Primary Timing Chain LH - Vehicles Built From: 08/1998 4.0L, Vehicles Without: Supercharger (12.65.67)

Special Service Tools

E36401

Camshaft setting
303-530

E36402

Timing chain tensioning
303-532

E36407

Wedges, primary chain
303-533

E36408

Crankshaft setting
303-531

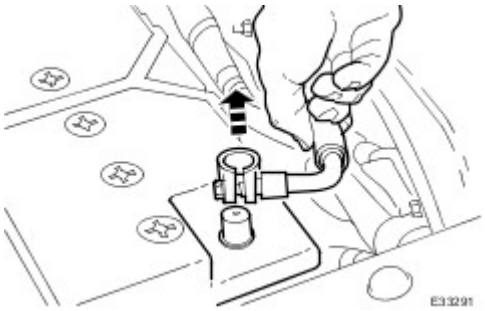
Removal

1 . Open the engine compartment and fit paintwork protection sheets.

2 . Set the engine compartment cover to the service access position.

3 . Disconnect the battery ground cable.

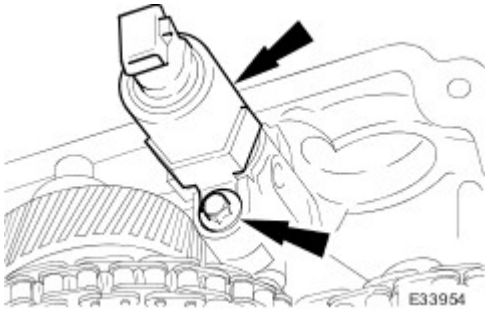
- Remove the battery cover.



4 . Remove the Timing Cover. Refer to Operation 12.65.01.

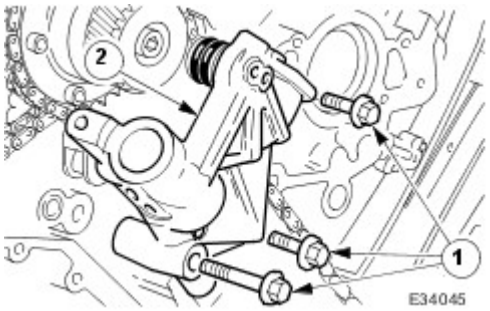
5 . If required (not necessary), to prevent accidental damage, remove the VVT solenoid from each bush carrier.

- Remove the bolt which secures the solenoid to the bush carrier.
- Remove the solenoid from the bush carrier and store it in a clean plastic bag.



6 . Remove the VVT bush carrier from Bank 1.

1) Remove the three bolts which secure the carrier to the cylinder block.
2) Release the carrier from the two ring dowels and remove it.



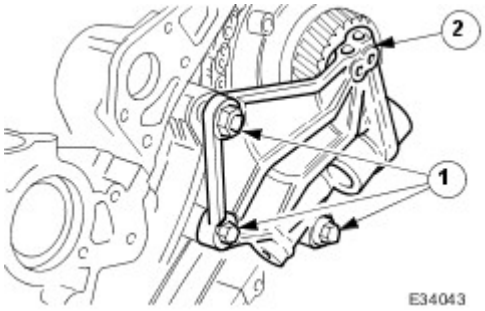
7 . Remove the seals from the bush carrier.

1) Remove the sealing rings from the carrier bush groove.

8 . Remove the VVT bush carrier from Bank 2.

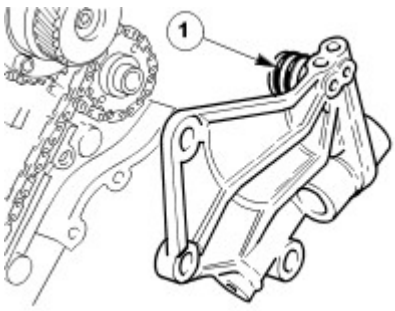
1) Remove the two bolts and one nut which secure the carrier to the cylinder block.

2) Release the carrier from the two ring dowels and remove it.



9 . Remove the seals from the bush carrier.

1) Remove the sealing rings from the carrier bush groove.



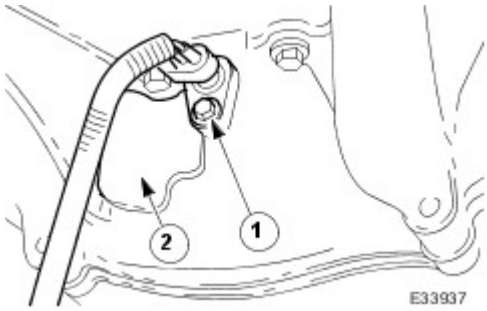
10 . Raise the vehicle on a ramp.

11 . Remove the crankshaft position sensor.

1) Remove the bolt which secures the crankshaft position sensor to the flywheel housing.

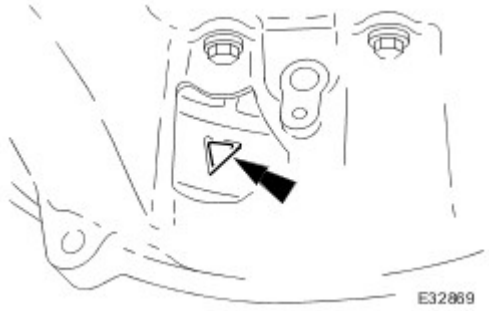
- Remove the sensor and allow it to hang free under the engine.

3) Remove the access grommet (for torque converter bolts) from the housing.



12 . Install the damper securing bolt (old one) to the crankshaft, hand-tight only.

Rotate the crankshaft until the triangular arrow indent on the drive plate is visible through the access hole; confirm that the timing flat on each camshaft is uppermost.

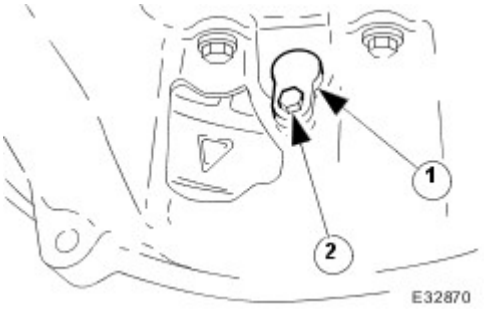


14 . Install the crankshaft setting peg 303-531 to the crankshaft position sensor location.

1) Install the crankshaft setting peg 303-531.

- Position the crankshaft so that the setting peg engages fully into the timing slot.

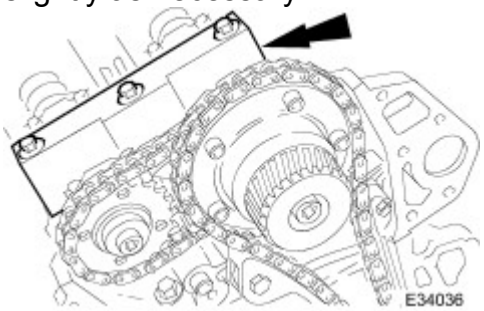
3) Install and tighten the bolt to secure the setting peg.



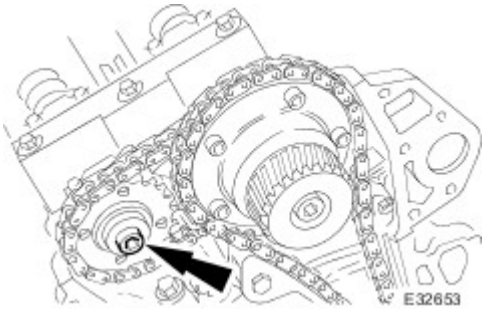
15 . Remove the damper securing bolt from the crankshaft.

16 . Lower the vehicle on the ramp.

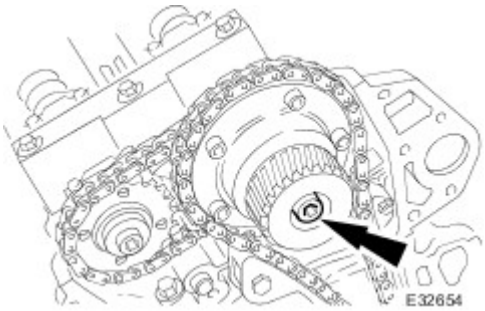
17 . Install the camshaft locking tool 303-530 to Bank 1 camshafts, aligning the shafts slightly as necessary.



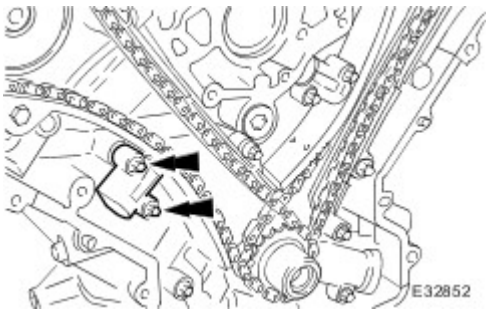
18 . Loosen the bolt which secures the sprocket to the camshaft.



19 . Loosen the bolt which secures the VVT unit to the camshaft.



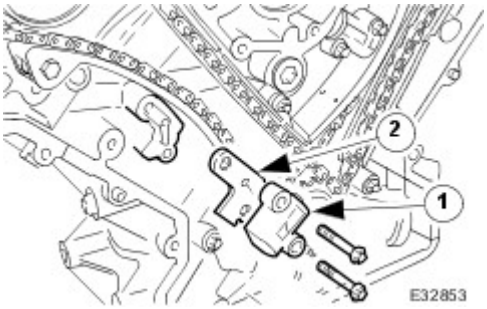
20 . Remove the primary chain tensioner bolts.



21 . Remove the tensioner assembly.

1) Remove the tensioner.

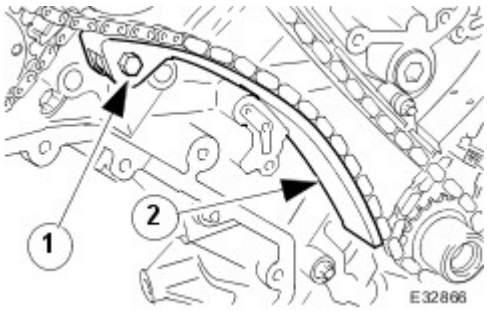
2) Remove the tensioner back-plate.



22 . Remove the chain tensioner blade.

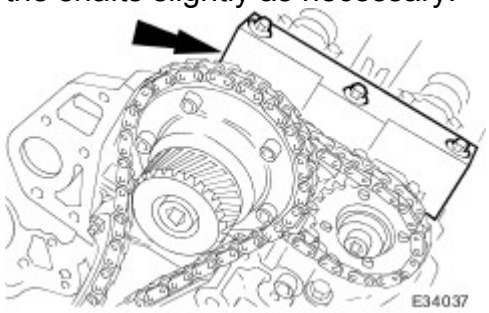
1) Remove the pivot bolt which secures the tensioner blade.

2) Remove the tensioner blade.

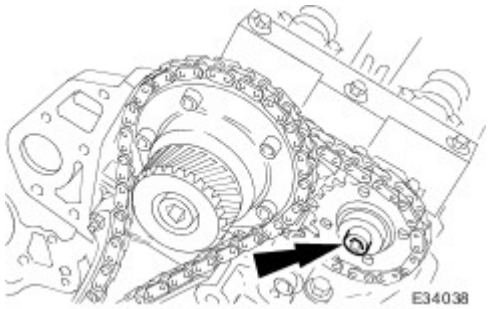


23 . Remove the chain from the VVT unit and from the crankshaft pulley.

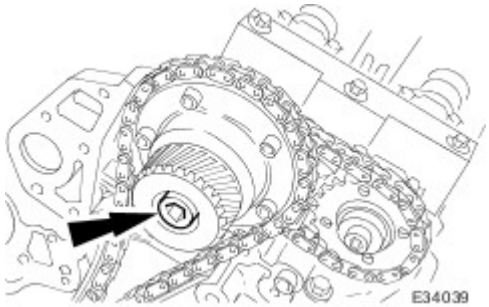
Remove the camshaft locking tool 303-530 and transfer it to Bank 2 camshafts, aligning the shafts slightly as necessary.



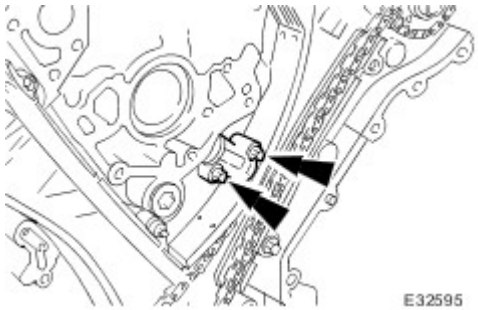
25 . Loosen the bolt which secures the sprocket to the camshaft.



26 . Loosen the bolt which secures the VVT unit to the camshaft.



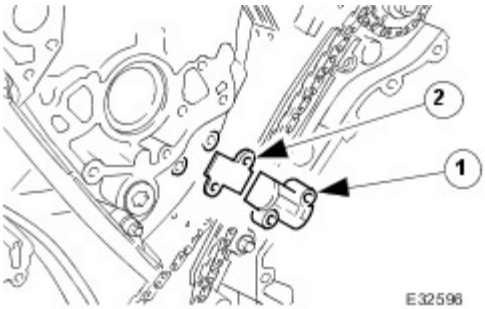
27 . Remove the primary chain tensioner bolts.



28 . Remove the tensioner assembly.

1) Remove the tensioner.

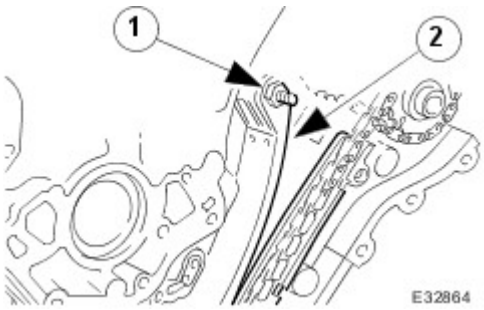
2) Remove the tensioner back-plate.



29 . Remove the chain tensioner blade.

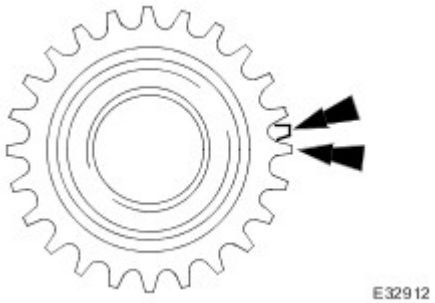
1) Remove the pivot bolt which secures the tensioner blade.

2) Remove the tensioner blade.



30 . Reposition the VVT unit and exhaust camshaft sprocket forward along the camshaft bosses and remove the chain from the VVT unit and from the crankshaft sprocket.

31 . Note the orientation of the sprockets relative to each other (half a tooth out of line).

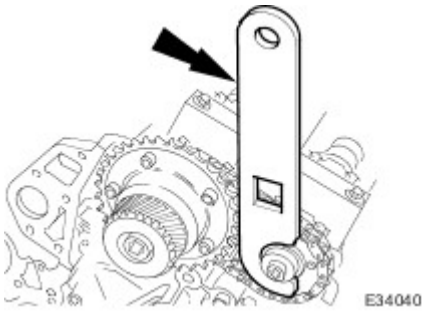


32 . Clean and inspect all relevant components.

Installation

1 . Install the chain tensioning tool 303-532 to the exhaust camshaft sprocket, Bank 2.

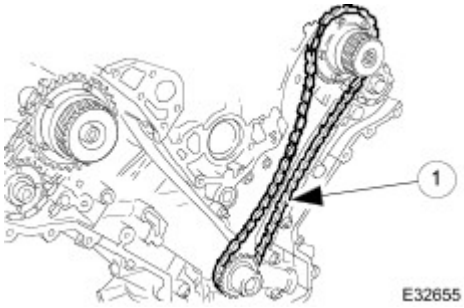
- Reposition the sprocket (and the VVT unit) for the most advantageous position for use of the tool.
- Remove the tool.



2 . Install the primary timing chain, Bank 2.

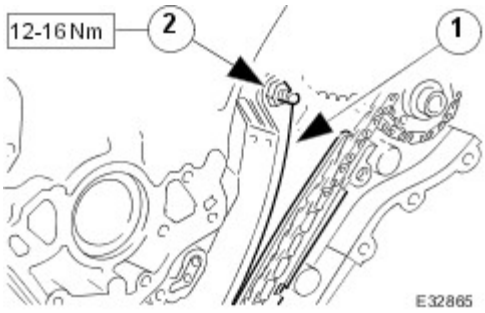
1) Install the primary chain over the crankshaft sprocket and the VVT unit sprocket. There must be no slack on the drive side of the primary chain and the VVT unit must not be rotated on the camshaft (or the tensioning tool may not fit).

- Slide the VVT and exhaust sprocket fully rearwards onto the respective camshafts.



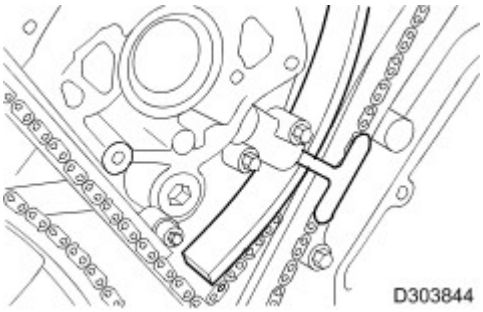
3 . Install the primary chain tensioner blade.

1) Position the tensioner blade to the cylinder block.
2) Install the retaining / pivot bolt and tighten it to 12-16 Nm.



4 . Install the primary chain tensioner assembly. Refer to Operation 12.65.55 in this Section.

- Use a wedge 303-533 (or two if required) between the primary chain tensioner and tensioner blade, to take up the slack in the chain.

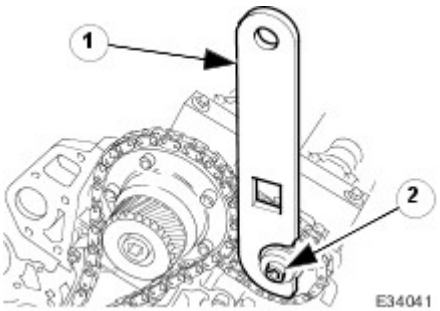


5 . Tighten the exhaust camshaft sprocket securing bolt.

1) Install the chain tensioner tool 303-532 to the sprocket holes.

- Apply force to the tool in an anti-clockwise direction to tension the chain on its drive side.

3) Whilst applying the opposing force to the sprocket and chain, tighten the sprocket securing bolt to 120 Nm.

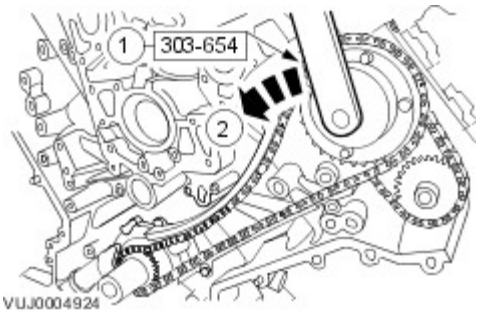


6 . Rotate the variable camshaft timing oil control unit fully counter-clockwise to the fully retarded position.

1) Install the variable camshaft timing oil control unit setting tool 303-

654.

2) Rotate the variable camshaft timing oil control unit fully anti-clockwise to the fully retarded position.



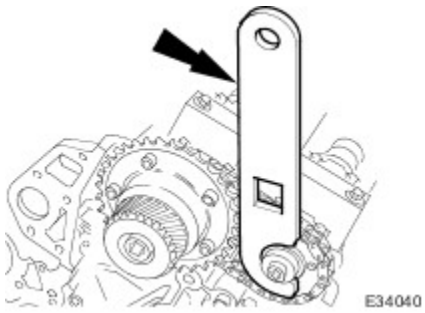
7 . Tighten the VVT unit bolt.

1) While still applying the opposing force to the sprocket and chain (using 303-532), check that the wedges are still in place, carry out the variable camshaft timing oil control unit retaining bolt tightening sequence.

- Tighten to 40 Nm + 90°.
- Remove the chain tensioning tool and the wedge(s).

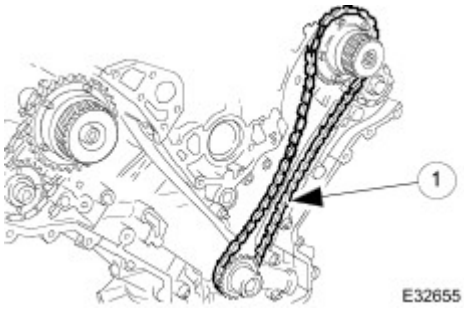
Install the chain tensioning tool 303-532 to the exhaust camshaft sprocket, Bank 2.

- Reposition the sprocket (and the VVT unit) for the most advantageous position for use of the tool.
- Remove the tool.



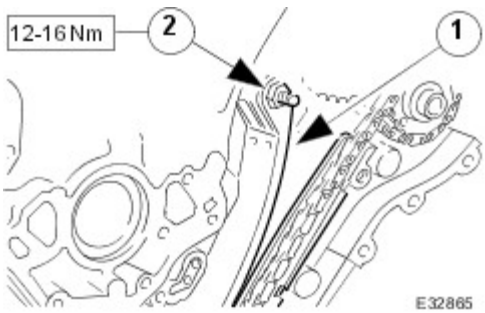
2 . Install the primary timing chain, Bank 2.

1) Install the primary chain over the crankshaft sprocket and the VVT unit sprocket. There must be no slack on the drive side of the primary chain and the VVT unit must not be rotated on the camshaft (or the tensioning tool may not fit).
- Slide the VVT and exhaust sprocket fully rearwards onto the respective camshafts.



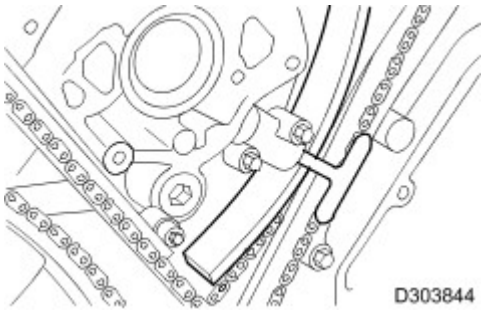
3 . Install the primary chain tensioner blade.

1) Position the tensioner blade to the cylinder block.
2) Install the retaining / pivot bolt and tighten it to 12-16 Nm.



4 . Install the primary chain tensioner assembly. Refer to Operation 12.65.55 in this Section.

- Use a wedge 303-533 (or two if required) between the primary chain tensioner and tensioner blade, to take up the slack in the chain.

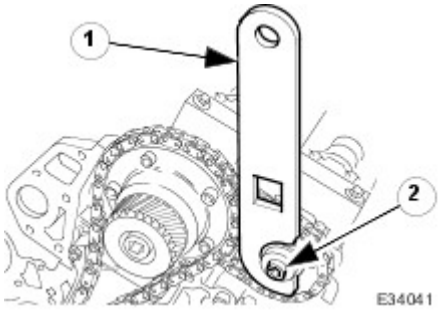


5 . Tighten the exhaust camshaft sprocket securing bolt.

1) Install the chain tensioner tool 303-532 to the sprocket holes.

- Apply force to the tool in an anti-clockwise direction to tension the chain on its drive side.

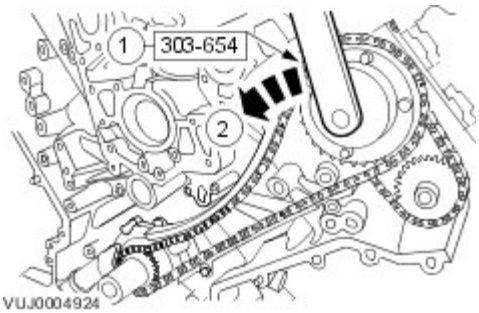
3) Whilst applying the opposing force to the sprocket and chain, tighten the sprocket securing bolt to 120 Nm.



6 . Rotate the variable camshaft timing oil control unit fully counter-clockwise to the fully retarded position.

1) Install the variable camshaft timing oil control unit setting tool 303-654.

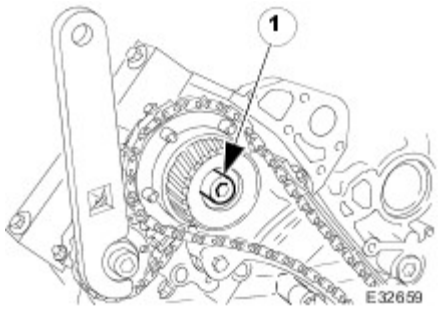
2) Rotate the variable camshaft timing oil control unit fully anti-clockwise to the fully retarded position.



7 . Tighten the VVT unit bolt.

1) While still applying the opposing force to the sprocket and chain (using 303-532), check that the wedges are still in place, carry out the variable camshaft timing oil control unit retaining bolt tightening sequence.

- Tighten to 40 Nm + 90°.
- Remove the chain tensioning tool and the wedge(s).



16 . Remove the camshaft locking tool 303-530.

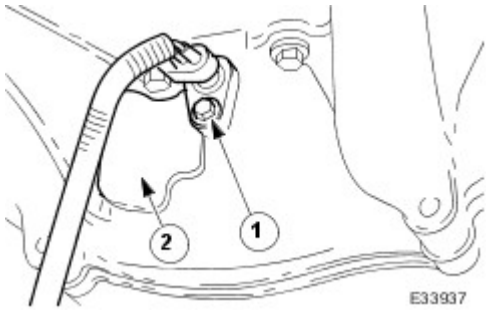
17 . Raise the vehicle on the ramp.

18 . Remove the crankshaft setting tool 303-531.

19 . Install the crankshaft position sensor.

1) Install the sensor to the flywheel housing and install the securing bolt. Tighten to 6-8 Nm.

2) Install the access grommet to the housing.



20 . Lower the ramp.

21 . Install new seals to the VVT bush carrier, Bank 1.

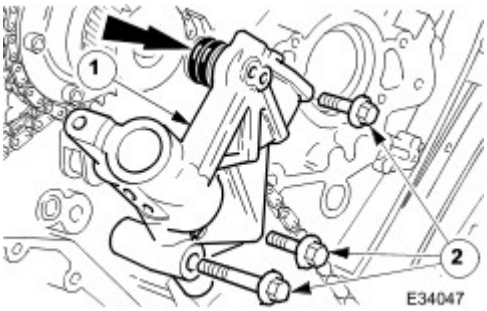
1) Install the new sealing rings to the carrier bush groove.

22 . **NOTE :**

Make sure the bush carrier oil inlet filter screen is clean.

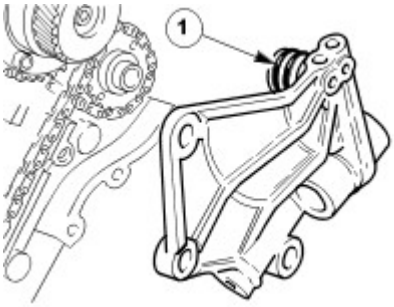
Install the VVT bush carrier to the cylinder block.

- Lubricate the seals and the bush.
- 2) Install the bush carrier assembly.
- Check that the ring dowels are engaged squarely. Fully locate the assembly as much as possible by hand pressure.
- 4) Install the three securing bolts. Tighten to 19-23 Nm.



23 . Install new seals to the VVT bush carrier, Bank 2.

1) Install the new sealing rings to the carrier bush groove.

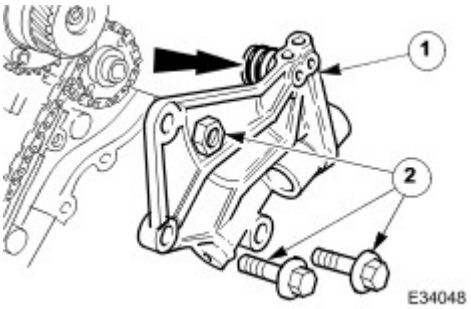


24 . **NOTE :**

Make sure the bush carrier oil inlet filter screen is clean.

Install the VVT bush carrier to the cylinder block.

- Lubricate the seals and the bush.
- 2) Install the bush carrier assembly.
- Check that the ring dowels are engaged squarely. Fully locate the assembly as much as possible by hand pressure.
- 4) Install the two securing bolts and one nut. Tighten to 19-23 Nm.


1
2
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