

SECTION **LC**

MODIFICATION NOTICE:

- VG30E engine has been added.

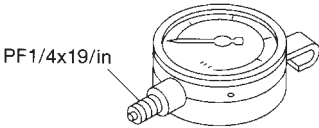
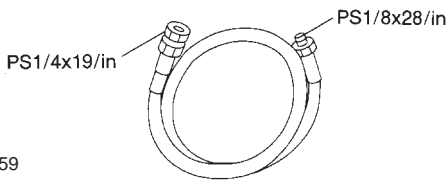
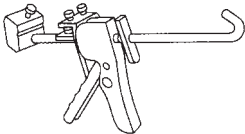
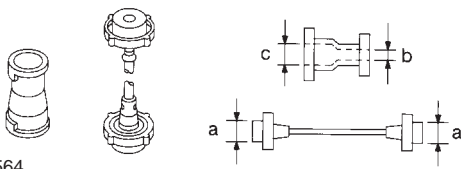
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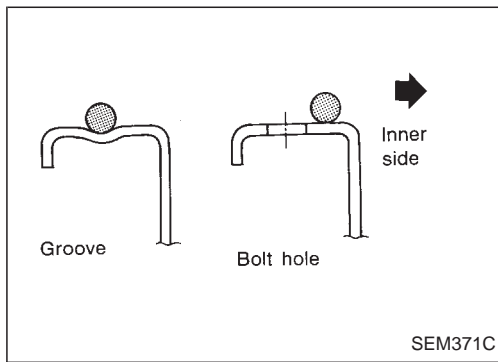
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PREPARATION

Special Service Tools

Tool number Tool name	Description
ST25051001 Oil pressure gauge	 <p>PF1/4x19/in</p> <p>NT558</p> <p>Maximum measuring range: 2,452 kPa (24.5 bar, 25 kg/cm², 356 psi)</p>
ST25052000 Hose	 <p>PS1/4x19/in</p> <p>PS1/8x28/in</p> <p>NT559</p> <p>Adapting oil pressure gauge to cylinder block</p>
WS39930000 Tube presser	 <p>NT052</p> <p>Pressing the tube of liquid gasket</p>
EG17650301 Radiator cap tester adapter	 <p>NT564</p> <p>a: 28 (1.10) dia. b: 31.4 (1.236) dia. c: 41.3 (1.626) dia. Unit: mm (in)</p> <p>Adapting radiator cap tester to radiator neck</p>

PRECAUTION



Liquid Gasket Application Procedure

- Before applying liquid gasket, use a scraper to remove all traces of old liquid gasket from mating surface.
- 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 sealing 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.

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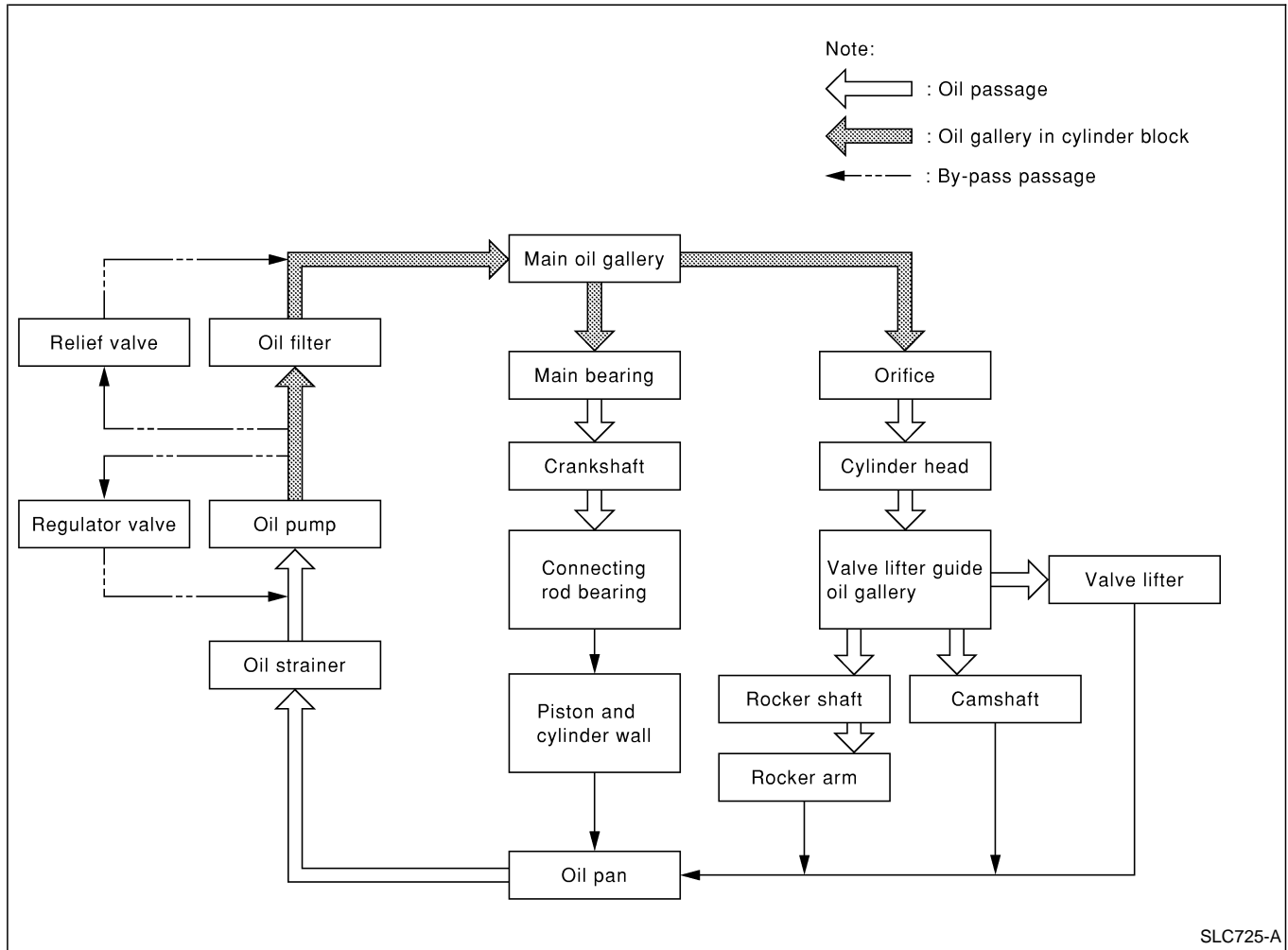
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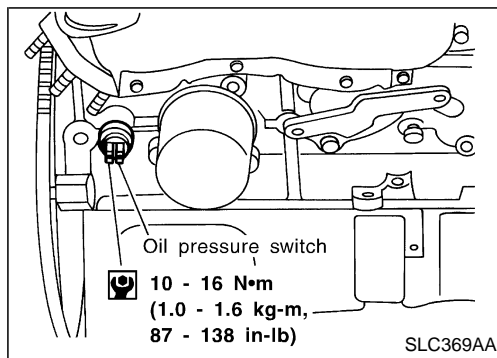
Lubrication Circuit



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.

Oil Pressure Check (Cont'd)

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 (bar, kg/cm ² , psi)
Idle speed 3,200	More than 59 (0.59, 0.6, 9) 363 - 451 (3.63 - 4.51, 3.7 - 4.6, 53 - 65)

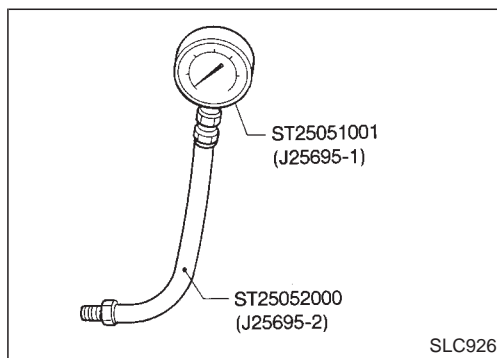
If difference is extreme, check oil passage and oil pump for oil leaks.

6. Install oil pressure switch with sealant.

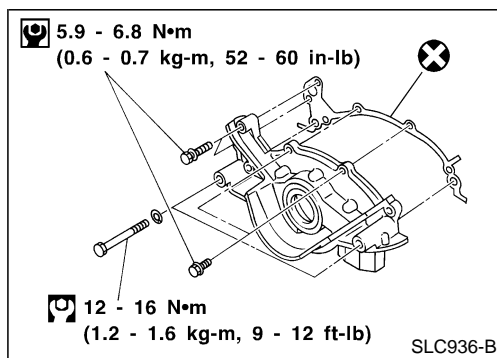
Oil Pump

REMOVAL

1. Drain oil.
2. Remove oil pan.
3. Remove oil pump assembly.

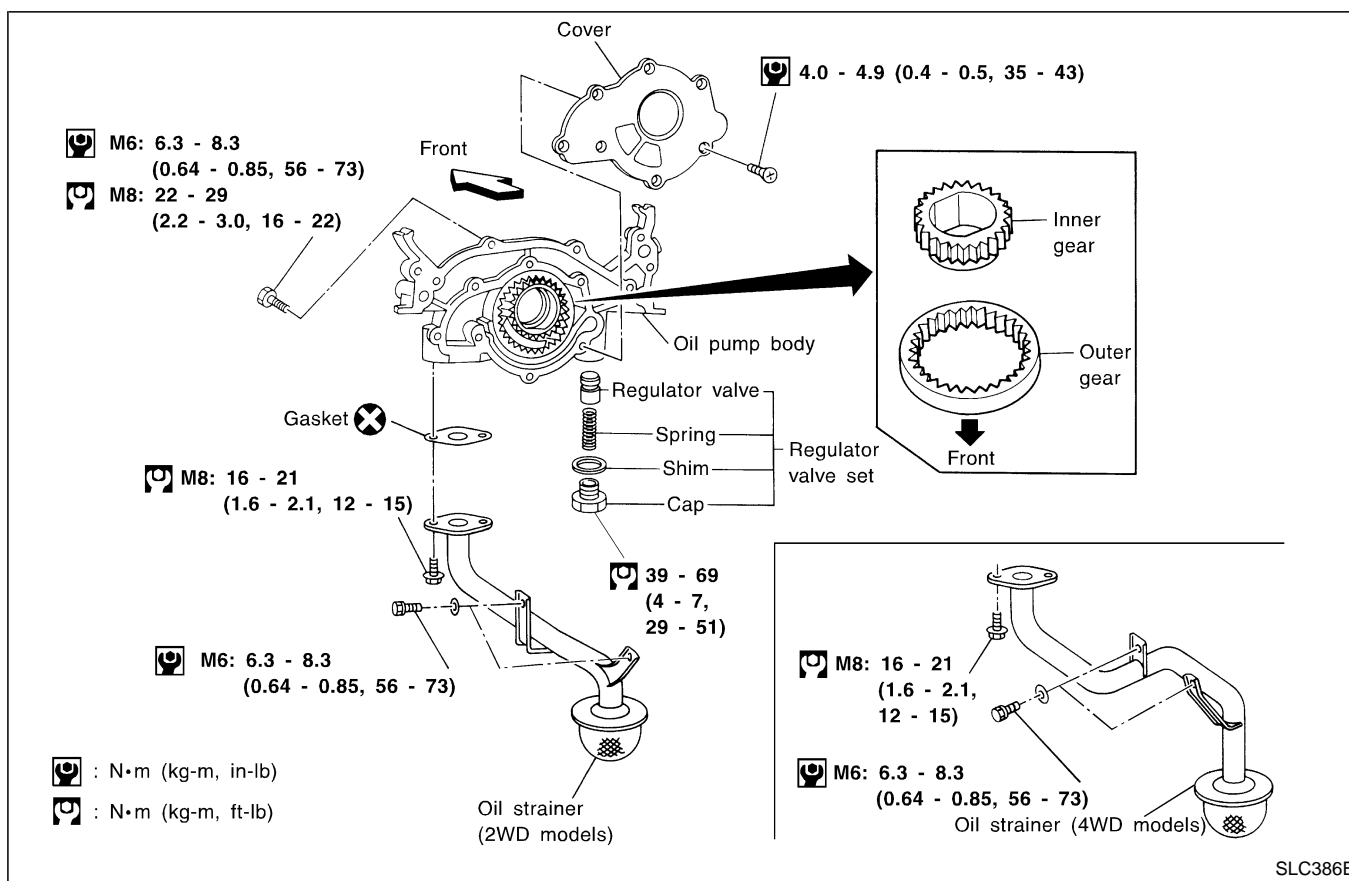


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DISASSEMBLY AND ASSEMBLY



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- Always replace with new oil seal and gasket.
- When installing oil pump, apply engine oil to inner and outer gears.

Oil Pump (Cont'd)

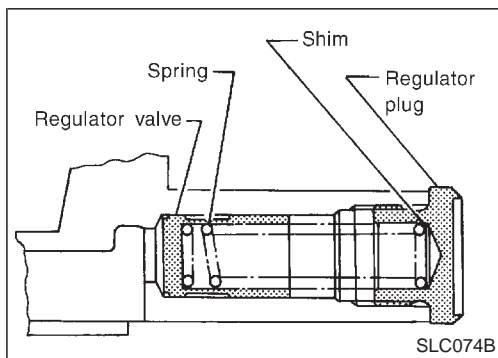
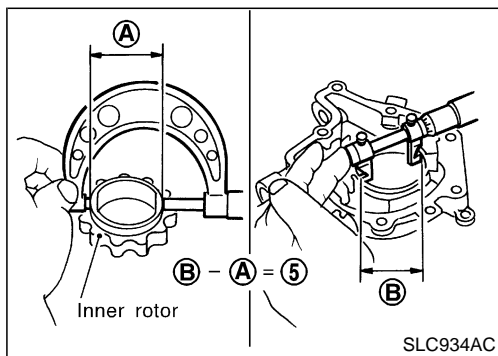
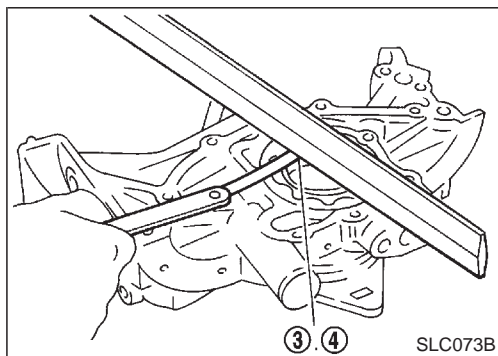
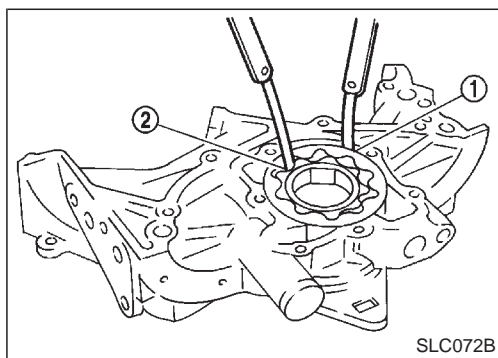
INSPECTION

Using a feeler gauge, straightedge and micrometers, check the following clearance:

Unit: mm (in)

Body to outer rotor radial clearance ①	0.114 - 0.200 (0.0045 - 0.0079)
Inner rotor to outer rotor tip clearance ②	Below 0.18 (0.0071)
Body to inner rotor axial clearance ③	0.05 - 0.09 (0.0020 - 0.0035)
Body to outer rotor axial clearance ④	0.050 - 0.110 (0.0020 - 0.0043)
Inner rotor to brazed portion of housing clearance ⑤	0.045 - 0.091 (0.0018 - 0.0036)

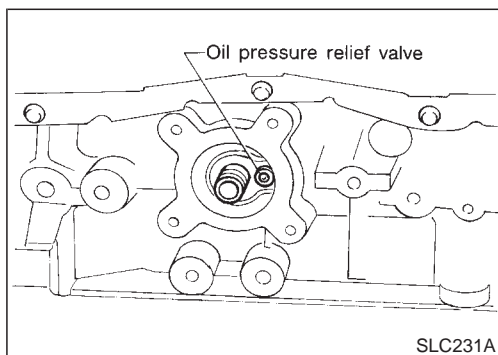
- If the tip clearance (②) exceeds the limit, replace rotor set.
- If body to rotor clearance (①, ③, ④, ⑤) exceed the limit, replace oil pump body assembly.



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. Check that it falls smoothly into the valve hole by its own weight.

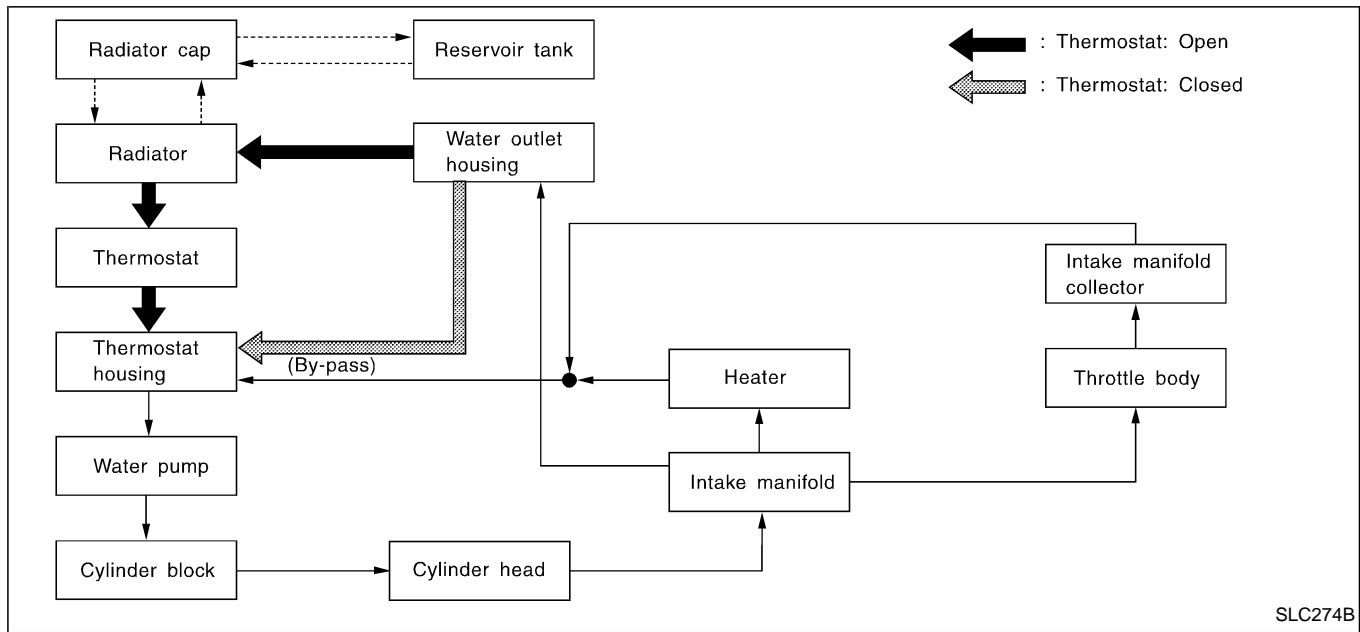
If damaged, replace regulator valve set or oil pump assembly.



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.

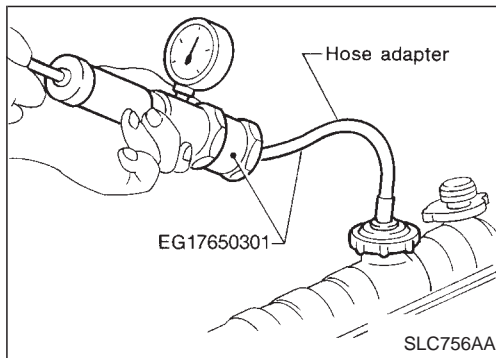
Cooling Circuit



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 carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn it all the way off.

**CHECKING COOLING SYSTEM HOSES**

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

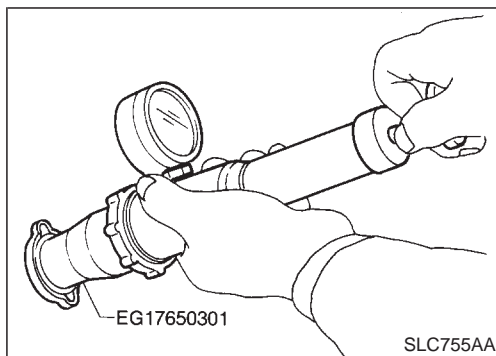
CHECKING COOLING SYSTEM FOR LEAKS

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

Testing pressure: 98 kPa (0.98 bar, 1.0 kg/cm², 14 psi)

CAUTION:

Higher pressure than specified may cause radiator damage.

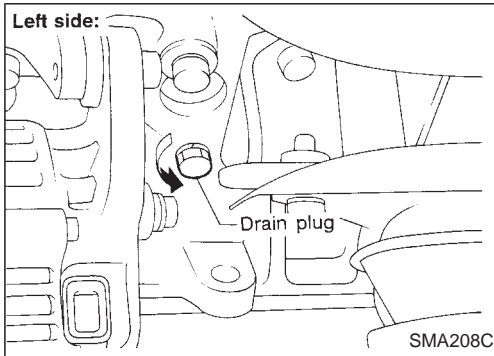
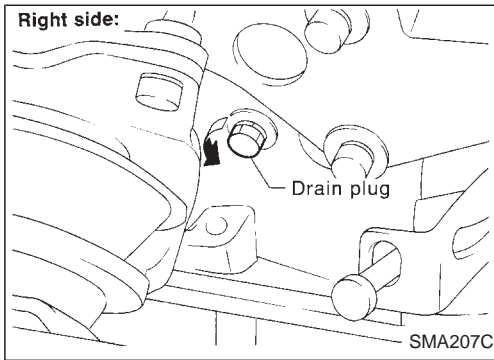
**CHECKING RADIATOR CAP**

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

Radiator cap relief pressure:

Standard

59 - 98 kPa (0.59 - 0.98 bar, 0.6 - 1.0 kg/cm², 9 - 14 psi)

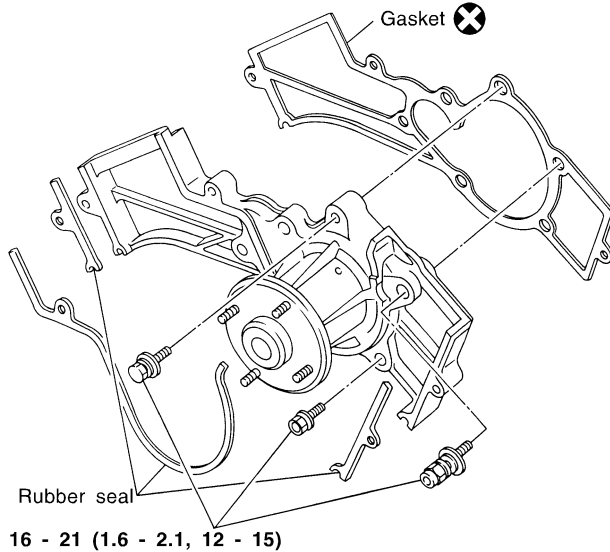


Water Pump

REMOVAL

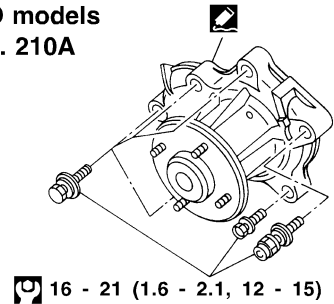
Drain coolant from drain cocks on both sides of cylinder block and radiator.

4WD models



16 - 21 (1.6 - 2.1, 12 - 15)

2WD models SEC. 210A



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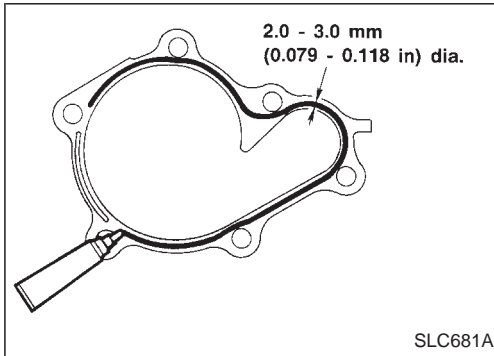
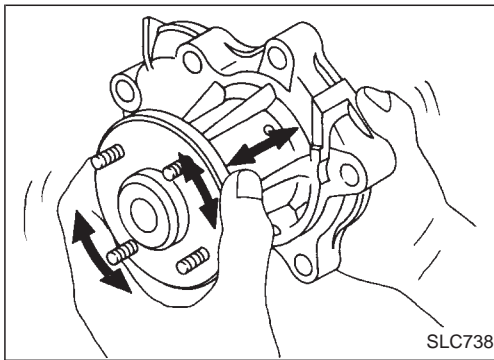
CAUTION:

- When removing water pump assembly, be careful not to get coolant on timing belt.
- Water pump cannot be disassembled and should be replaced as a unit.
- To avoid deforming timing cover, make sure there is adequate clearance between it and the hose clamp.

Water Pump (Cont'd)

INSPECTION

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



INSTALLATION

1. Use a scraper to remove old liquid gasket from water pump.
- Also remove old liquid gasket from mating surface of cylinder block.
2. Apply a continuous bead of liquid gasket to mating surface of water pump.
3. Install water pump.
4. Install remaining parts in reverse order of removal.

CAUTION:

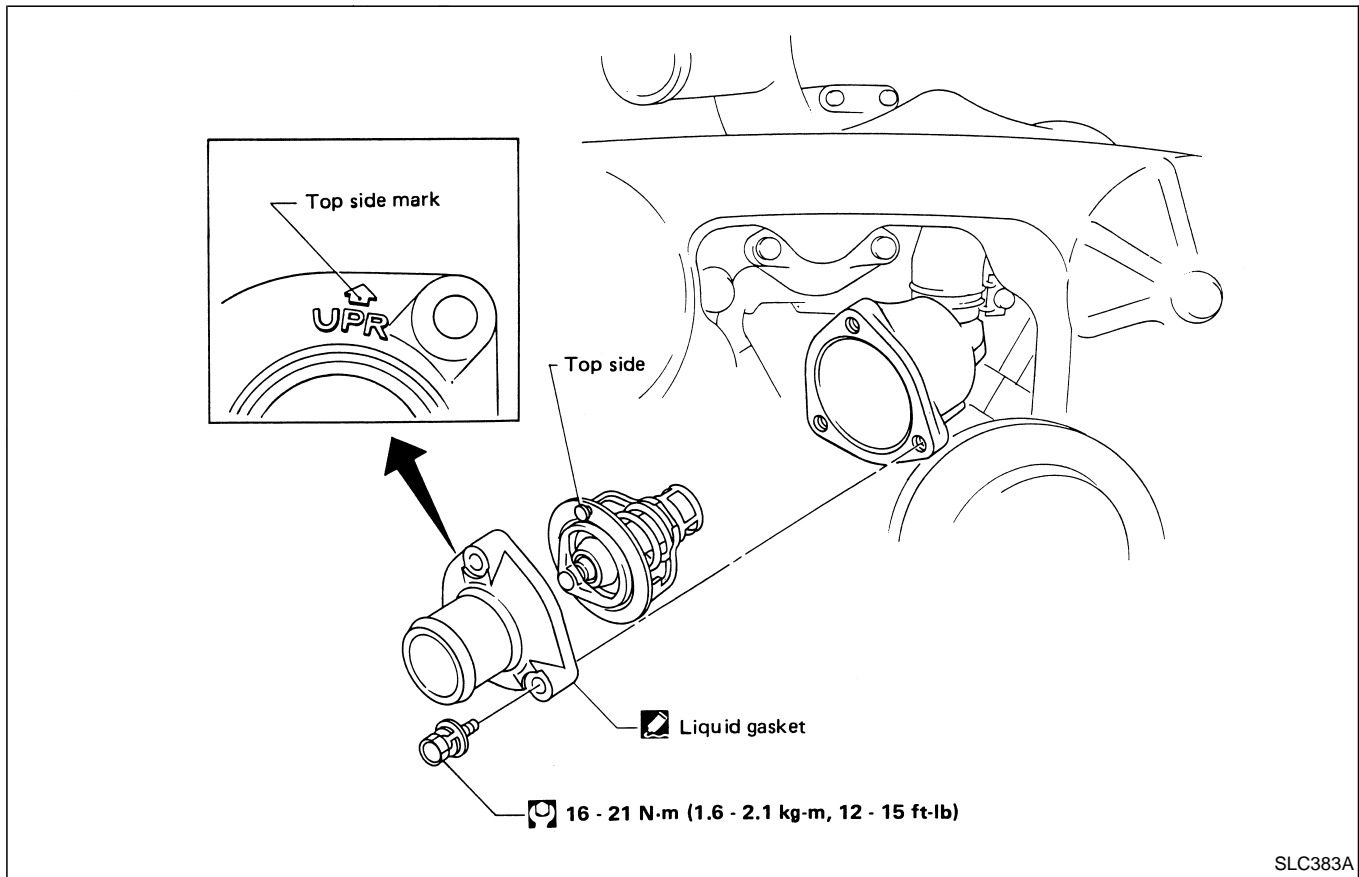
After installing the water pump, connect the hose and clamp securely, and then check for leaks using the radiator cap tester.

- When installing drive belts, refer to MA section ("Checking Drive Belts", "ENGINE MAINTENANCE").
- When filling radiator with coolant, refer to MA section ("Changing Engine Coolant", "ENGINE MAINTENANCE").

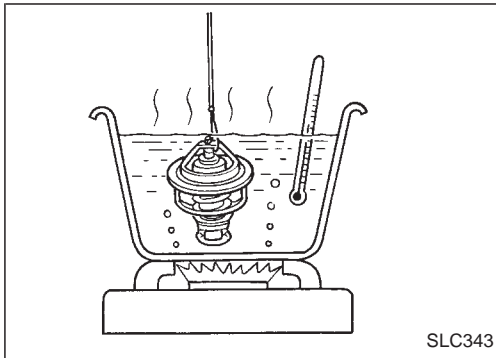
Thermostat

INSPECTION

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



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2. Check valve opening temperature and maximum valve lift.

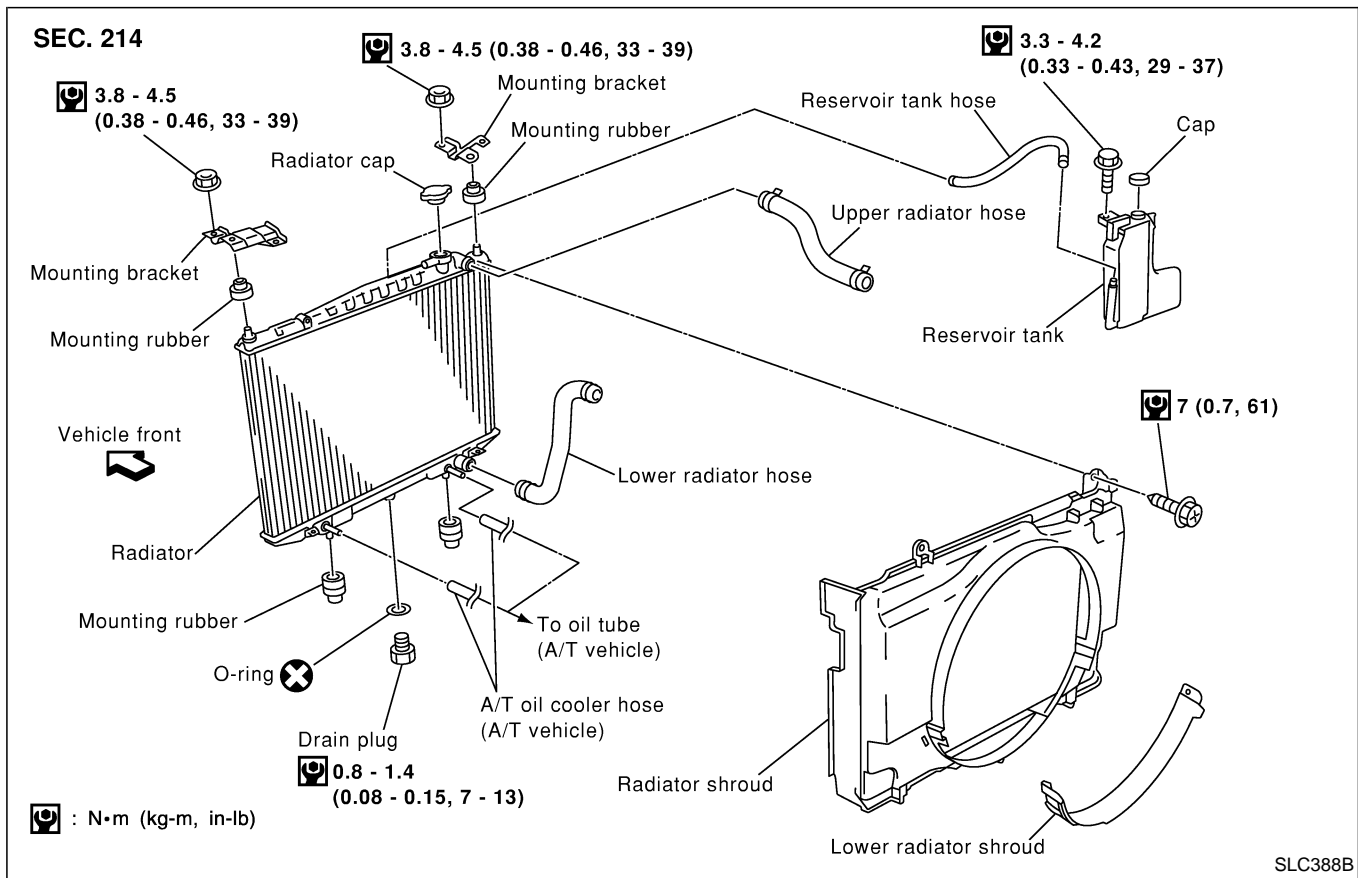
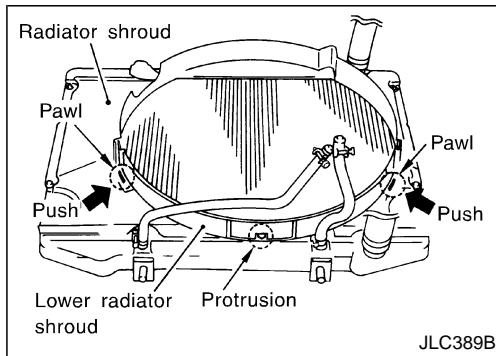
		Standard
Valve opening temperature	°C (°F)	76.5 (170)
Maximum valve lift	mm/°C (in/°F)	10/90 (0.39/194)

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

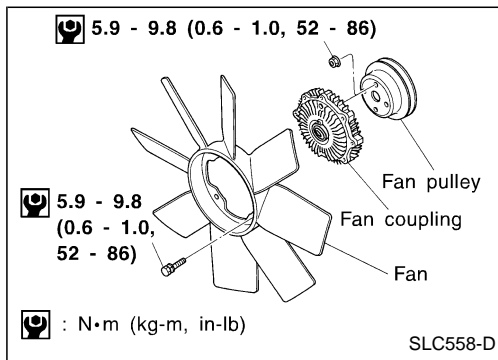
Radiator

REMOVAL AND INSTALLATION

1. Remove under cover.
2. Drain coolant from radiator drain cock.
3. Disconnect radiator upper and lower hoses.
4. Remove A/T oil cooler hoses. (A/T model only)
5. Remove radiator lower shroud.
 - When removing the shroud, pull it out backward while pushing both the right and left pawls.
 - When installing the shroud, align the center notch with the protrusion on the radiator shroud to insert both the right and left pawls.
6. Disconnect reservoir tank hose.
7. Remove radiator.
8. After repairing or replacing radiator, install all removed parts in the reverse order of removal.

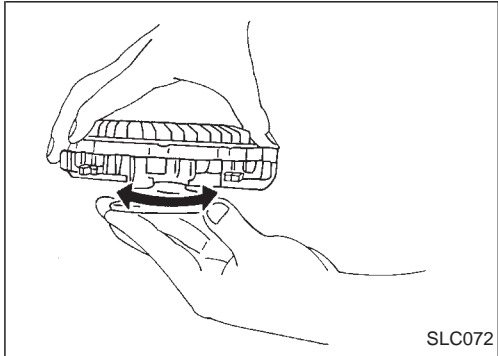


Cooling Fan



INSPECTION

Check fan coupling for oil leakage or bent bimetal.



Engine Lubrication System

OIL PRESSURE CHECK

Engine rpm	Approximate discharge pressure kPa (bar, kg/cm ² , psi)
Idle speed	More than 59 (0.59, 0.6, 9)
3,200	363 - 451 (3.63 - 4.51, 3.7 - 4.6, 53 - 65)

OIL PUMP

Unit: mm (in)

Body to outer rotor radial clearance	0.114 - 0.200 (0.0045 - 0.0079)
Inner rotor to outer rotor tip clearance	Below 0.18 (0.0071)
Body to inner rotor axial clearance	0.05 - 0.09 (0.0020 - 0.0035)
Body to outer rotor axial clearance	0.050 - 0.110 (0.0020 - 0.0043)
Inner rotor to brazed portion of housing clearance	0.045 - 0.091 (0.0018 - 0.0036)

Engine Cooling System

THERMOSTAT

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

RADIATOR

Unit: kPa (bar, kg/cm², psi)

Cap relief pressure	Standard	59 - 98 (0.59 - 0.98, 0.6 - 1.0, 9 - 14)
Leakage test pressure		98 (0.98, 1.0, 14)

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