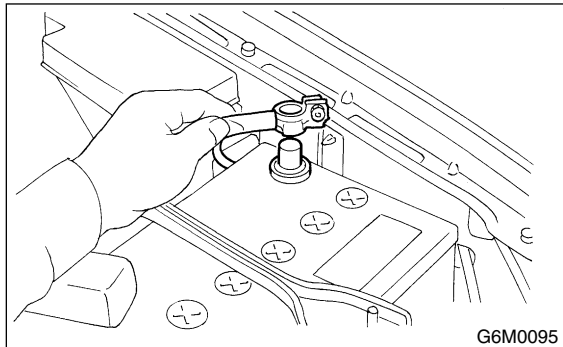


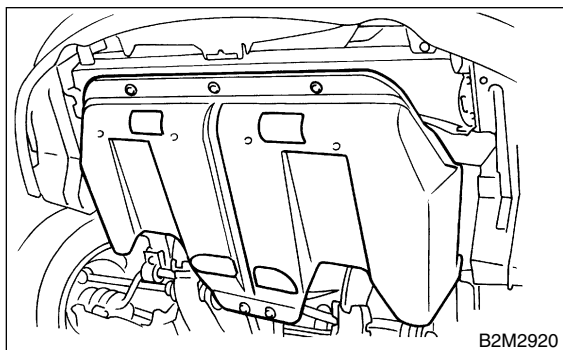
## 4. Oil Pump S178070

### A: REMOVAL S178070A18

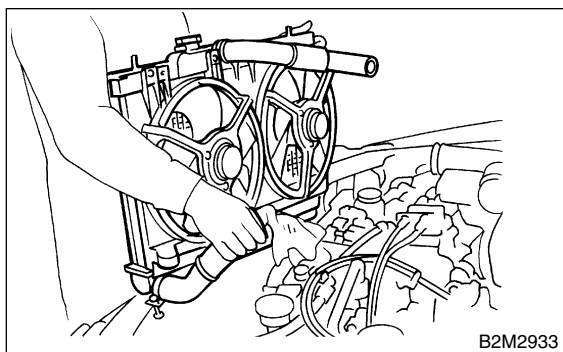
- 1) Disconnect battery ground cable.



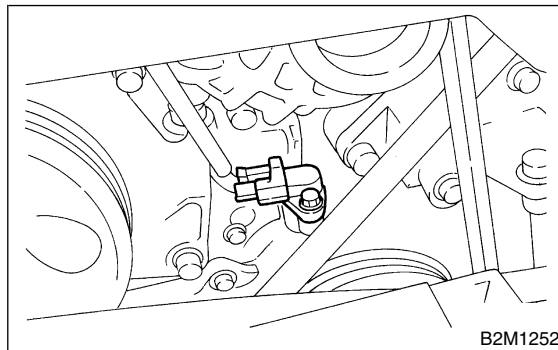
- 2) Lift-up the vehicle.
- 3) Remove under cover.



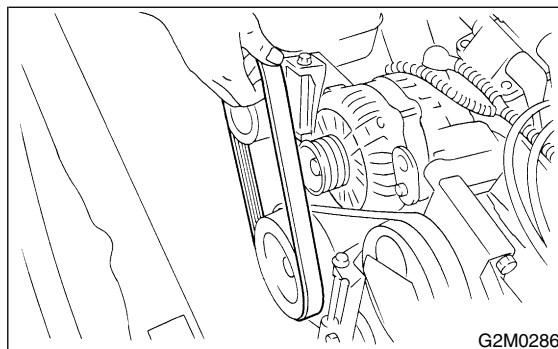
- 4) Lower the vehicle.
- 5) Remove radiator. <Ref. to CO-21, REMOVAL, Radiator.>



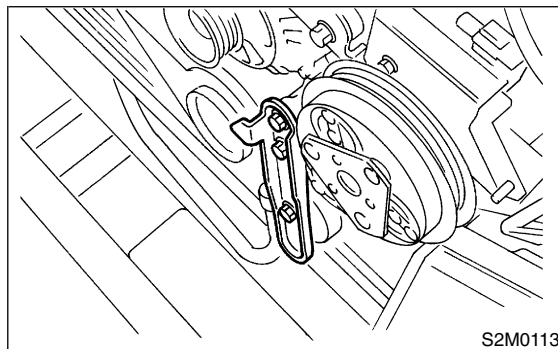
- 6) Remove crankshaft position sensor.



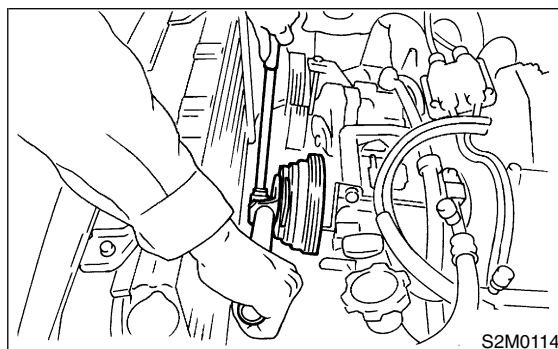
- 7) Remove V-belts. <Ref. to ME-42, REMOVAL, V-belt.>



- 8) Remove rear side V-belt tensioner.



- 9) Remove crankshaft pulley by using ST.  
ST 499977100 CRANKSHAFT PULLEY WRENCH

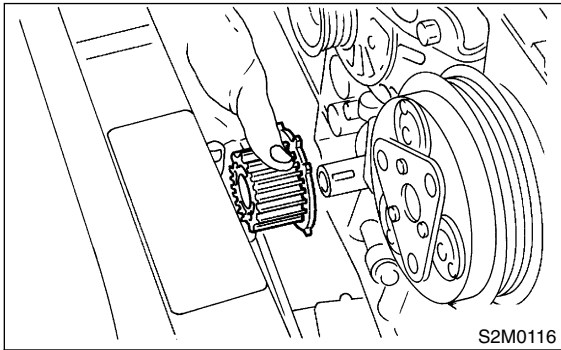


- 10) Remove water pump. <Ref. to CO-14 REMOVAL, Water Pump.>

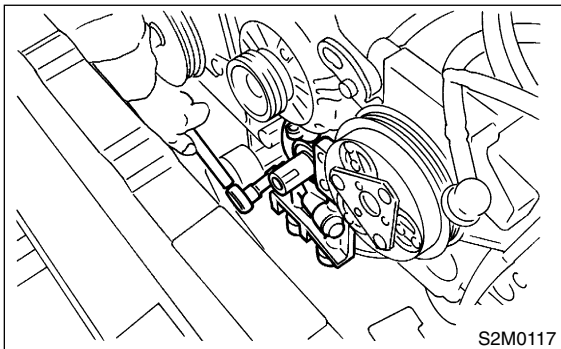
# OIL PUMP

Lubrication

11) Remove crankshaft sprocket.

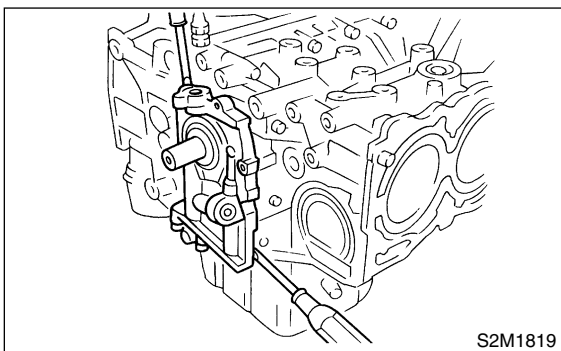


12) Remove bolts which install oil pump onto cylinder block.



13) Remove oil pump by using flat bladed screwdriver.

**CAUTION:**  
Be careful not to scratch mating surfaces of cylinder block and oil pump.



## B: INSTALLATION S178070A11

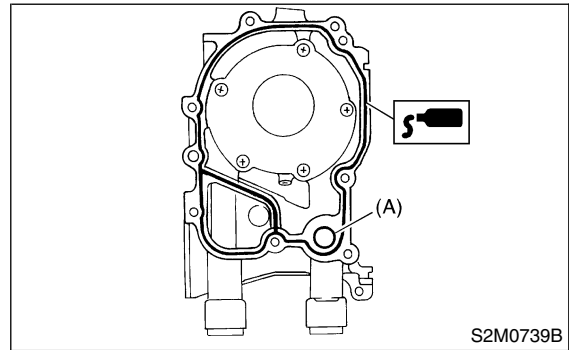
Install in the reverse order of removal.

Do the following:

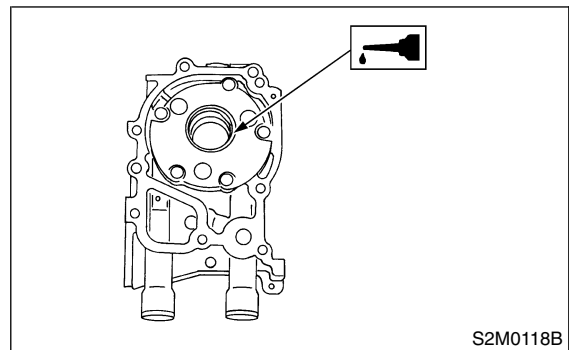
1) Apply fluid packing to matching surfaces of oil pump.

**Fluid packing:**  
**THREE BOND 1215 or equivalent**

2) Replace O-ring (A) with a new one.



3) Apply a coat of engine oil to the inside of the oil seal.



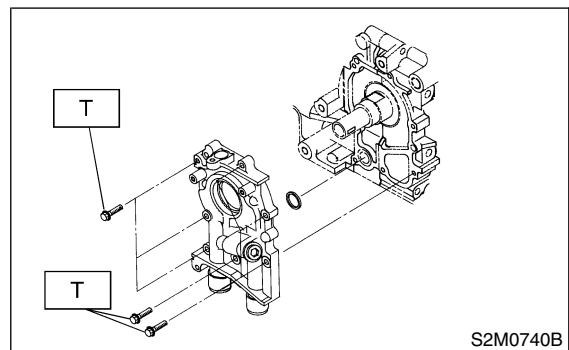
4) Be careful not to scratch oil seal when installing oil pump on cylinder block.

5) Position the oil pump, aligning the notched area with the crankshaft, and push the oil pump straight.

**CAUTION:**  
Make sure the oil seal lip is not folded.

6) Install oil pump.

**Tightening torque:**  
**6.4 N·m (0.65 kgf·m, 4.7 ft·lb)**

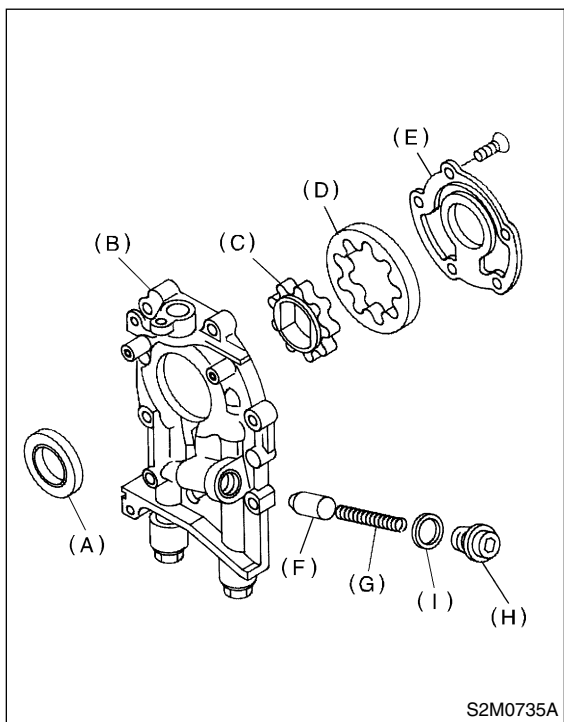


## C: DISASSEMBLY S178070A06

Remove screws which secure oil pump cover and disassemble oil pump. Inscribe alignment marks on inner and outer rotors so that they can be replaced in their original positions during reassembly.

### CAUTION:

**Before removing relief valve, loosen plug when removing oil pump from cylinder block.**



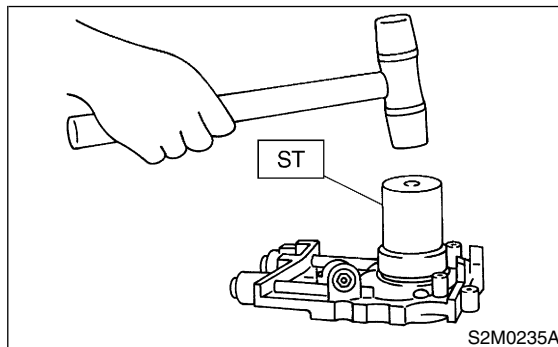
- (A) Oil seal
- (B) Pump case
- (C) Inner rotor
- (D) Outer rotor
- (E) Pump cover
- (F) Relief valve
- (G) Relief valve spring
- (H) Plug
- (I) Washer

## D: ASSEMBLY S178070A02

- 1) Install front oil seal by using ST.  
ST 499587100 OIL SEAL INSTALLER

### CAUTION:

**Use a new oil seal.**

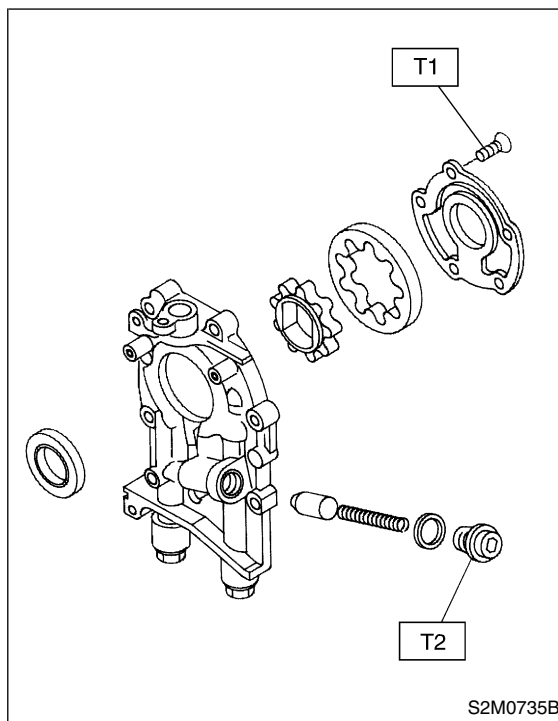


- 2) Apply a coat of engine oil to inner and outer rotors.
- 3) Install inner and outer rotors in their original positions.
- 4) Install oil relief valve and relief valve spring.
- 5) Install oil pump cover.

### Tightening torque:

**T1: 5 N·m (0.5 kgf·m, 3.6 ft·lb)**

**T2: 44 N·m (4.5 kgf·m, 33 ft·lb)**



## E: INSPECTION S178070A10

### 1. TIP CLEARANCE S178070A1001

Measure the tip clearance of rotors. If the clearance exceeds the limit, replace rotors as a matched set.

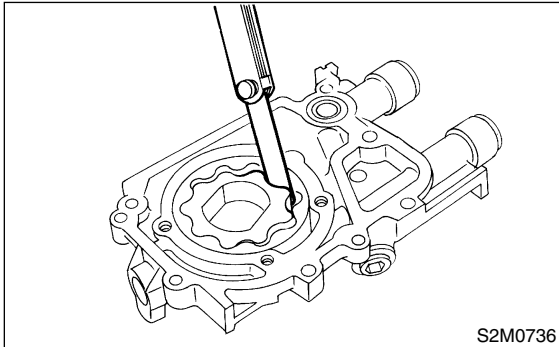
**Tip clearance:**

**Standard**

**0.04 — 0.14 mm (0.0016 — 0.0055 in)**

**Limit**

**0.18 mm (0.0071 in)**



### 2. CASE CLEARANCE S178070A1002

Measure the clearance between the outer rotor and the cylinder block rotor housing. If the clearance exceeds the limit, replace the rotor.

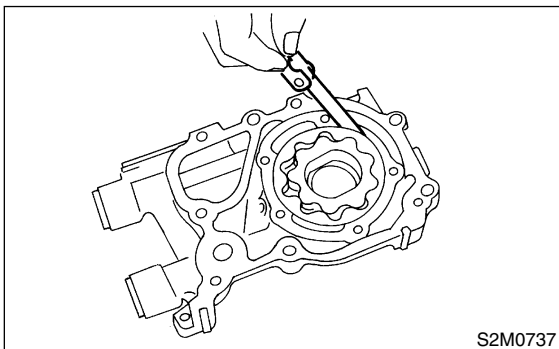
**Case clearance:**

**Standard**

**0.10 — 0.175 mm (0.0039 — 0.0069 in)**

**Limit**

**0.20 mm (0.0079 in)**



### 3. SIDE CLEARANCE S178070A1003

Measure clearance between oil pump inner rotor and pump cover. If the clearance exceeds the limit, replace rotor or pump body.

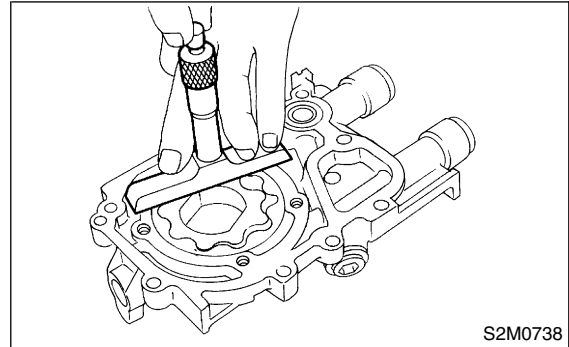
**Side clearance:**

**Standard**

**0.02 — 0.07 mm (0.0008 — 0.0028 in)**

**Limit**

**0.15 mm (0.0059 in)**



### 4. OIL RELIEF VALVE S178070A1004

Check the valve for fitting condition and damage, and the relief valve spring for damage and deterioration. Replace the parts if defective.

**Relief valve spring:**

**Free length**

**71.8 mm (2.827 in)**

**Installed length**

**54.7 mm (2.154 in)**

**Load when installed**

**77.08 N (7.86 kgf, 17.33 lb)**

### 5. OIL PUMP CASE S178070A1005

Check the oil pump case for worn shaft hole, clogged oil passage, worn rotor chamber, cracks, and other faults.

### 6. OIL SEAL S178070A1006

Check the oil seal lips for deformation, hardening, wear, etc. and replace if defective.