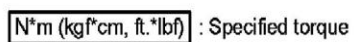
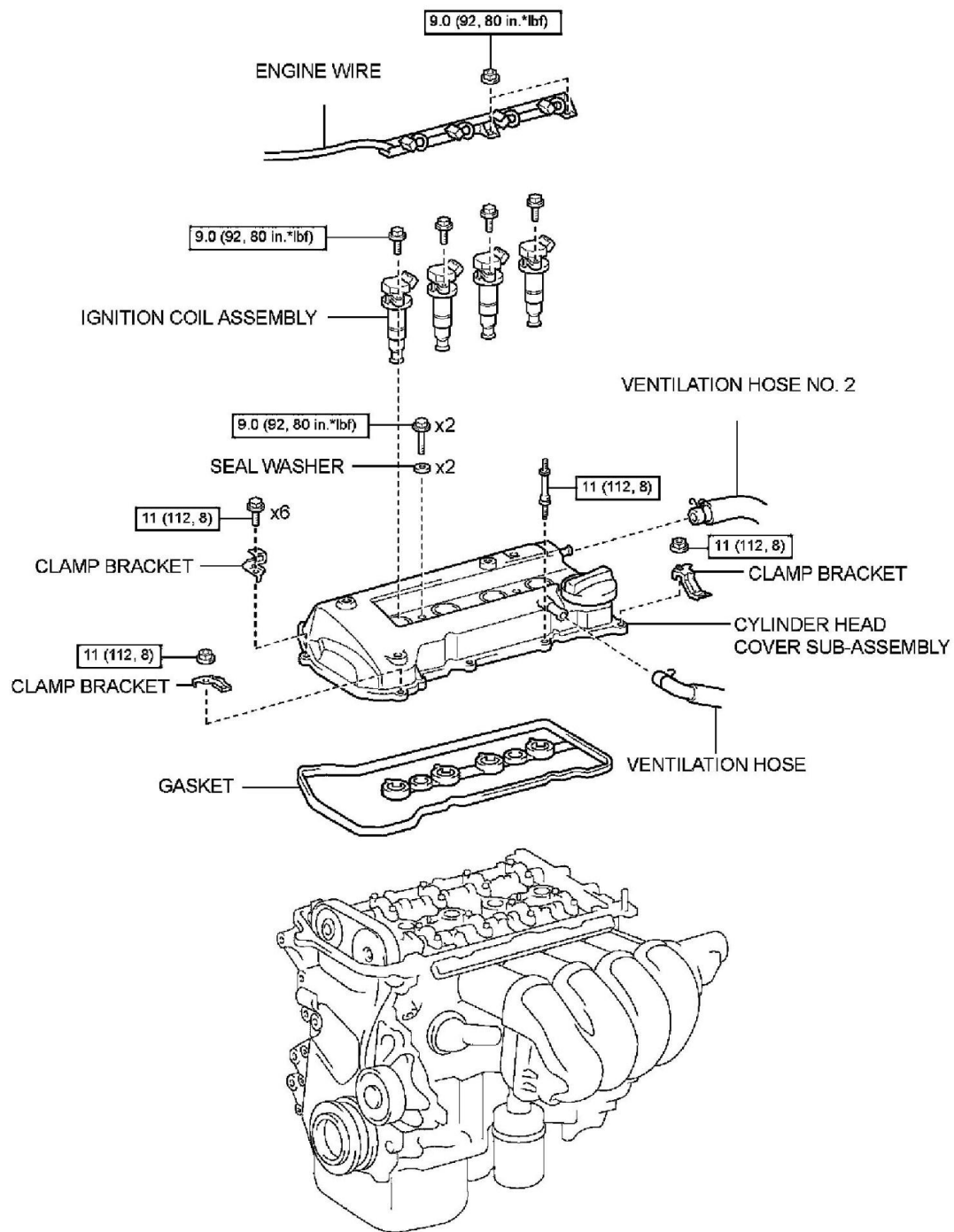
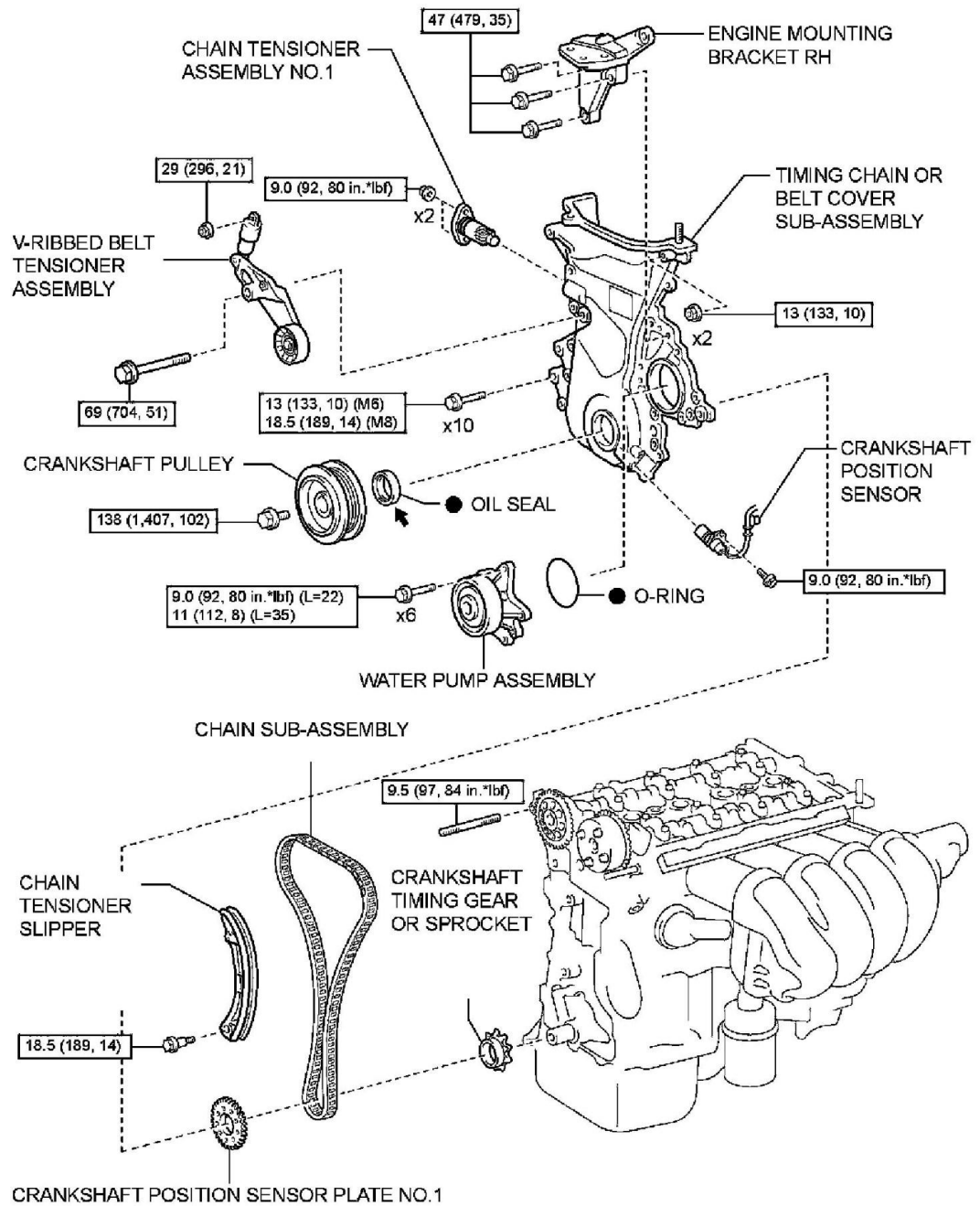


COMPONENTS



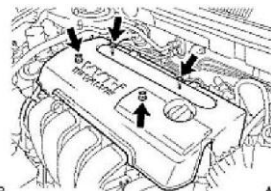


N*m (kgf*cm, ft.*lbf) : Specified torque



REMOVAL

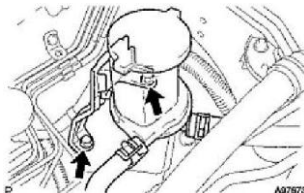
1. DISCONNECT BATTERY NEGATIVE TERMINAL
2. REMOVE FRONT WHEEL RH
3. REMOVE ENGINE UNDER COVER RH
4. REMOVE CYLINDER HEAD COVER NO.2
 - (a) Remove the 2 nuts and 2 clips, then remove the
5. DRAIN ENGINE COOLANT
 - (a) Drain the engine coolant (See: Cooling
6. REMOVE FAN AND GENERATOR V BELT



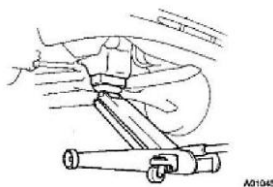
cylinder head cover No. 2.

System/Coolant/Testing and Inspection).

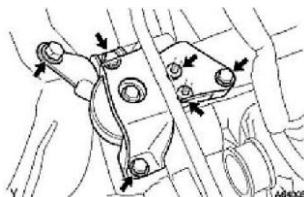
- (a) Remove the fan and generator V belt (See: Drive Belts, Mounts, Brackets and Accessories/Drive Belt/Service and Repair/Removal).
- 7. SEPARATE VANE PUMP ASSEMBLY
 - (a) Separate the vane pump assembly (See: Steering and Suspension/Steering/Power Steering/Power Steering Pump/Service and Repair/Removal).
- 8. REMOVE GENERATOR ASSEMBLY
 - (a) Remove the generator assembly (See: Starting and Charging/Charging System/Alternator/Service and Repair/Removal).
- 9. REMOVE ENGINE MOUNTING INSULATOR RH



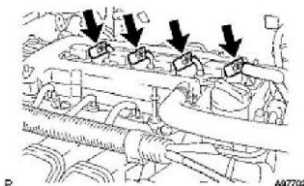
- (a) Remove the 2 bolts, then remove the oil reservoir bracket No. 1.



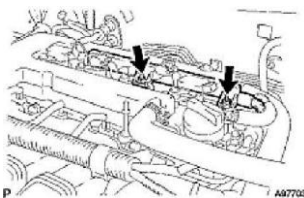
- (b) Place a wooden block on a jack underneath the engine.



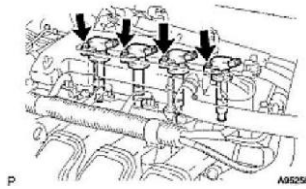
- (c) Remove the 4 bolts and 2 nuts, then remove the engine mounting insulator RH.
10. REMOVE IGNITION COIL ASSEMBLY



- (a) Disconnect the 4 ignition coil connectors.

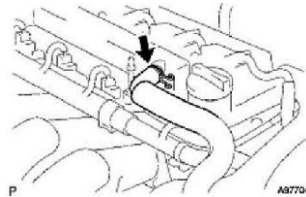


- (b) Remove the 2 nuts, then separate the engine wire.

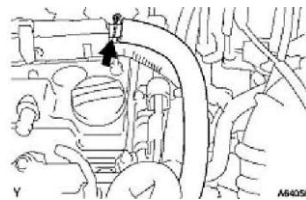


(c) Remove the 4 bolts, then remove the 4 ignition coils.

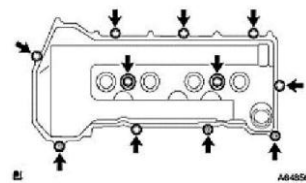
11. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY



(a) Disconnect the ventilation hose from the cylinder head cover.

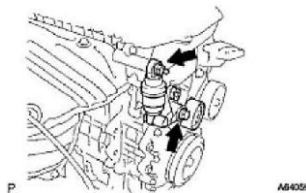


(b) Disconnect the ventilation hose No. 2 from the ventilation valve. (c) Remove the 3 clamps of the engine wire from the clamp bracket.



(d) Remove the 9 bolts, 2 seal washers, 2 nuts and 3 clamp brackets, then remove the cylinder head cover.

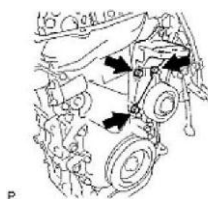
12. REMOVE V-RIBBED BELT TENSIONER ASSEMBLY



(a) Remove the bolt and nut, then remove the V-ribbed belt tensioner.

HINT: Jack the engine up and down to remove the bolt.

13. REMOVE ENGINE MOUNTING BRACKET RH

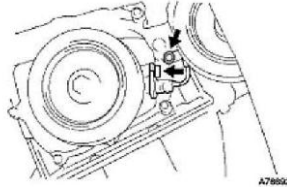


(a) Remove the 3 bolts, then remove the engine mounting bracket RH.

14. REMOVE WATER PUMP ASSEMBLY

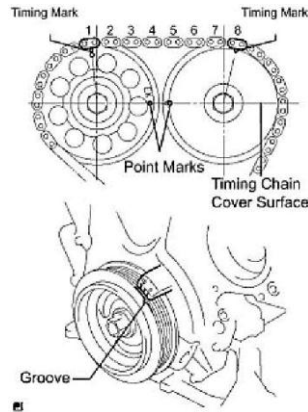
- (a) Remove the water pump assembly (See: Water Pump/Service and Repair/Removal).

15. SEPARATE CRANKSHAFT POSITION SENSOR



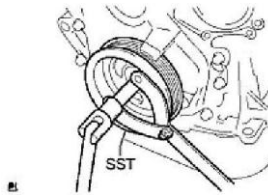
- (a) Remove the 2 bolts, then separate the crankshaft position sensor.

16. SET NO. 1 CYLINDER TO TDC / COMPRESSION



- (a) Turn the crankshaft pulley until its groove and timing mark "0" of the timing chain cover are aligned.
- (b) Check that the point marks of the camshaft timing gears are in a straight line on the timing chain cover surface as shown in the illustration. If not, turn the crankshaft 1 revolution (360°) to align the marks as above.

17. REMOVE CRANKSHAFT PULLEY



- (a) Using SST, remove the crankshaft pulley bolt.

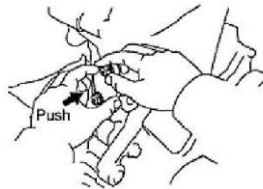
SST: 09960-10010

09962-01000

09963-01000

- (b) Remove the crankshaft pulley from the crankshaft.

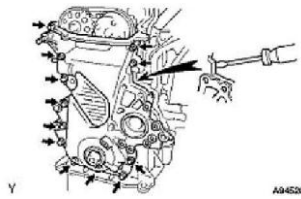
18. REMOVE CHAIN TENSIONER ASSEMBLY NO.1



- (a) Remove the 2 nuts, then remove the chain tensioner.

NOTE: Do not turn the crankshaft without the chain tensioner.

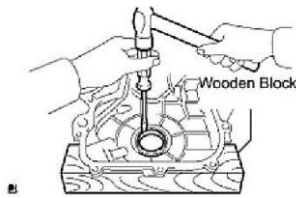
19. REMOVE TIMING CHAIN OR BELT COVER SUB-ASSEMBLY



- (a) Remove the 10 bolts and 2 nuts.
- (b) Using a "TORX" socket wrench (E8), remove the stud bolt.
- (c) Remove the timing chain cover by prying the portions between the timing chain cover, cylinder head and cylinder block with a screwdriver.

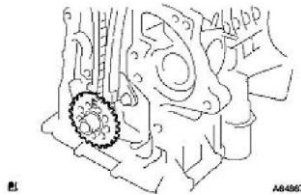
NOTE: Be careful not to damage the contact surfaces of the timing chain cover, cylinder head and cylinder block.

20. REMOVE TIMING CHAIN OR BELT COVER OIL SEAL



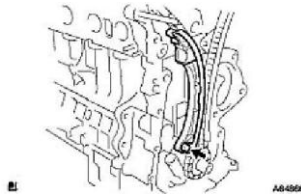
- (a) Place the timing chain cover on wooden blocks. (b) Using a screwdriver, remove the oil seal.

21. REMOVE CRANKSHAFT POSITION SENSOR PLATE NO.1



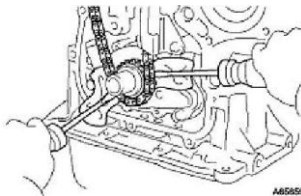
- (a) Remove the crankshaft position sensor plate from the crankshaft.

22. REMOVE CHAIN TENSIONER SLIPPER



- (a) Remove the bolt, then remove the chain tensioner slipper.

23. REMOVE CHAIN SUB-ASSEMBLY



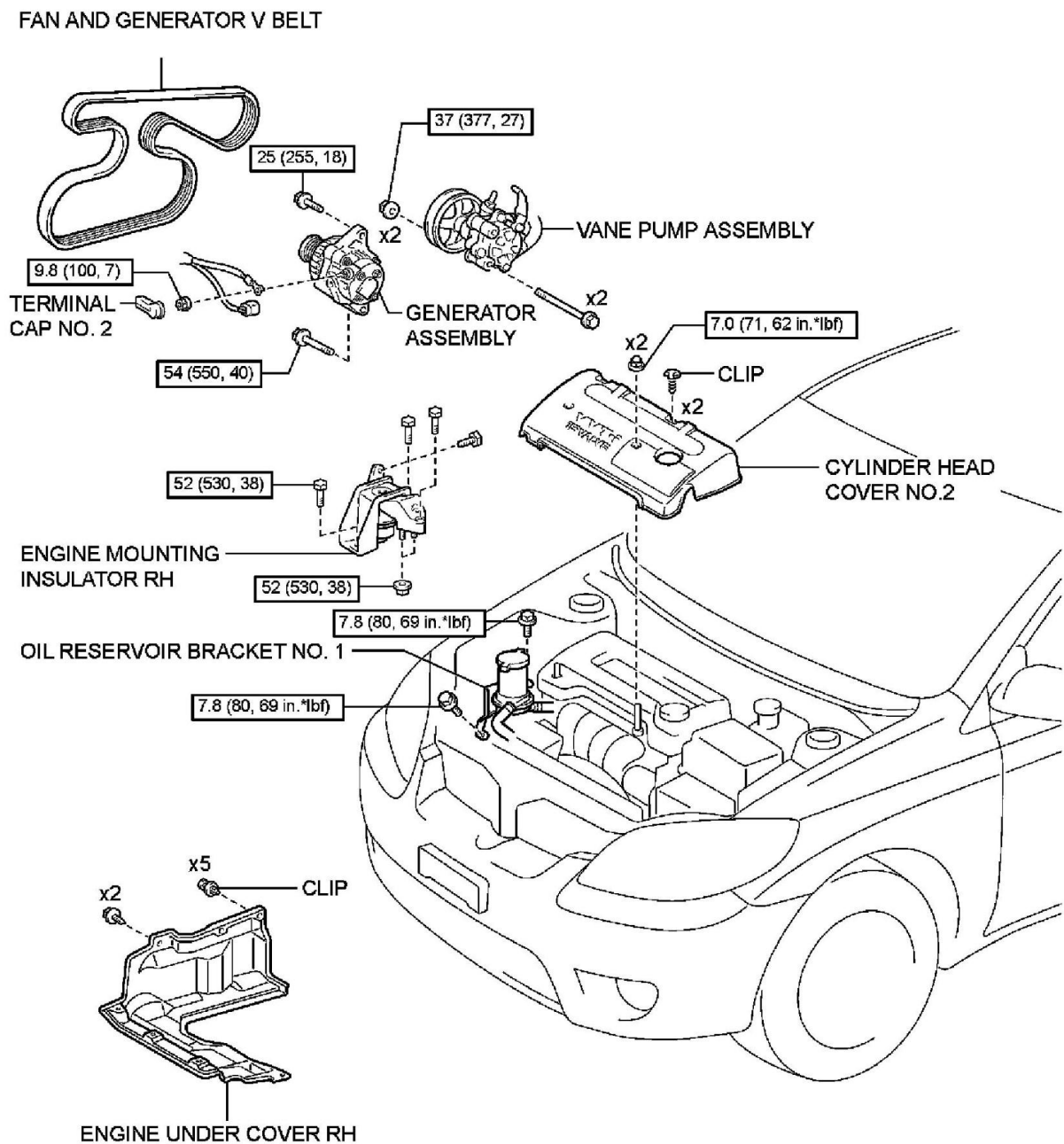
- (a) Using 2 screwdrivers, pry out the chain with the crankshaft timing gear, as shown in the illustration.

- Use a shop rag or piece of cloth to protect the engine.
- If revolving the camshafts with the chain off the gears, turn the crankshaft 1/4 revolution to prevent the valves from coming into contact with the pistons.

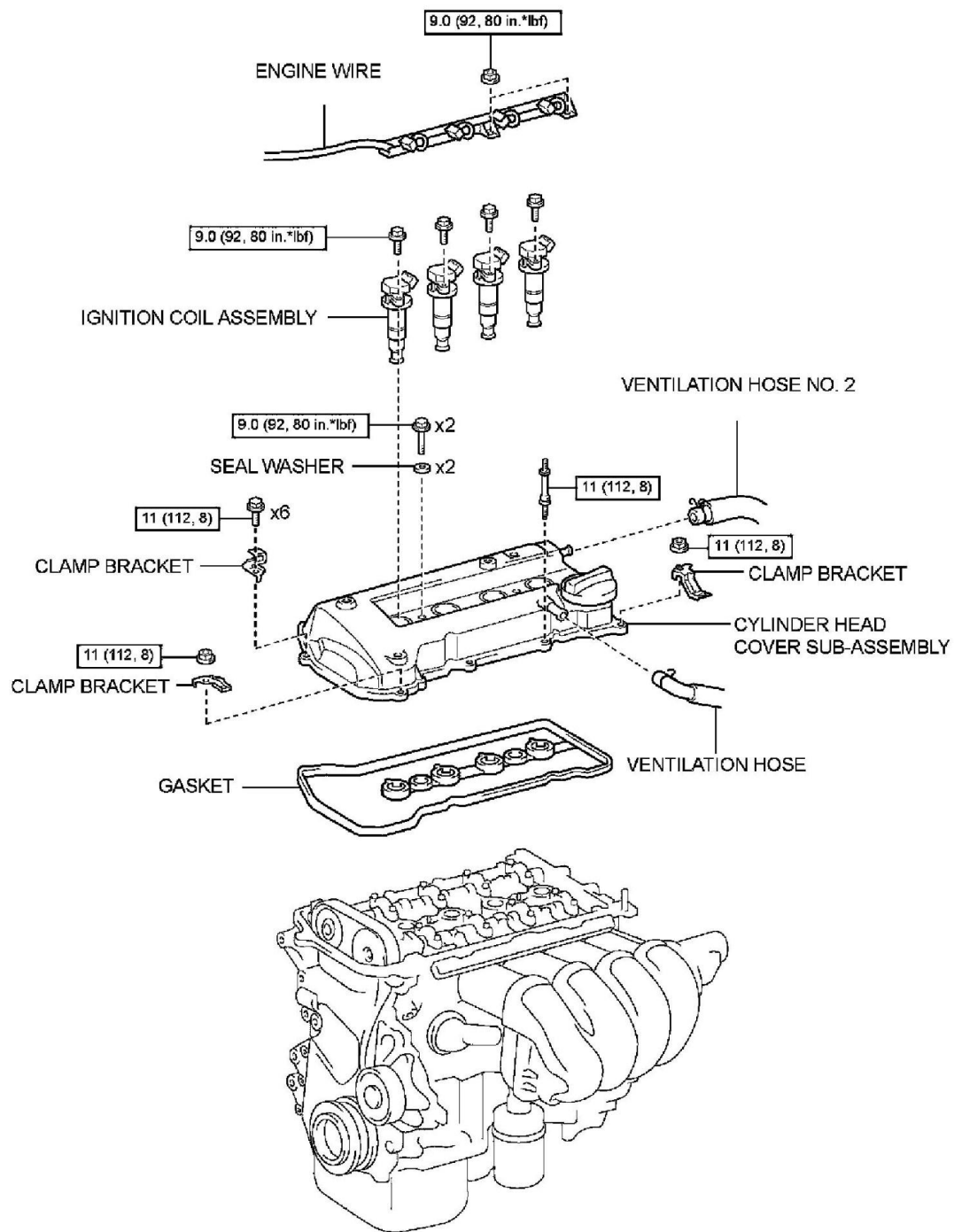
Timing Chain: Service and Repair Installation

1 ZZ-FE ENGINE MECHANICAL: TIMING CHAIN :

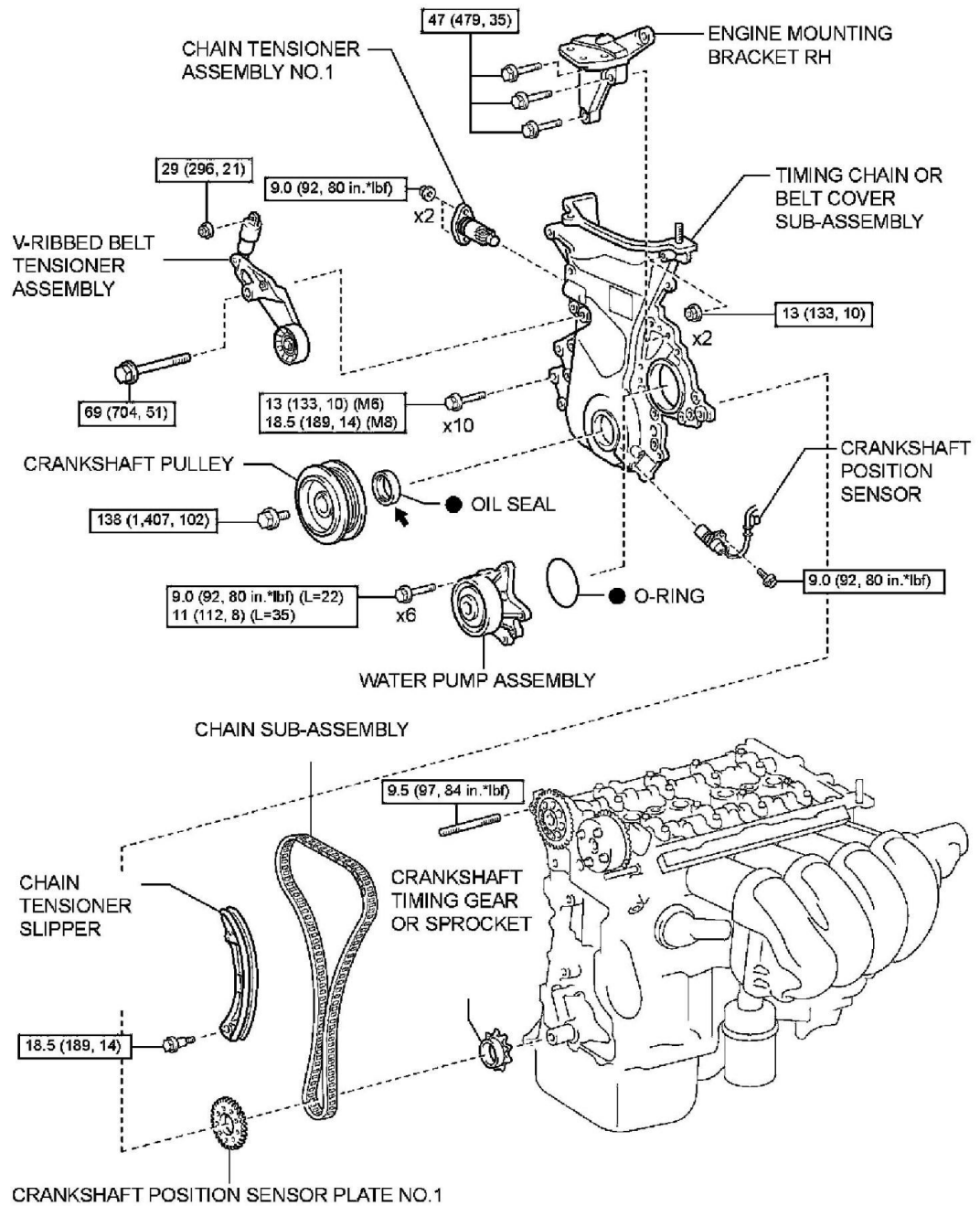
COMPONENTS



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



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



[N*m (kgf*cm, ft.*lbf)] : Specified torque

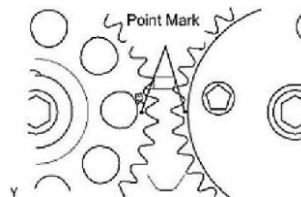
● Non-reusable part ← Apply multi-purpose grease

○

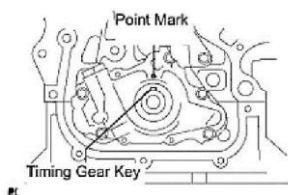
INSTALLATION

1. INSTALL CHAIN SUB-ASSEMBLY

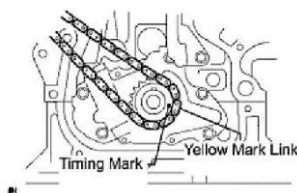
- (a) Set the No. 1 cylinder to the TDC/compression.



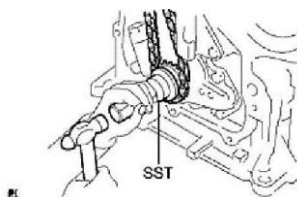
- (1) Turn the hexagonal wrench head portion of the camshafts until the point marks of the 2 camshaft timing gears are aligned.



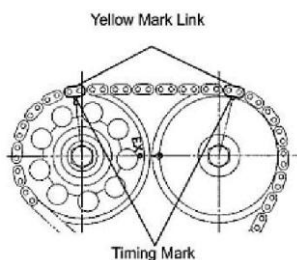
- (2) Using a crankshaft pulley bolt, turn the crankshaft to align the timing gear key with the point mark on the oil pump.



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

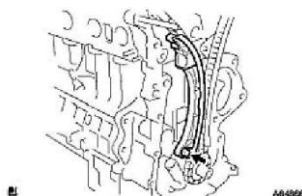


- (c) Using SST, install the crankshaft timing gear.
SST: 09223-22010



- (d) Install the chain onto the camshaft timing gears with the yellow mark links aligned with the timing marks on the camshaft timing gears.

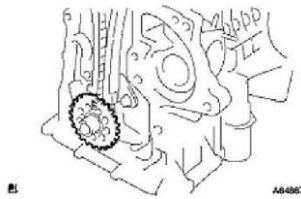
2. INSTALL CHAIN TENSIONER SLIPPER



- (a) Install the chain tensioner slipper with the bolt.

Torque: 18.5 Nm (189 kgf-cm, 14 ft-lbf)

3. INSTALL CRANKSHAFT POSITION SENSOR PLATE NO.1



- (a) Install the crankshaft position sensor plate with the "F" mark facing forward.
4. **INSTALL TIMING CHAIN OR BELT COVER OIL SEAL**

- (a) Apply a light coat of multi-purpose grease to a new oil seal lip.



- (b) Place the timing chain cover on wooden blocks.
- (c) Using SST, tap the oil seal in until its surface is flush with the timing chain cover edge. SST: 09223-22010

NOTE: Keep the lip free of foreign objects.

5. **INSTALL TIMING CHAIN OR BELT COVER SUB-ASSEMBLY**

- (a) Remove any old packing material from the contact surface.
- (b) Apply a continuous bead of seal packing (Diameter 3.5 to 4.5 mm (0.138 to 0.177 in.)) as shown in the illustration.



Seal packing:

Water pump part

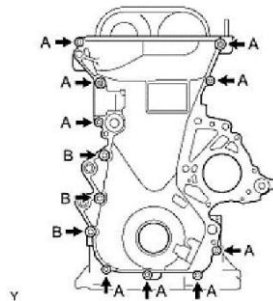
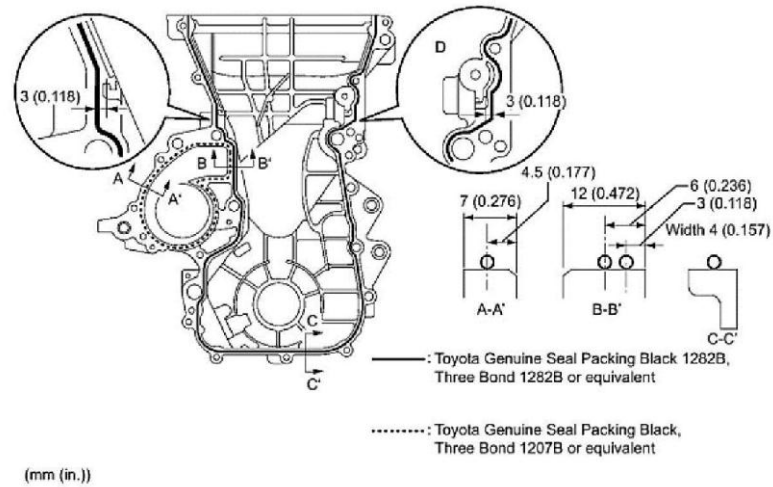
Toyota Genuine Seal Packing 1282B, Three Bond 1282B or equivalent Other part

Toyota Genuine Seal Packing Black, Three Bond 1207B or equivalent

NOTICE:

- Remove any oil from the contact surface.
- Install the chain cover within 3 minutes of applying seal packing.
- Do not start the engine for at least 2 hours after installing the chain cover.
- Be careful to only apply the specified thickness / volume of seal packing in area D.

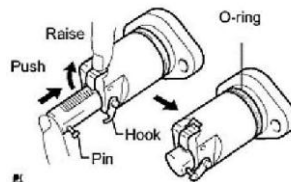
Timing Chain Cover Side:



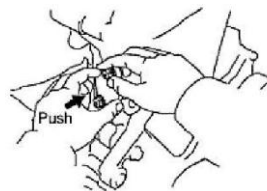
- (c) Install the timing chain cover with the 10 bolts and 2 nuts. Bolt A and nut A - Torque: 13 Nm (133 kgf-cm, 10 ft-lbf)
Bolt B - Torque: 18.5 Nm (189 kgf-cm, 14 ft-lbf)

- (d) Using a "TORX" socket wrench (E8), install the stud bolt.
Torque: 9.5 Nm (97 kgf-cm, 84 in-lbf)

6. INSTALL CHAIN TENSIONER ASSEMBLY NO.1



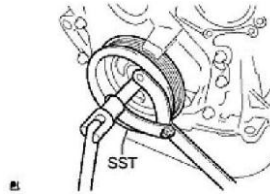
- (a) Check that the O-ring is clean, then set the hook as shown in the illustration. (b) Apply a light coat of engine oil to the O-ring.



- (c) Install the chain tensioner with the 2 nuts.
Torque: 9.0 Nm (92 kgf-cm, 80 in-lbf)

- Be careful not to twist the O-ring.
- When installing the chain tensioner, set the hook again if the hook releases the plunger.

7. INSTALL CRANKSHAFT PULLEY



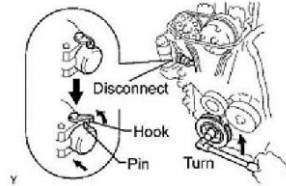
- (a) Align the pulley set key with the key groove of the crankshaft pulley, then slide on the crankshaft pulley.
- (b) Using SST, install the crankshaft pulley bolt.

SST: 09960-10010

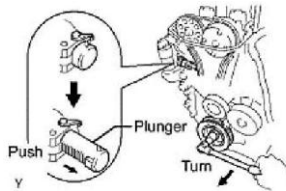
09962-01000

09963-01000

Torque: 138 Nm (1,407 kgf-cm, 102 ft-lbf)



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



- (d) Turn the crankshaft clockwise, then check that the slipper is pushed by the plunger.
If the plunger is not extended, push the slipper into the chain tensioner using a screwdriver so that the hook is released from the knock pin and the plunger can be extended.

8. INSTALL CRANKSHAFT POSITION SENSOR

- (a) Apply a light coat of engine oil to the O-ring of the crankshaft position sensor.
- (b) Install the crankshaft position sensor with the 2 bolts.

Torque: 9.0 Nm (92 kgf-cm, 80 in-lbf)

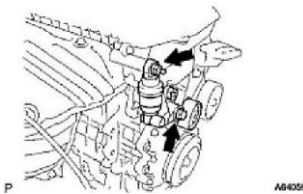
9. INSTALL WATER PUMP ASSEMBLY

- (a) Install the water pump assembly (See: Water Pump/Service and Repair/Installation).

10. INSTALL ENGINE MOUNTING BRACKET RH

Torque: 47 Nm (479 kgf-cm, 35 ft-lbf)

11. INSTALL V-RIBBED BELT TENSIONER ASSEMBLY



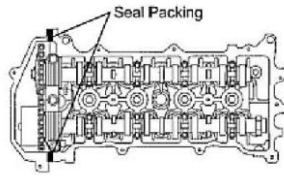
- (a) Install the V-ribbed belt tensioner with the bolt and nut.

Bolt - Torque: 69 Nm (704 kgf-cm, 51 ft-lbf)

Nut - Torque: 29 Nm (296 kgf-cm, 21 ft-lbf)

12. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY

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



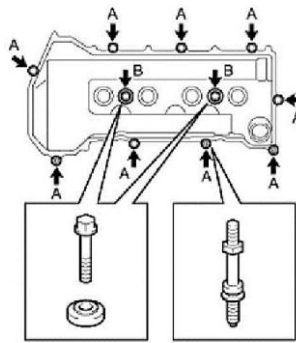
(b) Apply seal packing to the 2 locations as shown in the illustration.

Seal packing:

Toyota Genuine Seal Packing Black, Three Bond 1207B or equivalent

- Remove any oil from the contact surface.
- Install the cylinder head cover within 3 minutes of applying seal packing. -

Do not put in engine oil for at least 2 hours after installation.



(c) Install the cylinder head cover and 3 clamp brackets with the 9 bolts, 2 seal washers and 2 nuts.

Bolt A and nut A - Torque: 11 Nm (112 kgf-cm, 8 ft-lbf)

Bolt B - Torque: 9.0 Nm (92 kgf-cm, 80 in-lbf)

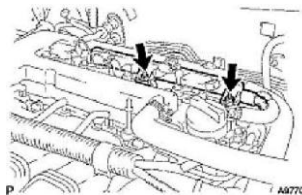
(d) Install the 3 clamps of the engine wire onto the clamp bracket.

(e) Connect the ventilation hose No. 2. (f) Connect the ventilation hose.

13. INSTALL IGNITION COIL ASSEMBLY

(a) Install the 4 ignition coils with the 4 bolts.

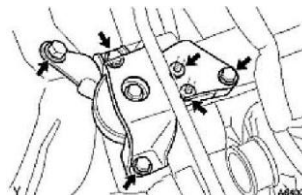
Torque: 9.0 Nm (92 kgf-cm, 80 in-lbf)



(b) Install the engine wire with the 2 nuts.

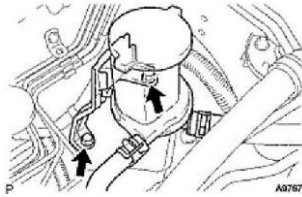
Torque: 9.0 Nm (92 kgf-cm, 80 in-lbf) (c) Connect the 4 ignition coil connectors.

14. INSTALL ENGINE MOUNTING INSULATOR RH



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

Torque: 52 Nm (530 kgf-cm, 38 ft-lbf)



(b) Install the oil reservoir bracket No. 1 with the 2 bolts.

Torque: 7.8 Nm (80 kgf-cm, 69 in-lbf)

15. INSTALL GENERATOR ASSEMBLY

(a) Install the generator assembly (See: Starting and Charging/Charging System/Alternator/Service and Repair/Installation).

16. INSTALL VANE PUMP ASSEMBLY

(a) Install the vane pump assembly (See: Steering and Suspension/Steering/Power Steering/Power Steering Pump/Service and Repair/Installation).

17. INSTALL FAN AND GENERATOR V BELT

18. ADD ENGINE COOLANT

(a) Add the engine coolant (See: Cooling System/Coolant/Testing and Inspection).

19. CONNECT BATTERY NEGATIVE TERMINAL

Torque: 5.4 Nm (55 kgf-cm, 48 in-lbf)

20. CHECK ENGINE COOLANT LEAK

(a) Check for the engine coolant leakage (See: Cooling System/Testing and Inspection).

21. CHECK ENGINE OIL LEAKAGE

22. INSTALL CYLINDER HEAD COVER NO.2

(a) Install the cylinder head cover No. 2 with the 2 nuts and 2 clips.

Torque: 7.0 Nm (71 kgf-cm, 62 in-lbf)

23. INSTALL FRONT WHEEL RH

Torque: 103 Nm (1,050 kgf-cm, 76 ft-lbf)