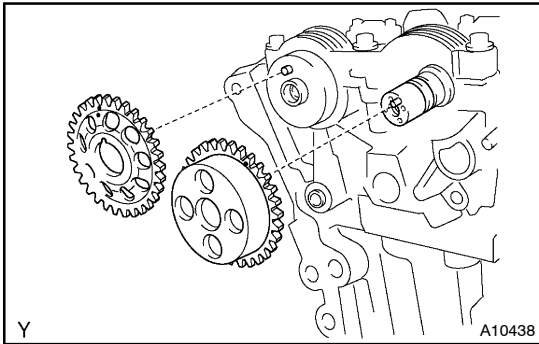




INSTALLATION

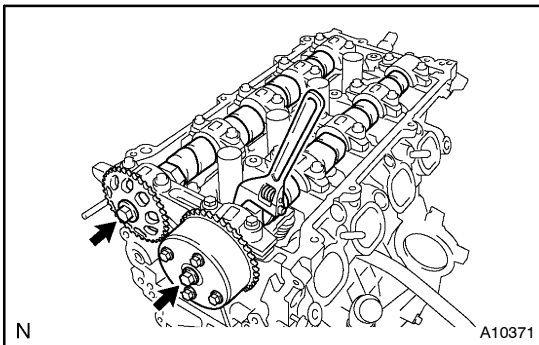
1. INSTALL VALVE TIMING CONTROLLER ASSEMBLY AND CAMSHAFT TIMING SPROCKET

- (a) Apply engine oil in the range from the tip of the intake camshaft to 16 mm from that tip.
- (b) Align the timing mark on the valve timing controller assembly with the knock pin, and install the valve timing controller assembly to the cam shaft.

NOTICE:

Do not push valve timing controller assembly to the camshaft forcibly when installing it.

- (c) Align the knock pin hole in the cam shaft timing sprocket with the knock pin of the cam shaft, and exhaust the sprocket to the cam shaft.

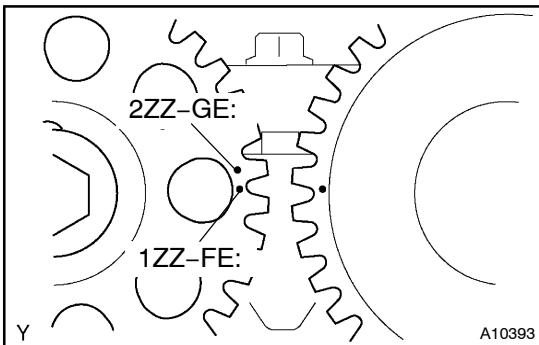


- (d) Temporarily install the timing sprocket bolt.
- (e) Hold the hexagon wrench head portion of the camshaft with a wrench, and tighten the timing sprocket bolt.

Torque:

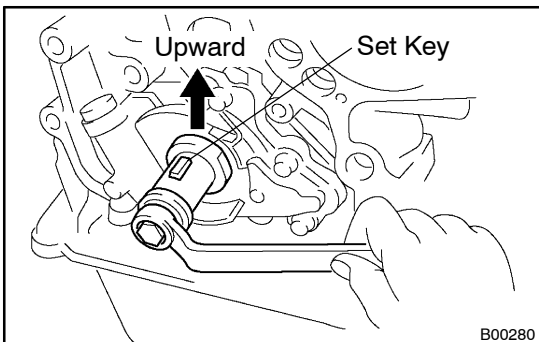
1ZZ-FE 45 N·m (460 kgf·cm, 33 ft·lbf)

2ZZ-GE 54 N·m (551 kgf·cm, 40 ft·lbf)

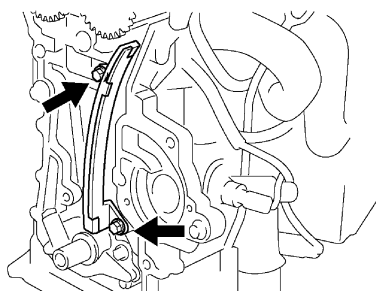
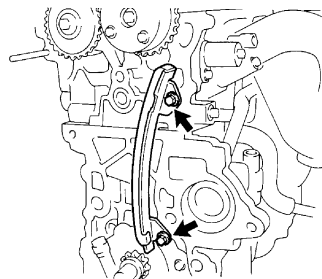


2. SET NO. 1 CYLINDER TO TDC/COMPRESSION

- (a) Turn the hexagonal wrench head portion of the camshafts, and align the point marks of the camshaft timing sprockets.



- (b) Using a crankshaft pulley bolt, Turn the crankshaft and set the set key on the crankshaft upward.

1ZZ-FE:**2ZZ-GE:**

B00281

A10394

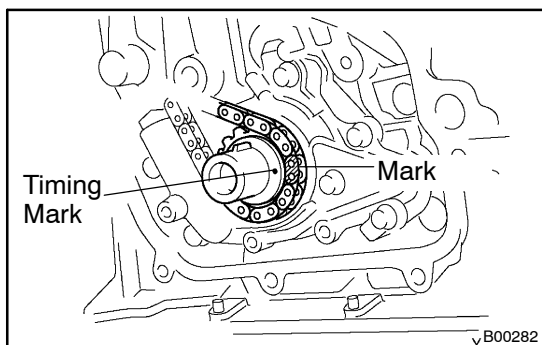
3. INSTALL CHAIN VIBRATION DAMPER

Install the damper with the 2 bolts.

Torque:

1ZZ-FE 11 N·m (113 kgf·cm, 8 ft·lbf)

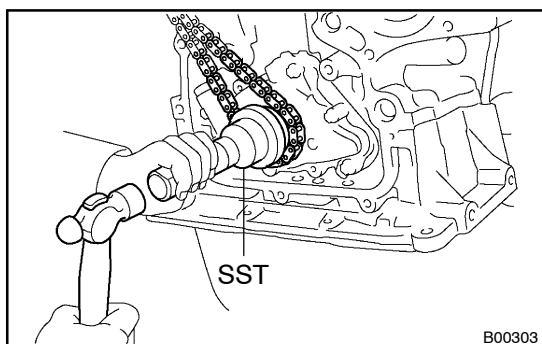
2ZZ-GE 20.5 N·m (209 kgf·cm, 15 ft·lbf)



B00282

4. INSTALL TIMING CHAIN AND CRANKSHAFT TIMING SPROCKET

- (a) Install the timing chain on the crankshaft timing sprocket with the yellow color link aligned with the timing mark on the crankshaft timing sprocket.

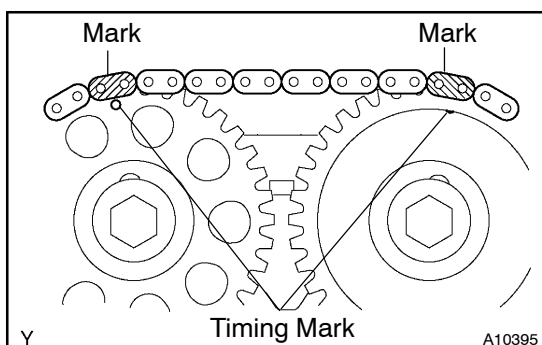


B00303

HINT:

If necessary, install the sprocket with SST.

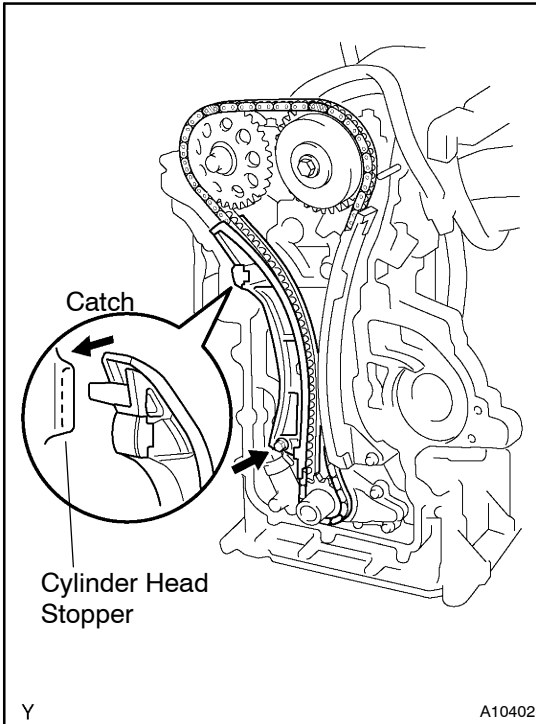
SST 09223-22010



Y

A10395

- (b) **1ZZ-FE:**
Install the timing chain on the camshaft timing sprockets with the yellow color links aligned with the timing marks on the camshaft timing sprockets.
- (c) **2ZZ-GE:**
Install the timing chain on the camshaft timing sprockets with the orange color links aligned with the timing marks on the camshaft timing sprockets.



- (d) Check that the tension between the intake camshaft timing sprocket and crankshaft timing sprocket.

5. INSTALL CHAIN TENSIONER SLIPPER

- (a) Install the slipper with the bolt.

Torque:

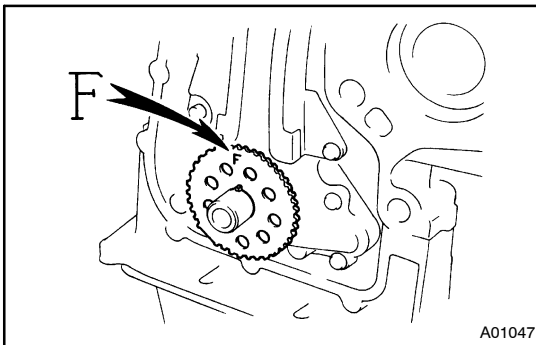
1ZZ-FE 18.5 N·m (189 kgf·cm, 14 ft·lbf)

2ZZ-GE 20.5 N·m (209 kgf·cm, 15 ft·lbf)

- (b) Check that the slipper moves is caught on the cylinder head stopper.

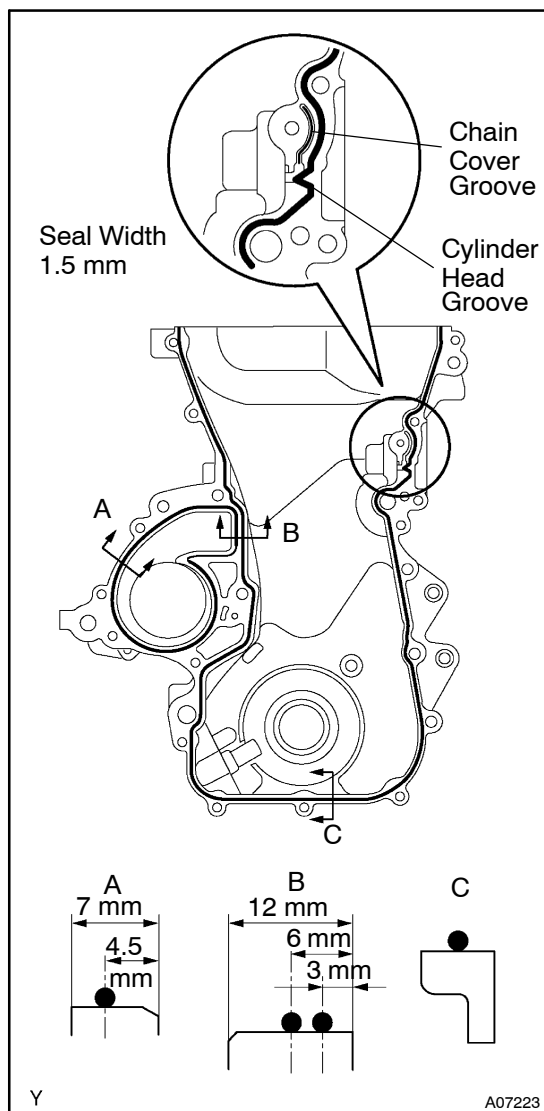
NOTICE:

DO not turn the crankshaft.



6. INSTALL CRANK ANGLE SENSOR PLATE

Install the plate with the "F" mark facing forward.

**7. 1ZZ-FE:****INSTALL TIMING CHAIN COVER AND WATER PUMP**

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the timing chain cover, cylinder head and cylinder block.
- Using a razor blade and a gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
 - Thoroughly clean all components to remove all the loose material.
 - Using a non-residue solvent, clean both sealing surfaces.
- (b) Apply seal packing to the timing chain cover as shown in the illustration.

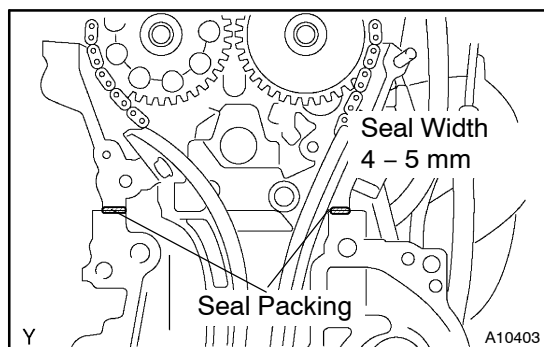
Seal packing:**Part No. 08826 – 00100 or equivalent**

- Install a nozzle that has been cut to a 1.5 mm (0.16 – 0.20 in.) opening.

HINT:

Avoid applying an excessive amount to the surface.

- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and re-install cap.



- (c) Apply seal packing to 2 locations as shown in the illustration.

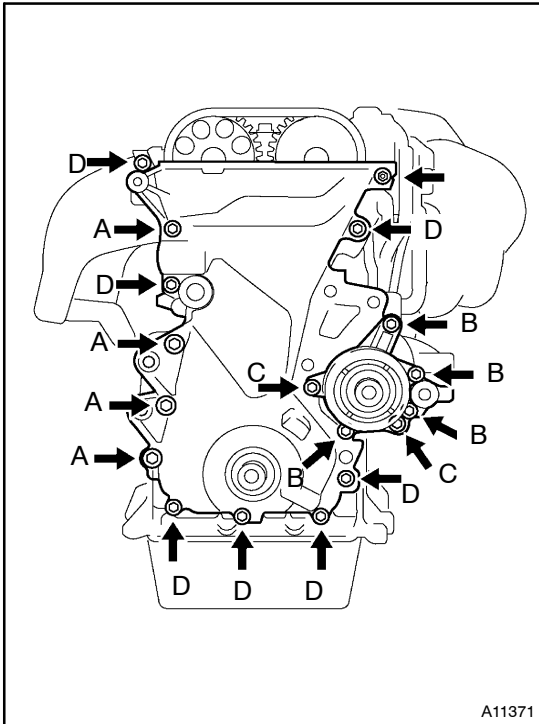
Seal packing:**Part No. 08826 – 00080 or equivalent**

- Install a nozzle that has been cut to a 1.5 mm (0.16 – 0.20 in.) opening.

HINT:

Avoid applying an excessive amount to the surface.

- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and re-install cap.



- (d) Install the timing chain cover, O-ring and water pump with the 17 bolts and nut. Uniformly tighten the bolts and nut in several passes.

Torque:

10 mm head:

9 N·m (92 kgf·cm, 80 in·lbf) for C

13 N·m (133 kgf·cm, 10 ft·lbf) for A

11 N·m (113 kgf·cm, 8 ft·lbf) for others

12 mm head:

18.5 N·m (189 kgf·cm, 14 ft·lbf)

NOTICE:

- Pay attention not to wrap the chain and slipper over the chain cover seal line.
- After installing the chain cover, must install the mounting bracket and water pump within 15 minutes.

HINT:

Each bolt length in indicated in the illustration.

A 45 mm (1.77 in.)

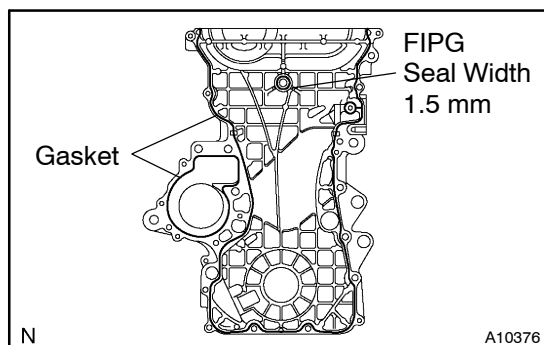
B 35 mm (1.38 in.)

C 30 mm (1.18 in.)

D 25 mm (0.98 in.)

- (e) Using a torx wrench socket (E8), install the stud bolt.

Torque: 9.3 N·m (95 kgf·cm, 82 in·lbf)

**8. 2ZZ-GE:****INSTALL TIMING CHAIN COVER AND WATER PUMP**

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the timing chain cover, cylinder head and cylinder block.
- Using a razor blade and a gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
 - Thoroughly clean all components to remove all the loose material.
 - Using a non-residue solvent, clean both sealing surfaces.
- (b) Apply seal packing to the timing chain cover as shown in the illustration.

Seal packing:**Part No. 08826-00100 or equivalent**

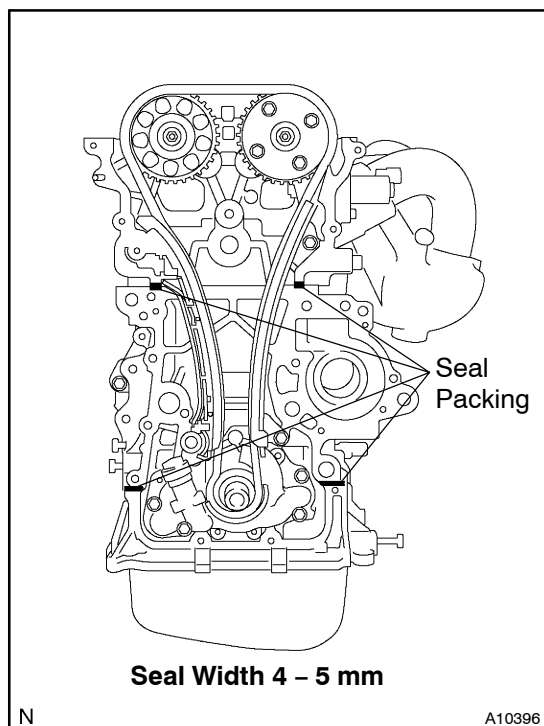
- Install a nozzle that has been cut to a 1.5 mm opening.

HINT:

Avoid applying an excessive amount to the surface.

- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

- (c) Install the 2 gasket to the timing chain cover as shown in the illustration.



- (d) Apply seal packing to 4 locations as shown in the illustration.

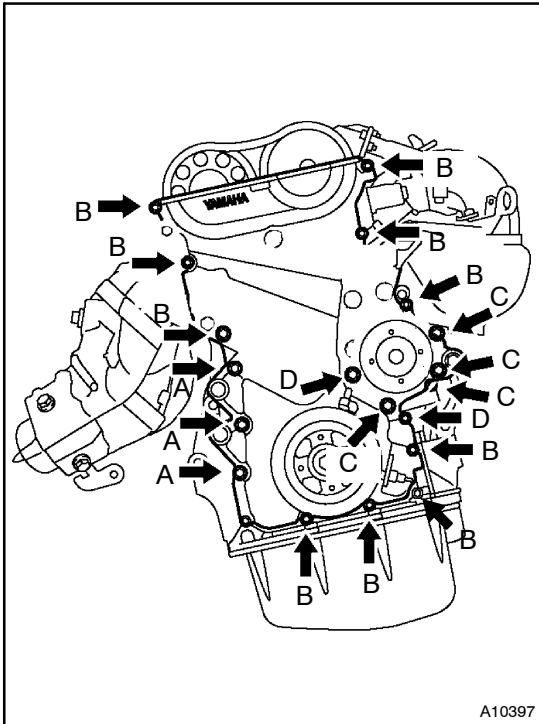
Seal packing:**Part No. 08826-00080 or equivalent**

- Install a nozzle that has been cut to a 4 – 5 mm (0.16 – 0.20 in.) opening.

HINT:

Avoid applying an excessive amount to the surface.

- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



- (e) Install the timing chain cover, O-ring and water pump with the 19 bolts. Uniformly tighten the bolts in several passes.

Torque:

A: 21 N·m (214 kgf·cm, 15 ft·lbf)

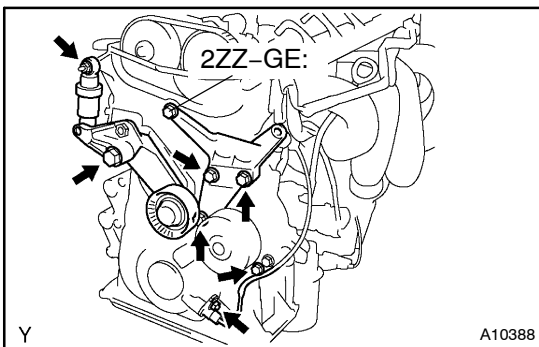
B: 11 N·m (113 kgf·cm, 8 ft·lbf)

C: 9.0 N·m (92 kgf·cm, 80 in·lbf)

D: 9.0 N·m (92 kgf·cm, 80 in·lbf)

NOTICE:

- Pay attention not to wrap the chain and slipper over the chain cover seal line.
 - After install the chain cover, must install the mounting bracket and water pump within 15 minutes.
- (f) Using a torx wrench socket (E8), install the stud bolt.
Torque: 9.3 N·m (95 kgf·cm, 82 in·lbf)



9. 1ZZ-FE:

INSTALL RH ENGINE MOUNTING BRACKET

- (a) Apply seal packing to threads of the mounting bolt.

Seal packing:

Part No. 08826 – 00080 or equivalent

HINT:

Do not apply seal packing to 2 or 3 threads of the bolt end.

- (b) Install the mounting bracket with the 3 bolts.

Torque: 47 N·m (479 kgf·cm, 35 ft·lbf)

10. 2ZZ-GE:

INSTALL RH ENGINE MOUNTING BRACKET

Install the mounting bracket with the 4 bolts.

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

11. INSTALL DRIVE BELT TENSIONER

- (a) Check the appearance before installing the drive belt tensioner.

If in case of having the oil leakage, crack, and etc., replace the drive belt tensioner.

- (b) Install the drive belt tensioner.

Torque:

Bolt

1ZZ-FE 69 N·m (704 kgf·cm, 51 ft·lbf)

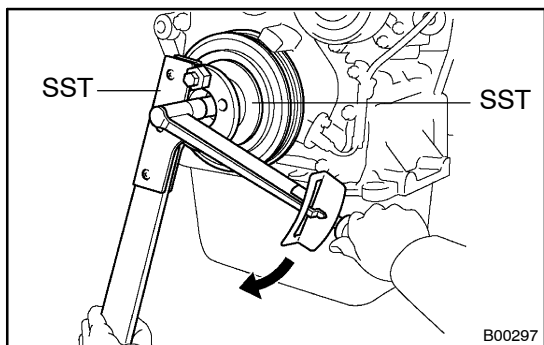
2ZZ-GE 100 N·m (1,020 kgf·cm, 74 ft·lbf)

Nut 29 N·m (296 kgf·cm, 21 ft·lbf)

- (c) Hook the tool on the hexagonal portion of the drive belt tensioner bracket and operate drive belt tensioner 3 times with full stroke.

HINT:

Take 3 seconds or more for 1 full stroke.

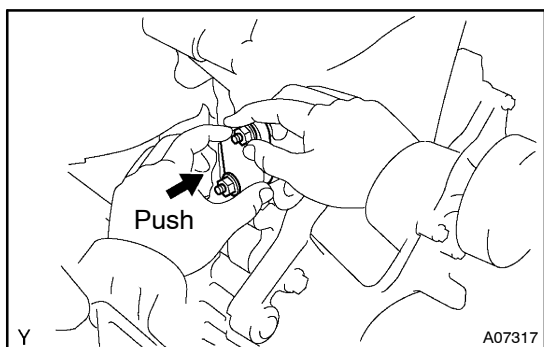
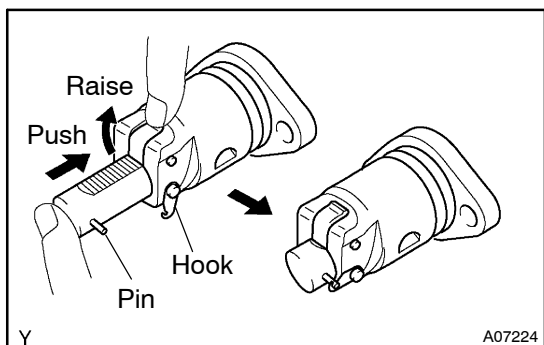
12. INSTALL CRANKSHAFT POSITION SENSOR**Torque: 9.0 N·m (92 kgf·cm, 80 in·lbf)****13. INSTALL CRANKSHAFT PULLEY**

- Clean the crankshaft pulley inside.
- Align the pulley set key with the key groove of the pulley, and slide on the pulley.
- Using SST and 2 nuts (width: 10 mm (0.25 in.)), install the pulley bolt.

SST 09213-70010, 09330-00021

Torque:**1ZZ-FE 138 N·m (1,409 kgf·cm, 102 ft·lbf)****2ZZ-GE 120 N·m (1,200 kgf·cm, 87 ft·lbf)****14. INSTALL CHAIN TENSIONER**

- Check the chain tensioner.
(See page EM-16)
- Release the ratchet pawl, fully push in the plunger and apply the hook to the pin so that the plunger cannot spring out.

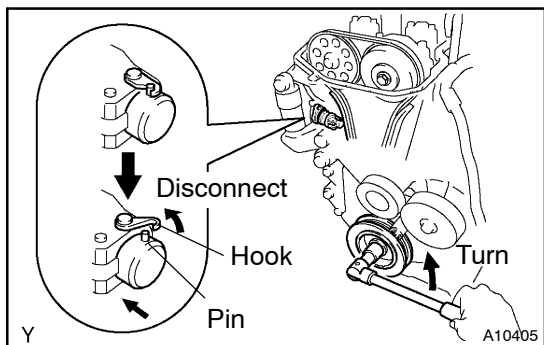


- Insert the O-ring with your hand until it reaches to the chamfering position and install nut temporarily. Then, by tightening the nut, insert the chain tensioner to the installation position.

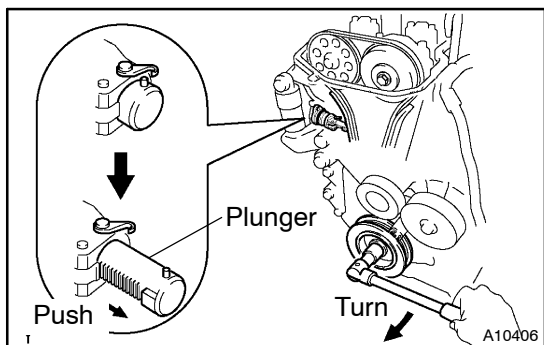
HINT:

- In the case that the hook is released while pushing in, apply the hook again and push the tensioner in.
 - Pay attention not to catch the O-ring as it is built in the chain tensioner previously.
- Tighten the 2 nuts.

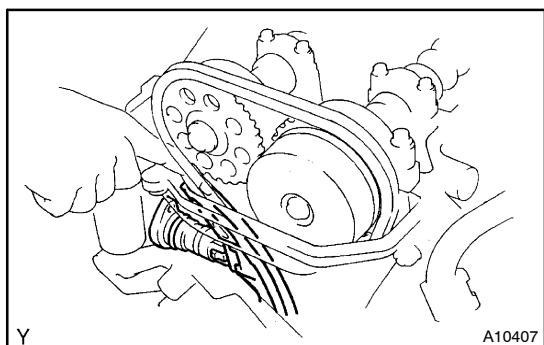
Torque: 9.0 N·m (92 kgf·cm, 80 in·lbf)

**15. SET CHAIN TENSION**

- (a) Turn the crankshaft counterclockwise, and disconnect the plunger knock pin from the hook.



- (b) Turn the crankshaft clockwise, and check that the slipper is pushed by the plunger.

**HINT:**

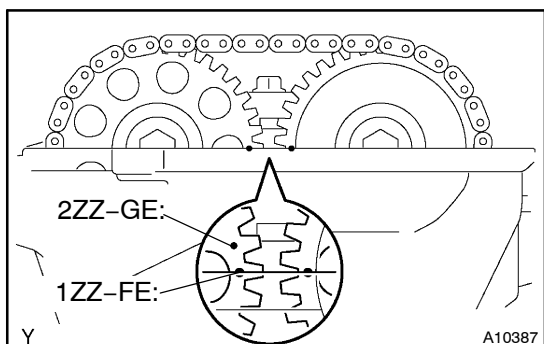
If the plunger does not spring out, press the slipper into the chain tensioner with a screwdriver or your finger so that the hook is released from the knock pin and the plunger springs out.

16. CHECK VALVE TIMING

- (a) Turn the crankshaft pulley, and align its groove with timing mark "0" of the timing chain cover.

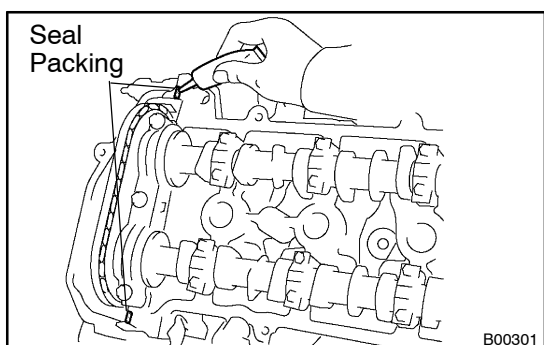
NOTICE:

Always turn the crankshaft clockwise.



- (b) Check that the point marks of the camshaft timing sprockets are in straight line on the timing chain cover surface as shown in the illustration.

If not, turn the crankshaft 1 revolution (360°) and align the marks as above.

**17. 1ZZ-FE:****INSTALL CYLINDER HEAD COVER**

- (a) Remove any old packing (FIPG) material.
(b) Apply seal packing to 2 locations as shown in the illustration.

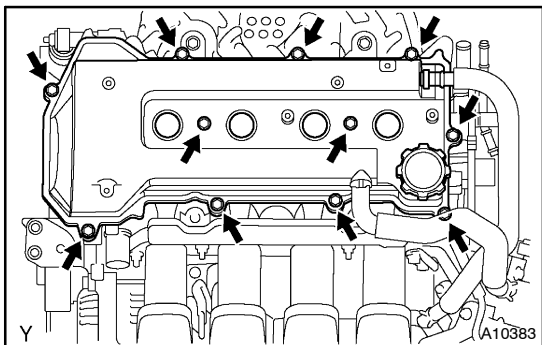
Seal packing:

Part No. 08826 – 00080 or equivalent

- (c) Install the gasket to the cylinder head cover.

HINT:

Part must be assembled within 3 minutes of application.
Otherwise the material must be remove and reapplied.



- (d) Install the cylinder head cover with the 9 bolts, 2 seal washers and 2 nuts.
Uniformly tighten the bolts and nuts, in the several passes, in the sequence shown.

Torque:

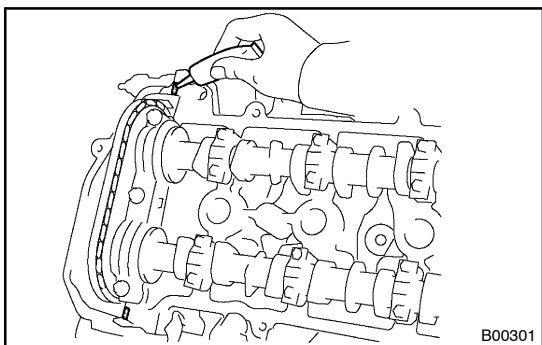
w/o washer

11 N·m (113 kgf·cm, 8 ft·lbf)

w/ washer

9.0 N·m (92 kgf·cm, 80 in·lbf)

- (e) Connect the 2 PCV hoses to the cylinder head cover.
(f) Install the ignition coil ([See page IG-7](#)).



18. 2ZZ-GE:

INSTALL CYLINDER HEAD COVER

- (a) Remove any old packing (FIPG) material.

HINT:

When FIPG on the head cover gasket side cannot be eliminated completely, replace the gasket.

- (b) Apply seal packing to 2 locations as shown in the illustration.

Seal packing:

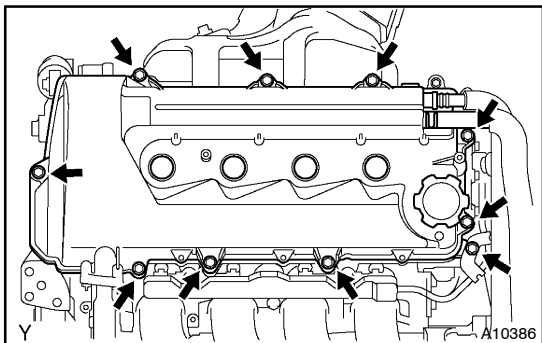
Part No. 08826-00080 or equivalent

- (c) Install the gasket to the cylinder head cover.

HINT:

Part must be assembled within 3 minutes of application. Otherwise the material must be remove and reapplied.

- (d) Install a new O-ring to the cylinder head cover.



- (e) Install the cylinder head cover and wire harness protector with the 9 bolts. Uniformly tighten the bolts, in the several passes, in the sequence shown.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

- (f) Connect the 2 PCV hoses to the cylinder head cover.



- (g) Install a new gasket and No. 1 ventilation pipe with 2 nuts and bolt.

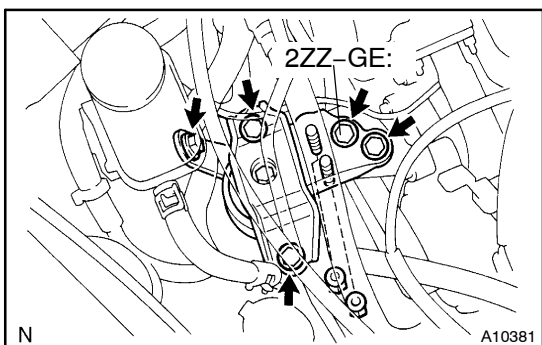
Torque:

Nut 10 N·m (100 kgf·cm, 7 ft·lbf)

Bolt 25 N·m (255 kgf·cm, 18 ft·lbf)

- (h) Connect the No. 3 ventilation hose to the No. 1 ventilation pipe.

- (i) Install the ignition coil (See page IG-7).



19. INSTALL RH ENGINE MOUNTING INSULATOR

- (a) 1ZZ-FE:

Install the RH engine mounting insulator with the 4 bolts and 2 nuts.

Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

- (b) 2ZZ-GE:

Install the RH engine mounting insulator with the 5 bolts and 2 nuts.

Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

20. INSTALL PS PUMP

- (a) Install the PS pump with the 2 through bolts and nuts.

Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)

- (b) Install the PS pump pulley with the pulley nut.

- (c) Connect the PS oil pressure switch connector.

21. INSTALL ALTERNATOR AND DRIVE BELT

(See page CH-5)

22. INSTALL RH ENGINE UNDER COVER

23. INSTALL RH FRONT WHEEL

24. FILL WITH ENGINE COOLANT (See page CO-2)

25. INSTALL FRONT FENDER APRON SEAL AND UPPER RADIATOR SUPPORT SEAL

26. START ENGINE AND CHECK FOR COOLANT LEAKS