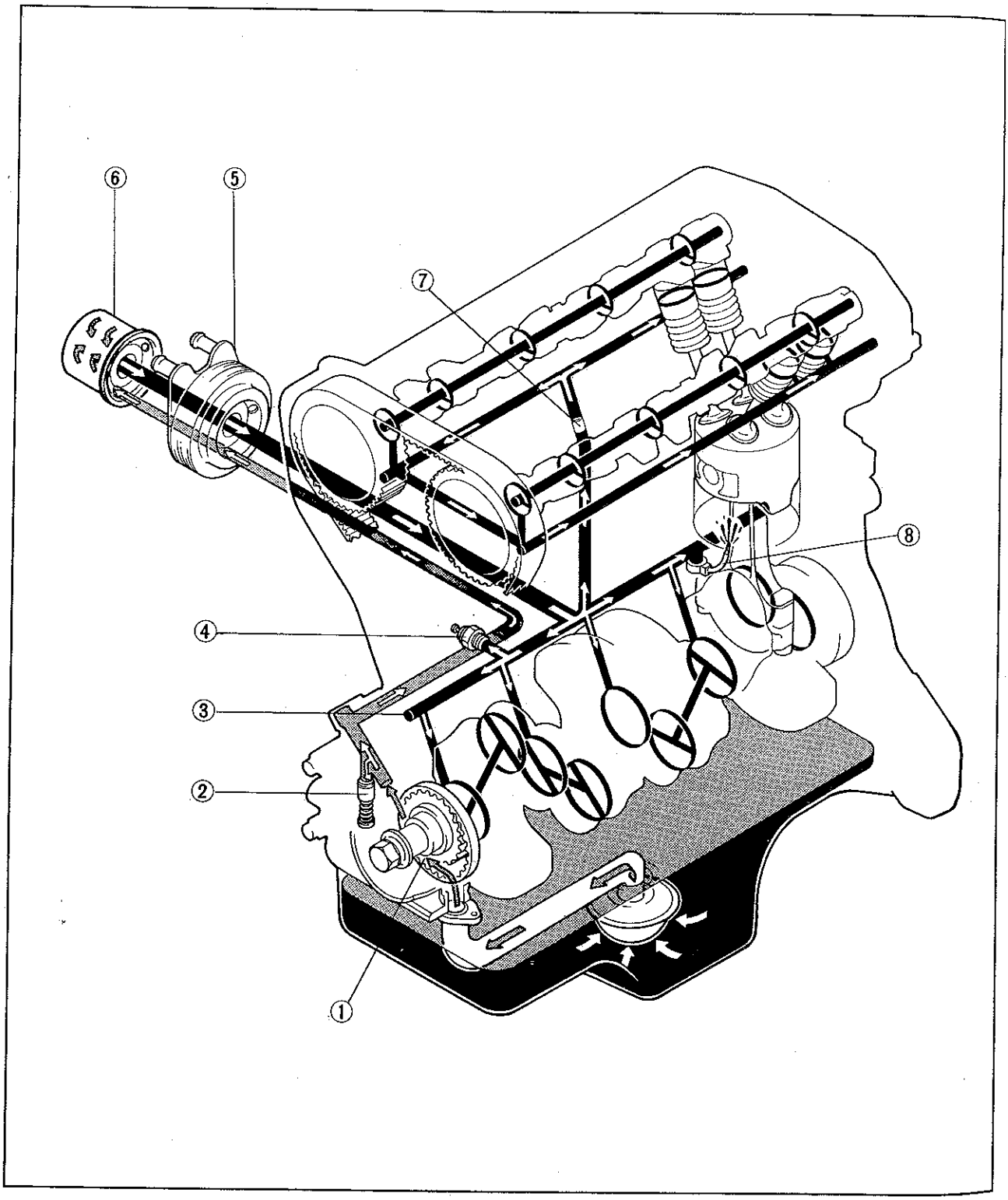
LUBRICATION SYSTEM

76F02X-001

OUTLINE

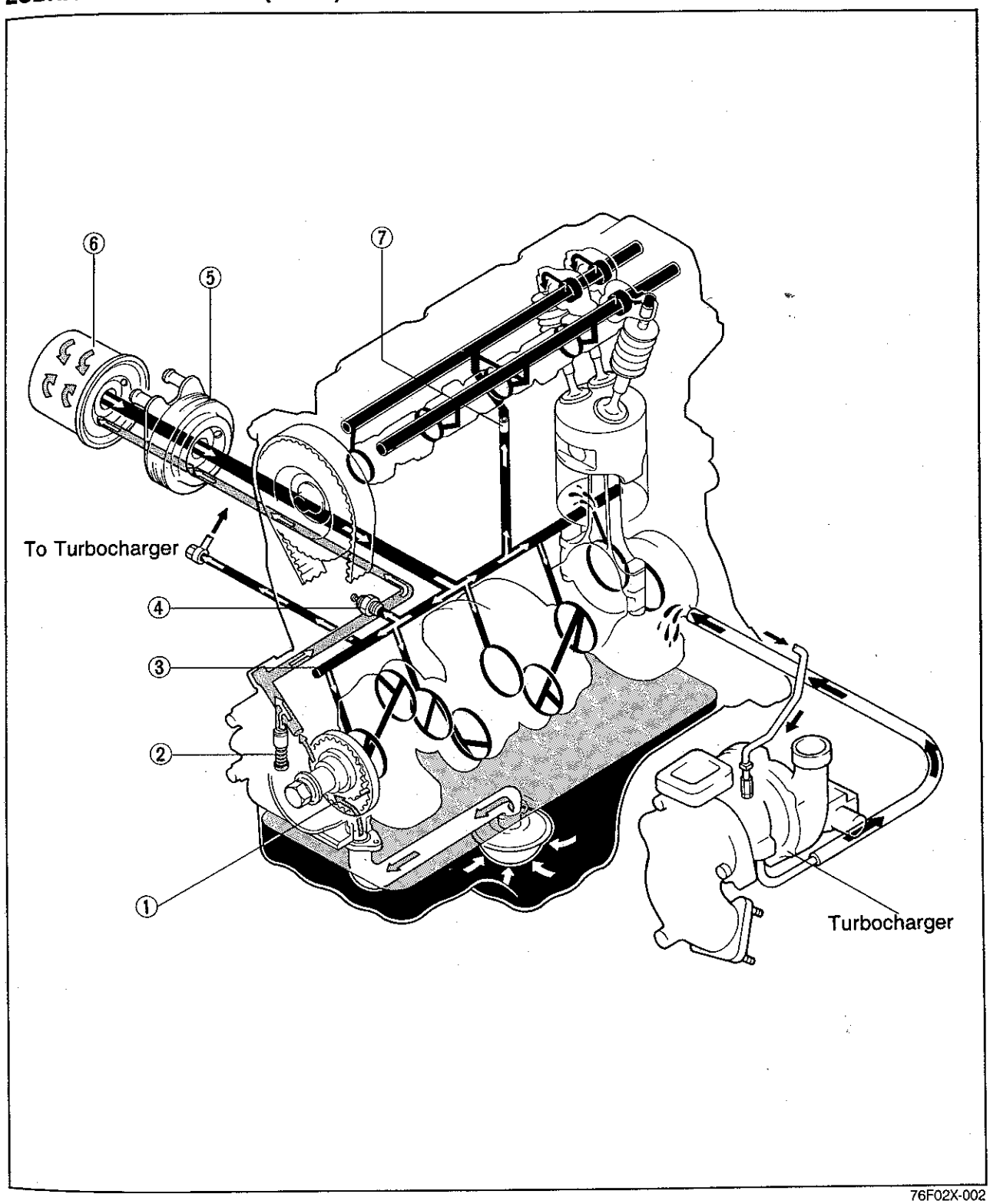
LUBRICATION CIRCUIT (DOHC)



76G02A-002

1. Oil pump
2. Pressure regulator valve
3. Main gallery
4. Oil pressure switch
5. Oil cooler
6. Oil filter
7. Oil control plug
8. Oil jet

LUBRICATION CIRCUIT (SOHC)



76F02X-002

1. Oil pump
2. Pressure regulator valve
3. Main gallery
4. Oil pressure switch
5. Oil cooler (F2 Turbo, FE 12-valve)
6. Oil filter
7. Oil control plug

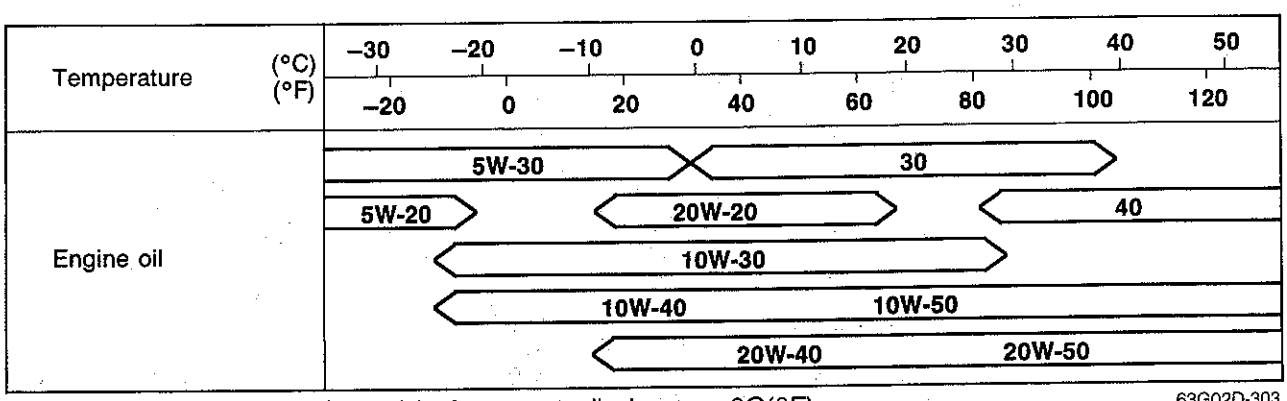
2 TROUBLESHOOTING GUIDE

SPECIFICATIONS

Item \ Engine model			F2		FE DOHC	F6·F8·FE SOHC
			Turbo	Non-Turbo		
Lubrication system			Force-fed			
Oil pump	Type		Trochoid gear			Crescent gear
	Regulated pressure kPa (kg/cm², psi)		392 (4.0, 57)		490 (5.0, 71)	392 (4.0, 57)
	Oil pressure kPa (kg/cm², psi)	1,000 rpm	147—245 (1.5—2.5, 21—36)			
		3,000 rpm	294—392 (3.0—4.0, 43—57)		343—441 (3.5—4.5, 50—64)	294—392 (3.0—4.0, 43—57)
Oil filter	Type		Full-flow, paper element			
	Relief pressure differential kPa (kg/cm², psi)		98 (1.0, 14)			
Oil cooler	Type		Water cooled, 4-layer		Water cooled, 6-layer	Water cooled, 4-layer
Oil warning pressure kPa (kg/cm², psi)			29 (0.3, 4.3)			
Oil capacity	Total (dry engine) liters (US qt, Imp qt)		4.6 (4.9, 4.0)		4.3 (4.5, 3.8)	
	Oil pan liters (US qt, Imp qt)		3.9 (4.1, 3.4)		3.6 (3.8, 3.2)	
	Oil filter liters (US qt, Imp qt)		0.3 (0.32, 0.26)		0.2 (0.21, 0.18)	0.3 (0.32, 0.26)
Engine oil (API service)			SF	SD, SE, or SF		

76F02X-003

Recommended SAE Viscosity



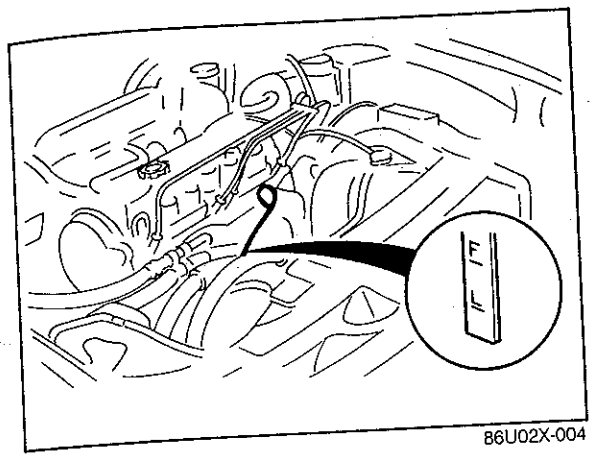
Temperature range anticipated before next oil change, °C(°F)

63G02D-303

TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy	Page
Engine hard starting	Improper engine oil	Replace	2— 5
	Insufficient engine oil	Add oil	2— 5
Excessive oil consumption	Oil working up or working down	Refer to Section 1	
	Oil leakage	Repair	—
Oil pressure drop	Insufficient oil	Add oil	2— 5
	Oil leakage	Repair	—
	Worn or damaged oil pump gear	Replace	2—11
	Worn plunger (inside oil pump) or weak spring	Replace	2—11
	Clogged oil strainer	Clean	—
	Excessive main bearing or connecting rod bearing clearance	Refer to Section 1	
Warning lamp illuminated while engine running	Oil pressure drop	As described above	—
	Malfunction of oil pressure switch	Refer to Section 15	
	Malfunction of electrical system	Refer to Section 15	

76F02X-004



86U02X-004

INSPECTION

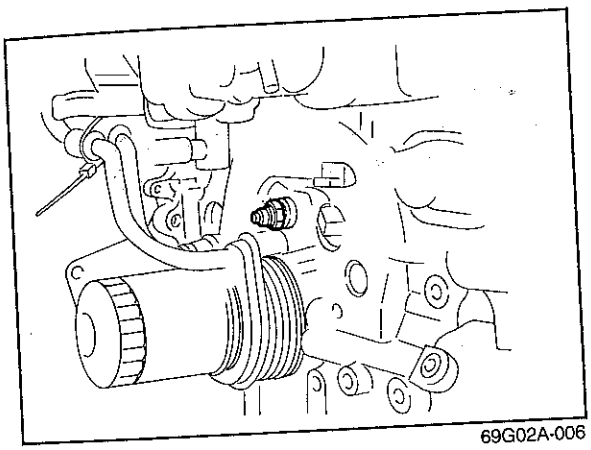
ENGINE OIL

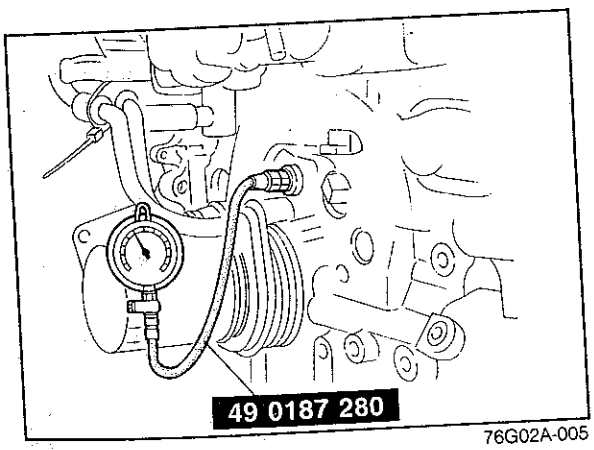
1. Be sure the vehicle is on level ground.
2. Warm up the engine to normal operating temperature and stop it.
3. Wait for five minutes.
4. Remove the oil level gauge and check the oil level and condition.
5. Add or replace oil if necessary.

Note
The distance between the L and F marks on the level gauge represents 1.0 liter (1.06 US qt, 0.88 Imp qt).

OIL PRESSURE

1. Remove the oil pressure switch.


69G02A-006

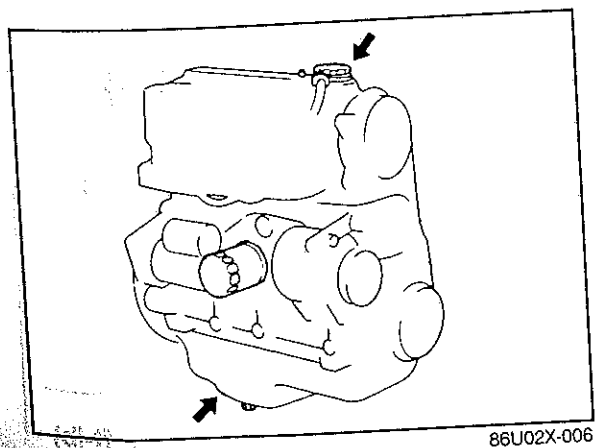


76G02A-005

2. Screw the **SST** into the pressure switch installation hole.
3. Warm up the engine to normal operating temperature.
4. Run the engine at **3,000 rpm**, and note the gauge reading.

Oil pressure:
343—441 kPa
(3.5—4.5 kg/cm^2, 50—64 psi)...DOHC
294—392 kPa
(3.0—4.0 kg/cm^2, 43—57 psi)...SOHC

5. If the pressure is not as specified, check for the cause, and repair if necessary.
(Refer to Troubleshooting Guide.)

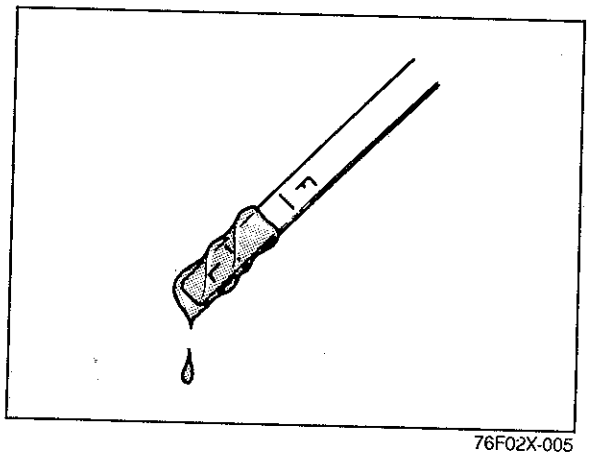

86U02X-006

ENGINE OIL

REPLACEMENT

1. Warm up the engine to the normal operating temperature and stop it.
2. Remove the oil filler cap and the oil pan drain plug.
3. Drain the oil into a suitable container.

Warning
Be careful when draining, the oil is very hot.

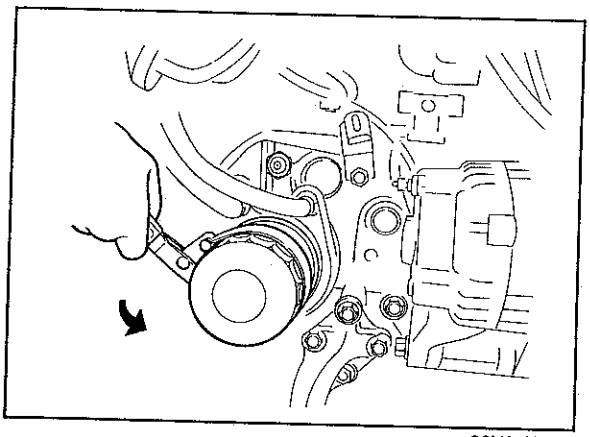


76F02X-005

4. Install the drain plug and a new gasket.
5. Refill the engine with the specified type and amount of engine oil.
6. Refit the oil filler cap.

Oil pan capacity:
3.9 liters (4.1 US qt, 3.4 Imp qt)...F2
3.6 liters (3.8 US qt, 3.2 Imp qt)...F6·F8·FE

7. Recheck the oil level after the engine has been run.

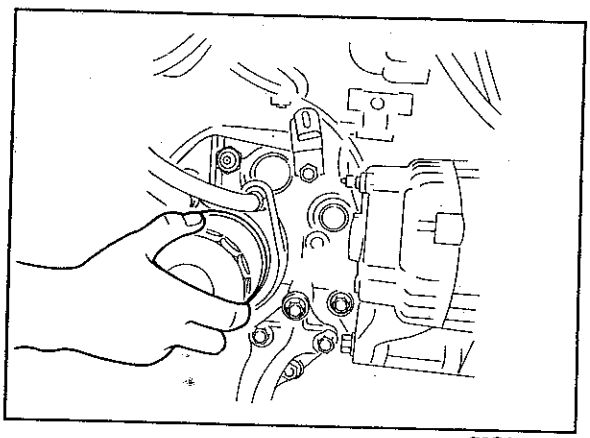


86U02X-008

OIL FILTER

REPLACEMENT

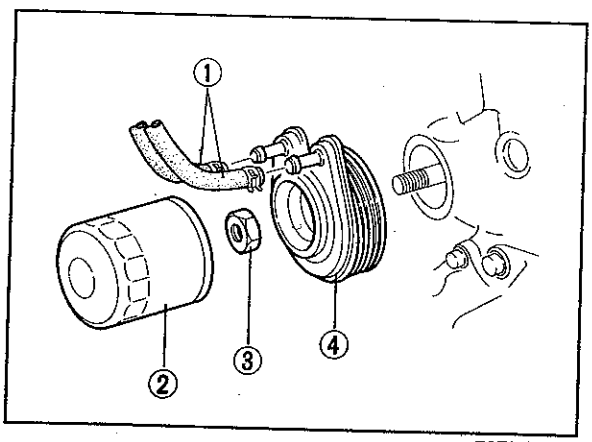
1. Remove the oil filter with a suitable wrench.
2. Use a clean rag to wipe off the mounting surface on the engine.



76G02A-007

3. (DOHC)
Install the oil filter until the rubber seal contacts the base and then tighten the filter 1 and 1/6 turn with a wrench.
(SOHC)
Install the oil filter and tighten it by hand only. Do not use a wrench.
4. Start the engine and inspect around the filter seal for leaks.
5. Check the oil level and add oil if necessary.

Oil filter capacity:
0.20 liters (0.21 US qt, 0.18 Imp qt)...DOHC
0.30 liters (0.32 US qt, 0.26 Imp qt)...SOHC



76F02X-006

OIL COOLER (DOHC, F2 Turbo, FE 12-valve)

REMOVAL AND INSTALLATION

Remove in the sequence shown in the figure.
Install in the reverse order of removal.
1. Water hose
2. Oil filter
3. Nut
4. Oil cooler

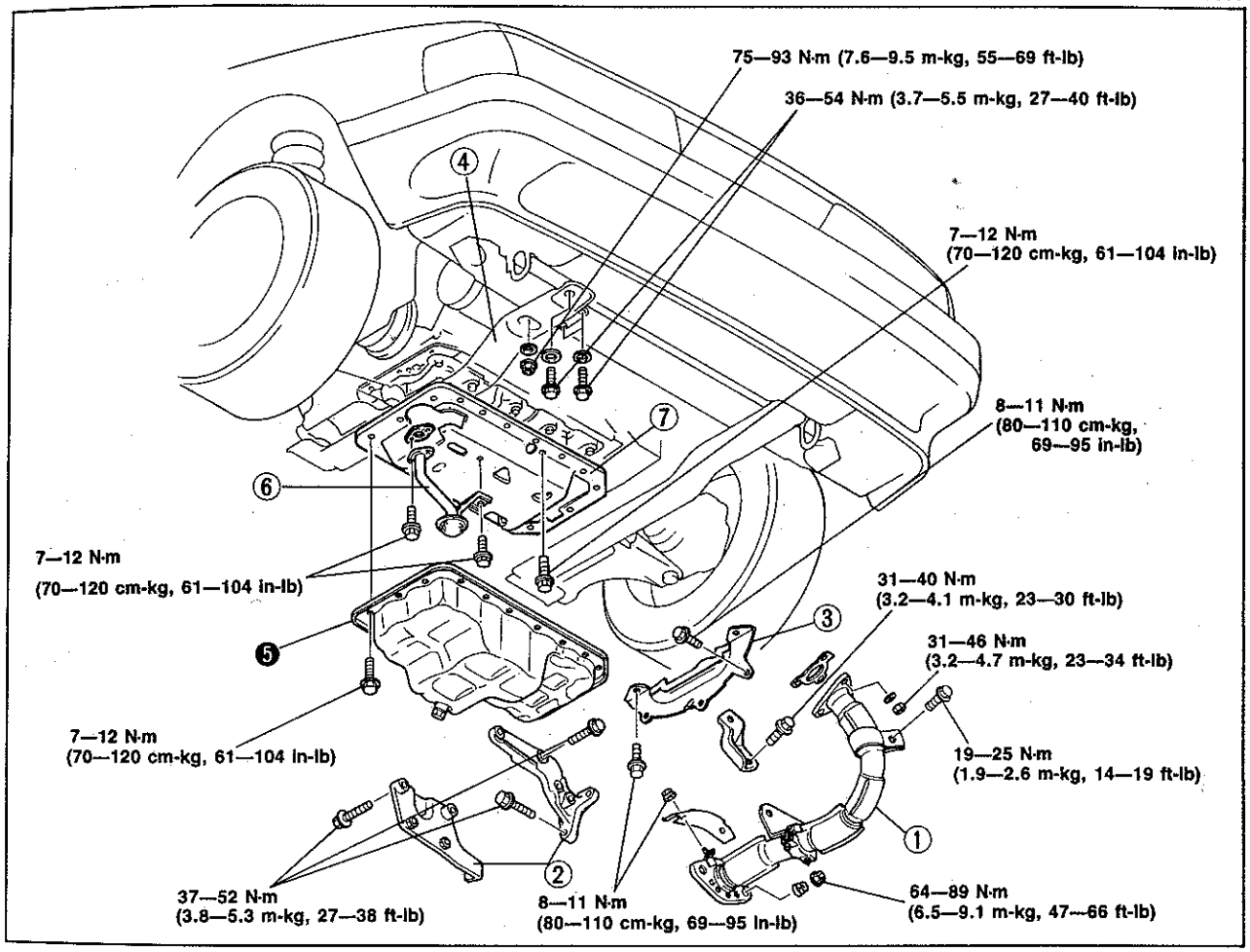
Nut tightening torque:
29—39 N·m (3.0—4.0 m-kg, 22—29 ft-lb)

OIL PAN

REMOVAL

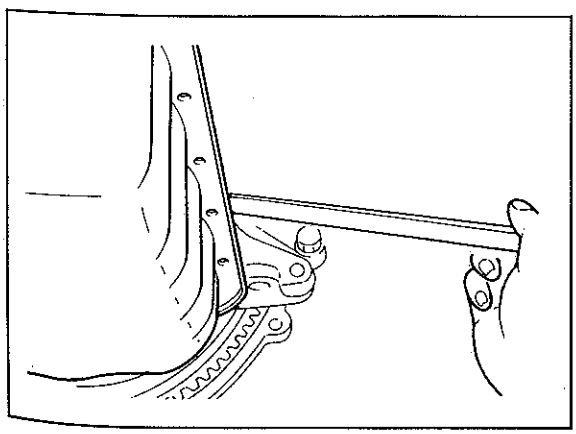
1. Disconnect the negative battery cable.
2. Drain the engine oil.
3. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.

76G02A-009



76F02X-007

1. Exhaust pipe
2. Gusset plate
3. Clutch housing under cover
4. Sub frame (RH)
5. Oil pan
6. Oil strainer
7. Stiffener (DOHC, 12-valve)



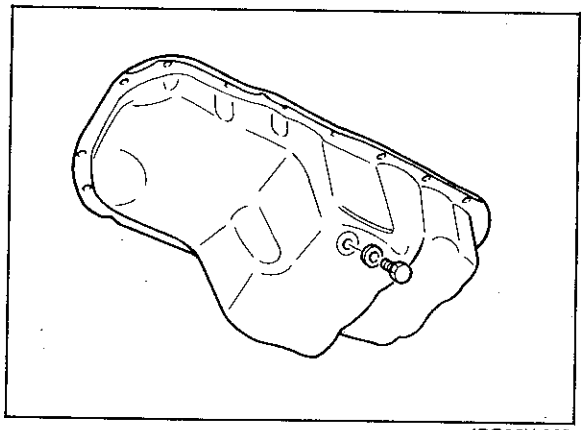
76F02X-008

Removal Note
Oil pan

1. Remove the oil pan mounting bolts.
2. Insert a scraper or a suitable tool between the oil pan and the stiffener or the cylinder block to separate them.
3. Remove the oil pan.

Caution
Do not bend the oil pan when prying loose.

2 OIL PAN

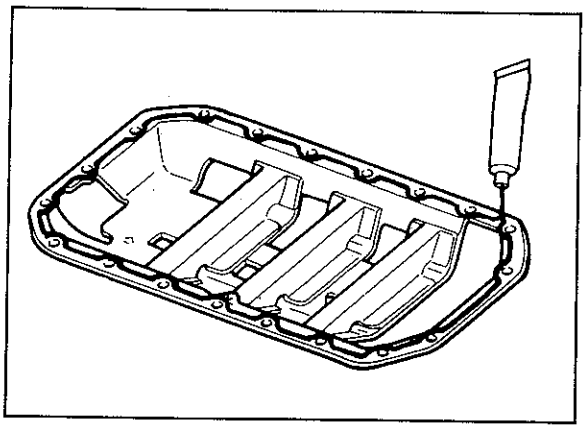


4BG02X-037

INSPECTION

Check the following points. Repair or replace if necessary.

1. Cracks, deformation, damage
2. Damaged drain plug threads



76F02X-009

INSTALLATION

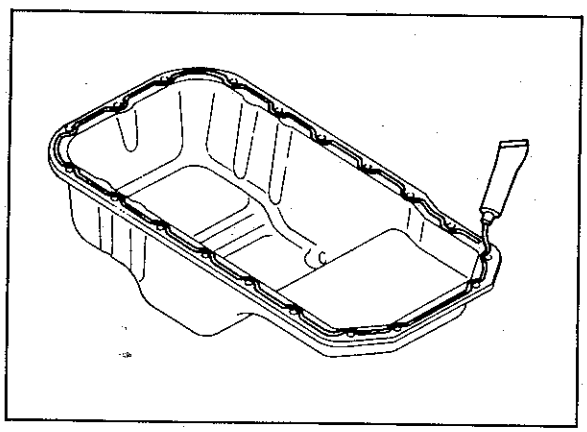
Install in the reverse order of removal referring to the installation note.

Installation Note

Stiffener (DOHC, 12-valve)

1. Remove any dirt or other material from the contact surface.
2. Apply silicon sealant to the stiffener around inside of the bolt holes and overlap the ends.
3. Install the stiffener.

Tightening torque:
7—12 N·m (70—120 cm-kg, 61—104 in-lb)



76F02X-010

Oil pan

1. Apply a confinuous bead of silicon sealant to the oil pan around inside of the bolt holes and overlap the ends.
2. Install the oil pan.

Tightening torque:
7—12 N·m (70—120 cm-kg, 61—104 in-lb)

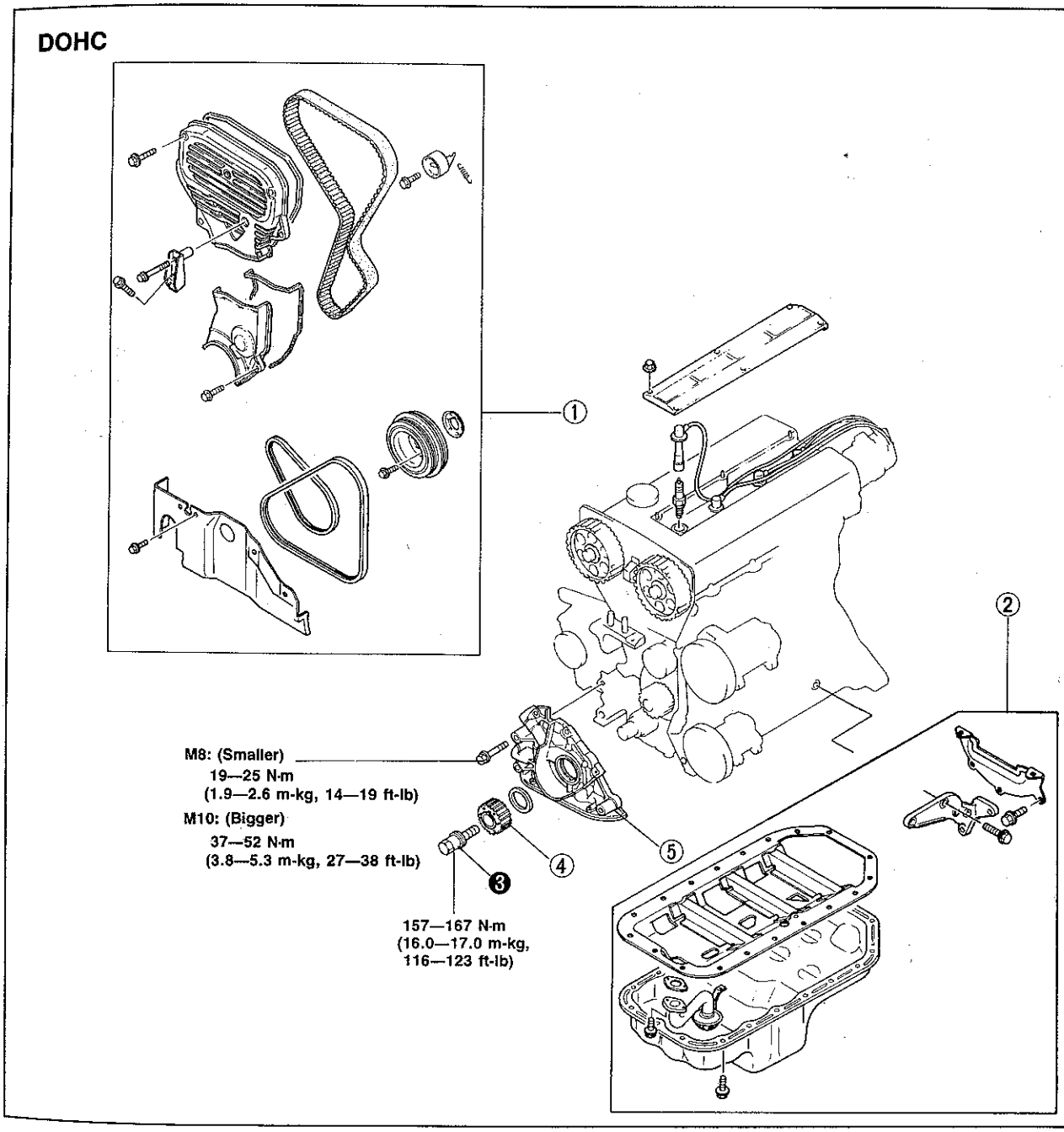
OIL PUMP

REMOVAL

1. Disconnect the negative battery cable.
2. Drain the engine oil.
3. Remove in the sequence shown in the figure referring to the removal note for specially marked parts.

76G02A-015

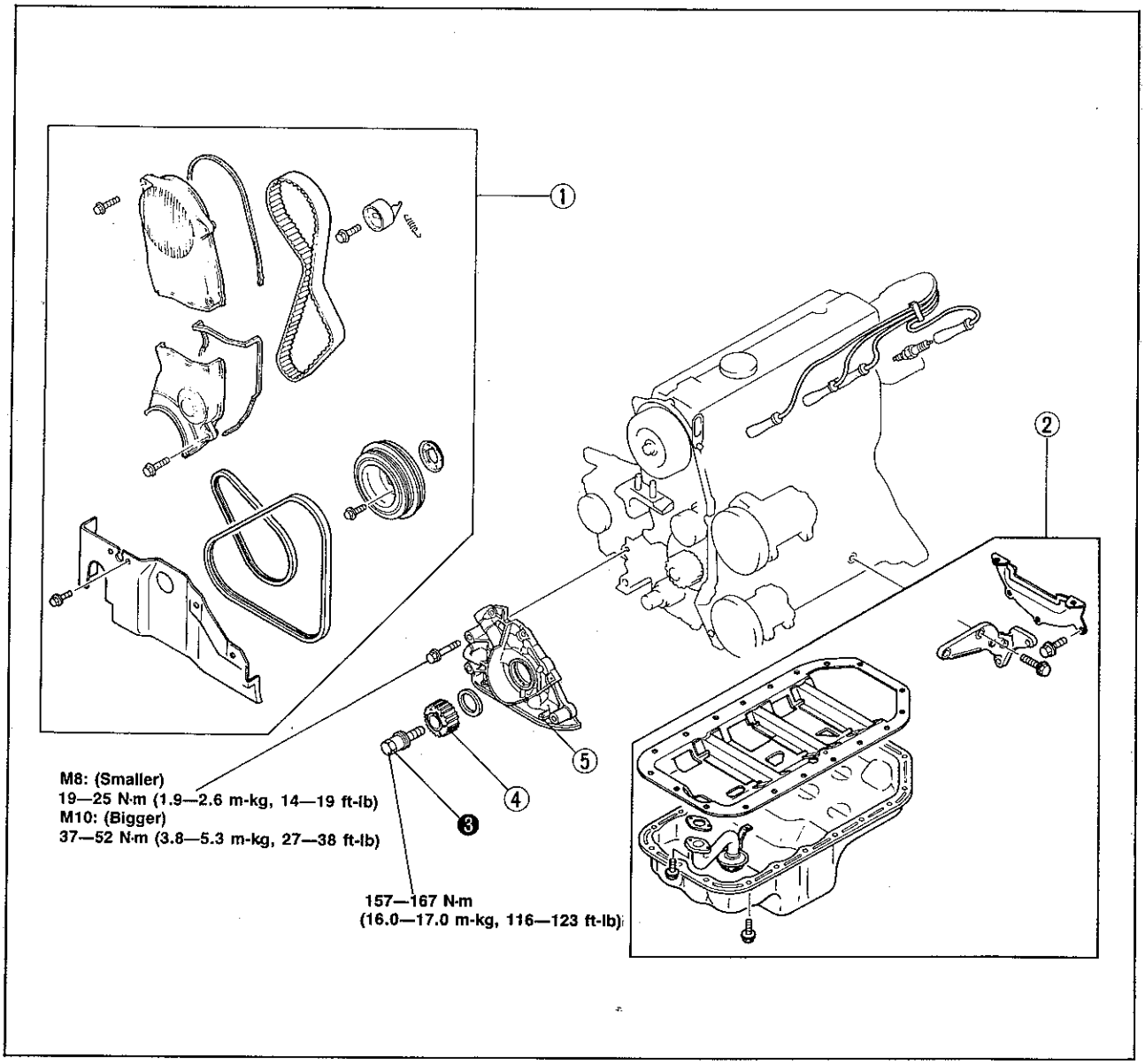
DOHC



76F02X-011

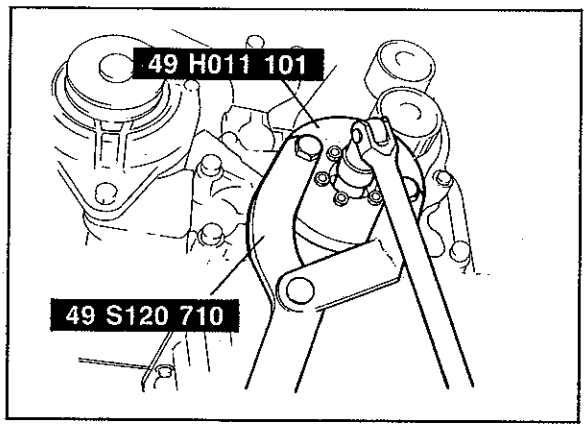
1. Timing belt (Refer to Section 1B)
2. Oil pan (Refer to page 2—7.)
3. Timing belt pulley lock bolt
4. Timing belt pulley
5. Oil pump

2 OIL PUMP



76F02X-012

1. Timing belt (Refer to Section 1)
2. Oil pan (Refer to page 2—7.)
3. Timing belt pulley lock bolt
4. Timing belt pulley
5. Oil pump



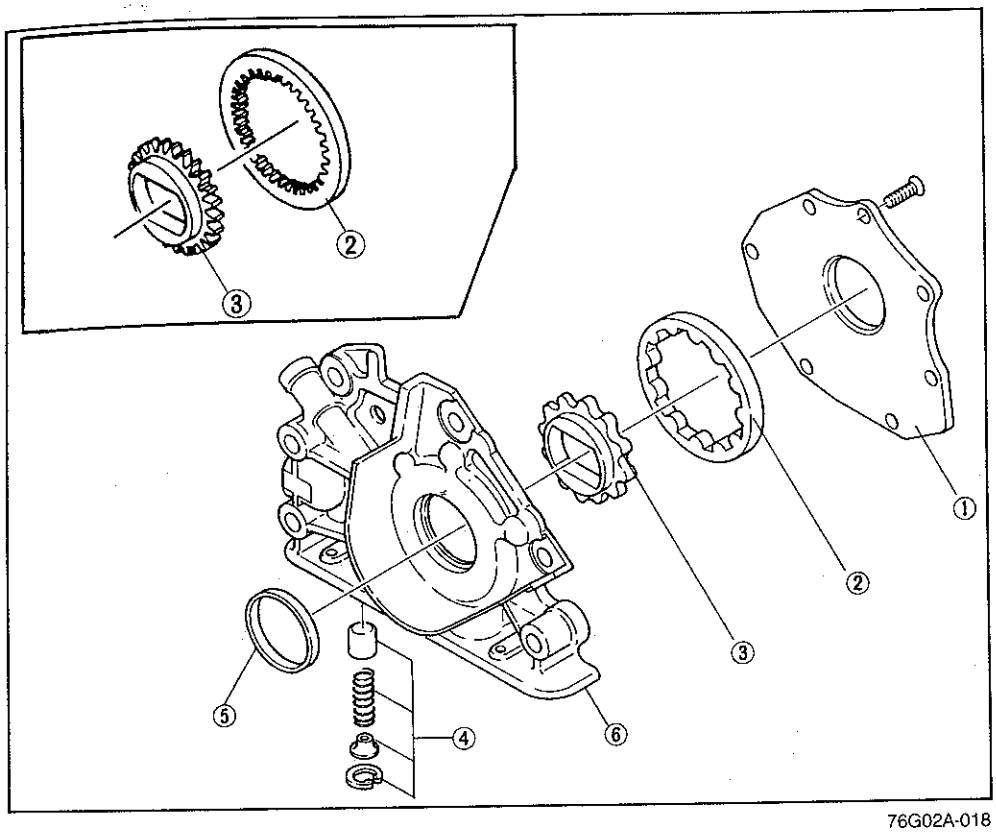
76G02A-026

Removal Note
Timing belt pulley lock bolt
Hold the timing belt pulley with the **SST** and remove the lock bolt.

DISASSEMBLY

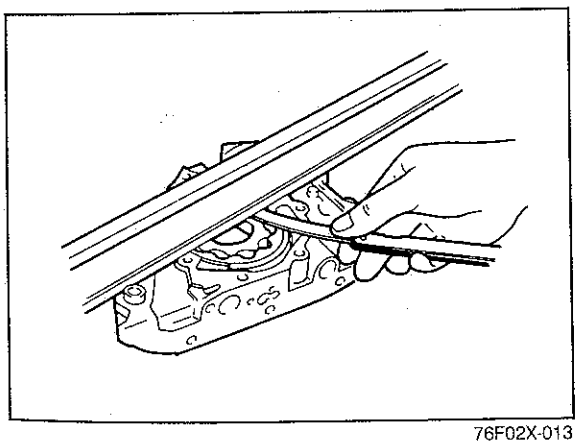
Disassemble in the sequence shown in the figure.

69G02B-012



76G02A-018

1. Pump cover
2. Outer gear
3. Inner gear
4. Pressure relief valve
5. Oil seal
6. Oil pump body



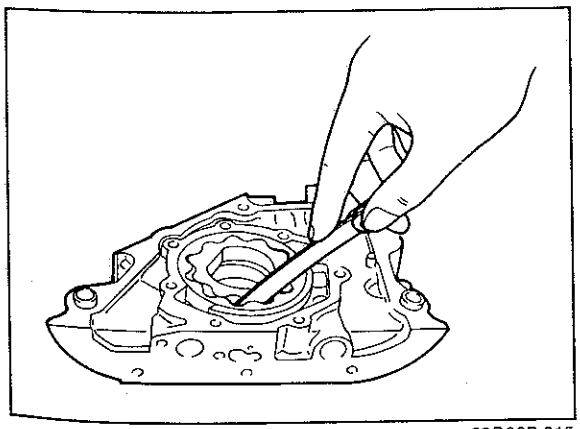
76F02X-013

INSPECTION

(DOHC, F2)

1. Check the following and replace any faulty parts.
   (1) Distorted or damaged oil pump body or cover
   (2) Worn or damaged plunger
   (3) Weak or broken plunger spring
2. Measure the side clearance.

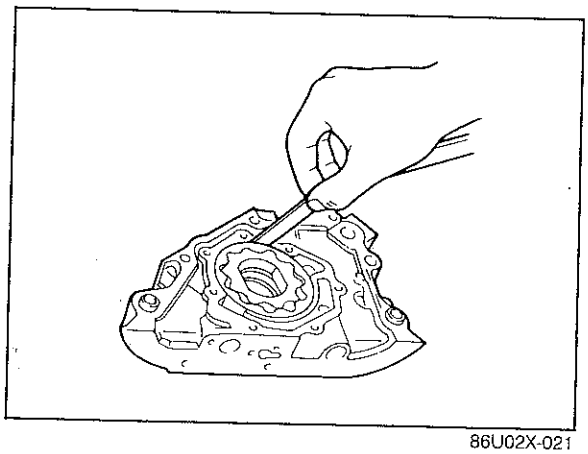
Clearance: 0.10 mm (0.004 in) max.



69G02B-015

3. Measure the tooth tip clearance.

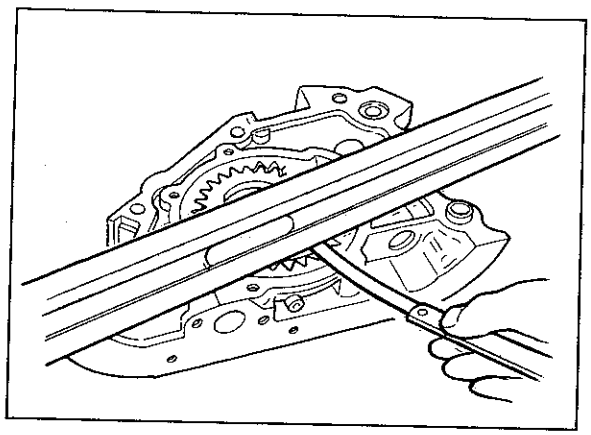
Clearance: 0.18 mm (0.007 in) max.



86U02X-021

4. Measure the outer gear to pump body clearance.

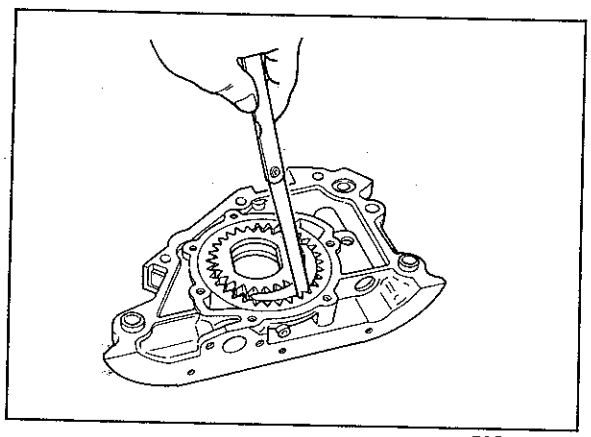
Clearance: 0.20 mm (0.008 in) max.



76F02X-014

(SOHC, except F2)
1. Check the following and replace any faulty parts.
   (1) Distorted or damaged oil pump body or cover
   (2) Worn or damaged plunger
   (3) Weak or broken plunger spring
2. Measure the side clearance.

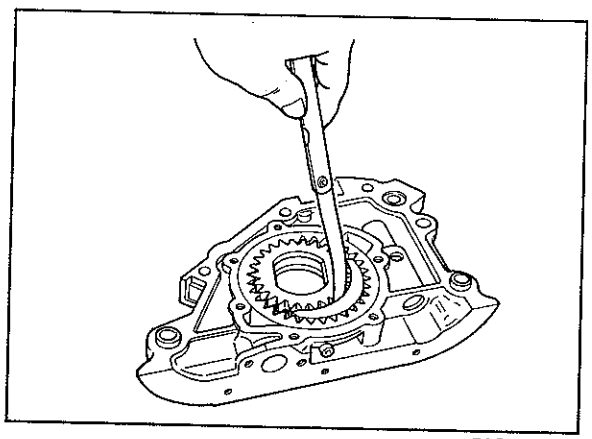
Clearance: 0.10 mm (0.004 in) max.



76G02A-021

3. Measure the outer gear tooth tip and crescent clearance.

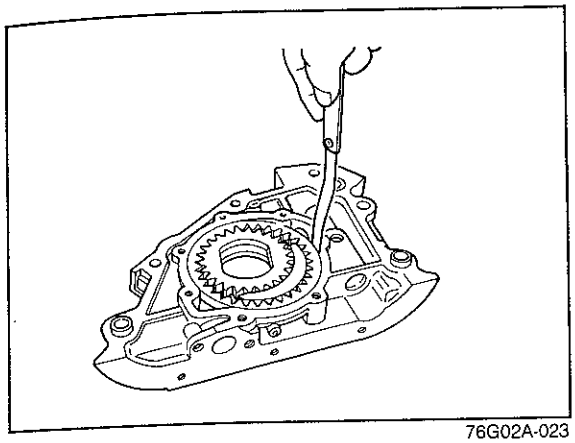
Clearance: 0.35 mm (0.014 in) max.



76G02A-022

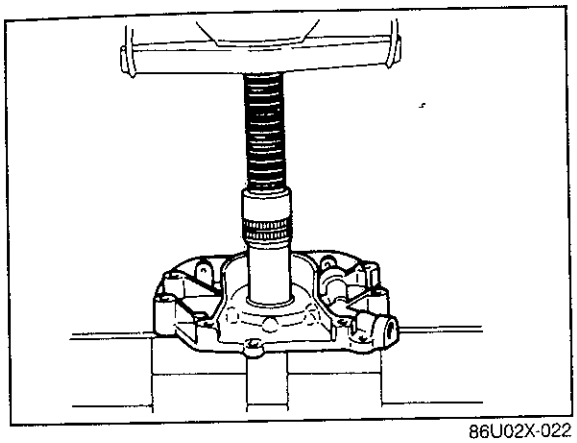
4. Measure the inner gear tooth tip and crescent clearance.

Clearance: 0.40 mm (0.016 in) max.


76G02A-023

5. Measure the outer gear to pump body clearance

Clearance: 0.20 mm (0.008 in) max.


86U02X-022

ASSEMBLY

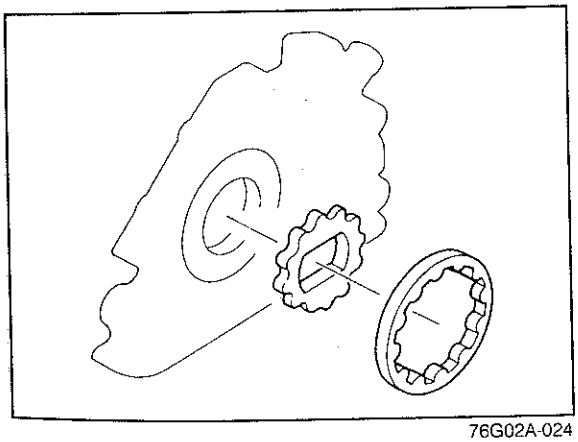
Assemble the pump as follows.

Oil Seal

1. Apply engine oil to the pump body and the outside of the new oil seal.
2. Press in the oil seal.

Pressure Relief Valve

1. Install the plunger and spring in the pump body.
2. Fit the snap ring.


76G02A-024

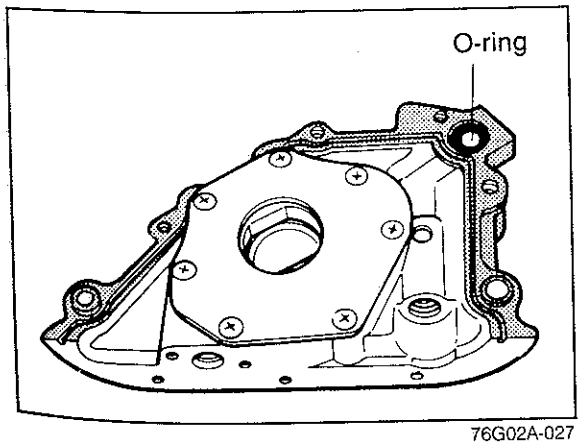
Outer and Inner Gear

Install the gears to the pump body.

Oil Pump Cover

1. Apply thread locking compound to the cover mounting screws' threads.
2. Attach the oil pump cover to the body.

Tightening torque:
6—9 N·m (60—90 cm-kg, 52—78 in-lb)



76G02A-027

INSTALLATION

Install in the reverse order of removal referring to the installation note.

Installation Note

Oil pump

1. Apply grease to a new O-ring and install it in the oil pump body.
2. Apply silicon sealant to the shaded area as shown in the figure.
3. Apply engine oil to the oil seal lip.