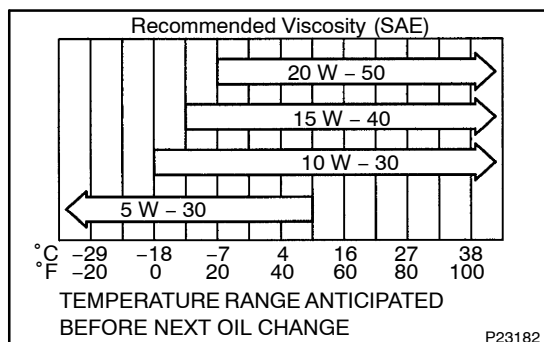




## OIL AND FILTER INSPECTION

LU0GI-01

### 1. CHECK ENGINE OIL QUALITY

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

If the quality is visibly poor, replace the oil.

#### Oil grade:

**API grade SH, Energy-Conserving II or SJ, Energy-Conserving or ILSAC multigrade engine oil. Recommended viscosity is as shown in the illustration.**

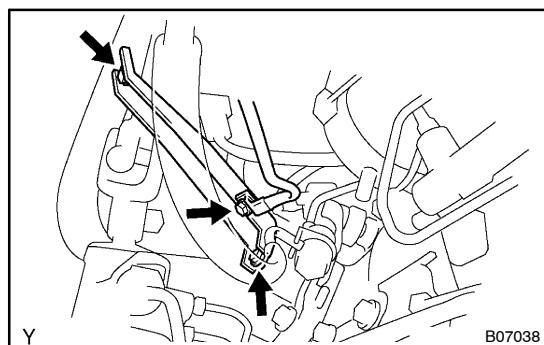
### 2. CHECK ENGINE OIL LEVEL

After warming up the engine, and then 5 minutes after the engine stops, oil level should be between the low level and full level marks of the dipstick.

If low, check for leakage and add oil up to the full level mark.

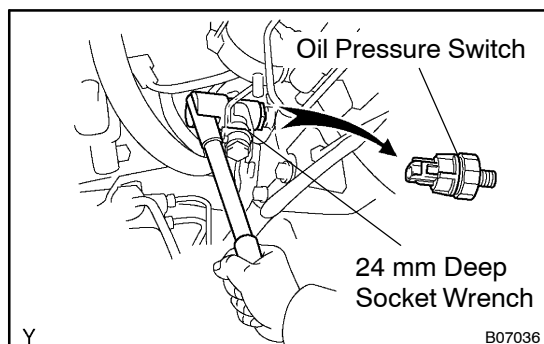
### 3. CHECK OIL PRESSURE

(a) Remove the No.2 engine under cover.

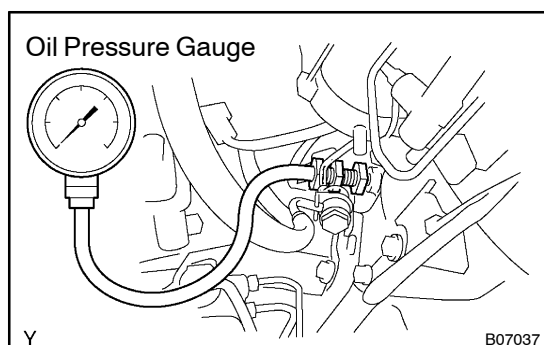


(b) Remove the bolt and disconnect the ground cable.

(c) Remove the 2 bolts and No.2 air intake chamber stay.



(d) Using a 24 mm deep socket wrench, remove the oil pressure switch.



(e) Install the oil pressure gauge.

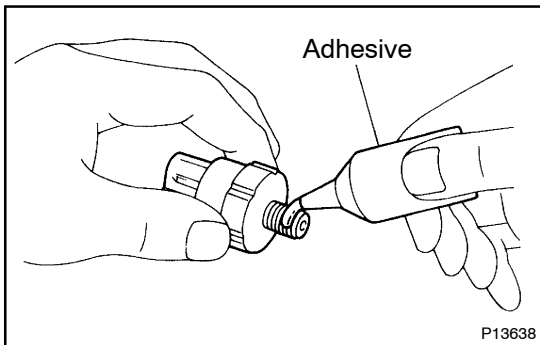
(f) Allow the engine to warm up to normal operating temperature.

(g) Check the oil pressure.

#### Oil pressure:

|              |                                                             |
|--------------|-------------------------------------------------------------|
| At idle      | 49 kPa (0.5 kgf/cm <sup>2</sup> , 7.3 psi) or more          |
| At 3,000 rpm | 284 - 441 kPa (2.9 - 4.5 kgf/cm <sup>2</sup> , 41 - 64 psi) |

(h) Remove the oil pressure gauge.



- (i) Apply adhesive to 2 or 3 threads of the oil pressure switch.

**Adhesive:**

**Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent**

- (j) Reinstall the oil pressure switch.  
(k) Reinstall the and No.2 air intake chamber stay with the 2 bolts.

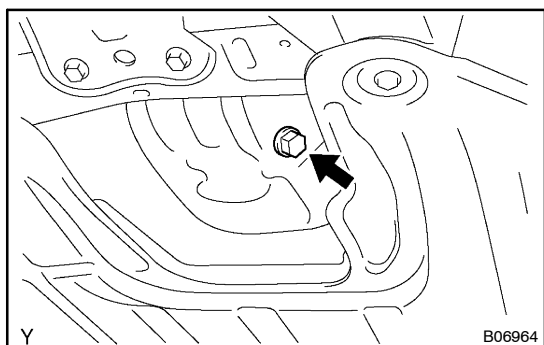
**Torque: 18.5 N·m (185 kgf·cm, 13 ft·lbf)**

- (l) Reconnect the ground cable with the bolt.  
(m) Reinstall the No.2 engine under cover.  
(n) Start the engine and check for oil leak.

## REPLACEMENT

### CAUTION:

- Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer.
- Care should be taken, therefore, when changing engine oil to minimize the frequency and length of time your skin is exposed to used engine oil. Protective clothing and gloves that cannot be penetrated by oil should be worn. The skin should be thoroughly washed with soap and water, or use water-less hand cleaner, to remove any used engine oil. Do not use gasoline, thinners, or solvents.
- In order to preserve the environment, used oil and used oil filters must be disposed of only at designated disposal sites.

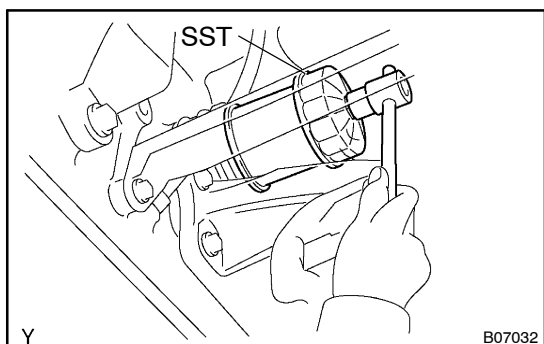


### 1. DRAIN ENGINE OIL

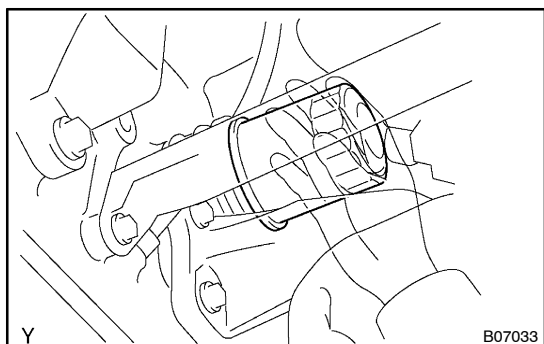
- Remove the oil filler cap.
- Remove the oil drain plug, and drain the oil into a container.

### 2. REPLACE OIL FILTER

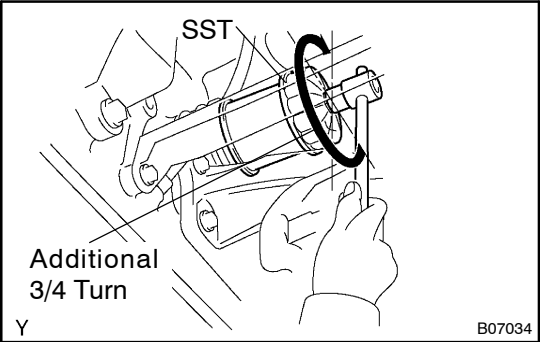
- Remove the No.1 engine under cover.



- Using SST, remove the oil filter.  
SST 09228-07501
- Clean the oil filter contacting the oil filter mounting.
- Lubricate the filter rubber gasket with clean engine oil.



- Tighten the oil filter by hand until the rubber gasket contacts the seat of the filter mounting.



- (f) Using SST, give it an additional 3/4 turn to seat the filter.  
SST 09228-07501
- (g) Reinstall the No.1 engine under cover.

**3. FILL WITH ENGINE OIL**

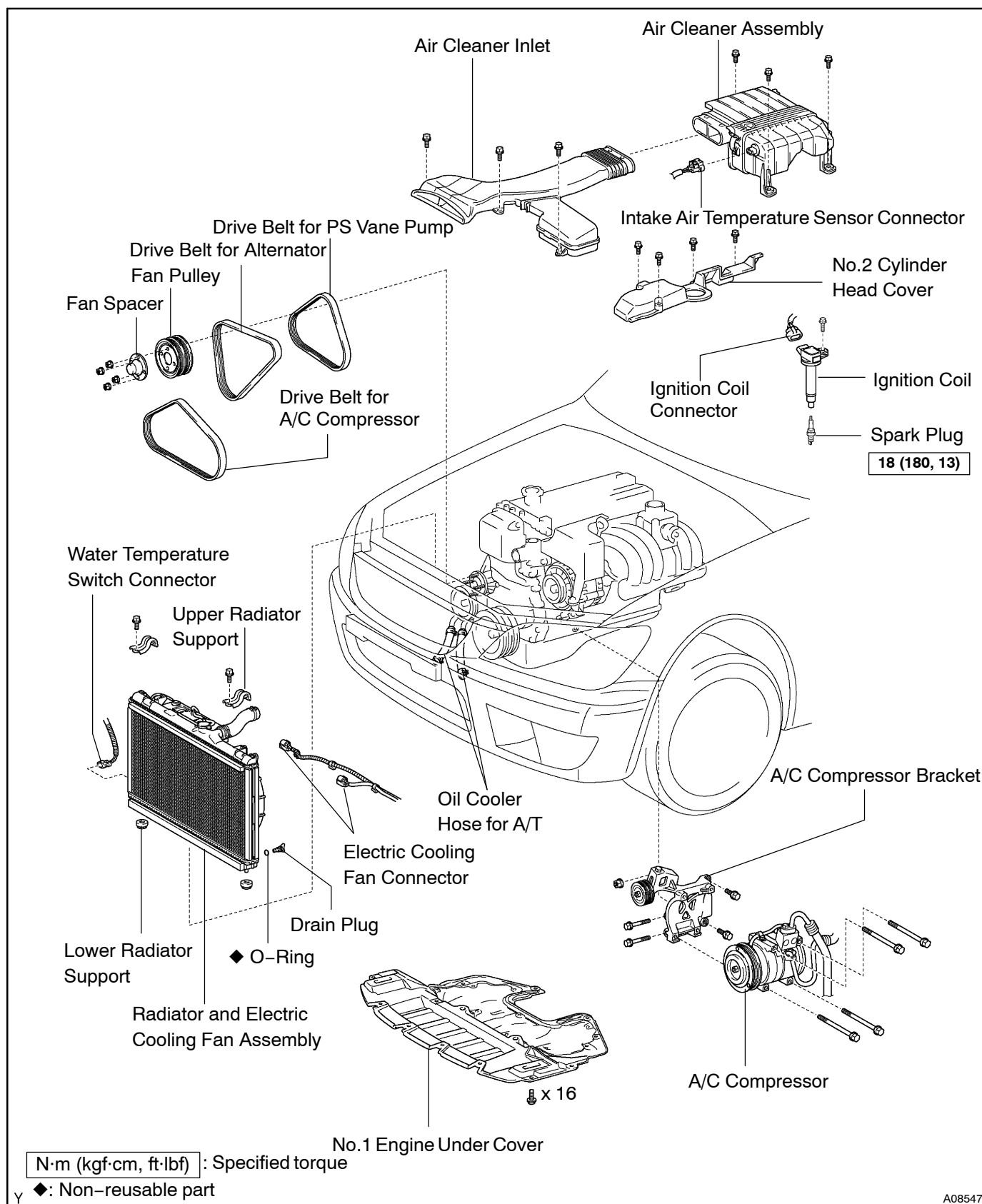
- (a) Clean and install the oil drain plug with a new gasket.  
**Torque: 37.5 N·m (375 kgf·cm, 27 ft·lbf)**
- (b) Fill with new engine oil.  
**Capacity:**

|                       |     |                                       |
|-----------------------|-----|---------------------------------------|
| Drain and refill      |     |                                       |
| w/ Oil filter change  | M/T | 4.2 liters (4.4 US qts, 3.7 Imp. qts) |
|                       | A/T | 4.1 liters (4.3 US qts, 3.6 Imp. qts) |
| w/o Oil filter change | M/T | 4.0 liters (4.2 US qts, 3.5 Imp. qts) |
|                       | A/T | 3.9 liters (4.1 US qts, 3.4 Imp. qts) |
| Dry fill              | M/T | 4.6 liters (4.9 US qts, 4.0 Imp. qts) |
|                       | A/T | 4.5 liters (4.8 US qts, 4.0 Imp. qts) |

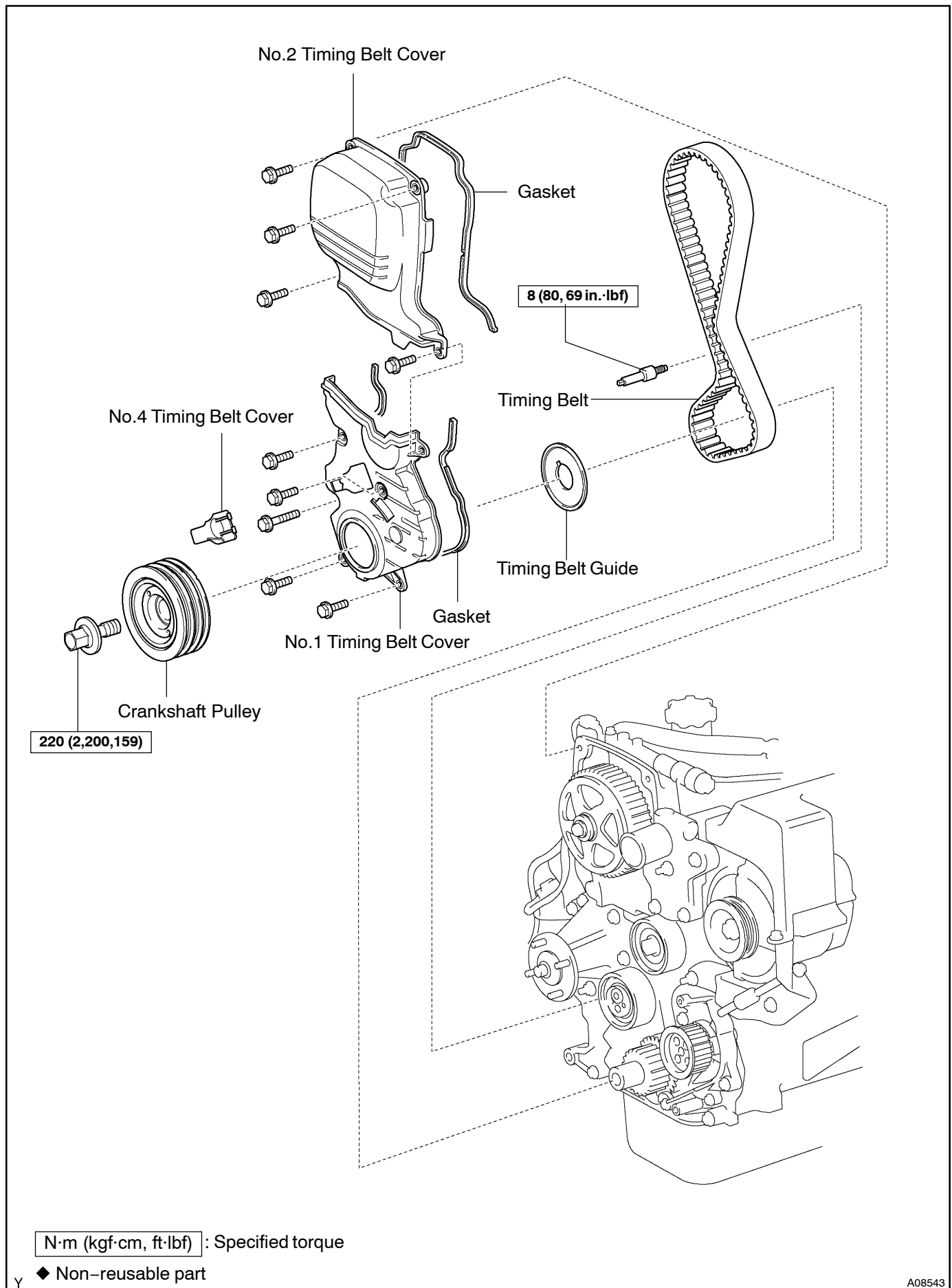
- (c) Reinstall the oil filler cap.
- 4. START ENGINE AND CHECK FOR OIL LEAK**
- 5. RECHECK ENGINE OIL LEVEL**

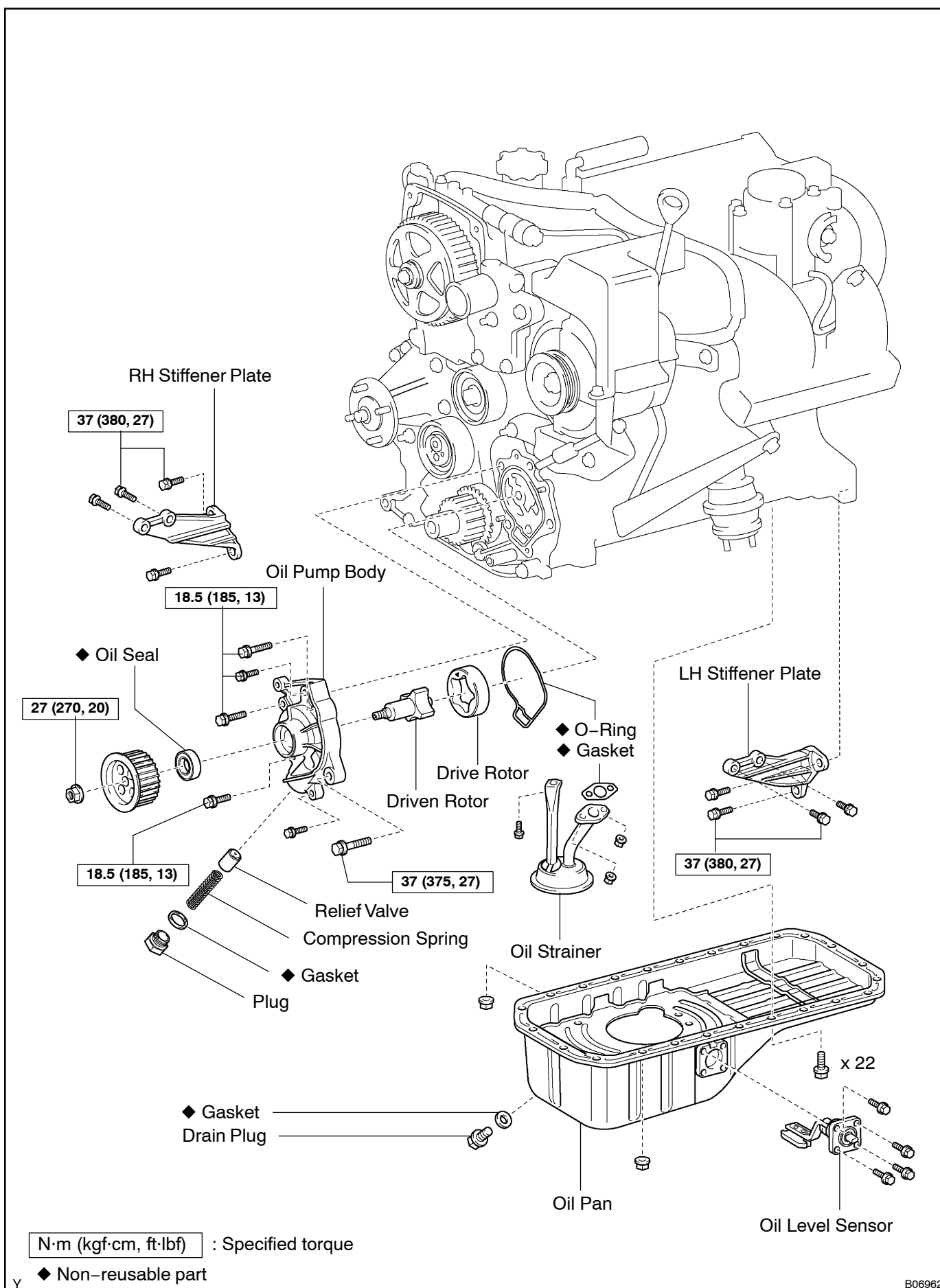
# OIL PUMP COMPONENTS

LU03J-04



A08547



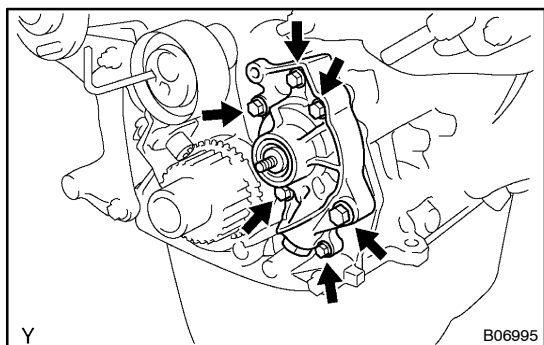


## REMOVAL

### HINT:

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

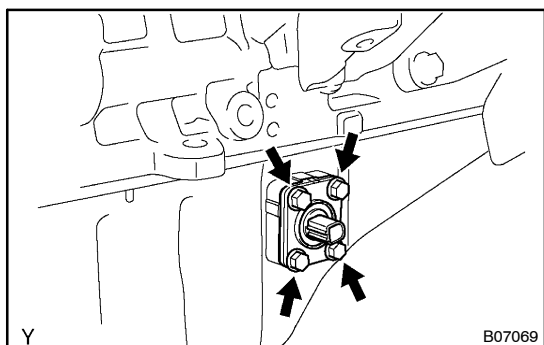
1. **DRAIN ENGINE OIL**
2. **REMOVE TIMING BELT AND OIL PUMP PULLEY**  
(See page EM-20)



### 3. REMOVE OIL PUMP

- (a) Remove the 6 bolts and oil pump.
- (b) Remove the O-ring.

### 4. REMOVE RH AND LH STIFFENER PLATES

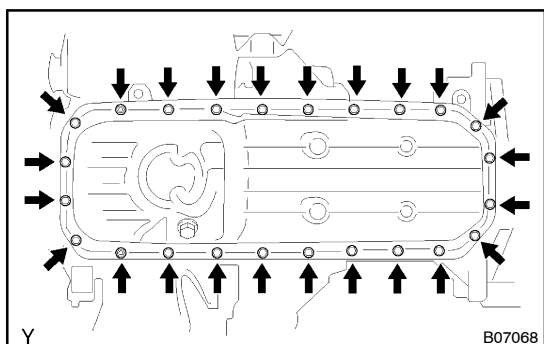


### 5. REMOVE OIL LEVEL SENSOR

- (a) Disconnect the level sensor connector.
- (b) Remove the 4 bolts and level sensor.

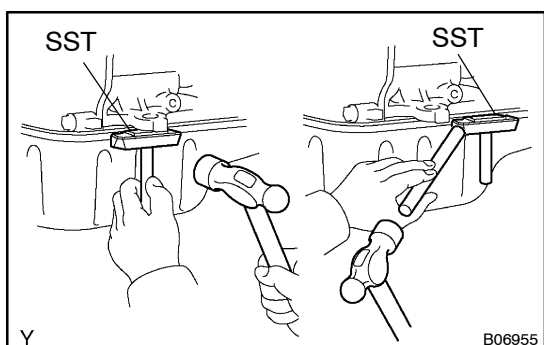
### NOTICE:

Be careful not to drop the oil level sensor when removing it.



### 6. REMOVE OIL PAN

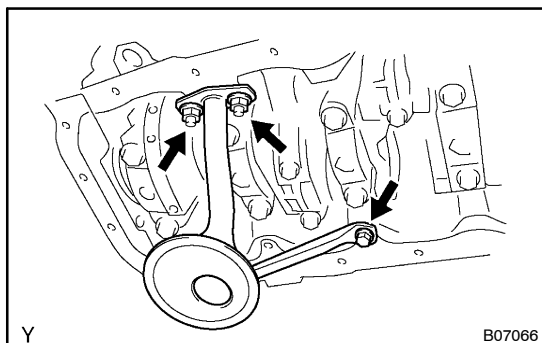
- (a) Remove the oil dipstick.
- (b) Remove the 22 bolts and 2 nuts.



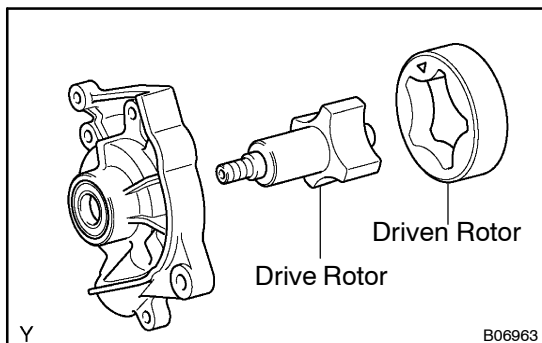
- (c) Insert the blade of SST between the cylinder block and oil pan, and cut off applied sealer and remove the oil pan.  
SST 09032-00100

### NOTICE:

- Do not use SST for the timing belt case and rear oil seal retainer.
- Be careful not to damage the oil pan flange.

**7. REMOVE OIL STRAINER**

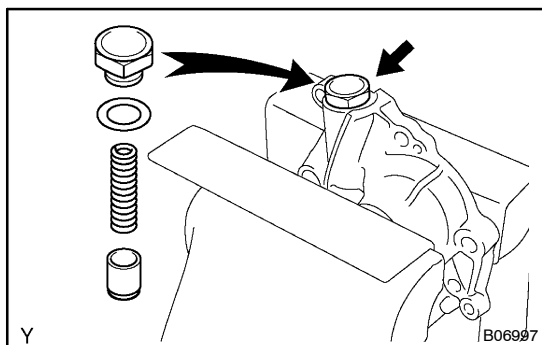
Remove the bolt, 2 nuts, oil strainer and gasket.



## DISASSEMBLY

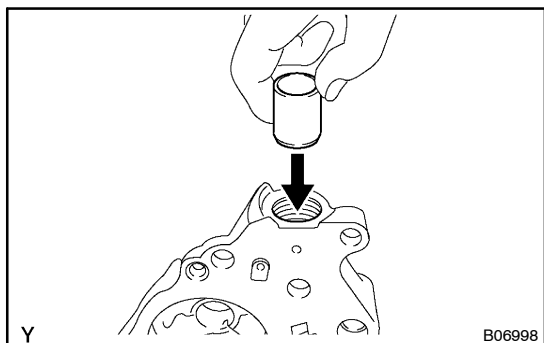
### 1. REMOVE DRIVE AND DRIVEN ROTORS

Pull out the drive and driven rotors.



### 2. REMOVE RELIEF VALVE

- (a) Carefully mount the oil pump body in a soft jaw vise.
- (b) Remove the plug, gasket, spring and relief valve.



## INSPECTION

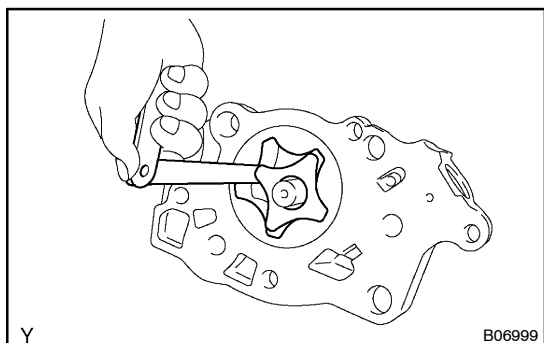
### 1. INSPECT RELIEF VALVE

Coat the valve with engine oil and check if 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 the drive and driven rotors into the oil pump body.  
(See [page LU-14](#))



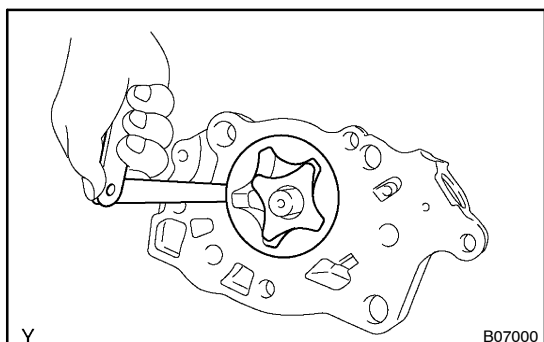
- (b) Inspect the rotors for tip clearance.  
Using a feeler gauge, measure the clearance between the drive and driven rotor tips.

**Standard tip clearance:**

**0.04 – 0.16 mm (0.0016 – 0.0063 in.)**

**Maximum tip clearance: 0.20 mm (0.0079 in.)**

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



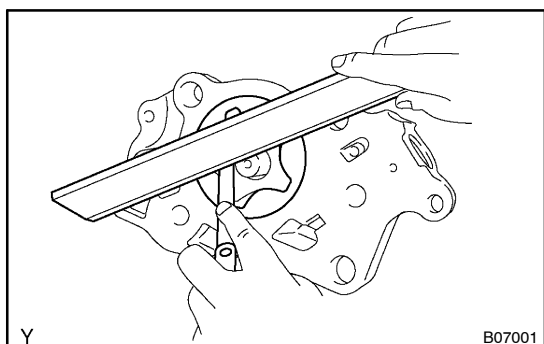
- (c) Inspect the rotors for body clearance.  
Using a feeler gauge, measure the clearance between the driven rotor and body.

**Standard body clearance:**

**0.10 – 0.16 mm (0.0039 – 0.0063 in.)**

**Maximum body clearance: 0.20 mm (0.0079 in.)**

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



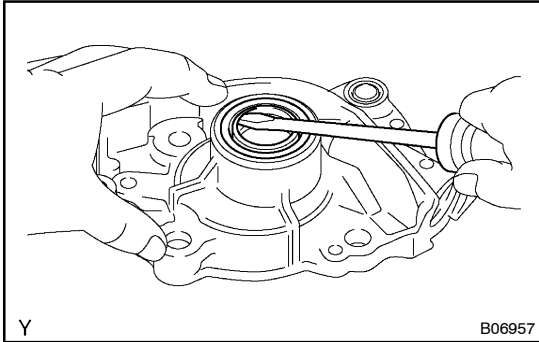
- (d) Inspect the rotors for side clearance.  
Using a feeler gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

**Standard side clearance:**

**0.03 – 0.09 mm (0.0012 – 0.0035 in.)**

**Maximum side clearance: 0.15 mm (0.0059 in.)**

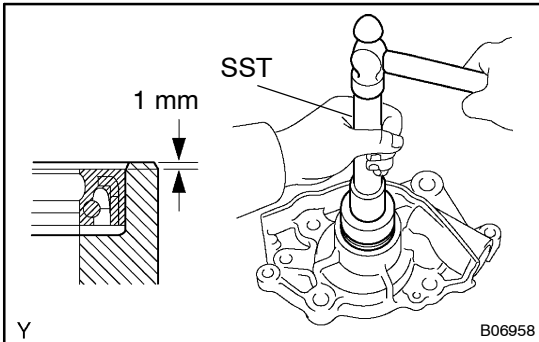
If the side clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.



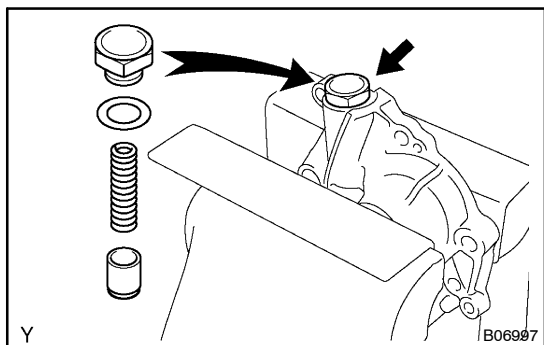
## REPLACEMENT

### REPLACE OIL PUMP OIL SEAL

- (a) Using a screwdriver, pry out the oil seal.



- (b) Using SST and a hammer, tap in a new oil seal to a depth of approx. 1 mm (0.04 in.) from the oil pump body edge.  
SST 09950-60010 (09951-00300),  
09950-70010 (09951-07100)
- (c) Apply MP grease to the oil seal lip.

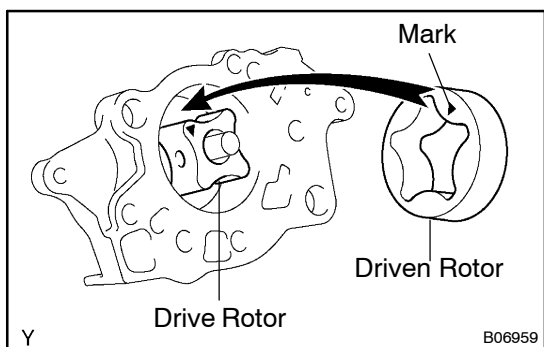


## REASSEMBLY

### 1. INSTALL RELIEF VALVE

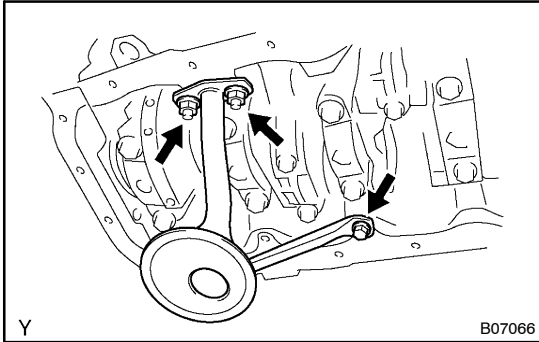
- (a) Insert the relief valve and spring into the oil pump body hole.
- (b) Install the plug with a new gasket.

**Torque: 36.8 N·m (375 kgf·cm 27 ft·lbf)**



### 2. INSTALL DRIVE AND DRIVEN ROTORS

Install the drive and driven rotors into pump body with the mark on the driven rotor facing the pump body side.



## INSTALLATION

### 1. INSTALL OIL STRAINER

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

**Torque:**

**8.5 N·m (85 kgf·cm, 74 in.·lbf) for bolt**

**18.5 N·m (185 kgf·cm, 13 ft·lbf) for nut**

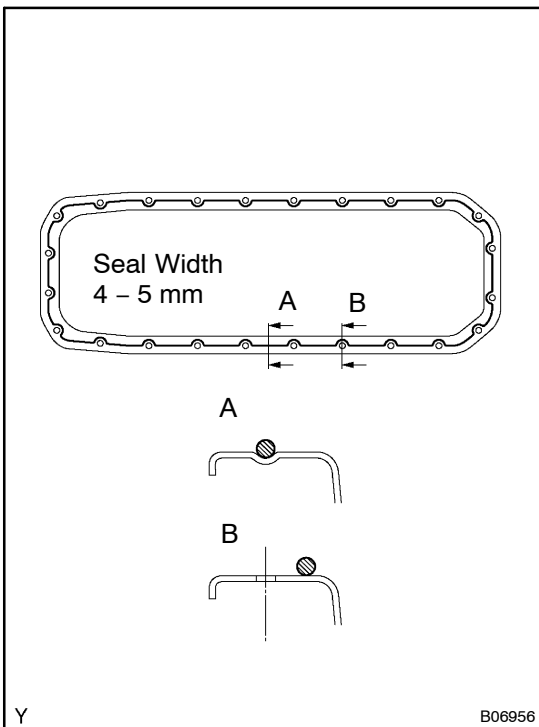
### 2. INSTALL OIL PAN

(a) Remove any old seal packing (FIPG) material and be careful not to drop any oil on the surfaces of the 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 surface.

#### NOTICE:

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



(b) Apply a seal packing to the oil pan shown in the illustration.

**Seal packing: Part No. 08826-00080 or equivalent**

- Install a nozzle that has been cut to a 4 – 5 mm (0.16 – 0.20 in.) opening.
- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall the cap.

(c) Install the oil pan with the 22 bolts and 2 nuts. Uniformly tighten the bolts and nuts in several passes.

**Torque: 5.5 N·m (55 kgf·cm, 48 in.·lbf)**

(d) Install the dipstick.

### 3. INSTALL RH AND LH STIFFENER PLATES

**Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)**

### 4. INSTALL OIL LEVEL SENSOR

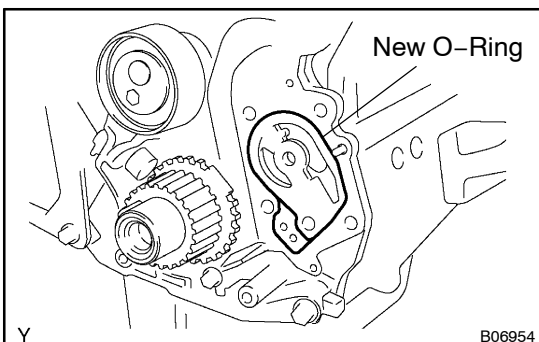
(a) Install the level sensor with the 4 bolts.

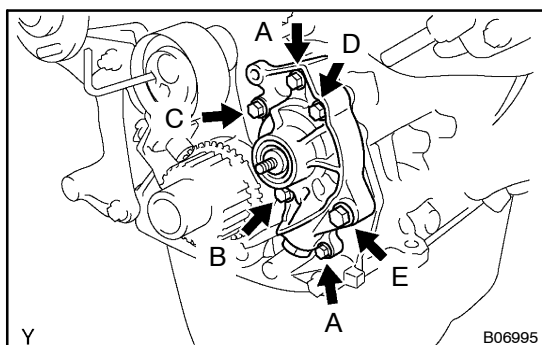
**Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)**

(b) Connect the level sensor connector.

### 5. INSTALL OIL PUMP

(a) Install a new O-ring into the timing belt case groove.





(b) Install the oil pump with the 6 bolts.

**Torque:**

**9 N·m (90 kgf·cm, 78 in·lbf) for 10 mm head**

**18.5 N·m (185 kgf·cm, 13 ft·lbf) for 12 mm head**

**37 N·m (375 kgf·cm, 27 ft·lbf) for 14 mm head**

**HINT:**

Each bolt length is indicated in the illustration.

Bolt length:

20 mm (0.79 in.) for A

30 mm (1.18 in.) for B

35 mm (1.38 in.) for C

40 mm (1.57 in.) for D

50 mm (1.97 in.) for E

**6. INSTALL OIL PUMP PULLEY AND TIMING BELT**  
(See page EM-26)

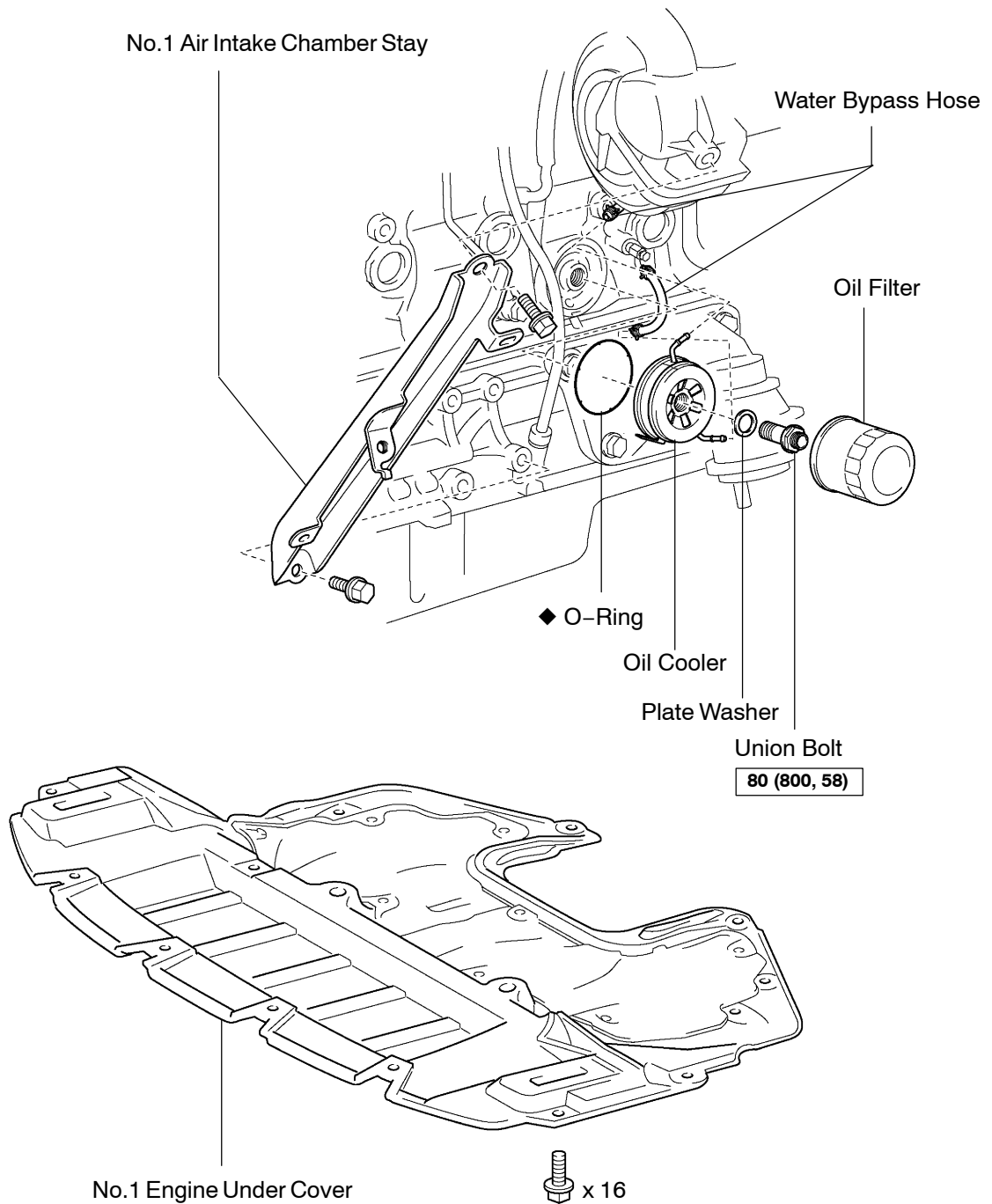
**7. FILL WITH ENGINE OIL**

**8. START ENGINE AND CHECK FOR OIL LEAK**

**9. RECHECK ENGINE OIL LEVEL**

# OIL COOLER COMPONENTS

LU03Q-04



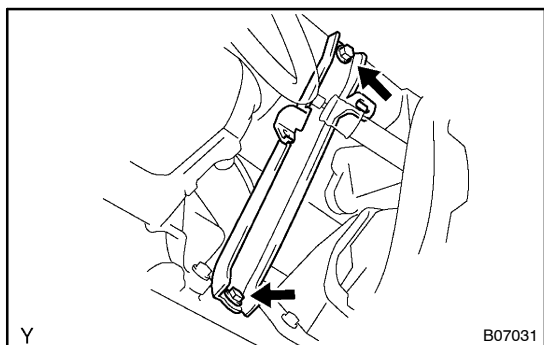
N·m (kgf·cm, ft·lbf) : Specified torque

γ ◆ Non-reusable part

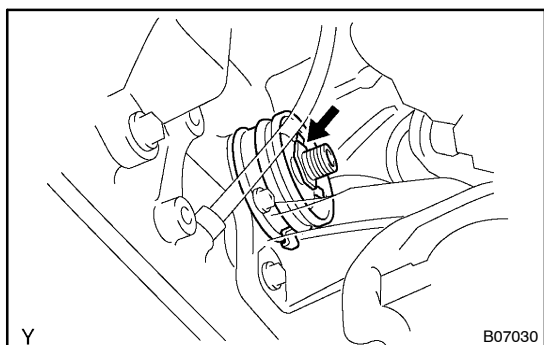
B07029

## REMOVAL

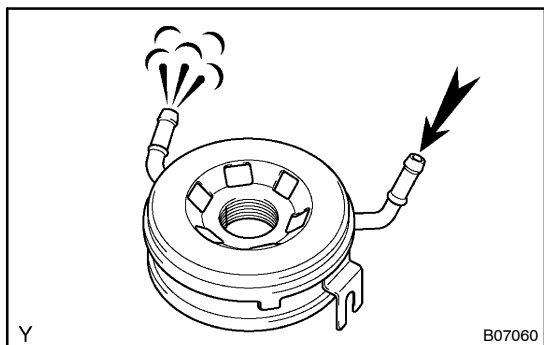
1. REMOVE NO.1 ENGINE UNDER COVER
2. DRAIN ENGINE COOLANT



3. REMOVE NO.1 AIR INTAKE CHAMBER STAY
4. REMOVE OIL FILTER (See page LU-3)



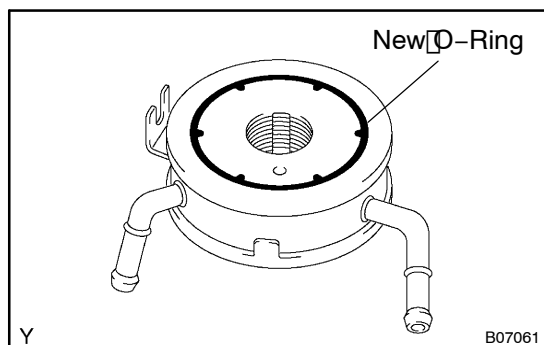
5. REMOVE OIL COOLER
  - (a) Remove the union bolt and plate washer.
  - (b) Disconnect the 2 water bypass hoses from the oil cooler and remove the oil cooler.
  - (c) Remove the O-ring from the oil cooler.



## INSPECTION

### INSPECT OIL COOLER

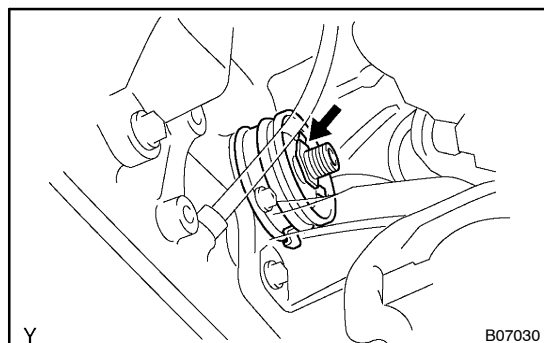
Check the oil cooler for damage or clogging.  
If necessary, replace the oil cooler.



## INSTALLATION

### 1. INSTALL OIL COOLER

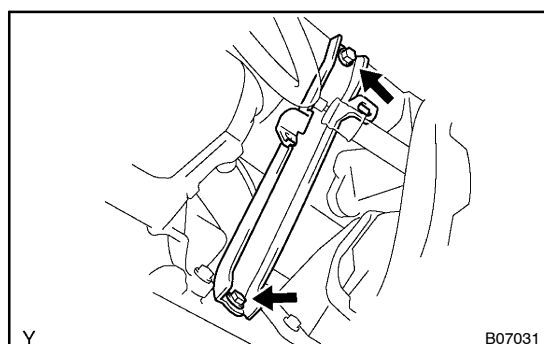
- (a) Clean the oil cooler contact surface on the oil cooler mounting.
- (b) Install a new O-ring to the oil cooler.
- (c) Connect the 2 water bypass hoses to the oil cooler.



- (d) Apply a light coat of engine oil on the threads and under the head of the union bolt.
- (e) Install the oil cooler with the plate washer and union bolt.

**Torque: 80 N·m (800 kgf·cm, 58 ft·lbf)**

### 2. INSTALL OIL FILTER (See page LU-3)



### 3. INSTALL NO.1 AIR INTAKE CHAMBER STAY

**Torque: 18.5 N·m (185 kgf·cm, 13 ft·lbf)**

4. FILL WITH ENGINE COOLANT
5. START ENGINE AND CHECK FOR LEAK
6. INSTALL NO.1 ENGINE UNDER COVER
7. CHECK ENGINE OIL LEVEL