

PUBLISHED: 19-JAN-2020
2020.0 DEFENDER (LE), 303-01C

ENGINE – INGENIUM I6 3.0L PETROL

UPPER TIMING CHAIN (G2344507)

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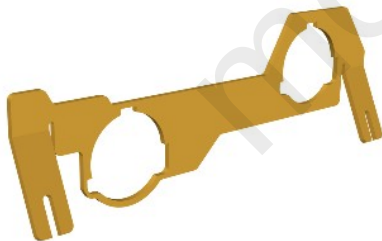
SPECIAL TOOL(S)



E242523

JLR-303-1656

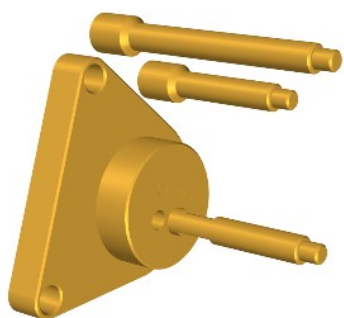
Crank Rotation Tool



E238889

JLR-303-1657

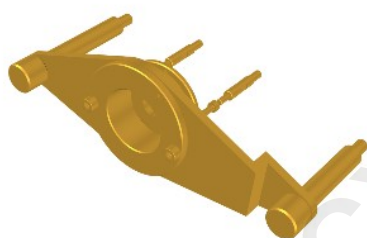
Locking Tool, VCT



E238888

JLR-303-1658

Locking Tool, Camshaft



E238887

JLR-303-1659

Locking Tool, Crankshaft Pulley

PART(S)

STEP	PART NAME	QUANTITY
Installation Step 1	Upper timing chain guide	1
Installation Step 1	Upper timing chain guide	1
Installation Step 3	Variable camshaft timing actuator bolts	1
Installation Step 4	Variable camshaft timing actuator bolts	1
Installation Step 6	Upper timing chain guide	1

STEP	PART NAME	QUANTITY
Installation Step 8	Upper timing chain tensioner	1
Installation Step 15	Oil fill pipe O-ring seal	1

REMOVAL

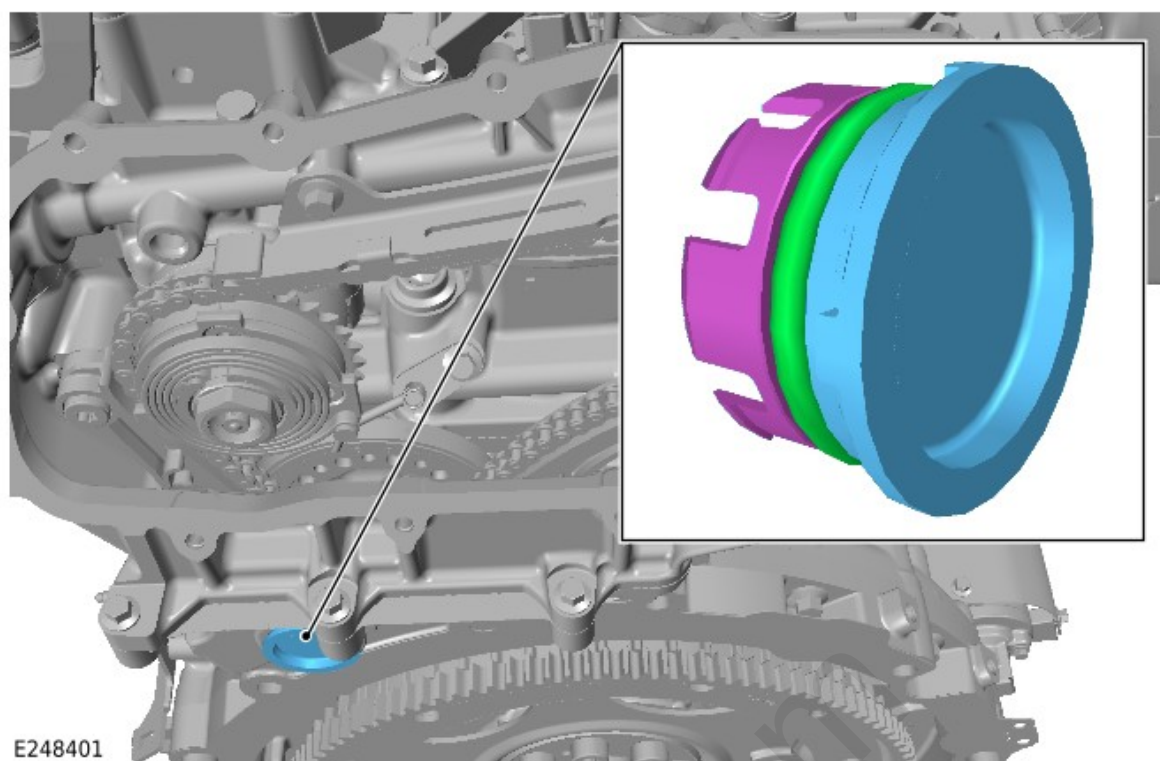


NOTE:

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

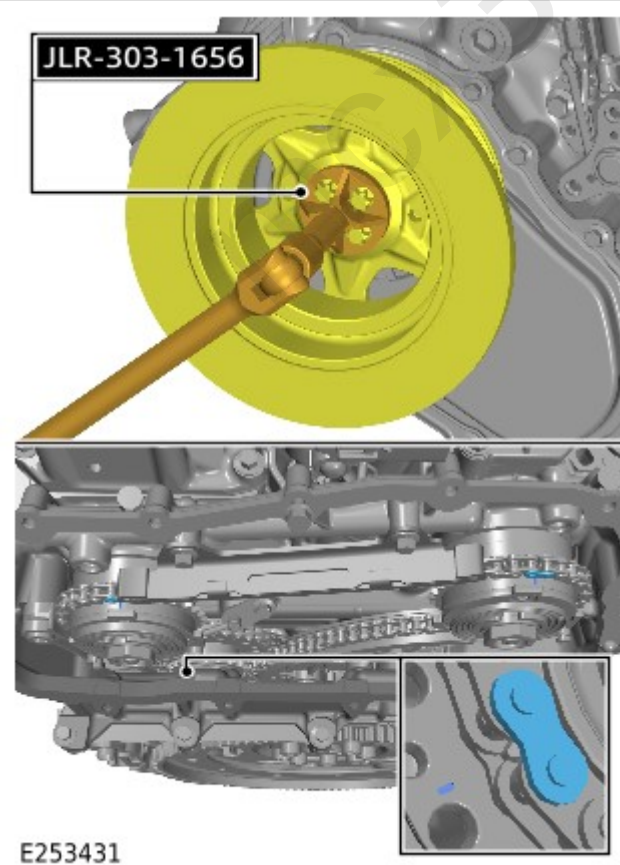
1. Raise and support the vehicle on a suitable 2 post lift.
Refer to: [Jacking and Lifting](#) (100-02 Jacking and Lifting, Description and Operation).
2. Disconnect the startup battery ground cable.
Refer to: [Startup Battery Disconnect and Connect](#) (414-00 Battery and Charging System - General Information, General Procedures).
3. Use a suitable telescopic tube to position the hood into the service position.
4. Remove the exhaust system.
Refer to: [Exhaust System](#) (309-00C Exhaust System - INGENIUM I6 3.0L Petrol, Removal and Installation).
5. Remove the viscous cooling fan.
Refer to: [Viscous Cooling Fan](#) (303-03C Engine Cooling - INGENIUM I6 3.0L Petrol, Removal and Installation).
6. Remove the upper timing cover.
Refer to: Upper Timing Cover (303-01C, Removal and Installation).

7.



- Remove the access cover.
- Inspect the O-ring seal for wear and replace the access cover if required.

8.

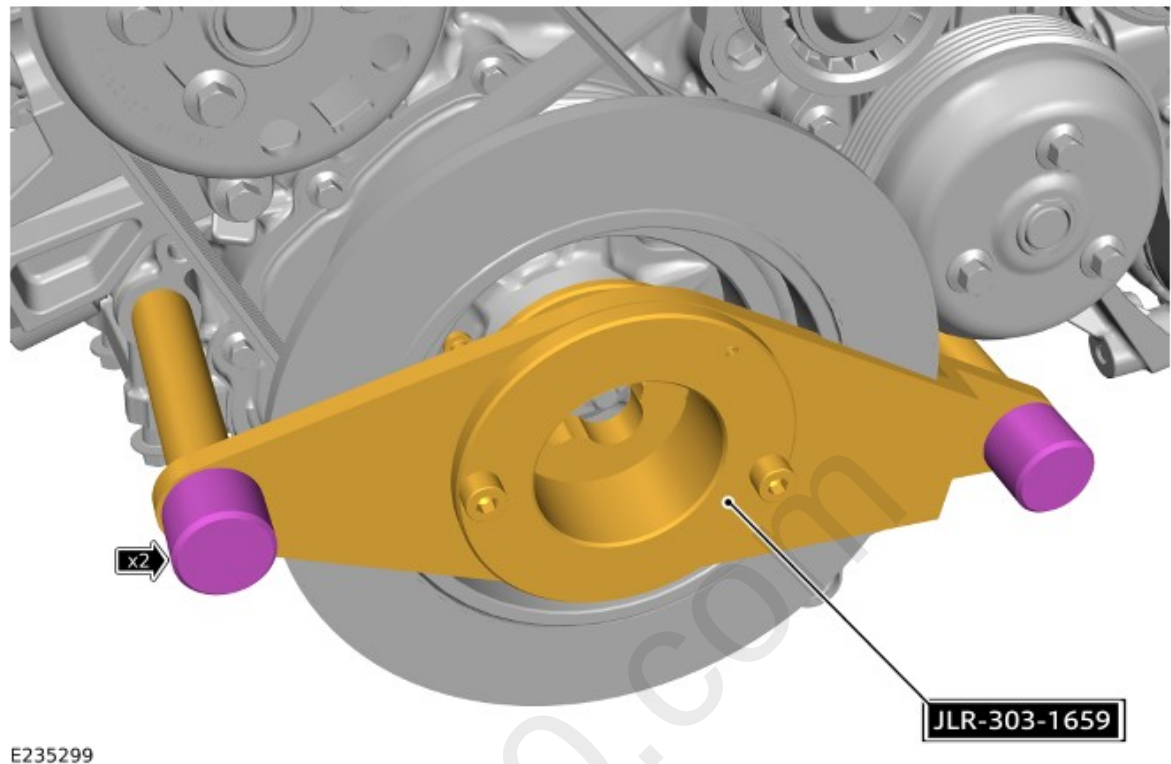


- Install the special tool.

Special Tool(s): [JLR-303-1656](#)

- Use the special tool to rotate the crankshaft clockwise until the timing marks align as illustrated.

9.

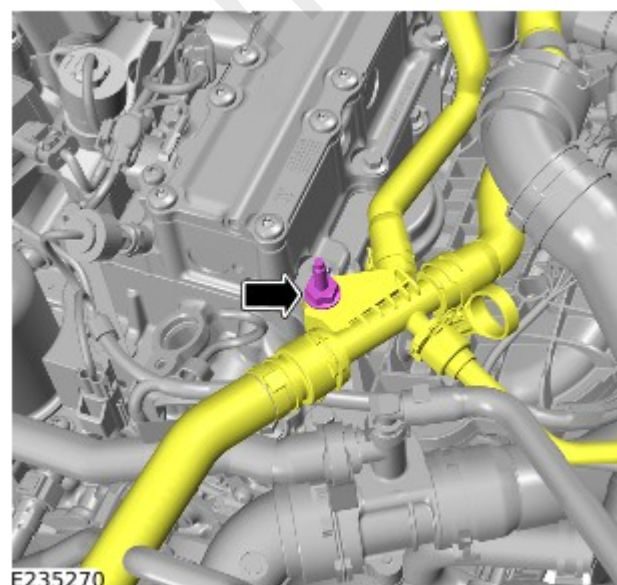


- Install the special tool.

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

- Install and tighten the 2 bolts.

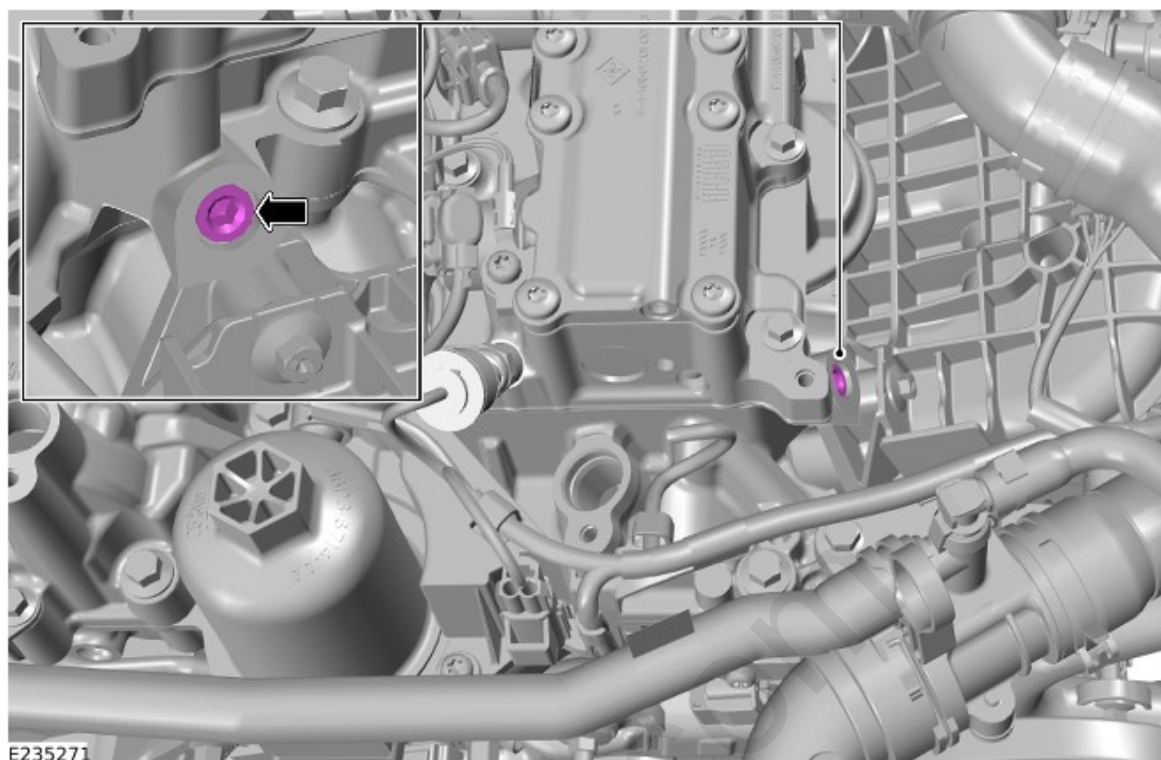
10.



- Remove the bolt.

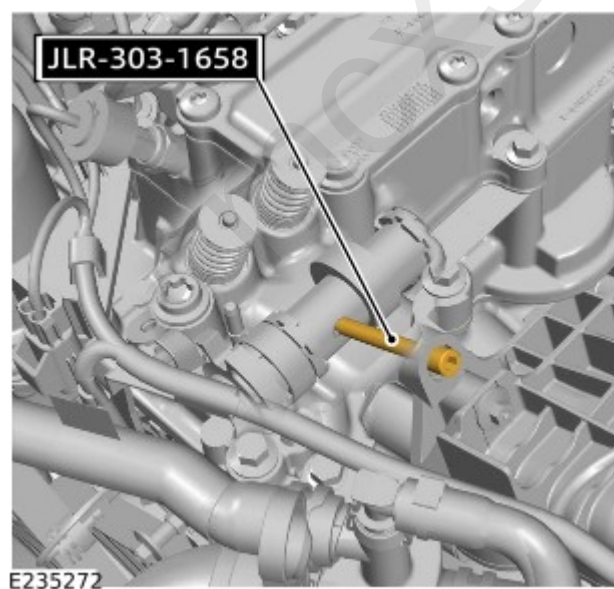
- Reposition the coolant hoses away from the Continuous Variable Valve Lift (CVVL) assembly.

11.



Remove the left camshaft carrier inspection plug.

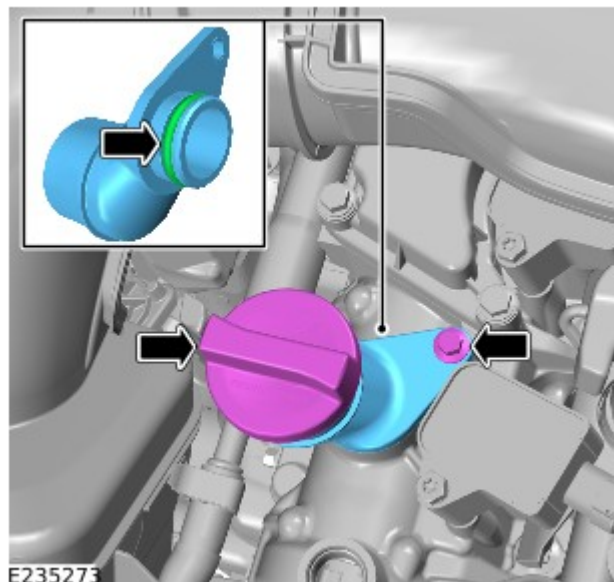
12.



Install the special tool.

Special Tool(s): [JLR-303-1658](#)

13.

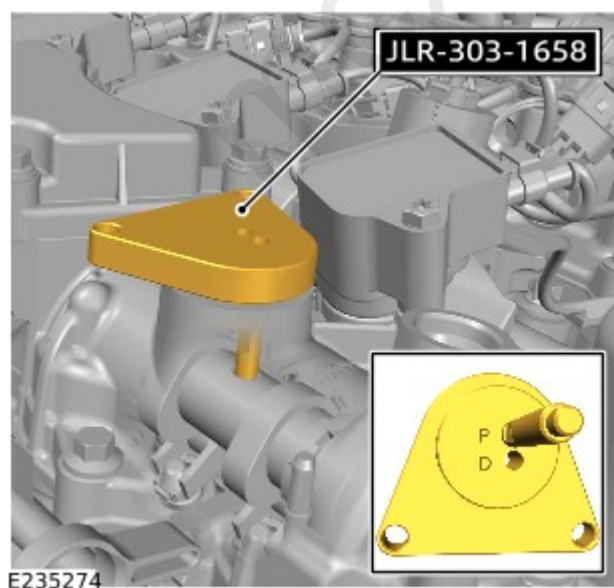


- Remove the oil filler cap.
- Remove the bolt.
- Remove the oil filler pipe.
- Remove and discard the O-ring seal.

14.

NOTE:

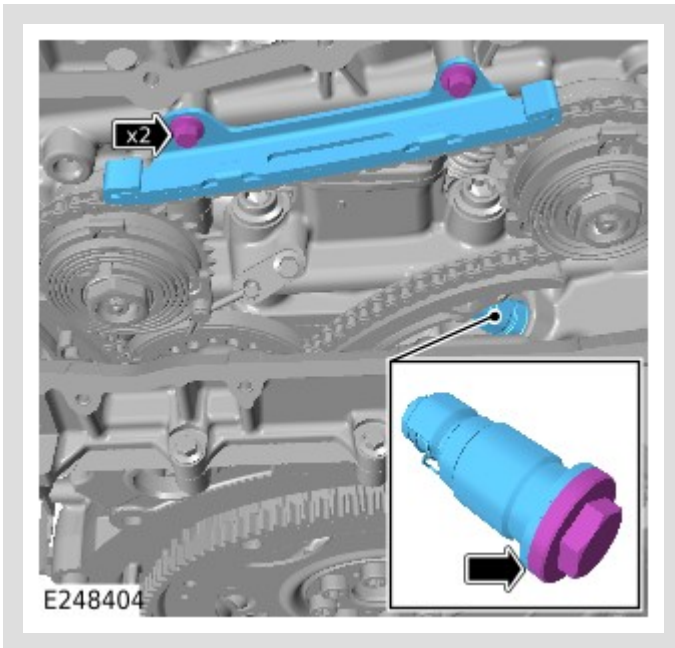
Note the illustrated orientation of the special tool.



Install the special tool.

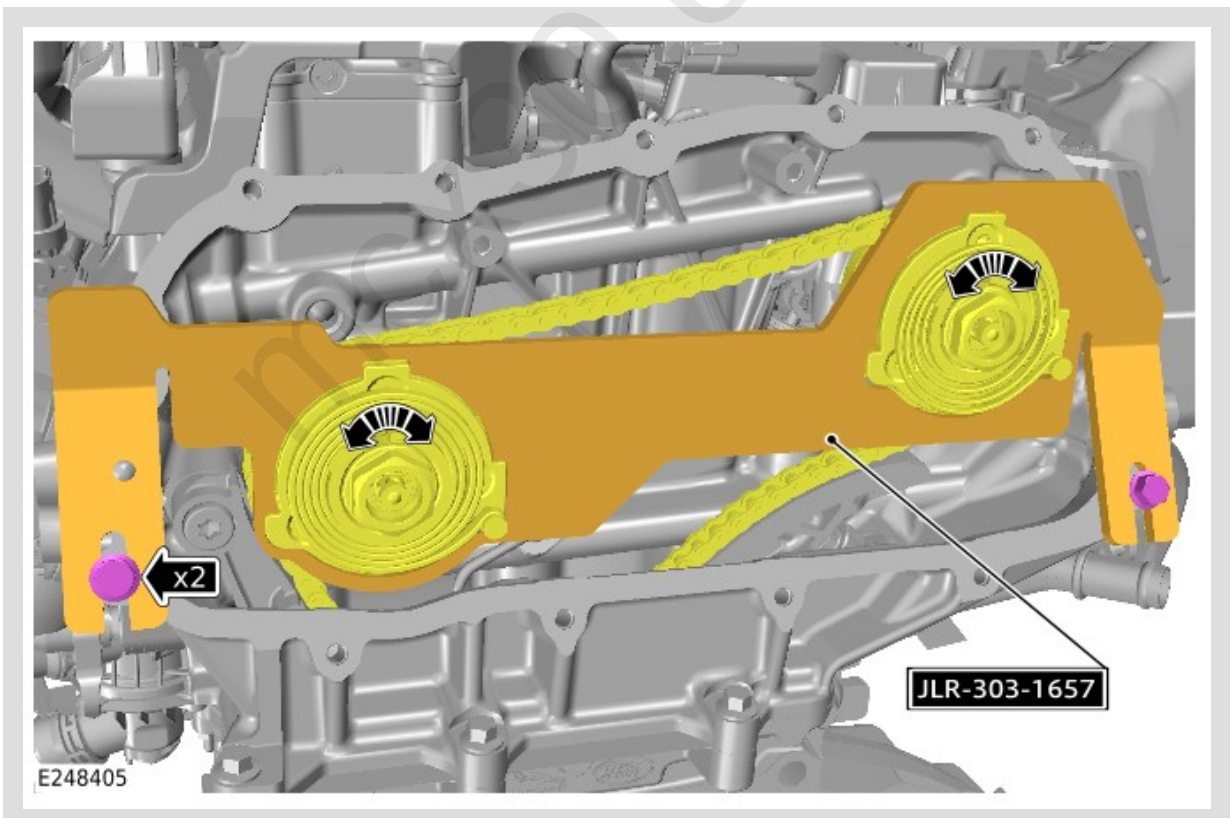
Special Tool(s): [JLR-303-1658](#)

15.



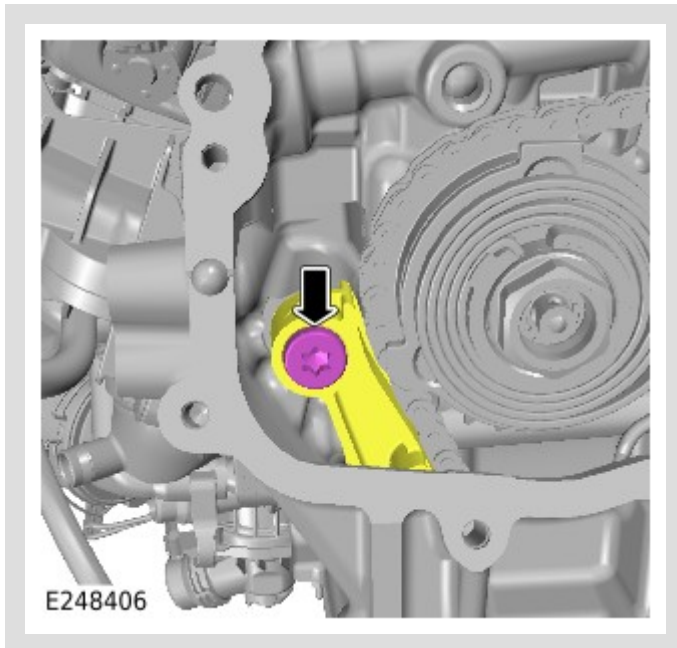
- Remove the 2 bolts.
- Remove and discard the upper timing chain upper guide.
- Loosen, but do not fully remove the upper timing chain tensioner.

16.



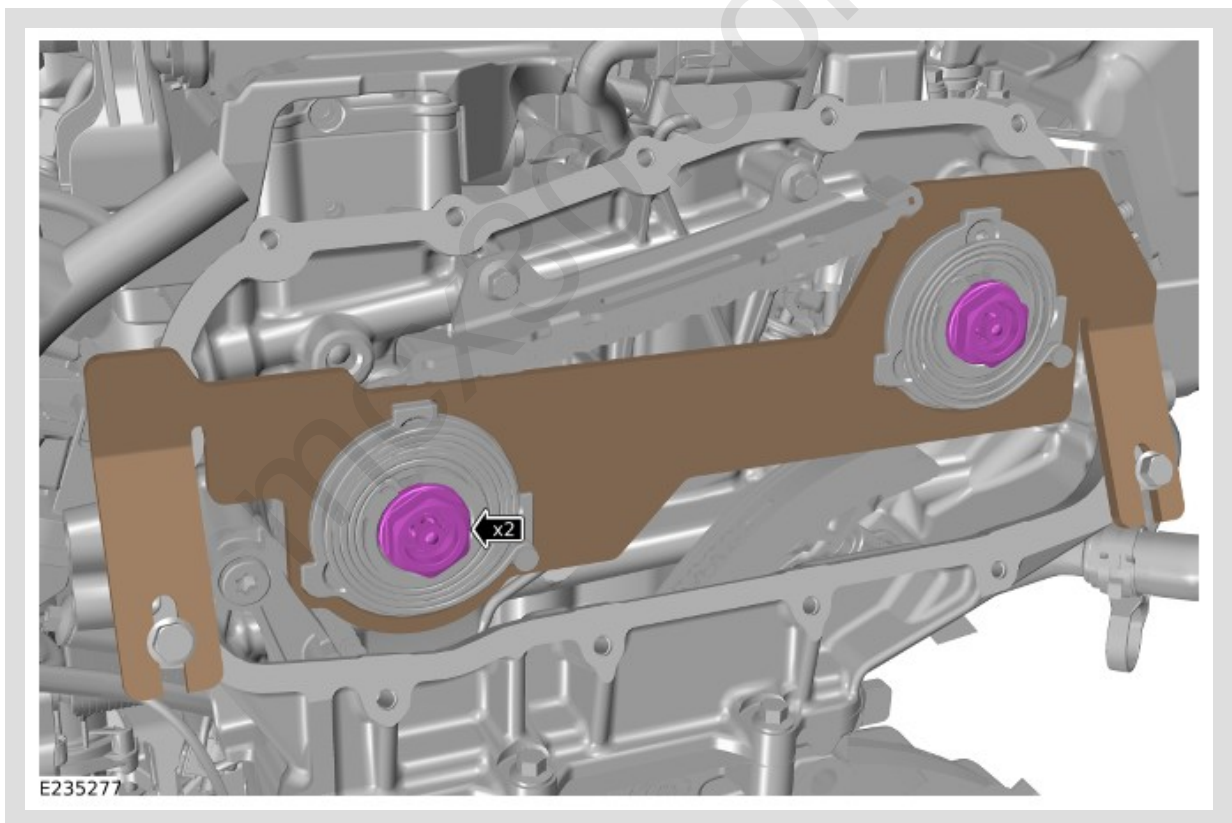
- Install the special tool.
Special Tool(s): [JLR-303-1657](#)
- Install and tighten the 2 bolts.
Torque: **13Nm**

17.



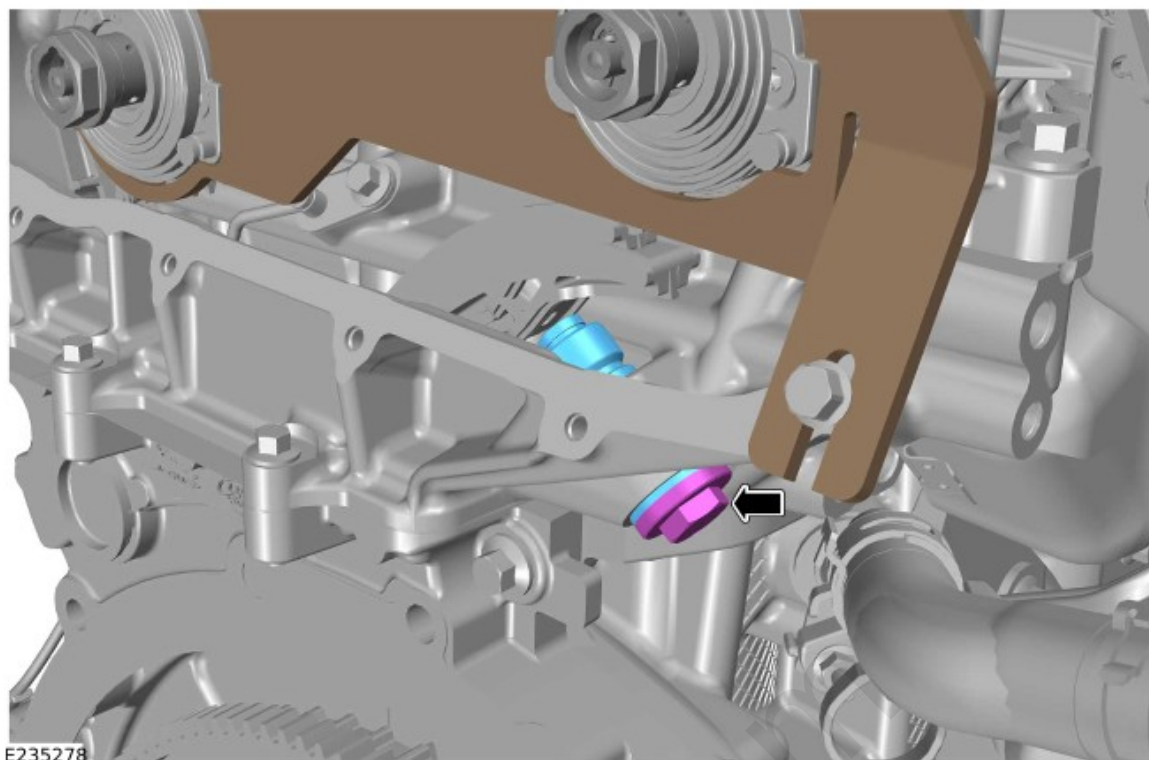
Remove the bolt.

18.



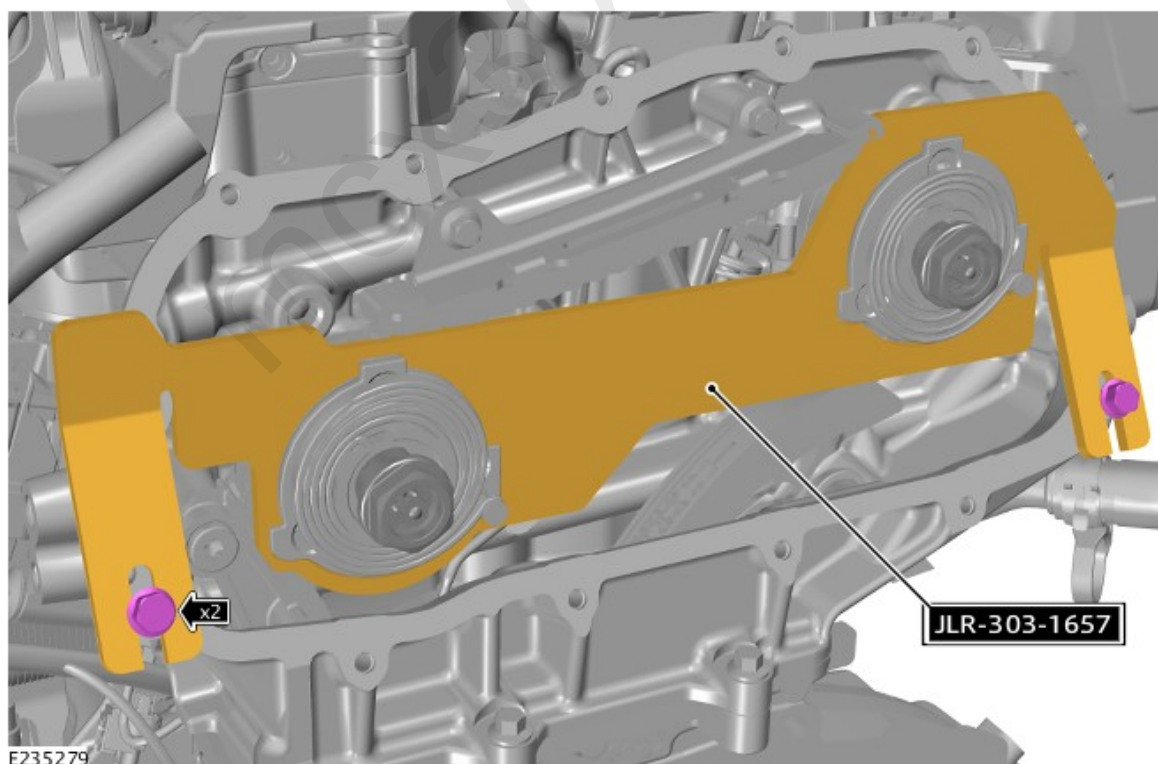
Loosen, but do not fully remove the 2 Variable Camshaft Timing (VCT) bolts.

19.



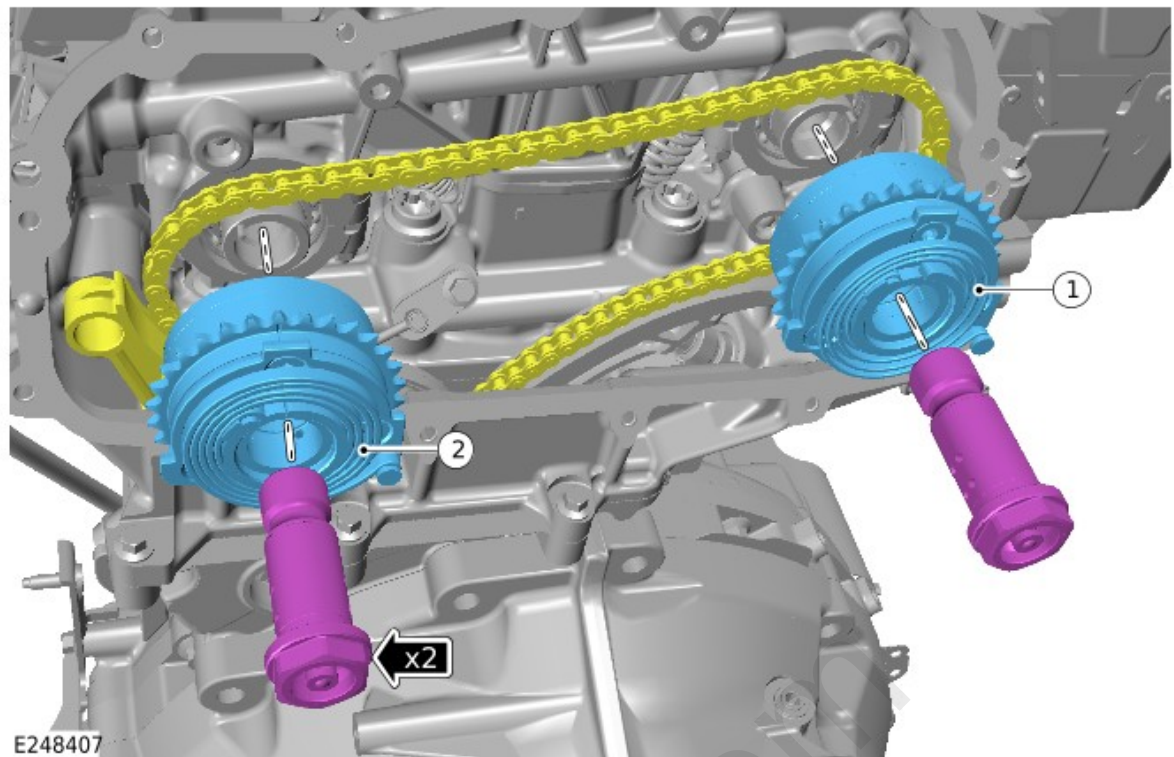
Remove and discard the upper timing chain tensioner.

20.



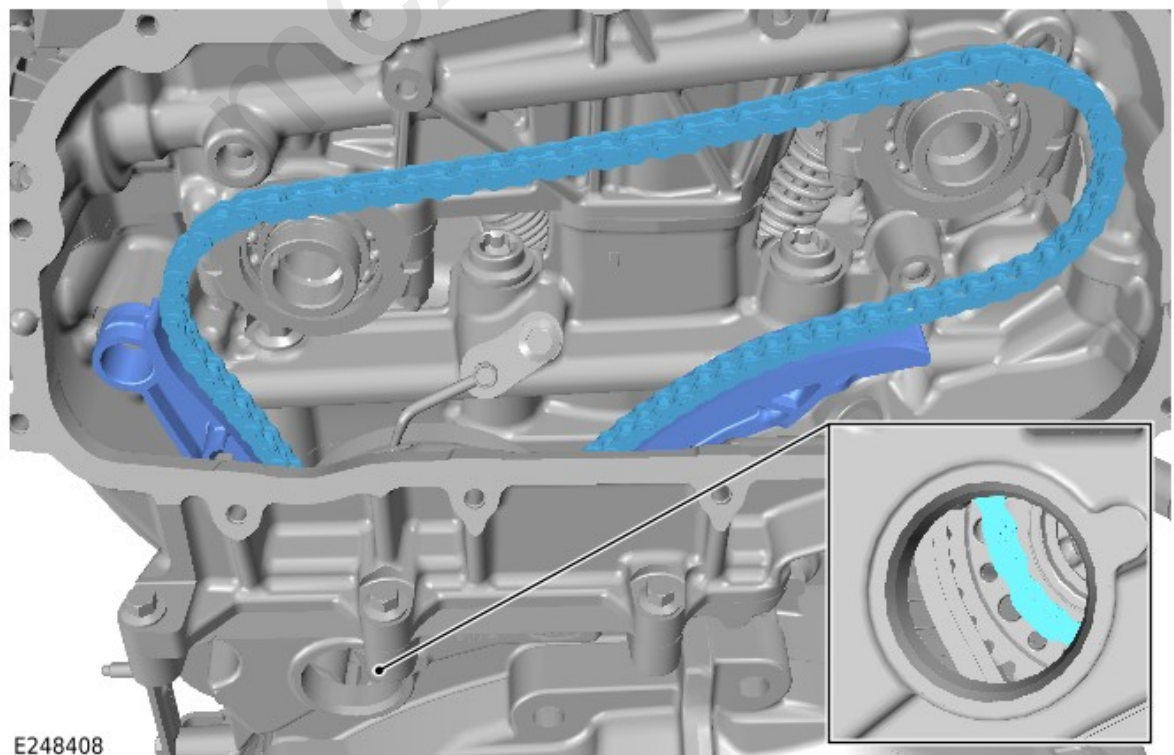
- Remove the 2 bolts.
- Remove the special tool.
Special Tool(s): [JLR-303-1657](#)

21.



- Note the location of the VCT actuators prior to removal, the VCT actuators are paired to camshafts.
- Remove and discard the 2 bolts.
- Remove the exhaust VCT actuator (1).
- Remove the intake VCT actuator (2).

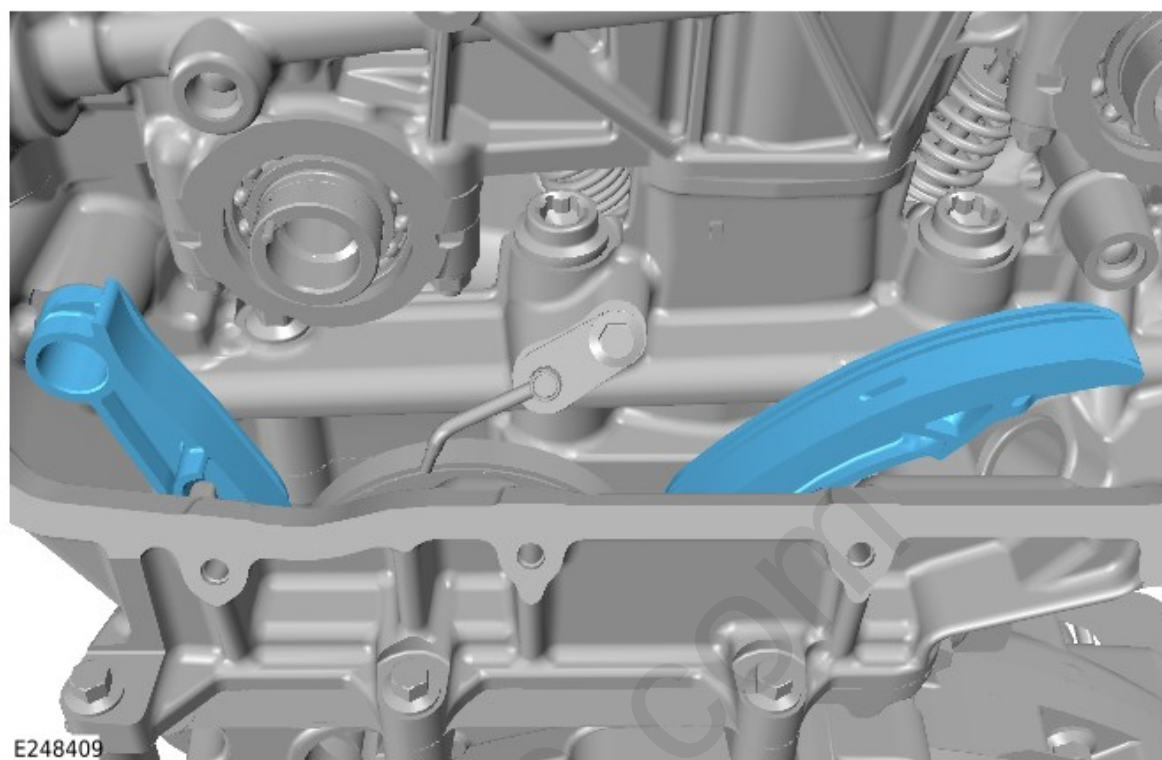
22.



- Remove the upper timing chain.
- Remove and discard the upper timing chain left guide.
- Remove and discard the upper timing chain right guide.

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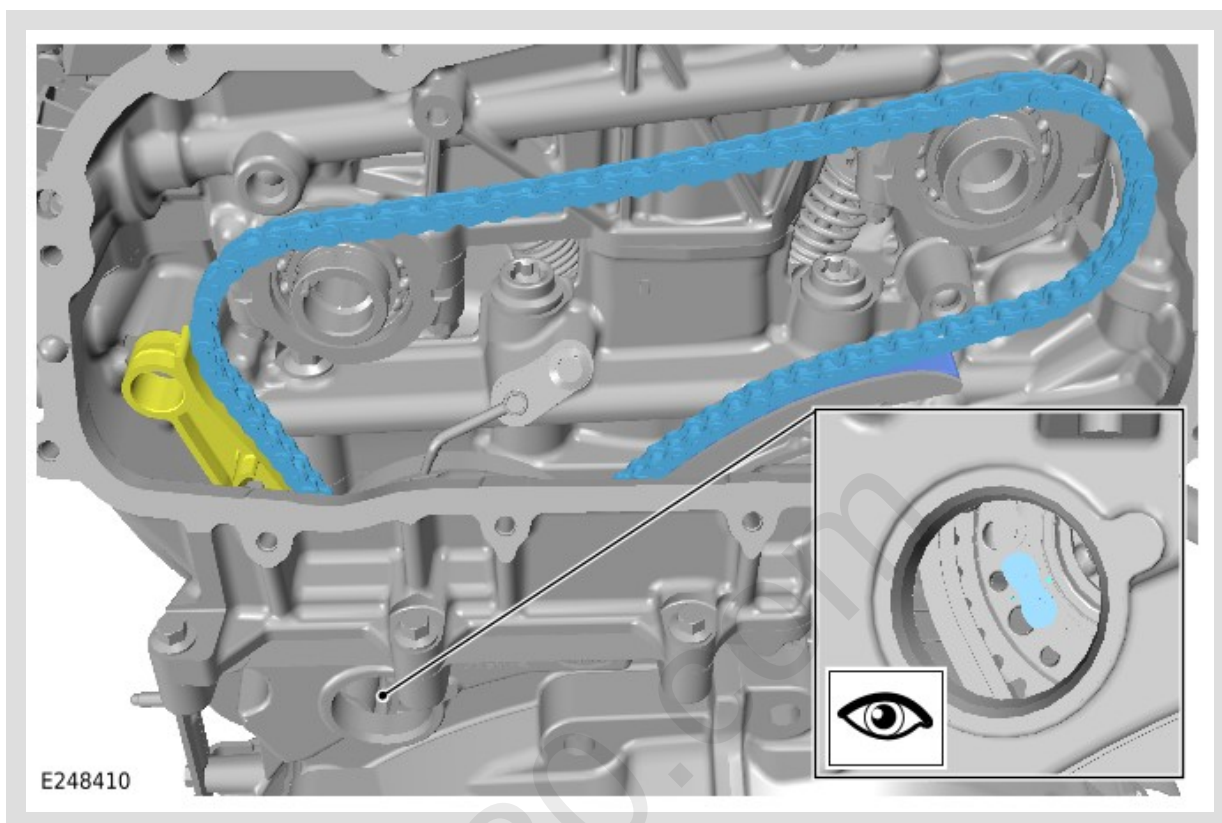
1.



- Install a new upper timing chain left guide.
Renew Part: [Upper timing chain guide](#) Quantity: 1.
- Install a new upper timing chain right guide.
Renew Part: [Upper timing chain guide](#) Quantity: 1.

 NOTE:

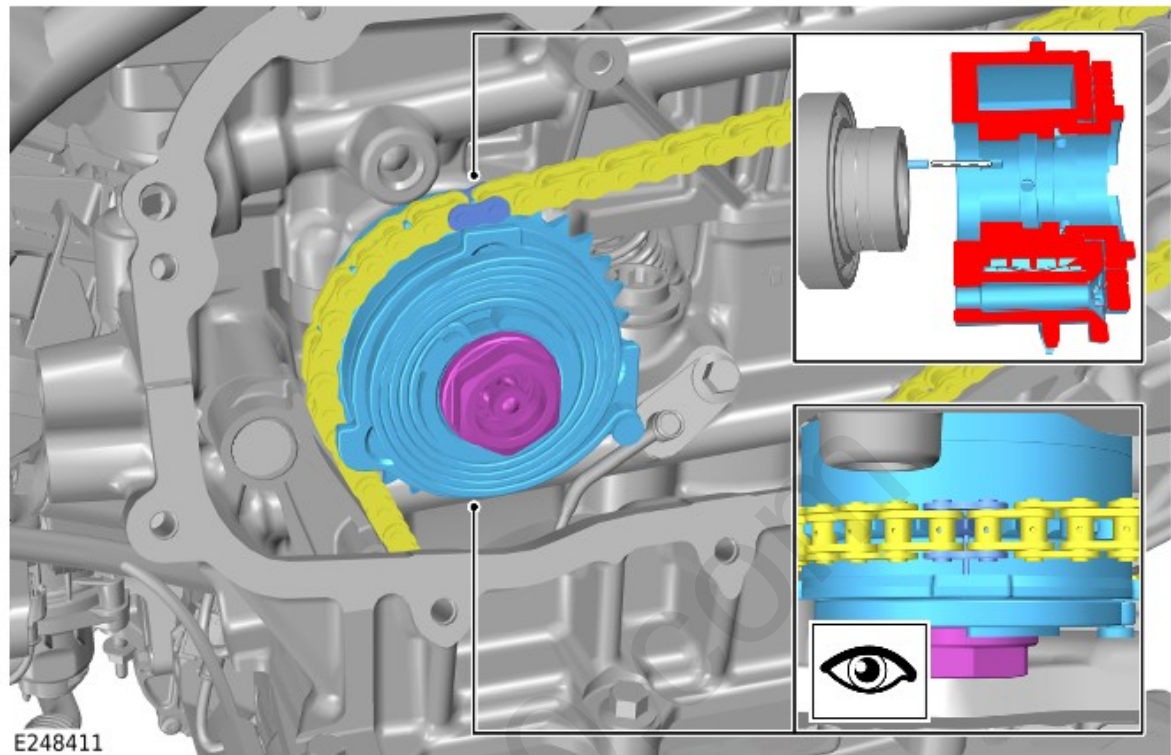
Maintain tension on the chain to prevent the timing chain from disengaging with its sprocket position.



- Install the upper timing chain.
- Make sure the timing mark is aligned with the center of the colored link.

 NOTE:

Maintain tension on the chain to prevent the timing chain from disengaging with its sprocket position.

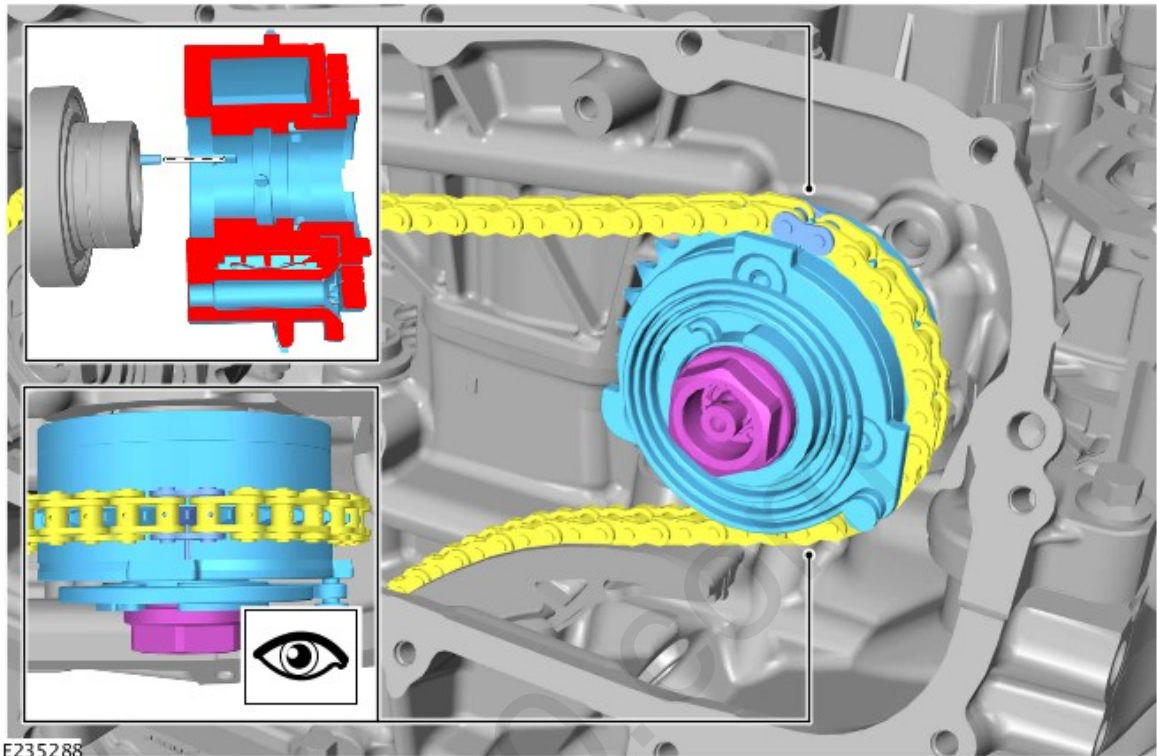


- Make sure that the component is installed to the previously noted location.
- Install the intake Variable Camshaft Timing (VCT) actuator.
- Make sure that the camshaft locating pin is correctly located into the VCT actuator as illustrated.
- Make sure that the colored link on the timing chain is aligned with the timing mark on the VCT actuator as illustrated.
- Install, but do not fully tighten the bolt.

Renew Part: *Variable camshaft timing actuator bolts* Quantity: 1.

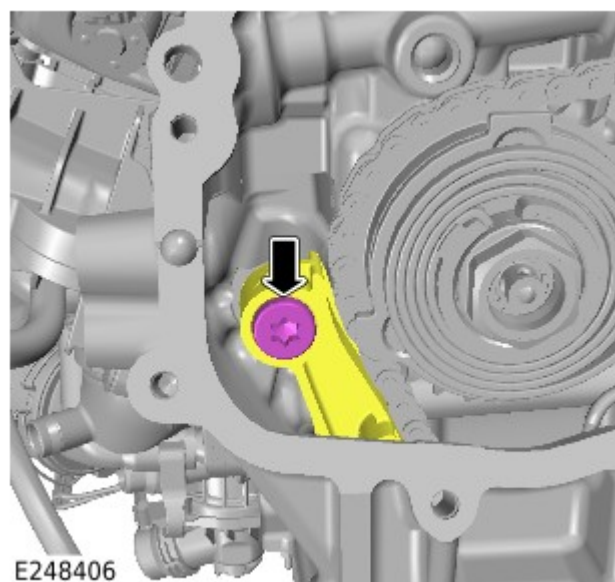
 NOTE:

Maintain tension on the chain to prevent the timing chain from disengaging with its sprocket position.



- Make sure that the component is installed to the previously noted location.
- Install the exhaust VCT actuator.
- Make sure that the camshaft locating pin is correctly located into the VCT actuator as illustrated.
- Make sure that the colored link on the timing chain is aligned with the timing mark on the VCT actuator as illustrated.
- Install, but do not fully tighten the bolt.

Renew Part: *Variable camshaft timing actuator bolts* Quantity: 1.

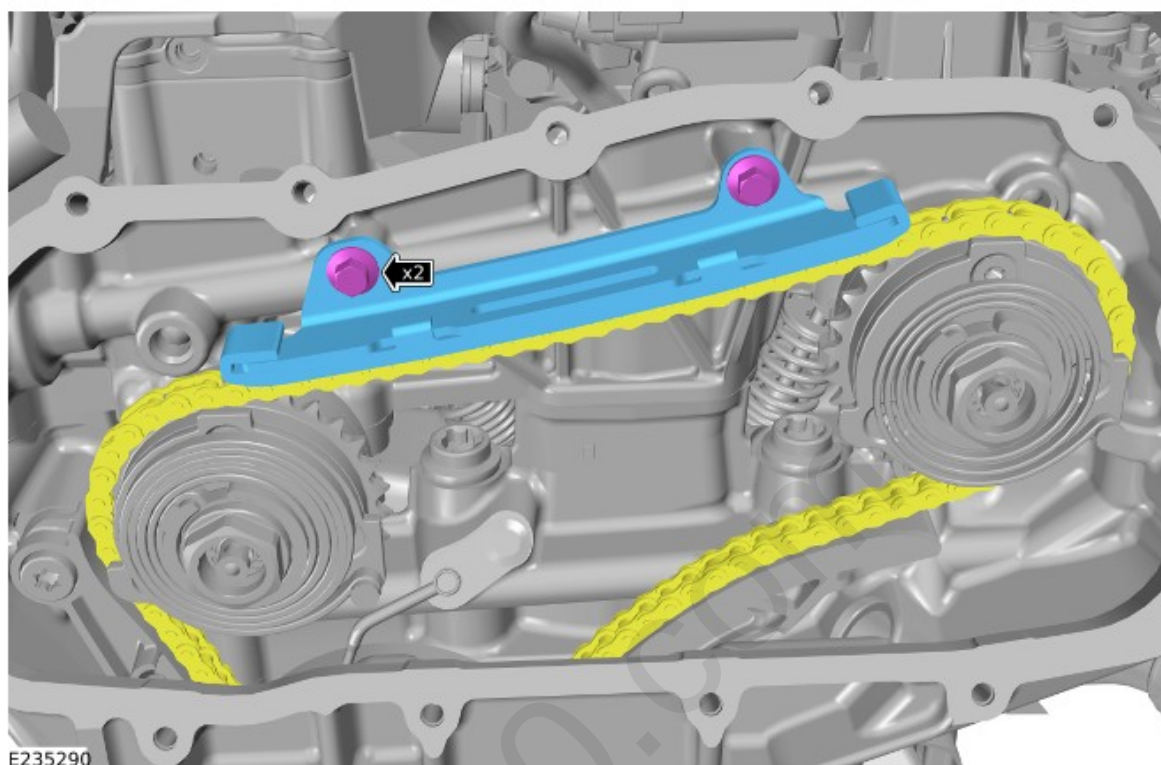


Install and tighten the bolt.

Torque: **25Nm**

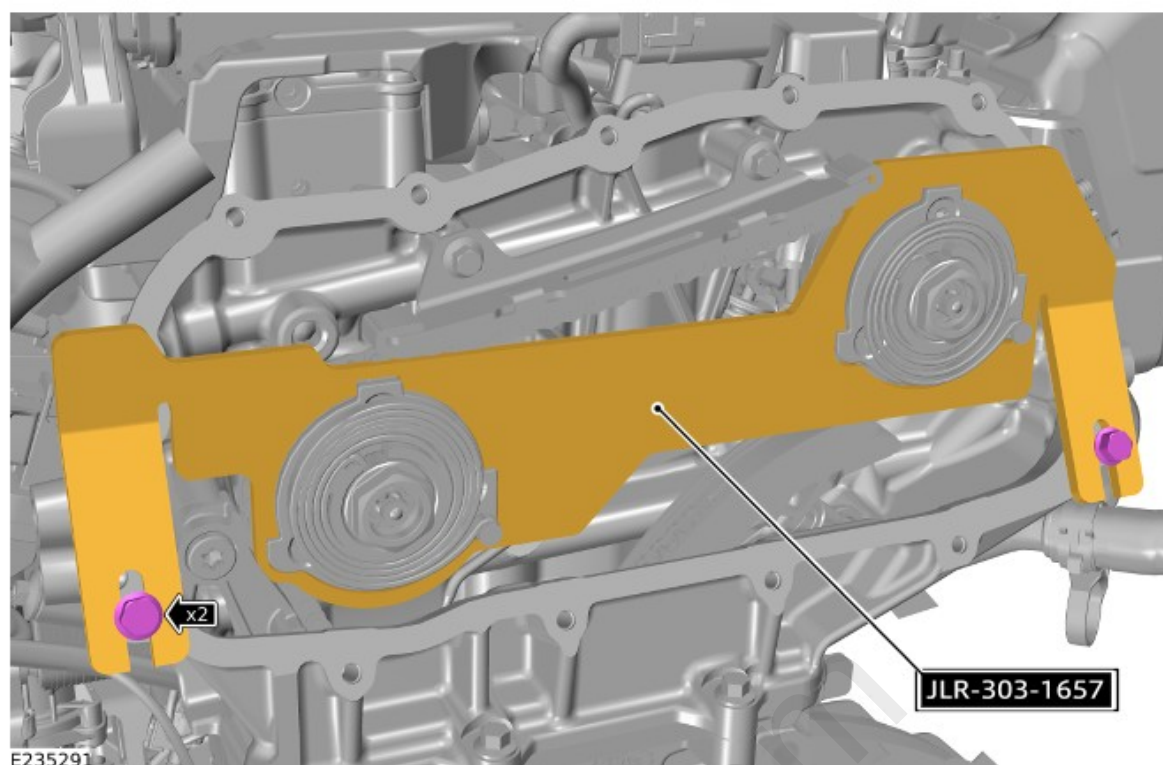
 NOTE:

Maintain tension on the chain to prevent the timing chain from disengaging with its sprocket position.



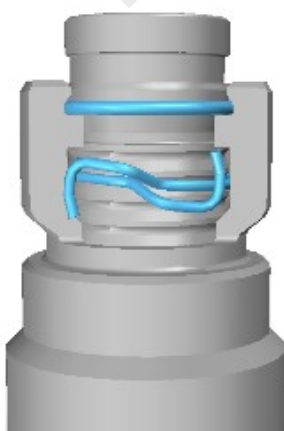
- Install a new upper timing chain upper guide.
Renew Part: [Upper timing chain guide](#) Quantity: 1.
- Install and tighten the 2 bolts.
Torque: 11Nm

7.



- Install the special tool.
Special Tool(s): [JLR-303-1657](#)
- Install and tighten the 2 bolts.
Torque: 13Nm

8.

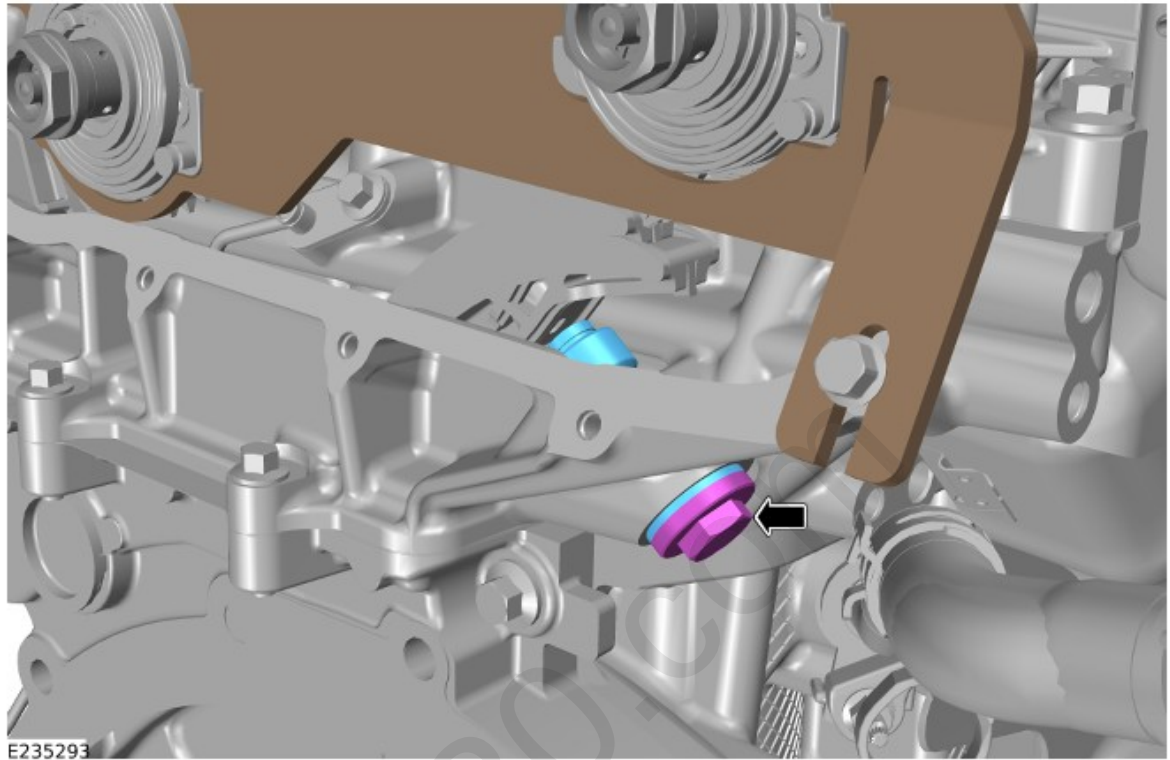


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- Inspect the new upper timing chain tensioner, make sure that the 2 clips are in the position as illustrated.
Renew Part: [Upper timing chain tensioner](#) Quantity: 1.
- If the 2 clips are in the incorrect position, do not install the upper timing chain tensioner.

9.



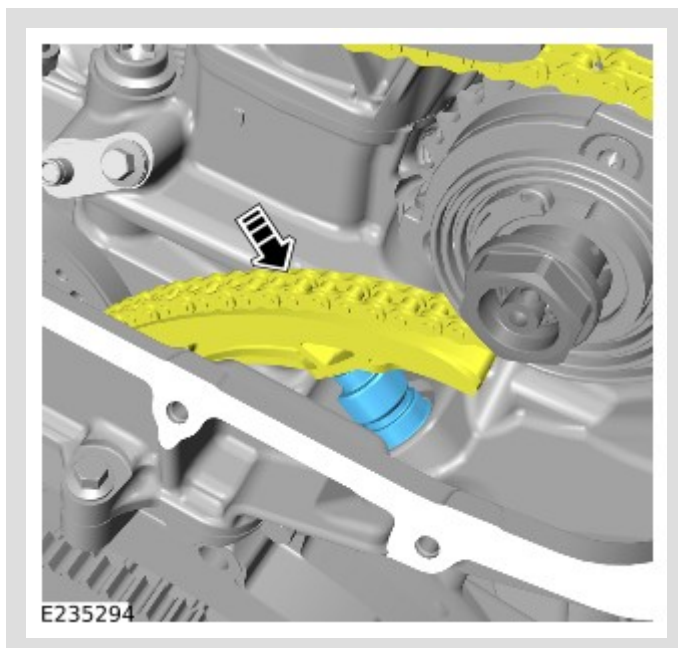
Install and tighten the new upper timing chain tensioner.

*Torque: **55Nm***

10.

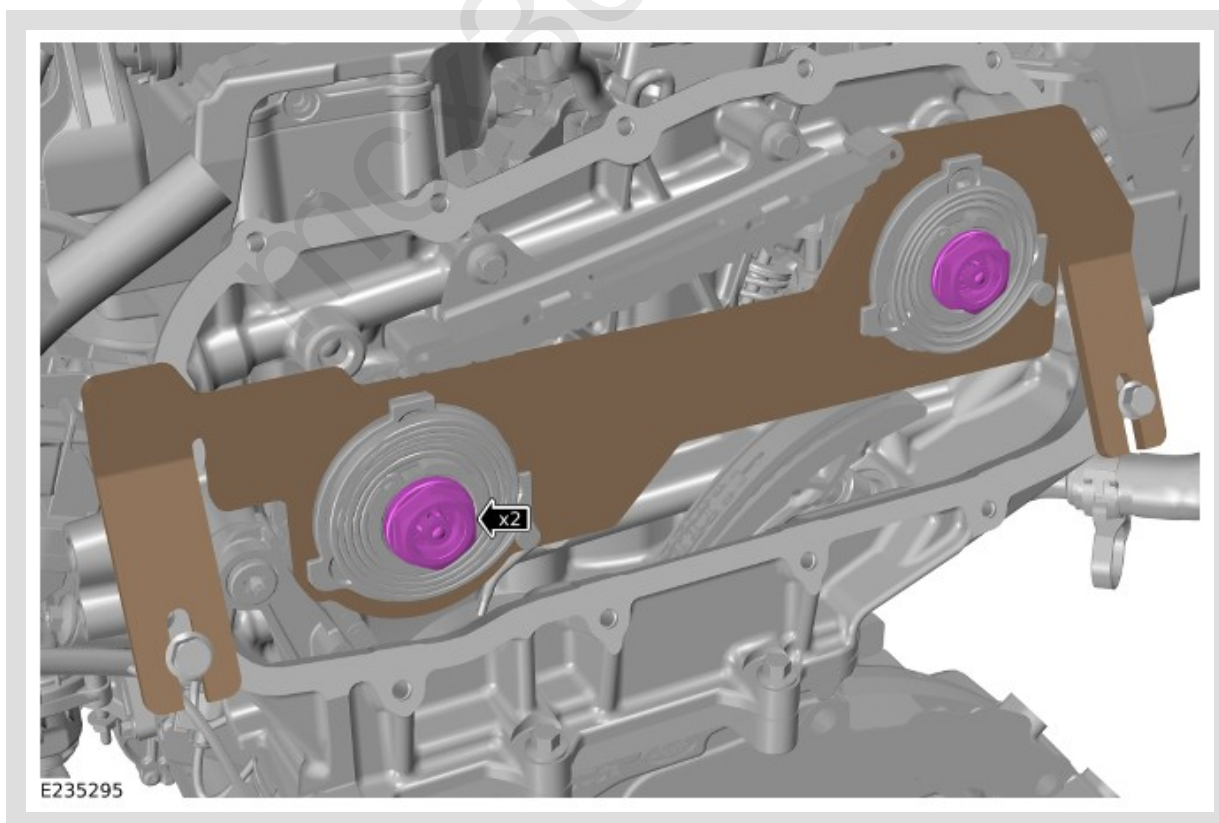
⚠ CAUTION:

Do not directly touch the timing chain tensioner at this stage.



- Push and release the upper timing chain guide to release the upper timing chain tensioner.
- Make sure the upper timing chain tensioner is correctly released.

11.



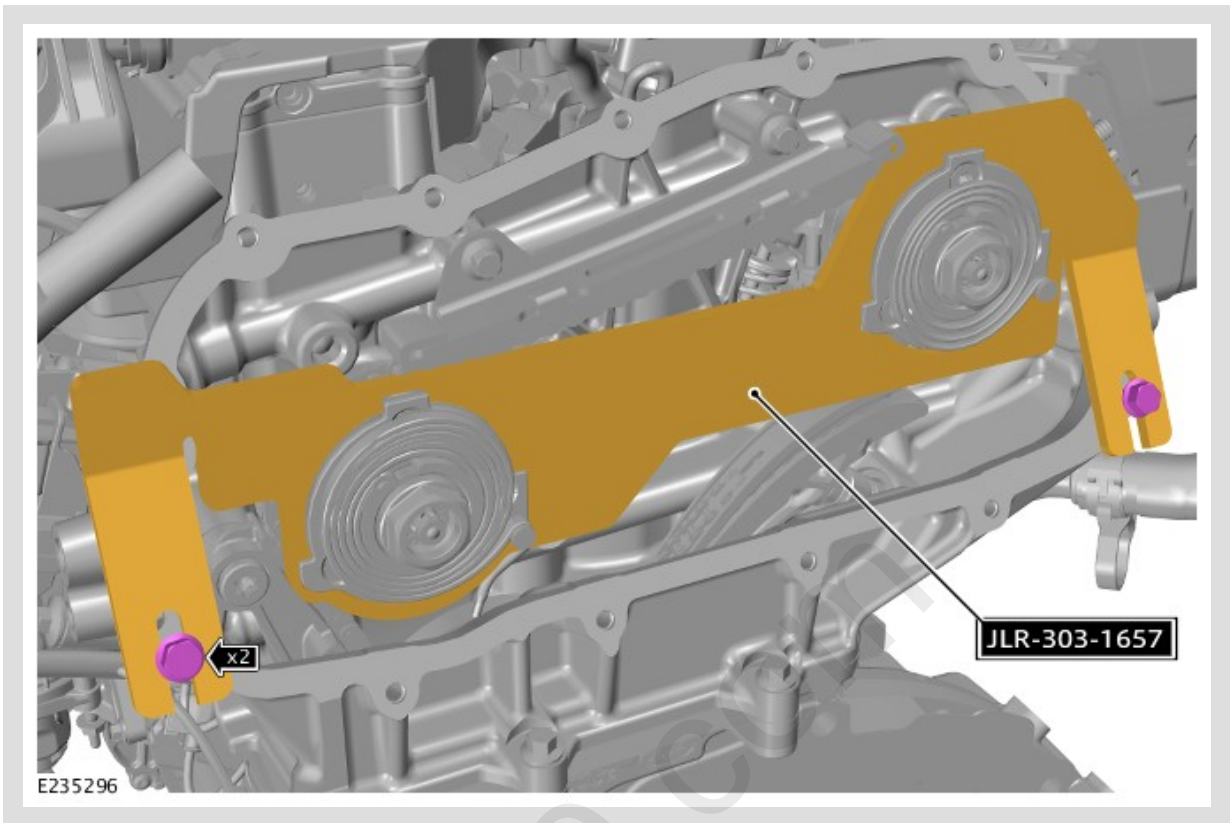
Tighten the 2 bolts.

Torque

Stage1: **25Nm**

Stage2: **60°**

12.

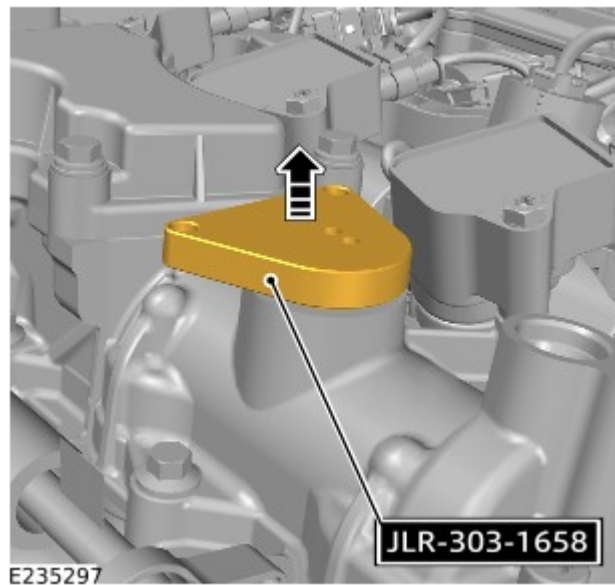


- Remove the 2 bolts.
- Remove the special tool.
Special Tool(s): [JLR-303-1657](#)

13.

Install the access cover.

14.



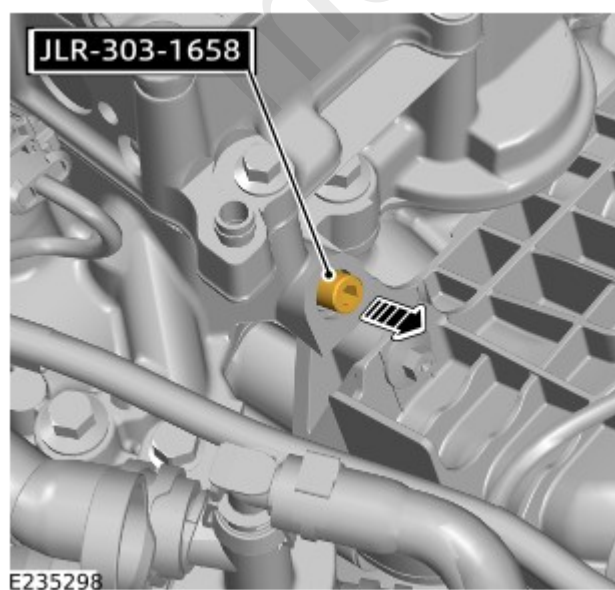
Remove the special tool.

Special Tool(s): [JLR-303-1658](#)

15.

- Install a new O-ring seal.
Renew Part: [Oil fill pipe O-ring seal](#) *Quantity:* 1.
- Install the oil filler pipe.
- Install and tighten the bolt.
Torque: **12Nm**
- Install the oil filler cap.

16.



Remove the special tool.

Special Tool(s): [JLR-303-1658](#)

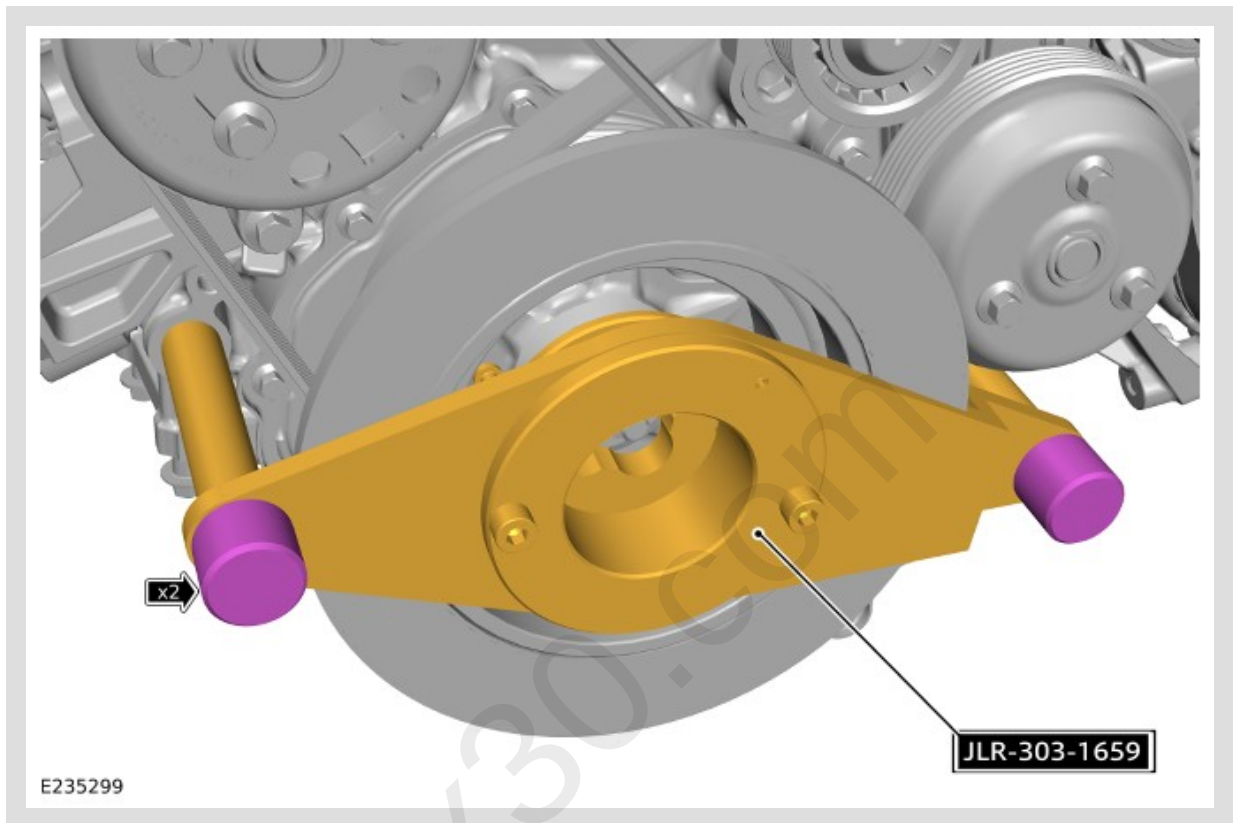
17. Install and tighten the left camshaft carrier inspection plug.

Torque: 10Nm

18. Install the upper timing cover.

Refer to: Upper Timing Cover (303-01C, Removal and Installation).

- 19.



- Remove the 2 bolts.
- Remove the special tool.

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

20. Install the viscous cooling fan.

Refer to: [Viscous Cooling Fan](#) (303-03C Engine Cooling - INGENIUM I6 3.0L Petrol, Removal and Installation).

21. Install the exhaust system.

Refer to: [Exhaust System](#) (309-00C Exhaust System - INGENIUM I6 3.0L Petrol, Removal and Installation).

22. Reposition the hood in the correct location.

23. Connect the startup battery ground cable.

Refer to: [Startup Battery Disconnect and Connect](#) (414-00 Battery and Charging System - General Information, General Procedures).

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