

ENGINE LUBRICATION AND COOLING SYSTEM

SECTION LC

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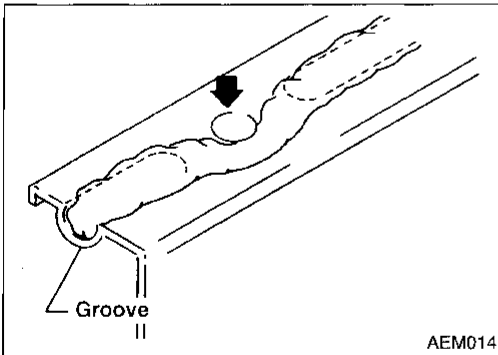
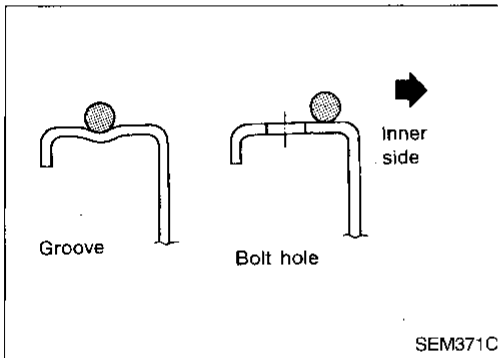
PRECAUTIONS

Precautions for Supplemental Restraint System “AIR BAG”

The Supplemental Restraint System “Air Bag” helps to reduce the risk or severity of injury to the driver and front passenger in a frontal collision. The Supplemental Restraint System consists of air bags (located in the center of the steering wheel and on the instrument panel on the passenger side), sensors, a control module, warning lamp, wiring harness and spiral cable. Information necessary to service the system safely is included in the **BF** section of this Service Manual.

WARNING:

- To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized NISSAN dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system.
- All SRS electrical wiring harnesses and connectors are covered with yellow outer insulation. Do not use electrical test equipment on any circuit related to the SRS “Air Bag”.

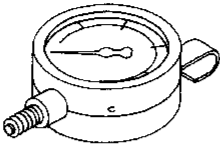
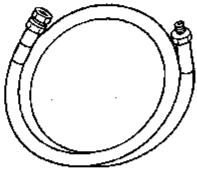
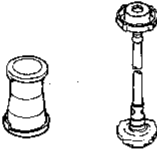
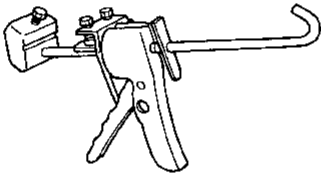


Liquid Gasket Application Procedure

- Before applying liquid gasket, use a scraper to remove all traces of old liquid gasket from mating surfaces and grooves, and then completely clean any oil stains from these portions.
- Apply a continuous bead of liquid gasket to mating surfaces. (Use Genuine Liquid Gasket or equivalent.)
 - Be sure liquid gasket is 3.5 to 4.5 mm (0.138 to 0.177 in) wide (for oil pan).
 - Be sure liquid gasket is 2.0 to 3.0 mm (0.079 to 0.118 in) wide (in areas except oil pan).
- Apply liquid gasket to inner surface around hole perimeter area. (Assembly should be done within 5 minutes after coating.)
- Wait at least 30 minutes before refilling engine oil and engine coolant.

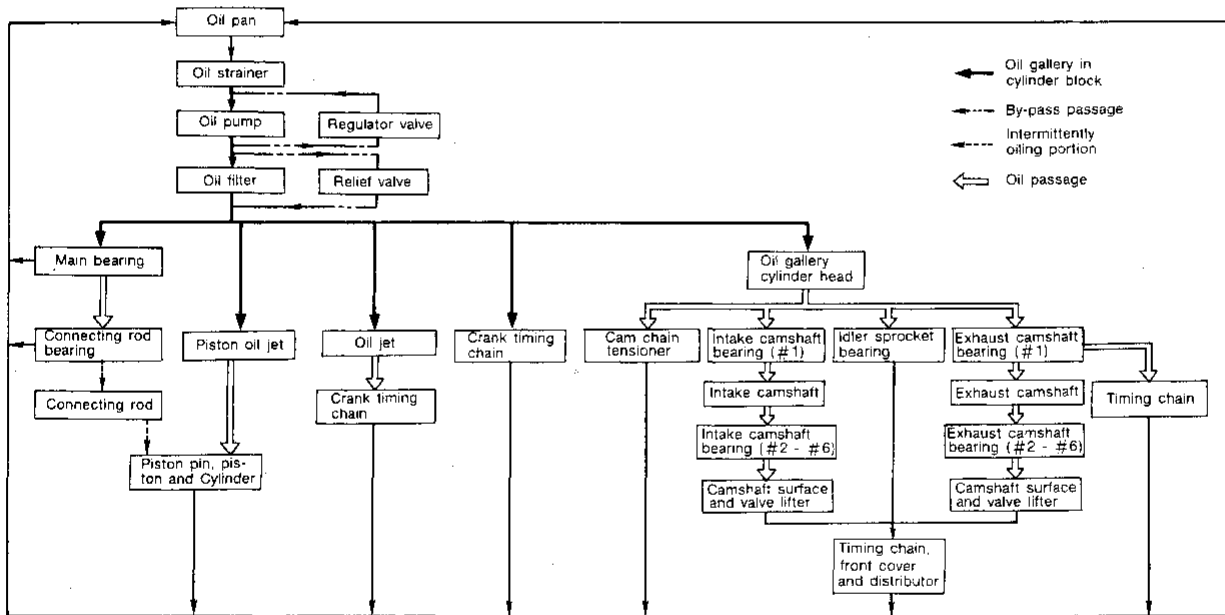
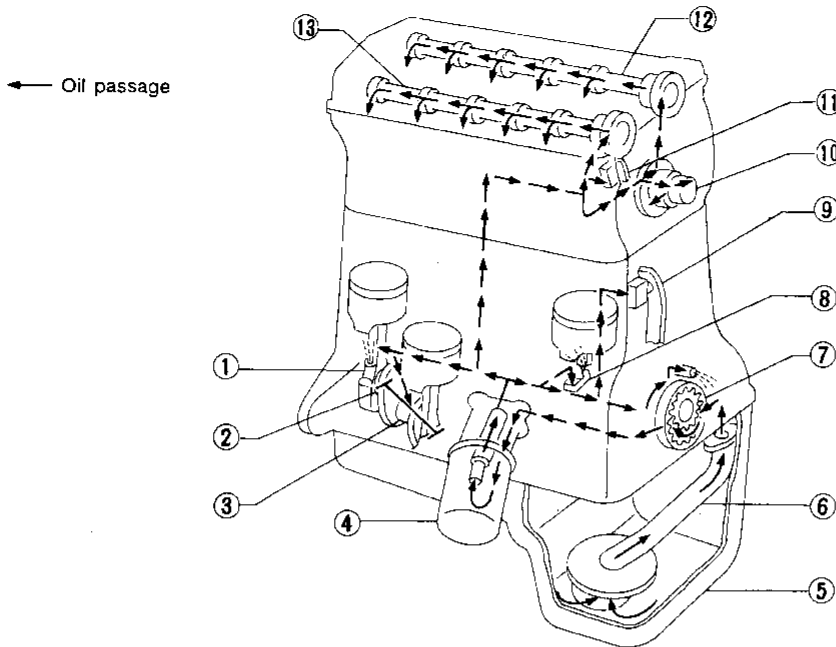
PREPARATION

Special Service Tools

Tool number (Kent-Moore No.) Tool name	Description	
ST25051001 (J25695-1) Oil pressure gauge		GI MA EM
ST25052000 (J25695-2) Hose		<div style="background-color: black; color: white; padding: 2px;">LC</div> EF & EC FE
EG17650301 (J33984-A) Radiator cap tester adapter		CL MT Adapting radiator cap tester to radiator filler neck
WS39930000 () Tube presser		AT FA RA BR ST BF HA EL IDX Pressing the tube of liquid gasket

ENGINE LUBRICATION SYSTEM

Lubrication Circuit



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- ① Connecting rod
- ② Connecting rod bearing
- ③ Main bearing
- ④ Oil filter
- ⑤ Oil pan

- ⑥ Oil strainer
- ⑦ Oil pump
- ⑧ Piston oil jet
- ⑨ Timing chain tensioner

- ⑩ Idler sprocket
- ⑪ Upper timing chain tensioner
- ⑫ Exhaust camshaft
- ⑬ Intake camshaft

Oil Pressure Check

WARNING:

- Be careful not to burn yourself, as the engine and oil may hot.
- Oil pressure check should be done in "Neutral" position.

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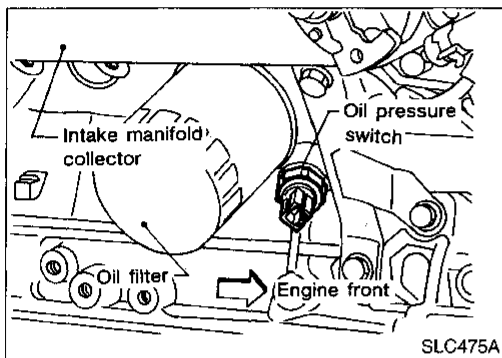
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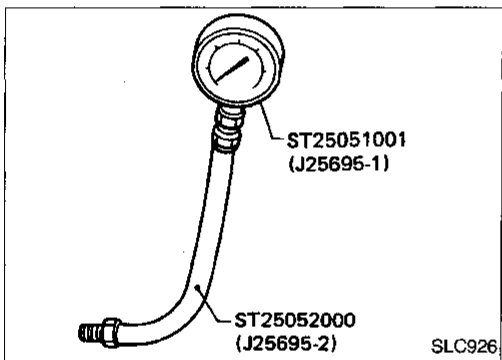
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1. Check oil level.
2. Remove oil pressure switch.

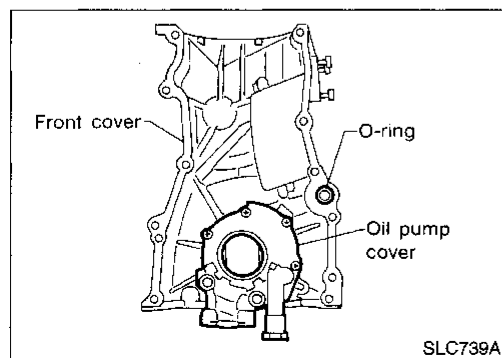


3. Install pressure gauge.
4. Start engine and warm it up to normal operating temperature.
5. Check oil pressure with engine running under no-load.

Engine speed	Approximate discharge pressure kPa (kg/cm ² , psi)
Idle speed	More than 78 (0.8, 11)
3,000 rpm	412 - 481 (4.2 - 4.9, 60 - 70)

If difference is extreme, check oil passage and oil pump for oil leaks.

6. Install oil pressure switch with sealant.



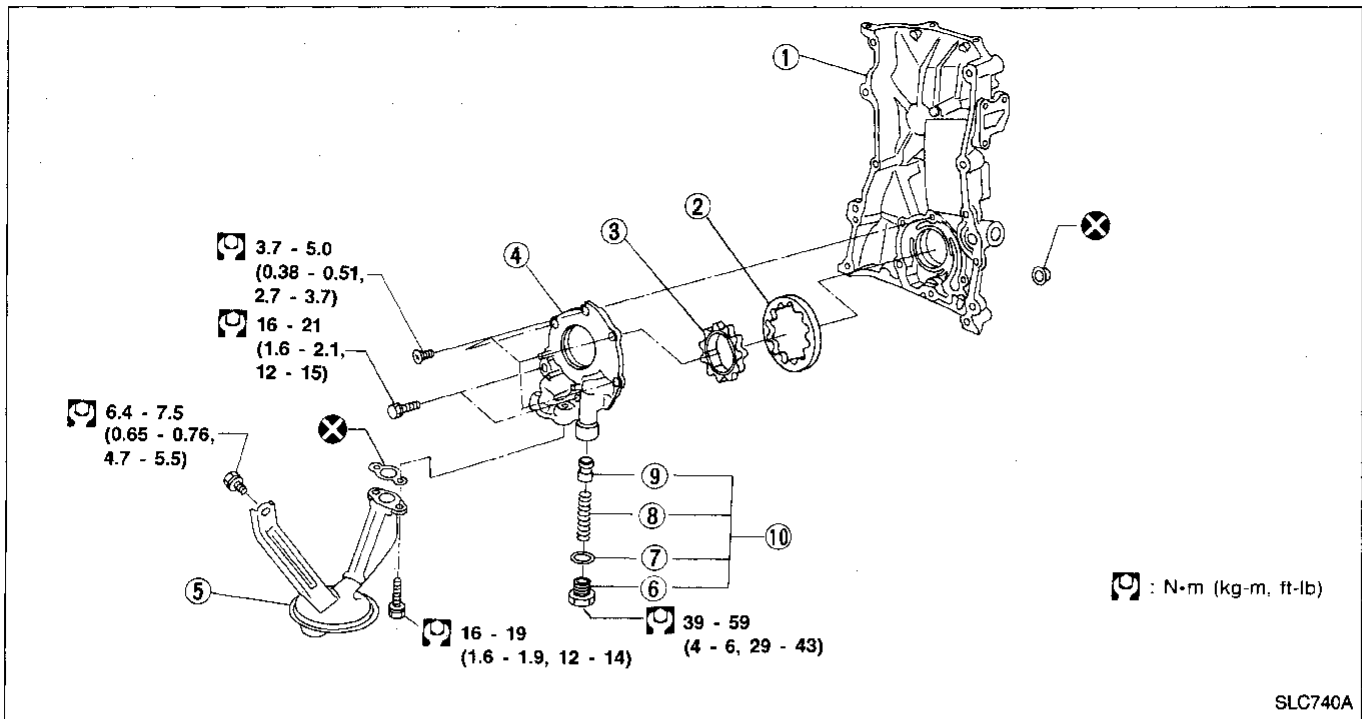
Oil Pump

REMOVAL

1. Remove front cover.
Refer to EM section ("Removal", "TIMING CHAIN").
2. Remove oil pump cover.

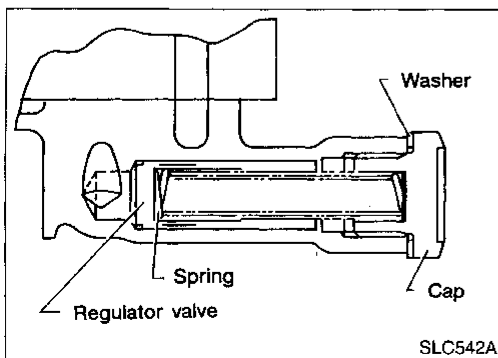
ENGINE LUBRICATION SYSTEM

Oil Pump (Cont'd)



- | | |
|------------------|----------------------------|
| ① Front cover | ⑥ Cap |
| ② Outer gear | ⑦ Washer |
| ③ Inner gear | ⑧ Spring |
| ④ Oil pump cover | ⑨ Regulator valve |
| ⑤ Oil strainer | ⑩ Regulator valve assembly |

- Always replace oil seals and gaskets with new ones.
- When installing oil pump, apply engine oil to inner and outer gears.



REGULATOR VALVE INSPECTION

1. Visually inspect components for wear and damage.
 2. Check oil pressure regulator valve sliding surface and valve spring.
 3. Coat regulator valve with engine oil and check that it falls smoothly into the valve hole by its own weight.
- If damaged, replace regulator valve set or oil pump assembly.

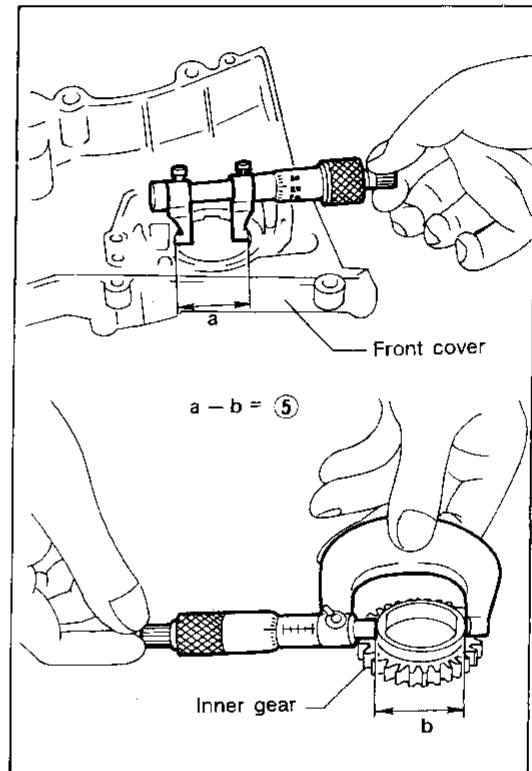
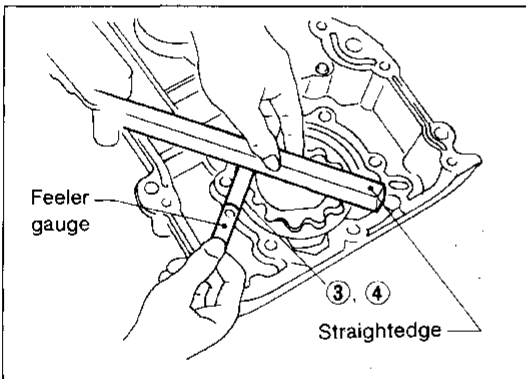
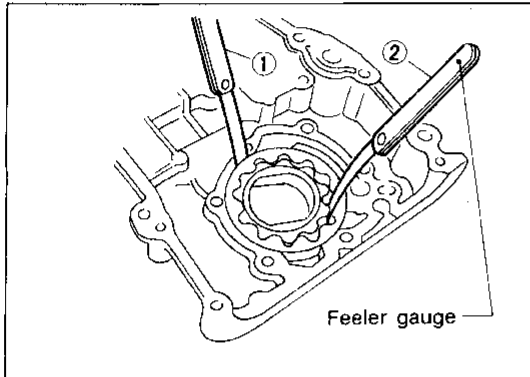
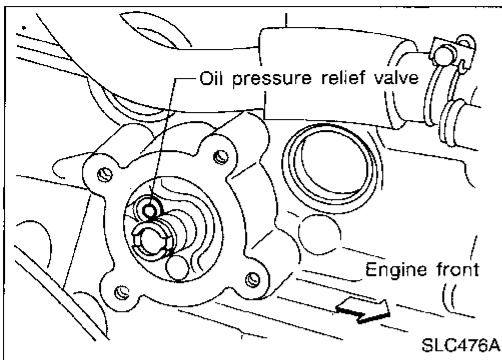
ENGINE LUBRICATION SYSTEM

Oil Pump (Cont'd)

OIL PRESSURE RELIEF VALVE INSPECTION

Inspect oil pressure relief valve for movement, cracks and breaks by pushing the ball. If replacement is necessary, remove valve by prying it out with a suitable tool.

Install a new valve in place by tapping it.



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OIL PUMP INSPECTION

Using a feeler gauge, check the following clearances.

Standard clearance:

Unit: mm (in)

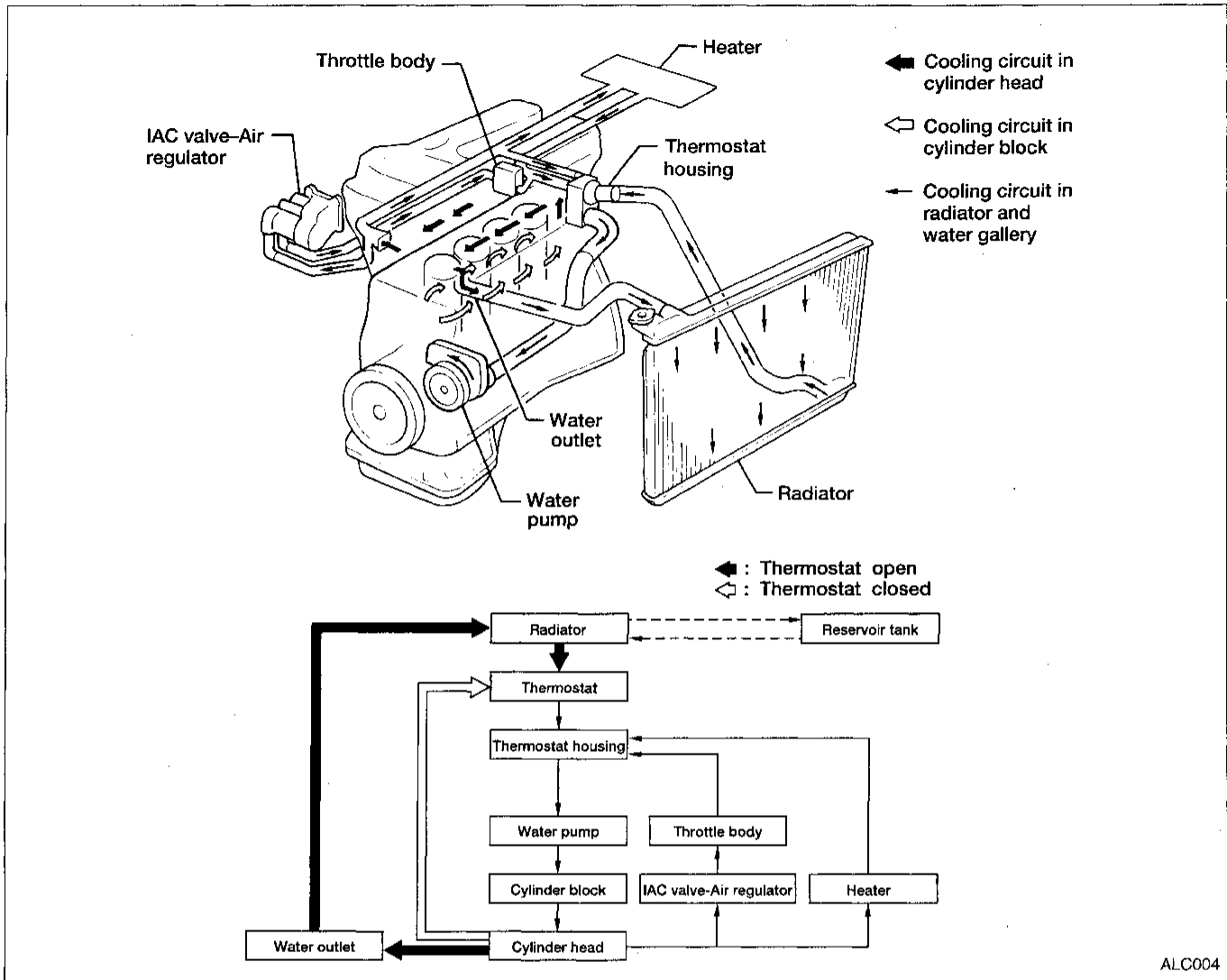
Body to outer gear clearance ①	.....	0.114 - 0.20 (0.0045 - 0.0079)
Inner gear to outer gear tip clearance ②	.....	0.04 - 0.18 (0.0016 - 0.0071)
Cover to inner gear clearance ③	.....	0.05 - 0.09 (0.0020 - 0.0035)
Cover to outer gear clearance ④	.....	0.05 - 0.11 (0.0020 - 0.0043)
Inner gear to brazed portion clearance ⑤	..	0.045 - 0.091 (0.0018 - 0.0036)

- If the tip clearance (②) exceeds the limit, replace gear set.
- If body to gear clearances (①, ③, ④, ⑤) exceed the limit, replace front cover assembly.

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ENGINE COOLING SYSTEM

Cooling Circuit



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System Check

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 the cap and slowly turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by turning it all the way.

CHECKING COOLING SYSTEM HOSES

Check hoses for improper attachment, leaks, cracks, damage, loose connections, chafing and deterioration.

ENGINE COOLING SYSTEM

System Check (Cont'd)

CHECKING COOLING SYSTEM FOR LEAKS

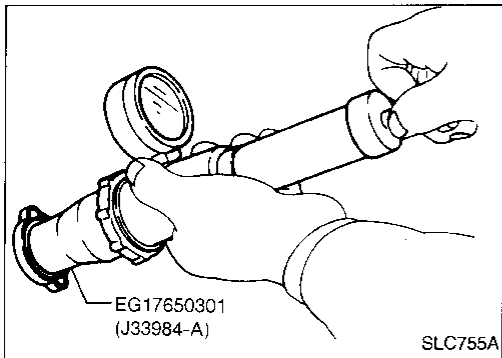
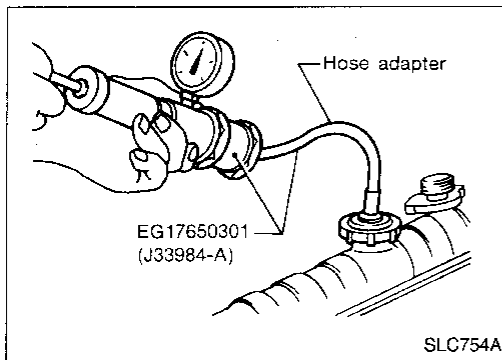
To check for leakage, apply pressure to the cooling system with a tester.

Testing pressure:

157 kPa (1.6 kg/cm², 23 psi)

CAUTION:

Higher than the specified pressure may cause radiator damage.



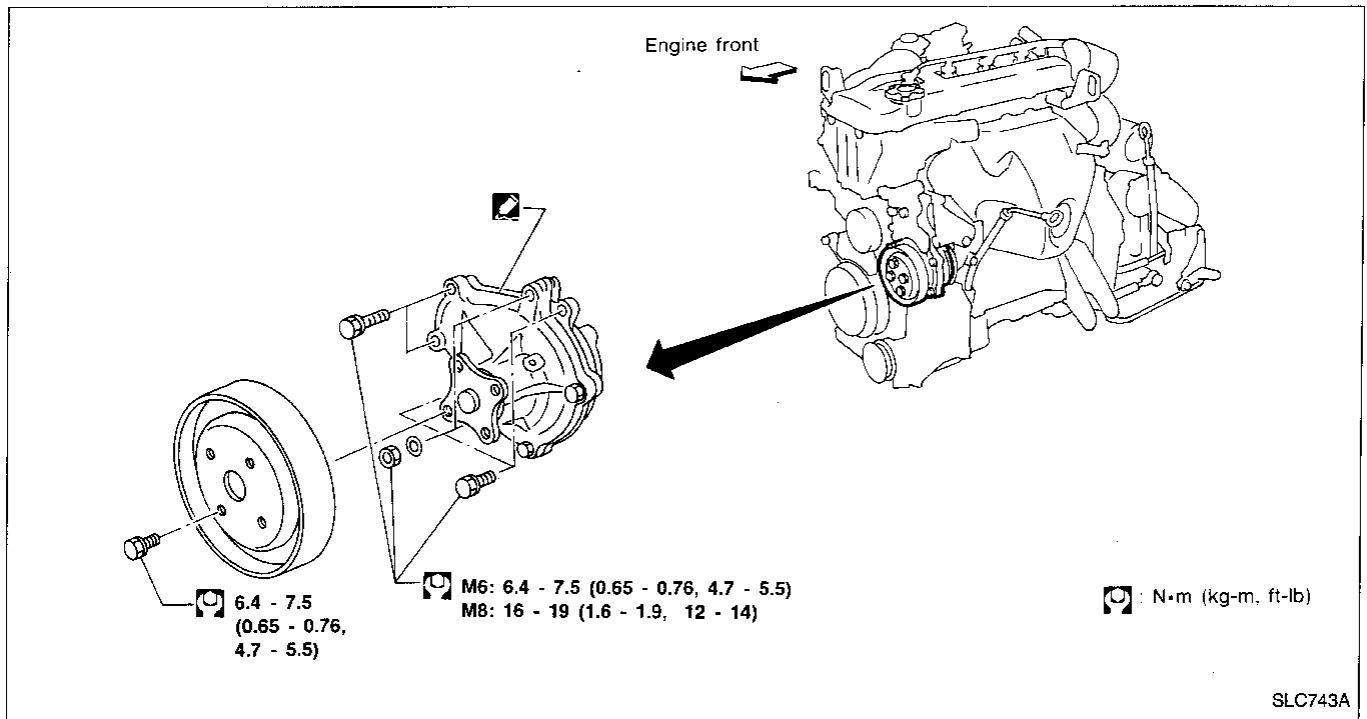
CHECKING RADIATOR CAP

To check radiator cap, apply pressure to cap with a tester.

Radiator cap relief pressure:

78 - 98 kPa (0.8 - 1.0 kg/cm², 11 - 14 psi)

Water Pump



CAUTION:

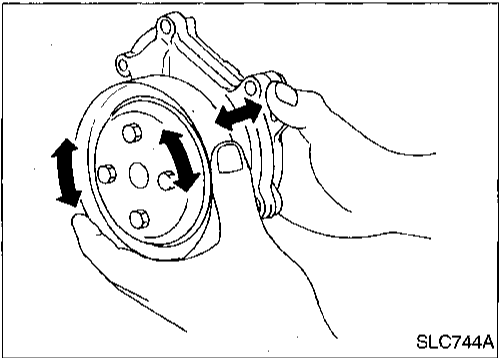
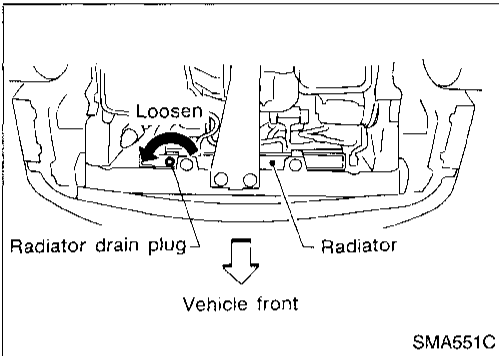
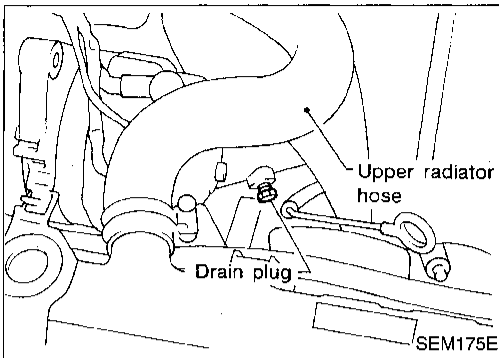
- When removing water pump assembly, be careful not to get coolant on drive belt.
- Water pump cannot be disassembled and should be replaced as a unit.
- After installing water pump, connect hose and clamp securely, then check for leaks using radiator cap tester.

ENGINE COOLING SYSTEM

Water Pump (Cont'd)

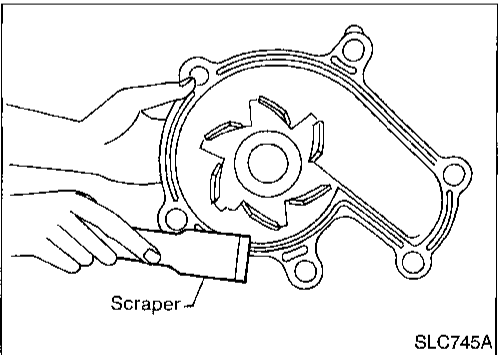
REMOVAL

1. Drain coolant from drain plug on water pipe and radiator.
2. Remove generator and air compressor.
3. Remove water pump.



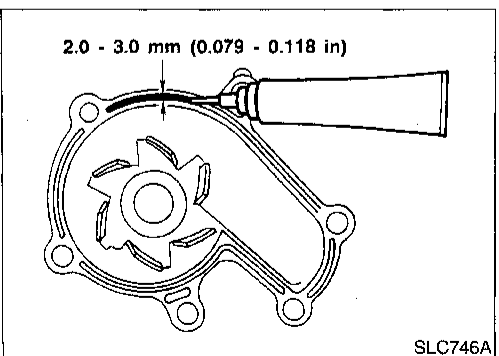
INSPECTION

1. Check for badly rusted or corroded vanes and body assembly.
2. Check for rough operation due to excessive end play.

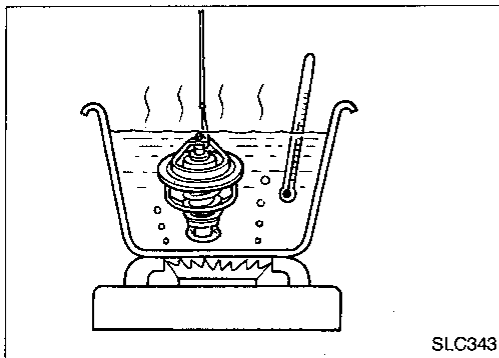
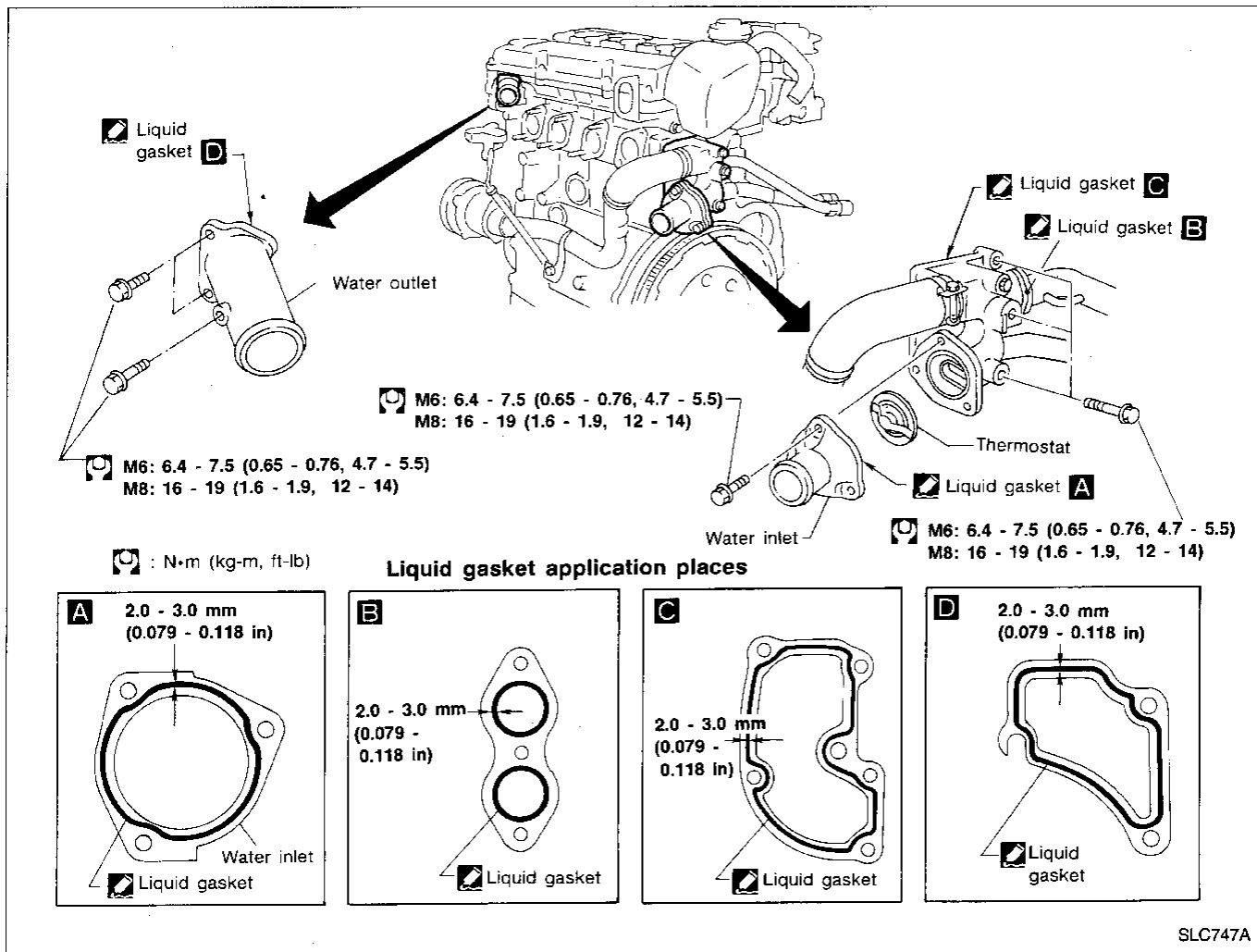


INSTALLATION

1. Before installing water pump, remove all traces of liquid gasket from mating surface using a scraper.
 - Also remove traces of liquid gasket from mating surface of cylinder block.
2. Apply a continuous bead of liquid gasket to mating surface of water pump.
 - Use genuine liquid gasket or equivalent.



Thermostat



INSPECTION

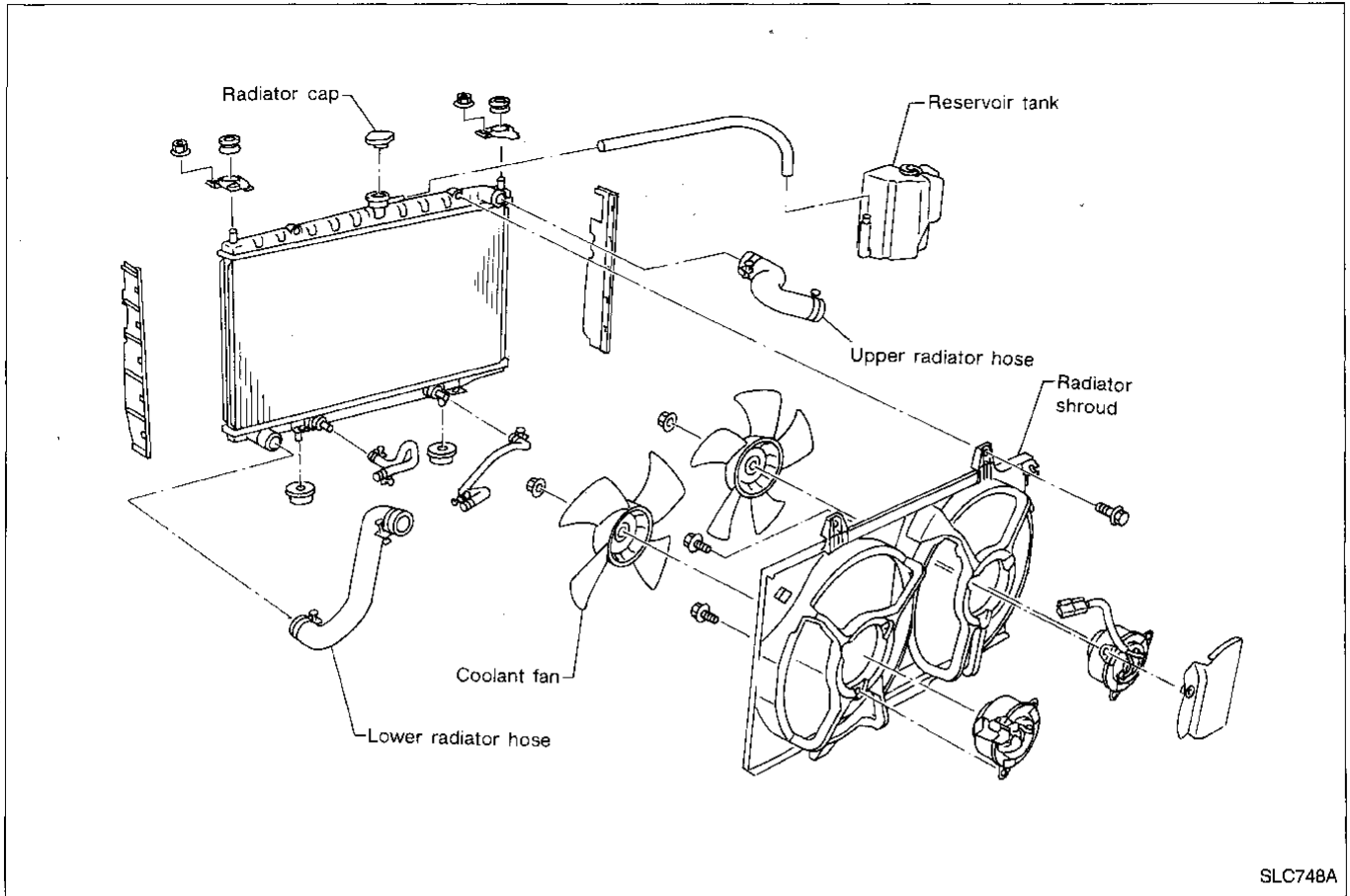
1. Check valve seating condition at normal room temperatures. It should seat tightly.
2. Check valve opening temperature and maximum valve lift.

		Standard
Valve opening temperature	°C (°F)	76.5 (170)
Maximum valve lift	mm/°C (in/°F)	10/90 (0.39/194)

3. Then check if valve is closed at 5°C (9°F) below valve opening temperature.
 - Apply a continuous bead of liquid gasket to mating surface of water inlet.
 - After installation, run engine for a few minutes, and check for leaks.
 - Be careful not to spill coolant over engine compartment. Use a rag to absorb coolant.

ENGINE COOLING SYSTEM

Radiator



SLC748A

CAUTION:
When filling radiator with coolant, refer to MA section ("Changing Engine Coolant", "ENGINE MAINTENANCE").

SERVICE DATA AND SPECIFICATIONS (SDS)

Engine Lubrication System

Oil pressure check

Engine speed	Approximate discharge pressure kPa (kg/cm ² , psi)
Idle speed	More than 78 (0.8, 11)
3,000 rpm	412 - 481 (4.2 - 4.9, 60 - 70)

Oil pump

		Unit: mm (in)
Body to outer gear clearance	.....	0.114 - 0.20 (0.0045 - 0.0079)
Inner gear to outer gear tip clearance	.....	0.04 - 0.18 (0.0016 - 0.0071)
Cover to inner gear clearance	.....	0.05 - 0.09 (0.0020 - 0.0035)
Cover to outer gear clearance	0.05 - 0.11 (0.0020 - 0.0043)
Inner gear to brazed portion clearance	0.045 - 0.091 (0.0018 - 0.0036)

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Engine Cooling System

Thermostat

Valve opening temperature	°C (°F)	76.5 (170)
Max. valve lift	mm/°C (in/°F)	10/90 (0.39/194)

Radiator

		Unit: kPa (kg/cm ² , psi)
Cap relief pressure		78 - 98 (0.8 - 1.0, 11 - 14)
Leakage test pressure		157 (1.6, 23)

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