

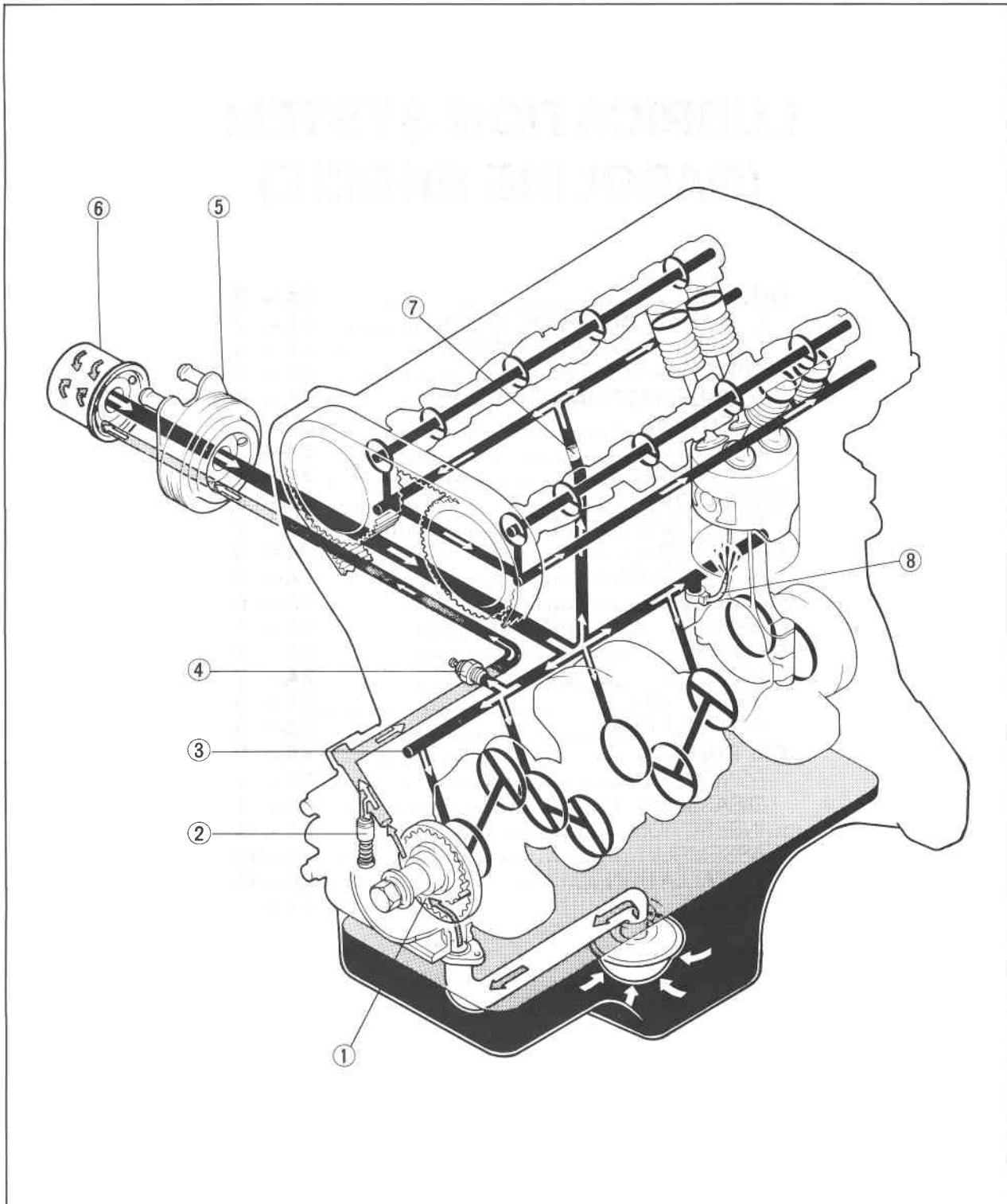
LUBRICATION SYSTEM (GASOLINE ENGINE)

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2A OUTLINE

OUTLINE

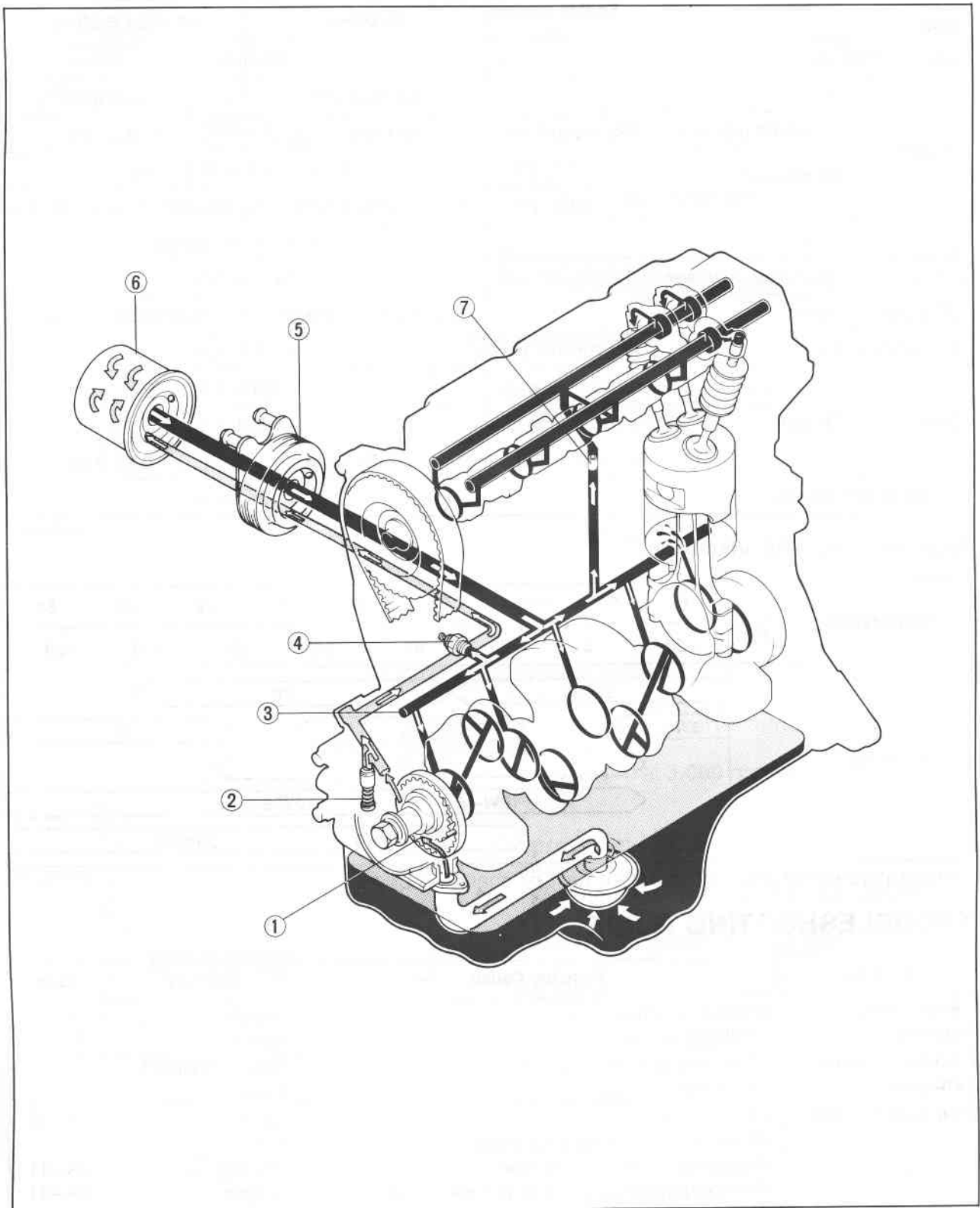
LUBRICATION CIRCUIT (DOHC)



76G02A-002

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

LUBRICATION CIRCUIT (SOHC)



76G02A-025

1. Oil pump
2. Pressure regulator valve
3. Main gallery
4. Oil pressure switch

5. Oil cooler (8-valve...only ECE, 12-valve)
6. Oil filter
7. Oil control plug

2A TROUBLESHOOTING GUIDE

SPECIFICATIONS

Item			Engine model	FE·DOHC	F6, F8, FE·SOHC
Lubrication system				Force-fed	
Oil pump	Type			Trochoid gear	Crescent gear
	Regulated pressure kPa (kg/cm ² , psi)			490 (5.0, 71)	392 (4.0, 57)
	Oil pressure kPa (kg/cm ² , psi)	1,000 rpm		147—245 (1.5—2.5, 21—36)	
		3,000 rpm		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/cm ² , psi)			98 (1.0, 14)	
Oil cooler	Type			Water cooled, 6-layer	Water cooled, 4-layer
Oil warning pressure kPa (kg/cm ² , psi)				29 (0.3, 4.3)	
Oil capacity	Total (dry engine)	liters (US qt, Imp qt)		4.3 (4.5, 3.8)	
	Oil pan	liters (US qt, Imp qt)		3.6 (3.8, 3.2)	
	Oil filter	liters (US qt, Imp qt)		0.2 (0.21, 0.18)	0.3 (0.32, 0.26)
Engine oil (API service)				SD, SE, or SF	

76G02A-003

Recommended SAE Viscosity

Temperature	(°C)	−30	−20	−10	0	10	20	30	40	50	
	(°F)	−20	0	20	40	60	80	100	120		
Engine oil		5W-30				30					
		5W-20	20W-20				40				
		10W-30									
		10W-40			10W-50						
		20W-40				20W-50					

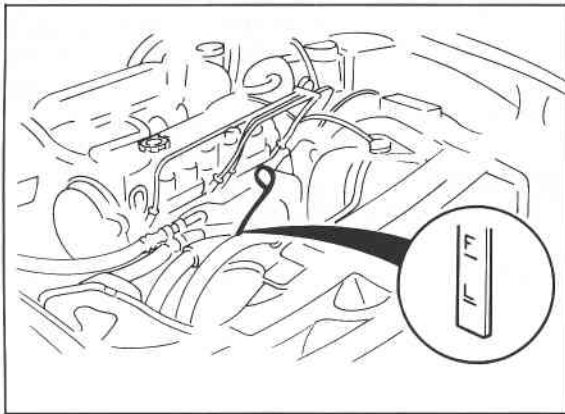
Temperature range anticipated before next oil change, °C(°F)

63G02D-303

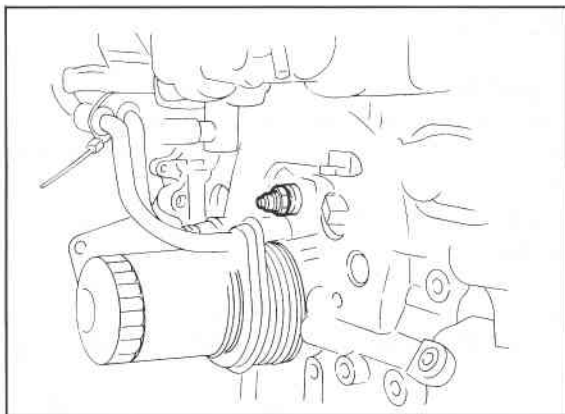
TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy	Page
Engine hard starting	Improper engine oil	Replace	2A— 5
	Insufficient engine oil	Add oil	2A— 5
Excessive oil consumption	Oil working up or working down Oil leakage	Refer to Section 1 Repair	—
Oil pressure drop	Insufficient oil	Add oil	2A— 5
	Oil leakage	Repair	—
	Worn or damaged oil pump gear	Replace	2A—11
	Worn plunger (inside oil pump) or weak spring	Replace	2A—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	—

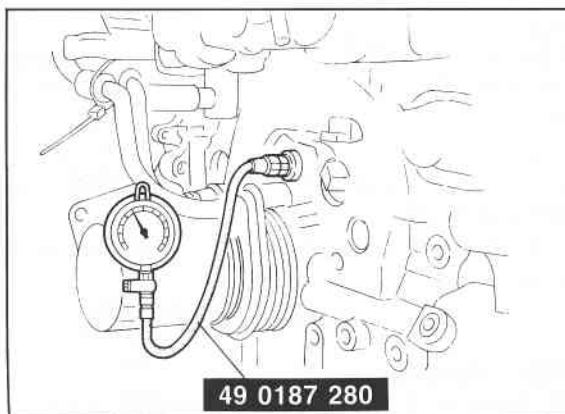
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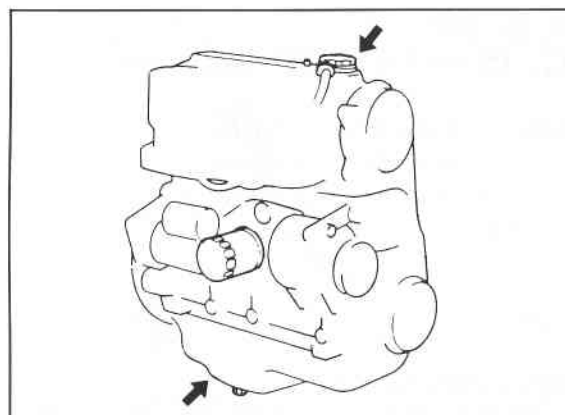
86U02X-004



69G02A-006



76G02A-005



86U02X-006

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.
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/cm², 50—64 psi)...DOHC

294—392 kPa

(3.0—4.0 kg/cm², 43—57 psi)...SOHC

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

ENGINE OIL

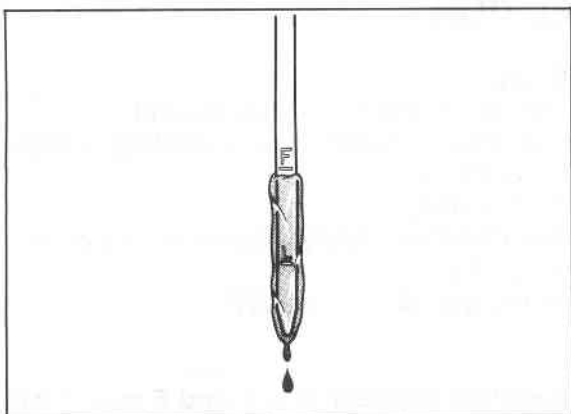
REPLACEMENT

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.

2A OIL FILTER, OIL COOLER



76G02A-006

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

Oil pan capacity:
3.6 liters (3.8 US qt, 3.2 Imp qt)

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

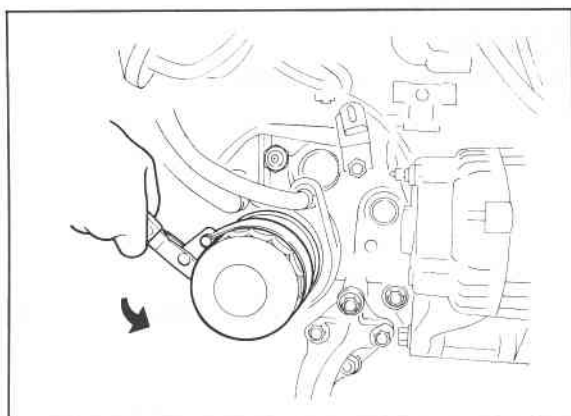
OIL FILTER

REPLACEMENT

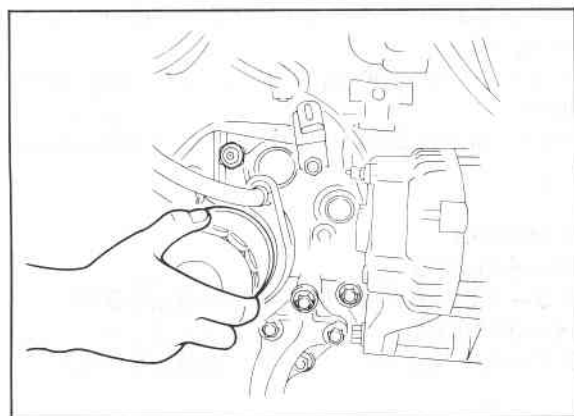
1. Remove the oil filter with a suitable wrench.
2. Use a clean rag to wipe off the mounting surface on the engine.
3. Apply a small amount of engine oil to the rubber seal of the new filter.

Warning

Be careful that the engine and filter are very hot.



86U02X-008



76G02A-007

4. (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.
5. Start the engine and inspect around the filter seal for leaks.
6. Check the oil level and add oil if necessary.

Oil filter capacity:

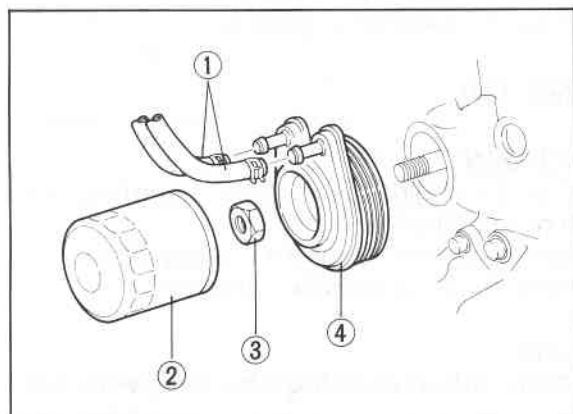
0.20 liters (0.21 US qt, 0.18 Imp qt)...DOHC
0.30 liters (0.32 US qt, 0.26 Imp qt)...SOHC

OIL COOLER (DOHC, 12-valve, ECE 8-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



76G02A-008

Nut tightening torque:

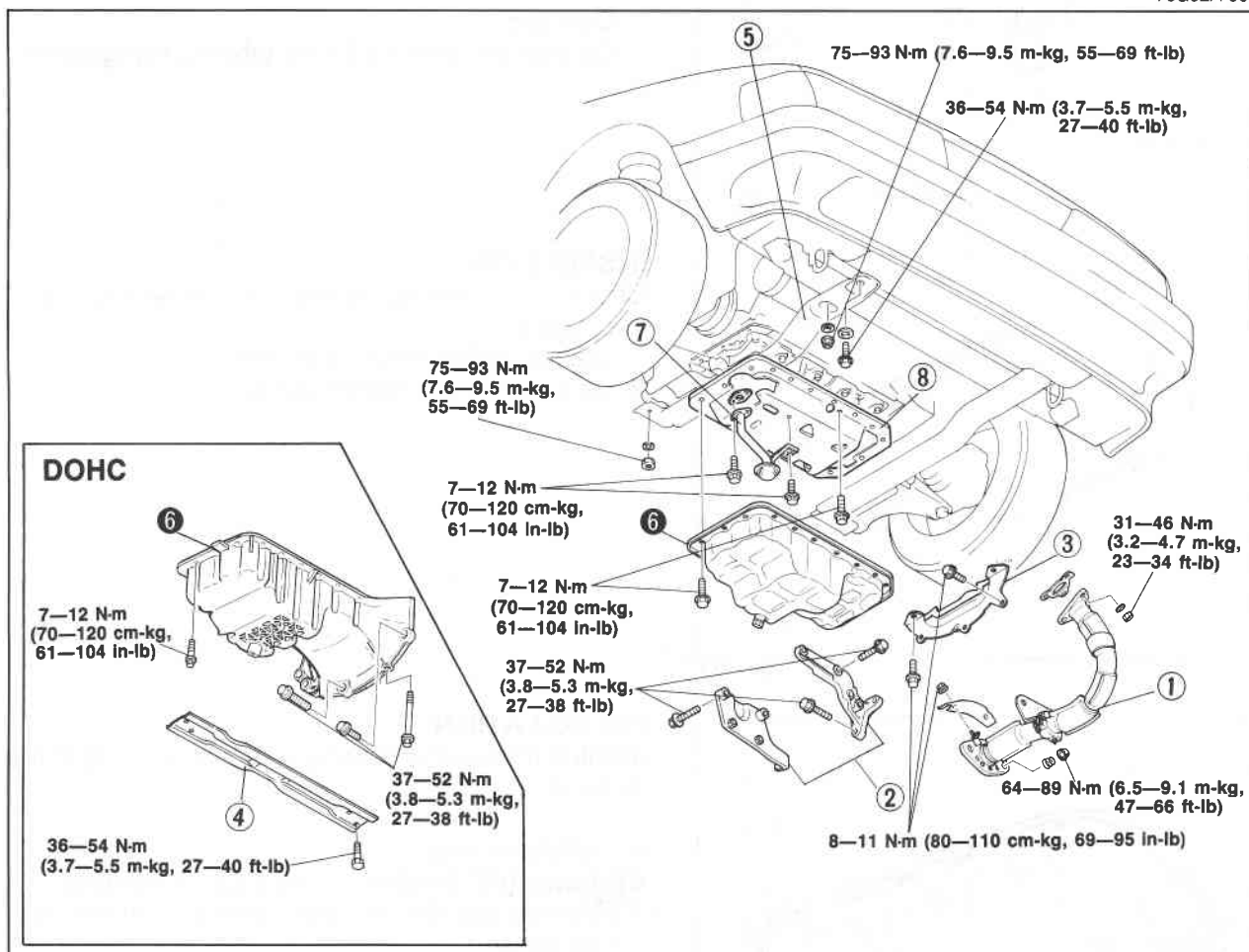
29—39 N·m (3.0—4.0 m·kg, 22—29 ft·lb)

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.

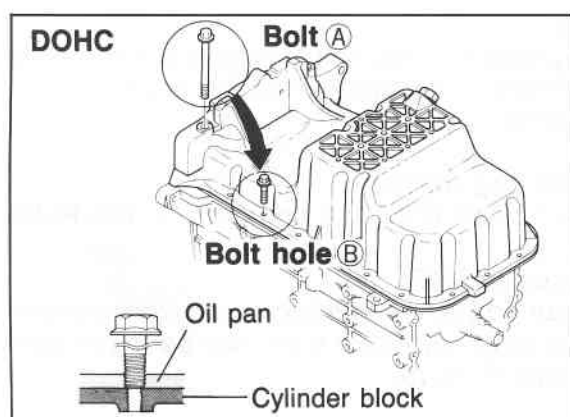
76G02A-009



76G02A-010

1. Exhaust pipe
2. Gusset plate (SOHC)
3. Clutch housing under cover (SOHC)
4. Performance plate (4WS)

5. Sub frame (RH)
6. Oil pan
7. Oil strainer
8. Stiffener (FE 8-valve...only ECE, 12-valve)



76G02A-011

Removal Note

Oil pan

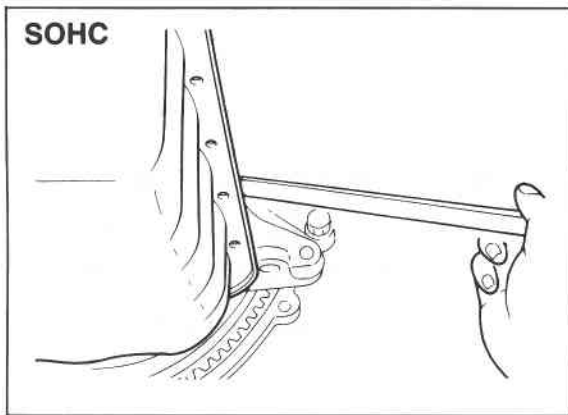
(DOHC)

1. Remove the oil pan mounting bolts.
2. Install the bolt (A) from the mounting bolt or 10 mm (0.39 in) bolts in the specified bolt holes (B) (both sides).
3. Screw in the bolts gradually and alternately to remove the oil pan.

Caution

Do not pry the oil pan to prevent damaging the contact surface.

2A OIL PAN



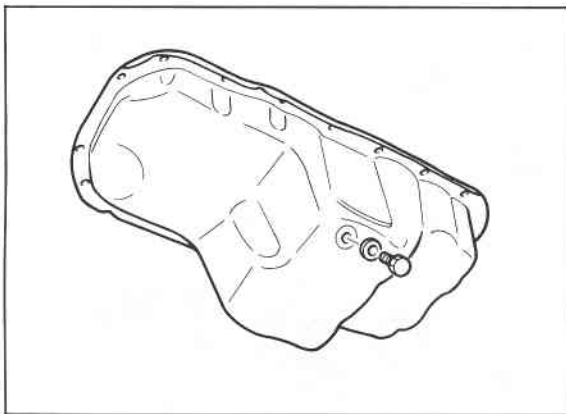
76G02A-012

(SOHC)

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.

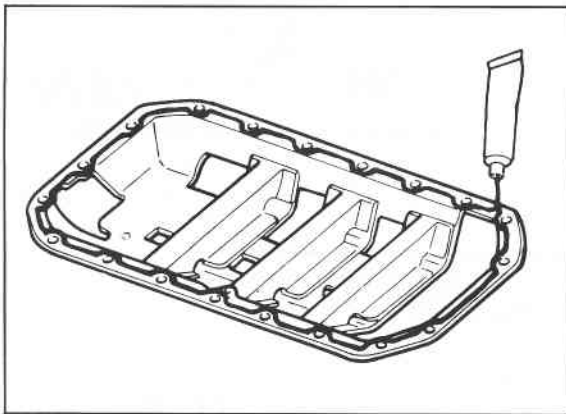


4BG02X-037

INSPECTION

Check the following points. Repair or replace if necessary.

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



76G02A-013

INSTALLATION

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

Installation Note

Stiffener (FE 8-valve...only ECE, 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)

Oil pan

1. Apply 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)

Caution (DOHC)

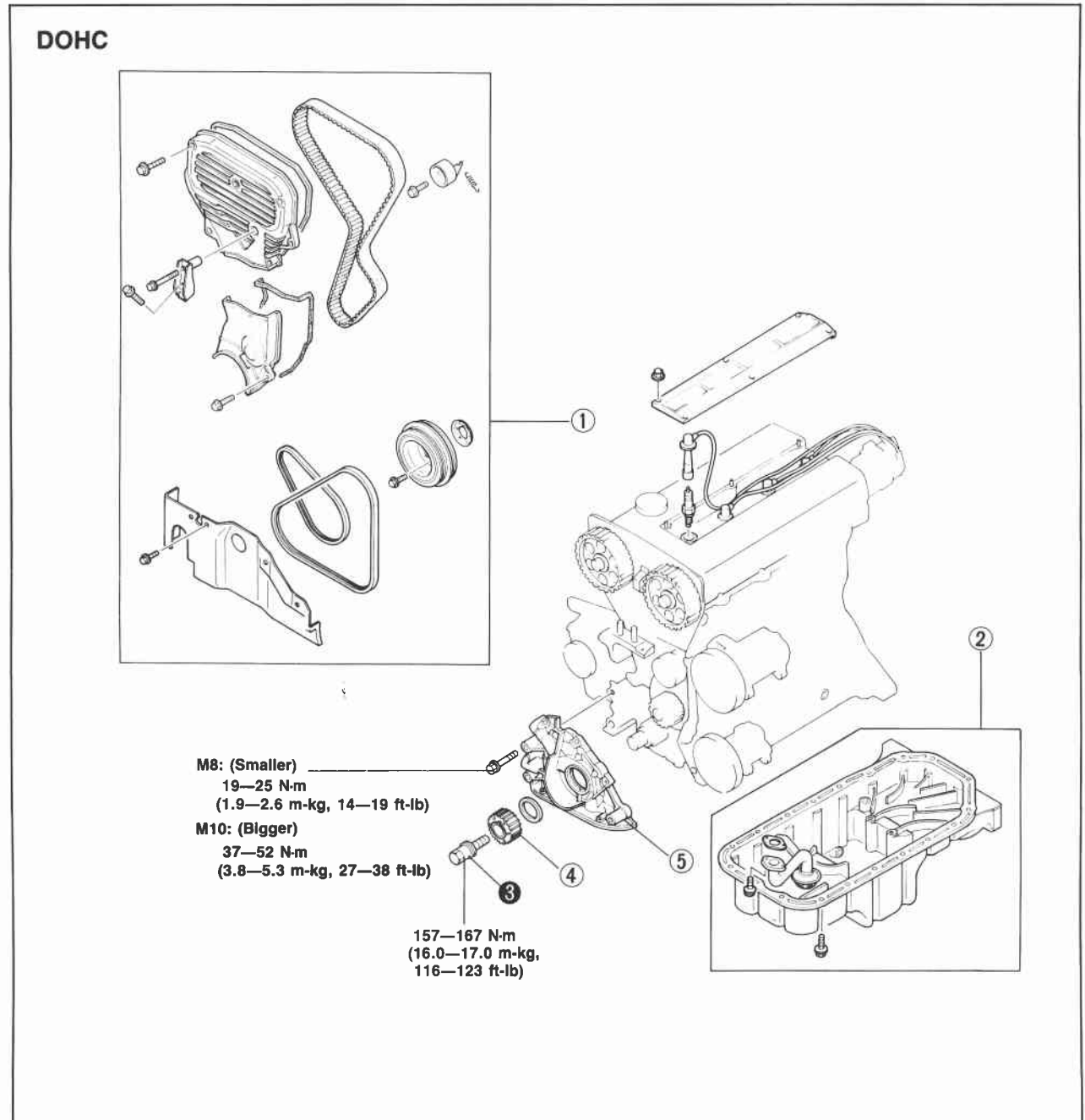
Oil pan projection and recession from the end of the cylinder block must not be more than 1.5 mm (0.06 in).

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



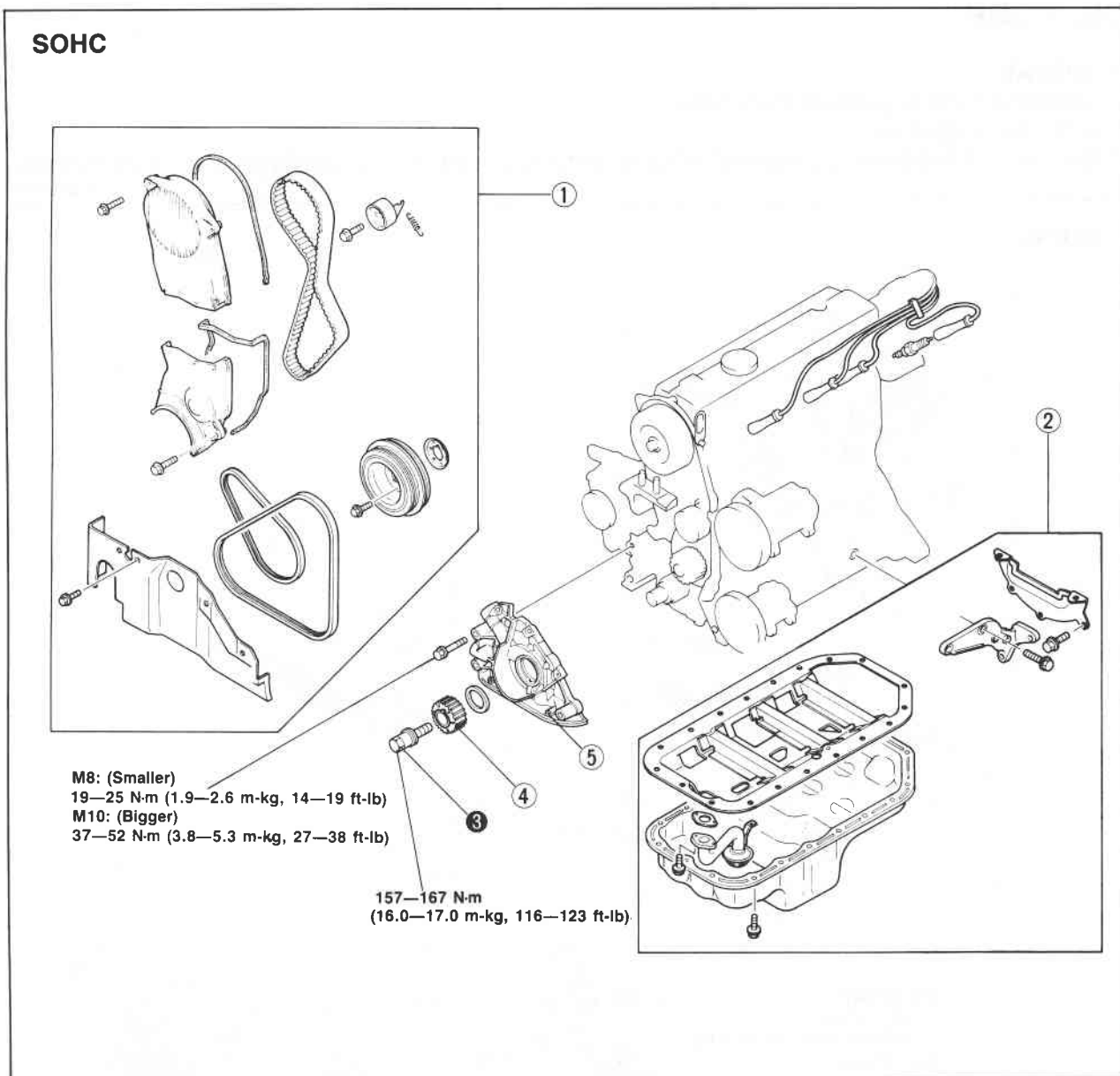
76G02A-016

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

4. Timing belt pulley
5. Oil pump

2A OIL PUMP

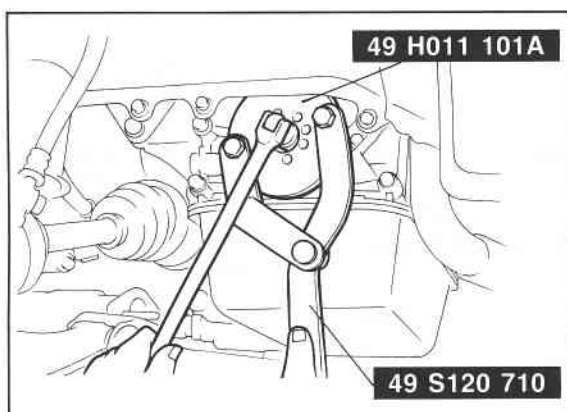
SOHC



76G02A-017

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

4. Timing belt pulley
5. Oil pump



76G02A-026

Removal Note

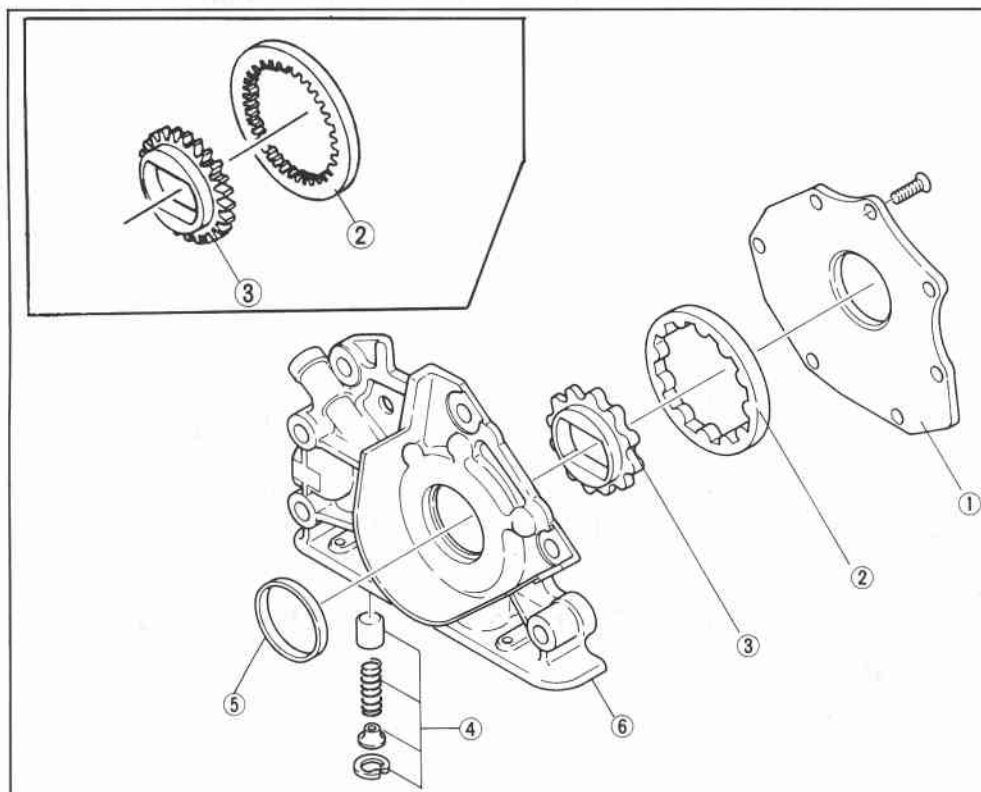
Timing belt pulley lock bolt

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

DISASSEMBLY

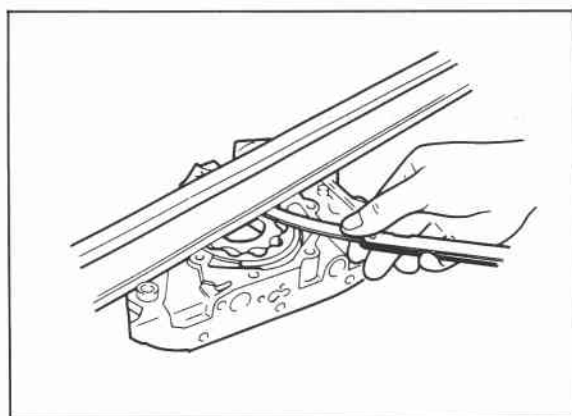
Disassemble in the sequence shown in the figure.

69G02B-012



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

76G02A-018



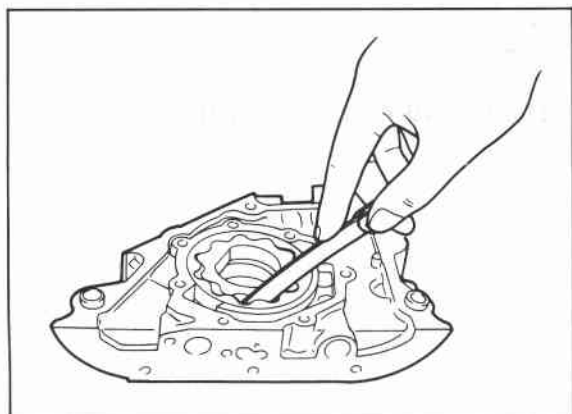
76G02A-019

INSPECTION

(DOHC)

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.

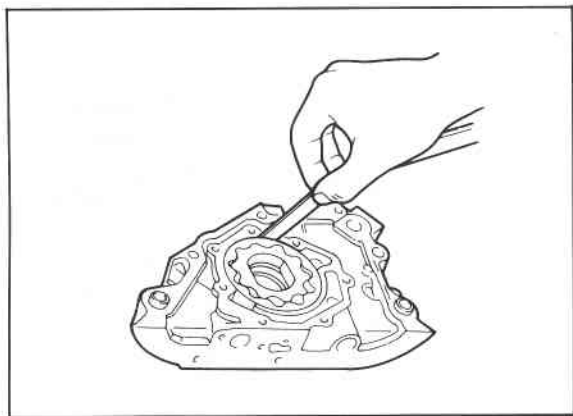


69G02B-015

3. Measure the tooth tip clearance.

Clearance: 0.18 mm (0.007 in) max.

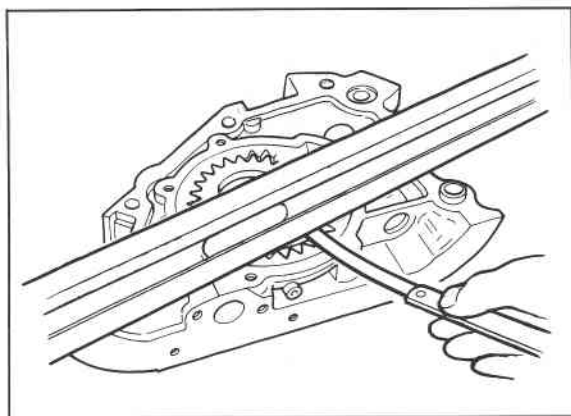
2A OIL PUMP



86U02X-021

4. Measure the outer gear to pump body clearance.

Clearance: 0.20 mm (0.008 in) max.

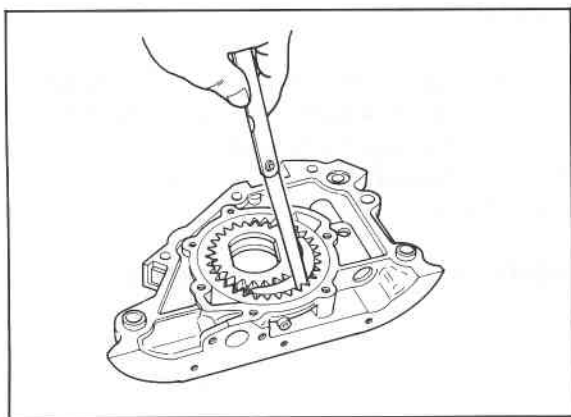


76G02A-020

(SOHC)

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.

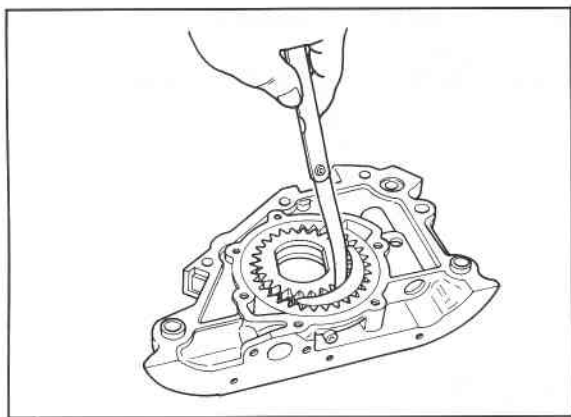
Clearance: 0.10 mm (0.004 in) max.



76G02A-021

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

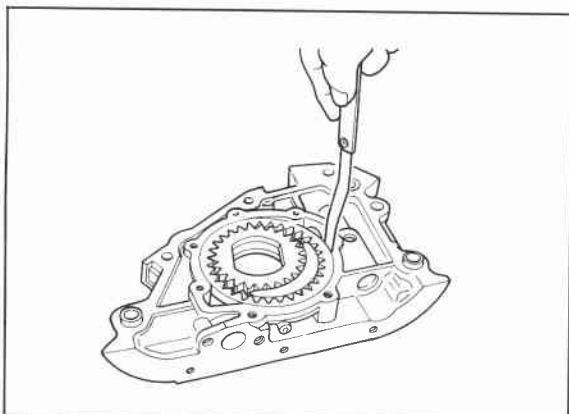
Clearance: 0.35 mm (0.014 in) max.



76G02A-022

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

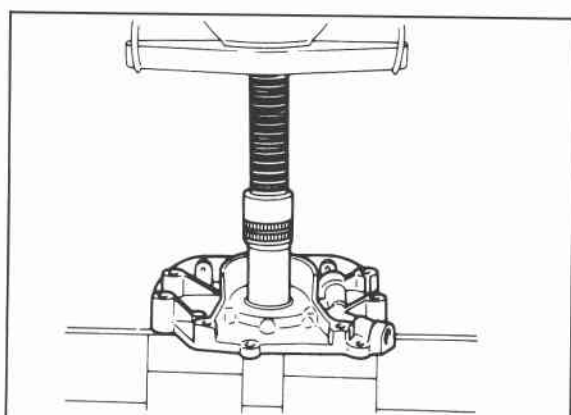
Clearance: 0.40 mm (0.016 in) max.



76G02A-023

5. Measure the outer gear to pump body clearance.

Clearance: 0.20 mm (0.008 in) max.



86U02X-022

ASSEMBLY

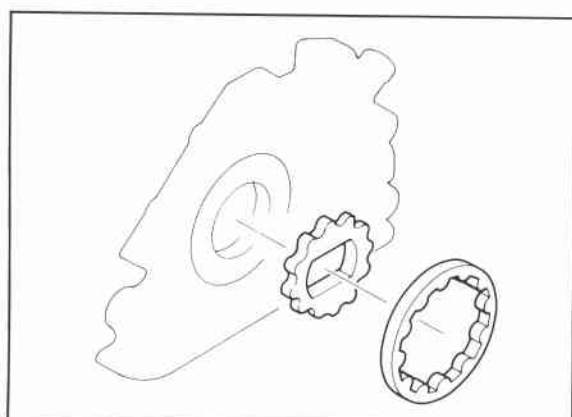
Assemble the pump as follows.

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

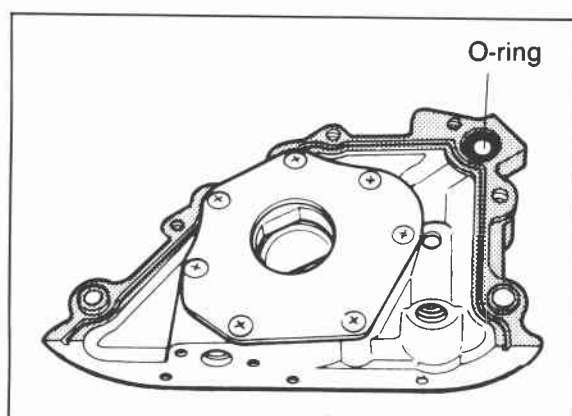
Install the gears to the pump body.

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.