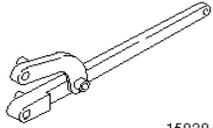


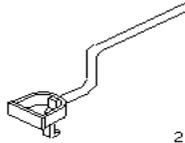
## Timing Chain - Renew (21 314 0)

### Special Tools



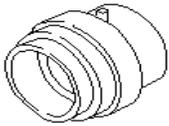
15030A

15-030 A Universal flange holding wrench



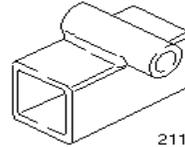
21051

21-051 Remover, seal



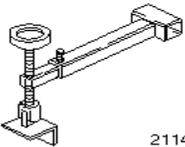
21094

21-094 Installer, oil seal



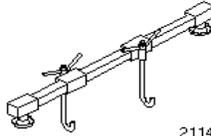
2114002

21-140-02 Adapter for 21-140



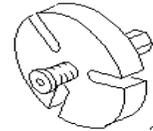
2114003

21-140-03 Adapter for 21-140



21140

21-140 Engine support bar



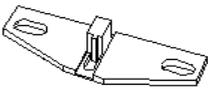
21153B

21-153 B Remover, vibration damper



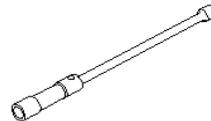
2115301

21-153-01 Guide bolts and remover bolts, vibration damper



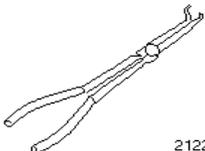
21168

21-168 Locking tool, crankshaft



E821202

21-202 Socket wrench, spark plugs



21226

21-226 Pliers, spark plug connectors

### Materials

Description	Specification
Spark plug lubricant 'Never-Seeze'	ESE-M1244-A
Welding rod ÷ 2,5 mm, length approx.	

220 mm

Coolant	ESD-M97B-49A
Cable ties	
Silicone grease	A960-M1C171-AA

## Renew

### 1. Standard Preparatory measures

- Make a note of the radio keycode.
- Make a note of the pre-set radio stations.



#### **CAUTION:**

**Disconnect the battery negative lead.**

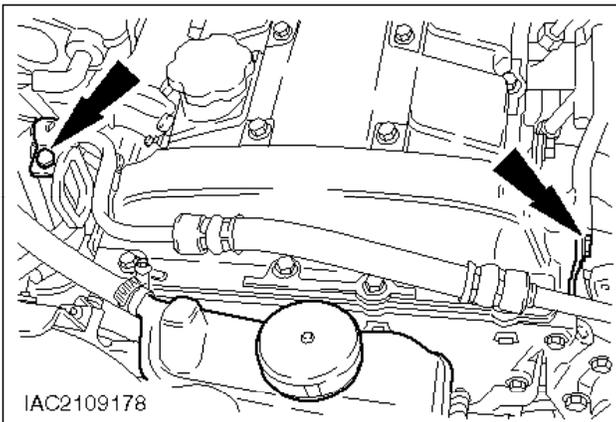
- Lay protective coverings on the fenders.
- Cut the cable ties where necessary and renew them for installation.



#### **WARNING:**

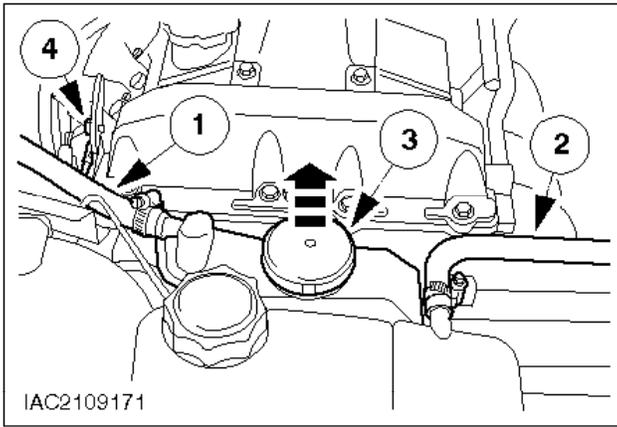
**BEFORE OPENING THE COOLING SYSTEM ON A HOT ENGINE, COVER THE CAP OF THE COOLANT EXPANSION TANK WITH A THICK CLOTH TO PREVENT THE RISK OF SCALDING.**

- Open the coolant expansion tank.
- Raise the vehicle.
- Drain off the coolant via the radiator drain plug and refit the drain plug.
- Lower the vehicle.

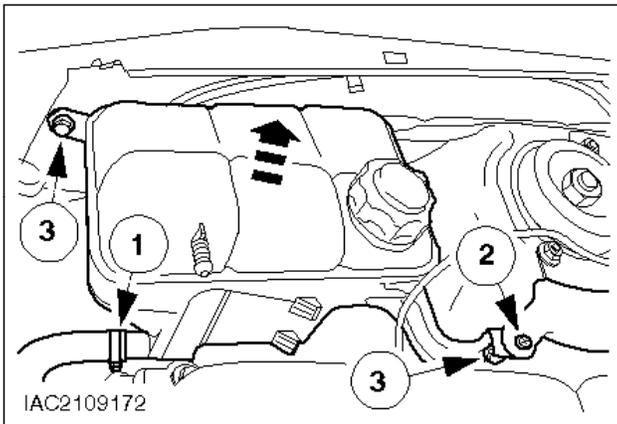


**Only vehicles with air conditioning. 09-156">**

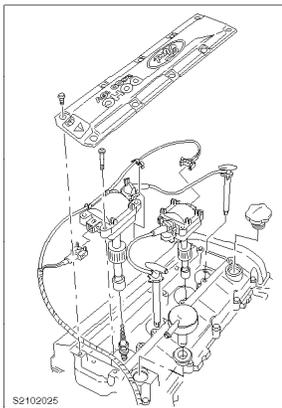
- μ 2. Detach the power steering pipe.



- μ 3. Detach the power steering reservoir.
- 1 Detach the upper hose from the power steering reservoir.
  - 2 Disconnect the coolant hose from the coolant expansion tank.
  - 3 Lift out the power steering reservoir and place to one side.
  - 4 Detach the ground cable from the engine lifting eye.



- μ 4. Remove the coolant expansion tank.
- 1 Detach the lower coolant hose from the coolant expansion tank.
  - 2 Detach the bracket of the manifold absolute pressure sensor (MAP sensor).
  - 3 Detach the coolant expansion tank.
- Remove the coolant expansion tank.





**CAUTION:**

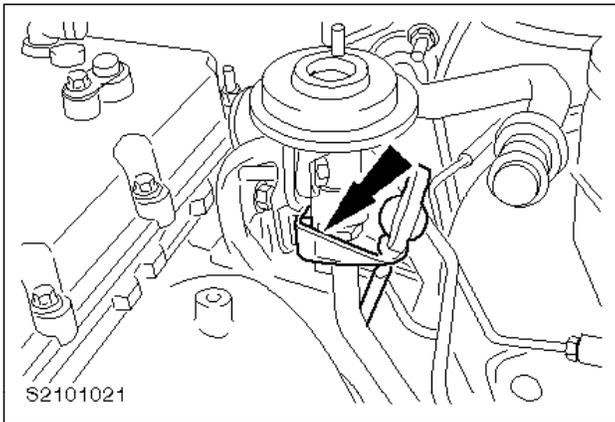
Do not pull on the cable when unplugging the spark plug connectors. If necessary disconnect the ignition cables from the ignition coil to prevent kinking of the cables. Slightly twist the spark plug connectors before pulling them off in order to release the seals.



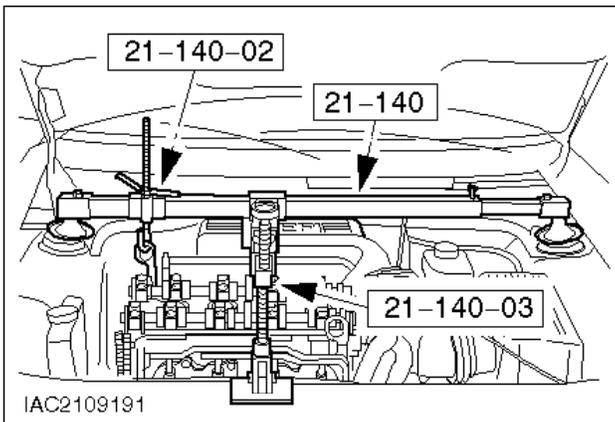
**CAUTION:**

Pull off the spark plug connectors in a straight line with the axis of the spark plug (use Special Tool 21-226 for angled spark plug connectors).

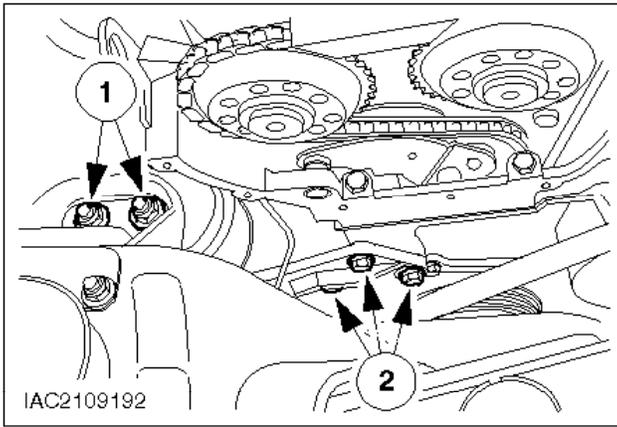
- μ 5. Remove the cylinder head cover.
- Detach the cover from the cylinder head cover.
  - Disconnect the plugs of the ignition coils and remove the engine wiring loom.
  - Remove the ignition coils and spark plug connectors.
  - Remove the spark plugs using special tool 21-202.
  - Disconnect the positive crankcase ventilation.
  - Detach the cylinder head cover (11 bolts and 4 nuts).



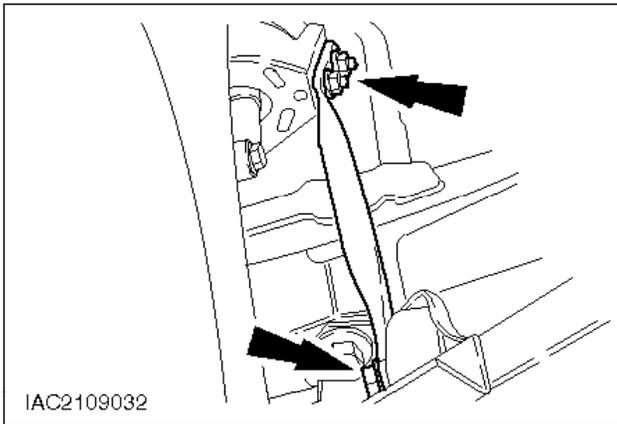
- μ 6. Detach the upper timing chain cover (7 bolts).



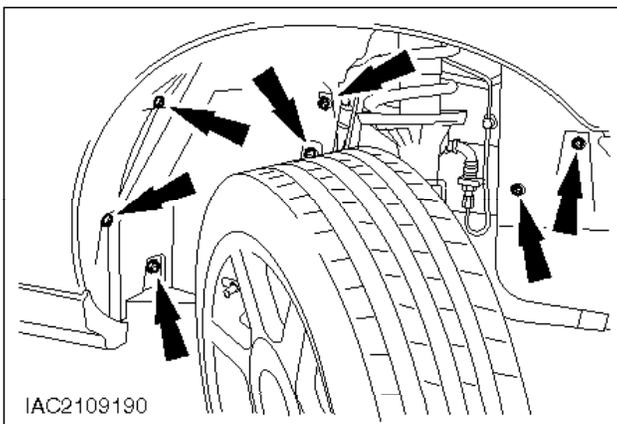
- μ 7. Fit the engine support bar.



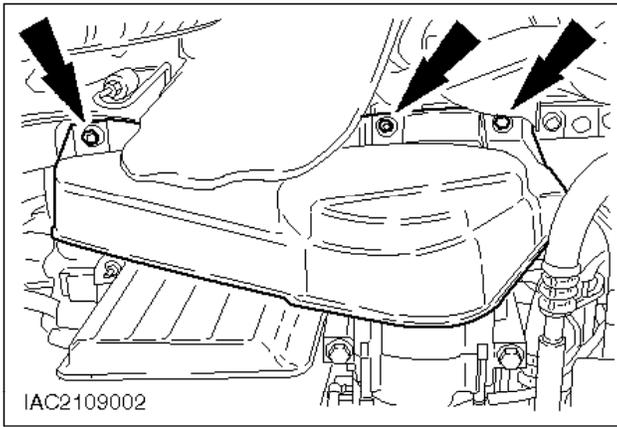
- μ 8. Detach the front right-hand engine mounting.
- 1 Detach the engine mounting from the body.
  - 2 Detach the engine mounting from the cylinder block.
- Raise the vehicle.



- μ 9. Detach the engine mounting brace.
- Remove the brace and the engine mounting.
  - Lower the vehicle.

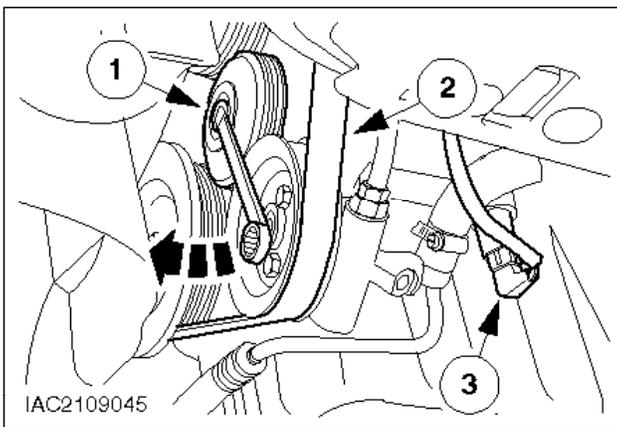


- μ 10. Detach the wheel arch trim panel.



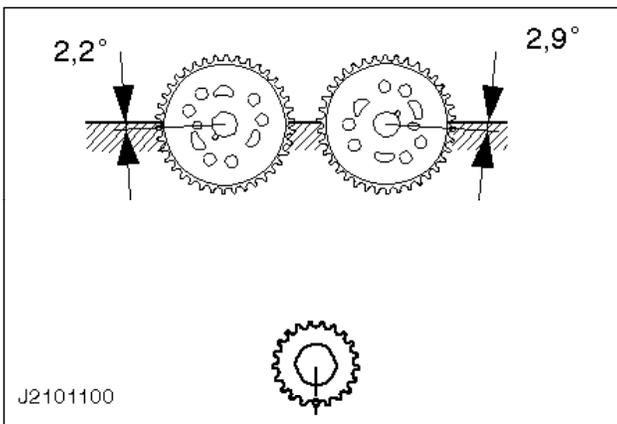
**Only vehicles with air conditioning 09-159">**

μ 11. Detach the multi-groove belt cover.

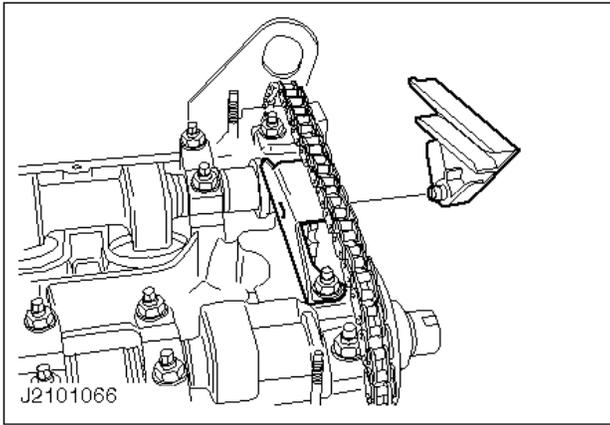


μ 12. Remove the multi-groove belt.

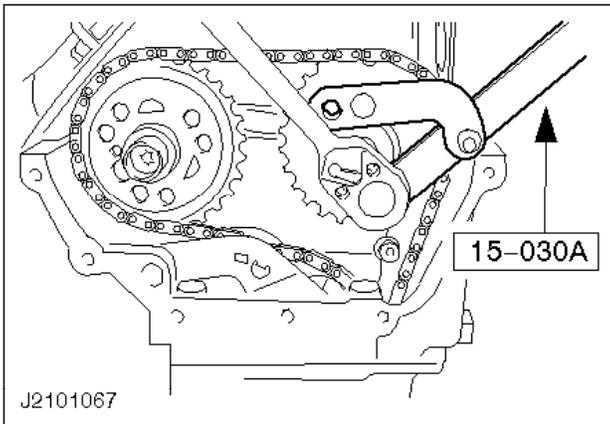
- 1 Tension the idler pulley (clockwise).
- 2 Remove the multi-groove belt.
- 3 Plug - power steering pressure (PSP) switch.



μ 13. Set the camshaft sprockets to the mark.

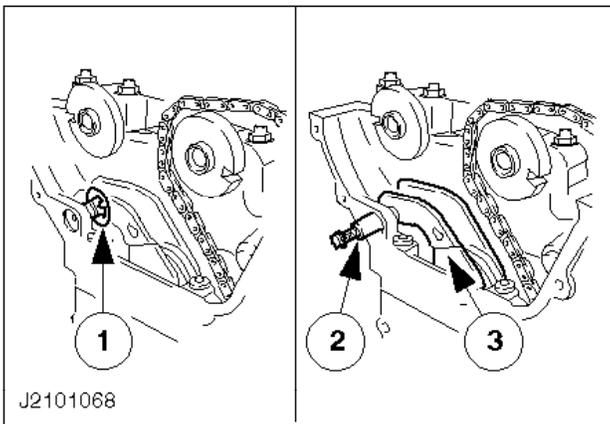


- μ 14. Detach the chain guide rail.



Note:  
Counterhold with the special tool.

- μ 15. Detach the camshaft sprockets.

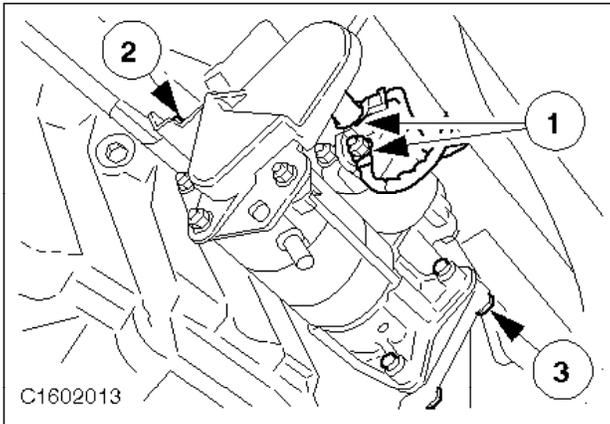


- μ 16. Remove the chain tensioning arm.

- 1 Pull off the circlip with pliers.
- 2 Pull out the chain tensioner pivot pin using a bolt (M6).
- 3 Take the chain tensioning arm out of the housing.

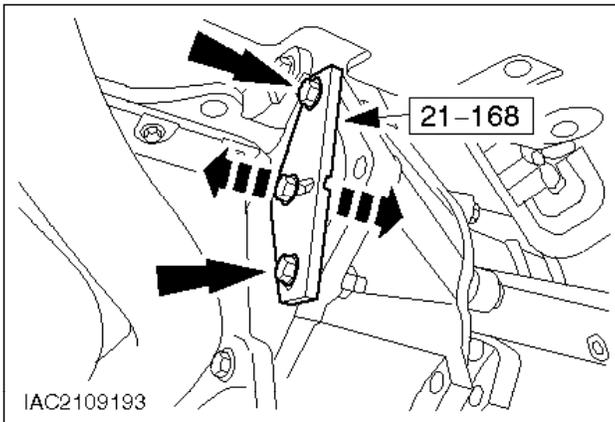
- 17. Lower the engine on the engine support bar by approx. 25 mm.

Raise the vehicle.



μ 18. Remove the starter motor.

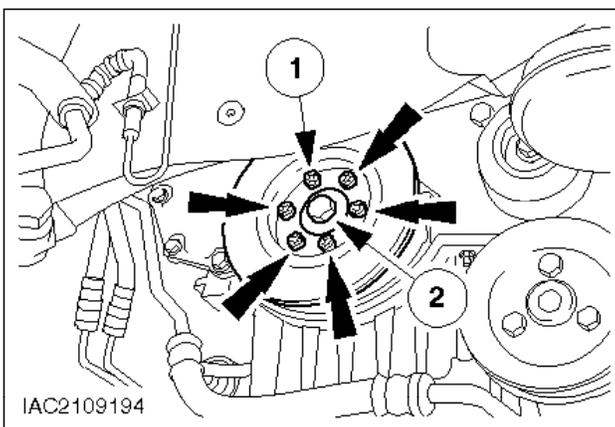
- 1 Disconnect the wiring.
- 2 Release the bracket from the cylinder block (one bolt).
- 3 Detach the starter motor and remove it.



Note:

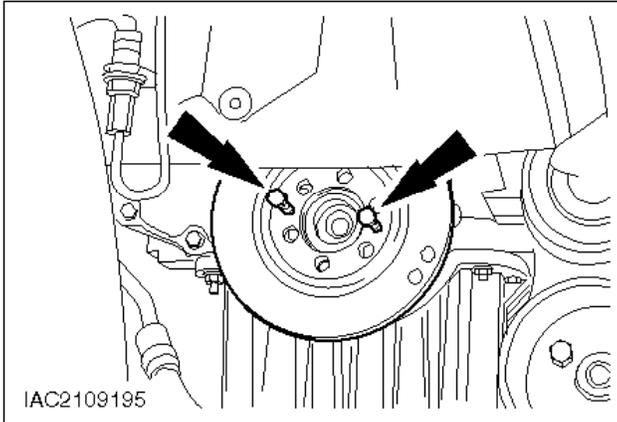
The locking tool must be firmly engaged in the flywheel teeth.

μ 19. Immobilise the flywheel.



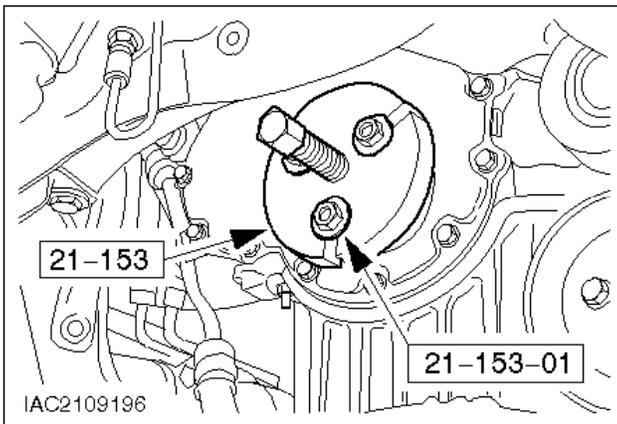
μ 20. Detach the crankshaft pulley/vibration damper.

- 1 Unscrew the bolts from the crankshaft pulley/vibration damper.
- 2 Unscrew the bolts from the crankshaft pulley/vibration damper hub.



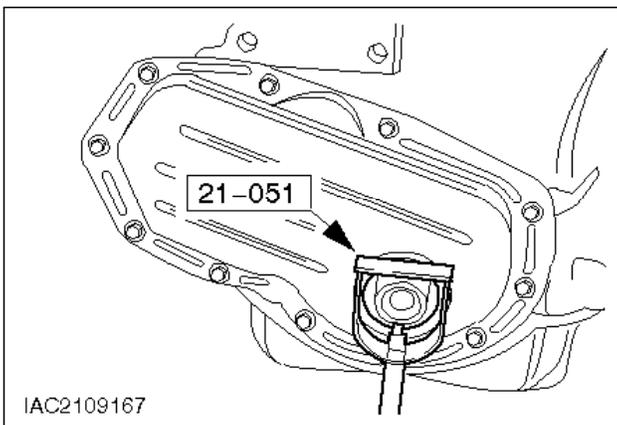
- μ 21. Detach the crankshaft pulley/vibration damper (cont.).

Pull the crankshaft pulley/vibration damper off the hub using two M6 bolts.



- μ 22. Detach the crankshaft pulley/vibration damper hub.

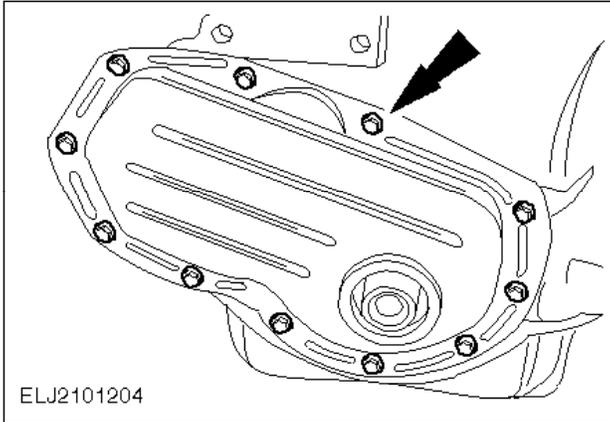
Release the centre bolt of the crankshaft locking tool and pull back the locking key until the crankshaft can move freely.



**Only vehicles with an aluminium cover 09-163">**

- μ 23. Detach the lower timing chain cover.

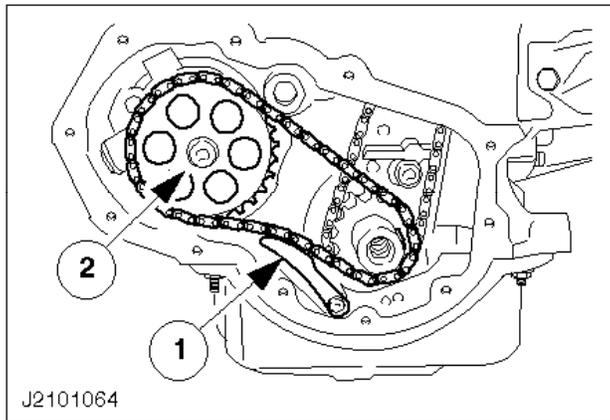
- Remove the front oil seal.
- Lower timing chain cover.



**Only vehicles with a sheet steel cover**

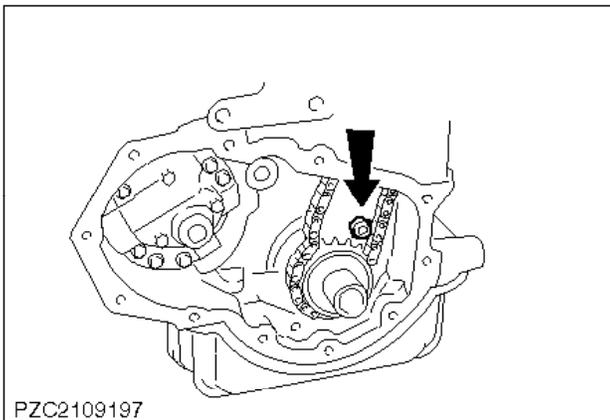
Note:  
Renew the sheet steel cover on installation.

- μ 24. Detach the lower timing chain cover.

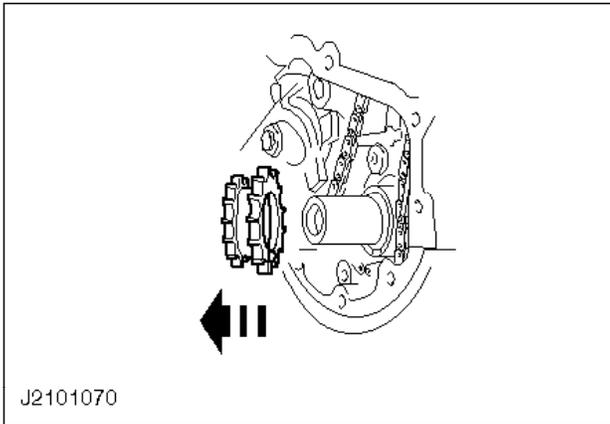


- μ 25. Detach the oil pump sprocket and chain.

- 1 Remove the chain tensioner for the oil pump chain.
- 2 Remove the oil pump sprocket and chain.

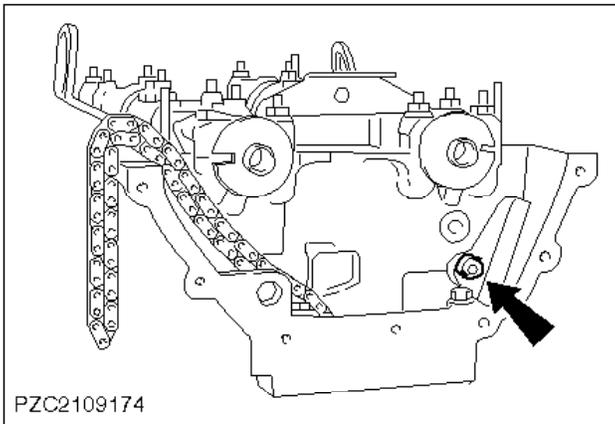


- μ 26. Detach the lower chain guide.

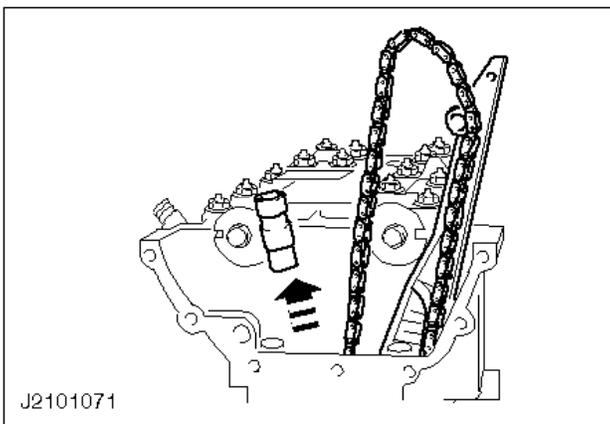


- μ 27. Remove the timing chain.

- Remove the crankshaft Woodruff key.
- Remove the crankshaft sprocket with the timing chain.
- Lower the vehicle.

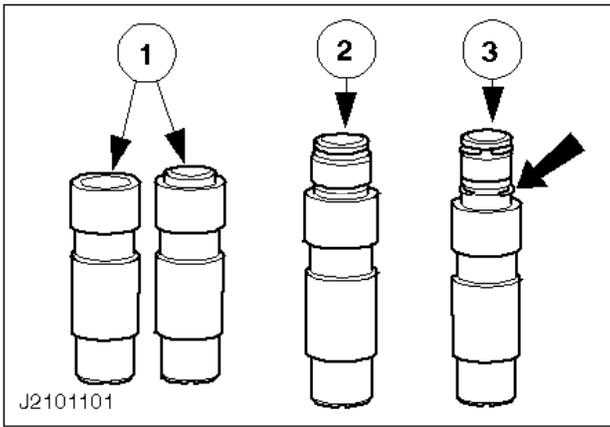


- μ 28. Detach the upper chain guide.



Note:  
Renew the chain tensioner hydraulic plunger.

- μ 29. Remove the chain tensioner hydraulic plunger and the timing chain.



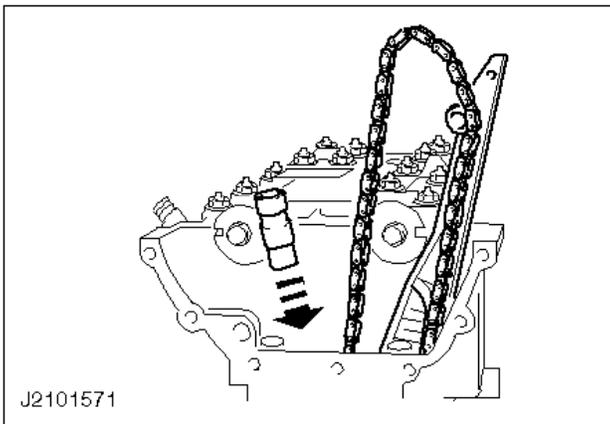
## Install



### CAUTION:

**Fully and partially released chain tensioner hydraulic plungers (new or used) must not be installed.**

- μ 30. Check the new chain tensioner hydraulic plunger.
  - 1 Chain tensioner hydraulic plunger latched.
  - 2 Chain tensioner hydraulic plunger partially released.
  - 3 Chain tensioner hydraulic plunger fully released (the detent ring is visible).



### CAUTION:

**Only use a new, latched chain tensioner hydraulic plunger.**

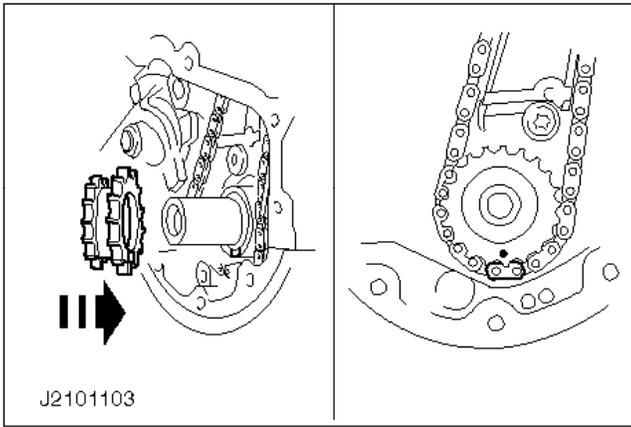
- μ 31. Install the chain tensioner hydraulic plunger.

Note:

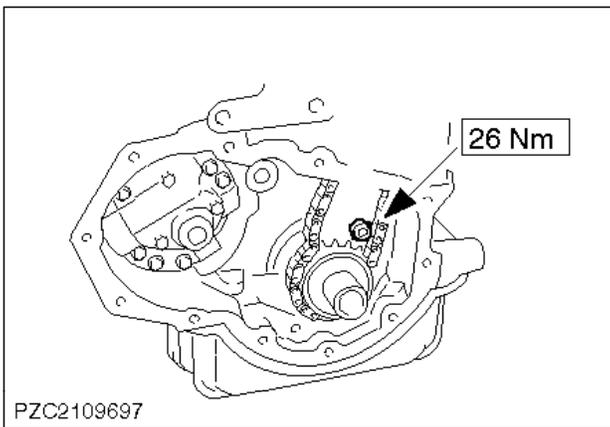
Do not tighten the chain guide.

- 32. Fit the timing chain with the chain guide.

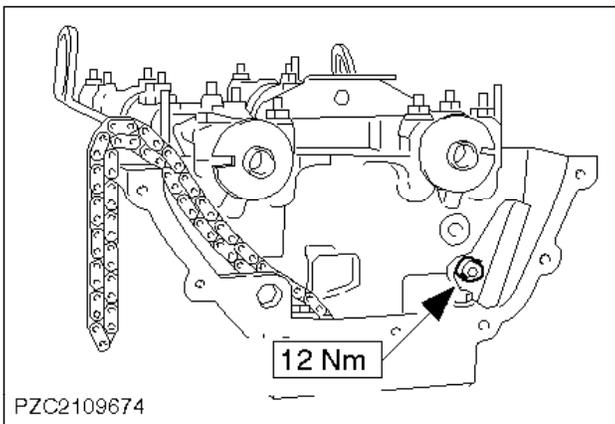
Raise the vehicle.



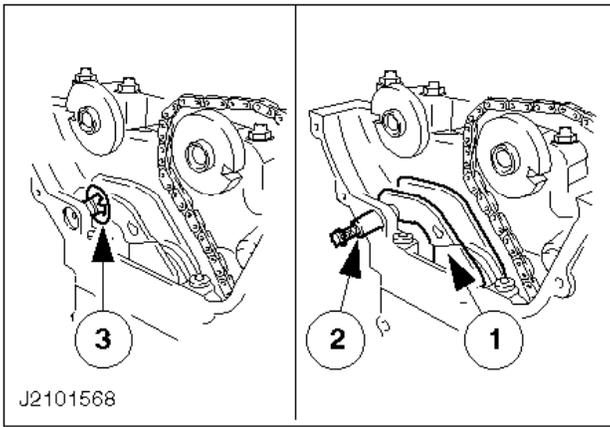
- μ 33. Fit the timing chain at the bottom.
- Slide the sprocket on approx. 10 mm.
  - Fit the timing chain over the inner chain wheel.
  - Insert the crankshaft Woodruff key.



- μ 34. Attach the lower chain guide.  
Lower the vehicle.

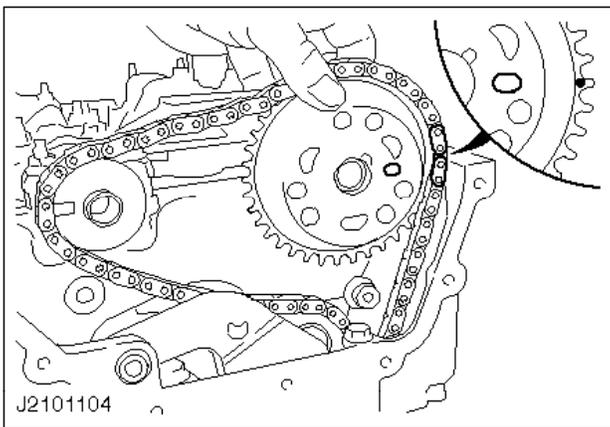


- μ 35. Attach the upper chain guide.



μ 36. Install the chain tensioner.

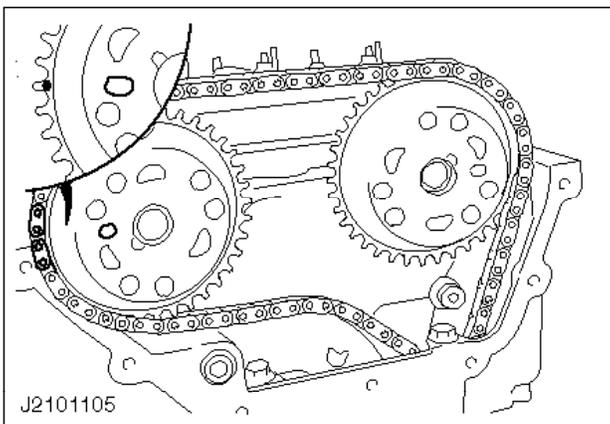
- 1 Fit the chain tensioner.
- 2 Fit the pivot pin.
- 3 Fit the circlip.



Note:

The timing chain must be taut on the long side. If necessary, turn the camshaft slightly.

μ 37. Fit the timing chain at the top.

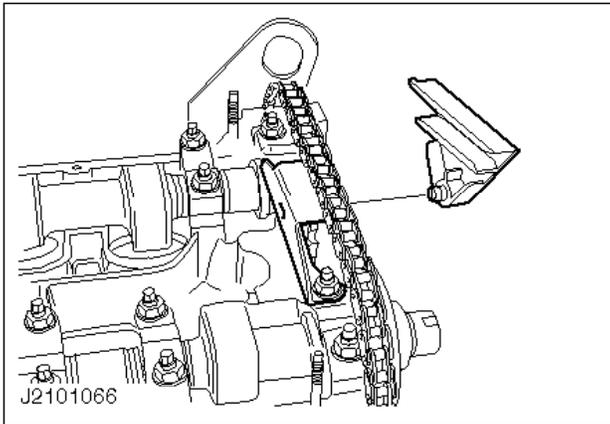


Note:

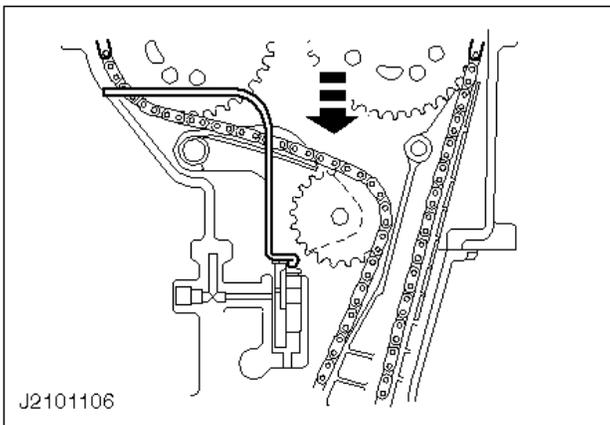
The timing chain may hang down slightly between the camshaft sprockets.

μ 38. Fit the timing chain at the top (continued)

Screw in the bolts of the camshaft sprockets.



- μ 39. Attach the new chain guide rail to the bracket.

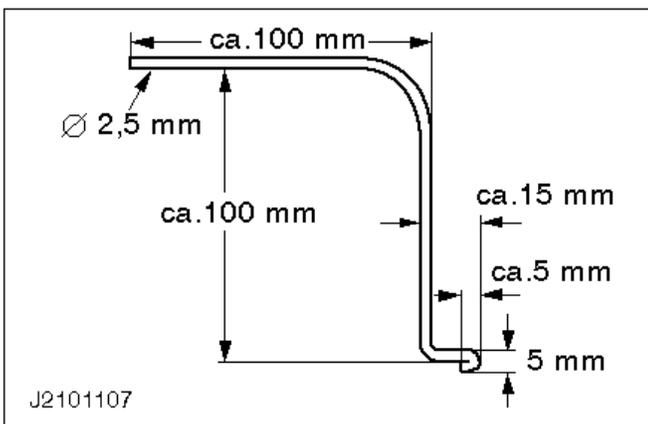


- μ 40. Release the tappet of the chain tensioner.

Note:

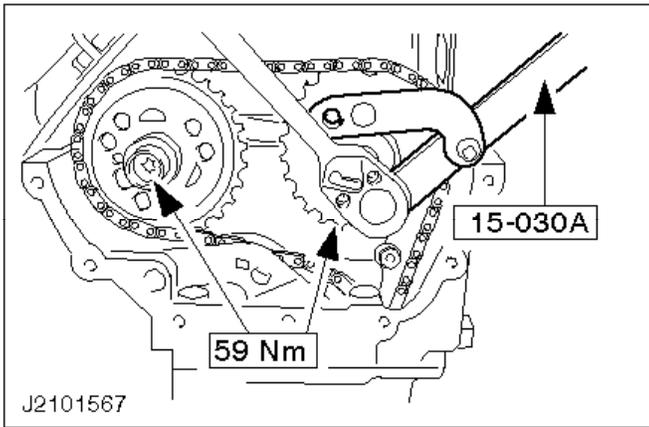
If the chain tensioner mounting does not reach the tappet, the tappet must be relaxed using an auxiliary tool.

Press down the chain tensioning arm manually and release the tappet.



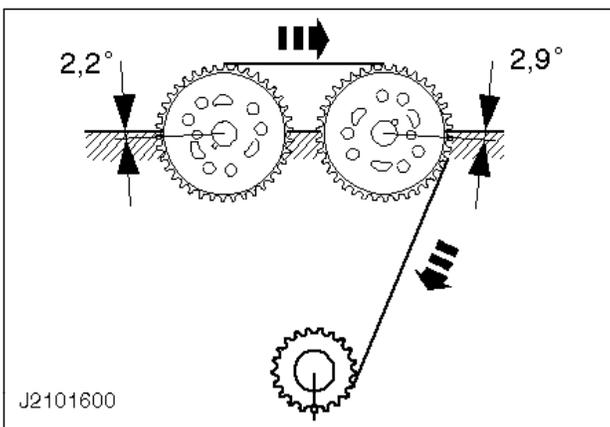
- μ 41. Make the auxiliary tool.

Use a piece of 2,5 mm welding rod approx. 220 mm in length.



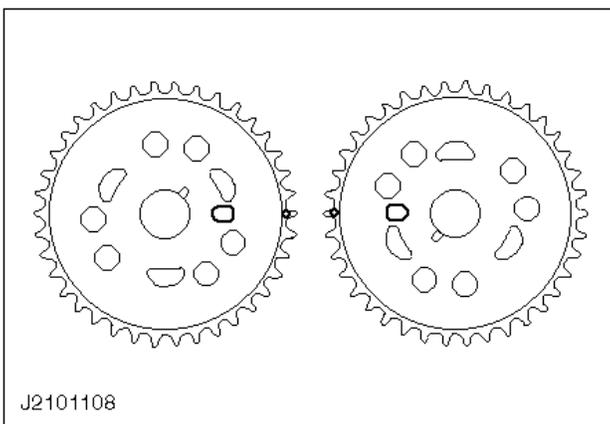
Note:  
Counterhold with the special tool.

- μ 42. Tighten the camshaft sprockets.



- μ 43. Check the valve timings.

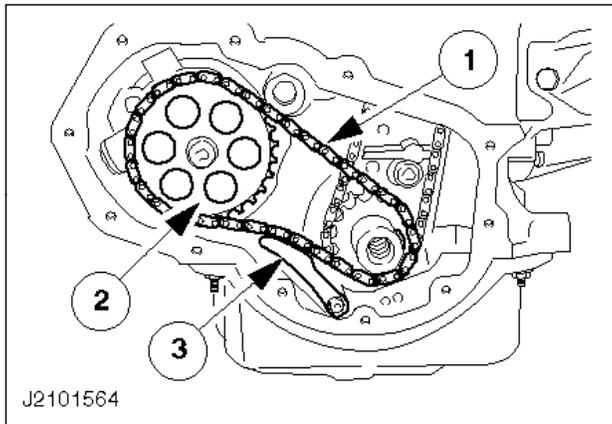
Note:  
If it is necessary to correct the valve timings, i.e. the chain tensioner has to be released, a new chain tensioner hydraulic plunger must be fitted.  
Crank the engine in the normal direction of rotation and set it to the mark.



- μ 44. Check the valve timings (continued).

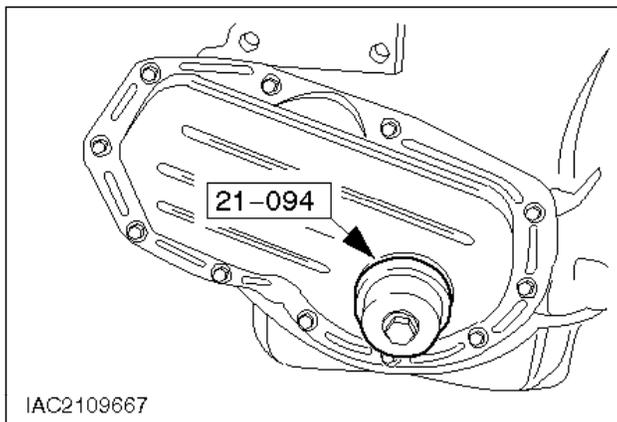
**Note:**

The marks on the camshaft sprockets must line up level with the top edge of the cylinder head.  
Turn the engine in the normal direction of rotation to the next TDC.



**μ 45. Install the oil pump drive.**

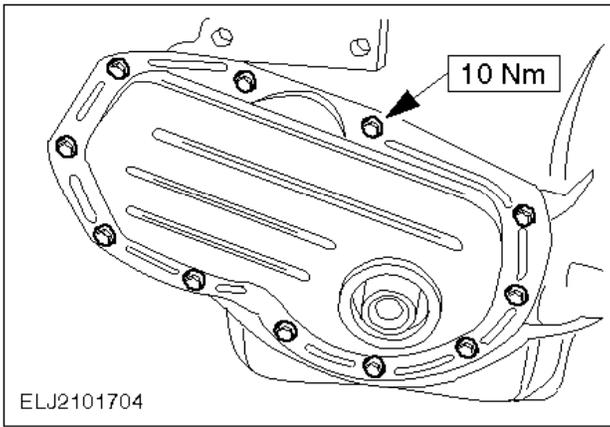
- 1 Lay the timing chain over the crankshaft drive pinion.
- 2 Fit the oil pump sprocket with the timing chain to the oil pump.
- 3 Install the chain tensioner.



**Only vehicles with an aluminium cover 09-169">**

**μ 46. Attach the lower timing chain cover.**

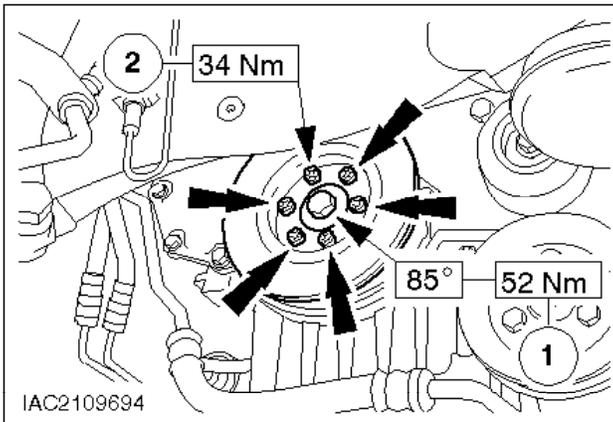
- Attach the lower timing chain cover with a new gasket and the centring cap.
- Install the new front oil seal.



**Only vehicles with a sheet steel cover**

μ 47. Attach the lower timing chain cover.

- Fit the new lower timing chain cover with the centring cap.
- Tighten the bolts.
- Remove the centring cap.

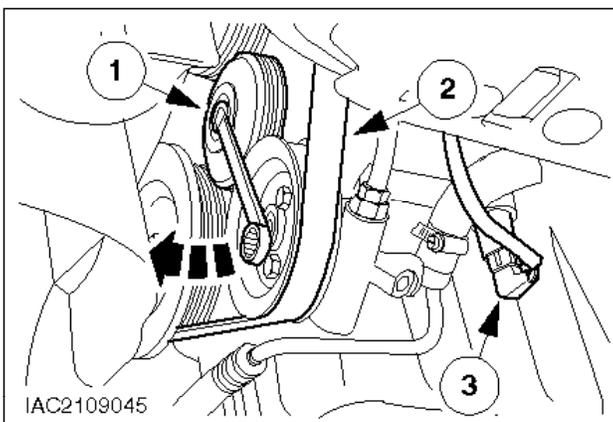


**Note:**

Lock the crankshaft in place with the crankshaft locking tool.

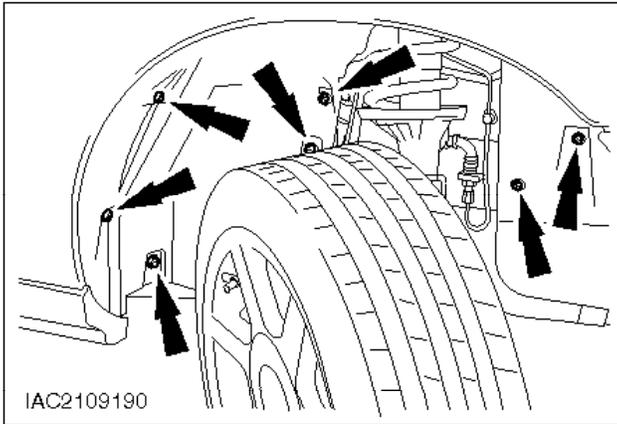
μ 48. Attach the crankshaft pulley/vibration damper hub.

- 1 Screw in the bolt for the crankshaft pulley/vibration damper hub.
- 2 Screw in the crankshaft pulley/vibration damper bolts.

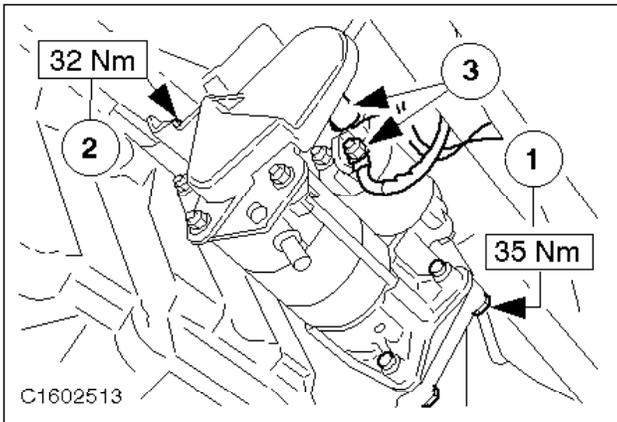


μ 49. Fit the multi-groove belt.

- 1 Tension the idler pulley (clockwise).
- 2 Locate the multi-groove belt in position.
- 3 Connect the PSP switch plug.



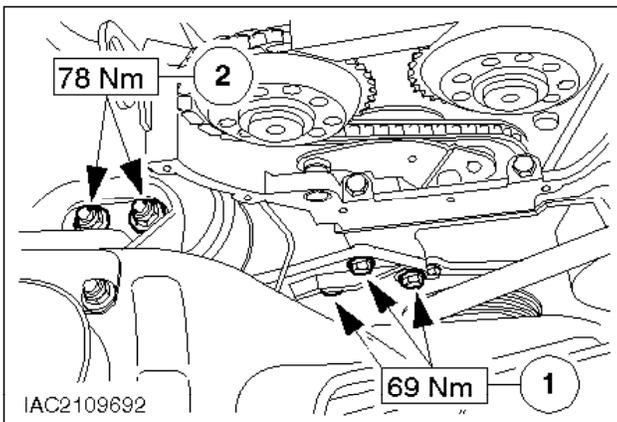
μ 50. Attach the wheel arch trim panel.



μ 51. Remove the crankshaft locking tool.

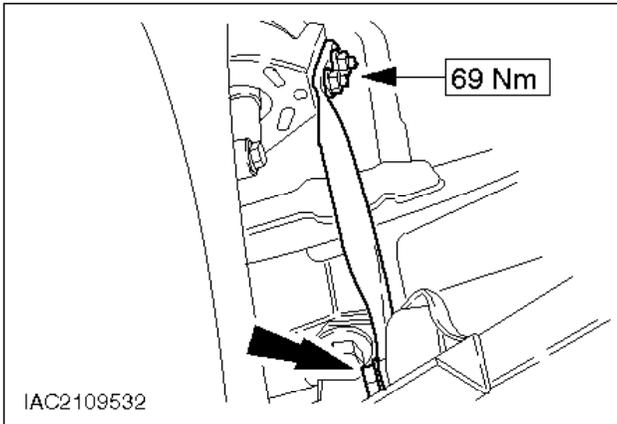
52. Fit the starter motor.

- 1 Fit the starter motor.
- 2 Attach the starter motor bracket to the cylinder block (one bolt)
- 3 Connect the wiring.



μ 53. Attach the front right-hand engine mounting.

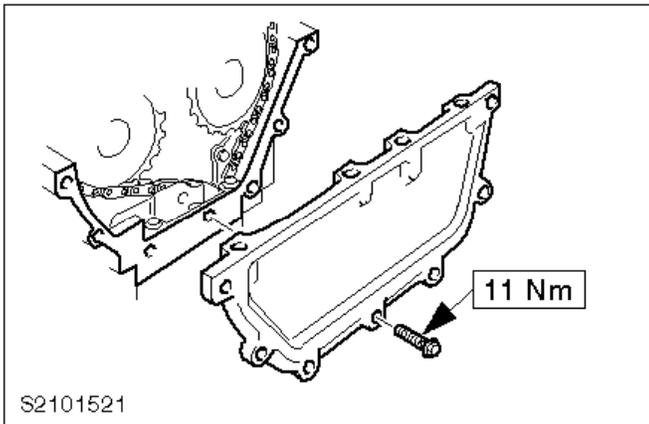
- 1 Attach the engine mounting to the cylinder block.
  - With the engine support bar, locate the engine in position for installation.
- 2 Attach the engine mounting to the body.
  - Raise the vehicle.



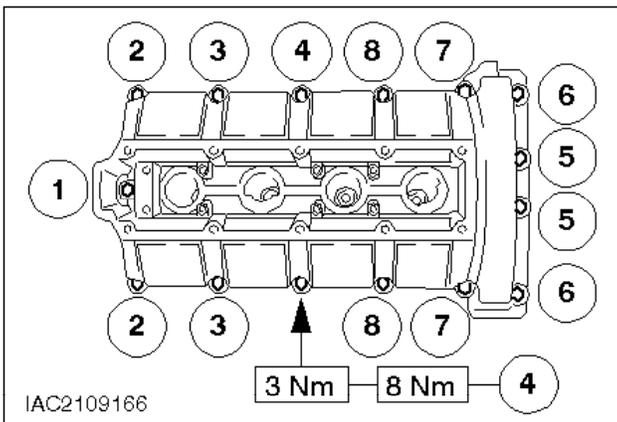
μ 54. Attach the engine mounting brace.

Lower the vehicle.

55. Remove the engine support bar.



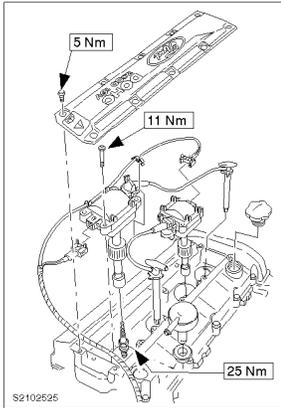
μ 56. Attach the upper timing chain cover (7 bolts).



Note:

Tightening sequence.

- μ 57. Fit the cylinder head cover.



**CAUTION:**

Use a blunt object to apply the silicone grease (e.g. a plastic cable tie) to avoid damaging the spark plug connector seal.



**CAUTION:**

Pull off the spark plug connectors in line with the axis of the spark plug.

Note:

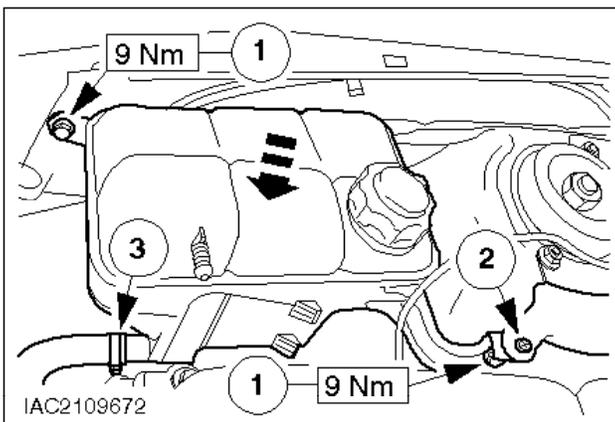
Coat the inside of the spark plug connectors to a depth of 5-10 mm with silicone grease (A960-M1C171-AA).

Note:

Apply lubricant 'Never Seize' (ESE-M1244-A) to the spark plug thread.

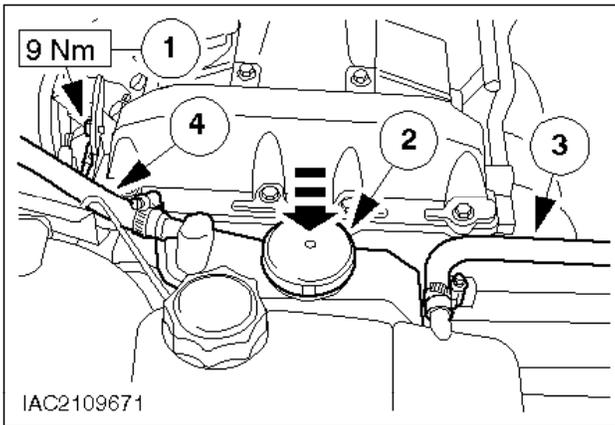
- μ 58. Fit the cover to the cylinder head cover.

- Connect the positive crankcase ventilation.
- Install the spark plugs using special tool 21-202.
- Install the ignition coils and spark plug connectors.
- Lay the engine wiring loom in the cylinder head cover and connect the ignition coil plugs.
- Attach the cover to the cylinder head cover.



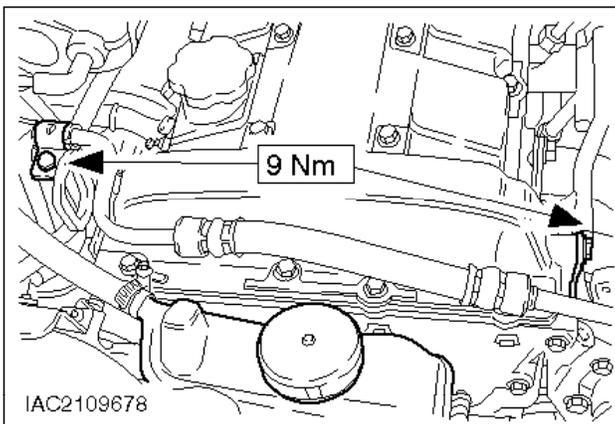
- μ 59. Install the coolant expansion tank.

- 1 Tighten the bolts.
- 2 Attach the bracket.
- 3 Attach the lower coolant hose to the coolant expansion tank.



- μ 60. Install the power steering reservoir.

- 1 Attach the ground cable to the engine lifting eye.
- 2 Slide the power steering reservoir onto the coolant expansion tank.
- 3 Attach the coolant hose to the coolant expansion tank.
- 4 Connect the upper hose to the power steering reservoir.



**Only vehicles with air conditioning 09-173">**

- μ 61. Attach the power steering pipe.

62. Standard finishing operations.

- Top up with coolant (ESD-M97B-49A).
- Connect the battery negative lead.
- Check the fluid levels and rectify as necessary.
- Check the routing of vacuum hoses and wiring and secure with cable ties.
- Remove the protective coverings.
- Enter the radio keycode.
- Reprogram the radio stations.
- Adjust the clock.
- Carry out a road test to enable the PCM to collect data.