

# General Information - About This Manual

Description and Operation

## 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 and effective techniques. Following them will help to ensure reliability.

## 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.

Anyone who departs from the instructions provided in this manual must first establish that personal safety or vehicle integrity is not compromised by the choice of method, 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.

Generic warnings or cautions are in their relevant description and operation procedure within section 100-00. If the generic warnings or cautions are required for a procedure, there will be a referral to the appropriate description and operation procedure.

If a warning, caution or note only applies to one step, it is placed at the beginning of the specific step.

## 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

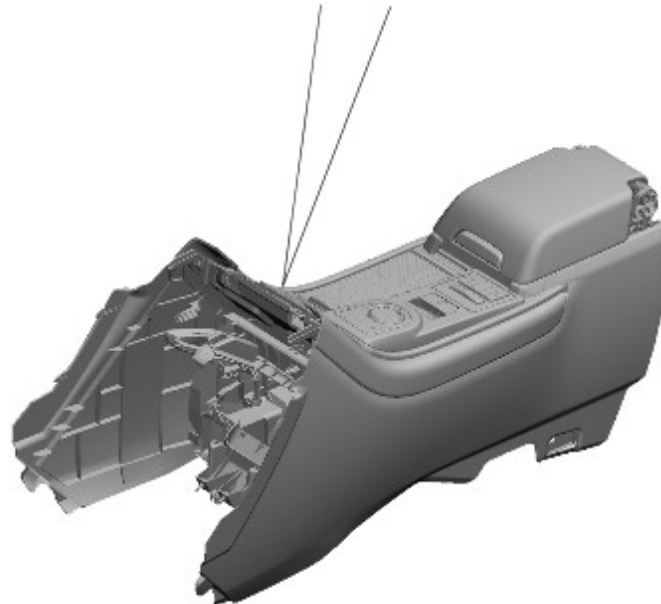
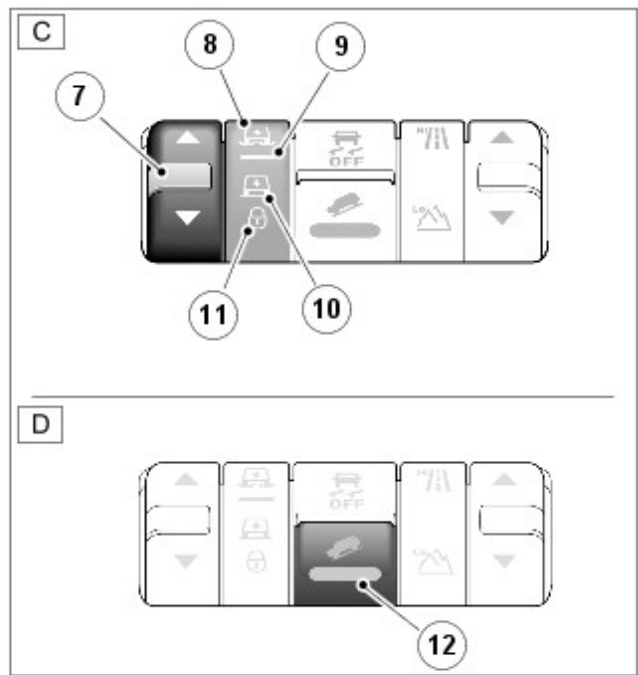
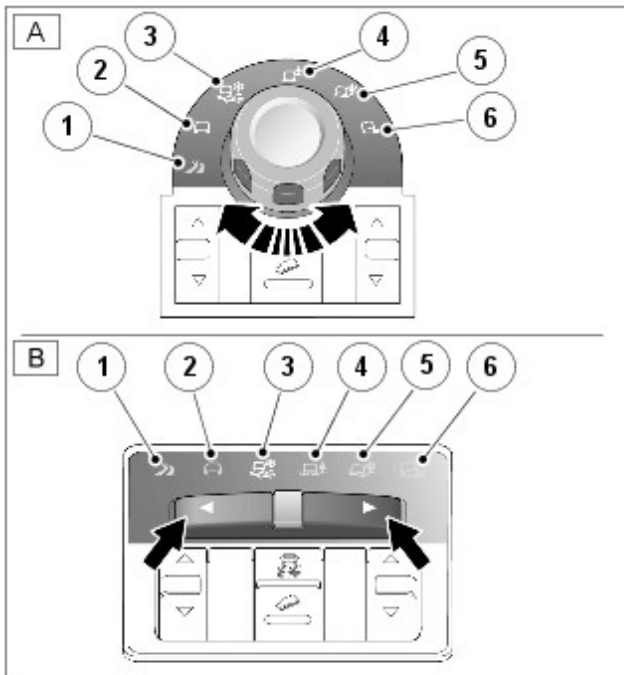
Colors used in the graphic are as follows:

- 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).

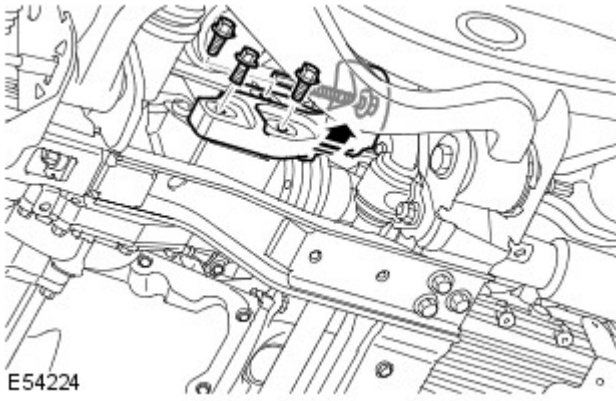


E140319

| Item | Part Number | Description                                                     |
|------|-------------|-----------------------------------------------------------------|
| A    | -           | Terrain Response™ control - Non-Electronic Transmission Shifter |
| B    | -           | Terrain Response™ control - Electronic Transmission Shifter     |
| C    | -           | Air suspension switch location in switch pack                   |
| D    | -           | Hill Descent Control (HDC) switch location in switch pack       |
| 1    | -           | Dynamic                                                         |
| 2    | -           | General program (special programs off)                          |
| 3    | -           | Grass/Gravel/Snow                                               |
| 4    | -           | Mud-Ruts                                                        |
| 5    | -           | Sand                                                            |
| 6    | -           | Rock crawl                                                      |
| 7    | -           | Raise/lower switch                                              |
| 8    | -           | Off-Road Mode                                                   |
| 9    | -           | On-Road Mode                                                    |
| 10   | -           | Access Mode                                                     |
| 11   | -           | Crawl (Locked at Access) Mode                                   |
| 12   | -           | Hill Descent Control (HDC) switch                               |

Each program is denoted by a symbol which represents the terrain encountered. The rotary control can be depressed downwards to lock it in a position flush with the trim surround. A second push of the control releases the lock and the control emerges from the surround allowing it to be rotated.


The rotary control can be rotated to select the required program. The control will only select the last program in its direction of rotation. Further rotation of the control once the last program in either direction has been selected, will



5.  **CAUTION:** The bolts must only be used once.

Remove the axle carrier.

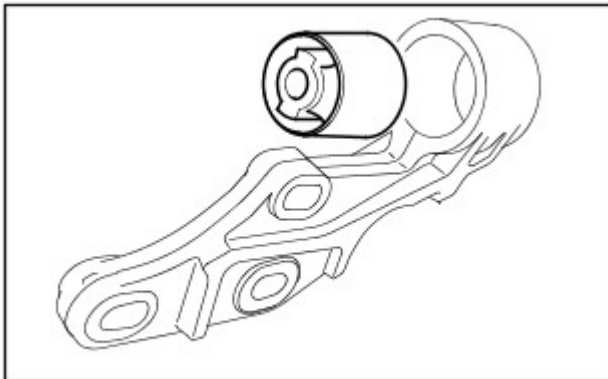
- Remove and discard the three bolts retaining the axle carrier to the axle.
- Remove the axle carrier bushing bolt.

6.  **NOTE:** Take note of the fitted position of the bush.

Using the special tools, remove the axle carrier bushing.

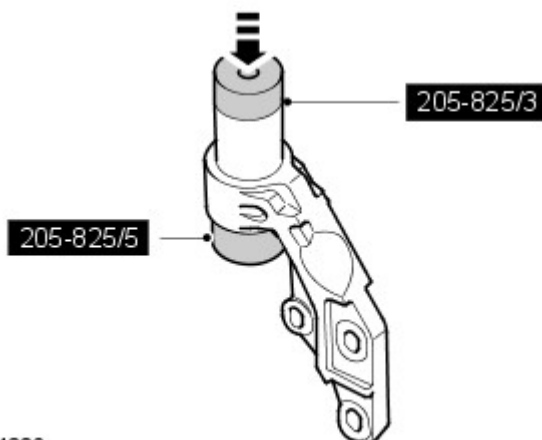


### Installation

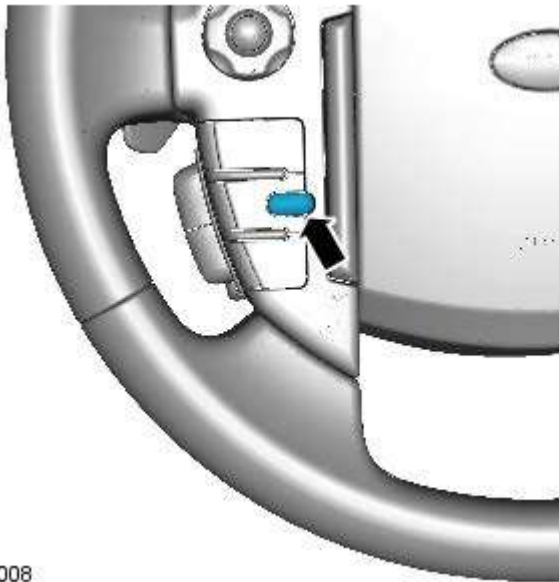


1.  **CAUTION:** Make sure the bush is correctly aligned.

Using the special tools, install the axle carrier bushing.



2. Install the axle carrier.
- Tighten the M14 bolt to 105 Nm (77 lb.ft).
  - Tighten the new axle carrier bracket bolts to 80 Nm (59 lb.ft), then a further 60 degrees.
3. Install the axle carrier bushing heat shield.




E121008

13.

- The message center display will revert to the normal display in the trip computer.
- Press the right-hand OK button and follow the instructions.
- Check that the oil level display shows an oil level reading.
- Only after having started and run the engine for 10 minutes (as indicated in Step 6), switch off the engine, then stabilizing for 10 minutes, take a reading from the oil level display and, if necessary top up with engine oil.




E123929

14.  **NOTE:** If instructed to follow Steps 7-13 in a previous step, return to Step 6 and continue the procedure.

Turn the ignition off.

15. Allow 10 minutes for the engine oil level to stabilize if there has been additional oil top up.

16.  **NOTE:** The following steps are to update the average oil level value.

- Turn the ignition on.
- Press and hold the cruise control cancel button for more than 2 seconds.


# Engine Cooling - V8 5.0L Petrol/V8 S/C 5.0L Petrol - Thermostat Housing V8 5.0L Petrol

Removal and Installation

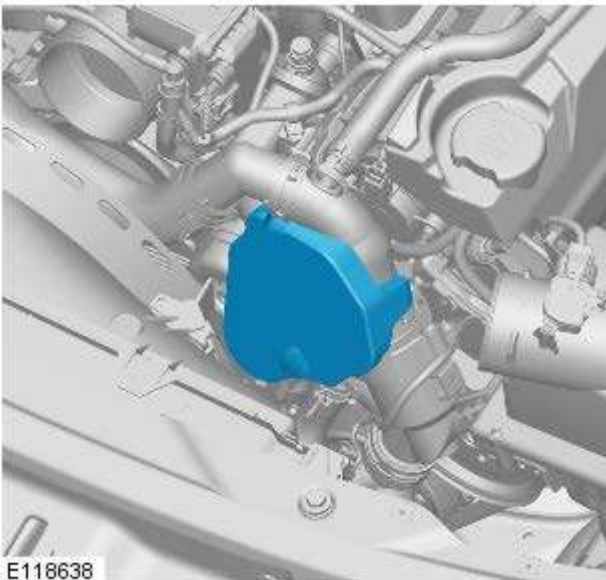
## Removal




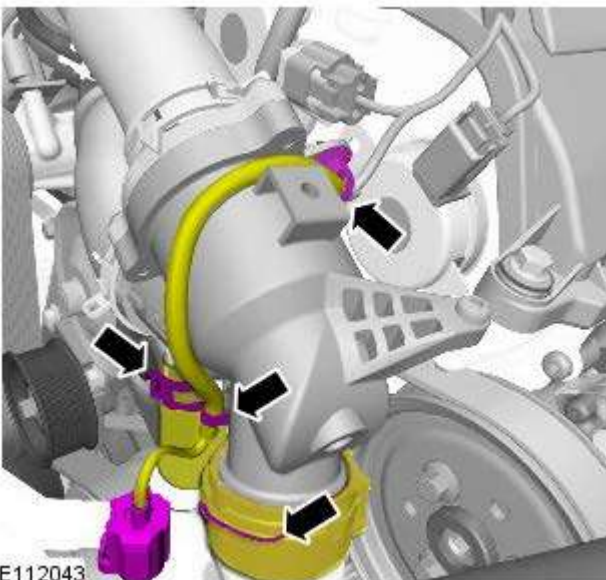
NOTE: Removal steps in this procedure may contain installation details.

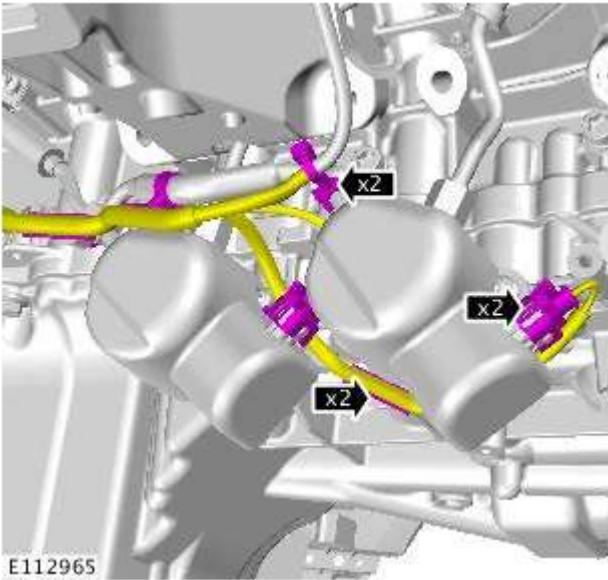
1.  **WARNING:** Make sure to support the vehicle with axle stands.  
Raise and support the vehicle.
2. Refer to: [Cooling System Partial Draining, Filling and Bleeding - V8 5.0L Petrol](#) (303-03B Engine Cooling - V8 5.0L Petrol/V8 S/C 5.0L Petrol, General Procedures).
3. Refer to: [Air Cleaner Outlet Pipe T-Connector](#) (303-12B Intake Air Distribution and Filtering - V8 5.0L Petrol, Removal and Installation).
4. Refer to: [Air Cleaner Outlet Pipe LH](#) (303-12B Intake Air Distribution and Filtering - V8 5.0L Petrol, Removal and Installation).

5.

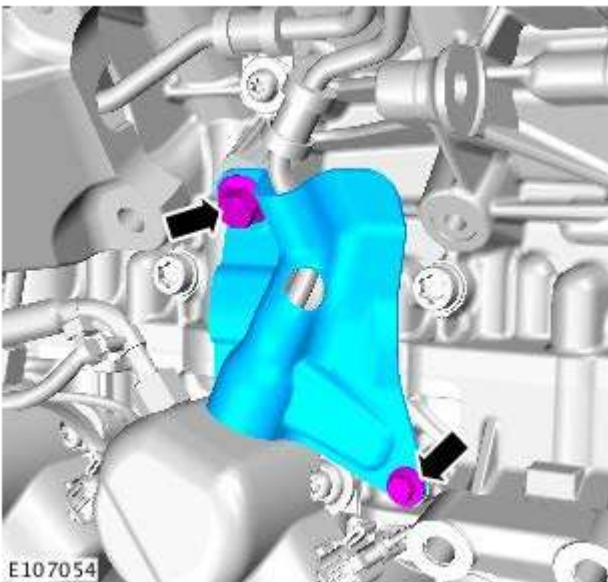
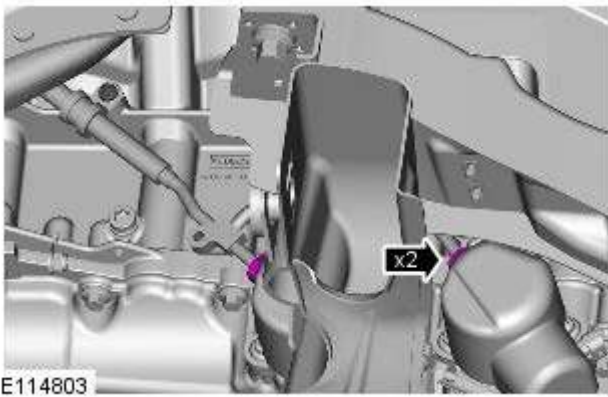


6.  NOTE: Some variation in the illustrations may occur, but the essential information is always correct.





13. Torque: 21 Nm



14.  NOTE: Engine shown removed for clarity.

Torque:  
M10 29 Nm  
M6 11 Nm

15.  NOTE: Engine shown removed for clarity.

# Electronic Engine Controls - V8 5.0L Petrol - Variable Valve Timing (VVT) Oil Control Solenoid LH

Removal and Installation

## Removal



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

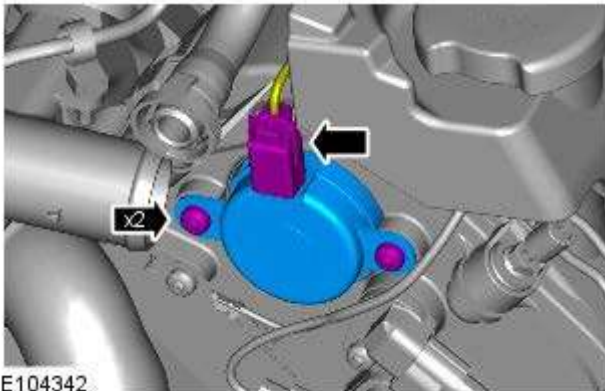
1. Disconnect the battery ground cable.

Refer to: Specifications (414-00, Specifications).


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

Raise and support the vehicle.

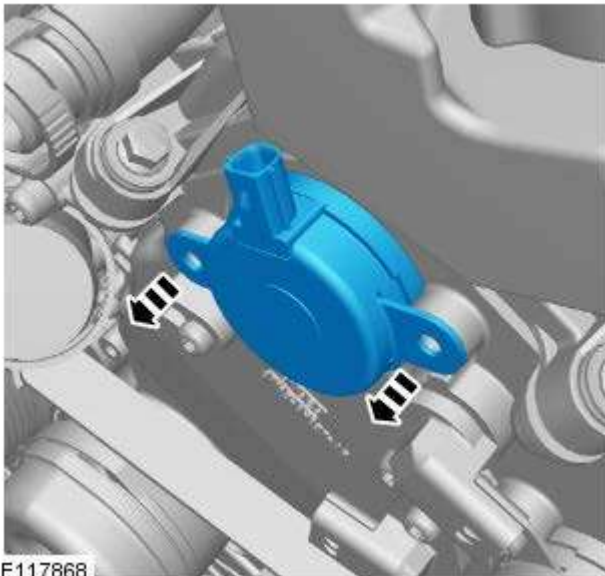
3. Refer to: Thermostat Housing - Vehicles Without: Supercharger (303-03, Removal and Installation).




E104342


4.  **NOTE:** Some variation in the illustrations may occur, but the essential information is always correct.

*Torque:* 10 Nm




E117868

5.  **CAUTION:** Evenly and progressively, remove the VVT units from each side.

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

## Installation

1.  **CAUTION:** Make sure that the mating faces are clean and free of foreign material.



**NOTE:** Lubricate the O-ring seal with clean engine oil.

To install, reverse the removal procedure.

# Exhaust System - TDV6 3.0L Diesel - Diesel Particulate Filter (DPF)

Removal and Installation


## General Equipment

Transmission jack

## Removal

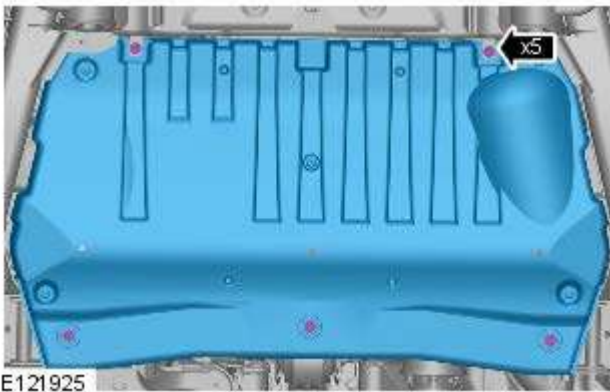


NOTE: Removal steps in this procedure may contain installation details.

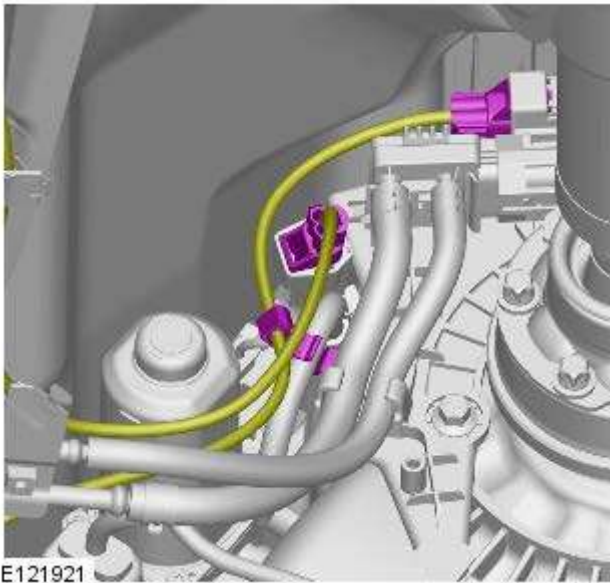
1.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

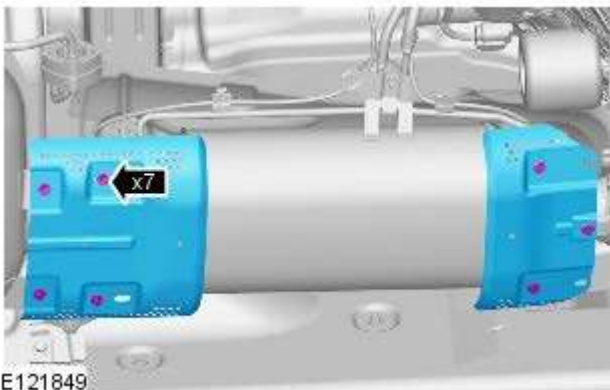
2. Torque: 10 Nm



- 3.



4. Torque: 10 Nm



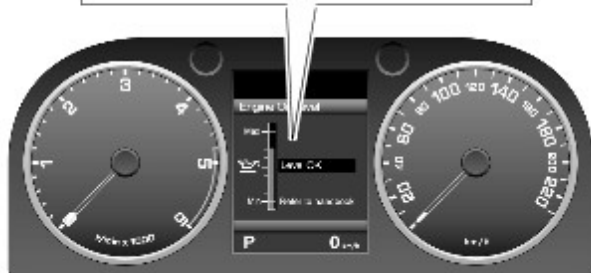




E123790

Scroll arrows to the left of the menu indicate that there are further menu items either above or below the currently viewed menu items. If the arrow is displayed brightly there are additional menu items available. If the arrows appear dim, there are no additional items. For example, the engine oil level display by can be accessed by selecting 'Service Manual' and then selecting 'Oil Level Display'.

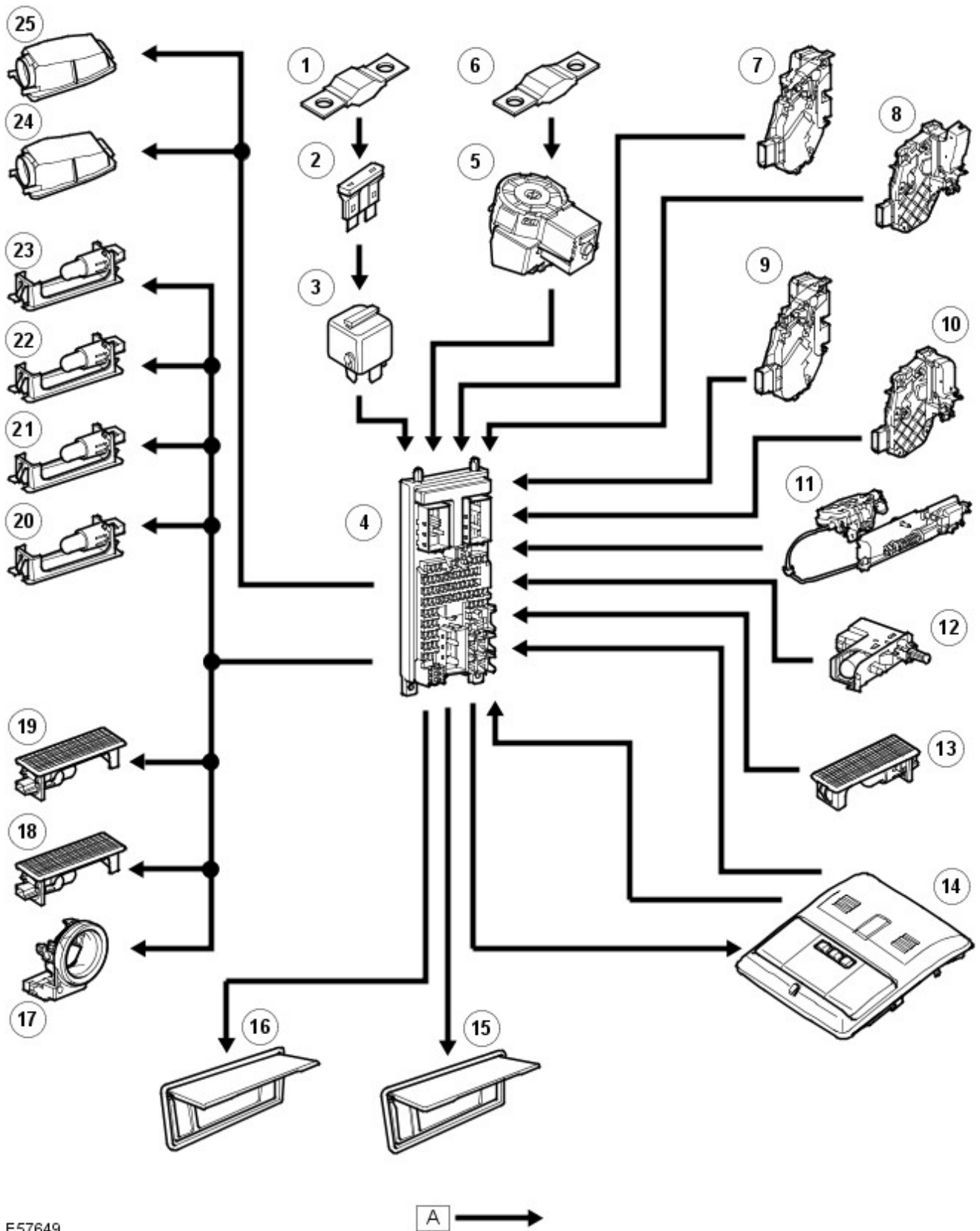
Engine Oil Level Display



E124084

To close the main menu, press the left button on the menu control. To close sub-menus press and hold the left button on the menu control.

The menu will close automatically if:



E57649

| Item | Part Number | Description                                   |
|------|-------------|-----------------------------------------------|
| 1    | -           | Fusible link 15E (40A) (Permanent 12V supply) |
| 2    | -           | Fuse 1P (10A)                                 |
| 3    | -           | Battery saver relay (located inside CJB)      |
| 4    | -           | Central Junction Box (CJB)                    |
| 5    | -           | Ignition switch                               |
| 6    | -           | Fusible link 11E (30A)                        |
| 7    | -           | Passenger door CDL motor                      |
| 8    | -           | Driver's door CDL motor                       |
| 9    | -           | RH rear door CDL motor                        |
| 10   | -           | LH rear door CDL motor                        |

# Interior Lighting - Interior Lighting

Diagnosis and Testing

## Principle of Operation

For a detailed description of the interior lighting system and operation, refer to the relevant Description and Operation section of the workshop manual.

REFER to: [Interior Lighting](#) (417-02 Interior Lighting, Description and Operation).

## Inspection and Verification



**CAUTION:** Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault and may also cause additional faults in the vehicle being checked and/or the donor vehicle.



**NOTE:** Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

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

### Visual Inspection

| Mechanical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Electrical                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Main interior lamp condition and installation</li> <li>• Map reading lamp(s) condition and installation</li> <li>• Vanity mirror lamp(s) condition and installation</li> <li>• Glovebox lamp condition and installation</li> <li>• Footwell lamp(s) condition and installation</li> <li>• Door mirror approach lamp(s) condition and installation</li> <li>• Puddle lamp(s) condition and installation</li> <li>• Luggage compartment lamp condition and installation</li> </ul> | <ul style="list-style-type: none"> <li>• Bulbs</li> <li>• Fuses</li> <li>• Battery Junction Box (BJB)</li> <li>• Central Junction Box (CJB)</li> <li>• Wiring harness</li> <li>• Loose or corroded connector(s)</li> <li>• Main interior lamp switch</li> <li>• Map reading lamp switches</li> <li>• Vanity mirror lamp switches</li> <li>• Glove compartment lamp switch</li> <li>• Waterfall lighting LED</li> <li>• Luggage compartment lamp switch</li> </ul> |

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, alternatively check for Diagnostic Trouble Codes (DTCs) and refer to the relevant DTC Index.

## Symptom Chart

| Symptom                            | Possible Causes                                                                                                                                                                                                                                                                                                                                                                        | Action                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Main interior lamp inoperative     | <p><b>NOTE:</b> Operate the main interior lamp switch for 3 seconds to toggle automatic mode on/off</p> <ul style="list-style-type: none"> <li>• Main interior lamp toggled off</li> <li>• Bulb(s) failure</li> <li>• Fuse(s) blown</li> <li>• Main interior lamp circuit short circuit to ground, open circuit, high resistance</li> <li>• Main interior lamp switch fault</li> </ul> | <ul style="list-style-type: none"> <li>• Check that the main interior lamp is not toggled off</li> <li>• Check the bulb(s) condition</li> <li>• Check the fuse(s)</li> <li>• Refer to the electrical circuit diagrams and test the main interior lamp circuit for short circuit to ground, open circuit, high resistance</li> <li>• Test the operation of the main interior lamp switch</li> </ul> |
| Waterfall lighting LED inoperative | <ul style="list-style-type: none"> <li>• LED failure</li> <li>• Fuse(s) blown</li> <li>• LED circuit short circuit to ground, open circuit, high resistance</li> </ul>                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>• Check the LED condition</li> <li>• Check the fuse(s)</li> <li>• Refer to the electrical circuit diagrams and test the LED circuit for short circuit to ground, open circuit, high resistance</li> </ul>                                                                                                                                                   |
| Map reading lamp(s) inoperative    | <ul style="list-style-type: none"> <li>• Bulb(s) failure</li> <li>• Fuse(s) blown</li> <li>• Map reading lamp circuit short circuit to ground, open circuit, high resistance</li> <li>• Map reading lamp switch fault</li> </ul>                                                                                                                                                       | <ul style="list-style-type: none"> <li>• Check the bulb(s) condition</li> <li>• Check the fuse(s)</li> <li>• Refer to the electrical circuit diagrams and test the map reading lamp circuit for short circuit to ground, open circuit, high resistance</li> <li>• Test the operation of the map reading lamp switch</li> </ul>                                                                     |
| Vanity mirror lamp(s) inoperative  | <ul style="list-style-type: none"> <li>• Bulb failure</li> <li>• Fuse(s) blown</li> <li>• Vanity mirror lamp circuit short circuit to ground, open circuit,</li> </ul>                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>• Check the bulb condition</li> <li>• Check the fuse(s)</li> <li>• Refer to the electrical circuit diagrams and test the vanity mirror lamp circuit for short circuit to ground,</li> </ul>                                                                                                                                                                 |

# Rear View Mirrors - Exterior Mirror Cover

## Removal and Installation

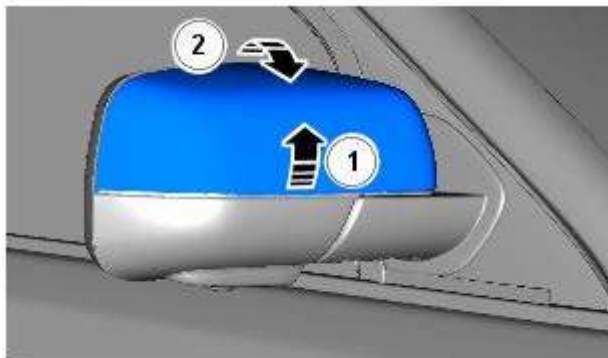
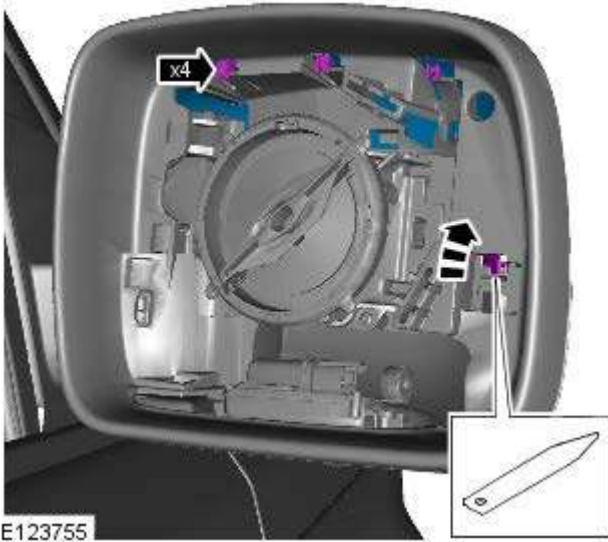
### Removal



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

1. Refer to: Exterior Mirror Glass (501-09, Removal and Installation).

2.



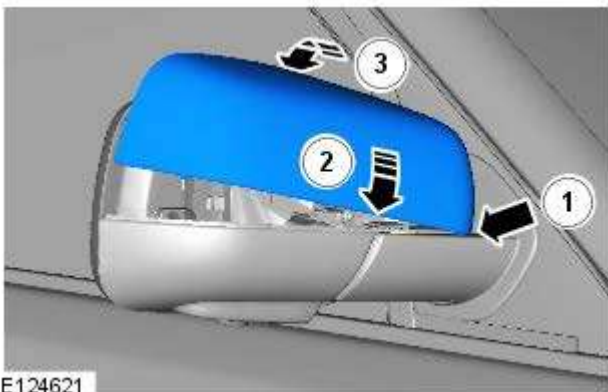
3. CAUTIONS:

 Take extra care not to damage the clips.

 Protect the surrounding trim to avoid damage.

 Protect the surrounding paintwork to avoid damage.

### Installation



1. CAUTIONS:

 Take extra care not to damage the clips.


 Protect the surrounding trim to avoid damage.

 Protect the surrounding paintwork to avoid damage.

To install, reverse the removal procedure.

|                                           |     |           |     |      |
|-------------------------------------------|-----|-----------|-----|------|
| (L319/L320)                               |     |           |     |      |
| Discovery / Range Rover Sport (L319/L320) | US  | Passenger | Yes | 2005 |
| Discovery / Range Rover Sport (L319/L320) | All | Driver    | No  | 2005 |
| Discovery / Range Rover Sport (L319/L320) | ROW | Passenger | No  | 2005 |
| Discovery (L319)                          | All | Row 2     | Yes | 2005 |
| Discovery (L319)                          | All | Row 3     | Yes | 2005 |
| Range Rover Sport (L320)                  | All | Row 2     | Yes | 2006 |
| Freelander (L359)                         | All | Driver    | No  | 2007 |
| Freelander (L359)                         | ROW | Passenger | No  | 2007 |
| Freelander (L359)                         | US  | Passenger | Yes | 2007 |
| Freelander (L359)                         | ROW | Row 2     | No  | 2007 |
| Freelander (L359)                         | US  | Row 2     | Yes | 2007 |
| Range Rover Evoque (L538)                 | All | Driver    | No  | 2011 |
| Range Rover Evoque (L538)                 | ROW | Passenger | No  | 2011 |
| Range Rover Evoque (L538)                 | US  | Passenger | Yes | 2011 |
| Range Rover Evoque (L538)                 | ROW | Row 2     | No  | 2011 |
| Range Rover Evoque (L538)                 | US  | Row 2     | Yes | 2011 |
| Range Rover (L322)                        | All | Driver    | No  | 2003 |
| Range Rover (L322)                        | ROW | Passenger | No  | 2003 |
| Range Rover (L322)                        | US  | Passenger | Yes | 2003 |
| Range Rover (L322)                        | ROW | Row 2     | No  | 2003 |
| Range Rover (L322)                        | US  | Row 2     | Yes | 2003 |

The **automatic locking retractor function** is a feature to secure a child seat or heavy load to the seat

| Activation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Deactivation                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p><b>NOTE:</b> When automatic locking retractor is activated, no further webbing can be drawn from the seatbelt retractor, prior to disengagement of the automatic locking. This can be mistaken as a jammed seatbelt retractor</p> <p>Activated by total extraction of the webbing</p> <p>When activated the automatic locking retractor is identified by a clicking noise during webbing retraction</p> | <p>Automatic locking retractor is deactivated by allowing the webbing to retract until the clicking stops (close to park position)</p> <p>When deactivated the automatic locking retractor seatbelt changes state, from a <b>static</b> seatbelt to an <b>automatic</b> seatbelt</p> |

### Seatbelt Locking Test

With the vehicle stationary and on level ground take firm hold of the seatbelt webbing (on the tongue side of the upper seatbelt anchor) and withdraw sharply, **the retractor should lock**. Preventing further webbing release (**repeat this test 3 times**). Any seatbelt retractor which fails to lock **must not be used** and a **new seatbelt must be installed**.

### DTC Index

For a list of diagnostic trouble codes that could be logged on this vehicle, please refer to Section 100-00 or for removal and installation/description and operation see Section 501-20

### Diagnostic Guide Inertia Reel Seatbelts

| PINPOINT TEST A : BACKLOCK |                                                                                                                                                                                                                                                          |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TEST CONDITIONS            | DETAILS/RESULTS/ACTIONS                                                                                                                                                                                                                                  |
| <b>A1: BACKLOCK</b>        |                                                                                                                                                                                                                                                          |
|                            | <b>1</b> Visually inspect the condition of the suspect seatbelt                                                                                                                                                                                          |
|                            | <b>2</b> Draw a maximum of 20mm of the webbing from the seatbelt retractor with moderate force. Then release the webbing                                                                                                                                 |
|                            | <b>3</b> Check for correct operation twice                                                                                                                                                                                                               |
|                            | Does the webbing move freely then retract correctly?<br><b>Yes</b><br>No further action required<br><b>No</b><br>For first row seatbelt GO to Pinpoint Test <a href="#">C.</a> For second and third row seatbelts GO to Pinpoint Test <a href="#">B.</a> |

| PINPOINT TEST B : WEBBING - TRAPPED IN SEAT |                                                                      |
|---------------------------------------------|----------------------------------------------------------------------|
| TEST CONDITIONS                             | DETAILS/RESULTS/ACTIONS                                              |
| <b>B1: WEBBING - TRAPPED IN SEAT</b>        |                                                                      |
|                                             | <b>1</b> Visually inspect the condition of the suspect seatbelt      |
|                                             | <b>2</b> Lift the seat base or release the seat backrest as required |

# Rear End Sheet Metal Repairs - D-Pillar Inner Lower Panel

Removal and Installation

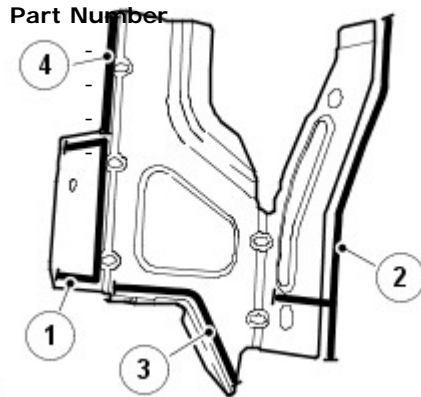
## Removal



**NOTE:** In this procedure the D-pillar inner lower panel is replaced in conjunction with the quarter panel.

1. Disconnect both battery cables.  
For additional information, refer to: Specifications (414-00 Charging System - General Information, Specifications).
2. Remove the quarter panel.  
For additional information, refer to: Quarter Panel (501-30 Rear End Sheet Metal Repairs, Removal and Installation).

3.



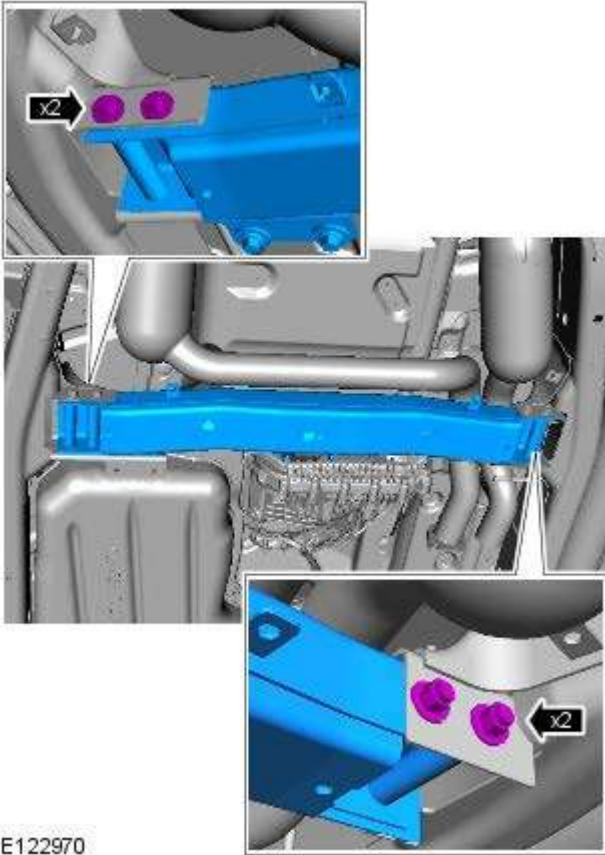
E65281

| Item | Description   |
|------|---------------|
| 1    | 6 plug welds. |
| 2    | 7 spot welds. |
| 3    | 5 spot welds. |
| 4    | 3 spot welds. |

4. For additional information:
  - Welding.  
For additional information, refer to: Body Repairs (501-25A Body Repairs - General Information, Description and Operation).
  - Corrosion protection.  
For additional information, refer to: Corrosion Protection (501-25B Body Repairs - Corrosion Protection, Description and Operation).
  - Tolerance checks.  
For additional information, refer to: Body and Frame (501-26 Body Repairs - Vehicle Specific Information and Tolerance Checks, Description and Operation).

## Installation

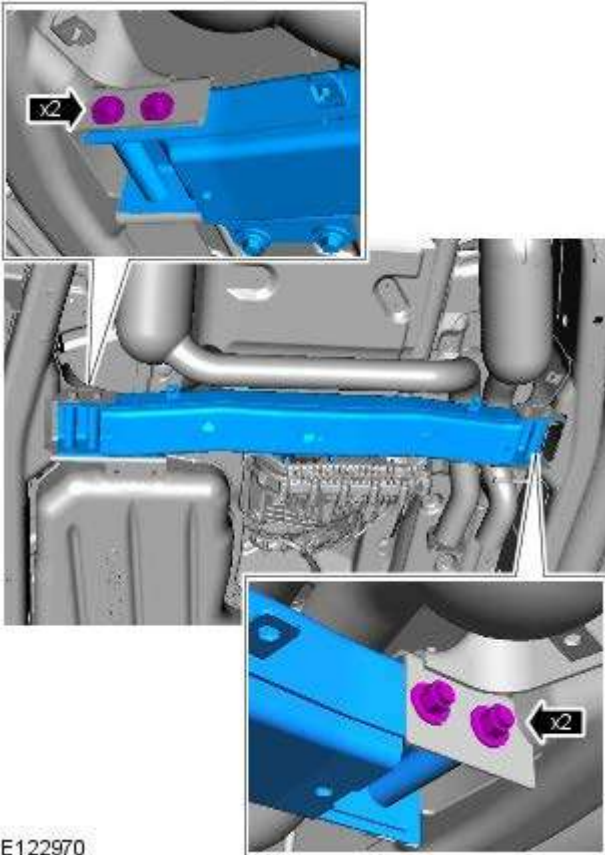
1. Install is the reversal of removal.



E122970

### Installation

1. TORQUE: 115 Nm



E122970

2. TORQUE: 175 Nm