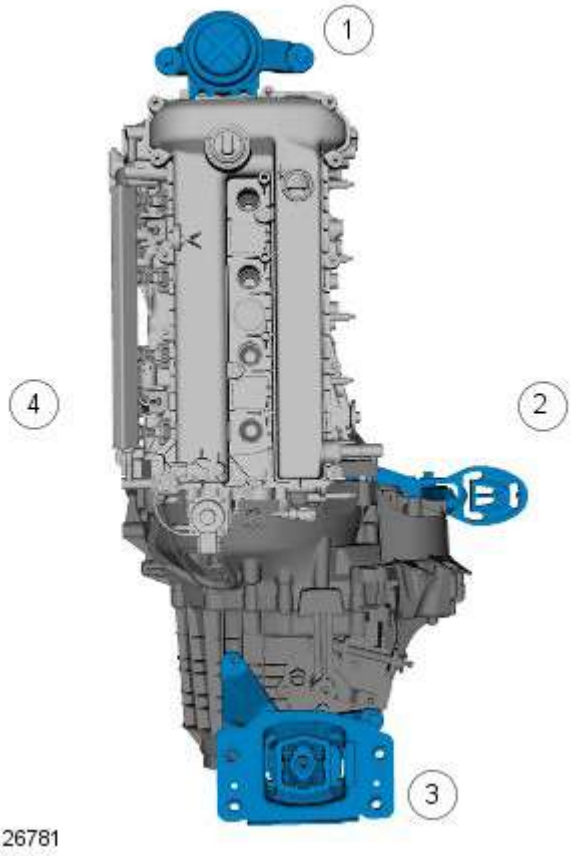


Item	Description
1	front
2	right
3	rear
4	left

How to use Repair Procedures

This manual has been written in a format that is designed to meet the needs of technicians worldwide. It provides general descriptions for accomplishing repair work with tested and effective techniques.

Important Safety Instructions

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

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

Warnings, Cautions and Notes in This Manual

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

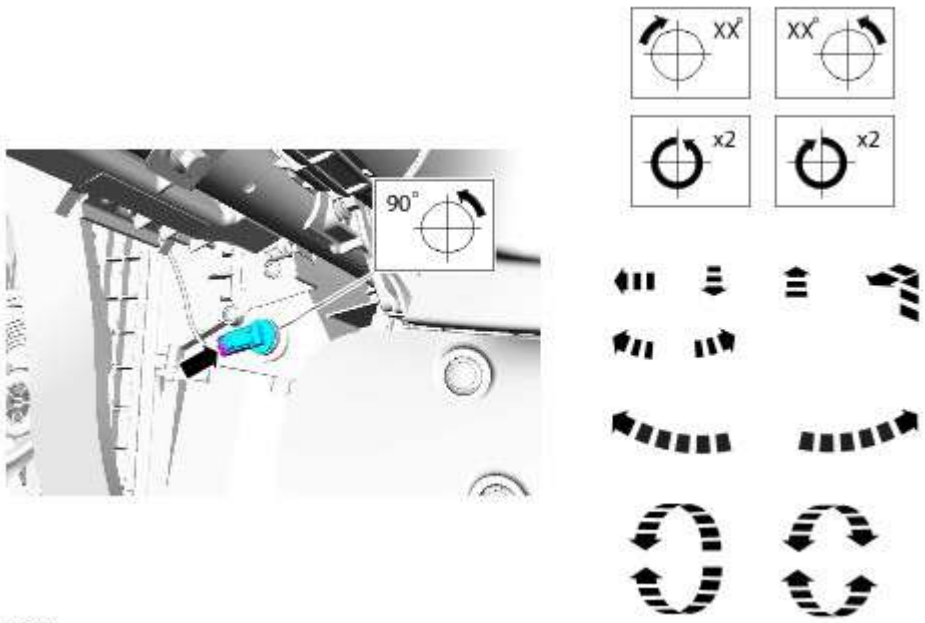
CAUTION: Cautions are used to indicate that failure to follow a procedure correctly may result in damage to the vehicle or equipment being used.

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

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

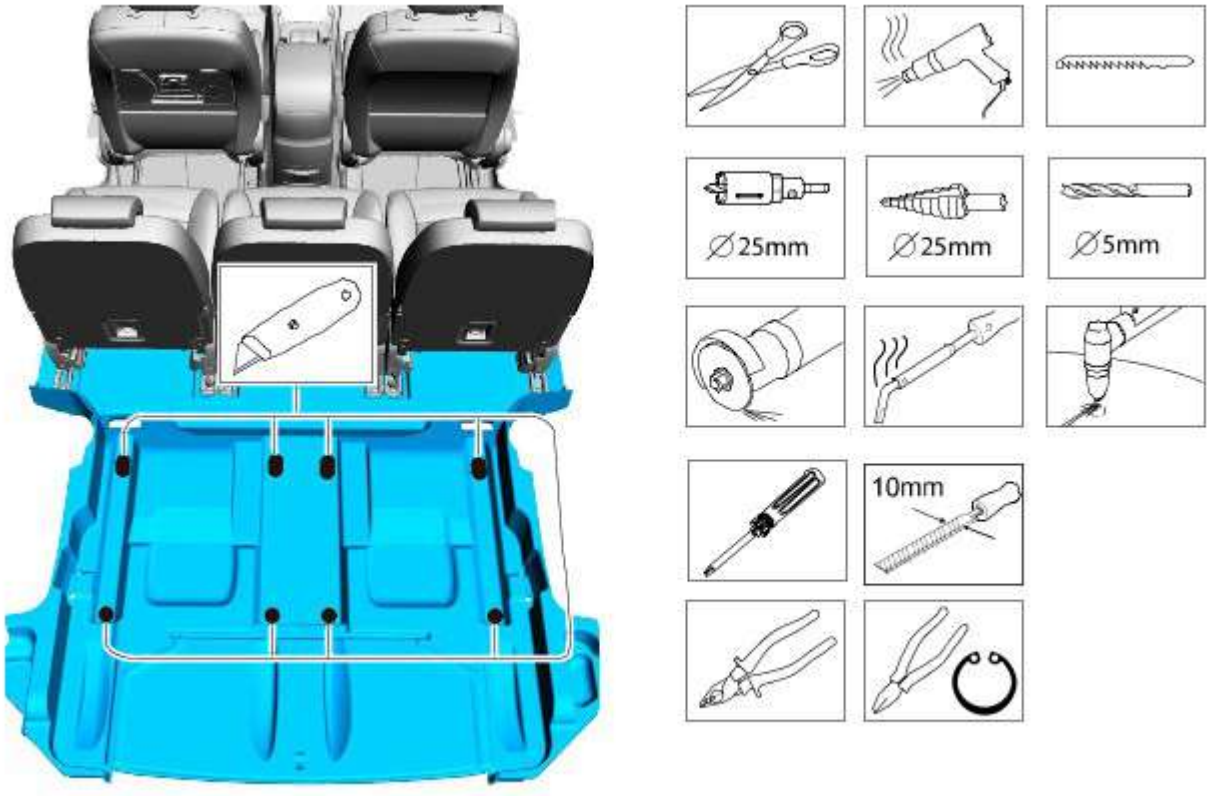
If a warning, caution or note only applies to one step, it is placed at the beginning of the specific step.

Trustmark Authoring Standards (TAS) Repair Procedures



E84838

Standard tool symbols recommend the use of certain standard tools. These tools can include dimension values if required.



E84839

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

	KHz playback supported only at specified bit rates	8-10 kbps (mono) playback supported	in Windows Media Player Version 9.0 cannot be supported. DRM (Digital Rights Management) protected files cannot be supported
	At sampling rates of 16 KHz playback supported only at specified bit rates	10-12 kbps and 16 kbps (mono); 16-20 kbps (stereo) playback supported	'Lossless', 'Professional' or 'Voice' format files created in Windows Media Player Version 9.0 cannot be supported. DRM (Digital Rights Management) protected files cannot be supported
WMA - Constant Bit Rate (CBR)	At sampling rates of 22.05 KHz playback supported only at specified bit rates	16-20 kbps (mono); 20, 22 and 36 kbps (stereo) playback supported	'Lossless', 'Professional' or 'Voice' format files created in Windows Media Player Version 9.0 cannot be supported. DRM (Digital Rights Management) protected files cannot be supported
	At sampling rates of 32 KHz playback supported only at specified bit rates	20 kbps (mono); 32, 40, 48 kbps (stereo) playback supported. 32 kbps (mono); 22, 36, 44, 64, 384 kbps (stereo) playback cannot be guaranteed but an attempt will be made to play	'Lossless', 'Professional' or 'Voice' format files created in Windows Media Player Version 9.0 cannot be supported. DRM (Digital Rights Management) protected files cannot be supported
	At sampling rates of 44.1 KHz playback supported only at specified bit rates	20, 32 and 48 kbps (mono); 32, 48, 64, 80, 96, 128, 160, 192, 256 and 320 kbps (stereo) playback supported. 15 kbps (mono) playback cannot be guaranteed but an attempt will be made to play	'Lossless', 'Professional' or 'Voice' format files created in Windows Media Player Version 9.0 cannot be supported. DRM (Digital Rights Management) protected files cannot be supported
	At sampling rates of 48 KHz playback supported only at specified bit rates	64, 96, 128, 160, 192 and 256* kbps (stereo) playback supported. 32 kbps (mono) & 48, 63, 95, 127, 191 and 320 kbps (stereo) playback cannot be guaranteed but an attempt will be made to play	'Lossless', 'Professional' or 'Voice' format files created in Windows Media Player Version 9.0 cannot be supported. DRM (Digital Rights Management) protected files cannot be supported. *All available versions can be supported at a bit rate of 256 kbps for this sampling rate only

USB AAC Files (only if file extension is '.aac' or '.m4a'): Playback of AAC audio files encoded in Variable Bit Rate (VBR) format is supported at bit rates between 8-320 kbps. For Constant Bit Rate (CBR) files, see table below for compatible sampling rates and bit rates.

File Format/Encoding Format	Sampling Rate	Bit Rates	Notes
AAC - Constant Bit Rate (CBR)	At sampling rates of between 8-32 KHz, playback cannot be not guaranteed but may be possible at some bit rates	8-320 kbps playback cannot be not guaranteed, but may be possible in some cases	-
	At sampling rates of between 44.1 - 48 KHz, playback supported at specified bit rates	48-80 kbps; 96-128 kbps; 160-256 kbps; 320 kbps playback supported	Playback at other bit rates between 44.1-576 kbps may be possible, but cannot be verified
	At sampling rates of between 64-96 KHz, playback cannot be not guaranteed but an attempt will be made to play at some bit rates	96-768 kbps playback cannot be not guaranteed but an attempt will be made to play	Playback at other bit rates between 64-1152 kbps cannot be not guaranteed but an attempt will be made to play

Playback Of Audio Files Stored On A CD Data Disk

CD Data Disk MP3 Files (only if file extension is '.mp3'): Playback of MP3 audio files encoded in Variable Bit Rate (VBR) format is supported at bit rates between 8-320 kbps. For Constant Bit Rate (CBR) files, see table below for compatible sampling rates and bit rates.

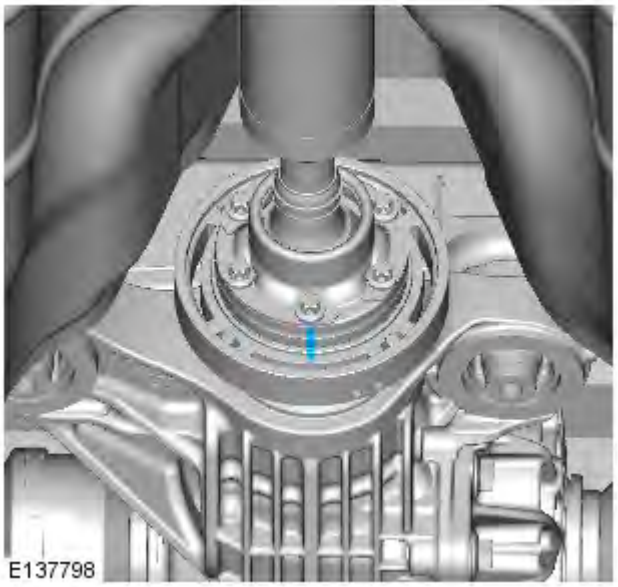
File Format/Encoding Format	Sampling Rate	Bit Rates	Notes
MP3 (MPEG 2.5*)	All available are supported	8-160 kbps playback supported	*For MPEG 2.5 format audio files, playback cannot be guaranteed but an attempt will be made to play
MP3 (MPEG 2)	All available are supported	8-160 kbps playback supported	-
MP3 (MPEG 1)	All available are supported	32-128 kbps; 160-320 kbps playback supported	Playback of MPEG 1 audio files with a bit rate of 144 kbps is not supported

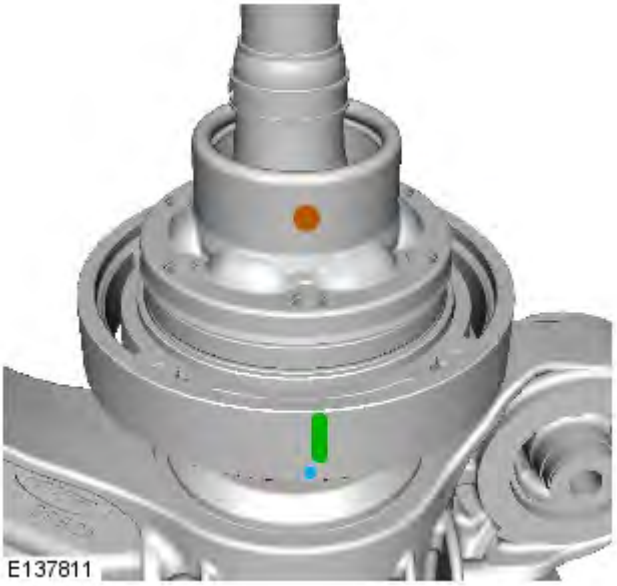
CD Data Disk WMA Files (only if file extension is '.wma'): Playback of WMA audio files encoded in Variable Bit Rate (VBR) format and created using Windows Media Player Version 9.0 is supported at bit rates between 32-192 kbps. For Constant Bit Rate (CBR) files, see table below for compatible sampling rates and bit rates. Note that WMA CBR files created using Windows Media Player Version 9.0 can be supported, while playback will be attempted but cannot be guaranteed for files created using Windows Media Player Versions 4.0, 4.1, 7.0, 8.0, 9 Beta and 9.1.

B10C6-11	Exterior Trunk Antenna - Circuit short to ground	NOTE: For the antenna to be tested once, the vehicle must go through five ignition on cycles and exceed a speed of 20 kph each cycle • Tailgate antenna circuit short circuit to ground or short circuit between positive and negative	NOTE: This DTC may be logged as a result of a short to power fault on another antenna. Before proceeding further, first perform an on demand self-test and monitor the test output to check for any short circuit to power DTCs on other antennas. If any such faults are found, they should be resolved first. Once all short circuit to power faults on other antennas have been resolved, then continue with the diagnostic actions detailed below • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the tailgate antenna circuit for short circuit to ground, short circuit between positive and negative
B10C6-12	Exterior Trunk Antenna - Circuit short to battery	NOTE: For the antenna to be tested once, the vehicle must go through five ignition on cycles and exceed a speed of 20 kph each cycle • Tailgate antenna circuit short circuit to power	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the tailgate antenna circuit for short circuit to power
B10C6-13	Exterior Trunk Antenna - Circuit open	NOTE: For the antenna to be tested once, the vehicle must go through five ignition on cycles and exceed a speed of 20 kph each cycle • Tailgate antenna circuit open circuit, high resistance	NOTE: This DTC may be logged as a result of a short to power fault on another antenna. Before proceeding further, first perform an on demand self-test and monitor the test output to check for any short circuit to power DTCs on other antennas. If any such faults are found, they should be resolved first. Once all short circuit to power faults on other antennas have been resolved, then continue with the diagnostic actions detailed below • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the tailgate antenna circuit for open circuit, high resistance
B10C7-00	Interior Trunk Antenna - No sub type information	NOTE: For the antenna to be tested once, the vehicle must go through five ignition on cycles and exceed a speed of 20 kph each cycle • Luggage compartment left antenna circuit short circuit to ground, short circuit to power • Luggage compartment left antenna incorrect position • Luggage compartment left antenna internal failure	NOTE: This DTC may be logged as a result of a short to power fault on another antenna. Before proceeding further, first perform an on demand self-test and monitor the test output to check for any short circuit to power DTCs on other antennas. If any such faults are found, they should be resolved first. Once all short circuit to power faults on other antennas have been resolved, then continue with the diagnostic actions detailed below • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the luggage compartment left antenna circuit for short circuit to ground, short circuit to power • Check the position of the luggage compartment left antenna and reposition as required • If the fault persists, check and install a new luggage compartment left antenna as required
B10C7-11	Interior Trunk Antenna - Circuit short to ground	NOTE: For the antenna to be tested once, the vehicle must go through five ignition on cycles and exceed a speed of 20 kph each cycle	NOTE: This DTC may be logged as a result of a short to power fault on another antenna. Before proceeding further, first perform an on demand self-test and monitor the test output to check for any short circuit to power DTCs on other antennas. If any such faults are found, they should be resolved first. Once all short circuit to power faults on other antennas have been resolved, then continue with the diagnostic actions detailed below

Auxiliary audio inoperative	• Incompatible/faulty auxiliary device • Auxiliary device link cable fault • Integrated audio module internal failure	• Connect a known good auxiliary device to the auxiliary socket and retest • Connect a known good auxiliary device to the auxiliary socket using a known good link cable and retest • Using the manufacturer approved diagnostic system, check the integrated audio module for related DTCs and refer to the relevant DTC index
USB audio/video inoperative	• Incompatible/faulty USB device • Integrated audio module internal failure	• Connect a known good USB device to the auxiliary socket and retest • Using the manufacturer approved diagnostic system, check the integrated audio module for related DTCs and refer to the relevant DTC index
USB audio/video inoperative - Apple devices	• Incompatible/faulty Apple device • Bluetooth® and USB connections made in the incorrect order • Integrated audio module internal failure	• Check Apple device compatibility table below. Connect a known good Apple device to the auxiliary socket and retest • Audio streaming is supported via the USB cable but this must be connected after the cellular phone connects via Bluetooth® - Best practice is to start the engine (causing the Bluetooth® connection to be made) before connecting the USB cable • Using the manufacturer approved diagnostic system, check the integrated audio module for related DTCs and refer to the relevant DTC index
Television inoperative	• TV antenna fault • TV control module internal failure	NOTE: Some functions are inhibited when the vehicle is moving. • Using the manufacturer approved diagnostic system, check the TV control module for related DTCs and refer to the relevant DTC index
Television video signal poor/inoperative at the touch screen (television audio normal)	• CVBS signal circuit short circuit to ground, short circuit to power, open circuit, high resistance	NOTES: Some functions are inhibited when the vehicle is moving. The television audio signal is transmitted on the MOST network. • Using the manufacturer approved diagnostic system, check the television control module for related DTCs and refer to the relevant DTC index. Refer to the electrical circuit diagrams and check the CVBS signal circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the television control module for related DTCs and refer to the relevant DTC index
Television channel list absent	• Incorrect country setting • Software fault	NOTE: Some functions are inhibited when the vehicle is moving. • Check country setting and reset as necessary • Set the country setting to Ukraine and wait 60 seconds. If the channel list is now present, reset to the correct country and using the manufacturer approved diagnostic system, re-configure the television control module with the latest level software
Unable to store television preset channels	• **Preset #** soft key not operated for sufficient duration	• Operate the **Preset #** soft key for at least 2 seconds to store the current channel
Television will not select preset channel when **Preset**		NOTE: Some functions are inhibited when the vehicle is moving.

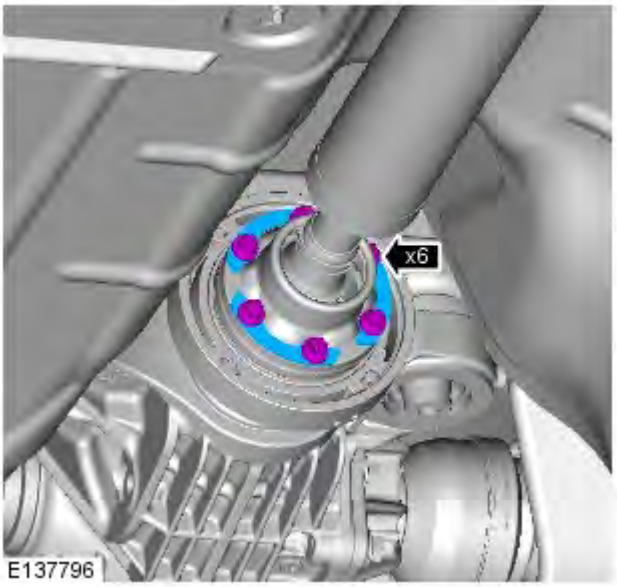
C101E-1C	Right Front Vertical Acceleration Sensor - Circuit voltage out of range	• Front right vertical acceleration sensor - Supply voltage out of range • Front right vertical acceleration sensor circuit - Short circuit to other circuit or short circuit to power, open circuit, high resistance • Front right vertical acceleration sensor - Internal fault • Control module - Internal failure	• Refer to the electrical circuit diagrams and check front right vertical acceleration sensor circuit for short circuit to other circuit or short circuit to power, open circuit, high resistance. Repair circuit as required. Clear DTC and retest • If fault persists, check and install a new vertical acceleration sensor as required. Clear DTC and retest • If fault persists, check control module sensor supply output voltage. Measured voltage should be between 4.995 volts and 4.85 volts. If output voltage is out of range, check and install a new integrated suspension control module as required. Clear DTC and retest
C101E-22	Right Front Vertical Acceleration Sensor - Signal amplitude > maximum	• Front right vertical acceleration sensor - Signal amplitude above maximum • Front right vertical acceleration sensor signal circuit - Short circuit to another circuit • Front right vertical acceleration sensor - Insecurely mounted • Front right vertical acceleration sensor - Internal fault	• With vehicle parked on a level surface, read front right vertical accelerometer voltage and check it lies in range 1.9 to 2.1 volts. If voltage values are outside this range, check front right vertical acceleration sensor signal circuit for short circuit to another circuit, loose connections and repair as required • If no wiring faults are present, check the sensor is correctly mounted and secure the sensor as required. Clear DTC and retest • If fault persists, check and install a new vertical acceleration sensor as required. Clear DTC and retest
C101E-26	Right Front Vertical Acceleration Sensor - Signal rate of change below threshold	• Front right vertical acceleration sensor - Signal not changing • Front right vertical acceleration sensor signal circuit - Short circuit to another circuit • Front right vertical acceleration sensor - Internal fault	• Refer to the electrical circuit diagrams and check front right vertical accelerometer signal circuit for short circuit to another circuit and repair as required. Clear DTC and retest • If fault persists, check and install a new vertical acceleration sensor as required. Clear DTC and retest
C101E-78	Right Front Vertical Acceleration Sensor - Alignment or adjustment incorrect	• Front right vertical acceleration sensor - Alignment or adjustment incorrect • Front right vertical acceleration sensor - Bracket bent • Front right vertical acceleration sensor damaged	• Check the sensor is correctly mounted and secure the sensor as required. Clear DTC and retest • Check the integrity and mounting of the sensor bracket and secure or replace as required. Clear DTC and retest • If fault persists, check and install a new vertical acceleration sensor as required. Clear DTC and retest
	System Temporarily Disabled Due To		





3. CAUTION: Using the 3mm drill mark and paint mark on the differential drive pinion flange damper and paint alignment mark on the driveshaft (as indicated). Make sure that the alignment marks are correctly aligned.

NOTE: This step only applies if a new driveshaft is being installed.



4. *Torque:* 75 Nm

	Bleed the brake system. REFER to: Brake System Bleeding (206-00 Brake System - General Information, General Procedures). Re-test the system for normal operation. **No** Check for leaking brake system and rectify as required. Add fluid and bleed the brake system. REFER to: Brake System Bleeding (206-00 Brake System - General Information, General Procedures). Re-test the system for normal operation.

PINPOINT TEST E : THE PEDAL GOES DOWN FAST

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: ROAD TEST VEHICLE	
	1 Road test the vehicle and apply the brake pedal.
	Is the brake pedal effort and brake pedal travel normal? **Yes** No action required, vehicle is OK. **No** GO to E2 .
E2: CHECK BRAKE PEDAL TRAVEL-PRESSURIZE SYSTEM	
	1 Pump the brake pedal rapidly (five times).
	Does the brake pedal travel build up and then hold? **Yes** Bleed the brake system. REFER to: Brake System Bleeding (206-00 Brake System - General Information, General Procedures). Re-test the system for normal operation. **No** GO to E3 .
E3: CHECK FOR BRAKE SYSTEM LEAKS	
	1 Check for external brake system leaks. For additional information, refer to brake master cylinder component test in this section.
	Is there a leak present? **Yes** Repair as necessary, add fluid and bleed brake system. REFER to: Brake System Bleeding (206-00 Brake System - General Information, General Procedures). Re-test the system for normal operation. **No** No action required, system is OK.

PINPOINT TEST F : THE PEDAL GOES DOWN SLOWLY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F1: ROAD TEST VEHICLE - CHECK BRAKE PEDAL OPERATION	
	1 Check if the condition occurs during actual stopping application by applying the brake pedal while the vehicle is moving.
	Does the condition occur when the vehicle is moving? **Yes** GO to F2 . **No** GO to F3 .
F2: CHECK FOR BRAKE SYSTEM LEAKS	
	1 Check for external brake system leaks. For additional information, refer to brake master cylinder component test in this section.
	Are there any external brake system leaks? **Yes** Rectify as necessary. Add fluid and bleed the brake system. REFER to: Brake System Bleeding (206-00 Brake System - General Information, General Procedures). Re-test the system for normal operation. **No** GO to F3 .
F3: CARRY OUT A BRAKE MASTER CYLINDER BYPASS TEST	
	1 Test for brake master cylinder bypass condition. Refer to Brake master cylinder component test in this section.
	Has a concern been identified? **Yes** Install a new brake master cylinder, add fluid and bleed the brake system. REFER to: Brake System Bleeding (206-00 Brake System - General Information, General Procedures). Re-test the system for normal operation. **No** No action required, system is OK.

PINPOINT TEST G : EXCESSIVE BRAKE PEDAL EFFORT

TEST	DETAILS/RESULTS/ACTIONS

Published: 31-Oct-2012

Rear Suspension - Rear Suspension AWD - System Operation and Component Description

Description and Operation

System Operation

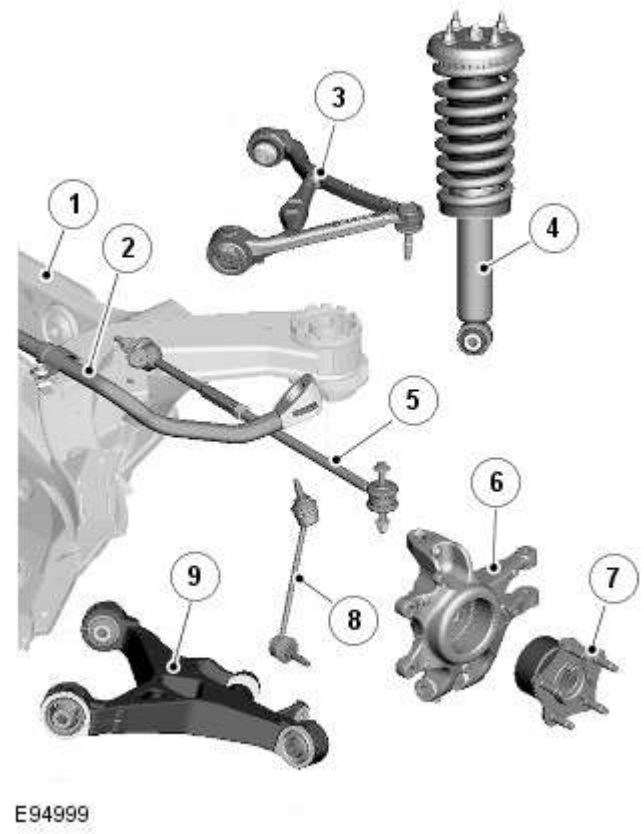
The double wishbone type rear-suspension is assembled on a fabricated high-grade steel subframe. Large diameter mounting bushes are used to isolate the subframe from the vehicle's body; the front bushes are hydrabushes, the rear are voided rubber.

To achieve optimum suspension refinement a cross-brace is used to increase the torsional stiffness of the subframe. The single brace attached to the shear brackets helps to reduce the transmission of road noise.

An adaptive damping system is available on specified models.
Refer to: Vehicle Dynamic Suspension - V8 5.0L Petrol/V8 S/C 5.0L Petrol (204-05 Vehicle Dynamic Suspension, Description and Operation).

Component Description

COMPONENTS



E94999

Item	Description
1	Subframe
2	Stabilizer bar
3	Upper control arm
4	Spring and damper assembly
5	Toe link
6	Wheel knuckle
7	Wheel hub and bearing assembly
8	Stabilizer bar link
9	Lower control arm

Upper Control Arm

The cast aluminum upper control arm locates to the subframe via one cross-axis joint and one plain rubber bush, and links to the aluminum wheel knuckle via an integral ball-joint.

Published: 11-May-2011

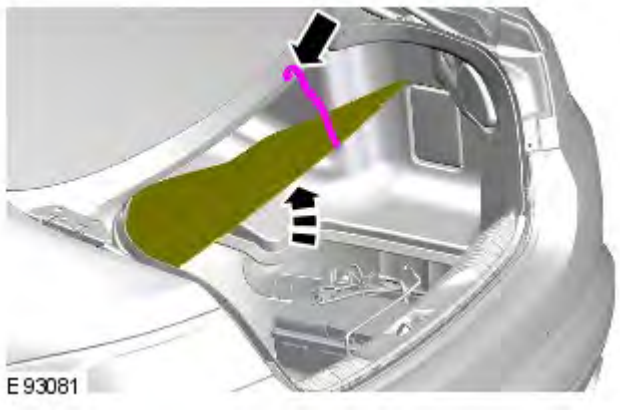
Vehicle Dynamic Suspension - Air Suspension Control Module 4-Door

Removal and Installation

Removal

CAUTION: Calibration of the air suspension system must be carried out after the following components have been replaced: air suspension control module, suspension height sensor, suspension components and body panels incorporating suspension fixing points.

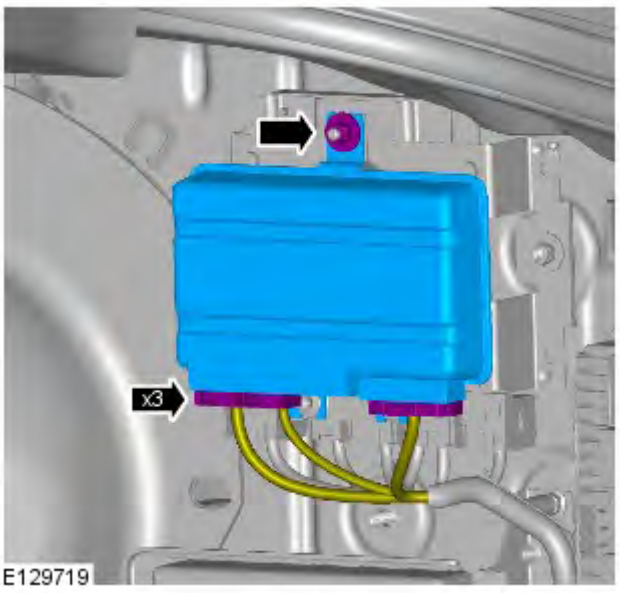
NOTE: Removal steps in this procedure may contain installation details.



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

2. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

3. Refer to: Loadspace Trim Panel RH - 4-Door (501-05 Interior Trim and Ornamentation, Removal and Installation).

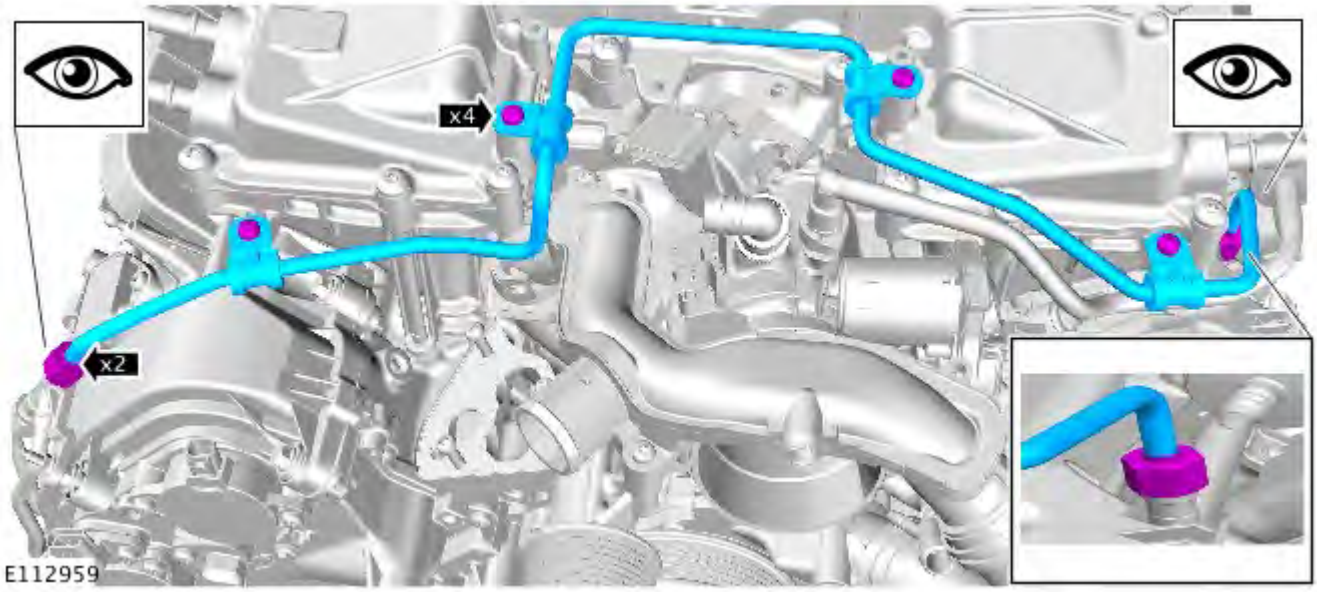


4. *Torque:* 7 Nm

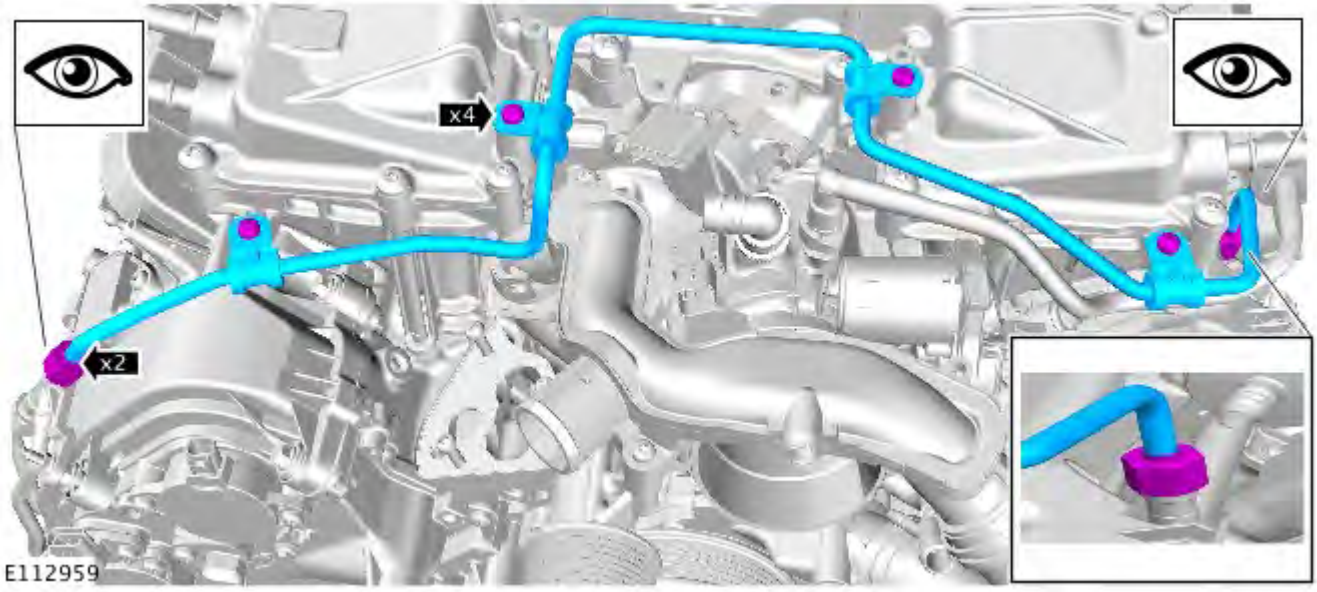
Installation

1. To install, reverse the removal procedure.

2. Refer to: Air Suspension System Depressurize and Pressurize (204-05 Vehicle Dynamic Suspension, General Procedures).

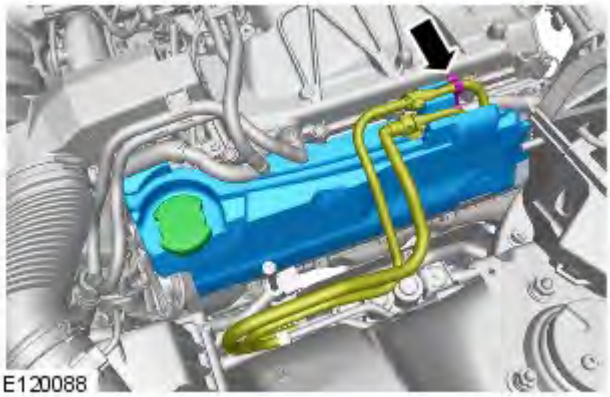


17. *Torque:*
    Unions 21 Nm
    Bolts 8 Nm



18. Refer to: Air Cleaner RH (303-12B Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

19.



9. CAUTION: Make sure that these components are installed to the noted removal position.

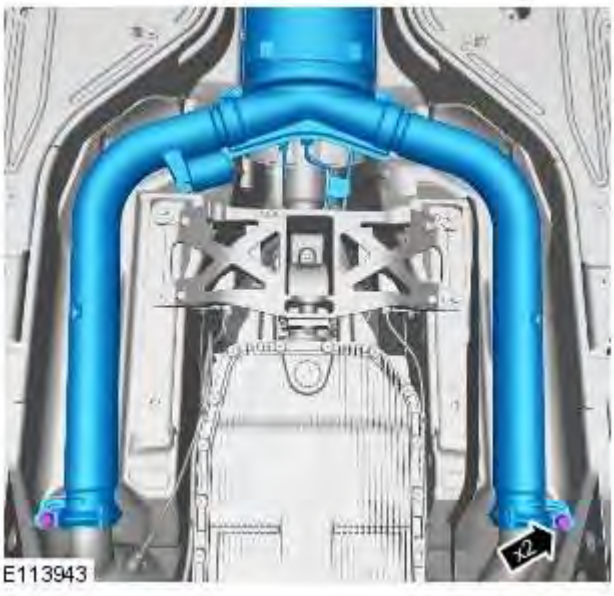
   NOTES:

   This step requires the aid of another technician.

   Left-hand shown, right-hand similar.

   Apply lubricant to the exhaust mount to aid installation.

   Torque: 25 Nm



10. *Torque:* 11 Nm

Installation

1. To install, reverse the removal procedure.

Published: 14-May-2015

Speed Control -

Diagnosis and Testing

Principles of Operation

For a detailed description of the adaptive speed control system, refer to the relevant description and operation sections in 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

1. Verify the customer concern

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

Visual Inspection

Mechanical	Electrical
• Adaptive speed control module sensor • Adaptive speed control module sensor mounting bracket • Ensure the sensor is free from obstructions • Adaptive speed control module • Brake switch • Visibly damaged or worn components	• Fuse(s) • Damage to wiring loom, incorrect location of wiring, wiring stretched or taught • Loose or corroded electrical connector(s) • Steering wheel switches • Brake switch • Adaptive speed control module sensor • Speed control module • Engine control module

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

4. If the cause is not visually evident, verify the symptom and refer to the symptom chart, alternatively, check for DTCs and refer to the DTC index

Adaptive Speed Control Module Sensor Adjustment (vehicles with adaptive system installed)

NOTES:

If any DTCs are set that indicate a fault with the speed sensor/radar or with the adaptive cruise control system both the adaptive speed control module sensor and its mounting bracket should be inspected for damage. If any damage is evident to either the sensor or its bracket, both components should be replaced

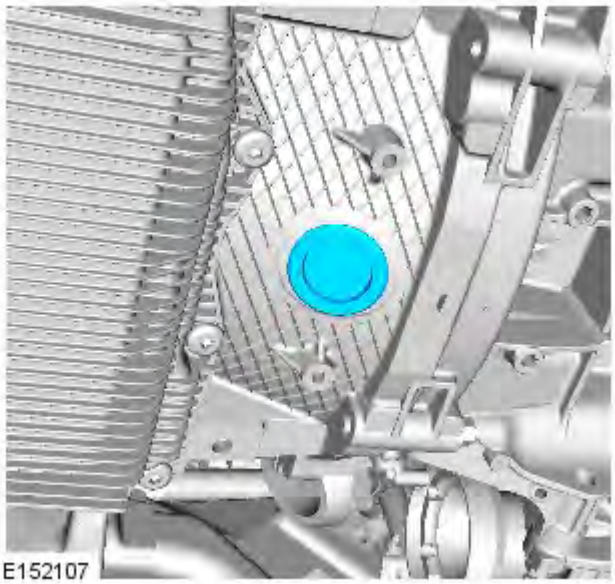
If a new speed sensor is installed, ensure that the sensor is aligned after installation as described in the adaptive speed control module sensor adjustment procedure. Ensure that all diagnostic trouble codes (DTCs) have been cleared/resolved following the road test

Care must be taken when removing the sensor to avoid deforming the bracket. An incorrectly aligned adaptive speed control module sensor can cause incorrect system operation. Before starting any repair work on the speed control system, on vehicles with the adaptive system installed, check adaptive speed control module sensor for correct vertical alignment, and carry out adaptive speed control module sensor adjustment procedure using manufacturer approved diagnostic system

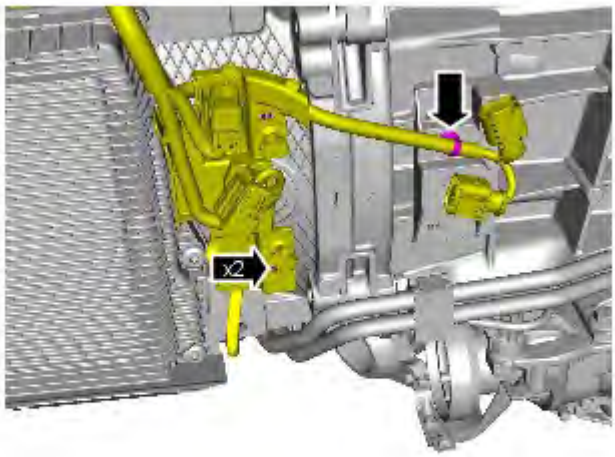
For a detailed description of the adaptive speed control module sensor adjustment procedure, refer to the relevant sections in the workshop manual.

Symptom Chart

Symptom	Possible Cause	Action
Speed control inhibited or disabled	• Power or ground supply to adaptive speed control module or adaptive speed control module sensor • Steering wheel speed control switch/circuits • Throttle sensors • Brake switch	• Check for DTCs that could be caused by power or ground failure to the module or sensor and refer to DTC index • Check for sticking, jammed and broken speed control switches. Refer to the electrical circuit diagrams and check speed control switch circuits for short circuit, open circuit, high resistance • Check for correct installation and adjustment of brake switch. Refer to the electrical circuit diagrams and check brake switch circuits for short circuit, open circuit, high resistance

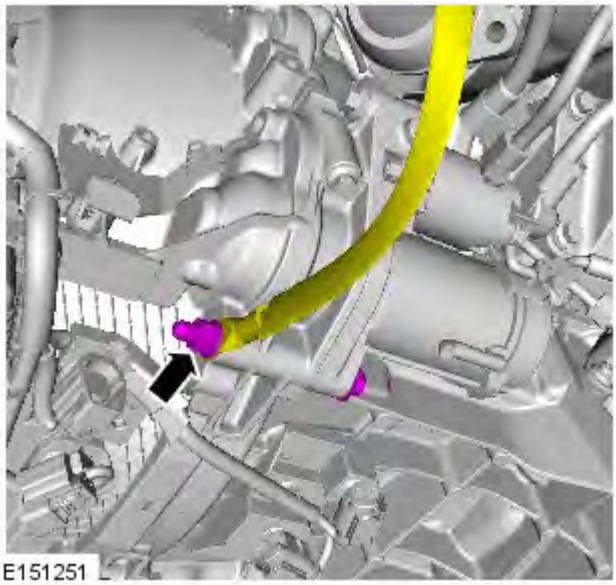


E152107



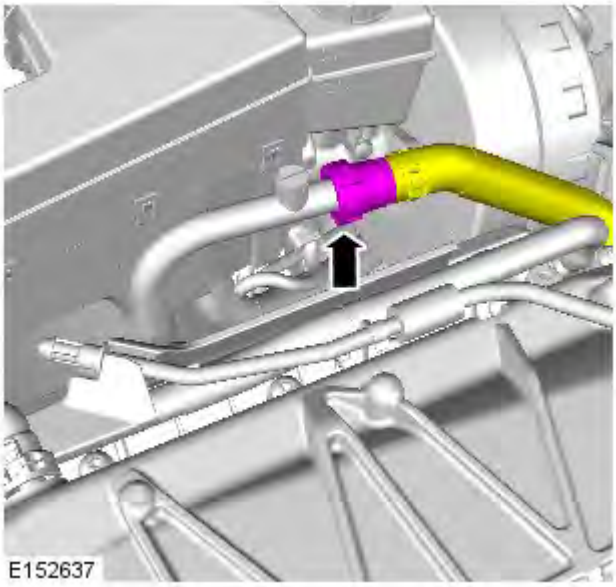
E151258

29. CAUTION: If necessary, install a new clip.

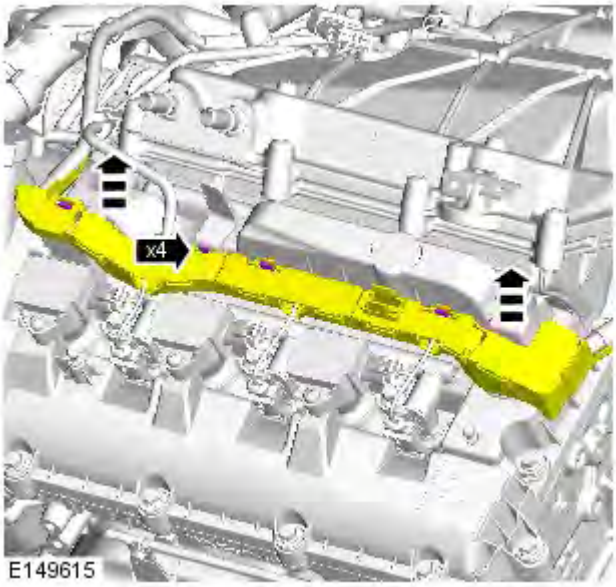


E151251

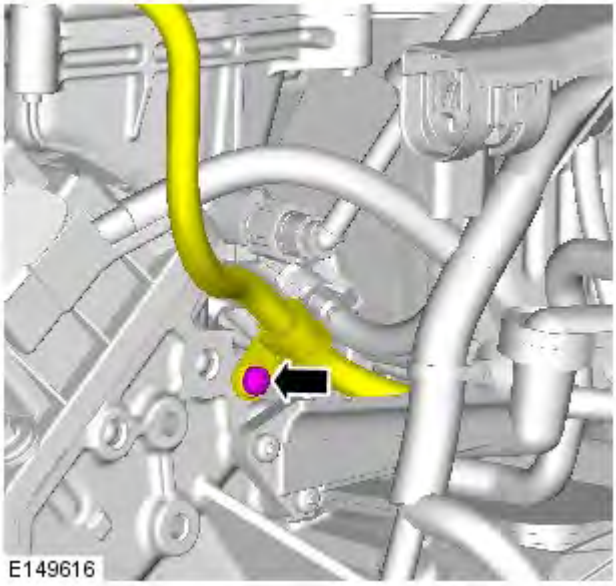
30. *Torque:* 48 Nm



20.



21.



22. *Special Tool(s):* 303-1435