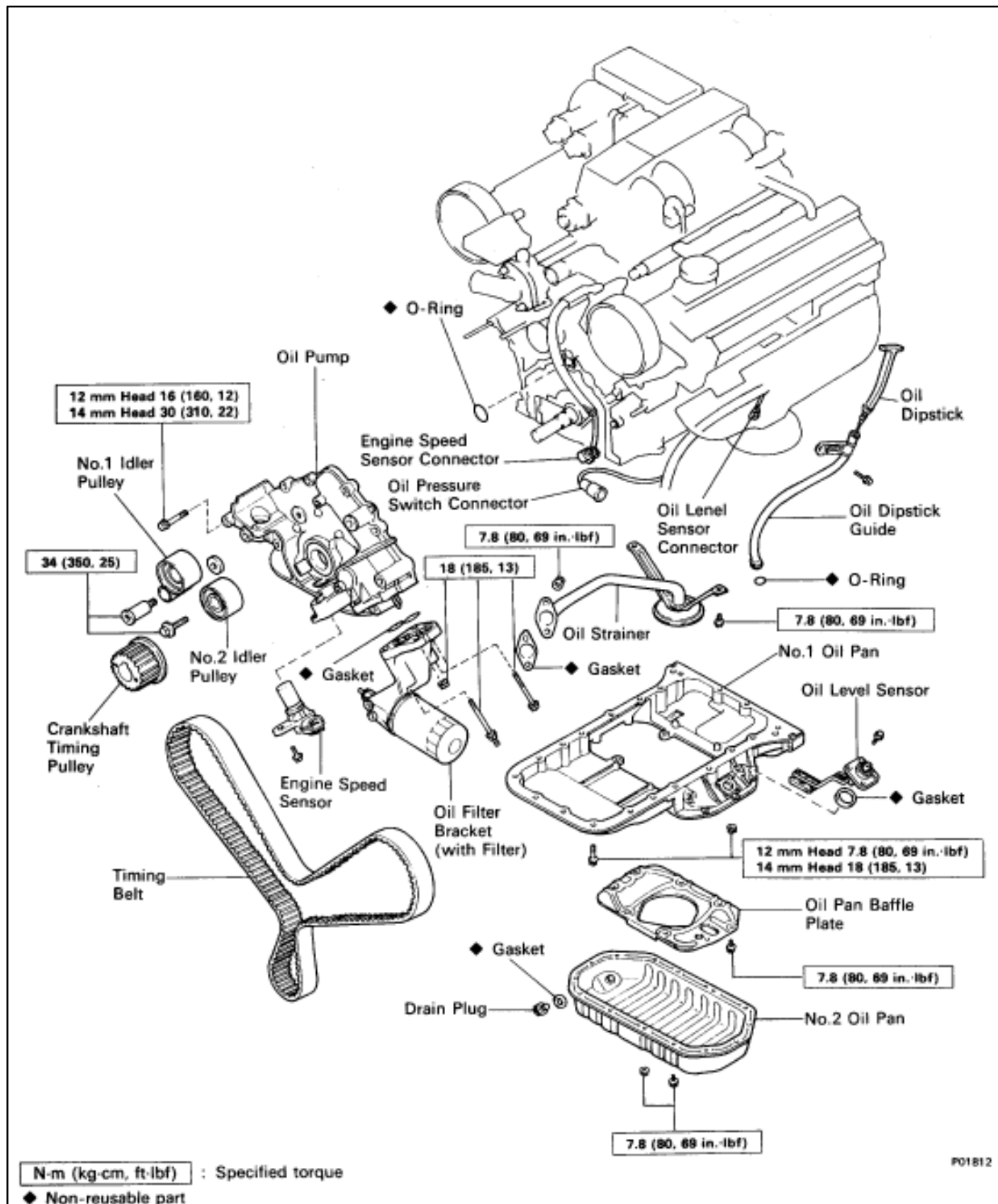


OIL PUMP

COMPONENTS FOR REMOVAL AND INSTALLATION

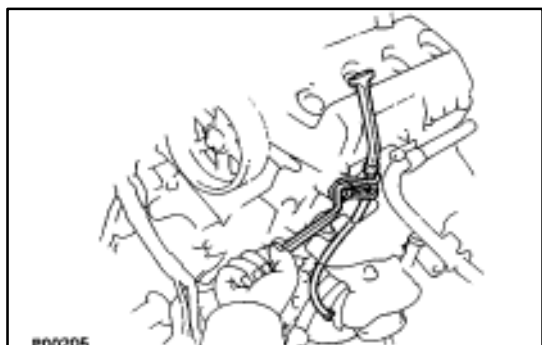


REMOVAL OF OIL PUMP

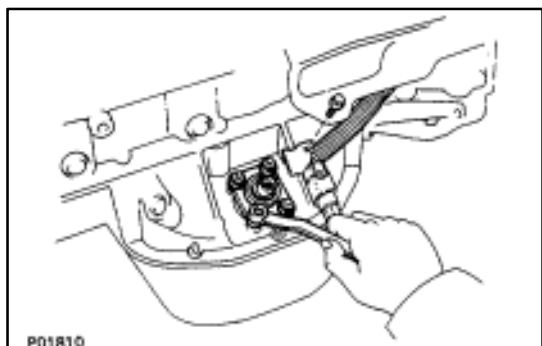
(See Components on page [LU-8](#))

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

1. **REMOVE ENGINE WITH TRANSMISSION**
(See pages [EM-118](#) to 128)
2. **SEPARATE ENGINE AND TRANSMISSION**
(See pages [EM-129](#) to 130)
3. **INSTALL ENGINE TO ENGINE STAND FOR REMOVAL**
4. **REMOVE TIMING BELT**
(See steps 8 to 35 on pages [EM-36](#) to 43)
5. **REMOVE NO.2 IDLER PULLEY, NO.1 IDLER PULLEY AND CRANKSHAFT TIMING PULLEY**
(See steps 36 to 38 on page [EM-44](#))

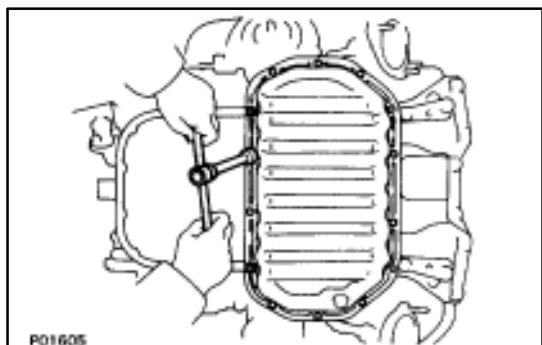


6. **REMOVE OIL DIPSTICK AND GUIDE**
 - (a) Remove the mounting bolt.
 - (b) Pull out the dipstick guide together with dipstick guide.
 - (c) Remove the O-ring from the dipstick guide.

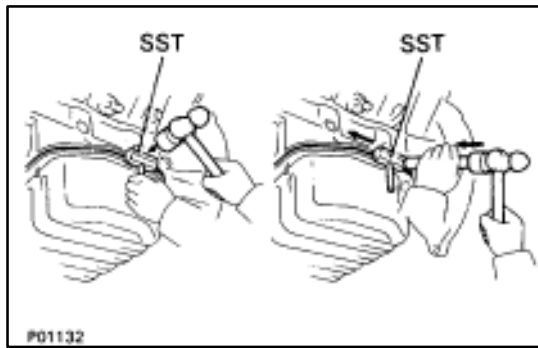


7. **REMOVE BRACKET OF MAIN OXYGEN SENSOR CONNECTOR FROM NO.1 OIL PAN**
Remove the bolt, and disconnect the connector bracket.

8. **REMOVE OIL LEVEL SENSOR**
 - (a) Disconnect the level sensor connector.
 - (b) Remove the four mounting bolts, and disconnect the engine wire bracket.
 - (c) Remove the level sensor.
 - (d) Remove the gasket from the level sensor.



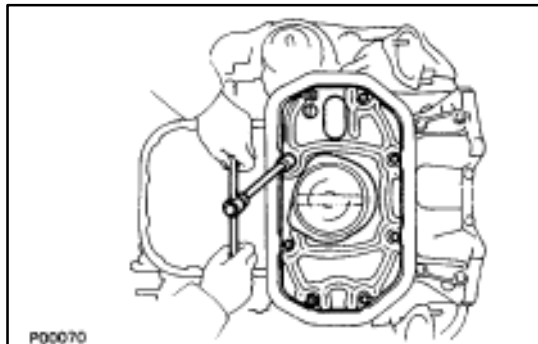
9. **REMOVE NO.2 OIL PAN**
 - (a) Remove the twelve mounting bolts and two nuts.



- (b) Insert the blade of SST between the No.1 and No.2 oil pan, cut off applied sealer and remove the No.1 oil pan.
SST 09032-00100

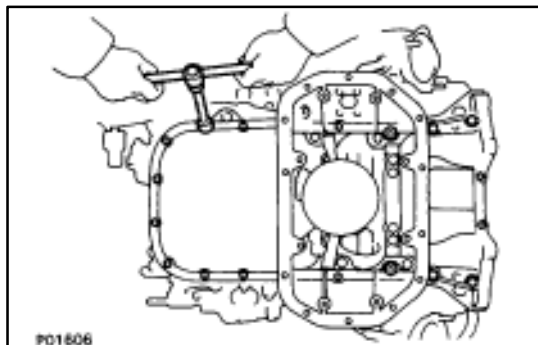
NOTICE:

- 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.



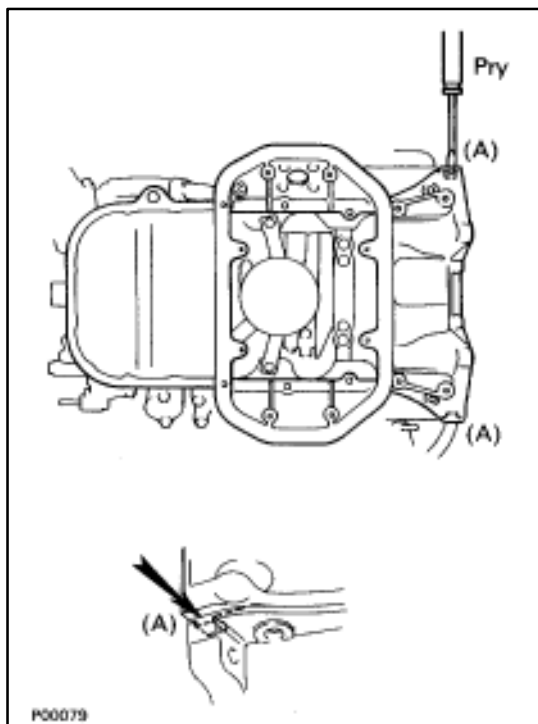
10. REMOVE OIL PAN BAFFLE PLATE

Remove the six bolts, two nuts and baffle plate.



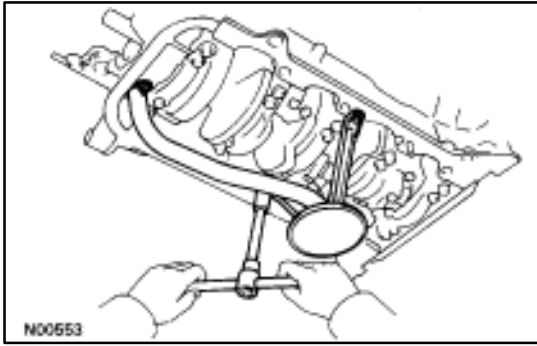
11. REMOVE NO.1 OIL PAN

- (a) Remove the sixteen mounting bolts and two nuts.



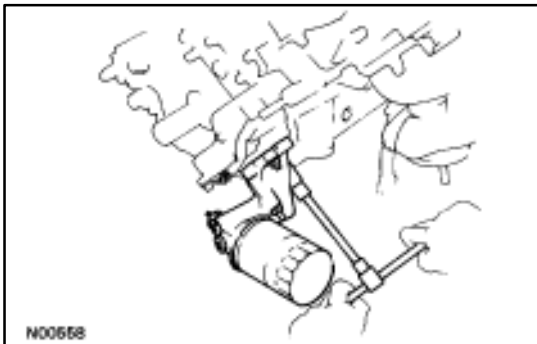
- (b) Remove the No.1 oil pan by prying the portions (A) between the cylinder block and No.1 oil pan with a screwdriver.

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



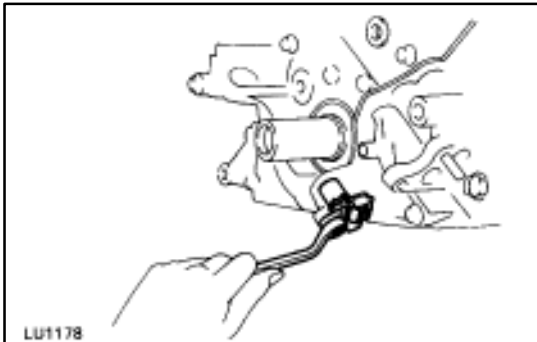
12. REMOVE OIL STRAINER

Remove the two bolts, two nuts, oil strainer and gasket.



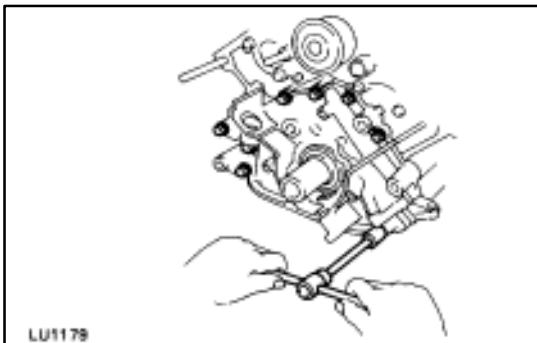
13. REMOVE OIL FILTER BRACKET

- (a) Disconnect the oil pressure switch connector.
- (b) Remove the two bolts, stud bolt, the filter bracket and oil filter assembly.
- (c) Remove the gasket from the filter bracket.



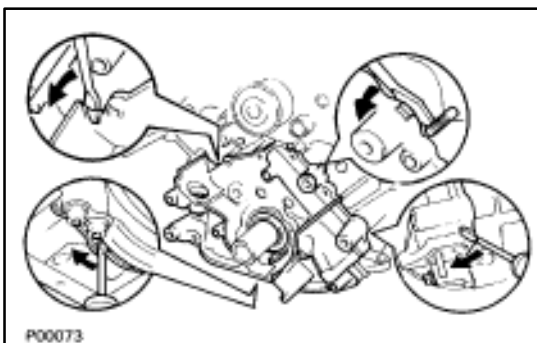
14. REMOVE ENGINE SPEED SENSOR

- (a) Disconnect the speed sensor connector.
- (b) Remove the bolt and speed sensor.



15. REMOVE OIL PUMP

- (a) Remove the eight mounting bolts.

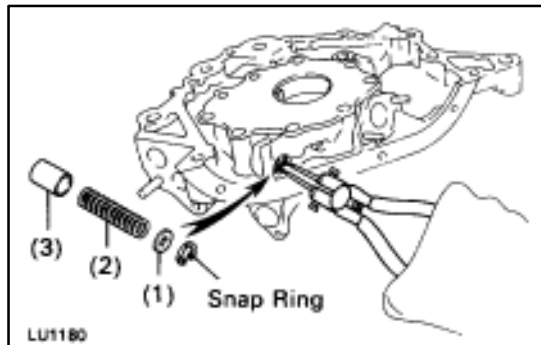
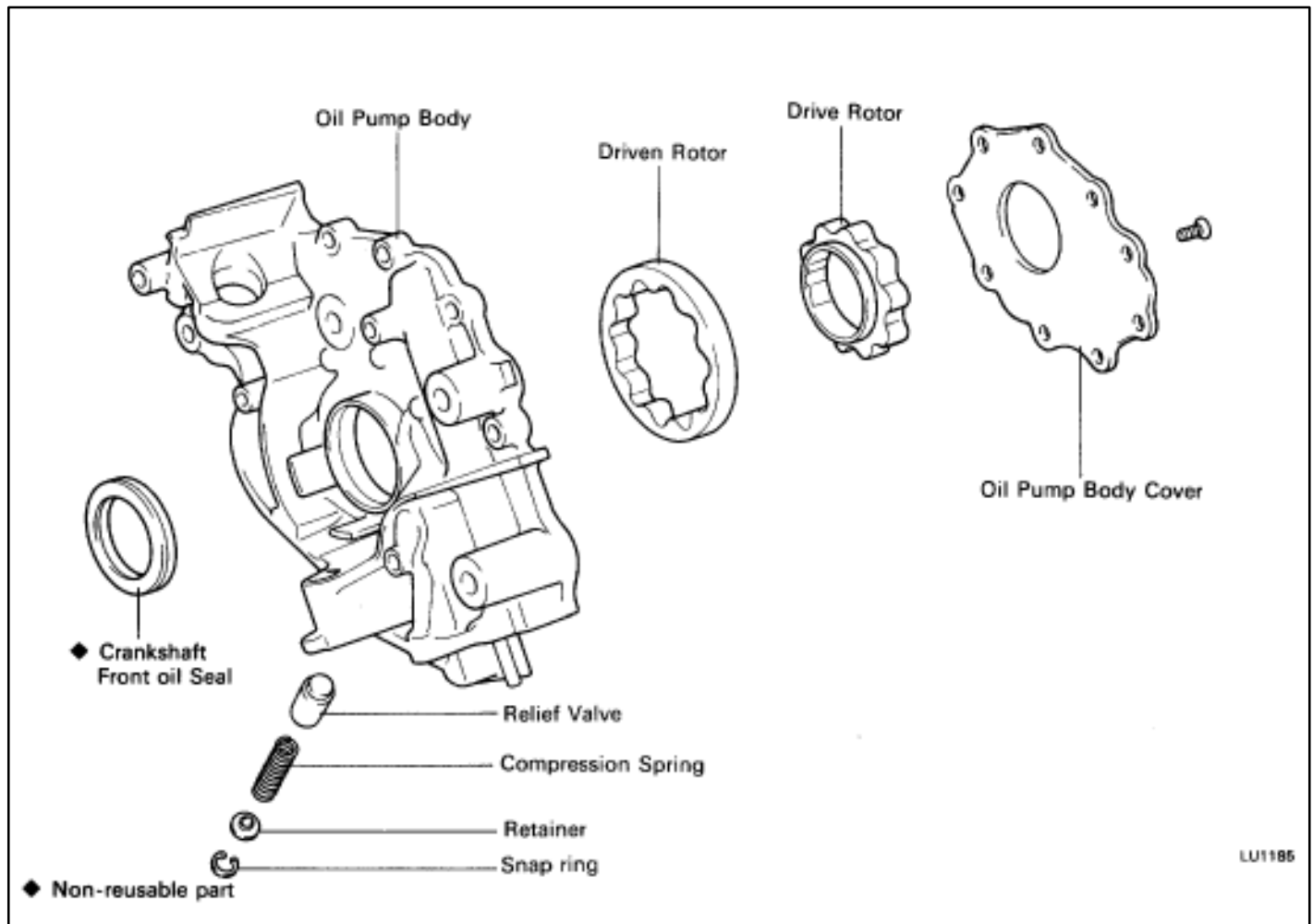


- (b) Remove the oil pump by prying the portions between the cylinder block and oil pump with a screwdriver.

NOTICE: Be careful not to damage the contact surfaces of the cylinder block and oil pump.

- (c) Remove the O-ring from the cylinder block.

COMPONENTS FOR DISASSEMBLY AND ASSEMBLY OF OIL PUMP

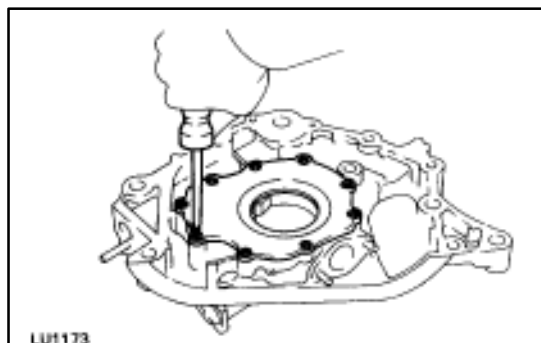


DISASSEMBLY OF OIL PUMP

1. REMOVE RELIEF VALVE

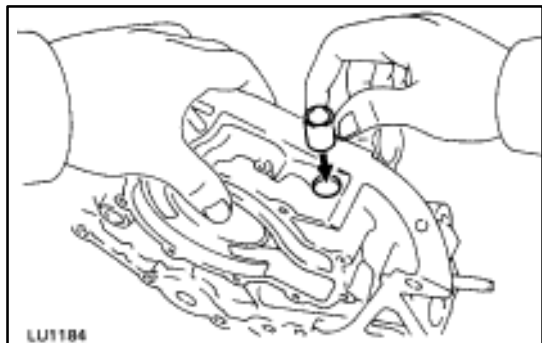
Using snap ring pliers, remove the snap ring and following parts:

- (1) Retainer
- (2) Compression spring
- (3) Relief valve.



2. REMOVE DRIVE AND DRIVEN ROTORS

Remove the nine screws, pump body cover, the drive and driven rotors.

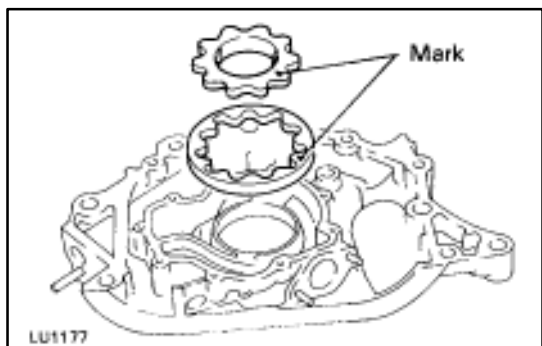


INSPECTION OF OIL PUMP

1. INSPECT RELIEF VALVE

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

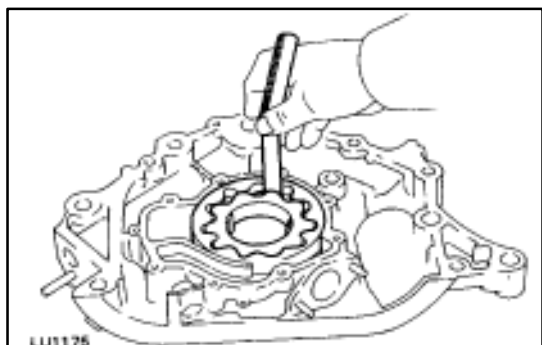
If it doesn't, replace the relief valve. If necessary, replace the oil pump assembly.



2. INSPECT DRIVE AND DRIVEN ROTORS

A. Place drive and driven rotors into oil pump body

Face the mark of the rotors upward.



B. Inspect rotor tip clearance

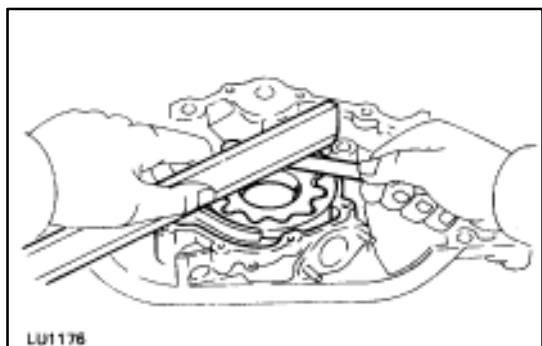
Using a feeler gauge, measure the clearance between the drive and driven rotors.

Standard tip clearance: 0.110–0.240 mm

(0.0043–0.0094 in.)

Maximum tip clearance: 0.35 mm (0.0138 in.)

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



C. Inspect rotor side clearance

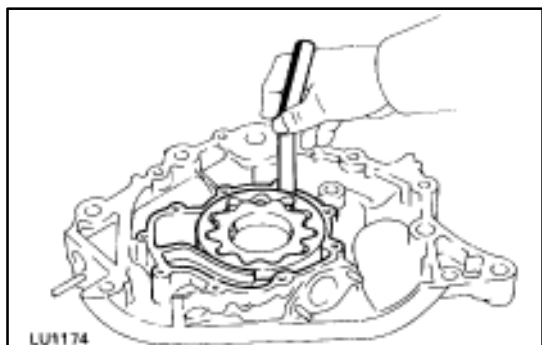
Using a feeler gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

Standard side clearance: 0.030–0.090 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.



D. Inspect rotor body clearance

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

Standard body clearance: 0.100–0.175 mm

(0.0039–0.0069 in.)

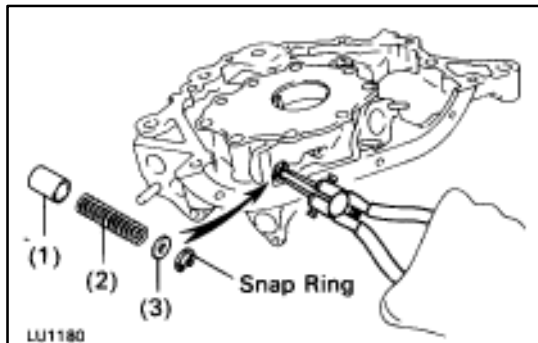
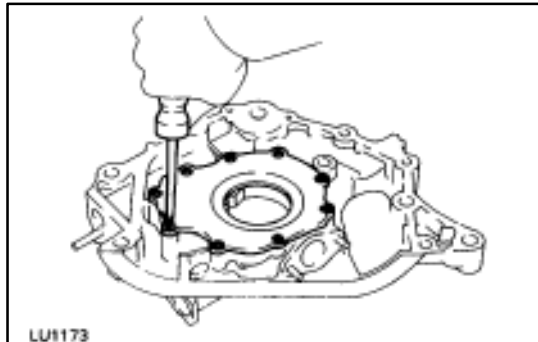
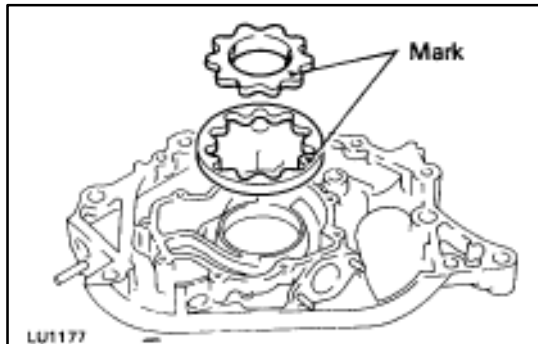
Maximum body clearance: 0.30 mm (0.0118 in.)

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

E. Remove drive and driven rotors

REPLACEMENT OF CRANKSHAFT FRONT OIL SEAL

(See page [EM-152](#))



ASSEMBLY OF OIL PUMP

(See Components on page [LU-12](#))

1. INSTALL DRIVE AND DRIVEN ROTORS

- (a) Place the drive and driven rotors into oil pump body with the mark facing upward.

- (b) Install the pump body cover with the nine screws.

Torque: 10 N·m (105 kgf·cm, 8 ft·lbf)

2. INSTALL RELIEF VALVE

- (a) Insert the following parts into the oil pump body hole:

- (1) Relief valve
- (2) Compression spring
- (3) Retainer

- (b) Using snap ring pliers, install the snap ring.

INSTALLATION OF OIL PUMP

(See Components on page [LU-8](#))

1. INSTALL OIL PUMP

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil pump cylinder block.
 - Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
 - Thoroughly clean all components to remove all the loose material.
 - Using a non-residue solvent, clean both sealing surfaces.

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

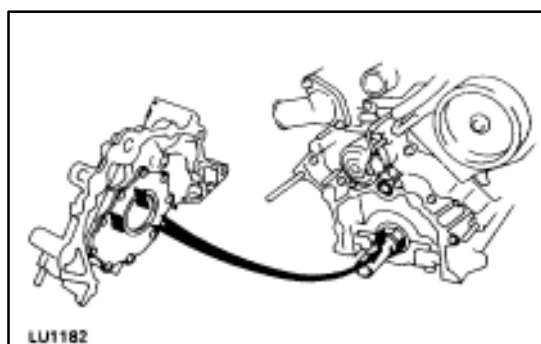
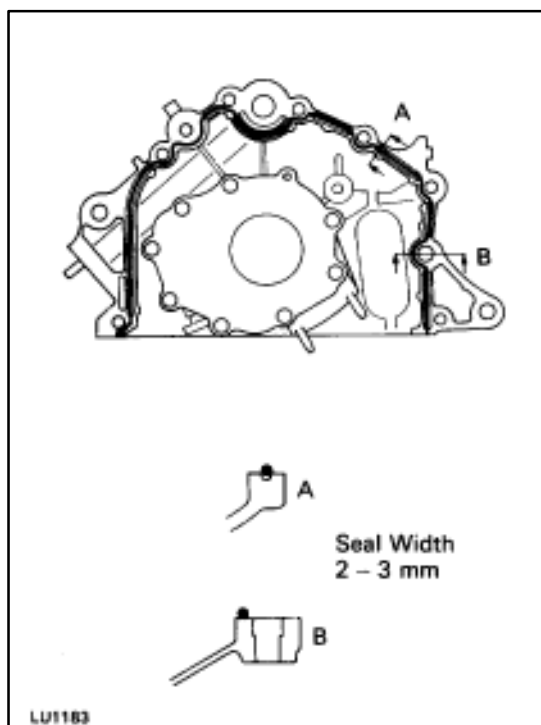
- (b) Apply seal packing to the oil pump as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

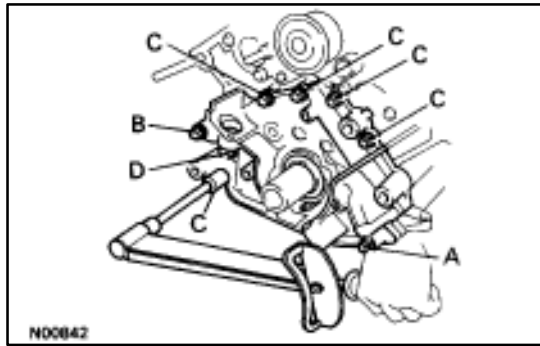
- Install a nozzle that has been cut to a 2–3 mm (0.08–0.12 in.) opening.

HINT: Avoid applying an excessive amount to the surface. Be particularly careful near oil passages.

- 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) Place a new gasket in position on the cylinder block.
- (d) Engage the spline teeth of the oil pump drive rotor with the large teeth of the crankshaft, and slide the oil pump.



(e) Install the oil pump with the eight bolts.

Torque:

12 mm head 16 N·m (160 kgf·cm, 12 ft·lbf)

14 mm head 30 N·m (310 kgf·cm, 22 ft·lbf)

HINT: Each bolt length is indicated in the illustration.

Bolt length:

A 50 mm (1.97 in.) for 12 mm head

B 106 mm (4.17 in.) for 12 mm head

C 30 mm (1.18 in.) for 12 mm head

D 40 mm (1.57 in.) for 14 mm head

2. INSTALL ENGINE SPEED SENSOR

(a) Install the speed sensor with the bolt.

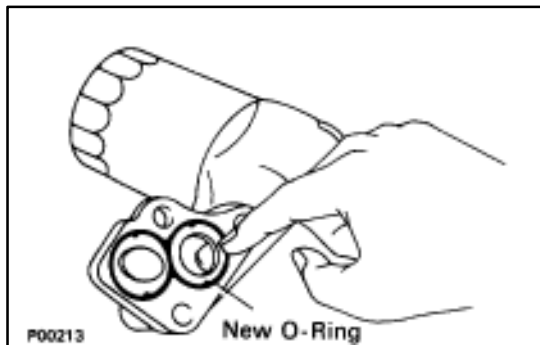
Torque: 6.4 N·m (65 kgf·cm, 56 in·lbf)

(b) Connect the speed sensor connector.



3. INSTALL OIL FILTER BRACKET

(a) Place a new gasket in position on the oil filter bracket.



(b) Install the oil filter bracket with the two bolts and stud bolt.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

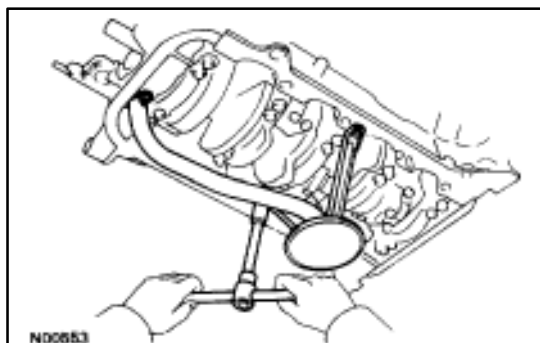
(c) Connect the oil pressure switch connector.



4. INSTALL OIL STRAINER

Install a new gasket and the oil strainer with the two bolts and two nuts.

Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)



5. 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 No.1 oil pan and cylinder block.
 - Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
 - Thoroughly clean all components to remove all the loose material.
 - Using a non-residue solvent, clean both sealing surfaces.

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

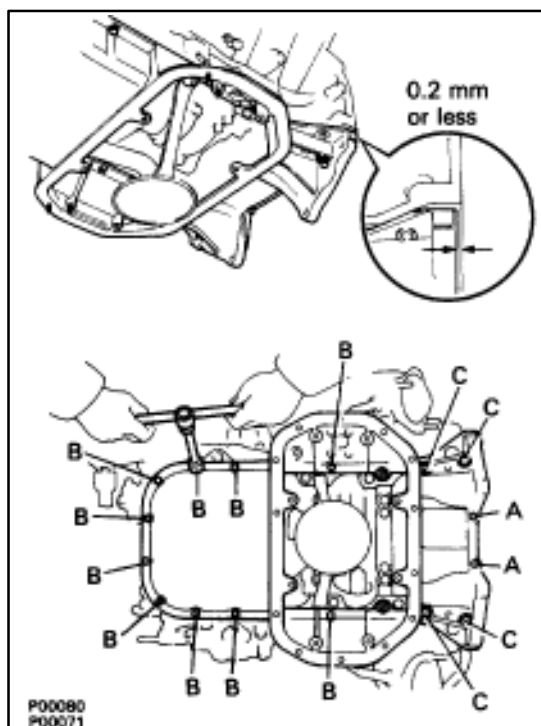
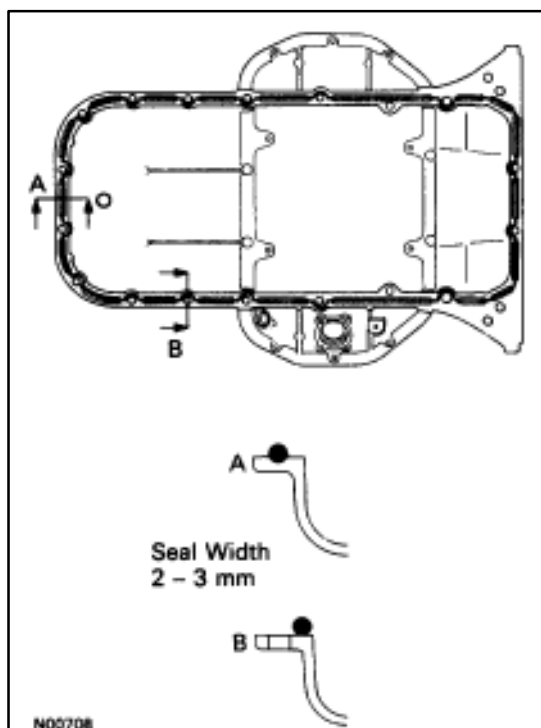
- (b) Apply seal packing to the No.1 oil pan as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

- Install a nozzle that has been cut to a 2–3 mm (0.08–0.12 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) Temporarily install the No.1 oil pan with the sixteen bolts and two nuts.

HINT: Each bolt length is indicated in the illustration.

Bolt length:

- A 20 mm (0.78 in.) for 10 mm head
- B 35 mm (1.38 in.) for 10 mm head
- C 55 mm (2.17 in.) for 12 mm head

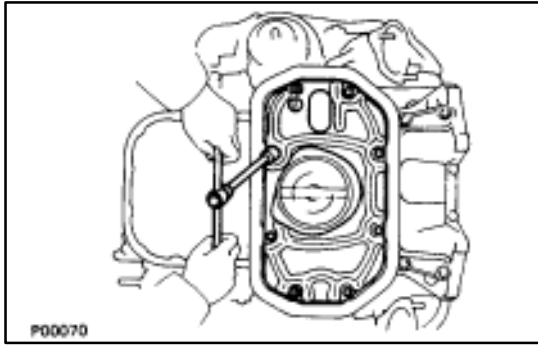
- (d) Set the No.1 oil pan as shown in the illustration.

NOTICE: Make sure the clearance between the rear ends of the oil pan and cylinder block is 0.2 mm (0.008 in.) or less. If the clearance is more than 0.2 mm (0.008 in.), the oil pan will be stretched.

- (e) Tighten the sixteen bolts and two nuts.

Torque:

- 10 mm head 7.8 N·m (80 kgf·cm, 69 in·lbf)
- 12 mm head 18 N·m (185 kgf·cm, 13 ft·lbf)



6. INSTALL OIL PAN BAFFLE PLATE

Install the baffle plate with the six bolts and two nuts.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

HINT: Use bolts 14 mm (0.55 in.) in length.

7. INSTALL NO.2 OIL PAN

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the No.1 and No.2 oil pans.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
- Thoroughly clean all components to remove all the loose material.
- Using a non-residue solvent, clean both sealing surfaces.

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

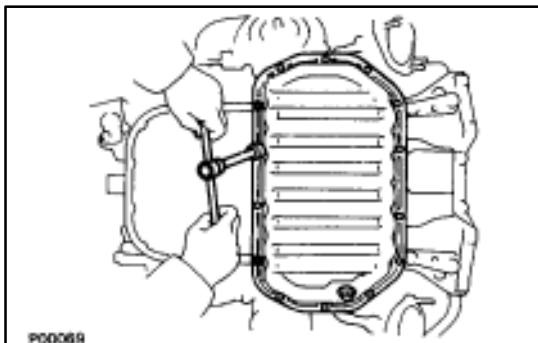
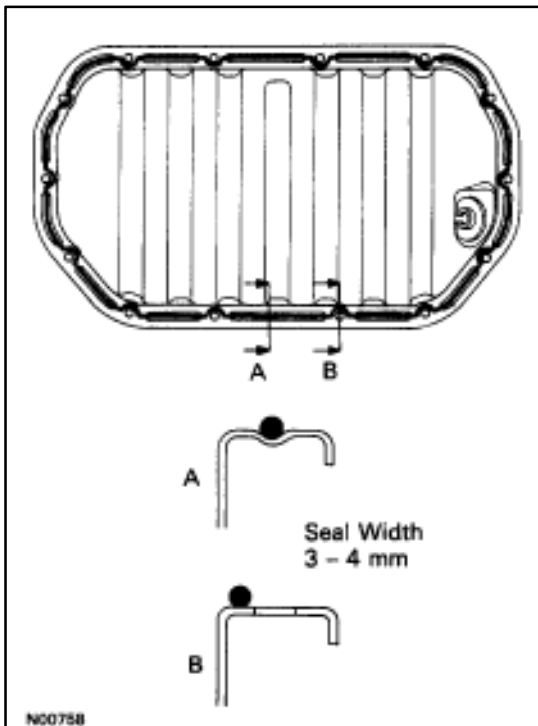
(b) Apply seal packing to the No.2 oil pan as shown in the illustration.

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.

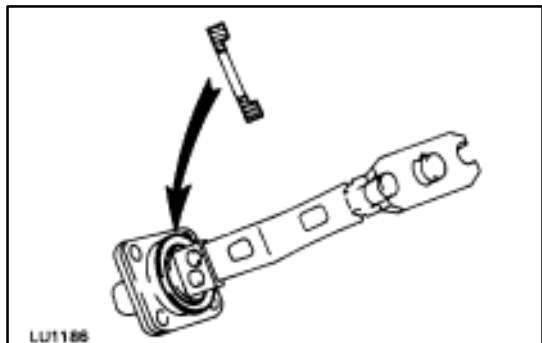
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



(c) Install the No.2 oil pan with the twelve bolts and two nuts.

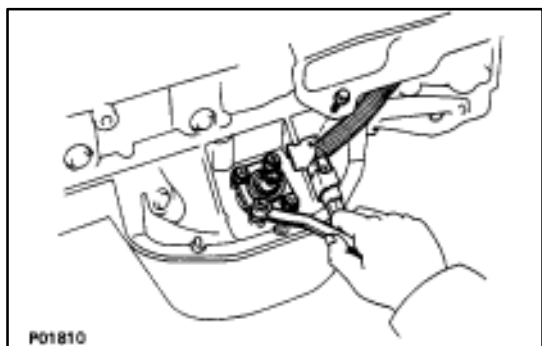
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

HINT: Use bolts 14 mm (0.55 in.) in length.



8. INSTALL OIL LEVEL SENSOR

- (a) Install a new gasket to the level sensor.



- (b) Install the level sensor with the four bolts.

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

HINT: Use bolts 16 mm (0.63 in.) in length.

- (c) Connect the level sensor connector.

9. INSTALL BRACKET OF MAIN OXYGEN SENSOR CONNECTOR TO NO.1 OIL PAN

Install the connector bracket with bolt.



10. INSTALL OIL DIPSTICK GUIDE AND DIPSTICK

- (a) Install a new O-ring to the dipstick guide.
- (b) Apply soapy water to the O-ring.
- (c) Push in the dipstick guide into the guide hole of the No.1 oil pan.
- (d) Install the engine wire bracket and dipstick guide with bolt.
- (e) Install the oil dipstick.

11. INSTALL CRANKSHAFT TIMING PULLEY, NO.1 IDLER PULLEY AND NO.2 IDLER PULLEY

(See steps 1 to 3 on pages [EM-46](#) and 47)

12. INSTALL TIMING BELT

(See steps 4 to 35 on pages [EM-47](#) to 56)

13. REMOVE ENGINE STAND FROM ENGINE

14. ASSEMBLE ENGINE AND TRANSMISSION

(See pages [EM-165](#) and 166)

15. INSTALL ENGINE WITH TRANSMISSION

(See pages [EM-167](#) to 177)