

ENGINE LUBRICATION AND COOLING SYSTEM

SECTION LC

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CONTENTS

PRECAUTIONS AND PREPARATION	2	ENGINE COOLING SYSTEM	8
Precautions for Supplemental Restraint		Cooling Circuit.....	8
System Supplemental "AIR BAG"	2	System Check.....	8
Liquid Gasket Application Procedure.....	2	Refilling Engine Coolant	9
Special Service Tools.....	3	Water Pump	10
ENGINE LUBRICATION SYSTEM	4	Thermostat.....	12
Lubrication Circuit	4	Radiator.....	14
Oil Pressure Check.....	5	Electric Cooling Fan Control System.....	15
Oil Pump	5	SERVICE DATA AND SPECIFICATIONS (SDS)	16
		Engine Lubrication System	16
		Engine Cooling System	16

PRECAUTIONS AND PREPARATION

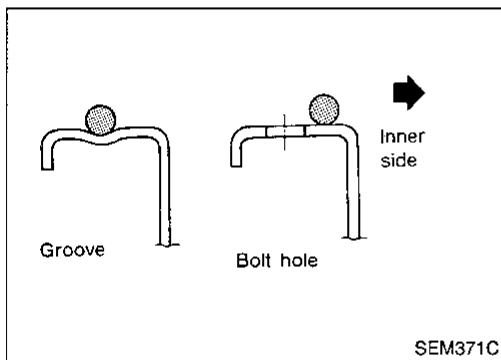


Precautions for Supplemental Restraint System Supplemental "AIR BAG"

The Supplemental Restraint System Supplemental "Air Bag", used along with seat belts, helps to reduce the risk or severity of injury to the driver in a frontal collision. The Supplemental Restraint System consists of a supplemental air bag module (located in the center of the steering wheel), sensors, diagnosis (control) unit, warning lamp, wiring harness and spiral cable. Information necessary to service the system safely is included in the **BF** section of this Service Manual.

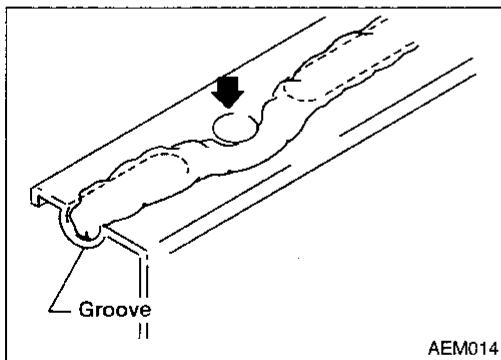
WARNING:

- 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 Supplemental "Air Bag".



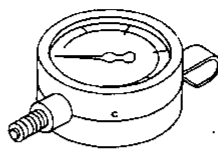
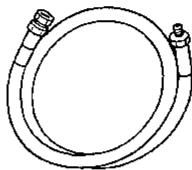
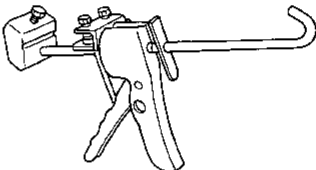
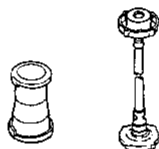
Liquid Gasket Application Procedure

- Before applying liquid gasket, use a scraper to remove all traces of old liquid gasket from mating surface and groove, and then completely clean any oil stains from these areas.
- 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



PRECAUTIONS AND 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	Adapting oil pressure gauge to cylinder block		LC EF & EC
WS39930000 (—) Tube presser	Pressing the tube of liquid gasket		FE AT
EG17650301 (J33984-A) Radiator cap tester adapter	Adapting radiator cap tester to radiator neck		FA RA BR

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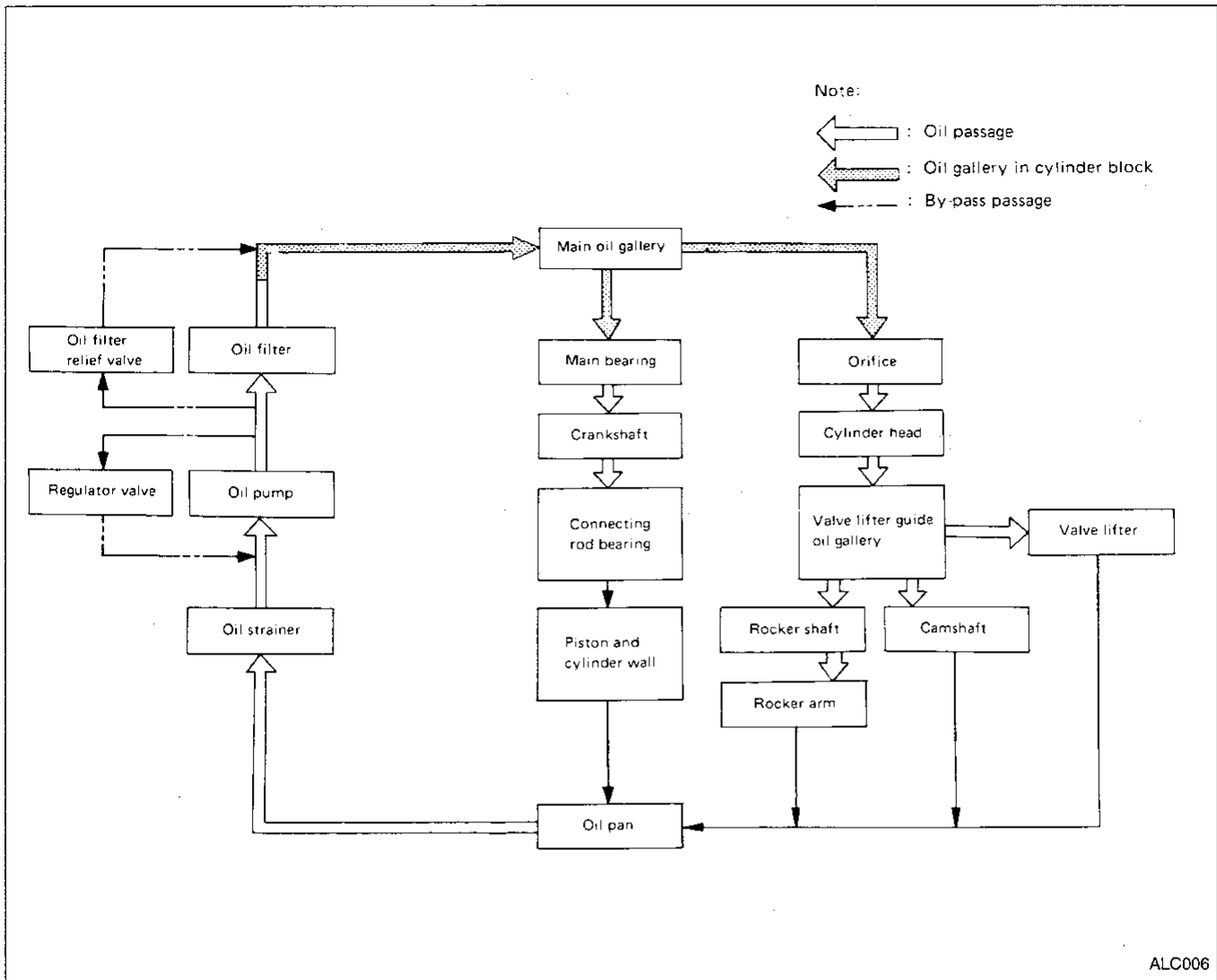
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ENGINE LUBRICATION SYSTEM

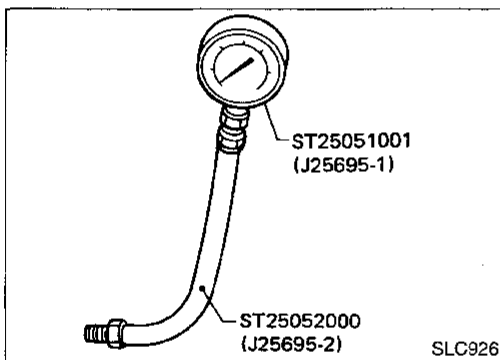
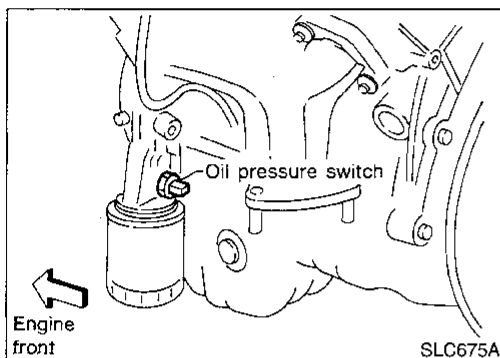
Lubrication Circuit



Oil Pressure Check

WARNING:

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



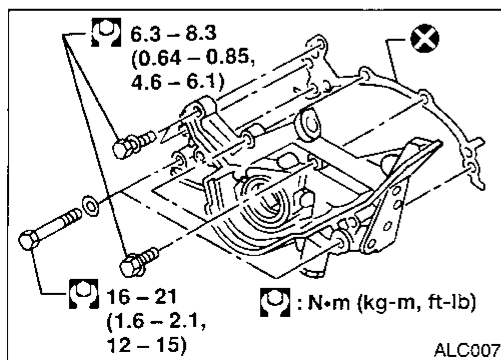
1. Check oil level.
2. Remove oil pressure switch.

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 rpm	Approximate discharge pressure kPa (kg/cm ² , psi)
Idle speed	More than 118 (1.2, 17)
3,200	392 - 481 (4.0 - 4.9, 57 - 70)

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

6. Install oil pressure switch with sealant.



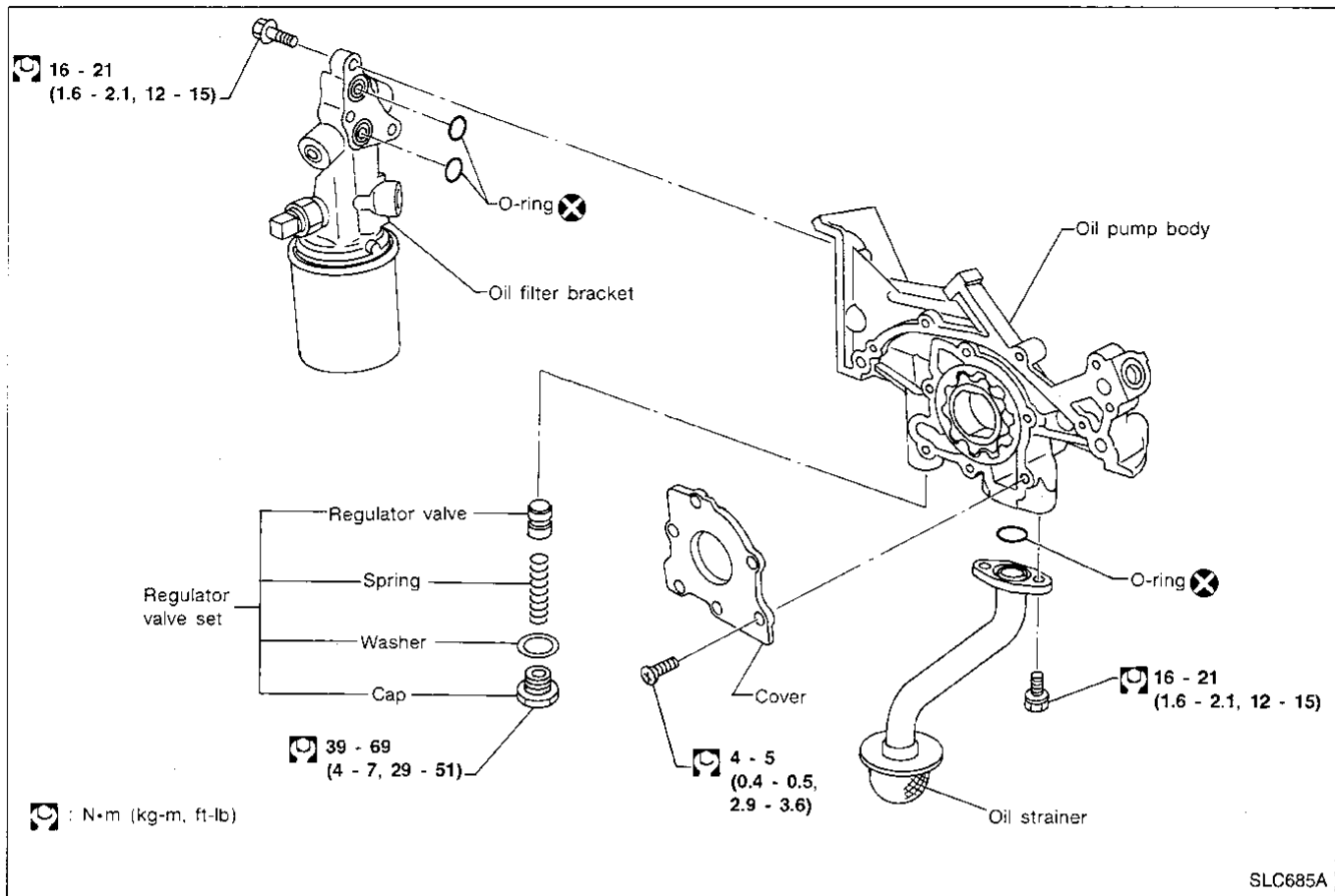
Oil Pump

REMOVAL

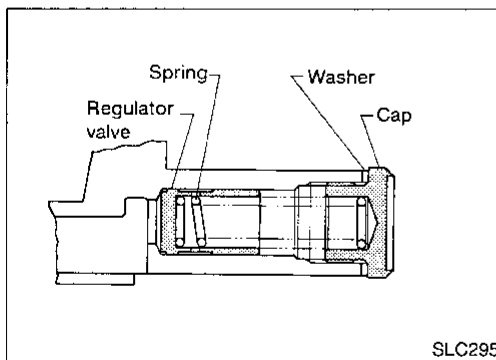
1. Drain engine oil.
2. Remove oil pan. Refer to EM section ("Removal", "OIL PAN").
3. After removing oil pan, install center member assembly and engine mounting insulator bolts and nuts.
4. Remove timing belt. Refer to EM section ("Removal", "TIMING BELT").
5. Remove oil pump assembly and gasket.

ENGINE LUBRICATION SYSTEM

Oil Pump (Cont'd) DISASSEMBLY AND ASSEMBLY



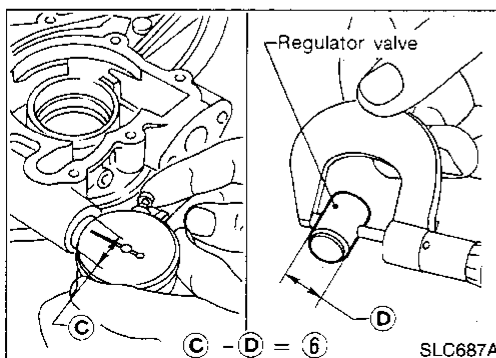
- Always replace oil seal and O-ring with new ones.
- When installing oil pump, apply engine oil to gears.
- Be sure that O-rings are properly fitted.



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.



4. Check regulator valve to oil pump cover clearance.

Clearance:

⑥ : 0.040 - 0.097 mm (0.0016 - 0.0038 in)

If it exceeds the limit, replace oil pump cover.

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 by tapping it in place.

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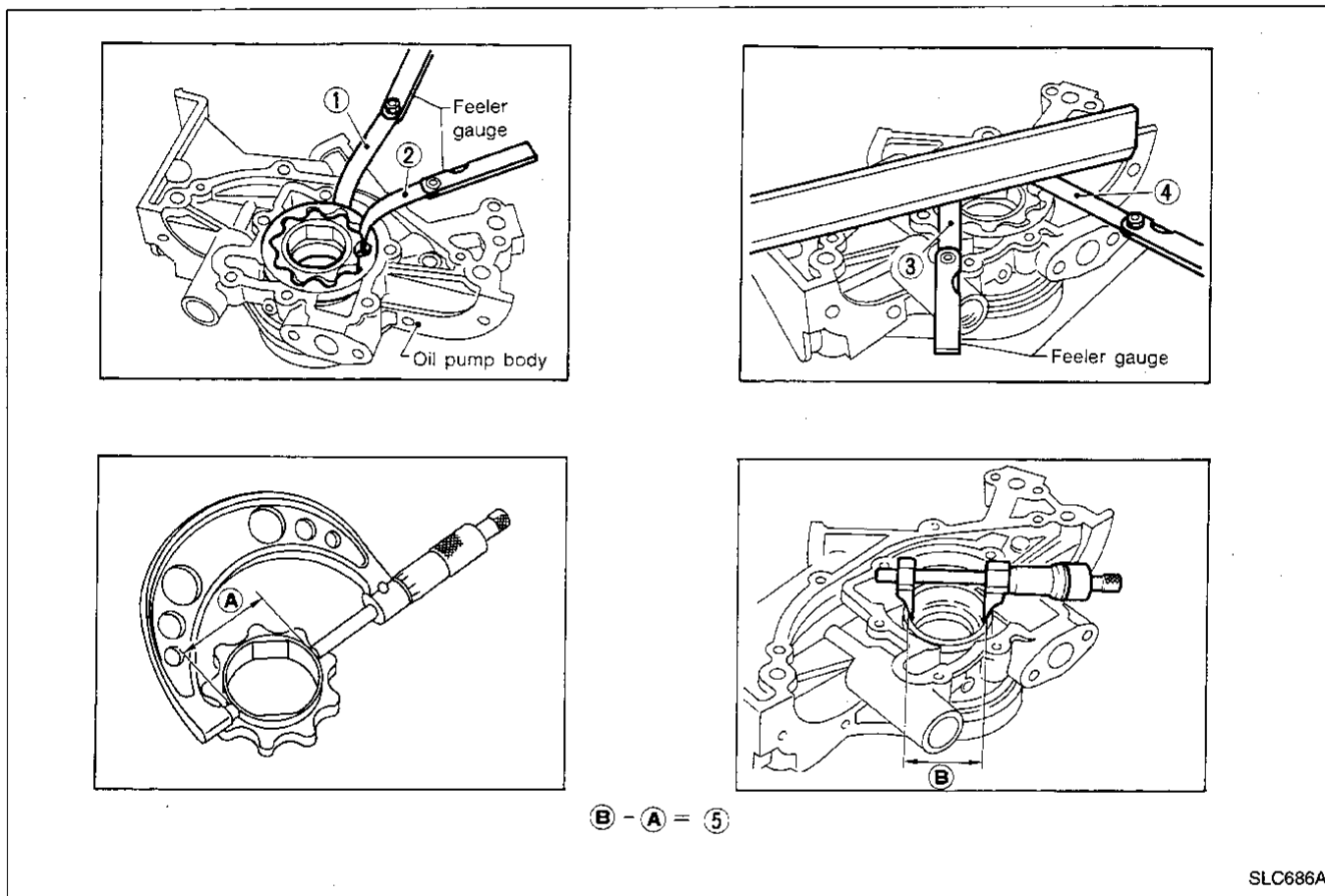
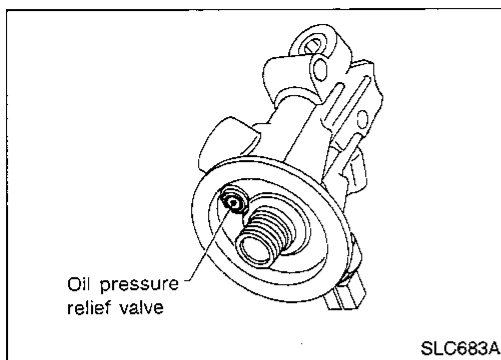
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INSPECTION

Using a feeler gauge, check the following clearances:

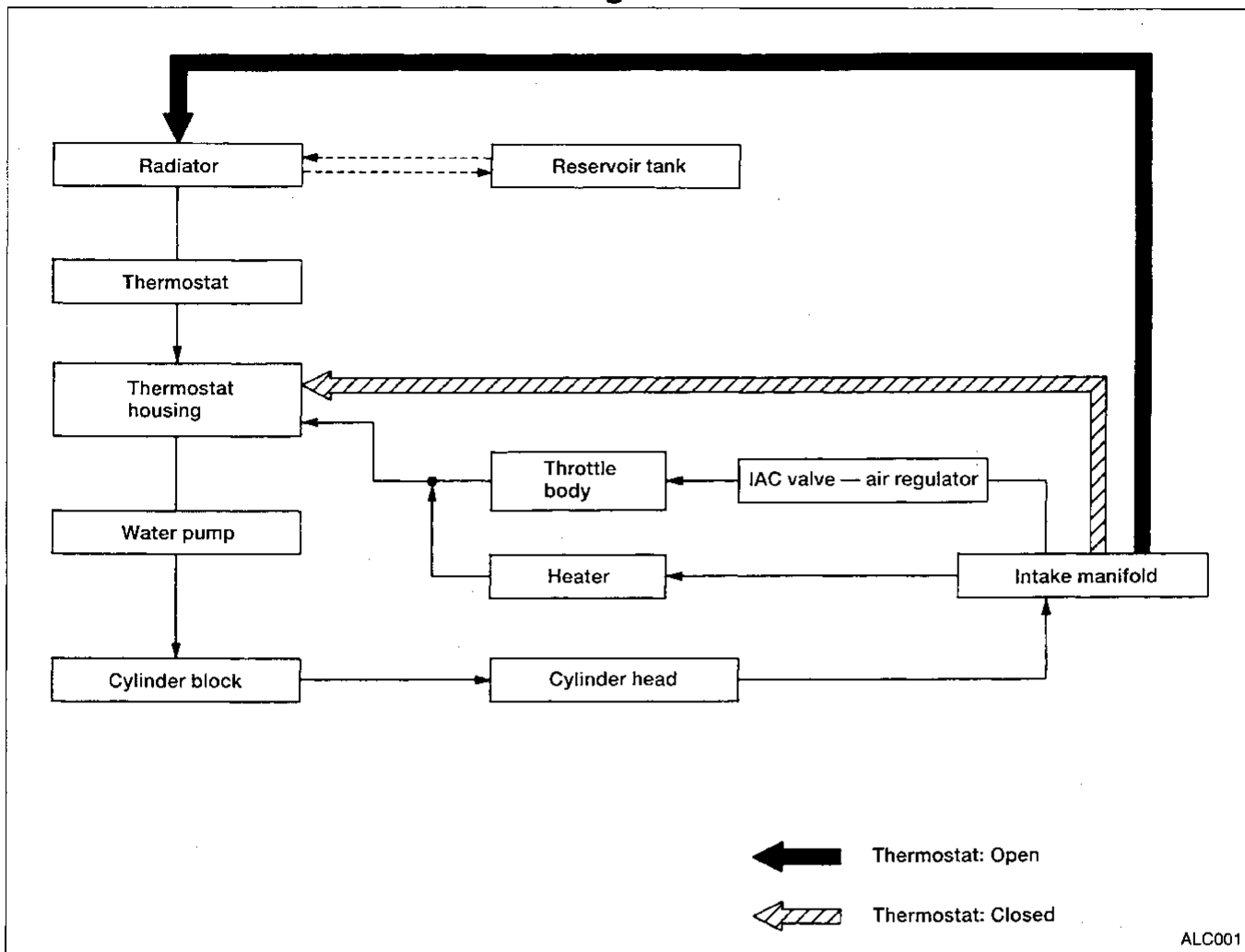
Unit: mm (in)

Body to outer gear clearance ①	0.114 - 0.200 (0.0045 - 0.0079)
Inner gear to outer gear tip clearance ②	Below 0.18 (0.0071)
Body to inner gear clearance ③	0.05 - 0.09 (0.0020 - 0.0035)
Body to outer gear clearance ④	0.05 - 0.11 (0.0020 - 0.0043)
Inner gear to brazed portion of housing 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.

ENGINE COOLING SYSTEM

Cooling Circuit



System Check

WARNING:

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

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

CHECKING COOLING SYSTEM HOSES

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

ENGINE COOLING SYSTEM

System Check (Cont'd)

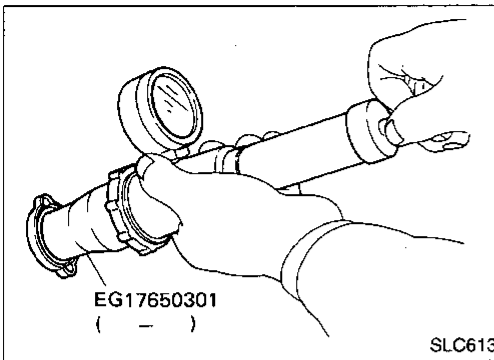
CHECKING RADIATOR CAP

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

Radiator cap relief pressure:

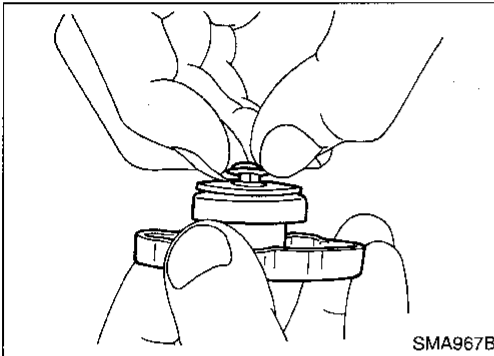
81.4 - 108.9 kPa

(0.83 - 1.11 kg/cm², 11.8 - 15.8 psi)



Pull the negative pressure valve to open it.

Check that it closes completely when released.



CHECKING COOLING SYSTEM FOR LEAKS

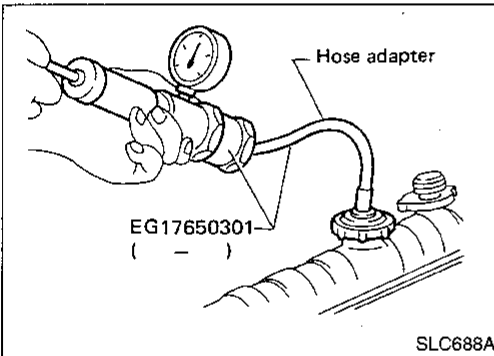
To check for leakage, apply pressure to the cooling system with a tester.

Testing pressure:

157 kPa (1.6 kg/cm², 23 psi)

CAUTION:

Higher than the specified pressure may cause radiator damage.



Refilling Engine Coolant

Refer to MA section ("Refilling Engine Coolant", "ENGINE MAINTENANCE").

- Proper heater performance and engine cooling requires accurately following "Refilling Engine Coolant" procedure.

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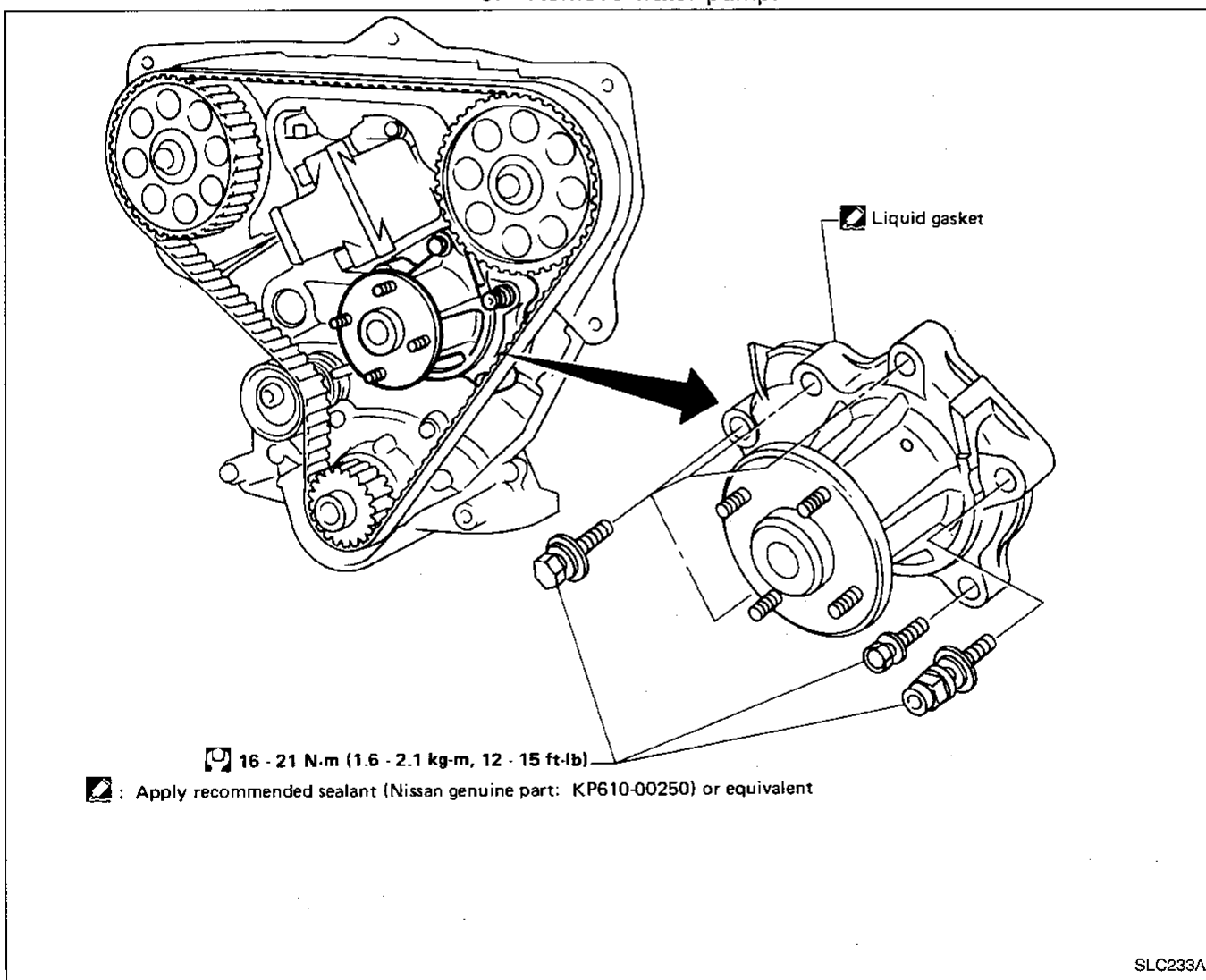
ENGINE COOLING SYSTEM

Water Pump

REMOVAL AND INSTALLATION

CAUTION:

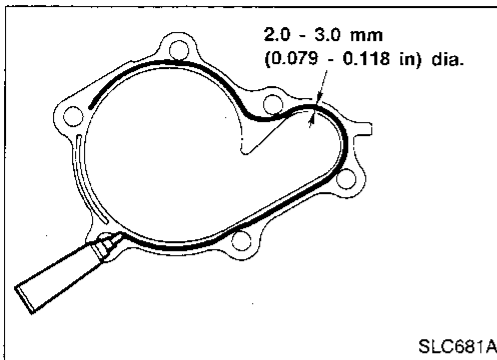
- When removing water pump assembly, be careful not to get coolant on drive belt.
 - Water pump cannot be disassembled and should be replaced as a unit.
 - After installing water pump, connect hose and clamp securely, then check for leaks using radiator cap tester.
1. Drain coolant from radiator and cylinder block. Refer to MA section ("Draining Engine Coolant"; "ENGINE MAINTENANCE").
 2. Remove drive belts.
 3. Remove crank pulley.
 4. Remove timing belt covers.
 5. Remove water pump.



6. Before installing water pump, remove all traces of liquid gasket from mating surface of water pump using a scraper.
- Also remove traces of liquid gasket from mating surface of cylinder block.

ENGINE COOLING SYSTEM

Water Pump (Cont'd)



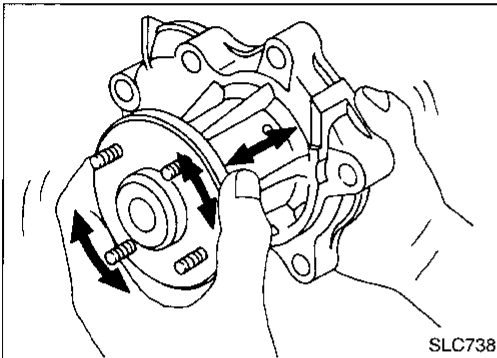
7. Apply a continuous bead of liquid gasket to mating surface of water pump.
 - Use Genuine Liquid Gasket or equivalent.
8. Install any parts removed in reverse order of removal.

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INSPECTION

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

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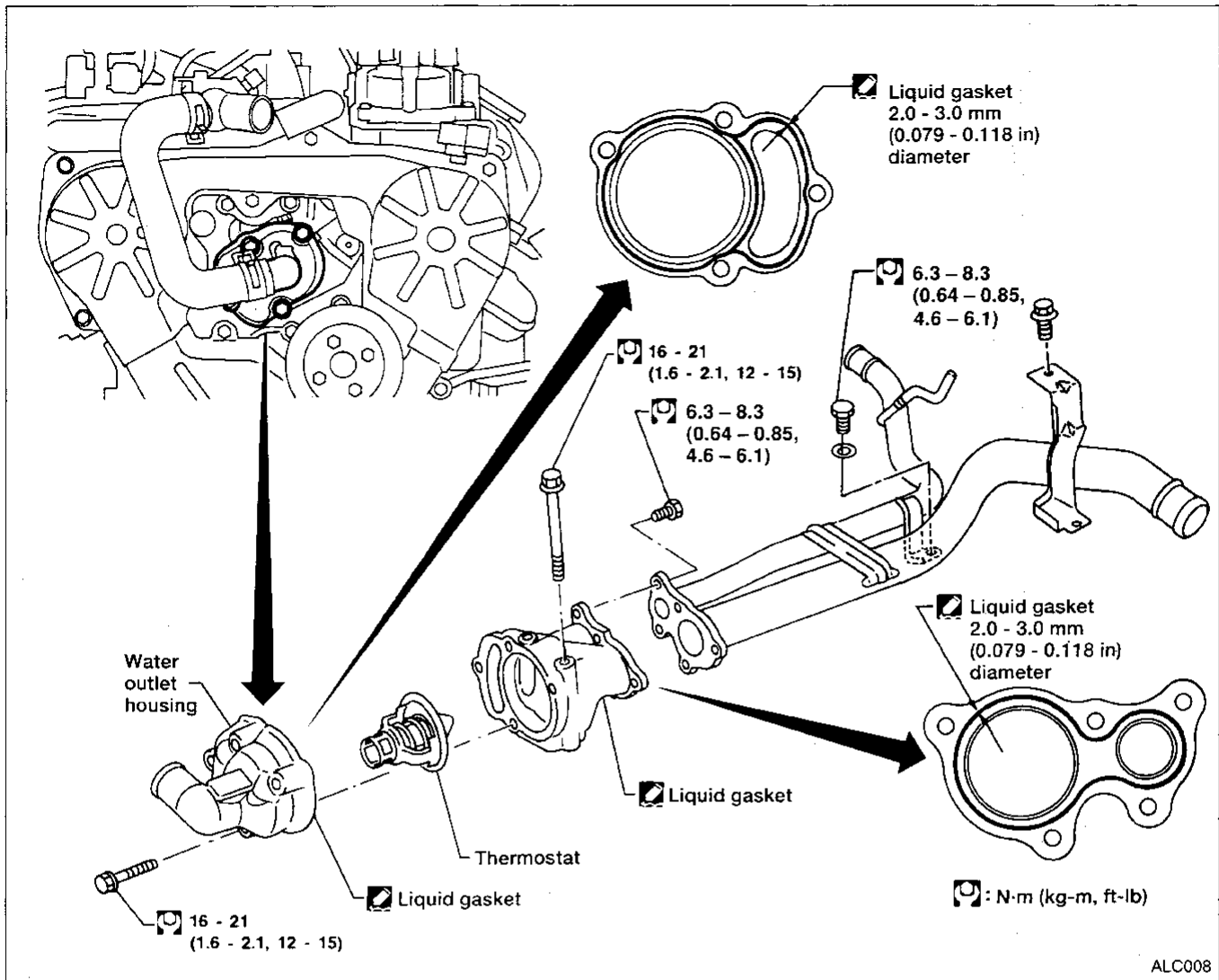
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ENGINE COOLING SYSTEM

Thermostat

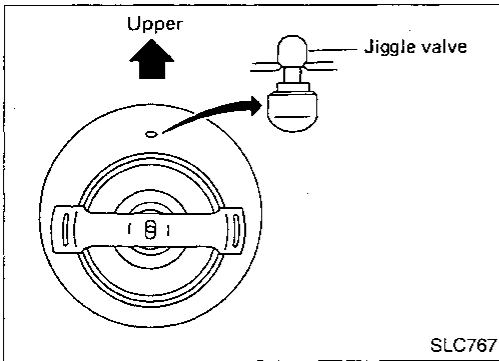
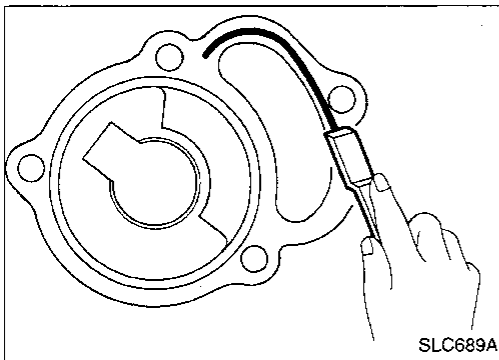


REMOVAL AND INSTALLATION

1. Drain engine coolant. Refer to MA section ("Draining Engine Coolant", "ENGINE MAINTENANCE").
2. Remove water hose from water outlet housing.
3. Remove water outlet housing, then take out thermostat.

ENGINE COOLING SYSTEM

Thermostat (Cont'd)



4. Before installing thermostat, remove all traces of liquid gasket from mating surface of each part using a scraper.
 - Also remove traces of liquid gasket from mating surface.
5. Apply a continuous bead of liquid gasket to mating surface of each part.
 - Use Genuine Liquid Gasket or equivalent.
6. Install thermostat with jiggle valve facing upward.
 - **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.**

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INSPECTION

1. Check valve seating condition at ordinary room temperatures. It should seat tightly.

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2. Check valve opening temperature and maximum valve lift.

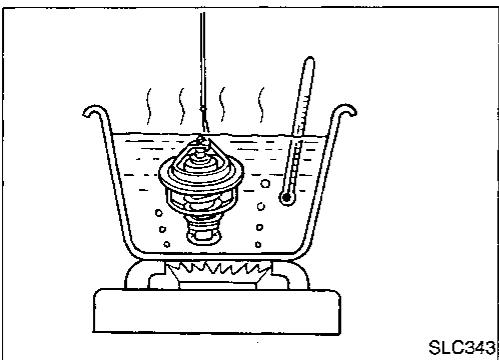
		Standard
Valve opening temperature	°C (°F)	82 (180)
Max. valve lift	mm/°C (in/°F)	10/90 (0.39/194)

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

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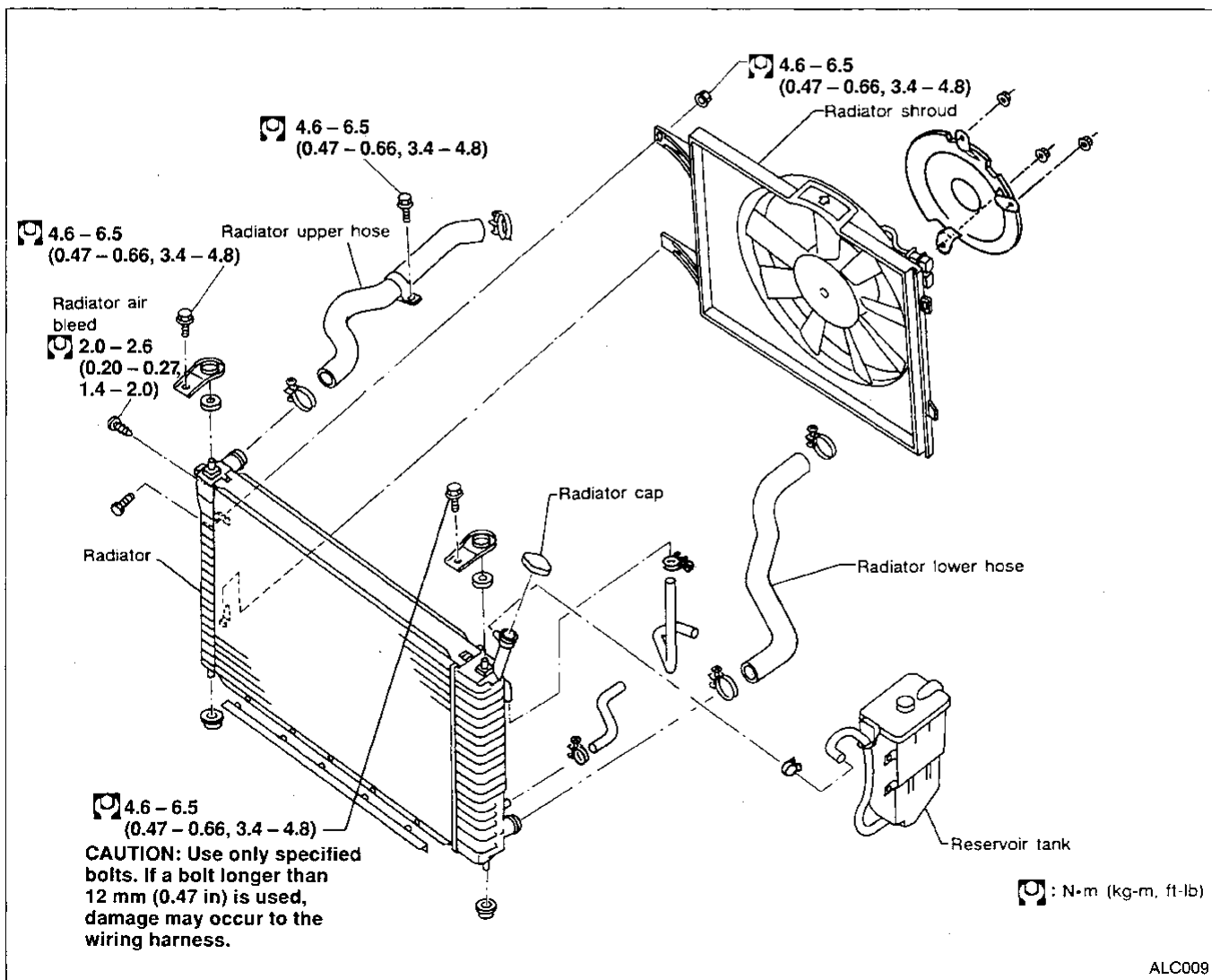


ENGINE COOLING SYSTEM

Radiator

REMOVAL AND INSTALLATION

1. Remove under cover.
 2. Drain coolant from radiator.
 3. Disconnect radiator upper and lower hoses.
 4. Remove A/T oil cooler hoses.
 5. Disconnect reservoir tank hose.
 6. Remove right bolt from fuse box and position fuse box aside.
 7. Disconnect cooling fan harness connectors.
 8. Remove radiator.
 9. After repairing or replacing radiator, install any parts removed in reverse order of removal.
 10. Fill radiator with engine coolant.
- Refer to MA section ("Refilling Engine Coolant", "ENGINE MAINTENANCE").
- **Proper heater performance and engine cooling requires accurately following "Refilling Engine Coolant" procedure.**



Electric Cooling Fan Control System

Cooling fan is controlled by ECM (ECCS control module). For details, refer to EF & EC section ("Cooling Fan Control", "ENGINE AND EMISSION CONTROL SYSTEM DESCRIPTION"). For diagnosis, refer to EF & EC section ("Diagnostic Procedure 29", "TROUBLE DIAGNOSES").

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SERVICE DATA AND SPECIFICATIONS (SDS)

Engine Lubrication System

Oil pressure check

Engine rpm	Approximate discharge pressure kPa (kg/cm ² , psi)
Idle speed	More than 118 (1.2, 17)
3,200	392 - 481 (4.0 - 4.9, 57 - 70)

Regulator valve inspection

Unit: mm (in)

Regulator valve to oil pump cover clearance	0.040 - 0.097 (0.0016 - 0.0038)
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Oil pump

Unit: mm (in)

Body to outer gear clearance	0.114 - 0.200 (0.0045 - 0.0079)
Inner gear to outer gear tip clearance	Below 0.18 (0.0071)
Body to inner gear clearance	0.05 - 0.09 (0.0020 - 0.0035)
Body to outer gear clearance	0.05 - 0.11 (0.0020 - 0.0043)
Inner gear to brazed portion of housing clearance	0.045 - 0.091 (0.0018 - 0.0036)

Engine Cooling System

Thermostat

Valve opening temperature	°C (°F)	82 (180)
Max. valve lift	mm/°C (in/°F)	10/90 (0.39/194)

Radiator

Unit: kPa (kg/cm², psi)

Cap relief pressure	81.4 - 108.9 (0.83 - 1.11, 11.8 - 15.8)
Leakage test pressure	157 (1.6, 23)