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# SECTION CO

## ENGINE COOLING SYSTEM

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PRECAUTION

PRECAUTIONS

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

INFOID:000000012602118

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. 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, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.
- Improper repair, 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 or batteries, and wait at least three minutes before performing any service.

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# PREPARATION

< PREPARATION >

[QR25DE]

## PREPARATION

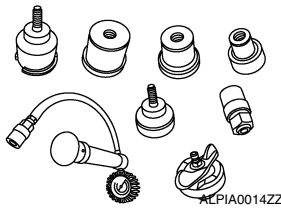
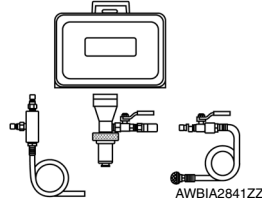
### PREPARATION

#### Special Service Tool

INFOID:000000012602119

The actual shape of the tools may differ from those illustrated here.

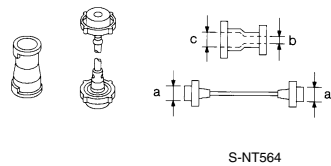
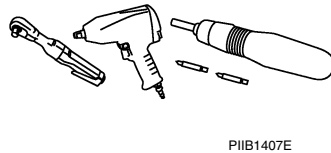
Tool number (TechMate No.) Tool name	Description
KV991J0070 (J-45695-A) Coolant refill tool	Refilling engine cooling system
— (J-51771) Cooling system pressure test kit	Checking cooling system and radiator cap



#### Commercial Service Tools

INFOID:000000012602120

Tool name	Description
Power tool	Loosening nuts, screws and bolts
— (J-33984-A) Radiator pressure adapter	Adapting cooling system pressure tester to radiator cap and reservoir tank cap <b>a: 28 (1.10) diameter</b> <b>b: 31.4 (1.236) diameter</b> <b>c: 41.3 (1.626) diameter</b> Unit: mm (in)



# COOLING SYSTEM

< SYSTEM DESCRIPTION >

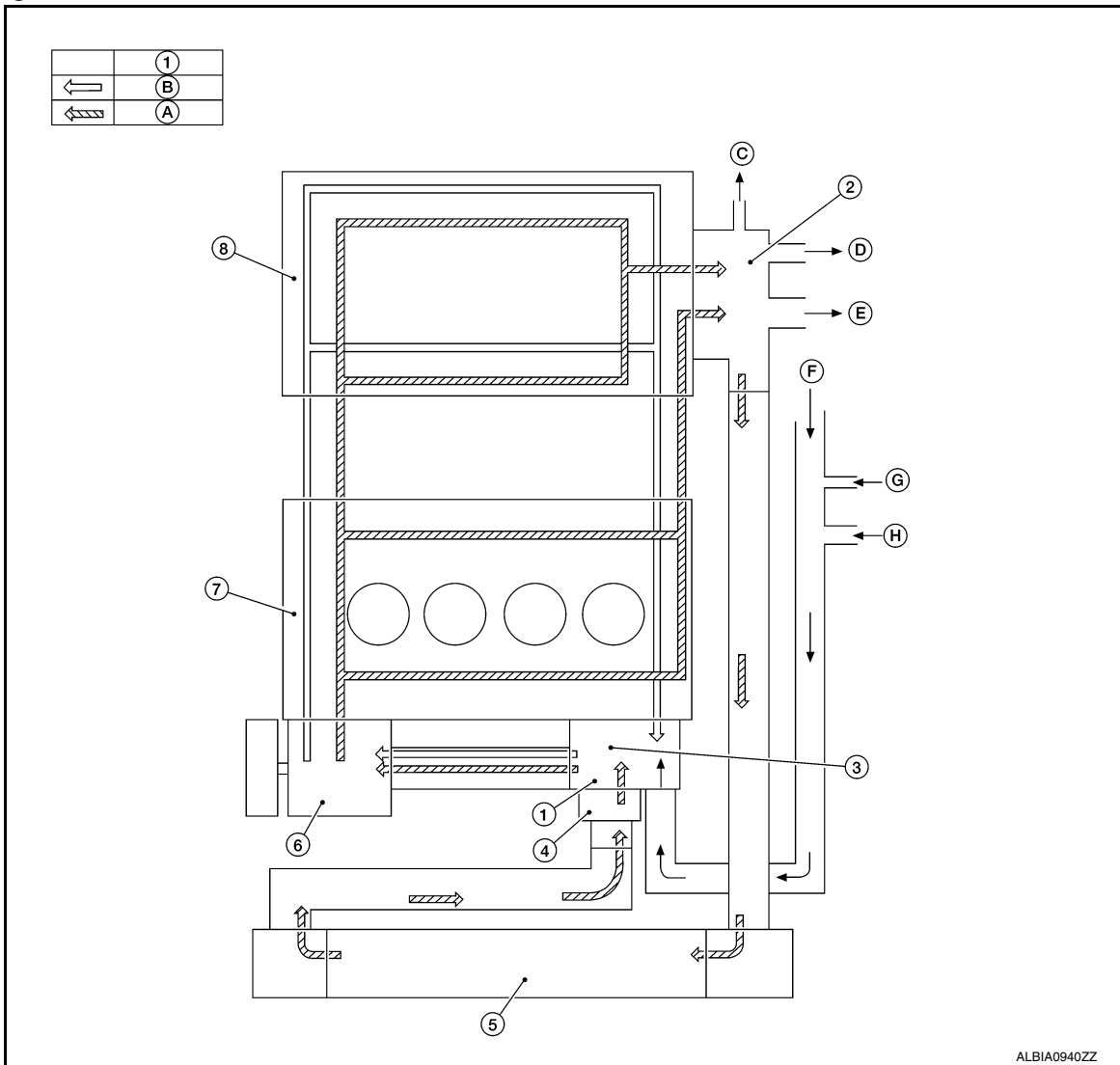
[QR25DE]

## SYSTEM DESCRIPTION

### COOLING SYSTEM

#### Cooling Circuit

INFOID:0000000012602121



- |                    |  |  |
|--------------------|--|--|
| 1. Thermostat      | 2. Water outlet                          | 3. Cylinder block (Thermostat housing)     |
| 4. Water inlet     | 5. Radiator                              | 6. Water pump                              |
| 7. Cylinder block  | 8. Cylinder head                         | A. Open                                    |
| B. Closed          | C. To electric throttle control actuator | D. To oil cooler                           |
| E. To heater       | F. From heater                           | G. From electric throttle control actuator |
| H. From oil cooler |  |  |

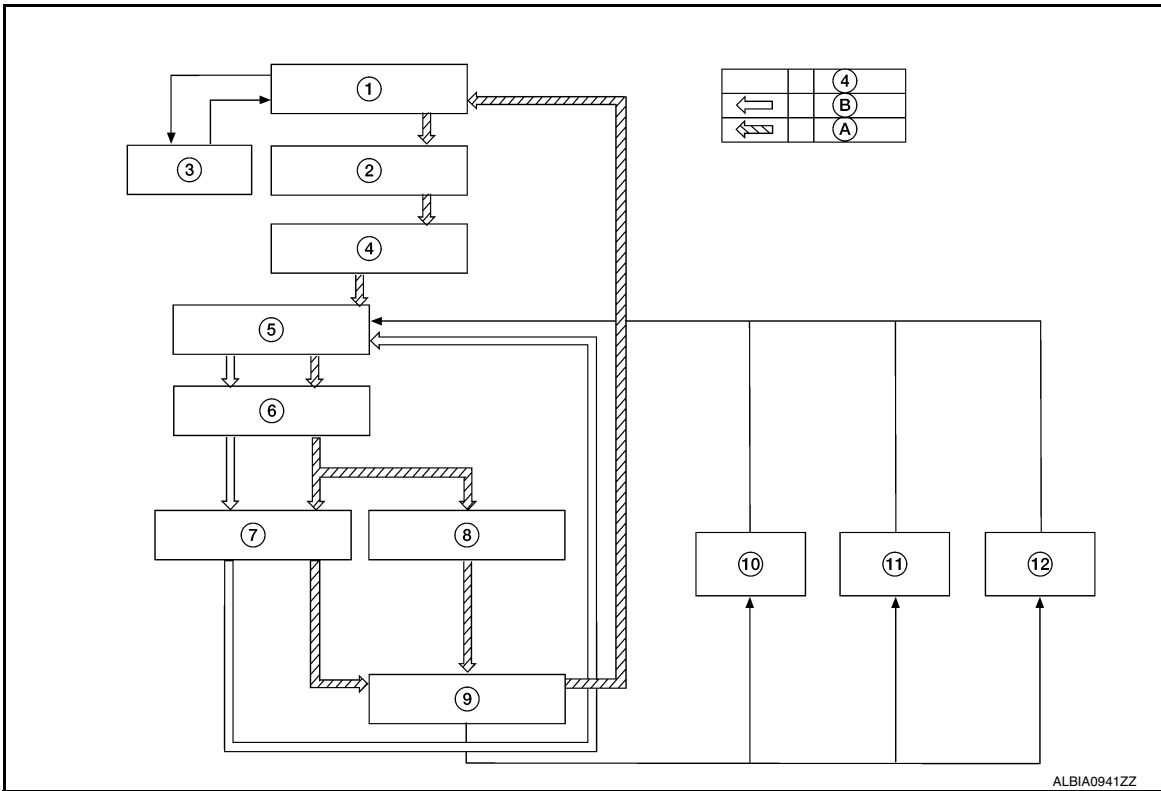
# COOLING SYSTEM

< SYSTEM DESCRIPTION >

[QR25DE]

## Schematic

INFOID:000000012602122



ALBIA0941ZZ

- |                  |                       |  |
|------------------|-----------------------|--|
| 1. Radiator      | 2. Water inlet        | 3. Reservoir tank                      |
| 4. Thermostat    | 5. Thermostat housing | 6. Water pump                          |
| 7. Cylinder head | 8. Cylinder block     | 9. Water outlet                        |
| 10. Heater       | 11. Oil cooler        | 12. Electric throttle control actuator |
| A. Open          | B. Closed             |  |

# OVERHEATING CAUSE ANALYSIS

< SYSTEM DESCRIPTION >

[QR25DE]

## OVERHEATING CAUSE ANALYSIS

### Troubleshooting Chart

INFOID:000000012602123

		Symptom	Check items		
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—	
		Thermostat stuck closed	Coolant circulation		
		Damaged fins	Dust contamination or rock clogging		
			Mechanical damage		
		Clogged radiator cooling tube	Excess foreign material (rust, dirt, sand, etc.)		
	Reduced air flow	Cooling fan does not operate	Engine cooling fans	—	
		High resistance to fan rotation			
		Damaged fan blades			
		Damaged radiator shroud	—	Radiator shroud	—
		Improper coolant mixture ratio	—	Coolant viscosity	—
		Poor coolant quality	—	Periodic maintenance	—
	Insufficient coolant	Coolant leaks	Cooling hose	Loose clamp	
				Cracked hose	
			Water pump	Poor sealing	
			Radiator cap	Loose	
Poor sealing					
Radiator			O-ring for damage, deterioration or improper fitting		
		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			

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# OVERHEATING CAUSE ANALYSIS

< SYSTEM DESCRIPTION >

[QR25DE]

		Symptom		Check items		
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	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			
			Dragging brakes			
	Blocked or restricted air flow	Blocked radiator grille	Blocked bumper	Blocked radiator	Installed car brassiere	—
					Blocked condenser	
					Mud contamination or paper clogging	
					Installed large fog lamp	



## PERIODIC MAINTENANCE

### ENGINE COOLANT

#### System Inspection

INFOID:0000000012602124

#### WARNING:

- Do not remove the radiator cap or reservoir tank cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the cooling system.
- When removing the radiator cap or reservoir tank cap, wrap a thick cloth around the cap and slowly turn it a quarter turn to allow built-up pressure to escape. Then carefully remove the cap by turning it all the way.

#### CHECKING COOLING SYSTEM HOSES

Check hoses for the following:

- Improper attachment
- Leaks
- Cracks
- Dents
- Bulges
- Internal obstruction
- Damage
- Loose connections
- Chafing
- Deterioration

#### CHECKING RESERVOIR LEVEL

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

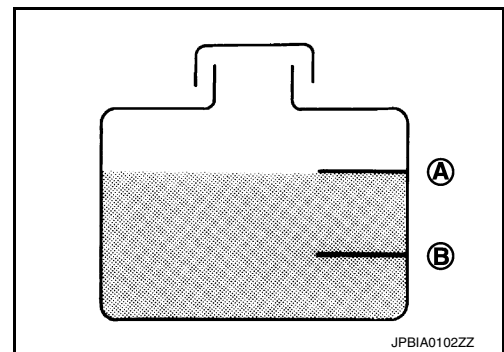
(A) : MAX

(B) : MIN

- Adjust coolant level (if necessary), to ensure that the engine coolant level is within the MIN to MAX range.

#### CAUTION:

Refill Genuine NISSAN Long Life Antifreeze/Coolant (blue) or equivalent in its quality mixed with water (distilled or demineralized). Refer to [MA-12, "Fluids and Lubricants"](#).



#### CHECKING COOLING SYSTEM FOR LEAKS

#### WARNING:

- Do not remove the radiator cap or reservoir tank cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the cooling system.
- When removing the radiator cap or reservoir tank cap, wrap a thick cloth around the cap and slowly turn it a quarter turn to allow built-up pressure to escape. Then carefully remove the cap by turning it all the way.

To check the cooling system for leaks, apply pressure to the cooling system using tool (A).

Tool number (A) : — (J-51771)

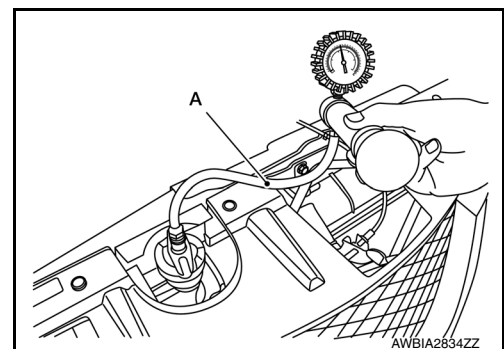
Leakage test pressure : Refer to [CO-26, "Radiator"](#).

#### CAUTION:

Higher testing pressure than specified may cause radiator damage.

#### NOTE:

- If engine coolant decreases, replenish radiator with engine coolant. Refer to [MA-12, "Fluids and Lubricants"](#).
- If anything is found, repair or replace damaged parts.



# ENGINE COOLANT

< PERIODIC MAINTENANCE >

[QR25DE]

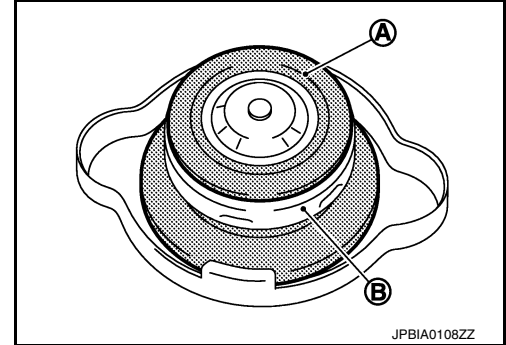
## CHECKING RADIATOR CAP

### WARNING:

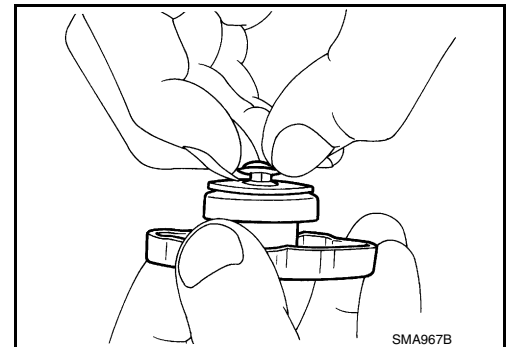
- Do not remove the radiator cap or reservoir tank cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the cooling system.
- When removing the radiator cap or reservoir tank cap, wrap a thick cloth around the cap and slowly turn it a quarter turn to allow built-up pressure to escape. Then carefully remove the cap by turning it all the way.
- Check the pressure valve of the radiator cap.
- Replace the radiator cap if the metal plunger (B) on the pressure valve cannot be seen around the edge of the rubber gasket (A).
- Replace the radiator cap if there is damage or deposits of foreign material on the rubber gasket or pressure valve.

### CAUTION:

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



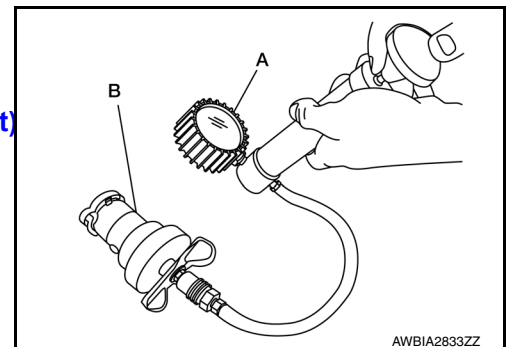
- Check the negative-pressure valve of the radiator cap.
- Replace the radiator cap if the negative-pressure valve does not close completely when pulled open and released.
- Replace the radiator cap if there is damage or deposits of foreign material on the valve seat of the negative-pressure valve.
- Replace the radiator cap if there is an abnormality in the operation of the negative-pressure valve.



- Check radiator cap relief pressure.
- Check the radiator cap relief pressure using Tool (A) and tool (B).

Tool number (A) : — (J-51771)  
Tool number (B) : — (J-33984-A or equivalent)  
(commercially available)  
Radiator cap relief pressure : Refer to [CO-26, "Radiator"](#).

- When connecting the radiator cap to tool (B), apply water or coolant to the radiator cap seal surface.
- Replace the radiator cap if the radiator cap relief pressure is out-side of specification.



## CHECKING RADIATOR

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

### CAUTION:

- Do not bend or damage the radiator fins.
  - When radiator is cleaned on-vehicle, remove surrounding parts in order to access the radiator core. Tape the harness and harness connectors to prevent water from entering.
1. Spray water to the back side of the radiator core using a side to side motion from the top down.
  2. Stop spraying when debris no longer flows from radiator core.
  3. Blow air into the back side of radiator core using a side to side motion from the top down.
    - 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. Continue to blow air until no water sprays out.
  5. Check for coolant leaks. Repair as necessary.

## Changing Engine Coolant

INFOID:000000012602125

**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 cap. Slowly push down and turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by pushing it down and turning it all the way.

## DRAINING ENGINE COOLANT

1. 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:**

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

2. Follow this step for heater core removal/replacement only. Disconnect the upper heater hose at the engine side and apply moderate air pressure [103.46 kPa (1.035 bar, 1.055 kg/cm<sup>2</sup>, 15 psi) maximum air pressure] into the hose for 30 seconds to blow the excess coolant out of the heater core.

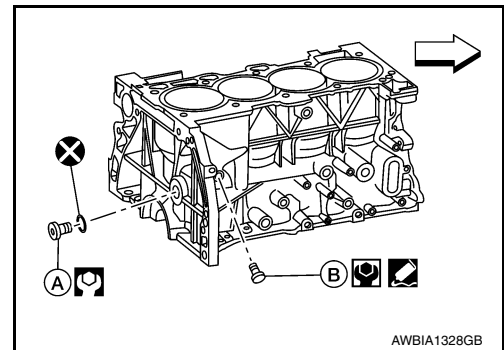
3. When draining all of the coolant in the system, remove the reservoir tank and drain the coolant, then clean the reservoir tank before installation.

**CAUTION:**

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

4. When draining all of the coolant in the system for engine removal or repair, open the drain plugs (A and B) on the cylinder block.

← : Engine front



5. Check the drained coolant for contaminants such as rust, corrosion or discoloration. If the coolant is contaminated, flush the engine cooling system.

## REFILLING ENGINE COOLANT

1. Install the following, if removed:
  - Cylinder block drain plugs, refer to [EM-91, "Exploded View"](#).
  - Reservoir tank, refer to [CO-13, "Exploded View"](#).
  - Cooling system hoses, refer to [CO-13, "Exploded View"](#).
  - Radiator drain plug, refer to [CO-13, "Exploded View"](#).
2. Set the vehicle heater controls to the full HOT and heater ON positions. Turn the vehicle ignition ON with the engine OFF as necessary to activate the heater mode.

## ENGINE COOLANT

[QR25DE]

### < PERIODIC MAINTENANCE >

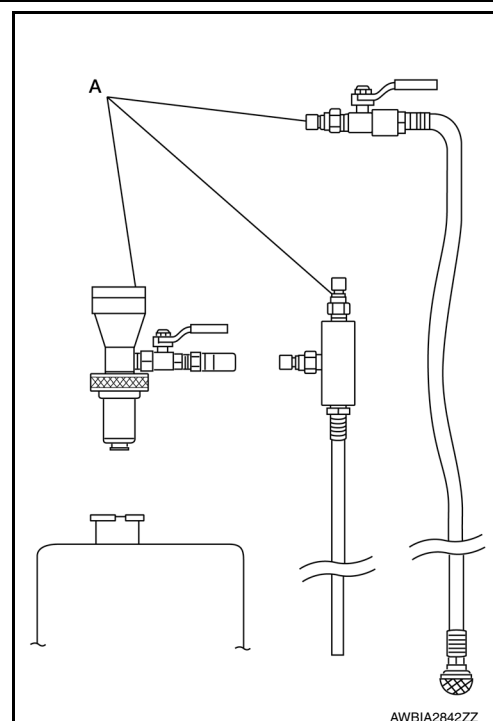
- Fill the cooling system with engine coolant using Tool (A), following the manufacturer's instructions included with the tool.

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

**Engine Coolant** : Refer to [MA-12, "Fluids and Lubricants"](#).

#### **CAUTION:**

- Use recommended coolant or equivalent.
  - Do not use any cooling system additives such as radiator sealer. Additives may clog the cooling system and cause damage to the engine, transmission or cooling system.
  - The compressed air supply must be equipped with an air dryer.
- Remove the Tool (A) and top off the cooling system with engine coolant as necessary.



- Install the radiator cap and reservoir tank cap.
- Run the engine until it reaches normal operating temperature.

#### **CAUTION:**

**Do not allow the engine to exceed normal operating temperature or engine damage may occur.**

- Stop the engine and allow it to cool.
- Check the engine coolant level and adjust if necessary.

### FLUSHING COOLING SYSTEM

- Fill the radiator from the filler neck above the radiator upper hose and reservoir tank with clean water and reinstall the radiator filler cap.
- Run the engine until it reaches normal operating temperature.
- Rev the engine two or three times under no-load.
- Stop the engine and wait until it cools down.
- Drain the water from the system. Refer to [CO-11, "Changing Engine Coolant"](#).
- Repeat steps 1 through 5 until clear water begins to drain from the radiator.

# RADIATOR

< REMOVAL AND INSTALLATION >

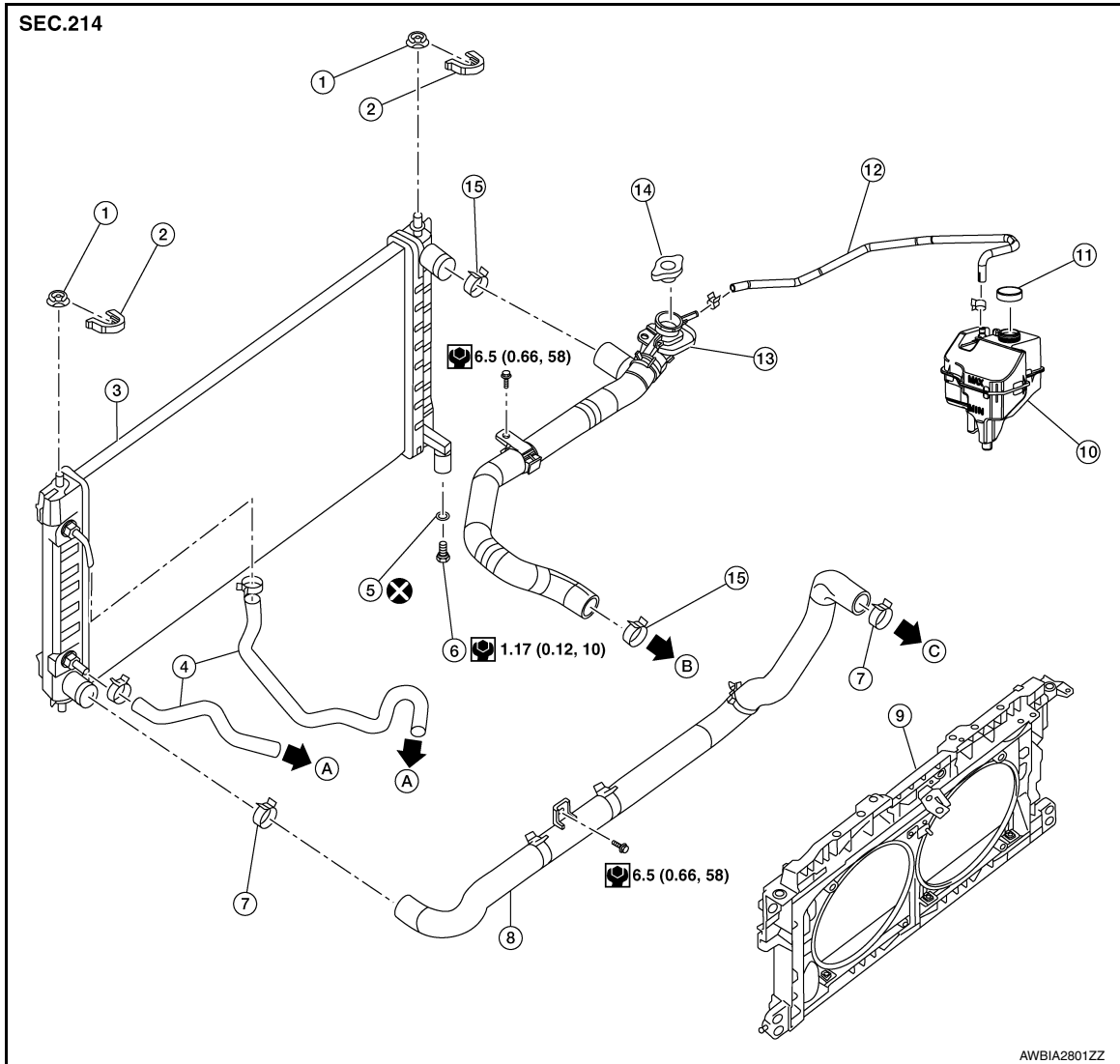
[QR25DE]

## REMOVAL AND INSTALLATION

### RADIATOR

#### Exploded View

INFOID:0000000012602126



- |                         |                        |                          |
|-------------------------|------------------------|--------------------------|
| 1. Mounting rubber      | 2. Radiator mount      | 3. Radiator              |
| 4. CVT oil cooler hose  | 5. Gasket              | 6. Drain plug            |
| 7. Clamp                | 8. Lower radiator hose | 9. Radiator core support |
| 10. Reservoir tank      | 11. Reservoir tank cap | 12. Reservoir tank hose  |
| 13. Upper radiator hose | 14. Radiator cap       | 15. Clamp                |
| A. To CVT oil warmer    | B. To water outlet     | C. To water inlet        |

#### Removal and Installation

INFOID:0000000012602127

#### **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 cap. Slowly push down and turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by pushing it down and turning it all the way.

#### **NOTE:**

# RADIATOR

[QR25DE]

## < REMOVAL AND INSTALLATION >

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

### REMOVAL

1. Remove radiator cap and drain coolant from radiator. Refer to [CO-11, "Changing Engine Coolant"](#).  
**CAUTION:**
  - Perform this step when the engine is cold.
  - Do not spill coolant on the drive belt.
2. Remove front air duct. Refer to [EM-29, "Removal and Installation"](#).
3. Disconnect coolant reservoir hose from the radiator.
4. Remove fender protector side covers (LH/RH). Refer to [EXT-36, "FENDER PROTECTOR : Exploded View"](#).
5. Disconnect radiator hose (upper) and radiator hose (lower) from the radiator.  
**CAUTION:**  
**Do not allow the coolant to contact the drive belt.**  
**NOTE:**  
The radiator hose clamps on the radiator hose (upper) and on the radiator hose (lower), are not serviced separately. Radiator hose clamps are part of the radiator hose assembly and serviced as one unit with the radiator hose.
6. Disconnect the CVT oil cooler hoses.
7. Remove the front bumper fascia. Refer to [EXT-24, "Exploded View"](#).
8. Remove A/C condenser. Refer to [HA-37, "CONDENSER : Removal and Installation"](#).  
**CAUTION:**  
**Do not damage condenser core.**
9. Remove the radiator mounts (upper).
10. Remove radiator.  
**CAUTION:**  
**Do not damage or scratch the radiator core when removing.**

### INSTALLATION

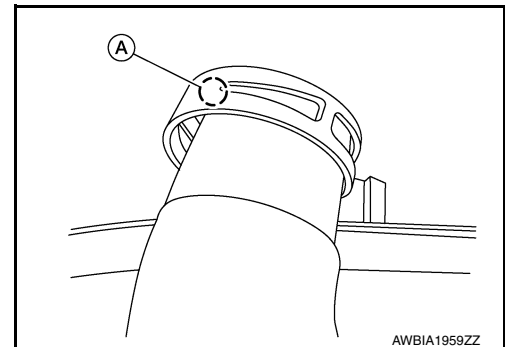
Installation is in the reverse order of removal.

- After installation, refill coolant and check for leaks. Refer to [CO-11, "Changing Engine Coolant"](#) and [CO-9, "System Inspection"](#).  
**CAUTION:**  
**Do not spill coolant in engine compartment. Use a shop cloth to absorb coolant.**
- After installation, refill CVT fluid (if necessary). Refer to [TM-185, "Inspection"](#) (RE0F10D) and [TM-388, "Inspection"](#) (RE0F10H).

Radiator hose

#### NOTE:

- Once hose clamp has been placed into position, place a small amount of glue (A) between the hose and the clamp.

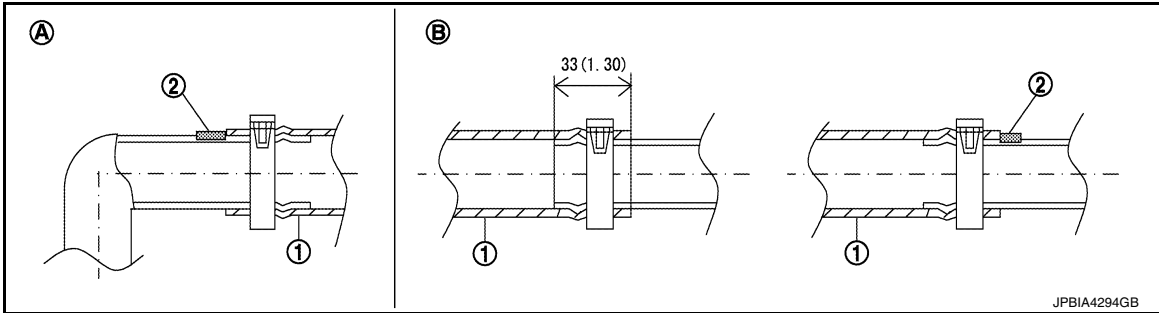


- Insert the radiator hose (1) all the way to the stopper (2) or by 33 mm (1.30 in) (hose without a stopper).

# RADIATOR

< REMOVAL AND INSTALLATION >

[QR25DE]



Unit: mm (in)

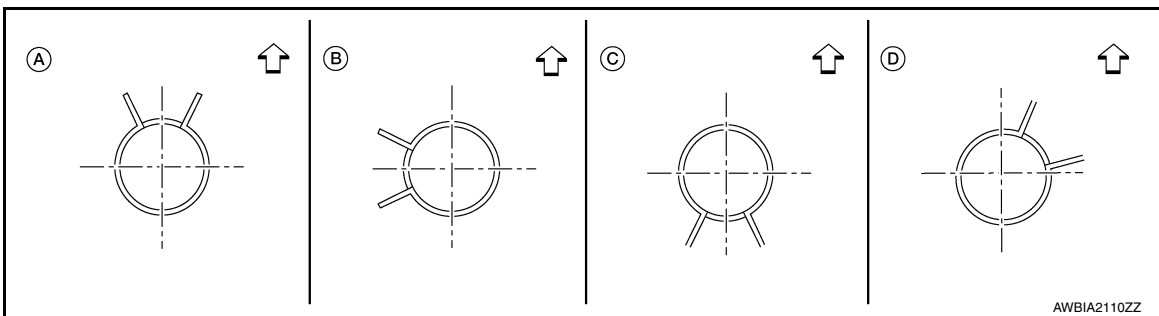
A. Radiator side

B. Engine side

- For the orientation of the hose clamp pawl, refer to the figure.

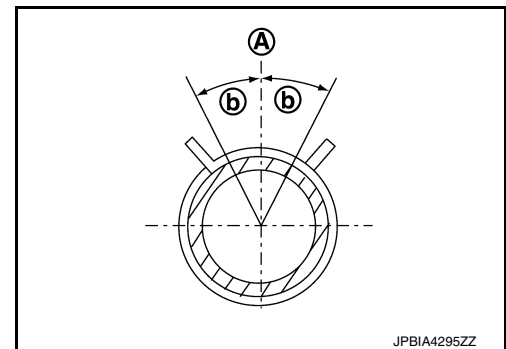
Radiator hose	Hose end	Paint mark	Position of hose clamp*
Radiator hose (upper)	Radiator side	Side	-
	Filler neck side	Upper	-
	Engine side	Upper	A
Radiator hose (lower)	Radiator side	Upper	-
	Engine side	Side	A
CVT fluid cooler hoses	Radiator side	Refer to <a href="#">TM-206. "CVT FLUID COOLER HOSE : Removal and Installation"</a>	<a href="#">TM-411. "CVT FLUID COOLER HOSE : Removal and Installation"</a>

\*: Refer to the illustrations for the specific position each hose clamp tab.



↖ : Vehicle upper

- The angle (b) created by the hose clamp pawl and the specified line (A) must be within  $\pm 30$  as shown in the figure.



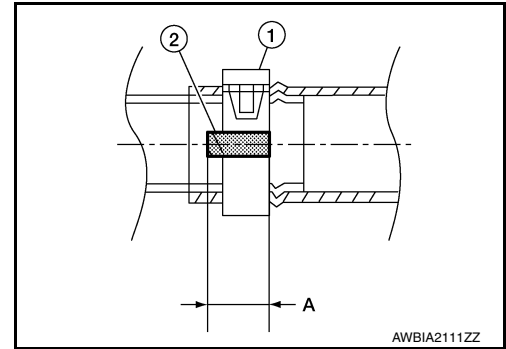
# RADIATOR

[QR25DE]

## < REMOVAL AND INSTALLATION >

- To install hose clamps (1), check that the dimension (A) from the end of the hose clamp on the radiator hose (2) to the hose clamp is within the reference value.

**Dimension "A" : 17.5 mm (0.69 in)**



## Inspection

INFOID:000000012602128

### INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for engine coolant leaks. Refer to [CO-9, "System Inspection"](#).
- Start and warm up the engine. Visually check that there is no leakage of engine coolant and CVT fluid.



# COOLING FAN

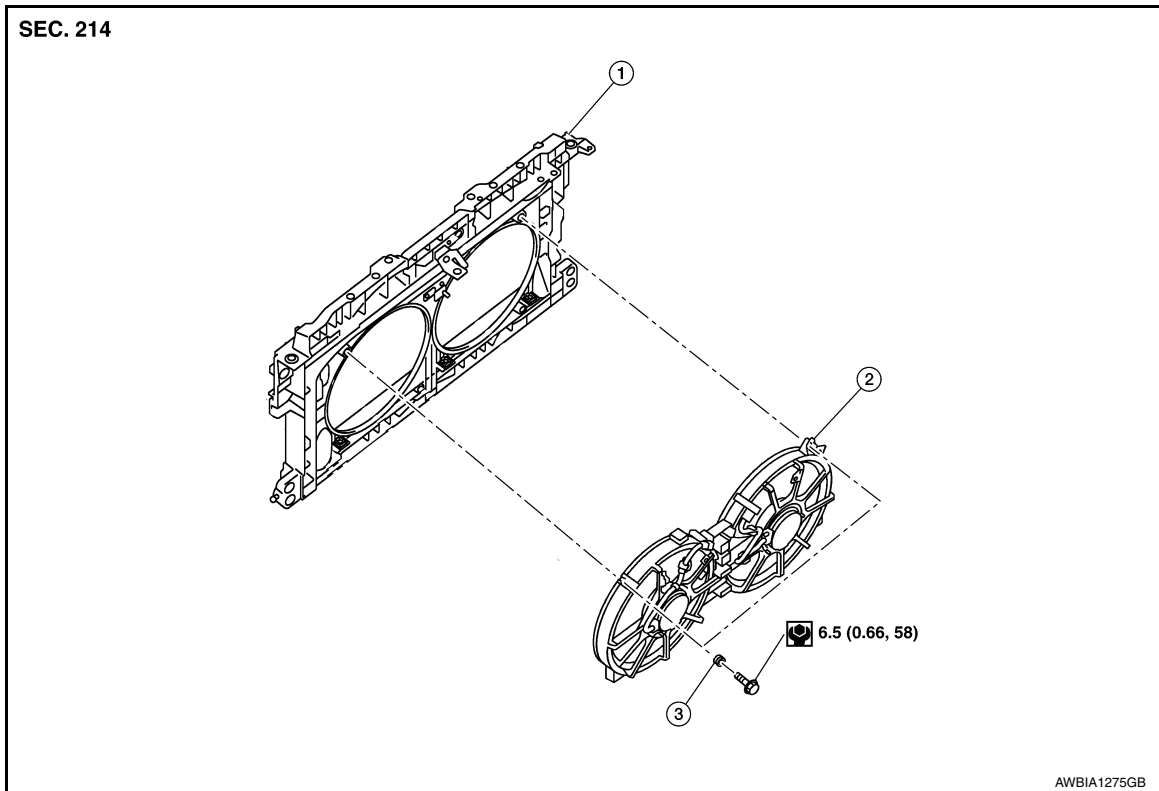
< REMOVAL AND INSTALLATION >

[QR25DE]

## COOLING FAN

### Exploded View

INFOID:000000012602129



1. Radiator core support      2. Fan shroud and motor assembly      3. Grommet

### Removal and Installation

INFOID:000000012602130

#### **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 cap. Slowly push down and turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by pushing it down and turning it all the way.**

#### **NOTE:**

- When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.
- Replace the radiator shroud and cooling fan assembly as a unit. Do not replace cooling fan motors or cooling fan blades separately.

#### REMOVAL

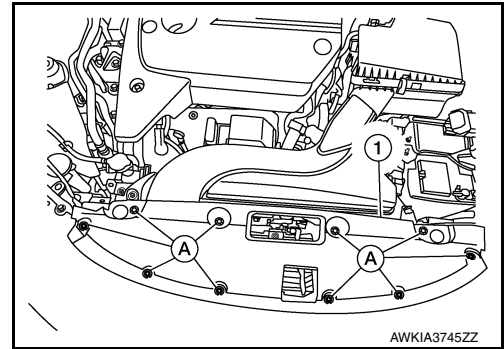
1. Partially drain engine coolant from the radiator. Refer to [CO-11, "Changing Engine Coolant"](#).  
**CAUTION:**
  - Perform when engine is cold.
  - Do not spill coolant on the drive belt.
2. Remove engine room cover. Refer to [EM-28, "Removal and Installation"](#).

## COOLING FAN

[QR25DE]

### < REMOVAL AND INSTALLATION >

3. Remove the core support cover clips (A), then remove the core support cover (1).



4. Remove front air duct. Refer to [EM-146, "Removal and Installation"](#).
5. Remove air cleaner and air duct assembly. Refer to [EM-29, "Removal and Installation"](#).
6. Remove battery tray and battery tray bracket. Refer to [PG-78, "Removal and Installation"](#).
7. Disconnect radiator hose (upper) from radiator.
8. Disconnect the harness connectors from the fan motor.
9. Remove fan shroud and motor assembly.

### INSTALLATION

Installation is in the reverse order of removal.

- After installation refill engine coolant and check for leaks. Refer to [CO-11, "Changing Engine Coolant"](#) and [CO-9, "System Inspection"](#).

#### **CAUTION:**

- **Do not spill coolant in engine compartment. Use a shop cloth to absorb coolant.**
- Cooling fans are controlled by ECM. Refer to [EC-76, "On Board Diagnosis Function"](#).

# WATER PUMP

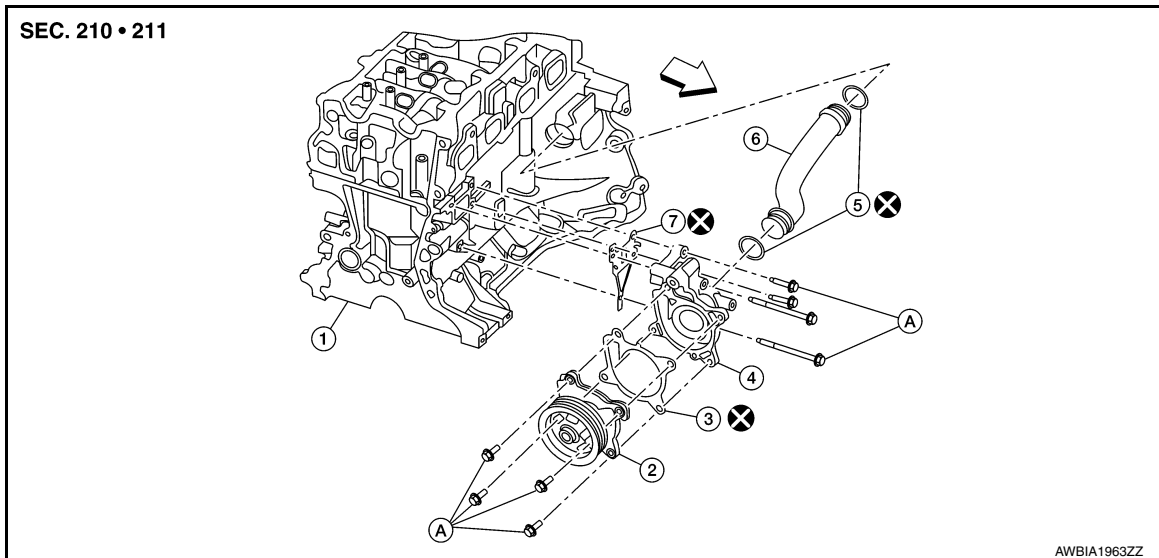
< REMOVAL AND INSTALLATION >

[QR25DE]

## WATER PUMP

### Exploded View

INFOID:000000012602131



- |                              |                          |                      |
|------------------------------|--------------------------|----------------------|
| 1. Cylinder block            | 2. Water pump            | 3. Water pump gasket |
| 4. Water pump housing        | 5. O-ring                | 6. Water pipe        |
| 7. Water pump housing gasket | A. Refer to INSTALLATION | ⇐ Front              |

### Removal and Installation

INFOID:000000012602132

#### **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 cap. Slowly push down and turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by pushing it down and turning it all the way.

#### **CAUTION:**

- When removing water pump assembly, do not 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.

#### **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"](#).

#### **CAUTION:**

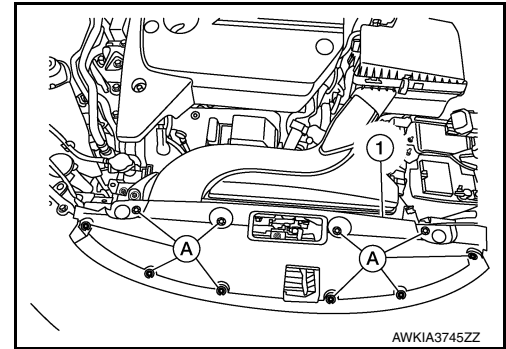
- Perform this step when the engine is cold.
- Do not spill engine coolant on the drive belt.

# WATER PUMP

[QR25DE]

## < REMOVAL AND INSTALLATION >

2. Remove the core support cover clips (A), then remove the core support cover (1).



3. Remove fender protector side cover (RH). Refer to [EXT-36. "FENDER PROTECTOR : Exploded View"](#).
4. Remove front air duct. Refer to [EM-29. "Removal and Installation"](#).
5. Remove generator. Refer to [CHG-32. "QR25DE : Removal and Installation"](#).
6. Remove water pump bolts.
7. Remove the water pump and gasket.

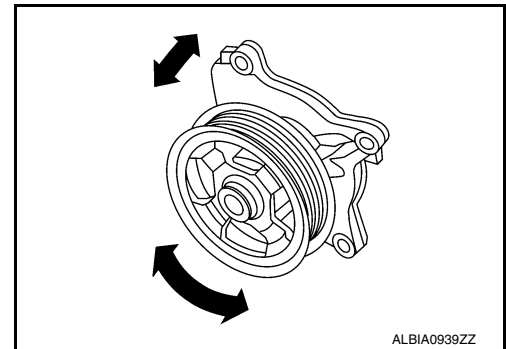
### CAUTION:

- Handle the water pump vane so that it does not contact any other parts.
- Water pump cannot be disassembled and should be replaced as an assembly.

8. Remove water pipe, O-rings, water pump housing, and gasket (if necessary).

## INSPECTION AFTER REMOVAL

- Visually check that there is no significant dirt or rusting on the water pump body and vane.
- Check that there is no looseness in the vane shaft, and that it turns smoothly when rotated by hand.
- If the water pump does not perform properly, replace the water pump assembly.
- Do not reuse O-rings.



## INSTALLATION

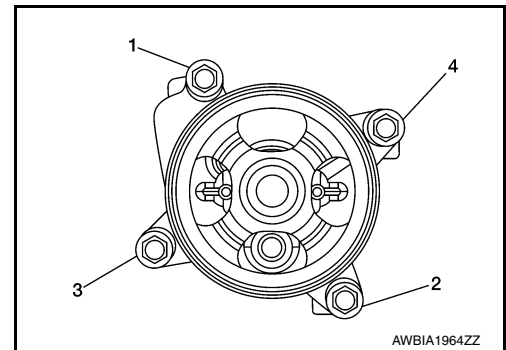
Installation is in the reverse order of removal.

### CAUTION:

- Do not reuse gasket.
- Do not reuse O-ring.

1. Tighten water pump bolts in sequence to specification.

**Bolts : 25 N·m (2.6 kg-m, 18 ft-lb)**



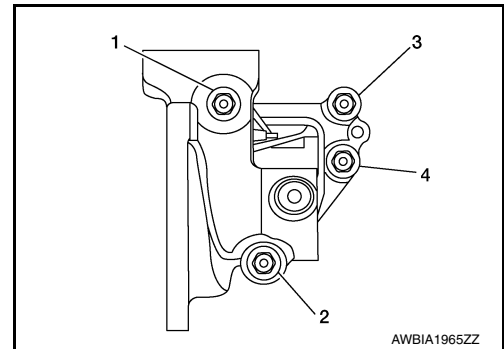
## WATER PUMP

< REMOVAL AND INSTALLATION >

[QR25DE]

2. Tighten water pump housing bolts in sequence to specification.

**Bolts : 22 N·m (2.2 kg-m, 16 ft-lb)**



### INSPECTION AFTER INSTALLATION

- After installation refill engine coolant and check for leaks. Refer to [CO-11. "Changing Engine Coolant"](#) and [CO-9. "System Inspection"](#).

#### **CAUTION:**

- Do not spill coolant in engine compartment. Use a shop cloth to absorb engine coolant.
- Do not reuse water pump gasket.

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# THERMOSTAT AND THERMOSTAT HOUSING

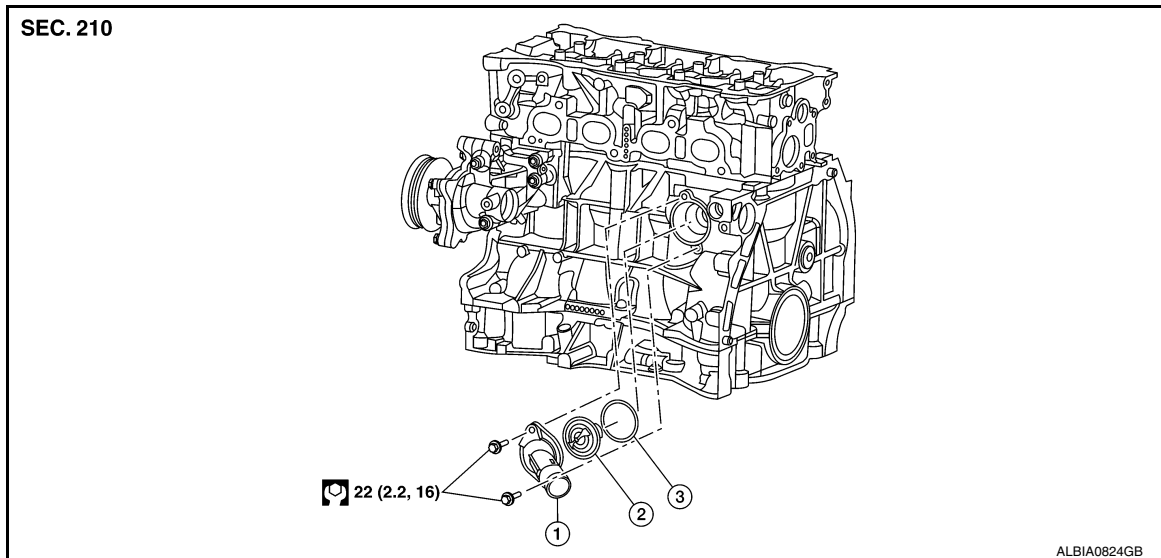
< REMOVAL AND INSTALLATION >

[QR25DE]

## THERMOSTAT AND THERMOSTAT HOUSING

Exploded View

INFOID:000000012602133



1. Water inlet

2. Thermostat

3. Rubber ring

## Removal and Installation

INFOID:000000012602134

### **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 cap. Slowly push down and turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by pushing it down and turning it all the way.

### **NOTE:**

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

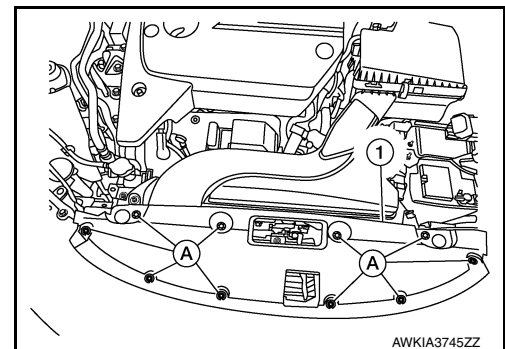
### REMOVAL

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

### **CAUTION:**

- Perform when the engine is cold.
- Do not spill coolant on the drive belt.

2. Remove the core support cover clips (A), then remove the core support cover (1).



3. Remove the front air duct. Refer to [EM-29, "Removal and Installation"](#).
4. Remove front under cover. Refer to [EXT-38, "FRONT UNDER COVER : Removal and Installation"](#).
5. Remove radiator hose (lower) from the water inlet side.
6. Remove exhaust manifold heat shield.
7. Remove water inlet and thermostat.

# THERMOSTAT AND THERMOSTAT HOUSING

< REMOVAL AND INSTALLATION >

[QR25DE]

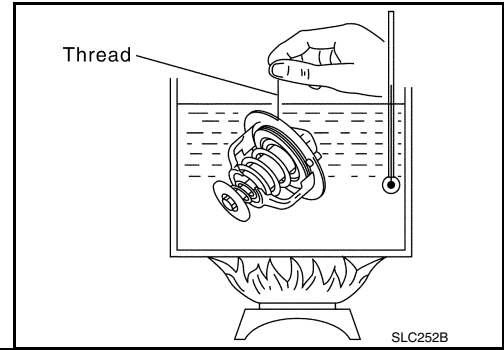
## INSPECTION AFTER REMOVAL

- Place a thread so that it is caught in the valves 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 the thermostat falls from the thread.
- Continue heating. Check the full-open lift amount.

### NOTE:

The full-open lift amount standard temperature for the thermostat is the reference value.

- 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-26. "Thermostat"</a>
Full-open lift amount	Refer to <a href="#">CO-26. "Thermostat"</a>
Valve closing temperature	Refer to <a href="#">CO-26. "Thermostat"</a>

- If valve setting at measured values are out of standard range, replace thermostat.

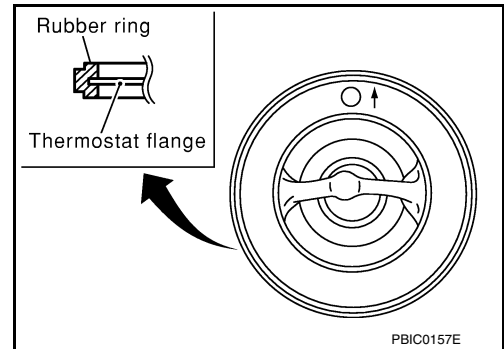
## INSTALLATION

Installation is in the reverse order of removal.

- Install the thermostat with the whole circumference of the flange fitting securely inside the rubber ring.

### CAUTION:

- **Do not reuse rubber ring.**
- **Ensure thermostat rubber ring mounting surface is free from dents or flaws.**
- Install the thermostat with the jiggle valve facing upwards. The position deviation may be within the range of  $\pm 10^\circ$ .
- After installation, refill coolant and check for leaks. Refer to [CO-11. "Changing Engine Coolant"](#) and [CO-9. "System Inspection"](#).



# WATER OUTLET AND WATER PIPING

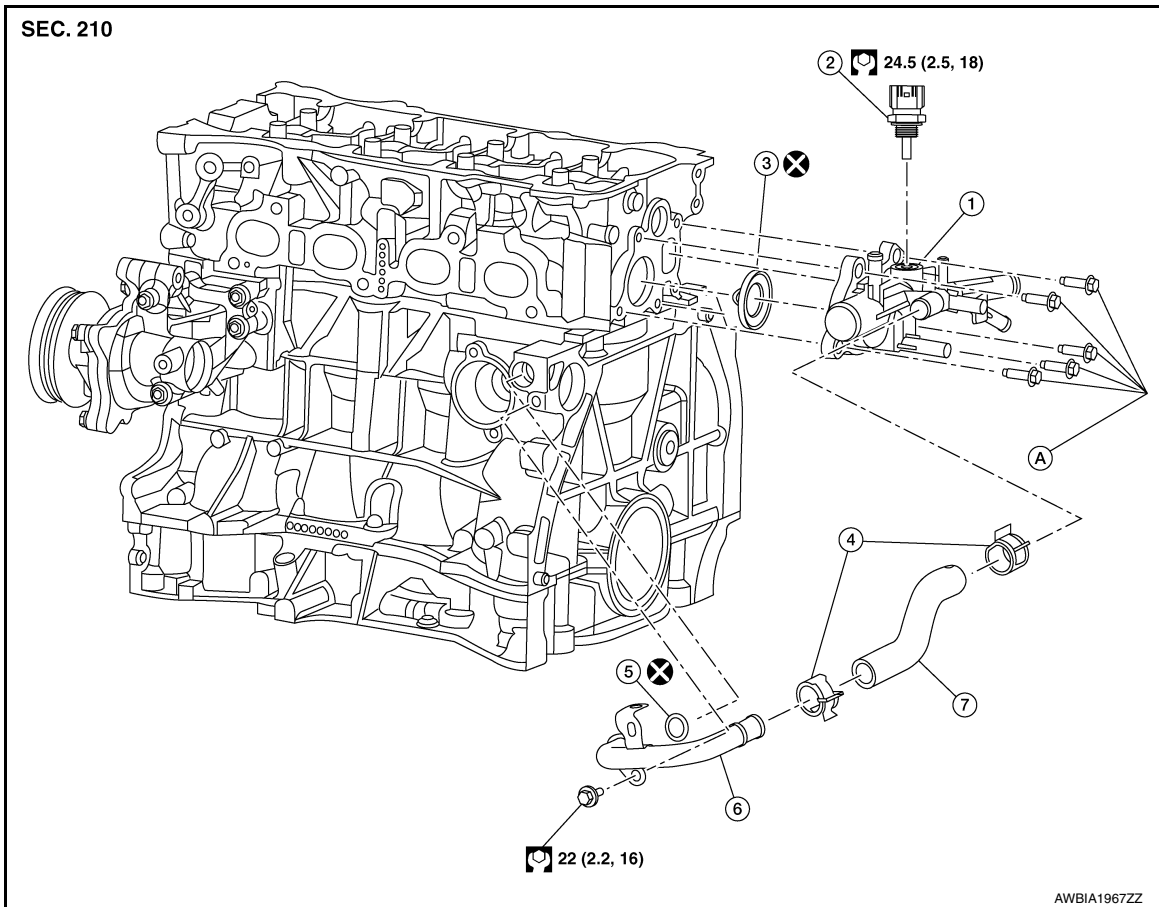
< REMOVAL AND INSTALLATION >

[QR25DE]

## WATER OUTLET AND WATER PIPING

Exploded View

INFOID:000000012602135



- |                 |                             |                |
|-----------------|-----------------------------|----------------|
| 1. Water outlet | 2. Water temperature sensor | 3. O-ring      |
| 4. Clamp        | 5. O-ring                   | 6. Heater pipe |
| 7. Water hose   | A. Refer to INSTALLATION    |                |

### Removal and Installation

INFOID:000000012602136

#### **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 cap. Slowly push down and turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by pushing it down and turning it all the way.

#### **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"](#).

#### **CAUTION:**

Perform when the engine cold.

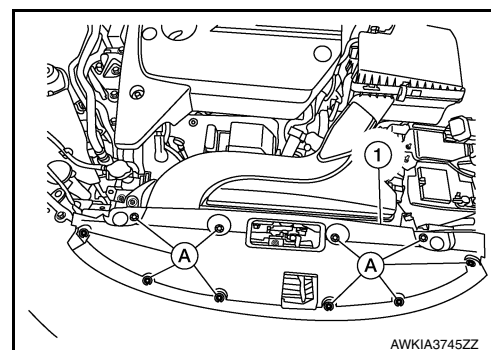


# WATER OUTLET AND WATER PIPING

< REMOVAL AND INSTALLATION >

[QR25DE]

2. Remove the core support cover clips (A), then remove the core support cover (1).



3. Remove air cleaner assembly and front air duct. Refer to [EM-29, "Removal and Installation"](#).
4. Remove the engine room cover. Refer to [EM-28, "Removal and Installation"](#).
5. Remove the upper radiator hose, heater pipe, electric throttle control actuator inlet hose, water hose, and water temperature sensor.
6. Remove the water outlet, O-ring and gasket.  
**CAUTION:**
  - Do not reuse O-ring.
  - Do not reuse gasket.

## INSTALLATION

Installation is in the reverse order of removal.

- Install the engine coolant temperature sensor.  
**Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-21, "Recommended Chemical Products and Sealants"](#).**
- Install the heater pipe, first apply a mild soap to the O-ring and quickly insert the heater pipe into the housing.  
**CAUTION:**
  - Do not reuse O-ring.
  - Do not reuse gasket.
- After installation, refill coolant and check for leaks. Refer to [CO-11, "Changing Engine Coolant"](#) and [CO-9, "System Inspection"](#).  
**CAUTION:**  
Do not spill coolant in engine compartment. Use a shop cloth to absorb coolant.

## SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[QR25DE]

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

#### Capacity

INFOID:0000000012602137

ℓ (US qt, Imp qt)

Coolant capacity (With reservoir tank at MAX level)	7.9 (8-3/8, 7)*
---	-----------------

\*Includes MAX-line quantity (0.75 L) of reservoir tank.

#### Thermostat

INFOID:0000000012602138

Valve opening temperature	80.5 - 83.5°C (177 - 182°F)
Full-open lift amount	More than 8 mm / 95°C (0.315 in / 203°F)
Valve closing temperature	77°C (171°F) or higher

#### Radiator

INFOID:0000000012602139

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

Cap relief pressure	Standard	127 ± 9.8 (1.30 ± 0.10, 18.4 ± 1.42)
Testing pressure		156 (1.6, 23)

PRECAUTION

PRECAUTIONS

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

INFOID:000000012602140

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. 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, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.
- Improper repair, 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 or batteries, and wait at least three minutes before performing any service.

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# PREPARATION

< PREPARATION >

[VQ35DE]

## PREPARATION

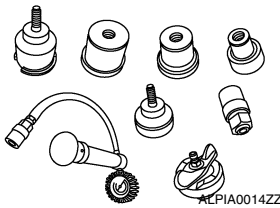
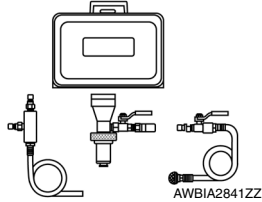
### PREPARATION

#### Special Service Tool

INFOID:000000012602141

The actual shape of the tools may differ from those illustrated here.

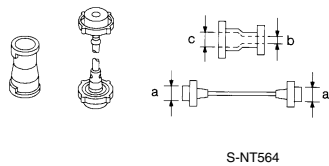
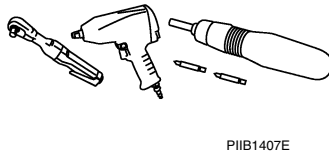
Tool number (TechMate No.) Tool name	Description
KV991J0070 (J-45695-A) Coolant refill tool	Refilling engine cooling system
— (J-51771) Cooling system pressure test kit	Checking cooling system and radiator cap



#### Commercial Service Tools

INFOID:000000012602142

Tool name	Description
Power tool	Loosening nuts, screws and bolts
— (J-33984-A) Radiator pressure adapter	Adapting cooling system pressure tester to radiator cap and reservoir tank cap <b>a: 28 (1.10) diameter</b> <b>b: 31.4 (1.236) diameter</b> <b>c: 41.3 (1.626) diameter</b> Unit: mm (in)

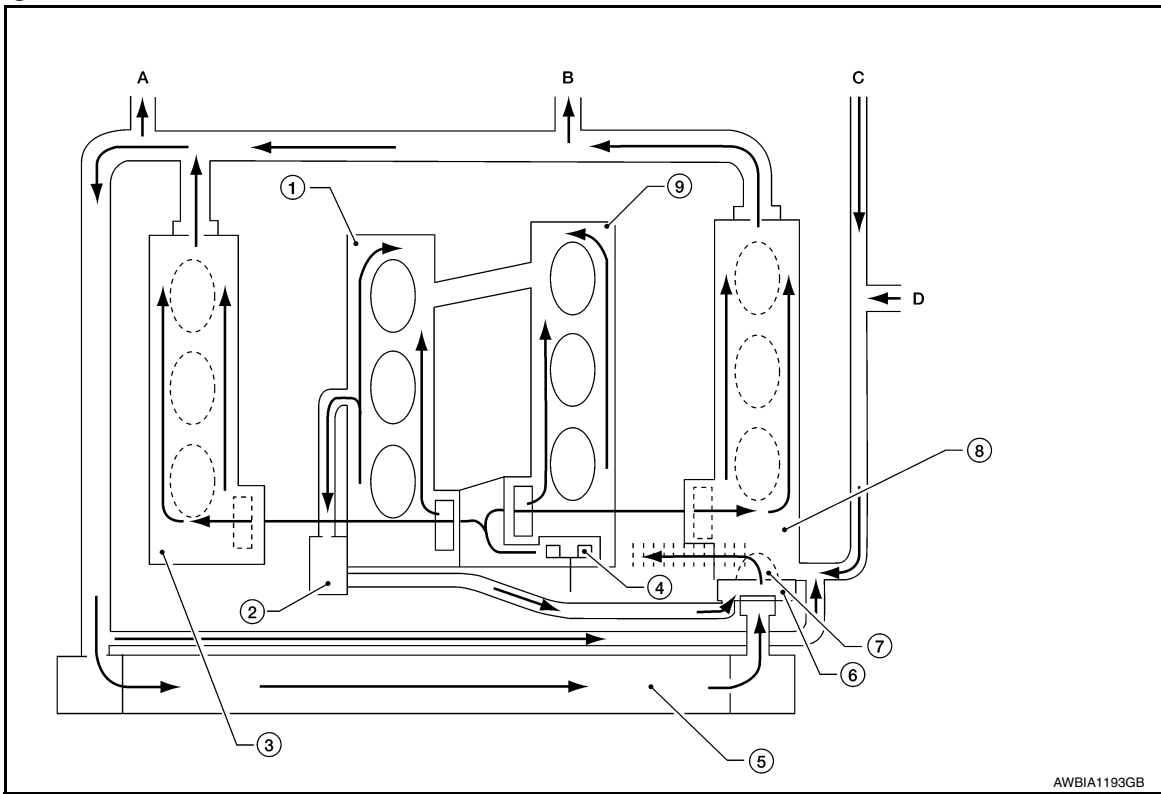


## SYSTEM DESCRIPTION

### COOLING SYSTEM

#### Cooling Circuit

INFOID:0000000012602143



- |  |  |                        |
|--|--|------------------------|
| 1. Cylinder block (RH)                     | 2. Oil cooler                            | 3. Cylinder head (RH)  |
| 4. Water pump                              | 5. Radiator                              | 6. Water inlet         |
| 7. Thermostat                              | 8. Cylinder head (LH)                    | 9. Cylinder block (LH) |
| A. To heater                               | B. To electric throttle control actuator | C. From heater         |
| D. From electric throttle control actuator |  |                        |

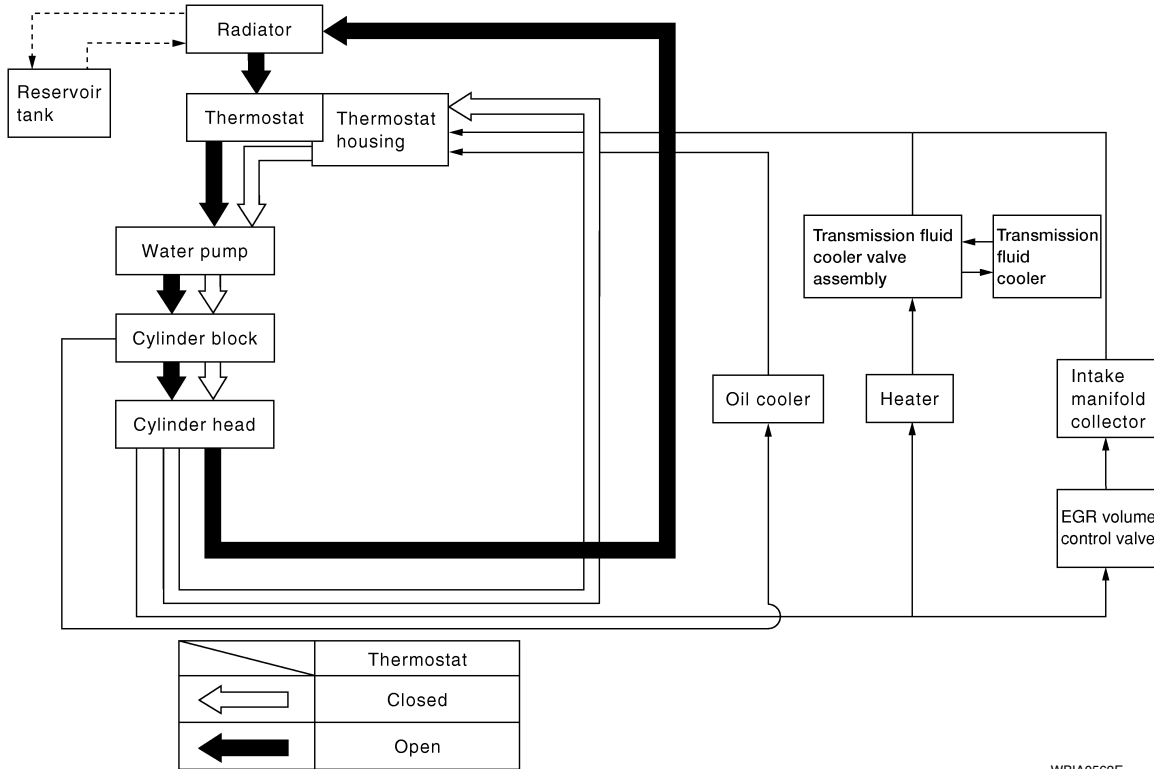
# COOLING SYSTEM

< SYSTEM DESCRIPTION >

[VQ35DE]

## Schematic

INFOID:000000012602144



WBIA0562E

# OVERHEATING CAUSE ANALYSIS

< SYSTEM DESCRIPTION >

[VQ35DE]

## OVERHEATING CAUSE ANALYSIS

### Troubleshooting Chart

INFOID:000000012602145

	Symptom		Check items		
Cooling system parts malfunction	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.)		
	Reduced air flow	Cooling fan does not operate	Fan assembly	—	
		High resistance to fan rotation			
		Damaged fan blades			
		Damaged radiator shroud	—	Radiator shroud	—
		Improper coolant mixture ratio	—	Coolant viscosity	—
		Poor coolant quality	—		—
	Insufficient coolant	Coolant leaks	Cooling hose	Loose clamp	
				Cracked hose	
			Water pump	Poor sealing	
			Radiator cap	Loose	
Poor sealing					
Radiator			O-ring for damage, deterioration or improper fitting		
		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			

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# OVERHEATING CAUSE ANALYSIS

< SYSTEM DESCRIPTION >

[VQ35DE]

	Symptom		Check items	
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	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	
			Dragging brakes	
	Improper ignition timing			
	Blocked or restricted air flow	Blocked bumper	Blocked air flow	—
		Blocked radiator grille	Installed car brassiere	
			Mud contamination or paper clogging	
Blocked radiator		Blocked air flow		
Blocked condenser				
Installed large fog lamp				



# PERIODIC MAINTENANCE

## ENGINE COOLANT

### System Inspection

INFOID:0000000012602146

#### WARNING:

- Do not remove the radiator cap or reservoir tank cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the cooling system.
- When removing the radiator cap or reservoir tank cap, wrap a thick cloth around the cap and slowly turn it a quarter turn to allow built-up pressure to escape. Then carefully remove the cap by turning it all the way.

#### CHECKING COOLING SYSTEM HOSES

Check hoses for the following:

- Improper attachment
- Leaks
- Cracks
- Dents
- Bulges
- Internal obstruction
- Damage
- Loose connections
- Chafing
- Deterioration

#### CHECKING RESERVOIR LEVEL

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

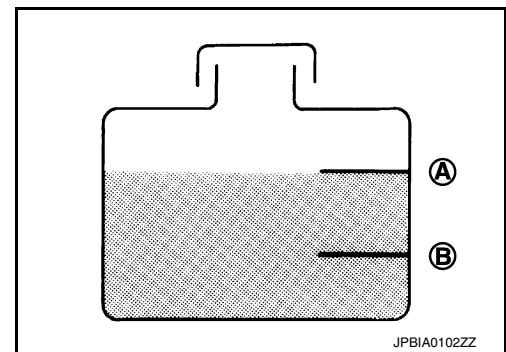
(A) : MAX

(B) : MIN

- Adjust coolant level (if necessary), to ensure that the engine coolant level is within the MIN to MAX range.

#### CAUTION:

Refill Genuine NISSAN Long Life Antifreeze/Coolant (blue) or equivalent in its quality mixed with water (distilled or demineralized). Refer to [MA-12, "Fluids and Lubricants"](#).



#### CHECKING COOLING SYSTEM FOR LEAKS

#### WARNING:

- Do not remove the radiator cap or reservoir tank cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the cooling system.
- When removing the radiator cap or reservoir tank cap, wrap a thick cloth around the cap and slowly turn it a quarter turn to allow built-up pressure to escape. Then carefully remove the cap by turning it all the way.

To check the cooling system for leaks, apply pressure to the cooling system using tool (A).

Tool number (A) : — (J-51771)

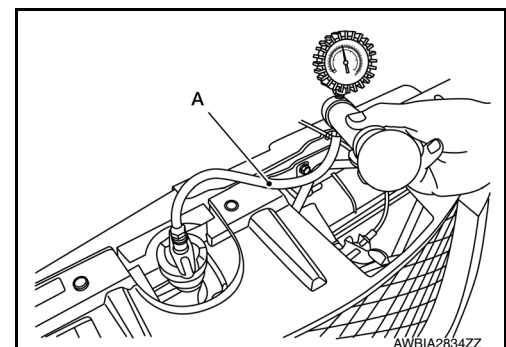
Leakage test pressure : Refer to [CO-50, "Radiator"](#).

#### CAUTION:

Higher testing pressure than specified may cause radiator damage.

#### NOTE:

- If engine coolant decreases, replenish radiator with engine coolant. Refer to [MA-12, "Fluids and Lubricants"](#).
- If anything is found, repair or replace damaged parts.



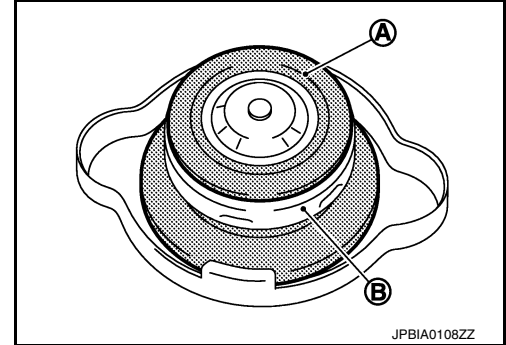
## CHECKING RADIATOR CAP

### WARNING:

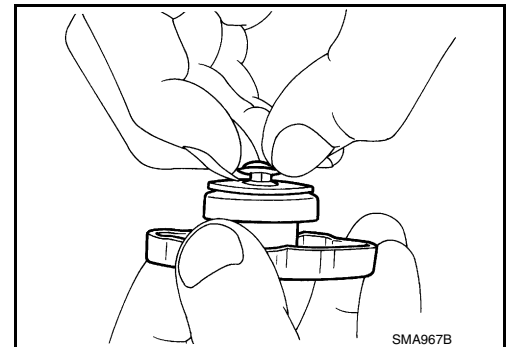
- Do not remove the radiator cap or reservoir tank cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the cooling system.
- When removing the radiator cap or reservoir tank cap, wrap a thick cloth around the cap and slowly turn it a quarter turn to allow built-up pressure to escape. Then carefully remove the cap by turning it all the way.
- Check the pressure valve of the radiator cap.
  - Replace the radiator cap if the metal plunger (B) on the pressure valve cannot be seen around the edge of the rubber gasket (A).
  - Replace the radiator cap if there is damage or deposits of foreign material on the rubber gasket or pressure valve.

### CAUTION:

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

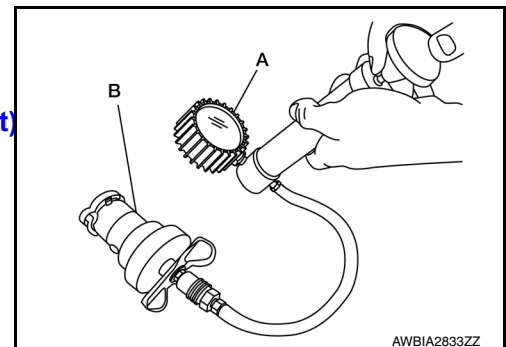


- Check the negative-pressure valve of the radiator cap.
  - Replace the radiator cap if the negative-pressure valve does not close completely when pulled open and released.
  - Replace the radiator cap if there is damage or deposits of foreign material on the valve seat of the negative-pressure valve.
  - Replace the radiator cap if there is an abnormality in the operation of the negative-pressure valve.



- Check radiator cap relief pressure.
  - Check the radiator cap relief pressure using Tool (A) and tool (B).

Tool number (A) : — (J-51771)  
 Tool number (B) : — (J-33984-A or equivalent) (commercially available)  
 Radiator cap relief pressure : Refer to [CO-50, "Radiator"](#).



- When connecting the radiator cap to tool (B), apply water or coolant to the radiator cap seal surface.
- Replace the radiator cap if the radiator cap relief pressure is out-side of specification.

## CHECKING RADIATOR

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

### CAUTION:

- Do not bend or damage the radiator fins.
- When radiator is cleaned on-vehicle, remove surrounding parts in order to access the radiator core. Tape the harness and electrical connectors to prevent water from entering.

1. Spray water to the back side of the radiator core using a side to side motion from the top down.
2. Stop spraying when debris no longer flows from radiator core.
3. Blow air into the back side of radiator core using a side to side motion from the top down.
  - 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. Continue to blow air until no water sprays out.
5. Check for coolant leaks. Repair as necessary.

## Changing Engine Coolant

INFOID:000000012602147

**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 cap. Slowly push down and turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by pushing it down and turning it all the way.

## DRAINING ENGINE COOLANT

1. Remove the front under cover. Refer to [EXT-38, "FRONT UNDER COVER : Removal and Installation"](#).
2. 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:**

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

3. Follow this step for heater core removal/replacement only. Disconnect the upper heater hose at the engine side and apply moderate air pressure [103.46 kPa (1.055 kg/cm<sup>2</sup>, 15 psi) maximum air pressure] into the hose for 30 seconds to blow the excess coolant out of the heater core.
4. When draining all of the coolant in the system, remove the reservoir tank and drain the coolant, then clean the reservoir tank before installation.

**CAUTION:**

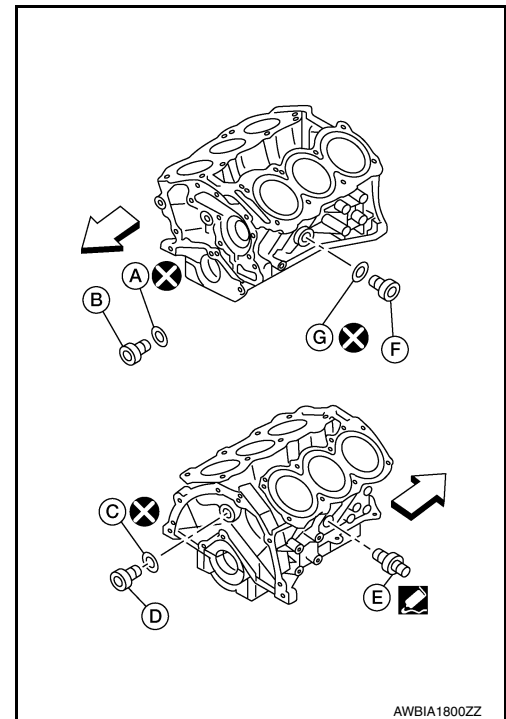
- Do not allow the coolant to contact the drive belts.
- Perform this step when engine is cold.

5. When draining all of the coolant in the system for engine removal or repair, open all of the drain plugs (A-F) on the cylinder block.
6. Check the drained coolant for contaminants such as rust, corrosion or discoloration. If the coolant is contaminated, flush the engine cooling system.

← : Engine front

**NOTE:**

For Canada, (F) is not plug but block heater.



## REFILLING ENGINE COOLANT

1. Install the following, if removed:
  - Cylinder block drain plugs, refer to [EM-230, "Exploded View"](#).
  - Reservoir tank, refer to [CO-37, "Exploded View"](#).
  - Cooling system hoses, refer to [CO-37, "Exploded View"](#).
  - Radiator drain plug, refer to [CO-37, "Exploded View"](#).
2. Set the vehicle heater controls to the full HOT and heater ON positions. Turn the vehicle ignition ON with the engine OFF as necessary to activate the heater mode.

## ENGINE COOLANT

[VQ35DE]

### < PERIODIC MAINTENANCE >

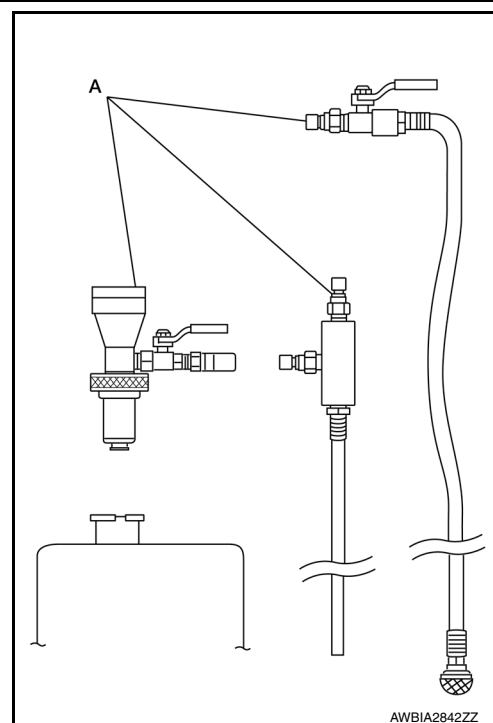
- Fill the cooling system with engine coolant using Tool (A), following the manufacturer's instructions included with the tool.

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

**Engine Coolant** : Refer to [MA-12, "Fluids and Lubricants"](#).

**CAUTION:**

- Use recommended coolant or equivalent.
  - Do not use any cooling system additives such as radiator sealer. Additives may clog the cooling system and cause damage to the engine, transmission or cooling system.
  - The compressed air supply must be equipped with an air dryer.
- Remove the Tool (A) and top off the cooling system with engine coolant as necessary.



- Install the radiator cap and reservoir tank cap.
- Run the engine until it reaches normal operating temperature.

**CAUTION:**

**Do not allow the engine to exceed normal operating temperature or engine damage may occur.**

- Stop the engine and allow it to cool.
- Check the engine coolant level and adjust if necessary.

### FLUSHING COOLING SYSTEM

- Fill the radiator from the filler neck above the radiator upper hose and reservoir tank with clean water and reinstall radiator filler cap.
- Run the engine until it reaches normal operating temperature.
- Rev the engine two or three times under no-load.
- Stop the engine and wait until it cools down.
- Drain the water from the system. Refer to [CO-35, "Changing Engine Coolant"](#).
- Repeat steps 1 through 5 until clear water begins to drain from the radiator.

# RADIATOR

< REMOVAL AND INSTALLATION >

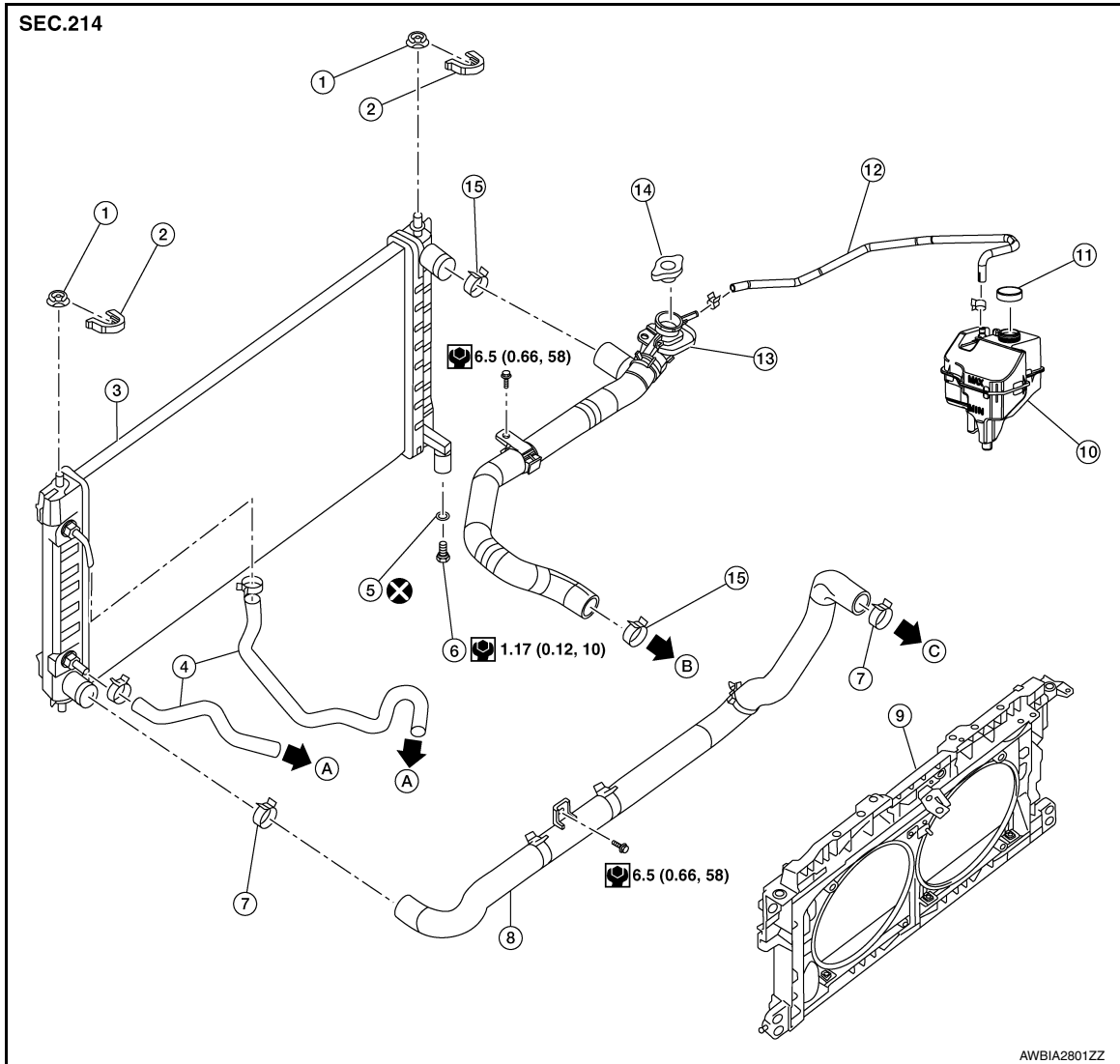
[VQ35DE]

## REMOVAL AND INSTALLATION

### RADIATOR

#### Exploded View

INFOID:000000012602148



- |                            |                               |                          |
|----------------------------|-------------------------------|--------------------------|
| 1. Mounting rubber (upper) | 2. Mounting bracket (upper)   | 3. Radiator              |
| 4. CVT oil cooler hose     | 5. Radiator drain cock O-ring | 6. Radiator drain cock   |
| 7. Clamp                   | 8. Radiator hose (lower)      | 9. Radiator core support |
| 10. Reservoir tank         | 11. Reservoir tank cap        | 12. Reservoir tank hose  |
| 13. Radiator hose (upper)  | 14. Radiator cap              | 15. Clamp                |
| A. To CVT                  | B. To water outlet            | C. To water inlet        |

#### Removal and Installation

INFOID:000000012602149

#### **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 cap. Slowly push down and turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by pushing it down and turning it all the way.

#### **NOTE:**

# RADIATOR

[VQ35DE]

## < REMOVAL AND INSTALLATION >

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

### REMOVAL

1. Remove radiator cap and drain engine coolant from radiator. Refer to [CO-35. "Changing Engine Coolant"](#).  
**CAUTION:**
  - Perform this step when the engine is cold.
  - Do not spill coolant on the drive belt.
2. Remove front air duct. Refer to [EM-146. "Removal and Installation"](#).
3. Disconnect coolant reservoir hose from the radiator.
4. Remove fender protector side covers (LH/RH). Refer to [EXT-36. "FENDER PROTECTOR : Exploded View"](#).
5. Disconnect radiator hose (upper) and radiator hose (lower) from the radiator.  
**CAUTION:**  
**Do not allow the coolant to contact the drive belt.**  
**NOTE:**  
The radiator hose clamps on the radiator hose (upper) and on the radiator hose (lower), are not serviced separately. Radiator hose clamps are part of the radiator hose assembly and serviced as one unit with the radiator hose.
6. Disconnect the CVT oil cooler hoses.
7. Remove the front bumper fascia. Refer to [EXT-25. "Removal and Installation"](#).
8. Remove A/C condenser. Refer to [HA-37. "CONDENSER : Removal and Installation"](#).  
**CAUTION:**  
**Do not damage condenser core.**
9. Remove the radiator mounts (upper).
10. Remove radiator.  
**CAUTION:**  
**Do not damage or scratch the radiator core when removing.**

### INSTALLATION

Installation is in the reverse order of removal.

- After installation, refill coolant and check for leaks. Refer to [CO-35. "Changing Engine Coolant"](#) and [CO-33. "System Inspection"](#).  
**CAUTION:**  
**Do not spill coolant in engine compartment. Use a shop cloth to absorb coolant.**

### Inspection

INFOID:000000012602150

### INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for engine coolant leaks. Refer to [CO-33. "System Inspection"](#).
- Start and warm up the engine. Visually check that there is no leakage of engine coolant and CVT fluid.

# COOLING FAN

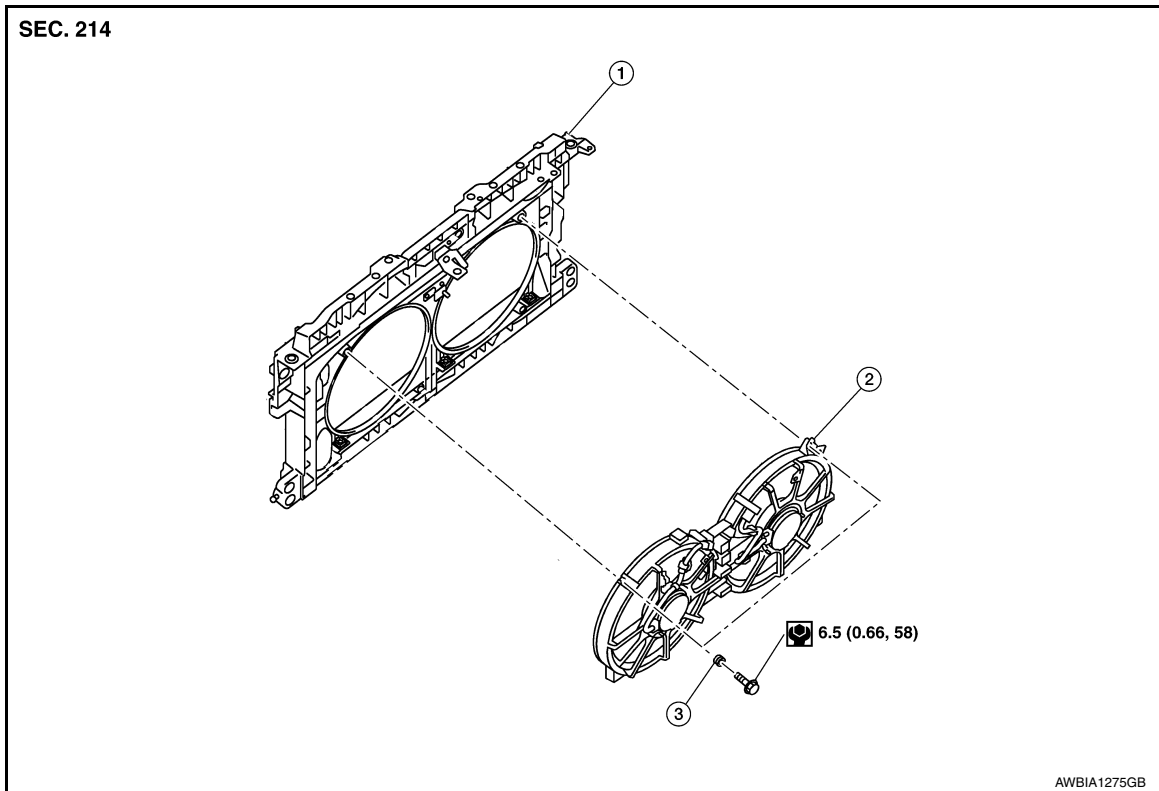
< REMOVAL AND INSTALLATION >

[VQ35DE]

## COOLING FAN

### Exploded View

INFOID:000000012602151



1. Radiator core support      2. Fan shroud and motor assembly      3. Grommet

### Removal and Installation

INFOID:000000012602152

#### **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 cap. Slowly push down and turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by pushing it down and turning it all the way.**

#### **NOTE:**

- When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.
- Replace the radiator shroud and cooling fan assembly as a unit. Do not replace cooling fan motors or cooling fan blades separately.

#### REMOVAL

1. Partially drain engine coolant from the radiator. Refer to [CO-35, "Changing Engine Coolant"](#).

#### **CAUTION:**

- Perform when engine is cold.
- Do not spill coolant on the drive belt.

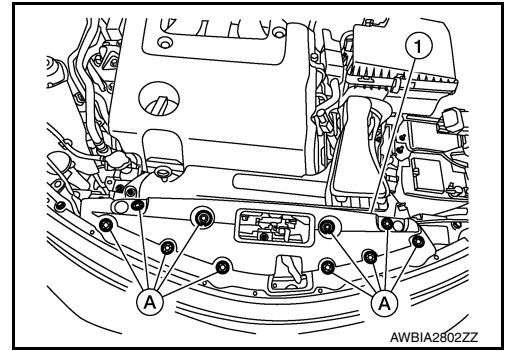
2. Remove engine room cover. Refer to [EM-28, "Removal and Installation"](#).

## COOLING FAN

[VQ35DE]

### < REMOVAL AND INSTALLATION >

3. Remove the core support cover clips (A), then remove the core support cover (1).



4. Remove air cleaner and air duct assembly. Refer to [EM-146, "Removal and Installation"](#).
5. Remove battery tray and battery tray bracket. Refer to [PG-78, "Removal and Installation"](#).
6. Disconnect radiator hose (upper) from radiator.
7. Disconnect the harness connectors from the fan motor.
8. Remove fan shroud and motor assembly.

### INSTALLATION

Installation is in the reverse order of removal.

- After installation refill engine coolant and check for leaks. Refer to [CO-35, "Changing Engine Coolant"](#) and [CO-33, "System Inspection"](#).

#### **CAUTION:**

- **Do not spill coolant in engine compartment. Use a shop cloth to absorb coolant.**
- Cooling fans are controlled by ECM. Refer to [EC-639, "On Board Diagnosis Function"](#).



# WATER PUMP

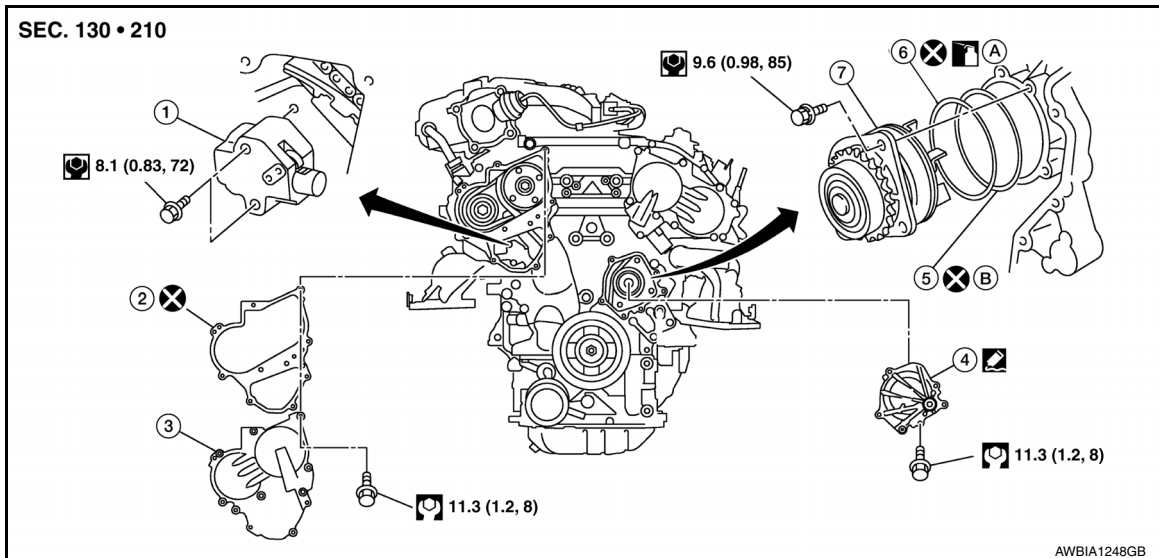
< REMOVAL AND INSTALLATION >

[VQ35DE]

## WATER PUMP

### Exploded View

INFOID:000000012602153



- |                                     |   |  |
|-------------------------------------|---|--|
| 1. Timing chain tensioner (primary) | 2. Valve timing control cover gasket (bank 1) | 3. Valve timing control cover (bank 1) |
| 4. Water pump cover                 | 5. O-ring                                     | 6. O-ring                              |
| 7. Water pump                       | A. Apply engine oil                           | B. Apply engine coolant                |

### Removal and Installation

INFOID:000000012602154

#### **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 cap. Slowly push down and turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by pushing it down and turning it all the way.

#### **CAUTION:**

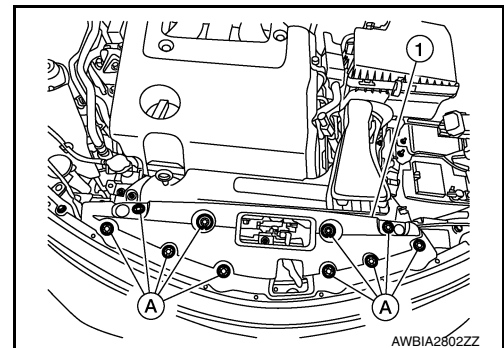
- When removing water pump assembly, do not get coolant on drive belt.
- Water pump cannot be disassembled and must be replaced as a unit.
- After installing the water pump, connect hose and clamp securely, then check for leaks. Repair as necessary.

#### **NOTE:**

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

#### REMOVAL

1. Disconnect the negative battery terminal. Refer to [PG-78, "Removal and Installation"](#).
2. Remove the core support cover clips (A), then remove the core support cover (1).



3. Remove front air duct. Refer to [EM-146, "Removal and Installation"](#).

# WATER PUMP

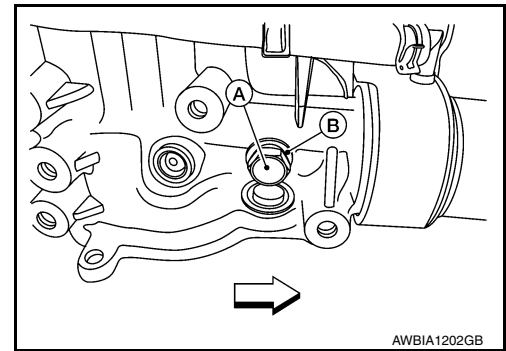
[VQ35DE]

## < REMOVAL AND INSTALLATION >

4. Remove cowl top extension. Refer to [EXT-34, "Removal and Installation"](#).
  5. Remove front under cover. Refer to [EXT-38, "FRONT UNDER COVER : Removal and Installation"](#).
  6. Drain coolant from the radiator. Refer to [CO-35, "Changing Engine Coolant"](#).
- CAUTION:**  
**Perform when the engine is cold.**
7. Disconnect coolant reservoir hose and remove coolant reservoir tank. Refer to [CO-37, "Exploded View"](#).
  8. Drain the power steering fluid reservoir. Refer to [ST-31, "Draining and Refilling"](#).
  9. Remove the power steering oil pump. Refer to [ST-39, "Removal and Installation"](#).
  10. Support engine and remove the RH engine insulator and bracket. Refer to [EM-226, "Exploded View"](#).
  11. Set No. 1 cylinder at TDC on its compression stroke.
    - Align pointer with TDC mark on crankshaft pulley.
  12. Remove drive belt. Refer to [EM-136, "Removal and Installation"](#).
  13. Remove the drive belt auto-tensioner assembly. Refer to [EM-138, "Removal and Installation of Drive Belt Auto-tensioner"](#).
  14. Remove water drain plug (A) and copper sealing washer (B) to drain coolant from engine.

**CAUTION:**  
**Do not reuse copper sealing washers.**

⇐ : Engine front



15. Disconnect valve timing control harness connectors and remove valve timing control cover (bank 1). Refer to [EM-176, "Valve Timing Control Cover \(bank 1\)"](#).

16. Remove water pump cover. Refer to [EM-178, "Exploded View"](#).

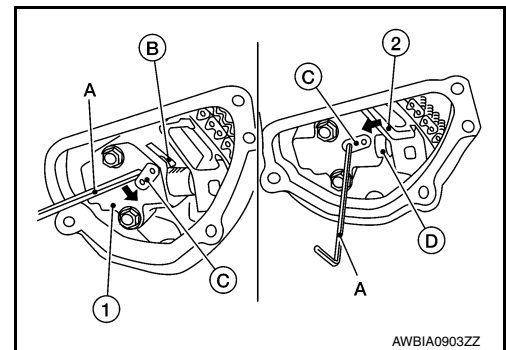
17. Remove the timing chain tensioner (primary) as follows:

- a. Pull the lever (C) down to release the plunger stopper tab (B).
- b. Insert the stopper pin A into the tensioner body hole to hold the lever (C) and keep the plunger stopper tab (B) released.

**NOTE:**

An allen wrench [(1.2 mm (0.047 in))] is used for a stopper pin A as an example.

- c. Compress the plunger (D) into the tensioner body (1) by pressing the slack guide (2).
- d. Keep the slack guide (2) pressed and lock the plunger (D) in by pushing the stopper pin A through the lever (C) and into the chain tensioner body hole.
- e. Remove timing chain tensioner bolts and then remove the timing chain tensioner.



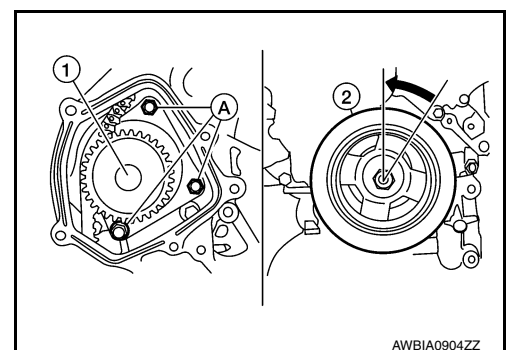
**CAUTION:**

**Do not drop timing chain tensioner bolts inside timing chain case.**

18. Remove the three water pump bolts (A). Make a gap between water pump sprocket (1) and timing chain, by carefully turning crankshaft pulley (2) counterclockwise until timing chain loosens on water pump sprocket (1).

**CAUTION:**

**Be careful not to drop water pump bolts inside the timing chain case.**

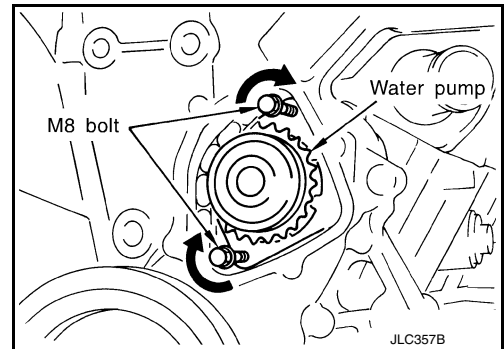


# WATER PUMP

[VQ35DE]

## < REMOVAL AND INSTALLATION >

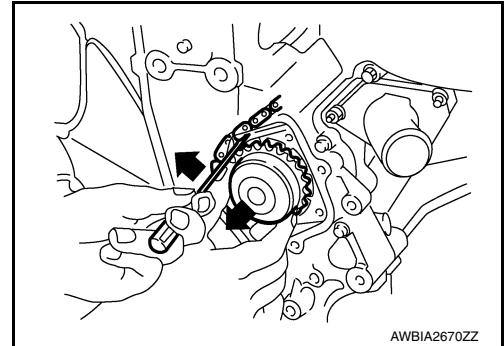
19. Screw M8 bolts [pitch: 1.25 mm (0.49 in) length: approximately 50 mm (1.97 in)] into water pumps upper and lower bolt holes until the reach the timing chain case.



20. Hold the timing chain to the side using a suitable tool and alternately tighten the M8 bolts for a half turn until the water pump can be removed.

**CAUTION:**

- Place a suitable shop cloth below the water pump housing to prevent any engine coolant from dripping into the timing chain case.
- Remove water pump without causing sprocket to contact timing chain.
- Pull water pump straight out while preventing vane from contacting the engine block and timing chain case.
- It may be necessary to adjust the timing chain until it loosens enough to remove the water pump.



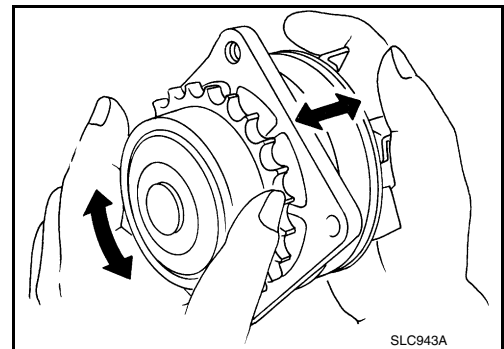
21. Remove M8 bolts and O-rings from water pump.

**CAUTION:**

**Do not reuse O-rings.**

## 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.



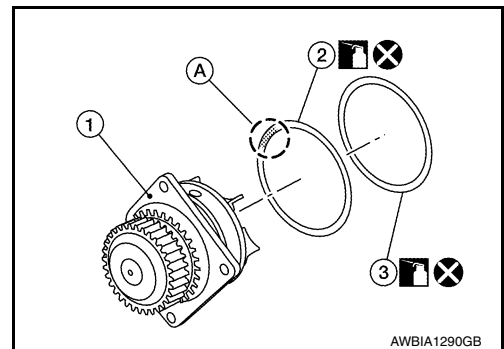
## INSTALLATION

1. Install new O-rings on water pump (1).

**CAUTION:**

**Do not reuse O-rings.**

- a. Apply engine coolant to the O-rings (2, 3) as shown.
- b. Locate the O-ring (2) with white paint mark (A) to engine front side.



A  
CO  
C  
D  
E  
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H  
I  
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L  
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O  
P

# WATER PUMP

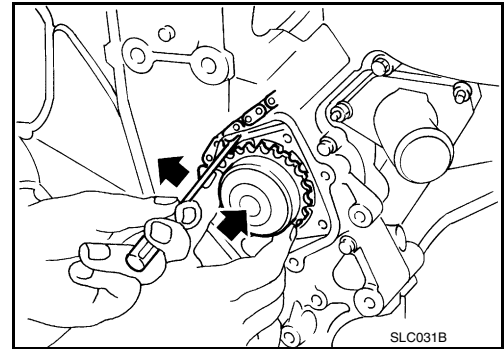
[VQ35DE]

## < REMOVAL AND INSTALLATION >

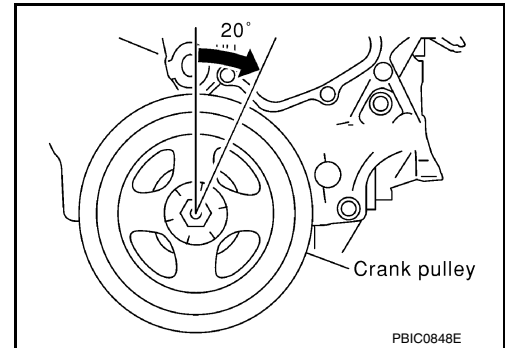
2. Hold timing chain to the side and install the water pump.

**CAUTION:**

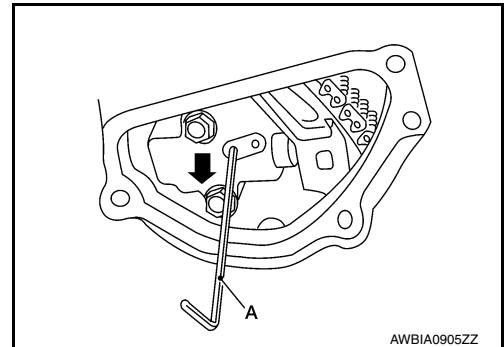
- Install water pump without causing sprocket to contact timing chain.
- It may be necessary to adjust the timing chain until it loosens enough to install the water pump.
- Install water pump straight in while preventing vane from contacting the engine block and timing chain case.
- Be careful not to damage the O-rings when installing the water pump.
- Check that timing chain and water pump sprocket are engaged.
- Tighten water pump bolts alternately and evenly to specification.



3. Remove dust and foreign material completely from installation area of timing chain tensioner and rear timing chain case.
4. Turn the crankshaft pulley approximately 20° clockwise so that the timing chain on the timing chain tensioner side is loose.



5. Apply engine oil to the oil feed hole and timing chain tensioner and install the timing chain tensioner.
6. Remove the stopper pin (A).



7. Install valve timing control cover (bank 1) and water pump cover.
- a. Before installing, remove all traces of liquid gasket from mating surface of water pump cover and IVT cover using a scraper. Also remove traces of liquid gasket from the mating surface of the front cover.
- b. Apply a continuous bead of liquid gasket to mating surface of IVT cover and water pump cover. **Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-21, "Recommended Chemical Products and Sealants"](#).**
- CAUTION:**
- Installation should be done within 5 minutes after applying liquid gasket.
  - Do not fill the engine with oil for at least 30 minutes after the components are installed to allow the sealant to cure.

# WATER PUMP

[VQ35DE]

## < REMOVAL AND INSTALLATION >

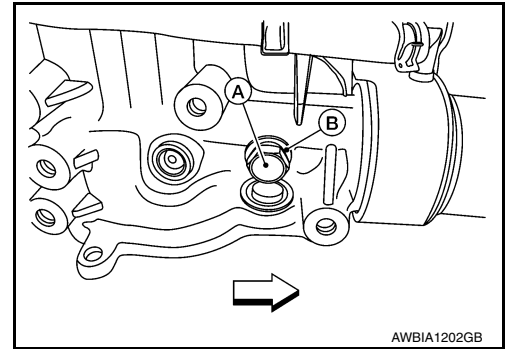
8. Install water drain plug (A) and copper sealing washer (B).

**CAUTION:**

**Do not reuse copper sealing washers.**

← : Engine front

**Water drain plug (A) : Refer to [CO-35, "Changing Engine Coolant"](#).**



9. Installation of remaining components is in the reverse order of removal.
- After installation, refill coolant and check for leaks. Refer to [CO-35, "Changing Engine Coolant"](#) and [CO-33, "System Inspection"](#).

**CAUTION:**

**Do not spill coolant in engine compartment. Use a shop cloth to absorb coolant.**

- After starting engine, let idle for three minutes, then rev engine up to 3,000 rpm no load to purge air from the high-pressure chamber of the chain tensioner. The engine may produce a rattling noise. This indicates that air still remains in the chamber and is not a matter of concern.

### 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-12, "Fluids and Lubricants"](#).
- 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	Leaks	Level
Engine oil		Level	Leaks	Level
Transmission/transaxle fluid	CVT Models	Leaks	Level/Leaks	Leaks
Other oils and fluids*		Level	Leaks	Level
Fuel		Leaks	Leaks	Leaks
Exhaust gas		—	Leaks	—

\*Power steering fluid, brake fluid, etc.

# THERMOSTAT AND THERMOSTAT HOUSING

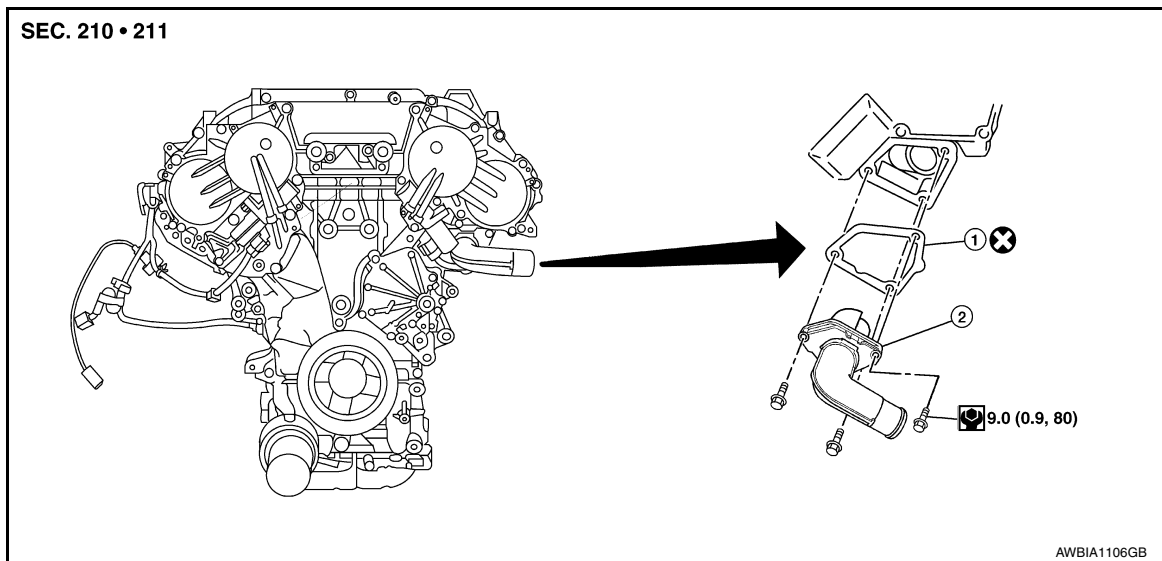
< REMOVAL AND INSTALLATION >

[VQ35DE]

## THERMOSTAT AND THERMOSTAT HOUSING

Exploded View

INFOID:000000012602155



1. Gasket
2. Thermostat assembly

### Removal and Installation

INFOID:000000012602156

#### **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 cap. Slowly push down and turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by pushing it down and turning it all the way.

#### **NOTE:**

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

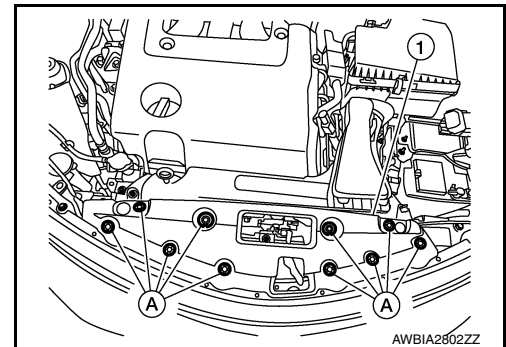
#### REMOVAL

1. Drain engine coolant from the radiator. Refer to [CO-35, "Changing Engine Coolant"](#).

#### **CAUTION:**

**Perform when engine is cool.**

2. Remove the core support cover clips (A), then remove the core support cover (1).



3. Remove front air duct. Refer to [EM-146, "Removal and Installation"](#).
4. Disconnect radiator hose (lower).
5. Remove coolant reservoir hose.
6. Remove coolant reservoir tank. Refer to [CO-37, "Exploded View"](#).
7. Disconnect IVT control valve connector.

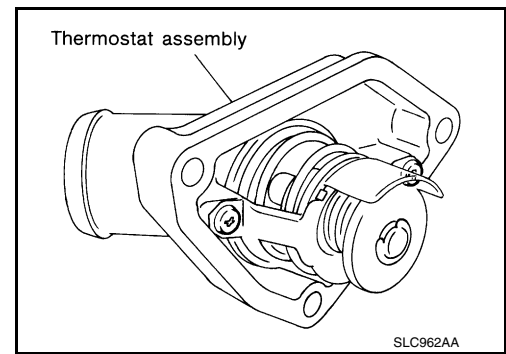


# THERMOSTAT AND THERMOSTAT HOUSING

[VQ35DE]

## < REMOVAL AND INSTALLATION >

8. Remove engine coolant inlet, thermostat assembly and gasket.
- **Do not disassemble engine coolant inlet and thermostat. Replace them as a unit, if necessary.**
  - **Do not reuse gasket.**



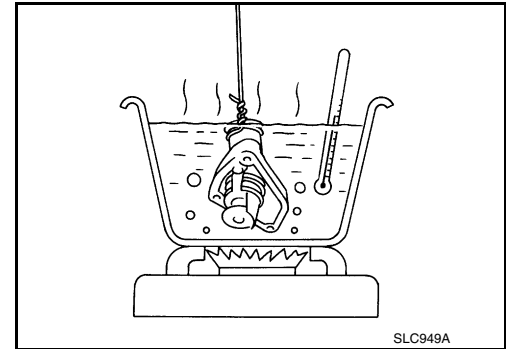
## INSPECTION AFTER REMOVAL

- Place a thread so that it is caught in the valves 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 the thermostat falls from the thread.
- Continue heating. Check the full-open lift amount.

### NOTE:

The full-open lift amount standard temperature for the thermostat is the reference value.

- 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-50. "Thermostat"</a>
Full-open lift amount	Refer to <a href="#">CO-50. "Thermostat"</a>
Valve closing temperature	Refer to <a href="#">CO-50. "Thermostat"</a>

- If valve setting at measured values are out of standard range, replace thermostat.

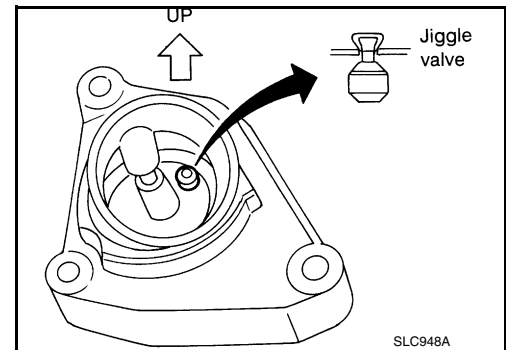
## INSTALLATION

Installation is in the reverse order of removal.

- Install thermostat with jiggle valve facing upward.
- After installation refill engine coolant and check for leaks. Refer to [CO-35. "Changing Engine Coolant"](#) and [CO-33. "System Inspection"](#).

### CAUTION:

- **Do not spill coolant in engine compartment. Use a shop cloth to absorb coolant.**
- **Do not reuse gasket.**



# WATER OUTLET AND WATER PIPING

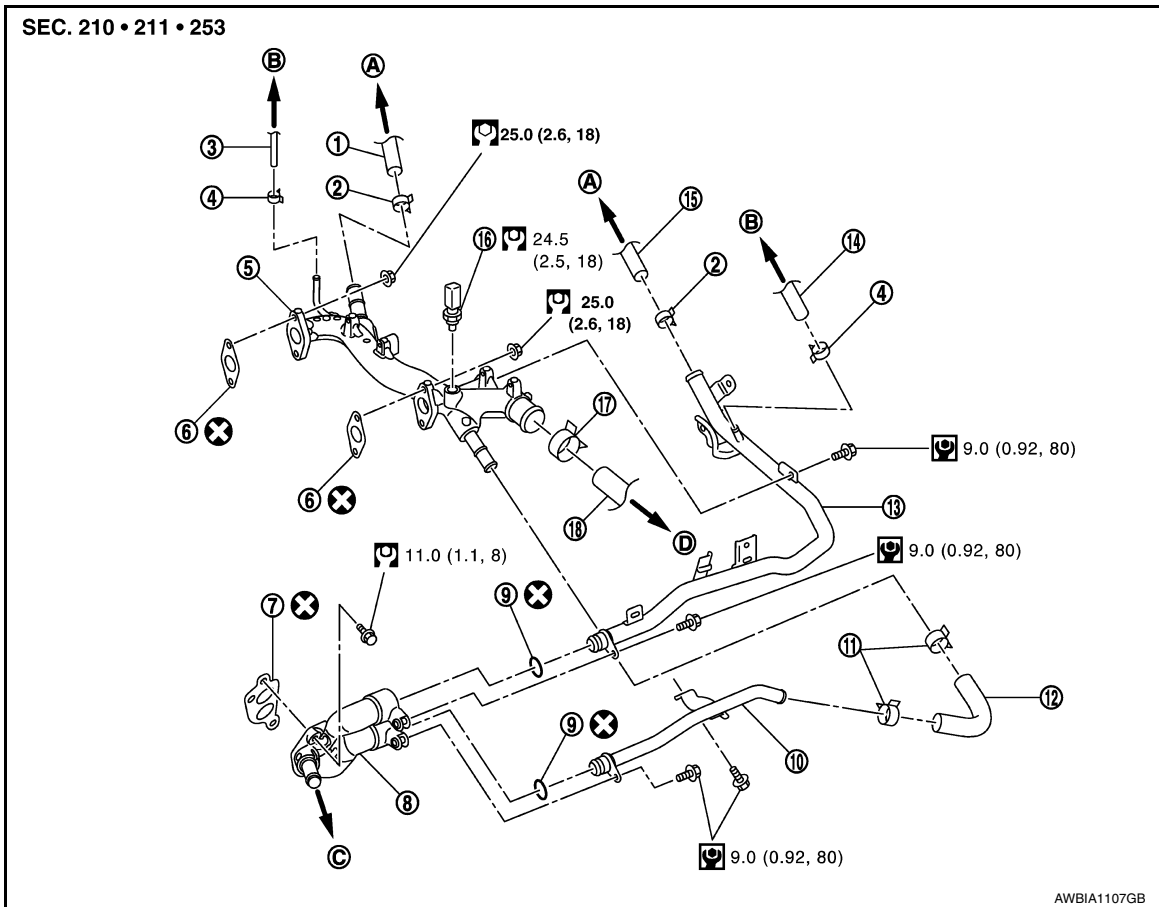
< REMOVAL AND INSTALLATION >

[VQ35DE]

## WATER OUTLET AND WATER PIPING

Exploded View

INFOID:000000012602157



- |                                       |  |                           |
|---------------------------------------|--|---------------------------|
| 1. Heater hose                        | 2. Clamp                                 | 3. Water hose             |
| 4. Clamp                              | 5. Water outlet                          | 6. Gasket                 |
| 7. Gasket                             | 8. Water connector                       | 9. O-ring                 |
| 10. Water bypass pipe                 | 11. Clamp                                | 12. Water hose            |
| 13. Heater pipe                       | 14. Water hose                           | 15. Heater hose           |
| 16. Engine coolant temperature sensor | 17. Clamp                                | 18. Radiator hose (upper) |
| A. To heater core                     | B. To electric throttle control actuator | C. To oil cooler          |
| D. To radiator                        |  |                           |

### Removal and Installation

INFOID:000000012602158

#### **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 cap. Slowly push down and turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by pushing it down and turning it all the way.

#### **NOTE:**

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

#### REMOVAL

1. Remove engine room cover. Refer to [EM-28, "Removal and Installation"](#).

#### **CAUTION:**

Perform when the engine is cold.

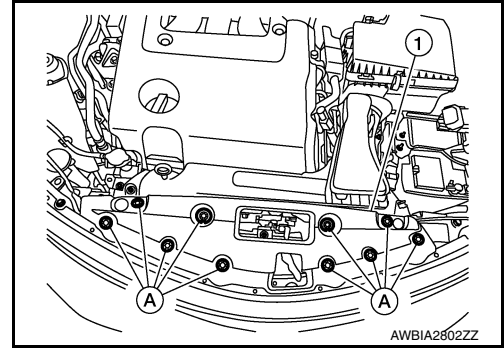


# WATER OUTLET AND WATER PIPING

[VQ35DE]

## < REMOVAL AND INSTALLATION >

- Partially drain engine coolant from radiator. Refer to [CO-35. "Changing Engine Coolant"](#).
- Remove the core support cover clips (A), then remove the core support cover (1).



- Remove air duct and air cleaner case assembly. Refer to [EM-146. "Removal and Installation"](#).
- Remove fender protector side cover (RH). Refer to [EXT-36. "FENDER PROTECTOR : Exploded View"](#).
- Disconnect hoses from electric throttle control actuator.
- Remove radiator upper hose and heater hoses.
- Remove connector(s) from heater pipe.
- Disconnect the harness connector from engine coolant temperature sensor.
- Remove water outlet, heater pipe, water connector, and water bypass pipe nuts and bolts.
- Remove engine coolant temperature sensor (if necessary).

## INSTALLATION

Installation is in the reverse order of removal.

### **CAUTION:**

#### **Do not reuse gasket.**

- Securely insert each hose, and install a clamp at a position where it does not interfere with the pipe bulge.
- When inserting heater pipe and water bypass pipe into water connector, apply mild soap to new O-rings.

### **CAUTION:**

#### **Do not reuse O-ring.**

- After installation refill engine coolant and check for leaks. Refer to [CO-35. "Changing Engine Coolant"](#) and [CO-33. "System Inspection"](#).

## SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[VQ35DE]

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

#### Capacity

INFOID:0000000012602159

ℓ (US qt, Imp qt)

Coolant capacity (With reservoir tank at MAX level)	9.2 (9-3/4, 8-1/8)
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#### Thermostat

INFOID:0000000012602160

Valve opening temperature	82°C (180°F)
Full-open lift amount	8.6 mm / 95°C (0.339 in / 203°F)
Valve closing temperature	77°C (171°F)

#### Radiator

INFOID:0000000012602161

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

Cap relief pressure	Standard	127 ± 9.8 (1.30 ± 0.10, 18.4 ± 1.42)
Testing pressure		156 (1.6, 23)