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Module Communications Network -

Torque Specifications

Description	Nm	lb-ft
Battery junction box (BJB) retaining bolt	10	7
Battery positive cable to battery junction box (BJB) nut	10	7
Body panel ground cable nuts	10	7
Central junction box (CJB) bracket retaining nuts	10	7
Engine compartment ground cable nuts:		
M6	10	7
M8	25	18

Module Communications Network - Communications Network

Description and Operation

OVERVIEW

A number of different types of communication network are incorporated into the vehicle wiring harnesses for the transmission of commands and information between control modules. The configuration installed on a particular vehicle depends on the model and equipment level.

The communication networks available on the vehicle are:

- Local Interconnect Network (LIN) bus
- Medium speed Controller Area Network (CAN) bus
- High speed CAN bus
- Media Orientated System Transport (MOST) ring

Bus	Baud Rate
LIN bus	9.6 kbits/s
Medium speed CAN bus	125 kbits/s
High Speed CAN bus	500 kbits/s
MOST ring	24 Mbits/s

LOCAL INTERCONNECT NETWORK BUS

The Local Interconnect Network (LIN) bus is a low speed broadcast network that employs master and slave components. The master component transmits a message along a single wire to the slave components identifying which slave is to respond. The message has a header (slave identifier) and an empty data field. The identified slave component fills the data field with the relevant information and returns a message to the master component along the same wire.

CONTROLLER AREA NETWORK BUS

The Controller Area Network (CAN) bus is a high speed broadcast network where control modules automatically transmit information every few microseconds. Information is broadcast down a pair of twisted wires, known as 'CAN high' and 'CAN low'. Information is transmitted on the CAN bus as a voltage difference between the 2 wires.

Two CAN bus networks are used on the vehicle; medium speed and high speed, with the Central Junction Box (CJB) acting as a gateway between the 2 networks. The table below shows the wire colors used on both networks.

Network	High	Low
Medium Speed	Grey and orange	Violet and orange
High Speed	White and blue	White

MEDIA ORIENTATED SYSTEM TRANSPORT (MOST) RING

The Media Orientated System Transport (MOST) ring uses fiber optic cables to transport data and audio signals around the information and entertainment system. The fiber optic cables are arranged in a ring, with each unit on the ring having a 'MOST in' and 'MOST out' connection.

The MOST ring is a synchronous network. A timing master supplies the clock and all other components on the ring synchronize their operation to this clock. The timing master for the MOST ring is the integrated control module.

When handling MOST fiber optic cables the following precautions should be observed:

- After disconnection of any cables carefully install appropriate dust caps to protect the mating faces of the connectors from damage and contamination.
- Avoid introducing bends of less than 25 mm (0.98 inches) radius or kinks into the fiber optic cable during service or repair. Tight bends or kinks could impair operation, cause immediate system failure, or future system failure.
- Avoid excessive force, strain or stress on the fibers or connectors especially permanent stress after reinstallation.

Ring Break Diagnostics

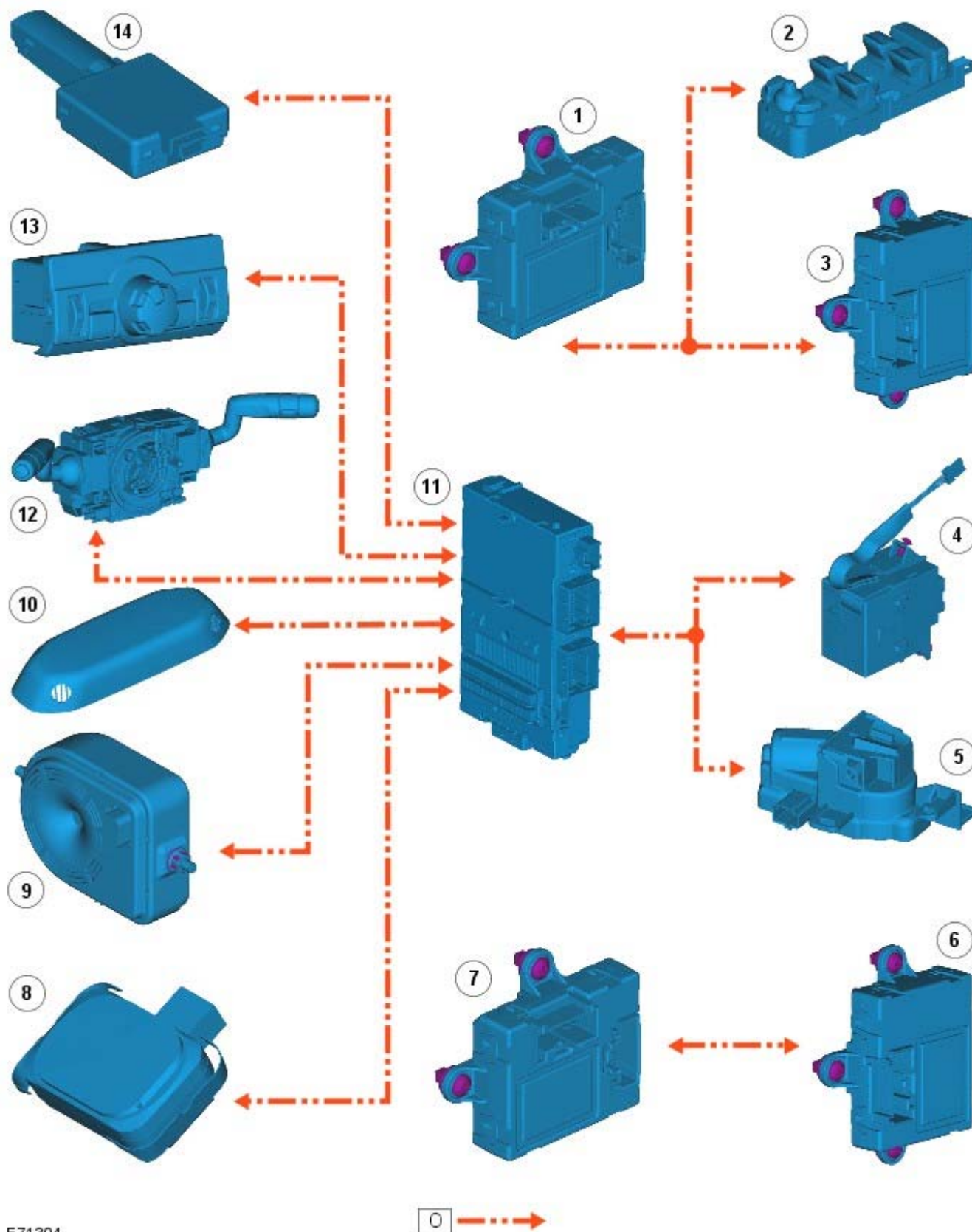
Incorporated into the Auxiliary Junction Box (AJB) is a Ring Break Diagnostics (RBD) link. The RBD link houses a copper link which when removed initiates the ring break diagnostics mode. The ring break diagnostics mode allows the technician to locate an optical fiber break in the MOST ring. To initiate the ring break diagnostics mode, carry out the following process:

- Connect the Land Rover approved diagnostic system.
- Ensure the vehicle is in power mode 4 or greater.
- Remove the RBD link for the length of time specified by the Land Rover approved diagnostic system.
- Replace the RBD link.

After approximately 30 seconds a Diagnostic Trouble Code (DTC) will be logged in the Integrated Control Module, identifying the location of the fault. The DTC can be read and interrogated using the Land Rover approved diagnostic system.

CONTROL DIAGRAM - LIN BUS (SHEET 1 OF 2)

NOTE: ○ = LIN bus




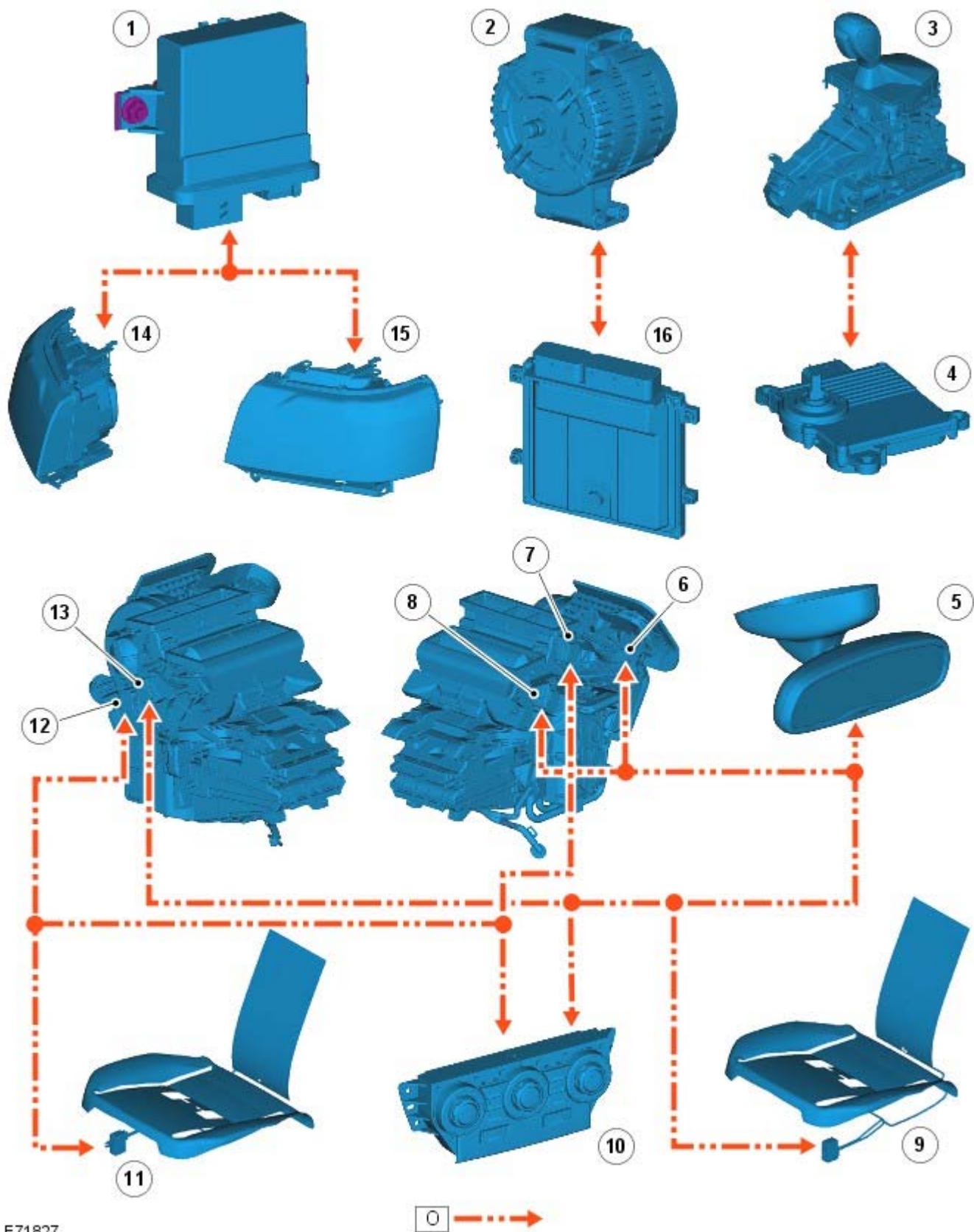
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Item		Description
1		Driver door module
2		Driver door switch pack
3		Rear door module (driver side)
4		Start control module

5		Electronic steering column lock
6		Rear door module (passenger side)
7		Passenger door module
8		Rain sensor
9		Battery backed sounder
10		Intrusion detection module
11		CJB
12		Steering wheel module
13		Light switch module
14		Radio Frequency (RF) receiver

CONTROL DIAGRAM - LIN BUS (SHEET 2 OF 2)

NOTE:  = LIN bus



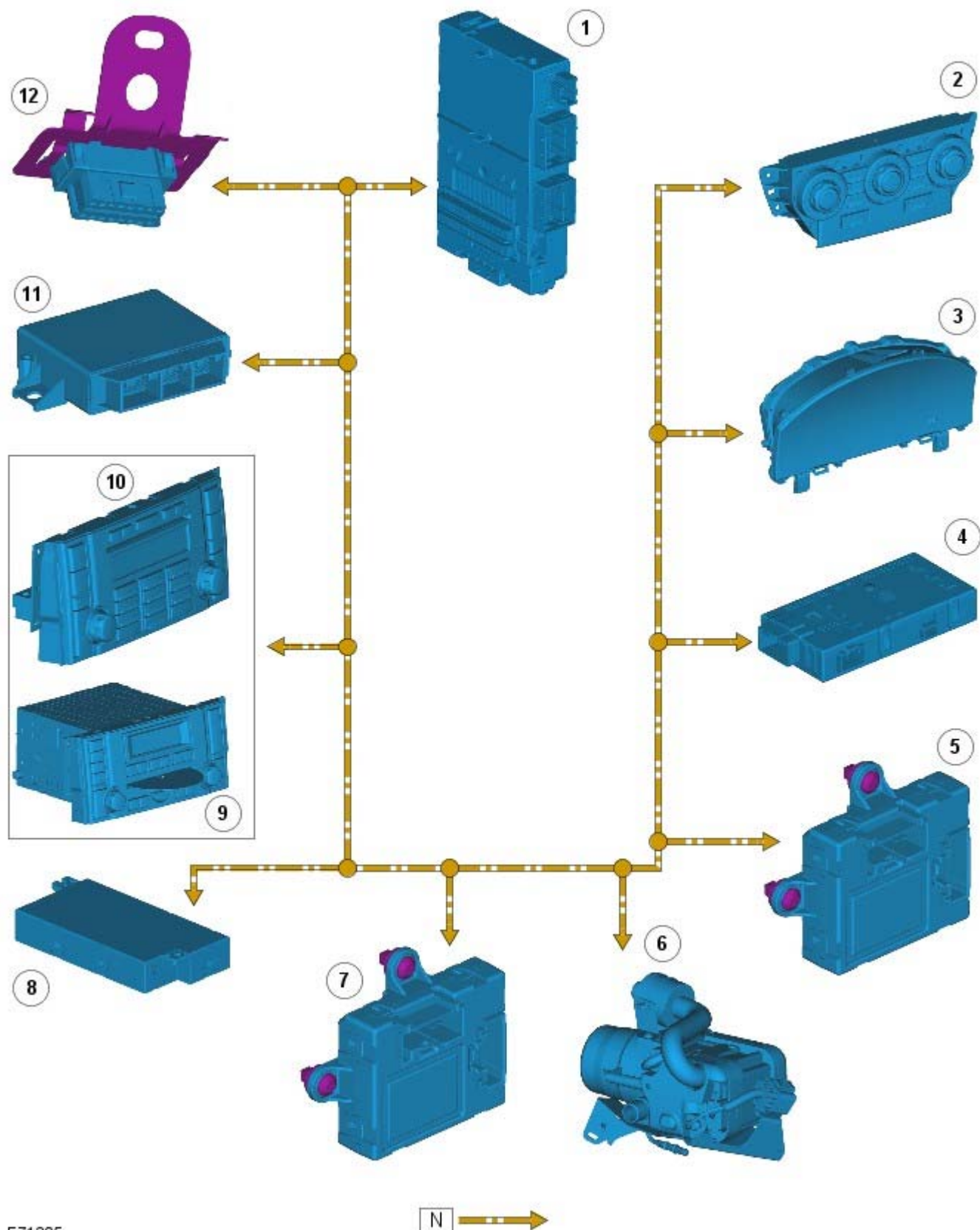
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Item		Description
1		Headlamp leveling control module
2		Generator control module
3		Selector lever module
4		Transmission Control Module (TCM)
5		Cabin humidity sensor
6		Air intake stepper motor
7		Windshield distribution (defrost) stepper motor

8		Right Hand (RH) temperature blend stepper motor
9		RH seat heat module
10		Automatic Temperature Control (ATC) module
11		Left Hand (LH) seat heat module
12		LH temperature blend stepper motor
13		Face/feet stepper distribution motor
14		RH headlamp control module
15		LH headlamp control module
16		Engine Control Module (ECM)

CONTROL DIAGRAM - MEDIUM SPEED CAN BUS

NOTE: **N** = Medium speed CAN bus



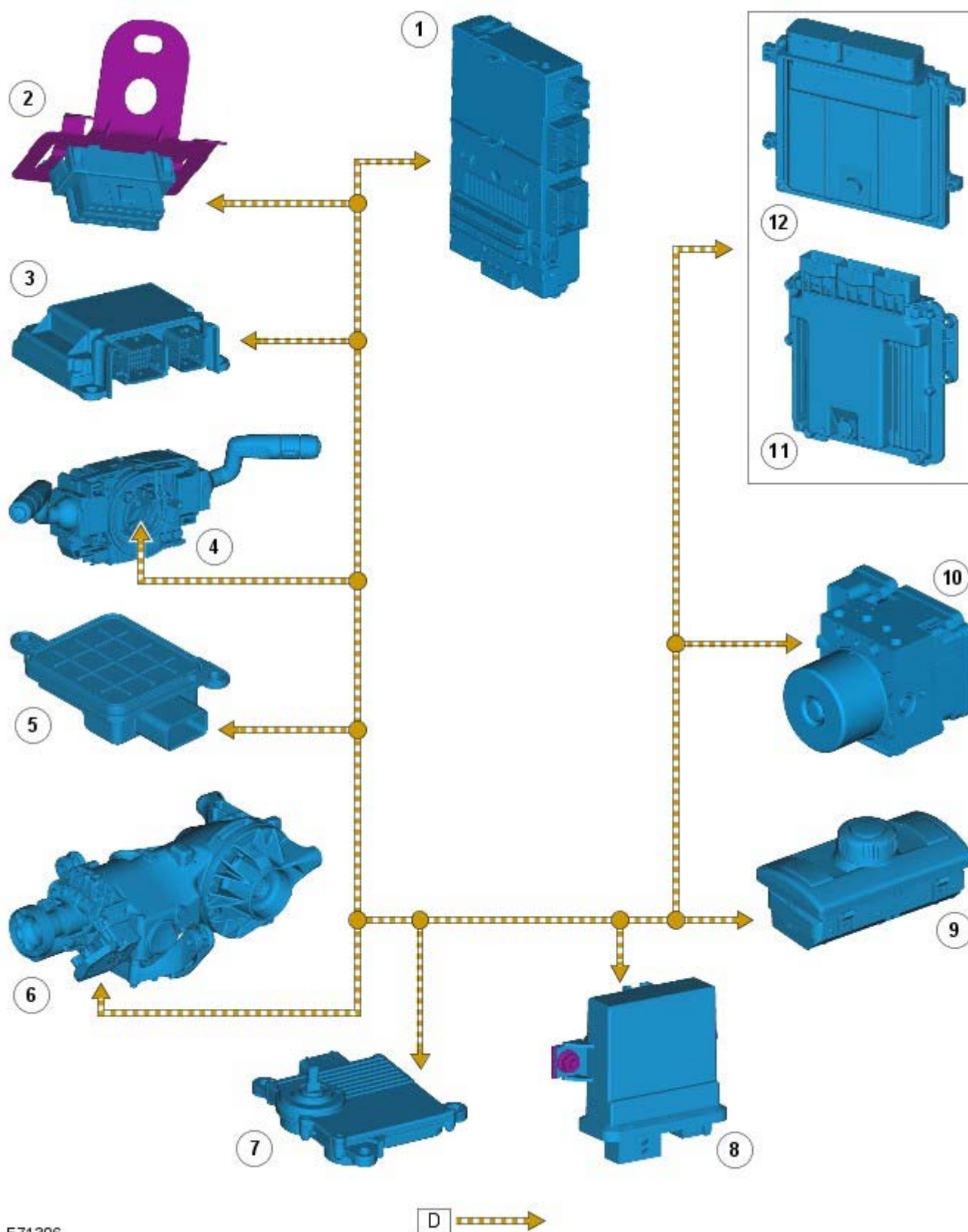
E71305

Item		Description
1		CJB
2		ATC module
3		Instrument cluster (Intelligent Drivers Module)
4		Trailer module
5		Driver door module
6		Fuel fired booster heater
7		Passenger door module

8	Seat memory module
9	Integrated head unit/Integrated control module - Low line audio
10	Integrated control module - High line audio
11	Parking aid module
12	Diagnostic socket

CONTROL DIAGRAM - HIGH SPEED CAN BUS

NOTE: **D** = High speed CAN bus

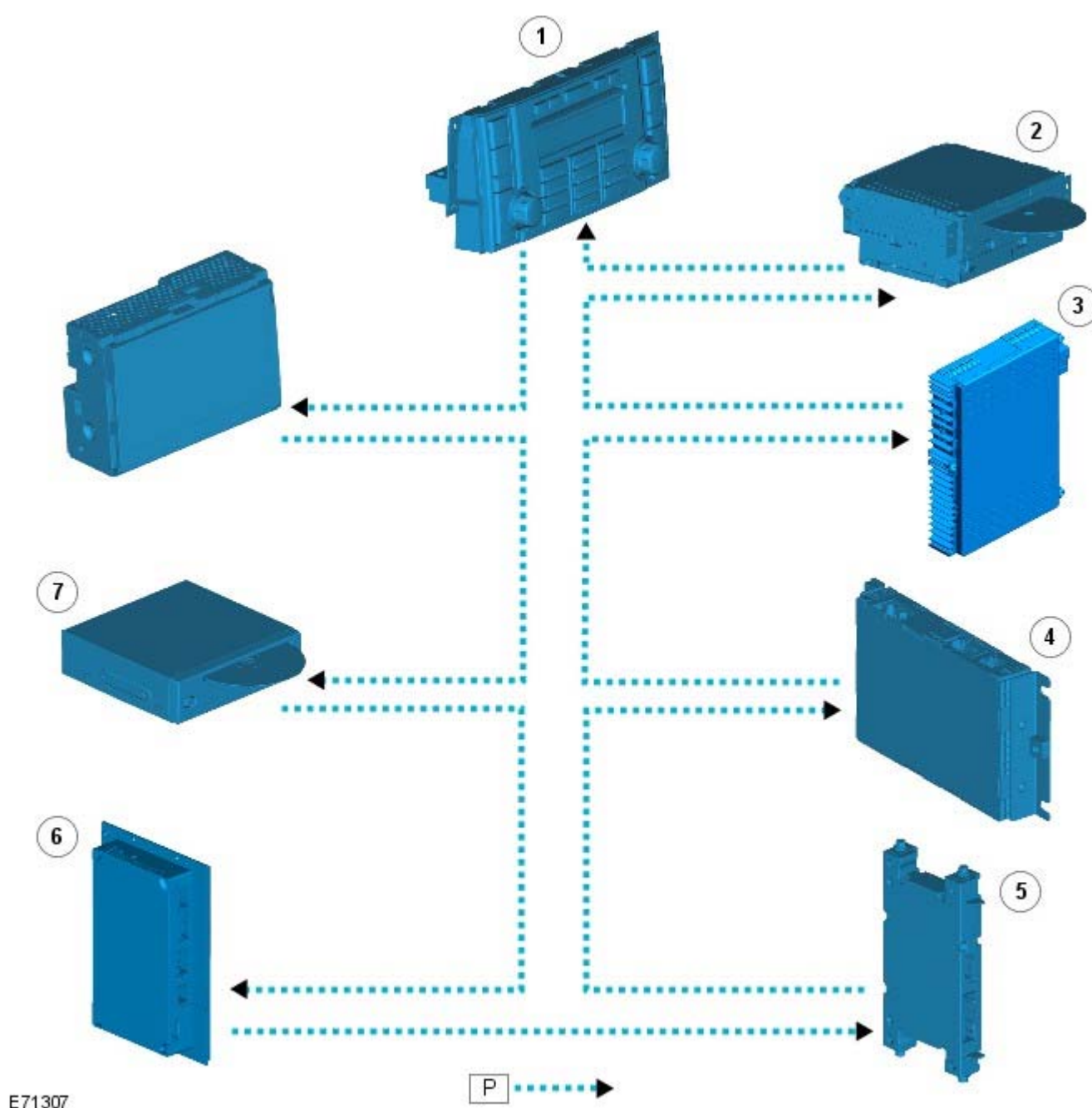


E71306

Item		Description
1		CJB
2		Diagnostic socket
3		Restraints Control Module (RCM)
4		Steering wheel angle sensor
5		Occupant classification sensor - North American Specification (NAS) vehicles only
6		Electronic rear differential control module
7		TCM
8		Headlamp leveling control module
9		Terrain Response control module
10		Anti-lock Brake System (ABS) module
11		ECM - TD4
12		ECM - i6

CONTROL DIAGRAM - MOST

NOTE: P = MOST



Item		Description
1		Integrated control module
2		Integrated head unit
3		High Defination (HD) radio module (NAS only from 2009MY)
4		Digital Audio Broadcast (DAB) receiver / Satellite Digital Audio Radio Sytem (SDARS) (NAS only from 2009MY) receiver
5		Bluetooth telephone module
6		Amplifier
7		Satellite navigation computer
8		Touch Screen Display (TSD)

Module Communications Network - Communications Network

Diagnosis and Testing

Principles of Operation

For a detailed description of the Communications Network, refer to the relevant Description and Operation section in the workshop manual.

REFER to: [Communications Network](#) (418-00 Module Communications Network, 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 tested and/or the donor vehicle.

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

Visual Inspection

Electrical
<ul style="list-style-type: none">● Fuses (refer to electrical guide)● Wiring harness● Correct engagement of electrical connectors● Loose or corroded connections● Routing of fibre optic harnesses● Correct engagement of optical connectors● Correct placement of optical connectors (ring order)● Correct assembly of optical connectors (backout, etc)● Damage to fibre (chafing, abrasion, kinking, cuts, etc)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step
4. If the cause is not visually evident, check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index.

For a complete list of all diagnostic trouble codes that could be logged on this vehicle, please refer to section 100-00. REFER to: [Diagnostic Trouble Code \(DTC\) Index - DTC: Body Control Module \(BCM\)](#) (100-00 General Information, Description and Operation).

Module Communications Network - Central Junction Box (CJB)

Removal and Installation

Removal

1. If renewing the CJB, use Land Rover approved diagnostic equipment to interrogate the module and upload the stored data, prior to removal of the CJB.

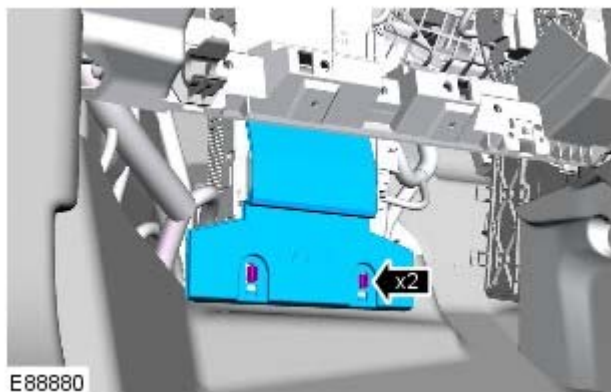
2. Disconnect the battery ground cable.

Refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).

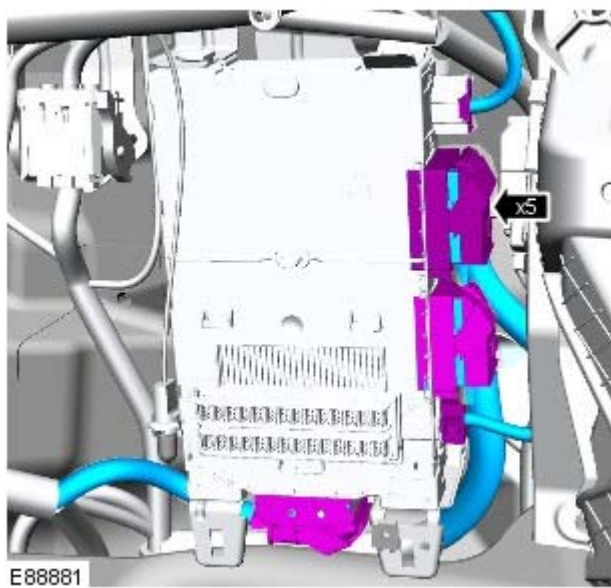
3. Remove the glove compartment.

Refer to: [Glove Compartment](#) (501-12 Instrument Panel and Console, Removal and Installation).

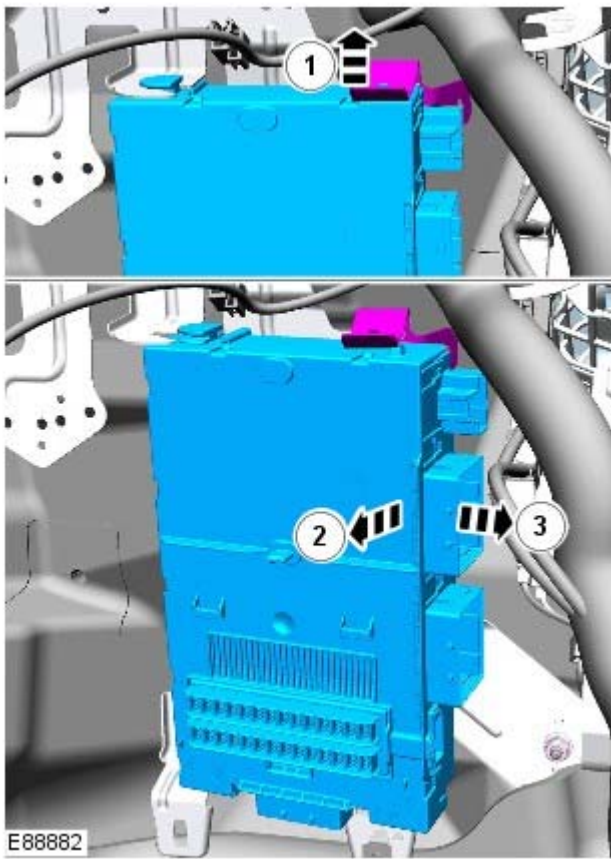
- 4.



- 5.



6.



Installation

1. To install, reverse the removal procedure.

Module Communications Network - Battery Junction Box (BJB)TD4 2.2L Diesel

Removal and Installation

Removal

1. Remove the bumper armature.

Refer to: [Front Bumper](#) (501-19 Bumpers, Removal and Installation).

2. Remove the air cleaner housing.

Refer to: [Air Cleaner](#) (303-12A Intake Air Distribution and Filtering - I6 3.2L Petrol, Removal and Installation).

3. Remove the secondary bulkhead center panel.

Refer to: [Secondary Bulkhead Center Panel - TD4 2.2L Diesel](#) (501-02 Front End Body Panels, Removal and Installation).

4. Remove the brake booster.

Refer to: [Brake Booster](#) (206-07 Power Brake Actuation, Removal and Installation).

5. Remove the ABS module.

Refer to: [Anti-Lock Brake System \(ABS\) Module](#) (206-09A Anti-Lock Control, Removal and Installation).

6. Remove the fuel fired booster heater.

Refer to: [Fuel Fired Booster Heater](#) (412-02B Auxiliary Climate Control, Removal and Installation).

7. Remove both headlamps.

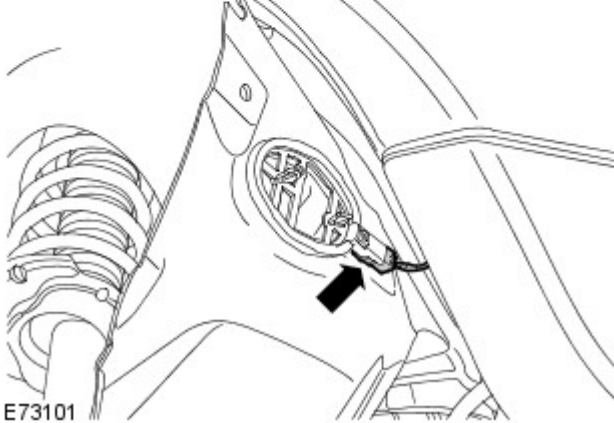
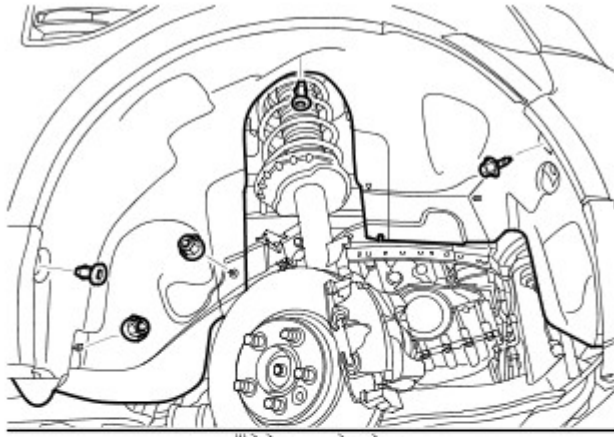
Refer to: [Headlamp Assembly](#) (417-01 Exterior Lighting, Removal and Installation).

8. Remove the engine upper support insulator.

Refer to: [Engine Upper Support Insulator](#) (303-01A Engine - I6 3.2L Petrol, Removal and Installation).

9. Remove the glove compartment lid.

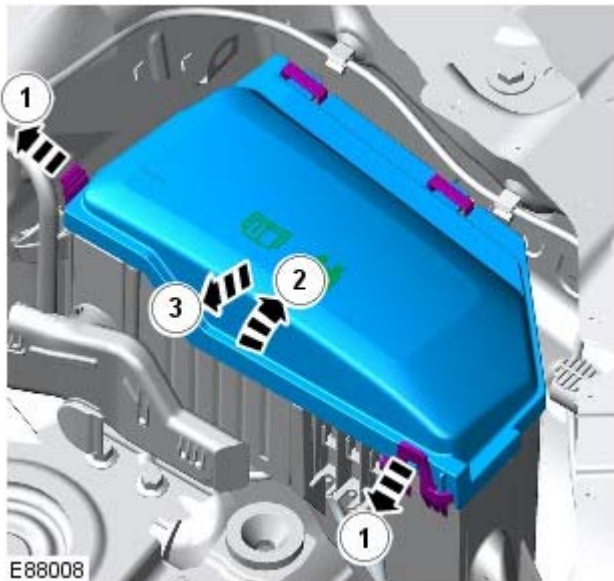
Refer to: [Glove Compartment](#) (501-12 Instrument Panel and Console, Removal and Installation).



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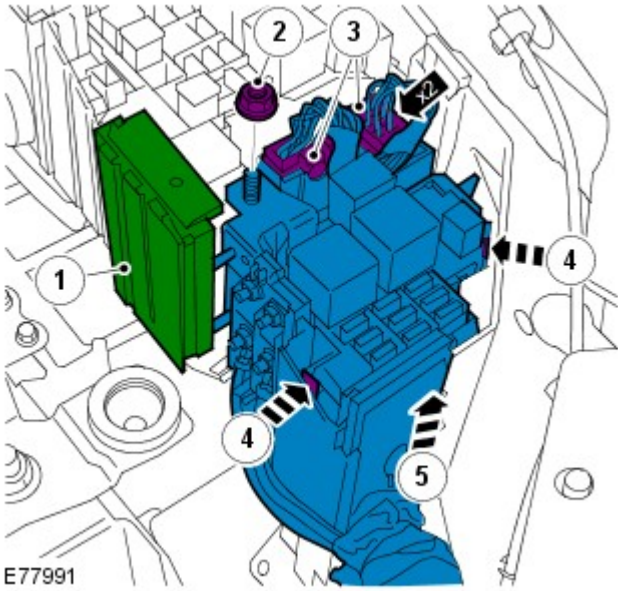
10. NOTE: RHD illustration shown, LHD is similar.

Remove the LH fender splash shield.

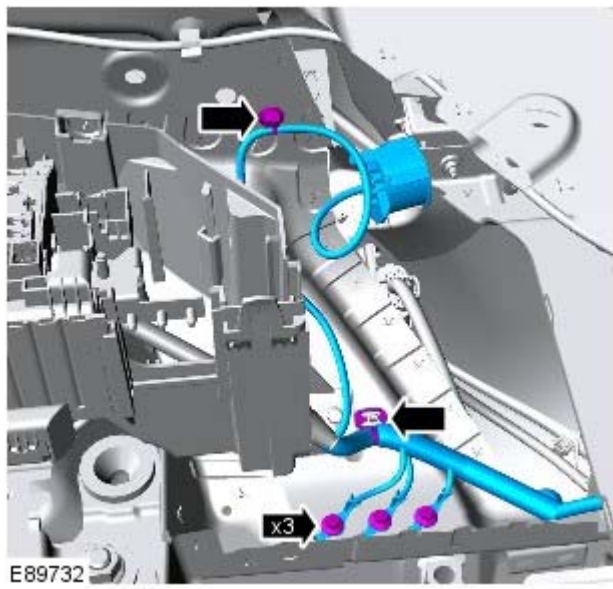


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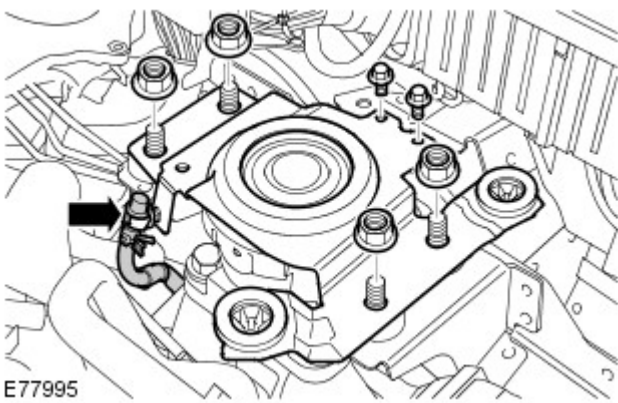
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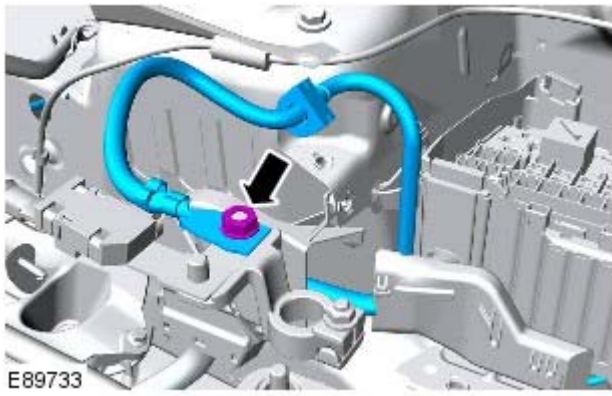
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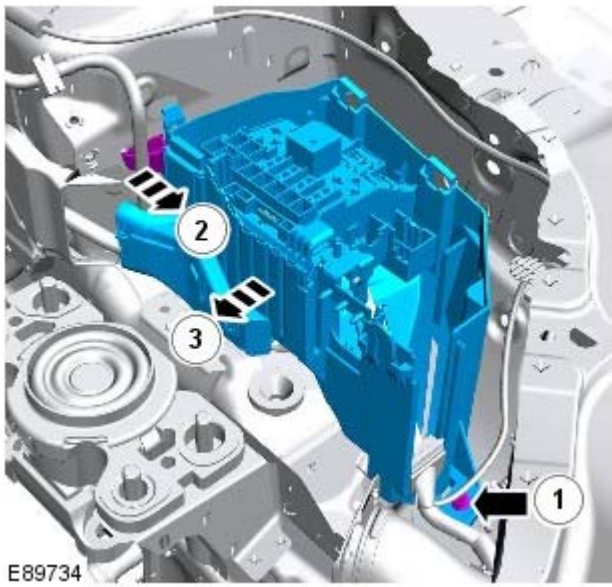
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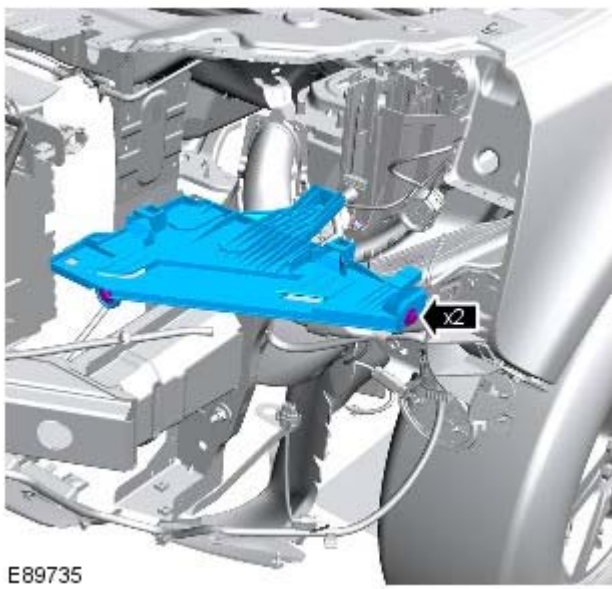
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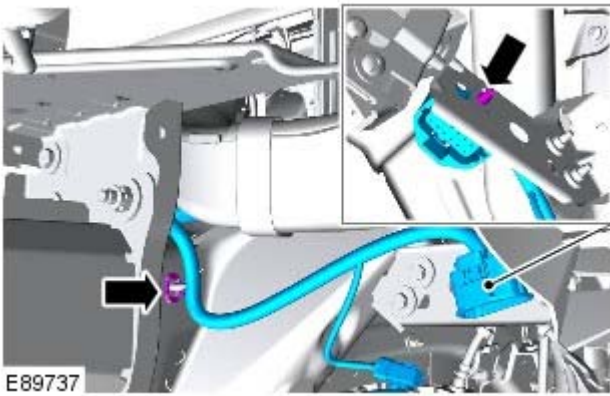
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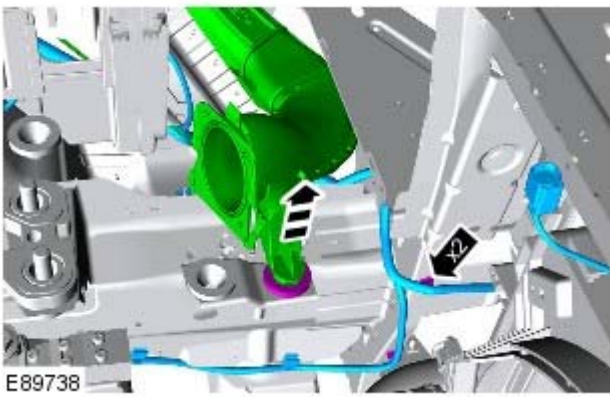
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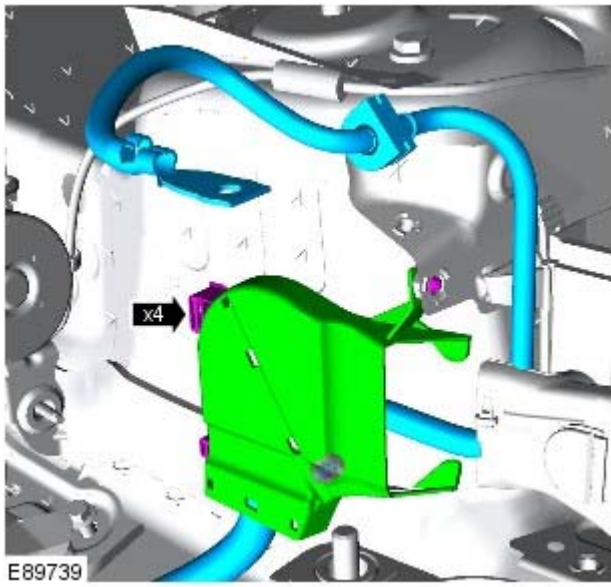


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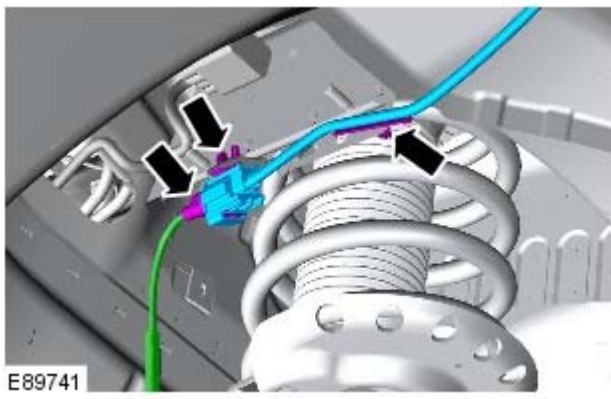


20. Release the harness and withdraw into engine bay area.

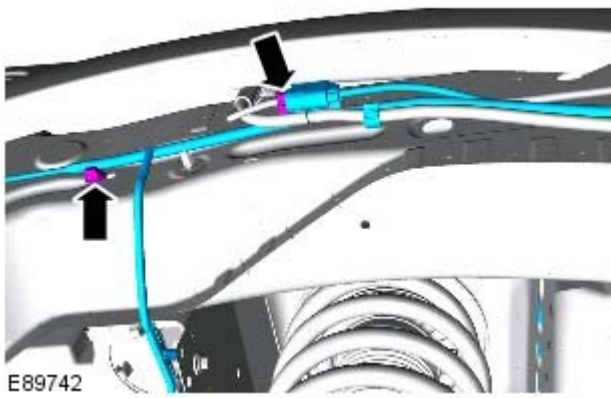
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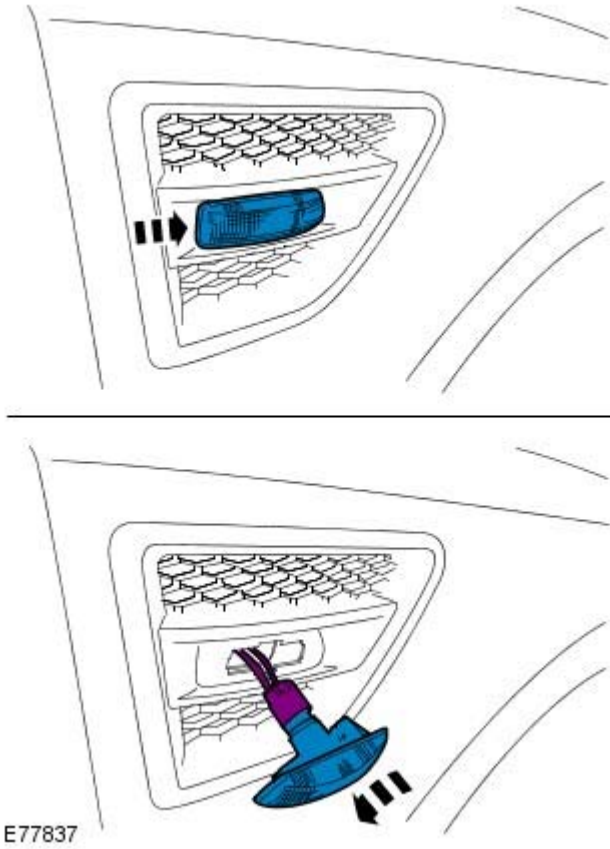
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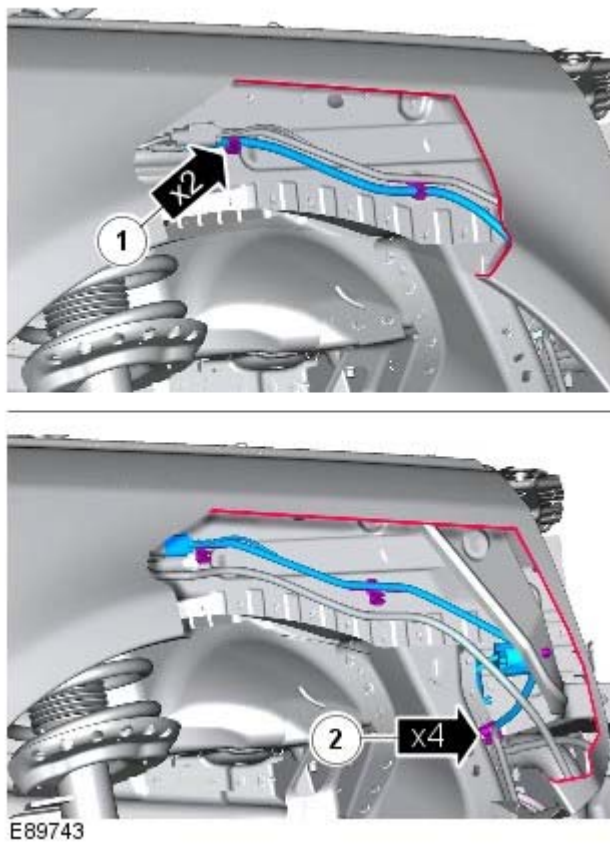
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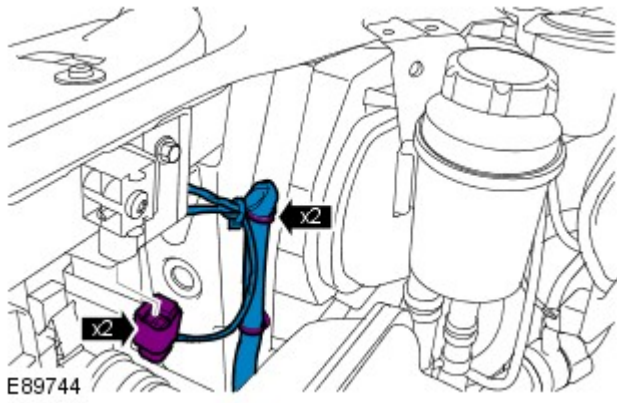
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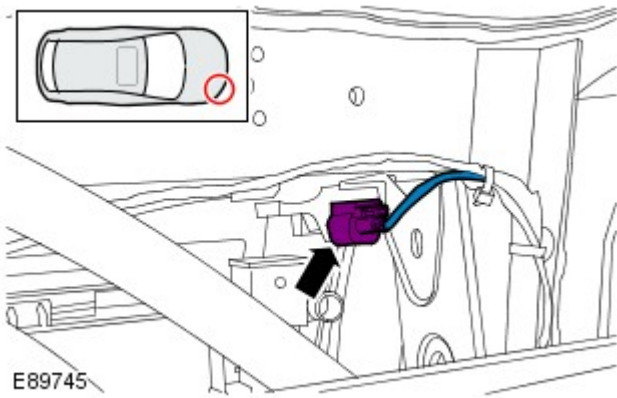
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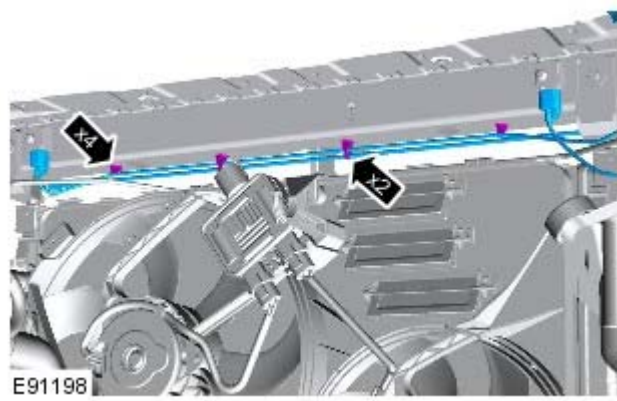
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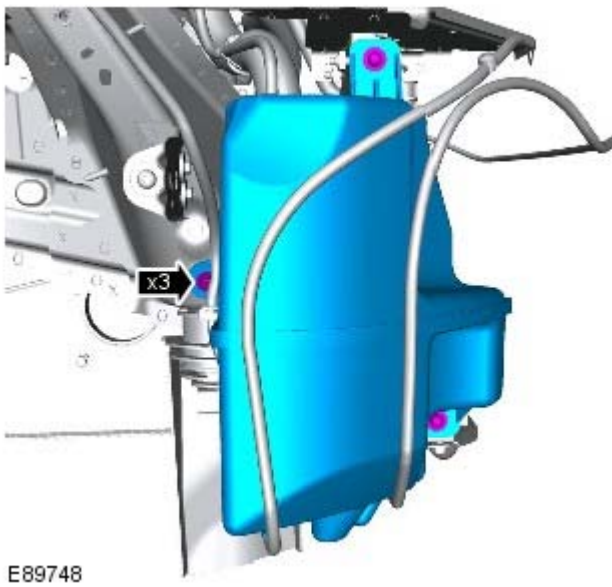
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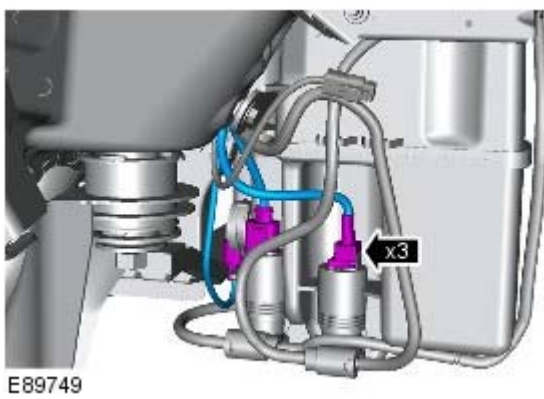
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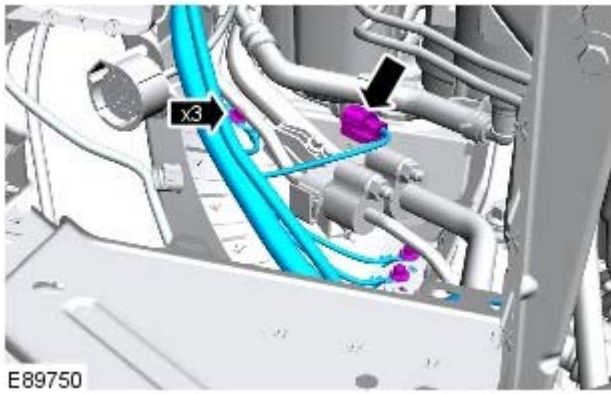


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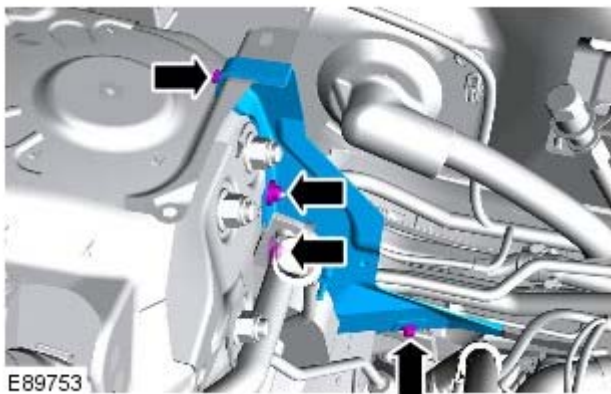




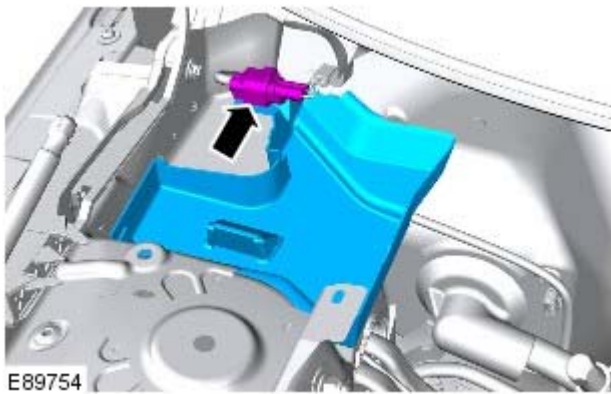
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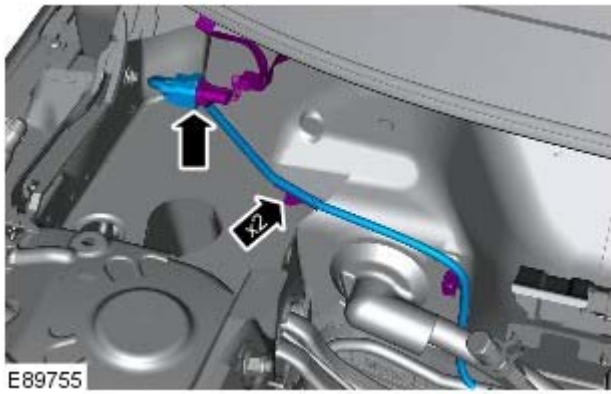
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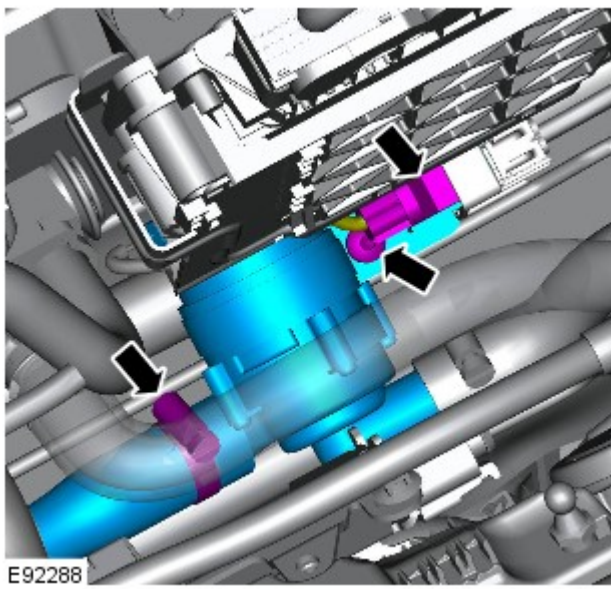
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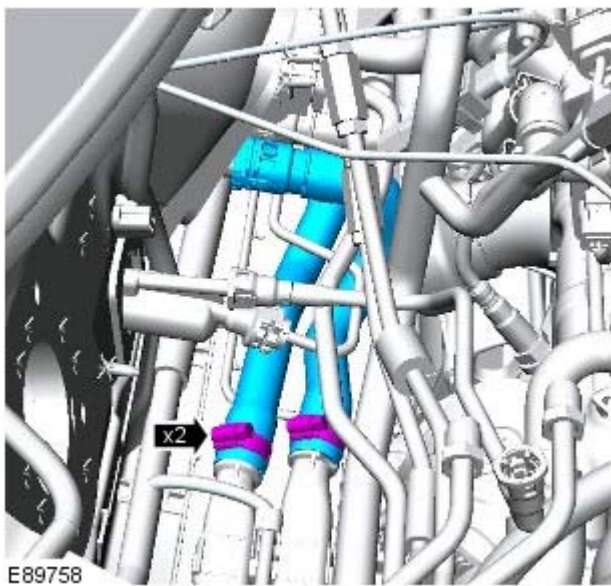
35. Unclip the windscreen heater electrical connector from the plenum side extension panel and remove the panel.



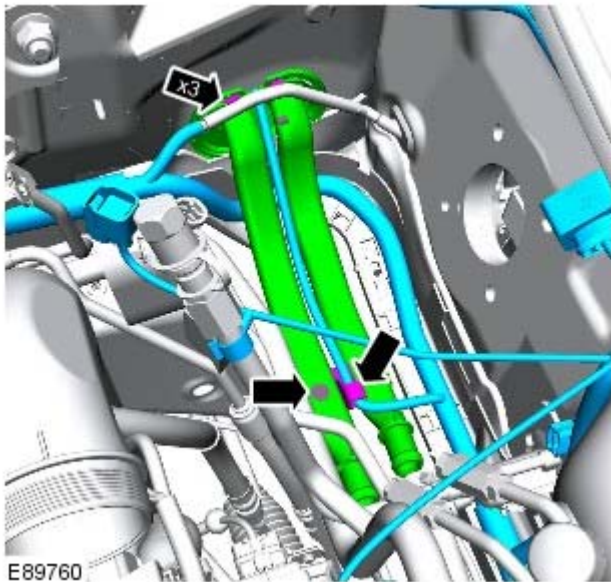
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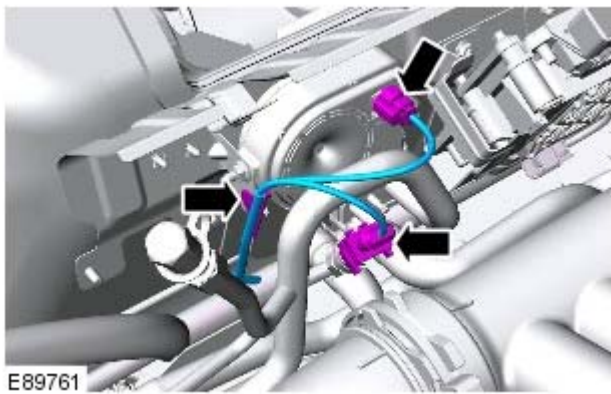
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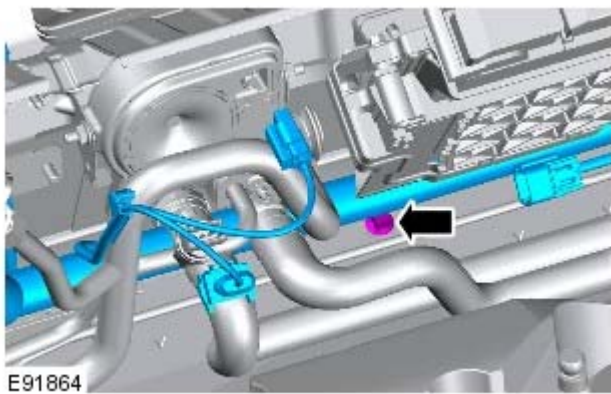
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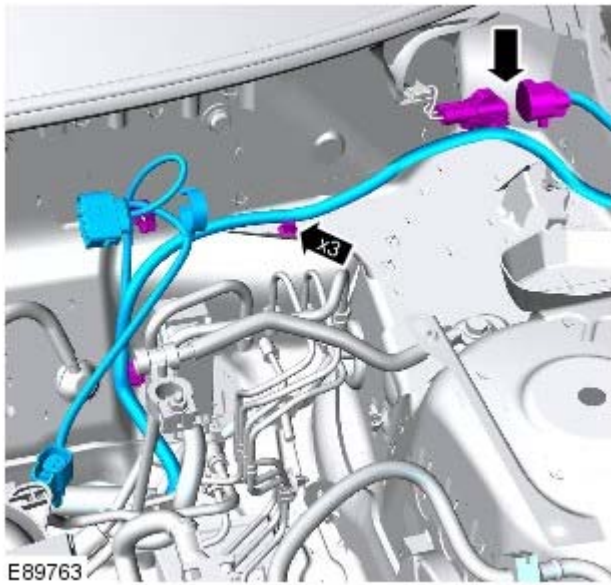


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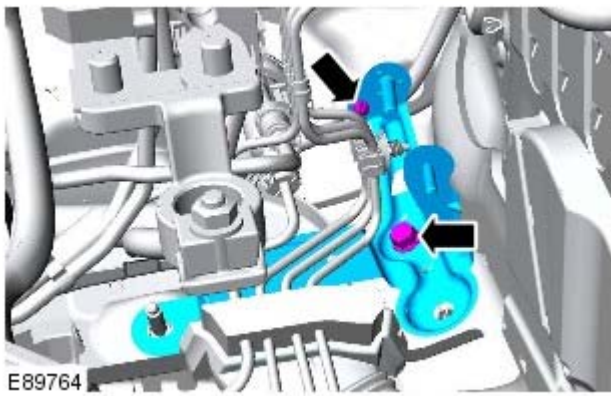


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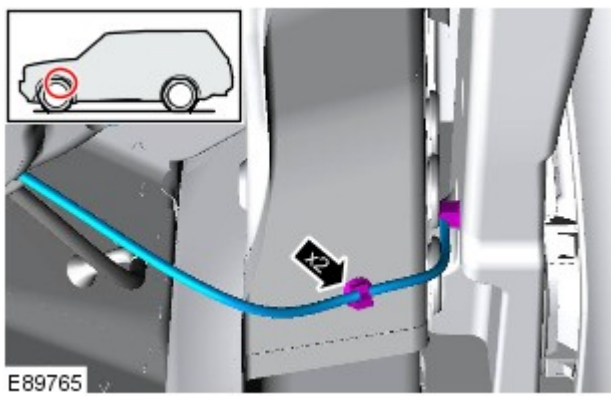
Release the engine compartment harness from clip securing it to the vehicle bulkhead.



42. NOTE: RHD illustration shown, LHD is similar.



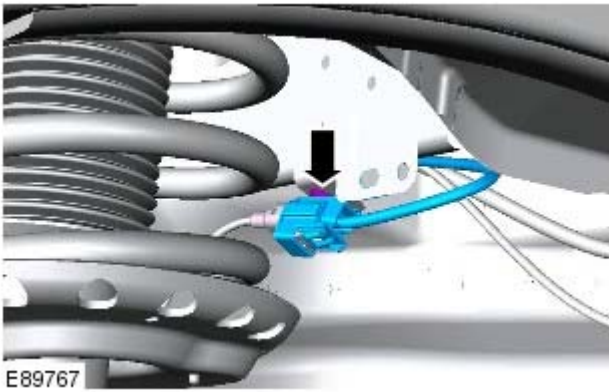
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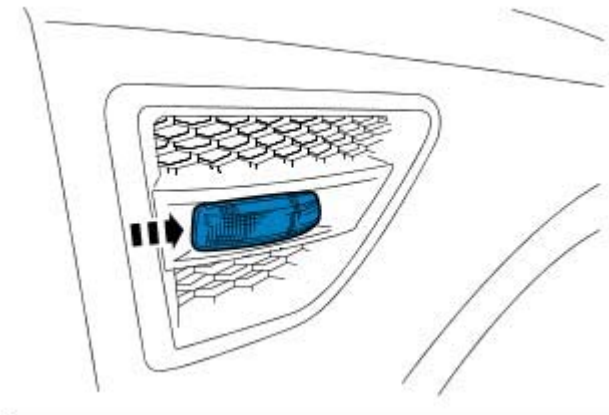
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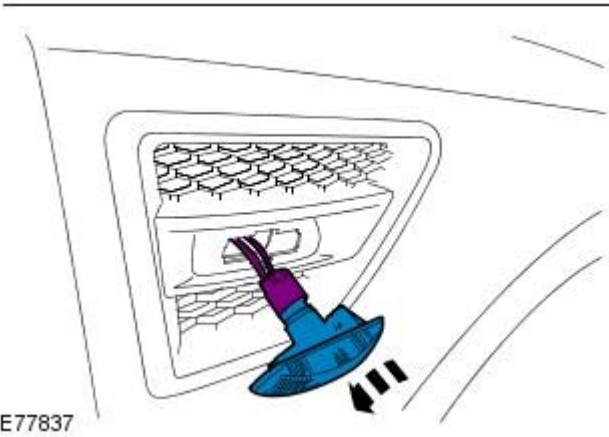
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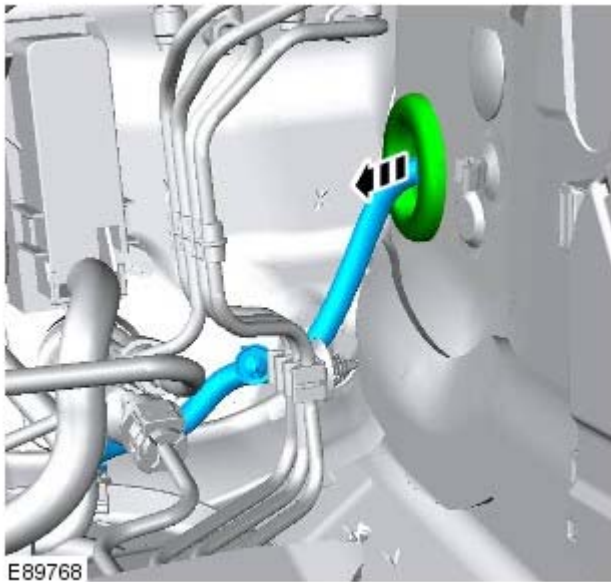


46. NOTE: LHD illustration shown, RHD is similar.



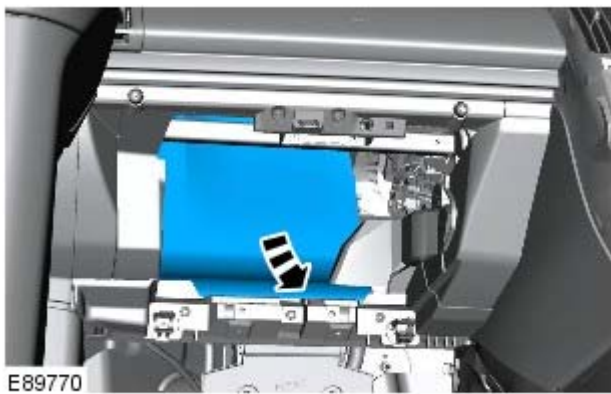
47. Release the LH side repeater from the vehicle body and disconnect the electrical connector.



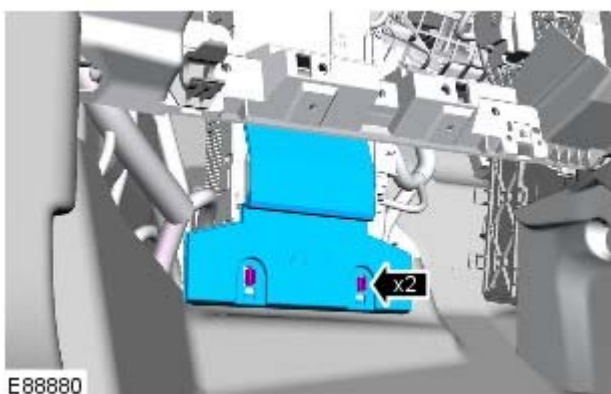


48. NOTE: LHD illustration shown, RHD is similar.

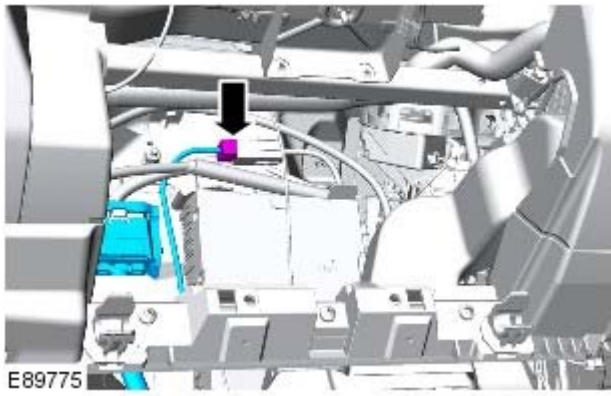
49. Unclip the harness tray from the vehicle bulkhead and route the RHS of the harness around the brake pipes into the LHS of the engine bay.



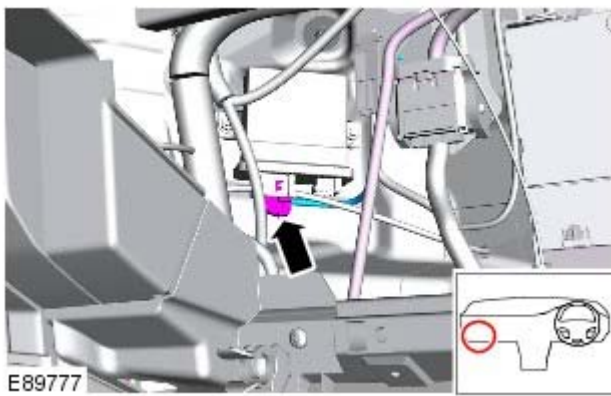
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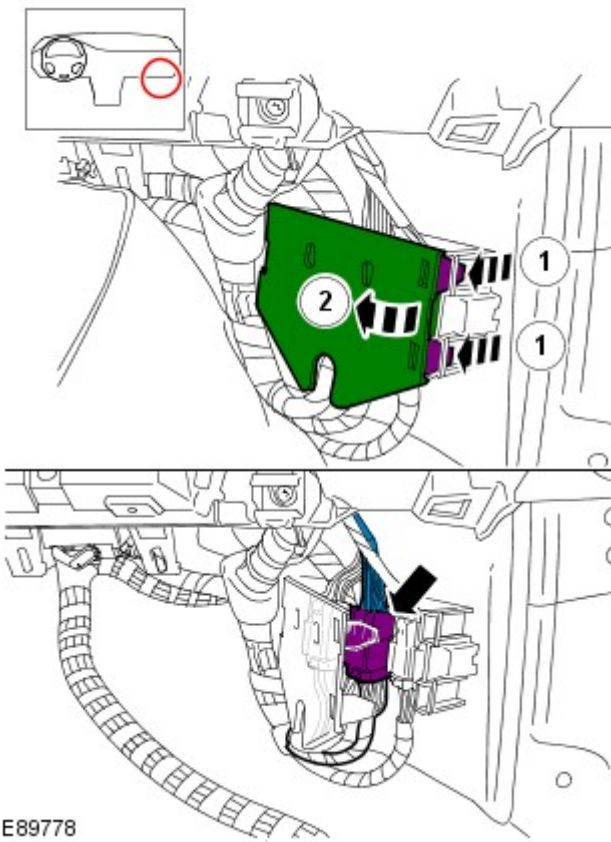
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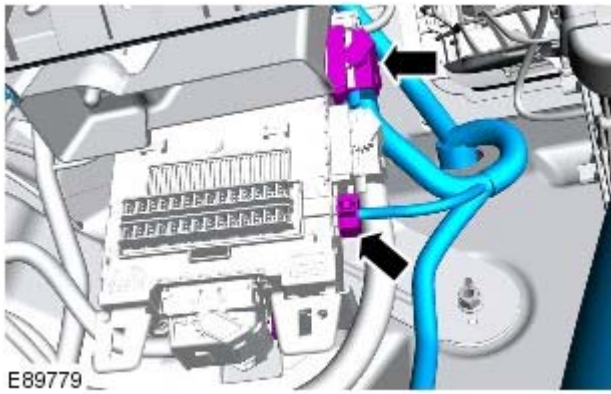
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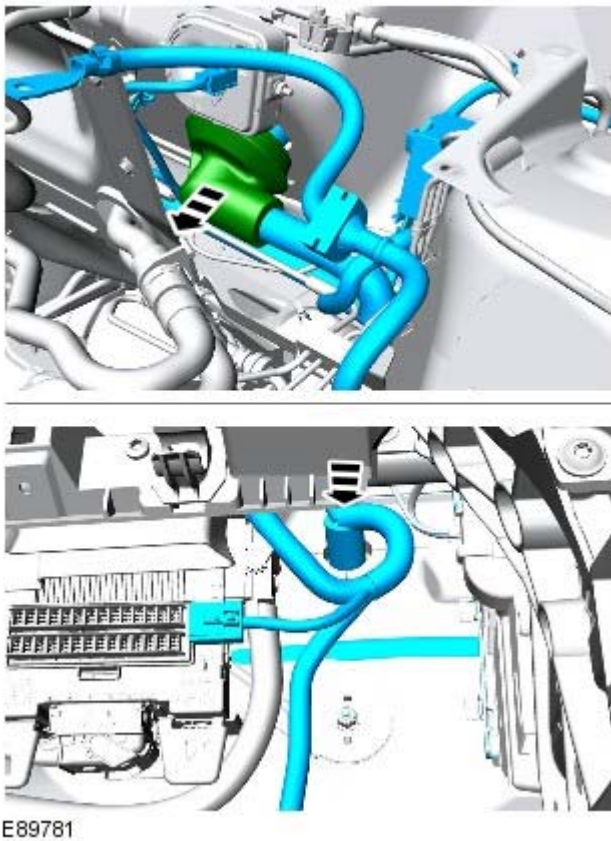
53. NOTE: LHD illustration shown, RHD is similar.



54. NOTE: LHD illustration shown, RHD is similar.



55. NOTE: RHD illustration shown, LHD is similar.



56. NOTE: RHD illustration shown, LHD is similar.

Installation

1. Place harness to vehicle plenum, feed connectors into inside of vehicle and install grommet. Use assistance inside vehicle to pull connectors through.

2. Secure harness tray clips and secure rubber grommet to vehicle body.

3. Install and secure fusebox to body.

Torque: 10 Nm

4. Install the engine mounting plate.
5. Secure the engine harness to the fusebox.

Torque:

6. Install and secure the battery lead to the fusebox and install the small battery lead cover.

Torque: 10 Nm

7. Connect the two electrical connectors to the BJB.
8. Secure the 3 earth points and secure the harness clips to the vehicle body.

Torque: 10 Nm

9. Secure the battery lead to the battery terminal clamp.

Torque: 25 Nm

10. Install the fuse box cover.
11. Install the harness cover to the suspension turret.
12. Feed harness under the air cleaner duct and secure the duct to the grommet.
13. Secure headlamp and bumper harness clips.
14. Connect the height sensor electrical connector and secure the harness with the clips.
15. Install headlamp mounting plate.

Torque: 10 Nm

16. Connect the side repeater electrical connector.
17. Connect the heated washer jet electrical connection and secure the harness to the vehicle body.
18. Connect the ABS sensor and secure the harness to the vehicle body.
19. Secure the washer pipe to the harness and secure the harness to the body.
20. Connect the crash sensor electrical connectors.
21. Connect the the bonnet lock electrical connector
22. Secure the harness to the body and then secure the bonnet release cable to the harness.
23. Secure the washer pipe to the washer bottle.
24. Install the washer bottle and connect the electrical connections.

Torque: 10 Nm

25. Secure the 3 ground cables to the vehicle body.

Torque: 10 Nm

26. Secure the harness to the vehicle body.
27. Connect the the bonnet lock electrical connector
28. Install the RH secondary bulkhead mounting bracket.

Torque: 10 Nm

29. Install the inner plenum plate and secure the electrical connector to the plate.
30. Connect the heated screen RH electrical connector.
31. Install the auxiliary coolant pump and connect the feed hose.

Torque: 10 Nm

32. Install the FFB heater coolant feed and return pipes.
33. Connect the FFB heater coolant feed and return hoses to the pipes.
34. Connect the A/C pressure switch and the BBUS electrical connectors. Also secure the harness to the vehicle body.
35. Secure the engine compartment harness to the vehicle bulkhead.
36. Secure the harness tray to the LHS of the vehicle bulkhead.
37. Connect the LH heated screen electrical connector and secure the harness to the vehicle body.
38. Feed the harness into the LH wheel arch and secure the grommet.
39. Install the ABS modulator bracket.

Torque: 25 Nm

40. Install the LH side repeater lamp and secure the clips to the vehicle body.
41. Connect the rear washer pipe.
42. Connect the ABS sensor electrical connector and secure the harness to the vehicle body.
43. Connect the two electrical connectors to the CJB.
44. Connect the main engine compartment harness to the instrument panel harness and close the cover.

45. Connect the main engine compartment harness to the headlamp levelling ECU.
46. Connect the 3 floor harness electrical connections.
47. Install the fuse cover and refit the sound deadening sheet.
48. Install the LH fender splash shield.

Torque: 6 Nm

49. Install the glove compartment lid.

Refer to: [Glove Compartment](#) (501-12 Instrument Panel and Console, Removal and Installation).

50. Install the engine upper support insulator.

Refer to: [Engine Upper Support Insulator](#) (303-01A Engine - I6 3.2L Petrol, Removal and Installation).

51. Install both headlamps.

Refer to: [Headlamp Assembly](#) (417-01 Exterior Lighting, Removal and Installation).

52. Install the fuel fired booster heater.

Refer to: [Fuel Fired Booster Heater](#) (412-02B Auxiliary Climate Control, Removal and Installation).

53. Install the ABS module.

Refer to: [Anti-Lock Brake System \(ABS\) Module](#) (206-09A Anti-Lock Control, Removal and Installation).

54. Install the brake booster.

Refer to: [Brake Booster](#) (206-07 Power Brake Actuation, Removal and Installation).

55. Install the secondary bulkhead center panel.

Refer to: [Secondary Bulkhead Center Panel - TD4 2.2L Diesel](#) (501-02 Front End Body Panels, Removal and Installation).

56. Install the air cleaner housing.

Refer to: [Air Cleaner](#) (303-12A Intake Air Distribution and Filtering - I6 3.2L Petrol, Removal and Installation).

57. Install the bumper armature.

Refer to: [Front Bumper](#) (501-19 Bumpers, Removal and Installation).

Published: 11-May-2011

Wiring Harnesses -

Torque Specifications

Description	Nm	lb-ft
Cylinder head ground	6	5
Ground cables	10	7
Wiring harness support bracket bolts	10	7

Wiring Harnesses - Wiring Harness

Description and Operation

Introduction



CAUTION: Do **not** use any other heat shrink sleeve other than the approved glue lined heat shrink sleeve mentioned in the repair procedure.

The purpose of this document is to promote quick and efficient minor repair to harness connectors or cables using approved methods and the wiring harness repair kit. Repairs may only be made to cables and connectors which have been mechanically, **not electrically** damaged. It also applies where the whole extent of the damage can be clearly identified and rectified.

Care and neatness are essential requirements in making a perfect repair.

Caution:

At the time of this first issue of the Harness Repair Guide, do not approve repairs to any of the following circuits:

- Any media orientated system transport network harnesses.
- Supplement restraint system (SRS) firing circuits (Air bags).
- Link lead assemblies, which are unique to safety critical circuits such as anti-lock brake system (ABS) and thermocouple circuits. An example of this is the ABS wheel speed sensors with moulded connectors.
- 4. Screened cables, leads and wiring harness(s).

If any harness(s) with defective electrical connector terminals or wires from the above circuits are a concern, new components must be installed.

Repair Kit



CAUTION: Where the repair procedure indicates that a glue lined heat shrink sleeve should be applied, apply sufficient heat to the glue lined heat shrink to melt the glue in order to provide a water tight seal. Do **not** over heat the glue lined heat shrink sleeve so that the wiring harness insulation becomes damaged.

The wiring harness repair kit has been produced which comprises:

- Pre-terminated wiring harness(s) of different sizes and types
- Three sizes of butt splice connectors
- A selection of colored cable identification sleeves
- Two sizes of glue lined heat shrink sleeves
- Crimping pliers
- A wire cutter and insulation stripper
- An electrical connector terminal extraction handle and tips

A suitable heat source, for shrinking heat shrink sleeves will be required.

The pre-insulated diamond grip range of electrical connector terminals and in-line, butt splice connectors contained within the wiring harness repair kit are the **only** acceptable product for the repairs of wiring harnesses. The butt connectors not only grip the wire but also the insulation, making a very secure joint.

If an electrical connector terminal is not included in the wiring harness repair kit then approval for the repair is **NOT** given and in these circumstances a new wiring harness must be installed.

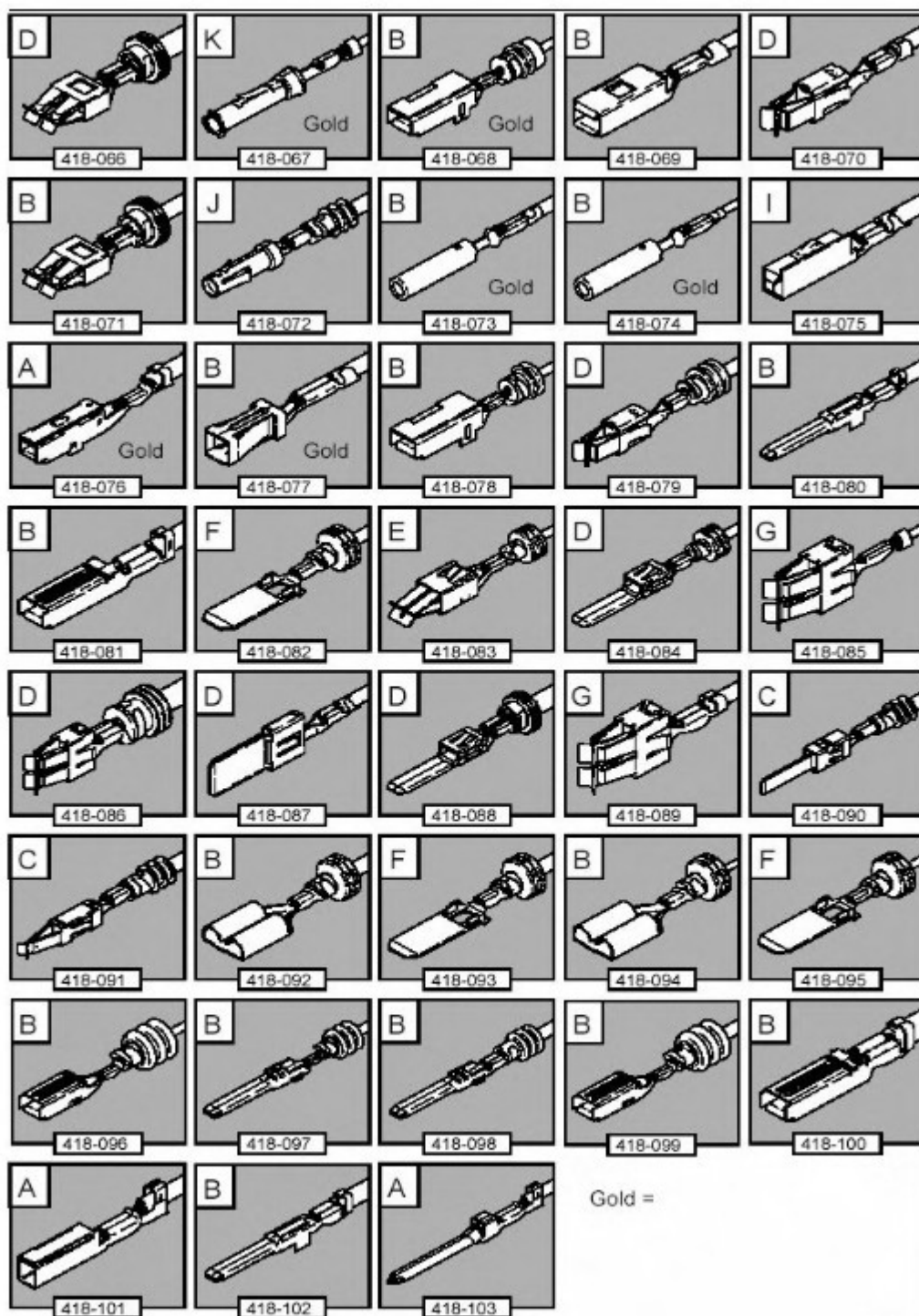
Pre-Terminated Wiring Harness(s) and Butt Splice Connectors

All pre-terminated wiring harness(s) and butt splice connectors in the wiring harness repair kit are contained in bags which can be resealed after use. Each bag is marked with the part number of the items stored within the bag. Each storage compartment in the wiring harness repair kit is identified with the corresponding part number. Make sure that pre-terminated wiring harness(s) and connectors are not mixed up it is advisable to only open one bag at a time and to reseal the bag securely before opening another bag. Also, replace the bag in its mating part number compartment within the case.

The pre-terminated wiring harness(s) are supplied with the insulation in one of three colors, red, blue or yellow. The colors do not apply to any particular circuit but to the harness wire size. See the Relationship Table in the Repair Method section.

Butt splice connectors are also supplied with red, blue or yellow coverings, which must be matched to the pre-terminated wiring harness insulation color.

Pre-Terminated Wiring Harness(s)



E130741

The illustration shows:

- The pre-terminated wiring harness(s) which are included in the wiring harness repair kit
- The part number of the pre-terminated wiring harness
- The letter showing the extractor tip which must be used to remove this type of electrical connector terminal
- Those electrical connector terminals which are gold

Some of the pre-terminated wiring harness(s) have seals installed to the insulation for sealed connector applications. It is essential for prevention of moisture ingress that a sealed pre-terminated wiring harness must be used where a sealed terminal was removed.



CAUTION: Where the repair procedure indicates that a glue lined heat shrink sleeve should be applied, apply sufficient heat to the glue lined heat shrink to melt the glue in order to provide a water tight seal. Do **not** over heat the glue lined heat shrink sleeve so that the wiring harness insulation becomes damaged.

Two sizes of heat shrink sleeving are supplied in the wiring harness repair kit. Each heat shrink sleeve contains a sealant glue. These must be used when connecting wiring harness(s) or electrical connector terminal(s) at all times. The smaller diameter heat shrink sleeve is to be used with the red and blue butt splice connectors and the larger diameter sleeve with the yellow butt splice connectors.

For ease and speed, some of the pre-terminated wiring harness(s) may already have the insulation partly stripped at the splice end. If the repair requires insulation to be stripped from the cable, refer to the Relationship Table for the correct length of insulation to be stripped.

The Pre-Terminated Wiring Harness(s) illustration shows the electrical connector terminal type, the part number of the pre-terminated wiring harness and the letter of the extractor tip which must be used to extract the electrical connector terminal from the connector housing. Additionally, those electrical connector terminal(s) which are gold are identified, all others are therefore, tinned and not gold.

Wiring Harness Cable Identification Sleeves

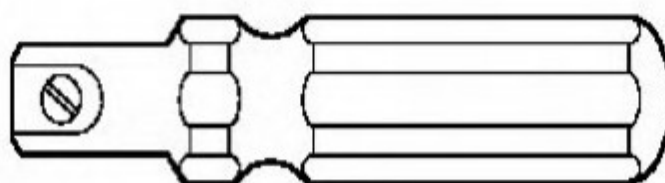
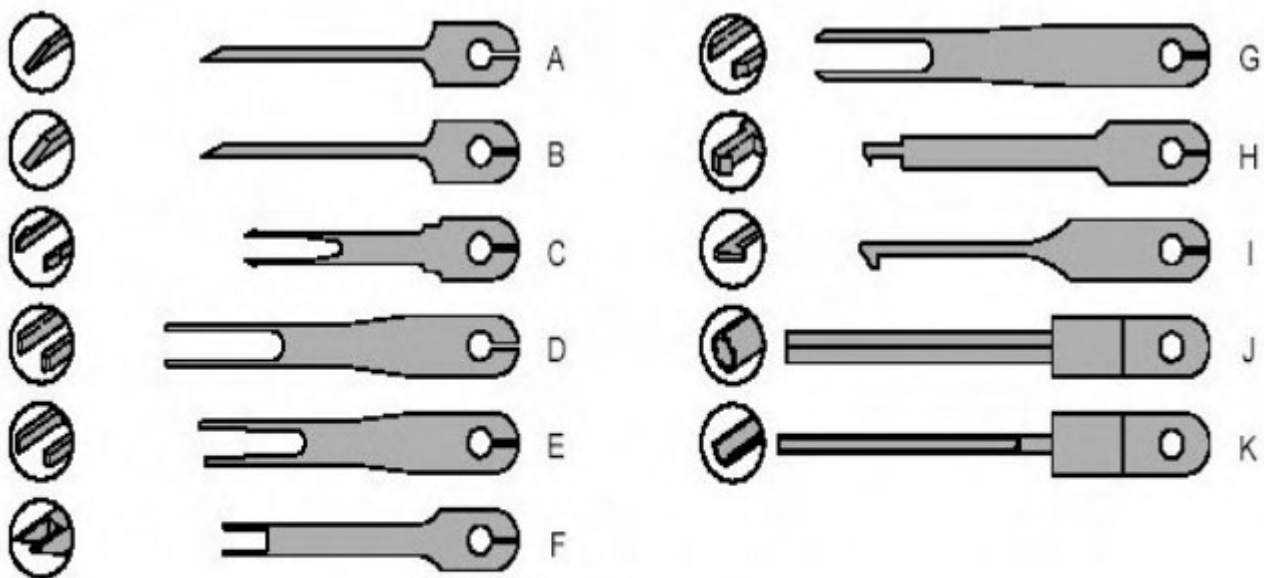
A selection of colored sleeves are contained in the wiring harness repair kit for maintaining the wiring harness cable identification on the pre-terminated wiring harness. Place the correct colored sleeve(s) over the pre-terminated wiring harness insulation as near to the electrical connector as possible with the main wiring harness cable color nearest to the electrical connector.

For example, if the original wiring harness cable color is pink with a black trace put the pink wiring harness cable identification sleeve on the pre-terminated wiring harness first followed by a black sleeve, and slide both along the wiring harness cable to the electrical connector terminal.

Extraction Handle and Tips

The extraction handle, in conjunction with the correct tip, is used to remove a terminal from an electrical connector. Each tip contained in the wiring harness repair kit is marked with an identification letter, A to K inclusive. Each tip has been specially designed to extract a particular type of electrical connector terminal. The use of any other tool is **not** recommended and is liable to cause damage to the electrical connector. The tip is fastened to the handle by a screw which holds the tip firmly yet allows it to be easily replaced.

Extraction Handle and Tips



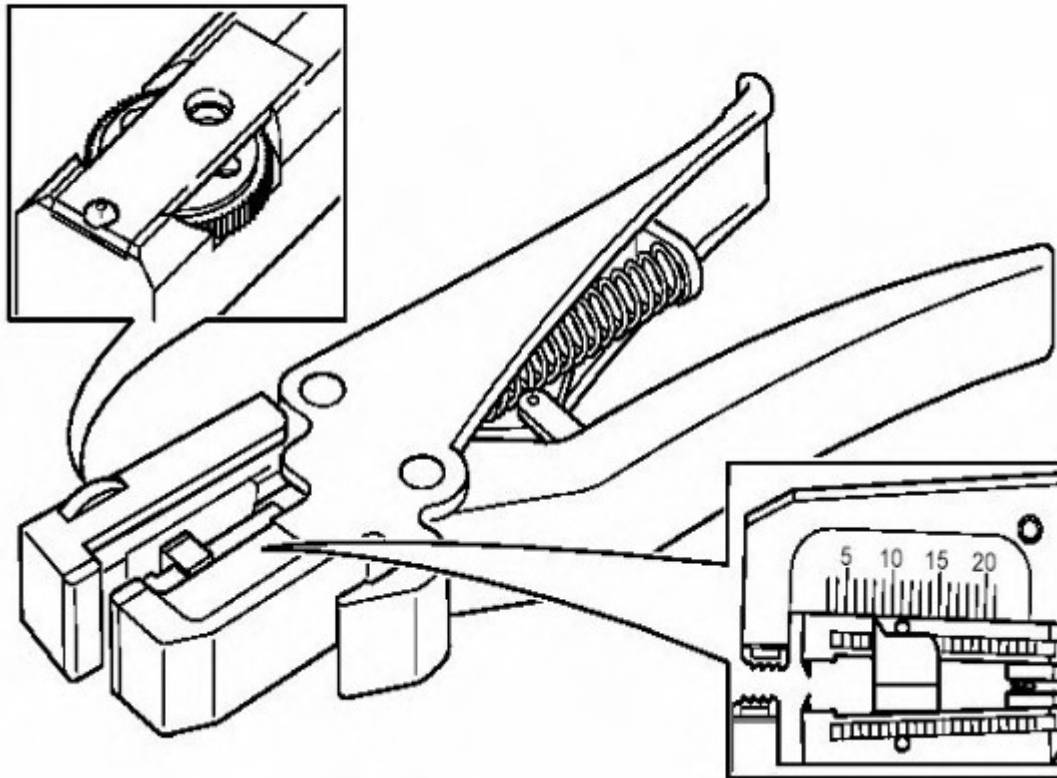
E130742

Insulation Stripper

The moving jaw has an adjuster wheel which has a series of holes in it. Turning the wheel and placing the cable in the

matching size hole will automatically adjust the jaw to the correct pressure. Note that some wiring harness(s) may have a harder insulation and slight adjustment of the wheel may be needed to make a clean strip but exercise care not to damage the wire.

Insulation Stripper

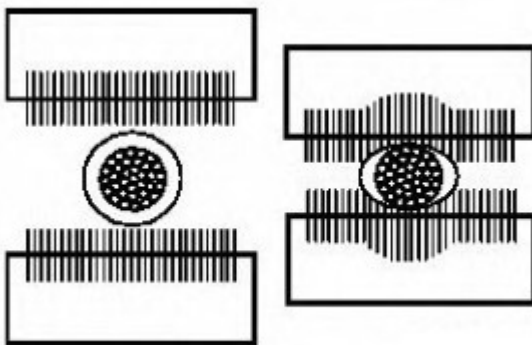


E130743

By pressing the outer edges of the wiring harness cable length stop together the adjuster can be slid up or down the jaw. This decreases or increases the length by which the wiring harness cable insulation will be stripped from the pre-terminated wiring harness or wiring harness wire. The adjuster has a position indicator to align with a graduated scale and this sets the correct length in millimetres, of insulation to be stripped. The amount of insulation to be stripped is shown in the Relationship Table.

The illustration shows the insulation stripper tool and a wiring harness correctly gripped in the jaws. A wire cutter is provided on the outer side of the fixed jaw.

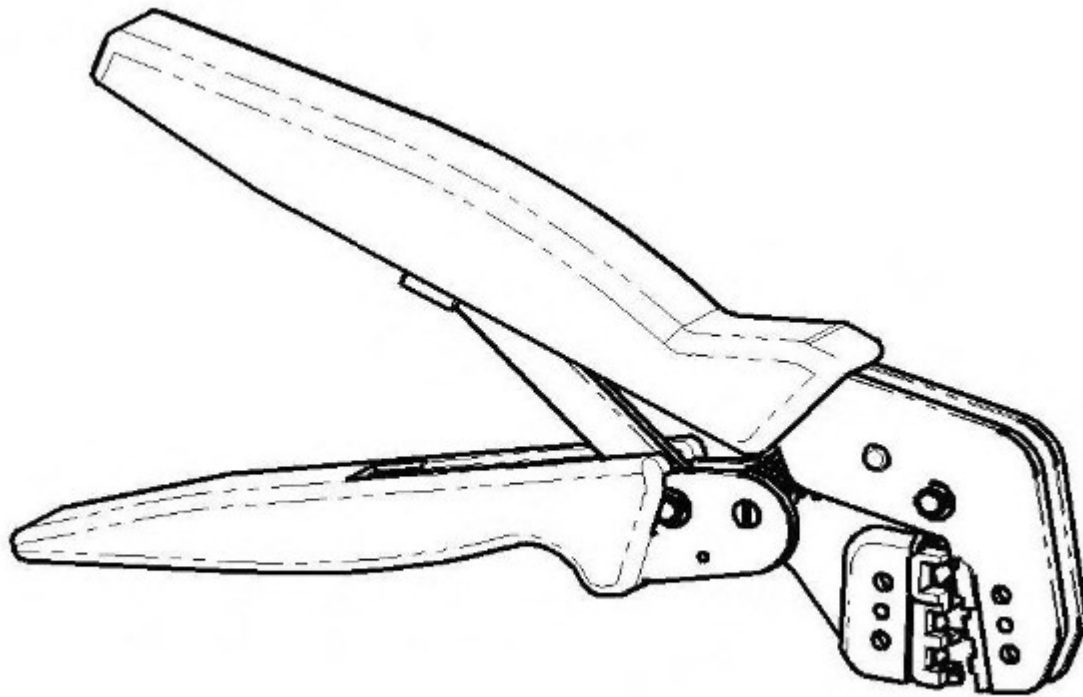
Cable Correctly Gripped in Stripper Blades



E130744

Crimping Pliers

Crimping Pliers



E130745

The crimping pliers have a moving jaw and a stationary jaw, with three different sized crimping enclosures. Each of the enclosures is identified by a red, blue or yellow coloured dot which corresponds to the three colours of the pre-terminated wiring harness(s) and butt splice connector colors.

List of Parts

Description	Part Number	Quantity
Wiring Harness Repair Kit	418-S065	1
Pre-Terminated Wiring Harness(s)	418-066 to 418-103 inclusive	10 each
Glue Lined Heat Shrink Pack – small diameter	418-104	25 per pack
Glue Lined Heat Shrink Pack – larger diameter	418-105	10 per pack
Case Assembly Comprising – carry case, lid, inner lid, base, insert, trays foam spacers	418-106	1
Butt Splice Connector – Red	418-107	50 per pack
Butt Splice Connector – Blue	418-108	50 per pack
Butt Splice Connector – Yellow	418-109	20 per pack
Extraction Tool Handle	418-110	1
Extraction Tip Pack consists of 2 spare screws plus	418-S111	1
Tip A	418-118	1
Tip B	418-119	1
Tip C	418-120	1
Tip D	418-121	1
Tip E	418-122	1
Tip F	418-123	1
Tip G	418-124	1
Tip H	418-125	1
Tip I	418-126	1
Tip J	418-127	1
Tip K	418-128	1
Sleeve Identification Pack – for Red insulation	418-112	500
Sleeve Identification Pack – for Blue insulation	418-113	500
Sleeve Identification Pack – for Yellow insulation	418-114	500

Description	Part Number	Quantity
Instruction Manual	JTP 593	1
Crimping Pliers	YRW500010	1
Wire Stripping Tool	418-117	1

Items can be ordered from:

SPX United Kingdom Limited

Ironstone Way

Brixworth

Northants

NN6 9UD

United Kingdom

Telephone: +44 (0) 1327 704461

Fax: +44 (0) 1327 706632

Repair Methods



CAUTION: Several different types and sizes of terminal may be found in a single electrical connector housing.

It is necessary to identify:

- The conductor (wire) size of the affected wiring harness
- The electrical connector range from which the damaged wiring harness is to be removed
- The terminal type

Use of the approved diagnostic tool will greatly assist in the quick identification of electrical connectors and faulty pin terminal(s).

Reference can also be made to the vehicle Electrical Guides, held by Dealers, to identify wiring harness(s) and electrical connector(s).

By using the Relationship Table, the wiring harness conductor (wire) size can be related to a suitable pre-terminated wiring harness by the color of the insulation. Also, the correct length of insulation to be stripped from the wiring harness lead is identified.

Relationship Table

CABLE RANGE	SPLICE	STRIP LENGTH
0.35 mm ² to 1.50 mm ²	RED	6.00 to 7.00 mm
1.00 mm ² to 2.50 mm ²	BLUE	6.00 to 7.00 mm
4.00 mm ² to 6.00 mm ²	YELLOW	9.00 to 9.50 mm

Electrical Connector Terminal Extraction

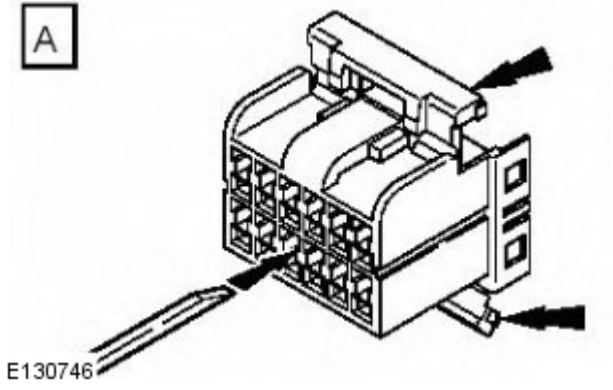
It must be noted that some electrical connector(s) have anti-backout devices which prevent the terminals from being removed from the electrical connector. Some examples of these are shown in following illustrations. The anti-backout device must be released before attempting to remove the terminal from the electrical connector. Some anti-backout devices require a special tip to release the device and these have been included in the kit. Most can be released by carefully using a suitable small screwdriver.

Various types of electrical connector have seals installed internally or externally to prevent moisture ingress. These normally do not have to be removed but make sure that they are installed when the electrical connectors are connected.

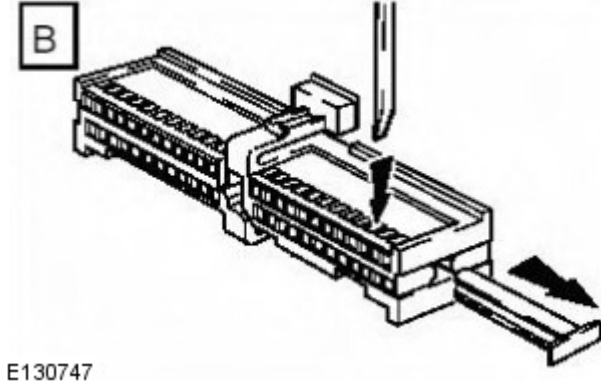
The illustrations show examples of each tip used on different types of electrical connector(s). There are a large number of different types of electrical connector used on vehicles therefore only one example using each tip is shown. Technicians experience and judgement will dictate which type of tip should be used for those electrical connector(s) which are not shown. Care should be exercised to avoid further damage when removing the terminals from the electrical connector.

NOTE: Examples of the extraction tips and anti-backout tips.

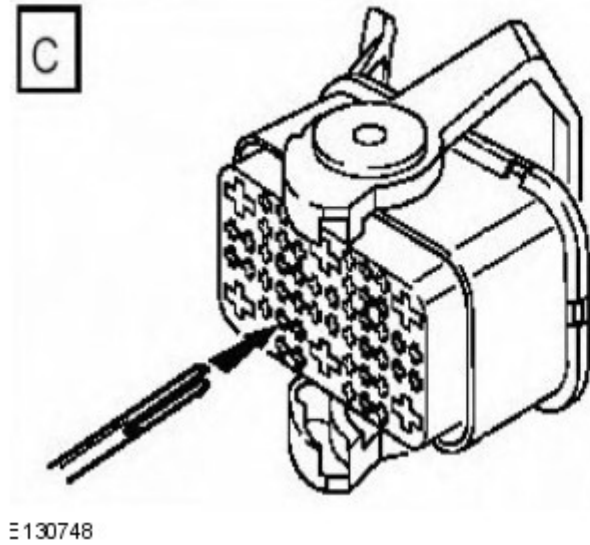
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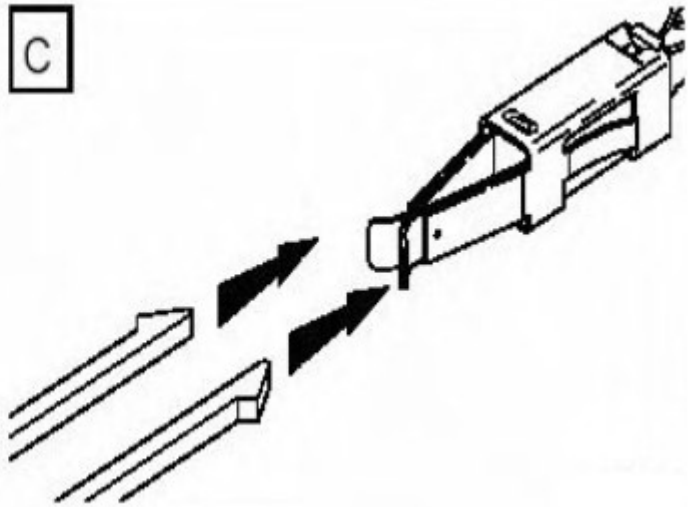
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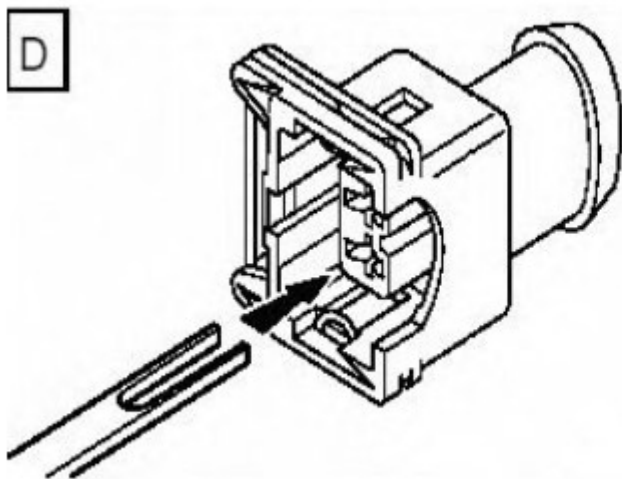


C

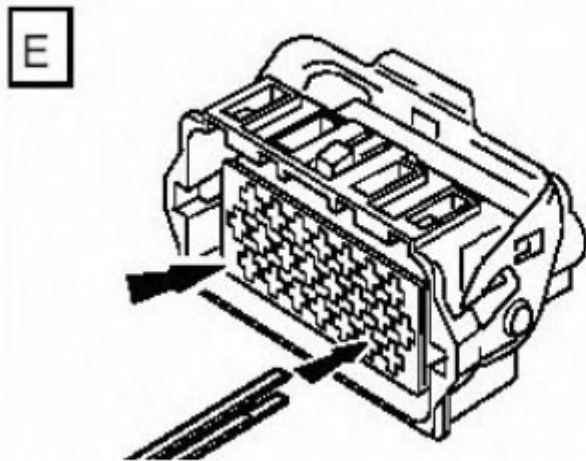
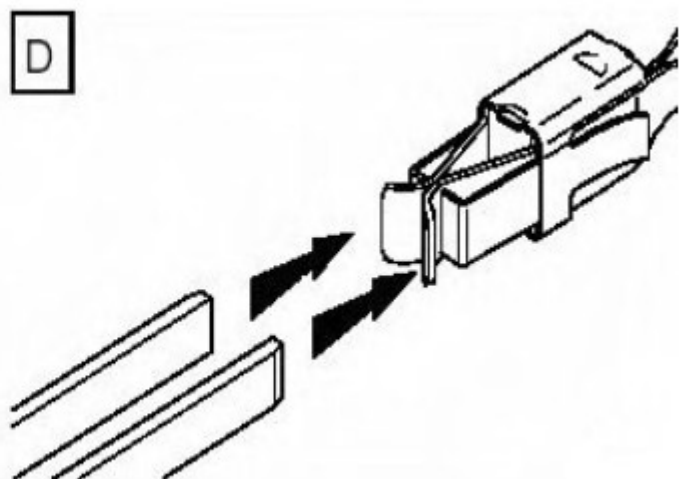


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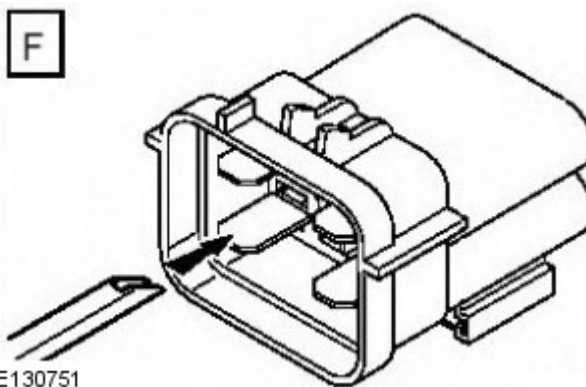
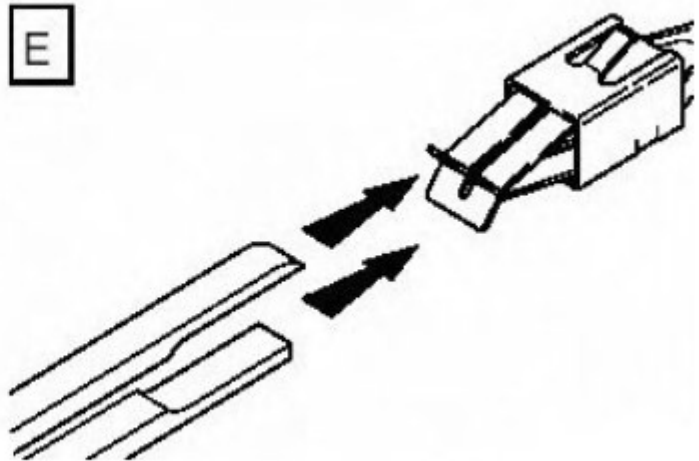




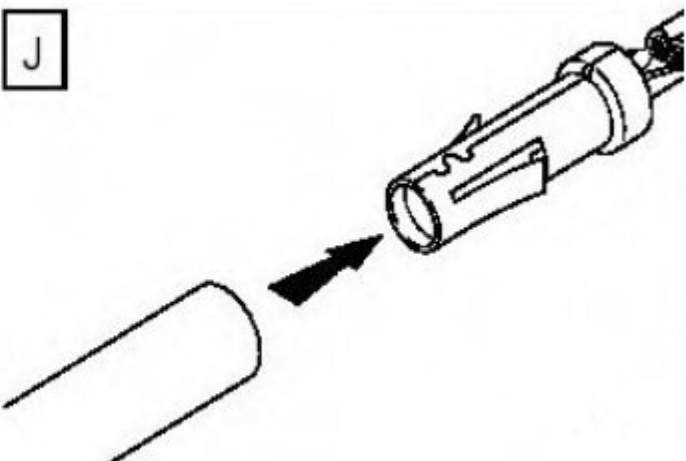
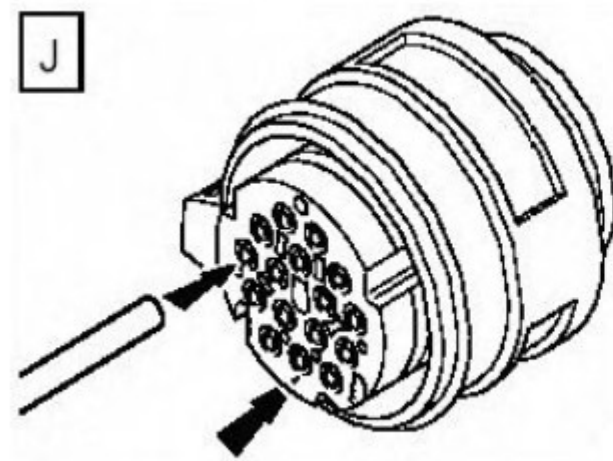
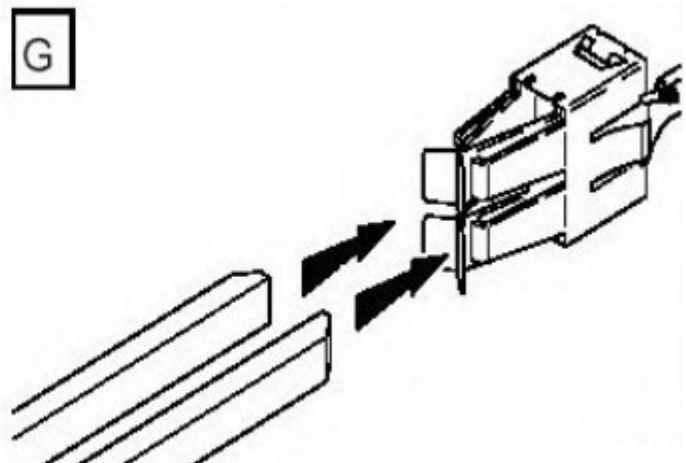
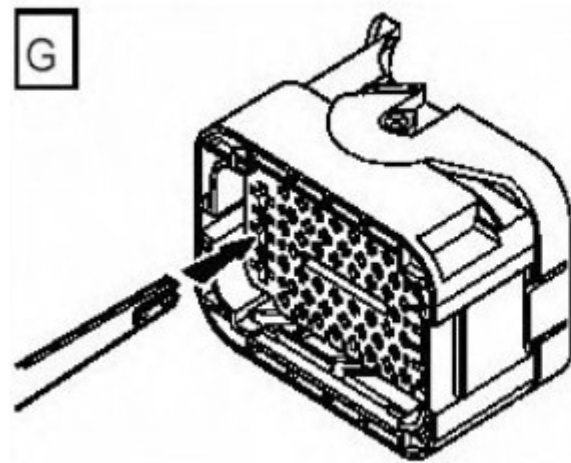
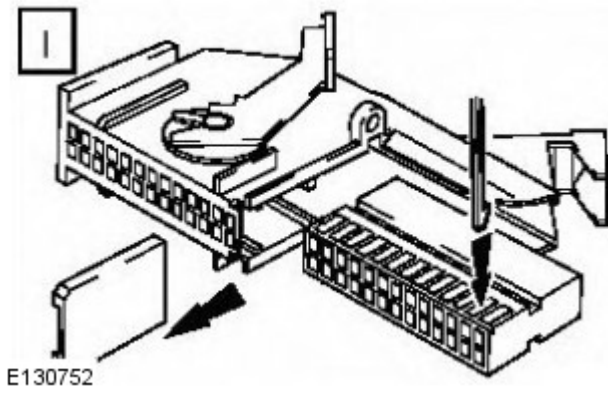
E130749

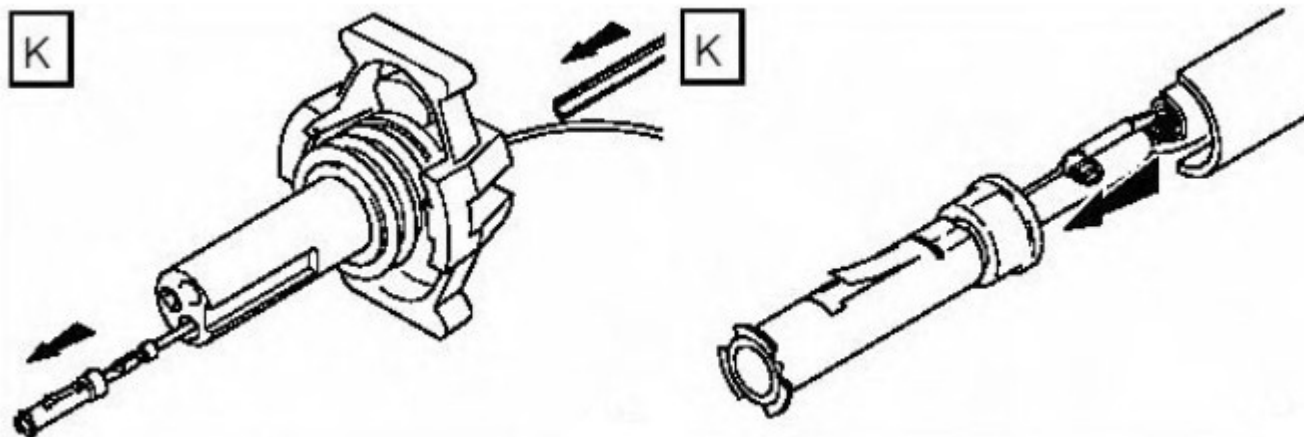


E130750



E130751





E130755

NOTE: The chart shows the electrical connector types, terminal pins/sockets, extractor tip and anti-backout tip.

Electrical connector terminal type	Pin or socket	Extractor tip	Anti-backout tip
Multilock 040 series	D	A	
Multilock 040 series	B	A	
Multilock 070 series	B	B	
Multilock 040 series	D	B	
Econoseal III 070 series	D	B	
Econoseal III 070 series	B	B	
Econoseal III 070 series	B	B	
Econoseal III J2	D	B	
Econoseal III 250 series	B	F	
Econoseal III 250 series	D	B	
Econoseal III 250 series	B	F	
Econoseal III 250 series	D	B	
Micro-timer II 1.5mm	D	C	
Micro-timer II 1.5mm	B	C	
Std power timer 4.8 flat	D	G	
Std power timer 5.8 flat	B	D	
Std power timer 5.8 flat	B	D	
Std power timer 2.8 flat	D	D	
Std power timer 4.8 flat	D	G	
Std power timer 5.8 flat	B	D	
Ford 2.8 flat	D	E	H
Multilock 070 series	D	B	
Multilock 070 series	B	B	
Junior power timer 2.8 flat	D	D	
Sumitomo TS90 connector	B	B	H
Modu IV gold plated	D	B	
Multilock 040 series gold plated	D	A	
Micro qualock	D	I	
EECV	D	B	
EECV	D	B	
Kostal dia 1.50 series	D	J	
AMP 6.3 flat	D	B	
Junior power timer 2.8 flat	D	D	
2.8 series	D	B	I
Sumitomo TS90 connector	D	B	H
Ducon 0.60 gold plated	D	K	
AMP 6.3 flat	D	D	
Econoseal III 250 series	B	F	

Repair Procedure

CAUTIONS:




Do not use crimping pliers, insulation strippers, butt splice connectors, heat shrink sleeves or pre-terminated wiring harness(s) that are not supplied with the Jaguar wiring harness repair kit. Each part has been designed to be used only with the other parts in this wiring harness repair kit.



Where the repair procedure indicates that a glue lined heat shrink sleeve should be applied, apply sufficient heat to the glue lined heat shrink to melt the glue in order to provide a water tight seal. Do **not** over heat the glue lined heat shrink sleeve so that the wiring harness insulation becomes damaged.

It is not correct to make more than five repair joints on the wiring harness to any electrical connector and if more damage is found at the same electrical connector then a new wiring harness must be installed.

- Remove the faulty terminal from the electrical connector using the extractor tool and correct tip. Make sure that any anti-backout device is released before trying to remove the terminal.
-  **CAUTION:** : A number of electrical connector terminals are gold plated or gold flashed. When defective, they must be installed with a gold pre-terminated wiring harness(s) from the wiring harness repair kit. It is not always easy to identify the female as gold but the male pins are visually easier, therefore always check both male and female terminals to identify those which are gold. Under no circumstances are gold and tin terminals to be mixed as this will lead to early failure of the electrical contact.

NOTE: Never use a harness lead with a smaller diameter than the original harness lead.


Select the correct size and type of pre-terminated wiring harness and butt splice connector from the wiring harness repair kit.

- Using the wire cutter on the stripping tool, cut the pre-terminated wiring harness and the harness cable to the required length.
- **NOTE:** See illustration: **Stripping Insulation**

From the Relationship Table, find the correct length of insulation to be stripped from the pre-terminated wiring harness and set the adjustable cable length stop to the correct length. Place the pre-terminated wiring harness in the wire stripper and remove the insulation.

- Put the cable identification sleeve(s) on to the wiring harness with the main cable colour nearest to the terminal.
- During this next step do not overtighten. Place the selected butt splice connector in the crimping tool, matching the aperture and the butt connector colours. Make sure that the window indentation in the butt connector is resting over the guide bar on the lower jaw. Partially close the grip until the butt connector is securely held in the aperture. This will give support to the butt connector while the pre-terminated wiring harness is inserted into it.
- **NOTE:** See illustration: **Splice Correctly Located**

Insert the pre-terminated wiring harness into the butt connector and make sure that the wire is against the wire stop. Close the grip firmly, crimping the lead to the butt connector. When the handles have been completely closed the butt connector will be freed from the tool as the handles are released. If the handles have not been completely closed then the jaws will hold the butt connector and it cannot be removed from the tool until the crimp is fully made by closing the handles completely.

- Make sure that the harness cable has been squarely cut and the correct length of insulation removed. If more than one splice is needed the butt connectors must not be crimped to the wiring harness at the same distance from the connector. The splices must be staggered to prevent a bulk of splices in the same area of the wiring harness.
- It is preferable to cover the butt splice joint with heat shrink sleeve. This is desirable not essential, except where the electrical connector is a sealed electrical connector. Use the smaller diameter sleeve for red and blue pre-terminated wiring harness(s) and the large diameter sleeve for the yellow pre-terminated wiring harness(s). It is advisable to place the heat shrink over the completed joint but in some instances the sleeve will not pass over the terminal. Check, and if required, place the correct size sleeve onto the harness cable or pre-terminated wiring harness before crimping the butt splice to the wiring harness.
- Place the harness cable into the butt splice with the splice window over the guide bar. Make sure that the cable harness wire is against the stop in the butt splice, crimp the butt splice connector to the wiring harness.
- Gently pull the harness cables each side of the butt splice to make sure that a secure joint has been made.
-  **WARNING:** Do not use a naked flame in areas where fuel or oil have been spilt. Clean the area of residual oil and fuel and wait until the fuel spill has fully evaporated.

CAUTIONS:



When using a heat source make sure that it is localised and causes no damage to surrounding materials.



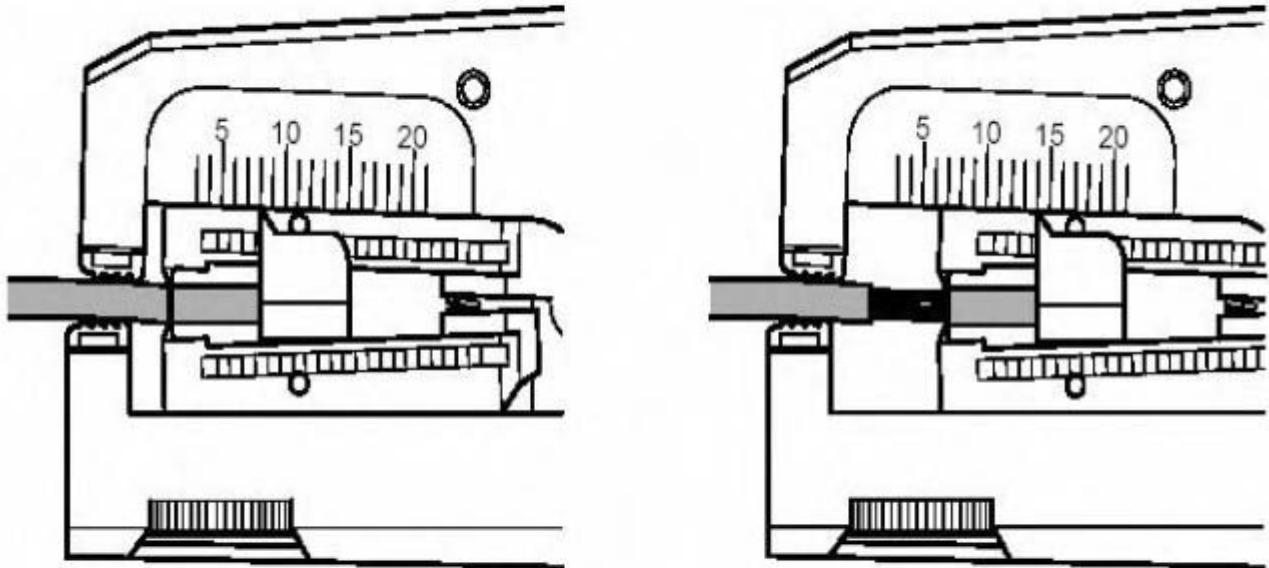
Where the repair procedure indicates that a glue lined heat shrink sleeve should be applied, apply sufficient heat to the glue lined heat shrink to melt the glue in order to provide a water tight seal. Do **not** over heat the glue lined heat shrink sleeve so that the wiring harness insulation becomes damaged.

Using a suitable heat source, shrink the sleeve over the butt splice.

- If further pre-terminated wiring harness(s) are to be installed to the same electrical connector, make sure that the lead is cut at a different length to the previous joint. This makes sure that the splices will, where possible, be staggered on the wiring harness and prevent a bulk of splices in one area.

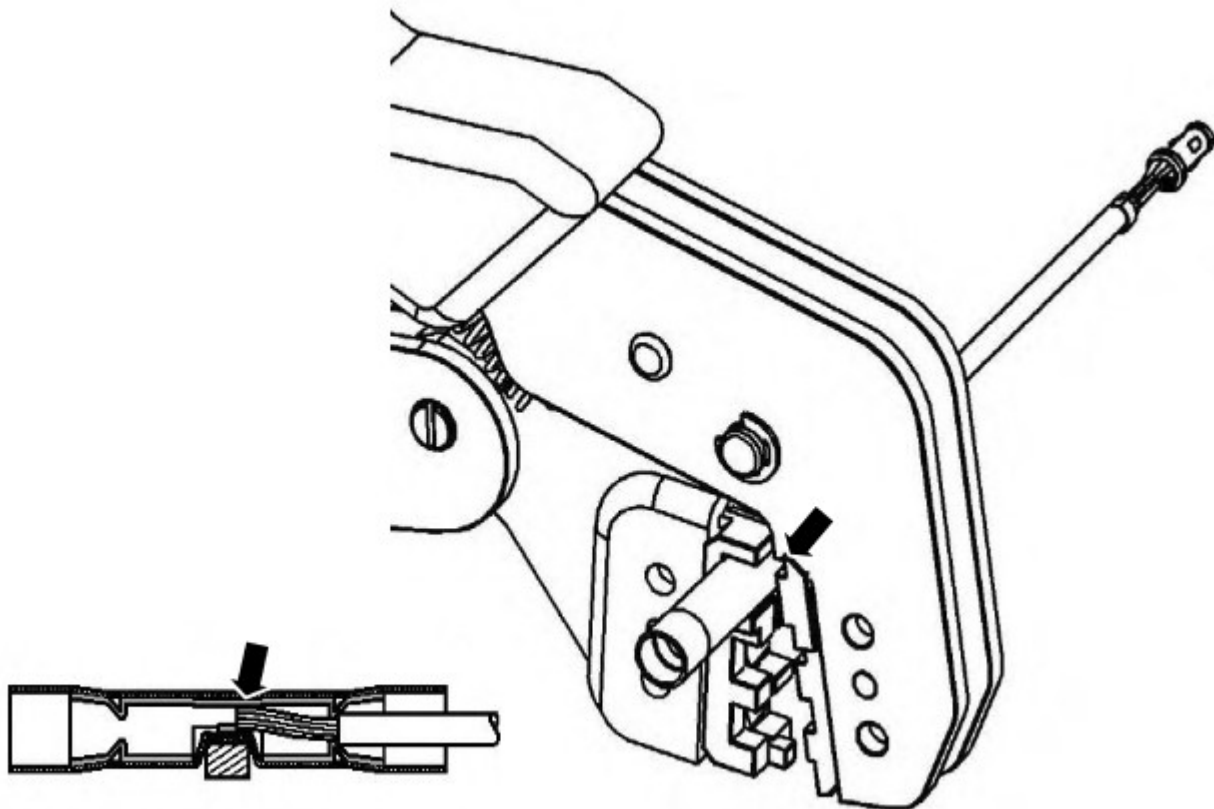
- When all of the splices have been made, fit the terminal(s) to the electrical connector, taking care that the terminals are correctly orientated.
- Install the wiring harness cover and secure with adhesive electrical tape. Do not cover the wiring harness right to the electrical connector as the terminals must have a little movement and not be firmly bound to the electrical connector or wiring harness. Make sure that the cable identification sleeve(s) are showing at the wiring harness electrical connector.

Stripping Insulation



E130756

Spice Correctly Located



E130757

Published: 11-May-2011

Wiring Harnesses - Wiring Harness Repair

General Procedures

1. For additional information, refer to: [Wiring Harness](#) (418-02 Wiring Harnesses, Description and Operation).

Wiring Harnesses - Engine Wiring Harness TD4 2.2L Diesel

Removal and Installation

Removal

NOTE: Make sure the wiring harness is routed correctly.

All vehicles

1. Remove the air cleaner housing.

Refer to: [Air Cleaner](#) (303-12B Intake Air Distribution and Filtering - TD4 2.2L Diesel, Removal and Installation).

2. Remove the fuel filter.

Refer to: [Fuel Filter](#) (310-01B Fuel Tank and Lines - TD4 2.2L Diesel, Removal and Installation).

3. Remove the engine compartment closing panel.

Refer to: [Secondary Bulkhead Center Panel - TD4 2.2L Diesel](#) (501-02 Front End Body Panels, Removal and Installation).

4. Remove the battery carrier.

Refer to: [Battery Tray](#) (414-01 Battery, Mounting and Cables, Removal and Installation).

5. Remove the engine undershield.

Refer to: [Engine Undershield](#) (501-02 Front End Body Panels, Removal and Installation).

6. Remove the front RH splash shield.

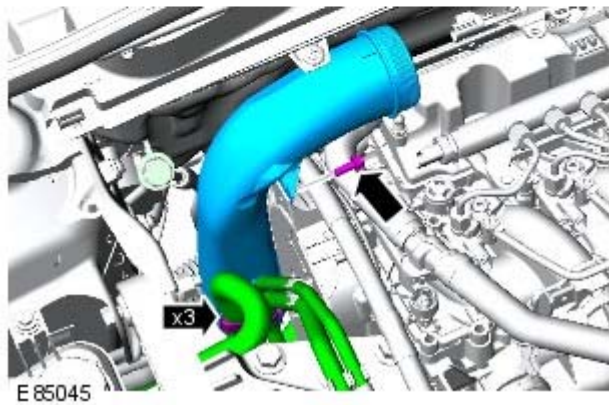
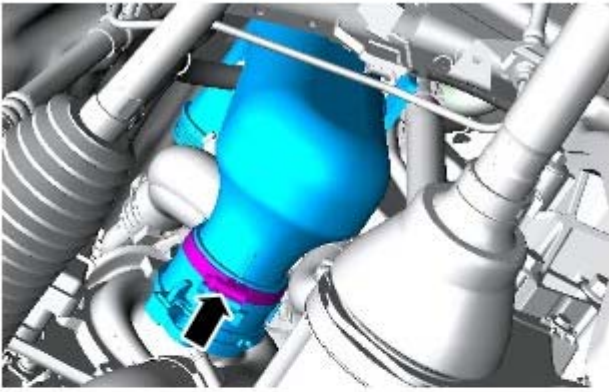
Refer to: [Fender Splash Shield](#) (501-02 Front End Body Panels, Removal and Installation).

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

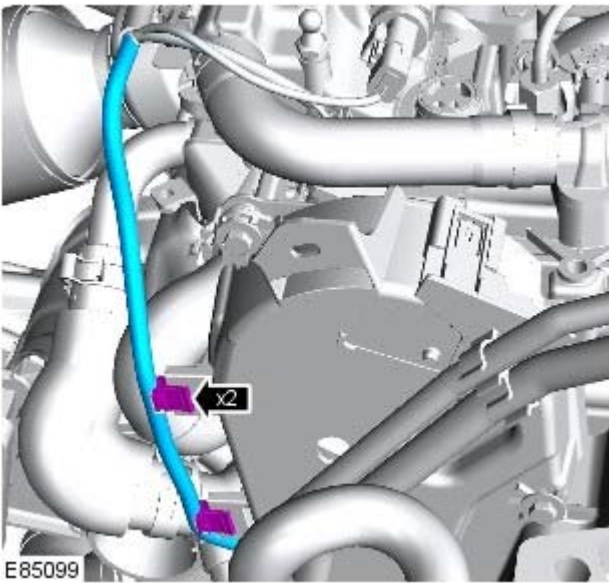
Raise and support the vehicle.

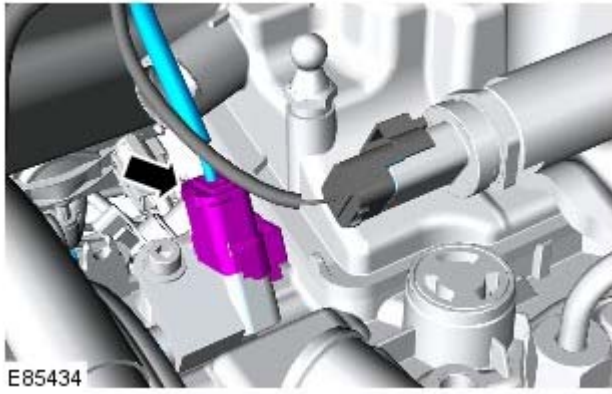
All vehicles

8. Torque: 10 Nm

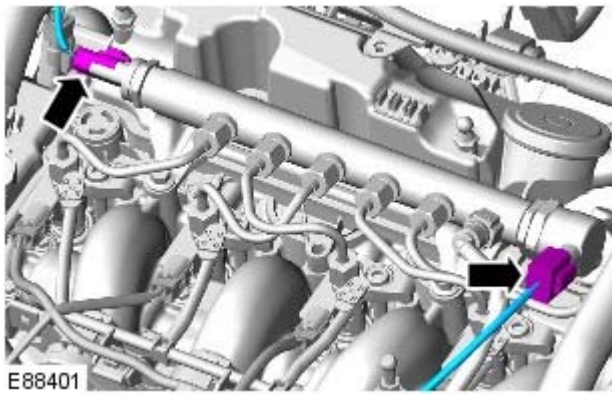


9.

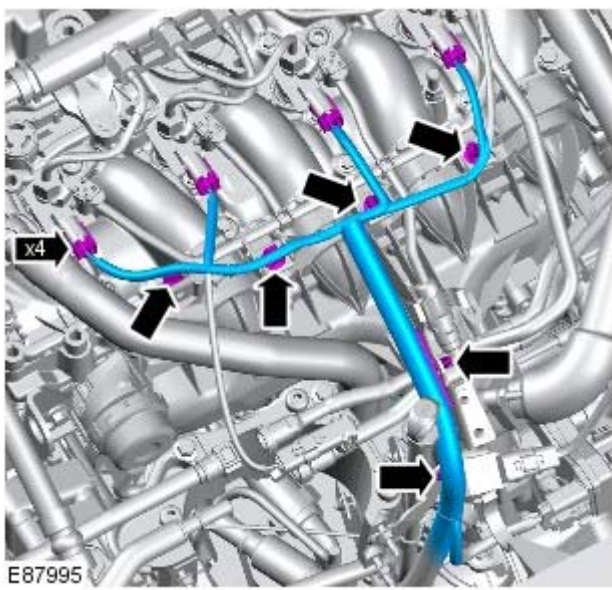




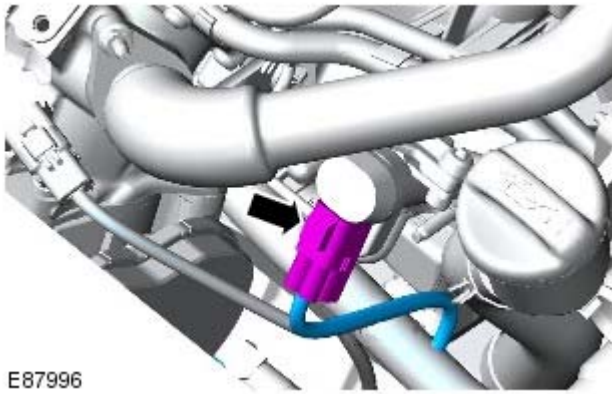
10.



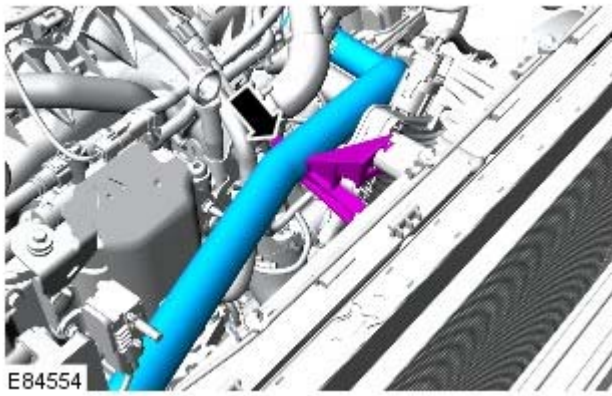
11.



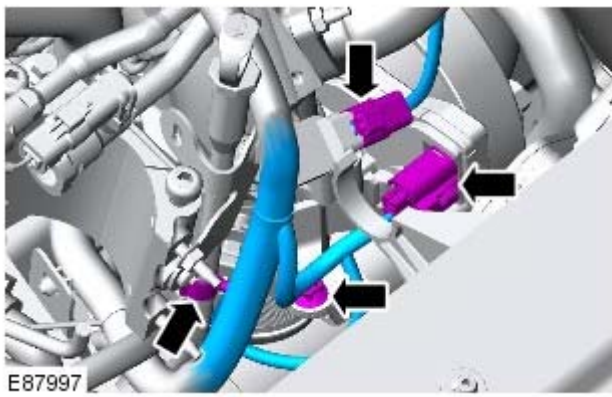
12.



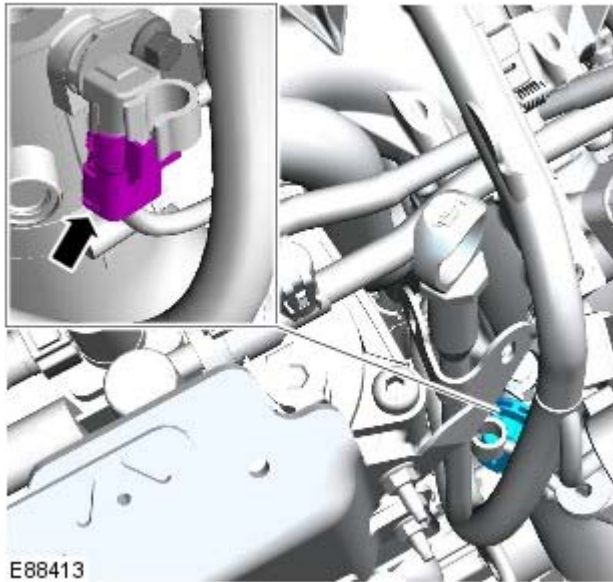
13.



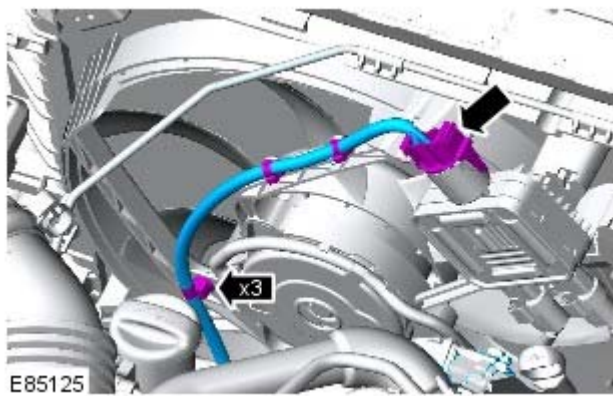
14.



15.

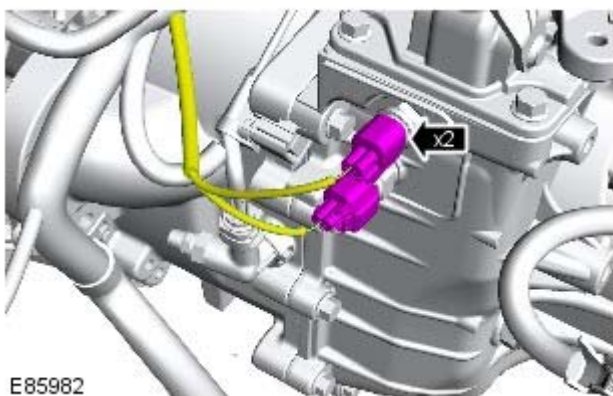


16.



17.

Vehicles with manual transmission



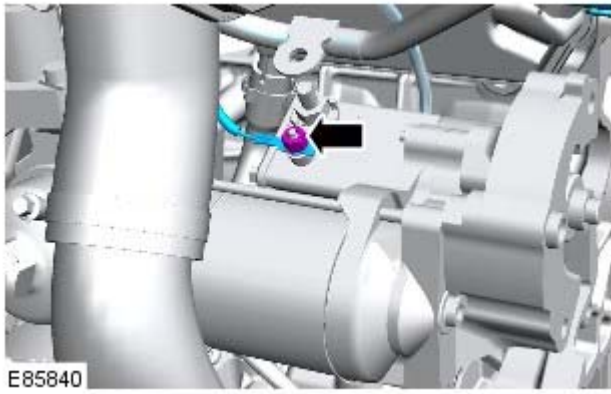
18.

Vehicles with automatic transmission

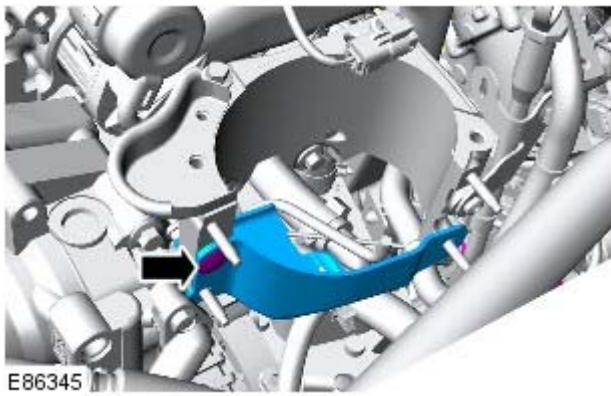


19.

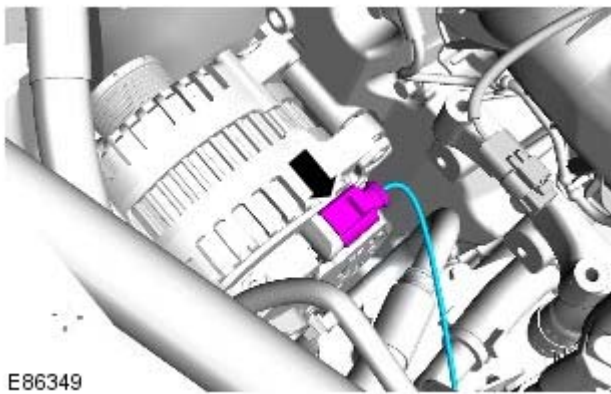
All vehicles



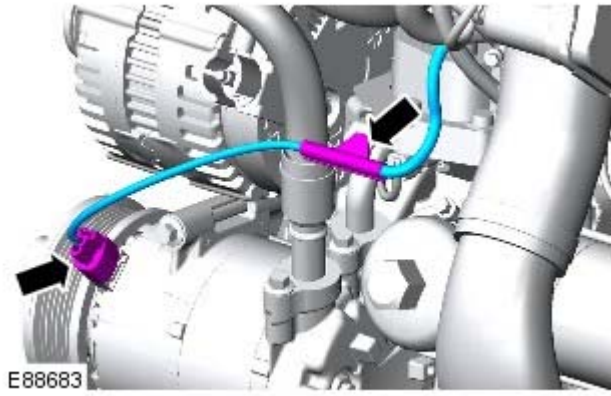
20. Torque: 6 Nm



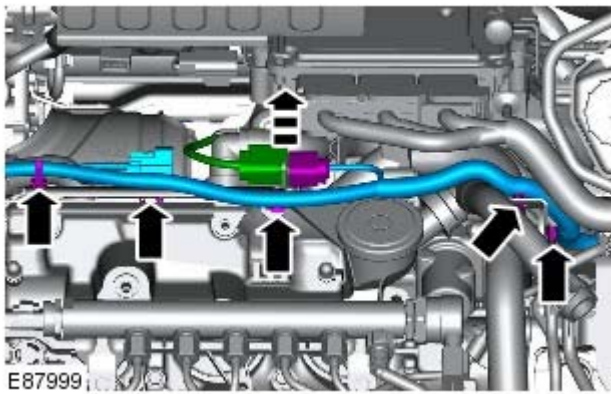
21.



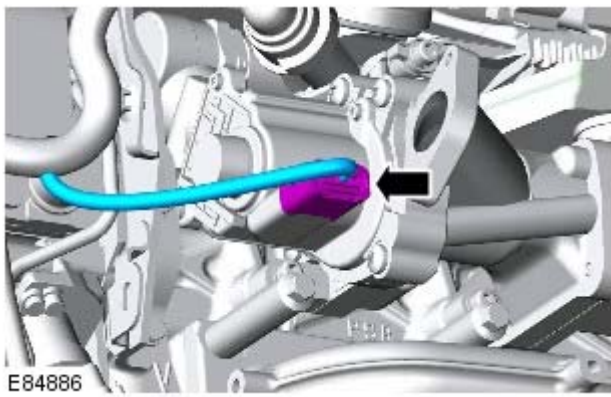
22.



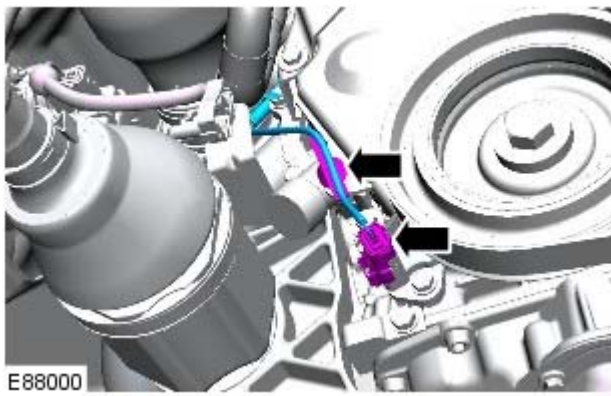
23.



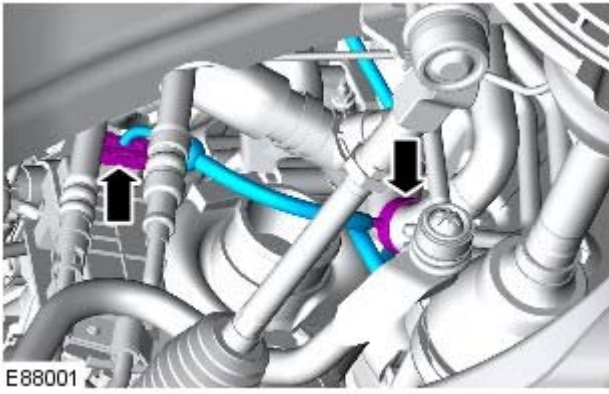
24.



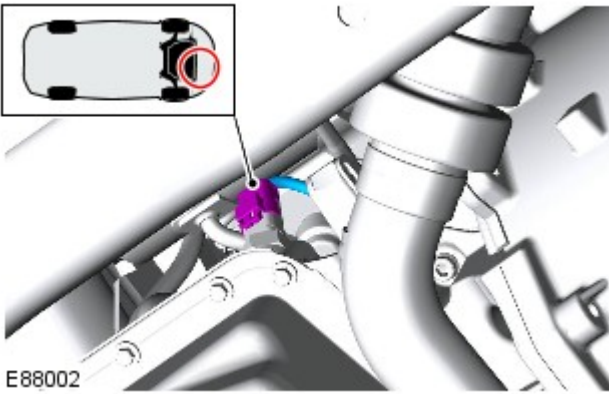
25.



26.



27.

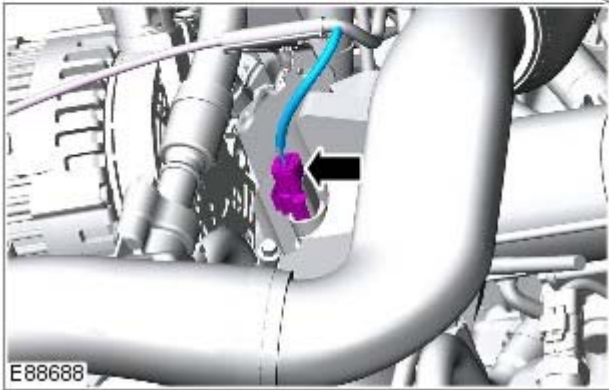
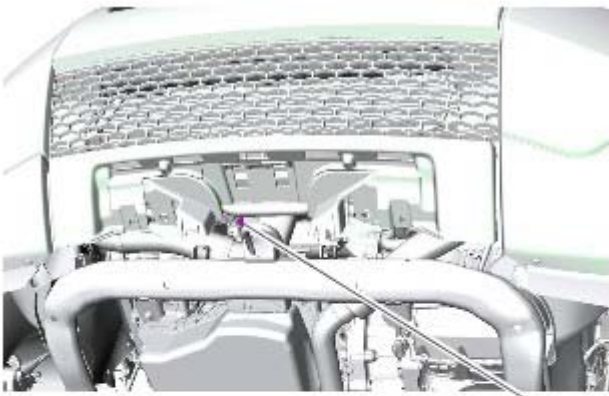


28.

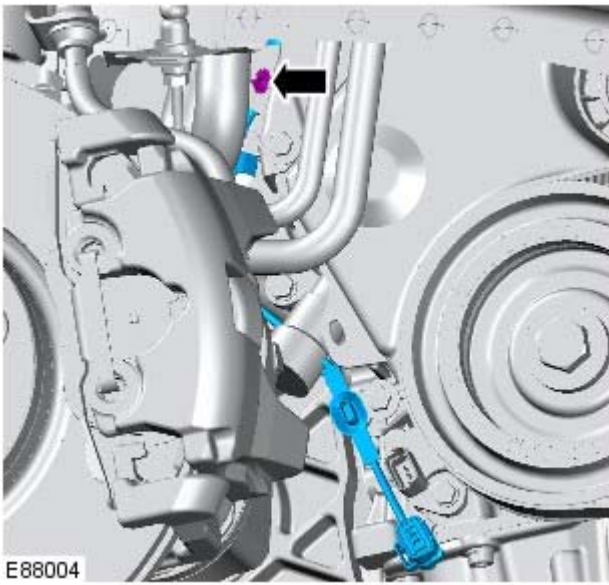


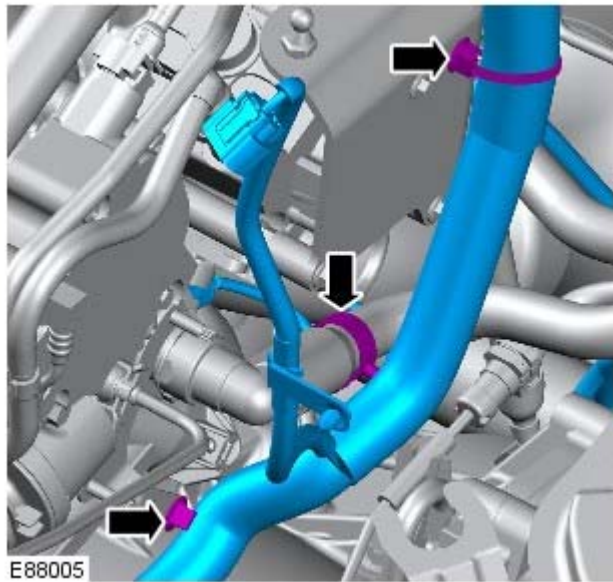
29. Torque: 25 Nm

30.

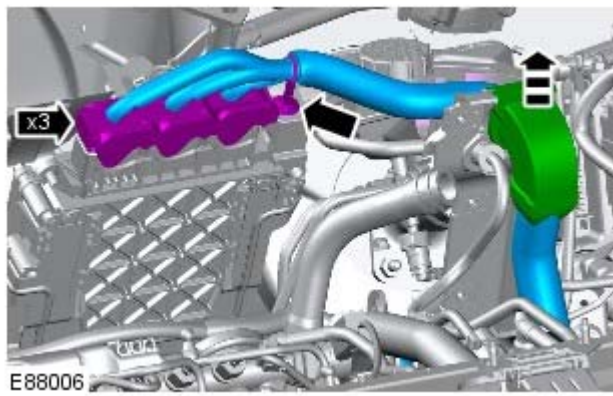


31.

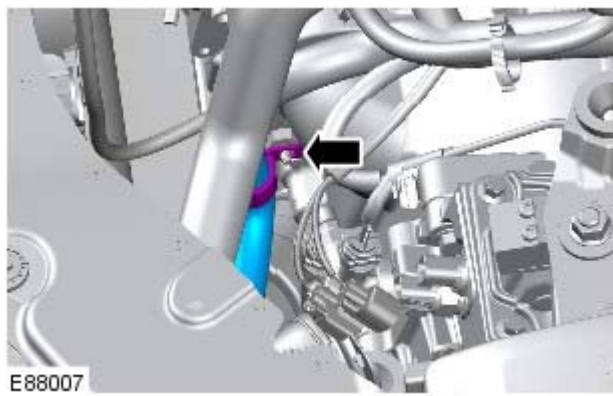




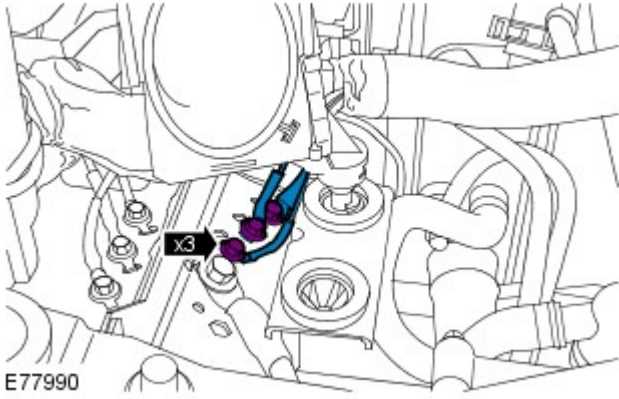
32.



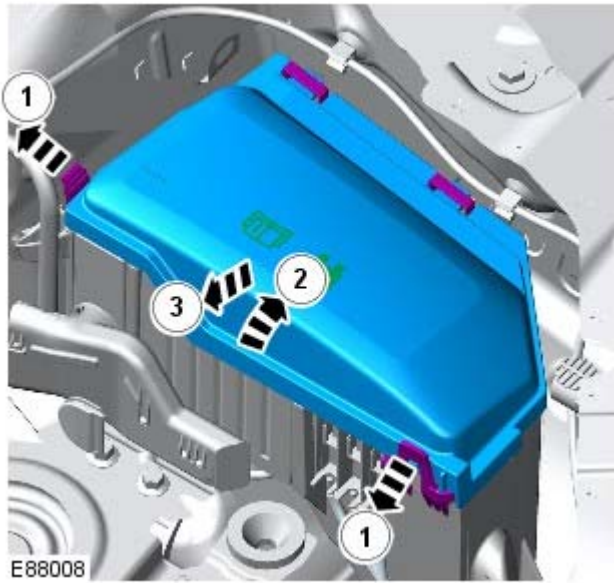
33.



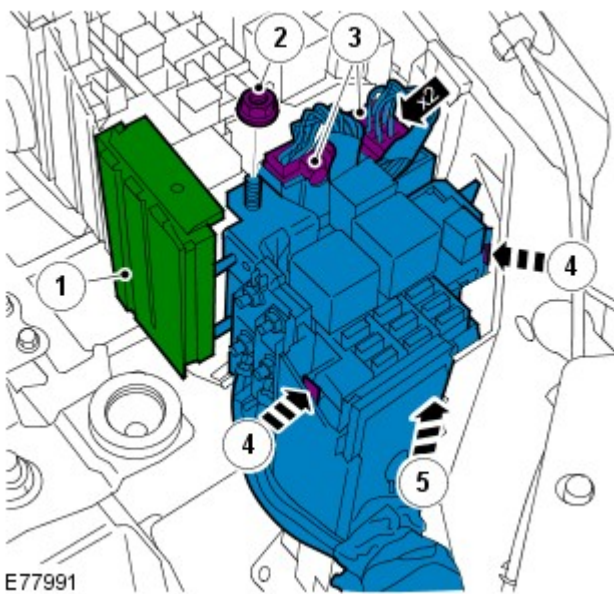
34.



35. Torque: 10 Nm



36.



37. Release the wiring harness from the battery junction box.

Torque: 10 Nm

38. Remove the engine wiring harness.

Installation

1. To install, reverse the removal procedure.

2. Check and top-up the engine oil if required.