



## CHAIN SUB-ASSY (1ZZ-FE/3ZZ-FE)

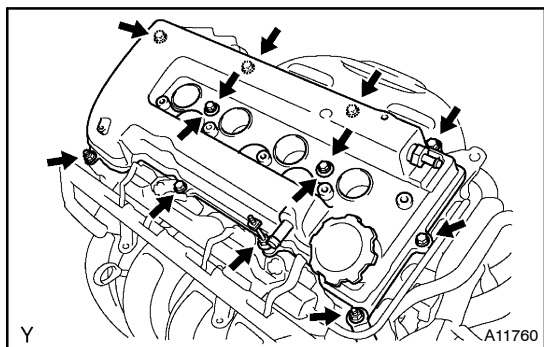
### REPLACEMENT

1401Z-01

1. REMOVE ENGINE UNDER COVER LH
2. REMOVE ENGINE UNDER COVER RH
3.  DRAIN  COOLANT (See [page 16-14](#))
4. REMOVE CYLINDER HEAD COVER NO.2
5. REMOVE FAN AND GENERATOR V BELT
6. REMOVE VANE PUMP ASSY
7. REMOVE GENERATOR ASSY
8. SEPARATE ENGINE WIRE
  - (a) Disconnect the ignition coil connectors, PS oil pressure switch connector, oil control valve connector and crankshaft position sensor connector.
  - (b) Remove the bolt and nut for the earth and put the engine wiring aside.
9. REMOVE IGNITION COIL ASSY

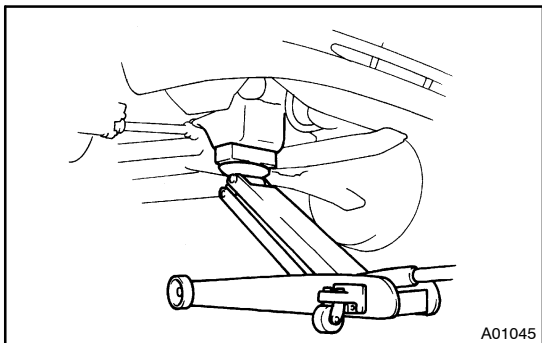
#### 10. REMOVE CYLINDER HEAD COVER SUB-ASSY

- (a) Disconnect the fuel hose clamp and 2 PCV hoses from the cylinder head cover.
- (b) Remove the 9 bolts, 2 seal washers, 2 nuts, cable bracket, cylinder head cover and gasket.



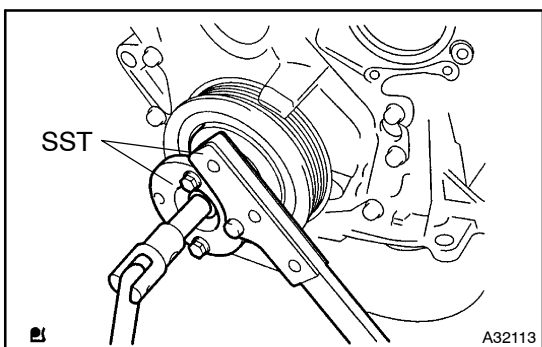
#### 11. REMOVE ENGINE MOUNTING INSULATOR SUB ASSY RH

- (a) Remove the PS oil pump reservoir and put it aside.



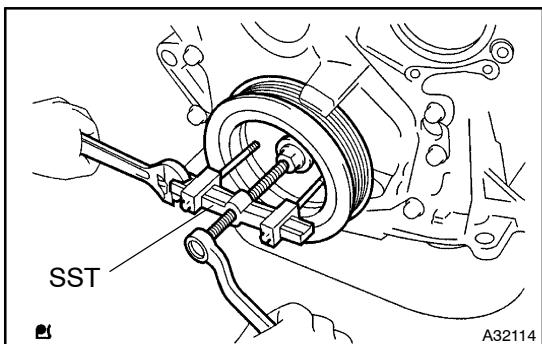
- (b) Place a wooden block between the jack and engine, and set the jack, then remove the engine mounting insulator.

## 12. SET NO.1 CYLINDER TO TDC/COMPRESSION



## 13. REMOVE CRANKSHAFT PULLEY

- (a) Using SST, remove the pulley bolt.  
SST 09213-70011, 09330-00021

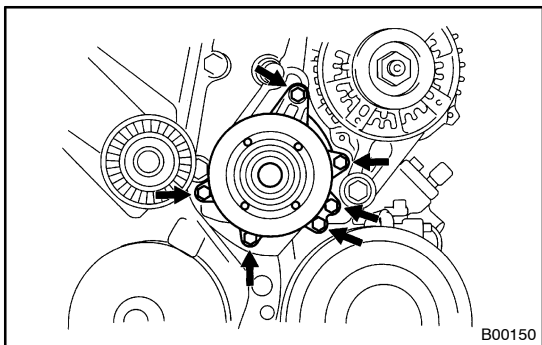


- (b) Using SST, remove the crankshaft pulley.  
SST 09950-50012 (09951-05010, 09952-05010, 09953-05020, 09954-05020, 09957-04010)

## 14. REMOVE V-RIBBED BELT TENSIONER ASSY

### HINT:

Handle a jack up and down to remove the bolt.

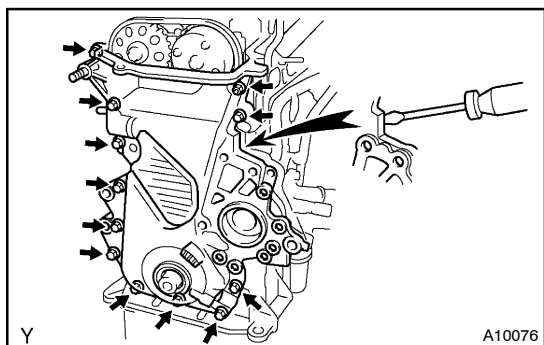


## 15. REMOVE WATER PUMP ASSY

- (a) Remove the 6 bolts and water pump.

**16. REMOVE TRANSVERSE ENGINE ENGINE MOUNTING BRACKET****17. REMOVE COMPRESSOR****18. REMOVE CRANK POSITION SENSOR****19. REMOVE CHAIN TENSIONER ASSY NO.1****NOTICE:**

Be sure not to revolve the crankshaft without the chain tensioner.

**20. REMOVE TIMING CHAIN OR BELT COVER SUB-ASSY**

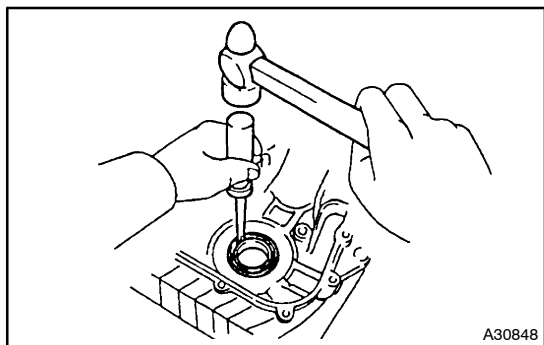
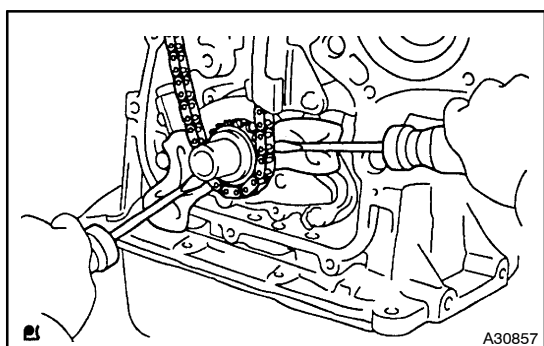
- (a) Remove the 11 bolts and nuts.
- (b) Using a torx wrench socket (E8), remove the stud bolt.
- (c) Remove the timing chain cover by prying the portions between the cylinder head and cylinder block with a screwdriver.

**NOTICE:**

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

**21. REMOVE TIMING GEAR COVER OIL SEAL**

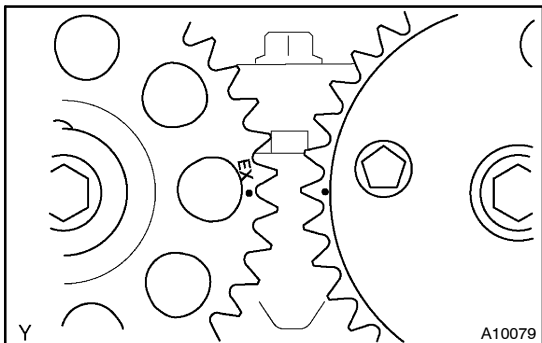
- (a) Using a screwdriver, remove the oil seal.

**22. REMOVE CRANKSHAFT POSITION SENSOR PLATE NO.1****23. REMOVE CHAIN TENSIONER SLIPPER****24. REMOVE CHAIN VIBRATION DAMPER NO.1****25. REMOVE CHAIN SUB-ASSY**

- (a) Remove the timing chain with the crankshaft timing gear prying screwdrivers as shown in the illustration.

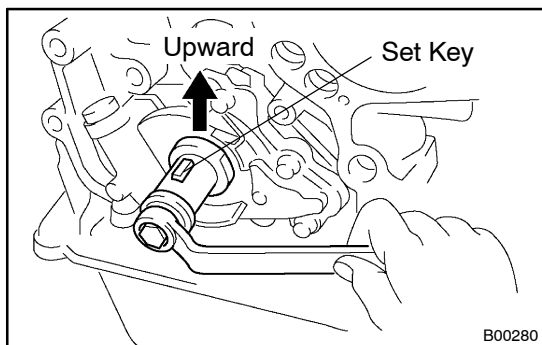
**NOTICE:**

- Put shop rag to protect the engine.
- In case of revolving the camshafts with the chain off the sprockets, turn the crankshaft 1/4 revolution for valves not to touch the pistons.

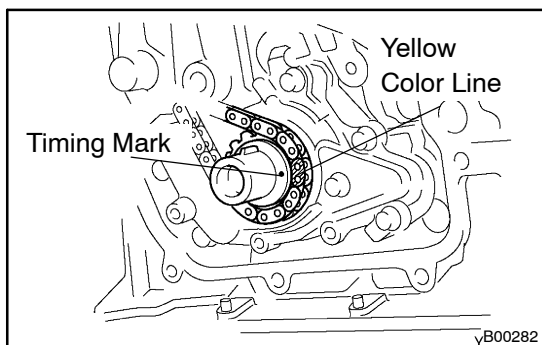


## 26. INSTALL CHAIN SUB-ASSY

- (a) Set No. 1 cylinder to TDC/compression.
- (1) Turn the hexagonal wrench head portion of the camshafts, and align the point marks of the camshaft timing sprockets.



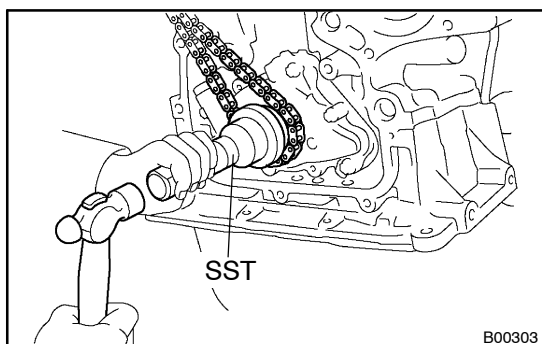
- (2) Using a crankshaft pully bolt, turn the crankshaft and set the set key on the crankshaft upward.



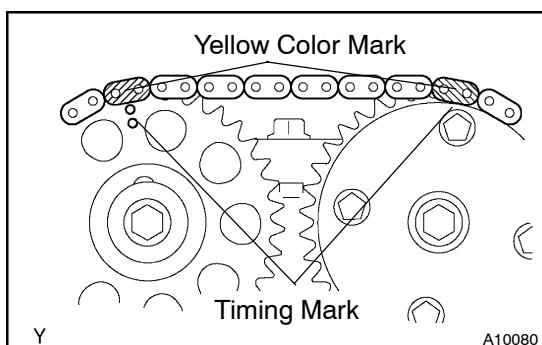
- (b) Install the timing chain on the crankshaft timing sprocket with the yellow color link aligned with the timing mark on the crankshaft timing sprocket.

### HINT:

Three yellow color links are on the chain.



- (c) Using a SST, install the sprocket.  
SST 09223-22010



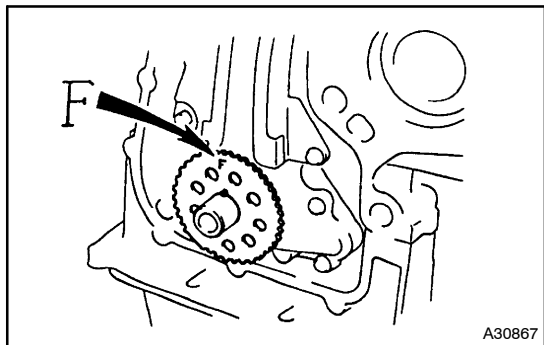
- (d) Install the timing chain on the camshaft timing sprockets with the yellow color links aligned with the timing marks on the camshaft timing sprockets.

**27. INSTALL CHAIN VIBRATION DAMPER NO.1**

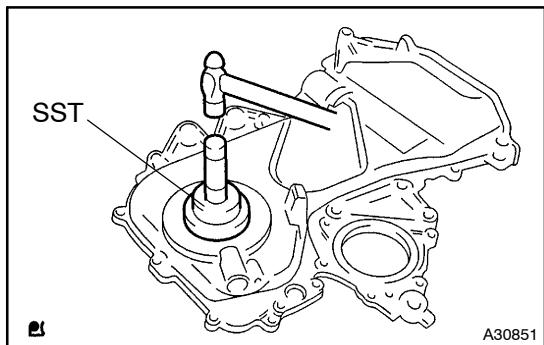
Torque: 11 N·m (112 kgf·cm, 8 ft·lbf)

**28. INSTALL CHAIN TENSIONER SLIPPER**

Torque: 19 N·m (189 kgf·cm, 15 ft·lbf)

**29. INSTALL CRANKSHAFT POSITION SENSOR PLATE NO.1**

- (a) Install the plate with the "F" mark facing forward.

**30. INSTALL TIMING GEAR COVER OIL SEAL**

- (a) Apply MP grease to the oil seal lip.  
(b) Using SST and a hammer, tap in a new oil seal until its surface is flush with the timing chain cover edge.

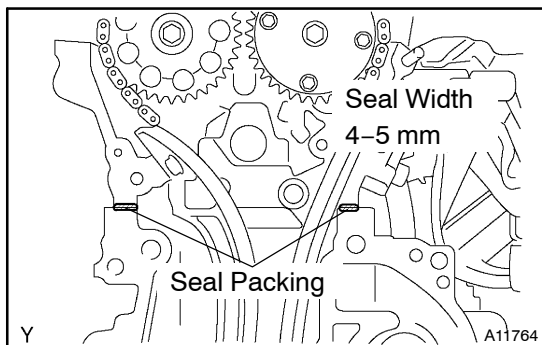
SST 09223-22010

**NOTICE:**

**Keep the lip off foreign materials.**

**31. INSTALL TIMING CHAIN OR BELT COVER SUB-ASSY**

- (a) Remove any old packing material from the contact surface.



- (b) Apply seal packing in the shape of bead (Diameter 3.5 mm – 4.5 mm (0.1379 – 0.177 in.)) consequently as shown in the illustration.

**Seal packing:**

**Water pump part part No. 08826-00100 or equivalent**

**Other part part No. 08826-00080 or equivalent.**

- (c) Install the timing chain cover, with the 12 bolts and nut.

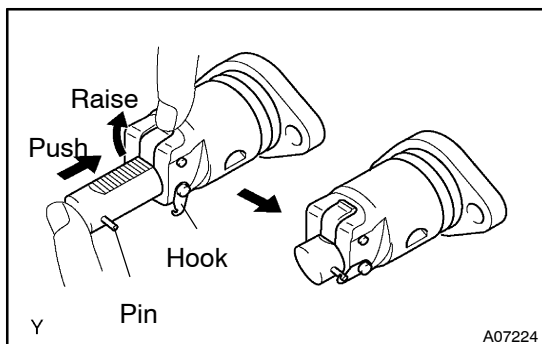
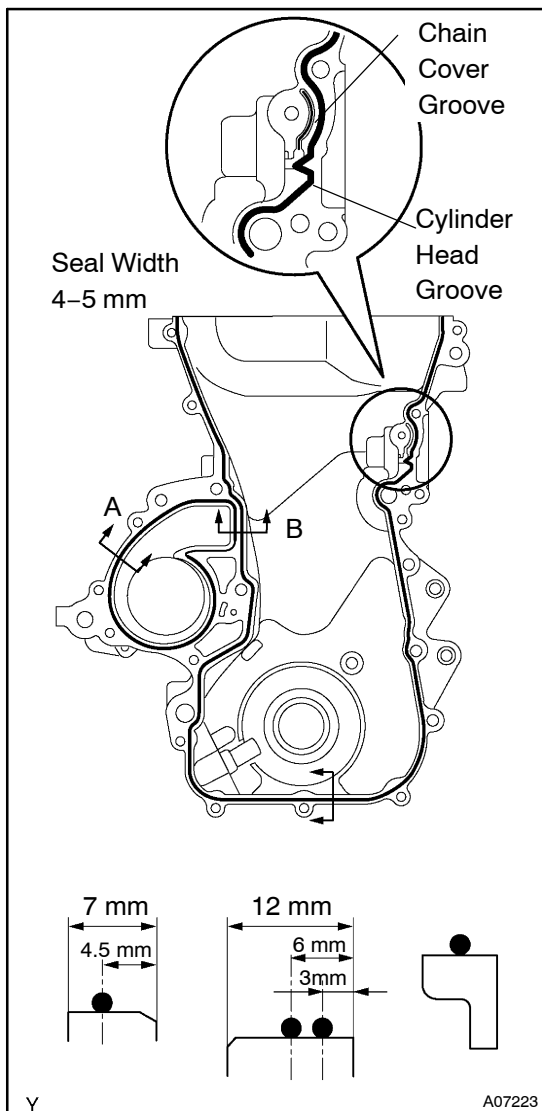
**Torque:**

**13 N·m (133 kgf·cm, 10 ft·lbf)**

**19 N·m (189 kgf·cm, 14 ft·lbf) (8m)**

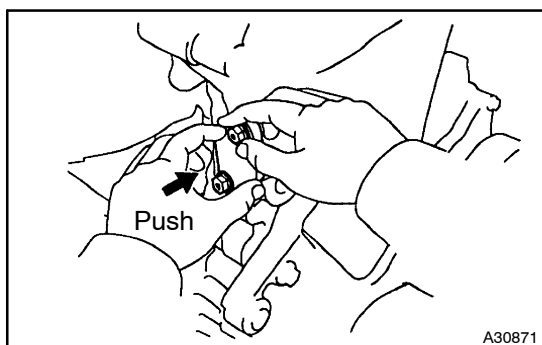
**NOTICE:**

- Remove any oil from the contact surface.
  - Install the oil pan within 3 minutes after applying seal packing.
  - Do not put into engine oil within 2 hours after installing.
- (d) Using a torx wrench socket (E8), install the stud bolt.



**32. INSTALL CHAIN TENSIONER ASSY NO.1**

- (a) Check the O-ring is clean, and set the hook as shown in the illustration.

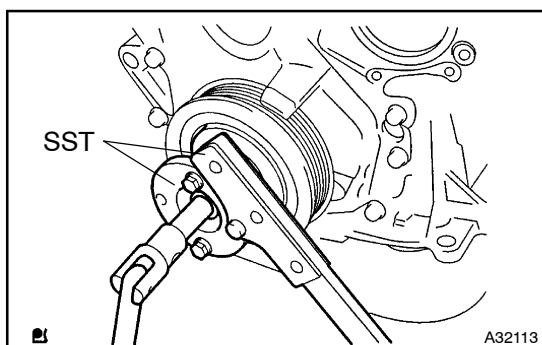


- (b) Apply engine oil to the chain tensioner and install it.

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

**NOTICE:**

**When installing the tensioner, set the hook again if the hook release the plunger.**



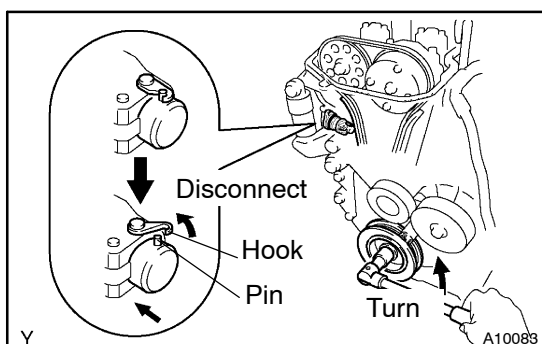
**33. INSTALL CRANKSHAFT PULLEY**

- (a) Align the pulley set key with the key groove of the pulley, and slide on the pulley.

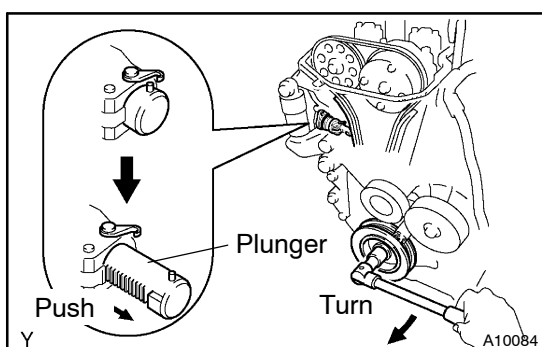
- (b) Using SST, install the pulley bolt.

SST 09213-70011, 09330-00021

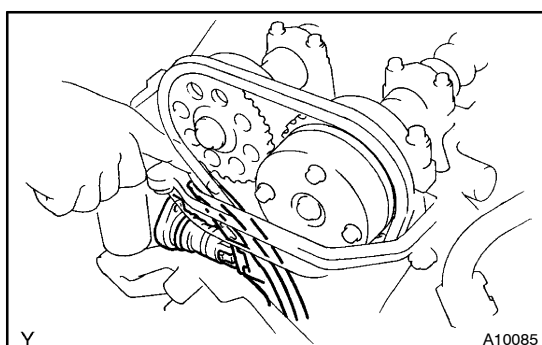
**Torque: 138 N·m (1,407 kgf·cm, 102 ft·lbf)**



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



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



**HINT:**

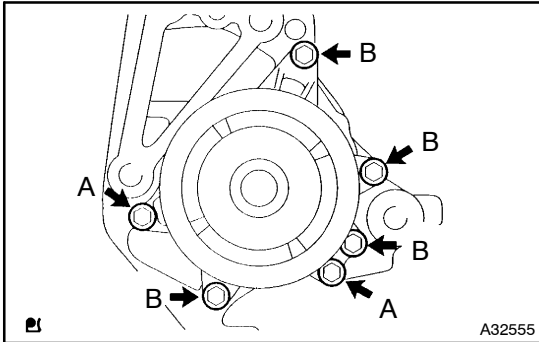
If the plunger does not spring out, press the slipper into the chain tensioner with a screwdriver or your finger so that the hook is released from the knock pin and the plunger springs out.

**34. INSTALL CRANK POSITION SENSOR**

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

**35. INSTALL TRANSVERSE ENGINE ENGINE MOUNTING BRACKET**

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

**36. INSTALL WATER PUMP ASSY**

- (a) Place a new O-ring on the timing chain cover.
- (b) Install the water pump with the 6 bolts.

**Torque:**

**9.0 N·m (92 kgf·cm, 80 in·lbf) for Bolt A**

**11 N·m (112 kgf·cm, 8 ft·lbf) for Bolt B**

**37. INSTALL V-RIBBED BELT TENSIONER ASSY**

**Torque:**

**Nut 29 N·m (296 kgf·cm, 21 ft·lbf)**

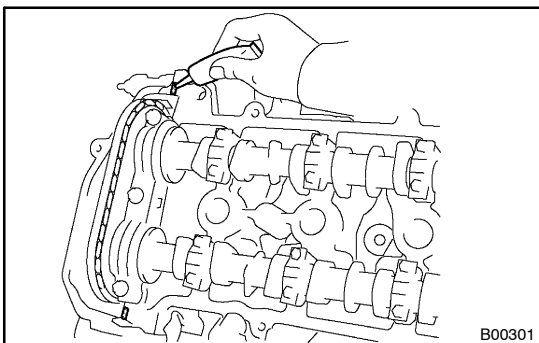
**Bolt 69 N·m (704 kgf·cm, 51 ft·lbf)**

**38. INSTALL ENGINE MOUNTING INSULATOR SUB ASSY RH**

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

**39. INSTALL CYLINDER HEAD COVER SUB-ASSY**

- (a) Install the gasket to the cylinder head cover.
- (b) Remove any old pacing (FIPG) material.



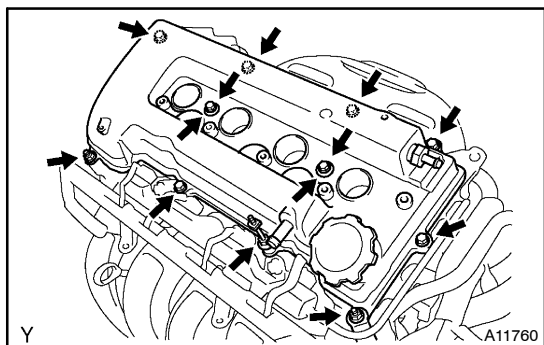
- (c) Apply seal packing to 2 locations as shown in the illustration.

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

**NOTICE:**

- **Remove any oil from the contact surface.**
- **Install the cylinder head cover within 3 minutes after applying seal packing.**
- **Do not put into engine oil 2 hours after installing.**





- (d) Install the cylinder head cover and cable bracket with the 9 bolts, 2 seal washers and 2 nuts.

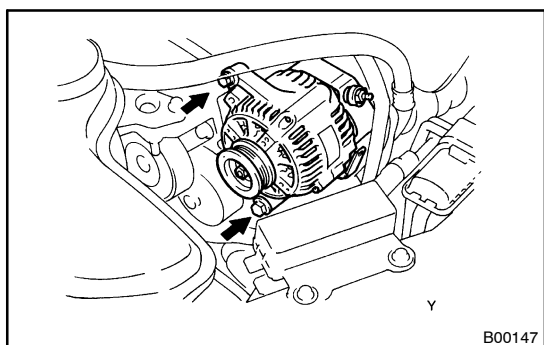
**Torque:**

w/o washer 11 N·m (112 kgf·cm, 8 ft·lbf)

Torque 9.0 N·m (92 kgf·cm, 80 in·lbf)

#### 40. INSTALL IGNITION COIL ASSY

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



#### 41. INSTALL GENERATOR ASSY

**Torque:**

12 mm head 25 N·m (255 kgf·cm, 18 ft·lbf)

14 mm head 54 N·m (551 kgf·cm, 40 ft·lbf)

#### 42. ADD COOLANT (See page 16-14)

#### 43. INSPECT COOLANT LEAKS (See page 16-1)

#### 44. INSPECT OIL LEAK