

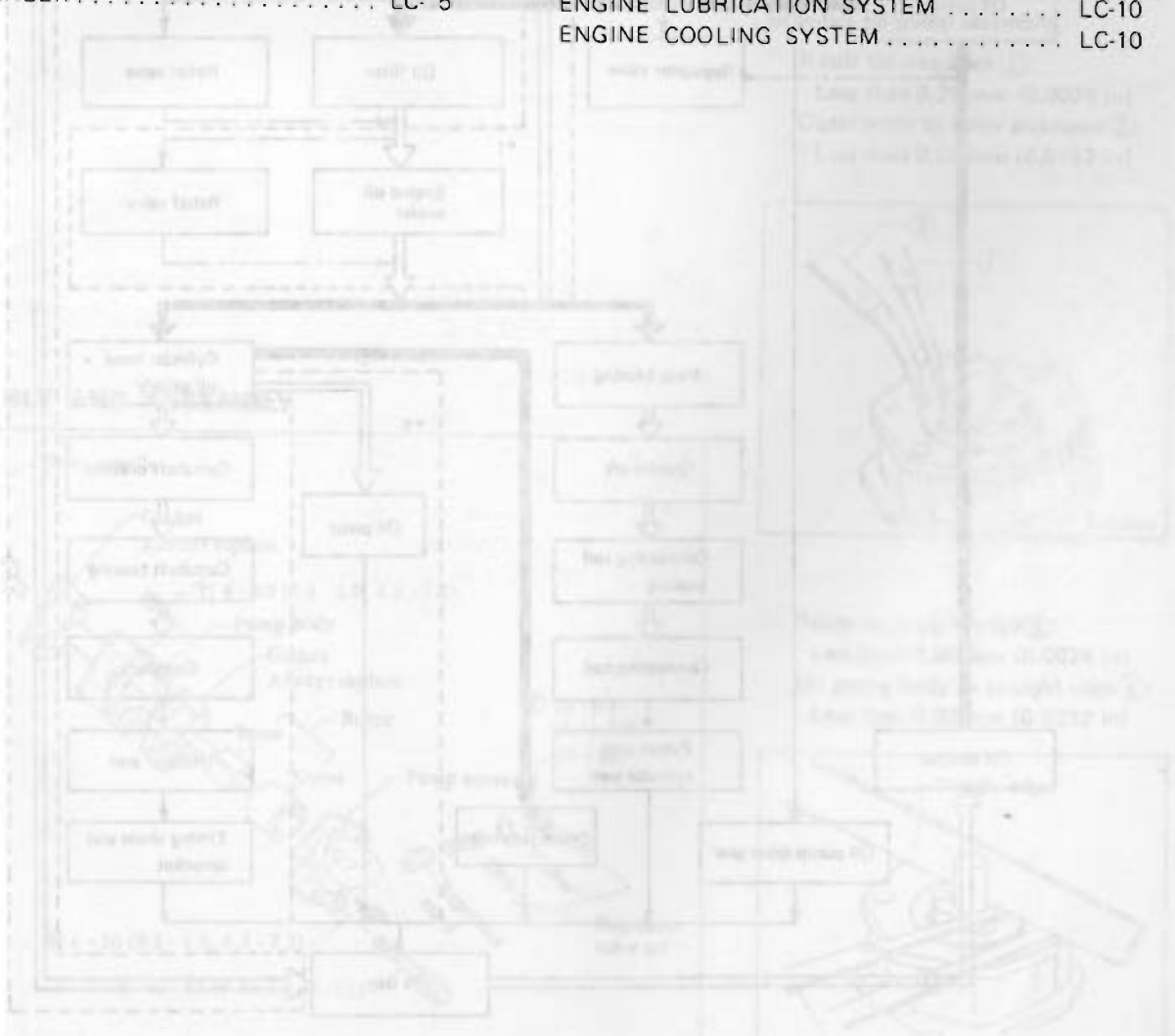
ENGINE LUBRICATION & COOLING SYSTEMS

SECTION LC

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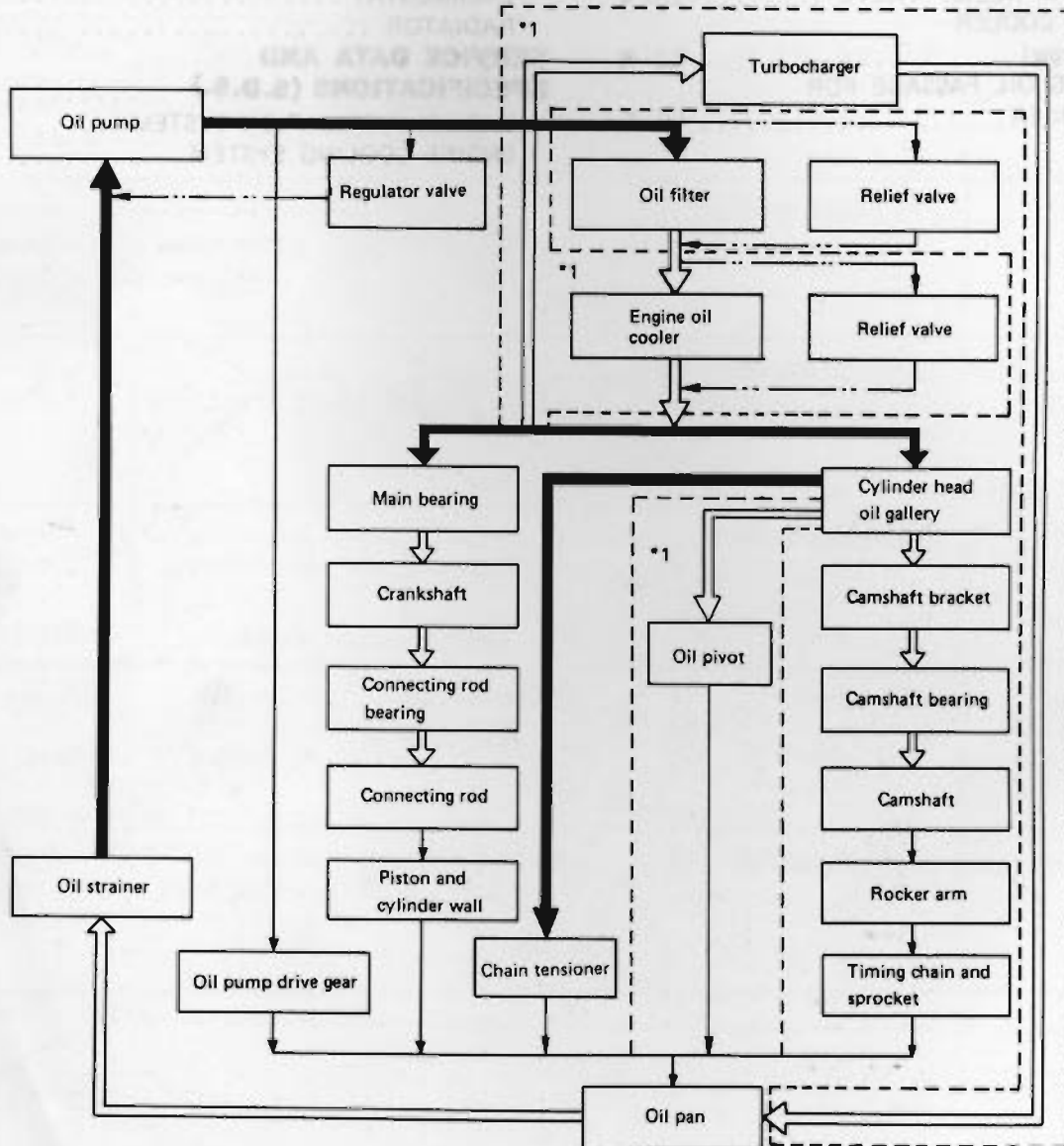
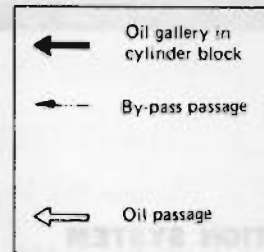
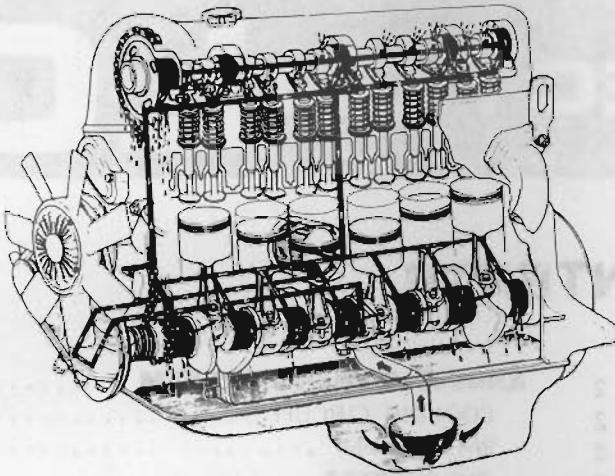
LC

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ENGINE LUBRICATION SYSTEM

LUBRICATION CIRCUIT



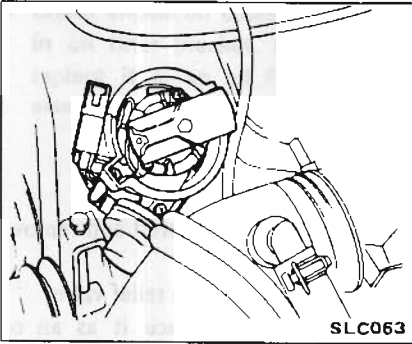
*1: Additional lubrication circuit for turbocharger model

OIL PUMP

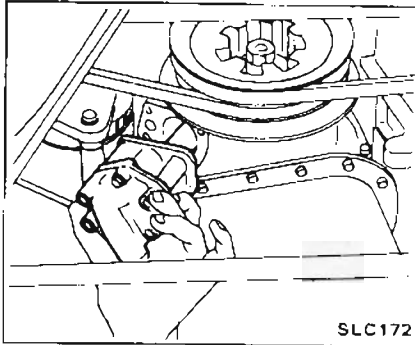
REMOVAL

1. Before removing oil pump, turn crankshaft so that No. 1 piston is at T.D.C.

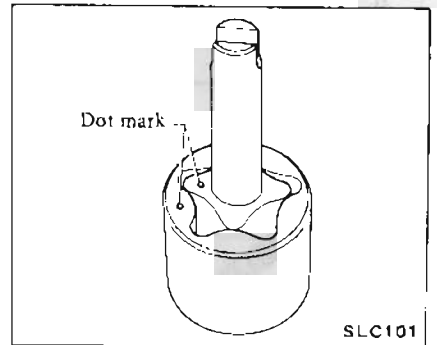
Under this condition, remove distributor cap and ascertain position of rotor head.



2. Remove under cover.
3. Remove oil pump and drive spindle as an assembly.



The dot on outer and inner rotor should face toward oil pump body.



INSPECTION

1. Using a feeler gauge, check the following clearance.

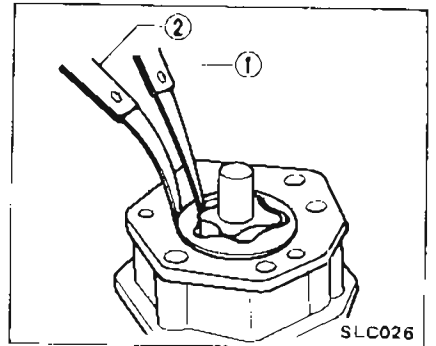
If it exceeds limit, replace rotor set or entire oil pump assembly.

Rotor tip clearance ①:

Less than 0.20 mm (0.0079 in)

Outer rotor to body clearance ②:

Less than 0.50 mm (0.0197 in)

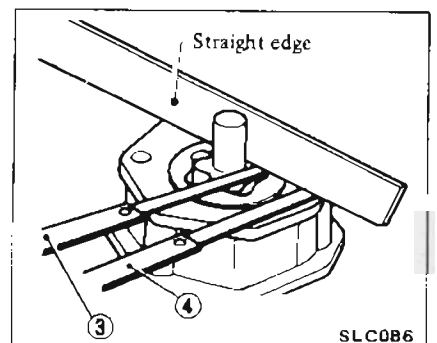


Rotor to straight edge ③:

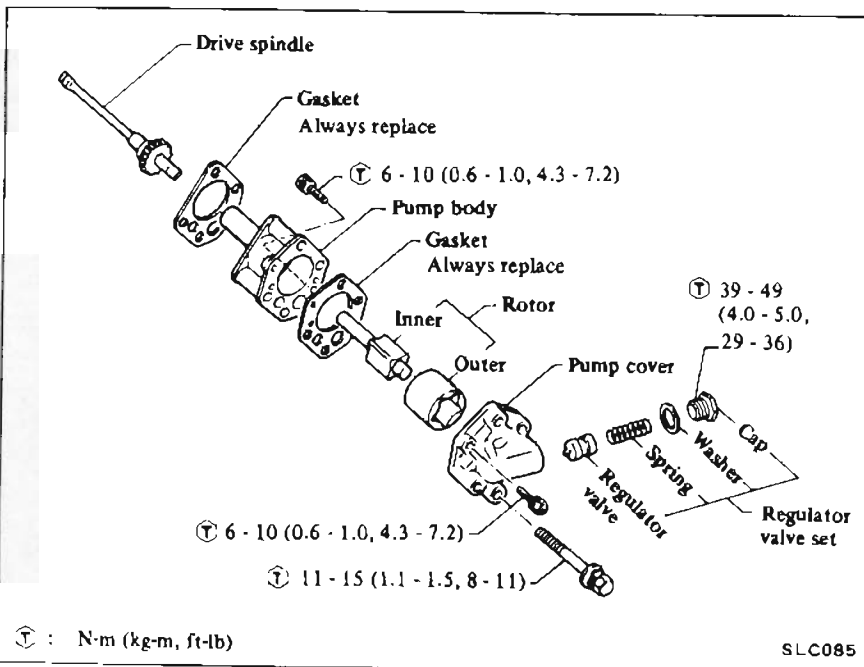
Less than 0.06 mm (0.0024 in)

Oil pump body to straight edge ④:

Less than 0.03 mm (0.0012 in)

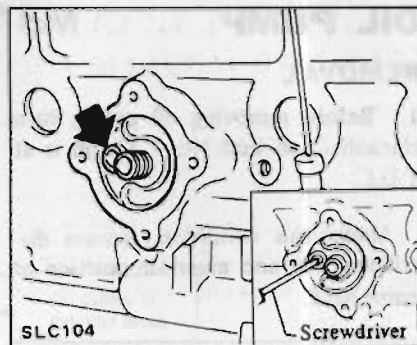
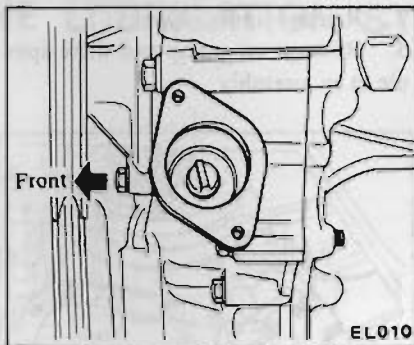
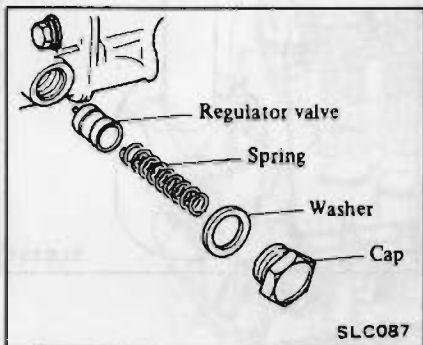


DISASSEMBLY AND ASSEMBLY



2. Check oil pressure regulator valve sliding surface and valve spring.

If damaged, replace valve set or pump assembly.



3. Using a new gasket, install oil pump and drive spindle assembly.

Make sure that tip of drive spindle assembly fits distributor fitting hole securely.

- ⊕ : Oil pump mounting bolts
- 11 - 15 N·m
- (1.1 - 1.5 kg·m,
- 8 - 11 ft·lb)

Equipped with oil cooler
(With turbocharger)

1. Loosen oil filter stud and remove oil filter bracket.
2. Check oil pressure relief valve.
If necessary, replace it as an oil filter bracket assembly.

INSTALLATION

1. Make sure that distributor rotor is in the same position as it was before removal.
2. Fill pump housing with engine oil, then adjust punch mark of drive spindle with hole in oil pump so that the projection on its top is located in an 11:25 clock position.

4. Refill engine with oil.

After installing, run engine for a few minutes, and check for leaks.

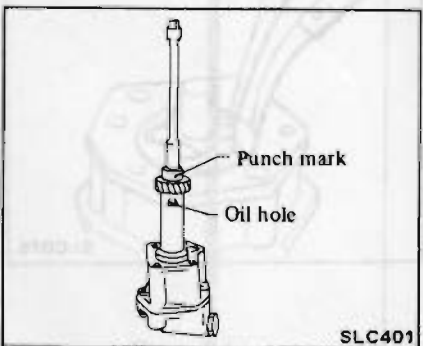
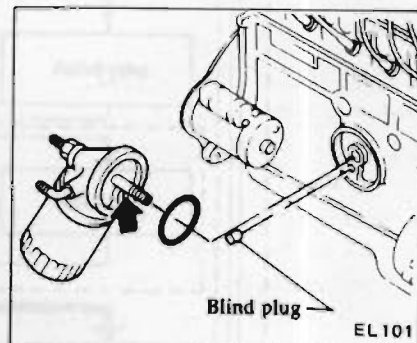
OIL PRESSURE RELIEF VALVE

INSPECTION

When removing oil filter, check oil pressure relief valve for a cracked or broken valve.

If necessary, remove valve by prying it out with a screwdriver.

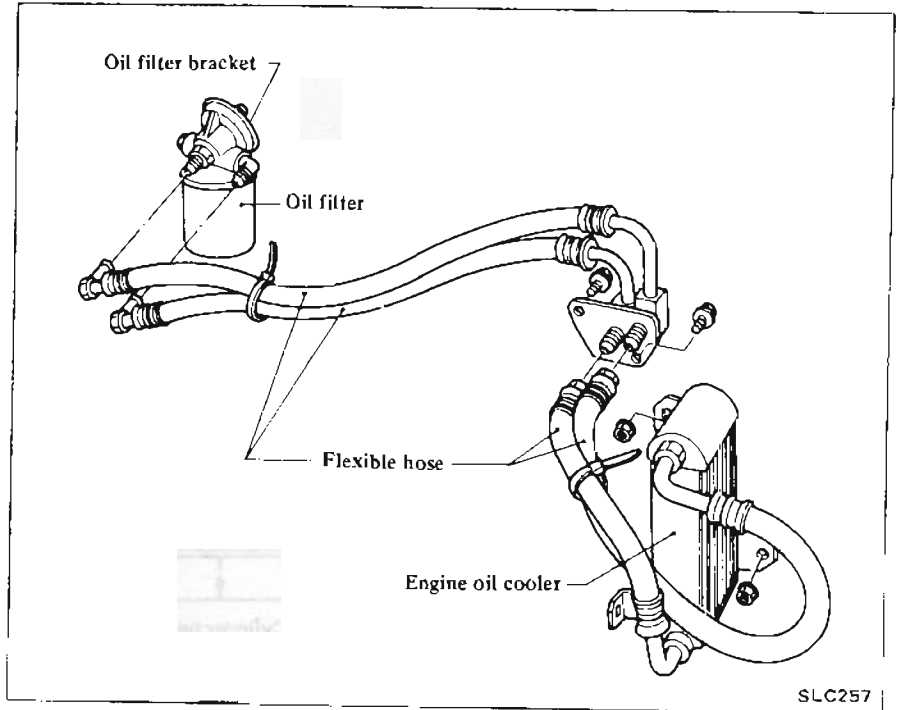
Install a new valve by tapping it in place.



ENGINE OIL COOLER (For turbocharger)

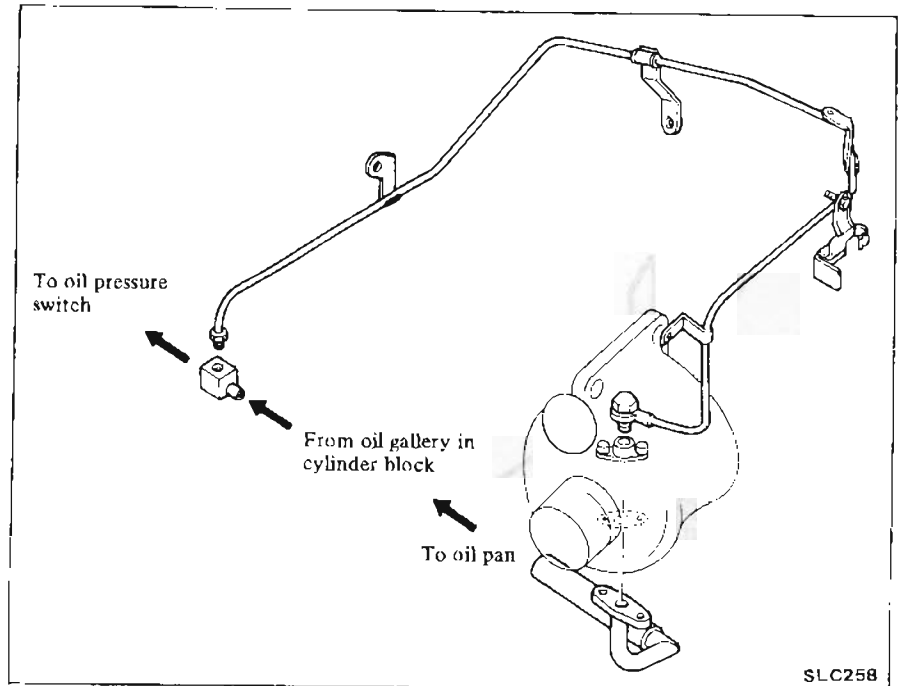
REMOVAL AND INSTALLATION

- When related parts of oil cooler are removed and installed, start engine after installing all parts and make sure that there are no oil leaks in oil passage.
- Check engine oil cooler relief valve in oil filter bracket. If necessary, replace it as an oil filter bracket assembly.



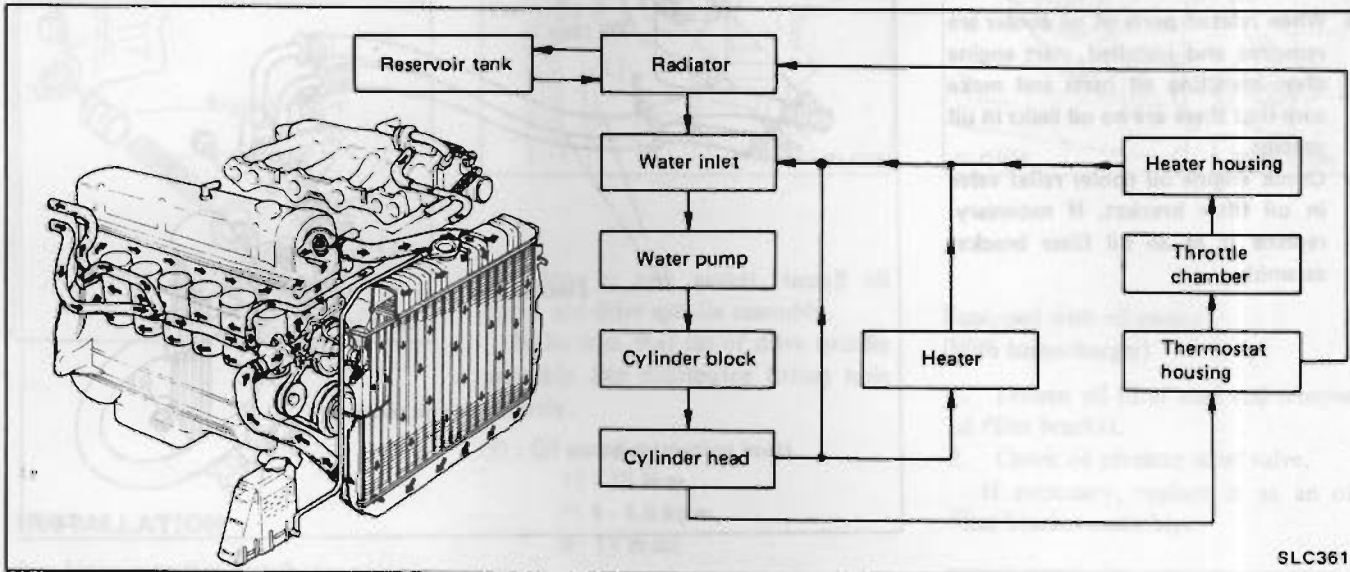
LUBRICATING OIL PASSAGE FOR TURBOCHARGER

- Before removing oil passage, remove auxiliary cooling fan. Refer to sections EF & EC.
- When related parts of oil passage are removed and installed, start engine after installing all parts and make sure that there are no oil leaks in oil passage.

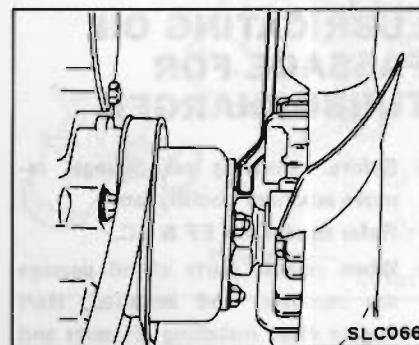
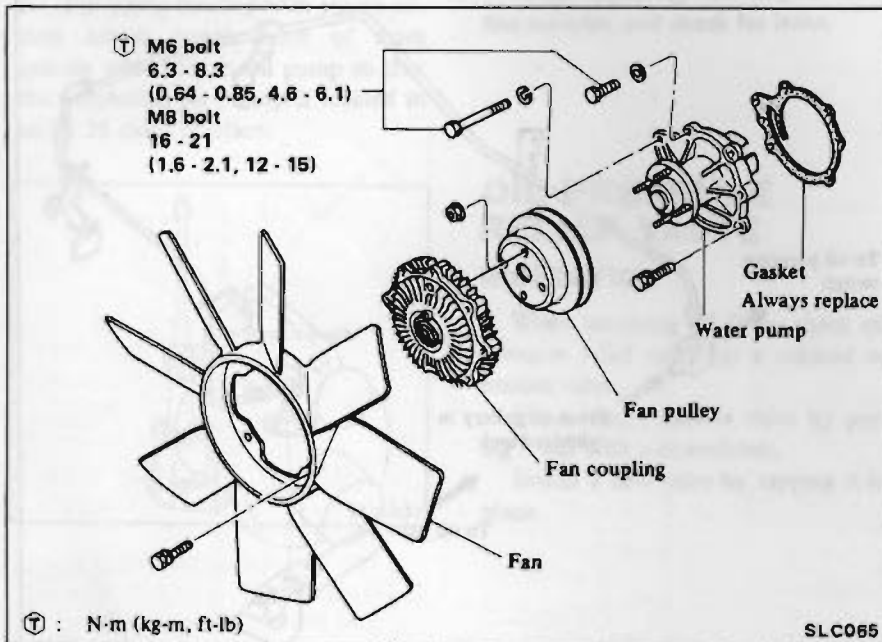


ENGINE COOLING SYSTEM

COOLING CIRCUIT



WATER PUMP



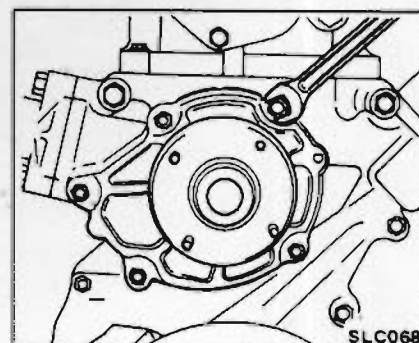
REMOVAL

1. Open radiator drain cock and remove radiator cap, and drain coolant into a suitable container.

WARNING:
 To avoid the danger of being scalded, never attempt to drain the coolant when the engine is hot.

2. Remove radiator shroud.
3. Loosen fan pulley nuts.

4. Loosen fan belt.
- (1) Loosen alternator securing bolts.
- (2) Move the alternator toward the engine.
5. Loosen power steering oil pump drive belt.
6. Remove fan, fan coupling and fan pulley as an assembly.
7. Remove water pump with gasket.

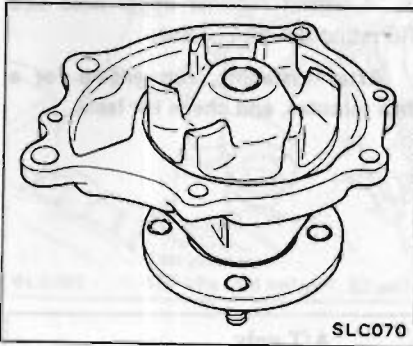


ENGINE COOLING SYSTEM

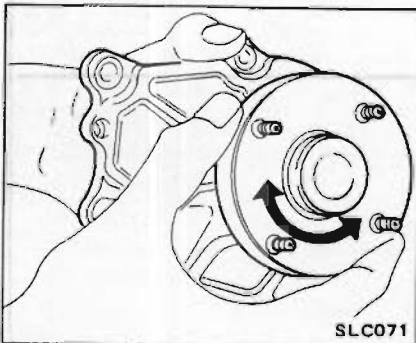
INSPECTION

The water pump and fan coupling cannot be disassembled and should be replaced as a unit.

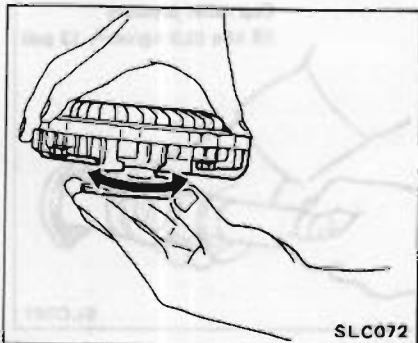
1. Inspect water pump body and vane for rust or corrosion.



2. Inspect water pump bearing. Check for excessive end play or rough operation.



3. Inspect fan coupling. Check the coupling for oil leakage or bent bimetal.



INSTALLATION

1. Install water pump in the reverse order of removal.

Always use new gasket.

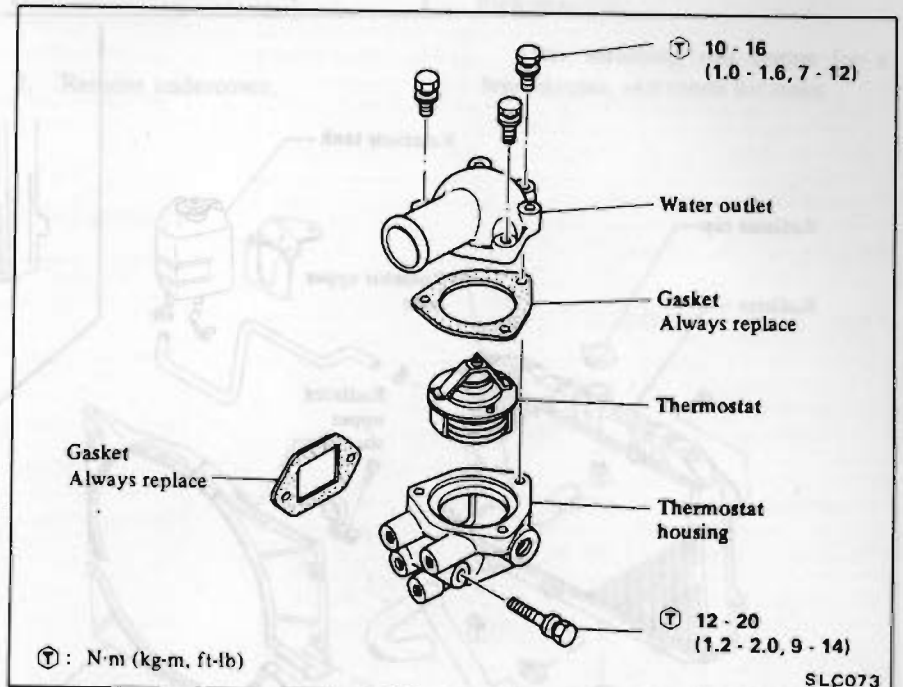
2. Adjust fan belt tension.

Refer to section MA.

3. Fill radiator with coolant.

After installing, run engine for a few minutes, and check for leaks.

THERMOSTAT



REMOVAL

1. Drain a small amount of coolant partially and disconnect radiator upper hose at water outlet.

WARNING:

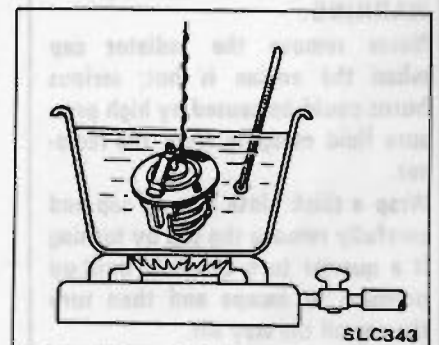
To avoid the danger of being scalded, never attempt to drain the coolant when the engine is hot.

2. Remove water outlet and then remove thermostat.

INSPECTION

Inspect thermostat for the following and replace if necessary.

1. Check valve seating condition at ordinary temperature. It should seat tightly.
2. Check valve opening temperature and maximum valve lift. (Refer to S.D.S.)



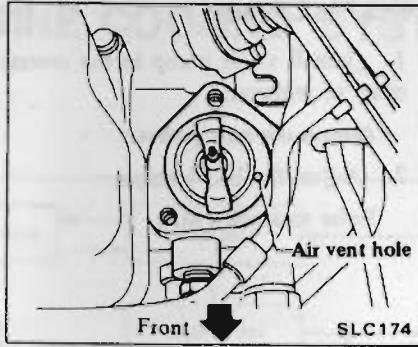
ENGINE COOLING SYSTEM

3. Then check if valve closes at 5°C (9°F) below valve opening temperature.

It is necessary to check a new thermostat before installing it.

INSTALLATION

1. Position thermostat on thermostat housing with its air vent hole facing the left side of the engine.



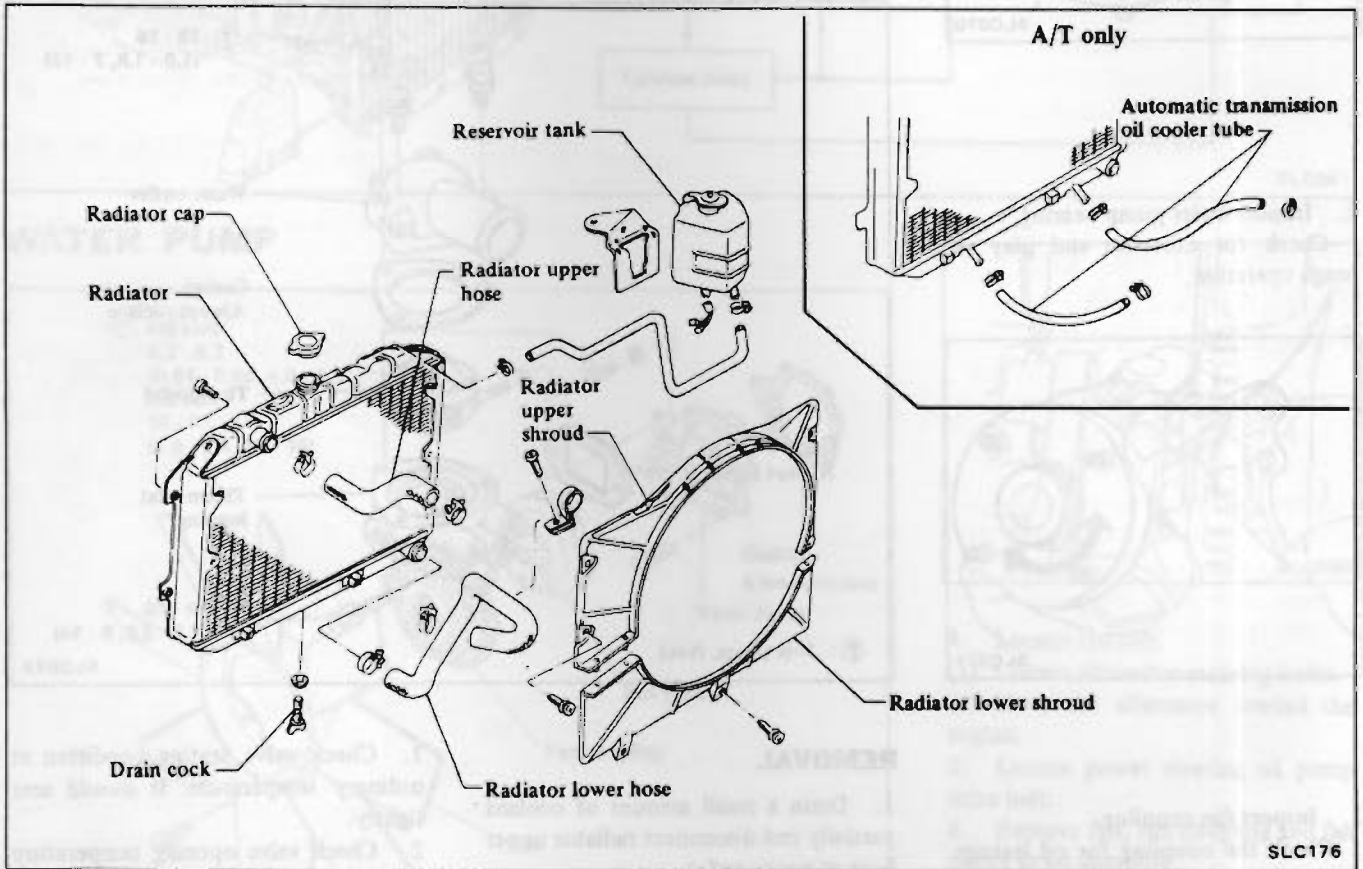
2. Install water outlet with new gasket.

⊕ : Attaching bolt
10 - 16 N·m
(1.0 - 1.6 kg·m,
7 - 12 ft·lb)

3. Connect radiator upper hose and fill radiator with coolant.

After installing, run engine for a few minutes, and check for leaks.

RADIATOR



WARNING:

Never remove the radiator cap when the engine is hot; serious burns could be caused by high pressure fluid escaping from the radiator.

Wrap a thick cloth around cap and carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape and then turn the cap all the way off.

INSPECTION

Checking radiator cap

Using cap tester, check the radiator cap relief pressure.

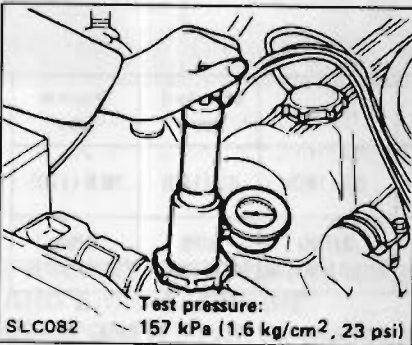
If the pressure gauge drops rapidly and excessively, replace the radiator cap.

Cap relief pressure
88 kPa (0.9 kg/cm², 13 psi)



Checking cooling system for leaks

Attach pressure tester. Then pump the tester to the specified pressure. Check for drop in pressure.



If the pressure drops, check for leaks from hoses, radiator, or water pump.

If no external leaks are found, check heater core, block and head.

REMOVAL AND INSTALLATION

1. Open radiator drain cock and allow to drain into a suitable container.

WARNING:

To avoid the danger of being scalded, never attempt to drain the coolant when the engine is hot.

2. Remove undercover.

3. Remove radiator shroud attaching screws.

4. Disconnect radiator upper hoses at engine side, and disconnect reservoir tank hose.

5. Disconnect radiator lower hose on radiator side.

6. On a car with automatic transmission, disconnect cooler inlet and outlet lines from radiator.

7. Disconnect air cleaner duct hose.

8. Remove air conditioner pipe clip screw (with turbocharger).

9. Remove radiator attaching bolts.

10. Install radiator in the reverse order of removal.

11. Fill radiator with coolant to specified quantity.

After installing, run engine for a few minutes, and check for leaks.

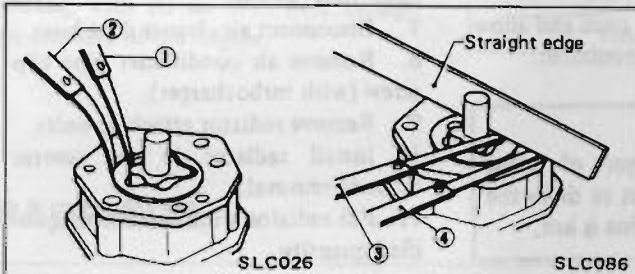
SERVICE DATA AND SPECIFICATIONS (S.D.S.)

ENGINE LUBRICATION SYSTEM

INSPECTION AND ADJUSTMENT

Oil pump

Unit: mm (in)



Rotor tip clearance ①	Less than 0.20 (0.0079)
Outer rotor to body clearance ②	Less than 0.50 (0.0197)
Rotor to straight edge ③	Less than 0.06 (0.0024)
Oil pump body to straight edge ④	Less than 0.03 (0.0012)

TIGHTENING TORQUE

Unit	N·m	kg·m	ft·lb
Oil pump mounting bolts	11 - 15	1.1 - 1.5	8 - 11
Oil pump cover bolt	7 - 10	0.7 - 1.0	5.1 - 7.2
Regulator valve cap	39 - 49	4.0 - 5.0	29 - 36
Oil pan drain plug	20 - 29	2.0 - 3.0	14 - 22

ENGINE COOLING SYSTEM

INSPECTION AND ADJUSTMENT

Thermostat

	Frigid type	Standard type	Tropical type
Valve opening temperature °C(°F)	88 (190)	82 (180)	76.5 (170)
Max. valve lift mm/°C (in/°F)	8/100 (0.31/212)	8/95 (0.31/203)	8/90 (0.31/194)

Radiator

Cap relief pressure	kPa (kg/cm ² , psi)	88 (0.9, 13)
Leakage test pressure	kPa (kg/cm ² , psi)	157 (1.6, 23)

TIGHTENING TORQUE

Unit	N·m	kg·m	ft·lb	
Water pump bolt	M6	6.3 - 8.3	0.64 - 0.85	4.6 - 6.1
	M8	16 - 21	1.6 - 2.1	12 - 15
Water pump pulley stud	6 - 10	0.6 - 1.0	4.3 - 7.2	
Water outlet bolt	10 - 16	1.0 - 1.6	7 - 12	
Thermostat housing	12 - 20	1.2 - 2.0	9 - 14	

WARNING
Never remove the radiator cap when the engine is hot, unless you are prepared for high pressure that escapes from the radiator.
Wipe a cloth over the cap and carefully remove the cap by turning it a quarter turn to allow built-up pressure to decrease. Then turn the cap off the way.

INSPECTION
Checking radiator cap
Using an approved, clean thermostat test plate
If the pressure cap does not hold the thermostat, replace the cap.

