Published: 10-Mar-2016

Body Repairs - Vehicle Specific Information and Tolerance Checks - Body and Frame

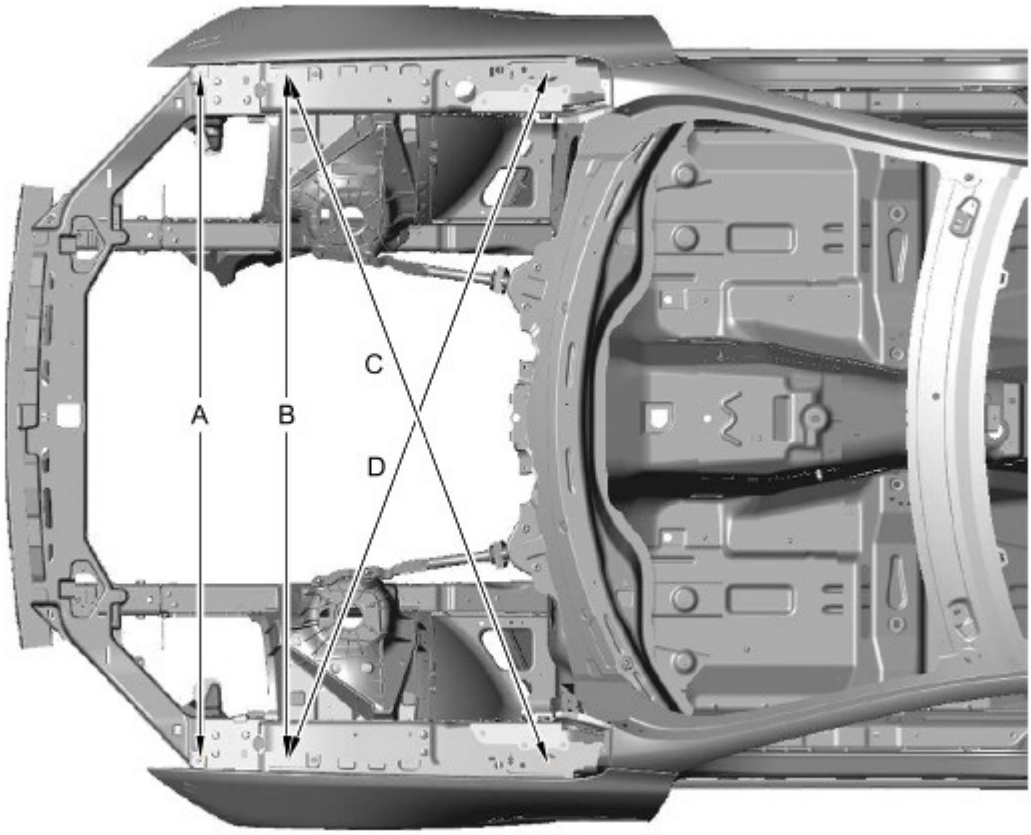
Description and Operation

Front End Body Dimensions

NOTES:

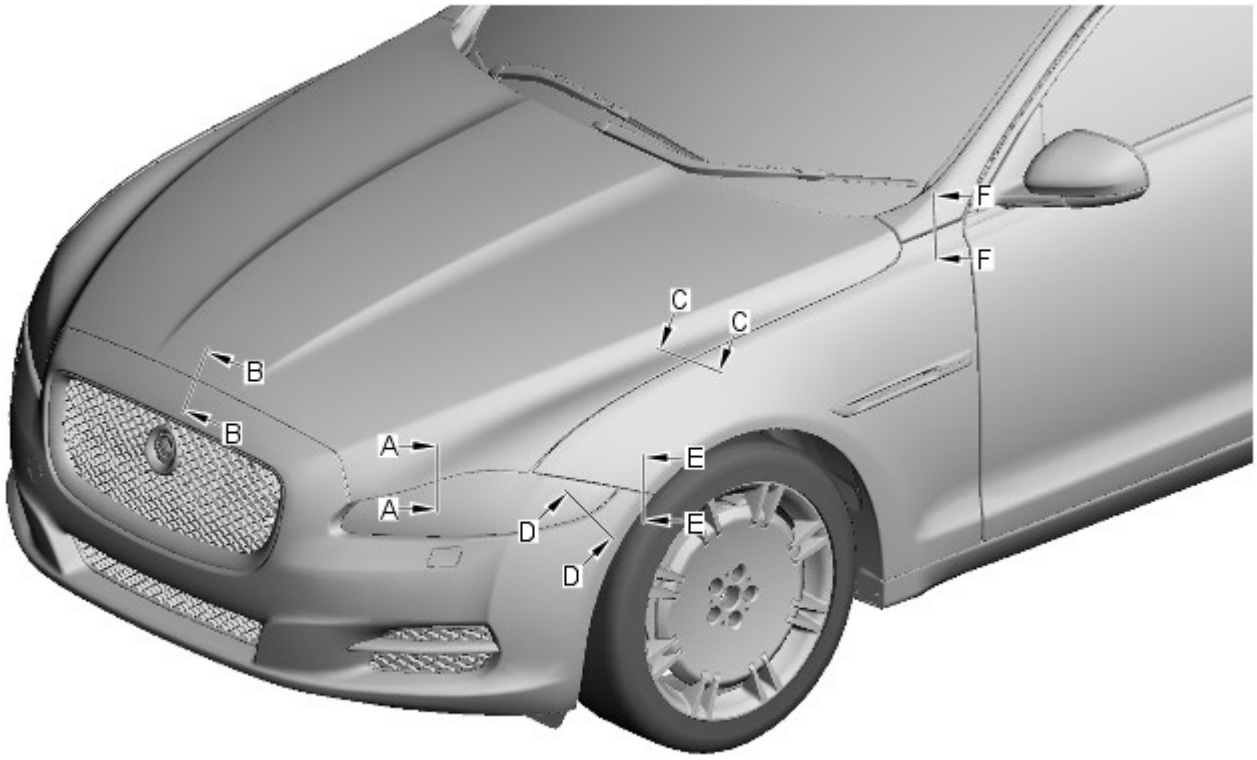
All dimensions shown are in millimetres (mm).

Dimensions shown to holes, are always taken from/to the hole centre. They are also always to the body panel surface, not to the top of bolts or components.



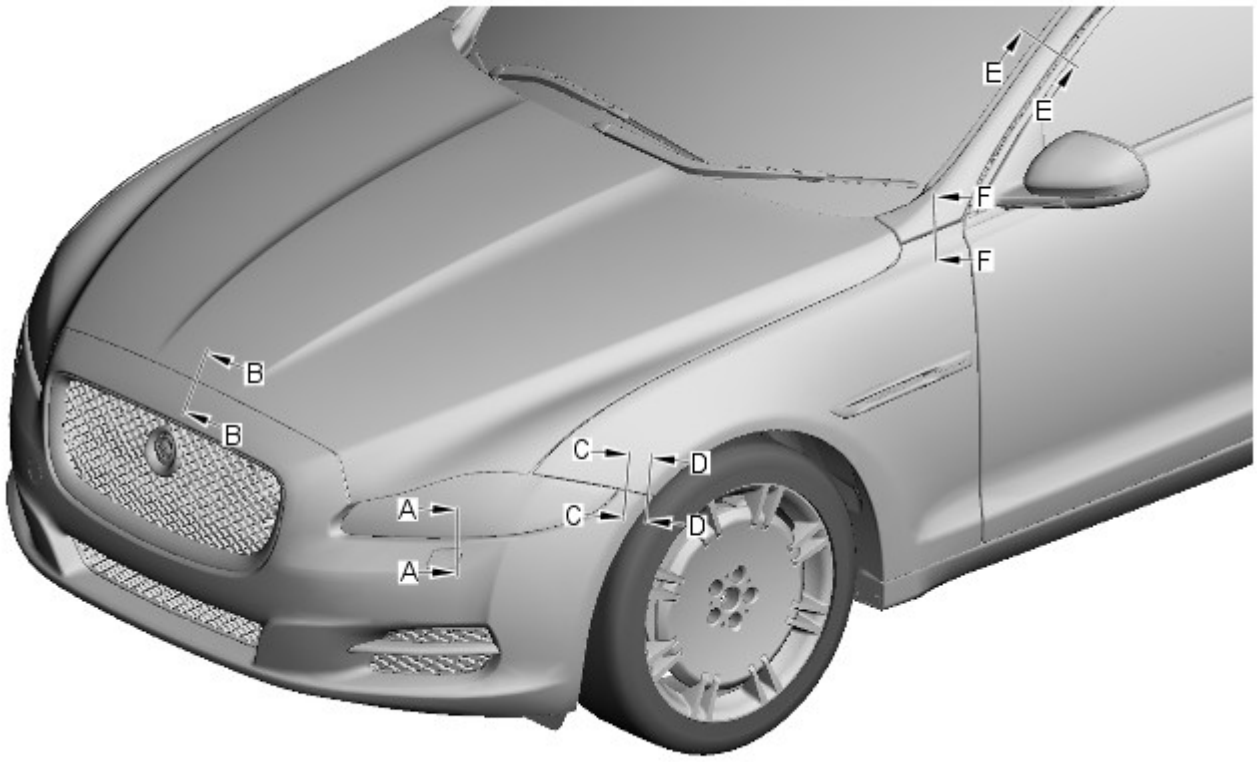
E133463

Item	From	To	Dimension
A	Front fender RH, front fixing hole	Front fender LH, front fixing hole	1580.0
B	Front fender RH, second front fixing hole	Front fender LH, second front fixing hole	1570.0
C	Front fender RH, second front fixing hole	Front fender LH, rear fixing hole	1689.4
D	Front fender LH, second front fixing hole	Front fender RH, rear fixing hole	1689.4



E133471

A-A	Hood to headlamp	6.0 ± 1.0
B-B	Hood to front bumper cover	3.5 ± 1.0
C-C	Hood to front fender	3.5 ± 1.0
D-D	Front bumper cover to headlamp	1.0 ± 0.5
E-E	Front fender to front bumper cover	0.0 + 1.0
F-F	Front fender to A-pillar	3.5 ± 1.0



E133472

These materials are varied and the manufacturer's instructions should be followed. They may contain solvents, resins, petroleum products etc. 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.

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/or 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.

Ensure that electrical equipment is maintained in good condition and frequently tested. Faulty equipment should be labelled and preferably removed from the work station.

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

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

Ensure that electrical equipment is protected by the correct rated fuse.

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

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

Ensure 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.

Gasolene (petrol) engine

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

Fibre Insulation

See also Dusts.

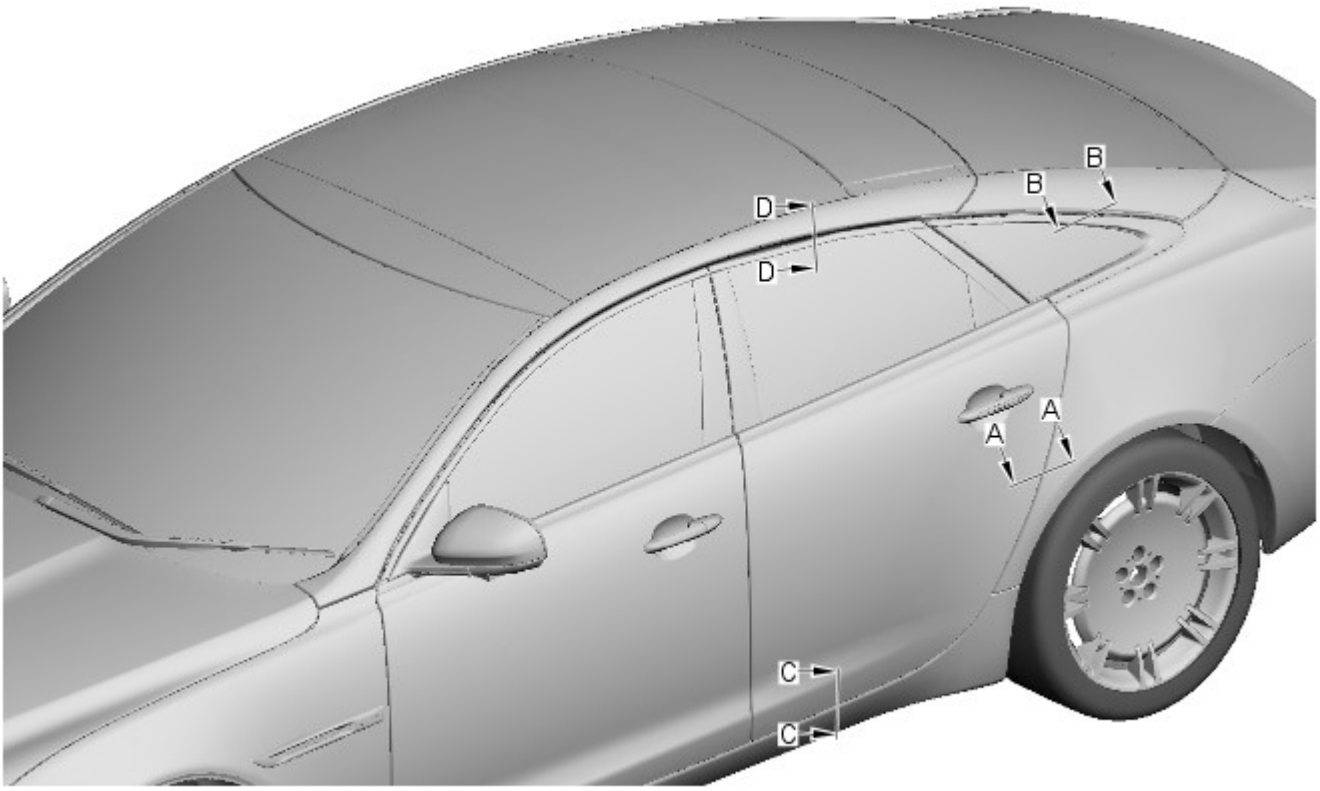
Used in noise and sound insulation.

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.

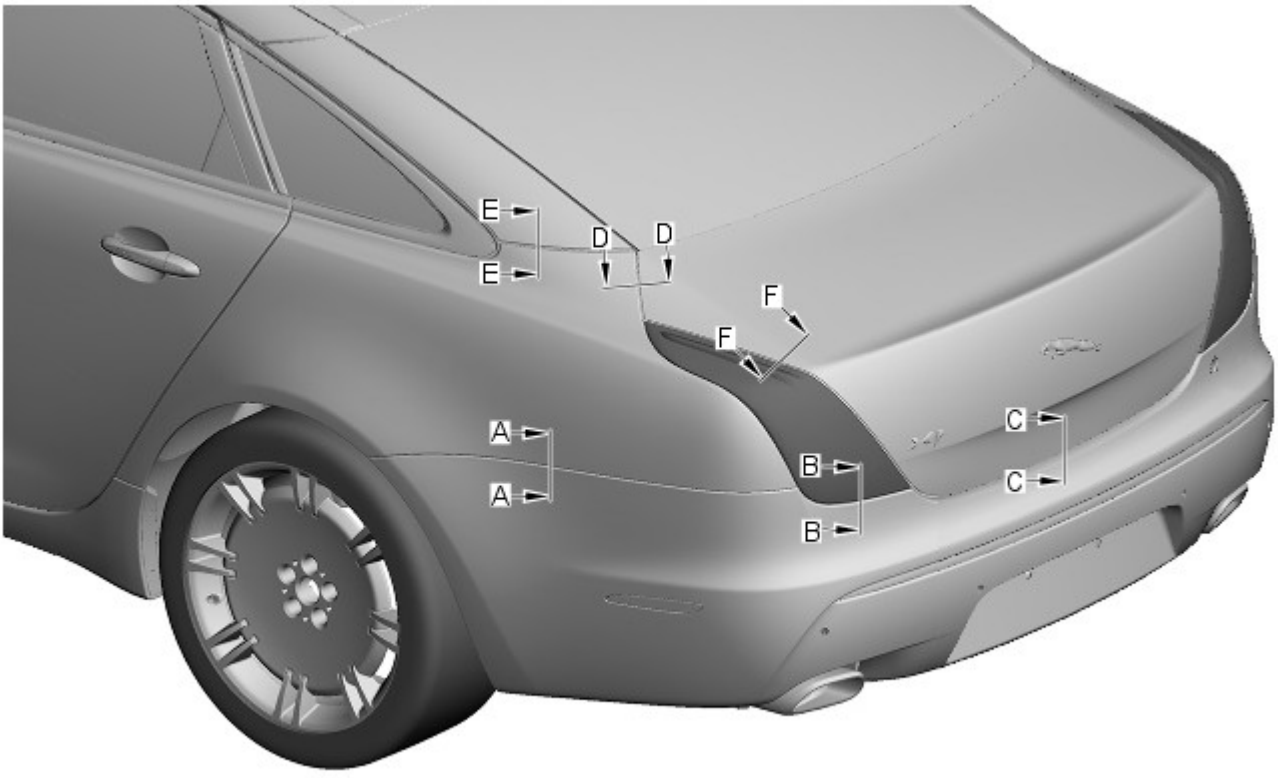
Fire

See also Welding, Foams, Legal Aspects.



E133474

A-A	Rear door to quarter panel	4.0 ± 1.0
B-B	Rear quarter window glass encapsulation to quarter panel finisher	0.0
C-C	Rear door to rocker panel	5.0 ± 1.0
D-D	Rear door to roof panel	6.5 ± 1.0



E133475

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.

The flame is bright, and eye protection should be used, but the ultraviolet 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.

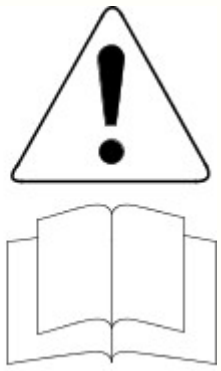
SPECIAL PRECAUTIONS MUST BE TAKEN BEFORE ANY WELDING OR CUTTING TAKES PLACE ON VESSELS WHICH HAVE CONTAINED COMBUSTIBLE MATERIALS, E.G. BOILING OR STEAMING OUT OF FUEL TANKS.

Warning Symbols on Vehicles

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

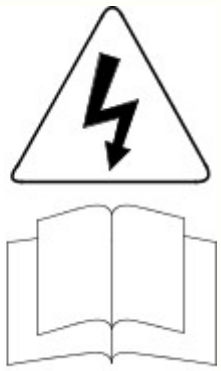
These decals must not be removed. The warnings are for the attention of owners/operators and persons carrying out service or repair operations on the vehicle.

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



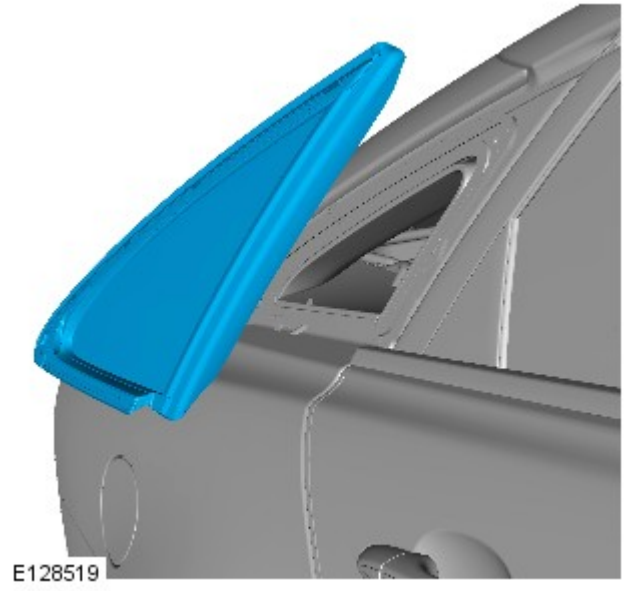
VUJ0000269

1. Components or assemblies displaying the warning triangle and open book symbol advise consultation of the relevant section of the owners handbook before touching or attempting adjustments of any kind.

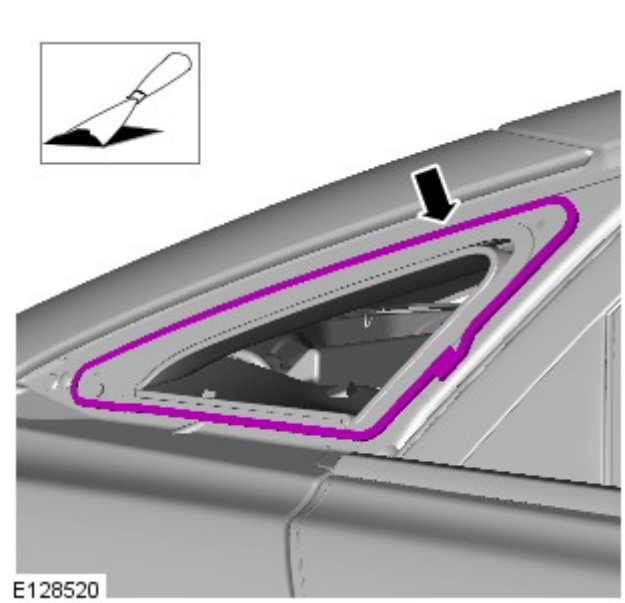


VUJ0000270

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.



Installation

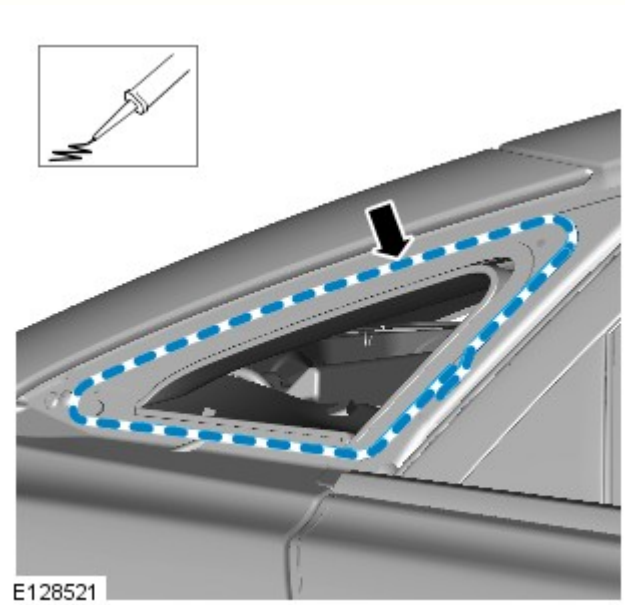


1. CAUTIONS:

Make sure that the mating faces are clean and free of foreign material.

Correct preparation of body apertures “post painting” to ensure satisfactory glass adhesion, must be carried out in line with industry practise.

- Prepare the window glass, window glass flange and trimmed PU adhesive in accordance with the instructions included with the PU adhesive kit.



2. CAUTION: Touching the adhesive surface will impair rebonding.

- All visible weld surfaces shall be clean, bright and of a uniform profile
- The weld seam should show uniform height and width over its entire length
- There shall be complete fusion between the surfaces of the work piece and the weld metal deposit

Correct level of penetration will be visible at the rear of the coupon as a fine continuous line.

Effective Weld Length

The effective weld length is the weld seam as described in the Body Repair Sections. The effective weld length does not include allowances for the run-in/run-out, or termination defects, (start/stop), of the weld seam. It is permissible that the overall weld length is longer than detailed in the repair section, as the overall weld will include a minimum of 5mm at both the start and the stop of the weld seam, provided the function of the part is not affected, or the weld finishes on the edge of a panel.

Post Weld Checks

Weld inspections take the form of a visual examination, non-destructive and destructive testing.

Visual Examination

A visual examination of fusion welds should be carried out in accordance with the acceptance criteria detailed in the following Imperfections/Defect Levels table.

Imperfection/Defect Levels Table

Defect/Imperfection Type	Details	Limits
Burn-through	Burn holes	Not permitted
Seam offset, sides melted away	Incomplete fusion	Not permitted within effective weld length
Cracks	Any form of cracking is not permitted at any position along the entire length of the weld seam	Not permitted
Fused weld spatter		Limited acceptance. Not permitted on visible surfaces or in areas where functional performance of the part is affected, e.g. mating surfaces, sealing surfaces, etc. In such instances spatter is to be removed. All loosely adherent spatters must be removed
Visible ignition marks	Local melting of parent metal due to arc	Permitted provided functional performance of the component is not affected.
Open end crater	Reduces the cross sectional area of the weld seam	Not permitted
Visual pores		Not permitted
Weld skip	Discontinuity/interruption in weld seam	Not permitted at any position along the entire length of the weld seam

Non Destructive

Dye penetrate testing **MUST** be used for detection of discontinuities, such as cracks, laps, folds, porosity and lack of fusion that are open to the surface of the material. Typical defects include start, (cold start/incomplete fusion) and stop, (crater cracking), defects within a fusion weld run. In addition to this lack of fusion/coalescence at the weld toe, solidification cracks in the weld bead may also be detected.

Non Destructive Crack Inspection Process

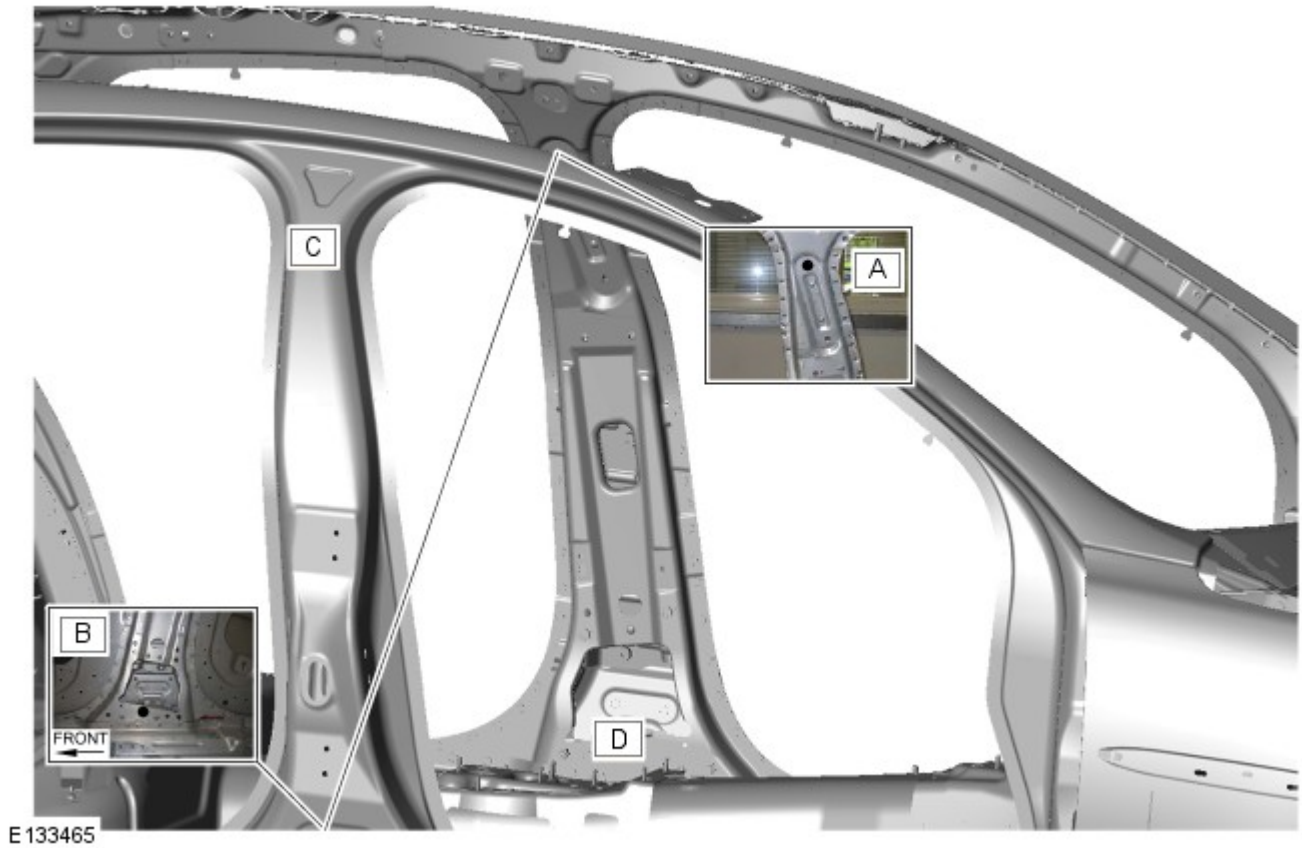
Use the product as listed in the Approved Materials Section, this product is supplied within the Category A tool kit. The product is an aerosol applied dye system. It is designed to penetrate the finest cracks and flaws to facilitate detection, the system includes: Cleaner, Penetrant and Developer.

The process is as follows:

- 1. Use the cleaner to de-grease/clean the test area, then wipe with a lint free cloth.
- 2. When the surface is completely dry apply the penetrant. Cover the test area and allow a minimum contact time of 10 minutes.
- 3. Remove excess penetrant from the surface with a lint free cloth wetted with the cleaner.
- 4. Apply a **THIN** film of the developer and leave for a minimum of 10 minutes to draw up the retained dye from flaws or cracks.
- 5. Suspect areas should then be examined under natural or electric light for signs of flaws and/or cracks. Cracks will show up as lines whilst porosity will appear as pin holes.

Destructive Testing

F (long wheel base)	Rear door bottom hinge, top fixing hole	Rear door striker, top fixing hole	1036.8

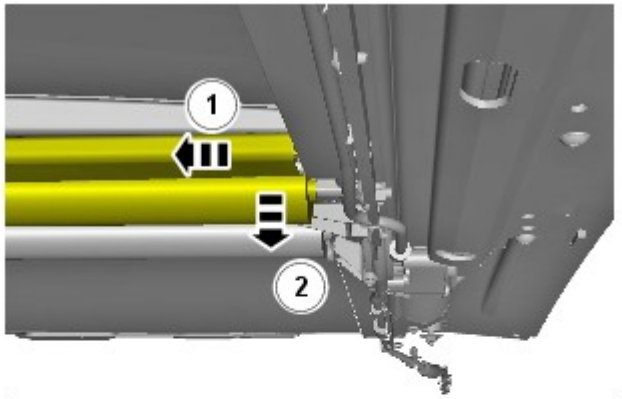


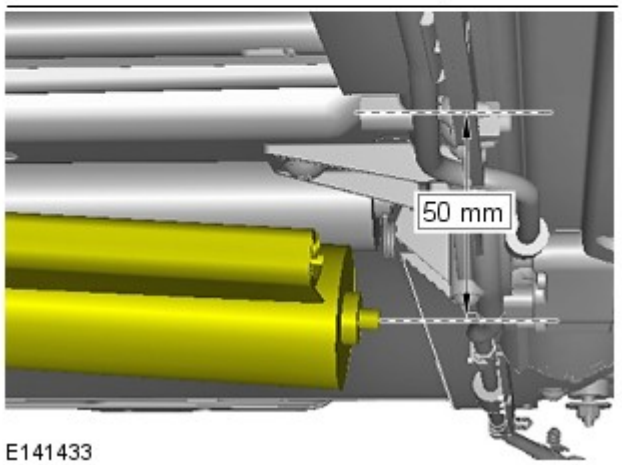
E133465

Item	From	To	Dimension
A-B	Front seat belt adjuster LH, top fixing hole	Front seat belt retractor RH, mounting hole	1606.2
C-D	Front seat belt adjuster RH, top fixing hole	Front seat belt retractor LH, mounting hole	1606.2

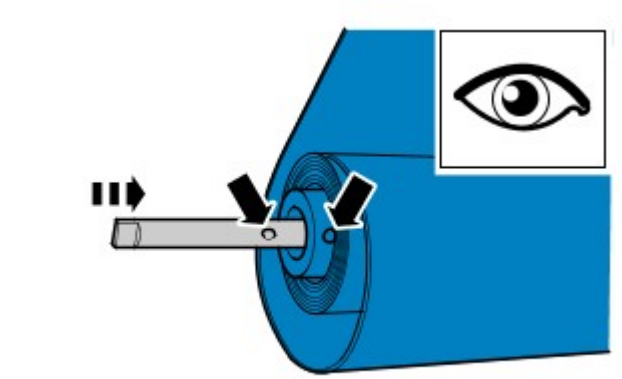
Rear End Body Dimensions

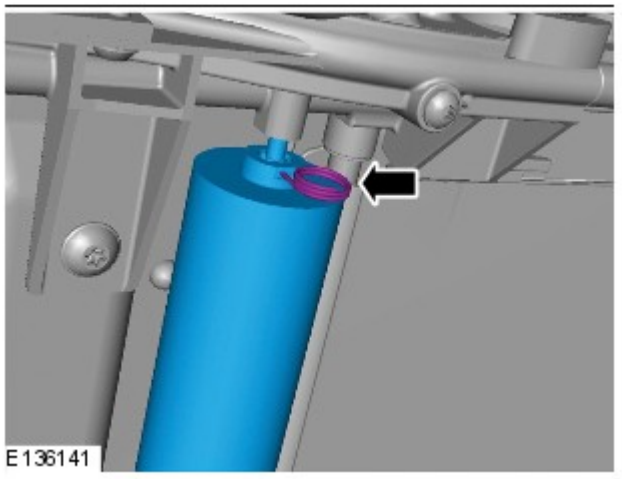
E133464





E141433





E136141

4. CAUTIONS:

Make sure that the clip is correctly located.

If the correct clip is not available, make sure that a suitable hardened pin is used such as a drill bit, do not use a paperclip.

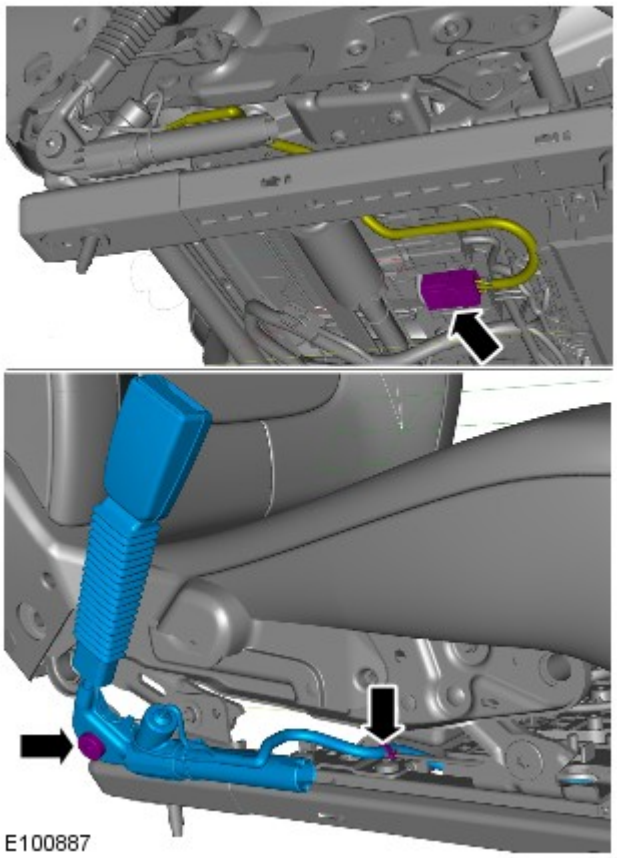
Make sure that the roof opening panel blind is not released from the drive mechanism until the clip has been correctly located.

NOTE: Roof opening panel blind shown, glass roof panel blind similar.

Install the retaining clip.

5. CAUTION: Note the installed position of the component prior to removal.

	Module - Missing message	circuit to power, open circuit, high resistance • Instrument cluster system fault	diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the instrument cluster for related DTCs and refer to the relevant DTC index
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Car configuration file mismatch with vehicle specification • Incorrect restraints control module installed	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary • Install a new restraints control module as necessary
U0415-29	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - Signal invalid	• Missing/invalid data from the anti-lock brake system control module	• Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index
U0455-55	Invalid Data Received From Restraints Occupant Classification System Module - Not configured	• Car configuration file mismatch with vehicle specification • Incorrect passenger seat installed	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary • Install a new passenger seat as necessary
U0455-92	Invalid Data Received From Restraints Occupant Classification System Module - Performance or incorrect operation	• Missing/invalid data from the occupant classification sensor control module	• Using the manufacturer approved diagnostic system, check the occupant classification sensor control module for related DTCs and refer to the relevant DTC index
U0455-93	Invalid Data Received From Restraints Occupant Classification System Module - No operation	• Missing/invalid data from the occupant classification sensor control module	• Using the manufacturer approved diagnostic system, check the occupant classification sensor control module for related DTCs and refer to the relevant DTC index
U0455-95	Invalid Data Received From Restraints Occupant Classification System Module - Incorrect assembly	• Mismatch between restraints control module and occupant classification sensor control module software	• Using the manufacturer approved diagnostic system, re-configure the restraints control module with the latest level software. If the fault persists, re-configure the occupant classification sensor control module with the latest level software
U1A14-55	CAN Initialisation Failure - Not configured	• Restraints control module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new restraints control module
U2100-00	Initial Configuration Not Complete - No sub type information	• Restraints control module is not configured correctly	• Using the manufacturer approved diagnostic system, re-configure the restraints control module with the latest level software
U2101-00	Control Module Configuration	• Car configuration file mismatch with	



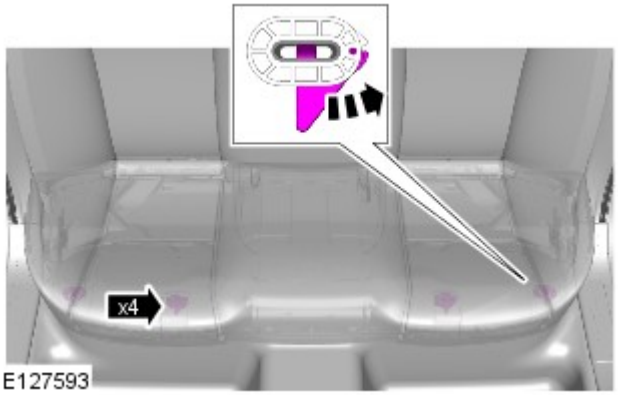
Installation

1. CAUTION: Make sure that a new bolt is installed.

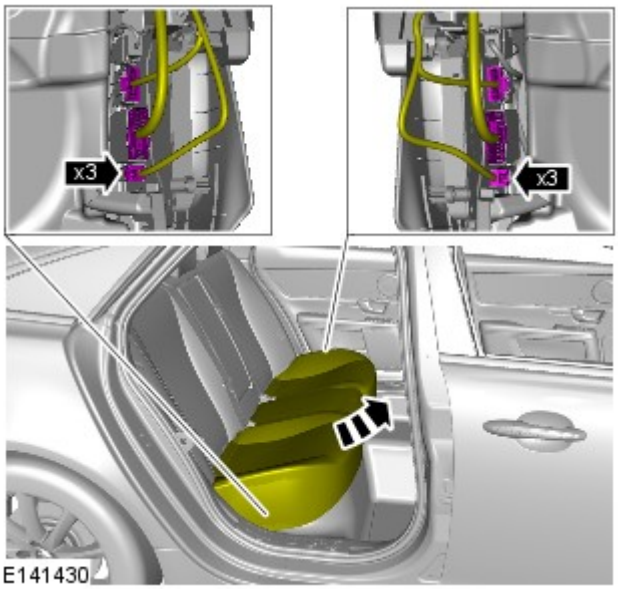
To install, reverse the removal procedure.

All vehicles

5.



6.



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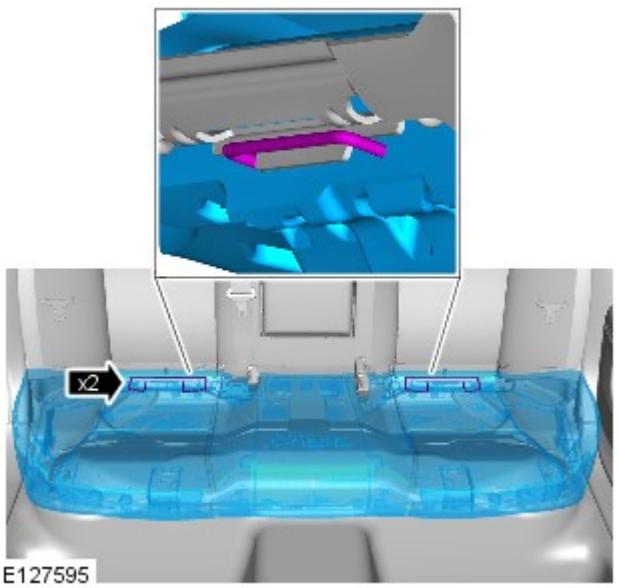


Vehicles with split rear seat backrest

NOTE: If equipped.

The air suspension system provides a fully automatic self-leveling function that ensures the vehicle maintains a constant attitude, irrespective of load, by adjusting the rear ride height to match the front ride height.

The air suspension system comprises of:

- An air spring in the spring and damper assembly of each rear wheel.
- An air compressor assembly.
- A valve block.
- A reservoir.
- A silencer.
- A network of pipes to connect the individual components.
- Four suspension height sensors (one for each corner of the vehicle).
- An air suspension module.

Published: 05-Oct-2016

Front Suspension - Front Shock Absorber

Removal and Installation

Removal

NOTES:

Some variation in the illustrations may occur, but the essential information is always correct.

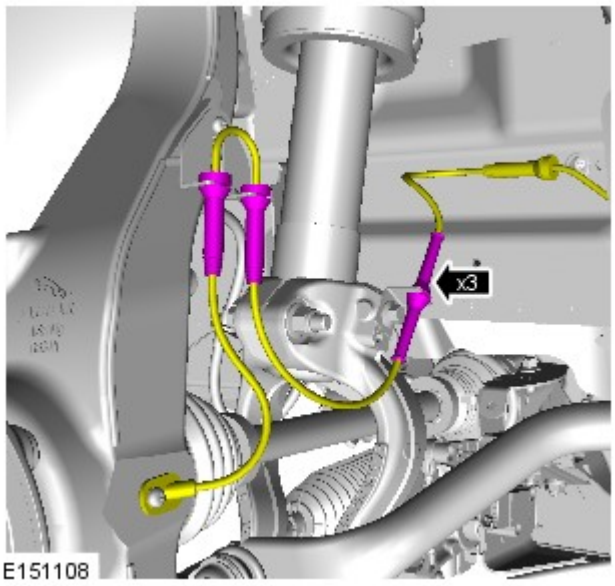
Removal steps in this procedure may contain installation details.

Right illustrations shown, left similar.

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

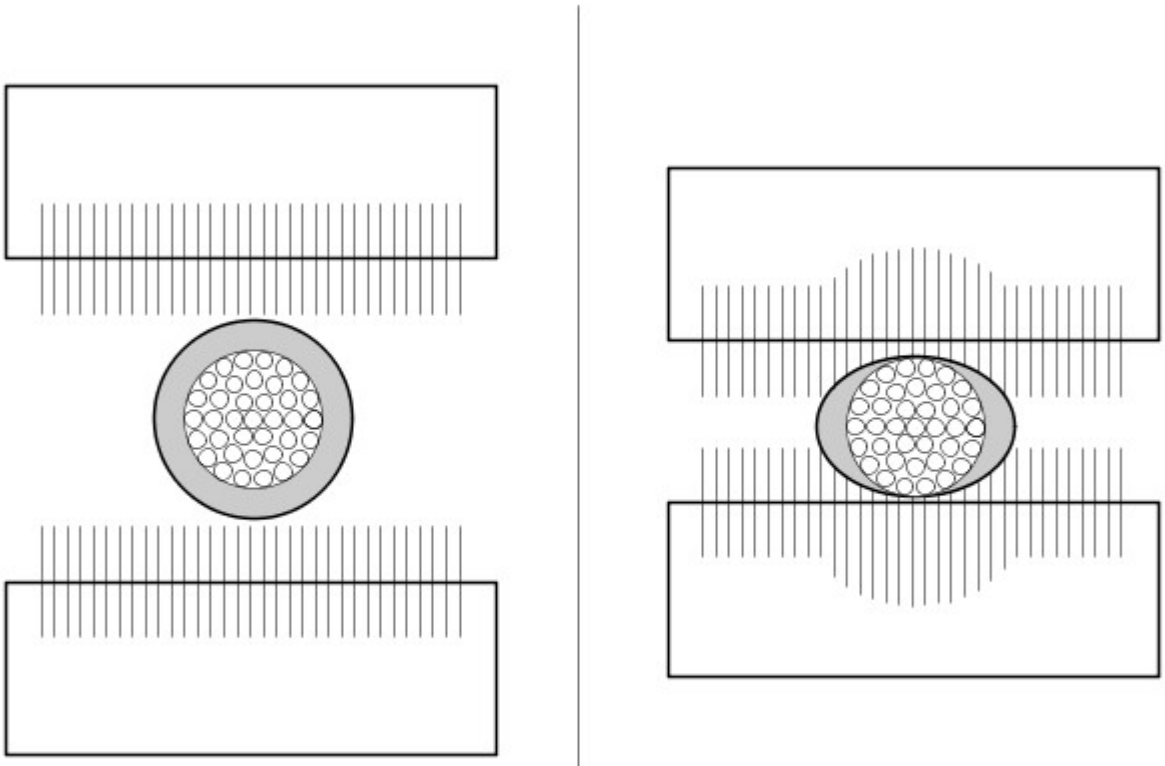
2. WARNING: Make sure to support the vehicle with axle stands.

Raise and support the vehicle.



3. Position the sensor harness to one side.

4. Torque: 20 Nm

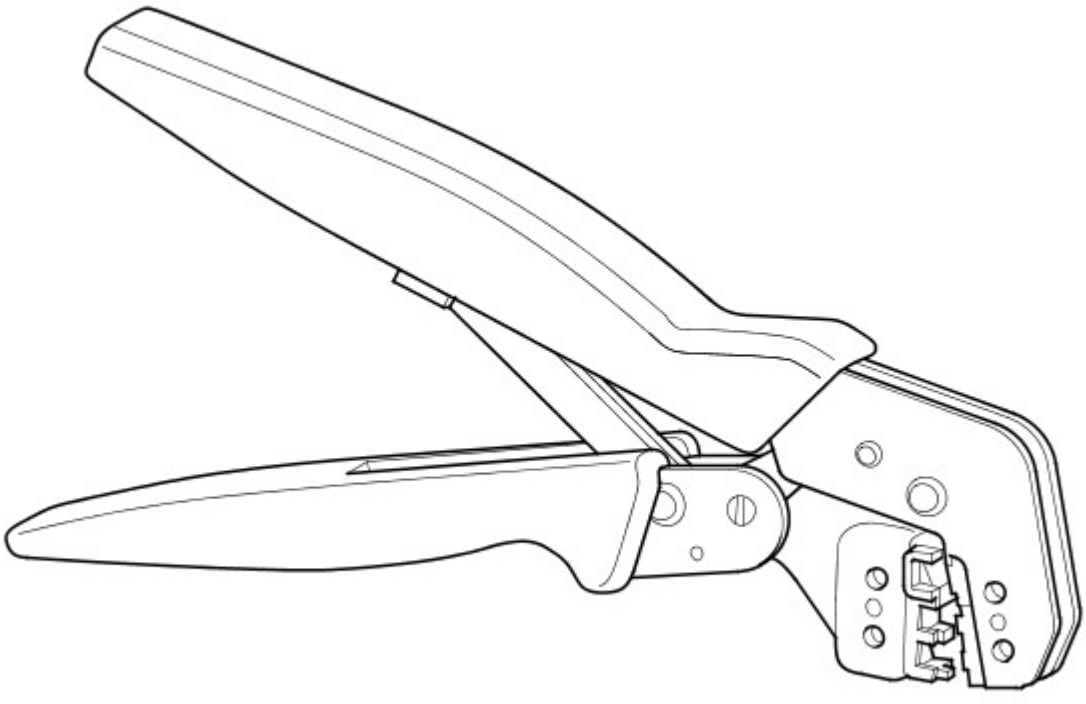


E178865

Crimpers

The crimpers have a moving jaw and a stationary jaw, with three different sized crimping enclosures. Each of the enclosures are identified by a red, blue or yellow colored dot which corresponds to the three colors of the pre-terminated leads and splice connector.

Crimpers



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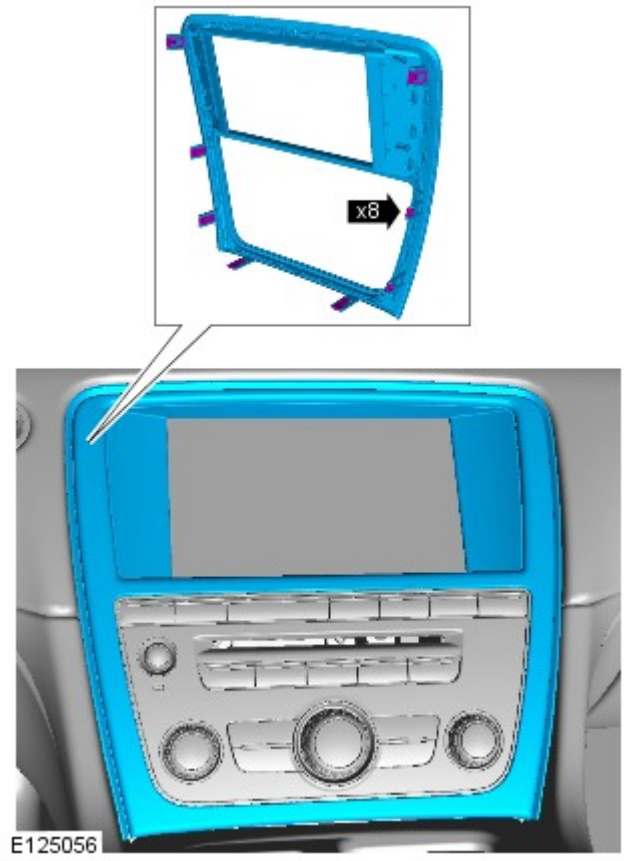
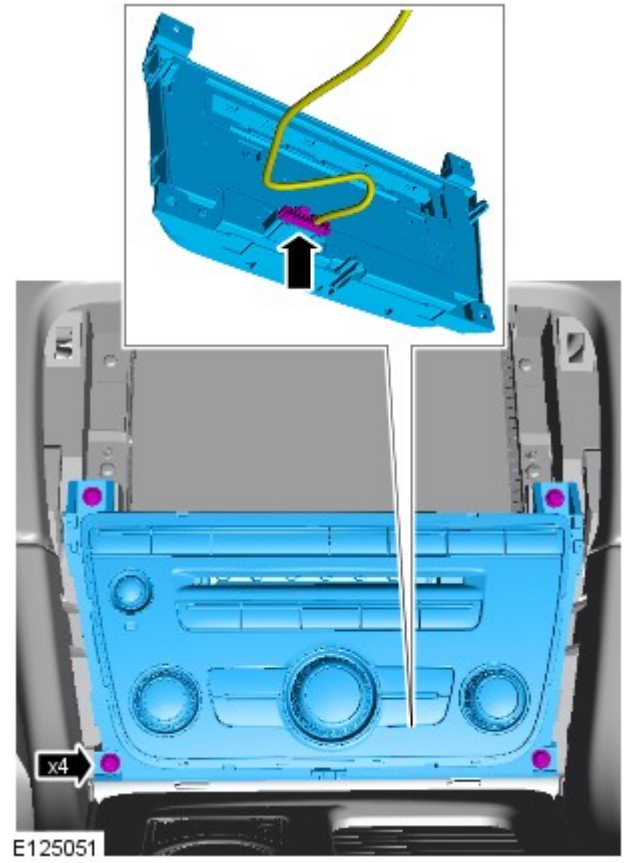


2. *Torque:* 1.7 Nm



Installation

1. To install, reverse the removal procedure.