



SECTION LC

ENGINE LUBRICATION & COOLING SYSTEMS

LC

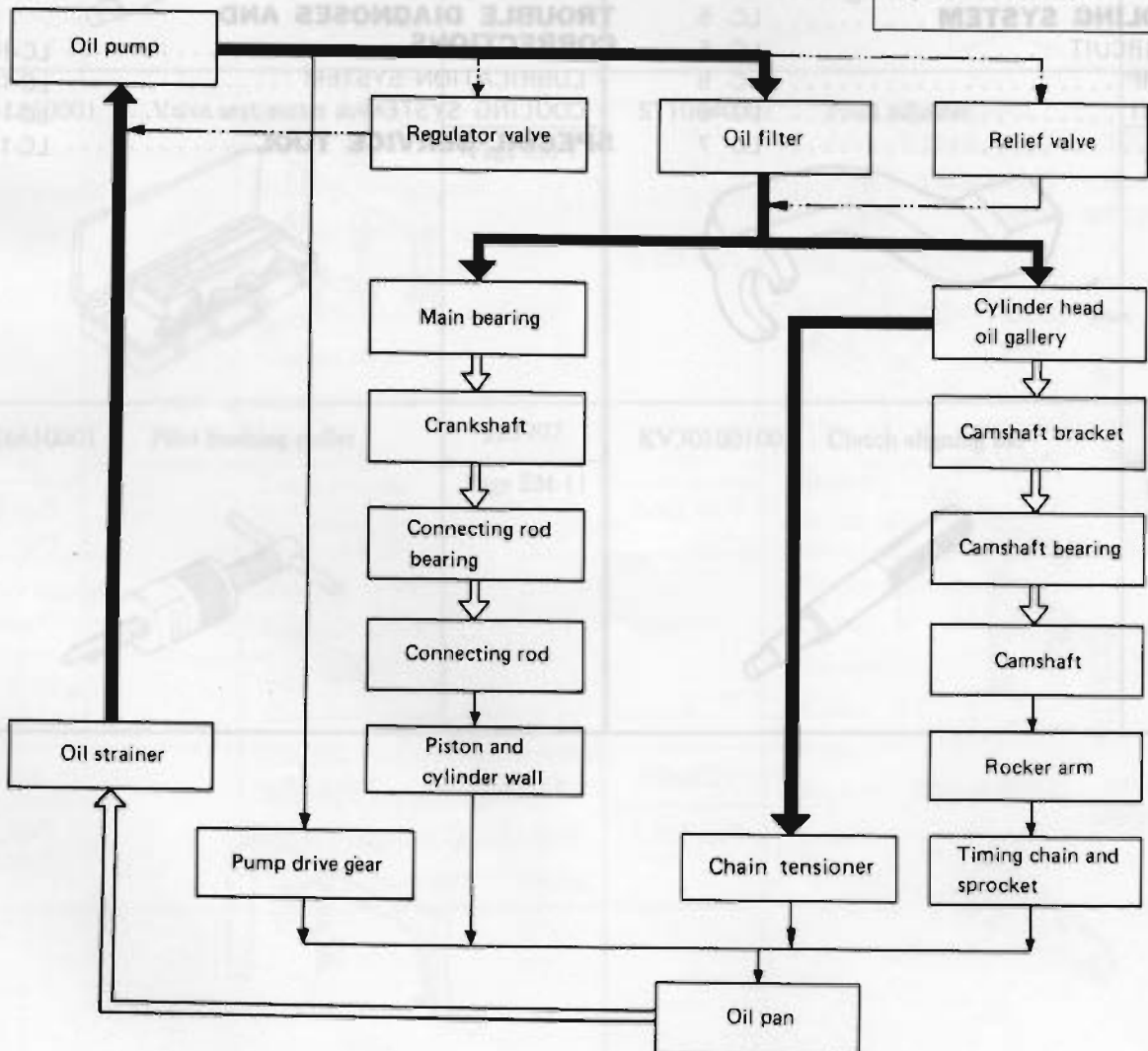
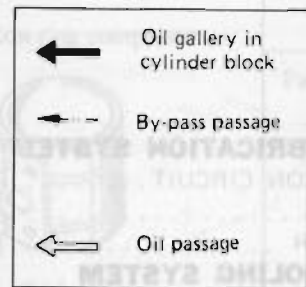
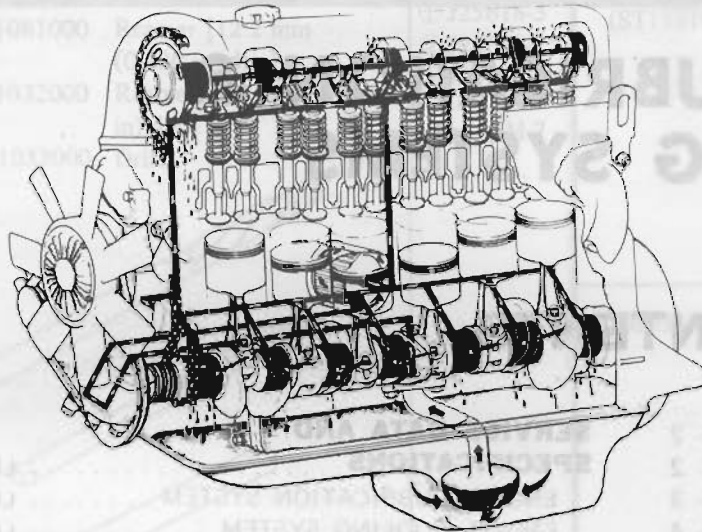
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ENGINE LUBRICATION SYSTEM

LUBRICATION CIRCUIT

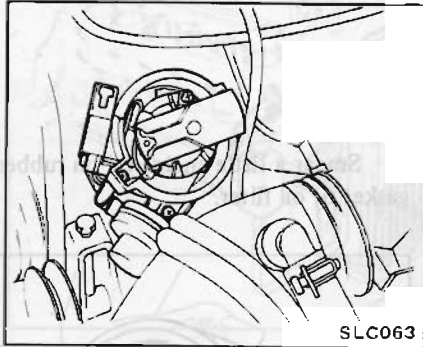


OIL PUMP

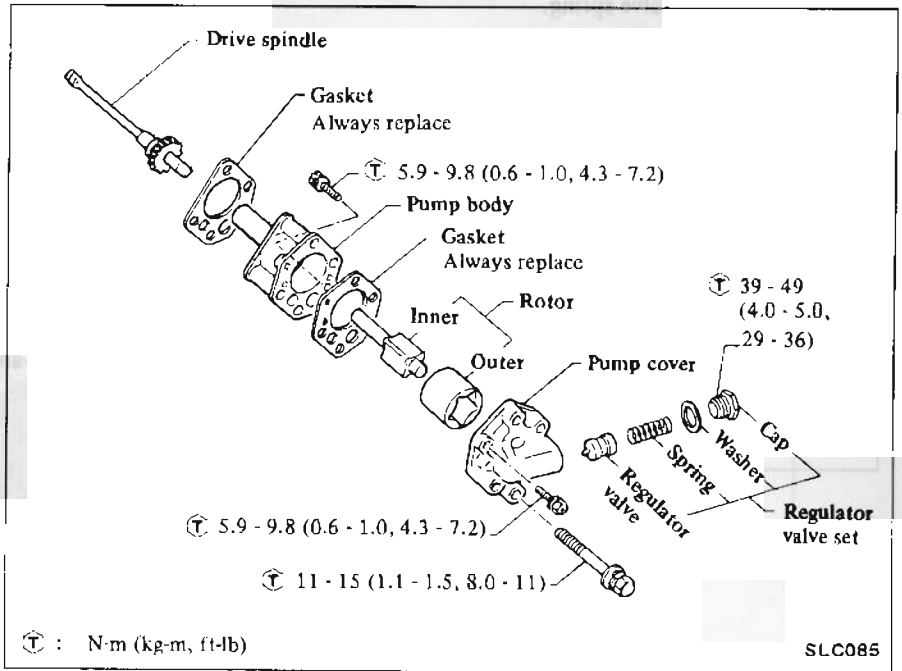
REMOVAL

1. Remove oil pan drain plug, and allow oil to drain.
2. Before removing oil pump in engine, turn crankshaft so that No. 1 piston is at T.D.C.

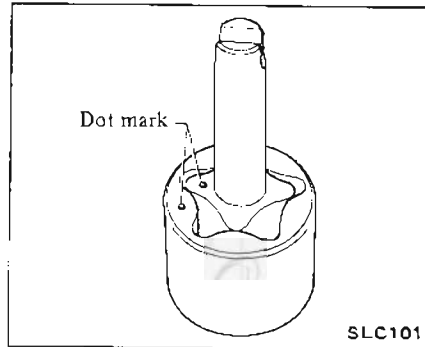
Under this condition, remove distributor cap and ascertain position of rotor head.



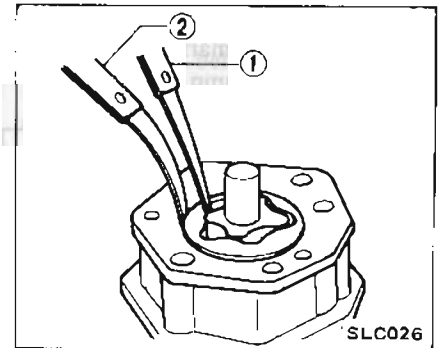
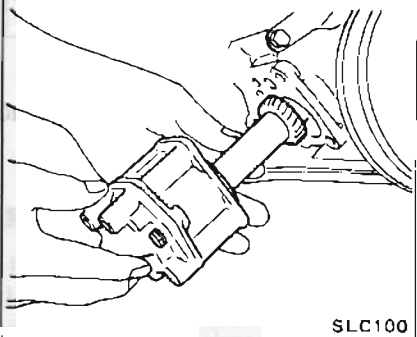
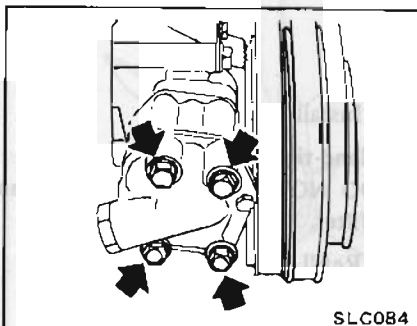
DISASSEMBLY AND ASSEMBLY



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



3. Remove oil pump and drive spindle as an assembly.



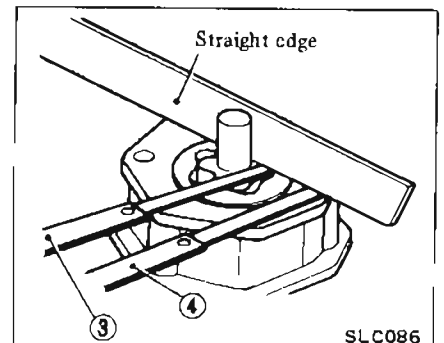
- Rotor to straight edge ③:
 Less than 0.06 mm (0.0024 in)
- Oil pump body to straight edge ④:
 Less than 0.03 mm (0.0012 in)

INSPECTION

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

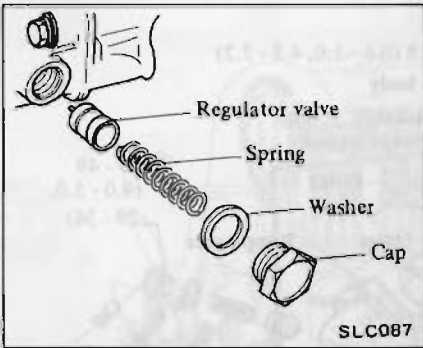
If it exceeds limit, replace rotor set or entire oil pump assembly.

- 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)



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

If damaged, replace valve set or pump assembly.



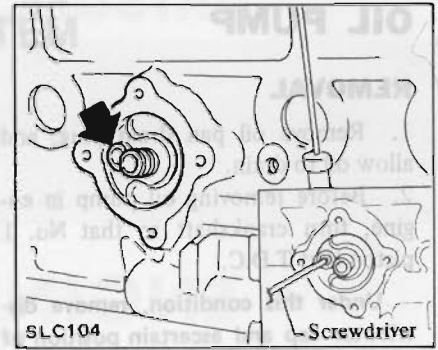
4. Refill engine with oil.

Oil capacity

Unit: ℓ (US qt, Imp qt)

| | |
|--------------------|-----------------------|
| With oil filter | 4.5 (4-3/4, 4) |
| Without oil filter | 4.0 (4-1/4, 3-1/2) |

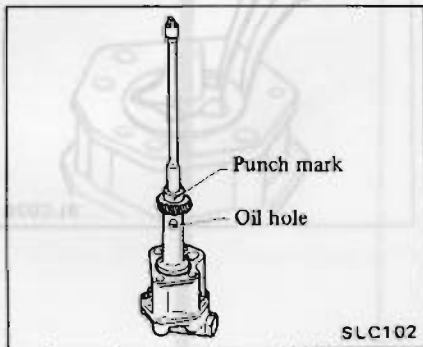
5. Run engine for a few minutes, and check for leaks.



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 align punch mark of drive spindle with hole in oil pump.



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

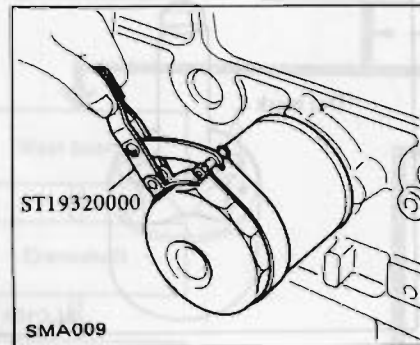
Make sure that tip of drive spindle assembly fits distributor fitting hole securely.

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

OIL FILTER

REPLACEMENT

1. Remove oil pan drain plug, and allow oil to drain.
2. Using Tool, remove oil filter.



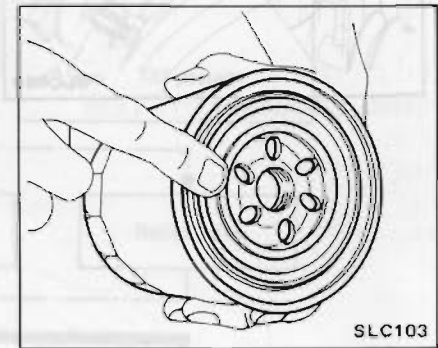
3. Wipe oil filter mounting surface with clean rag.

4. 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.

5. Smear a little engine oil on rubber gasket of oil filter.



6. Install oil filter.

Hand-tighten ONLY.
DO NOT use a wrench to tighten the filter.

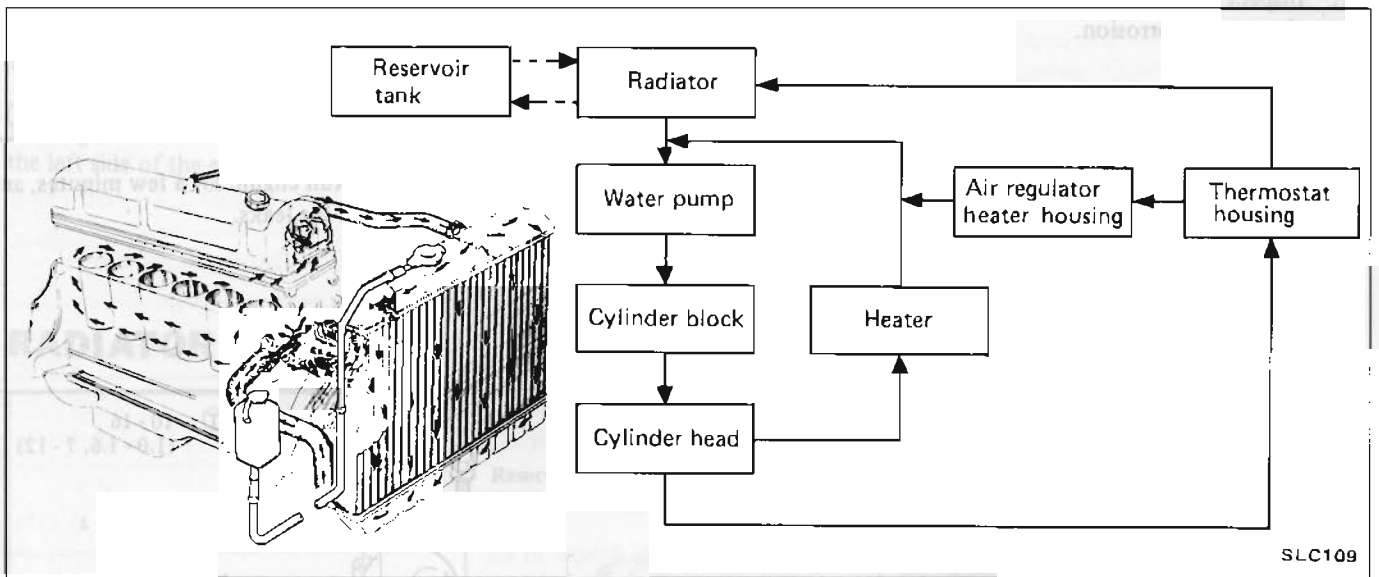
7. Refill engine with oil.

Oil capacity:
 4.5 liters
 (4-3/4 US qt,
 4 Imp qt)

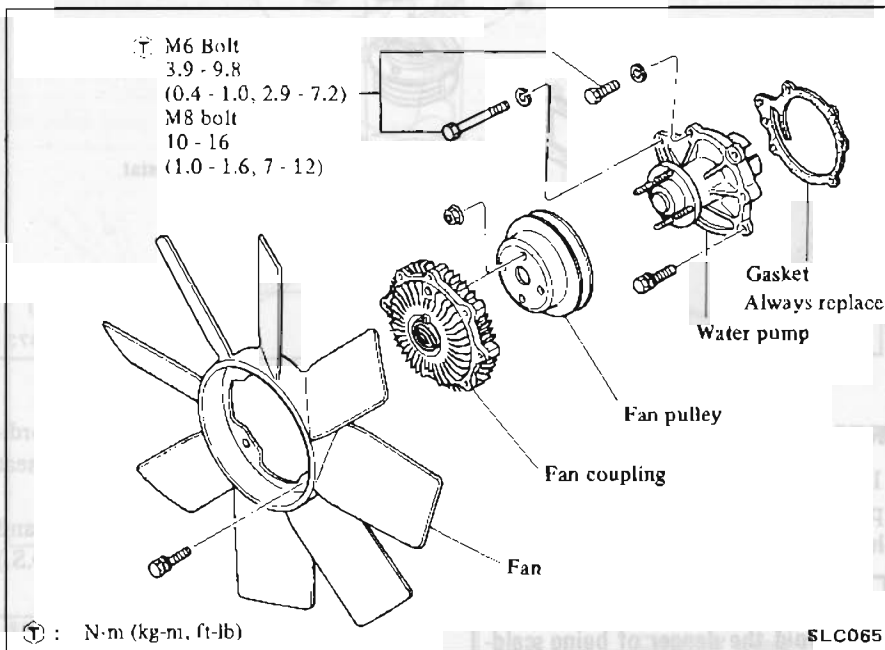
8. Run engine for a few minutes, and check for leaks.

ENGINE COOLING SYSTEM

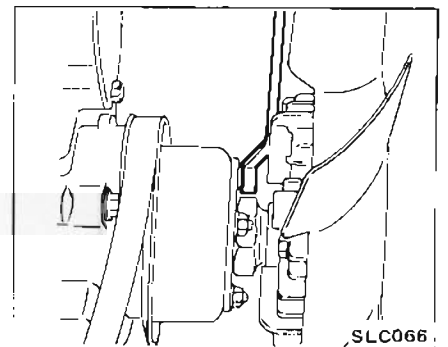
COOLING CIRCUIT



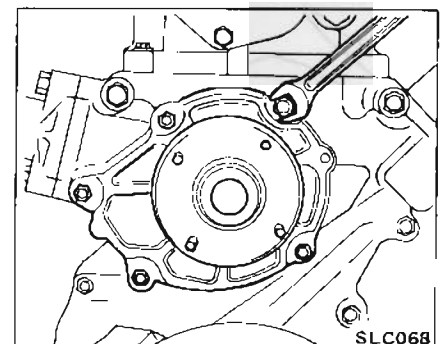
WATER PUMP



2. Remove radiator shroud.
3. Loosen fan belt.
 - (1) Loosen alternator securing bolts.
 - (2) Move the alternator toward the engine.
4. Remove fan, fan coupling and fan pulley as an assembly.



5. Remove water pump with gasket.



REMOVAL

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

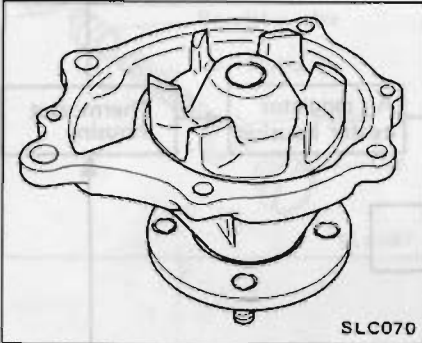
WARNING:

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

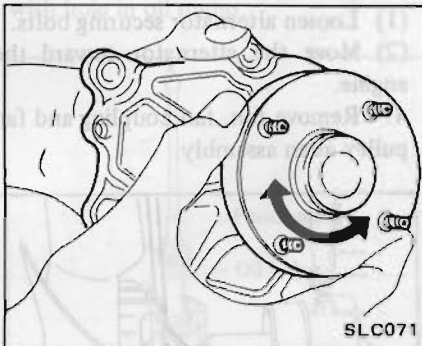
INSPECTION

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

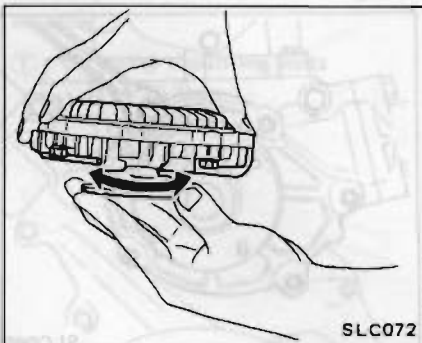
1. Inspect water pump body and vane for rust or corrosion.



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 bi-metal.



INSTALLATION

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

Always use new gasket.

2. Adjust fan belt tension.

Fan belt deflection:
8 - 12 mm (0.31 - 0.47 in)
Pushing force:
98 N (10 kg, 22 lb)

3. Fill radiator with coolant.

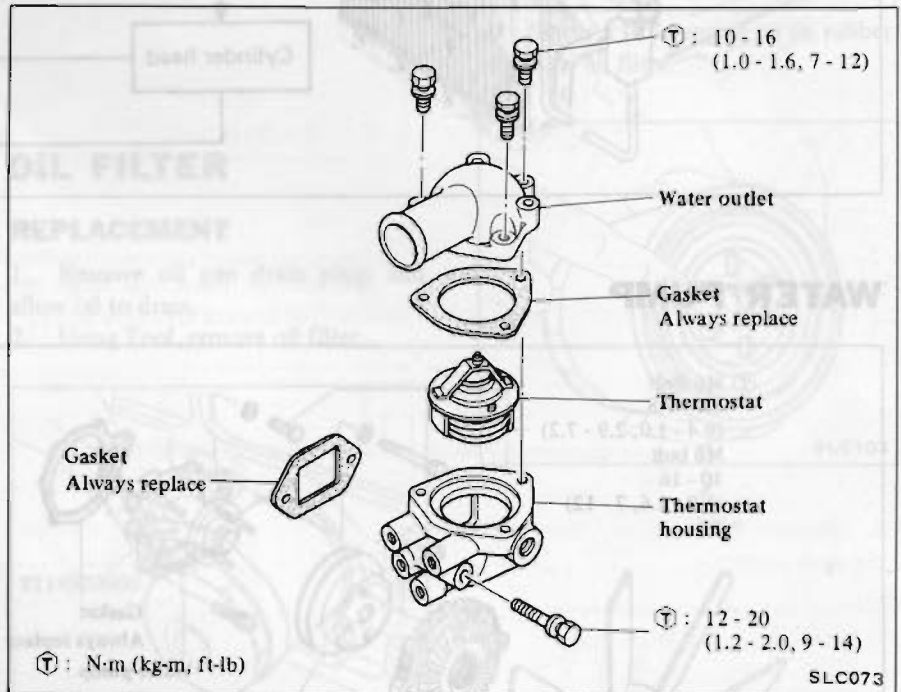
Cooling water capacity:

Unit: liter (US qt, Imp qt)

| | |
|---------------------------|-------------------------|
| With coolant reservoir | 10.5 (11-1/8, 9-1/4) |
| Without coolant reservoir | 9.7 (10-1/4, 8-1/2) |

4. 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.

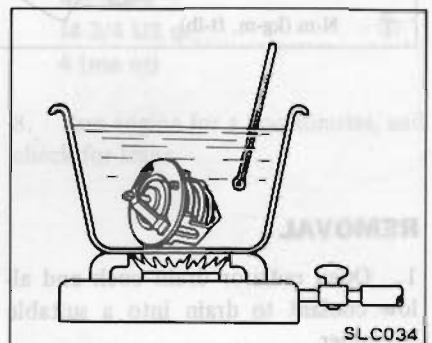
WARNING:
To avoid the danger of being scalded, never attempt to drain the coolant when the engine is hot.

2. Remove water outlet and then remove thermostat.

INSPECTION

Inspect thermostat for the following and replace if necessary.

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

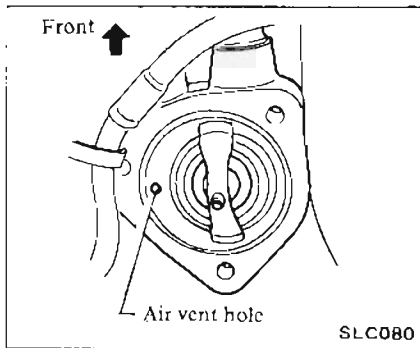


3. Then check if valve closes at 5°C (9°F) below valve opening temperature.

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

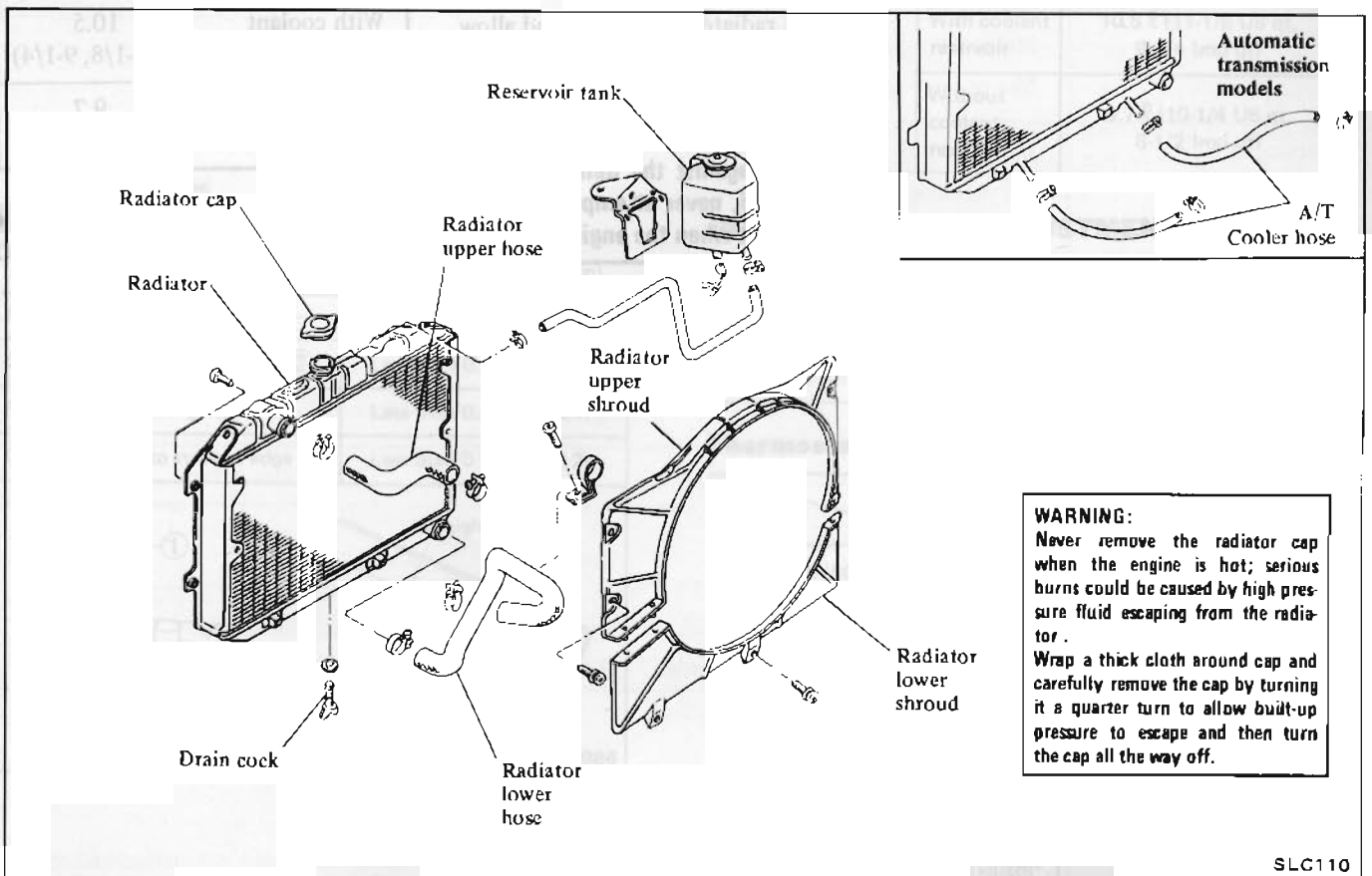
INSTALLATION

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.
3. Connect radiator upper hose and fill radiator with coolant.
4. Run engine for a few minutes, and check for leaks.

RADIATOR



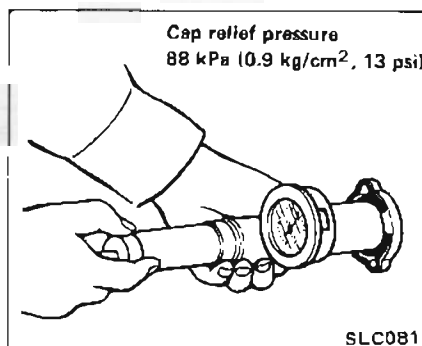
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INSPECTION

Checking radiator cap

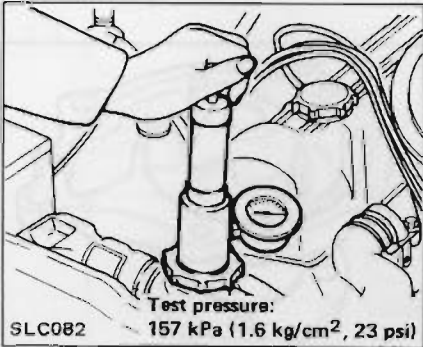
Using cap tester, check the radiator cap relief pressure.

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



Checking cooling system for leaks

- Attach pressure tester, pump 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.

- Remove radiator shroud attaching screws and place radiator shroud close to engine.
(Radiator shroud can be removed after removing radiator.)
- Disconnect radiator upper and lower hoses, and reservoir tank hose.
- On a car with automatic transmission, disconnect cooler inlet and outlet lines from radiator.
- Remove radiator.
- Install radiator in the reverse order of removal.
- Fill radiator with coolant.

Cooling water capacity:

Unit: liter (US qt, Imp qt)

| | |
|---------------------------|-------------------------|
| With coolant reservoir | 10.5 (11-1/8, 9-1/4) |
| Without coolant reservoir | 9.7 (10-1/4, 8-1/2) |

REMOVAL AND INSTALLATION

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

WARNING:

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

- Run engine for a few minutes, and check for leaks.

SERVICE DATA AND SPECIFICATIONS

ENGINE LUBRICATION SYSTEM

GENERAL SPECIFICATIONS

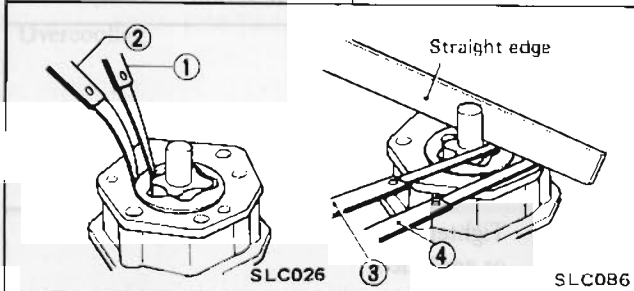
| | | |
|--------------------|--------------------|--------------------------------------|
| Lubrication method | | Pressed feed flow |
| Oil pump type | | Trachoid type |
| Oil filter type | | Full flow and cartridge type |
| Oil capacity | With oil filter | 4.5 ℓ (4-3/4 US qt, 4 Imp qt) |
| | Without oil filter | 4.0 ℓ (4-1/4 US qt, 3-1/2 Imp qt) |

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 | 6.9 - 9.8 | 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

GENERAL SPECIFICATIONS

| | | |
|---|---------------------------|-------------------------------------|
| Cooling method | | Water cooling, forced circulation |
| Water pump type | | Centrifugal |
| Thermostat type | | Wax-pellet |
| Radiator type | | Corrugated fin and tube |
| Cooling fan Fan dia. × No. of blades | | 410 mm (16.14 in) × 8 |
| Fan coupling method | | Temperature coupling |
| Cooling water capacity | With coolant reservoir | 10.5 ℓ (11-1/8 US qt, 9-1/4 Imp qt) |
| | Without coolant reservoir | 9.7 ℓ (10-1/4 US qt, 8-1/2 Imp qt) |

INSPECTION AND ADJUSTMENT

Water pump

| | |
|---|----------------------|
| Fan belt deflection [Applied force 98 N mm (in) (10 kg, 22 lb)] | 8 - 12 (0.31 - 0.47) |
|---|----------------------|

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 | 3.9 - 9.8 | 0.4 - 1.0 | 2.9 - 7.2 |
| | M8 | 10 - 16 | 1.0 - 1.6 | 7 - 12 |
| Water pump pulley stud | 5.9 - 9.8 | 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 | |

TROUBLE DIAGNOSES AND CORRECTIONS

LUBRICATION SYSTEM

| Condition | Probable cause | Corrective action |
|--|---|---|
| Oil leakage | Damaged or cracked pump body cover. Oil leakage from gasket and oil seal. Oil leakage from regulator valve. Oil leakage from blind plug. | Replace. Replace. Tighten or replace. Replace. |
| Decreased oil pressure | Lack of oil in engine oil pan. Dirty oil strainer. Damaged or worn pump rotors. Malfunctioning regulator. Use of poor quality engine oil. | Correct. Clean or replace. Replace. Replace. Replace. |
| Warning light remains "on" with engine running | Decreased oil pressure. Oil pressure switch unserviceable. Electrical fault. | Previously mentioned. Replace. Check circuit. |
| Noise | Excessive backlash in pump rotors. | Replace. |

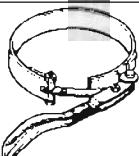
COOLING SYSTEM

| Condition | Probable cause | Corrective action |
|---------------|---|---|
| Water leakage | Damaged radiator seams. Leaks from heater connections or plugs. Leak from water pump shaft seal. Leak from water temperature gauge. Leaks from gaskets or small cracks. | Repair. Repair. Replace as pump assembly. Tighten. Tighten or use Nissan Cooling System Sealer or equivalent. |
| | Loose joints. Damaged cylinder head gasket. | Tighten. Replace. Check engine oil for contamination and refill as necessary. |
| | Cracked cylinder block. | Replace. Check engine oil in crankcase for mixing with water by pulling oil level gauge. |
| | Cracked cylinder head. Loose cylinder head bolts. | Replace. Tighten. |

ENGINE LUBRICATION & COOLING SYSTEMS – *Special Service Tool*

| Condition | Probable cause | Corrective action |
|------------------|--|--|
| Poor circulation | Restriction in system. Insufficient coolant. Inoperative water pump. Loose fan belt. Inoperative thermostat. | Check hoses for crimps, and clear the system of rust and sludge by flushing radiator. Replenish. Replace. Adjust. Replace. |
| Corrosion | Excessive impurity in water. Infrequent flushing and draining of system. | Use soft, clean water. (rain water is satisfactory). Cooling system should be drained and flushed thoroughly at least twice a year. Permanent antifreeze (Ethylene glycol base) can be used throughout the seasons of a year. |
| Overheating | Malfunctioning thermostat, radiator cap and fan coupling. Radiator fin choked with mud, chaff, etc. Incorrect ignition and valve timing. Dirty oil and sludge in engine. Inoperative water pump. Loose fan belt. Restricted radiator. Inaccurate temperature gauge. Impurity in water. | Replace. Clean out air passage thoroughly by using air pressure from engine side of radiator. Adjust. Refill. Replace. Adjust. Flush radiator. Replace. Use soft, clean water. |
| Overcooling | Malfunctioning thermostat. Inaccurate temperature gauge. | Replace. Replace. |
| Noise | Squeak at water pump mechanical seal. Damaged or worn water pump bearing. | Replace pump assembly. Replace pump assembly. |

SPECIAL SERVICE TOOL

| Tool number (Kent-Moore No.) | Tool name |
|---------------------------------|---|
| ST19320000 (J25664) | Oil filter wrench <div style="text-align: center;">  </div> |

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