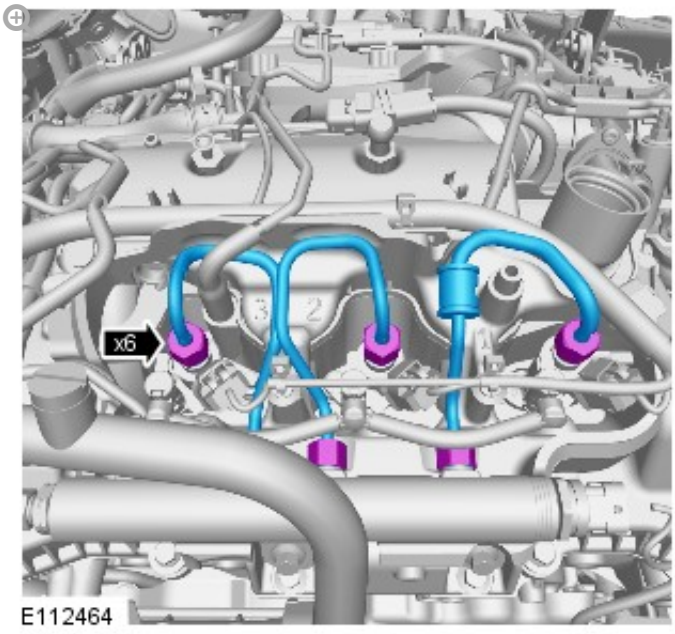
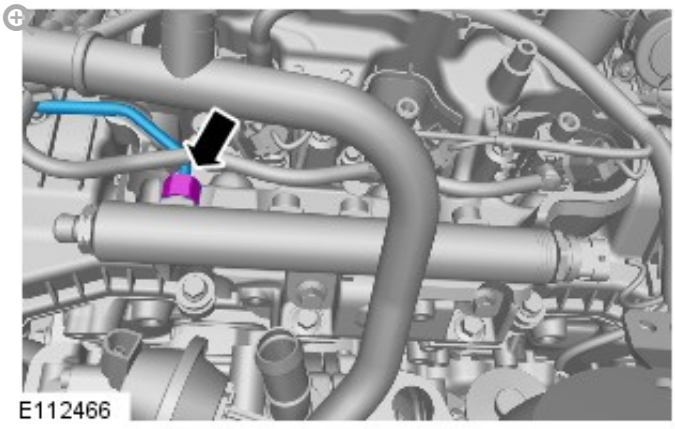
15.



- Stage 1:Tighten the high-pressure fuel supply line unions at the fuel rail to 15Nm.
- Stage 2: Tighten the high-pressure fuel supply line unions at the injector to 15Nm.

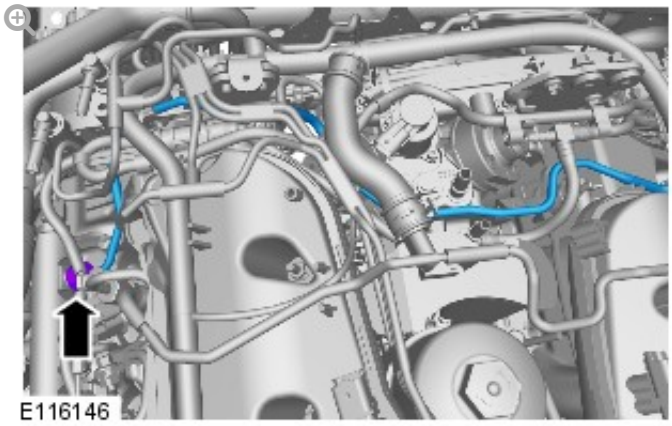
16.



Tighten the high-pressure fuel lines union to 15Nm.

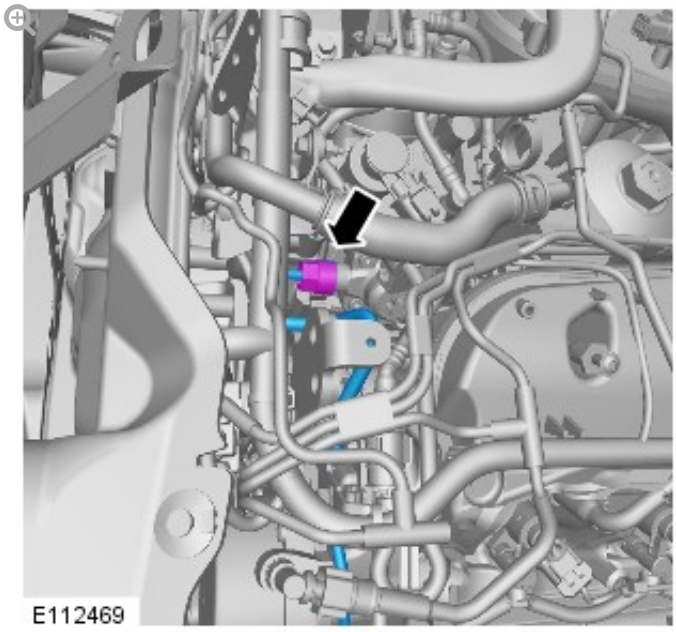
17.

Make sure that a new component is installed.



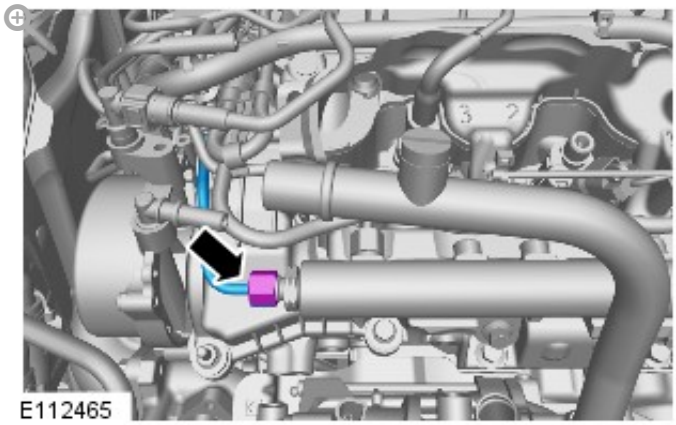
Tighten the high-pressure fuel lines union to 15Nm.

18.



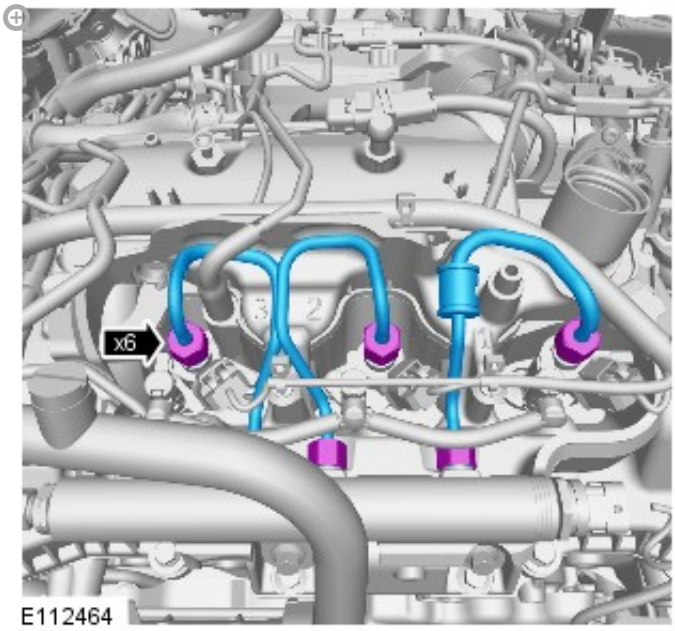
Tighten the high-pressure fuel lines union to 15Nm.

19.



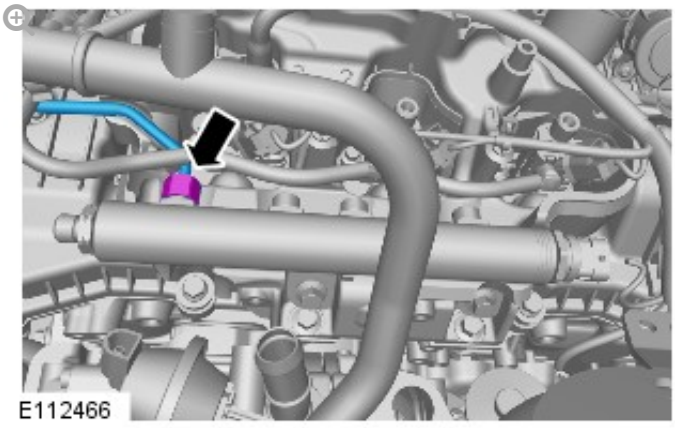
Tighten the high-pressure fuel lines union to 15Nm.

20.



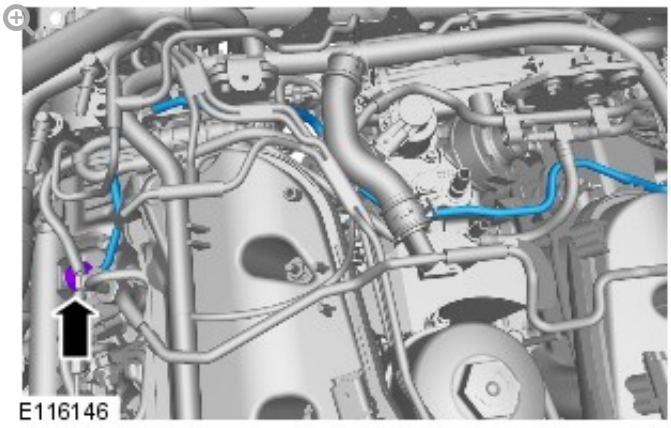
- Stage 1: Tighten the high-pressure fuel supply line unions at the fuel rail to 30Nm.
- Stage 2: Tighten the high-pressure fuel supply line unions at the injector to 30Nm.

21.



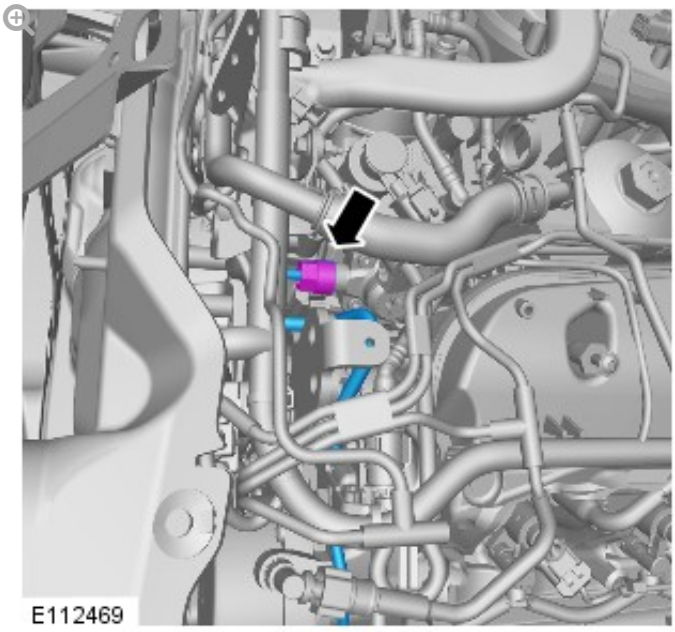
Tighten the high-pressure fuel line union to 30Nm.

22.



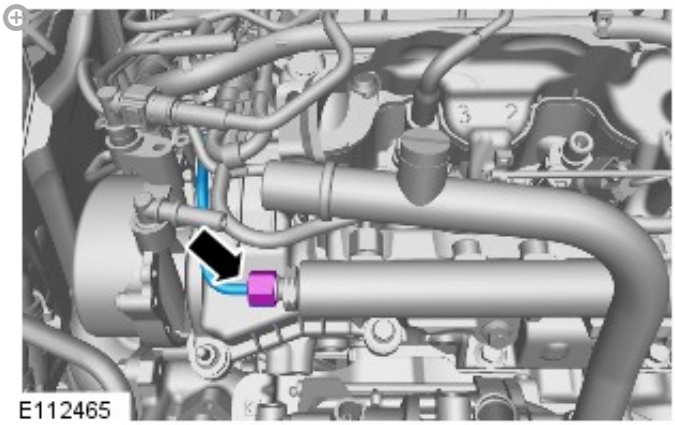
Tighten the high-pressure fuel line union to 30Nm.

23.



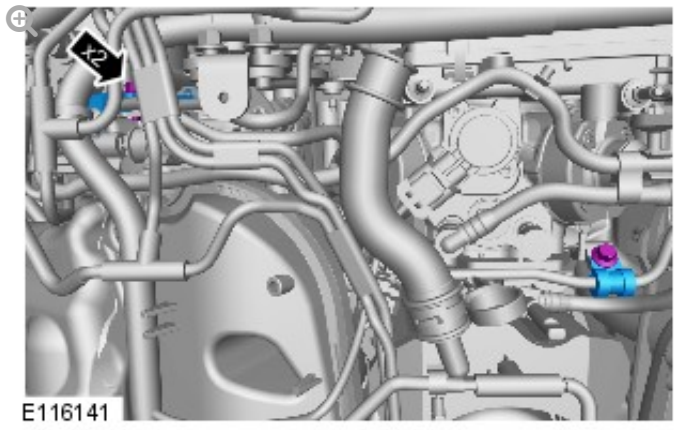
Tighten the high-pressure fuel line union to 30Nm.

24.



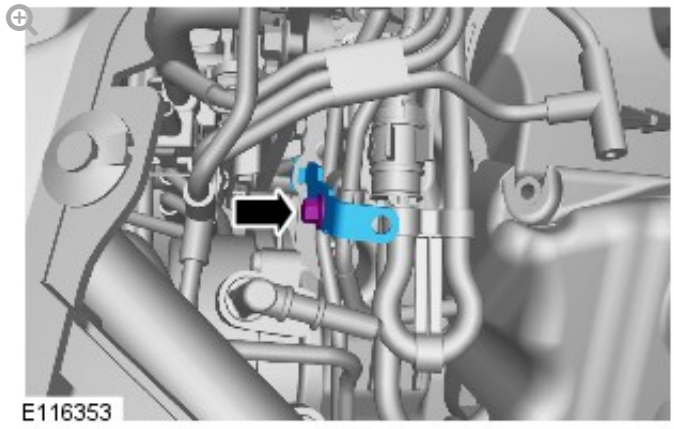
Tighten the high-pressure fuel line union to 30Nm.

25.



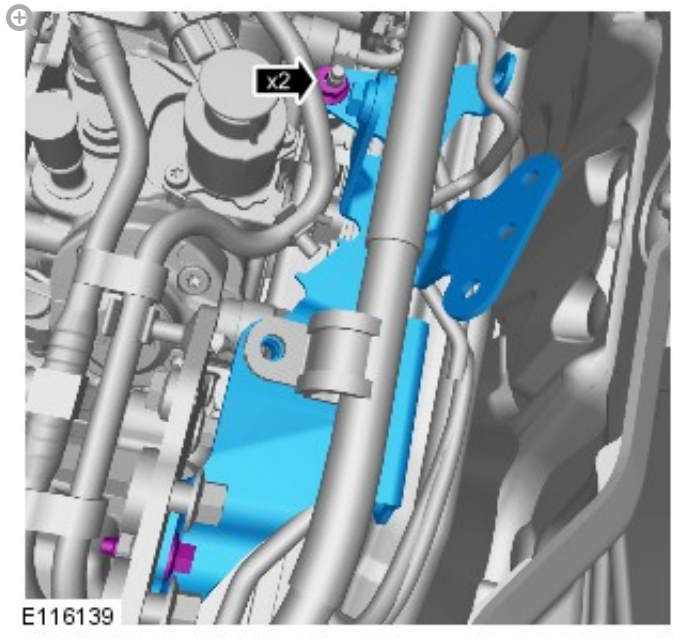
Torque: **10 Nm**

26.



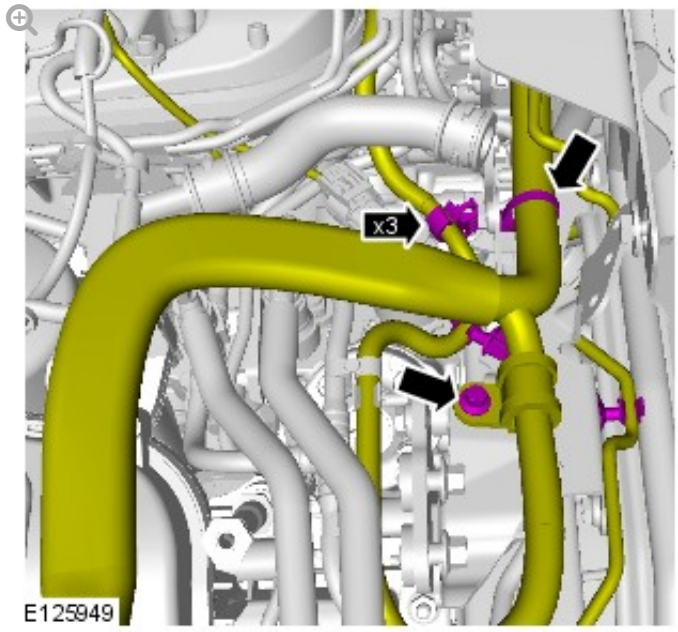
Torque: **10 Nm**

27.



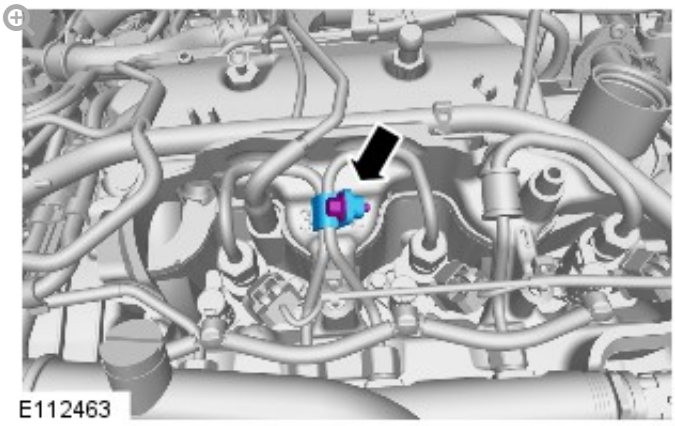
Torque: **10 Nm**

28.



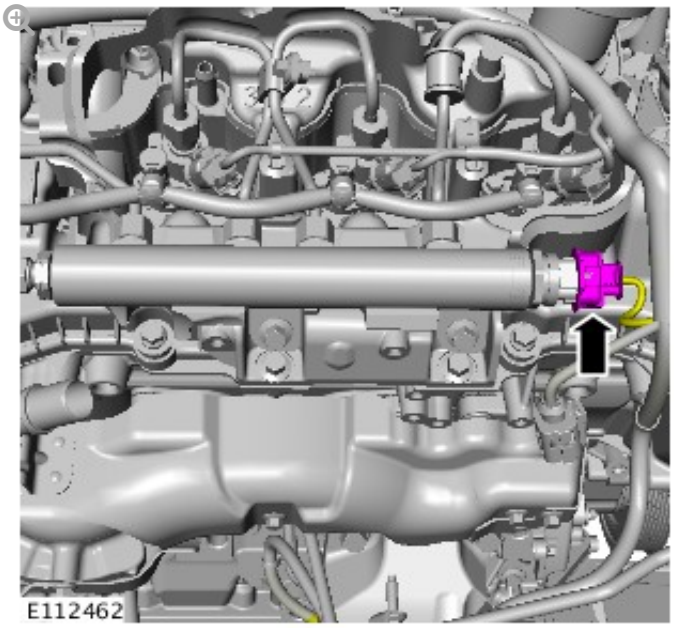
Torque: **10 Nm**

29.

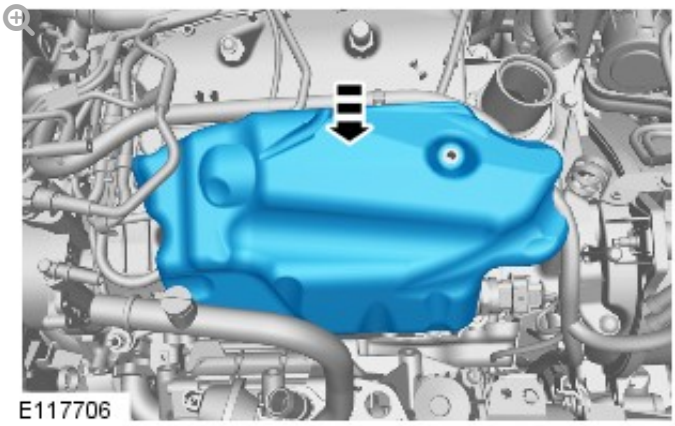


Torque: **10 Nm**

30.

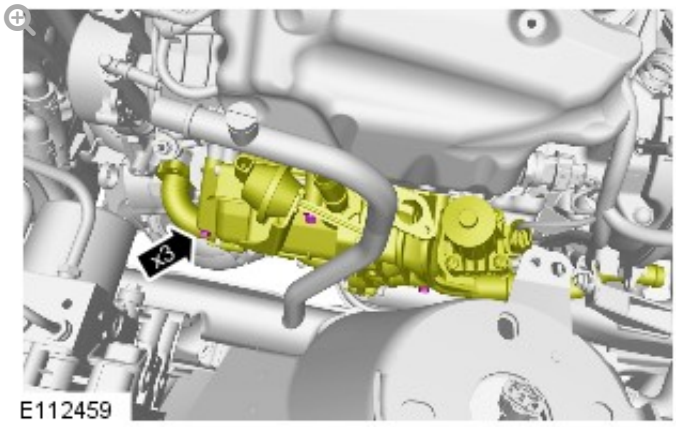


31.



32.

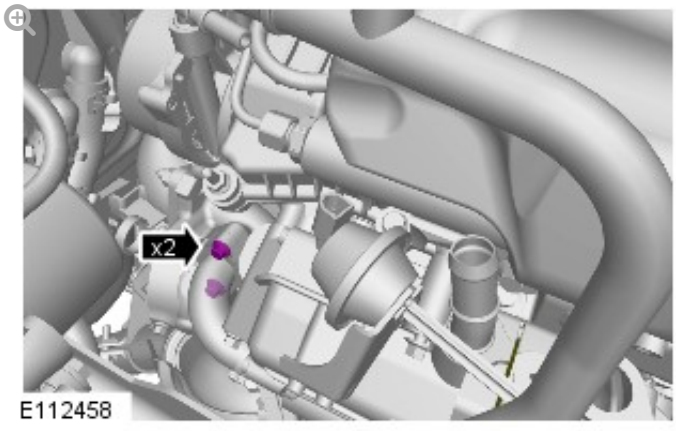
Only tighten the bolts finger-tight at this stage.



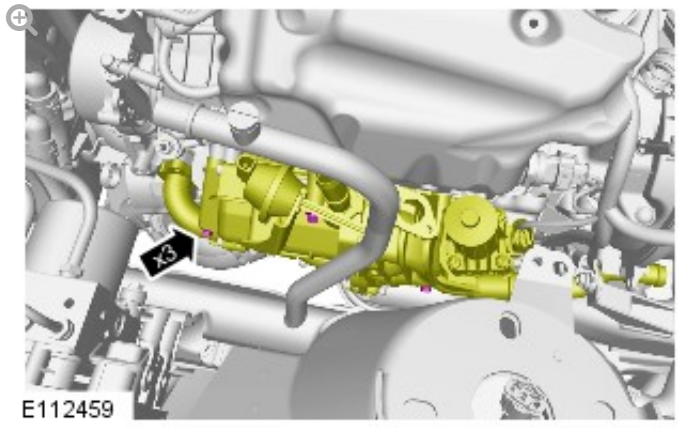
33.

Only tighten the bolts finger-tight at this stage.

Install a new gasket.

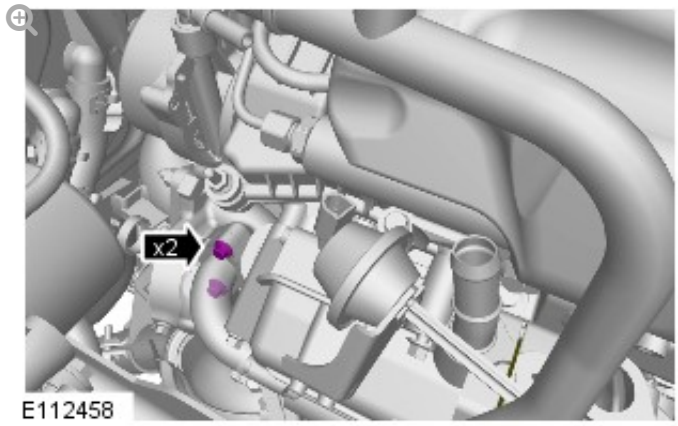


34.



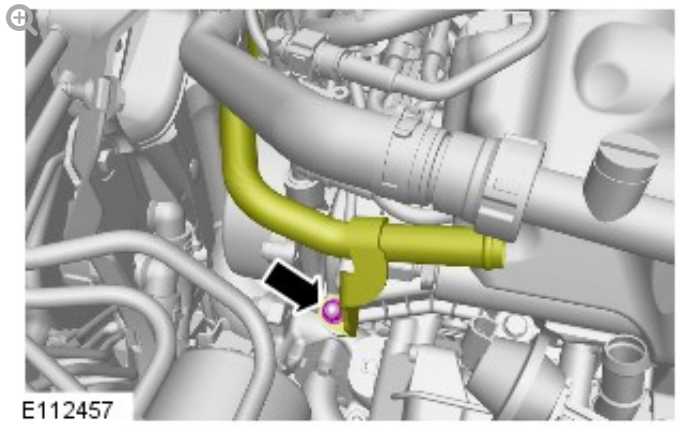
Torque: **10 Nm**

35.



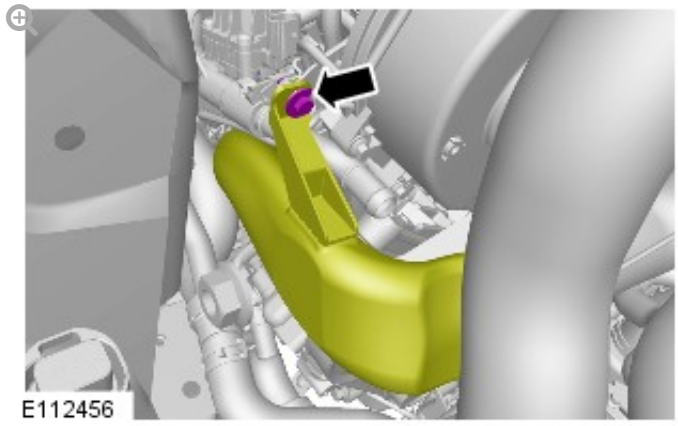
Torque: **10 Nm**

36.



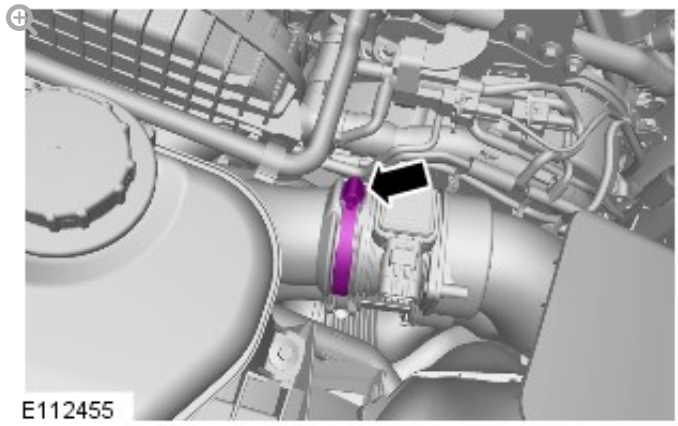
Torque: **10 Nm**

37.



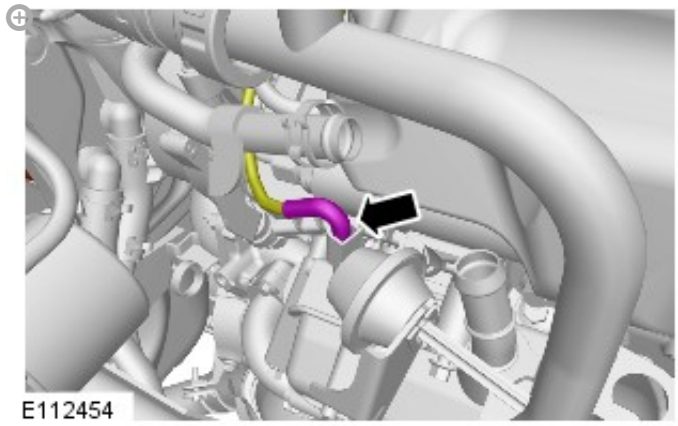
Torque: **10 Nm**

38.

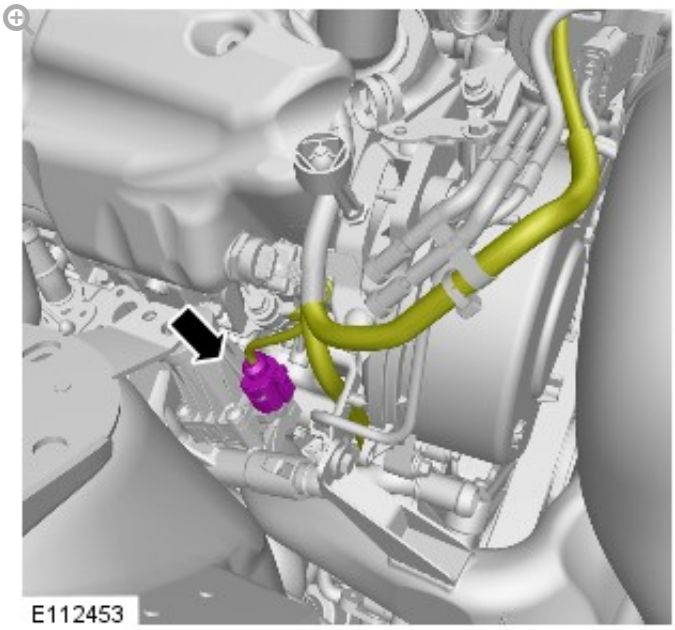


Torque: **7 Nm**

39.

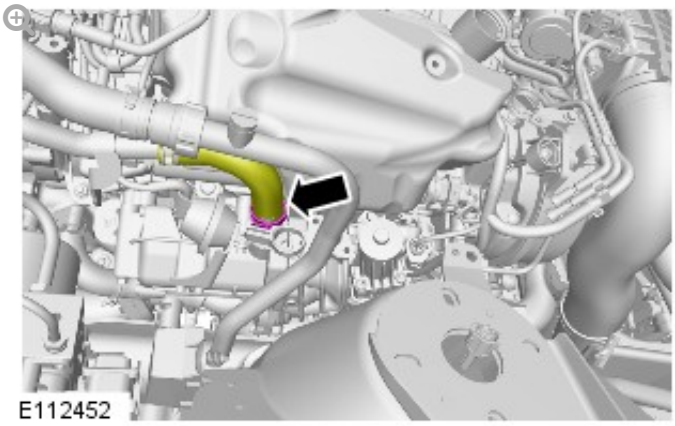


40.



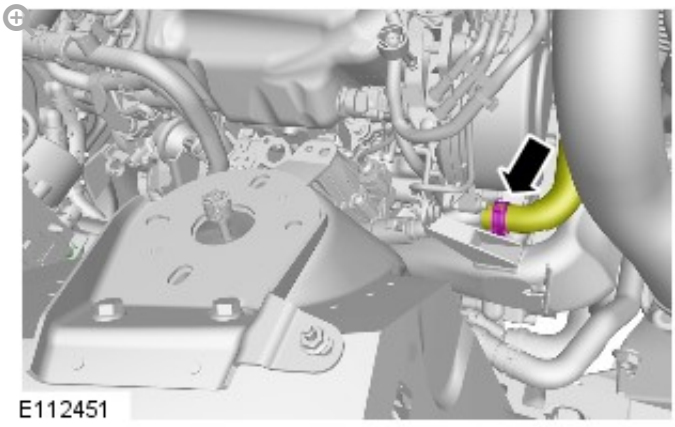
E112453

41.



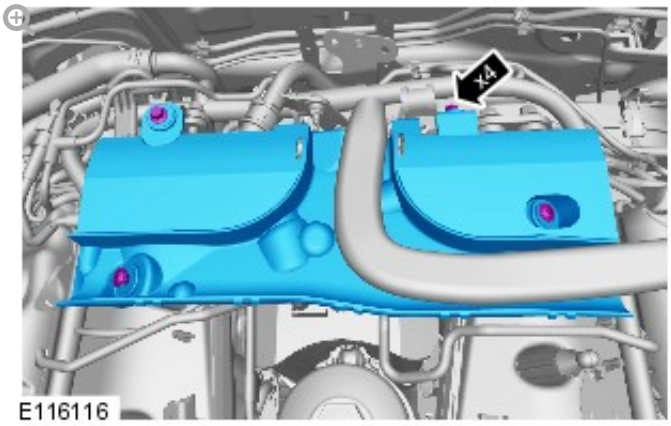
E112452

42.



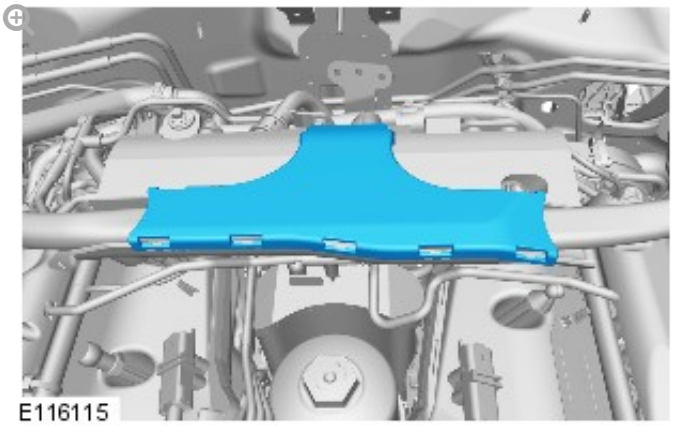
E112451

43.



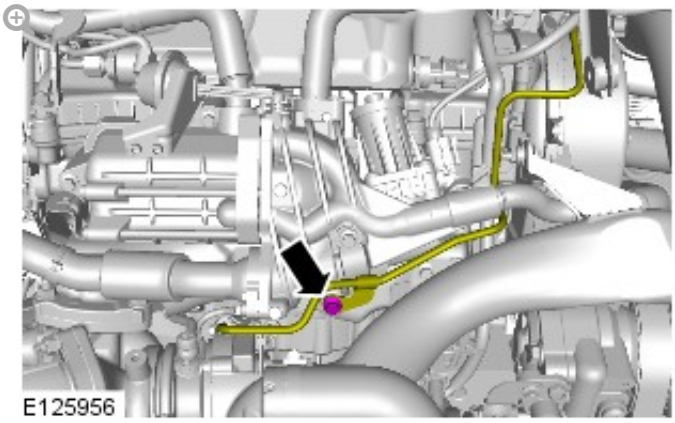
Torque: **10 Nm**

44.



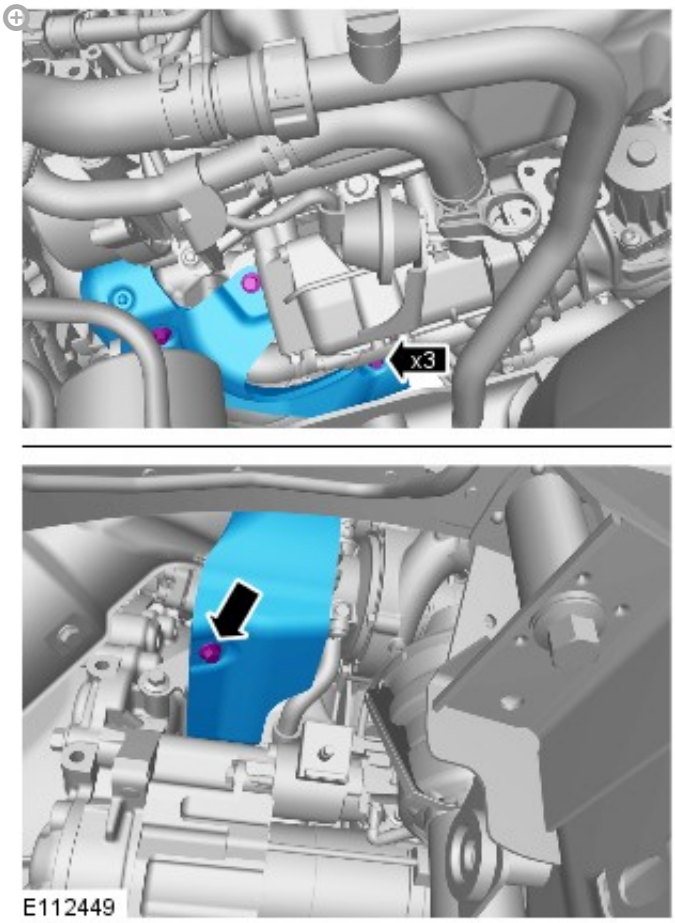
45.

Engine shown removed for clarity.



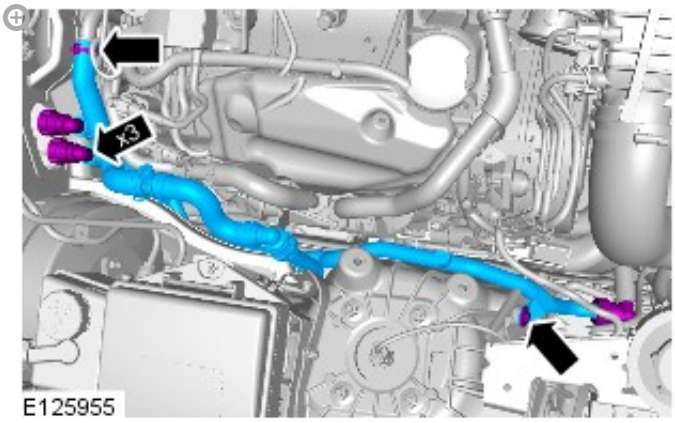
Torque: **10 Nm**

46.



Torque: **10 Nm**

47.



48. Refer to: Cooling System Partial Draining and Vacuum Filling (303-03A Engine Cooling - TDV6 3.0L Diesel, General Procedures).

49. Refer to: Right Exhaust Gas Recirculation Valve Outlet Tube (303-08A

Engine Emission Control - TDV6 3.0L Diesel, Removal and Installation).

50. Refer to: Secondary Bulkhead Right Panel (501-02 Front End Body Panels, Removal and Installation).

51. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

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

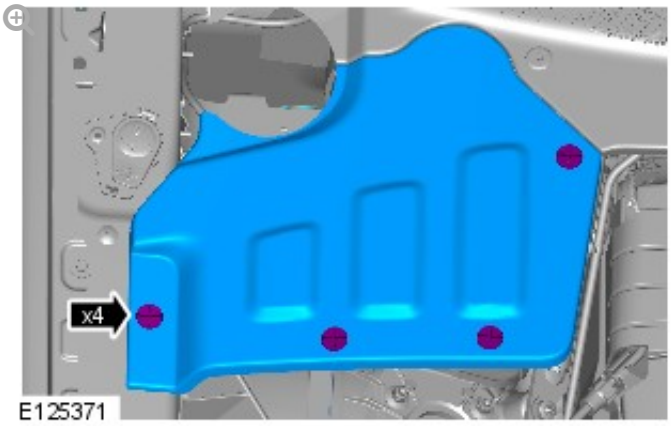
ENGINE EMISSION CONTROL - TDV6 3.0L DIESEL

RIGHT EXHAUST GAS RECIRCULATION VALVE OUTLET TUBE [G1271860]

REMOVAL

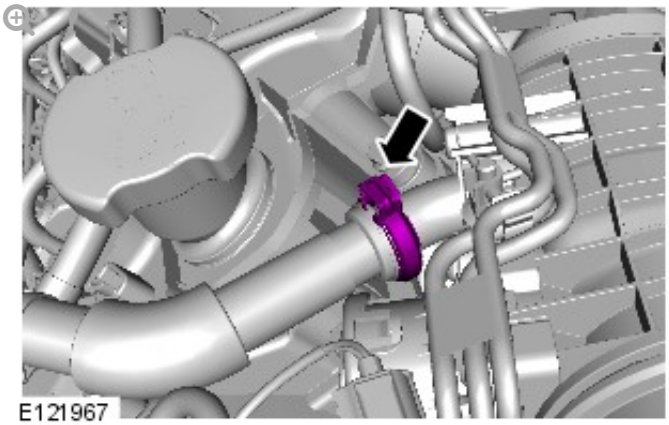
Some variation in the illustrations may occur, but the essential information is always correct.

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

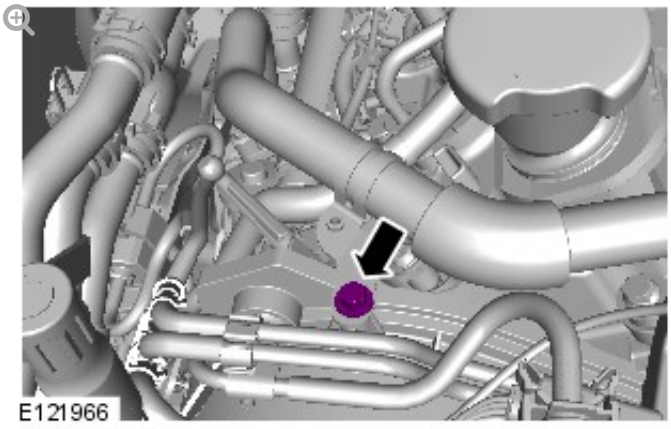
2. 

3.

Discard the retaining clips.



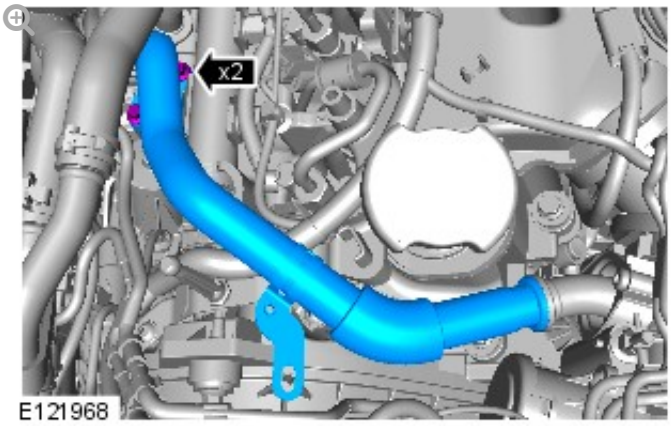
4.



5.

Make sure that all openings are sealed.

Discard the gasket.

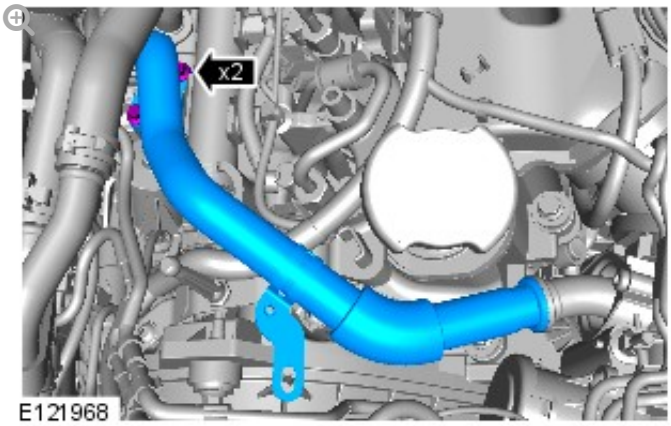


INSTALLATION

1.

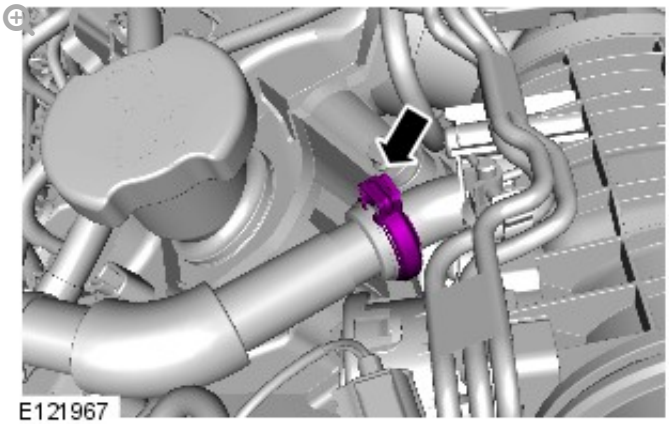
Only tighten the bolts finger-tight at this stage.

Install a new gasket.

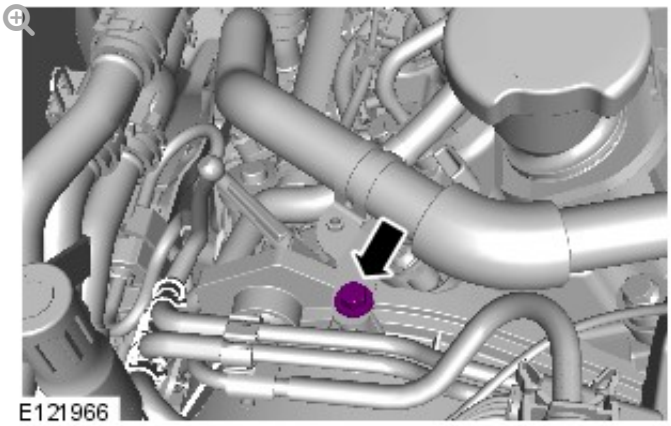


2.

Install a new clamp. Close the clamp to the first audible click by hand. Making sure that the clamp is in a central position to the joint, close to the second audible click using a suitable tool.

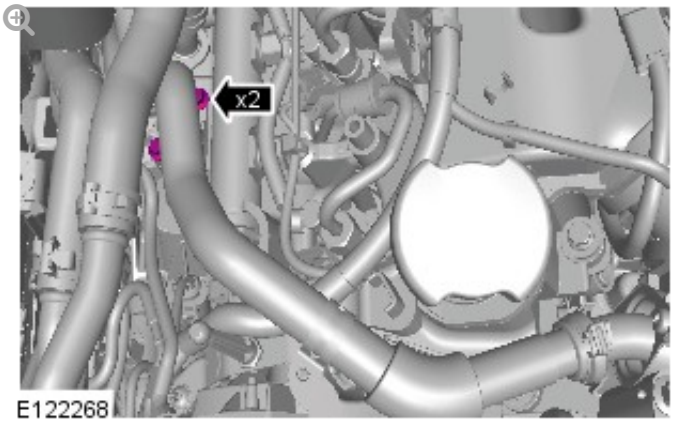


3.



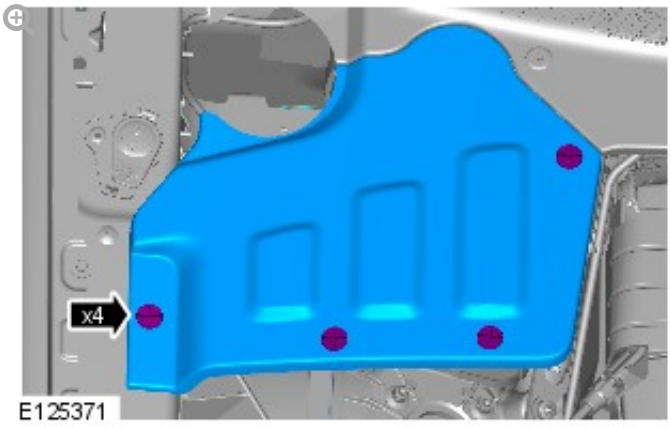
Torque: **5 Nm**

4.



Torque: **10 Nm**

5.

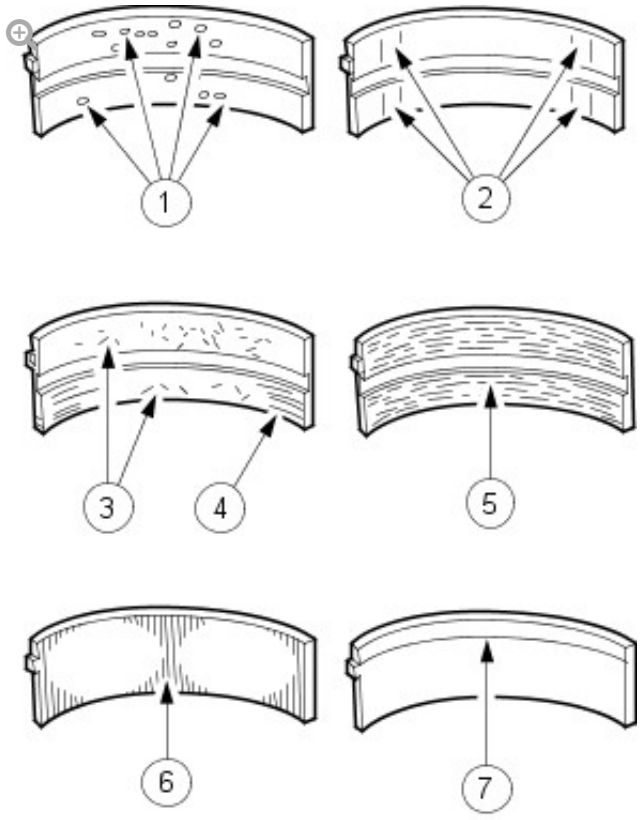


6. Refer to: Engine Cover - TDV6 3.0L Diesel (501-05 Interior Trim and Ornamentation, Removal and Installation).

ENGINE SYSTEM - GENERAL INFORMATION

BEARING INSPECTION [G61255]

1.



VUJ0002219

Inspect bearings for the following defects.

Cratering - fatigue failure

Spot polishing - incorrect seating.

Imbedded dirt engine oil.

Scratching - dirty engine oil.

Base exposed - poor lubrication.

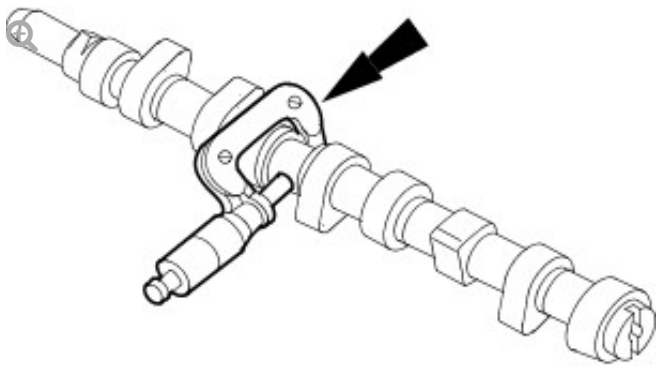
Both edges worn - journal damaged.

One edge worn - journal tapered or bearing not seated.

ENGINE SYSTEM - GENERAL INFORMATION

CAMSHAFT BEARING JOURNAL DIAMETER [G61234]

1.



VUJ0001695

Determine the diameter of the camshaft journals.

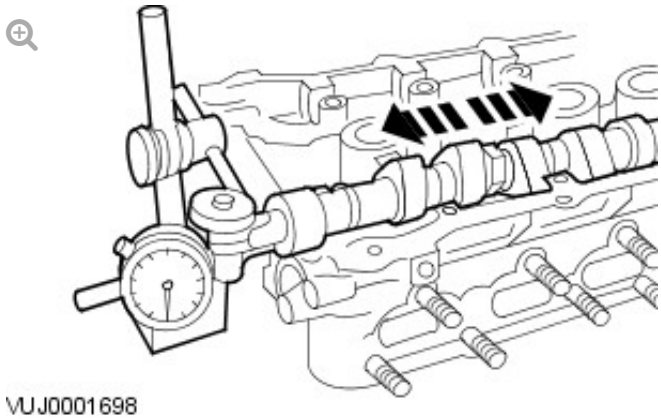
- Using a micrometer measure the diameter at 90 degrees intervals to determine if the journals are out-of-round.
- Measure at two different points on the journal to determine if there is any tapering.
- If the measurements are out of the specified range, install a new camshaft.

ENGINE SYSTEM - GENERAL INFORMATION

CAMSHAFT END PLAY [G61236]

1.

Make sure that the camshaft is to specification.



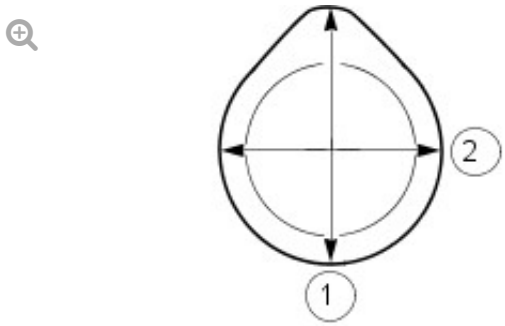
Using the special tool, measure the end play.

- Slide the camshaft in both directions. Read and note the maximum and minimum values on the dial indicator gauge.
  - End play = maximum value minus minimum value.
- If the measurement is out of specification, install new components.

ENGINE SYSTEM - GENERAL INFORMATION

CAMSHAFT LOBE LIFT [G61238]

1.

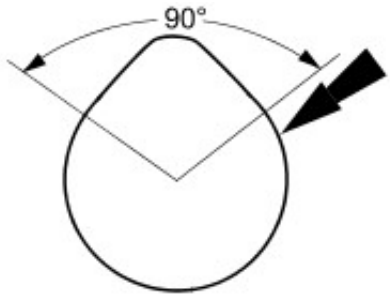


Measure the diameter (1) and diameter (2) with a vernier caliper. The difference in measurements is the lobe lift.

ENGINE SYSTEM - GENERAL INFORMATION

CAMSHAFT SURFACE INSPECTION [G61237]

1.



Inspect camshaft lobes for pitting or damage in the active area. Minor pitting is acceptable outside the active area.

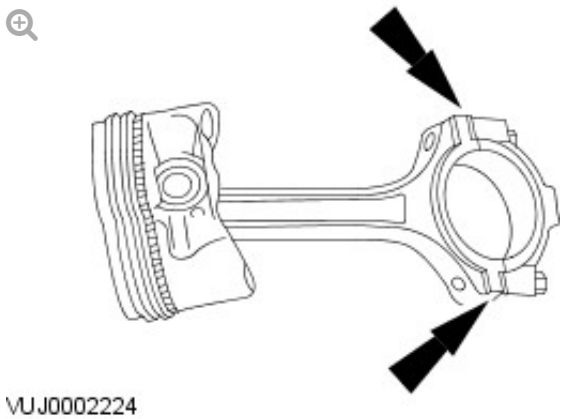
ENGINE SYSTEM - GENERAL INFORMATION

CONNECTING ROD CLEANING

[G61251]

1.

Do not use a caustic cleaning solution or damage to connecting rods may occur.



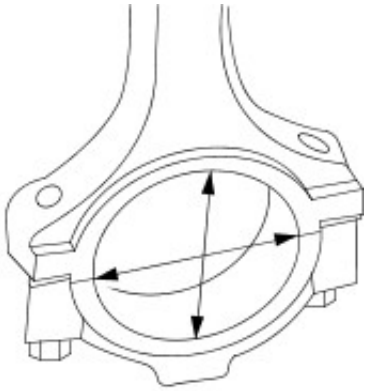
VUJ0002224

Mark and separate the parts and clean with solvent. Clean the oil passages.

ENGINE SYSTEM - GENERAL INFORMATION

CONNECTING ROD LARGE END BORE [G61252]

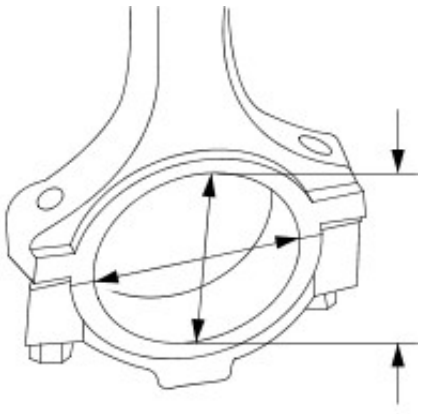
1.



VUJ0002223

Measure the bearing bore in two directions. The difference is the connecting rod bore out-of-round. Verify the out-of-round is within specification.

2.



VUJ0002222

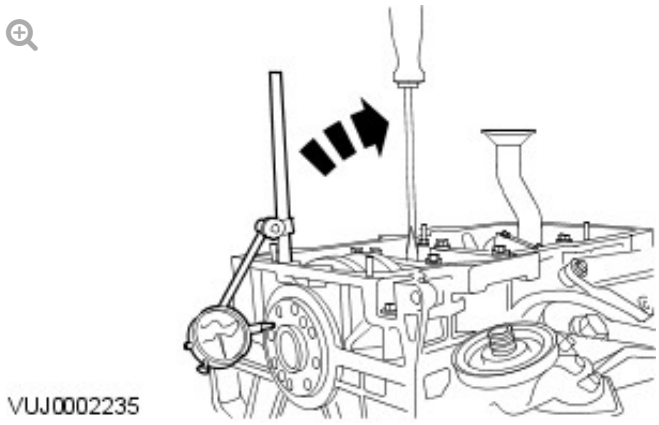
Measure the bearing bore diameter in two directions. Verify the

bearing bore is within specification.

ENGINE SYSTEM - GENERAL INFORMATION

CRANKSHAFT END PLAY [G61242]

1.



Using the Dial Indicator Gauge with Brackets, measure the end play.

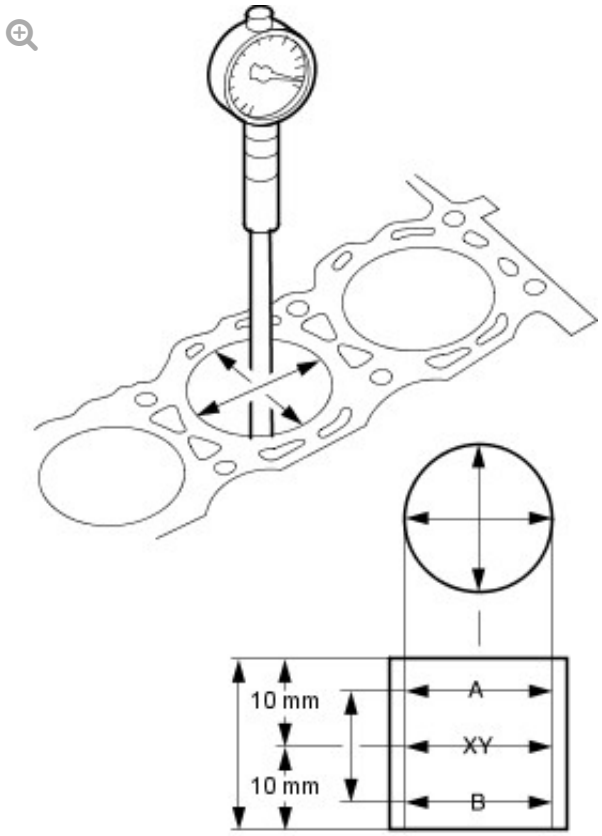
- Measure the end play by lifting the crankshaft using a lever.
- If the value is out of the specification, install new thrust half rings to take up the end float and repeat the measurement.

ENGINE SYSTEM - GENERAL INFORMATION

CYLINDER BORE OUT-OF-ROUND [G61243]

1.

The main bearing caps or lower crankcase must be in place and tightened to the specified torque; however, the bearing shells should not be installed.



VUJ0002234

Measure the cylinder bore with an internal micrometer.

- Carry out the measurements in different directions and at different heights to determine if there is any out-of-roundness or tapering.
- If the measurement is out of the specified range, hone out the cylinder block or install a new block.

ENGINE SYSTEM - GENERAL INFORMATION

CYLINDER COMPRESSION TEST - TDV6 3.0L DIESEL [G1716514]

SPECIAL TOOL(S)

JLR-303-1623-2

Adaptor, Compression Tester

JLR-303-1629

SP 90 Degree Elbow, Compression Tester

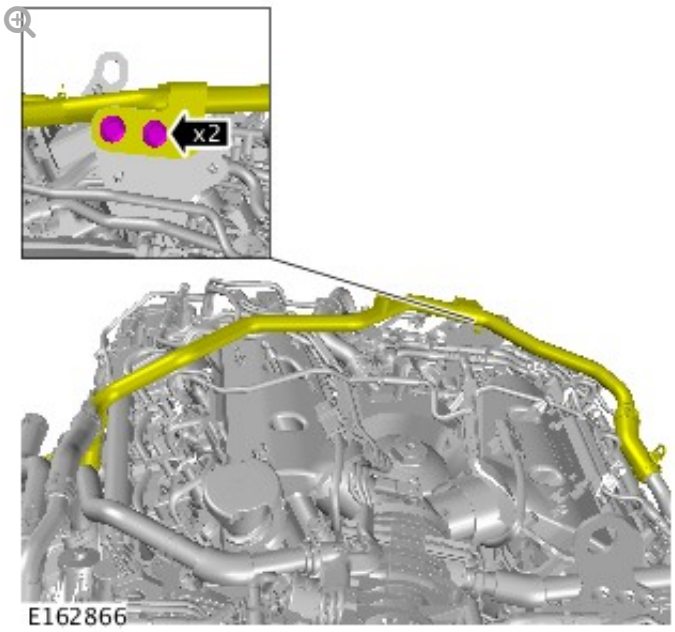
CHECK

Before disconnecting or removing components, make sure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.
- The vehicle battery must be in good condition and fully charged before carrying out this procedure.

1. Refer to: Glow Plugs (303-07B Glow Plug System - TDV6 3.0L Diesel, Removal and Installation).

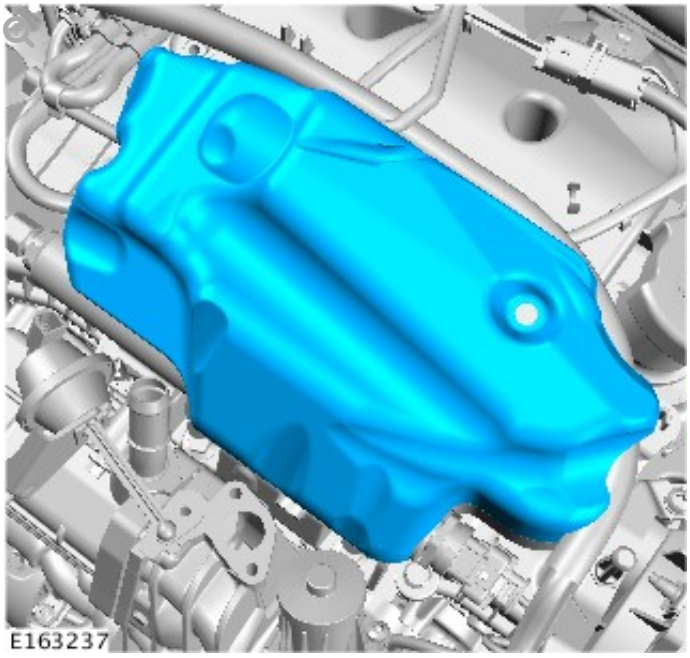
2.



Torque: **10 Nm**

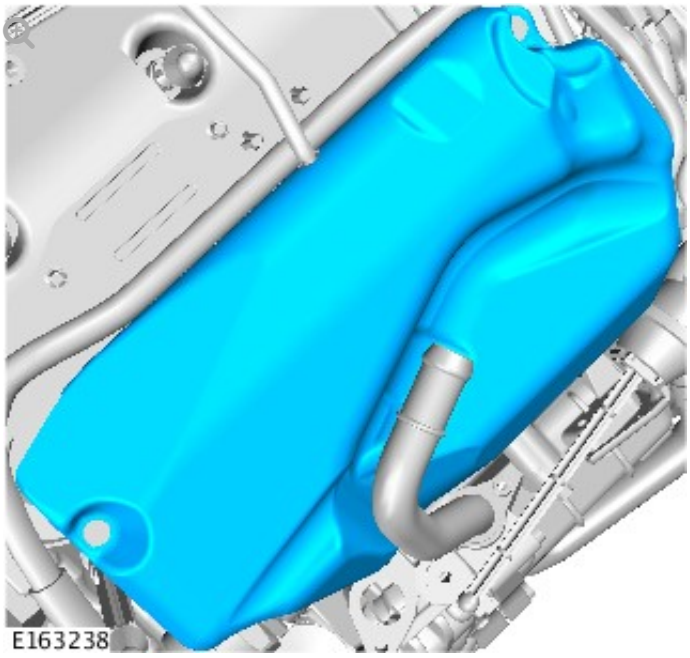
3.

Some components shown removed for clarity.



4.

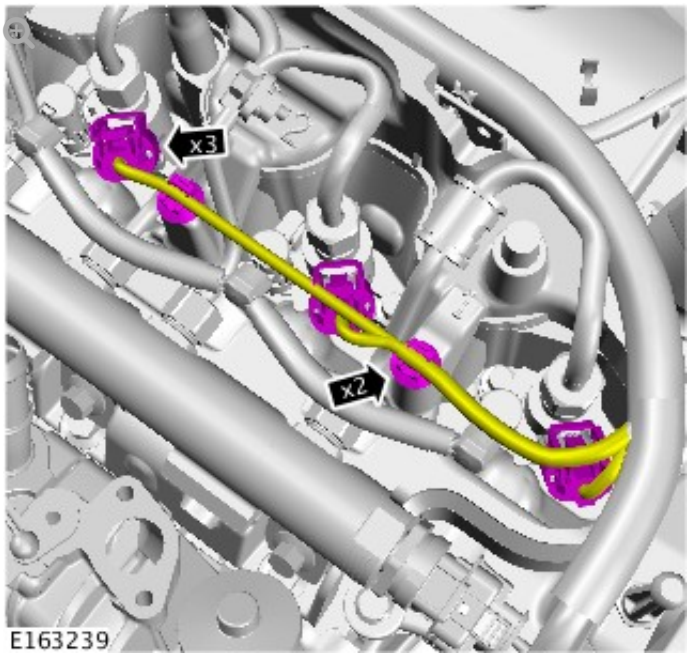
Some components shown removed for clarity.



5.

Make sure the fuel injection system is disabled before carrying out a cylinder compression test. Failure to follow this step may result in damage to the vehicle.

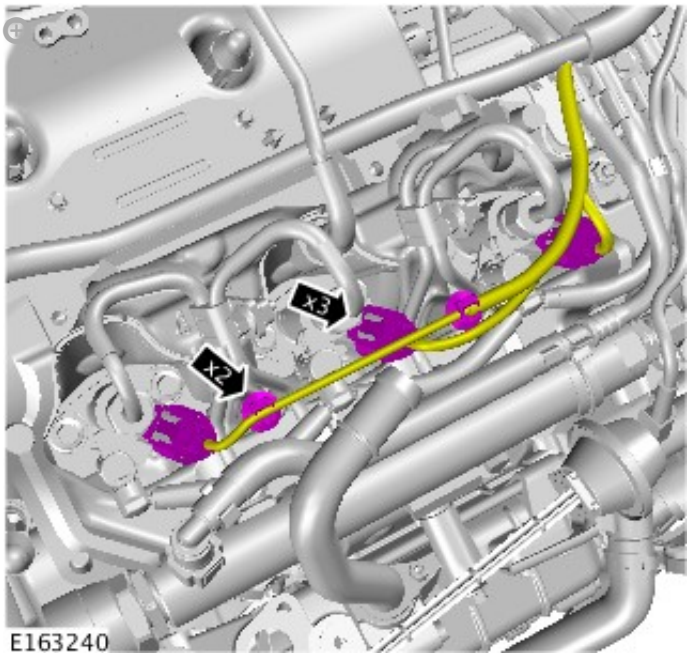
Some components shown removed for clarity.



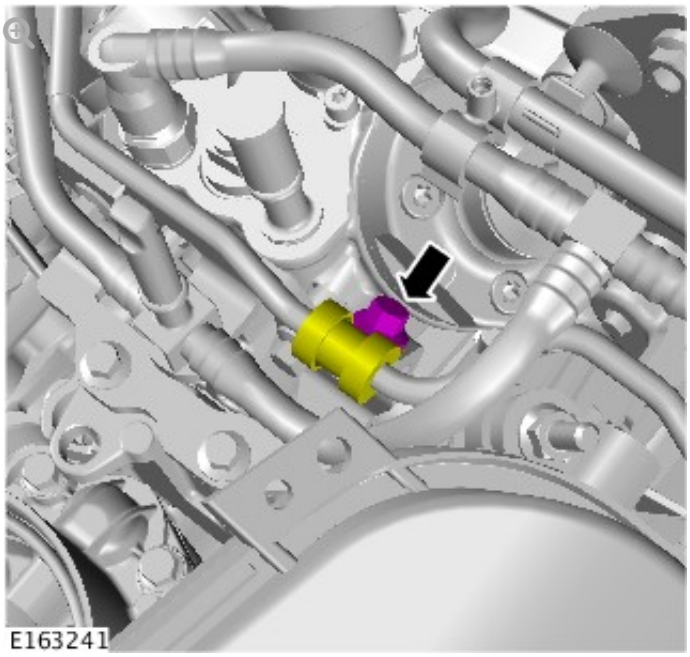
6.

Make sure the fuel injection system is disabled before carrying out a cylinder compression test. Failure to follow this step may result in damage to the vehicle.

Some components shown removed for clarity.

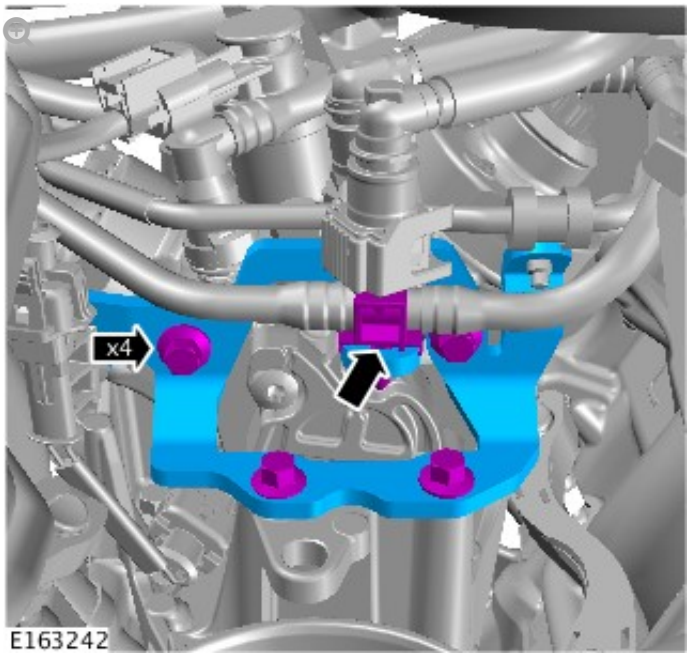


7.



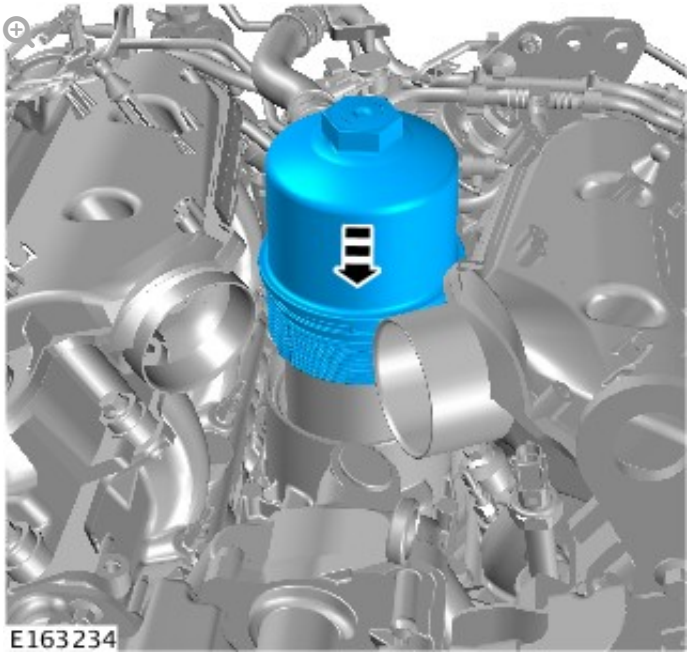
Torque: **10 Nm**

8.



Torque: **10 Nm**

9.



Install the oil filter element and housing.

Torque: **28 Nm**

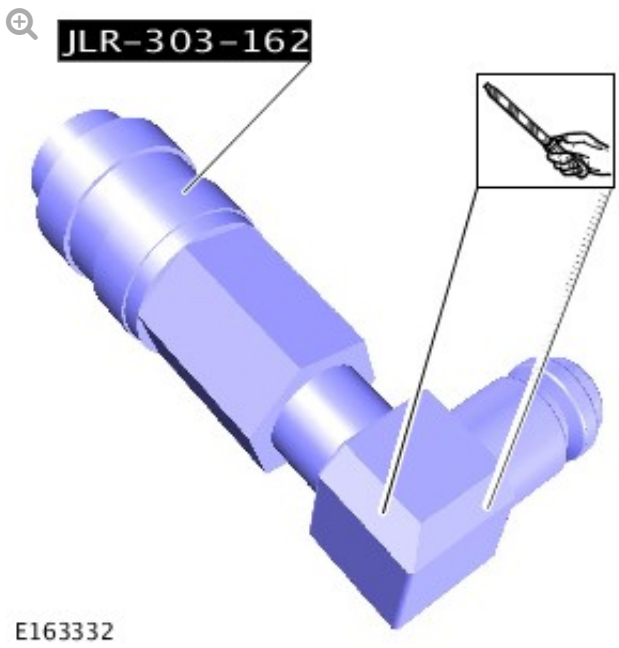
10.

> Make sure the fuel injection system is disabled before carrying out a cylinder compression test. Failure to follow this step may result in damage to the vehicle.

Crank the engine for approximately five seconds to remove any remaining fuel in the cylinders.

11.

> Make sure that the component is clean, free of foreign material and lubricant.

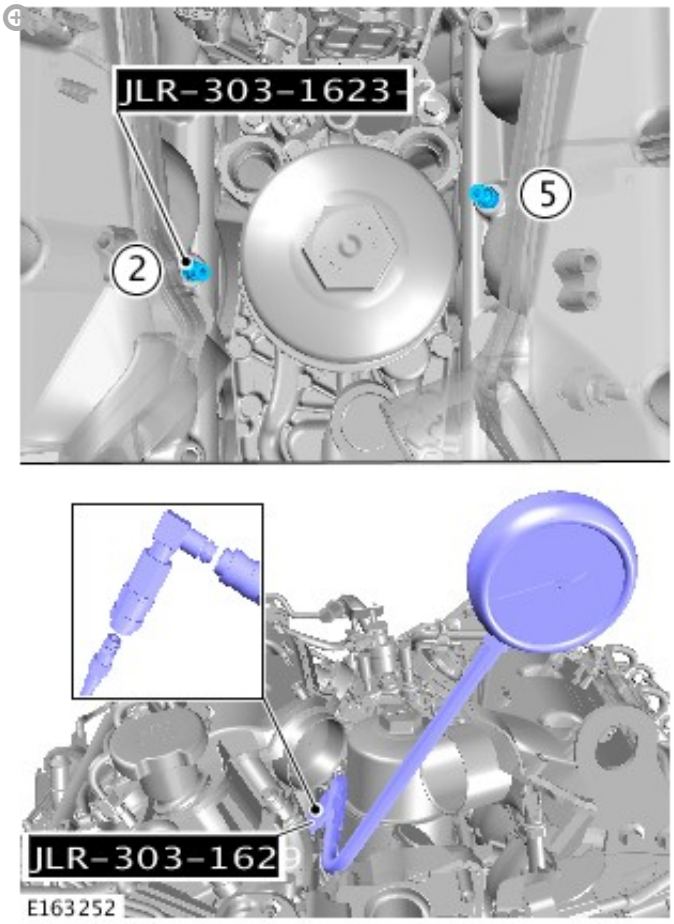


Using a suitable tool, remove the corner edges of special tool JLR-303-1629 as illustrated.

Special Tool(s): JLR-303-1629

12.

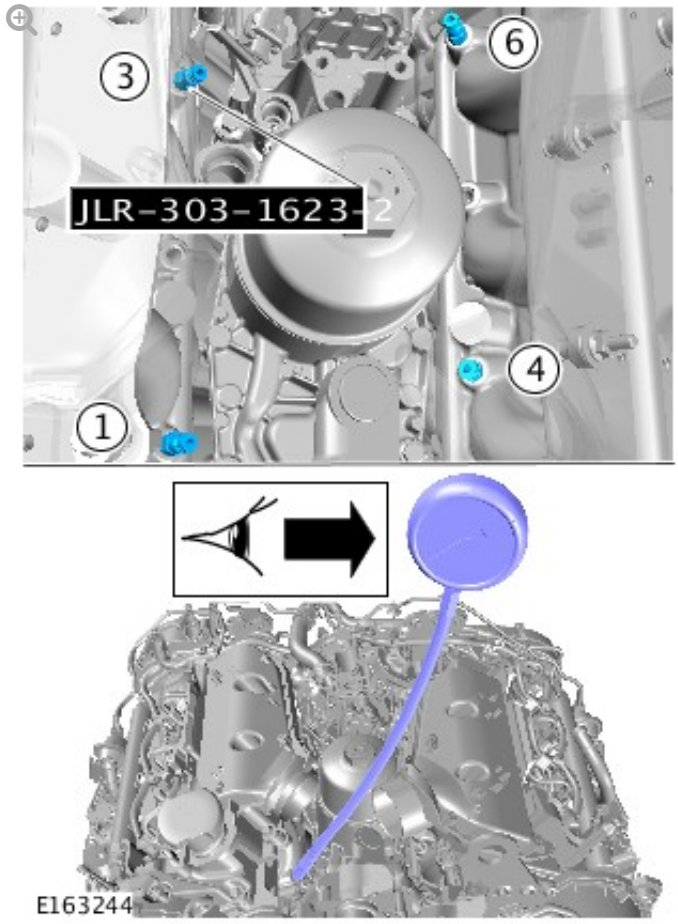
The compression test gauge requires special tool JLR-303-1629 for cylinders 2 and 5.



Special Tool(s): JLR-303-1623-2, JLR-303-1629

Torque: **10 Nm**

13.

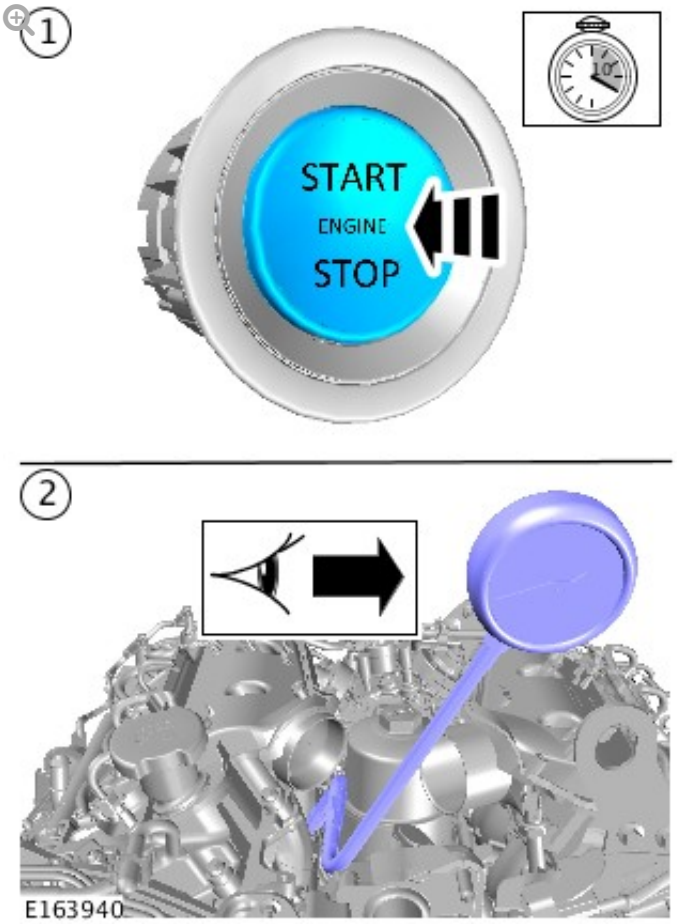


Special Tool(s): JLR-303-1623-2

Torque: **10 Nm**

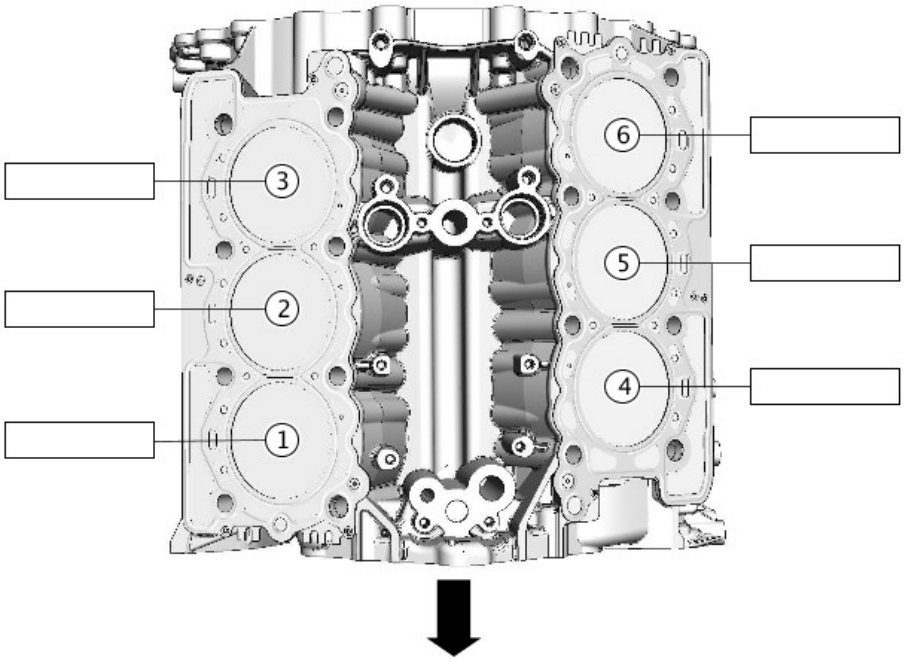
14.

- This step requires the aid of another technician.
- Print graphic number E163867 in Step 15. Use this graphic to record each cylinder compression figure.
- The vehicle battery must be in good condition and fully charged before carrying out this procedure.



Crank the engine for 10 seconds and record the figure displayed on the compression test gauge. Make sure the pressure is released from the compression test gauge after each cylinder recording. Repeat the process for all cylinders.

15.



E163867

16.

Remove and discard all blanking caps.

To install, reverse the removal procedure.

17. The minimum cylinder compression reading recorded must be within 10% of the maximum cylinder compression reading recorded. If the difference across the cylinders is higher than 10% please contact dealer technical support (DTS) for further assistance.

18. Using Land Rover approved diagnostic equipment, read and clear any diagnostic trouble codes (DTCs).

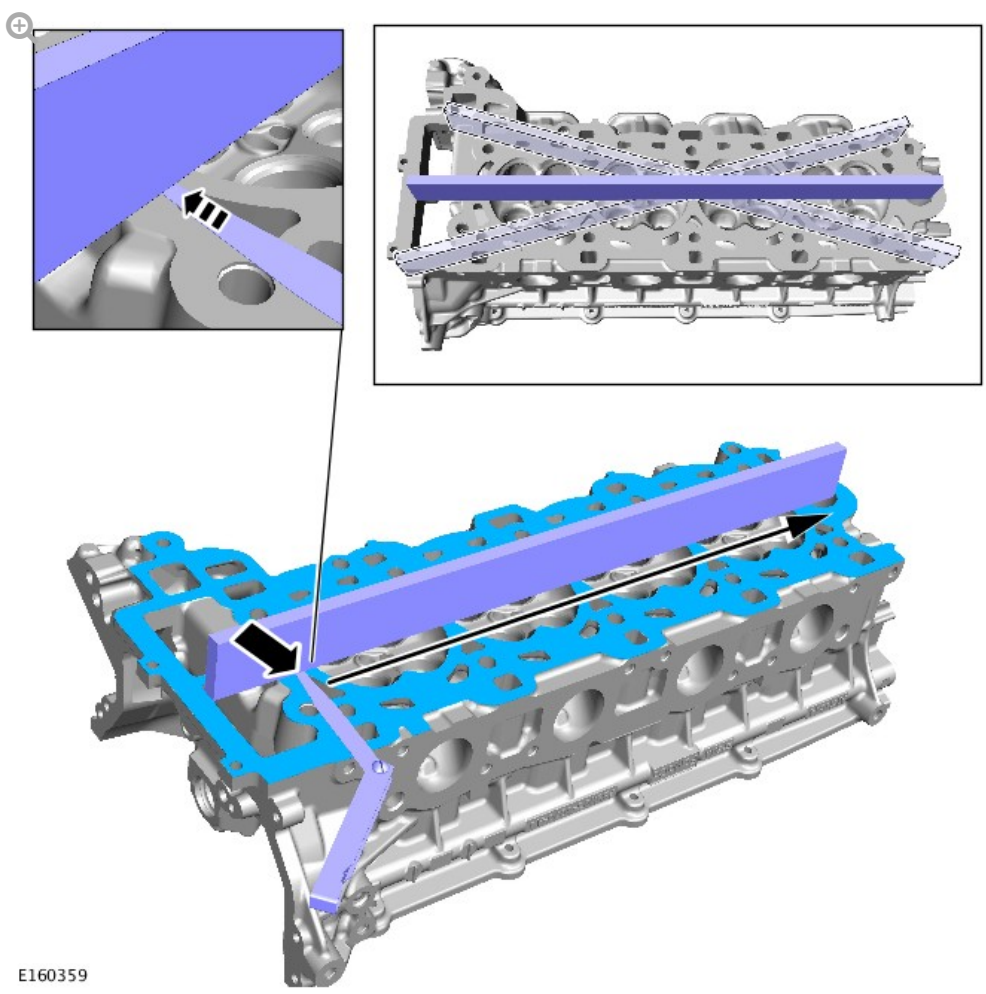
ENGINE SYSTEM - GENERAL INFORMATION

CYLINDER HEAD DISTORTION

[G1676086]

CHECK

1.



Using a suitable metallic straight edge and feeler gauge, measure the

cylinder head face in the areas illustrated. **Note the maximum value**.

2.

Machine the **minimum** thickness of material from the cylinder head to meet specification. If a selection of cylinder head gaskets are available, increase the thickness of the cylinder head gasket by one size.

- Prior to having the cylinder head machined, prior approval is required by Jaguar or Land Rover engineering.
- If the cylinder head requires machining, this must be carried out by a local engineering company.

If the cylinder head exceeds the maximum value (0.2mm), the cylinder head must be machined.

ENGINE SYSTEM - GENERAL INFORMATION

CYLINDER HEAD GASKET SELECTION - TDV6 3.0L DIESEL [G1470530]

SPECIAL TOOL(S)

303-979

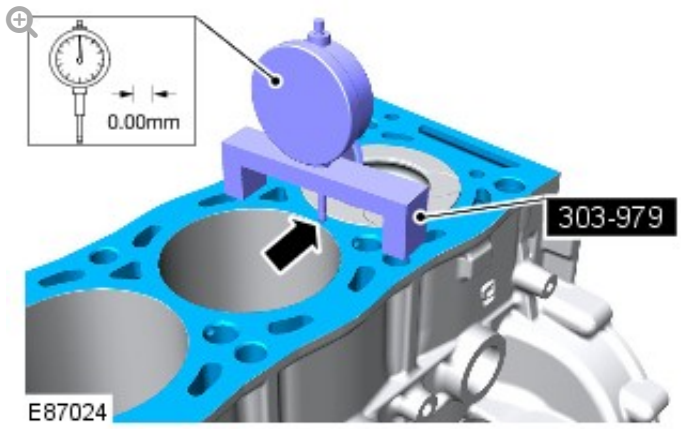
Measuring Bridge, Piston Protusion

CHECK

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

1.

Make sure that the surface is clean and free of foreign material.



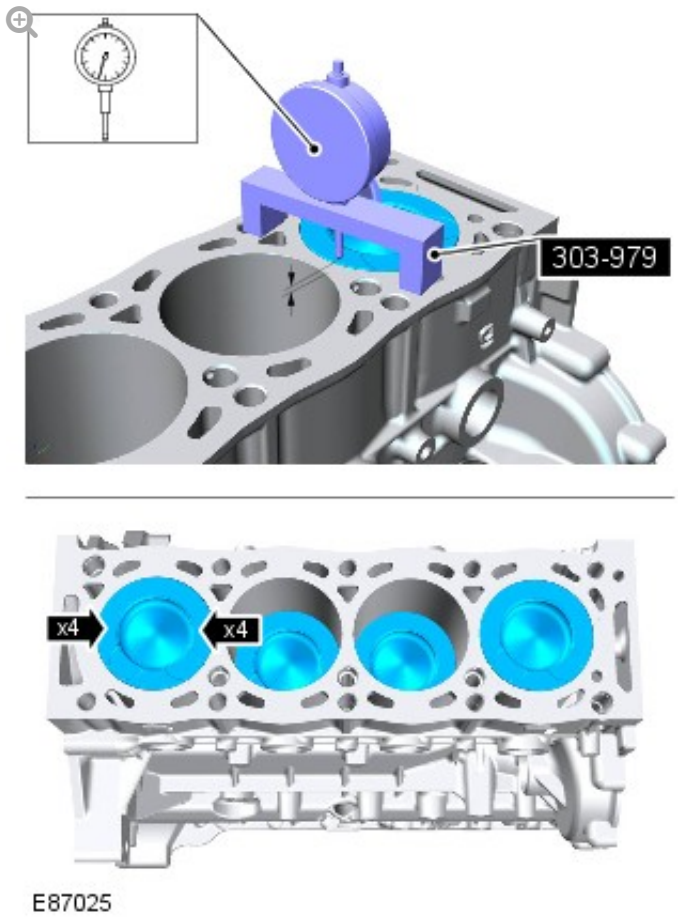
Zero the gauge on the cylinder block machined face.

Special Tool(s): 303-979

2.

Make sure that the surface is clean and free of foreign material.

Note the dial gauge readings.



Take 2 measurements on each piston crown.

3. Use the average piston protrusion measurement (taken from all piston measurements), to select the correct thickness cylinder head gasket.
   Refer to: Specifications (303-01A Engine - TDV6 3.0L Diesel, Specifications).