

Variable valve timing unit, checking and adjusting

Special tools: [999 5451](#)

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Caution! This element must be carried out with precision as any deviation could generate a fault symptom.

Installing the crankshaft adjustment tool

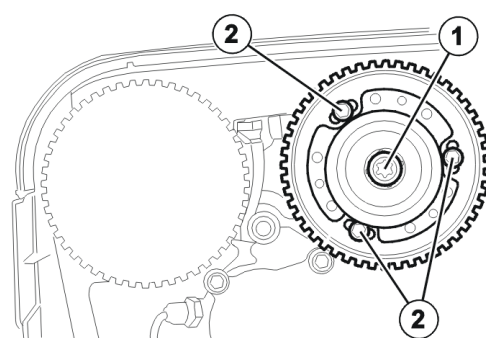


Remove the starter motor mounting screws. Pull out the starter motor and put it aside. Remove the blind cover plug for the adjustment tool hole. Turn the crankshaft clockwise slightly. Install the adjustment tool [999 5451](#), making sure it bottoms against the engine block.

Aligning the crankshaft

Turn the crankshaft counterclockwise to its stop against the crankshaft adjustment tool. Check that the marking on the crankshaft timing gear pulley aligns with the marking on the oil pump.

Installing the camshaft variable valve timing unit

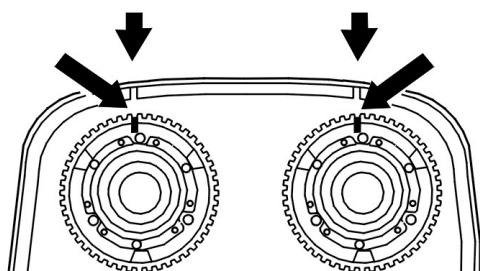


Caution! Oil the center screw before installation.

Press the variable valve timing unit/timing gear pulley onto the camshaft. Install the center screw (1) that holds the variable valve timing unit to the camshaft. Tighten slightly. Loosen but do not remove the screws (2) holding the timing gear pulley to the variable valve timing unit. Turn the timing gear pulley so that the screws at the oval holes are in the center position and then tighten the screws (2) slightly.

Turn the variable valve timing unit clockwise to its stop so that the unit is in its end position. Install the upper timing cover.

Installing the camshaft belt



Undo the center screw and continue turning clockwise until the timing gear pulley marking aligns with the marking on the upper timing cover.

Tighten the center screw in the variable valve timing unit.

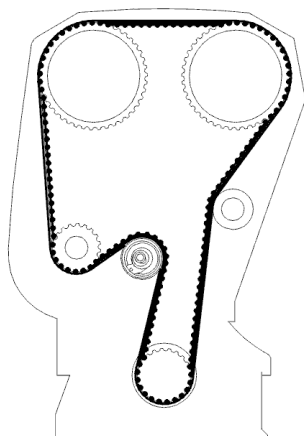
Tighten according to: [Tightening torque](#).

Tensioning the camshaft belt

Note! Variable valve timing units do not have return springs and are easily thrown out of position when the camshaft belt is installed. Check that the markings align.

Install the belt in the following order:

- crankshaft
- idler pulley
- intake camshaft
- exhaust camshaft
- water pump
- tensioner pulley.



Tensioning the camshaft belt

This setting is done on a cold engine. A suitable temperature is approximately 20°C/68°F. At higher temperature, for example if the engine is warm or ambient temperature is higher, the indicator assumes a position farther to the right. The illustration shows the indicator position when setting the belt tensioner at approximately 20°C/68°F.

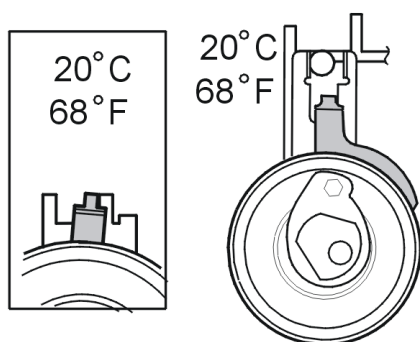
Note! There are two different tensioners depending on model year.

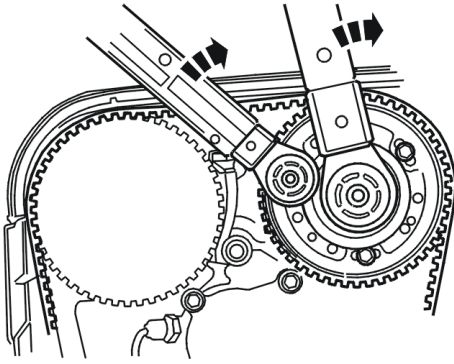
Fix the belt tensioner center screw in position and turn the belt tensioner eccentric counterclockwise until the tensioner indicator passes the marked position and reaches the end position. Then turn the eccentric back so the indicator reaches the marked position illustrated. Tighten the center screw. See [Tightening torque](#).

Check that the indicator is in the correct position.

Tightening

Undo the 3 timing gear pulley screws slightly.





Install the center plug in the variable valve timing unit. Tighten following **Tightening torque** .

Hold the center plug in place with **25 Nm** while the 3 screws on the camshaft timing gear pulley are tightened. See **Tightening torque** .

This is to ensure that the variable valve timing unit is in its end position when the timing gear pulley is fastened.

Removing the camshaft adjustment tool

Remove the camshaft adjustment tool **999 5452** and the crankshaft adjustment tool **999 5451** .

Install the plug to the starter motor with a new washer and tighten. See **Tightening torque** .

Final check

Turn the engine 2 revolutions.

Then check that the belt tensioner indicator is in the center position. If not, it must be adjusted so that the indicator is in the correct position described in a previous work element.

