic measuring system and with the assemblies removed.
- A tolerance of ± 3 mm applies to all measurements given. All detailed illustrations correspond to the left-hand side of the vehicle.



E62637

GENERAL PROCEDURES

Frame Tolerance Check

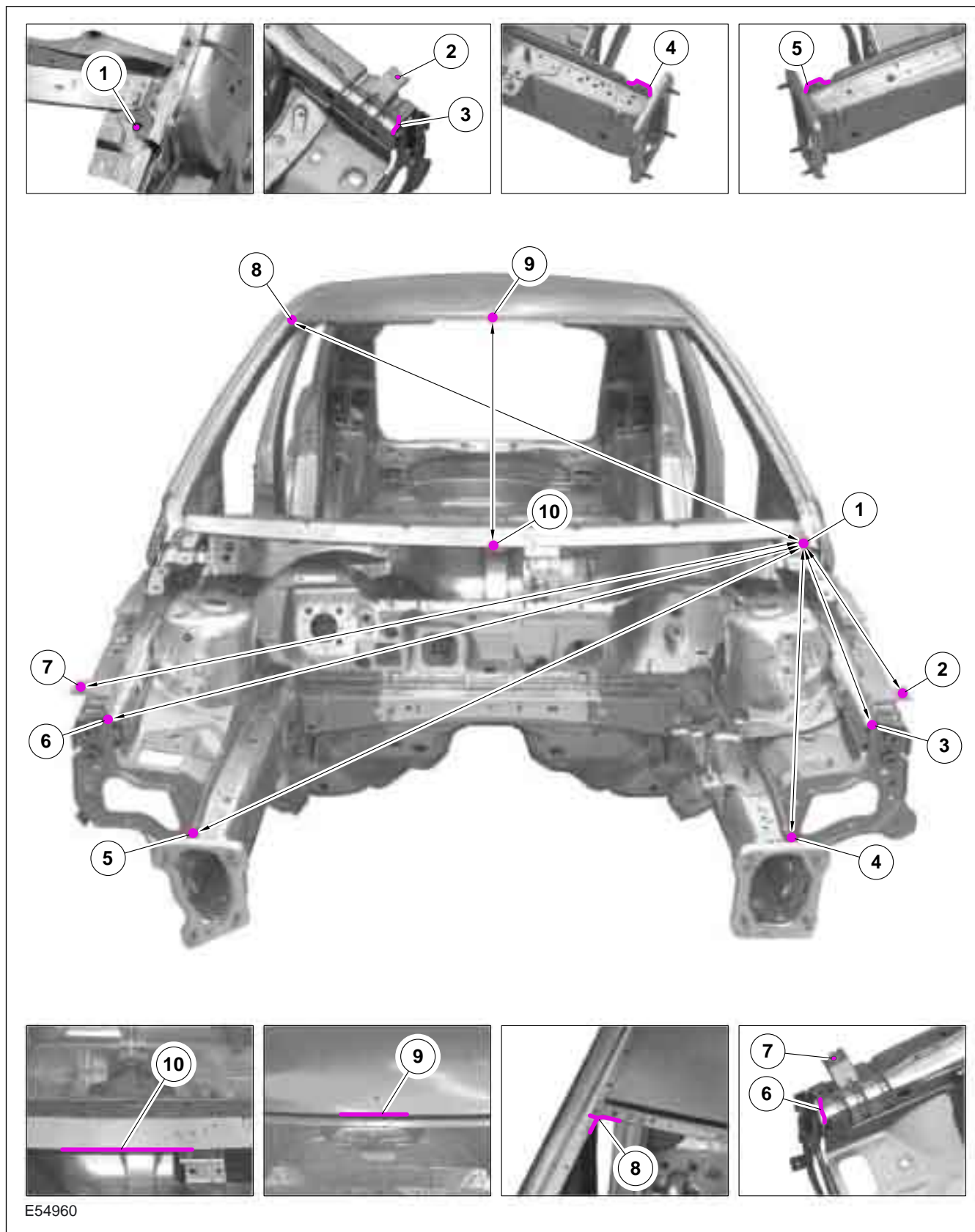
1. Front end body dimensions, all models

- All dimensions have a tolerance of ± 3 mm. All dimensions were determined starting from the center of each hole or panel edge using a symmetrically adjusted beam trammel.

Measuring points and dimensions

1 - 2 = 530 mm	1 - 6 = 1496 mm
1 - 3 = 608 mm	1 - 7 = 1532 mm
1 - 4 = 786 mm	1 - 8 = 1556 mm
1 - 5 = 1426 mm	9 - 10 = 965 mm

GENERAL PROCEDURES



2. Body dimensions, side view (5-door version)

- All dimensions have a tolerance of ± 3 mm. All dimensions were determined starting from the edge of the steel panel using a symmetrically adjusted measuring gauge.

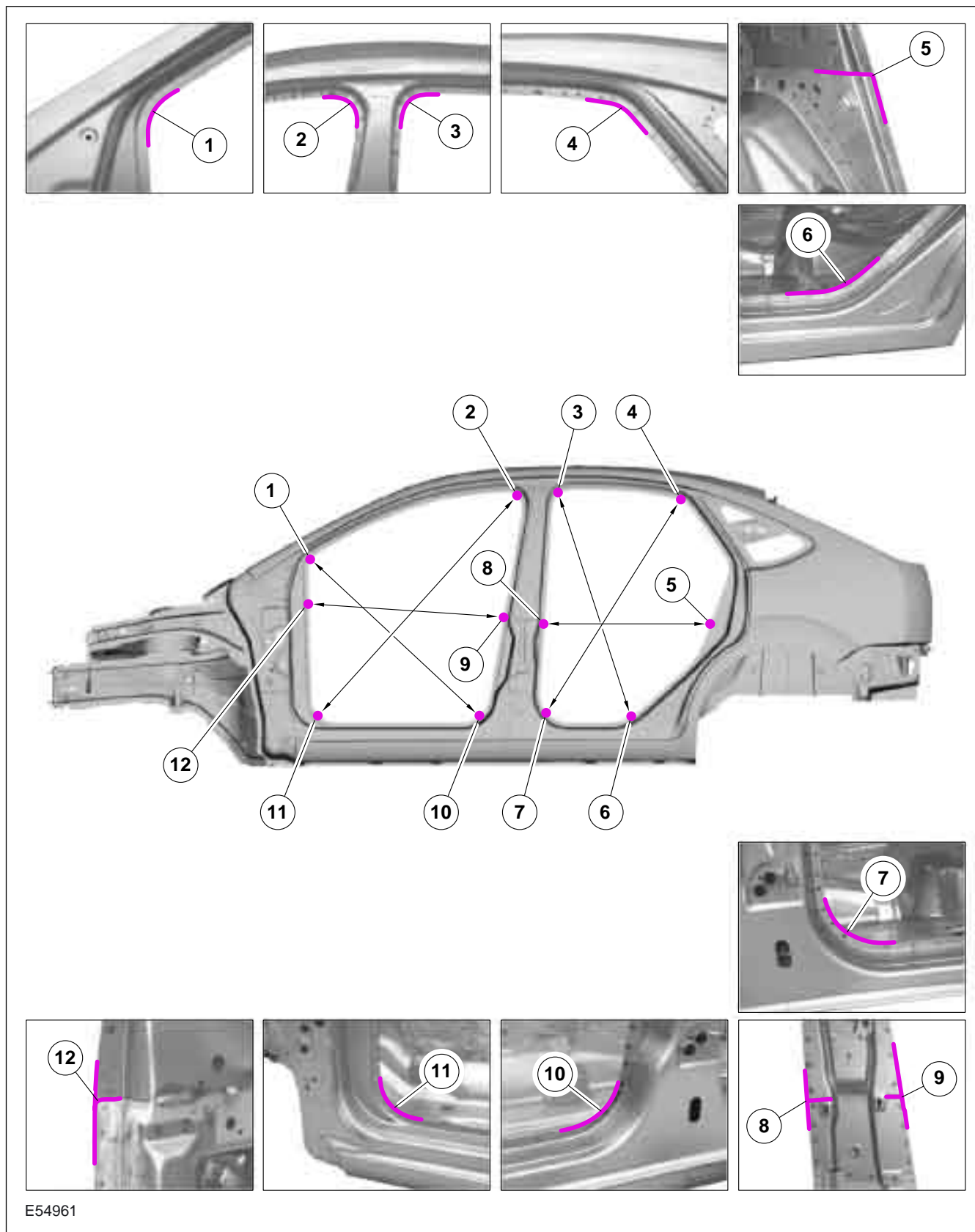
**Body Repairs - Vehicle Specific Information
and Tolerance Checks****501-26-33****501-26-33****GENERAL PROCEDURES**

- Measuring points 1, 2, 3, 4, 6, 7, 10 and 11 are measured in the curve and represent the greatest distance to the measuring point opposite.
- The detail views of measuring points 5, 8, 9 and 12 are shown looking from the vehicle interior outwards.

Measuring points and dimensions

1 - 10 = 992 mm	4 - 7 = 1095 mm
2 - 11 = 1281 mm	5 - 8 = 711 mm
3 - 6 = 1025 mm	9 - 12 = 838 mm

GENERAL PROCEDURES



E54961

3. Body dimensions, rear (5-door version)

- All dimensions have a tolerance of ± 3 mm. All dimensions were determined starting from the center of the welded flange using a symmetrically adjusted measuring gauge.

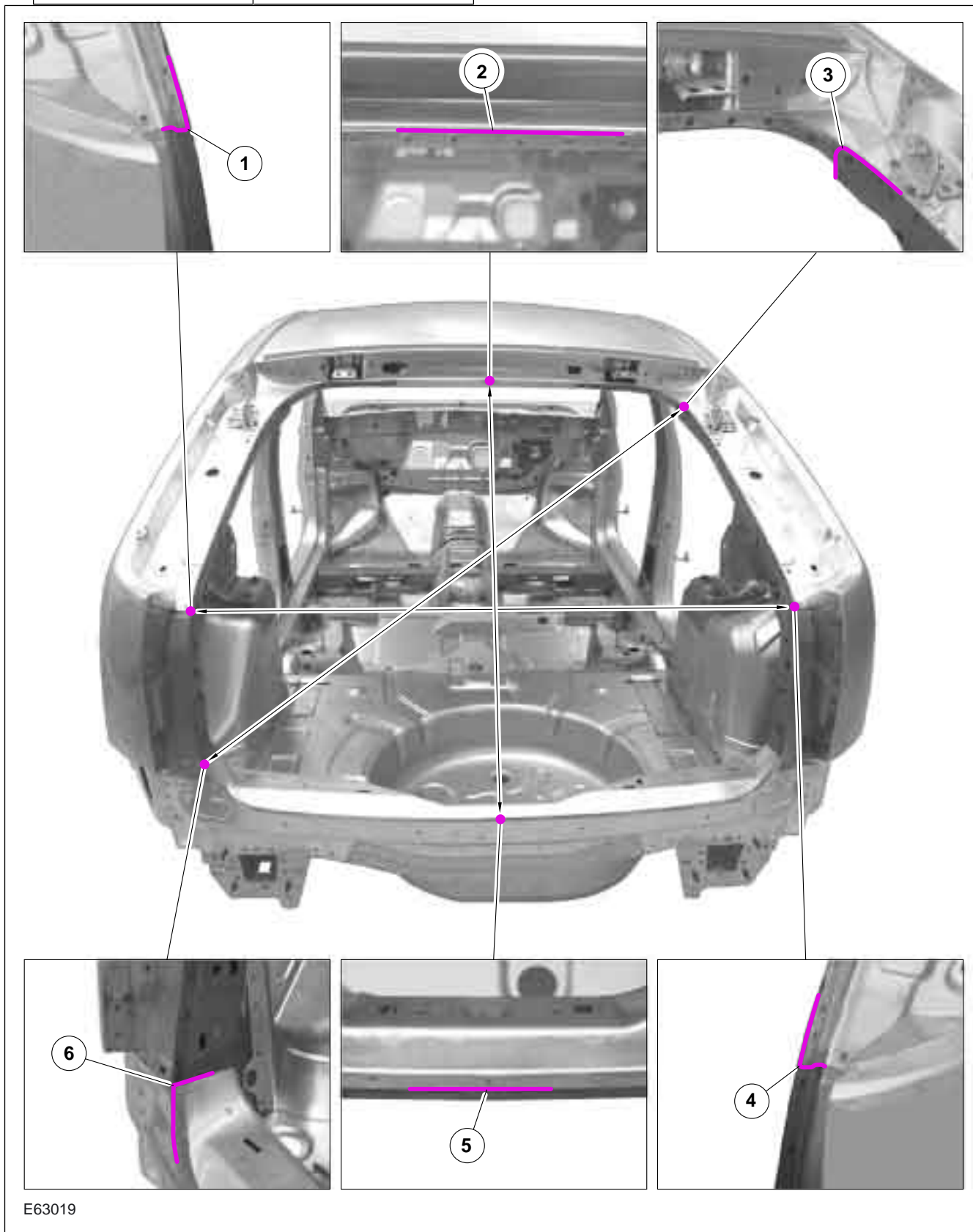
GENERAL PROCEDURES

Measuring points and dimensions

1 - 4 = 1115 mm

3 - 6 = 1327 mm

2 - 5 = 996 mm



E63019

4. Body dimensions, interior (5-door version)

**Body Repairs - Vehicle Specific Information
and Tolerance Checks**

501-26-36

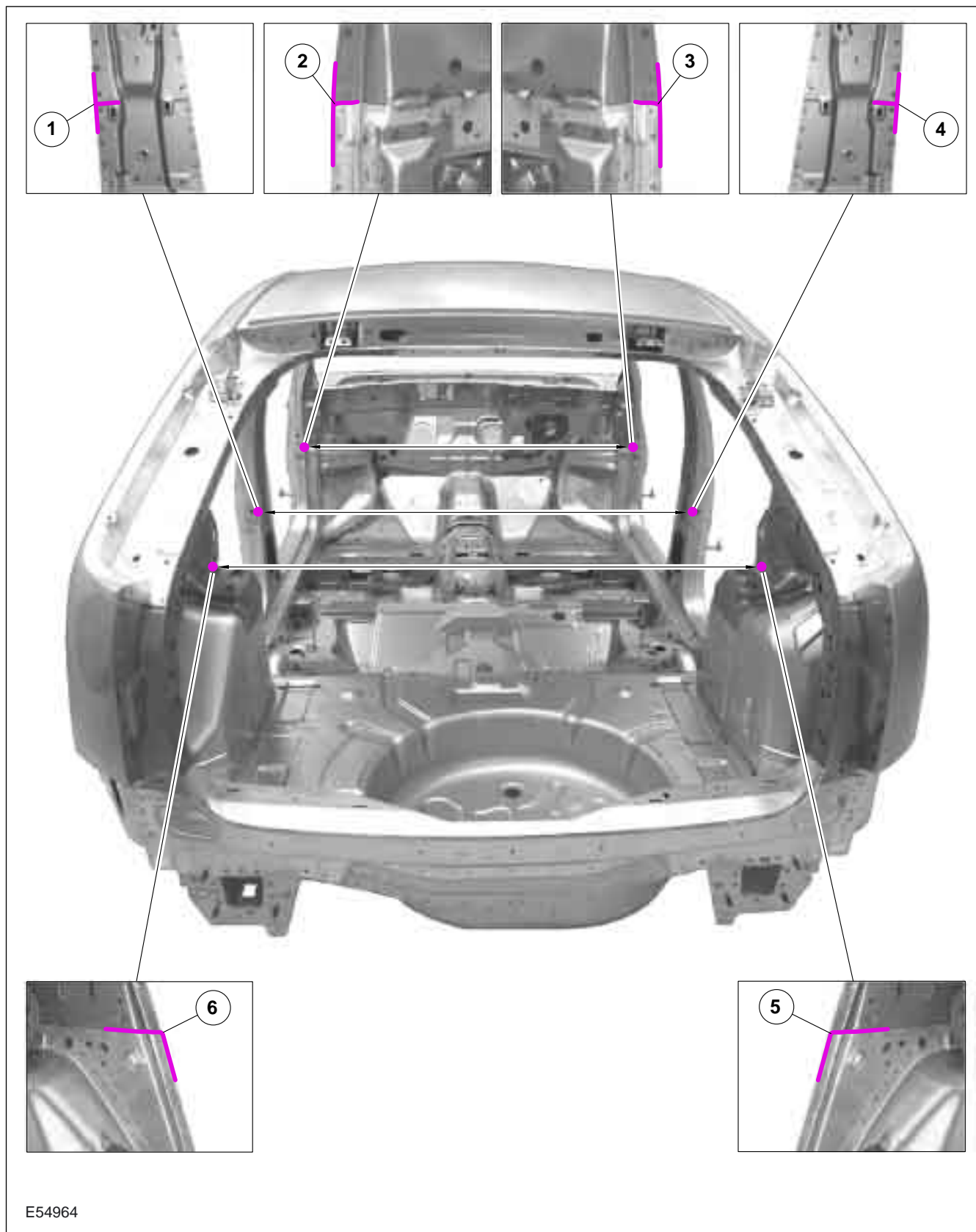
501-26-36

GENERAL PROCEDURES

- All dimensions have a tolerance of ± 3 mm. All dimensions were determined starting from the center of the welded flange using a symmetrically adjusted measuring gauge.

Measuring points and dimensions

1 - 4 = 1458 mm	5 - 6 = 1441 mm
2 - 3 = 1442 mm	



**Body Repairs - Vehicle Specific Information
and Tolerance Checks****501-26-37****501-26-37****GENERAL PROCEDURES****5. Body dimensions, side view (3-door version)**

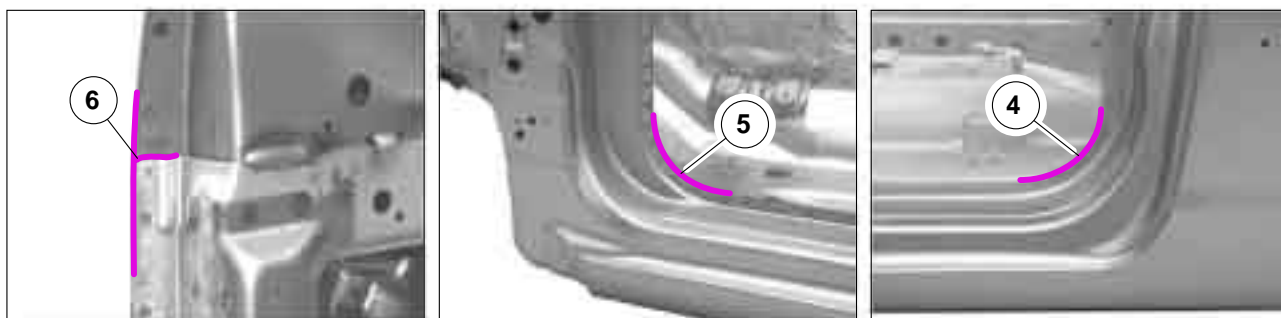
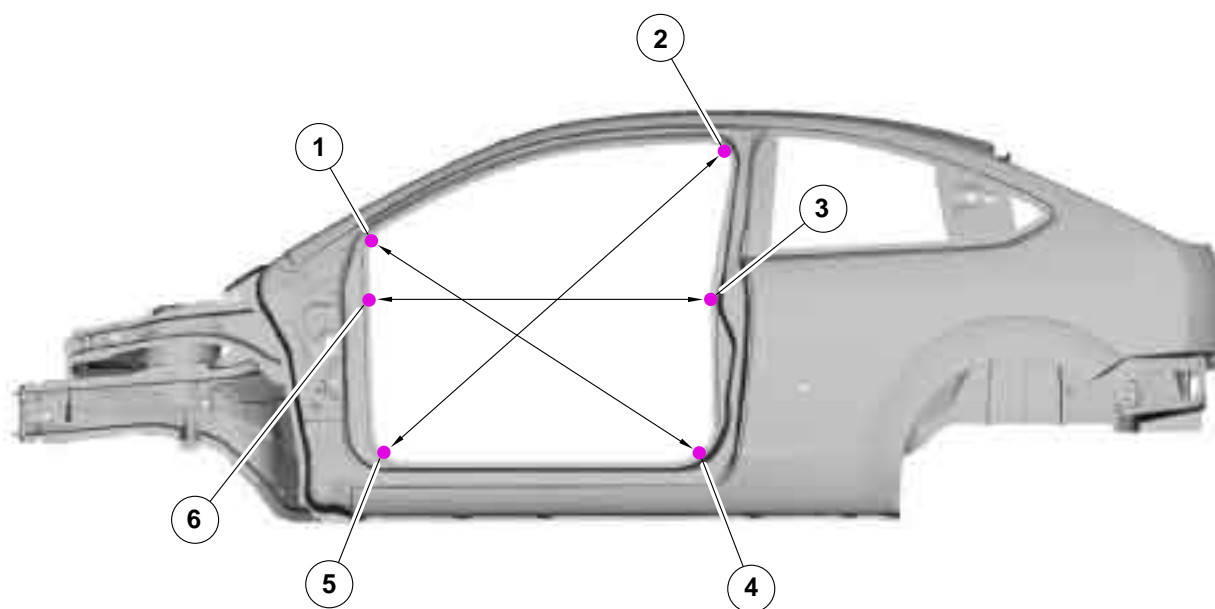
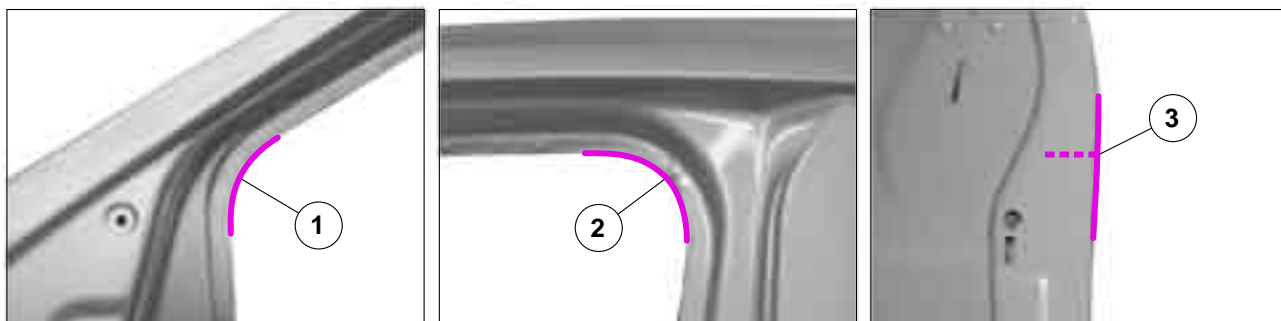
- All dimensions have a tolerance of ± 3 mm. All dimensions were determined starting from the edge of the steel panel using a symmetrically adjusted measuring gauge.
- Measuring points 1, 2, 4 and 5 are measured in the curve and represent the greatest distance to the measuring point opposite.

- The detail views of measuring points 3 and 6 are shown looking from the vehicle interior outwards.

Measuring points and dimensions

1 - 4 = 1234 mm	3 - 6 = 1068 mm
2 - 5 = 1439 mm	

GENERAL PROCEDURES



E54962

6. Body dimensions, rear (3-door version)

- All dimensions have a tolerance of ± 3 mm. All dimensions were determined starting from the center of the welded flange using a symmetrically adjusted measuring gauge.

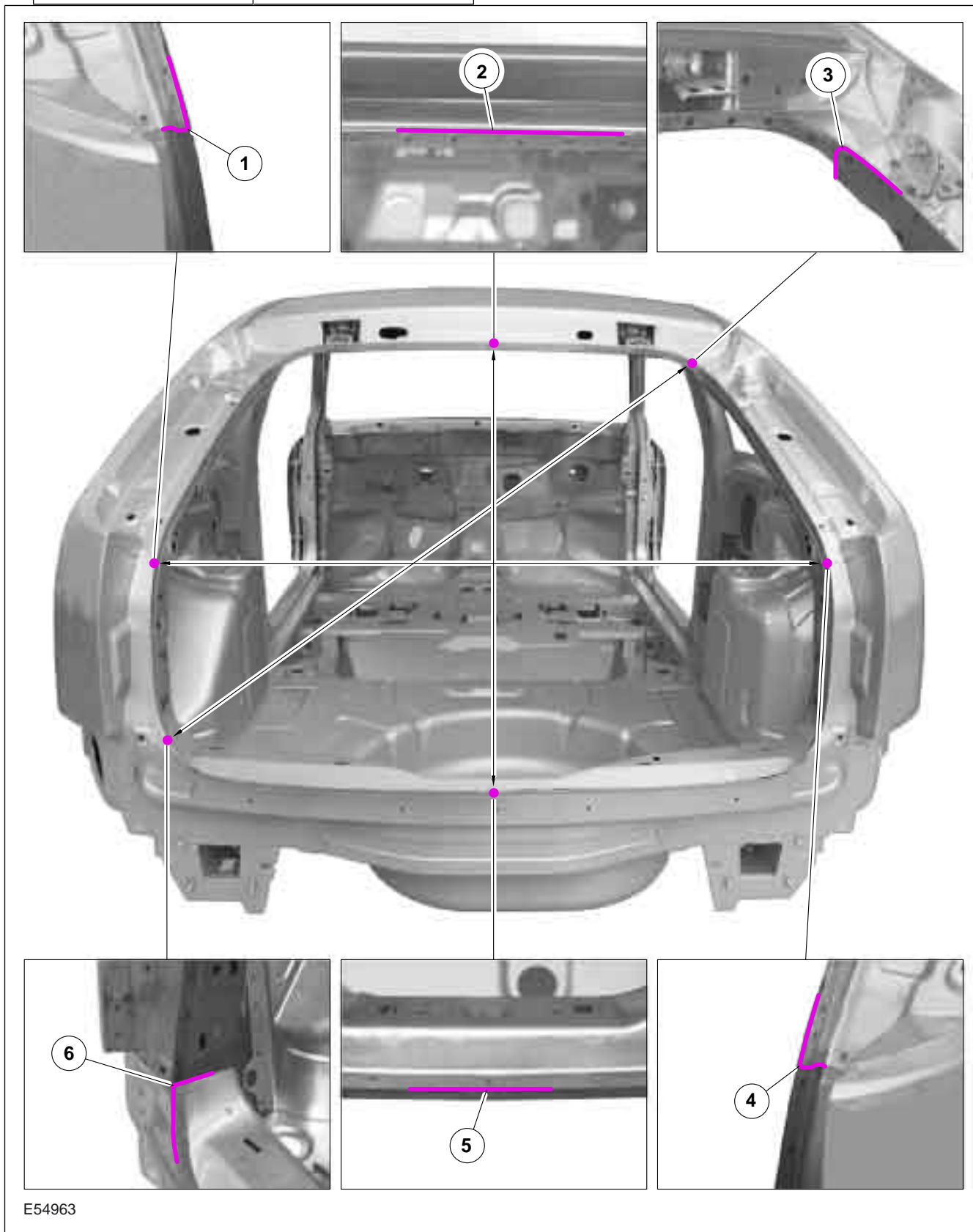
GENERAL PROCEDURES

Measuring points and dimensions

1 - 4 = 1115 mm

3 - 6 = 1327 mm

2 - 5 = 996 mm



E54963

7. Body dimensions, interior (3-door version)

Body Repairs - Vehicle Specific Information and Tolerance Checks

501-26-40

501-26-40

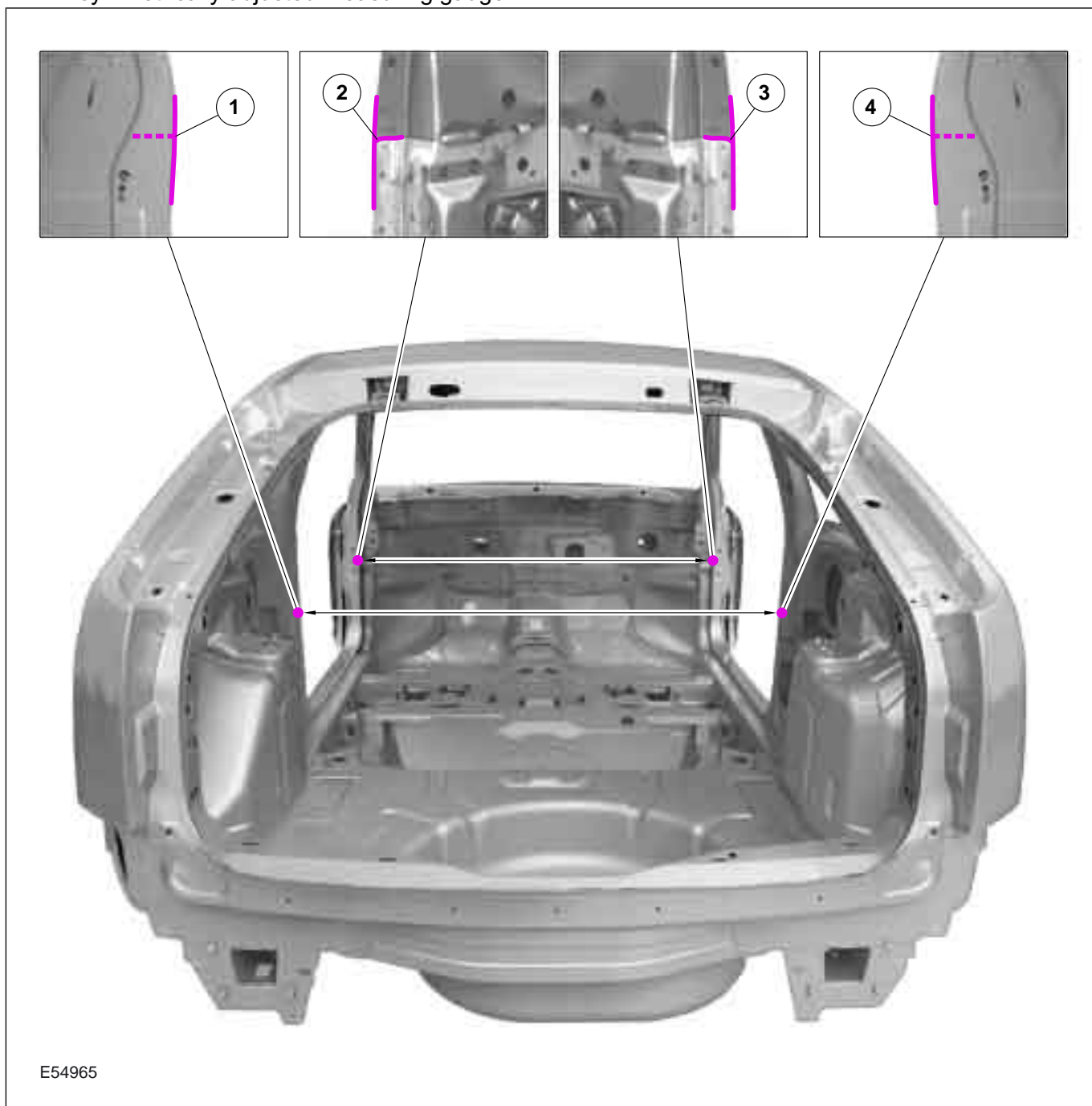
GENERAL PROCEDURES

- All dimensions have a tolerance of ± 3 mm. All dimensions were determined starting from the center of the welded flange using a symmetrically adjusted measuring gauge.

Measuring points and dimensions

1 - 4 = 1460 mm

2 - 3 = 1442 mm



E54965

8. Body dimensions, side view (4-door version)

- All dimensions have a tolerance of ± 3 mm. All dimensions were determined starting from the edge of the steel panel using a symmetrically adjusted measuring gauge.
- Measuring points 1, 2, 3, 4, 6, 7, 10 and 11 are measured in the curve and represent the greatest distance to the measuring point opposite.
- The detail views of measuring points 5, 8, 9 and 12 are shown looking from the vehicle interior outwards.

Body Repairs - Vehicle Specific Information and Tolerance Checks

501-26-41

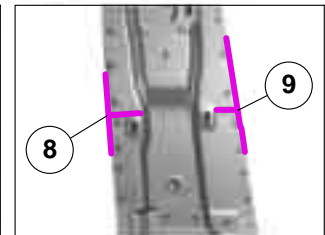
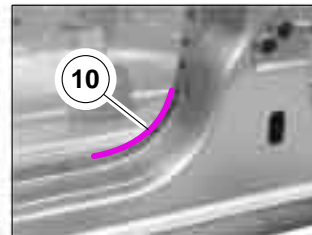
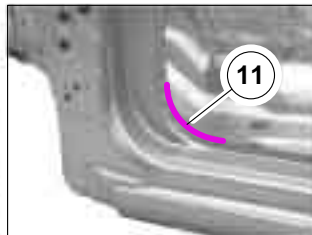
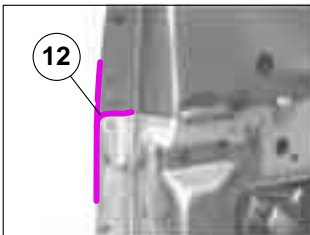
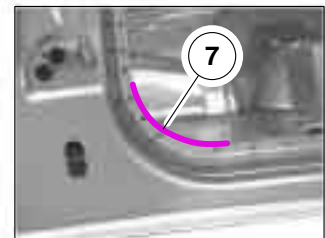
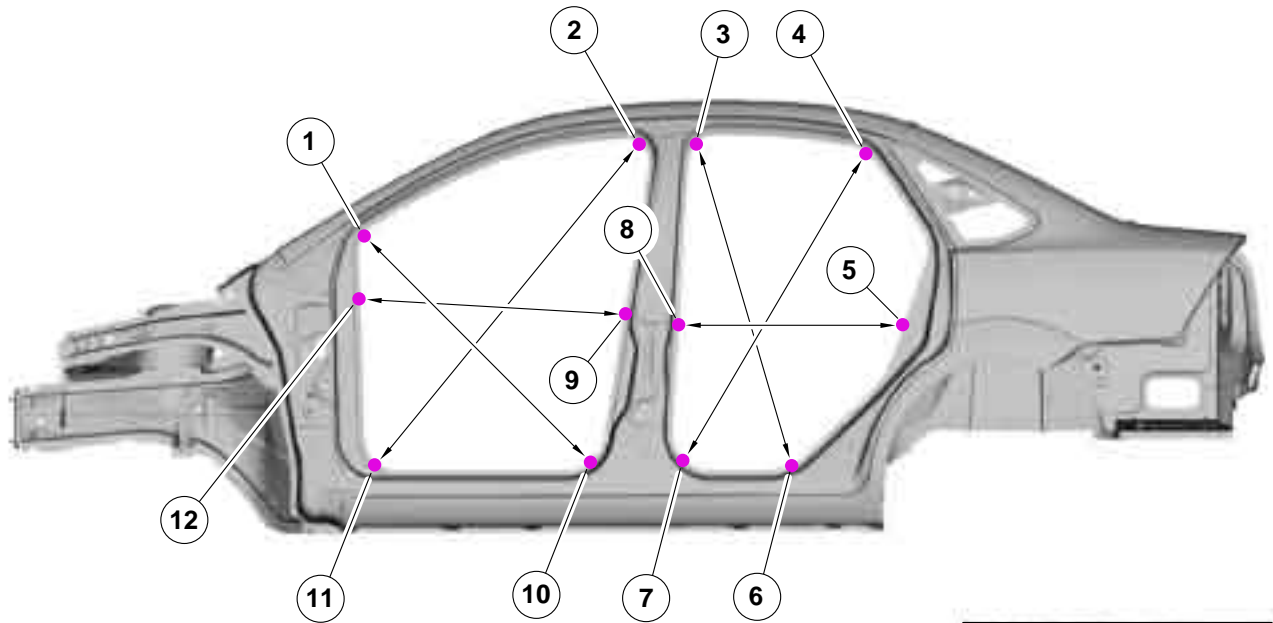
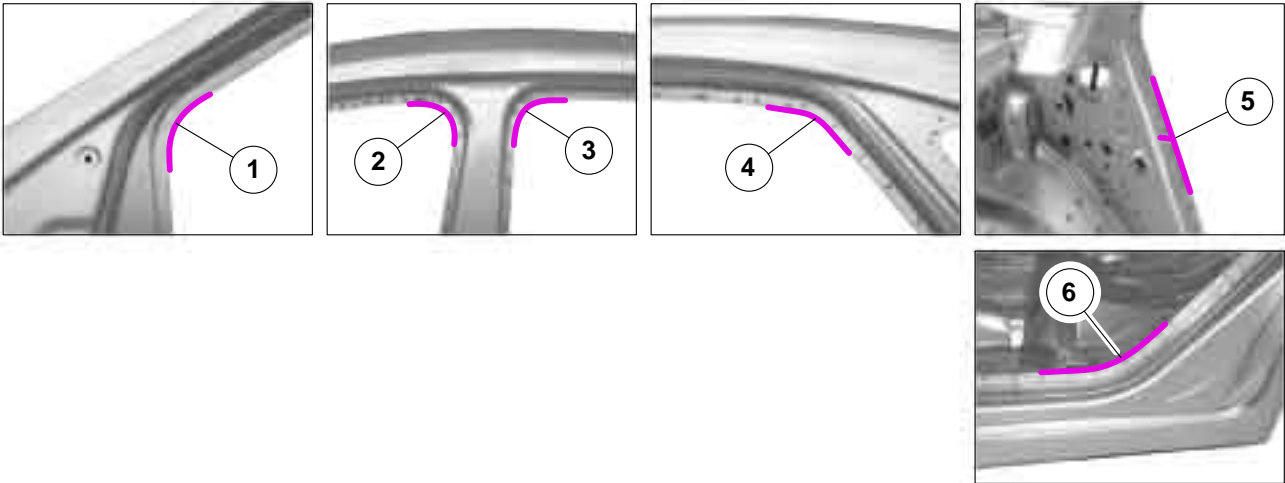
501-26-41

GENERAL PROCEDURES

Measuring points and dimensions

1 - 10 = 992 mm	4 - 7 = 1095 mm
-----------------	-----------------

2 - 11 = 1281 mm	5 - 8 = 711 mm
3 - 6 = 1025 mm	9 - 12 = 838 mm



E62630

**Body Repairs - Vehicle Specific Information
and Tolerance Checks****501-26-42****501-26-42****GENERAL PROCEDURES****9. Body dimensions, rear (4-door version)**

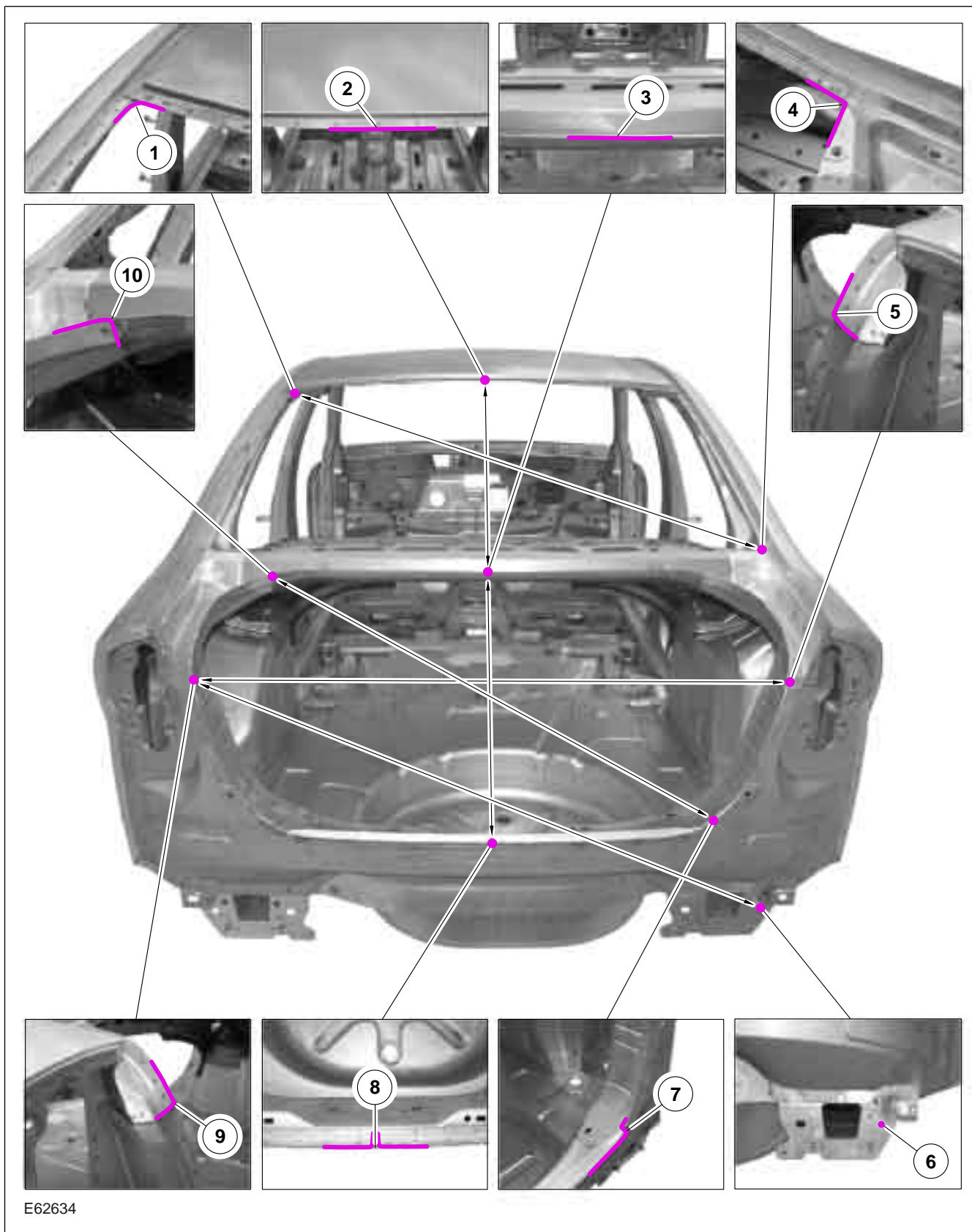
- All dimensions have a tolerance of ± 3 mm. All dimensions were determined starting from the center of the welded flange using a symmetrically adjusted measuring gauge.
- Measurement points 1 and 4 are measured in the curve and correspond to the largest distance to the opposite measurement point.

- Measurement point 6 is measured from the center of the hole.

Measuring points and dimensions

1 - 4 = 1324 mm	5 - 9 = 1043 mm
2 - 3 = 824 mm	6 - 9 = 1212 mm
3 - 8 = 512 mm	7 - 10 = 960 mm

GENERAL PROCEDURES



E62634

10. Body dimensions, interior (4-door version)

- All dimensions have a tolerance of ± 3 mm. All dimensions were determined starting from the center of the welded flange using a symmetrically adjusted measuring gauge.

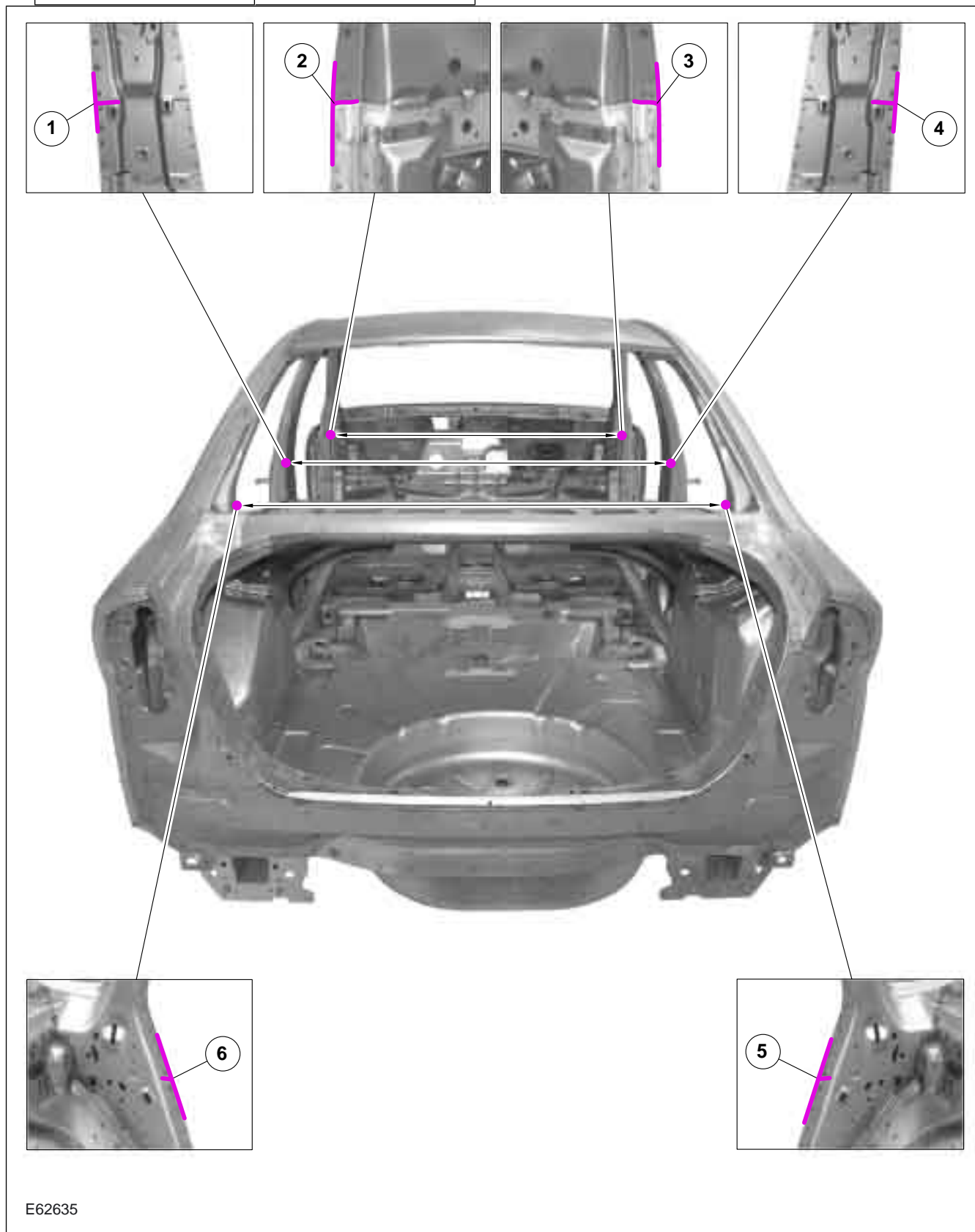
GENERAL PROCEDURES

Measuring points and dimensions

1 - 4 = 1458 mm

5 - 6 = 1441 mm

2 - 3 = 1442 mm



E62635

11. Body dimensions, side view (wagon)

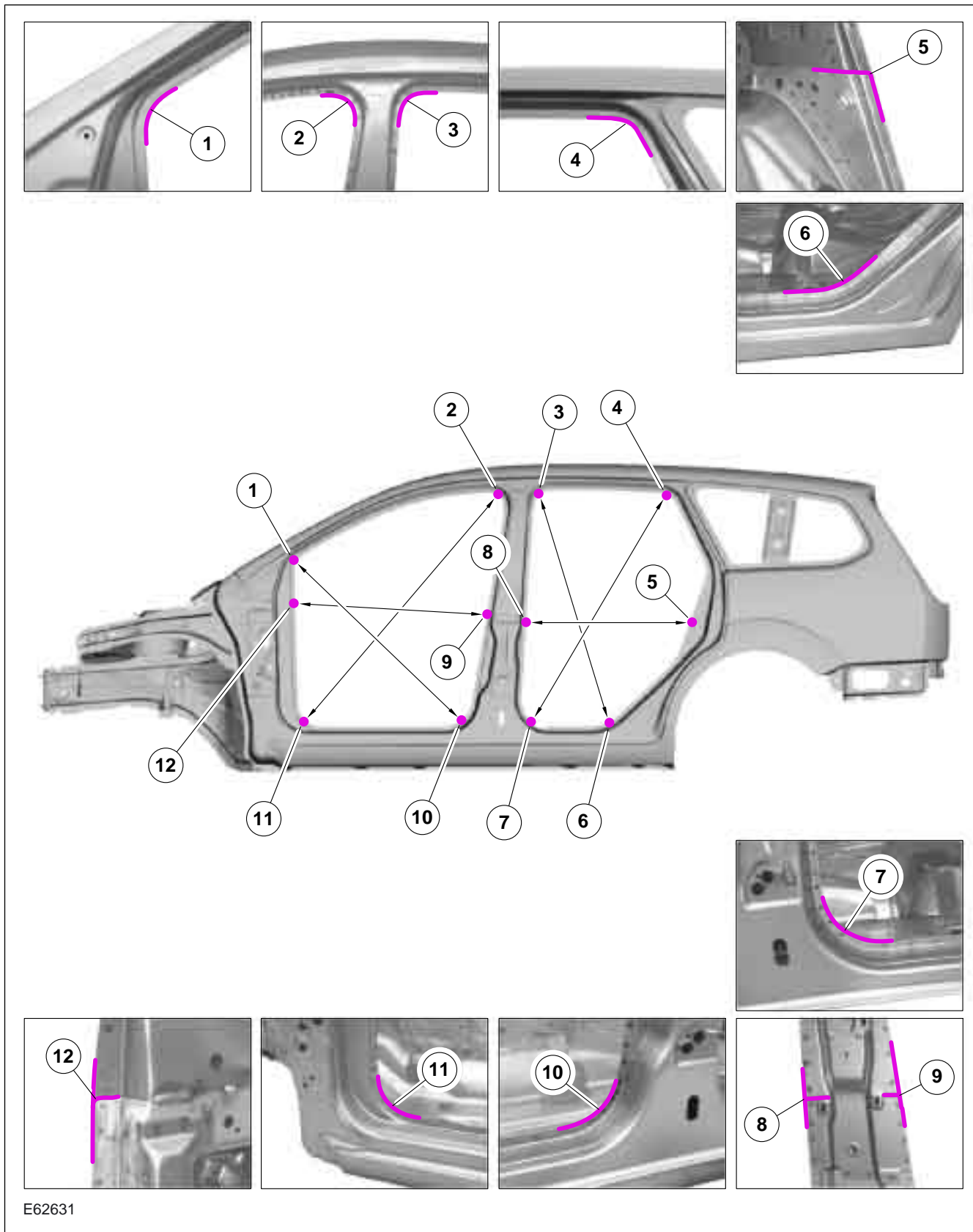
**Body Repairs - Vehicle Specific Information
and Tolerance Checks****501-26-45****501-26-45****GENERAL PROCEDURES**

- All dimensions have a tolerance of ± 3 mm. All dimensions were determined starting from the edge of the steel panel using a symmetrically adjusted measuring gauge.
- Measuring points 1, 2, 3, 4, 6, 7, 10 and 11 are measured in the curve and represent the greatest distance to the measuring point opposite.
- The detail views of measuring points 5, 8, 9 and 12 are shown looking from the vehicle interior outwards.

Measuring points and dimensions

1 - 10 = 992 mm	4 - 7 = 1136 mm
2 - 11 = 1281 mm	5 - 8 = 711 mm
3 - 6 = 1025 mm	9 - 12 = 838 mm

GENERAL PROCEDURES



E62631

12. Body dimensions, rear (wagon)

- All dimensions have a tolerance of ± 3 mm. All dimensions were determined starting from the center of the welded flange using a symmetrically adjusted measuring gauge.

Body Repairs - Vehicle Specific Information and Tolerance Checks

501-26-47

501-26-47

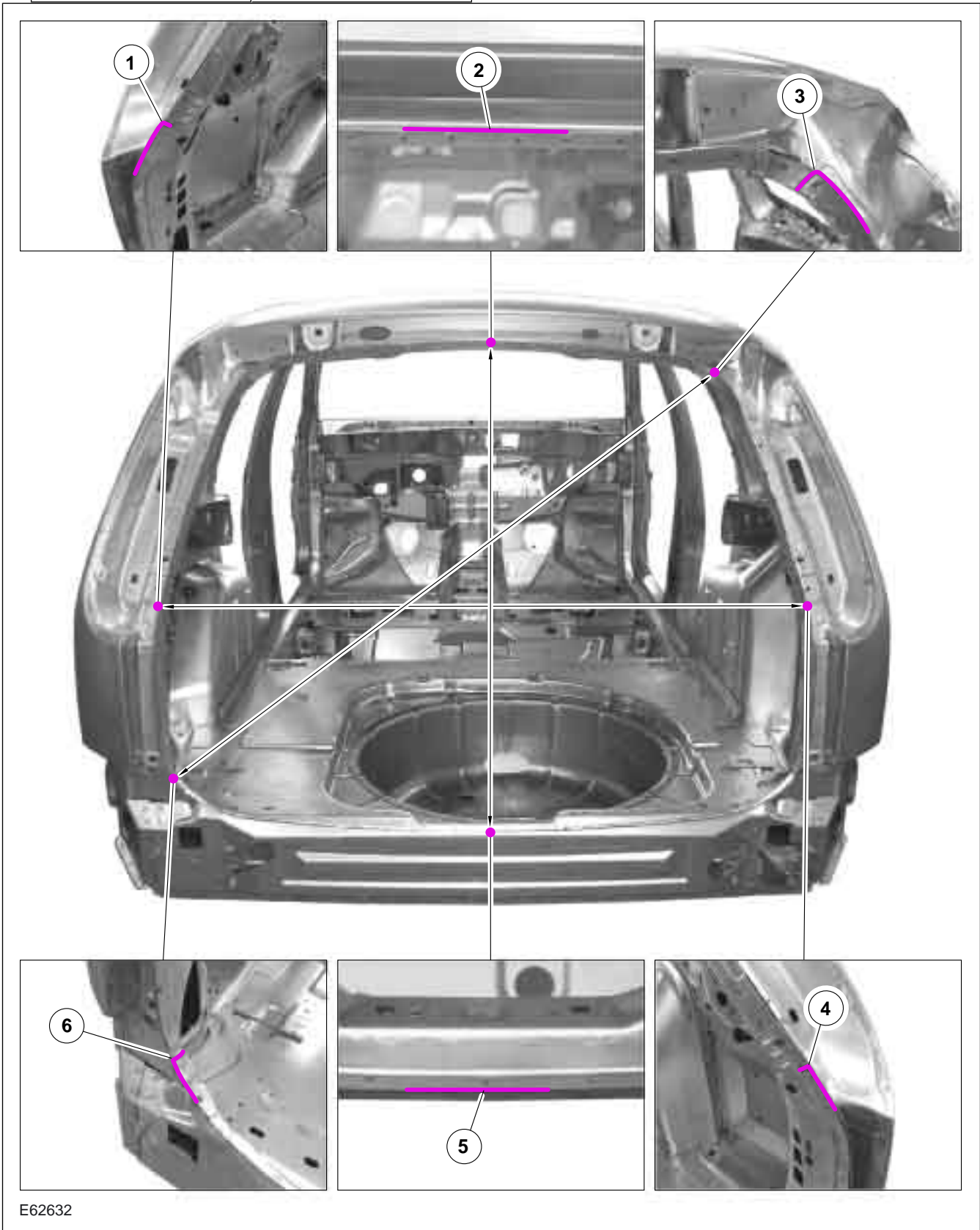
GENERAL PROCEDURES

Measuring points and dimensions

1 - 4 = 1155 mm

3 - 6 = 1276 mm

2 - 5 = 906 mm



13. Body dimensions, interior (wagon)

**Body Repairs - Vehicle Specific Information
and Tolerance Checks**

501-26-48

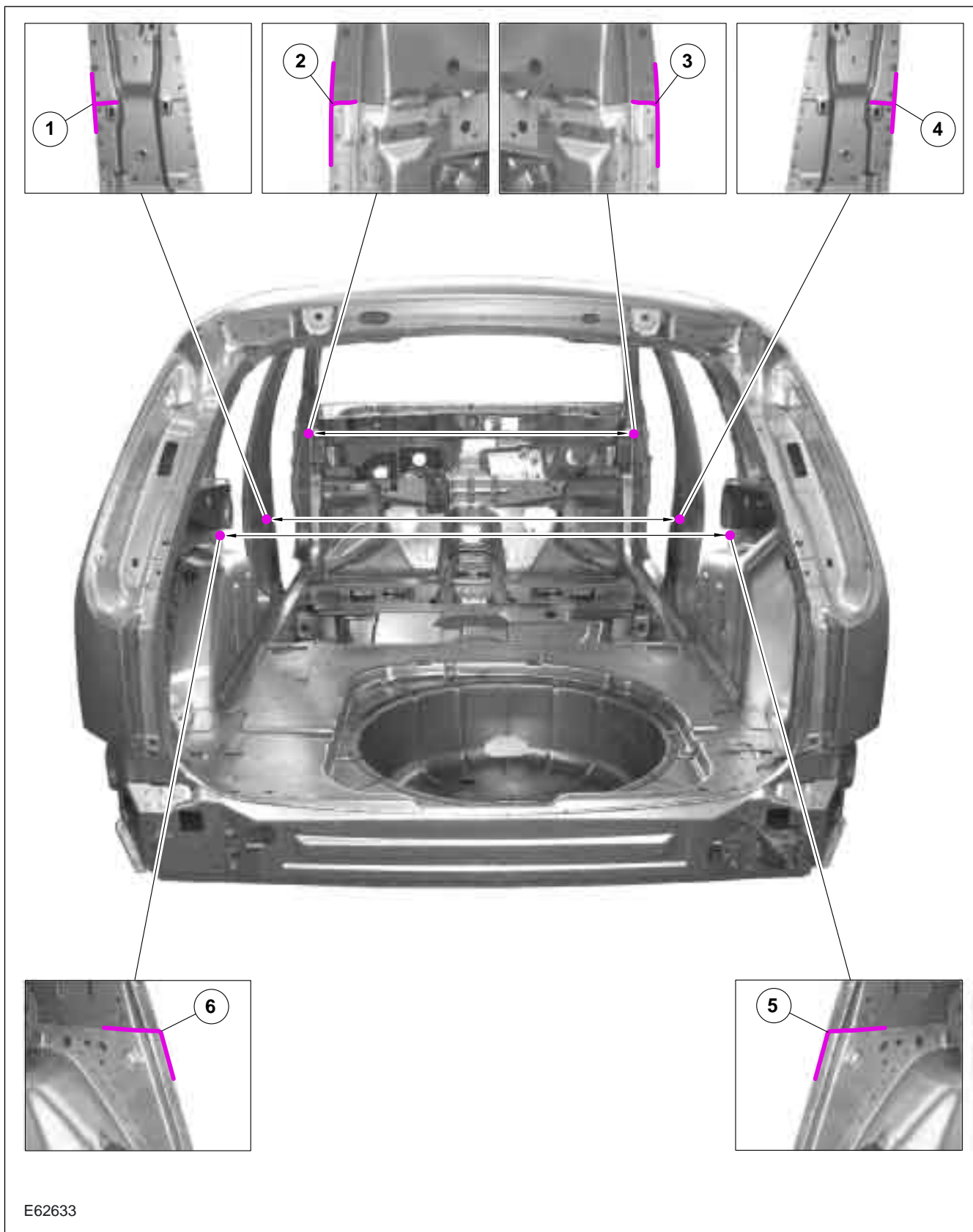
501-26-48

GENERAL PROCEDURES

- All dimensions have a tolerance of ± 3 mm. All dimensions were determined starting from the center of the welded flange using a symmetrically adjusted measuring gauge.

Measuring points and dimensions

1 - 4 = 1458 mm	5 - 6 = 1441 mm
2 - 3 = 1442 mm	





SECTION 501-27 Front End Sheet Metal Repairs

VEHICLE APPLICATION: 2008.75 Focus ST C307

CONTENTS	PAGE
REMOVAL AND INSTALLATION	
Fender Apron Panel Section.....	501-27-2
Fender Apron Panel Reinforcement..... (44 277 4)	501-27-4
Front Side Member Section.....	501-27-6
Front Side Member and Fender Apron Panel LH.....	501-27-8



REMOVAL AND INSTALLATION

Fender Apron Panel Section

1. Replacement parts

- Apron panel section
- Front module bracket
- Inner apron panel reinforcement

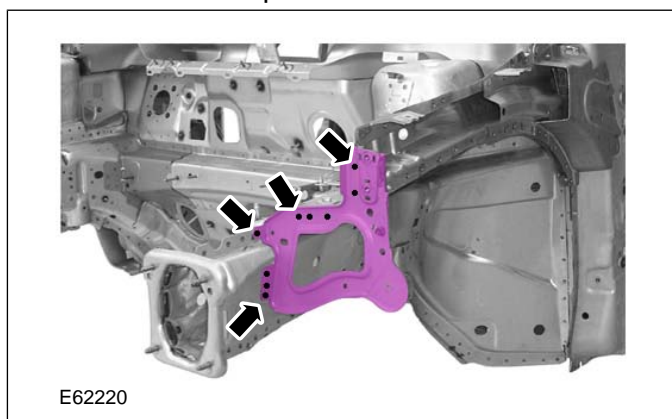
Removal

1. General information

- The apron panel reinforcement is already removed as a sectional replacement before repair work starts.
- Necessary removal work: Bonnet, wing, bumper, door, front module, headlamp and wheelhouse liner.

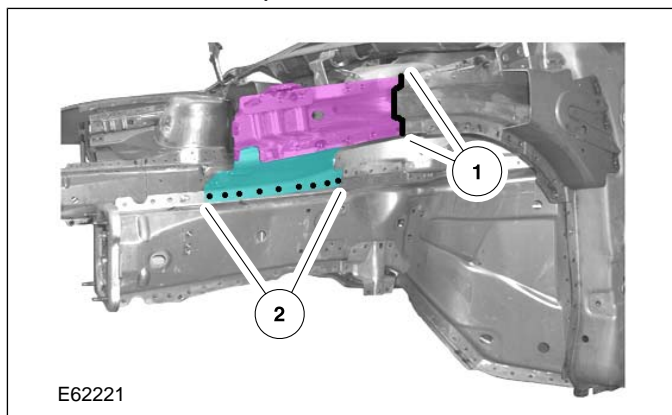
2. Front module bracket

- Mill out the spot welds.



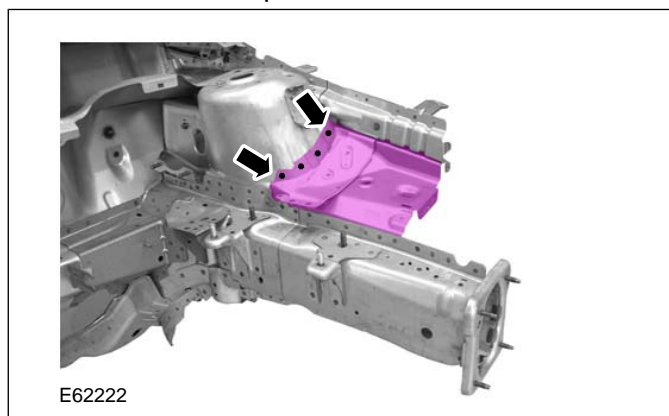
3. Apron panel and apron panel inner reinforcement

1. Separating cut.
2. Mill out the spot welds.



4. Apron panel

- Mill out the spot welds.

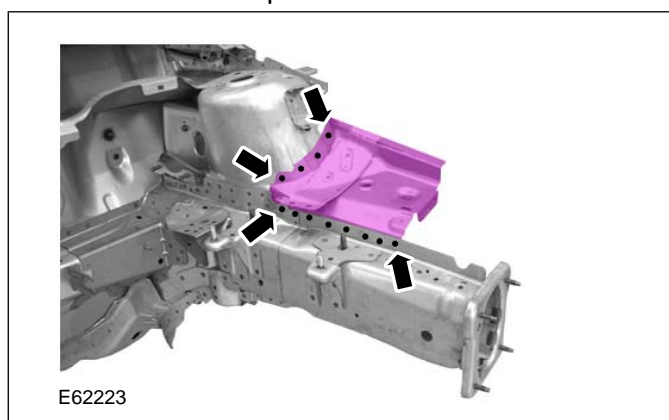


Installation

NOTE: Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25 must be followed.

1. Apron panel

- Resistance spot weld.

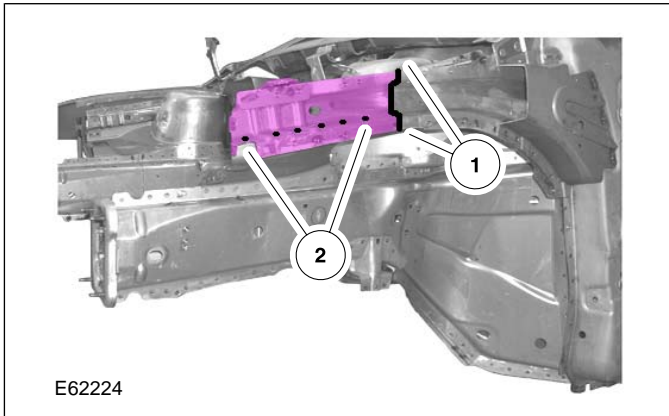


2. Apron panel and apron panel inner reinforcement

1. Continuous MIG weld seam.

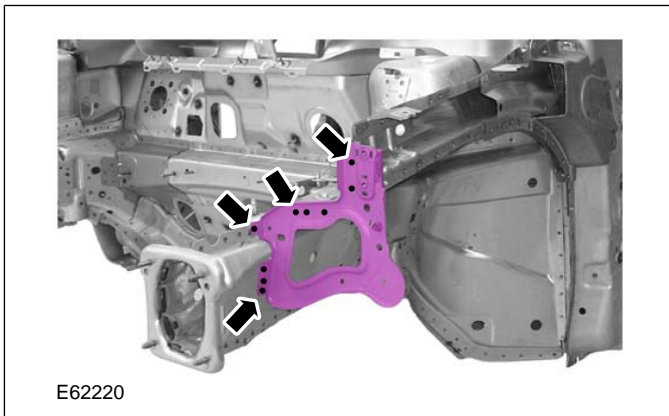
REMOVAL AND INSTALLATION

2. Resistance spot weld.



3. Front module bracket

- Resistance spot weld.



REMOVAL AND INSTALLATION

Fender Apron Panel Reinforcement(44 277 4)

1. Replacement Parts

- Fender panel reinforcement

Removal

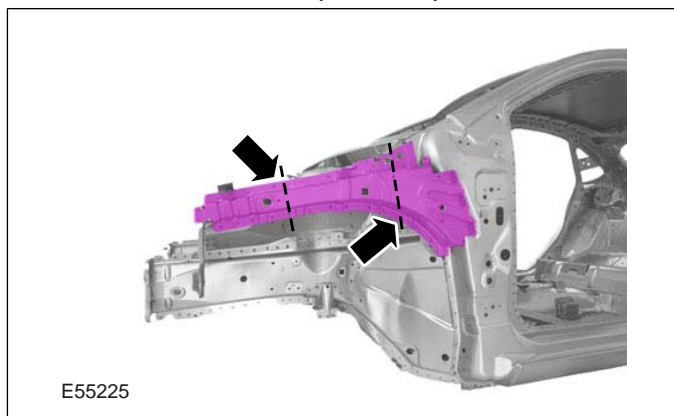
NOTE: Where possible, a partial replacement of the fender panel reinforcement is preferred to a complete replacement, as this can save a considerable amount of time on assembly work in the inner area of the A-pillar. The partial replacement options shown do not require the MIG brazed joints on the A-pillar to be detached.

1. General notes

- Necessary removal work: Bonnet, wing, bumper, door, front module, headlamp and wheelhouse liner.

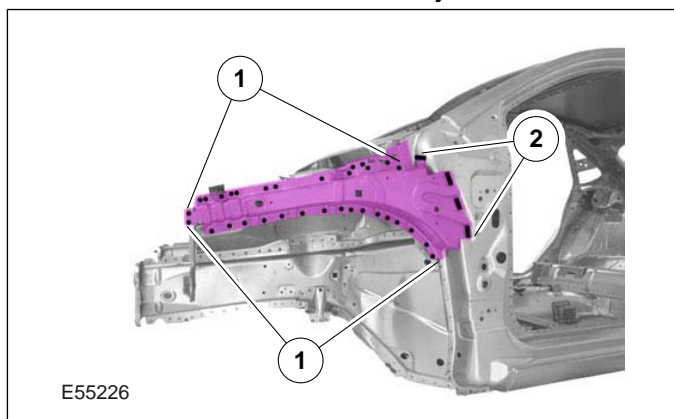
2. Fender panel reinforcement

- Cut locations for partial replacement.



3. Fender panel reinforcement

1. Mill out the spot welds.
2. Grind out the MIG brazed joints.

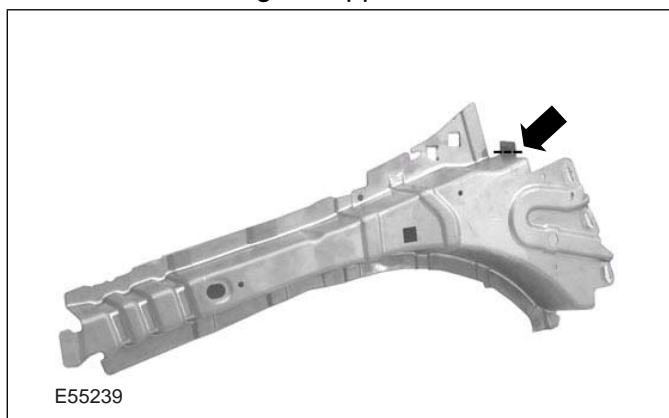


Installation

NOTE: Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25 must be followed.

1. Prepare fender panel reinforcement

- Cut off the sheet metal tabs, leaving a residual flange of approx. 5 mm.

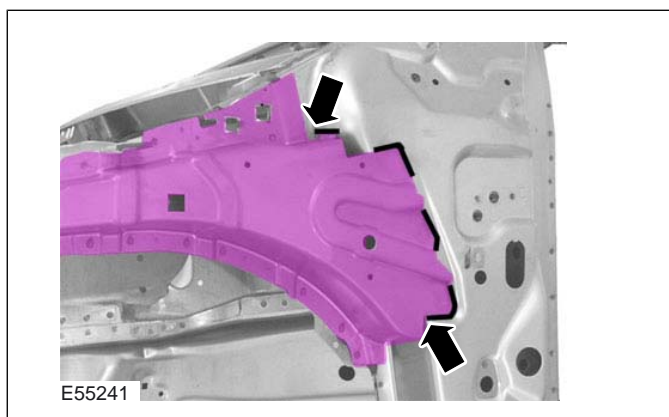


2. NOTE:

- When carrying out a repair, the MIG brazed joints made during vehicle production must be replaced by MIG weld joints in a different location (see diagram E55241).
- These MIG welds must not be carried out on or near existing MIG brazed seams as even the smallest amount of brazing solder can result in a reduction in the strength of the weld seam.

Fender panel reinforcement

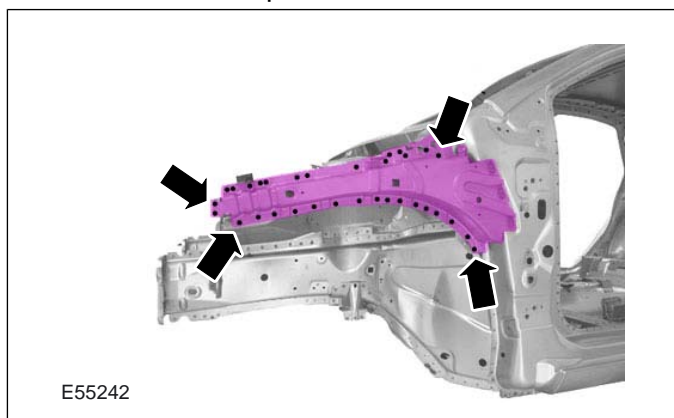
- Continuous MIG seam weld.



3. NOTE: After carrying out the repair carefully apply cavity seal. Also treat the areas of the original MIG brazed joints.

REMOVAL AND INSTALLATION**Fender panel reinforcement**

- Resistance spot weld.



REMOVAL AND INSTALLATION

Front Side Member Section

General Equipment

Measurement or alignment angle system

1. Replacement Parts

- Outer side member
- Inner side member
- Crossmember retaining flange

Removal

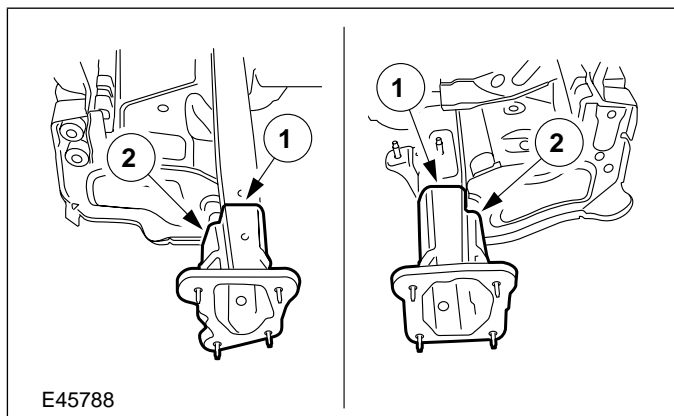
1. General Notes

- Required removal operations: Bumper, hood, fender, front module, headlamps and crossmember with crash elements.

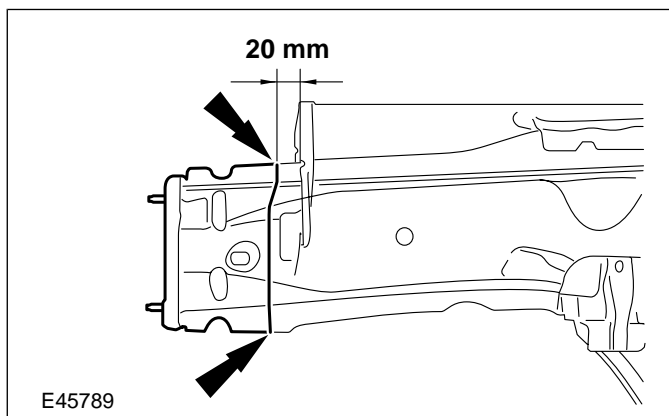
NOTE: The cuts in the side member must be offset to one another.

2. Overview of cuts

1. Inside of member.
2. Outside of member.

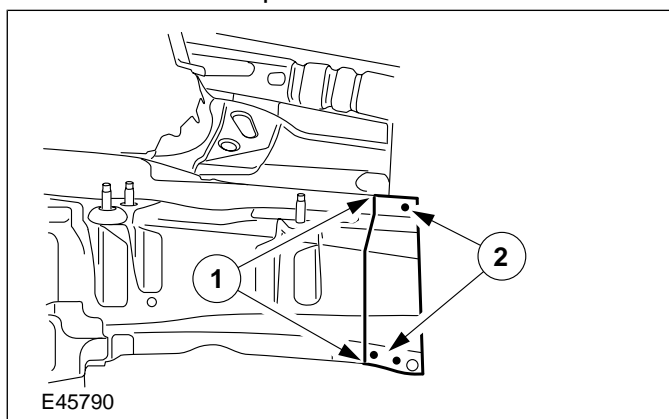


- Cut location.



4. Inner side member

1. Cut location.
2. Mill out the spot welds.

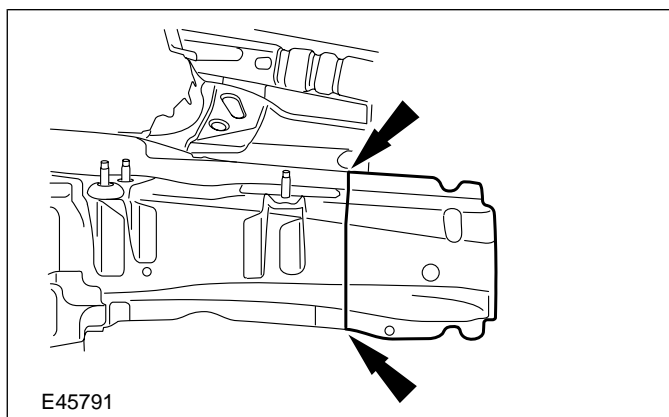


Installation

NOTE: Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25A must be followed.

1. Inner side member

- Continuous MIG weld.

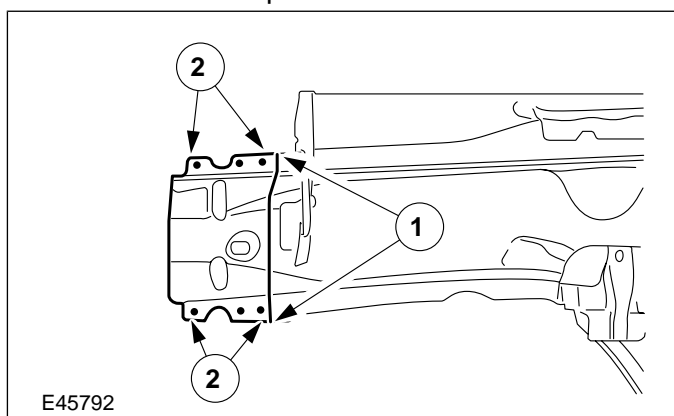


3. NOTE: Cut through the complete cross section of the side member using a large jigsaw. This is the final cut on the outside of the member.

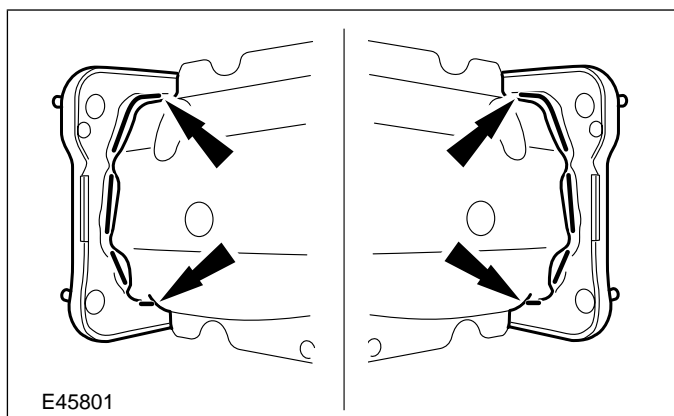
Outer side member

REMOVAL AND INSTALLATION**2. Outer side member**

1. Continuous MIG weld.
2. Resistance spot weld.

**3. Crossmember retaining flange**

- Continuous MIG weld.



REMOVAL AND INSTALLATION

Front Side Member and Fender Apron Panel LH

General Equipment

Measurement and alignment angle system

1. Replacement parts

- Outer side member
- Inner side member
- Side member inner reinforcement
- Crossmember retaining flange
- Apron panel
- Inner apron panel reinforcement
- Front module bracket

Removal

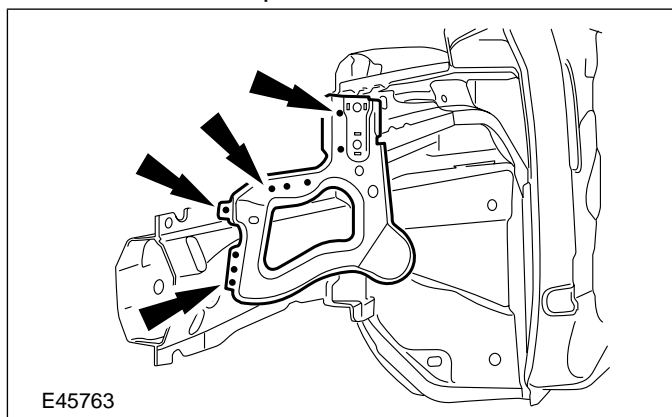
1. General information

- The apron panel reinforcement is already removed before commencing the repair.
- Necessary removal work: radiator, drive aggregates, crossmember with crash elements, crash padding and A-pillar trim.
- Move carpets and wiring out of the working area.

2. NOTE: The cross member retaining flange is already detached from the side member during removal work.

Front module bracket

- Mill out the spot welds.

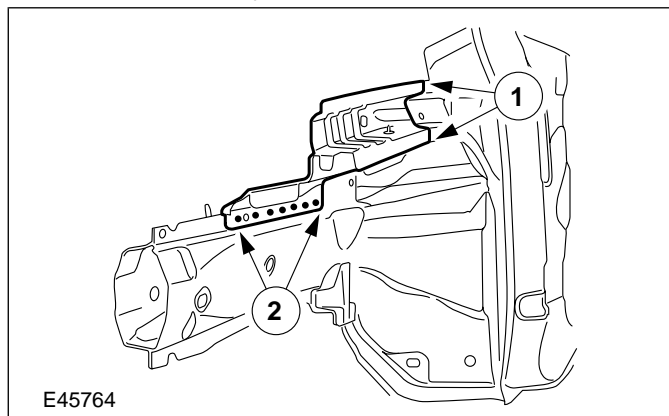


3. NOTE: After the rough separating cut both panel layers of the side member connection are accessible.

Inner apron panel reinforcement

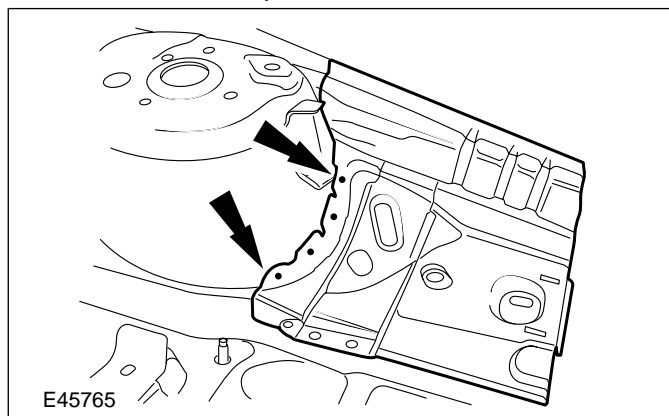
1. Separating cut.

2. Mill out the spot welds (two panel thicknesses).



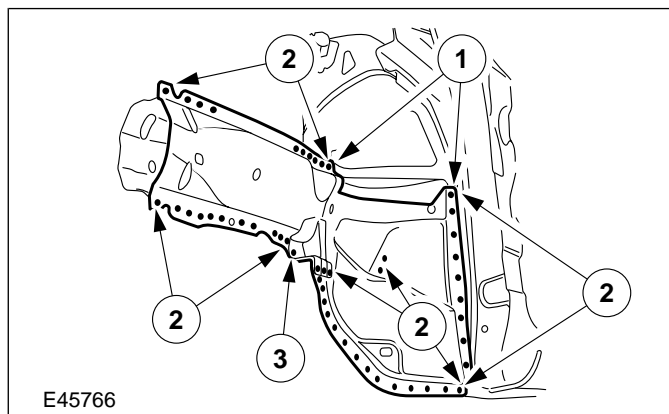
4. Apron panel

- Mill out the spot welds.



5. Outer side member

1. Rough separating cut.
2. Mill out the spot welds.
3. Grind out the weld seam.

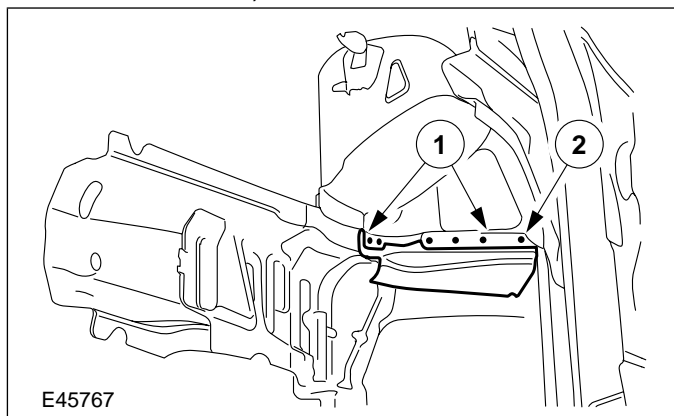


6. Outer side member (remainder)

1. Mill out the spot welds.

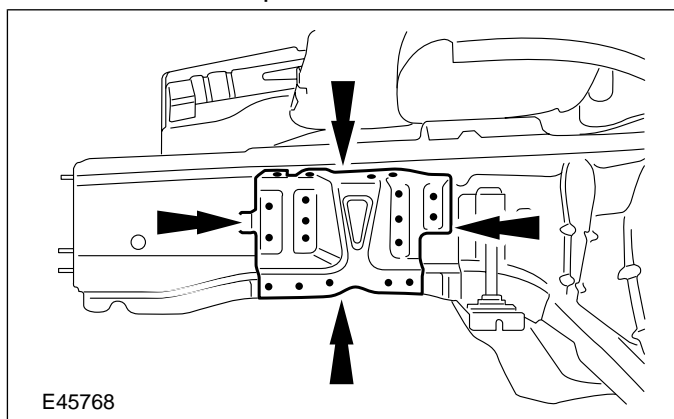
REMOVAL AND INSTALLATION

- 2. Mill out the spot welds (two panel thicknesses).



7. Side member inner reinforcement

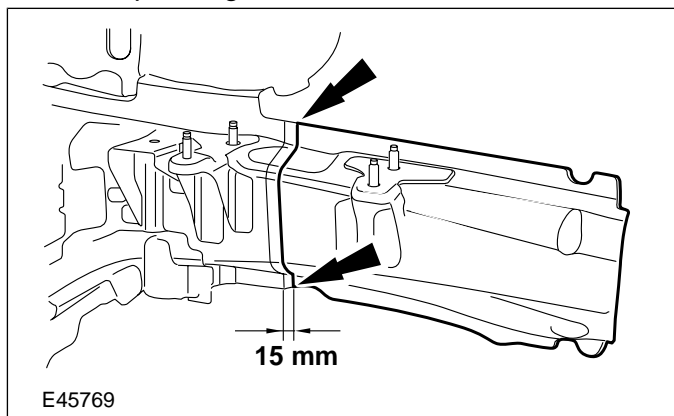
- Mill out the spot welds.



8. NOTE: Cut dimensions measured from the laser weld seam.

Inner side member

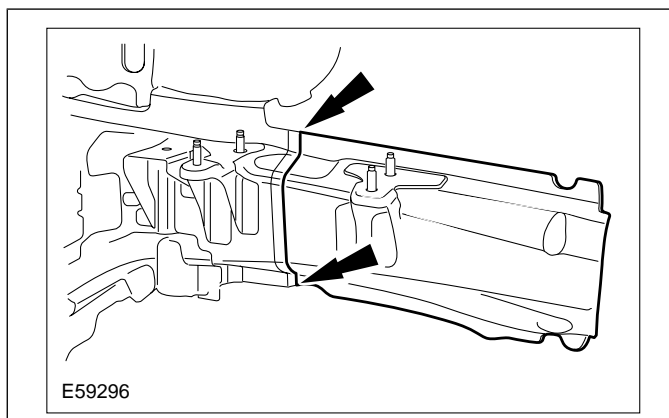
- Separating cut.



- Fit the inner and outer side members as well as the crossmember retaining flange using the alignment angle and fix in place.
- Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25 must be followed.

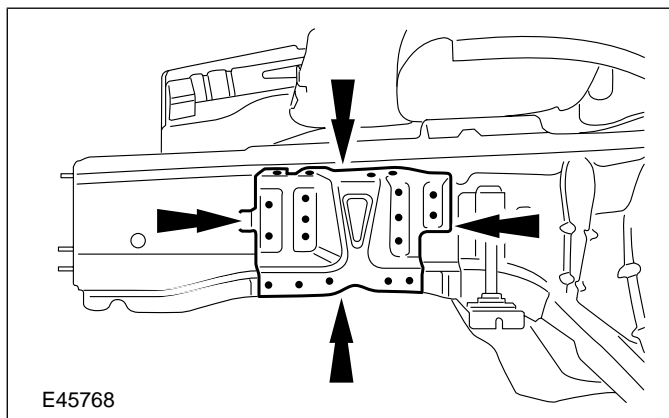
1. Inner side member

- Continuous MIG weld seam.



2. Side member inner reinforcement

- Offer up the new part and resistance spot weld it.



NOTE: Determine the position of the holes for puddle welding on the vehicle.

3. Outer side member

Installation

NOTE:

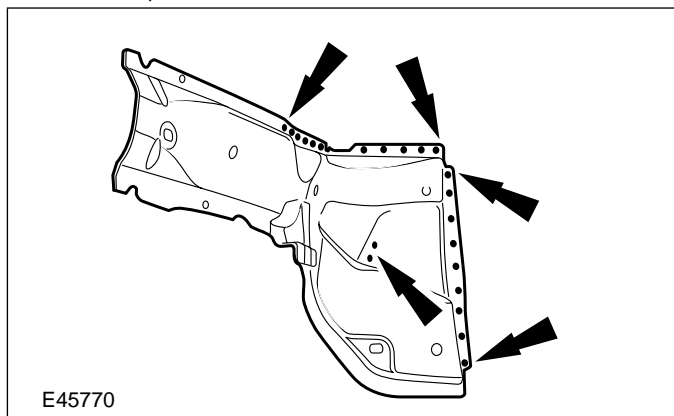
501-27-10

Front End Sheet Metal Repairs

501-27-10

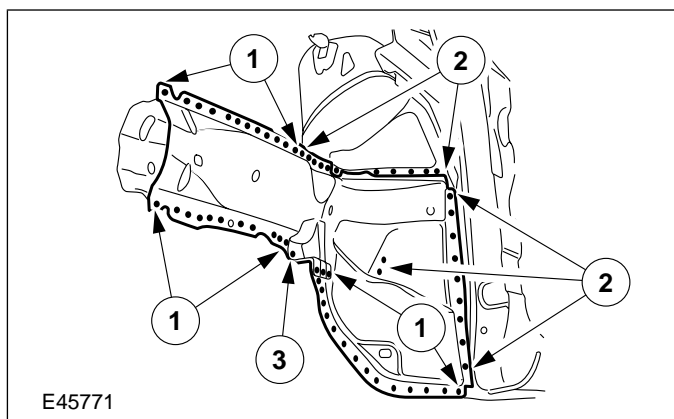
REMOVAL AND INSTALLATION

- Drill holes for puddle welding (diameter: 10 mm).



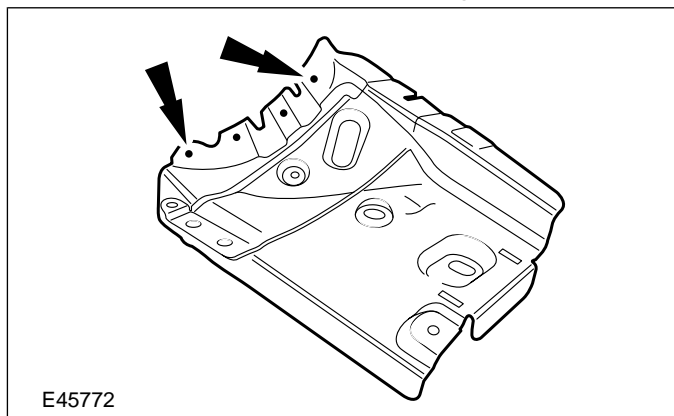
4. Outer side member

1. Resistance spot weld.
2. Puddle weld.
3. Continuous MIG weld seam.



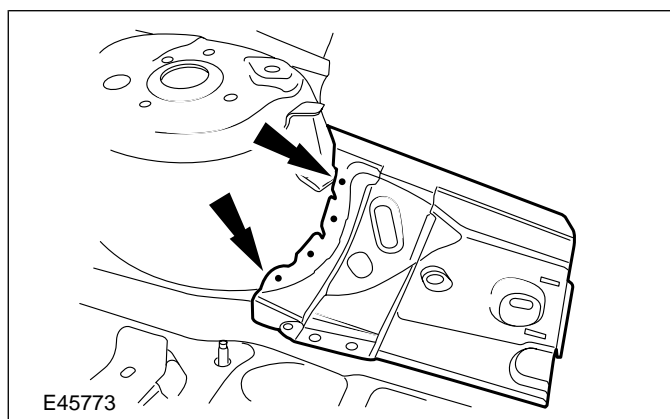
5. Apron panel

- Drill holes for puddle welding.



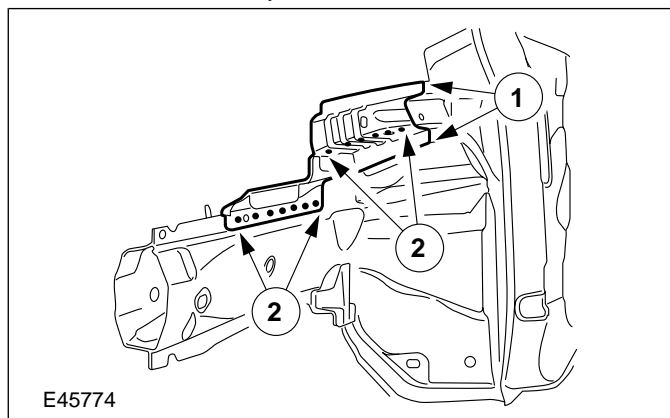
6. Apron panel

- Puddle weld.



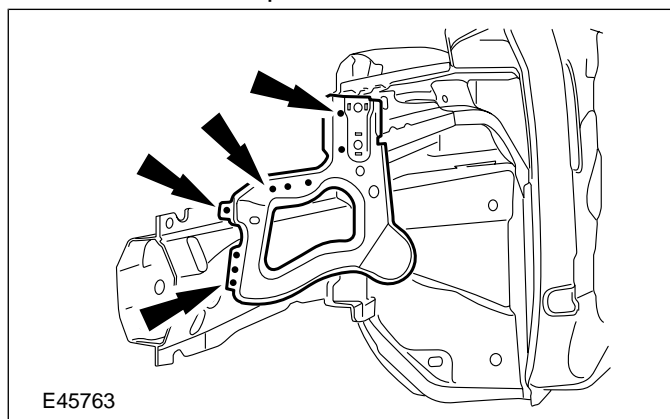
7. Inner apron panel reinforcement

1. Continuous MIG weld seam.
2. Resistance spot weld.



8. Front module bracket

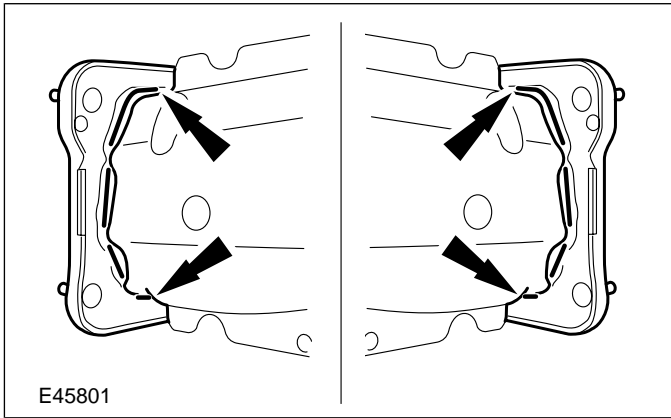
- Resistance spot weld.



9. Crossmember retaining flange

REMOVAL AND INSTALLATION

- Continuous MIG weld seam.





SECTION 501-28 Roof Sheet Metal Repairs

VEHICLE APPLICATION: 2008.75 Focus ST C307

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REMOVAL AND INSTALLATION	
Roof Panel.....	501-28-3





SPECIFICATIONS

Lubricants, Sealers and Adhesives

	Part number	Specification
PU glass adhesive (150 ml)	1 102 109	WSK-M11 P57-A1



REMOVAL AND INSTALLATION

Roof Panel

1. Repair parts

- Roof panel
- Middle roof rail

Removal

1. General Notes

- Required removal operations: Windshield, side windows, tailgate, headliner, interior trim panels and rear lights.

2. NOTE:

- Release the screw fixings (4 off) at the sides on the middle roof rail.
- Warm the bonded areas of the roof panel from outside (front and rear roof crossmembers) before removal. The middle roof rail will be removed with the roof.

Roof

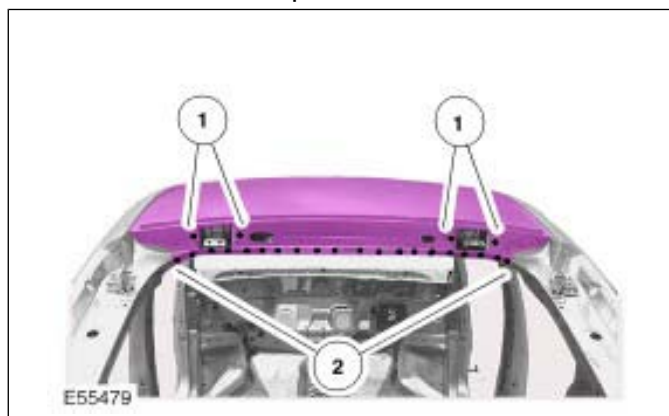
- Mill out the spot welds.



3. Rear roof panel

1. Mill out the spot welds.

2. Grind out the spot welds from the rear.



Installation

NOTE: Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25 must be followed.

1. Roof panel rear

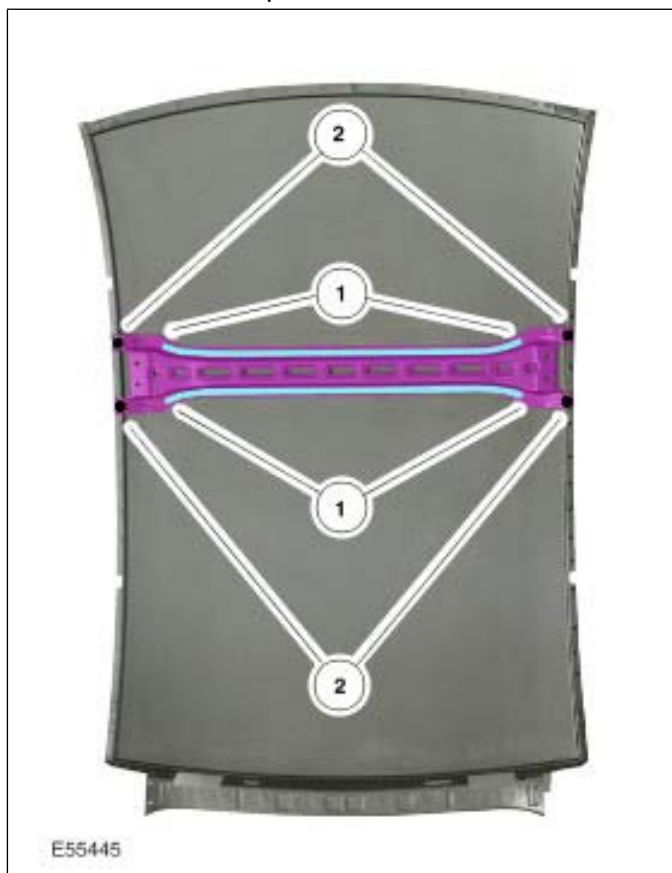
- Drill holes for puddle welding.



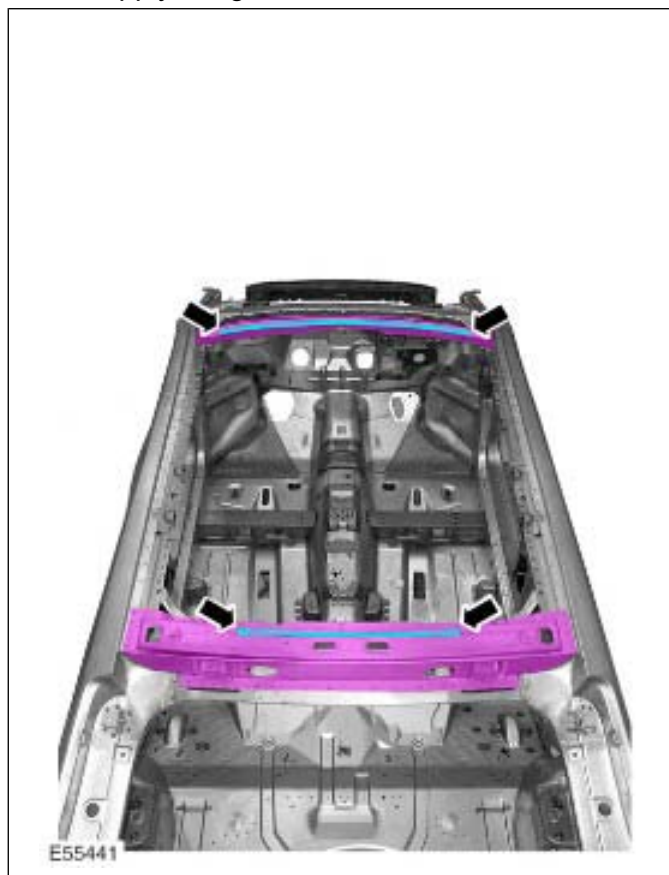
2. NOTE: Measure out the correct installation position of the roof rail on the vehicle.

REMOVAL AND INSTALLATION**Install the middle roof rail**

1. Apply PU glass adhesive.
2. Resistance spot weld.

**3. Prepare the bonded areas**

- Apply PU glass adhesive.

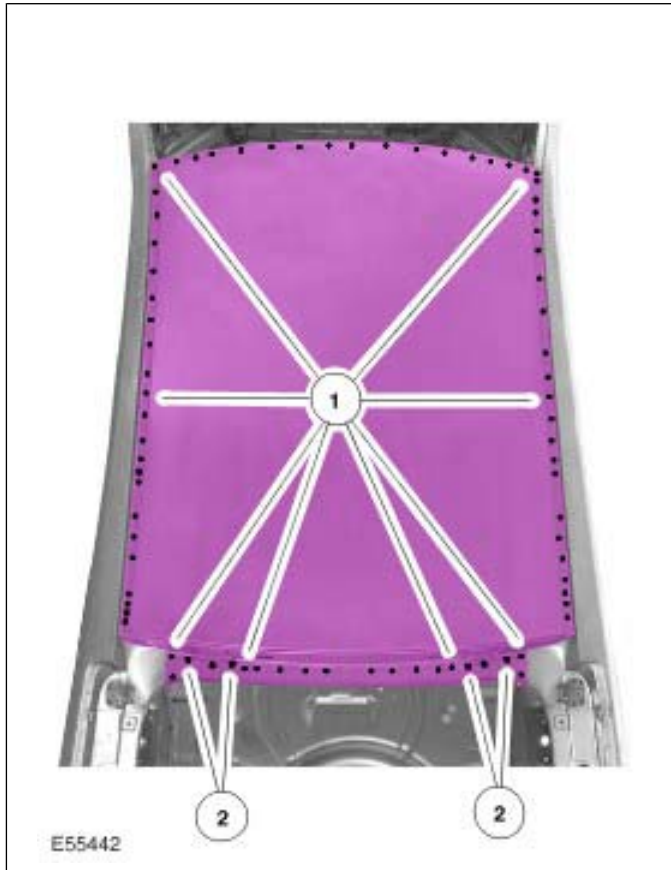
**4. Offer up the roof panel and weld in place.**

1. Resistance spot weld.



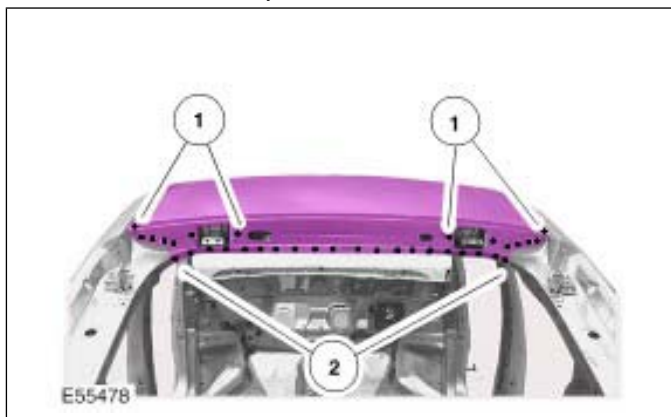
REMOVAL AND INSTALLATION

2. Puddle weld.



5. Weld the roof into place

1. Puddle weld.
2. Resistance spot weld.





SECTION 501-29 Side Panel Sheet Metal Repairs

VEHICLE APPLICATION: 2008.75 Focus ST C307

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B-Pillar and Reinforcement — 3-Door.....	501-29-10
B-Pillar and Reinforcement — 5-Door.....	501-29-13



SPECIFICATIONS**Lubricants, Sealers and Adhesives**

	Part number	Specification
PU glass adhesive (150 ml)	1 102 109	WSK-M11 P57-A1
Metal adhesive kit - 2-component	1 203 241	WSK-M4 G200 A/B

REMOVAL AND INSTALLATION

Rocker Panel — 3-Door

1. Replacement parts

- Rocker panel

Removal

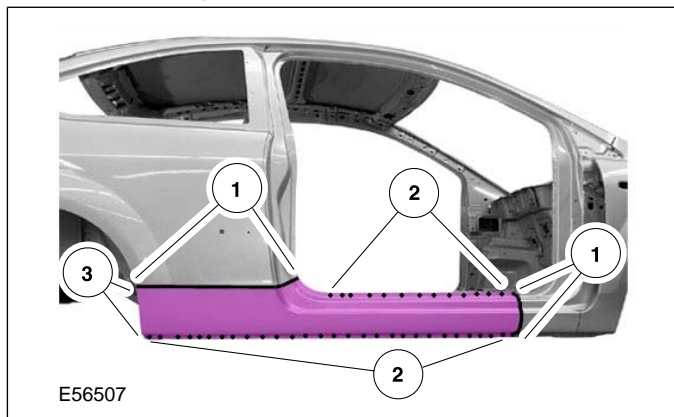
1. General notes

- Necessary removal work: doors, front and rear seats, rocker panel inner trim, A- and B-pillar inner trim.
- Fold back the carpets and move the wiring harness out of the working area.

2. **NOTE:** The cut locations may vary depending on the extent of the damage. When cutting the quarter panel (pos. 1) ensure there is a sufficient gap (min. 10 mm) from the horizontal edge of the panel so that a strip can be left for welding.

Rocker panel

1. Cut locations.
2. Mill out the spot welds.
3. Grind down one panel thickness at the wheel arch edge.



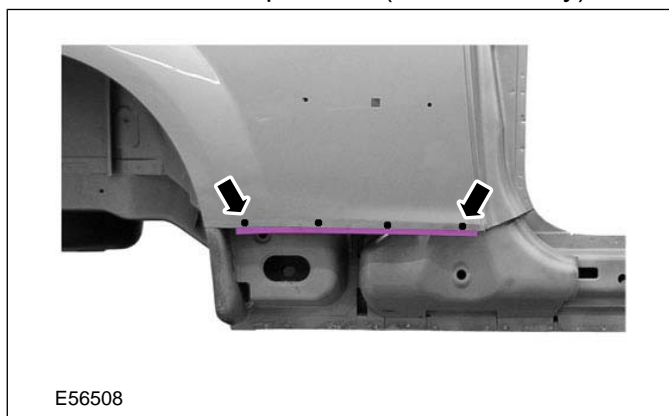
Installation

NOTE: Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25 must be followed.

1. **NOTE:** Remove the damping matting which is adhesive-bonded to the quarter panel. Before inserting the rocker panel offer up a panel strip to the quarter panel and insert. The panel strip can be cut from the remainder of the new part.

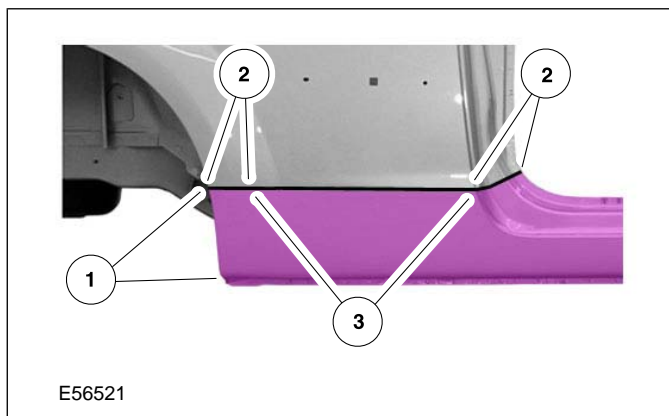
Panel strip

- Resistance spot weld (tack weld only).



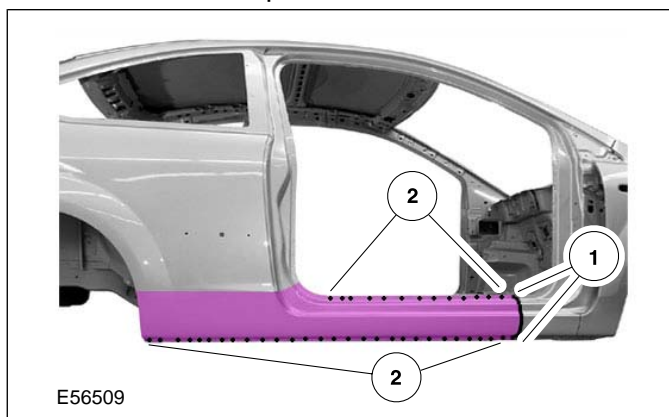
2. Rocker panel

1. Apply two-component metal adhesive to the clinched flange.
2. Continuous MIG weld.
3. MIG intermittent weld seam.



3. Rocker panel

1. Continuous MIG weld.
2. Resistance spot weld.



REMOVAL AND INSTALLATION

Rocker Panel — 5-Door

1. Replacement Parts

- Rocker panel

Removal

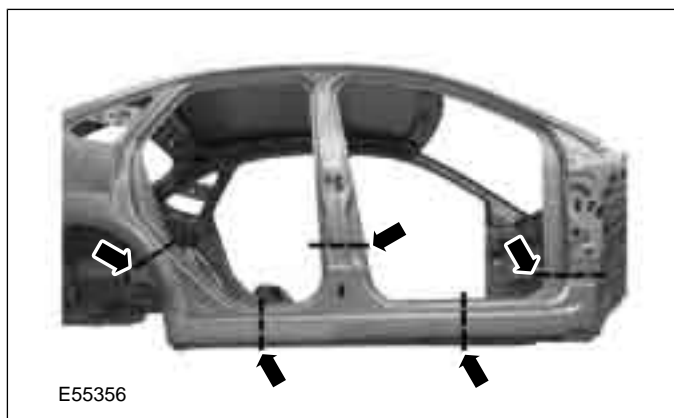
1. General notes

- Required removal operations: Doors, door hinges, front and rear seats, door sill inner trim, A- B- and C- pillar inner trim.
- Fold back the carpets and move the wiring harness out of the working area.

NOTE: The cut location may vary depending upon the extent of the damage. The repair shown describes a partial rear repair.

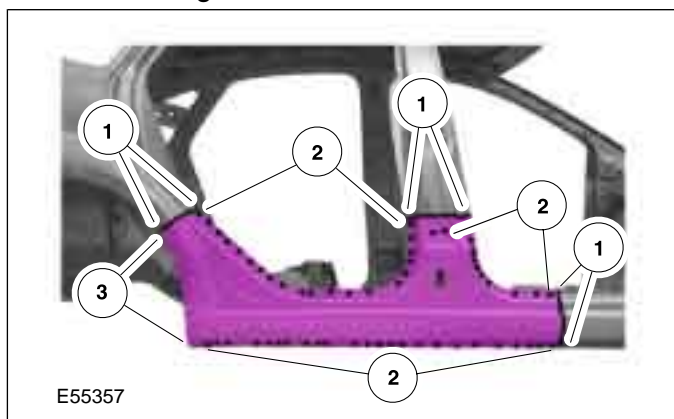
2. Rocker panel

- Cut locations.



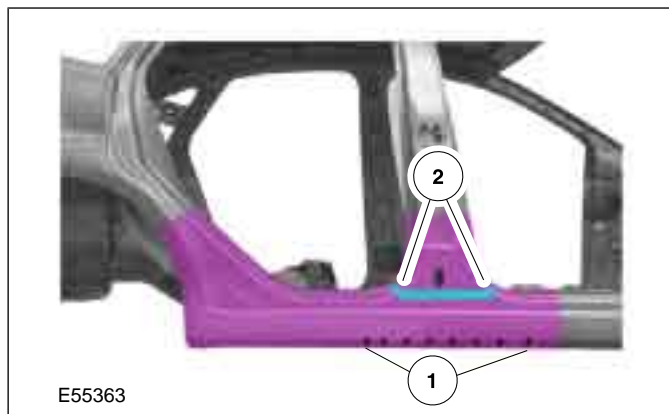
3. Rocker panel

1. Cut locations.
2. Grind out the spot welds.
3. Grind down one panel thickness at the wheel arch edge.



4. Rocker panel

1. Mill out the spot welds.
2. Heat the area (approx. 170°) and detach the NVH element.

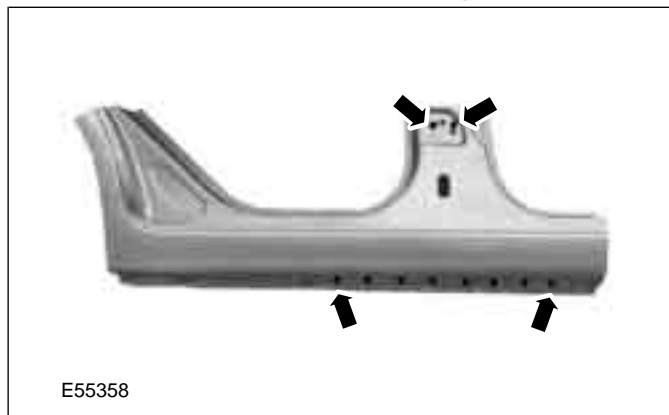


Installation

NOTE: Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25 must be followed.

1. Rocker panel

- Drill holes for puddle welding.



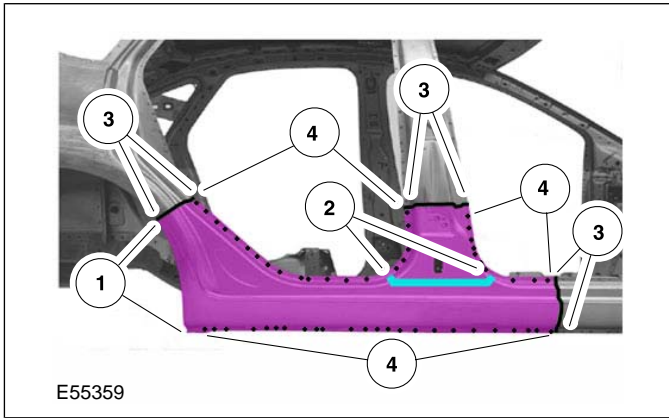
2. Rocker panel

1. Apply two-component metal adhesive to the clinched flange.
2. Apply PU glass adhesive to the NVH element.
3. Continuous MIG weld.



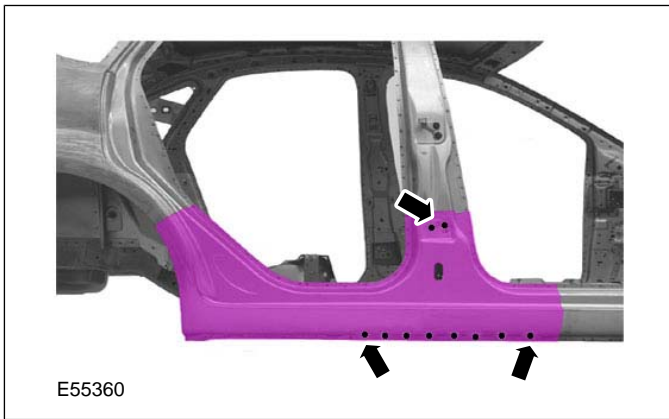
REMOVAL AND INSTALLATION

4. Resistance spot weld.



3. Rocker panel

- Puddle weld.



REMOVAL AND INSTALLATION

A-Pillar Outer Panel Section and Reinforcement

General Equipment

Measurement and alignment angle system

1. Replacement parts

- A-pillar outer panel
- A-pillar inner panel
- A-pillar reinforcement
- A-pillar/fender apron panel reinforcement

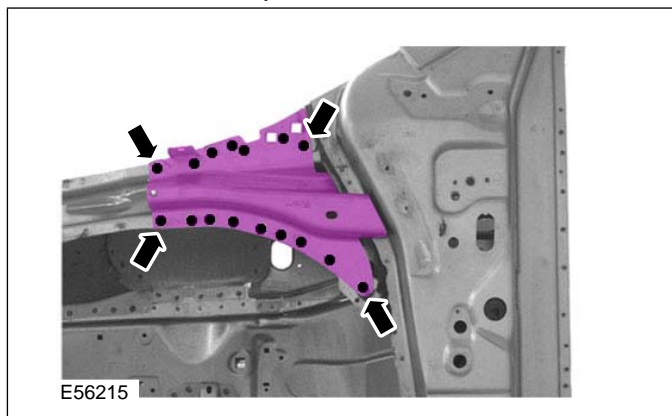
Removal

1. General notes

- The fender apron panel reinforcement is already removed before commencing the repair.
- Required removal operations: A-pillar trim panel, rocker panel trim and driver or passenger seat.
- Move the carpeting and the wiring away from the working area.

2. A-pillar/fender apron panel reinforcement

- Mill out the spot welds.

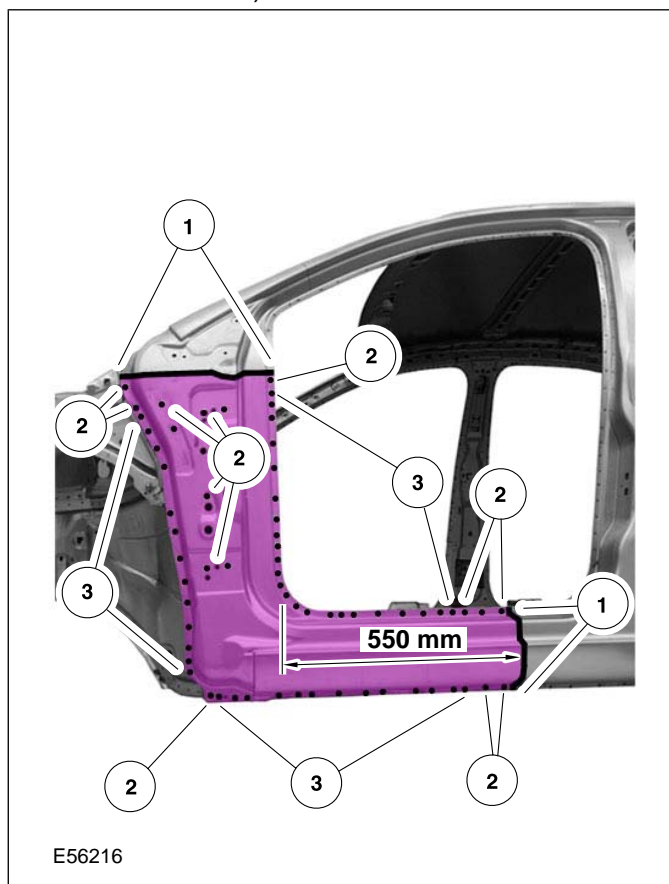


NOTE: To gain access to the front area of the B-pillar inner panel, the separating cut on the outer rocker panel must be made according to the specified dimensions (550 mm).

3. Outer A-pillar

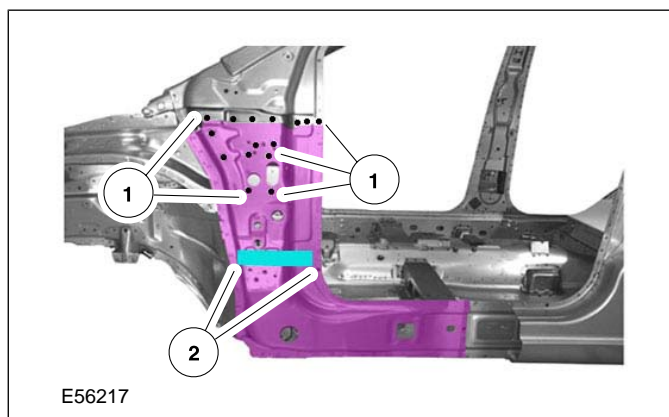
1. Cut point.
2. Mill out the spot welds.

3. Mill out the spot welds (two panel thicknesses).



4. A-pillar reinforcement

1. Mill out the spot welds.
2. Heat the area (approx. 170°) and detach the NVH element.

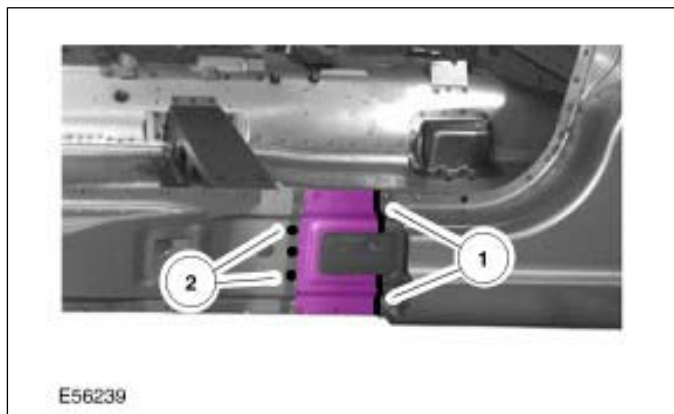


5. **NOTE:** To gain access to the original A-pillar inner panel join, the B-pillar inner panel must be cut at the front and removed. The part cut away will be re-used for the installation.

B-pillar inner panel

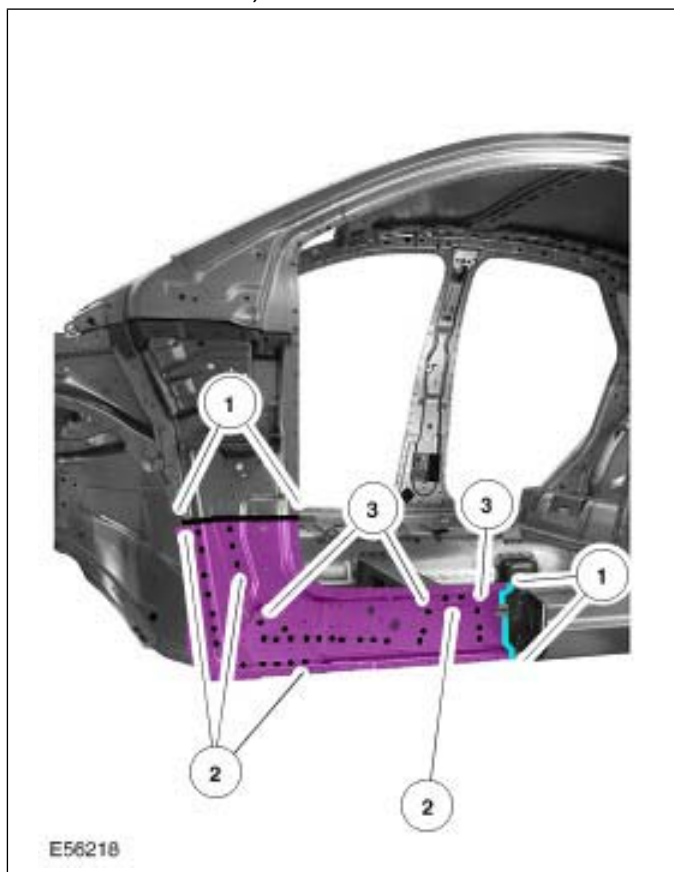
REMOVAL AND INSTALLATION

1. Cut point.
2. Mill out the spot welds.



6. Inner A-pillar

1. Cut point.
2. Mill out the spot welds.
3. Mill out the spot welds (two panel thicknesses).

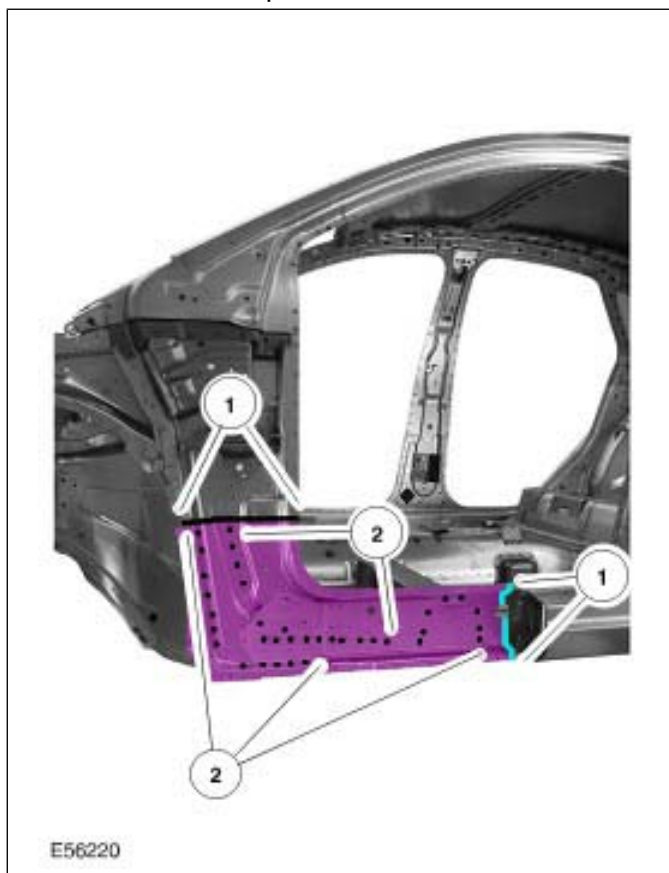


Installation

NOTE: Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25 must be followed.

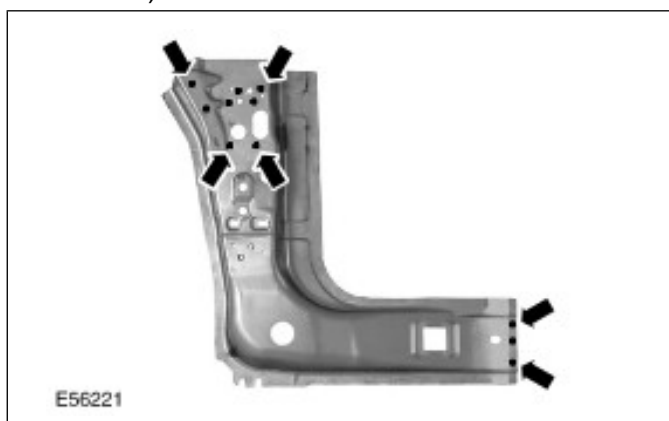
1. Inner A-pillar

1. Continuous MIG weld.
2. Resistance spot weld.



2. A-pillar reinforcement

- Drill holes for puddle welding (diameter: 10 mm).

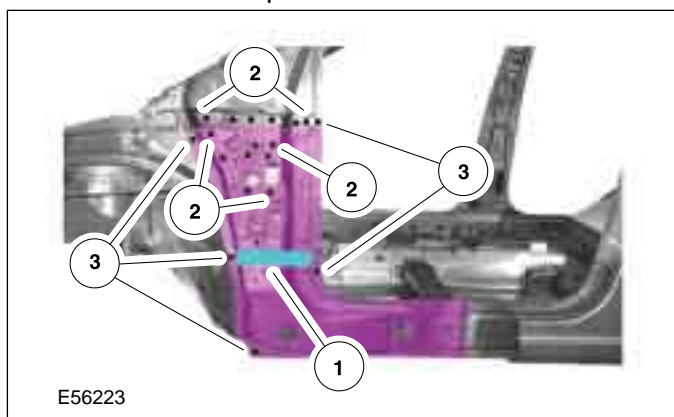


3. NOTE: Only tack-weld A-pillar reinforcement. The final weld joint is made with the outer A-pillar installed. The puddle weld areas (item 2) on the A-pillar reinforcement must be ground down, otherwise the outer A-pillar cannot be inserted correctly.

A-pillar reinforcement

REMOVAL AND INSTALLATION

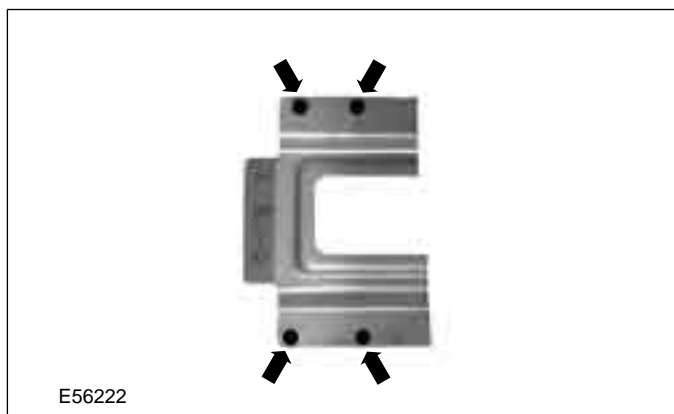
1. Apply PU glass adhesive to the NVH element.
2. Puddle weld.
3. Resistance spot weld.



4. **NOTE: The puddle weld areas on the B-pillar inner panel must be ground down, otherwise it cannot be installed using resistance spot welding.**

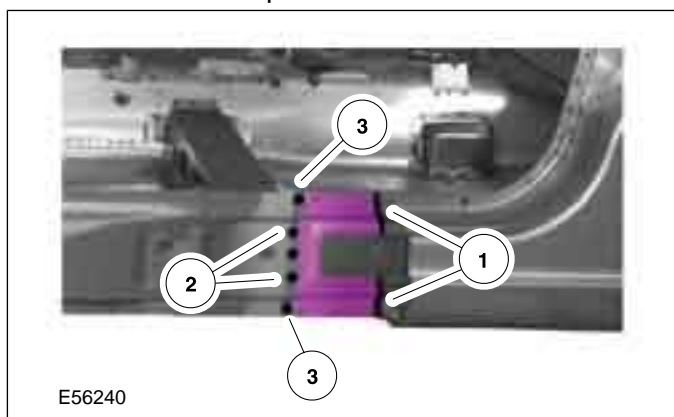
B-pillar inner panel

- Puddle weld.



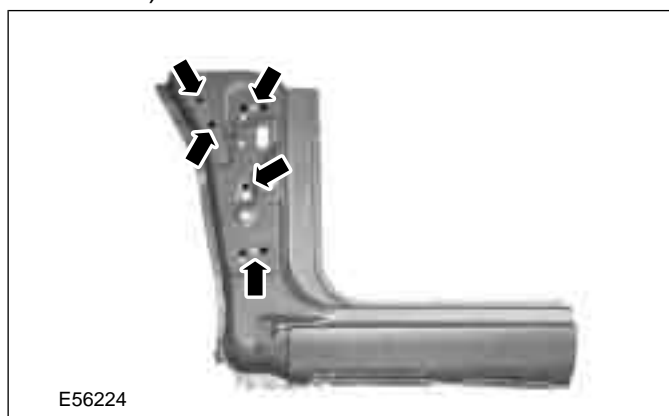
5. B-pillar inner panel

1. Continuous MIG weld.
2. Puddle weld.
3. Resistance spot weld.



6. Outer A-pillar

- Drill holes for puddle welding (diameter: 10 mm).



7. Outer A-pillar

1. Continuous MIG weld.
2. Puddle weld.
3. Resistance spot weld.

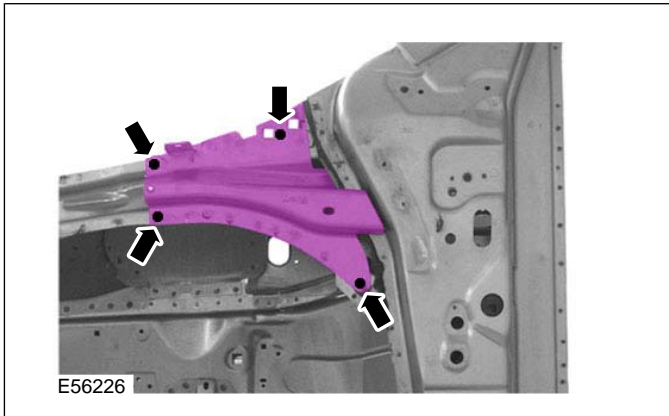


8. **NOTE: Only tack-weld A-pillar/fender apron panel reinforcement. The final welded joint is made with the fender panel reinforcement installed.**

A-pillar/fender apron panel reinforcement

REMOVAL AND INSTALLATION

- Resistance spot weld.



REMOVAL AND INSTALLATION

B-Pillar and Reinforcement — 3-Door

General Equipment

Measurement and alignment angle system

1. Replacement parts

- B-pillar inner panel
- B-pillar reinforcement

Removal

1. General notes

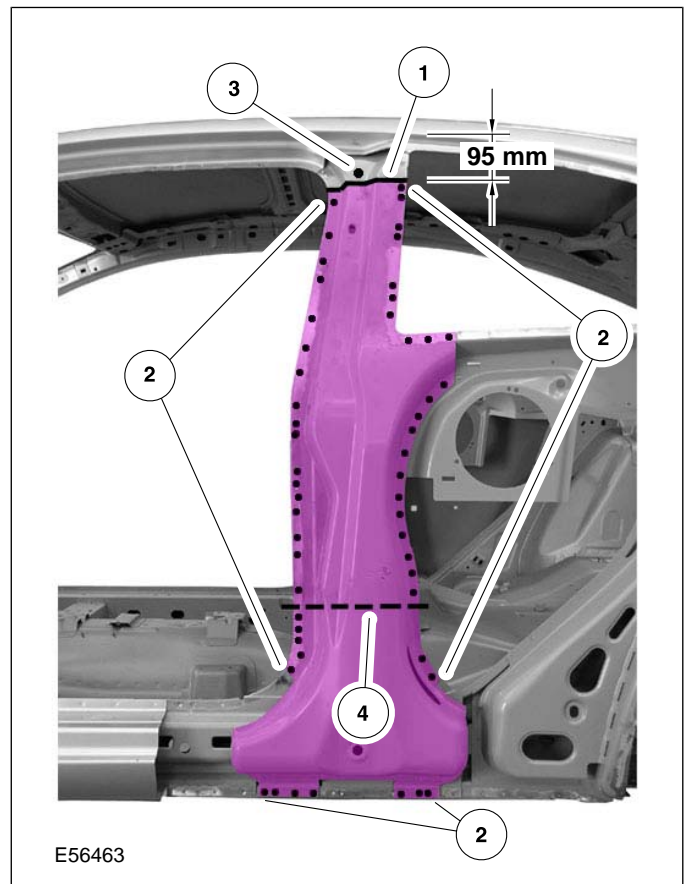
- Necessary removal work: Front door, B-pillar trim panel, rocker panel trim, headliner, front and rear seats.
- Fold back the carpets and move the wiring harness out of the working area.

2. **NOTE:** If the B-pillar inner panel is also being renewed, the cut on the upper B-pillar must be made according to dimensions. Depending on the damage, it is also possible to carry out a partial replacement of the B-pillar reinforcement.

B-pillar reinforcement

1. Cut point.
2. Mill out the spot welds.
3. Mill out the spot weld and drill out to 10 mm.

4. Cut location for partial replacement.

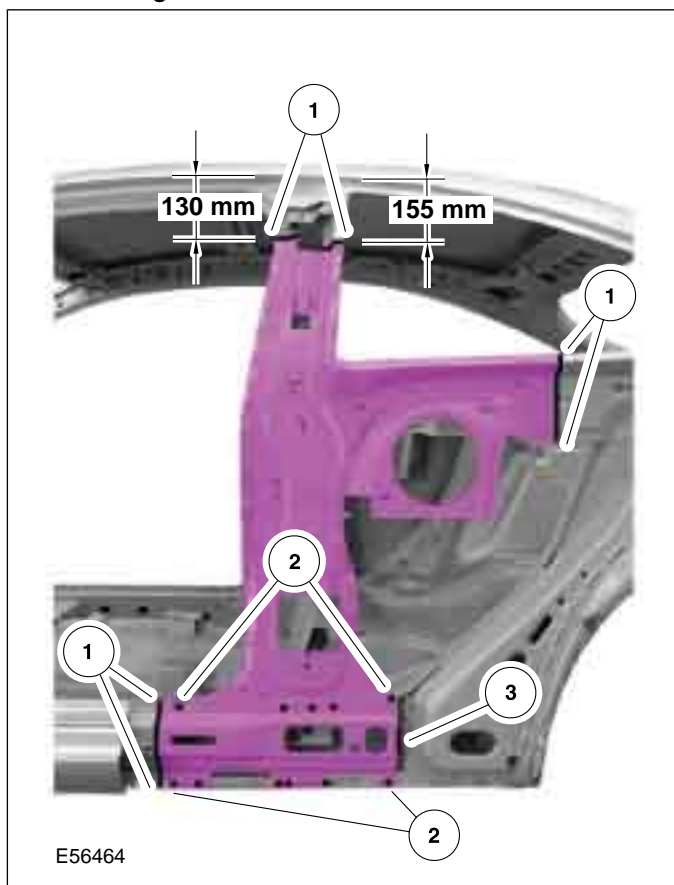


3. Inner B-pillar

1. Cut locations.
2. Mill out the spot welds.

REMOVAL AND INSTALLATION

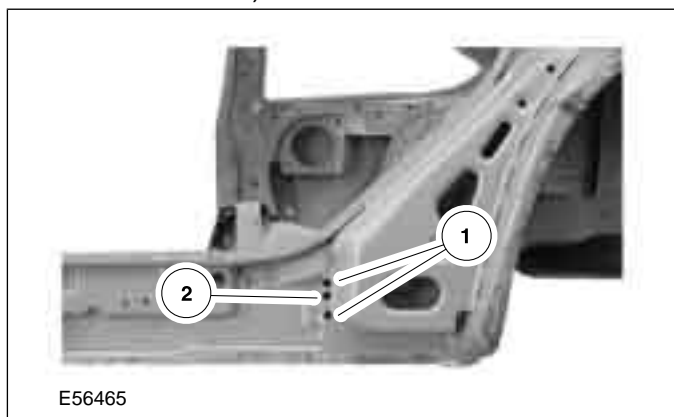
3. Rough cut location.



4. **NOTE:** The spot welds at pos. 1 only join the rear panel layers.

Inner B-pillar

1. Mill out the spot welds from the rear using the spherical milling cutter.
2. Mill out the spot welds (three panel thicknesses).

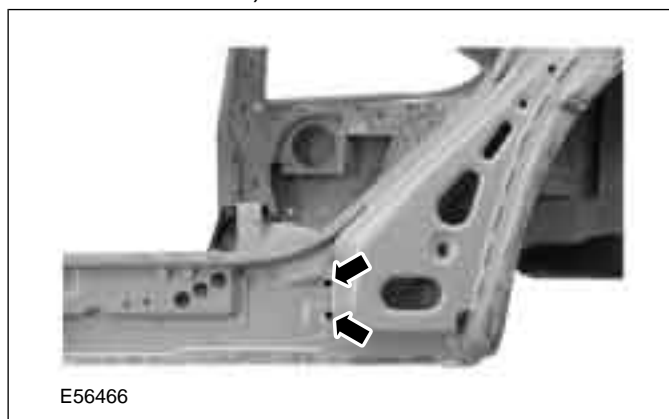


Installation

NOTE: Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25 must be followed.

1. Inner B-pillar

- Drill holes for puddle welding (two panel thicknesses).



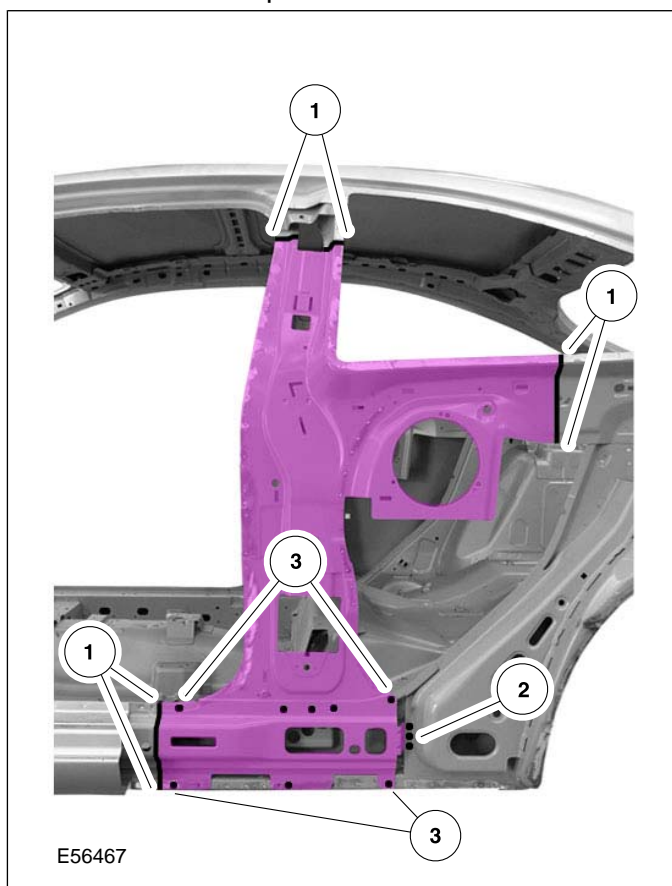
2. NOTE: Only tack-weld the B-pillar inner panel to the lower rocker panel. The final weld joint is made with the B-pillar reinforcement and quarter panel installed.

Inner B-pillar

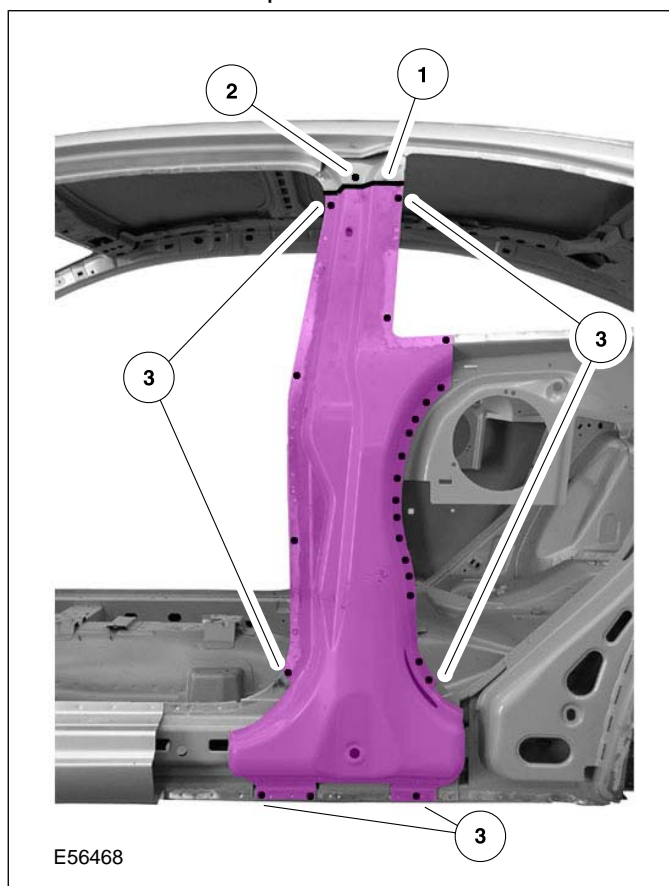
1. Continuous MIG weld.
2. Puddle weld.

REMOVAL AND INSTALLATION

3. Resistance spot weld.



3. Resistance spot weld.



3. NOTE: Only tack-weld the B-pillar reinforcement in the areas of the door and side window cut-out and the lower rocker panel. The final welded joint is made with the quarter panel installed.

B-pillar reinforcement

1. Continuous MIG weld.
2. Puddle weld.

REMOVAL AND INSTALLATION

B-Pillar and Reinforcement — 5-Door

General Equipment

Measurement and alignment angle system

1. Replacement Parts

- B-pillar outer panel
- B-pillar inner panel
- B-pillar reinforcement

Removal

1. General notes

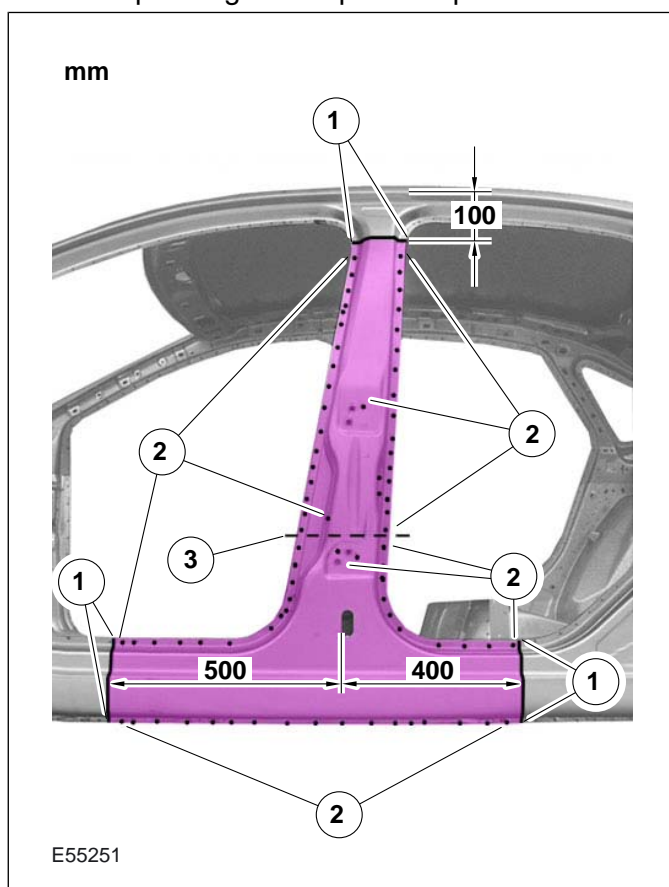
- Required removal operations: Front door, rear door, B-pillar trim panel, rocker panel trim, headliner, front and rear seats.
- Fold back the carpets and move the wiring harness out of the working area.

2. **NOTE:** If the B-pillar reinforcement is also to be renewed, the separating cuts on the door sill and the upper B-pillar must be made according to the specified dimensions. If only the lower part of the B-pillar outer panel is being renewed, the separating cut must be made above the lower door hinge mounting point.

Outer B-pillar

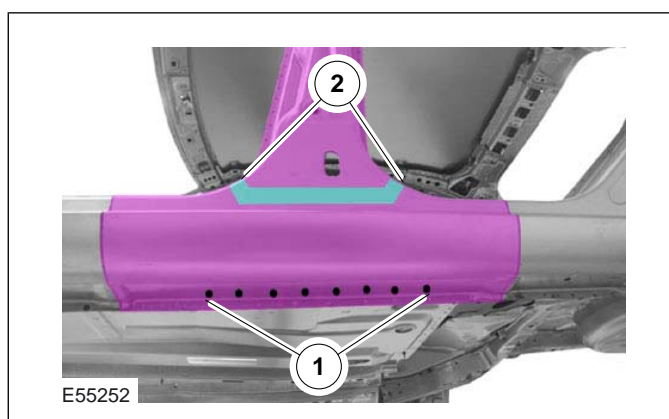
1. Cut locations.
2. Mill out the spot welds.

3. Separating cut for partial replacement.



3. Outer B-pillar

1. Mill out the spot welds.
2. Heat the area (approx. 170°) and detach the NVH element.

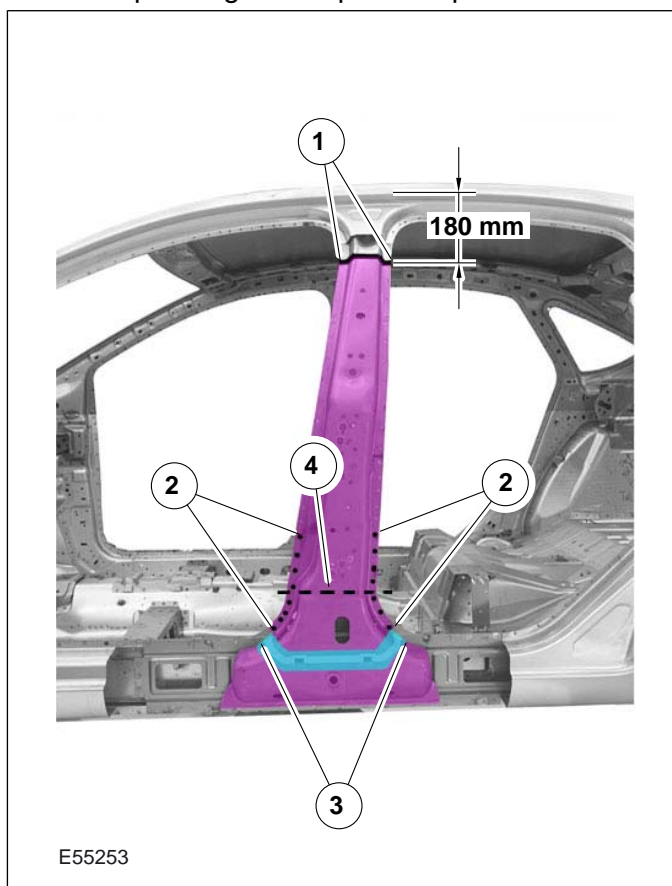


4. B-pillar reinforcement

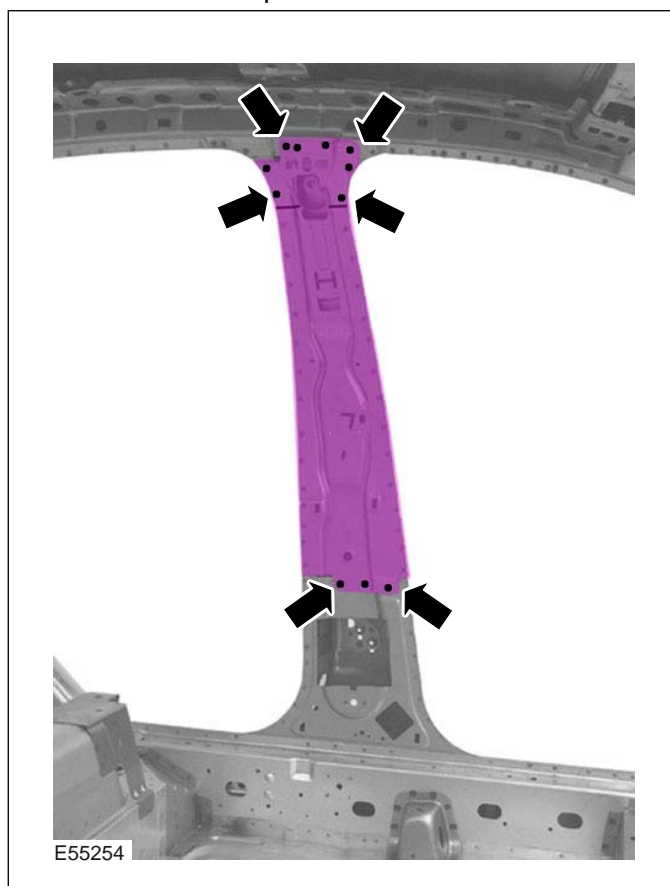
1. Cut point.
2. Mill out the spot welds.
3. Heat the area (approx. 170°) and detach the NVH element.

REMOVAL AND INSTALLATION

4. Separating cut for partial replacement.



• Mill out the spot welds.

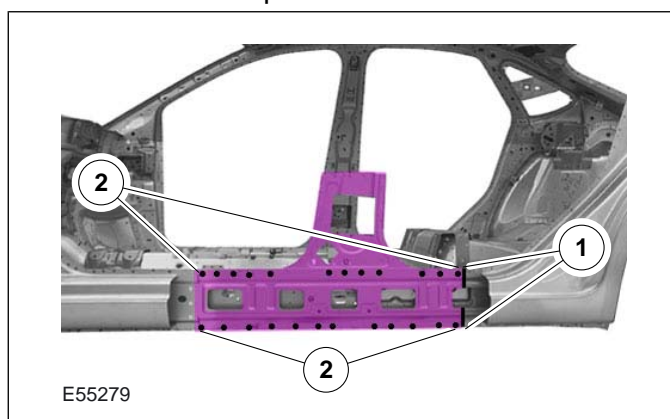


5. **NOTE:** Remove the B-pillar reinforcement with B-pillar inner panel downwards.

B-pillar (inside view)

6. Inner B-pillar

1. Cut point.
2. Mill out the spot welds.



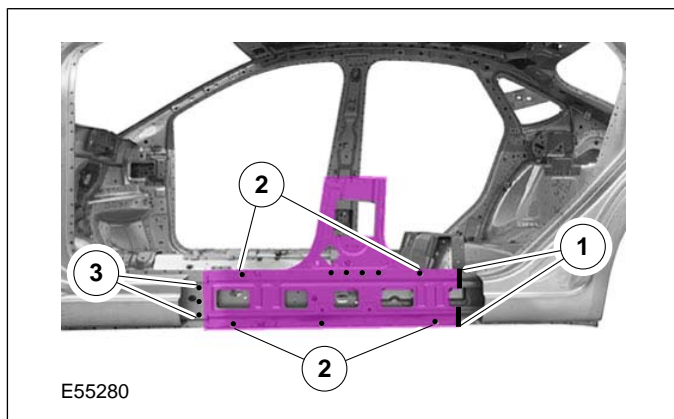
Installation

1. Inner B-pillar

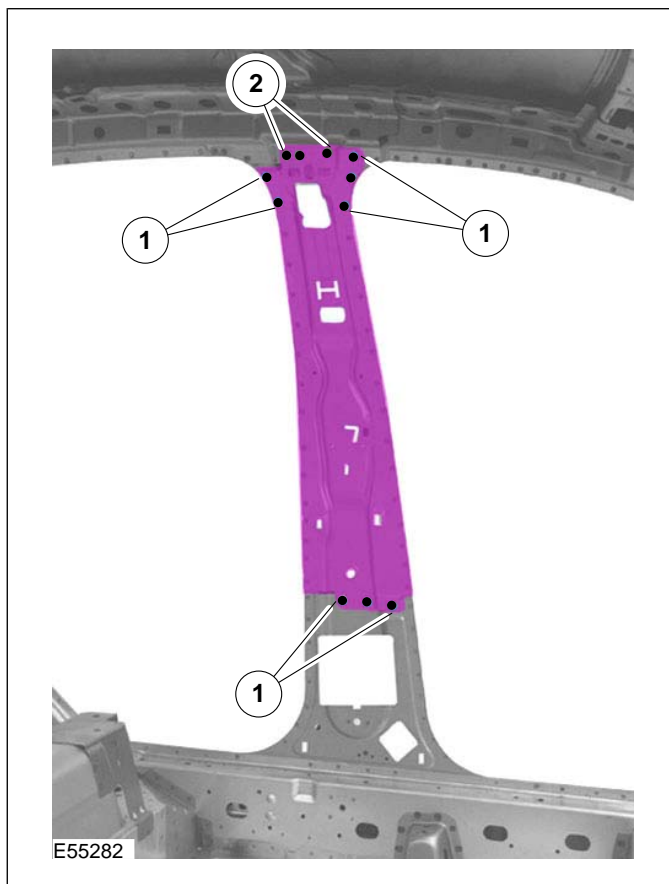
1. Continuous MIG weld.
2. Resistance spot weld.

REMOVAL AND INSTALLATION

3. Puddle weld.

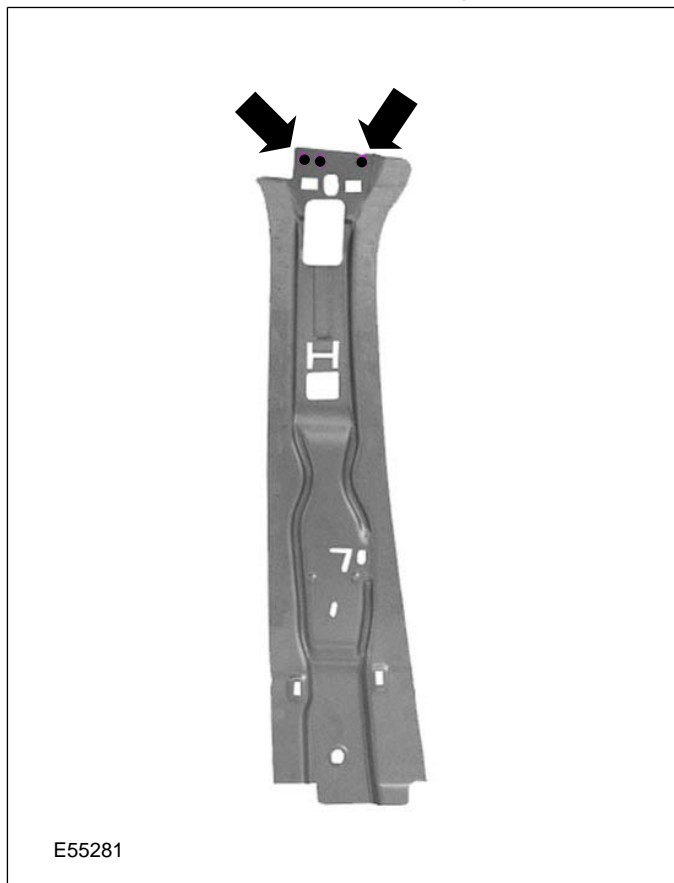


2. Puddle weld.



2. Inner B-pillar

- Drill holes for puddle welding.



4. B-pillar reinforcement

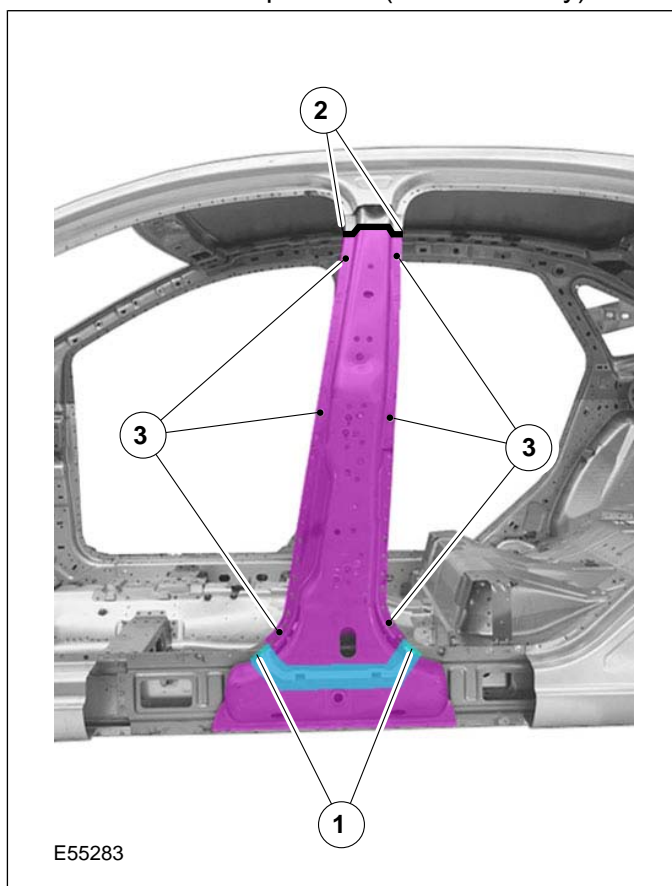
1. Apply PU glass adhesive to the NVH element.
2. Continuous MIG weld.

3. Inner B-pillar

1. Resistance spot weld.

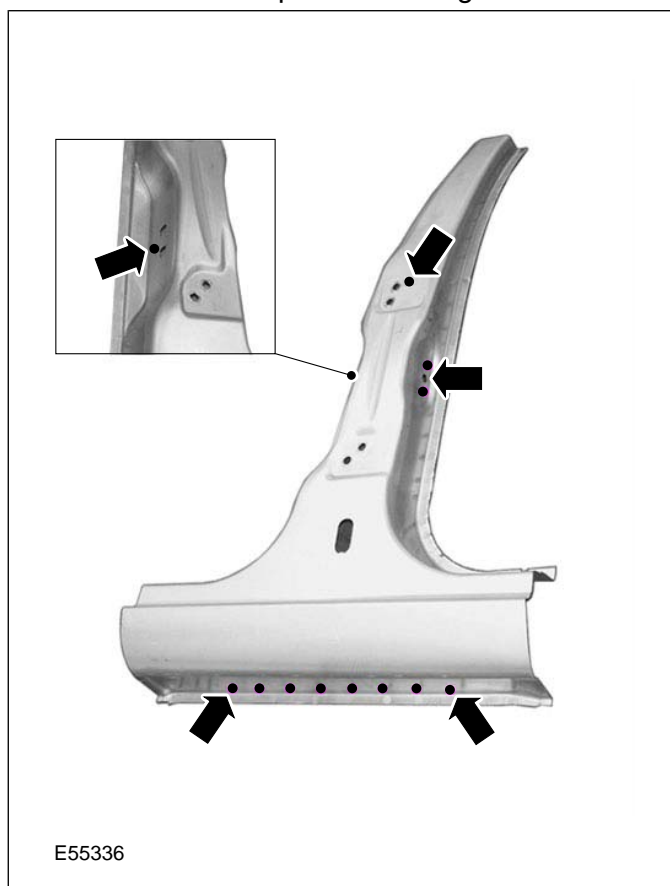
REMOVAL AND INSTALLATION

3. Resistance spot weld (tack weld only).



5. Outer B-pillar

• Drill holes for puddle welding.

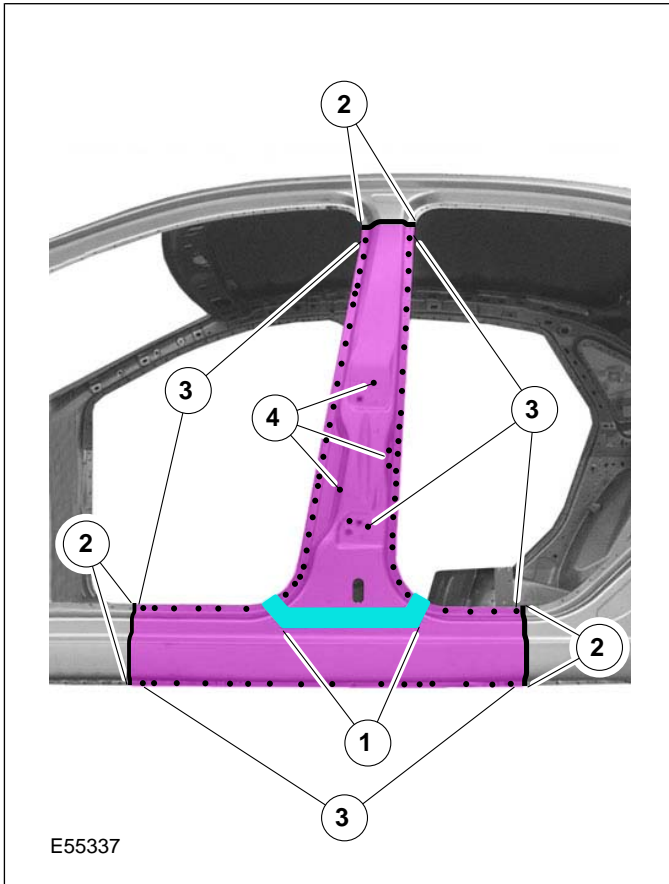


6. Outer B-pillar

1. Apply PU glass adhesive to the NVH element.
2. Continuous MIG weld.
3. Resistance spot weld.

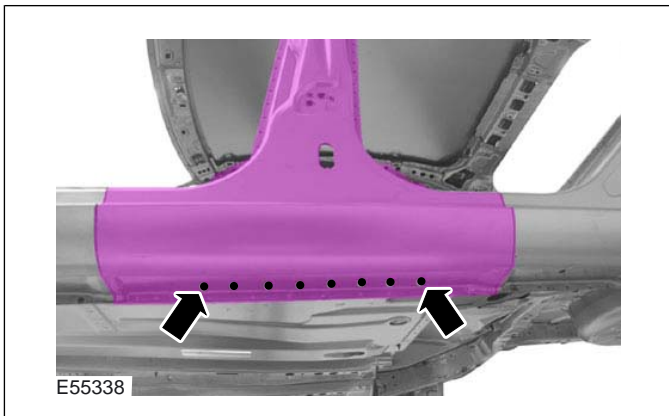
REMOVAL AND INSTALLATION

4. Puddle weld.



7. Outer B-pillar

• Puddle weld.



SECTION 501-30 Rear End Sheet Metal Repairs

VEHICLE APPLICATION: 2008.75 Focus ST C307

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Water Drain Panel Reinforcement.....	501-30-14
Rear Lamp Mounting Panel — Convertible.....	501-30-15
Rear Wheelhouse Outer — 3-Door.....	501-30-16
Rear Wheelhouse Outer — 5-Door.....	501-30-19
Back Panel — 3-Door/5-Door.....	501-30-22
Rear Floor Panel — 2.5L Duratec-ST (VI5).....	501-30-24
Rear Floor Panel Section.....	501-30-27
Rear Side Member Section.....	501-30-29
Luggage Compartment Bulkhead.....	501-30-30

SPECIFICATIONS**Lubricants, Sealers and Adhesives**

	Part number	Specification
PU glass adhesive (150 ml)	1 102 109	WSK-M11 P57-A1
Metal adhesive kit - 2-component	1 203 241	WSK-M4 G200 A/B

SPECIFICATIONS**Lubricants, Sealers and Adhesives**

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REMOVAL AND INSTALLATION

Quarter Panel LH — 3-Door

1. Replacement parts

- Quarter panel

Removal

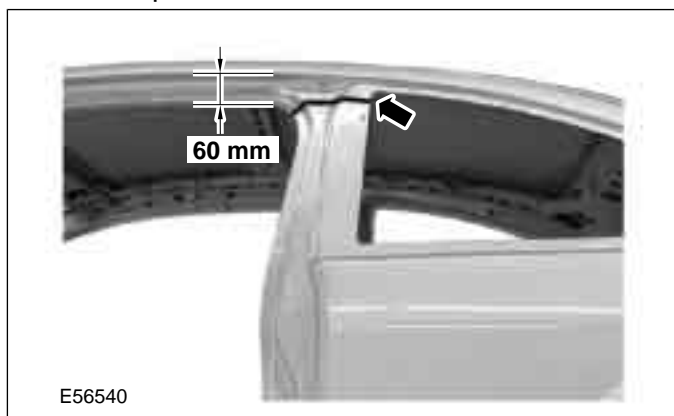
1. General notes

- Necessary removal work: door, weatherstrip, side window, rear seat, wheelhouse trim panel, rear lamp, rear bumper, quarter panel trim.
- Move the carpeting and the wiring away from the working area.
- Depending on the extent of the damage, the forced air extraction gusset should also be replaced.

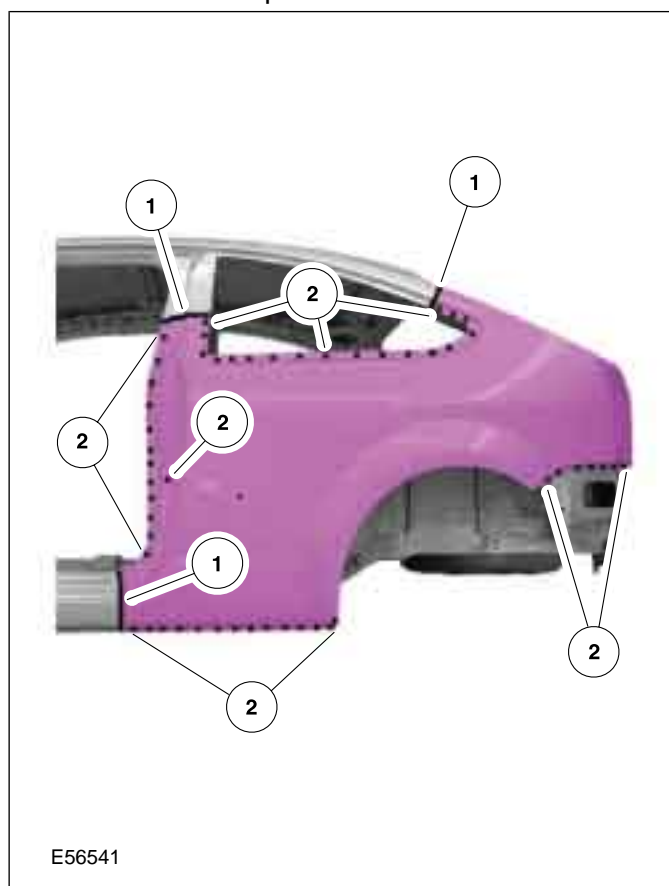
2. **NOTE:** If the B-pillar is also being renewed, the cut in the area of the upper B-pillar must be made according to dimensions. Otherwise, this cut can be varied according to damage.

Quarter panel (B-pillar)

- Cut point.



2. Mill out the spot welds.



4. Quarter panel

1. Grind down one panel thickness at the wheel arch edge.

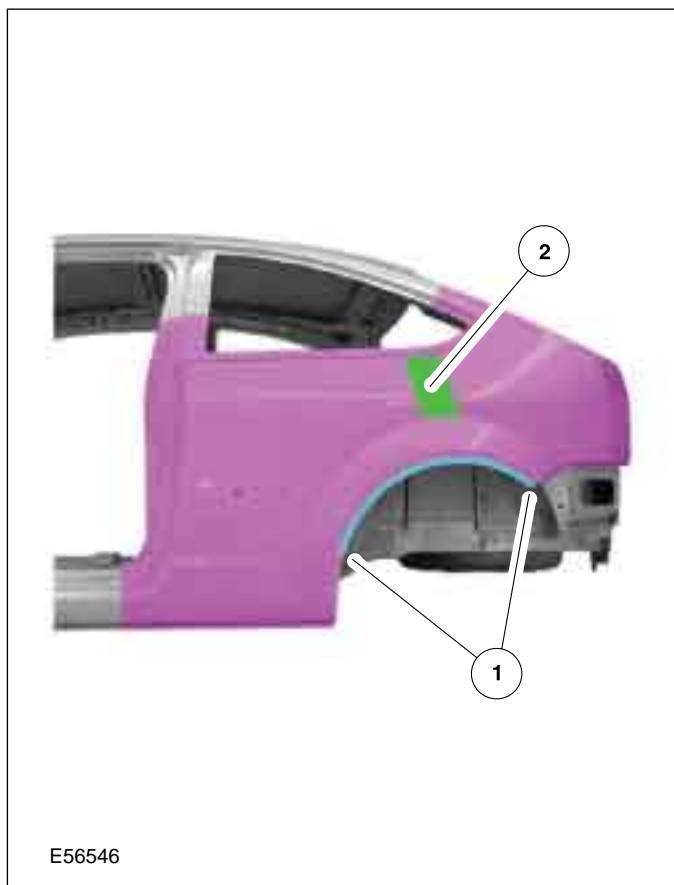
3. **NOTE:** When making the cut on the rocker panel, bear in mind the length of the replacement part.

Quarter panel

1. Cut locations.

REMOVAL AND INSTALLATION

2. Heat the area (approx. 170°) and detach the NVH element.



5. Quarter panel

- Mill out the spot welds.

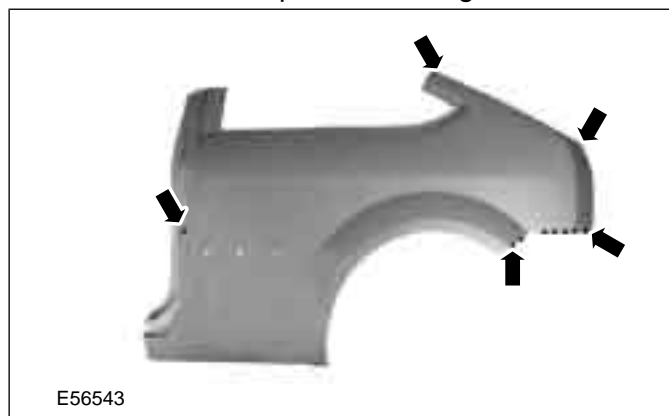


Installation

NOTE: Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25 must be followed.

1. Quarter panel

- Drill holes for puddle welding.

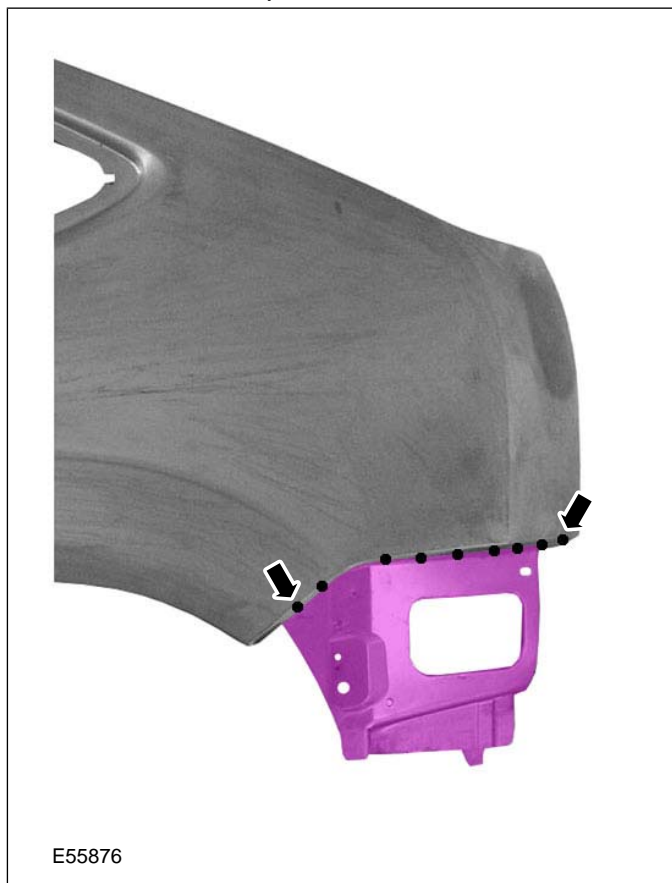


2. **NOTE:** If the forced air extraction gusset is being replaced, it must be welded onto the quarter panel before installation of the quarter panel.

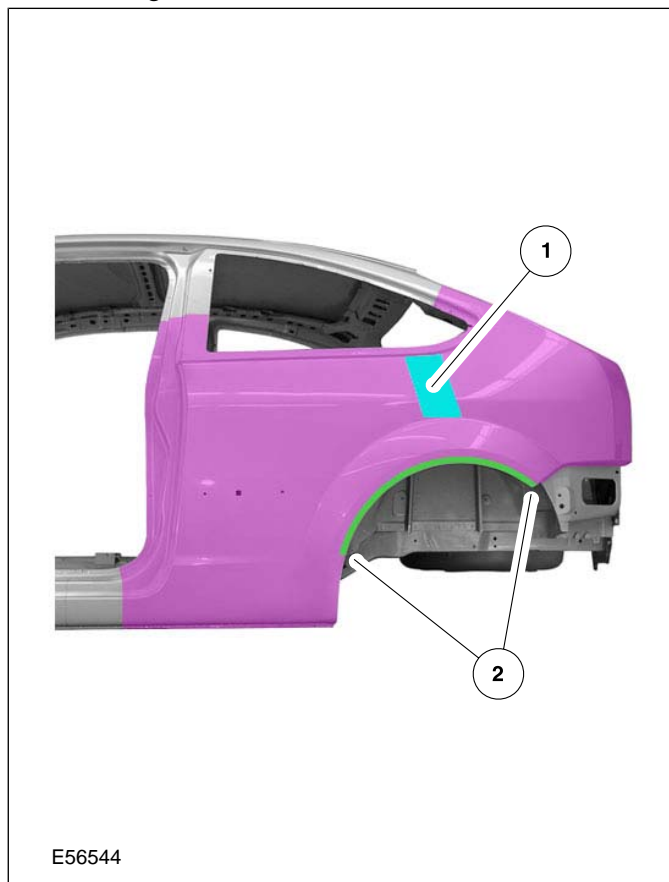
REMOVAL AND INSTALLATION

Forced air extraction gusset

- Resistance spot weld.



2. Apply two-component metal adhesive to the clinched flange and clinch the wheel arch flange.

**3. Quarter panel**

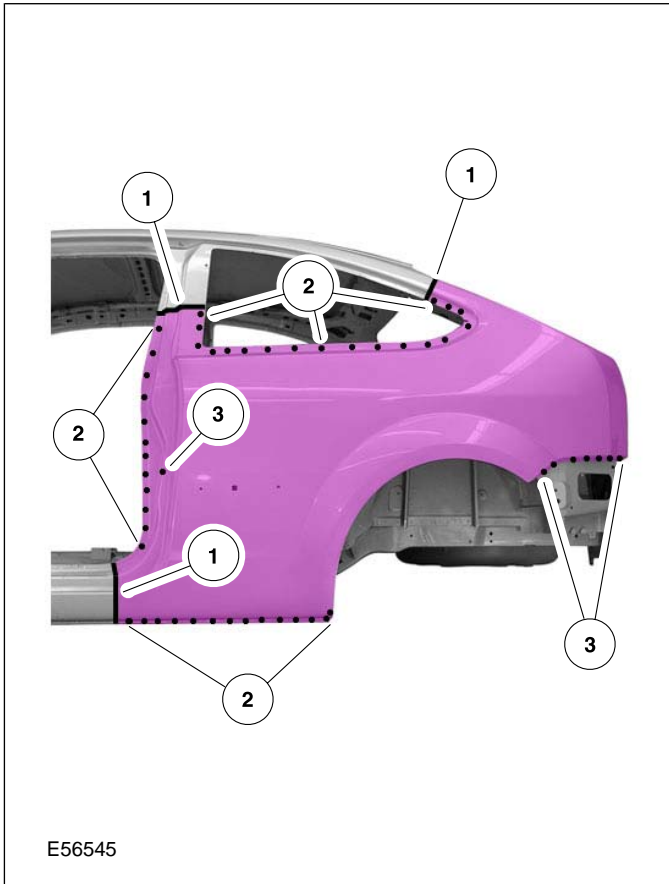
1. Apply PU glass adhesive to the NVH element.

4. Quarter panel

1. Continuous MIG weld.
2. Resistance spot weld.

REMOVAL AND INSTALLATION

3. Puddle weld.



• Puddle weld.



5. Quarter panel

REMOVAL AND INSTALLATION

Quarter Panel LH — 5-Door

1. Replacement Parts

- Quarter panel

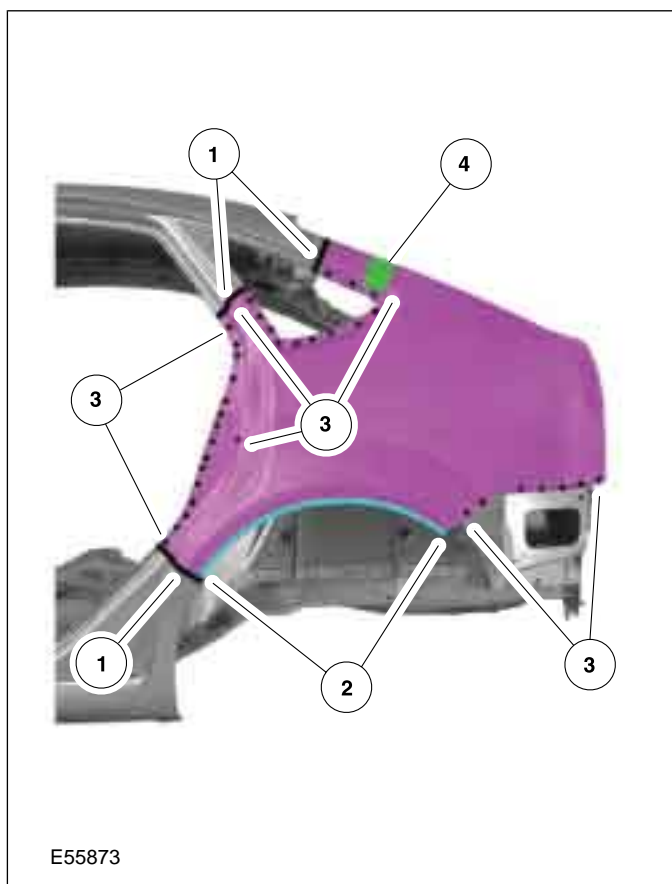
Removal

1. General notes

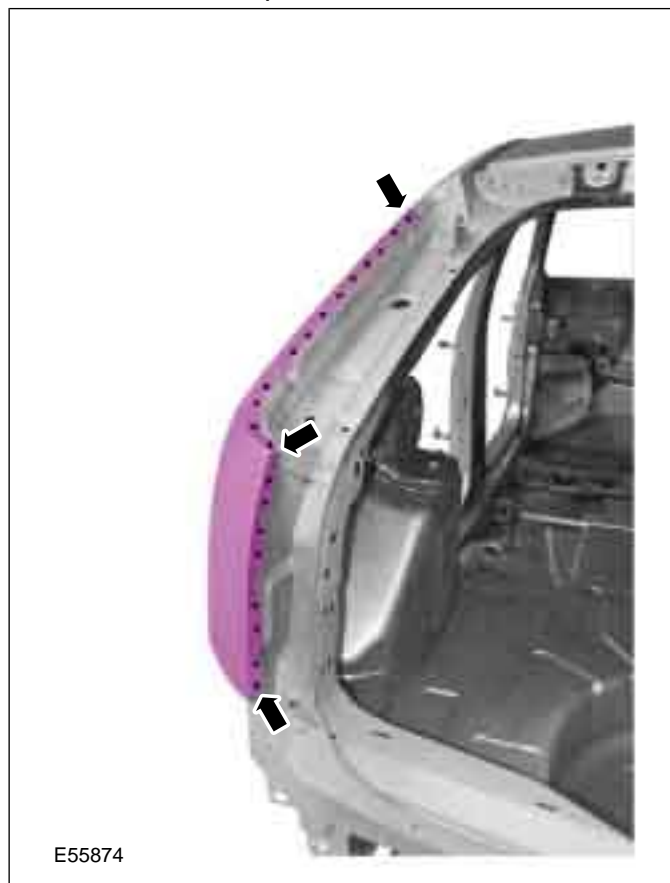
- Required removal operations: Rear door, weatherstrip, side window, rear seat, wheelhouse trim panel, rear lamp, rear bumper, quarter panel trim.
- Move the carpeting and the wiring away from the working area.
- Depending on the extent of the damage, the forced air extraction gusset should also be replaced.

2. Quarter panel

1. Cut locations.
2. Grind down one panel thickness at the wheel arch edge.
3. Mill out the spot welds.
4. Heat the areas (approx. 170°) and detach the NVH elements.



- Mill out the spot welds.

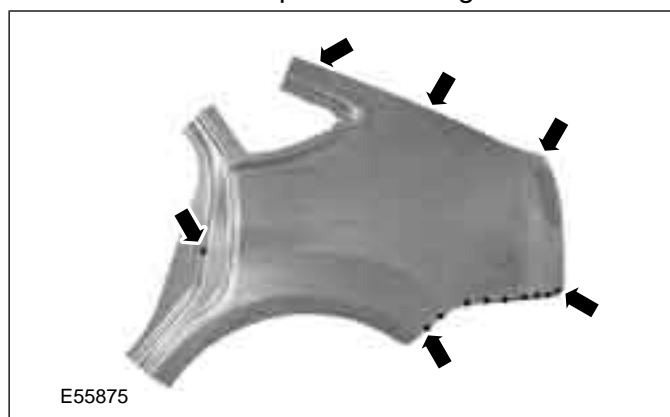


Installation

NOTE: Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25 must be followed.

1. Quarter panel

- Drill holes for puddle welding.



3. Quarter panel

REMOVAL AND INSTALLATION

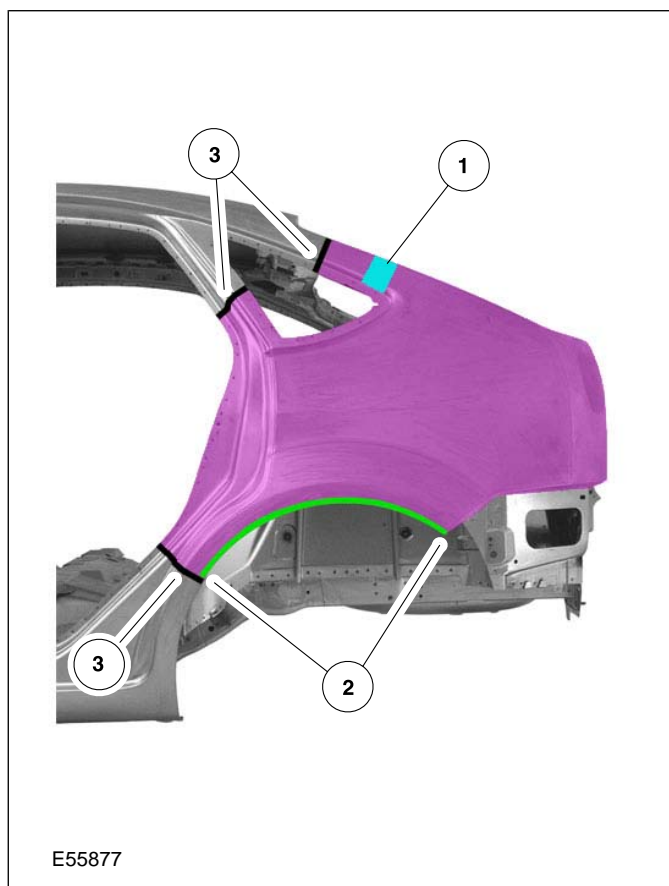
2. **NOTE:** If the forced air extraction gusset is being replaced, it must be welded onto the quarter panel before installation of the quarter panel.

Forced air extraction gusset

- Resistance spot weld.



3. Continuous MIG weld.



4. Quarter panel

1. Resistance spot weld.

3. Quarter panel

1. Apply PU glass adhesive to the NVH elements.
2. Apply two-component metal adhesive to the clinched flange and clinch the wheel arch flange.

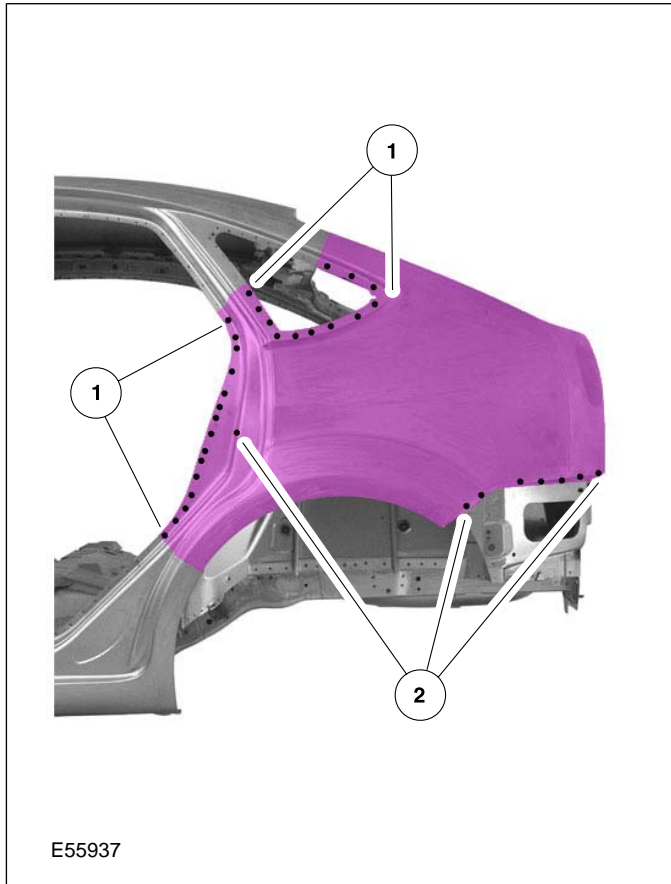
501-30-10

Rear End Sheet Metal Repairs

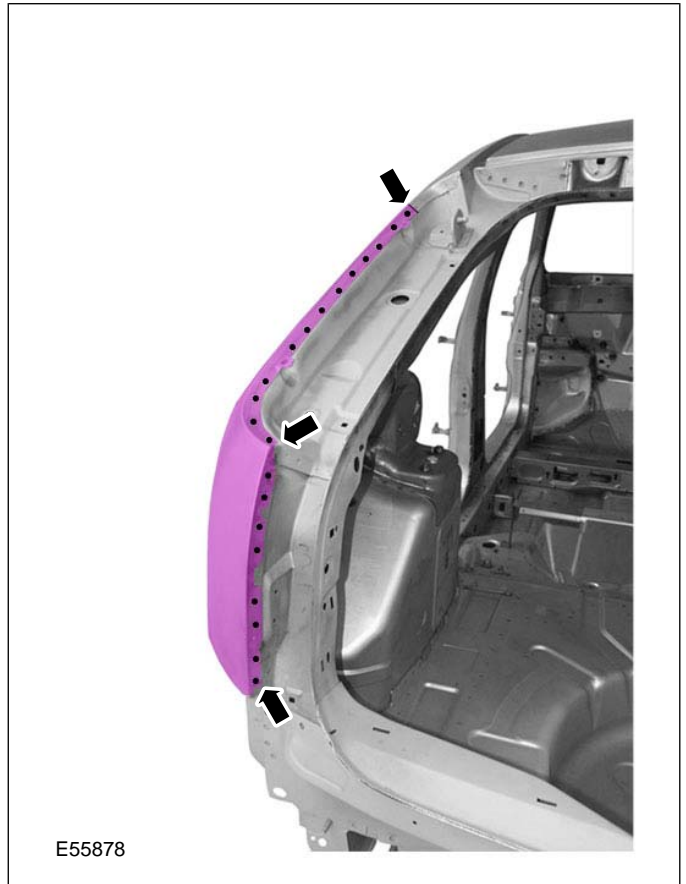
501-30-10

REMOVAL AND INSTALLATION

2. Puddle weld.



• Puddle weld.



5. Quarter panel

REMOVAL AND INSTALLATION

Quarter/Side Panel Rear Section LH — 3-Door/5-Door

1. Replacement Parts

- Repair panel, rear quarter panel

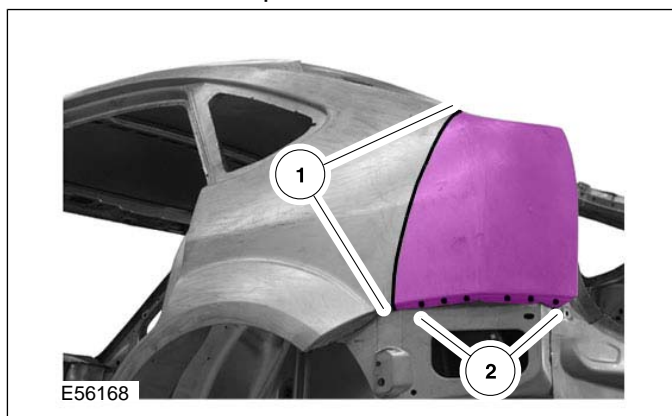
Removal

1. General notes

- Required removal operations: wheelhouse trim panel, rear lamp, rear bumper, quarter panel trim.
- Move the carpeting and the wiring away from the working area.
- Depending on the extent of the damage, the forced air extraction gusset should also be replaced.

2. Quarter panel

1. Cut point.
2. Mill out the spot welds.



3. Quarter panel

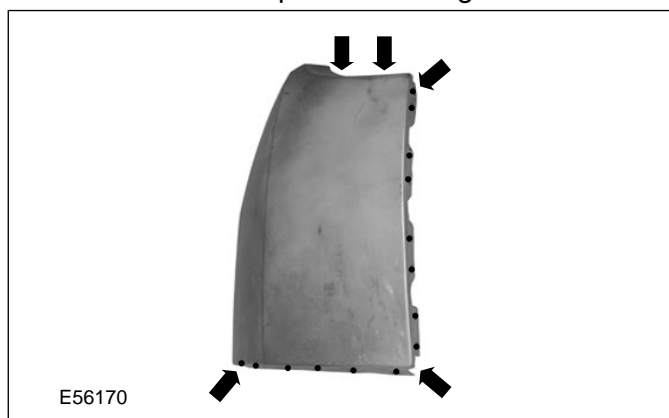
- Mill out the spot welds.



Installation

1. Quarter panel section

- Drill holes for puddle welding.



2. Quarter panel

1. Continuous MIG weld.

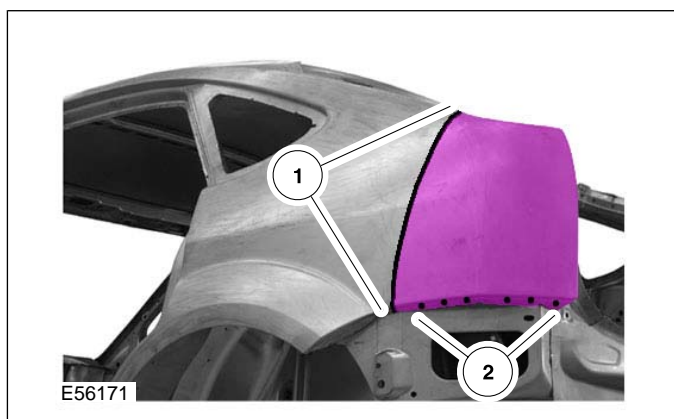
501-30-12

Rear End Sheet Metal Repairs

501-30-12

REMOVAL AND INSTALLATION

2. Puddle weld.



3. Quarter panel

• Puddle weld.



REMOVAL AND INSTALLATION

Water Drain Panel — 3-Door/5-Door

1. Replacement Parts

- Water drain panel

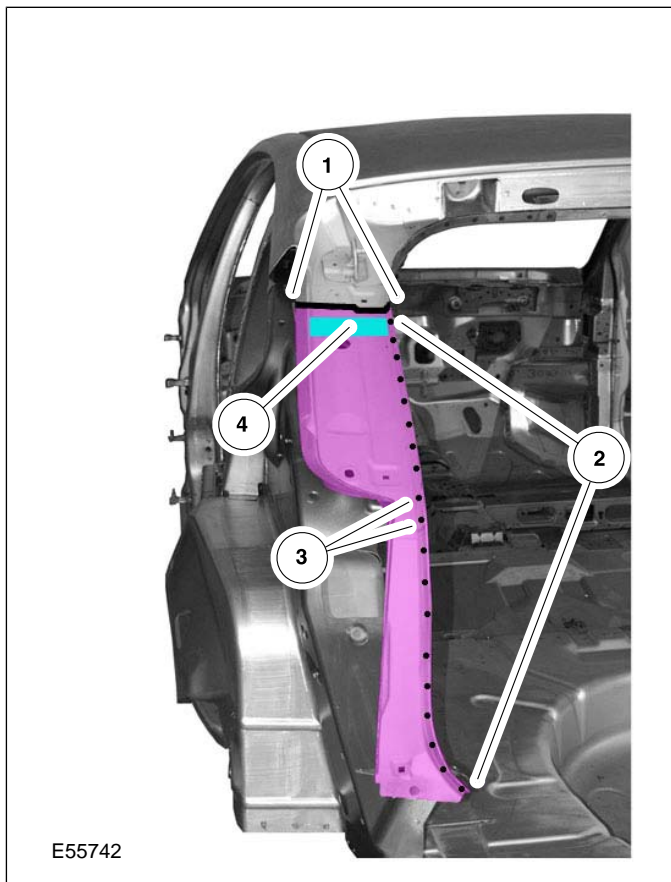
Removal

1. General Notes

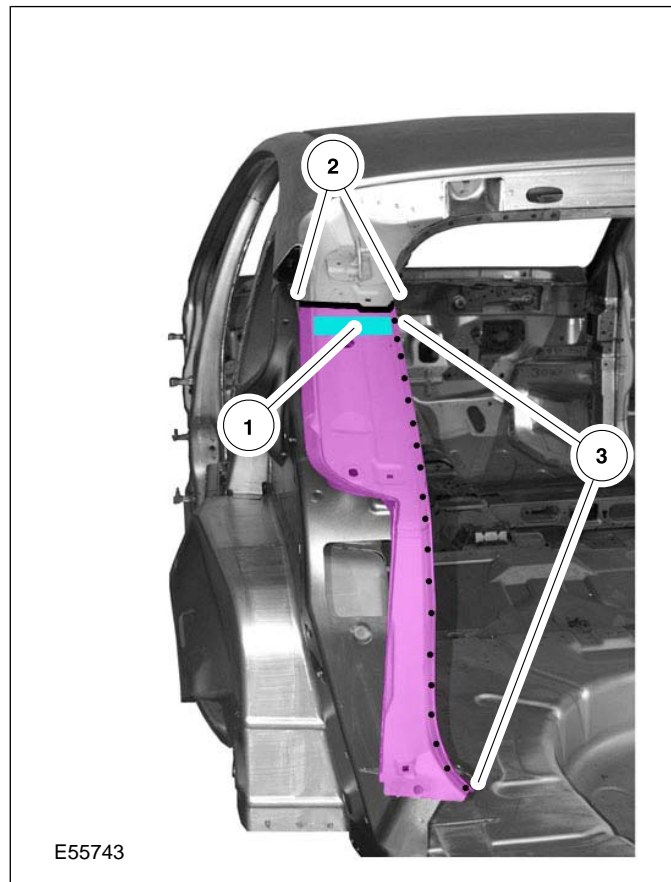
- Quarter panel and back panel are already removed before commencing the repair.
- Move carpets and wiring out of the working area.

2. Water drain panel

1. Cut location.
2. Grind out the spot welds.
3. Grind out the spot welds (two panel thicknesses).
4. Heat the area (approx. 170°) and detach the NVH element.



2. Continuous MIG weld.
3. Resistance spot weld.



Installation

1. Water drain panel

1. Apply PU glass adhesive to the NVH element.

REMOVAL AND INSTALLATION

Water Drain Panel Reinforcement

1. Replacement Parts

- Water drain panel reinforcement

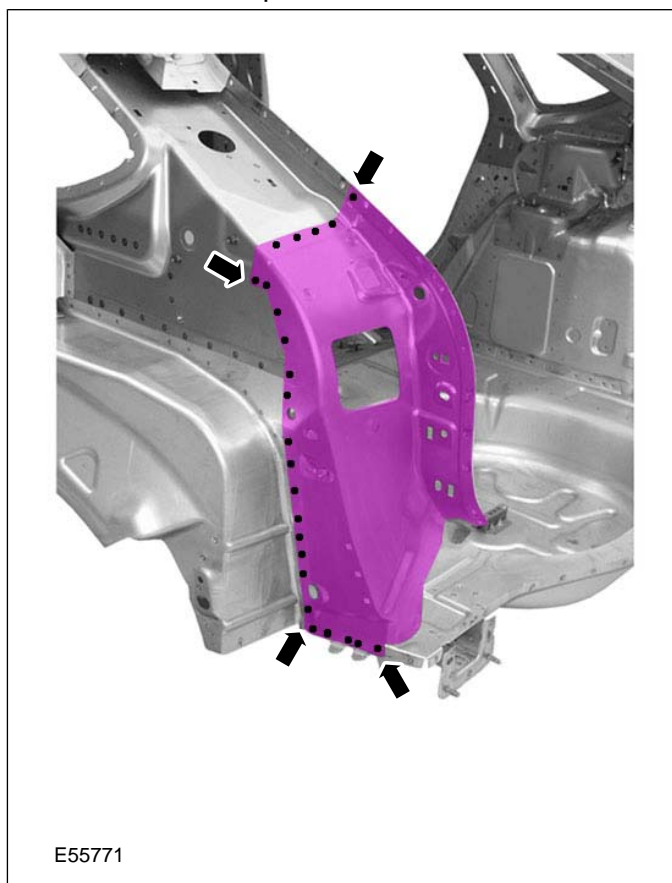
Removal

1. General Notes

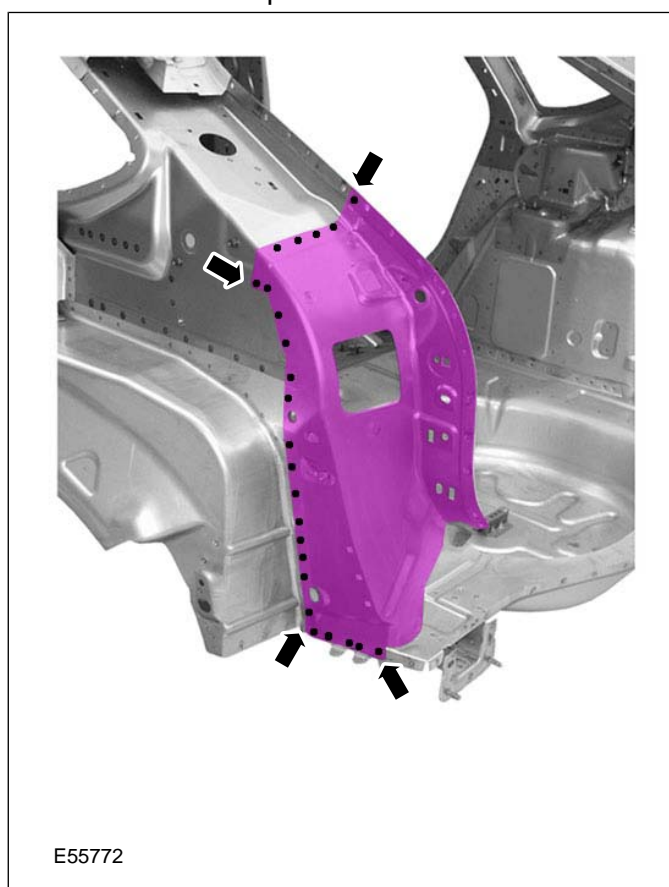
- Quarter panel, back panel and water drain panel are already removed before commencing the repair.
- Move carpets and wiring out of the working area.

2. Water drain panel reinforcement

- Mill out the spot welds.



- Resistance spot weld.



Installation

NOTE: Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25 must be followed.

1. Water drain panel reinforcement

REMOVAL AND INSTALLATION

Rear Lamp Mounting Panel — Convertible

1. Replacement parts

- Rear lamp retaining plate

Removal

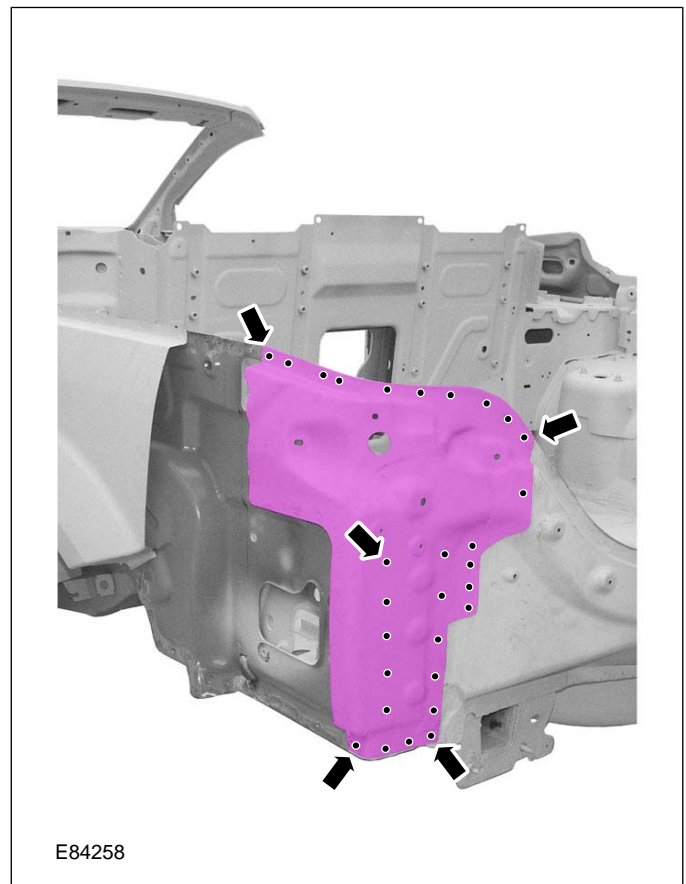
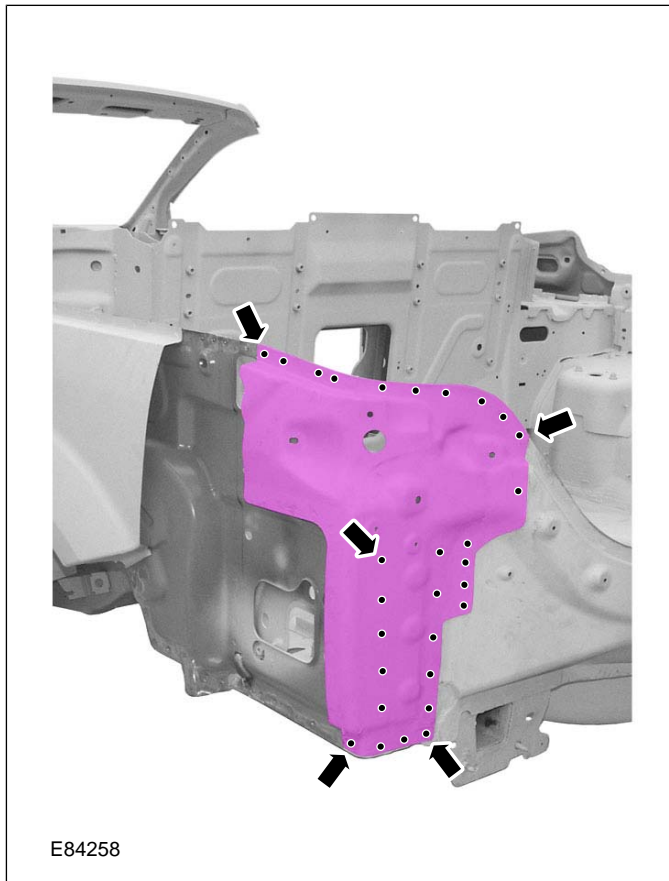
1. General Notes

- The quarter panel part to be replaced must be removed before starting repairs.
- Reposition the carpeting and the wiring harness away from the working area.

2. Rear lamp retaining plate

- Mill out the spot welds.

- Resistance spot weld.



Installation

NOTE: Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25 must be followed.

1. Rear lamp retaining plate

REMOVAL AND INSTALLATION

Rear Wheelhouse Outer — 3-Door

General Equipment

Measurement and alignment angle system

1. Repair parts

- Outer rear wheelhouse
- C-pillar reinforcement

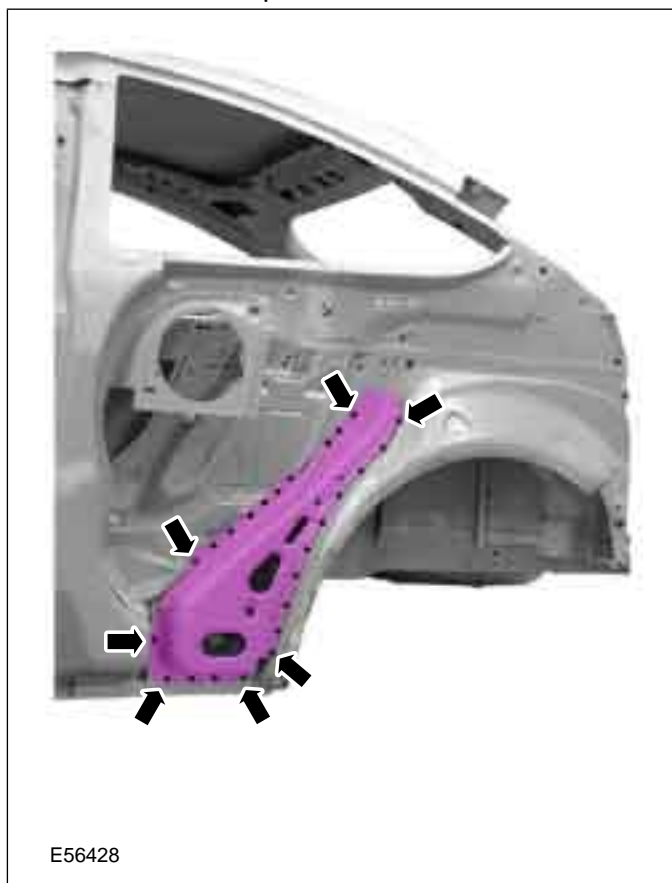
Removal

1. General Notes

- Back panel, quarter panel and boot water drain panel with reinforcement are already removed before commencing the repair.
- Move carpets and wiring out of the working area.

2. C-pillar reinforcement

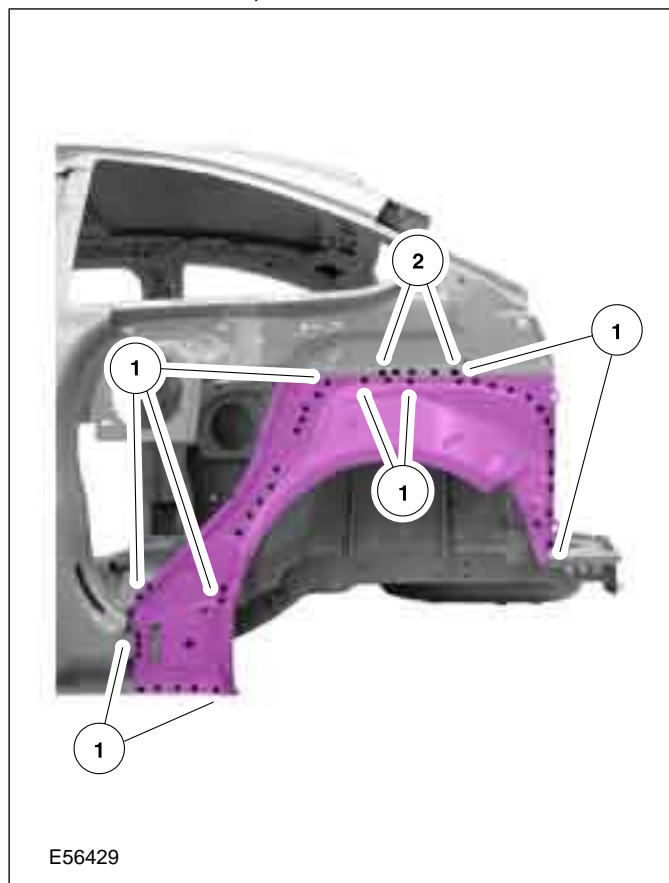
- Mill out the spot welds.



3. Outer rear wheelhouse

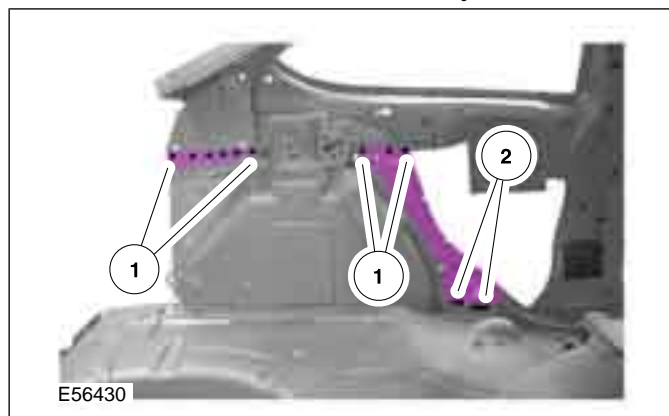
1. Mill out the spot welds.

2. Mill out the spot welds (two panel thicknesses).



4. Inner rear wheelhouse

1. Mill out the spot welds.
2. Grind out the MIG-soldered joints.



5. NOTE:

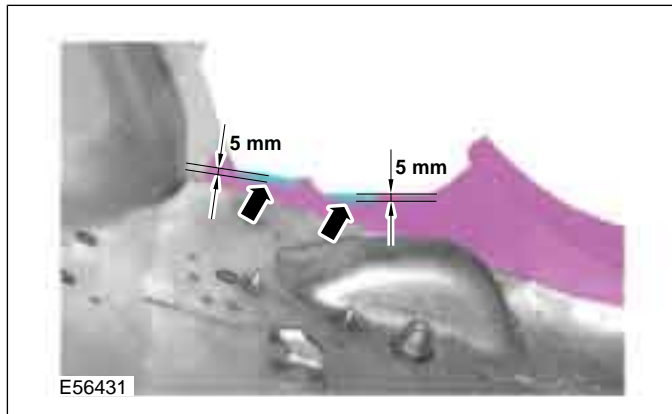
- In order to make a proper MIG welded joint, the MIG soldered areas must be ground back according to the specified dimensions (by approx. 5 mm).

REMOVAL AND INSTALLATION

- When grinding back, it must be ensured that all the residual traces of the MIG soldered joints are completely removed.

Inner rear wheelhouse (MIG-soldered areas)

- Grind back the MIG soldered areas.

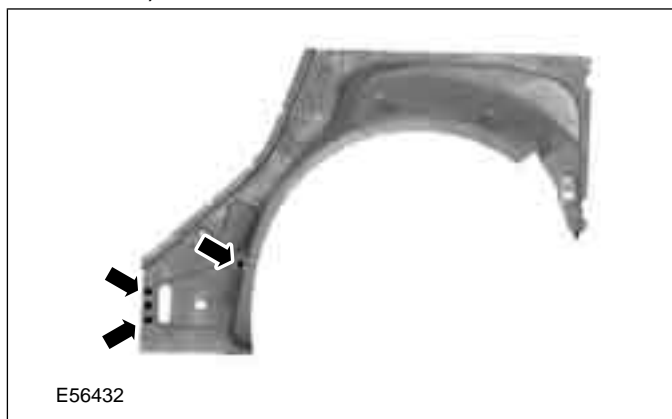


Installation

NOTE: Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25 must be followed.

1. Outer rear wheelhouse

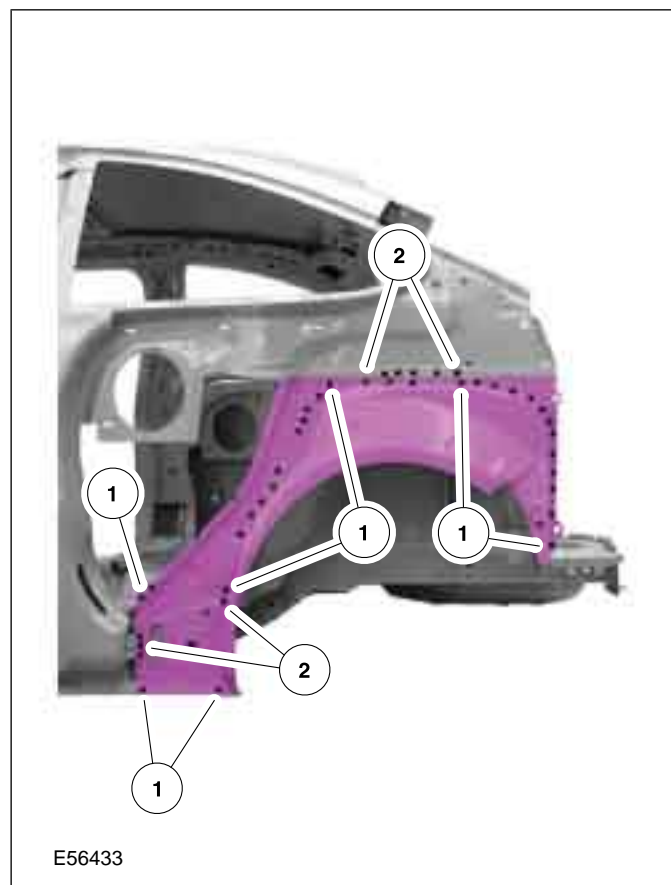
- Drill holes for puddle welding (diameter: 10 mm).



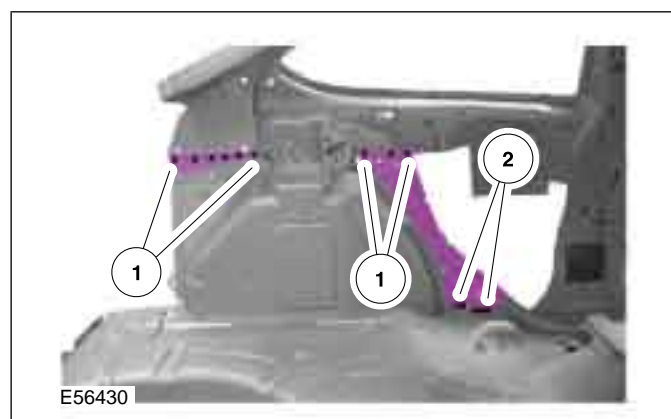
- 2. NOTE:** Drill through one panel thickness at the upper area of outer rear wheelhouse (position 2) through the existing holes in the inner quarter panel before puddle welding.

Outer rear wheelhouse

- Resistance spot weld.

2. Puddle weld.**3. Inner rear wheelhouse**

- Resistance spot weld.
- Continuous MIG weld.

**4. C-pillar reinforcement**

501-30-18

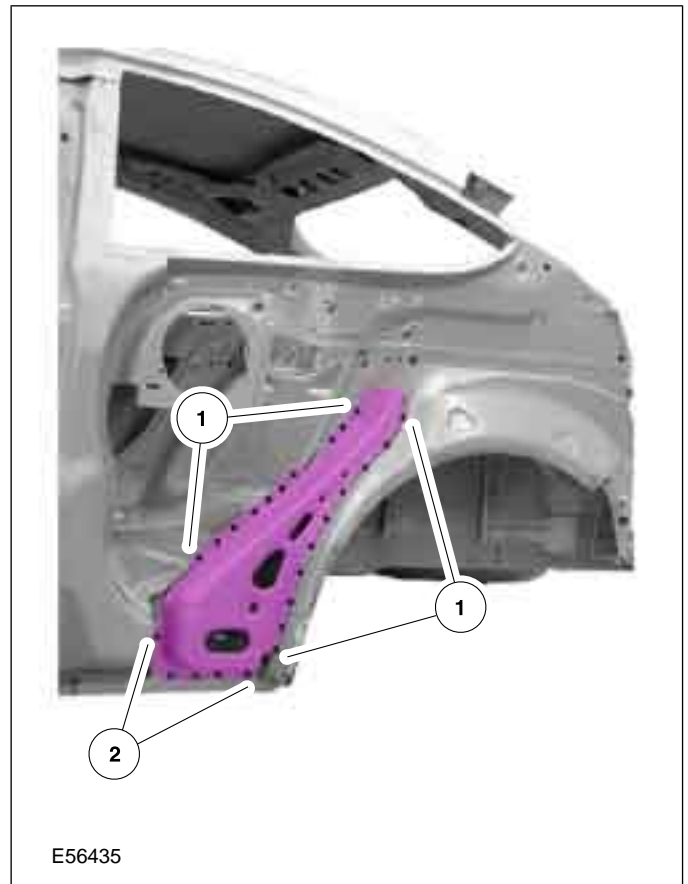
Rear End Sheet Metal Repairs

501-30-18

REMOVAL AND INSTALLATION

- Drill holes for puddle welding (diameter: 10 mm).

2. Puddle weld.



5. C-pillar reinforcement

1. Resistance spot weld.

REMOVAL AND INSTALLATION

Rear Wheelhouse Outer — 5-Door

General Equipment

Measurement and alignment angle system

1. Replacement Parts

- Outer rear wheelhouse
- C-pillar reinforcement

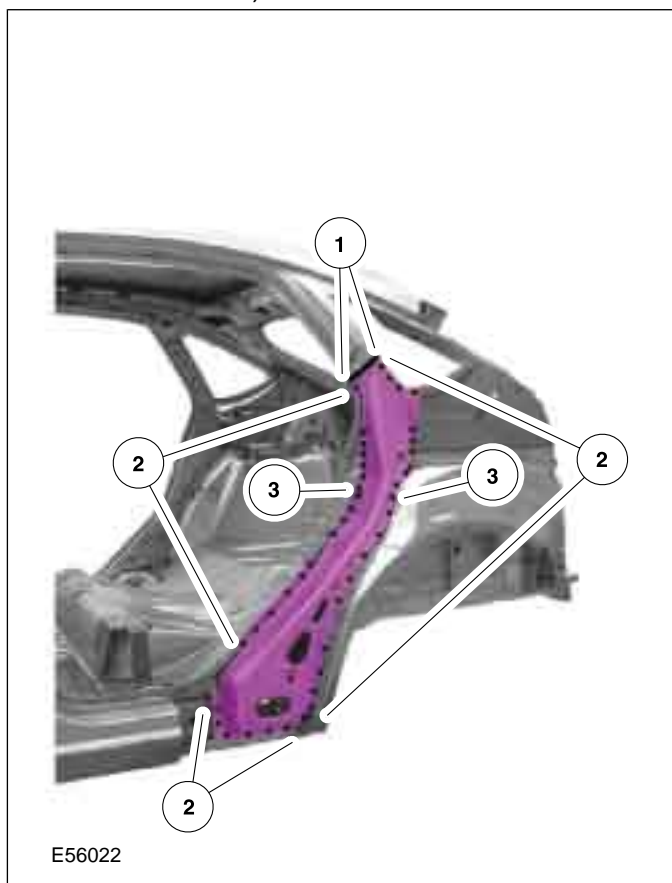
Removal

1. General Notes

- Back panel, quarter panel and water drain panel with reinforcement are already removed before commencing the repair.
- Move carpets and wiring out of the working area.

2. C-pillar reinforcement

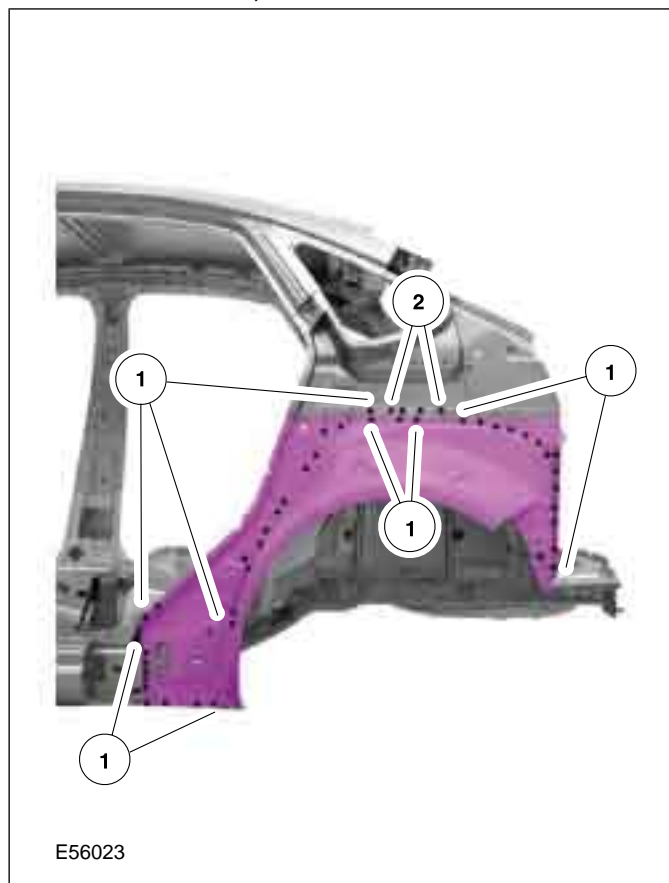
1. Cut location.
2. Mill out the spot welds.
3. Mill out the spot welds (two panel thicknesses).



3. Outer rear wheelhouse

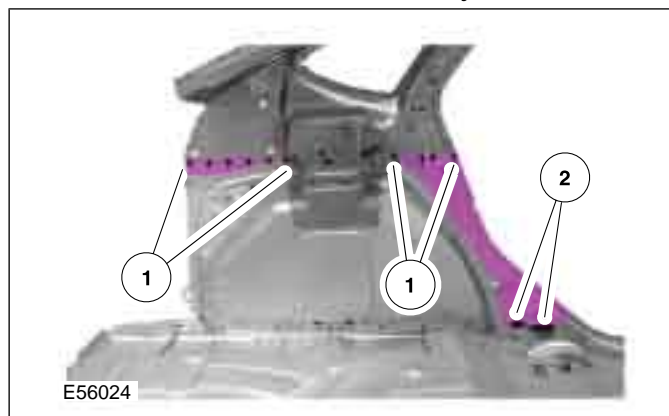
1. Mill out the spot welds.

2. Mill out the spot welds (two panel thicknesses).



4. Inner rear wheelhouse

1. Mill out the spot welds.
2. Grind out the MIG-soldered joints.



5. NOTE:

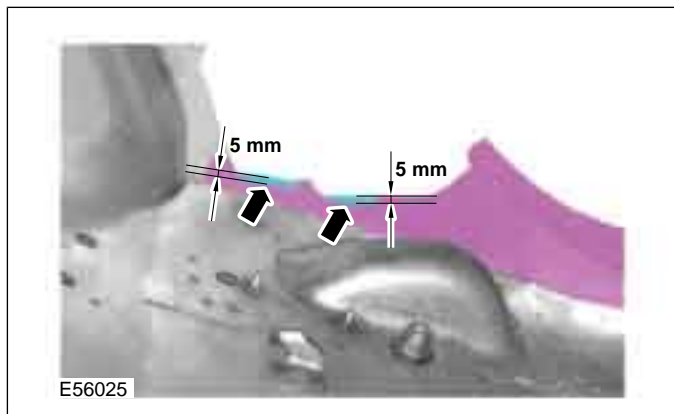
- In order to make a proper MIG welded joint, the MIG soldered areas must be ground back according to the specified dimensions (by approx. 5 mm).

REMOVAL AND INSTALLATION

- When grinding back, it must be ensured that all the residual traces of the MIG soldered joints are completely removed.

Inner rear wheelhouse (MIG-soldered areas)

- Grind back the MIG soldered areas.



Installation

NOTE: Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25 must be followed.

1. Outer rear wheelhouse

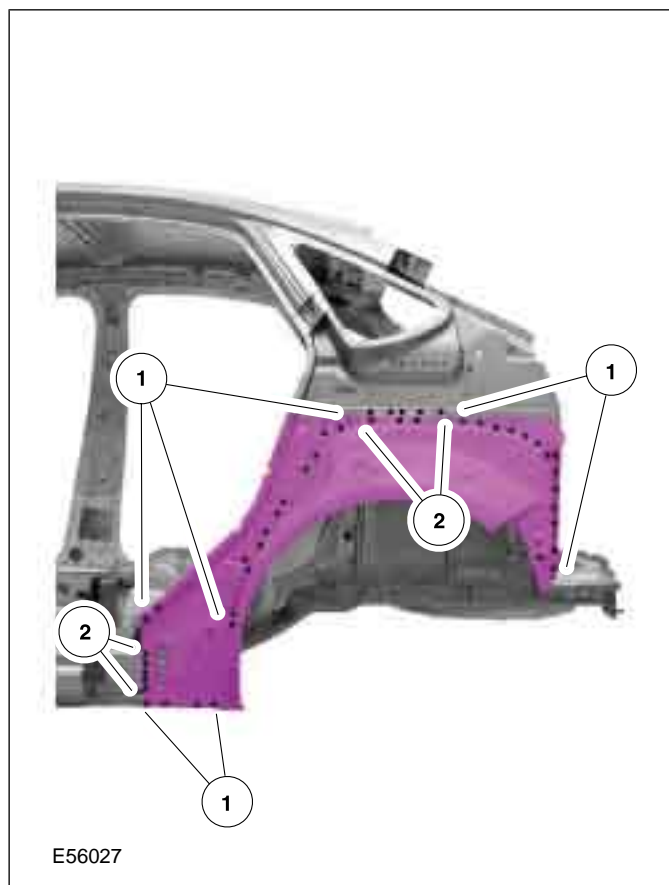
- Drill holes for puddle welding (diameter: 10 mm).



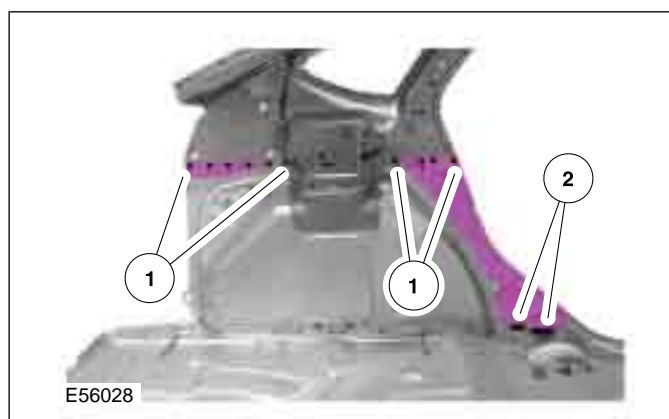
- 2. NOTE:** Drill through one panel thickness at the upper area of outer rear wheelhouse (position 2) through the existing holes in the inner quarter panel before puddle welding.

Outer rear wheelhouse

- Resistance spot weld.

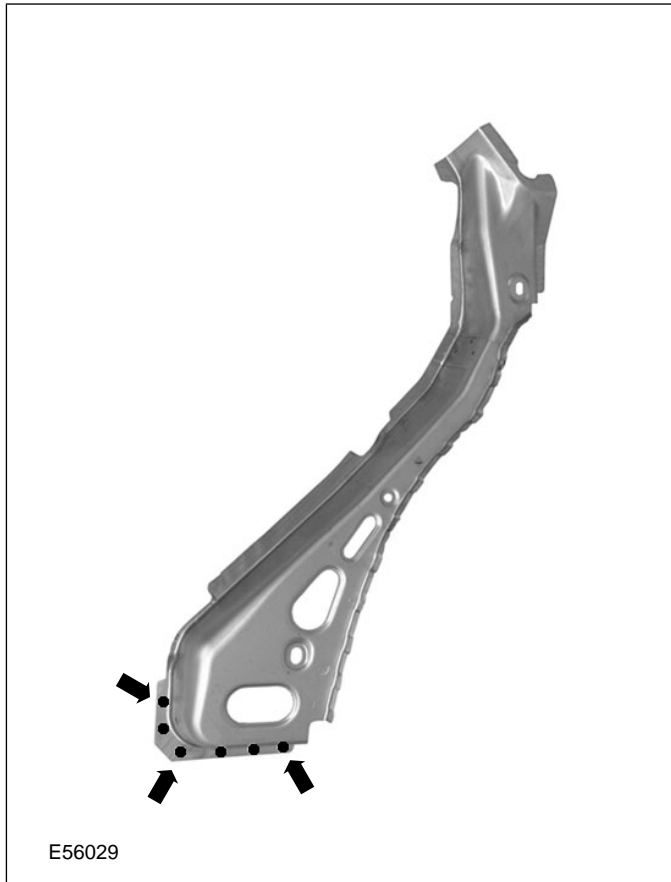
2. Puddle weld.**3. Inner rear wheelhouse**

- Resistance spot weld.
- Continuous MIG weld.

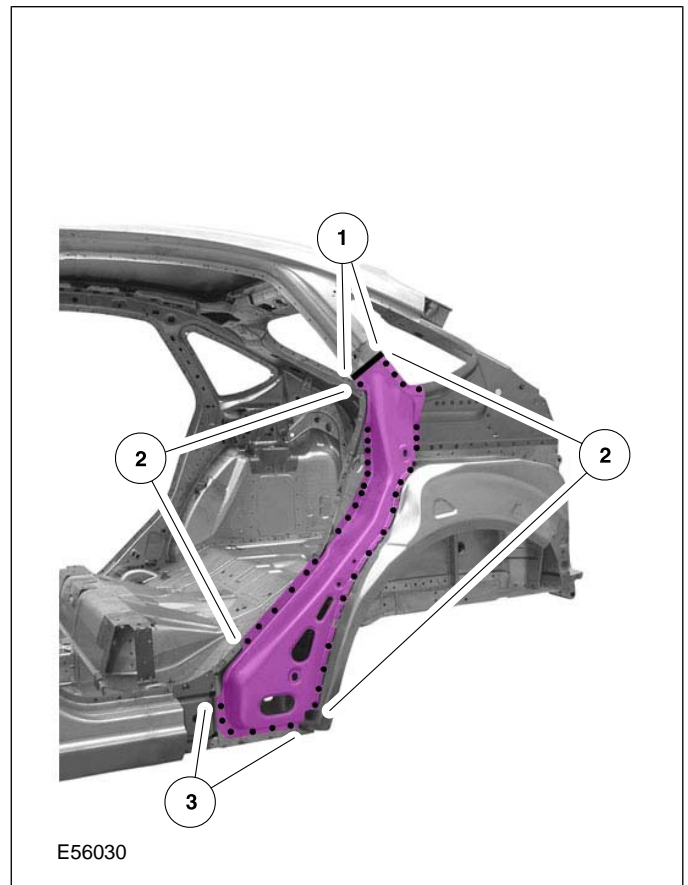
**4. C-pillar reinforcement**

REMOVAL AND INSTALLATION

- Drill holes for puddle welding (diameter: 10 mm).



- 3. Puddle weld.



5. C-pillar reinforcement

1. Continuous MIG weld.
2. Resistance spot weld.

REMOVAL AND INSTALLATION

Back Panel — 3-Door/5-Door

1. Replacement Parts

- Back panel
- Rear crossmember
- Rear crossmember reinforcement
- Crossmember reinforcements/rear floor panel

Removal

1. General Notes

- Required removal operations: Rear bumper, rear lamps, back panel inner trims and quarter panel trims.
- Move carpets and wiring out of the working area.

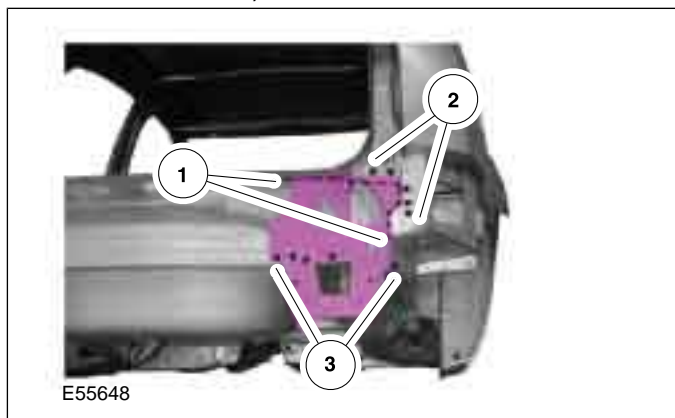
2. Back panel

- Mill out the spot welds.



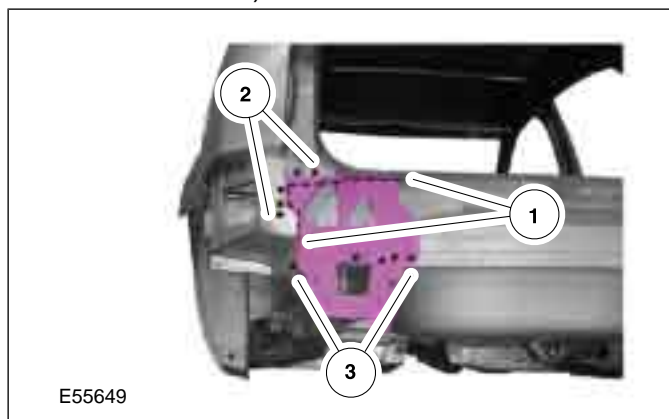
3. Crossmember reinforcement, rear right

1. Rough cut location.
2. Grind out the spot welds on the inside.
3. Mill out the spot welds (two panel thicknesses).



4. Crossmember reinforcement, rear left

1. Rough cut location.
2. Grind out the spot welds on the inside.
3. Mill out the spot welds (two panel thicknesses).



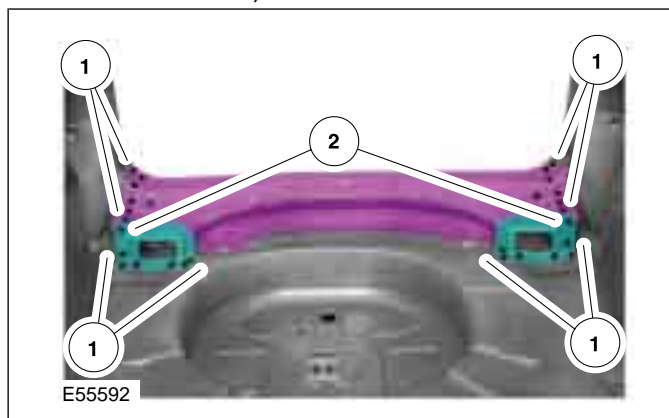
5. Rear crossmember

- Mill out the spot welds.



6. Rear crossmember

1. Grind out the spot welds.
2. Grind out the spot welds (two panel thicknesses).



REMOVAL AND INSTALLATION

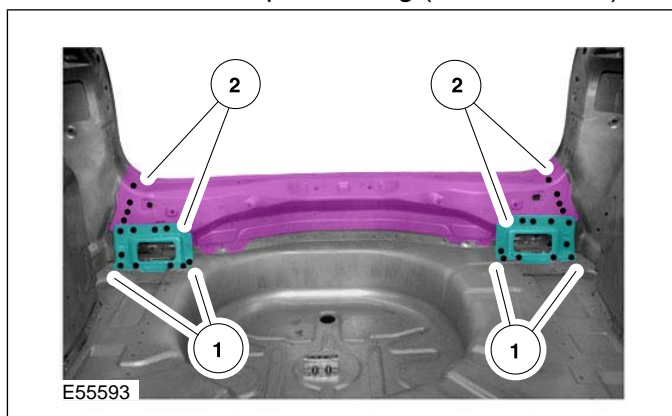
Installation

NOTE: Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25 must be followed.

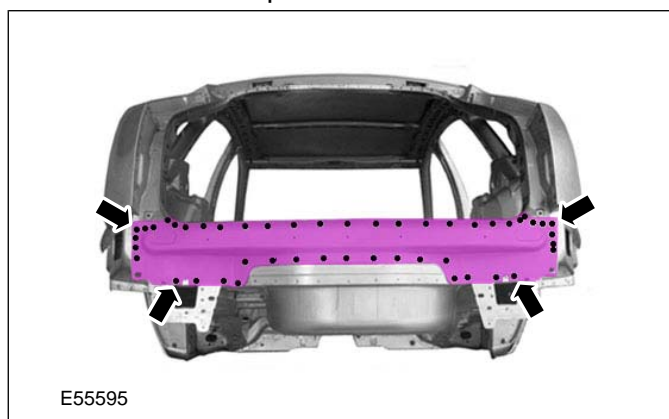
NOTE: First of all, offer up the crossmember reinforcements/rear floor panel and weld in place.

1. Rear crossmember

1. Resistance spot welding (crossmember reinforcements/rear floor panel)
2. Resistance spot welding (crossmember).



- Resistance spot weld.

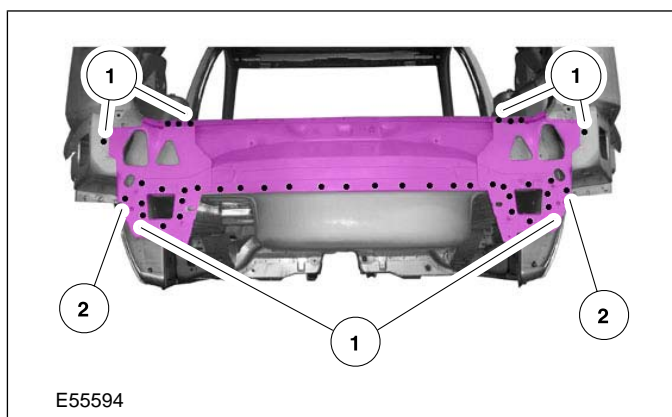


2. Rear crossmember reinforcement

1. Resistance spot weld.

NOTE: Before puddle welding, drill through one panel thickness through the existing holes.

2. Puddle weld.



3. Back panel

REMOVAL AND INSTALLATION

Rear Floor Panel — 2.5L Duratec-ST (VI5)

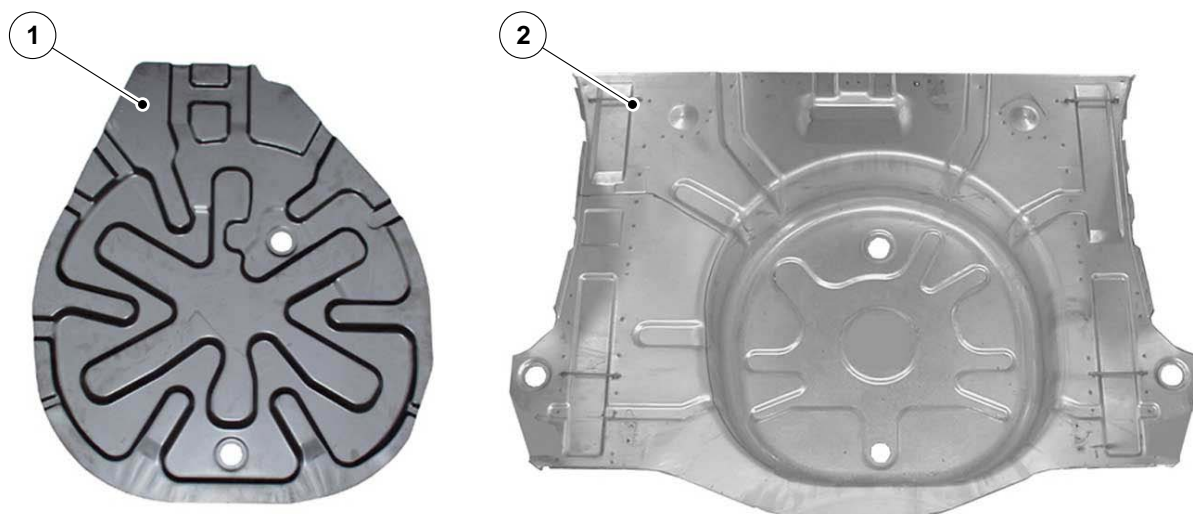
Removal

- The Focus 2004.75 (07/2004-) rear floor panel is equipped with a spare wheel well. Due to a different exhaust pipe routing this well has to be replaced by a gusset plate for the Focus 2.5L Duratec-ST.
- Replace the gusset plate before the rear floor panel will be installed into the vehicle.
- Remove and install of the rear floor panel is similar to Focus 2004.75 (07/2004-).

Refer to: **Rear Floor Panel** (501-30 Rear End Sheet Metal Repairs, Removal and Installation).

1. • Replacement parts:

- 1) Gusset Plate 2.5L Duratec-ST
- 2) Rear Floor Panel (Repair Panel)



E97536

REMOVAL AND INSTALLATION

2. • Necessary removal and installation work:

- Back Panel

Refer to: **Back Panel - 3-Door/5-Door** (501-30 Rear End Sheet Metal Repairs, Removal and Installation).

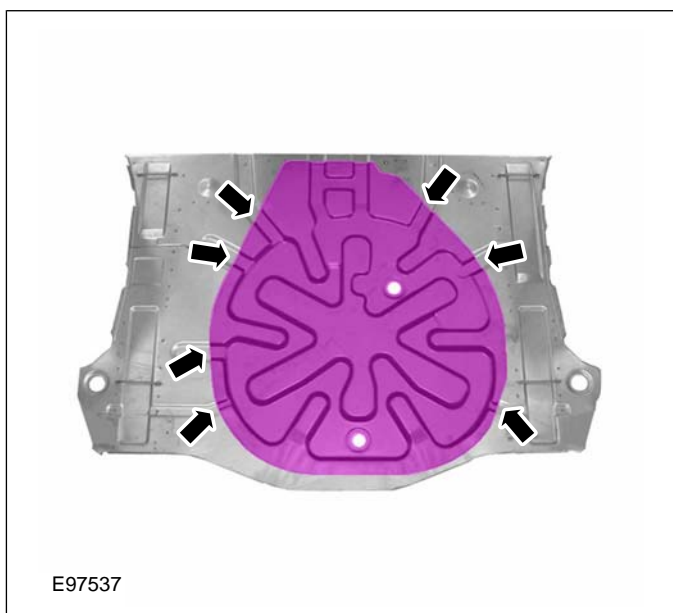
- Rear Floor Panel

Refer to: **Rear Floor Panel** (501-30 Rear End Sheet Metal Repairs, Removal and Installation).

- Reposition the carpeting and the wiring harness away from the working area.

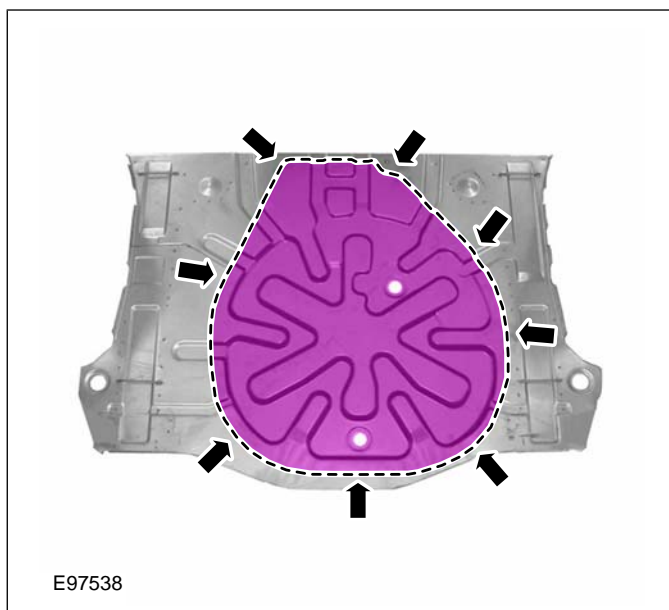
3. • Gusset Plate

- Insert the gusset plate into the slots (arrows) of the rear floor panel with a positive locking.



4. • Gusset Plate

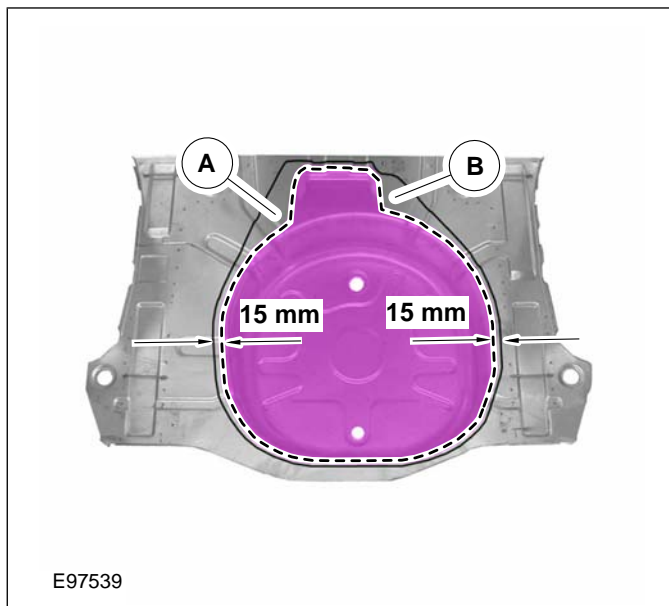
- Mark the outline of the gusset plate to the rear floor panel.
- Take off the gusset plate.



5. • Mark Cutline

- **NOTE:** The cutline has to be marked with a displacement of 15 mm to the center. In areas A and B mark cutline along the recess with a greater displacement.

- Mark the cutline.



501-30-26

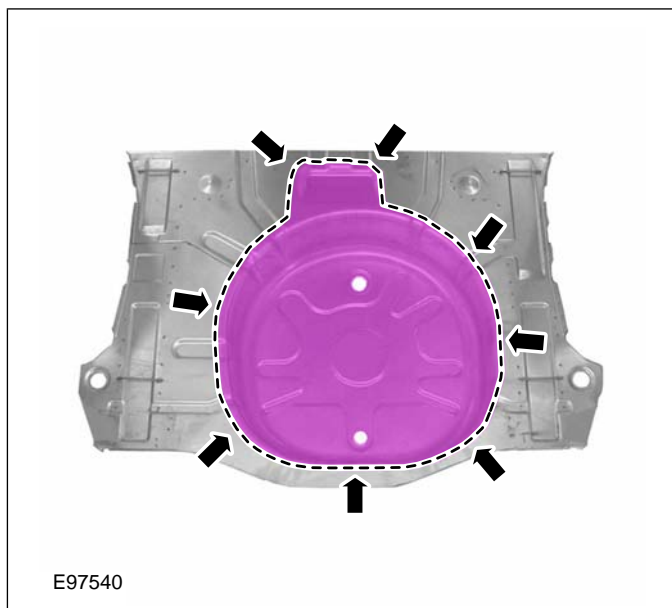
Rear End Sheet Metal Repairs

501-30-26

REMOVAL AND INSTALLATION

6. • Cut Rear Floor Panel

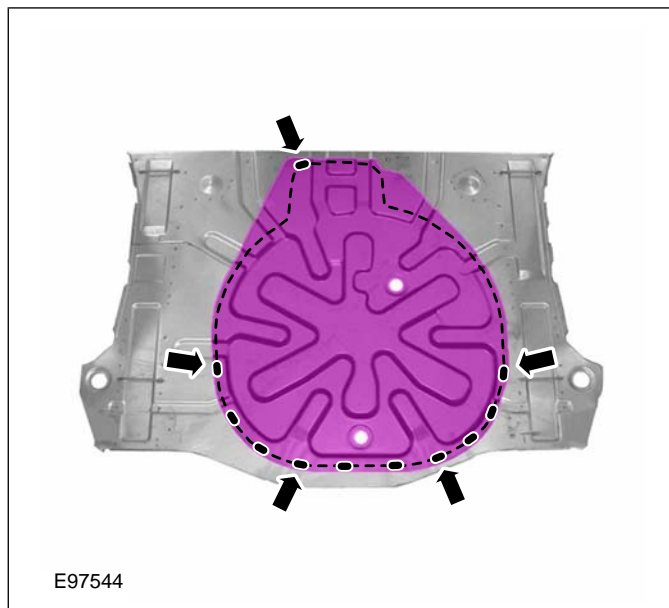
- Cut out the spare wheel well along the cutline.



2. • Weld Rear Floor Panel

- **NOTE:** MIG weld from underneath!

Intermittant MIG weld seam (single seam length ca. 20mm)



Installation

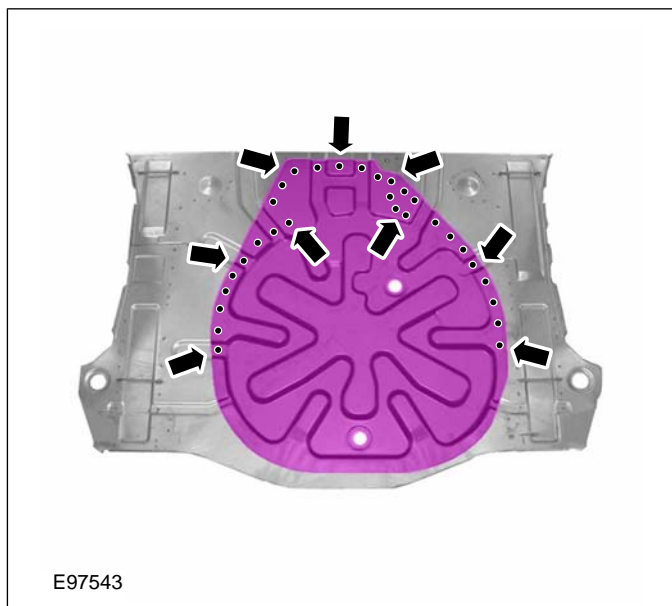
NOTE: Corrosion protection must be carefully maintained during this repair work.

Refer to: **Corrosion Prevention** (501-25 Body Repairs - General Information, Description and Operation).

1. • Weld Rear Floor Panel

- **NOTE:** Insert the gusset plate into the rear floor panel with a positive locking and locate with clamps.

Resistance spot weld.



3. • Finishing and corrosion prevention

- Seal weld flanges on both sides with body sealing compound.

REMOVAL AND INSTALLATION

Rear Floor Panel Section

General Equipment

Measurement or alignment angle system

1. Replacement Parts

- Rear floor panel

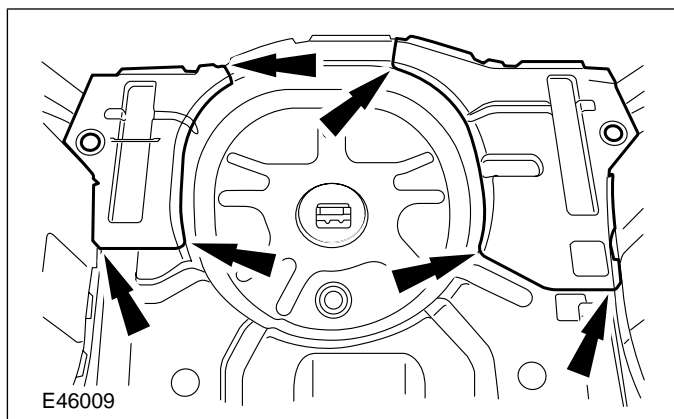
Removal

1. General Notes

- Back panel, quarter panel and water drain panel with reinforcement are already removed before commencing the repair.
- Move carpets and wiring out of the working area.

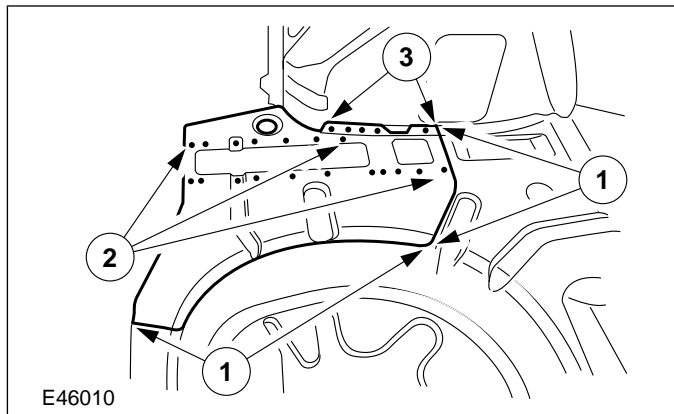
2. **NOTE:** Several sectional repairs may be necessary depending upon the extent of damage.

Overview of cut locations



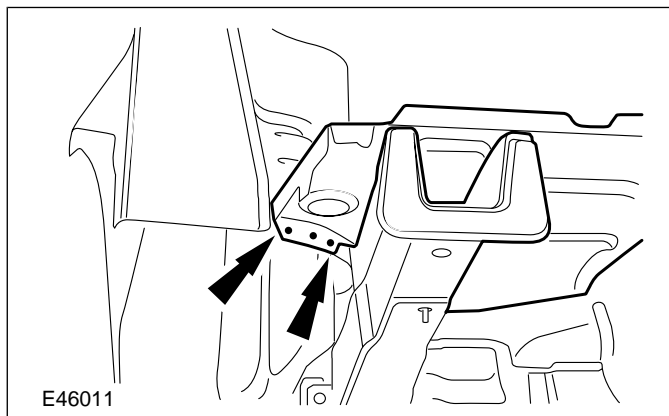
3. Rear floor panel

1. Cut location.
2. Mill out the spot welds.
3. Grind out the spot welds.



4. Rear floor panel

- Grind out the spot welds.

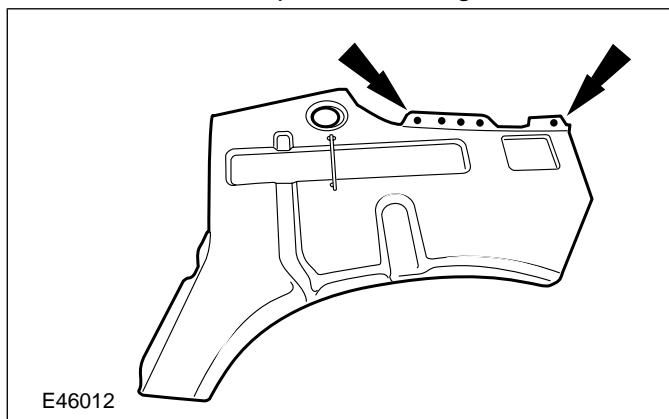


Installation

NOTE: Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25A must be followed.

1. Rear floor panel

- Drill holes for puddle welding.

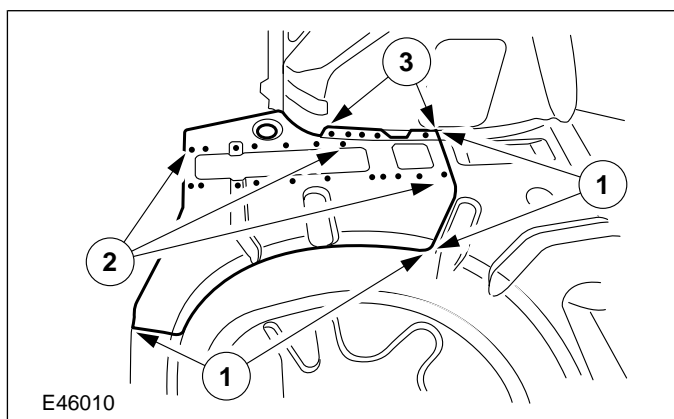


2. Rear floor panel

1. Continuous MIG weld.
2. Resistance spot weld.

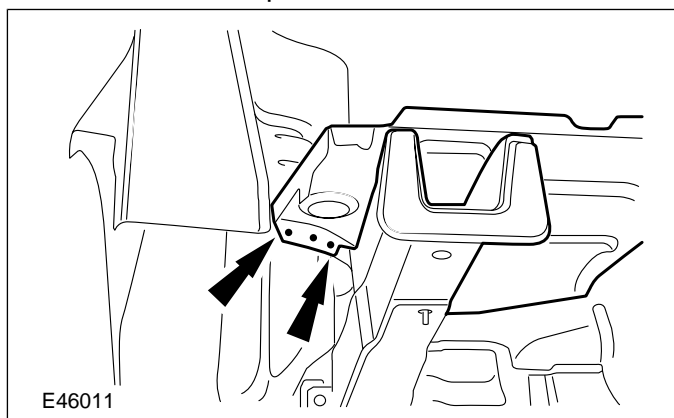
REMOVAL AND INSTALLATION

3. Puddle weld.



3. Rear floor panel

- Resistance spot weld.



REMOVAL AND INSTALLATION

Rear Side Member Section

General Equipment

Measurement or alignment angle system

1. Replacement Parts

- Side member sectional part
- Crossmember retaining flange

Removal

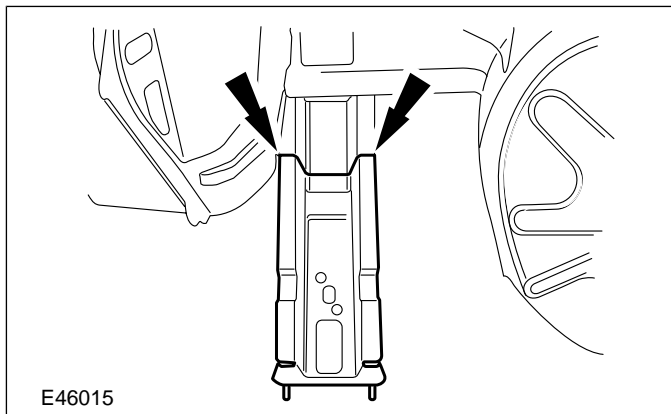
1. General Notes

- Rear floor panel, back panel and quarter panel are already removed before commencing the repair.

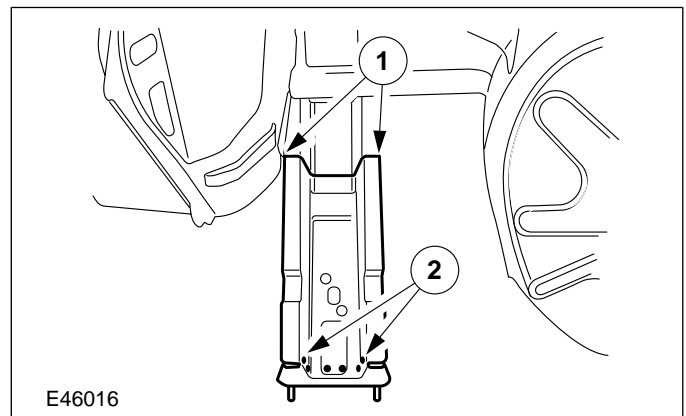
2. **NOTE:** The cut location may vary depending upon the extent of the damage.

Rear side member

- Cut location.



2. Resistance spot weld.



Installation

NOTE: Fit crossmember retaining flange using the alignment angle and fix in place. Insert and fit the side member.

1. Rear side member

1. Continuous MIG weld.

REMOVAL AND INSTALLATION

Luggage Compartment Bulkhead

General Equipment

Measurement and alignment angle system

1. Replacement parts

- Luggage compartment bulkhead
- Left luggage compartment bulkhead connecting piece
- Right luggage compartment bulkhead connecting piece

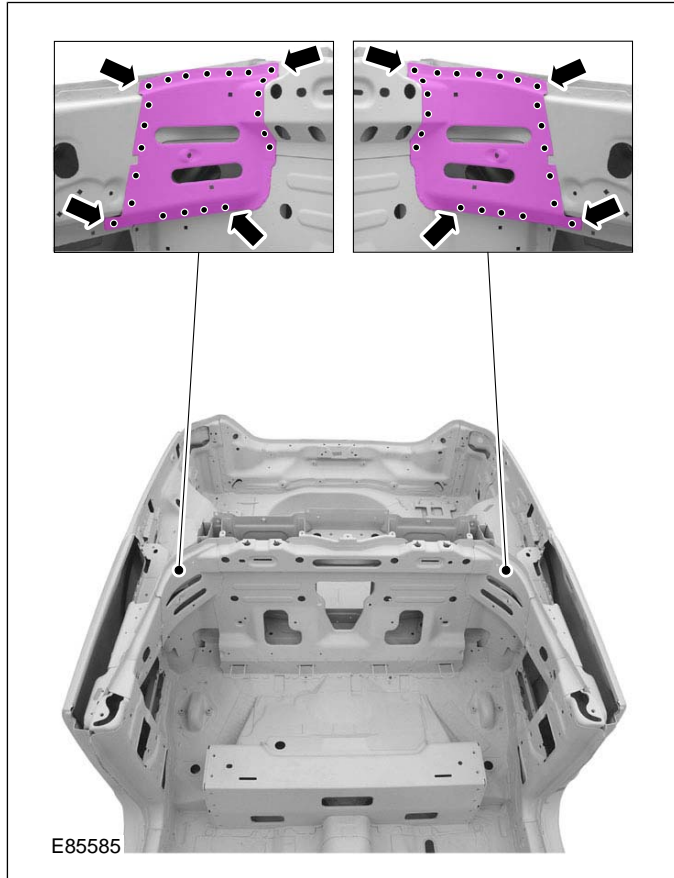
Removal

1. General:

- Necessary removal work: Cover, both roll protection units, doors, luggage compartment lid, B pillar trim, rear seat and back, driver and passenger seats.
- Reposition the carpeting and the wiring harness away from the working area.

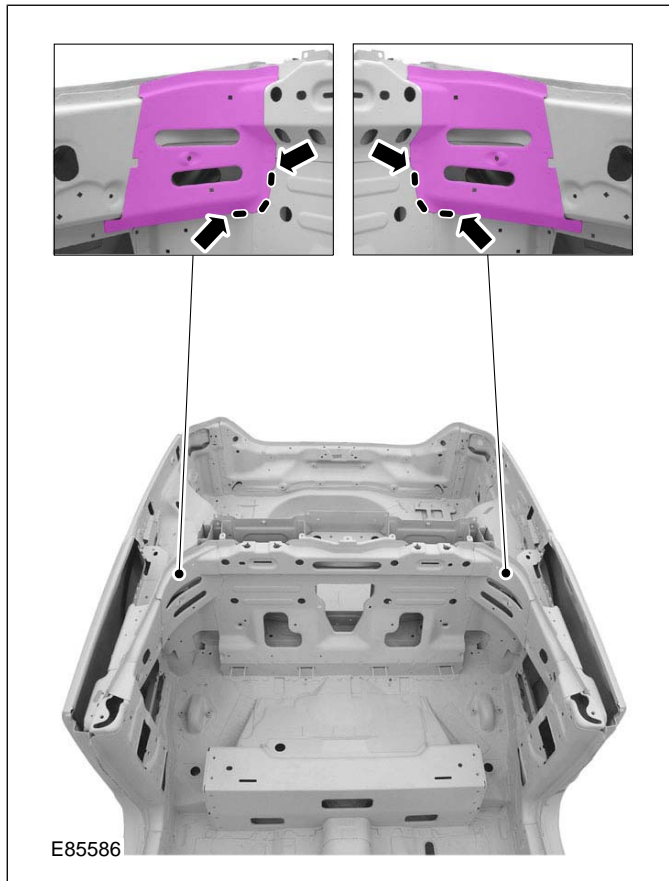
2. Luggage compartment bulkhead connecting pieces

- Mill out the spot welds.



3. Luggage compartment bulkhead connecting pieces

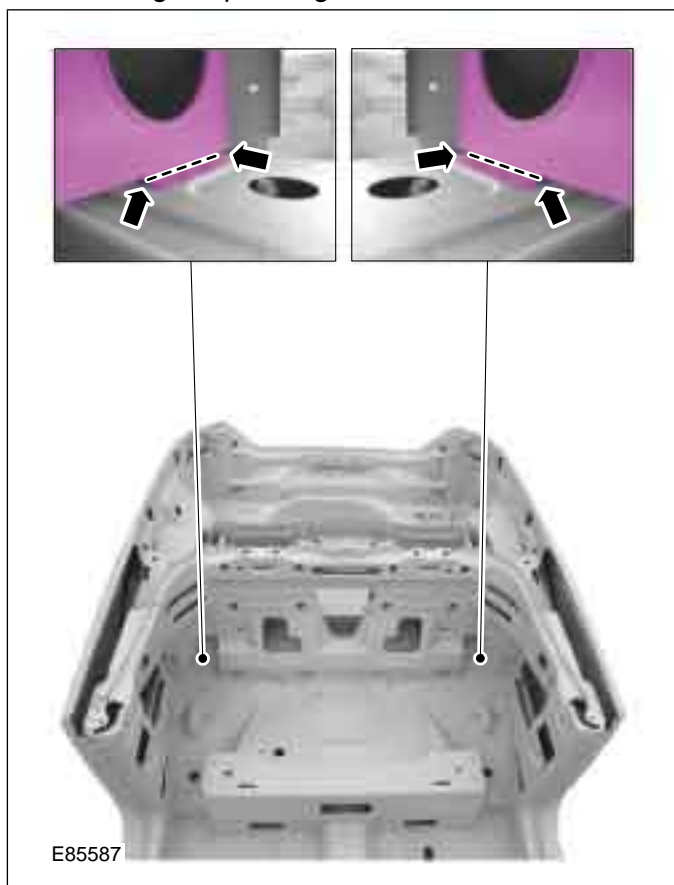
- Grind out the MIG weld seams.



4. Luggage compartment bulkhead

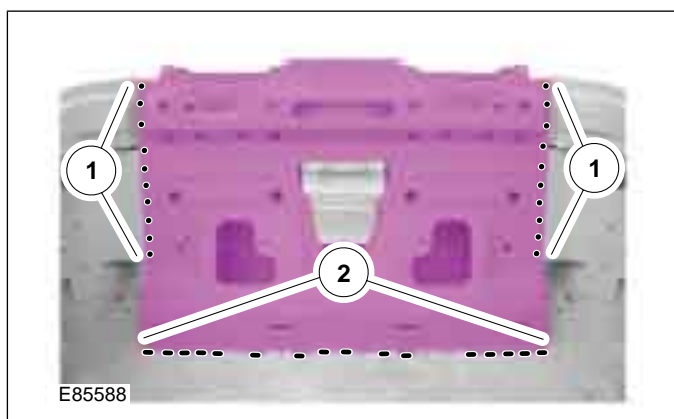
REMOVAL AND INSTALLATION

- Rough separating cuts.



5. Luggage compartment bulkhead (view from front)

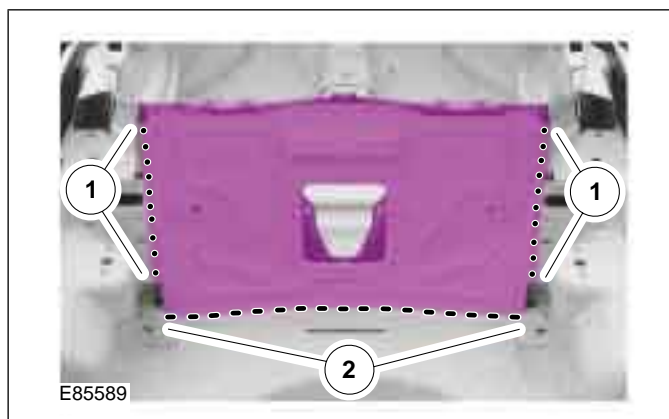
1. Mill out the spot welds.
2. Grind out the MIG weld seams.



6. Luggage compartment bulkhead (view from rear)

1. Mill out the spot welds.

2. Grind out the MIG weld seams.



7. Luggage compartment bulkhead (view from rear)

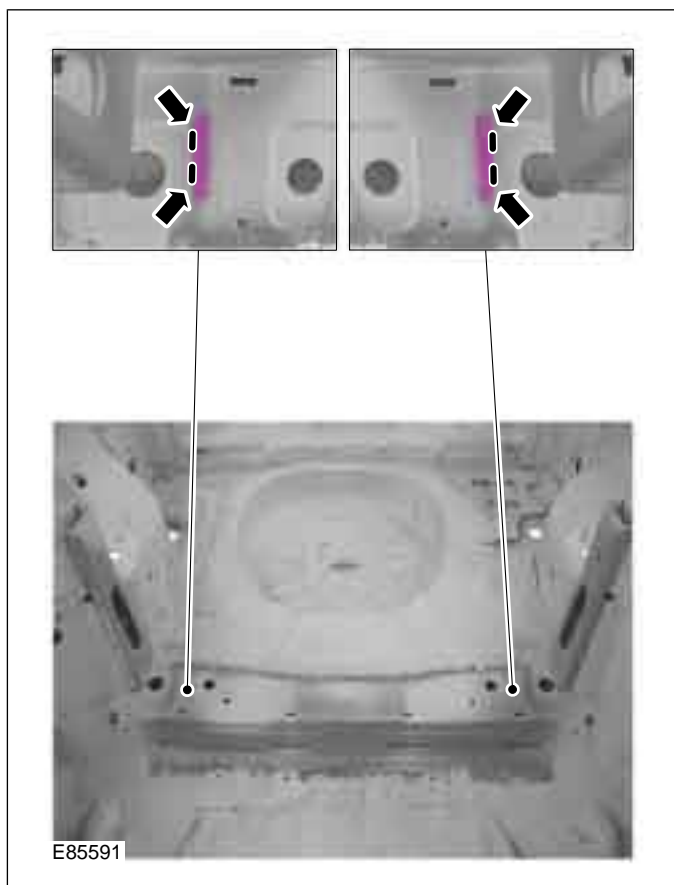
- Warm the adhesive application area (approx. 170° C).



8. Luggage compartment bulkhead remaining flanges

REMOVAL AND INSTALLATION

- Grind out the MIG weld seams.



Installation

NOTE:

- Before resistance spot welding of body panels with a total panel thickness of 3 mm and greater, the welding equipment instructions contained in sub-section 501-25 must be followed.
- The new parts must be positioned accurately in order for the roof mechanism to work properly.

1. Fit the new parts and fix with the alignment angle.
2. Luggage compartment bulkhead (view from rear)

- Drill holes for puddle welding (10 mm diameter).



3. Luggage compartment bulkhead (view from front)

- Drill holes for puddle welding (10 mm diameter).

4. **NOTE: Adhesive may only be applied thinly between the welding points (MIG welding areas) on the panel flange. Adhesive must not get into the welding areas.**

Luggage compartment bulkhead (view from rear)

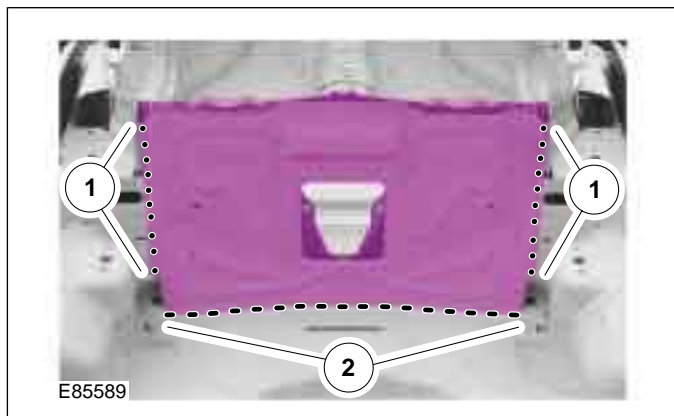
- Before inserting the bulkhead, apply 2 K metal adhesive.



REMOVAL AND INSTALLATION

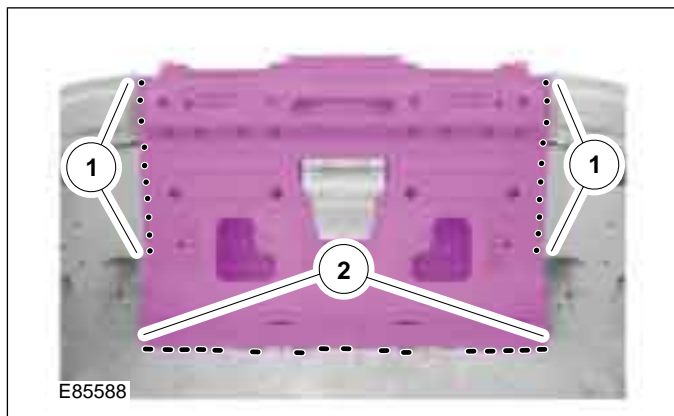
5. Luggage compartment bulkhead (view from rear)

1. Puddle weld.
2. Intermittent MIG weld.



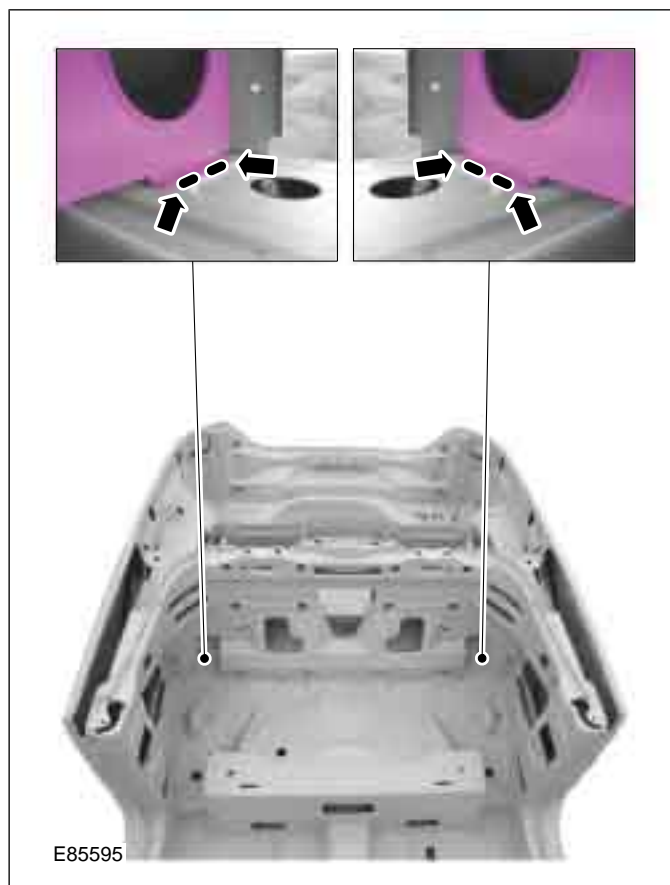
6. Luggage compartment bulkhead (view from front)

1. Puddle weld.
2. Intermittent MIG weld.



7. Luggage compartment bulkhead

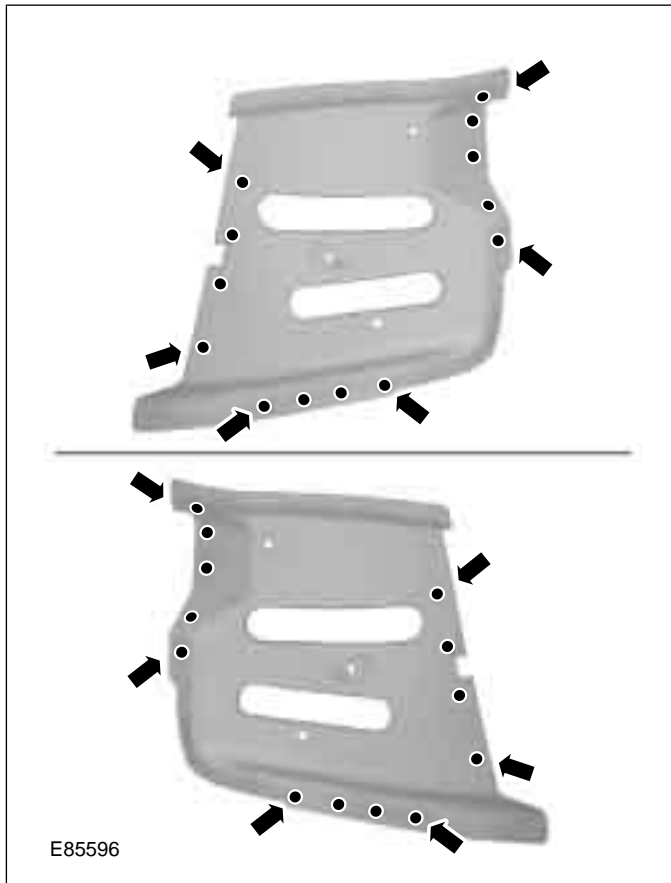
- Intermittent MIG weld.



8. Luggage compartment bulkhead connecting pieces (interior views)

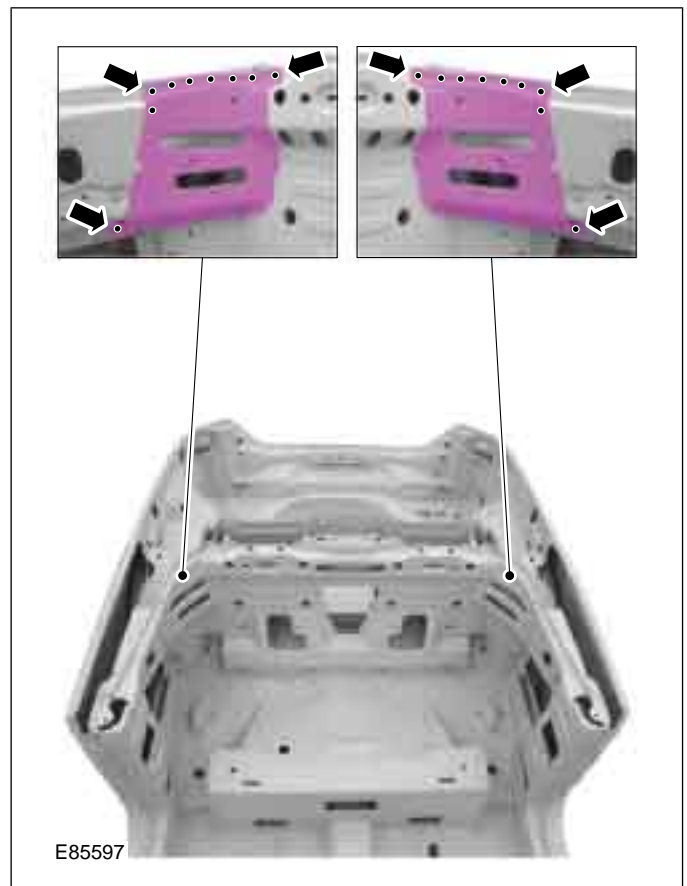
REMOVAL AND INSTALLATION

- Drill holes for puddle welding (10 mm diameter).



9. Luggage compartment bulkhead connecting pieces

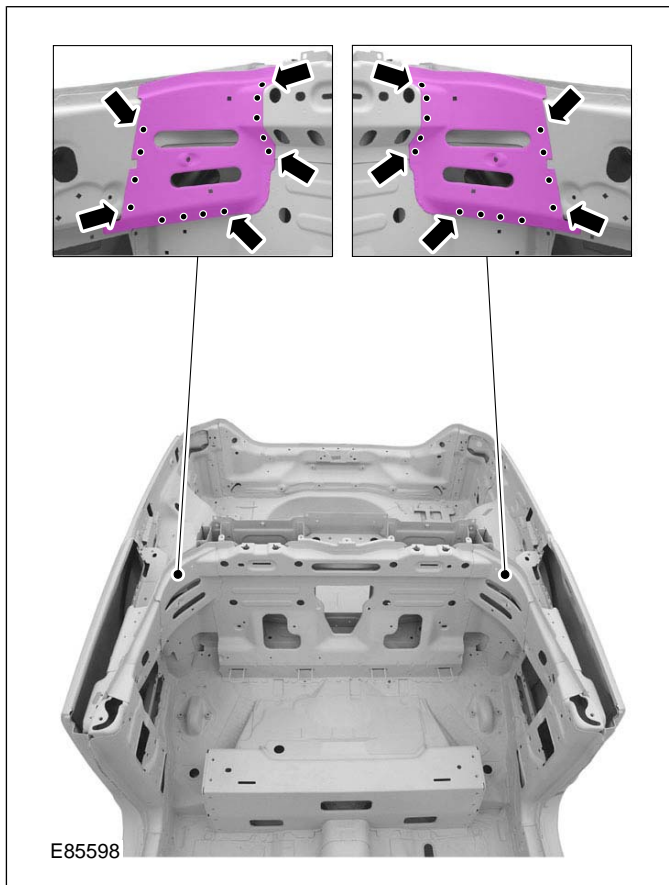
- Resistance spot weld.



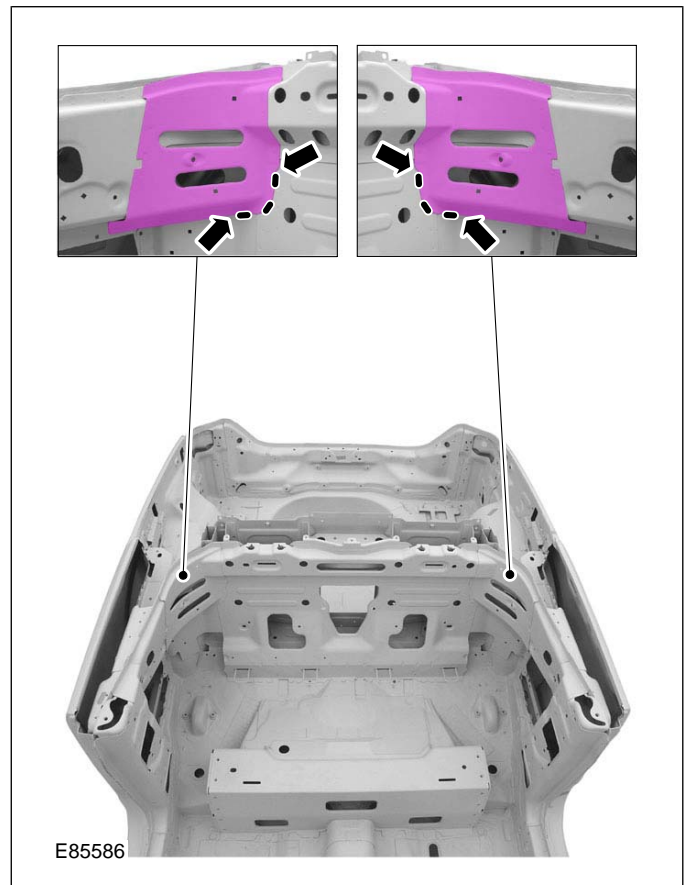
10. Luggage compartment bulkhead connecting pieces

REMOVAL AND INSTALLATION

- Puddle weld.



- Intermittent MIG weld.



11. Luggage compartment bulkhead connecting pieces

SECTION 501-36 Paint - General Information

VEHICLE APPLICATION: 2008.75 Focus ST C307

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SPECIFICATIONS

Description	Finis Code	Specification
Underbody protection	5 030 492	-
Anti-corrosion wax	1 219 834	WSK-M7C89-A
Cavity wax	5 030 081	-
Profiled butyl seal	1 128 983	S-M3G4620-A
Weld primer	1 205 996	-
Clinched flange protection	1 136 479	WSK-M4G245-B
Seam sealing compound	1 205 817	WSS-M4G364-A
Body sealing compound	1 143 255	-

Because the supply of paint materials to the dealer workshops has been handed over to paint suppliers, the specifications for these materials are not given in the table.

DESCRIPTION AND OPERATION

Description and Usage of Paint Literature

Vehicle paints are subject to severe demands caused by external influences. Moisture, air-borne deposits in the form of various chemicals and UV light constantly affect a paint surface. Furthermore, mechanical damage occurs through grit, stones and sand. Bird droppings, insect residues, pollen and tree sap also attack the paint surface.

The present literature not only informs the specialist about current repair painting techniques, but also provides tips and instructions on modern and economical repair processes.

High quality bodywork paints require the use of the most modern technologies and regular updating of the technician's knowledge of painting techniques, because of the constantly new developments in paint technology.

Information about different materials is listed under Specification.

Furthermore, information on the fundamental principles of repair painting and paint materials is provided in several chapters. The safety instructions indicate the possible health hazards and other sources of danger. There are also notes about tools and materials as well as on basic painting methods.

In the model specific repair instructions, only the most important repair steps or special features are referred to. Detailed information on the generally applicable painting procedures is given in this paint manual.

Direct supply of repair paints by Ford has been discontinued. There is however an agreement with many paint manufacturers, which ensures fast and problem-free supply to the dealer undertakings.

Paint suppliers:

- DuPont
- Glasurit
- PPG
- Sikkens
- Spies Hecker
- Standox

When using painting materials, it should be taken into account that the manufacturers have exactly matched their products between each other. In order to avoid quality defects, difficulties in working and losses in corrosion protection, these may not be substituted with other products.

NOTE: The Ford Service Organization organizes basic and more in-depth training on much of the content of this paint manual. As well as the practical part of the training, a further component is the Student Information document, which offers supplementary information in the form of a brochure.

During all work it must always be ensured that personal safety and the operational capability of the vehicle are not threatened by the choice of methods, tools and components.


The information given in the diagrams in the chapter "Paint Damage" is provided by the repair paint manufacturer.


DESCRIPTION AND OPERATION

Symbols

General

Various symbols, signs, instructions and illustrations are used in this literature. Warnings and cautions have different meanings and require different ways of proceeding. Diagrammatic representations are provided with instructional signs for improved clarity. These are briefly explained below:

 **WARNING:** This caption is used when failure to follow instructions exactly or failure to follow them at all may result in a hazard to persons or in persons being injured.

 **CAUTION:** This caption is used when incorrectly following the test procedures or instructions or failure to follow them at all could lead to damage to the vehicle or components.

NOTE: This caption is used when attention needs to be drawn to special or extra information.

When reading this handbook, you will come across the points WARNING, CAUTION AND NOTE. These instructions are always given immediately before the corresponding job steps.

Hazardous materials designations

Many accidents occur because of ignorance. In the area of personal health protection, it is particularly important to clearly emphasize sources of danger and their effects on human organs.

Only with knowledge of hazardous material designations can it be certain that the necessary precautions are taken when handling substances which are harmful to health.

NOTE: Pay attention to the manufacturer's data on the containers and given in the Safety Data Sheet.

DESCRIPTION AND OPERATION

Hazardous material symbols



E59393

Item	Description
1	Very poisonous, T+ (extremely toxic), small quantities can be fatal.
2	Poisonous, T (toxic), causes serious damage to health
3	Corrosive, C (corrosive), destroys living tissue.
4	Harmful to health, Xn (noxious).
5	Irritant, Xi (irritant), can cause inflammation.

Item	Description
6	Explosive
7	Highly flammable, F+ (extremely flammable), already flammable at temperatures below 0° C.
8	Flammable, F (flammable), forms a flammable mixture with air.
9	Oxidizing, O (oxidizing), reacts with combustible substances.

DESCRIPTION AND OPERATION

As well as the danger symbols, there is more comprehensive manufacturer's information to be found on the containers and in the Safety Data Sheets, and you must pay attention to this information.

Instructions on measures to be taken for personal protection.

As well as the information about sources of danger, there are mandatory instructions which draw your attention to the personal protection measures to be taken.

Mandatory symbol

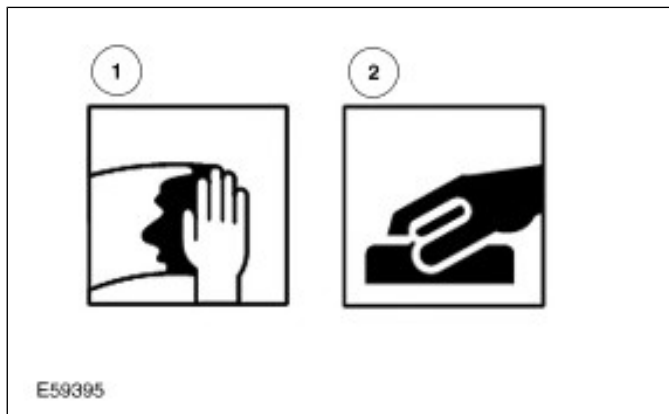


Item	Description
1	Breathing protection must be worn
2	Eye protection must be worn
3	Ear protection must be worn
4	Protective gloves must be worn
5	Protective footwear must be worn

Icons

So that the necessary information for optimal handling is clear, unambiguous and can be quickly understood, the leading paint manufacturers have agreed a standard symbolic language. Language independent representations in the form of icons provide handling instructions which are supplemented with quantity or time information.

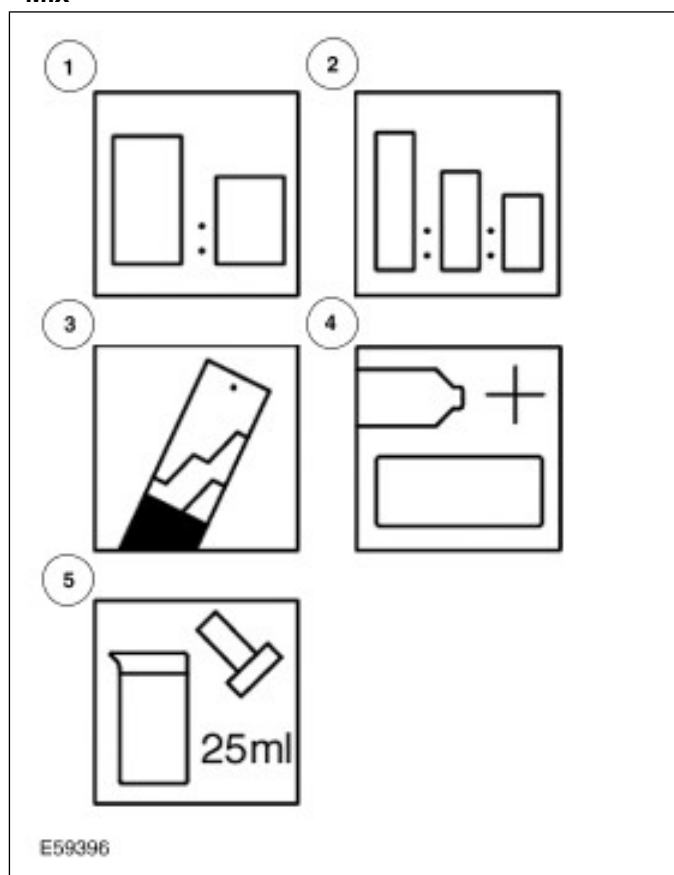
Pretreatment



Item	Description
1	Clean
2	Sand

DESCRIPTION AND OPERATION

Mix



Item	Description
1	2 component mixture
2	3 component mixture
3	Use a measuring rod
4	Addition of hardener
5	Addition of additives

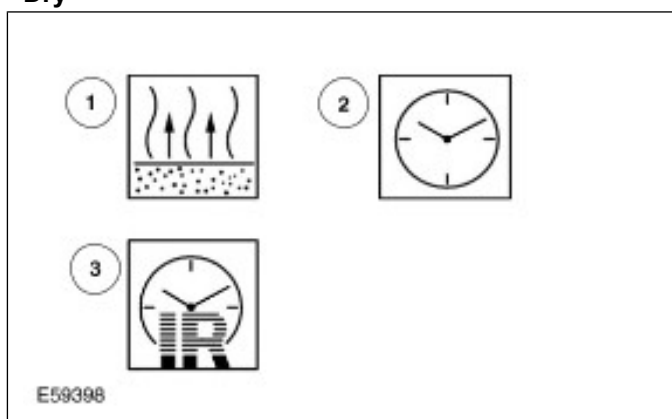
Process



Item	Description
1	Flow-beaker spray gun
2	Suction-beaker spray gun
3	Spray passes
4	Filler
5	Coat
6	Underbody protection spray gun

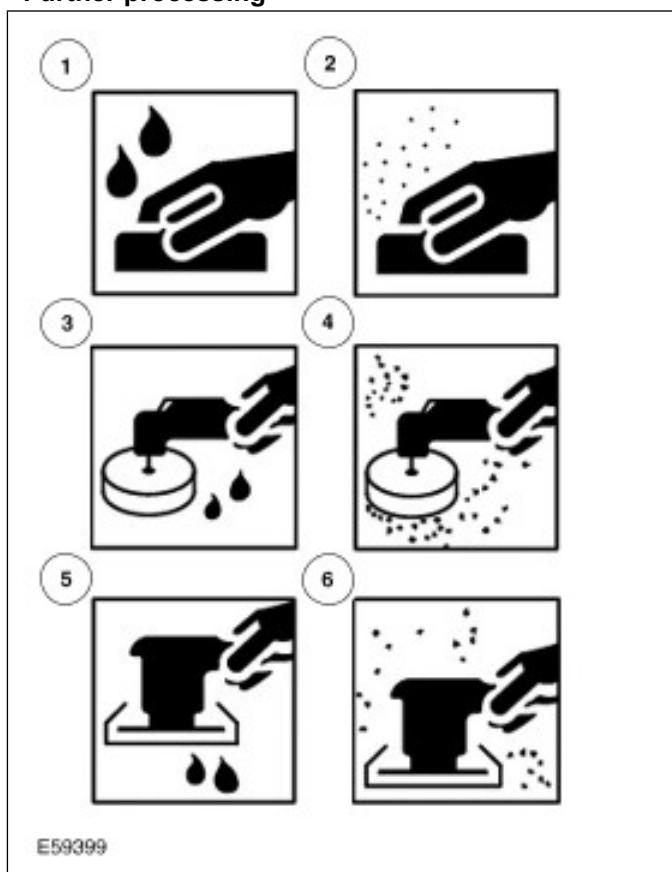
DESCRIPTION AND OPERATION

Dry



Item	Description
1	Ventilate
2	Drying time
3	Drying time with infra-red dryer

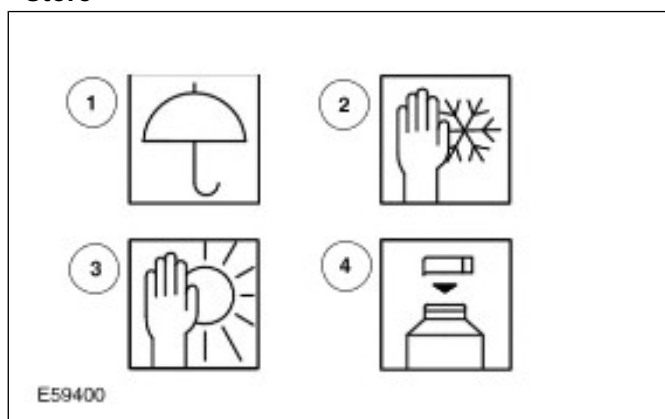
Further processing



Item	Description
1	Hand abrade (wet)
2	Hand abrade (dry)
3	Eccentric sander (wet)
4	Eccentric sander (dry)

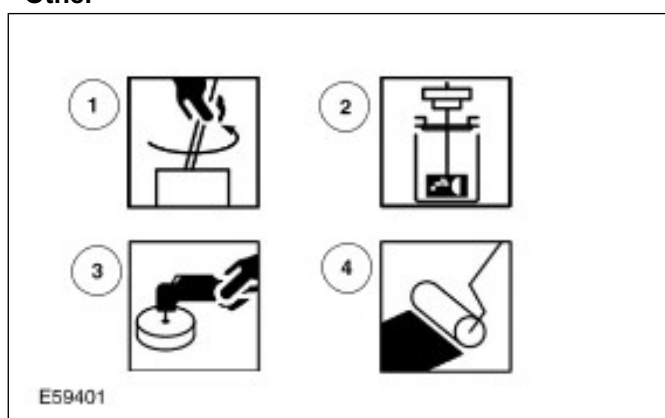
Item	Description
5	Oscillating sander (wet)
6	Oscillating sander (dry)

Store



Item	Description
1	Protect from moisture
2	Store in a frost-free environment
3	Store in a cool place
4	Close the container

Other



Item	Description
1	Stir by hand
2	Stir using a mixing machine
3	Polish
4	Roll

DESCRIPTION AND OPERATION

Health and Safety Precautions

General instructions for the paint shop and handling paint materials

Hazardous areas in repair paint shops:

- Danger from fires, explosions and hot surfaces.
- Dangers to health and safety from the effects of harmful substances because of their absorption through the skin and/or inhalation.
- Dangers caused by electricity, compressed air, power tools and noise.

▲ WARNING: During painting work there is an increased danger of fire or explosion. Prevent any sparks being created. Fire, naked lights and smoking are forbidden.

Measures:

- Wear protective footwear made from anti-static material.
- Only use tools made of wood, brass or copper to clean stands and extraction ducts. Do not use tools made of steel.

Only fill or decant paint materials in a specially marked area.

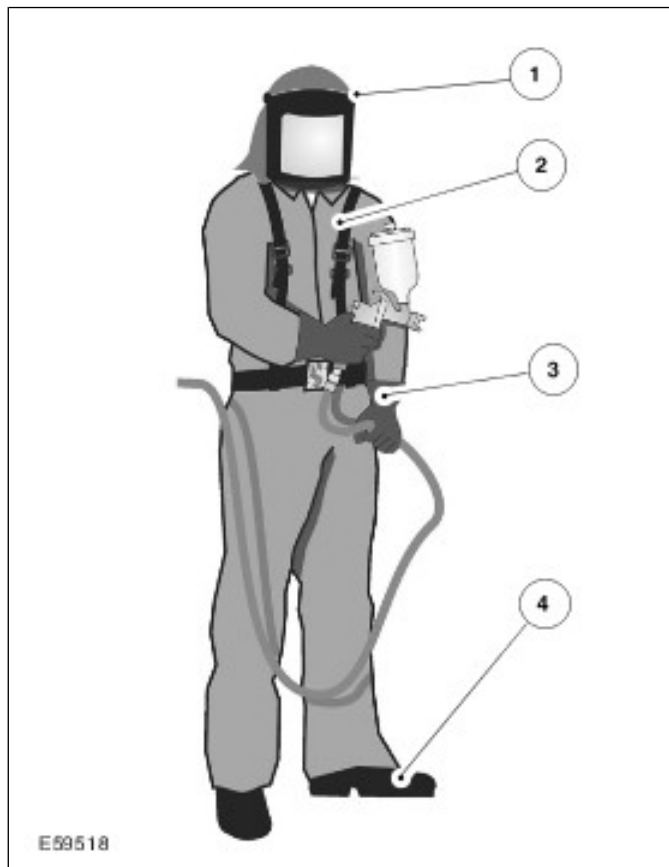
As well as these general instructions on the dangers in repair paint shops, all national and international regulations must be observed:

- Health and Safety at Work Act
- Ordinance on Hazardous Substances
- Technical Rules for Hazardous Substances
- Regulations for the Prevention of Industrial Accidents
- EU Directive on Hazardous Substances, 98/24/EU
- EU Directive on Noise, 2003/10/EU
- EU Directive on Volatile Organic Compounds (VOC), 1999/13/EU, 2001/81/EU, 2004/42/EU
- Safety instructions of equipment and tool manufacturers

Personal protection

Besides the body and limbs, several organs vital to life are in very particular danger. Because damage is mostly irreparable, special attention and comprehensive protection are necessary.

▲ WARNING: Solvents cause damage to the health through inhalation. Splashes in the eyes or on the skin can cause bodily harm. When working with solvents, always use suitable means of protection.



Item	Description
1	Protective hood with fresh air supply
2	Protective clothing
3	Protective gloves
4	Protective footwear

Breathing protection

During painting work and in the preparations for painting, gases, vapors, mists or dusts can appear in dangerous concentrations in the areas where fellow employees breath.

For short periods of work or minimal concentrations of hazardous substances, breathing protection devices with a combination filter are suitable as breathing protection equipment.

DESCRIPTION AND OPERATION



Item	Description
1	Activated charcoal filter
2	Coarse filter

For higher concentrations of harmful substances, breathing protection devices which are independent of the local atmosphere are suitable.

In these types of isolation systems, a compressed air hose carries natural air from the compressor line into the protective mask. During supply, the air undergoes pressure reduction, water removal, fine filtration and usually warming to natural breath temperature.

▲ WARNING: Vapor or spray mist containing isocyanate as a paint base or hardener can cause toxic respiratory disease (conditions similar to asthma) leading to permanent damage, even when inhaled in the lowest concentrations.

Filter masks with wadding, sponge or colloid filters and also paper masks are all unsuitable for working with coating materials because they do not stop solvent vapors.

The instructions for use provided by the manufacturer must be observed when working with breathing protection equipment.

Skin protection

Spray painters who are subject to considerable exposure to coating materials must wear suitable protective work clothing (flame-proof and anti-static).

NOTE: Also, when working with water based materials, comprehensive skin protection must be worn, because these materials are very easily absorbed through the skin.

The protective clothing must be changed at the proper intervals. Items of clothing which are contaminated with coating materials can easily catch fire.

When selecting protective clothing, it must be taken into account that cloth containing a high proportion of easily melted plastic thread considerably increases the degree of burns injury (melted plastic on the skin!). This must also be taken into account in the choice of underwear.

For areas of skin which are not covered by protective clothing, suitable skin protection, skin cleaning and skin care agents must be used.

Eye protection

Working with portable hand sanding machines on which the tools move unguarded, at speed and with power is fundamentally dangerous.

Goggles must be worn not only when sanding, but also when working with paints and their additives. These contain substances which are harmful to the eyes. Damage ranging from irritation of the cornea to incurable illnesses are possible.

The protective goggles must be inert toward splashes of solvent, and fully enclose the areas at the side of the eyes on both sides. The best protection during spray painting is offered by full mask respirators or helmet respirators with a built-in visor.

Ear protection

Noise disturbance in repair paint shops caused by various sources is particularly high. Sanding and compressed air machines, paint cabin extractor fans (compressors) and extractor ducts in the work rooms are the causes of the high levels of noise.

▲ WARNING: Avoid damage to your hearing! Wear ear protection.

Suitable ear protection is offered by ear plugs or ear defenders.

DESCRIPTION AND OPERATION

Environmental Regulations

Waste disposal in the repair paint shop

More than ever before, since the introduction of EU directives, rigorous attention is paid to the avoidance of waste materials and to recycling in repair paint shops. In this respect, repair paint shops must take into account and comply with the following requirements:

- Separate waste according to its recycling and disposal methods.
- Produce evidence for the correct transport and disposal of waste.

NOTE: The organization of disposal in the plant must comply with the requirements of the Waste Avoidance and Management Act: The avoidance and recycling of waste must always take priority.

However, despite all measures which may be taken, waste cannot be completely avoided.

NOTE: Waste which is not allowed in household rubbish, and which can no longer be utilized, must be disposed of as special waste.

Paint residues containing solvent, application residues, sanding dust, waste containing peroxides, solvents, soiled cleaning cloths and paint slurry all count as special waste. Each of these must be collected in a separate, sealed and suitably labeled metal container and properly disposed of using a specialist company.

Careful separation allows some waste to be usefully re-used.

- Empty metal containers can be sent for scrap instead of being disposed of as waste.
- Contaminated cleaning thinners can be separated by distillation.
- Packing material and masking paper can be added to the recycled paper collection.

Residues which cannot be used must be correctly disposed of.

All remaining waste must be treated as commercial waste and disposed of according to the local regulations.

The new VOC (Volatile Organic Compounds) solvent regulation

Keeping the air clean protects the environment and the population from the health-damaging effects of air pollutants.

In certain atmospheric conditions, volatile organic compounds contribute to summer smog.

NOTE: For comprehensive information, please refer to the European VOC Directive, 1999/13/EU. Furthermore, the effective national regulations must be complied with.

The European VOC (Volatile Organic Compounds) Directive has controlled the limits for such compounds since August 2001. It applies to production coating companies and those which undertake repair painting of private and commercial vehicles.

Not least because of the VOC legislation, modern, low solvent and solvent-free lacquers and paints are finding greatly increased distribution across industry and the trade. Up to the year 2007, emissions from painting work will drop by at least 40%.

At the same time, the paint manufacturers guarantee for example that they will produce a ready-to-spray product consisting of base paint + hardener + thinners, with a permitted VOC level.

A company in business today can conform with the stipulated requirements by introducing water-based paints and using the other necessary products from the relevant paint manufacturers.

For more detailed information, please refer to the EU VOC Directive.

DESCRIPTION AND OPERATION**Factory Paint Application****General fundamentals of paint technology**

Paint is a pigment-containing liquid which undergoes chemical and/or physical processes after it has been applied to a surface, so changing into a solid film covering.

Repair paint consists of binder, pigments, filler and solvent.

NOTE: Organic solvent is being replaced by solvent based on water.

Constituents of paint

- Binder
 - Mostly semi-fluid resins which bind together the other components of the paint when it dries.
 - Makes the paint durable.
 - Ensures good surface coverage.
- Pigments
 - Fine, colored powders, which give color to the paint.
 - Cover the components below (covering power).
- Additives
 - Additives give the paint special properties.
 - e.g. flow improver, softener, drying accelerator, thickener.
- Solvent
 - Thins the paint and allows it to flow more freely.
 - Evaporates during drying.

Painting process and corrosion protection.

In production, painting consists of individual steps which are optimally matched to each other.

Bodywork consists almost entirely of steel panels which have been pre-coated with zinc. The zinc layer is between 5-10 µm thick and acts as the first corrosion protection layer of the steel panel.

Production sequence:

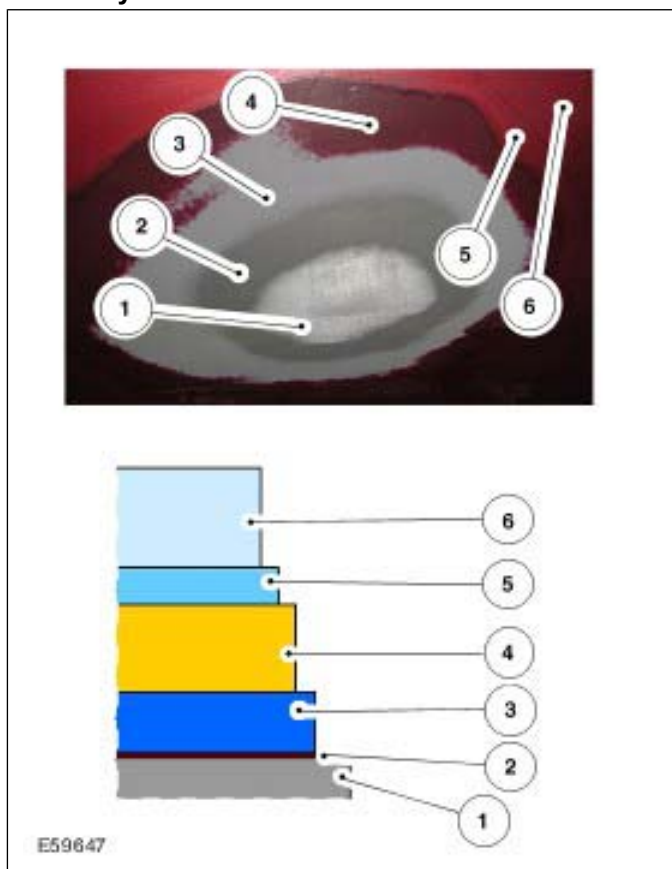
- Clean and de-grease
 - In the first step, the bare bodywork is initially dipped in a cleaning bath and cleaned with a degreasing solution.
- Phosphatising
 - The cleaned bodywork is dipped in a bath containing various phosphate salt solutions. This creates a crystalline metal-phosphate layer which offers the optimal prepared surface and also corrosion protection.
- CDP base
 - The cathophoretic dip paint (CDP) base acts as a further corrosion protection layer.
 - In this process the bodywork is completely immersed in a bath consisting of a paint and electrolyte solution.
 - By application of an electric voltage, an electric field is created.
 - Positively charged paint particles settle on the negatively charged bodywork and form a protective layer up to 20 µm thick.
 - Next the bodywork is placed in a dryer, where the CDP base is hardened at 180°C.
- Sealing, stone-chip protection
 - Edges, seams and but joints are sealed with a sealing compound.
 - Vulnerable areas are coated with stone-chip protection.
- Filler
 - Filler protects the body panels from stone impacts. Furthermore, any unevenness of the metal surface is flattened out, in order to create the most homogenous and fault-free undersurface possible.
 - Once the filler is dry, it serves as the base on which paint is applied.
- Top coat
 - The top coat is applied as a single layer or two layers of paint.
 - When working with two layer paint, in the first job step the initial colored base paint is applied. In the second job step, a clear lacquer is applied, giving the base paint shine and hardness.

DESCRIPTION AND OPERATION**The structure of an original paint finish**

During construction of the original paint, a total surface thickness of between 120 and 130 μm is achieved. The thicknesses of the layers may vary however, because they are greater for horizontal surfaces than vertical ones.

Not every exterior paint has its own matching filler. It is more that the tones of the filler are color compatible, i.e. they have similar intensity to the top coat.

During repair painting the filler color tones must be used according to the manufacturer's instructions.

Paint layers

Item	Description
1	Steel panel
2	Phosphate layer 2.9 g/m ² , corresponding to 2 μm .
3	Cathodic dip paint 30-35 μm
4	Filler 30-35 μm
5	Base paint 15-20 μm
6	Clear varnish 55 μm

Colored fillers applied in production

Filler which gives color is used in production. Its use makes the base paint and clear varnish unnecessary on certain vehicle interior surfaces (engine, doors).

DESCRIPTION AND OPERATION**Paintwork Defects and Damage****Diagnosis and Damage Assessment**

Paint concerns, regardless of their causes, are part of the everyday work in the paint shop. Correct damage assessment and determination of the cause are preconditions for a professional resolution of a paint concern.

Paint concerns can still occur through a variety of causes, despite improved paint materials and new spray methods.

NOTE: A first appraisal of the paint damage should be done before cleaning. External factors such as rust, droppings, incorrect or insufficient paint care can then be more easily detected.

Diagnosis is best done in daylight but not in direct sunlight. Exact evaluation can also be done under artificial light from special luminescent lamps.

Paint damage guide

The most important paint damage concerns which make a paint repair necessary are:

- Damage from biological paint contamination such as bird or insect droppings, tree resin and aphids.
- Chemical paint damage caused by industrial contaminants such as smoke, fuel, acids, oils.
- Mechanical damage caused by stone impact during operation, scratches in the car wash and parking.
- Damage caused by faults in treatment. Application defects such as paint runs or orange peel.
- Dirt inclusions in the paint layer, e.g. caused by dust in top coat or textile lint.
- Damage due to corrosion.

Before repair of such paint concerns, exact diagnosis must be performed to determine the cause exactly. On the spot diagnoses using simple aids and processes are often enough.

Diagnosis without disturbing the paint is done by:

- Optical inspection without visual aids, under suitable light conditions from a suitable angle and correct distance.
- Optical inspection with the help of a magnifying glass.

- pH paper.
- Measurement of the thickness using FE / NFE coating thickness meters for ferrous (FE) and non-ferrous metals and non-magnetic steel (NFE) - magnetic process on steel panels, eddy current process on non-metals.

A test method where the traces of testing can be easily removed again is the finger nail test. With suitable experience the existing hardness of the paint can be determined.

Test methods where the paint is partially destroyed are:

- Pencil hardness test.
- Adhesion test using adhesive tape.
- Lattice cut test process to check the strength of adhesion.

Under certain circumstances these test methods are not enough for a certain diagnosis. In this case, paint diagnosis under laboratory conditions must be performed.

Measuring and testing equipment for painted surfaces

Coating thickness measuring devices

Magnifying glass

pH paper (together with water)

Suitable photographic equipment with macro lens

Shine measuring equipment

Paint damage caused by environmental factors

- Bee droppings
- Bird droppings
- Insects
- Tree resin and sap
- Aphid secretions
- Tar spots
- Cement, plaster and slaked lime
- Rust film/deposits from industrial fallout
- Battery acid
- Brake fluid

DESCRIPTION AND OPERATION

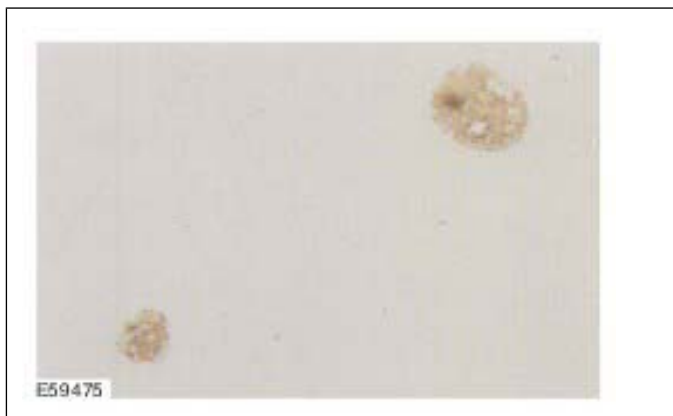
In all the cases of paint damage described below, if the damage is irreversible a new paint finish must be applied.

Paint damage cause by bee droppings

Bee droppings can be recognized on a paint surface through its yellow or brown color and sausage or drop-like shape with a diameter of 3-4 mm.

Cause/damage pattern:

- In combination with heat and high air humidity, bee droppings leave discolorations and cause paint decomposition.
- The paint can be destroyed down to the filler.



Repair of damage:

- If the damage is light, perform a polishing repair.

Paint damage caused by bird droppings

Bird dropping damage appears most often as matt, etched topcoat areas of various sizes. If left on the vehicle for a long time, crack formation and etching down to the filler will occur.

Cause/damage pattern:

- Bird droppings are particularly harmful in combination with heat and moisture. The urea (white part) has a very high salt content and is very aggressive.
- The intensity of the damage varies depending on the type, quantity, contact time and extent.
- Cracks, etching, marks up to dissolution of the top coat are the results.



Repair of damage:

- If the damage is light, perform a polishing repair.

Paint damage caused by insects

At insect impact locations on the hood, roof and bumper, small etched or etched through paint marks with partially visible spots of filler.

Cause/damage pattern:

- The top coat layer is destroyed in a short time by surface swelling and etching.
- Colliding insects stick to the paint surface. In combination with moisture and heat, because of the resulting acids the insect bodies sink into the paint top coat.
- The corrosion is G, C, U or O shaped and is only a few millimeters thick.



Repair of damage:

- Wash the vehicle, treat the affected area with insect remover. Clean the paint surface several times.
- Protect with hard wax.

DESCRIPTION AND OPERATION**Paint damage caused by tree resin or sap**

Small yellow-brown marks or drops on the horizontal parts of the vehicle. The drops melt in sunlight. Resin damage only occurs in the warm summer months.

Cause/damage pattern:

- Because of their chemical composition, tree resins combine with or adhere very well to paint top coats and cause them to swell. The higher the temperature, the more intensive is the chemical bonding between the resin and the paint topcoat surface.



Repair of damage:

- Soak several times using a cloth saturated with a petrol & paraffin mixture.

NOTE: After successful cleaning the top coat must be preserved.

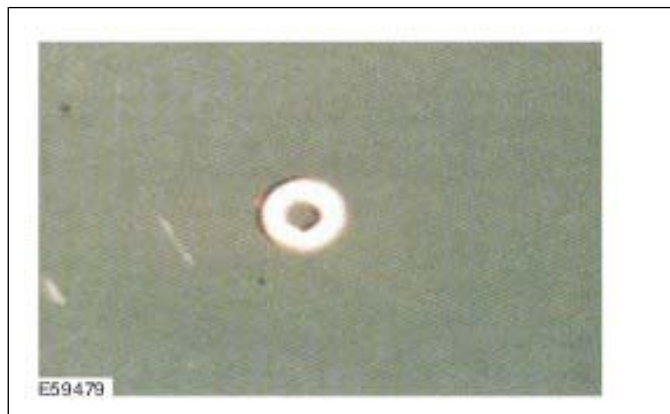
- Swellings can be removed by warming.

Paint damage from aphid secretions

Small, round, matt marks about 1 mm diameter and etching with small islands down to the filler. Fresh aphid excrement looks like small drops of honey.

Cause/damage pattern:

- Aphids produce a mixture of starch, leaf acid and sugar from sap in leaves. Under the effects of warming and moisture this can turn into alcohol.
- The round shape of the damage and the island of intact paint are typical.



Repair of damage:

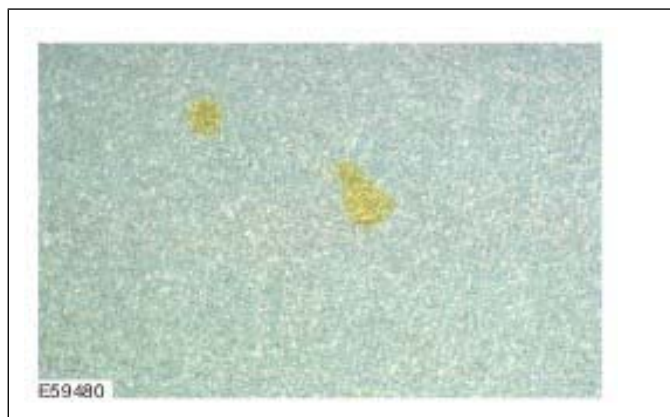
- Remove the excrement as soon as possible.
- Small single matt locations without etching can be repaired using a polishing repair.

Paint damage caused by tar spots

Yellow or dark marks.

Cause/damage pattern:

- Firmly stuck spots of tar which lead to discoloration of the surface. In some cases penetration through the clear lacquer into the top coat.



Repair of damage:

- Clean the paint surface with tar remover and polish.

Paint damage caused by cement, plaster and slaked lime

Damage appears as whitish matt marks on the top coat.

Cause/damage pattern:

- Corrosive alkaline compounds interacting with moisture.

DESCRIPTION AND OPERATION



Repair of damage:

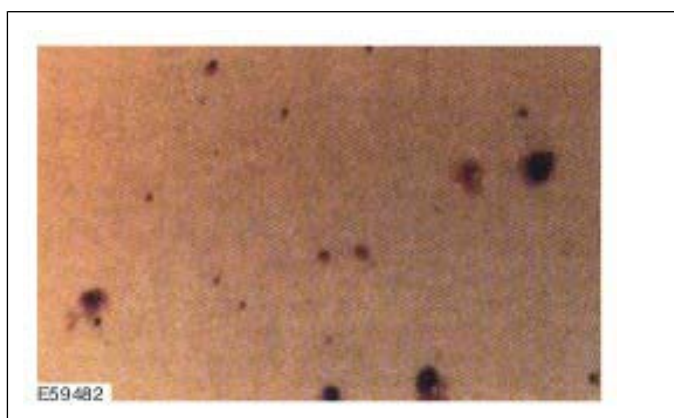
- Wash immediately if the contamination is fresh.
- If the contamination has dried on, dissolve and neutralise it with vinegar, then thoroughly wash off with water and rinse.
- Rectify mild damage using a polishing repair.

Rust film/deposits from industrial fallout

Small round marks, about 1 mm in size, in all shades from black, grey, blue to reddish, on the horizontal surfaces of the vehicle.

Cause/damage pattern:

- Deposits from oil fired systems and industrial plant, especially at high humidities and inversion weather conditions, cause damage to the paint top coat.
- As the activity time increases so called rust halos form. They spread as long as the deposits corrode.
- Industrial fallout containing iron will no longer be removable after a few days!



Repair of damage:

- Remove the dust using an industrial fallout remover and thoroughly wash.
- Polish the paint surface.

NOTE: Never try to remove the particles of industrial fallout by polishing or rubbing!

- Use cleaning dough.

Damage caused by battery acid.

Splashes of battery acid caused by carelessly topping up the battery.

▲ WARNING: Batteries contain sulphuric acid. When working near the battery, or where there is battery acid on the vehicle body, protect the skin and eyes from contact with the acid. If battery acid contacts the skin or enters the eyes, flush the affected area immediately with water (flush for at least 15 minutes) and call a doctor without delay. If acid is swallowed, call a doctor immediately. Failure to follow these instructions may result in personal injury.

NOTE: High temperatures accelerate the attack on the top coat. At 50°C the top coat layer breaks down after about 15 minutes!

Cause/damage pattern:

- Etching of the paint layer to decomposition of the paint finish.



Repair of damage:

- Flush the acid splashes with plenty of water and neutralize with car washing liquid.
- If the contact time of the acid was short, perform a polishing repair.

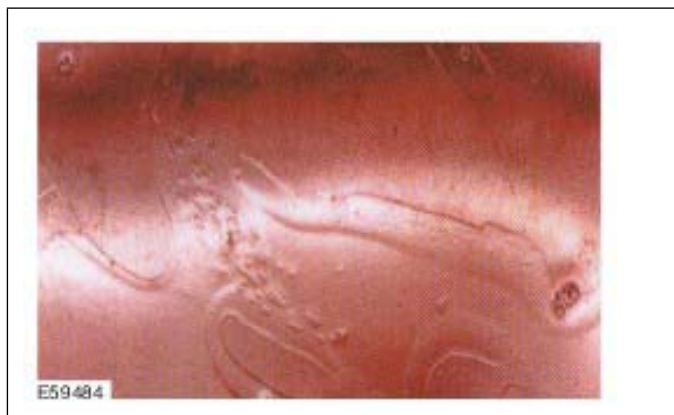
Paint damage caused by brake fluid.

Careless handling of brake fluid. The glycols contained in the fluid cause swellings.

DESCRIPTION AND OPERATION

Cause/damage pattern:

- The temperature and contact time are critical. Splashes lead to loss of shine and lightening of color.



Repair of damage:

- Flush immediately with plenty of water.
- The swellings can often be made to recede completely by treatment with the radiant heater or in the paint drying oven at max. 60°C for about 1 hour.

Mechanical damage**Stone impact damage or mechanical damage**

Mechanical damage caused by impact of stones or other hard objects and extending down to the metal panel lead very quickly to corrosion and rusting under the paint on the adjoining surface.

Cause/damage pattern:

- Paint damage caused from the outside, down to filler, primer or metal panel.



Repair of damage:

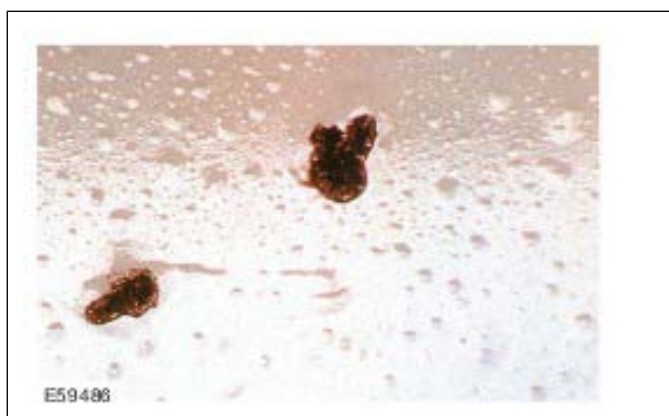
- Sand or blast out.
- Use anti-corrosion primer.
- Apply top coat.

Damage due to corrosion**Blistering/rusting below**

Air or water filled blister-shaped raised areas in the paint film.

Cause/damage pattern:

- Overpainting corroded steel panel.
- Condensation in the spray air.
- Sanding water not dried out or salt crystal residues.
- Road chippings and road winter grit containing salt.



Repair of damage:

- Sand the affected area of damage or the body component and re-create the paint finish.
- More severe and larger areas of rusting below must be repaired using the corresponding repair painting, Repair Level III or IV.

Damage caused by faults in treatment

- Craters
- Paint boils
- Adhesion defects
- Adhesion defects - clear lacquer
- Sanding scores
- Formation of stripes
- Peeling/blistering on plastic parts
- Blistering on polyester material
- Peroxide marks in metallic paints

DESCRIPTION AND OPERATION

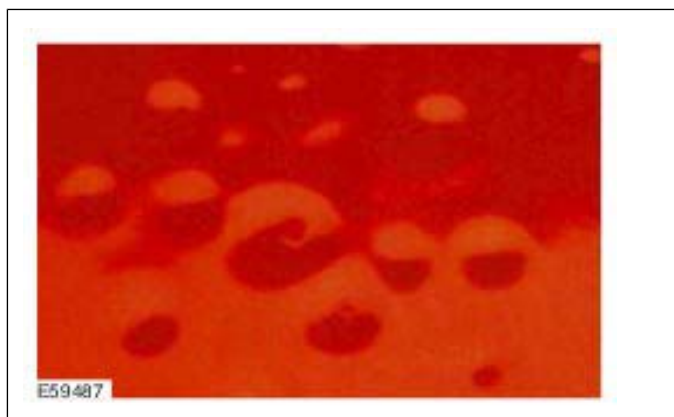
- Crack formation
- Shrinking back/zone edge marks
- Blistering
- Etching
- Paint wrinkles/puckering
- Cloud formation
- Spots/metallics
- Metamerism/color deviations
- Washing out
- Loss of gloss
- Covering ability/areas of thin paint
- Flow problems/orange peel
- Dirt embedded in metallic base paint
- Dirt embedded in top coat
- Water marks
- Paint runs
- Swirl marks

Craters

Crater-like single or extensively occurring depressions with raised edges, in top coat or the intermediate layers.

Cause/damage pattern:

- Substrate not adequately cleaned with silicone remover.
- Spray air contaminated by oil residues and water accumulations.
- Filter ceiling not adequate for requirements.
- Use of polishes, cleaning agents or sprays (e.g. interior sprays) containing silicone.
- Oil, wax, grease, silicone containing residues.
- Working clothes contaminated by materials containing silicone.



Repair of damage:

- Sand paint surface, clean with silicone remover and apply one thin spray pass. Let it begin to dry well, then apply several thin and dry sprayed passes.

Paint boils

Small, hard, closed or burst blisters in the paint top coat. They appear locally in groups or spread individually across the whole surface. Sanding opens up a larger cavity, under which the primer can often be seen.

Cause/damage pattern:

- Paint applied in layers which were too thick.
- Specified flash-off and drying times between coats were not adhered to.
- Specified working viscosity and spray pressure were not adhered to.
- Use of unsuitable hardener and thinner materials. (Solvent combinations in paint system not optimally matched).
- Poor booth conditions.



Repair of damage:

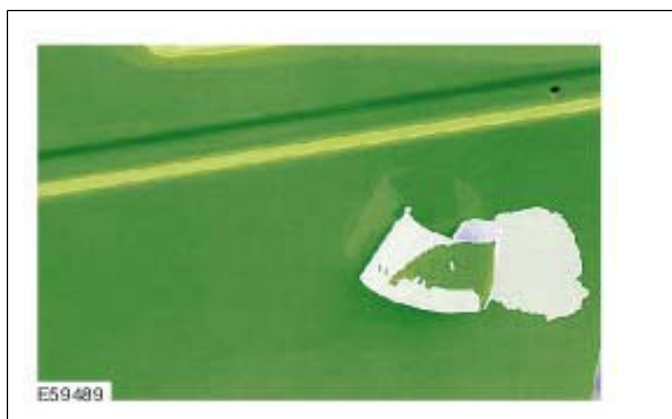
- Single boil blisters can be removed using polishing.
- After thorough drying, sand the top coat at the affected areas, clean with silicone remover and re-paint. Fill any fine pores still present with 2-component acrylic filler.
- On larger areas of damaged topcoat, sand completely away and apply new paint finish.

DESCRIPTION AND OPERATION**Adhesion defects**

Whole coating detached from substrate or individual layers one from another. Sometimes adhesion defects can only be noticed after an external influence such as stone impact.

Cause/damage pattern:

- Substrate not adequately prepared (rust, grease, moisture, sanding, cleaning).
- Unsuitable material used.
- Drying times, flash-off times too short.
- Base paint not sprayed wet-in-wet, instead the intermediate drying times were too long.
- Failure to intermediate sand.
- Condensation formed because of temperature fluctuations.
- Unprofessional preparation (especially on plastics).
- Overheated CDP/intermediate filler.



Repair of damage:

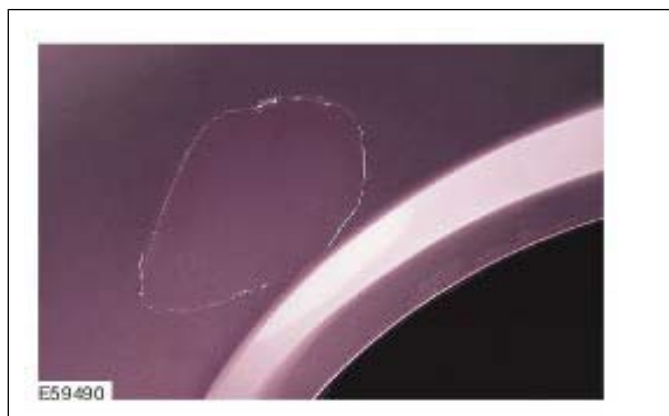
- Sand out the damage and recreate the paint finish. Create the paint finish strictly in accordance with the general technical information.

Adhesion defects in clear lacquer.

Clear lacquer detached from base paint.

Cause/damage pattern:

- Base paint layer too thick.
- Intermediate and final flash-off times of base paint too long.
- Incorrect mixture ratio clear lacquer/hardner.



Repair of damage:

- Refinish sanding and recreate the paint finish.

Sanding scores

Single or wide area clusters of scoring or sanding marks, often with raised edges. Noticeable on metallic paints as light-dark stripes.

Cause/damage pattern:

- Stopper sanded too coarsely.
- Filler sanded too coarsely.
- Filler not thoroughly dried before sanding.
- Old paint sanded too coarsely.
- Soft elastic substrates, e.g. TPA base, treated with thinners which was too aggressive and therefore etched.
- Top coat applied too thinly.



Repair of damage:

- If the damage pattern is minimal, after the top coat has dried fine sand the paint surface and refurbish by polishing.
- If the damage is great or on metallic paints, sand the paint surface or substrates and if necessary remove them, then cover the bare metal and re-paint.

DESCRIPTION AND OPERATION**Formation of stripes**

Differing, stripe shaped color/effect formations in dark/light areas of a metallic paint finish.

Cause/damage pattern:

- Spray gun (nozzle) not perfect.
- Incorrect spray pressure.
- Thinners not suitable.
- Incorrect spray viscosity.
- Flash-off time too short.
- Unsuitable working temperature.



Repair of damage:

- Apply base paint evenly.
- Repair spray gun.
- After clear lacquer has thoroughly dried, sand surface and paint again.

Peeling/blistering on plastic parts

Paint adhesion insufficient between top coat and filler and/or primer layer. It often happens that the whole of the paint finish detaches from the plastic.

Cause/damage pattern:

- Plastic item not cleaned sufficiently, not or inadequately tempered.
- Unsuitable cleaning agent used.
- Unsuitable materials used.
- Moisture.
- Paint finish underbaked or overbaked.
- Poor or lack of intermediate sanding.



Repair of damage:

- Sand away faulty paint coats and re-apply paint finish.
- In extreme cases use a new part.

Blistering on polyester material

Color shade differences or marks in paintwork subsequently applied to previously unpainted plastic material.

Cause/damage pattern:

- Plastic material is not suitable for painting.
- Incorrect bonding agent.
- Paint used not solvent resistant.

Repair of damage:

- Repaint using suitable materials.
- Install unpainted new part (after consulting customer).

Peroxide marks in metallic paints

After longer period of drying, abnormal marks where the color shade varies.

Cause/damage pattern:

- Too much hardener added to polyester stopper (over 3% can cause this damage pattern).
- Polyester stopper not well enough mixed.

DESCRIPTION AND OPERATION

Repair of damage:

- Sand, fill with polyester or epoxide filler and re-paint.

Crack formation

Cracks of different lengths and depths running in all directions.

Cause/damage pattern:

- Layers too thick.
- Painted several times.
- Temperature fluctuations.
- Mechanical effects e.g. distortions.
- Substrate not thoroughly hardened.
- Old paint not completely dried out.
- No or insufficient hardener added.
- 2-component materials used on nitro or TPA.



Repair of damage:

- Sand away layers until sound substrate is reached and create new paint finish (prime, fill, apply topcoat).

Shrinking back/zone edge marks

Lifting or dropping in of edge zones (edges which accentuate themselves in the top coat), flow problems and loss of shine in top coat.

Cause/damage pattern:

- Old paintwork not rubbed down to a seamless transition.
- Stopper and filler on a viscoplastic base primer.
- Filler sanded and overpainted when not thoroughly hard.
- Previous materials overworked too early, substrate not sufficiently hardened.
- Primer applied in layers which were too thick, and not dried for long enough.
- Sanding paper too coarse.
- Top coat thinned too much.



Repair of damage:

- After hardening off the top coat, fine sand the surface and polish up, apply filler if necessary and paint once more.

Blistering

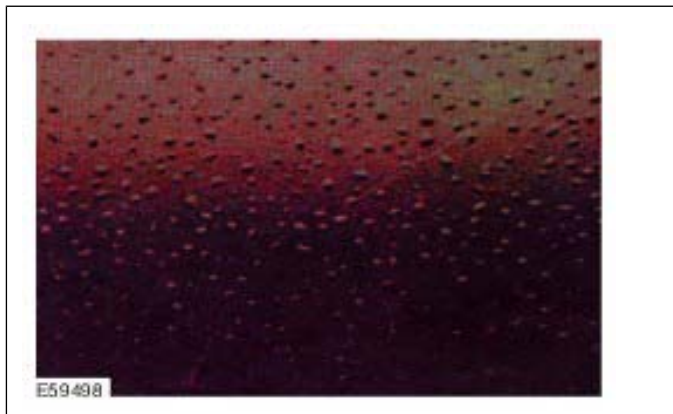
Small, spot-like, air-filled or water-filled blister shaped high-spots in the paint construction. Their dimensions can range from pin-head to pin-point size in a closed paint film. Arrangement and accumulation very variable. In the advanced stages, circular flaking of the paint from the substrate. These are neither boils nor corrosion.

Cause/damage pattern:

- Moisture absorption by substrate.
- Insufficient drying of the substrate after wet sanding (especially on polyester material).
- Humidity too high before painting; condensation formation because of temperature fluctuations.
- Pores/sink holes in substrate not sanded out.

DESCRIPTION AND OPERATION

- Polyester material not covered.
- Sweat from hands.
- Salts and minerals in sanding water.
- Spray air contaminated.



Repair of damage:

- Sand away damage, matt sand remainder of surface, clean with silicone remover, fill and re-paint.

Etching

The base paint is etched by the clear lacquer. This causes the aluminum pigments to change their alignments. The color of the etched base paint seems more grey than that of normal base paint. Result is that the surface structure of the clear lacquer becomes increasingly more matt.

Cause/damage pattern:

- Base painted too wet.
- No intermediate flash-off time.
- Layers too thick.



Repair of damage:

- Sand and re-paint.

Paint wrinkles/puckering

Lifting/puckering of the paint surface.

Cause/damage pattern:

- First paint not hardened through or can be etched.
- Areas of clear lacquer which were sanded through to base paint have not been not isolated with filler, or with unsuitable filler.
- Unsuitable substrate (e.g. spray can painting with TPA or nitro).
- Use of unsuitable primer, paint and thinner materials.
- Paint systems not matched to each other.
- In wet-in-wet process, specified flash-off times not adhered to.
- Synthetic resin top coat (alkyd resin) worked over too soon.



Repair of damage:

- After thorough drying, completely remove the top coat together with the attacked substrate at the affected areas and re-create a new paint finish.
- Before applying top coat, rub down the complete surface.

Cloud formation

Differing, blotchy color/effect formations in dark/light areas of a metallic paint finish.

Cause/damage pattern:

- Spray gun, spray nozzle, spray pressure not perfect.
- Varying spray viscosity, spraying method, flash-off times, spray booth temperature.
- Thinners not suitable.

DESCRIPTION AND OPERATION

Repair of damage:

- Droplet method before clear lacquer application.
- After clear lacquer has thoroughly dried, sand surface and re-paint.

Spots

Points rising up from the paint film.

Cause/damage pattern:

- Metallic base paint sprayed too dry, so that the metal particles could not incorporate into the paint. The clear lacquer could not cover these vertical standing particles because the spray air was too hot or the booth temperature was too high.



Repair of damage:

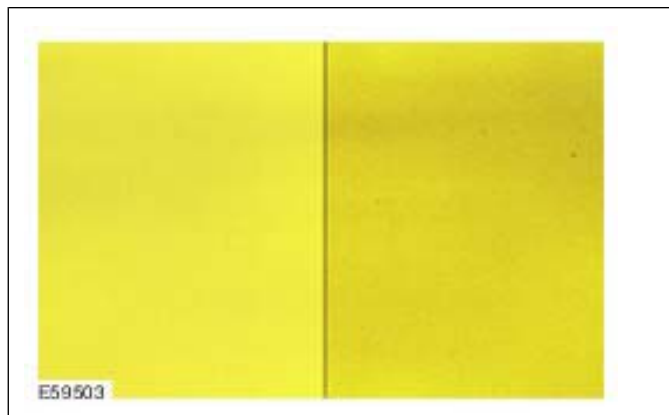
- After the paint surface has dried, lightly sand it with grade P800 sanding paper, clean with silicone remover and re-apply clear lacquer.

Metamerism/color deviations

Noticeable when identical color shades undergo a change of hue as the light source changes (daylight/artificial light). Different pigment composition between original and repair paint.

Cause/damage pattern:

- Use of paints with pigmentation which was not compatible with the standard, e.g. a green can be formulated from yellow and blue, or directly from green.
- Use of an unsuitable mixed or ready made paint to re-tone.



Repair of damage:

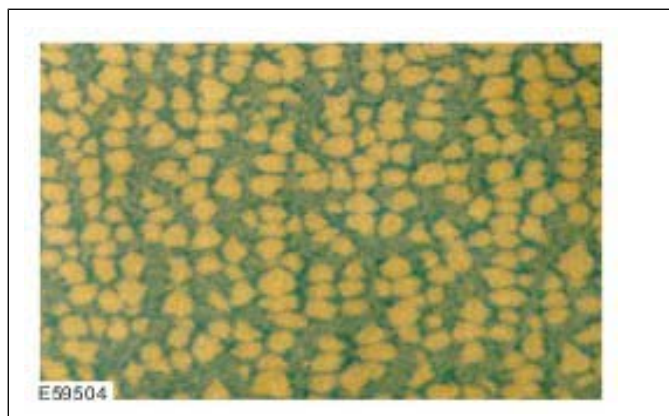
- Repaint using the correct paint.

Washing out

On paint which has been newly applied but not yet dried, the interaction of surface tension and very different specific gravities of the different pigments can lead to swirl-like turbulence which results in separation of the pigments.

Cause/damage pattern:

- Layer too thick, paint not stirred enough.



Repair of damage:

- Sand and re-paint.

Loss of gloss

Milky, dreary tarnishing of the paint with more or less even loss of gloss.

DESCRIPTION AND OPERATION

Cause/damage pattern:

- Cold with low air humidity.
- Heat with high air humidity.
- Substrate can be etched.
- Hardener fault or wrong hardener used.
- Paint thinned too much.
- Proportion of pigment too high because of poor stirring.
- Not optimum drying.



Repair of damage:

- After drying, remove the matt effect by polishing. If unsuccessful, rub down complete area and paint again.

Covering ability/areas of thin paint

Different color shades in the surface. The minimum layer thickness is not achieved here. The effects range from local minor shade variations through mottled spray zones to completely missing top coat.

Cause/damage pattern:

- No correct, uniform substrate (effect paint).
- On three-layer systems, wrong filler.
- Insufficient top coat application.



Repair of damage:

- Sand surface and recreate the paint finish.

Flow problems/orange peel

Surface structure bumpy, grained. The surface is similar to the peel of an orange.

Cause/damage pattern:

- Paint viscosity too high.
- Use of fast evaporating, highly volatile thinners.
- Booth temperature too high.
- Spray gun distance too great, too little material applied.
- Nozzle too large.
- Incorrect spray pressure.



Repair of damage:

- Small surfaces: fine sand and polish.
- Sand out the surface and recreate the paint finish.

Dirt embedded in metallic base paint.

Inclusions of contamination in metallic base paint, of different sizes and shapes (grains or lint).

Cause/damage pattern:

- Dust was not properly removed from the surface to be painted.
- Paint material not sieved.
- Function of the painting facilities not optimum.
- Filter contaminated.
- Wearing unsuitable clothing.

Repair of damage:

- Sand and repaint.

DESCRIPTION AND OPERATION**Dirt embedded in top coat**

Inclusions of contamination in top coat or under paint layers, of different sizes and shapes (grains or lint). Optical adverse effect.

Cause/damage pattern:

- Dust was not properly removed from the surface to be painted.
- Paint material not sieved.
- Function of the painting facilities not optimum.
- Filter contaminated.
- Wearing unsuitable clothing.



Repair of damage:

- Single inclusions: after thorough hardening, sand out using 1200 - 1500 grade paper and repolish using a suitable silicone-free sanding or painting paste.
- Large area contamination: sand and repaint.

Water marks

Ring shaped marks appearing on the paint surface.

Cause/damage pattern:

- Evaporation of water droplets on freshly painted and not yet fully hardened paint finishes (mostly only found on horizontal surfaces).
- Layer too thick.
- Drying time too short.
- Hardening faults or hardener no longer useable.
- Use of unsuitable thinners.



Repair of damage:

- Rub down only slight marks with sanding paper grade P1000 - P1200 and then polish.
- For heavy marking, sand the surface matt, clean with silicone remover and repaint.

Paint runs

Wave-like paint run tracks in top coat or in an intermediate layer on vertical surfaces. Mostly in the area of swage lines, seams or openings (there they are paint runs, otherwise curtains).

Cause/damage pattern:

- Uneven paint application.
- The specified viscosity was not complied with.
- Use of unsuitable thinner materials.
- Air, material or room temperature too low.
- Layers too thick.
- Spray gun (nozzle) not perfect.



Repair of damage:

- After thorough drying, sand unevenness flat, if necessary leave to dry afterwards.
- Small areas of damage can be equalised using the paint plane, then sand, polish or repaint.

DESCRIPTION AND OPERATION**Swirl marks**

Three dimensional appearance in the paint surface in the form of smears or blotches. This effect is intensified in direct sunlight.

Cause/damage pattern:

- Polishing using polishing machine on paint which has not yet hardened throughout.
- Polishing intervals too long or none at all.
- Pressure too high while polishing.
- Incorrect polishing material or polishing tool.



Repair of damage:

- Allow the paint to harden completely and then polish.
- If the damage is irreversible, rub down and apply new clear lacquer.

DESCRIPTION AND OPERATION

Tools and Equipment for Paint Repairs

General work equipment

In the repair paint shop there is a range of painting tools which make the work of the painter easier and improve the quality of the repair paintwork.

Among these are small tools which are used for the following work:

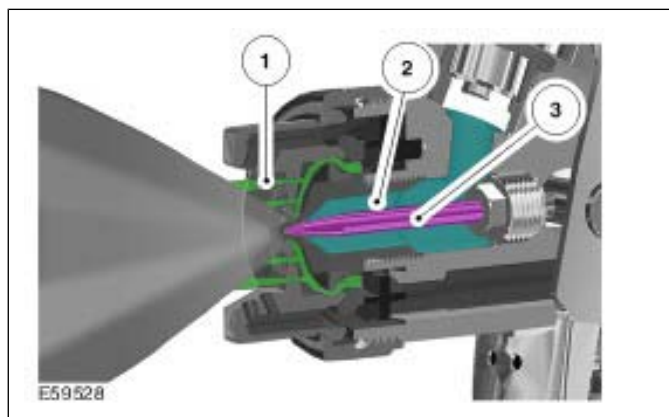
- **Measuring beakers** to measure and mix various paint materials.
- **Measuring rods** with which the required combination amounts of paint and primer filler are gauged and mixed.
- **Viscosity measuring beaker** with a calibrated opening of 4mm, used to set the correct paint viscosity.
- **Paint filter/paint sieve** for filtering foreign bodies out of mixed paint or primer. Care must be taken that the correct filter is used for each paint.
- **Color sample plates** onto which the mixed paint is applied, and the shade is then compared to that of the vehicle. Other aids which should help the painter to find the correct shade are **color sample cards** and **color panels**, which are offered by many paint manufacturers.
- **Dust bonding cloths** which are impregnated with a tacky resin and which pick up dust particles particularly well. A surface to be painted must be cleaned with a dust binding cloth immediately before paint is applied.
- **Compressed air guns** are used to remove sanding residues and to dry sanded surfaces.

Filler and spray guns

NOTE: Regular maintenance, cleaning after use and careful handling of all individual parts of the spray gun are essential for a high-quality paint finish.

The spray gun is the most important implement in the paint shop. Application of paint using the spray gun can produce a layer with absolutely constant thickness and a smooth paint surface.

Principle of operation



Item	Description
1	Air supply
2	Paint supply
3	Nozzle needle

Because of the construction design and with the aid of compressed air, a spray-ready paint mixture is dragged out of the container to the nozzle by the venturi effect, and is applied to the surface being worked.

When the trigger of the spray gun is pressed to the first pressure point, only the compressed air passage opens. If the trigger is pressed further, the nozzle needle displaces and the air stream drags paint with it at high speed. This produces a spray mist consisting of micro-droplets of paint.

DESCRIPTION AND OPERATION

Types of spray gun



Item	Description
1	Suction-beaker spray gun
2	Flow-beaker spray gun

In the flow-beaker spray gun, the paint container is mounted above the spray gun. On the suction-beaker spray gun, it is below.

Furthermore, spray guns are categorized by their air pressure requirement into high and low pressure guns.

High pressure guns have the disadvantage that they exhibit high consumption of energy and materials. The spray pressure they require is between 1 - 6 bar.

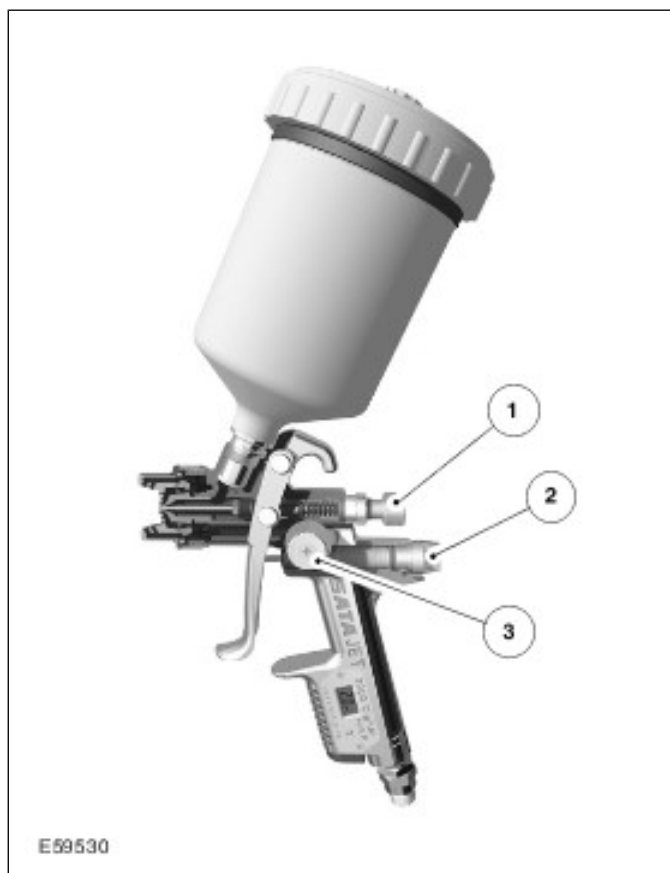
Because of the high air pressure and the large amount of air needed, the result is a powerful paint mist formation (paint transfer rate approx. 35%).

Current practice is mainly to work with reduced mist spray systems (RP and HVLP systems).

Reduced pressure (RP) guns are optimized high pressure guns which have an input pressure at the gun of approx. 2.5 bar and an atomization pressure at the air cap of 1 - 2 bar. In practice this spray technology is preferred for spraying clear lacquer because of the finer atomization.

Low pressure guns have the advantage that they exhibit minimal paint mist formation and because of this the paint transfer rate rises to approx. 65%. The spray pressure required in this case is between 1 - 5 bar. Nozzle sizes from 1 - 2.2 mm can be used.

HVLP spray guns



Item	Description
1	Quantity control
2	Working pressure control
3	Spray pattern control

The high volume low pressure (HVLP) spray gun is a high performance spray gun which forms a soft, fine and homogenous spray pattern. The atomization pressure at the air cap is 0.7 bar when the input pressure at the gun is 2.0 bar.

The low atomization pressure of 0.7 bar together with greatly reduced spray mist provide high material ejection. The low nozzle internal pressure minimizes rebound of the paint droplets from the object and thus the proportion of overspray.

This spray technology has a very high application efficiency. By matching the size of the nozzle, the HVLP spray gun can be used for all repair painting materials.

HVLP spray guns are often used in practice for the application of water based paints.

DESCRIPTION AND OPERATION

Mini spray guns are often used for small, localized touching-up work. Use of HVLP spray technology and nozzle sizes of 0.3 - 1.2 mm permits very fine work, so that the area of the repair can be kept as small as possible.

In order to ensure that a spray gun operates efficiently for a long time, careful cleaning is absolutely vital after use.

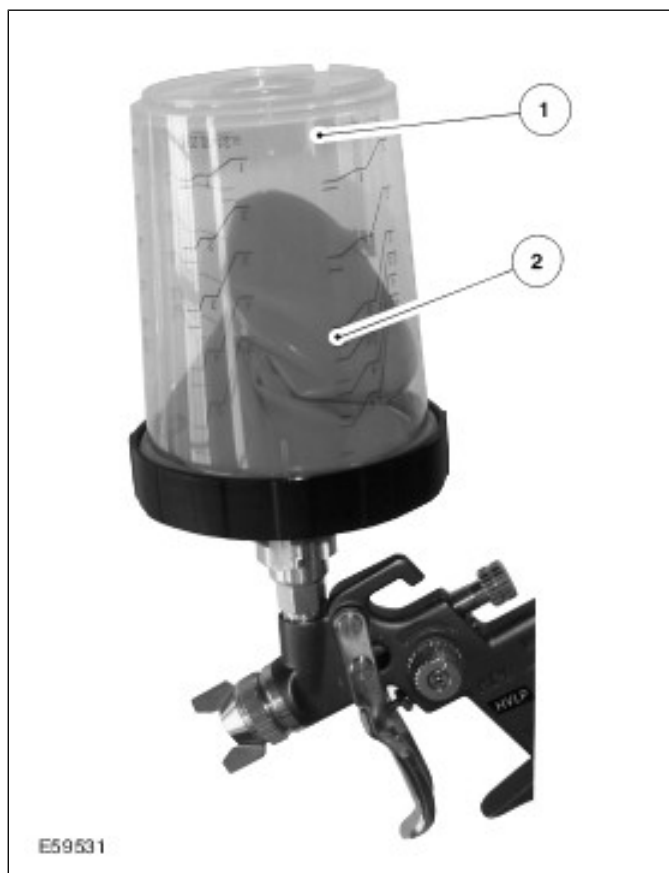
NOTE: During cleaning you must distinguish between water based and solvent based materials.

Cleaning by hand:

- Empty the paint beaker immediately after use.
- Flush the gun with cleaner.
- Clean it inside and outside with a brush.
- Dismantle the gun to clean it thoroughly.
- Clean the air cap using a suitable brush.
- Use nozzle cleaning needles to clean bores and nozzles.

A spray gun washing machine is recommended if the painting work is highly intensive.

New types of paint processing systems are replacing the conventional mixing beaker, filter and spray gun flow beaker. This reduces the amount of solvent required for cleaning and the amount of routine waste which remains.

Paint preparation system (PPS)

Item	Description
1	Beaker
2	Color bag

With this system, which is suitable for both suction and flow beaker spray guns, only one beaker is required for mixing and painting.

A bag is inserted in the beaker, in which paint can be mixed, processed and stored after use or completely disposed of.

The small quantity of paint remaining in the gun is removed using a minimum quantity of solvent from the pipette bottle.

The amount of cleaner used is reduced because only the spray gun needs to be cleaned.

Hand and machine sanding tools

Sanding is used to prepare a surface for application of a paint layer, enabling it to adhere well. Sanding materials have a great influence on the quality of a repair paint finish. The correct sanding medium must therefore be chosen for every material.

DESCRIPTION AND OPERATION

During sanding, material is mechanically removed from a surface.

In the paint shop, carborundum or silicon carbide abrasive on a substrate of paper or cloth are the most common sanding materials used.

Carborundum is a very hard mineral consisting mostly of aluminum oxide. During use carborundum becomes blunt and wears away.

Silicon carbide has a very high degree of hardness, but is more brittle than carborundum. When silicon carbide is used, the mineral grains break. New long and pointed profiles are formed.

Use of the correct sanding paper depends on the application, the substrates and the tools used. The following table can be used as a guideline, but the recommendations of the supplier of the auxiliary materials and additive materials must be followed.

Application	Working area	Grade	Sanding system
Body work, corrosion damage	Equalizing paint system transition	to P150	Orbital sander, dry
			Hand sanding, dry
Stopper	Rough sand	P80 - P150	Orbital sander, dry
	Fine sand	P240 - P320	Orbital sander, dry
Spray stopper	Rough sand	P120 - P180	Orbital sander, dry
	Fine sand	P240 - P320	Orbital sander, dry
Filler sanding work	Filler fine sand	P400 - P500	Orbital sander, dry
			Hand sand, wet
Top coat	Old paint	P400 - P500	Orbital sand, dry
			Hand sand, wet
Paint damage	Sanding out faults	P1000 - P2000	Hand sand, wet
			Hand sand, wet

Soft Pads are recommended for manual refinishing of contours, curves and difficult to reach areas. On a Soft Pad the abrasive is found on a coarse structured fleece. Because of this, it is very flexible, does not kink and does not slip in the hand. This enables a fine and even finish to be achieved.



Item	Description
1	Extraction bores
2	Connection for extraction equipment

Notes on working with sanding tools:

DESCRIPTION AND OPERATION

- Tools with a rigid backing pad do not adjust to fit the surface. They are used for flat surfaces.
- Tools with a flexible backing pad are used for fine sanding of a surface because they adjust to the shape of the surface.
- Build up an even working pressure over the sanding surface.
- Keep the sanding paper tight on the tool (use self-gripping systems).
- Align the extraction holes in the sanding paper with the holes in the tool.
- Guide the tool flat over the surface to be worked. Do not tilt it.

Hand sanding can be carried out dry but also wet. Wet and dry paper with particle size P 80 to P 1200 is used for this in the paint field.

Ways of sanding

Sanding tools are driven either by electricity or compressed air.



Item	Description
1	Sanding machine
2	Polishing machine
3	Orbital sander

The disadvantage of electrically driven machines is that their own weight is high compared with pneumatic systems. They also become warm during work. They do not however need any special operating equipment for their energy supply.

Sanding machines are categorized by their type of sanding movement.

Rotational sanders

On these machines the sanding paper turns.

- Advantage:
 - Ideal for heavy sanding work.
 - Fast and aggressive sanding possible.
- Disadvantage:
 - Large amount of heat developed.
 - Difficulty sanding flat surfaces.
- Application:
 - Removal of old paint layers.
 - Preparation of panel for stopper.
 - Removal of rust.

Oscillating sander

On these machines the sanding paper oscillates. The backing pad is rectangular.

- Advantage:
 - Large sanding surface.
 - Ideal for large and flat surfaces.
- Disadvantage:
 - Hardly useable on rounded surfaces.
 - Flexible backing pad not possible.
 - Vibrations because of the poor support of the backing pad.
- Application:
 - Sanding of polyester stopper.
 - Sanding processes on flat surfaces.

Orbital sander

On these machines the sanding paper turns and oscillates.

- Advantage:
 - Easy to handle and good sanding power.
 - Minimal heat development.
- Disadvantage:
 - Not suitable for sanding stopper on flat surfaces.
 - Smooth guidance important, otherwise sanding marks will occur.
- Application:
 - Sanding of paint layers.
 - Well suited for final preparation of a primer.

NOTE: Comply with the manufacturer's recommendations when setting the orbital sander.

DESCRIPTION AND OPERATION

On the orbital sander, stroke settings of approx. 3 mm for fine sanding work and approx. 5 - 7 mm for coarse sanding work have been established.

Polishing and finishing tools

The term polishing in the context of paint repairs means the elimination of paint flaws and high shine polishing of neighboring parts.

During polishing the fine sanded surface is returned to a high shine using a special abrasive polish.

Before the actual polishing, all flaws in the paint surface must be removed and the following working procedures must be adhered to:

- Thoroughly clean the vehicle.
- Remove spray mist from all surfaces.
- Sand out and polish particle inclusions.
- Sand down paint runs and polish them out.
- Examine the exactness of the color match in daylight.
- Remove masking edges.
- Remove sanding water, sanding dust and polish residues.

After the polishing process the results must be tested using a special test spray.

Infrared drying technology

The drying process in a painting/drying cabin occurs through heat conductance (convection). When an infrared dryer is used, the drying process is through heat radiation.



The infrared rays penetrate the air and the paint layer without warming them. Because the infrared rays are reflected from the steel panel, the paint coat is warmed from the inside outwards.

Advantages of infrared drying:

- The drying process occurs from the inside to the outside.
- The drying time is shorter than for warm air systems.
- Because the infrared dryer consists of several cassettes which can be switched on independently, the drying area can be optimally controlled.

Independent of the manufacturer's instructions, pay attention to the following:

- Flash-off time of the paint before switching on the infrared dryer.
- Distance between the infrared dryer and the surface.
- Duration of the irradiation.

The most common use of the infrared dryer is to dry stopper and primers. The wait time between the job steps is shortened without having to use the painting/drying cabin.

The painting/drying cabin can then be used exclusively for application and drying of topcoat.

There are two types of infrared dryer:

- Infrared dryer with short wavelength radiation.
- Infrared dryer with medium wavelength radiation.

As an indication, the following drying times are listed for some materials (at 80 cm distance):

NOTE: Observe the material manufacturer's and supplier's specifications.

- Polyester stopper 2 minutes.
- Spray stopper 2 to 7 minutes.
- Water based primer-filler 7 to 9 minutes.
- Primer 3 to 8 minutes.
- Top coat 7 to 10 minutes.

Air dryers

The air dryer is suitable in places where drying needs to be done, but without great outlay (painting/drying cabin or infrared dryer).

DESCRIPTION AND OPERATION

NOTE: Air from the compressor is often too cold for effective drying.

Air dryers use the venturi effect to blow the warm ambient air over the paint surface in a gentle air flow.

Paint mixing system

Because of the many different color variants, it is now seldom possible to store all color shades as ready-made mixtures.

For this reason, vehicle manufacturers make the mixture proportions of their paints available as color codes. The required color shade can be obtained from the paint mixing system using this color code.

All the color components are combined according to their proportions by weight using a precise computer scales to produce a finished color shade.

Painting cabin

The air requirement in a painting cabin is large. The outside air which is drawn in must be passed through filtering and warming equipment. This particularly applies during colder times of the year and especially for combined types of building where the painting cabin is also used as a drying cabin.

It is primarily used to keep the air free of dust. At the same time, explosive solvent-air mixture concentrations are prevented

NOTE: Vacuum will lead to contamination of the newly applied paint. The outside air flows through door gaps, wall joints and other openings and as it does so, brings dust deposits with it.

The air supply quantity depends on the size of the painting space and the quantity of extracted air. Enough air must be supplied to cause positive pressure in the painting space. An air extraction : air supply ratio of about 1 : 1.05 is sufficient.

The filters should have a dust-removal grade of not less than 99.8% and must always be kept clean.

It is especially important that the air supply does not cause strong air currents in the painting cabin. If not, the following problems could occur:

- Paint contamination cause by paint mist, which persists in air eddies and gradually falls on the fresh paintwork.
- Flow problems in the paint because of the high speed of the air, causing the paint to thicken very quickly on the surface.
- Loss of gloss and wrinkle formation because the surface dries too fast.
- Painter disturbance while working.

In modern paint cabins the air supply is provided from the complete surface of the ceiling. The air speed should be 0.3 m/sec (measured in the unrestricted cross-section of the spray cabin). At the same time, the air in the cabin should change about 350 times per hour.

Air extraction is best achieved through extraction channels in the floor of the painting cabin.

NOTE: Refer to the manufacturer's specifications for the operating instructions, safety instructions and notes on the maintenance of a paint cabin.

Smooth walls in the paint cabin should prevent dust deposits. Regular cleaning is necessary however.

Special easily washed adhesive-bonding paint can be applied to the walls to protect the cabin from paint mist.

DESCRIPTION AND OPERATION

Refinishing Materials

The manufacturer's instructions must always be followed when dealing with all materials!

The information given in the following text is data which is independent of the manufacturer, and it should only be used as an indication.

Stopper materials

- 1-component nitro-combination stopper
- 2-component polyester stopper
- 2-component plastic stopper

Use suitable primer to protect from corrosion areas which have been sanded bare before applying stopper.

1-component nitro-combination stopper

Nitro-combination stopper has mostly been superseded by 2-component polyester stopper.

Fast drying fine stopper for the smoothing of irregularities.



The working properties of 1-component nitro-combination stopper can be improved by the addition of nitro thinners.

Drying time increases with thickness of the layer.

Application	1-component nitro-combination stopper
Layer thickness	Max. 80 µm
Drying time	up to 2 hours at 20°C
Sand	P240 - P400

2-component polyester general stopper

CAUTIONS:

-  **Do not exceed the quantity of hardener specified by the manufacturer, excess peroxide can cause staining of the paint top coat.**
-  **Mix the stopper base and the hardener well to avoid a marble-like effect.**

Check that the manufacturer permits use on the substrate to which it will be applied.

2-component polyester stopper is available in coarse and fine grades. The coarse stopper can be used for very uneven areas and surfaces and fine stopper or spray stopper should be applied afterwards.

Application	2-component polyester coarse stopper
Use	Rough equalization of unevenness
Hardener quantity	approx. 3 - 5%
Working time	approx. 4 - 6 minutes
Drying	20°C approx. 12 minutes
	Short wavelength infrared approx. 4 minutes
	Medium wavelength infrared approx. 5 - 10 minutes
Sanding tool	Eccentric, sanding disk by hand
Grade	P80 - P150

Application	2-component polyester fine stopper
Use	Equalization of unevenness
Hardener quantity	approx. 3 - 5%
Working time	approx. 4 - 6 minutes
Drying	20°C approx. 12 minutes
	Short wavelength infrared approx. 4 minutes
	Medium wavelength infrared approx. 5 - 10 minutes
Sanding tool	Eccentric, sanding disk by hand
Grade	P80 - P240

DESCRIPTION AND OPERATION

Application	2-component polyester glass fiber stopper
Use	Equalization of unevenness; blending in of vehicle extensions; repair of GRP components
Hardener quantity	approx. 3 - 5%
Working time	approx. 4 - 6 minutes
Drying	20°C approx. 12 minutes
	Short wavelength infrared approx. 4 minutes
	Medium wavelength infrared approx. 5 - 10 minutes
Sanding tool	Eccentric, sanding disk by hand
Grade	P80 - P150

2-component polyester fine stopper should always be applied after 2-component polyester glass fiber stopper.

Application	2-component polyester spray stopper
Use	Equalization of unevenness
Hardener quantity	approx. 3 - 5%
Working time	approx. 25 - 30 minutes
Layer thickness	200 µm or 4 - 8 spray passes
Drying	20°C approx. 3 hours
	Short wavelength infrared approx. 10 minutes
	Medium wavelength infrared approx. 15 - 20 minutes
Sanding tool	Eccentric, sanding disk by hand
Grade	P80 - P150; fine sand - P280

Application	2-component plastic stopper for flexible thermoplastic
Use	Equalization of scratches or unevenness
Hardener quantity	approx. 3 - 5%
Working time	approx. 25 - 30 minutes
Drying	20°C approx. 15 - 30 minutes
	60°C approx. 15 min
	(Short wavelength infrared approx. 8 minutes)*
	(Medium wavelength infrared approx. 8-10 minutes)*
Sanding tool	Eccentric, sanding disk by hand
Grade	P80 - P150; fine sand - P280

***Infrared drying may adversely affect adhesion, therefore check the manufacturer's instructions.**

Plastic stopper has a very great tendency to shrink back, so that the edge of the stopper repair becomes visible.

Plastic stoppers are flexible and universally applicable on all types of plastic (except for pure PE and PP, these are plastics which cannot be painted). The manufacturer's instructions must be very exactly followed in order that no adhesion problems occur. A special plastic etch primer is specified for some materials.

Primers

Application	1-component primer
Use	Isolation of bare sanded areas.
Spray gun	HVLP 1.3 mm
Spray pressure	2.0 bar
Drying	20°C approx. 15 - 20 minutes
	60°C approx. 10 min

DESCRIPTION AND OPERATION

Application	1-component primer
Coat application	Wet on wet, no intermediate sanding

Application	2-component primer
Use	Corrosion protection and bonding agent (steel sheet, zinc coated steel sheet, aluminum)
Spray gun	HVLP 1.3 mm
Spray pressure	2.0 bar
Drying	20°C approx. 15 - 20 minutes
	60°C approx. 10 min
Coat application	Wet on wet, no intermediate sanding

Application	HS primer filler and HS tinted filler
Layer thickness	50 - 70 µm to 150 µm possible
Drying	20°C approx. 2.5 hours
	(60°C approx. 25 min)*
	(Short wavelength infrared approx. 8 minutes)*
	(Medium wavelength infrared approx. 10-15 minutes)*
Coat application	Wet on wet, no intermediate sanding

***In order to avoid boiling out, drying should be performed slowly.**

HS primer filler and HS tinted filler

Note:

- Primer filler is available as 1-component and 2-component water based and solvent based forms.
- 1-component products are only suitable for isolation of sanded through bare areas and new painting.
- Water based products are also used for the skinning of thermoplastics and substrates which are sensitive to solvents.
- Tinted fillers can be individually matched to the top coat color and therefore find uses in effect paints and paints with poor covering power.
- Use dry sand or wet sand filler according to application in order to avoid unnecessary sanding work.
- On critical substrates the use of epoxy resin base filler is recommended in order to avoid adhesion problems.

Application	HS primer filler and HS tinted filler
Use	Equalization of unevenness, edge zones, sanding scores
Spray gun	HVLP 1.6 - 1.9 mm
Spray pressure	2.0 bar

Paint

The base and the clear lacquer must be matched to one another.

Application	Water based paint
Use	Two layer metallic effect paint and Uni-paint finishes
Spray viscosity	At 20°C 18 - 20 s
Spray gun	HVLP 1.2 - 1.3 mm
Spray pressure	2.0 bar
Layer thickness	15 - 20 µm
Drying	20°C approx. 2.5 hours
	60°C approx. 25 min
	Short wavelength infrared approx. 8 minutes
	Medium wavelength infrared approx. 10 - 15 minutes
Coat application	Wet on wet
Ventilation time	approx. 5 minutes

The base paint must be dried matt before the clear lacquer is applied.

DESCRIPTION AND OPERATION

Application	2-component HS clear lacquer
Use	Gloss providing protective coat for base coat substrate
Spray viscosity	At 20°C 18 - 20 s
Spray gun	HVLP 1.2 - 1.3 mm
Spray pressure	2.0 bar
Layer thickness	50 - 70 µm
Drying	20°C approx. 10 hours
	60°C approx. 30 min
	Short wavelength infrared approx. 8 minutes
	Medium wavelength infrared approx. 10 - 15 minutes

Application	2K HS Uni top coat
Use	Color and gloss providing paint layer
Spray viscosity	At 20°C 20 - 22 s
Spray gun	HVLP 1.2 - 1.3 mm
Spray pressure	2.0 bar - 3.0 bar
Layer thickness	50 - 70 µm
Drying	20°C approx. 8 hours
	60°C approx. 30 min
	Short wavelength infrared approx. 8 minutes
	Medium wavelength infrared approx. 10 -15 minutes

DESCRIPTION AND OPERATION**Additional Materials**

The manufacturer's instructions must always be followed when dealing with any materials!

The information given in the following text is data which is independent of the manufacturer, and it should only be used as an indication.

Adhesive sealants

Adhesive sealants are permanently elastic, long-lived, can be painted and accept filler.

Application: Sealing of visible and normal seams.

Can be over-painted with 2-component paint, primer and fillers after having dried throughout.

Contamination can be removed using cleaner and thinner.

1-component PUR adhesive sealant

Note:

- Hardens using oxygen from the air. For that reason, it must only be stripped after it has completely dried through.

2-component MS polymer adhesive sealant

2-component MS polymer adhesive sealant is free of isocyanate, solvent and silicones and can be spot-welded.

MS polymer adhesive sealant

Can be over painted with water-based paints.

Suitable for spraying and brushing to obtain a composition true to the original.

MS polymer adhesive sealant is free of isocyanate, solvent and silicones and can be spot-welded.

Underbody protection

Underbody protection products are immune to abrasion, permanently elastic, adhere well and are suitable for a true to original texture.

Underbody protection based on solvent

Application:

- Underbody protection for visible areas.

Properties:

- Can be over-painted, also with 2-component paint.
- Can be colored with a proportion of up to 40% paint.

Note:

- Contamination can be removed using cleaner and thinner.

Water based underbody protection

Can be over-painted with water based paint.

Can be colored with water based paint.

Contamination can be removed using water.

Application	Water based underbody protection
Use	Underbody protection for visible areas
Spray viscosity	ready to use
Spray gun	Suction beaker HVLP gun 3 - 4 mm
Spray pressure	4 - 6 bar
Layer thickness	500 - 1000 µm
Drying	approx. 6 hours at 20°C
	approx. 45 - 60 minutes at 60°C
	Short wavelength infrared approx. 8 minutes
	Medium wavelength infrared approx. 10 - 15 minutes

DESCRIPTION AND OPERATION

Application	Water based underbody protection
Use	Isolation primer for peroxide marks, bloomed old paintwork and thermo-plastics.
Spray viscosity	Thin as necessary with distilled water
Spray gun	HVLP gun 1.9 mm
Spray pressure	2.0 - 3.0 bar
Layer thickness	40 - 50 µm
Drying	approx. 2 hours at 20°C
	approx. 30 minutes at 60°C
	Short wavelength infrared approx. 8 minutes
	Medium wavelength infrared approx. 10 - 15 minutes

Paint additives

Application	Sanding test color
Use	To test sanding results
Spray gun	HVLP 1.7 - 1.9 mm
Spray pressure	2.0 bar
Layer thickness	Spray drifted

Application	Fixer additive
Use	Converts solid top coat into two layer solid; multi-color painting
Spray viscosity	18 - 20 secs at 20°C
Spray gun	HVLP 1.2 - 1.3 mm
Spray pressure	2.0 - 3.0 bar
Layer thickness	max. 30 µm
Coat application	Wet on wet
Ventilation time	approx. 15 - 30 minutes

Maintain maximum layer thickness without fail.
Must always next be overpainted with clear lacquer.

Application	Drying accelerator
Use	Accelerates drying with only minimal reduction in working life
Working life	approx. 5 hours at 20°C
Spray gun	HVLP 1.2 - 1.3 mm
Spray pressure	2.0 bar
Layer thickness	50 - 70 µm
Drying	approx. 6 hours at 20°C
	approx. 25 minutes at 60°C
	Short wavelength infrared approx. 8 minutes
	Medium wavelength infrared approx. 10 - 15 minutes

Cannot be used in all paints, read the manufacturer's instructions.

Particularly suitable for partial painting.

Application	Elastifier additive in primer material
Use	Elastifies the complete paint structure on plastics.
Addition	Up to 25%
Spray gun	HVLP 1.7 - 1.9 mm
Spray pressure	2.0 - 3.0 bar
Layer thickness	50 µm
Drying	approx. 4 hours at 20°C
	approx. 40 minutes at 60°C
	Short wavelength infrared approx. 8 minutes
	Medium wavelength infrared approx. 10 - 15 minutes

Application	Elastifier additive in top coat
Use	Elastifies the complete paint structure on plastics.

DESCRIPTION AND OPERATION

Application	Elastifier additive in top coat
Addition	Up to 25%
Spray gun	HVLP 1.7 - 1.9 mm
Spray pressure	2.0 - 3.0 bar
Layer thickness	50 - 60 µm
Drying	approx. 16 hours at 20°C
	approx. 45 minutes at 60°C
	Short wavelength infrared approx. 8 minutes
	Medium wavelength infrared approx. 10 - 15 minutes

Application	Matting additive in solid paint
Use	Elastifies the complete paint structure on plastics.
Semi-gloss addition	Up to 25% in the paint without hardener and thinner
Silk gloss addition	Up to 35% in the paint without hardener and thinner
Silk matt addition	Up to 45% in the paint without hardener and thinner
Spray gun	HVLP 1.2 - 1.3 mm
Spray pressure	2.0 - 3.0 bar
Layer thickness	50 - 70 µm
Drying	approx. 8 hours at 20°C
	approx. 30 minutes at 60°C
	Short wavelength infrared approx. 8 minutes
	Medium wavelength infrared approx. 10 - 15 minutes

 **CAUTION: Do not dry using infrared.**

Application	Matting additive in clear lacquer
Use	Elastifies the complete paint structure on plastics.
Semi-gloss addition	Up to 25% in the paint without hardener and thinner
Silk gloss addition	Up to 35% in the paint without hardener and thinner
Silk matt addition	Up to 45% in the paint without hardener and thinner
Spray gun	HVLP 1.2 - 1.3 mm
Spray pressure	2.0 - 3.0 bar
Layer thickness	50 - 70 µm
Drying	approx. 8 hours at 20°C
	approx. 30 minutes at 60°C

Note:

- When mixing, first put in the matting additive, then the hardener and thinners.
- Stir immediately after adding the matting additive.
- Do not store after addition of the matting additive, storage will change the degree of gloss.
- Also suitable for use on plastics without addition of elastifier additive.

Application	Matting paste
Use	Matts, elasticizes and gives structure to solid paint and clear lacquer during painting of bumpers or hard plastic.
Addition	1:1 or 2:1 depending on manufacturer in solid paint without hardener or thinners.
Spray gun	HVLP 1.2 - 1.3 mm
Spray pressure	2.0 - 3.0 bar
Layer thickness	50 - 70 µm

DESCRIPTION AND OPERATION

Application	Matting paste
Drying	approx. 6 - 10 hours at 20°C
	approx. 30 minutes at 60°C
	Short wavelength infrared approx. 8 minutes
	Medium wavelength infrared approx. 10 - 15 minutes

Note:

- **The paint must not be filtered.**

Application	Anti-silicone additive
Use	Prevents silicone craters
Addition	2% to maximum 5%

Note:

- Only add away from the paint cabin and immediately remove contaminated cloths.
- If anti-silicone additive is used in the first coat, then it must be used in the following coats, and in at least the same proportions.

Additive materials**Variety of adhesive tapes**

For profile, fine and large area masking work.

Properties:

- Withstands heat.
- Withstands water-based paint.
- Accepts paint.
- Easily removed without leaving adhesive residues.

Masking film.

For masking of large areas on vehicles.

Properties:

- Accepts 2-component and water-based paints.
- Withstands heat.
- Withstands water spray and condensation.
- Withstands solvent.

- Easily cut.
- Environmentally friendly and can be recycled.

Polishing materials.

Polishing means microfine sanding. For this reason, polishes must only contain abrasives, and no silicones.

During polishing repair, a good shine is achieved through the step-by-step use of polishes, starting with a highly abrasive polish and ending with a polish having very slight abrasive action.

Polishes are available in graduations from coarse to fine.

Abrasives

Please refer to the "Tools" chapter for information on abrasives.

DESCRIPTION AND OPERATION

Paint Repairs

General information

There is a great difference between painting in production and repair painting.

In production, only the bodyshell is painted, it has no trim, upholstery or assemblies. Because of this, other paints, tools and processing techniques can be used.

In contrast to that used in production, paint used in the workshop must dry at low temperatures. Plastics and the vehicle electronics must not be subjected to temperatures greater than 70°C.

The painting process in the case of repair work consists of two phases:

- Pre-treatment of the surface for corrosion protection and the smoothing of irregularities.
- Top coat application.

The precondition for a professional paint finish on a vehicle is the permanently maintained cleanliness of work spaces, tools and equipment,

Original materials must be worked according to the manufacturer's instructions, so that no problems arise in the processing nor during drying.

The room temperature must be 20 - 25°C and the humidity must be low. Temperatures which are too low or too high can lead to porosity, poor flow and boiling. High humidity leads to paint damage such as tarnishing of the paint film (matt film), adhesion problems and craters.

Pre-treatment of the surface

Perfect preparation of the subsurface is the precondition for a brilliant paintwork result. Faults in the preliminary stages delay completion and cause unnecessary extra work. The working steps described here demonstrate how important it is to follow these instructions step by step.

NOTE: Thorough cleaning of the vehicle and especially of the area being repaired is particularly important because of the danger of contamination of the paint.

Clean the area of the damage



Clean the damaged surface thoroughly, to allow the extent of the damage to be seen. Use silicone remover to produce a grease-free surface.

NOTE: The treated surface must be rubbed with a clean dry cloth before the solvent evaporates, otherwise there will be no cleaning effect.

Effective de-greasing is important not only before the application of paint, but also before all sanding stages, for two reasons:

- During sanding of grease contaminated surfaces, globules may form with the sanding dust. Sanding marks will occur and the sanding medium quickly becomes unuseable.
- Oil and grease are embedded by the action of the abrasive particles, and are then very difficult to remove.

Establish the area of damage and the repair stages. In doing so, establish how much disassembly work must be undertaken. Perform a color test at this stage.

Mask off the area of the repair ready for preparatory work.

DESCRIPTION AND OPERATION

Sand out the damage location



When sanding, produce smooth transitions from the painted area to the bare metal.

Use an eccentric sander and P80 or P120 abrasive sheets. Finish off sanding with P150 or P180. The remaining adhering sanding dust must be completely removed.

Cleaning, de-greasing



Use silicone remover to thoroughly clean the surface in order to remove grease residues, sweat from the hands and other contamination.

NOTE: Use a solvent test to establish whether the old paint can be etched. Apply 2-component thinners to the damaged area using a clean cloth and rub lightly for about 1 minute. If the subsurfaces can be etched away, special pre-treatment is necessary. See "Tips and Tricks"

Apply primer filler



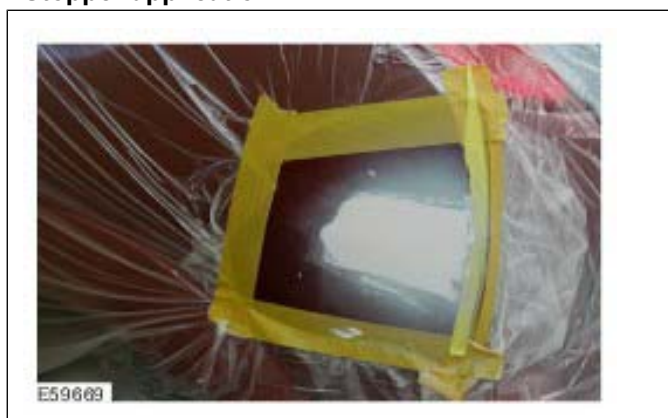
Before applying stopper, apply primer to the sanded and bare surface.

Allow the primer to dry and then lightly sand by hand using P220 - P400 dry.

NOTE: Most stopper can be applied directly to bare metal. But application of a primer filler provides better corrosion protection.

NOTE: Avoid sanding through to the bare metal. Points which are sanded through must be retreated with primer filler.

Stopper application



Pre-sand the hardened stopper using an eccentric sander and P80 dry, then final-sand using P120 - P140 dry. Clean the sanded surface using silicone remover.

Apply 2-component stopper to the filled surface. The stopper compound must only be applied thinly.

NOTE: Use of a testing powder is recommended so that the sanding process can be more easily checked.

DESCRIPTION AND OPERATION

Apply filler



Filler can now be applied to the dried repair area. Choose the correctly toned filler according to the manufacturer's instructions.

NOTE: Alternatively, filler with the correct tone can be mixed with the aid of colour matching cards.

Sand the filler.



The working area is expanded by applying new masking. This makes it possible to even out the transition from the damage area to the vehicle paintwork.

NOTE: The primer filler must be carefully sanded. Faults in the primer filler layer will be visible in the top coat.

The sanding process consists of two stages. Coarse sanding levels out the surface of the filler primer. Fine sanding ensures the necessary surface structure which allows the top coat to adhere well and cover sanding marks.

Sand the filler using the eccentric sander and P400 - P500 used dry. Clean the sanded filler finished surface using silicone remover.

The painted area is matted using a fine matting sponge, and then thoroughly cleaned.

Surface ready for paint



The surface which has been repaired and then prepared according to the manufacturer's instructions is now ready for basic paint application.

Top coat application

It is important for a good paint result that the recommended process data is adhered to, i.e. mixture proportions, layer thickness, viscosity, drying time etc.

First of all the work area is carefully masked ready for paint application. The correct adhesive materials and techniques must be used so that no hard transitions and edges are created during painting.

NOTE: The chapter "Tips and Tricks" gives in-depth information on masking work.

Thoroughly check the surface once more and rub-off with a dust-bonding cloth.

NOTE: Once more check the paint material and that the spray gun is correctly adjusted before applying the paint.

Paint application



The base paint is applied in two or three steps. First of all only the repair area is painted with the first paint application.

DESCRIPTION AND OPERATION**Flash off**

Allow the paint application to flash off until the surface has a matt appearance. So that the transition to the original paint is optimally created, the next paint application is applied to a wider area.

After the base paint has dried for the specified time, the clear lacquer is applied. Next the transitions to the original paintwork are treated with fade-out remover. This removes the spray mist and forms an ideal paint surface.

Repair stages for repair painting

The required time and material data is divided into four painting levels for calculations concerning repair painting. Proceed according to these divisions for every calculation.

Level 1 - Painting of new components

On new components, all inner surfaces, seams and edges which will no longer be seen after assembly must be primed and pre-painted.

NOTE: The cathodic dip primer must not be sanded away. Cleaning with silicone remover or light sanding of the primer is all that is required.

Job steps:

- Wash off, prime and pre-paint inner surfaces, seams and edges which cannot be reached at all or only partly after the component is installed.
- Sand new component with P280 - P320 or a fine sanding pad.
- Clean subsurface with silicone remover.
- Carry out masking work (when painting an installed component).
- Apply one spray run of filler, dry.
- Sand the filler. P1200 wet or P500 dry.
- Clean filler application with silicone remover.

Then the prepared surface can be painted with solid or 2-component paint.

If the new part has mild transport damage, this must be rectified beforehand.

To do so, add the following steps:

- Grind out the scratch.
- Finely sand the surrounding surfaces.
- Use a steel cleaning agent to thoroughly clean and then rub dry.
- Apply corrosion protection primer to the bare areas.

Level II - Top surface painting (color tone matching)

Complete bodywork surfaces which are to be painted without the need to apply stopper belong to this group. In addition, surfaces with faults in the top coat surface which cannot be removed by polishing.

The following faults are included:

- Loss of gloss.
- Sanding scores.
- Heavy paint runs.
- Large dust and dirt inclusions.

The scope of the work is as follows:

- Sand the surface.
- Sand out paint damage and faults.
- Treatment of small areas which have been sanded through.
- Masking work (when painting an installed component).
- Apply top coat according to the painting process (one or several coat process).
- Dry the top coat and perform finishing work.

Level III - Repair painting with stopper applied to up to 50% of the surface.

If in addition to painting, work with stopper application must be performed, then the repair levels III or IV must be used.

In repair level III, apart from painting the complete bodywork surface, partial stopper work is carried out on up to 50% of the surface to be painted. The necessary primer and filler work are also included.

The following damage must be rectified in this level:

- Slight panel unevenness.
- Damage due to corrosion.
- Dented body surfaces.
- Weld locations.
- Deep scores or scratches.

DESCRIPTION AND OPERATION

The scope of the work is as follows:

- Fine sand pre-treated bodywork surfaces (e.g. lead-loaded areas).
- Sand out existing damage.
- Perform all necessary masking operations on the vehicle.
- Apply primer.
- Partial stopper application on up to 50% of the surface to be painted (two to a maximum of three stopper applications).
- Fill the repair area.
- Apply stone chip protection (when present in production).
- Apply top coat according to the painting process (one or several coat process).
- Dry the top coat and perform finishing work.

Level IV - Repair painting with stopper applied to more than 50% of the surface.

In repair level IV, apart from painting the complete bodywork surface, partial stopper work is carried out on more than 50% of the surface to be painted. The necessary primer and filler work are also included.

The following damage must be rectified in this level:

- Damage due to hail.
- More extensive stone chip damage.
- Extensively dented body panels.
- Sectional repairs with large weld seams.
- Surfaces with severe corrosion damage.

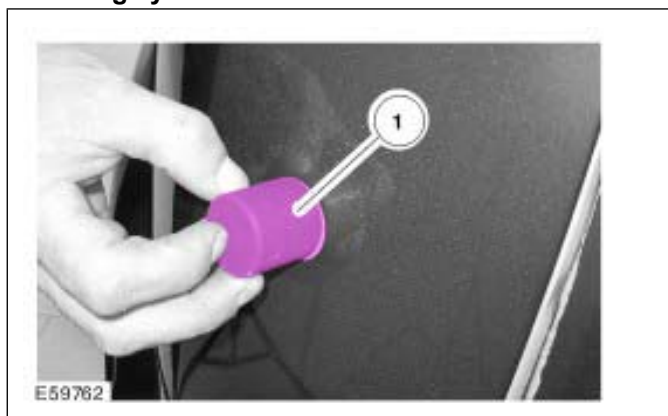
The scope of the work is different to level III because of the partial application of stopper to more than 50% of the area to be painted. In addition, more extensive sanding work is usually required.

Polish

In order to achieve faultless quality, it is sometimes necessary afterwards to polish a newly painted surface.

Even after the most careful painting, it sometimes happens that dirt inclusions and paint runs occur in work with top coat or clear lacquer. Before polishing, such paint faults must be removed with the sanding cylinder ("Finiball") and hand sanding or eccentric sander in a wet sanding process.

Sanding cylinder



The special sanding compound -1- (sanding bloom) for the sanding cylinder is self-adhering and available in grades from P1000 to P2500.

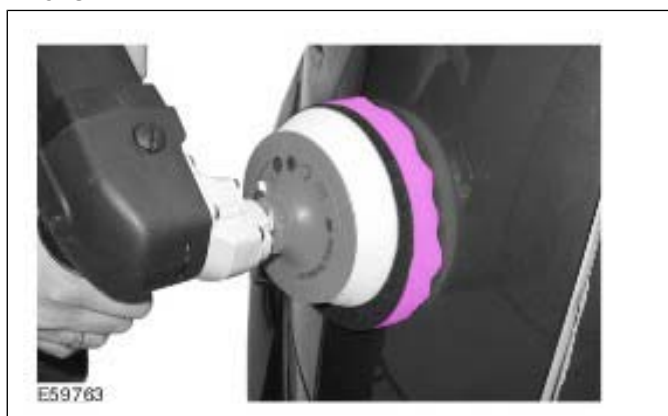
- P1000 - P1500 for pre-sanding of runs and large imperfections in the paint.
- P1500 - P3000 for subsequent sanding of runs and sanding out of dust inclusions.

A small eccentric sander can be used for more extensive working areas. When doing so, first of all put the eccentric sander in place and then switch it on, so that the danger of sanding through on edge is reduced.

Finally polish the sanded area to a high gloss with suitable polish. To this end the various manufacturers recommend materials and process techniques which are specially suited to their products.

NOTE: The polishing is to be done in the same way as that used to remove swirl marks.

Polish



NOTE: Before using the nap sponge for the first time and after any long pauses in working, dampen the nap sponge with polish.

DESCRIPTION AND OPERATION

Job steps:

- Clean and degrease the area to be polished using silicone remover.
- Apply the polish to the polishing disc and spread it.
- Place the polishing machine down flat on the area to be polished and before switching it on, gently distribute the polish over the underlying surface.
- Polish out the location for 10 - 15 seconds with the edge, working with a criss-cross motion.
- Subsequently polish the location for about 10 seconds with the machine laid down flat.
- Wash off and clean the polished location using the professional polishing cloth and then clean the polished surface.
- It is absolutely vital to carry out a visual check after finishing the polishing procedure. If any swirl marks are not completely removed by the first polishing procedure, then process must be repeated.

Aids

Cleaning putty

Cleaning putty allows deposits on the paint surface to be removed easily and gently. The following paint faults can be removed using cleaning putty:

- Metal deposits and iron dust.
- Paint or color mist.
- Tree resin and tar.
- Insect residues.

The surface to be worked must be thoroughly cleaned before the cleaning putty can be applied. Then the surface is sprayed with soapy water. Now the cleaning putty can be slid over the surface until all unevenness is removed.

DESCRIPTION AND OPERATION**Painting Plastic Parts****General**

Although these days plastics can be produced in all colors and with a matt or gloss surface, painting is often necessary.

NOTE: Manufacturer's limitations concerning the feasibility of painting certain components must always be observed.

Reasons in favor of applying paint to plastic are:

- Individual coloring, matching the body paint.
- More gloss and color brilliance through painting.
- Removal of production imperfections.
- Protection from atmospheric exposure.

Nowadays painting plastic presents no problems because the materials are known and matched to the paint. In order that the painter can use the correct painting materials, the type of plastic must first be correctly determined.

To allow this, plastics are marked on the rear in accordance with the recommendations of the Association of Vehicle Manufacturers.

Once the type of plastic is determined it is an easy matter to assign special paint recommendations, matched to that particular plastic. Unmarked plastics require knowledge of materials so that a correct choice of paint materials can be made and the component can be reliably painted.

Plastic groups**Thermoplastics**

When warmed these undergo a reversible transformation into a plastic deformable state and once cooled they maintain their shape. They consist of string-like (linear) or only slightly branched molecular chains.

Thermosets

Thermosets are hard and have the form of a close-meshed network in all directions. They do not undergo plastic deformation, are especially resistant to chemicals, are difficult to swell and are insoluble. At normal temperatures they are hard to brittle. At first the material does not undergo any change when heated, but when it reaches a critical point, the thermoset is totally destroyed.

Elastomers

Elastomers are characterized by high elasticity over a wide temperature range. They have properties like rubber or a sponge and after compression or distension they return to their original state.

Types of plastic

The plastics used in the automotive area:

- ABS - Acrylonitrile butadiene styrene (polymer)
- PA - Polyamide
- PC - Polycarbonate
- PE - Polyethylene
- PP - Polypropylene
- PP/EPDM - Polypropylene/ethylene propylene diene copolymer
- PC/PBT - Polycarbonate/Polybutylene terephthalate
- PBT/PC - Polybutylene terephthalate/Polycarbonate
- PUR - Polyurethane
- GRP - Glass reinforced plastic

NOTE: PE and PP are plastics which cannot be painted, or can only be painted using special techniques.

As well as the pure plastics, so-called 'blends' are also used. This means combinations of different plastics. If we were dealing with metals they would be called alloys.

Plastic identification

Normally the identifier is marked on the plastic components used in vehicle construction.

One method to determine the plastic group is the sanding test. In this a place is chosen which will not be visible later, and the finger belt sander is used to sand the plastic.

The plastic group can be determined using the pattern left by the sanding and the dust:

- Thermosets produce a white dust.
- Thermoplastics smear and do not produce dust.

The plastic group can be determined by a sound test:

DESCRIPTION AND OPERATION

- Degree of hardness - the higher-pitched the sound, the harder the plastic.
- Elasticity - the more muffled the sound, the higher the elasticity of the plastic.

Cleaning plastic

Plastic components are manufactured using complicated moulds and presses or other highly engineered tools, mostly using an injection moulding process or reactive injection moulding process.

In order to be able to remove the component from a particular tool, a separating agent is used, which in some cases adheres very strongly to the plastic.

This separating agent on the plastic components must be completely removed before any surface coating is applied.

Warm storage (tempering) before actual cleaning brings the following advantages:

- The separating agent sweats out of the plastic.
- Tensions in the plastic are released.
- Air inclusions can be recognized and removed.

Intensively clean the item several times using a pad and fresh cleaning agent.

NOTE: A single wipe, even with cleaning agent, is not usually sufficient in most cases. Clean textured components with the aid of a soft brush.

After cleaning, it is absolutely vital that cleaning agent absorbed by the plastic should be expelled by tempering again. If the ventilation is good and the room temperature is about 20°C the solvent can be evaporated away by overnight storage.

Painting new components

It is absolutely vital that the substrate of an unpainted new component is free of separating agent. Paint can only be applied directly to very few plastics. The plastic must first be identified exactly and then worked with a repair system which is matched to the type of plastic. In most cases a plastic etch primer must be applied as adhesion base to all plastics which can be painted.

NOTE: Plastics have a tendency to become electrostatically charged. This can easily cause contamination during painting. Special antistatic cleaning cloths prevent electrostatic charging.

Work process for thermoplastics:

- Thoroughly clean the surface.
- Temper the plastic.

- Afterwards clean with antistatic cleaner or antistatic cloths.
- Apply the bonding agent.
- Apply elastic filler. After it has dried, sand and clean.
- Apply one coat Uni-paint with elasticizer additive. For two layer painting the elasticizer additive is in the clear lacquer.

NOTE: Follow the paint manufacturer's guidelines during all work.

Work process for thermosets:

- As a rule, thermosets can be handled in the same way as normal body components.

Work process for PUR soft foam:

- The work process is the same as for thermoplastic.
- Instead of using bonding agent, a filler wash is applied to close the pores of the PUR soft foam.

The primer which has been applied to a primed new component can vary greatly. If no manufacturer's data is available, the composition and suitability for further working must be tested.

Painted components with an already ascertained and intact paint coat present no problems for possible repainting. After sanding and careful cleaning with plastic cleaner or thinners, painting can be done directly.

Unknown primer

When dealing with unknown substrates it is important to carry out an adhesion test on the existing paint before any repainting is attempted. First of all a mechanical test must be carried out, for instance using a lattice cut and tear-off band. If the adhesion of the old paint is not acceptable, it must be mechanically removed and new paint finish applied.

If the adhesion is acceptable, then an etch test is performed using 2-component thinners. If no etching can be detected in this test, application of the the paint finish can be started directly. Otherwise the old paint must be removed and a new paint finish created.

With the help of universal or special plastic primers and with only a few materials complementary to those previously present anyway, the painter can now apply a long-lasting paint finish to all popular vehicle attachments made of plastic.

DESCRIPTION AND OPERATION**Paint faults on plastic substrates**

NOTE: Paint faults are fully described in the chapter Paint Defects and Damage.

The most common paint faults which can occur when painting plastic components and the methods of repair are briefly described.

Discoloration

Cause/damage pattern:

- Plastic material is not suitable for painting.
- Incorrect bonding agent.
- Paint used not solvent resistant.

Repair of damage:

- Repaint using suitable materials.
- Install a new unpainted component.

Softening

Cause/damage pattern:

- Substrate not carefully cleaned.
- Air humidity too high or working temperature too low.
- Drying time incorrect (too short).
- Materials for substrate not correctly matched to each other or not mixed correctly.

Repair of damage:

- Dry out, sand, re-isolate and paint.
- Sand away faulty paint coats and re-apply paint finish.

Paint damage caused by detachment, poor adhesion

Cause/damage pattern:

- Insufficient paint adhesion between top coat and filler. The whole of the paint finish detaches from the plastic.
- Plastic not cleaned sufficiently, not or inadequately tempered.
- Unsuitable cleaning agent or materials used.
- Poor or lack of intermediate sanding.
- Paint finish underbaked or overbaked.

Repair of damage:

- Sand away faulty paint coats and re-apply paint finish.

Paint damage caused by blisters, craters, sink holes

Cause/damage pattern:

- Painting on PUR plastic which was not painted in production.
- Surface of the plastic material too porous.
- Flash-off time not adhered to.
- Drying temperature too high.
- Moisture in plastic material.
- Layers too thick.

Repair of damage:

- Clean the damaged area, sand, re-isolate and paint.
- Remove the paint layers and re-paint.

Crack formation

Cause/damage pattern:

- Overexpansion of painted PUR plastic components.
- Use of unsuitable paint materials.
- Paint materials not suited to each other or incorrect mixture ratio.

Repair of damage:

- It is not possible to repair overexpanded PUR plastic components.
- On other plastics, sand away damaged layers, isolate and repaint.

DESCRIPTION AND OPERATION

Spot Repairs

General

In general, partial surface painting at a point is called a spot repair. Using this technique, minor paint damage can be resolved economically and to time.

Advantage of this method

Because this application remains confined to the area of the damage, it is often unnecessary to remove components or color match against neighboring components. The material used is very much reduced because only a part of the repair area is coated.

Practical application areas

Only occasionally can satisfactory results be achieved in the centre of larger surfaces and/or on difficult colors. In addition, unprofessional

application may cause tear-off edges to appear in clear lacquer. Only certain application areas are recommended.

NOTE: The final decision on whether to spot repair or paint the component must be made by an expert.

Application areas:

- 2-layer paint.
- Depending on the damage zone, paint damage up to a diameter of 3.5 cm or a length of 10 cm.
- Scratches.
- Clear lacquer application up to an area of DIN A4 max.
- Smaller areas which are optically broken up by other components such as trim strip, tail lights, swage lines and edges.
- Boundary zones and edge areas of larger components.

The best application areas have proven to be optical break lines such as corners, narrow surfaces, fenders and wheel arches.



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DESCRIPTION AND OPERATION

Because of their locations, the violet colored areas are the most suitable for spot repair painting. The turquoise areas are only marginally suitable and the rest of the areas are not suitable for spot repairs.

Repair process

Perfect preparation of the subsurface is the precondition for a brilliant paintwork result. Faults in the preliminary stages delay completion and cause unnecessary extra work. The working steps described here demonstrate how important it is to follow these instructions step by step.

Illustration of damage



A typical case for spot repair is a small stone chip on the fender.

Cleaning



First of all the component is thoroughly cleaned using silicone remover and refurbished using abrading and polishing paste. This re-creates the original degree of shine and ensures exact color matching on the touch-up surface.

Sand out



Sand out the damaged location using P180 - P320. Only small sanding blocks and small sanding machines must be used, so that the area of the repair remains as small as possible.

Sanding is completed by rubbing down the surrounding surface with a fine sanding pad or P1000 paper. Remove sanding residues and clean the repair area with silicone remover. The peripheral zone must then be masked for application of the filler.

NOTE: The size of the repair area must be kept as small as possible (maximum size DIN A4).

Filling



The filler layer is applied in stages. First of all, filler is only applied to the location which has been sanded away. After a wait time for flashing off, the second coat is applied so that it spreads over onto the existing paintwork.

The filler must be dried according to the instructions of the material supplier.

DESCRIPTION AND OPERATION**Rubbing down**

The repair location is now rubbed down with P400 - P500 and the bordering surface with P2000 - P4000. Remove sanding residues and clean the repair area with silicone remover.

Paint

Before painting, clean the area for the final time using a dust-bonding cloth. Then apply the basic paint in thin layers using a spray gun until enough coverage is achieved.

After drying, apply clear lacquer in 1 or 2 coats (depending on product). In doing so, spray so that only the newly applied basic paint is completely covered. Finally a touch-up thinners is sprayed over the edge of the clear lacquer to dissolve the clear lacquer spray mist.

Dry

Now dry the clear lacquer according to the manufacturer's instructions using an infrared gun.

Polish

Polish the component using a polisher and polish and check the polished area for any swirl marks which may be present. Polish away any swirl marks which are present.

Dirt inclusions**Sand out**

DESCRIPTION AND OPERATION

Minor damage can be removed with a small sanding machine or preferably with an eccentric sander with P1500 - P2000. Very fine spray mist can be removed using P2000 - P4000 paper and a larger eccentric sander.

DESCRIPTION AND OPERATION**Corrosion Prevention****General**

Although corrosion protection measures and painting processes in production have reached a very high technical standard and will be continuously developed further, in the long term corrosion on a vehicle cannot be totally avoided. Further demands are therefore made of the paint specialist besides his knowledge of normal repainting of vehicles which have been repaired after an accident, in addition specialist knowledge is required for assessing and rectifying damage due to corrosion.

During repair painting, take care over the maintenance and re-creation of the corrosion protection applied in production, in view of the long-term warranty on Ford vehicles. Only those repair materials which are approved by Ford may be used for body repair work and repair painting.

For detailed information on corrosion protection measures during body repairs, please refer to chapter 501-25.

Furthermore, information on corrosion protection measures is repeated in individual chapters of the paint manual.

In particular, pay attention that the layer thicknesses specified in production are maintained. The complete system of solid one-layer on galvanized steel panels must equal at least 90 µm and the total system of two-layer on galvanized steel panels must equal at least 105 µm.

It is important that sealing operations, as far as they are necessary, should be undertaken after the application of the paint to specification, in order to ensure the best corrosion protection. All components which form hollow cavities such as pillars, rails, side components etc. must be provided with a coating of cavity protection wax.

Causes of corrosion

Corrosion of steel is an electrochemical process during which the steel combines with oxygen. The following factors lead to corrosion:

- Acidic compounds contained in the air, such as carbonic acid and sulphur dioxide, combined with oxygen from the air and/or water. Salts such as sodium chloride used as road salt accelerate the corrosion process.
- Mechanical damage such as stone chips and scratches which penetrate through to the steel panel.
- Lack of care by the vehicle owner of the painted and corrosion proofed surfaces or areas on the vehicle.
- Unfavorable weather or environmental conditions, as may occur in areas with high humidity, high salt content in the air or serious air pollution due to aggressive gases and dusts.

In the case of mechanical damage, formation of rust can often be seen, beginning to spread into the painted surface from a point (stone chip) or from a line (scratch). If these faults are not professionally rectified in good time, the result is rusting through from the outside to the inside. Rusting penetration from the inside to the outside occurs when for instance the cavity protection was inadequate.

Operations after painting

NOTE: The manufacturer's instructions must be followed when working with the various corrosion protection materials.

- After painting, treat all cavities in the repair area with cavity protection wax. In doing so, pay particular attention to the weld seams. In dead-end applications with a panel insert, the cavity protection wax must be applied so that it also reaches the area of the panel insert.
- Seals which were applied in production and not over painted must be reapplied. Seals protect vulnerable parts of the bodywork, keep moisture away, reduce wind and road noise and dampen vibrations.
- Apply transparent wax.

Definition of the degree of rust

In workshop practice, in order to be able to carry out a consistent and objective evaluation of the scope of the damage, a degree of rust on the scale of 1 to 5 is determined by the DIN 53 210 standard.

DESCRIPTION AND OPERATION

The main criterion here is the extent to which rust exists under the paint structure. It is determined in millimeters (mm).

Underlying rust grade: R1 < 1 mm

Corrosion starting with up to 1 mm of rust underlying (in the form of a spot or a line).

The damage can be rectified by cleaning the defective location and mechanically removing the underlying rust. For a small extent, apply a primer using a brush and allow it to dry. Touch-up the location with a paint pen or provide a new paint coating.

Underlying rust grade R2 < 1 - 2 mm

Advanced corrosion with up to 2 mm underlying rust.

Rectifying the damage:

- Clean the defective location.
- Remove the underlying rust mechanically down to the paintwork carrier.
- Apply 1-component filler and then 2-component "Vario" filler.
- Provide the damage location with new paint coat on visible outer surfaces. Only locally touch-up areas which are not optically conspicuous.

Underlying rust grade R3 < 2 - 4 mm

More advanced corrosion with up to 4 mm underlying rust. The damage must be rectified in the same way as for R2. A permanent cure of this type of damage pattern is still just possible

Underlying rust grade R4 < 4 - 5 mm

Notably advanced corrosion with up to 5 mm underlying rust. The damage must be rectified in the same way as for R2. If it is found that for whole areas this is only possible with a great deal of work, or is not possible at all, then a new component must be used.

Underlying rust grade R5 > 5 mm

Extreme corrosion, with more than 5mm underlying rust (panels, flanges or load-bearing components partially rusted or rusted through).

Such damage can no longer be repaired because in many cases the constructional strength of the component can no longer be produced. The risk in making a repair is too great. Install a new component and paint it.

DESCRIPTION AND OPERATION

Color Identification and Chromatics

Basic color theory

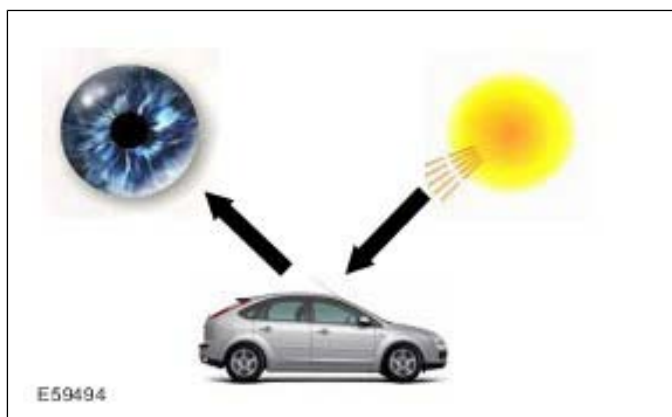
In order to achieve optically perfect painting results it is vital to understand the physical principles of the origin of color impression.

Color

Color itself is a sensory perception.

This perception arises through the combined effect of the following components:

- Light (sunlight or artificial light irradiates the object).
- Surface of the object (reflection from the object of certain constituent parts of the light).
- Eye (perception of the reflections from the object).

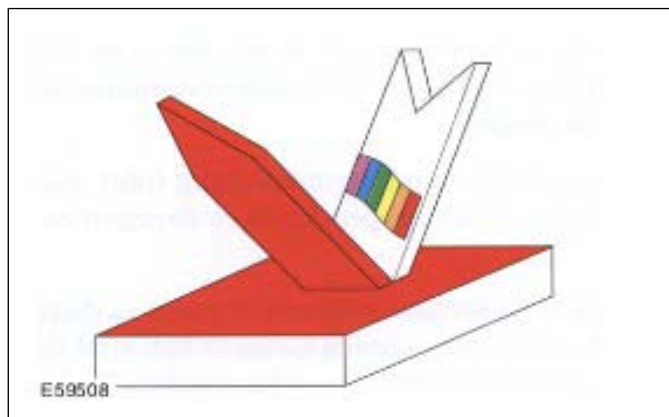


Because the sensory impression of color is produced by all three of these components, it is dependent on the type, quality and function of the individual components. Practical examples make this clear:

- If a particular article is subjected to artificial light, then it gives a different impression of color to that which it gives in sunlight.
- An object with uniform color but different surface textures appears to have different colors (grained or ungrained dashboard).
- A person with perception disorder (colorblindness) cannot recognize certain colors or distinguish between them e.g. red-green weakness).

In turn the type of color is determined by the light absorption ability of an object. Light shines with all color components (spectral colors) onto an object, certain components of the light are absorbed (taken

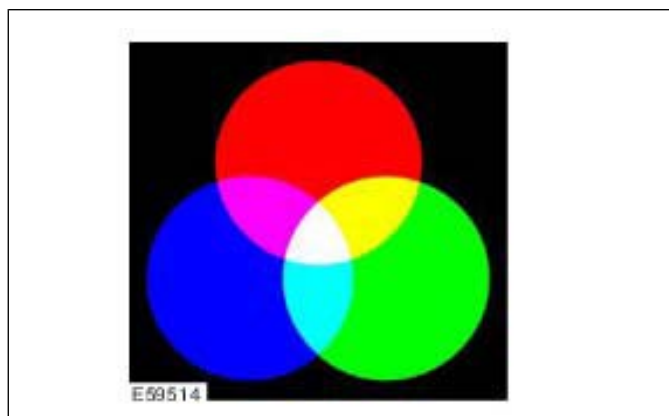
in) and other components are reflected (sent on). The components which are reflected produce the specific color impression.



The colors as we see them are the result of a combination of reflected colors from the spectrum. Physically speaking, these are electromagnetic waves with different wavelengths (and frequencies). The healthy human eye can recognize wavelengths between 0.36 μm (violet) and 0.78 μm (red).

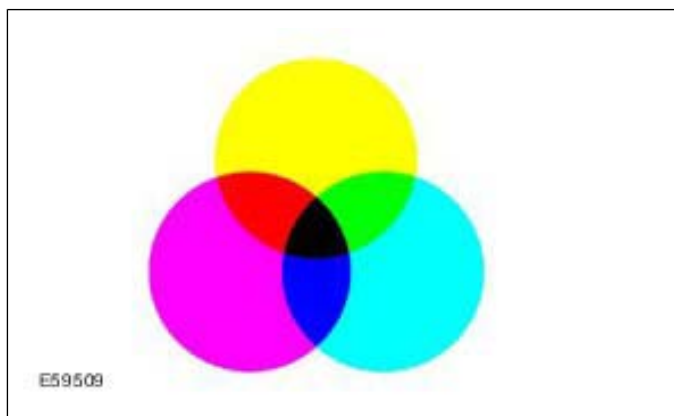
If all the perceptible wavelengths of the spectrum impinge on the human eye at the same time, the impression of white light is produced.

Additive and subtractive color mixing



Additive color mixing is the combination of light from different sources to give white. Different intensities of the additive primary colors red, green and blue allow millions of different colors to be represented (RGB colors).

Additive color mixing is always therefore used when light should enter the eye directly (without reflection off an object). Such as in the case of computer monitors or overhead beamers.

DESCRIPTION AND OPERATION

Subtractive color mixing means mixing the primary colors cyan, magenta and yellow to form a desired color (CMY colors).

Subtractive color mixing is used when light should enter the eye of an observer after reflection from an object. Such as happens with painting or in printing.

Oswald color circle

The Oswald color circle is based on subtractive color mixing, and enables the behavior of paints when they are mixed together to be represented.

Colors lying opposite each other are complementary colors and should not be mixed together as this will produce a dull (i.e. grey) shade. If green is added to red, the red becomes greyer, not greener.

Color shades which are side by side are partner colors and produce a mixed color shade. For instance, mixing red and blue produces a pure violet.

In addition, black and/or white may be necessary to produce a particular color shade.

- White makes the color shade lighter.
- Black makes the color shade darker.
- With black and white the color shade becomes more dreary or greyer.

Metamerism

Metamerism is the name of the effect which occurs when two colors appear identical in a particular light (e.g. artificial light), but the colors appear different under another light source (e.g. daylight).

The cause is the fact that the human brain, aided by the eyes, does not evaluate the wavelength, instead it evaluates the spectral intensity of the reflected light.

It is for this reason that color matching in practice must only ever be performed in daylight, or under special artificial light which is based on daylight.

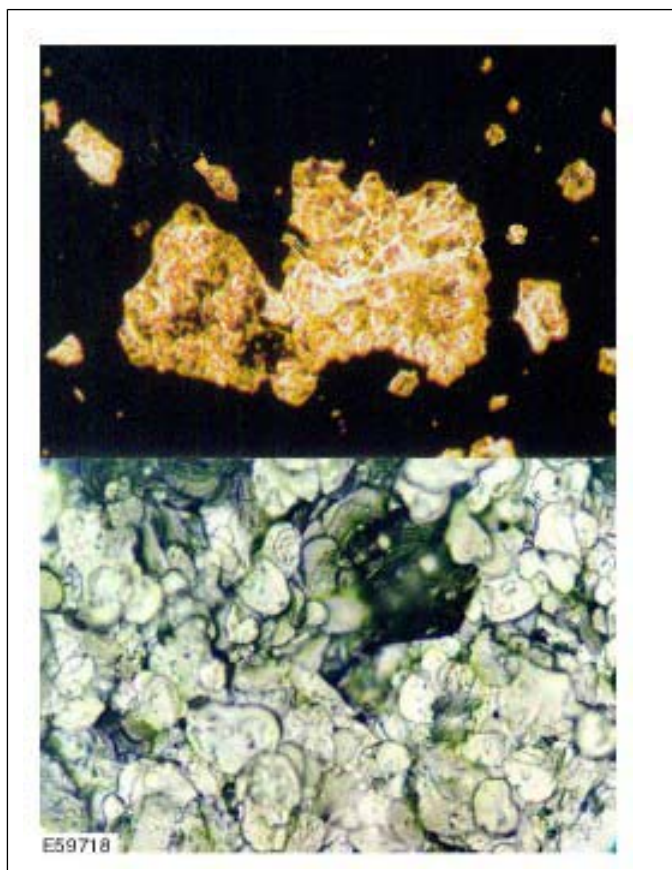
Metallic and pearl pigments

Colored paints achieve their color effect by the addition of pigments. Pigments are colored, solid, very fine organic and inorganic particles which are insoluble in the binding material.

Metallic pigments

Aluminum platelets are added as pigment to form metallic paint.

DESCRIPTION AND OPERATION



Depending on the size and shape of the aluminum platelets, different metallic effects can be achieved:

- Cornflake aluminum (1) causes very strong dispersion because of rough edges, low brilliance, very low flop and produces grey-silver shades.
- Dollar aluminum (2) causes hardly any dispersion because of the smooth surface, high brilliance, produces very light, almost white silver shades.

With metallic paints however, only a light-dark light reflection effect occurs.

Colored metallic paints are produced by the extra addition of color pigments to the metallic paint.

Pearl pigments



The basis of pearl pigments is formed by mica, which is metallized with a silver or gold layer.

Depending on the angles of light and observation, the mica platelets reflect different proportions of light. Because of this, the color of the paint appears to the observer to change.

Pearl pigments produce a colored and light-dark reflected light effect.

Color codes and their determination on Ford vehicles

It is necessary to determine the correct color shade of the original paintwork in order to perform a professional and perfect paint repair.

The original paint color shade can be found by:

- Inspection of the vehicle type plate with the color code stamped on it.
 - Later design
 - Earlier design
- Color shade catalog or color shade system of the manufacturer.
- The bare bodyshell plate with color designation.

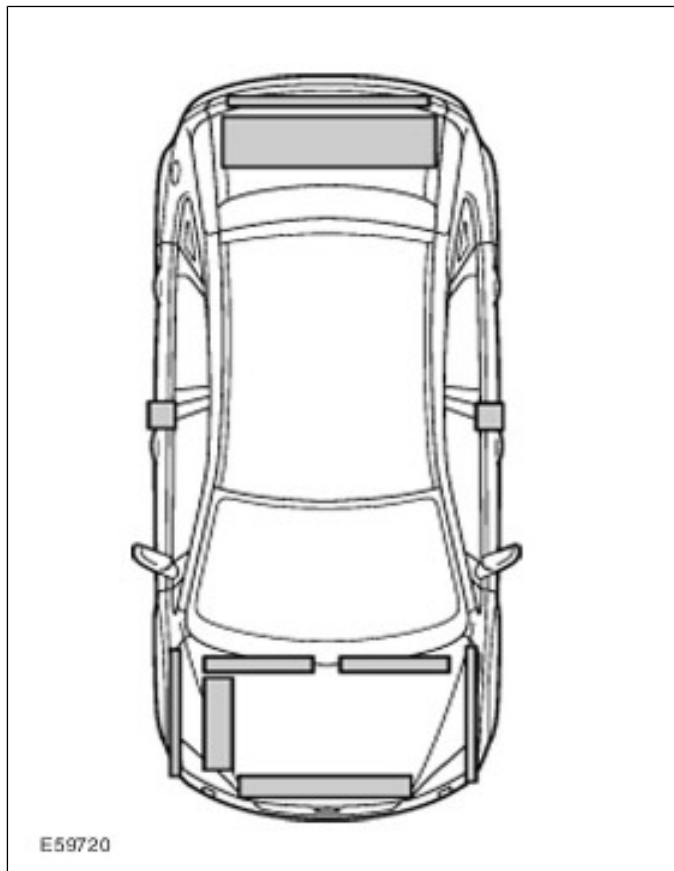
Type plate

Type plate - location on Ford vehicles:

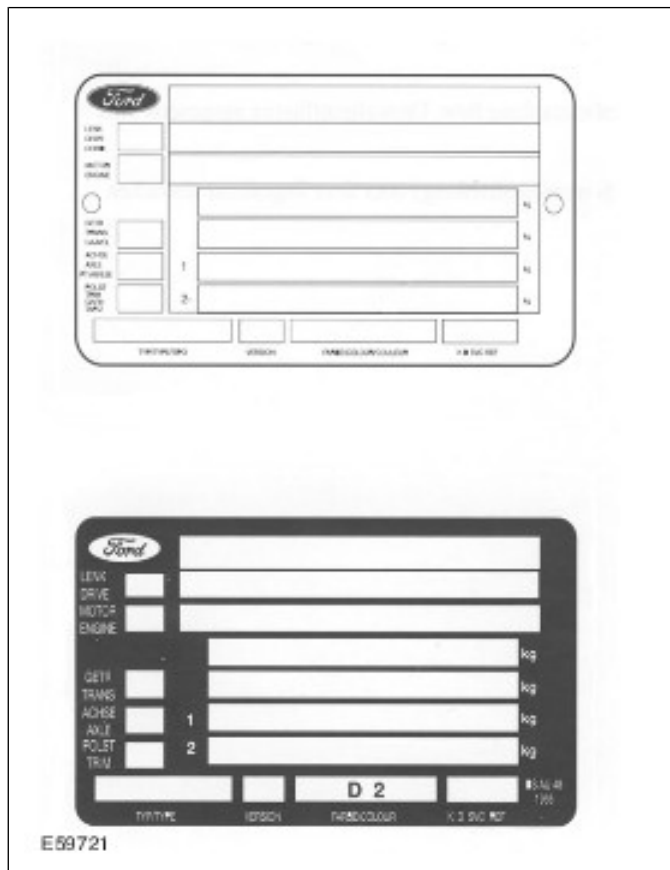
- Right-hand B-pillar - door rebate
- Left-hand B-pillar - door rebate
- Hood lock panel
- Left-hand vertical edge of inner front wing
- Right-hand vertical edge of inner front wing
- Right-hand engine compartment side member
- Left-hand bulkhead
- Right-hand bulkhead

DESCRIPTION AND OPERATION

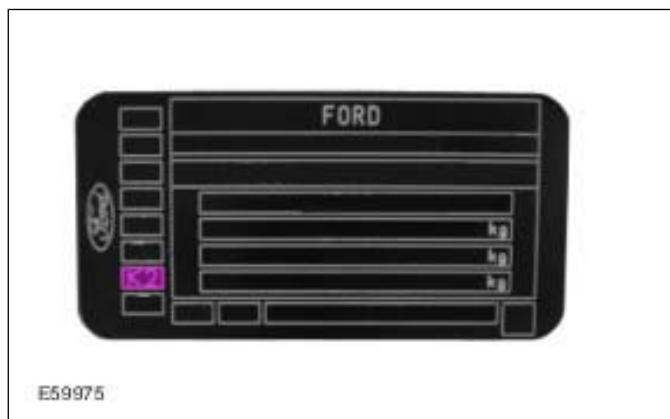
- Luggage compartment interior
- Inner rear panel - luggage compartment



The type plate gives the color code in the last row.



On the newer type plates, the color code is given in the left-hand column, at the penultimate position.



Color shade catalog or color shade system of the repair paint manufacturer.

The repair paint manufacturers offer a variety of possible systems for the determining the production color shade of motor vehicles. There are electronic systems, color card systems and manuals for the determination of color shades.

DESCRIPTION AND OPERATION

Most repair paint manufacturers use the following systems:

- A tabular system based on the following parameters:
 - Color code
 - Make
 - Model
 - Build year
 - Color or color name
 - Ancillary codes
- A system with color cards based on the following parameters:
 - Make
 - Color shade
 - Build year

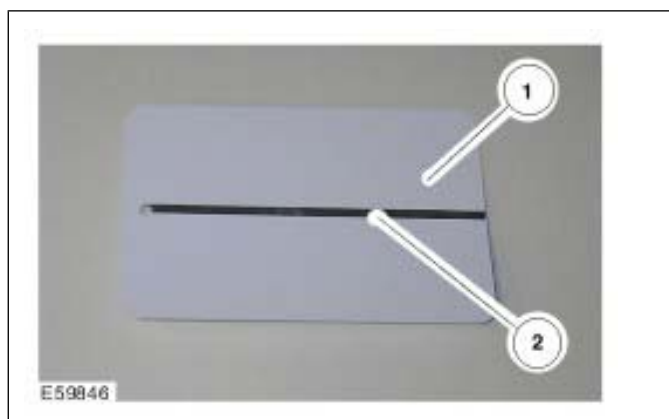


Because of the many parameters used, in a tabular system the color shade can also be determined by the lack of a parameter.

When using the color cards, emphasis is placed on matching of the original color shade with the color shade samples. For this reason this method is very helpful when the other parameters are not available.

Comparison of the results of both methods increases the certainty of using the correct original color shade and its formulation.

Additional certainty can be achieved during color shade determination by making a color sample plate. Here it is however important to apply the complete paint structure with base paint and clear lacquer onto a sample plate (1) in order to carry out a color shade and color coverage test.



The color shade comparison is done by comparing the vehicle paintwork with the sample plate (1). The color coverage test is possible by using the black test stripe (2): If the test stripe (2) is still visible after test painting of the sample plate (1), the coverage is not good enough.

By using this determination of the original color shade, the formulation and information on any very slight fine adjustments which may be necessary can be established.

Bare bodyshell plate

The bare bodyshell plate is located:

- On the hood lock panel.
- Near the type plate.

The color name is stamped on in the last row.



DESCRIPTION AND OPERATION**Matching tinted filler to the color code**

NOTE: Color samples must always be made from the same materials as the subsequent repair painting. Perform color shade matching in the fully hardened state, in natural light or under suitable artificial light.

Various tinted fillers are used during factory painting. In order to achieve the exact color shade of the factory applied paint, attention should be paid that the correctly matched fillers are used.



The repair paint manufacturers offer suitable precolored primers. The use of filler color cards allows the matching color shade to be determined.

DESCRIPTION AND OPERATION

Tips and Tricks

Comparing paint structures

It may happen that an area remains visible, especially when the area of the repair is small. The reason for this is the structural variation in the paint surface at the repair location compared with the original paint finish. The original paint finish has a slight orange peel effect while the repair areas is extremely smooth.

This effect can be reduced by fine sanding using P3000 of the area around the repair location and then polishing.

Etching substrate

If the substrate can be etched during the solvent test, suitable preparation must be done.

Job steps:

NOTE: Follow the manufacturer specific instructions.

- Sand the damaged area extensively using an eccentric sander and P80 or P120 abrasive sheets. Finish off sanding with P150 or P180.
- Remove the sanding dust and clean the area of the damage using silicone remover.
- Apply polyester stopper to the bare panel and to the damaged area.
- Sand the dried polyester stopper to an even surface using P80 - P150. Finish sanding using P180 - P240. If required apply more stopper, again only on the bare panel.
- Wet sand the residual old paint finish using P600 - P800. Transitions with P400 - P600. Clean with silicone remover.
- Prime bare metal areas with acid primer.
- After the acid primer has been left exposed to the air for the correct evaporation time, apply 2-component primer filler in thin layers over the complete repair area, leaving enough air exposure time in between coats.
- After the filler has dried, sand wet with P800 or sand dry with P400. Sanded through areas must be covered again with 2-component Nonstop filler primer.

Another possible method of preventing etching of the substrate is to use waterbased primer and filler materials.

Masking the vehicle

Masking and covering work are among the most important preparations required to achieve a high quality paint finish. Paint application onto neighboring components, paint mist and sharp paint transitions are quality faults. For this reason it is extremely important to take special care and to use suitable masking materials.

NOTE: When water based paints are used, all materials must be stable towards water.

Plan the masking work:

- Determine the sequence of masking work. Sometimes after masking film has been applied, it is difficult or impossible to reach certain areas.
- Prepare the masking material.
- Start with small difficult areas.

Pay special attention to the areas of profiled seals, edges, openings and paint transitions.

Masking tape

Masking tape is available in various widths for special application areas. In practice however, a wide tape has proved best for almost all areas, also taking into account the time required for masking work.

NOTE: Use of differing masking materials is often much more time-consuming.

Advantages

- Good coverage. Narrower tapes must often be applied in several layers.
- More resistant to tearing.
- Wide tapes can be applied deep into joints and therefore protect from paint mist and contamination.
- Removal is often easier.

Masking film

Transparent plastic film has become accepted as a practical method to mask large areas of a whole vehicle. It can quickly and easily be applied to the vehicle from the roll.

DESCRIPTION AND OPERATION

NOTE: Only mask the vehicle when it is dry. Moisture under the film can lead to matt paint in the drying process.

Using masking film

- Clean the vehicle before masking it.
- Pull the film over the vehicle. Because of the static charge, the film lies on the vehicle like a second skin.
- Cut out the repair area using the film knife and then mask it.

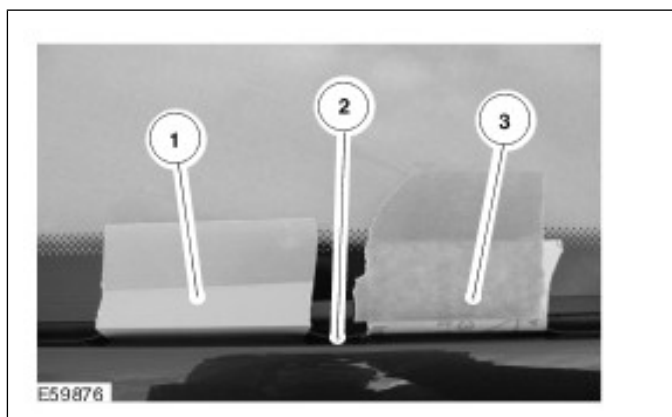
Other ways of masking a vehicle are:

- Masking using masking paper.
- Painting cloth (mostly used during filling work).

Profiled seals

If it is not possible to remove a profiled seal, then it must be masked in such a way that no edges can form due to paint accumulation.

To do this, the seal is lifted slightly and masked. The following techniques are possible:



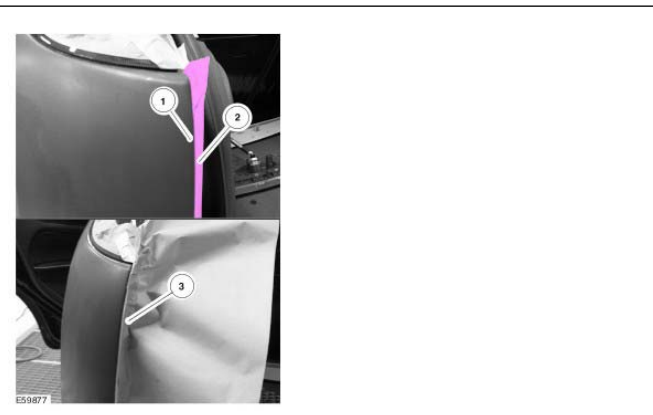
Item	Description
1	Masking tape with plastic strips
2	Sealing lip
3	Sandpaper with masking tape

- Laying a string or cord under the seal. Suitable for soft and elastic seal lips.
- Special masking tape with plastic strips for hard seal lips.
- Instead of using plastic strips, fine sandpaper cut into strips can be inserted and secured using normal masking tape.
- If the seal can be easily displaced, normal masking tape can also be used.

Edges/openings

Smooth paint transitions can be produced by positioning adhesive tapes.

NOTE: Pull the adhesive tapes away immediately after the paint has been applied and check the paint transitions.



Item	Description
1	Vehicle edge
2	Adhesive surface
3	Masking paper

Possible variations

- At edges apply one strip of masking tape half on the area not to be painted and mask using a second strip.
- On surfaces, two masking strips can be attached, each affixed by half their adhesive surface. The adhesive strip which arises is then applied with one half on the edge of the area to be painted. The other half is aligned and fixed in addition in the curves.
- Affix masking paper on one side over the area to be painted. Double back the masking paper and secure it.
- Affix round profiled foam at the edge of the area to be painted using masking tape.

Foam strips are suitable for affixing to openings such as door gaps.

DESCRIPTION AND OPERATION



NOTE: Choose a suitable profile diameter. A profile which is too thick will protrude from the opening, one which is too thin will leave a gap.

Clean the door opening well and affix the matching shape.

Color shade problems

If a vehicle color shade is taken from a vehicle on a hot summer day and the mixed color applied, this may cause color shade problems. Some colors change so much at higher temperatures that it can lead to an incorrect result. Red color shades are particularly prone to this shade behavior.

This means that color determination should always be done on the bodywork when it is at about the same temperature as the later working temperature will be. The best temperature of the item is between 15° and 25° C.

Isopropanol and water

Painted surfaces are very easily cleaned using a mixture of 70% water and 30% isopropanol (can be obtained through a laboratory supplies specialist or a pharmacist).

Temperature reduction spray

If finishing work must be performed on touched-up surfaces and newly painted plastic parts, problems may arise. The paint and the transitions are not yet fully hardened.

NOTE: When working with the polishing machine, make certain that each operating run lasts no longer than about 5 - 10 seconds, in order to prevent the paint becoming warm.

Even so, in order to be able to polish over transitions, temperature reduction spray must be applied to the surface. The transition area is then alternately sprayed and polished until a perfect transition surface is achieved.

Paint faults on soft plastic components where elasticizer additive has been used in painting must be wet sanded using grade P2000 - P2500 paper.

In doing this the sanding location and the surroundings are sprayed with temperature reduction spray and the paint faults sanded out by hand. Afterwards the location is polished as described above.

Paint plane

Dirt inclusions and paint runs can be removed with the sanding cylinder ("Finiball") and hand sanding or eccentric sander in a wet sanding process.

Another practical tool for removal of paint faults which lie proud of the surface is the paint plane.

NOTE: Guide the tool carefully with the minimum of force. It must not tilt, otherwise more serious damage may easily be caused.



This tool allows paint faults to be carefully removed in shavings. Afterwards the surface must be polished using suitable materials.

Shading

Even when all the rules, steps and corresponding instructions have been followed concerning possible shades, it may happen that the mixed color shade does not exactly match the vehicle color.

In these cases, shading must be done. Because there is no fixed formula for this, experience and a trained eye are important. Some rules must be followed for shading.

DESCRIPTION AND OPERATION

NOTE: Self-made color sample plates of the current colors are very helpful for determining the color shade. Refer to the chapter Color Determination and Color Theory.

- When shading, if possible only use the paint mixture that is also allotted in the color shade formula.
- Observe the rules concerning contrary colors (complementary colors) and partner colors according to the Oswald color circle.
- Complementary colors are not recommended during shading because they mutually inhibit and lead to muddy mixtures.

Sanding marks

In certain circumstances, the recommended sanding methods up to now are no longer suitable for light metallic color shades. Wet sanding with grade P1200 paper or a grey sanding pad can cause sanding scratches which can become very visible under certain lights.

In order to achieve an excellent paint result on difficult color shades, follow these working rules:

- Sand filler as before, rub down area to be painted with 3M ultra fine matting sponge and 3M matting gel.
- Sand filler as before, rub down area to be painted with soaked 3M wet sand paper P1500 - P2000.
- Sand filler as before, rub down area to be painted with 3M 260 L P1000 eccentric (Interface Pad).

Improving touch-up work

During application of special effect base paints, the effect particles align themselves exactly parallel to the surface in the paint layer while it is still liquid. This means a particular thickness of the paint layer is required.

Because during painting the layer thickness in the transition zones reduces from normal to zero, the effect particles can no longer align themselves. This leads to lighter, darker or cloudy zones.

If 1-component clear lacquer is sprayed before the base coat, this effect is prevented. An optically perfect transition will result.

SECTION 502-00 Uni-Body, Subframe and Mounting System

VEHICLE APPLICATION: 2008.75 Focus ST C307

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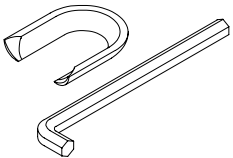
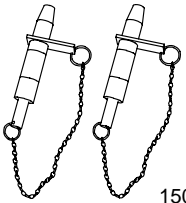
SPECIFICATIONS**Torque Specifications**

Item	Nm	lb-ft	lb-in
Catalytic converter to rear muffler flange retaining nuts - Vehicles with diesel engine	51	38	-
Catalytic converter to rear muffler flange retaining nuts - All except vehicles with diesel engine	48	35	-
Engine support insulator retaining bolts	80	59	-
Stabilizer bar clamp retaining bolts	48	35	-
Lower arm rear clamp retaining bolts	115	85	-
Lower arm front retaining bolt	175	129	-
Front axle crossmember bracket retaining bolts	70	52	-
Front axle crossmember front retaining bolts	115	85	-
Front axle crossmember rear retaining bolts	275	203	-
Steering gear mounting bolts	90	66	-
Lower arm ball joint retaining nut	70	52	-
Stabilizer bar to stabilizer bar link retaining nut	48	35	-
Headlamp leveling front sensor bracket retaining bolt	8	-	71
Rear axle crossmember retaining bolts	125	92	-
Rear lower arm to wheel knuckle retaining bolt	115	85	-
Upper arm retaining bolts	115	85	-
Front lower arm retaining bolts	115	85	-
Stabilizer bar link to rear lower arm retaining nut - Vehicles with solid stabilizer bar link	25	18	-
Stabilizer bar link to rear lower arm retaining nut - Vehicles with ball joint stabilizer bar link	48	35	-
Fuel additive tank retaining screws	8	-	71
Rear lower arm adjustment cam nut	90	66	-

REMOVAL AND INSTALLATION

Front Axle Crossmember

Special Tool(s)

 <p>E42949</p>	<p>Protector, Ball Joint Gaiter 204-349</p>
 <p>15097A</p>	<p>Alignment Pins, Subframe 205-316 (15-097A)</p>

General Equipment

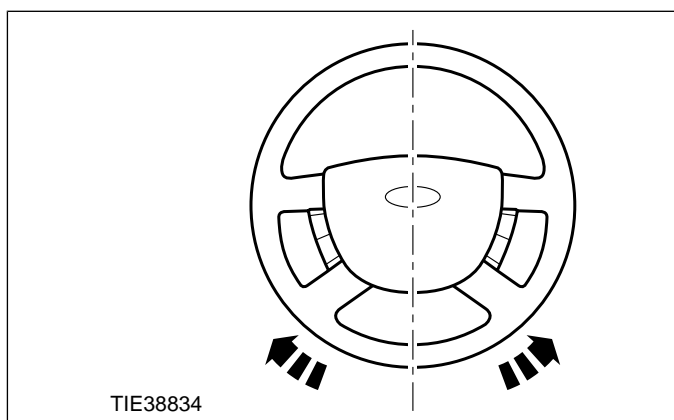
<p>Ball joint separator</p>
<p>Securing strap</p>
<p>Transmission jack</p>

CAUTION: Make sure the strut and spring assembly does not move in a forwards or rearwards direction, to prevent damage to the top mount center cup.

All vehicles

1. **NOTE:** Make sure the road wheels are in the straight ahead position.

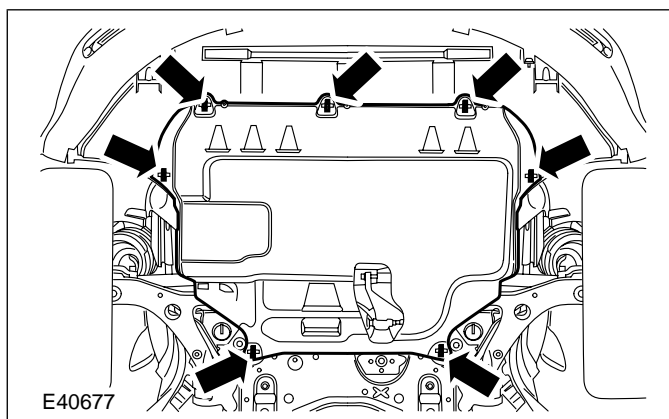
Centralize the steering wheel and lock it in position.



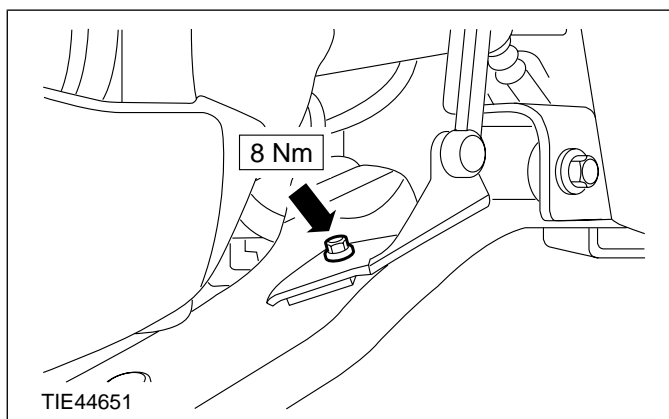
2. Remove the front wheels and tires.

For additional information, refer to: **Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).**

3. Remove the engine undershield.

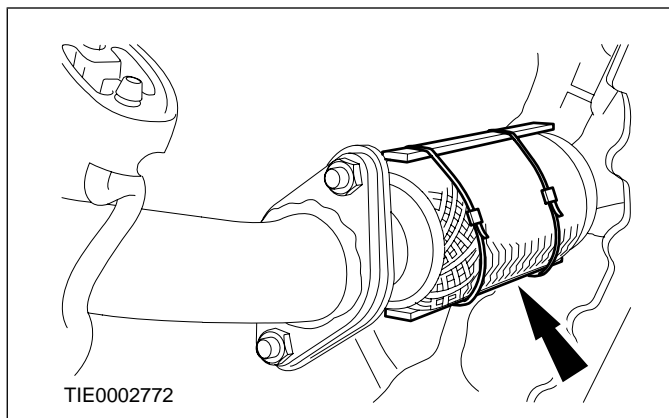


4. Detach the headlamp leveling front sensor bracket from the right-hand lower arm and secure it to one side (if equipped).



5. **CAUTION:** Over bending of the exhaust flexible pipe may cause damage resulting in failure.

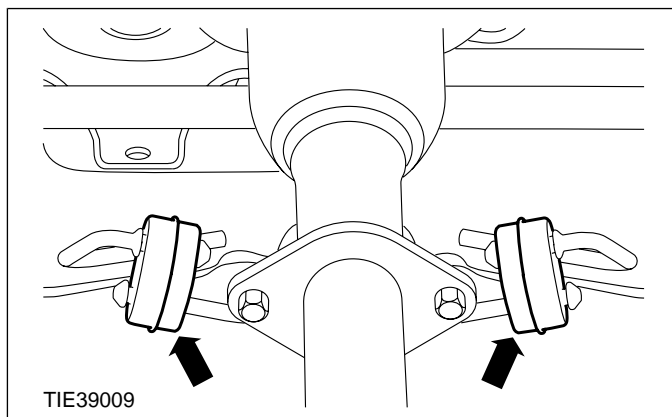
Support the exhaust flexible pipe with a suitable support wrap or a suitable splint.



REMOVAL AND INSTALLATION

6. **⚠ CAUTION:** Take care when removing the exhaust hanger insulators to prevent damage.

Detach the exhaust flexible pipe from the front axle crossmember exhaust hanger insulators.

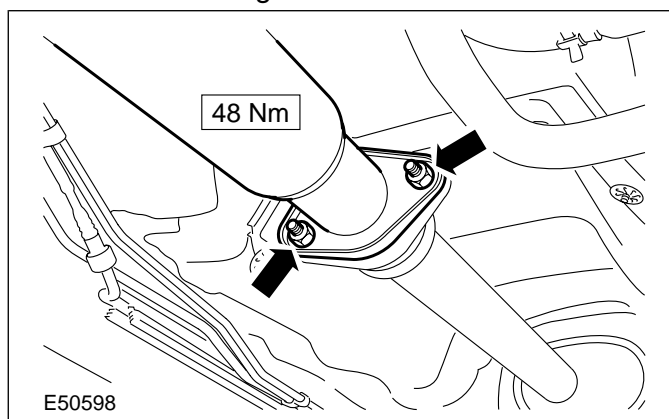


All except vehicles with diesel engine

7. **⚠ CAUTION:** Using suitable cable ties, support the rear muffler and exhaust tailpipe assembly to prevent damage to the exhaust hanger insulators.

Detach the exhaust flexible pipe from the rear muffler flange.

- Discard the gasket and nuts.

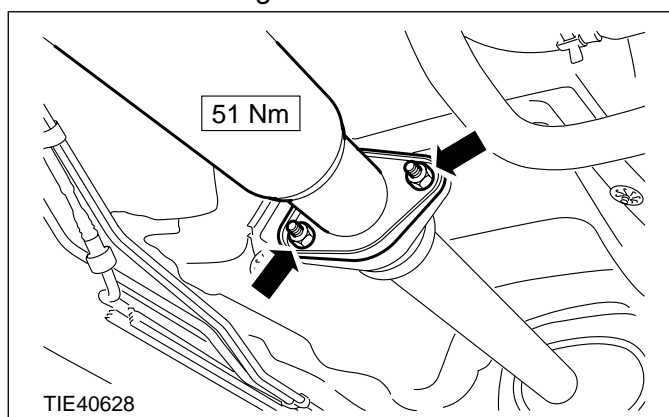


Vehicles with diesel engine

8. **⚠ CAUTION:** Using suitable cable ties, support the rear muffler and exhaust tailpipe assembly to prevent damage to the exhaust hanger insulators.

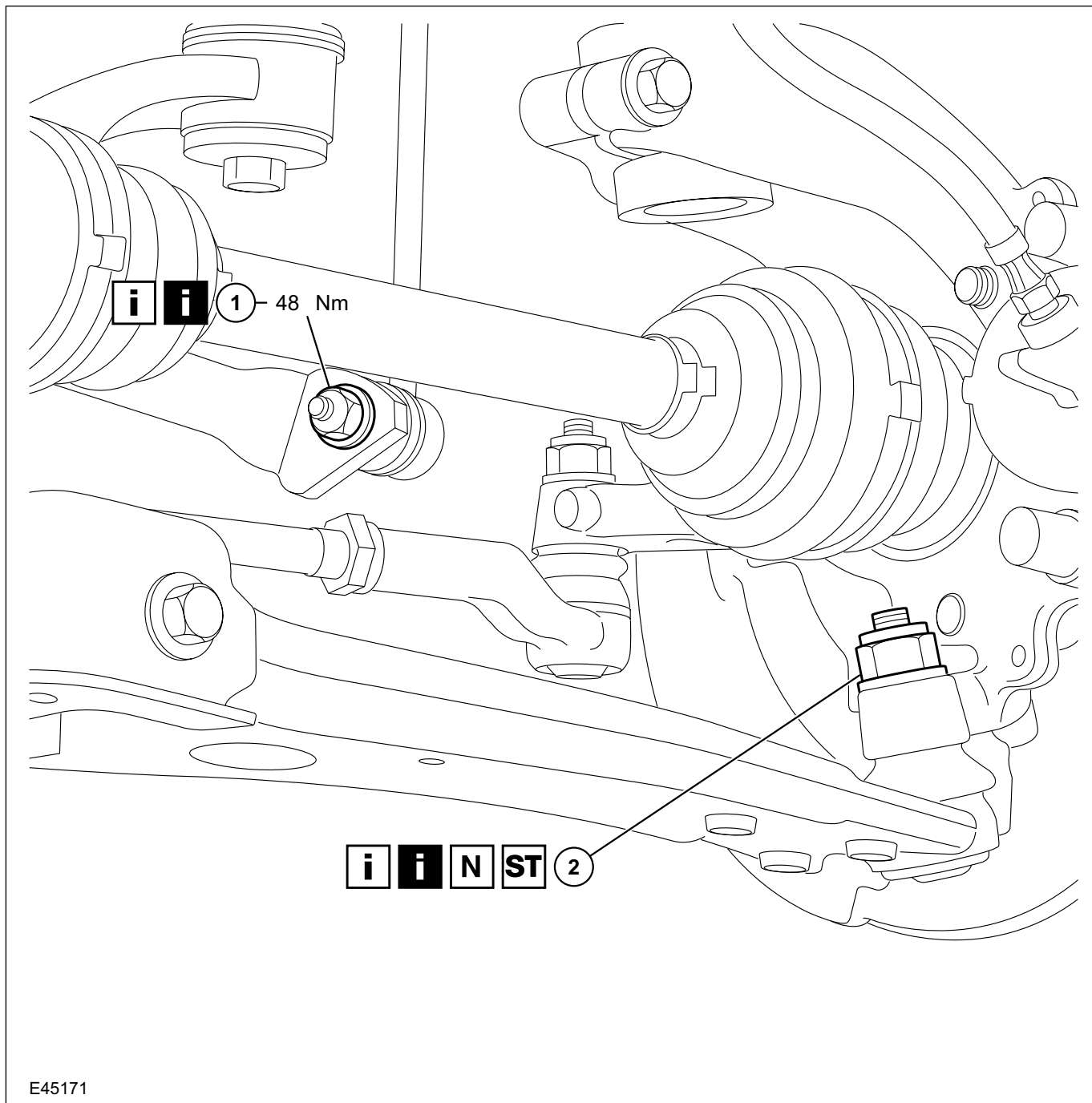
Detach the exhaust flexible pipe from the rear muffler flange (2.0L Duratorq-TDCi (DW) Diesel shown).

- Discard the gasket and nuts.



9. Remove the components in the order indicated in the following illustration(s) and table(s).

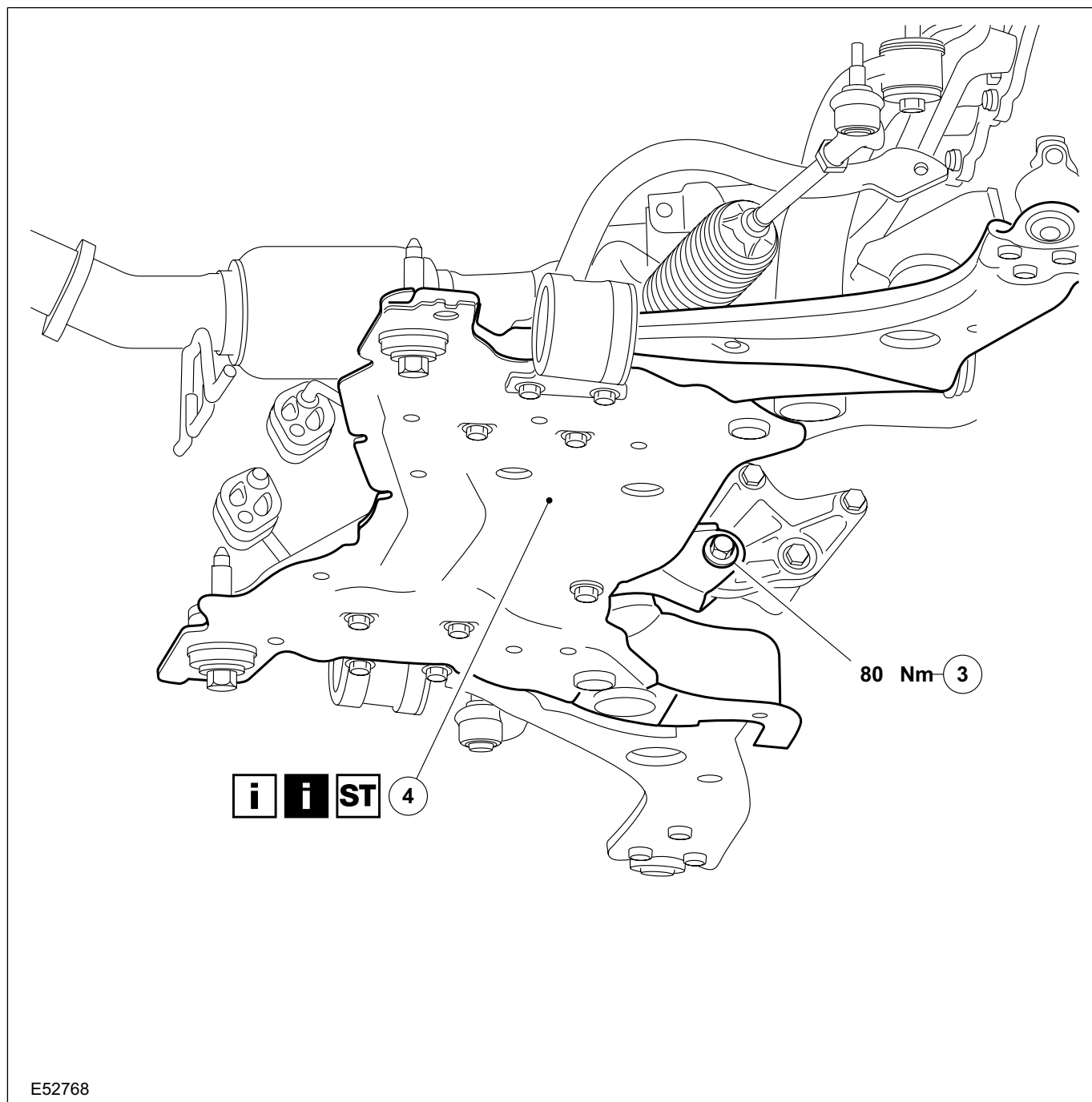
REMOVAL AND INSTALLATION



E45171

Item	Description
1	Stabilizer bar link retaining nut See Removal Detail See Installation Detail
2	Lower arm ball joint retaining nut See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION



E52768

Item	Description
3	Engine support insulator front retaining bolt
4	Front axle crossmember See Removal Detail See Installation Detail

10. To install, reverse the removal procedure.

11. Check the toe setting and adjust as necessary.

For additional information, refer to:
Specifications (204-00 Suspension System - General Information, Specifications)

/ **Front Toe Adjustment** (204-00 Suspension System - General Information, General Procedures).

Removal Details

REMOVAL AND INSTALLATION

Item 1 Stabilizer bar link retaining nut

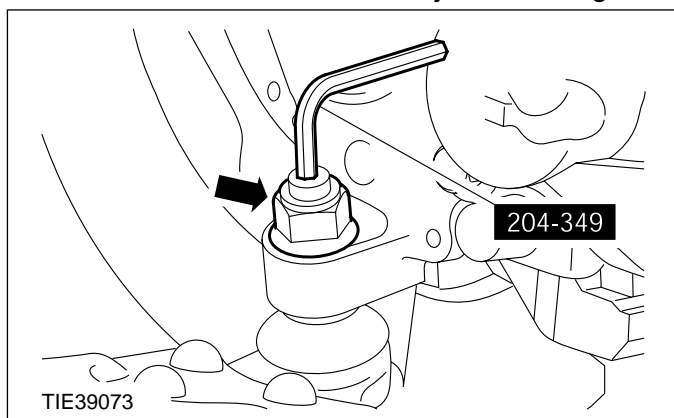
1. **NOTE:** Use a 5 mm Allen key to prevent the ball joint stud from rotating.

Detach the stabilizer bar link from the stabilizer bar on both sides.

Item 2 Lower arm ball joint retaining nut

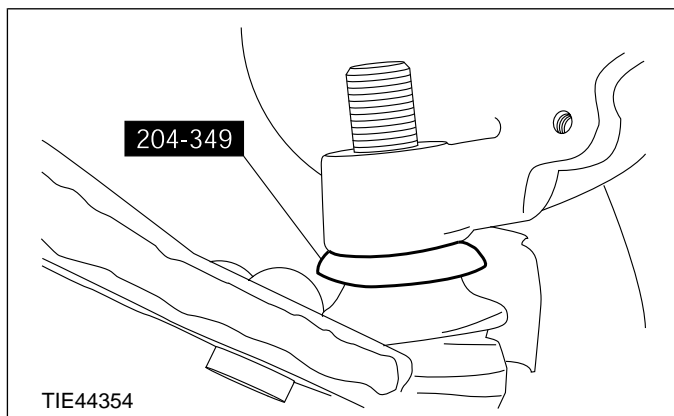
1. Using the special tool to prevent the ball joint rotating, remove the lower arm ball joint retaining nut on both sides.

- Discard the lower arm ball joint retaining nut.

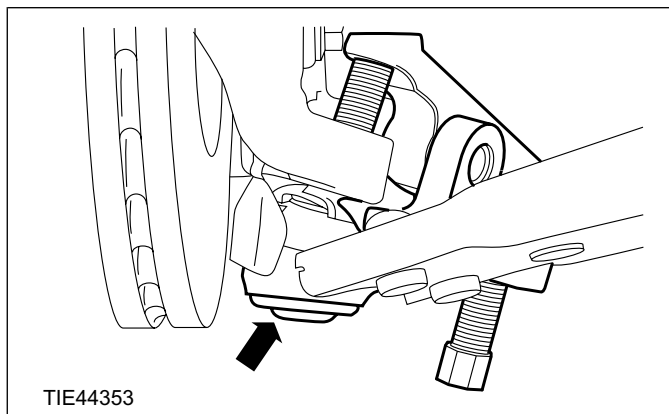


2. **CAUTION:** Make sure the special tool is installed with the curved surface facing upwards to prevent damage to the ball joint seal.

Install the special tool.

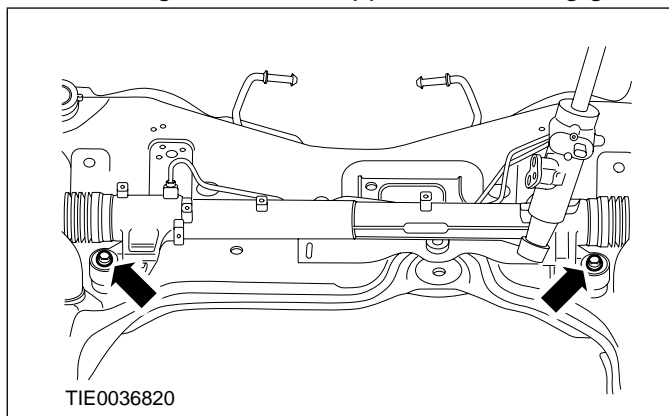


3. Using a suitable ball joint separator, detach the lower arm from the wheel knuckle on both sides.

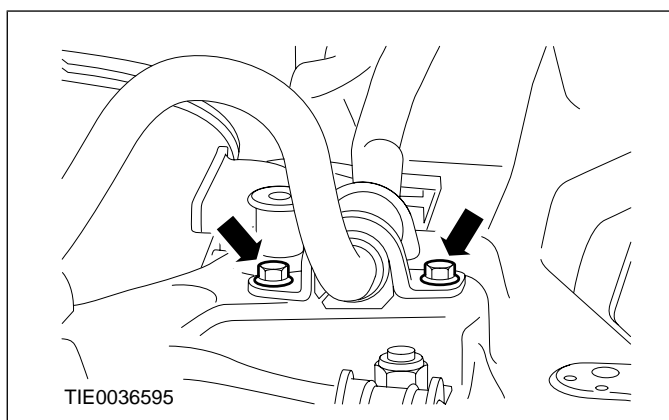
**Item 4 Front axle crossmember**

1. Detach the steering gear from the front axle crossmember.

- Using cable ties, support the steering gear.



2. Loosen the stabilizer bar retaining bolts on both sides.



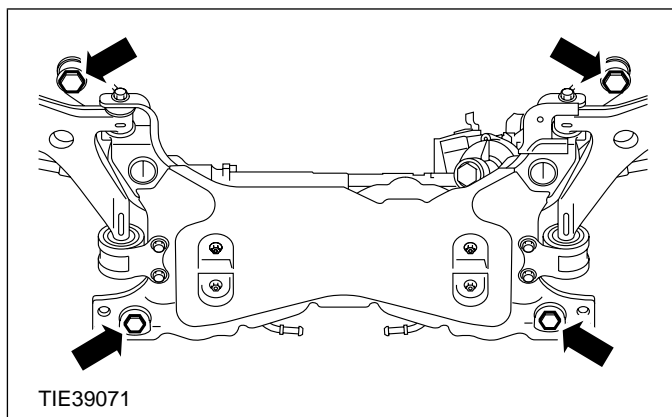
3. Using a transmission jack and a wooden block, support the front axle crossmember, stabilizer bar and lower arm assembly.

REMOVAL AND INSTALLATION

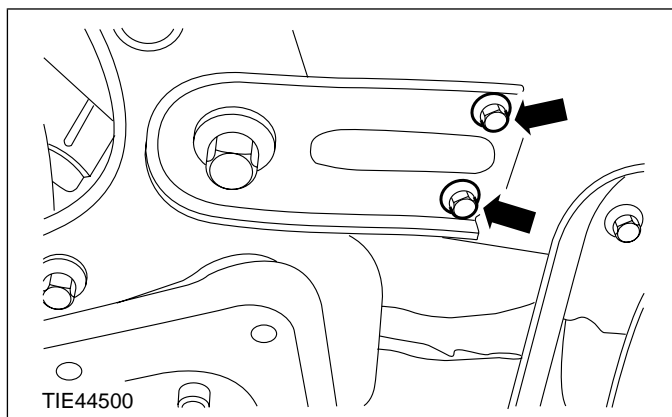
4. **▲WARNING:** Make sure the front axle crossmember is secured to the transmission jack. Failure to follow this instruction may result in personal injury.

Using a suitable securing strap, secure the front axle crossmember, stabilizer bar and lower arm assembly to the transmission jack.

5. Remove the front axle crossmember retaining bolts (transmission jack shown removed for clarity).

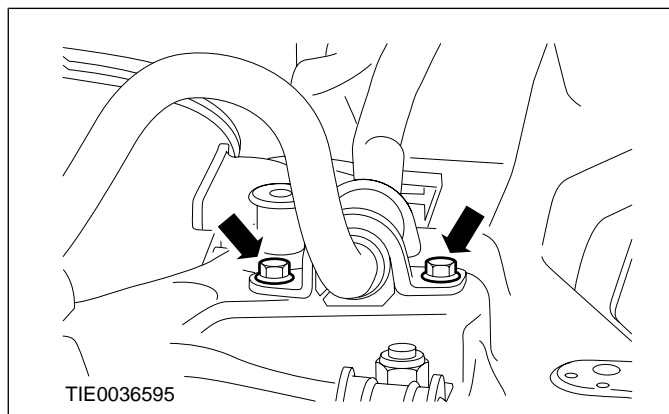


6. Remove the front axle crossmember bracket retaining bolts on both sides.



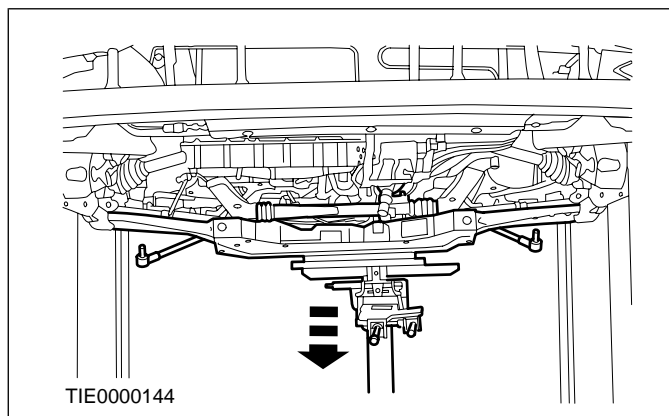
7. Lower the front axle crossmember, stabilizer bar and lower arm assembly approximately 50 mm.

8. Remove the stabilizer bar retaining bolts on both sides.



9. **NOTE:** When lowering the front axle crossmember, stabilizer bar and lower arm assembly, make sure the stabilizer bar is clear of the steering gear.

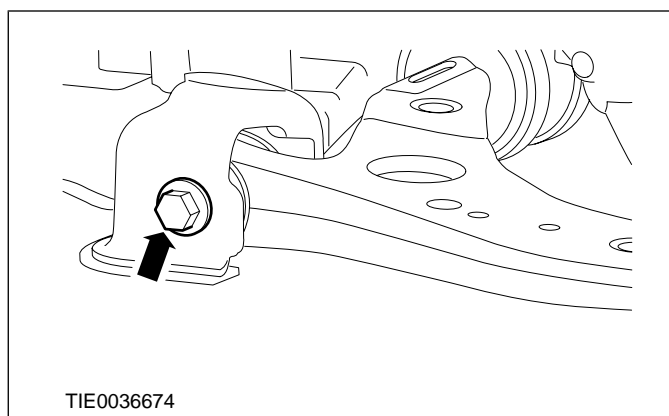
Remove the front axle crossmember, stabilizer bar and lower arm assembly.



10. Remove the stabilizer bar.

11. **NOTE:** If installing a new front axle crossmember, remove the lower arms.

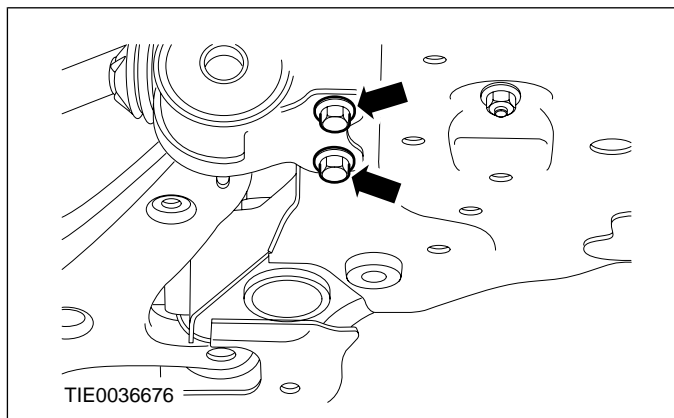
Remove the lower arm front retaining bolt on both sides.



REMOVAL AND INSTALLATION

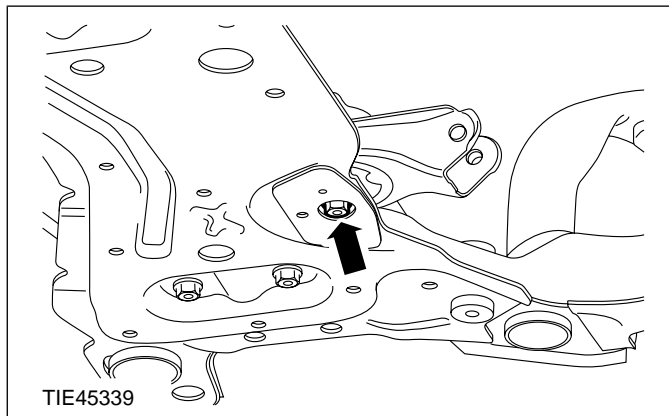
12. **NOTE:** If installing a new front axle crossmember, remove the lower arms.

Remove the lower arm on both sides.



13. **NOTE:** If installing a new front axle crossmember, remove the engine support insulator.

Remove the engine support insulator.

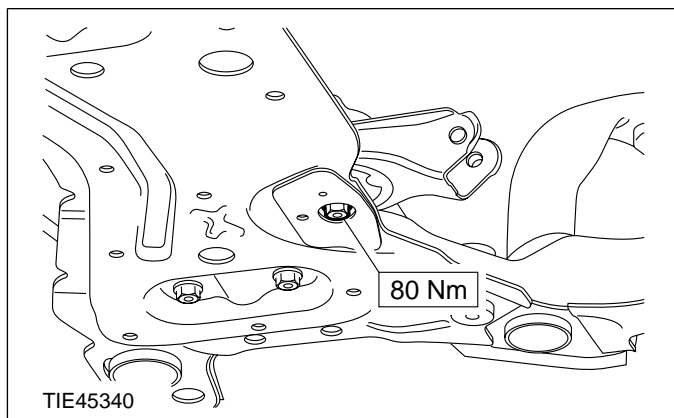


Installation Details

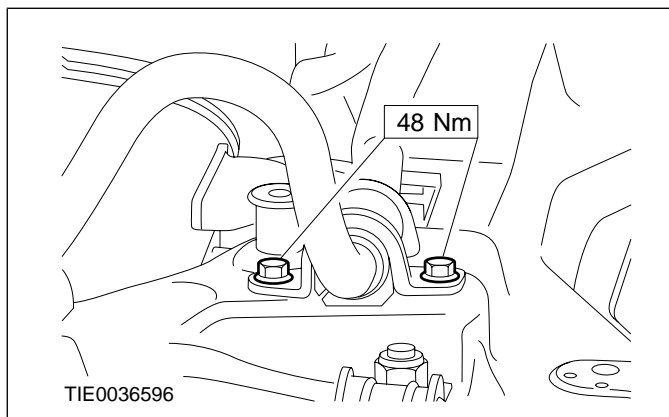
Item 4 Front axle crossmember

1. **NOTE:** If installing a new front axle crossmember, install the engine support insulator.

Install the engine support insulator.



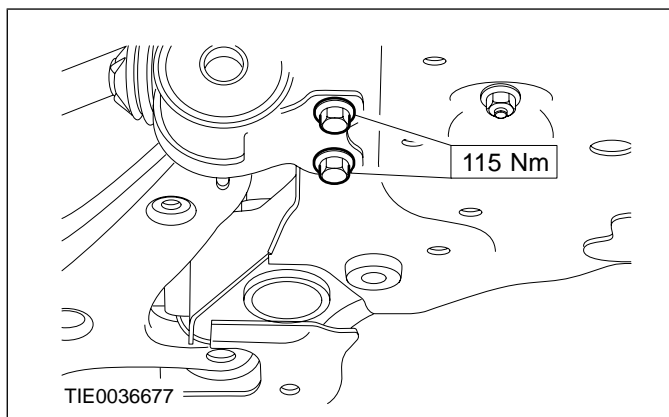
- Install the stabilizer bar clamp retaining bolts on both sides.



2. Install the stabilizer bar.

3. **NOTE:** If installing a new front axle crossmember, install the lower arms.

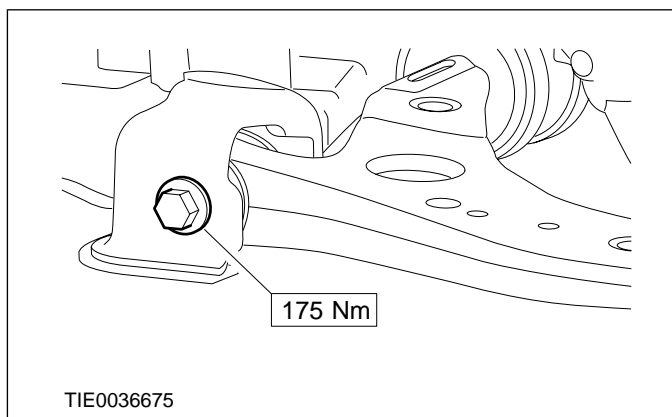
Install the lower arm rear clamp retaining bolts on both sides.



REMOVAL AND INSTALLATION

4. **NOTE:** If installing a new front axle crossmember, install the lower arms.

Install the lower arm on both sides.



5. Using a transmission jack and a wooden block, support the front axle crossmember, stabilizer bar and lower arm assembly.

6. **WARNING:** Make sure the front axle crossmember is secured to the transmission jack. Failure to follow this instruction may result in personal injury.

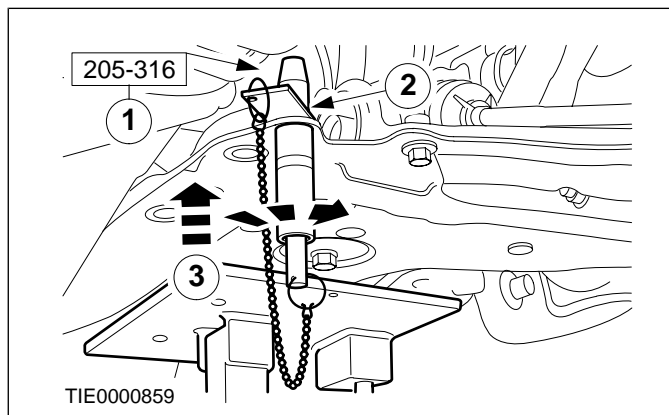
Using a suitable securing strap secure the front axle crossmember, stabilizer bar and lower arm assembly to the transmission jack.

7. Using the transmission jack, position and raise the front axle crossmember until the front axle crossmember is approximately 100 mm from the body.

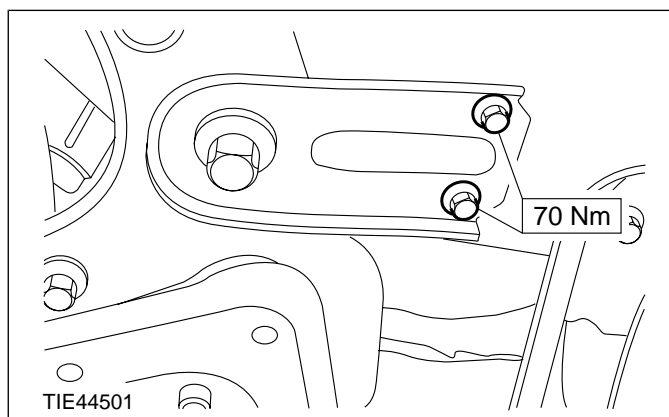
8. Using the transmission jack and the special tool, position and align the front axle crossmember.

1. Insert the alignment pins through the front axle crossmember alignment holes.
2. Slide the locking plates into the groove of the special tool and tighten the alignment pin sleeve.

3. Raise the front axle crossmember engaging the alignment pins into the chassis aligning holes.

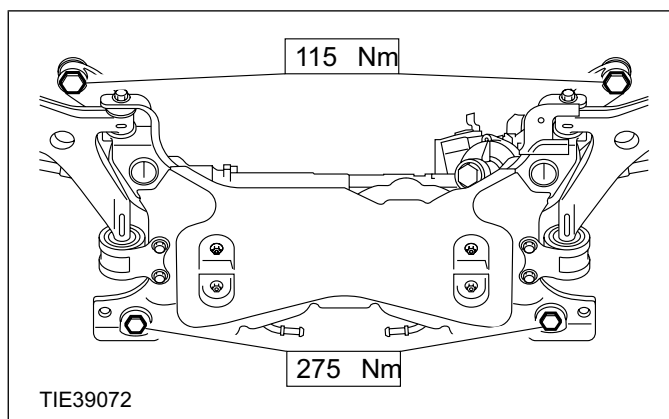


9. Install the front axle crossmember bracket retaining bolts on both sides.



10. **CAUTION:** Make sure the front axle crossmember does not move while tightening the front axle crossmember retaining bolts.

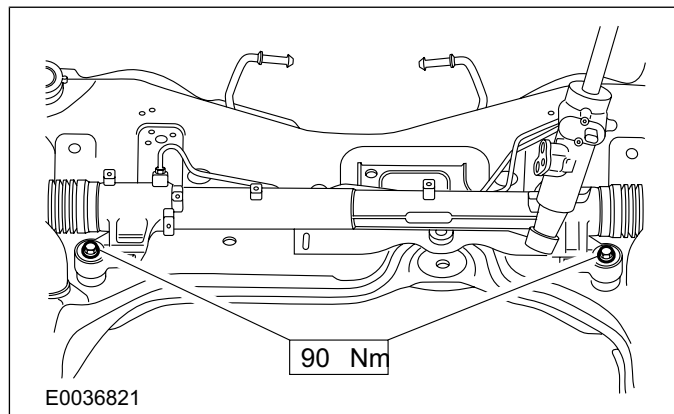
Install the front axle crossmember retaining bolts (transmission jack shown removed for clarity).



11. Remove the securing strap.

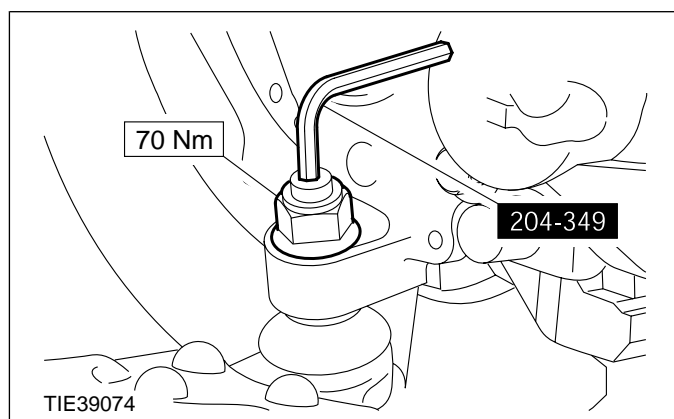
REMOVAL AND INSTALLATION

12. Lower and remove the transmission jack and the wooden block.
13. Attach the steering gear to the front axle crossmember.
 - Remove the cable ties.

**Item 2 Lower arm ball joint retaining nut**

1. **▲WARNING:** Install a new lower arm ball joint retaining nut. Failure to follow this instruction may result in personal injury.

Using the special tool to prevent the ball joint from rotating, install the lower arm ball joint retaining nut on both sides.

**Item 1 Stabilizer bar link retaining nut**

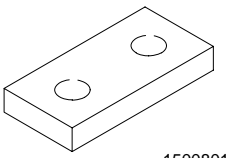
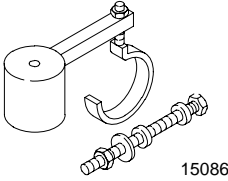
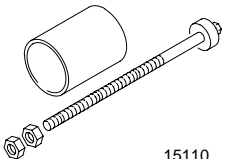
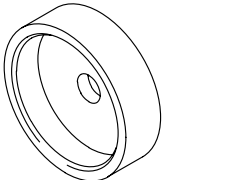
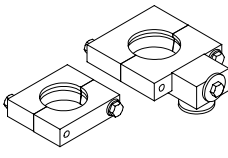
1. **NOTE:** Use a 5 mm Allen key to prevent the ball joint stud from rotating.

Attach the stabilizer bar link to the stabilizer bar on both sides.

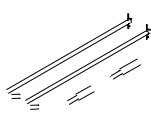
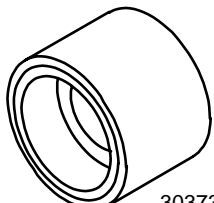
REMOVAL AND INSTALLATION

Front Axle Crossmember Front Bushing

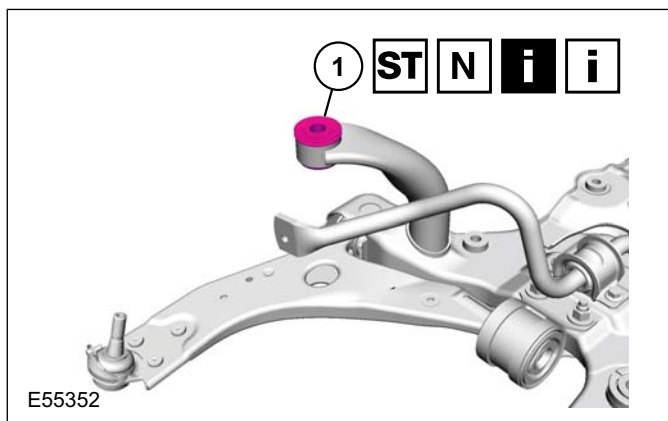
Special Tool(s)

 <p>1500801</p>	<p>Adapter for 205-044 205-044-01</p>
 <p>15086</p>	<p>Remover/Installer, Pivot Bushing 205-297</p>
 <p>15110</p>	<p>Remover/Installer, Pivot Bushing 205-342</p>
 <p>1511002</p>	<p>Adapter for 205-342 205-342-02</p>
 <p>E51254</p>	<p>Remover/Installer, Subframe Bush 205-810 Comprises 205-810-01, 205-810-02</p>

Special Tool(s)

 <p>30329013</p>	<p>Adapter for 303-290A 303-290-13</p>
 <p>303733</p>	<p>Installer, Crankshaft Front Seal 303-733</p>

1. Remove the front axle crossmember.
For additional information, refer to: Front Axle Crossmember - 3-Door (502-00 Uni-Body, Subframe and Mounting System, Removal and Installation).
2. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Front axle crossmember front bushing See Removal Detail See Installation Detail

3. To install, reverse the removal procedure.

Removal Details

502-00-13

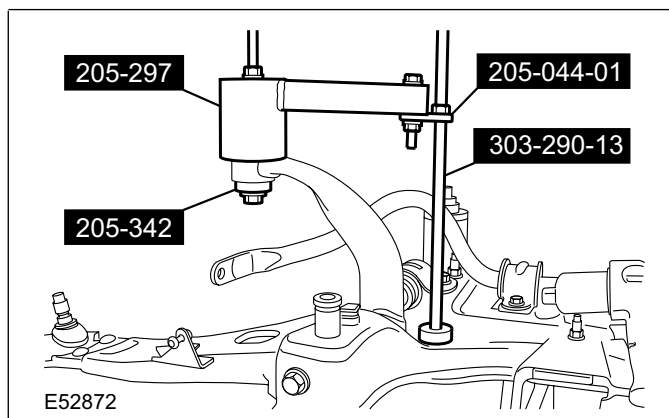
Uni-Body, Subframe and Mounting System

502-00-13

REMOVAL AND INSTALLATION

Item 1 Front axle crossmember front bushing

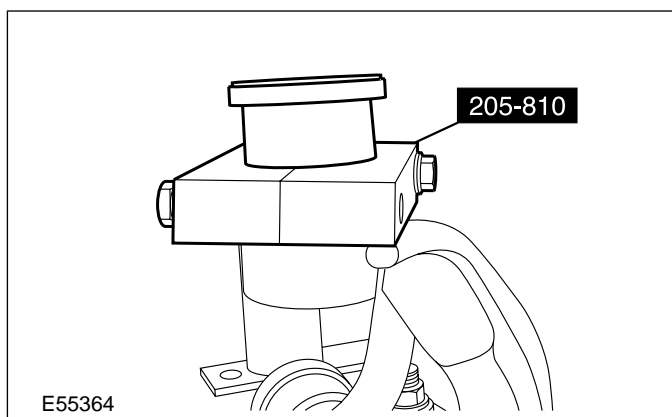
1. Using the special tools, remove the front axle crossmember front bushing.



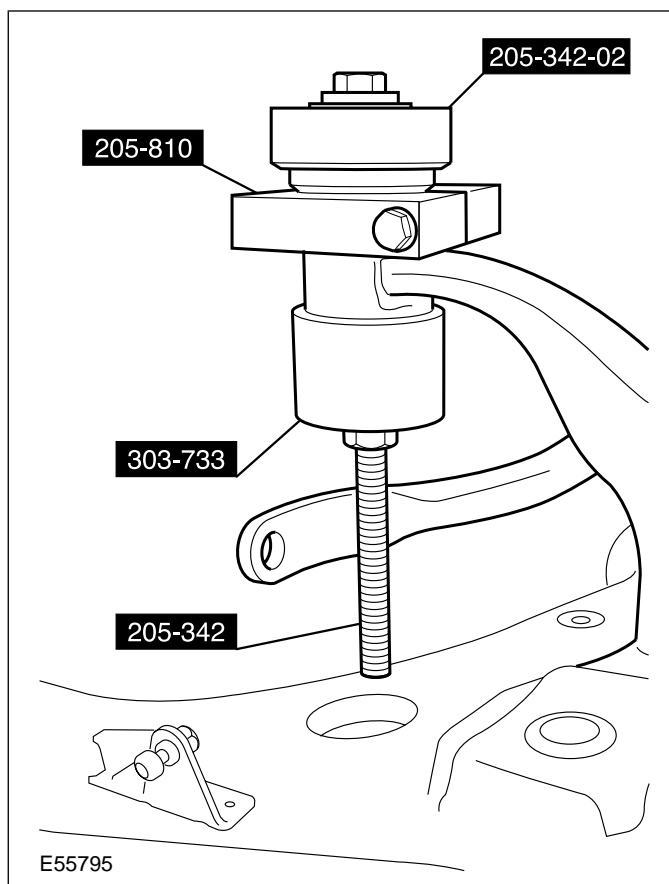
Installation Details

Item 1 Front axle crossmember front bushing

1. Clean the front axle crossmember front bushing housing.
2. Using the special tool, attach the front axle crossmember front bushing to the front axle crossmember.

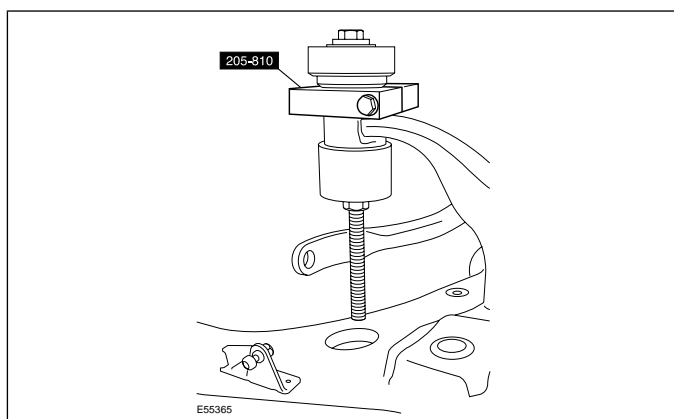


3. Using the special tools, press the front axle crossmember front bushing in approximately 10 mm.

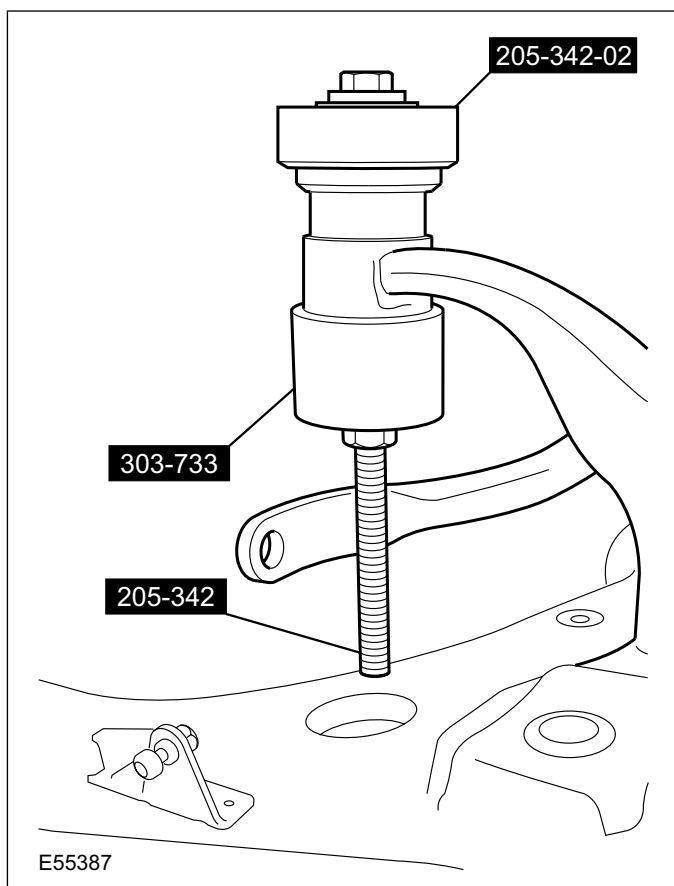


REMOVAL AND INSTALLATION

4. Remove the special tool.



5. Using the special tools, install the front axle crossmember front bushing.

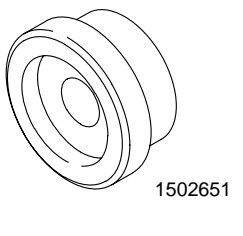
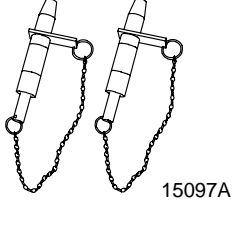
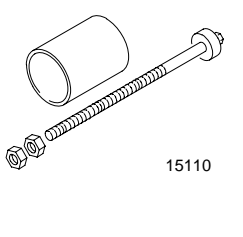
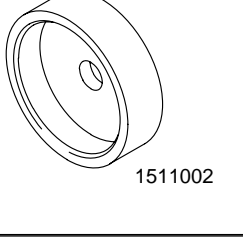
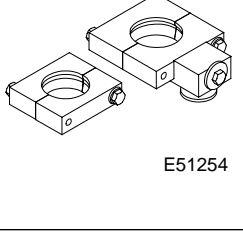


6. Remove the special tools.

REMOVAL AND INSTALLATION

Front Axle Crossmember Rear Bushing

Special Tool(s)

 <p>1502651</p>	<p>Adapter for 205-071 (Thrust Pad) 205-071-02</p>
 <p>15097A</p>	<p>Alignment Pins, Subframe 205-316 (15-097A)</p>
 <p>15110</p>	<p>Remover/Installer, Pivot Bushing 205-342</p>
 <p>1511002</p>	<p>Adapter for 205-342 205-342-02</p>
 <p>E51254</p>	<p>Remover/Installer, Subframe Bush 205-810 Comprises 205-810-01, 205-810-02</p>

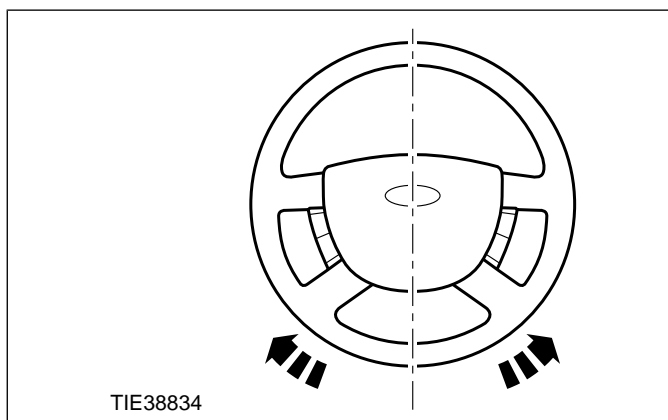
General Equipment

<p>Transmission jack</p>
<p>Securing strap</p>

All vehicles

1. **NOTE:** Make sure that the road wheels are in the straight ahead position.

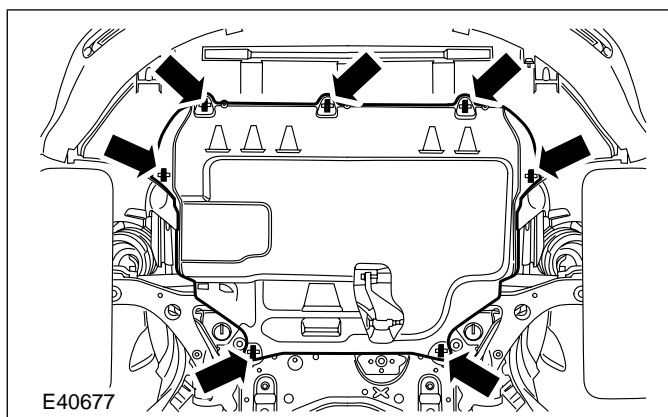
Centralize the steering wheel and lock it in position.



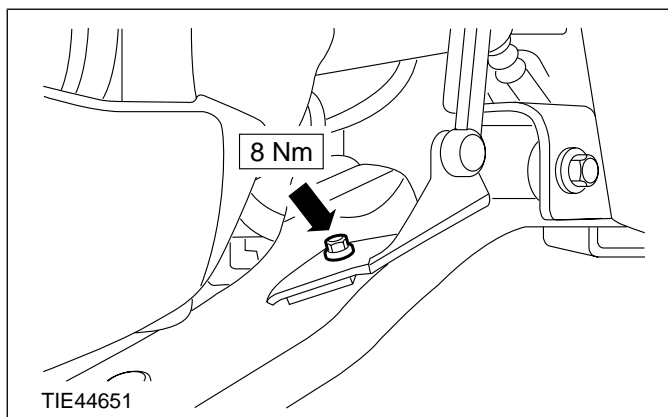
2. Remove the front wheels and tires.

For additional information, refer to: **Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).**

3. Remove the engine undershield.



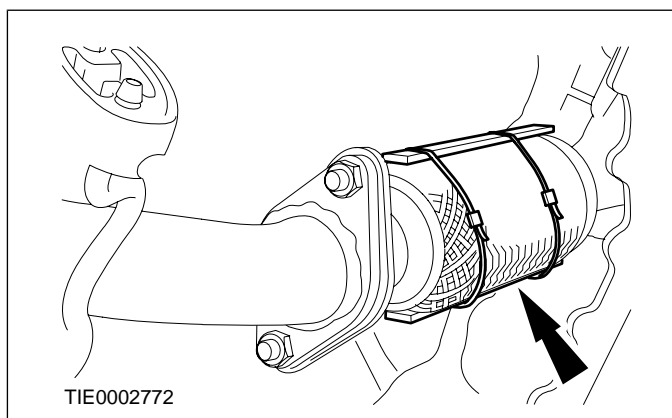
4. Detach the headlamp leveling front sensor bracket from the right-hand lower arm and secure it to one side (if equipped).



REMOVAL AND INSTALLATION

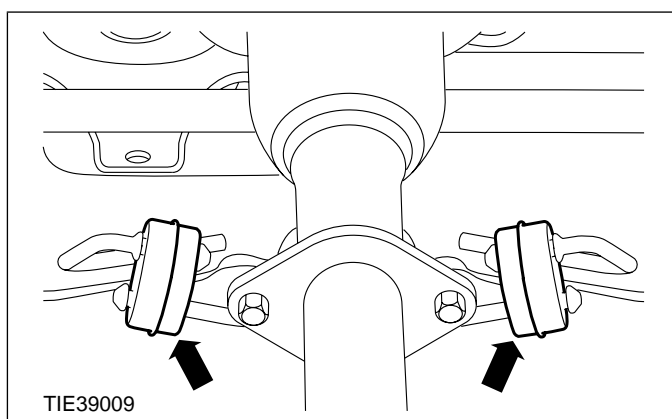
5. **⚠ CAUTION:** Over bending of the exhaust flexible pipe may cause damage resulting in failure.

Support the exhaust flexible pipe with a suitable support wrap or a suitable splint.



6. **⚠ CAUTION:** Take care when removing the exhaust hanger insulators to prevent damage.

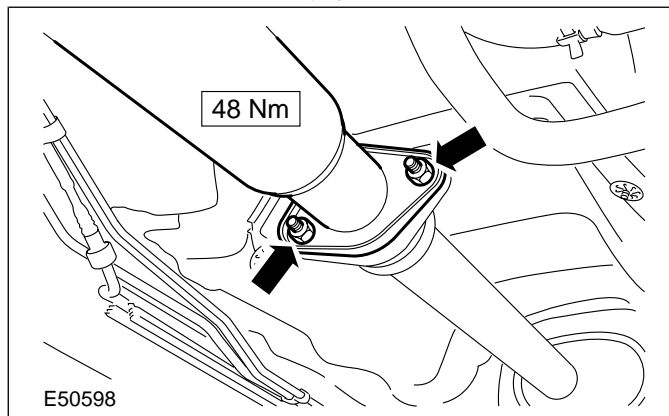
Detach the exhaust flexible pipe from the exhaust hanger insulators.



All except vehicles with diesel engine

7. Detach the catalytic converter from the muffler and tailpipe assembly.

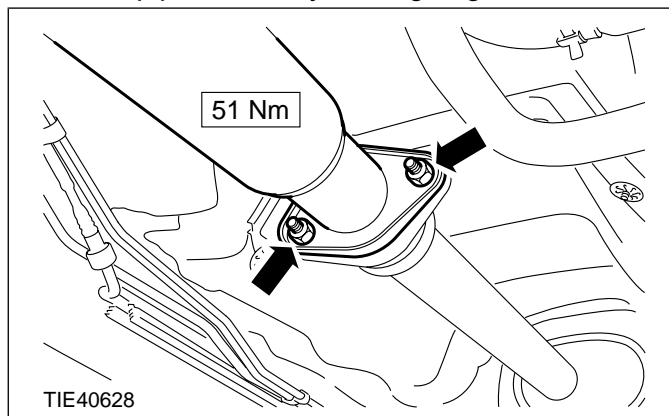
- Discard the catalytic converter to muffler and tailpipe assembly gasket and nuts.



Vehicles with diesel engine

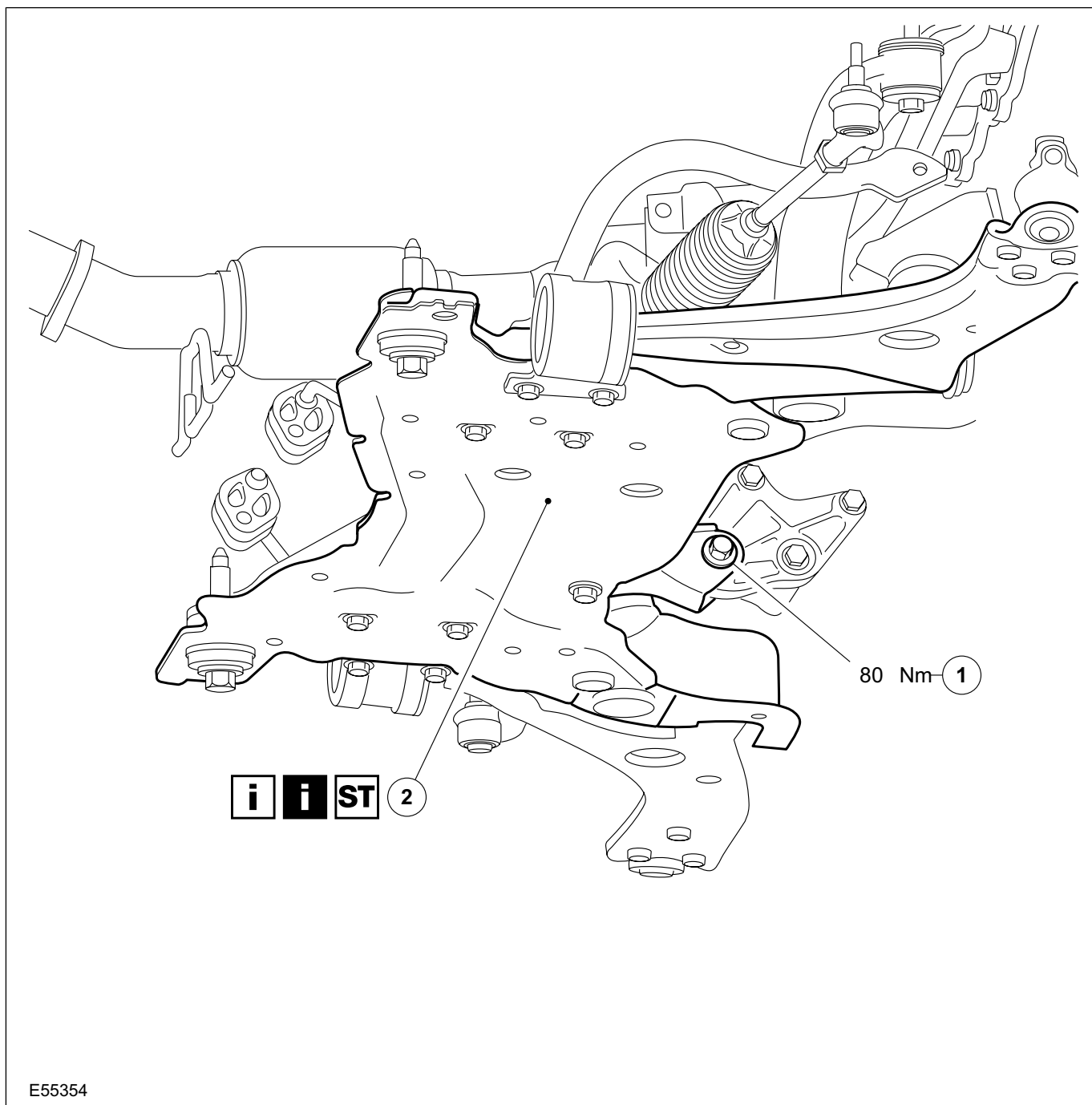
8. Detach the catalytic converter from the muffler and tailpipe assembly.

- Discard the catalytic converter to muffler and tailpipe assembly sealing ring and nuts.



9. Remove the components in the order indicated in the following illustration(s) and table(s).

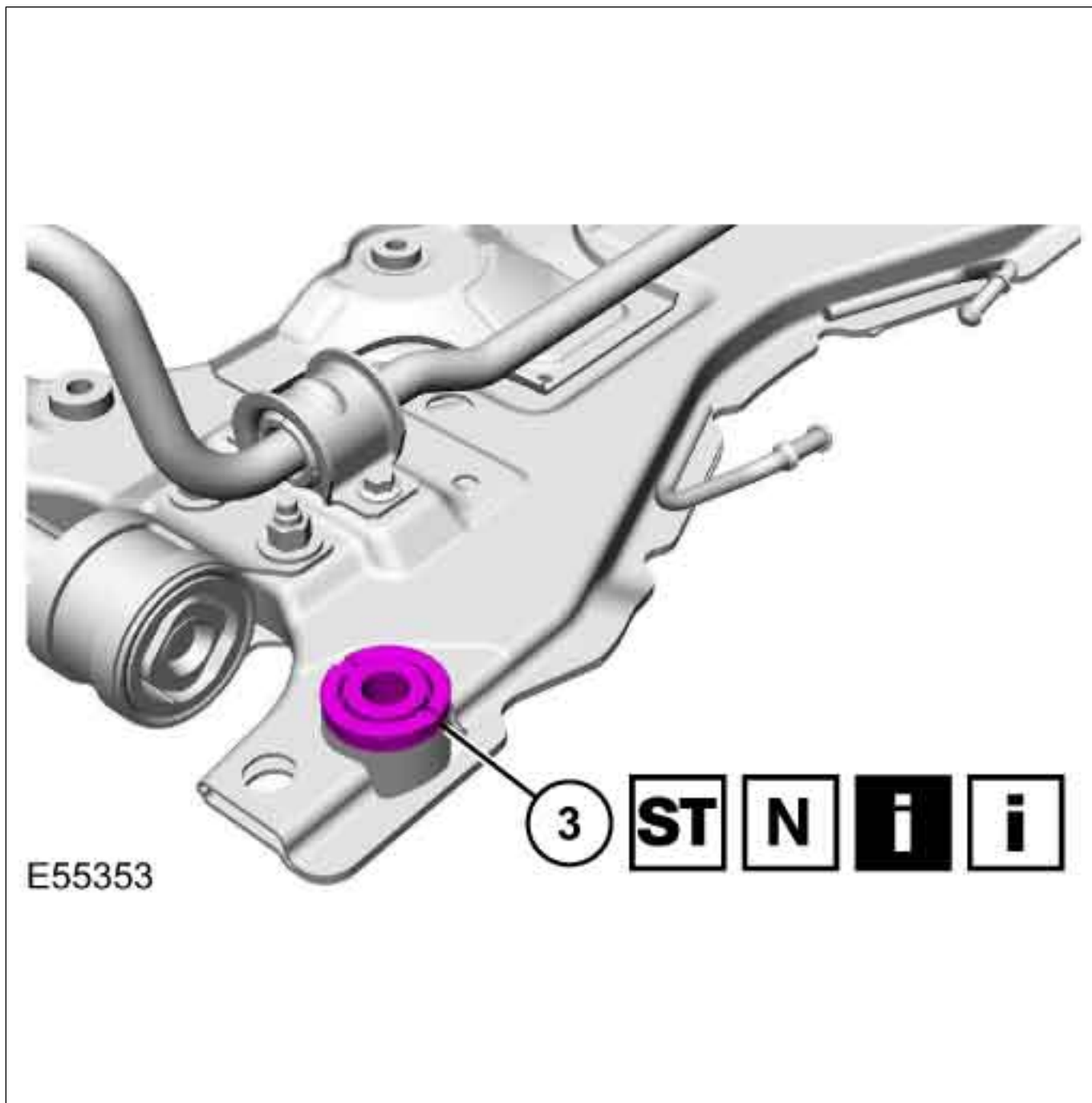
REMOVAL AND INSTALLATION



E55354

Item	Description
1	Engine support insulator front retaining bolt
2	Front axle crossmember See Removal Detail See Installation Detail

REMOVAL AND INSTALLATION



Item	Description
3	Front axle crossmember rear bushing See Removal Detail See Installation Detail

10. To install, reverse the removal procedure.

11. Check the toe setting and adjust as necessary. For additional information, refer to: (204-00 Suspension System - General Information)

Specifications - 3-Door (Specifications),
Front Toe Adjustment (General Procedures).

Removal Details

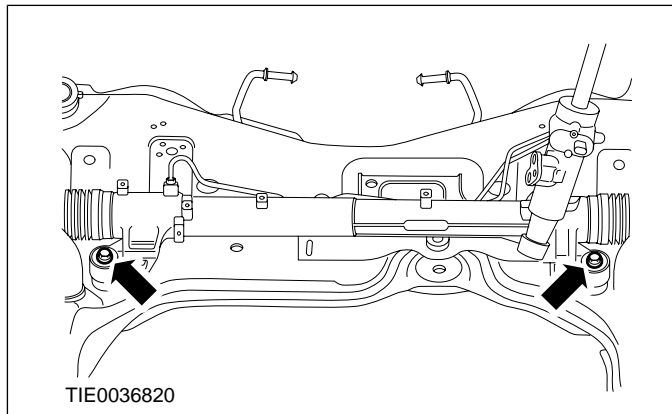
REMOVAL AND INSTALLATION

Item 2 Front axle crossmember

NOTE: The front axle crossmember is lowered to gain access to the front axle crossmember rear bushings.

1. Detach the steering gear from the front axle crossmember.

- Using cable ties, support the steering gear.

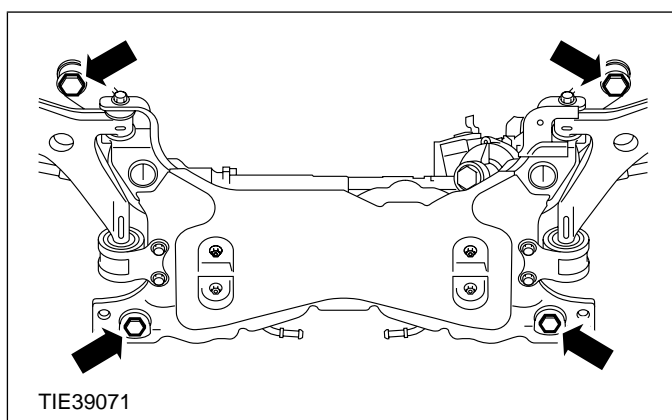


2. Using a transmission jack and a wooden block, support the front axle crossmember, stabilizer bar and lower arm assembly.

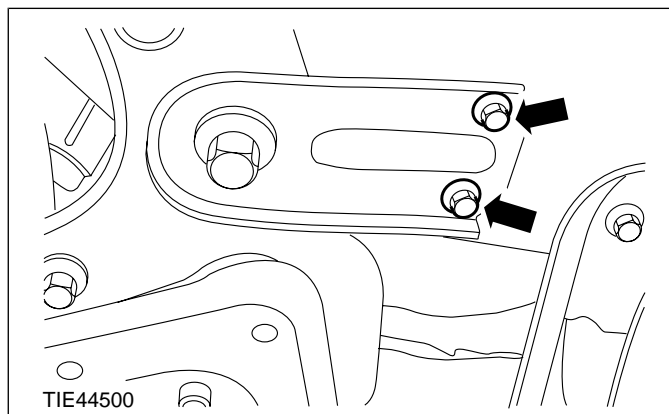
3. **WARNING:** Make sure that the front axle crossmember is secured to the transmission jack. Failure to follow this instruction may result in personal injury.

Using a suitable securing strap, secure the front axle crossmember, stabilizer bar and lower arm assembly to the transmission jack.

4. Remove the front axle crossmember retaining bolts (transmission jack shown removed for clarity).



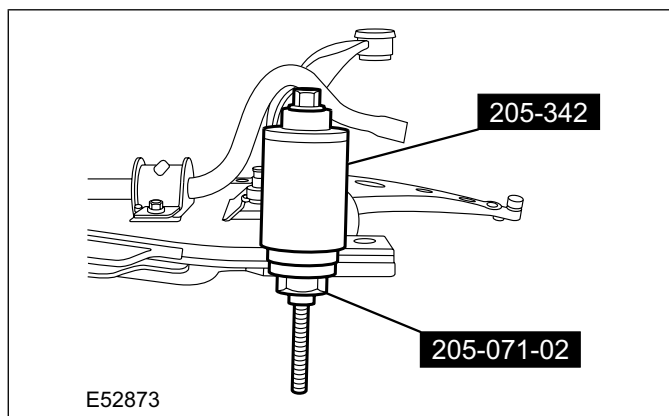
5. Remove the front axle crossmember bracket retaining bolts on both sides.



6. Lower the front axle crossmember, stabilizer bar and lower arm assembly to gain access to the front axle crossmember rear bushings.

Item 3 Front axle crossmember rear bushing

1. Using the special tools, remove the front axle crossmember rear bushing.



Installation Details

502-00-20

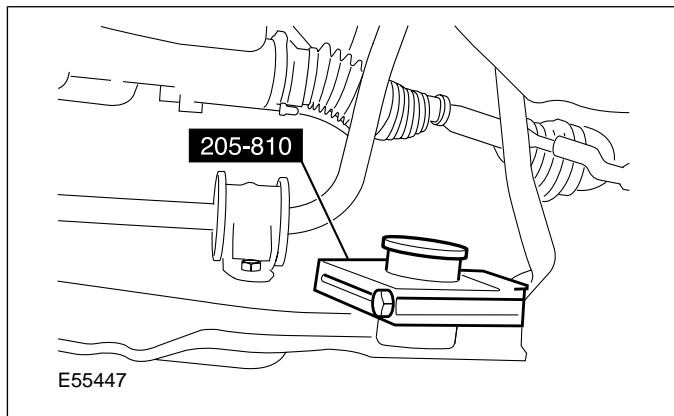
Uni-Body, Subframe and Mounting System

502-00-20

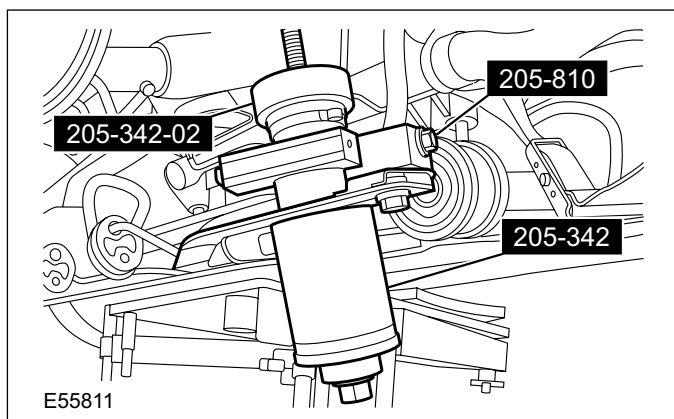
REMOVAL AND INSTALLATION

Item 3 Front axle crossmember rear bushing

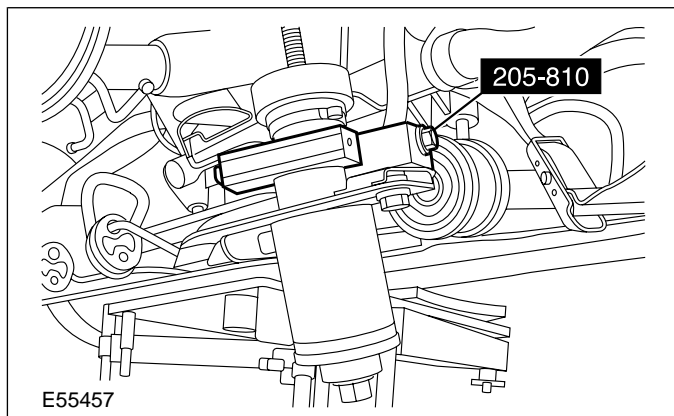
1. Clean the front axle crossmember rear bushing housing.
2. Using the special tool, attach the front axle crossmember rear bushing to the front axle crossmember.



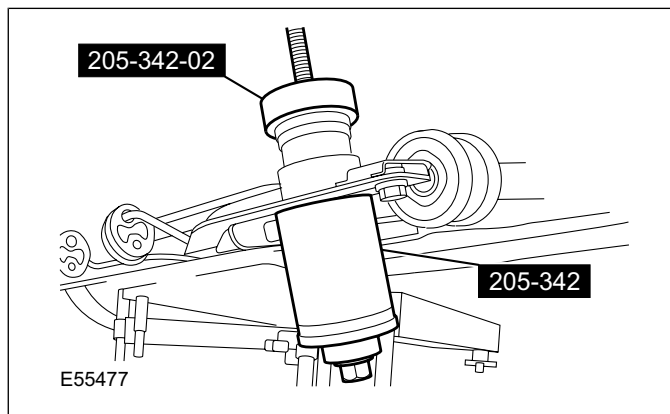
3. Using the special tools, press the front axle crossmember rear bushing in approximately 10 mm.



4. Remove the special tool.



5. Using the special tools, install the front axle crossmember rear bushing.

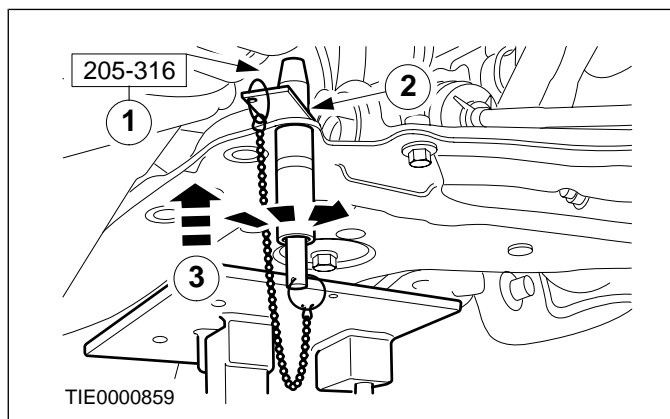


6. Remove the special tools.

Item 2 Front axle crossmember

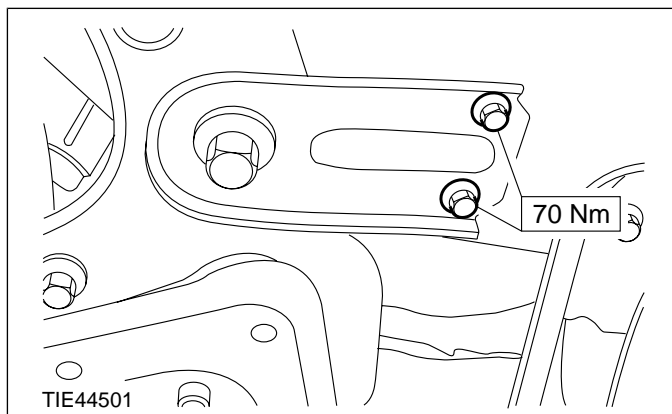
1. Using the transmission jack and the special tool, position and align the front axle crossmember.

1. Insert the special tool through the front axle crossmember alignment holes.
2. Slide the locking plates into the groove of the special tool and tighten the special tool sleeve.
3. Raise the front axle crossmember engaging the special tool into the chassis alignment holes.

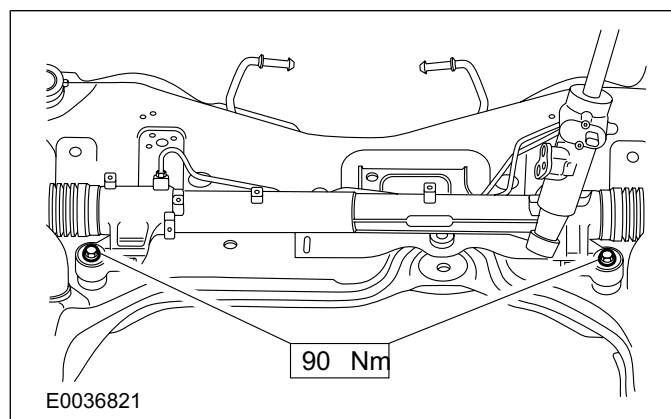


REMOVAL AND INSTALLATION

2. Install the front axle crossmember bracket retaining bolts on both sides.

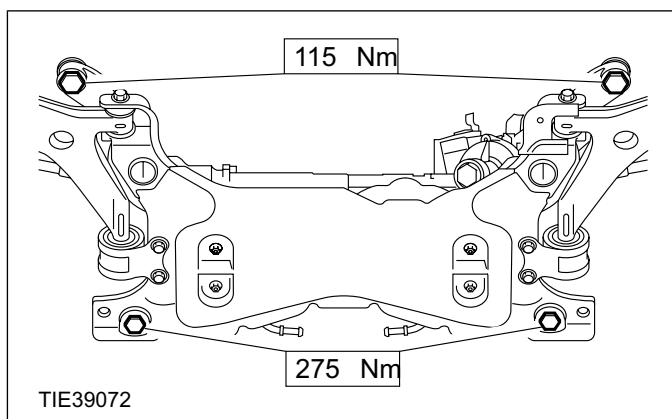


- Remove the cable ties.



3. **CAUTION:** Make sure that the front axle crossmember does not move while tightening the front axle crossmember retaining bolts.

Install the front axle crossmember retaining bolts (transmission jack shown removed for clarity).



4. Remove the special tool.
5. Remove the securing strap.
6. Lower and remove the transmission jack and the wooden block.
7. Attach the steering gear to the front axle crossmember.

REMOVAL AND INSTALLATION

Rear Axle Crossmember — Vehicles With: Solid Stabilizer Bar Link, Vehicles Without: Fuel Additive Tank

General Equipment

Securing strap

Transmission jacks

1. Remove the spring on both sides.

For additional information, refer to: **Spring (204-02, Removal and Installation)**.

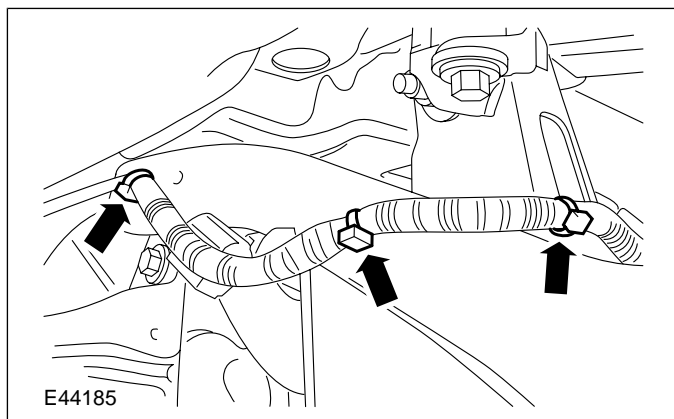
2. Remove the evaporative emission canister (if equipped).

For additional information, refer to: **Evaporative Emission Canister (303-13 Evaporative Emissions, Removal and Installation)**.

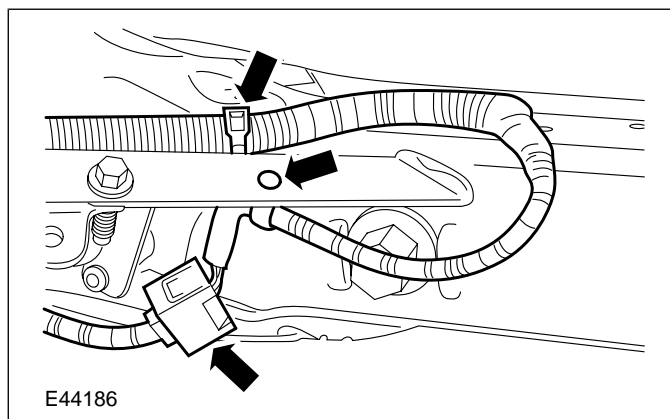
3. Remove the headlamp leveling rear sensor (if equipped).

For additional information, refer to: **Headlamp Leveling Rear Sensor (417-01 Exterior Lighting, Removal and Installation)**.

4. Detach the headlamp leveling sensor wiring harness from the rear axle crossmember (if equipped).

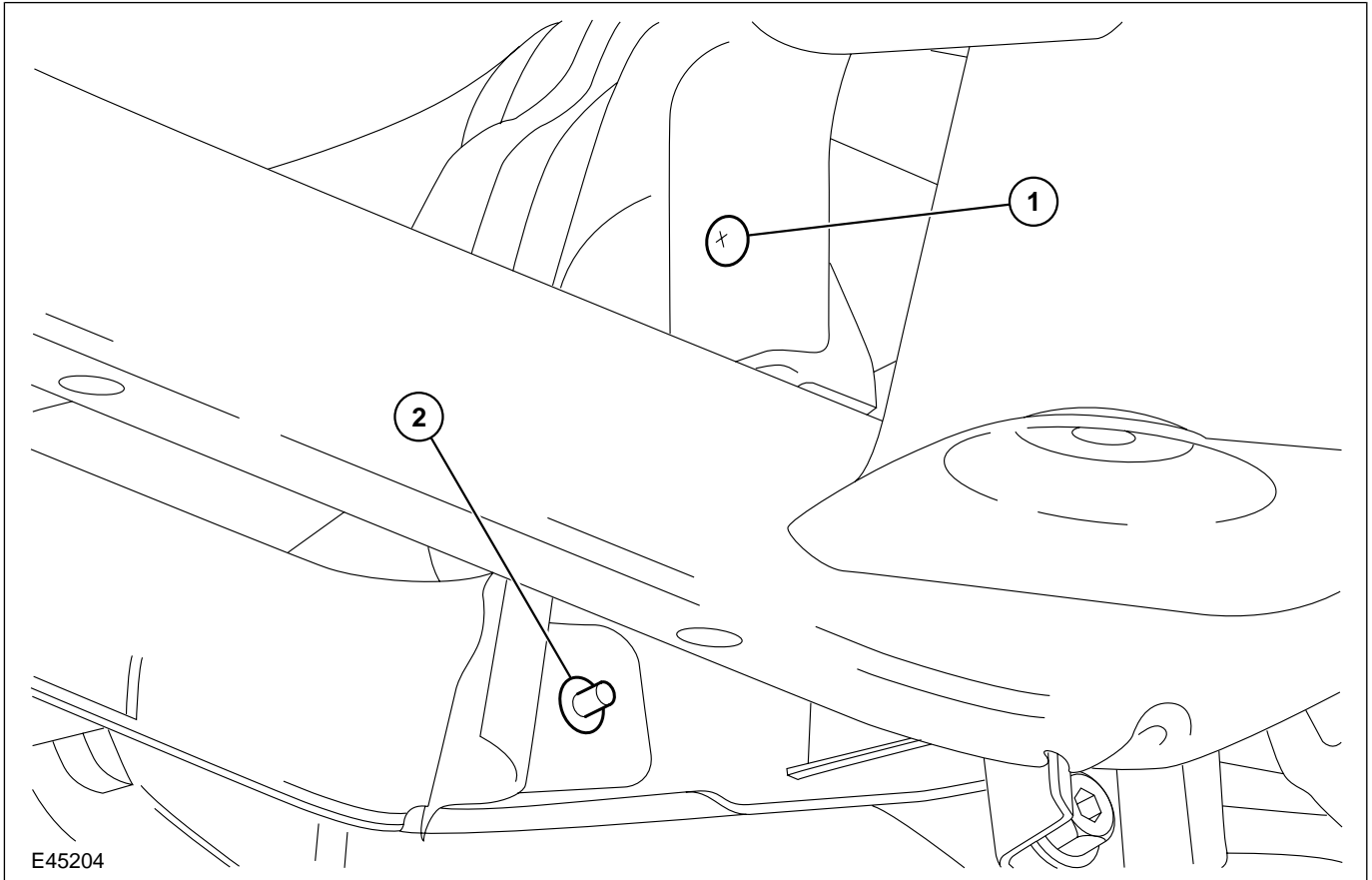


5. Detach the headlamp leveling sensor wiring harness from the rear axle crossmember and disconnect the electrical connector (if equipped).



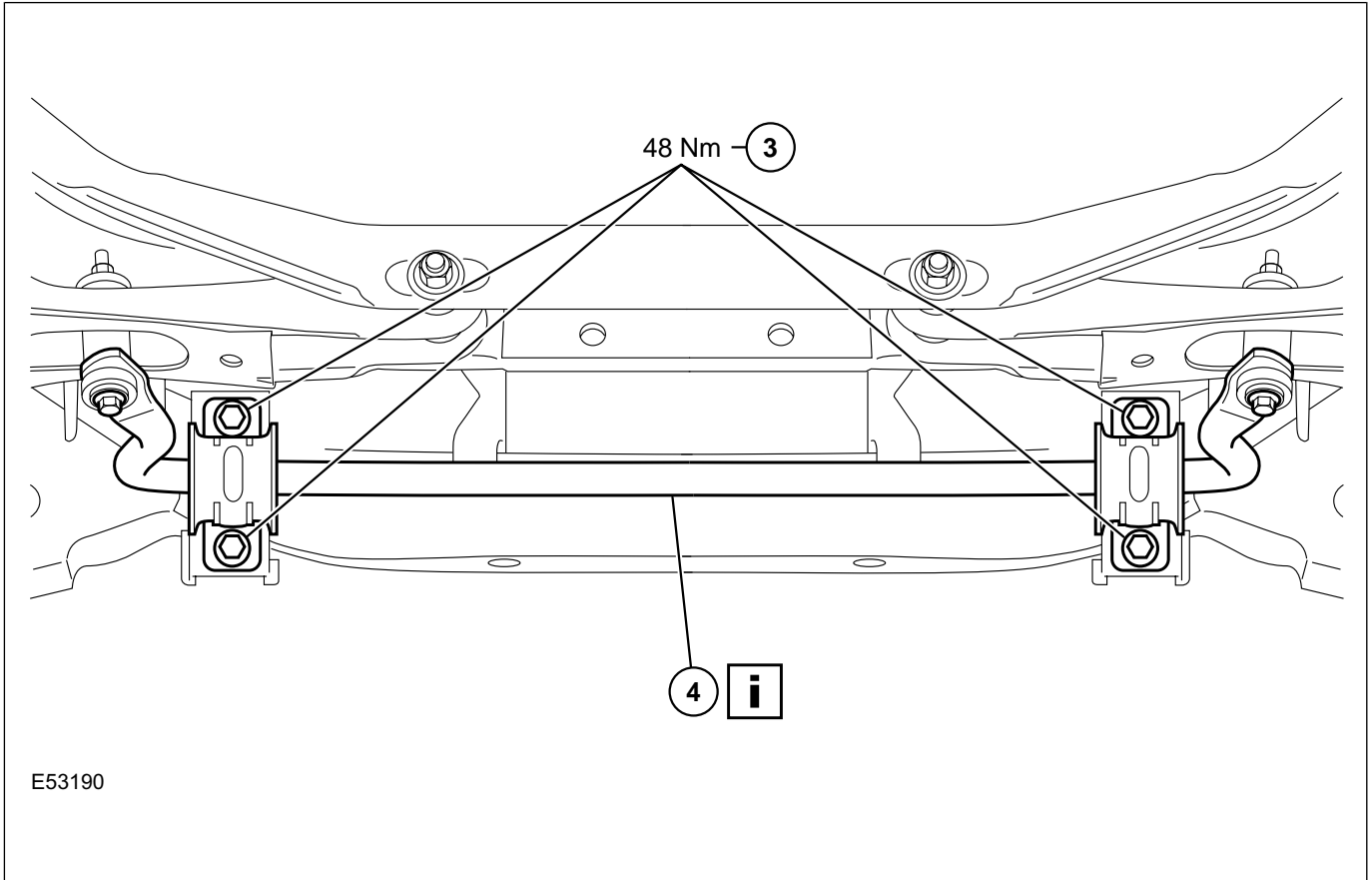
6. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



Item	Description
1	Evaporative emission canister heat shield to rear axle crossmember stud (if equipped)
2	Evaporative emission canister heat shield to rear axle crossmember retaining bolt (if equipped)

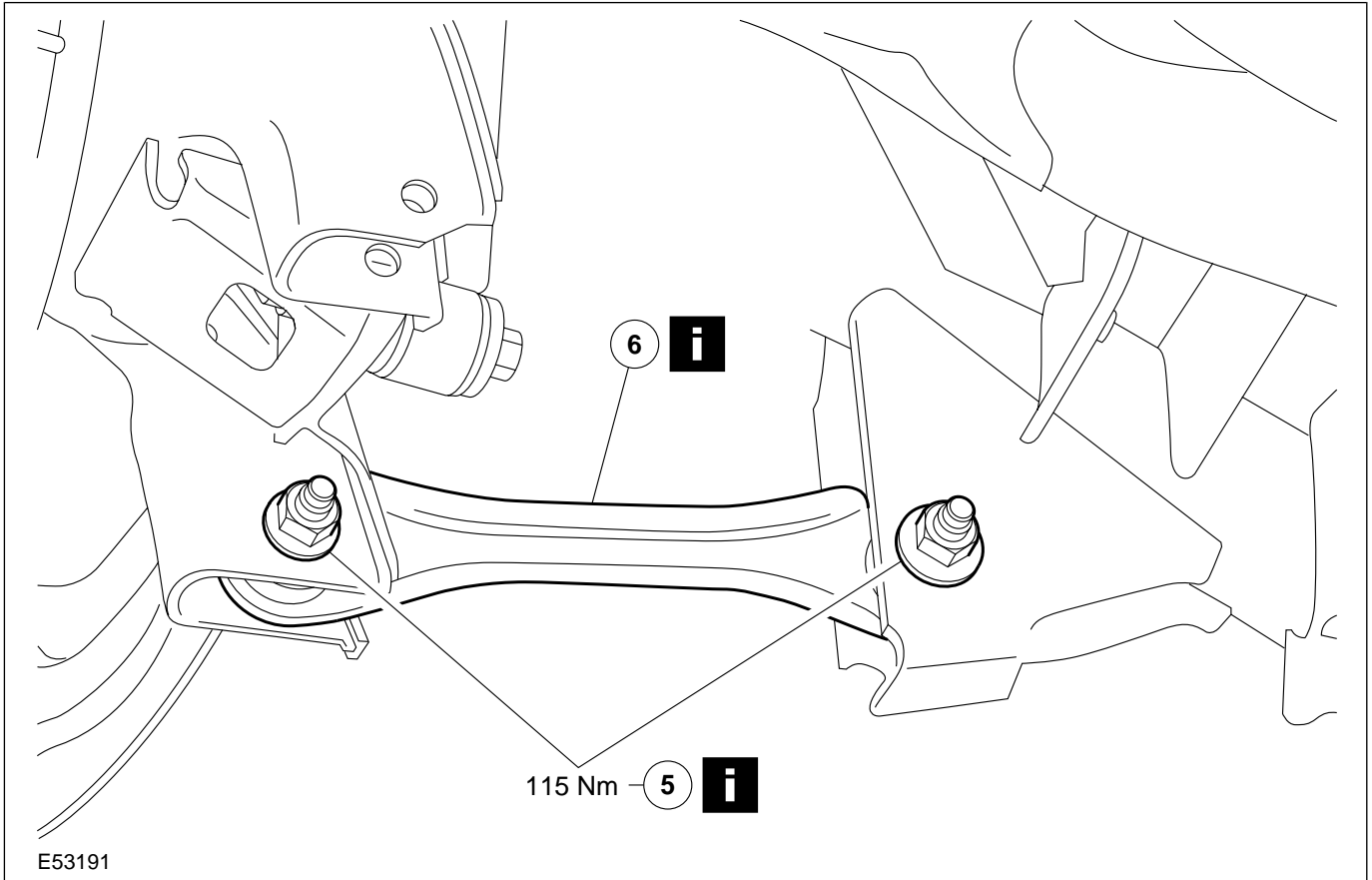
REMOVAL AND INSTALLATION



E53190

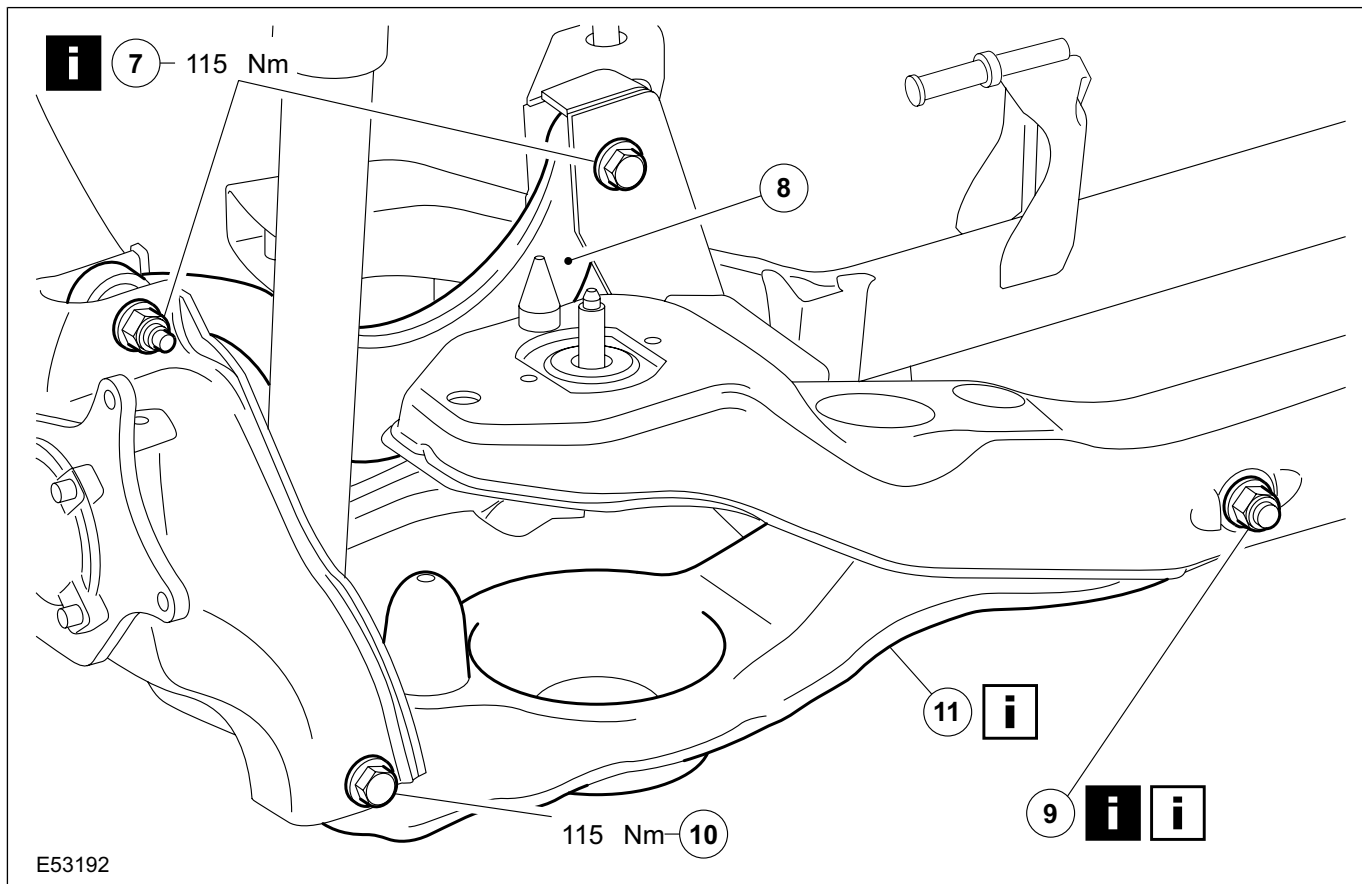
Item	Description
3	Stabilizer bar clamp retaining bolts
4	Stabilizer bar <i>See Installation Detail</i>

REMOVAL AND INSTALLATION



Item	Description
5	Front lower arm retaining bolts See Removal Detail
6	Front lower arm See Removal Detail

REMOVAL AND INSTALLATION

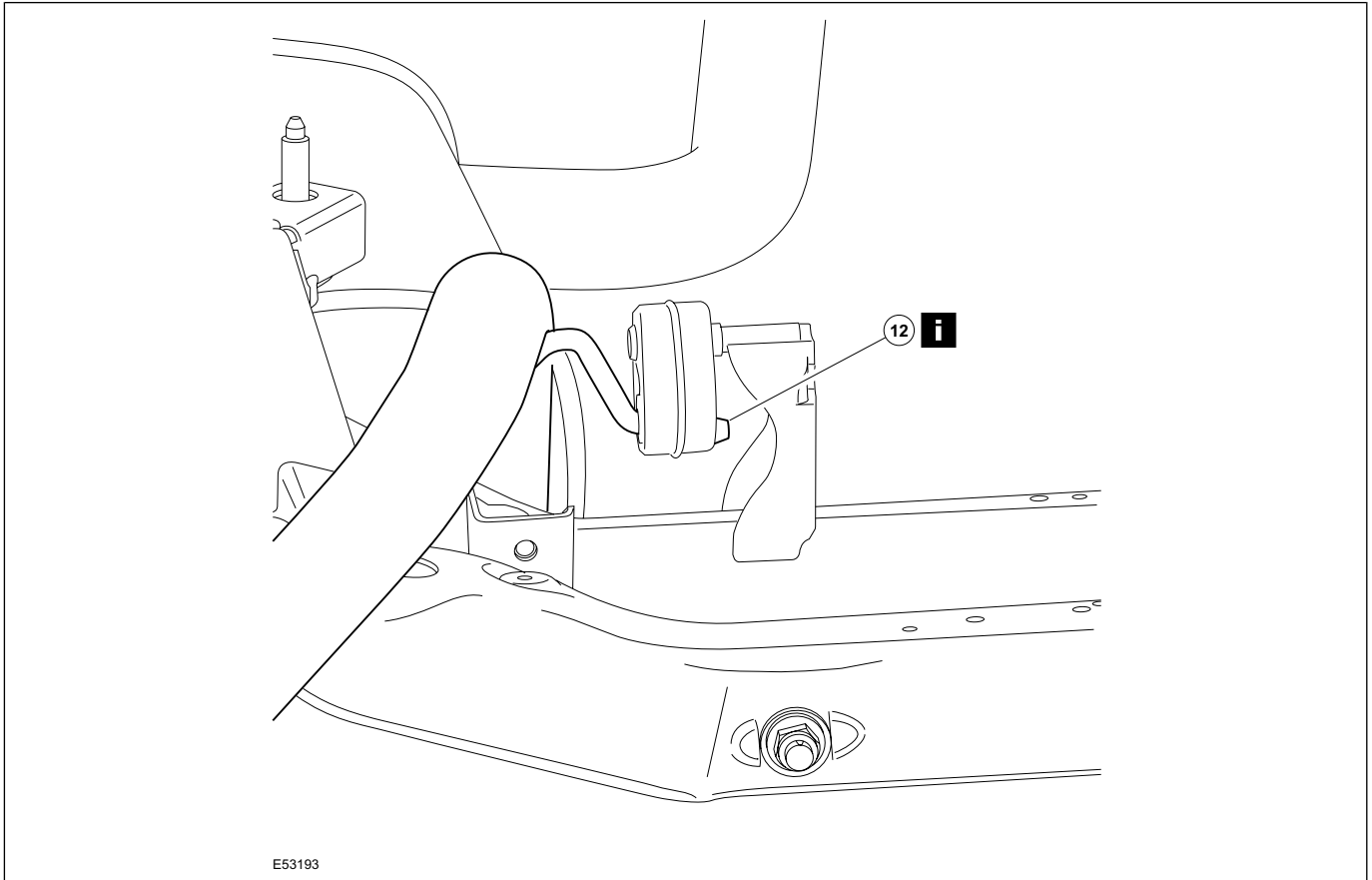


E53192

Item	Description
7	Upper arm retaining bolts <i>See Removal Detail</i>
8	Upper arm
9	Rear lower arm adjustment cam nut <i>See Removal Detail</i> <i>See Installation Detail</i>

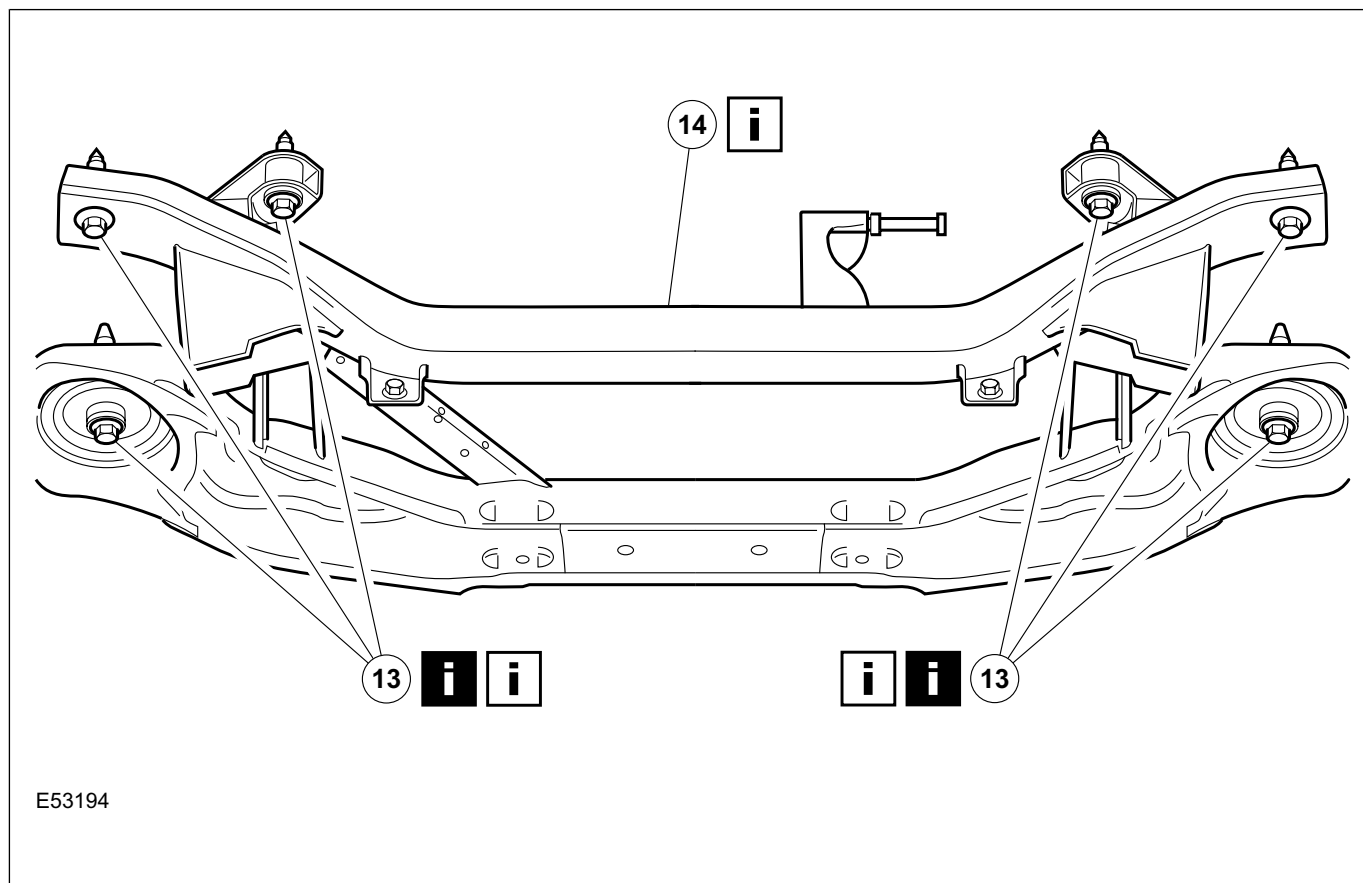
Item	Description
10	Rear lower arm to wheel knuckle retaining bolt
11	Rear lower arm <i>See Installation Detail</i>

REMOVAL AND INSTALLATION



Item	Description
12	Exhaust hanger insulator See Removal Detail

REMOVAL AND INSTALLATION



Item	Description
13	Rear axle crossmember retaining bolts See Removal Detail See Installation Detail
14	Rear axle crossmember See Installation Detail

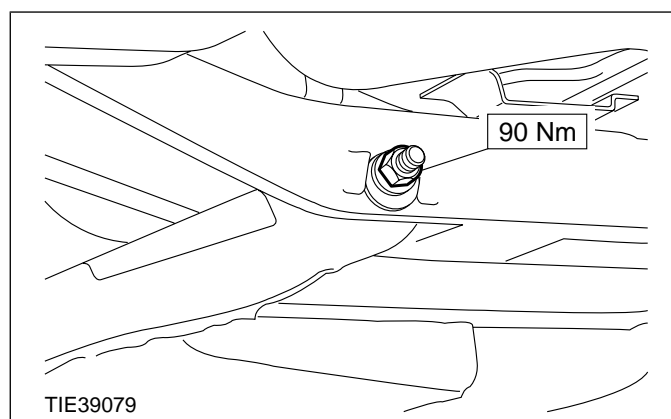
7. To install, reverse the removal procedure.

8. Check the toe setting and adjust as necessary. For additional information, refer to: (204-00 Suspension System - General Information)

Specifications (Specifications),
Rear Toe Adjustment (General Procedures).

9. **NOTE:** Final tightening of the rear lower arm adjustment cam nut must be carried out when the vehicle weight is on the road wheels.

Tighten the rear lower arm adjustment cam nut on both sides.



Removal Details

502-00-29

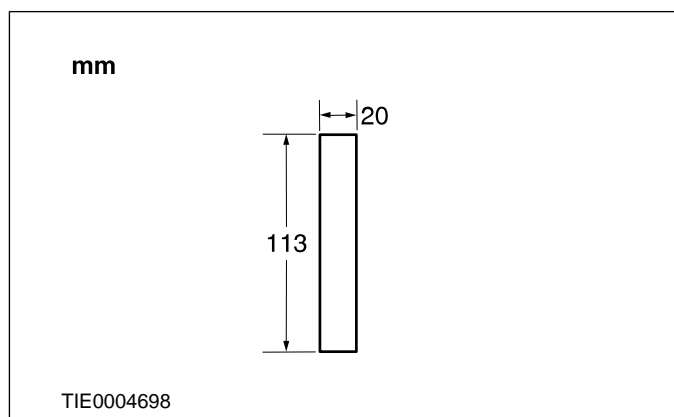
Uni-Body, Subframe and Mounting System

502-00-29

REMOVAL AND INSTALLATION

Item 5 Front lower arm retaining bolts

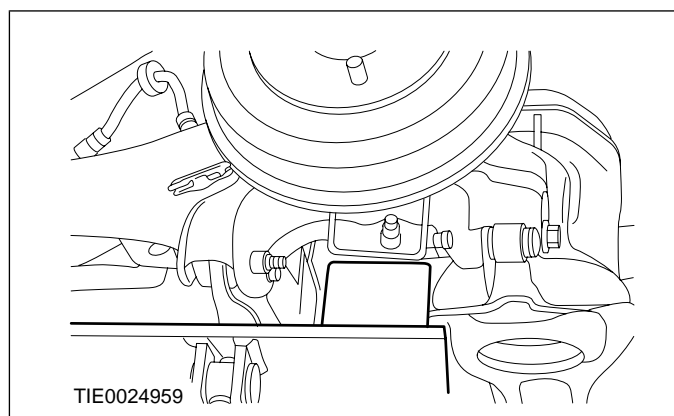
1. Fabricate two 20 mm wide by 113 mm long spacers.



2. **CAUTION:** Both sides of the suspension must be set to the design height setting.

Using two transmission jacks and wooden blocks, raise the suspension to the design height setting on both sides.

- Position the transmission jack and the wooden block as shown.

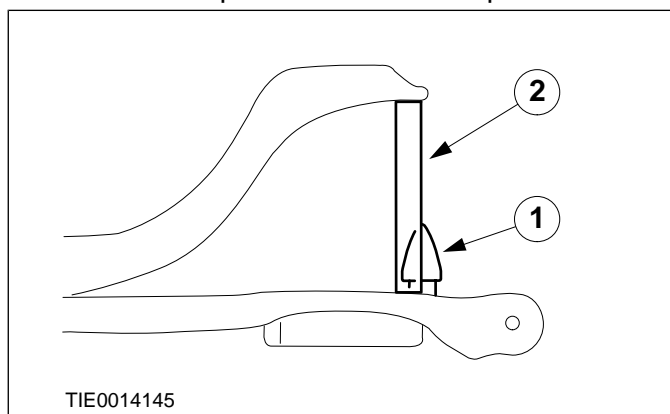


3. **NOTE:** The spacer must be positioned exactly as shown.

Install the spacer on both sides.

1. Remove the bump stop.

2. Install the spacer between the rear lower arm and the rear axle crossmember making sure that the spacer is in a vertical plane.



Item 6 Front lower arm

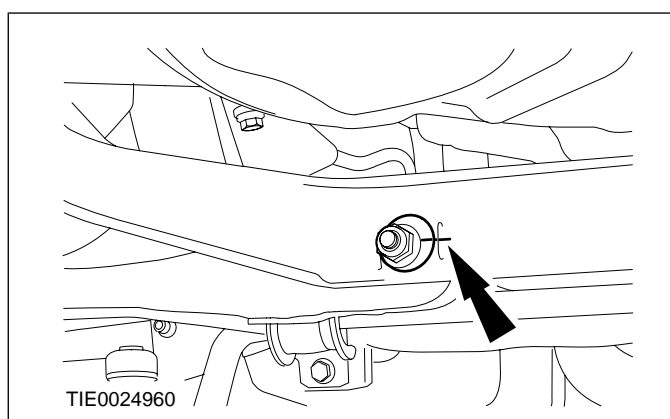
- CAUTION:** The front lower arms are marked FRONT. Make a note of the position of the front lower arms to aid installation.

Item 7 Upper arm retaining bolts

NOTE: Make a note of the position of the upper arms to aid installation.

Item 9 Rear lower arm adjustment cam nut

1. Mark the position of the rear lower arm adjustment cam to the rear axle crossmember on both sides.



Item 12 Exhaust hanger insulator

NOTE: Support the exhaust muffler and tailpipe assembly.

Item 13 Rear axle crossmember retaining bolts

1. Using a transmission jack, support the rear axle crossmember.

REMOVAL AND INSTALLATION

2. **▲WARNING:** Make sure that the rear axle crossmember is secured to the transmission jack. Failure to follow this instruction may

result in personal injury.

Using a securing strap, secure the rear axle crossmember to the transmission jack.

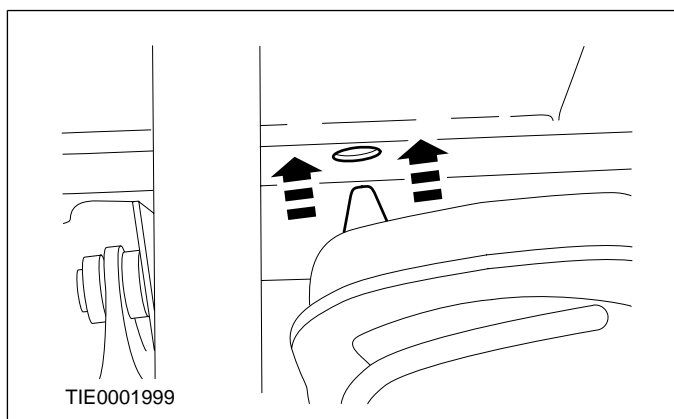
Installation Details

Item 14 Rear axle crossmember

1. Using a transmission jack, support the rear axle crossmember.
2. **▲WARNING:** Make sure that the rear axle crossmember is secured to the transmission jack. Failure to follow this instruction may result in personal injury.

Using a securing strap, secure the rear axle crossmember to the transmission jack.

3. Locate the rear axle crossmember.

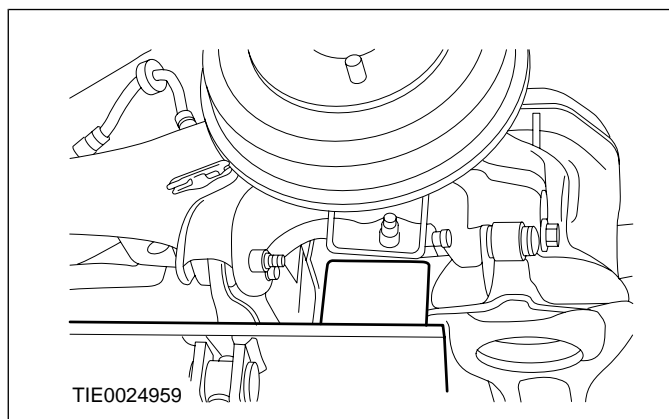


Item 11 Rear lower arm

1. **▲CAUTION:** Both sides of the suspension must be set to the design height setting.

Using two transmission jacks and wooden blocks, raise the suspension to the design height setting on both sides.

- Position the transmission jack and the wooden block as shown.



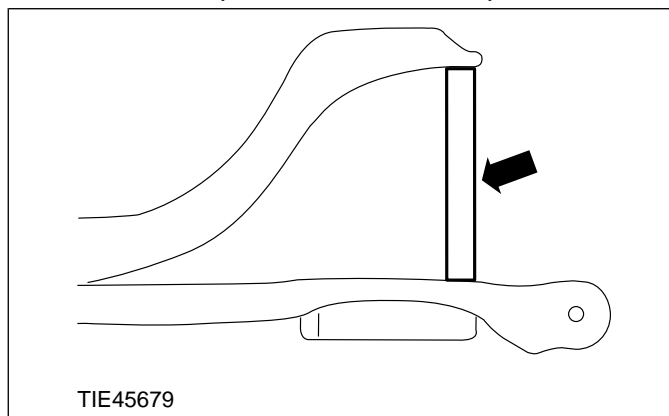
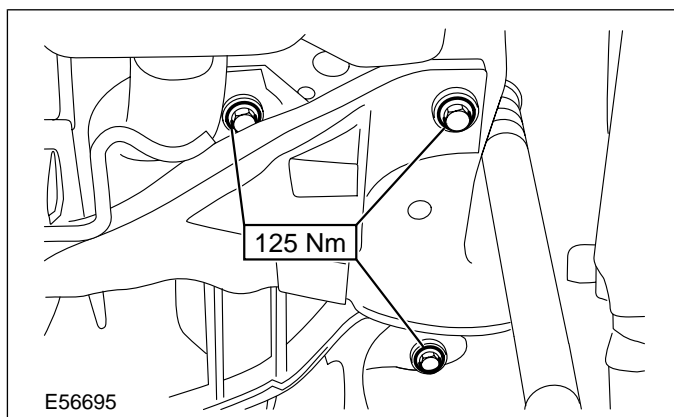
2. **NOTE:** The spacer must be positioned exactly as shown.

Install the spacer on both sides.

- Install the spacer between the rear lower arm and the rear axle crossmember making sure that the spacer is in a vertical plane.

Item 13 Rear axle crossmember retaining bolts

1. Install the rear axle crossmember retaining bolts on both sides.



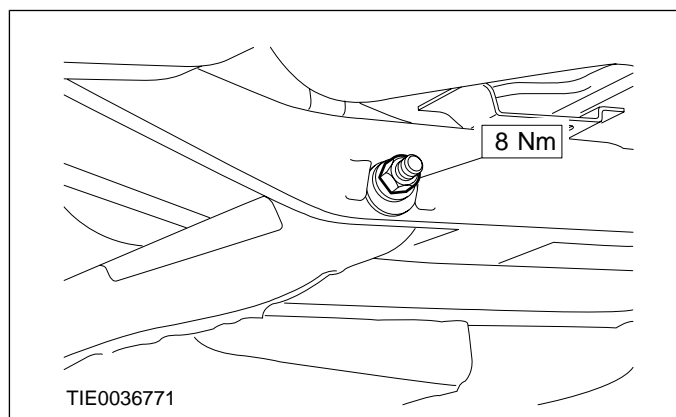
2. Remove the securing strap.
3. Lower and remove the transmission jack.

REMOVAL AND INSTALLATION**Item 9 Rear lower arm adjustment cam nut**

1. **NOTE: Do not fully tighten the rear lower arm adjustment cam nut at this stage.**

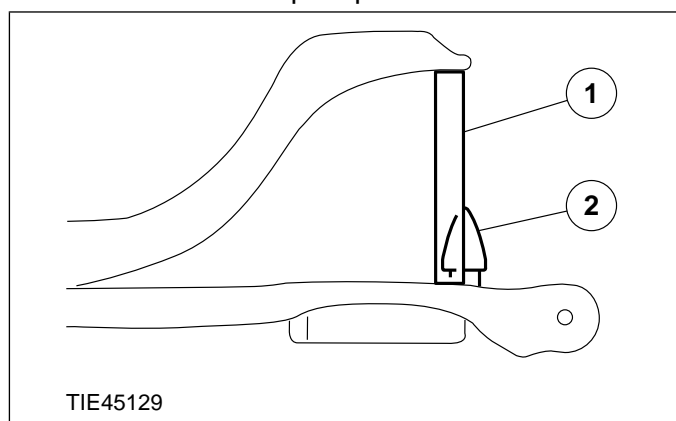
NOTE: Align the mark on the rear lower arm adjustment cam to the mark on the rear axle crossmember.

Install the rear lower arm adjustment cam nut on both sides.

**Item 4 Stabilizer bar**

1. **Lower the suspension from the design height setting on both sides.**

1. Remove the spacer.
2. Install the bump stop.



2. **Position the stabilizer bar.**

REMOVAL AND INSTALLATION

Rear Axle Crossmember — Vehicles With: Ball Joint Stabilizer Bar Link, Vehicles Without: Fuel Additive Tank

General Equipment

Securing strap
Transmission jacks

1. Remove the spring on both sides.

For additional information, refer to: **Spring (204-02, Removal and Installation)**.

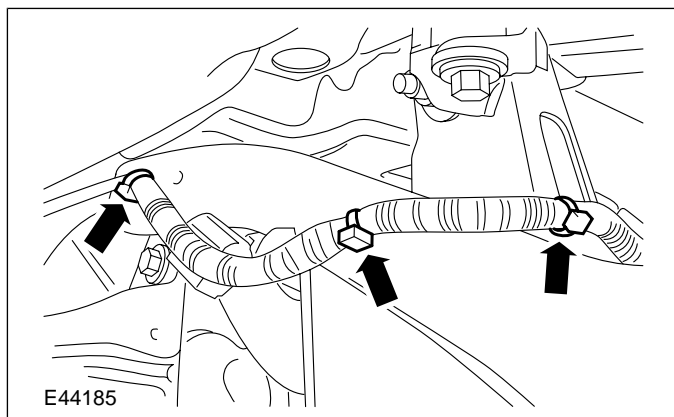
2. Remove the evaporative emission canister (if equipped).

For additional information, refer to: **Evaporative Emission Canister (303-13 Evaporative Emissions, Removal and Installation)**.

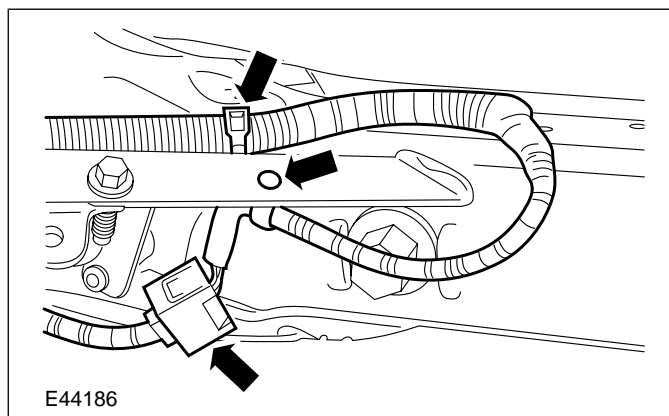
3. Remove the headlamp leveling rear sensor (if equipped).

For additional information, refer to: **Headlamp Leveling Rear Sensor (417-01 Exterior Lighting, Removal and Installation)**.

4. Detach the headlamp leveling sensor wiring harness from the rear axle crossmember (if equipped).

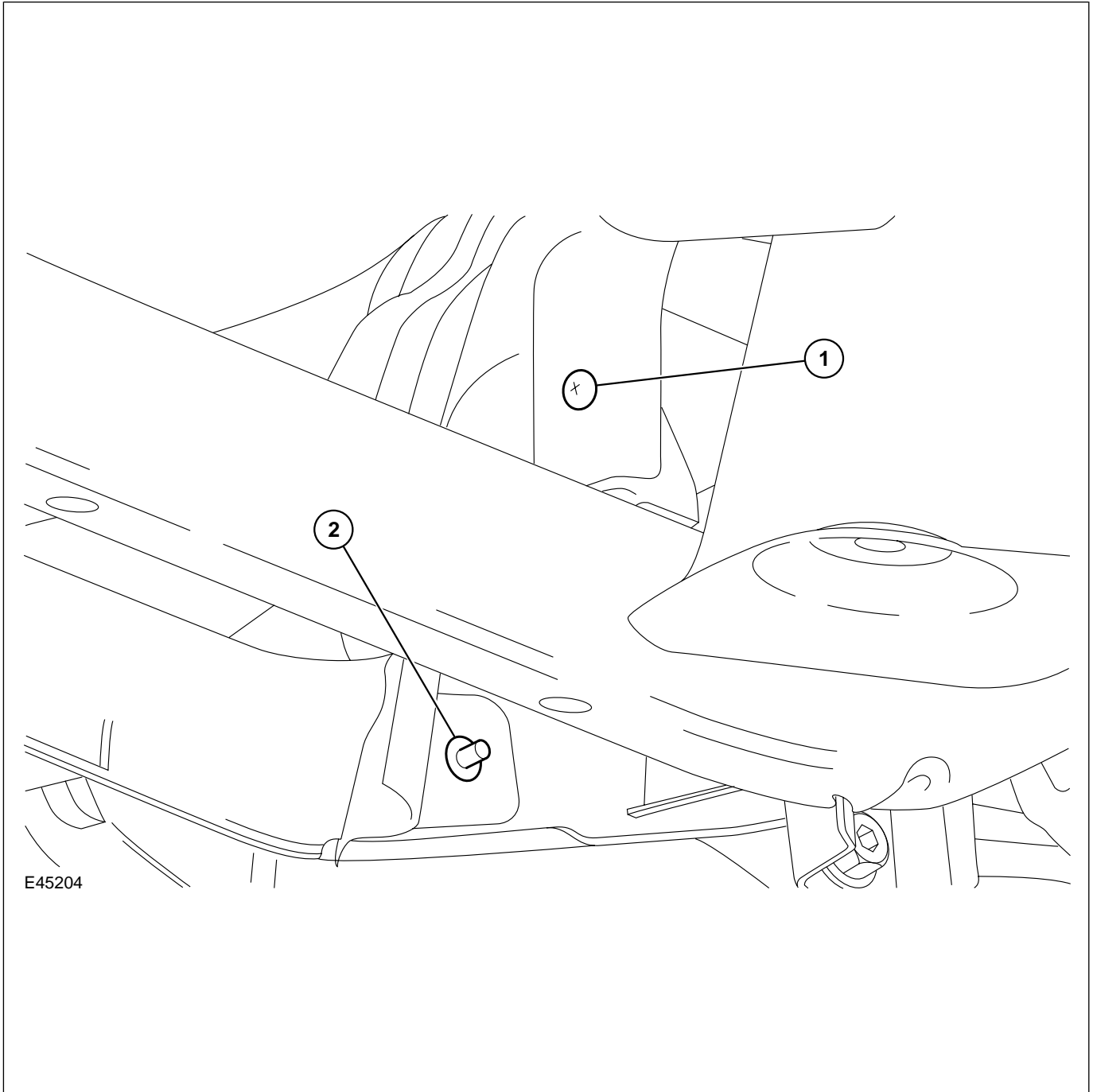


5. Detach the headlamp leveling sensor wiring harness from the rear axle crossmember and disconnect the electrical connector (if equipped).



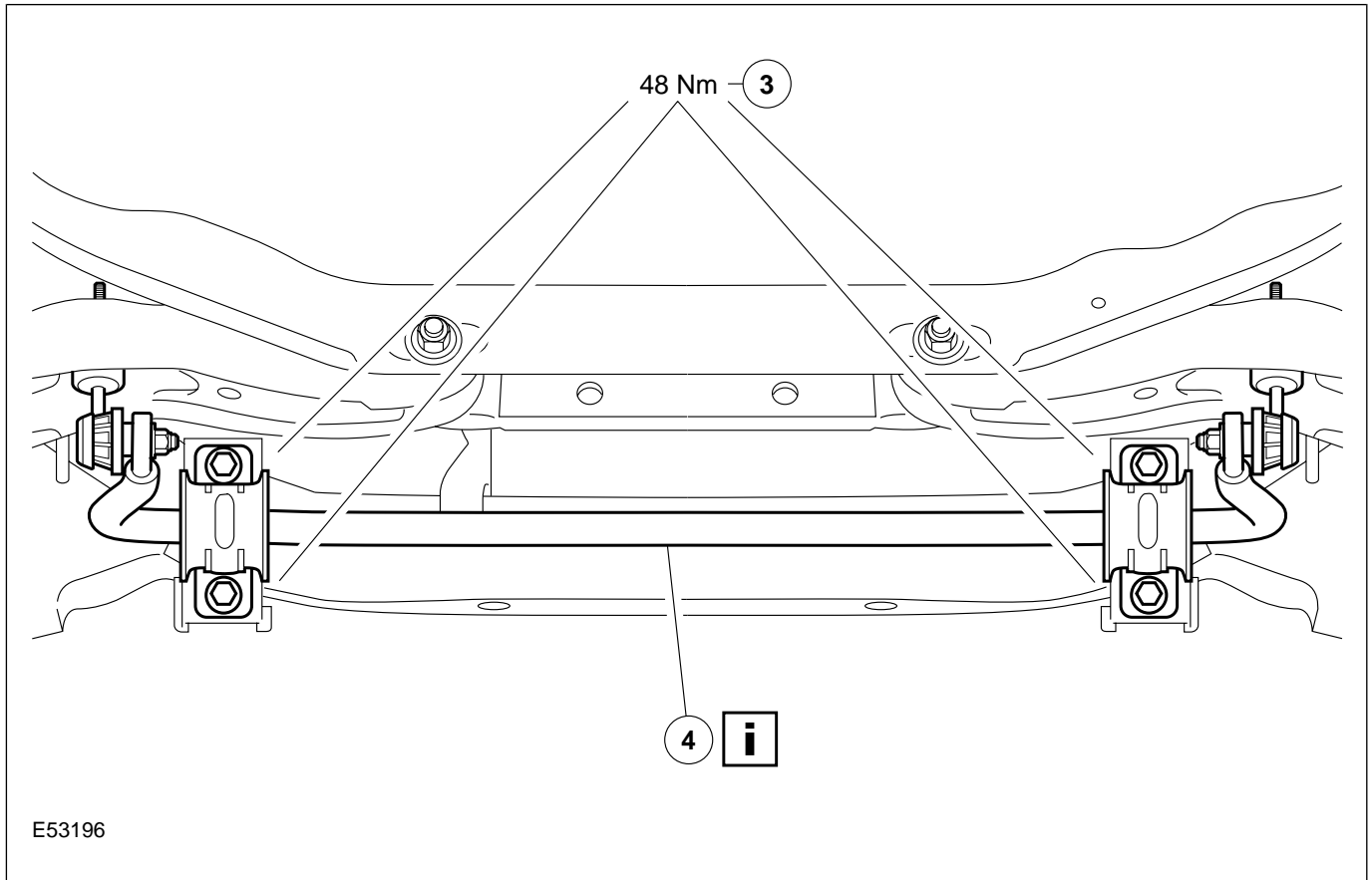
6. Remove the components in the order indicated in the following illustration(s) and table(s).

REMOVAL AND INSTALLATION



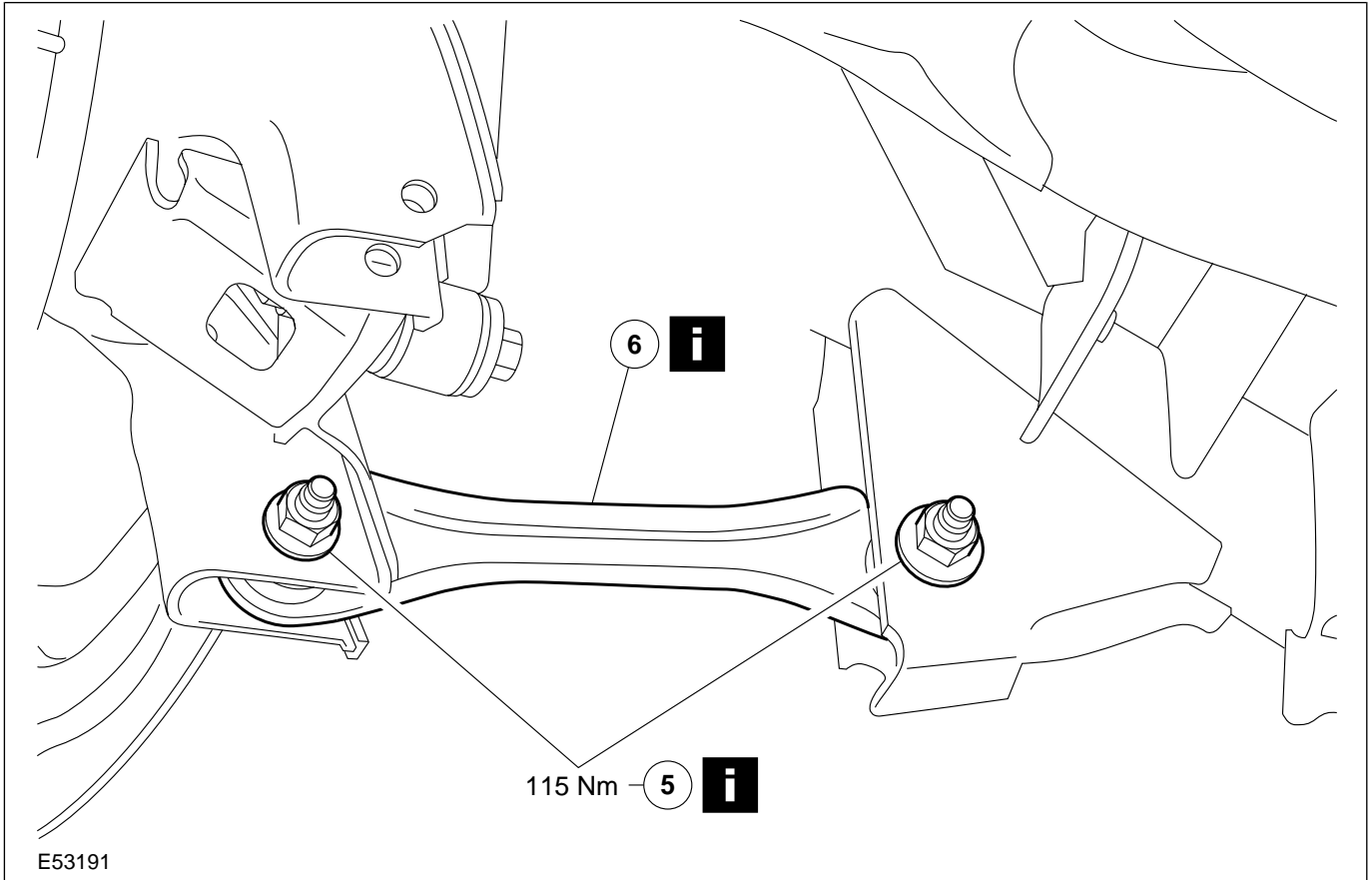
Item	Description
1	Evaporative emission canister heat shield to rear axle crossmember stud (if equipped)
2	Evaporative emission canister heat shield to rear axle crossmember retaining bolt (if equipped)

REMOVAL AND INSTALLATION



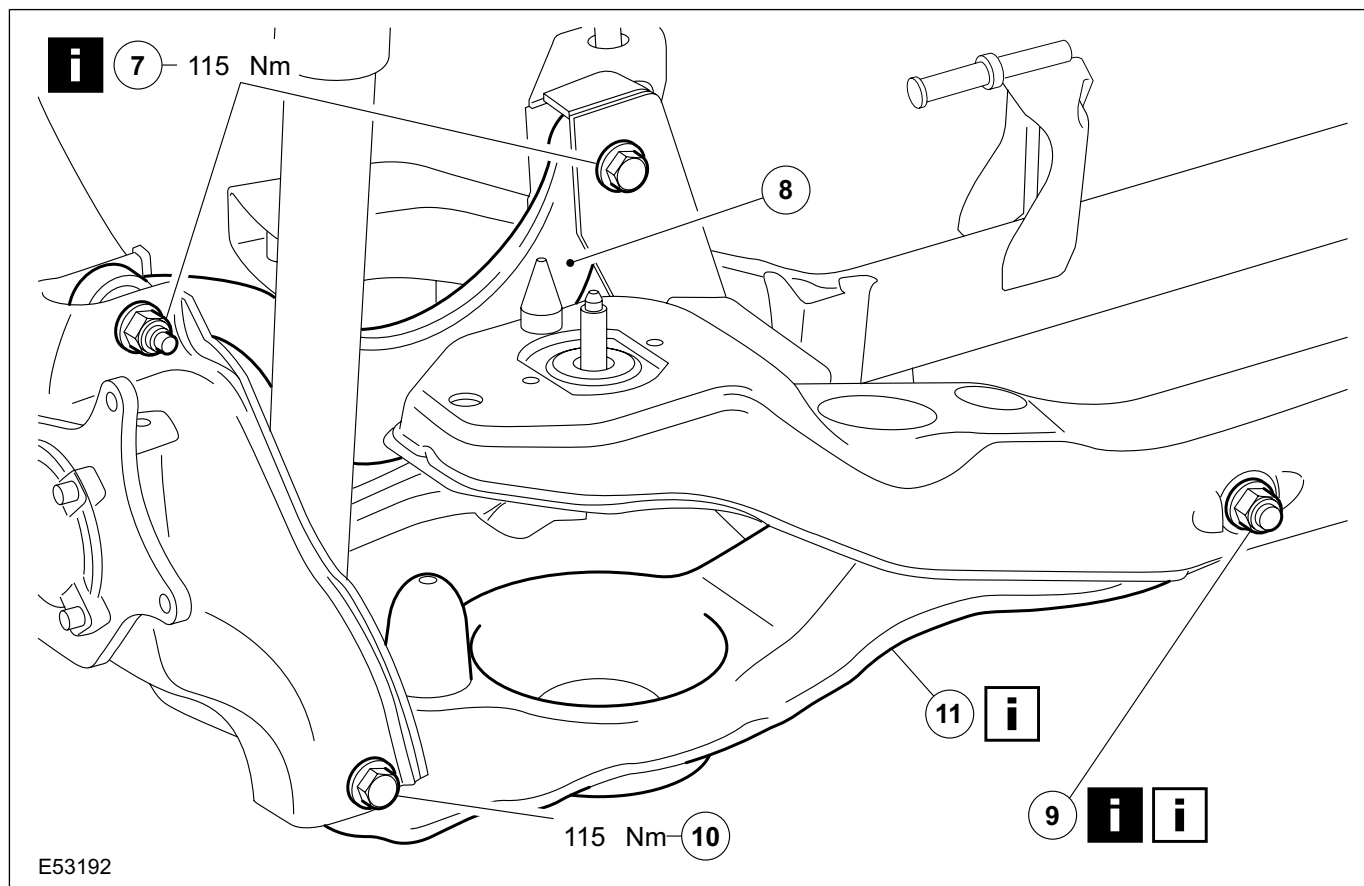
Item	Description
3	Stabilizer bar clamp retaining bolts
4	Stabilizer bar <i>See Installation Detail</i>

REMOVAL AND INSTALLATION



Item	Description
5	Front lower arm retaining bolts <i>See Removal Detail</i>
6	Front lower arm <i>See Removal Detail</i>

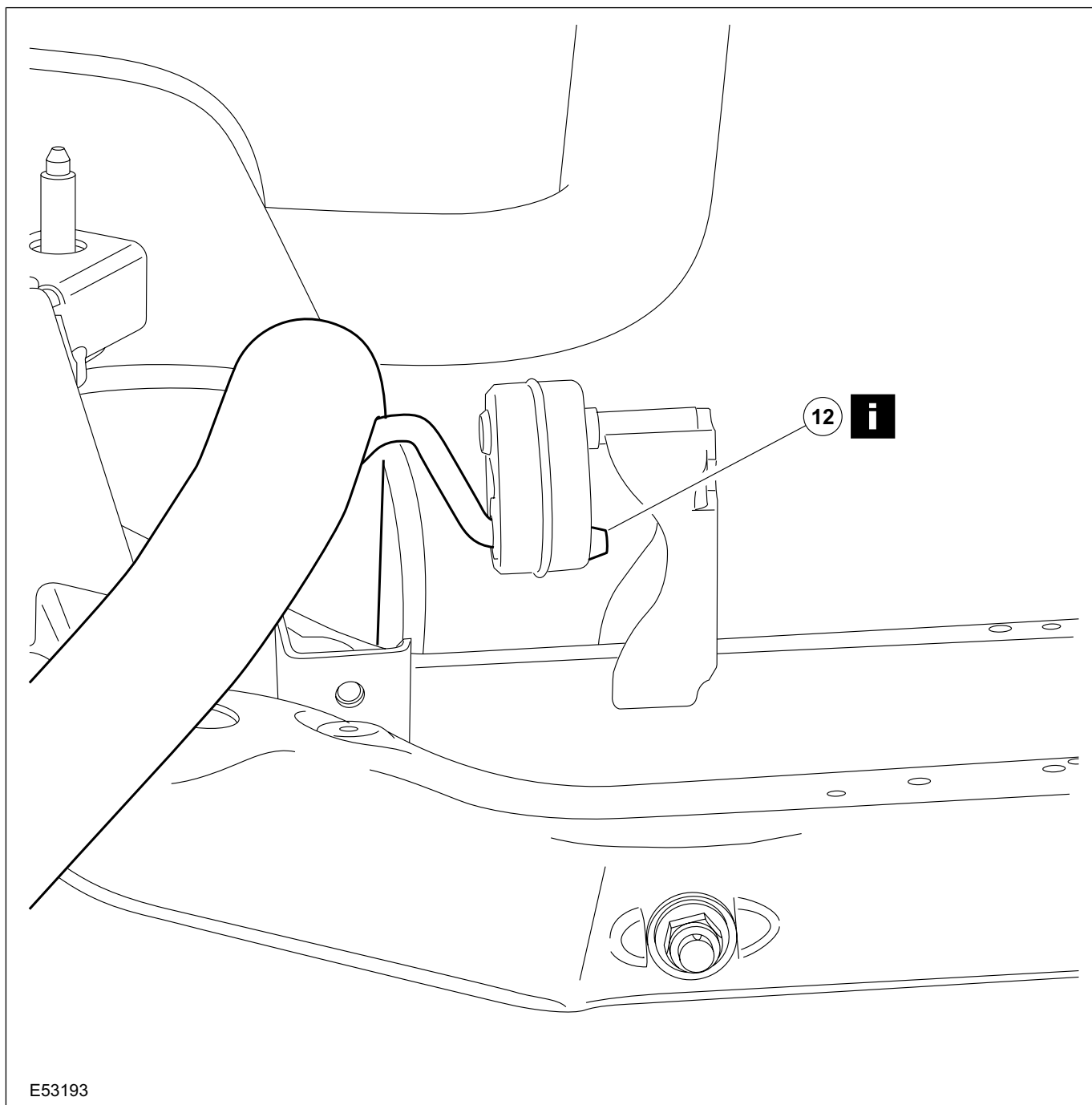
REMOVAL AND INSTALLATION



Item	Description
7	Upper arm retaining bolts <i>See Removal Detail</i>
8	Upper arm
9	Rear lower arm adjustment cam nut <i>See Removal Detail</i> <i>See Installation Detail</i>

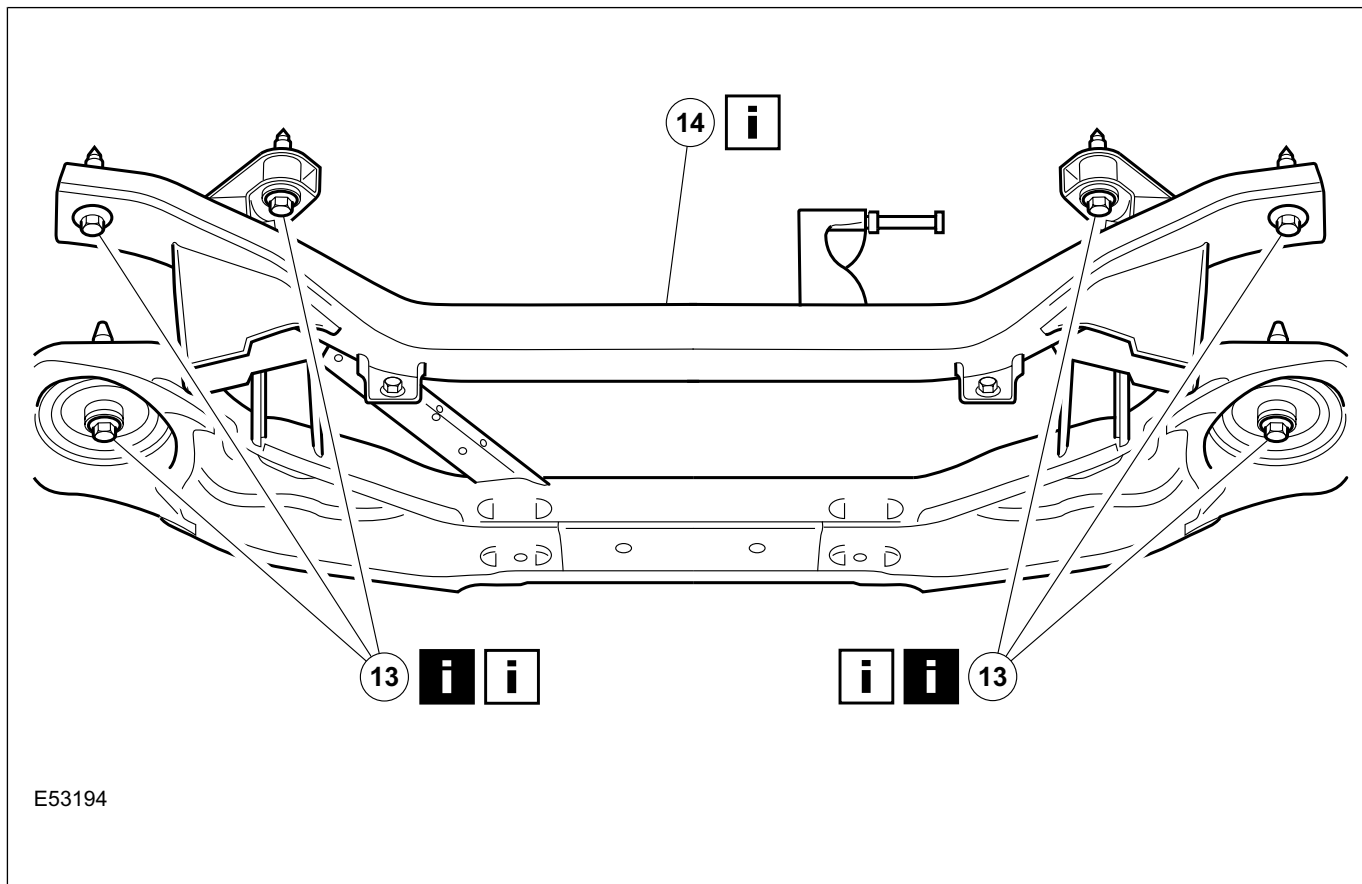
Item	Description
10	Rear lower arm to wheel knuckle retaining bolt
11	Rear lower arm <i>See Installation Detail</i>

REMOVAL AND INSTALLATION



Item	Description
12	Exhaust hanger insulator See Removal Detail

REMOVAL AND INSTALLATION

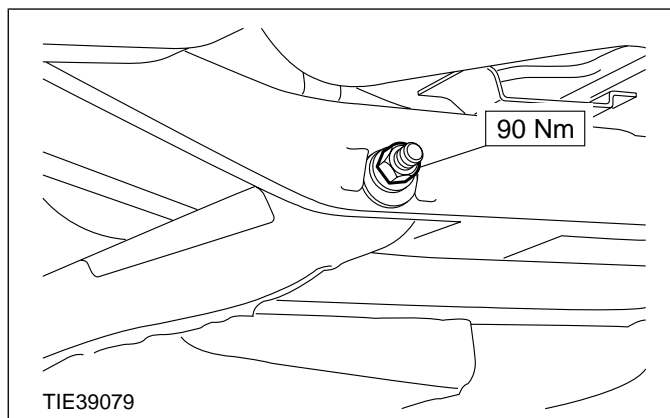


E53194

Item	Description
13	Rear axle crossmember retaining bolts See Removal Detail See Installation Detail
14	Rear axle crossmember See Installation Detail

9. **NOTE:** Final tightening of the rear lower arm adjustment cam nut must be carried out when the vehicle weight is on the road wheels.

Tighten the rear lower arm adjustment cam nut on both sides.



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- 7. To install, reverse the removal procedure.
- 8. Check the toe setting and adjust as necessary. For additional information, refer to: (204-00 Suspension System - General Information)
Specifications - 3-Door (Specifications),
Rear Toe Adjustment (General Procedures).

Removal Details

502-00-39

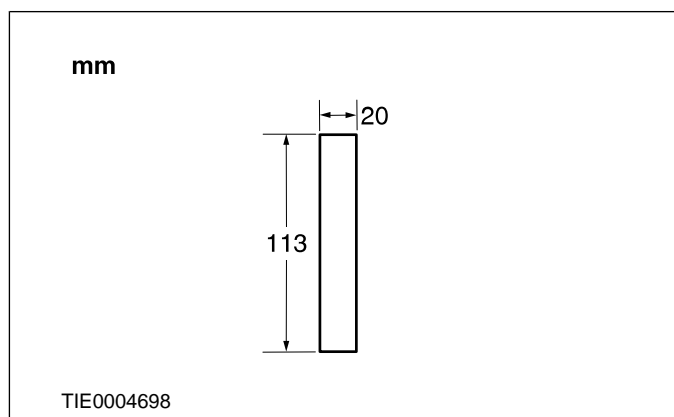
Uni-Body, Subframe and Mounting System

502-00-39

REMOVAL AND INSTALLATION

Item 5 Front lower arm retaining bolts

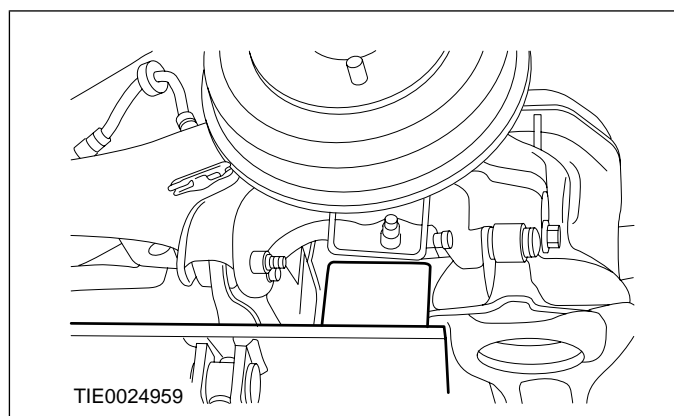
1. Fabricate two 20 mm wide by 113 mm long spacers.



2. **CAUTION:** Both sides of the suspension must be set to the design height setting.

Using two transmission jacks and wooden blocks, raise the suspension to the design height setting on both sides.

- Position the transmission jack and the wooden block as shown.

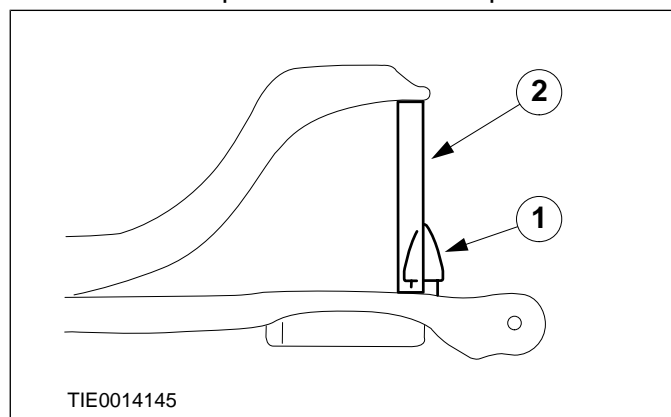


3. **NOTE:** The spacer must be positioned exactly as shown.

Install the spacer on both sides.

1. Remove the bump stop.

2. Install the spacer between the rear lower arm and the rear axle crossmember making sure that the spacer is in a vertical plane.



Item 6 Front lower arm

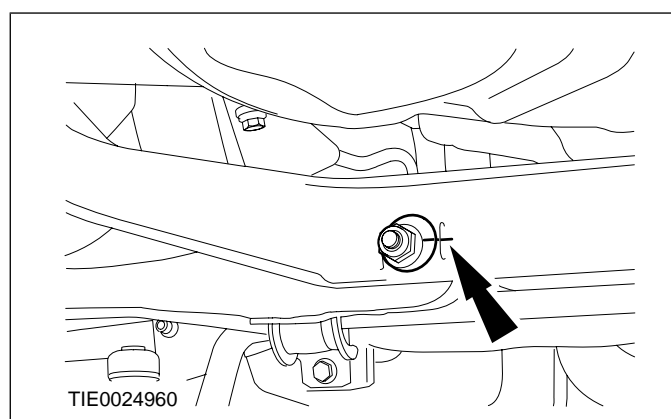
- CAUTION:** The front lower arms are marked FRONT. Make a note of the position of the front lower arms to aid installation.

Item 7 Upper arm retaining bolts

NOTE: Make a note of the position of the upper arms to aid installation.

Item 9 Rear lower arm adjustment cam nut

1. Mark the position of the rear lower arm adjustment cam to the rear axle crossmember on both sides.



Item 12 Exhaust hanger insulator

NOTE: Support the exhaust muffler and tailpipe assembly.

Item 13 Rear axle crossmember retaining bolts

1. Using a transmission jack, support the rear axle crossmember.

REMOVAL AND INSTALLATION

2. **▲WARNING:** Make sure that the rear axle crossmember is secured to the transmission jack. Failure to follow this instruction may

result in personal injury.

Using a securing strap, secure the rear axle crossmember to the transmission jack.

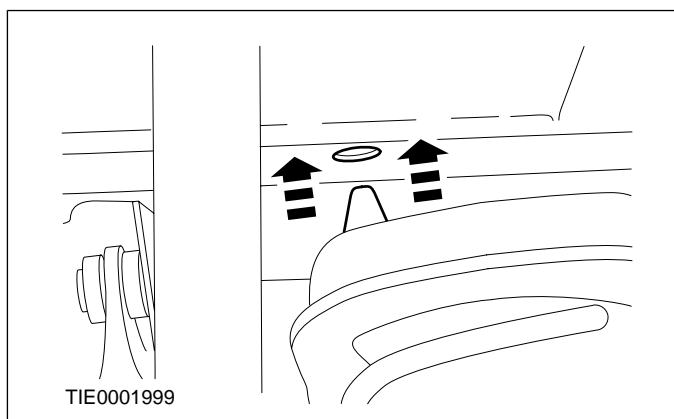
Installation Details

Item 14 Rear axle crossmember

1. Using a transmission jack, support the rear axle crossmember.
2. **▲WARNING:** Make sure that the rear axle crossmember is secured to the transmission jack. Failure to follow this instruction may result in personal injury.

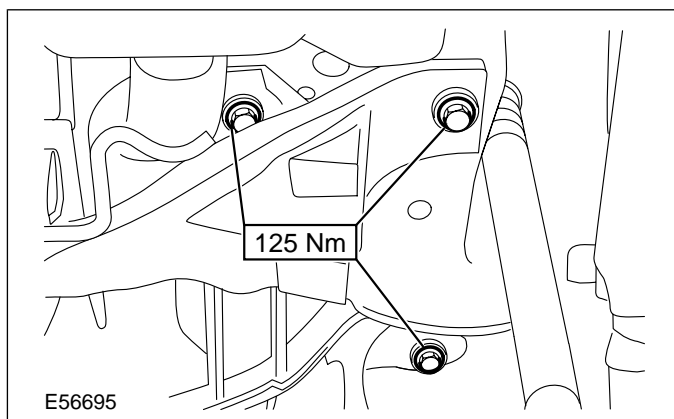
Using a securing strap, secure the rear axle crossmember to the transmission jack.

3. Locate the rear axle crossmember.



Item 13 Rear axle crossmember retaining bolts

1. Install the rear axle crossmember retaining bolts on both sides.



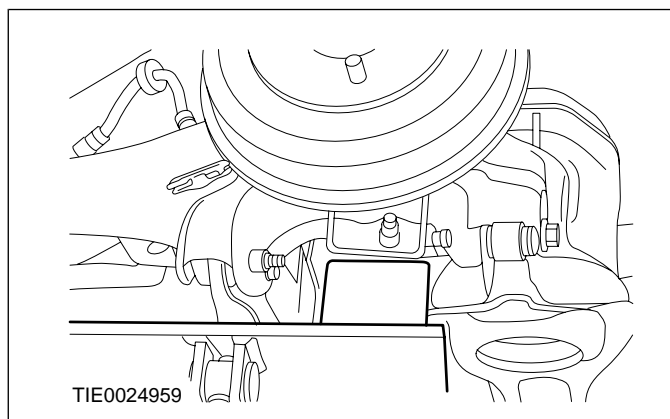
2. Remove the securing strap.
3. Lower and remove the transmission jack.

Item 11 Rear lower arm

1. **▲CAUTION:** Both sides of the suspension must be set to the design height setting.

Using two transmission jacks and wooden blocks, raise the suspension to the design height setting on both sides.

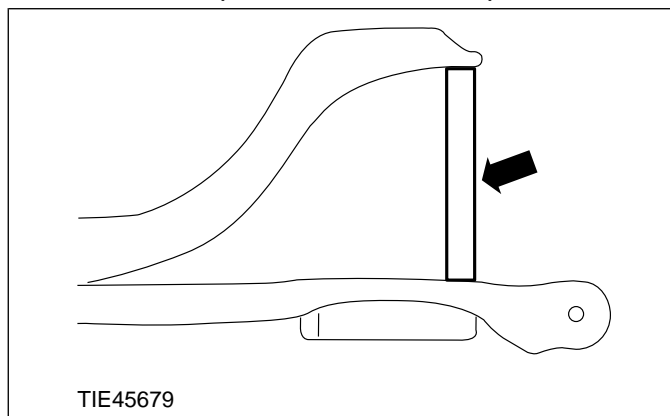
- Position the transmission jack and the wooden block as shown.



2. **NOTE:** The spacer must be positioned exactly as shown.

Install the spacer on both sides.

- Install the spacer between the rear lower arm and the rear axle crossmember making sure that the spacer is in a vertical plane.

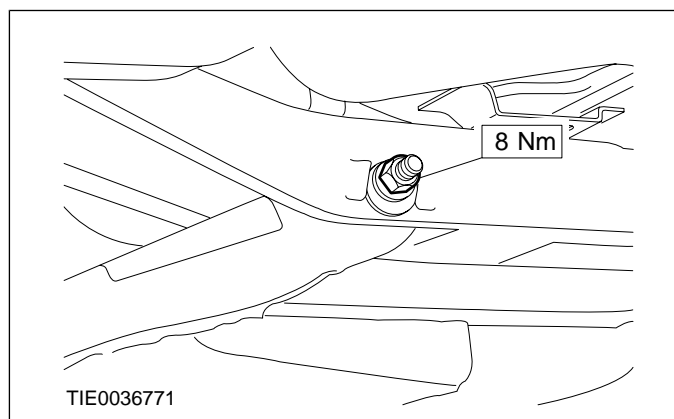


REMOVAL AND INSTALLATION**Item 9 Rear lower arm adjustment cam nut**

1. **NOTE: Do not fully tighten the rear lower arm adjustment cam nut at this stage.**

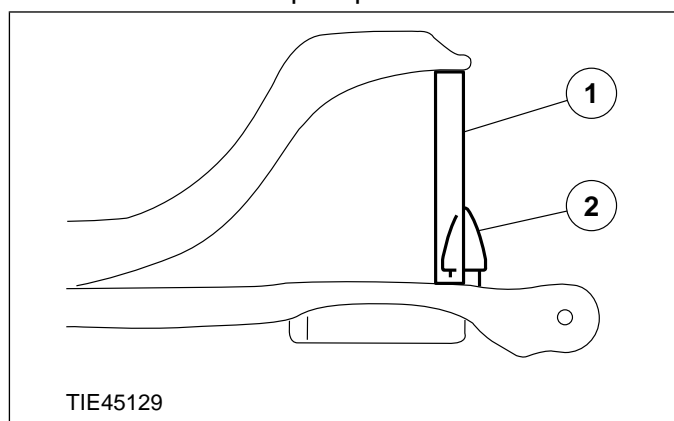
NOTE: Align the mark on the rear lower arm adjustment cam to the mark on the rear axle crossmember.

Install the rear lower arm adjustment cam nut on both sides.

**Item 4 Stabilizer bar**

1. **Lower the suspension from the design height setting on both sides.**

1. Remove the spacer.
2. Install the bump stop.



2. **Position the stabilizer bar.**