

# SECTION CO

## ENGINE COOLING SYSTEM

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## PRECAUTIONS

< PRECAUTION >

# PRECAUTION

## PRECAUTIONS

### Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

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The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SR and SB section of this Service Manual.

#### **WARNING:**

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SR section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

### PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

#### **WARNING:**

- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

### Precaution for Liquid Gasket

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#### REMOVAL OF LIQUID GASKET

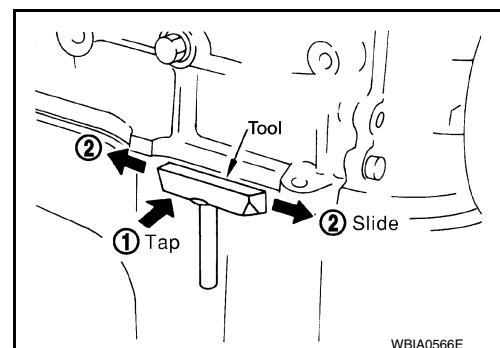
- After removing the bolts and nuts, separate the mating surface and remove the old liquid gasket using Tool.

**Tool number : KV10111100 (J-37228)**

#### **CAUTION:**

**Do not damage the mating surfaces.**

- Tap the seal cutter to insert it (1).
- In areas where the Tool is difficult to use, lightly tap to slide it (2).

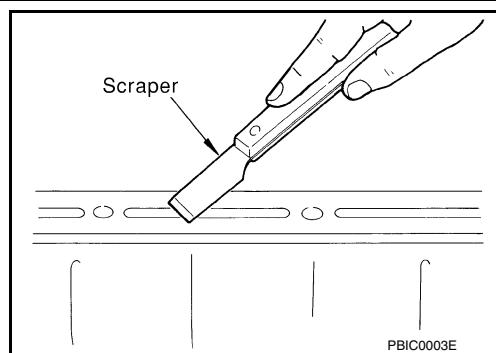


#### LIQUID GASKET APPLICATION PROCEDURE

## PRECAUTIONS

### < PRECAUTION >

1. Remove the old liquid gasket adhering to the gasket application surface and the mating surface using suitable tool.
  - Remove the liquid gasket completely from the groove of the liquid gasket application surface, bolts, and bolt holes.
2. Thoroughly clean the mating surfaces and remove adhering moisture, grease and foreign material.

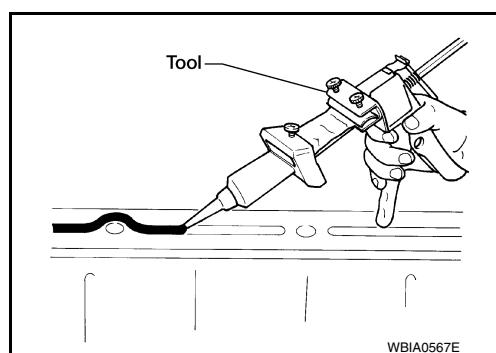


3. Attach the liquid gasket tube to the Tool.

**Tool number : WS39930000 ( - )**

Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-21, "Recommended Chemical Products and Sealants"](#).

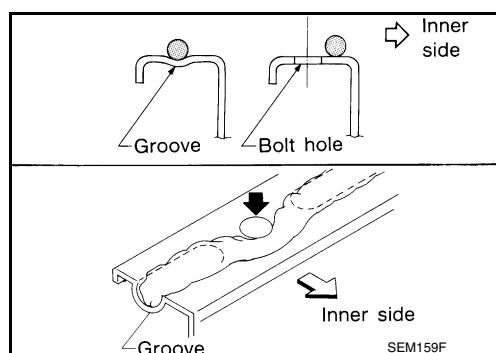
4. Apply the liquid gasket without breaks to the specified location with the specified dimensions.



- If there is a groove for the liquid gasket application, apply the liquid gasket to the groove.
- Normally apply the liquid gasket on the inside edge of the bolt holes. Also apply to the outside edge of the bolt holes when specified in the procedure.
- Within five minutes of liquid gasket application, install the mating component.
- If the liquid gasket protrudes, wipe it off immediately.
- Do not retighten after the installation.
- Wait 30 minutes or more after installation before refilling the engine with oil or coolant.

### CAUTION:

Carefully follow all of the warnings, cautions, notes, and procedures contained in this manual.



## PREPARATION

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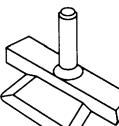
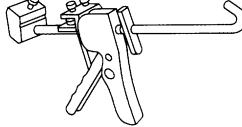
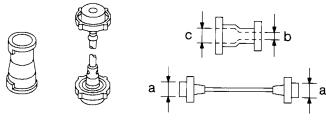
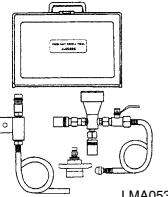
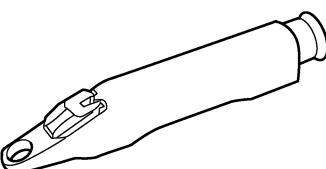
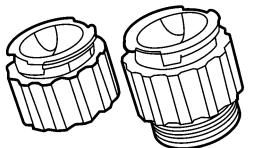
# PREPARATION

## PREPARATION

### Special Service Tool

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The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
KV10111100 (J-37228) Seal cutter	<p>Removing steel oil pan and rear timing chain case</p>  <p>NT046</p>
WS39930000 (—) Tube presser	<p>Pressing the tube of liquid gasket</p>  <p>S-NT052</p>
EG17650301 (J-33984-A) Radiator cap tester adapter	<p>Adapting radiator cap tester to radiator cap and radiator filler neck</p> <p>a: 28 (1.10) dia. b: 31.4 (1.236) dia. c: 41.3 (1.626) dia. Unit: mm (in)</p>  <p>S-NT564</p>
KV991J0070 (J-45695) Coolant refill tool	<p>For refilling engine cooling system</p>  <p>LMA053</p>
KV991J0010 (J-23688) Engine coolant refractometer	<p>Checking concentration of ethylene glycol in engine coolant</p>  <p>WBIA0539E</p>
— (J-24460-92) Radiator Pressure Test Adapter	<p>Pressure testing of the pressurized cooling system overflow tank</p>  <p>AWBIA0891ZZ</p>

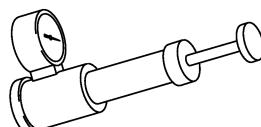
# PREPARATION

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Commercial Service Tool

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Tool name	Description
Power tool	 PIIB1407E Loosening nuts, screws and bolts
Radiator cap tester	 PBIC1982E Checking radiator and radiator cap

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# COOLING SYSTEM

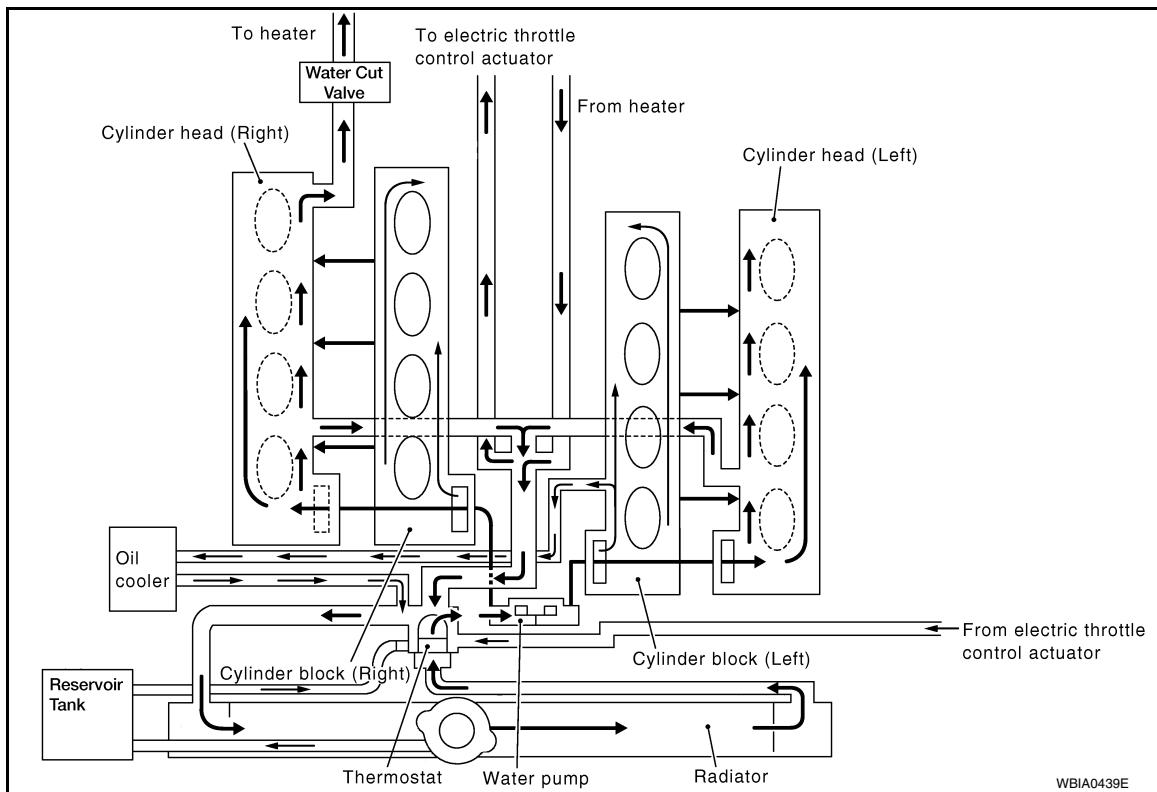
< SYSTEM DESCRIPTION >

## SYSTEM DESCRIPTION

### COOLING SYSTEM

#### Cooling Circuit

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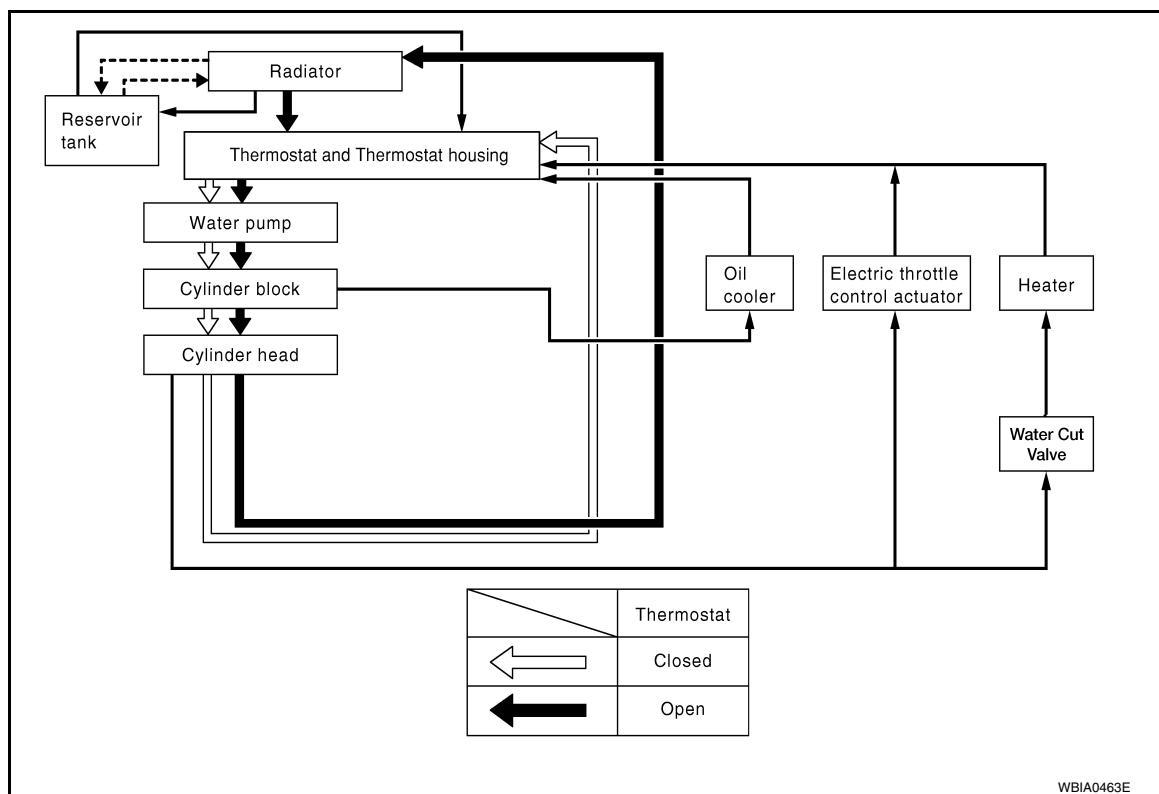


# COOLING SYSTEM

< SYSTEM DESCRIPTION >

Schematic

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# OVERHEATING CAUSE ANALYSIS

< SYSTEM DESCRIPTION >

## OVERHEATING CAUSE ANALYSIS

### Troubleshooting Chart

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	Symptom	Check items	
Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—
	Thermostat stuck closed	Coolant circulation	
	Damaged fins	Dust contamination or paper clogging	
		Physical damage	
	Clogged radiator cooling tube	Excess foreign material (rust, dirt, sand, etc.)	
	Water cut valve malfunction	Excess foreign material (rust, dirt, sand, etc.), physical damage	
Reduced air flow	Cooling fan does not operate	Fan assembly	—
	High resistance to fan rotation		
	Damaged fan blades		
Cooling system parts malfunction	Damaged radiator shroud	Radiator shroud	—
	Improper engine coolant mixture ratio	Coolant viscosity	—
	Poor engine coolant quality	Engine coolant density	—
Insufficient engine coolant	Engine coolant leaks	Cooling hose	Loose clamp Cracked hose
		Water pump	Poor sealing
		Radiator cap	Loose Poor sealing
			O-ring for damage, deterioration or improper fitting
		Radiator	Cracked radiator tank Cracked radiator core
			Reservoir tank
			Cracked reservoir tank
	Overflowing reservoir tank	Exhaust gas leaks into cooling system	Cylinder head deterioration Cylinder head gasket deterioration

# OVERHEATING CAUSE ANALYSIS

## < SYSTEM DESCRIPTION >

Symptom		Check items	
Except cooling system parts malfunction	—	Overload on engine	High engine rpm under no load
			Driving in low gear for extended time
			Driving at extremely high speed
			Powertrain system malfunction
			Installed improper size wheels and tires
	Blocked or restricted air flow	Dragging brakes	—
		Improper ignition timing	—
		Blocked radiator grille	Installed car brassiere
		Blocked bumper	Mud contamination or paper clogging
		Blocked radiator	—
	Blocked condenser	Blocked condenser	Blocked air flow
		Installed large fog lamp	—

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&lt; PERIODIC MAINTENANCE &gt;

## PERIODIC MAINTENANCE

### ENGINE COOLANT

#### Inspection

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##### **WARNING:**

Do not remove the radiator cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the radiator. Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Carefully remove radiator cap by turning it all the way.

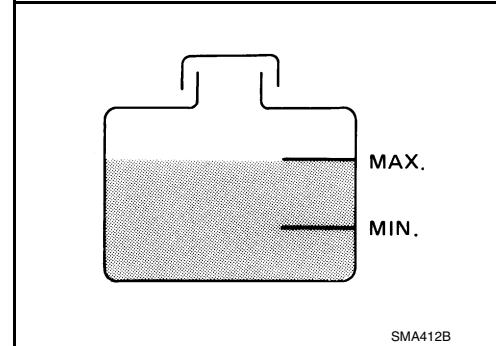
#### CHECKING COOLING SYSTEM HOSES

Check hoses for the following:

- Improper attachment
- Leaks
- Cracks
- Damage
- Loose connections
- Chafing
- Deterioration

#### LEVEL CHECK

- Check if the engine coolant reservoir tank level is within MIN to MAX level when engine is cool.
- Adjust engine coolant level as necessary.



#### CHECKING COOLING SYSTEM FOR LEAKS

##### **WARNING:**

Do not remove the radiator cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the radiator. Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Carefully remove radiator cap by turning it all the way.

- To check for leakage, apply pressure to the cooling system at the reservoir filler neck using suitable tool (A) and Tool (B).

**Tool number : — (J-24460-92)**

**Test pressure : 137 kPa (1.4 kg/cm, 20 psi)**

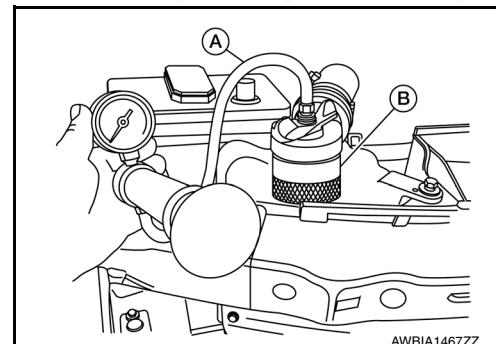
##### **CAUTION:**

Higher pressure than specified may cause radiator damage.

##### **NOTE:**

In case that engine coolant decreases, replenish cooling system with engine coolant.

- If any concerns are found, repair or replace damaged parts.



#### CHECKING RESERVOIR CAP

# ENGINE COOLANT

## < PERIODIC MAINTENANCE >

- Check reservoir cap relief pressure using suitable tool and Tool.

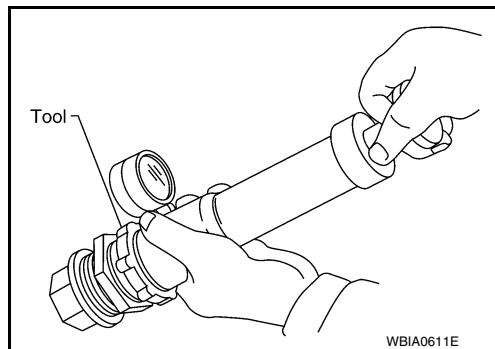
**Tool number : — (J-24460-92)**

**Standard : 110 kPa (1.12 kg/cm<sup>2</sup>, 16 psi)**

**NOTE:**

Apply engine coolant to the cap seal.

- Replace the reservoir cap if there is any damage in the negative-pressure valve, or if the open-valve pressure is outside of the limit.



## CHECKING RADIATOR CAP

Inspect the radiator cap.

**NOTE:**

Thoroughly wipe out the radiator filler neck to remove any waxy residue or foreign material.

- Replace the cap if deposits of waxy residue or other foreign material are on the black rubber gasket or the metal retainer.

## Changing Engine Coolant

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**WARNING:**

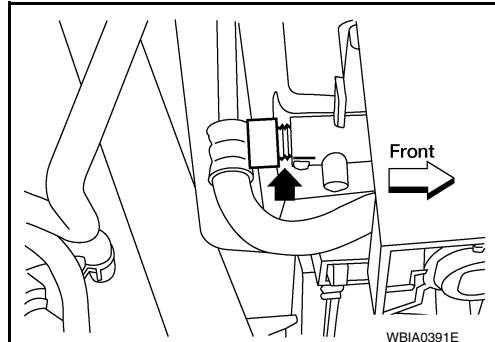
**Do not remove the radiator cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the radiator. Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Carefully remove radiator cap by turning it all the way.**

## DRAINING ENGINE COOLANT

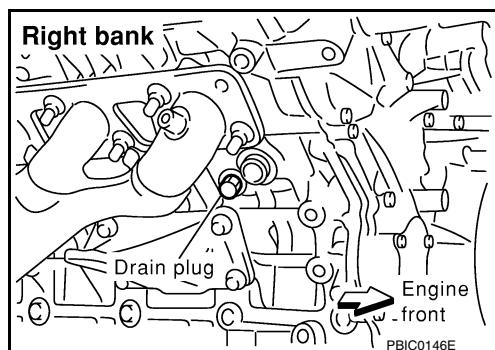
- Turn ignition switch ON and set temperature control lever all the way to HOT position or the highest temperature position. Wait 10 seconds and turn ignition switch OFF.
- Remove the engine undercover or skid plate. Refer to [EXT-15, "Removal and Installation"](#).
- Open the radiator drain plug at the bottom of the radiator, and remove the radiator filler cap. This is the only step required when partially draining the cooling system (radiator only).

**CAUTION:**

- Perform this step when the engine is cold.
- Do not allow the coolant to contact the drive belts.

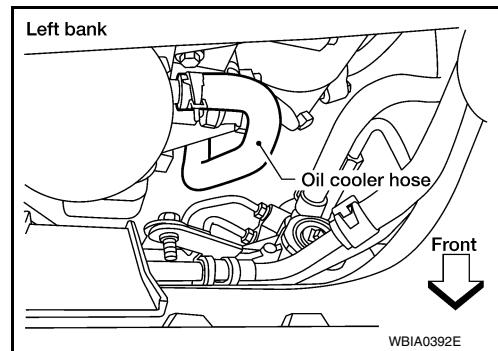


- When draining all of the coolant in the system, it is necessary to drain the cylinder block. Remove the RH cylinder block drain plug to drain the right bank and the oil cooler hose to drain the left bank as shown.



# ENGINE COOLANT

## < PERIODIC MAINTENANCE >



5. Remove the reservoir tank to drain the engine coolant, then clean the reservoir tank before installing it.
6. Check the drained coolant for contaminants such as rust, corrosion or discoloration.  
If the coolant is contaminated, flush the engine cooling system. Refer to [CO-11, "Changing Engine Coolant"](#).

## REFILLING ENGINE COOLANT

1. Close the radiator drain plug. Install the reservoir tank, cylinder block drain plug, and the oil cooler hose, (if removed).
  - The radiator must be completely empty of coolant and water.
  - Apply sealant to the threads of the cylinder block drain plug. Use Genuine High Performance Thread Sealant or equivalent. Refer to [GI-21, "Recommended Chemical Products and Sealants"](#).

**Radiator drain plug** : Refer to [CO-15, "Removal and Installation"](#).

**RH cylinder block drain plug** : Refer to [EM-92, "Exploded View"](#).

2. Set the vehicle heater controls to the full HOT and heater ON position. Turn the vehicle ignition ON with the engine OFF as necessary to activate the heater mode.
3. Remove the vented reservoir cap and replace it with a non-vented reservoir cap before filling the cooling system.
4. Install the Tool by installing the radiator cap adapter onto the radiator neck opening. Then attach the gauge body assembly with the refill tube and the venturi assembly to the radiator cap adapter.

**Tool number** : KV991J0070 (J-45695)

5. Insert the refill hose into the coolant mixture container that is placed at floor level. Make sure the ball valve is in the closed position.
  - Use recommended coolant or equivalent. Refer to [MA-15, "FOR NORTH AMERICA : Fluids and Lubricants"](#) (United States and Canada) or [MA-16, "FOR MEXICO : Fluids and Lubricants"](#) (Mexico).

**Cooling system capacity (with reservoir)** : Refer to [CO-24, "Standard and Limit"](#).

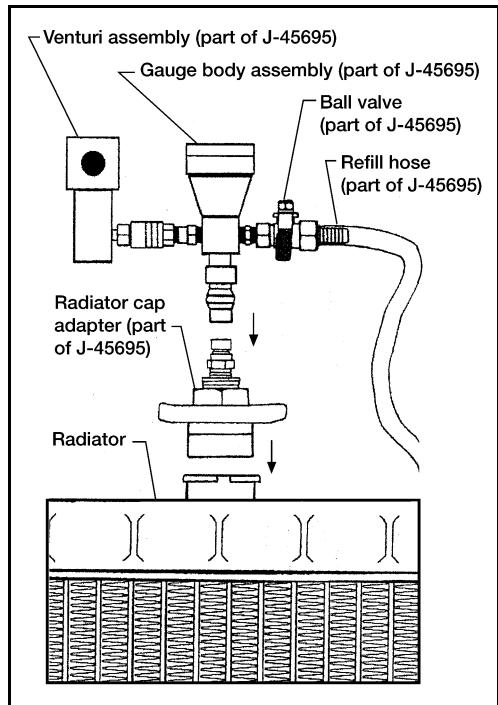
### CAUTION:

**Do not use any cooling additives such as radiator sealer. Additives may clog the cooling system and cause damage to the engine, transmission and/or cooling system.**

6. Install an air hose to the venturi assembly, the air pressure must be within specification.

**Compressed air supply pressure** : 549 - 824 kPa (5.6 - 8.4 kg/cm<sup>2</sup>, 80 - 119 psi)

### CAUTION:



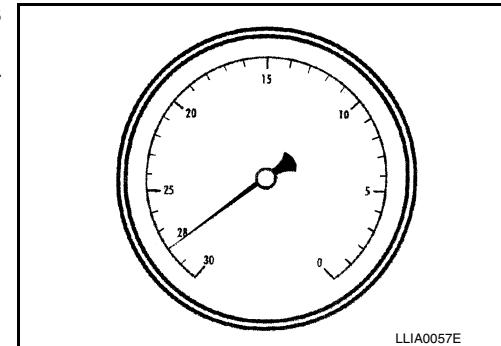
# ENGINE COOLANT

## < PERIODIC MAINTENANCE >

**The compressed air supply must be equipped with an air dryer.**

7. The vacuum gauge will begin to rise and there will be an audible hissing noise. During this process open the ball valve on the refill hose slightly. Coolant will be visible rising in the refill hose. Once the refill hose is full of coolant, close the ball valve. This will purge any air trapped in the refill hose.
8. Continue to draw the vacuum until the gauge reaches 28 inches of vacuum. The gauge may not reach 28 inches in high altitude locations. Refer to the following table for expected vacuum readings.

Altitude above sea level	Vacuum gauge reading
0 - 100 m (328 ft)	: 28 inches of vacuum
300 m (984 ft)	: 27 inches of vacuum
500 m (1,641 ft)	: 26 inches of vacuum
1,000 m (3,281 ft)	: 24 - 25 inches of vacuum



9. When the vacuum gauge has reached the specified amount, disconnect the air hose and wait 20 seconds to see if the system loses any vacuum. If the vacuum level drops, perform any necessary repairs to the system and repeat steps 6 - 8 to bring the vacuum to the specified amount. Recheck for any leaks.
10. Place the coolant container (with the refill hose inserted) at the same level as the top of the radiator. Then open the ball valve on the refill hose so the coolant will be drawn up to fill the cooling system. The cooling system is full when the vacuum gauge reads zero.

**CAUTION:**

**Do not allow the coolant container to get too low when filling, to avoid air from being drawn into the cooling system.**

11. Remove the Tool from the radiator neck opening and install the radiator cap.
12. Remove the non-vented reservoir cap.
13. Fill the cooling system reservoir tank to the specified level. Run the engine to warm up the cooling system and top up the system as necessary before installing the vented reservoir cap.
14. Install the engine under cover or skid plate. Refer to [EXT-15, "Removal and Installation".](#)

## FLUSHING COOLING SYSTEM

1. Drain the water from the engine cooling system. Refer to [CO-11, "Changing Engine Coolant".](#)
2. Fill the radiator and the reservoir tank (to the "MAX" line), with water. Reinstall the radiator cap and leave the vented reservoir cap off.
3. Run the engine until it reaches normal operating temperature.
4. Press the engine accelerator two or three times under no-load.
5. Stop the engine and wait until it cools down.
6. Drain the water from the engine cooling system. Refer to [CO-11, "Changing Engine Coolant".](#)
7. Repeat steps 2 through 6 until clear water begins to drain from the radiator.

## RADIATOR

### Checking Radiator

INFOID:000000009886474

Check radiator for mud or clogging. If necessary, clean radiator as follows.

**CAUTION:**

- Be careful not to bend or damage the radiator fins.
- When radiator is cleaned without removal, remove all surrounding parts such as cooling fan, radiator shroud and horns. Then tape the harness and electrical connectors to prevent water from entering.

1. Spray water to the back side of the radiator core starting at the top and working down using a side to side motion.
2. Stop washing when dirt and debris no longer flow out from the radiator.
3. Blow air into the back side of radiator core starting at the top and working down using a side to side motion until no water sprays out.
  - Use compressed air lower than 490 kPa (5 kg/cm<sup>2</sup>, 71 psi) and keep distance more than 30 cm (11.8 in).
4. Check for leaks and repair if necessary.

&lt; REMOVAL AND INSTALLATION &gt;

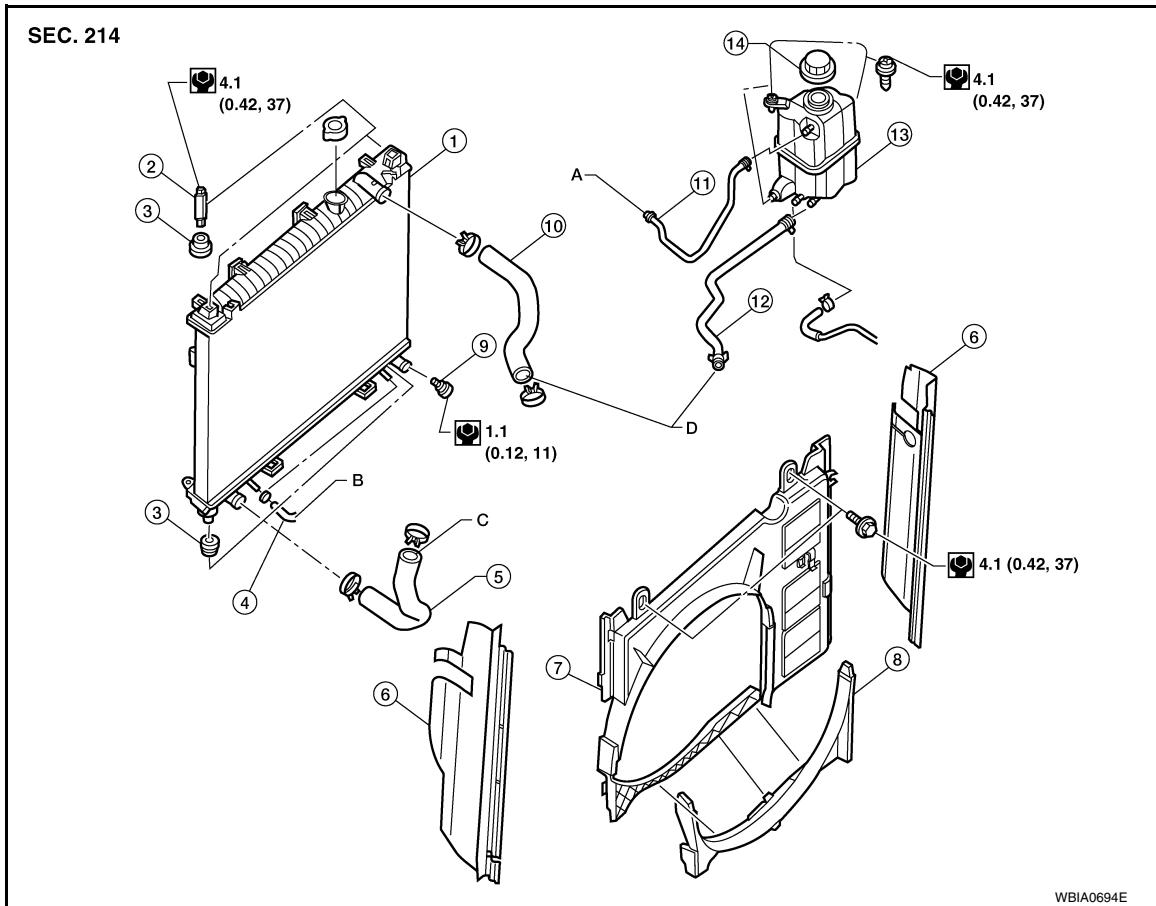
# REMOVAL AND INSTALLATION

## RADIATOR

### Exploded View

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CO



WBIA0694E

1. Radiator	2. Bolt	3. Mounting rubber
4. A/T fluid cooler hose	5. Radiator hose (lower)	6. Flaps
7. Radiator shroud (upper)	8. Radiator shroud (lower)	9. Drain plug
10. Radiator hose (upper)	11. Reservoir tank hose	12. By-pass hose
13. Reservoir tank	14. Reservoir tank cap	A. To radiator fill neck
B. To A/T cooler tube	C. To water suction pipe	D. To thermostat housing

### Removal and Installation

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#### **WARNING:**

**Do not remove the radiator cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the radiator. Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Carefully remove radiator cap by turning it all the way.**

#### **CAUTION:**

**Perform when the engine is cold.**

#### **NOTE:**

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

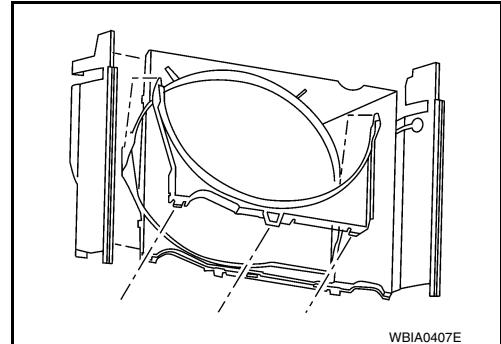
#### **REMOVAL**

1. Drain engine coolant from the radiator. Refer to [CO-11, "Changing Engine Coolant"](#).
2. Remove engine room cover, if equipped. Refer to [EM-25, "Removal and Installation"](#).

# RADIATOR

## < REMOVAL AND INSTALLATION >

3. Remove air duct and resonator assembly. Refer to [EM-26, "Removal and Installation".](#)
4. Disconnect A/T fluid cooler hoses.
5. Disconnect radiator lower hose from the radiator.
- CAUTION:**  
**Do not allow coolant to contact drive belt.**
6. Remove the lower radiator shroud.
  - Release the tabs, pull lower radiator shroud rearward and down to remove.

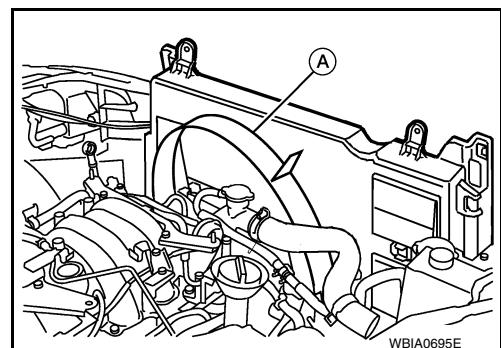


7. Disconnect the radiator upper hose and the coolant reservoir hose from the radiator.

**CAUTION:**

**Do not allow coolant to contact drive belt.**

8. Remove the radiator shroud upper bolts and remove the radiator shroud upper (A).



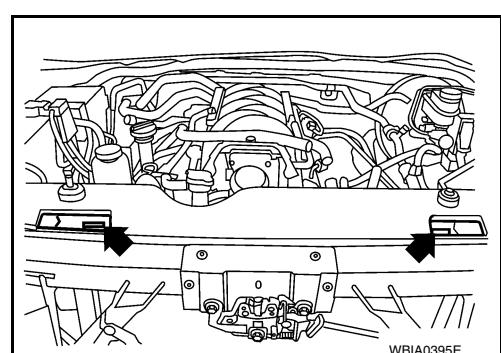
9. Remove the fan coupling nuts, and then remove the fan coupling and cooling fan as an assembly. Refer to [CO-18, "Exploded View".](#)

10. Remove the upper radiator mounting bolts and rubbers.

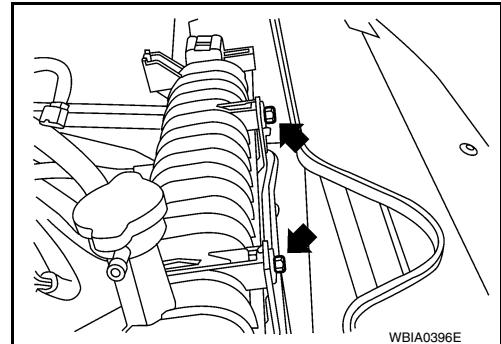
11. Remove the A/C condenser bolts and brackets.

**NOTE:**

Lift A/C condenser up and forward to remove from radiator.



12. Remove A/T oil cooler bolts and oil cooler from radiator and position aside.



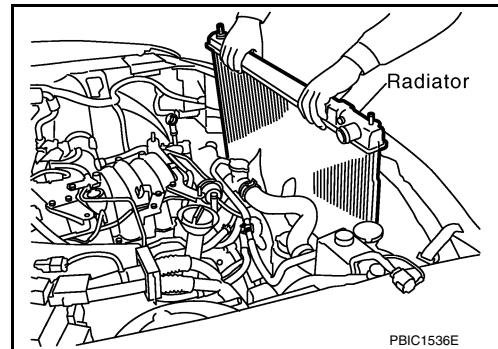
# RADIATOR

## < REMOVAL AND INSTALLATION >

13. Tilt radiator toward the engine and lift to remove (1).

**CAUTION:**

**Do not damage or scratch air conditioner condenser, A/T oil cooler or radiator core when removing.**



## INSTALLATION

Installation is in the reverse order of removal.

- Refill A/T fluid. Refer to [TM-174, "Changing the A/T Fluid \(ATF\)"](#).
- Refill engine coolant. Refer to [CO-11, "Changing Engine Coolant"](#).

## INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to [MA-15, "FOR NORTH AMERICA : Fluids and Lubricants"](#) (United States and Canada) or [MA-16, "FOR MEXICO : Fluids and Lubricants"](#) (Mexico).
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

**NOTE:**

If hydraulic pressure inside timing chain tensioner drops after removal and installation, slack in the guide may generate a pounding noise during and just after engine start. However, this is normal. Noise will stop after hydraulic pressure rises.

- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gas, or any oils/fluids including engine oil and engine coolant.
- Bleed air from passages in lines and hoses, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to specified level, if necessary.

• Summary of the inspection items:

Item		Before starting engine	Engine running	After engine stopped
Engine coolant		Level	Leakage	Level
Engine oil		Level	Leakage	Level
Transmission/ transaxle fluid	A/T and CVT Models	Leakage	Level/Leakage	Leakage
	M/T Models	Level/Leakage	Leakage	Level/Leakage
Other oils and fluids*		Level	Leakage	Level
Fuel		Leakage	Leakage	Leakage
Exhaust gas		—	Leakage	—

\*Power steering fluid, brake fluid, etc.

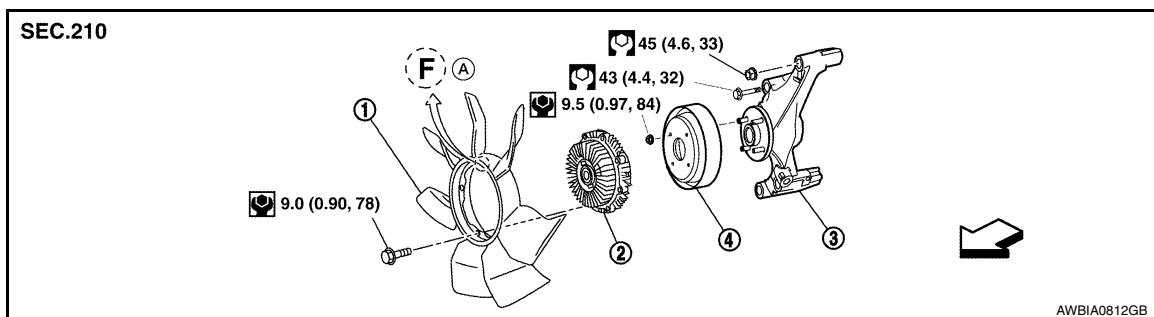
# ENGINE COOLING FAN

< REMOVAL AND INSTALLATION >

## ENGINE COOLING FAN

### Exploded View

INFOID:0000000009886477



1. Cooling fan
2. Fan coupling
3. Fan bracket
4. Cooling fan pulley
- A. Front mark
- Engine front

### Removal and Installation (Crankshaft Driven Type)

INFOID:0000000009886478

#### **WARNING:**

**Do not remove the radiator cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the radiator. Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Carefully remove radiator cap by turning it all the way.**

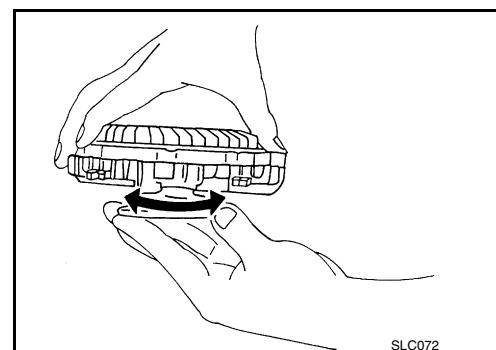
#### REMOVAL

1. Partially drain engine coolant from the radiator. Refer to [CO-11, "Changing Engine Coolant"](#).
2. Remove the lower and upper radiator shrouds. Refer to [CO-15, "Removal and Installation"](#).
3. Remove the drive belt. Refer to [EM-14, "Removal and Installation"](#).
4. Remove the cooling fan.
5. Remove the fan bracket if necessary.

#### INSPECTION AFTER REMOVAL

##### Fan Coupling

- Inspect fan coupling for oil leakage and bimetal conditions.
- If there are any unusual concerns, replace the fan coupling.

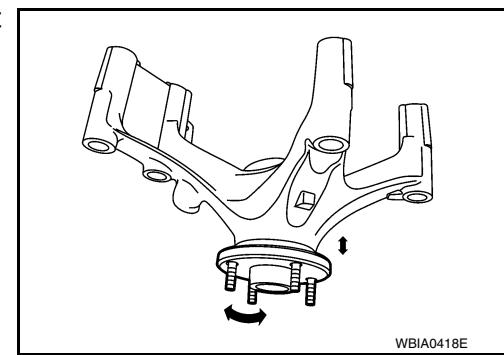


##### Fan Bracket

# ENGINE COOLING FAN

## < REMOVAL AND INSTALLATION >

- Check that the fan bracket shaft turns smoothly by hand and is not excessively loose.
- Replace the fan bracket assembly if necessary.



### Cooling Fan Pulley

- Inspect cooling fan pulley.
- If there are any concerns, replace the cooling fan pulley.

## INSTALLATION

Installation is in the reverse order of removal.

- Install cooling fan with its front mark "F" facing front of engine.

## INSPECTION AFTER INSTALLATION

- Check for engine coolant leaks. Refer to [CO-10, "Inspection"](#).
- Start and warm up the engine. Visually make sure that there are no engine coolant leaks.

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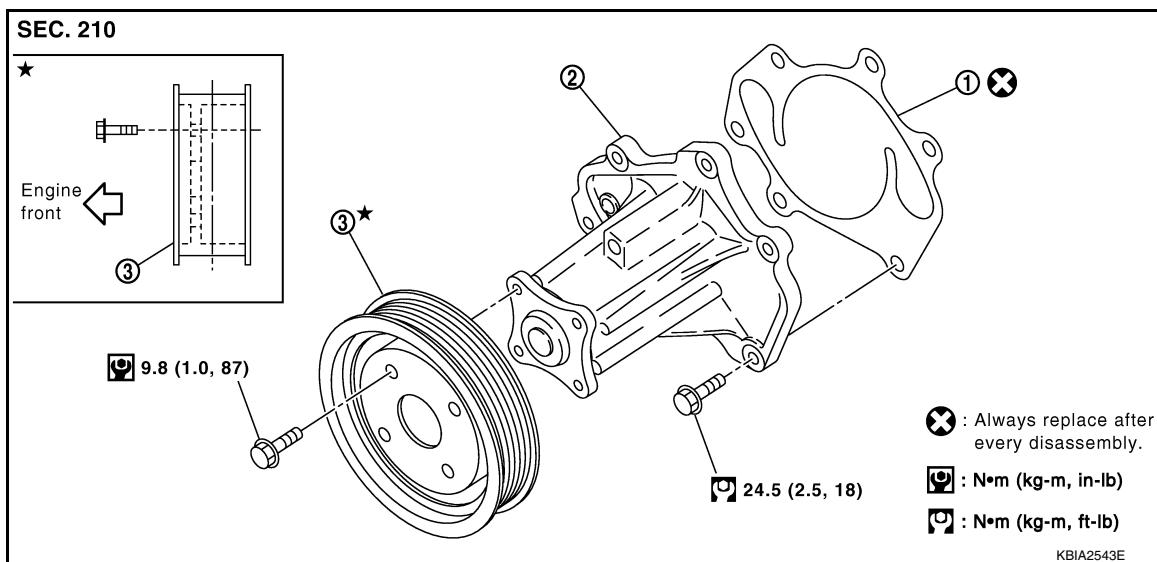
# WATER PUMP

< REMOVAL AND INSTALLATION >

## WATER PUMP

### Exploded View

INFOID:0000000009886479



1. Gasket

2. Water pump

3. Water pump pulley

### Removal and Installation

INFOID:0000000009886480

#### WARNING:

Do not remove the radiator cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the radiator. Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Carefully remove radiator cap by turning it all the way.

#### CAUTION:

- When removing water pump, be careful not to get engine coolant on drive belt.
- Water pump cannot be disassembled and should be replaced as a unit.
- After installing water pump, connect hoses and clamps securely, then check for leaks.

#### REMOVAL

- Drain engine coolant from the radiator. Refer to [CO-11, "Changing Engine Coolant"](#).

#### CAUTION:

Perform when the engine is cold.

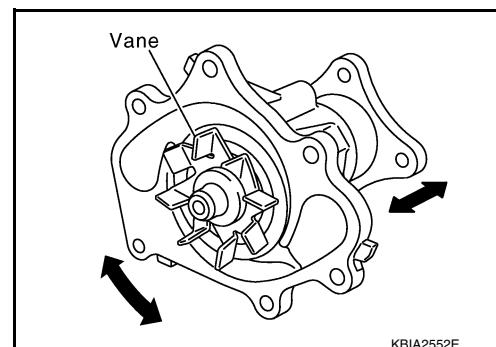
- Remove the engine cooling fan. Refer to [CO-18, "Removal and Installation \(Crankshaft Driven Type\)"](#).
- Remove the water pump pulley.
- Remove the water pump.
  - Engine coolant will leak from the cylinder block, so have a receptacle ready below.

#### CAUTION:

Handle water pump vane so that it does not contact any other parts.

#### INSPECTION AFTER REMOVAL

- Visually check for significant dirt or rust on the water pump body and vane.
- Check that the vane shaft turns smoothly by hand and is not excessively loose.
- Replace the water pump assembly if the water pump does not perform properly.



# WATER PUMP

## < REMOVAL AND INSTALLATION >

### INSTALLATION

Installation is in the reverse order of removal.

- After installation bleed the air from the cooling system. Refer to [CO-11, "Changing Engine Coolant"](#).

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### INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to [MA-15, "FOR NORTH AMERICA : Fluids and Lubricants"](#) (United States and Canada) or [MA-16, "FOR MEXICO : Fluids and Lubricants"](#) (Mexico).
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

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#### NOTE:

If hydraulic pressure inside timing chain tensioner drops after removal and installation, slack in the guide may generate a pounding noise during and just after engine start. However, this is normal. Noise will stop after hydraulic pressure rises.

- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gas, or any oils/fluids including engine oil and engine coolant.
- Bleed air from passages in lines and hoses, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to specified level, if necessary.
- Summary of the inspection items:

Item	Before starting engine	Engine running	After engine stopped
Engine coolant	Level	Leakage	Level
Engine oil	Level	Leakage	Level
Transmission/ transaxle fluid	A/T and CVT Models M/T Models	Leakage Level/Leakage	Level/Leakage Leakage
Other oils and fluids*	Level	Leakage	Level
Fuel	Leakage	Leakage	Leakage
Exhaust gas	—	Leakage	—

\*Power steering fluid, brake fluid, etc.

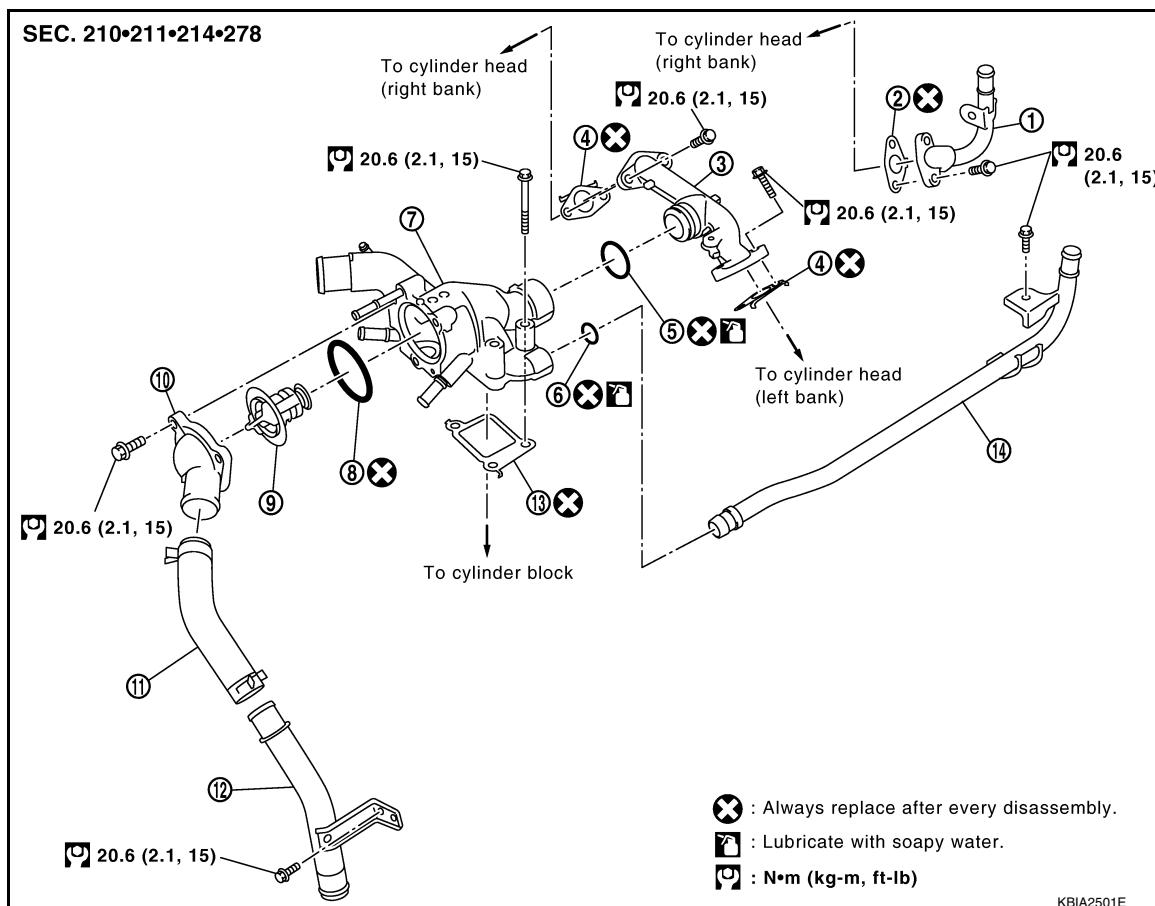
# THERMOSTAT AND WATER PIPING

< REMOVAL AND INSTALLATION >

## THERMOSTAT AND WATER PIPING

### Exploded View

INFOID:0000000009886481



KBIA2501E

1. Heater pipe	2. Gasket	3. Water outlet
4. Gasket	5. O-ring	6. O-ring
7. Thermostat housing	8. Rubber ring	9. Thermostat
10. Water inlet	11. Water suction hose	12. Water suction pipe
13. Gasket	14. Heater pipe	

### Removal and Installation

INFOID:0000000009886482

#### **WARNING:**

**Do not remove the radiator cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the radiator. Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Carefully remove radiator cap by turning it all the way.**

#### **CAUTION:**

- When removing water pump, be careful not to get engine coolant on drive belt.
- Water pump cannot be disassembled and should be replaced as a unit.
- After installing water pump, connect hoses and clamps securely, then check for leaks.
- Perform when engine is cold.

#### **NOTE:**

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

### REMOVAL

#### Removal of Thermostat

1. Partially drain engine coolant from the radiator. Refer to [CO-11, "Changing Engine Coolant"](#).

# THERMOSTAT AND WATER PIPING

## < REMOVAL AND INSTALLATION >

2. Disconnect the water suction hose from the water inlet.
3. Remove the water inlet and thermostat.

### Removal of Thermostat Housing, Water Outlet and Heater Pipe

1. Remove the intake manifold. Refer to [EM-27, "Removal and Installation"](#).
2. Remove the thermostat housing, water outlet and heater pipe.

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### Removal of Water Cut Valve

1. Partially drain engine coolant from the radiator. Refer to [CO-11, "Changing Engine Coolant"](#).

**CAUTION:**

**Perform when the engine is cold.**

2. Disconnect the water cut valve connector.
3. Disconnect the water hoses from the water cut valve.
4. Remove the water cut valve.

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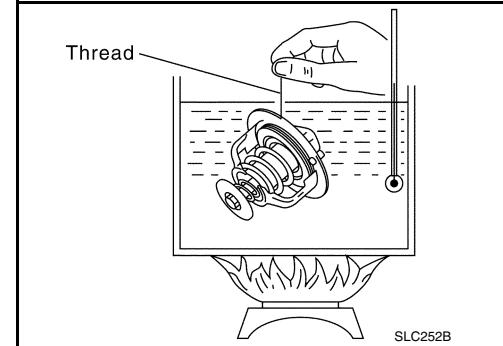
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### INSPECTION AFTER REMOVAL

- Place a thread so that it is caught in the valve of the thermostat. Immerse fully in a container filled with water. Heat while stirring.
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the full-open lift amount.
- After checking the full-open lift amount, lower the water temperature and check the valve closing temperature.



Thermostat	Standard values
Valve opening temperature	Refer to <a href="#">CO-24, "Standard and Limit"</a> .
Full-open lift amount	Refer to <a href="#">CO-24, "Standard and Limit"</a> .
Valve closing temperature	Refer to <a href="#">CO-24, "Standard and Limit"</a> .

Replace the thermostat if the valve opening or closing values are out of the specification range.

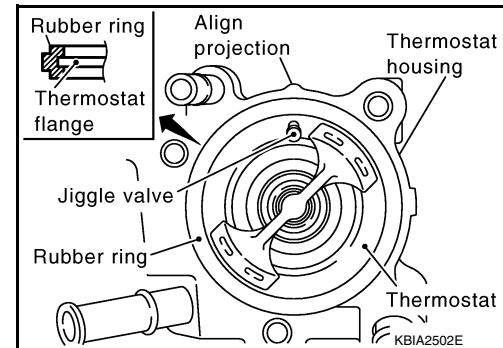
### INSTALLATION

Installation is in the reverse order of removal.

#### Installation of Thermostat

Installation is in the reverse order of removal.

- Install the thermostat with the flange securely inside the rubber ring as shown.
- Install the thermostat with the jiggle valve facing upwards.



#### Installation of Water Outlet Pipe and Heater Pipe

Installation is in the reverse order of removal.

Apply a mild detergent to the O-rings before installing the water outlet pipe and heater pipe.

### INSPECTION AFTER INSTALLATION

- Check for engine coolant leaks. Refer to [CO-10, "Inspection"](#).
- Start and warm up the engine. Visually check for engine coolant leaks.

# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

# SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

### Standard and Limit

INFOID:000000009886483

#### ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit:  $\ell$  (US qt, Imp qt)

Engine coolant capacity (With reservoir at "MAX" level)	12.2 (12-7/8, 10-3/4)
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### THERMOSTAT

Valve opening temperature	80° - 84°C (176° - 183°F)
Full-open lift amount	More than 10 mm / 95°C (0.39 in / 203°F)
Valve closing temperature	77°C (171°F) or higher

### RADIATOR

Unit: kPa (kg/cm<sup>2</sup>, psi)

Reservoir cap relief pressure	Standard	110 (1.12, 16)
Test pressure		137 (1.4, 20)