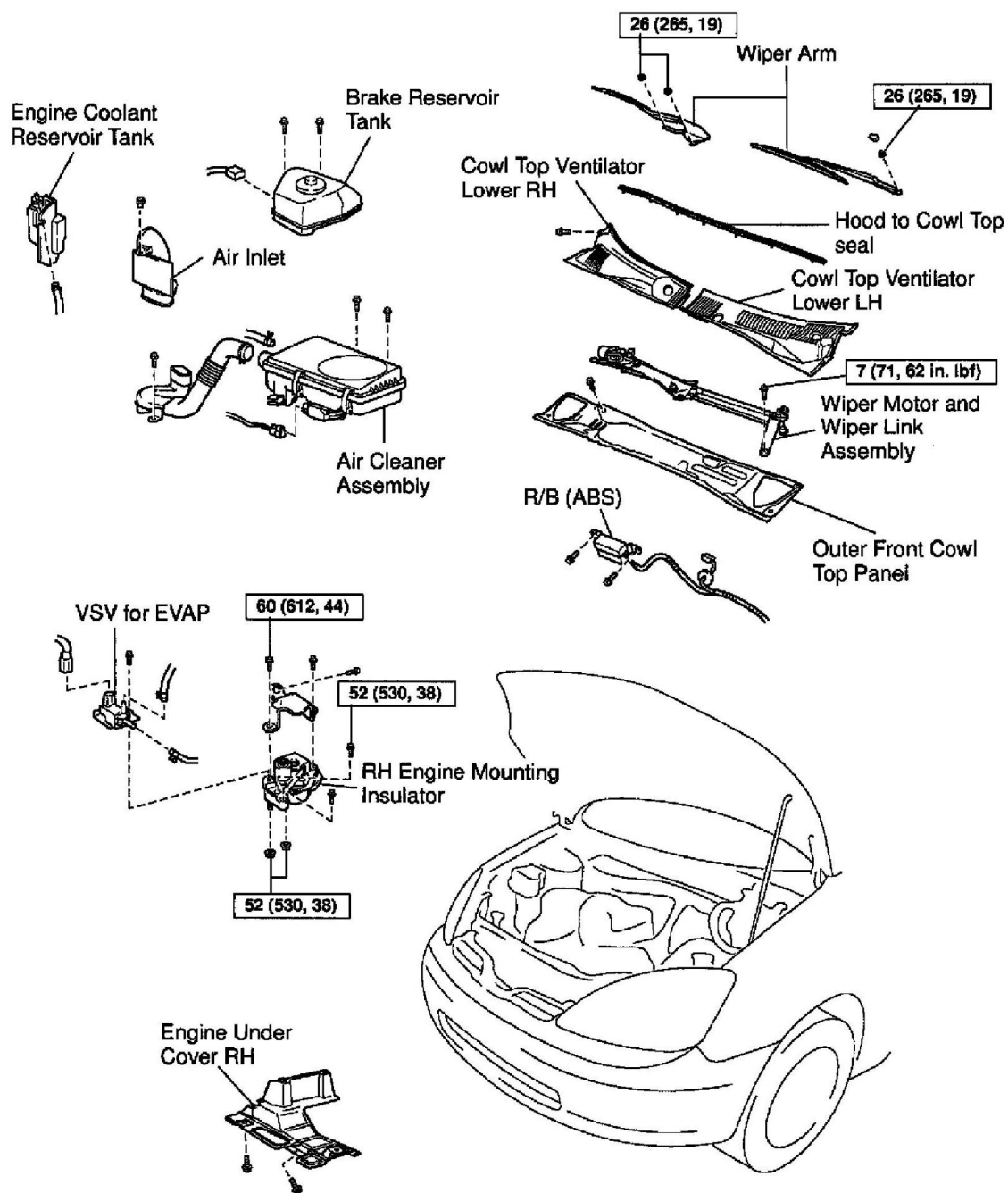


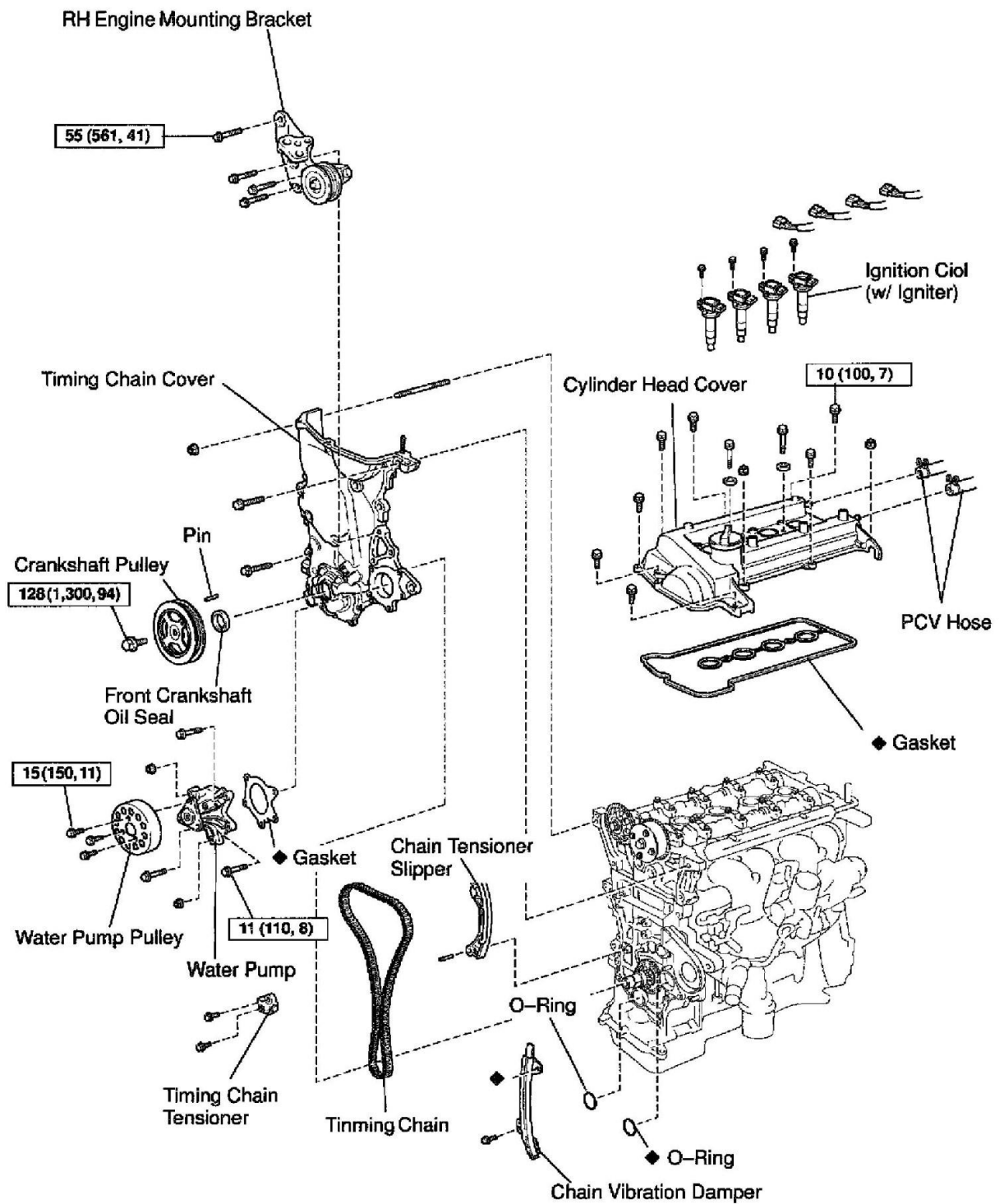


2001 Toyota Prius L4-1.5L (1NZ-FXE) Hybrid

Timing Chain: Service and Repair



N·m (kgf·cm, ft·lbf) : Specified torque

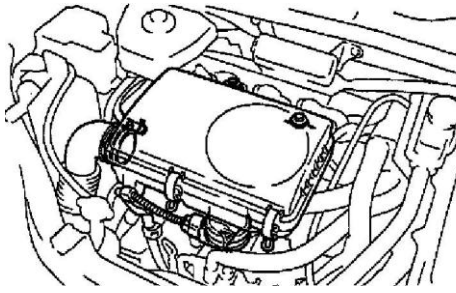


N

N·m (kgf·cm, ft·lbf) : Specified torque
 ◆ Non-reusable part

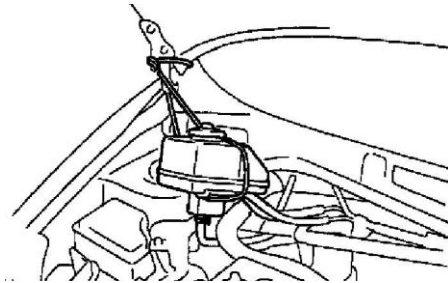
REMOVAL

1. DISCONNECT BATTERY NEGATIVE (-) TERMINAL AND HV BATTERY SERVICE PLUG
2. REMOVE OUTER FR COWL TOP PANEL ASSEMBLY
3. REMOVE RH ENGINE UNDER COVER
4. DRAIN ENGINE COOLANT



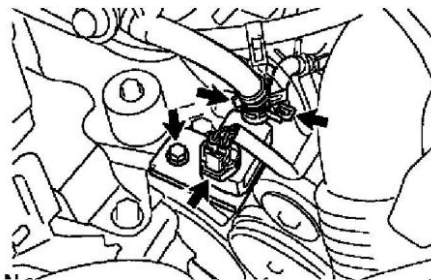
5. REMOVE AIR CLEANER ASSEMBLY

- a. Disconnect the MAP meter connector.
- b. Disconnect the EVAP hose from the air cleaner case.
- c. Loosen the 2 hose clamps.
- d. Remove the 3 bolts and air cleaner assembly.



6. REMOVE BRAKE RESERVOIR TANK

- a. Disconnect the brake fluid level sensor connector.
- b. Remove the 2 bolts and remove the reservoir tank and suspend it.
- c. Remove the 3 bolts and reservoir tank bracket.



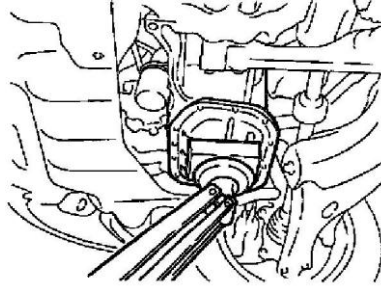
7. DISCONNECT CONNECTORS

- a. Disconnect the 4 ignition connectors.
- b. Disconnect the 4 injector connectors.
- c. Disconnect the 2 VSV connectors.
- d. Disconnect the camshaft position sensor connector.
- e. Disconnect the water temperature connector.
- f. Disconnect the Camshaft timing oil control valve connector.

8. REMOVE AIR INLET

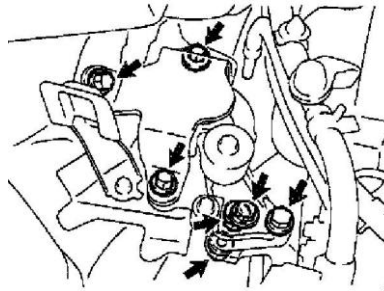
9. REMOVE ENGINE COOLANT RESERVOIR TANK

10. REMOVE VSV FROM ENGINE MOUNTING INSULATOR
11. REMOVE DRIVE BELT
12. REMOVE RH ENGINE MOUNTING INSULATOR

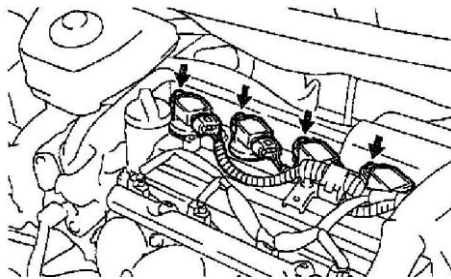


- a. Set the jack to the engine.

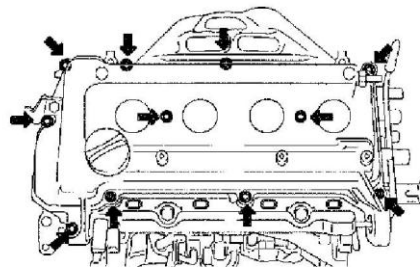
HINT: Place the wooden block between the jack and engine.



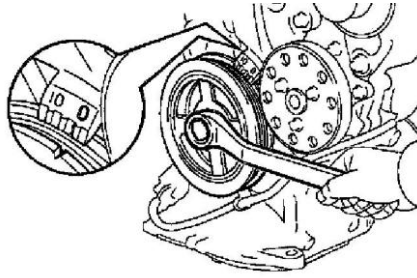
- b. Remove the 5 bolts, 2 nuts and RH engine mounting insulator.
13. DISCONNECT ENGINE WIRE FROM CYLINDER HEAD COVER
- Remove the 3 bolts and disconnect the engine wire from the cylinder head.
14. REMOVE CYLINDER HEAD COVER



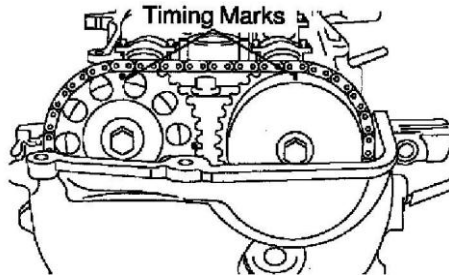
- a. Remove the ignition coils.
- b. Remove the 2 PCV hoses from the cylinder head cover.



- c. Remove the 7 bolts, 2 seal washers, 2 nuts, cylinder head cover and gasket.
15. SET NO.1 CYLINDER TO TDC/COMPRESSION

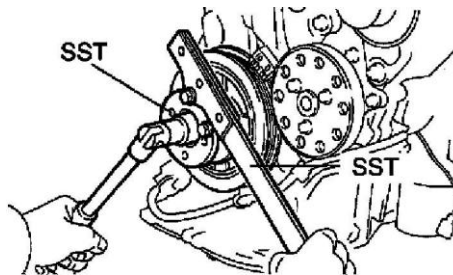


- a. Turn the crankshaft pulley, and align its groove with timing mark "0" of the timing chain cover.

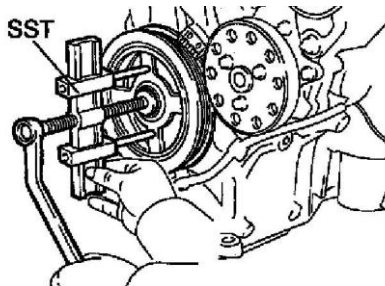


- b. Check that both timing marks on the camshaft timing sprocket and valve timing controller assembly are facing right up as shown in the illustration. If not, turn the crankshaft 1 revolution (360°) and align the marks.

16. REMOVE CRANKSHAFT PULLEY



- a. Using SST, remove the pulley bolt. SST 09213-70010, 09330-00021

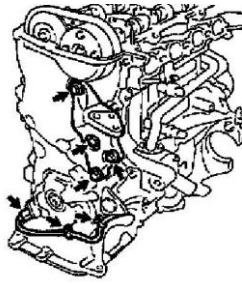


- b. Remove the crankshaft pulley and pin.

HINT: If necessary, remove the pulley with SST.

SST 09950-50012 (09951-05010, 09952-05010, 09953-05020, 09954-05020)

17. REMOVE CRANKSHAFT POSITION SENSOR

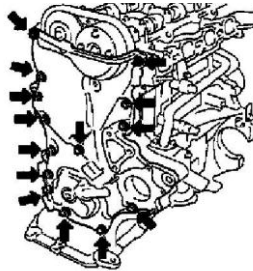


18. REMOVE RH ENGINE MOUNTING BRACKET

Remove the 4 bolts and mounting bracket.

19. REMOVE WATER PUMP

20. REMOVE OIL CONTROL VALVE



21. REMOVE TIMING CHAIN COVER

a. Remove the 13 bolts and nut.

b. Using a torx wrench socket (E8), remove the stud bolt.

c. Remove the timing chain cover by prying the portions between the cylinder head and cylinder block with a screw driver.

NOTICE: Be careful not to damage the contact surfaces of the timing chain cover, cylinder head and

cylinder block. d. Remove the 2 O-rings from the cylinder block and oil pan No. 1.

22. REMOVE CHAIN TENSIONER

Remove the 2 bolts and chain tensioner.

23. REMOVE CHAIN TENSIONER SLIPPER

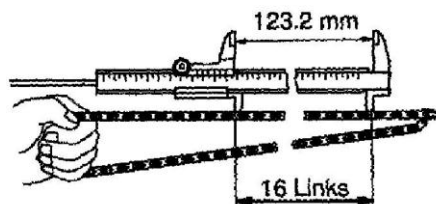
24. REMOVE CHAIN VIBRATION DAMPER

Remove the 2 bolts and damper.

25. REMOVE TIMING CHAIN

INSPECTION

1. INSPECT TIMING CHAIN AND TIMING SPROCKETS



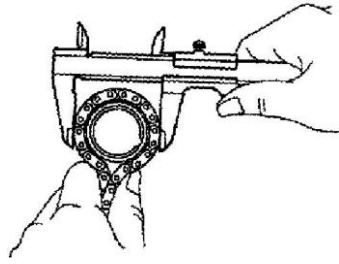
a. Using a vernier calipers, measure the length of 16 links with the dully stretched.

Maximum chain elongation: 123.2 mm (4.850 inch).

If the elongation is greater than maximum, replace the chain.

HINT: Make the same measurements pulling at 3 or more places selected at random.

b. Wrap the chain around the timing sprocket.



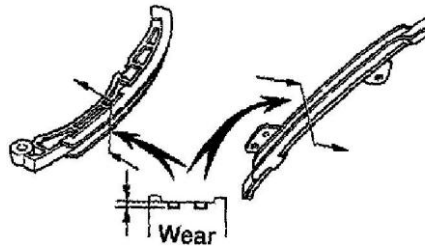
- c. Using a vernier calipers, measure the timing sprocket diameter with the chain.

NOTICE: Vernier calipers must contact the chain rollers for measuring.

Minimum sprocket diameter
(w/Chain): Camshaft 96.2 mm
(3.787 inch)

Crankshaft 50.5 mm (1.988 inch)

If the diameter is less than minimum, replace the chain and sprockets.

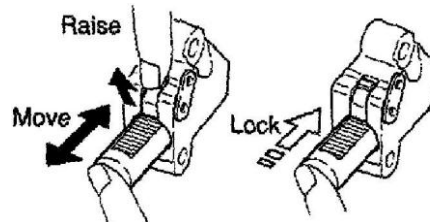


2. INSPECT CHAIN TENSIONER SLIPPER AND VIBRATION DAMPER

Measure the chain tensioner slipper and vibration damper wears.

Minimum wear: 1.0 mm (0.039 inch)

If the wear is greater than maximum, replace the slipper and/or damper.



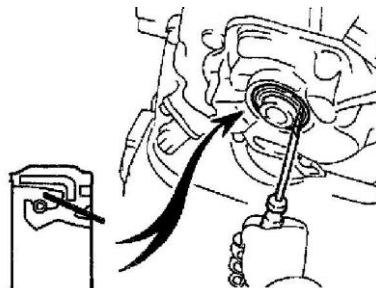
3. INSPECT CHAIN TENSIONER

- Check that the plunger moves smoothly when the ratchet pawl is raised with your finger.
- Release the ratchet pawl and check that the plunger locked in place by the ratchet pawl and does not move when pushed with your finger.

REPLACEMENT

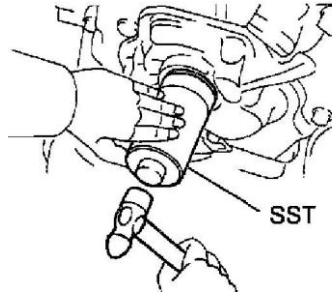
REPLACE CRANKSHAFT FRONT OIL SEAL

- Using a knife, cut off the oil seal lip.



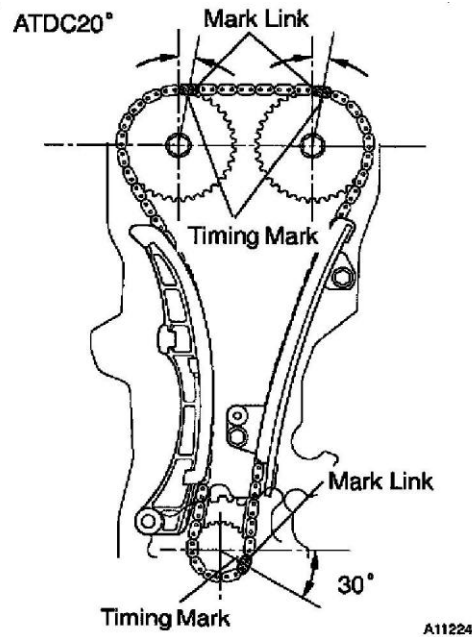
- b. Using a screwdriver, pry out the oil seal.

NOTICE: Be careful not to damage the crankshaft. Tape the screw driver tip.



- c. Using SST and a hammer, tap in the oil seal until its surface is flush with the timing chain cover edge. SST 09612-22011

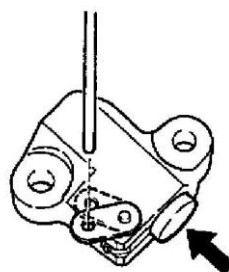
INSTALLATION



1. INSTALL TIMING CHAIN

- After setting the crankshaft at ATDC 40 - 140°, set cams of intake and exhaust timing sprockets at ATDC 20° and then the reset the crankshaft at ATDC 20°.
- Install the chain vibration damper with the 2 bolts.
Torque: 9.0 Nm (92 kgf-cm, 80 inch lbs.)
- Align the match marks of timing chain mark plate (Yellow), camshaft timing sprocket, camshaft timing gear and crankshaft timing sprocket to install the timing chain as shown in the illustration.

HINT: To prevent the exhaust camshaft from spring back turn it using a wrench and set it at the mark on a chain. d. Install the chain tensioner slipper.

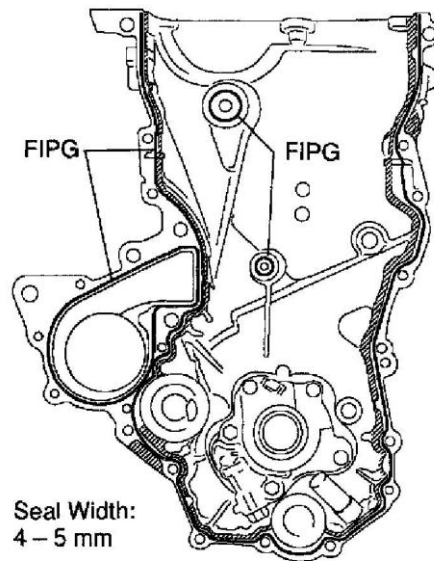


2. INSTALL CHAIN TENSIONER

- a. While rotating the lock plate of the tensioner upward, push in the plunger of the tensioner as shown in the illustration.
- b. While rotating the lock plate of the tensioner downward, insert a bar of 2.5 mm (0.098 inch) into the holes in the lock plate.
- c. Install the chain tensioner with the 2 bolts.
Torque: 9.0 Nm (92 kgf-cm, 80 inch lbs.)
- d. Remove the bar from the chain tensioner.
- e. Check that the tension between the intake and exhaust camshaft timing sprocket.

3. INSTALL TIMING CHAIN COVER AND WATER PUMP

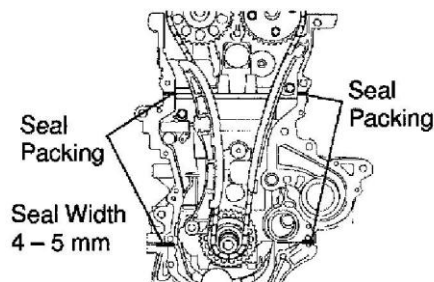
- a. Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the timing chain cover, cylinder head and cylinder block.
 - Using a razor blade and a gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
 - 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 4 - 5 mm (0.16 - 0.20 inch) opening.
 - FIPG shall be accumulated in the groove for FIPG to a depth of 2.5 mm (0.10 inch) or more.

HINT: Avoid applying an excessive amount to the surface.

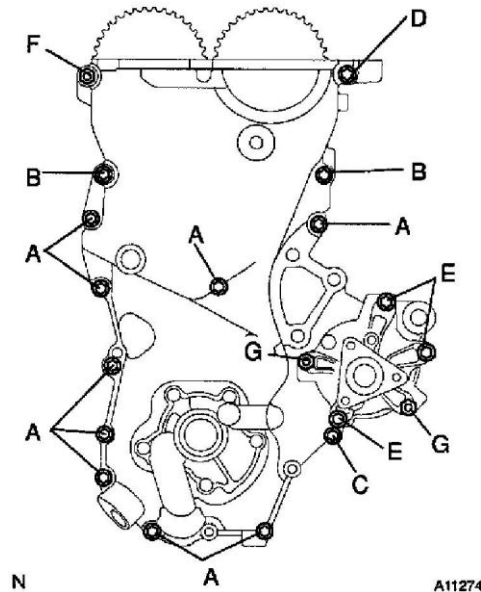
- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



- c. 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 inch) 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.
- d. Install 2 new O-rings to the cylinder block and oil pan No. 1.



- e. Install the timing chain cover, new O-ring and water pump with the 16 bolts and 3 nuts. Uniformly tighten the bolts and nut in several passes.

Torque:

Bolt A 11 Nm (113 kgf-cm, 8 ft. lbs.)
Bolt B 24 Nm (245 kgf-cm, 18 ft. lbs.)
Bolt C 11 Nm (113 kgf-cm, 8 ft. lbs.)
Bolt D 24 Nm (245 kgf-cm, 18 ft. lbs.)
Bolt E 11 Nm (113 kgf-cm, 8 ft. lbs.)
Nut F 24 Nm (245 kgf-cm, 18 ft. lbs.) Nut G 11 Nm (113 kgf-cm, 8 ft. lbs.)

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.

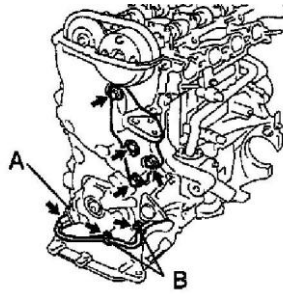
A 20 mm (0.787 inch)
B 30 mm (1.181 inch)
C 35 mm (1.378 inch)
D 20 mm (0.787 inch)
E 35 mm (1.378 inch)

4. 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 4 bolts. Torque: 55 Nm (561 kgf-cm, 41 ft. lbs.)



5. INSTALL CRANKSHAFT POSITION SENSOR

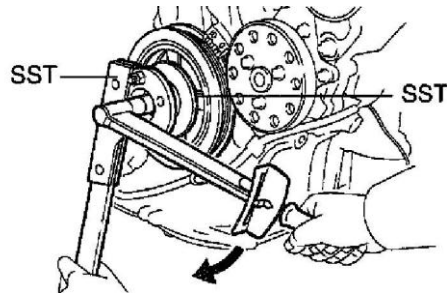
Torque:

Bolt A 7.5 Nm (76 kgf-cm, 66 inch lbs.)

Bolt B 11 Nm (113 kgf-cm, 8 ft. lbs.)

6. INSTALL OIL CONTROL VALVE

Torque: 7.5 Nm (76 kgf-cm, 66 inch lbs.)



7. INSTALL CRANKSHAFT PULLEY

a. Clean the crankshaft pulley inside.

b. Install the pin to the crankshaft.

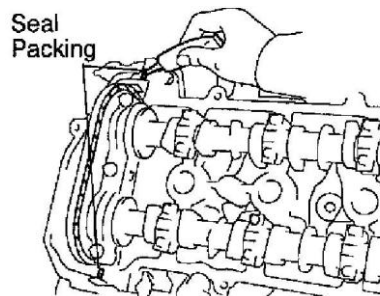
c. Align the hole in the crank pulley with the pin position and install the crank pulley. d. Using SST, install the pulley bolt.

SST 09213-70010, 09330-00021

Torque: 128 Nm (1,300 kgf-cm, 94 ft. lbs.)

8. INSTALL CYLINDER HEAD COVER

a. Remove any old packing (FIPG) material.

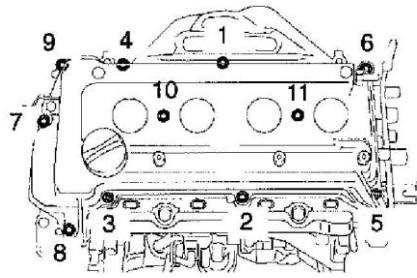


b. Apply seal packing to 2 locations as shown in the illustration.

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.

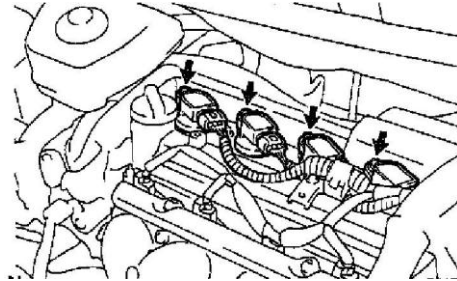


- d. Install the cylinder head cover and cable bracket with the 7 bolts, 2 seal washers and 2 nuts. Uniformly tighten the bolts and nuts, in the several passes, in the sequence shown.

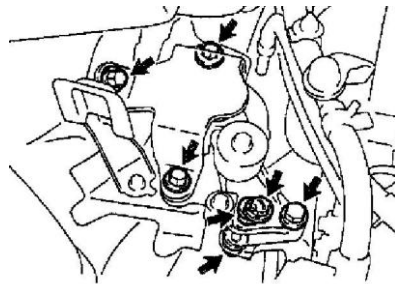
Torque: 10 Nm (100 kgf-cm, 7 ft. lbs.)

- e. Connect the 2 PCV hoses to the cylinder head cover. 9.

CONNECT ENGINE WIRE TO CYLINDER HEAD COVER



10. INSTALL IGNITION COILS



11. REMOVE RH ENGINE MOUNTING INSULATOR

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

12. INSTALL VSV TO RH ENGINE MOUNTING INSULATOR

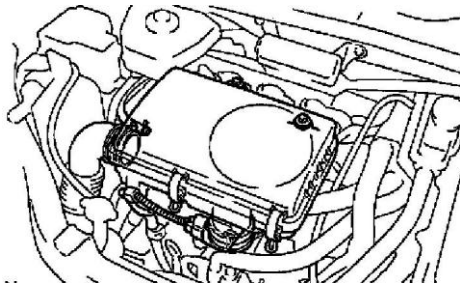
13. INSTALL DRIVE BELT

14. INSTALL ENGINE COOLANT RESERVOIR TANK 15. INSTALL AIR INLET



16. CONNECT CONNECTORS

- a. Connect the Camshaft timing oil control valve connector.
- b. Connect the water temperature sensor connector.
- c. Connect the camshaft position sensor connector.
- d. Connect the 2 VSV connectors.
- e. Connect the 4 injector connectors.
- f. Connect the 4 ignition connectors.



17. INSTALL AIR CLEANER ASSEMBLY
 - a. Install the air cleaner assembly with the 2 bolts.
 - b. Tighten the 2 hose clamps.
 - c. Connect the EVAP hose to the air cleaner case.
 - d. Connect the MAF meter connector.
18. INSTALL BRAKE RESERVOIR TANK
19. INSTALL OUTER FR COWL TOP PANEL ASSEMBLY
20. FILL WITH ENGINE COOLANT
21. INSTALL ENGINE UNDER COVERS
22. CONNECT BATTERY NEGATIVE (-) TERMINAL AND HV BATTERY SERVICE PLUG
23. ROAD TEST VEHICLE

Check for abnormal noises, shock slippage, correct shift points and smooth operation.
24. RECHECK ENGINE COOLANT AND HV TRANSAXLE COOLANT