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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:000000012958208

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 "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".
- 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.

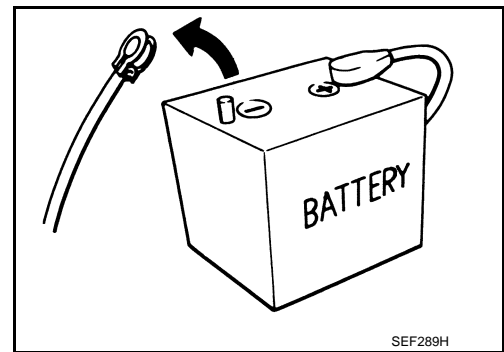
Precautions for Removing Battery Terminal

INFOID:000000013517286

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:

BR08DE	: 4 minutes	V9X engine	: 4 minutes
D4D engine	: 20 minutes	YD25DDTi	: 2 minutes
HR09DET	: 12 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		



**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.

# PRECAUTIONS

[2.0L TURBO GASOLINE ENGINE]

## < PRECAUTION >

- 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.

## Precautions For Engine Service

INFOID:000000012958210

### DISCONNECTING FUEL PIPING

- Before starting work, check no fire or spark producing items are in the work area.
- Release fuel pressure before disconnecting and disassembly.
- After disconnecting pipes, plug openings to stop fuel leakage.

### DRAINING ENGINE COOLANT

Drain engine coolant and engine oil when the engine is cooled.

### INSPECTION, REPAIR AND REPLACEMENT

Before repairing or replacing, thoroughly inspect parts. Inspect new replacement parts in the same way, and replace if necessary.

### REMOVAL AND DISASSEMBLY

- When instructed to use SST, use specified tools. Always be careful to work safely, avoid forceful or uninstructed operations.
- Exercise maximum care to avoid damage to mating or sliding surfaces.
- Dowel pins are used for several parts alignment. When replacing and reassembling parts with dowel pins, check that dowel pins are installed in the original position.
- Must cover openings of engine system with a tape or equivalent, to seal out foreign materials.
- Mark and arrange disassembly parts in an organized way for easy troubleshooting and reassembly.
- When loosening nuts and bolts, as a basic rule, start with the one furthest outside, then the one diagonally opposite, and so on. If the order of loosening is specified, do exactly as specified. Power tools may be used in the step.

### ASSEMBLY AND INSTALLATION

- Use torque wrench to tighten bolts or nuts to specification.
- When tightening nuts and bolts, as a basic rule, equally tighten in several different steps starting with the ones in center, then ones on inside and outside diagonally in this order. If the order of tightening is specified, do exactly as specified.
- Replace with new gasket, packing, oil seal or O-ring.
- Thoroughly wash, clean, and air-blow each part. Carefully check engine oil or engine coolant passages for any restriction and blockage.
- Avoid damaging sliding or mating surfaces. Completely remove foreign materials such as cloth lint or dust. Before assembly, oil sliding surfaces well.
- After disassembling, or exposing any internal engine parts, change engine oil and replace oil filter with a new one.
- Release air within route when refilling after draining engine coolant.
- After repairing, start the engine and increase engine speed to check engine coolant, fuel, engine oil, and exhaust gases for leakage.

< PREPARATION >

PREPARATION

PREPARATION

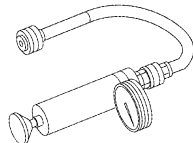
Special Service Tools

INFOID:000000012958211

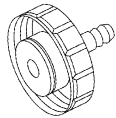
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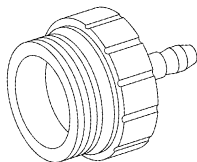
Tool number (DAIMLER tool No.) Tool name	Description
KV115H0870 (DAIMLER tool No.124 589 24 21 00) Pump press	Cooling system check
KV115H0880 (DAIMLER tool No.210 589 00 91 00) Cap	Test cap for cooling system check
KV115H0900 (DAIMLER tool No.210 589 03 63 00) Adapter	Test cap for reservoir tank cap check



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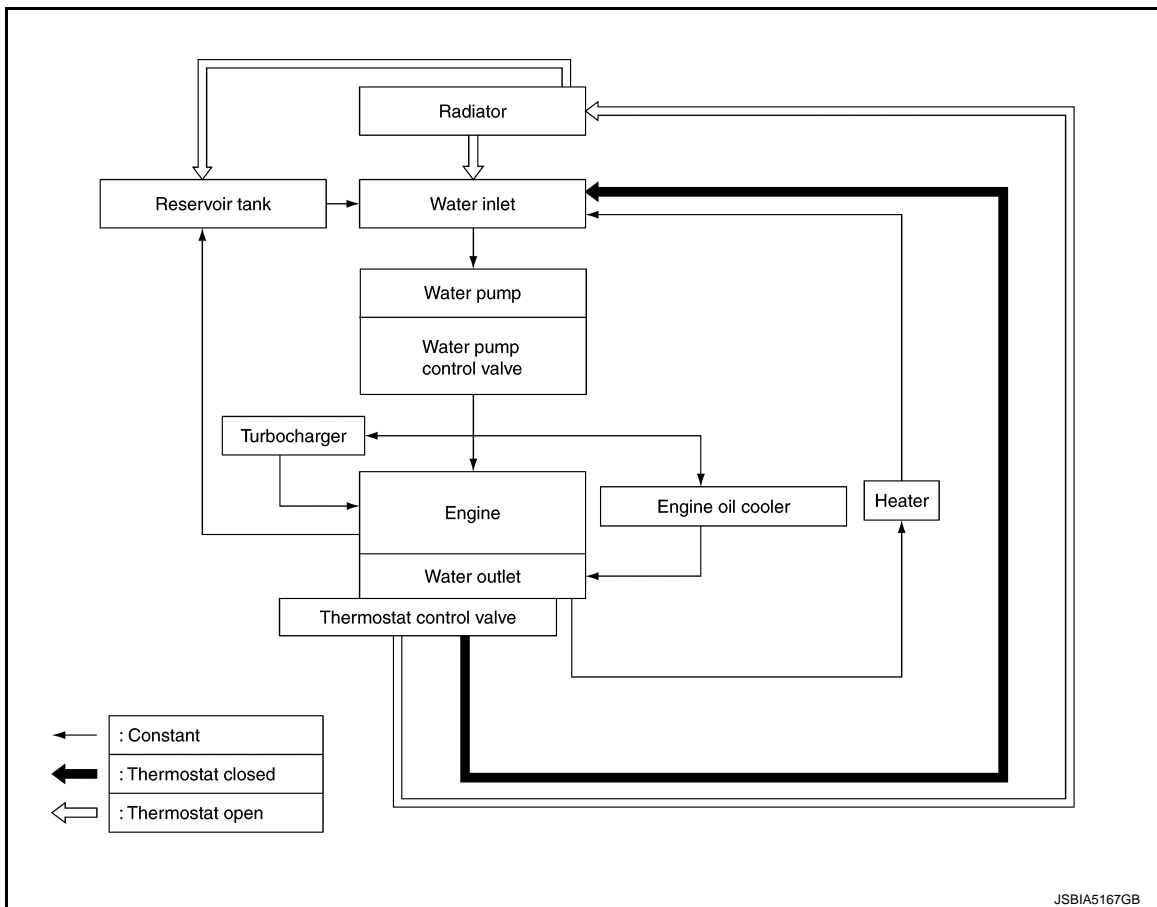
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# SYSTEM DESCRIPTION

## DESCRIPTION

### Engine Cooling System Schematic

INFOID:000000012958212



## PERIODIC MAINTENANCE

## ENGINE COOLANT

## Inspection

INFOID:0000000012958213

## LEVEL

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

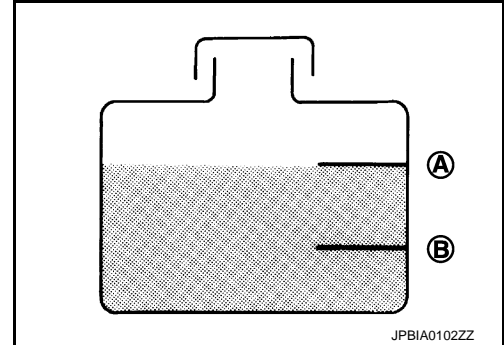
Ⓐ : MAX

Ⓑ : MIN

- Adjust the engine coolant level if necessary.
- Check that the reservoir tank cap is tightened.

**CAUTION:**

Refill Genuine NISSAN Long Life Antifreeze/Coolant (BASF Glysantin® G48®) or equivalent in its quality mixed with water (distilled or demineralized). Refer to [MA-20, "Recommended Fluids and Lubricants"](#).



## LEAKAGE

- To check for leakage, apply pressure to the cooling system with the pump press [SST: KV115H0870 (124 589 24 21 00)] (A) and cap [SST: KV115H0880 (201 589 00 91 00)] (B).

Testing pressure : Refer to [CO-21, "Radiator"](#).

**WARNING:**

Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from engine cooling system.

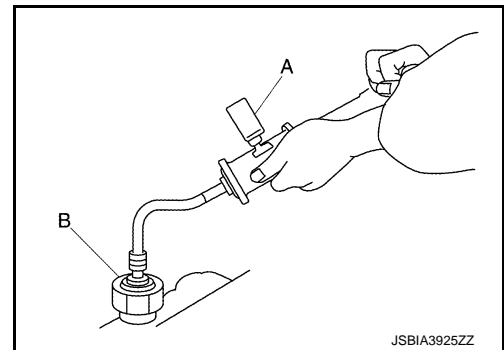
**CAUTION:**

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:0000000012958214

**WARNING:**

- To avoid being scalded, never change engine coolant when the engine is hot.
- Wrap a thick cloth around reservoir tank cap and carefully remove reservoir tank cap. First, turn reservoir tank cap a quarter of a turn to release built-up pressure. Then turn reservoir tank cap all the way.

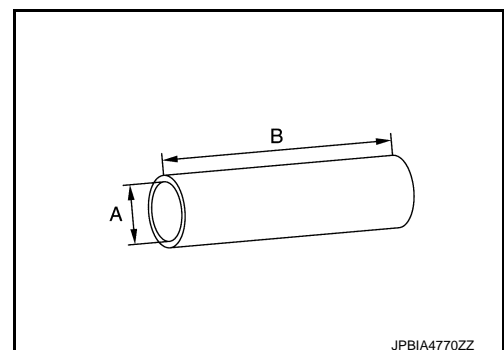
1. Remove front under cover. Refer to [EXT-35, "FRONT UNDER COVER : Removal and Installation"](#).
2. Connect drain hose.

**NOTE:**

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

A :  $\phi$  8 - 9 mm (0.31 - 0.35 in)

B : 145 mm (5.71 in)



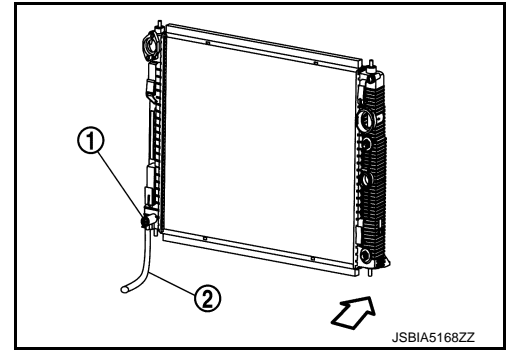
# ENGINE COOLANT

< PERIODIC MAINTENANCE >

[2.0L TURBO GASOLINE ENGINE]

3. Open radiator drain cock ① at the bottom of radiator, and then remove reservoir tank cap.

- ② : Drain hose  
← : Vehicle front



4. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to [CO-9, "Flushing"](#).
5. Disconnect drain hose.

## Refilling

INFOID:0000000012958215

### CAUTION:

When refilling use Genuine NISSAN Long Life Antifreeze/Coolant (BASF Glystantin® G48®) or equivalent in its quality mixed with water (distilled or demineralized). Refer to [MA-20, "Recommended Fluids and Lubricants"](#).

1. Install radiator drain cock if removed.

### CAUTION:

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

**Tightening torque** : Refer to [CO-11, "Exploded View"](#).

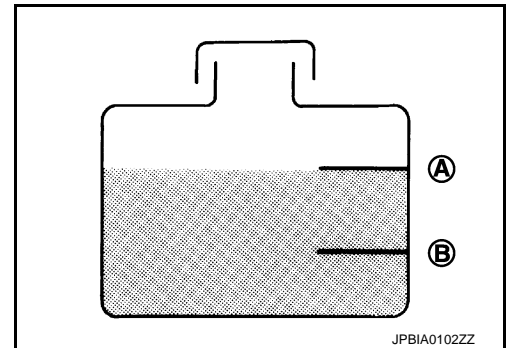
2. Check that each hose clamp has been firmly tightened.
3. Refill reservoir tank to "MAX" level line with engine coolant.

- Ⓐ : MAX  
Ⓑ : MIN

### CAUTION:

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

- Pour coolant slowly of less than 2 ℓ (1-6/8 Imp qt, 2-1/8 US 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-21, "Periodical Maintenance Specification"](#).

4. Install reservoir tank cap.
5. 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.

6. 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.).



# ENGINE COOLANT

< PERIODIC MAINTENANCE >

[2.0L TURBO GASOLINE ENGINE]

7. Refill reservoir tank to "MAX" level line with engine coolant.
8. Repeat steps 3 through 6 two or more times with radiator cap installed until engine coolant level no longer drops.
9. Check cooling system for leakage with engine running.
10. 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.
11. Repeat step 10 three times.
12. If sound is heard, bleed air from cooling system by repeating step 5 through 10 until reservoir tank level no longer drops.

## Flushing

INFOID:000000012958216

1. Install reservoir tank if removed, and radiator drain cock.  
**CAUTION:**  
**Be sure to clean drain cock and install with new O-ring.**
2. Fill radiator and reservoir tank with water and reinstall reservoir tank cap.
3. Run the engine and warm it up to normal operating temperature.
4. Rev the engine two or three times under no-load.
5. Stop the engine and wait until it cools down.
6. Drain water from the system. Refer to [CO-7, "Draining"](#).
7. Repeat steps 1 through 6 until clear water begins to drain from radiator.
8. Check that the reservoir tank cap is tightened.

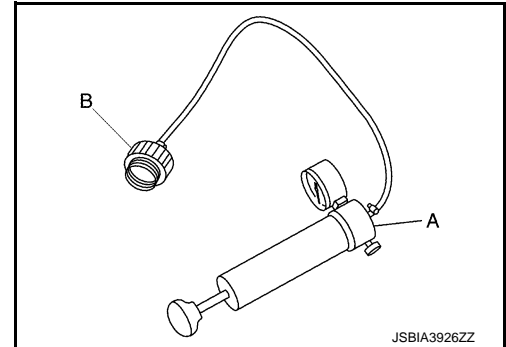
## RADIATOR

### RESERVOIR TANK CAP

#### RESERVOIR TANK CAP : Inspection

INFOID:000000012958217

- Fit the adapter [SST: KV115H0900 (210 589 03 63 00)] (B) to the reservoir tank cap tester [SST: KV115H0870 (124 589 24 21 00)] (A) as shown.
- When connecting the reservoir tank cap to the reservoir tank cap tester, apply water or LLC to the reservoir tank cap seal part.
- Check reservoir tank cap relief pressure.



**Standard: Refer to [CO-21](#),  
"Periodical Maintenance Specification".**

- Replace the reservoir tank cap if the engine coolant passes through it, or if any fur signs is detected.

#### **CAUTION:**

**When installing reservoir tank cap, thoroughly wipe out the reservoir tank to remove any waxy residue or foreign material.**

## RADIATOR

#### RADIATOR : Inspection

INFOID:000000012958218

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

- Never 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 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.
  4. Blow air into the back side of radiator core vertically downward.
    - 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).
  5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

# RADIATOR

< REMOVAL AND INSTALLATION >

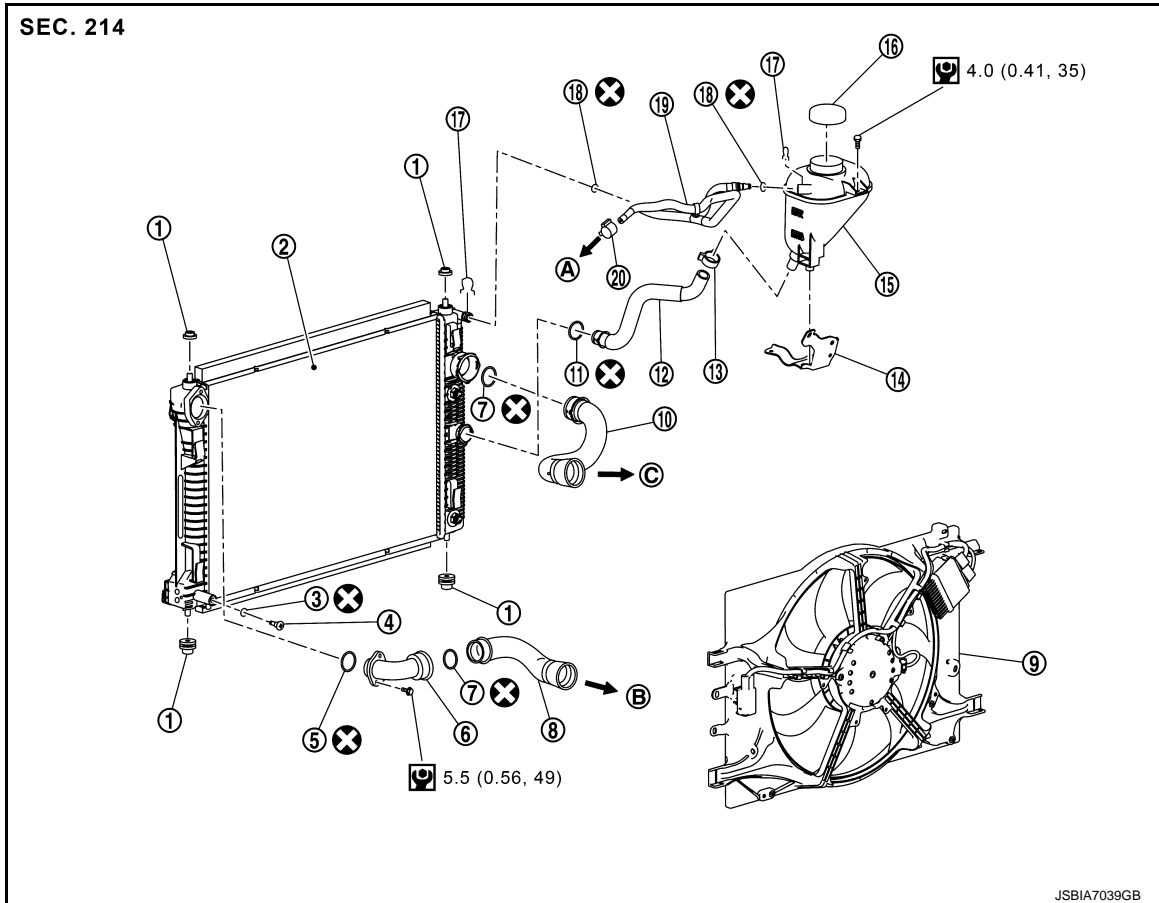
[2.0L TURBO GASOLINE ENGINE]

## REMOVAL AND INSTALLATION

### RADIATOR

#### Exploded View

INFOID:000000012958219



- |                                |                           |                             |
|--------------------------------|---------------------------|-----------------------------|
| ① Mounting rubber              | ② Radiator                | ③ O-ring                    |
| ④ Drain cock                   | ⑤ O-ring                  | ⑥ Coolant tube              |
| ⑦ O-ring                       | ⑧ Coolant hose (lower)    | ⑨ Cooling fan unit assembly |
| ⑩ Coolant hose (upper)         | ⑪ O-ring                  | ⑫ Reservoir tank hose       |
| ⑬ Clamp                        | ⑭ Reservoir tank bracket  | ⑮ Reservoir tank            |
| ⑯ Reservoir tank cap           | ⑰ Stop spring             | ⑱ O-ring                    |
| ⑲ Reservoir tank hose (return) | ⑳ Clamp                   |                             |
| (A) To cylinder head           | (B) To coolant thermostat | (C) To coolant pump         |

⊗ : Always replace after every disassembly.

⊞ : N·m (kg·m, in·lb)

### Removal and Installation

INFOID:000000012958220

#### REMOVAL

##### **WARNING:**

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

# RADIATOR

[2.0L TURBO GASOLINE ENGINE]

## < REMOVAL AND INSTALLATION >

1. Discharge refrigerant from A/C circuit. Refer to [HA-22, "Recycle Refrigerant"](#).
2. Remove cooling fan unit assembly. Refer to [CO-13, "Removal and Installation"](#).  
**CAUTION:**  
**Never damage radiator core.**
3. Remove the following from radiator:
  - A/T fluid cooler tube and A/T fluid cooler mounting bolts. [TM-318, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).
  - Reservoir tank hose [CO-11, "Exploded View"](#).
  - Coolant hose (lower) [CO-11, "Exploded View"](#).
4. Disconnect A/C high-pressure pipe and low-pressure pipe from condenser. Refer to [HA-33, "Exploded View"](#).

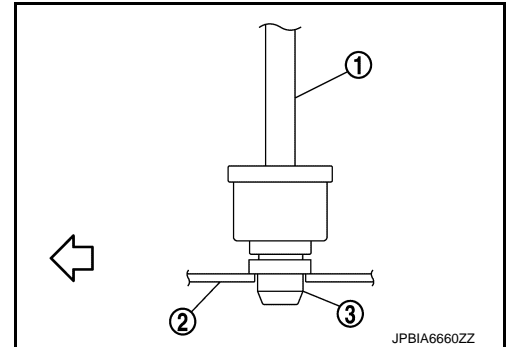
5. Remove radiator and condenser assembly as follows:

**CAUTION:**

**Never damage radiator & condenser assembly core.**

- a. Lift up and pull the radiator & condenser assembly ① backward and then remove the mounting rubber (lower) ③ from the radiator core support ②.

← : Vehicle front



- b. Remove radiator and condenser assembly from front of radiator core support.

## INSTALLATION

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

**CAUTION:**

**Do not reuse O-rings.**

## Inspection

INFOID:000000012958221

## INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter and the radiator cap tester (commercial service tool). Refer to [CO-7, "Inspection"](#).
- Start and warm up the engine. Visually check that there is no leakage of engine coolant and A/T fluid.

# COOLING FAN

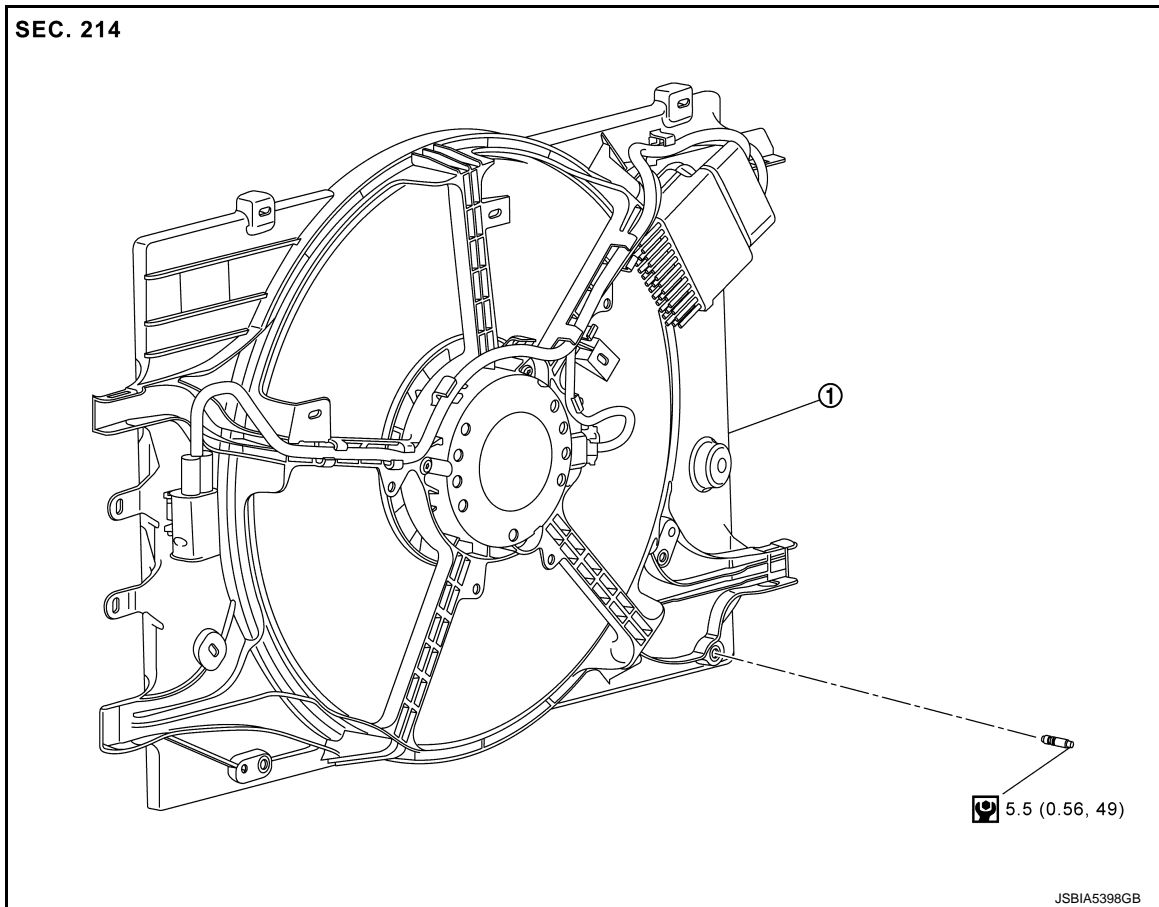
< REMOVAL AND INSTALLATION >

[2.0L TURBO GASOLINE ENGINE]


## COOLING FAN

Exploded View

INFOID:000000012958222



① Cooling fan assembly

 : N-m (kg-m, in-lb)

## Removal and Installation

INFOID:000000012958223

### REMOVAL

#### **WARNING:**

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

1. Remove the following parts:
  - Engine under cover with power tool.
  - Air duct (inlet): Refer to [EM-25, "Removal and Installation"](#).
2. Drain engine coolant from radiator. Refer to [CO-7, "Draining"](#).

#### **CAUTION:**

- Perform this step when the engine is cold.
  - Never spill engine coolant on drive belt.
3. Remove coolant hose (upper).
  4. Remove coolant tube.

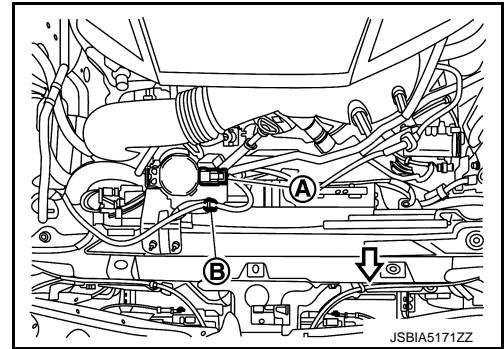
# COOLING FAN

## < REMOVAL AND INSTALLATION >

[2.0L TURBO GASOLINE ENGINE]

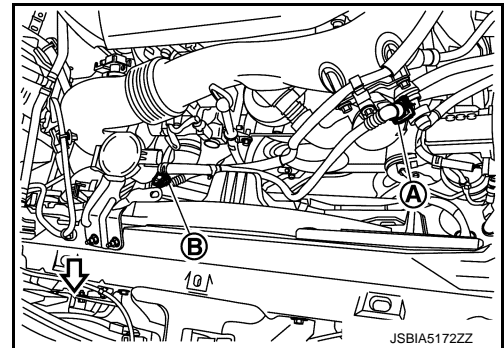
5. Disconnect EVAP canister purge volume control solenoid valve harness connector (A) and clamp (B).

⇐ : Vehicle front



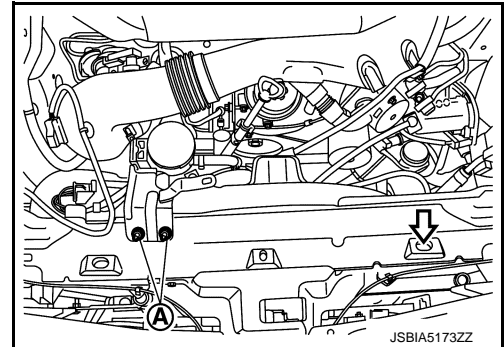
6. Disconnect EVAP canister purge volume control solenoid valve tube connector (A) and (B).

⇐ : Vehicle front



7. Remove EVAP canister purge volume control solenoid valve mounting nuts (A).

⇐ : Vehicle front



8. Remove EVAP canister purge volume control solenoid valve.
9. Disconnect cooling fan control module harness connector and clamp.
10. Remove A/T fluid cooler tube bracket mounting nut and stud bolt from cooling fan shroud. Refer to [TM-317, "2.0L TURBO GASOLINE ENGINE : Exploded View"](#).
11. Disconnect ground cable clamp and bracket from cooling fan shroud.
12. Remove radiator core upper support. Refer to [DLK-188, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).
13. Remove cooling fan unit assembly.  
**CAUTION:**  
**Never damage radiator core.**

## INSTALLATION

Install in the reverse order of removal.

# WATER PUMP

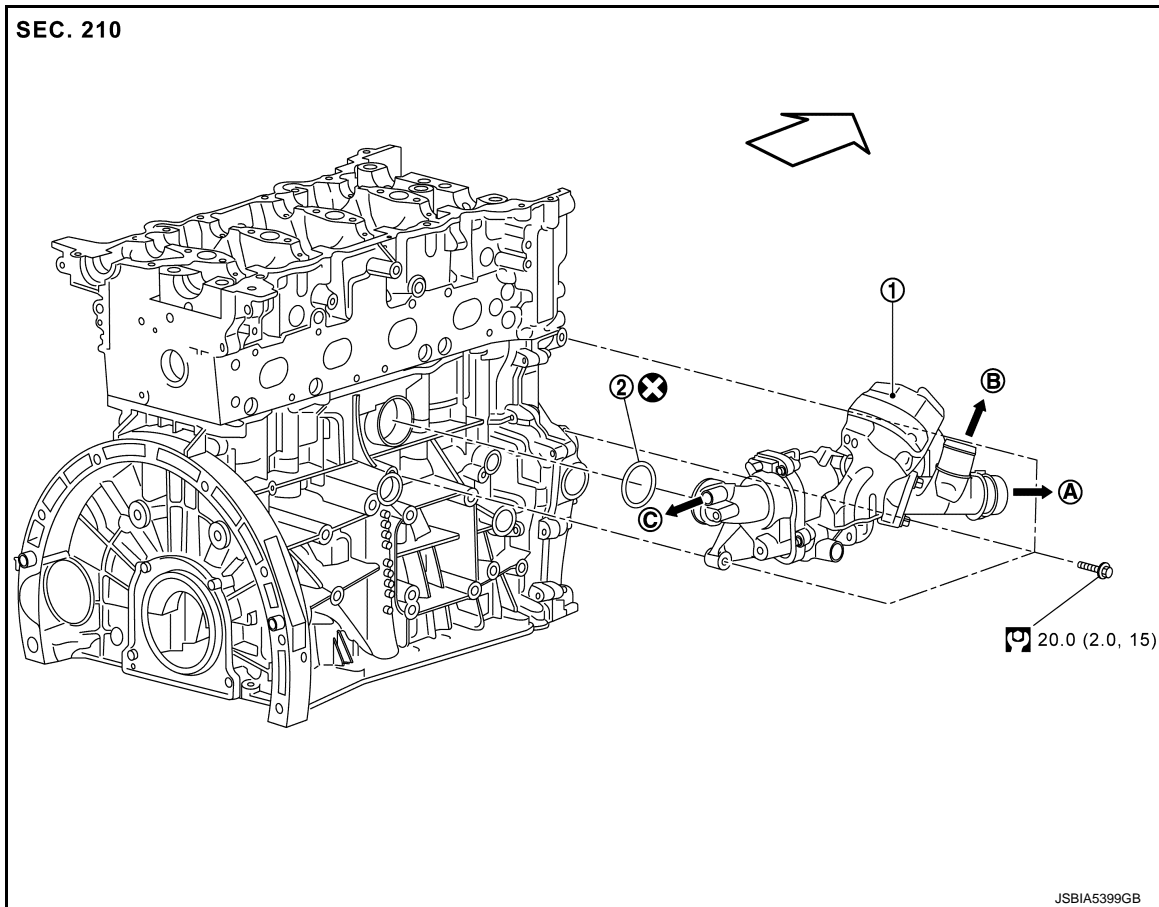
< REMOVAL AND INSTALLATION >

[2.0L TURBO GASOLINE ENGINE]

## WATER PUMP

### Exploded View

INFOID:000000012958224



- ① Water pump  
② O-ring  
A To radiator  
B To heater core and thermostat  
C To thermostat  
⊗ : Always replace after every disassembly.  
⊞ : N-m (kg-m, ft-lb)  
↔ : Engine front

### Removal and Installation

INFOID:000000012958225

#### CAUTION:

- When removing coolant pump assembly, never allow engine coolant to contact drive belt.
- Coolant pump cannot be disassembled and should be replaced as a unit.
- After installing coolant pump, connect hose and clamp securely, then check for leakage using pump press [SST: KV115H0870 (124 589 24 21 00)] and cap [SST: KV115H0880 (210 589 00 91 00)].

#### REMOVAL

##### 2WD

1. Remove engine cover. Refer to [EM-22. "Removal and Installation"](#).
2. Remove air duct (turbocharger side). Refer to [EM-25. "Removal and Installation"](#).
3. Remove front under cover. Refer to [EXT-35. "FRONT UNDER COVER : Removal and Installation"](#).
4. Drain engine coolant from radiator. Refer to [CO-7. "Draining"](#).

#### CAUTION:

- Perform this step when the engine is cold.

# WATER PUMP

## < REMOVAL AND INSTALLATION >

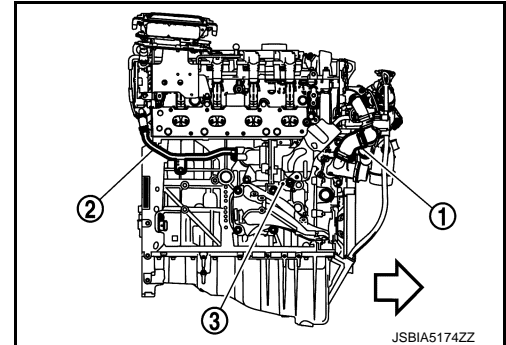
[2.0L TURBO GASOLINE ENGINE]

- **Never spill engine coolant on drive belt.**

5. Remove radiator coolant hose (lower). Refer to [CO-11, "Exploded View"](#).
6. Remove drive belt. Refer to [EM-16, "Removal and Installation"](#).
7. Remove exhaust manifold and turbocharger assembly. Refer to [EM-42, "Removal and Installation"](#).
8. Remove water pump as follows:
  - a. Remove coolant hose ①, and coolant tube ②.

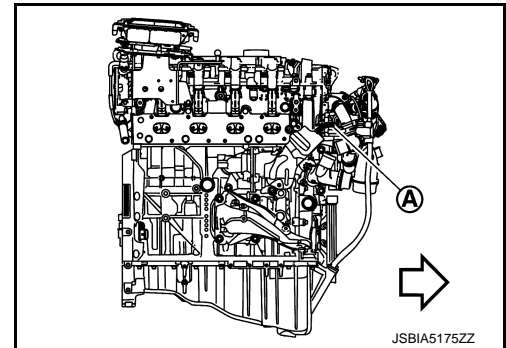
③ : Water pump

⇐ : Engine front



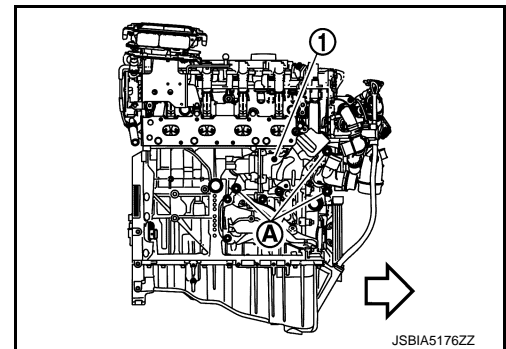
- b. Disconnect vacuum hose ① from water pump.

⇐ : Engine front



9. Loosen mounting bolts ① to remove water pump ①.

⇐ : Engine front



## AWD

1. Remove engine assembly. Refer to [EM-102, "Removal and Installation"](#).
2. Remove engine cover. Refer to [EM-22, "Removal and Installation"](#).
3. Remove air duct (turbocharger side). Refer to [EM-25, "Removal and Installation"](#).
4. Remove drive belt. Refer to [EM-16, "Removal and Installation"](#).
5. Remove exhaust manifold and turbocharger assembly. Refer to [EM-42, "Removal and Installation"](#).
6. Remove water pump as follows:



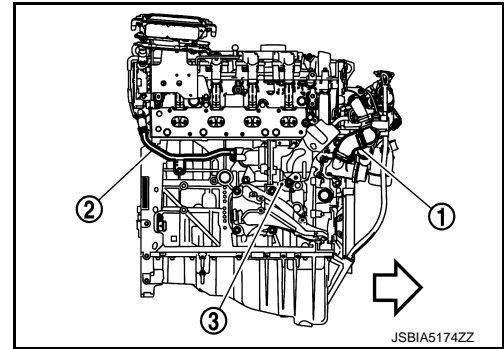
# WATER PUMP

## < REMOVAL AND INSTALLATION >

[2.0L TURBO GASOLINE ENGINE]

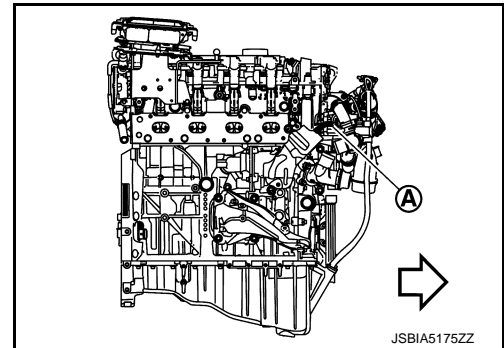
- a. Remove coolant hose ①, and coolant tube ②.

③ : Water pump  
⇐ : Engine front



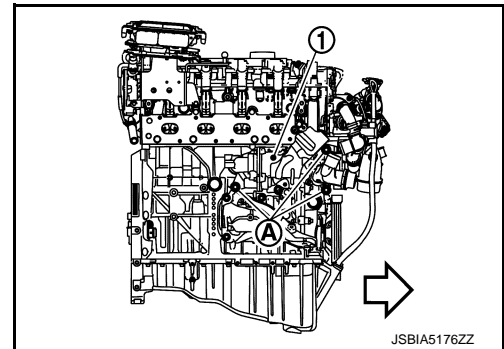
- b. Disconnect vacuum hose ① from water pump.

⇐ : Engine front



7. Loosen mounting bolts ① to remove water pump ①.

⇐ : Engine front



## INSTALLATION

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

### **CAUTION:**

**Do not reuse O-rings.**

### **NOTE:**

If a sensor is replaced, carry out the reset of adaption of sensors. Refer to [EC4-216. "Description"](#).

## Inspection

INFOID:000000012958226

### INSPECTION AFTER REMOVAL

- Check for badly rusted or corroded water pump body assembly.
- Check for rough operation due to excessive end play.
- If anything is found, replace water pump.

### INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using pump press [SST: KV115H0870 (124 589 24 21 00)] and cap [SST: KV115H0880 (210 589 00 91 00)]. Refer to [CO-7. "Inspection"](#).
- Start and warm up the engine. Visually check that there is no leakage of engine coolant.

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# THERMOSTAT

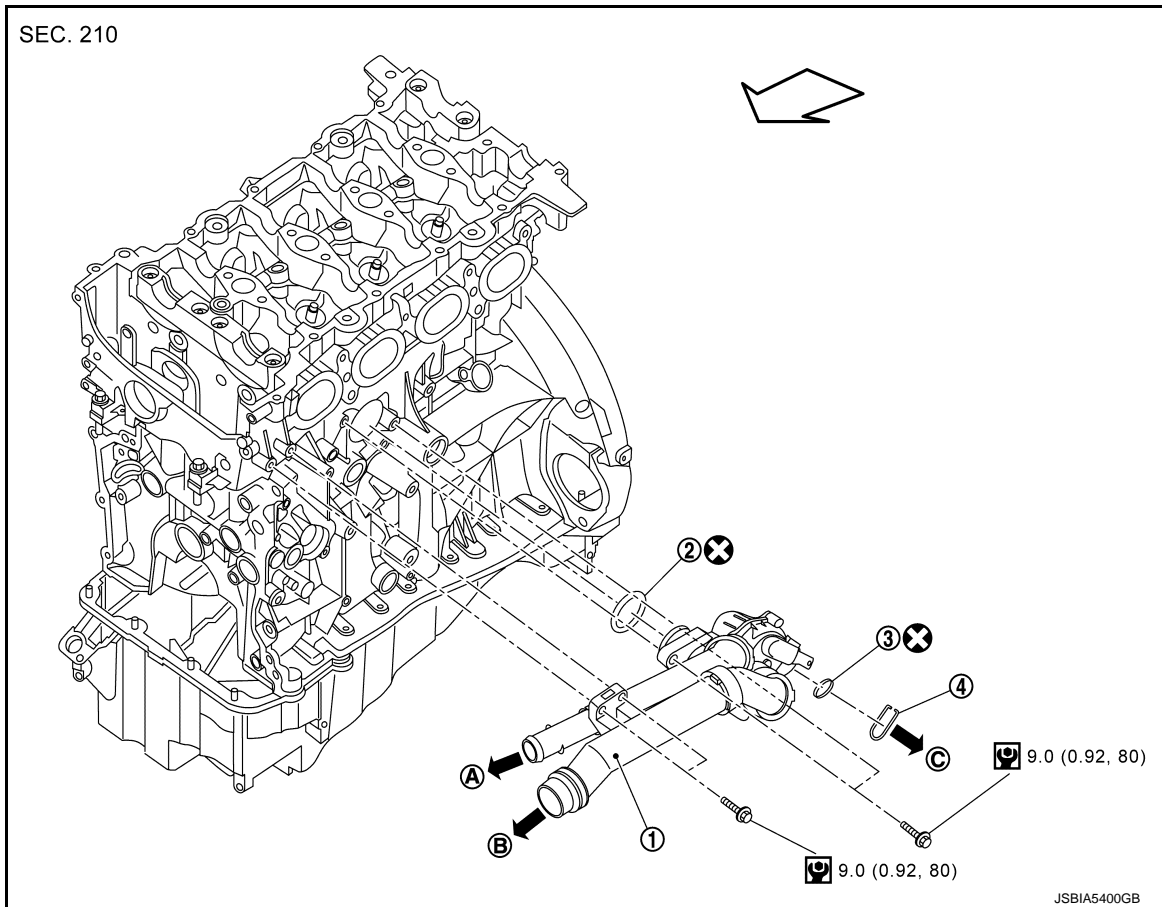
< REMOVAL AND INSTALLATION >

[2.0L TURBO GASOLINE ENGINE]

## THERMOSTAT

### Exploded View

INFOID:000000012958227



- |                 |               |             |
|-----------------|---------------|-------------|
| ① Thermostat    | ② O-ring      | ③ O-ring    |
| ④ Clip          |               |             |
| A To water pump | B To radiator | C To heater |

: N·m (kg·m, in·lb)

: Always replace after every disassembly.

: Engine front

## Removal and Installation

INFOID:000000012958228

### REMOVAL

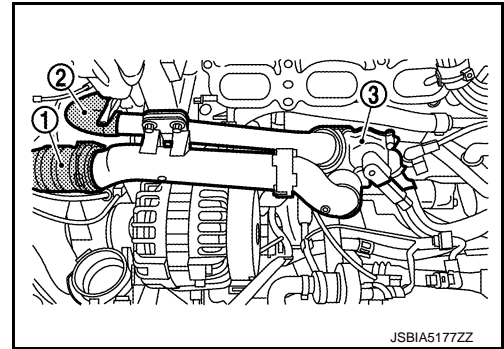
1. Remove charge air manifold assembly. Refer to [EM-29, "Removal and Installation"](#).
2. Remove front under cover. Refer to [EXT-35, "FRONT UNDER COVER : Removal and Installation"](#).
3. Drain engine coolant. Refer to [CO-7, "Draining"](#).  
**CAUTION:**
  - Perform this step when the engine is cold.
  - Never spill engine coolant on drive belt.
4. Remove coolant thermostat as follows:

# THERMOSTAT

## < REMOVAL AND INSTALLATION >

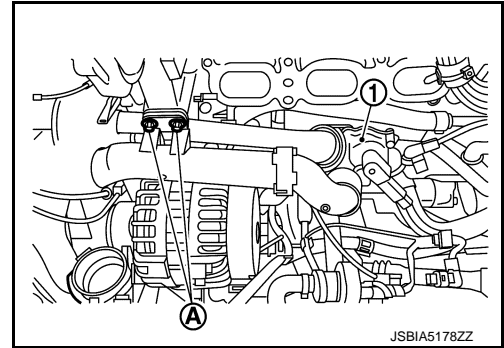
[2.0L TURBO GASOLINE ENGINE]

- a. Disconnect coolant hose ①, and coolant hose ② from coolant thermostat ③.



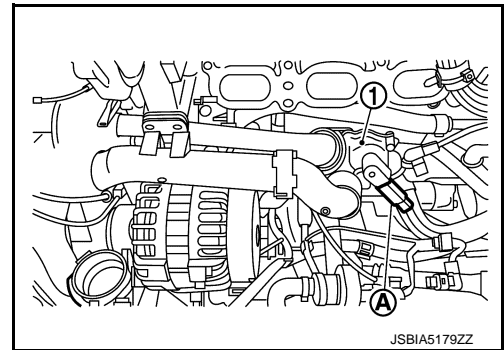
- b. Remove coolant thermostat mounting bolts ①.

① Coolant thermostat



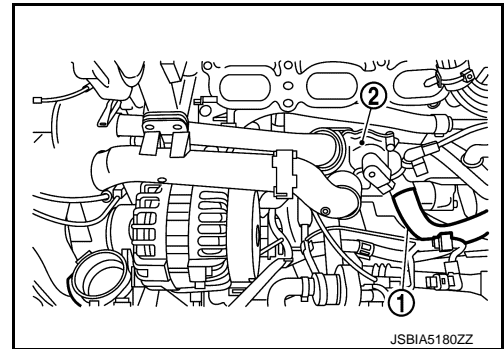
- c. Disconnect coolant thermostat heater element harness connector ①.

① Coolant thermostat



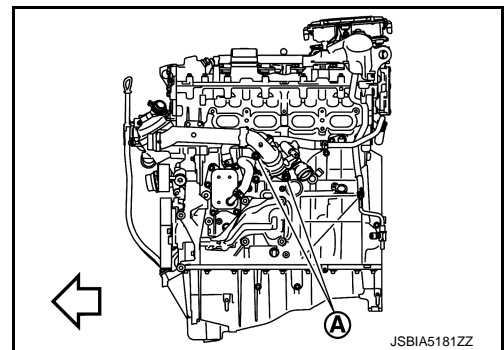
- d. Disconnect coolant hose ①.

② Coolant thermostat



- e. Remove coolant thermostat mounting bolts ①.

← : Engine front



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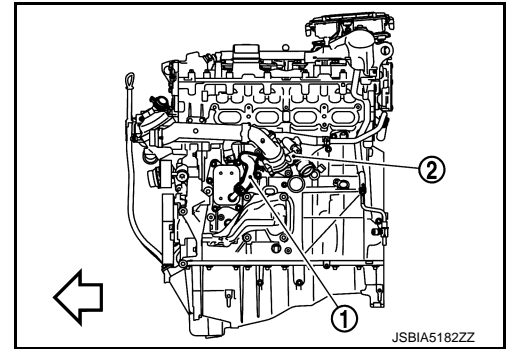
# THERMOSTAT

## < REMOVAL AND INSTALLATION >

[2.0L TURBO GASOLINE ENGINE]

- f. Disconnect coolant hose ① from coolant thermostat ②.

↔ : Engine front



5. Remove coolant thermostat.

### INSTALLATION

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

#### **CAUTION:**

**Never spill engine coolant over engine room. Use rag to absorb engine coolant.**

#### **NOTE:**

If a sensors is replaced, carry out the reset of adaption of sensors. Refer to [EC4-216. "Description"](#).

# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[2.0L TURBO GASOLINE ENGINE]

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

#### Periodical Maintenance Specification

INFOID:0000000012958229

#### ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (US qt, Imp qt)

Engine coolant capacity [With reservoir tank ("MAX" level)]	9.0 (9-4/8, 7-7/8)
Reservoir tank engine coolant capacity (At "MAX" level)	0.9 (1, 6/8)

#### Radiator

INFOID:0000000012958230

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

Cap relief pressure	Standard (Stage 1)	130.0 - 150.0 (1.3 - 1.5, 1.33 - 1.53, 18.85 - 21.75)
	Standard (Stage 2)	180.0 - 220.0 (1.8 - 2.20, 1.84 - 2.24, 26.1 - 31.9)
	Testing pressure	140.0 (1.40, 1.42, 20.3)
Leakage testing pressure		196.0 (1.96, 1.99, 28.4)

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# HOW TO USE THIS MANUAL

## APPLICATION NOTICE

### Information

INFOID:000000013805225

Check the engine type to use the service information in this section.

As per the engine type, refer to [GI-35, "Model Variation"](#)

Service information	Engine type
Type 1	Turbo high pressure
Type 2	Turbo low pressure

PRECAUTION

PRECAUTIONS

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

INFOID:000000013590771

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".
- 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.

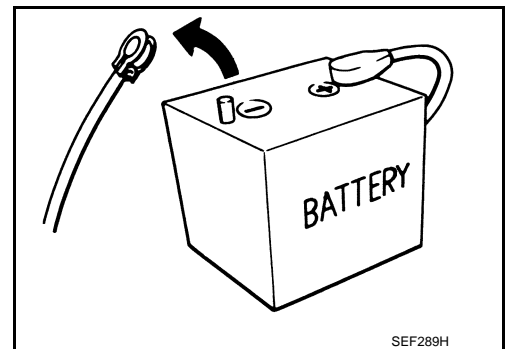
Precautions for Removing Battery Terminal

INFOID:000000013590772

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:

BR08DE	: 4 minutes	V9X engine	: 4 minutes
D4D engine	: 20 minutes	YD25DDTi	: 2 minutes
HR09DET	: 12 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		



**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:**

## PRECAUTIONS

[VR30DDTT]

### < PRECAUTION >

---

- 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.



# PREPARATION

< PREPARATION >

[VR30DDTT]

## PREPARATION

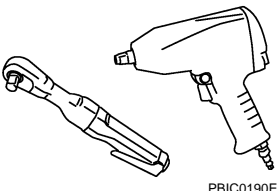
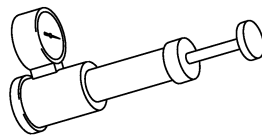
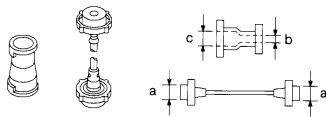
### PREPARATION

#### Commercial Service Tools

INFOID:0000000013590773

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Tool name	Description
<p>Power tool</p>  <p>PBI0190E</p>	<p>Loosening nuts and bolts</p>
<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 water outlet (front) 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

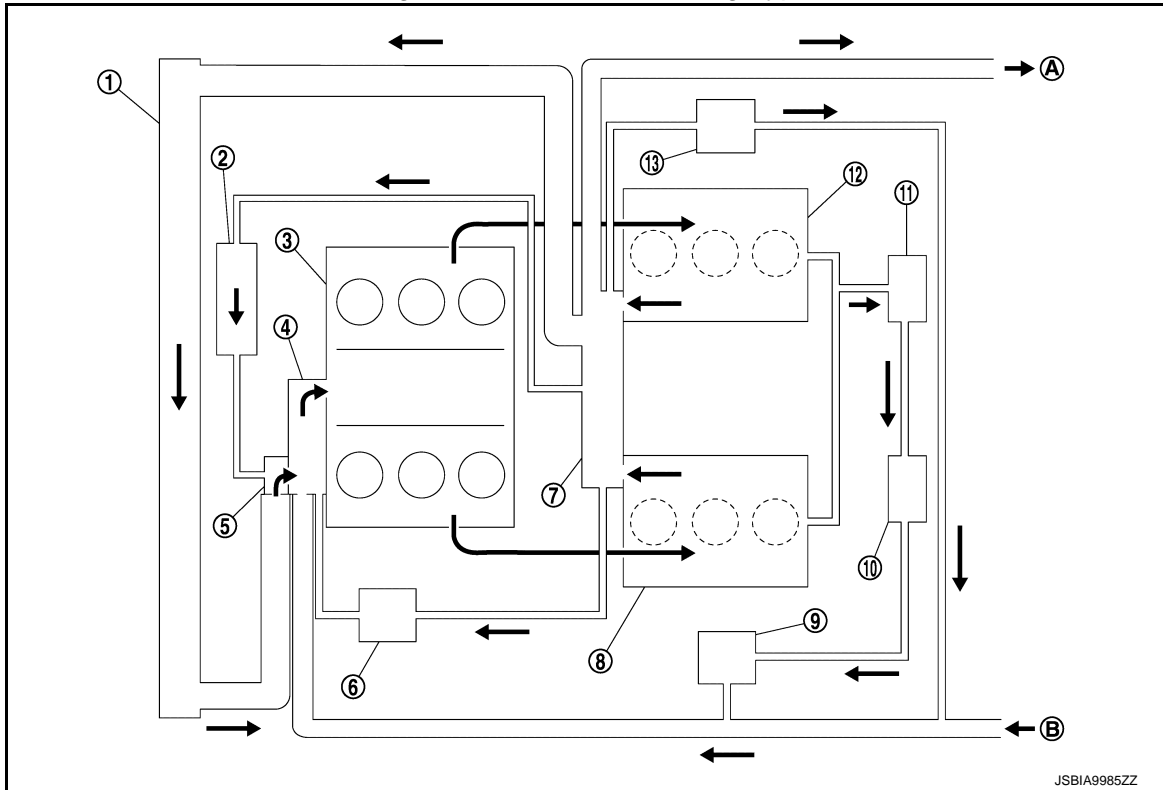
## DESCRIPTION

### Engine Cooling System

INFOID:000000013590774

### ENGINE COOLING

Engine Oil Cooler Air Cooling Type



JSBIA9985ZZ

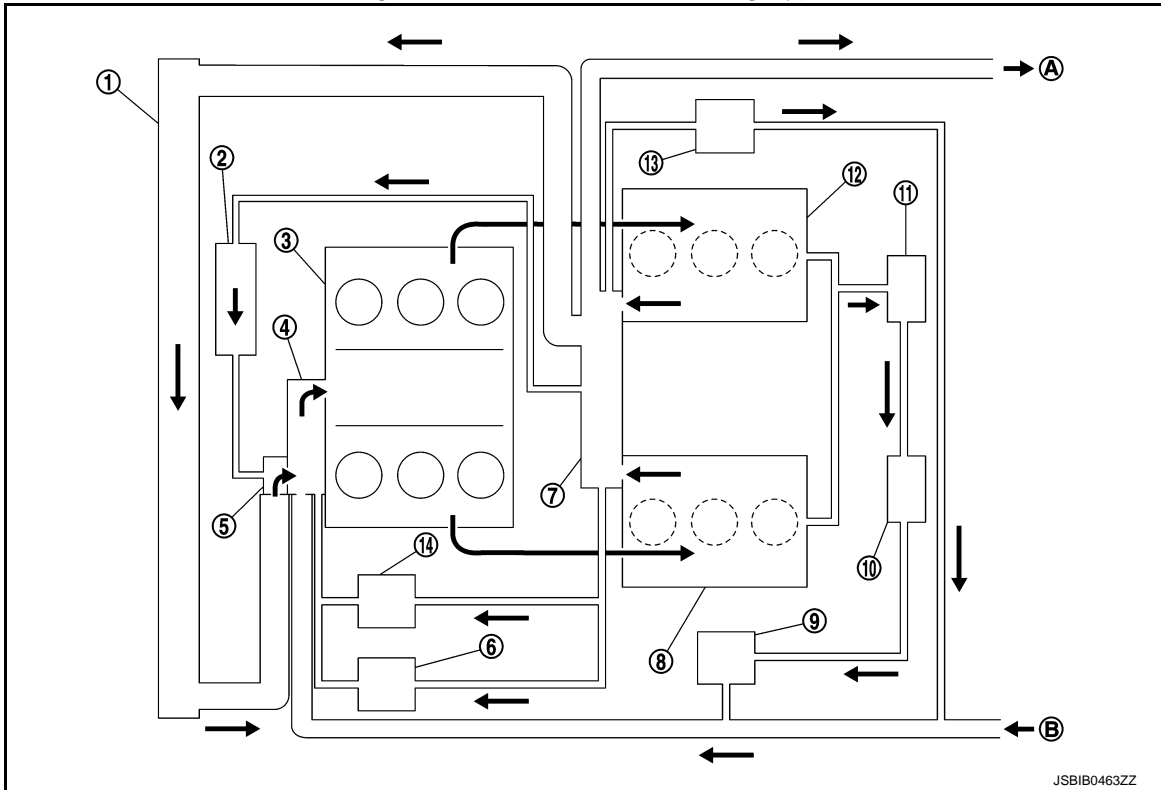
- |   |   |                                  |
|---|---|----------------------------------|
| ① Radiator                                    | ② Reservoir tank                              | ③ Cylinder block                 |
| ④ Water pump                                  | ⑤ Water inlet                                 | ⑥ A/T fluid warmer               |
| ⑦ Multi-way control valve                     | ⑧ Cylinder head (bank 2)                      | ⑨ Turbocharger assembly (bank 2) |
| ⑩ Electric throttle control actuator (bank 2) | ⑪ Electric throttle control actuator (bank 1) | ⑫ Cylinder head (bank 1)         |
| ⑬ Turbocharger assembly (bank 1)              |   |                                  |
| Ⓐ To heater                                   | Ⓑ From heater                                 |                                  |

# DESCRIPTION

< SYSTEM DESCRIPTION >

[VR30DDTT]

## Engine Oil Cooler Water Cooling Type



- |   |   |                                  |
|---|---|----------------------------------|
| ① Radiator                                    | ② Reservoir tank                              | ③ Cylinder block                 |
| ④ Water pump                                  | ⑤ Water inlet                                 | ⑥ A/T fluid warmer               |
| ⑦ Multi-way control valve                     | ⑧ Cylinder head (bank 2)                      | ⑨ Turbocharger assembly (bank 2) |
| ⑩ Electric throttle control actuator (bank 2) | ⑪ Electric throttle control actuator (bank 1) | ⑫ Cylinder head (bank 1)         |
| ⑬ Turbocharger assembly (bank 1)              | ⑭ Engine oil cooler                           |                                  |
| Ⓐ To heater                                   | Ⓑ From heater                                 |                                  |

## CHARGE AIR COOLING

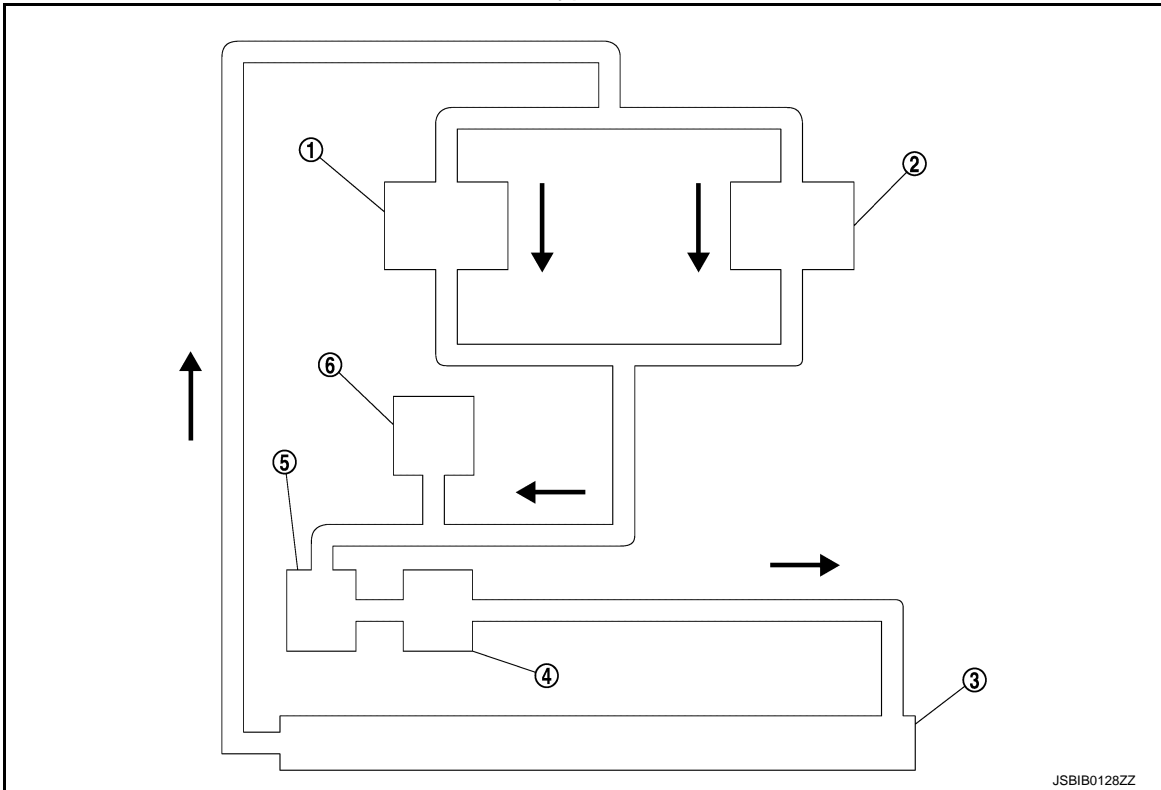
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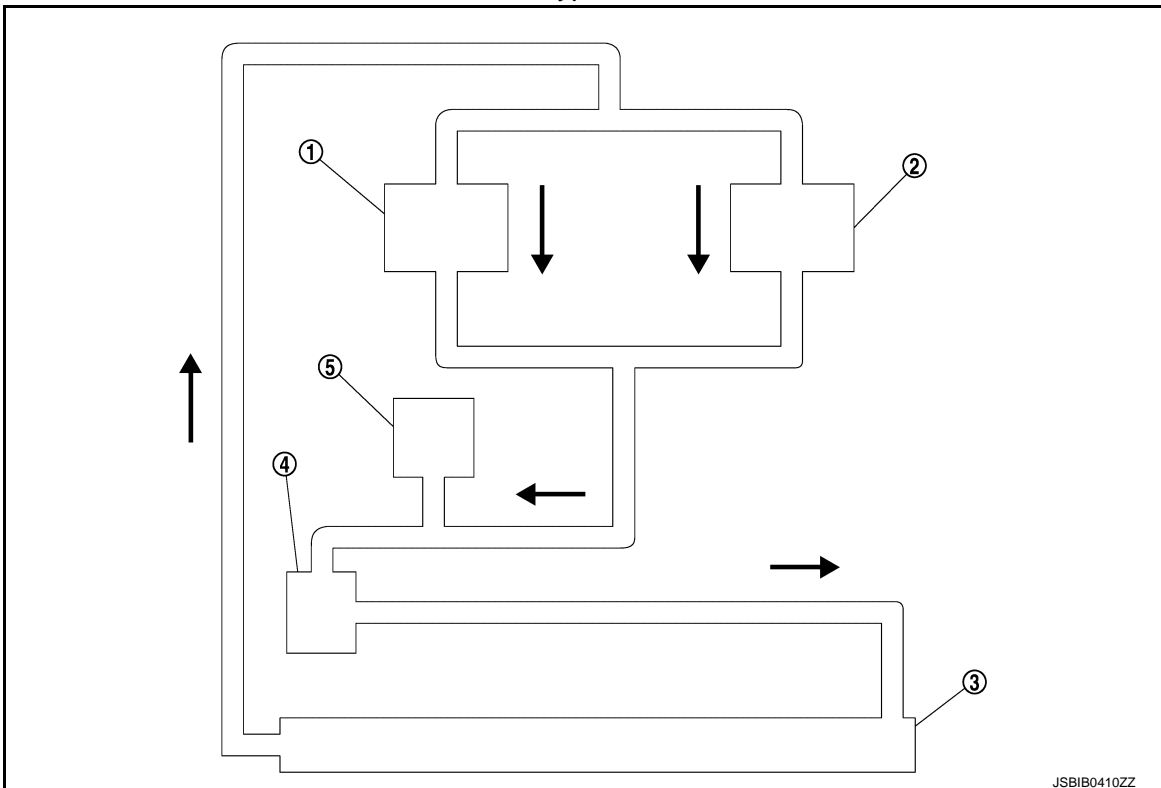
Type 1



JSBIB0128ZZ

- ① Charge air cooler (bank 1)
- ② Charge air cooler (bank 2)
- ③ Sub radiator
- ④ Electric water pump
- ⑤ Electric water pump
- ⑥ Reservoir tank

Type 2



JSBIB0410ZZ

- ① Charge air cooler (bank 1)
- ② Charge air cooler (bank 2)
- ③ Sub radiator
- ④ Electric water pump
- ⑤ Reservoir tank

# DESCRIPTION

< SYSTEM DESCRIPTION >

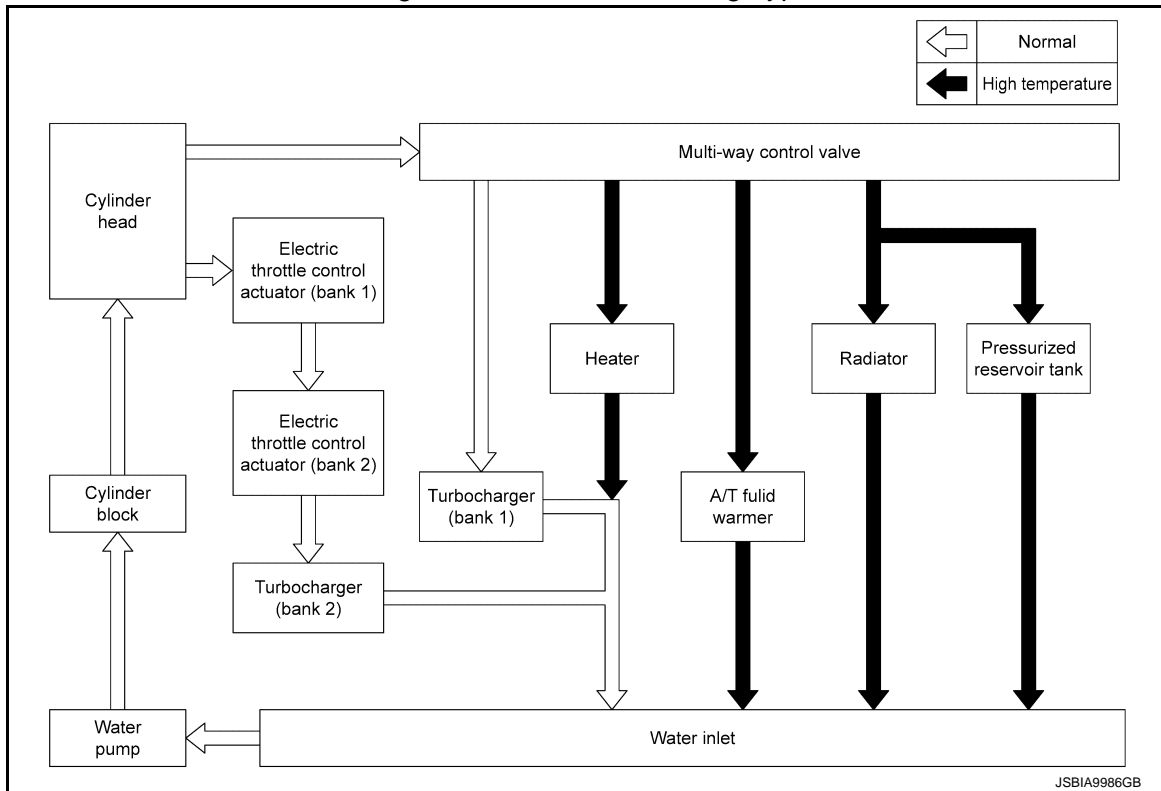
[VR30DDTT]

## Engine Cooling System Schematic

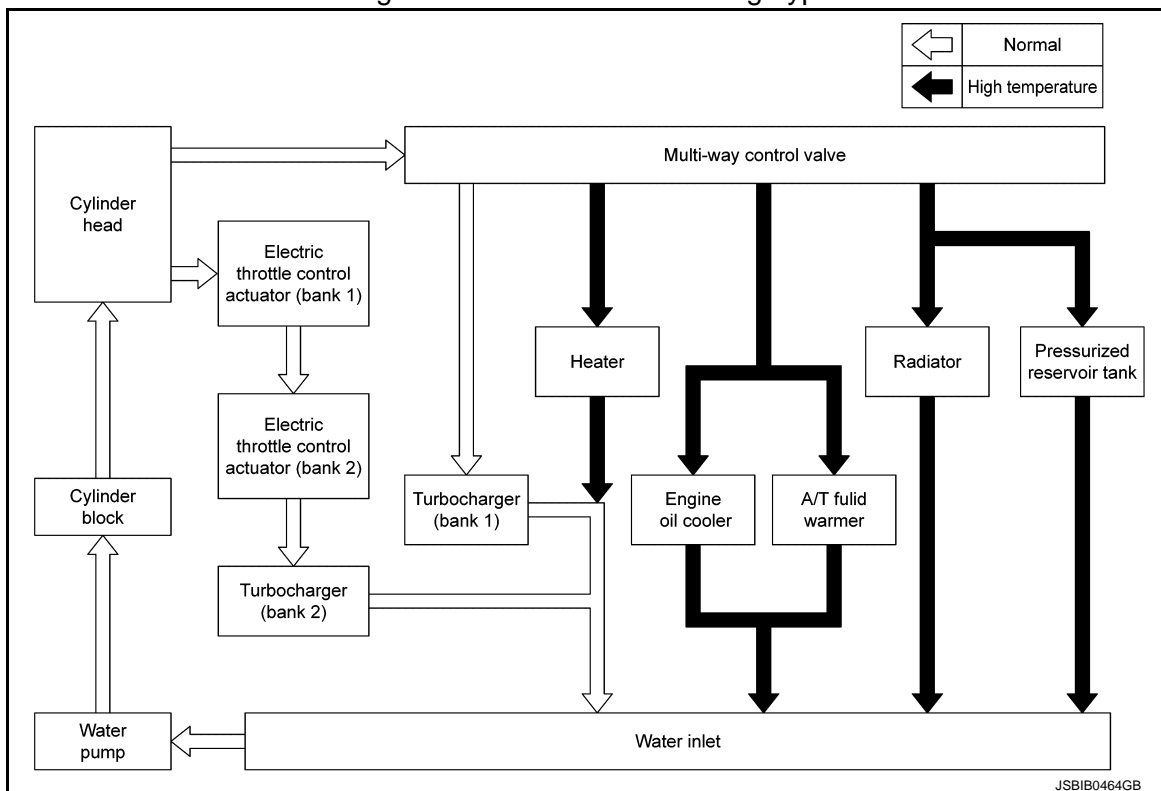
INFOID:000000013590775

### ENGINE COOLING

#### Engine Oil Cooler Air Cooling Type



#### Engine Oil Cooler Water Cooling Type



### CHARGE AIR COOLING

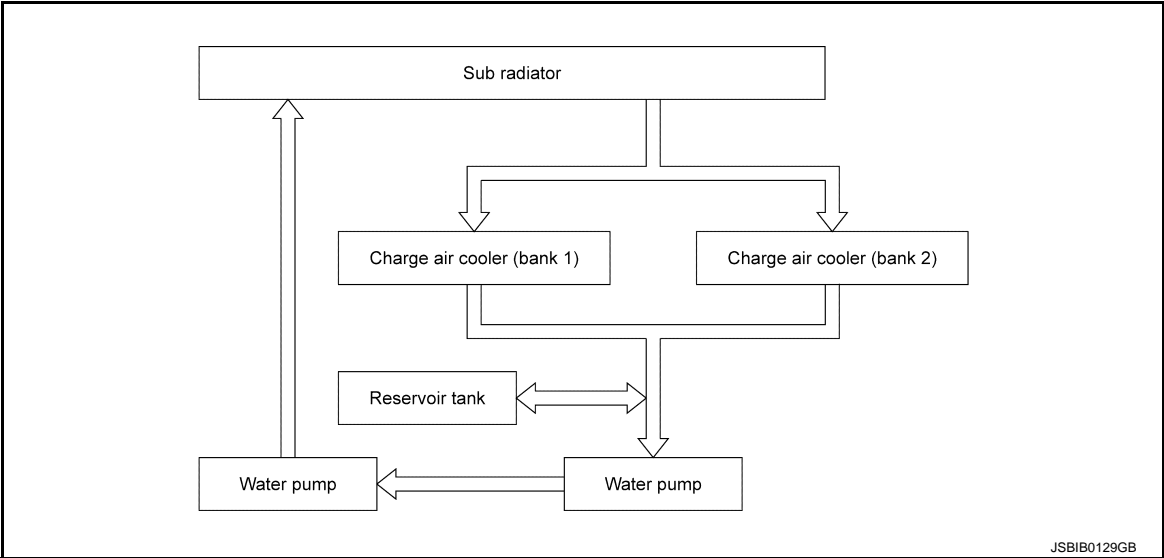
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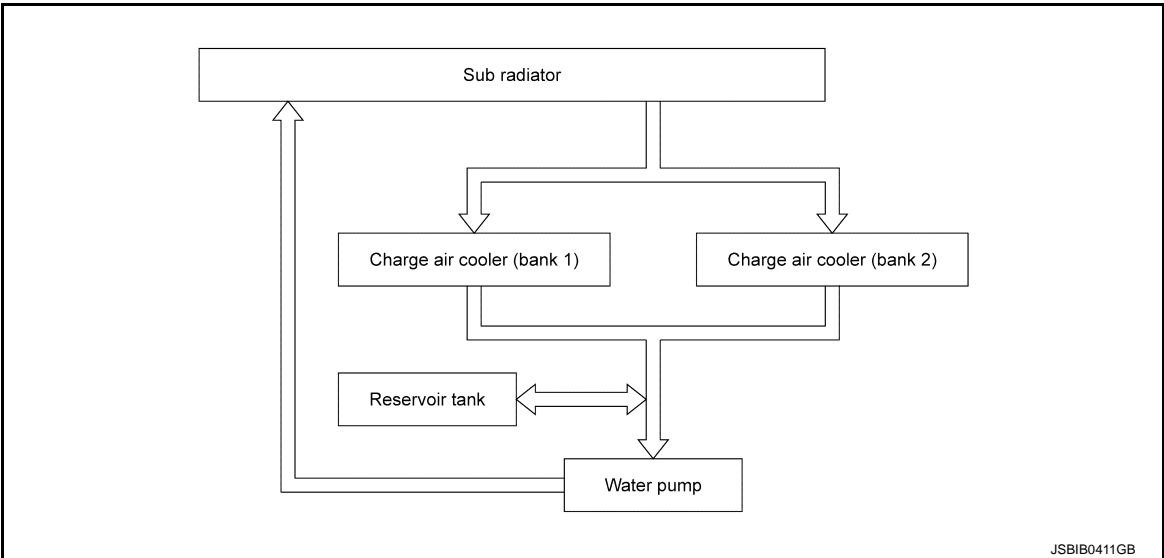
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[VR30DDTT]

Type 1



Type 2



# OVERHEATING CAUSE ANALYSIS

< SYMPTOM DIAGNOSIS >

[VR30DDTT]

## SYMPTOM DIAGNOSIS

### OVERHEATING CAUSE ANALYSIS

#### Troubleshooting Chart

INFOID:000000013590776

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		Symptom	Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—
		Multi-way control valve is 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 density
	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		

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# OVERHEATING CAUSE ANALYSIS

< SYMPTOM DIAGNOSIS >

[VR30DDTT]

	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 or restricted air flow	Blocked bumper	—	—
			Blocked radiator grille	Installed car brassiere	
				Mud contamination or paper clogging	
			Blocked radiator	—	
Blocked condenser			Blocked air flow		
Installed large fog lamp					



PERIODIC MAINTENANCE

COOLANT

Inspection

INFOID:0000000013590777

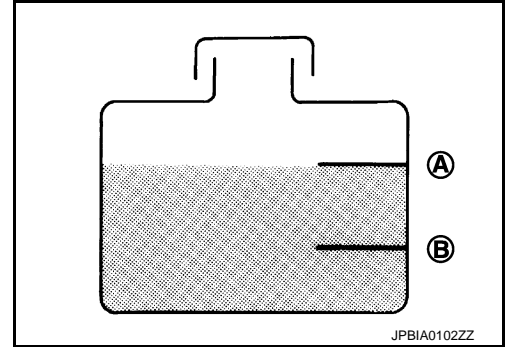
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LEVEL

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

- Ⓐ : MAX
- Ⓑ : MIN



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- Adjust the coolant level if necessary.

**CAUTION:**

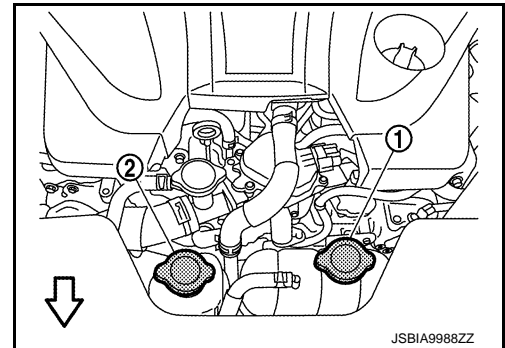
Refill Genuine NISSAN Long Life Antifreeze/Coolant (blue) or equivalent in its quality mixed with water (distilled or demineralized). Refer to [MA-20. "Recommended Fluids and Lubricants"](#).

- Check that the reservoir tank cap is tightened.

LEAKAGE

- Open the reservoir tank cap.

- ① : Reservoir tank cap (for engine)
- ② : Reservoir tank cap (for charge air cooler)
- ↶ : Vehicle front



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

**Testing pressure** : Refer to [CO-68. "Radiator"](#).

**WARNING:**

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

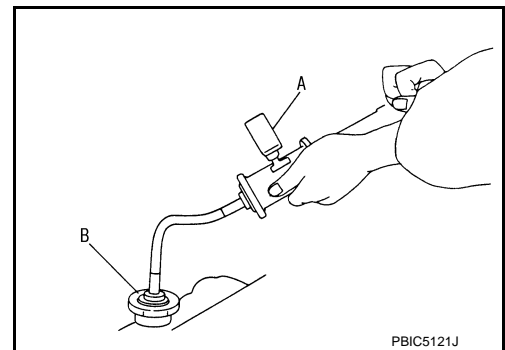
**CAUTION:**

Higher test pressure than specified may cause radiator damage.

**NOTE:**

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

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



K

L

M

N

Draining

INFOID:0000000013590778

**WARNING:**

- To avoid being scalded, never change engine coolant when the engine is hot.
- Wrap a thick cloth around reservoir tank cap and carefully remove reservoir tank cap. First, turn reservoir tank cap a quarter of a turn to release built-up pressure. Then turn reservoir tank cap all the way.
- Never spill engine coolant on drive belt.

**NOTE:**

O

P

# COOLANT

[VR30DDTT]

## < PERIODIC MAINTENANCE >

This procedure is engine cooling system. For procedure of charge air cooler system, refer to [CO-51. "Draining and Refilling"](#).

### Engine cooling system

1. Turn ignition switch ON and wait for 10 seconds.
2. Turn ignition switch OFF.
3. Remove front under cover using a power tool. Refer to [EXT-35. "FRONT UNDER COVER : Removal and Installation"](#).

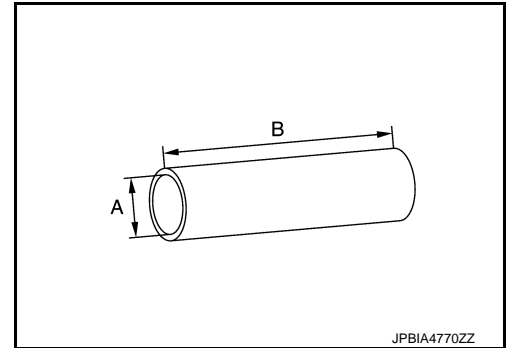
4. Connect drain hose.

#### NOTE:

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

A :  $\phi$  8 - 9 mm (0.31 - 0.35 in)

B : 145 mm (5.71 in) or more

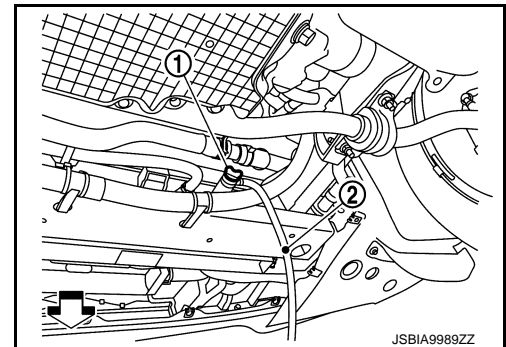


5. Open radiator drain cock ① at the bottom of radiator, and then remove radiator cap and reservoir tank cap.

② : Drain hose

← : Vehicle front

**When draining all of engine coolant in the system, open water drain plugs on cylinder block. Refer to [EM-215. "Setting"](#).**



6. Remove reservoir tank if necessary, and drain engine coolant and clean reservoir tank before installing.
7. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to [CO-36. "Flushing"](#).
8. Disconnect drain hose.

### Refilling

INFOID:000000013590779

#### 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-20. "Recommended Fluids and Lubricants"](#).
- Do not start engine when reservoir tank (for engine and sub-radiator) does not contain engine coolant.
- Electric water pump may be activated under the status of ignition switch ON. To prevent damage, electric water pump must not be activated when engine coolant is insufficient.

#### NOTE:

This procedure is engine cooling system. For procedure of charge air cooler system, refer to [CO-51. "Draining and Refilling"](#).

### Engine cooling system

1. Check that radiator cap on the top center of the engine is certainly fastened, before charge the engine with coolant.

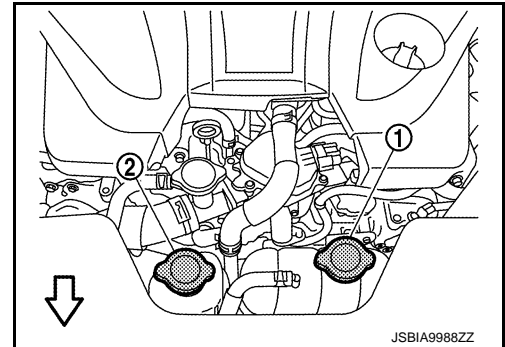
# COOLANT

[VR30DDTT]

## < PERIODIC MAINTENANCE >

2. Open the reservoir tank cap.

- ① : Reservoir tank cap (engine cooling system)
- ② : Reservoir tank cap (charge air cooling system)
- ↔ : Vehicle white



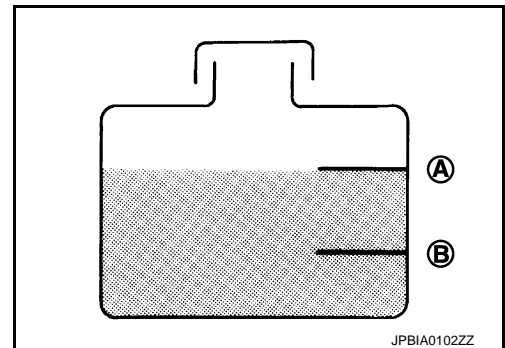
3. Fill up the engine cooling system with engine coolant.

- Ⓐ : MAX
- Ⓑ : MIN

Pour engine coolant through reservoir tank filler neck slowly of less than 3 ℓ (3-1/8 US qt, 2-5/8 Imp qt) a minute to allow air in system to escape.

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

: Refer to [CO-68](#),  
"[Periodical Maintenance  
e Specification](#)".



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

:Refer to [CO-68](#),  
"[Periodical Maintenance Specification](#)".

4. Install reservoir tank cap.
  5. Start the engine. And stop at once.
  6. Leave engine for about 10sec. Then check the coolant level at the reservoir tank.
  7. Refill reservoir tank to "MAX" level line with engine coolant.
  8. Repeat step 5 through 8 until engine coolant level no longer drops.
  9. Warm up engine until opening thermostat. Standard for warming-up time is approximately 10 minutes at 2,000 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.**
  - **Do not start engine when reservoir tank (for engine and sub-radiator) does not contain engine coolant.**
  - **Electric water pump may be activated under the status of ignition switch ON. To prevent damage, electric water pump must not be activated when engine coolant is insufficient.**
10. Stop the engine and cool down to less than approximately 50°C (122°F).
    - Cool down using fan to reduce the time.
    - Check the engine coolant level. If the level is low, refill with engine coolant and repeat the steps from Step 4.
  11. Refill reservoir tank to "MAX" level line with engine coolant.
  12. Check cooling system for leakage with engine running.
  13. Check flow noise, according to the following steps.

**CAUTION:**

**To check flow noise, turn OFF the radio and close the windows, doors, and the hood.**

    - a. Allow the engine to become cold [approximately 50°C (122°F) or less].
    - b. Start the engine, maintain 1000 rpm for approximately 30 seconds, and increase the engine speed from 1000 to 3000 rpm. Repeat this cycle three times.
    - c. Check that flow noise can be heard from the heater core during the Step b operation.

# COOLANT

< PERIODIC MAINTENANCE >

[VR30DDTT]

- d. If flow noise can be heard, repeat from Step 11 to 13 of Refilling to Step c of Flow Noise Verification Method.
- e. Check that the reservoir tank cap is tightened.

## Flushing

INFOID:000000013590780

1. Install reservoir tank if removed, and radiator drain plug.

**CAUTION:**

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

**Tightening torque** : Refer to [CO-39, "Exploded View"](#).

**If water drain plugs on cylinder block are removed, close and tighten them. Refer to [EM-215, "Setting"](#).**

2. Fill radiator and reservoir tank with water and reinstall reservoir tank cap.
3. Run the engine and warm it up to normal operating temperature.
4. Rev the engine two or three times under no-load.
5. Stop the engine and wait until it cools down.
6. Drain water from the system. Refer to [CO-33, "Draining"](#).
7. Repeat steps 1 through 6 until clear water begins to drain from radiator.
8. Check that the reservoir tank cap is tightened.

## RADIATOR

### RESERVOIR TANK CAP

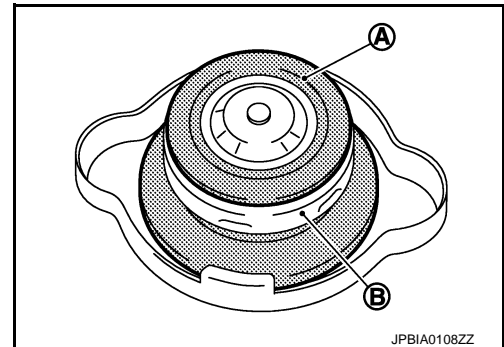
#### RESERVOIR TANK CAP : Inspection

INFOID:000000013590781

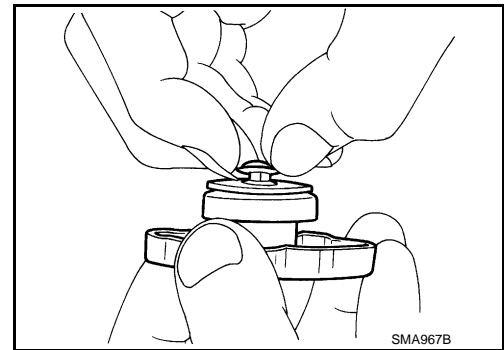
- Check valve seat (A) of reservoir tank cap.

(B) : Metal plunger

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



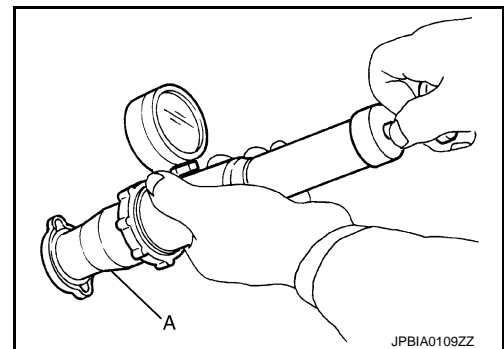
- Pull negative-pressure valve to open it, and check that it close completely when released.
- Check that there is no dirt or damage on the valve seat of reservoir tank cap negative-pressure valve.
- Check that there are no unusualness in the opening and closing conditions of negative-pressure valve.



- Check reservoir tank cap relief pressure.

**Standard and limit** : Refer to [CO-68, "Radiator"](#).

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



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

**CAUTION:**

**When installing reservoir tank cap, thoroughly wipe out the reservoir tank to remove any waxy residue or foreign material.**

## RADIATOR

### RADIATOR : Inspection

INFOID:000000013590782

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

- 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 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.
  4. Blow air into the back side of radiator core vertically downward.

## RADIATOR

< PERIODIC MAINTENANCE >

[VR30DDTT]

- 
- 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).
5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

# RADIATOR

< REMOVAL AND INSTALLATION >

[VR30DDTT]

## REMOVAL AND INSTALLATION

### RADIATOR

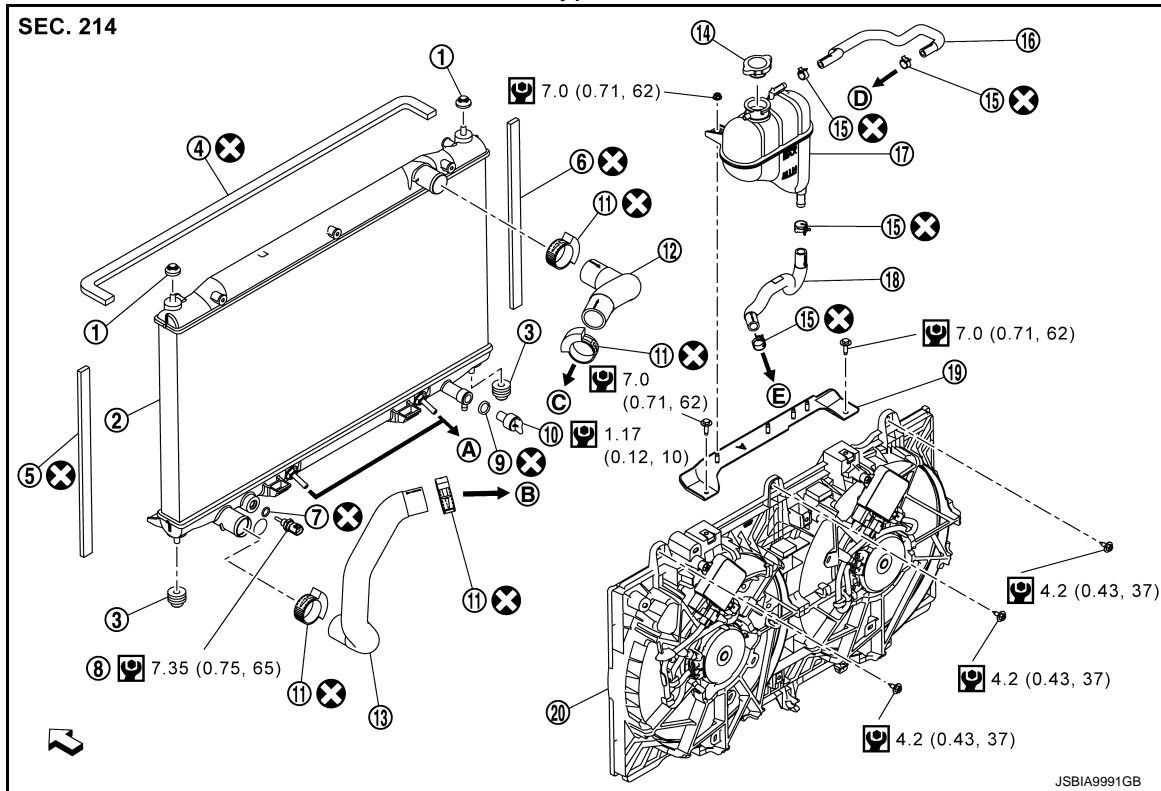
#### Exploded View

INFOID:000000013590783

A

CO

Type 1



C

D

E

F

G

H

I

J

K

L

M

N

O

P

- |                              |                            |                              |
|------------------------------|----------------------------|------------------------------|
| ① Mounting rubber (upper)    | ② Radiator                 | ③ Mounting rubber (lower)    |
| ④ Seal                       | ⑤ Seal (LH)                | ⑥ Seal (RH)                  |
| ⑦ O-ring                     | ⑧ Water temperature sensor | ⑨ O-ring                     |
| ⑩ Drain cock                 | ⑪ Clamp                    | ⑫ Radiator hose (Upper)      |
| ⑬ Radiator hose (lower)      | ⑭ Reservoir tank cap       | ⑮ Clamp                      |
| ⑯ Reservoir tank hose        | ⑰ Reservoir tank           | ⑱ Reservoir tank hose        |
| ⑲ Reservoir tank bracket     | ⑳ Cooling fan assembly     |                              |
| Ⓐ To transmission            | Ⓑ To water inlet           | Ⓒ To multi-way control valve |
| Ⓓ To multi-way control valve | Ⓔ To water inlet           |                              |

← : Vehicle front

: N·m (kg·m, in·lb)

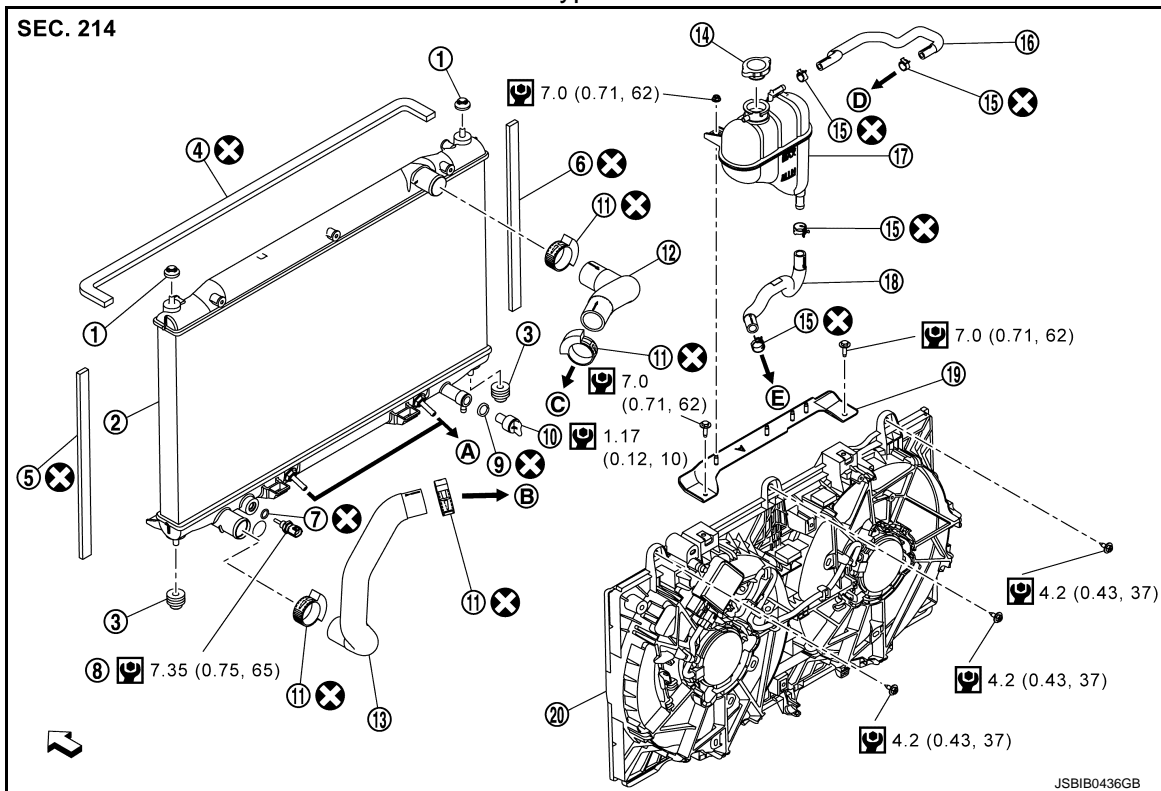
: Always replace after every disassembly.

# RADIATOR

< REMOVAL AND INSTALLATION >

[VR30DDTT]

Type 2



- |                              |                            |                              |
|------------------------------|----------------------------|------------------------------|
| ① Mounting rubber (upper)    | ② Radiator                 | ③ Mounting rubber (lower)    |
| ④ Seal                       | ⑤ Seal (LH)                | ⑥ Seal (RH)                  |
| ⑦ O-ring                     | ⑧ Water temperature sensor | ⑨ O-ring                     |
| ⑩ Drain cock                 | ⑪ Clamp                    | ⑫ Radiator hose (Upper)      |
| ⑬ Radiator hose (lower)      | ⑭ Reservoir tank cap       | ⑮ Clamp                      |
| ⑯ Reservoir tank bracket     | ⑰ Reservoir tank           | ⑱ Reservoir tank hose        |
| Ⓐ To transmission            | Ⓑ To water inlet           | Ⓒ To multi-way control valve |
| Ⓓ To multi-way control valve | Ⓔ To water inlet           |                              |

← : Vehicle front

: N·m (kg·m, in·lb)

: Always replace after every disassembly.

## Removal and Installation

INFOID:000000013590784

### REMOVAL

#### WARNING:

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

#### NOTE:

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

1. Remove fan shroud assembly. Refer to [CO-45, "Removal and Installation"](#).

#### CAUTION:

Never damage or scratch radiator core when removing.

2. Remove radiator hose (lower).



# RADIATOR

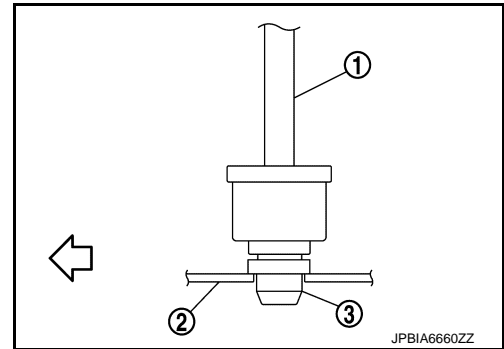
[VR30DDTT]

## < REMOVAL AND INSTALLATION >

3. Remove A/T fluid cooler hoses from radiator.
4. Remove radiator core support upper. Refer to [DLK-194, "VR30DDTT : Removal and Installation"](#).
5. Move condenser as following steps:
  - a. Remove condenser mounting screw.
  - i. Lift up and pull the radiator ① with condenser backward, and then remove the mounting rubber (lower) ③ from the radiator core support ②.

← : Vehicle front

- ii. Remove condenser mounting screw.
  - b. Set the radiator with condenser to the radiator core support.



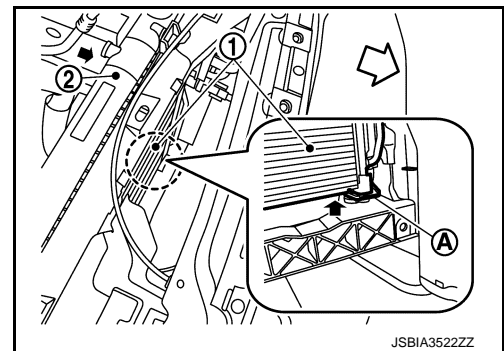
- c. Lift the lower left side of condenser ① to remove it from the condenser mounting part (A) of radiator.

### NOTE:

Hold radiator ② to prevent it from leaning backward.

- Remove lower right side in the same manner.

← : Vehicle front



6. Remove radiator.

### CAUTION:

**Be careful not to damage radiator core.**

## INSTALLATION

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

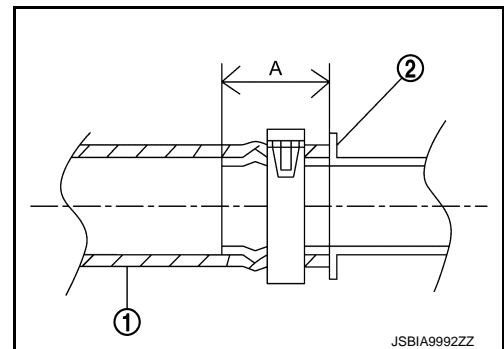
### CAUTION:

- Do not reuse O-rings.
- Replace water hose clamp if it is removed.
- Use genuine mounting bolts for the cooling fan assembly and strictly observe the tightening torque.  
(Breakage prevention for radiator)

### NOTE:

- Insert the radiator hose ① by stopper ②.

A 33.0 mm (1.30 in)

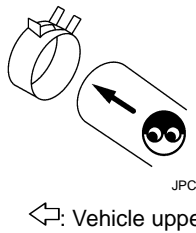
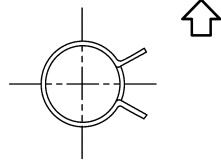
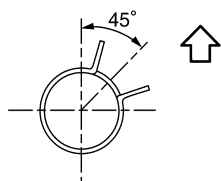
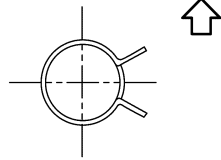
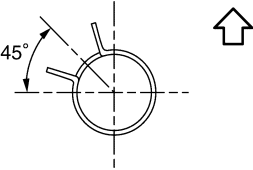


- Refer to the following table when installing the hose clamps.

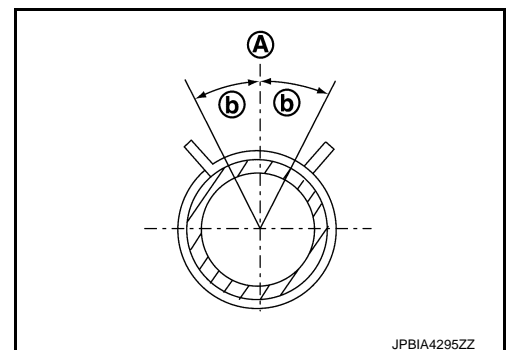
# RADIATOR

< REMOVAL AND INSTALLATION >

[VR30DDTT]

Hose location	Hose end	Direction of paint mark	<p>Direction of hose clamp tabs</p>  <p>JPCIA0366ZZ</p> <p>←: Vehicle upper</p>
Radiator hose (upper)	Radiator side	Vehicle upper	 <p>JPCIA0360ZZ</p>
	Engine side	Vehicle upper	 <p>JPCIA0363ZZ</p>
Radiator hose (lower)	Radiator side	Vehicle lower	 <p>JPCIA0360ZZ</p>
	Engine side	Vehicle upper left	 <p>JPCIA0365ZZ</p>

- The direction of the hose clamp tabs must be within  $\pm 30^\circ$  (b) of the indicated position (A).



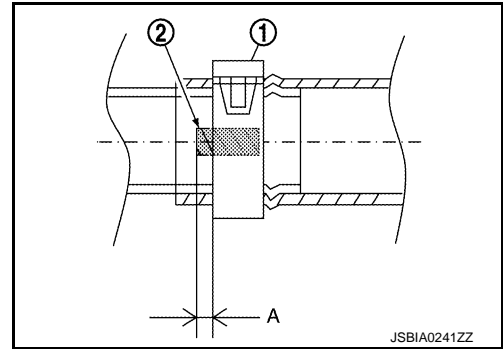
# RADIATOR

[VR30DDTT]

## < REMOVAL AND INSTALLATION >

- When installing hose clamp ①, check that the distance “A” between the end of the radiator hose paint mark ② and the hose clamp is within the standard range.

**Dimension “A” : (-1) - (+1) mm**  
**(-0.04) - (+0.04) in**



## Inspection

INFOID:000000013590785

### INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for leakage of engine coolant using the radiator cap tester adapter and the radiator cap tester (commercial service tool). Refer to [CO-33. "Inspection"](#).
- Start and warm up the engine. Visually check that there is no leakage of engine coolant and A/T fluid (A/T models).

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

# COOLING FAN

< REMOVAL AND INSTALLATION >

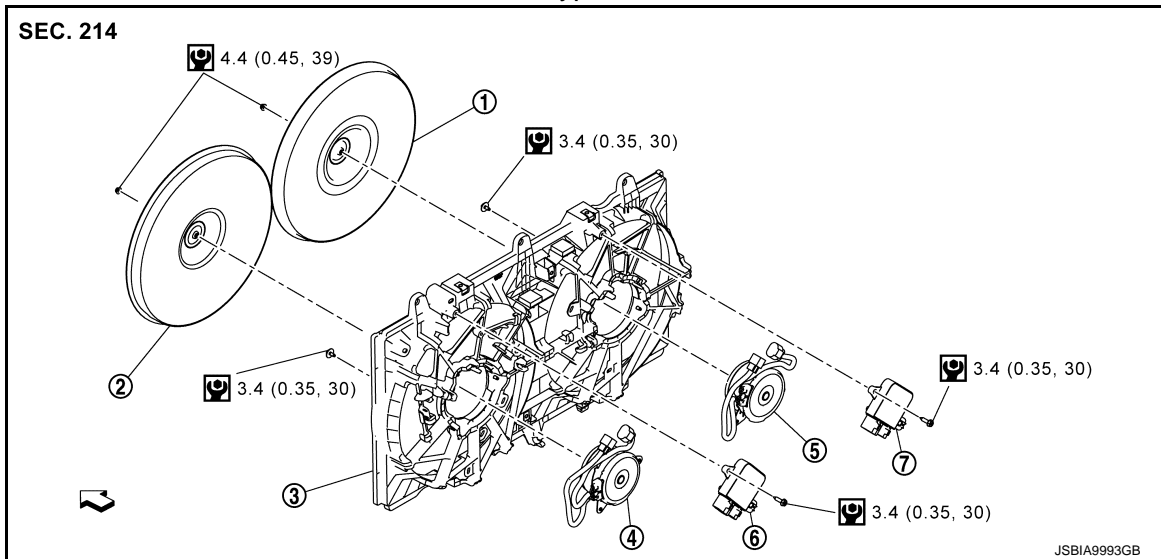
[VR30DDTT]

## COOLING FAN

### Exploded View

INFOID:000000013590789

Type 1

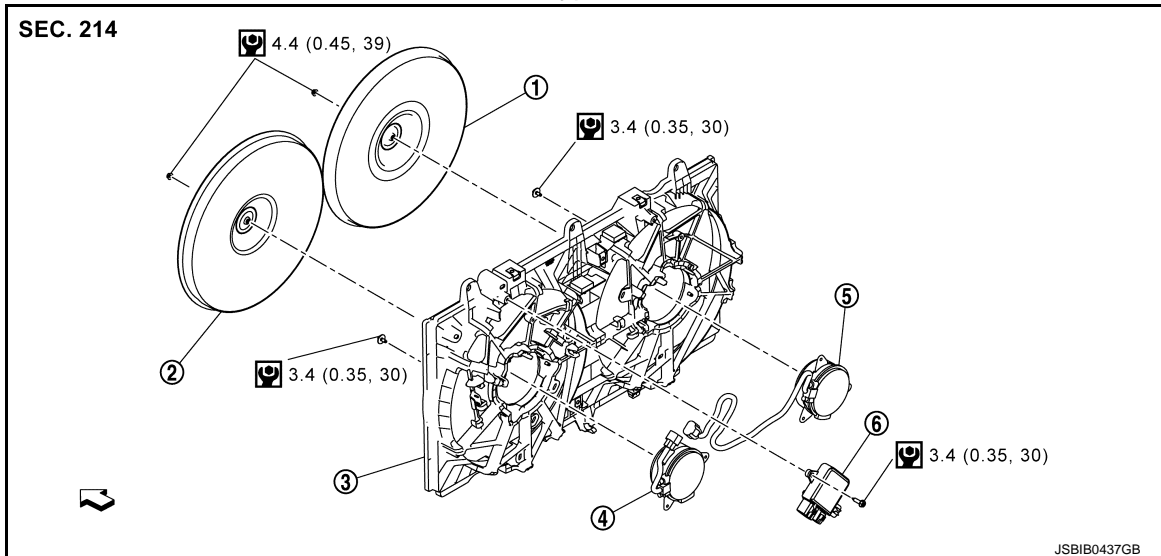


- ① Cooling fan 2
- ② Cooling fan 1
- ③ Fan shroud
- ④ Fan motor 1
- ⑤ Fan motor 2
- ⑥ Cooling fan control module 1
- ⑦ Cooling fan control module 2

← : Vehicle front

: N·m (kg·m, in·lb)

Type 2



- ① Cooling fan 2
- ② Cooling fan 1
- ③ Fan shroud
- ④ Fan motor 1
- ⑤ Fan motor 2
- ⑥ Cooling fan control module

← : Vehicle front

: N·m (kg·m, in·lb)

## Removal and Installation

INFOID:000000013590790

## REMOVAL

**WARNING:**

Never remove radiator cap and reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from engine cooling system. Wrap a thick cloth around the cap. Slowly turn it a quarter of a turn to release built-up pressure. Carefully remove radiator cap and reservoir tank cap by turning 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 engine coolant from radiator. Refer to [CO-33, "Draining"](#).  
**CAUTION:**
  - Perform this step when the engine is cold.
  - Never spill engine coolant on drive belt.
2. Drain charge air cooler coolant from radiator. Refer to [CO-33, "Draining"](#).  
**CAUTION:**  
Perform this step when the engine is cold.
3. Remove air duct (inlet). Refer to [EM-165, "Exploded View"](#).
4. Remove air cleaner assembly. Refer to [EM-165, "Removal and Installation"](#).
5. Remove reservoir tank (for engine).
6. Remove reservoir tank (for charge air cooler). Refer to [CO-49, "Exploded View"](#).
7. Remove reservoir tank bracket.
8. Remove water hose (for charge air cooler) and water tube. Refer to [CO-65, "Exploded View"](#).
9. Remove radiator hose (upper).
10. Disconnect cooling fan control module (1 and 2) harness connectors, and cooling fan control module harness move to aside.
11. Disconnect water temperature sensor harness connector and remove water temperature sensor harness from fan shroud.
12. Remove fan shroud assembly.  
**CAUTION:**  
Never damage or scratch radiator core when removing.

## INSTALLATION

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

**CAUTION:**

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

## Disassembly and Assembly

INFOID:000000013590791

## DISASSEMBLY

1. Disconnect fan motor harness connectors from cooling fan control module.
2. Remove cooling fan control module from cooling fan assembly.  
**CAUTION:**  
Handle carefully to avoid dropping and shocks.
3. Remove cooling fan mounting nuts, and then remove the cooling fan (1 and 2).
4. Remove fan motor (1 and 2).

## ASSEMBLY

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

Cooling fan

**CAUTION:**

RH and LH cooling fans are different. Be careful not to misassemble them.

- Install each fan in the following position.

# COOLING FAN

< REMOVAL AND INSTALLATION >

[VR30DDTT]

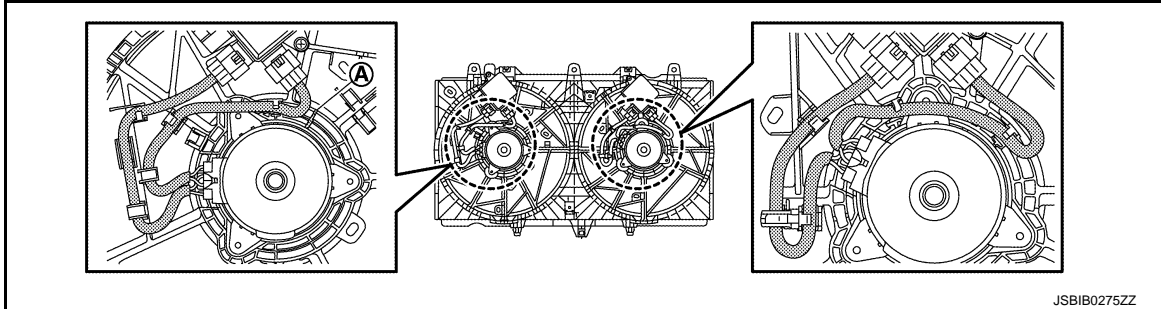
Right side : 9 blades

Left side : 7 blades

- Secure the harness tightly to the fan shroud to prevent the fan rotation area from being loose.

Cooling fan motor (Type 1)

- Install cooling fan motor harness as shown in the figure.

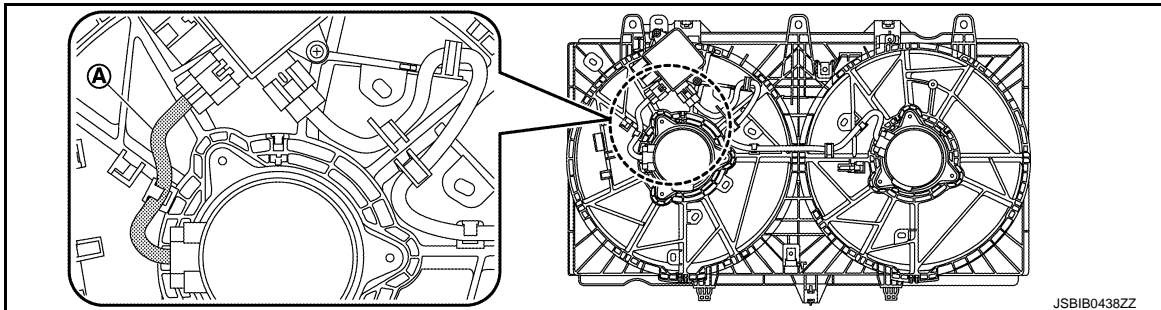


## CAUTION:

- Cooling fan motor harness may contact with peripheral parts, resulting in a break in the harness. For this reason, install without a mistake.
- Do not allow cooling fan motor harness to run off rightward from rib (A).

Cooling fan motor (Type 2)

- Install cooling fan motor harness as shown in the figure.



## CAUTION:

- Cooling fan motor harness (A) may contact with peripheral parts, resulting in a break in the harness. For this reason, install without a mistake.

## Inspection

INFOID:000000013590792

### INSPECTION AFTER REMOVAL

Check that fan motors operate normally.

#### NOTE:

Cooling fans are controlled by cooling fan control module. For details, refer to [EC6-84. "COOLING SYSTEM: System Description \(Cooling Fan Control System\)"](#).

### INSPECTION AFTER DISASSEMBLY

Cooling Fan

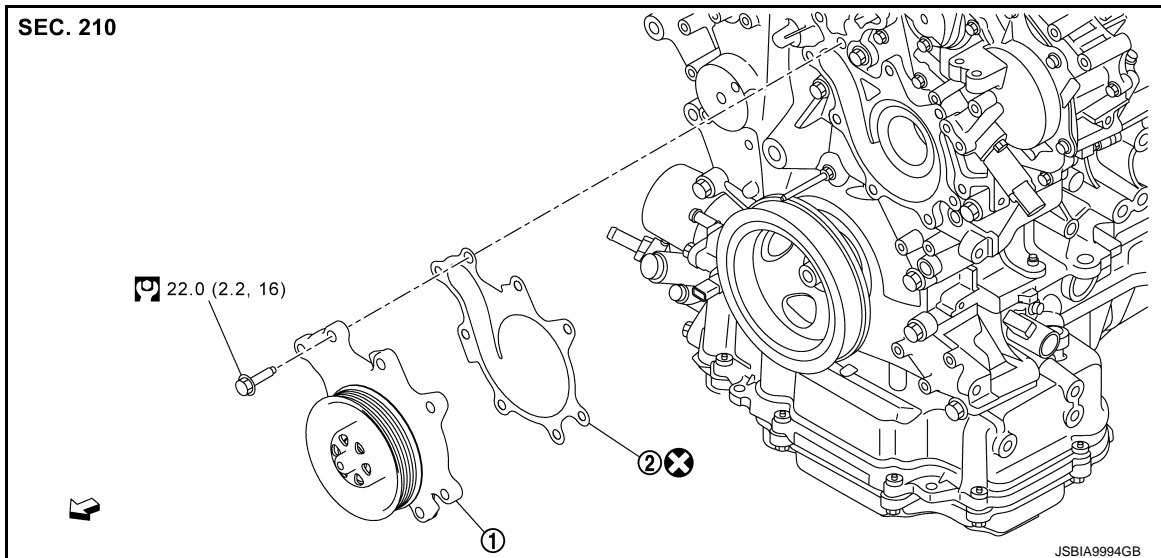
Inspect cooling fan for crack or unusual bend.

- If anything is found, replace cooling fan.

## WATER PUMP

### Exploded View

INFOID:000000013590786



- ① Water pump
- ② Gasket

← : Engine front

⊗ : Always replace after every disassembly

⊞ : N·m (kg·m, ft·lb)

### Removal and Installation

INFOID:000000013590787

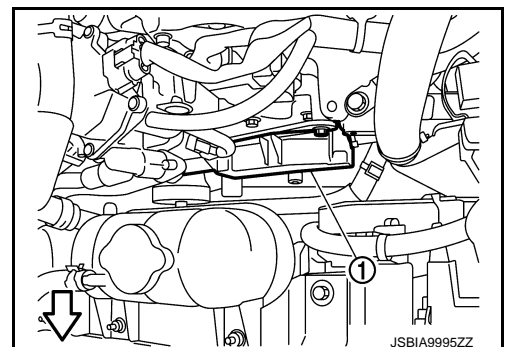
#### CAUTION:

- Water pump cannot be disassembled and should be replaced as a unit.
- After installing water pump, connect hose and clamp securely, then check for leakage using the radiator cap tester and the radiator cap tester adapter (commercial service tool).

#### REMOVAL

1. Remove drive belt. Refer to [EM-154, "Removal and Installation"](#).
2. Remove harness cover ① from front cover and move it to aside.

← : Vehicle front



3. Remove cooling fan shroud. Refer to [CO-45, "Removal and Installation"](#).

4. Remove water pump.

#### CAUTION:

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

5. Remove gasket.

#### INSTALLATION

#### CAUTION:

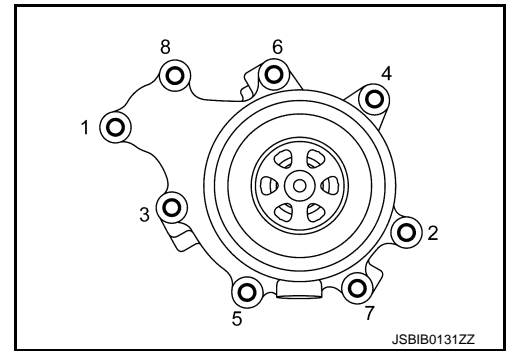
**Do not reuse gasket.**

# WATER PUMP

[VR30DDTT]

## < REMOVAL AND INSTALLATION >

- Tighten mounting bolts of water pump in the order from 1 to 8 as shown in the figure.

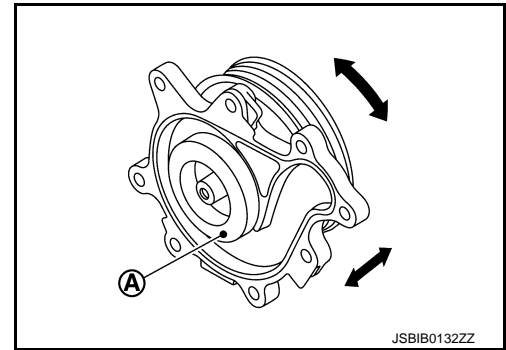


## Inspection

INFOID:000000013590788

### 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

- Check that the reservoir tank cap is tightened.
- Check for leakage of engine coolant using the radiator cap tester adapter and the radiator cap tester (commercial service tool). Refer to [CO-33. "Inspection"](#).
- Start and warm up the engine. Visually check that there is no leakage of engine coolant.



# SUB RADIATOR

< REMOVAL AND INSTALLATION >

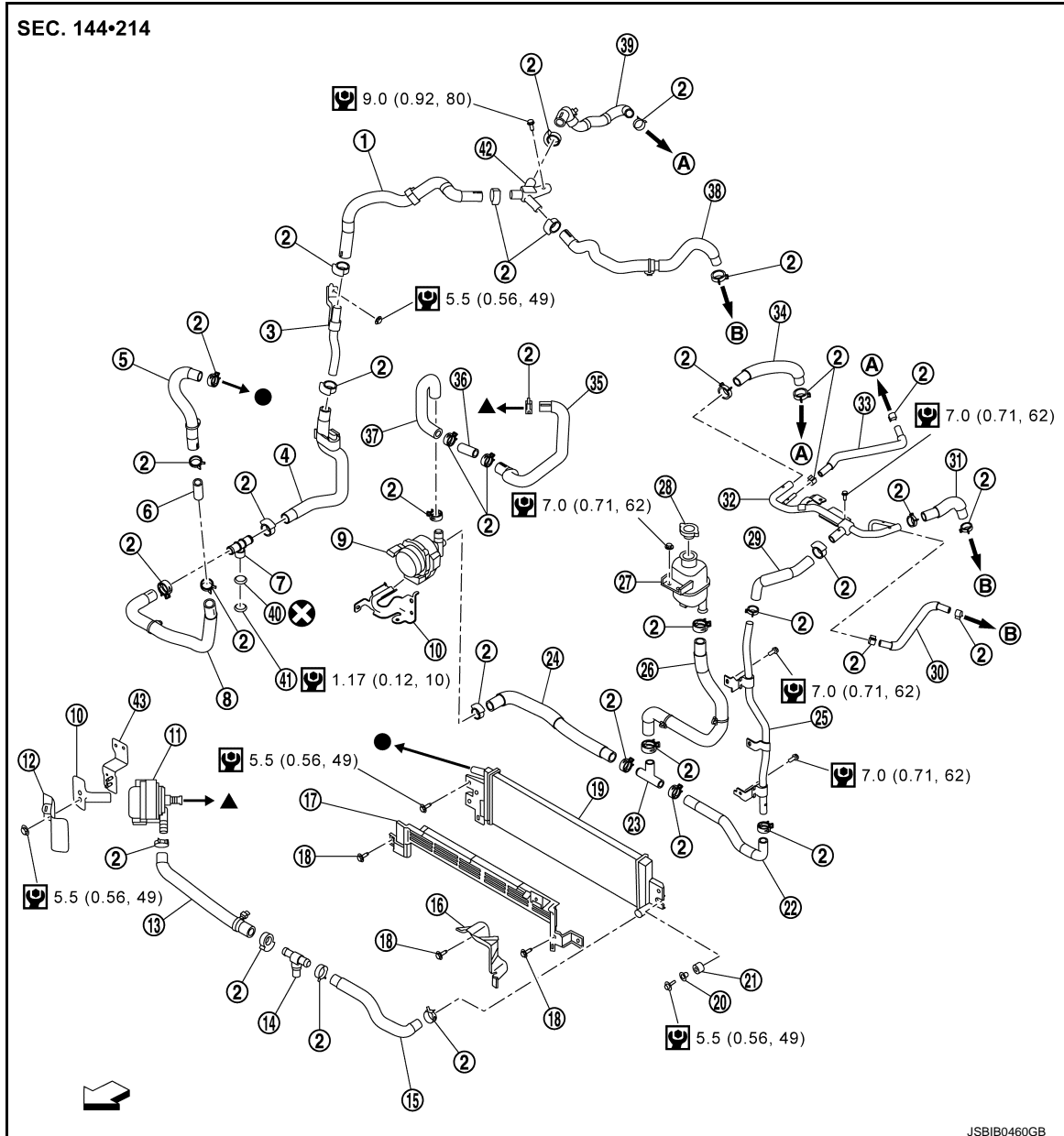
[VR30DDTT]

## SUB RADIATOR

Exploded View

INFOID:000000013590793

Type 1



- |  |                                      |                         |
|--|--------------------------------------|-------------------------|
| ① Water hose 1                           | ② Clamp                              | ③ Water pipe 1          |
| ④ Water hose 2                           | ⑤ Water hose 3                       | ⑥ Connector pipe 1      |
| ⑦ Water hose connector (with drain plug) | ⑧ Water hose 4                       | ⑨ Electric water pump 1 |
| ⑩ Electric water pump bracket            | ⑪ Electric water pump 2              | ⑫ Pump cover            |
| ⑬ Water hose 5                           | ⑭ Water hose connector (with sensor) | ⑮ Water hose 6          |
| ⑯ Air guide                              | ⑰ Radiator seal                      | ⑱ Clip                  |
| ⑲ Sub radiator                           | ⑳ Coller                             | ㉑ Bush                  |
| ㉒ Water hose 7                           | ㉓ Water hose connector               | ㉔ Water hose 8          |
| ㉕ Water pipe 2                           | ㉖ Reservoir tank hose                | ㉗ Reservoir tank        |
| ㉘ Reservoir tank cap                     | ㉙ Water hose 9                       | ㉚ Water hose 10         |

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# SUB RADIATOR

[VR30DDTT]

## < REMOVAL AND INSTALLATION >

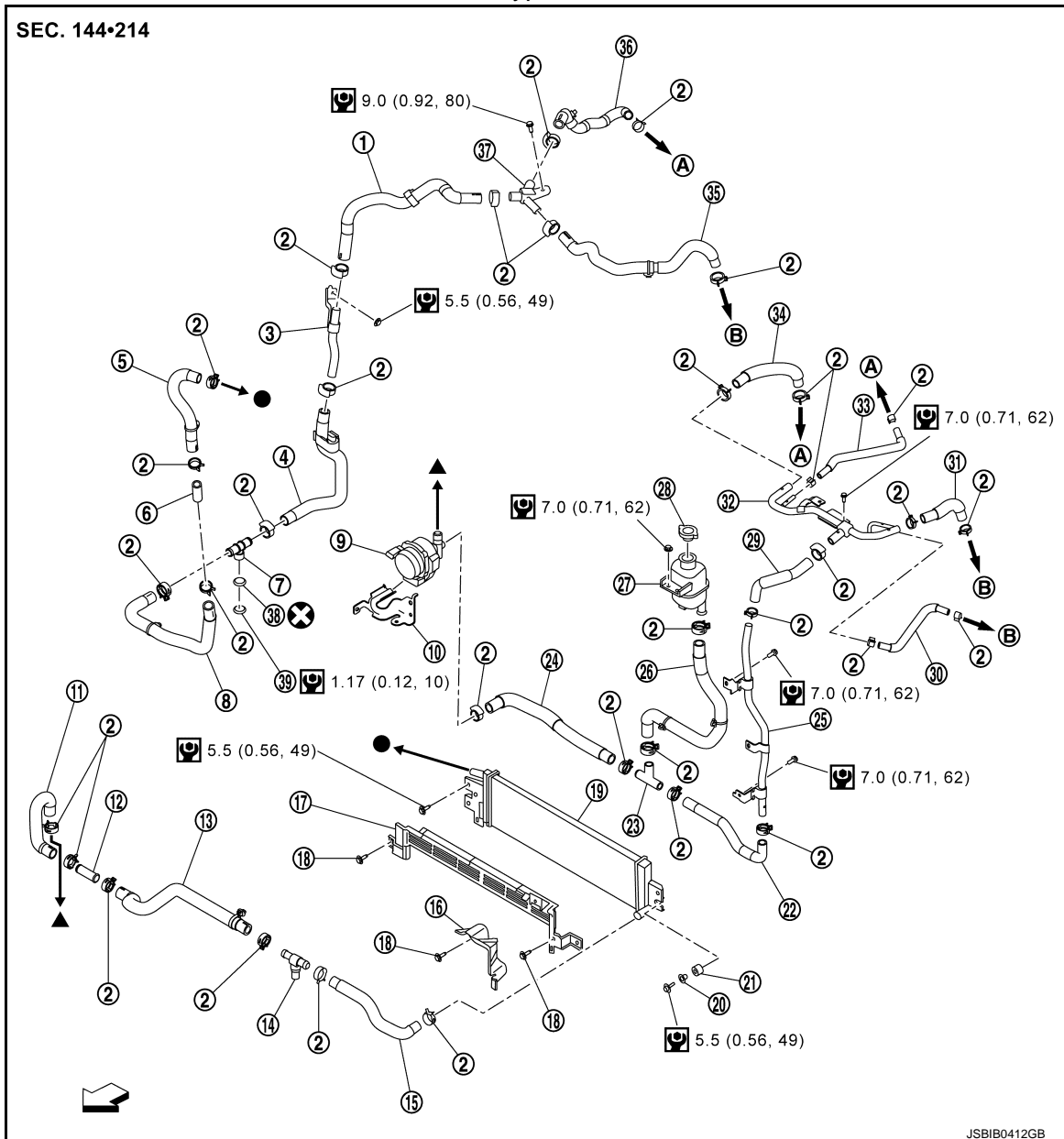
- |                                 |                                 |                     |
|---------------------------------|---------------------------------|---------------------|
| ③① Water hose 11                | ③② Water pipe 3                 | ③③ Water hose 12    |
| ③④ Water hose 13                | ③⑤ Water hose 14                | ③⑥ Connector pipe 2 |
| ③⑦ Water hose 15                | ③⑧ Water hose 16                | ③⑨ Water hose 17    |
| ④① O-ring                       | ④② Drain plug                   | ④③ Connector pipe 3 |
| ④④ Bracket                      |                                 |                     |
| Ⓐ To charge air cooler (bank 1) | Ⓑ To charge air cooler (bank 2) |                     |

← : Vehicle front

Ⓜ : N·m (kg·m, in·lb)

●, ▲ Indicates that the part is connected at points with same symbol in actual vehicle.

### Type 2



- |  |                 |                       |
|--|-----------------|-----------------------|
| ① Water hose 1                           | ② Clamp         | ③ Water pipe 1        |
| ④ Water hose 2                           | ⑤ Water hose 3  | ⑥ Connector pipe 1    |
| ⑦ Water hose connector (with drain plug) | ⑧ Water hose 4  | ⑨ Electric water pump |
| ⑩ Electric water pump bracket            | ⑪ Water hose 15 | ⑫ Connector pipe 2    |


# SUB RADIATOR

## < REMOVAL AND INSTALLATION >

[VR30DDTT]

- |                                 |                                      |                  |
|---------------------------------|--------------------------------------|------------------|
| ⑬ Water hose 5                  | ⑭ Water hose connector (with sensor) | ⑮ Water hose 6   |
| ⑯ Air guide                     | ⑰ Radiator seal                      | ⑱ Clip           |
| ⑲ Sub radiator                  | ⑳ Coller                             | ㉑ Bush           |
| ㉒ Water hose 7                  | ㉓ Water hose connector               | ㉔ Water hose 8   |
| ㉕ Water pipe 2                  | ㉖ Reservoir tank hose                | ㉗ Reservoir tank |
| ㉘ Reservoir tank cap            | ㉙ Water hose 9                       | ㉚ Water hose 10  |
| ㉛ Water hose 11                 | ㉜ Water pipe 3                       | ㉝ Water hose 12  |
| ㉞ Water hose 13                 | ㉟ Water hose 16                      | ㊱ Water hose 17  |
| ㊲ Connector pipe 3              | ㊳ O-ring                             | ㊴ Drain plug     |
| Ⓐ To charge air cooler (bank 1) | Ⓑ To charge air cooler (bank 2)      |                  |

← : Vehicle front

 : N·m (kg·m, in·lb)

●, ▲ Indicates that the part is connected at points with same symbol in actual vehicle.

## Draining and Refilling

INFOID:000000013804699

### WARNING:

- Wrap a thick cloth around reservoir tank cap and carefully remove reservoir tank cap. First, turn reservoir tank cap a quarter of a turn to release built-up pressure. Then turn reservoir tank cap all the way.
- Never spill engine coolant on drive belt.

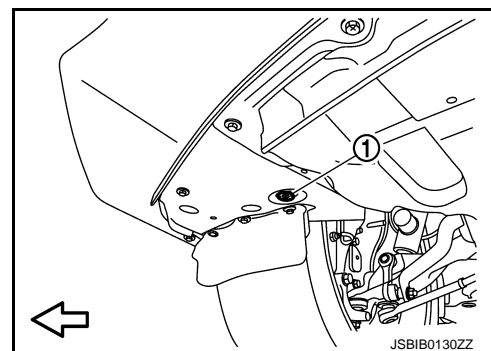
### CAUTION:

- Do not start engine when reservoir tank (for engine and sub-radiator) does not contain engine coolant.
- Electric water pump may be activated under the status of ignition switch ON. To prevent damage, electric water pump must not be activated when engine coolant is insufficient.

### DRAINING (CHARGE AIR COOLER COOLANT)

1. Open drain plug ①, and then remove reservoir tank cap.

← : Vehicle front



2. Remove reservoir tank if necessary, and clean reservoir tank before installing.

### REFILLING (CHARGE AIR COOLER COOLANT)

#### CAUTION:

- Check the tightening condition of hose clamp, drain plug, and others.
- Do not start engine when reservoir tank (for engine and sub-radiator) does not contain engine coolant.
- Electric water pump may be activated under the status of ignition switch ON. To prevent damage, electric water pump must not be activated when engine coolant is insufficient.

1. Connect CONSULT and select "Full Drive".
2. Open the reservoir tank cap and pour of 3 ℓ (2-5/8 Imp qt) a minute or less from reservoir tank.
3. Fill the reservoir tank until the "MAX" level line.
4. Start the engine and check that electric water pump is activated.
5. When coolant level in reservoir tank falls, fill coolant up to "MAX" line.

#### NOTE:

# SUB RADIATOR

[VR30DDTT]

< REMOVAL AND INSTALLATION >

Water pump must be in operation.

6. When coolant level stops falling, turn off the engine.
7. Select "Full Drive" again and repeat the procedure 4 to 6 until coolant level stops falling.
8. Tighten reservoir tank cap.
9. Turn off CONSULT after work completion.

## Removal and Installation

INFOID:000000013590794

### REMOVAL

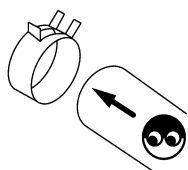
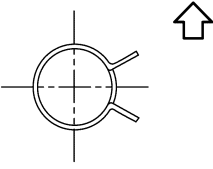
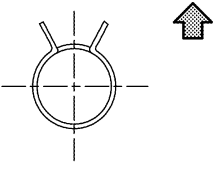
1. Drain coolant from sub radiator. Refer to [CO-51, "Draining and Refilling"](#)
2. Remove radiator. Refer to [CO-40, "Removal and Installation"](#).
3. Remove bumper fascia. Refer to [EXT-15, "Removal and Installation"](#).
4. Remove front bumper reinforcement. Refer to [EXT-14, "Exploded View"](#)
5. Disconnect water hose 3 and 6 from sub radiator.
6. Remove sub radiator.

### INSTALLATION

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

**NOTE:**

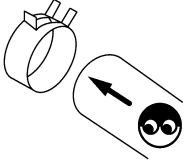
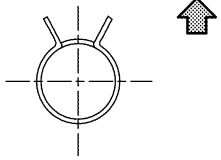
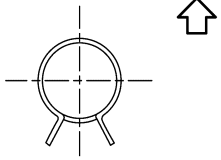
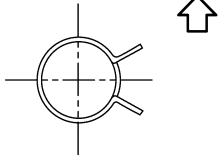
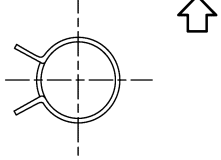
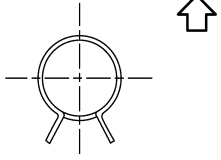
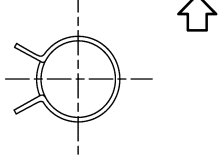
- Water hose marking fit with water pipe marking.
- Refer to the following table when installing the hose clamps.

Hose location	Hose end	Direction of paint mark	Direction of hose clamp tabs
			 <p style="text-align: right; font-size: small;">JPCIA0366ZZ</p> <p style="text-align: center;"> <span style="display: inline-block; width: 10px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Vehicle upper  <span style="display: inline-block; width: 10px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Vehicle front                 </p>
Water hose 1	Connector pipe 3 side	Vehicle upper	 <p style="text-align: right; font-size: small;">JPCIA0360ZZ</p>
	Water pipe 1 side	Vehicle front	 <p style="text-align: right; font-size: small;">JSFIA2590ZZ</p>

# SUB RADIATOR

< REMOVAL AND INSTALLATION >

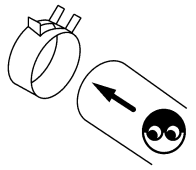
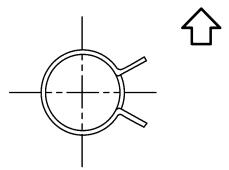
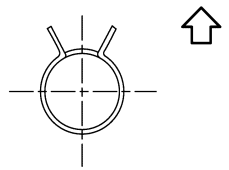
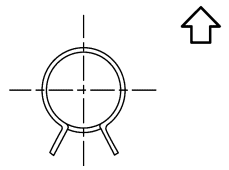
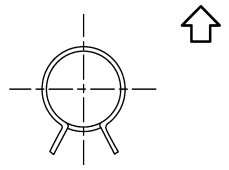
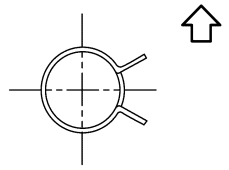
[VR30DDTT]

<p>Hose location</p>	<p>Hose end</p>	<p>Direction of paint mark</p>	<p>Direction of hose clamp tabs</p>  <p>JPCIA0366ZZ</p> <p>←: Vehicle upper ←: Vehicle front</p>	<p>A CO</p>
<p>Water hose 2</p>	<p>Water pipe 1 side</p>	<p>Vehicle front</p>	 <p>JSFIA2590ZZ</p>	<p>D E F</p>
	<p>Water hose connector (with drain) side</p>	<p>Vehicle upper</p>	 <p>JSBIA4312ZZ</p>	<p>G H</p>
<p>Water hose 3</p>	<p>Radiator side</p>	<p>Vehicle front</p>	 <p>JPCIA0360ZZ</p>	<p>I J K</p>
	<p>Connector pipe 1 side</p>	<p>Vehicle front left</p>	 <p>JPCIA0364ZZ</p>	<p>L M</p>
<p>Water hose 4</p>	<p>Water hose connector (with drain) side</p>	<p>Vehicle upper</p>	 <p>JSBIA4312ZZ</p>	<p>N O P</p>
	<p>Connector pipe 1 side</p>	<p>Vehicle front left</p>	 <p>JPCIA0364ZZ</p>	

# SUB RADIATOR

< REMOVAL AND INSTALLATION >

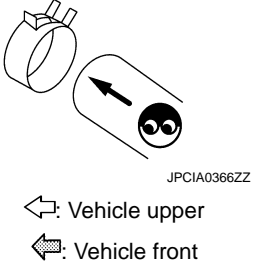
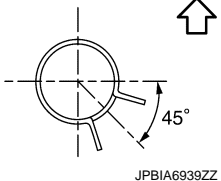
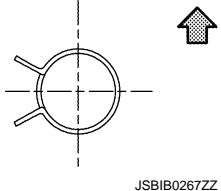
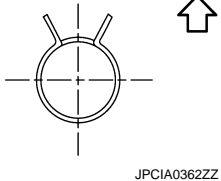
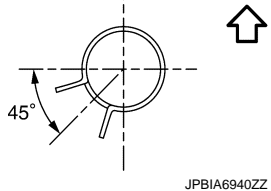
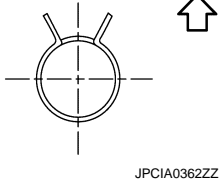
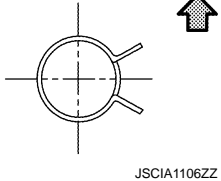
[VR30DDTT]

Hose location	Hose end	Direction of paint mark	Direction of hose clamp tabs  JPCIA0366ZZ ⇐: Vehicle upper ⇐: Vehicle front
Water hose 5	Electric water pump 2 side (type 1)	Vehicle rear	 JPCIA0360ZZ
	Electric water pump 2 side (Type 2)	Vehicle upper	 JPCIA0362ZZ
	Water hose connector (with drain) side	Vehicle upper	 JSBIA4312ZZ
Water hose 6	Water hose connector (with sensor) side	Vehicle upper	 JSBIA4312ZZ
	Radiator side	Vehicle upper	 JPCIA0360ZZ

# SUB RADIATOR

< REMOVAL AND INSTALLATION >

[VR30DDTT]

Hose location	Hose end	Direction of paint mark	Direction of hose clamp tabs 
Water hose 7	Water hose connector side	Vehicle lower right	
	Water pipe 2 side	Vehicle front left	
Water hose 8	Electric water pump 2 side	Vehicle upper	
	Water hose connector side	Vehicle lower right	
Water hose 9	Water pipe 3 side	Vehicle upper	
	Water pipe 2 side	Vehicle front right	

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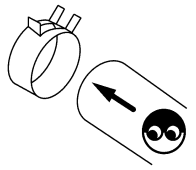
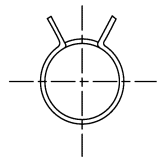
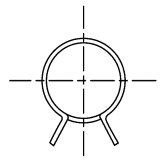
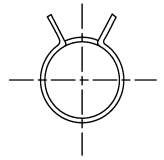
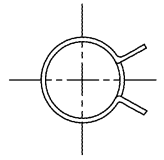
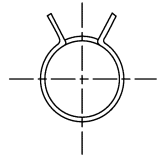
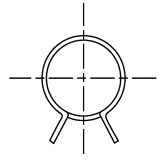
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# SUB RADIATOR

< REMOVAL AND INSTALLATION >

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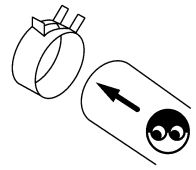
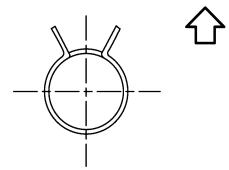
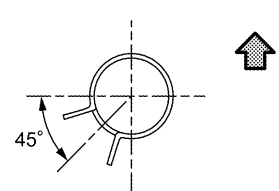
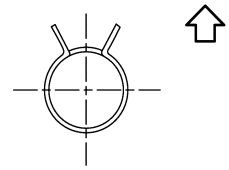
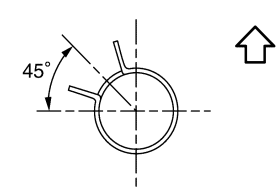
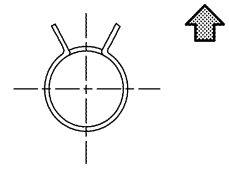
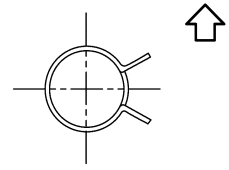
Hose location	Hose end	Direction of paint mark	Direction of hose clamp tabs  JPCIA0366ZZ ⇐: Vehicle upper ⇐: Vehicle front
Water hose 10	Water pipe 3 side	Vehicle upper	 JPCIA0362ZZ
	Charge air cooler side (bank 2)	Vehicle lower	 JSBIA4312ZZ
Water hose 11	Water pipe 3 side	Vehicle upper	 JPCIA0362ZZ
	Charge air cooler side (bank 2)	Vehicle front right	 JSCIA1106ZZ
Water hose 12	Water pipe 3 side	Vehicle upper	 JPCIA0362ZZ
	Charge air cooler side (bank 1)	Vehicle lower	 JSBIA4312ZZ



# SUB RADIATOR

< REMOVAL AND INSTALLATION >

[VR30DDTT]

			Direction of hose clamp tabs  <p style="text-align: right; font-size: small;">JPCIA0366ZZ</p> <p>←: Vehicle upper ↖: Vehicle front</p>
Hose location	Hose end	Direction of paint mark	
Water hose 13	Water pipe 3 side	Vehicle upper	 <p style="text-align: right; font-size: x-small;">JPCIA0362ZZ</p>
	Charge air cooler side (bank 1)	Vehicle front left	 <p style="text-align: right; font-size: x-small;">JSBIB0268ZZ</p>
Water hose 14	Connector pipe 2 side	Vehicle upper	 <p style="text-align: right; font-size: x-small;">JPCIA0362ZZ</p>
	Electric water pump 2 side	Vehicle upper left	 <p style="text-align: right; font-size: x-small;">JPCIA0365ZZ</p>
Water hose 15	Electric water pump 1 side	Vehicle rear	 <p style="text-align: right; font-size: x-small;">JSFIA2590ZZ</p>
	Connector pipe 2 side	Vehicle upper	 <p style="text-align: right; font-size: x-small;">JPCIA0360ZZ</p>

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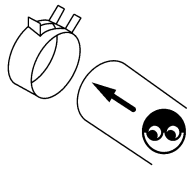

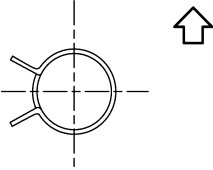
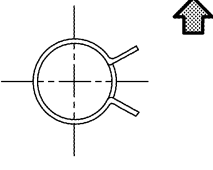
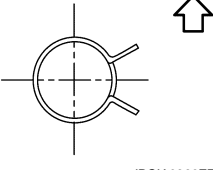
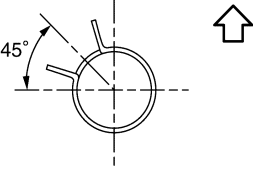
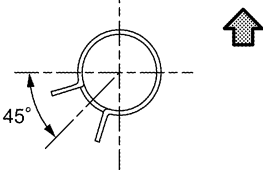
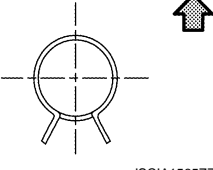
O

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# SUB RADIATOR

< REMOVAL AND INSTALLATION >

[VR30DDTT]

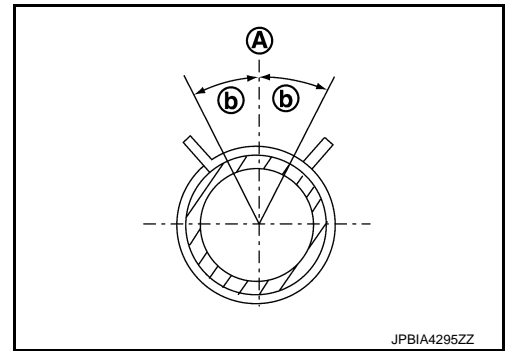
<p>Hose location</p>	<p>Hose end</p>	<p>Direction of paint mark</p>	<p>Direction of hose clamp tabs</p>  <p>JPCIA0366ZZ</p> <p>←: Vehicle upper  : Vehicle front</p>
<p>Water hose 16</p>	<p>Connector pipe 3 side</p>	<p>Vehicle upper</p>	 <p>JPCIA0364ZZ</p>
	<p>Charge air cooler side (bank 2)</p>	<p>Vehicle front right</p>	 <p>JSCIA1106ZZ</p>
<p>Water hose 17</p>	<p>Connector pipe 3 side</p>	<p>Vehicle upper</p>	 <p>JPCIA0360ZZ</p>
	<p>Charge air cooler side (bank 2)</p>	<p>Vehicle front right</p>	 <p>JPCIA0365ZZ</p>
<p>reservoir tank hose</p>	<p>Water hose connector (with sensor) side</p>	<p>Vehicle rear</p>	 <p>JSBIB0268ZZ</p>
	<p>Charge air cooler side (bank 2)</p>	<p>Vehicle rear</p>	 <p>JSCIA1565ZZ</p>

# SUB RADIATOR

[VR30DDTT]

## < REMOVAL AND INSTALLATION >

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



## Inspection

INFOID:000000013590795

### INSPECTION AFTER REMOVAL

Check air passages of charge air cooler core and fins for clogging, leaks or deformation. Clean or replace charge air cooler if necessary.

- **Be careful not to deform core fins.**

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# ELECTRIC WATER PUMP

< REMOVAL AND INSTALLATION >

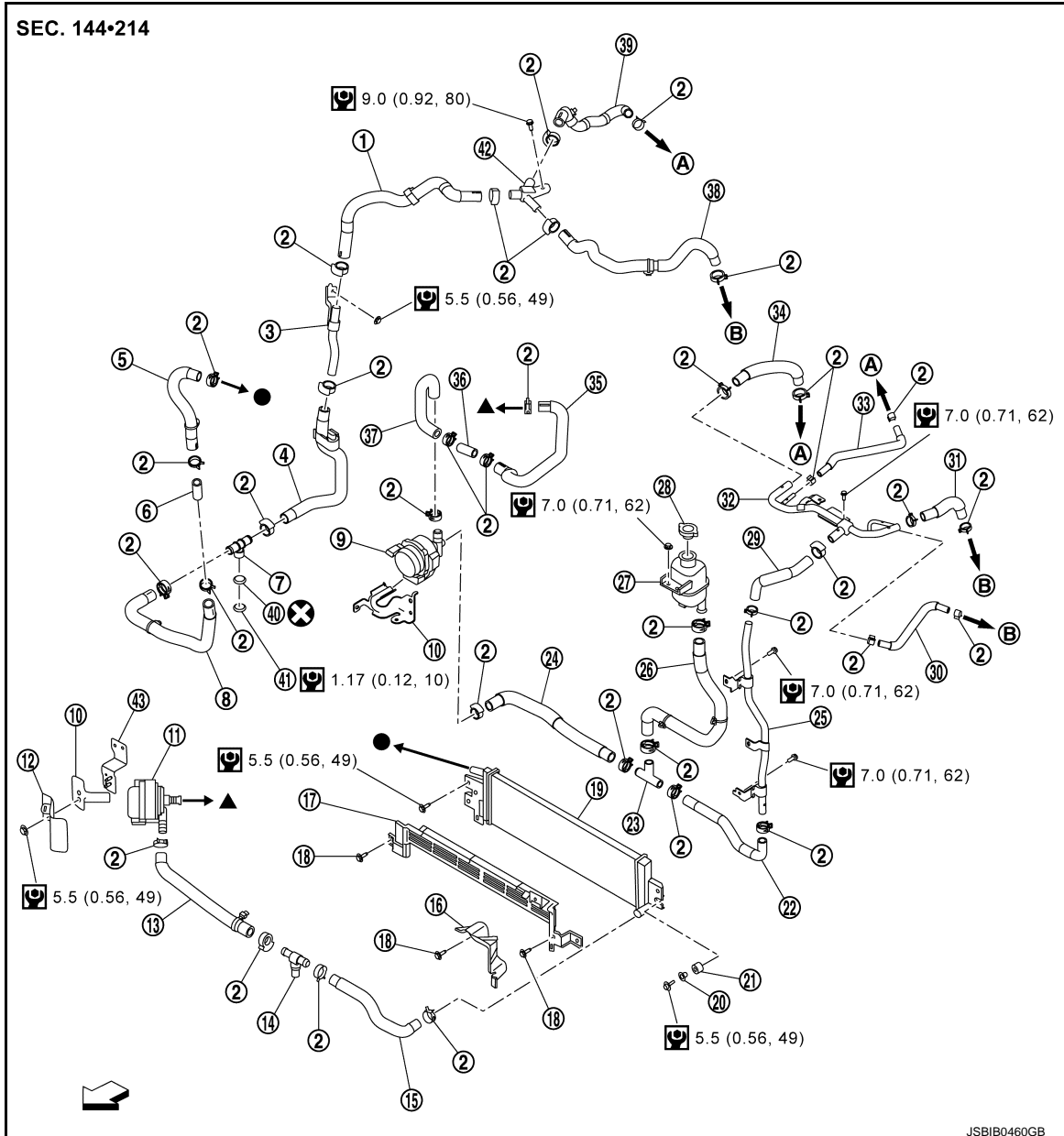
[VR30DDTT]

## ELECTRIC WATER PUMP

Exploded View

INFOID:000000013831645

Type 1



JSBIB0460GB

- |  |                                      |                         |
|--|--------------------------------------|-------------------------|
| ① Water hose 1                           | ② Clamp                              | ③ Water pipe 1          |
| ④ Water hose 2                           | ⑤ Water hose 3                       | ⑥ Connector pipe 1      |
| ⑦ Water hose connector (with drain plug) | ⑧ Water hose 4                       | ⑨ Electric water pump 1 |
| ⑩ Electric water pump bracket            | ⑪ Electric water pump 2              | ⑫ Pump cover            |
| ⑬ Water hose 5                           | ⑭ Water hose connector (with sensor) | ⑮ Water hose 6          |
| ⑯ Air guide                              | ⑰ Radiator seal                      | ⑱ Clip                  |
| ⑲ Sub radiator                           | ⑳ Coller                             | ㉑ Bush                  |
| ㉒ Water hose 7                           | ㉓ Water hose connector               | ㉔ Water hose 8          |
| ㉕ Water pipe 2                           | ㉖ Reservoir tank hose                | ㉗ Reservoir tank        |
| ㉘ Reservoir tank cap                     | ㉙ Water hose 9                       | ㉚ Water hose 10         |

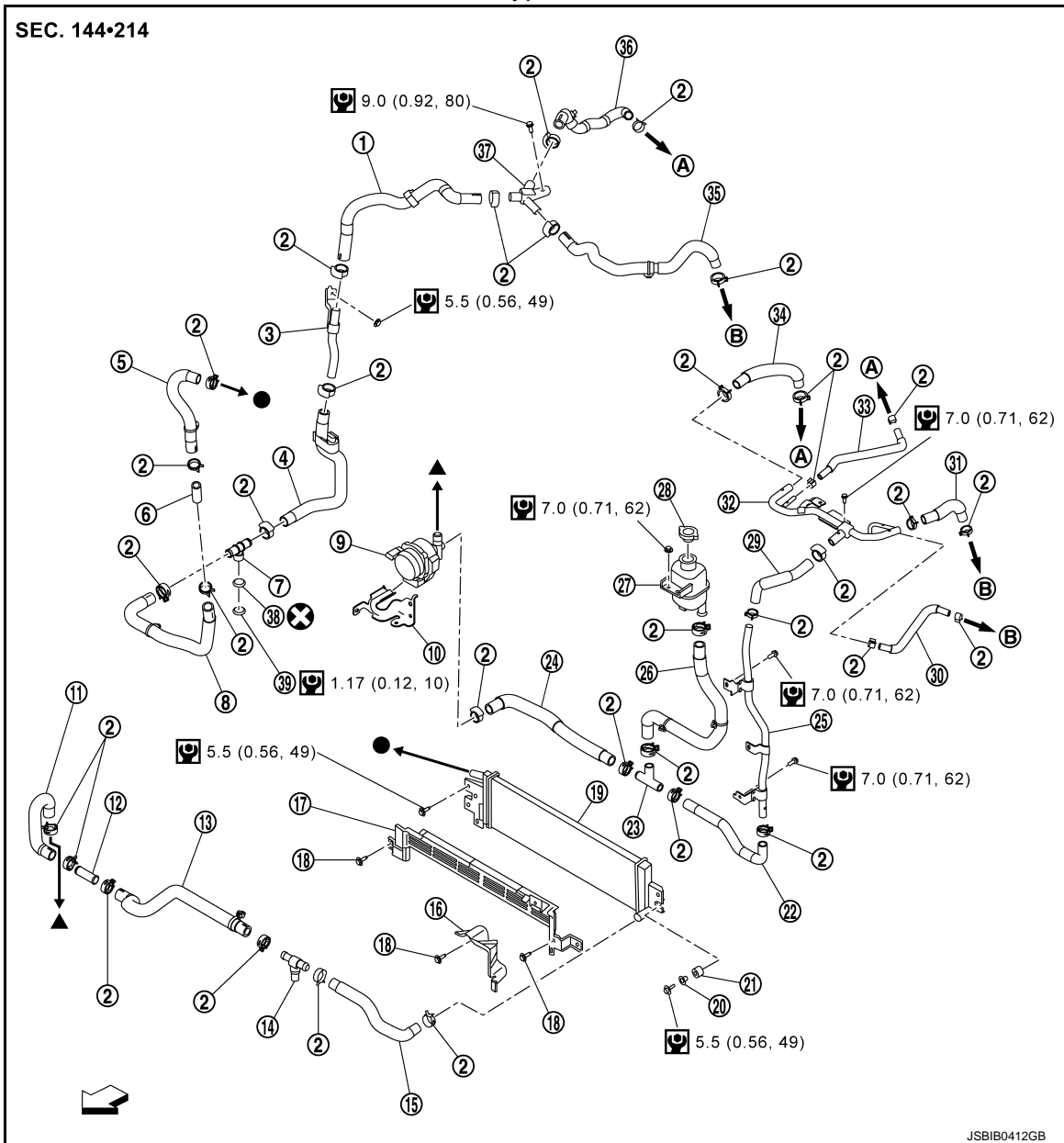
# ELECTRIC WATER PUMP

[VR30DDTT]

## < REMOVAL AND INSTALLATION >

- |   |                                   |                     |
|---|-----------------------------------|---------------------|
| ③① Water hose 11  | ③② Water pipe 3                   | ③③ Water hose 12    |
| ③④ Water hose 13  | ③⑤ Water hose 14                  | ③⑥ Connector pipe 2 |
| ③⑦ Water hose 15  | ③⑧ Water hose 16                  | ③⑨ Water hose 17    |
| ④① O-ring   | ④② Drain plug                     | ④③ Connector pipe 3 |
| ④④ Bracket  |                                   |                     |
| (A) To charge air cooler (bank 1)   | (B) To charge air cooler (bank 2) |                     |
| ← : Vehicle front   |                                   |                     |
| ⊙ : N-m (kg-m, in-lb)   |                                   |                     |
| ●, ▲ Indicates that the part is connected at points with same symbol in actual vehicle. |                                   |                     |

Type 2



- |  |                 |                       |
|--|-----------------|-----------------------|
| ① Water hose 1                           | ② Clamp         | ③ Water pipe 1        |
| ④ Water hose 2                           | ⑤ Water hose 3  | ⑥ Connector pipe 1    |
| ⑦ Water hose connector (with drain plug) | ⑧ Water hose 4  | ⑨ Electric water pump |
| ⑩ Electric water pump bracket            | ⑪ Water hose 15 | ⑫ Connector pipe 2    |


# ELECTRIC WATER PUMP

[VR30DDTT]

## < REMOVAL AND INSTALLATION >

- |                                 |                                      |                  |
|---------------------------------|--------------------------------------|------------------|
| ⑬ Water hose 5                  | ⑭ Water hose connector (with sensor) | ⑮ Water hose 6   |
| ⑯ Air guide                     | ⑰ Radiator seal                      | ⑱ Clip           |
| ⑲ Sub radiator                  | ⑳ Coller                             | ㉑ Bush           |
| ㉒ Water hose 7                  | ㉓ Water hose connector               | ㉔ Water hose 8   |
| ㉕ Water pipe 2                  | ㉖ Reservoir tank hose                | ㉗ Reservoir tank |
| ㉘ Reservoir tank cap            | ㉙ Water hose 9                       | ㉚ Water hose 10  |
| ㉛ Water hose 11                 | ㉜ Water pipe 3                       | ㉝ Water hose 12  |
| ㉞ Water hose 13                 | ㉟ Water hose 16                      | ㊱ Water hose 17  |
| ㊲ Connector pipe 3              | ㊳ O-ring                             | ㊴ Drain plug     |
| Ⓐ To charge air cooler (bank 1) | Ⓑ To charge air cooler (bank 2)      |                  |

← : Vehicle front

 : N·m (kg·m, in·lb)

●, ▲ Indicates that the part is connected at points with same symbol in actual vehicle.

## Removal and Installation

INFOID:000000013590797

### REMOVAL

#### **WARNING:**

**Never remove the reservoir tank cap if a high voltage part including traction motor is hot. Hot liquid may spray out from the reservoir tank cap, causing serious injury.**

1. Remove bumper fascia. Refer to [EXT-15, "Removal and Installation"](#).
2. Drain coolant from sub radiator. Refer to [CO-33, "Draining"](#).
3. Remove front bumper reinforcement. Refer to [EXT-14, "Exploded View"](#).
4. Remove electric water pump.

### INSTALLATION

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

#### **CAUTION:**

**Be sure to perform the air bleeding. Refer to [CO-34, "Refilling"](#).**

# MULTI-WAY CONTROL VALVE

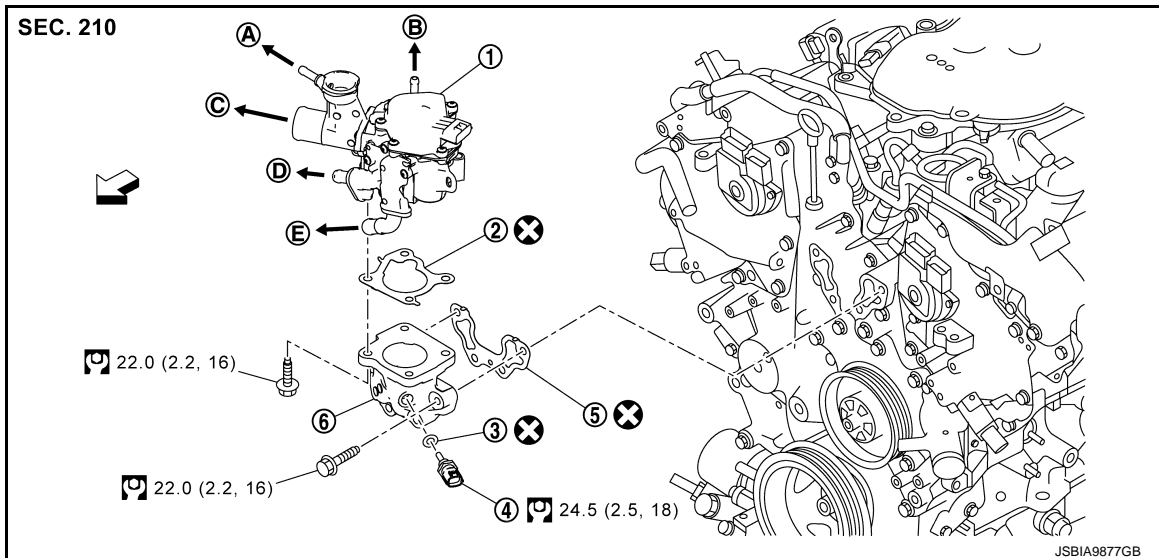
< REMOVAL AND INSTALLATION >

[VR30DDTT]

## MULTI-WAY CONTROL VALVE

### Exploded View

INFOID:000000013590798



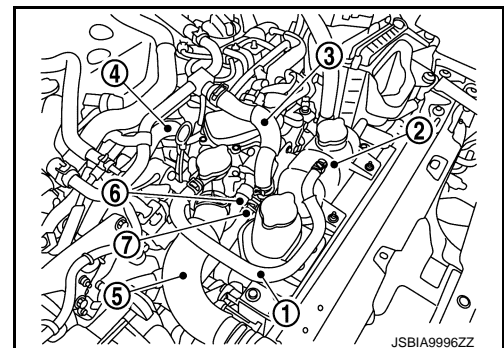
- |   |                                     |                |
|---|-------------------------------------|----------------|
| ① Multi-way control valve                     | ② Gasket                            | ③ Gasket       |
| ④ Water temperature sensor                    | ⑤ Gasket                            | ⑥ Water outlet |
| Ⓐ To reservoir tank                           | Ⓑ To turbocharger assembly (bank 1) | Ⓒ To radiator  |
| Ⓓ To A/T fluid warmer<br>To engine oil cooler | Ⓔ To heater                         |                |
- ← : Engine front
- : N·m (kg·m, ft·lb)
- : Always replace after every disassembly.

### Removal and Installation

INFOID:000000013590799

#### REMOVAL

1. Remove drive belt. Refer to [EM-154. "Removal and Installation"](#).
2. Drain engine coolant. Refer to [CO-33. "Draining"](#).  
**CAUTION:**  
**Perform this step when the engine is cold.**
3. Remove engine cover. Refer to [EM-163. "Removal and Installation"](#).
4. Remove air duct (inlet). Refer to [EM-165. "Exploded View"](#).
5. Remove reservoir tank hose ①.
6. Remove reservoir tank ②.
7. Remove water hose ③
8. Disconnect water hose ④ from multi-way control valve.
9. Remove radiator hose (upper) ⑤.
10. Disconnect A/T fluid warmer water hose ⑥ from multi-way control valve.
11. Disconnect heater hose ⑦ from multi-way control valve.
12. Disconnect water temperature harness connector.
13. Disconnect multi-way control valve harness connector.



## MULTI-WAY CONTROL VALVE

[VR30DDTT]

### < REMOVAL AND INSTALLATION >

---

14. Remove water outlet with multi-way control valve from engine.
15. Remove multi-way control valve from water outlet.

### INSTALLATION

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

**CAUTION:**

**Be careful not to spill engine coolant over engine room. Use rag to absorb engine coolant.**

### Inspection

INFOID:000000013590800

### INSPECTION AFTER INSTALLATION

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



# WATER OUTLET AND WATER PIPING

< REMOVAL AND INSTALLATION >

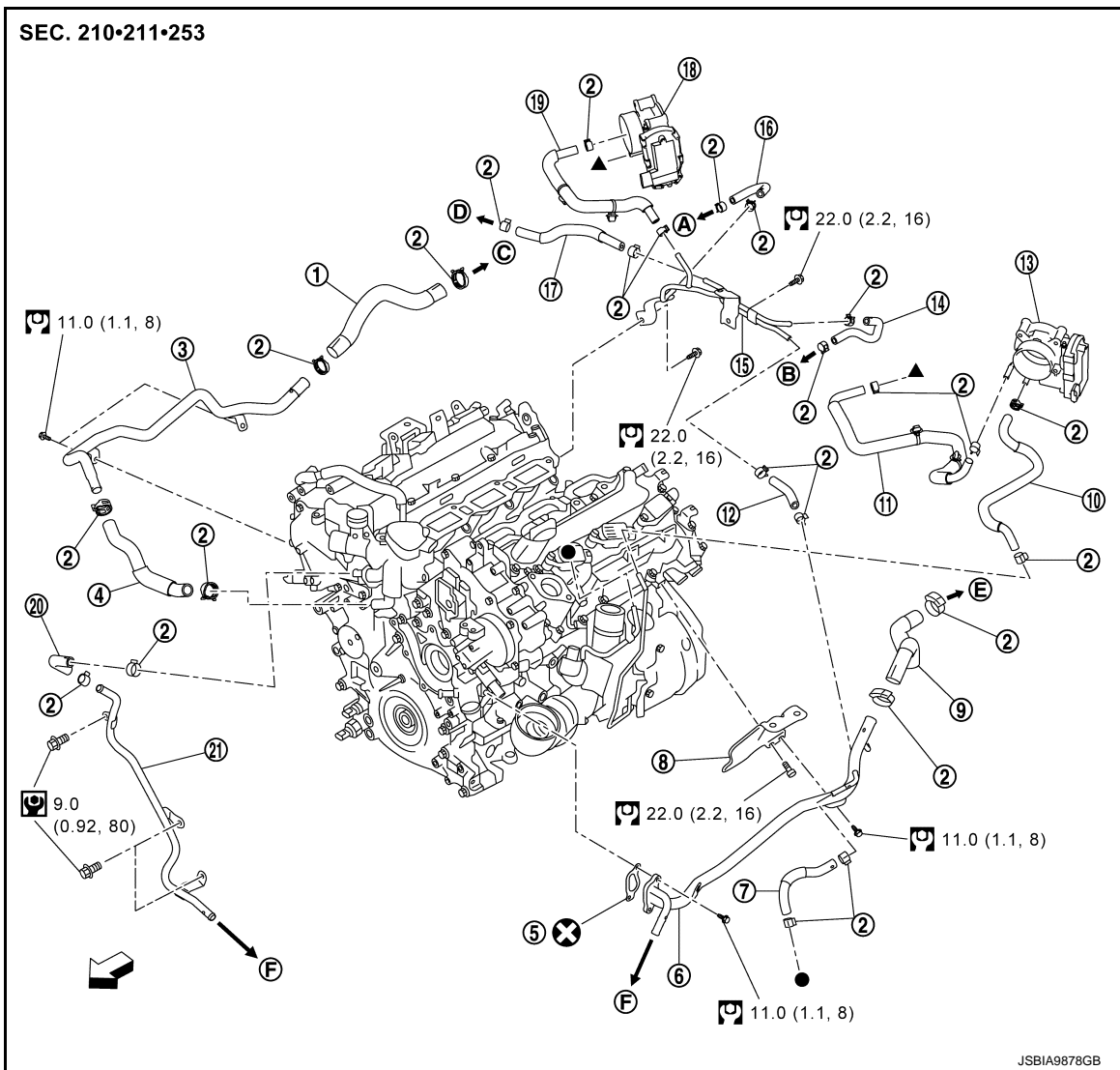
[VR30DDTT]

## WATER OUTLET AND WATER PIPING

Exploded View

INFOID:000000013590801

ENGINE OIL COLLER AIR COOLING TYPE



- |   |                               |   |
|---|-------------------------------|---|
| ① Water hose 1                                | ② Clamp                       | ③ Water pipe 1                                |
| ④ Water hose 2                                | ⑤ Gasket                      | ⑥ Heater pipe                                 |
| ⑦ Water hose 3                                | ⑧ Bracket                     | ⑨ Water hose 4                                |
| ⑩ Water hose 5                                | ⑪ Water hose 6                | ⑫ Water hose 7                                |
| ⑬ Electric throttle control actuator (bank 2) | ⑭ Water hose 8                | ⑮ Water pipe assembly                         |
| ⑯ Water hose 9                                | ⑰ Water hose 10               | ⑱ Electric throttle control actuator (bank 1) |
| ⑲ Water hose 11                               | ⑳ Water hose 12               | ㉑ Water pipe 2                                |
| (A) To cylinder head (bank 1)                 | (B) To cylinder head (bank 2) | (C) To heater                                 |
| (D) To turbocharger                           | (E) To heater                 | (F) To A/T fluid warmer                       |

← : Engine front

: N·m (kg·m, in·lb)

: N·m (kg·m, ft·lb)

# WATER OUTLET AND WATER PIPING

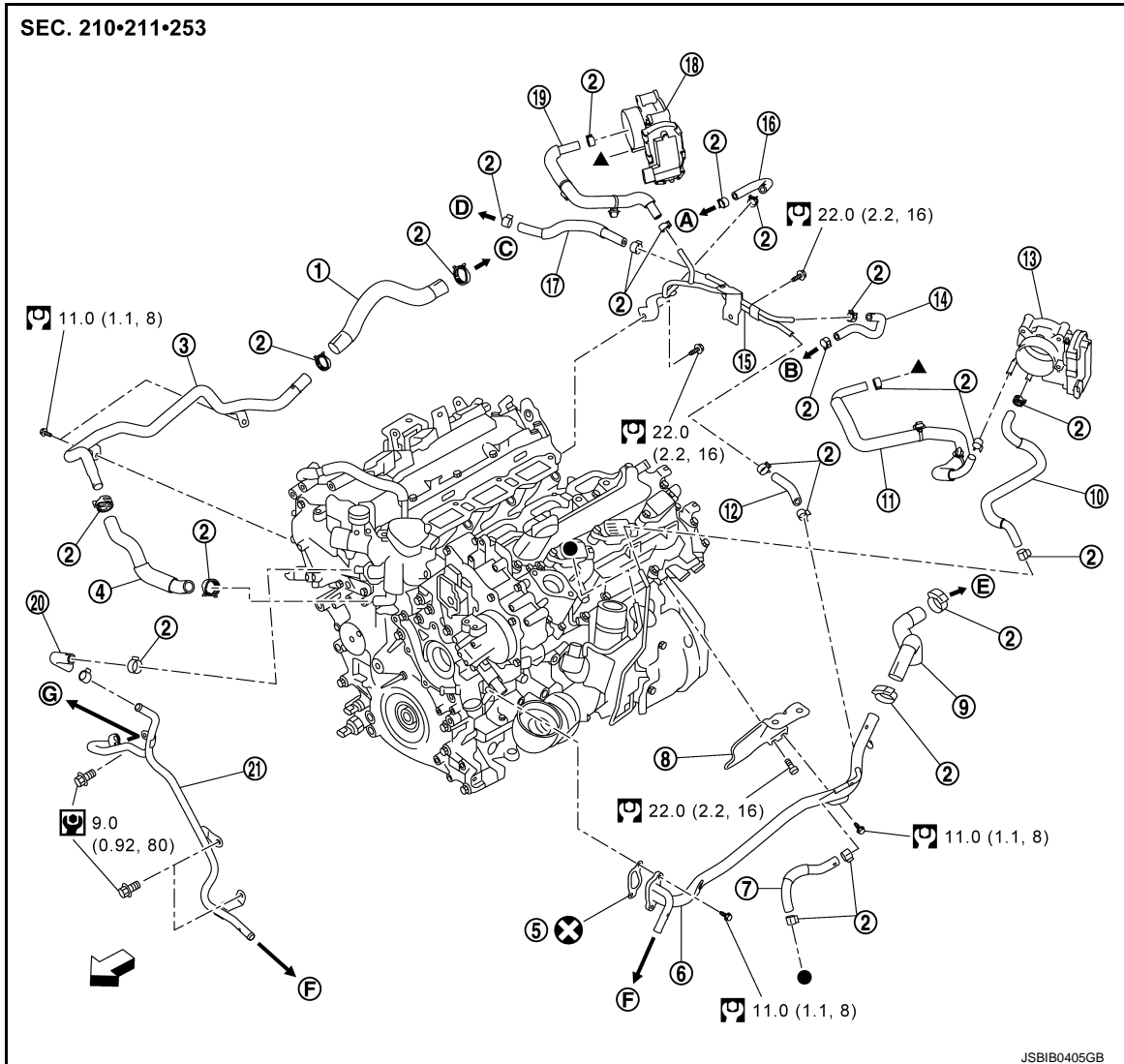
< REMOVAL AND INSTALLATION >

[VR30DDTT]

⊗ : Always replace after every disassembly

●, ▲ Indicates that the part is connected at points with same symbol in actual vehicle.

## ENGINE OIL COOLER WATER COOLING TYPE



- |   |                             |   |
|---|-----------------------------|---|
| ① Water hose 1                                | ② Clamp                     | ③ Water pipe 1                                |
| ④ Water hose 2                                | ⑤ Gasket                    | ⑥ Heater pipe                                 |
| ⑦ Water hose 3                                | ⑧ Bracket                   | ⑨ Water hose 4                                |
| ⑩ Water hose 5                                | ⑪ Water hose 6              | ⑫ Water hose 7                                |
| ⑬ Electric throttle control actuator (bank 2) | ⑭ Water hose 8              | ⑮ Water pipe assembly                         |
| ⑯ Water hose 9                                | ⑰ Water hose 10             | ⑱ Electric throttle control actuator (bank 1) |
| ⑲ Water hose 11                               | ⑳ Water hose 12             | ㉑ Water pipe 2                                |
| Ⓐ To cylinder head (bank 1)                   | Ⓑ To cylinder head (bank 2) | Ⓒ To heater                                   |
| Ⓓ To turbocharger                             | Ⓔ To heater                 | Ⓕ To A/T fluid warmer                         |
| Ⓖ To oil cooler                               |                             |   |

← : Engine front


⊗ : N·m (kg·m, in·lb)


⊕ : N·m (kg·m, ft·lb)

# WATER OUTLET AND WATER PIPING

< REMOVAL AND INSTALLATION >

[VR30DDTT]

 : Always replace after every disassembly

 Indicates that the part is connected at points with same symbol in actual vehicle.

## Removal and Installation

INFOID:000000013590802

CO

### REMOVAL

Water pipe

1. Remove engine cover. Refer to [EM-163, "Removal and Installation"](#).
2. Remove air cleaner assembly. Refer to [EM-165, "Removal and Installation"](#).
3. Remove charge air cooler and air inlet hose. Refer to [EM-167, "Exploded View"](#).
4. Remove water pipe.

Heater pipe

1. Remove engine assembly from vehicle. Refer to [EM-204, "2WD : Removal and Installation"](#) (2WD) or [EM-209, "AWD : Removal and Installation"](#) (AWD).
2. Remove turbocharger (bank 2). Refer to [EM-233, "Removal and Installation"](#).
3. Remove water pipe.

### INSTALLATION

Note the following and install in the reverse order removal.

#### **CAUTION:**

**Do not reuse gasket.**

- Securely insert each hose, and install clamp at a position where it does not interfere with the pipe bulge.

### Inspection

INFOID:000000013590803

### INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for leakage of engine coolant using the radiator cap tester adapter and the radiator cap tester (commercial service tool). Refer to [CO-33, "Inspection"](#).
- Start and warm up the engine. Visually check that there is no leakage of engine coolant.

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# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[VR30DDTT]

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

#### Periodical Maintenance Specification

INFOID:0000000013590804

#### ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (US qt, Imp qt)

Engine coolant capacity [With reservoir tank ("MAX" level)]	Type 1	10.3 (10-7/8, 9-1/8)
	Type 2	8.8 (9-2/8, 7-6/8)
Reservoir tank engine coolant capacity (At "MAX" level)		0.6 (5/8, 4/8)

#### CHARGE AIR COOLER COOLANT VAPACITY (APPROXIMATE)

Unit: ℓ (US qt, Imp qt)

Charge air cooler coolant capacity [With reservoir tank ("MAX" level)]	3.2 (3-3/8, 2-7/8)
Reservoir tank charge air cooler coolant capacity (At "MAX" level)	0.15 (1/8, 1/8)

#### Radiator

INFOID:0000000013590805

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

Cap relief pressure	Standard	122.3 - 151.7 (1.2 - 1.5, 18 - 22)
	Limit	107 (1.1, 16)
Leakage testing pressure		200 (2.04, 29)

#### Sub Radiator

INFOID:0000000013590806

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

Cap relief pressure	Standard	122.3 - 151.7 (1.2 - 1.5, 18 - 22)
	Limit	122.3 (1.2, 18)
Leakage testing pressure		151.7 (1.5, 22)