

Recommended Viscosity (SAE):

5W-30

°F	-20	0	20	40	60	80	100
°C	-29	-18	-7	4	16	27	38

TEMPERATURE RANGE ANTICIPATED BEFORE NEXT OIL CHANGE

B16233

OIL AND FILTER INSPECTION

LU011-09

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 SL Energy-Conserving or ILSAC multi-grade engine oil.

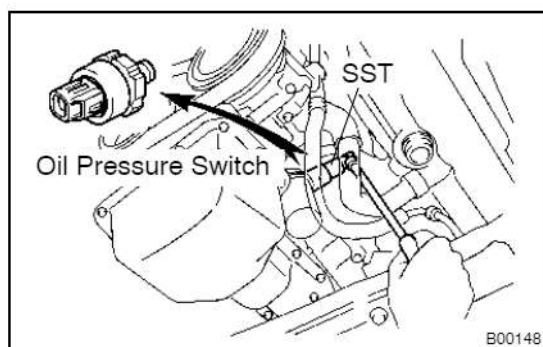
2. CHECK ENGINE OIL LEVEL

After warming up the engine and then 5 minutes after the engine stop, oil level should be between the "L" and "F" marks on the dipstick.

If low, check for leakage and add oil up to the "F" mark.

NOTICE:

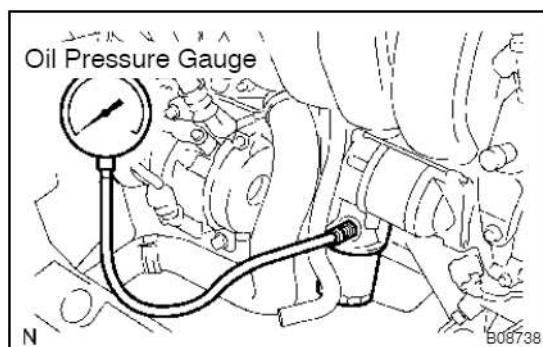
Do not fill with engine oil above the "F" mark.



3. REMOVE OIL PRESSURE SWITCH AND INSTALL OIL PRESSURE GAUGE

- (a) Using SST, remove the oil pressure switch.

SST 09816-30010



- (b) Install the oil pressure gauge.

4. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

5. CHECK OIL PRESSURE

Oil pressure:

At idle speed

1ZZ-FE 29 kPa (0.3 kgf/cm², 4.3 psi) or more

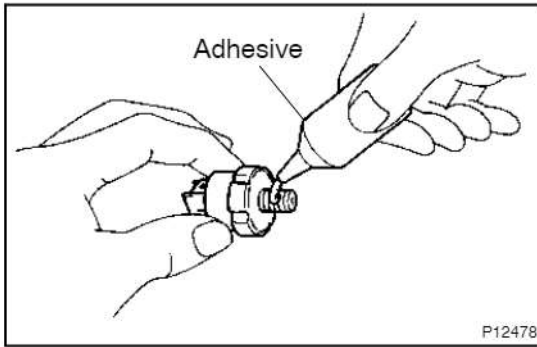
2ZZ-GE 39.2 kPa (0.4 kgf/cm², 5.7 psi) or more

At 3,000 rpm

294 - 539 kPa (3.0 - 5.5 kgf/cm², 43 - 78 psi)

6. REMOVE OIL PRESSURE GAUGE AND REINSTALL OIL PRESSURE SWITCH

- (a) Remove the oil pressure gauge.



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

Adhesive:

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

- (c) Using SST, install the oil pressure switch.
SST 09816-30010

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

7. START ENGINE AND CHECK FOR LEAKS

REPLACEMENT

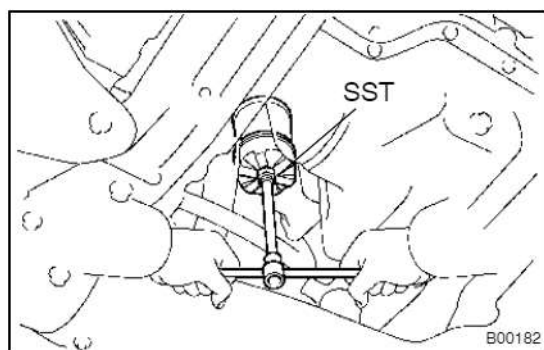
CAUTION:

- 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.
- Exercise caution in order to minimize the length and frequency of contact of your skin to used oil. Wear protective clothing and gloves. Wash your skin thoroughly 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 filter must be disposed of only at designated disposal sites.

1. REMOVE CENTER ENGINE UNDER COVER

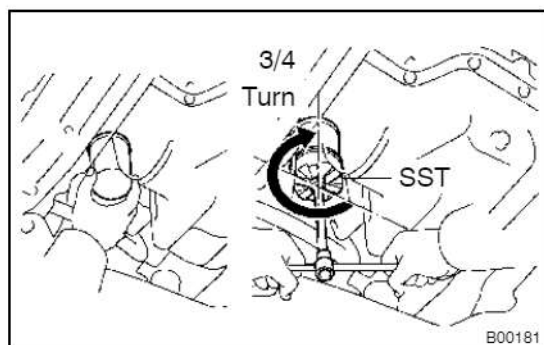
2. DRAIN ENGINE OIL

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



3. REPLACE OIL FILTER

- Using SST, remove the oil filter.
SST 09228-06501
- Check and clean the oil filter installation surface.
- Check the part number of the new oil filter is as same as old one.
- Apply clean engine oil to the gasket of a new oil filter.



- Lightly screw the oil filter into place, and tighten it until the gasket contacts the seat.
- Using SST, tighten it an additional 3/4 turn.
SST 09228-06501

4. REFILL WITH ENGINE OIL

- Clean and install the oil drain plug with a new gasket.
Torque: 37 N·m (378 kgf·cm, 27 ft·lbf)

- (b) Fill with fresh engine oil.

Capacity

1ZZ-FE

Drain and refill:

w/ Oil filter change: 3.7 liters (3.9 US qts, 3.3 Imp. qts)

w/o Oil filter change: 3.5 liters (3.7 US qts, 3.1 Imp. qts)

Dry fill: 4.2 liters (4.4 US qts, 3.7 Imp. qts)

2ZZ-GE

w/ Oil filter change: 4.4 liters (4.8 US qts, 4.0 Imp. qts)

w/o Oil filter change: 4.2 liters (4.6 US qts, 3.8 Imp. qts)

Dry fill: 4.8 liters (5.1 US qts, 4.2 Imp. qts)

- (c) Install the oil filter cap.

5. START ENGINE AND CHECK FOR OIL LEAKS

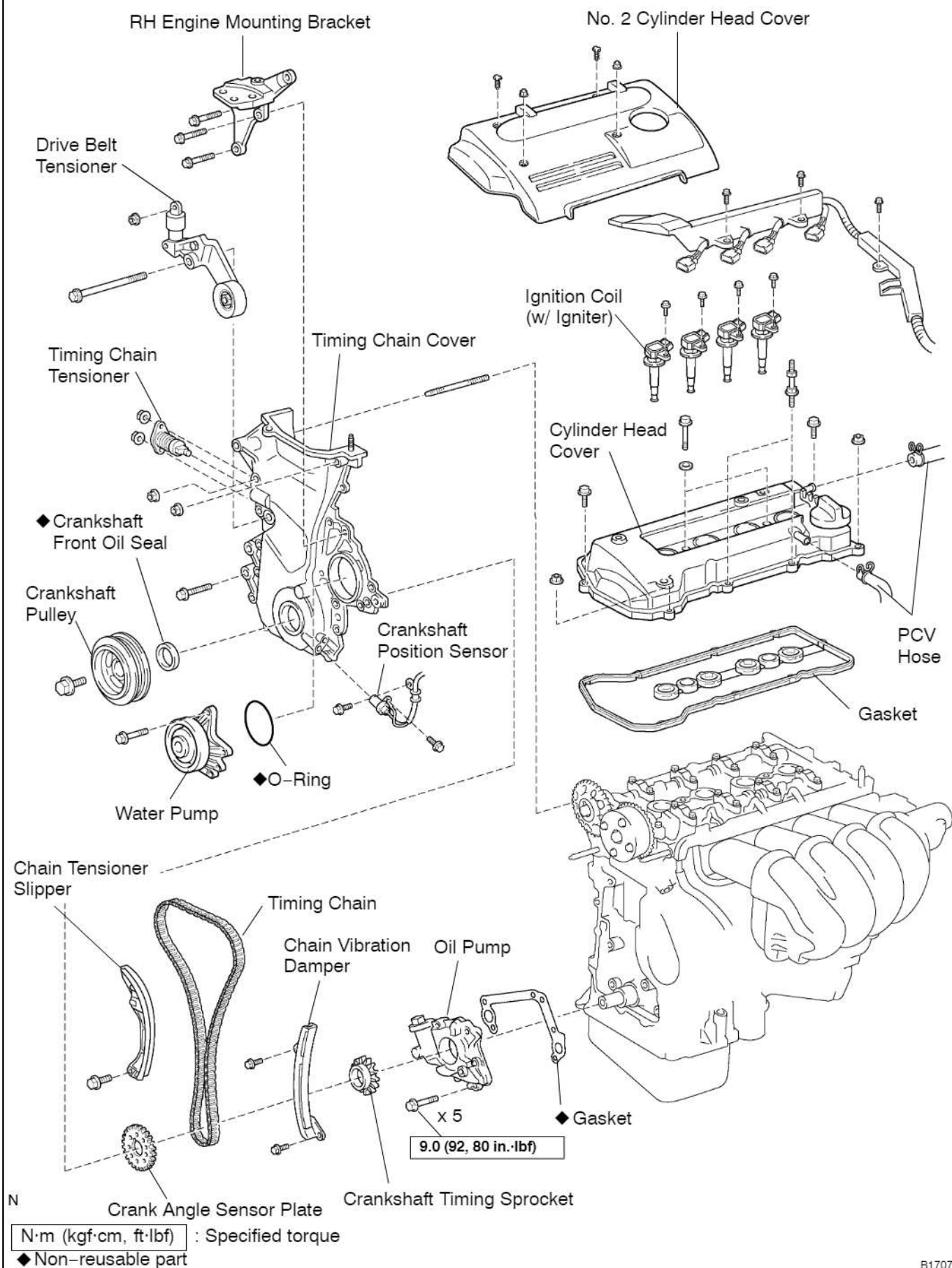
6. INSTALL CENTER ENGINE UNDER COVER

7. RECHECK ENGINE OIL LEVEL

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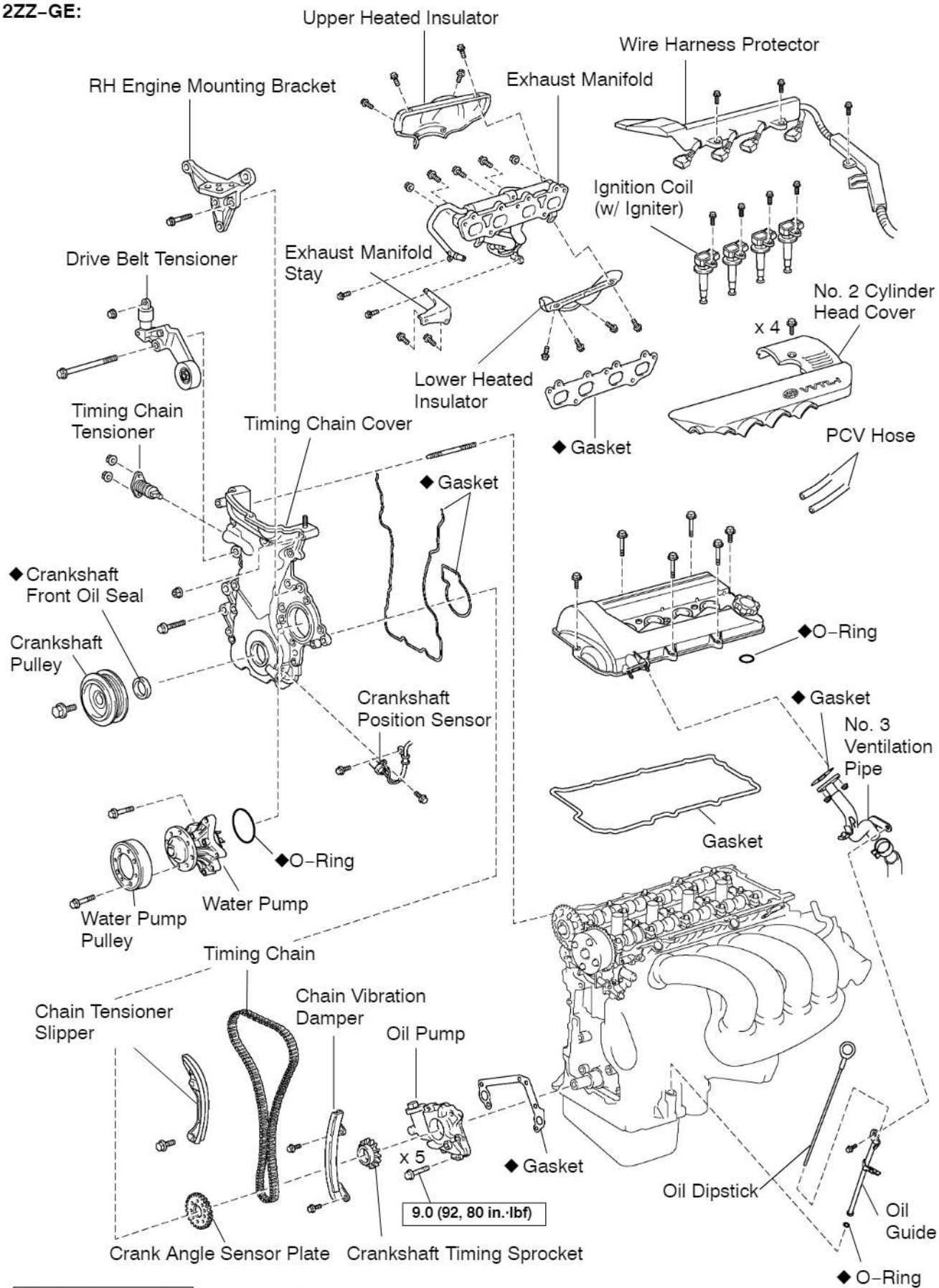


1ZZ-FE:



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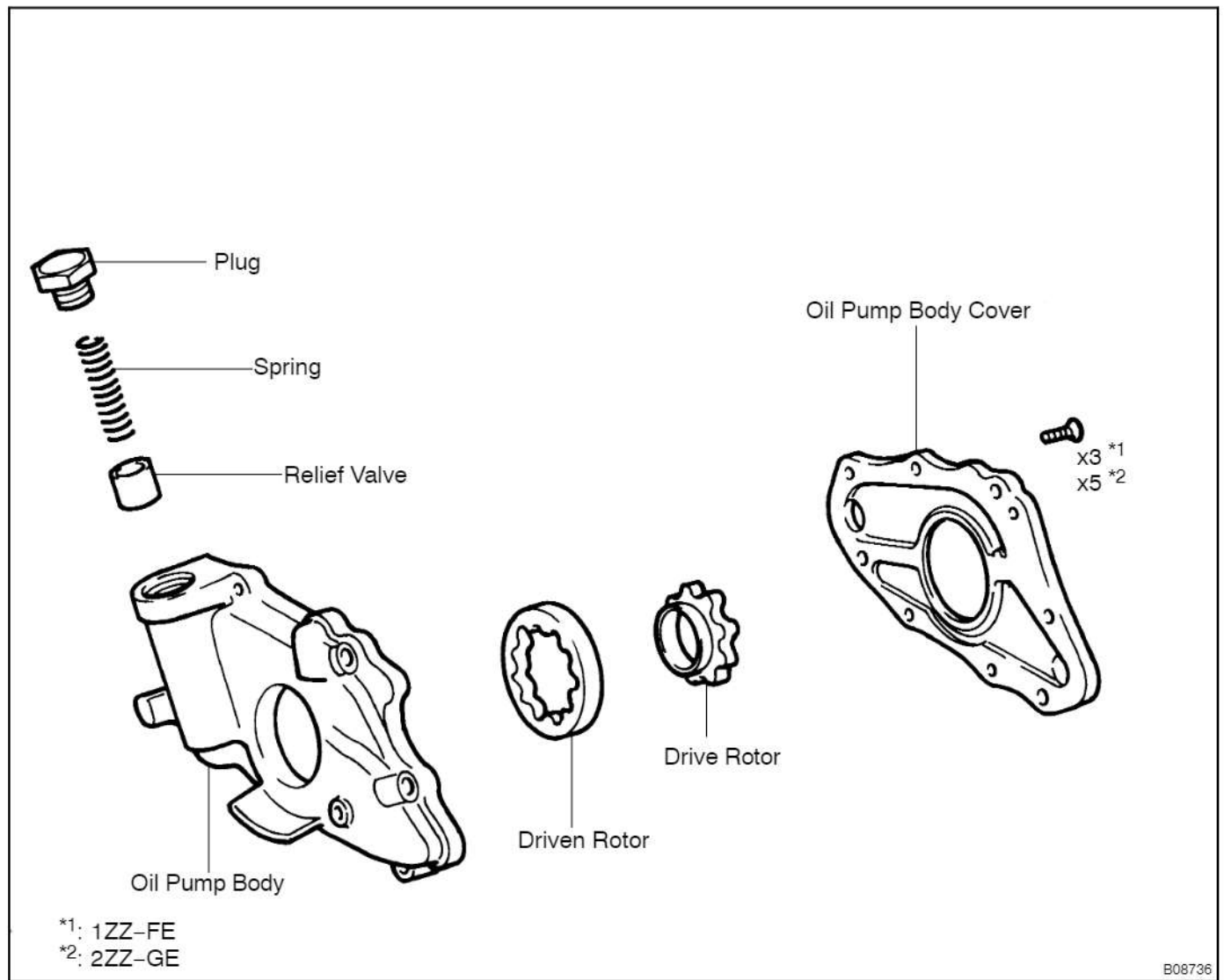
2ZZ-GE:



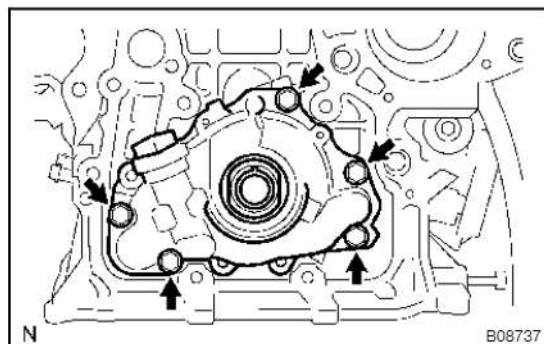
N.m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

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REMOVAL

1. DRAIN ENGINE OIL
2. REMOVE TIMING CHAIN AND CRANKSHAFT TIMING SPROCKET (See pages EM-19)
3. REMOVE OIL PUMP

Remove the 5 bolts, oil pump and gasket.

DISASSEMBLY

1. REMOVE RELIEF VALVE

Remove the plug, spring and relief valve.

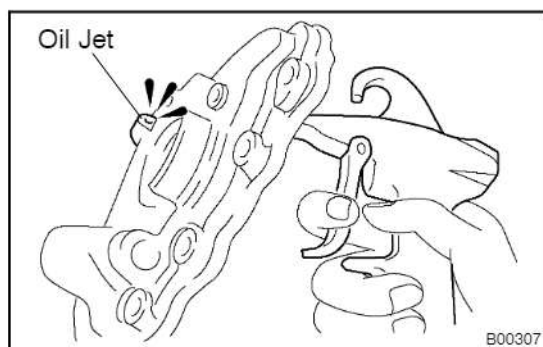
2. REMOVE DRIVE AND DRIVEN ROTORS

(a) 1ZZ-FE:

Remove the 3 screws, pump body cover, drive and driven rotors.

(b) 2ZZ-GE:

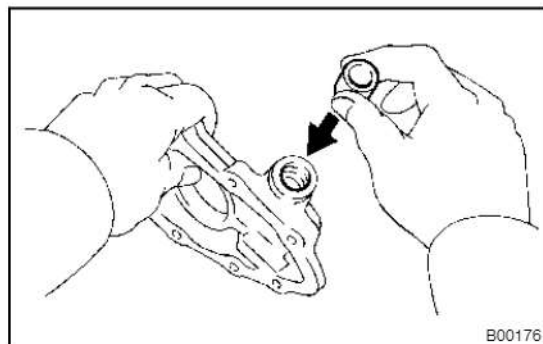
Remove the 5 screws, pump body cover, drive and driven rotors.



INSPECTION

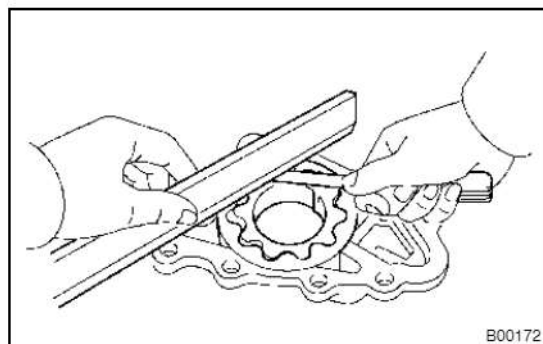
1. INSPECT OIL JET

Check the oil jet for damage or clogging.
If necessary, replace the oil pump assembly.



2. 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.



3. 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:

1ZZ-FE 0.025 – 0.071 mm (0.00098 – 0.00280 in.)

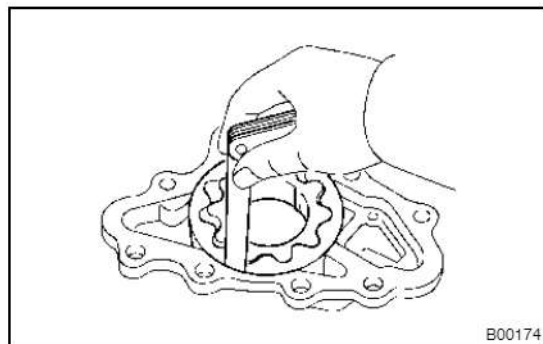
2ZZ-GE 0.030 – 0.080 mm (0.00118 – 0.00314 in.)

Maximum side clearance:

1ZZ-FE 0.071 mm (0.00280 in.)

2ZZ-GE 0.160 mm (0.00630 in.)

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



4. INSPECT ROTOR BODY CLEARANCE

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

Standard body clearance:

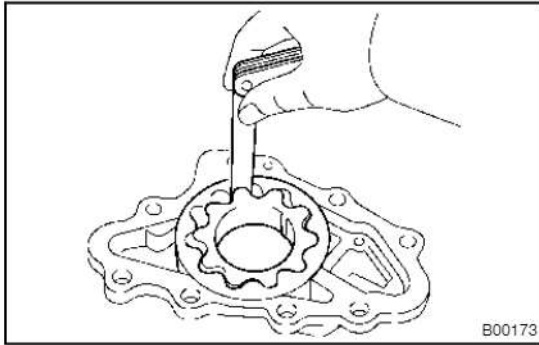
1ZZ-FE 0.260 – 0.325 mm (0.01024 – 0.01280 in.)

2ZZ-GE 0.125 – 0.180 mm (0.00492 – 0.00709 in.)

Maximum body clearance:

0.325 mm (0.01280 in.)

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



5. INSPECT ROTOR TIP CLEARANCE

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

Standard tip clearance:

1ZZ-FE 0.040 – 0.160 mm (0.00157 – 0.00630 in.)

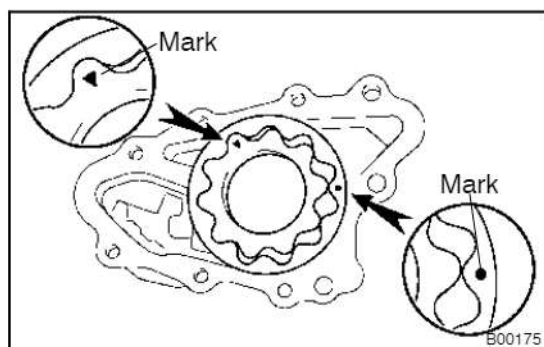
2ZZ-GE 0.060 – 0.180 mm (0.00236 – 0.00709 in.)

Maximum tip clearance:

1ZZ-FE 0.16 mm (0.00630 in.)

2ZZ-GE 0.35 mm (0.01378 in.)

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



REASSEMBLY

1. INSTALL DRIVE AND DRIVEN ROTORS

- (a) Place the drive and driven rotors into pump body with the marks facing the pump body cover side.

- (b) 1ZZ-FE:

Install the pump body cover with the 3 screws.

Torque: 10.5 N·m (107 kgf·cm, 8 ft·lbf)

- (c) 2ZZ-GE:

Install the pump body cover with the 5 screws.

Torque: 10.5 N·m (107 kgf·cm, 8 ft·lbf)

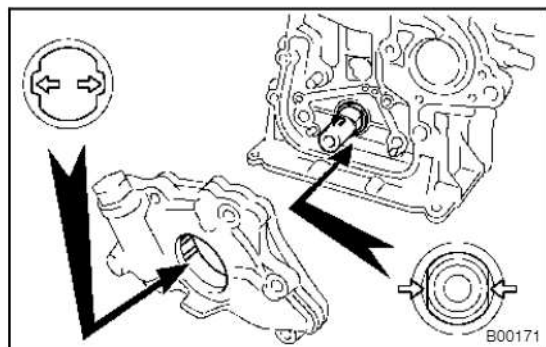
2. INSTALL RELIEF VALVE

Insert the relief valve and spring into the pump body hole, and install the plug.

Torque:

1ZZ-FE: 37 N·m (375 kgf·cm, 27 ft·lbf)

2ZZ-GE: 49 N·m (500 kgf·cm, 36 ft·lbf)



INSTALLATION

1. INSTALL OIL PUMP

- Place a new gasket on the cylinder block.
- Engage the spline teeth of the oil pump drive rotor with the large teeth of the crankshaft, and slide the oil pump.
- Install the oil pump with the 5 bolts.

Torque: 9.0 N·m (92 kgf·cm, 80 in·lbf)

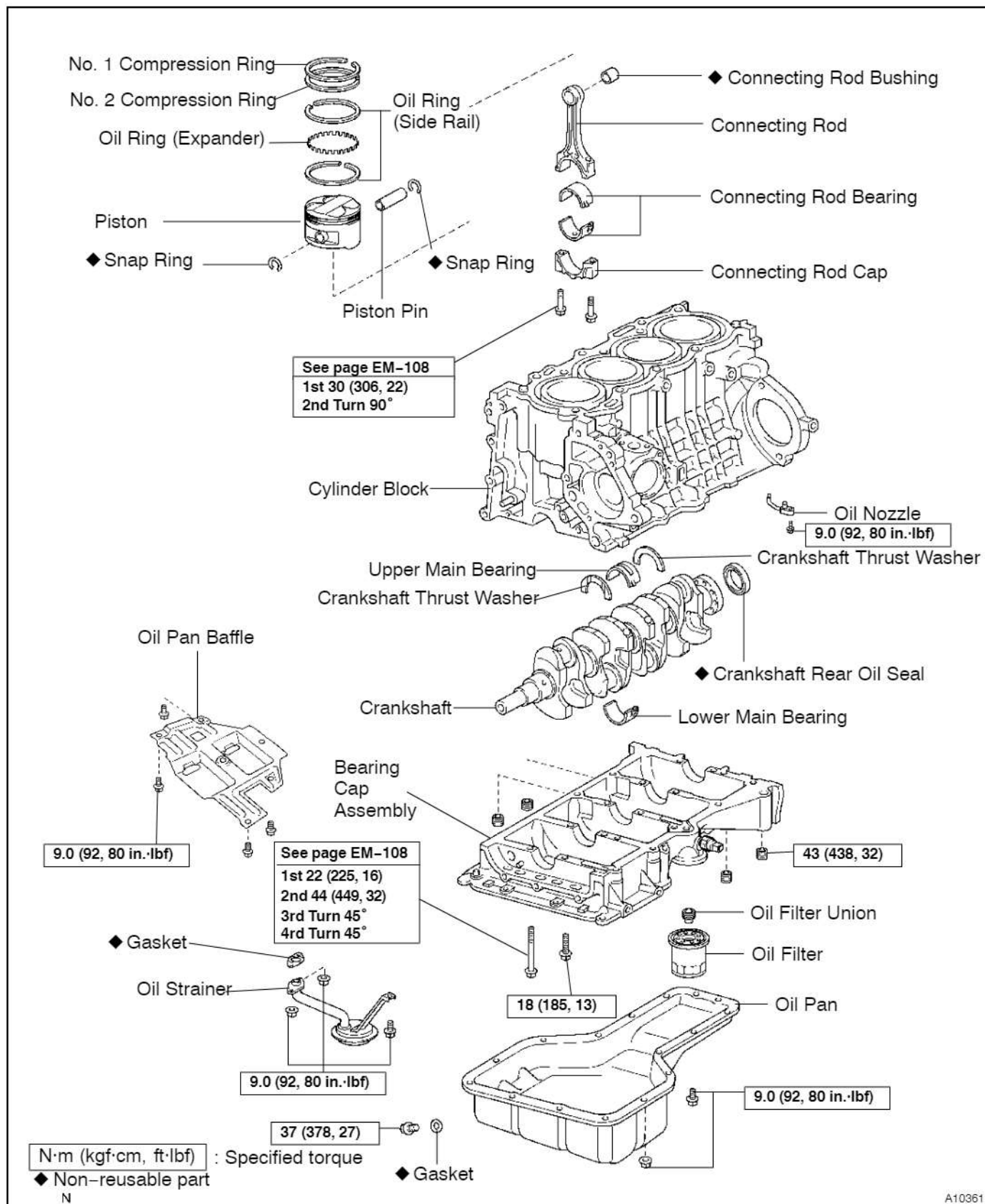
2. INSTALL CRANKSHAFT TIMING SPROCKET AND TIMING CHAIN (See pages EM-26)

- FILL ENGINE WITH OIL
- START ENGINE AND CHECK FOR LEAKS
- RECHECK ENGINE OIL LEVEL

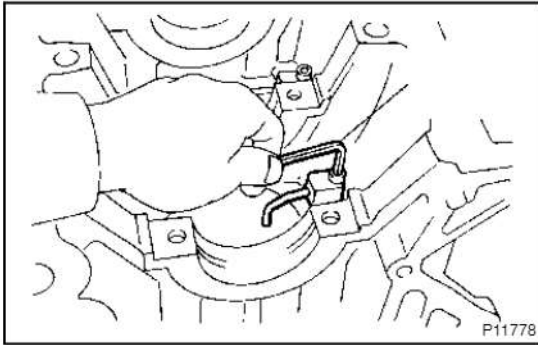
OIL NOZZLE (2ZZ-GE)

COMPONENTS

LU01H-07



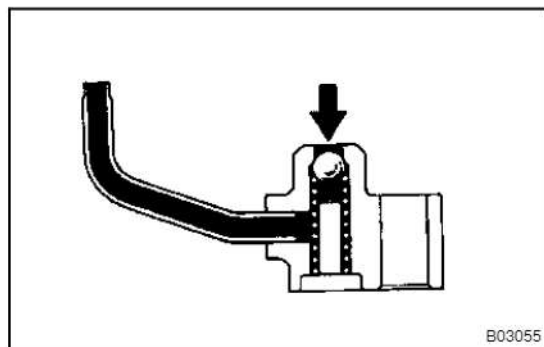
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REMOVAL

1. **REMOVE CRANKSHAFT (See page EM-91)**
2. **REMOVE OIL NOZZLE (WITH RELIEF VALVE)**

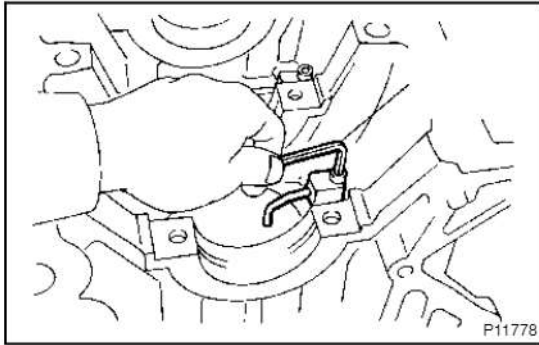
Using a 5 mm hexagon wrench, remove the bolt and oil nozzle.



INSPECTION

INSPECT RELIEF VALVE (OIL NOZZLE)

Push the valve with a wooden stick to check if it is stuck.
If stuck, replace the relief valve.



INSTALLATION

1. INSTALL OIL NOZZLE (WITH RELIEF VALVE)

Using a 5 mm hexagon wrench, install the oil nozzle with the bolt.

Torque: 9.0 N·m (92 kgf·cm, 80 in·lbf)

2. INSTALL CRANKSHAFT (See page EM-108)