

PUBLISHED: 24-JUL-2020
2020.0 DEFENDER (LE), 303-01C

ENGINE – INGENIUM I6 3.0L PETROL

ENGINE AND ANCILLARIES – LONG ENGINE (G2340961)

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SPECIAL TOOL(S)



E115267

303-1449-01

Supercharger Installation Guide Pins - Threaded



E115267

303-1449-02

Supercharger Installation Guide Pins - Unthreaded



E107680

310-198

Installer, Teflon Seal



E136268

JLR-303-1591

Lifting Bracket, Engine - Rear



E238887

JLR-303-1659

Locking Tool, Crankshaft Pulley



E241320

JLR-303-1667

Holding Tool, Cooling Fan Pulley



E218674

JLR-303-1673

Engine stand adaptor



E238238

JLR-303-1676

Engine lifting eyes



E237508

JLR-303-1683

Exhaust Manifold Bolt Socket



E233668

JLR-308-1699

Accessory Drive Belt Tensioner Locking Tool



E204 101

JLR-310-255

Guide pins threaded



E204 102

JLR-310-256

Guide pins unthreaded



E203 540

JLR-310-257

Teflon Seal Resize Tool

GENERAL EQUIPMENT

EQUIPMENT NAME
Hydraulic jib crane

PART(S)

STEP	PART NAME	QUANTITY
Step 11	Crankshaft pulley bolts	4
Step 13	Drive plate bolts	8
Step 15	Engine vent oil separator to valve cover gasket	1
Step 16	Oil filter and O-ring seal kit	1
Step 24	Cylinder block vacuum connector bolt	1
Step 26	Engine coolant pump gasket	1
Step 26	Coolant pump bolts	3
Step 32	Fuel Injector replacement kits	6
Step 44	Fuel rail bolt(s)	4
Step 45	Fuel rail bolt(s)	2
Step 53	Exhaust manifold gasket	1
Step 54	Exhaust manifold bolts	11
Step 56	Exhaust manifold bolts	2
Step 59	Turbocharger coolant pipe O-ring seal	2
Step 60	Turbocharger oil return pipe seals	2
Step 61	Oil supply pipe sealing washers	2
Step 75	Engine block heater manifold seal(s)	1
Step 77	Oil cooler gasket	1
Step 80	Intake manifold seals	6
Step 83	Fuel pump O-ring seal	1
Step 83	Fuel Injection Pump retaining bolts	2
Step 89	Throttle body to intake manifold seal	1

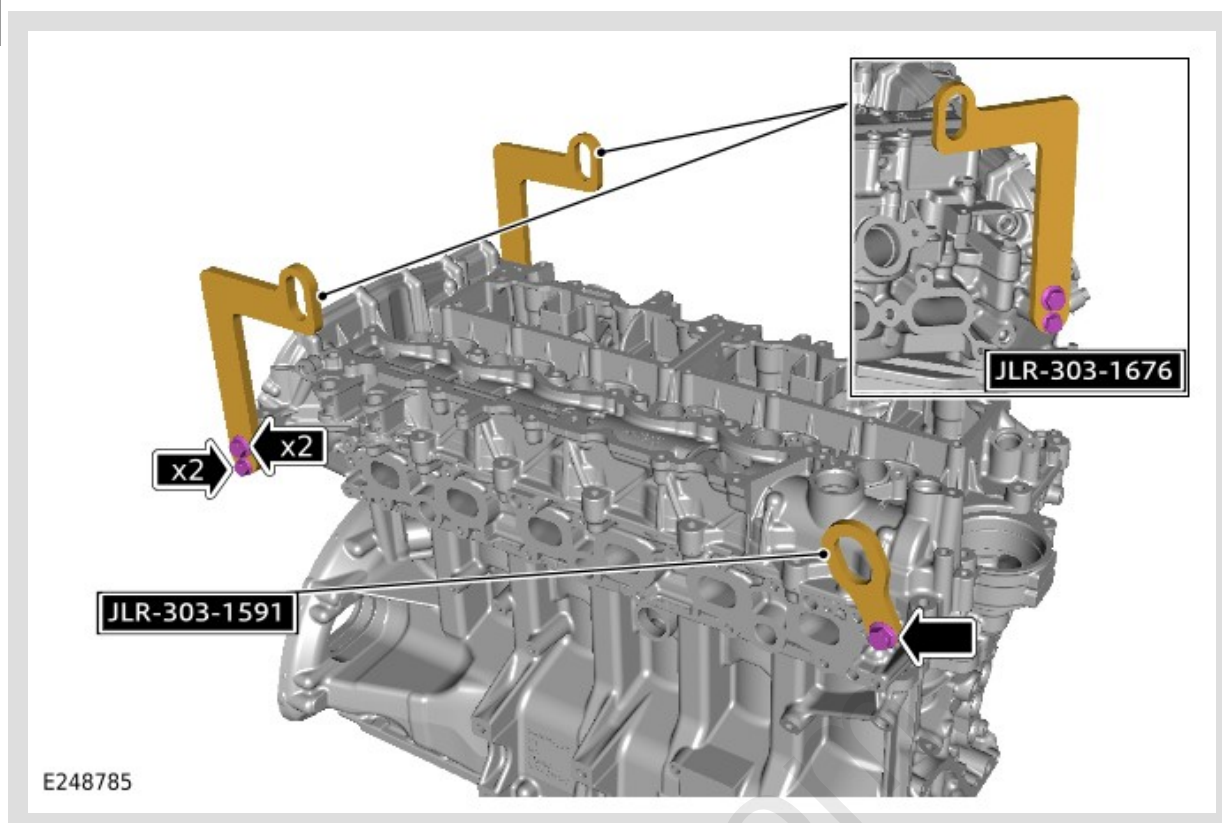
**WARNING:**

- Be prepared to collect escaping coolant.
- Be prepared to collect escaping oil.
- Be prepared to collect escaping fuel.

**NOTE:**

- This procedure contains illustrations showing certain components removed to provide extra clarity.
- This procedure contains some variation in the illustrations depending on the vehicle specification, but the essential information is always correct.

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- Install the special tools JLR-303-1676.

Special Tool(s): [JLR-303-1676](#)

- Install and tighten the 4 bolts.

Torque

M8: **24Nm**

M10: **47Nm**

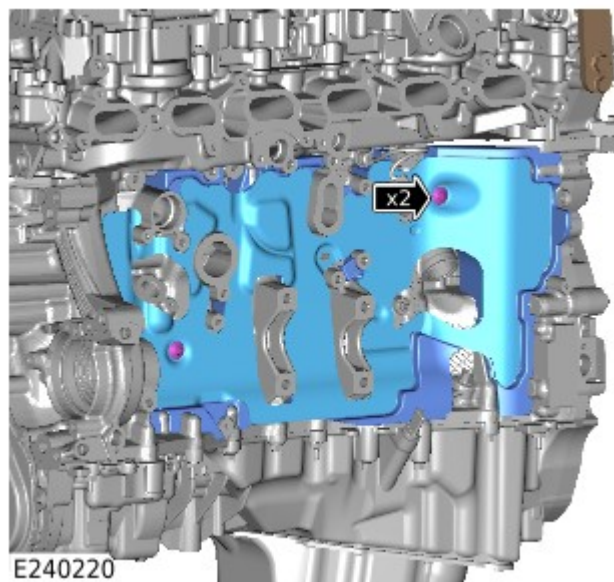
- Install the special tool JLR-303-1591.

Special Tool(s): [JLR-303-1591](#)

- Install and tighten the bolt.

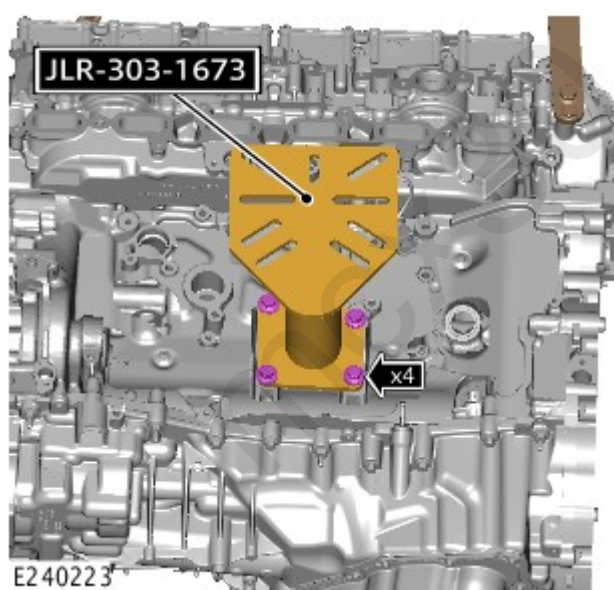
Torque: **10Nm**

2.



- Install the Noise, Vibration and Harshness (NVH) material.
- Install the 2 clips.

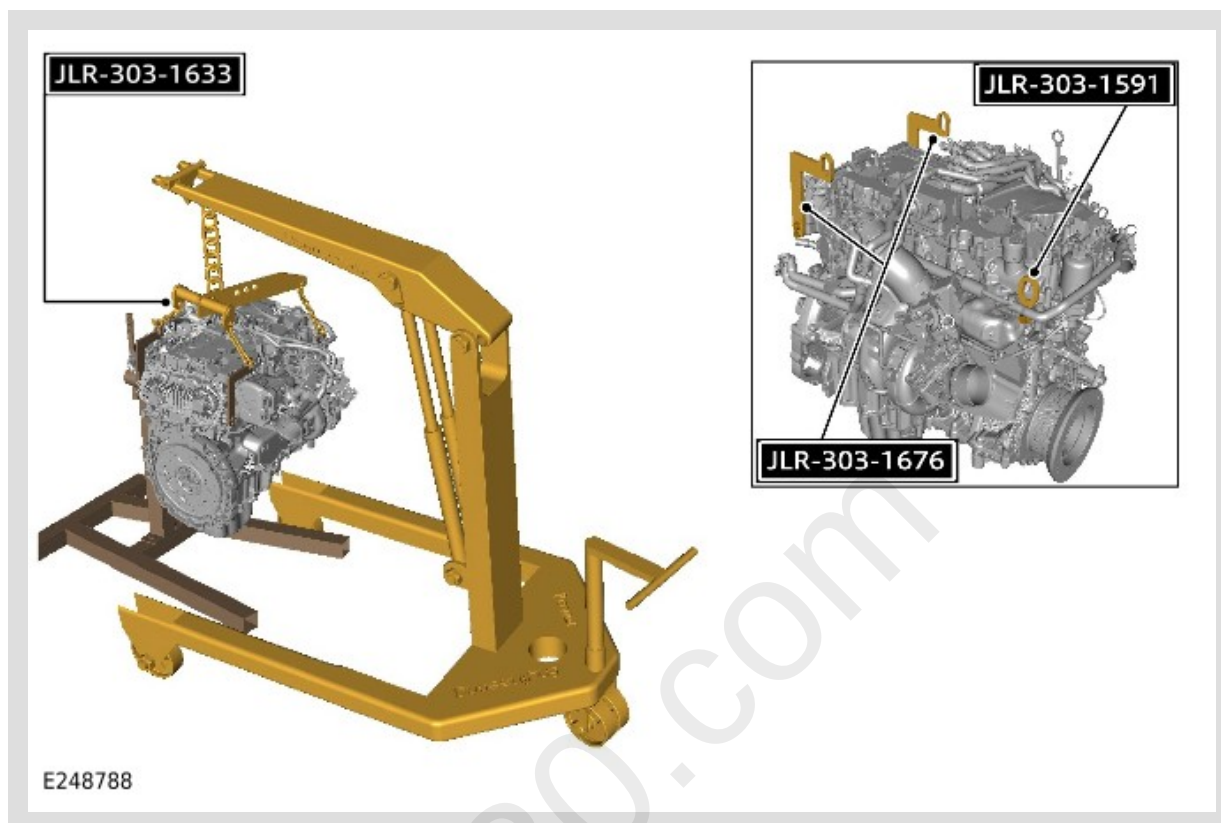
3.



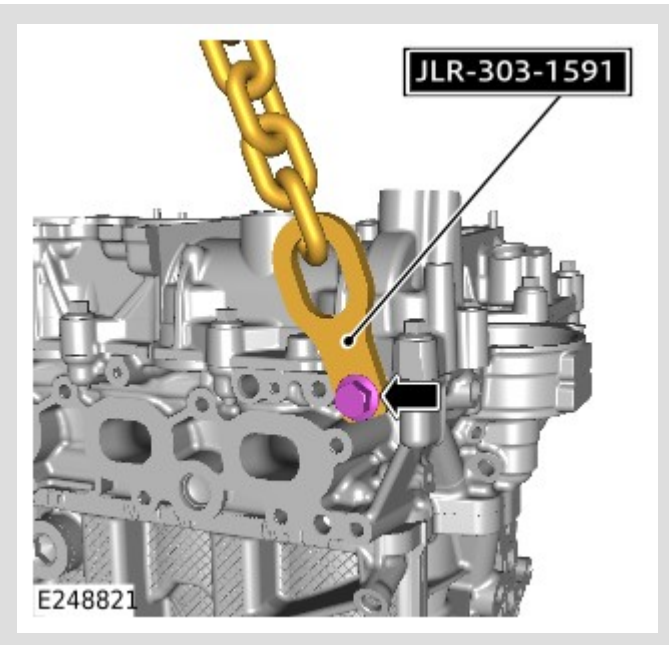
- Install the special tool.
Special Tool(s): [JLR-303-1673](#)
- Install and tighten the 4 bolts.
Torque: **40Nm**

⚠ CAUTION:

Only operate the crane enough to align special tool JLR-303-1591. Do not apply lifting force to the engine.



- Install a suitable hydraulic jib crane to the special tools and lifting bracket as illustrated.
General Equipment: [Hydraulic jib crane](#)
- Operate the crane to align the special tool JLR-303-1591.



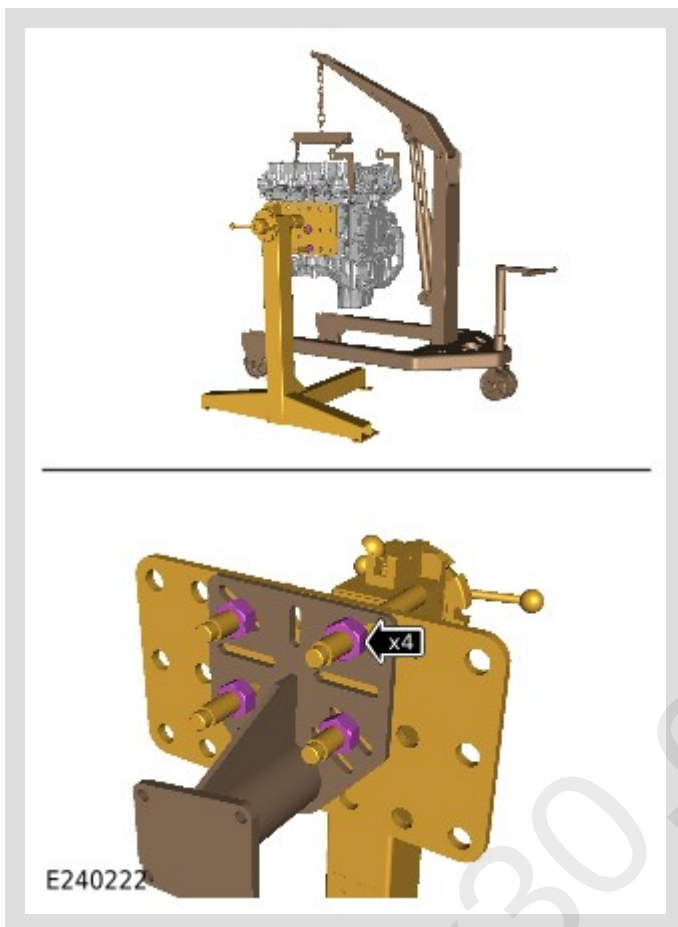
- Fully tighten the bolt.

Torque: 47Nm

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**WARNING:**

This step requires the aid of another technician.



With the aid of another technician, install the engine assembly to a suitable engine stand following the manufacturers instructions.

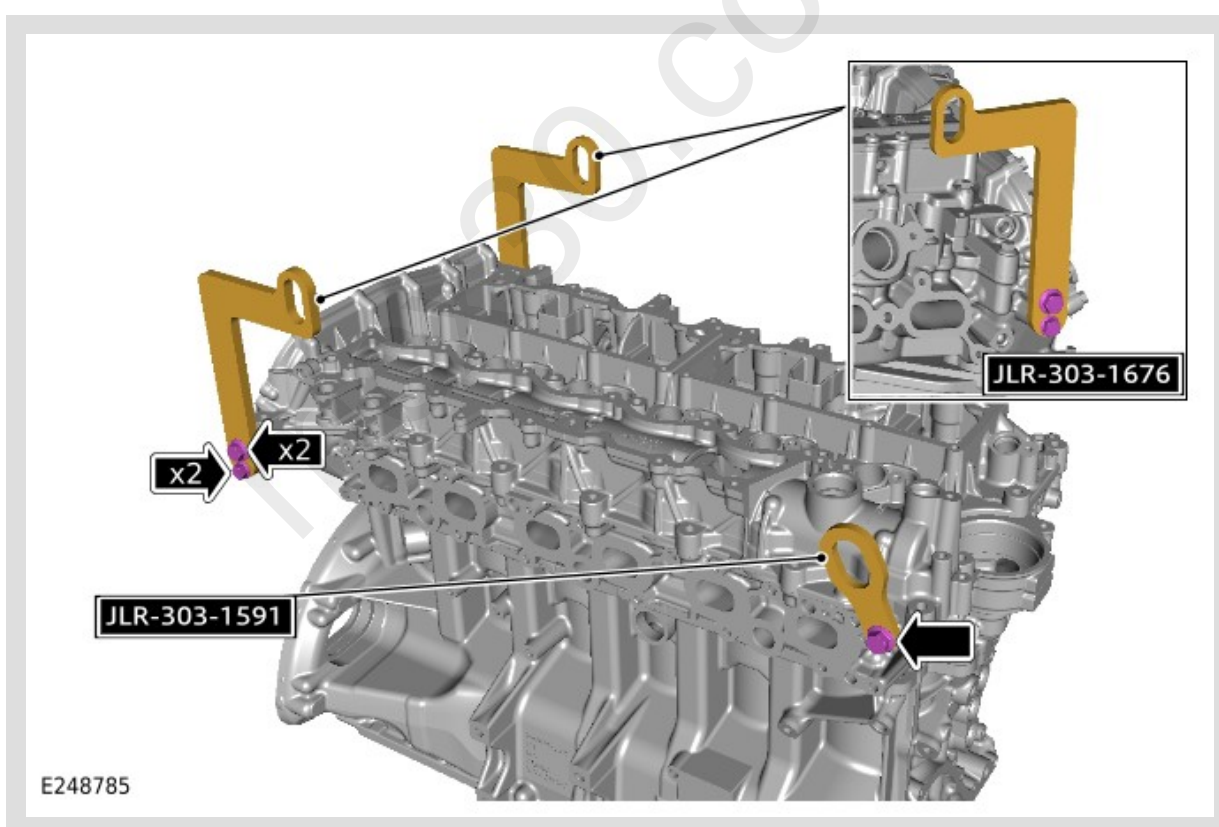
7.



Remove the hydraulic jib crane.

General Equipment: [Hydraulic jib crane](#)

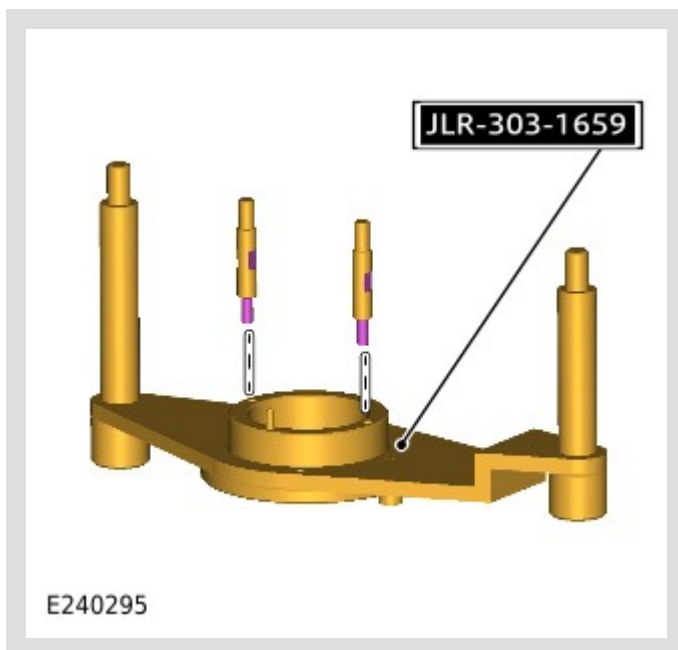
8.



Remove the special tools.

Special Tool(s): [JLR-303-1676](#), [JLR-303-1591](#)

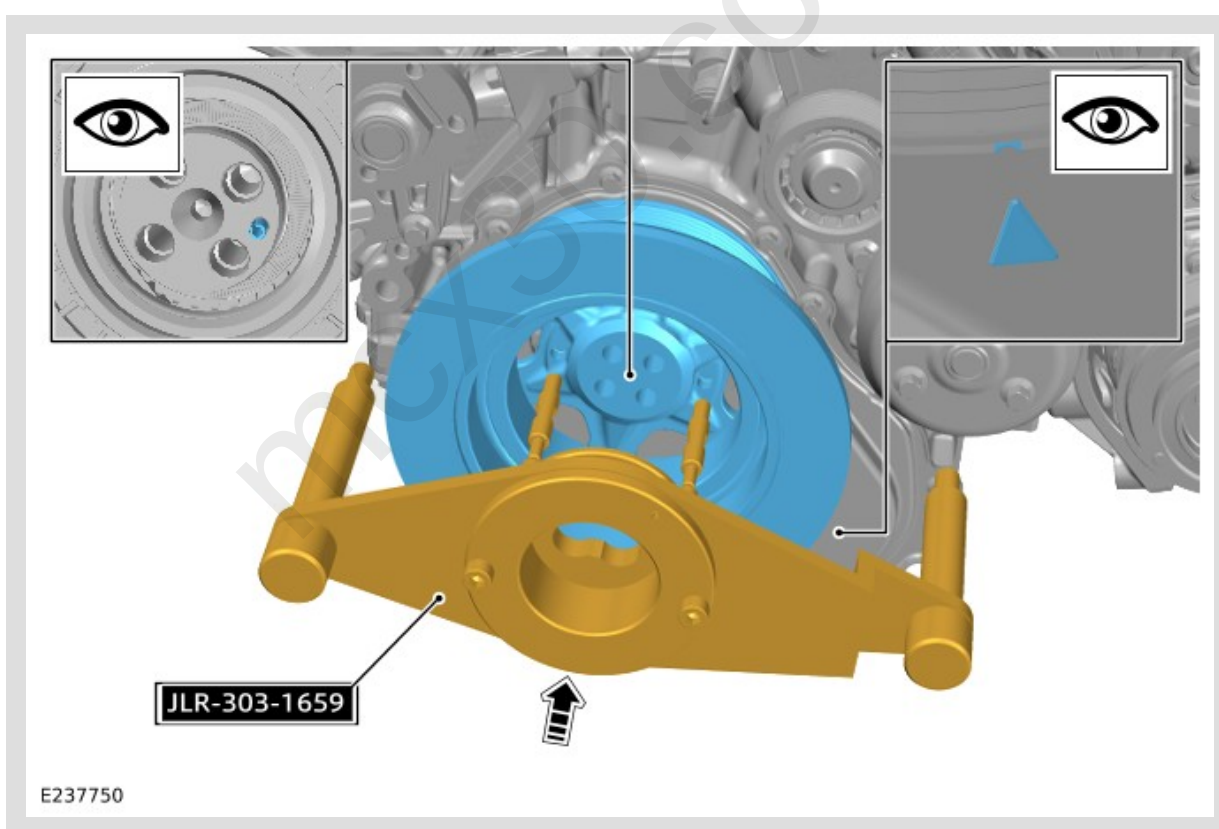
9.



Install the special tool as illustrated.

Special Tool(s): [JLR-303-1659](#)

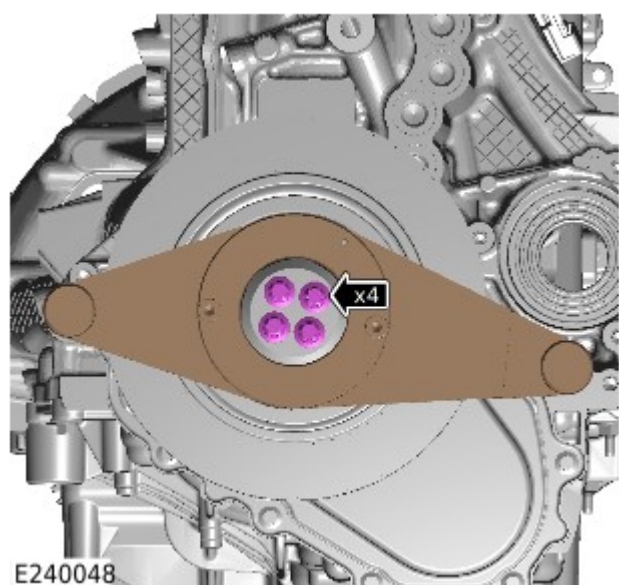
10.



- Install the crankshaft damper pulley.

- Install the special tool.

Special Tool(s): [JLR-303-1659](#)



Install and tighten the 4 new bolts.

Renew Part: [Crankshaft pulley bolts](#) Quantity: 4.

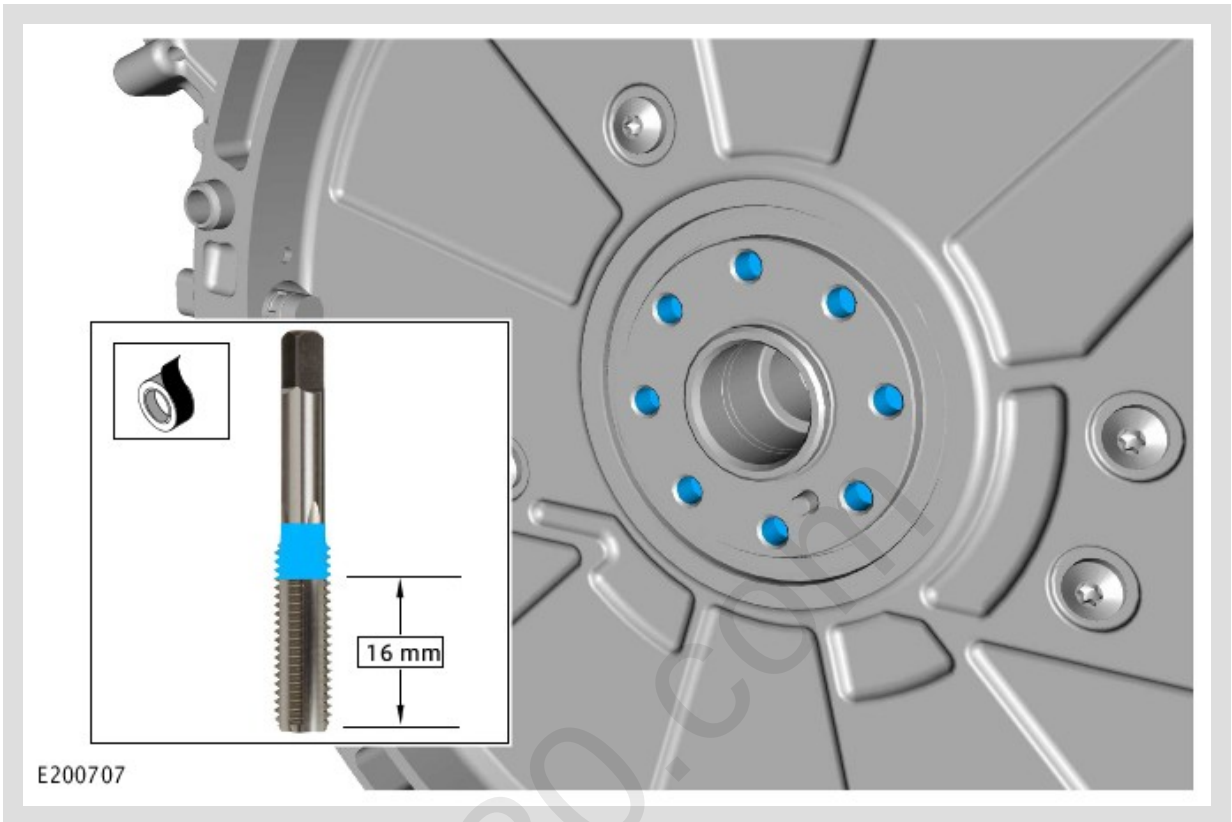
Torque

Stage1: **37Nm**

Stage2: **90°**

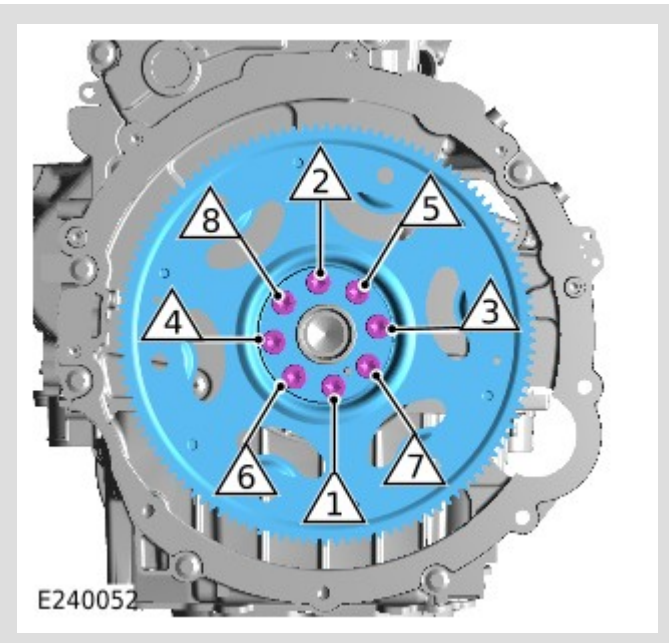
NOTE:

Do not insert the bottoming tap more than the depth of the threaded holes (16mm). Apply tape to the bottoming tap 16mm from the end as a visual guide.



- Use a suitable M10 x 1.0 mm tap to clean out the threads illustrated.
- Use a suitable cleaning solution to remove any foreign material from the threads.

13.



- Install the drive plate.
- Install and tighten the 8 new bolts in the sequence illustrated.

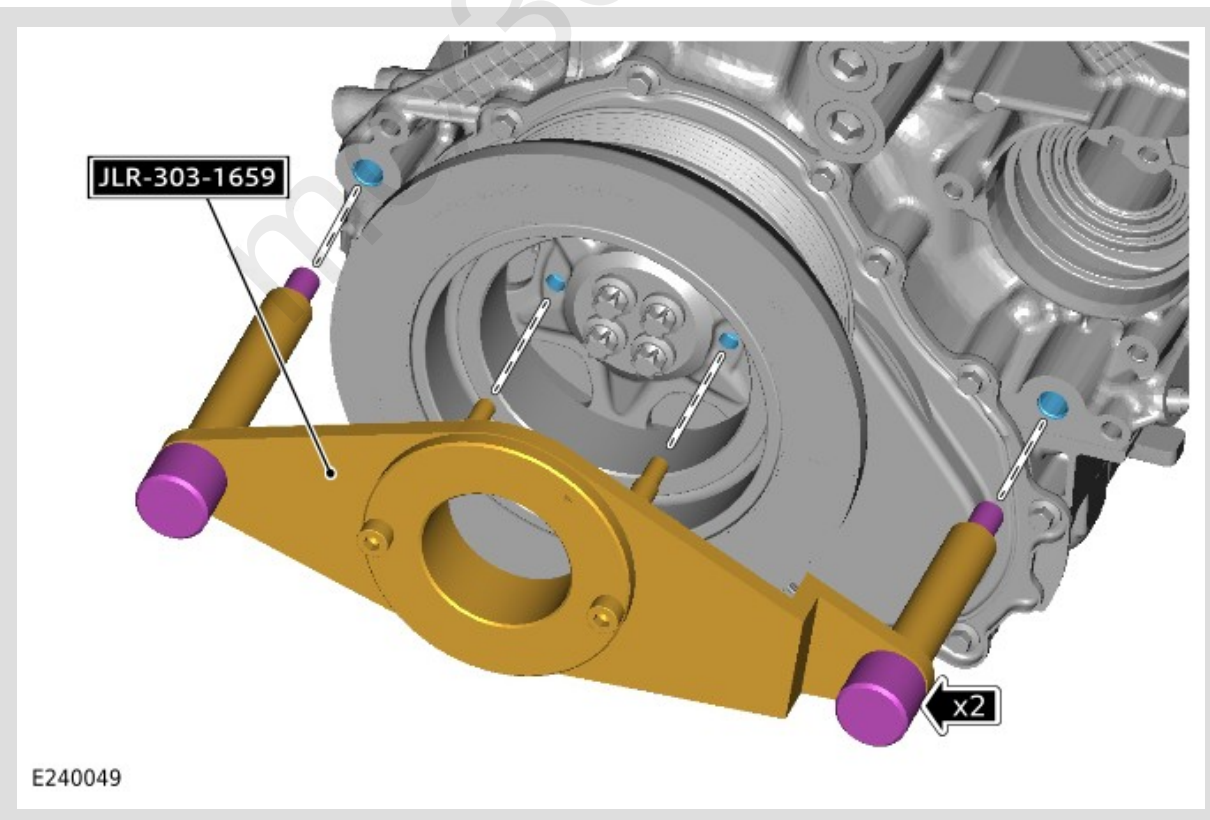
Renew Part: [Drive plate bolts](#) Quantity: 8.

Torque

Stage1: 30Nm

Stage2: 120°

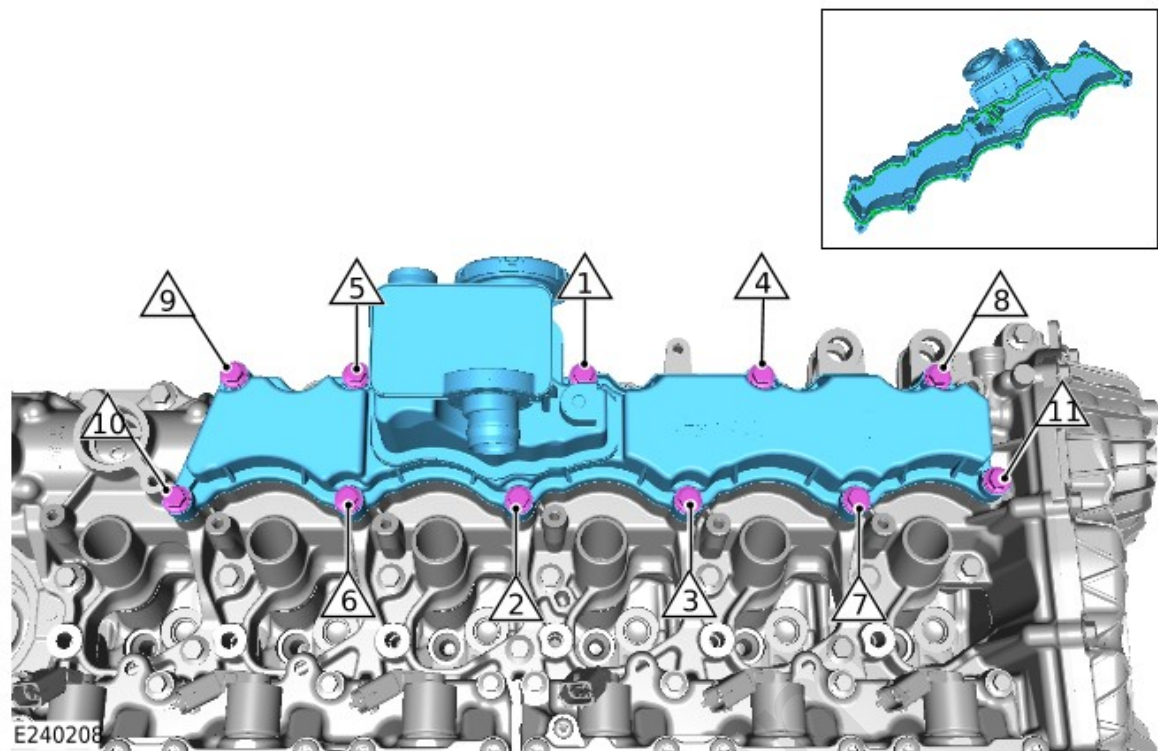
14.



Remove the special tool.

Special Tool(s): [JLR-303-1659](#)

15.



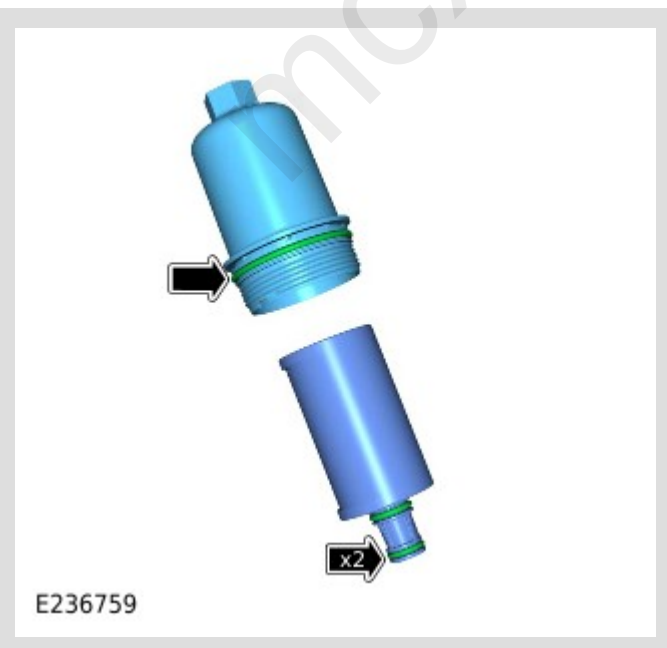
- Install a new gasket.

Renew Part: [Engine vent oil separator to valve cover gasket](#) Quantity: 1.

- Install the engine vent oil separator.
- Tighten the 11 bolts in the torque sequence illustrated.

Torque: 12Nm

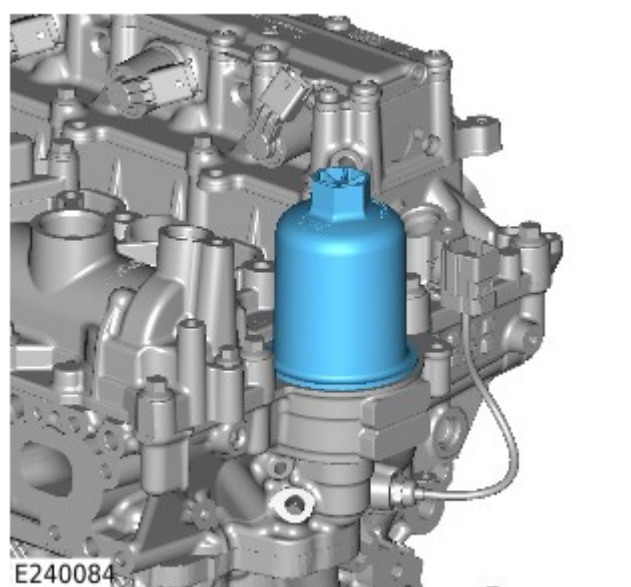
16.



Install a new oil filter element and O-ring seal.

Renew Part: [Oil filter and O-ring seal kit](#) Quantity: 1.

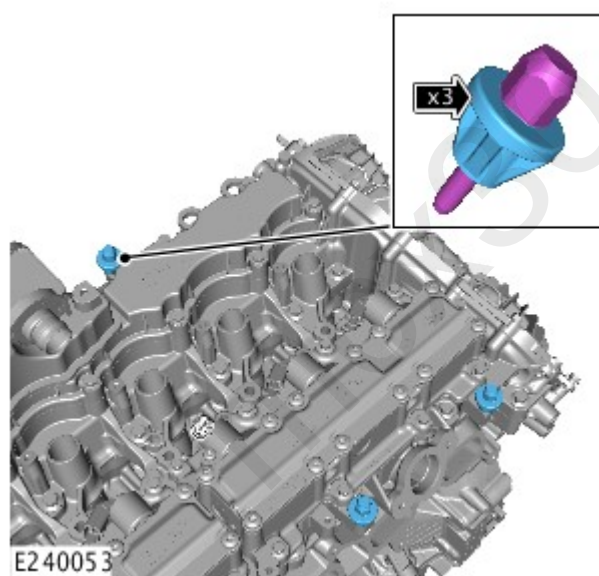
17.



Install and tighten the oil filter assembly.

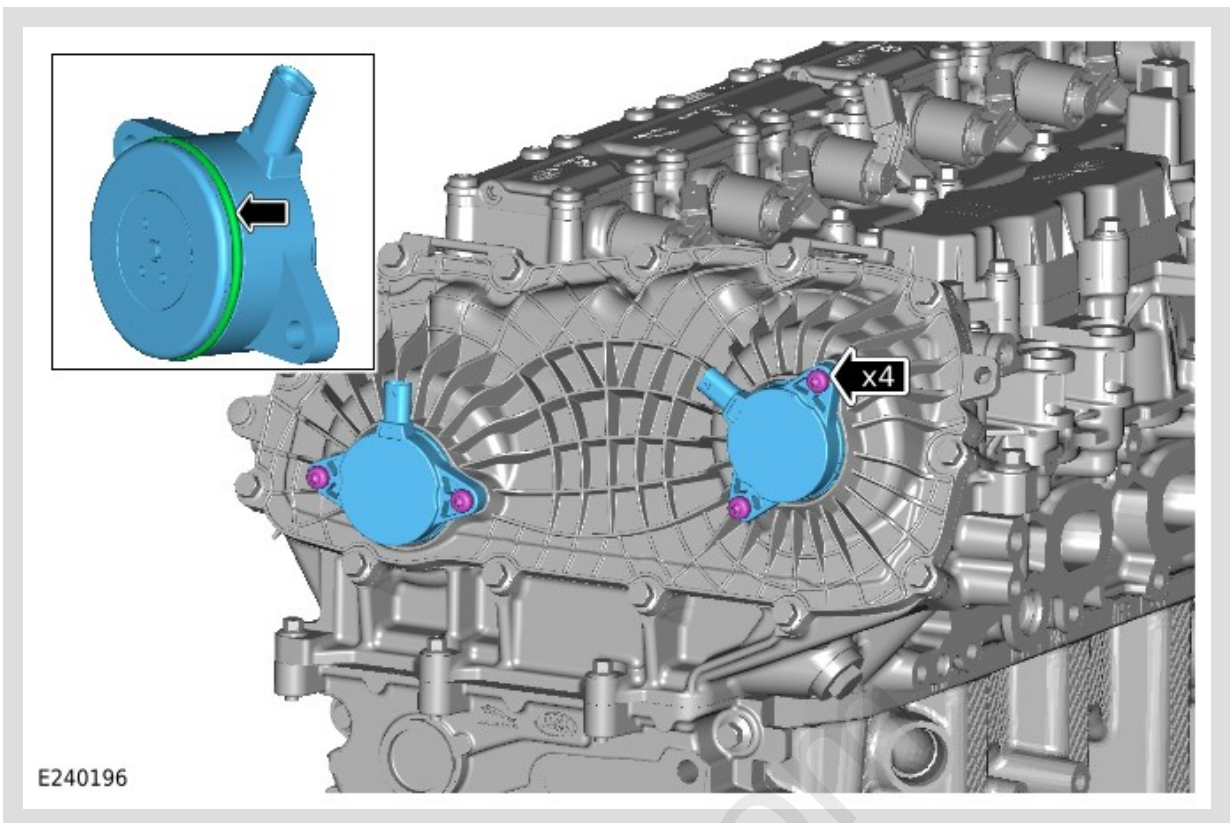
Torque: 27.5Nm

18.



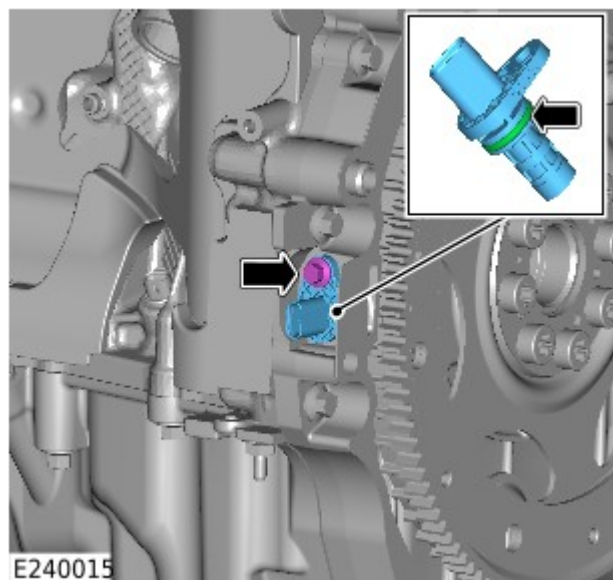
Install and tighten the 3 studs.

Torque: 10Nm



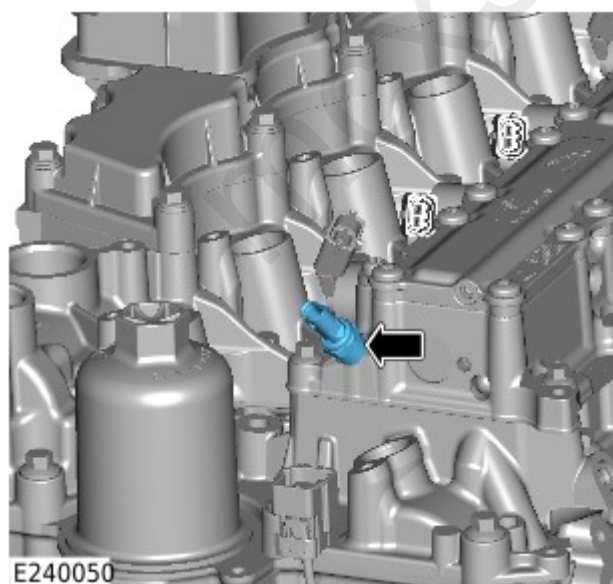
- Inspect the 2 O-ring seals and replace if damaged.
- Lubricate the 2 O-ring seals with clean engine oil.
Refer to: [Specifications](#) (303-01C Engine - INGENIUM I6 3.0L Petrol, Specifications).
- Install the 2 Variable Valve Timing (VVT) solenoids.
- Install and tighten the 4 bolts.
Torque: 9Nm

20.

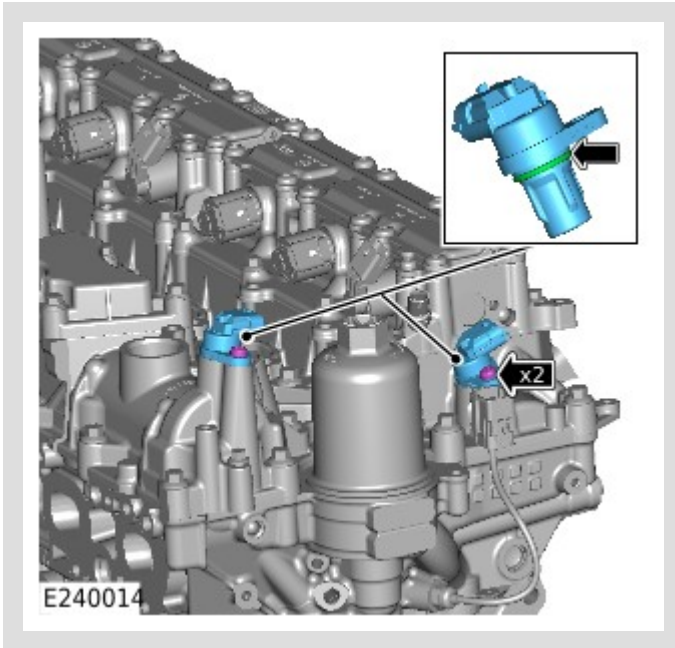


- Inspect the O-ring seal and replace if damaged.
- Lubricate the O-ring seal with clean engine oil.
Refer to: [Specifications](#) (303-01C Engine - INGENIUM I6 3.0L Petrol, Specifications).
- Install the Crankshaft Position Sensor (CKP) sensor.
- Install and tighten the bolt.
Torque: 8Nm

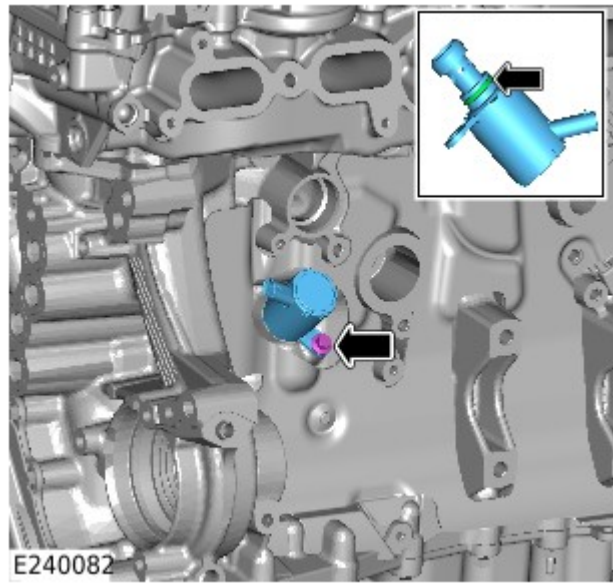
21.



Install and tighten the Continuous Variable Valve Lift (CVVL) oil temperature sensor.
Torque: 18Nm

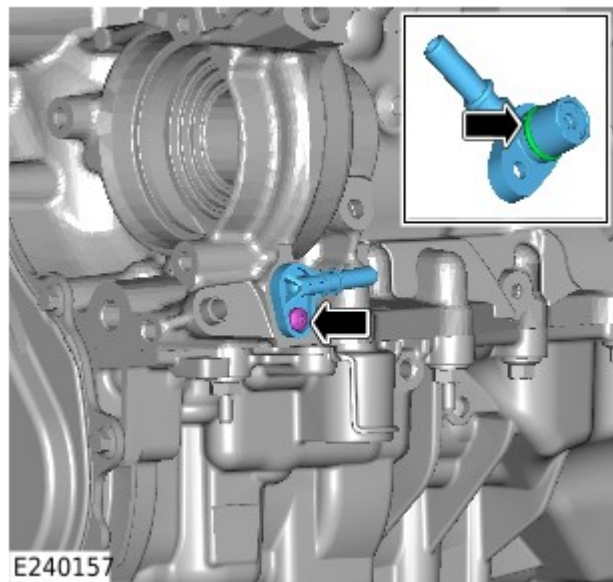


- Inspect the O-ring seal and replace if damaged.
- Lubricate the O-ring seal with clean engine oil.
Refer to: [Specifications](#) (303-01C Engine - INGENIUM I6 3.0L Petrol, Specifications).
- Install the 2 Camshaft Position Camshaft Position Sensor (CMP) sensors.
- Install and tighten the 2 bolts.
Torque: 8Nm



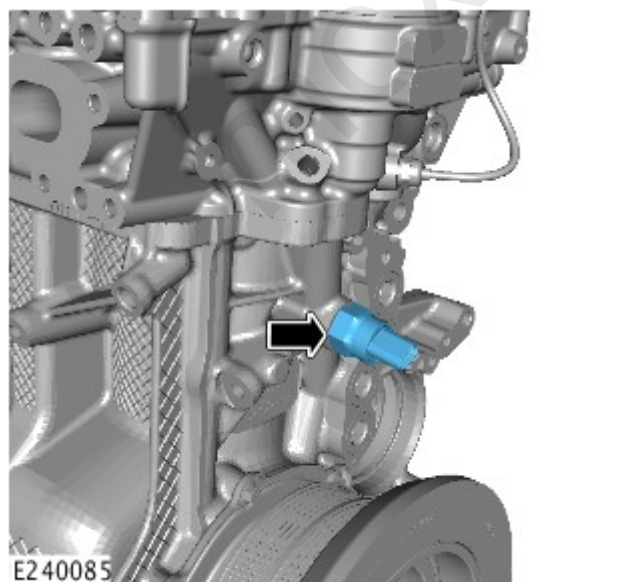
- Inspect the O-ring seal and replace if damaged.
- Lubricate the O-ring seal with clean engine oil.
Refer to: [Specifications](#) (303-01C Engine - INGENIUM I6 3.0L Petrol, Specifications).
- Install the piston cooling oil jet solenoid.
- Install and tighten the bolt.
Torque: 11.5Nm

24.



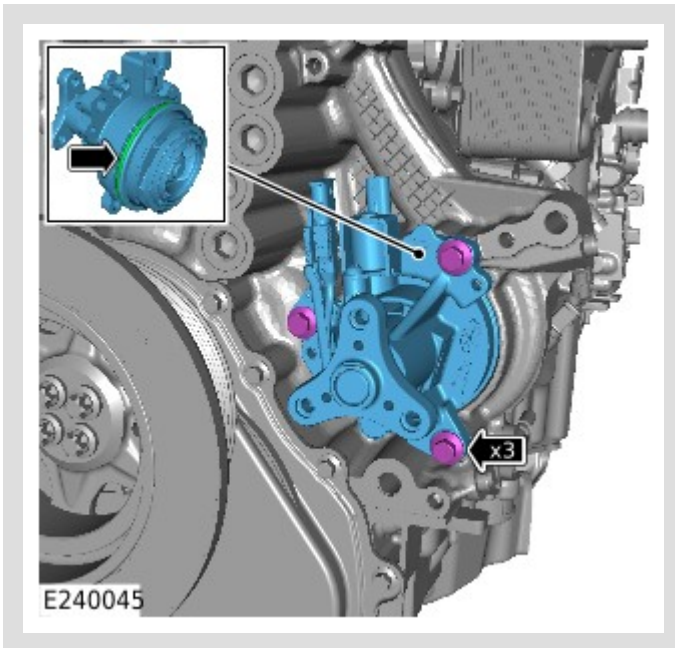
- Inspect the O-ring seal and replace if damaged.
- Lubricate the O-ring seal with clean engine oil.
Refer to: [Specifications](#) (303-01C Engine - INGENIUM I6 3.0L Petrol, Specifications).
- Install the vacuum pipe connector.
- Install and tighten the new bolt.
Renew Part: [Cylinder block vacuum connector bolt](#) Quantity: 1.
Torque: 5Nm

25.



Install and tighten the oil pressure and temperature sensor.
Torque: 15Nm

26.



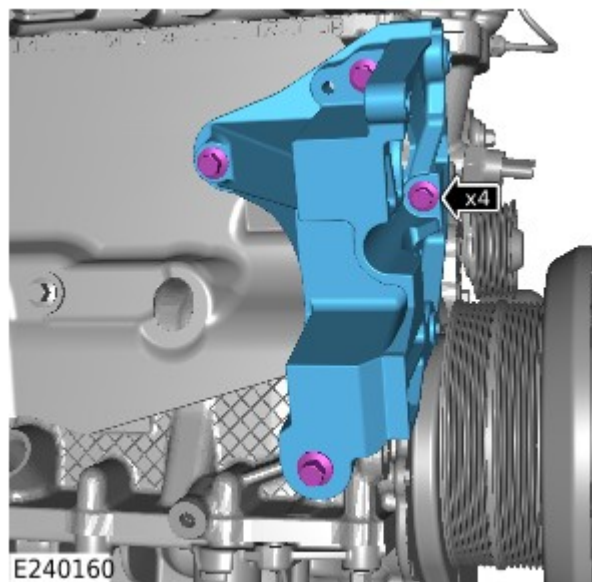
- Install a new O-ring seal.
Renew Part: [Engine coolant pump gasket](#) Quantity: 1.
- Install the coolant pump.
- Install and tighten the 3 new bolts.
Renew Part: [Coolant pump bolts](#) Quantity: 3.
Torque: 25.5Nm

27.



- Install the coolant pump pulley.
- Install but do not fully tighten the 3 bolts.

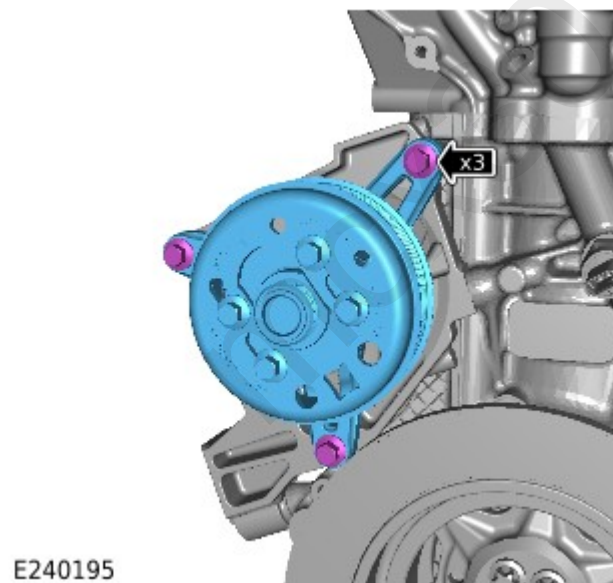
28.



- Install the bracket.
- Install and tighten the 4 bolts.

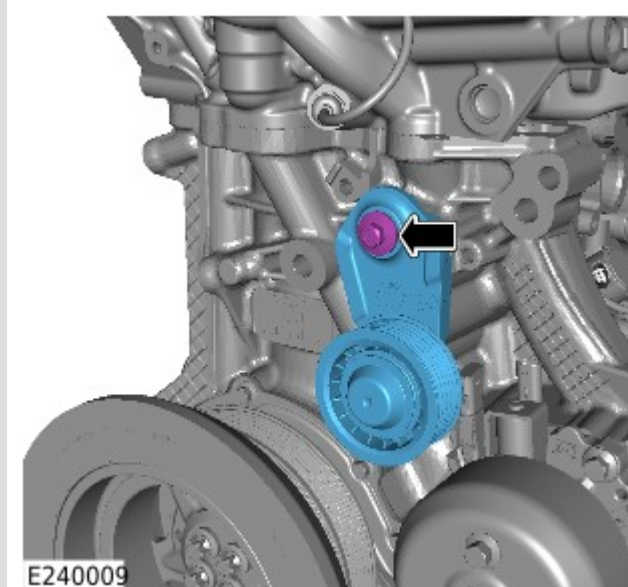
Torque: 25Nm

29.



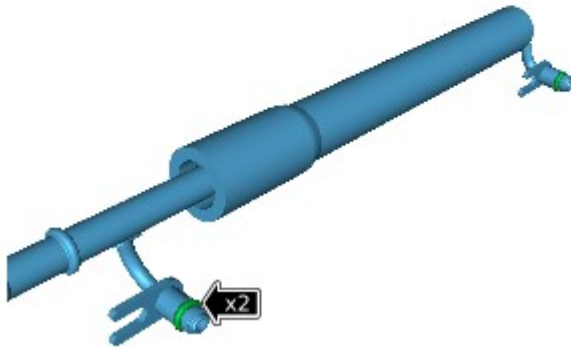
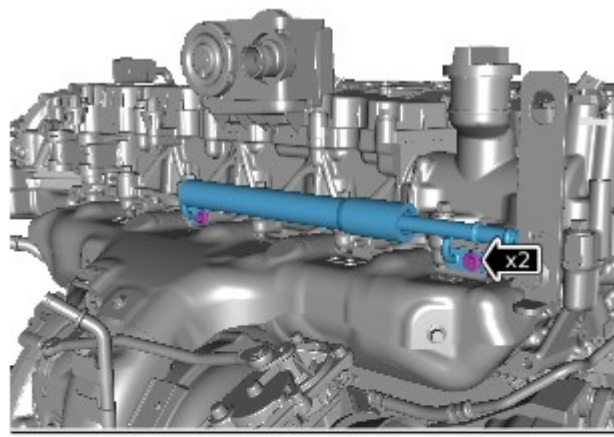
- Install the viscous cooling fan drive pulley.
- Install and tighten the 3 bolts.

Torque: 25Nm



- Install the idler pulley.
- Install and tighten the bolt.

Torque: 25Nm

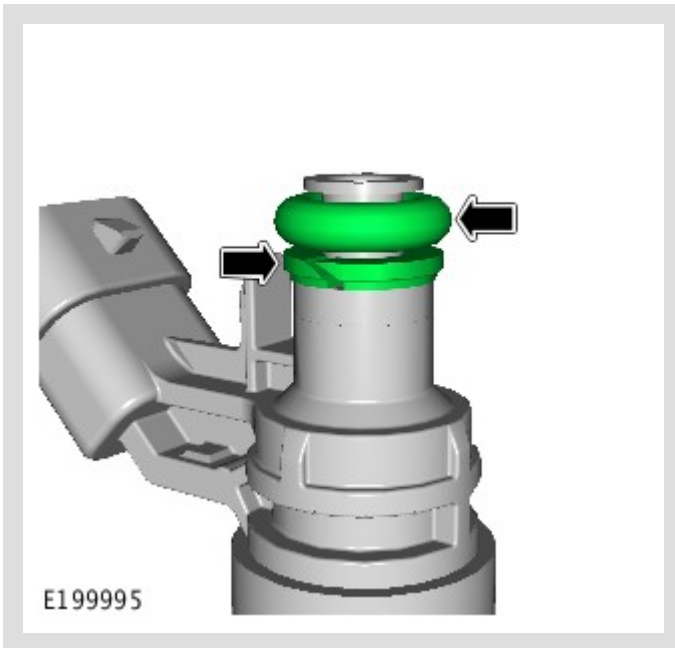


E240092

- Inspect the 2 O-ring seals and replace if damaged.
- Install the coolant pipe.
- Install and tighten the 2 bolts.

Torque: 11.5Nm

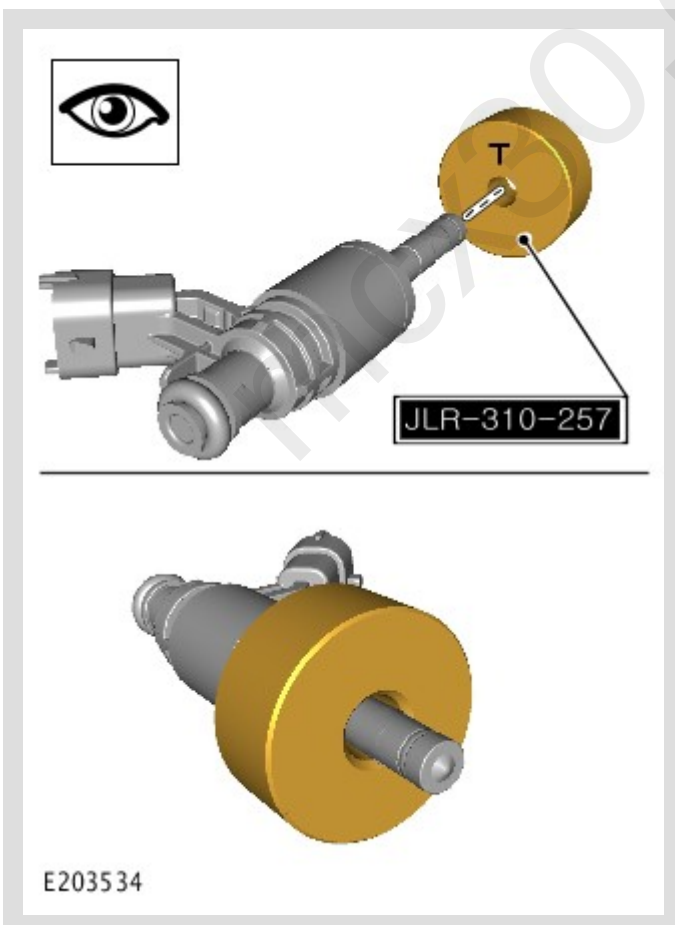
32.



- Install the new spacer washer.
- Install the new O-ring seal.

Renew Part: [Fuel Injector replacement kits](#) Quantity: 6.

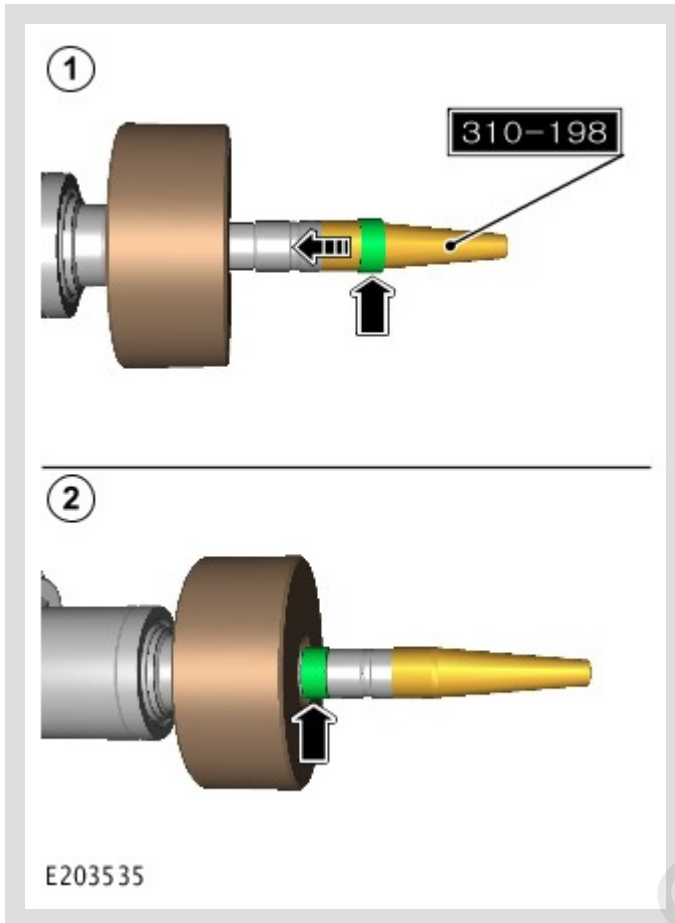
33.



Install the special tool to the fuel injector with the 'T' symbol towards the top of the fuel injector as illustrated.

Special Tool(s): [JLR-310-257](#)

34.



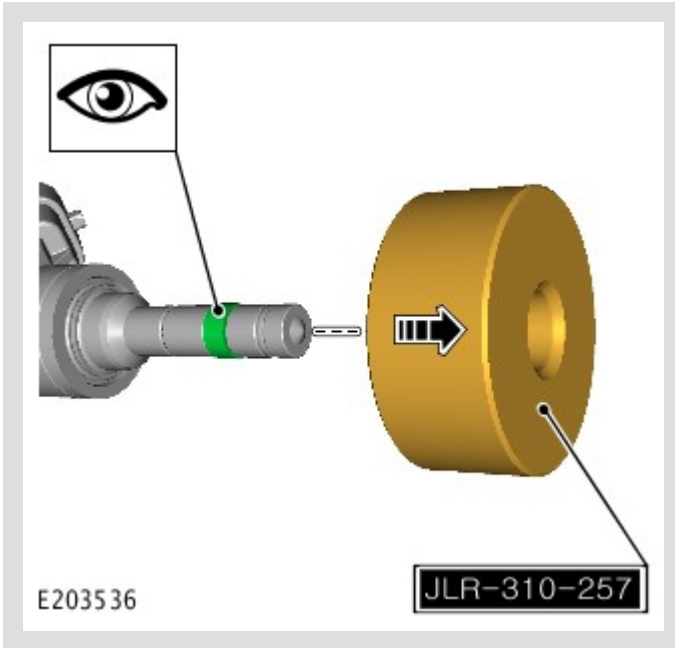
Use the special tool to install the new Teflon™ seal to the fuel injector.

Special Tool(s): [310-198](#)

35.

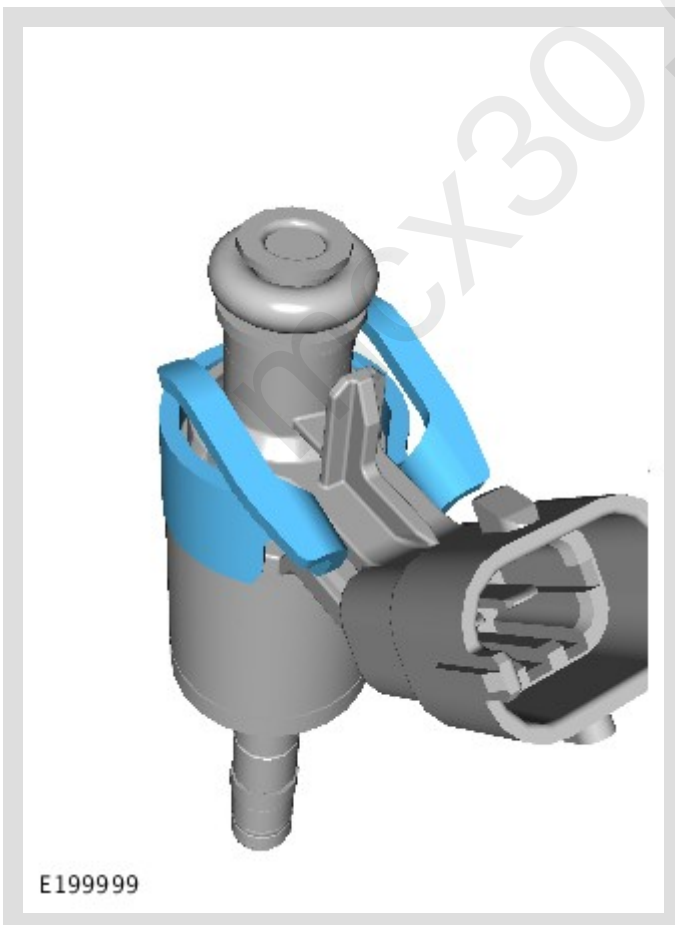
Wait 2 minutes to allow the Teflon™ seal to recover its shape.

36.



- Remove the special tool.
Special Tool(s): [JLR-310-257](#)
- Make sure the Teflon™ seal is correctly installed.

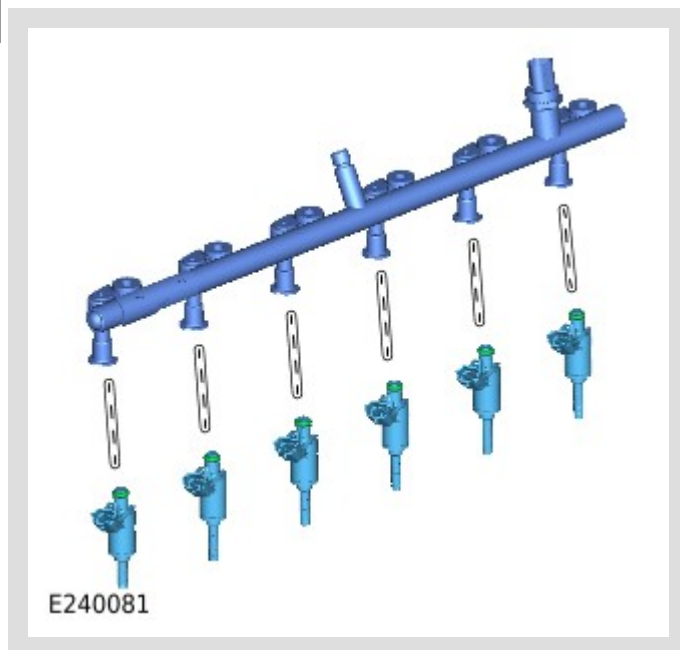
37.



Install the new fuel injector spring clamp.

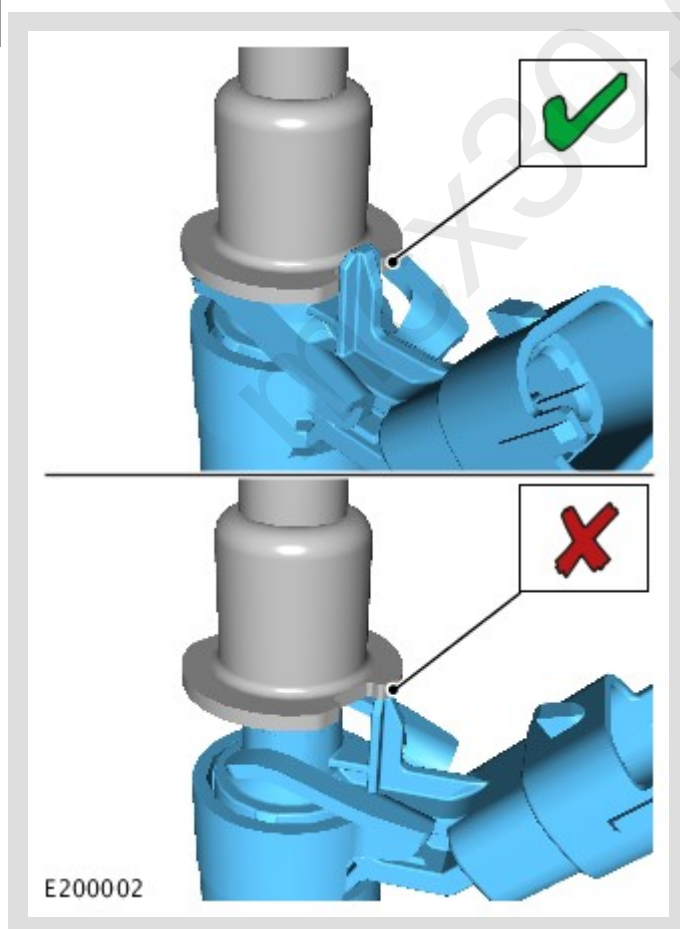
38. Repeat steps 29-34 for the remaining 5 fuel injectors.

39.



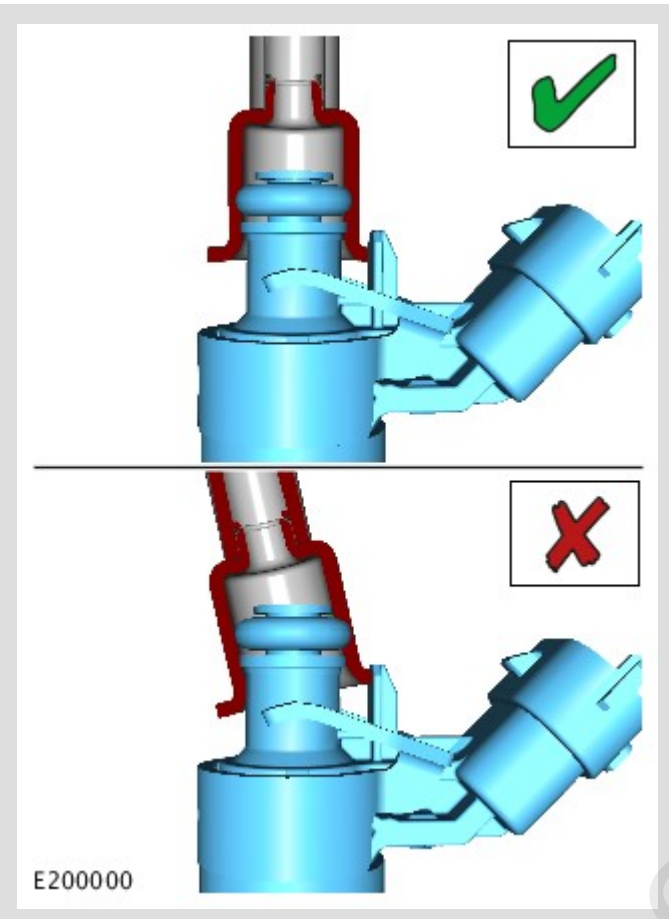
Install the 6 fuel injectors into the fuel rail.

40.



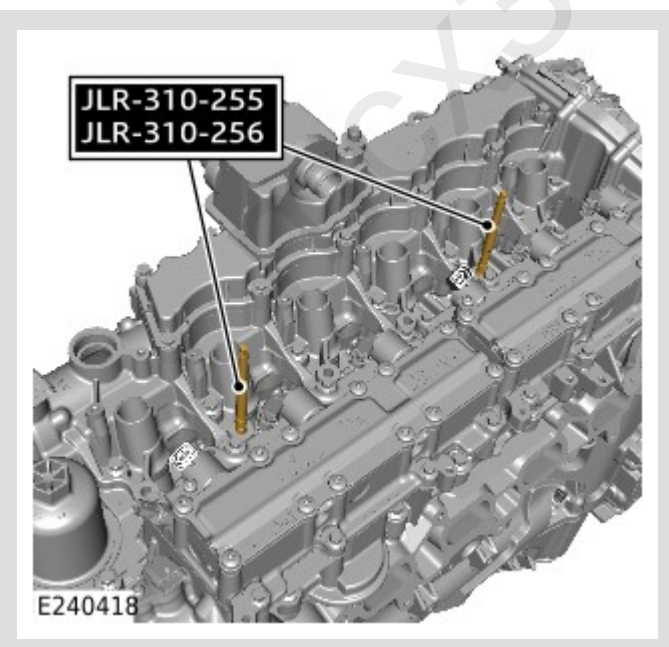
Make sure the fuel injectors are correctly installed.

41.



Make sure the fuel injectors are correctly installed.

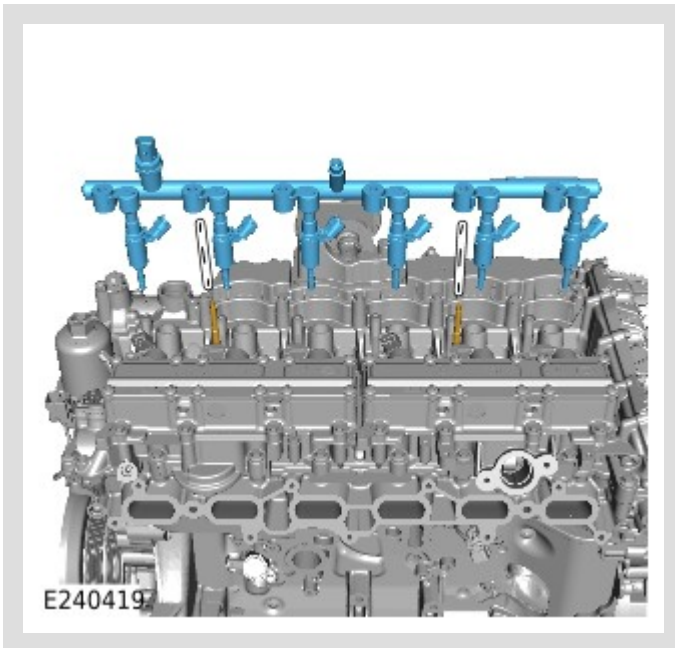
42.



Install the appropriate special tools. If a new cylinder head **has not** been installed then the special tool JLR-310-255 with the threaded section must be used. If a new cylinder head **has** been installed then the special tool JLR-310-256 without the threaded section must be used.

Special Tool(s): [JLR-310-255](#), [JLR-310-256](#)

43.

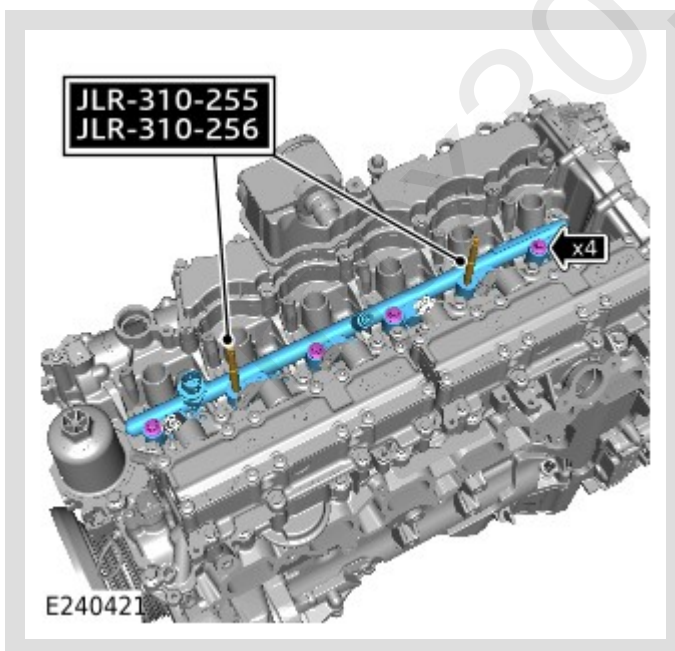


Install the fuel rail and injector assembly allowing guide pins to control position.

44.

NOTE:

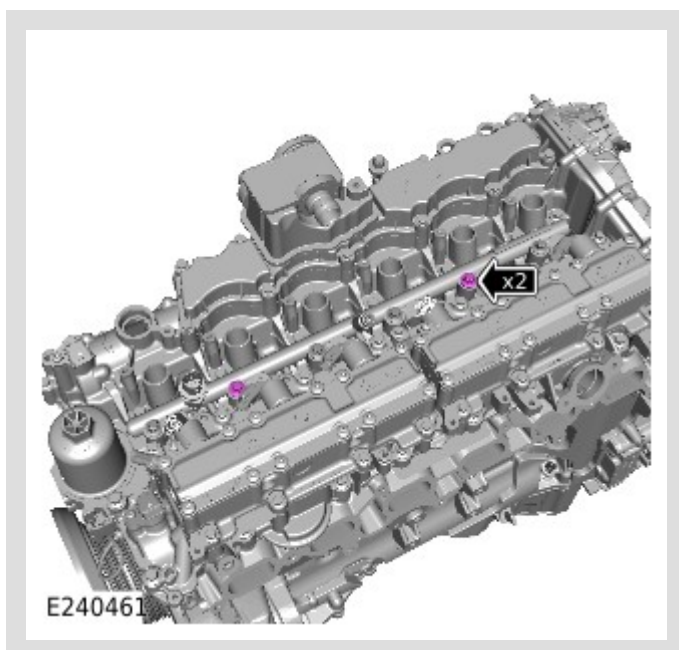
Tighten each of the bolts 1 turn at a time until the fuel rail is fully installed.



- Install and tighten the 4 bolts.
Renew Part: [Fuel rail bolt\(s\)](#) Quantity: 4.
Torque: **15Nm**
- Remove the special tools.
Special Tool(s): [JLR-310-255](#), [JLR-310-256](#)

 NOTE:

Tighten each of the bolts 1 turn at a time until the fuel rail is fully installed.



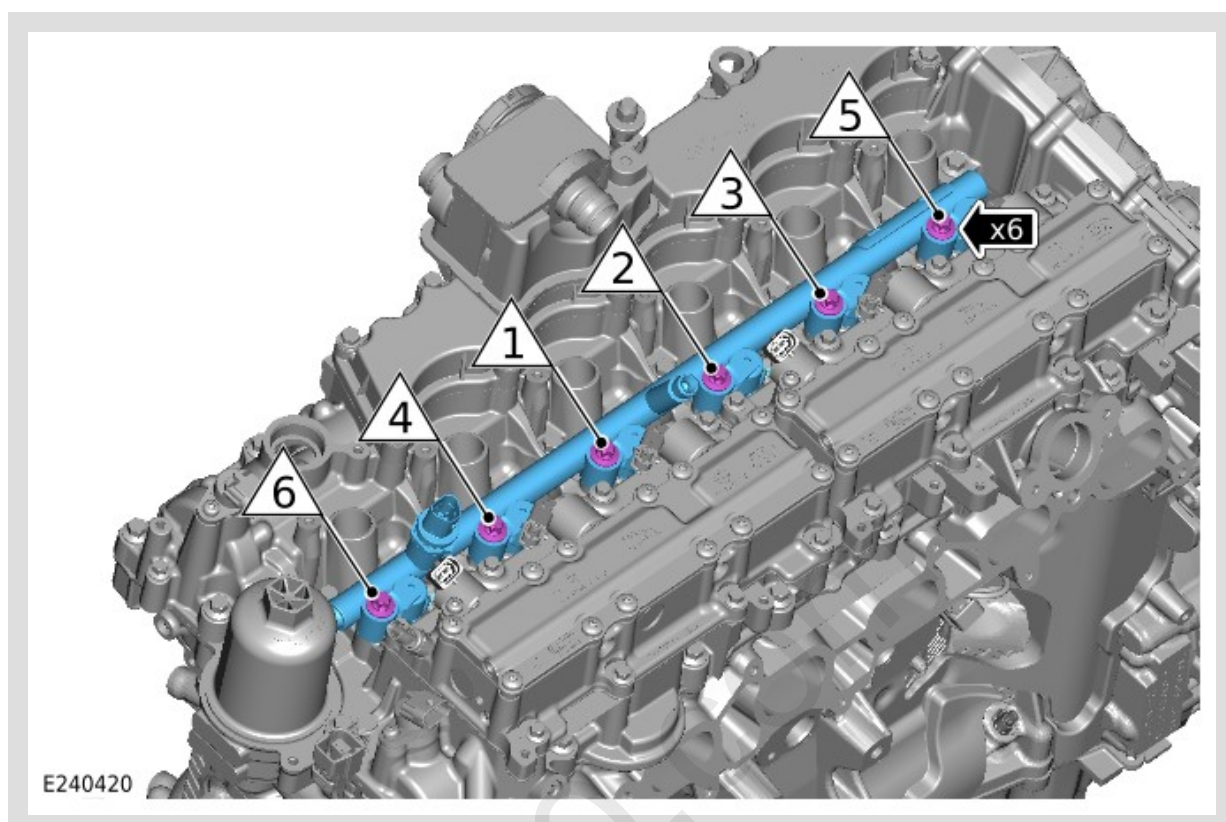
Install and tighten the 2 bolts.

Renew Part: *Fuel rail bolt(s)* Quantity: 2.

Torque: 15Nm

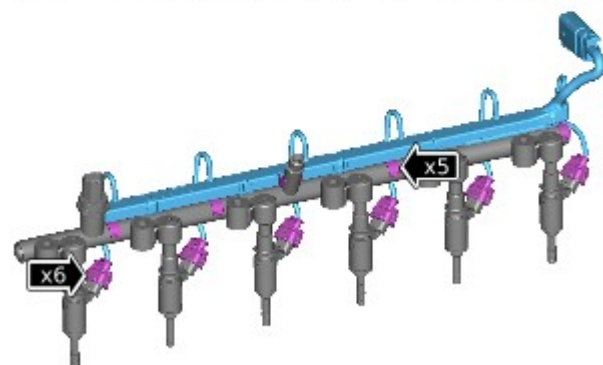
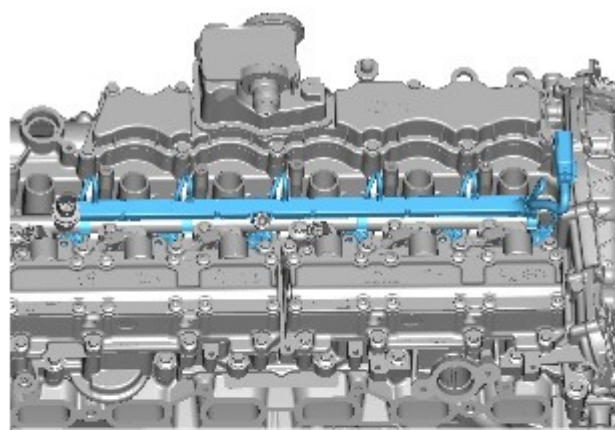
 NOTE:

Tighten each of the bolts 1 turn at a time until the fuel rail is fully installed.



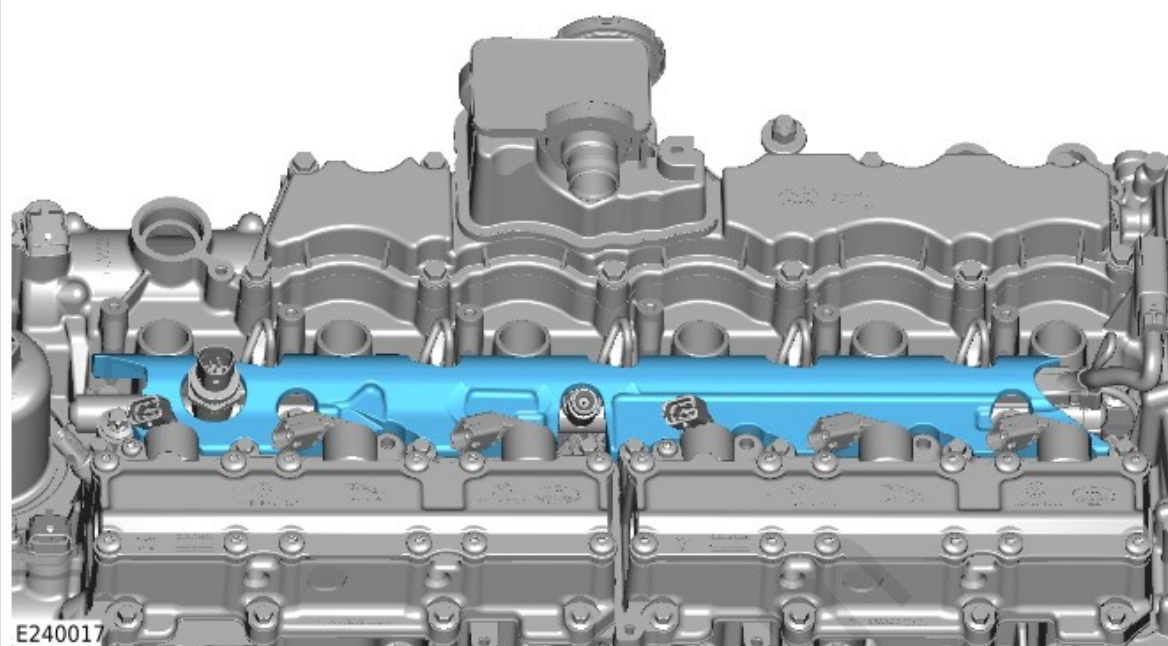
Tighten the 6 bolts in the sequence illustrated.

Torque: 30Nm

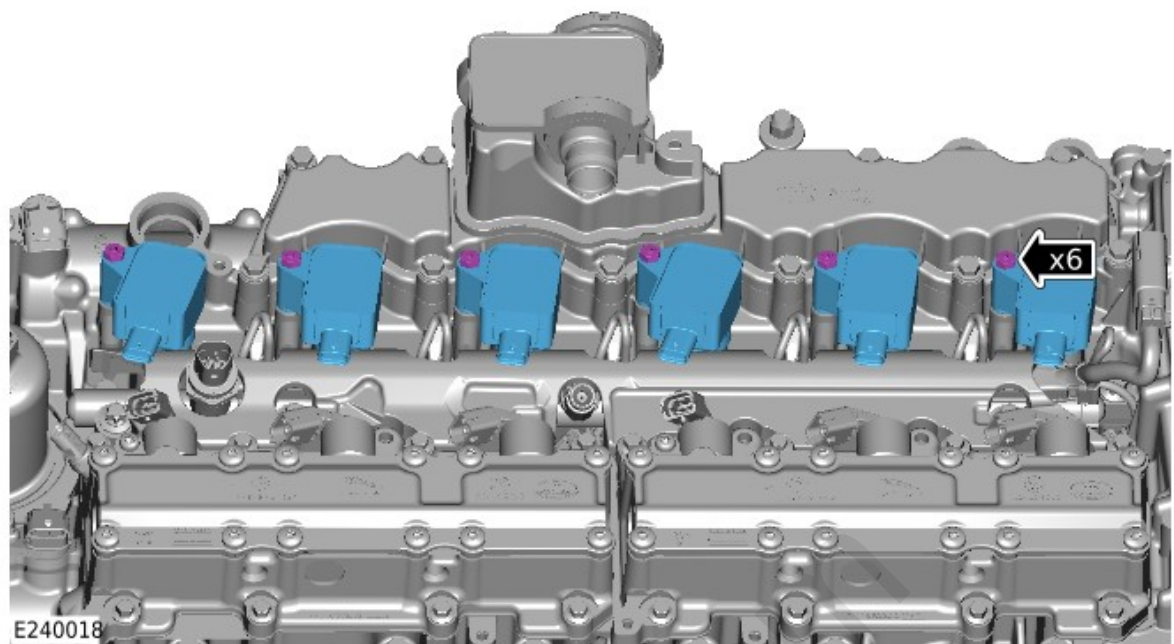


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- Install the wiring harness.
- Connect the 6 electrical connectors.
- Install the 5 clips.



Install the NVH material.

**WARNINGS:**

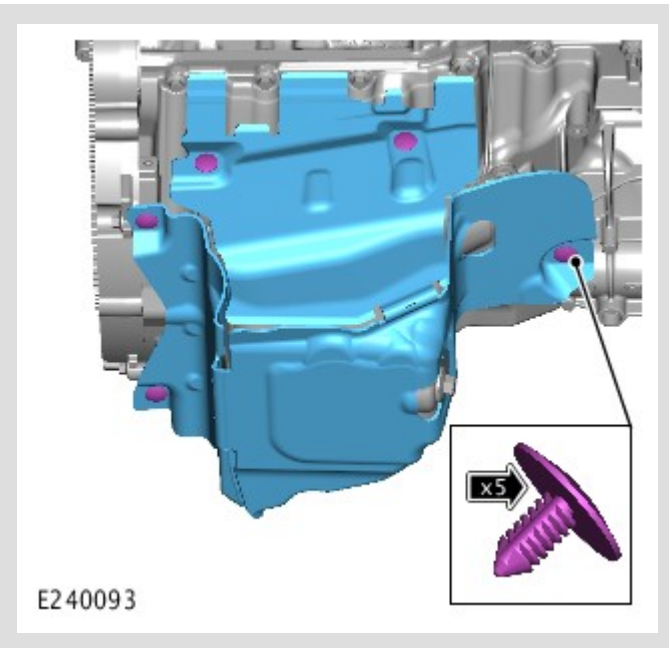
- Make sure that the spark plug ceramic insulator and terminal pin are wiped/cleaned dry using a soft clean cloth.
- Make sure that the ignition coil-on-plug rubber boot is pushed down fully over the spark plug ceramic insulator. Double check by installing the ignition coil-on-plug as usual and then pushing on the ignition coil-on-plug head gently for a second time to make sure that the ignition coil-on-plug rubber boot has seated correctly over the spark plug insulator.

Install the 6 ignition coils.

- Install and tighten the 6 bolts.

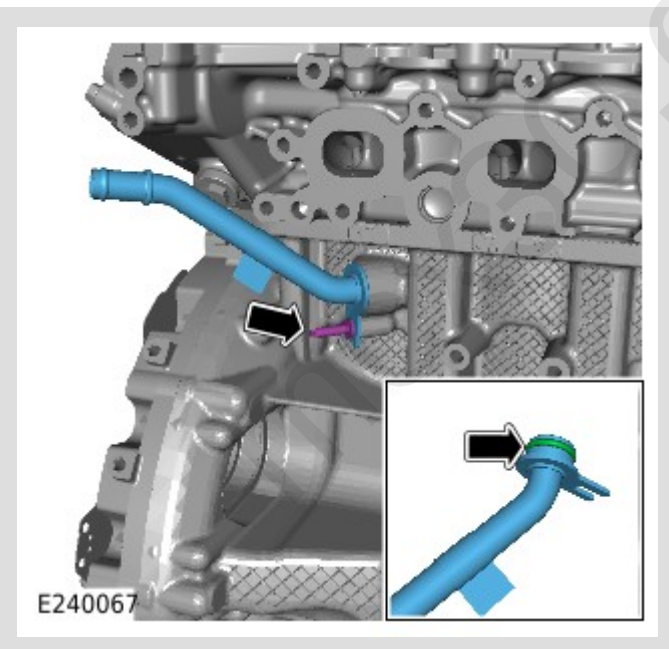
Torque: 8Nm

50.



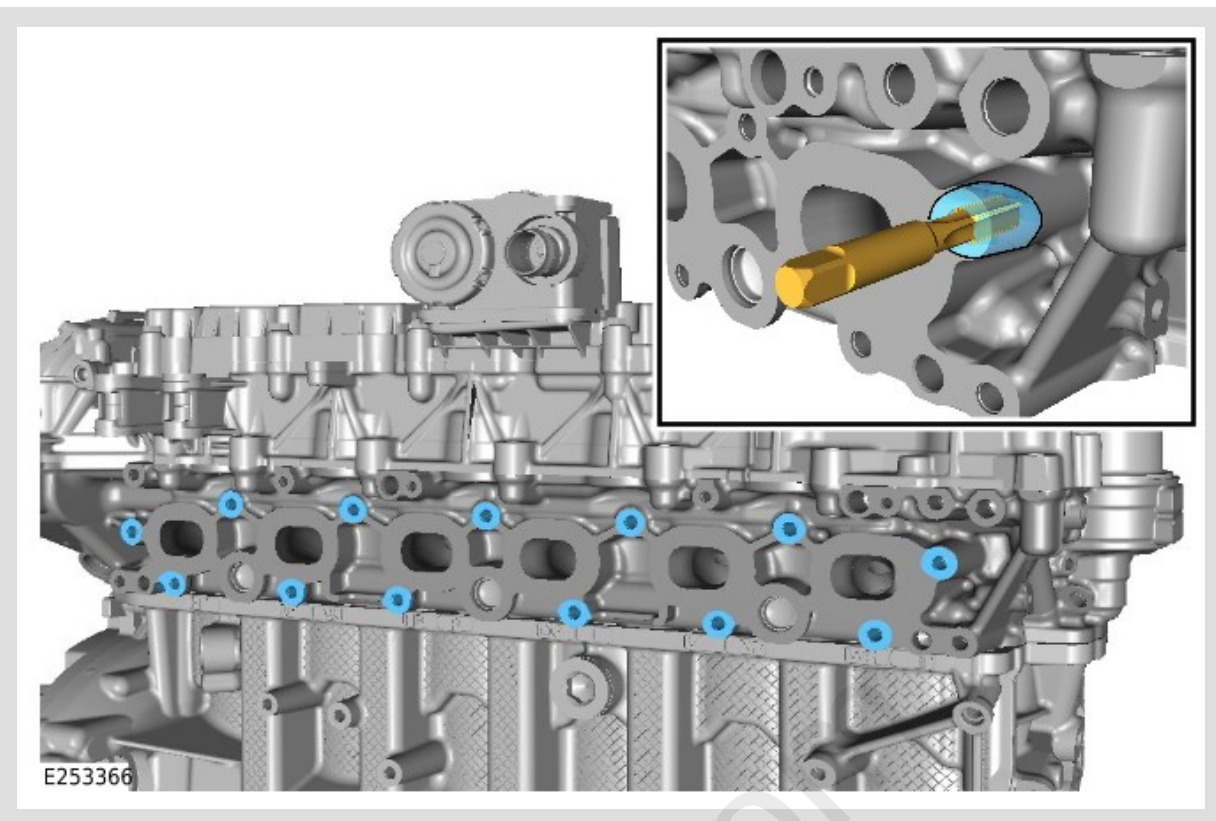
- Install the NVH material.
- Install the 5 clips.

51.

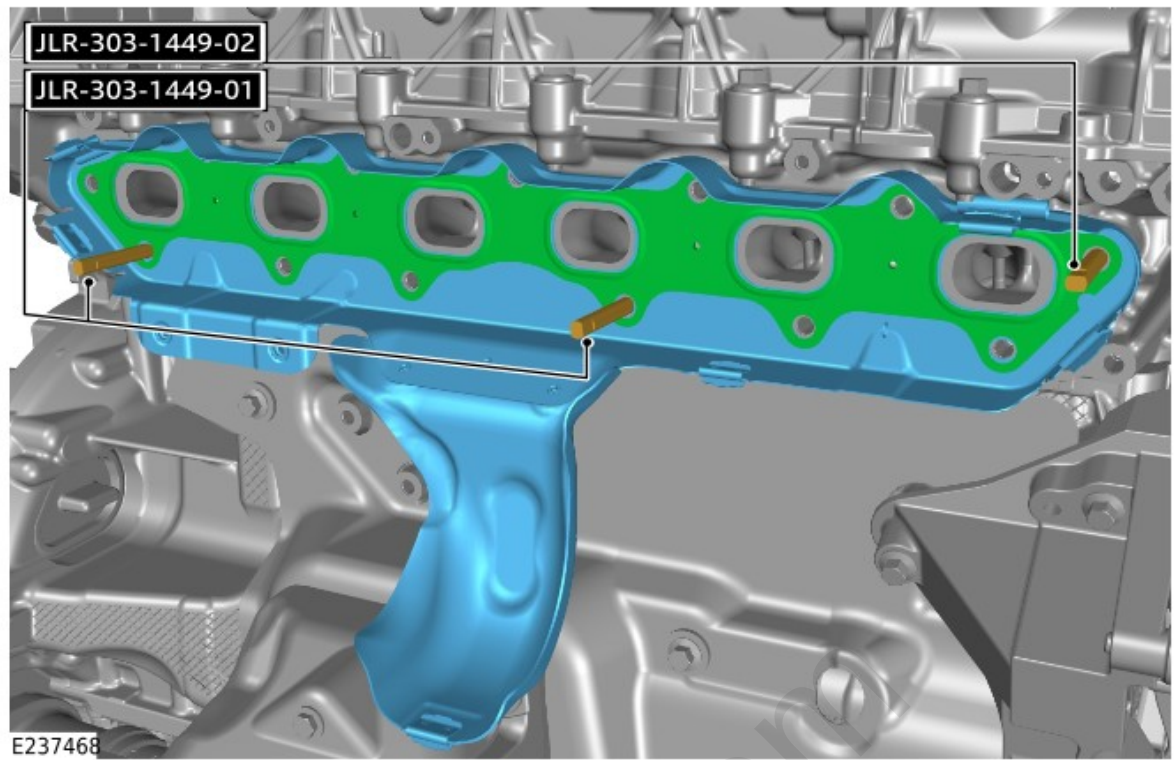


- Inspect the O-ring seal, replace if damaged.
- Install the coolant pipe.
- Install and tighten the bolt.

Torque: 11.5Nm



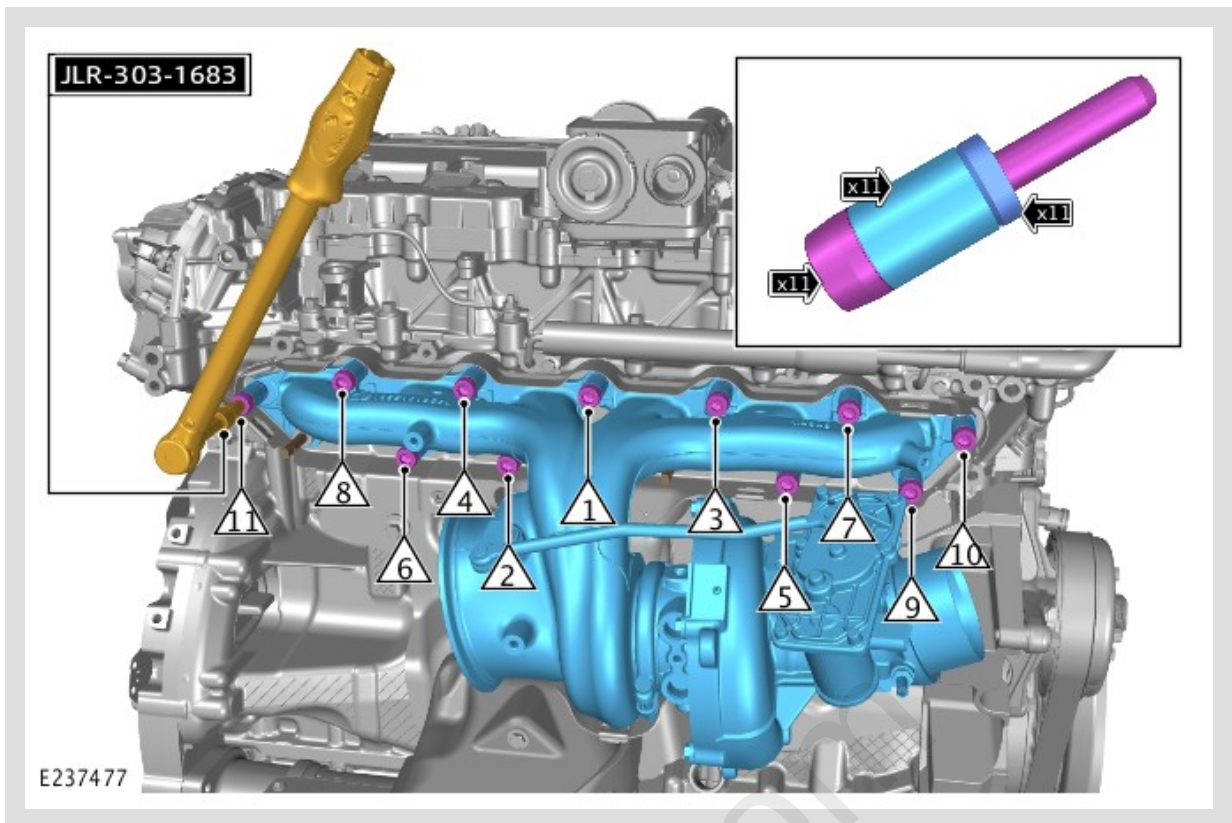
Use an M8 x 1.25 bottoming tap to clean the threads.



- Install the appropriate special tools. If a new cylinder head **has not** been installed then the special tool JLR-303-1449-01 with the threaded section must be used. If a new cylinder head **has** been installed then the special tool JLR-303-1449-02 without the threaded section must be used.

Special Tool(s): [303-1449-01](#), [303-1449-02](#)

Renew Part: [Exhaust manifold gasket](#) Quantity: *1*.

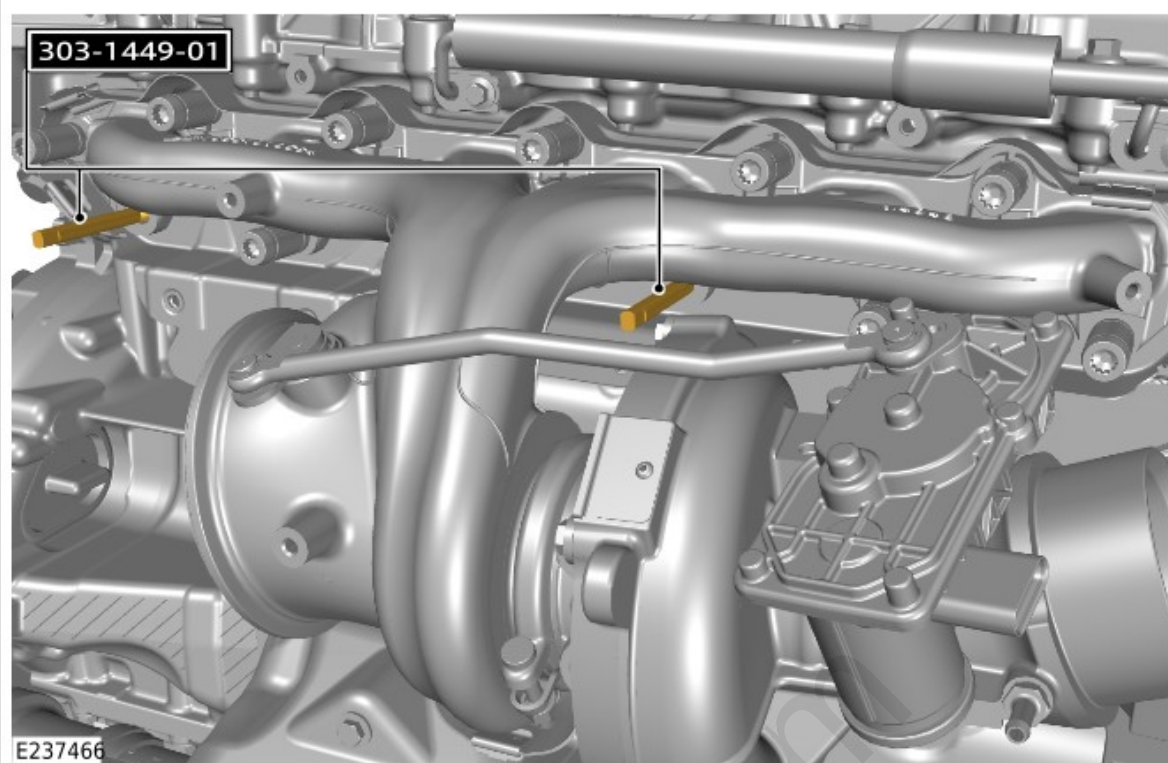


- Install the turbocharger.
- Use the special tool to install and tighten the 11 new bolts, spacers and washers in the sequence illustrated.

Special Tool(s): [JLR-303-1683](#)

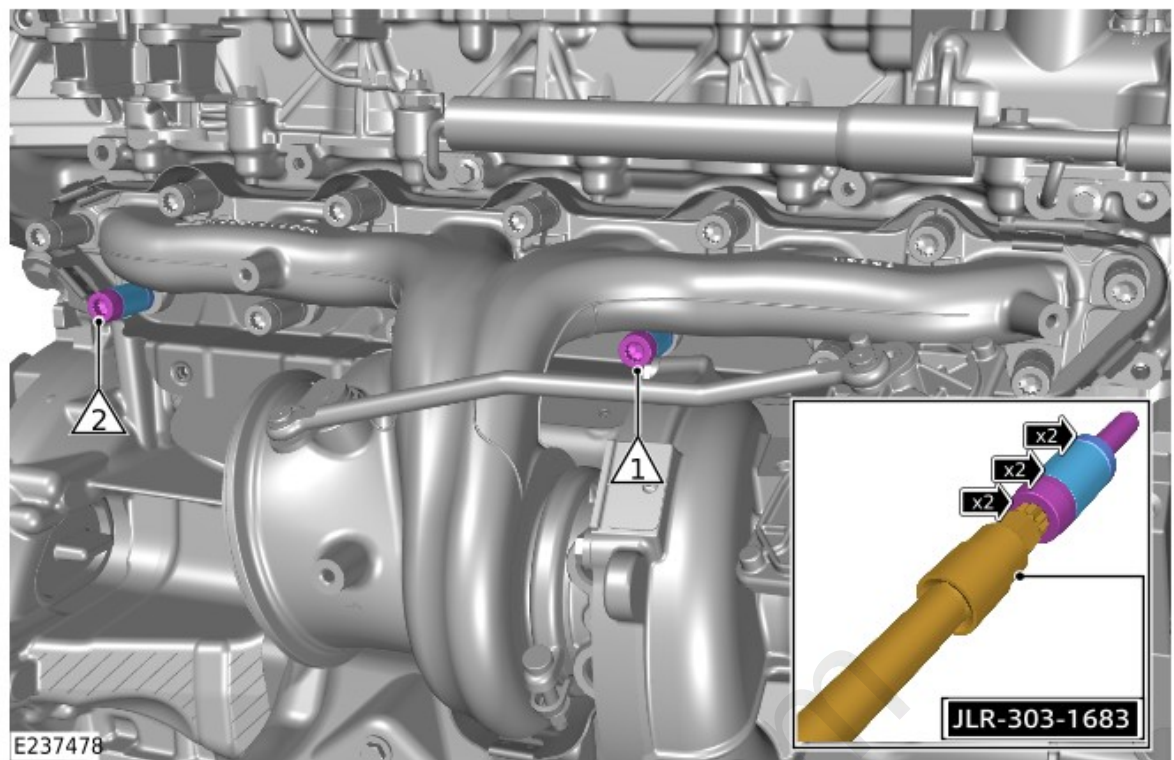
Renew Part: [Exhaust manifold bolts](#) *Quantity:* 11.

Torque: 8Nm



Remove the special tools.

Special Tool(s): [303-1449-01](#), [303-1449-02](#)



Use the special tool to install and tighten the 2 new bolts, spacers and washers in the sequence illustrated.

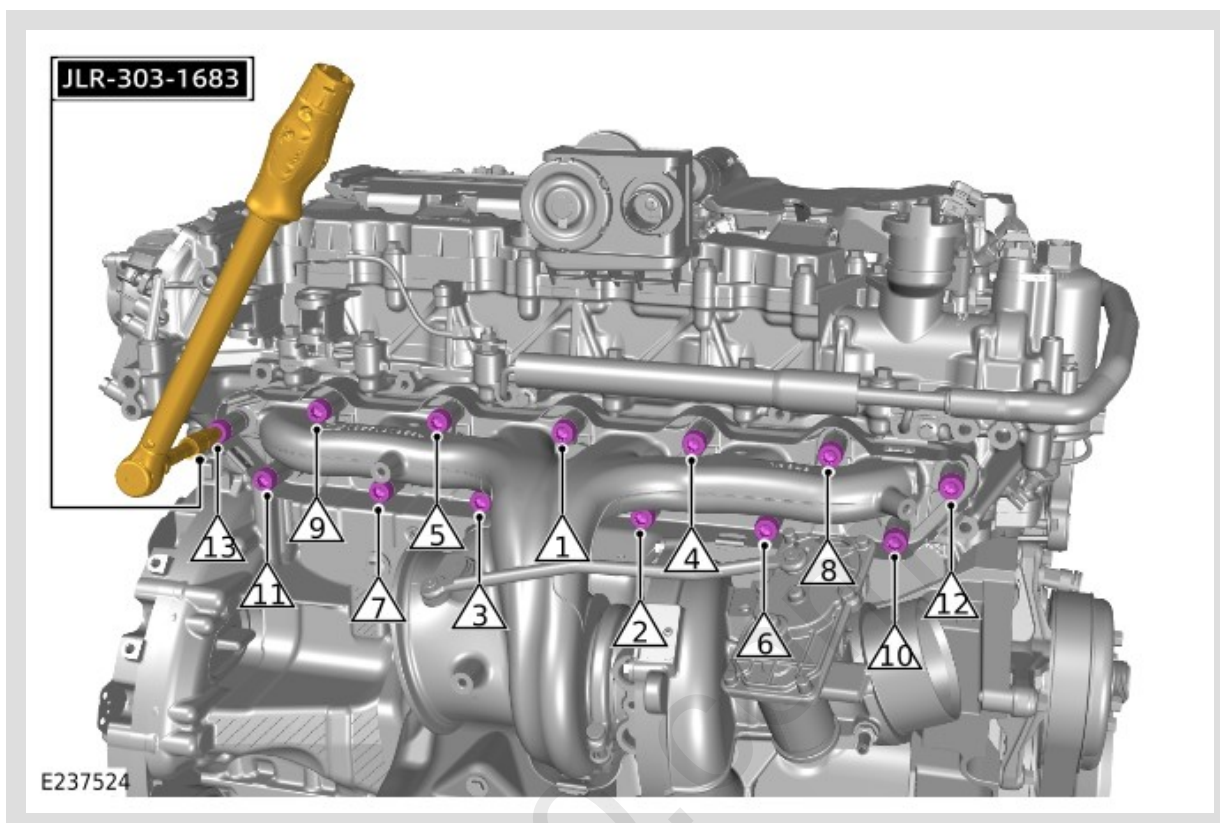
Special Tool(s): [JLR-303-1683](#)

Renew Part: [Exhaust manifold bolts](#) Quantity: 2.

Torque: 8Nm

CAUTION:

Allow 4 hours for the thread locking compound to cure.



Use the special tool to tighten the 13 bolts in the sequence illustrated.

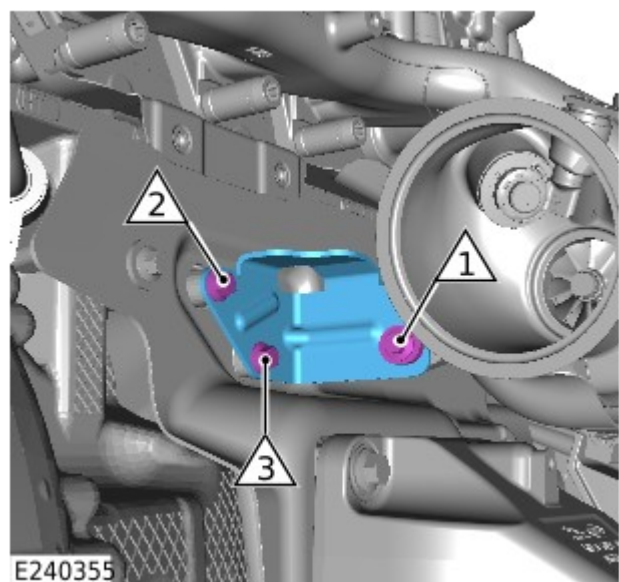
Special Tool(s): [JLR-303-1683](#)

Torque

Stage1: **12Nm**

Stage2: **15Nm**

Stage3: **135°**

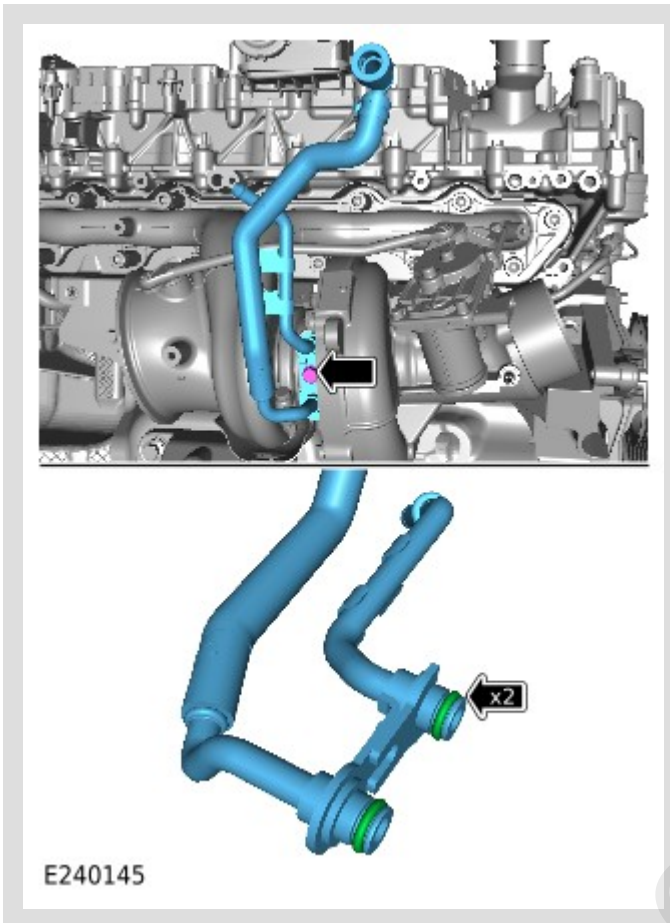


- Install the bracket.
- Install and tighten the 3 bolts in the sequence illustrated.

Torque

Stage1: **11.5Nm**

Stage2: **25Nm**



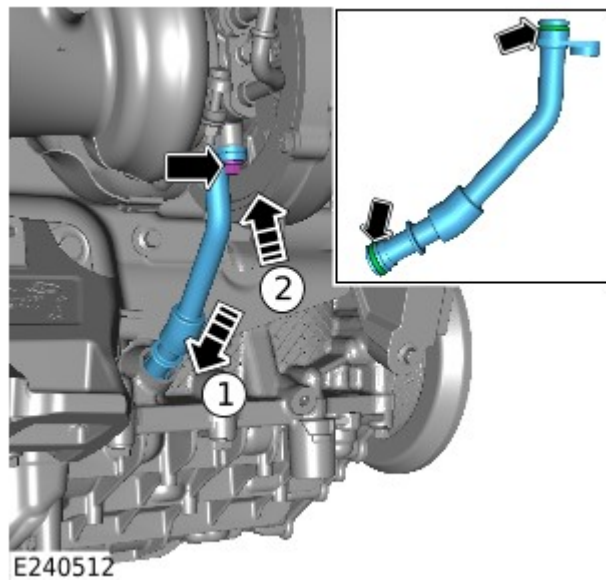
- Install 2 new O-ring seals.

Renew Part: [Turbocharger coolant pipe O-ring seal](#) Quantity: 2.

- Install the 2 coolant pipes.
- Install and tighten the bolt.

Torque: 11.5Nm

60.



- Install the 2 new O-ring seals.

Renew Part: [Turbocharger oil return pipe seals](#) *Quantity:* 2.

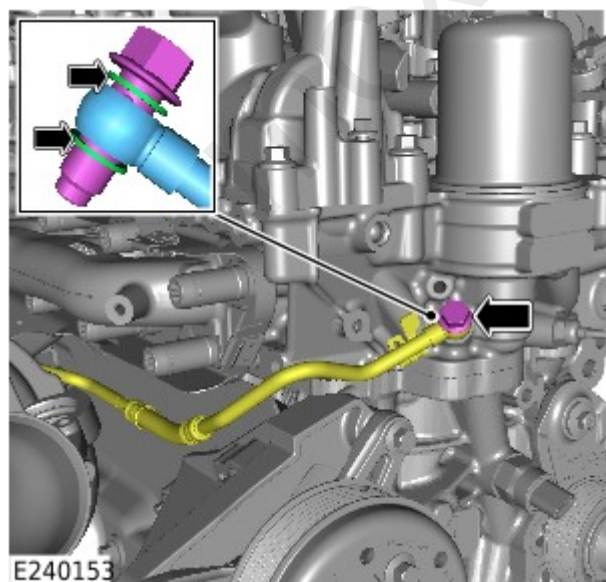
- Lubricate the 2 O-ring seals with clean engine oil.

Refer to: [Specifications](#) (303-01C Engine - INGENIUM I6 3.0L Petrol, Specifications).

- Install the pipe.
- Install and tighten the bolt.

Torque: **10.5Nm**

61.



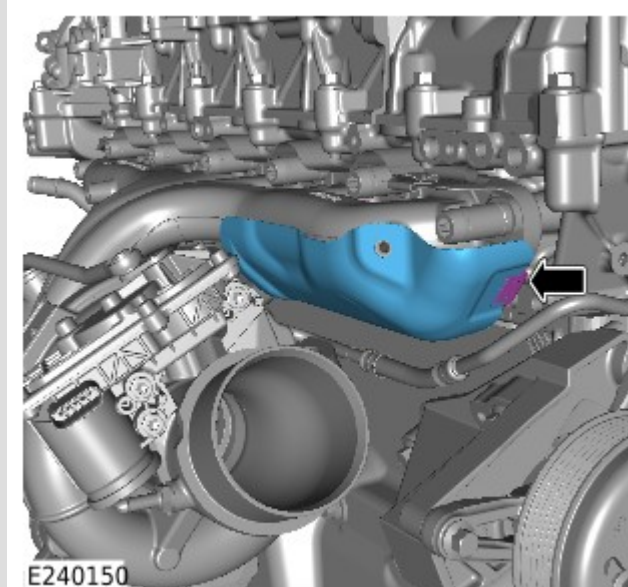
- Install 2 new sealing washers.

Renew Part: [Oil supply pipe sealing washers](#) *Quantity:* 2.

- Install and tighten the banjo bolt.

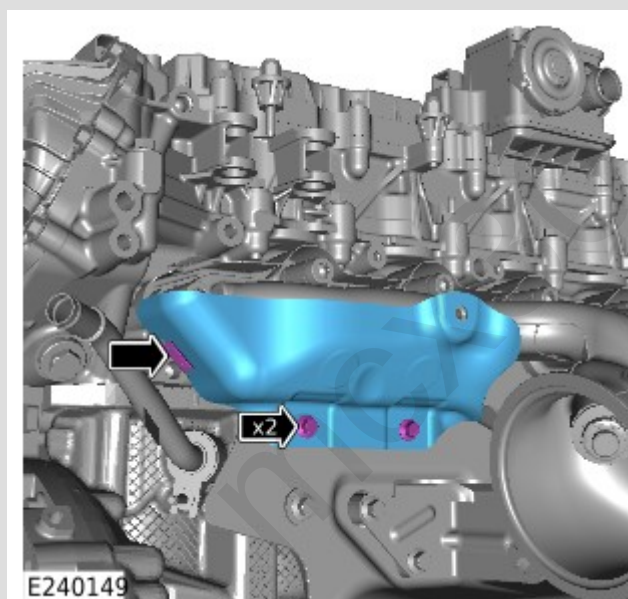
Torque: **18Nm**

62.



Install the heatshield.

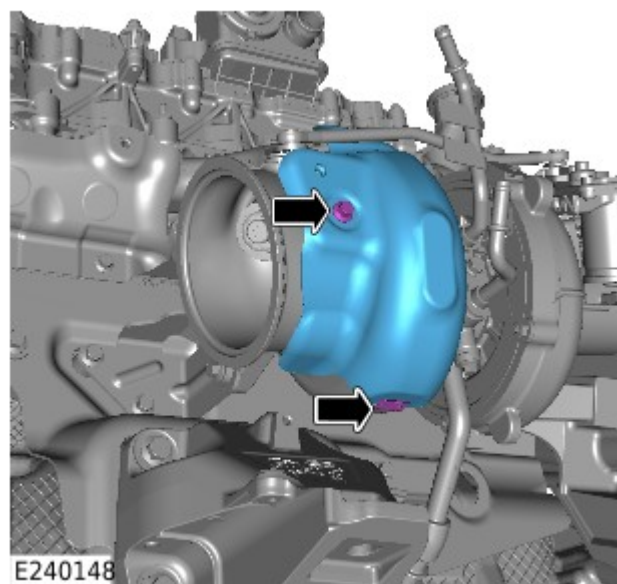
63.



- Install the heatshield.
- Install and tighten the 2 bolts.

Torque: 9Nm

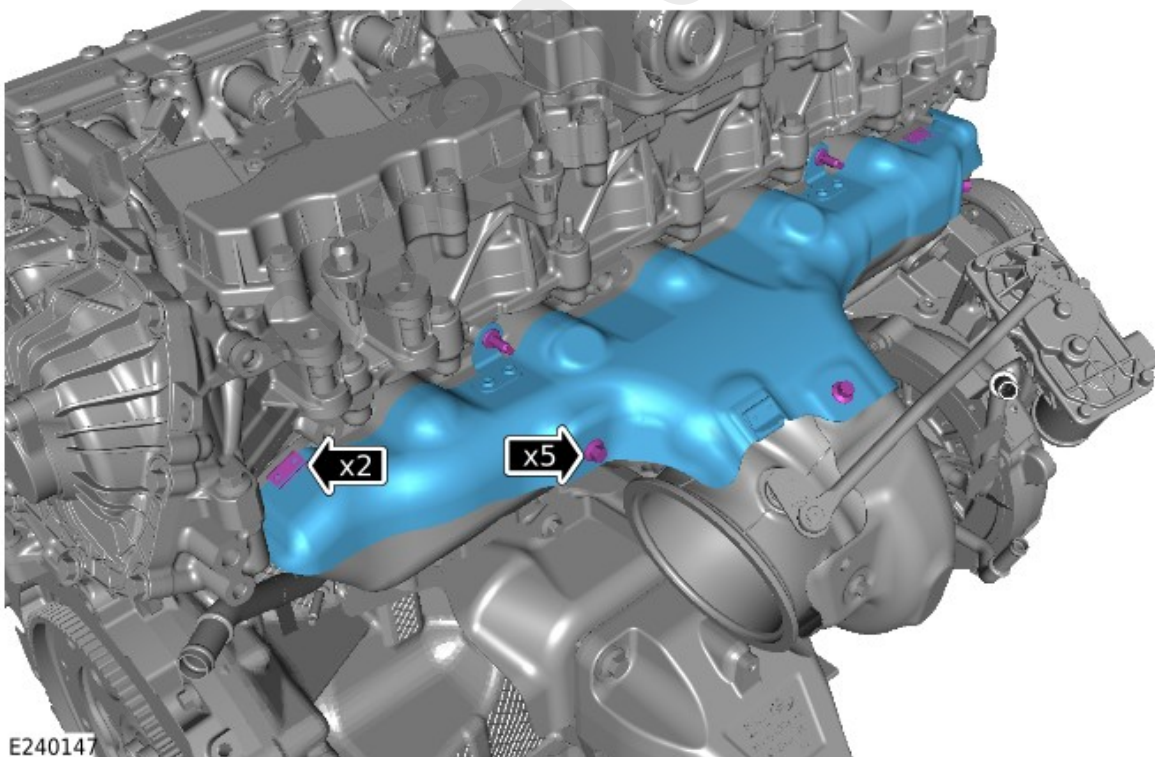
64.



- Install the heatshield.
- Install and tighten the bolt.

Torque: 9Nm

65.



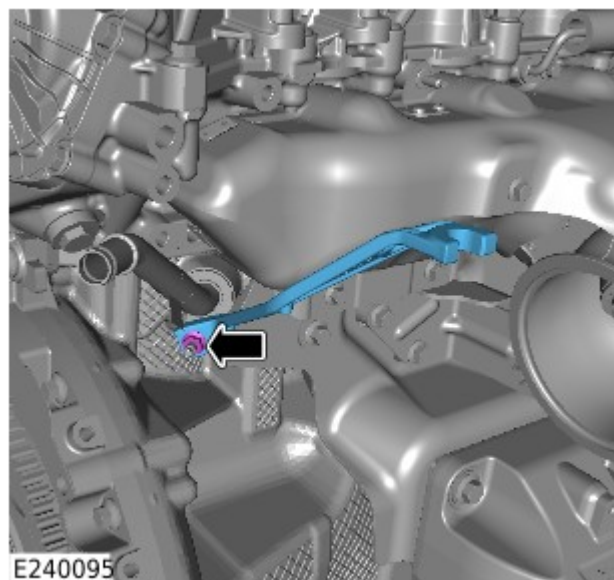
- Install the heatshield.
- Install and tighten the 5 bolts.

Torque

M6 x 14 mm: **6.5Nm**

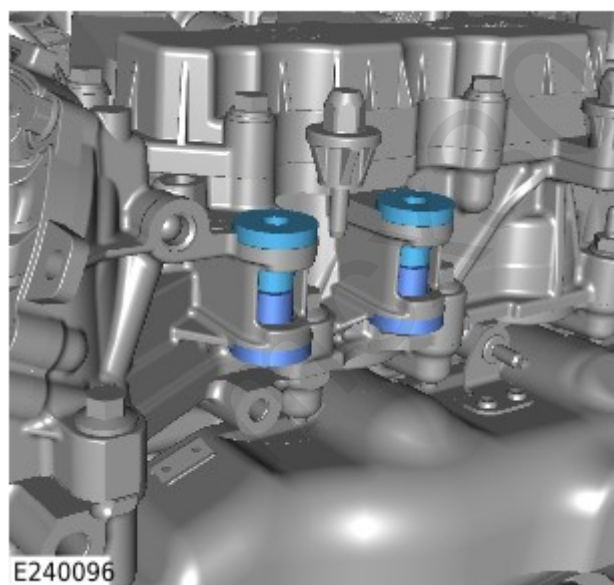
M6 x 18 mm: **9Nm**

66.



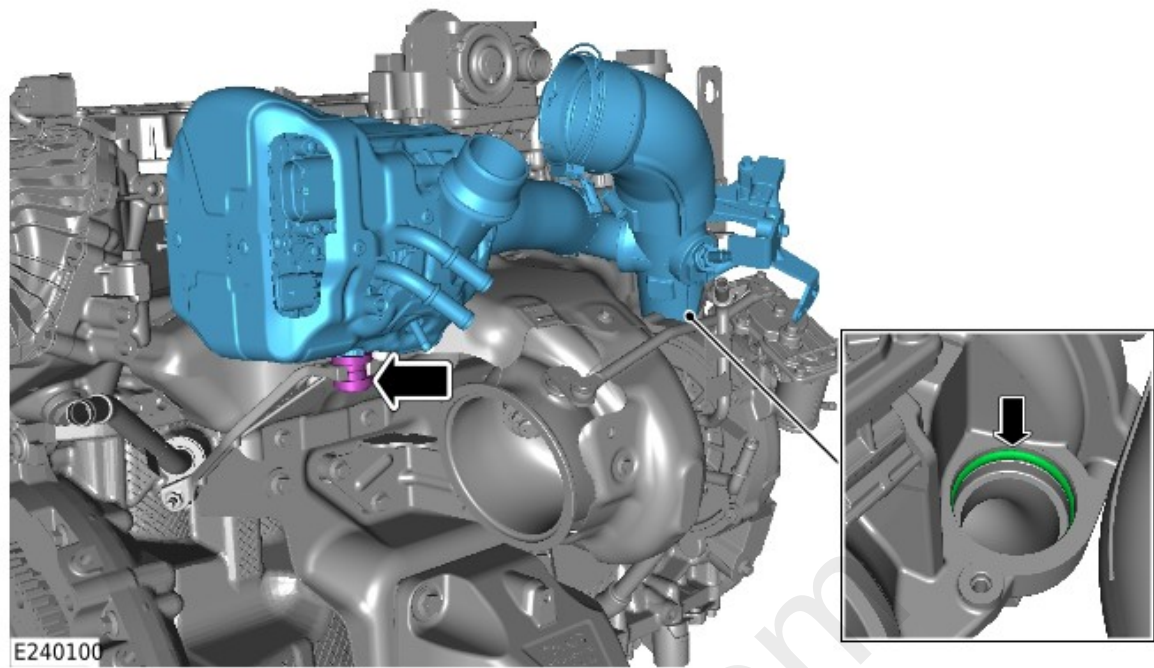
- Install the bracket.
- Install, but do not fully tighten the nut.

67.



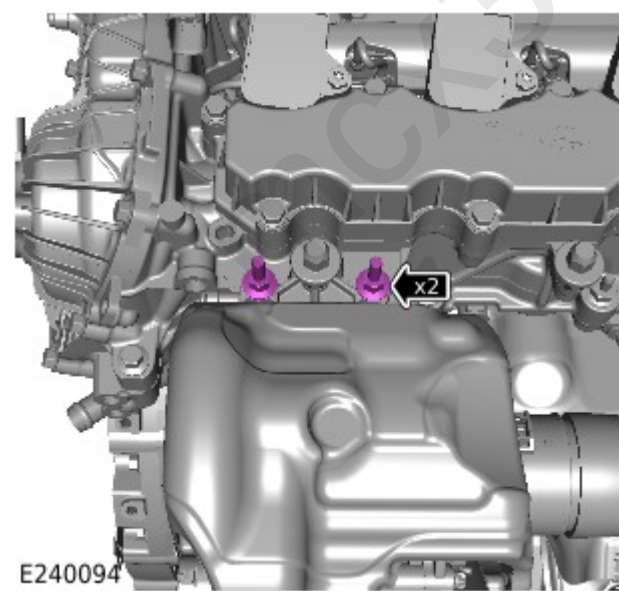
Install the 4 supercharger mounting rubbers.

68.



- Inspect the O-ring seal and replace if damaged.
- Install the supercharger assembly.

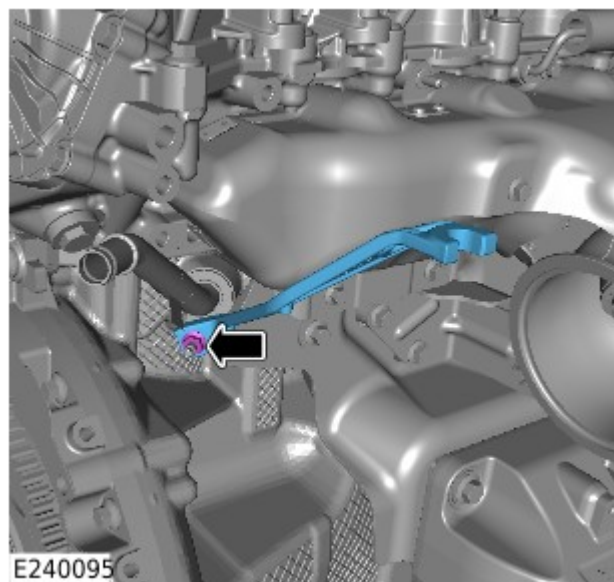
69.



Install and tighten the 2 bolts.

Torque: 25Nm

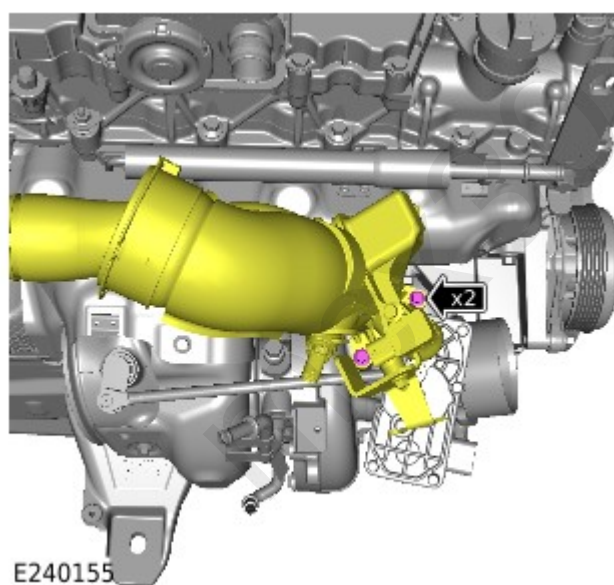
70.



Fully tighten the nut.

Torque: 11.5Nm

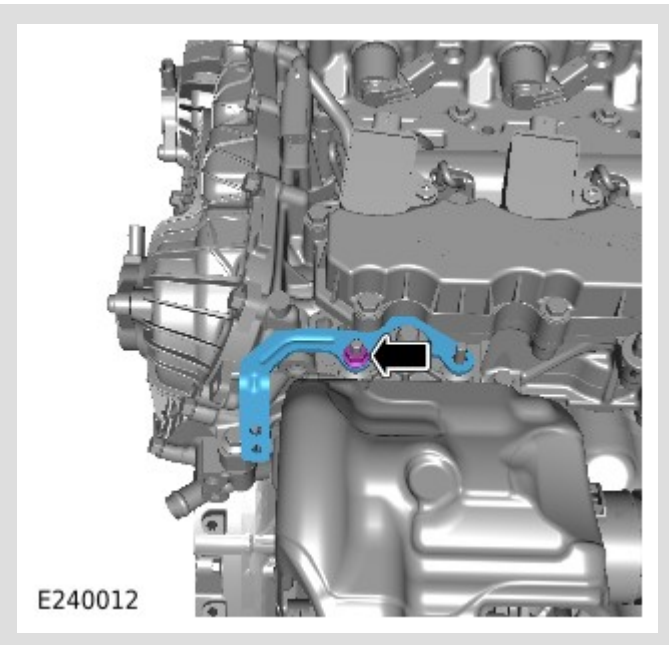
71.



Install and tighten the 2 bolts.

Torque: 11.5Nm

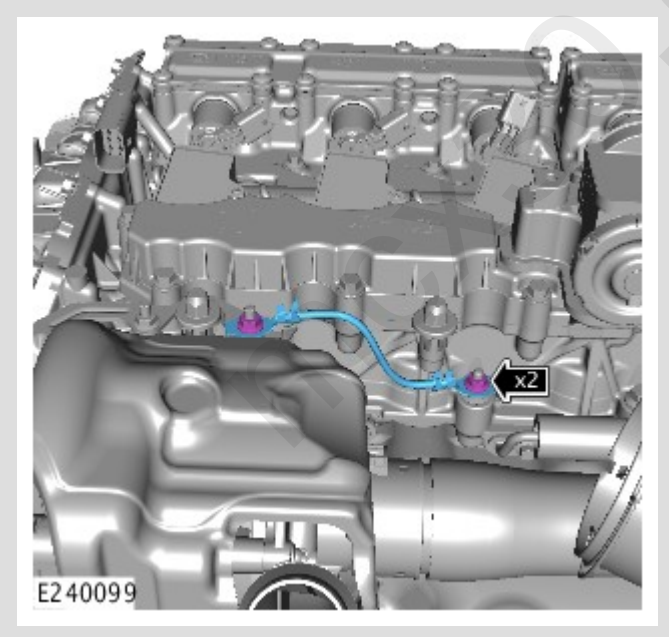
72.



- Install the bracket.
- Install and tighten the nut.

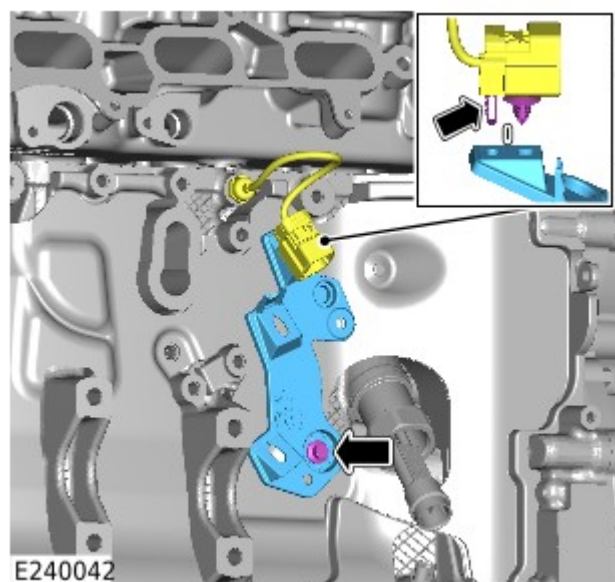
Torque: 11.5Nm

73.



- Install the ground cable.
- Install and tighten the 2 nuts.

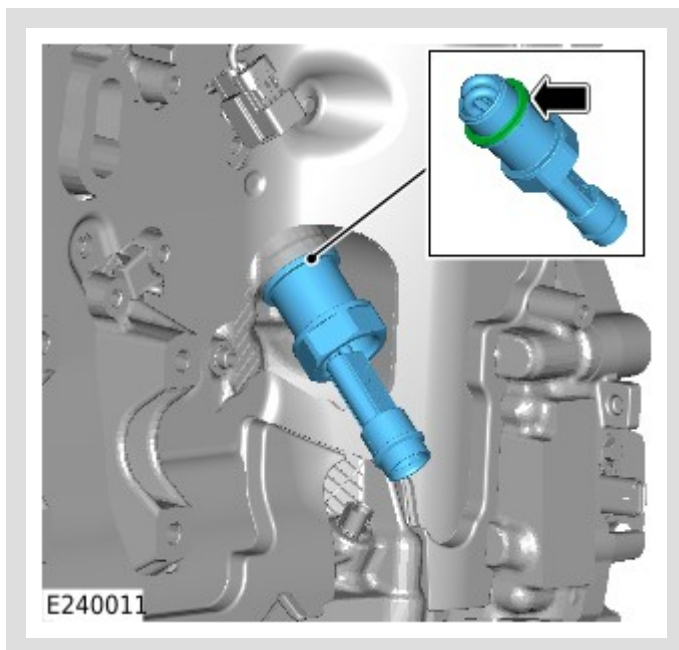
Torque: 11.5Nm



- Install the bracket.
- Install and tighten the bolt.
Torque: 9Nm
- Install the clip.

 NOTE:

If equipped.

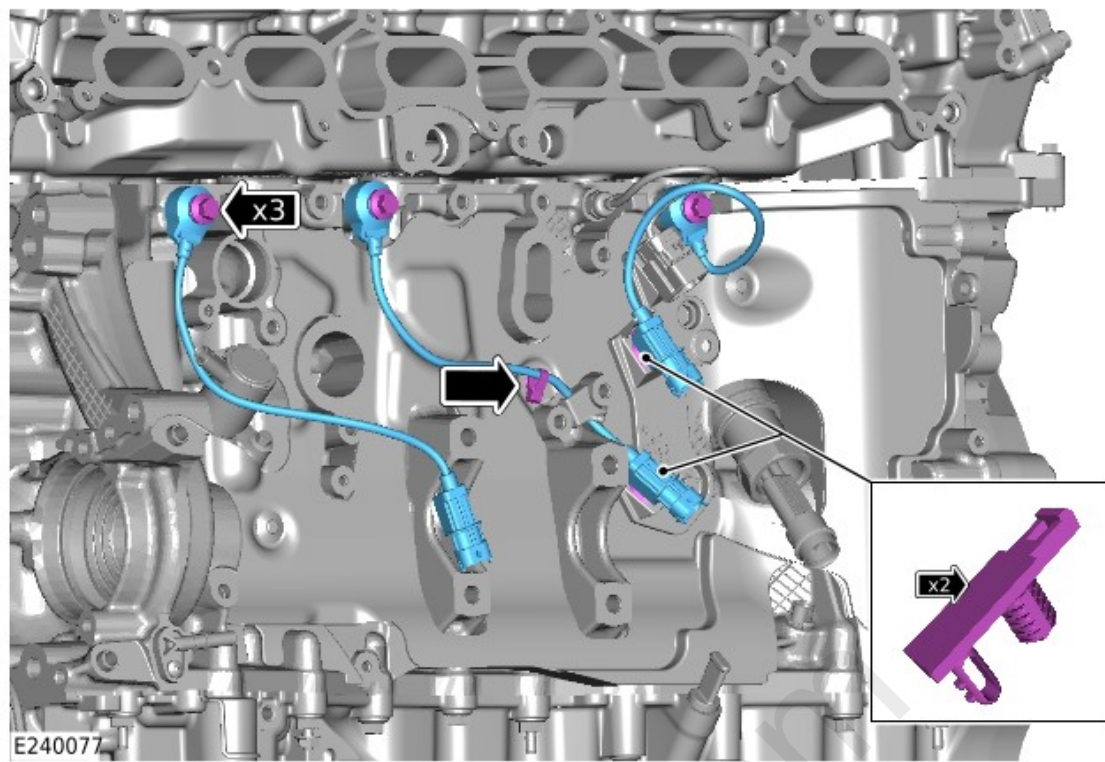


- Install a new gasket.

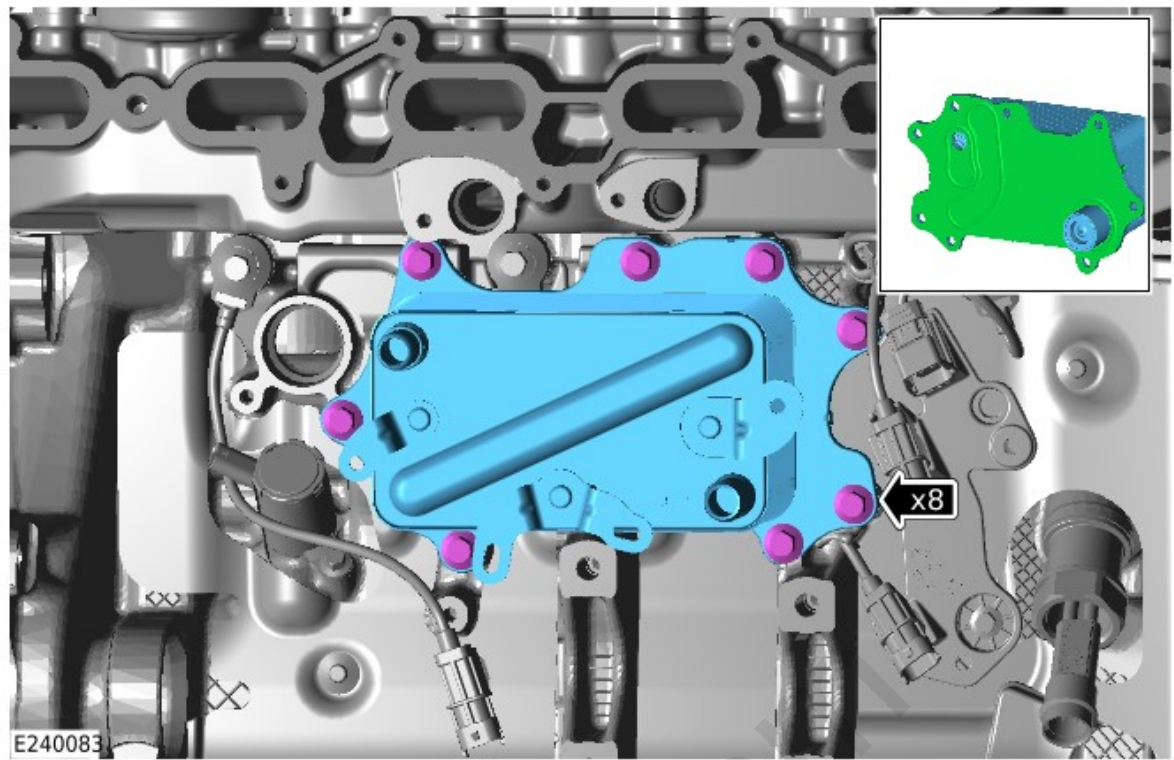
Renew Part: [Engine block heater manifold seal\(s\)](#) *Quantity:* 1.

- Install and tighten the block heater.

Torque: **50Nm**

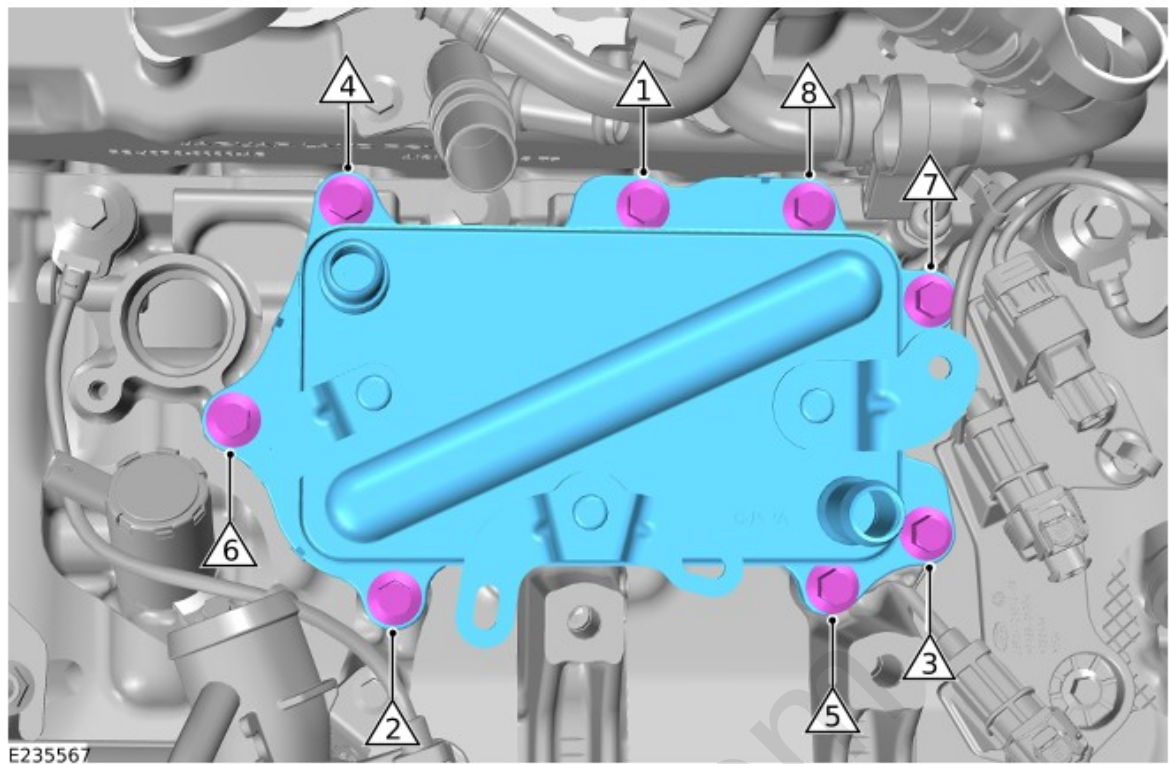


- Install the 3 knock sensors to the position noted in the removal step.
- Install and tighten the 3 bolts.
Torque: 20Nm
- Install the 3 clips.



- Install a new gasket.
Renew Part: [Oil cooler gasket](#) Quantity: 1.
- Install the oil cooler.
- Install, but do not fully tighten the 8 bolts.

78.



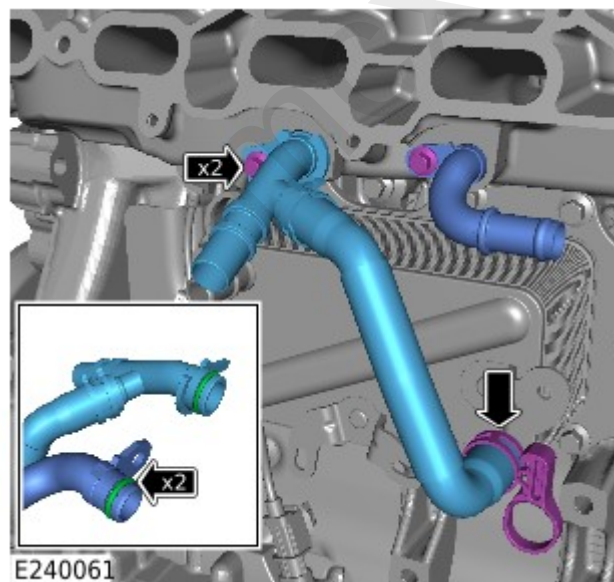
Tighten the 8 bolts in the sequence illustrated.

Torque

Stage1: **10Nm**

Stage2: **25Nm**

79.

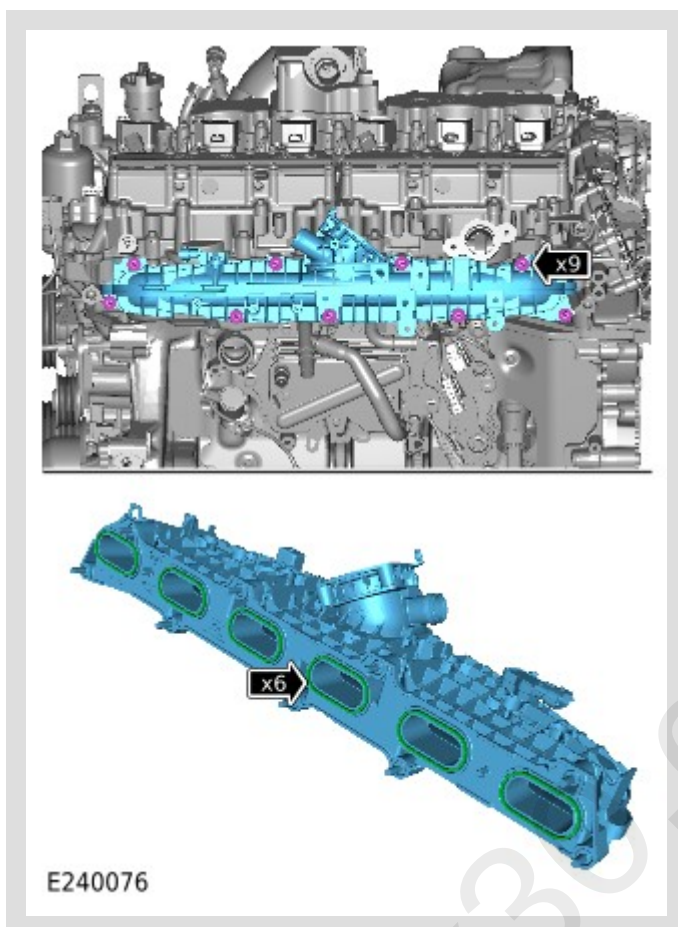


- Inspect the 2 O-ring seals and replace if damaged.
- Install the 2 coolant pipes.
- Install and tighten the 2 bolts.

Torque: 11.5Nm

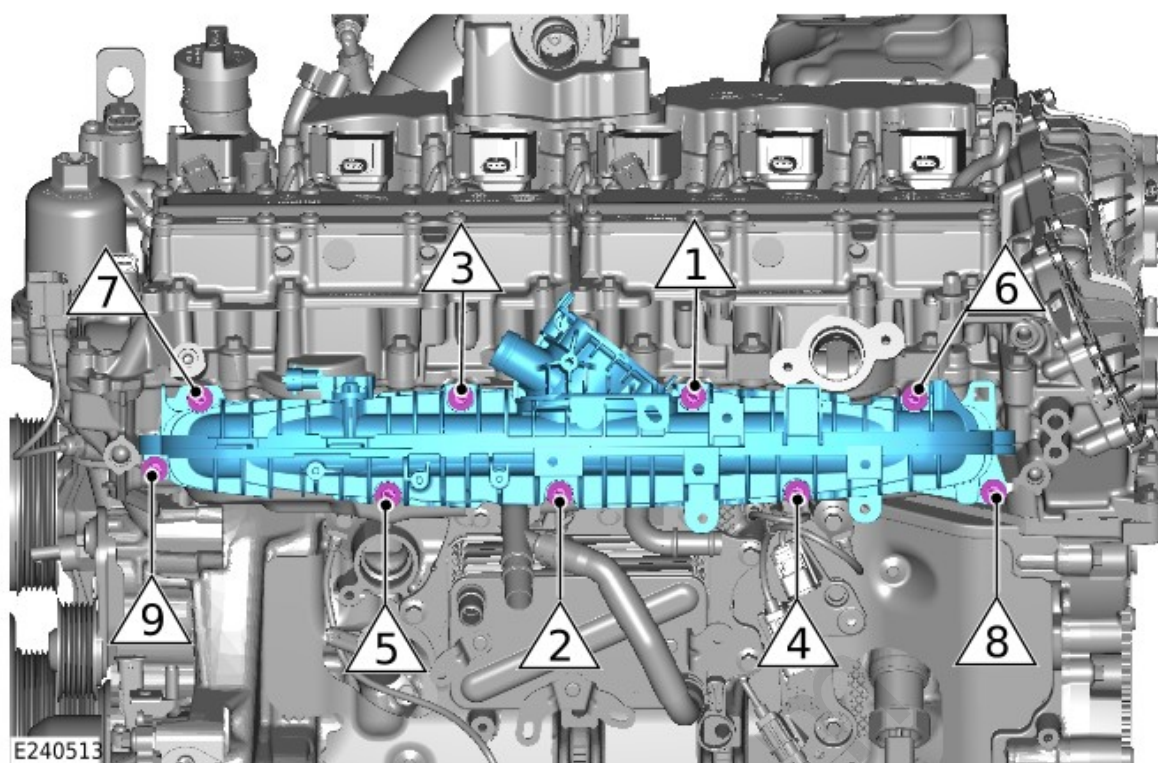
 NOTE:

The bolts will remain captive.



- Install 6 new O-ring seals.
Renew Part: [Intake manifold seals](#) Quantity: 6.
- Install the intake manifold.
- Install, but do not fully tighten the 9 bolts.

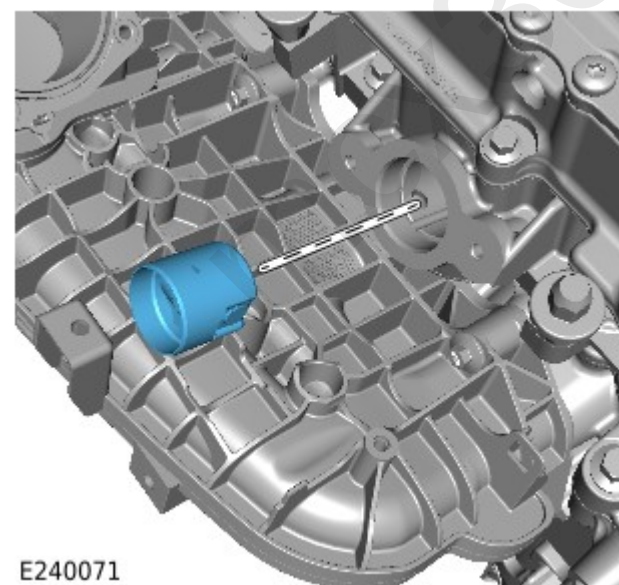
81.



Tighten the 9 bolts in the sequence illustrated.

Torque: 11.5Nm

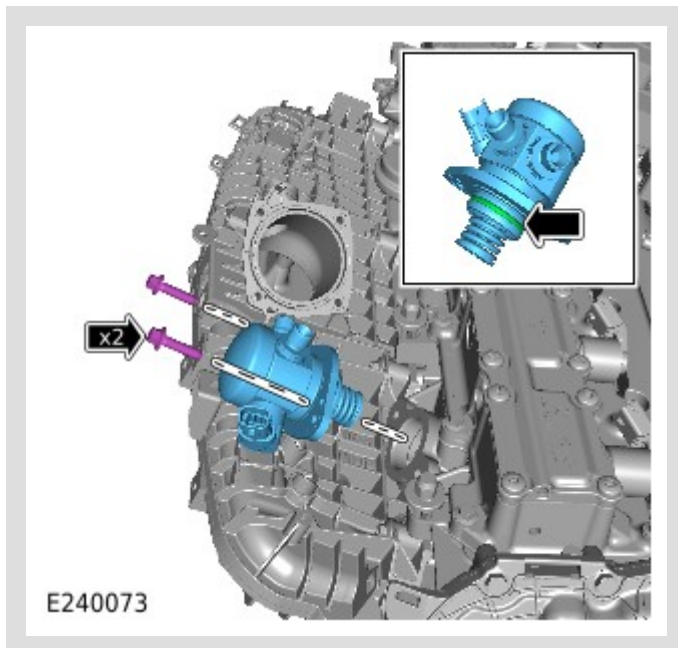
82.



Install the High Pressure High Pressure (HP) fuel pump Camshaft follower.

 NOTE:

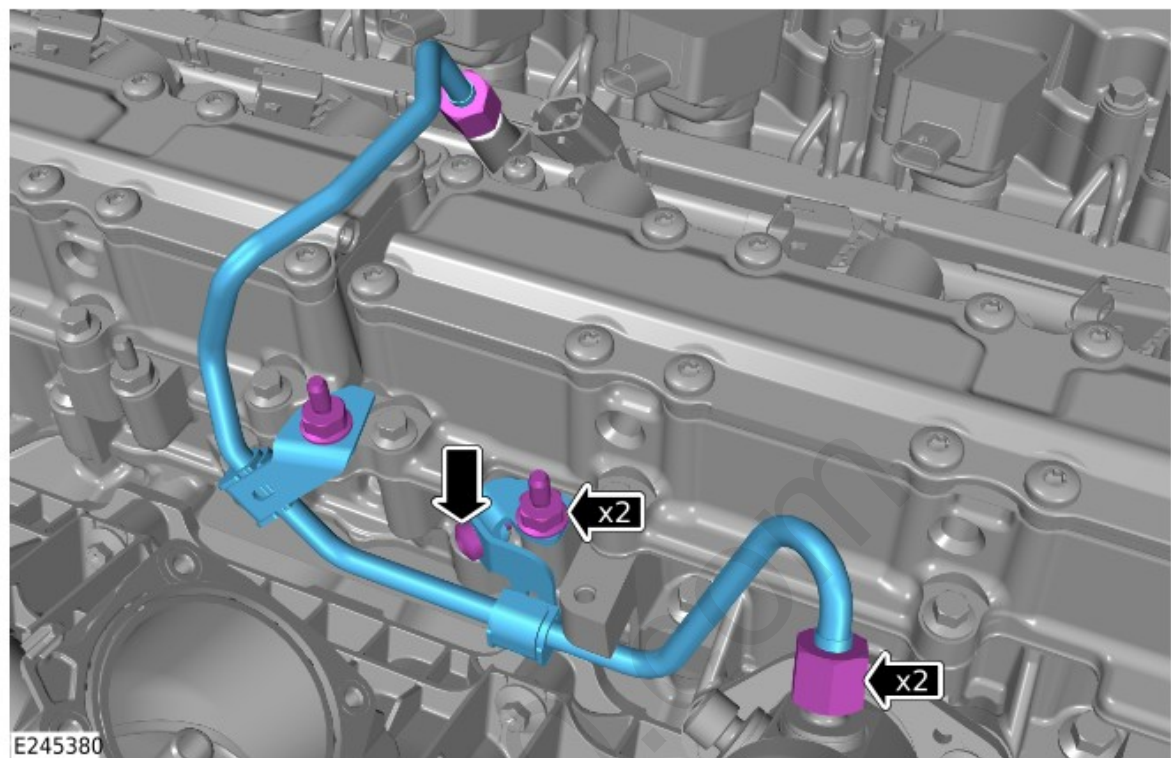
Tighten each of the bolts a half turn at a time until the fuel pump is fully installed.



- Install a new O-ring seal.
Renew Part: [Fuel pump O-ring seal](#) Quantity: 1.
- Lubricate the O-ring seal with clean engine oil.
Refer to: [Specifications](#) (303-01C Engine - INGENIUM I6 3.0L Petrol, Specifications).
- Install the HP fuel pump.
- Install and tighten the 2 bolts.
Renew Part: [Fuel Injection Pump retaining bolts](#) Quantity: 2.
Torque: 14.5Nm

⚠ CAUTION:

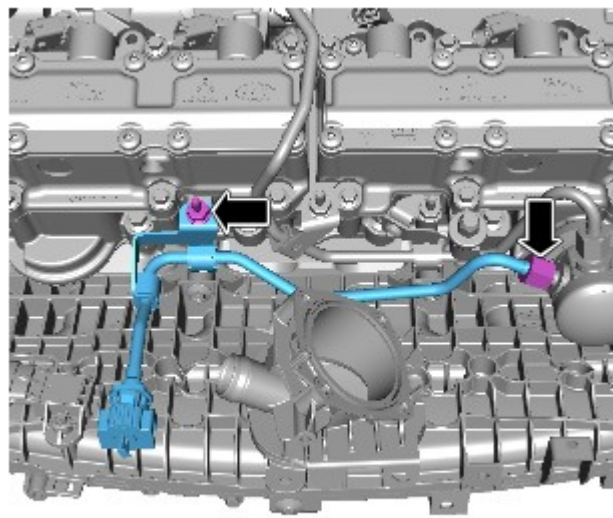
Fuel lines may only be reused one time. After final tightening, clean the fuel line and apply a paint mark to identify reuse. If the fuel line is already paint marked, a new fuel line must be installed.



- Install the HP fuel line.
- Finger tighten the 2 unions.
- Tighten the 2 unions.
Torque: 20Nm
- Install and tighten the 2 M6 Hex stud bolts.
Torque: 11.5Nm
- Fully loosen the 2 fuel line unions.
- Finger tighten the 2 unions.
- Tighten the 2 fuel line unions.
Torque: 20Nm
- Wait for 30 seconds and recheck the final torque.
- Install and tighten the M6 Torx bolt.
Torque: 11.5Nm

ⓘ CAUTION:

Fuel lines may be used a maximum of 4 times, paint mark fuel line after each full tightening sequence.

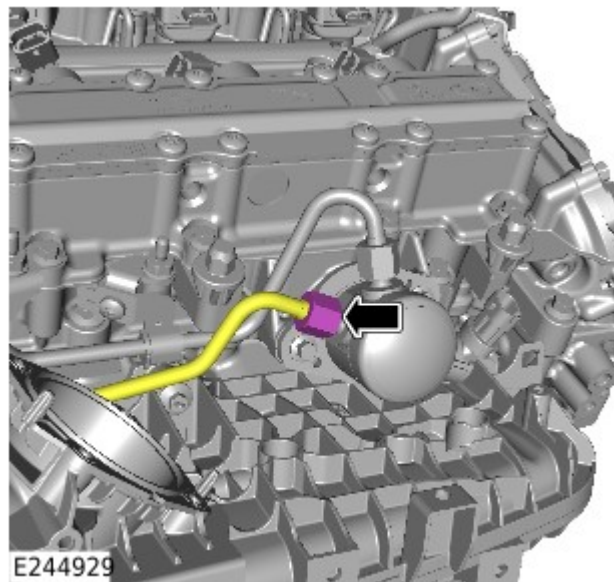


E240069

- Install the Low Pressure Low Pressure (LP) fuel line.
- Finger tighten the union.
- Install and tighten the bolt.

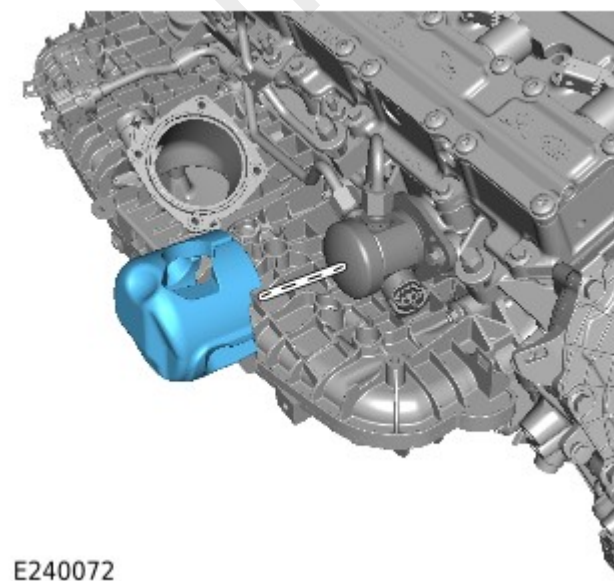
Torque: 11.5Nm

86.

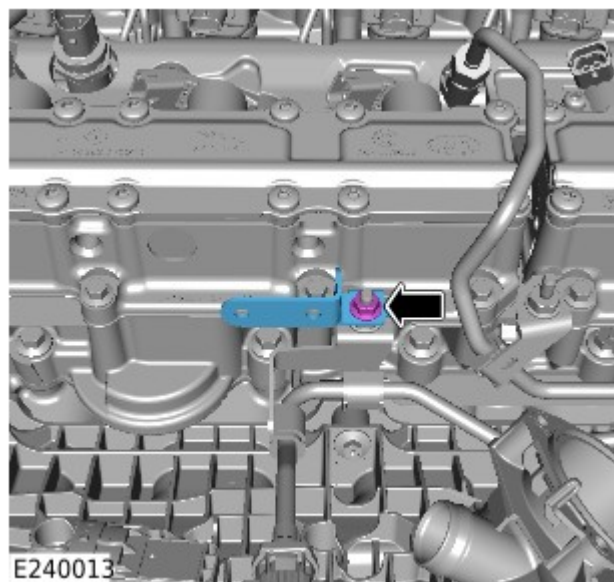


- Tighten the union.
Torque: 20Nm
- Wait 10 seconds.
- Loosen the union.
Torque: 1 turn(s)
- Tighten the union.
Torque: 20Nm
- Wait 10 seconds.
- Tighten the union.
Torque: 20Nm

87.



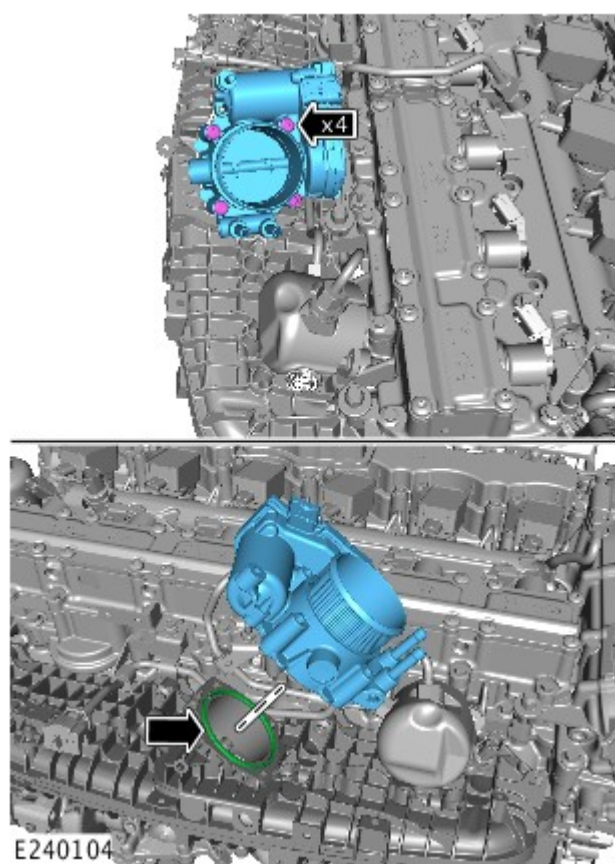
Install the NVH material.



- Install the bracket.
- Install and tighten the nut.

Torque: 11.5Nm

89.

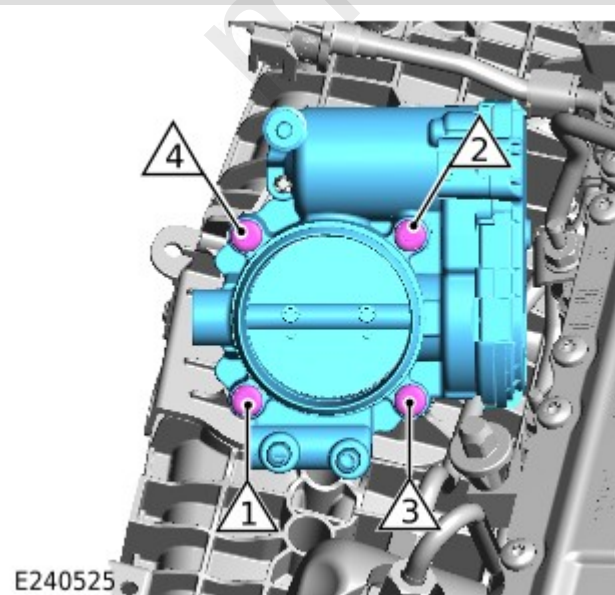


- Install a new O-ring seal.

Renew Part: [Throttle body to intake manifold seal](#) Quantity: 1.

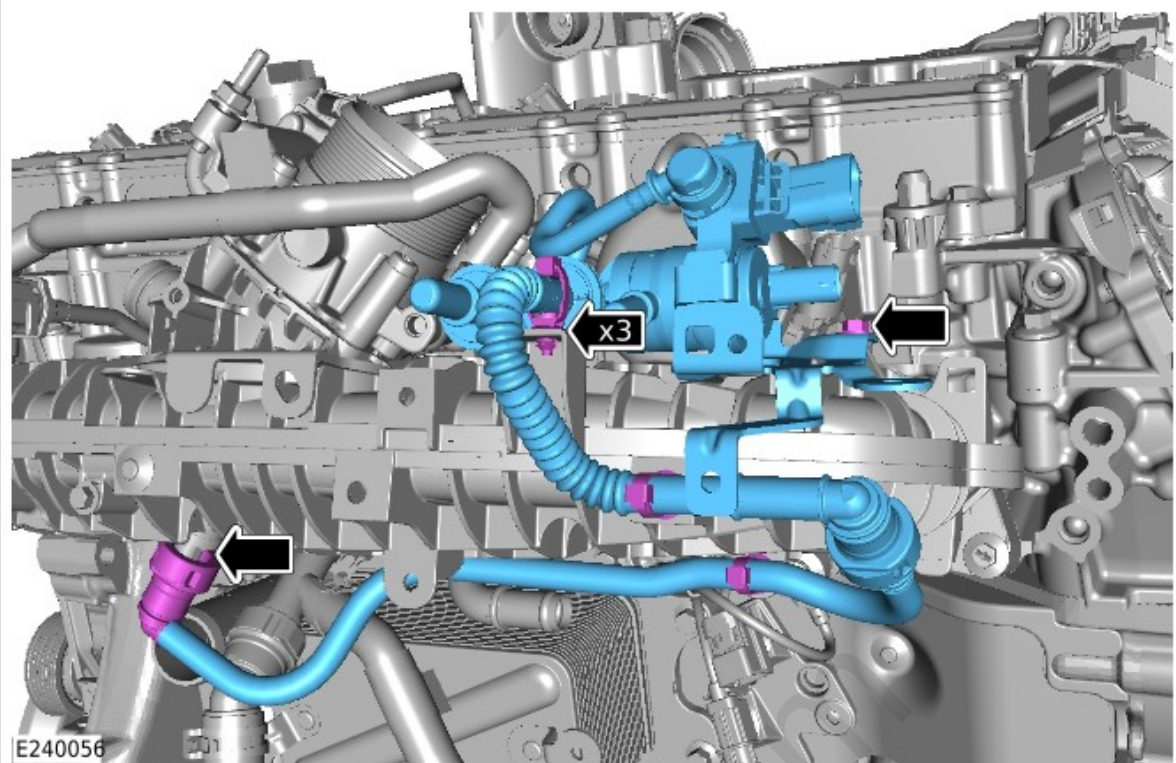
- Install the throttle body.
- Install, but do not fully tighten the 4 bolts.

90.



Tighten the 4 bolts in the sequence illustrated.

Torque: 11.5Nm

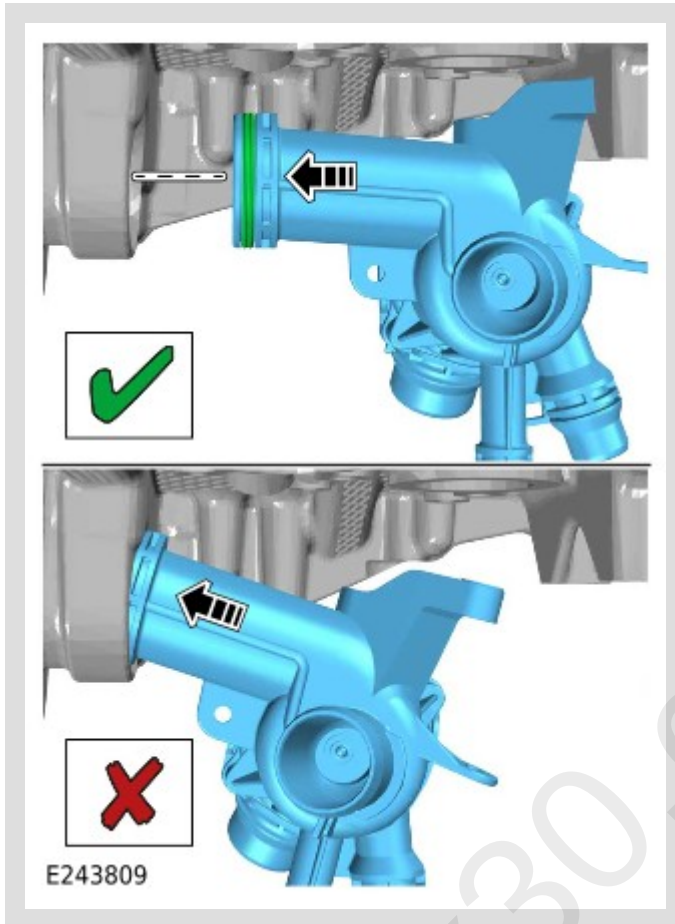


- Install the purge valve assembly.
- Connect the breather pipe.
- Install the 3 clips.
- Install and tighten the bolt.

Torque: 7Nm

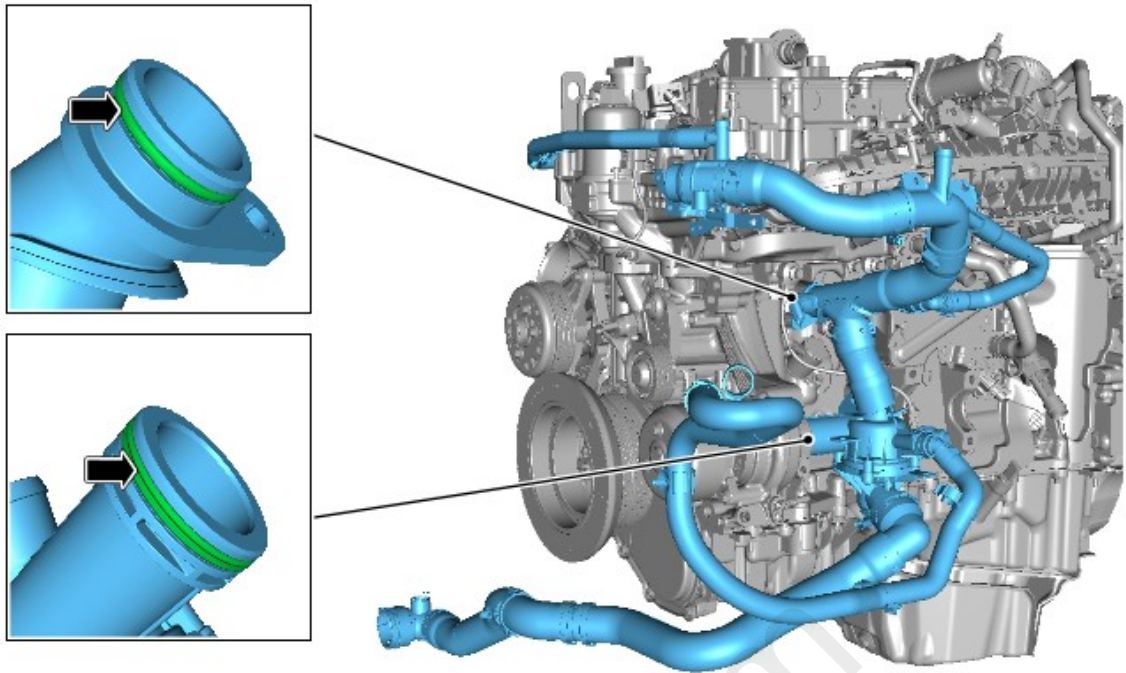
ⓘ CAUTION:

Failure to follow this instruction could cause damage to the thermostat housing.



Make sure the thermostat housing is installed correctly as illustrated.

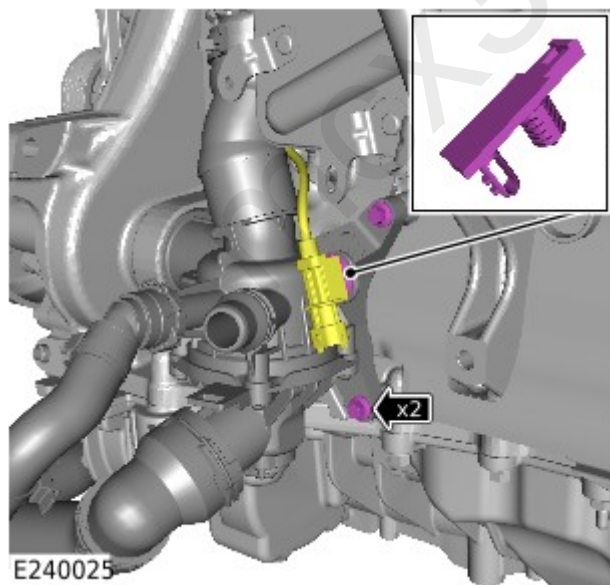
93.



E240044

- Inspect the 2 O-ring seals and replace if damaged.
- Install the coolant hose assembly.

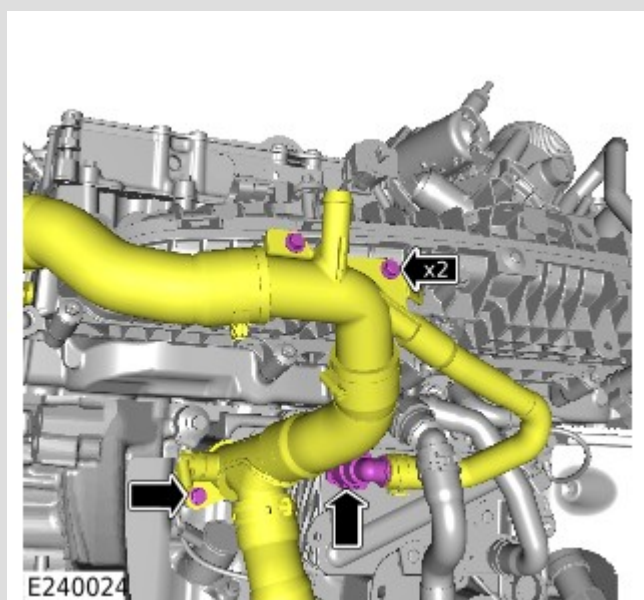
94.



E240025

- Install and tighten the 2 bolts.
Torque: 11.5Nm
- Install the clip.

95.



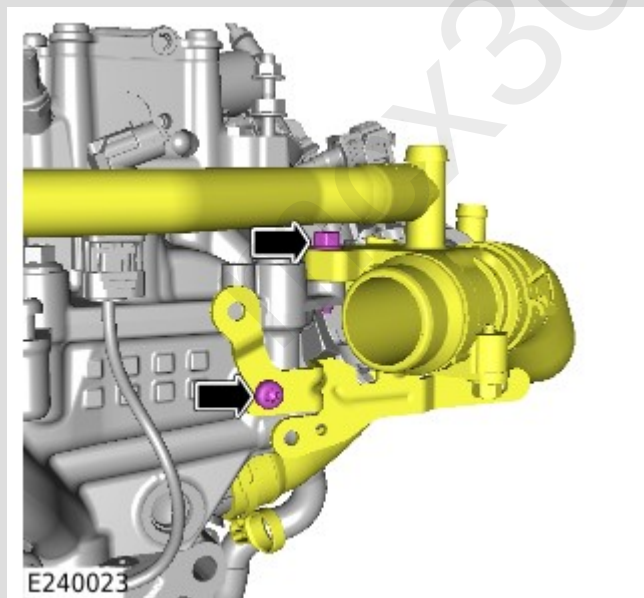
- Connect the coolant hose.
- Install and tighten the 3 bolts.

Torque

M6 x 25 mm: **11.5Nm**

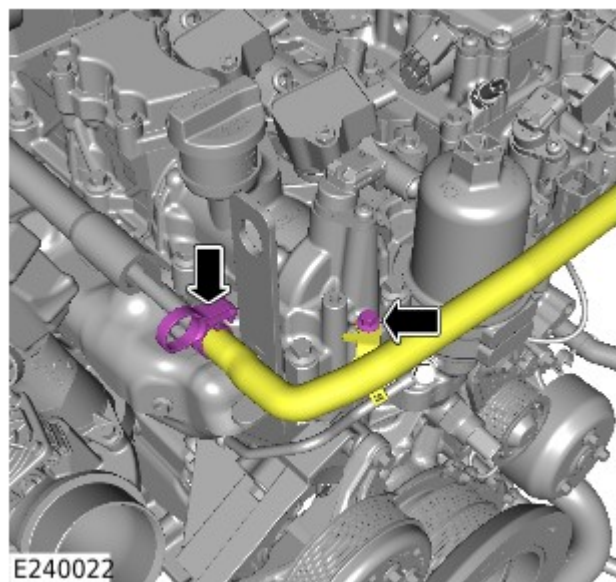
M6 x 20 mm: **7Nm**

96.



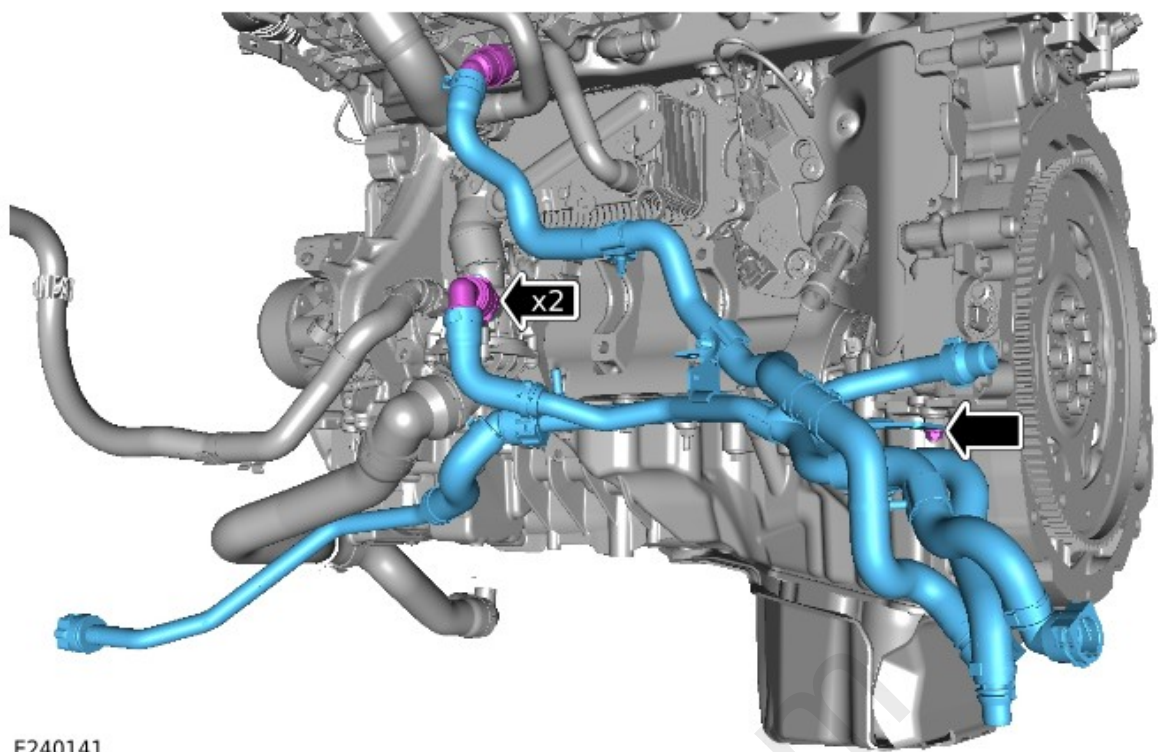
Install and tighten the 2 bolts.

Torque: **11.5Nm**

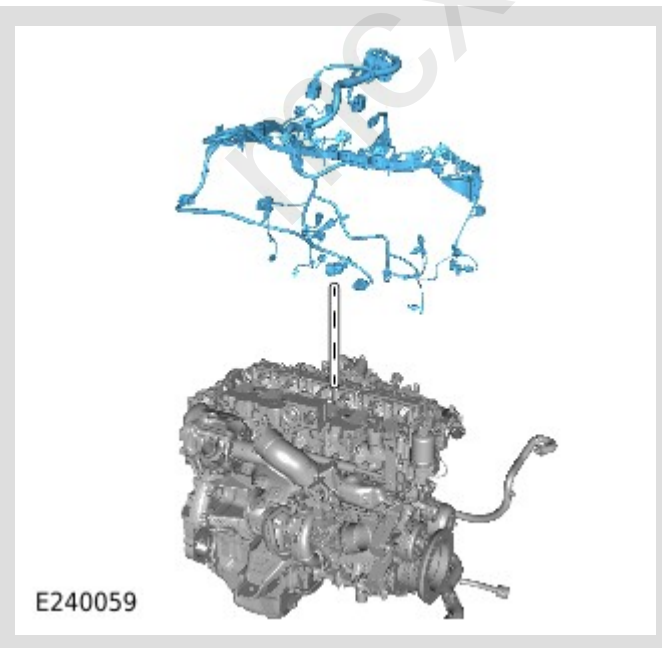


- Connect the coolant hose.
- Install the clip.
- Install and tighten the bolt.

Torque: 11.5Nm

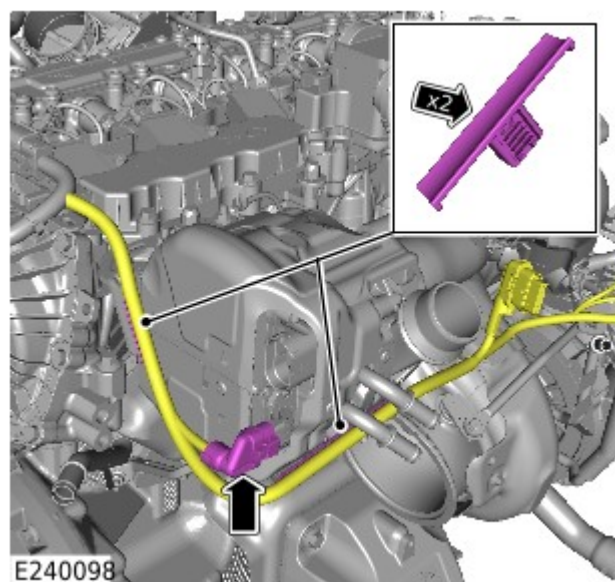


- Install the coolant hose assembly.
- Install and tighten the nut.
Torque: 11.5Nm
- Connect the 2 coolant hoses.



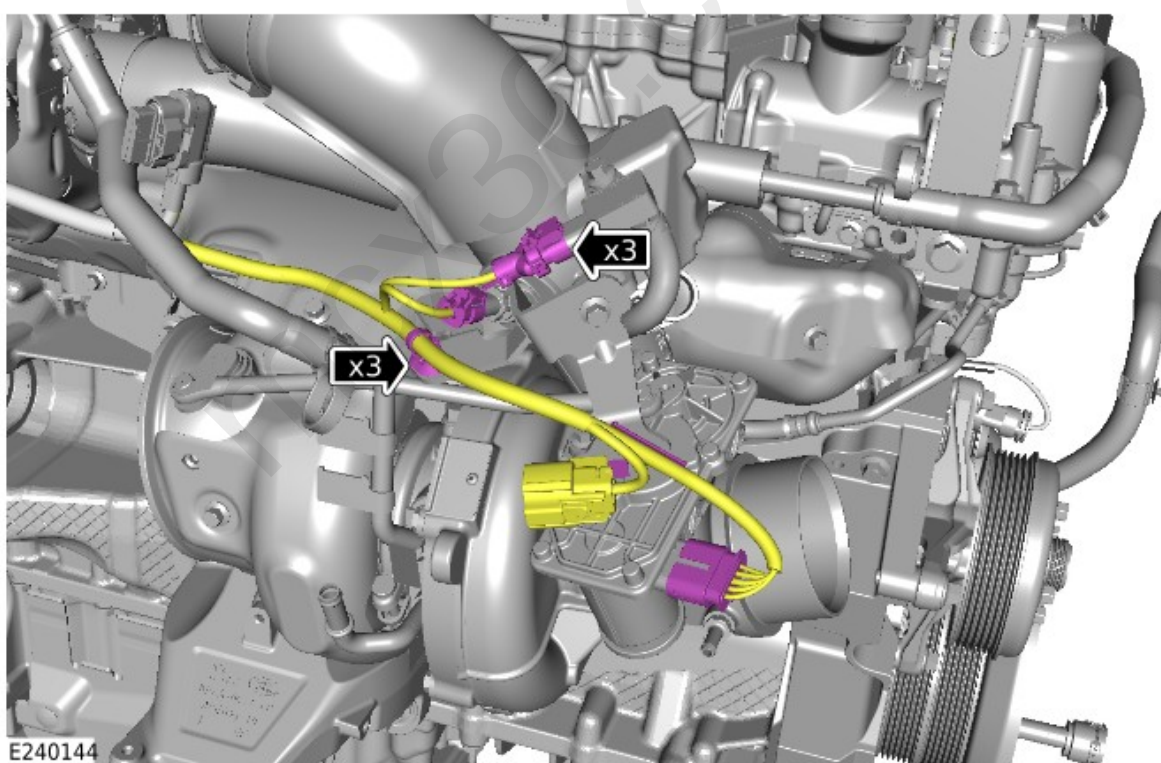
Install the wiring harness.

100.



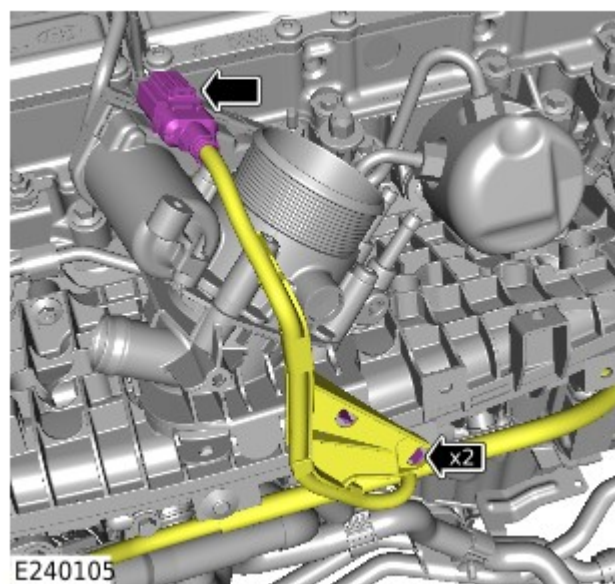
- Connect the electrical connector.
- Install the 2 clips.

101.



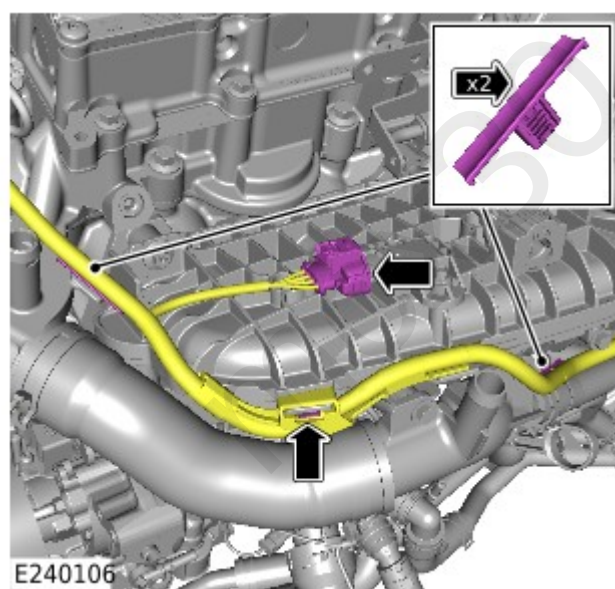
- Connect the 3 electrical connectors.
- Install the 3 clips.

102.

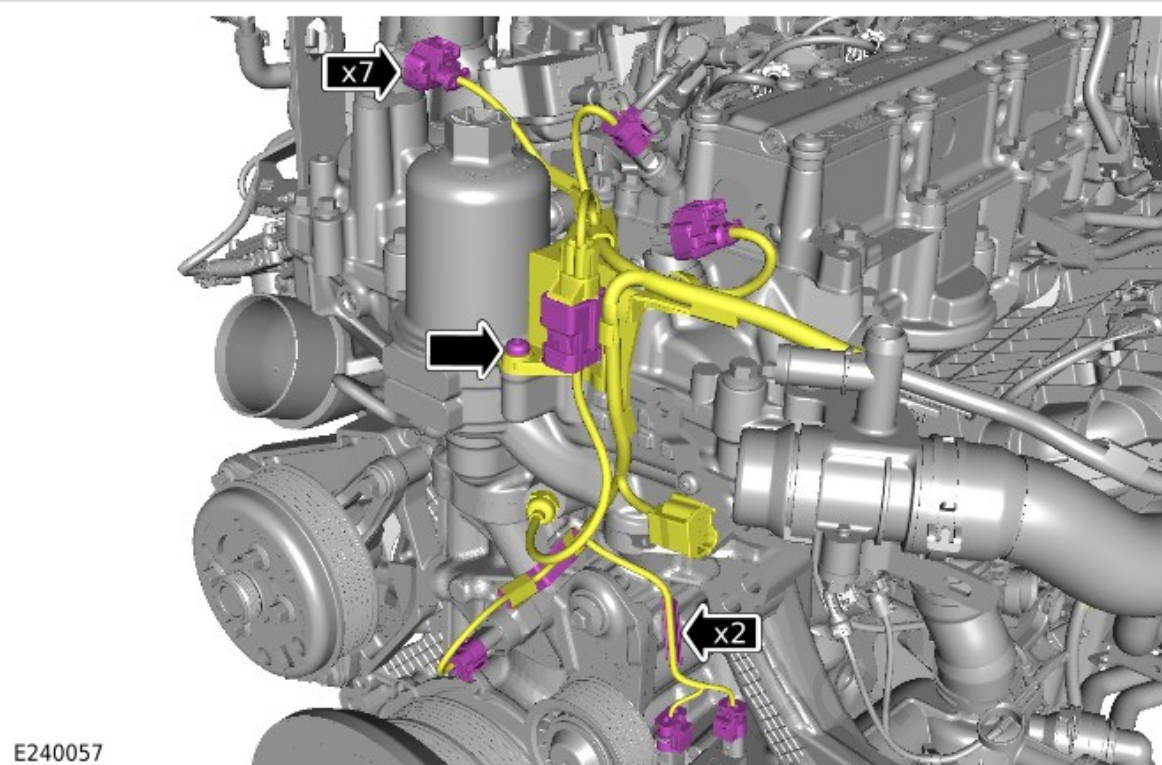


- Connect the electrical connector.
- Install the 2 clips.

103.

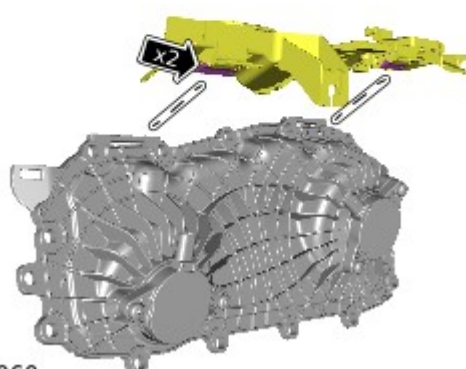
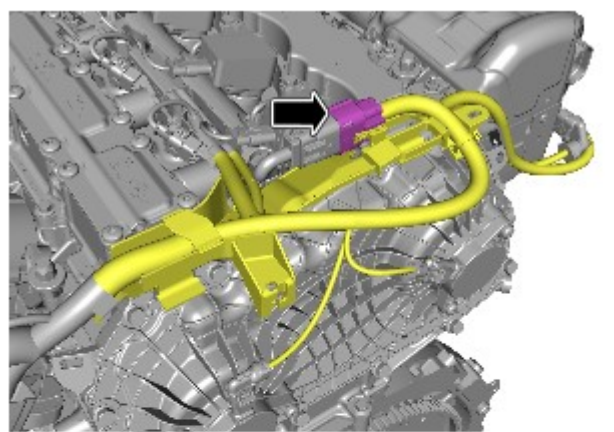


- Connect the electrical connector.
- Install the 3 clips.



- Connect the 7 electrical connectors.
- Install the 2 clips.
- Install and tighten the bolt.
Torque: 10Nm

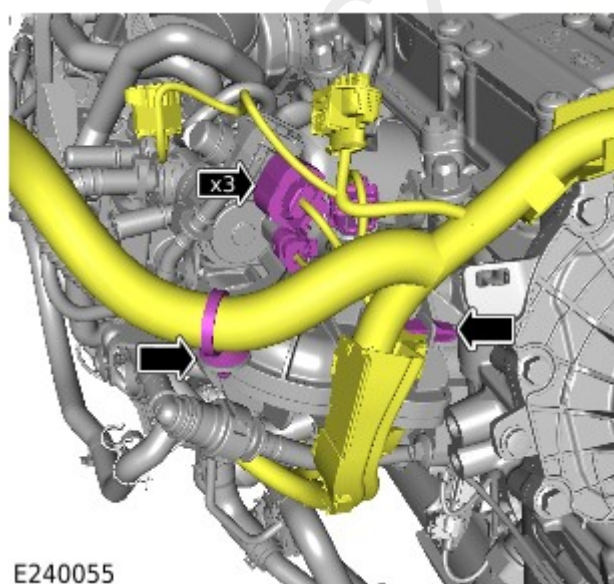
105.



E240060

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

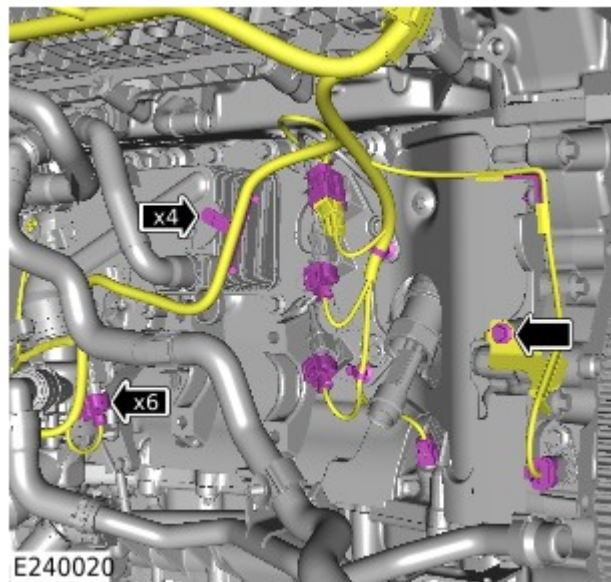
106.



E240055

- Connect the 3 electrical connectors.
- Install the 2 clips.

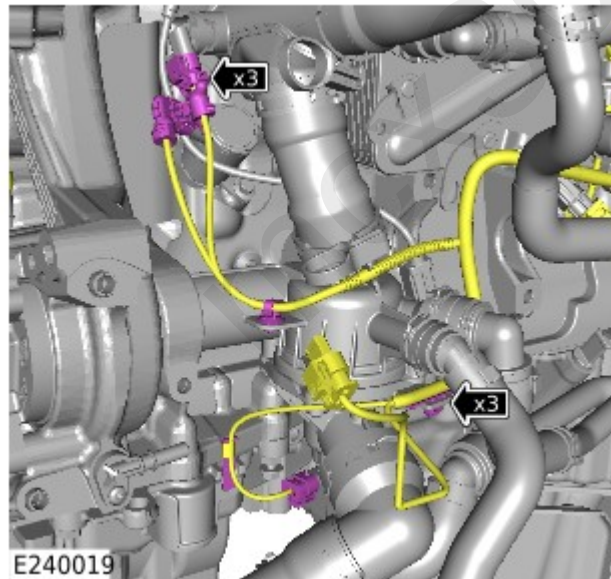
107.



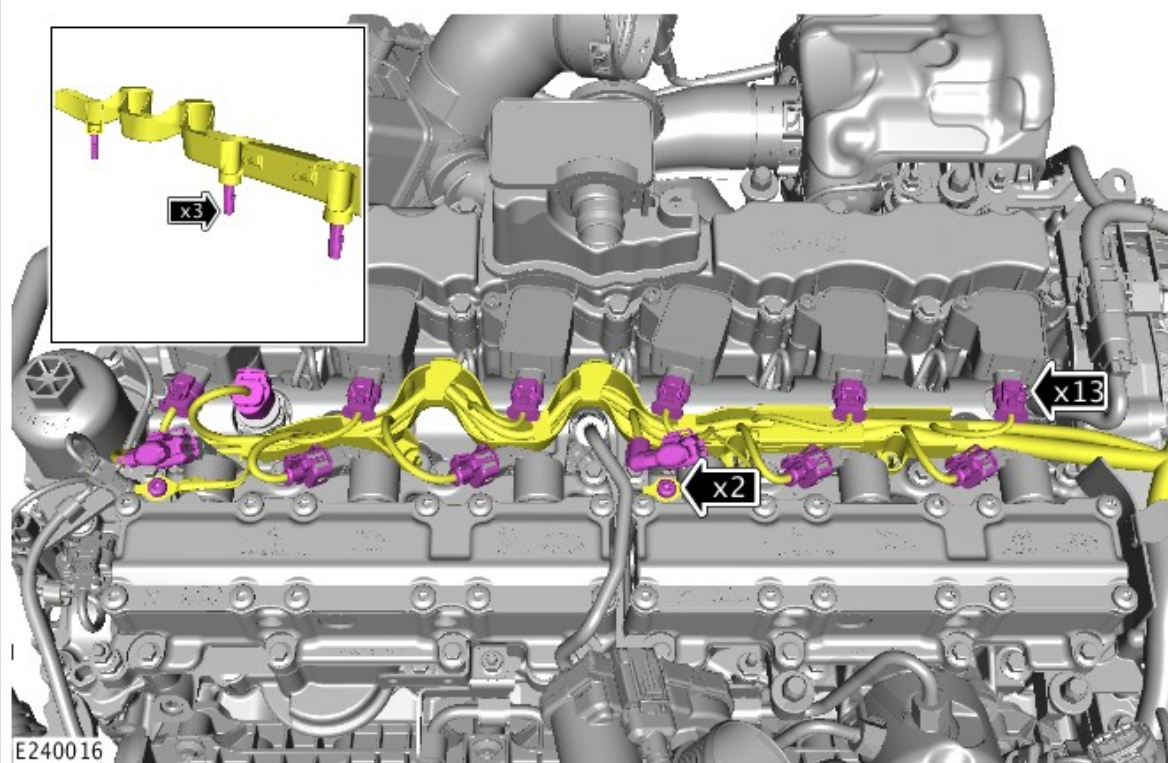
- Connect the 6 electrical connectors.
- Install the 4 clips.
- Install and tighten the bolt.

Torque: 11.5Nm

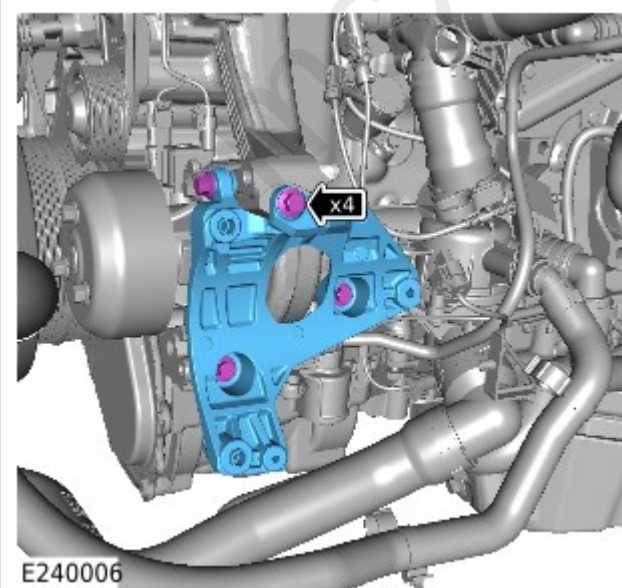
108.



- Connect the 3 electrical connectors.
- Install the 3 clips.

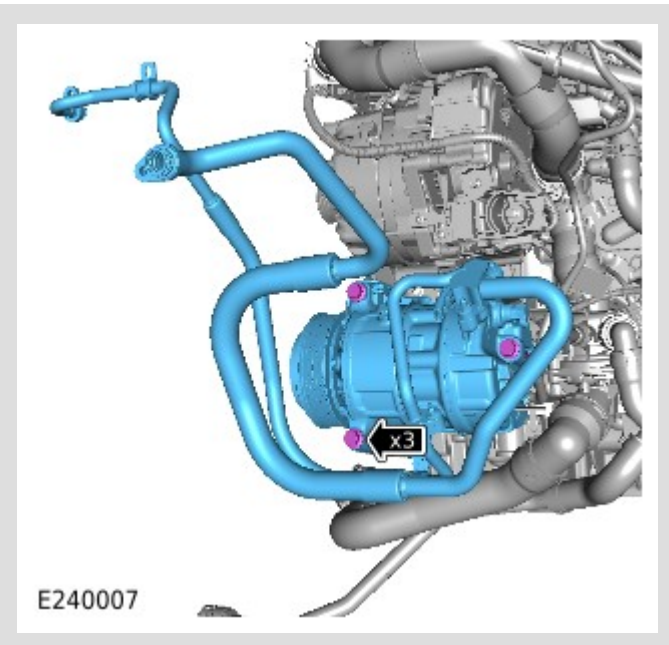


- Connect the 13 electrical connectors.
 - Install the 3 clips.
 - Install and tighten the 2 bolts.
- Torque: 10Nm*



- Install the bracket.
 - Install and tighten the 4 bolts.
- Torque: 25Nm*

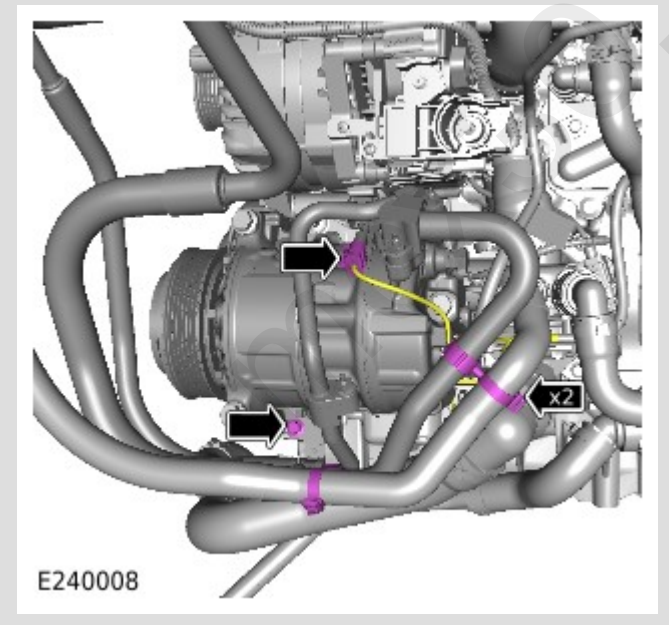
111.



- Install the Air Conditioning Air Conditioning (A/C) compressor.
- Install and tighten the 3 bolts.

Torque: 25Nm

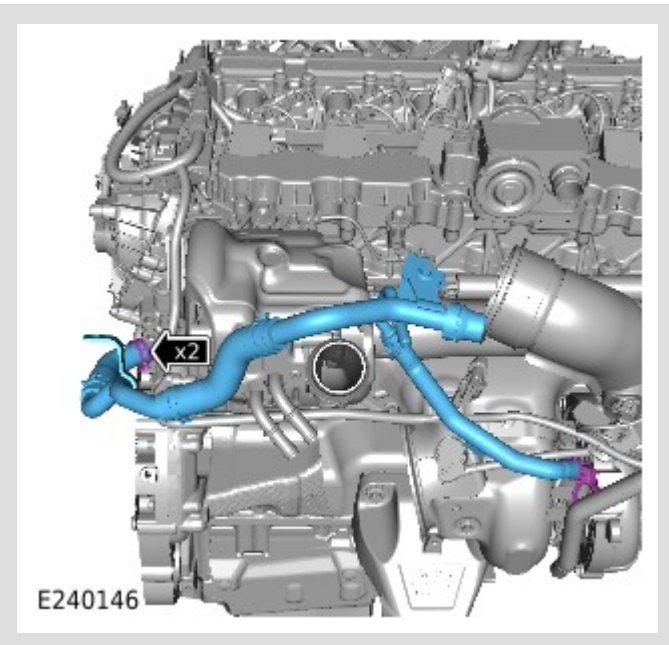
112.



- Connect the electrical connector.
- Install the 2 clips.
- Install and tighten the bolt.

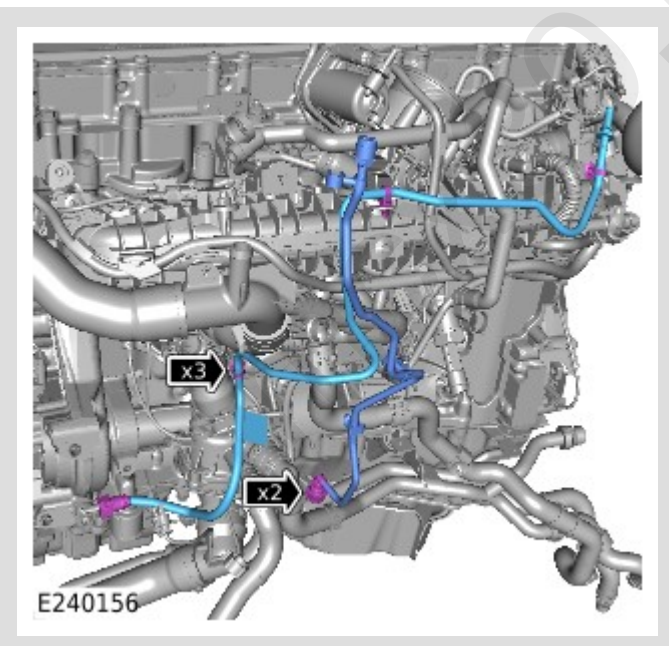
Torque: 10Nm

113.



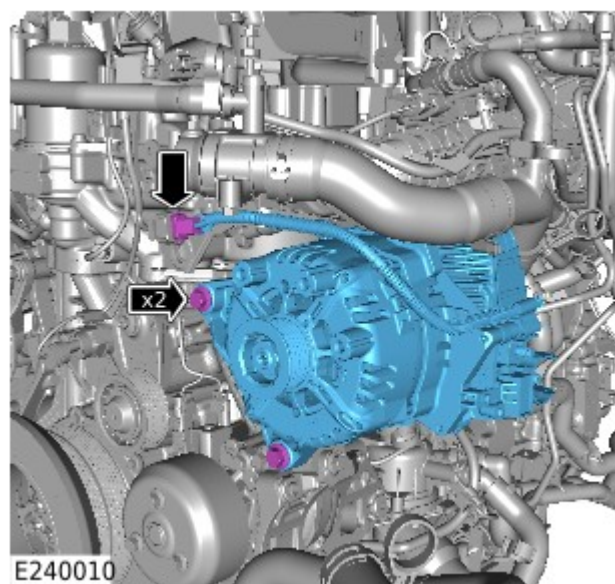
- Install the coolant hose assembly.
- Connect the 2 coolant hoses.
- Install the 2 clips.

114.



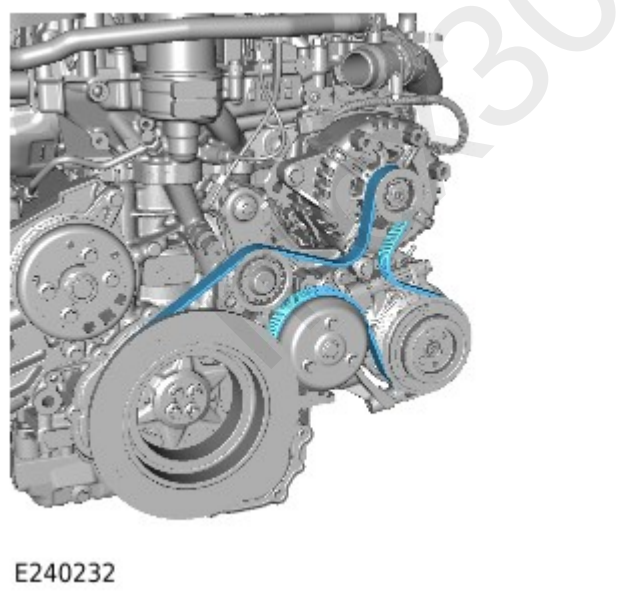
- Install the vacuum pipe.
- Install the 3 clips.
- Connect the vacuum pipe.
- Install the coolant pipe.
- Connect the coolant pipe.

115.



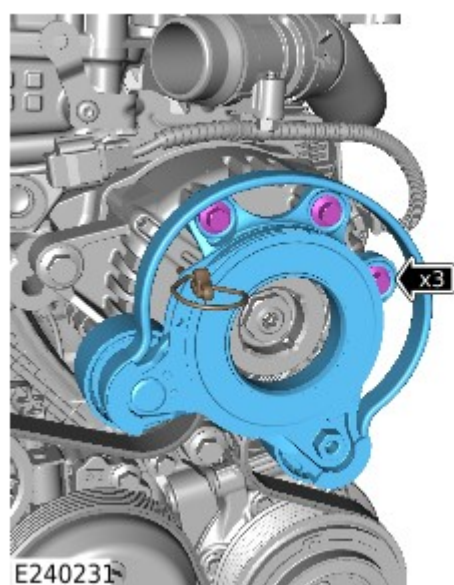
- Install the Belt Integrated Starter Generator Belt Integrated Starter Generator (BISG).
- Install and tighten the 2 bolts.
Torque: 47.5Nm
- Connect the electrical connector.

116.



Install the accessory drive belt.

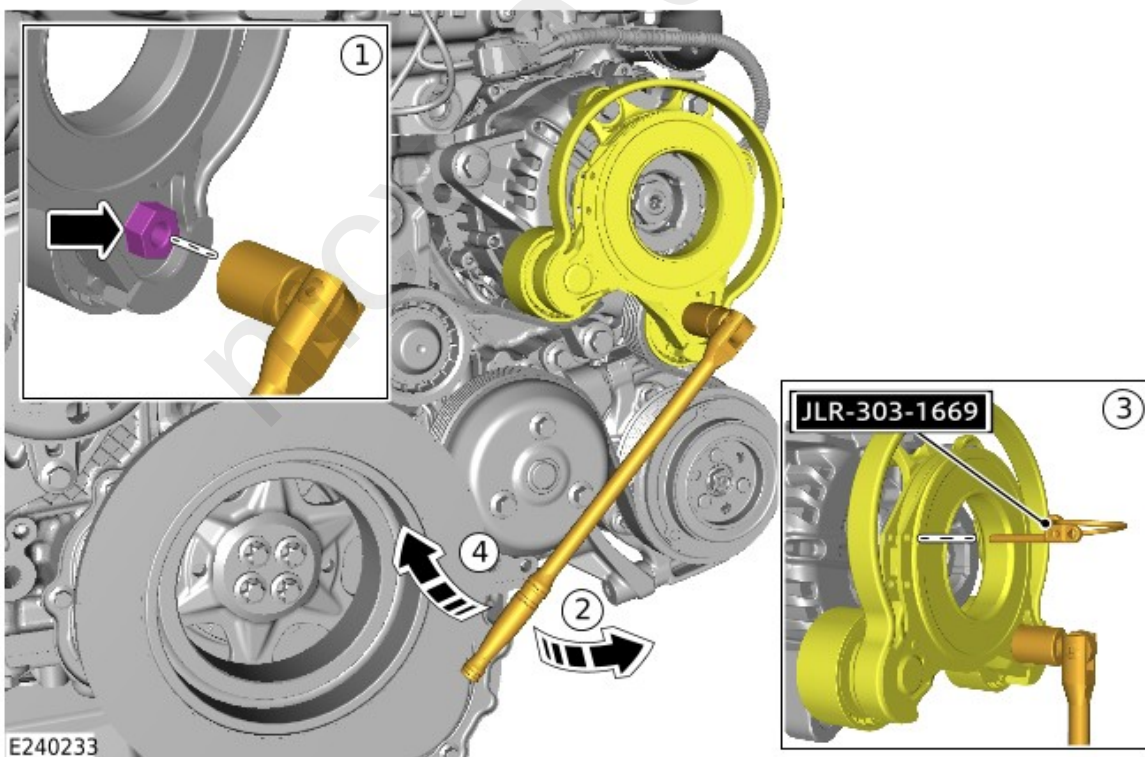
117.



- Install the accessory drive belt tensioner.
- Install and tighten the 3 bolts.

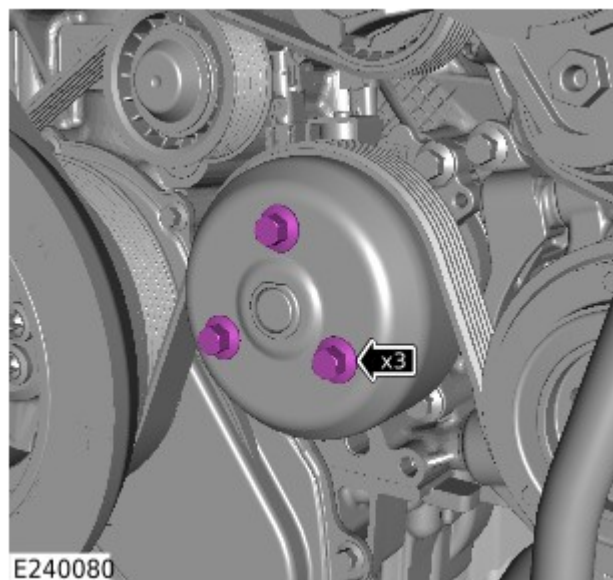
Torque: 25Nm

118.



- Use a suitable tool to release the accessory drive belt tension as illustrated.
- Remove the special tool.
Special Tool(s): [JLR-308-1699](#)
- Tension the accessory drive belt.

119.



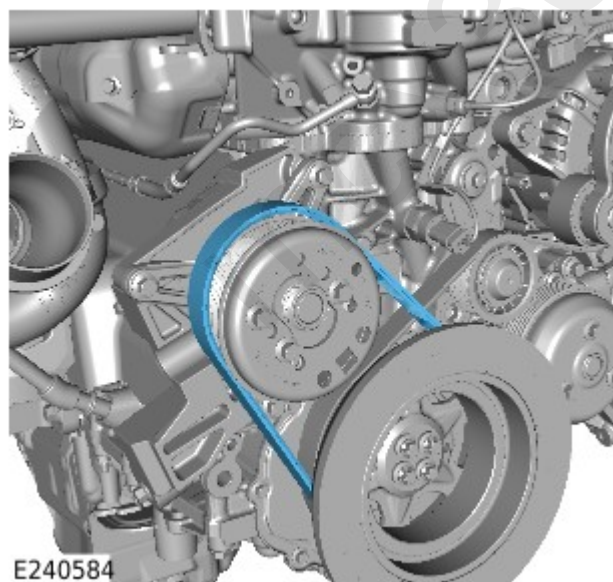
Tighten the 3 bolts.

Torque: 25Nm

120.

 NOTE:

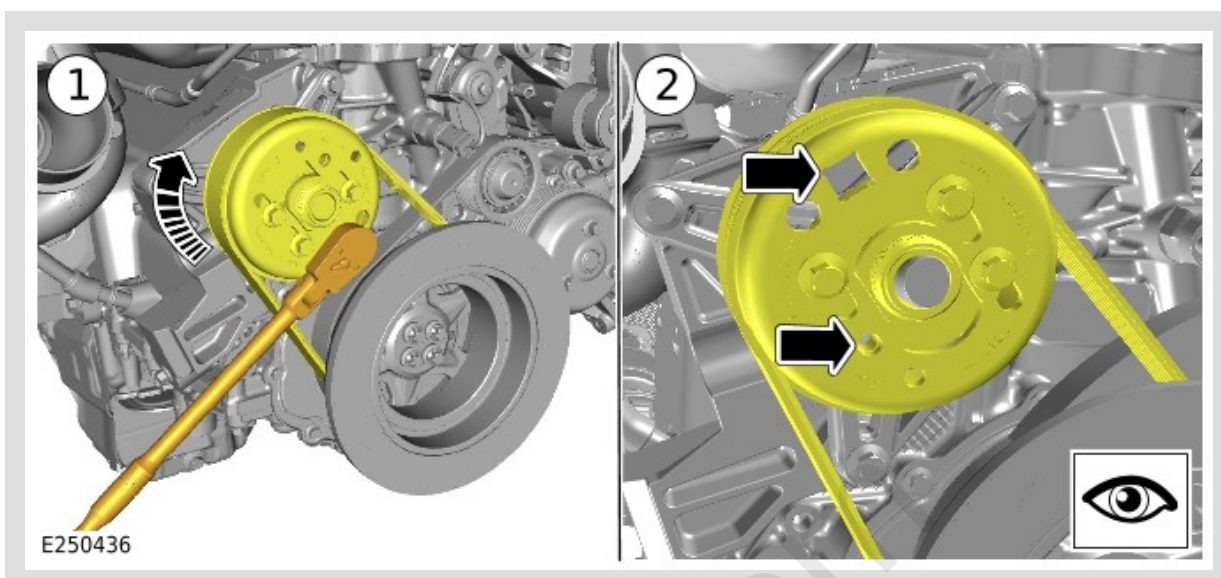
Make sure the pulley is in the position illustrated before removing the belt.



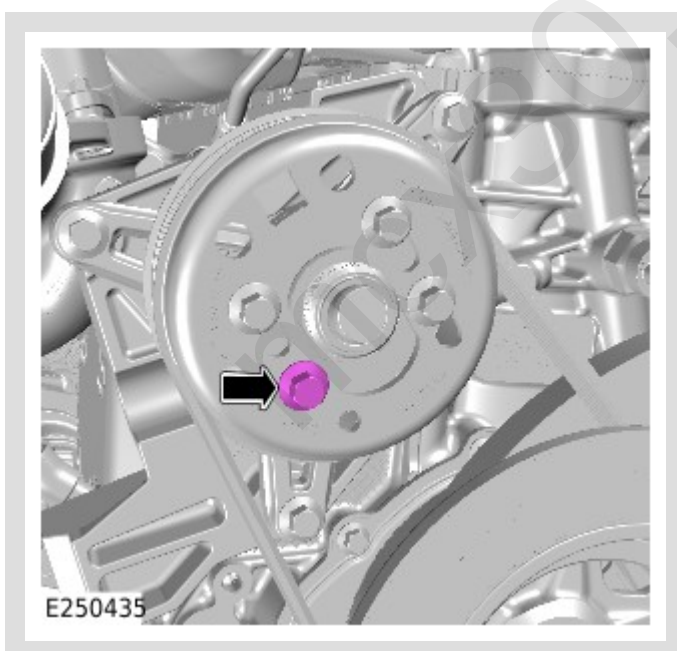
Install the viscous cooling fan drive belt.

 NOTES:

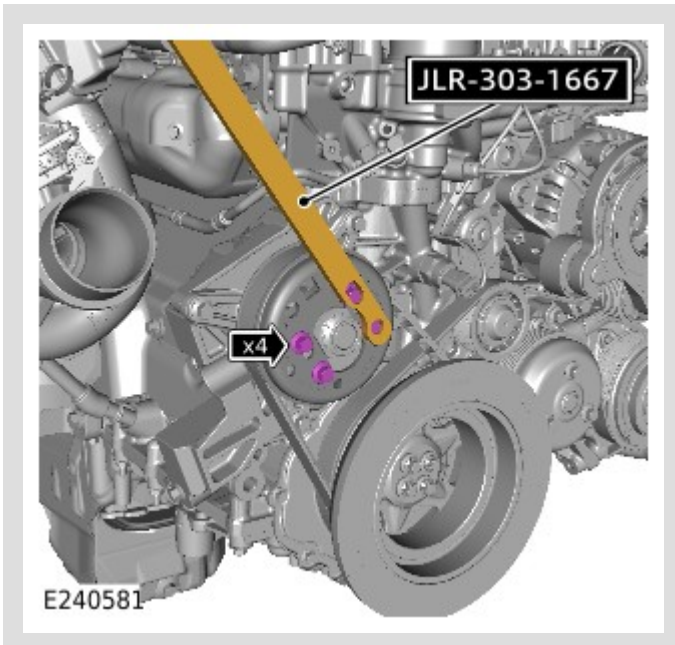
- During the rotation of the pulley, expect the pulley to snap down into position.
- If the pulley does not snap down into the correct position, loosen the bolts half a turn.



Use a suitable tool to rotate the pulley to the position illustrated.



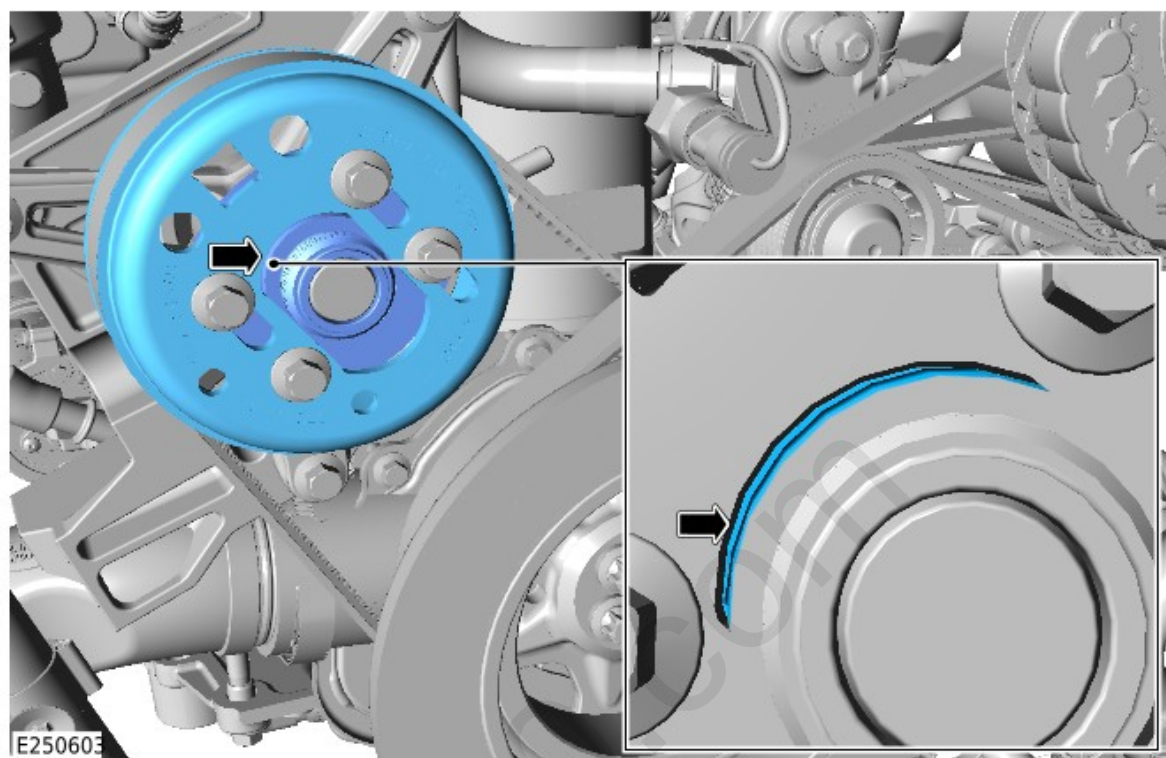
Install the illustrated bolt finger tight.



- Use the special tool to prevent the pulley from rotating when tightening the 4 bolts.
Special Tool(s): [JLR-303-1667](#)
- Fully tighten the 4 bolts.
Torque: **25Nm**

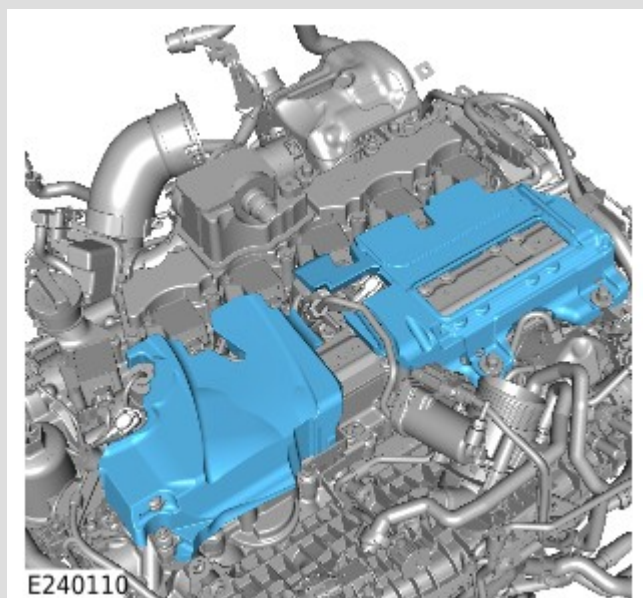
ⓘ CAUTION:

This step must be completed, failure to complete this step may result in damage to the viscous cooling fan bracket.



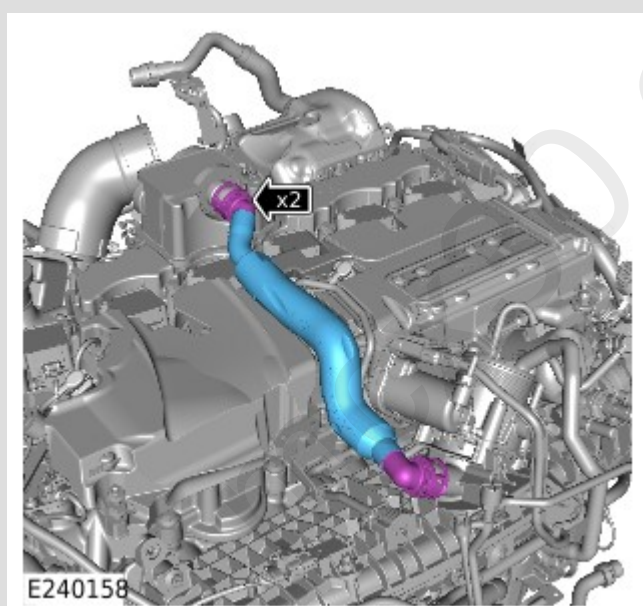
- Measure the gap between the viscous cooling fan pulley and the viscous cooling fan bracket.
- If the gap is 0.15 mm or less, continue to step 6.
- If the gap is greater than 0.15 mm, re-adjust the viscous cooling fan belt.

125.

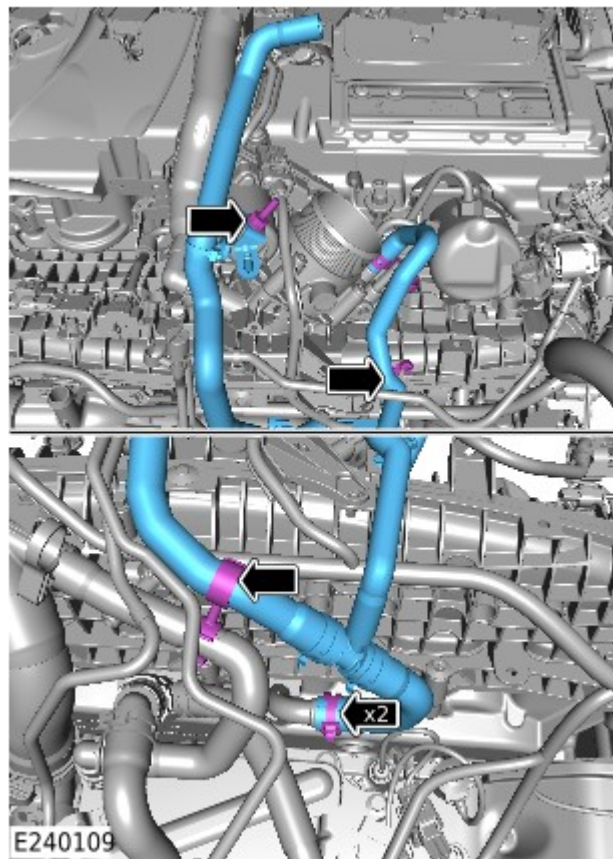


Install the NVH material.

126.



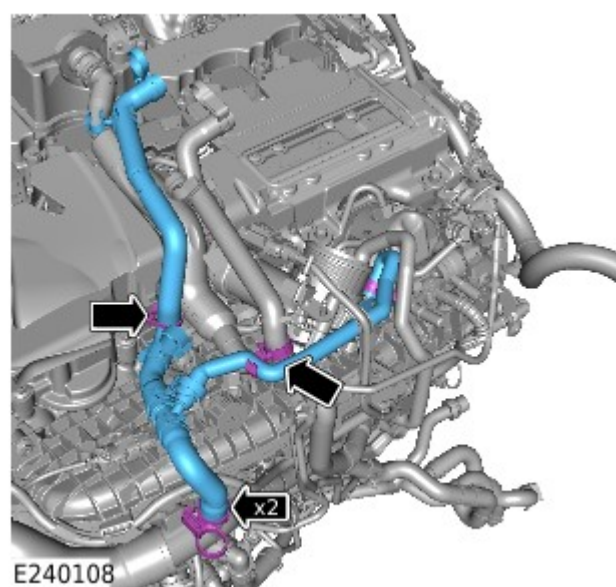
Install the breather pipe.



- Install the coolant hose assembly.
- Connect the 2 coolant hoses.
- Install the 2 clips.
- Install and tighten the bolt.

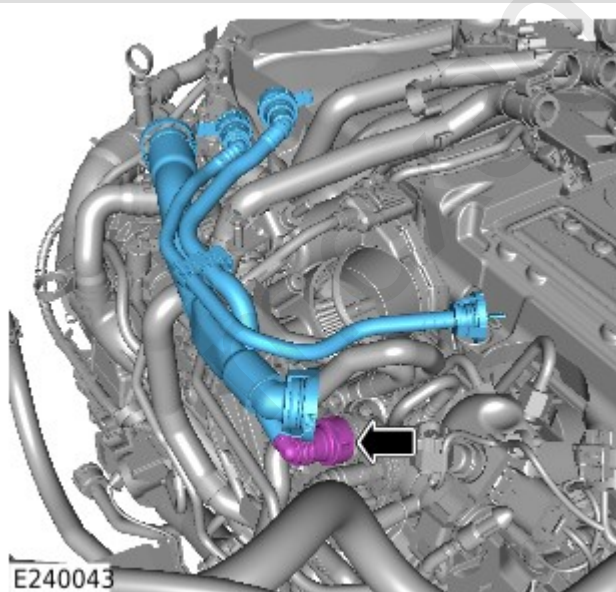
Torque: 11.5Nm

128.



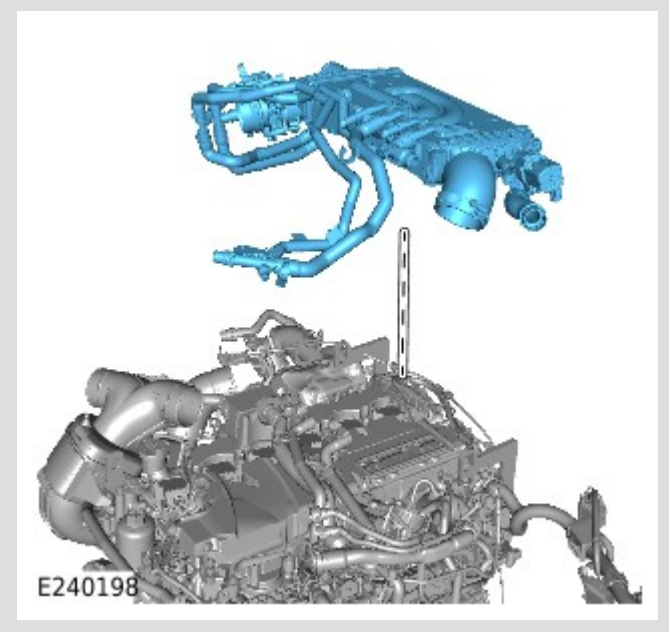
- Install the coolant hose assembly.
- Connect the 2 coolant hoses.
- Install the 2 clips.

129.



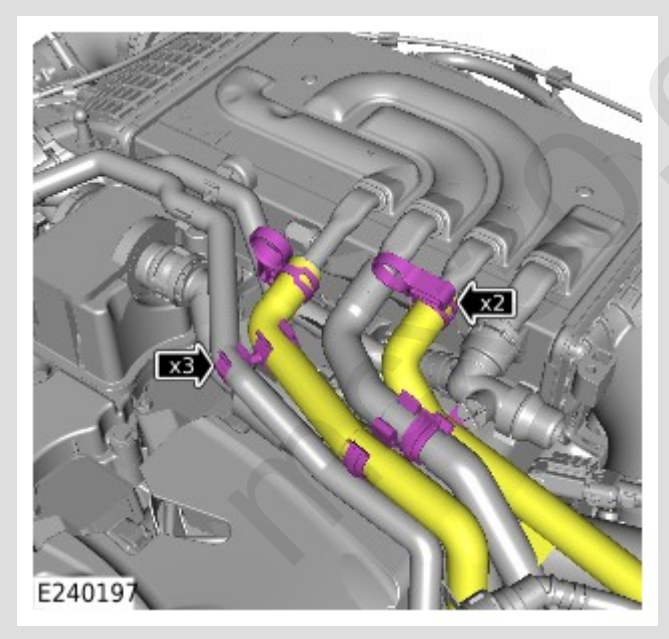
Install the breather pipe assembly.

130.



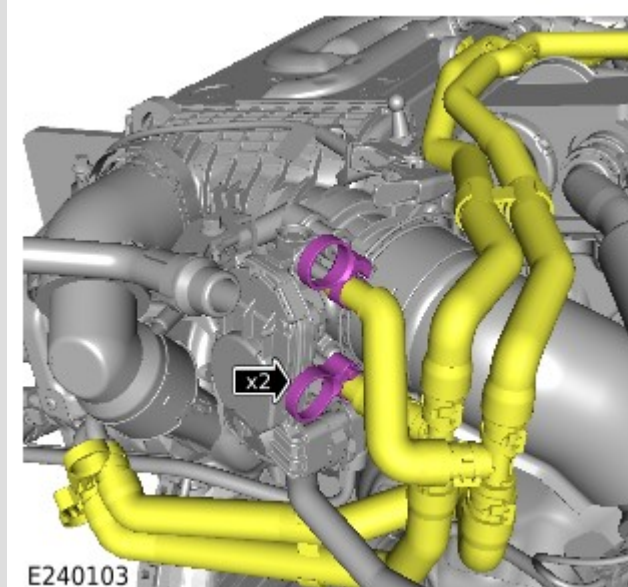
Install the charge air cooler assembly.

131.



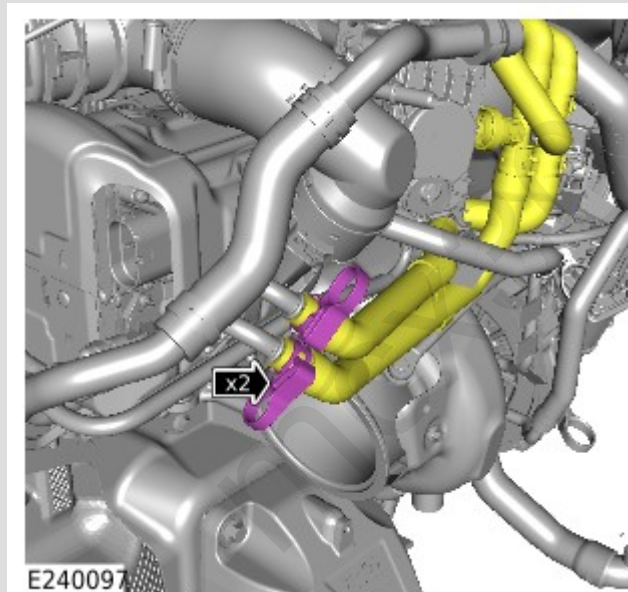
- Connect the 2 coolant hoses.
- Install the 3 clips.

132.



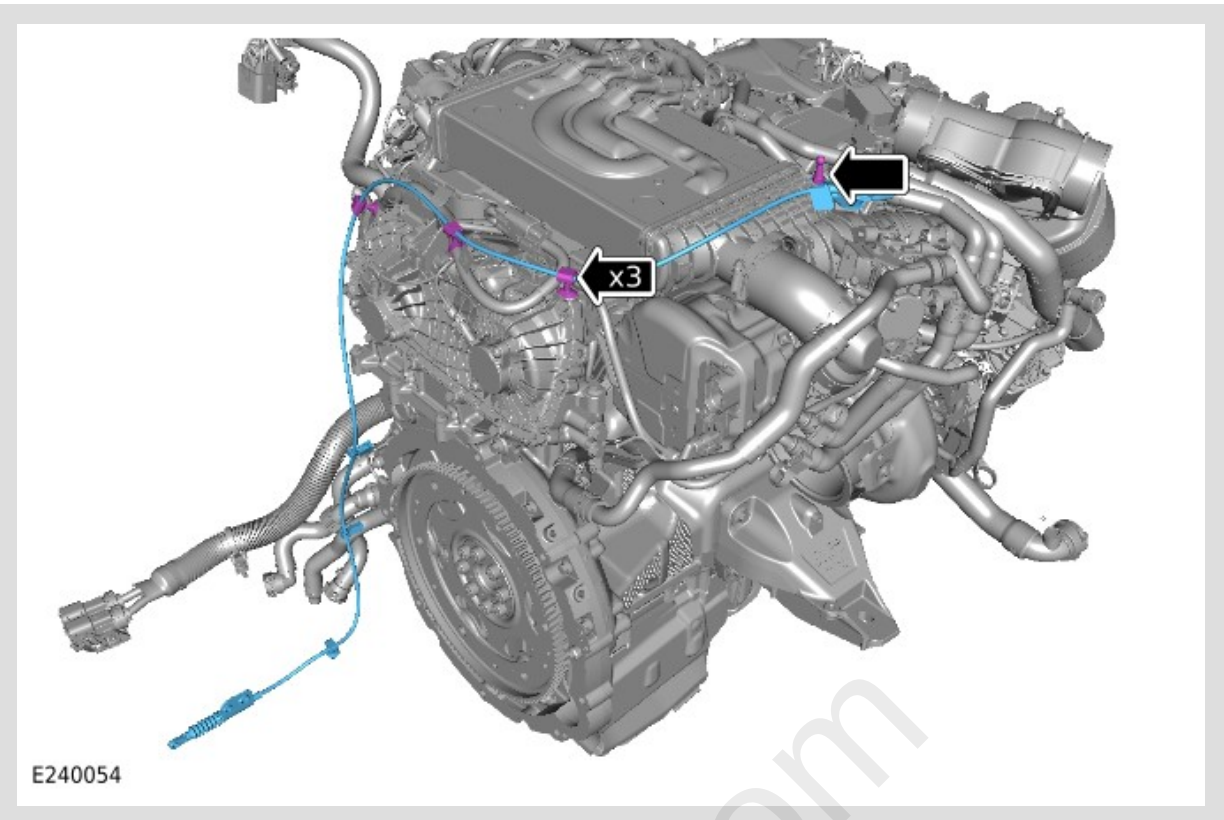
Connect the 2 coolant hoses.

133.



Connect the 2 coolant hoses.

134.



- Install the Emergency Park Release (EPR) cable.
- Install and tighten the bolt.
Torque: 7Nm
- Install the 3 clips.

135. Install the engine assembly.

Refer to: [Engine Assembly Remove for Access](#) (303-01C Engine - INGENIUM I6 3.0L Petrol, Installation).

136. Connect the startup battery ground cable.

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

137. Fill the engine with the recommended oil to the correct level.

Refer to: [Specifications](#) (303-01C Engine - INGENIUM I6 3.0L Petrol, Specifications).