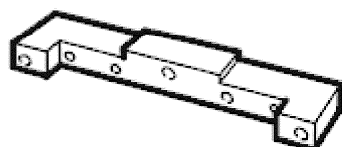


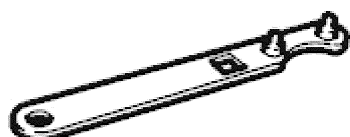
Primary Timing Chain LH 12.65.67

Special Service tools



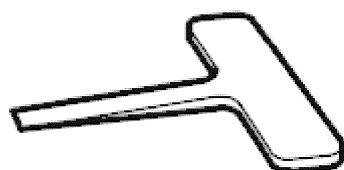
E36401

Camshaft setting
303-530



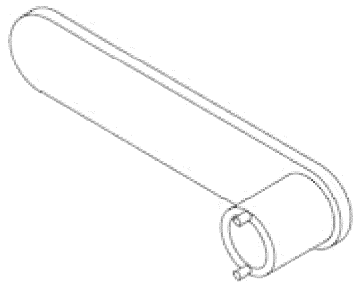
E36402

Timing chain tensioning
303-532



E36407

Wedges, primary chain
303-533



303-654

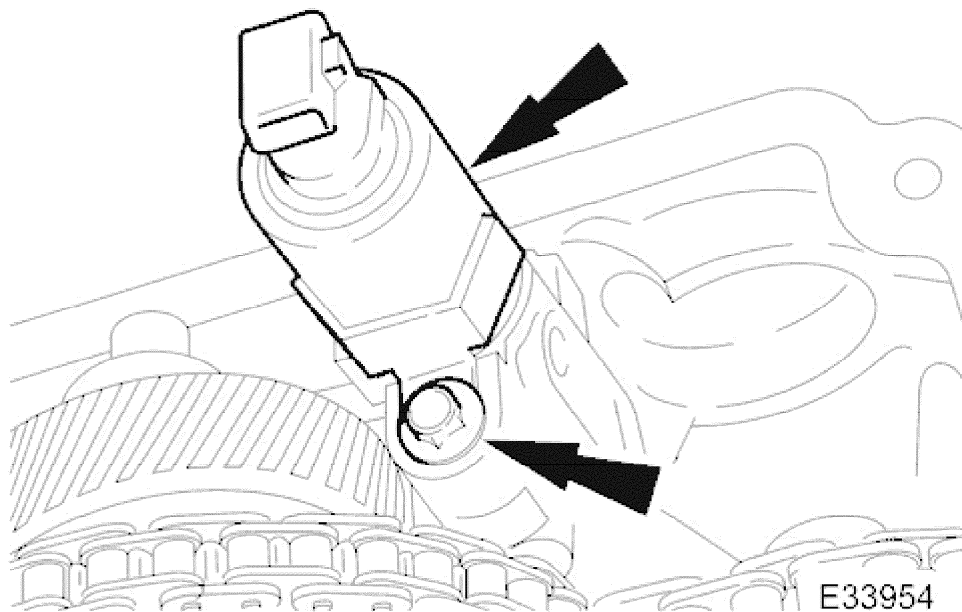
Variable camshaft timing oil control unit setting tool
303-654

Removal

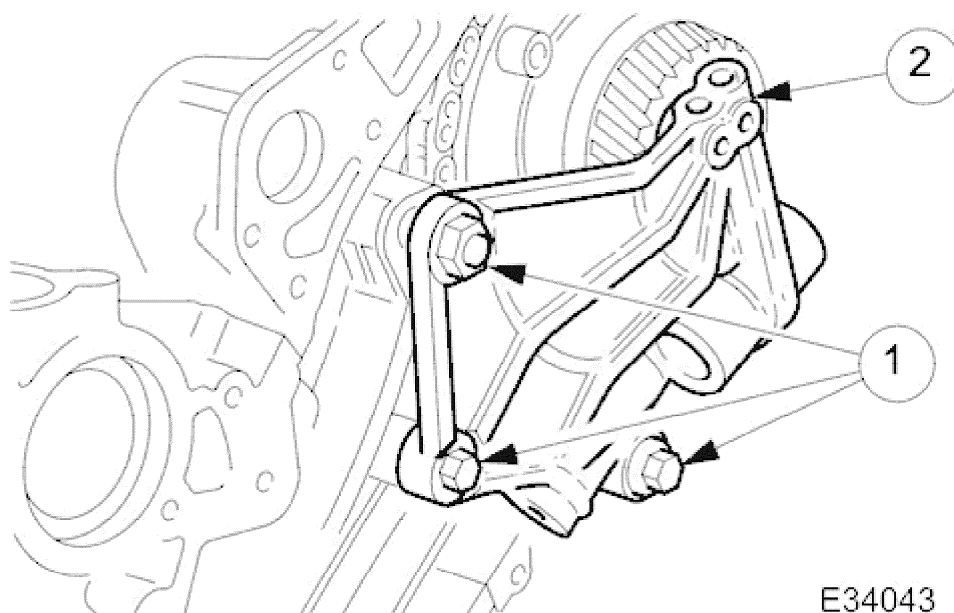
All vehicles

1. Remove the right-hand primary timing chain. <<Primary Timing Chain RH>>

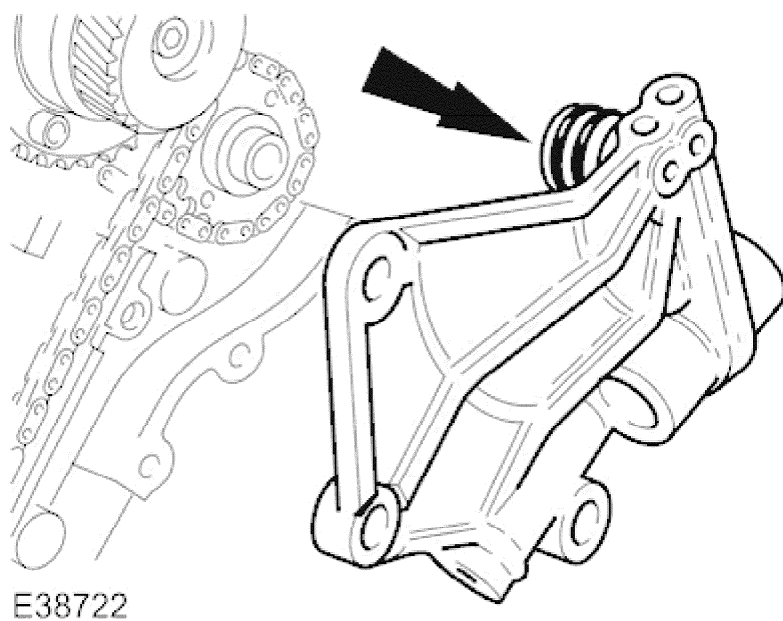
Vehicles without supercharger



2. Remove the variable camshaft timing oil control solenoid.



3. Remove variable camshaft timing oil control unit housing.
 1. Remove variable camshaft timing oil control unit housing retaining bolts.
 2. Remove variable camshaft timing oil control unit housing.

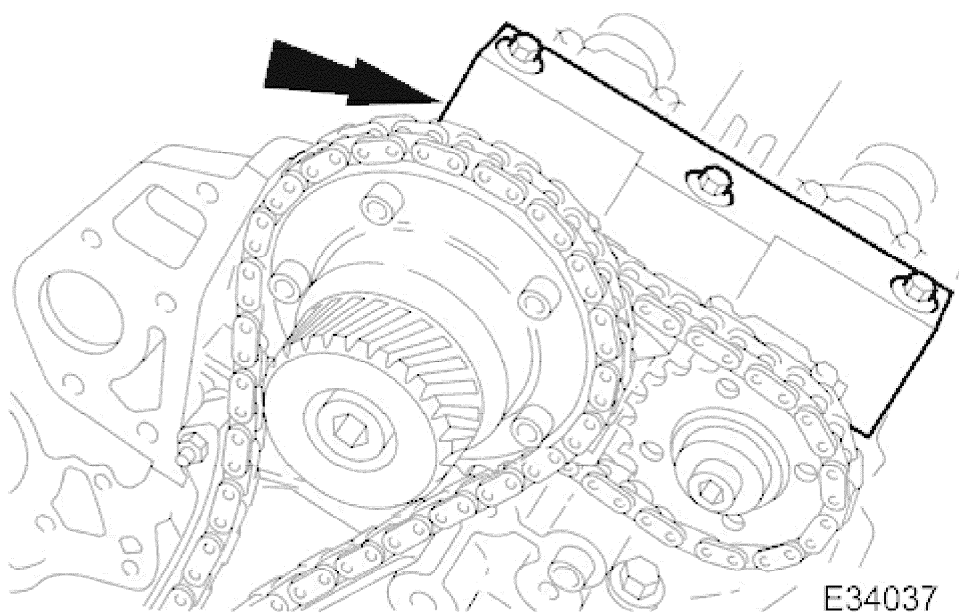


4. Remove and discard the variable camshaft timing oil control unit housing O-ring seals.

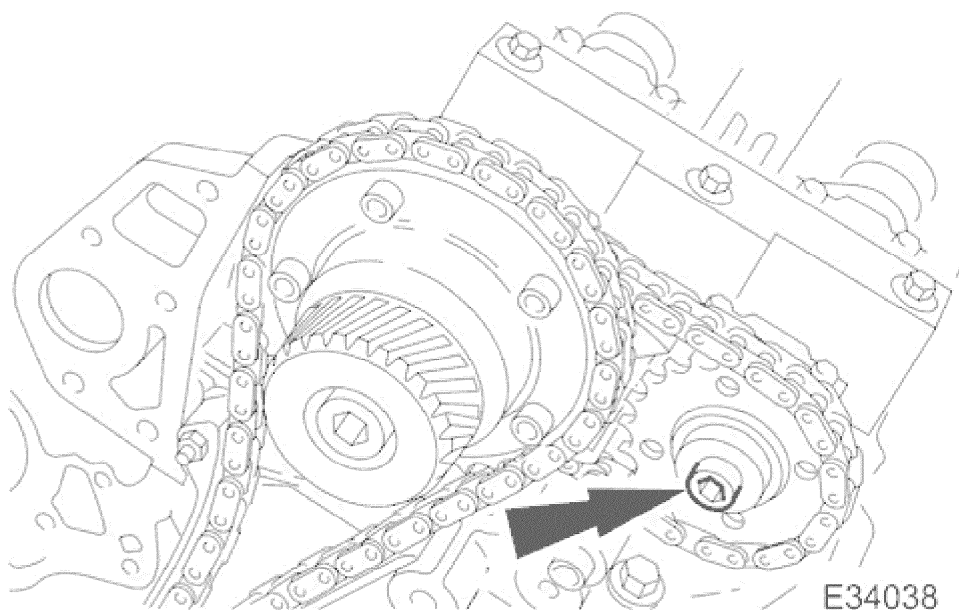
All vehicles

NOTE:

Vehicles without supercharger shown, vehicles with supercharger similar.

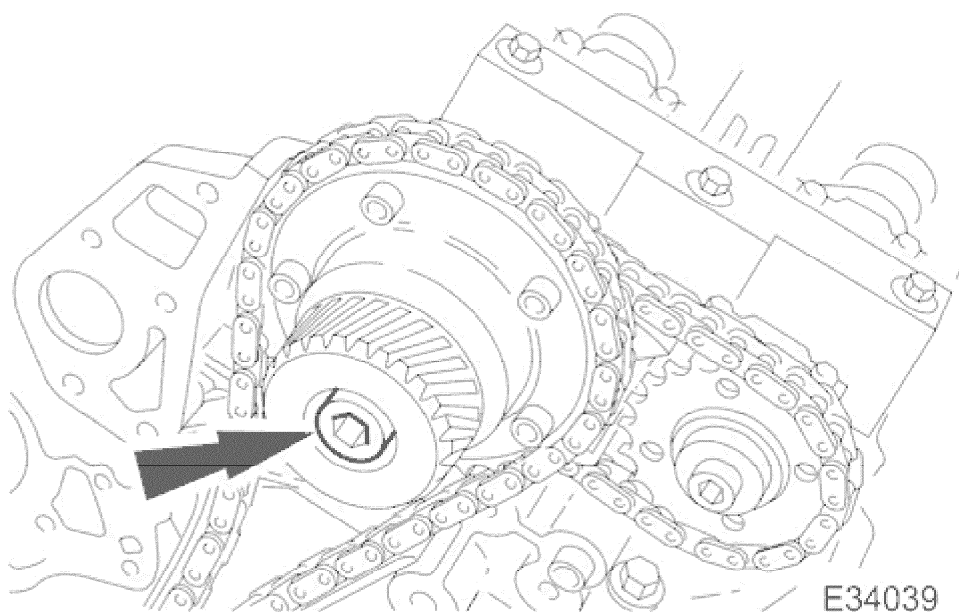


5. Install the camshaft locking tool 303-530 to the left-hand camshafts, aligning the camshafts as necessary.



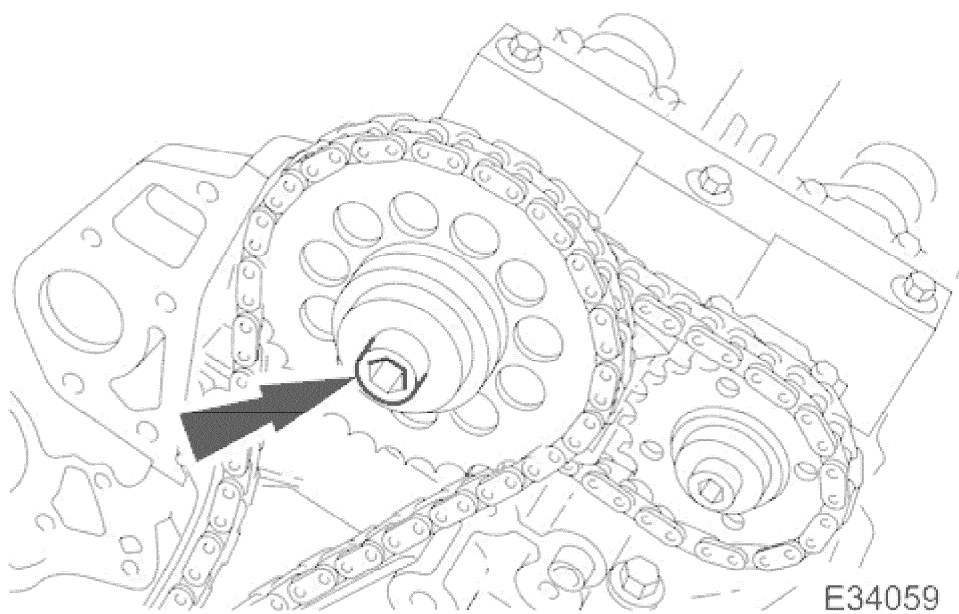
6. Loosen the exhaust camshaft sprocket retaining bolt.

Vehicles without supercharger



7. Loosen the variable camshaft timing oil control unit retaining bolt.

Vehicles with supercharger

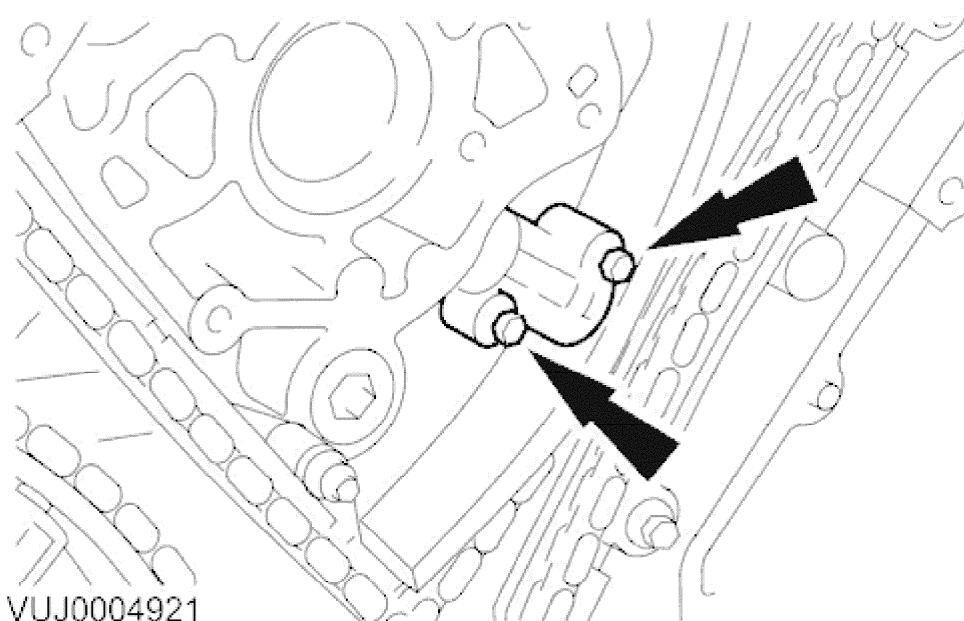


8. Loosen the intake camshaft sprocket retaining bolt.

All vehicles

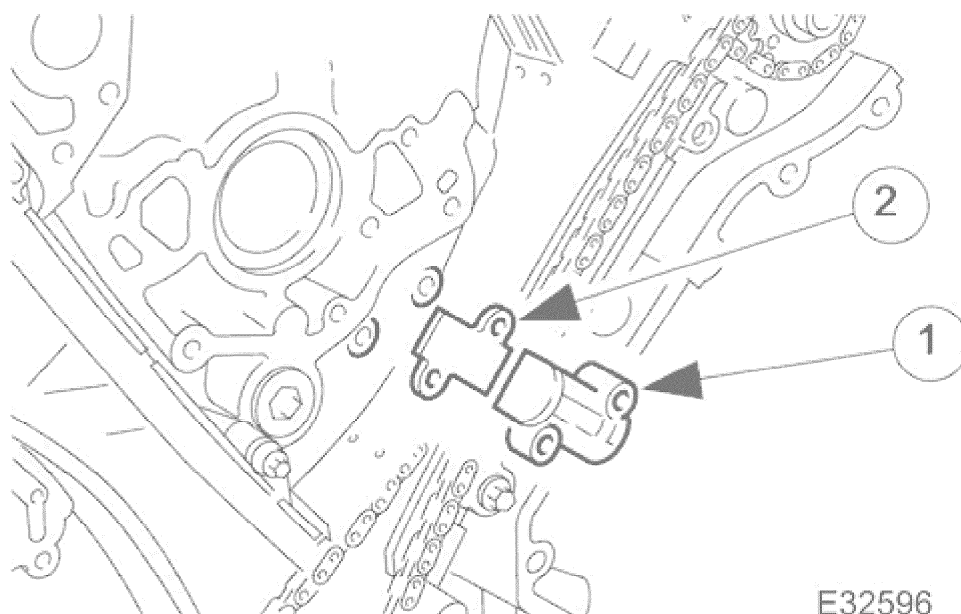
NOTE:

Vehicles without supercharger shown, vehicles with supercharger similar.



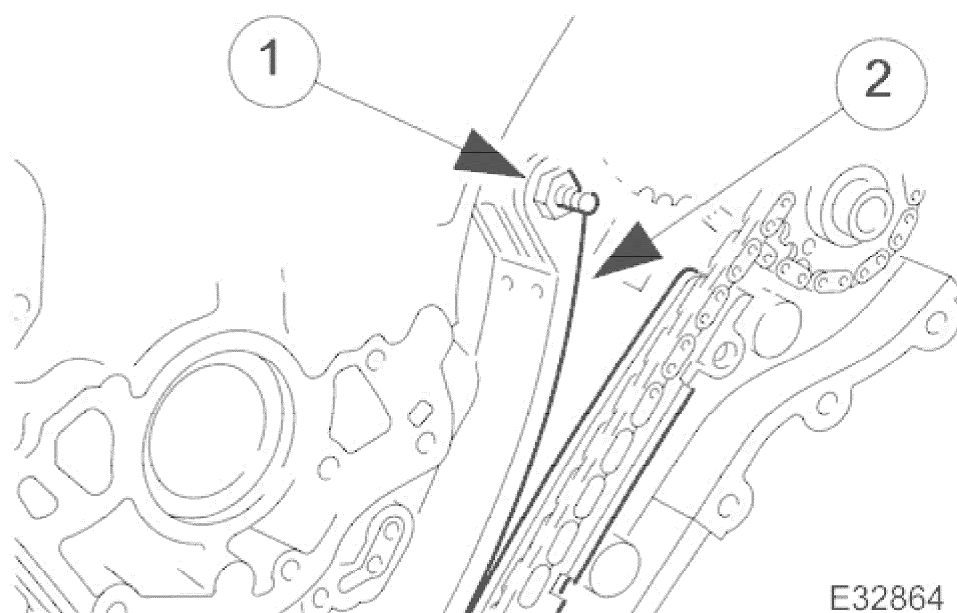
VUJ0004921

9. Remove the primary chain tensioner retaining bolts.

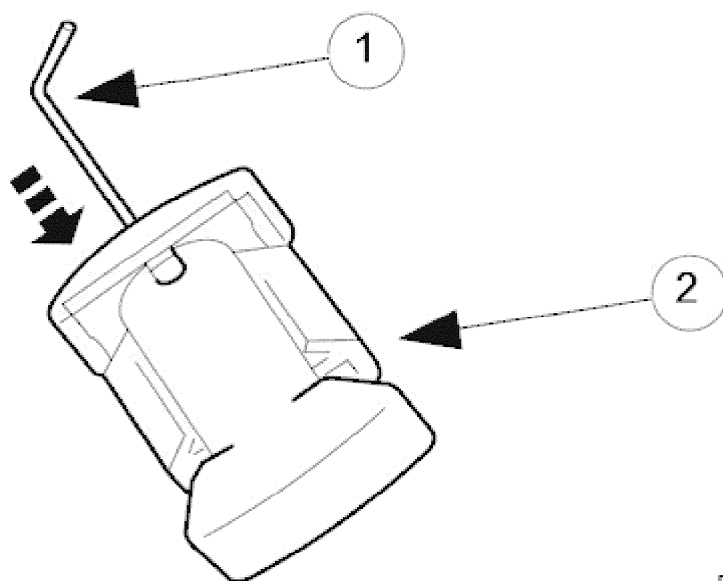


E32596

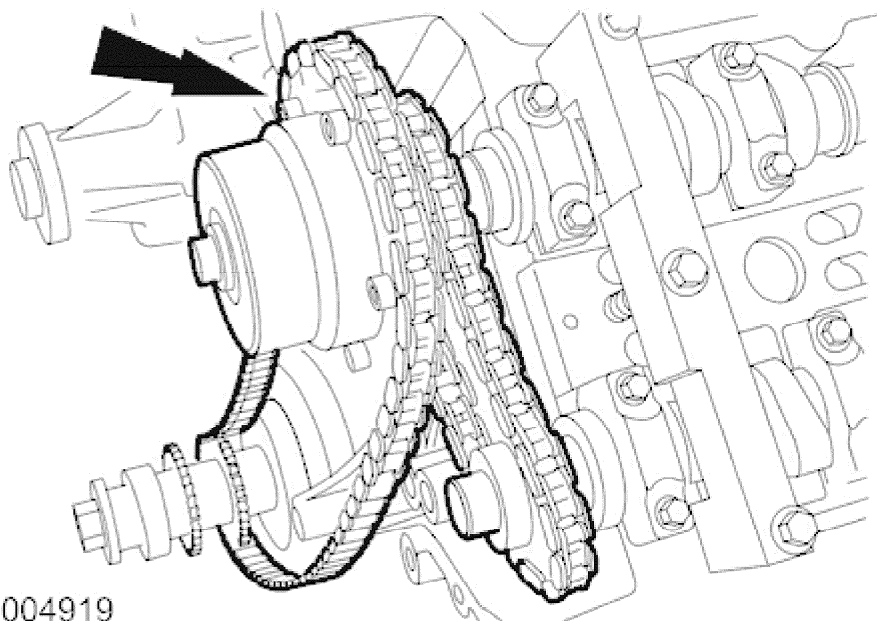
10. Remove the tensioner assembly.
1. Remove the tensioner.
2. Remove the tensioner back-plate.



11. Remove the primary chain tensioner blade.
1. Remove the pivot bolt which secures the tensioner blade.
 2. Remove the tensioner blade.

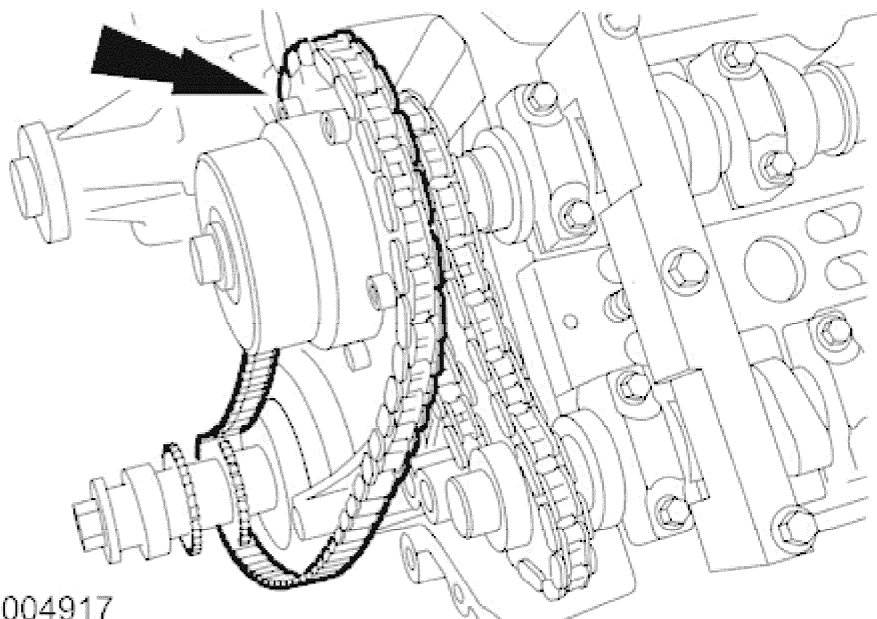


12. Push the tensioner piston (secondary chain) into the body to to release the tension on the left-hand secondary timing chain.
- Insert a thin rigid wire through the hole in the end of the tensioner piston to displace the ball from the non-return valve seat.
 - With the wire in position, press the piston fully into the tensioner body.
 - Remove the wire.



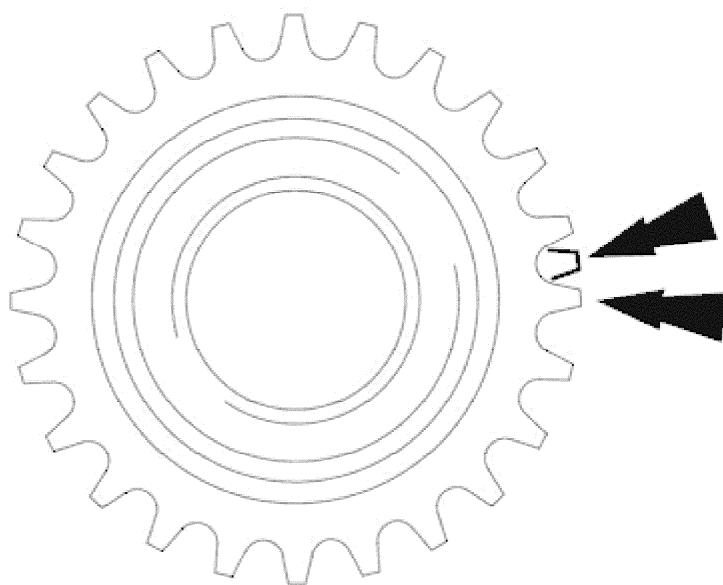
VUJ0004919

13. Reposition the timing chain assembly forward along the camshaft bosses to enable the primary timing chain to clear the cylinder head casting.



VUJ0004917

14. Remove the left-hand primary timing chain.



E32912

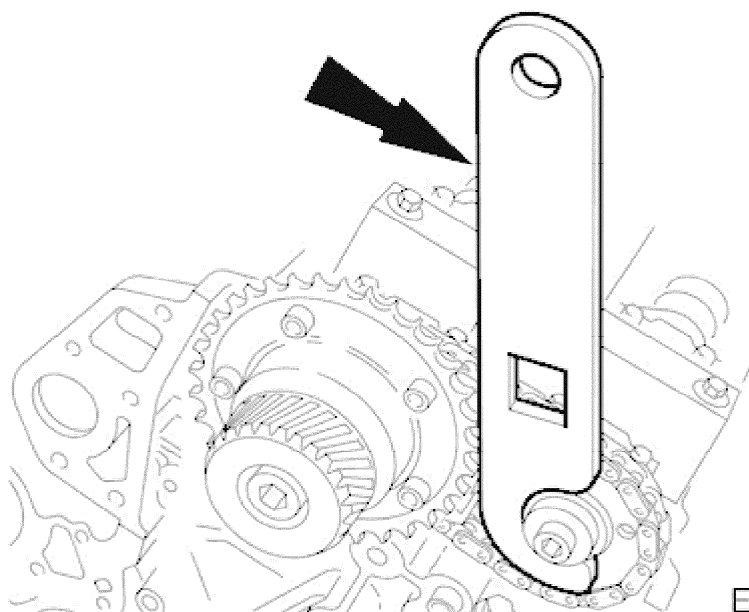
15. Note the orientation of the sprockets relative to each other (half a tooth out of line).

Installation

All vehicles

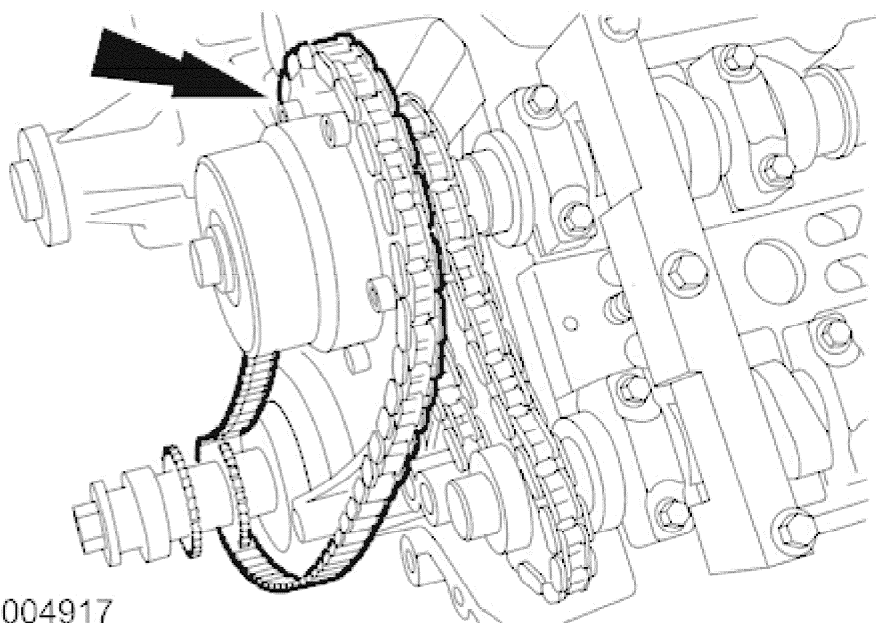
NOTE:

Vehicles without supercharger shown, vehicles with supercharger similar.



E34040

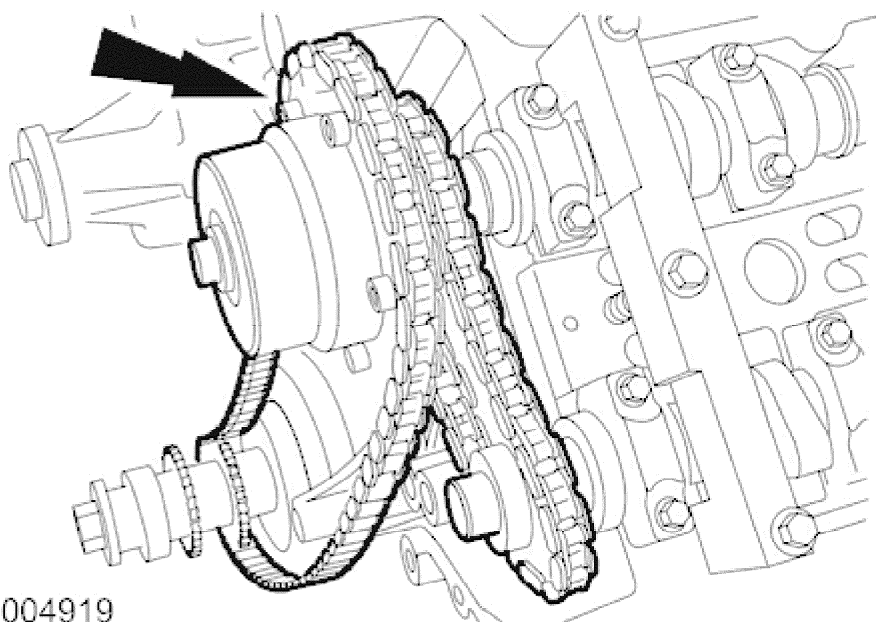
1. Install the chain tensing tool 303-532 to the exhaust camshaft sprocket.
 - Reposition the sprockets for the most advantageous position for use of the tool.
 - Remove the tool.



VUJ0004917

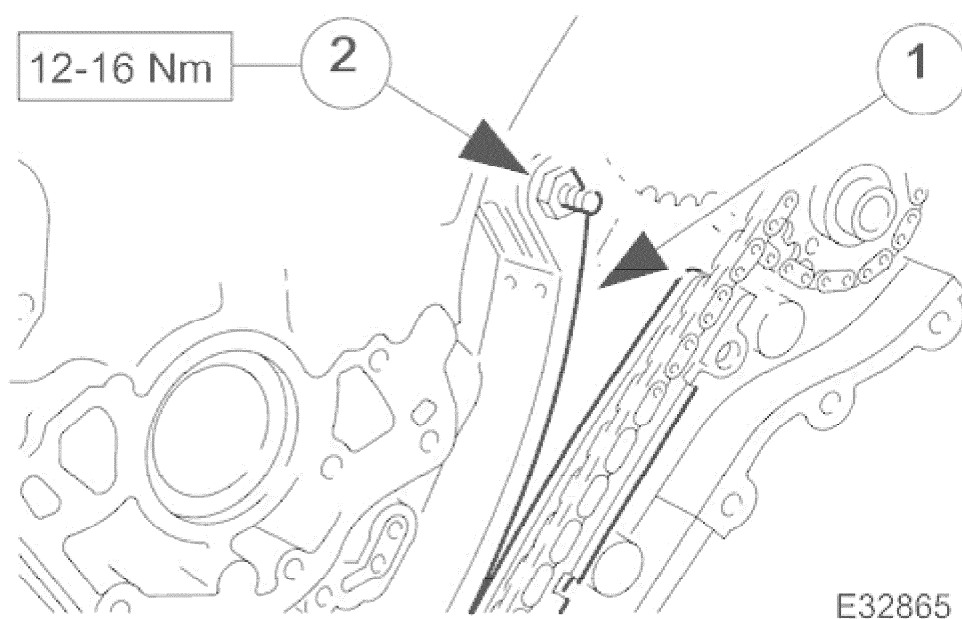
2. Install the primary timing chain.

- Install the primary chain over the crankshaft sprocket and the variable camshaft timing oil control unit (or intake camshaft sprocket - vehicles fitted with supercharger). There must be no slack on the drive side of the primary chain and the sprockets must not be rotated on the camshafts (or the tensioning tool may not fit).

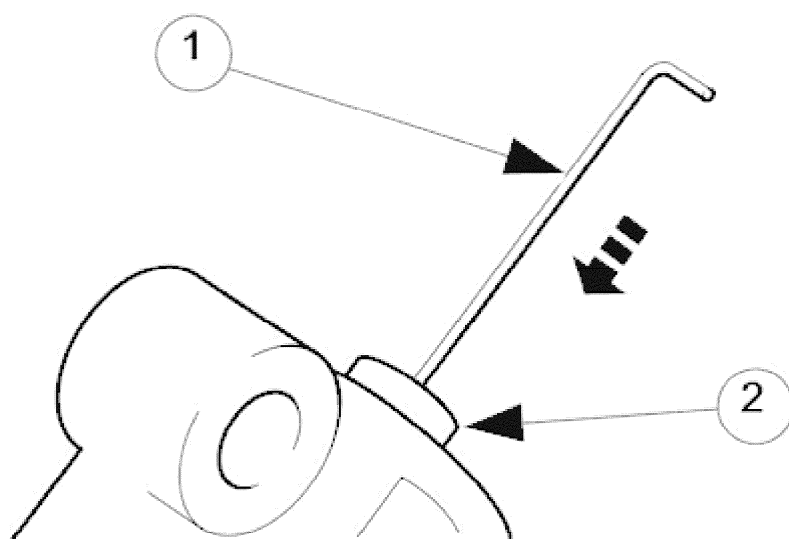


VUJ0004919

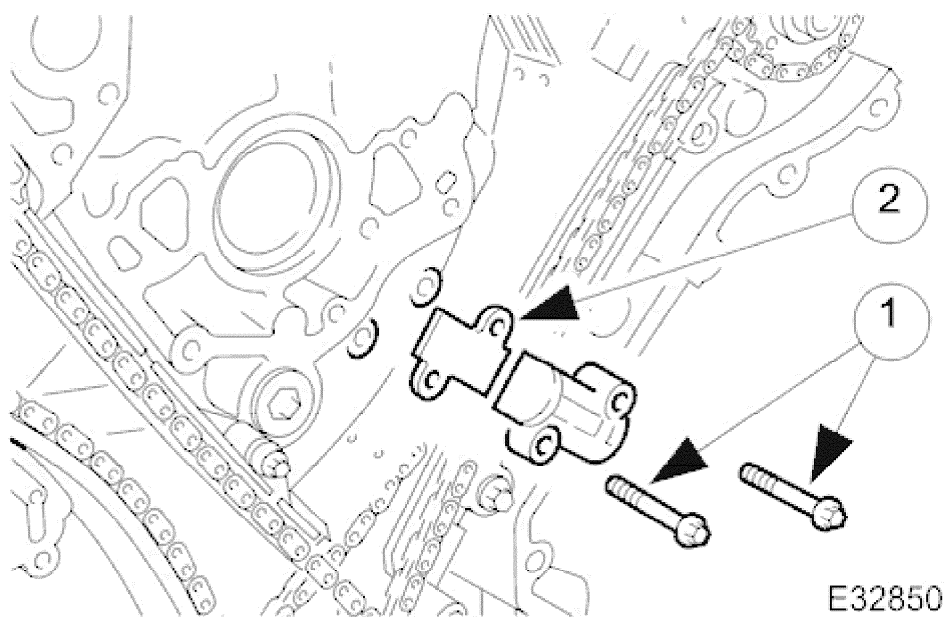
3. Reposition the timing chain assembly along the intake camshaft.



4. 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.

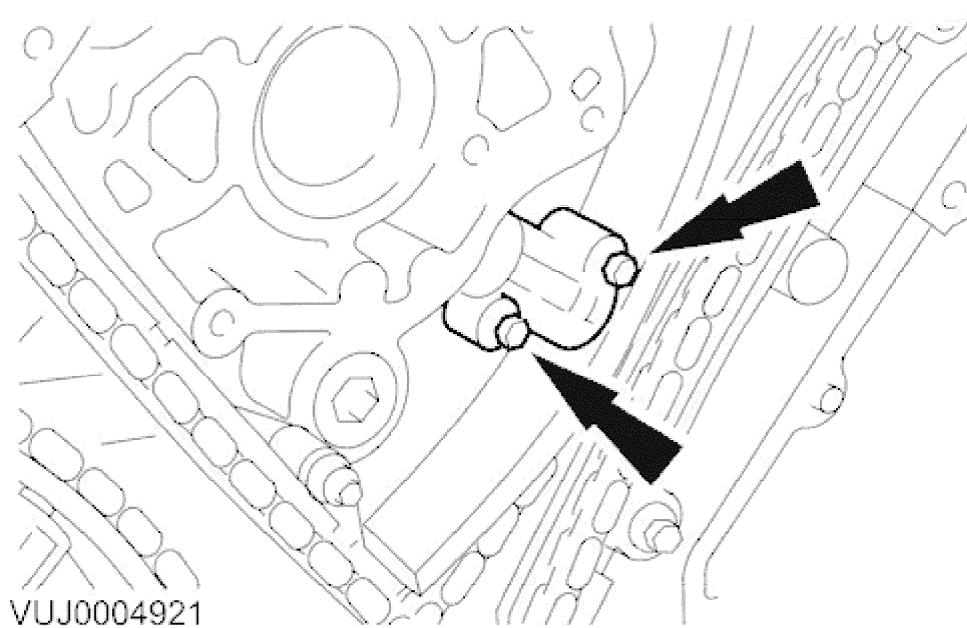


5. Push the tensioner piston into the body to provide clearance for fitting.
1. Install a thin rigid wire through the hole in the end of the tensioner piston to displace the ball from the non-return valve seat.
 2. With the wire in position, press the piston fully into the tensioner body.
- Remove the wire.



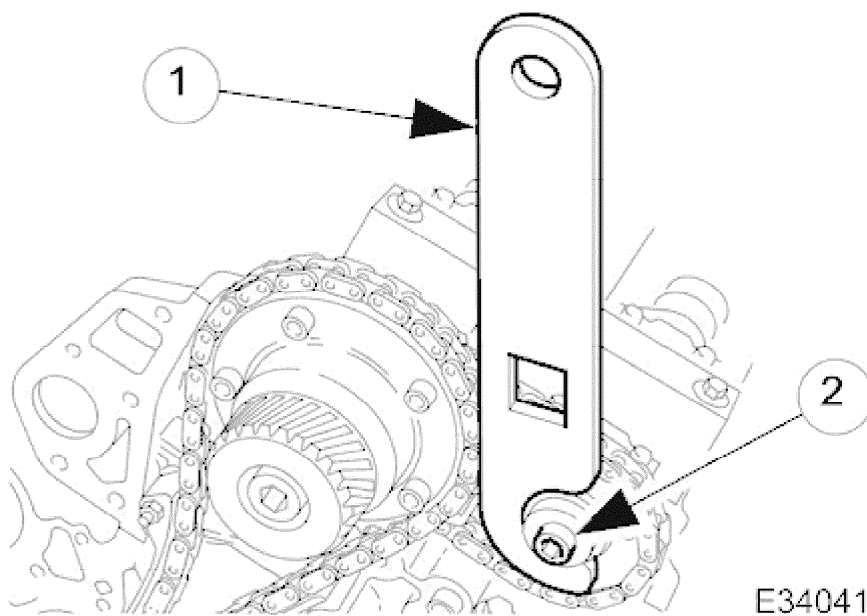
6. Assemble the tensioner.

1. Fit the two mounting bolts to the tensioner.
2. Locate the tensioner back-plate to the two bolts.



7. Install the primary chain tensioner retaining bolts.

- Tighten to 12 Nm.



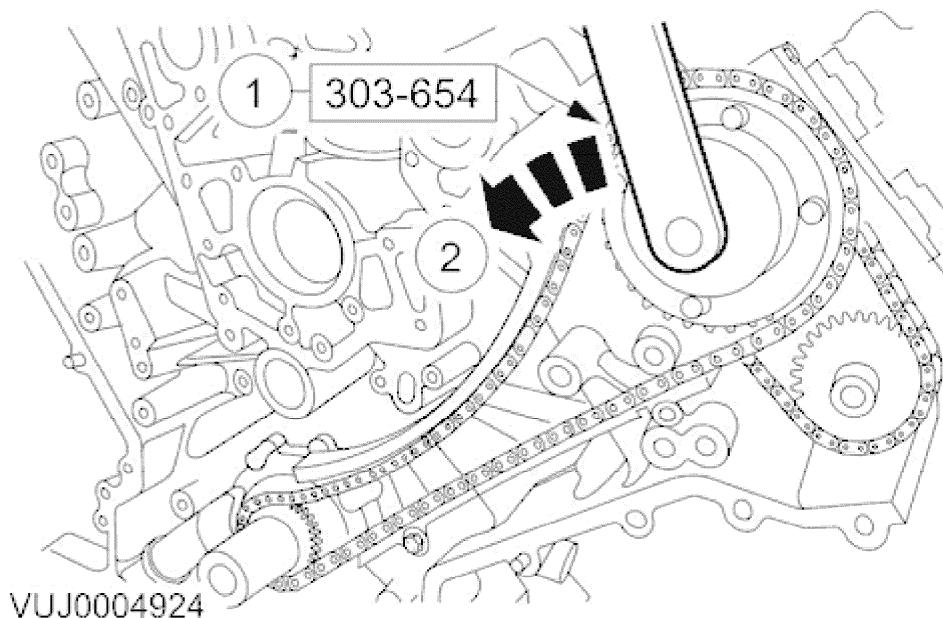
8. Tighten the exhaust camshaft sprocket retaining bolt.

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.

2. Whilst applying the opposing force to the sprocket and chain, tighten the sprocket retaining bolt to 115-125 Nm.

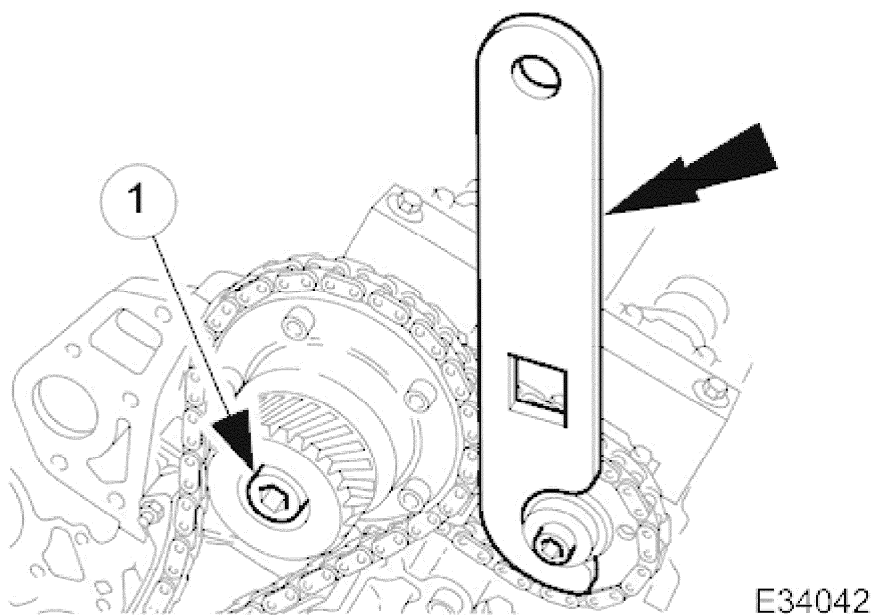
Vehicles without supercharger



9. 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.

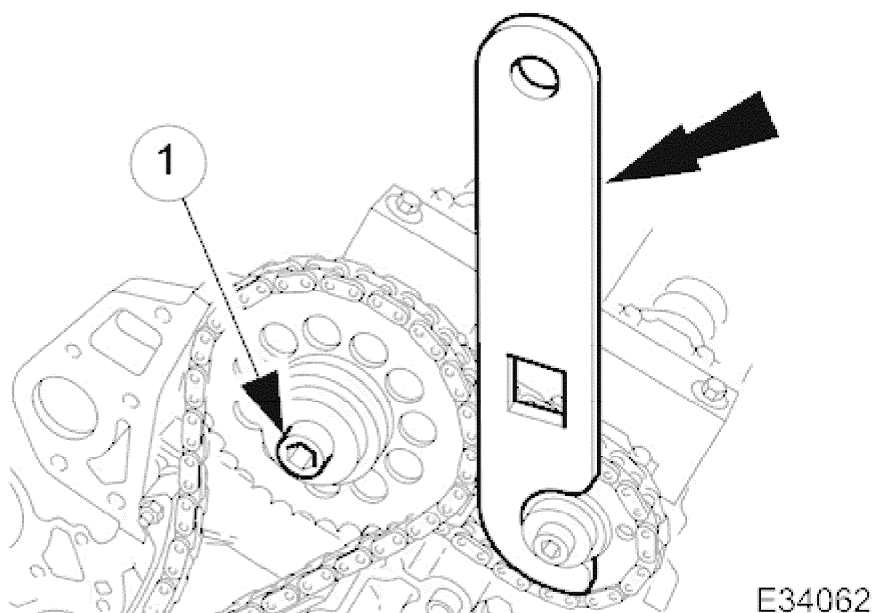


10. Tighten the variable camshaft timing oil control unit retaining bolt.

1. Whilst 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).

Vehicles with supercharger



11. Tighten the intake camshaft retaining bolt.

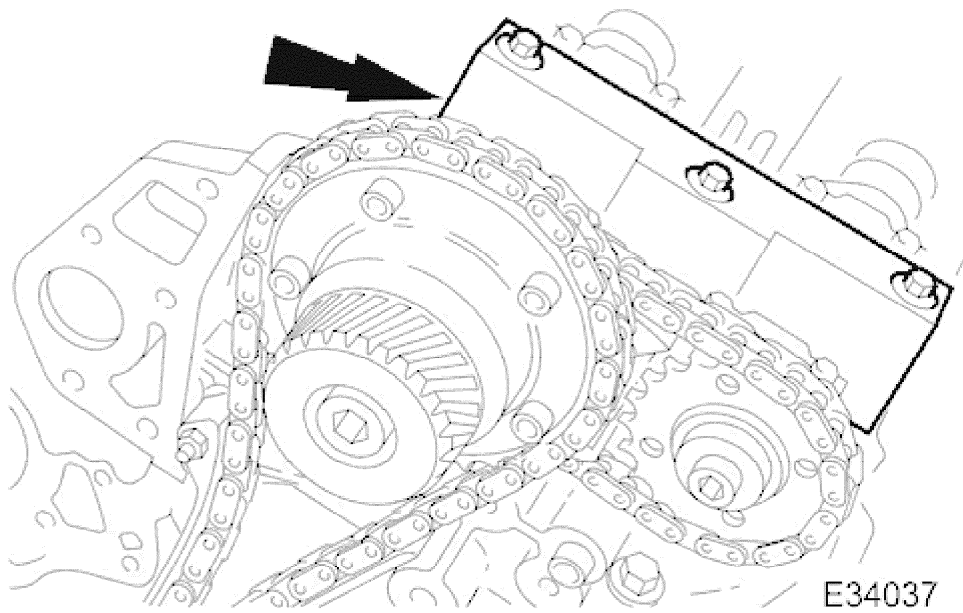
1. Whilst still applying the opposing force to the sprocket and chain (using 303 - 532), check that the wedges are still in place, carry out the intake camshaft retaining bolt tightening sequence.

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

All vehicles

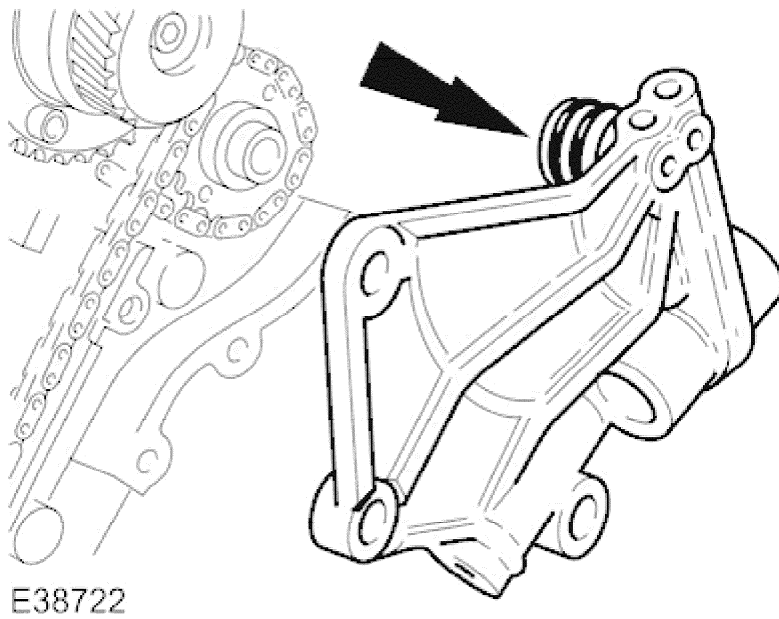
NOTE:

Vehicles without supercharger shown, vehicles with supercharger similar.

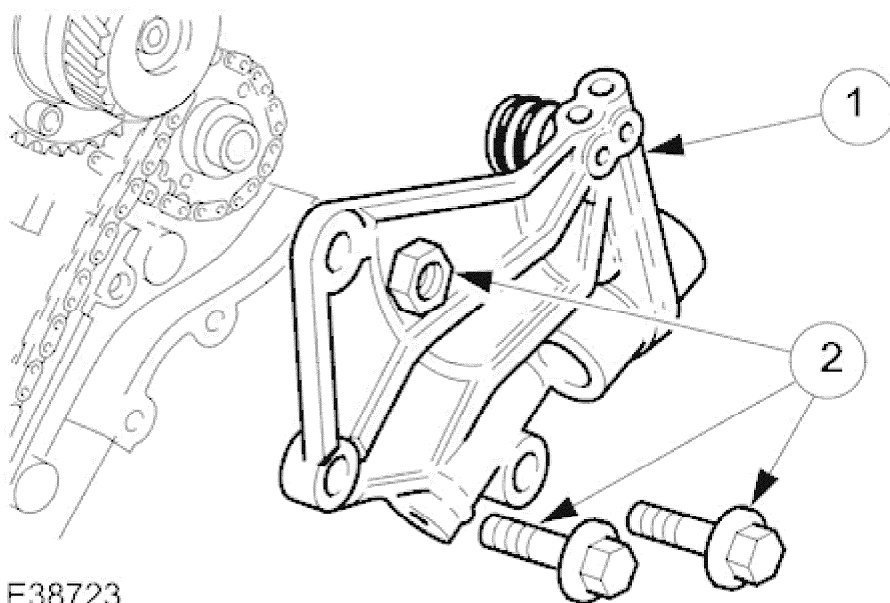


12. Remove the camshaft locking tool 303-530.

Vehicles without supercharger



13. Install new seals to the variable camshaft timing oil control unit housing.



E38723

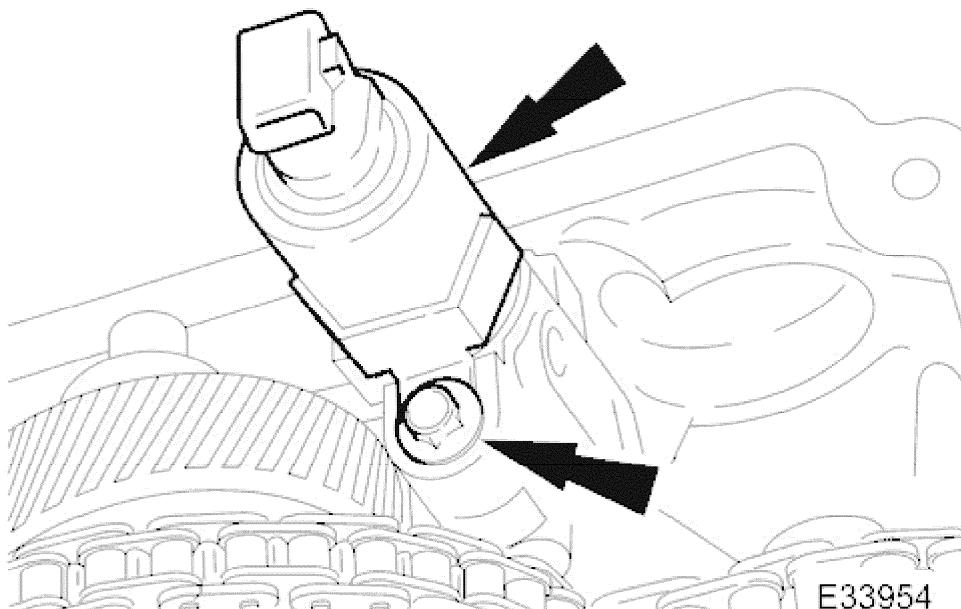
14.  **WARNING:**
CHECK THAT THE RING DOWELS ARE ENGAGED SQUARELY. FULLY LOCATE THE ASSEMBLY AS MUCH AS POSSIBLE BY HAND PRESSURE. FAILURE TO FOLLOW THIS PROCEDURE MAY RESULT IN DAMAGE TO THE VEHICLE.

NOTE:

Lubricate the seals and the bush.

Install the variable camshaft timing oil control unit housing to the cylinder block.

1. Install the variable camshaft timing oil control unit housing.
2. Install the two retaining bolts and one nut. Tighten to 19-23 Nm.



15. Install the variable camshaft timing oil control solenoid.
- Check the seal areas and locate the solenoid to the bush carrier.
 - Install the retaining bolt. Tighten to 8-10 Nm.

All vehicles

16. Install the right-hand primary timing chain. <<**Primary Timing Chain RH**>>