

2015.0 F-TYPE (X152), 303-01

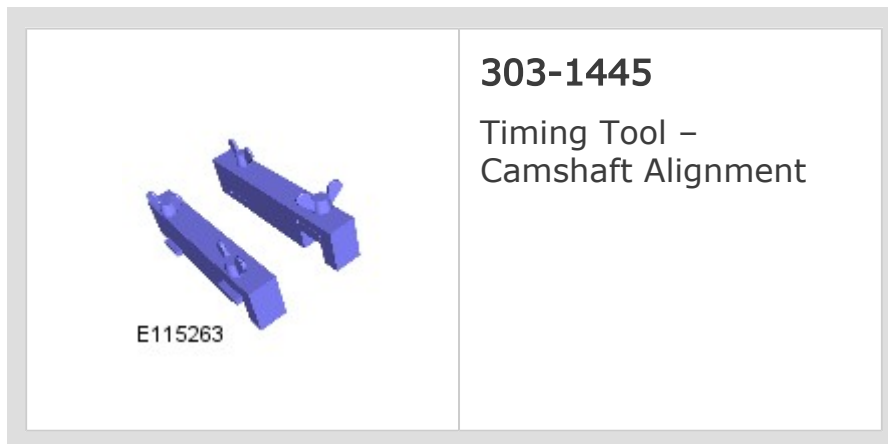
ENGINE - V6 S/C 3.0L PETROL

## TIMING DRIVE COMPONENTS (G1584118)

### REMOVAL AND INSTALLATION

12.65.13	TIMING CHAINS, GEARS AND TENSIONERS - ENGINE SET - RENEW	3000 CC, AJ V6 (AJ126)	15.6	USED WITHINS
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### SPECIAL TOOL(S)





E115270

**303-1452**

Camshaft Rotating Tool



E115271

**303-1482**

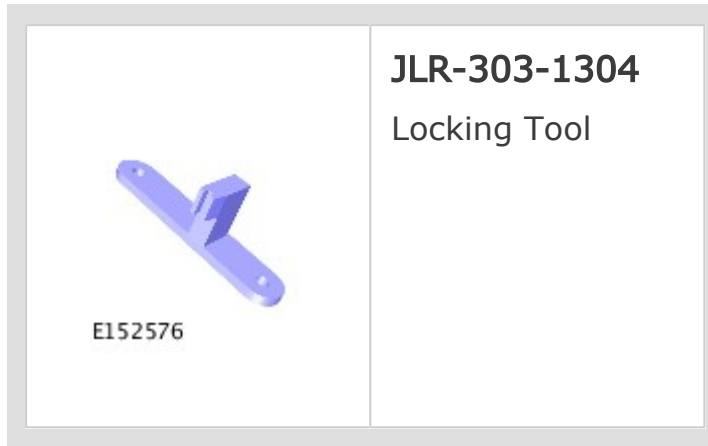
Tensioner Tool



E152575

**JLR-303-1303**

Timing Tool



## REMOVAL

### ⚠ CAUTION:

Check all timing components for wear and install new components if required.

### ⚠ NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the engine removed for clarity.

1. Disconnect the battery ground cable.  
Refer to: [Battery Disconnect and Connect](#) (414-01 Battery, Mounting and Cables, General Procedures).

- 2.

**⚠ WARNING:**

Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

3. Remove the starter motor.

Refer to: Starter Motor (303-06A, Removal and Installation).

Refer to: Starter Motor (303-06B, Removal and Installation).

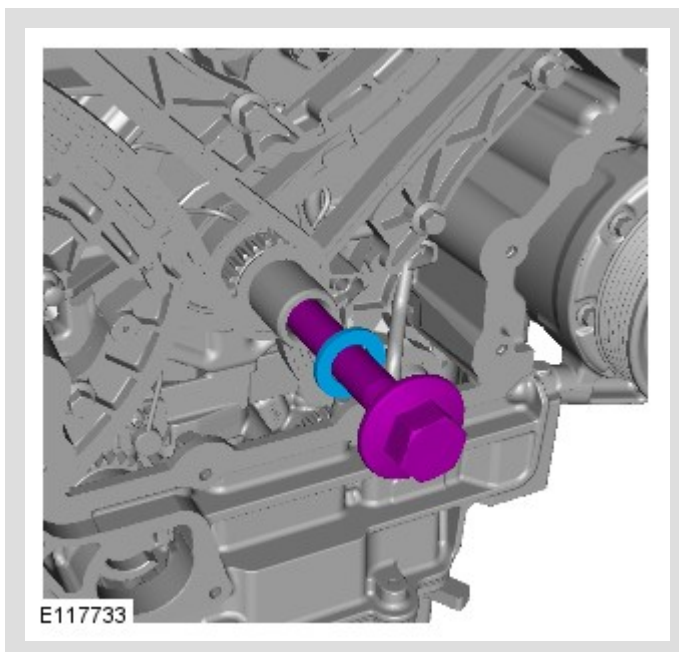
4. Remove the timing cover.

Refer to: [Timing Cover](#) (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

- 5.

**⚠ CAUTION:**

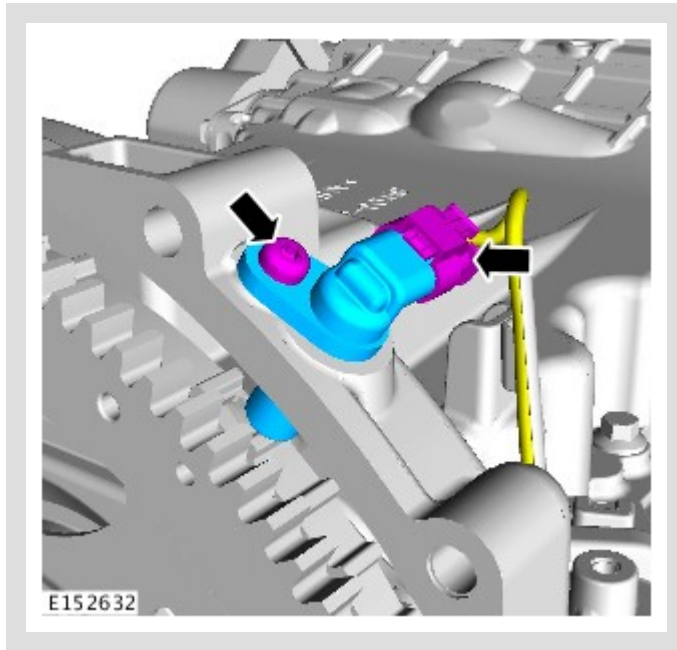
An M16 washer must be used to prevent damage to the crankshaft on installation.



Install the crankshaft pulley bolt.

*Torque:* **20 Nm**

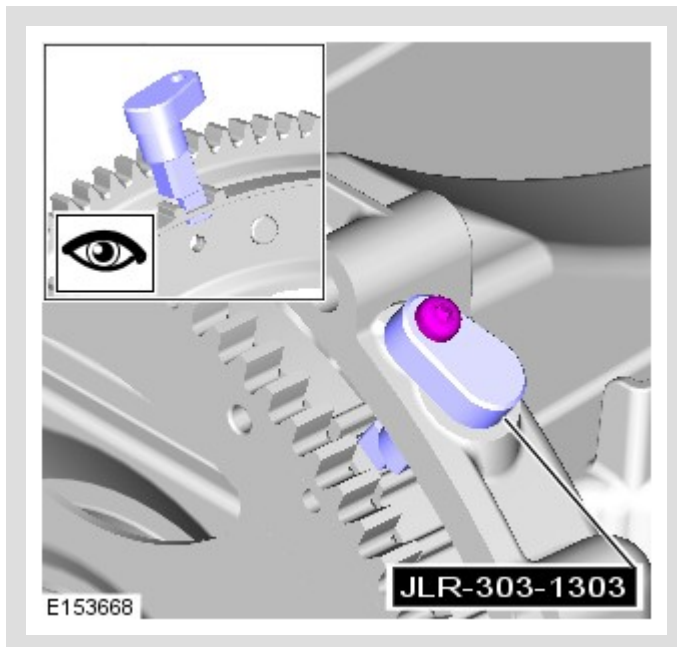
- 6.



7.

⚠ CAUTION:

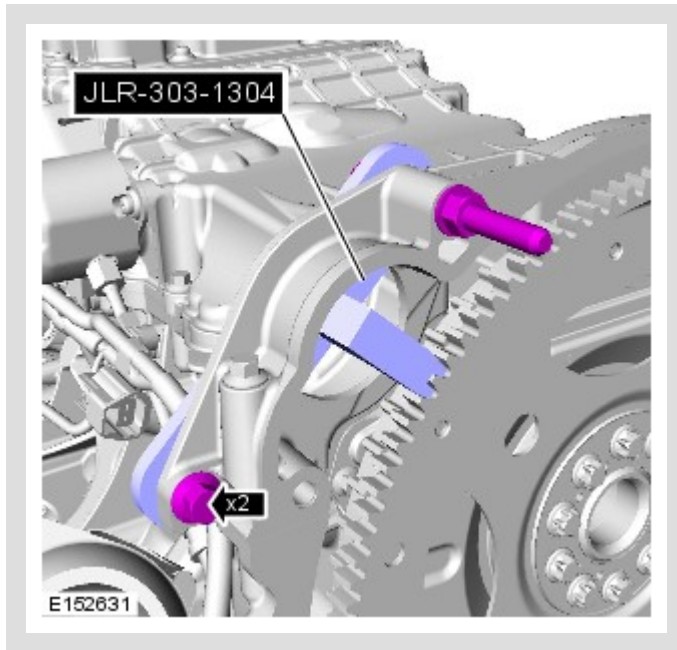
Only rotate the crankshaft clockwise.



Install the special tool.

*Special Tool(s):* [JLR-303-1303](#)

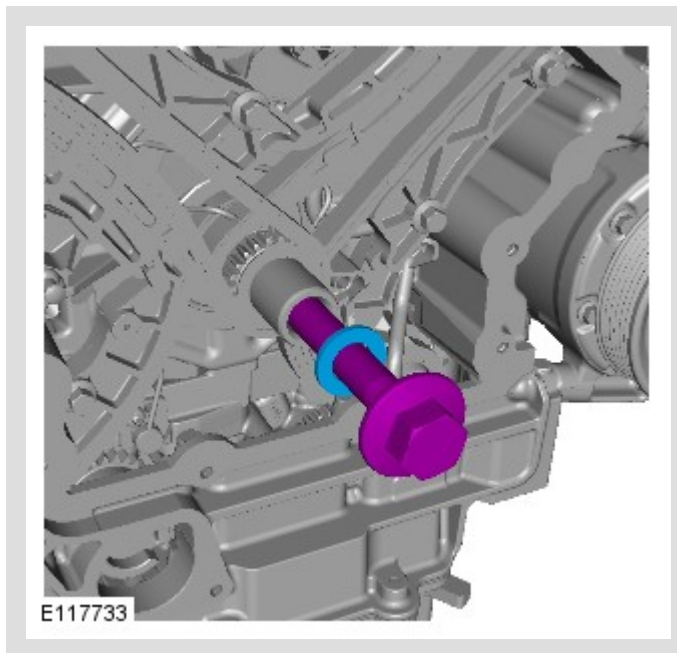
8.



Install the special tool.

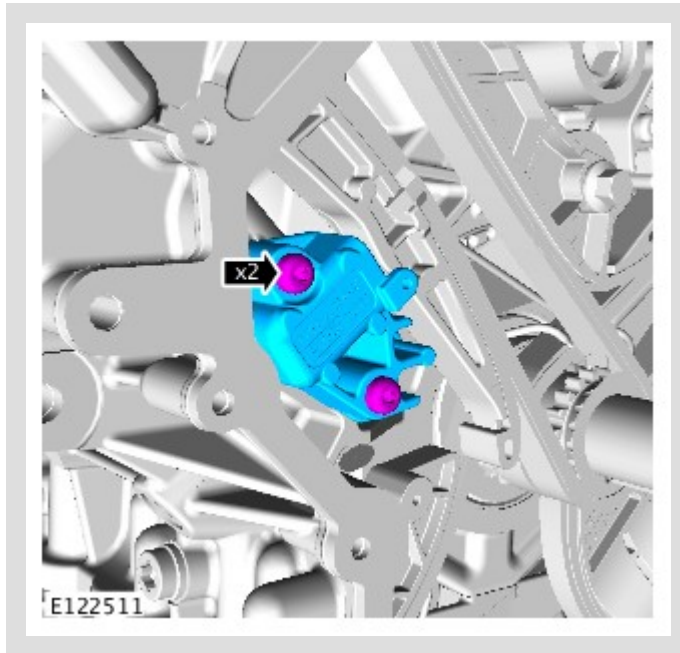
*Special Tool(s):* [JLR-303-1304](#)

9.



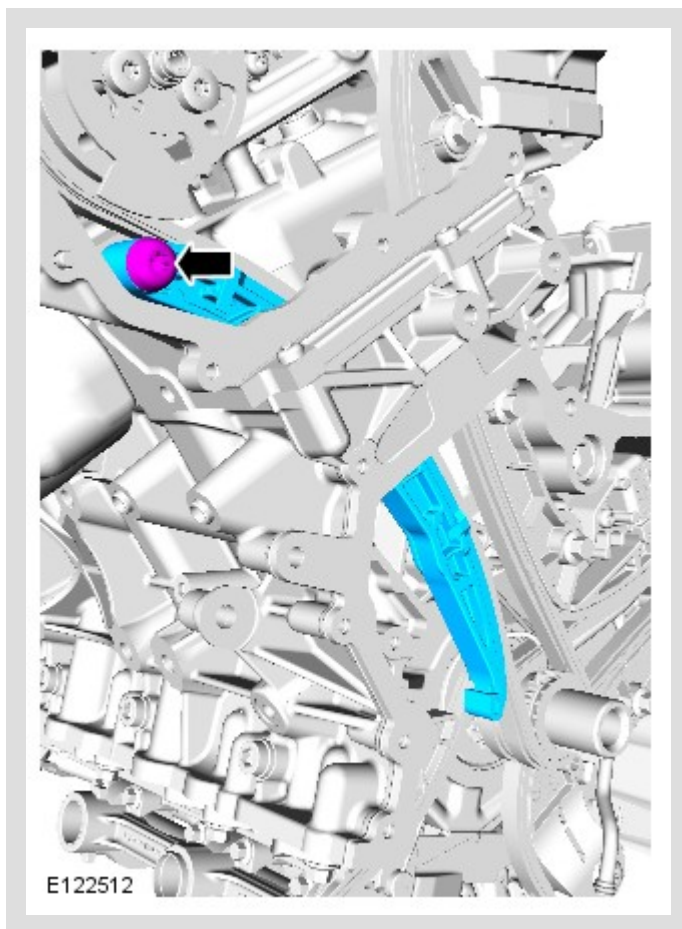
Remove the crankshaft pulley bolt.

10.



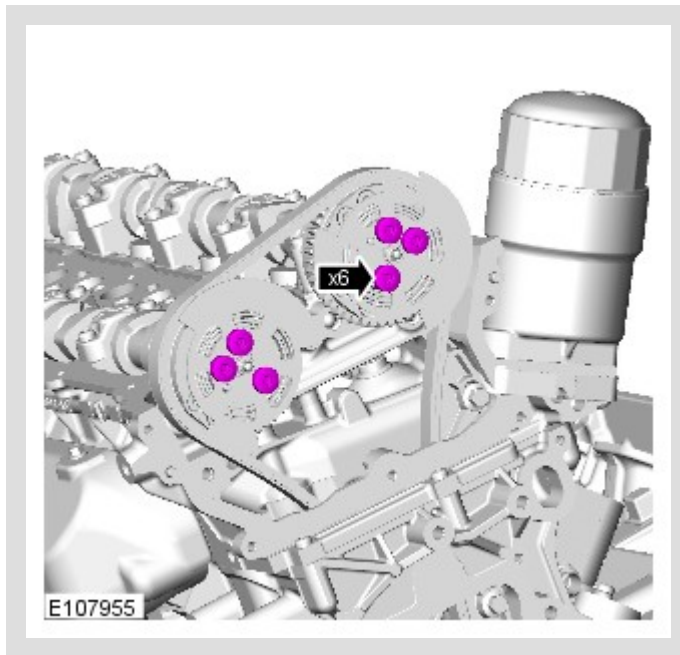
Remove the timing chain tensioner.

11.



Remove the timing chain guide.



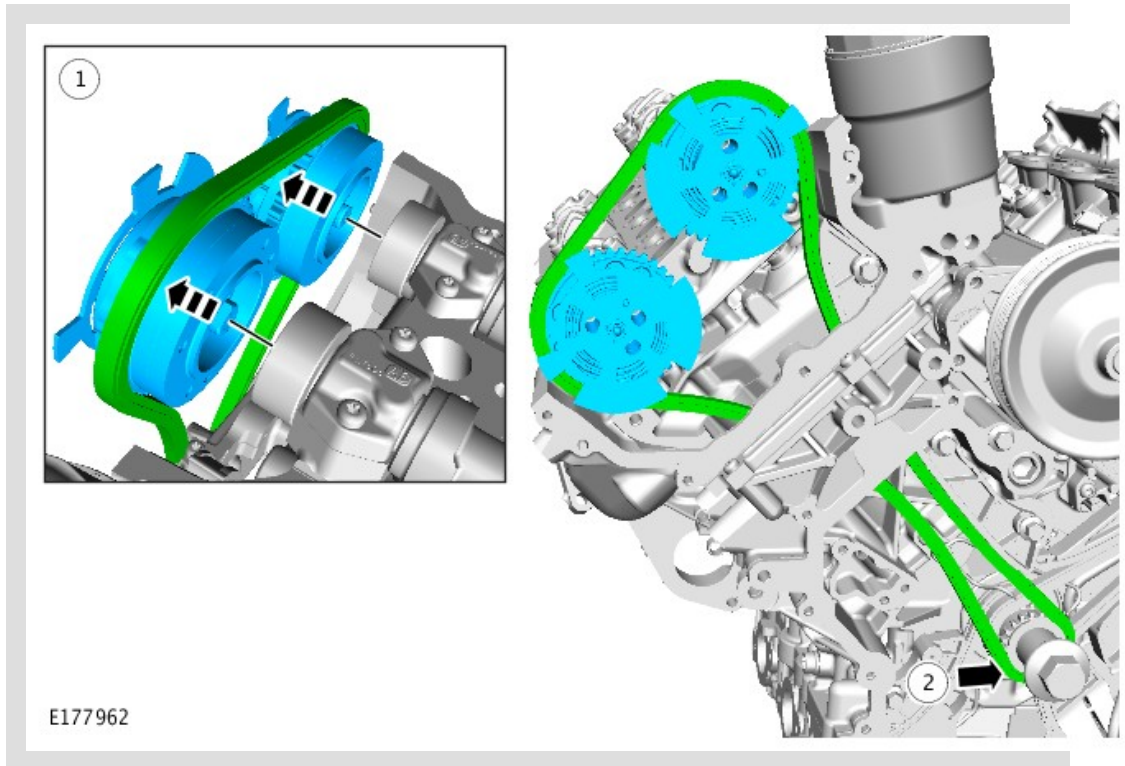


Remove the variable valve timing (VVT) unit bolts.

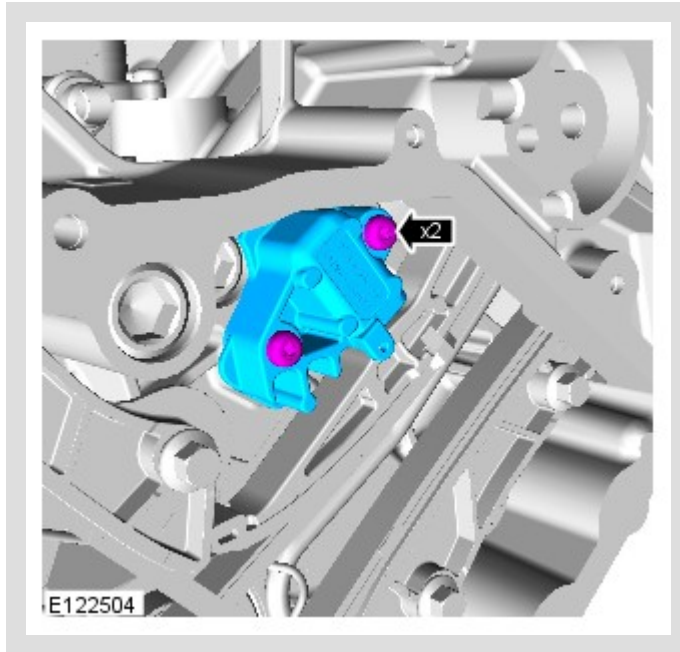
13.

**ⓘ CAUTION:**

If the variable valve timing (VVT) units are knocked or dropped then new VVT(s) must be installed.

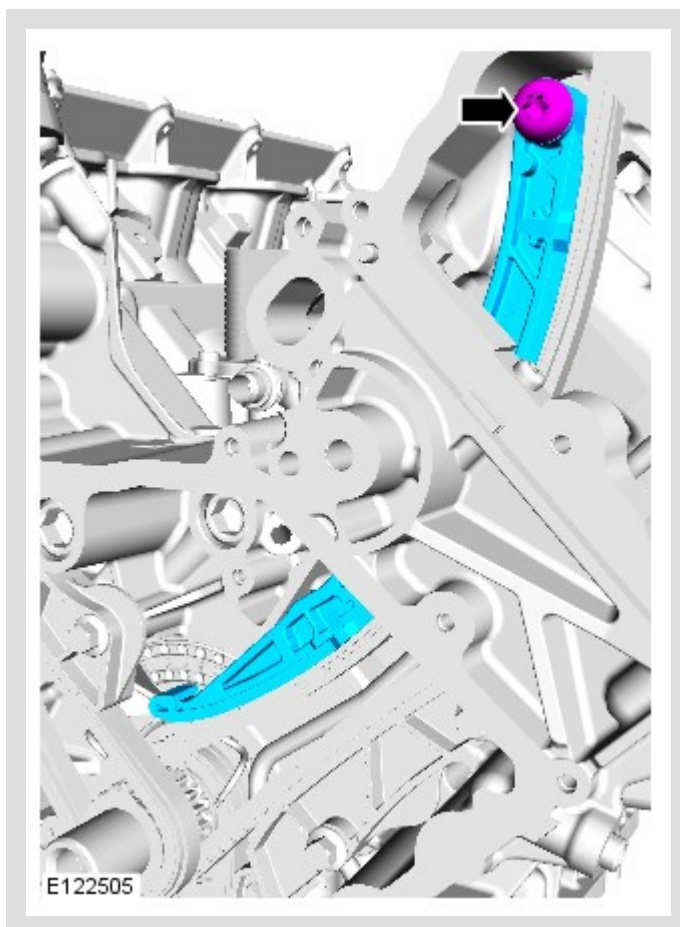


Remove the timing chain and VVT units.

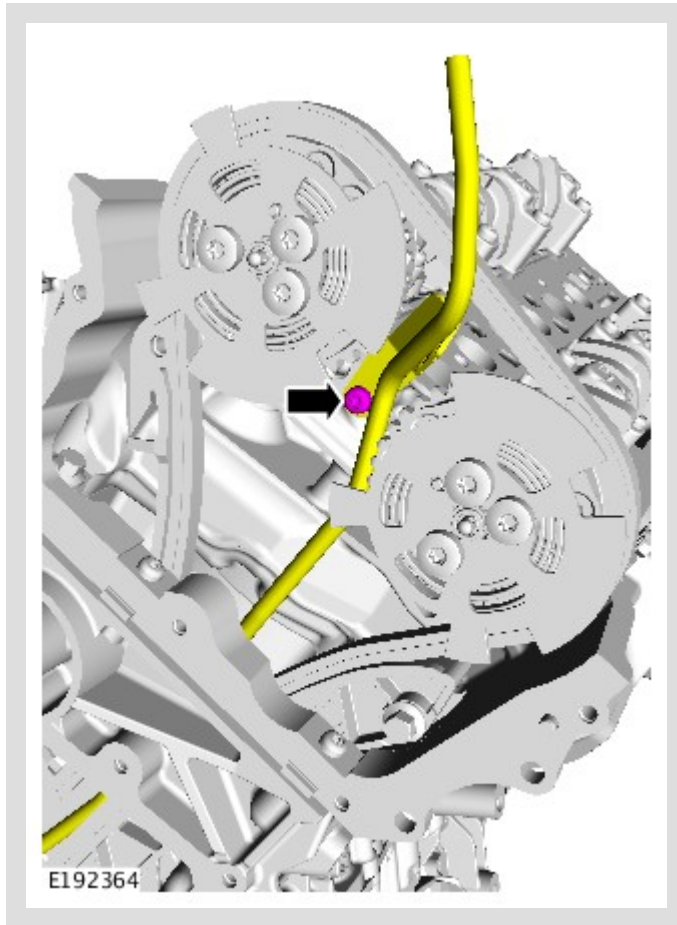


Remove the timing chain tensioner.

15.

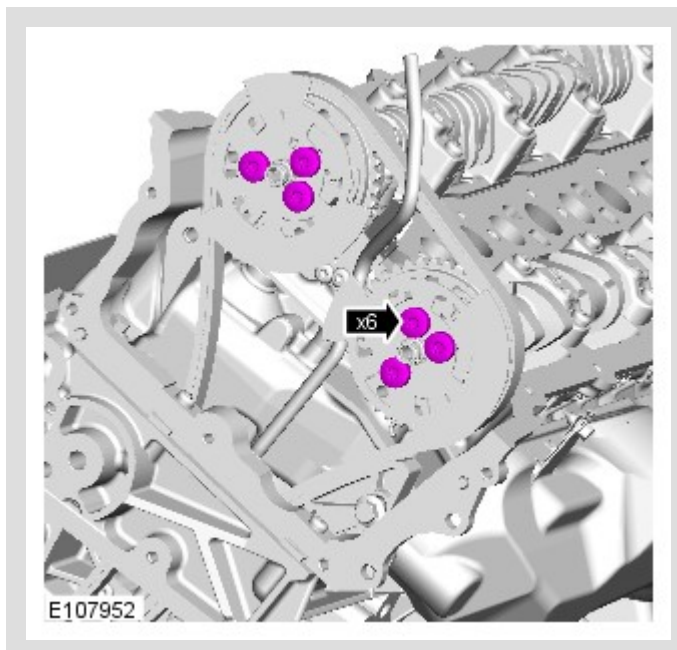


Remove the timing chain guide.



Release the oil drain tube.

17.

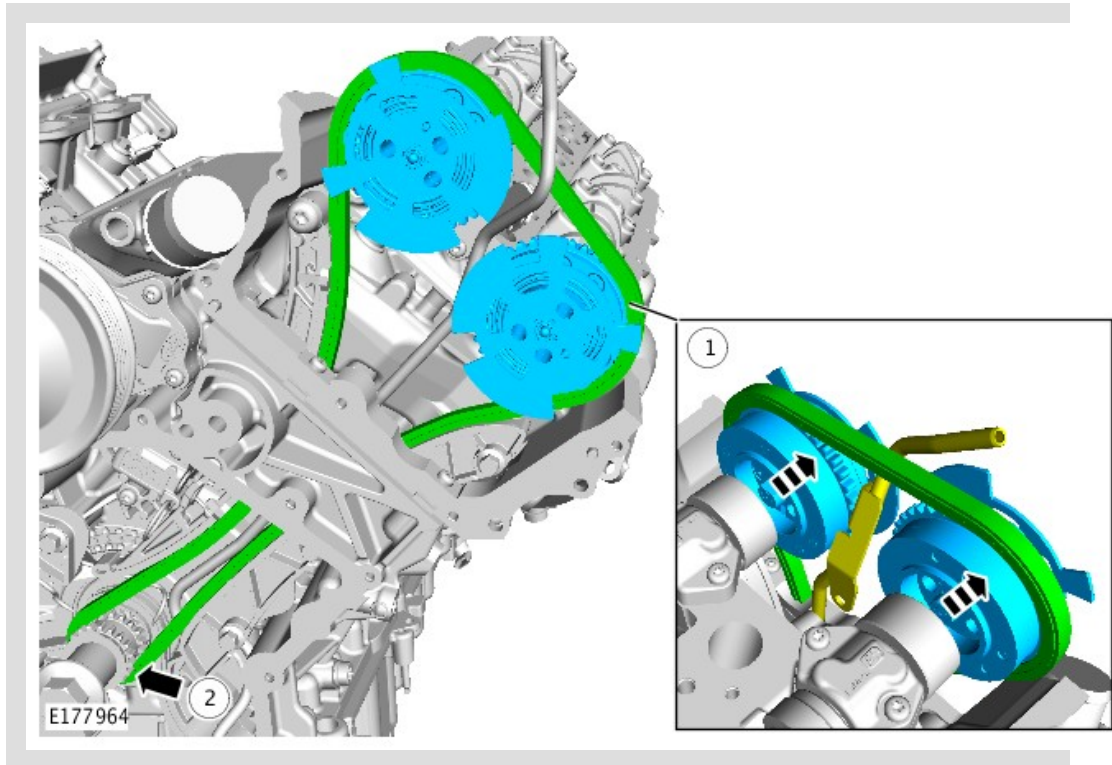


Remove the variable valve timing (VVT) unit bolts.

18.

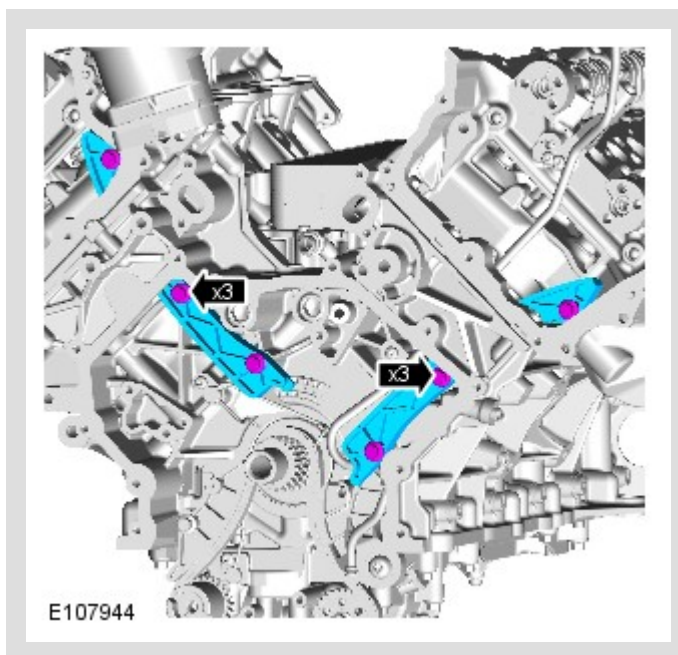
⚠ CAUTION:

If the VVT is knocked or dropped then new VVT(s) must be installed.



Remove the timing chain with the VVT units.

19.

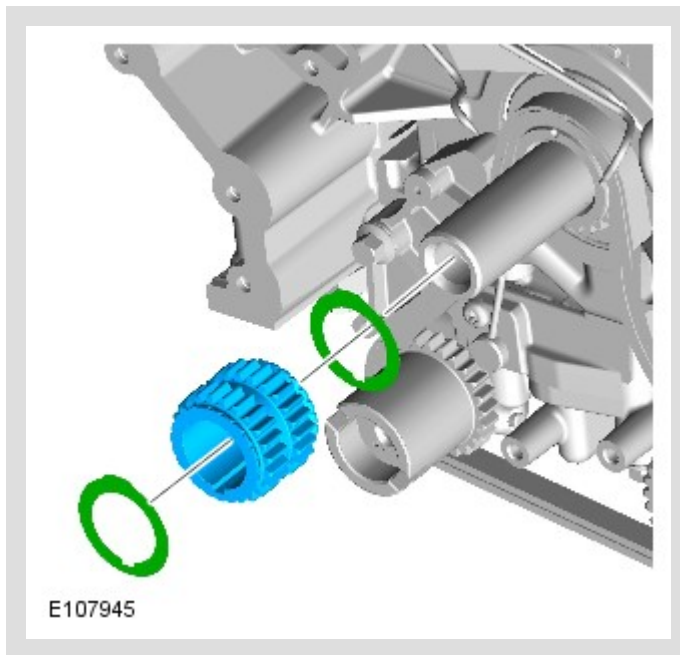


20.



⚠ CAUTION:

Discard the friction washer.

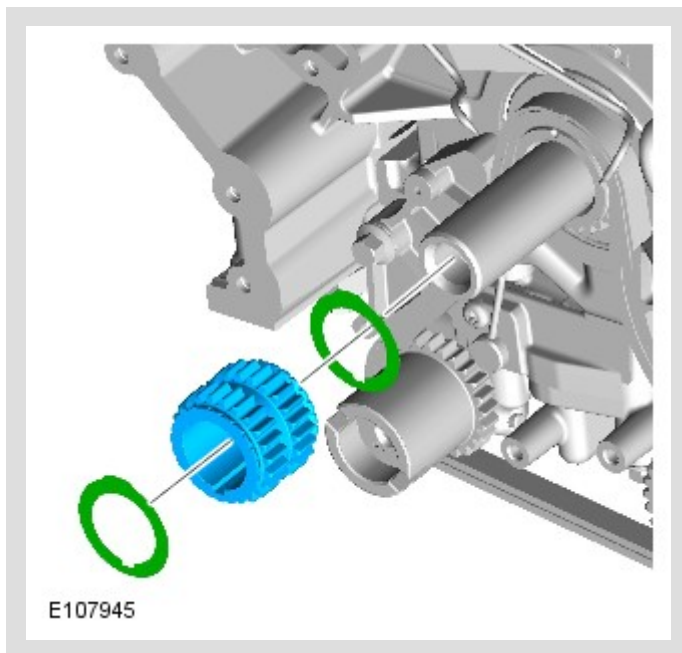


INSTALLATION

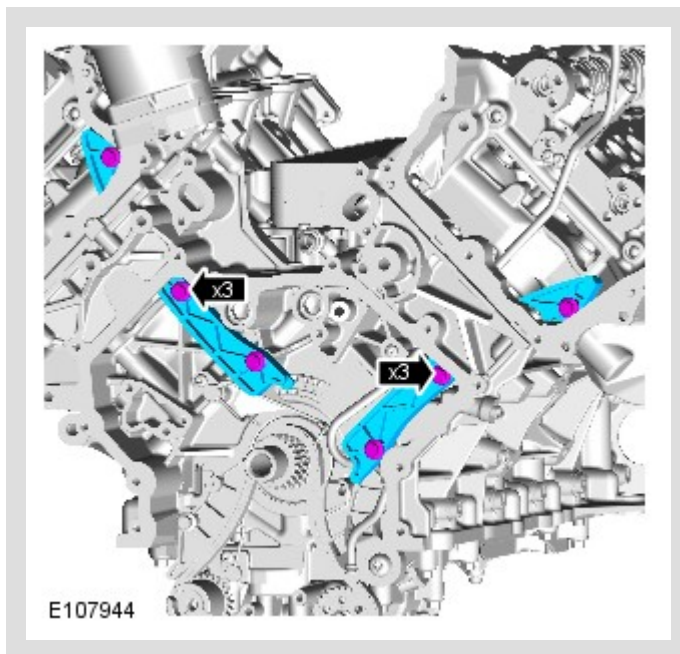
1.

⚠ CAUTION:

Install a new friction washer.

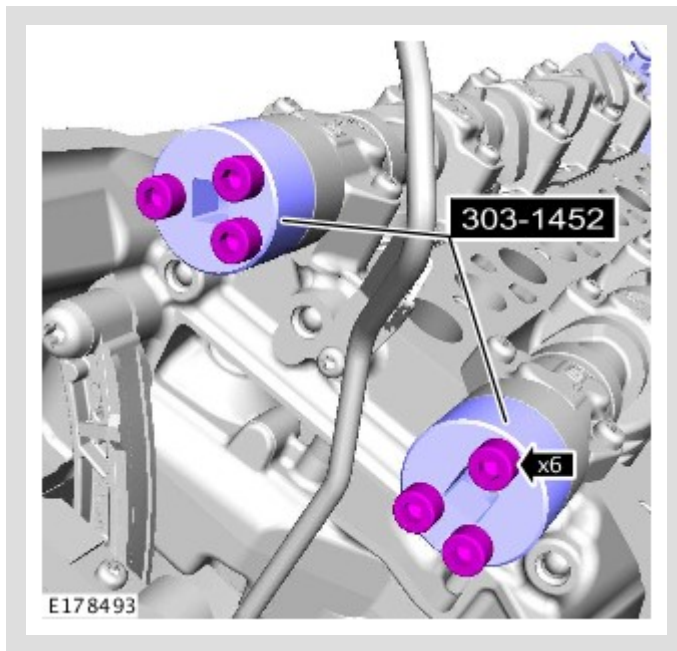






Install the timing chain fixed guides.

*Torque:* **12 Nm**



Install the special tool to each Camshaft.

*Special Tool(s):* [303-1452](#)

*Torque:* **10 Nm**



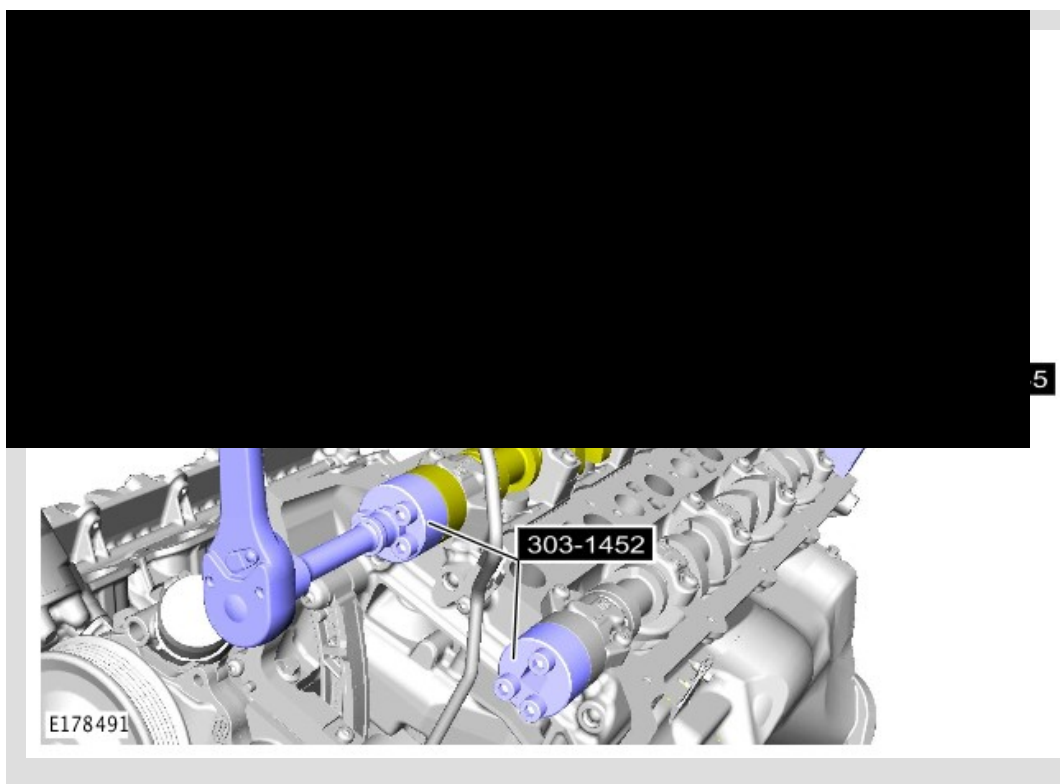
Carefully rotate the camshafts if the position is not as shown.

5.

**⚠ CAUTIONS:**

Do not overturn the camshafts.

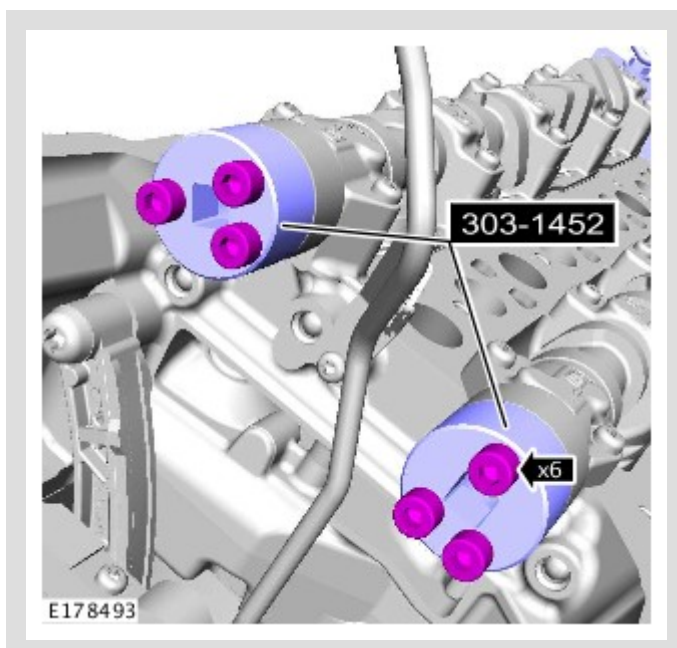
Tighten the wing nuts finger tight. Failure to follow this instruction may result in damage to the components.



*Special Tool(s):* [303-1452](#)

Using a suitable tool, carefully rock the camshaft clockwise then anti-clockwise. Turn the special tool locking nuts until there is no movement left in camshafts. Repeat this step for both camshafts.

6.



Remove the special tool from each Camshaft.

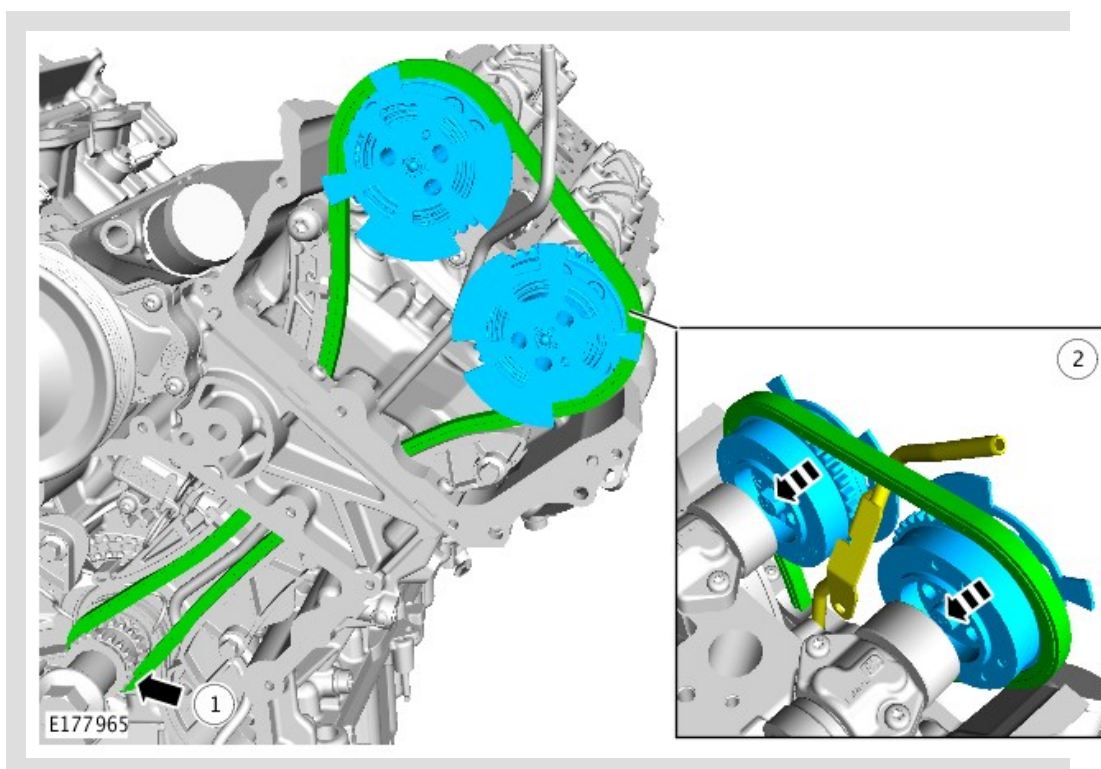
*Special Tool(s):* [303-1452](#)

7.

**ⓘ CAUTIONS:**

Do not allow the camshaft to rotate.

If the VVT is knocked or dropped then new VVT(s) must be installed.

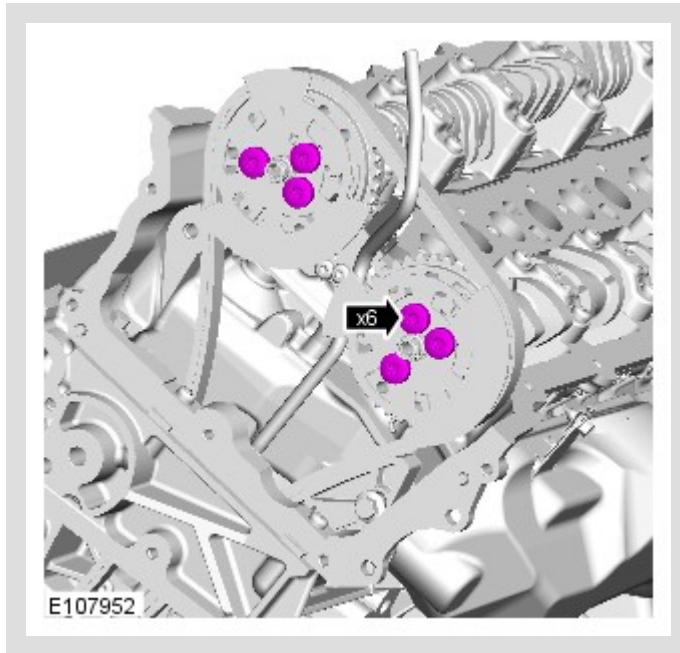


Install the timing chain with the VVT units.

8.

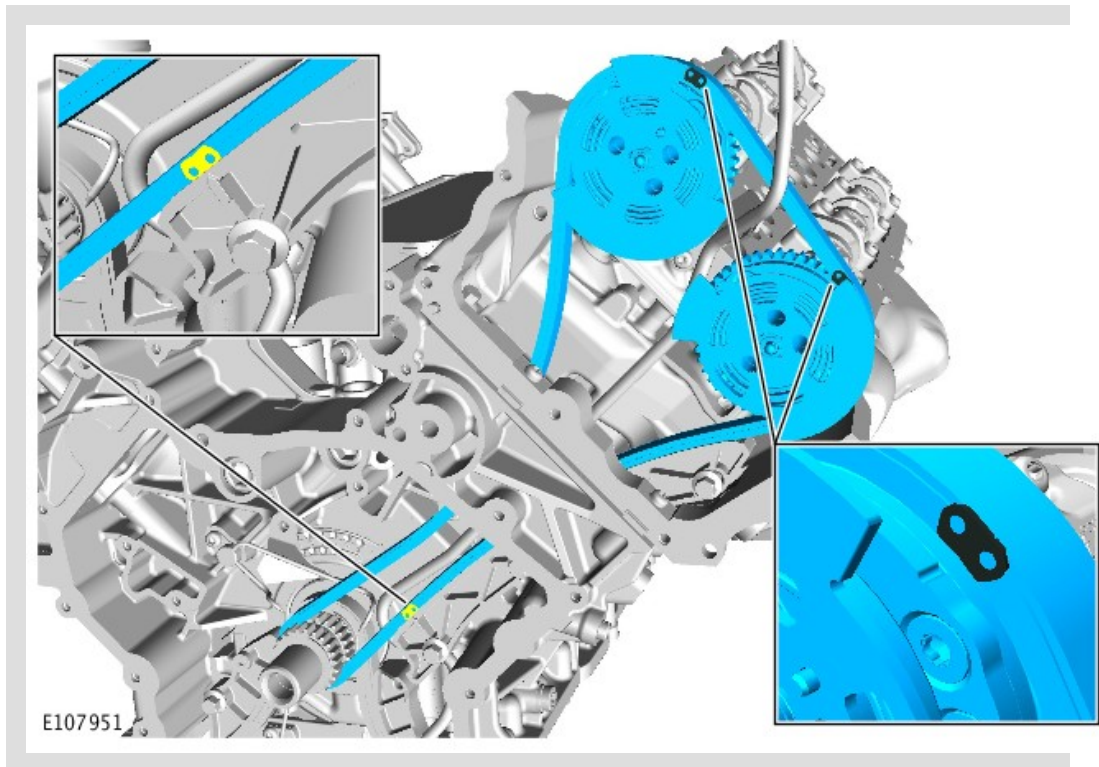
**⚠ NOTE:**

Install the bolts finger tight at this stage.



Install the variable valve timing (VVT) unit bolts.

9.



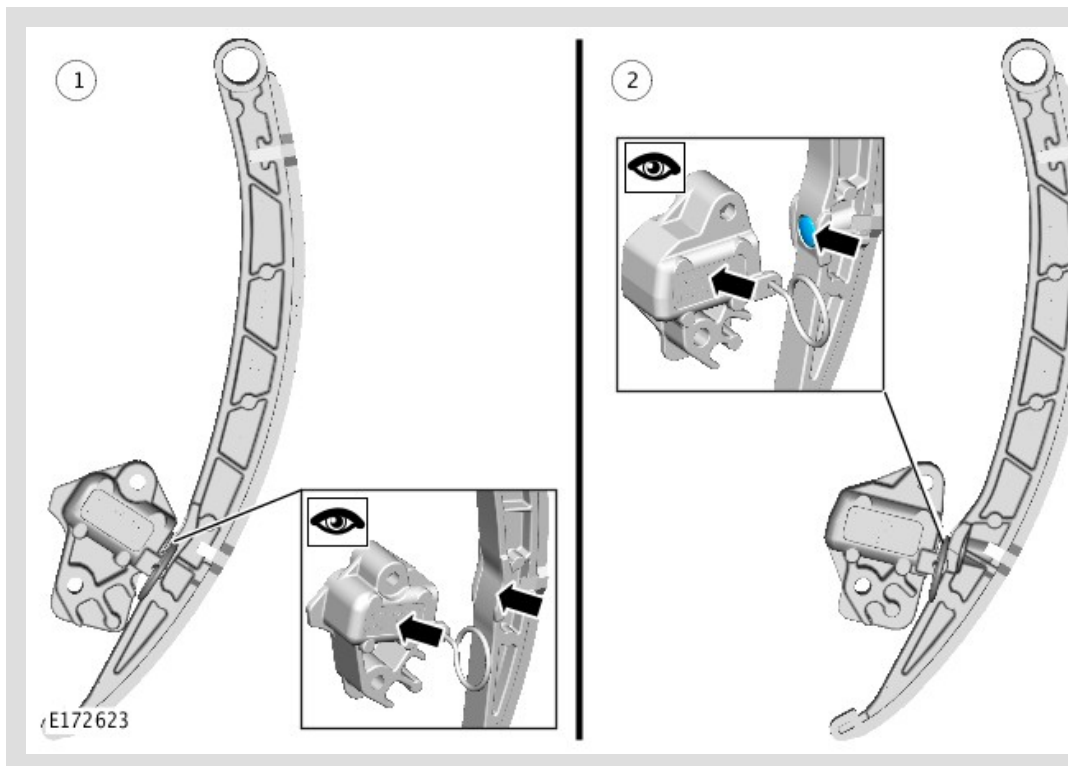
Make sure that all the timing chain alignment marks are in the positions shown.



10.

**⚠ CAUTIONS:**

- If the vehicle is fitted with components shown in section 1 of the illustration, these must be replaced with components shown in section (2).
- Do not attempt to install the components shown in section 1 of the illustration, as damage to the engine may occur.

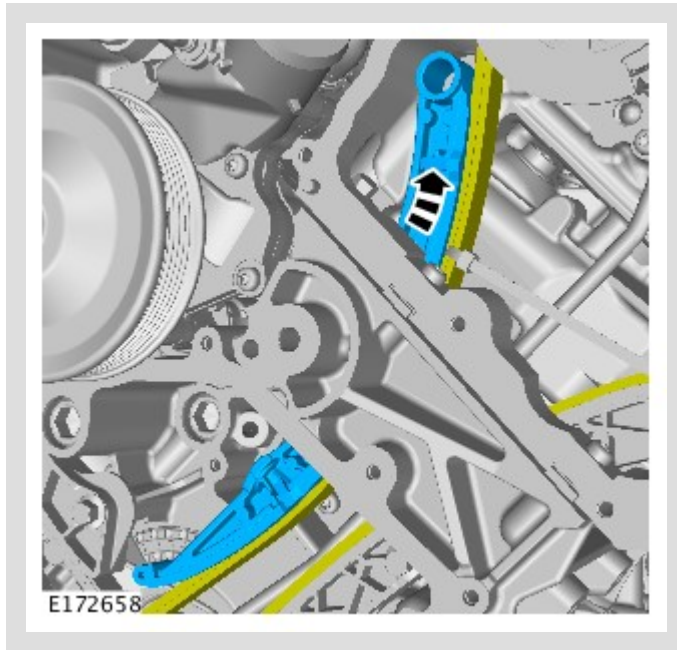


Using the illustration, identify which timing chain tensioner and guide is currently fitted to the vehicle. Make sure the vehicle is assembled using components shown in section (2) of the illustration only.

11.

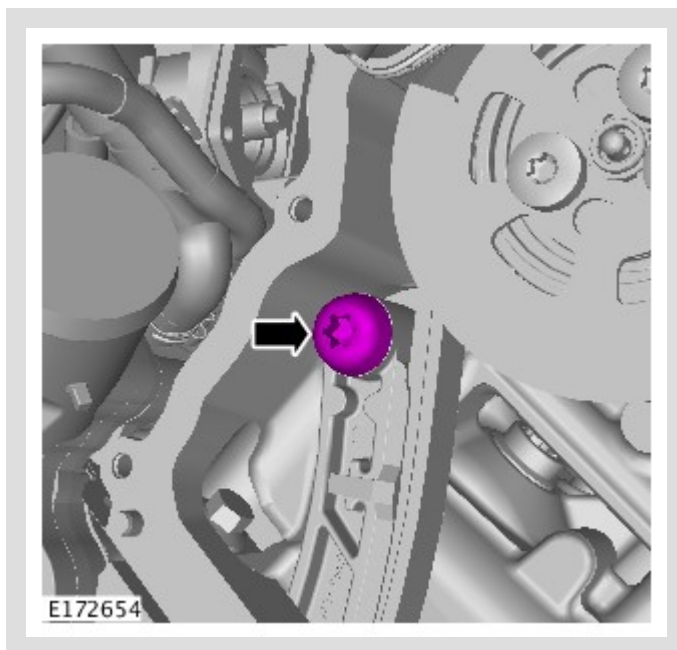
**⚠ CAUTION:**

Make sure that a new component is installed.



Install the timing chain guide.

12.



Install the timing chain guide bolt.

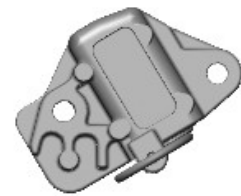
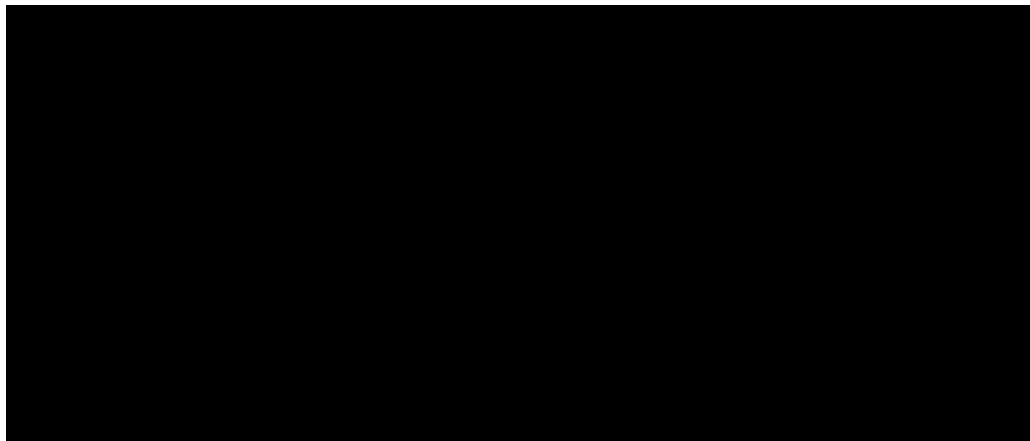
*Torque: 25 Nm*

13.



⚠ CAUTIONS:

- If the vehicle is Installed with components shown in section 1 of the illustration, these must be replaced with components shown in section (2).
- Do not attempt to install the components shown in section 1 of the illustration, as damage to the engine may occur.



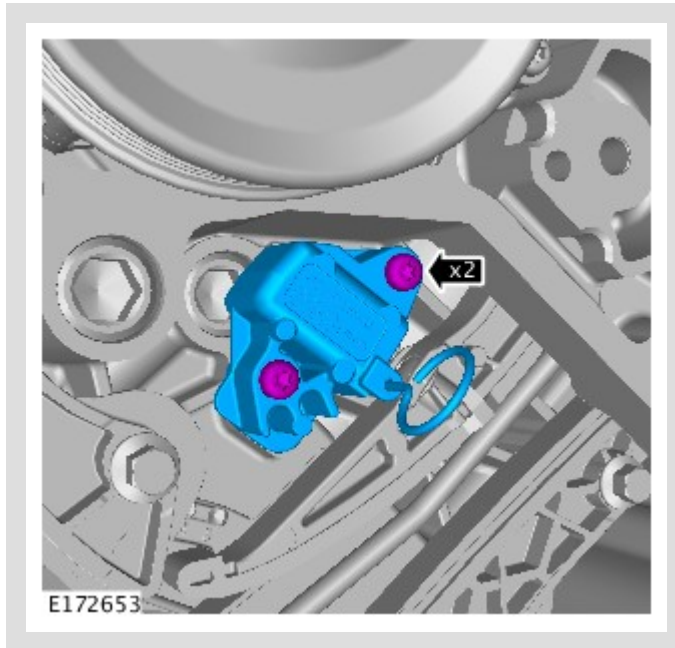
E182504

Before installing the timing chain tensioners, use the illustration shown to identify which timing chain tensioner is currently fitted to the vehicle. Make sure the vehicle is assembled using components shown in section (2) of the illustration only. If a new timing chain tensioner is installed, do not deploy the tensioner pin and proceed to the next step. If the tensioner to be installed has previously been deployed, make sure the attached animation is followed to make sure the tensioner is set correctly, failure to do this may result in damage to the engine.

14.

⚠ CAUTION:

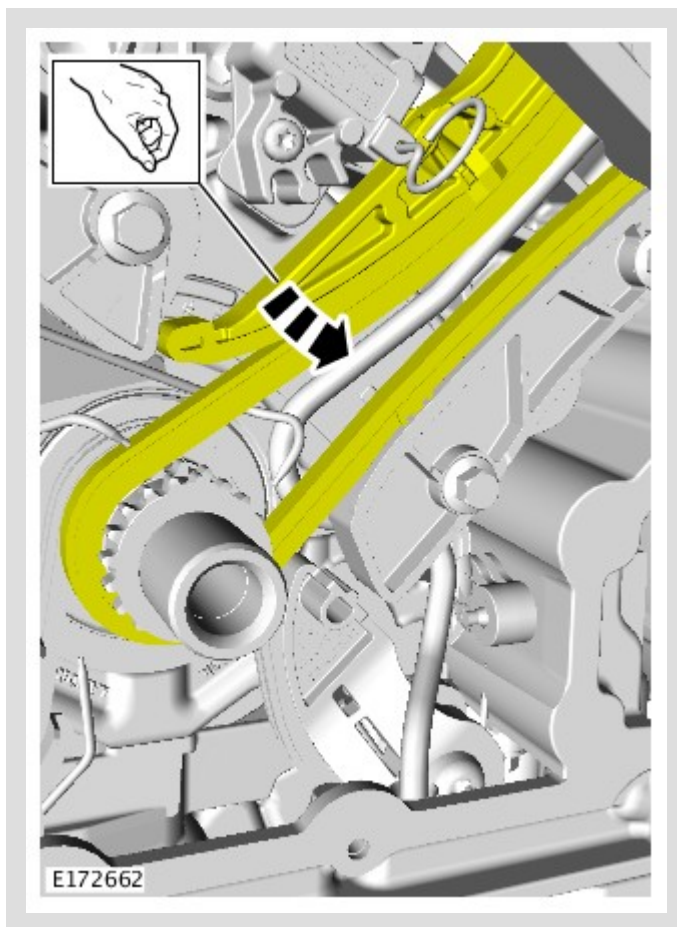
Do not release the timing chain tensioner locking pin at this stage.



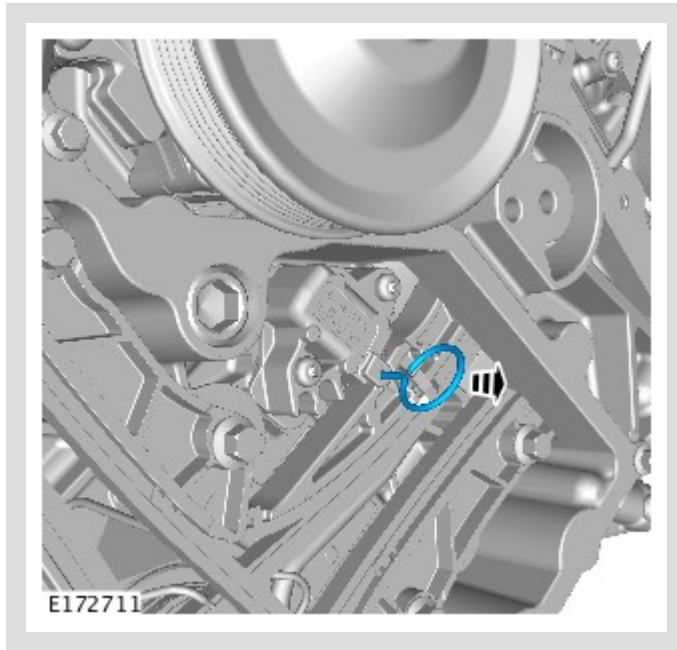
Install the timing chain tensioner.

*Torque:* **12 Nm**

15.

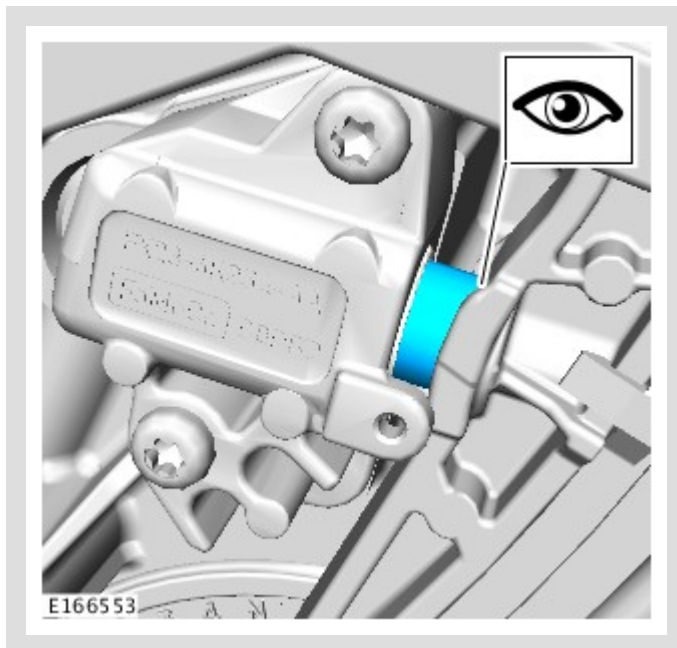


Apply and maintain tension on the component.



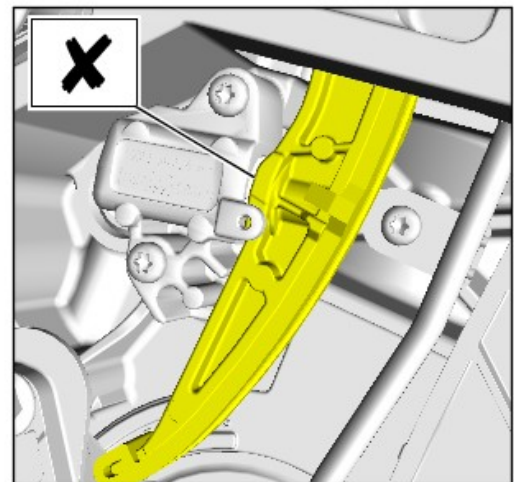
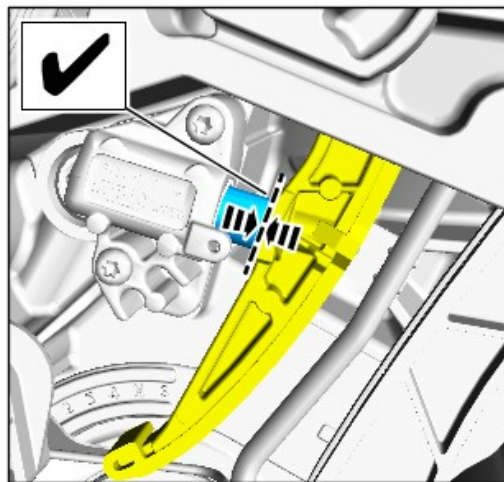
Remove the timing chain tensioner retaining pin and release the timing chain guide.

17.



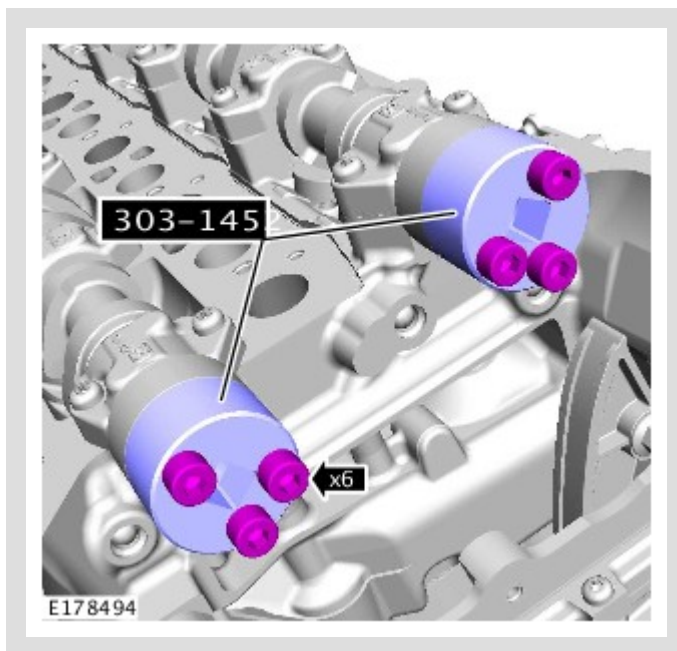
The timing chain tensioner piston should apply tension to the timing chain guide.

18.



E166556

The timing chain tensioner must maintain tension on the chain guide. If the piston can be pushed back so the chain guide contacts with the body of the tensioner, the tensioner is not correct. Repeat steps 13-18.



Install the special tool to each Camshaft.

*Special Tool(s):* [303-1452](#)

*Torque:* **10 Nm**



⚠ CAUTION:

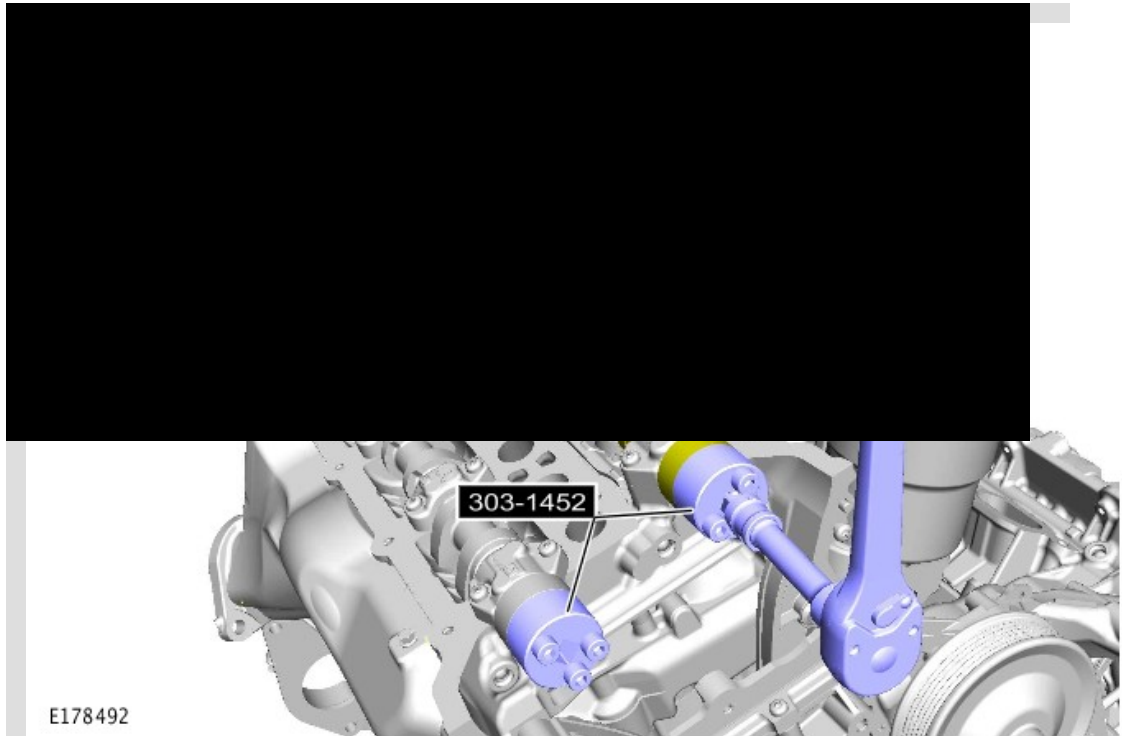
Do not overturn the camshafts.

Carefully rotate the camshafts if the position is not as shown.

⚠ CAUTIONS:

Do not overturn the camshafts.

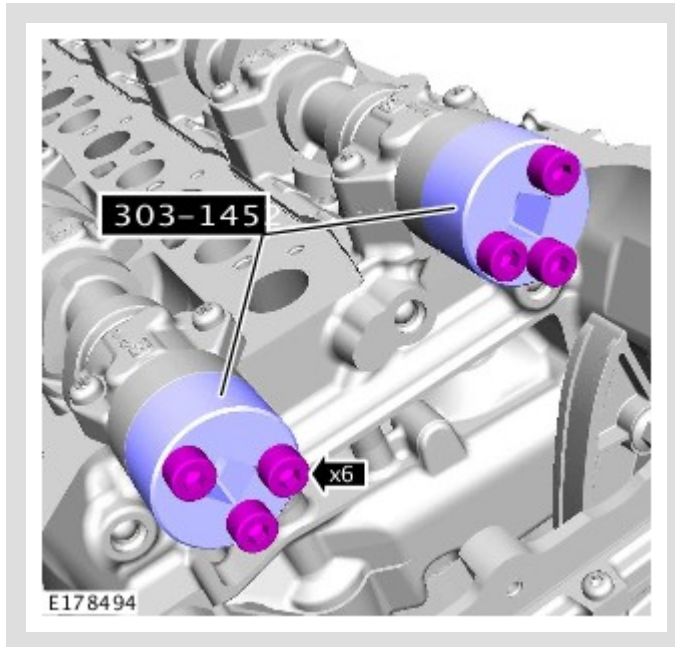
Tighten the wing nuts finger tight. Failure to follow this instruction may result in damage to the components.



*Special Tool(s):* [303-1452](#)

Using a suitable tool, carefully rock the camshaft clockwise then anti-clockwise. Turn the special tool locking nuts until there is no movement left in camshafts. Repeat this step for both camshafts.





Remove the special tool from each Camshaft.

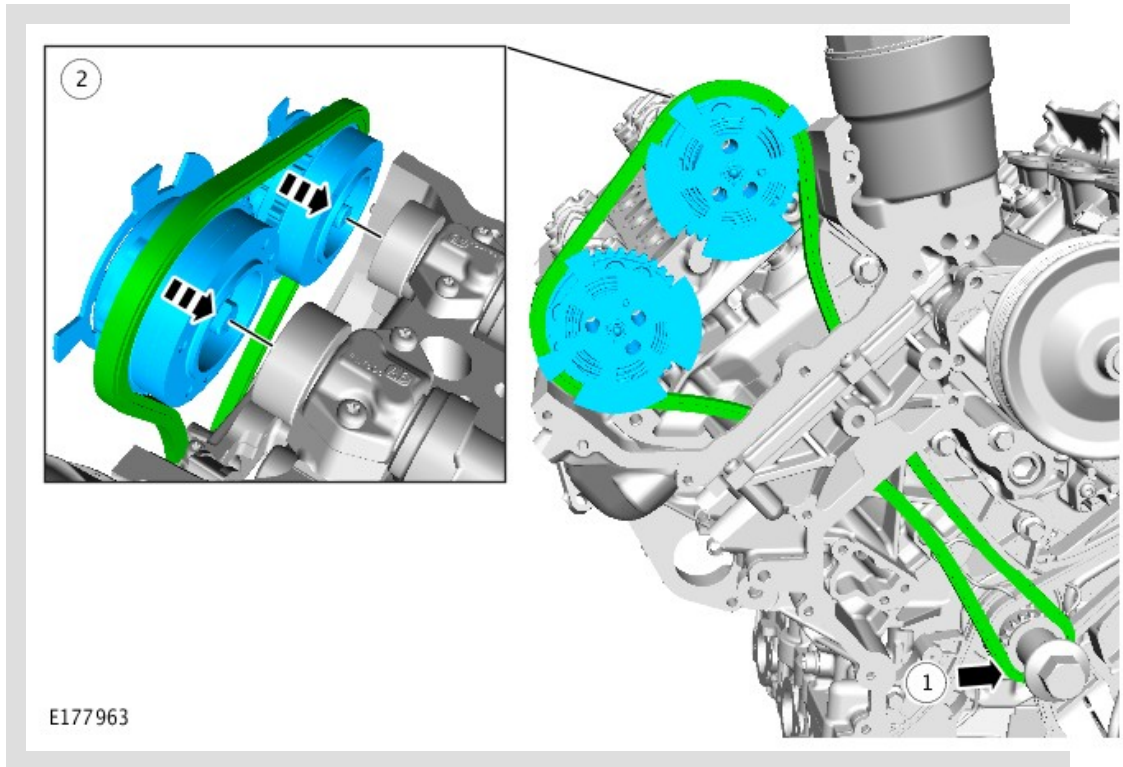
*Special Tool(s):* [303-1452](#)

23.

⚠ CAUTIONS:

Do not allow the camshafts to rotate.

If the VVT is knocked or dropped then new VVT(s) must be installed.

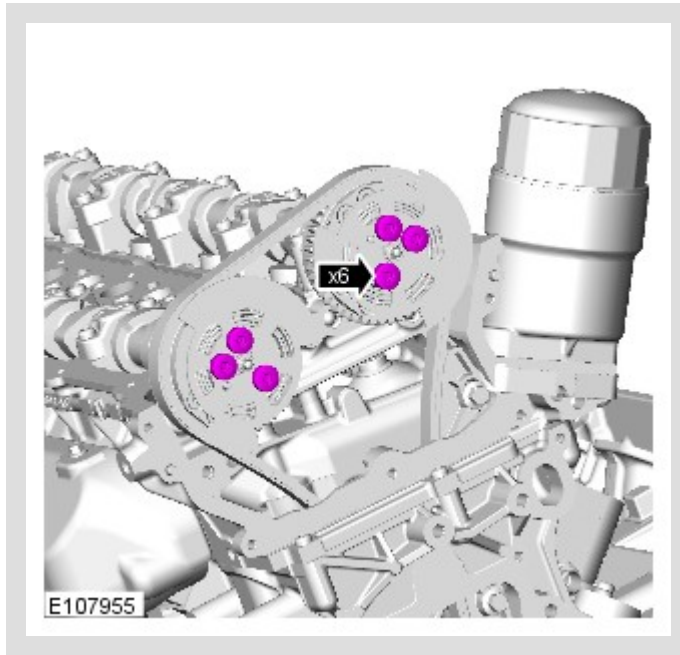


Install the timing chain with the VVT units.

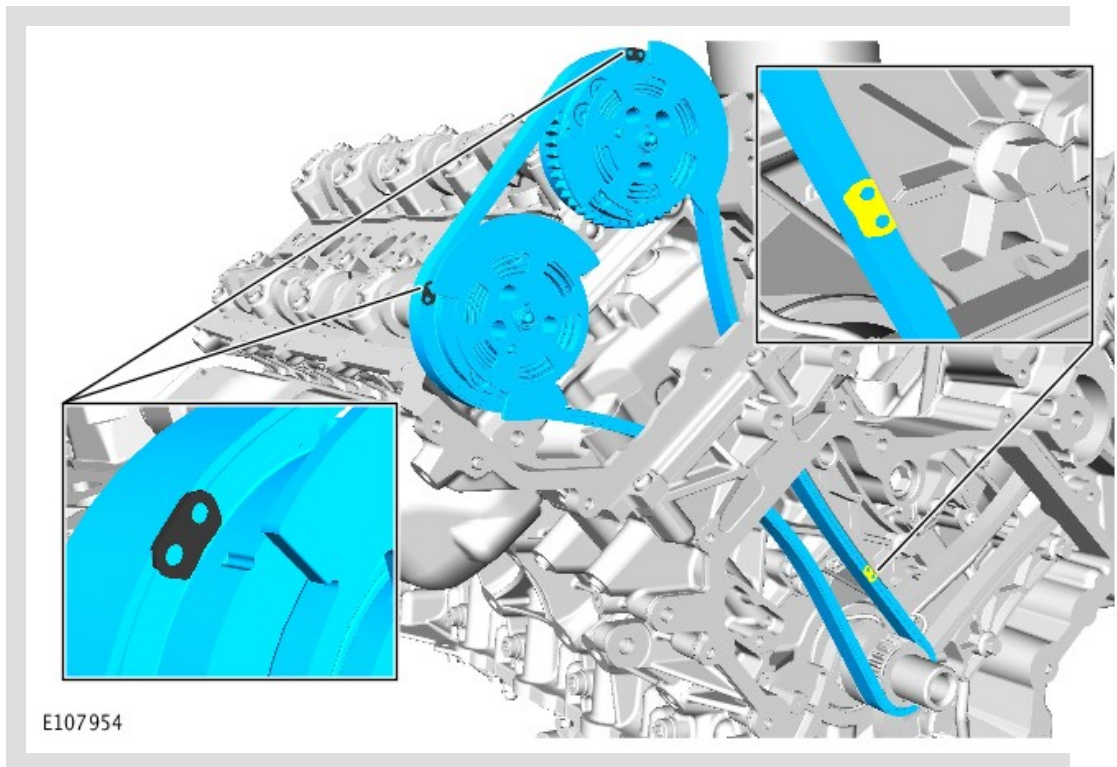
24.

 **NOTE:**

Install the bolts finger tight at this stage.



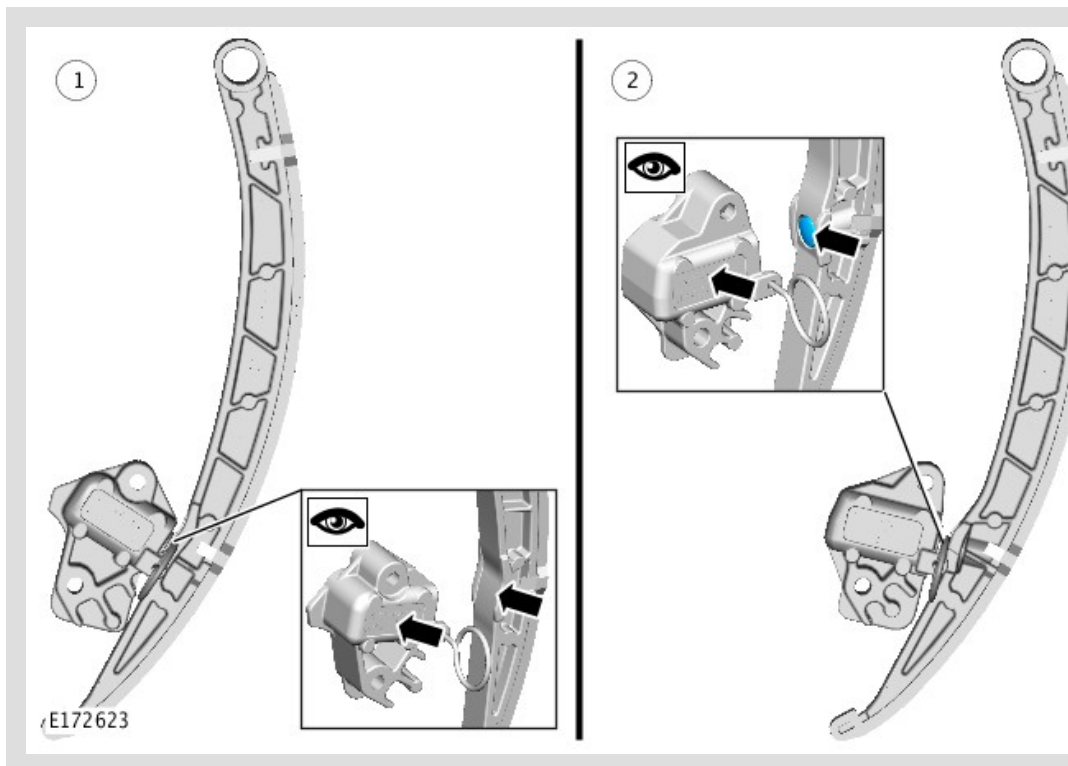
Install the variable valve timing (VVT) unit bolts.



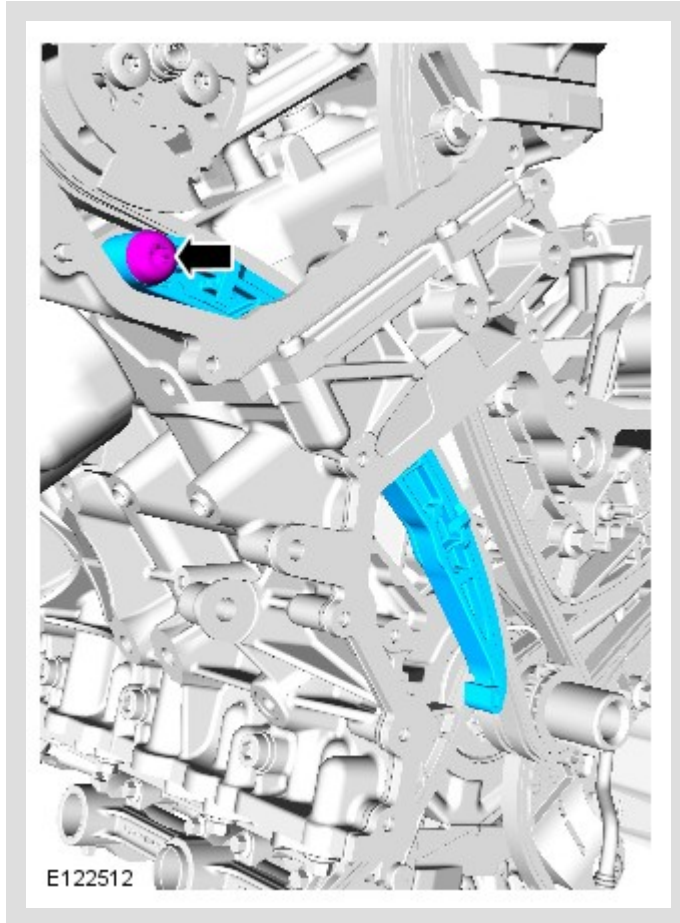
Make sure that all the timing chain alignment marks are in the positions shown.

⚠ CAUTIONS:

- If the vehicle is fitted with components shown in section 1 of the illustration, these must be replaced with components shown in section (2).
- Do not attempt to install the components shown in section 1 of the illustration, as damage to the engine may occur.



Using the illustration, identify which timing chain tensioner and guide is currently fitted to the vehicle. Make sure the vehicle is assembled using components shown in section (2) of the illustration only.

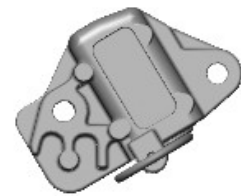
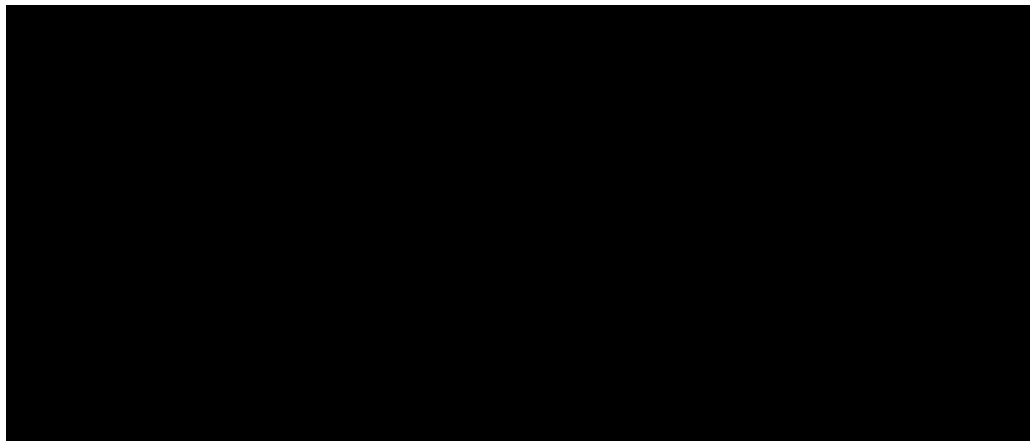


Install the timing chain guide.

*Torque:* **25 Nm**

⚠ CAUTIONS:

- If the vehicle is Installed with components shown in section 1 of the illustration, these must be replaced with components shown in section (2).
- Do not attempt to install the components shown in section 1 of the illustration, as damage to the engine may occur.



E182504

Before installing the timing chain tensioners, use the illustration shown to identify which timing chain tensioner is currently fitted to the vehicle. Make sure the vehicle is assembled using components shown in section (2) of the illustration only. If a new timing chain tensioner is installed, do not deploy the tensioner pin and proceed to the next step. If the tensioner to be installed has previously been deployed, make sure the attached animation is followed to make sure the tensioner is set correctly, failure to do this may result in damage to the engine.

29.

⚠ CAUTION:

Do not release the timing chain tensioner locking pin at this stage.

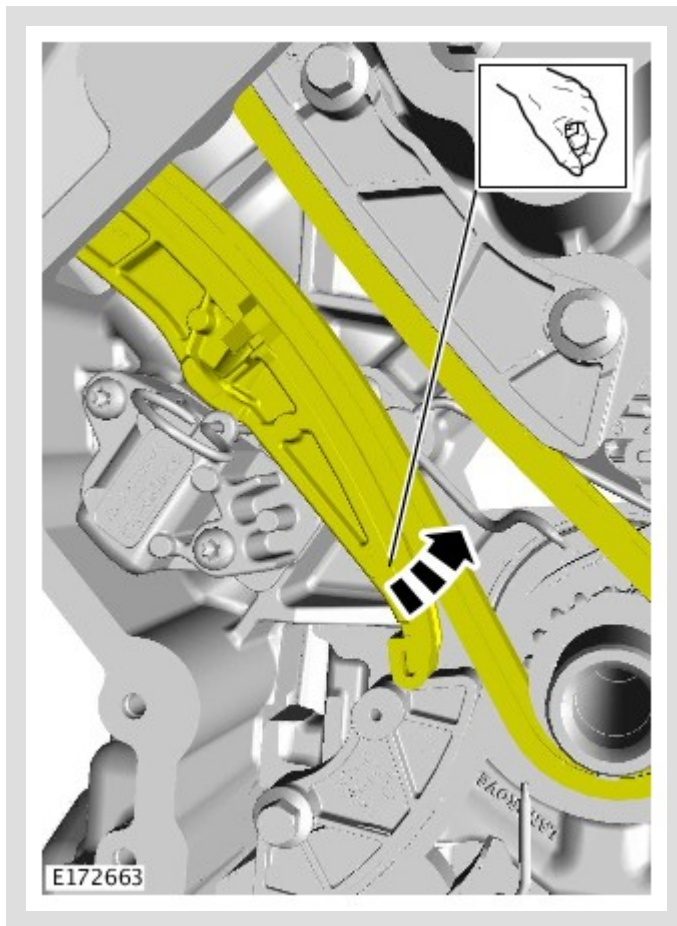


Before installing the timing chain tensioners, make sure the attached animation is followed to ensure the tensioner is set correctly, failure to do this may result in damage to the engine.

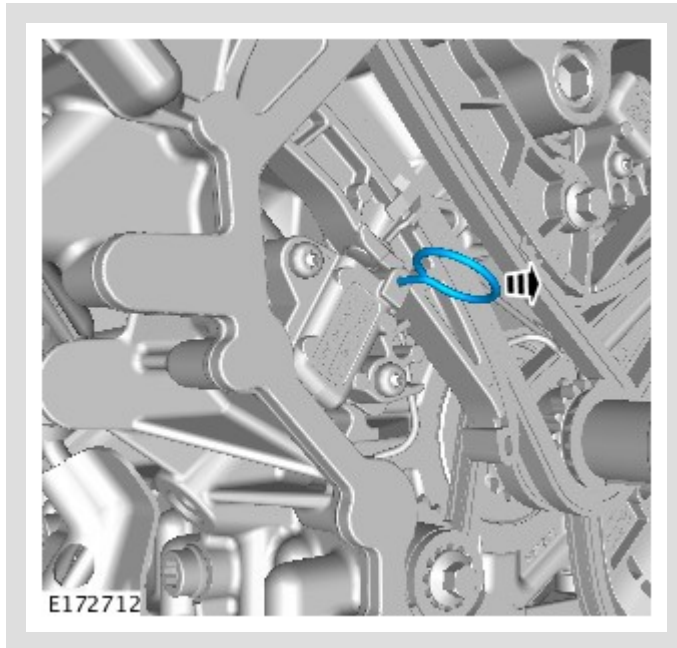
*Torque:* **12 Nm**

30.





Apply and maintain tension on the component.

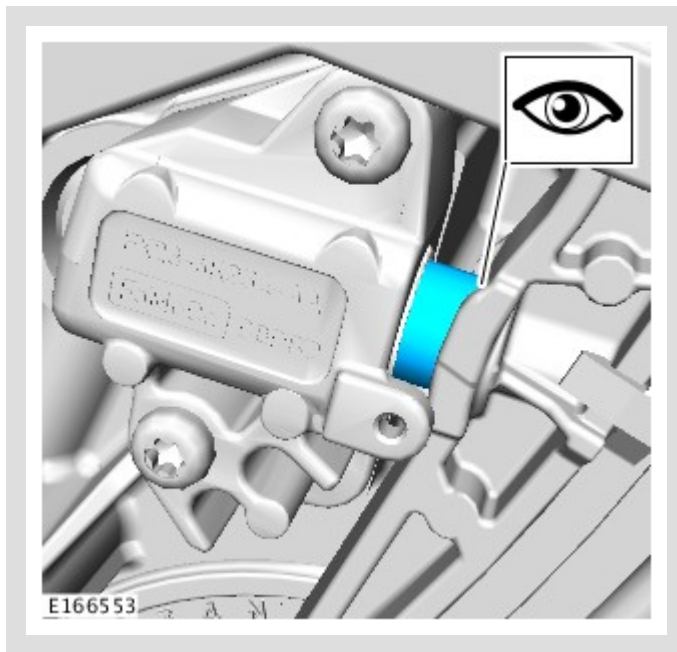


Remove the timing chain tensioner retaining pin and release the timing chain guide.

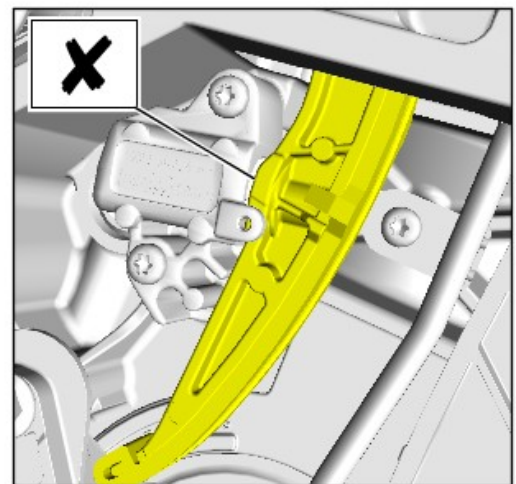
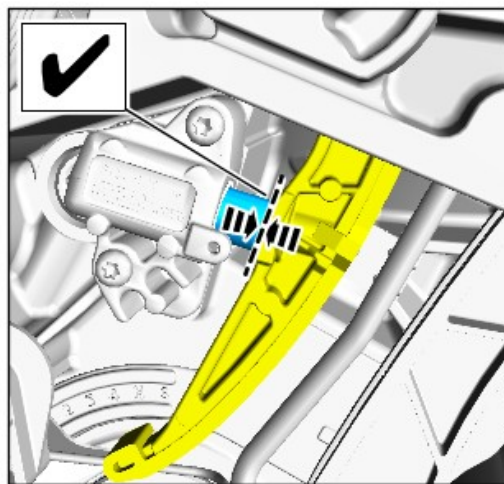
32.

 **NOTE:**

Left hand illustration shown, Right hand is similar.

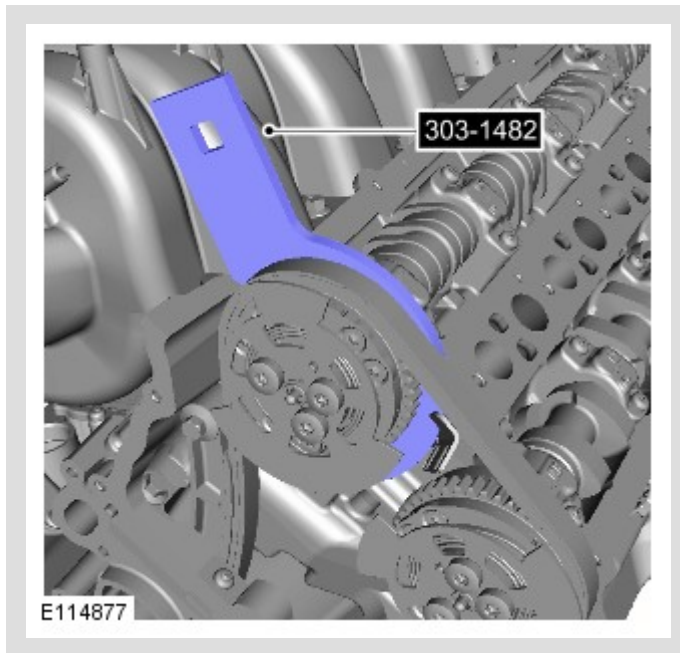


The piston should apply tension to the timing chain guide.



E166556

The timing chain tensioner must maintain tension on the chain guide. If the piston can be pushed back so the chain guide contacts with the body of the tensioner, the tensioner is not correct. Repeat steps 28-33.



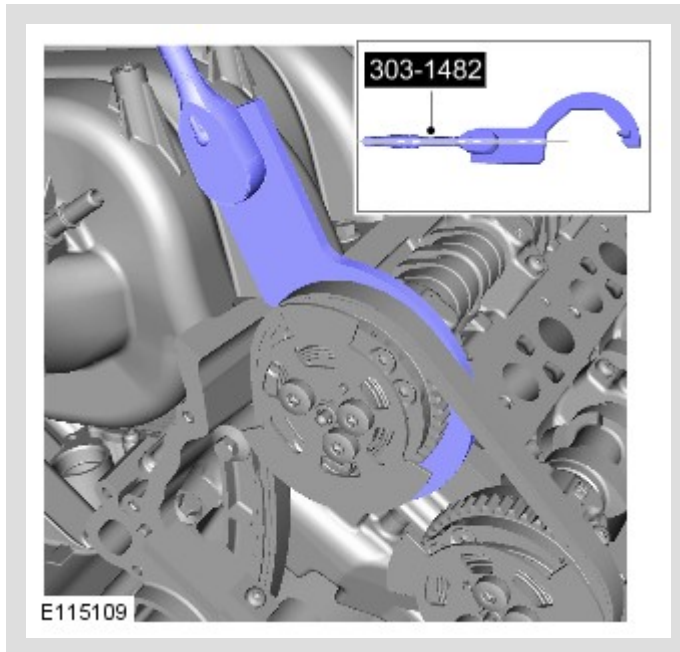
Install the special tool.

*Special Tool(s):* [303-1482](#)

35.

ⓘ **CAUTIONS:**

Apply the torque to the end of the special tool.  
Make sure that the torque wrench is aligned with the special tool as illustrated in the graphic.



Install the torque wrench to the special tool.

*Torque: 35 Nm*

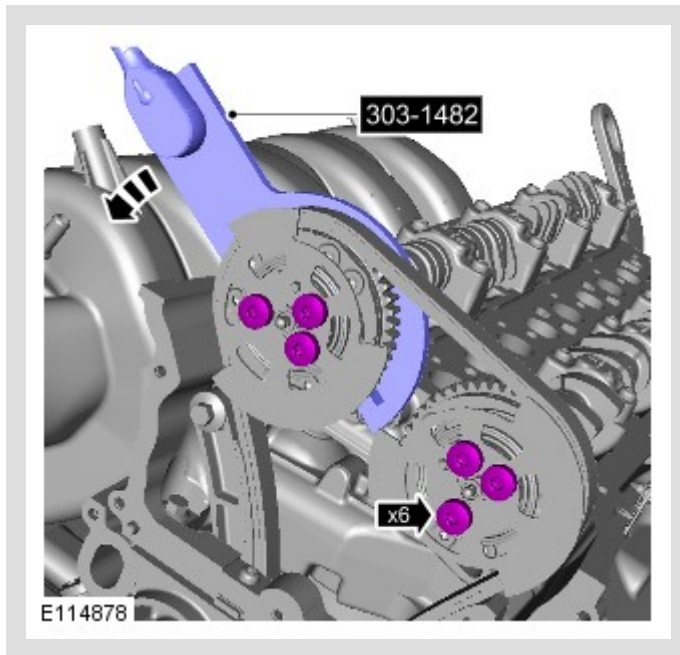
36.

⚠ **CAUTION:**

Make sure that the torque wrench does not move whilst tightening the VVT bolts.

△ **NOTE:**

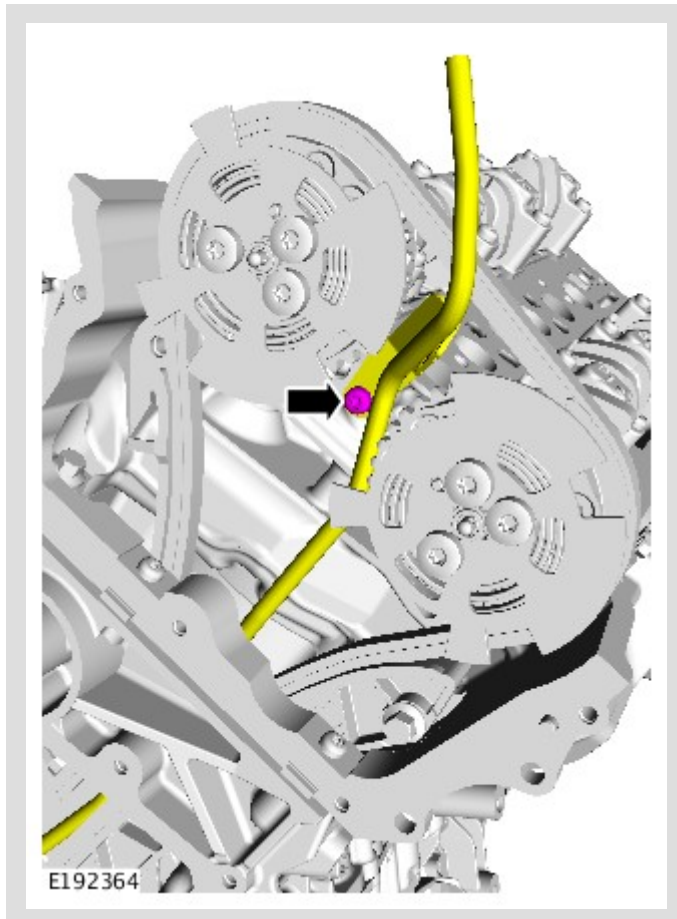
Make sure to tighten the exhaust VVT unit bolts first.



1. *Torque:* **32 Nm**

1. *Special Tool(s):* **303-1482**

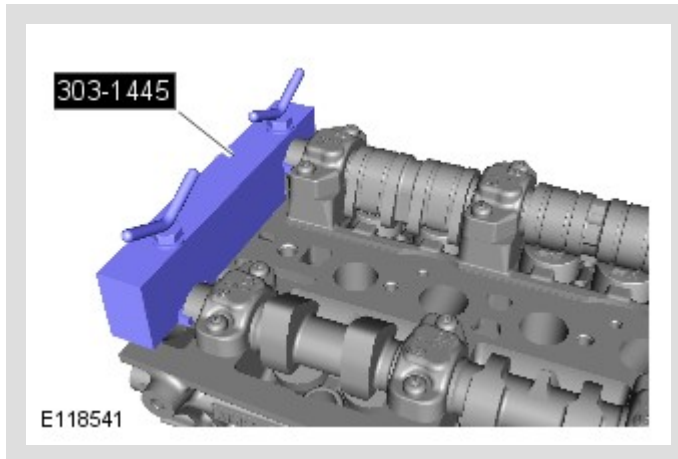
37.



Install the oil drain tube.

*Torque: 10 Nm*

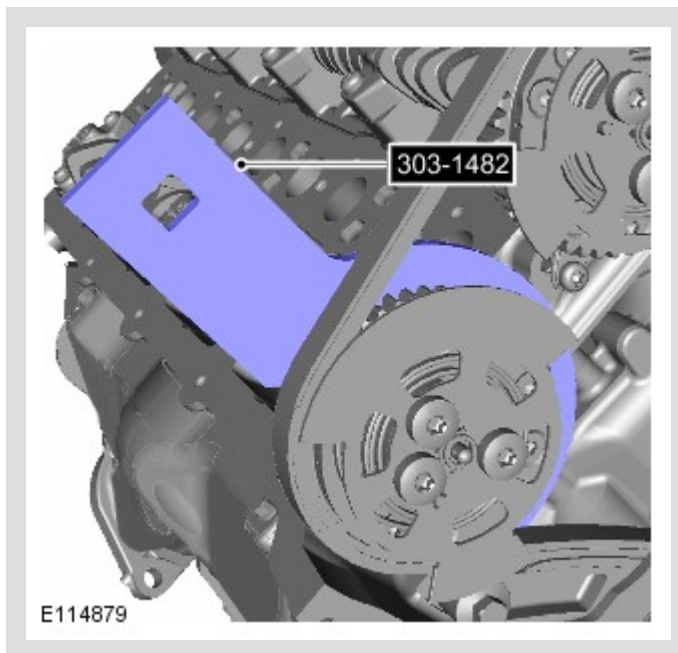
38.



Remove the special tool.

*Special Tool(s):* [303-1445](#)

39.



Install the special tool.

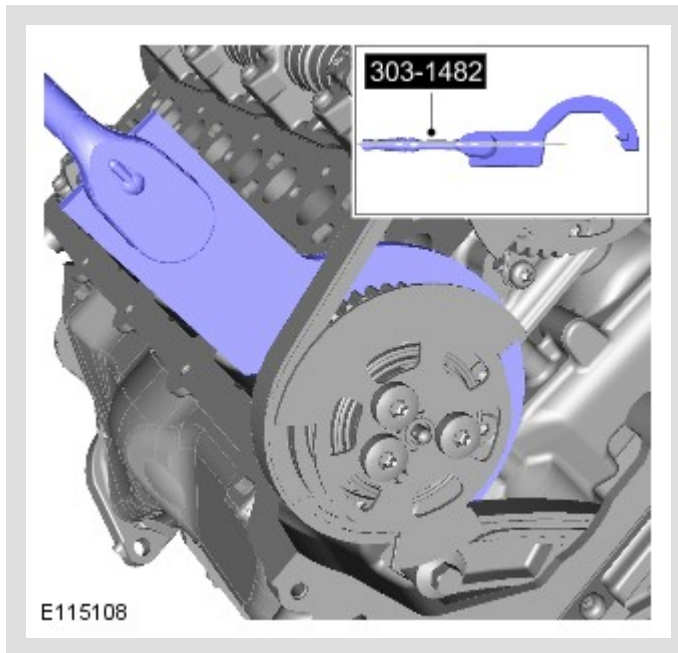
*Special Tool(s):* [303-1482](#)

40.



⚠ CAUTIONS:

Apply the torque to the end of the special tool.  
Make sure that the torque wrench is aligned with the special tool as illustrated in the graphic.



Install the torque wrench to the special tool.

*Torque:* **35 Nm**

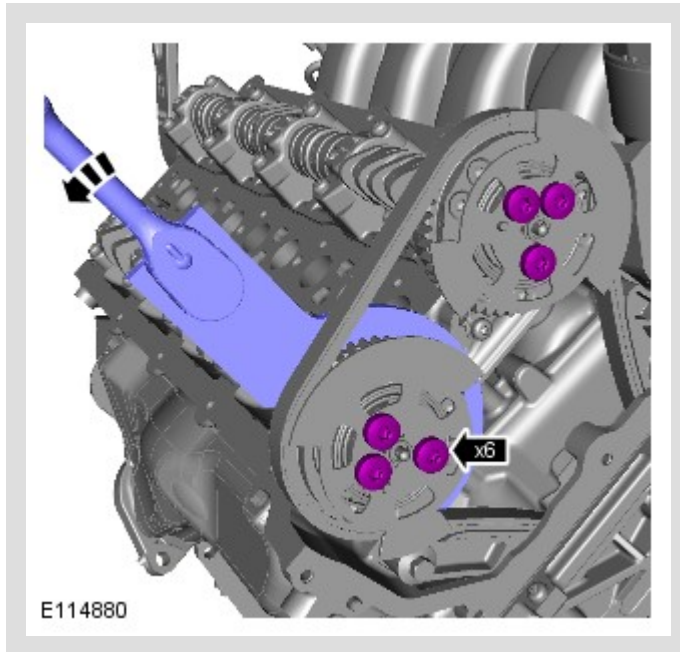
41.

⚠ CAUTION:

Make sure that the torque wrench does not move whilst tightening the VVT bolts.

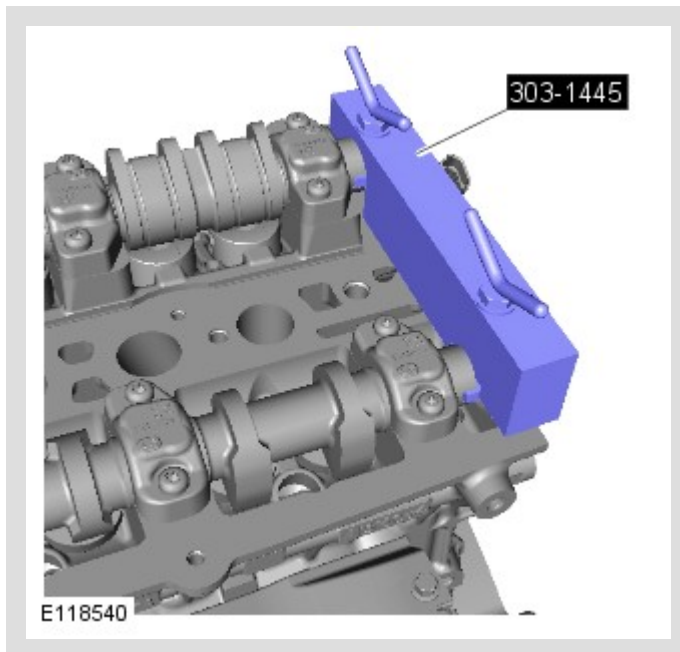
△ NOTE:

Make sure to tighten the inlet VVT unit bolts first.



*Torque: 32 Nm*

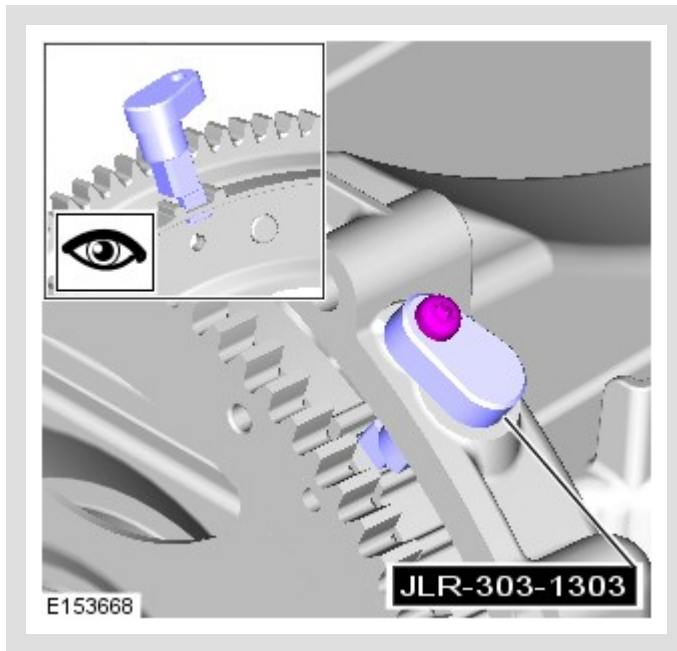
42.



Remove the special tool.

*Special Tool(s): 303-1445*

43.



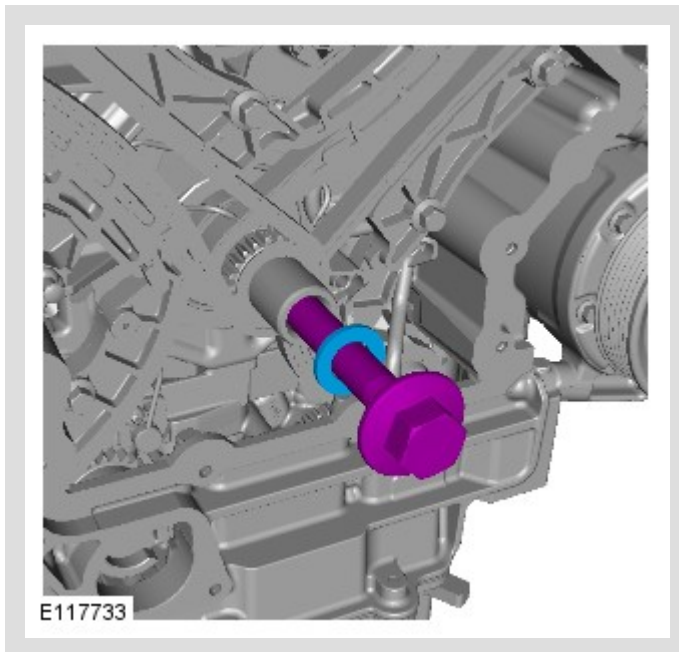
Remove the special tool.

*Special Tool(s):* [JLR-303-1303](#)

44.

**⚠ CAUTION:**

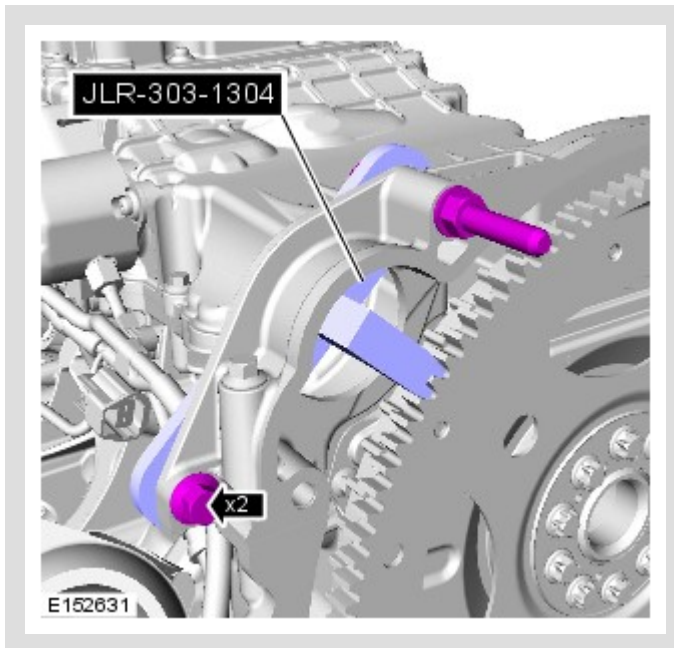
An M16 washer must be used to prevent damage to the crankshaft on installation.



Install the crankshaft pulley bolt.

*Torque: 20 Nm*

45.



Remove the special tool.

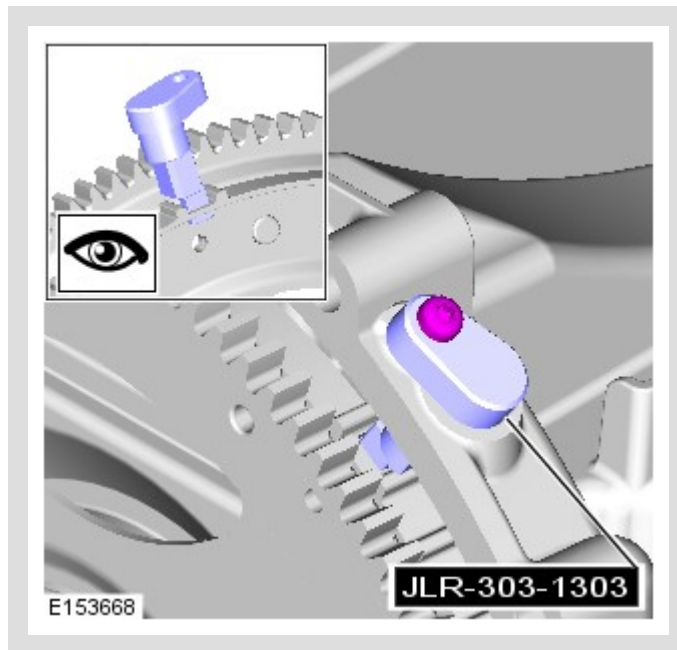
*Special Tool(s): [JLR-303-1304](#)*

46. Rotate the engine two complete turns clockwise.

47.

⚠ CAUTION:

Only rotate the crankshaft clockwise.



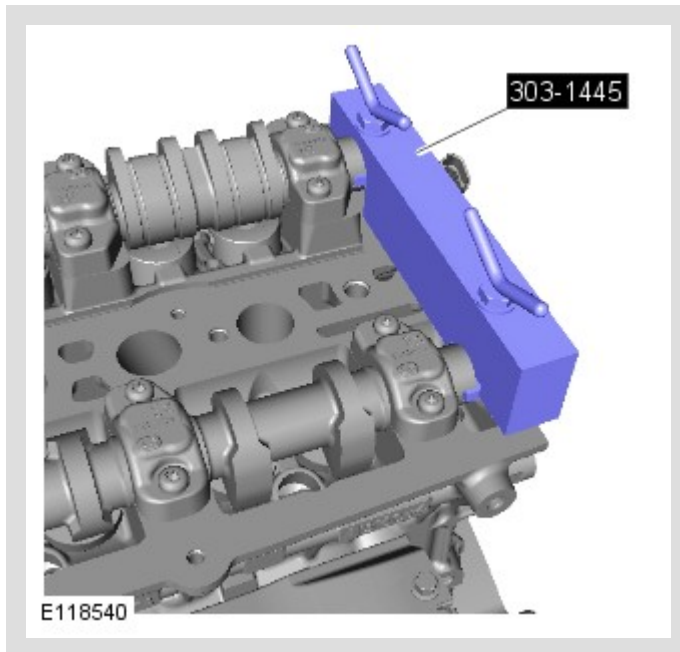
Install the special tool.

*Special Tool(s):* [JLR-303-1303](#)

48.

**ⓘ CAUTION:**

If the special tool cannot be installed, the timing chain installation steps must be repeated.



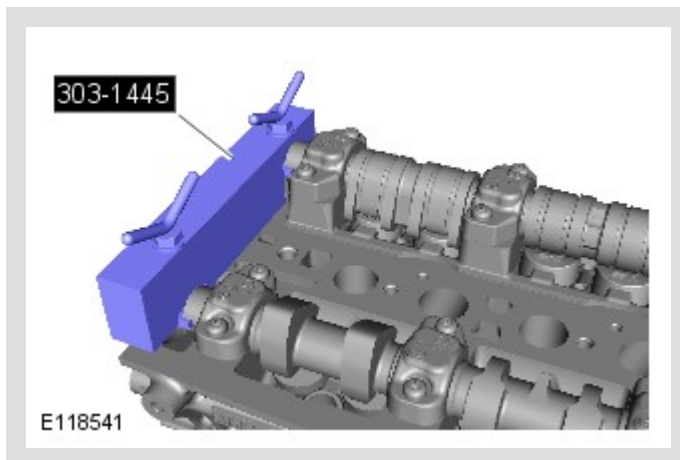
Install the special tool. If the special tool cannot be installed, remove both timing chains and components and repeat the process from step 3 of the installation until the special tool 303-1445 is installed correctly.

*Special Tool(s):* [303-1445](#)

49.

**ⓘ CAUTION:**

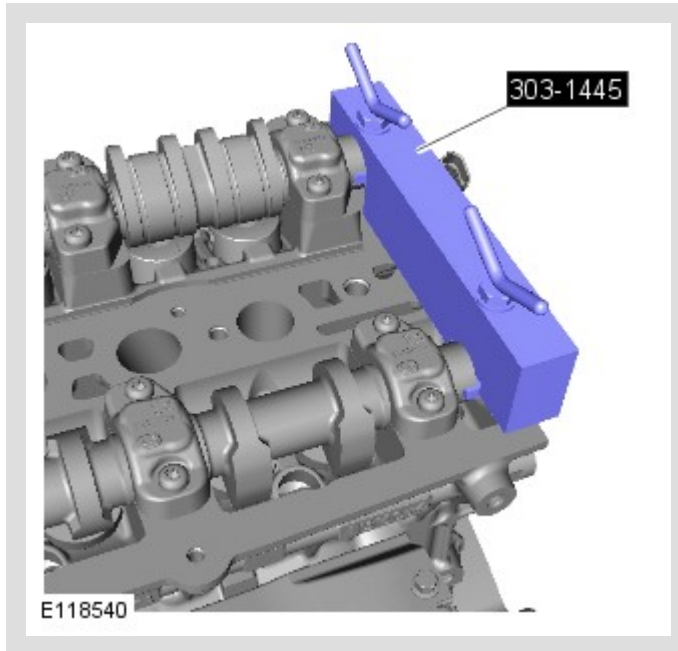
If the special tool cannot be installed, the timing chain installation steps must be repeated.



Install the special tool. If the special tool cannot be installed,

remove both timing chains and components and repeat the process from step 3 of the installation until the special tool 303-1445 is installed correctly.

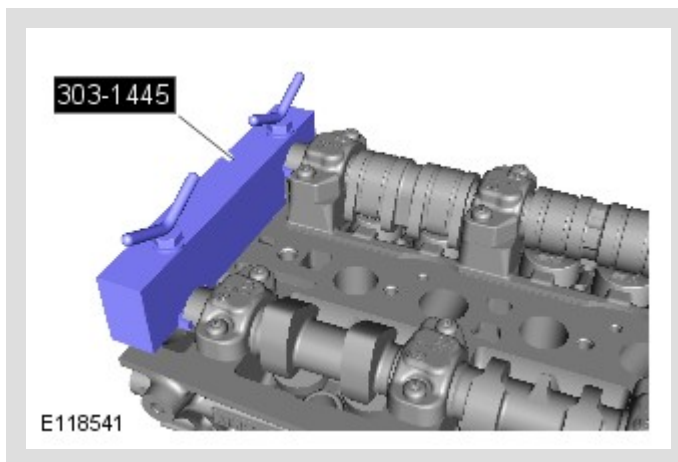
50.



Remove the special tool.

*Special Tool(s):* [303-1445](#)

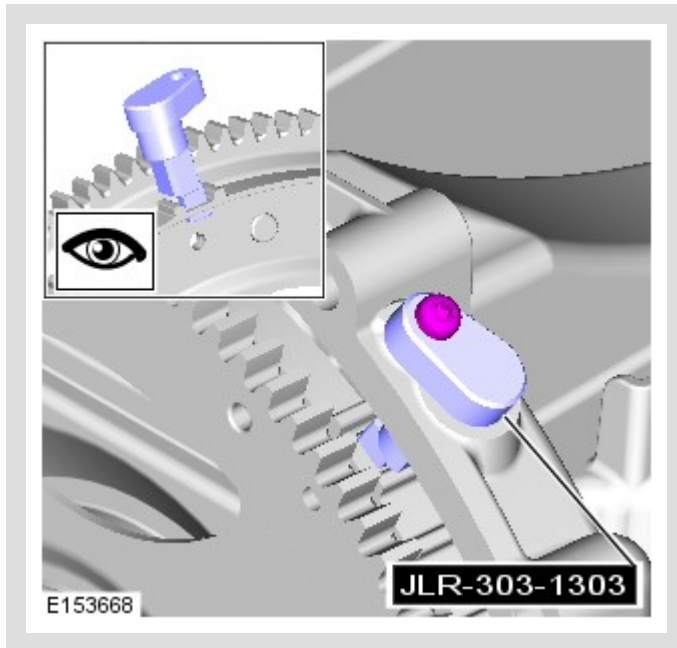
51.



Remove the special tool.

*Special Tool(s):* [303-1445](#)

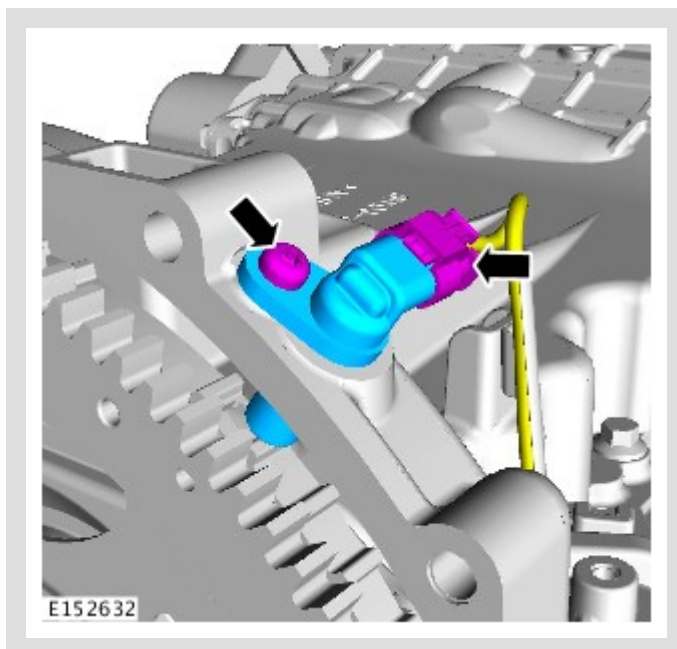
52.



Remove the special tool.

*Special Tool(s):* [JLR-303-1303](#)

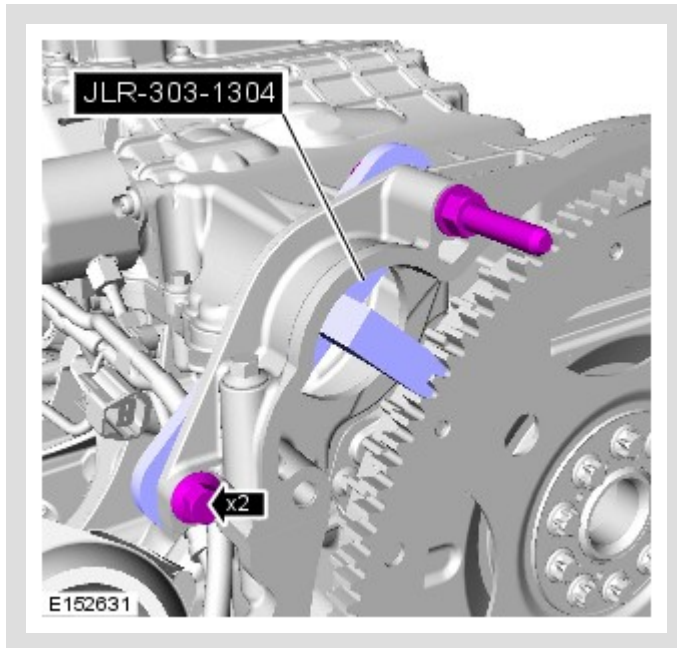
53.



*Torque:* **10 Nm**

54.

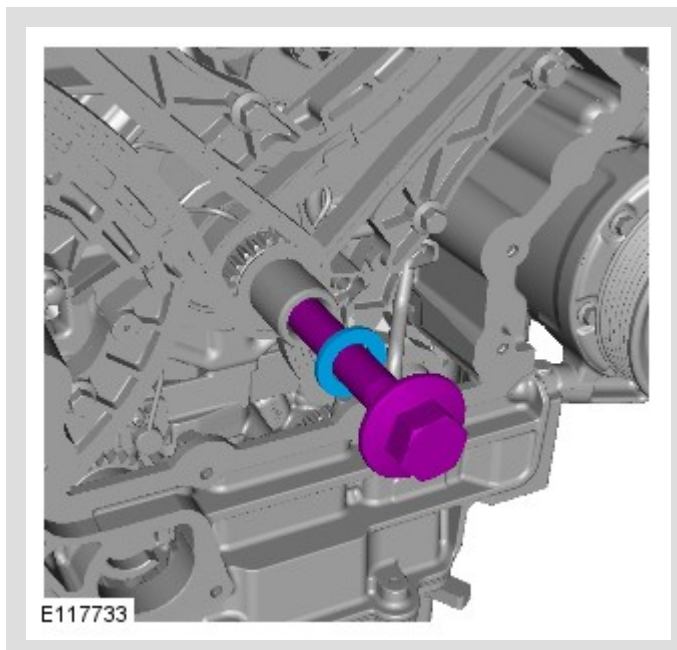




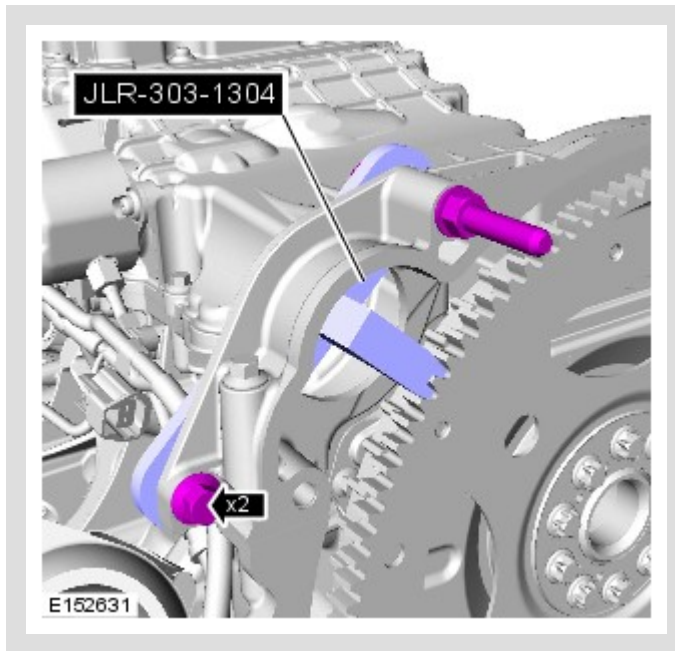
Install the special tool.

*Special Tool(s):* [JLR-303-1304](#)

55.



56.



Remove the special tool.

*Special Tool(s):* [JLR-303-1304](#)

57. Install the timing cover.  
Refer to: [Timing Cover](#) (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).
58. Install the starter motor  
Refer to: [Starter Motor](#) (303-06A, Removal and Installation).  
Refer to: [Starter Motor](#) (303-06B, Removal and Installation).
59. Connect the battery ground cable.  
Refer to: [Battery Disconnect and Connect](#) (414-01 Battery, Mounting and Cables, General Procedures).