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# SECTION CO

## ENGINE COOLING SYSTEM

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PRECAUTION

PRECAUTIONS

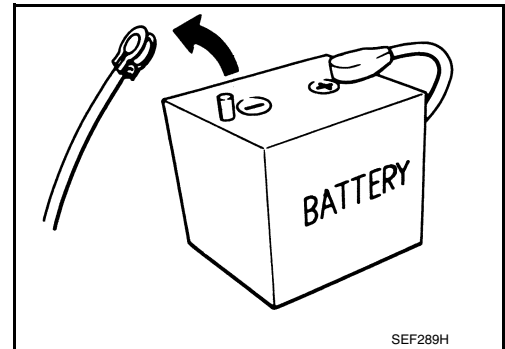
Precautions for Removing Battery Terminal

INFOID:000000012959272

When disconnecting the battery terminal, pay attention to the following.

- Always use a 12V battery as power source.
- Never disconnect battery terminal while engine is running.
- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
- For vehicles with the engine listed below, remove the battery terminal after a lapse of the specified time:

D4D engine	: 20 minutes	YS23DDT	: 4 minutes
HRA2DDT	: 12 minutes	YS23DDTT	: 4 minutes
K9K engine	: 4 minutes	ZD30DDTi	: 60 seconds
M9R engine	: 4 minutes	ZD30DDTT	: 60 seconds
R9M engine	: 4 minutes		
V9X engine	: 4 minutes		
YD25DDTi	: 2 minutes		



**NOTE:**

ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

- After high-load driving, if the vehicle is equipped with the V9X engine, turn the ignition switch OFF and wait for at least 15 minutes to remove the battery terminal.

**NOTE:**

- Turbocharger cooling pump may operate in a few minutes after the ignition switch is turned OFF.
- Example of high-load driving
  - Driving for 30 minutes or more at 140 km/h (86 MPH) or more.
  - Driving for 30 minutes or more on a steep slope.
- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

**NOTE:**

If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.

**NOTE:**

The removal of 12V battery may cause a DTC detection error.

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

INFOID:000000012197511

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 "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

**WARNING:**

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 "SRS AIR BAG".

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## PRECAUTIONS

< PRECAUTION >

[MR FOR NISMO RS MODELS]

- 
- **Never 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:**

Always observe the following items for preventing accidental activation.

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never 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 3 minutes before performing any service.**

PREPARATION

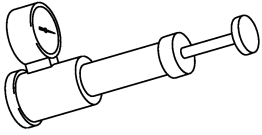
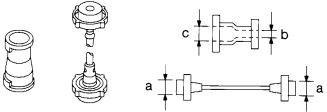
PREPARATION

Commercial Service Tools

INFOID:000000012197512

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Tool name	Description
<p>Radiator cap tester</p>  <p>PBI1982E</p>	<p>Checking radiator and radiator cap</p>
<p>Radiator cap tester adapter</p>  <p>S-NT564</p>	<p>Adapting radiator cap tester to radiator cap and radiator filler neck  <b>a: 28 (1.10) dia.</b>  <b>b: 31.4 (1.236) dia.</b>  <b>c: 41.3 (1.626) dia.</b>                      Unit: mm (in)</p>

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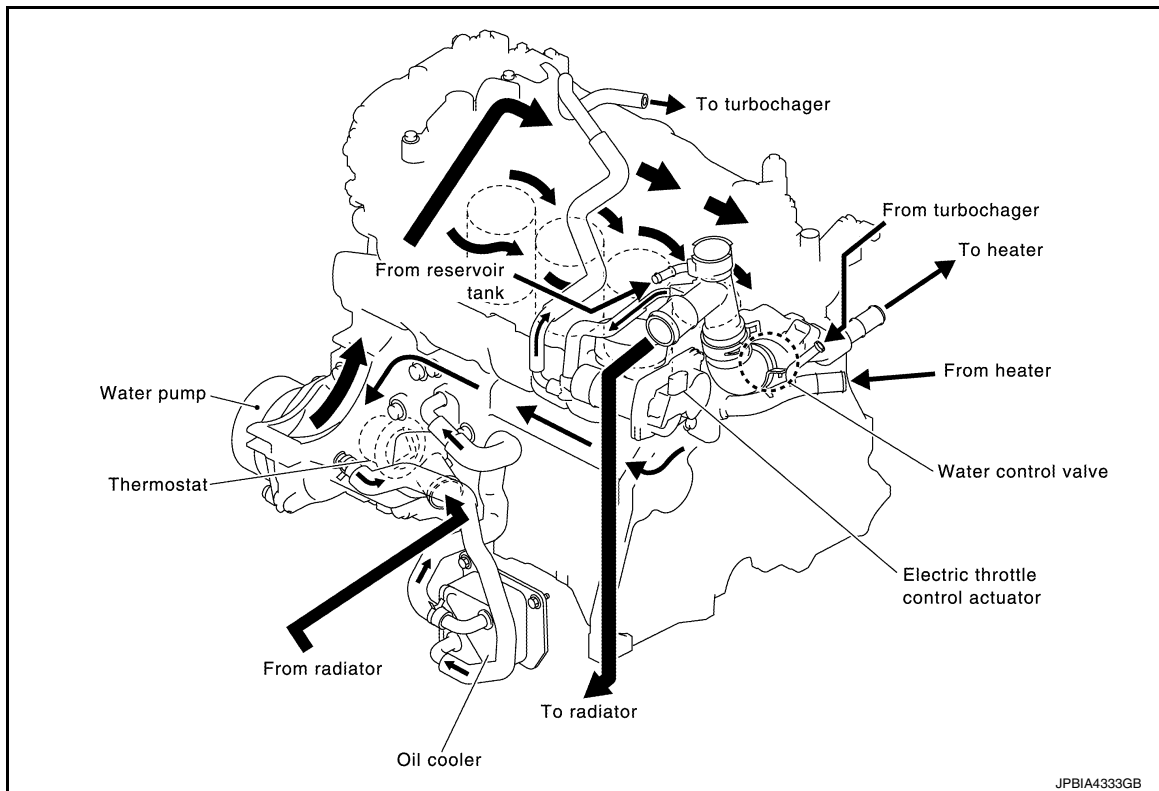
# SYSTEM DESCRIPTION

## DESCRIPTION

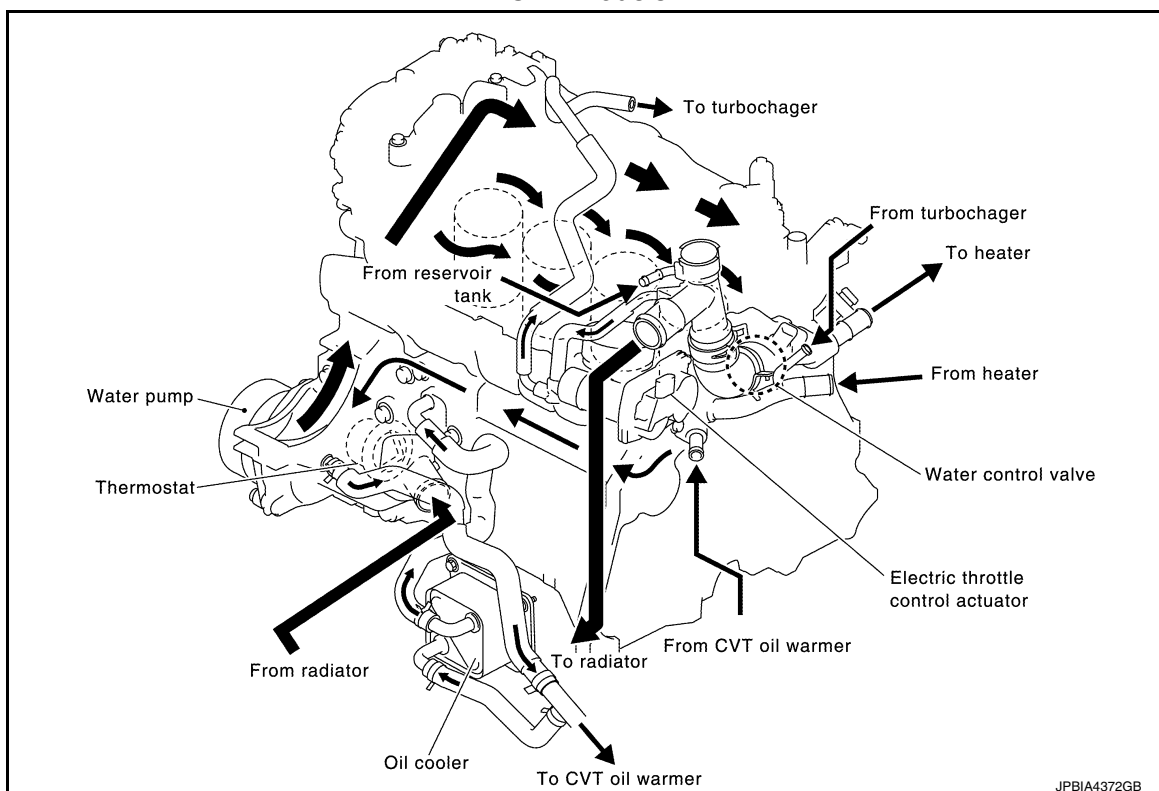
### Engine Cooling System

INFOID:000000012197513

M/T models



CVT models



# DESCRIPTION

< SYSTEM DESCRIPTION >

[MR FOR NISMO RS MODELS]

## Engine Cooling System Schematic

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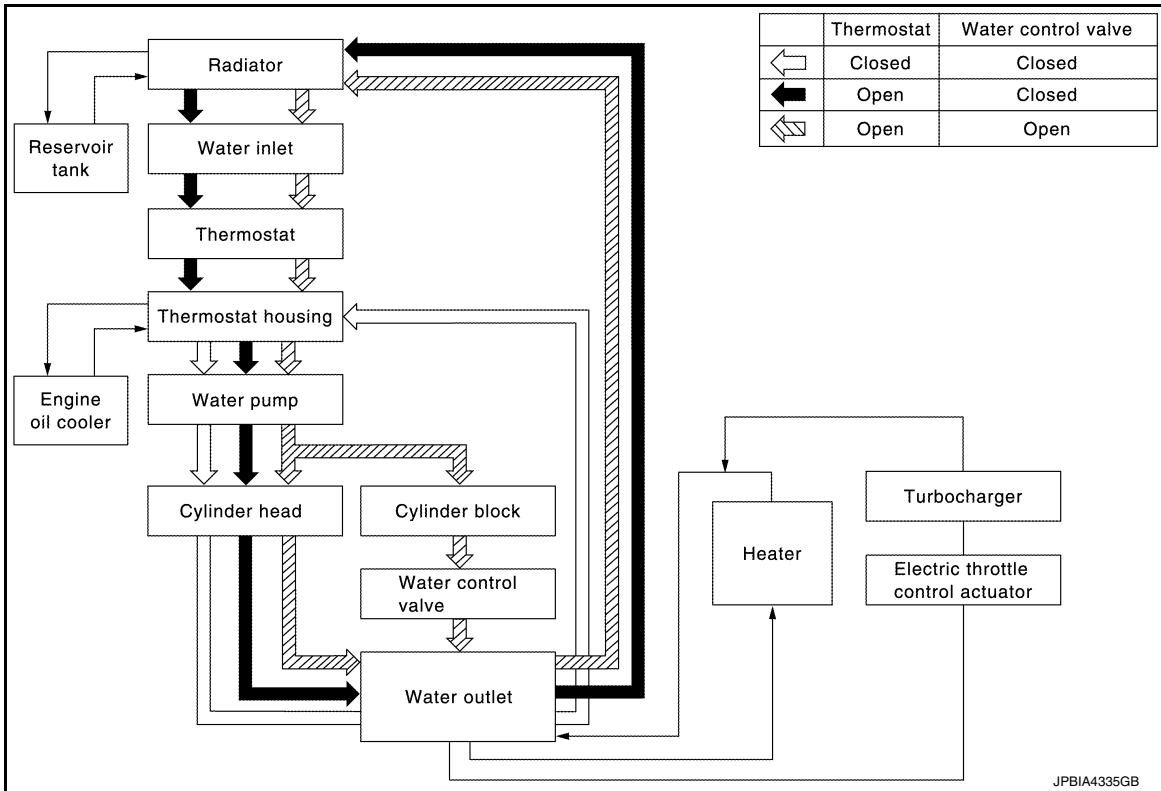
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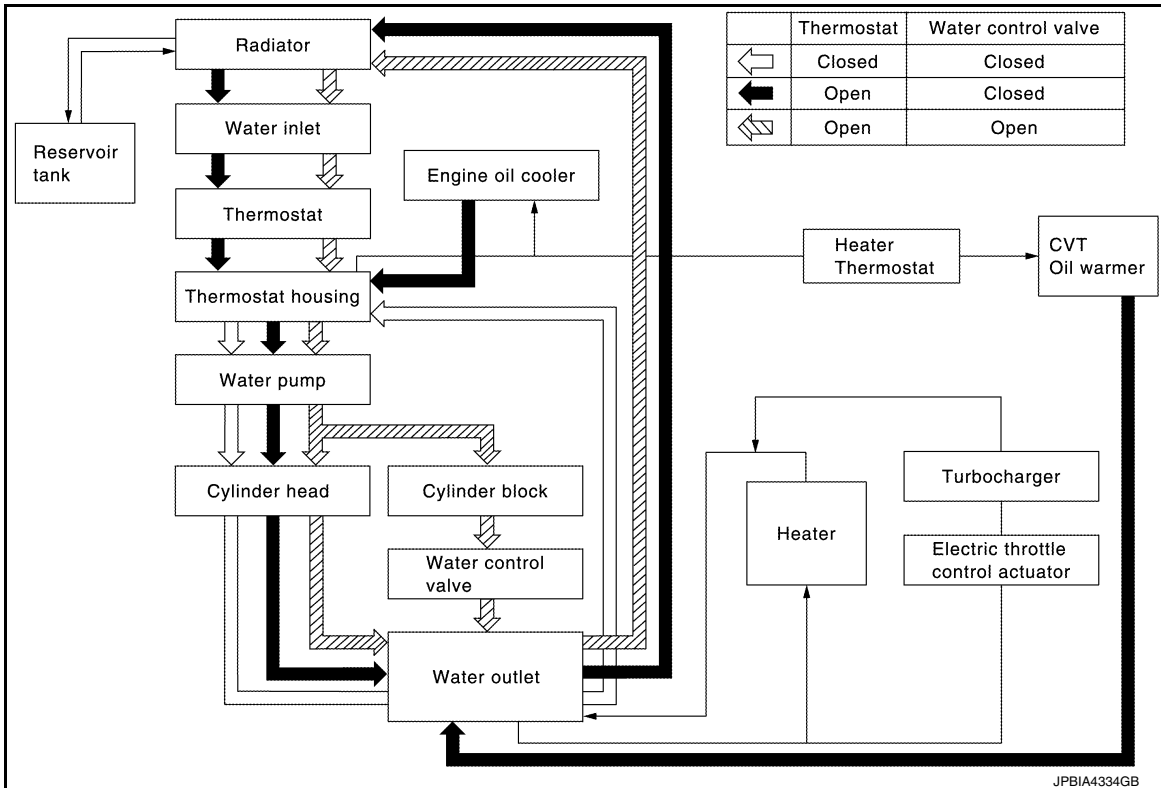
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M/T models



CVT models



# OVERHEATING CAUSE ANALYSIS

< SYMPTOM DIAGNOSIS >

[MR FOR NISMO RS MODELS]

## SYMPTOM DIAGNOSIS

### OVERHEATING CAUSE ANALYSIS

#### Troubleshooting Chart

INFOID:0000000012197515

		Symptom	Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—
		Thermostat and water control valve stuck closed	—	
		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	—	—	—
	Improper engine coolant mixture ratio	—	—	—
	Poor engine coolant quality	—	Engine coolant viscosity	—
	Insufficient engine coolant	Engine coolant leakage	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 leakage into cooling system	Cylinder head deterioration		
		Cylinder head gasket deterioration		



# OVERHEATING CAUSE ANALYSIS

< SYMPTOM DIAGNOSIS >

[MR FOR NISMO RS MODELS]

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

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# PERIODIC MAINTENANCE

## ENGINE COOLANT

### Inspection

INFOID:000000012197516

#### LEVEL

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

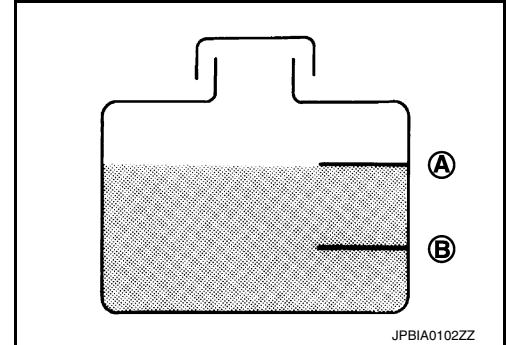
A : MAX

B : MIN

- Adjust the engine coolant level if necessary.

**CAUTION:**

Refill Genuine NISSAN Long Life Antifreeze/Coolant (blue) or equivalent in its quality mixed with water (distilled or demineralized). Refer to [MA-11, "Fluids and Lubricants"](#).



#### LEAKAGE

- To check for leakage, apply pressure to the cooling system with the radiator cap tester (commercial service tool) (A) and the radiator cap tester adapter (commercial service tool) (B).

Testing pressure: Refer to [CO-28, "Radiator"](#).

**WARNING:**

Never remove radiator cap when engine is hot. Serious burns may occur from high-pressure engine coolant escaping from engine cooling system.

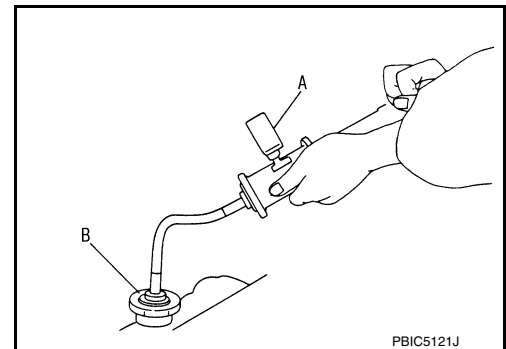
**CAUTION:**

Higher test pressure than specified may cause radiator damage.

**NOTE:**

In a case that engine coolant decreases, replenish radiator with engine coolant.

- If anything is found, repair or replace damaged parts.



### Draining

INFOID:000000012197517

**WARNING:**

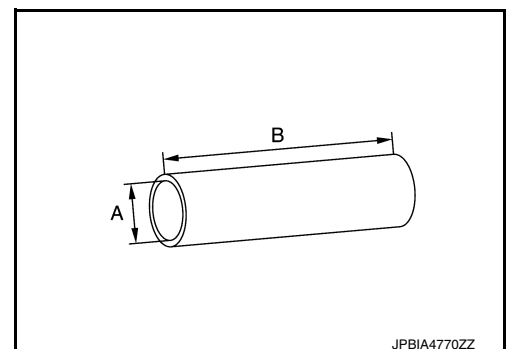
- Never remove radiator cap when engine is hot. Serious burns may occur from high-pressure engine coolant escaping from radiator.
- Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.

- Connect drain hose.

- Use a general-purpose hose with the dimensions shown in the figure.

A :  $\phi$  8 mm (0.31 in)

B : 300 mm (11.81 in)



# ENGINE COOLANT

< PERIODIC MAINTENANCE >

[MR FOR NISMO RS MODELS]

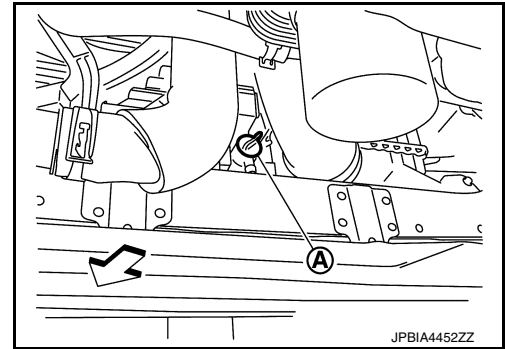
- Open radiator drain plug (A) at the bottom of radiator, and then remove radiator cap.

↩ : Vehicle front

### CAUTION:

**Perform this step when engine is cold.**

- When draining all of engine coolant in the system, open water drain plugs on cylinder block. Refer to [EM-72, "Setting"](#).



- Remove reservoir tank if necessary, and drain engine coolant and clean reservoir tank before installing. Refer to [CO-16, "Exploded View"](#).
- Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to [CO-12, "Flushing"](#).
- Disconnect drain hose.

## Refilling

INFOID:0000000012197518

### CAUTION:

- Do not reuse O-rings.
- Do not put additive such as waterleak preventive, since it may cause cooling waterway clogging.
- When refilling use Genuine NISSAN Long Life Antifreeze/Coolant (blue) or equivalent in its quality mixed with water (distilled or demineralized). Refer to [MA-11, "Fluids and Lubricants"](#).

- Install reservoir tank if removed, and install radiator drain plug.

### CAUTION:

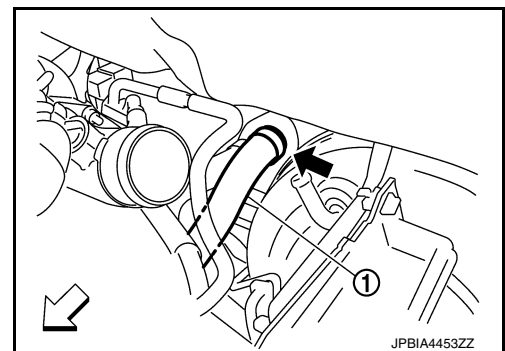
**Be sure to clean drain plug and install with new O-ring.**

**Radiator drain plug** : Refer to [CO-16, "Exploded View"](#).

- If water drain plugs on cylinder block are removed, close and tighten them. Refer to [EM-72, "Setting"](#).
- Check that each hose clamp has been firmly tightened.
  - Remove air duct (suction side). Refer to [EM-27, "Exploded View"](#).
  - Disconnect vacuum hose break booster side, and removal vacuum tube from clamp. Refer to [BR-42, "Exploded View"](#).
  - Disconnect heater hose (1) at position (↩) in the figure.

↩ : Vehicle front

- Enhance heater hose as high as possible.

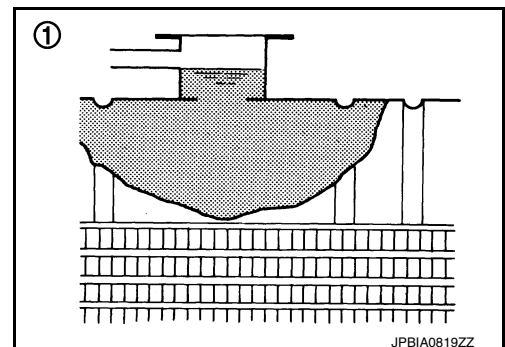


- Fill radiator (1) to specified level.

### CAUTION:

**Never adhere the engine coolant to electronic equipments (alternator etc.).**

- Pour coolant slowly of less than 2 ℓ (2-1/8 US qt, 1-3/4 Imp qt) a minute to allow air in system to escape.
- When engine coolant overflows disconnected heater hose, connect heater hose, and continue filling the engine coolant.



**Engine coolant capacity  
(With reservoir tank at "MAX" level)**

Refer to [CO-28, "Periodical Maintenance Specification"](#).

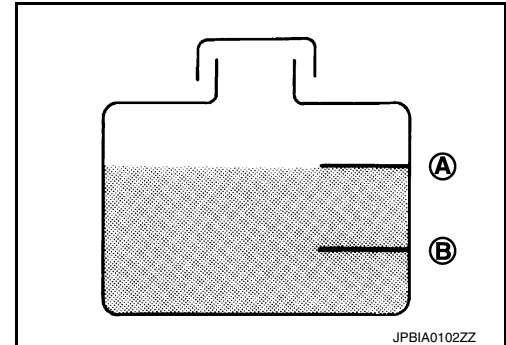
7. Refill reservoir tank to "MAX" level line with engine coolant.

A : MAX

B : MIN

**Reservoir tank engine coolant capacity  
(At "MAX" level)**

Refer to [CO-28, "Periodical Maintenance Specification"](#).



8. Install air duct (suction side). Refer to [EM-27, "Exploded View"](#).
9. Install radiator cap.
10. Warm up engine until opening thermostat. Standard for warming-up time is approximately 10 minutes at 3,000 rpm.
  - Check thermostat opening condition by touching radiator hose (lower) to see a flow of warm water.

**CAUTION:**  
**Watch water temperature gauge so as not to overheat engine.**
11. Stop the engine and cool down to less than approximately 50°C (122°F).
  - Cool down using fan to reduce the time.
  - If necessary, refill radiator up to filler neck with engine coolant.

**CAUTION:**  
**Never adhere the engine coolant to electronic equipments (alternator etc.).**
12. Refill reservoir tank to "MAX" level line with engine coolant.
13. Repeat steps 6 through 11 two or more times with radiator cap installed until engine coolant level no longer drops.
14. Check cooling system for leakage with engine running.
15. Warm up the engine, and check for sound of engine coolant flow while running engine from idle up to 3,000 rpm with heater temperature controller set at several position between "COOL" and "WARM".
  - Sound may be noticeable at heater unit.
16. Repeat step 15 three times.
17. If sound is heard, bleed air from cooling system by repeating step 6 through 11 until reservoir tank level no longer drops.

## Flushing

INFOID:000000012197519

1. Install radiator drain plug.

**CAUTION:**

**Be sure to clean drain plug and install with new O-ring.**

**Radiator drain plug** : Refer to [CO-16, "Exploded View"](#).

- If water drain plugs on cylinder block are removed, close and tighten them. Refer to [EM-72, "Setting"](#).
2. Remove air duct (suction side), air cleaner cover assembly and air cleaner body assembly. Refer to [EM-27, "Exploded View"](#).
  3. Disconnect vacuum hose breaker booster side, and remove vacuum tube from clamp. Refer to .

# ENGINE COOLANT

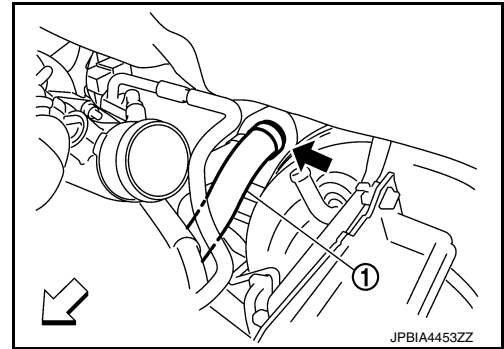
< PERIODIC MAINTENANCE >

[MR FOR NISMO RS MODELS]

4. Disconnect heater hose (1) at position (←) in the figure.

↔ : Vehicle front

- Enhance heater as high as possible.



5. Fill radiator and reservoir tank with water and reinstall radiator cap.
- When engine coolant over flows disconnected heater hose, connect heater hose, and continue filling the engine coolant.
6. Connect vacuum hose, and install vacuum tube.
7. Install air duct (suction side), air cleaner cover assembly and air cleaner body assembly. Refer to [EM-27, "Exploded View"](#).
8. Run the engine and warm it up to normal operating temperature.
9. Rev the engine two or three times under no-load.
10. Stop the engine and wait until it cools down.
11. Drain water from the system. Refer to [CO-10, "Draining"](#).
12. Repeat steps 1 through 9 until clear water begins to drain from radiator.

## RADIATOR RADIATOR CAP

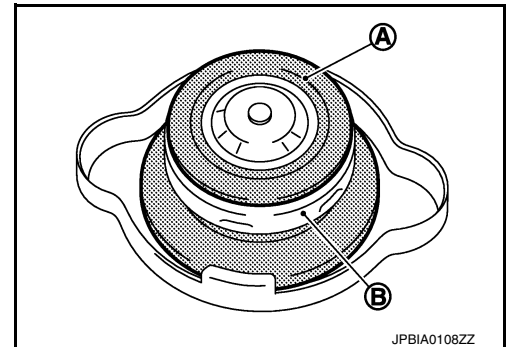
### RADIATOR CAP : Inspection

INFOID:000000012197520

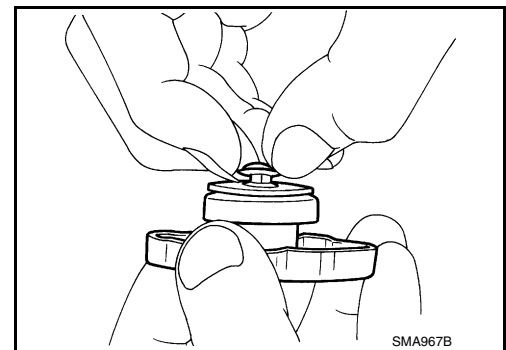
- Check valve seat (A) of radiator cap.

B : Metal plunger

- Check that valve seat is swollen to the extent that the edge of the plunger cannot be seen when watching it vertically from the top.
- Check that valve seat has no soil and damage.



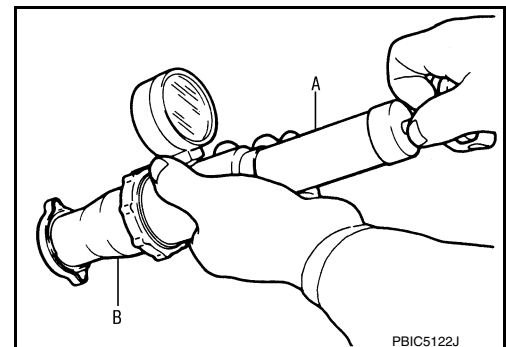
- Pull negative-pressure valve to open it, and that it close completely when released.
- Check that there is no dirt or damage on the valve seat of radiator cap negative-pressure valve.
- Check that there are no unusualness in the opening and closing conditions of negative-pressure valve.



- Check radiator cap relief pressure.

**Standard and Limit** : Refer to [CO-28, "Radiator"](#).

- When connecting radiator cap to the radiator cap tester (commercial service tool) (A) and the radiator cap tester adapter (commercial service tool) (B), apply engine coolant to the cap seal surface.



- Replace radiator cap if there is an unusualness related to the above three.

**CAUTION:**

**When installing radiator cap, thoroughly wipe out the radiator filler neck to remove any waxy residue or foreign material.**

## RADIATOR

### RADIATOR : Inspection

INFOID:000000012197521

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

**CAUTION:**

- **Be careful not to bend or damage radiator fins.**
  - **When radiator is cleaned without removal, remove all surrounding parts such as radiator cooling fan assembly and horns. Then tape harness and harness connectors to prevent water from entering.**
1. Apply water by hose to the back side of the radiator core vertically downward.
  2. Apply water again to all radiator core surfaces once per minute.
  3. Stop washing if any stains no longer flow out from radiator.

# RADIATOR

< PERIODIC MAINTENANCE >

[MR FOR NISMO RS MODELS]

4. Blow air into the back side of radiator core vertically downward.
  - Use compressed air lower than 490 kPa (4.9 bar, 5 kg/cm<sup>2</sup>, 71 psi) and keep distance more than 30 cm (11.81 in).
5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

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# RADIATOR

< REMOVAL AND INSTALLATION >

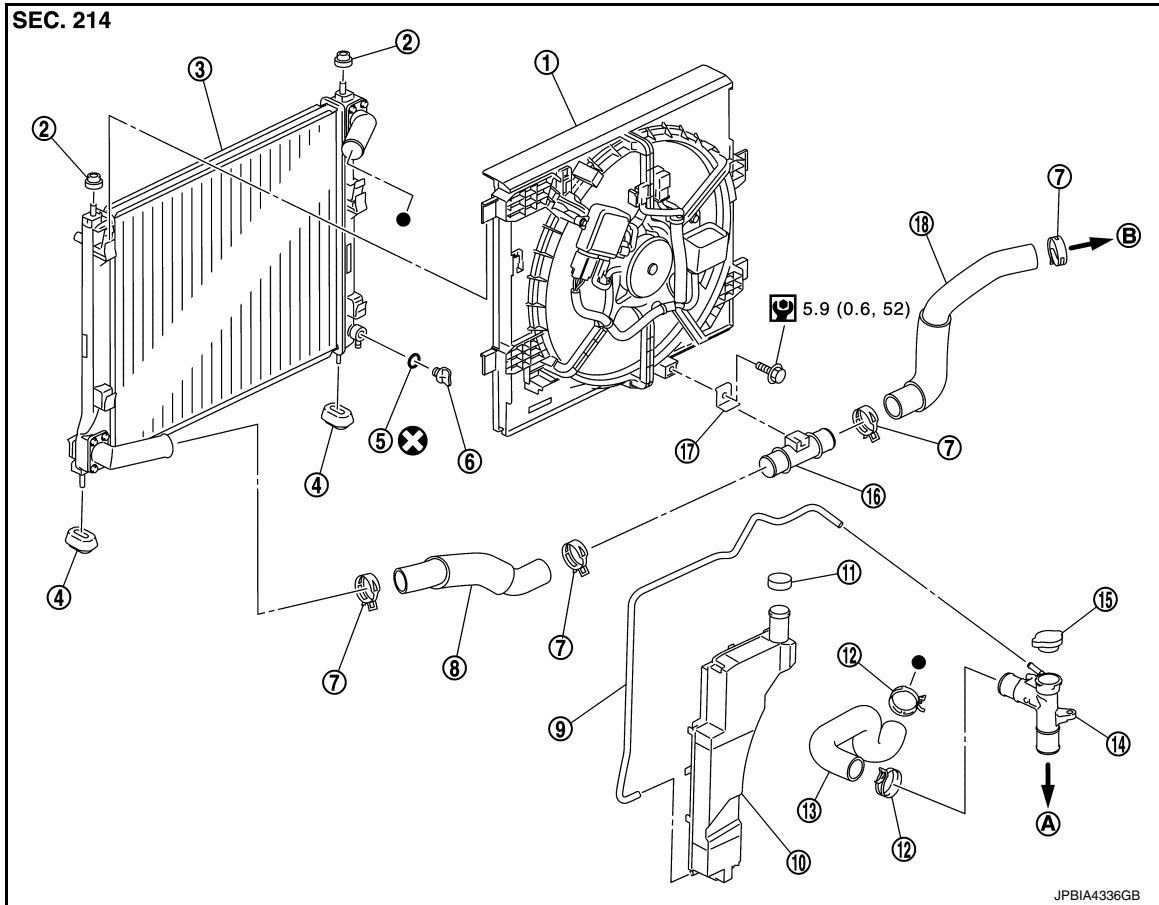
[MR FOR NISMO RS MODELS]

## REMOVAL AND INSTALLATION

### RADIATOR

#### Exploded View

INFOID:000000012197522



JPBIA4336GB

- |                            |                               |                                |
|----------------------------|-------------------------------|--------------------------------|
| 1. Cooling fan assembly    | 2. Mounting rubber (upper)    | 3. Radiator                    |
| 4. Mounting rubber (lower) | 5. O-ring                     | 6. Drain plug                  |
| 7. Clamp                   | 8. Radiator hose (lower) (LH) | 9. Reservoir tank hose         |
| 10. Reservoir tank         | 11. Reservoir tank cap        | 12. Clamp                      |
| 13. Radiator hose (upper)  | 14. Water outlet adaptor      | 15. Radiator cap               |
| 16. Radiator hose pipe     | 17. Bracket                   | 18. Radiator hose (lower) (RH) |
| A. To water outlet         | B. To water inlet             |                                |

: N·m (kg·m, in·lb)

: Always replace after every disassembly.

: Indicates that the parts is connected at points with symbols in actual vehicle.

### Removal and Installation

INFOID:000000012197523

#### REMOVAL

##### **WARNING:**

- Never remove radiator cap when engine is hot. Serious burns may occur from high-pressure engine coolant escaping from engine cooling system.
- Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.

##### NOTE:



# RADIATOR

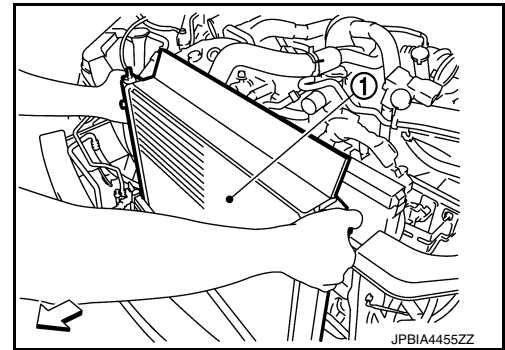
[MR FOR NISMO RS MODELS]

## < REMOVAL AND INSTALLATION >

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

1. Drain engine coolant from radiator. Refer to [CO-10, "Draining"](#).  
**CAUTION:**
  - Perform this step when the engine is cold.
  - Never spill engine coolant on drive belt.
2. Remove engine cover. Refer to [EM-26, "Exploded View"](#).
3. Remove engine under cover.
4. Remove radiator hose (upper and lower).
5. Remove front bumper. Refer to [EXT-12, "Exploded View"](#).
6. Remove radiator core support upper. Refer to [DLK-130, "MR16DDT : Removal and Installation"](#).
7. Disconnect cooling fan harness connector.
8. Remove reservoir tank.
9. Remove cooling fan assembly.
10. Remove condenser from radiator and temporarily fasten it on vehicle with a rope.
11. Pull up and remove the radiator assembly (1).

**CAUTION:**  
**Never damage radiator core and condenser assembly core.**



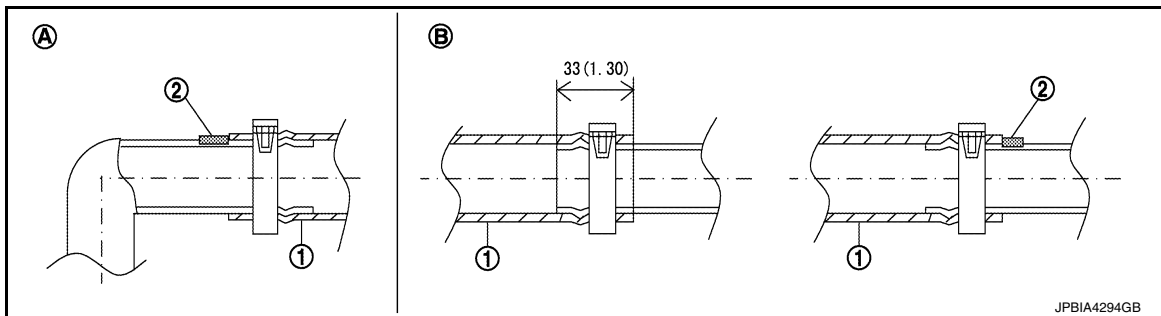
## INSTALLATION

**CAUTION:**  
**Do not reuse O-rings.**

Note the following, and install in the reverse order of removal.

**NOTE:**

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



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	Upper	A
	Engine side	Upper	B
Radiator hose (lower) (RH)	Radiator side	Upper	C
	Engine side	Front side	D

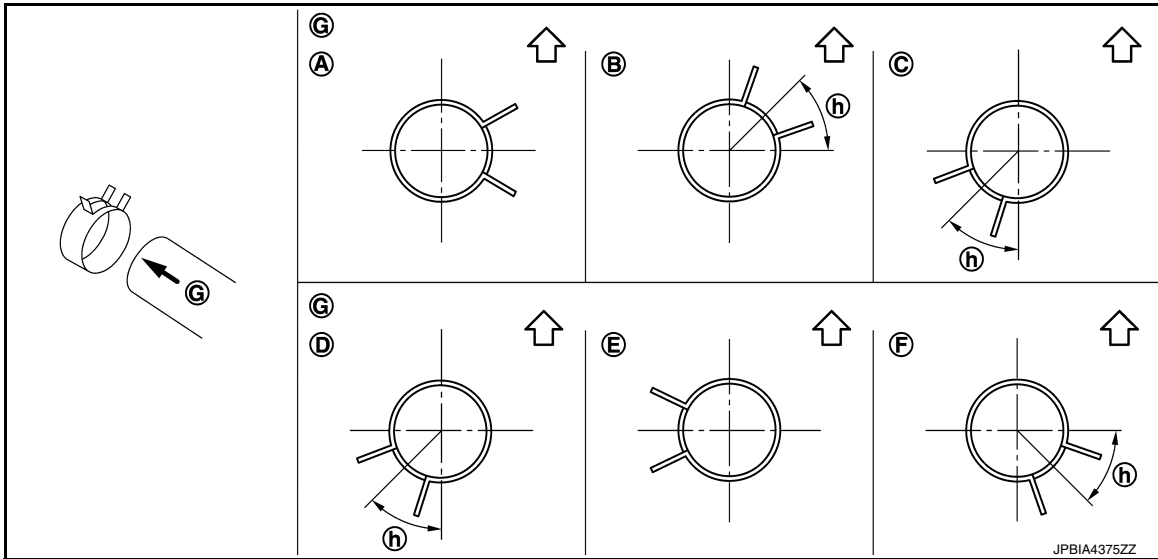
# RADIATOR

< REMOVAL AND INSTALLATION >

[MR FOR NISMO RS MODELS]

Radiator hose	Hose end	Paint mark	Position of hose clamp*
Radiator hose (lower) (LH)	Radiator side	Rear side	E
	Engine side	Rear side	F

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

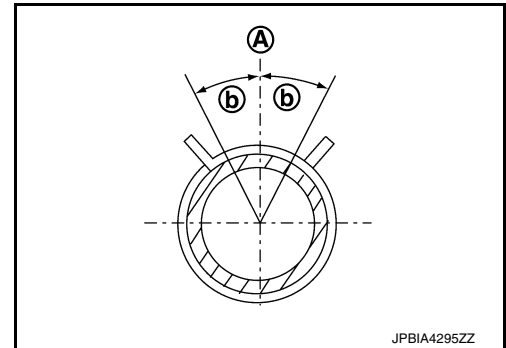


G. View G

h. 45°

↕ : Vehicle upper

- The angle (b) created by the hose clamp pawl and the specified line (A) must be within  $\pm 15^\circ$  as shown in the figure.

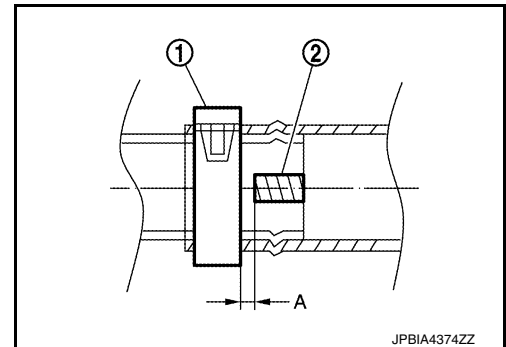


JPBIA4295ZZ

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

**Dimension "A"**

**3 mm (0.12 in)**



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## Inspection

INFOID:000000012197524

### INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to [CO-10. "Inspection"](#).
- Start and warm up the engine. Check visually that there is no leakage of engine coolant.

# COOLING FAN

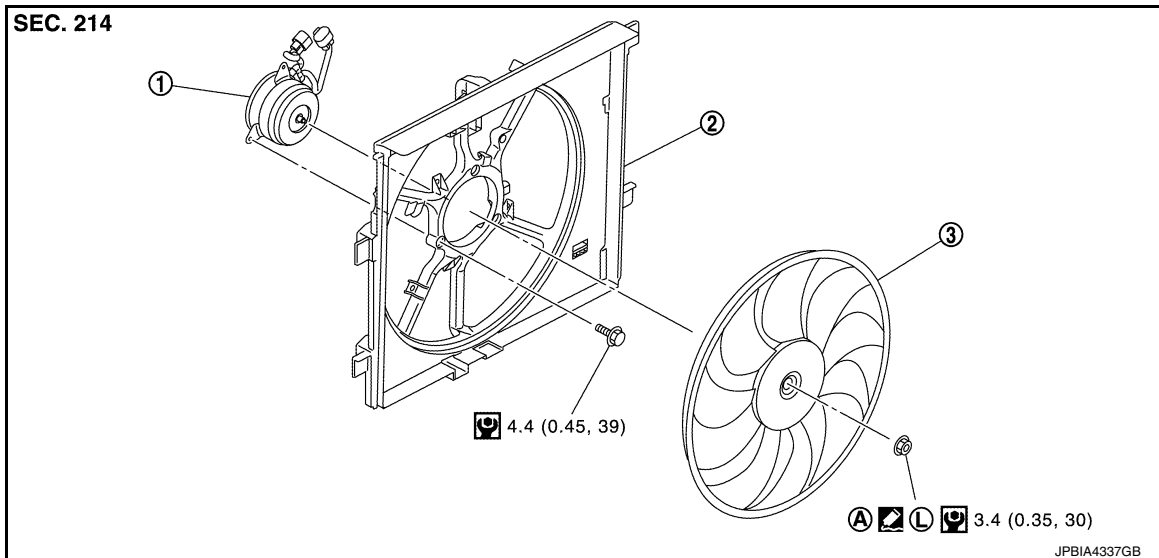
< REMOVAL AND INSTALLATION >

[MR FOR NISMO RS MODELS]

## COOLING FAN

### Exploded View

INFOID:000000012197525



1. Fan motor  
A. Apply on fan motor shaft
2. Fan shroud
3. Cooling fan

: N·m (kg-m, in-lb)

: Apply genuine high strength thread locking sealant or equivalent.

### Removal and Installation

INFOID:000000012197526

#### REMOVAL

1. Drain engine coolant. Refer to [CO-10. "Draining"](#).  
**CAUTION:**
  - Perform this step engine is cold.
  - Never spill engine coolant on drive belt.
2. Remove engine cover.
3. Remove front bumper. Refer to [EXT-12. "Exploded View"](#).
4. Remove radiator core support upper. Refer to [DLK-130. "MR16DDT : Removal and Installation"](#).
5. Disconnect cooling fan harness connector.
6. Remove reservoir tank. Refer to [CO-16. "Exploded View"](#).
7. Remove radiator hose (upper). Refer to [CO-16. "Exploded View"](#).
8. Remove cooling fan assembly.  
**CAUTION:**  
Be careful not to damage or scratch on radiator core when removing.

#### INSTALLATION

Note the following, and install in the reverse order of removal.

##### **CAUTION:**

Only use genuine parts for fan shroud mounting bolt and observe the specified torque (to prevent radiator from being damaged).

##### **NOTE:**

Cooling fan is controlled by ECM. For details, Refer to [EC-560. "Component Function Check"](#).

### Disassembly and Assembly

INFOID:000000012197527

#### DISASSEMBLY

## COOLING FAN

< REMOVAL AND INSTALLATION >

[MR FOR NISMO RS MODELS]

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1. Remove cooling fan mounting nut, and then remove the cooling fan.
2. Remove fan motor.

### ASSEMBLY

Note the following, and assemble in the reverse order of disassembly.

- Apply genuine high strength thread locking sealant on fan motor shaft.

### Inspection

INFOID:000000012197528

### INSPECTION AFTER DISASSEMBLY

Cooling Fan

Inspect cooling fan for crack or unusual bend.

- If anything is found, replace cooling fan.

# WATER PUMP

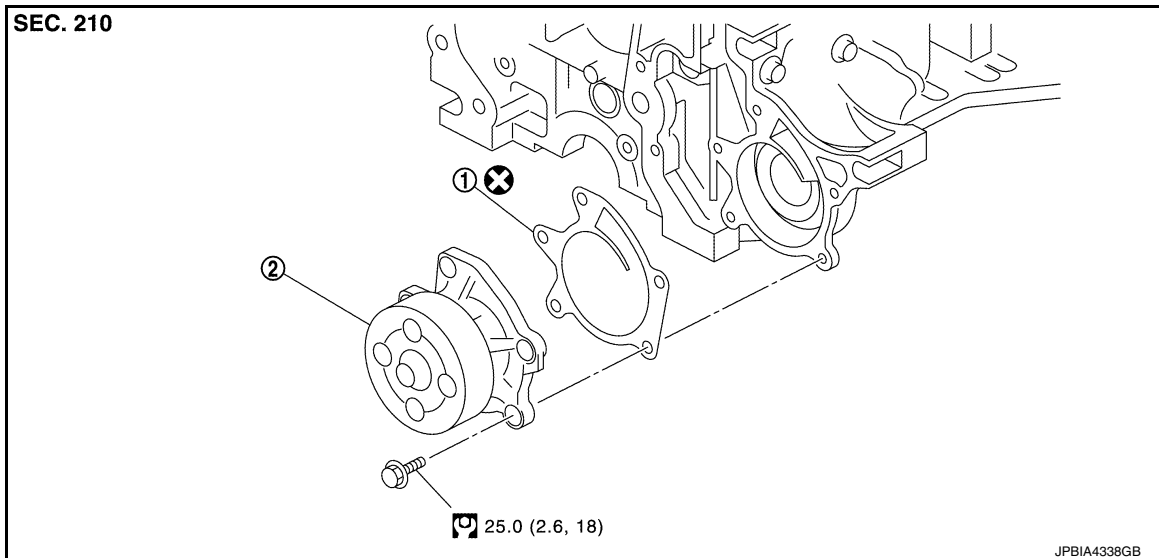
< REMOVAL AND INSTALLATION >

[MR FOR NISMO RS MODELS]

## WATER PUMP

### Exploded View

INFOID:000000012197529



1. Gasket
2. Water pump

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

## Removal and Installation

INFOID:000000012197530

### REMOVAL

1. Drain engine coolant from radiator. Refer to [CO-10, "Draining"](#).  
**CAUTION:**
  - Perform this step when the engine is cold.
  - Never spill engine coolant on drive belt.
2. Steer front wheel to the right.
3. Remove front fender protector (RH). Refer to [EXT-31, "Exploded View"](#).
4. Remove drive belt. Refer to [EM-20, "Exploded View"](#).
5. Remove water pump.
  - Engine coolant will leak from cylinder block, so have a receptacle ready below.**CAUTION:**
  - Handle water pump vane so that it does not contact any other parts.
  - Water pump cannot be disassembled and should be replaced as a unit.

### INSTALLATION

Install in the reverse order of removal.

### Inspection

INFOID:000000012197531

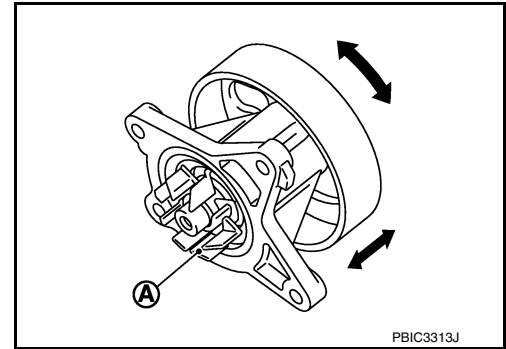
### INSPECTION AFTER REMOVAL

# WATER PUMP

[MR FOR NISMO RS MODELS]

## < REMOVAL AND INSTALLATION >

- Check visually that there is no significant dirt or rusting on water pump body and vane (A).
- Check that there is no looseness in vane shaft, and that it turns smoothly when rotated by hand.
- Replace water pump, if necessary.



## INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to [CO-10. "Inspection"](#).
- Start and warm up the engine. Check visually that there is no leakage of engine coolant.

# THERMOSTAT

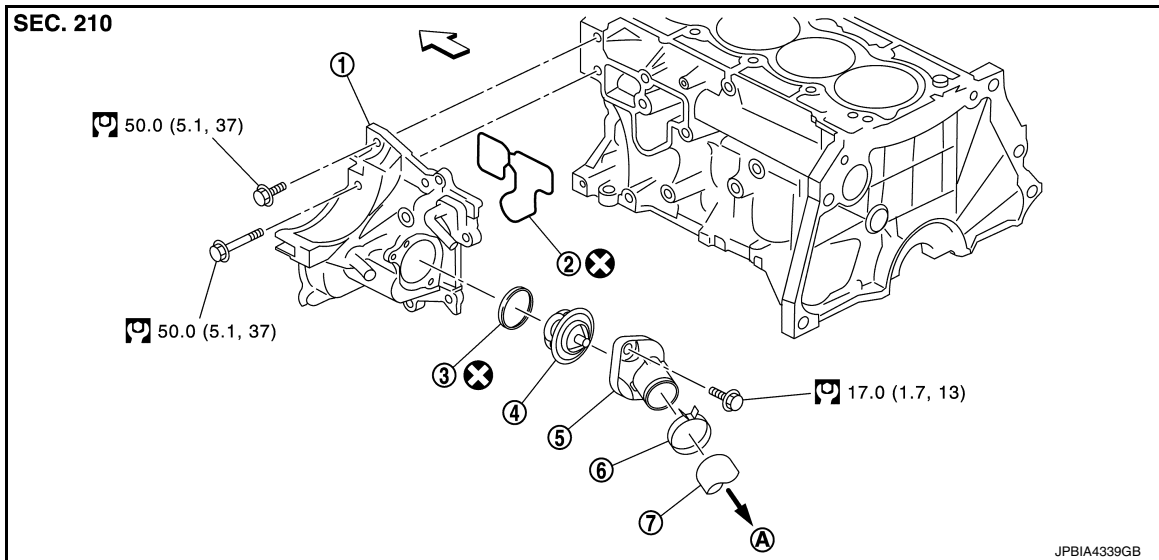
< REMOVAL AND INSTALLATION >

[MR FOR NISMO RS MODELS]

## THERMOSTAT

### Exploded View

INFOID:000000012197532



- |                          |                |                |
|--------------------------|----------------|----------------|
| 1. Thermostat housing    | 2. Gasket      | 3. Rubber ring |
| 4. Thermostat            | 5. Water inlet | 6. Clamp       |
| 7. Radiator hose (upper) |                |                |
- A. To radiator  
← Engine front

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

## Removal and Installation

INFOID:000000012197533

### REMOVAL

1. Drain engine coolant from radiator. Refer to [CO-10. "Draining"](#).  
**CAUTION:**  
**Perform this step when engine is cold.**
2. Remove intake manifold. Refer to [EM-29. "Exploded View"](#).
3. Disconnect radiator hose (lower) (RH) from water inlet. Refer to [CO-16. "Exploded View"](#).
4. Remove water inlet and thermostat.
  - Engine coolant leakage from cylinder block, so have a receptacle ready below.

### Thermostat housing

1. Drain engine coolant. Refer to [CO-10. "Draining"](#).
2. Remove alternator. Refer to [CHG-33. "MR16DDT : Removal and Installation"](#).
3. Remove water pump. Refer to [CO-21. "Exploded View"](#).
4. Disconnect water hose, and then remove thermostat housing.

### INSTALLATION

Note the following, and install in the reverse order of removal.

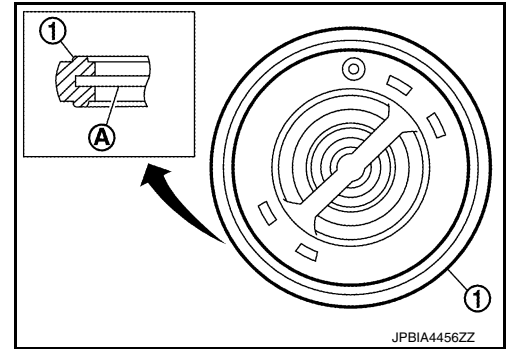
### Thermostat

# THERMOSTAT

## < REMOVAL AND INSTALLATION >

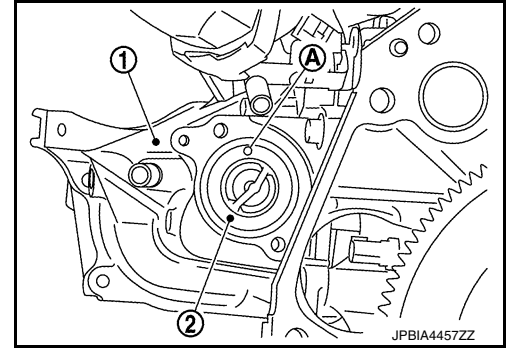
[MR FOR NISMO RS MODELS]

- Install thermostat with making rubber ring (1) groove fit to thermostat flange (A) with the whole circumference.



- Install thermostat (2) with jiggle valve (A) facing upwards.

1 : Thermostat housing



Thermostat housing

- Install in the reverse order of removal.

## Inspection

INFOID:000000012197534

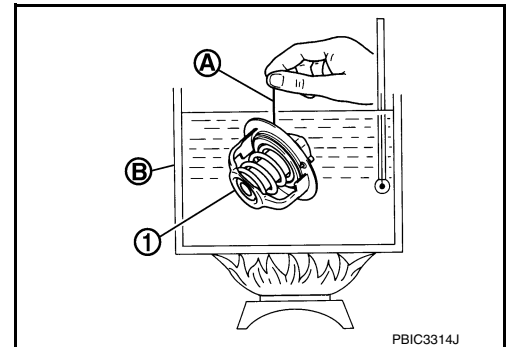
## INSPECTION AFTER REMOVAL

Thermostat

- Place a thread (A) so that it is caught in the valves of thermostat (1). Immerse fully in a container (B) 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 valve lift amount.
- After checking the maximum valve lift amount, lower the water temperature and check the valve closing temperature.

**Standard: Refer to [CO-28, "Thermostat"](#).**

- If out of the standard, replace thermostat.



## INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to [CO-10, "Inspection"](#).
- Start and warm up the engine. Check visually that there is no leakage of engine coolant.



# WATER OUTLET

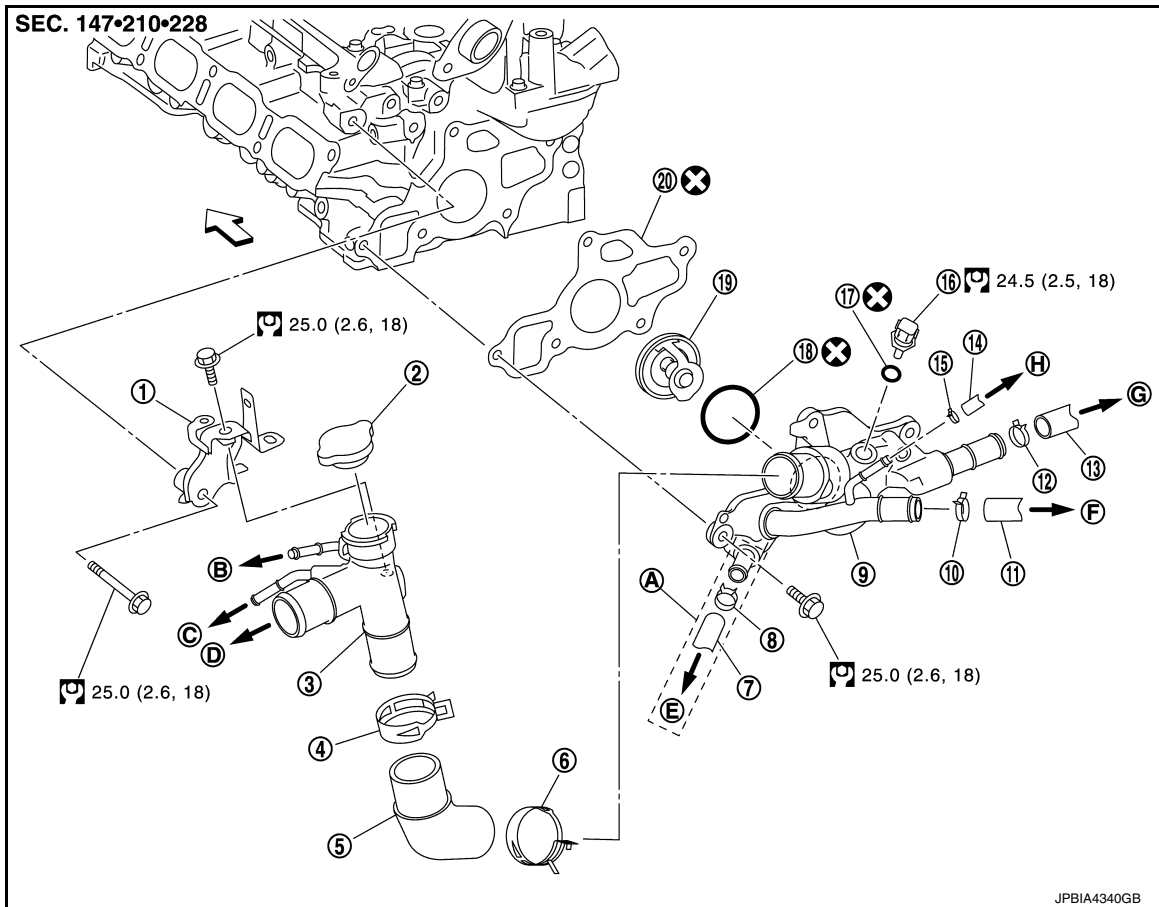
< REMOVAL AND INSTALLATION >

[MR FOR NISMO RS MODELS]

## WATER OUTLET

### Exploded View

INFOID:000000012197535



- |                                       |                      |                         |
|---------------------------------------|----------------------|-------------------------|
| 1. Heater pipe bracket                | 2. Radiator cap      | 3. Water outlet adaptor |
| 4. Clamp                              | 5. Water outlet hose | 6. Clamp                |
| 7. Hose                               | 8. Clamp             | 9. Water outlet         |
| 10. Clamp                             | 11. Heater hose      | 12. Clamp               |
| 13. Heater hose                       | 14. Hose             | 15. Clamp               |
| 16. Engine coolant temperature sensor | 17. Gasket           | 18. Rubber ring         |
| 19. Water control valve               | 20. Gasket           |                         |

⇐ Engine front

- |                             |                               |  |
|-----------------------------|-------------------------------|--|
| A. For CVT models           | B. To reservoir tank          | C. To electric throttle control actuator |
| D. To radiator hose (upper) | E. To CVT oil warmer          | F. To heater hose                        |
| G. To heater hose           | H. To turbocharger inlet tube |  |

: N·m (kg·m, ft·lb)

: Always replace after every disassembly.

## Removal and Installation

INFOID:000000012197536

### REMOVAL

1. Drain engine coolant from radiator. Refer to [CO-10. "Draining"](#).  
**CAUTION:**  
• Perform this step when engine is cold.
2. Remove engine cover. Refer to [EM-26. "Exploded View"](#).

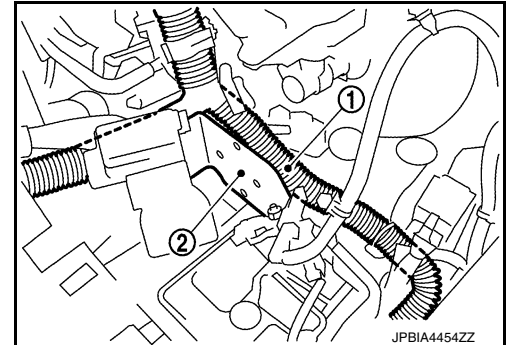
# WATER OUTLET

[MR FOR NISMO RS MODELS]

## < REMOVAL AND INSTALLATION >

3. Remove battery. [PG-105. "Exploded View"](#).
4. Remove air duct (upper) and air cleaner cover assembly and air cleaner body assembly.
5. Disconnect radiator hose (upper). Refer to [CO-16. "Exploded View"](#).
6. Remove water outlet adaptor.
7. Disconnect connectors of engine harness around the battery.
8. Remove bracket (2), and disconnect engine harness clip. (transmission side and water outlet side)

1 : Engine harness



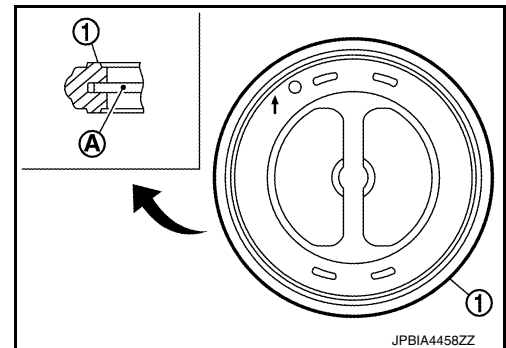
9. Disconnect crankshaft position sensor harness connector.
10. Move engine harness, and keep a service area.
11. Remove water hose of each water outlet connection and heater hose.
12. Remove water outlet.
13. Remove engine coolant temperature sensor from water outlet, if necessary.

## INSTALLATION

Note the following, and install in the reverse order of removal.

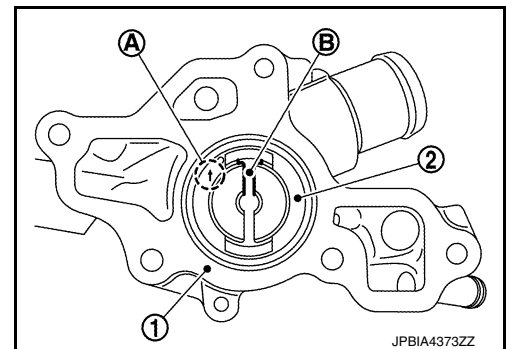
### Water Control valve

- Install water control valve with making rubber ring (1) groove fit to water control valve flange (A) with the whole circumference.



- Install water control valve (2) with the arrow (A) facing up and the frame center part (B) facing upwards.

1 : Water outlet



## Inspection

INFOID:000000012197537

## INSPECTION AFTER REMOVAL

### Water Control Valve

## WATER OUTLET

### < REMOVAL AND INSTALLATION >

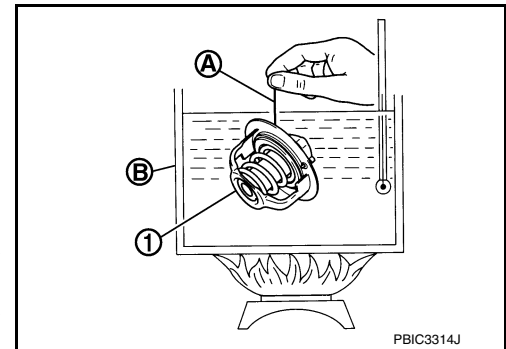
[MR FOR NISMO RS MODELS]

- Place a thread (A) so that it is caught in the valves of water control valve (1). Immerse fully in a container (B) 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 continuous valve lifting toward maximum valve lift.

**NOTE:**

The maximum valve lift amount standard temperature for water control valve is the reference value.

- After checking the maximum valve lift amount, lower the water temperature and check the valve closing temperature.



**Standard:** Refer to [CO-28, "Water Control Valve"](#).

- If out of the standard, replace water control valve.

### INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to [CO-10, "Inspection"](#).
- Start and warm up the engine. Check visually that there is no leakage of engine coolant.

# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[MR FOR NISMO RS MODELS]

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

#### Periodical Maintenance Specification

INFOID:0000000012197538

#### ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (US qt, Imp qt)

Engine coolant capacity (With reservoir tank at "MAX" level)	M/T models	7.9 (8- 3/8, 7)
	CVT models	8.1 (8- 1/2, 7-1/8)
Reservoir tank engine coolant capacity (At "MAX" level)		0.6 (5/8, 1/2)

#### Radiator

INFOID:0000000012197539

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

Cap relief pressure	Standard	78 - 98 (0.8 - 1.0, 11 - 14)
	Limit	59 (0.6, 9)
Leakage testing pressure		98 (1.0, 14)

#### Thermostat

INFOID:0000000012197540

##### Standard

Valve opening temperature	80.5 - 83.5°C (177 - 182°F)
Maximum valve lift	8.0 mm/95°C (0.315 in/203°F)
Valve closing temperature	77°C (171°F)

#### Water Control Valve

INFOID:0000000012197541

##### Standard

Valve opening temperature	93.5 - 96.5°C (200 - 206°F)
Maximum valve lift	8.0 mm/108°C (0.315 in/226°F)
Valve closing temperature	90°C (194°F)

# PRECAUTIONS

< PRECAUTION >

[MR EXCEPT FOR NISMO RS MODELS]

## PRECAUTION

### PRECAUTIONS

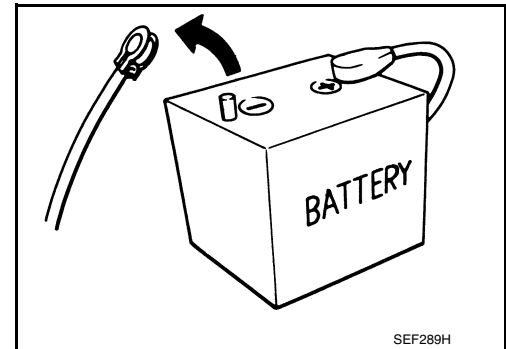
#### Precautions for Removing Battery Terminal

INFOID:0000000012959273

When disconnecting the battery terminal, pay attention to the following.

- Always use a 12V battery as power source.
- Never disconnect battery terminal while engine is running.
- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
- For vehicles with the engine listed below, remove the battery terminal after a lapse of the specified time:

D4D engine	: 20 minutes	YS23DDT	: 4 minutes
HRA2DDT	: 12 minutes	YS23DDTT	: 4 minutes
K9K engine	: 4 minutes	ZD30DDTi	: 60 seconds
M9R engine	: 4 minutes	ZD30DDTT	: 60 seconds
R9M engine	: 4 minutes		
V9X engine	: 4 minutes		
YD25DDTi	: 2 minutes		



#### NOTE:

ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

- After high-load driving, if the vehicle is equipped with the V9X engine, turn the ignition switch OFF and wait for at least 15 minutes to remove the battery terminal.

#### NOTE:

- Turbocharger cooling pump may operate in a few minutes after the ignition switch is turned OFF.
- Example of high-load driving
  - Driving for 30 minutes or more at 140 km/h (86 MPH) or more.
  - Driving for 30 minutes or more on a steep slope.
- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

#### NOTE:

If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.

#### NOTE:

The removal of 12V battery may cause a DTC detection error.

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

INFOID:0000000012197542

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 "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

#### WARNING:

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 "SRS AIR BAG".

## PRECAUTIONS

< PRECAUTION >

[MR EXCEPT FOR NISMO RS MODELS]

- **Never 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:**

Always observe the following items for preventing accidental activation.

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never 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 3 minutes before performing any service.**

### Precautions Necessary for Steering Wheel Rotation after Battery Disconnect

INFOID:000000012197544

#### **NOTE:**

- Before removing and installing any control units, first turn the push-button ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT-II to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

This vehicle is equipped with a push-button ignition switch and a steering lock unit.

If the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the procedure below before starting the repair operation.

### OPERATION PROCEDURE

1. Connect both battery cables.

#### **NOTE:**

Supply power using jumper cables if battery is discharged.

2. Carry the Intelligent Key or insert it to the key slot and turn the push-button ignition switch to ACC position. (At this time, the steering lock will be released.)
3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
4. Perform the necessary repair operation.
5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the push-button ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the push-button ignition switch is turned to LOCK position.)
6. Perform self-diagnosis check of all control units using CONSULT-II.

# PREPARATION

< PREPARATION >

[MR EXCEPT FOR NISMO RS MODELS]

## PREPARATION

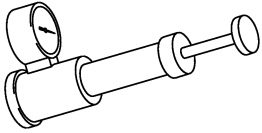
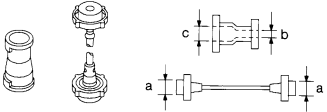
### PREPARATION

#### Commercial Service Tools

INFOID:000000012197545

A

CO

Tool name	Description
<p>Radiator cap tester</p>  <p>PBIC1982E</p>	<p>Checking radiator and radiator cap</p>
<p>Radiator cap tester adapter</p>  <p>S-NT564</p>	<p>Adapting radiator cap tester to radiator cap and radiator filler neck  <b>a: 28 (1.10) dia.</b>  <b>b: 31.4 (1.236) dia.</b>  <b>c: 41.3 (1.626) dia.</b>                      Unit: mm (in)</p>

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< SYSTEM DESCRIPTION >

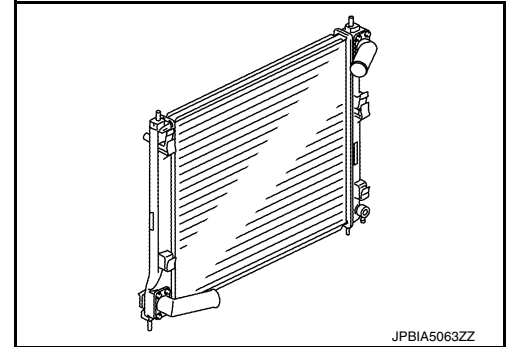
SYSTEM DESCRIPTION

COMPONENT PARTS

Radiator

INFOID:000000012197546

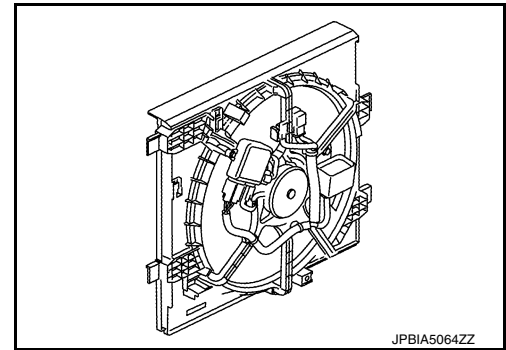
- A side flow radiator with an aluminum radiator core and plastic tank is adopted.



Cooling Fan

INFOID:000000012197547

- A cooling fan with plastic shroud is adopted.
- The cooling fan is controlled by the ECM (engine control module) based on the vehicle speed, coolant temperature, and A/C signals.
- For details about the control, refer to [EC-646. "COOLING FAN CONTROL : System Description"](#).



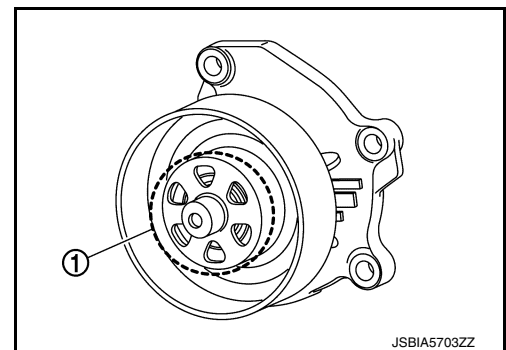
Water Pump

INFOID:000000012197548

- The water pump adopts an outer bearing type pump.

1 : Water pump vane

Bearing	Ball bearing
Mechanical seal	Alumina



- The water pump is driven by the drive belt. For the drive belt path, refer to [EM-186. "Inspection"](#).



# COMPONENT PARTS

< SYSTEM DESCRIPTION >

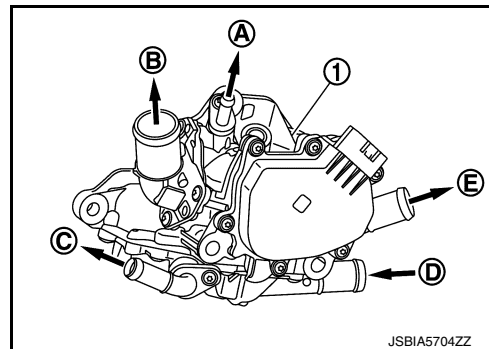
[MR EXCEPT FOR NISMO RS MODELS]

## Multi-way Control Valve

INFOID:000000012197549

A motor-driven valve that integrates the thermostat and water control valve and that can open and close the flow of water to the heater, oil cooler, and radiator according to the coolant temperature is adopted.

- 1 : Multi-way control valve
- A : To electric throttle control actuator
- B : To water outlet adapter
- C : To engine oil cooler
- D : From EGR cooler
- E : To heater



- When the water temperature is low, the water channels to the heater, oil cooler, and radiator are closed, accelerating warming of these parts.
- After they are warmed up, the radiator water channel is opened and closed to control the hot water temperature (100 to 105 °C), raising the engine oil temperature for reducing friction and improving fuel economy.

For control, refer to [EC-647, "THERMAL MANAGEMENT CONTROL : System Description"](#).

# DESCRIPTION

< SYSTEM DESCRIPTION >

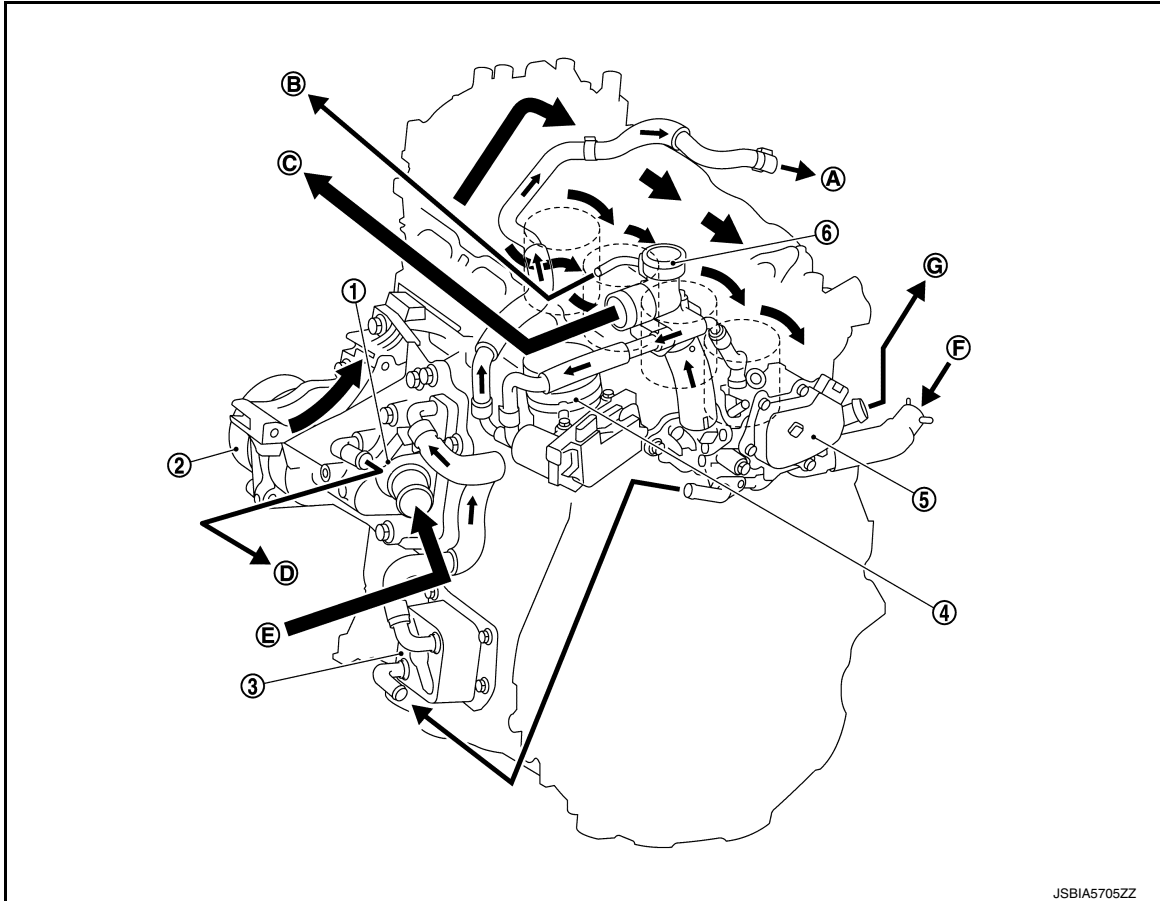
[MR EXCEPT FOR NISMO RS MODELS]

## DESCRIPTION

### Engine Cooling System

INFOID:000000012197550

- The radiator adopts a side flow aluminum radiator core.
- A drive belt is adopted for water pump operation.
- A multi-way control valve is adopted to control the water temperature.
- A shallow bottom is adopted for the cylinder block water jacket for optimizing cooling performance.
- An electric cooling fan is adopted. The cooling fan is controlled by signals from the ECM (engine control module).



- |  |                            |                         |
|--|----------------------------|-------------------------|
| 1. Water pump housing  | 2. Water pump              | 3. Oil cooler           |
| 4. Electric throttle control actuator                              | 5. Multi-way control valve | 6. Water outlet adapter |
| A. To turbocharger   | B. To reservoir tank       | C. To radiator          |
| D. To CVT fluid warmer (CVT models)<br>Not applicable (M/T models) | E. From radiator           | F. From EGR cooler      |
| G. To heater core  |                            |                         |

# DESCRIPTION

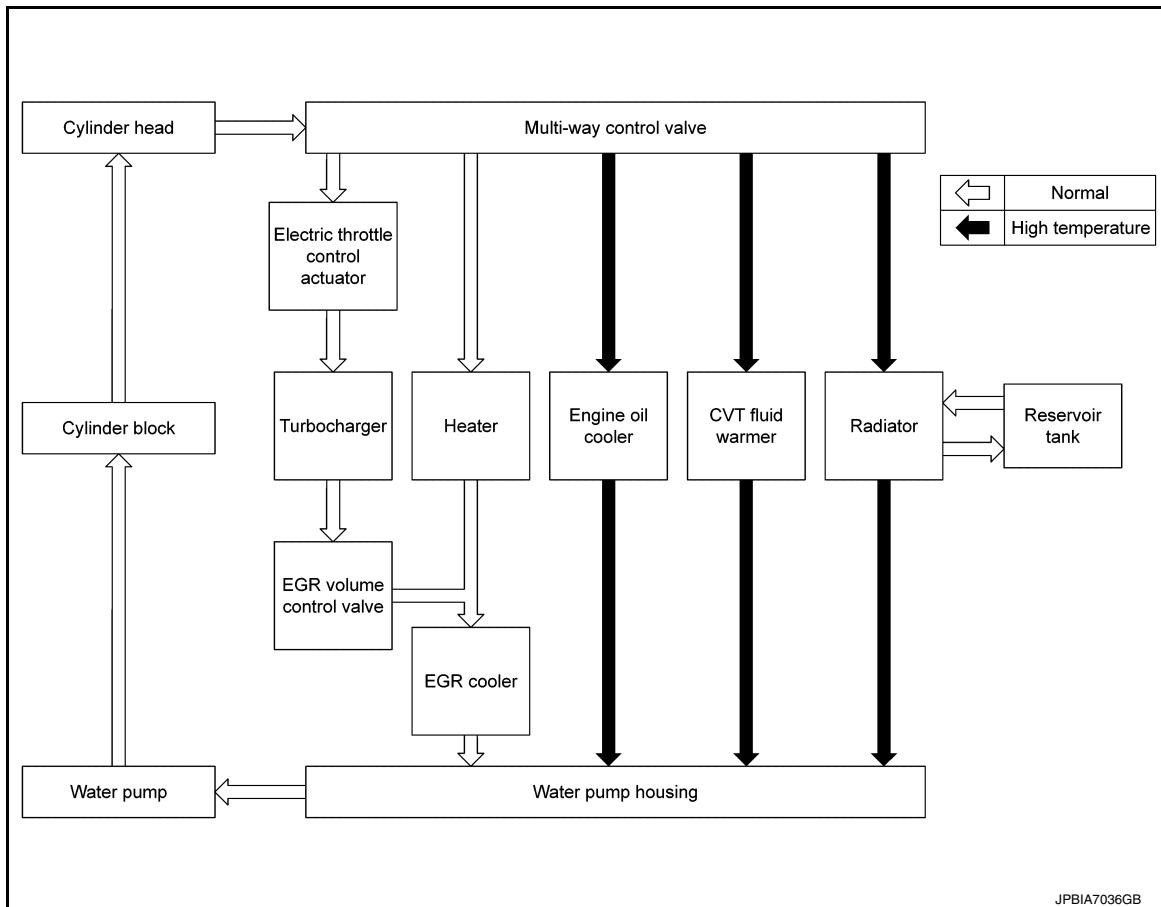
< SYSTEM DESCRIPTION >

[MR EXCEPT FOR NISMO RS MODELS]

## Engine Cooling System Schematic

INFOID:000000012197551

CVT models



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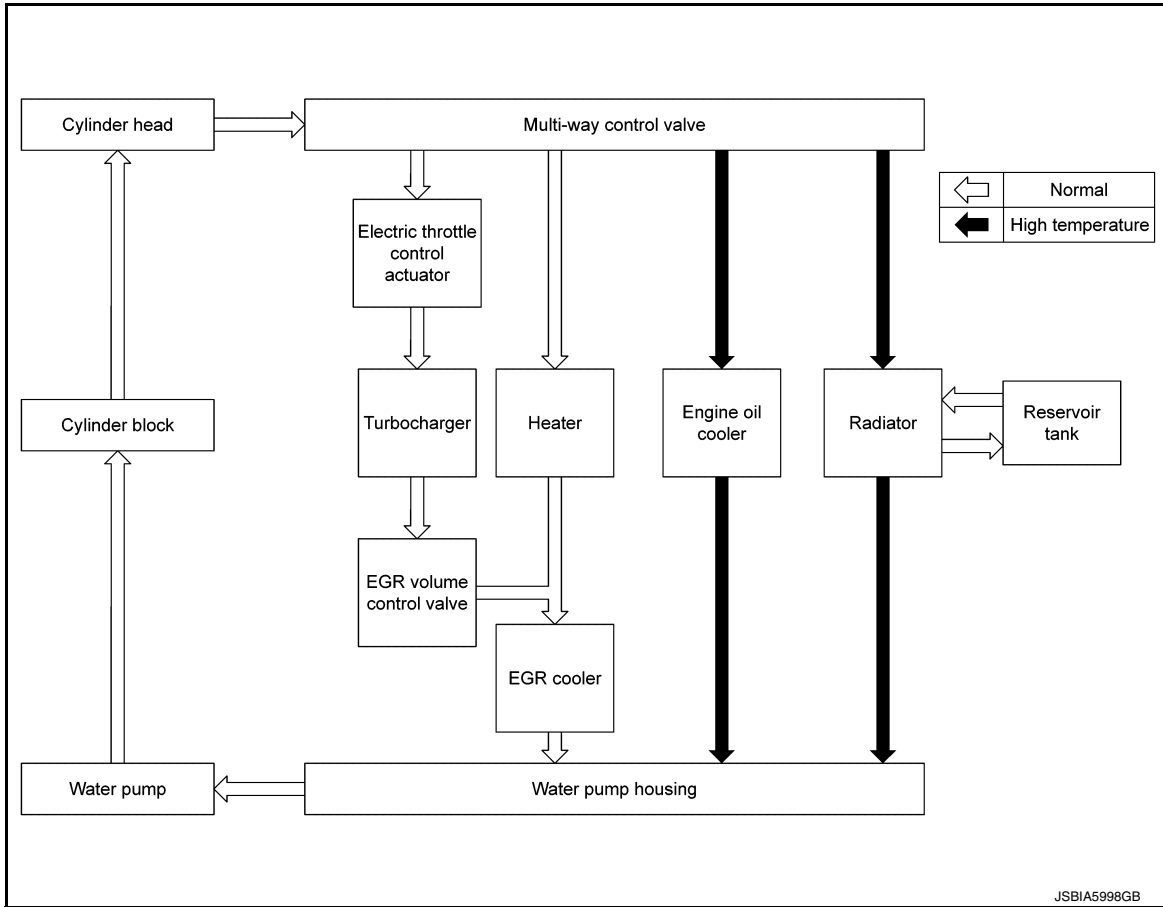
P

# DESCRIPTION

< SYSTEM DESCRIPTION >

[MR EXCEPT FOR NISMO RS MODELS]

M/T models



# BASIC INSPECTION

## RADIATOR

### Cleaning the Radiator

INFOID:000000012197552

A

CO

Check radiator for mud or clogs, and follow the procedure below to remove any that are found.

**CAUTION:**

- **Never bend or damage radiator fin.**
- **When cleaning radiator mounted to the vehicle, remove surrounding parts such as cooling fan assembly and horn. Cover harnesses and connectors with tape, never expose those parts to water.**

C

1. Flush with water vertically by hose from back of radiator.
  - Repeat cleaning. Be careful not to wash continuously with water at the same location.
2. Clean dirt from radiator completely.
3. Blow-dry vertically from back of radiator with compressed air.

D

E

**CAUTION:**

**Blow-dry from a location 30 cm or more away from radiator, using a pressure of less than 0.49 MPa (5 kg/cm<sup>2</sup>).**

F

- Do not blow-dry continuously at the same location. Continue blow-drying until there is no water.

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# OVERHEATING CAUSE ANALYSIS

< SYMPTOM DIAGNOSIS >

[MR EXCEPT FOR NISMO RS MODELS]

## SYMPTOM DIAGNOSIS

### OVERHEATING CAUSE ANALYSIS

#### Diagnosis Chart by Symptom

INFOID:000000012197553

		Symptom	Inspection item	
Cooling system malfunctions	Poor heat radiation	Water pump malfunction	Drive belt looseness or wear	—
		Multi-way control valve is stuck closed.	—	
		Damage of radiator fins	Clogging by mud or foreign substance	
			Physical damage	
	Clogged radiator hose	Foreign substance intrusion (corrosion, mud, sand, etc.)		
	Reduced cooling airflow	Cooling fan does not operate	Cooling fan assembly	—
		Poor cooling fan rotation		
		Damage of cooling fan		
	Damage of radiator shroud	—	—	—
	Incorrect LLC concentration	—	—	—
	Deteriorated coolant	—	LLC concentration	—
	Low coolant level	Coolant leakage	Radiator hose	Loose hose clamps
				Cracks and fractures of hose
			Water pump	Poor seal
			Radiator cap	Looseness
Poor seal				
Radiator			Damage, deterioration, or poor installation of O-ring	
		Cracks and fractures of radiator tank		
	Cracks and fractures of radiator core			
Reservoir tank	Cracking of reservoir tank cap			
Overflow of coolant from the reservoir tank	Entry of combustion gas into the cooling system	Cylinder head distortion		
		Deterioration of cylinder head gasket		

# OVERHEATING CAUSE ANALYSIS

< SYMPTOM DIAGNOSIS >

[MR EXCEPT FOR NISMO RS MODELS]

	Symptom		Inspection item		
Malfunction other than the cooling system	—	Engine overload	High-load driving	High engine speed with no load	A
				Driving in low gear for a long period of time	CO
				Extreme continuous high-speed driving	
			Power train system malfunction	—	C
			Size of installed wheel or tire		D
			Dragging of brakes		
	Ignition timing	E			
	Obstruction of outside air inflow	Blocked bumper opening	—		F
		Blocked radiator grille	Installation of bumper cover	—	G
			Blocked by mud or foreign substance		H
		Clogged radiator fins	—		I
		Clogged condenser fan	Obstruction of outside air inflow path		J
	Blocked due to installation of fog lamps			K	
					L
					M
				N	
				O	
				P	

## PERIODIC MAINTENANCE

### ENGINE COOLANT

#### Inspection

INFOID:000000012197554

#### LEVEL

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

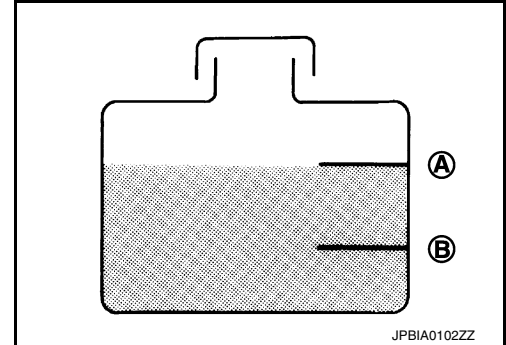
A : MAX

B : MIN

- Adjust the engine coolant level if necessary.

**CAUTION:**

Refill Genuine NISSAN Long Life Antifreeze/Coolant (blue) or equivalent in its quality mixed with water (distilled or demineralized). Refer to [MA-11, "Fluids and Lubricants"](#).



#### LEAKAGE

- To check for leakage, apply pressure to the cooling system with the radiator cap tester (commercial service tool) (A) and the radiator cap tester adapter (commercial service tool) (B).

Testing pressure: Refer to [CO-58, "Radiator"](#).

**WARNING:**

Never remove radiator cap when engine is hot. Serious burns may occur from high-pressure engine coolant escaping from engine cooling system.

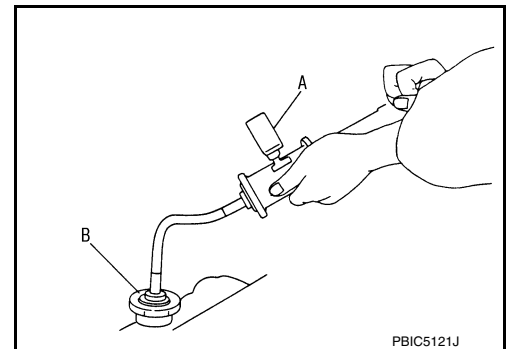
**CAUTION:**

Higher test pressure than specified may cause radiator damage.

**NOTE:**

If a case that engine coolant decreases, replenish radiator with engine coolant.

- If anything is found, repair or replace damaged parts.



#### Draining and Filling

INFOID:000000012197555

**CAUTION:**

- Never apply additive agent like anti-leakage sealant. Doing so may cause coolant passage clog.
- When refilling use Genuine NISSAN Long Life Antifreeze/Coolant (blue) or equivalent in its quality mixed with water (distilled or demineralized). Refer to [MA-11, "Fluids and Lubricants"](#).
- Never dilute using water.

#### DRAINING

**WARNING:**

Never open the radiator cap or drain plug when the engine is hot. Hot liquid may spray out, causing serious injury.

**CAUTION:**

- Never spill coolant on the drive belt while working.
  - Be sure to perform this operation when coolant temperature is cold.
1. Turn the ignition switch ON, wait for 10 seconds or more, and then turn it OFF again.
  2. Connect drain hose.



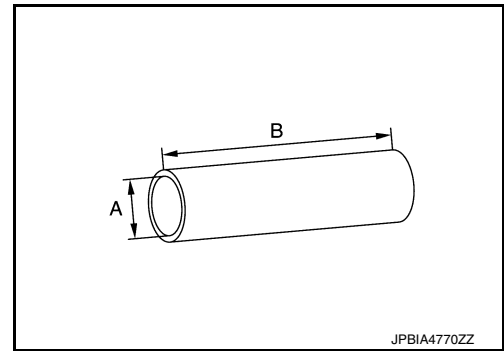
# ENGINE COOLANT

< PERIODIC MAINTENANCE >

[MR EXCEPT FOR NISMO RS MODELS]

- Use a general-purpose hose with the dimensions show in the figure.

A :  $\phi$  8 mm (0.31 in)  
B : 300 mm (11.81 in)



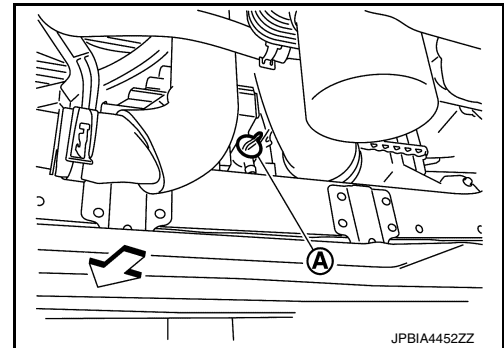
3. Open radiator drain plug (A) at the bottom of radiator, and then remove radiator cap.

↶ : Vehicle front

### CAUTION:

**Perform this step when engine is cold.**

- When draining all of engine coolant in the system, open water drain plugs on cylinder block. Refer to [EM-287, "Disassembly and Assembly"](#).



4. Remove reservoir tank if necessary, and drain engine coolant and clean reservoir tank before installing. Refer to [CO-46, "Exploded View"](#).
5. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to [CO-44, "Flushing"](#).
6. Disconnect drain hose.

## REFILLING

1. Install reservoir tank. Refer to [CO-46, "Exploded View"](#).
2. Install the radiator drain plug.
  - Replace the drain plug O-ring with a new one.

### CAUTION:

**Be sure to clean drain plug and install with new O-ring.**

**Radiator drain plug** : Refer to [CO-46, "Exploded View"](#).

- If water drain plugs on cylinder block are removed, close and tighten them. Refer to [EM-287, "Disassembly and Assembly"](#).
3. Check that each hose clamp is firmly tightened.
  4. Remove the cowl top extension. Refer to [EXT-30, "Removal and Installation"](#).
  5. Perform the following procedure for draining the air from piping.

Ⓜ If using CONSULT

1. Turn the ignition switch ON again and use CONSULT "WORK SUPPORT" mode to perform "ENGINE COOLANT BYPASS VALVE". Refer to [EC-667, "CONSULT Function"](#).

### CAUTION:

**Never start engine.**

### NOTE:

CONSULT can be used to open the bypass valve on the multi-way control valve.

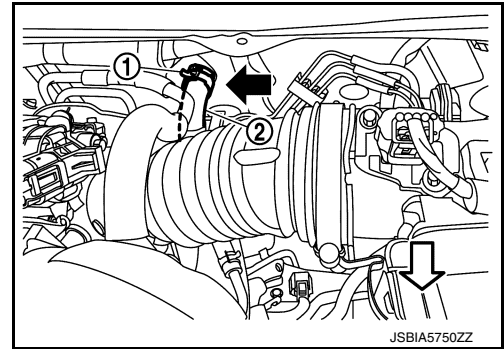
# ENGINE COOLANT

< PERIODIC MAINTENANCE >

[MR EXCEPT FOR NISMO RS MODELS]

2. Separate the hose clamp (1) and heater hose (2) at the position shown in the figure (←), and hold the end of the hose at the same height.

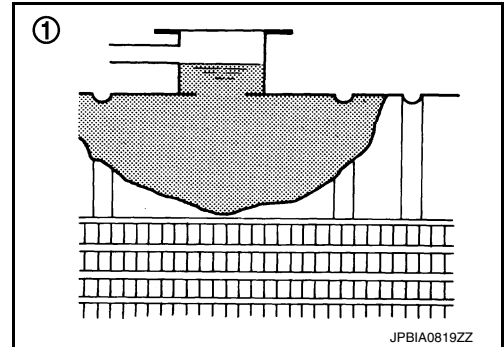
← : Vehicle front



3. Fill with coolant at a speed of 3 L/min or less (like pouring water with a kettle) until it fills the radiator cap (1) neck.
- If coolant comes out from the heater hose when filling with coolant, connect the heater hose and continue filling with coolant.

**CAUTION:**

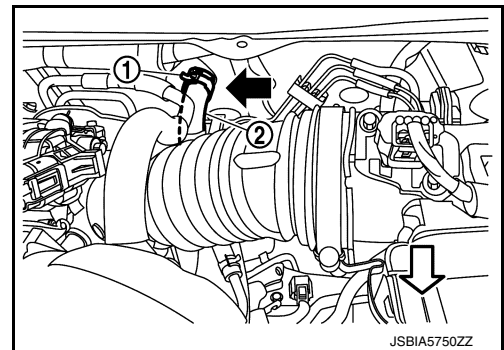
- Filling with coolant at a high speed may allow air to mix with coolant. Be sure to fill with coolant slowly, observing the above speed.
- Never spill coolant on any electrical equipment (such as the alternator) during the operation.



⊗ When not using CONSULT

1. Separate the hose clamp (1) and heater hose (2) at the position as shown in the figure (←), and hold the end of the hose at the same height.

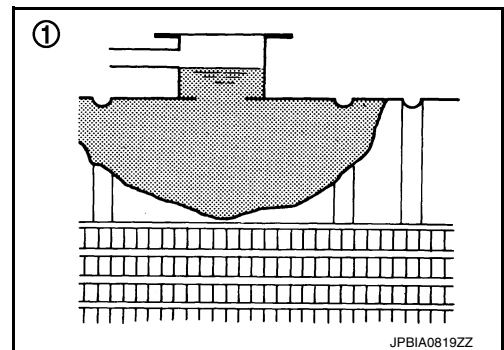
← : Vehicle front



2. Fill with coolant at a speed of 3 L/min or less (like pouring water with a kettle) until it fills the radiator cap (1) neck.
- If coolant comes out from the heater hose while adding coolant, connect the heater hose and continue adding coolant.

**CAUTION:**

- Filling with coolant at a high speed may allow air to mix with coolant. Be sure to fill with coolant slowly, observing the above speed.
- Never spill coolant on any electrical equipment (such as the alternator) during the operation.



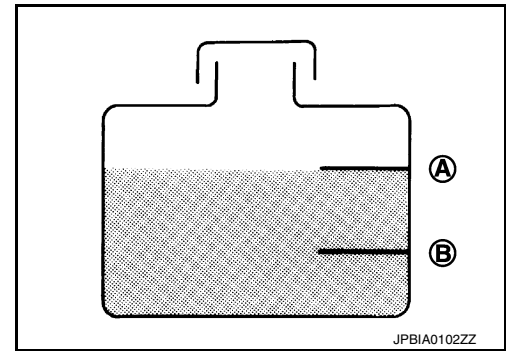
# ENGINE COOLANT

< PERIODIC MAINTENANCE >

[MR EXCEPT FOR NISMO RS MODELS]

6. Fill with coolant to "MAX" line of reservoir tank.

- A : MAX
- B : MIN



7. Install the cowl top extension. Refer to [EXT-30, "Removal and Installation"](#).
8. Install the radiator cap.
9. Perform the following operation for warming up the engine.

Ⓜ When using CONSULT

1. Start the engine, and set the heater control temperature to "FULL HOT".
2. Use CONSULT "WORK SUPPORT" mode to perform "ENGINE COOLANT BYPASS VALVE". Refer to [EC-667, "CONSULT Function"](#).

**NOTE:**

CONSULT can be used to open the bypass valve on the multi-way control valve.

- Check that there is no coolant leakage from the drain plug and heater hose connections.

ⓧ When not using CONSULT

1. Start the engine and set the heater control temperature to "FULL HOT".
  2. Warm up the engine until the bypass valve on the multi-way control valve opens. The warm-up time should be approximately 10 minutes at 3,000 rpm.
- Check that the bypass valve on the multi-way control valve is open by touching the radiator hose (lower) with a hand and checking that warm water is flowing.

**CAUTION:**

**Be careful that coolant does not overheat.**

- Check that there is no coolant leakage from the drain plug and heater hose connections.

10. Stop the engine.

11. When the engine is cold (approximately 50°C or less), remove the radiator cap and check the coolant level. If the level is low, fill with coolant again until it fills the radiator cap neck, and then repeat operation from step 7.

**CAUTION:**

**Never spill coolant on any electrical equipment (such as the alternator) during the operation.**

12. When the coolant level stabilizes, fill with coolant up to the "MAX" line of reservoir tank.

## CHECK WATER FLOW SOUND

**CAUTION:**

**Prior to check, be sure to close windows, doors, and hood, and turn off radio and other electrical loads.**

1. Allow the engine to cool (to approximately 50°C or less).
2. Set the temperature of the heater control to "FULL HOT".
3. Start engine. Perform the following cycle three times. Keep the engine speed at 1,000 rpm for approximately 30 seconds and then increase it gradually to 3,000 rpm.
4. During the operation described above in step 3, check for water flow sound from heater core.
5. If water flow sounds are heard, fill with coolant to the radiator cap neck at a speed of 3 L/min or less (like pouring water with a kettle), and then repeat the operations from step 7 of "Filling Engine Coolant" to step 4 of "How to Check Water Flow Sound".

**CAUTION:**

- Filling with coolant at a high speed may allow air to mix with coolant. Be sure to fill with coolant slowly, observing the speed specified above.
- Never spill coolant on any electrical equipment (such as the alternator) during the operation.

# ENGINE COOLANT

< PERIODIC MAINTENANCE >

[MR EXCEPT FOR NISMO RS MODELS]

## Flushing

INFOID:000000012197556

1. Install radiator drain plug.

**CAUTION:**

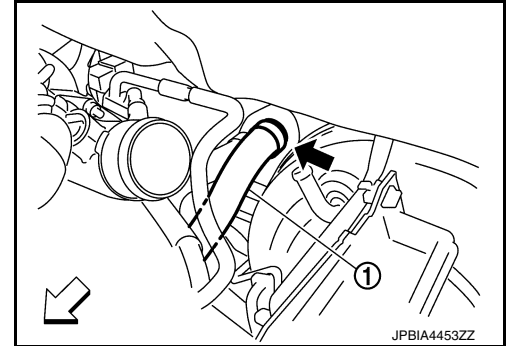
Be sure to clean drain plug and install with new O-ring.

**Radiator drain plug** : Refer to [CO-46, "Exploded View"](#).

- If water drain plugs on cylinder block are removed, close and tighten them. Refer to [EM-72, "Setting"](#).
2. Remove air duct (suction side), air cleaner cover assembly and air cleaner body assembly. Refer to [EM-27, "Exploded View"](#).
  3. Disconnect vacuum hose break booster side, and remove vacuum tube from clamp.
  4. Disconnect heater hose (1) at position (←) in the figure.

← : Vehicle front

- Enhance heater as high as possible.



5. Fill radiator and reservoir tank with water and reinstall radiator cap.
  - When engine coolant overflows disconnected heater hose, connect heater hose, and continue filling the engine coolant.
6. Connect vacuum hose, and install vacuum tube.
7. Install air duct (suction side), air cleaner cover assembly and air cleaner body assembly. Refer to [EM-27, "Exploded View"](#).
8. Run the engine and warm it up to normal operating temperature.
9. Rev the engine two or three times under no-load.
10. Stop the engine and wait until it cools down.
11. Drain water from the system. Refer to [CO-40, "Draining and Filling"](#).
12. Repeat steps 1 through 9 until clear water begins to drain from radiator.

# RADIATOR CAP

< PERIODIC MAINTENANCE >

[MR EXCEPT FOR NISMO RS MODELS]

## RADIATOR CAP

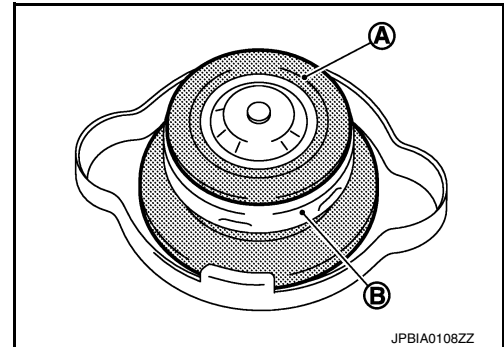
### Radiator Cap Inspection

INFOID:000000012197557

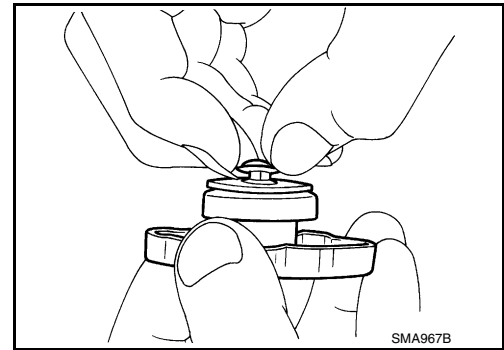
- Visually check valve seat of the radiator cap vacuum valve for dirt and damage.

**CAUTION:**

Check valve seat (A) visually in vertical position. If the valve seat is excessively extended so that lower metal plunger (B) is not visible, replace the radiator cap.



- Move the vacuum valve and check for smooth opening and closing.



- Connect radiator cap tester (commercial service tool) (A) and apply pressure to check opening pressure of the pressure regulating valve.

**Standard  
Limit**

: Refer to [CO-58. "Radiator"](#).

- Be sure to apply water or LLC to the cap seals when connecting the radiator cap to the radiator cap tester.
- Replace radiator cap if vacuum valve is malfunctioning or if the valve opening pressure is outside (is lower than) the limit.



# RADIATOR

< REMOVAL AND INSTALLATION >

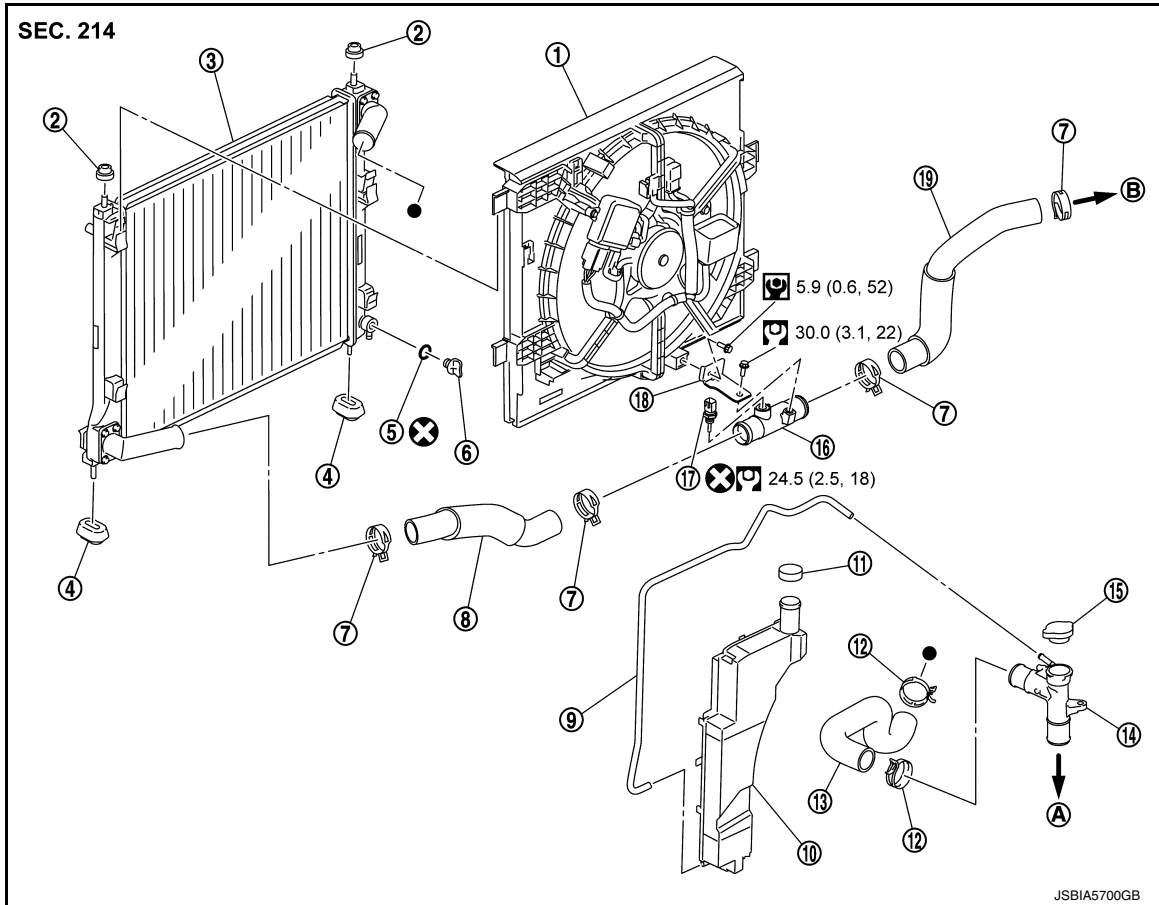
[MR EXCEPT FOR NISMO RS MODELS]

## REMOVAL AND INSTALLATION

### RADIATOR

#### Exploded View

INFOID:000000012197558



- |                                |                                       |                        |
|--------------------------------|---------------------------------------|------------------------|
| 1. Cooling fan assembly        | 2. Mounting rubber (upper)            | 3. Radiator            |
| 4. Mounting rubber (lower)     | 5. O-ring                             | 6. Drain plug          |
| 7. Hose clamp                  | 8. Radiator hose (lower) (LH)         | 9. Reservoir tank hose |
| 10. Reservoir tank             | 11. Reservoir tank cap                | 12. Hose clamp         |
| 13. Radiator hose (upper)      | 14. Water outlet adapter              | 15. Radiator cap       |
| 16. Radiator hose pipe         | 17. Engine coolant temperature sensor | 18. Bracket            |
| 19. Radiator hose (lower) (RH) |                                       |                        |
| A. To multi-way control valve  | B. To water inlet                     |                        |

⊗ : Always replace after every disassembly.

☐ : N·m (kg-m, ft-lb)

☐ : N·m (kg-m, in-lb)

● : Indicates that the parts is connected at points with symbols in actual vehicle.

### Removal and Installation

INFOID:000000012197559

#### REMOVAL

#### **WARNING:**

- Never remove radiator cap when engine is hot. Serious burns may occur from high-pressure engine coolant escaping from engine cooling system.

# RADIATOR

< REMOVAL AND INSTALLATION >

[MR EXCEPT FOR NISMO RS MODELS]

- **Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.**

## NOTE:

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

1. Drain coolant. Refer to [CO-40, "Draining and Filling"](#).  
**CAUTION:**
  - **Perform this step when the engine is cold.**
  - **Never spill engine coolant on drive belt.**
2. Remove the engine cover. Refer to [EM-191, "Removal and Installation"](#).
3. Disconnect harness connector of coolant temperature sensor.
4. Remove the radiator core support upper. Refer to [DLK-130, "MR16DDT : Removal and Installation"](#).
5. Disconnect the radiator hoses (upper and lower) and radiator hose pipe.
6. Remove the front bumper. Refer to [EXT-17, "Removal and Installation"](#).
7. Disconnect harness connector of cooling fan.
8. Remove reservoir tank.
9. Disconnect harness and remove cooling fan assembly.  
**CAUTION:**  
**Never damage radiator core when removing it.**
10. Remove the air condenser from the radiator, and temporarily fasten it on the vehicle side with rope.
11. Lift up and remove the radiator (1).

← : Vehicle front

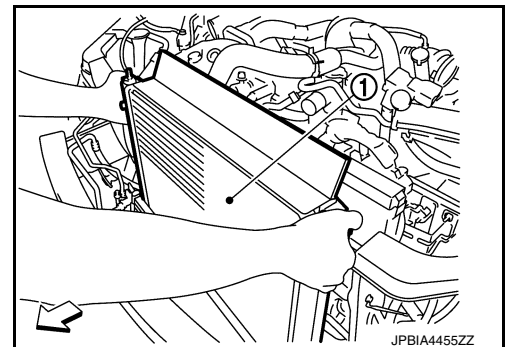
## CAUTION:

**Never damage the radiator core and A/C condenser core.**

12. If necessary, remove the coolant temperature sensor from the radiator hose pipe.

## CAUTION:

**Handle parts carefully and never subjecting them to impact.**



## INSTALLATION

### CAUTION:

**Do not reuse O-rings.**

Note the following, and install in the reverse order of removal.

Radiator

### CAUTION:

**Use genuine parts for the cooling fan assembly installation bolts, and strictly observe the tightening torque. (This is to prevent damage to the radiator.)**

### NOTE:

When installing radiator core support (upper), check that upper and lower mount units of radiator and A/C condenser are fitted in each mounting hole of radiator core support (upper/lower).

Radiator Hose

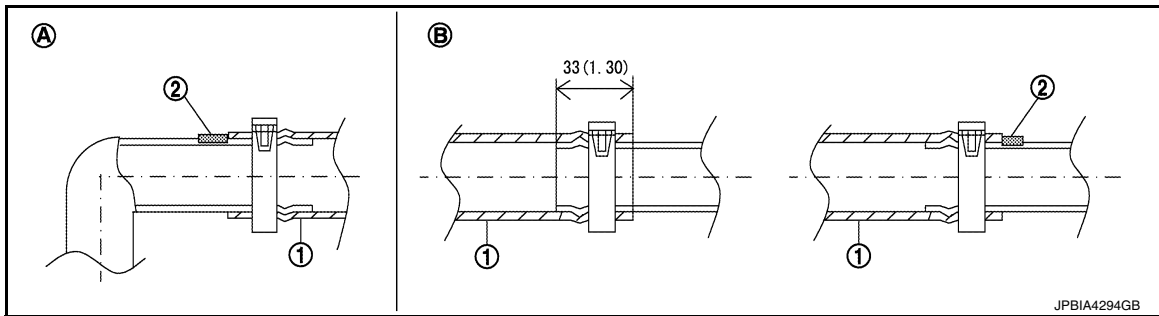
### NOTE:

When inserting the radiator hose (1), insert the hose until it contacts the stopper (2) When a stopper is present. When a stopper is not present, insert hose 33 mm.

# RADIATOR

< REMOVAL AND INSTALLATION >

[MR EXCEPT FOR NISMO RS MODELS]



Unit: mm (in)

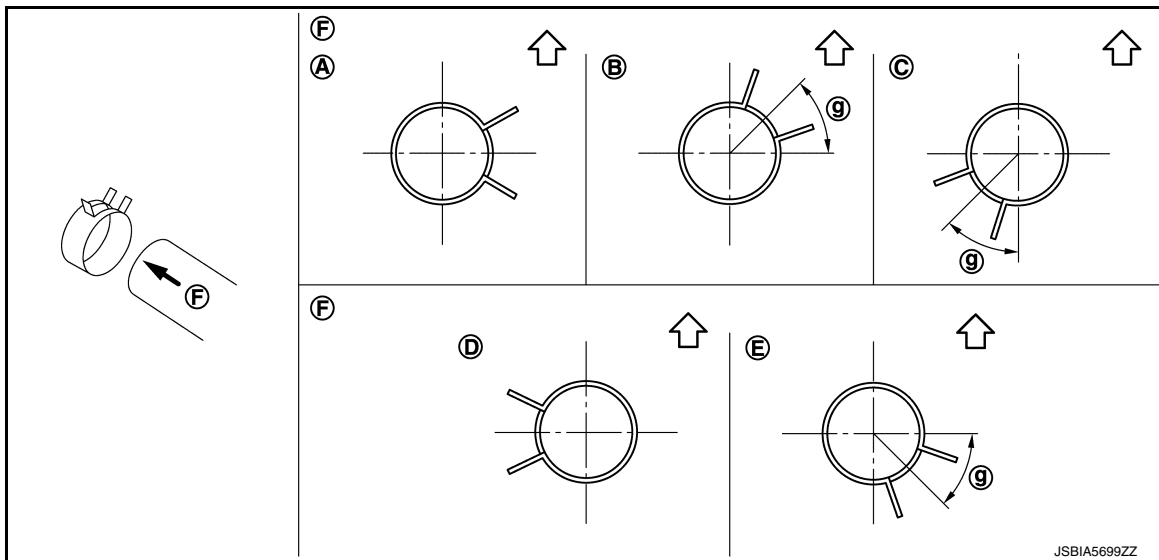
A. Radiator side

B. Engine side

- Refer to the following table when installing hose clamps.

Radiator hose	Hose end	Direction of paint mark	Orientation of hose clamp tabs*
Radiator hose (upper)	Radiator side	Vehicle upper	A
	Engine side	Vehicle upper	B
Radiator hose (lower) (RH)	Radiator side	Vehicle rear	C
	Engine side	Vehicle front	C
Radiator hose (lower) (LH)	Radiator side	Vehicle rear	D
	Engine side	Vehicle rear	E

\*: Refer to the illustration for the orientation of the hose clamp tabs.



F. Arrow view F

↖ : Vehicle upper

g. 45°

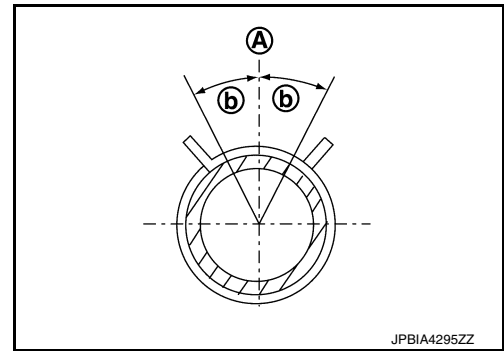


# RADIATOR

## < REMOVAL AND INSTALLATION >

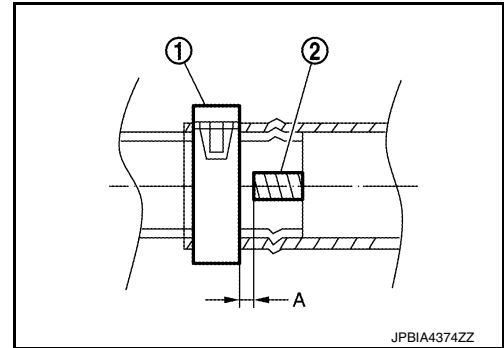
[MR EXCEPT FOR NISMO RS MODELS]

- The orientation of the hose clamp tabs must be within  $\pm 15^\circ$  (b) of the specified position (A).



- When installing hose clamp (1), check that dimension "A" between the end of the radiator hose paint mark (2) and the hose clamp is within the standard.

**Dimension "A"      3 mm (0.12 in)**



Engine Coolant Temperature Sensor

### **CAUTION:**

**If the coolant temperature sensor is removed, never reuse it. Replace it with a new one.**

### Inspection

INFOID:0000000012197560

### INSPECTION AFTER INSTALLATION

- Start the engine, and check the joints for coolant leakage.

A  
CO  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P



# COOLING FAN

< REMOVAL AND INSTALLATION >

[MR EXCEPT FOR NISMO RS MODELS]

## Disassembly and Assembly

INFOID:000000012197563

A

### DISASSEMBLY

1. Remove cooling fan mounting nuts and then remove the cooling fan. Refer to [CO-50. "Removal and Installation"](#).
2. Remove fan motor.

CO

### ASSEMBLY

Note the following, and assemble in the reverse order of disassembly.

- When assembling the fan, apply adhesive (Three Bond Thread Lock Super 1303 or an equivalent) to the threads of the fan motor shaft before tightening the nuts.

C

D

### Inspection

INFOID:000000012197564

### INSPECTION AFTER ASSEMBLY

Check for significant damage or bending of the fan.

- If necessary, replace the cooling fan.

E

F

G

H

I

J

K

L

M

N

O

P

# WATER PUMP

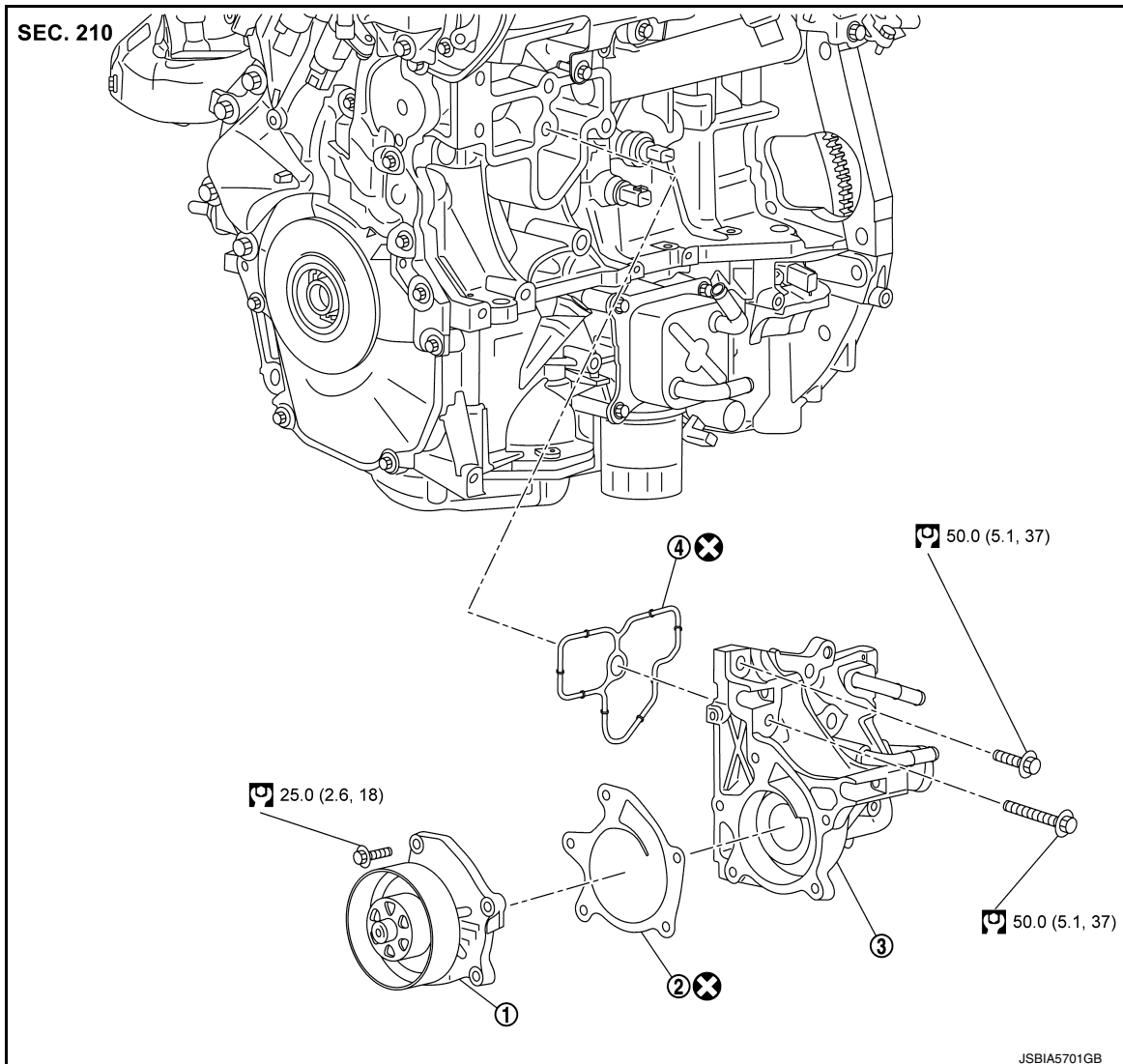
< REMOVAL AND INSTALLATION >

[MR EXCEPT FOR NISMO RS MODELS]

## WATER PUMP

Exploded View

INFOID:000000012197565



1. Water pump
2. Water pump gasket
3. Water pump housing
4. Water pump housing gasket

⊗ : Always replace after every disassembly.

⊞ : N·m (kg-m, ft-lb)

## Removal and Installation

INFOID:000000012197566

### REMOVAL

1. Fully turn the front wheel to the right.
2. Disconnect battery cable from negative terminal. Refer to [PG-106, "Removal and Installation"](#).
3. Drain coolant. Refer to [CO-40, "Draining and Filling"](#).  
**CAUTION:**
  - Never spill coolant on the drive belt while working.
  - Be sure to perform this operation when coolant temperature is cold.
4. Remove the front fender protector (RH). Refer to [EXT-31, "Removal and Installation"](#).
5. Remove engine drive belts. Refer to [EM-185, "Removal and Installation"](#).

# WATER PUMP

< REMOVAL AND INSTALLATION >

[MR EXCEPT FOR NISMO RS MODELS]

6. Remove the water pump mounting bolts and then remove the water pump.
  - Coolant remaining in the cylinder block drains out at this time. Use a tray to collect it.
- CAUTION:**
  - **Never allow water pump vane to interfere with other parts.**
  - **Never disassemble water pump. (Disassembly of this part is prohibited.)**
7. Remove the water pump gasket.
8. Remove the alternator. Refer to [CHG-33, "MR16DDT : Removal and Installation"](#).
9. Disconnect the water hose from the water pump housing.
10. Disconnect the radiator hose (lower) (RH) from the water pump housing. Refer to [CO-46, "Removal and Installation"](#).
11. Remove the water pump housing mounting bolts, and then remove the water pump housing.
12. Remove the water pump housing gasket.

## INSTALLATION

Note the following, and install in the reverse order of removal.

Water Pump Housing

### CAUTION:

**Never reuse the water pump housing gasket. Always replace it with a new one.**

Water Pump

### CAUTION:

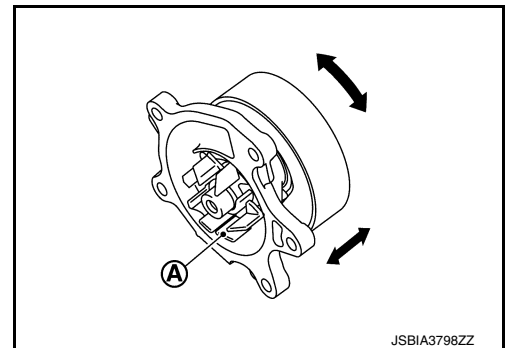
**Never reuse the water pump gasket. Always replace it with a new one.**

## Inspection

INFOID:000000012197567

## INSPECTION AFTER REMOVAL

- Check visually that there is no significant dirt or rusting on water pump body and vane (A).
- Check that there is no looseness in vane shaft, and that it turns smoothly when rotated by hand.
- Replace water pump, if necessary.



## INSPECTION AFTER INSTALLATION

Checking for Coolant Leakage

- Start the engine, and check the joints for coolant leakage.

# MULTI-WAY CONTROL VALVE

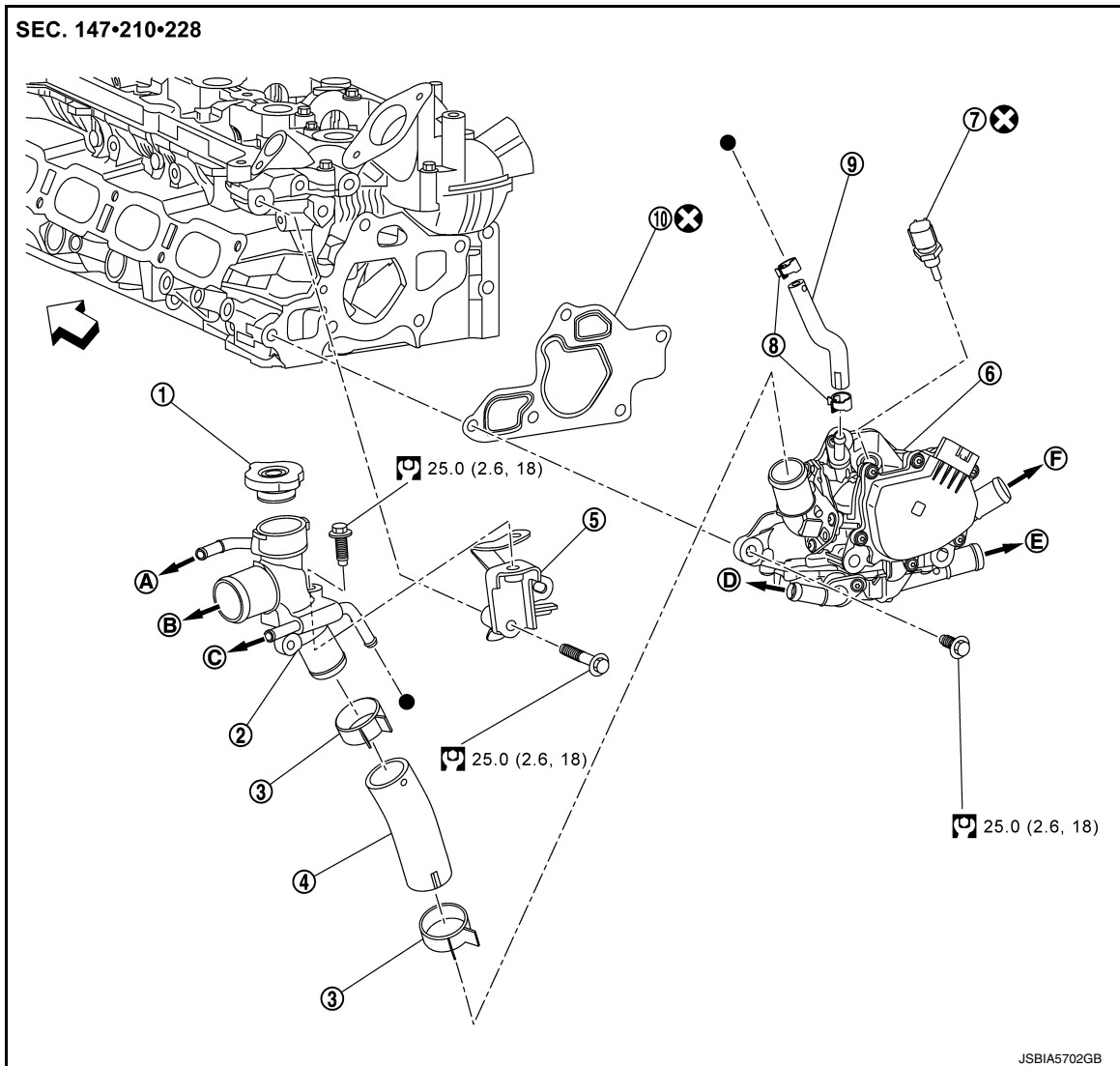
< REMOVAL AND INSTALLATION >

[MR EXCEPT FOR NISMO RS MODELS]

## MULTI-WAY CONTROL VALVE

Exploded View

INFOID:000000012197568



- |  |                         |  |
|--|-------------------------|--|
| 1. Radiator cap                        | 2. Water outlet adapter | 3. Hose clamp                            |
| 4. Water outlet hose                   | 5. Bracket              | 6. Multi-way control valve               |
| 7. Engine coolant temperature sensor 1 | 8. Hose clamp           | 9. Water hose                            |
| 10. Gasket                             |                         |  |
| A. To reservoir tank                   | B. To radiator          | C. To electric throttle control actuator |
| D. To oil cooler                       | E. To EGR cooler        | F. To heater core                        |

← : Engine front

⊗ : Always replace after every disassembly.

Ⓜ : N·m (kg·m, in·lb)

● : Indicates that the parts is connected at points with symbols in actual vehicle.

## Removal and Installation

INFOID:000000012197569

### REMOVAL

1. Drain coolant. Refer to [CO-40. "Draining and Filling"](#).

**CAUTION:**

# MULTI-WAY CONTROL VALVE

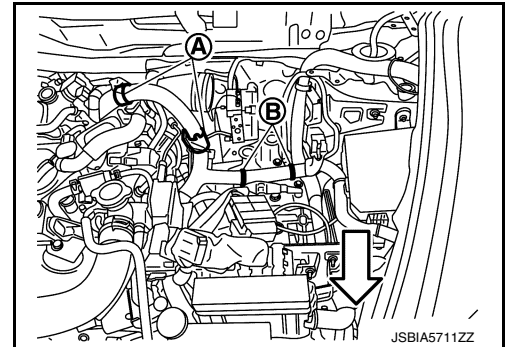
< REMOVAL AND INSTALLATION >

[MR EXCEPT FOR NISMO RS MODELS]

**Be sure to perform this operation when coolant temperature is cold.**

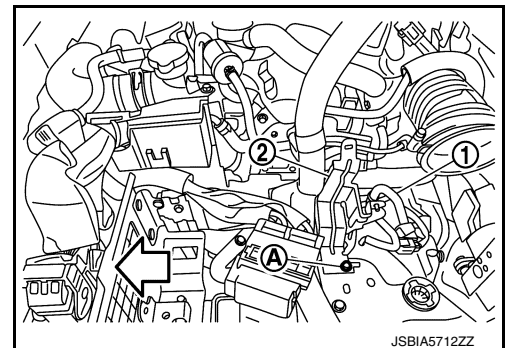
2. Remove the engine cover. Refer to [EM-191, "Removal and Installation"](#).
3. Remove the battery. Refer to [PG-105, "Removal and Installation"](#).
4. Remove the air duct inlet (upper), element case, and air cleaner case. Refer to [EM-192, "Removal and Installation"](#).
5. Disconnect the radiator hose (upper) from the water outlet adapter. Refer to [CO-46, "Exploded View"](#).
6. Disconnect the reservoir tank hose from the water outlet adapter. Refer to [CO-46, "Exploded View"](#).
7. Disconnect the water hose from the water outlet adapter. Refer to [EM-197, "Exploded View"](#).
8. Disconnect the water outlet hose and the water outlet adapter.
9. Remove the harness clamps (A) and harness clips (B).

⇐ : Vehicle front



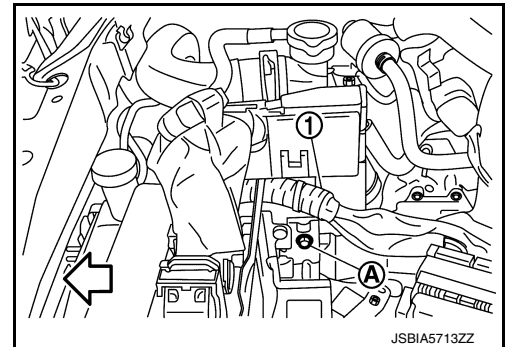
10. Remove the breather hose (1) and bracket mounting bolt (A), and then remove the bracket (2).

⇐ : Vehicle front



11. Remove the bracket mounting bolt (A) and move the engine harness (1) to a location where it does not interfere with work.

⇐ : Vehicle front



12. Disconnect harness connector of coolant temperature sensor 1.
13. Disconnect the multi-way control valve harness connector.
14. Disconnect the water hose and heater hose.
15. Remove the multi-way control valve mounting bolt, and then remove the multi-way control valve and gasket.
16. If necessary, remove engine coolant temperature sensor 1 from the multi-way control valve.

**CAUTION:**

**Handle it carefully and never subject it to impact.**

## INSTALLATION

Note the following, and install in the reverse order of removal.

Engine Coolant Temperature Sensor 1

**CAUTION:**

**If engine coolant temperature sensor 1 is removed, never reuse it. Replace it with a new one.**

Water Hose

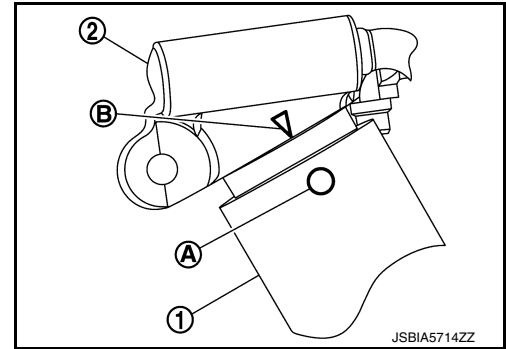
Water outlet adapter side

# MULTI-WAY CONTROL VALVE

< REMOVAL AND INSTALLATION >

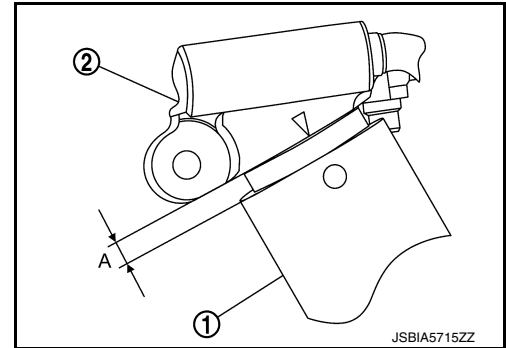
[MR EXCEPT FOR NISMO RS MODELS]

- When inserting the water outlet hose (1), align the water outlet hose paint mark (A) with the mark (B) on the water outlet adapter (2).

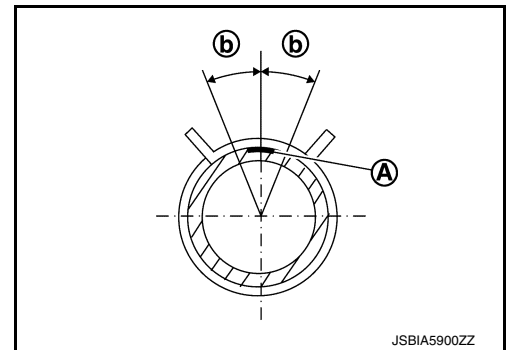


- Check that the distance (A) from the end of the water outlet hose (1) to the water outlet adapter (2) is within the standard.

**Dimension (A) : 5 mm**

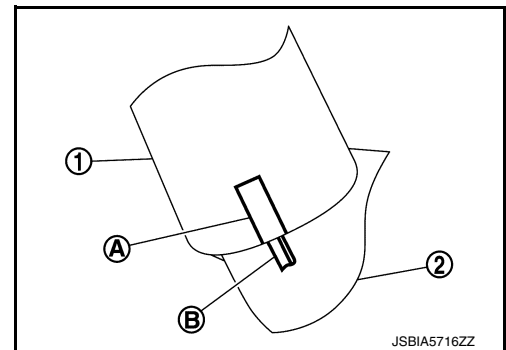


- The orientation of the hose clamp tabs must be within  $\pm 15^\circ$  (b) of the water outlet hose paint mark (A).



Multi-way control valve side

- When inserting the water outlet hose (1), align the water outlet hose paint mark (A) with the rib shape (B) on the multi-way control valve (2).



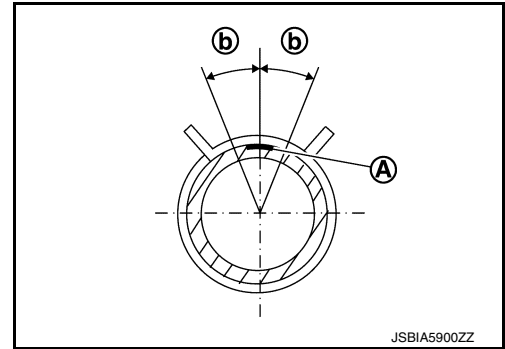


# MULTI-WAY CONTROL VALVE

< REMOVAL AND INSTALLATION >

[MR EXCEPT FOR NISMO RS MODELS]

- The orientation of the hose clamp tabs must be within  $\pm 15^\circ$  (b) of the water outlet hose paint mark (A).



## Inspection

INFOID:000000012197570

### INSPECTION AFTER INSTALLATION

- Start the engine, and check the joints for coolant leakage.

A  
CO  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[MR EXCEPT FOR NISMO RS MODELS]

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

#### Periodical Maintenance Specification

INFOID:0000000012197571

#### ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (US qt, Imp qt)

Engine coolant capacity (With reservoir tank at "MAX" level)	M/T models	8.5 (9, 7-1/2)
	CVT models	8.7 (9-2/8, 7-5/8)
Reservoir tank engine coolant capacity (At "MAX" level)		0.6 (5/8, 1/2)

#### Radiator

INFOID:0000000012197572

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

Cap relief pressure	Standard	80 - 100 (0.8 - 1.0, 11.6 - 14.5)
	Limit	60 (0.6, 8.7)
Leakage testing pressure		100 (1.0, 14.5)