

2012.0 RANGE ROVER (LM), 501-16

WIPERS AND WASHERS

WINDSHIELD WIPER MOTOR

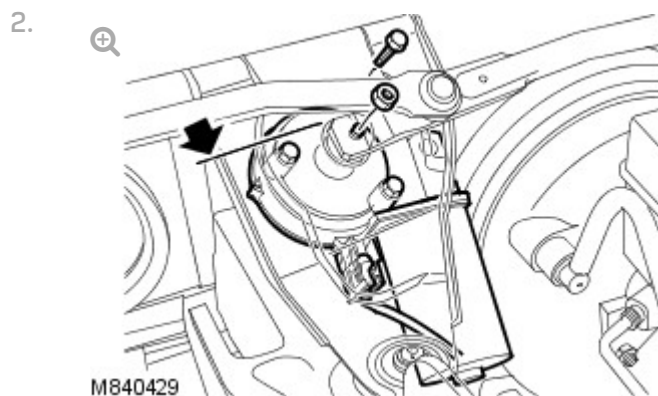
[G913463]

REMOVAL AND INSTALLATION

84.15.12	MOTOR - WIPER - RENEW	ALL DERIVATIVES	0.2	USED WITHINS	+
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REMOVAL

1. Disconnect the battery ground cable.
For additional information, refer to: Specifications (414-00, Specifications).
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Remove the windshield wiper motor.

- Mark the position of the windshield wiper motor linkage to aid assembly.
- Remove the windshield wiper motor to windshield wiper

motor linkage assembly nut.

- Release the wiper linkage assembly from the windshield wiper motor.
- Remove the 3 windshield wiper motor to support bracket bolts.
- Disconnect the electrical connector.

INSTALLATION

1. Install the windshield wiper motor.

- Tighten the bolts to 10 Nm (7 lb.ft).
- Connect the electrical connector.

2. Carry out the windshield wiper motor park operation.

- Connect the battery ground cable.
- Turn the ignition key to the ON position and make sure the windshield wiper motor is in the park position, turn the ignition key to the OFF position.
- Disconnect the battery ground cable.

3. Install the windshield wiper motor and linkage.

- Reposition the windshield wiper motor linkage to its original position.
- Install the windshield wiper motor to windshield wiper motor linkage assembly nut.
- Tighten the nut to 25 Nm (18 lb.ft).

4. Connect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

2012.0 RANGE ROVER (LM), 501-16

WIPERS AND WASHERS

WINDSHIELD WIPER PIVOT ARM (G913865)

REMOVAL AND INSTALLATION

84.15.02 ARM -
WIPER - ALL
EACH - DERIVATIVES 0.1
RENEW USED WITHINS +

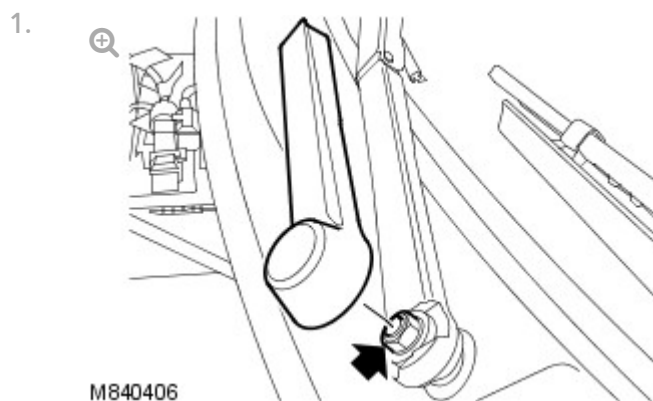
SPECIAL TOOL(S)



(LRT-84-001)

Aligner windshield wiper 100-055

REMOVAL



Remove the nut cover from the windshield wiper pivot arm and remove the nut.

2. Remove the windshield wiper pivot arm from the pivot shaft.

3.

NOTE:

Do not disassemble further if the component is removed for access only.

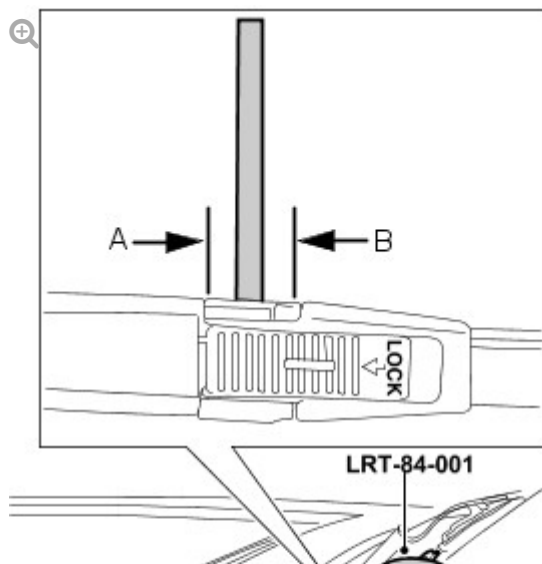
Release the windshield wiper pivot arm to windshield wiper blade locking clip.

4. Release the windshield wiper blade from the windshield wiper pivot arm.

INSTALLATION

1. Install the new windshield wiper blade to the windshield wiper pivot arm.
2. Push the windshield wiper blade fully home, to engage the windshield wiper pivot arm locking clip, check the windshield wiper blade for retention.
3. Install the windshield wiper pivot arm to the windshield wiper pivot shaft.
 - Install the nut but do not fully tighten at this stage.

4.

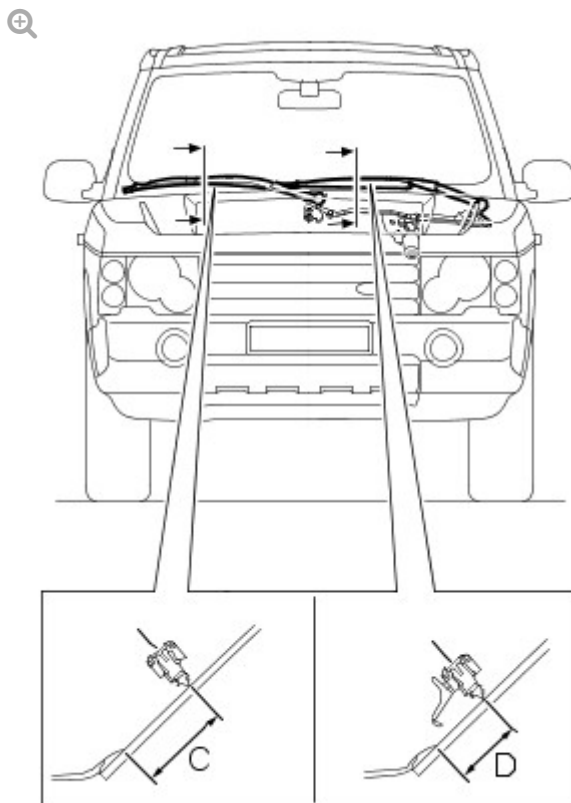




Align the special tool between points A and B on the windshield wiper pivot arm.

- Align the face of the windshield wiper pivot arm to the special tool angle of 86 degrees.

5.



M840435A

Retaining an 86 degrees angle, set the respective windshield wiper pivot arm to the dimension shown.

- Passenger side C = 58 mm (2.283 inches). Drivers side D = 40.5 mm (1.594 inches).
- The measurement must be taken from the plenum chamber glass seal, to the lip of the windshield wiper blade adjacent to the windshield wiper pivot arm fulcrum.

6. Tighten the windshield wiper pivot arm nut to 34 Nm (25 lb.ft).

7. Install the windshield wiper pivot arm nut cover.

8. Close the hood.

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WIPERS AND WASHERS

WIPER LINKAGE ASSEMBLY

[G913866]

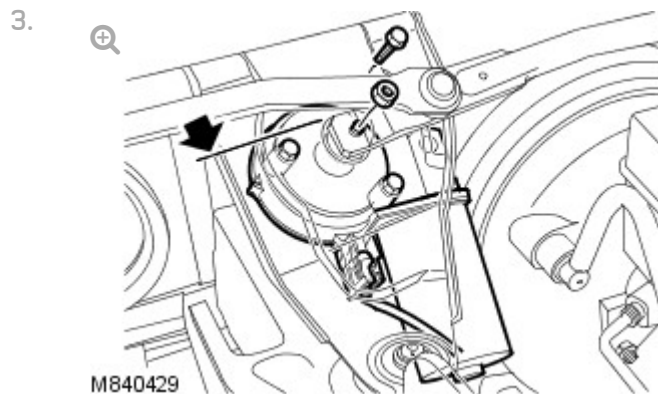
REMOVAL AND INSTALLATION

84.15.26	LINKAGE - WIPER - RENEW	ALL DERIVATIVES	0.7	USED WITHINS	+
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REMOVAL

1. Remove the cowl panel grille.
For additional information, refer to: Cowl Panel Grille (501-02, Removal and Installation).

-
2. Remove the plenum chamber.
For additional information, refer to: Plenum Chamber (412-01, Removal and Installation).
-



Disconnect the windshield wiper motor electrical connector.

4. Remove the windshield wiper assembly.
 - Remove the 5 bolts.
-

INSTALLATION

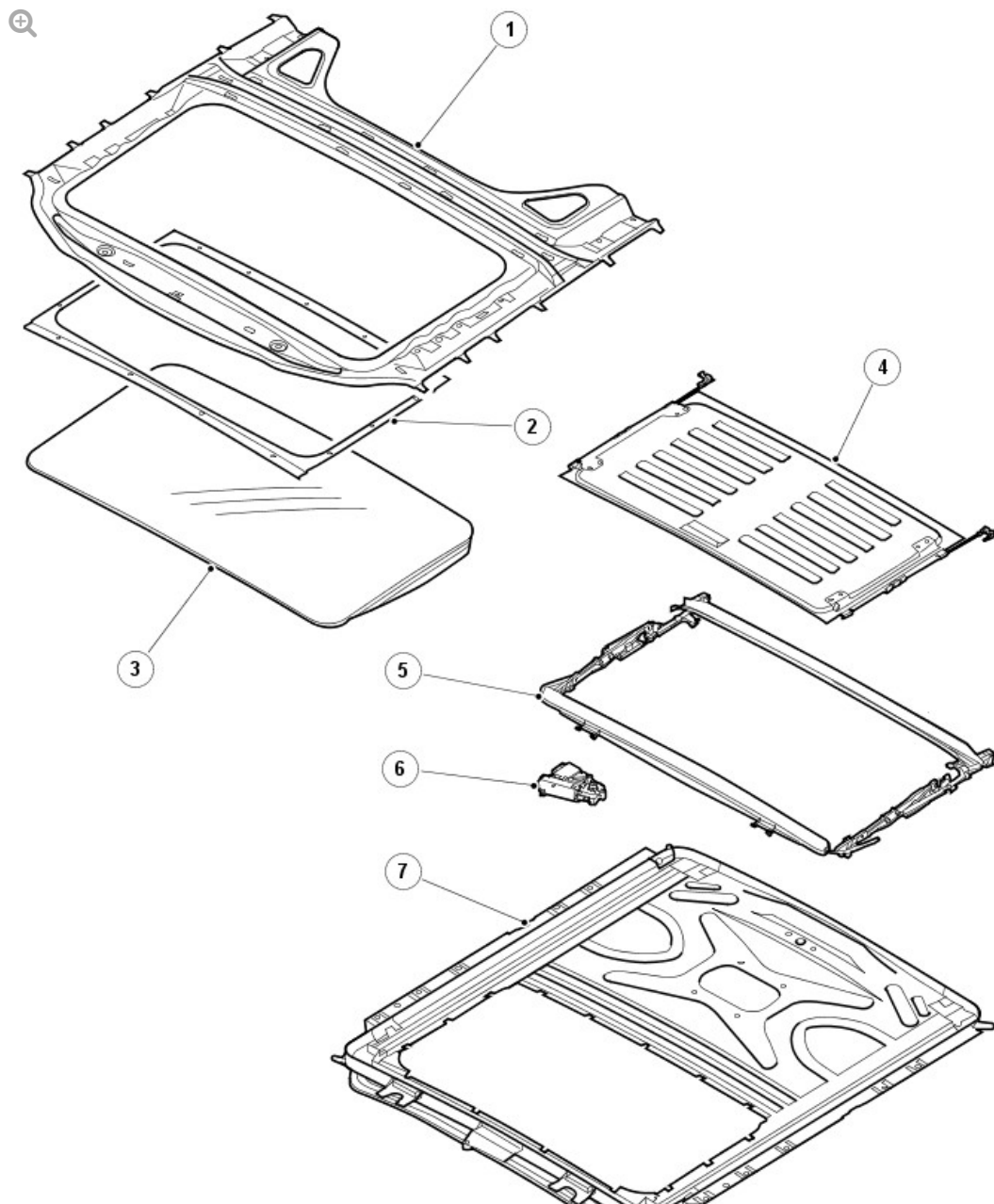
1. Install the windshield wiper motor assembly.
 - Tighten the bolts to 10 Nm (7 lb.ft).
 2. Connect the windshield wiper motor electrical connector.
 3. Install the plenum chamber.
For additional information, refer to: Plenum Chamber (412-01, Removal and Installation).
 4. Install the cowl panel grille.
For additional information, refer to: Cowl Panel Grille (501-02, Removal and Installation).
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2012.0 RANGE ROVER (LM), 501-17

ROOF OPENING PANEL

DESCRIPTION AND OPERATION

COMPONENT LOCATION





ITEM	DESCRIPTION
1	Closing panel
2	Clamp plate
3	Glass panel
4	Sunshade panel
5	Carriage
6	Motor and control module assembly
7	Frame

OVERVIEW

The roof opening panel is electrically operated by a three-way switch located on the forward interior light assembly. The roof opening panel drive unit moves the roof opening panel to the tilt, open or closed positions. The unit is actuated by the integrated roof opening panel control electronics.

The roof opening panel frame is bolted to mounting points on the roof panel. The frame, constructed from pressed steel, supports all the roof opening panel components.

A rubber gaiter is fitted between the sides of the glass panel and drive assembly. The gaiter reduces wind noise with the roof opening panel in the tilt position and conceals the drive linkage.

The roof opening panel drive unit is accessible by removing the motor access panel (integral with the forward interior light assembly). The drive unit is mounted ahead of the roof segment between the roof liner and lower frame section of the roof opening panel. It comprises a motor with add-on reduction gear (worm drive), two Hall-effect integral position sensors and integrated control circuit.

The worm drive drives a gear in a cast housing attached to the end of the motor. The gear has a small pinion gear attached to the outer part of its

spindle. The pinion engages with the spiral cables to form a rack and pinion drive. Rotation of the motor turns the pinion which in turn drives the cables in the required direction.

Two cables are attached to either side of the pinion. One end of each cable is attached to the guide. The opposite end is clamped in its position on the pinion by a riveted bracket. The cables run in metal tubes to the guides. As the roof opening panel is closed, the cables are pulled through the metal tubes. The displaced cable is guided into plastic tubes which protect the cable and prevent it snagging. The cables are made from rigid spring steel and therefore can push as well as pull the roof opening panel along the guides.

A sunshade is also located in the guides. When the roof opening panel is opened or tilted, the sunshade moves rearward. When the roof opening panel is opened, two brackets on the sunshade engage with the panel as it is retracted. The sunshade is then pulled back by the retracting panel. When the panel is closed, the sunshade remains retracted until pulled manually to its closed position.

Drain hoses are connected to the front and rear corners of the frame. The drain hoses are located inside the 'A' and 'D' pillars to allow water which has collected in the frame to escape. A one-way valve is fitted to the end of each drain hose to prevent the ingress of dirt and moisture.

CONTROL MODULE

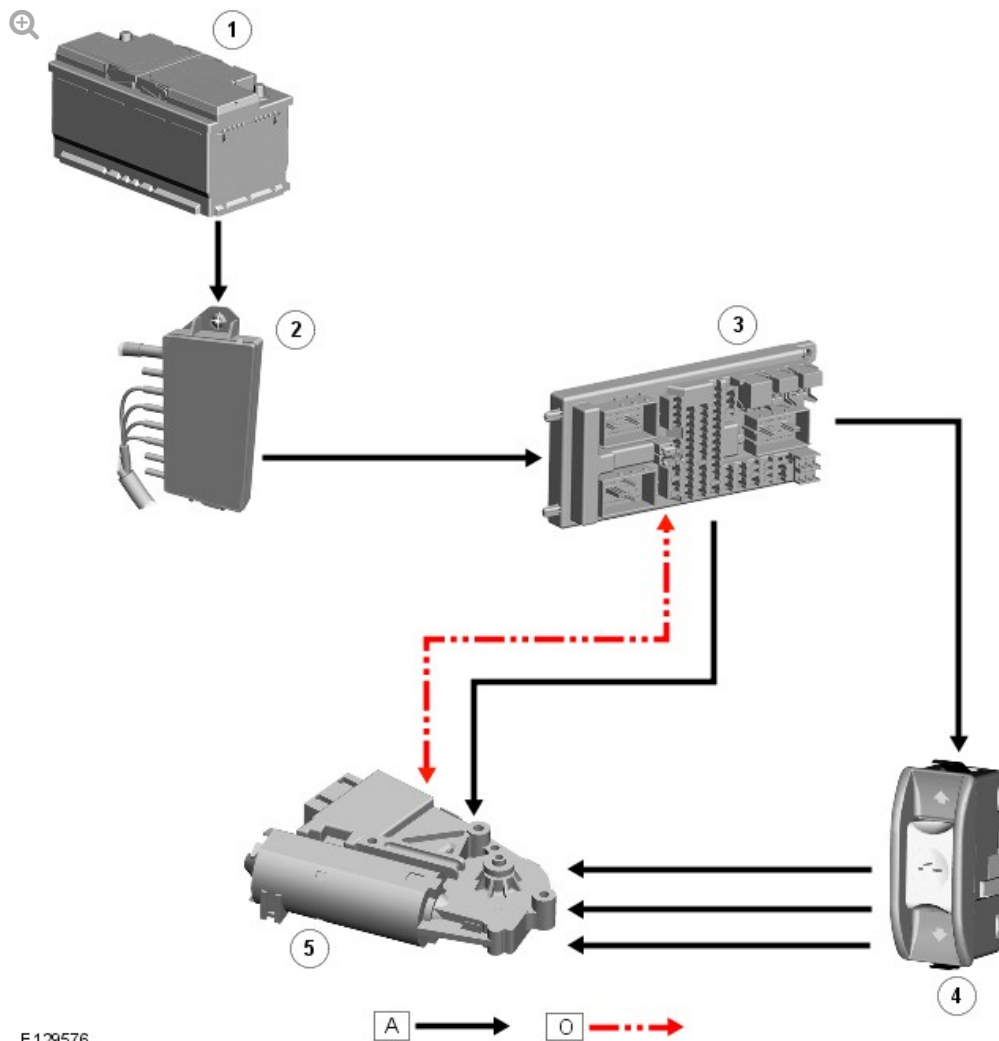
The roof opening panel control module is integral with the drive motor, and is mounted behind the headlining at the front of the vehicle. The control module connects to the vehicle wiring via a 13 pin electrical connector. The software contained within the control module is configured to meet individual national regulations.

The control module communicates to the CJB (central junction box) via the LIN (local interconnect network) bus.

CONTROL DIAGRAM

NOTE:

A = Hardwired; **O** = LIN bus



E129576

ITEM	DESCRIPTION
1	Battery
2	BJB (battery junction box)
3	CJB
4	Roof opening panel switch
5	Roof opening panel motor and control module

PRINCIPLES OF OPERATION

ANTI-TRAP

The anti-trap feature is configured to meet the specific requirements of individual national regulations. The system operates by monitoring the torque output of the sliding/tilting roof opening panel drive. It operates when the roof opening panel is closing and the opening is greater than 4 mm. To ensure that the roof opening panel fully closes it is disabled for the last 4 mm of travel.

If activated, the anti-trap feature returns the roof opening panel to the point at which the close selection was initially made.

The control module disables the anti-trap feature when emergency closing (panic mode) is selected.

SLEEP MODES

To reduce the current consumption of the vehicle, the roof opening panel control module switches to a power saving mode after receiving a message from the CJB via the LIN bus. In this condition manual operation of the roof opening panel will result in the loss of its absolute position. If this occurs, the roof opening panel will require re-initializing.

The power saving mode is exited on receipt of a message from the CJB via the LIN bus.

SHUTDOWN

During the engine cranking process, the CJB requests the roof opening panel control module to inhibit roof opening panel operation via the LIN bus. Any requested movement is halted until the ignition is returned to ignition on (mode 6).

If the voltage supplied to the roof opening panel control module drops below 9.5 V, any one-touch operation currently in progress will be terminated and no new roof opening panel movement will be initiated.

INITIALIZATION

Initializing the roof opening panel allows the control module to learn the end positions of the motors travel. Hall sensors in the motor provide pulses for motor spindle rotation. The control module counts the pulses and determines where the panel is by memorizing the stored pulses.

If the system is not initialized, the roof opening panel will only operate in the tilt up and slide closed positions.

The roof opening panel initialization procedure is as follows:

- Start the engine
- Ensure the blind is fully closed
- Press and hold the roof opening panel tilt switch, when the roof is in the tilt position release the switch
- Press the tilt switch again and hold for 20 seconds
- The roof and blind will then open, ensure the switch is kept pressed until the roof has completed its opening and closing cycle.
- Once the roof opening and closing cycle is complete the roof opening panel has been initialized.

DIAGNOSTICS

The roof opening panel control module has a built in test function to allow self-checking and self-diagnosis.

Exchange of data with the Land Rover approved diagnostic system takes place via the CJB and the LIN bus. It can be used to identify 3 possible faults.

- Mechanical stiffness (fault in the roof opening panel unit)
- Implausible input signals (control fault)
- Electronic fault.

2012.0 RANGE ROVER (LM), 501-17

ROOF OPENING PANEL

DIAGNOSIS AND TESTING

PRINCIPLE OF OPERATION

For a detailed description of the roof opening panel system and operation, refer to the relevant Description and Operation section of the workshop manual. REFER to: Roof Opening Panel (501-17 Roof Opening Panel, 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.

1. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection

MECHANICAL	ELECTRICAL
<ul style="list-style-type: none">▪ Glass panel assembly▪ Glass panel seal▪ Frame assembly▪ Sunblind▪ Deflector▪ Access panel▪ Roof opening panel cables▪ Drain tube(s)	<ul style="list-style-type: none">▪ Fuses▪ Battery Junction Box (BJB)▪ Central Junction Box (CJB)▪ Wiring harness▪ Loose or corroded connector(s)▪ Roof opening panel motor and control module▪ Roof opening panel switch

1. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

1. 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 DTC Index.

SYMPTOM CHART

SYMPTOM	POSSIBLE CAUSES	ACTION
Roof opening panel inoperative	<ul style="list-style-type: none">▪ Fuse(s) blown▪ Circuit fault▪ Switch fault▪ Motor fault	Check the fuse(s). Check the roof opening panel circuits. Check the switch and motor function. Refer to the electrical guides.
Roof opening panel sticking	<ul style="list-style-type: none">▪ Debris in the channels/guides▪ Cable(s) sticking/damaged▪ Roof opening panel not correctly aligned▪ Switch fault▪ Motor fault	Check for general debris. Inspect, clean and lubricate the cable(s) and guides. Check the roof opening panel alignment. Refer to the relevant section of the workshop manual. Check the switch and motor function. Refer to the electrical guides.
Roof opening panel juddering	<ul style="list-style-type: none">▪ Debris in the channels/guides▪ Cable(s) sticking/damaged▪ Roof opening panel not correctly aligned▪ Motor fault	Check for general debris. Inspect, clean and lubricate the cable(s) and guides. Check the roof opening panel alignment. Refer to the relevant section of the workshop manual. Check the motor function.
Water ingress from roof opening panel	<ul style="list-style-type: none">▪ Debris in the channels/guides▪ Drain tube(s) blocked	Check for general debris and blocked drain tube(s). Inspect, clean and lubricate the cable(s) and guides. Check the glass panel seal. Check the roof opening panel alignment. Refer to the relevant section of the workshop manual.

	<ul style="list-style-type: none"> ▪ Damage to the glass panel seal ▪ Roof opening panel not correctly aligned 	
Wind noise	<ul style="list-style-type: none"> ▪ Damage to the glass panel seal ▪ Cable(s) sticking/damaged ▪ Roof opening panel not correctly aligned 	Check the glass panel seal. Inspect, clean and lubricate the cable(s) and guides. Check the roof opening panel alignment. Refer to the relevant section of the workshop manual.

DTC INDEX

For a list of Diagnostic Trouble Codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00. REFER to: Diagnostic Trouble Code (DTC) Index - DTC: Module Name: Central Junction Box (100-00, Description and Operation).

2012.0 RANGE ROVER (LM), 501-17

ROOF OPENING PANEL

ROOF OPENING PANEL ALIGNMENT (G928367)

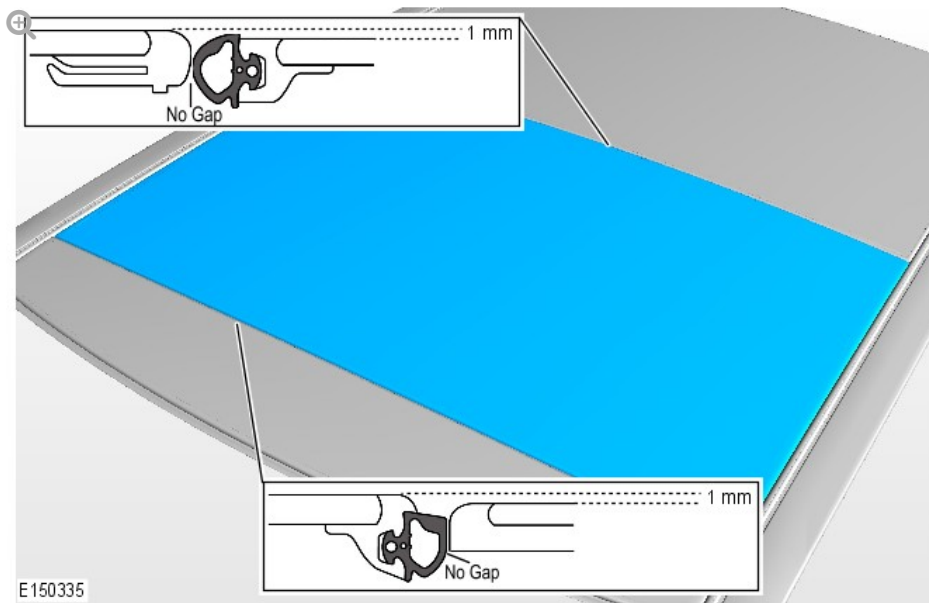
GENERAL PROCEDURES

76.84.82	ROOF OPENING PANEL - ALIGN TO ROOF PANEL AND ADJUST	ALL DERIVATIVES	0.2	USED WITHINS	+
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1.

NOTES:

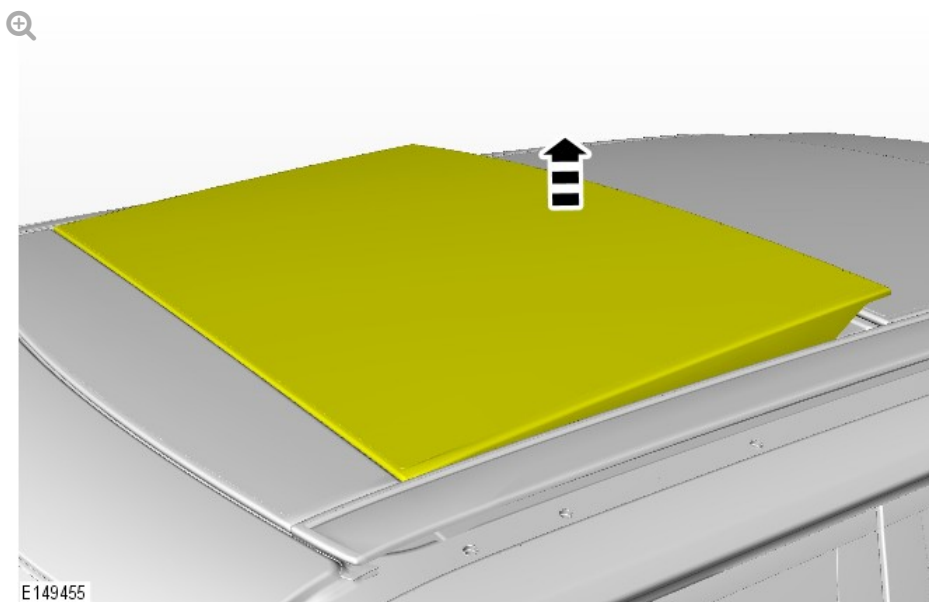
- The roof opening panel must be closed
- With the roof opening panel closed, check the alignment of the glass to the roof panel. The glass should be central in its aperture. Profile of rear glass panel to body: front edge, set flush or up to 1.0 mm (0.040") low; rear edge, set flush or up to 1.0 mm (0.040") high.



Check the alignment of the roof opening panel.

- The roof opening panel should be central in the roof opening.

2.



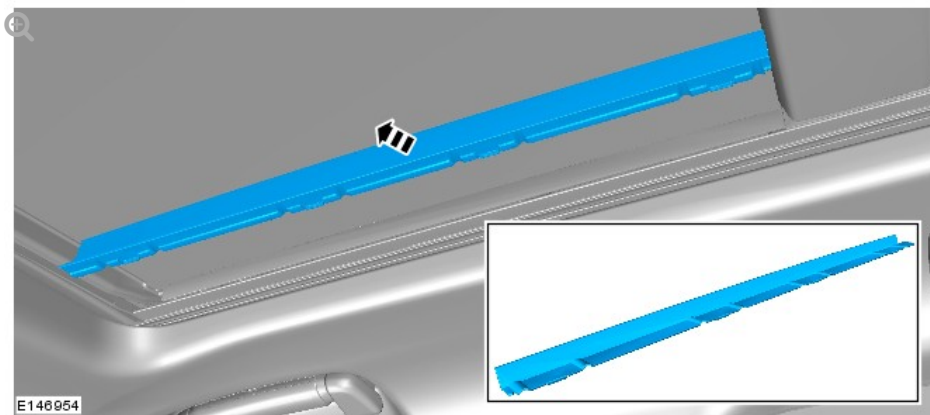
Raise the roof opening panel glass.

- Open the roof opening panel shield.

3.

NOTES:

- The step must be carried out on both sides.
- RH shown LH similar.

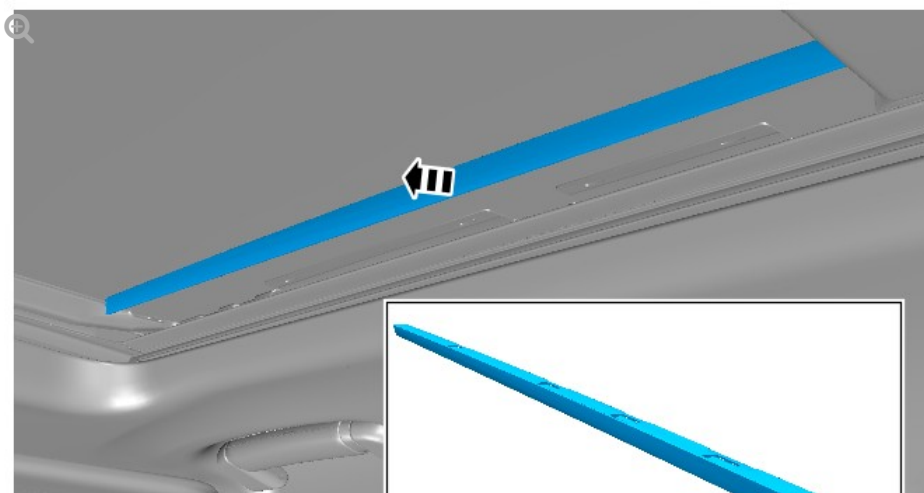


Release the upper edges of the RH and LH roof opening panel side trims.

4.

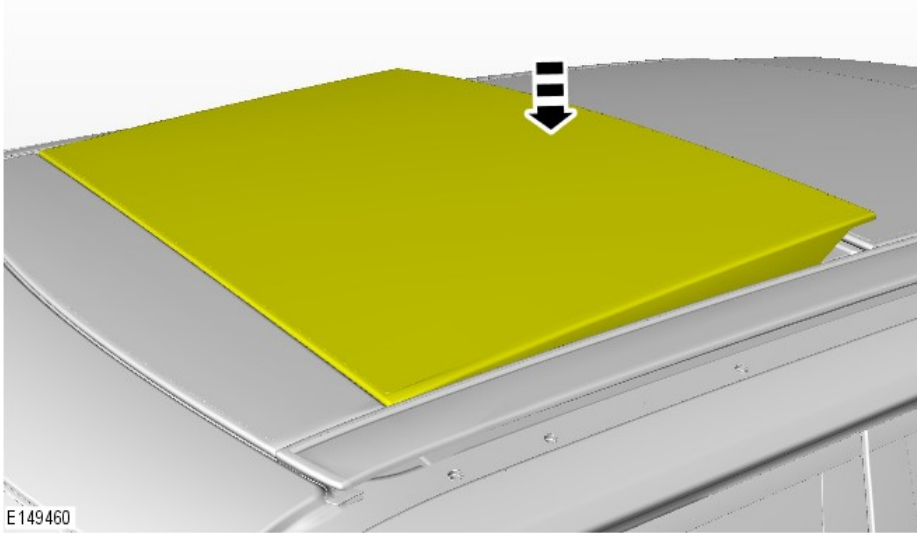
NOTES:

- The step must be carried out on both sides.
- RH shown LH similar.





5.

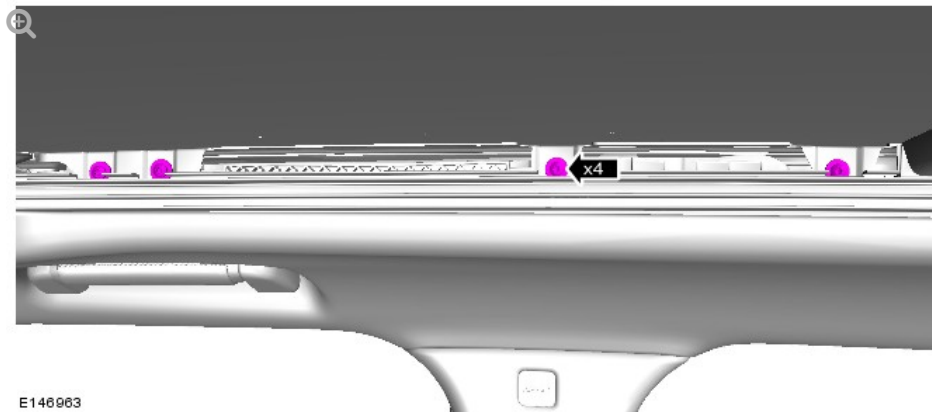


Close the roof opening panel.

6.

NOTE:

RH shown LH similar.



Loosen the 4 screws.

7.

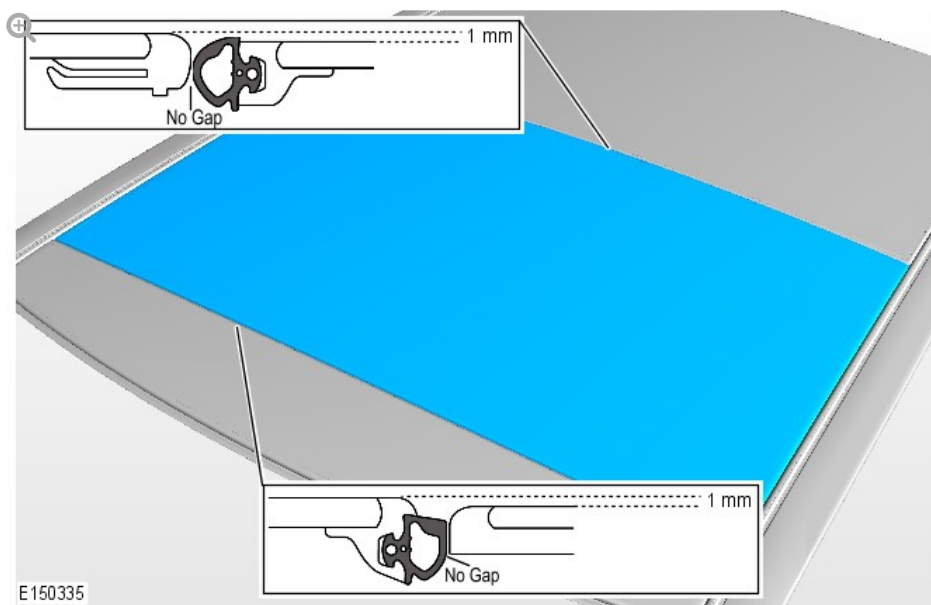
CAUTION:



Make sure the glass laminate is not damaged during remove and installation.

NOTE:

With the roof opening panel closed, check the alignment of the glass to the roof panel. The glass should be central in its aperture. Profile of rear glass panel to body: front edge, set flush or up to 1.0 mm (0.040") low; rear edge, set flush or up to 1.0 mm (0.040") high.

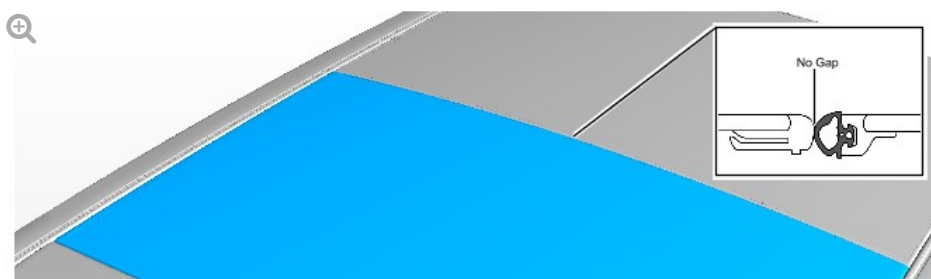


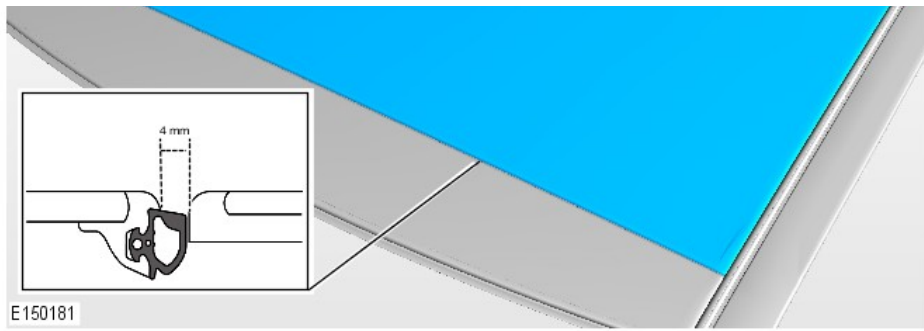
Align the roof opening panel glass.

8.

NOTE:

Apply force to the top of the glass panel to aid alignment.





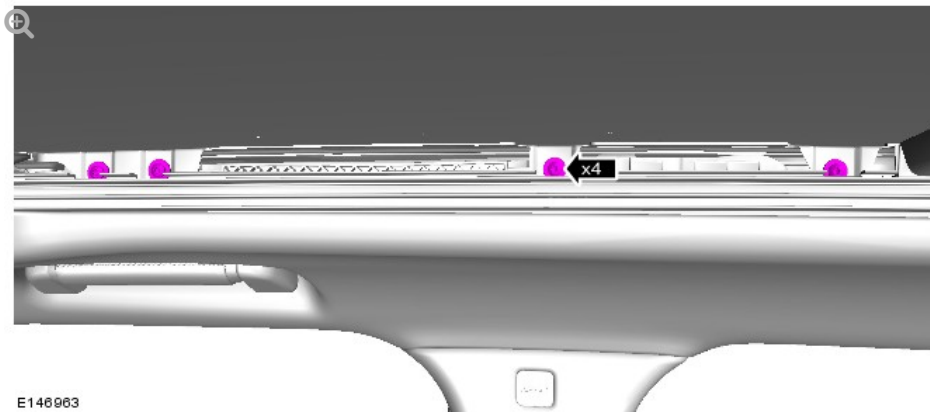
Align the roof opening panel glass.

- Tighten the screws to 5 Nm.

9.

NOTES:

- RH shown LH similar.
- This step requires the aid of another technician.



With assistance position the moving panel and tighten the fixings.

10.

NOTES:

- The step must be carried out on both sides.
- RH shown LH similar.



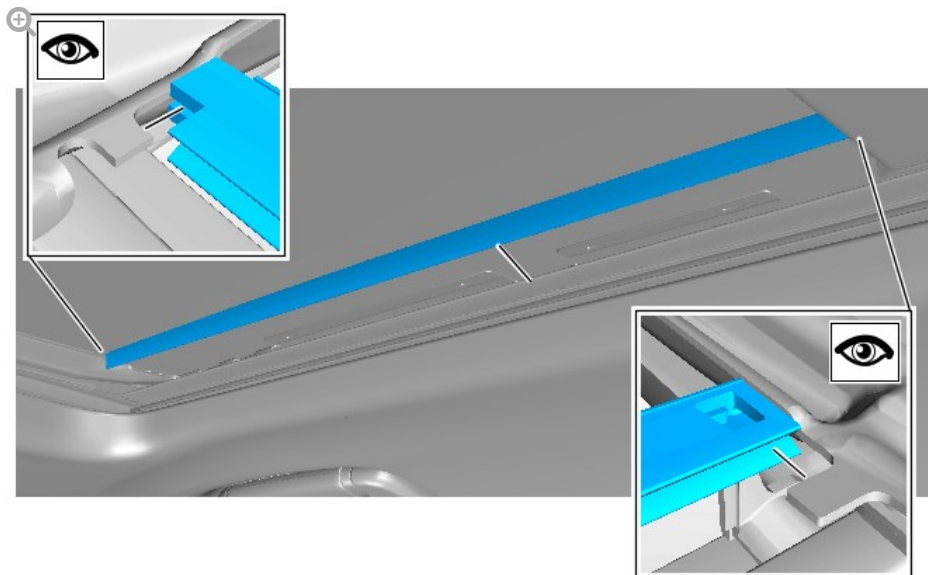


Secure the upper edges of the RH and LH roof opening panel side trims.

11.

NOTES:

- The step must be carried out on both sides.
- RH shown LH similar.



E150764

2012.0 RANGE ROVER (LM), 501-17

ROOF OPENING PANEL

AIR DEFLECTOR (G1763538)

REMOVAL AND INSTALLATION

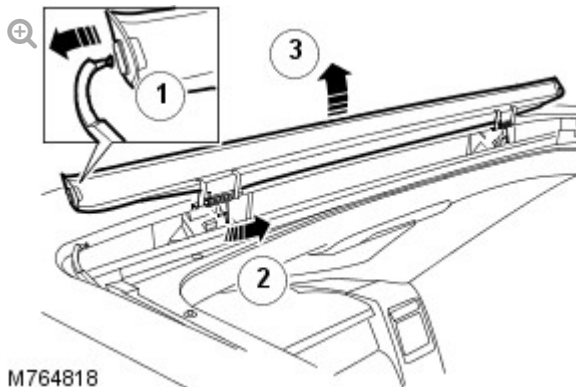
86.25.07	SWITCH - FRONT DOOR - RENEW	ALL DERIVATIVES	0.4	USED WITHINS	+
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REMOVAL

1.

NOTE:

Motor the roof opening panel to the fully rearwards position.



Remove the air deflector.

- Release the LH and RH operating rods from the air deflector.
- Release the LH and RH air deflector hinges from the housing.

INSTALLATION

1. Install the air deflector.
 - Tension both springs.
 - Secure the LH and RH air deflector hinges in the housing.
 - Secure the LH and RH operating rods in the air deflector.

2012.0 RANGE ROVER (LM), 501-17

ROOF OPENING PANEL

ROOF OPENING PANEL

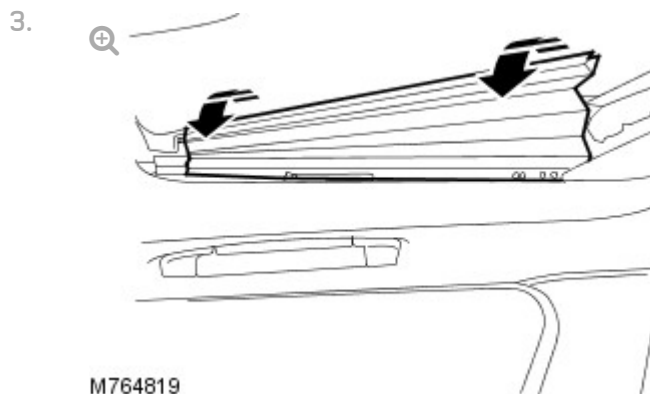
GLASS (0000000)

REMOVAL AND INSTALLATION

76.84.03	GLASS PANEL - ROOF OPENING - FRONT - RENEW	ALL DERIVATIVES	0.4	USED WITHINS	+
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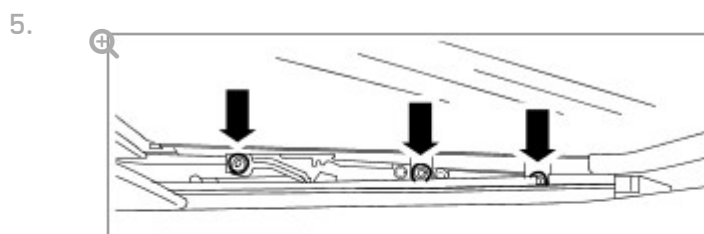
REMOVAL

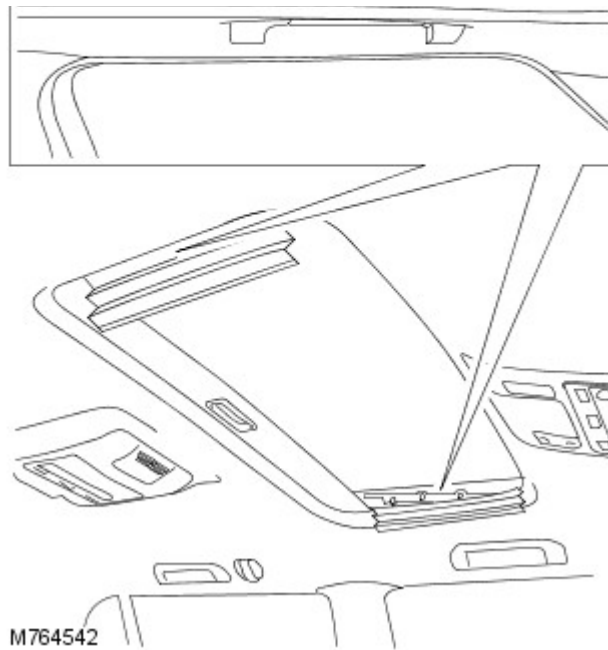
1. Open the roof opening panel shield.
2. Raise the roof opening panel glass.



Release the upper edges of the RH and LH roof opening panel side trims.

4. Remove the RH and LH roof opening panel side trims.
 - Release the front of the RH and LH roof opening panel side trims and slide forwards.





Remove the roof opening panel glass.

- Remove the 6 screws.

INSTALLATION

1. Install the roof opening panel glass.
 - Tighten the screws to 6 Nm (4 lb.ft).
2. Align the roof opening panel glass to the roof.

For additional information, refer to: Roof Opening Panel Alignment (501-17, General Procedures).
3. Install the RH and LH roof opening panel side trims, starting with the rear ends.
4. Secure the upper edges of the RH and LH roof opening panel side trims.

2012.0 RANGE ROVER (LM), 501-17

ROOF OPENING PANEL

LIFTER ARMS (G928691)

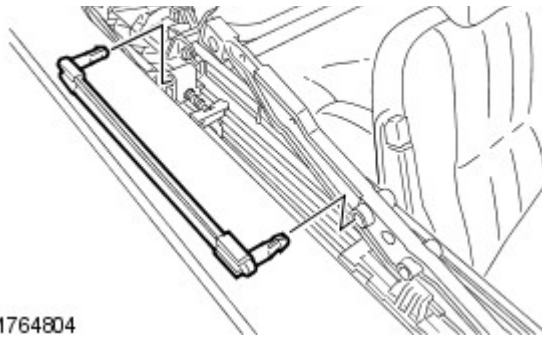
REMOVAL AND INSTALLATION

REMOVAL

1. Remove the roof opening panel glass.
For additional information, refer to: Roof Opening Panel Glass (501-17, Removal and Installation).
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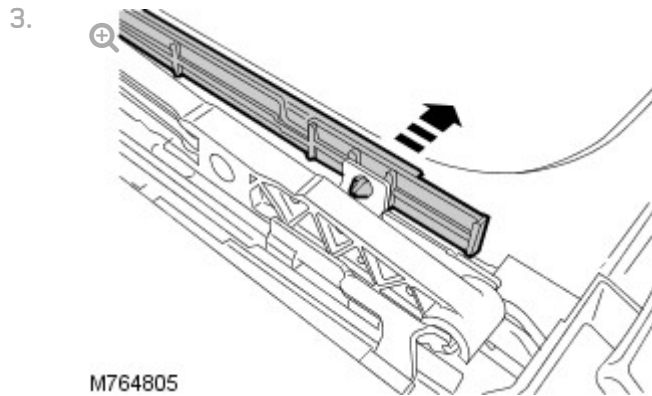
2.





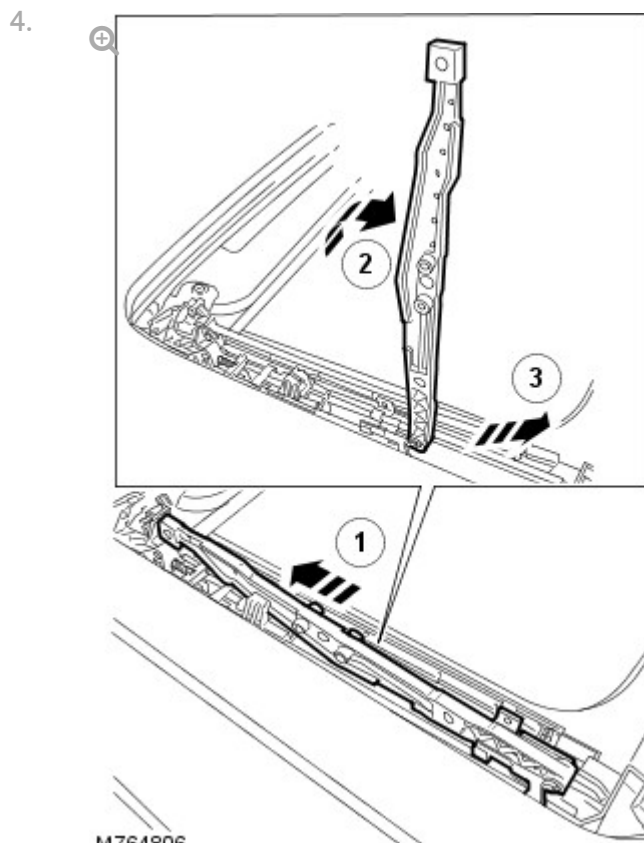
M764804

Release the spacing rod from the lifter arm.



M764805

Remove the roof opening panel side trim.



M764806

Remove the lifter arm.

- Slide the lifter arm backwards.
- Raise the front of the lifter arm.

INSTALLATION

1. Install the lifter arm.
 - Lower the front of the lifter arm.
 - Slide the lifter arm forwards.
2. Install the roof opening panel side trim.
3. Secure the spacing rod to lifter arm.
4. Install the roof opening panel glass.

For additional information, refer to: Roof Opening Panel Glass (501-17, Removal and Installation).

2012.0 RANGE ROVER (LM), 501-17

ROOF OPENING PANEL

ROOF OPENING PANEL [G928692]

REMOVAL AND INSTALLATION

76.84.01	ROOF OPENING PANEL - COMPLETE - FRONT - RENEW	ALL DERIVATIVES	3.5	USED WITHINS	+
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REMOVAL

WARNINGS:

- Persons working on the supplemental restraint system (SRS) must be fully trained and have been issued with the safety guidelines.
- Allow a period of 10 minutes to elapse after disconnecting the battery before undertaking any work on the SRS.
- The SRS electrical connectors are unique. DO NOT force, or attempt to connect electrical connectors to the wrong sockets.
- The correct procedures must always be used when working on SRS components.
- It is imperative that before any work is undertaken on the SRS

system, the appropriate information is read thoroughly.

- Always disconnect both battery cables before beginning work on the SRS system. Disconnect the ground cable first. Never reverse connect the battery.
- Take extra care when handling SRS components.
- Make sure the roof opening panel is in the closed position and the motor in park position before removing / installing roof opening panel motor.
- Make sure the roof opening panel is in the closed position and the motor in park position before removing or installing roof opening panel motor.

-
1. Disconnect the battery ground cable.

For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).

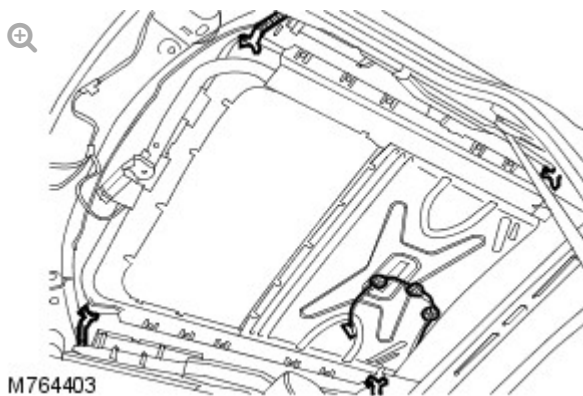
-
2. Make the air bag supplemental restraint system (SRS) safe.

For additional information, refer to: [Standard Workshop Practices](#) (100-00 General Information, Description and Operation).

-
3. Remove the headliner.

For additional information, refer to: [Headliner](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).

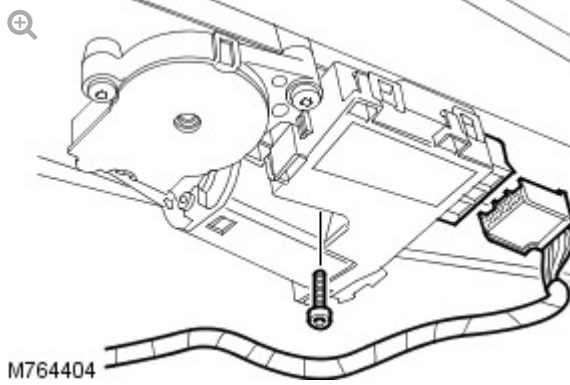
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- 4.



Release the roof opening panel drain tubes.

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5. Release the wiring harness from the roof opening panel.

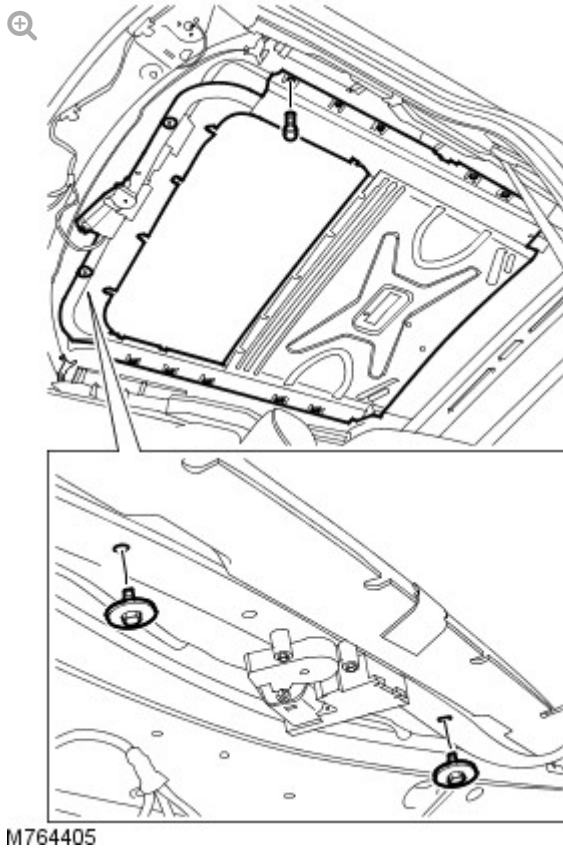
6.



Disconnect the roof opening panel motor electrical connector.

7. Remove the screw from the roof opening panel motor and the roof opening panel.

8.



Remove the 2 bolts from the front of the roof opening panel.

- Remove the 2 washers.

9. With assistance, remove the roof opening panel.

- Remove the 10 bolts.

INSTALLATION

1. Clean the roof opening panel and mounting surface.
2. With assistance, install the roof opening panel.
 - Install the bolts and tighten to 10 Nm (7 lb.ft).
3. Install the screw to the roof opening panel motor and the roof opening panel.
 - Tighten to 6 Nm (4 lb.ft).
4. Connect the electrical connector to the roof opening panel motor.
5. Secure the wiring harness to the roof opening panel.

6. **NOTE:**

Make sure the roof opening panel drain tubes are free from any debris.

Secure the roof opening panel drain tubes.

7. Install the headliner.

For additional information, refer to: [Headliner](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).
8. Connect the battery ground cable.

For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).

2012.0 RANGE ROVER (LM), 501-17

ROOF OPENING PANEL

ROOF OPENING PANEL

ROOF OPENING PANEL MOTOR (G928693)

REMOVAL AND INSTALLATION

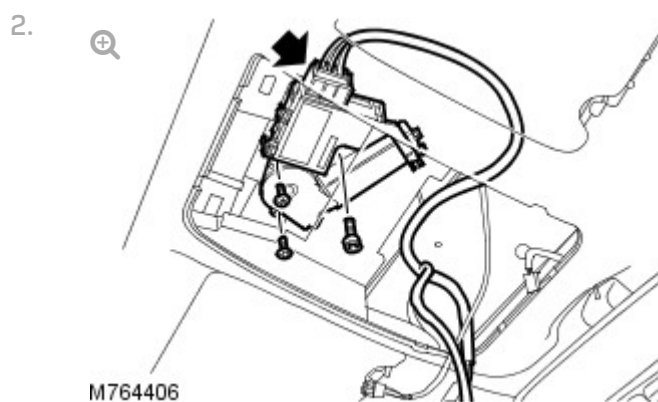
76.84.07	MOTOR - ROOF OPENING PANEL - FRONT - RENEW	ALL DERIVATIVES	0.2	USED WITHINS	+
----------	---	--------------------	-----	-----------------	---

REMOVAL

WARNING:

Make sure the roof opening panel is in the closed position and the motor in park position before removing or installing roof opening panel motor.

1. Remove the overhead console.
For additional information, refer to: [Overhead Console \(501-12 Instrument Panel and Console, Removal and Installation\)](#).



Remove the roof opening panel motor.

- Disconnect the roof opening panel motor electrical connector.

- Remove the 3 screws.

INSTALLATION

1. Install the roof opening panel motor.
 - Tighten the bolts to 5 Nm (4 lb.ft).
 - Tighten the bolt to 10 Nm (7 lb.ft).
 - Connect the roof opening panel motor electrical connector.
2. Install the overhead console.

For additional information, refer to: [Overhead Console](#) (501-12 Instrument Panel and Console, Removal and Installation).
3. If the roof opening panel motor is to be replaced, the one touch and anti-trap function will become inoperative. Close the roof opening panel and continue to hold the switch for a further 20 seconds to allow the sunroof to complete a full cycle. This will complete the roof opening panel calibration routine and reset these functions.

2012.0 RANGE ROVER (LM), 501-17

ROOF OPENING PANEL

ROOF OPENING PANEL SHIELD (G928369)

REMOVAL AND INSTALLATION

REMOVAL

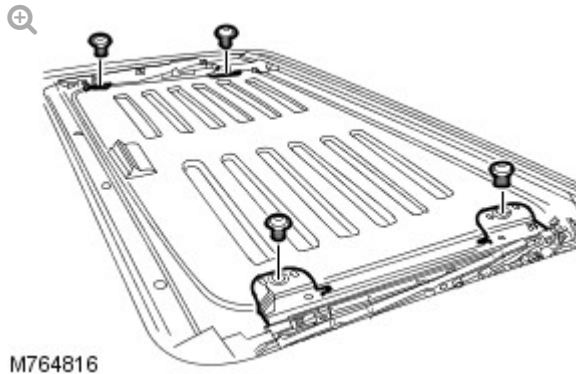
1. Remove the roof opening panel glass.

For additional information, refer to: Roof Opening Panel Glass (501-

2.

NOTE:

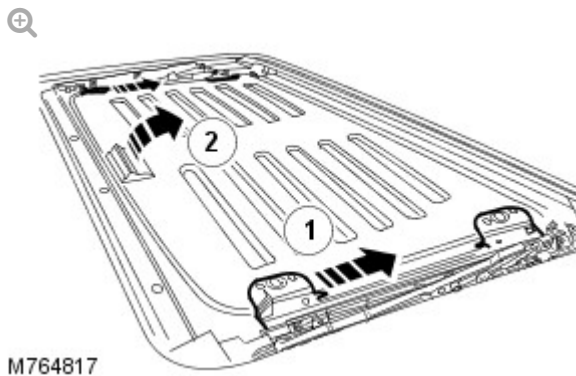
Make sure the roof opening panel is in the fully closed position.



Release the roof opening panel shield.

- Remove the 4 bolts.

3.



Remove the roof opening panel shield.

- Reposition the roof opening panel shield brackets.

INSTALLATION

1. Install the roof opening panel shield.

- Align the roof opening panel shield brackets.
- Tighten the bolts.

-
2. Install the roof opening panel glass.

For additional information, refer to: Roof Opening Panel Glass (501-17, Removal and Installation).

2012.0 RANGE ROVER (LM), 501-19

BUMPERS

SPECIFICATIONS

Torque Specifications

DESCRIPTION	NM	LB-FT
Front bumper nuts	45	33
Horn assembly bolt	20	15

2012.0 RANGE ROVER (LM), 501-19

BUMPERS

FRONT BUMPER (G1226524)

REMOVAL AND INSTALLATION

76.22.49	BUMPER ARMATURE - FRONT - RENEW	ALL DERIVATIVES	1.6	USED WITHINS	+
----------	--	--------------------	-----	-----------------	---

REMOVAL

NOTE:

Removal steps in this procedure may contain installation details.



All vehicles

1.

WARNING:

Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

2. Refer to: Front Bumper Cover (501-19, Removal and Installation).



Vehicles built 10MY upto 11MY

1.



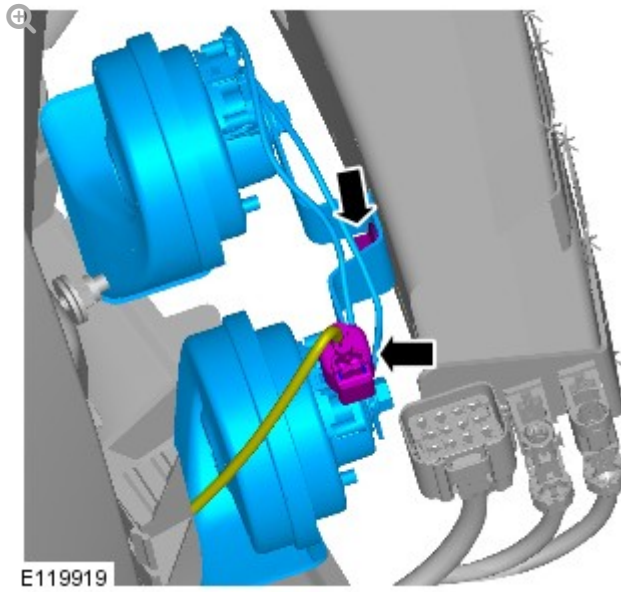
2.



Torque: 5 Nm

i	All vehicles
----------	--------------

1.



Torque: 20 Nm

i	Vehicles built 11MY onwards
----------	-----------------------------

1.



2.



3.



Torque: 9 Nm

i	All vehicles
----------	--------------

1.



Torque: 2.5 Nm

2.



3.



4.

WARNING:

Make sure that new nuts are installed.

NOTE:

With assistance remove the component.



Torque: 45 Nm

INSTALLATION

1. To install, reverse the removal procedure.

2012.0 RANGE ROVER (LM), 501-19

BUMPERS

FRONT BUMPER COVER (G1225043)

REMOVAL AND INSTALLATION

76.22.72	BUMPER VALANCE - FRONT - RENEW	ALL DERIVATIVES	1.9	USED WITHINS	+
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REMOVAL

CAUTION:

Protect the surrounding paintwork to avoid damage.

NOTES:

- Removal steps in this procedure may contain installation details.
- The ignition must be switched off.

1. Disconnect the battery ground cable.
Refer to: Specifications (414-00, Specifications).
2. Refer to: Radiator Grille (501-08, Removal and Installation).

3.

WARNING:

Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

4. Remove both the front wheels and tires.

5.



6.

NOTES:

- The procedure must be carried out on both sides.
- RH illustration shown, LH is similar.



Torque: 1.5 Nm

7.

NOTES:

- The procedure must be carried out on both sides.
- RH illustration shown, LH is similar.



Torque: 1.5 Nm

8.



Torque: 4 Nm

9.



Torque: 4 Nm

10.

CAUTION:

Take extra care not to damage the wiring harnesses.



11.

CAUTION:

Make sure damage does not occur to bumper cover. Failure to follow this instruction may result in damage to the vehicle.

NOTE:

With assistance remove the component.



12.

CAUTIONS:

- Protect the surrounding paintwork to avoid damage.
- Take extra care not to damage the clips.

NOTES:

- Do not disassemble further if the component is removed for access only.
- The procedure must be carried out on both sides.



13.

NOTES:

- Support as necessary.
- The procedure must be carried out on both sides.



Torque: 2.5 Nm

14.

NOTES:

- Support as necessary.

- The procedure must be carried out on both sides.



15.

NOTE:

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



Torque: 1 Nm

16.

NOTE:

The procedure must be carried out on both sides.



Torque: 2.5 Nm

17.

NOTE:

The procedure must be carried out on both sides.



18.

NOTE:

The procedure must be carried out on both sides.



19.



20.



INSTALLATION

1. To install, reverse the removal procedure.

2012.0 RANGE ROVER (LM), 501-19

BUMPERS


FRONT BUMPER LOWER COVER (G1226542)

REMOVAL AND INSTALLATION

REMOVAL

NOTE:

Removal steps in this procedure may contain installation details.

1. 

INSTALLATION

1. To install, reverse the removal procedure.

BUMPERS

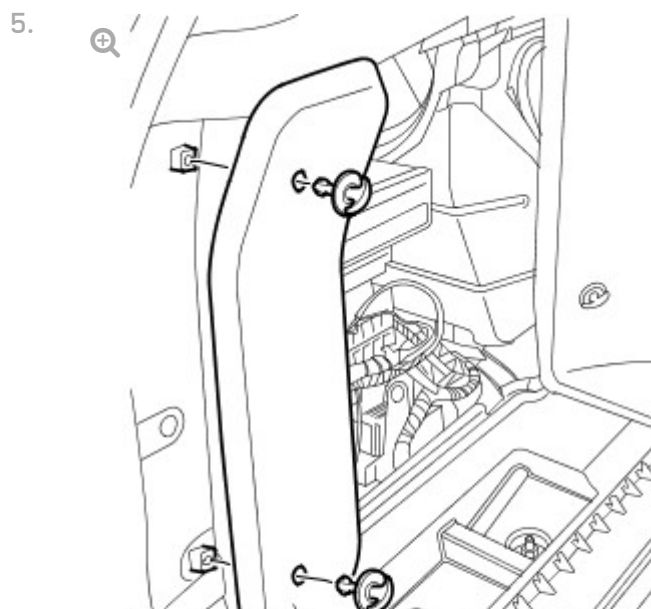
REAR BUMPER (G927835)

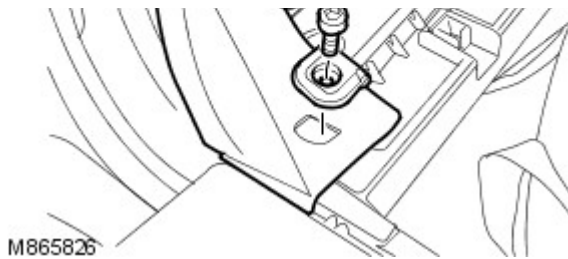
REMOVAL AND INSTALLATION

76.22.52	BUMPER ARMATURE - REAR - RENEW	ALL DERIVATIVES	1.1	USED WITHINS	+
----------	---	--------------------	-----	-----------------	---

REMOVAL

1. Open the tailgate and fold back the loadspace cargo cover.
2. Remove the rear bumper cover assembly.
For additional information, refer to: Rear Bumper Cover (501-19, Removal and Installation).
3. Raise and support the spare tire loadspace trim panel.
4. Remove the access panel from the LH and RH loadspace trim panels.





Remove the LH and RH luggage tie down rings.

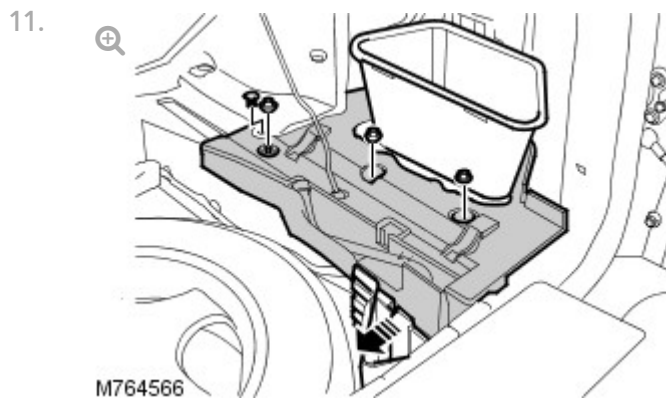
-
6. Remove the LH and RH finisher trim panels.
 - Release the 4 turn fasteners.

 7. Remove the loadspace trim panel, floor stowage compartment LH and RH access covers.

 8. Remove the turn fastener and trim clip securing the LH and RH front loadspace trim panels.

 9. Remove the warning triangle.

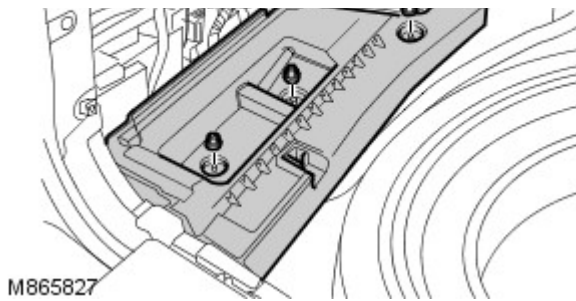
 10. Release the clip and remove the wheel chock and tool roll.



Remove the RH floor stowage compartment.

- Remove the RH floor stowage compartment plastic liner.
- Release the 2 clips.
- Remove the 3 nuts.





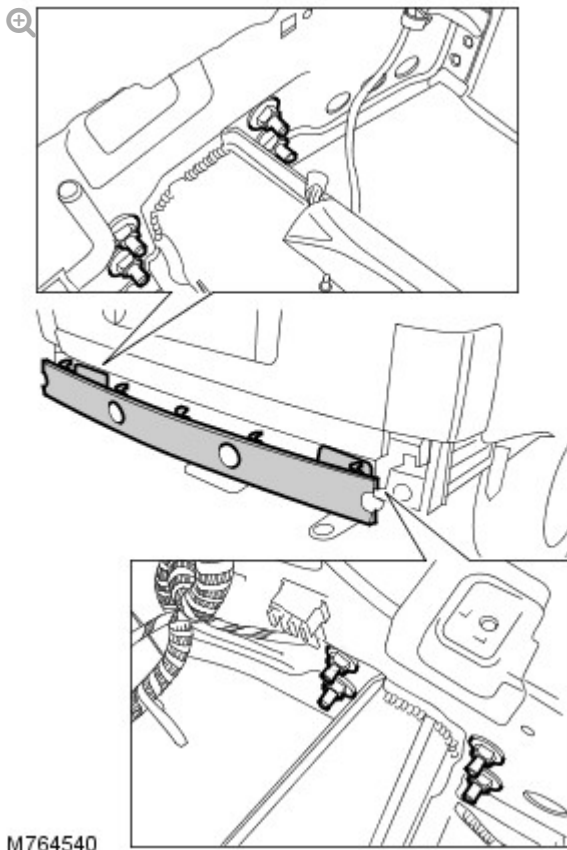
Remove the LH floor stowage compartment.

- Remove the 3 nuts.

13.

NOTE:

Do not disassemble further if the component is removed for access only.



Remove the rear bumper.

- Remove the 8 nuts.

14. Release the 8 clips from the rear bumper.

INSTALLATION

1. Install the 8 clips to the rear bumper.

2. Install the rear bumper.
 - Tighten the nuts to 45 Nm (33 lb.ft).

3. Install the LH floor stowage compartment.
 - Install the nuts.

4. Install the RH floor stowage compartment.
 - Install the nuts.
 - Install the clips.
 - Install the RH floor stowage compartment plastic liner.

5. Install the wheel chock and tool roll.
 - Secure with the clip.

6. Install the warning triangle.

7. Install the turn fastener and trim clip to the LH and RH front loadspace trim panels.

8. Install the loadspace trim panel, floor stowage compartment LH and RH access covers.

9. Install the LH and RH finisher trim panels.
 - Secure the turn fasteners.

10. Install the luggage tie down rings.
 - Tighten the bolts to 25 Nm (18 lb.ft).

11. Install the access panel to the LH and RH loadspace trim panels.

12. Lower and secure the spare tire loadspace trim panel.

13. Install the rear bumper cover assembly.

For additional information, refer to: Rear Bumper Cover (501-19, Removal and Installation).

14. Close the tailgate and liftgate.

- Return the loadspace cargo cover to the original position.

2012.0 RANGE ROVER (LM), 501-19

BUMPERS

REAR BUMPER COVER (G927836)

REMOVAL AND INSTALLATION

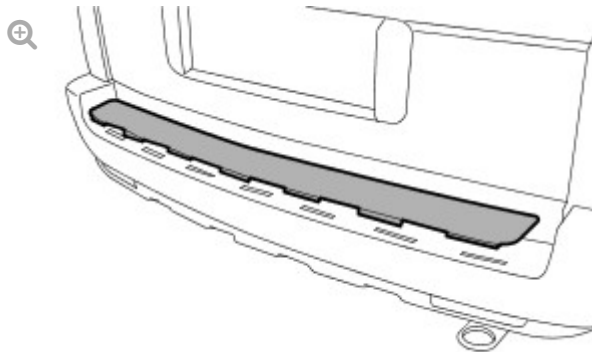
76.22.74	BUMPER VALANCE - REAR - RENEW	ALL DERIVATIVES	0.4	USED WITHINS	+
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REMOVAL

1.

CAUTION:

Protect the paintwork during this operation.

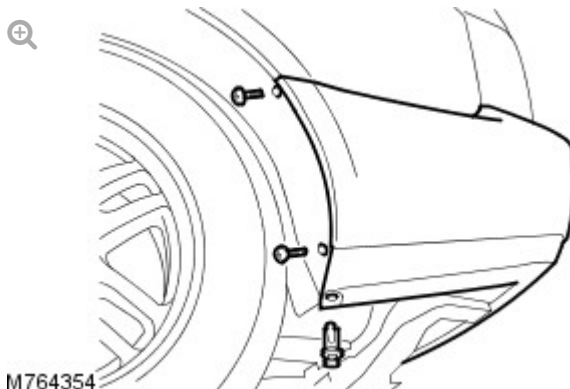


M764356

Remove the rear bumper cover trim panel.

- Release the 7 clips securing the rear edge of the rear bumper cover trim panel.
- Open the tailgate.
- Release the 12 clips securing the front edge of the rear bumper cover trim panel.

2.

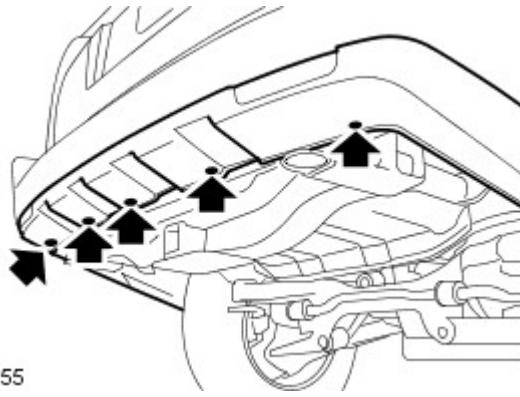


M764354

Release the rear fender splash shield from the rear bumper cover.

- Remove the 2 clips.
 - Remove the 4 screws.
-

3.

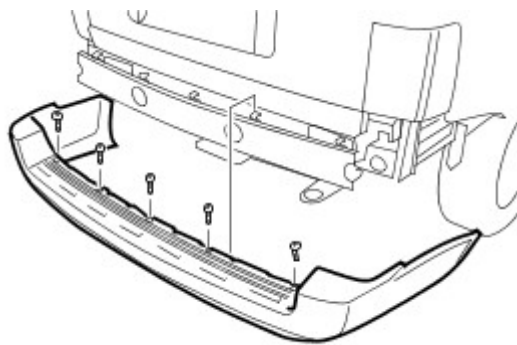


M764355

Release the rear bumper cover lower section.

- Remove the 5 screws.

4.



M764357

With assistance, remove the rear bumper cover.

- Remove the 5 screws.
- Release the 6 clips.
- Disconnect the 4 electrical connectors to the rear parking aid sensors.

INSTALLATION

1. With assistance, install the rear bumper cover.

- Connect the electrical connectors to the rear parking aid sensors.
- Install the screws.

2. Secure the rear bumper cover lower section.

- Install the screws

- Install the screws.

3. Secure the fender splash shield to the rear bumper cover.

- Install the screws.
- Install the clips.

4. Install the rear bumper cover trim panel.

- Close the tailgate

2012.0 RANGE ROVER (LM), 501-20

SAFETY BELT SYSTEM

SPECIFICATIONS

Torque Specifications

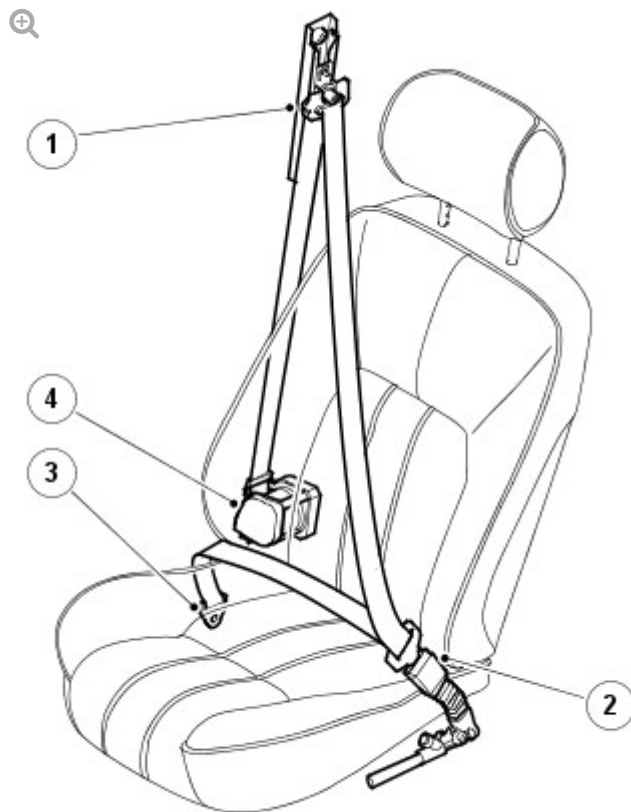
DESCRIPTION	NM	LB-FT
Safety belt retractor bolt	31	23
Safety belt height adjuster nut	31	23
Front safety belt upper anchor bolt	50	37
Rear safety belt upper anchor bolt	31	23
Safety belt guide bolt	6	4.4
Front safety belt buckle bolt	40	30
Rear safety belt buckle bolt	25	18

2012.0 RANGE ROVER (LM), 501-20

SAFETY BELT SYSTEM

DESCRIPTION AND OPERATION

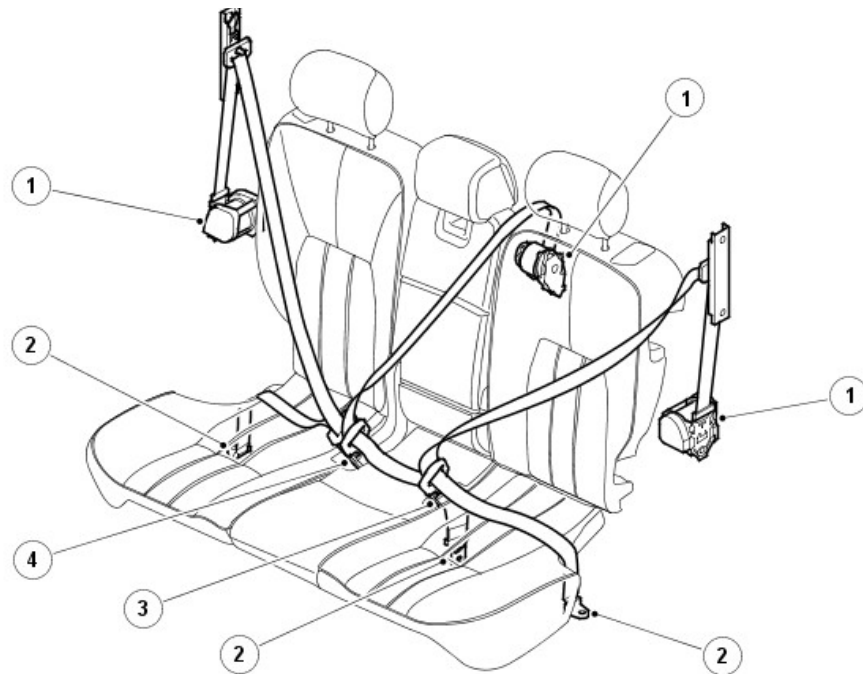
COMPONENT LOCATIONS - FRONT SAFETY BELTS



M764479

ITEM	DESCRIPTION
1	Height adjuster
2	Buckle
3	Anchor point
4	Retractor

COMPONENT LOCATIONS - REAR SAFETY BELTS



M764480

ITEM	DESCRIPTION
1	Retractor
2	Anchor point
3	left-hand (LH) outer belt buckle
4	right-hand (RH) outer and center belt buckles

GENERAL

Three point safety belts are installed at all seat positions. The front safety belts incorporate load limiters and have height adjusters on the B/C pillar. The rear outer safety belts have height adjusters on the D pillar.

On NAS vehicles, all passenger safety belts are the ALR (automatic locking retractor) type for use with child restraint systems.

A safety belt warning lamp and associated message are activated on the instrument cluster, by the lighting control module (LCM), at the beginning of each ignition cycle, as a reminder to fasten safety belts.

Child safety seat tether anchors are installed on the back of each rear outer seat.

2012.0 RANGE ROVER (LM), 501-20

SAFETY BELT SYSTEM

DIAGNOSIS AND TESTING

PRINCIPLES OF OPERATION

For a detailed description of the Safety Belt System, refer to the relevant Description and Operation section in the workshop manual. REFER to:

SAFETY INFORMATION

WARNINGS:

- TO AVOID ACCIDENTAL DEPLOYMENT AND POSSIBLE PERSONAL INJURY, THE BACKUP POWER SUPPLY MUST BE DEPLETED BEFORE REPAIRING OR REPLACING ANY AIR BAG SUPPLEMENTAL RESTRAINT SYSTEM (SRS) COMPONENTS. TO DEplete THE BACKUP POWER SUPPLY ENERGY, DISCONNECT THE BATTERY GROUND CABLE AND WAIT ONE MINUTE. FAILURE TO FOLLOW THIS INSTRUCTION MAY RESULT IN PERSONAL INJURY.
- Do not use a multimeter to probe the restraints control module. It is possible for the power from the meter battery to trigger the activation of the airbags. Failure to follow this instruction may result in personal injury.

NOTES:

- It is advisable not to use a cellular phone or to have a cellular phone in close proximity when working on the restraints control module or associated systems.
- Given the legal implications of a restraints system failure, harness repairs to Air Bag module circuits are not acceptable. Where the text refers to "REPAIR the circuit", this will normally mean the replacement of a harness.

Power Supply Depletion

Before beginning any work on the SRS system or related components:

1. Set the ignition to off

1. Disconnect the battery leads, ground first

1. Wait 2 minutes for the power circuit to discharge

There are comprehensive instructions on the correct procedures for SRS system repairs, refer to the relevant section of the workshop manual.

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 tested and/or the donor vehicle.

NOTES:

- If a control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component.
- When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.
- Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

1. Verify the customer concern

1. Visually inspect for obvious signs of damage and system integrity

Visual Inspection

MECHANICAL	ELECTRICAL
<ul style="list-style-type: none"> ▪ Check for the installation of non-standard accessories which may affect or obstruct the function of the seatbelt system ▪ Frayed or damaged webbing ▪ Missing or damaged button stop ▪ Pretensioner buckles/stalks 	<ul style="list-style-type: none"> ▪ Fuses ▪ Wiring harnesses and connectors ▪ Restraints control module ▪ Pretensioner(s)

1. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step
1. 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 DTC Index
1. Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required

SYMPTOM CHART FOR SEATBELT ROWS 1, 2 AND 3

SYMPTOM	POSSIBLE CAUSES	ACTION
Seatbelt jammed - Webbing tight	<ul style="list-style-type: none"> ▪ Backlock effect-in action (webbing retracted quickly and came to sudden stop) ▪ Seatbelt retractor not installed correctly ▪ Rear centre seatbelt only. Mini-button (webbing travel limit stop) missing and seat squab has been moved causing tight fit ▪ Automatic locking retractor activated (clicking, during retraction only) 	<ul style="list-style-type: none"> ▪ GO to Pinpoint Test A. ▪ GO to Pinpoint Test F. ▪ GO to Pinpoint Test H. ▪ See the automatic locking retractor description below
Seatbelt jammed - Webbing loose	<ul style="list-style-type: none"> ▪ Seatbelt webbing trapped in seat ▪ Seatbelt retractor webbing guide loose ▪ Twist in webbing 	<ul style="list-style-type: none"> ▪ GO to Pinpoint Test B. ▪ GO to Pinpoint Test C. ▪ GO to Pinpoint Test D.

	<ul style="list-style-type: none"> ▪ Interference in webbing routing ▪ D-loop not rotating correctly 	<ul style="list-style-type: none"> ▪ GO to Pinpoint Test E. ▪ GO to Pinpoint Test G.
Seatbelt jammed - Intermittent	<ul style="list-style-type: none"> ▪ Seatbelt retractor not installed correctly 	<ul style="list-style-type: none"> ▪ GO to Pinpoint Test F.
Seat squab will not fold/jammed	<p style="text-align: center;">NOTE:</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;">Rear centre seatbelt only</div> <ul style="list-style-type: none"> ▪ Mini-button (webbing travel limit stop) missing and seat squab has been moved causing excessive tension 	<ul style="list-style-type: none"> ▪ GO to Pinpoint Test H.
Seatbelt retraction slow	<ul style="list-style-type: none"> ▪ Seatbelt retractor webbing guide loose ▪ Twist in seatbelt webbing ▪ Interference in webbing routing ▪ Seatbelt retractor not installed correctly ▪ D-loop not rotating correctly ▪ Foreign object/debris 	<ul style="list-style-type: none"> ▪ GO to Pinpoint Test C. ▪ GO to Pinpoint Test D. ▪ GO to Pinpoint Test E. ▪ GO to Pinpoint Test F. ▪ GO to Pinpoint Test G. ▪ GO to Pinpoint Test E.
Seatbelt will not retract	<ul style="list-style-type: none"> ▪ Seatbelt retractor webbing guide loose ▪ Twist in seatbelt webbing ▪ D-loop not rotating correctly ▪ Interference in webbing routing ▪ Foreign object/debris 	<ul style="list-style-type: none"> ▪ GO to Pinpoint Test C. ▪ GO to Pinpoint Test D. ▪ GO to Pinpoint Test G. ▪ GO to Pinpoint Test E. ▪ GO to Pinpoint Test E.
Seatbelt will not extract	<ul style="list-style-type: none"> ▪ Backlock effect-in action (webbing retracted quickly and came to sudden stop) ▪ Seatbelt retractor not installed correctly ▪ Seatbelt retractor webbing guide loose ▪ Twist in seatbelt webbing ▪ D-loop not rotating correctly ▪ Interference in webbing routing ▪ Foreign object/debris ▪ Automatic locking retractor activated (clicking – during retraction only) 	<ul style="list-style-type: none"> ▪ GO to Pinpoint Test A. ▪ GO to Pinpoint Test F. ▪ GO to Pinpoint Test C. ▪ GO to Pinpoint Test D. ▪ GO to Pinpoint Test G. ▪ GO to Pinpoint Test E. ▪ GO to Pinpoint Test E. ▪ See the automatic locking retractor description below

Seatbelt noisy during operation	<ul style="list-style-type: none"> ▪ Automatic locking retractor activated (clicking–during retraction only) ▪ Interference in webbing routing (rubbing) 	<ul style="list-style-type: none"> ▪ GO to Pinpoint Test B. ▪ GO to Pinpoint Test E.
Seatbelt buckle not latching / jammed	<ul style="list-style-type: none"> ▪ Foreign object/debris 	<p style="text-align: center;">CAUTION:</p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p>Do not insert any objects or tools into the buckle head</p> </div> <ul style="list-style-type: none"> ▪ GO to Pinpoint Test I.

INERTIA REEL SEATBELTS

The vehicle is equipped with (two row one), (three row two), and (two row three (seven seat versions only)) inertia reel seatbelts.

These seatbelts are dual sensitive, which means that they feature:

- Car sense system - A vehicle motion sensor, which locks the seatbelt webbing under braking, cornering, on steep hills and in adverse camber conditions, when parked on a steep incline or driveway or with two wheels on a high curb
- Web sense system - A webbing motion sensor, which locks when the seatbelt webbing is extracted suddenly

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**.

AUTOMATIC LOCKING RETRACTORS

Some seatbelts feature an automatic locking retractor function. These can be used to secure a child seat or heavy load.

All

VEHICLE	SEAT POSITION	MARKET	AUTOMATIC LOCKING RETRACTOR INSTALLED	FROM MODEL YEAR
Freelander (L359)	Driver	All	No	2007
Freelander (L359)	Passenger	ROW	No	2007
Freelander (L359)	Passenger	US	Yes	2007
Freelander (L359)	Row 2	ROW	No	2007
Freelander (L359)	Row 2	US	Yes	2007
Discovery Sport (L550)	Driver	All	No	2015
Discovery Sport (L550)	Passenger	ROW	No	2015
Discovery Sport (L550)	Passenger	US	Yes	2015
Discovery Sport (L550)	Row 2	ROW	No	2015
Discovery Sport (L550)	Row 2	US	Yes	2015
Discovery Sport (L550)	Row 3	ROW	No	2015
Discovery Sport (L550)	Row 3	US	Yes	2015
Discovery 3/4 (L319)	Driver	All	No	2005
Discovery 3/4 (L319)	Passenger	ROW	No	2005
Discovery 3/4 (L319)	Passenger	US	Yes	2005
Discovery 3/4 (L319)	Row 2	All	Yes	2005

(L319)				
Discovery 3/4 (L319)	Row 3	Yes	2005	
Defender (L316)	All	All	No	2007
Range Rover Evoque (L538)	Driver	All	No	2012
Range Rover Evoque (L538)	Passenger	ROW	No	2012
Range Rover Evoque (L538)	Passenger	US	Yes	2012
Range Rover Evoque (L538)	Row 2	ROW	No	2012
Range Rover Evoque (L538)	Row 2	US	Yes	2012
Range Rover (L322)	Driver	All	No	2002
Range Rover (L322)	Passenger	ROW	No	2002
Range Rover (L322)	Passenger	US	Yes	2002
Range Rover (L322)	Row 2	ROW	No	2002
Range Rover (L322)	Row 2	US	Yes	2002
Range Rover (L405)	Driver	All	No	2013
Range Rover (L405)	Passenger	ROW	No	2013
Range Rover (L405)	Passenger	US	Yes	2013
Range Rover (L405)	Row 2	ROW	No	2013
Range Rover (L405)	Row 2	US	Yes	2013
Range Rover (L405)	Row 3	All	No	2013
Range Rover Sport (L320)	Driver	All	No	2005
Range Rover Sport (L320)	Passenger	ROW	No	2005

Model	Row	Region	Feature	Year
Range Rover Sport (L320)	Passenger	US	Yes	2005
Range Rover Sport (L320)	Row 2	All	Yes	2006
Range Rover Sport (L494)	Driver	All	No	2014
Range Rover Sport (L494)	Passenger	ROW	No	2014
Range Rover Sport (L494)	Passenger	US	Yes	2014
Range Rover Sport (L494)	Row 2	ROW	No	2014
Range Rover Sport (L494)	Row 2	US	Yes	2014
Range Rover Sport (L494)	Row 3	ROW	No	2014
Range Rover Sport (L494)	Row 3	US	Yes	2014

Automatic Locking Retractor Activation and Deactivation

ACTIVATION	DEACTIVATION
<p>NOTE:</p> <p>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>Automatic locking retractor is deactivated by allowing the webbing to retract until the clicking stops (close to park position)</p>
<p>When activated the automatic locking retractor is identified by a clicking noise during webbing retraction</p>	<p>When deactivated the automatic locking retractor seatbelt changes state, from a static seatbelt to an automatic seatbelt</p>

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

PINPOINT TEST B : WEBBING - TRAPPED IN SEAT	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: WEBBING - TRAPPED IN SEAT	
	1 Visually inspect the condition of the suspect seatbelt
	2 Lift the seat base or release the seat backrest as required
	3 Free the trapped webbing, allow the webbing to retract Note: If the automatic locking retractor is activated, allow the webbing to retract until the clicking stops
	4 Check for correct operation twice
	Does the webbing move freely then retract correctly? Yes No further action required No GO to Pinpoint Test C .

PINPOINT TEST C : SEATBELT RETRACTOR - WEBBING GUIDE LOOSE	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: SEATBELT RETRACTOR - WEBBING GUIDE LOOSE	
	1 Refer to 501-20 removal and installation section of the workshop manual, remove any trim panels required to expose the D loop (anchor point) and seatbelt retractor
	2 Check the webbing is not trapped or twisted and is centrally

	located on the seatbelt retractor spindle
3	Attempt to withdraw the webbing from the seatbelt retractor NOTE: If the seatbelt webbing is jammed, the automatic locking retractor could be engaged
4	To release the automatic locking retractor, manually wind the webbing onto the spindle until the automatic locking retractor deactivates (clicking stops)
5	Fully extract webbing
6	Confirm webbing guide location is correct , Confirm the fixing lugs are correctly located in the retractor frame
7	Allow webbing to retract
8	Check for correct operation twice
	Does the webbing move freely then retract correctly? Yes Refer to the 501-20 removal and installation section of the workshop manual, reinstall any trim panels, ensure there are no obstructions and the webbing does not catch or rub. No further action required No GO to Pinpoint Test D .

PINPOINT TEST D : TWIST IN WEBBING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: TWIST IN WEBBING	
	1 Refer to section 501-20 removal and installation section of the workshop manual, remove any trim panels required to expose the D loop (anchor point)
	2 Twist the webbing back the correct way in the loop
	3 Pass the twist through the pillar loop or escutcheon as required
	4 Check for correct operation twice
	Does the webbing move freely then retract correctly? Yes Refer to the 501-20 removal and installation section of the workshop manual, reinstall any trim panels, ensure there are no obstructions and the webbing does not catch or rub. No further action required No GO to Pinpoint Test E .

PINPOINT TEST E : INTERFERENCE - WEBBING ROUTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
-----------------	-------------------------

E1: INTERFERENCE - WEBBING ROUTING

	1 Refer to the 501-20 removal and installation section of the workshop manual, remove any trim panels required to expose the D loop (anchor point)
	2 Remove obstructions and foreign objects ensure the webbing does not catch or rub
	3 Confirm the seatbelt does not contact the wiring harness
	4 Check for correct operation twice
	<p>Does the webbing move freely then retract correctly?</p> <p>Yes</p> <p>Refer to the 501-20 removal and installation section of the workshop manual, reinstall any trim panels, ensure there are no obstructions and the webbing does not catch or rub. No further action required</p> <p>No</p> <p>GO to Pinpoint Test F.</p>

PINPOINT TEST F : SEATBELT RETRACTOR - INCORRECT INSTALLATION

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F1: SEATBELT RETRACTOR - INCORRECT INSTALLATION	
	1 Refer to the 501-20 removal and installation section of the workshop manual, remove any trim panels required to expose the D loop (anchor point) and the seatbelt retractor
	2 Refer to the 501-20 removal and installation section of the workshop manual, correctly reinstall the seatbelt retractor ensure that the locating "T bar" and "anti rotation pins" are correctly located
	3 Check for correct operation twice
	<p>Does the webbing move freely then retract correctly?</p> <p>Yes</p> <p>Refer to the 501-20 removal and installation section of the workshop manual, reinstall any trim panels, ensure there are no obstructions and the webbing does not catch or rub. No further action required</p> <p>No</p> <p>Replace as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component</p>

PINPOINT TEST G : D-LOOP NOT ROTATING CORRECTLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
G1: D-LOOP NOT ROTATING CORRECTLY	
	1 Refer to the 501-20 removal and installation section of the

	workshop manual, remove any trim panels required to expose the D loop (anchor point) and the seatbelt retractor
	2 Ensure there are no obstructions and the webbing does not catch or rub, the D loop (anchor point) rotates correctly and if installed the confirm the height adjuster operates correctly
	3 Check for correct operation twice
	<p>Does the webbing move freely then retract correctly?</p> <p>Yes Refer to the 501-20 removal and installation section of the workshop manual, reinstall any trim panels, ensure there are no obstructions and the webbing does not catch or rub. No further action required</p> <p>No Replace as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component</p>

NOTE:

This test applies to the rear centre seatbelt retractor installed in the **seat back**

PINPOINT TEST H : MINI BUTTON - MISSING/DAMAGED	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
H1: MINI BUTTON - MISSING/DAMAGED	
	1 Refer to the 501-20 removal and installation section of the workshop manual, remove the seat cushion and the plastic escutcheon at the top of the seat back (where the webbing exits to expose the lower anchor fixing point of the center seatbelt)
	2 Remove the lower anchorage of the seatbelt
	3 With the seat back correctly latched, allow up to 20mm webbing to retract, then extract the webbing
	<p>Is the mini-button (webbing travel limit stop) correctly installed to the webbing and in good condition?</p> <p>Yes Feed the mini-button back through the plastic escutcheon if required. Correctly reinstall the escutcheon to the seat back, extract the webbing then allow to retract, ensure the mini-button comes to rest outside the escutcheon stop</p> <p>No Replace as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component</p>

CAUTION:

Do not insert any objects or tools into the buckle head

PINPOINT TEST I : SEATBELT BUCKLE - NOT LATCHING/JAMMED	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
I1: SEATBELT BUCKLE - NOT LATCHING/JAMMED	
	1 Visually inspect the buckle head for evidence of damage. If damaged replace as required
	2 Depress the buckle release (red button) and (Using a torch) carry out visual inspection for any evidence of debris/material or foreign objects in the buckle head
	3 If required remove the pretensioner from the vehicle. Remove the seat. Remove the pretensioner from the seat frame
	4 Do not insert any objects or tools buckle head With the buckle removed invert and attempt to shake out any debris
	5 Attempt to latch the tongue in the buckle
	Does the seatbelt buckle operate correctly Yes Reinstall any components, no further action required No Replace the pretensioner, Refer to section 501 20

2012.0 RANGE ROVER (LM), 501-20

SAFETY BELT SYSTEM

FRONT SAFETY BELT BUCKLE (G875411)

REMOVAL AND INSTALLATION

76.73.30	STALK - FRONT SAFETY BELT - EACH - RENEW	ALL DERIVATIVES	0.5	USED WITHINS	+
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REMOVAL

WARNINGS:

- Persons working on the supplemental restraint system (SRS) must be fully trained and have been issued with the safety guidelines.
- Allow a period of 10 minutes to elapse after disconnecting the

- Allow a period of 10 minutes to elapse after disconnecting the battery before undertaking any work on the SRS.
- The SRS electrical connectors are unique. DO NOT force, or attempt to connect electrical connectors to the wrong sockets.
- The correct procedures must always be used when working on SRS components.
- It is imperative that before any work is undertaken on the SRS system, the appropriate information is read thoroughly.
- Always disconnect both battery cables before beginning work on the SRS system. Disconnect the ground cable first. Never reverse connect the battery.
- Take extra care when handling SRS components.

-
1. Disconnect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

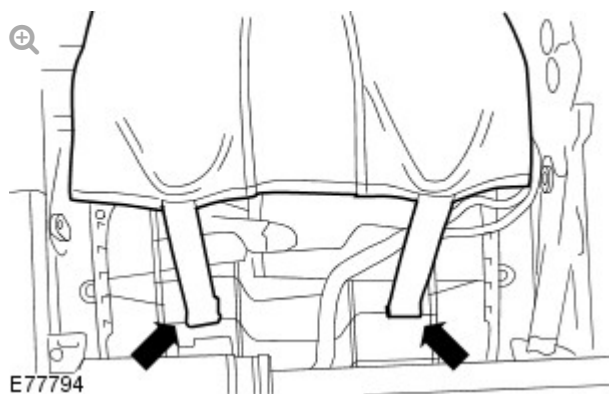
-
2. Make the air bag supplemental restraint system (SRS) safe.

For additional information, refer to: Standard Workshop Practices (100-00, Description and Operation).

-
3. Remove the front seat.

For additional information, refer to: Front Seat (501-10, Removal and Installation).

-
- 4.



Release the 2 lower tension straps from the front seat base.

- Reposition the front seat backrest cover for access.

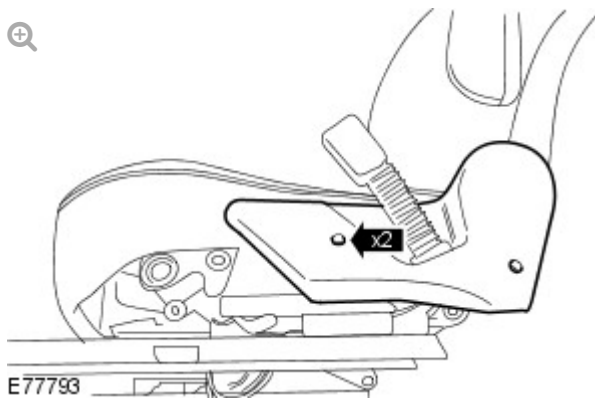
5.



Remove the front seat side trim panel support.

- Release the 2 clips.

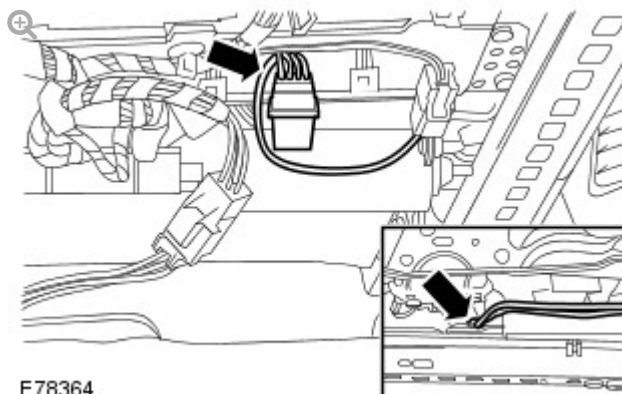
6.



Remove the front seat backrest hinge cover.

- Remove the 2 screws.
- Release the clip.

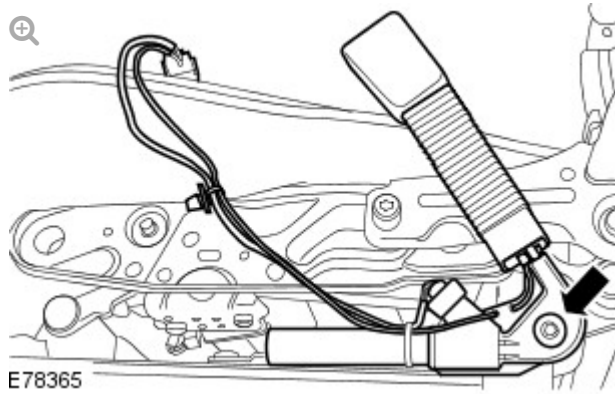
7.



Disconnect the front safety belt buckle electrical connector.

- Release the wiring harness clip.

8.



Remove the front safety belt buckle.

- Remove and discard the bolt.

INSTALLATION

1. Install the front safety belt buckle.

- Install a new bolt and tighten to 40 Nm (30 lb.ft).

2. Connect the front safety belt buckle electrical connector.

- Secure the wiring harness clip.

3.

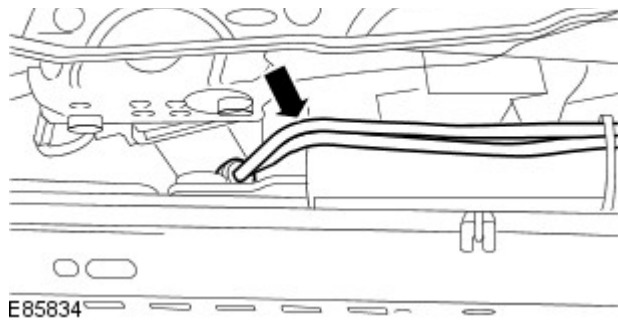
WARNING:

Make sure the front safety belt buckle wiring harness is correctly routed and secured in the position shown. Failure to follow this instruction may result in personal injury.

CAUTION:

Make sure the front safety belt buckle wiring harness is correctly routed and secured in the position shown. Failure to follow this instruction may result in damage to the vehicle.





Reposition the front safety belt buckle wiring harness.

-
4. Install the front seat backrest hinge cover.
 - Secure the clip.
 - Install the 2 screws.

 5. Install the front seat side trim panel support.
 - Secure the 2 clips.

 6. Secure the 2 lower tension straps to the front seat base.
 - Reposition the front seat backrest cover.

 7. Install the front seat.

For additional information, refer to: Front Seat (501-10, Removal and Installation).

 8. Connect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

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SAFETY BELT SYSTEM

FRONT SAFETY BELT RETRACTOR (G914422)

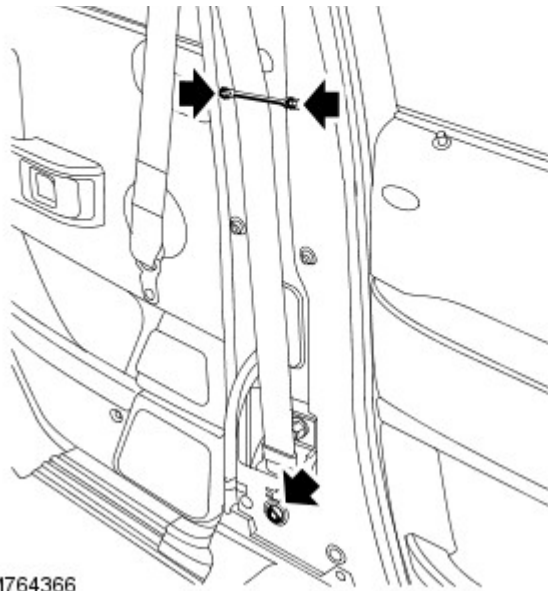
REMOVAL AND INSTALLATION

76.73.13	SAFETY BELT - FRONT - EACH - RENEW	ALL DERIVATIVES	0.5	USED WITHINS	+
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REMOVAL

1. Disconnect the battery ground cable.
For additional information, refer to: Specifications (414-00, Specifications).
 2. Make the air bag supplemental restraint system (SRS) safe.
For additional information, refer to: Standard Workshop Practices (100-00, Description and Operation).
 3. Remove the B-pillar trim panel.
For additional information, refer to: B-Pillar Trim Panel (501-05, Removal and Installation).
-

4. 



Remove the safety belt guide.

- Remove the 2 bolts.

5. Release the safety belt from the safety belt shoulder height adjuster.

- Remove and discard the nut.

6. Remove the front safety belt.

- Release the front safety belt retractor.
- Remove and discard the bolt.

INSTALLATION

1. Install the front safety belt.

- Secure the front safety belt retractor.
- Install the new bolt and tighten to 31 Nm (23 lb.ft).

2. Secure the safety belt to the safety belt shoulder height adjuster.

- Install the new nut and tighten to 31 Nm (23 lb.ft).

3. Install the safety belt guide.

- Tighten the bolts to 6 Nm (4.4 lb.ft).

-
4. Install the B-pillar trim panel.

For additional information, refer to: B-Pillar Trim Panel (501-05, Removal and Installation).

-
5. Connect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

2012.0 RANGE ROVER (LM), 501-20

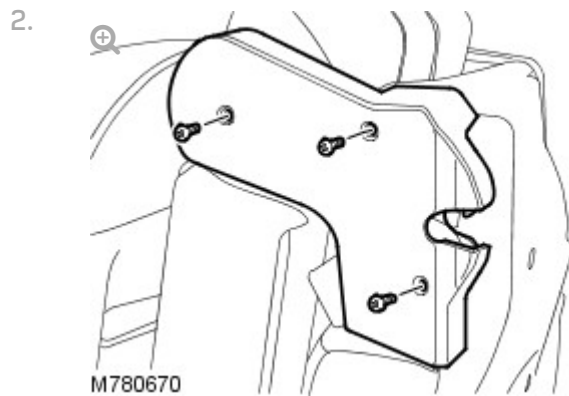
SAFETY BELT SYSTEM

REAR CENTER SAFETY BELT BUCKLE (G915167)

REMOVAL AND INSTALLATION

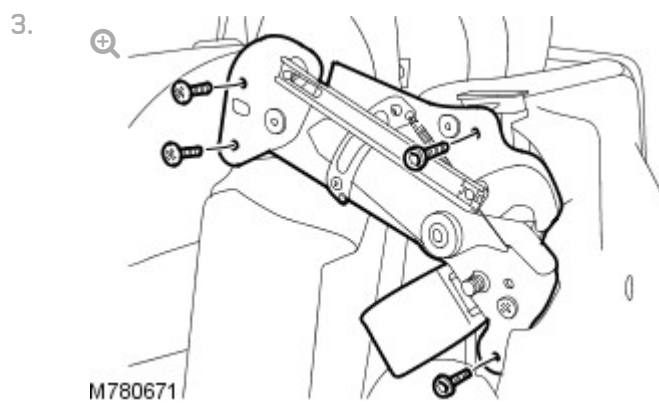
REMOVAL

1. Fold the rear seat fully forwards.
 - Release the rear seat backrest catch.



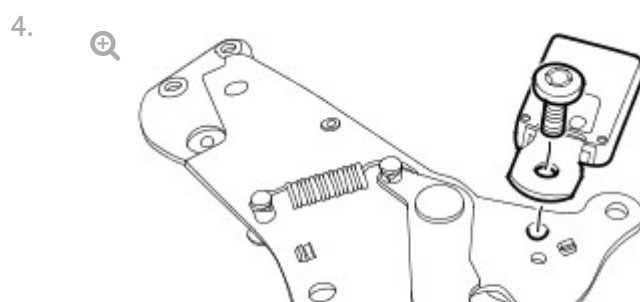
Remove the rear seat backrest inner hinge cover.

- Remove the 3 screws.



Remove the rear seat backrest inner hinge.

- Remove the 4 bolts.
- Discard the 2 lower bolts.



M780672



Remove the rear safety belt buckle.

- Remove and discard the bolt.

INSTALLATION

-
1. Install the rear safety belt buckle.
 - Install the new bolt and tighten to 25 Nm (18 lb.ft).
 2. Install the rear seat backrest inner hinge.
 3. Install the rear seat backrest inner hinge cover.
 - Install the 3 screws.
 4. Fold the rear seat fully rearwards.
 - Secure the rear seat backrest catch.

2012.0 RANGE ROVER (LM), 501-20

SAFETY BELT SYSTEM

REAR CENTER SAFETY BELT RETRACTOR (G915168)

REMOVAL AND INSTALLATION

76.73.20	SAFETY BELT - CENTRE - REAR - RENEW	ALL DERIVATIVES	1.3	USED WITHINS	+
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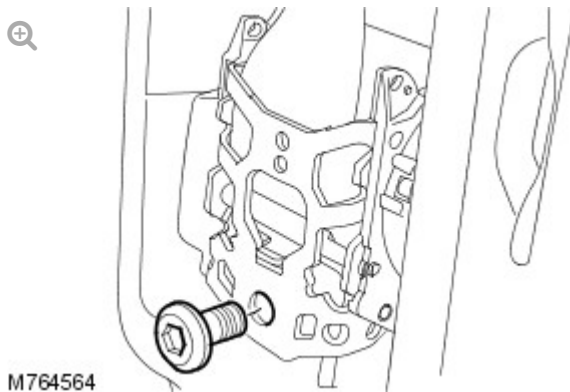
REMOVAL

1. Remove the rear seat.
For additional information, refer to: [Rear Seat](#) (501-10 Seating, Removal and Installation).

-
2. Remove the rear seat backrest cover.

For additional information, refer to: [Rear Seat Backrest Cover](#) (501-10 Seating, Removal and Installation).

-
- 3.



Remove the rear center safety belt retractor.

- Remove and discard the bolt.

INSTALLATION

-
1. Install the rear centre safety belt retractor.

- Install the new bolt and tighten to 25 Nm (18 lb.ft).

-
2. Install the rear seat backrest cover.

For additional information, refer to: [Rear Seat Backrest Cover](#) (501-10 Seating, Removal and Installation).

-
3. Install the rear seat.

For additional information, refer to: [Rear Seat](#) (501-10 Seating, Removal and Installation).

2012.0 RANGE ROVER (LM), 501-20

SAFETY BELT SYSTEM

REAR SAFETY BELT BUCKLE

[G913900]

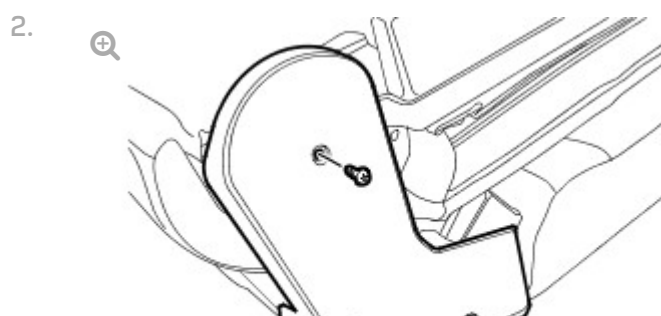
REMOVAL AND INSTALLATION

76.73.30	STALK - FRONT SAFETY BELT - EACH - RENEW	ALL DERIVATIVES	0.5	USED WITHINS	+
76.73.32	STALK - REAR SAFETY BELT - LH/EACH - RENEW	ALL DERIVATIVES	0.4	USED WITHINS	+

REMOVAL

1. Remove the rear seat.

For additional information, refer to: Rear Seat (501-10, Removal and Installation).



M780656



Remove the rear seat backrest inner hinge cover.

- Remove the 3 screws.

3.

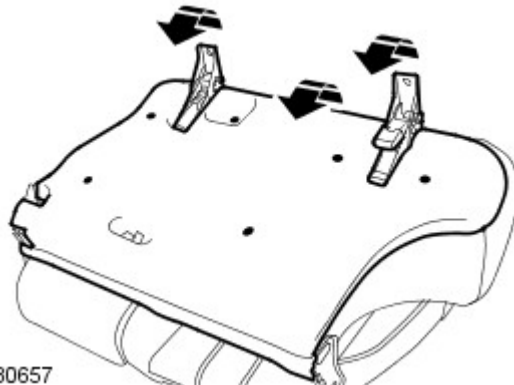


M780655

Remove the rear seat backrest outer hinge cover.

- Remove the 2 screws.

4.

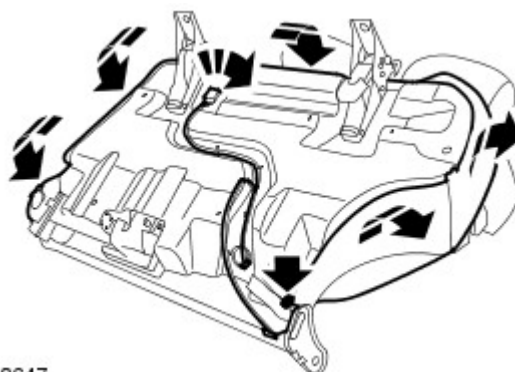


M780657

Remove the rear seat base lower trim panel.

- Remove the 6 clips.
- Reposition the rear seat hinge plates for access.

5.



M780647

Release the rear seat cushion cover from the rear seat base.

6. Reposition the rear seat cushion and seat cushion cover for access.

7. Remove the LH rear safety belt buckle.

- Remove and discard the bolt.

INSTALLATION

1. Install the LH rear safety belt buckle.

- Install the new bolt and tighten to 25 Nm (18 lb.ft).

2. Reposition the rear seat cushion and seat cushion cover for access.

3. Secure the rear seat cushion cover to the rear seat base.

4. Install the rear seat base lower trim panel.

- Install the 6 clips.
- Reposition the rear seat hinge plates for access.

5. Install the rear seat backrest outer hinge cover.

- Remove the 2 screws.
- Install the 2 screws.

6. Install the rear seat backrest inner hinge cover.

- Install the 3 screws.

7. Install the rear seat.

For additional information, refer to: Rear Seat (501-10, Removal and Installation).

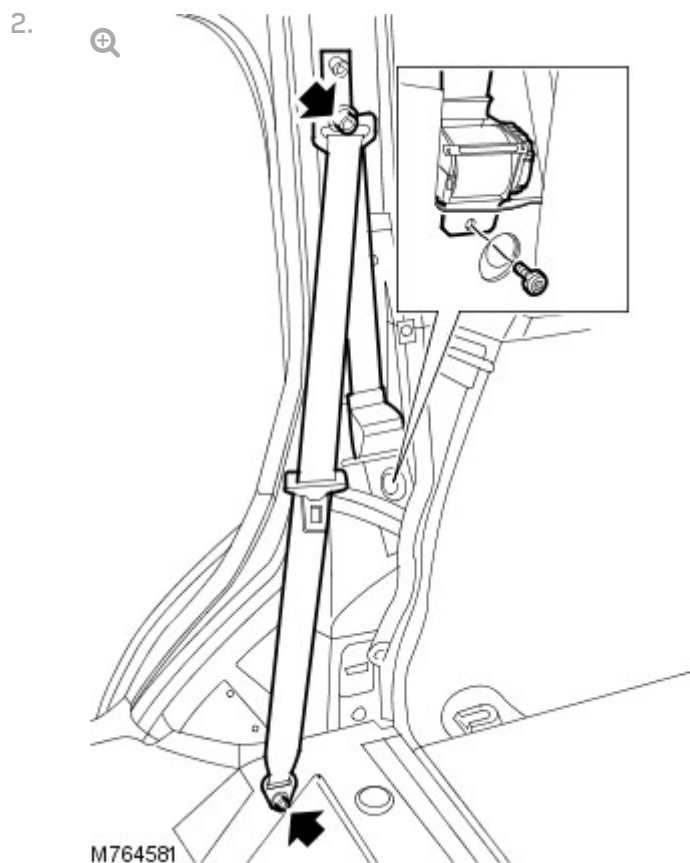
2012.0 RANGE ROVER (LM), 501-20

SAFETY BELT SYSTEM

REAR SAFETY BELT RETRACTOR (G914138)

REMOVAL

1. Remove the C-pillar trim panel.
For additional information, refer to: C-Pillar Upper Trim Panel (501-05, Removal and Installation).
-



Release the safety belt upper anchor.

- Remove and discard the bolt.
-

3. Remove the rear safety belt.
 - Remove and discard the bolt.
 - Release the rear safety belt retractor.
-

INSTALLATION

1. Install the rear safety belt.

- Secure the safety belt retractor.
 - Install the new bolt and tighten to 31 Nm (23 lb.ft).
-

2. Secure the safety belt upper anchor.

- Install the new bolt and tighten to 31 Nm (23 lb.ft).
-

3. Install the C-Pillar trim panel.

For additional information, refer to: C-Pillar Upper Trim Panel (501-05, Removal and Installation).

2012.0 RANGE ROVER (LM), 501-20

SUPPLEMENTAL RESTRAINT SYSTEM

SPECIFICATIONS

Torque Specifications

DESCRIPTION	NM	LB-FT
Column switchgear and clockspring housing to steering column screws	6	4
* Passenger air bag to in-vehicle crossbeam bolts	19	14
* Passenger air bag to instrument panel upper section nuts	7	5
* Driver lower air bag to driver lower air bag trim panel nuts	7	5
* Front seat side air bag module nut	7	5
* Side air curtain module screw	7	5
* B-pillar side impact sensor bracket bolts	8	6

* Side air bag module bolts	9	7
* Front side air curtain module screw	10	7
* Front side air curtain module to the A-pillar screws	10	7

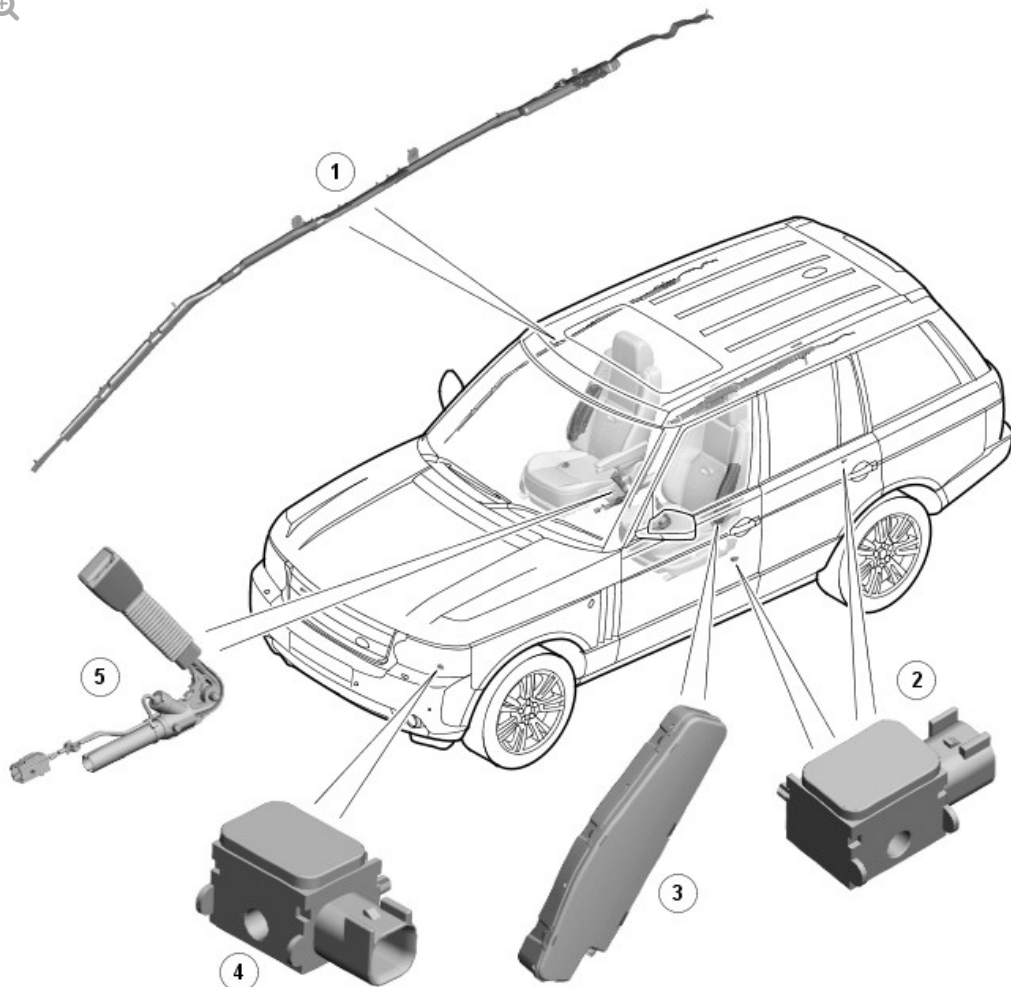
*** Indicates a new bolt, nut or screw must be installed.**

2012.0 RANGE ROVER (LM), 501-20

SUPPLEMENTAL RESTRAINT SYSTEM

DESCRIPTION AND OPERATION

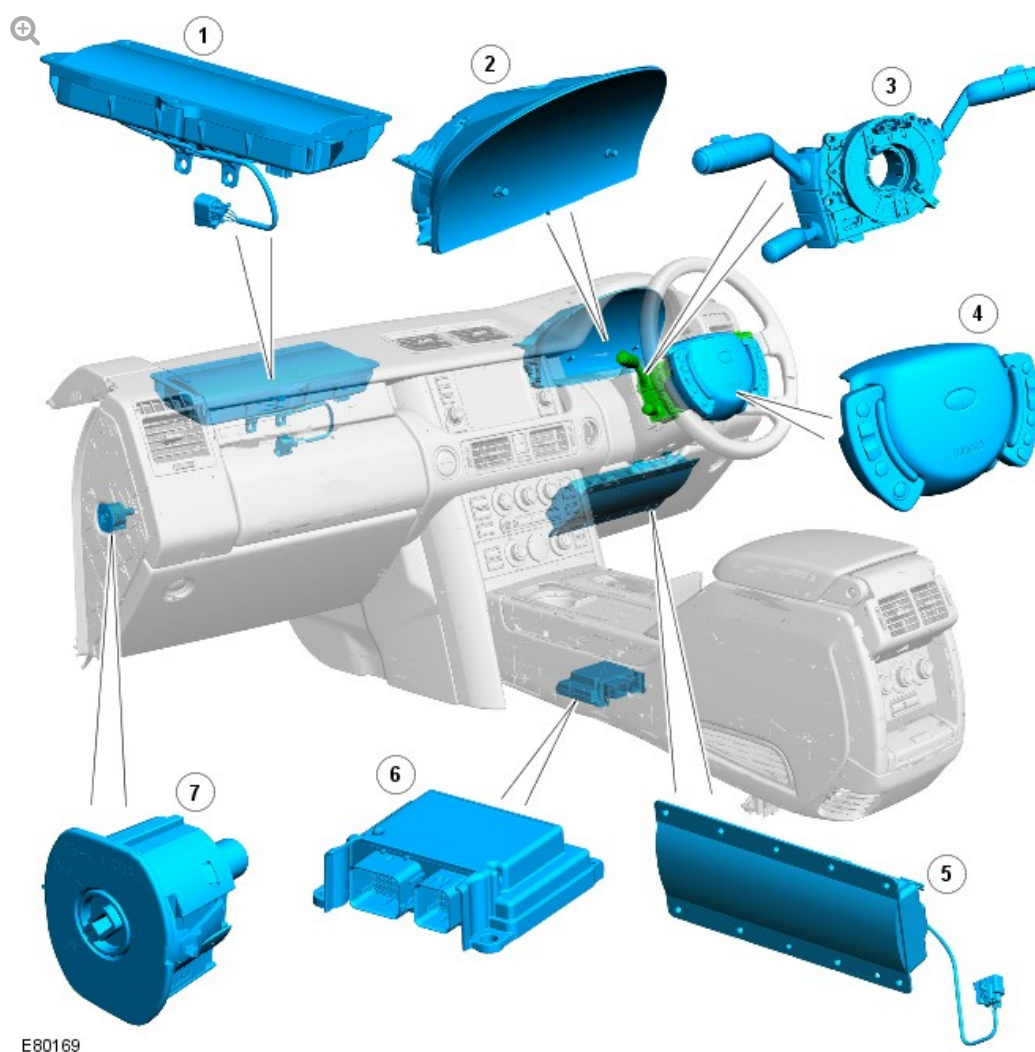
COMPONENT LOCATIONS - SHEET 1 OF 2



E 122289

ITEM	DESCRIPTION
1	Side head air bag
2	Side impact sensors
3	Side air bag
4	Front impact sensors
5	Pretensioners

COMPONENT LOCATIONS - SHEET 2 OF 2



ITEM	DESCRIPTION
1	Passenger air bag
1	Instrument cluster
3	Clock spring

4	Driver air bag
5	Knee airbag
6	restraints control module (RCM)
7	Passenger airbag deactivation switch

OVERVIEW

WARNING:

All pyrotechnic devices are dangerous. Before performing any procedures on any pyrotechnic device, read all information contained within the Standard Workshop Practices section of this manual. For additional information, refer to: Standard Workshop Practices (100-00, Description and Operation).

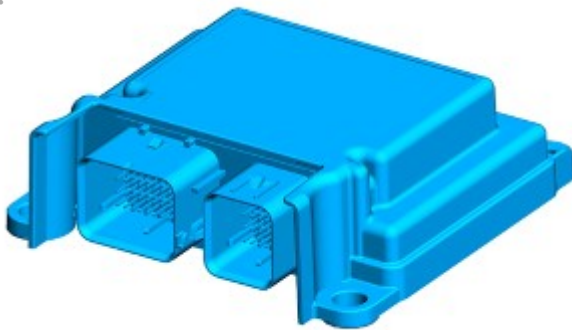
The supplemental restraint system (SRS) activates pretensioners and/or air bags if the vehicle suffers an impact above preset limits. When it activates the pretensioners/air bags the SRS also disconnects the starter lead from the battery. The SRS consists of:

- An RCM
- Four side impact sensors
- An occupancy sensor(NAS (north American specification) only)
- An occupancy sensor module (NAS (north American specification) only)
- Safety belt switches
- Safety belt pretensioners
- A driver air bag
- A passenger air bag
- Side air bags
- Head air bags
- A clockspring
- A warning lamp

- A warning lamp
- A driver knee bolster airbag
- A belt minder sensor
- A passenger airbag deactivation switch (Not NAS and Australia)
- A passenger airbag deactivation indicator (not Australia).

The SRS features selective activation of the air bags and pretensioners, and two stage driver and passenger air bags. The driver and passenger air bags each have two gas generators which are fired sequentially, with a variable time delay between firings to adjust the speed of air bag inflation to the severity of the crash impact.

RCM



E80170

The RCM is installed on the top of the transmission tunnel, beneath the transmission gear selector lever assembly, and controls the operation of the SRS. The main functions of the RCM include:

- Crash detection and recording.
- Air bag and pretensioner firing.
- Self test and system monitoring, with status indication via the warning lamp and non-volatile storage of fault information.

WARNING:

The electrical connectors must not be connected to the restraints control module unless it is properly secured to the vehicle. Movement

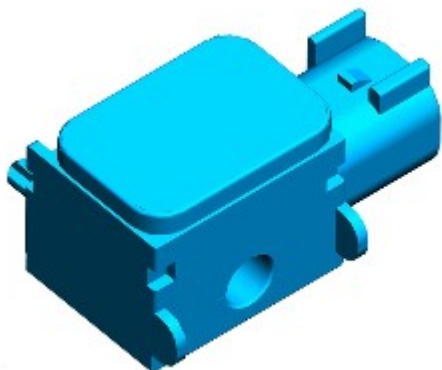
of the restraints control module while connected to the vehicle wiring could cause air bag deployment.

A safing function is provided by accelerometers in the RCM to concur impacts. Various firing strategies are employed by the restraints control module to ensure the air bags/pretensioners that are fired are appropriate to the severity and direction of the impact. The firing strategy used also depends on the inputs from the safety belt buckle switches, seat position sensor, passenger air bag deactivation switch, and the occupant classification sensor, dependant on market.

An energy reserve in the RCM ensures there is always a minimum of 150 milliseconds of stored energy available if the power supply from the ignition switch is disrupted during a crash. The stored energy is sufficient to produce firing signals for the driver air bag, the passenger air bag and the safety belt pretensioners.

When the ignition is switched on the RCM performs a self test and then performs cyclical monitoring of the system. If a fault is detected the RCM stores a related fault code and sends the signal to illuminate the air bag warning indicator. The faults can be retrieved by the Land Rover approved diagnostic system via the high speed controller area network (CAN) bus connection (J1962). If a fault that could cause a false fire signal is detected, the RCM disables the respective firing circuit, and keeps it disabled during a crash event.

IMPACT SENSORS



E80171

Impact sensors are installed in the front and both sides of the vehicle. The use of multiple impact sensors provides shorter air bag trigger times, through faster detection of lateral and longitudinal acceleration, and improves detection accuracy.

There are two front impact sensors, attached to the headlamp surround panel below the headlamps.

There are four side impact sensors located in the passenger compartment, as follows:

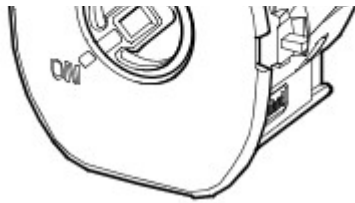
- One attached to the base of each B/C pillar
- One attached to the base of each D pillar.

Each impact sensor incorporates an accelerometer and a microchip powered by a feed from the RCM. The power feed also provides the interface connection through which the side impact sensor communicates with the RCM using serial data messages. Acceleration is evaluated by the microchip and transmitted to the restraints control module, which then makes the decision on whether or not to activate the air bags and pretensioners.

When the ignition is switched on the RCM supplies power to the impact sensors, which perform a self test. After satisfactory self tests the impact sensors continually output 'digital acceleration' messages to the restraints control module. If a fault is detected the relevant impact sensor sends a fault message, instead of the digital acceleration message, to the restraints control module. The RCM then stores a related fault code and illuminates the air bag warning indicator. Faults can be retrieved by the Land Rover approved diagnostic system from the RCM via the high speed CAN bus connection (J1962).

PASSENGER AIR BAG DEACTIVATION SWITCH (ALL EXCEPT NAS AND AUSTRALIA)



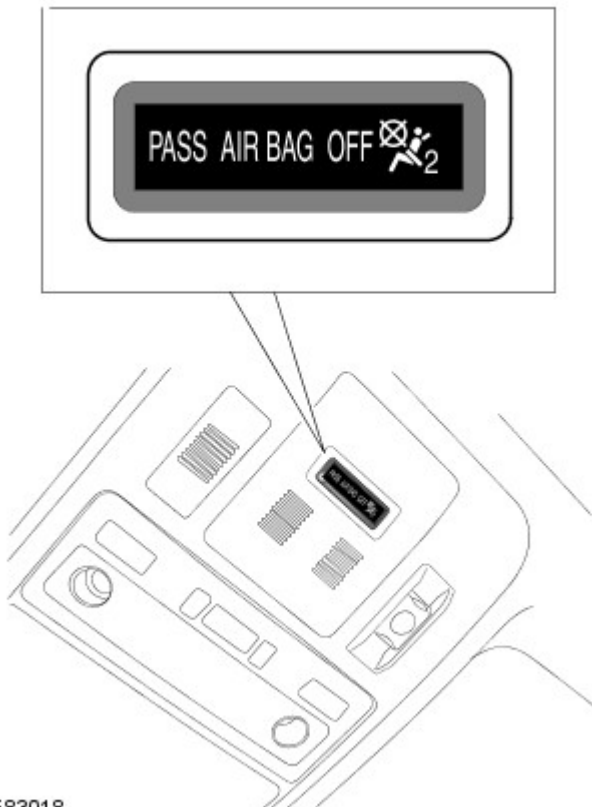


E45259

The passenger air bag deactivation switch provides a method of manually disabling the passenger air bag. The switch is installed in the front passenger end of the instrument panel and operated by the ignition key.

When the passenger air bag deactivation switch is operated, it changes a ground connection between two pins in the connectors of the RCM. When the passenger air bag deactivation switch is selected to OFF, the RCM disables the passenger air bag and, if the front passenger seat is occupied, illuminates the passenger air bag deactivation indicator.

PASSENGER AIR BAG DEACTIVATION INDICATOR (ALL EXCEPT AUSTRALIA)



E83018

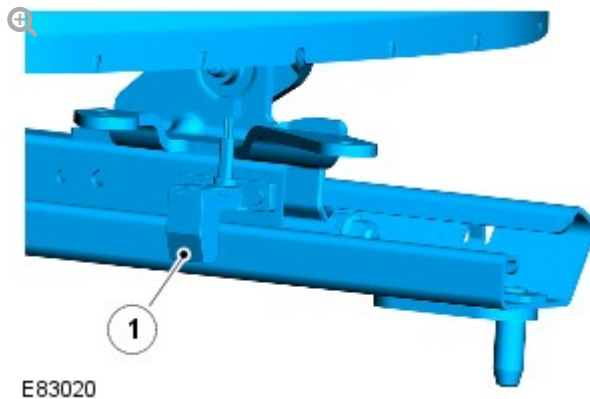
The passenger air bag deactivation indicator is installed in the overhead console (on the header rail). When appropriate, the indicator illuminates to advise front seat occupants that the passenger air bag is disabled.

advise front seat occupants that the passenger air bag is disabled.

Operation of the indicator is controlled by the RCM. The RCM illuminates the indicator when:

- There is a fault with the passenger air bag firing circuit(s) that warrants disablement
- The passenger air bag is deactivated with the passenger air bag deactivation switch (where fitted)
- The occupant classification sensor sends a passenger air bag disable state.

SEAT POSITION SENSOR



ITEM	DESCRIPTION
1	Seat position sensor

The seat position sensor allows the RCM to detect when the driver seat is forward of a given point on the seat track. The seat position sensor consists of a Hall effect sensor attached to the driver seat frame. While the ignition is on, the RCM supplies the sensor with power, and monitors the return current. When the seat frame moves forwards, the sensor moves over the edge of the seat track, which changes the reluctance of the sensor. The change of current is detected by the RCM and used as a switching point. The switching point is when the center of the sensor is 3 ± 4 mm from the leading edge of the seat track.

When the driver seat is forward of the switching point, the RCM increases the time delay between firing the two stages of the inflator in the driver air

bag. When the driver seat is rearward of the switching point, the RCM uses the normal time delay between firing the two stages.

OCCUPANT MONITORING

There are two types of occupant monitoring:

- In all markets except NAS & Australia, vehicles have an occupant detection sensor
- In NAS markets, vehicles have an occupant classification system

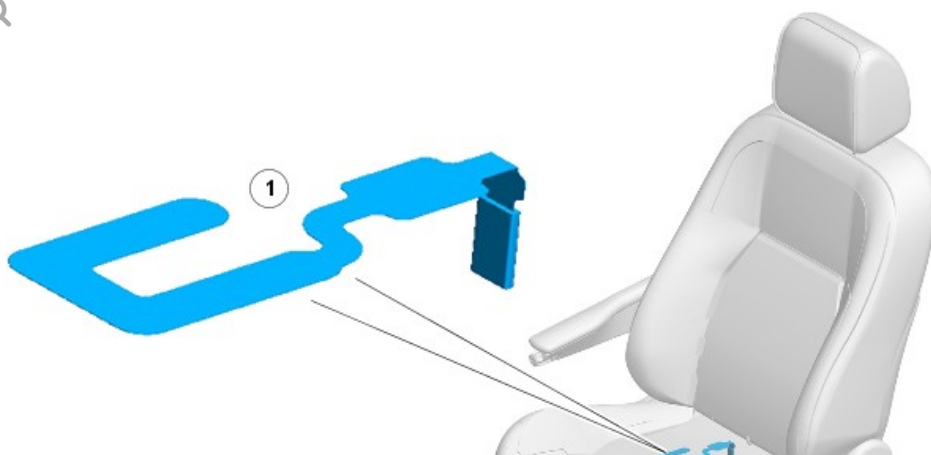
For markets which have an occupant detection sensor, this has no interface with the restraints system and only provides the belt reminder function.

For markets that have an occupant classification system, this provides the RCM with the occupancy status of the front passenger seat. The restraints control module uses this and the seat buckle status in the evaluation of the firing strategy for the passenger front air bag, side air bag, and pretensioner.

SAFETY BELT SWITCHES

A safety belt switch is installed in the buckle of each front safety belt to provide the RCM with a status signal of the related safety belt(s). When the safety belt is unfastened the switch outputs a low current to the RCM. When the safety belt is fastened the switch outputs a high current to the RCM.

OCCUPANCY SENSOR





E81045

ITEM	DESCRIPTION
1	Seat occupancy sensor

The occupancy sensor is installed in the cushion of the front passenger seat between the foam padding and the cover. The sensor consists of a foil contact circuit, embedded in a plastic sheet. Weight on the sensor reduces the resistance of the circuit. The occupancy sensor is directly connected to the instrument cluster and has no input into the SRS.

OCCUPANT CLASSIFICATION SYSTEM



E80172

ITEM	DESCRIPTION
1	Belt tension sensor
2	Pressure pad
3	Occupant classification system control module

The occupant classification system can determine if the front passenger seat is unoccupied, occupied by a small person, or occupied by a large person.

The occupant classification system consists of:

- A pressure pad, installed under the cushion of the front passenger seat, which is connected to a pressure sensor
- A safety belt tension sensor, integrated into the anchor point of the front passenger safety belt
- An occupant classification module, installed under the front passenger seat.

The pressure pad is a silicone filled bladder. Any load on the pressure pad is detected by the pressure sensor.

The safety belt tension sensor is a strain gauge that measures the load applied by the safety belt anchor to the anchor bolt. The sensor is located in the lower safety belt anchor point.

Safety Belt Tension Sensor



E83017

The occupant classification module supplies a reference voltage to the pressure sensor and the safety belt tension sensor and, from the returned signals, measures the loads acting on the pressure pad and the safety belt tension sensor. The load measurement from the safety belt tension sensor is used to produce a correction factor for the load measurement from the pressure pad. The tightness of the safety belt affects the load acting on the pressure pad, so without the correction factor the occupant classification module cannot derive an accurate occupancy status.

The occupant classification module translates the load readings into a seat occupancy status and transmits the result to the RCM, on a dedicated high speed CAN bus link. The occupant classification module incorporates two load limits for the seat cushion: When the load exceeds the lower limit, but is less than the upper limit, the occupant is classified as small; when the upper limit is exceeded, the occupant is classified as large.

The occupant classification system has 4 possible states which are detailed in the following table.

CLASSIFICATION	SEAT STATUS	PASSENGER AIRBAG STATUS	AIRBAG INDICATOR STATUS
Empty	Empty	Disabled	Off
Occupied inhibit	The seat is occupied by a small person or child restraint is being used	Passenger air bag/Thorax airbag operation is disabled	On
Occupied allow	The seat is occupied by a large person	Passenger air bag/Thorax airbag operation is enabled	Off
Error	-	Passenger air bag/Thorax airbag operation is disabled	On

OCCUPANCY SENSOR MODULE

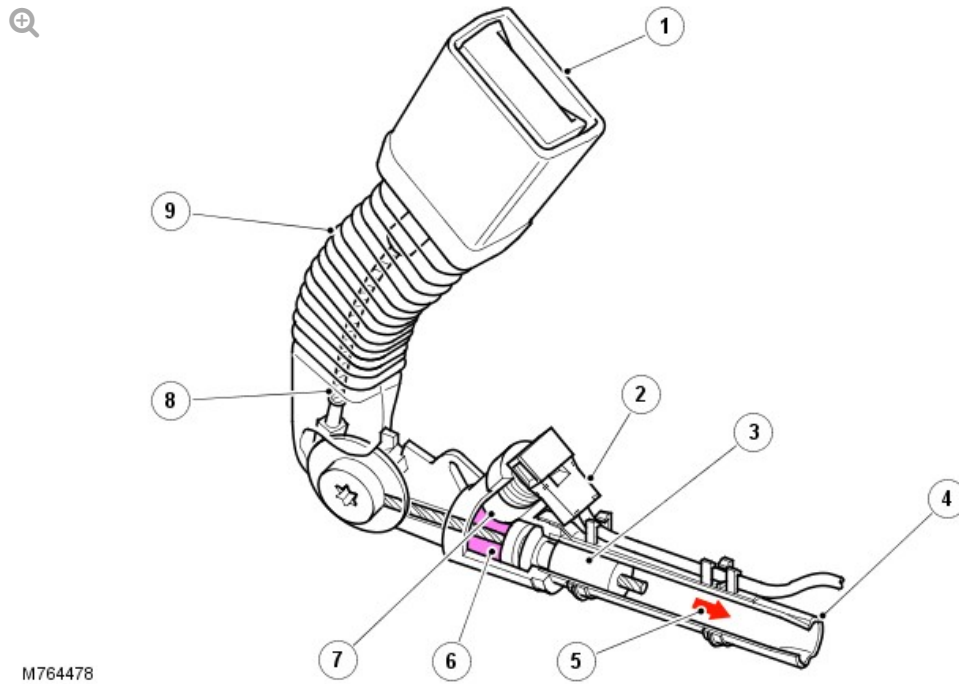


E80173

The occupancy sensor module is installed on the underside of the front passenger seat. The module supplies a power feed to the occupancy sensor and monitors the return voltage to determine if the seat is occupied or not. The result is transmitted to the RCM on the High speed CAN bus. The

The result is transmitted to the BCM on the high speed CAN bus. The occupancy sensor module also monitors for short and open circuits in the occupancy sensor. If it detects a fault, the occupancy sensor module transmits a fault message in place of the status message.

PRETENSIONER



M764478

ITEM	DESCRIPTION
1	Safety belt buckle
2	Electrical connector
3	Piston
4	Piston housing
5	Direction of piston travel
6	Expanding gas
7	Squib/Gas generator
8	Steel cable
9	Gaiter

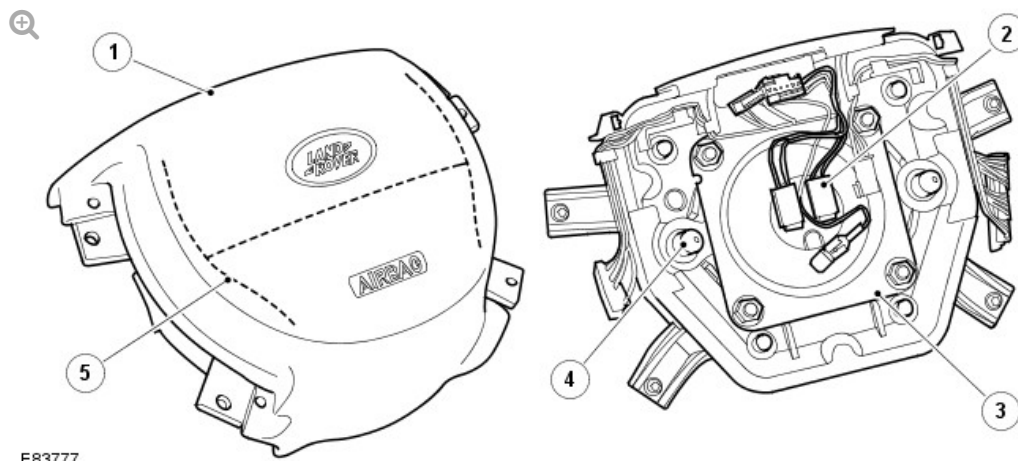
The pretensioners are used to tighten the front safety belts during a collision to ensure the occupants are securely held in their seats. A pretensioner is integrated into each front safety belt buckle and attached to a bracket on

integrated into each front safety belt buckle and attached to a bracket on the inboard side of the seat.

Each pretensioner has a tube containing propellant and a piston. The piston is attached to a steel cable, the opposite end of which is attached to the safety belt buckle. A squib in the base of the tube provides an ignition source when triggered by a fire signal from the RCM.

On receipt of a fire signal from the RCM, the squib ignites the propellant. The propellant produces nitrogen gas that rapidly expands to drive the piston along the tube, pulling the cable and drawing the buckle downwards.

DRIVER AIR BAG



E83777

ITEM	DESCRIPTION
1	Cover
2	Electrical connector
3	Housing
4	Securing pins
5	Etched lines

The driver air bag forms the center pad of the steering wheel. Four pins and two latches locate and secure the driver air bag to the steering wheel. The latches consist of wire springs on each side of the driver air bag which engage with hooks in the steering wheel. The driver air bag is released from the steering wheel by pulling on the wire springs with a special tool inserted

through a slot on each side of the steering wheel hub. Springs on the locating pins then push the driver air bag away from the steering wheel.

The driver air bag has a two stage inflator, with separate electrical connectors for each stage. The inflator contains a non-azide propellant as the gas generator.

Lines molded into the inner surface of the driver air bag cover provide weak points that split open in a controlled manner when the driver air bag deploys. The inflated volume of the air bag is 57 liters (2.01 ft³).

PASSENGER AIR BAG



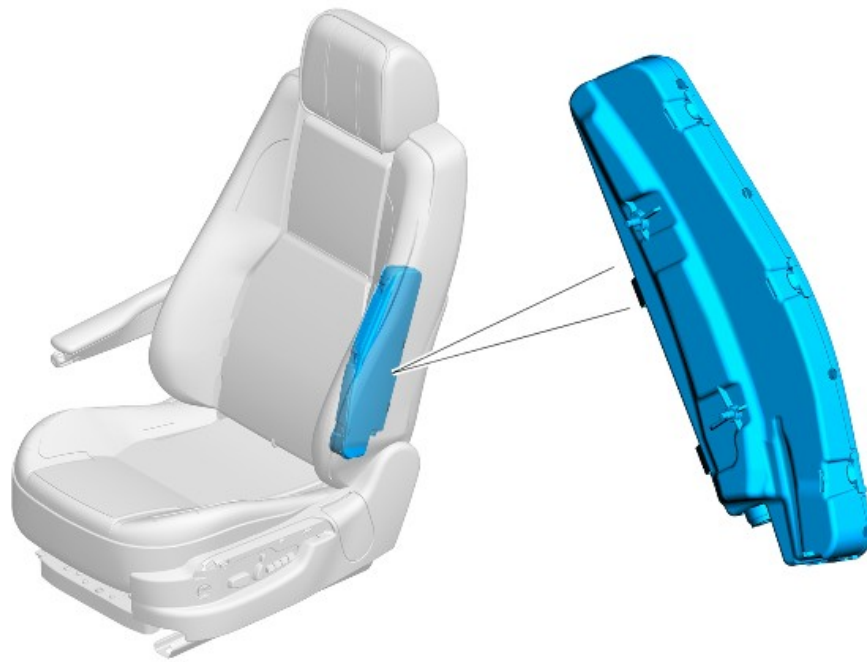
E80174

The passenger air bag is located in the instrument panel, behind the upper glove compartment. The bottom of the passenger air bag is attached to a mounting bracket on the in-vehicle crossbeam. The top of the passenger air bag is attached to a re-enforcement lid in the top of the instrument panel. The reinforcement lid incorporates a single door that opens, splitting the instrument panel covering, when the air bag deploys.

The passenger air bag is grounded through an earth track and the module's connection to the in-vehicle crossbeam.

The air bag has a two stage inflator, with separate electrical connectors for each stage. The inflator contains a non-azide propellant as the gas generator in each stage. The inflated volume of the air bag is 121 liters (4.27 ft³)."

SIDE AIR BAG



E80175

A side air bag is attached to the outside of each front seat backrest frame, under the backrest cover.

The side air bags are handed, and each consist of a molded plastic case which contains the folded air bag and the inflator. A cable connects the igniter of the inflator to a connector in the main seat harness connector block located under the front edge of the seat cushion.

When the air bag deploys it forces the front edge of the molded plastic case apart and splits open the backrest cover.

The side air bags use compressed argon as the inflation medium. The inflated volume of each side air bag is 12 liters (0.42 ft³).

SIDE HEAD AIR BAGS

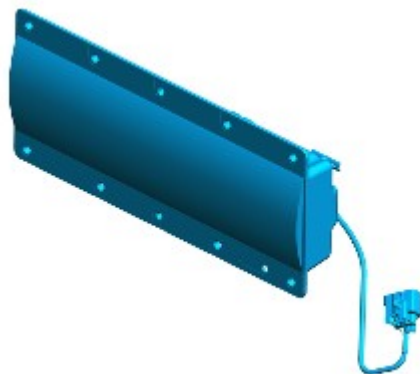


E122288



The side head air bags are installed between the A and D pillar trims and above the outer edges of the headlining. The inflatable bags incorporate tether straps at each end which are attached to the body. When the air bag deploys, the inflating bag shortens in length and pulls on the tether straps, which forces it from behind the trim to cover the window in a straight line between the tether strap anchor points.

KNEE AIRBAG



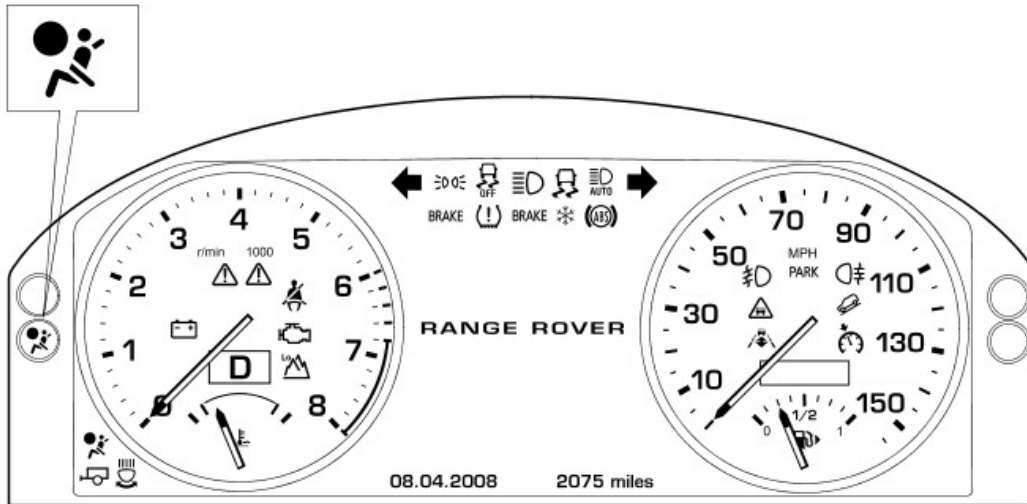
E83021

The inflatable knee bolster air bag is located behind the driver's knee bolster panel below the steering column. The flanges of the inflatable knee bolster air bag are attached to a re-enforcement lid in the driver knee bolster panel. The re-enforcement lid incorporates two deployment doors that are forced open, splitting the instrument panel covering, when the air bag deploys.

An EPC connector attaches a ground to the inflatable knee bolster air bag.

The inflatable knee bolster air bag has a single stage inflator with one connector on the outboard end. The inflator contains a non-azide propellant as the gas generator. The inflated volume of the air bag is 19 liters (0.67 ft³).

AIR BAG WARNING INDICATOR

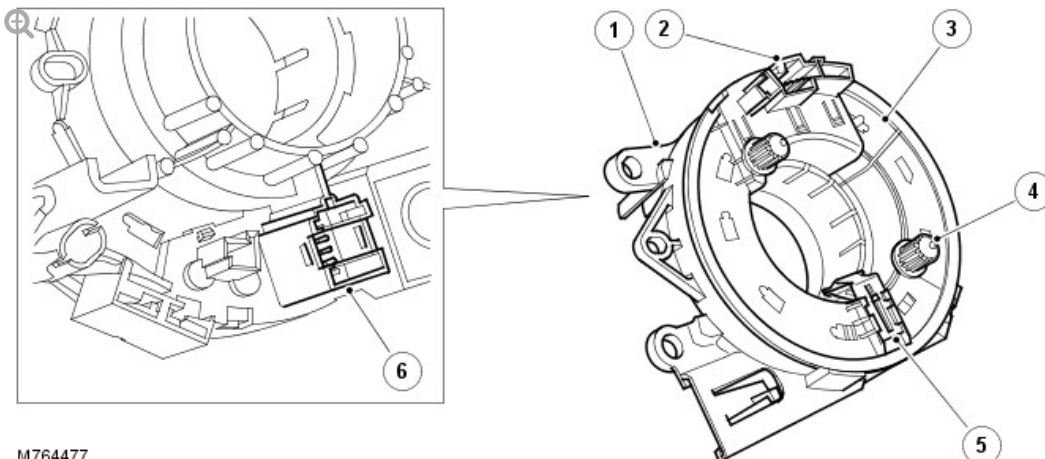


E122290

The air bag warning indicator consists of a yellow light emitting diode (LED) behind a SRS graphic in the instrument cluster.

Operation of the air bag warning indicator is controlled by a high speed CAN bus message from the RCM to the instrument cluster. The RCM sends the signal to illuminate the air bag warning indicator if a fault is detected, and for approximately 6 seconds during the bulb check at the beginning of each ignition cycle.

CLOCKSPRING



M764477

ITEM	DESCRIPTION
1	Outer housing
2	Electrical connector
3	Inner housing
4	Drive spigot
5	Locking lever
6	Electrical connector

The clockspring is installed on the steering column to provide the electrical interface between the fixed wiring harness and the steering wheel. The clockspring provides connections for the driver air bag, horn and steering wheel switch packs.

A rotating link harness is encapsulated into a plastic cassette comprising outer and inner housings with integral connectors. Brackets on the outer housing accommodate the column stalk switches. A spring loaded locking lever attached to the outer housing automatically engages and disengages with the inner housing when the steering wheel is removed and installed. To prevent damage to the rotating link harness, both the steering and the clockspring must be centralized when removing and installing the steering wheel.

SRS OPERATION

In a collision, the sudden deceleration or acceleration is measured by the impact sensors and the accelerometers in the restraints control module. The restraints control module evaluates the readings to determine the impact point on the vehicle and whether the deceleration/acceleration readings exceed the limits for firing any of the air bags, pretensioners, and battery disconnect unit. During a collision, the restraints control module only fires the air bags and pretensioners if the safing function confirms that the data from the impact sensor(s) indicates an impact limit has been exceeded.

The restraints control module incorporates the following impact thresholds to cater for different accident scenarios:

- Front impact, pretensioners
- Front impact, driver and passenger air bags stage 1, belt unfastened
- Front impact, driver and passenger air bags stage 1, belt fastened
- Front impact, driver and passenger air bags stage 2, belt unfastened
- Front impact, driver and passenger air bags stage 2, belt fastened
- Rear impact
- Driver side impact
- Passenger side impact.

The front impact thresholds increase in severity from pretensioners, through to driver and passenger air bag stage 2, belt fastened.

FIRING STRATEGIES

The safety belt pretensioners are fired when the pretensioner impact limit is exceeded. The restraints control module only fires the pretensioners if the related safety belt is fastened.

The driver and passenger air bags are only fired in a frontal impact. If an impact exceeds a stage 1 limit, but is less than the corresponding stage 2 limit, only one inflator in each air bag is fired (stage 2 is still fired for disposal after a delay of 100ms). If an impact exceeds the stage 2 limit, the two inflators in each air bag are fired simultaneously.

The passenger air bag is disabled unless the front passenger seat is occupied by a large person (NAS only), or the passenger air bag deactivation switch is on (all except NAS & AUS).

The stage 2 inflator of the driver air bag is disabled if the driver seat is forward of the switching point of the seat position sensor.

If there is a fault with a safety belt buckle sensor, the restraints control module assumes the related safety belt is fastened for the pretensioner firing strategy and unfastened for the driver and passenger air bag firing strategies. If there is a fault with the occupant classification sensor, the restraints control module disables the passenger air bag. If there is a fault with the passenger air bag deactivation switch, the restraints control module disables the passenger air bag.

disables the passenger air bag.

If a side impact limit is exceeded, the restraints control module fires the side air bag and the side head air bag on that side of the vehicle. If the side impact limit on the front passenger side of the vehicle is exceeded, the restraints control module also evaluates the input from the occupant classification sensor, and fires the side air bag only if the front passenger seat is occupied by a large person (NAS only).

If multiple impacts occur during a crash event, after responding to the primary impact the restraints control module will output the appropriate fire signals in response to any further impacts if unfired units are available.

Front and Rear Impact Firing Strategy (All Except NAS)

SAFETY BELT STATUS		STRATEGY		
DRIVER	PASSENGER	APPLICABLE PRETENSIONER	DRIVER AIR BAG	PASSENGER AIR BAG
Fastened	-	Fired at pretensioner threshold	Fired at belt fastened threshold	-
Unfastened	-	Not fired	Fired at belt unfastened threshold	-
-	Fastened	Fired at pretensioner threshold	-	Fired at belt fastened threshold
-	Unfastened	Not fired	-	Fired at belt unfastened threshold

Front and Rear Impact Firing Strategy (NAS Only)

SAFETY BELT STATUS		PASSENGER SEAT STATUS	STRATEGY		
DRIVER	PASSENGER		APPLICABLE PRETENSIONER	DRIVER AIR BAG	PASSENGER AIR BAG
Fastened	-	-	Fired at pretensioner threshold	Fired at belt fastened threshold	-
Unfastened	-	-	Not fired	Fired at belt unfastened	-

				threshold	
-	Fastened	Occupied allow	Fired at pretensioner threshold	-	Fired at belt fastened threshold
-	Fastened	Unoccupied inhibit/empty	Fired at pretensioner threshold	-	Not fired
-	Unfastened	Occupied allow	Not fired	-	Fired at belt unfastened threshold
	Unfastened	Unoccupied inhibit/empty	Not fired	-	Not fired

The battery disconnect unit is fired:

- At driver and passenger air bag belt fastened threshold in a frontal impact
- At the driver and passenger side impact threshold in a side impact
- At the rear impact threshold in a rear impact.

CRASH SIGNAL

When the RCM outputs any of the fire signals it also outputs a crash signal to the CJB (central junction box) and the engine control module (ECM) on the High speed CAN. The crash signal is also hardwired to the ECM and the CJB. The instrument cluster picks up the crash signal from the High speed CAN and gateways it to the lighting control module (LCM). On receipt of the crash signal, the CJB goes into a crash mode and the ECM cuts the power supply to the fuel pump relay. In the crash mode, the CJB:

- Activates all of the unlock signals of the vehicle locking system, even if the vehicle is already unlocked.
- Ignores all locking/superlocking inputs until it receives an unlock input, when it returns the locking system to normal operation.
- Activates the interior lamps. The interior lamps remain on permanently until they are manually switched off at the lamp unit, or the CJB crash mode is switched off and they return to normal operation.
- Disables the rear window child lock input until the crash mode is switched off.

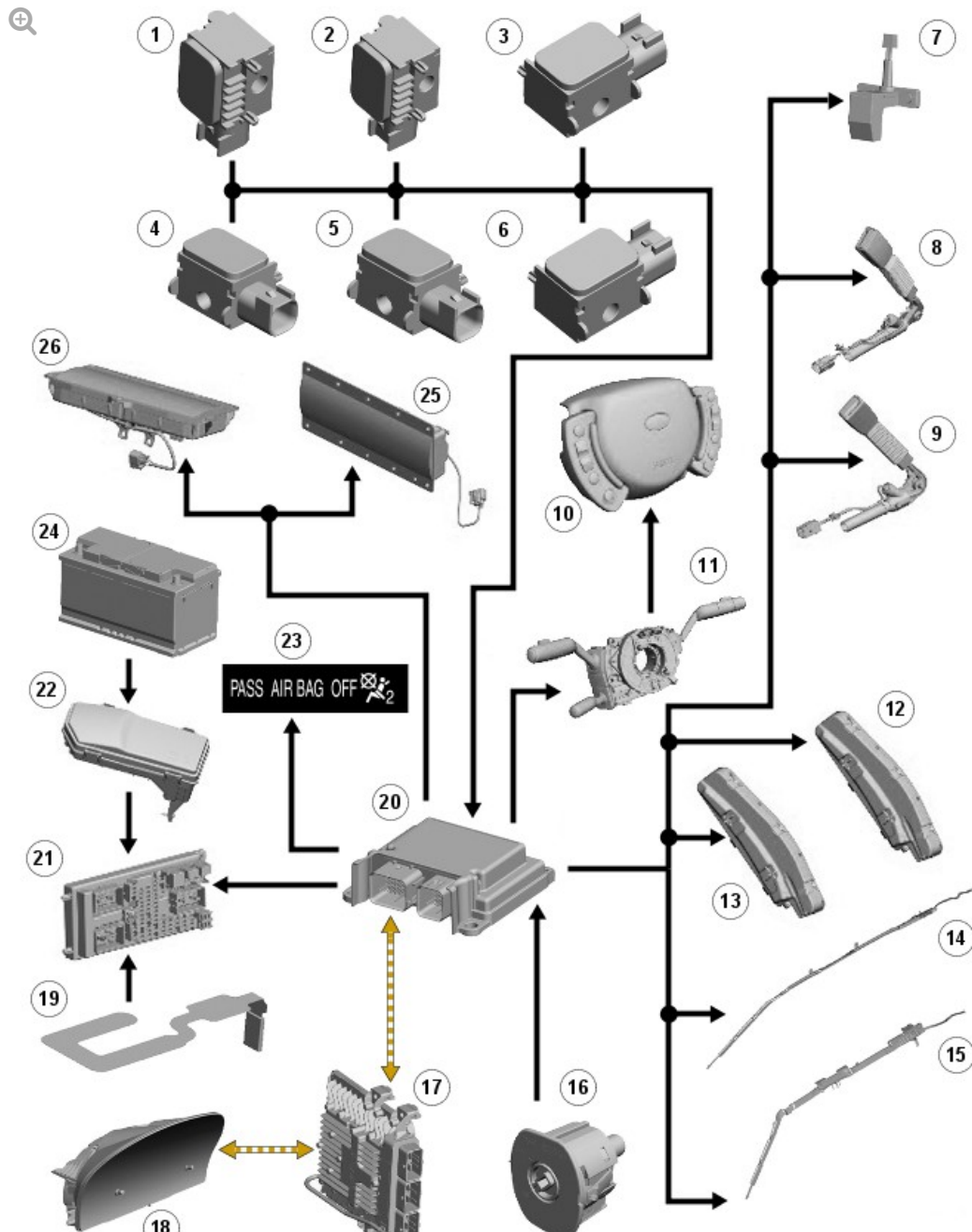
- Sends a crash message to the LCM1 to activate the hazard flashers. The hazard flashers remain on until cancelled by the hazard warning switch or the crash mode is switched off.

The CJB crash mode is switched off by a valid locking and unlocking cycle of the locking system.

CONTROL DIAGRAM SHEET

NOTE:

A = Hardwired; D = High Speed CAN





ITEM	DESCRIPTION
1	right-hand (RH) rear side impact sensor
2	left-hand (LH) rear side impact sensor
3	RH front side impact sensor
4	RH front impact sensor
5	LH front impact sensor
6	LH front side impact sensor
7	Seat position sensor
8	Safety belt pretensioner
9	Safety belt pretensioner
10	Drivers airbag
11	Clock spring
12	Side airbag
13	Side airbag
14	Head airbag
15	Head airbag
16	Passenger airbag deactivation switch
17	ECM
18	Instrument cluster
19	Occupant detection sensor
20	RCM
21	CJB
22	EJB (engine junction box)
23	Passenger airbag deactivated warning lamp
24	Battery
25	Knee airbag
26	Passenger airbag

2012.0 RANGE ROVER (LM), 501-20

SUPPLEMENTAL RESTRAINT SYSTEM

DIAGNOSIS AND TESTING

PRINCIPLE OF OPERATION

For a detailed description of the air bag supplemental restraint system and operation, refer to the relevant Description and Operation section of the workshop manual. REFER to: Air Bag and Safety Belt Pretensioner Supplemental Restraint System (SRS) (501-20 Supplemental Restraint System, Description and Operation).

SAFETY INFORMATION

WARNINGS:

- To avoid accidental deployment the back-up power supply must be depleted before beginning any work on the SRS system or its components. Failure to follow this instruction may result in personal injury.
- Do not use a multimeter to probe an SRS module. It is possible for the power from the meter battery to trigger the activation of the module. Failure to follow this instruction may result in personal injury.

NOTES:

- It is advisable not to use a cellular phone or to have a cellular phone in close proximity when working on the SRS system or components.
- Given the legal implications of a restraints system failure, harness repairs to Air Bag module circuits are not acceptable. Where the text refers to "REPAIR the circuit", this will normally mean the replacement of a harness.

Power supply depletion

Before beginning any work on the SRS system or related components:

before beginning any work on the SRS system or related components:

1. Remove the ignition key.
1. Disconnect the battery leads, ground first.
1. Wait 2 minutes for the power circuit to discharge.

There are comprehensive instructions on the correct procedures for SRS system repairs in the workshop manual. Refer to the relevant section of the workshop manual.

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.
 - Confirm the function of the warning lamp (if the warning lamp is inoperative, system faults will be signalled by an audible chime)
1. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection

MECHANICAL	ELECTRICAL
<ul style="list-style-type: none">▪ Check for the installation of non-standard accessories which may affect or obstruct the function of the SRS system	<ul style="list-style-type: none">▪ Fuses▪ Wiring harness▪ Make sure all electrical

<ul style="list-style-type: none"> ▪ Check the condition of trim, etc at the SRS system components ▪ Sensor(s) ▪ Pretensioner(s) ▪ Air bag module(s) ▪ Occupant detection/classification sensors ▪ Seat position sensor 	<p>connector(s) are engaged correctly on the air bag circuits</p> <ul style="list-style-type: none"> ▪ Make sure the Restraints Control Module (RCM) is correctly installed ▪ Warning lamp bulb(s) ▪ Impact sensor(s) ▪ Buckle sensor(s) ▪ Pretensioner(s) ▪ Air bag module(s) ▪ Air bag deactivation switch ▪ Air bag deactivation warning lamp ▪ Occupant detection/classification sensors ▪ Seat position sensor ▪ Clockspring
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1. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

1. If the cause is not visually evident, check for Diagnostic Trouble Codes (DTCs) and refer to the relevant DTC Index.

DTC INDEX

For a list of Diagnostic Trouble Codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00. REFER to: (100-00)

Diagnostic Trouble Code (DTC) Index - DTC: Module Name: Restraints Control Module (Description and Operation),

Diagnostic Trouble Code (DTC) Index - DTC: Module Name: Occupant Classification System (Description and Operation).

2012.0 RANGE ROVER (LM), 501-20

SUPPLEMENTAL RESTRAINT SYSTEM

AIR BAG DISPOSAL (G928274)

GENERAL PROCEDURES

SPECIAL TOOL(S)



**LRT-86-
007-02**

Air Bag Bracket



LRT-86-007-05

Air Bag Bracket



LRT-86-007-08

Air Bag Bracket Nut



LRT-86-003

Air Bag Deployment Kit



LRT-86-003-05

Adaptor Cable, Air Bag Deployment Kit



LRT-86-003-08

Adaptor Cable, Air Bag Deployment Kit



LRT-86-003-03

Adaptor Cable, Air Bag Deployment Kit

DEPLOYED AIR BAG

1.

WARNING:

Always wear safety glasses when repairing an air bag supplemental restraint system (SRS) vehicle and when handling an air bag module. Failure to follow this instruction may result in personal injury.

Deployed air bag modules are to be disposed of as special waste and must comply with local environmental requirements, if in doubt, contact the Authority for disposal requirements.

2.

WARNING:

The storage, transportation, disposal, and/or recycling of air bag module components must be carried out in accordance with all applicable federal, state and local regulations including, but not limited to, those governing building and fire codes, environmental protection, occupational health and safety, and transportation.

Air bag modules removed and deployed by Land Rover service are to be returned to the importer for disposal.

UNDEPLOYED AIR BAG — INOPERATIVE

1. **WARNINGS:**

- Carry a live air bag module with the air bag and trim cover or deployment door pointed away from your body. This will reduce the risk of injury in the event of an accidental deployment. Failure to follow this instruction may result in personal injury.
- All inoperative air bag modules should be placed on the Mandatory Return List. All discoloured or damaged air bag modules must be treated the same as any inoperative live air bag being returned. Failure to follow this instruction may result in personal injury.

Remove the inoperative driver air bag module or passenger air bag module. For additional information, refer to:

[Driver Air Bag Module](#) (501-20B Supplemental Restraint System, Removal and Installation),

[Passenger Air Bag Module](#) (501-20 Supplemental Restraint System, Removal and Installation),

[Driver Lower Air Bag Module](#) (501-20B Supplemental Restraint System, Removal and Installation),

[Side Air Bag Module](#) (501-20B Supplemental Restraint System, Removal and Installation)

removal and installation),

[Side Air Curtain Module](#) (501-20B Supplemental Restraint System, Removal and Installation),

[Front Safety Belt Buckle](#) (501-20A Safety Belt System, Removal and Installation).

UNDEPLOYED AIR BAG — PREPARATION OF VEHICLE FOR DISPOSAL

NOTE:

Remote Deployment

1.

WARNINGS:

- Always wear safety glasses when repairing an air bag supplemental restraint system (SRS) vehicle and when handling an air bag module. Failure to follow this instruction may result in personal injury.
- Carry a live air bag module with the air bag and trim cover or deployment door pointed away from your body. This will reduce the risk of injury in the event of an accidental deployment. Failure to follow this instruction may result in personal injury.
- Before proceeding, make sure precautions have been taken to warn personnel of a possible loud noise upon activation. Do not allow anybody to approach closer to SRS device than 15 Metres (50 Feet). Failure to follow this instruction may result in personal injury.
- Do not place the driver or passenger air bag module with the trim cover or deployment door facing down, as the forces of the deploying air bag module can cause it to ricochet and cause personal injury. Failure to follow this instruction may result in personal injury.

Remove any loose debris from around air bag module. Make sure that no flammable liquids are present.

2. Disconnect the battery ground cable.

3. Disconnect the air bag module electrical connector.

4. Connect the special tool adaptor lead to the air bag module.

5. Connect the special tool lead to the air bag deployment tool adaptor lead. Pass the special tool lead through the window, close all doors, leave the window with the special tool lead open.

6. **WARNING:**

Make sure all personnel are a minimum of 15 Metres (50 Feet) away from the SRS component. Failure to follow this instruction may result in personal injury.

Connect the special tool to a 12V battery.

7. **WARNING:**

Do not handle the deployed air bag module immediately after activation - it may be hot. Allow the air bag module to cool. Cooling air bag modules should be continuously monitored to make sure the heat does not create a fire with spilled liquids or other debris. Failure to follow this instruction may result in personal injury.

Deploy the air bag module by operating both of the switches on the special tool. If deployment does not occur, disconnect the special tool from the battery and seek advice from Land Rover.

8. Repeat the procedure for all of the air bag modules in the vehicle.

-
9. The vehicle can now be disposed of in the normal manner with the air bag modules installed.
-

DISPOSAL OF THE DRIVER AIR BAG MODULE, PASSENGER AIR BAG MODULE, SIDE AIR BAG MODULES AND DRIVER LOWER AIR BAG MODULE

NOTE:

Equipment required: Air bag deployment tools, LRT-86-003, LRT-86-007/02, LRT-86-007/05, LRT-86-007/08, LRT-86-003/05 and LRT-86-003/08, Battery (12V), Safety goggles to BS2092 grade 2, Rubber gloves to PrEN 374 class 2, Ear protectors that have been measured to BS.EN 24869, Particulate respirator to EN 149 grade FFP2S, Suitable vice.

-
1. Using a suitable vice, secure the special tool bracket.
 2. Secure the air bag module to the special tool bracket.
-

3. **WARNING:**

Power must not be connected during this step. Failure to follow this instruction may result in personal injury.

CAUTION:

Make sure the connector is not in contact with the inflator or it will be damaged during the test.

Connect the special tool adaptor lead to the air bag module.

-
4. Make sure the special tool battery connections are 15 Metres (50

Make sure the special tool battery connections are 15 metres (50 Feet) away from the air bag module.

-
5. Remove any loose parts from around the air bag module. Make sure that no flammable liquids are present.

-
6. **WARNING:**

Before proceeding, make sure precautions have been taken to warn personnel of a possible loud noise upon activation. Do not allow anybody to approach closer to the restraint device than 15 Metres (50 Feet). Failure to follow this instruction may result in personal injury.

Connect the special tool to a 12V battery.

-
7. **WARNING:**

Do not handle the deployed air bag module immediately after activation - it may be hot. Allow the air bag module to cool. Cooling air bag modules should be continuously monitored to make sure the heat does not create a fire with spilled liquids or other debris. Failure to follow this instruction may result in personal injury.

Deploy the air bag module by operating both of the switches on the special tool. If deployment does not occur, disconnect the special tool from the battery and seek advice from Land Rover.

-
8. Allow the air bag module to cool.

-
9. Remove the air bag module from the special tool bracket and seal it in a plastic bag, ready for disposal.

-
10. In the event of any problems or queries arising from this procedure, contact Land Rover.

DISPOSAL OF THE FRONT SIDE CURTAIN AIR BAG MODULE AND SIDE CURTAIN AIR BAG MODULES

NOTE:

Equipment required: Air bag deployment tools LRT-86-003 and LRT-86-003/08, Battery (12V), Safety goggles to BS2092 grade 2, Rubber gloves to PrEN 374 class 2, Ear protectors that have been measured to BS.EN 24869, Particulate respirator to EN 149 grade FFP2S.

1. Using a suitable vice, secure the special tool bracket.

2. Secure the air bag module to the special tool bracket.

3.

WARNING:

Power must not be connected during this step. Failure to follow this instruction may result in personal injury.

CAUTION:

Make sure the connector is not in contact with the inflator or it will be damaged during the test.

Connect the special tool adaptor lead to the air bag module.

4. Make sure the special tool battery connections are 15 Metres (50 Feet) away from the air bag module.

5. Remove any loose parts from around the air bag module. Make sure that no flammable liquids are present.

6.

WARNING:

Before proceeding, make sure precautions have been taken to warn personnel of a possible loud noise upon activation. Do not allow anybody to approach closer to the restraint device than 15 Metres (50 Feet). Failure to follow this instruction may result in personal injury.

Connect the special tool to a 12V battery.

7.

WARNING:

Do not handle the deployed air bag module immediately after activation - it may be hot. Allow the air bag module to cool. Cooling air bag modules should be continuously monitored to make sure the heat does not create a fire with spilled liquids or other debris. Failure to follow this instruction may result in personal injury.

Deploy the air bag module by operating both of the switches on the special tool. If deployment does not occur, disconnect the special tool from the battery and seek advice from Land Rover.

8. Allow the air bag module to cool.

9. Remove the air bag module from the special tool bracket and seal in a plastic bag, ready for disposal.

10. In the event of any problems or queries arising from this procedure, contact Land Rover.

**DISPOSAL OF THE SAFETY BELT
PRETENSIONER.**

NOTE:

Equipment required: Air bag deployment tools LRT-86-003, LRT-86-003/08 and LRT-86-007/02 , Battery (12V), Safety goggles to BS2092 grade 2, Rubber gloves to PrEN 374 class 2, Ear protectors that have been measured to BS.EN 24869, Particulate respirator to EN 149 grade FFP2S.

1. Using a suitable vice, secure the special tool bracket.

2. Secure the safety belt pretensioner to the special tool bracket.

3.

WARNING:

Power must not be connected during this step. Failure to follow this instruction may result in personal injury.

CAUTION:

Make sure the connector is not in contact with the inflator or it will be damaged during the test.

Connect the special tool adaptor lead to the safety belt pretensioner.

4. Make sure the special tool battery connections are 15 Metres (50 Feet) away from the safety belt pretensioner.

5. Remove any loose parts from around the safety belt pretensioner. Make sure that no flammable liquids are present.

6.

WARNING:

Before proceeding, make sure precautions have been taken to warn personnel of a possible loud noise upon activation. Do not allow anybody to approach closer to the restraint

device than 15 Metres (50 Feet). Failure to follow this instruction may result in personal injury.

Connect the special tool to a 12V battery.

7.

WARNING:

Do not handle the deployed device immediately after activation - it may be hot. Allow the unit to cool for at least 20 minutes. Cooling modules should be continuously monitored to make sure heat does not create a fire with spilled liquids or other debris. Failure to follow this instruction may result in personal injury.

Deploy the safety belt pretensioner by operating both of the switches on the special tool. If deployment does not occur, disconnect the battery from the special tool and seek advice from Land Rover.

-
8. Allow the safety belt pretensioner to cool for at least 20 minutes. Cooling SRS modules should be continuously monitored to make sure the heat does not generate a fire with spilt liquids or other debris.

 9. Remove the safety belt pretensioner from the air bag deployment tool bracket and seal in a plastic bag, ready for disposal.

 10. In the event of any problems or queries arising from this procedure, contact Land Rover.

2012.0 RANGE ROVER (LM), 501-20

SUPPLEMENTAL RESTRAINT SYSTEM

B-PILLAR SIDE IMPACT SENSOR (G928275)

REMOVAL AND INSTALLATION

REMOVAL

WARNINGS:

- Persons working on the supplemental restraint system (SRS) must be fully trained and have been issued with the safety guidelines.
- Allow a period of 10 minutes to elapse after disconnecting the battery before undertaking any work on the SRS.
- The SRS electrical connectors are unique. DO NOT force, or attempt to connect electrical connectors to the wrong sockets.
- The correct procedures must always be used when working on SRS components.
- It is imperative that before any work is undertaken on the SRS system, the appropriate information is read thoroughly.
- Always disconnect both battery cables before beginning work on the SRS system. Disconnect the ground cable first. Never reverse connect the battery.

- Take extra care when handling SRS components.

1. Disconnect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

2. Make the air bag supplemental restraint system (SRS) safe.

For additional information, refer to: Standard Workshop Practices (100-00, Description and Operation).

3. Remove the B-pillar trim panel.

For additional information, refer to: B-Pillar Trim Panel (501-05, Removal and Installation).

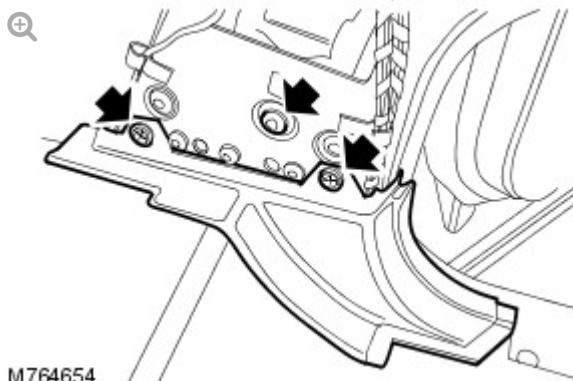
4. Remove the front scuff plate trim panel.

For additional information, refer to: Front Scuff Plate Trim Panel (501-05, Removal and Installation).

5. Remove the rear scuff plate trim panel.

For additional information, refer to: Rear Scuff Plate Trim Panel (501-05, Removal and Installation).

- 6.

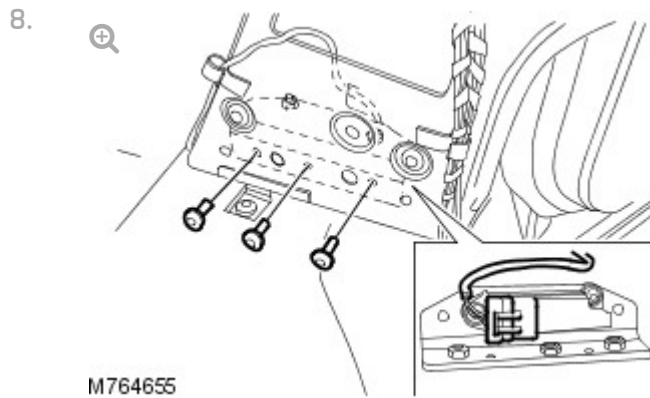


Release the front safety belt retractor.

- Remove and discard the bolt.

7. Remove the B-pillar floor covering trim panel.

- Remove the 2 clips.



Release the B-pillar side impact sensor bracket.

- Remove and discard the 3 bolts.

9. Disconnect the B-pillar side impact sensor electrical connector.

- Release the 2 wiring harness clips.

10. Remove the B-pillar side impact sensor and B-pillar side impact sensor bracket.

INSTALLATION

1. Install the B-pillar side impact sensor and B-pillar side impact sensor bracket.

2. Connect the B-pillar side impact sensor electrical connector.

- Secure the 2 wiring harness clips.

3. Secure the B-pillar side impact sensor bracket.

- Tighten the 3 new bolts to 8 Nm (6 lb.ft).

4. Install the B-pillar floor covering trim panel.

- Install the 2 clips.

5. Secure the front safety belt retractor.

- Install the new bolt and tighten to 31 Nm (23 lb.ft).

6. Install the rear scuff plate trim panel.

For additional information, refer to: Rear Scuff Plate Trim Panel (501-05, Removal and Installation).

7. Install the front scuff plate trim panel.

For additional information, refer to: Front Scuff Plate Trim Panel (501-05, Removal and Installation).

8. Install the B-pillar trim panel.

For additional information, refer to: B-Pillar Trim Panel (501-05, Removal and Installation).

9. Connect the battery ground lead.

For additional information, refer to: Specifications (414-00, Specifications).

2012.0 RANGE ROVER (LM), 501-20

SUPPLEMENTAL RESTRAINT SYSTEM

CLOCKSPRING (G1239689)

76.74.20	CLOCKSPRING - (S.R.S) AIR BAG SYSTEM - RENEW	ALL DERIVATIVES	0.4	USED WITHINS	+
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REMOVAL

WARNINGS:

- Persons working on the supplemental restraint system (SRS) must be fully trained and have been issued with the safety guidelines.
- It is imperative that before any work is undertaken on the SRS system, the appropriate information is read thoroughly.
- The correct procedures must always be used when working on SRS components.
- Always disconnect both battery cables before beginning work on the SRS system. Disconnect the ground cable first. Never reverse connect the battery.
- Allow a period of 10 minutes to elapse after disconnecting the battery before undertaking any work on the SRS.
- The SRS electrical connectors are unique. DO NOT force, or attempt to connect electrical connectors to the wrong sockets.
- Do not probe supplemental restraint system (SRS) electrical connectors.
- Take extra care when handling supplemental restraint system (SRS) components.

CAUTION:

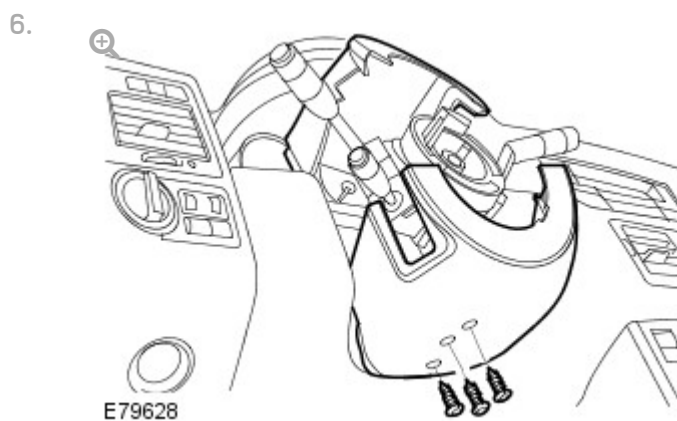
Do not dismantle the clockspring, it has no serviceable parts and must be replaced as a complete assembly

to be replaced as a complete assembly.

NOTE:

If the SRS component is to be replaced, the bar code of the new unit must be recorded.

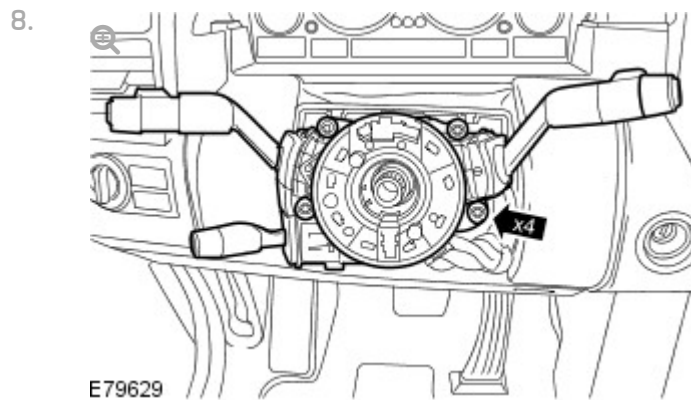
1. Make the air bag supplemental restraint system (SRS) safe.
For additional information, refer to: Standard Workshop Practices (100-00, Description and Operation).
2. Fully extend the steering column for access.
3. Disconnect the battery ground cable.
For additional information, refer to: Specifications (414-00, Specifications).
4. Remove the steering wheel.
For additional information, refer to: Steering Wheel (211-04, Removal and Installation).
5. Release the steering column extension gaiter.
 - Release the 6 clips.



Remove the steering column lower shroud.

- Remove the 3 screws.

7. Remove the steering column upper shroud.



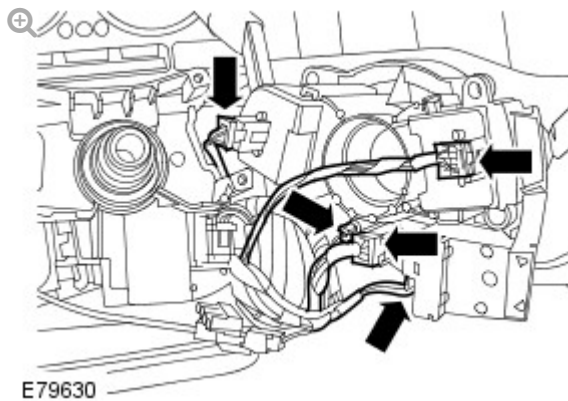
Release the clockspring.

- Remove the 4 screws.

9.

CAUTION:

Do not dismantle the clockspring, it has no serviceable parts and must be replaced as a complete assembly.



Remove the clockspring.

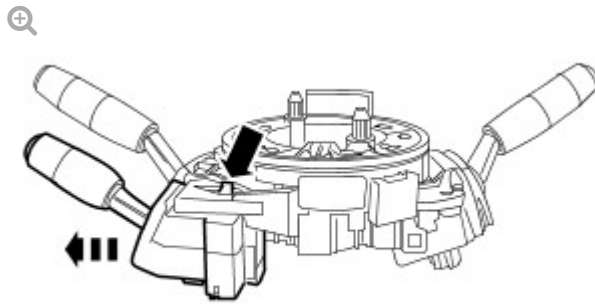
- Disconnect the 5 electrical connectors.
- Cut the cable tie.

10.

NOTE:

Do not disassemble further if the component is removed for

access only.

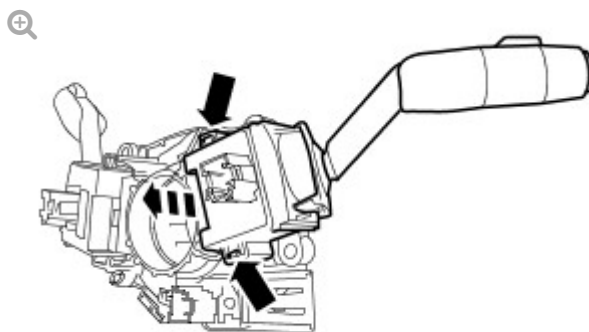


E 79631

Remove the steering column control switch.

- Carefully release the clip.

11.



E 79632

Remove the LH steering column multifunction switch.

- Release the 2 clips.

12. Remove the RH steering column multifunction switch.

- Release the 2 clips.

INSTALLATION

1. Install RH steering column multifunction switch.

2. Install LH steering column multifunction switch.

3. Install the steering column control switch.

4.

NOTE:

If the SRS component is to be replaced, the bar code of the new unit must be recorded.

Install the clockspring.

- Align the wiring harness and secure with a cable tie.
- Connect the 5 electrical connectors.
- Install the 4 screws.

5. Install the steering column upper shroud.

6. Install the steering column lower shroud.

- Install the 3 screws.

7. Attach the steering column extension gaiter.

8. Install the steering wheel.

For additional information, refer to: Steering Wheel (211-04, Removal and Installation).

9. Connect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

10. Return the steering column to its original position.

2012.0 RANGE ROVER (LM), 501-20

SUPPLEMENTAL RESTRAINT SYSTEM

DRIVER AIR BAG MODULE

[G874162]

REMOVAL AND INSTALLATION

76.74.01	AIR BAG - STEERING WHEEL - RENEW	ALL DERIVATIVES	0.2	USED WITHINS	+
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REMOVAL

WARNINGS:

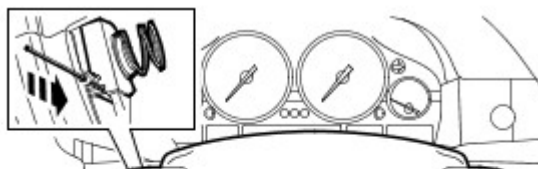
- Persons working on the supplemental restraint system (SRS) must be fully trained and have been issued with the safety guidelines.
- Allow a period of 10 minutes to elapse after disconnecting the battery before undertaking any work on the SRS.
- The SRS electrical connectors are unique. DO NOT force, or attempt to connect electrical connectors to the wrong sockets.
- The correct procedures must always be used when working on SRS components.
- It is imperative that before any work is undertaken on the SRS system, the appropriate information is read thoroughly.
- Always disconnect both battery cables before beginning work on the SRS system. Disconnect the ground cable first. Never reverse connect the battery.
- Take extra care when handling SRS components.

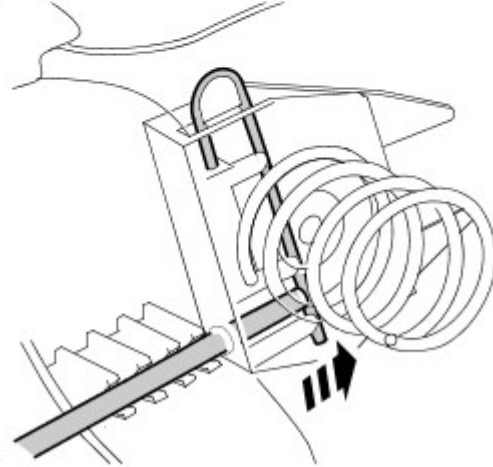
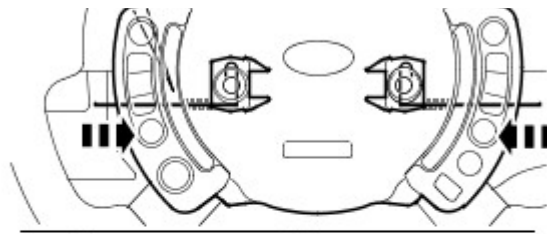
NOTE:

If the SRS component is to be replaced, the bar code of the new unit must be recorded.

1. Make the air bag supplemental restraint system (SRS) safe.
For additional information, refer to: Standard Workshop Practices (100-00, Description and Operation).
2. Disconnect the battery ground cable.
For additional information, refer to: Specifications (414-00, Specifications).

3.





E79633

Release the 2 clips from the driver air bag module using a rod at least 50 mm (2 inches.) long and not exceeding 3 mm (1/8 inch.) diameter. Install the rod through each access hole in the steering wheel control switches at right angles to the steering column. Locate the secondary hole and carefully push on the rod until the clip is released.

4.



E79634

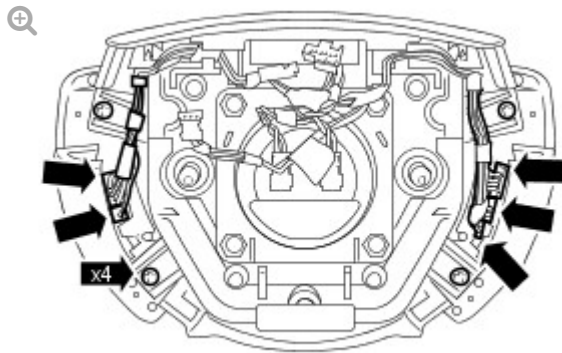
Remove the driver air bag module.

- Disconnect the 3 electrical connectors.

5.

NOTE:

Do not disassemble further if the component is removed for access only.



E 79635

Remove the speed control switch and steering wheel audio controls.

- Remove the 4 screws.
- Disconnect the 5 electrical connectors from the speed control switch and steering wheel audio controls.

INSTALLATION

1. Install the speed control switch and steering wheel audio controls.
 - Connect the 5 electrical connectors to the speed control switch and steering wheel audio controls.
 - Install the 4 screws and tighten to 3 Nm (2 lb.ft).

2.

NOTE:

If the SRS component is to be replaced, the bar code of the new unit must be recorded.

Position the driver air bag module and connect the 3 electrical connectors.

3. Locate the driver air bag module and carefully push to secure the clips.
-

4. Connect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

2012.0 RANGE ROVER (LM), 501-20

SUPPLEMENTAL RESTRAINT SYSTEM

DRIVER LOWER AIR BAG MODULE (G899343)

REMOVAL AND INSTALLATION

REMOVAL

WARNINGS:

- Persons working on the supplemental restraint system (SRS) must be fully trained and have been issued with the safety guidelines.
- Allow a period of 10 minutes to elapse after disconnecting the battery before undertaking any work on the SRS.
- The SRS electrical connectors are unique. DO NOT force, or attempt to connect electrical connectors to the wrong sockets.
- The correct procedures must always be used when working on SRS components.
- It is imperative that before any work is undertaken on the SRS system, the appropriate information is read thoroughly.
- Always disconnect both battery cables before beginning work on the SRS system. Disconnect the ground cable first. Never reverse

connect the battery.

- Take extra care when handling SRS components.

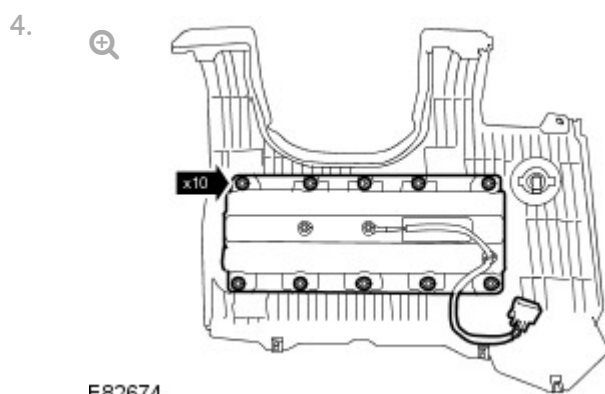
CAUTION:

The driver lower air bag module is handed to the drive of vehicle.

NOTE:

If the SRS component is to be replaced, the bar code of the new unit must be recorded.

1. Make the air bag supplemental restraint system (SRS) safe.
For additional information, refer to: Standard Workshop Practices (100-00, Description and Operation).
2. Disconnect the battery ground cable.
For additional information, refer to: Specifications (414-00, Specifications).
3. Remove the instrument panel lower section.
For additional information, refer to: Instrument Panel Lower Section (501-12, Removal and Installation).



Remove the driver lower air bag module.

- Remove the 10 nuts.

INSTALLATION

1.

NOTE:

If the SRS component is to be replaced, the bar code of the new unit must be recorded.

Install the driver lower air bag module.

- Tighten the nuts to 8 Nm (6 lb.ft).

2. Install the instrument panel lower section.

For additional information, refer to: Instrument Panel Lower Section (501-12, Removal and Installation).

3. Connect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

2012.0 RANGE ROVER (LM), 501-20

SUPPLEMENTAL RESTRAINT SYSTEM

FRONT SEAT SIDE AIR BAG MODULE (G909553)

REMOVAL AND INSTALLATION

REMOVAL

WARNINGS:

- Persons working on the supplemental restraint system (SRS) must be fully trained and have been issued with the safety guidelines.
- The correct procedures must always be used when working on SRS components.
- Allow a period of 10 minutes to elapse after disconnecting the battery before undertaking any work on the SRS.
- The SRS electrical connectors are unique. DO NOT force, or attempt to connect electrical connectors to the wrong sockets.
- Always disconnect both battery cables before beginning work on the SRS system. Disconnect the ground cable first. Never reverse connect the battery.
- It is imperative that before any work is undertaken on the SRS system, the appropriate information is read thoroughly.
- Take extra care when handling SRS components.

-
1. Disconnect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

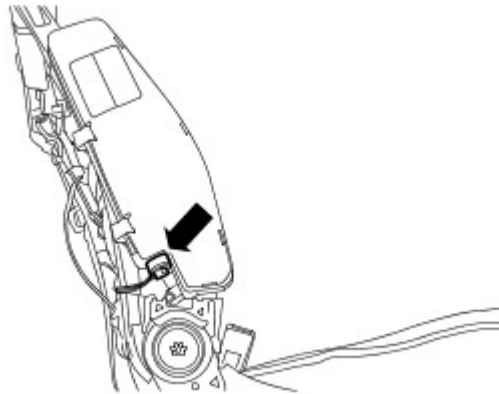
-
2. Make the air bag supplemental restraint system (SRS) safe.

For additional information, refer to: Standard Workshop Practices (100-00, Description and Operation).

-
3. Remove the front seat backrest cover.

For additional information, refer to: Front Seat Backrest Cover (501-10, Removal and Installation).

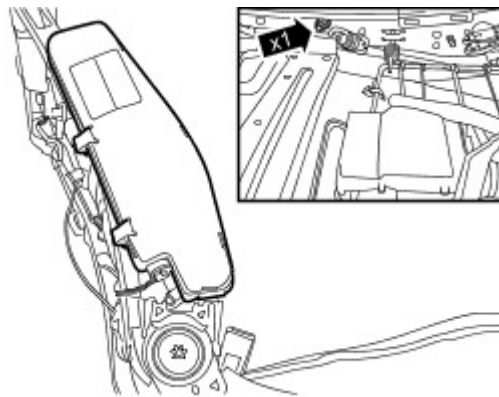
- 4.



E78250

Disconnect the side air bag module electrical connector.

- 5.



E78251

Remove the front seat side air bag module.

- Remove and discard the nut.
-

INSTALLATION

1. Install the front seat side air bag module.

- Tighten the new nut to 7 Nm (5 lb.ft).
-

2. Connect the side air bag module electrical connector.
-

3. Install the front seat backrest cover.

For additional information, refer to: Front Seat Backrest Cover (501-10, Removal and Installation).

to, remove the insulation.

-
4. Connect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

2012.0 RANGE ROVER (LM), 501-20

SUPPLEMENTAL RESTRAINT SYSTEM

OCCUPANT CLASSIFICATION SENSOR (G909979)

REMOVAL AND INSTALLATION

76.74.76	SENSOR - SEAT OCCUPANCY - RENEW	ALL DERIVATIVES	1.2	USED WITHINS	+
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REMOVAL

WARNINGS:

- Persons working on the supplemental restraint system (SRS) must be fully trained and have been issued with the safety guidelines.
- Allow a period of 10 minutes to elapse after disconnecting the battery before undertaking any work on the SRS.
- The SRS electrical connectors are unique. DO NOT force, or attempt to connect electrical connectors to the wrong sockets.
- The correct procedures must always be used when working on SRS components.
- It is imperative that before any work is undertaken on the SRS system, the appropriate information is read thoroughly.
- Always disconnect both battery cables before beginning work on the SRS system. Disconnect the ground cable first. Never reverse connect the battery.
- Take extra care when handling SRS components.

CAUTION:

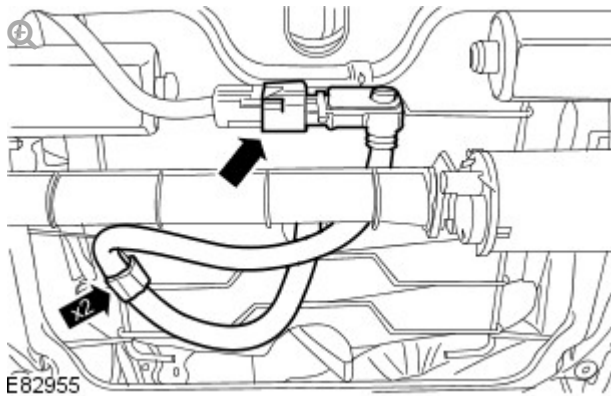
The front passenger seat occupant classification sensor is available only as a service kit. No attempt should be made to replace individual components. Failure to follow this instruction may result in personal injury.

1. Disconnect the battery ground cable.
For additional information, refer to: Specifications (414-00, Specifications).
2. Make the air bag supplemental restraint system (SRS) safe.
For additional information, refer to: Standard Workshop Practices (100-00, Description and Operation).

3. Remove the front seat cushion cover.

For additional information, refer to: Front Seat Cushion Cover (501-10, Removal and Installation).

4.



Disconnect the occupant classification sensor electrical connector.

- Release the 2 clips from the occupant classification sensor wiring harness.

5.



Remove the occupant classification sensor.

- Remove the 2 clips.
- Reposition the occupant classification sensor wiring harness.

INSTALLATION

-
1. Install the occupant classification sensor.

- Reposition the occupant classification sensor wiring harness.
 - Install the 2 clips.
-

2. Connect the occupant classification sensor electrical connector.
 - Secure the 2 clips to the occupant classification sensor wiring harness.
-

3. Install the front seat cushion cover.

For additional information, refer to: Front Seat Cushion Cover (501-10, Removal and Installation).
-

4. Connect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).
-

5. Using the Land Rover approved diagnostic system, calibrate the occupant classification sensor.

2012.0 RANGE ROVER (LM), 501-20

SUPPLEMENTAL RESTRAINT SYSTEM

PASSENGER AIR BAG DEACTIVATION (PAD) SWITCH (G874163)

REMOVAL AND INSTALLATION

76.74.19	SWITCH - PASSENGER AIR BAG DEACTIVATION (PAD) - RENEW	ALL DERIVATIVES	0.1	USED WITHINS	+
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REMOVAL

WARNINGS:

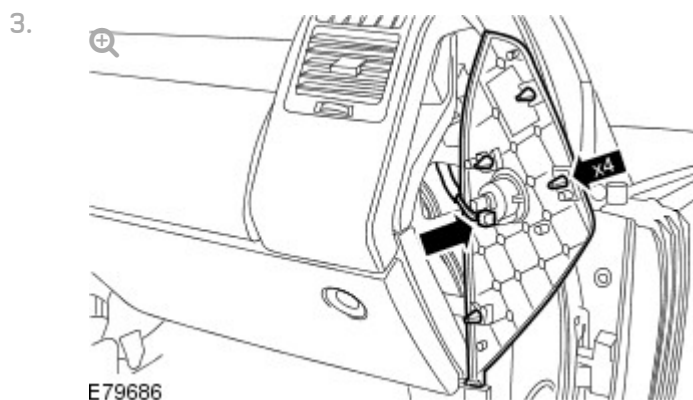
- Persons working on the supplemental restraint system (SRS) must be fully trained and have been issued with the safety guidelines.
- Allow a period of 10 minutes to elapse after disconnecting the battery before undertaking any work on the SRS.
- The SRS electrical connectors are unique. DO NOT force, or

attempt to connect electrical connectors to the wrong sockets.

- The correct procedures must always be used when working on SRS components.
- It is imperative that before any work is undertaken on the SRS system, the appropriate information is read thoroughly.
- Always disconnect both battery cables before beginning work on the SRS system. Disconnect the ground cable first. Never reverse connect the battery.
- Take extra care when handling SRS components.

-
1. Make the air bag supplemental restraint system (SRS) safe.
For additional information, refer to: Standard Workshop Practices (100-00, Description and Operation).

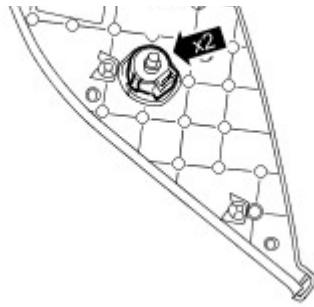
-
2. Disconnect the battery ground cable.
For additional information, refer to: Specifications (414-00, Specifications).



Remove the instrument panel end trim panel.

- Release sufficient door aperture seal for access.
- Carefully release the 4 clips.
- Disconnect the electrical connector from the passenger air bag deactivation switch.





E 79687

Remove the passenger air bag deactivation switch.

- Release the 2 clips.

INSTALLATION

1. Install the passenger air bag deactivation switch.
2. Install the instrument panel end trim panel.
 - Connect the passenger air bag deactivation switch electrical connector.
 - Carefully align and secure the clips.
 - Install the aperture seal.
3. Connect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

PASSENGER AIR BAG MODULE (G1988668)

REMOVAL AND INSTALLATION

76.74.02	AIR BAG - INSTRUMENT PANEL - PASSENGER - RENEW	ALL DERIVATIVES	1.4	USED WITHINS	+
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REMOVAL

WARNINGS:

- Persons working on the supplemental restraint system (SRS) must be fully trained and have been issued with the safety guidelines.
- Allow a period of 10 minutes to elapse after disconnecting the battery before undertaking any work on the SRS.
- The SRS electrical connectors are unique. DO NOT force, or attempt to connect electrical connectors to the wrong sockets.
- The correct procedures must always be used when working on SRS components.
- It is imperative that before any work is undertaken on the SRS system, the appropriate information is read thoroughly.
- Always disconnect both battery cables before beginning work on the SRS system. Disconnect the ground cable first. Never reverse connect the battery.
- Take extra care when handling SRS components.

NOTE:

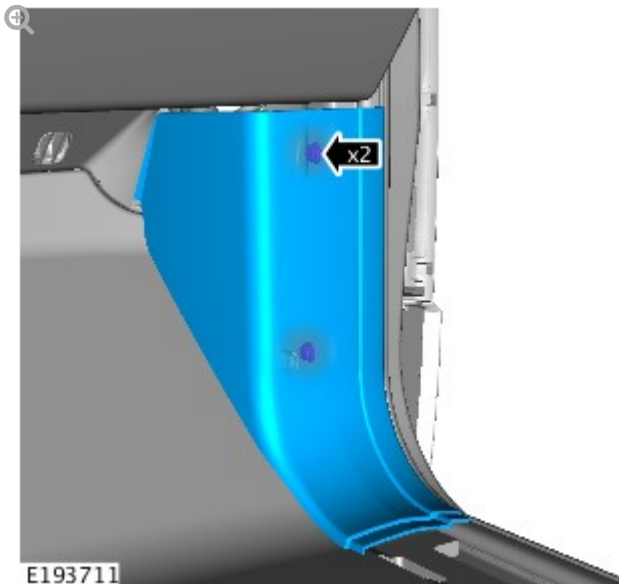
If the SRS component is to be replaced, the bar code of the new unit must be recorded.

1.
 - Open the upper and lower glove compartment.
2.
 - Make the air bag supplemental restraint system (SRS) safe.
Refer to: [Standard Workshop Practices](#) (100-00 General Information, Description and Operation).
3.
 - Disconnect both battery cables.
Refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).

4. 

- Remove the front scuff plate trim panel.
- Release the 7 clips.

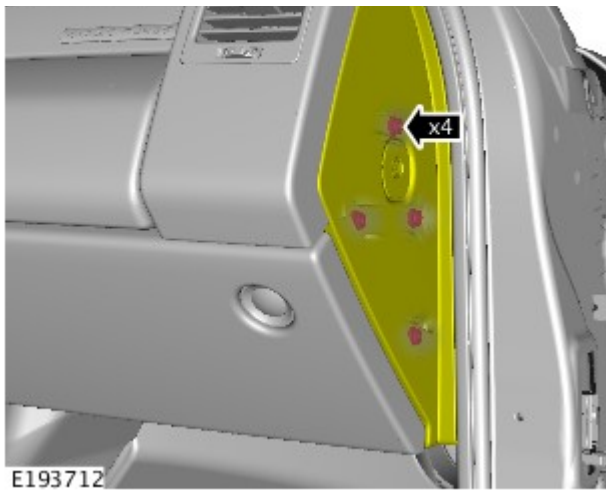
5.



- Remove the cowl side trim panel.
- Release the 2 clips.

6.





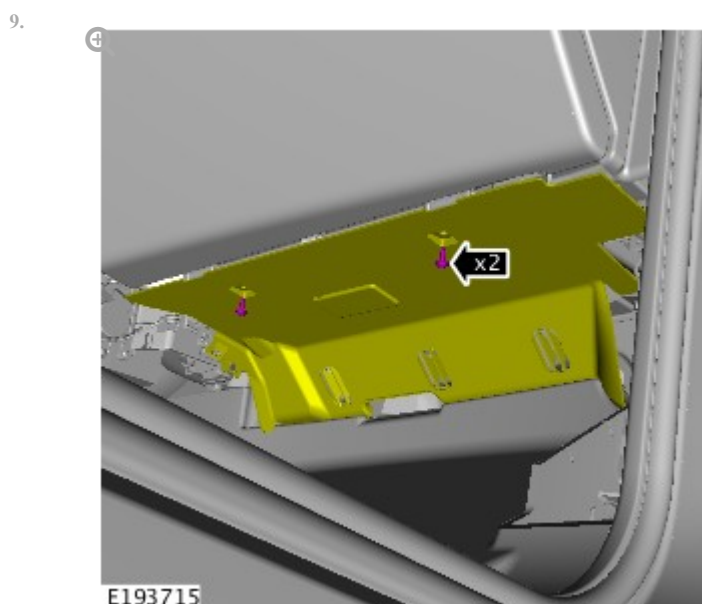
- Release the instrument panel end trim panel.
- Release the 4 clips.

7. 

- Remove the instrument panel end trim panel.
- Disconnect the electrical connector.

8. 

- Remove the floor console extension trim panel.
- Remove the screw.
- Release the 2 clips.



- Release the closing trim panel.
- Remove the 2 screws.

10.



- Remove the closing trim panel.
- Disconnect the electrical connector.

11.



- Release the side register.
- Release the 4 clips.

12.



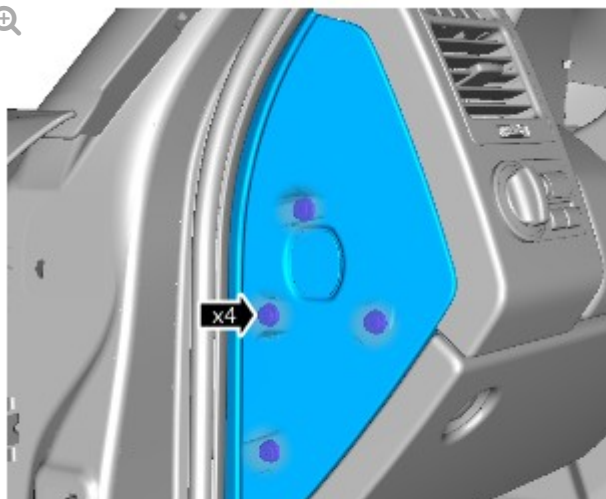
- Remove the side register.
- Disconnect the electrical connector.

13.



- Remove the side register trim panel.
- Remove the 3 screws.

14.





- Remove the instrument panel end trim panel.
- Release the 4 clips.

15.



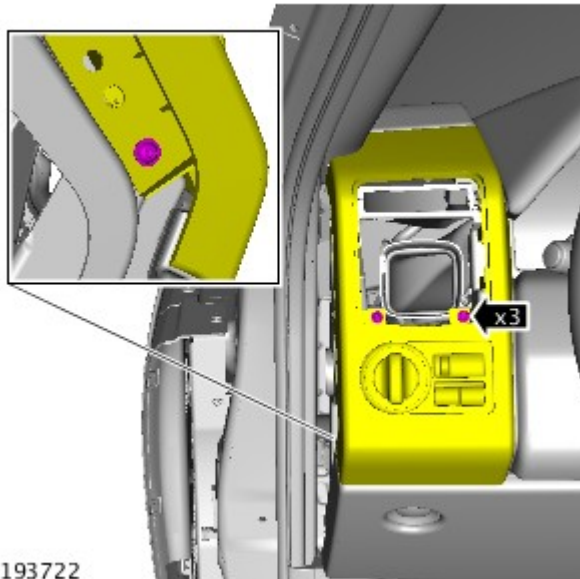
- Release the side register.
- Release the 4 clips.

16.



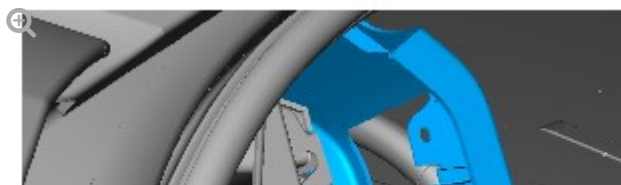
- Remove the side register.
- Disconnect the electrical connector.

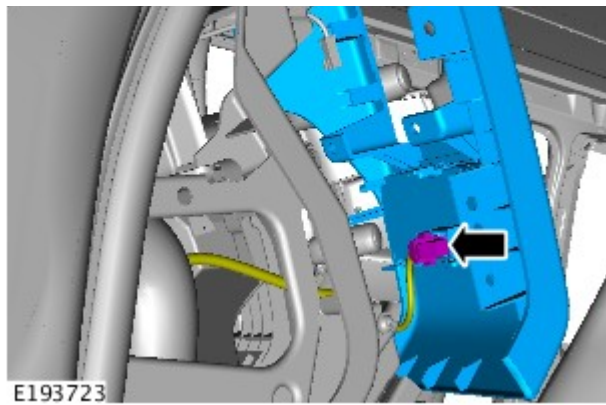
17.



- Release the side register trim panel.
- Remove the 3 screws.

18.





- Remove the side register trim panel.
- Disconnect the electrical connector.

19.



- Remove the screw.
1. Disconnect the electrical connector.

20.



- Open the lower glove compartment to the service position.

21.



- Release the lower glove compartment.
- Remove the 8 screws.

22.



- Remove the lower glove compartment.
- Disconnect the 2 electrical connectors.

23.

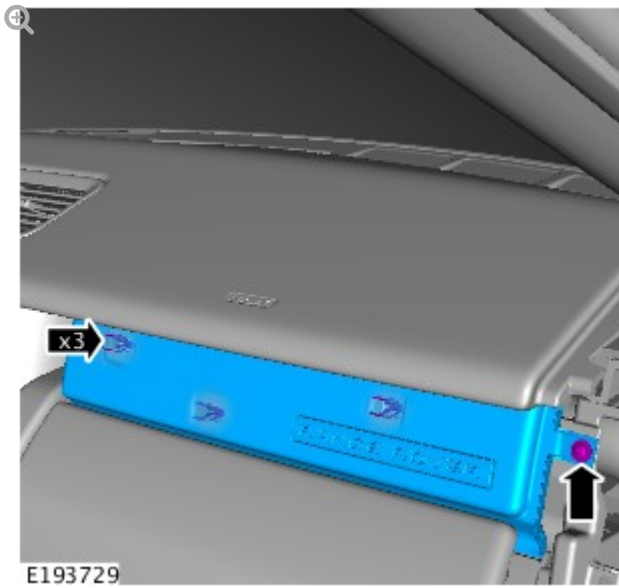


- Remove the 2 screws.

Remove the 2 screws.

- Release the clip.

24.



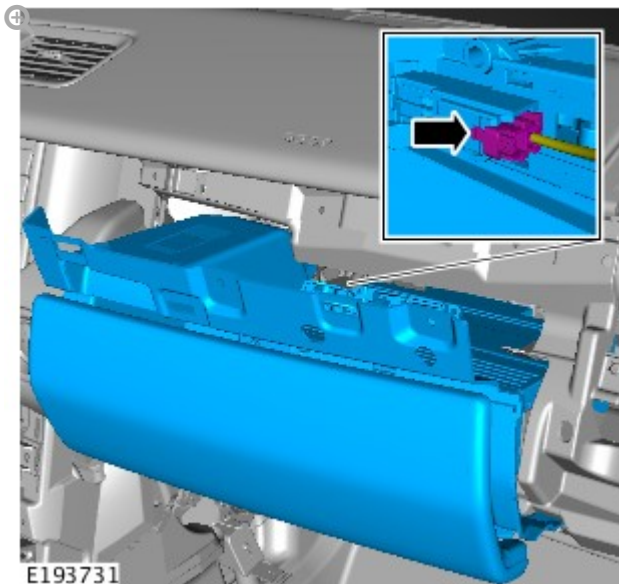
- Remove the upper glove compartment finisher trim panel.
- Remove the screw.
- Release the 3 clips.

25.



- Release the upper glove compartment.
- Remove the 3 screws.

26.



- Remove the upper glove compartment.
- Disconnect the electrical connector.

27.



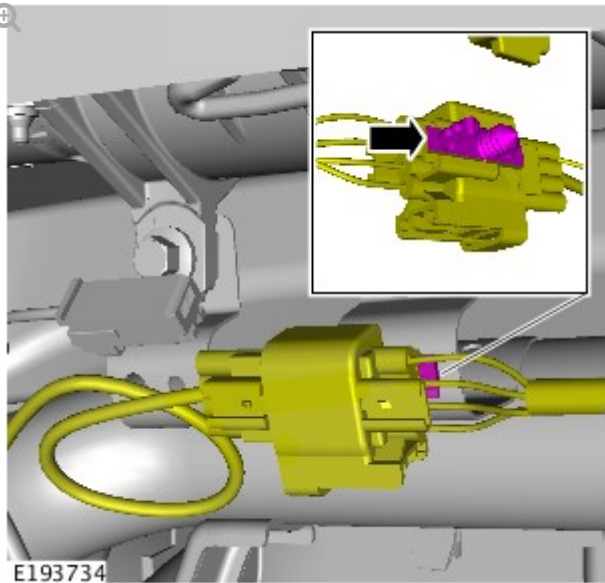
- Remove the instrument panel center speaker grille.
- Release the 8 clips.

28.



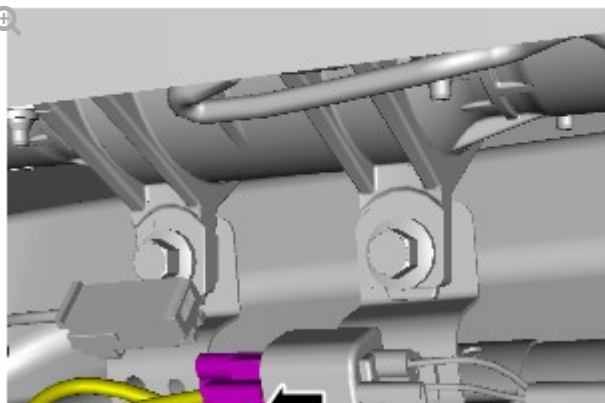
- Remove the upper center registers.
- Release the 5 clips.

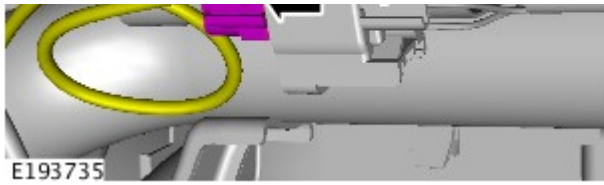
29.



- Release the clip.

30.





- Disconnect the electrical connector.

31.

NOTE:

Discard the bolts.



- Remove and discard the 2 bolts.

32.



- Release the instrument panel upper section.
- Remove the 10 screws.

33.



- Remove the instrument panel upper section.
- Disconnect the electrical connector.

34.

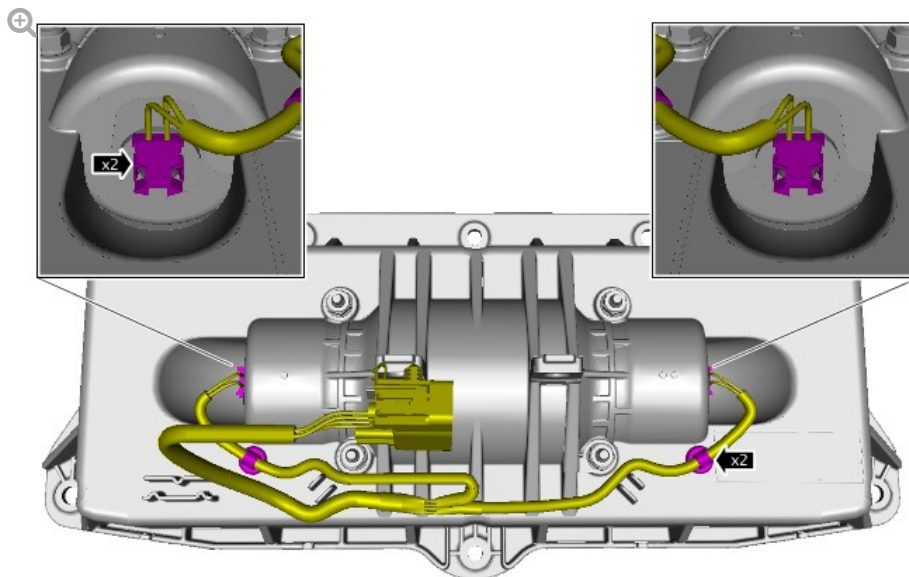
NOTE:

Discard the nuts.



- Remove the air bag module.
- Remove and discard the 8 nuts.

35.



E194793

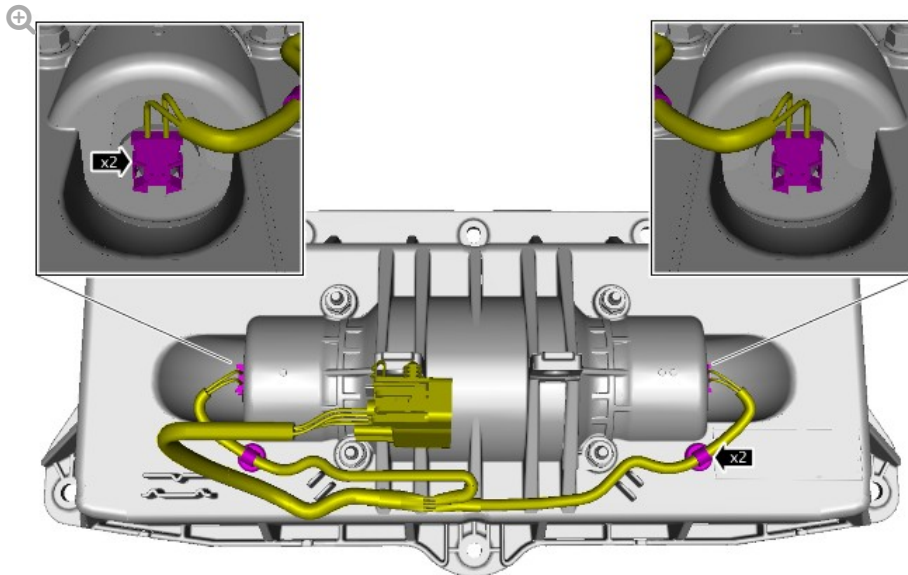
- Remove the air bag wiring harness.
- Disconnect the 2 electrical connectors.
- Release the 2 clips.

INSTALLATION

1.

WARNING:

If a new air bag module is supplied **with** a wiring harness attached. The wiring harness **must** be removed and discarded.



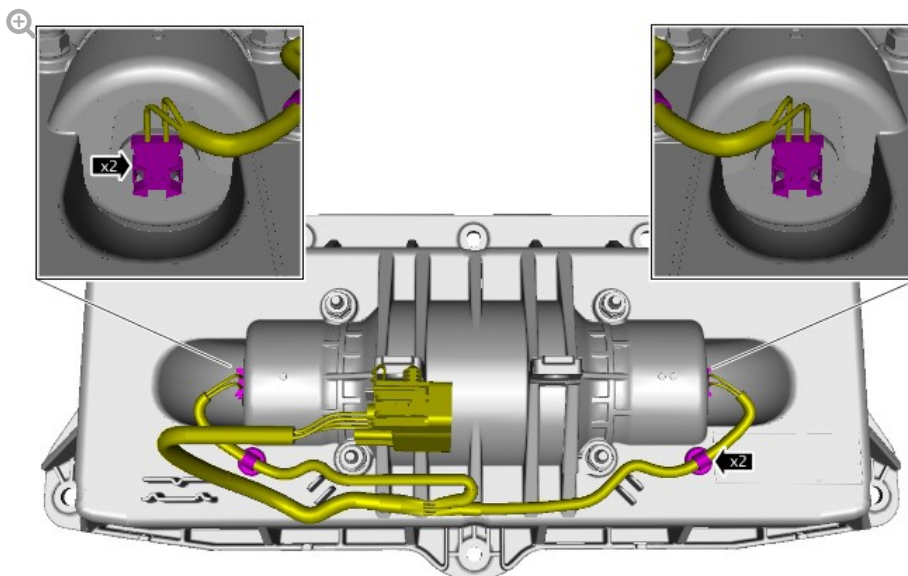
E194793

- Remove and discard the air bag wiring harness.
- Disconnect the 2 electrical connectors.
- Release the 2 clips.

2.

WARNING:

The original air bag wiring harness, as supplied with the vehicle, **must** be fitted to the new air bag module.



E194793

- Install the air bag wiring harness.

- Install the 2 clips.
- Connect the 2 electrical connectors.

3.

NOTE:

New nuts must be installed.



- Install the air bag module.
- Install the 8 nuts.
Torque: 7 Nm

4.



- Install the instrument panel upper section.
- Connect the electrical connector.

5.



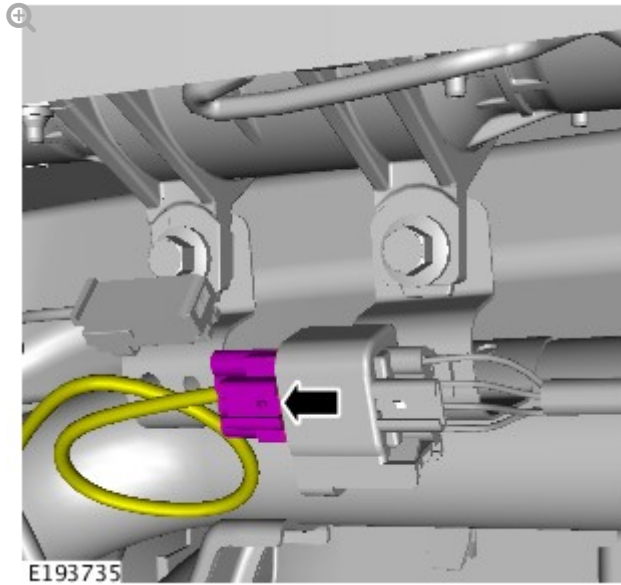
- Position the instrument panel upper section in the correct location.
- Install the 10 screws.

NOTE:

New bolts must be installed.

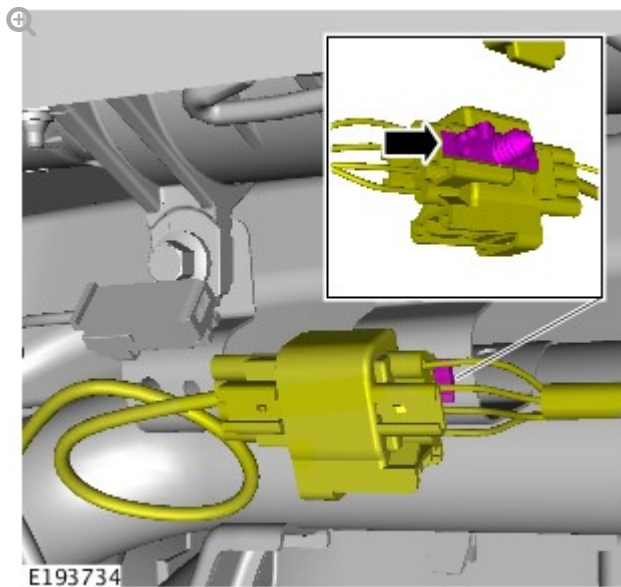
Install the 2 bolts.19

6.



- Connect the electrical connector.

7.



- Install the clip.

8.



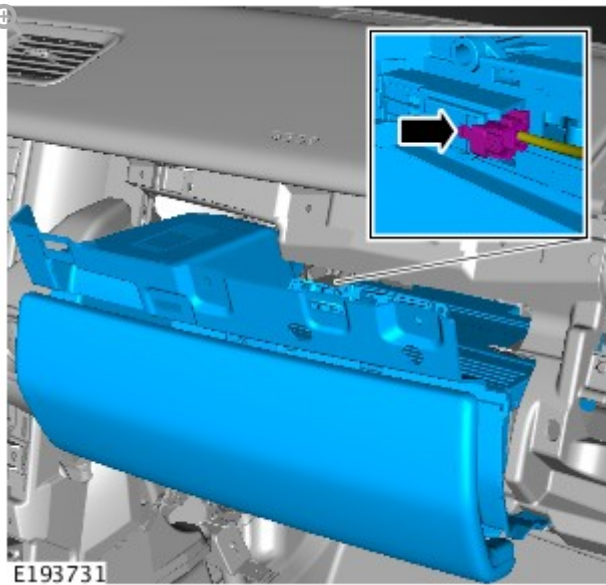
- Install the upper center registers.
- Install the 5 clips.

9.



- Install the instrument panel center speaker grille.
- Install the 8 clips.

10.



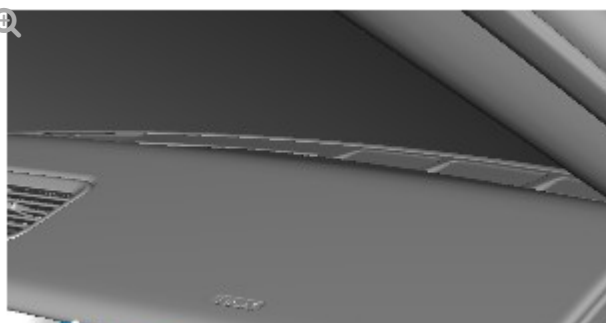
- Install the upper glove compartment.
- Connect the electrical connector.

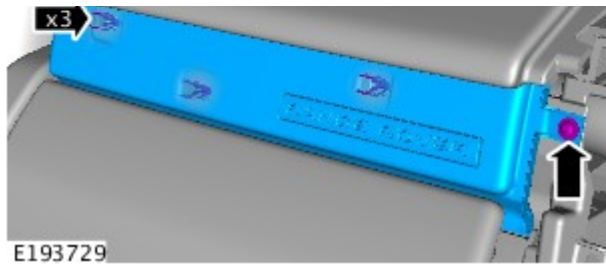
11.



- Position the upper glove compartment in the correct location.
- Install the 3 screws.

12.





- Install the upper glove compartment finisher trim panel.
- Install the screw.
- Install the 3 clips.

13.



- Install the 2 screws.
- Install the clip.

14.



- Install the lower glove compartment.
- Connect the 2 electrical connectors.

15.



- Position the lower glove compartment in the correct location.
- Install the 8 screws.

16.



- Position the lower glove compartment out of the service position.

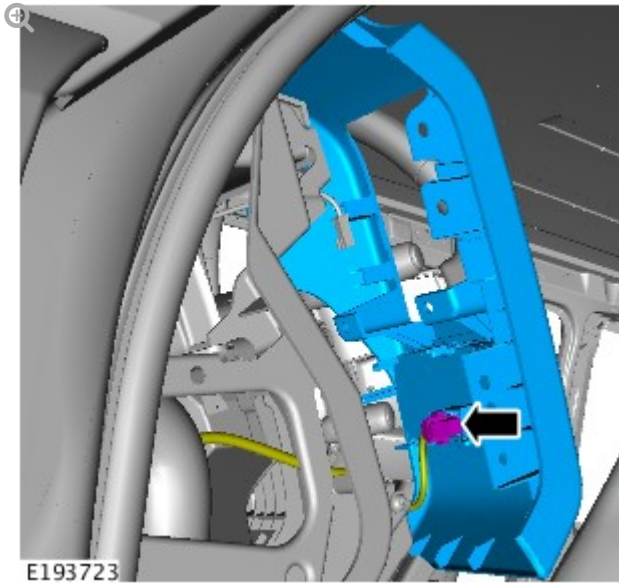
17.



- Install the screw.

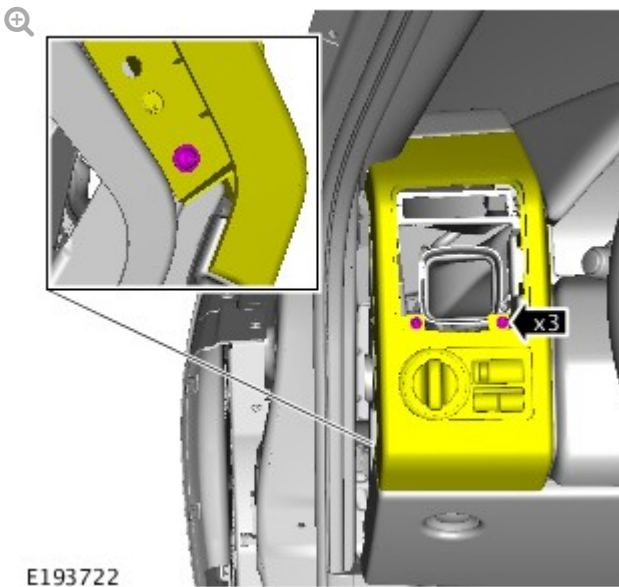
1. Connect the electrical connector.

18.



- Install the side register trim panel.
- Connect the electrical connector.

19.



- Position the side register trim panel in the correct location.
- Install the 3 screws.

20.



- Install the side register.

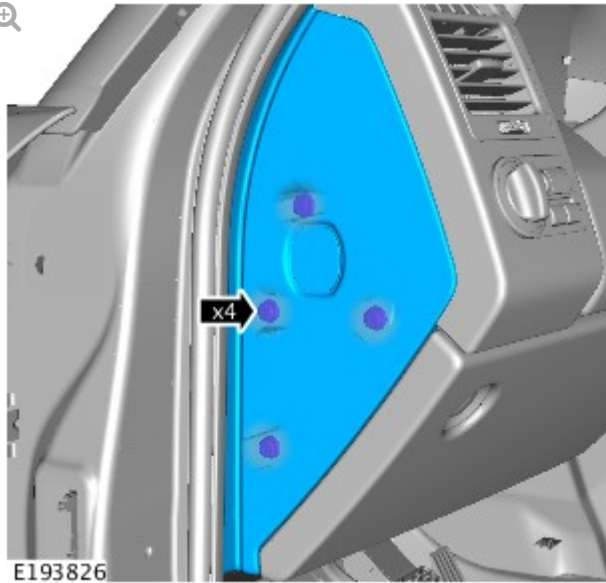
- Connect the electrical connector.

21.



- Position the side register in the correct location.
- Install the 4 clips.

22.



- Install the instrument panel end trim panel.
- Install the 4 clips.

23.



- Install the side register trim panel.
- Install the 3 screws.

24.



- Install the side register.
- Connect the electrical connector.

25.



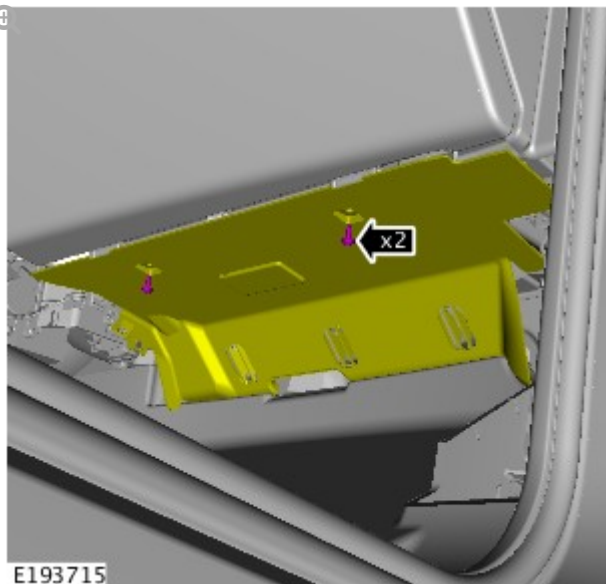
- Position the side register in the correct location.
- Install the 4 clips.

26.



- Install the closing trim panel.
- Connect the electrical connector.

27.



- Position the closing trim panel in the correct location.
- Install the 2 screws.

28.



- Install the floor console extension trim panel.
- install the 2 clips.
- Install the screw.

29.



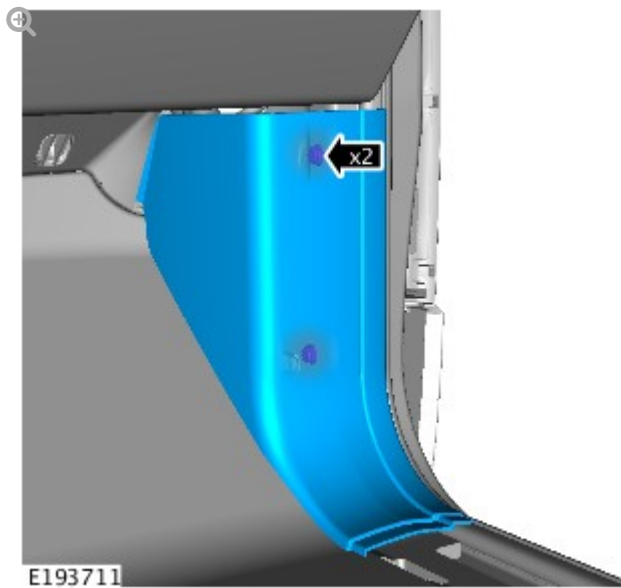
- Install the instrument panel end trim panel.
- Connect the electrical connector.

30.



- Position the instrument panel end trim panel in the correct location.
- Install the 4 clips.

31.



- Install the cowl side trim panel.
- Install the 2 clips.

32.



- Install the front scuff plate trim panel.

- Install the / clips.
- 33.
- Connect both battery cables.
Refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).



NOTE:

New bolts must be installed.



- Install the 2 bolts.
Torque: 19 Nm

2012.0 RANGE ROVER (LM), 501-20

SUPPLEMENTAL RESTRAINT SYSTEM

SIDE AIR BAG MODULE (G875365)

REMOVAL AND INSTALLATION

76.74.30	AIR BAG - SIDE IMPACT FRONT DOOR - RENEW	ALL DERIVATIVES	0.5	USED WITHINS	+
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76.74.31	AIR BAG - SIDE IMPACT - FRONT SEAT - DRIVERS - RENEW	ALL DERIVATIVES	1.3	USED WITHINS	+
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REMOVAL

WARNINGS:

- Persons working on the supplemental restraint system (SRS) must be fully trained and have been issued with the safety guidelines.
- Allow a period of 10 minutes to elapse after disconnecting the battery before undertaking any work on the SRS.
- The SRS electrical connectors are unique. DO NOT force, or attempt to connect electrical connectors to the wrong sockets.
- The correct procedures must always be used when working on SRS components.
- It is imperative that before any work is undertaken on the SRS system, the appropriate information is read thoroughly.
- Always disconnect both battery cables before beginning work on the SRS system. Disconnect the ground cable first. Never reverse connect the battery.
- Take extra care when handling SRS components.

-
1. Disconnect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

-
2. Make the air bag supplemental restraint system (SRS) safe.

For additional information, refer to: Standard Workshop Practices (100-00, Description and Operation).

-
3. Remove the front door trim panel.

For additional information, refer to: Front Door Trim Panel (501-05, Removal and Installation).

4.



Remove the side air bag module.

- Disconnect the electrical connector.
- Remove and discard the 3 bolts.

INSTALLATION

1. Install the side air bag module.

- Tighten the 3 new bolts to 9 Nm (7 lb.ft).
- Connect the electrical connector.

2. Install the front door trim panel.

For additional information, refer to: Front Door Trim Panel (501-05, Removal and Installation).

3. Connect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

2012.0 RANGE ROVER (LM), 501-20

SUPPLEMENTAL RESTRAINT SYSTEM

SIDE AIR CURTAIN MODULE

[G1239682]

REMOVAL AND INSTALLATION

76.74.41	SIDE AIR CURTAIN - BOTH SIDES - RENEW	ALL DERIVATIVES	6.8	USED WITHINS	+
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REMOVAL

WARNINGS:

- Persons working on the supplemental restraint system (SRS) must be fully trained and have been issued with the safety guidelines.
- Allow a period of 10 minutes to elapse after disconnecting the battery before undertaking any work on the SRS.
- The SRS electrical connectors are unique. DO NOT force, or

attempt to connect electrical connectors to the wrong sockets.

- The correct procedures must always be used when working on SRS components.
- It is imperative that before any work is undertaken on the SRS system, the appropriate information is read thoroughly.
- Always disconnect both battery cables before beginning work on the SRS system. Disconnect the ground cable first. Never reverse connect the battery.
- Take extra care when handling supplemental restraint system (SRS) components.

NOTE:

Removal steps in this procedure may contain installation details.

1. Disconnect the battery ground cable.
Refer to: Specifications (414-00, Specifications).
2. Make the air bag supplemental restraint system (SRS) safe.
Refer to: Standard Workshop Practices (100-00, Description and Operation).
3. Refer to: Headliner (501-05, Removal and Installation).

4.

NOTE:

Right-hand shown, left-hand similar.



Torque: 6 Nm

5.

NOTES:

- Right-hand shown, left-hand similar.
- When installing the side air curtain module, make sure that the tether is tucked under the bracket.



Torque: 6 Nm

6.

NOTE:

Right-hand shown, left-hand similar.



Torque: 6 Nm

7.

NOTE:

Right-hand shown, left-hand similar.



Torque: 6 Nm

8.

NOTE:

Right-hand shown, left-hand similar.



9.

NOTE:

NOTE:

Right-hand shown, left-hand similar.



10.

WARNING:

Take extra care when handling supplemental restraint system (SRS) components.

CAUTION:

Do not allow the side air curtain module to twist. Failure to follow this instruction may result in damage to the component.

NOTE:

Right-hand shown, left-hand similar.



Torque: 8 Nm

11.

NOTES:

- Right-hand shown, left-hand similar.
- If the side air curtain module has deployed, new retaining brackets must be installed.
- When installing the side air curtain module, make sure that the component is tucked under the bracket.



Torque: 9 Nm

12.

NOTES:

- Right-hand shown, left-hand similar.
- If the side air curtain module has deployed, new retaining brackets must be installed.
- When installing the side air curtain module, make sure that the component is tucked under the bracket.



Torque: 9 Nm

INSTALLATION

1. To install reverse the removal procedure.

BODY REPAIRS – GENERAL INFORMATION

DESCRIPTION AND OPERATION

Description

Structural adhesive

CAUTION:

When separating a joint treated with metal-to-metal adhesive, it is important to avoid distortion. Heat the joint gradually until the bond weakens sufficiently to allow panel separation. Failure to follow this instruction may result in damage to the vehicle.

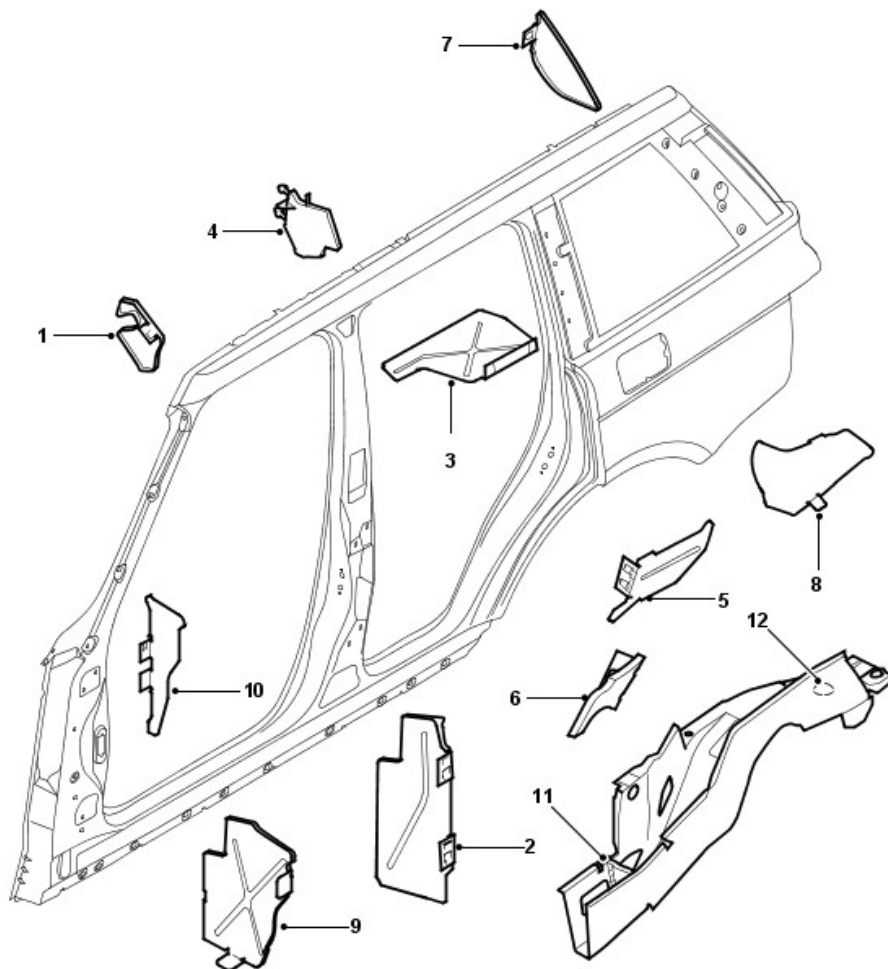
NOTE:

When spot welding through metal-to-metal adhesive, take particular care to adjust the transformer setting to make sure the weld is reliable.

Metal-to-metal adhesive is applied to the critical joint areas during factory assembly. The material used is a high-temperature, heat cured, nitrile phenolic which serves to bond two metal surfaces and also to seal the joint against ingress of dust, moisture and fumes. This material is not suitable for service use and, during repair, should be substituted by an approved Structural Adhesive.

Those joints which require the application of structural adhesive are detailed in the illustrations. Only the joints applicable to the service panels are included. Apply the structural adhesive where indicated or to the mating panel surface.

Expanding foam acoustic seals



M772180A

Expanding foam seals numbers 1 to 10 are fitted to various sections of the body side panel, body side closing and the body side panel inner. Seal numbers 11 and 12 are fitted inside the rear longitudinals.

Expanding foam acoustic seals are used in various closed sections of the body to improve vehicle refinement. The seals expand during the factory paint process, locking them into position. The seals are used in various locations throughout the vehicle.

The main function of the seals is to insulate the cabin from noise, vibration and harshness (NVH).

A secondary function of the seals is to seal the internal sections of the vehicle against the ingress of dust, moisture and fumes.

Another advantage of the seals is that they marginally increase the overall

Another advantage of the seals is that they marginally increase the overall stiffness of the body and its structural performance in case of a collision.

The seals are manufactured from an expandible synthetic rubber, `Betacore 4300`.

All the seals are fitted in the body-in-white areas, and after going through the paint baking process they expand up to eight times their original size.

Replacing seals

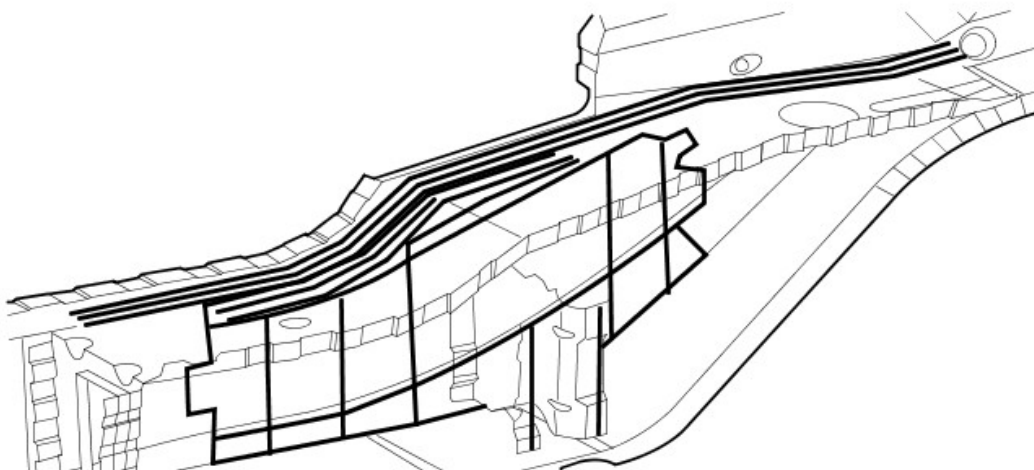
As paint oven temperatures used in a repair workshop are lower than those that are used during manufacture of the vehicle, a different process is required to replace the seals in service.

After a repair that involves replacement of a section containing expanded foam, the new section must be injected with an approved sound dampening foam. The sound dampening foam should be injected after paint refinishing and application of cavity wax. When injecting the foam, make sure the foam fills a complete cross section of the cavity.

Structural adhesive to the front side member joints

NOTE:

The front side member joints opposite to those shown are also treated. Apply 3 mm (0.118 inch) beads to all of the joints shown. Make sure all drain points are free from adhesive.



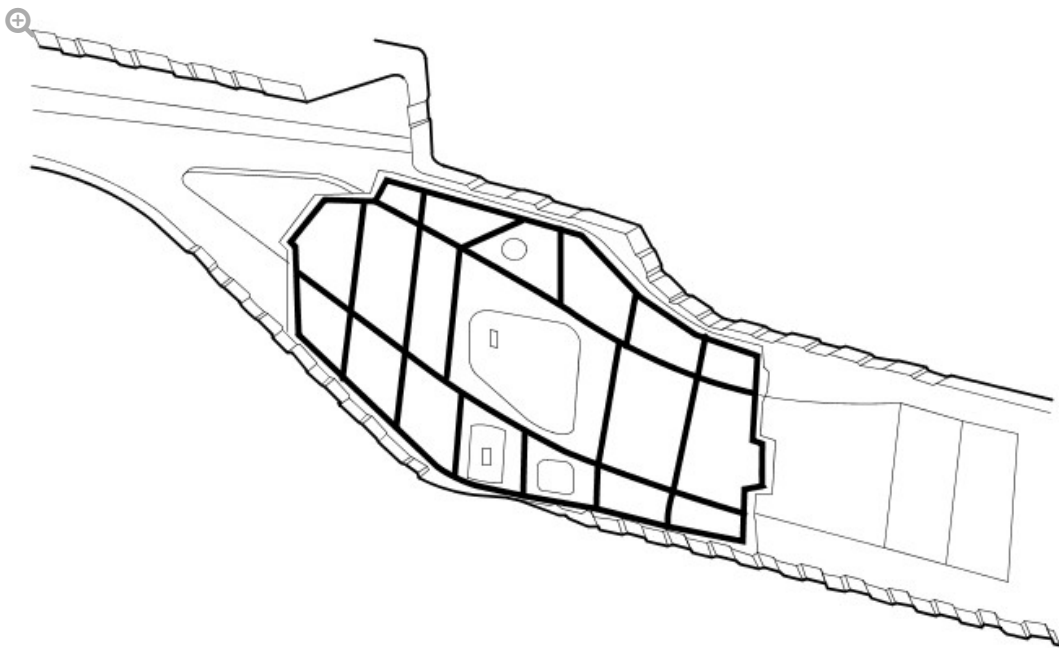


M772176A

Structural adhesive to the front side member joints

NOTE:

The front side member joints opposite to those shown are also treated. Apply 3 mm (0.118 inch) beads to all of the joints shown. Make sure all drain points are free from adhesive.



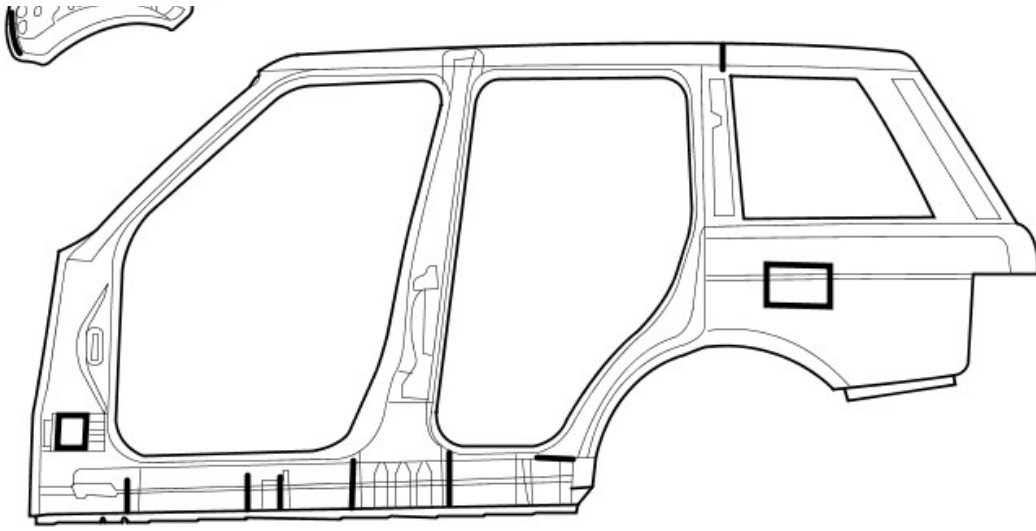
M772177A

Structural adhesive to the fender apron and side panel joints

NOTE:

The fender apron and side panel joints opposite to those shown are also treated. Apply 3 mm (0.118 inch) beads to all of the joints shown. Make sure all drain points are free from adhesive.



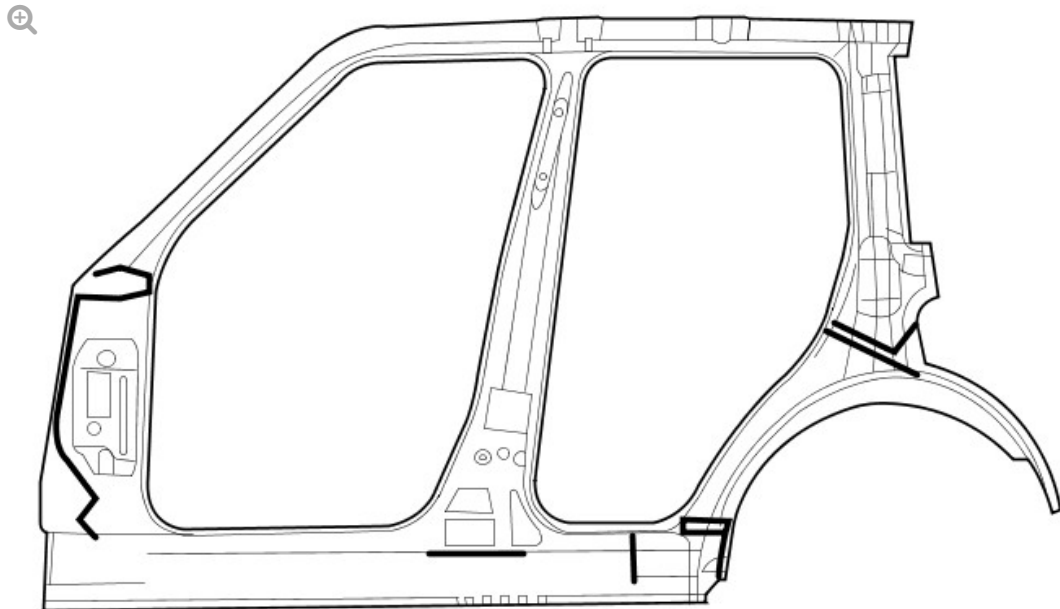


M772178A

Structural adhesive to the side panel inner joints

NOTE:

The side panel inner joints opposite to those shown are also treated. Apply 3 mm (0.118 inch) beads to all of the joints shown. Make sure all drain points are free from adhesive.



M772179

2012.0 RANGE ROVER (LM), 501-25

BODY REPAIRS - WATER LEAKS

DESCRIPTION AND OPERATION

When dealing with water leaks, always adopt a logical approach to the problem using a combination of skill, experience and intuition. Do not reach a conclusion based only on visual evidence, such as assuming that a wet footwell is caused by a water leak from the windshield. It may be found that

leak is caused by a water leak from the windshield. It may be found that the source of the water leak is elsewhere. Use of the correct procedure will increase the chance of locating the water leak.

TOOLS AND EQUIPMENT

1	Garden sprayer (hand-operated).
2	Wet/dry vacuum cleaner.
3	Dry, absorbent cloths.
4	Battery torch.
5	Small mirror.
6	Weatherstrip locating tool.
7	Trim panel remover.
8	Small wooden or plastic wedges.
9	Dry compressed air supply.
10	Hot air blower.
11	Sealer applicators.
12	Ultrasonic leak detector.

During leak detection, the vehicle should be considered in three basic sections:

- The front interior space.
- The rear passenger space.
- The luggage compartment.

TESTING

It is important to gain as much information as possible from the customer to be able to identify the approximate location of the leak, this will help when locating the original water leak point of entry.

An effective way to find the water leak point of entry is to use an ordinary garden water spray with the option for water pressure and water jet

adjustment, this will allow the water to be directed at a specific point of the vehicle. Use an assistant with a mirror and a battery powered torch to assist with locating the water leak from inside the vehicle.

The testing method is important. Start at the lowest point possible and work slowly upwards. Avoid testing in one area while masking the leak in another. For example: If you suspect a water leak from a windshield seal, make sure that there are no water leaks from the bulkhead grommets and all seals below the level of the windshield before inspecting the windshield seal.

Always visually examine door aperture weatherstrips, grommets and seals. Check for visual signs of damage, deterioration or misalignment.

Always check for door, liftgate and tailgate misalignment.

SEALING

When a water leak has been detected use the following checks to assist with rectification.

1	Renew all door aperture weatherstrips, grommets and seals which have suffered damage, misalignment or deterioration.
2	Check all body seals to make sure that they are correctly located on their mountings. use a lipping tool if necessary.
3	Make sure all body seams to be treated are dry, use compressed air and/or a hot air blower if necessary.
4	Apply sealant on the outside of the joint wherever possible.
5	When rectifying leaks between a windshield or vehicle glazing and its weatherstrip (or in the case of direct glazing, between the glass and bodywork), avoid removing the glass if possible. Apply the approved material at the appropriate location (i.e. glass to weatherstrip or glass to body).

2012.0 RANGE ROVER (LM), 501-25

BODY REPAIRS - CORROSION PROTECTION

DESCRIPTION AND OPERATION

This section reviews the treatments, sealers and inspection maintenance that is available for vehicle anti-corrosion protection.

MANUFACTURER TREATMENTS

All steel panels are double zinc coated.

During production, vehicle bodies are treated with the following anti-corrosion materials:

Anti-Corrosion Materials

- A heat cured, Polyvinyl Chloride (PVC) based sealant is applied to specific joint seams during factory assembly
- A PVC based underbody sealer is sprayed onto the underside of the main floor pan and rocker panels, the exterior of the spare wheel well and the

forward face of the lower dash crossbeam

- An application of cavity wax is sprayed into various body sections

Whenever body repairs are carried out, make sure the anti-corrosion materials in the affected area are repaired or renewed as necessary using the approved materials.

SEAM SEALERS

A heat cured, PVC based sealant is applied to specific joint seams during factory assembly. This material is not suitable for service use and, during repair, should be substituted by an approved seam sealer.

Seams to which seam sealer is applied during factory assembly are detailed by illustrations in the following section.

Apply seam sealer after the application of primer and before the application of surface treatment and top coat. The seam sealer must form a continuous bead, with the profile of the bead dependant on the type of seam. If seam sealer is applied with a brush, take particular care to maintain the required coverage of the seam. Where shaping of the seam sealer is required, use a cloth soaked with solvent such as white spirit or Shell SBP3 to achieve the required finish.

Make sure that all accessible repair seams are sealed following a repair. Damage to a vehicle often flexes areas of the body remote from the impact. As a result, the seam sealer in these areas may be disturbed by subsequent straightening and repair operations. Check all seams in the vicinity of the area undergoing repair for evidence of cracked seam sealer, then clean out as required and apply fresh seam sealer using the following procedure:

Seam Repair Observations

- Clean the affected seam and re-treat any exposed metal areas with a suitable etch phosphate primer
- Treat affected area with an etch acid primer
- Apply appropriate seam sealer as necessary
- Apply appropriate sealant coat (and underbody sealant as applicable)

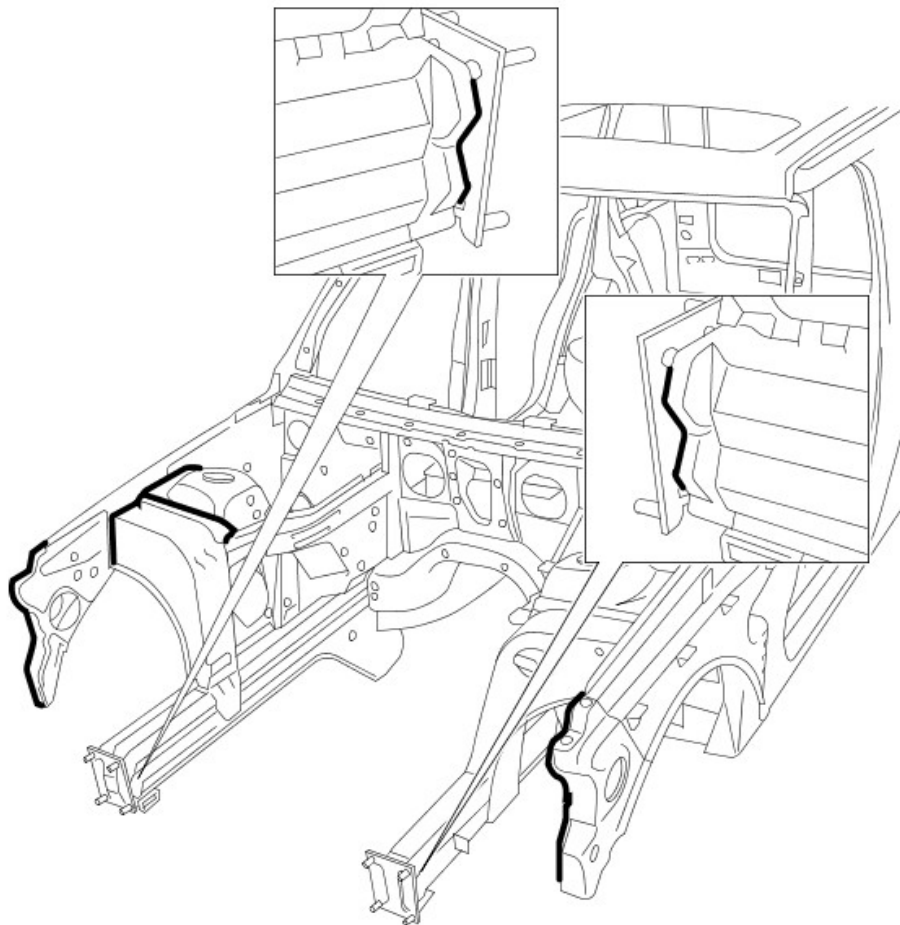
- Apply appropriate color coat (and underbody sealer as applicable)

Where seams are inaccessible following the re-assembly or fitting of components, make sure that a paste type seam sealer is applied to such seams. Certain seams also become inaccessible after the completion of panel repairs. In such instances apply seam sealer and paint before final assembly.

Provided access is adequate, apply seam sealer to both sides of a repair joint. Where access is limited to one side only (e.g. box sections), treat the affected box member with cavity wax.

MANUFACTURING APPLIED SEAM SEALER LOCATIONS

SEAM SEALER - FRONT END BODY PANELS

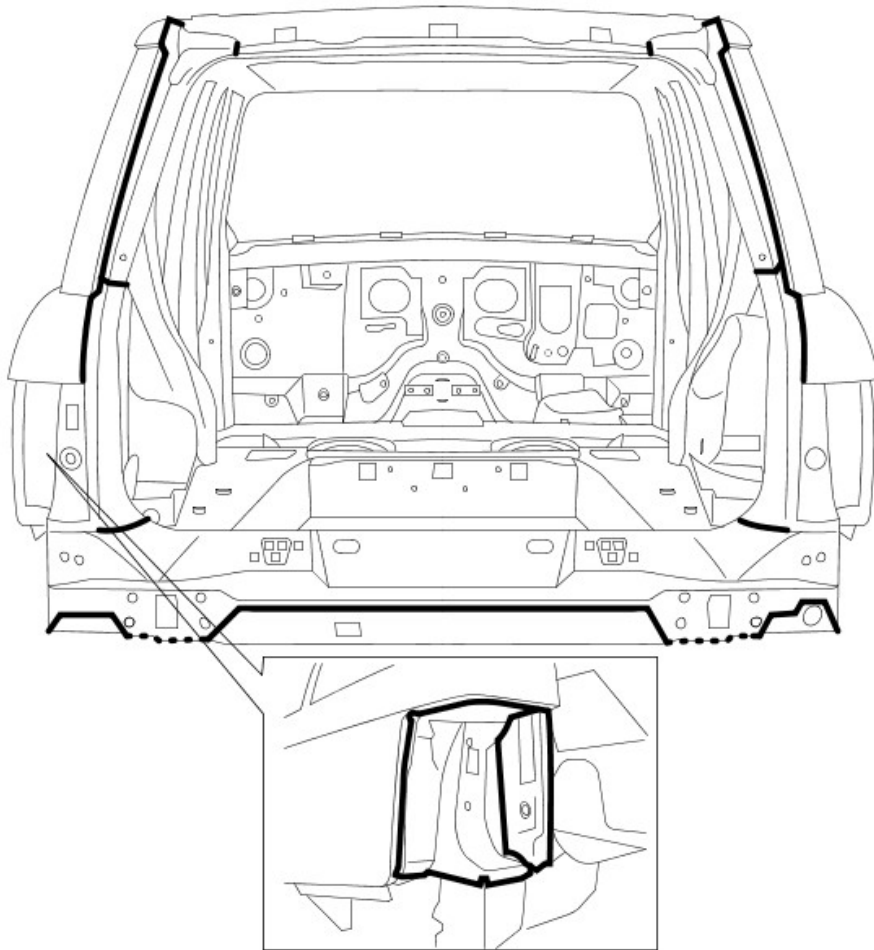


M772182A

Seams symmetrically opposite to those shown are also treated. On the

suspension top mount, make sure the front strut and spring mounting holes are kept free of sealant.

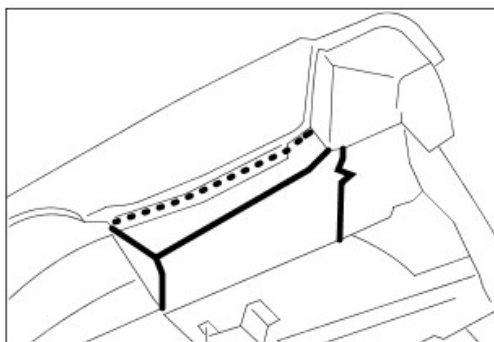
SEAM SEALER - REAR END BODY PANELS

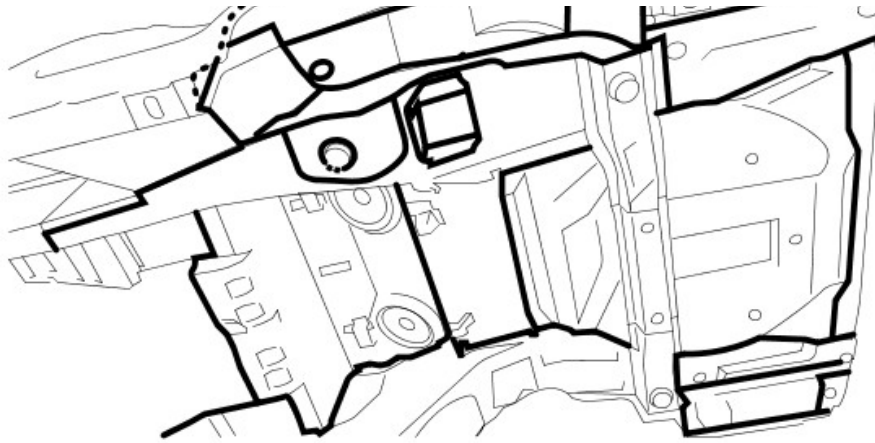


M772183A

Seams symmetrically opposite to those shown are also treated.

SEAM SEALER - VEHICLE UNDERSIDE

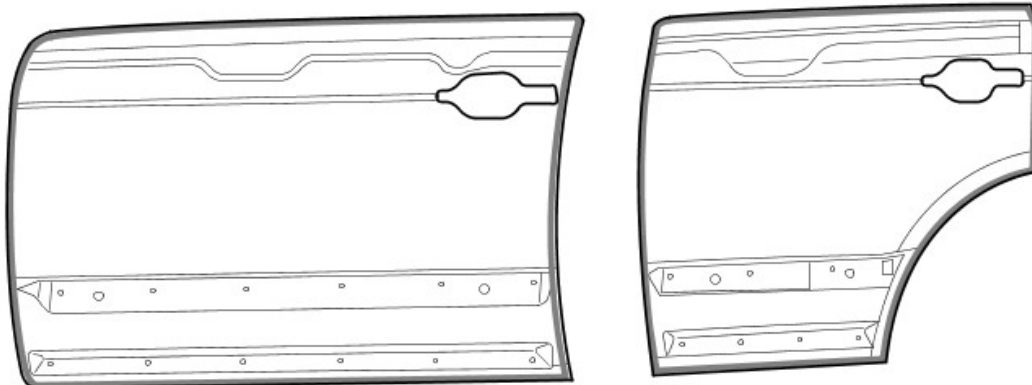




M772184A

Seams symmetrically opposite to those shown are also treated. Make sure the water drain holes in the doors are not blocked by sealant.

SEAM SEALER - DOORS



M772175B

Seams symmetrically opposite to those shown are also treated.

UNDERBODY SEALER

The underfloor and the outer rocker panel areas are treated with a Plastisol PVC underbody sealer. This material is not suitable for re-treatment. When repairing areas of underbody sealer, strip the manufacturer applied underbody sealer back to a suitable break point. Make sure that a clean metal surface is exposed and that the edge of the existing sealer adheres soundly to the panel.

CAUTION:

CAUTION:

Make sure that suspension assemblies, wheels and tires, power unit, driveshafts, exhaust and brakes (including all mounting points) are shielded prior to the application of fresh underbody sealer.

Apply new underbody sealer between the primer and surface treatment paint operations. Apply seam sealer as necessary before the application of underbody sealer. Make sure that blanking plugs and grommets in the floor pan (except those used for wax injection) are fitted before the underbody sealer application is carried out. Refit any heat fusible plugs which have been disturbed in the repair with the aid of a hot air blower, or replace with rubber grommets.

BODY REPAIR AND HANDLING PRECAUTIONS

During vehicle body repairs underbody sealers, seam sealers, underbody wax and body panels could become damaged if the vehicle body is carelessly handled. Make sure that best workshop practices are used throughout the handling of the vehicle during all workshop procedures.

PROPRIETARY ANTI-CORROSION TREATMENTS

The application of proprietary anti-corrosion treatments in addition to the manufacturer applied treatment could invalidate the Corrosion Warranty and is to be discouraged. This does not apply to approved, compatible, preservative waxes which may be applied on top of existing coatings.

FITMENT OF APPROVED ACCESSORIES

When fitting any approved accessory, make sure that the vehicle's corrosion protection is not affected, either by breaking the protective coating or by introducing a moisture trap.

Do not insert self tapping screws directly into the body panels. Install a suitable plastic insert into the panel before the fitting any self tapping screw. Always make sure that the edges of holes drilled into panels, chassis members and other body parts are protected with a suitable zinc rich or acid etch primer, and follow this process with a protective wax coating brushed onto the surrounding area.

Do not attach painted metal surfaces of any accessory directly to the

Do not attach painted metal surfaces or any accessory directly to the vehicle's bodywork unless suitably protected. Where metal faces are bolted together always insert a suitable interface material such as weldable zinc rich primer, extruded strip, or zinc tape between the components.

STEAM CLEANING AND DEWAXING

Due to the high temperatures generated by steam cleaning equipment, there is a risk that certain trim components could be damaged and some adhesives and corrosion prevention materials may be softened or liquified.

Adjust the equipment so that the nozzle temperature does not exceed 90°C (194°F). Take care not to allow the steam jet to dwell on one area, and keep the nozzle at least 300 mm from panel surfaces.

Do not remove wax or lacquer from the underbody or under the hood areas during vehicle repairs. Should it be necessary to steam clean these areas, apply a new coating of wax or underbody protection as soon as possible.

INSPECTIONS AND MAINTENANCE CHECK SHEETS

It is a requirement of the Corrosion Warranty that the vehicle body is checked for corrosion by an authorised Land Rover Dealer at least once a year, to make sure that the factory-applied protection remains effective.

Maintenance check sheets include the following operations to check the vehicle bodywork for corrosion:

- With the vehicle on a lift, carry out visual check of underbody sealer for damage
- With the vehicle lowered, inspect exterior paintwork for damage and body panels for corrosion.

The vehicle must be washed and free from deposits prior to inspection. It is part of the owner's responsibility to make sure that the vehicle is kept free of accumulations of mud which could accelerate the onset of corrosion. It will be necessary for the vehicle to be washed by the Dealer prior to inspection of bodywork if the customer has offered the vehicle in a dirty condition. Particular attention should be paid to areas where access is difficult.

The checks described above are intended to be visual only. It is not

intended that the operator should remove trim panels, finishers, rubbing strips or sound deadening materials when checking the vehicle for corrosion and paint damage.

With the vehicle on a lift, and using an inspection or spot lamp, visually check for the following:

- Corrosion damage and damaged paintwork, condition of underbody sealer on the front and rear lower body panels, rocker panels and fenders.
- Damage to underbody sealer and corrosion in areas adjacent to the suspension mounts and fuel tank fixings.

The presence of small blisters in underbody sealer is acceptable, providing they do not expose bare metal.

Pay special attention to signs of damage caused to body panels or corrosion protection material by incorrect jack positioning.

WARNING:

It is essential to follow the correct jacking and lifting procedures at all times.

With the vehicle lowered, visually check for evidence of damage and corrosion on all visible painted areas, in particular the following:

- Front edge of the hood
- Visible flanges in the engine compartment
- Lower body and door panels

Rectify any bodywork damage or evidence of corrosion found during inspection as soon as is practicable, both to minimize the extent of the damage and to make sure the long term effectiveness of the manufacturer applied corrosion prevention treatment. Where the cost of rectification work is the owner's responsibility, the Dealer must advise the owner and endorse the relevant documentation accordingly.

Where corrosion has become evident from beneath a removable component

where corrosion has become evident from beneath a removable component (e.g. trim panel, windshield glass, seat etc.), remove the component as required to permit effective rectification.

UNDERBODY PROTECTION REPAIRS

Whenever body repairs are carried out, make sure that full sealing and corrosion protection treatments are reinstated. This applies both to the damaged areas and also to areas where protection has been indirectly impaired, as a result either of accident damage or a repair operations.

Remove corrosion protection from the damaged area before straightening or panel beating. This applies in particular to panels coated with wax, PVC underbody sealer, sound deadening pads etc.

WARNING:

Do not use oxy-acetylene gas equipment to remove corrosion prevention materials. Large volumes of fumes and gases are liberated by these materials when they burn.

Equipment for the removal of tough anti-corrosion sealers offers varying degrees of speed and effectiveness. The compressed air operated scraper (not an air chisel) offers a relatively quiet mechanical method using an extremely rapid reciprocating action. Move the operating end of the tool along the work surface to remove the material.

The most common method for the removal of material is by means of a hot air blower with integral scraper.

High temperatures can be generated with this type of equipment which may cause fumes. Take all necessary precautions during its use.

Another tool, and one of the most efficient methods, is the rapid-cutting 'hot knife'. This tool uses a wide blade and is quick and versatile, able to be used easily in profiled sections where access is otherwise difficult.

Use the following procedure when repairing underbody coatings:

- 1** Remove existing underbody coatings

- 2 After panel repair, clean the affected area with a solvent wipe, and treat bare metal with an etch phosphate material
- 3 Re-prime the affected area

CAUTION:

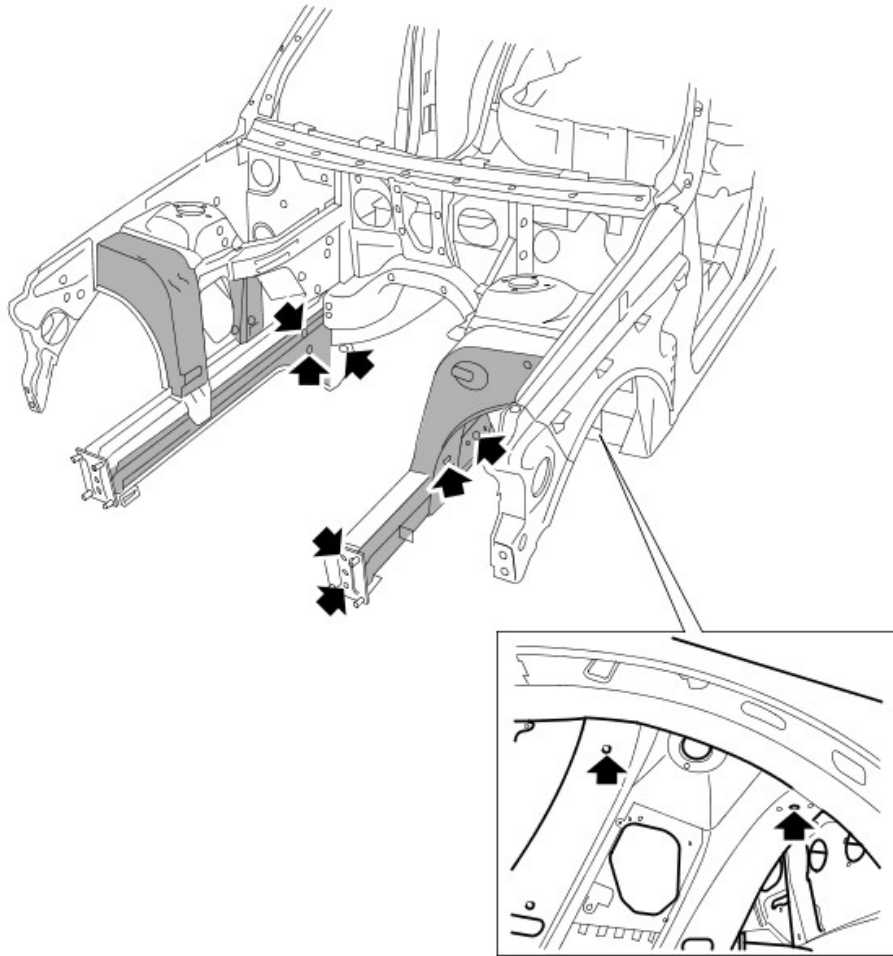
Do not, under any circumstances, apply underbody sealer directly to bare metal surfaces.

- Replace all heat-fusible plugs which have been disturbed. Where such plugs are not available use rubber grommets of equivalent size, ensuring that they are embedded into the sealer
- Mask off all mounting faces from which mechanical components, hoses and pipe clips, have been removed. Underbody sealer must be applied before such components are refitted
- Brush sealer into all exposed seams
- Spray the affected area with an approved service underbody sealer
- Remove masking from component mounting faces, and touch-in where necessary
- Allow adequate drying time before applying underbody wax

NOTE:

Where repairs include the application of finish paint coats in the areas requiring underbody wax, carry out paint operations before applying wax

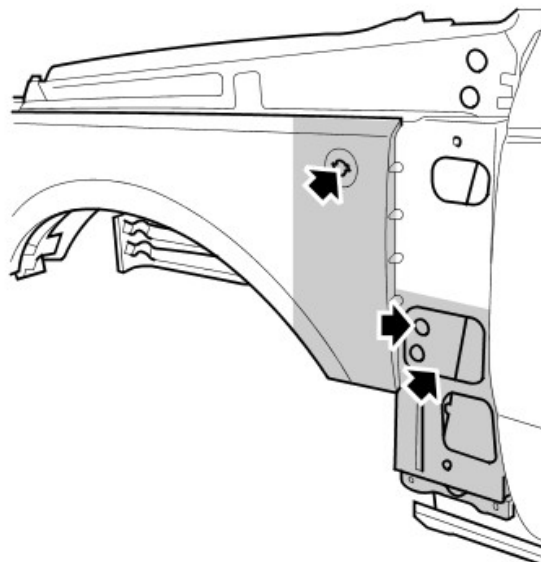
After refitting mechanical components, including hoses and pipes and other fixtures, mask off the brake rotors and apply a coat of approved underbody wax.



M772191A

The arrows indicate the cavity wax injection points.

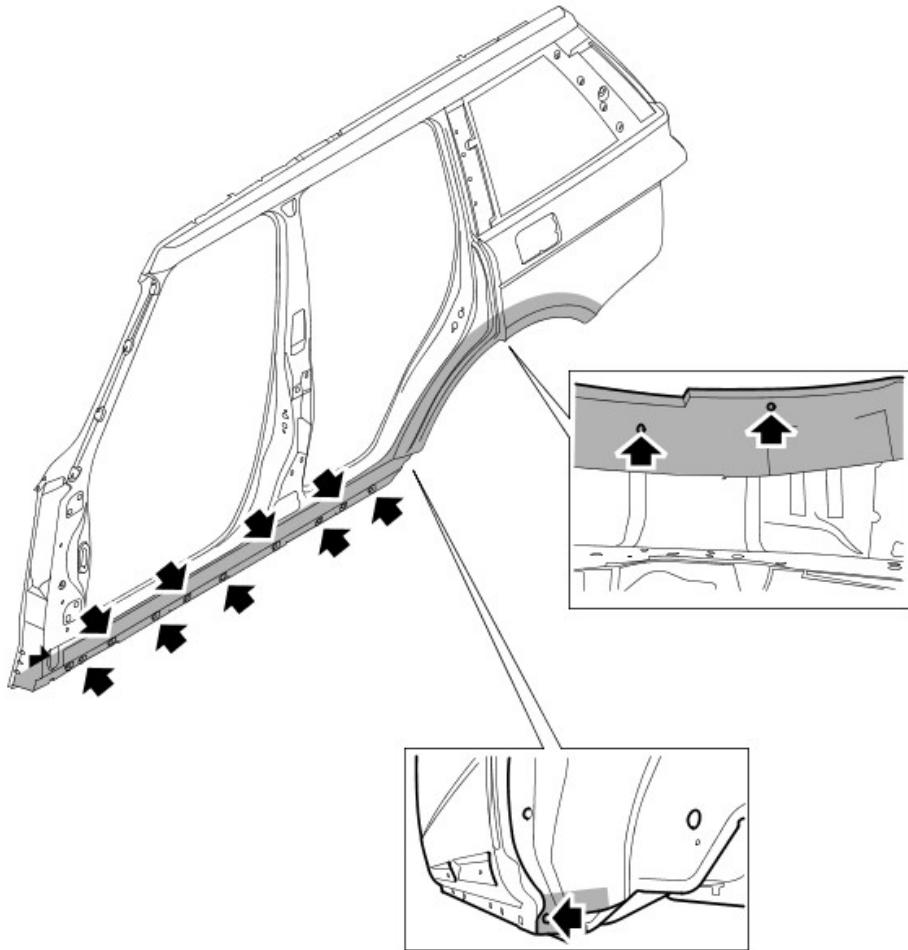
All areas symmetrically opposite to those shown are also treated.



M772192A

The arrows indicate the cavity wax injection points.

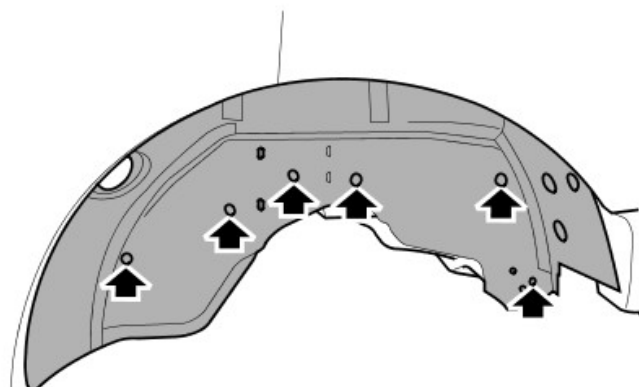
All areas symmetrically opposite to those shown are also treated.



M772193B

The arrows indicate the cavity wax injection points.

All areas symmetrically opposite to those shown are also treated.

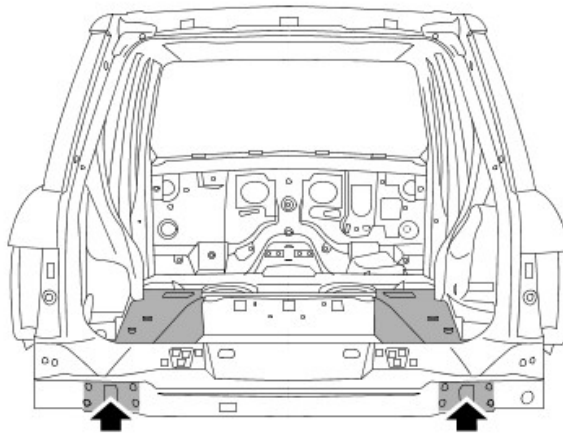




M772194A

The arrows indicate the cavity wax injection points.

All areas symmetrically opposite to those shown are also treated.



M772195A

The arrows indicate the cavity wax injection points.

All areas symmetrically opposite to those shown are also treated.

CAVITY WAX

After repairs, always re-treat these areas with an approved cavity wax. In addition, treat all interior surfaces which have been disturbed during repairs whether they have been treated in production or not.

This includes all box members, cavities and door interiors. It is permissible to drill extra holes for access where necessary, provided these are not positioned in load-bearing members. Make sure that such holes are treated with a suitable zinc rich primer, brushed with wax and then sealed with a rubber grommet.

Before wax injection, make sure that the cavity to be treated is free from any contamination or foreign matter. Where necessary, clear out any debris

using compressed air using best workshop practices.

Make sure that cavity wax is applied after the final paint process and before refitting any trim components.

During wax application, make sure that the wax covers all flange and seam areas and that it is adequately applied to all repaired areas of both new and existing panels.

It should be noted that new panel assemblies and complete body shells are supplied without wax injection treatment. Make sure that such treatment is carried out after repairs.

Effective cavity wax protection is vital. Always observe the following points:

- Complete all paint refinish operations before wax application
- Clean body panel areas and blow-clean cavities if necessary, before treatment
- Maintain a temperature of 18 °C (64 °F) during application and drying
- Check the spray pattern of injection equipment
- Mask off all areas not to be wax coated and which could be contaminated by wax over spray
- Remove all body fixings, such as seat belt retractors, if contamination will occur
- Make sure the door glass is position to the fully closed position before treating door interiors
- Treat body areas normally covered by trim before refitting items
- Check that body and door drain holes are clear after the protective wax has dried
- Keep all equipment clean, especially wax injection nozzles

2012.0 RANGE ROVER (LM), 501-26

BODY REPAIRS - VEHICLE SPECIFIC INFORMATION AND TOLERANCE CHECKS

DESCRIPTION AND OPERATION

MEASUREMENT TYPES

The following dimensional information is shown so as to assist the technician in the diagnosis and repair of body panels. The information is shown in two different styles. There are X,Y,Z dimensions and point to point dimensions.

The X,Y,Z dimensions are the measuring planes used within Land Rover for the measurement of body panels. The whole bodyshell is within a parallel grid system.

The X plane is an imaginary vertical plane starting at the front of the vehicle. It is at right angles to the centre line of the vehicle and measures distances along the length of the vehicle. For Range Rover, the X '0' point is from the large hole in the front suspension turret. Therefore, any dimensions rearward of this point are shown as positive figures and dimensions forward of this point are shown as negative.

The Y plane is an imaginary plane through the centre of the vehicle. All Y dimensions start from this plane. As a rule, body dimensions are symmetrical situated around the centre line.

The Z plane is set at a fixed distance parallel to the underside of the vehicle. All Z dimensions start from this plane. For Range Rover, the Z '0' point is through the wheel centres.

The point to point measurements are actual distances between two points. These points can be holes or intersection points. Where holes are taken, the

point of measurement is always from the hole centre.

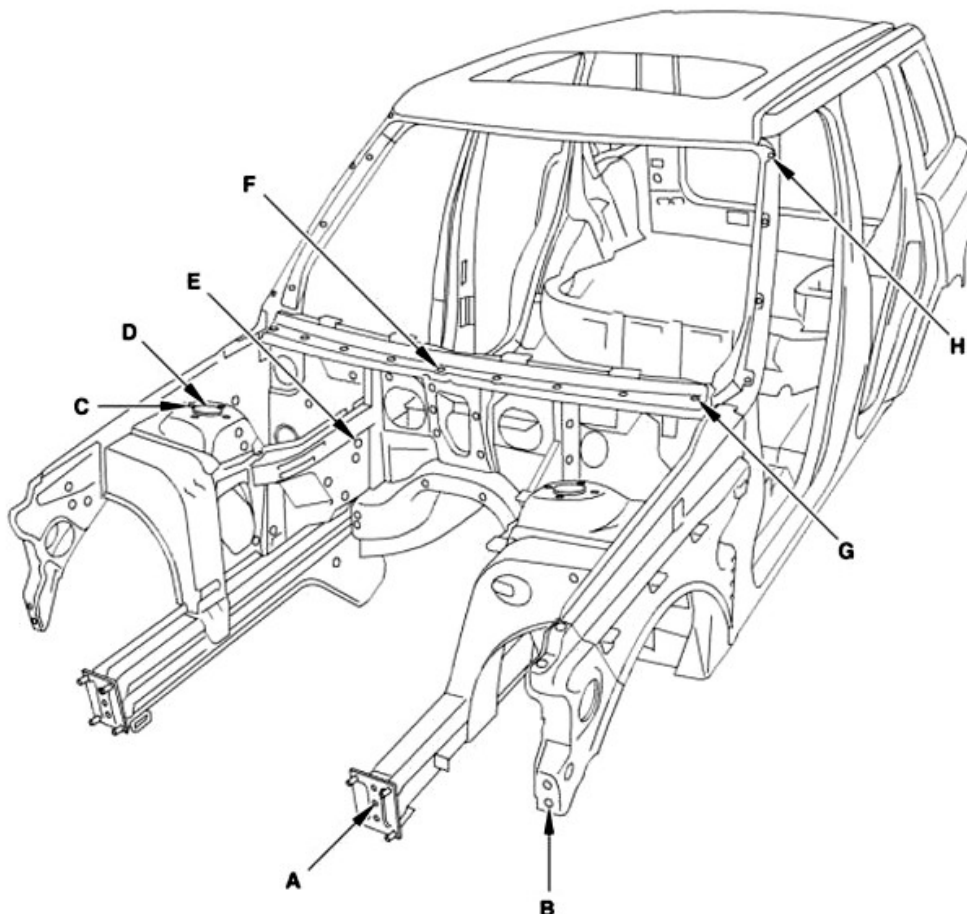
Measurements shown are in millimetres and inches. The measurements shown in brackets are in inches.

The tolerance for the basic geometry of the vehicle is ± 1.0 mm (0.040). This includes tooling holes, all fixing holes and apertures.

The tolerance for matching panel form and break lines is ± 0.5 mm (0.020).

DIMENSIONAL ILLUSTRATIONS

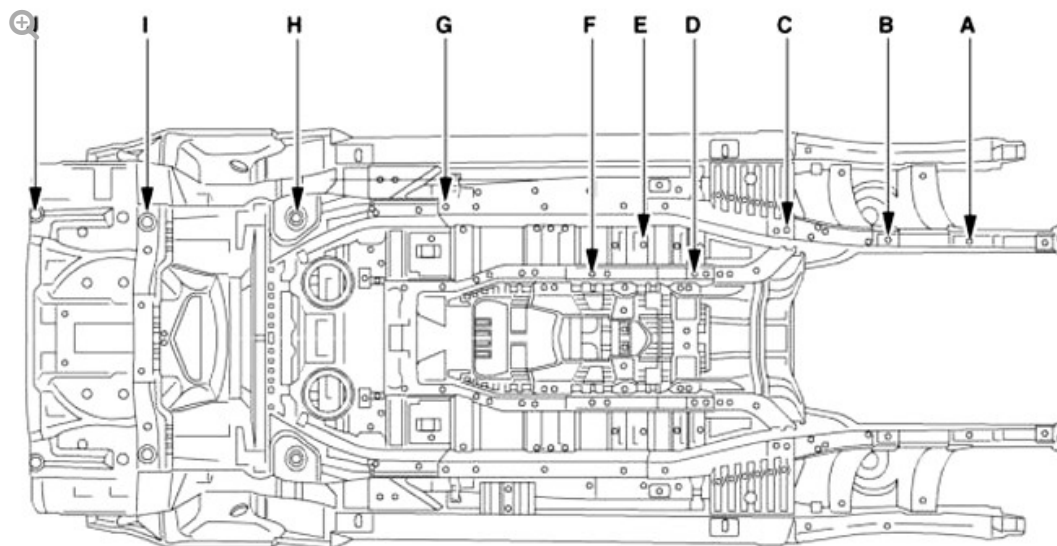
X, Y, Z Dimensional Information



E 85420

ITEM	DESCRIPTION	X	Y	Z
A	Tooling hole - front armature mounting bracket	-707.8 (-27.866)	578.5 (22.775)	241 (9.488)

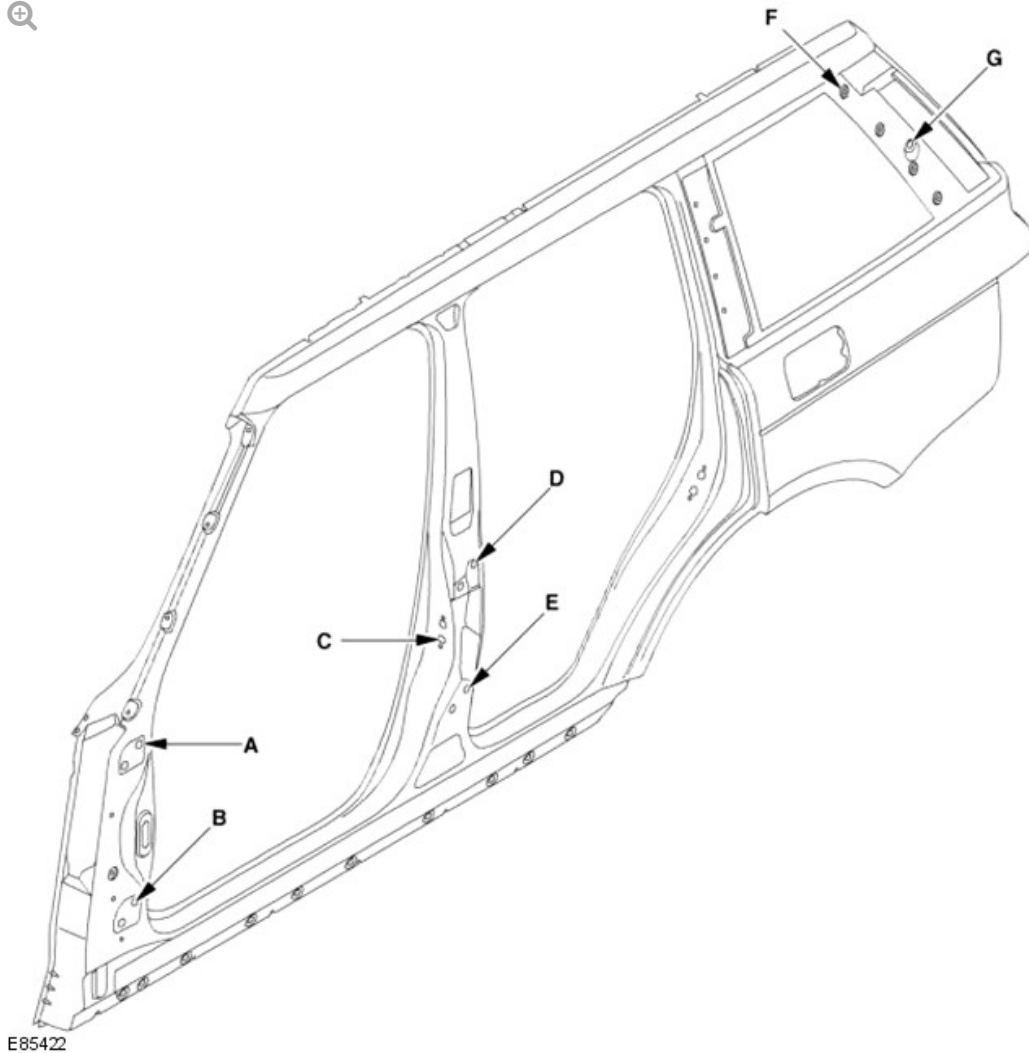
D	Fender apron - headlamp mounting bracket lower fixing hole	-580 (-22.834)	817.1 (32.169)	693.7 (11.255)
C	Outboard fixing hole - damper mounting	4.2 (0.165)	649.6 (25.574)	755 (29.724)
D	Large hole - damper mounting	3.2 (0.126)	586.3 (23.082)	750 (29.527)
E	Tooling hole - valance support	400 (15.748)	316.8 (12.472)	616.1 (24.255)
F	Center fixing hole - plenum	352.2 (13.866)	0	842.1 (33.153)
G	Outboard fixing hole - plenum	488 (19.212)	719.8 (28.338)	827.4 (32.574)
H	Top fixing hole - windshield finisher	1163.5 (45.807)	681.4 (26.826)	1350.6 (53.173)



E85421

ITEM	DESCRIPTION	X	Y	Z
A	Front subframe - front fixing hole	-322 (-12.677)	419 (16.496)	175 (6.889)
B	Front subframe - middle fixing hole	20 (0.787)	425 (16.732)	175 (6.889)
C	Front subframe - rear fixing hole	434 (17.086)	435.5 (17.145)	-65 (-2.559)
D	Crossmember - front fixing hole	774.2 (30.48)	340.4 (13.4) LH, 277.6 (10.929) RH	92.9 (3.657)

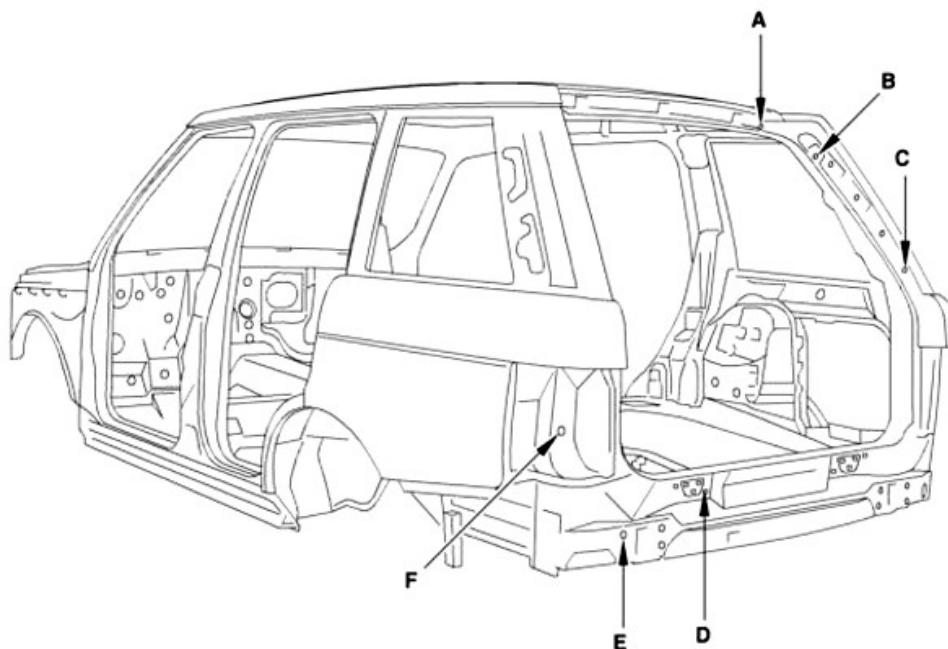
E	Main floor - tooling hole	1021.2 (40.204)	337.6 (13.291)	91.7 (3.61)
F	Crossmember - rear fixing hole	1268.2 (49.929)	340.4 (13.4) LH, 277.6 (10.929) RH	92.9 (3.657)
G	Fuel tank heat shield - front fixing hole	1766 (69.527)	528.8 (20.818)	-61.6 (-2.425)
H	Rear subframe - front fixing hole	2455 (96.653)	510 (20.078)	71.5 (2.814)
I	Rear subframe - rear fixing hole	3143 (123.47)	510 (20.078)	101.5 (3.996)
J	Rear tooling hole	3717 (146.33)	546 (21.496)	168.5 (6.633)



E85422

ITEM	DESCRIPTION	X	Y	Z
A	Front door top hinge - top fixing hole	623.5 (24.547)	841.4 (33.125)	757.7 (29.83)
B	Front door bottom hinge - top	602.4	849.5	293.1

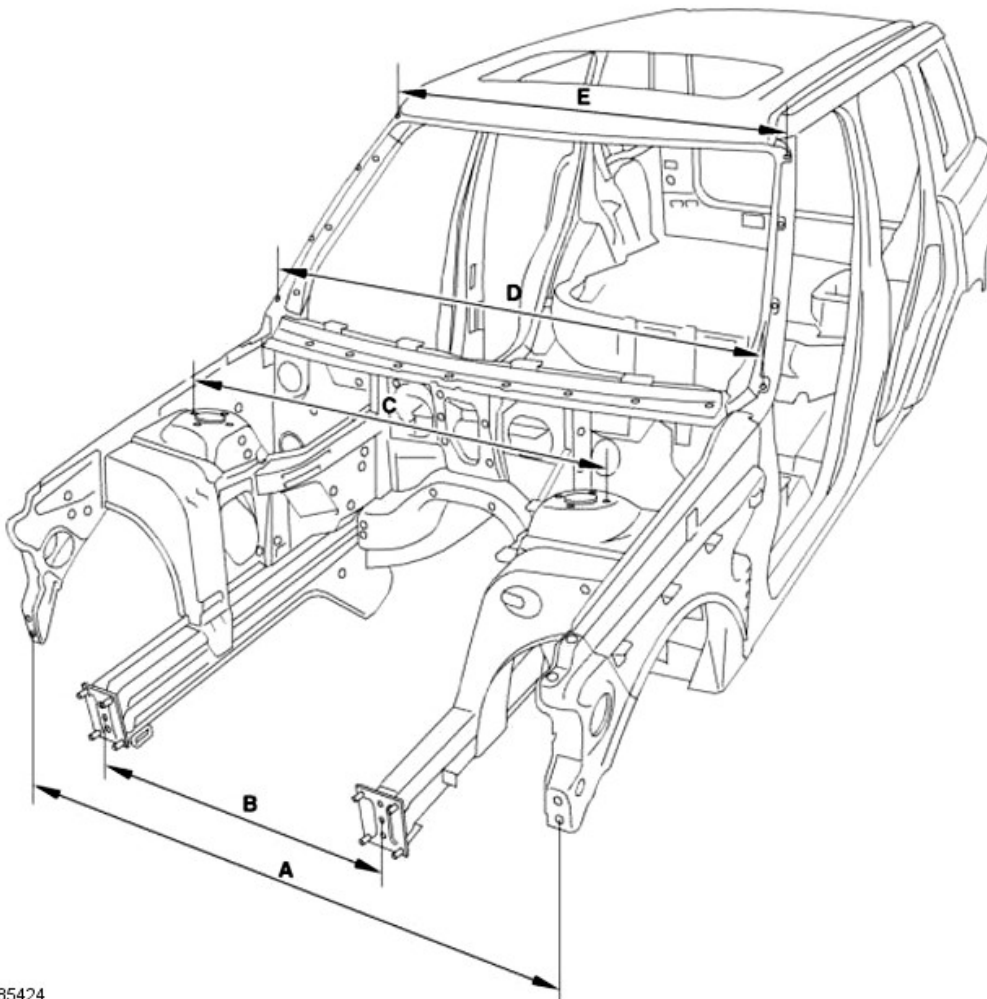
B	Front door bottom hinge - top fixing hole	302.7 (23.716)	377.3 (33.444)	273.1 (11.539)
C	Front door striker - bottom fixing hole	1669.1 (65.712)	843.3 (33.2)	549.1 (21.618)
D	Rear door top hinge - top fixing hole	1766.2 (69.535)	857.7 (33.767)	731.7 (28.807)
E	Rear door bottom hinge - top fixing hole	1734.6 (68.291)	866.7 (34.122)	383.1 (15.082)
F	D-pillar finisher top fixing hole	3253.4 (128.086)	667.8 (26.291)	1320.8 (52)
G	D-pillar tooling hole	3431 (135.078)	719 (28.307)	1100 (43.307)



E85423

ITEM	DESCRIPTION	X	Y	Z
A	Tailgate upper - inboard hinge fixing hole	3253.1 (128.074)	473.4 (18.637)	1380.2 (54.338)
B	Tailgate upper - gas strut fixing hole	3351.8 (131.96)	570.5 (22.46)	1302.6 (51.283)
C	D-pillar drain channel - finisher fixing hole	3661.2 (144.141)	663.3 (26.114)	943.4 (37.141)
D	Tailgate lower, hinge - lower fixing hole	3717.2 (146.346)	283.5 (11.161) LH, 377.5 (14.862) RH	336 (13.228)
E	Rear armature - outboard top fixing hole	3749.5 (147.618)	615.3 (24.224)	267.1 (10.515)
F	Tailgate lower, hinge - upper fixing hole	3440.0 (135.078)	751.5 (29.541)	500.0 (19.685)

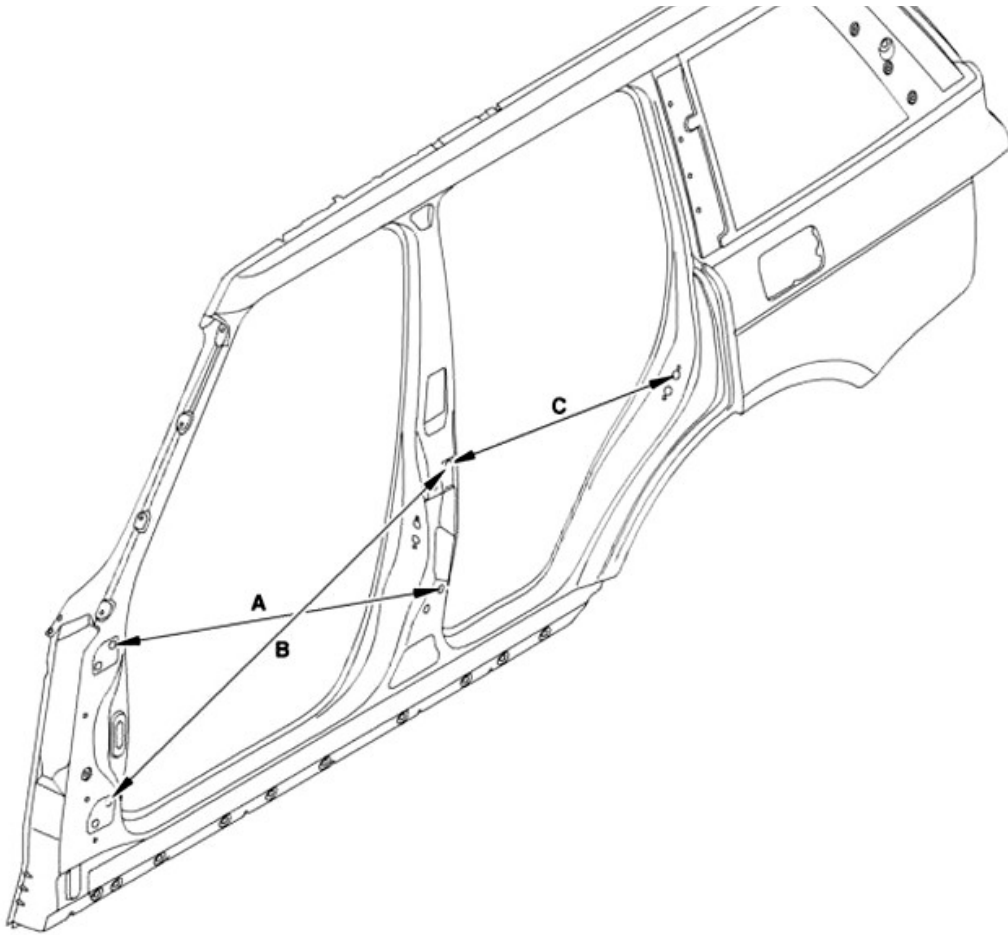
F	Tail lamp mounting panel - tooling hole	3648.9 (143.657)	751.5 (29.586)	532.4 (20.96)
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E85424

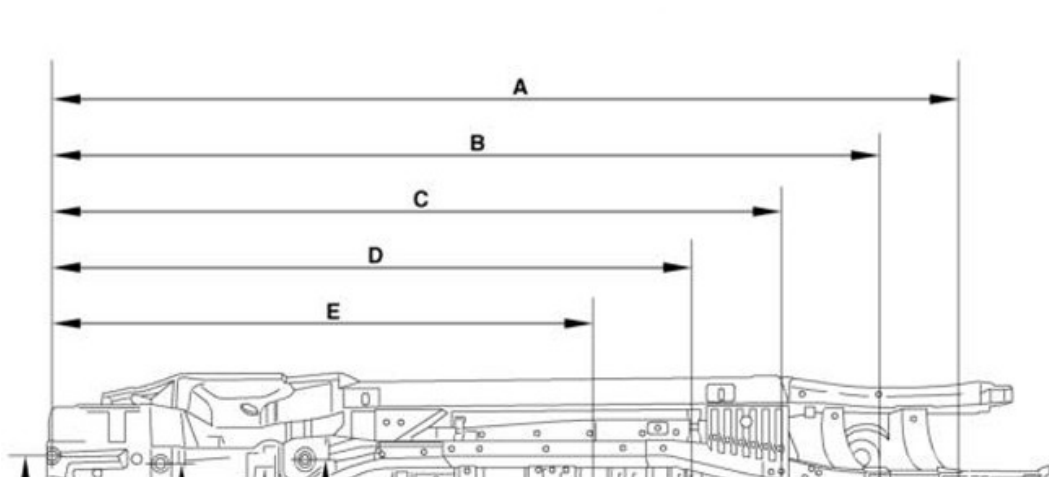
ITEM	FROM	TO	LENGTH
A	Fender apron, bulkhead lower fixing hole, LH	Fender apron, bulkhead lower fixing hole, RH	1634.2 (64.338)
B	Front armature mounting plate, tooling hole, LH	Front armature mounting plate, tooling hole, RH	861 (33.897)
C	Shock absorber mounting, outboard fixing, LH	Shock absorber, outboard fixing, RH	1300 (51.181)
D	Windshield moulding, lower fixing hole, LH	Windshield moulding, lower fixing hole, RH	1651.8 (65.031)
E	Windshield moulding, top fixing hole, LH	Windshield moulding, top fixing hole, RH	1362.8 (53.653)

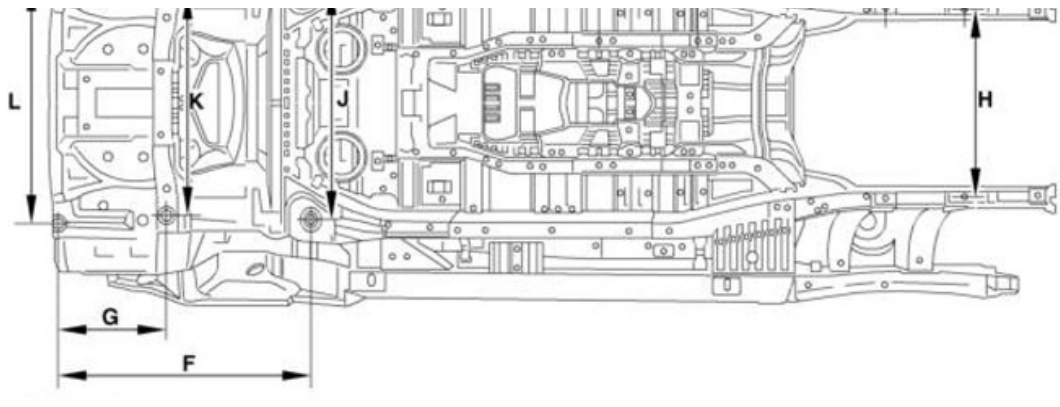




E 85425

ITEM	FROM	TO	LENGTH
A	Body side, top hinge fixing hole - front door	Body side, bottom hinge fixing hole - rear door	1172.7 (46.169)
B	Body side, bottom hinge fixing hole - front door	Body side, top hinge fixing hole - rear door	1243.7 (48.964)
C	Body side, top hinge fixing hole - rear door	Body side, top striker fixing hole - rear door	827.4 (32.574)

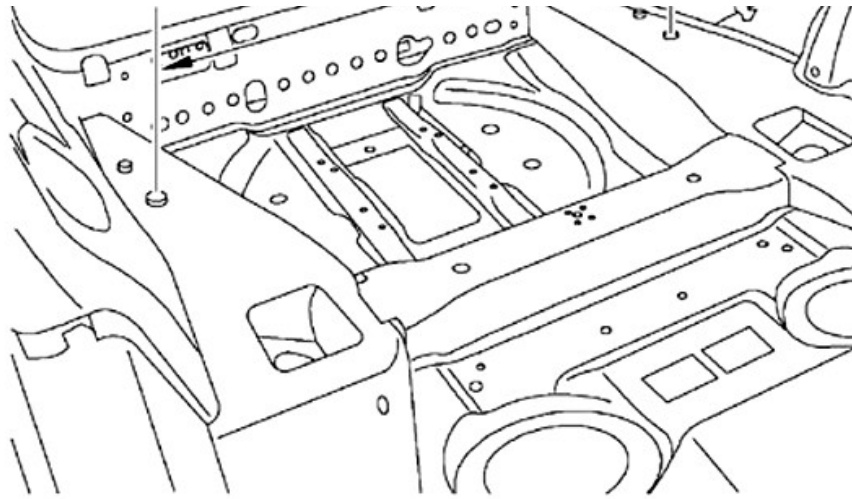




E85426

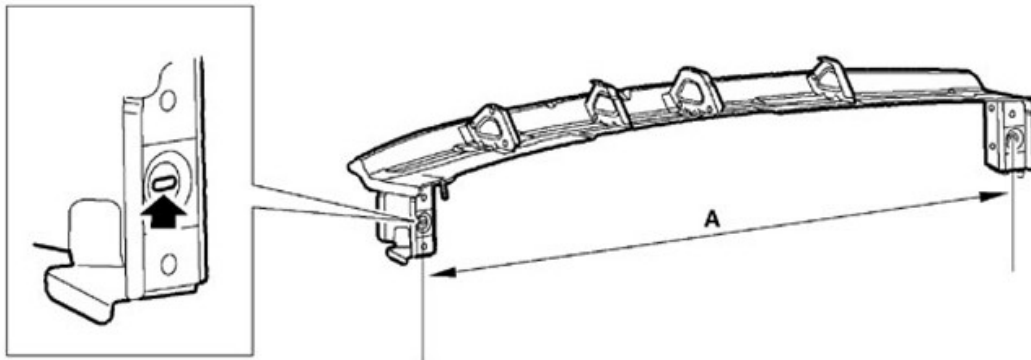
ITEM	FROM	TO	LENGTH
A	Rear tow bar fixing hole	Front subframe - front fixing hole	4039 (159.015)
B	Rear tow bar fixing hole	Front subframe, middle mounting hole	3737 (147.125)
C	Rear tow bar fixing hole	Front subframe, rear mounting hole	3283 (129.251)
D	Rear tow bar fixing hole	Centre crossmember - front fixing hole	2942.8 (115.858)
E	Rear tow bar fixing hole	Centre crossmember - rear fixing hole	2448.8 (96.409)
F	Rear tow bar fixing hole	Rear subframe, front mounting hole	1262 (49.685)
G	Rear tow bar fixing hole	Rear subframe, rear mounting hole	574 (22.598)
H	Front subframe - front fixing hole, LH	Front sub frame - front fixing hole, RH	838 (32.992)
J	Rear subframe, front mounting hole, LH	Rear subframe, front mounting hole, RH	1020 (40.157)
K	Rear subframe, rear mounting hole, LH	Rear subframe, rear mounting hole, RH	1020 (40.157)
L	Rear tow bar fixing hole, LH	Rear tow bar fixing hole, RH	1092 (42.992)





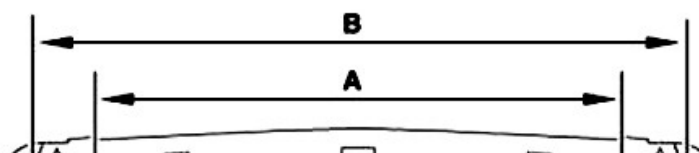
E85427

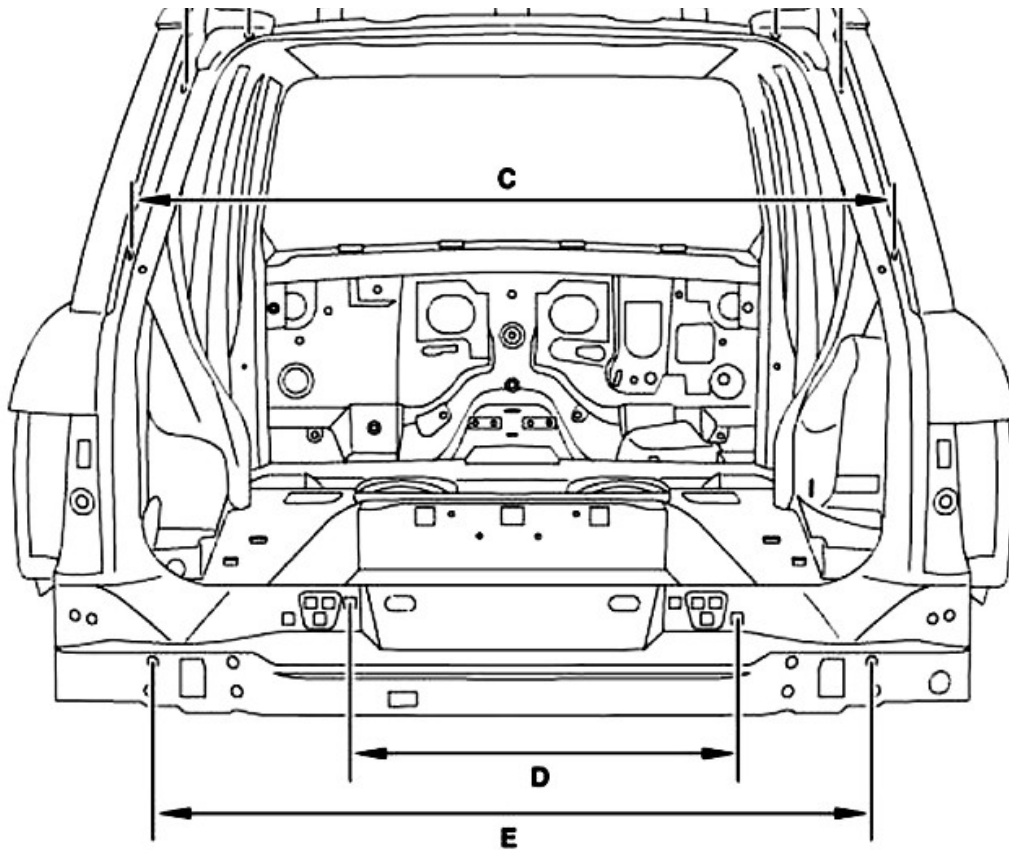
ITEM	FROM	TO	LENGTH
A	Rear subframe, rear mounting hole, LH	Rear subframe, rear mounting hole, RH	1020 (40.157)



E85428

ITEM	FROM	TO	LENGTH
A	Fascia carrier mounting hole, RH	Fascia carrier mounting slot, LH	1458 (57.401)





E85429

ITEM	FROM	TO	LENGTH
A	Upper tailgate - inboard hinge fixing hole, LH	Upper tailgate - inboard hinge fixing hole, RH	946.8 (37.275)
B	Upper tailgate - gas strut fixing hole, LH	Upper tailgate - gas strut fixing hole, RH	1141 (44.921)
C	D-pillar drain channel - finisher fixing hole, LH	D-pillar drain channel - finisher fixing hole, RH	1326.6 (52.228)
D	Lower tailgate hinge fixing - inboard hole, LH	Lower tailgate hinge fixing - inboard hole, RH	661 (26.023)
E	Rear armature - outboard top fixing hole, LH	Rear armature - outboard top fixing hole, RH	1230.6 (48.448)

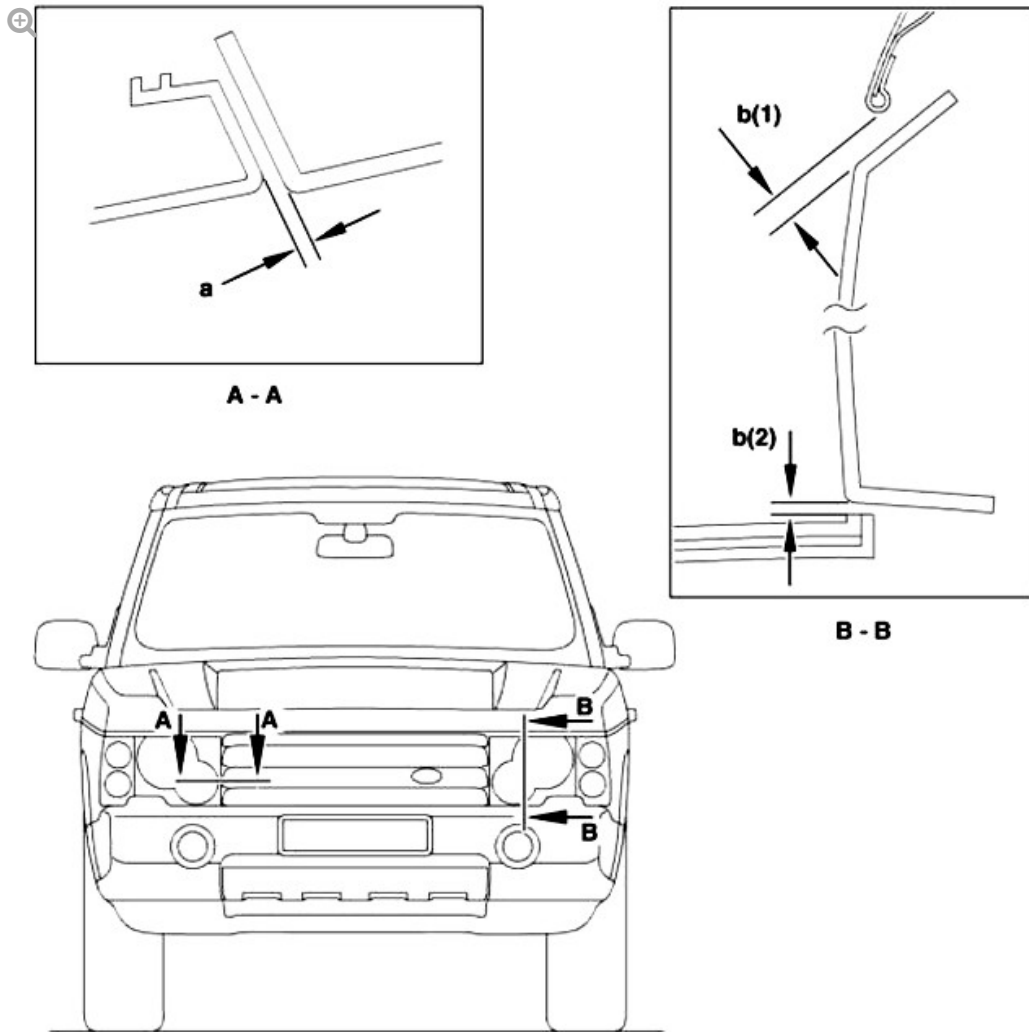
DESCRIPTION

Gap and Profile Measurements

The following information is to be used as a guide to assist the technician when fitting exterior body panels and trim.

Measurements shown are in millimetres and inches. The measurements shown in brackets are in inches.

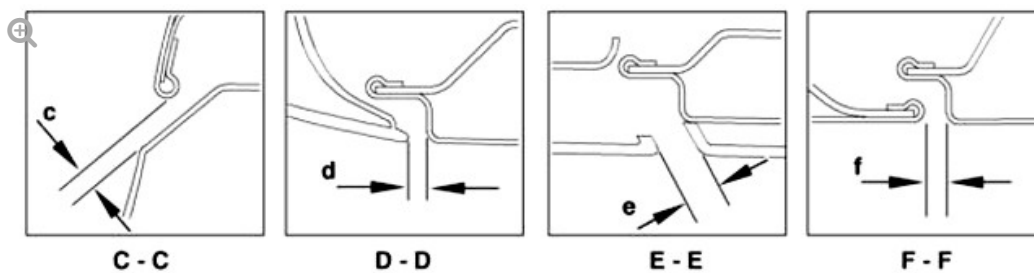
shown in brackets are in inches.

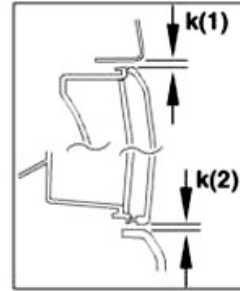
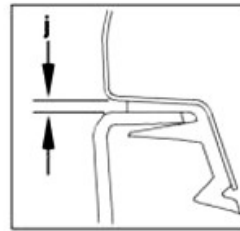
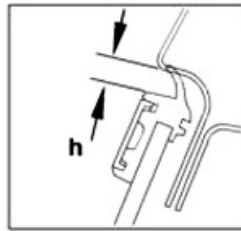
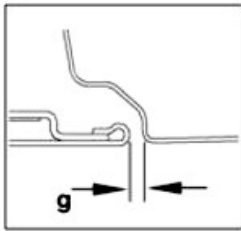
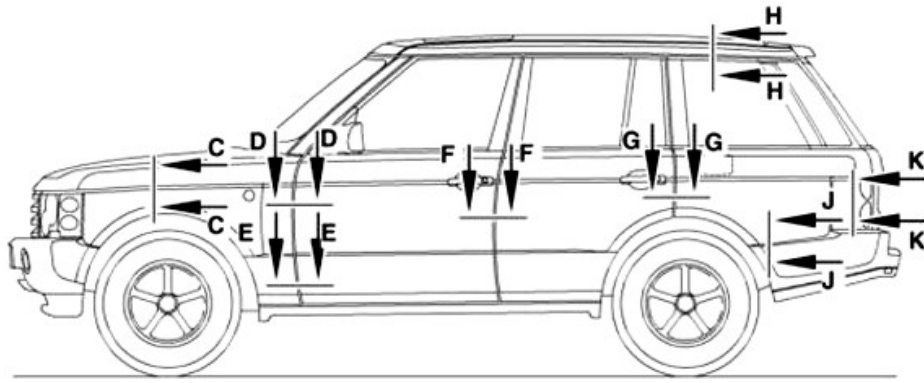


E85430

SECTION	GAP	DESCRIPTION	DIMENSION
A-A	a	Headlamp to cowl panel grille	4.0 (0.157), \pm 2.0 (0.078)
B-B	b(1)	Headlamp to hood	6.0 (0.236), \pm 2.0 (0.078)
B-B	b(2)	Headlamp to bumper cover	3.0 (0.118), \pm 1.0 (0.0393)

The profile of hood to the headlamps should be flush. Even gaps from side to side, to a tolerance \pm 1.0 mm (0.040).





E85431

G - G

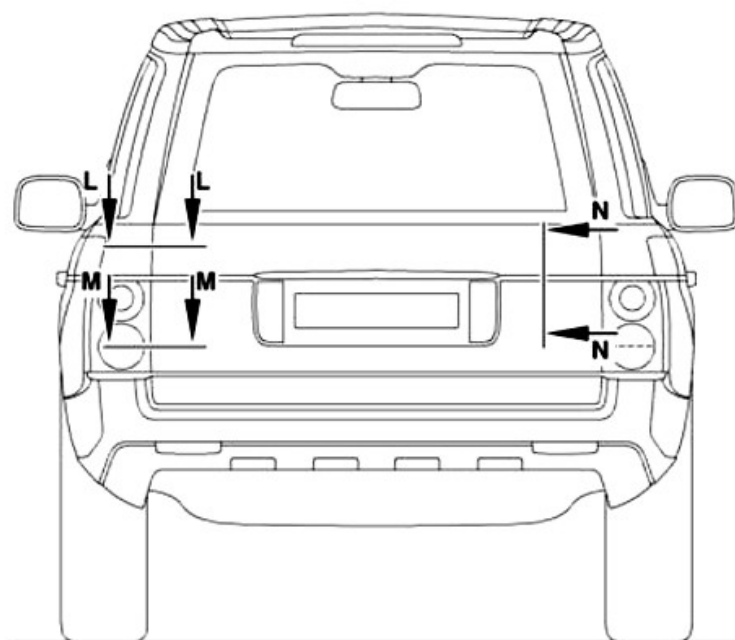
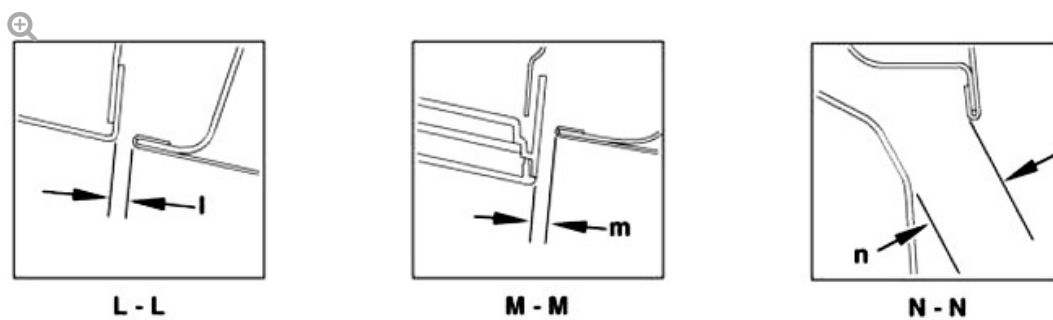
H - H

J - J

K - K

SECTION	GAP	DESCRIPTION	DIMENSION
C-C	c	Hood to front fender grille	6.0 (0.236), ± 1.5 (0.059)
D-D	d	Front fender grille finisher to front door	5.0 (0.196), ± 1.0 (0.040)
E-E	e	Front fender lower finisher to front door	7.5 (0.295), ± 1.25 (0.049)
F-F	f	Front door to rear door	5.0 (0.196), ± 1.0 (0.040)
G-G	g	Rear door to body side	5.0 (0.196), ± 1.0 (0.040)
H-H	h	Roof panel to rear quarter trim	6.5 (0.255), ± 2 (0.078)
J-J	j	Body side to rear bumper	3.0 (0.118), ± 1.0 (0.040)
K-K	k(1)	Tail lamp to body side	3.0 (0.118), ± 1.0 (0.040)
K-K	k(2)	Tail lamp to bumper cover	3.0 (0.118), ± 1.0 (0.040)

- Section D-D, profile of fender grille to front door is 0.0 nominal, tolerance +1.0 (0.040) / -0.0.
- Section F-F, profile of front door to rear door is 0.0 nominal, tolerance +1.0 (0.040) / -0.0.
- Section G-G, profile of rear door to body side is 0.0 nominal, tolerance +1.0 (0.040) / -0.0.
- Section J-J, profile of rear bumper cover to body side is 3.5 mm (0.137) nominal, tolerance ± 1.0 (0.040).



E85432

SECTION	GAP	DESCRIPTION	DIMENSION
L-L	l	Body side to liftgate	4.0 (0.157), \pm 1.0 (0.040)
M-M	m	Tailgate to tail lamp	5.0 (0.196), \pm 1.5 (0.059)
N-N	n	Liftgate to tailgate	20 (0.787), \pm 2 (0.078)

2012.0 RANGE ROVER (LM), 501-27

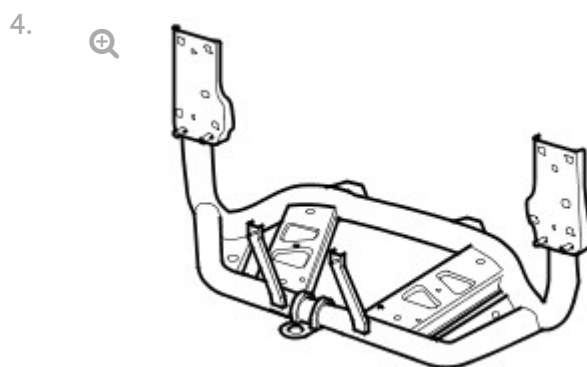
FRONT END SHEET METAL REPAIRS

AUXILIARY FRONT CROSSMEMBER (G928694)

REMOVAL AND INSTALLATION

REMOVAL

1. Disconnect the battery ground cable.
For additional information, refer to: Specifications (414-00, Specifications).
2. Remove the LH and RH headlamp mounting brackets.
For additional information, refer to: Headlamp Mounting Bracket (501-02, Removal and Installation).
3. Release the power steering hose from the auxiliary front crossmember.
 - Remove the nut.
 - Reposition the power steering hose.



M772240

Remove the auxiliary front crossmember.

- Remove the 2 bolts.

5.

NOTE:

Do not disassemble further if the component is removed for access only.

Remove the front axle cooling duct.

- Remove the clip.
-

6. Remove the charge air cooler trim panel.

- Remove the 5 clips.

7. Prepare the new panel for installation.

For additional information, refer to: Body (501-00, Description and Operation).

INSTALLATION

1. Install the charge air cooler trim panel.

- Install the 5 clips.

2. Install the front axle cooling duct.

- Install the clip.

3. Install the auxiliary front crossmember.

- Install the 2 bolts.

4. Install the power steering hose to the auxiliary front crossmember.

- Reposition the power steering hose.
- Install the nut.

5. Install the LH and RH headlamp mounting brackets.

For additional information, refer to: Headlamp Mounting Bracket (501-02, Removal and Installation).

6. Connect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

2012.0 RANGE ROVER (LM), 501-27

FRONT END SHEET METAL REPAIRS

FENDER APRON PANEL (G928696)

REMOVAL AND INSTALLATION

REMOVAL

1. Disconnect the battery ground cable.
For additional information, refer to: Specifications (414-00, Specifications).
 2. Disconnect the generator electrical connector.
 3. Remove the fender.
For additional information, refer to: Fender (501-02, Removal and Installation).
-

4.

NOTE:

RH fender apron panel replacement only.

Remove the Engine control module (ECM).

- Remove the ECM housing.

5.

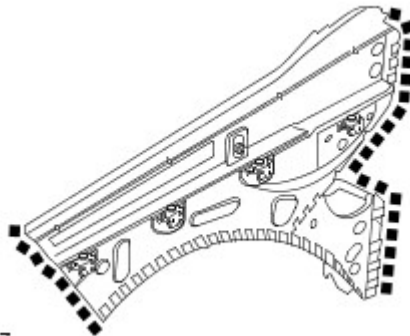
NOTE:

LH fender apron panel replacement only.

Remove the windscreen washer reservoir.

For additional information, refer to: Windshield Washer Reservoir (501-16, Removal and Installation).

6.



M772217

Remove the fender apron panel.

7. Prepare the new panel for installation.

For additional information, refer to: Body (501-00, Description and Operation).

INSTALLATION

1. Install the fender apron panel.

2.

NOTE:

LH fender apron panel replacement only.

Install the windscreen washer reservoir.

For additional information, refer to: Windshield Washer Reservoir (501-16, Removal and Installation).

3.

NOTE:

RH fender apron panel replacement only.

Install the ECM.

- Install the ECM housing.

4. Install the fender.

For additional information, refer to: Fender (501-02, Removal and Installation).

5. Connect the generator electrical connector.

6. Connect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

2012.0 RANGE ROVER (LM), 501-27

FRONT END SHEET METAL REPAIRS

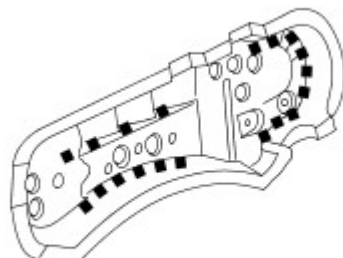
FENDER APRON PANEL CLOSING PANEL (G928697)

REMOVAL AND INSTALLATION

REMOVAL

1. Disconnect the battery ground cable.
For additional information, refer to: Specifications (414-00, Specifications).
2. Disconnect the generator electrical connector.
3. Remove the fender.
For additional information, refer to: Fender (501-02, Removal and Installation).
4. Remove the fender apron panel.
For additional information, refer to: Fender Apron Panel (501-27, Removal and Installation).

5.



Remove the fender apron panel closing panel.

-
6. Prepare the new panel for installation.

For additional information, refer to: Body (501-00, Description and Operation).

INSTALLATION

-
1. Install the fender apron panel closing panel.

-
2. Install the fender apron panel.

For additional information, refer to: Fender Apron Panel (501-27, Removal and Installation).

-
3. Install the fender.

For additional information, refer to: Fender (501-02, Removal and Installation).

-
4. Connect the generator electrical connector.

-
5. Connect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

2012.0 RANGE ROVER (LM), 501-27

FRONT END SHEET METAL REPAIRS

FENDER APRON PANEL INNER REINFORCEMENT (G928699)

REMOVAL AND INSTALLATION

REMOVAL

1. Remove the front side member and suspension top mount assembly.

For additional information, refer to: Front Side Member and Suspension Top Mount Assembly (501-27, Removal and Installation).

2.





M772212

Remove the fender apron panel inner reinforcement.

-
3. Prepare the new panel for installation.

For additional information, refer to: Body (501-00, Description and Operation).

INSTALLATION

-
1. Install the fender apron panel inner reinforcement.

-
2. Install the front side member and suspension top mount assembly.

For additional information, refer to: Front Side Member and Suspension Top Mount Assembly (501-27, Removal and Installation).

