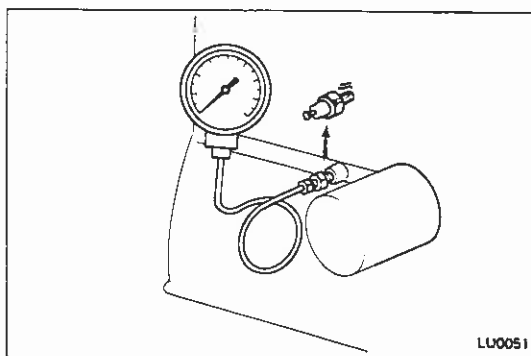
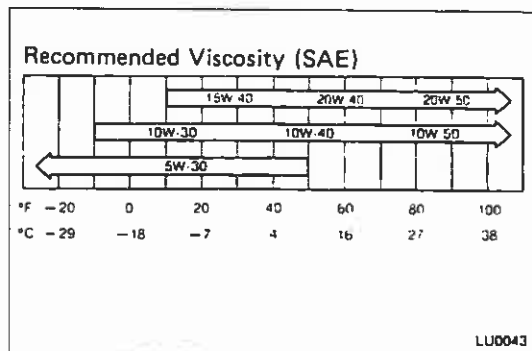


# LUBRICATION SYSTEM

	Page
TROUBLESHOOTING .....	LU-2
OIL PRESSURE CHECK .....	LU-2
REPLACEMENT OF ENGINE OIL AND OIL FILTER .....	LU-3
OIL PUMP .....	LU-4

## TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Oil leakage	Cylinder head, cylinder block or oil pump body damaged or cracked Oil seal faulty Gasket faulty	Replace as necessary Replace oil seal Replace gasket	LU-4
Low oil pressure	Oil leakage Relief valve faulty Oil pump faulty Engine oil poor quality Crankshaft bearing faulty Connecting rod bearing faulty	Replace as necessary Replace relief valve Replace oil pump Replace engine oil Replace bearing Replace bearing	LU-4 LU-4 LU-3
High oil pressure	Oil filter clogged Relief valve faulty	Replace oil filter Replace relief valve	LU-3 LU-4



## OIL PRESSURE CHECK

### 1. CHECK OIL QUALITY

Check the oil for deterioration, entry of water, discoloring or thinning.

If the quality is poor, change the oil.

Use API grade SF or SF/CC multigrade, fuel-efficient and recommended viscosity oil.

### 2. CHECK OIL LEVEL

The oil level should be between the L and F marks on the level gauge. If low, check for leakage and add oil up to the F mark.

### 3. REMOVE OIL PRESSURE SWITCH OR SENDER GAUGE

### 4. INSTALL OIL PRESSURE GAUGE

### 5. START ENGINE

Start engine and warm it up to normal operating temperature.

### 6. MEASURE OIL PRESSURE

Oil pressure:

At idle speed    More than 0.3 kg/cm<sup>2</sup>  
                                 (4.3 psi, 29 kPa)

At 3,000 rpm    2.5 — 5.0 kg/cm<sup>2</sup>  
                                 (36 — 71 psi, 245 — 490 kPa)

NOTE: Check for oil leakage after reinstalling the oil pressure switch or sender gauge.

## REPLACEMENT OF ENGINE OIL AND OIL FILTER

### 1. DRAIN ENGINE OIL

Remove the oil drain plug and drain the oil into a container.

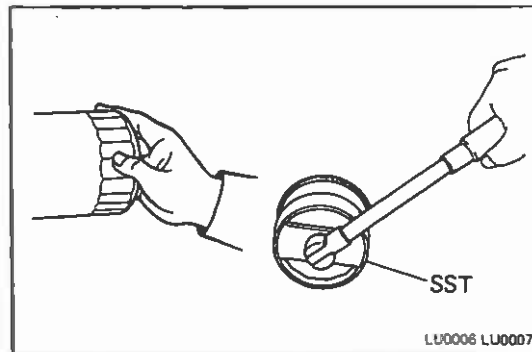
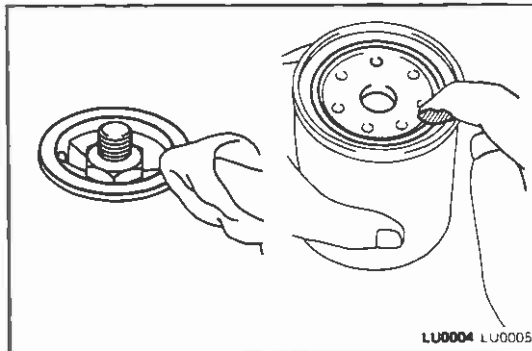
### 2. REPLACE OIL FILTER

- (a) Using SST, remove the oil filter (located on right side of the engine block).

SST 09228-44010

- (b) Inspect and clean the oil filter installation surface.

- (c) Apply clean engine oil to the gasket of the new oil filter.



- (d) Lightly screw in the oil filter to where you feel resistance.

- (e) Then, using SST, tighten the oil filter an extra 3/4 turn.

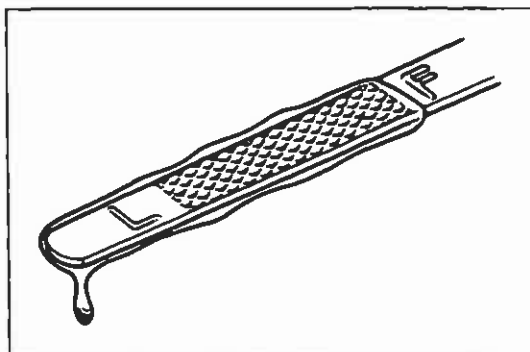
SST 09228-44010

### 3. FILL WITH ENGINE OIL

- (a) Clean and install the oil drain plug with a new gasket.
- (b) Fill the engine with new oil API grade SF or SF/CC, multigrade, fuel efficient and recommended viscosity oil.

Oil capacity:

Dry fill	4.8 liters (5.1 US qts, 4.2 Imp. qts)
Drain and refill	
w/o Oil filter change	3.8 liters (4.0 US qts, 3.3 Imp. qts)
w/ Oil filter change	4.6 liters (4.9 US qts, 4.0 Imp. qts)



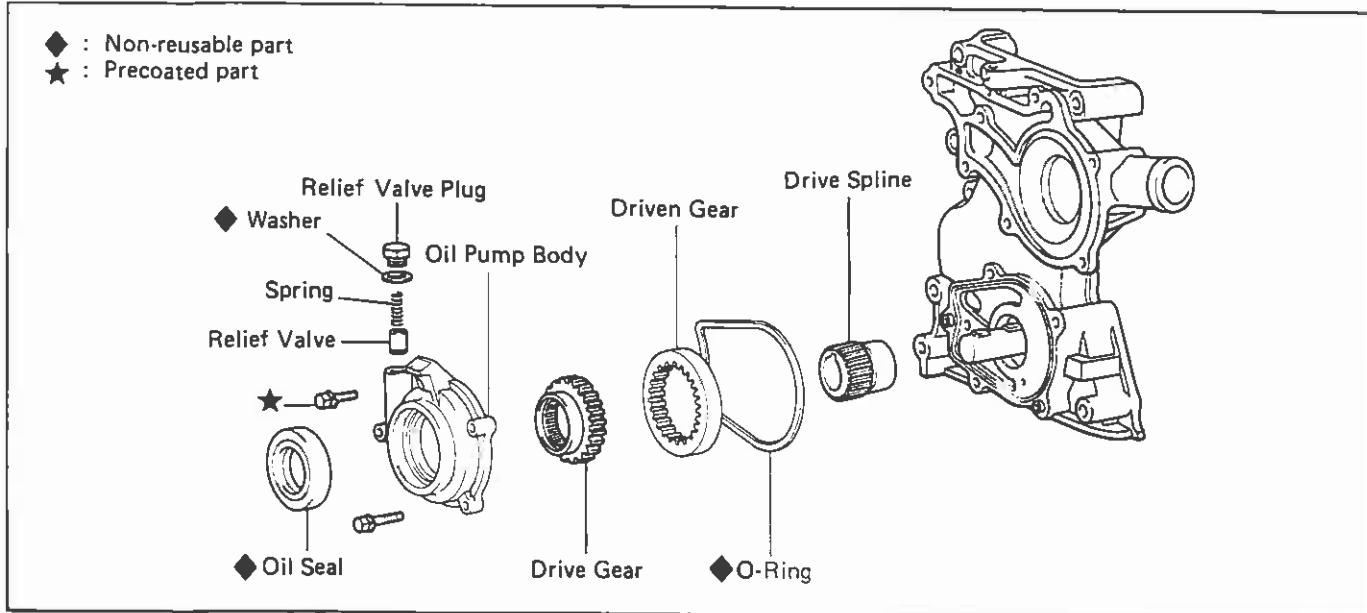
### 4. START ENGINE AND CHECK FOR LEAKS

### 5. RECHECK ENGINE OIL LEVEL

Recheck the engine oil level and refill as necessary.

**NOTE:** Insert the oil level gauge with the curved tip pointed toward the engine.

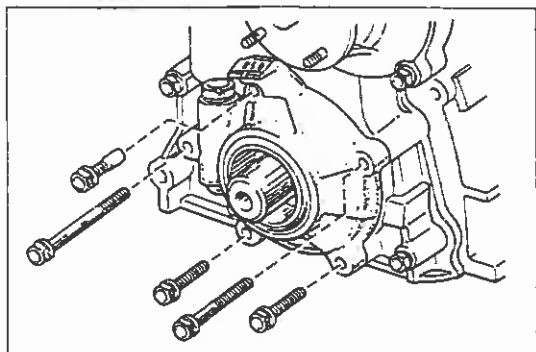
## OIL PUMP COMPONENTS



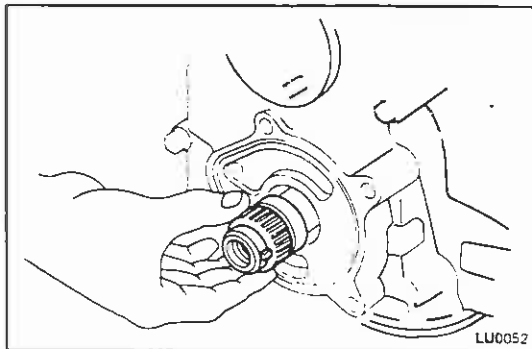
### REMOVAL AND DISASSEMBLY OF OIL PUMP

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

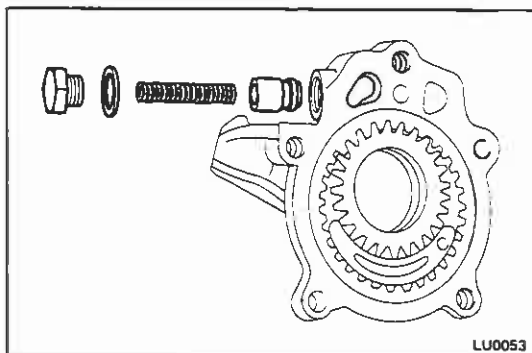
1. **REMOVE OIL PAN (ON-VEHICLE)**  
(See step 3 on page EM-30)
2. **REMOVE OIL STRAINER**  
Remove the four bolts holding the oil strainer.
3. **REMOVE DRIVE BELTS**
4. **REMOVE CRANKSHAFT PULLEY**  
(See step 2 on page EM-31)



5. **REMOVE OIL PUMP ASSEMBLY**  
Remove the five bolts and the oil pump assembly.

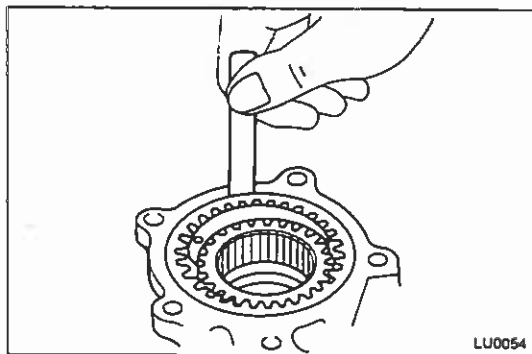


## 6. REMOVE OIL PUMP DRIVE SPLINE AND O-RING



## 7. DISASSEMBLE OIL PUMP ASSEMBLY

- (a) Unscrew the relief valve plug, and remove the spring and the relief valve piston.
- (b) Remove the drive and the driven gears.



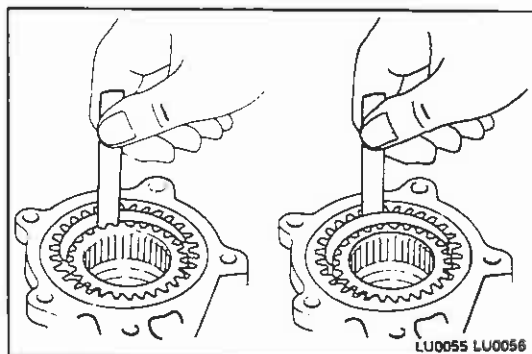
## INSPECTION OF OIL PUMP

### 1. MEASURE BODY CLEARANCE

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

If the clearance is greater than the maximum, replace the gear and/or body.

**Maximum clearance: 0.2 mm (0.008 in.)**

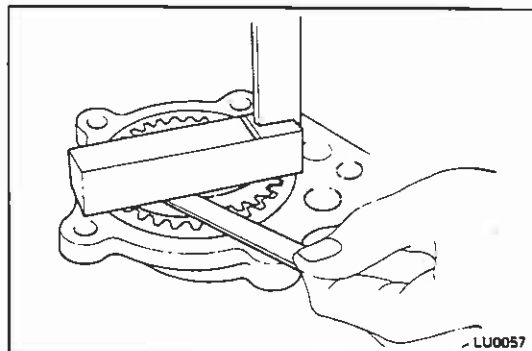


### 2. MEASURE TIP CLEARANCE

Using a feeler gauge, measure the clearance between both gear tips and the crescent.

If the clearance is greater than the maximum, replace the gears and/or body.

**Maximum clearance: 0.3 mm (0.012 in.)**

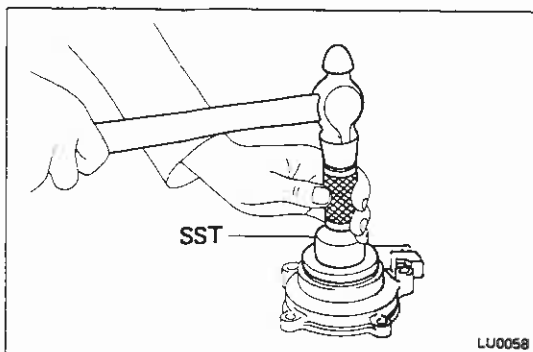


### 3. MEASURE SIDE CLEARANCE

Using a feeler gauge and a flat block, measure the side clearance as shown.

If the clearance is greater than the maximum, replace the gears and/or body.

**Maximum clearance: 0.15 mm (0.006 in.)**



## REPLACE FRONT OIL SEAL

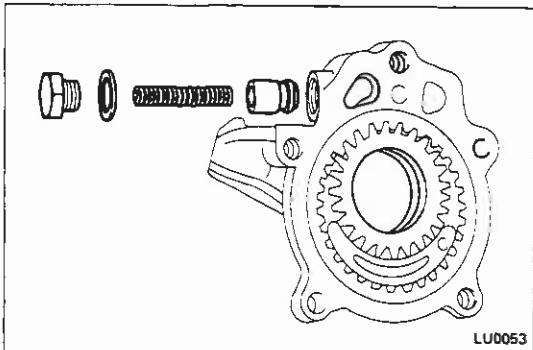
### 1. REMOVE OIL SEAL

Remove the oil seal with a small screwdriver.

### 2. INSTALL OIL SEAL

Drive in the new oil seal with SST.

SST 09223-50010

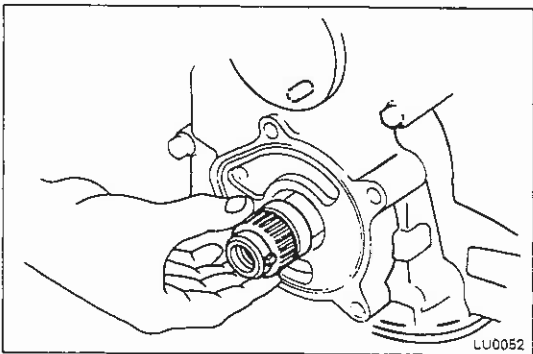


## ASSEMBLY AND INSTALLATION OF OIL PUMP

(See page LU-4)

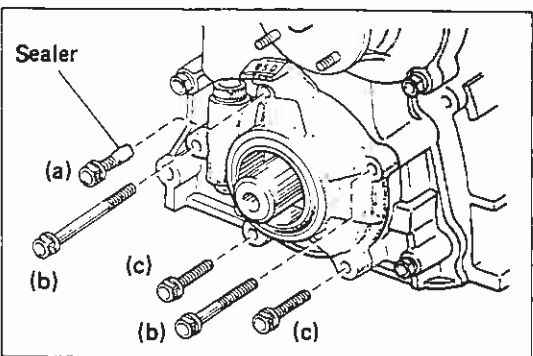
### 1. ASSEMBLE OIL PUMP ASSEMBLY

- Install relief valve piston and the spring in the body, and screw on the relief valve plug with the gasket.
- Insert the drive and driven gears into the pump body.



### 2. INSTALL OIL PUMP DRIVE SPLINE AND O-RING

- Slide the pump drive spline onto the crankshaft.
- Place the O-ring into the groove.



### 3. INSTALL OIL PUMP

Apply the sealer to the upper bolt (a) and tighten the five bolts.

Torque: (a) 250 kg-cm (18 ft-lb, 25 N·m)  
 (b) 195 kg-cm (14 ft-lb, 19 N·m)  
 (c) 130 kg-cm (9 ft-lb, 13 N·m)

### 4. INSTALL FOLLOWING ITEMS:

- Clean oil strainer with four bolts.
- Clean oil pan and cylinder block. (See step 10 on page EM-36)
- Crankshaft pulley. (See step 8 on page EM-35)
- Drive belts. (See step 9 on page EM-35)