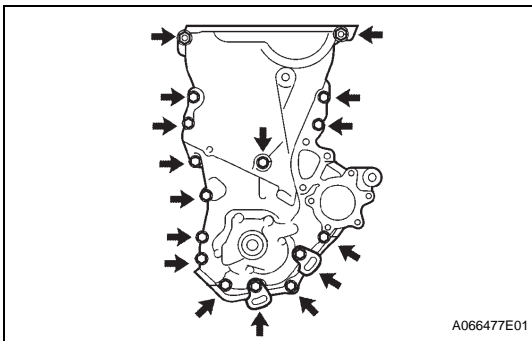
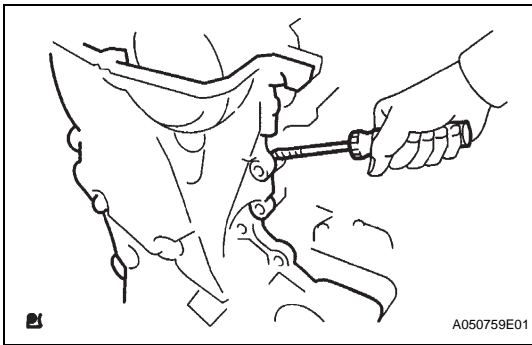


REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
CAUTION:
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. REMOVE FRONT WHEEL RH
3. REMOVE NO. 2 CYLINDER HEAD COVER (See page [EM-73](#))
4. REMOVE IGNITION COIL (See page [EM-25](#))
5. DISCONNECT VENTILATION HOSE (See page [EM-25](#))
6. DISCONNECT NO. 2 VENTILATION HOSE (See page [EM-25](#))
7. REMOVE CYLINDER HEAD COVER (See page [EM-26](#))
8. REMOVE GENERATOR V BELT (See page [EM-7](#))
9. REMOVE GENERATOR (See page [CH-9](#))
10. REMOVE ENGINE UNDER COVER RH
11. DRAIN ENGINE OIL (See page [LU-3](#))
12. DRAIN ENGINE COOLANT (See page [CO-5](#))
13. REMOVE VANE PUMP V BELT (See page [EM-7](#))
14. REMOVE WATER PUMP PULLEY (See page [EM-92](#))
15. REMOVE WATER PUMP (See page [EM-93](#))
16. REMOVE CRANKSHAFT PULLEY (See page [EM-92](#))
17. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY (See page [EM-92](#))
18. REMOVE CRANKSHAFT POSITION SENSOR (See page [ES-338](#))
19. REMOVE ENGINE MOUNTING BRACKET INSULATOR RH (See page [EM-27](#))
20. REMOVE ENGINE MOUNTING BRACKET RH (See page [EM-93](#))
21. REMOVE TIMING CHAIN COVER (OIL PUMP)
 - (a) Remove the 15 bolts and nut.



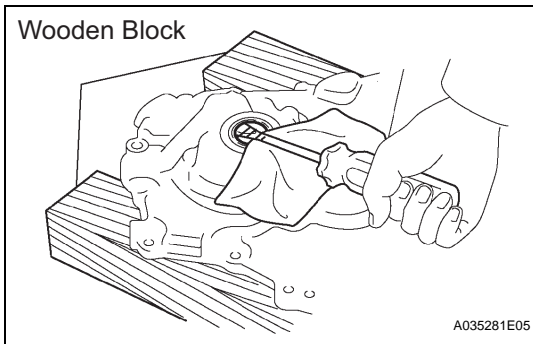


- (b) Using a screwdriver with its tip wrapped in tape, remove the oil pump by prying between the cylinder head and cylinder block.

NOTICE:

Be careful not to damage the contact surface of the oil pump, cylinder head and cylinder block.

- (c) Remove the 2 O-rings from the cylinder block and No. 1 oil pan.

**DISASSEMBLY****1. REMOVE OIL PUMP SEAL**

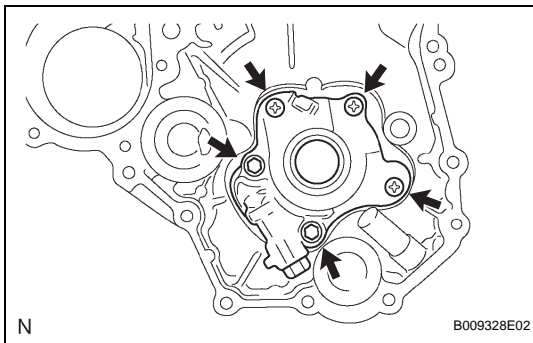
- (a) Using a screwdriver, remove the oil seal.

HINT:

Tape the screwdriver tip before use.

2. REMOVE OIL PUMP RELIEF VALVE

- (a) Remove the plug, spring and relief valve.

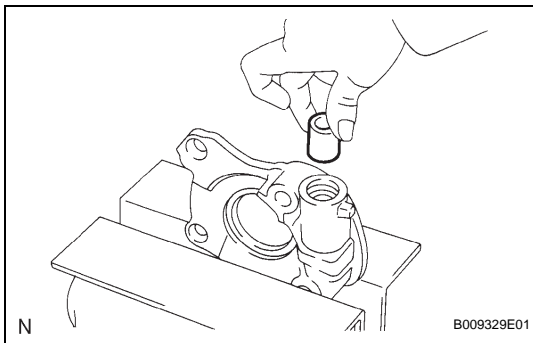
**3. REMOVE OIL PUMP**

- (a) Remove the 2 bolts, 3 screws and oil pump cover.

- (b) Remove the oil pump rotor set.

NOTICE:

Do not change the arrangement or turn over the 2 removed rotors.

**INSPECTION****1. INSPECT OIL PUMP RELIEF VALVE**

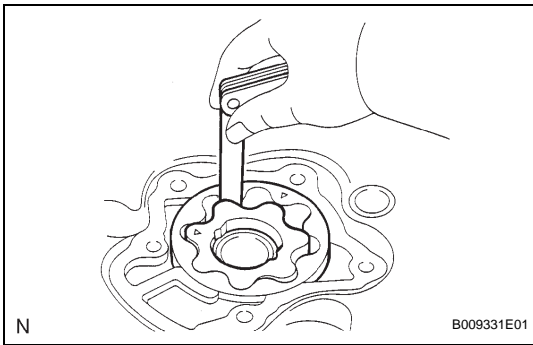
- (a) Coat the valve with engine oil and check that it falls smoothly into the valve hole by its own weight.

2. INSPECT OIL PUMP

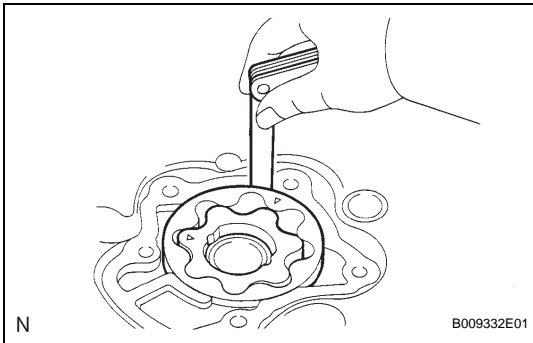
- (a) Inspect the oil pump rotor set.

- (1) Coat the oil pump rotor set with engine oil and place it into the oil pump body. Check that the rotors revolve smoothly.

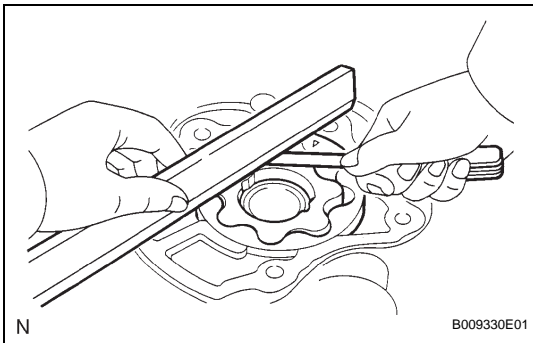
If the condition is not as specified, replace the timing chain cover (oil pump).



- (b) Inspect the rotor tip clearance.
 - (1) Using a feeler gauge, measure the clearance between the drive and driven rotor tips.
 - Standard tip clearance:**
0.060 to 0.180 mm (0.0024 to 0.0071 in.)
 - Maximum tip clearance:**
0.28 mm (0.0110 in.)
 If the tip clearance is greater than the maximum, replace the timing chain cover (oil pump).



- (c) Inspect the rotor body clearance.
 - (1) Using a feeler gauge, measure the clearance between the driven rotor and the oil pump body.
 - Standard body clearance:**
0.250 to 0.325 mm (0.0098 to 0.0128 in.)
 - Maximum body clearance:**
0.425 mm (0.0167 in.)
 If the body clearance is greater than the maximum, replace the timing chain cover (oil pump).

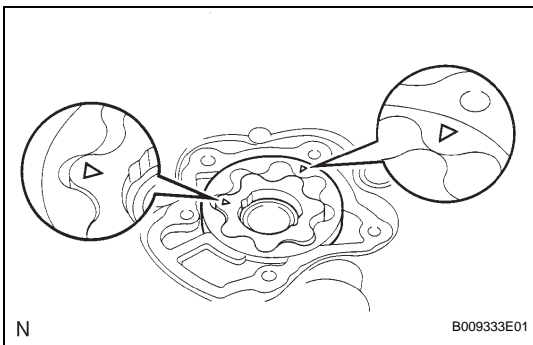


- (d) Inspect the rotor side clearance.
 - (1) Using a feeler gauge and precision straightedge, measure the clearance between the rotors and precision straightedge.
 - Standard side clearance:**
0.03 to 0.09 mm (0.0012 to 0.0035 in.)
 - Maximum side clearance:**
0.15 mm (0.0059 in.)
 If the side clearance is greater than the maximum, replace the timing chain cover (oil pump).

REASSEMBLY

1. INSTALL OIL PUMP

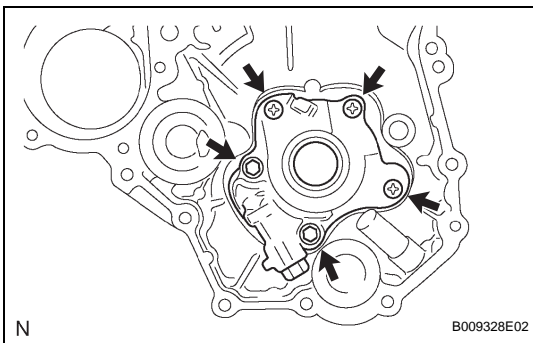
- (a) Install the oil pump rotor set.
 - (1) Coat the oil pump rotor set with engine oil and place it into the pump body with the marks facing the pump body cover side.

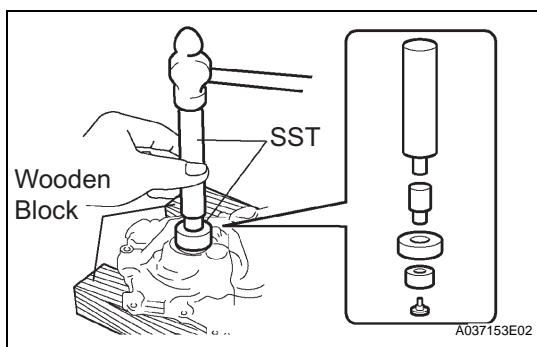


- (b) Install the oil pump cover with the 2 bolts and 3 screws.
 - Torque: 8.8 N*m (90 kgf*cm, 78 in.*lbf) for bolt**
10 N*m (102 kgf*cm, 7.6 ft.*lbf) for screw

2. INSTALL OIL PUMP RELIEF VALVE

- (a) Coat the relief valve with engine oil and insert the relief valve and spring into the pump body hole.
- (b) Install the relief valve plug.
 - Torque: 25 N*m (255 kgf*cm, 18 ft.*lbf)**





3. INSTALL OIL PUMP SEAL

- (a) Using SST and a hammer, tap in a new oil seal until its surface is flush with the timing chain cover edge.
SST 09950-60010 (09951-00250, 09951-00380, 09952-06010), 09950-70010 (09951-07100)

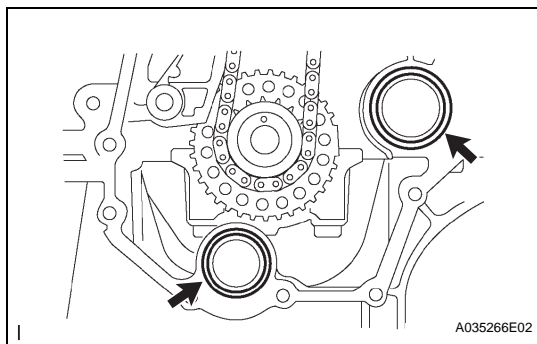
NOTICE:

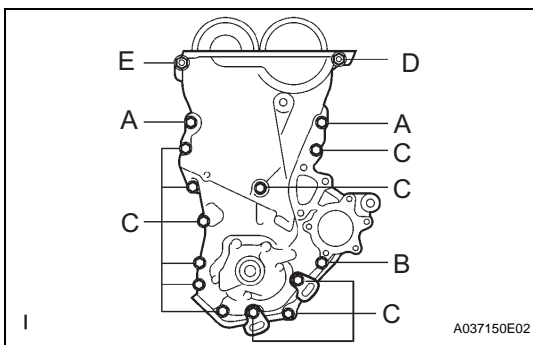
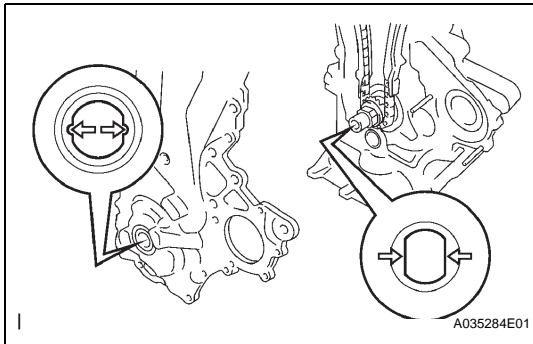
- Be careful not to tap the oil seal at an angle.
 - Keep the lip free of foreign objects.
- (b) Apply multi-purpose grease to the lip of the oil seal.

INSTALLATION

1. INSTALL TIMING CHAIN COVER (OIL PUMP)

- (a) Install 2 new O-rings onto the 2 locations as shown in the illustration.
- (b) Remove any old packing material from the contact surface.





- Install the oil pump within 3 minutes of applying seal packing.
- Do not expose the seal to engine oil for at least 2 hours after the installation.

(d) Align the keyway of the oil pump drive rotor with the rectangular portion of the crankshaft, and slide the oil pump into place.

(e) Install the timing chain cover with the 15 bolts and nut. Tighten the bolts and nut uniformly in several steps.

Torque: 24 N*m (245 kgf*cm, 18 ft.*lbf) for bolt A
 11 N*m (112 kgf*cm, 8.1 ft.*lbf) for bolt B
 11 N*m (112 kgf*cm, 8.1 ft.*lbf) for bolt C
 24 N*m (245 kgf*cm, 18 ft.*lbf) for bolt D
 24 N*m (245 kgf*cm, 18 ft.*lbf) for nut E

NOTICE:

After installing the oil pump assembly, the mounting bracket and water pump must be installed within 15 minutes.

HINT:

Each bolt length is as follows.

30 mm (1.18 in.) for bolt A

35 mm (1.38 in.) for bolt B

20 mm (0.79 in.) for bolt C

20 to 14 mm (0.79 to 0.55 in.) for bolt D

2. INSTALL WATER PUMP (See page [EM-121](#))
3. INSTALL ENGINE MOUNTING BRACKET RH (See page [EM-122](#))
4. INSTALL ENGINE MOUNTING BRACKET INSULATOR RH (See page [EM-30](#))
5. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY (See page [EM-123](#))
6. INSTALL CRANKSHAFT POSITION SENSOR (See page [ES-339](#))
7. INSTALL WATER PUMP PULLEY (See page [EM-121](#))
8. INSTALL CRANKSHAFT PULLEY (See page [EM-122](#))
9. INSTALL CYLINDER HEAD COVER (See page [EM-123](#))
10. CONNECT NO. 2 VENTILATION HOSE (See page [EM-31](#))

11. CONNECT VENTILATION HOSE (See page [EM-31](#))
12. INSTALL IGNITION COIL (See page [EM-79](#))
13. INSTALL NO. 2 CYLINDER HEAD COVER (See page [EM-85](#))
14. INSTALL GENERATOR (See page [CH-15](#))
15. INSTALL VANE PUMP V BELT (See page [EM-7](#))
16. INSTALL GENERATOR V BELT (See page [EM-7](#))
17. ADJUST GENERATOR V BELT (See page [EM-7](#))
18. ADJUST VANE PUMP V BELT (See page [EM-7](#))
19. INSPECT DRIVE BELT TENSION (See page [EM-6](#))
20. INSTALL FRONT WHEEL RH
21. INSTALL OIL PAN DRAIN PLUG
 - (a) Clean and install the drain plug with a new gasket.
Torque: 37.5 N*m (382 kgf*cm, 28 ft.*lbf)
22. ADD ENGINE OIL (See page [LU-3](#))
23. CHECK FOR ENGINE OIL LEAKS
24. ADD ENGINE COOLANT (See page [CO-5](#))
25. CHECK FOR COOLANT LEAKS (See page [CO-1](#))
26. INSTALL ENGINE UNDER COVER RH
27. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL