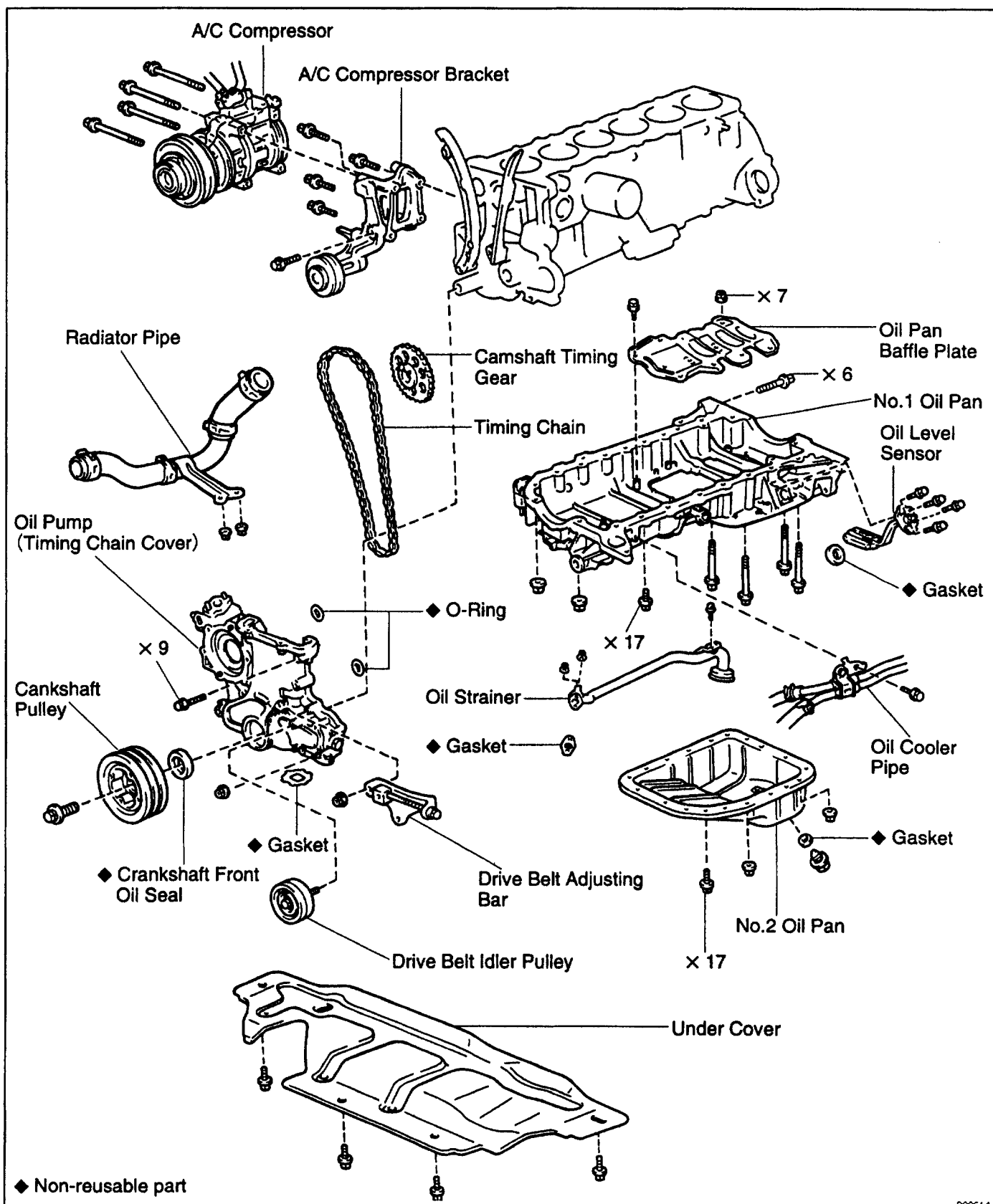


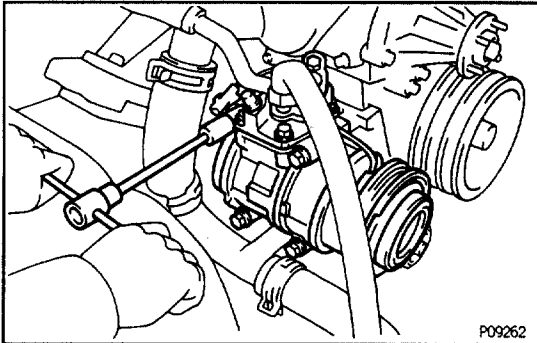
OIL PUMP COMPONENTS FOR REMOVAL AND INSTALLATION



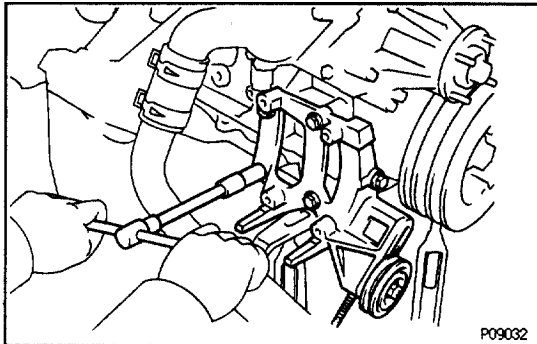
OIL PUMP REMOVAL

HINT: When repairing the oil pump, the oil pan and strainer should be removed and cleaned.

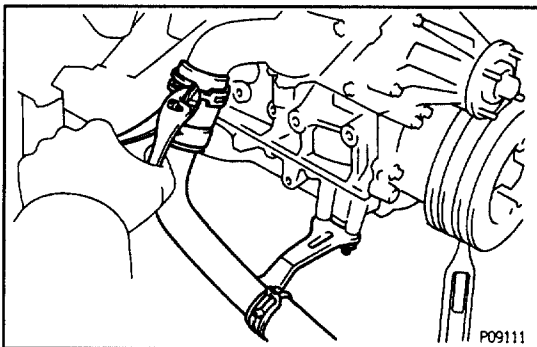
1. **DRAIN ENGINE OIL**
2. **REMOVE ENGINE UNDER COVER**
3. **DRAIN ENGINE COOLANT**
4. **REMOVE RADIATOR**
(See radiator removal in Cooling System)



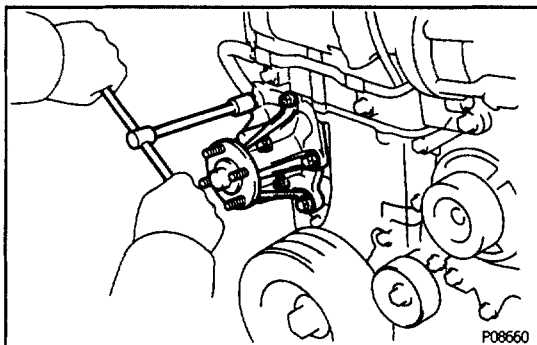
5. **DISCONNECT A/C COMPRESSOR AND BRACKET**
 - (a) Loosen the idler pulley nut and adjusting bolt, and remove the drive belt.
 - (b) Remove the 4 mounting bolts, and disconnect the compressor from the bracket.
- HINT: Put aside the compressor, and suspend it.



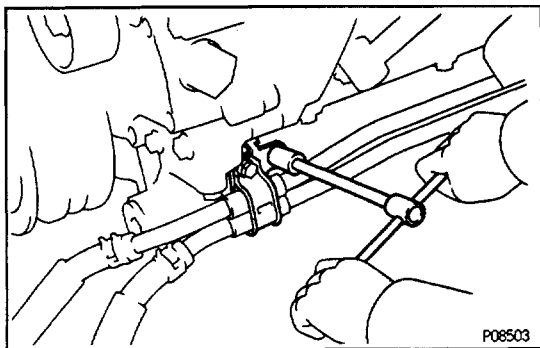
- (c) Remove the 5 bolts and A/C compressor bracket.



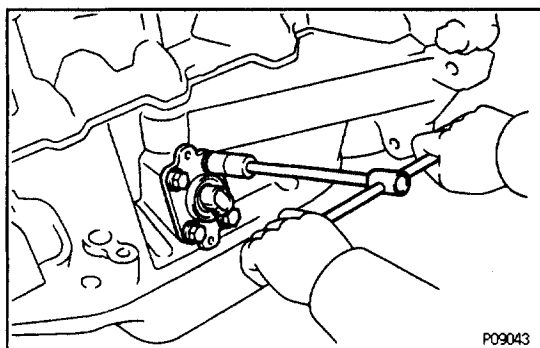
6. **REMOVE RADIATOR PIPE**
 - (a) Disconnect the No.2 radiator hose from the water inlet.
 - (b) Remove the 2 nuts and radiator pipe.



7. **REMOVE WATER PUMP**
Remove the 4 bolts, 2 nuts, water pump and gasket.
8. **REMOVE CYLINDER HEAD**
(See cylinder head removal in Engine Mechanical)

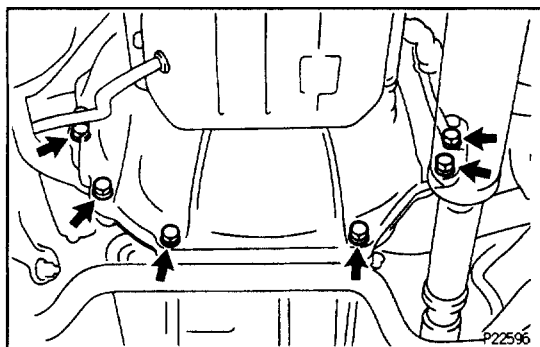


9. DISCONNECT OIL COOLER PIPE BRACKET FROM NO.1 OIL PAN



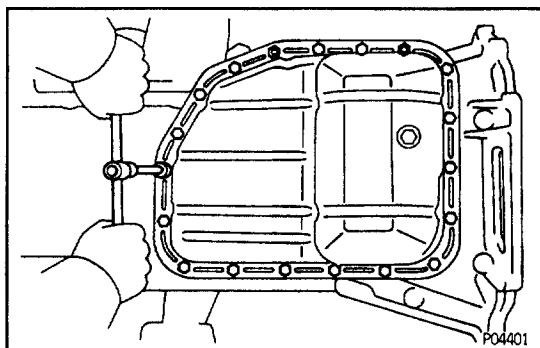
10. REMOVE OIL LEVEL SENSOR

- (a) Remove the 4 bolts and level sensor.
- (b) Remove the gasket from the level sensor.



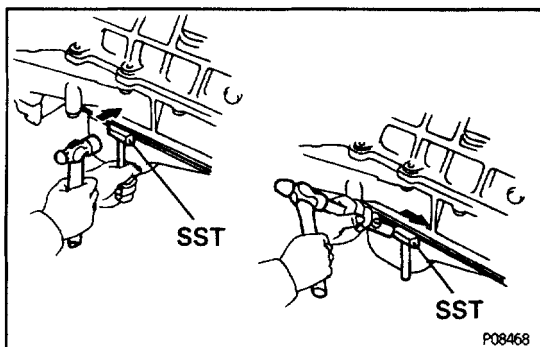
11. REMOVE BOLTS HOLDING NO.1 OIL PAN TO TRANSMISSION HOUSING

Remove the 6 bolts.



12. REMOVE NO.2 OIL PAN

- (a) Remove the 17 mounting bolts and 2 nuts.

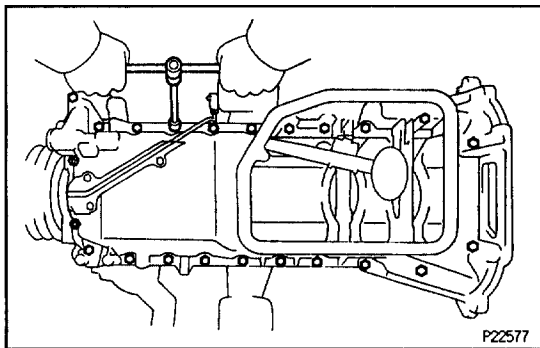


- (b) Insert the blade of SST between the No.1 and No.2 oil pans, cut off applied sealer and remove the No.2 oil pan.

SST 09032-00100

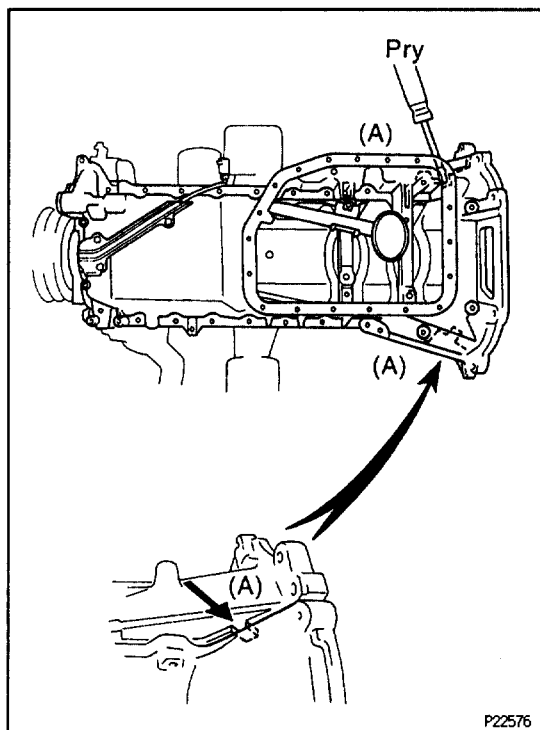
NOTICE:

- Be careful not to damage the No.2 oil pan contact surface of the No.1 oil pan.
- Be careful not to damage the oil pan flange.



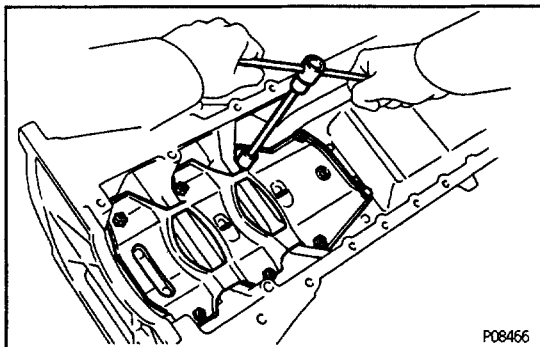
13. REMOVE NO.1 OIL PAN

- (a) Remove the 21 mounting bolts and 2 nuts.



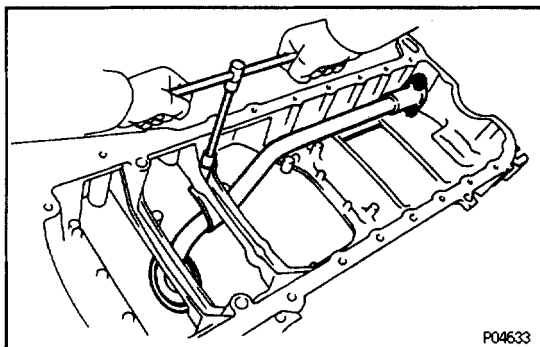
- (b) Remove the No.1 oil pan by prying the portions (A) between the cylinder block and No.1 oil pan with a screwdriver.

NOTICE: Be careful not to damage the contact surfaces of the cylinder block and No.1 oil pan.



14. REMOVE OIL PAN BAFFLE PLATE

Remove the bolt, 7 nuts and baffle plate.

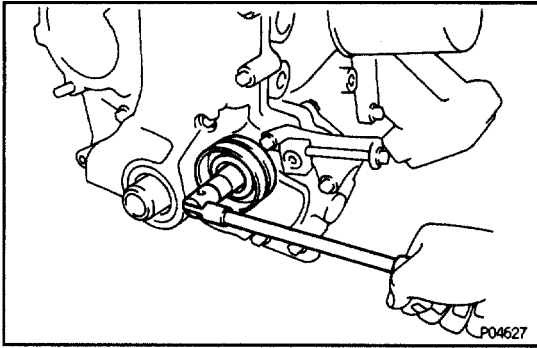


15. REMOVE OIL STRAINER

Remove the bolt, 2 nuts, oil strainer and gasket.

16. REMOVE CRANKSHAFT PULLEY

(See step 14 in timing chain removal in Engine Mechanical)

**17. REMOVE DRIVE BELT IDLER PULLEY**

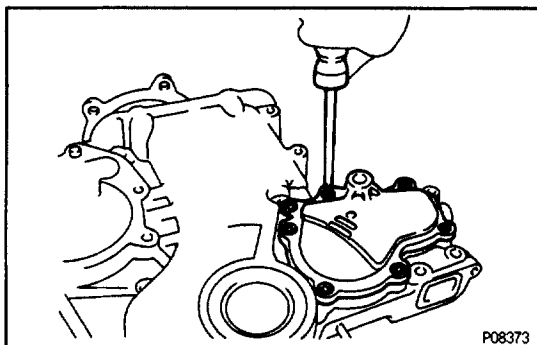
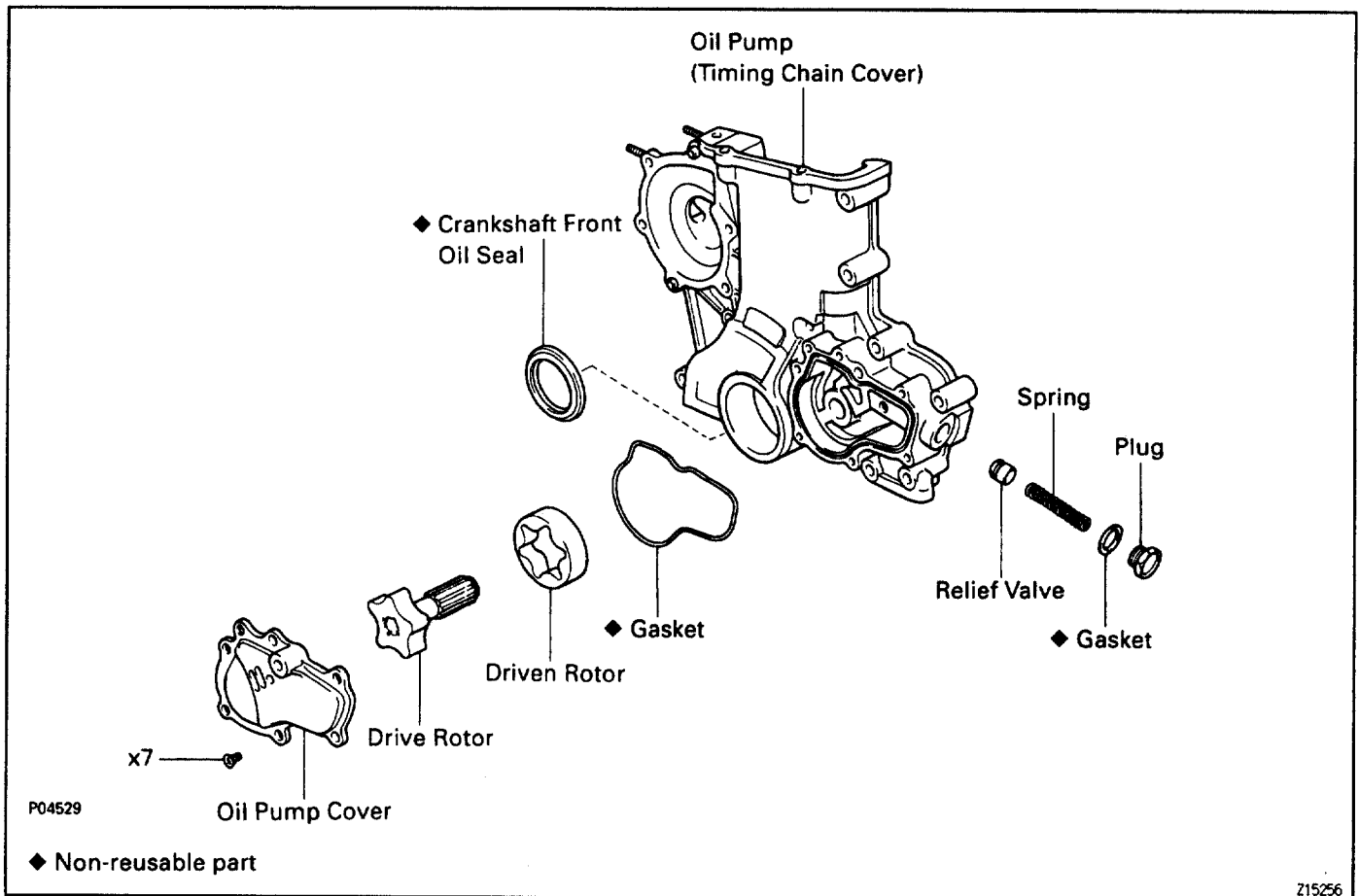
Remove the bolt and idler pulley.

18. REMOVE OIL PUMP (TIMING CHAIN COVER)

(See step 17 in timing chain removal in Engine Mechanical)

19. REMOVE TIMING CHAIN AND CAMSHAFT TIMING GEAR

COMPONENTS FOR DISASSEMBLY AND ASSEMBLY



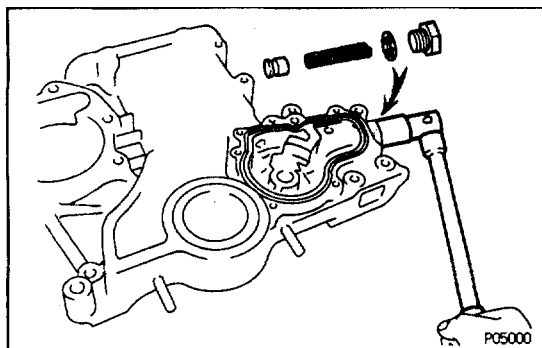
OIL PUMP DISASSEMBLY

Assembly is in the reverse order of disassembly.

1. REMOVE DRIVE AND DRIVEN ROTORS

Remove the 7 screws, pump cover, drive rotor, driven rotor and gasket.

INSTALLATION HINT: Place a new gasket on the pump body.

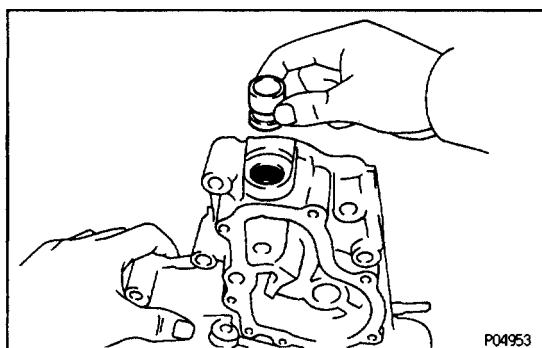


2. REMOVE RELIEF VALVE

Remove the plug, gasket, spring and relief valve.

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

INSTALLATION HINT: Install a new gasket to the plug.



OIL PUMP INSPECTION

1. INSPECT RELIEF VALVE

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

If it does not, replace the relief valve. If necessary, replace the oil pump assembly.

2. INSPECT DRIVE AND DRIVEN ROTORS

A. Inspect rotor body clearance

Using a thickness gauge, measure the clearance between the driven rotor and body.

Standard body clearance:

0.100 – 0.170 mm (0.0039 – 0.0067 in.)

Maximum body clearance:

0.30 mm (0.0118 in.)

If the body clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.

B. Inspect rotor side clearance

Using a thickness gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

Standard side clearance:

0.030 – 0.0090 mm (0.0012 – 0.0035 in.)

Maximum side clearance:

0.15 mm (0.0059 in.)

If the side clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.

C. Inspect rotor tip clearance

Using a thickness gauge, measure the clearance between the drive and driven rotor tips.

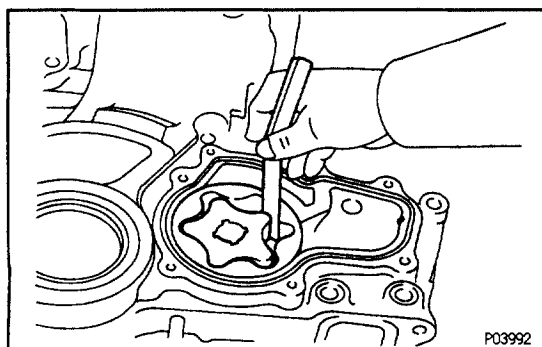
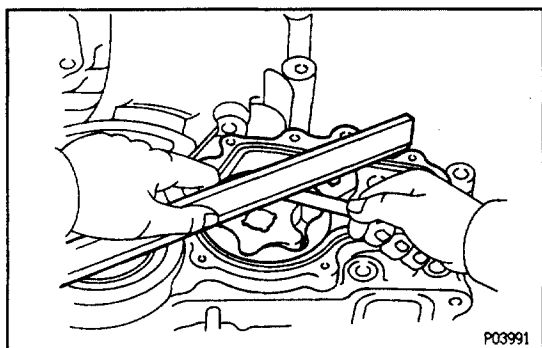
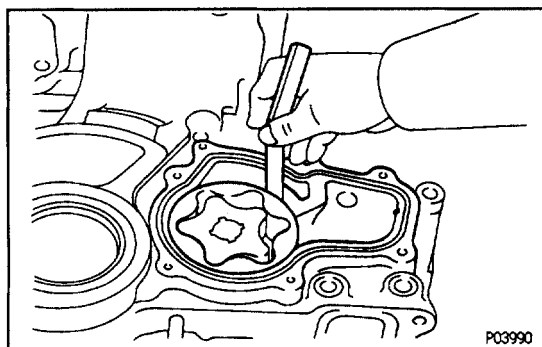
Standard tip clearance:

0.030 – 0.160 mm (0.0012 – 0.0063 in.)

Maximum tip clearance:

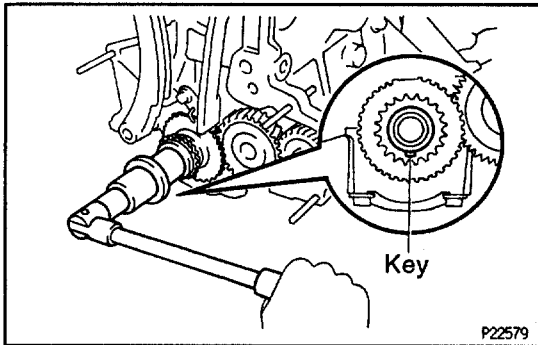
0.25 mm (0.0098 in.)

If the tip clearance is greater than maximum, replace the rotors as a set.



CRANKSHAFT FRONT OIL SEAL REPLACEMENT

(See cylinder block in Engine Mechanical)



OIL PUMP INSTALLATION

1. SET CRANKSHAFT

Turn the crankshaft until the set key on the crankshaft facing downward.

2. INSTALL TIMING CHAIN AND CAMSHAFT TIMING GEAR (See step 8 in timing chain installation in Engine Mechanical)

3. INSTALL OIL PUMP (TIMING CHAIN COVER) (See step 9 in timing chain installation in Engine Mechanical)

4. INSTALL DRIVE BELT IDLER PULLEY

Install the pulley with the bolt.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

5. INSTALL CRANKSHAFT PULLEY

(See step 11 in timing chain installation in Engine Mechanical)

6. INSTALL OIL STRAINER

Install a new gasket and the oil strainer with the bolt and 2 nuts.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

7. INSTALL OIL PAN BAFFLE PLATE

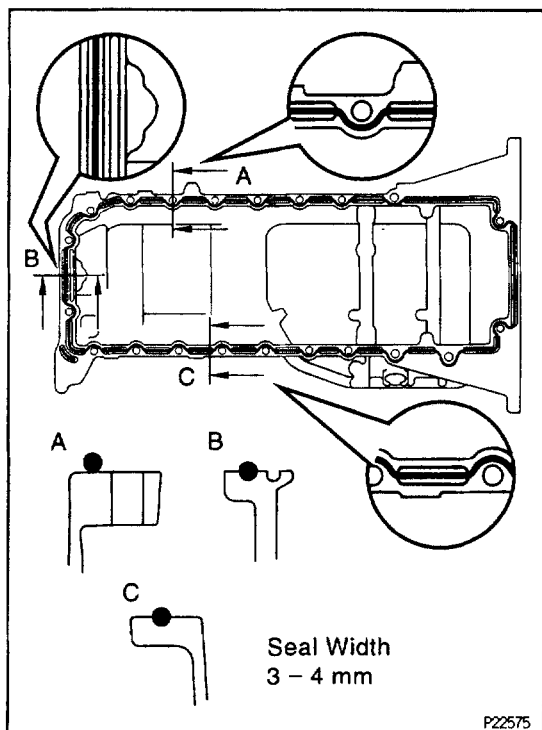
Install the baffle plate with the bolt and 7 nuts.

Torque: 9.0 N·m (90 kgf·cm, 78 in·lbf)

8. INSTALL NO.1 OIL PAN

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil pan, oil pump and cylinder block.

- Using a razor blade and 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 No.1 oil pan as shown in the illustration.

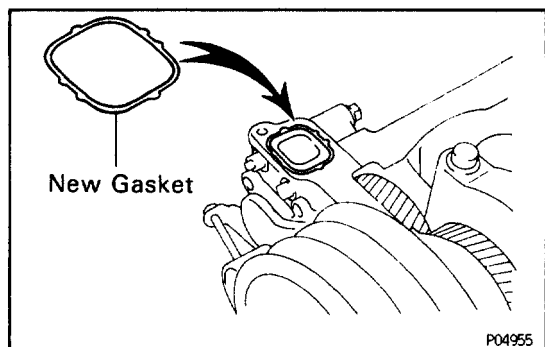
Seal packing:

Part No. 08826-00080 or equivalent

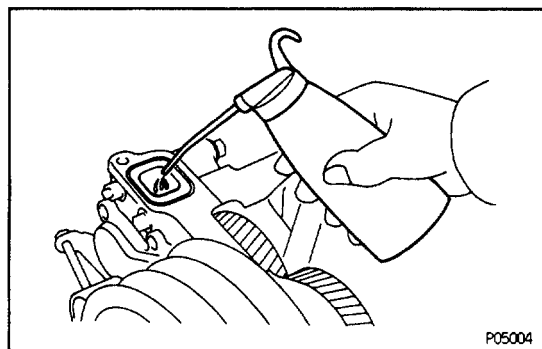
- Install a nozzle that has been cut to a 3–4 mm (0.12–0.16 in.) opening.

HINT: Avoid applying an excessive amount to the surface.

- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



- (c) Install a new gasket in position.



- (d) Pour in approximately 15 cm³ (0.9 cu in.) of engine oil into oil pump hole.

- (e) Install the No.1 oil pan with the 21 bolts and 2 nuts.

Torque:

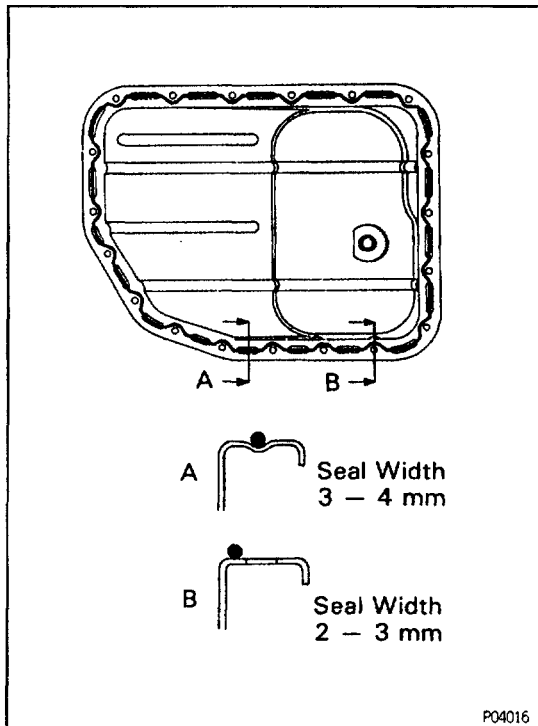
14 mm head: 44 N·m (440 kgf·cm, 32 ft·lbf)

12 mm head: 20 N·m (200 kgf·cm, 14 ft·lbf)

9. INSTALL NO.2 OIL PAN

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surface of the No.1 oil pan.

- Using a razor blade and 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 No.2 oil pan as shown in the illustration.

NOTICE: Do not use a solvent which will affect the painted surfaces.

Seal packing:

Part No. 08826-00080 or equivalent

- Install a nozzle that has been cut to a 2-3 mm (0.08-0.12 in.) opening or 3-4 mm (0.0120-0.016 in.) opening.

HINT: Avoid applying an excessive amount to the surface.

- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

- (c) Install the No.2 oil pan with the 17 bolts and 2 nuts.

Torque:

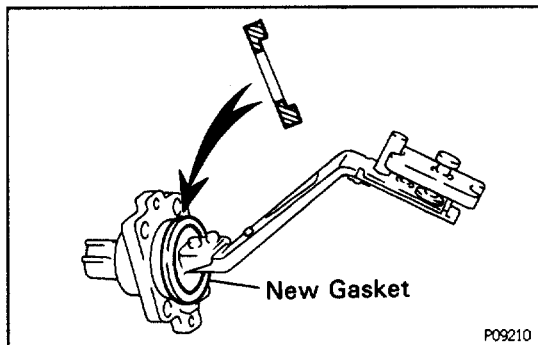
Bolt: 7.8 N·m (80 kgf·cm, 69 in·lbf)

Nut: 8.8 N·m (90 kgf·cm, 78 in·lbf)

10. INSTALL BOLTS HOLDING NO.1 OIL PAN TO TRANSMISSION HOUSING

Install the 6 bolts.

Torque: 72 N·m (730 kgf·cm, 53 ft·lbf)



11. INSTALL OIL LEVEL SENSOR

- (a) Install a new gasket to the level sensor.
(b) Install the level sensor with the 4 bolts.

Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)

12. CONNECT OIL COOLER PIPE BRACKET TO NO.1 OIL PAN

13. INSTALL CYLINDER HEAD

(See cylinder head installation in Engine Mechanical)

14. INSTALL WATER PUMP

Install a new gasket and water pump with the 4 bolts and 2 nuts.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

15. INSTALL RADIATOR PIPE

- (a) Connect the No. 2 radiator hose to the water inlet.
(b) Install the 2 nuts holding the radiator pipe to the No.1 oil pan.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

16. INSTALL A/C COMPRESSOR AND BRACKET

- (a) Install the A/C compressor bracket with the 5 bolts.

Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

- (b) Install the A/C compressor with the 4 bolts.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

- (c) Install and adjust the drive belt.
(See AC section)

17. INSTALL RADIATOR

(See radiator installation in Cooling System)

18. INSTALL ENGINE UNDER COVER

19. FILL WITH ENGINE OIL

20. START ENGINE AND CHECK FOR LEAKS