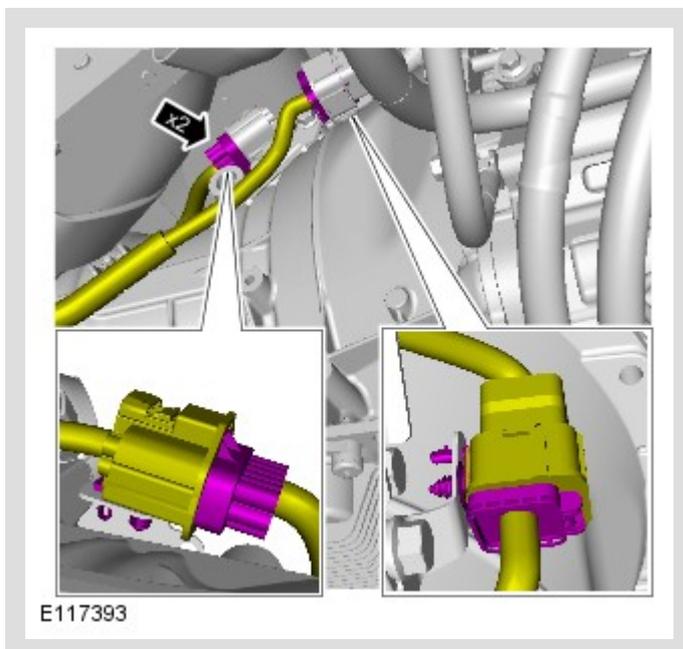
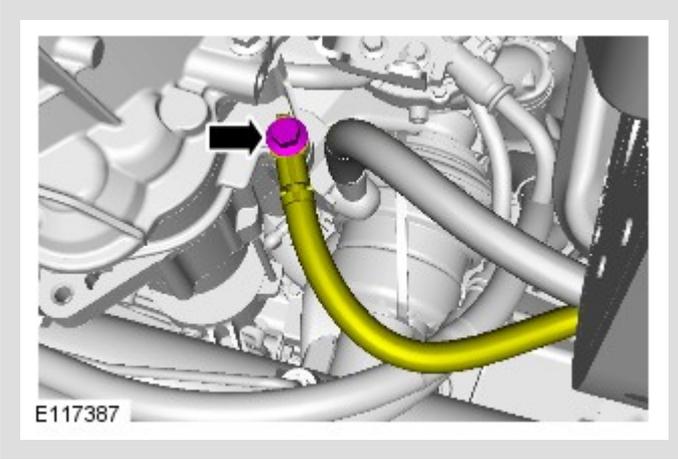


9.



10. Refer to: [Exhaust Manifold Cross-over Pipe \(303-01A Engine - TDV6 3.0L Diesel, Removal and Installation\)](#).

11.

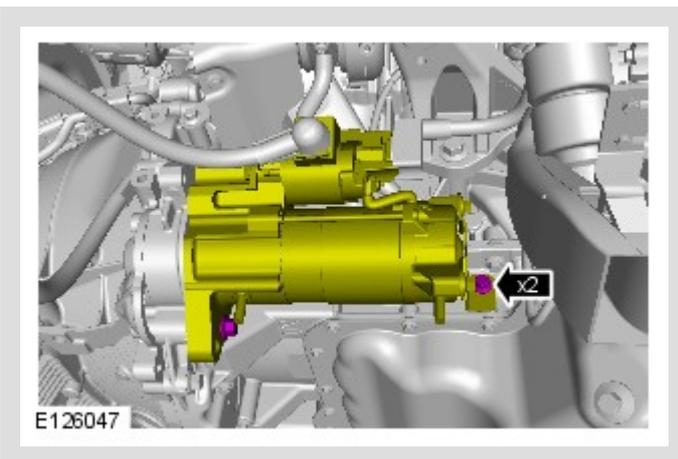


12.

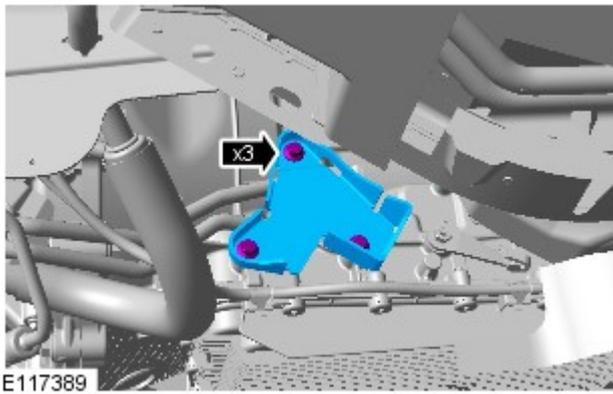


NOTE:

Secure with cable ties.



13.

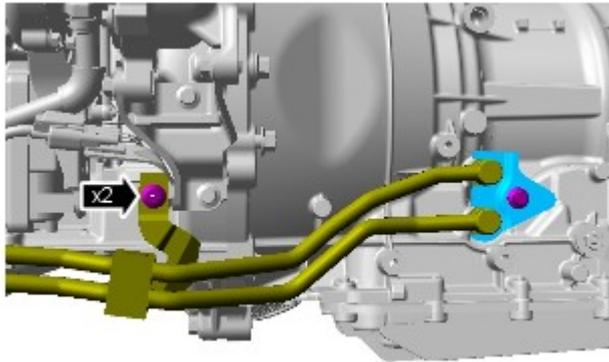


14.



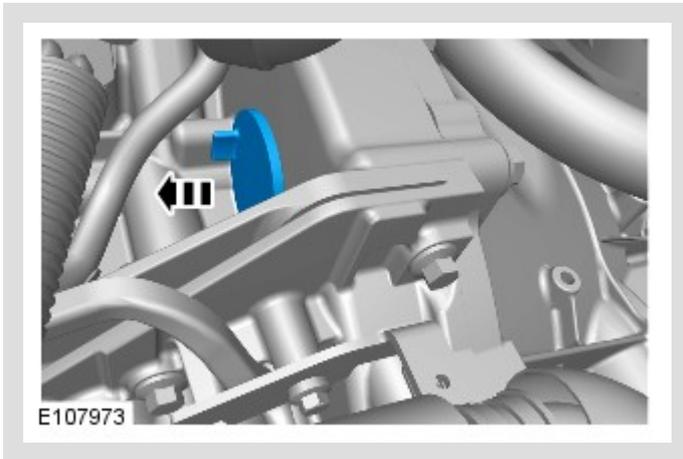
NOTE:

Remove and discard the O-ring seals.



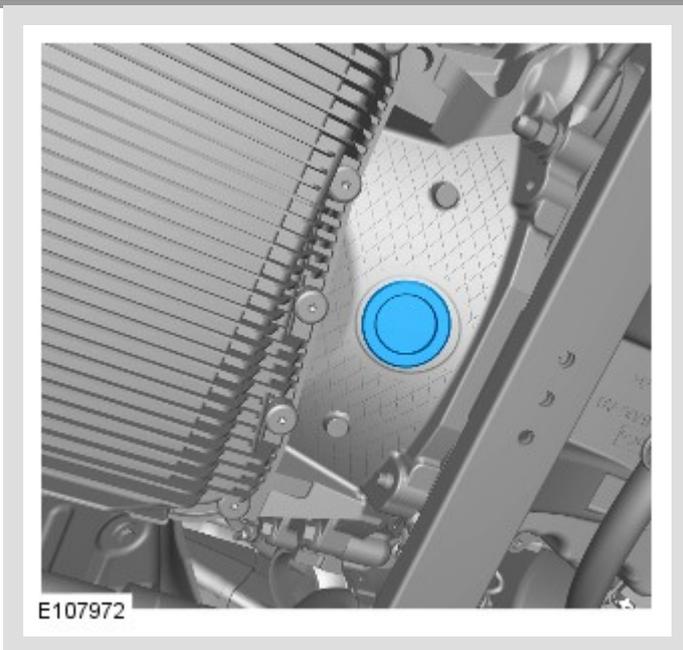
- Install blanking caps to the exposed ports.

15.



Remove the rubber access cover.

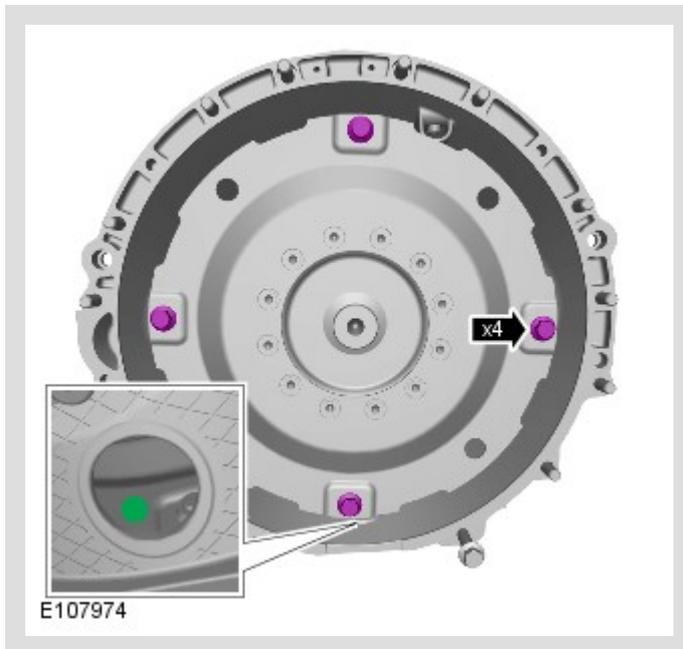
16.



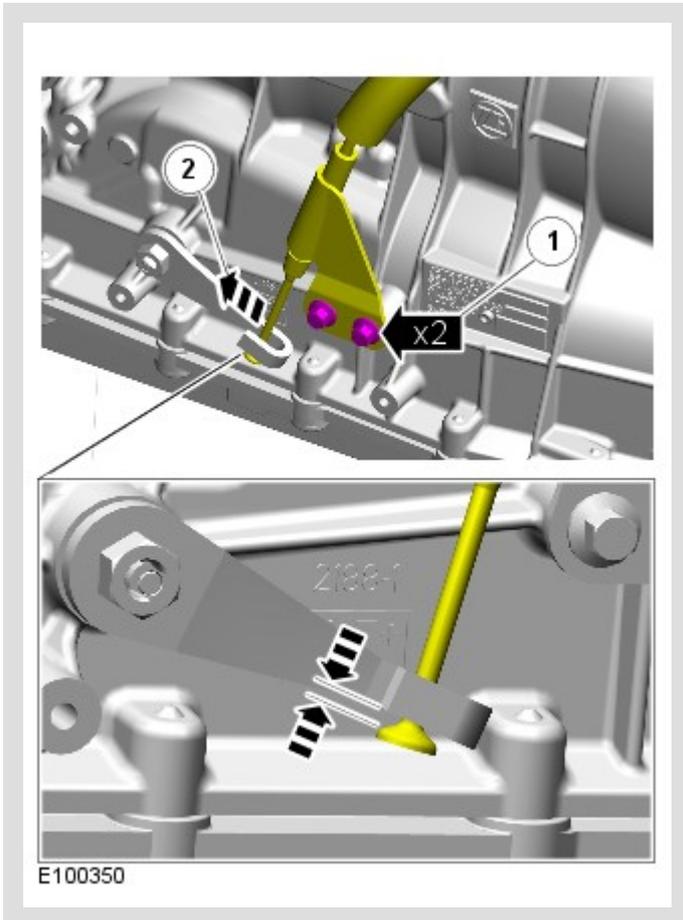
17.

! CAUTION:

Only rotate the crankshaft clockwise.



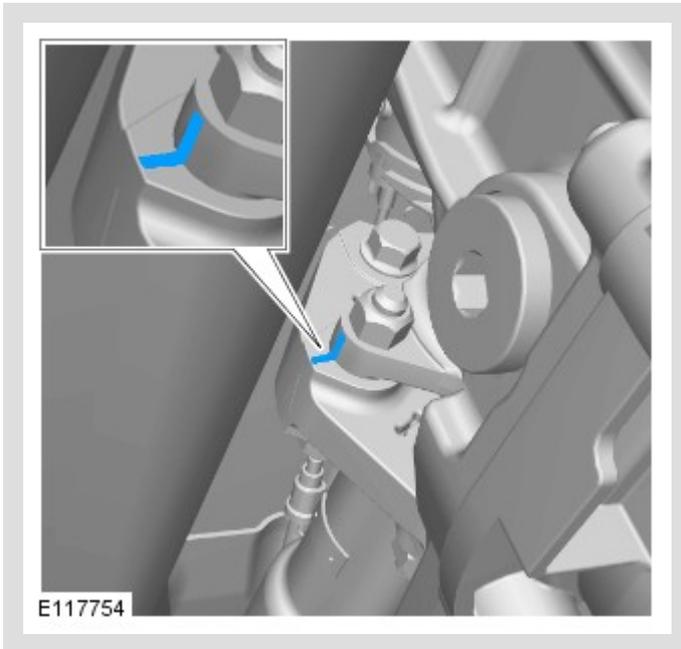
- Make sure that the alignment mark is visible through the inspection hole on removal of the last torque converter bolt.



19.

 **NOTE:**

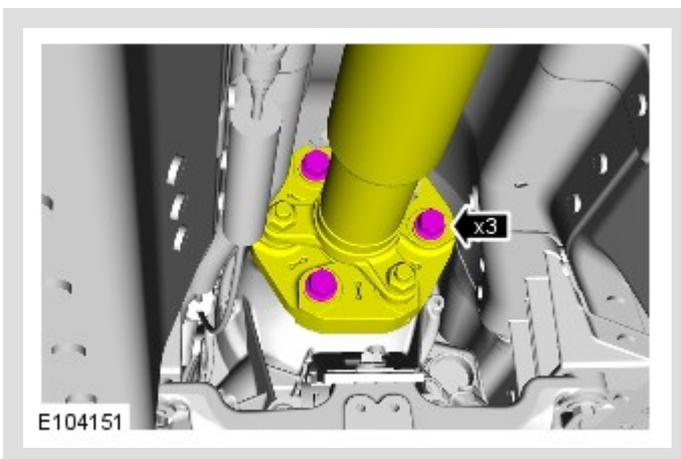
Mark the position of the driveshaft on the transmission flange.



20.

⚠ CAUTION:

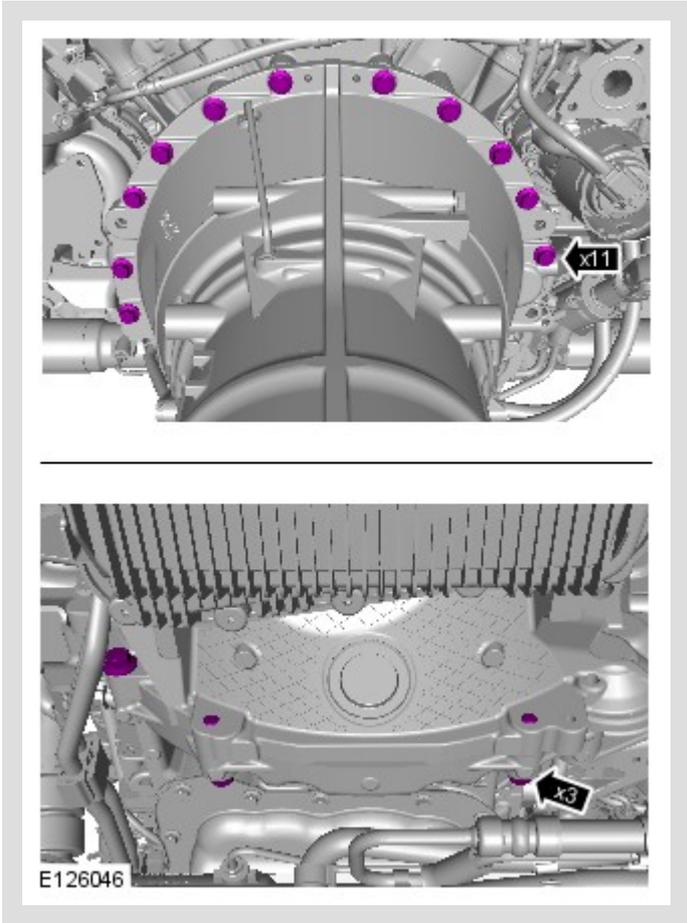
Under no circumstances must the flexible coupling (or its fixings) be loosened or removed from the driveshaft.



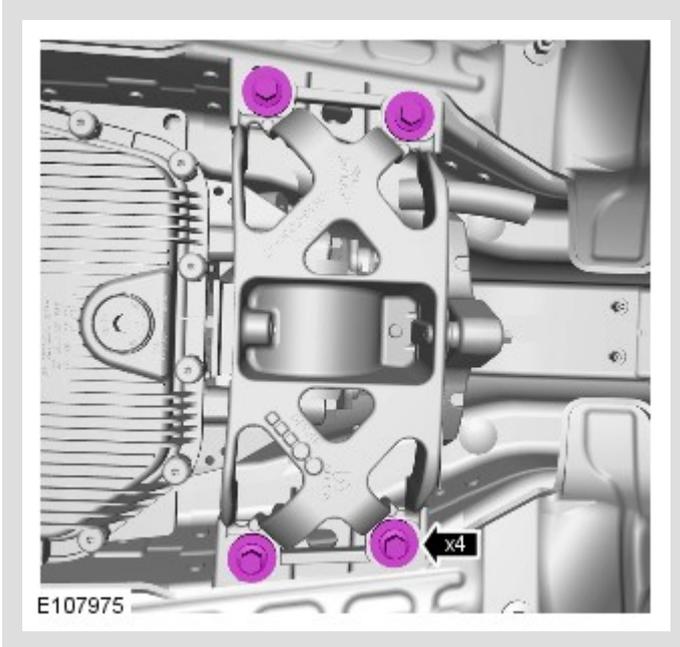
21.

⚠ WARNING:

Make sure that the transmission is secured with suitable retaining straps.



Align the powertrain assembly jack to the transmission.



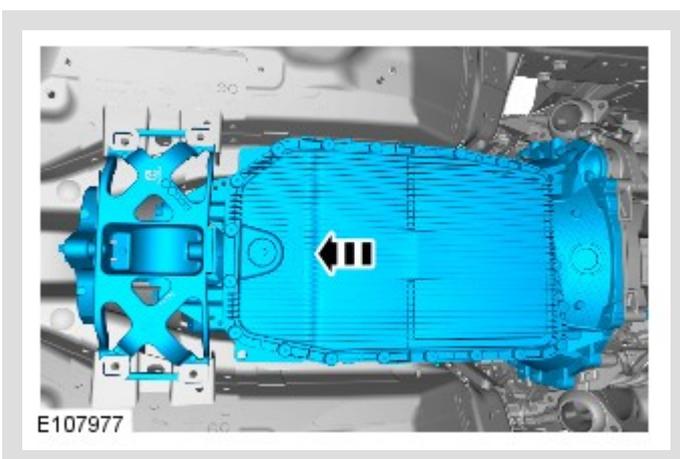
23.

⚠ CAUTION:

Make sure that the torque converter remains in the transmission.

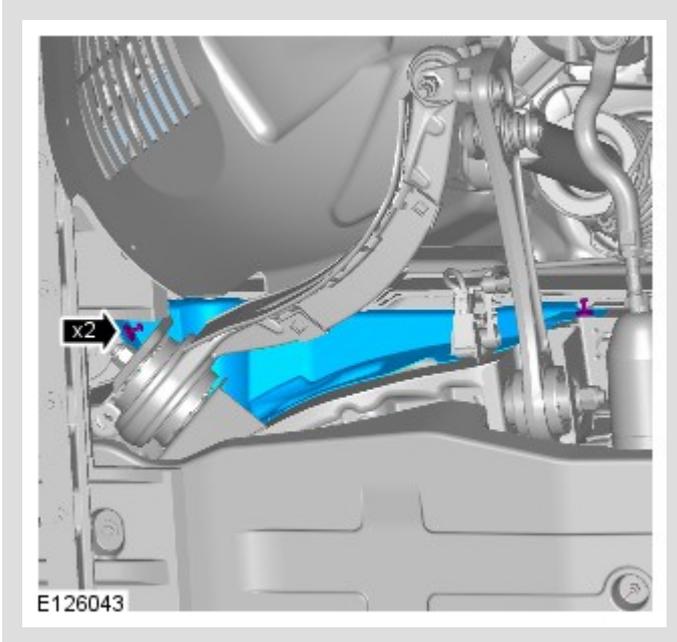
⚠ NOTE:

This step requires the aid of another technician.

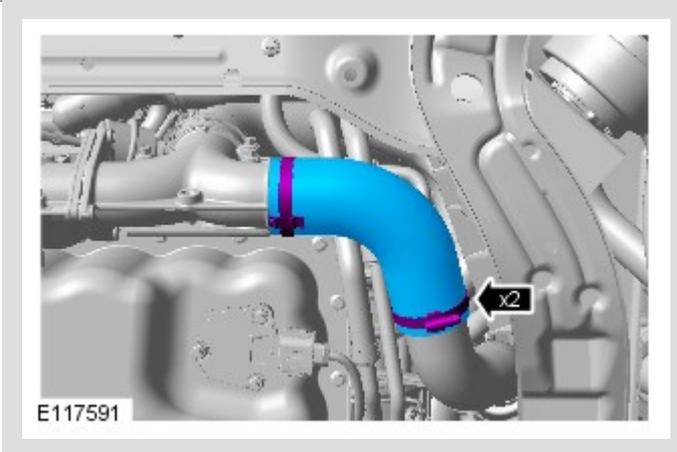


- Install the torque converter retainer.

24.



25.

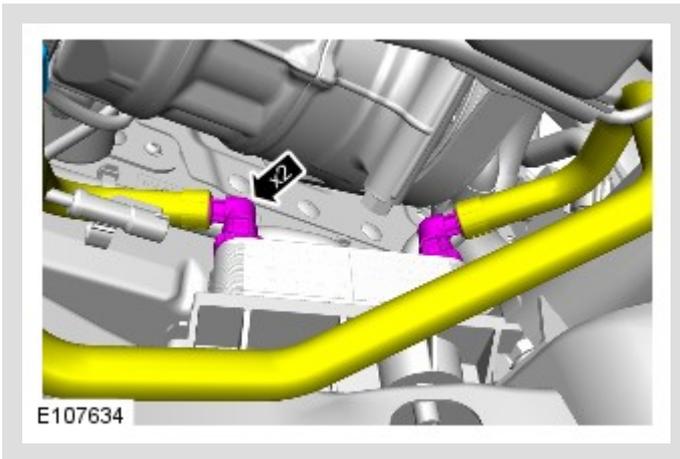


26.



CAUTIONS:

- Be prepared to collect escaping fluids.
- Make sure that all openings are sealed. Use new blanking caps.



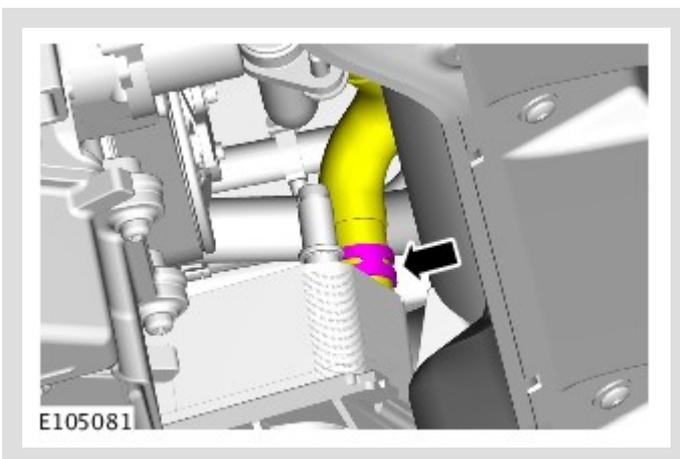
27.

⚠ CAUTION:

Be prepared to collect escaping coolant.

⚠ NOTE:

Clamp the hoses to minimize coolant loss.



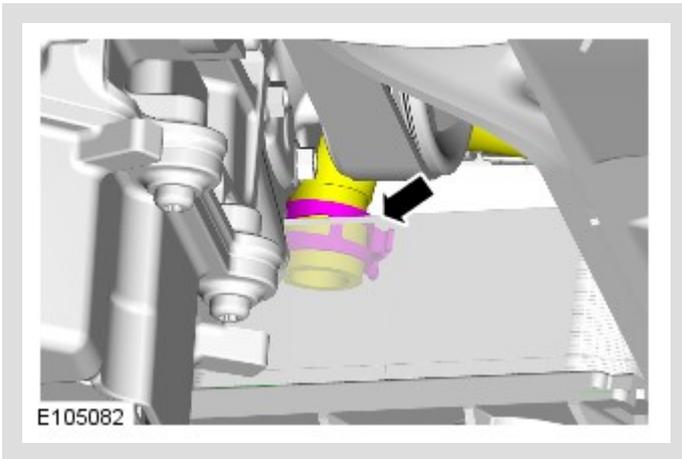
28.

⚠ CAUTION:

Be prepared to collect escaping coolant.

⚠ NOTE:

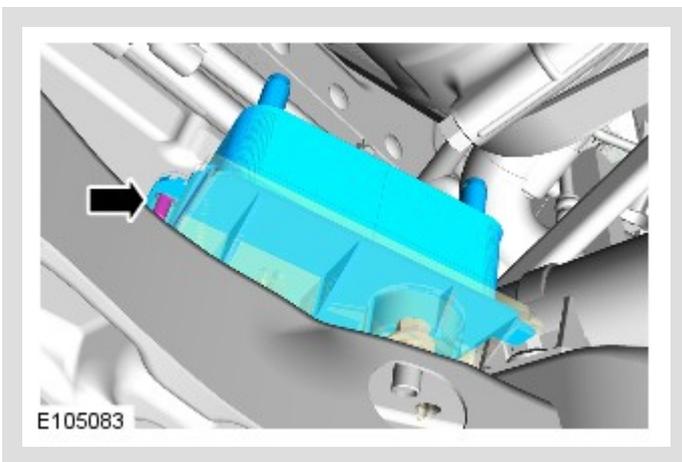
Clamp the hoses to minimize coolant loss.



29.

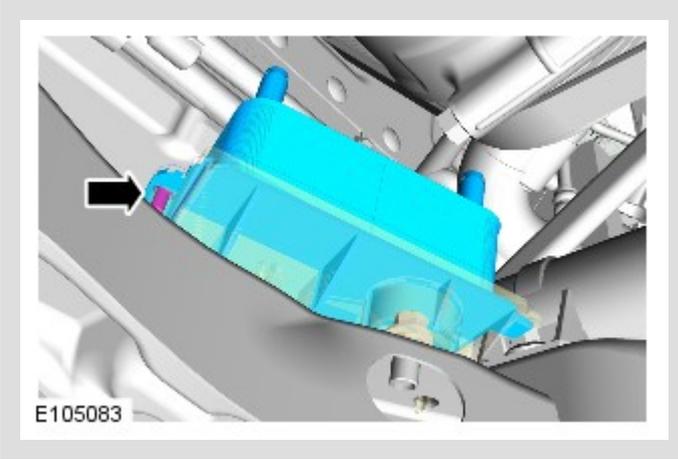
⚠ CAUTION:

Be prepared to collect escaping fluids.



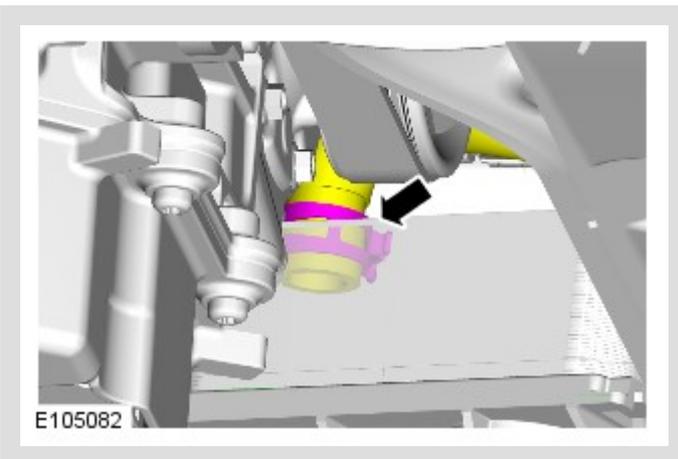
INSTALLATION

1.

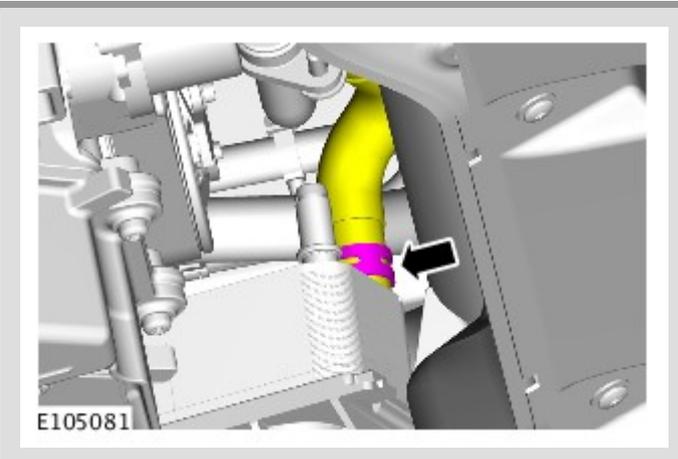


Torque: 5 Nm

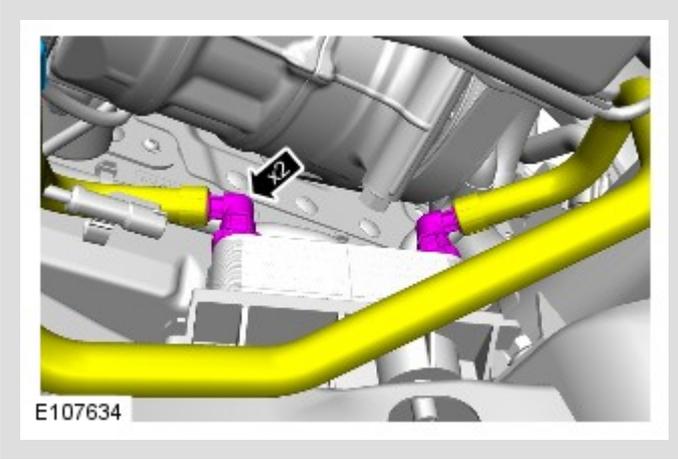
2.



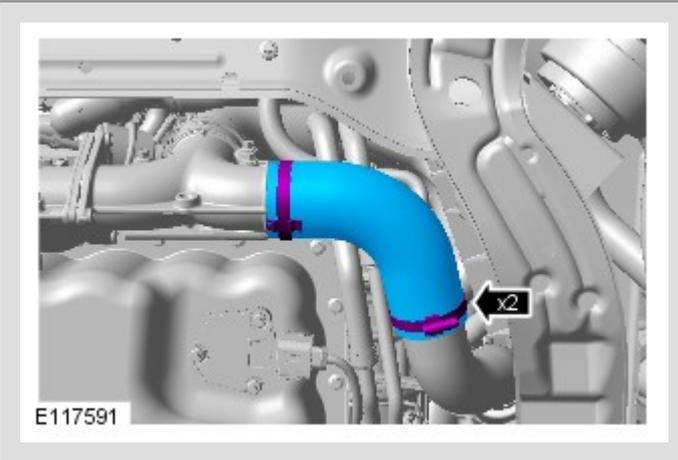
3.



4.

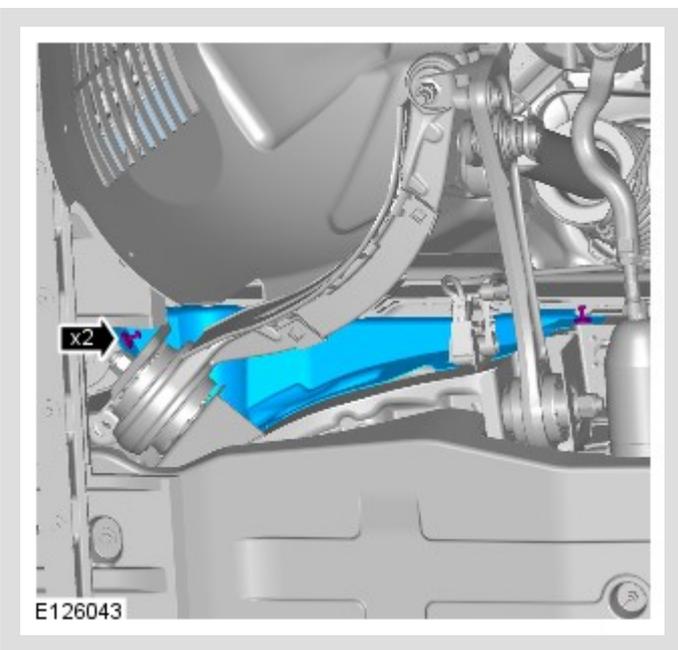


5.

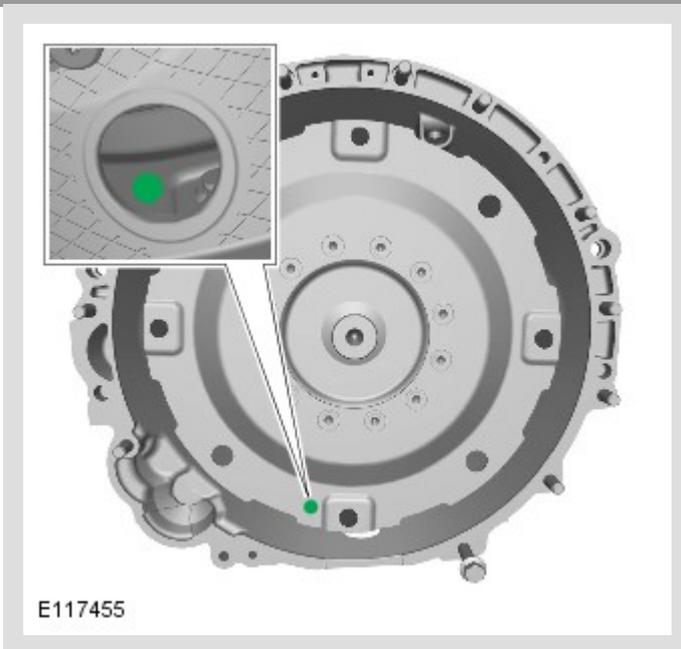


Torque: 5 Nm

6.



7.

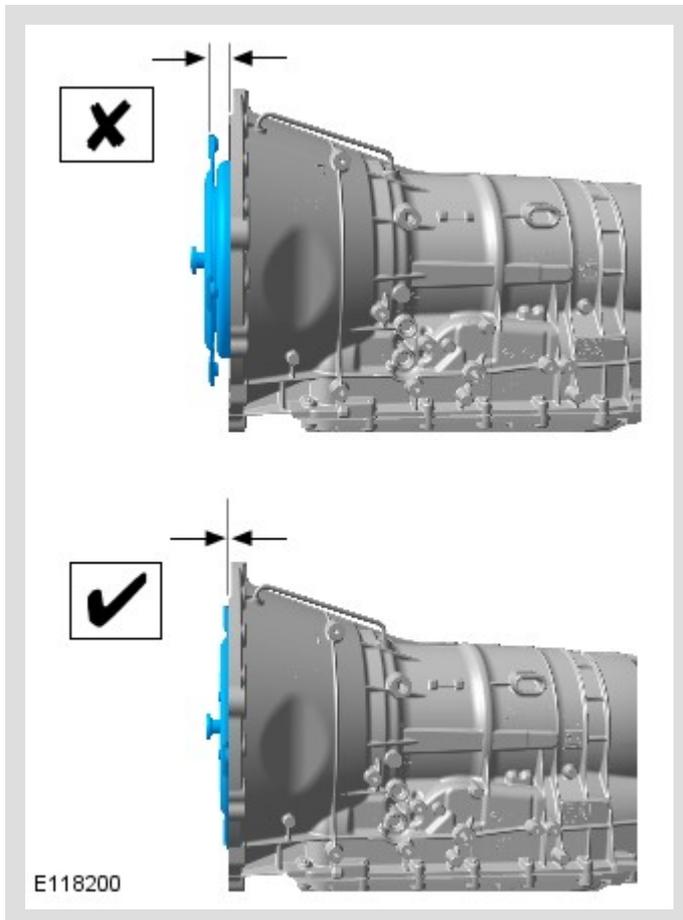


Make sure that the alignment mark is visible through the inspection hole on installation of the first torque converter bolt.

8.

⚠ CAUTION:

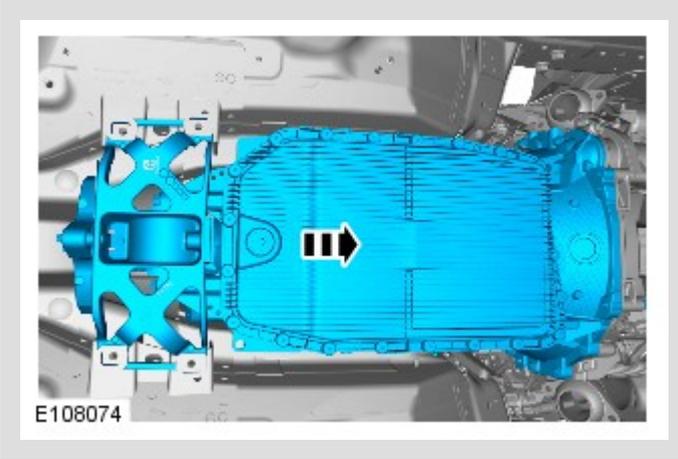
Make sure the torque converter is fully located into the oil pump drive.



9.

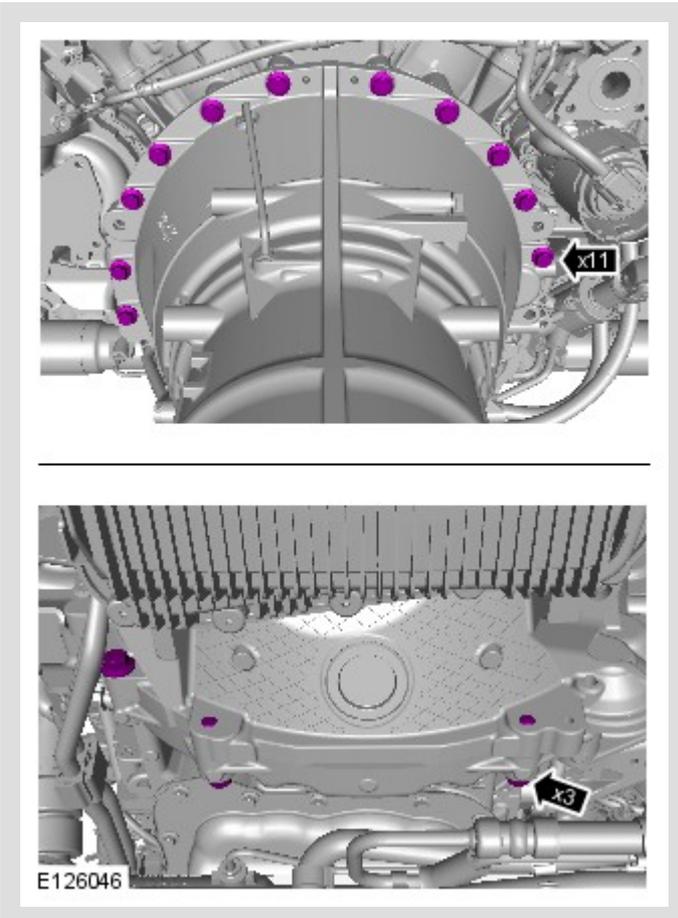
⚠ CAUTION:

Make sure that the torque converter remains in the transmission.



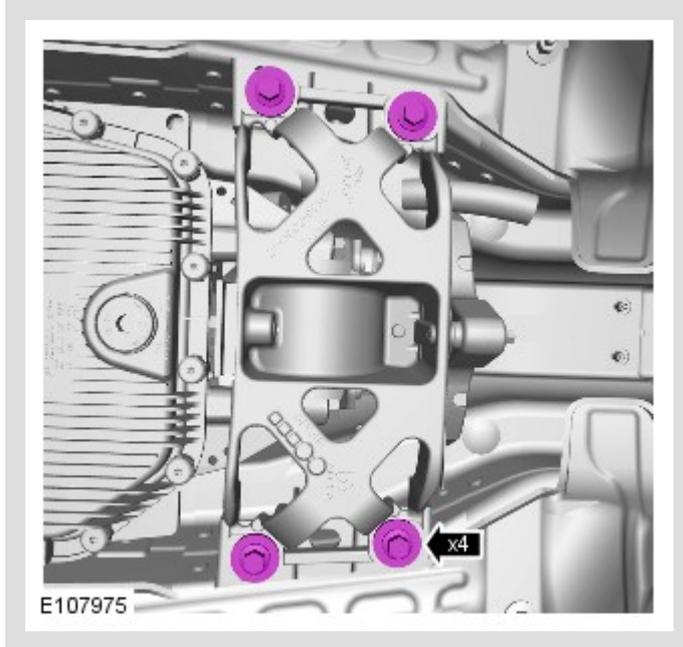
Raise the powertrain assembly jack and transmission assembly.

10.



Torque: 48 Nm

11.



Torque: 48 Nm

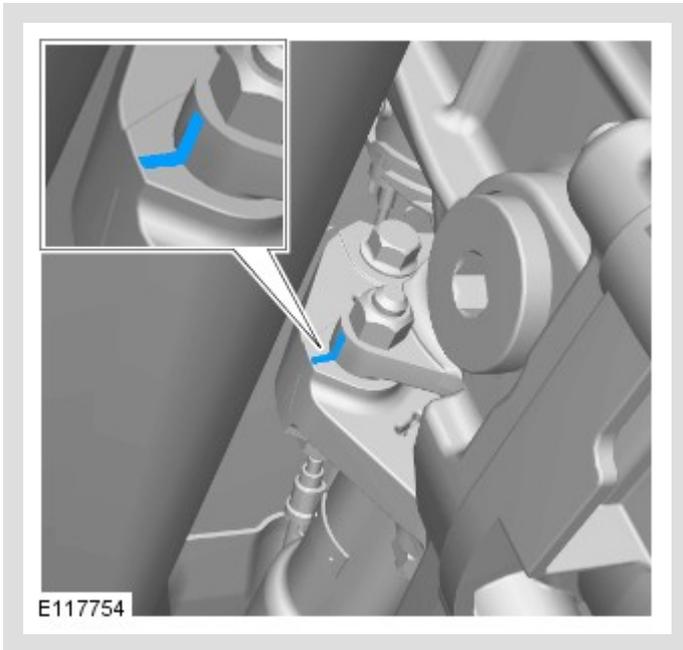
12. Remove the transmission jack.

13.



NOTE:

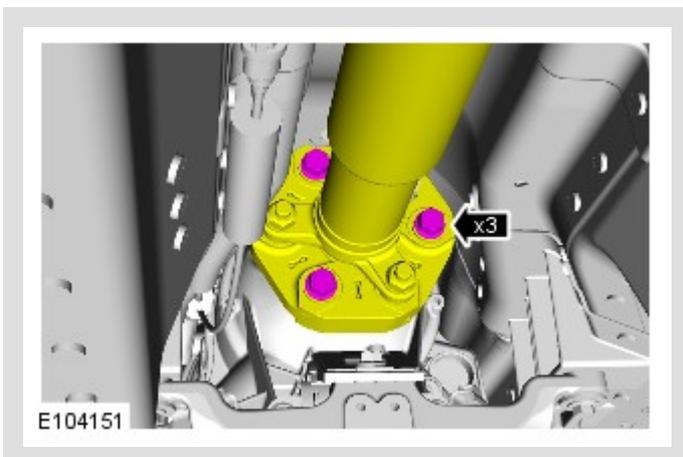
Make sure that you re-align the driveshaft to the transmission flange using the alignment mark.



14.

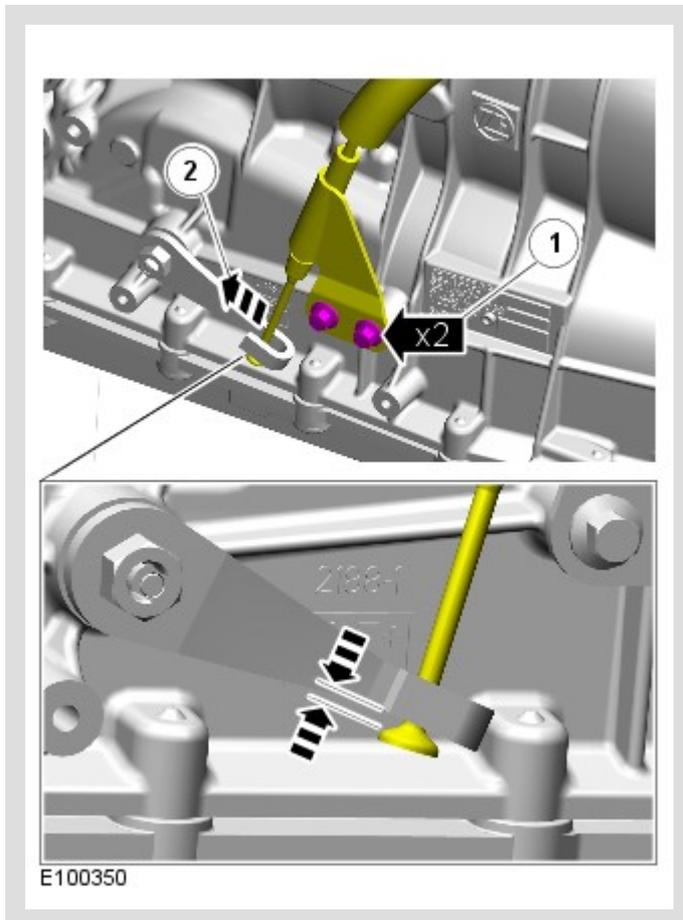
⚠ CAUTION:

Under no circumstances must the flexible coupling (or its fixings) be loosened or removed from the driveshaft.



Torque: **127 Nm**

15.

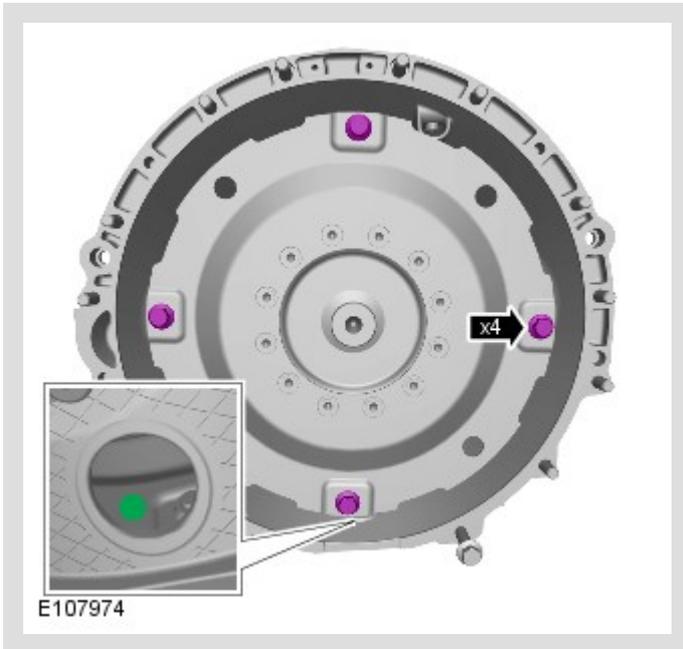


Torque: 10 Nm

16.

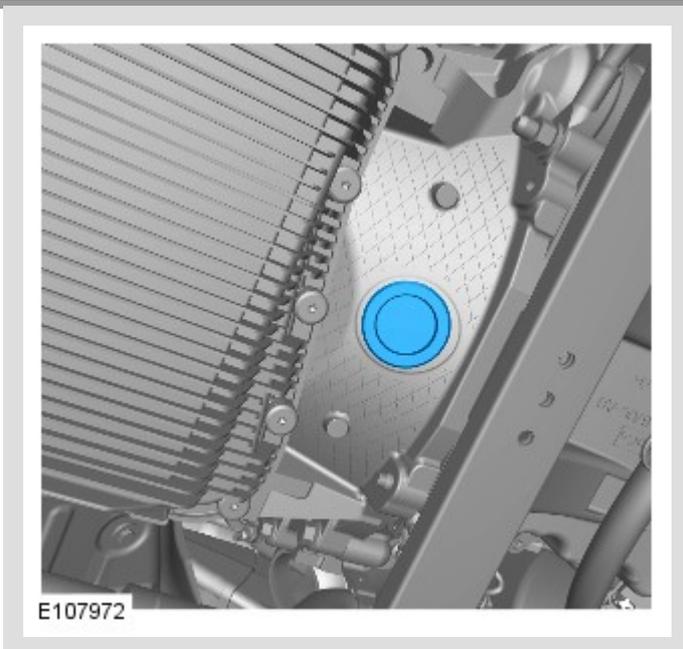
⚠ CAUTION:

Only rotate the crankshaft clockwise.

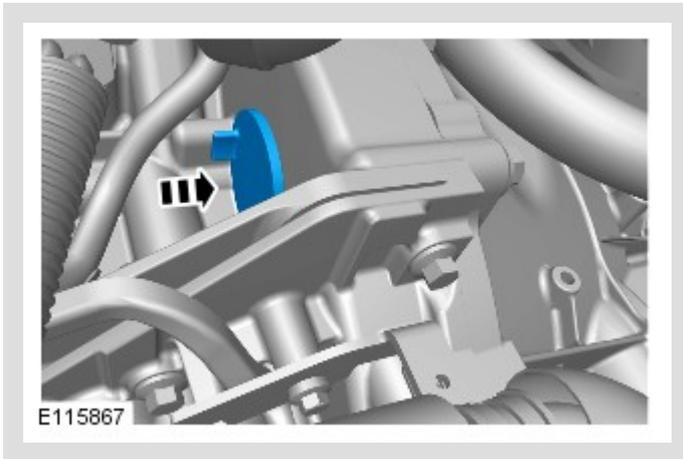


Torque: 63 Nm

17.



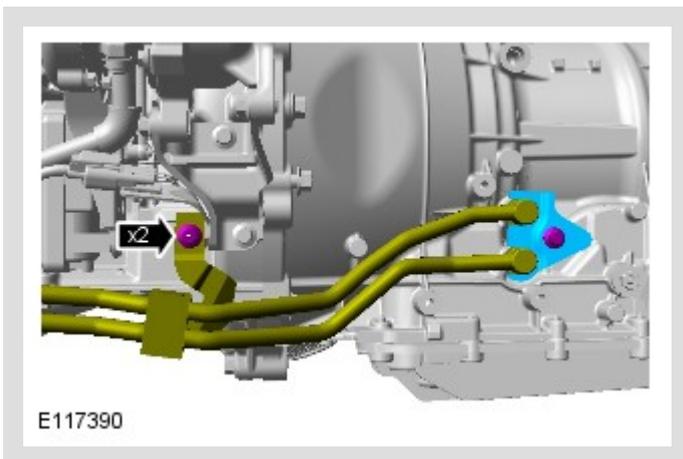
18.



19.

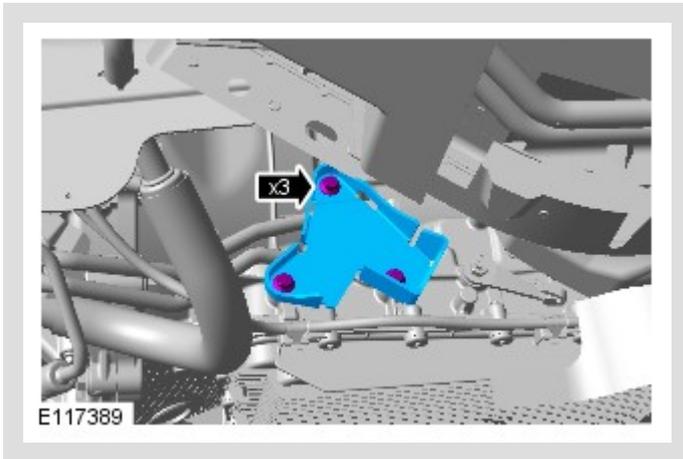
⚠ CAUTION:

Install new o-ring seals



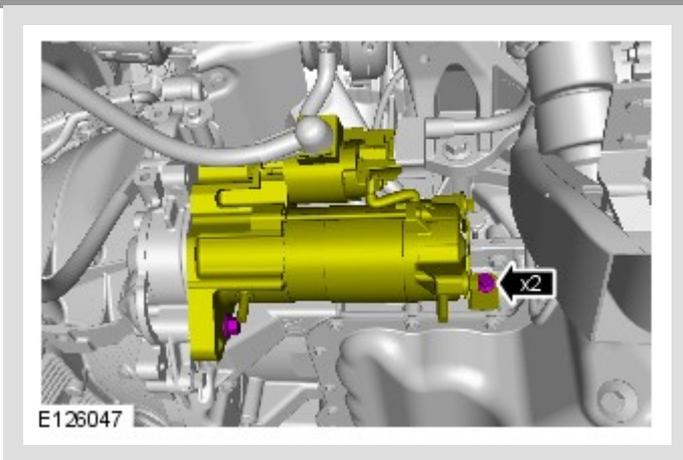
Torque: 10 Nm

20.



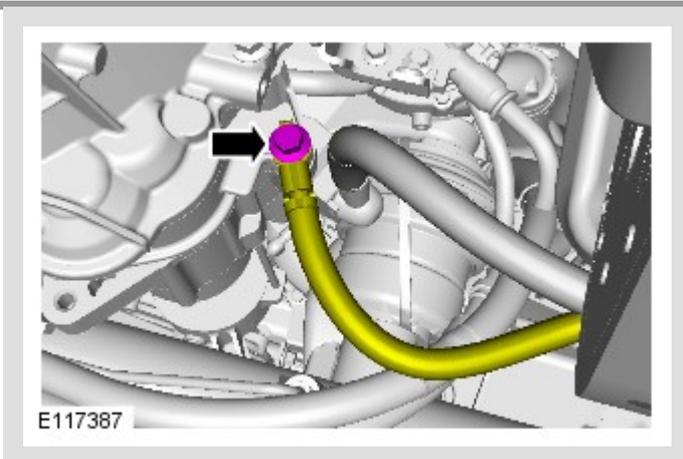
Torque: 23 Nm

21.



Torque: 48 Nm

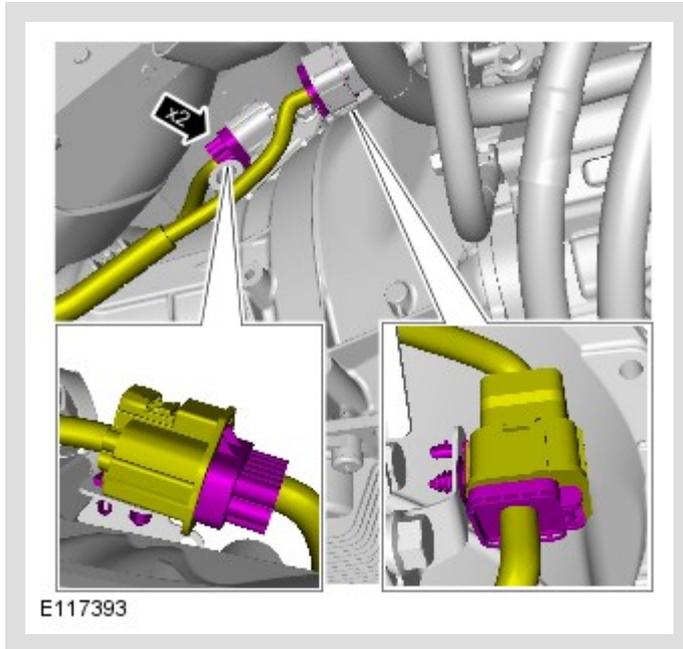
22.



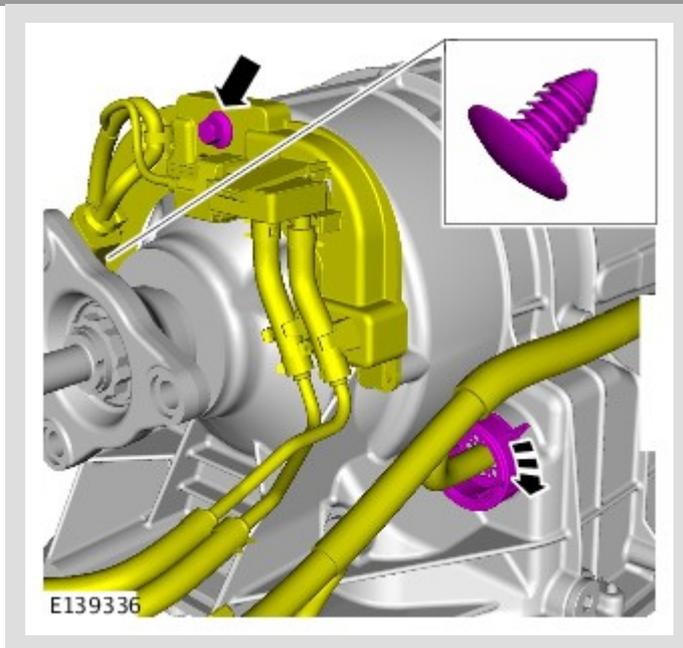
Torque: 30 Nm

23. Refer to: [Exhaust Manifold Cross-over Pipe \(303-01A Engine - TDV6 3.0L Diesel, Removal and Installation\)](#).

24.

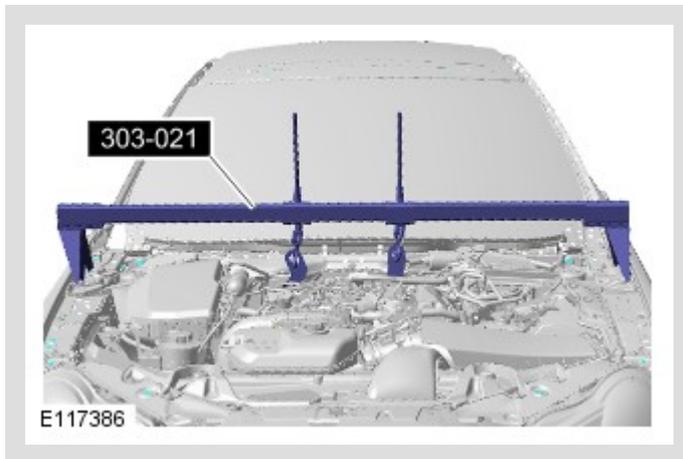


25.



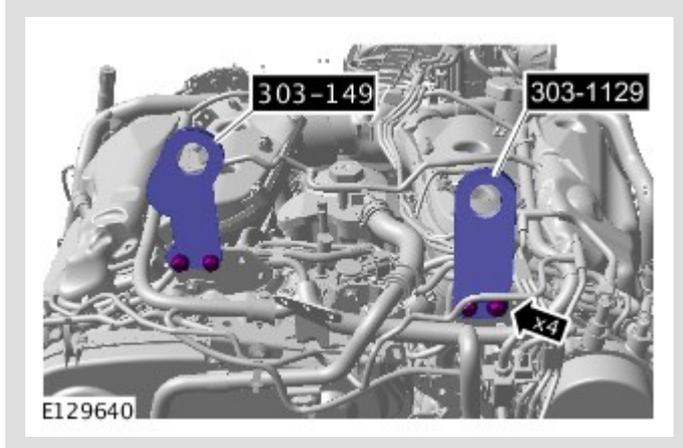
26. Lower the vehicle.

27.



- Remove the special tool supporting the engine.
- *Special Tool(s):* [303-021](#)

28.

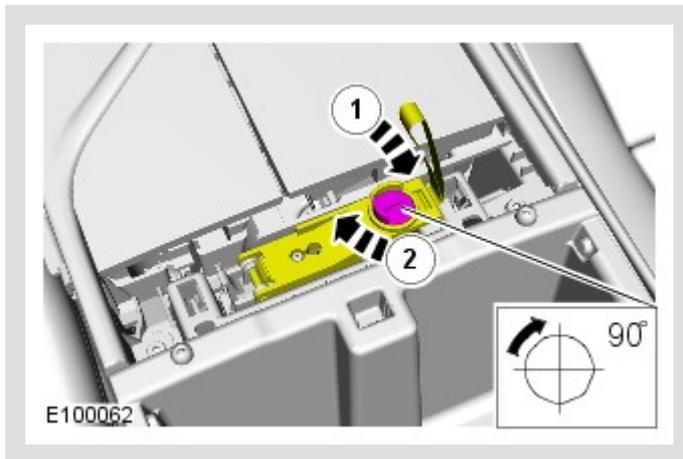


- Remove the special tools from the engine.
- *Special Tool(s):* [303-1129](#) , [303-1497](#)

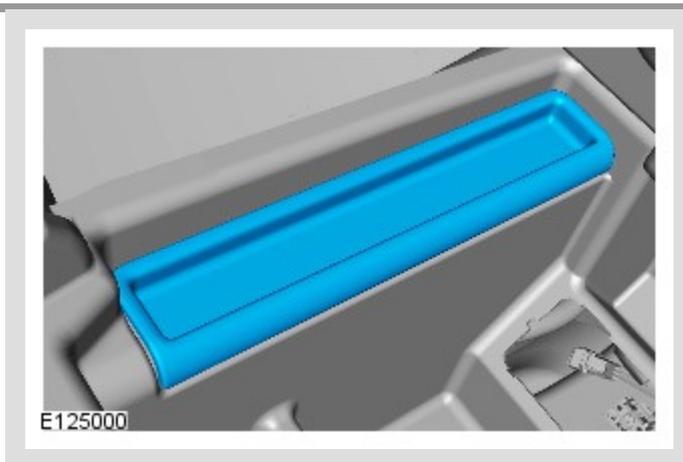
29. Refer to: [Engine Cover - TDV6 3.0L Diesel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).

30. Refer to: [Battery Disconnect and Connect](#) (414-01 Battery, Mounting and Cables, General Procedures).

31.



32.



33. Check and top up the cooling system as required.

34. Set the heater controls to HOT.

35.

⚠ CAUTION:

Observe the engine temperature warning light. If the warning light is displayed, switch off immediately and allow to cool. Failure to follow this instruction may cause damage to the vehicle.

Start the engine and allow to idle until hot air is emitted at the face registers.

36.

⚠ CAUTION:

Observe the engine temperature warning light. If the warning light is displayed, switch off immediately and allow to cool. Failure to follow this instruction may cause damage to the vehicle.

Raise the engine speed to 2000 RPM and maintain at 2000 RPM until the engine cooling fan operates.

37.

⚠ CAUTION:

Switch off the engine and allow the coolant temperature to go cold.

Switch the engine off and allow to cool.

38.

Visually check the engine and cooling system for signs of coolant leakage.

39.

⚠ WARNINGS:

- When releasing the cooling system pressure, cover the coolant expansion tank cap with a thick cloth.
- Since injury such as scalding could be caused by escaping steam or coolant, make sure the vehicle cooling system is cool prior to carrying out this procedure.

⚠ CAUTIONS:

- Make sure the coolant level remains above the "COLD FILL RANGE" lower level mark.
- Anti-freeze concentration must be maintained at 50%.

△ NOTE:

When the cooling system is warm, the coolant will be approximately 10mm above the upper level mark on the expansion tank with the cap removed.

Check and top-up the coolant if required.

40.

Refer to: [Transmission Fluid Level Check](#) (307-01C Automatic Transmission/Transaxle - Vehicles With: 8HP70 8-Speed Automatic Transmission AWD, General Procedures).

PUBLISHED: 02-AUG-2017
2015.0 XJ RANGE (X351), 307-01

AUTOMATIC TRANSMISSION/TRANSAXLE - VEHICLES WITH: 8HP70 8-SPEED AUTOMATIC
TRANSMISSION RWD

**TRANSMISSION CONTROL MODULE AND MAIN CONTROL VALVE
BODY - TDV6 3.0L DIESEL** (G1450193)

44.40.01	VALVE BODY ASSEMBLY - RENEW	3000 CC, TDV6	2	USED WITHINS
----------	-----------------------------	---------------	---	--------------

SPECIAL TOOL(S)

 <p>E130935</p>	<p>JLR-308-844 Remover/Installer, Transmission Control Module Electrical Connector</p>
---	---

PART(S)

STEP	REPLACE PART / RENEW PART	PART NAME
Installation Step 1	Renew Part	Transmission control module and main control valve body bolts

REMOVAL

⚠ WARNING:

Be prepared to collect escaping fluid.

⚠ CAUTION:

Make sure all suitable safety precautions are taken to protect the TCM and main control valve body electrical connector pins against electrostatic discharge.



NOTE:

Removal steps in this procedure may contain installation details.

1.



WARNING:

Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

2.

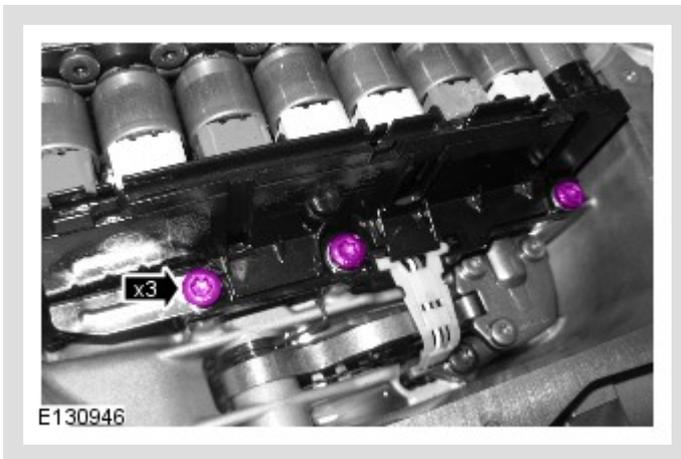
Refer to: [Transmission Fluid Pan, Gasket and Filter - GTDi 2.0L Petrol/TDV6 3.0L Diesel /V6 S /C 3.0L Petrol /V8 N/A 5.0L Petrol/V8 S/C 5.0L Petrol \(307-01B Automatic Transmission /Transaxle - Vehicles With: 8HP70 8-Speed Automatic Transmission RWD, Removal and Installation\)](#).

3.



CAUTION:

Discard the bolts.



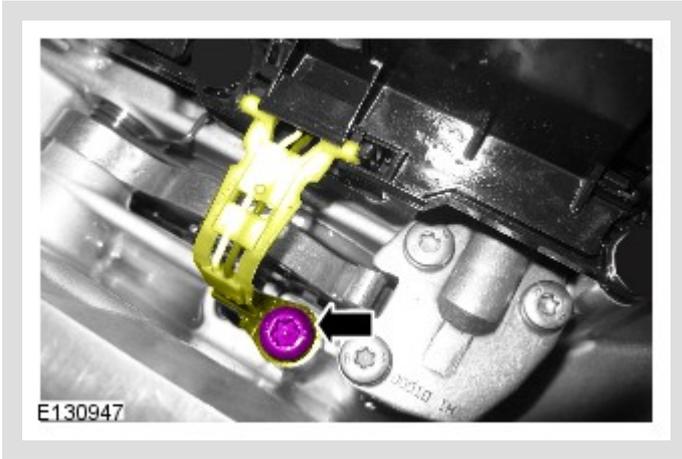
Take precautions to avoid any electrostatic charging, which could damage these components.

4.

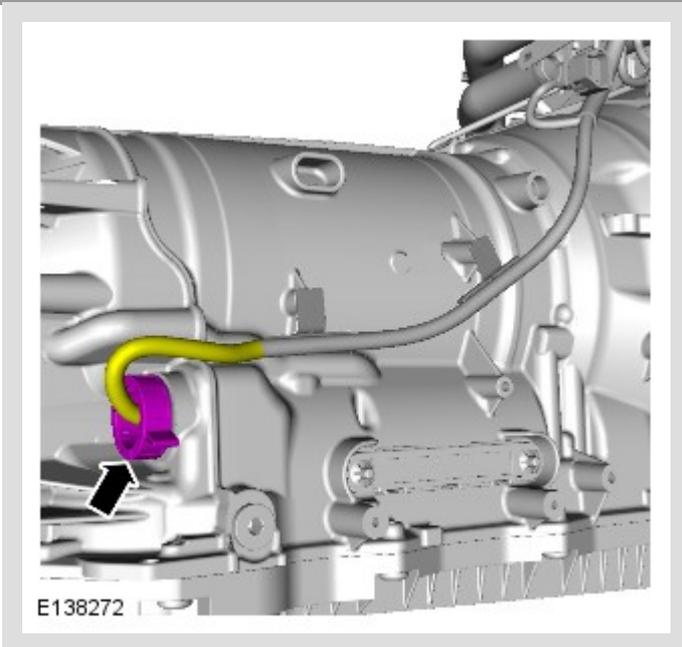


CAUTION:

Discard the bolt.



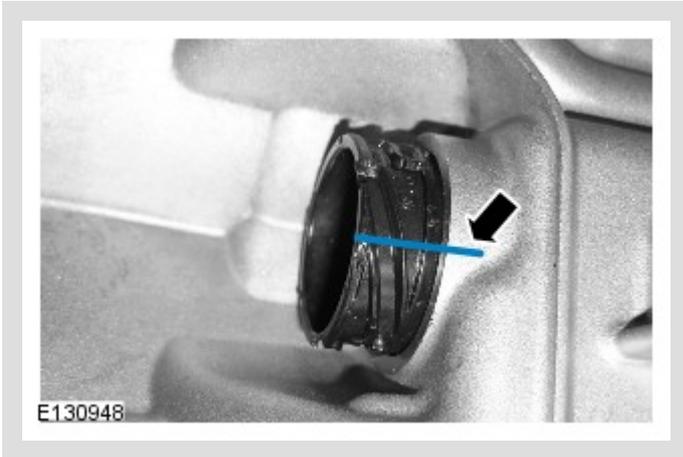
5.



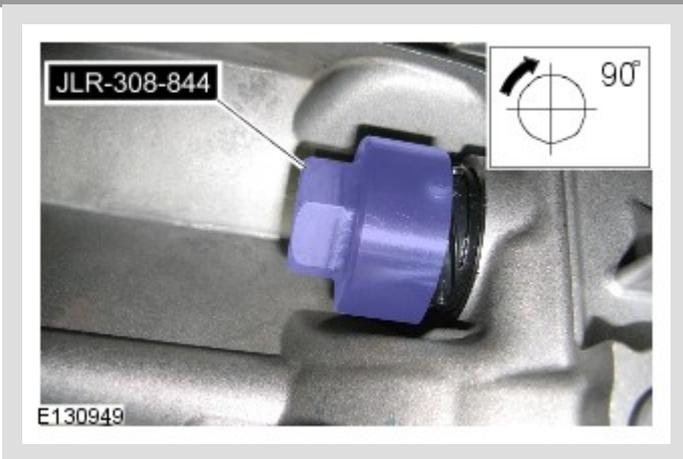
6.

⚠ CAUTION:

Note the fitted position of the component prior to removal.



7.

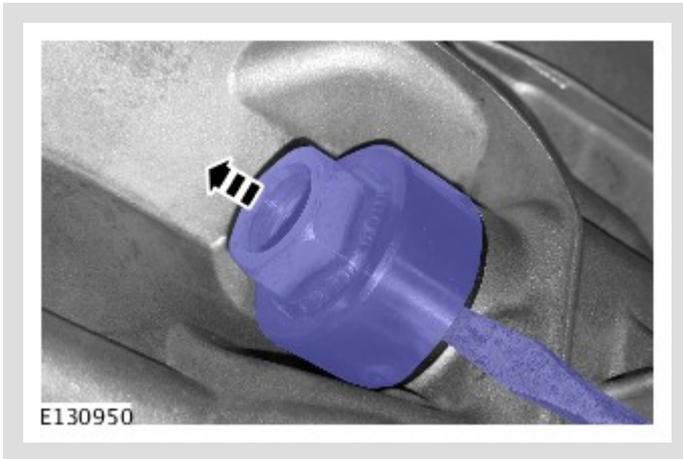


Special Tool(s): [JLR-308-844](#)

8.



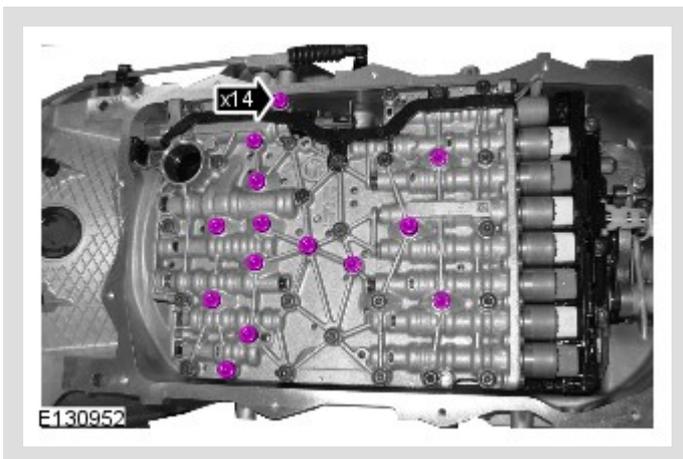
9.



10.

⚠ CAUTION:

Discard the bolts.



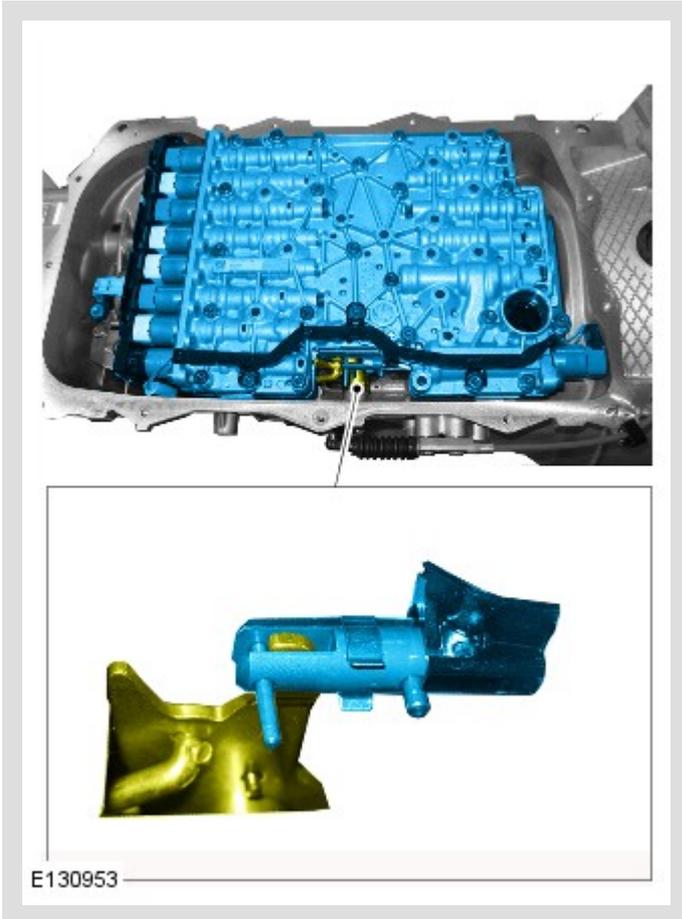
11.

⚠ WARNING:

Be prepared to collect escaping fluid.

📌 NOTE:

Note the position of the manual park brake release.



INSTALLATION

1.



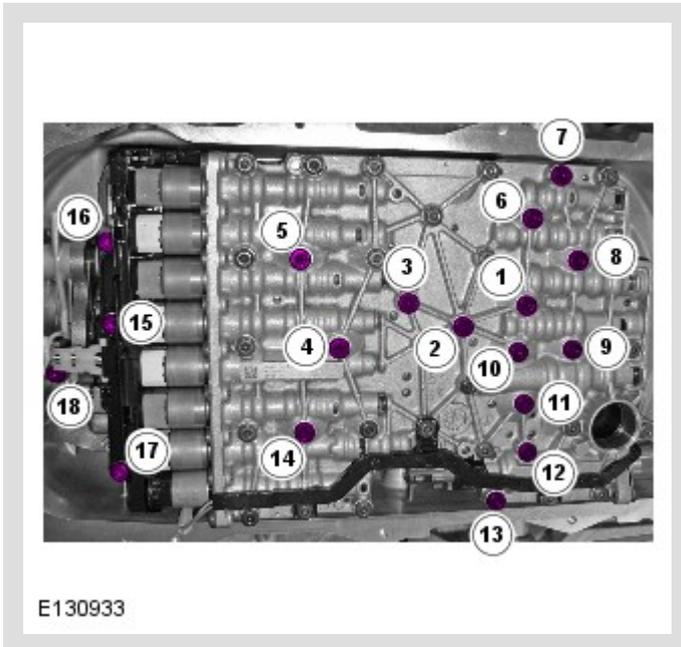
CAUTION:

Make sure that new bolts are installed.



NOTE:

Tighten the retaining bolts evenly and progressively.



To install, reverse the removal procedure.

Renew Part: *Transmission control module and main control valve body bolts* : .

Torque: **8 Nm**

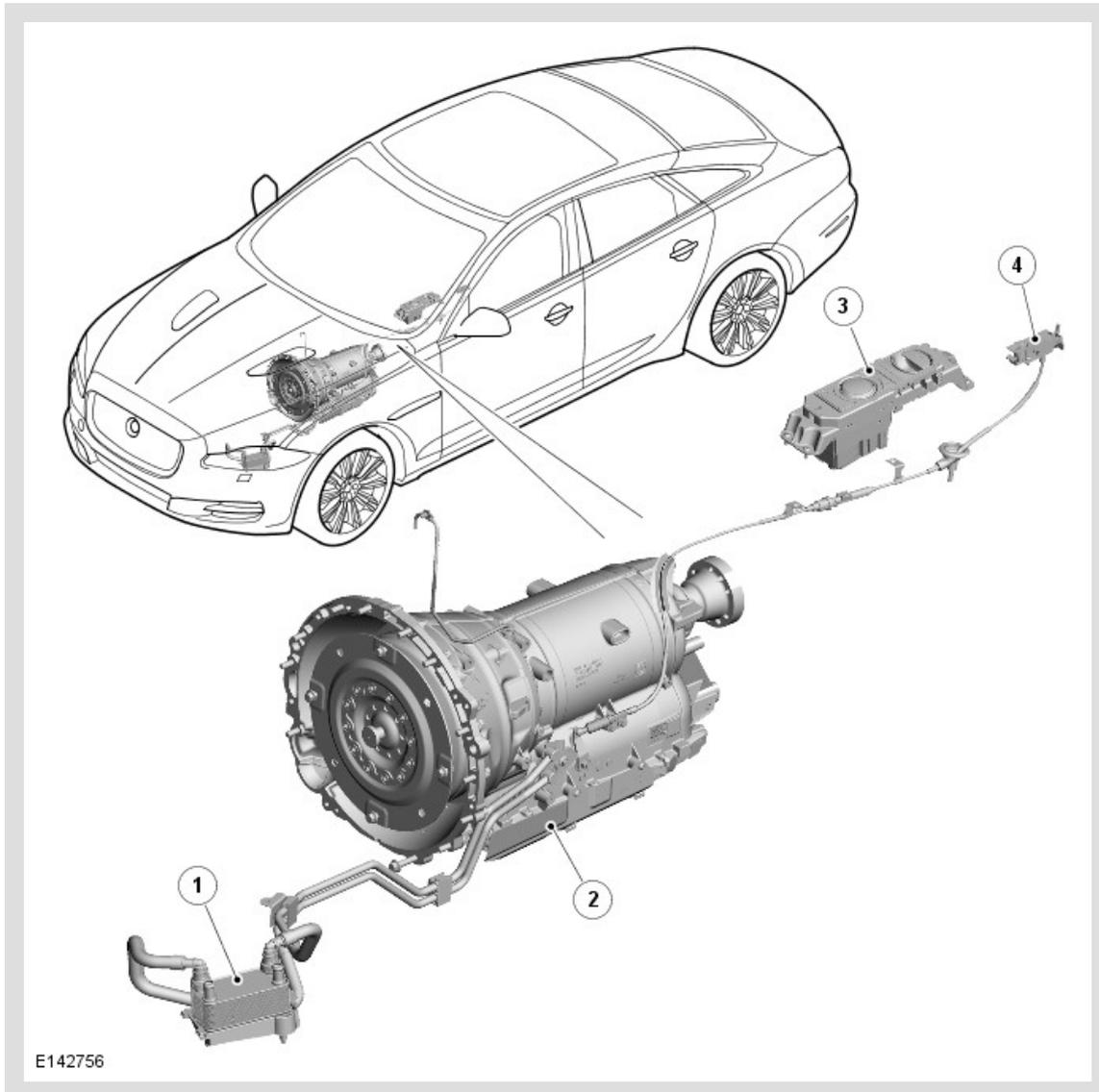
2. Using the diagnostic tool, calibrate the main control valve body and the transmission control module (TCM).

PUBLISHED: 24-JUL-2012
2015.0 XJ RANGE (X351), 307-01

AUTOMATIC TRANSMISSION/TRANSAXLE - VEHICLES WITH: 8HP70 8-SPEED AUTOMATIC
TRANSMISSION RWD

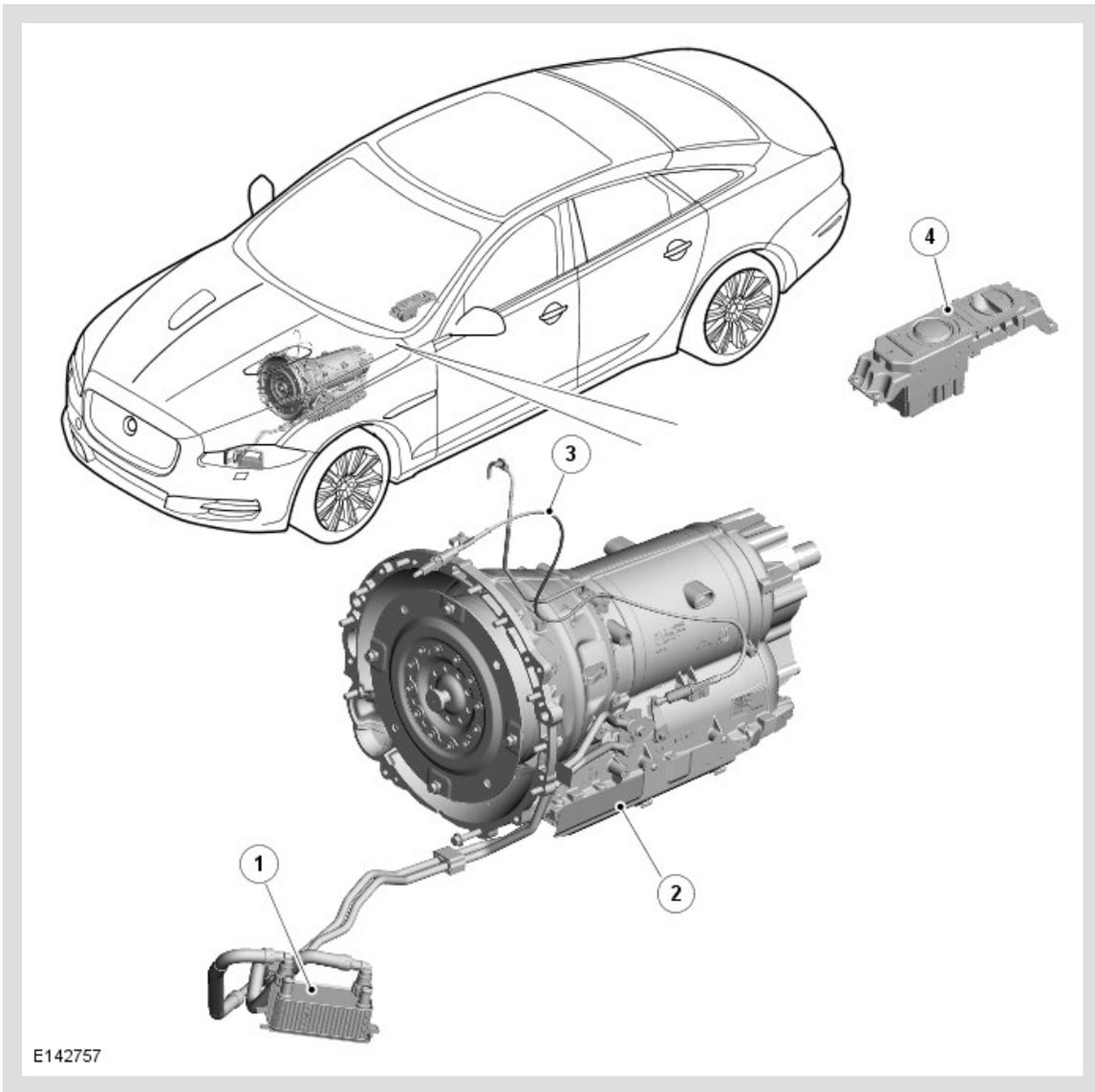
TRANSMISSION DESCRIPTION - COMPONENT LOCATION (G1520377)

COMPONENT LOCATION - REAR WHEEL DRIVE (RWD)



ITEM	DESCRIPTION
1	Transmission fluid cooler
2	Automatic transmission
3	Transmission Control Switch (TCS)
4	Emergency park release lever and cable

COMPONENT LOCATION - ALL WHEEL DRIVE (AWD)



E142757

ITEM	DESCRIPTION
1	Transmission fluid cooler
2	Automatic transmission
3	Emergency park release cable
4	Transmission Control Switch (TCS)

PUBLISHED: 24-JUL-2012
2015.0 XJ RANGE (X351), 307-01

AUTOMATIC TRANSMISSION/TRANSAXLE - VEHICLES WITH: 8HP70 8-SPEED AUTOMATIC
TRANSMISSION RWD

TRANSMISSION DESCRIPTION - OVERVIEW (G1520378)

OVERVIEW

The ZF 8HP70 transmission is an electronically controlled, hydraulically operated, 8 speed automatic unit. The hydraulic and electronic control elements of the transmission, including the TCM (transmission control module) , are incorporated in a single unit located inside the transmission and is known as 'Mechatronic'.

The ZF 8HP70 transmission has the following features:

- Designed to be maintenance free
- Automatic Transmission Fluid (ATF) is 'fill for life'
- The torque converter features a controlled slip feature with electronically regulated control of lock-up, creating a smooth transition to the fully locked condition
- Shift programs controlled by the TCM
- ASIS (adaptive shift strategy), to provide continuous adaptation of shift changes to suit the driving style of the driver, which can vary from sporting to economical
- Connected to the ECM (engine control module) via the high speed CAN (controller area network) bus for communications
- Default mode if major faults occur
- Diagnostics available from the TCM via the high speed CAN bus.

The higher fuel efficiency of the ZF 8HP70 automatic transmission is mainly due to the following modifications:

- A wider ratio spread and more gears for better adaptation to ideal engine operating points
- Significantly reduced drag torque in the shift elements (only two open shift elements per gear)
- Use of a more efficient ATF (automatic transmission fluid) pump (double-stroke vane pump)
- Decoupling of the transmission when the vehicle is at standstill
- Improved torsion damping in the converter.

The transmission selections are made using the rotary JaguarDrive TCS (transmission control switch) in the floor console.

Refer to: External Controls (307-05, Description and Operation).

The 3.0L V6 S/C engine features stop/start technology on some models. To complement this, the 8 speed transmission, on vehicles with stop/start technology, is fitted with a Hydraulic Impulse Storage (HIS) device to ensure ATF is available to the shift elements as quickly as possible when the engine is started.

Two versions of the 8HP70 transmission are available; one version is for RWD (rear wheel drive) vehicles and the second is for AWD (all-wheel drive) vehicles. The transmission internals of both transmissions are similar.

PUBLISHED: 24-JUL-2012
2015.0 XJ RANGE (X351), 307-01

AUTOMATIC TRANSMISSION/TRANSAXLE - VEHICLES WITH: 8HP70 8-SPEED AUTOMATIC
TRANSMISSION RWD

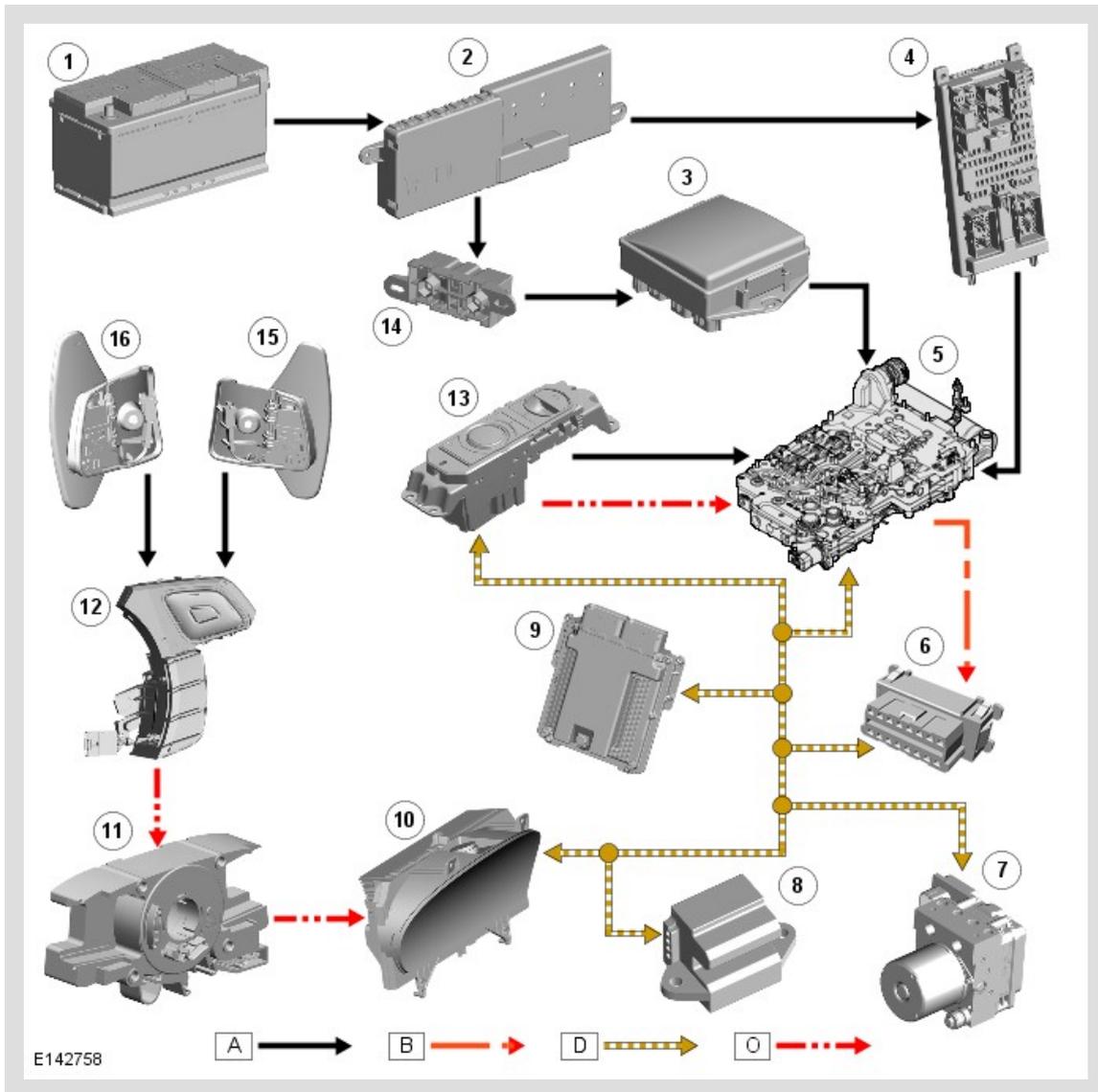
TRANSMISSION DESCRIPTION - SYSTEM OPERATION AND COMPONENT DESCRIPTION (G1520379)

DESCRIPTION AND OPERATION

CONTROL DIAGRAM

NOTE:

A = Hardwired; **B** = K Bus; **D** = High speed CAN bus; **O** = Local Interconnect Network (LIN) bus



ITEM	DESCRIPTION
1	Battery
2	Battery Junction Box (BJB) (250 A megafuse for EJB supply)
3	Engine Junction Box (EJB)
4	Central Junction Box (CJB)
5	Transmission Control Module (TCM)
6	Diagnostic socket
7	Anti-lock Brake system (ABS)
8	Steering angle sensor module

9	Engine Control Module (ECM)
10	Instrument cluster
11	Clockspring
12	Right steering wheel switchpack
13	Transmission Control Switch (TCS)
14	Megafuse (500A)
15	Paddle switch - upshift
16	Paddle switch - downshift

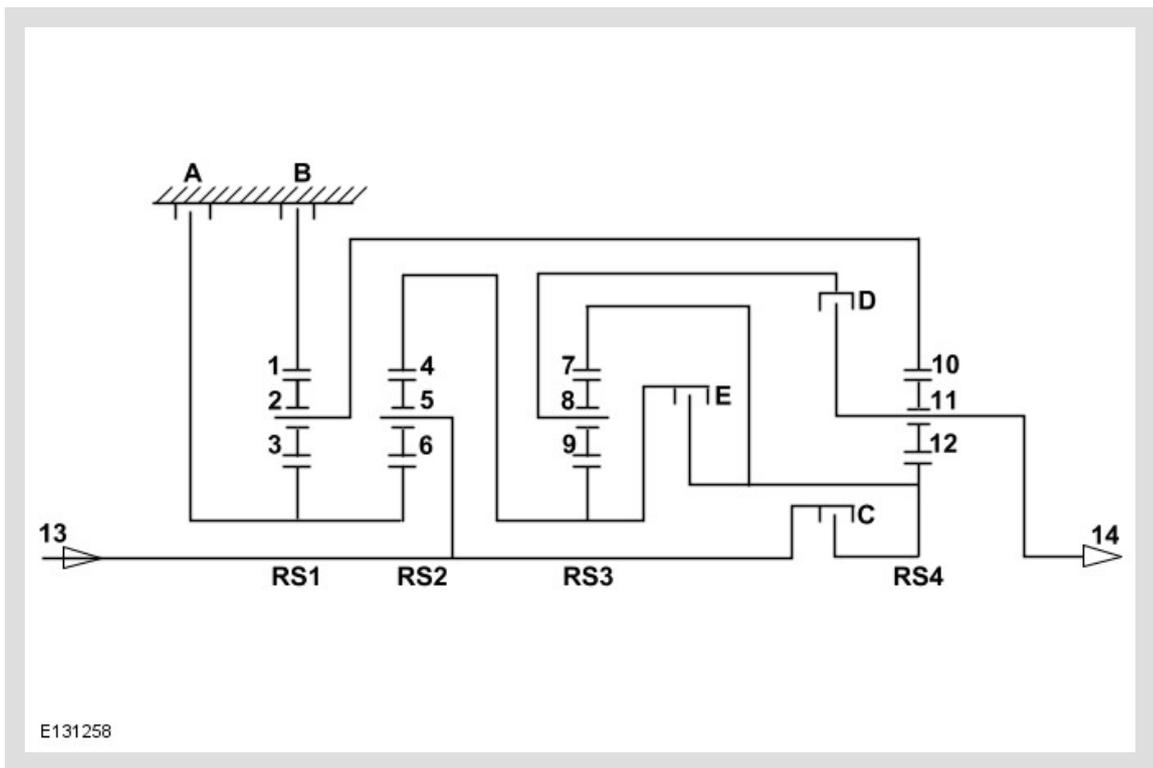
SYSTEM OPERATION

OPERATION

Power Flows

Operation of the transmission is controlled by the TCM (transmission control module) , which electrically activates various solenoids to control the transmission gear selection. The sequence of solenoid activation is based on programmed information in the TCM memory and physical transmission operating conditions such as vehicle speed, throttle position, engine load and TCS (transmission control switch) position.

All gear shifts from 1st to 8th and 8th to 1st are known as 'overlap' shifts. Overlap shifts are during a gear shift and one clutch must remain capable of transmitting torque at a reduced main pressure until the other clutch is ready to accept the torque.

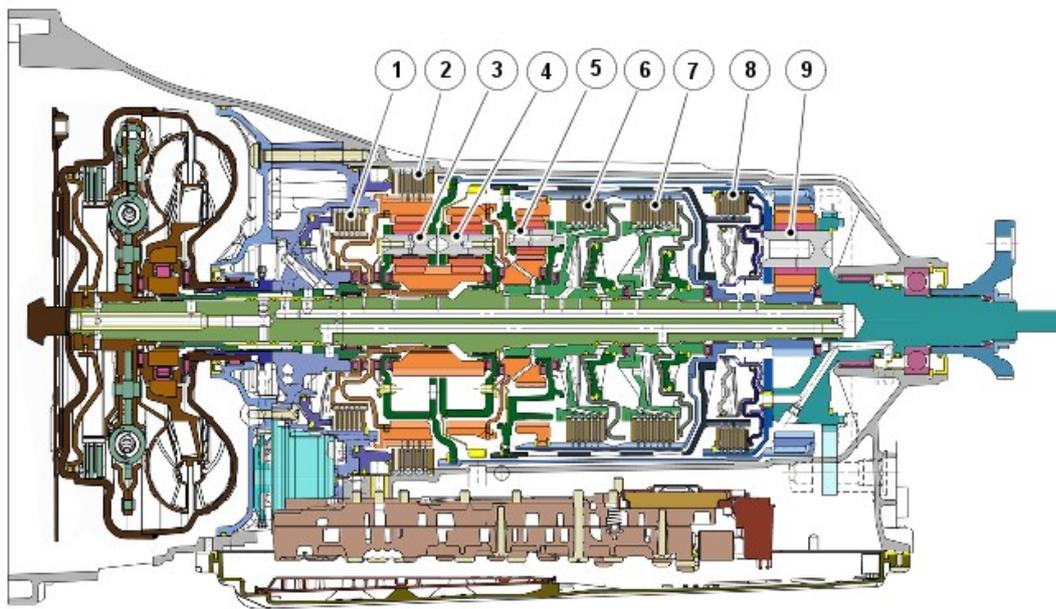


ITEM	DESCRIPTION
A	Multiplate brake
B	Multiplate brake
C	Multiplate clutch
D	Multiplate clutch
E	Multiplate clutch
1	Ring gear of planetary gear set 1
2	Planetary gears of planetary gear set 1
3	Sun gear of planetary gear set 1
4	Ring gear of planetary gear set 2
5	Planetary gears of planetary gear set 2
6	Sun gear of planetary gear set 2
7	Ring gear of planetary gear set 3
8	Planetary gears of planetary gear set 3
9	Sun gear of planetary gear set 3
10	Ring gear of planetary gear set 4
11	Planetary gears of planetary gear set 4
12	Sun gear of planetary gear set 4
13	Power input from torque converter
14	Power output to output shaft

Engine torque is transferred, via operation of single or combinations of clutches to the 4 planetary gear trains. All gear trains are controlled by reactionary inputs from brake clutches to produce the 8 forward gears and 1 reverse gear. The ratios are as follows:

GEAR	1ST	2ND	3RD	4TH	5TH	6TH	7TH	8TH	REVERSE
Ratio	4.714	3.143	2.106	1.667	1.285	1.000	0.839	0.667	3.317

Shift Elements



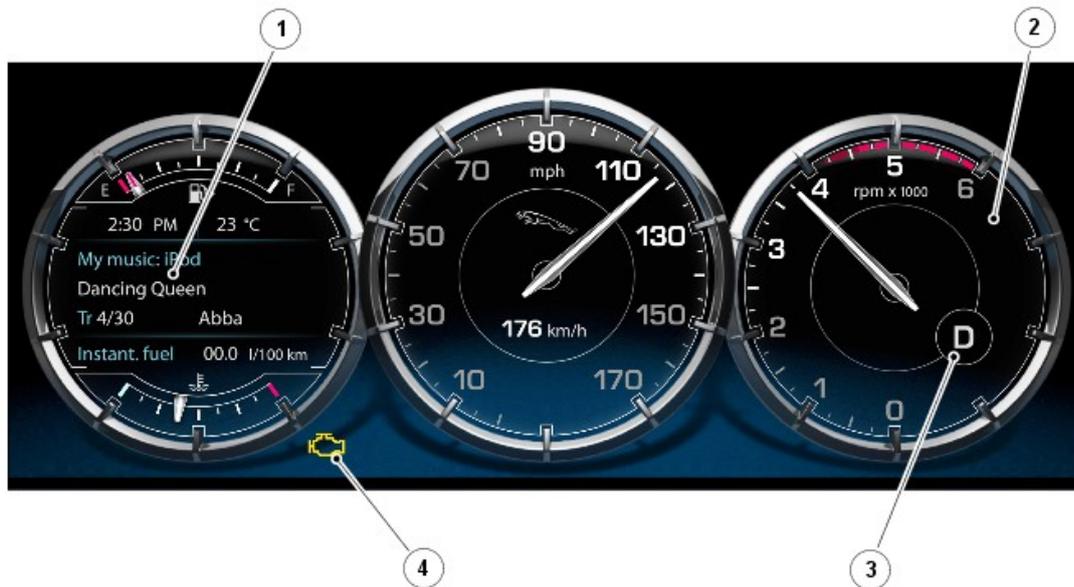
E137676

ITEM	DESCRIPTION
1	Brake A
2	Brake B
3	Gear set 1
4	Gear set 2
5	Gear set 3
6	Clutch E
7	Clutch C
8	Clutch D
9	Gear set 4

The shift elements, clutches and brakes are actuated hydraulically. Fluid pressure is applied to the required clutch and/or brake, pressing the plates together and allowing drive to be transmitted through the plates. The purpose of the shift elements is to perform power-on shifts with no interruption to traction and smooth transition between gear ratios.

Instrument Cluster

Instrument Cluster in Standard mode



E122722

ITEM	DESCRIPTION
1	Information display
2	Tachometer/Message center
3	Transmission status display
4	Malfunction Indicator Lamp (MIL)

The instrument cluster is connected to the TCM via the high speed CAN (controller area network) bus. Transmission status is transmitted by the TCM and displayed to the driver in the instrument cluster. Refer to: Instrument Cluster (413-01, Description and Operation).

Malfunction Indicator Lamp (MIL)

Transmission related faults that effect the vehicle emissions output will illuminate the MIL (malfunction indicator lamp) . The MIL is illuminated by the ECM (engine control module) on receipt of a relevant fault message from the TCM on the high speed CAN bus. The nature of the fault can be diagnosed using a Jaguar approved diagnostic system, which reads the fault codes stored in the TCM memory.

Transmission Status Display

The transmission status display is located in the tachometer. The display shows the JaguarDrive TCS position. When the transmission is in the Jaguar sequential shift mode the current gear is displayed in the information window.

Message Center

The message center is located in the instrument cluster. The message center is a Thin Film Transistor display that relays vehicle status and operating information to the driver and can display messages relating to a number of vehicle systems. If a transmission fault occurs, the message GEARBOX FAULT

is displayed in the message center.

Refer to: Information and Message Center (413-08, Description and Operation).

Transmission Control Module (TCM)

The TCM outputs signals to control the shift control solenoid valves and the EPRS's to control the hydraulic operation of the transmission.

The TCM processes signals from the transmission speed and temperature sensors, the TCS , the ECM and other vehicle systems. From the received signal inputs and pre-programmed data, the TCM calculates the correct gear, torque converter clutch setting and optimum pressure settings for gear shift and lock-up clutch control.

The ECM supplies the engine management data over the high speed CAN bus. The TCM requires engine data to efficiently control the transmission operation, for example; flywheel torque, engine speed, accelerator pedal angle, engine temperature. The steering angle sensor and the ABS (anti-lock brake system) module also supply data to the TCM on the high speed CAN bus. The TCM uses data from these systems to suspend gear changes when the vehicle is cornering and/or the ABS module is controlling braking or traction control.

The CJB (central junction box) supplies steering wheel paddle data over the high speed CAN bus. The TCM uses this to schedule driver requested upshifts and downshifts.

Using the signal inputs and the memorized data, the TCM control program computes the correct gear and torque converter lock-up clutch setting and the optimum pressure settings for gear shift and lock-up clutch control. Special output-side modules (power output stages, current regulator circuits), allow the TCM to control the solenoid valves and pressure regulators and consequently precisely control the hydraulics of the automatic transmission. In addition, the amount and duration of engine interventions are supplied to the engine management by way of the CAN bus.

The TCM determines the position of the TCS using signals from the TCS on the high speed CAN bus and LIN (local interconnect network) bus.

The TCM transmits the position of the TCS and any manual gear selected on the high speed CAN bus. This information is shown in the gear selector display in the instrument cluster.

Engine Stall

If the vehicle stalls it will coast down in gear, with the transmission providing drive to the engine. A restart can be attempted at this point and the engine may start and the driver can continue.

If the coast down speed reduces such that the speed of the engine is less than 400 rev/min, the transmission will go to neutral, D illumination will flash in the instrument cluster. The driver needs to select neutral or park and then press the brake pedal to restart the engine.

If the start/stop button is pressed when driving, the message ENGINE STOP BUTTON PRESSED is displayed in the message center but there will be no change to the ignition state. If the driver requires to switch off the engine, the start/stop button must be pressed for a second time. The engine will be stopped and will be back driven by the transmission as the vehicle coasts down.
