SECTION CO
ENGINE COOLING SYSTEM

CONTENTS

PRECAUTION

PRECAUTIONS

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

INFOID:0000000010782922

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, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see “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:

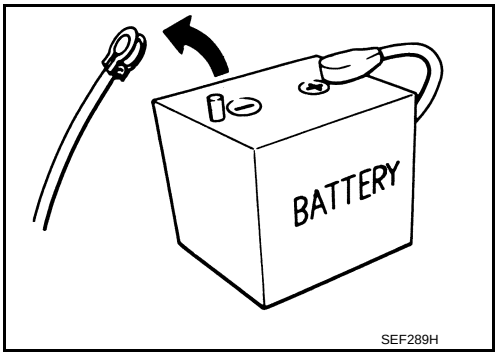
Always observe the following items for preventing accidental activation.

- **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, and wait at least 3 minutes before performing any service.**

Precautions for Removing Battery Terminal

INFOID:0000000010783278

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.
- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing “How to disconnect 12V battery terminal” described below.
  NOTE:
  Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage may occur.
- 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.



HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.
For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

1. Open the hood.

2. Turn key switch to the OFF position with the driver side door opened.
3. Get out of the vehicle and close the driver side door.
4. Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes
K9K engine	: 4 minutes
M9R engine	: 4 minutes
R9M engine	: 4 minutes
V9X engine	: 4 minutes

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

5. Remove 12V battery terminal.
CAUTION:
After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

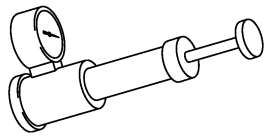
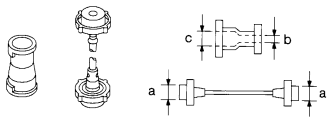
1. Unlock the door with intelligent key or remote keyless entry.
NOTE:
At this moment, ACC power is supplied.
2. Open the driver side door.
3. Open the hood.
4. Close the driver side door.
5. Wait at least 3 minutes.
CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.
6. Remove 12V battery terminal.
CAUTION:
After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000010782924

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

Lubricant or/and Sealant

INFOID:0000000010782925

Name	Description	Note
Three bond 1303	Cooling fan	Fan moter shaft

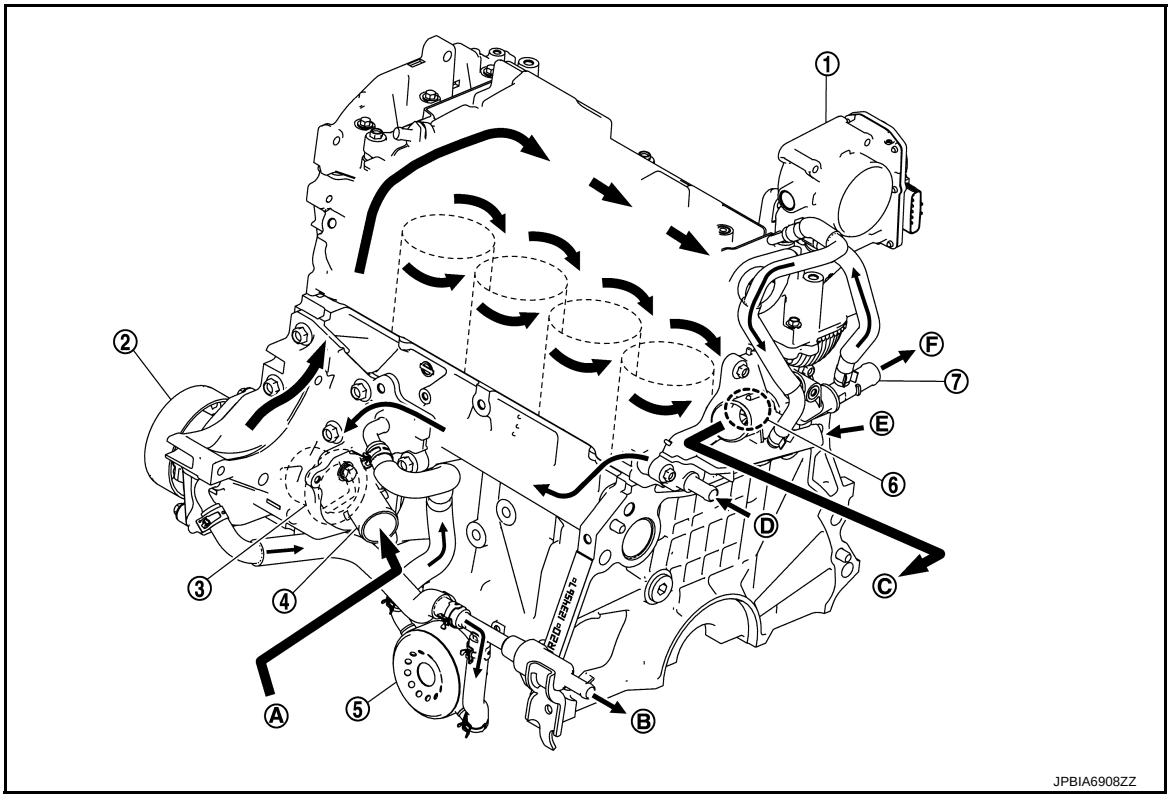
SYSTEM DESCRIPTION

DESCRIPTION

Engine Cooling System

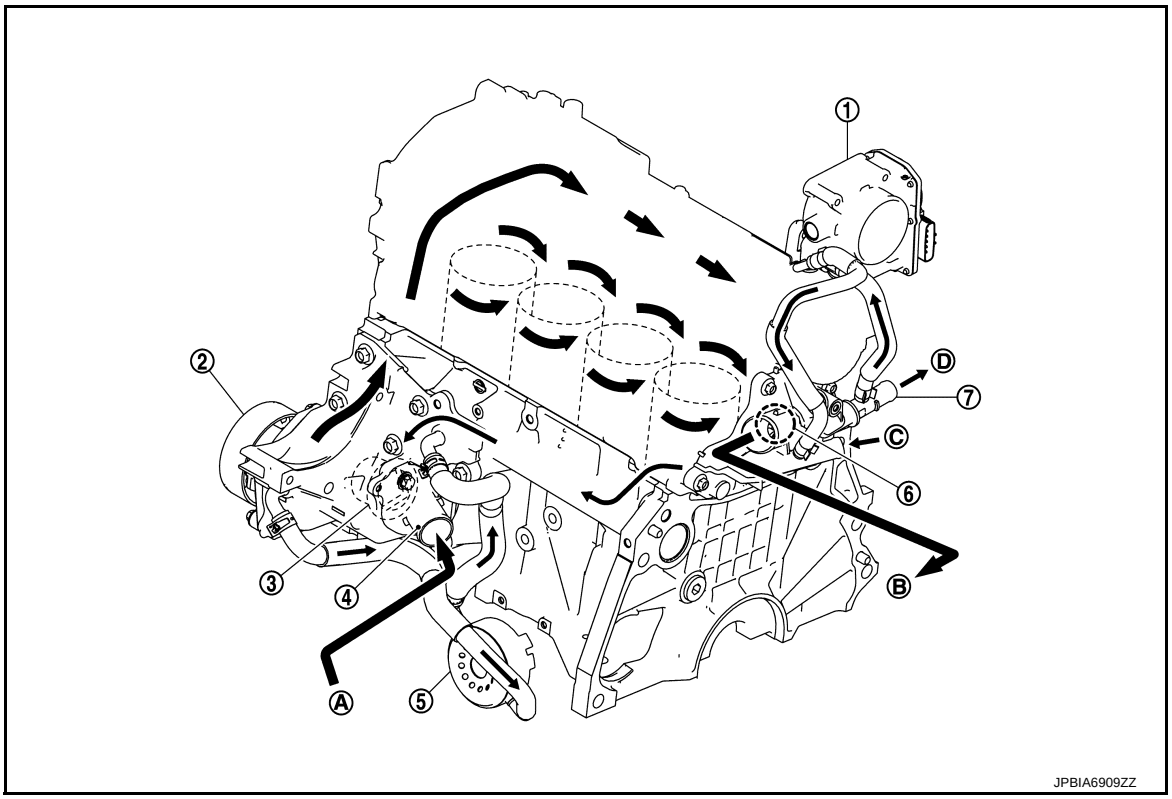
INFOID:0000000010782926

CVT models



① Electric control throttle actuator	② Water pump	③ Thermostat
④ Water inlet	⑤ Oil cooler	⑥ Water control valve
⑦ Water outlet		
Ⓐ From radiator	Ⓑ To CVT oil warmer	Ⓒ To radiator
Ⓓ From CVT oil warmer	Ⓔ From heater	Ⓕ To heater

M/T models

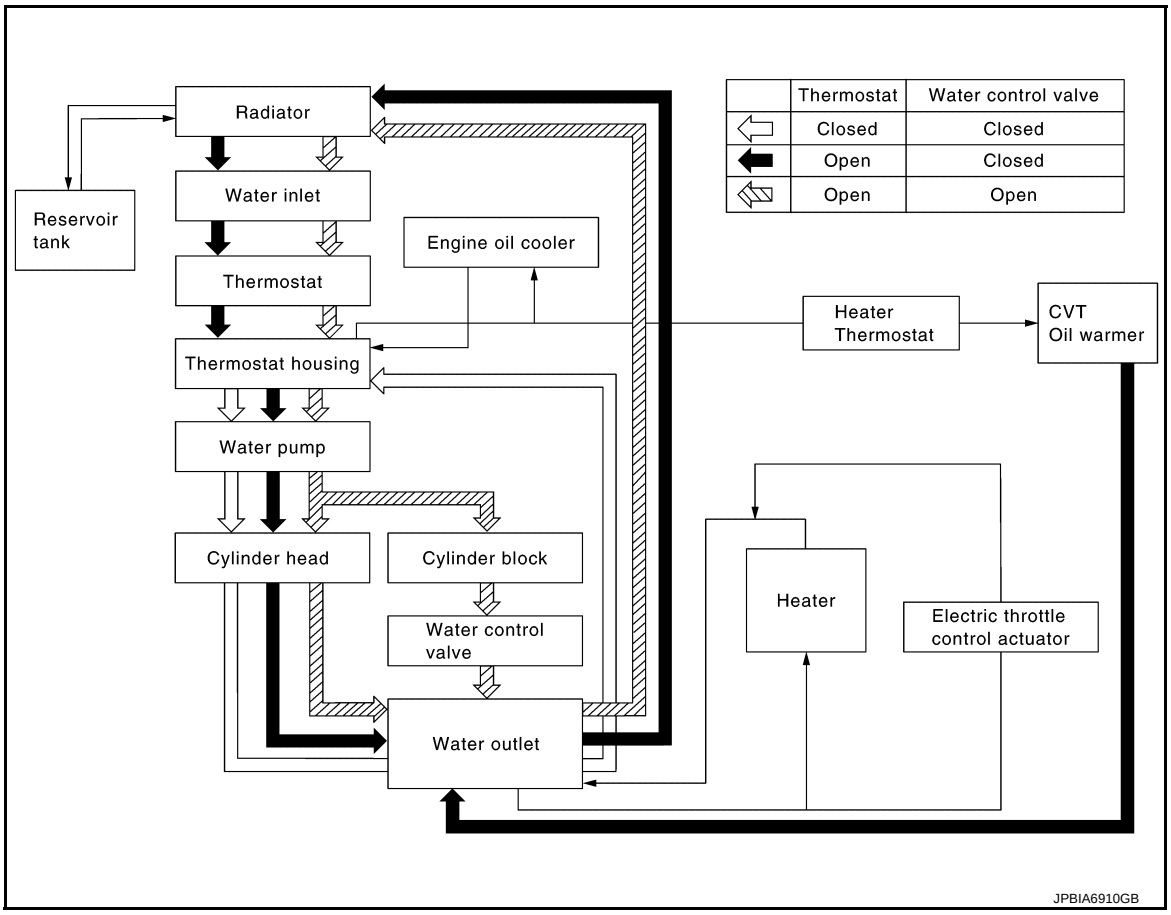


① Water pump	② Thermostat	③ Water inlet
④ Water inlet	⑤ Oil cooler	⑥ Water control valve
⑦ Water outlet		
Ⓐ From radiator	Ⓑ To radiator	Ⓒ From heater
Ⓓ To heater		

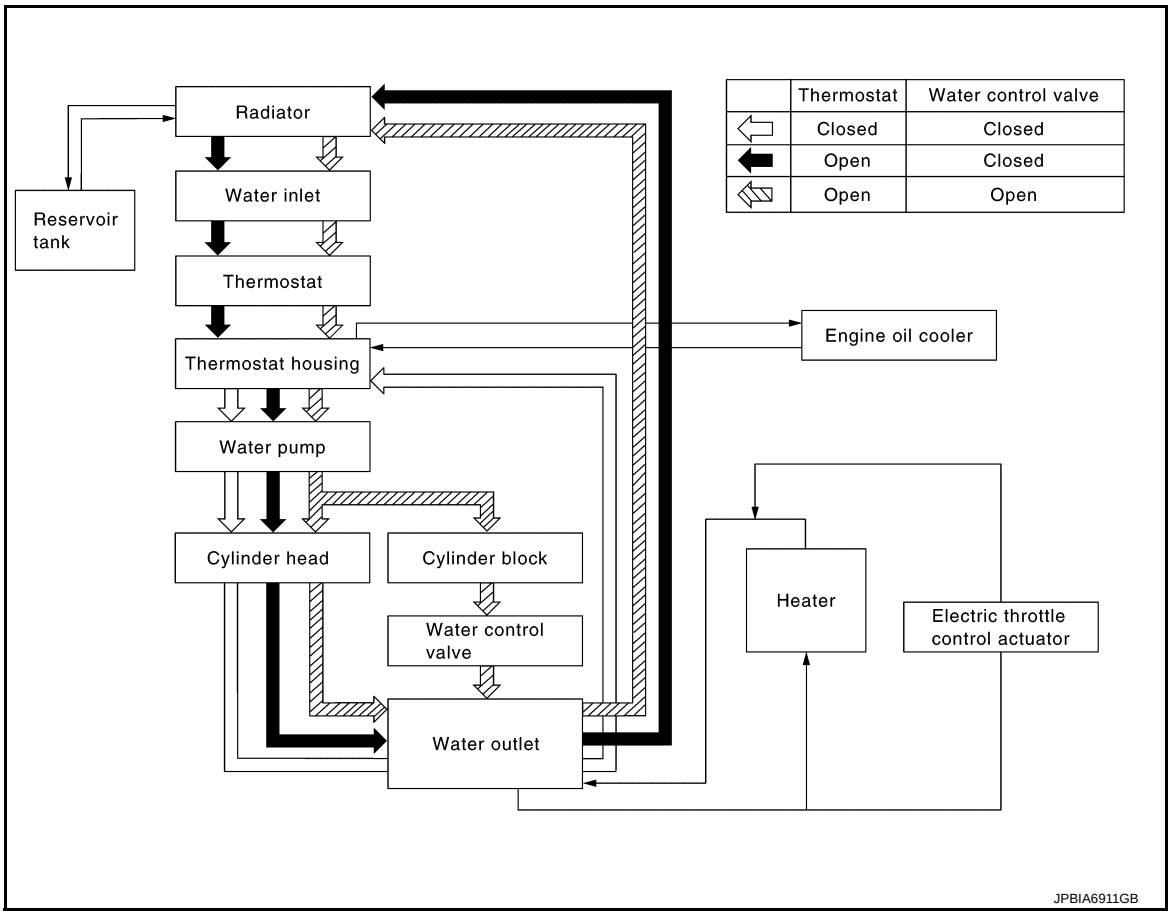
Engine Cooling System Schematic

INFOID:0000000010782927

CVT models



M/T models


Radiator
Reservoir tank
Water inlet
Thermostat
Thermostat housing
Water pump
Cylinder head
Cylinder block
Water control valve
Water outlet
Engine oil cooler
Heater
Electric throttle control actuator
Thermostat
Water control valve
Closed
Closed
Open
Closed
Open
Open
JPBIA6911GB

SYMPTOM DIAGNOSIS

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:0000000010782928

	Symptom		Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—
		Thermostat and water control valve stuck closed	—	
		Damaged fins	Dust contamination or paper clogging	
			Physical damage	
		Clogged radiator cooling tube	Excess foreign material (rust, dirt, sand, etc.)	
	Reduced air flow	Cooling fan does not operate	Fan assembly	—
		High resistance to fan rotation		
		Damaged fan blades		
	Damaged radiator shroud	—	—	—
	Improper engine coolant mixture ratio	—	—	—
	Poor engine coolant quality	—	Engine coolant viscosity	—
	Insufficient engine coolant	Engine coolant leakage	Cooling hose	Loose clamp
				Cracked hose
			Water pump	Poor sealing
			Reservoir tank 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

	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
			Power train system malfunction	—
			Installed improper size wheels and tires	
			Dragging brakes	
			Improper ignition timing	
	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

ENGINE COOLANT

Inspection

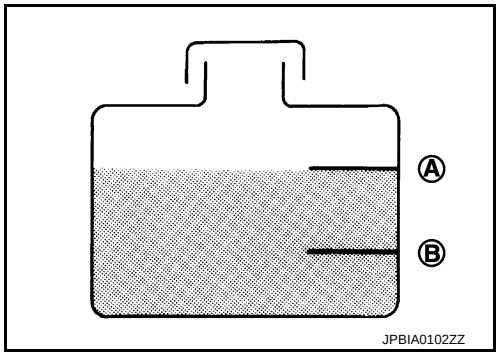
INFOID:0000000010782929

LEVEL

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

Ⓐ : MAX

Ⓑ : MIN



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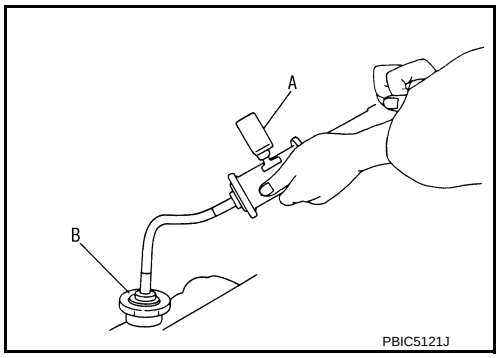
- Adjust the engine coolant level if necessary.

CAUTION:

Refill Genuine NISSAN Long Life Antifreeze/Coolant (blue) or equivalent in its quality mixed with water (distilled or demineralized). Refer to MA-23, "Fluids and Lubricants".

LEAKAGE

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



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Testing pressure: Refer to CO-31, "Radiator".

WARNING:

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

CAUTION:

Higher test pressure than specified may cause radiator damage.

NOTE:

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

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

Draining

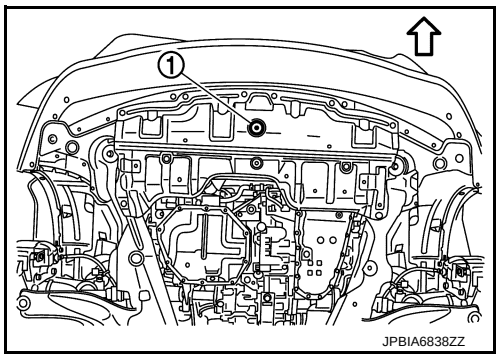
INFOID:0000000010782930

WARNING:

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

1. Remove engine under cover. Refer to EXT-39, "ENGINE UNDER COVER : Exploded View".
2. Open radiator drain plug ① at the bottom of radiator, and then remove radiator cap.

⇦ : Vehicle front



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CAUTION:

Perform this step when engine is cold.

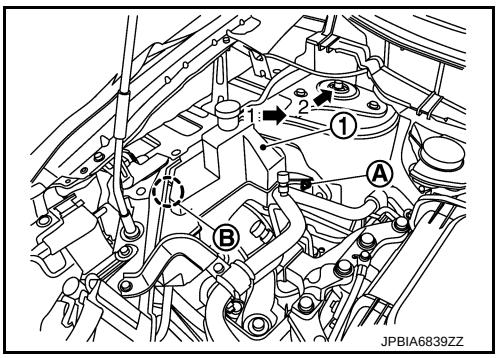
- When draining all of engine coolant in the system, open water drain plugs on cylinder block. Refer to EM-61, "Setting".

3. Remove reservoir tank if necessary, and drain engine coolant and clean reservoir tank before installing.

- Move reservoir tank ①, and then remove it numerical order as shown in the figure.

Ⓐ : Nut

Ⓑ : Pawl



4. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to CO-15, "Flushing".

Refilling

INFOID:0000000010782931

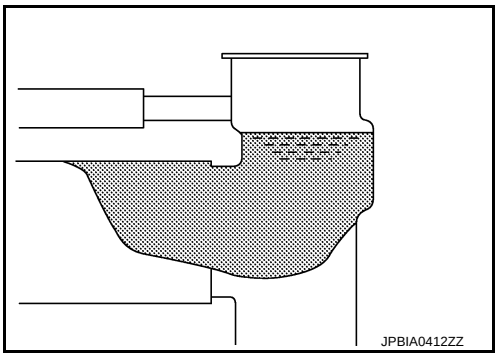
CAUTION:
- **Do not put additive such as waterleak preventive, since it may cause cooling waterway clogging.**
- **When refilling use Genuine NISSAN Long Life Antifreeze/Coolant (blue) or equivalent in its quality mixed with water (distilled or demineralized). Refer to MA-23, "Fluids and Lubricants".**

1. Install reservoir tank if removed and radiator drain plug.
   CAUTION:
   Be sure to clean drain plug and install with new O-ring.

   Radiator drain plug : Refer to CO-17, "Exploded View".

   - If water drain plugs on cylinder block are removed, close and tighten them. Refer to EM-107, "Disassembly and Assembly".
2. Check that each hose clamp has been firmly tightened.
3. Fill radiator to specified level.
   CAUTION:
   Never adhere the engine coolant to electronic equipments (alternator etc.).
   - **Pour coolant slowly of less than 2 ℓ (1-3/4 Imp qt) a minute to allow air in system to escape.**

   Engine coolant capacity
   (With reservoir tank at "MAX" level)
   Refer to CO-31, "Periodical Maintenance Specification".

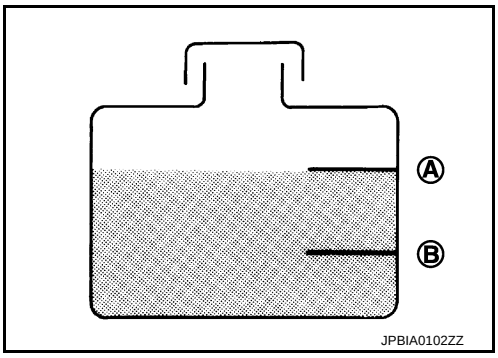


4. Refill reservoir tank to "MAX" level line with engine coolant.

Ⓐ : MAX

Ⓑ : MIN

Reservoir tank engine coolant capacity
(At "MAX" level)
Refer to CO-31, "Periodical Maintenance Specification".



5. Install radiator cap.
6. 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.

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

Flushing

INFOID:0000000010782932

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

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

   Radiator drain plug : Refer to CO-17, "Exploded View".
   - If water drain plugs on cylinder block are removed, close and tighten them. Refer to EM-107, "Disassembly and Assembly".
2. Fill radiator and reservoir tank with water and reinstall radiator 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-13, "Draining".
7. Repeat steps 1 through 6 until clear water begins to drain from radiator.

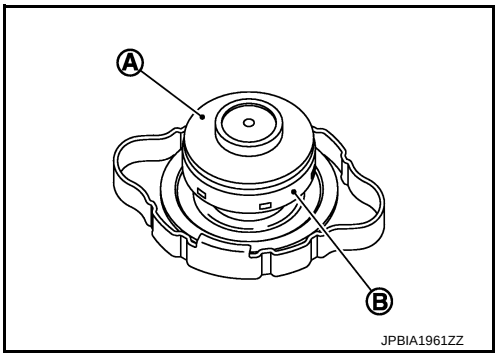
RADIATOR

RADIATOR CAP

RADIATOR CAP : Inspection

INFOID:0000000010782933

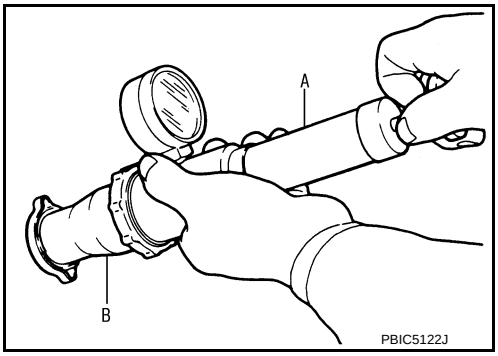
- Check valve seat Ⓐ of radiator cap.
- Check that valve seat is swollen to the extent that the edge of the plunger Ⓑ cannot be seen when watching it vertically from the top.
- Check that valve seat has no soil and damage.
- Check that there is no dirt or damage on the valve seat of radiator cap negative-pressure valve.
- Check that there are no unusualness in the opening and closing conditions of negative-pressure valve.



- Check radiator cap relief pressure.

Standard and Limit : Refer to CO-31, "Radiator".

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



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

CAUTION:

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

RADIATOR

RADIATOR : Inspection

INFOID:0000000010782934

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

CAUTION:

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

1. Apply water by hose to the back side of the radiator core vertically downward.
2. Apply water again to all radiator core surfaces once per minute.
3. Stop washing if any stains no longer flow out from radiator.
4. Blow air into the back side of radiator core vertically downward.
   - Use compressed air lower than 490 kPa (4.9 bar, 5 kg/cm^2, 71 psi) and keep distance more than 30 cm (11.81 in).
5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

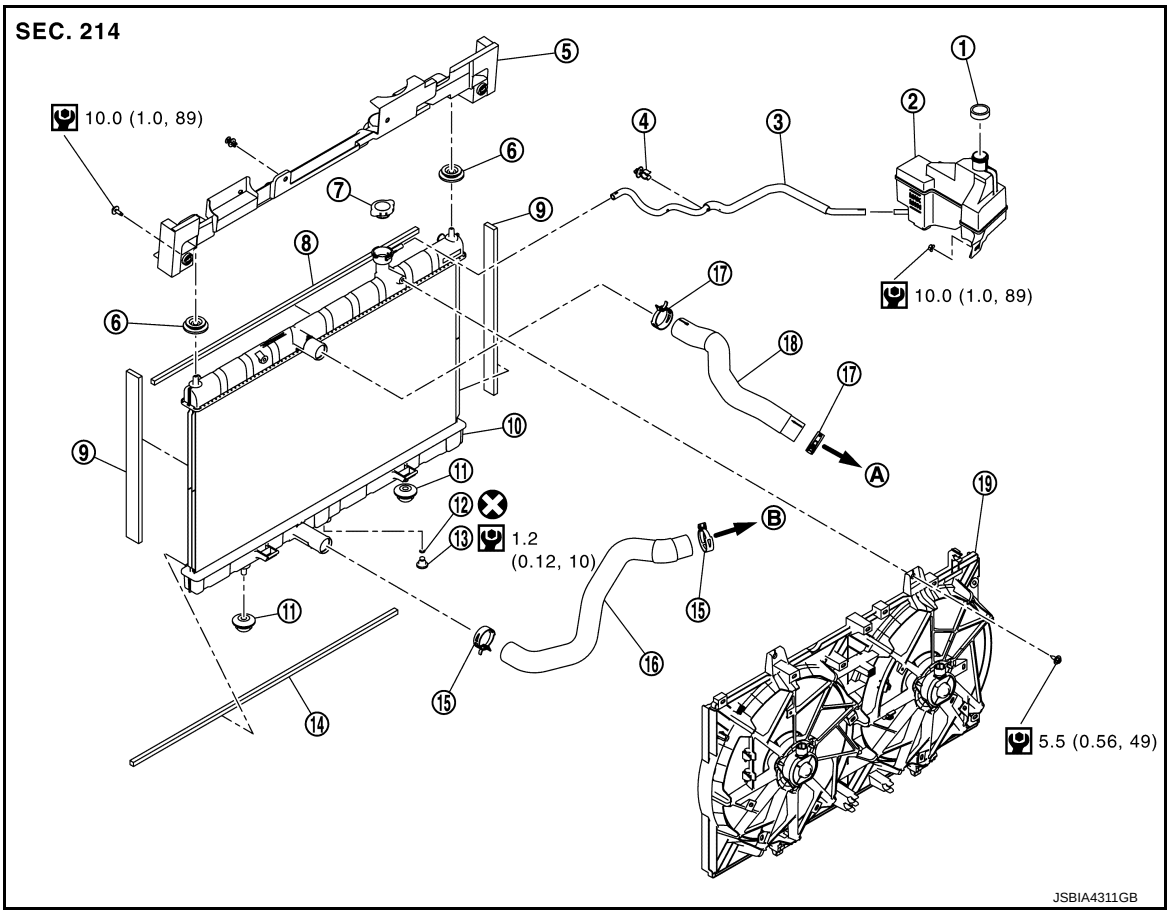
REMOVAL AND INSTALLATION

RADIATOR

Exploded View

INFOID:0000000010782935

REMOVAL



① Reservoir tank cap	② Reservoir tank	③ Reservoir tank hose
④ Clip	⑤ Mounting bracket	⑥ Mounting rubber (upper)
⑦ Radiator cap	⑧ Side seal	⑨ Side seal
⑩ Radiator	⑪ Mounting rubber (lower)	⑫ O-ring
⑬ Drain plug	⑭ Side seal	⑮ Clamp
⑯ Radiator hose (lower)	⑰ Clamp	⑱ Radiator hose (upper)
⑲ Cooling fan assembly		
Ⓐ To water outlet	Ⓑ To water inlet	

: Always replace after every disassembly.

: N·m (kg-m, in-lb)

Removal and Installation

INFOID:0000000010782936

REMOVAL

WARNING:

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

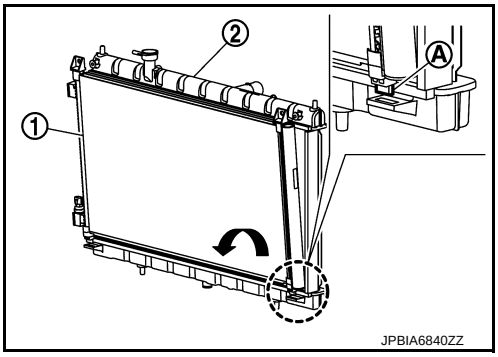
- **Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.**

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

1. Remove engine under cover. Refer to EXT-39, "ENGINE UNDER COVER : Exploded View".
2. Drain engine coolant from radiator. Refer to CO-13, "Draining".
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belts.**
3. Remove radiator hose (lower) from radiator.
4. Remove air duct 1 and air duct 2. Refer to EM-31, "Removal and Installation".
5. Remove battery and battery bracket. Refer to PG-140, "EXCEPT FOR R9M : Exploded View".
6. Remove radiator hose (upper) from radiator.
   CAUTION:
   Never spill engine coolant on drive belt.
7. Remove cooling fan assembly. Refer to CO-21, "Removal and Installation".
8. Remove condenser ① from radiator ②, and move it frontward.

   Ⓐ : Mount

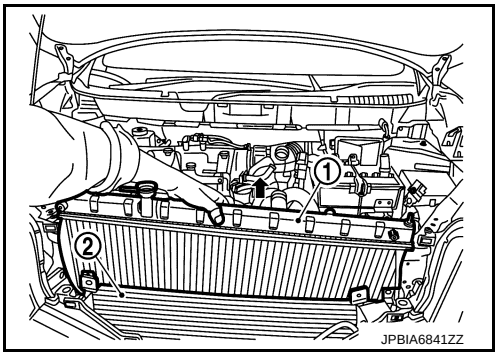
   CAUTION:
   - **Be careful not to damage condenser core.**
   - **Minimize the moving distance of condenser to prevent load to air conditioner piping.**



9. Remove radiator ① from the clearance between condenser ② and upper radiator core support.

   ⬅ : Radiator moving direction

   CAUTION:
   - **Be careful not to damage radiator core.**
   - **Minimize the moving distance of condenser to prevent load to air conditioner piping.**



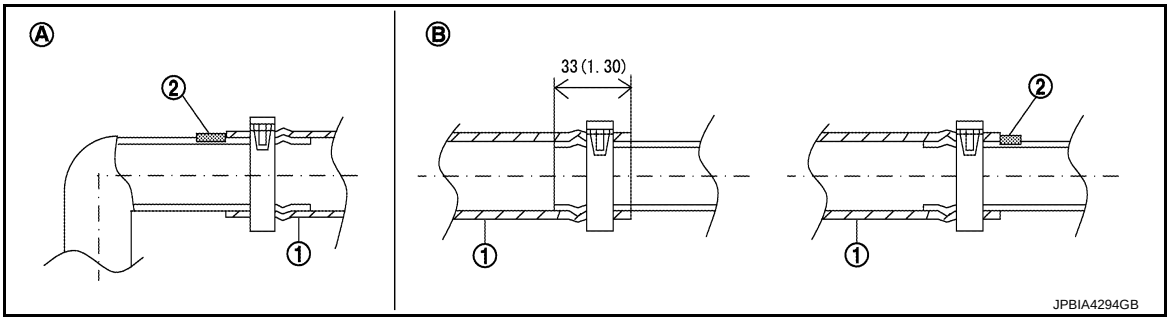
INSTALLATION

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

Radiator hose

CAUTION:
- **Use genuine mounting bolts for the cooling fan assembly and strictly observe the tightening torque. (Breakage prevention for radiator)**

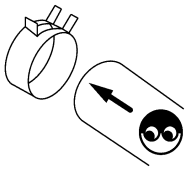
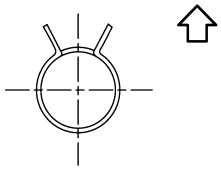
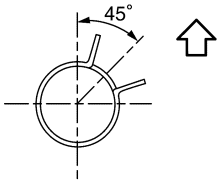
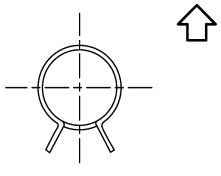
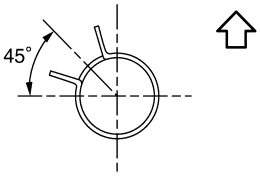
NOTE:
- Insert the radiator hose ① all the way to the stopper ② or by 33 mm (1.30 in) (hose without a stopper).



Unit: mm (in)

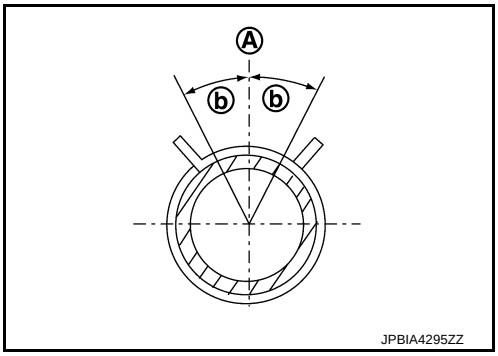
Ⓐ Radiator side Ⓑ Engine side

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

Radiator hose	Hose end	Paint mark	Position of hose clamp*  JPCIA0366ZZ ⇦ : Vehicle upper
Radiator hose (upper)	Radiator side	Upper	 JPCIA0362ZZ
	Engine side	Upper	 JPCIA0363ZZ
Radiator hose (lower)	Radiator side	Lower	 JSBIA4312ZZ
	Engine side	Front	 JPCIA0365ZZ

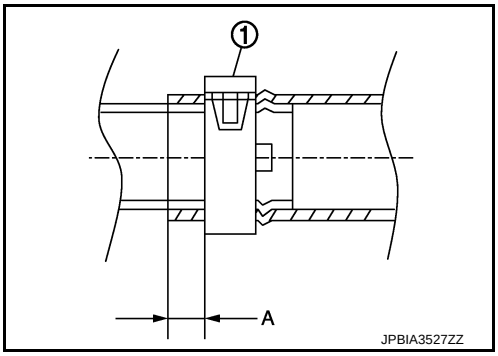
*Refer to the illustrations for the specific position each hose clamp tab.

- The angle ⓑ created by the hose clamp pawl and the specified line Ⓐ must be within ±30° as shown in the figure.



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

Dimension “A”	**3 - 5 mm** **0.12 - 0.20 in**



Inspection

INFOID:0000000010782937

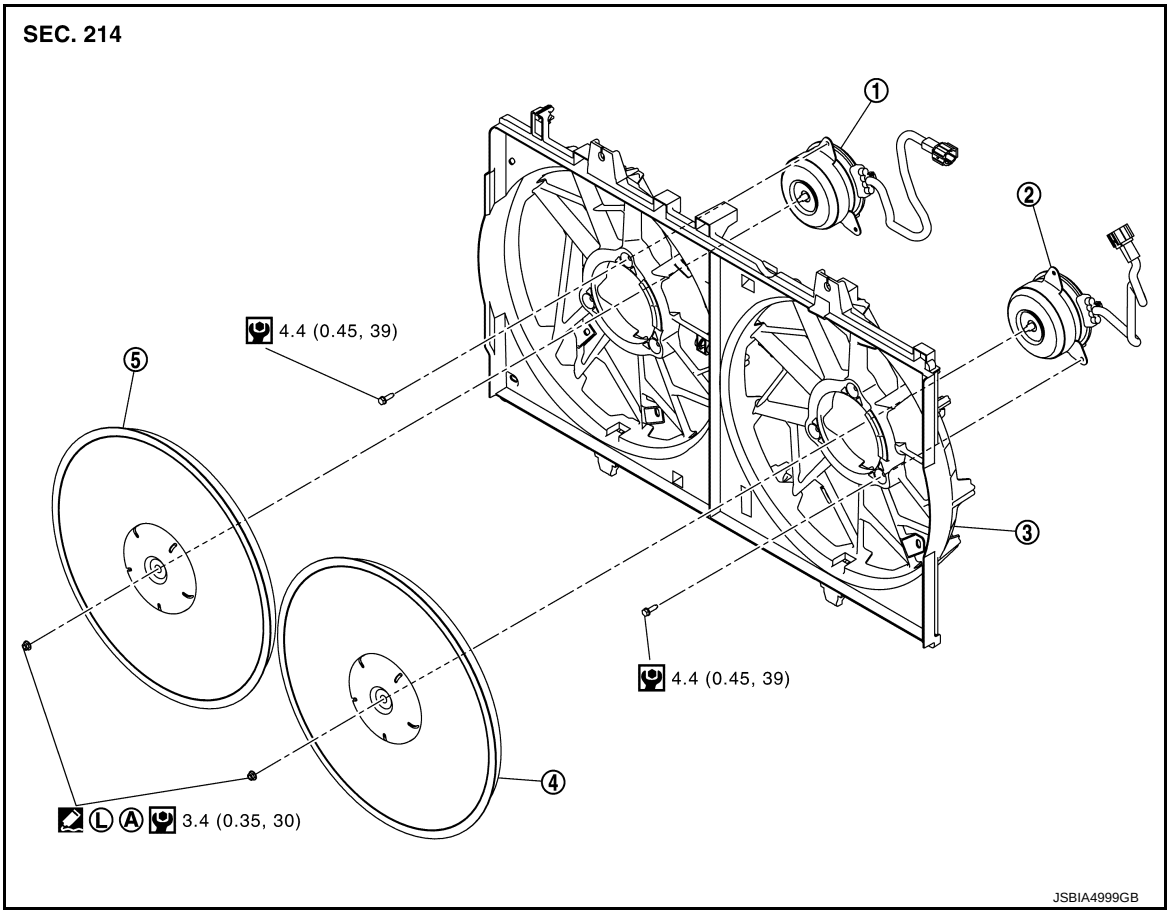
INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to CO-13, "Inspection".
- Start and warm up the engine. Visually check that there is no leakage of engine coolant.

COOLING FAN

Exploded View

INFOID:0000000010782938



①	Fan motor (RH)	②	Fan motor (LH)	③	Fan shroud
④	Cooling fan (LH)	⑤	Cooling fan (RH)		
Ⓐ	Apply on fan motor shaft				
	: N·m (kg-m, in-lb)				
Ⓛ	: Apply high strength thread locking sealant or equivalent.				

Removal and Installation

INFOID:0000000010782939

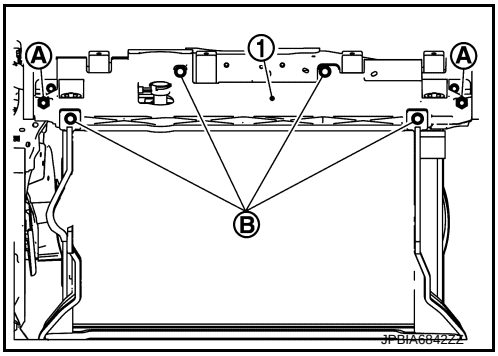
REMOVAL

1. Remove engine under cover. Refer to EXT-39, "ENGINE UNDER COVER : Exploded View".
2. Drain engine coolant from radiator. Refer to CO-13, "Draining".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belts.**
3. Remove air duct 1 and air duct 2. Refer to EM-30, "Exploded View".
4. Remove radiator hose (upper) from radiator. Refer to CO-17, "Exploded View".
5. Remove front grille. Refer to EXT-22, "Exploded View".
6. Remove crash zone sensor. Refer to SR-31, "Exploded View".
7. Remove hood lock bell crank and hood lock assembly. Refer to folloing table:

TYPE	Reference
1	DLK-297, "Exploded View"
2	DLK-605, "Exploded View"
3	DLK-768, "Exploded View"
4	DLK-910, "Exploded View"

How to select vehicle type: refer to DLK-22, "Information".

8. Disconnect harness connector from fan motor (RH and LH), and move harness to aside.
9. Remove mounting bolts Ⓐ and clips Ⓑ of mounting bracket ①.



10. Remove radiator core support upper. Refer to folloing table:

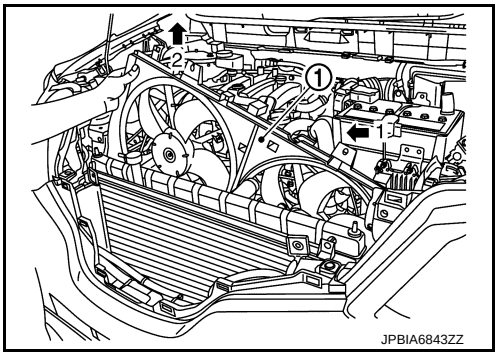
TYPE	Reference
2	DLK-572, "MR20DD : Exploded View"
4	DLK-876, "MR20DD : Exploded View"

How to select vehicle type: refer to DLK-22, "Information".

11. Remove mounting bracket.
12. Remove cooling fan assembly according to the following instructions:

a. Lift cooling fan assembly and disconnect the lower mount.

b. Move cooling fan assembly ① to rightward of vehicle (⬅ 1) and lift (⬅ 2) the right side to remove it.
CAUTION:
Be careful not to damage or scratch on radiator core when removing.



INSTALLATION

Note the following, and install in the reverse order of removal.
CAUTION:
Only use genuine parts for fan shroud mounting bolt and observe the specified torque (to prevent radiator from being damaged).
NOTE:
Cooling fans are controlled by ECM. For details. Refer to EC-57, "COOLING FAN CONTROL : System Description".

Disassembly and Assembly

INFOID:0000000010782940

DISASSEMBLY

1. Remove cooling fan mounting nuts, and then remove the cooling fans (RH and LH).
2. Remove fan motors (RH and LH).

ASSEMBLY

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

CAUTION:

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

- Install each fan in the following position.

Right side : 9 blades

Left side : 7 blades

- Secure the harness to the fan shroud to prevent the fan rotation area from being loose.
- Apply high thread locking sealant on fan motor shaft.

Inspection

INFOID:0000000010782941

INSPECTION AFTER DISASSEMBLY

Cooling Fan

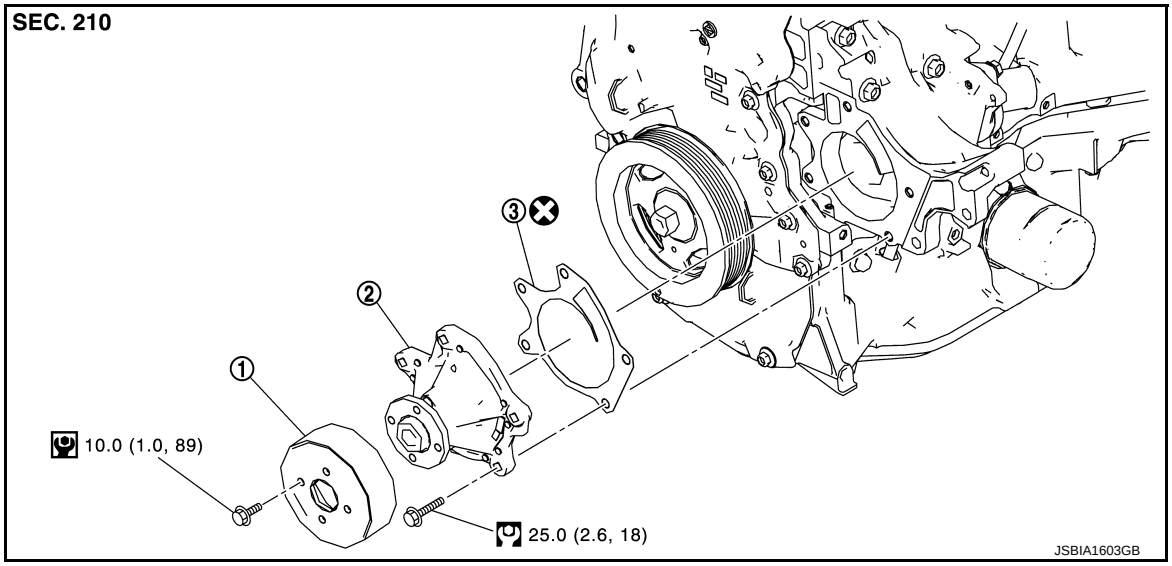
Inspect cooling fan for crack or unusual bend.

- If anything is found, replace cooling fan.

WATER PUMP

Exploded View

INFOID:0000000010782942



① Pulley ② Water pump ③ Gasket

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

Removal and Installation

INFOID:0000000010782943

REMOVAL

1. Remove engine under cover. Refer to EXT-39, "ENGINE UNDER COVER : Exploded View".
2. Drain engine coolant from radiator. Refer to CO-13, "Draining".
   CAUTION:
   Perform this step when the engine is cold.
3. Remove front wheel (RH). Refer to WT-61, "Exploded View".
4. Remove front fillet molding (RH). Refer to EXT-32, "FRONT FILLET MOLDING : Removal and Installation".
5. Remove front fender protector. Refer ro EXT-35, "FENDER PROTECTOR : Removal and Installation".
6. Remove drive belts. Refer to EM-22, "Removal and Installation".
7. Remove water pump.
   • Engine coolant leakage from cylinder block, so have a receptacle ready below.
   CAUTION:
   • **Handle water pump vane so that it does not contact any other parts.**
   • **Water pump cannot be disassembled and should be replaced as a unit.**

INSTALLATION

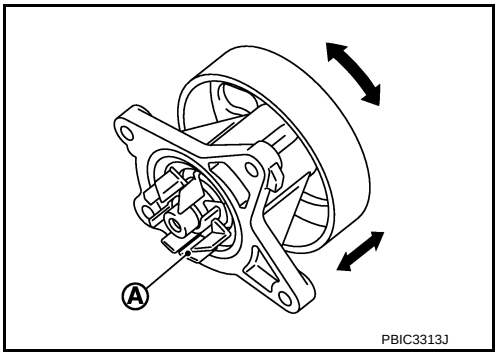
Install in the reverse order of removal.

Inspection

INFOID:0000000010782944

INSPECTION AFTER REMOVAL

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



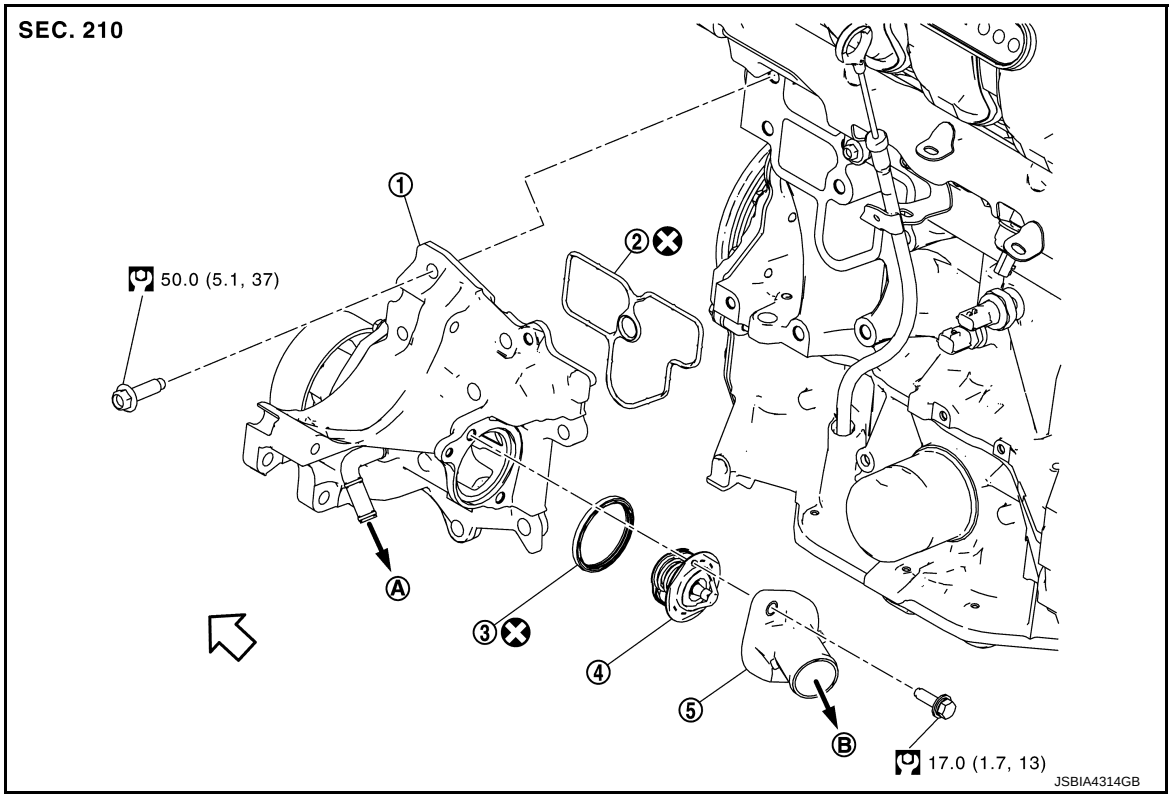
INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to CO-13, "Inspection".
- Start and warm up the engine. Check visually that there is no leakage of engine coolant.

THERMOSTAT

Exploded View

INFOID:0000000010782945



① Thermostat housing	② Gasket	③ Rubber ring
④ Thermostat	⑤ Water inlet	
Ⓐ To oil cooler	Ⓑ To radiator	

⇦ : Engine front

⊗ : Always replace after every disassembly.

: N·m (kg-m, ft-lb)

Removal and Installation

INFOID:0000000010782946

REMOVAL

1. Remove engine under cover. Refer to EXT-39, "ENGINE UNDER COVER : Exploded View".
2. Drain engine coolant from radiator. Refer to CO-13, "Draining".
   CAUTION:
   Perform this step when engine is cold.
3. Disconnect radiator hose (lower) from water inlet. Refer to CO-17, "Exploded View".
4. Remove water inlet and thermostat.
   • Engine coolant leakage from cylinder block, so have a receptacle ready below.
5. Disconnect the battery cable from the negative terminal. Refer to PG-140, "EXCEPT FOR R9M : Exploded View".
6. Remove thermostat housing with the following procedure:

a. Remove water pump. Refer to CO-24, "Exploded View".

b. Remove alternator. Refer to CHG-44, "MR20DD : Exploded View".

c. Remove A/C compressor with A/C piping connected, and temporarily fasten it on vehicle with a rope. Refer to HA-76, "Exploded View".

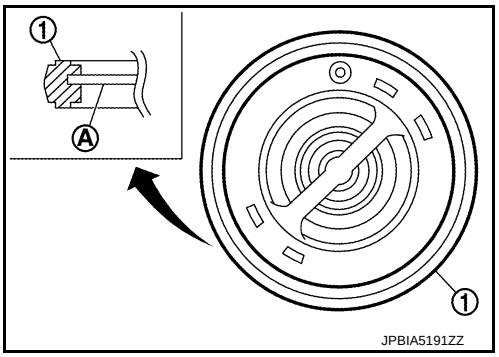
d. Remove water hoses. Refer to LU-13, "Exploded View".
e. Remove thermostat housing.

INSTALLATION

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

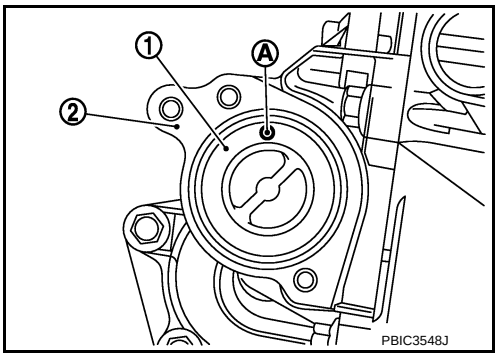
Thermostat

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



- Install thermostat ① with jiggle valve Ⓐ facing upwards.

② : Thermostat housing



Inspection

INFOID:0000000010782947

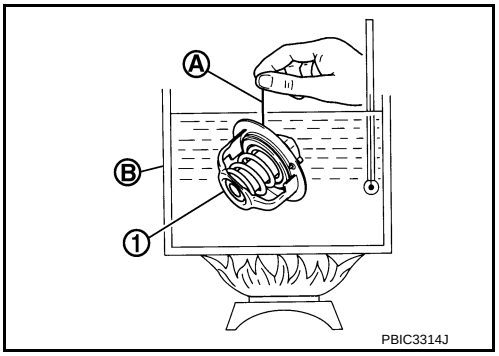
INSPECTION AFTER REMOVAL

Thermostat

- Place a thread Ⓐ so that it is caught in the valves of thermostat ①. Immerse fully in a container Ⓑ filled with water. Heat while stirring.
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the full open valve lift amount.
- After checking the maximum valve lift amount, lower the water temperature and check the valve closing temperature.

Standard: Refer to CO-31, "Thermostat".

- If out of the standard, replace thermostat.



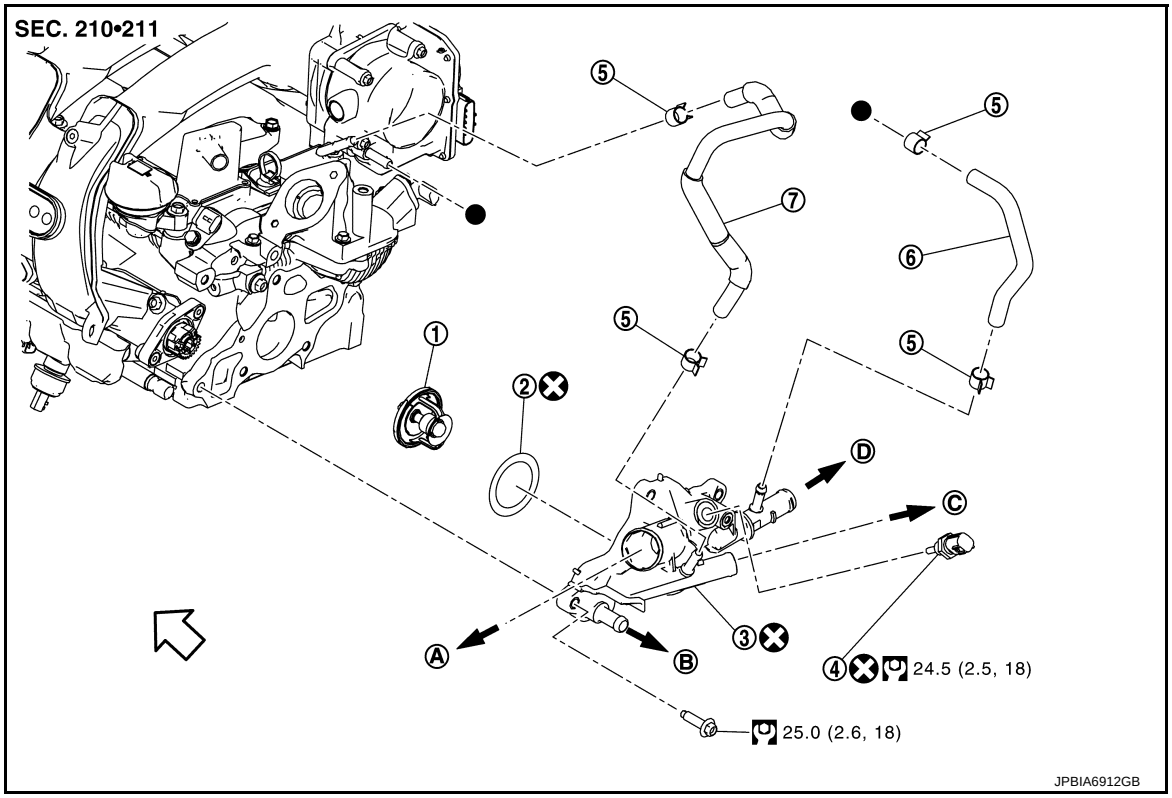
INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to CO-13, "Inspection".
- Start and warm up the engine. Check visually that there is no leakage of engine coolant.

WATER OUTLET

Exploded View

INFOID:0000000010782948



① Water control valve	② Rubber ring	③ Water outlet
④ Engine coolant temperature sensor	⑤ Clamp	⑥ Water hose
⑦ Water hose		
Ⓐ To radiator	Ⓑ To CVT oil warmer (CVT models)	Ⓒ To heater
Ⓓ To heater		

⇦ : Engine front

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

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

Removal and Installation

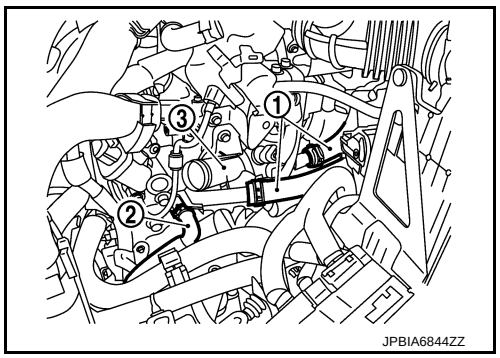
INFOID:0000000010782949

REMOVAL

1. Drain engine coolant from radiator. Refer to CO-13, "Draining".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belts.**
2. Remove air duct 1 and air duct 2. Refer to EM-30, "Exploded View".
3. Remove battery. Refer to PG-140, "EXCEPT FOR R9M : Exploded View".
4. Remove battery tray. Refer to PG-146, "EXCEPT FOR R9M : Exploded View".
5. Disconnect radiator hose (upper) form water outlet. Refer to CO-17, "Exploded View".
6. Disconnect harness connector from engine coolant temperature sensor.

7. Remove heater hoses ① and water hose ② (CVT models).

③ : Water outlet



JPBIA6844ZZ

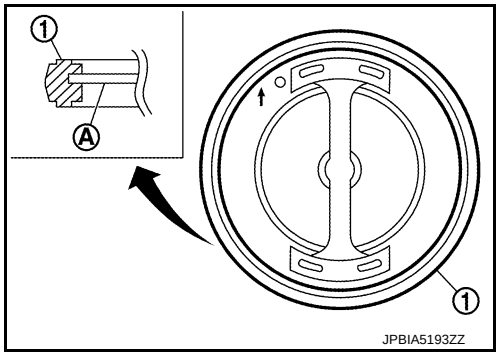
8. Remove water outlet.

INSTALLATION

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

Water Control Valve

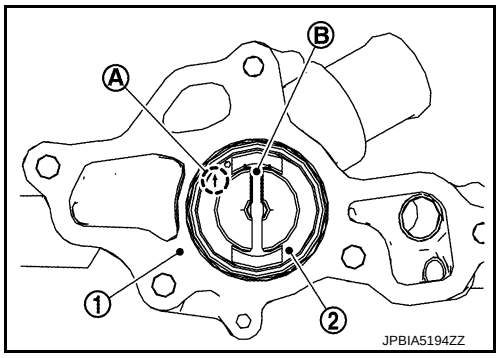
- Install water control valve with making rubber ring ① groove fit to water control valve flange Ⓐ with the whole circumference.



JPBIA5193ZZ

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

① : Water outlet



JPBIA5194ZZ

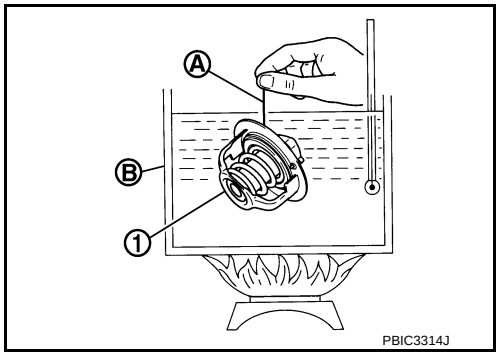
Inspection

INFOID:0000000010782950

INSPECTION AFTER REMOVAL

Water Control Valve

- Place a thread Ⓐ so that it is caught in the valves of water control valve ①. Immerse fully in a container Ⓑ filled with water. Heat while stirring.
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the continuous valve lifting toward maximum valve lift.
  NOTE:
  The maximum valve lift amount standard temperature for water control valve is the reference value.
- After checking the maximum valve lift amount, lower the water temperature and check the valve closing temperature.



PBIC3314J

Standard: Refer to CO-31, "Water Control Valve".

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

INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to CO-13, "Inspection".
- Start and warm up the engine. Check visually that there is no leakage of engine coolant.

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000010782951

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Engine coolant capacity (With reservoir tank at “MAX” level)	CVT models	7.7 (6-6/8)
	M/T models	7.2 (6-3/8)
Reservoir tank engine coolant capacity (At “MAX” level)		0.85 (6/8)

Radiator

INFOID:0000000010782952

Unit: kPa (bar, kg/cm^2, psi)

Cap relief pressure	Standard	90 (0.9, 0.9, 13.1)
	Lower limit	60 (0.6, 0.6, 8.7)
Leakage testing pressure		157 (1.6, 1.6, 22.8)

Thermostat

INFOID:0000000010782953

Standard

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

Water Control Valve

INFOID:0000000010782954

Standard

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

PRECAUTION

PRECAUTIONS

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

INFOID:0000000010782955

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, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see “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:

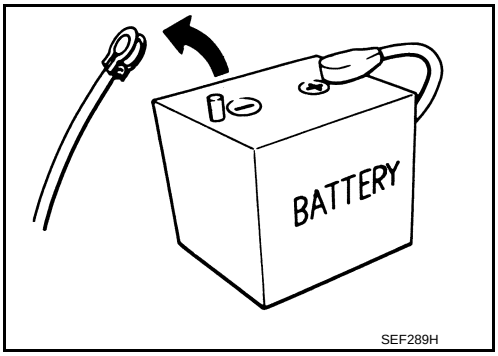
Always observe the following items for preventing accidental activation.

- **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, and wait at least 3 minutes before performing any service.**

Precautions for Removing Battery Terminal

INFOID:0000000010783279

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.
- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing “How to disconnect 12V battery terminal” described below.
  NOTE:
  Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage may occur.
- 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.



SEF289H

HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.
For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

1. Open the hood.

2. Turn key switch to the OFF position with the driver side door opened.
3. Get out of the vehicle and close the driver side door.
4. Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes
K9K engine	: 4 minutes
M9R engine	: 4 minutes
R9M engine	: 4 minutes
V9X engine	: 4 minutes

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

5. Remove 12V battery terminal.
CAUTION:
After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

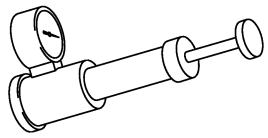
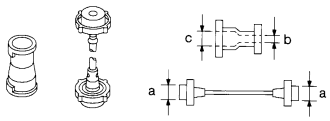
1. Unlock the door with intelligent key or remote keyless entry.
NOTE:
At this moment, ACC power is supplied.
2. Open the driver side door.
3. Open the hood.
4. Close the driver side door.
5. Wait at least 3 minutes.
CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.
6. Remove 12V battery terminal.
CAUTION:
After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000010782957

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

Lubricant or/and Sealant

INFOID:0000000010782958

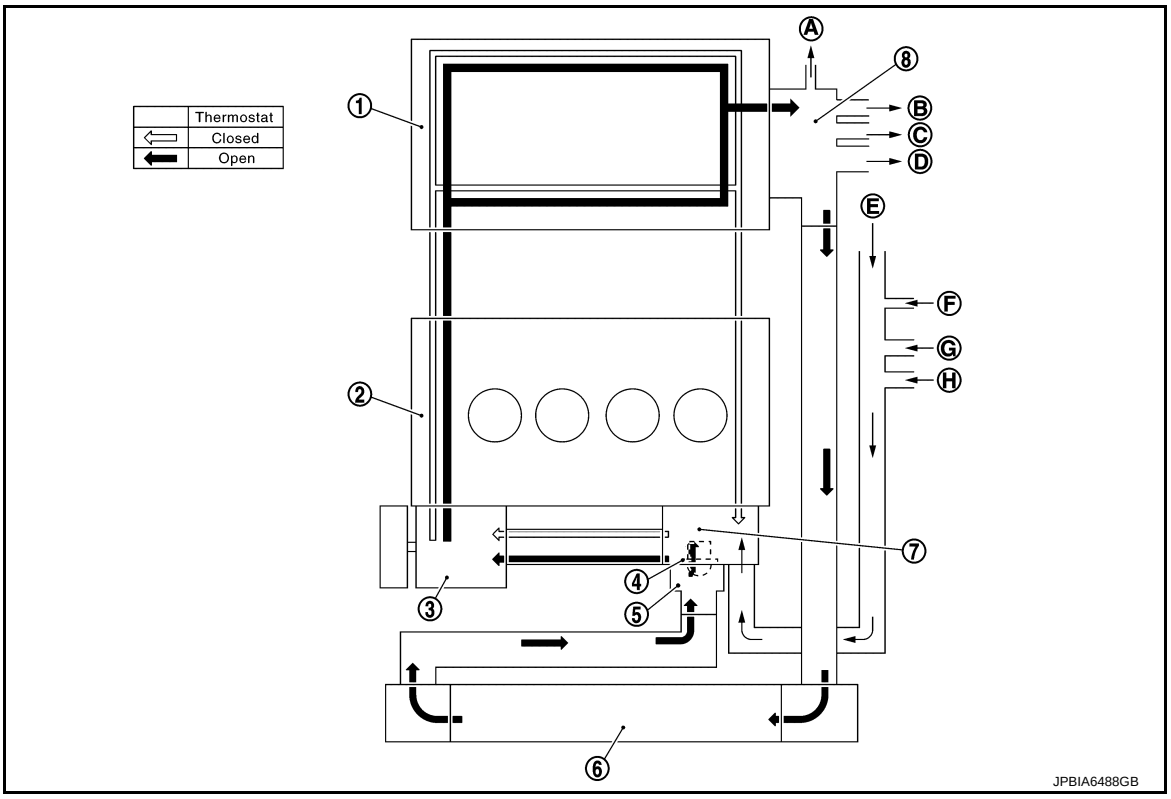
Name	Description	Note
Three bond 1303	Cooling fan	Fan moter shaft

SYSTEM DESCRIPTION

DESCRIPTION

Engine Cooling System

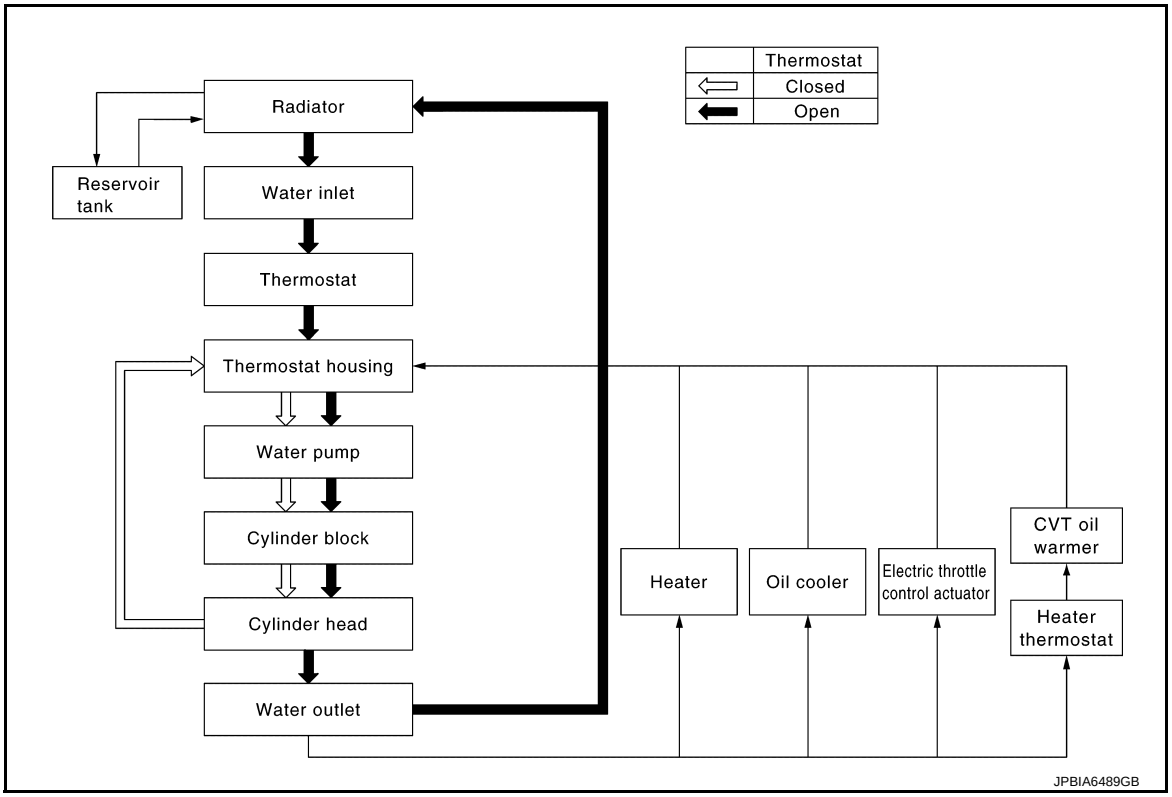
INFOID:0000000010782959



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

Engine Cooling System Schematic

INFOID:0000000010782960



SYMPTOM DIAGNOSIS

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:0000000010782961

	Symptom		Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—
		Thermostat and water control valve stuck closed	—	
		Damaged radiator 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 leaks into cooling system	Cylinder head deterioration
				Cylinder head gasket deterioration

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

PERIODIC MAINTENANCE

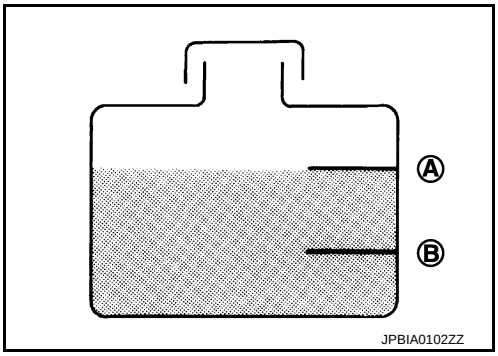
ENGINE COOLANT

Inspection

INFOID:0000000010782962

LEVEL

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



Ⓐ : MAX

Ⓑ : MIN

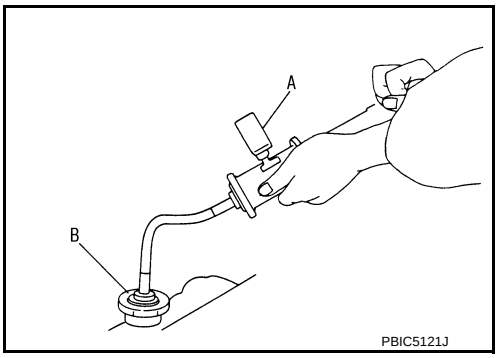
- Adjust the engine coolant level if necessary.

CAUTION:

Refill Genuine NISSAN Long Life Antifreeze/Coolant (blue) or equivalent in its quality mixed with water (distilled or demineralized). Refer to MA-23, "Fluids and Lubricants".

LEAKAGE

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



Testing pressure: Refer to CO-55, "Radiator".

WARNING:

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

CAUTION:

Higher test pressure than specified may cause radiator damage.

NOTE:

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

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

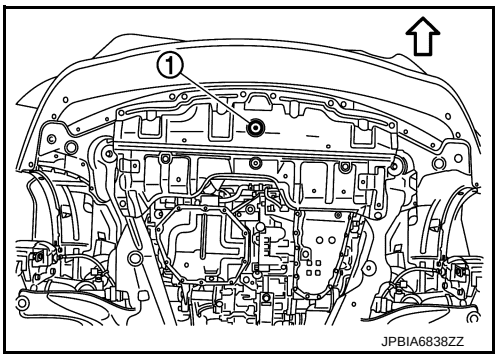
Draining

INFOID:0000000010782963

WARNING:

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

1. Remove engine under cover. Refer to EXT-39, "ENGINE UNDER COVER : Exploded View".
2. Open radiator drain plug ① at the bottom of radiator, and then remove radiator cap.



⇦ : Vehicle front

CAUTION:

Perform this step when engine is cold.

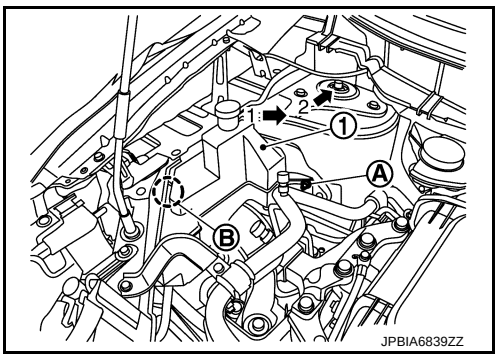
- When draining all of engine coolant in the system, open water drain plugs on cylinder block. Refer to EM-207, "Setting".

3. Remove reservoir tank if necessary, and drain engine coolant and clean reservoir tank before installing.

- Move reservoir tank ①, and then remove it numerical order as shown in the figure.

Ⓐ : Nut

Ⓑ : Pawl



4. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to CO-41, "Flushing".

Refilling

INFOID:0000000010782964

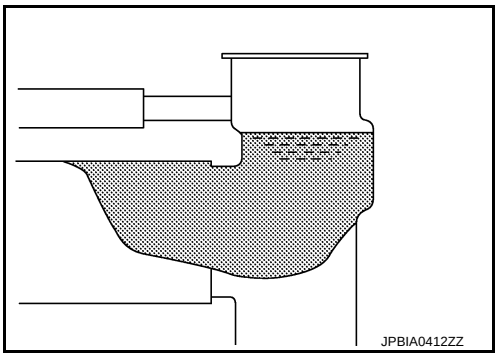
CAUTION:
- **Do not put additive such as waterleak preventive, since it may cause cooling waterway clogging.**
- **When refilling use Genuine NISSAN Long Life Antifreeze/Coolant (blue) or equivalent in its quality mixed with water (distilled or demineralized). Refer to MA-23, "Fluids and Lubricants".**

1. Install reservoir tank if removed and radiator drain plug.
   CAUTION:
   Be sure to clean drain plug and install with new O-ring.

   Radiator drain plug : Refer to CO-43, "Exploded View".

   - If water drain plugs on cylinder block are removed, close and tighten them. Refer to EM-248, "Disassembly and Assembly".
2. Check that each hose clamp has been firmly tightened.
3. Fill radiator to specified level.
   CAUTION:
   Never adhere the engine coolant to electronic equipments (alternator etc.).
   - **Pour coolant slowly of less than 2 ℓ (1-3/4 Imp qt) a minute to allow air in system to escape.**

   Engine coolant capacity
   (With reservoir tank at "MAX" level)
   Refer to CO-55, "Periodical Maintenance Specification".

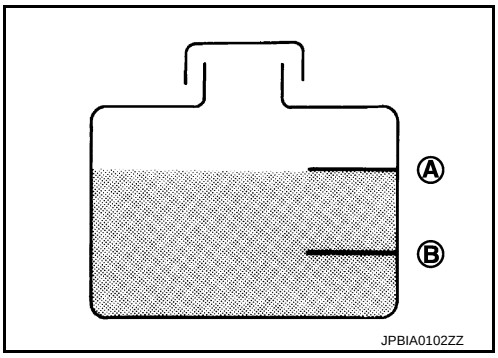


4. Refill reservoir tank to "MAX" level line with engine coolant.

Ⓐ : MAX

Ⓑ : MIN

Reservoir tank engine coolant capacity
(At "MAX" level)
Refer to CO-55, "Periodical Maintenance Specification".



5. Install radiator cap.
6. 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.

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

Flushing

INFOID:0000000010782965

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

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

   Radiator drain plug : Refer to CO-43, "Exploded View".
   - If water drain plugs on cylinder block are removed, close and tighten them. Refer to EM-248, "Disassembly and Assembly".
2. Fill radiator and reservoir tank with water and reinstall radiator 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-39, "Draining".
7. Repeat steps 1 through 6 until clear water begins to drain from radiator.

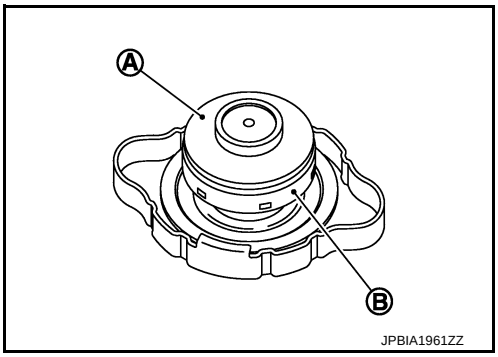
RADIATOR

RADIATOR CAP

RADIATOR CAP : Inspection

INFOID:0000000010782966

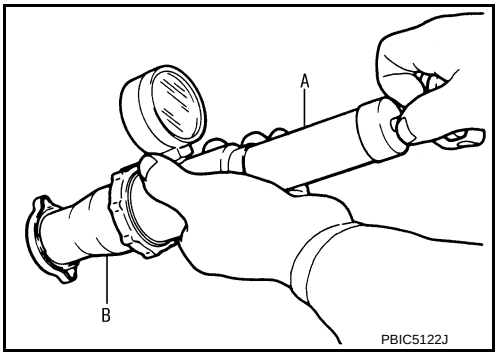
- Check valve seat Ⓐ of radiator cap.
- Check that valve seat is swollen to the extent that the edge of the plunger Ⓑ cannot be seen when watching it vertically from the top.
- Check that valve seat has no soil and damage.
- Check that there is no dirt or damage on the valve seat of radiator cap negative-pressure valve.
- Check that there are no unusualness in the opening and closing conditions of negative-pressure valve.



- Check radiator cap relief pressure.

Standard and Limit : Refer to CO-55, "Radiator".

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



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

CAUTION:

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

RADIATOR

RADIATOR : Inspection

INFOID:0000000010782967

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

CAUTION:

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

1. Apply water by hose to the back side of the radiator core vertically downward.
2. Apply water again to all radiator core surfaces once per minute.
3. Stop washing if any stains no longer flow out from radiator.
4. Blow air into the back side of radiator core vertically downward.
   - Use compressed air lower than 490 kPa (4.9 bar, 5 kg/cm^2, 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.

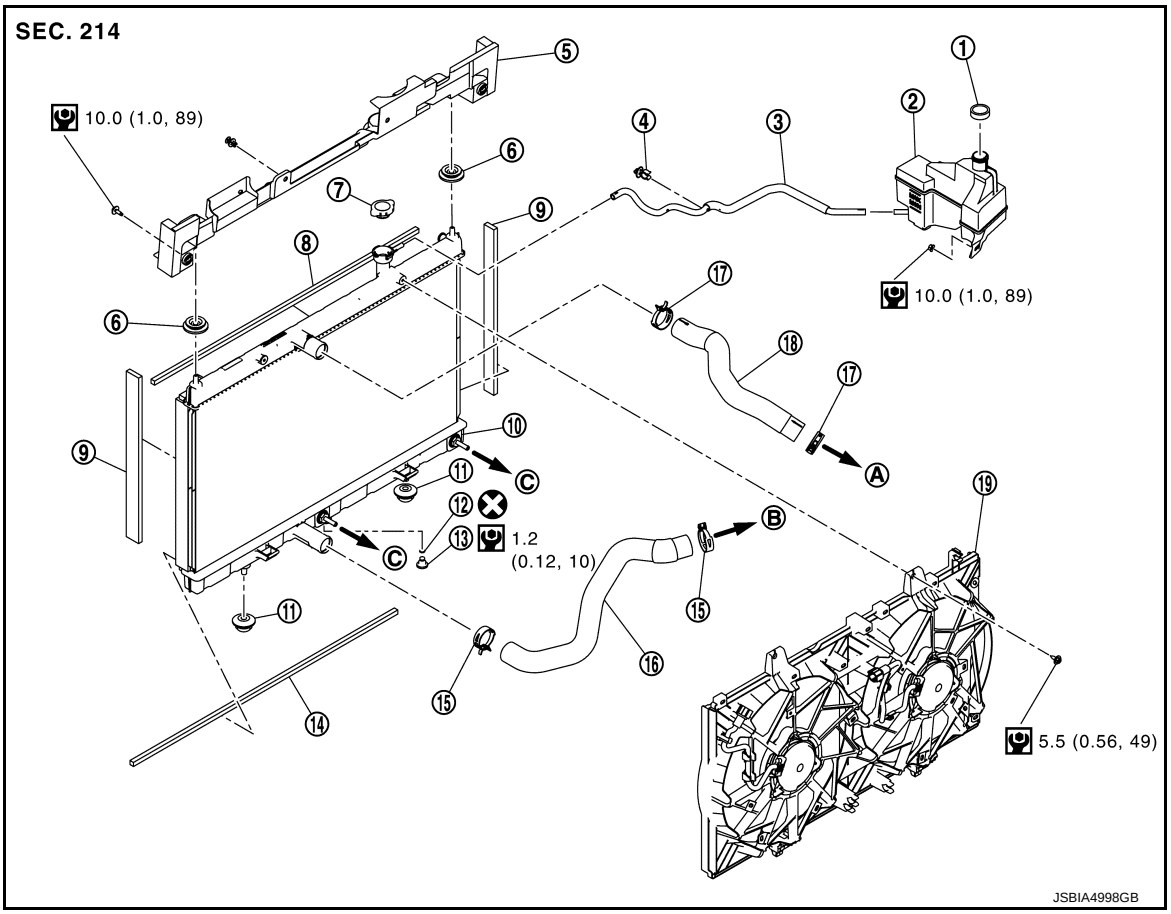
REMOVAL AND INSTALLATION

RADIATOR

Exploded View

INFOID:0000000010782968

REMOVAL



① Reservoir tank cap	② Reservoir tank	③ Reservoir tank hose
④ Clip	⑤ Mounting bracket	⑥ Mounting rubber (upper)
⑦ Radiator cap	⑧ Side seal	⑨ Side seal
⑩ Radiator	⑪ Mounting rubber (lower)	⑫ O-ring
⑬ Drain plug	⑭ Side seal	⑮ Clamp
⑯ Radiator hose (lower)	⑰ Clamp	⑱ Radiator hose (upper)
⑲ Cooling fan assembly		
Ⓐ To water outlet	Ⓑ To water inlet	Ⓒ Not applicable

: Always replace after every disassembly.

: N·m (kg-m, in-lb)

Removal and Installation

INFOID:0000000010782969

REMOVAL

WARNING:

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

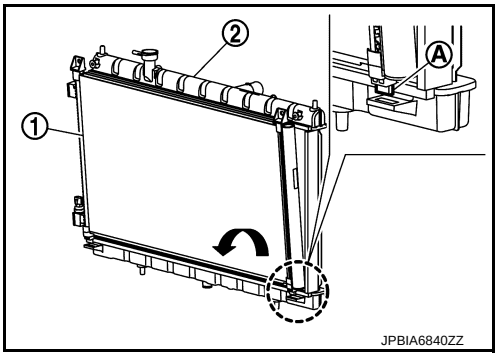
- **Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.**

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

1. Remove engine under cover. Refer to EXT-39, "ENGINE UNDER COVER : Exploded View".
2. Drain engine coolant from radiator. Refer to CO-39, "Draining".
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belts.**
3. Remove radiator hose (lower) from radiator.
4. Remove air duct 1 and air duct 2. Refer to EM-175, "Removal and Installation".
5. Remove battery and battery bracket. Refer to PG-140, "EXCEPT FOR R9M : Exploded View".
6. Remove radiator hose (upper) from radiator.
   CAUTION:
   Never spill engine coolant on drive belt.
7. Remove cooling fan assembly. Refer to CO-47, "Removal and Installation".
8. Remove condenser ① from radiator ②, and move it frontward.

   Ⓐ : Mount

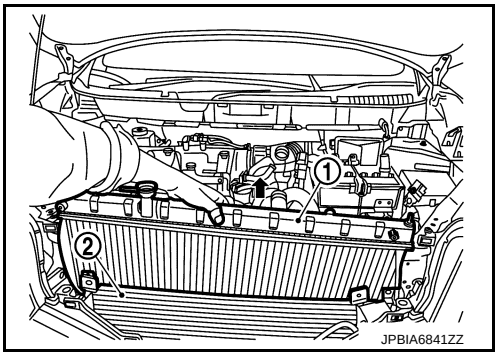
   CAUTION:
   - **Be careful not to damage condenser core.**
   - **Minimize the moving distance of condenser to prevent load to air conditioner piping.**



9. Remove radiator ① from the clearance between condenser ② and upper radiator core support.

   ⬅ : Radiator moving direction

   CAUTION:
   - **Be careful not to damage radiator core.**
   - **Minimize the moving distance of condenser to prevent load to air conditioner piping.**



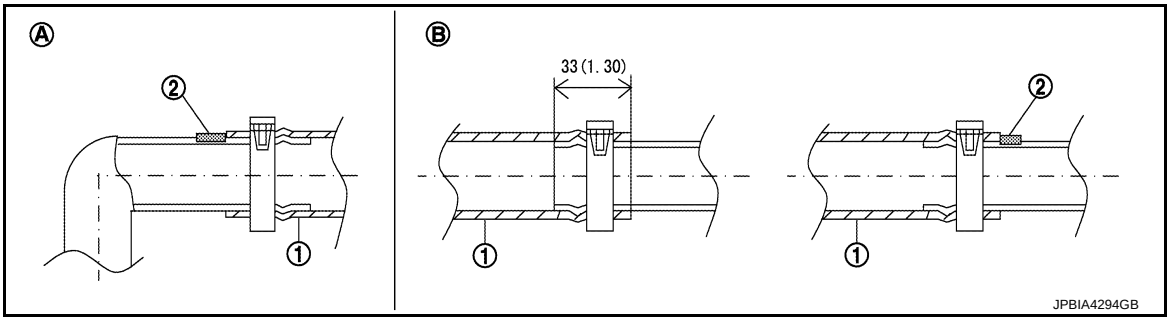
INSTALLATION

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

Radiator hose

CAUTION:
- **Use genuine mounting bolts for the cooling fan assembly and strictly observe the tightening torque. (Breakage prevention for radiator)**

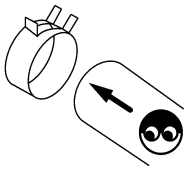
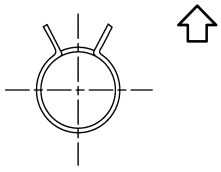
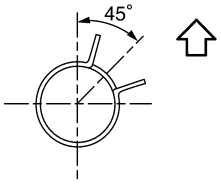
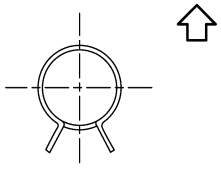
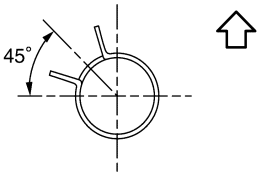
NOTE:
- Insert the radiator hose ① all the way to the stopper ② or by 33 mm (1.30 in) (hose without a stopper).



Unit: mm (in)

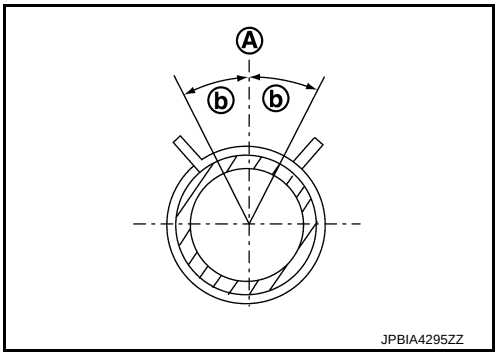
Ⓐ Radiator side Ⓑ Engine side

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

Radiator hose	Hose end	Paint mark	Position of hose clamp*  JPCIA0366ZZ ⇦ : Vehicle upper
Radiator hose (upper)	Radiator side	Upper	 JPCIA0362ZZ
	Engine side	Upper	 JPCIA0363ZZ
Radiator hose (lower)	Radiator side	Lower	 JSBIA4312ZZ
	Engine side	Front	 JPCIA0365ZZ

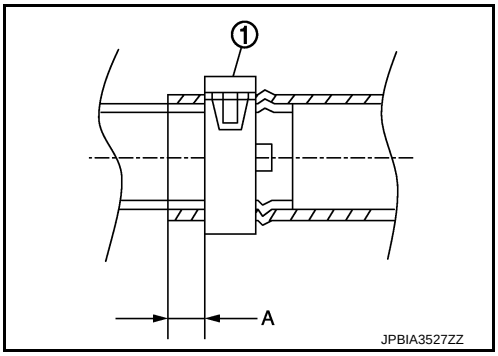
*Refer to the illustrations for the specific position each hose clamp tab.

- The angle ⓑ created by the hose clamp pawl and the specified line Ⓐ must be within ±30° as shown in the figure.



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

Dimension “A”	**3 - 5 mm** **0.12 - 0.20 in**



Inspection

INFOID:0000000010782970

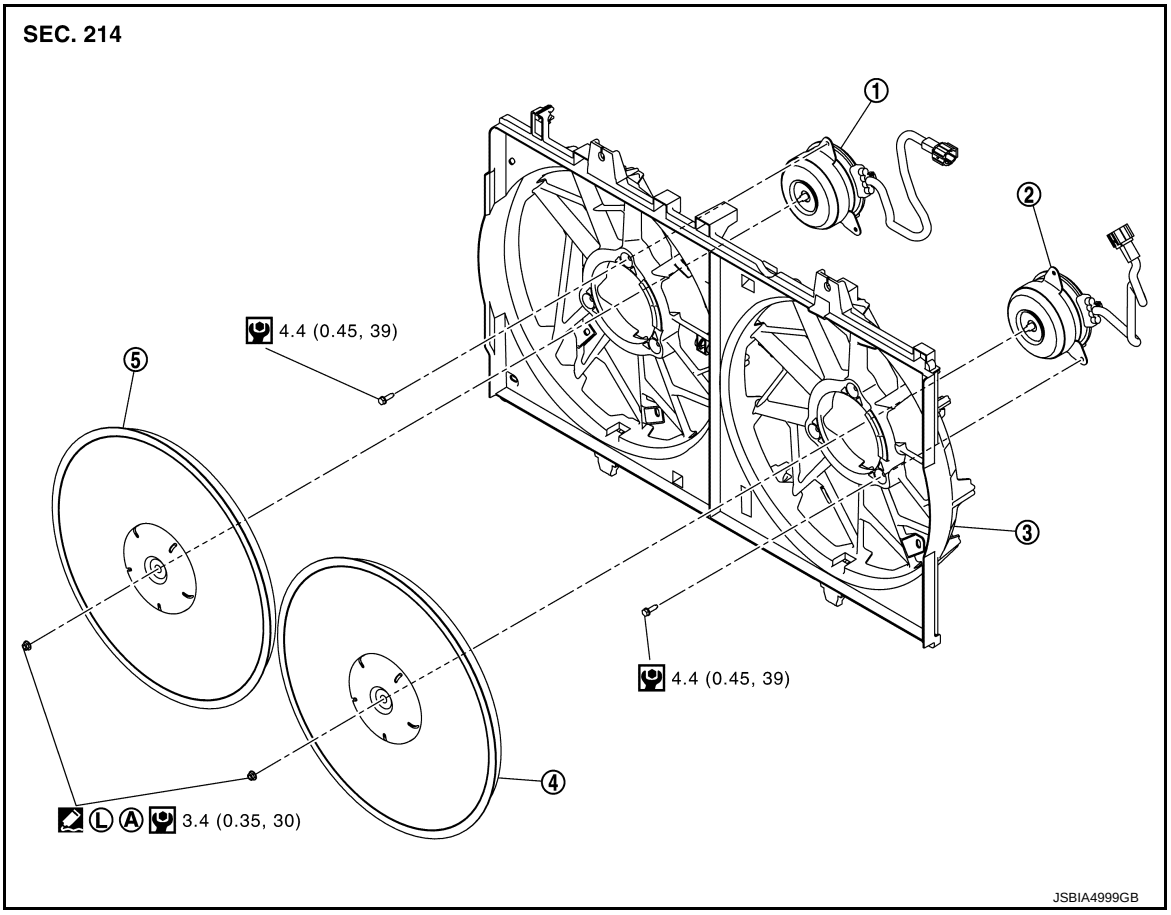
INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to CO-39, "Inspection".
- Start and warm up the engine. Visually check that there is no leakage of engine coolant.

COOLING FAN

Exploded View

INFOID:0000000010782971



①	Fan motor (RH)	②	Fan motor (LH)	③	Fan shroud
④	Cooling fan (LH)	⑤	Cooling fan (RH)		
Ⓐ	Apply on fan motor shaft				
	: N·m (kg-m, in-lb)				
Ⓛ	: Apply high strength thread locking sealant or equivalent.				

Removal and Installation

INFOID:0000000010782972

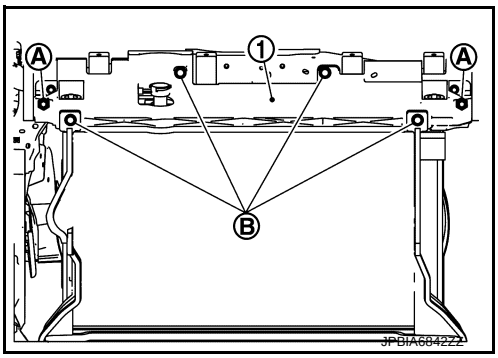
REMOVAL

1. Remove engine under cover. Refer to EXT-39, "ENGINE UNDER COVER : Exploded View".
2. Drain engine coolant from radiator. Refer to CO-39, "Draining".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belts.**
3. Remove air duct 1 and air duct 2. Refer to EM-174, "Exploded View".
4. Remove radiator hose (upper) from radiator. Refer to CO-43, "Exploded View".
5. Remove front grille. Refer to EXT-22, "Exploded View".
6. Remove crash zone sensor. Refer to SR-31, "Exploded View".
7. Remove hood lock bell crank and hood lock assembly. Refer to folloing table:

TYPE	Reference
2	DLK-605, "Exploded View"
4	DLK-910, "Exploded View"

How to select vehicle type: refer to DLK-22, "Information".

8. Disconnect harness connector from fan motor (RH and LH), and move harness to aside.
9. Remove mounting bolts Ⓐ and clips Ⓑ of mounting bracket ①.



10. Remove radiator core support upper. Refer to folloing table:

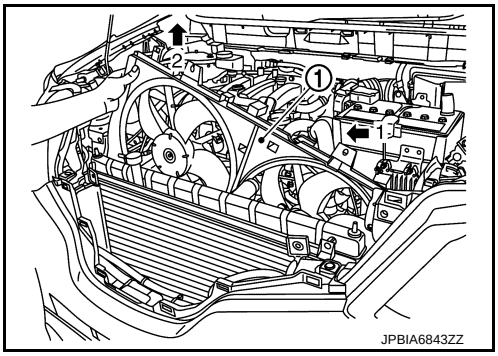
TYPE	Reference
2	DLK-572, "MR20DD : Exploded View"
4	DLK-876, "MR20DD : Exploded View"

How to select vehicle type: refer to DLK-22, "Information".

11. Remove mounting bracket.
12. Remove cooling fan assembly according to the following instructions:

a. Lift cooling fan assembly and disconnect the lower mount.

b. Move cooling fan assembly ① to rightward of vehicle (⬅ 1) and lift (⬅ 2) the right side to remove it.
CAUTION:
Be careful not to damage or scratch on radiator core when removing.



INSTALLATION

Note the following, and install in the reverse order of removal.
CAUTION:
Only use genuine parts for fan shroud mounting bolt and observe the specified torque (to prevent radiator from being damaged).
NOTE:
Cooling fans are controlled by ECM. For details. Refer to EC-472, "COOLING FAN CONTROL : System Description".

Disassembly and Assembly

INFOID:0000000010782973

DISASSEMBLY

1. Remove cooling fan mounting nuts, and then remove the cooling fans (RH and LH).
2. Remove fan motors (RH and LH).

ASSEMBLY

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

CAUTION:
RH and LH cooling fans are different. Be careful not to misassemble them.
- Install each fan in the following position.

Right side : 9 blades
Left side : 7 blades

- Secure the harness to the fan shroud to prevent the fan rotation area from being loose.
- Apply high thread locking sealant on fan motor shaft.

Inspection

INFOID:0000000010782974

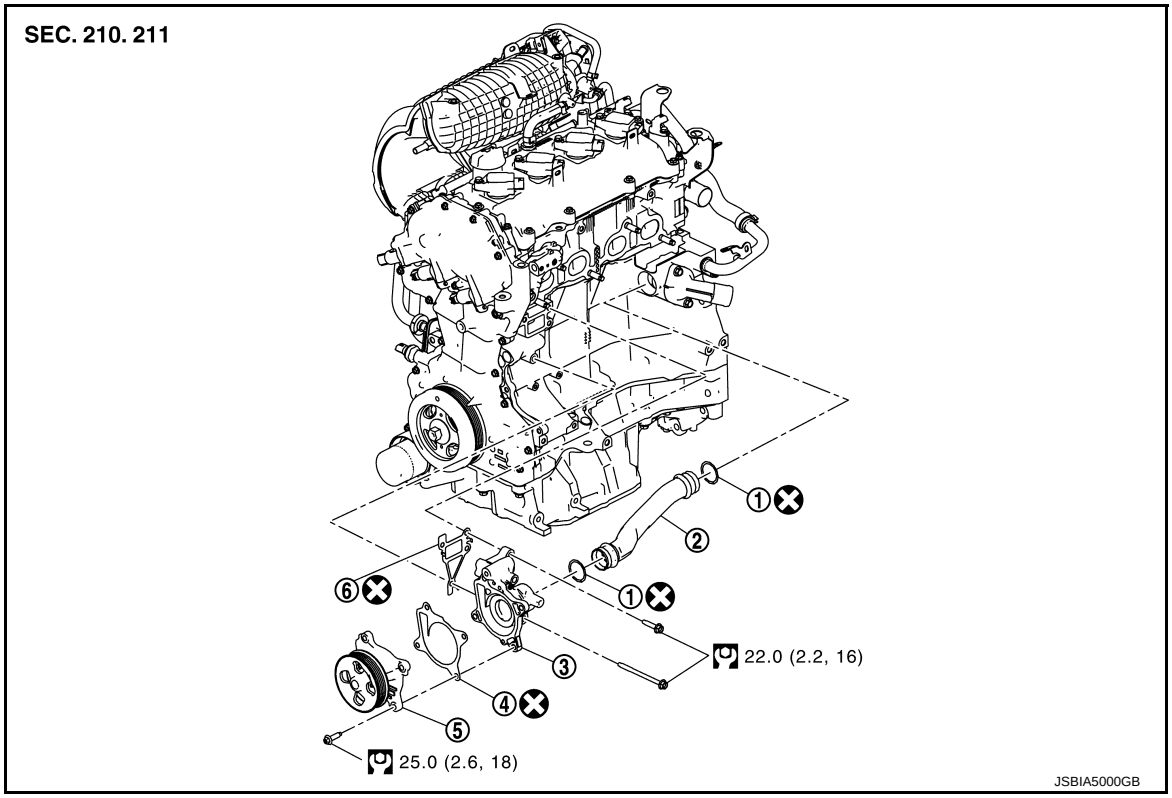
INSPECTION AFTER DISASSEMBLY

Cooling Fan
Inspect cooling fan for crack or unusual bend.
- If anything is found, replace cooling fan.

WATER PUMP

Exploded View

INFOID:0000000010782975



① O-ring
② Water pipe
③ Water pump housing
④ Gasket
⑤ Water pump
⑥ Gasket

⊗ : Always replace after every disassembly.

: N·m (kg-m, ft-lb)

Removal and Installation

INFOID:0000000010782976

REMOVAL

1. Remove engine under cover. Refer to EXT-39, "ENGINE UNDER COVER : Exploded View".
2. Drain engine coolant. Refer to CO-39, "Draining".
   CAUTION:
   Perform this step when engine is cold.
3. Remove the following parts.
   - Drive belt: Refer to EM-166, "Removal and Installation".
   - Alternator: Refer to CHG-46, "QR25DE : Exploded View".
4. Remove water pump.
   - Engine coolant leaks from cylinder block, so have a receptacle ready below.

   CAUTION:
   - **Handle water pump vane so that it does not contact any other parts.**
   - **Water pump cannot be disassembled and should be replaced as a unit.**
5. Remove water pump housing with the following procedure:

a. Remove oil level gauge and oil level gauge guide. Refer to EM-247, "Exploded View".
   CAUTION:
   Plug the oil level gauge guide opening to prevent oil pan from entering foreign materials.
b. Remove exhaust manifold. Refer to EM-180, "Exploded View".

c. Remove water pump housing.
6. Remove water pipe.

INSTALLATION

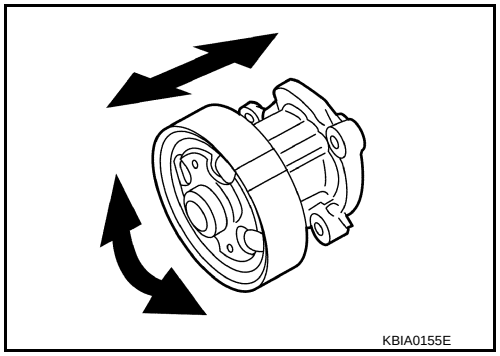
CAUTION:
Do not reuse O-ring.
Note the following, and install in the reverse order of removal.
- When inserting water pipe end into cylinder block, apply a neutral detergent to O-ring. Then insert it immediately.

Inspection

INFOID:0000000010782977

INSPECTION AFTER REMOVAL

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


KBIA0155E

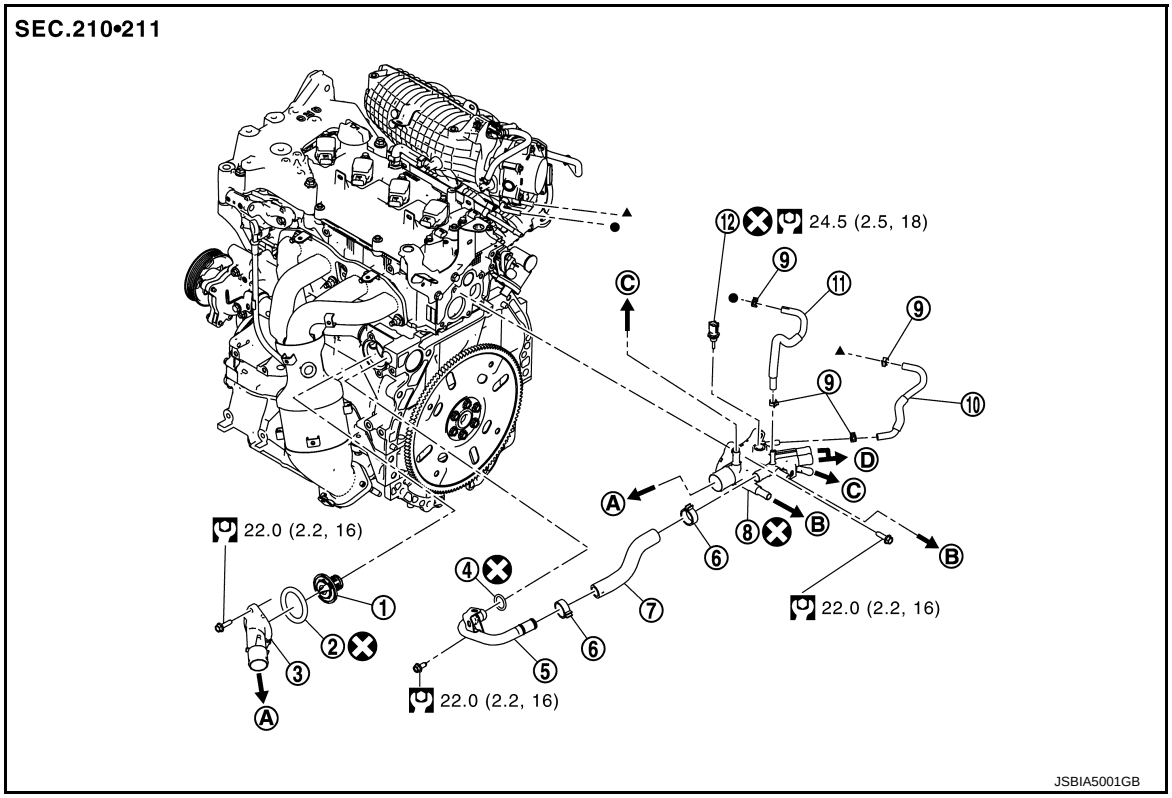
INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to CO-39, "Inspection".
- Start and warm up engine. Check visually that there is no leakage of engine coolant.

THERMOSTAT AND WATER OUTLET

Exploded View

INFOID:0000000010782978



① Thermostat	② O-ring	③ Water inlet
④ O-ring	⑤ Heater pipe	⑥ Clamp
⑦ Water hose	⑧ water outlet	⑨ Clamp
⑩ Water hose	⑪ Water hose	⑫ Engine coolant temperature sensor
Ⓐ To radiator	Ⓑ To CVT oil warmer	Ⓒ To oil cooler
Ⓓ To heater		

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

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

Removal and Installation

INFOID:0000000010782979

REMOVAL

Thermostat

1. Remove air duct 1 and air duct 2. Refer to EM-174, "Exploded View".
2. Drain engine coolant. Refer to CO-39, "Draining".
   CAUTION:
   Perform this step when engine is cold.
3. Remove exhaust manifold cover. Refer to EM-180, "Exploded View".
4. Disconnect radiator hose (lower) at water inlet side. Refer to CO-43, "Exploded View".
5. Remove water inlet and thermostat.

Water Outlet

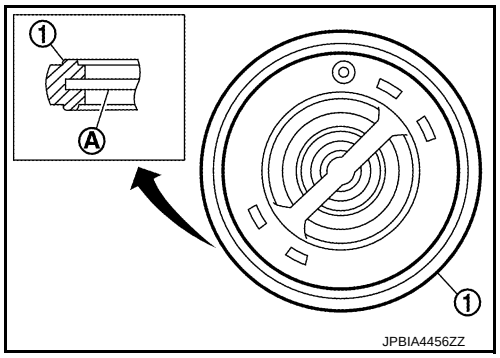
1. Remove air duct 1 and air duct 2. Refer to EM-174, "Exploded View".
2. Drain engine coolant. Refer to CO-39, "Draining".
   CAUTION:
   Perform this step when engine is cold.
3. Remove battery and battery bracket. Refer to PG-140, "EXCEPT FOR R9M : Exploded View".
4. Disconnect radiator hose (upper) at water outlet side.
5. Disconnect harness connector from engine coolant temperature sensor.
6. Disconnect water hoses.
7. Remove heater pipe and heater hose.
8. Remove water outlet.

INSTALLATION

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

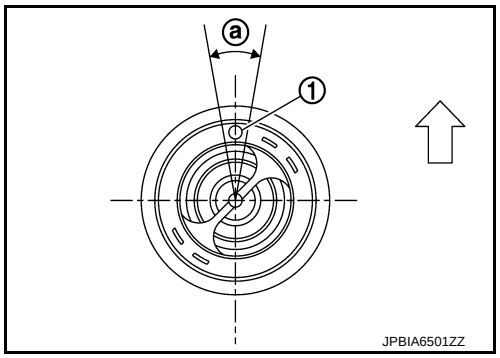
Thermostat

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



- Install thermostat with jiggle valve ① facing upwards. (The position deviation may be within the range of 20 degrees ⓐ as shown in the figure.)

⇦ : Up



Heater Pipe Installation

Apply a neutral detergent to O-ring, then quickly insert the insertion part of heater pipe into cylinder block.

Inspection

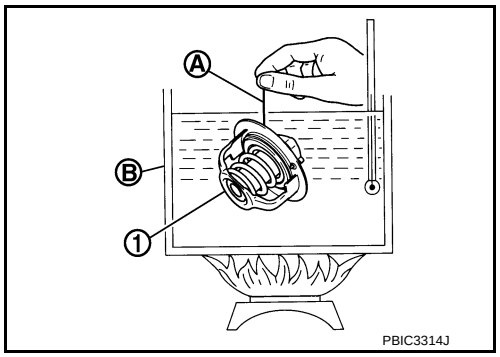
INFOID:0000000010782980

INSPECTION AFTER REMOVAL

- Place a thread Ⓐ so that it is caught in the valves of thermostat ①. Immerse fully in a container Ⓑ filled with water. Heat while stirring.
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the maximum valve lift amount.
- After checking the maximum valve lift amount, lower the water temperature and check the valve closing temperature.

Standard

Thermostat : Refer to CO-55, "Thermostat".



- If out of the standard, replace thermostat.

INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to CO-39, "Inspection".
- Start and warm up engine. Check visually that there is no leakage of engine coolant.

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000010782981

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (lmp qt)

Engine coolant capacity (With reservoir tank at “MAX” level)	8.2 (7-2/8)
Reservoir tank	0.85 (6/8)

Radiator

INFOID:0000000010782982

Unit: kPa (bar, kg/cm^2, psi)

Cap relief pressure	Standard	90 (0.9, 0.9, 13.1)
	Lower limit	60 (0.6, 0.6, 8.7)
Leakage testing pressure		157 (1.6, 1.6, 22.8)

Thermostat

INFOID:0000000010782983

Standard

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

PRECAUTION

PRECAUTIONS

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

INFOID:0000000010783281

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, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see “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:

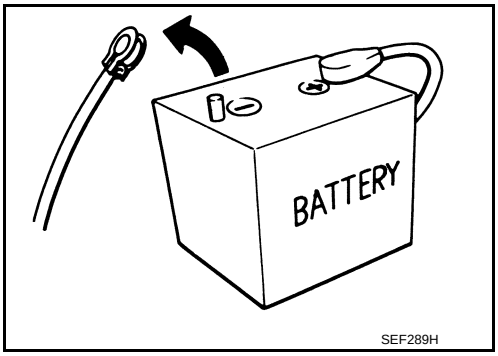
Always observe the following items for preventing accidental activation.

- **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, and wait at least 3 minutes before performing any service.**

Precautions for Removing Battery Terminal

INFOID:0000000010783280

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.
- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing “How to disconnect 12V battery terminal” described below.
  NOTE:
  Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage may occur.
- 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.



HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.
For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

1. Open the hood.

2. Turn key switch to the OFF position with the driver side door opened.
3. Get out of the vehicle and close the driver side door.
4. Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes
K9K engine	: 4 minutes
M9R engine	: 4 minutes
R9M engine	: 4 minutes
V9X engine	: 4 minutes

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

5. Remove 12V battery terminal.
CAUTION:
After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

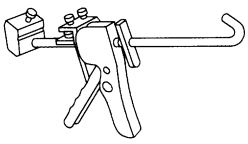
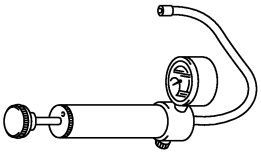
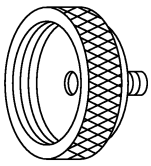
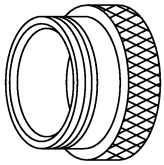
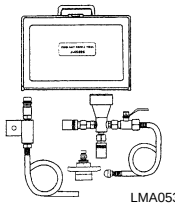
1. Unlock the door with intelligent key or remote keyless entry.
NOTE:
At this moment, ACC power is supplied.
2. Open the driver side door.
3. Open the hood.
4. Close the driver side door.
5. Wait at least 3 minutes.
CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.
6. Remove 12V battery terminal.
CAUTION:
After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

PREPARATION

PREPARATION

Special Service Tool

INFOID:0000000010969419

NISSAN tool number (RENAULT too number) Tool name	Description
WS39930000 (—) Tube pressure  S-NT052	Pressing the tube of liquid gasket
— (M.S. 554-07) Tester  MLIA0012E	Leak checking Checking reservoir tank cap
— (M.S. 554-01) Reservoir tank cap tester adapter A  MLIA0013E	Adapting tester to reservoir tank
— (M.S. 554-06) Reservoir tank cap tester adapter B  MLIA0014E	Adapting tester to reservoir tank cap
NI. 205 — Coolant refill tool  LMA053	Refilling engine cooling system

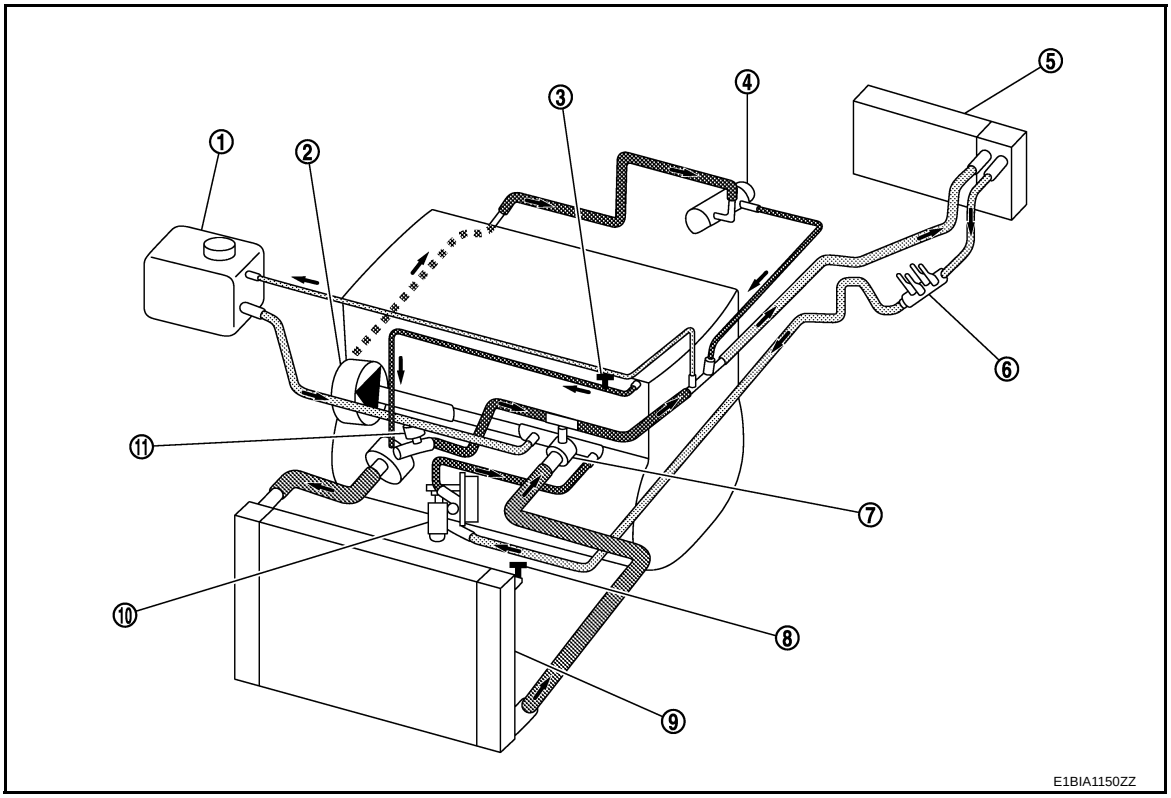
SYSTEM DESCRIPTION

DESCRIPTION

Engine Cooling System

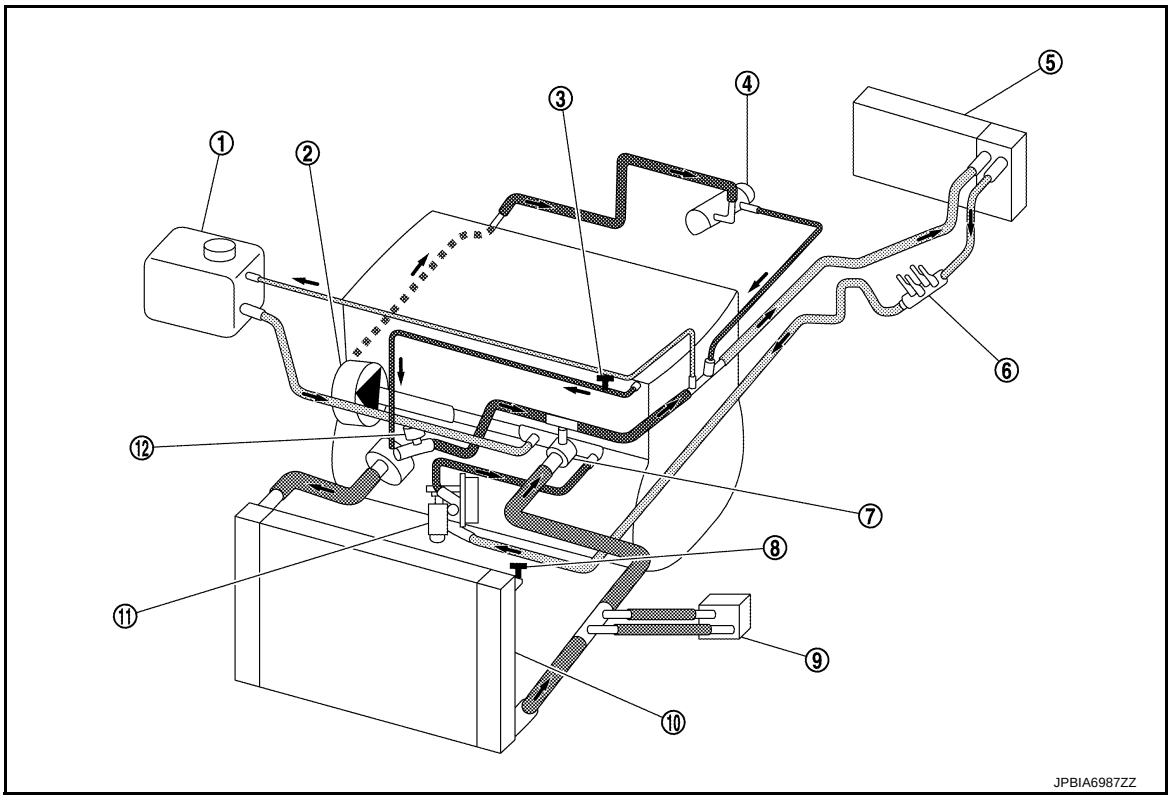
INFOID:0000000010782988

M/T models



① Reservoir tank	② Water pump	③ Air relief plug
④ EGR cooler	⑤ Heater	⑥ Thermoplunger
⑦ Water inlet (Thermostat housing)	⑧ Air relief plug	⑨ Radiator
⑩ Oil cooler	⑪ Water outlet (With engine coolant by-pass valve)	

CVT models

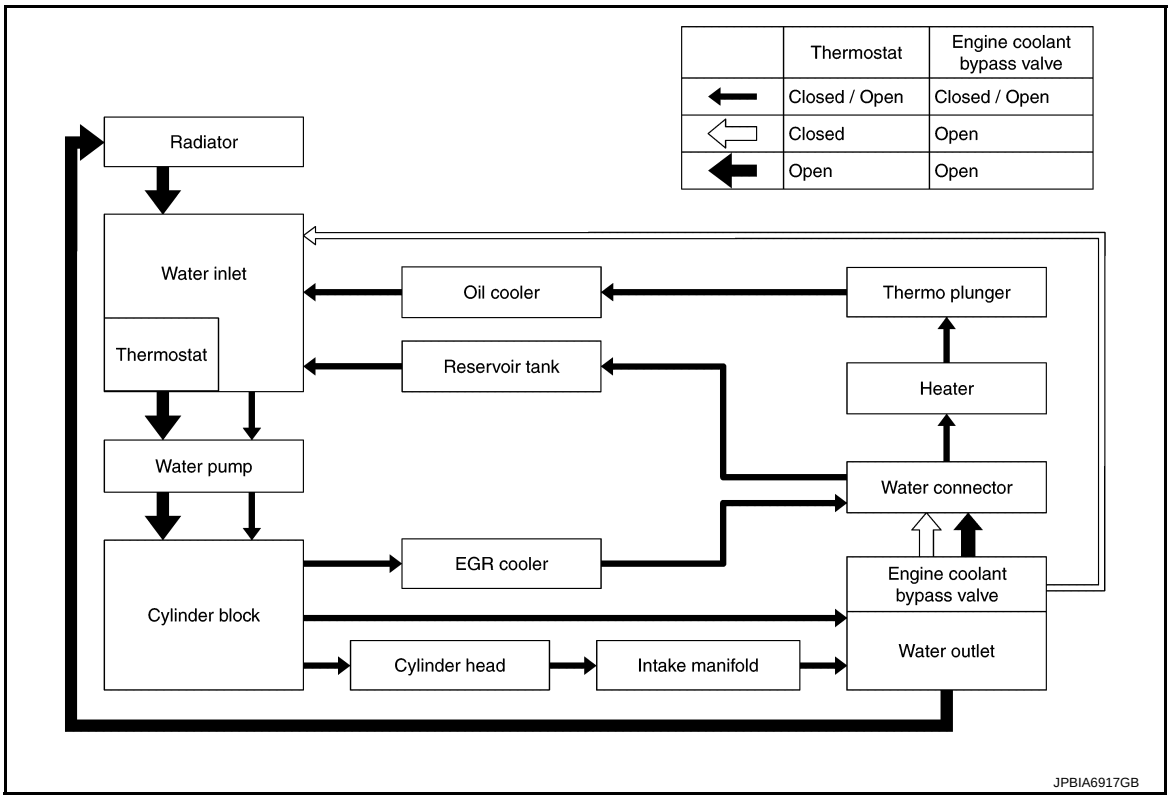


① Reservoir tank	② Water pump	③ Air relief plug
④ EGR cooler	⑤ Heater	⑥ Thermoplunger
⑦ Water inlet (Thermostat housing)	⑧ Air relief plug	⑨ CVT oil warmer
⑩ Radiator	⑪ Oil cooler	⑫ Water outlet (With engine coolant by-pass valve)

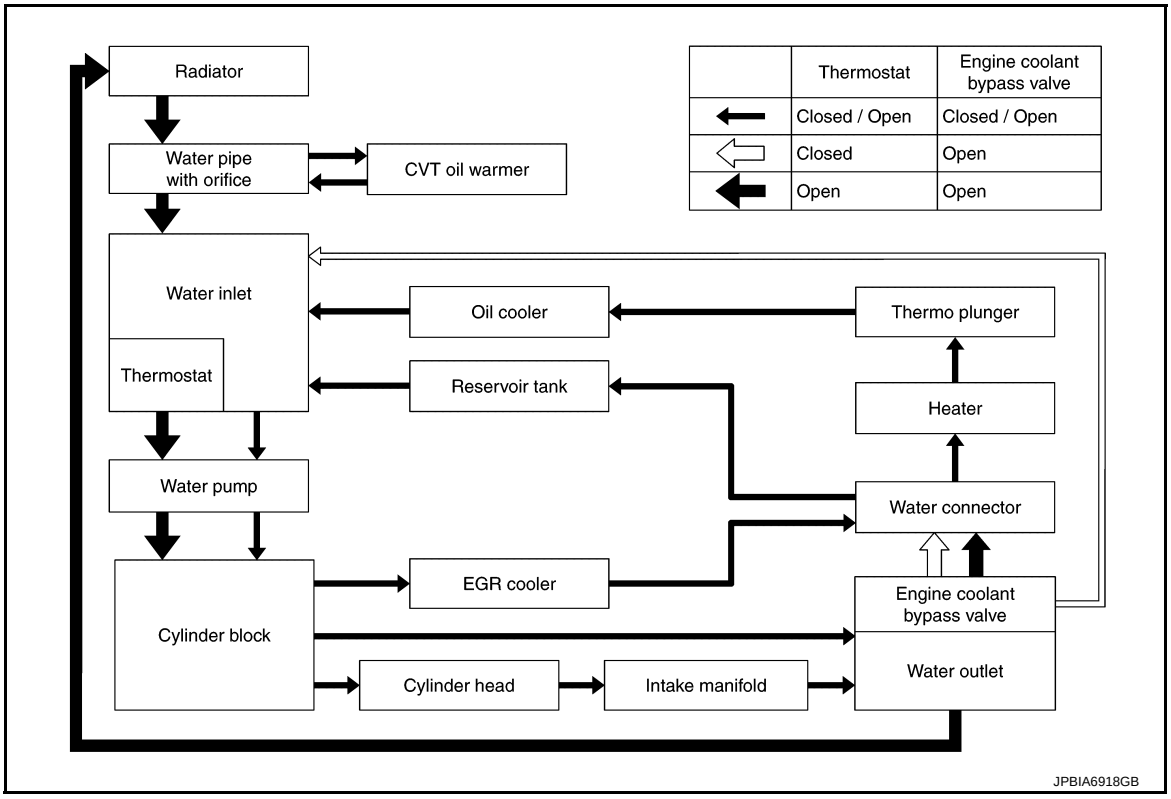
Engine Cooling System Schematic

INFOID:0000000010782989

M/T models



CVT models



SYMPTOM DIAGNOSIS

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:0000000010782990

	Symptom		Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—
		Thermostat and water control valve stuck closed	—	
		Damaged radiator 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 leaks into cooling system	Cylinder head deterioration
				Cylinder head gasket deterioration

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

PERIODIC MAINTENANCE

ENGINE COOLANT

Inspection

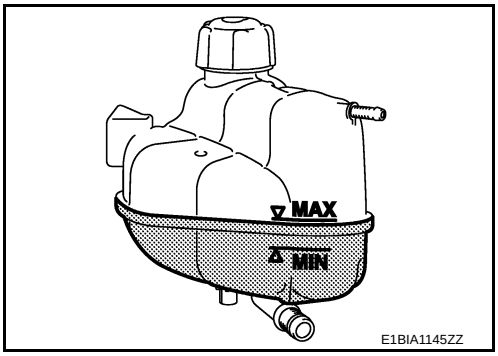
INFOID:0000000010969777

LEVEL

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

CAUTION:
Refill Genuine NISSAN Long Life Antifreeze/Coolant (blue) or equivalent in its quality mixed with water (distilled or demineralized). Refer to MA-23, "Fluids and Lubricants".

- Check that the reservoir tank cap is tightened.

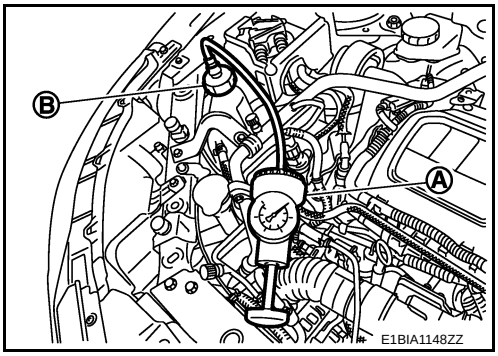


WARNING:
Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.

LEAKAGE

- To check for leakage, fit the adapter Ⓑ to the reservoir tank, and then connect it to the reservoir tank cap tester [SST: — (M.S.554-07)] Ⓐ as shown.

Testing pressure: Refer to CO-85, "Radiator".



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

CAUTION:
Higher test pressure than specified may cause radiator damage.

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

Draining

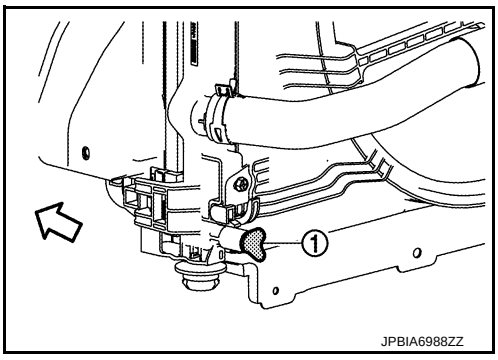
INFOID:0000000010969778

WARNING:

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

1. Remove engine under cover.
2. Remove reservoir tank cap.
3. Open radiator drain plug ① of radiator.

⇦ : Vehicle front



CAUTION:
Perform this step when engine is cold.

4. Remove reservoir tank if necessary, and drain engine coolant and clean reservoir tank before installing. Refer to CO-70, "Exploded View".
5. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to CO-66, "Flushing".

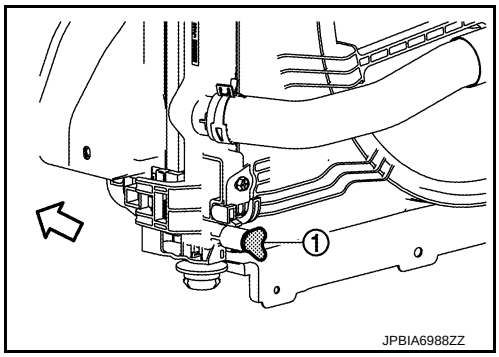
Refilling

INFOID:0000000010969779

CAUTION:
- **Never 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-23, "Fluids and Lubricants".**

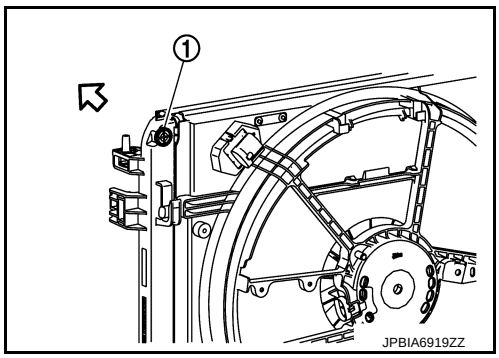
1. Install reservoir tank if removed and radiator drain plug ①.
   CAUTION:
   Be sure to clean drain plug and install with new O-ring.

   ⇦ : Vehicle front



2. Check that each hose clamp has been firmly tightened.
3. Open radiator air relief plug ①.

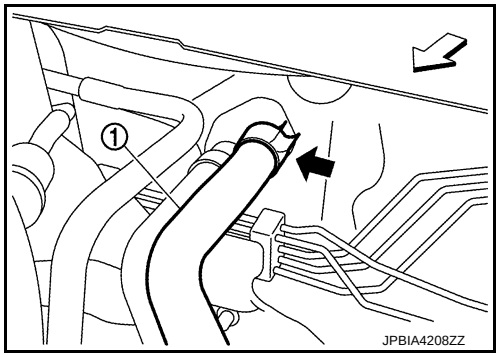
   ⇦ : Vehicle front



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

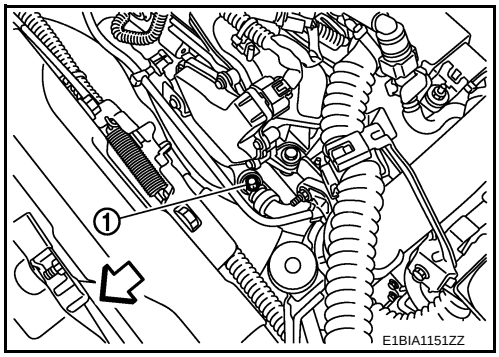
   ⇦ : Vehicle front

   - Enhance heater hose as high as possible.



5. Open air relief plug ①.

   ⇦ : Vehicle front



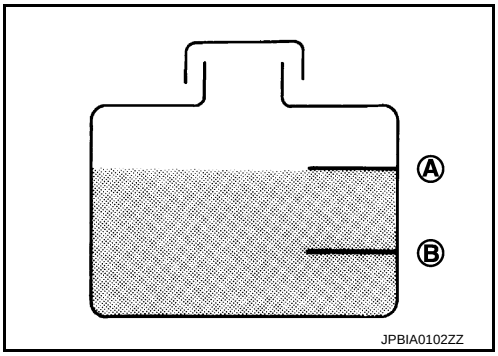
6. Fill reservoir tank with engine coolant.
   CAUTION:
   Never adhere the engine coolant to electronic equipments (alternator etc.).

- **Pour coolant slowly of less than 3 ℓ (2-5/8 Imp qt) per minute to allow air in system to escape.**
- **Engine coolant capacity (With reservoir tank at “MAX” level)**
  Refer to CO-85, "Periodical Maintenance Specification".

7. When engine coolant spill from radiator air relief plug with continuous flow, close air relief plug and continue filling reservoir tank.
8. When engine coolant spill from air relief plug with continuous flow, close air relief plug and continue filling reservoir tank.
9. When engine coolant spill from heater hose with continuous flow, connect heater hose and continue filling reservoir tank until reach “MAX” level

Ⓐ : MAX
Ⓑ : MIN

Reservoir tank engine coolant capacity (At “MAX” level)
Refer to CO-85, "Periodical Maintenance Specification".



JPBIA0102ZZ

11. Install radiator cap.
12. Warm up engine at 3000 rpm until thermostat is opened.
    - 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.
13. 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.).
14. Refill reservoir tank to “MAX” level line with engine coolant.
15. Repeat steps 11 through 14 two or more times with radiator cap installed until engine coolant level no longer drops.
16. Check cooling system for leakage with engine running.
17. Warm up the engine, and check for flowing noise while repeat at least three time slow acceleration from idle up to 3,000 rpm.
18. If flowing noise is heard, bleed air from cooling system by repeating step 11 through 17 until flowing noise is no longer heard.

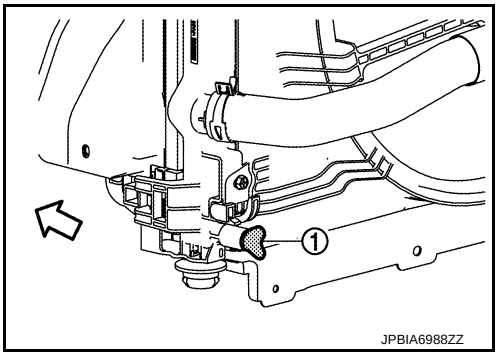
Flushing

INFOID:0000000010969780

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

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

⇦ : Vehicle front



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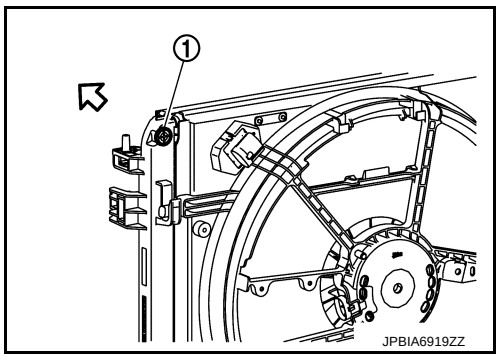
2. Open radiator air relief plug ①.

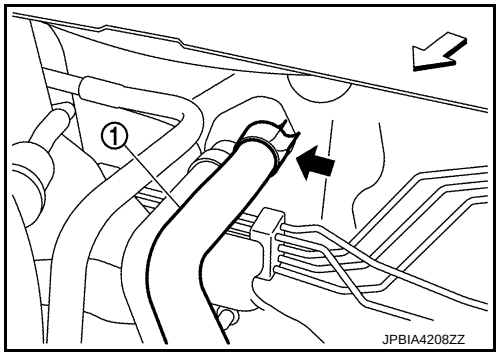
⇦ : Vehicle front



3. Disconnect heater hose ① at position (⬅) in the figure.

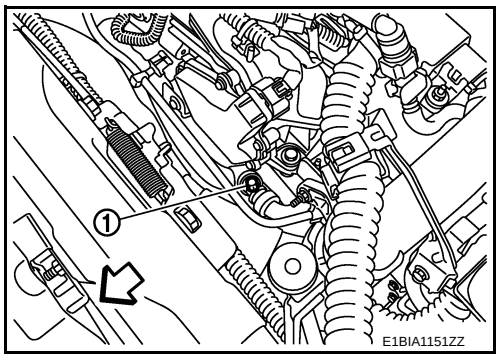
⇦ : Vehicle front

- Enhance heater as high as possible.



4. Open air relief plug ①.

⇦ : Vehicle front



5. Fill reservoir tank with water.
   - When engine coolant over flows opened radiator air relief plug, close air relief plug, and continue filling the engine coolant.
   - When engine coolant over flows opened water outlet air relief plug, close air relief plug, and continue filling the engine coolant.
   - When engine coolant over flows disconnected heater hose, connect heater hose, and continue filling the engine coolant.
6. Install radiator cap.
7. Run the engine and warm it up to normal operating temperature.
8. Rev the engine two or three times under no-load.
9. Stop the engine and wait until it cools down.
10. Drain water from the system. Refer to CO-64, "Draining".
11. Repeat steps 1 through 10 until clear water begins to drain from radiator.

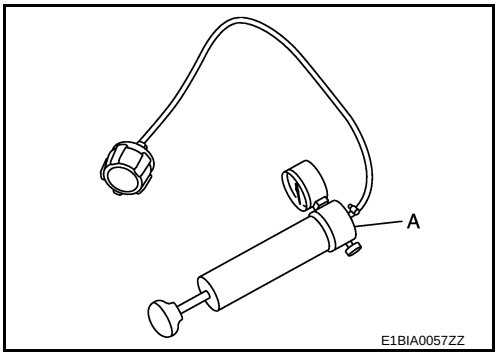
RESERVOIR TANK CAP

Inspection

INFOID:0000000010969781

- Fit the adapter to the reservoir tank cap tester [SST: — (M.S. 554-07)] (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-85, "Radiator".



- 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 filler neck to remove any waxy residue or foreign material.

RADIATOR

Inspection

INFOID:0000000010969782

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

CAUTION:

- **Never bend or damage the radiator fins.**
- **When radiator is cleaned without removal, remove all surrounding parts such as radiator fan, radiator shroud and horns. Then tape the harness and connectors to prevent water from entering.**

1. Apply water by hose to the back side of the radiator core vertically downwards.
2. Apply water again to all radiator core surface once per minute.
3. Stop washing if any stains no longer flow out from the radiator.
4. Blow air into the back side of radiator core vertically downwards.

- Use compressed air lower than 490 kPa (4.9 bar 5 kg/cm^2, 71psi) and keep distance more than 30 cm (11.8 in).

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

REMOVAL AND INSTALLATION

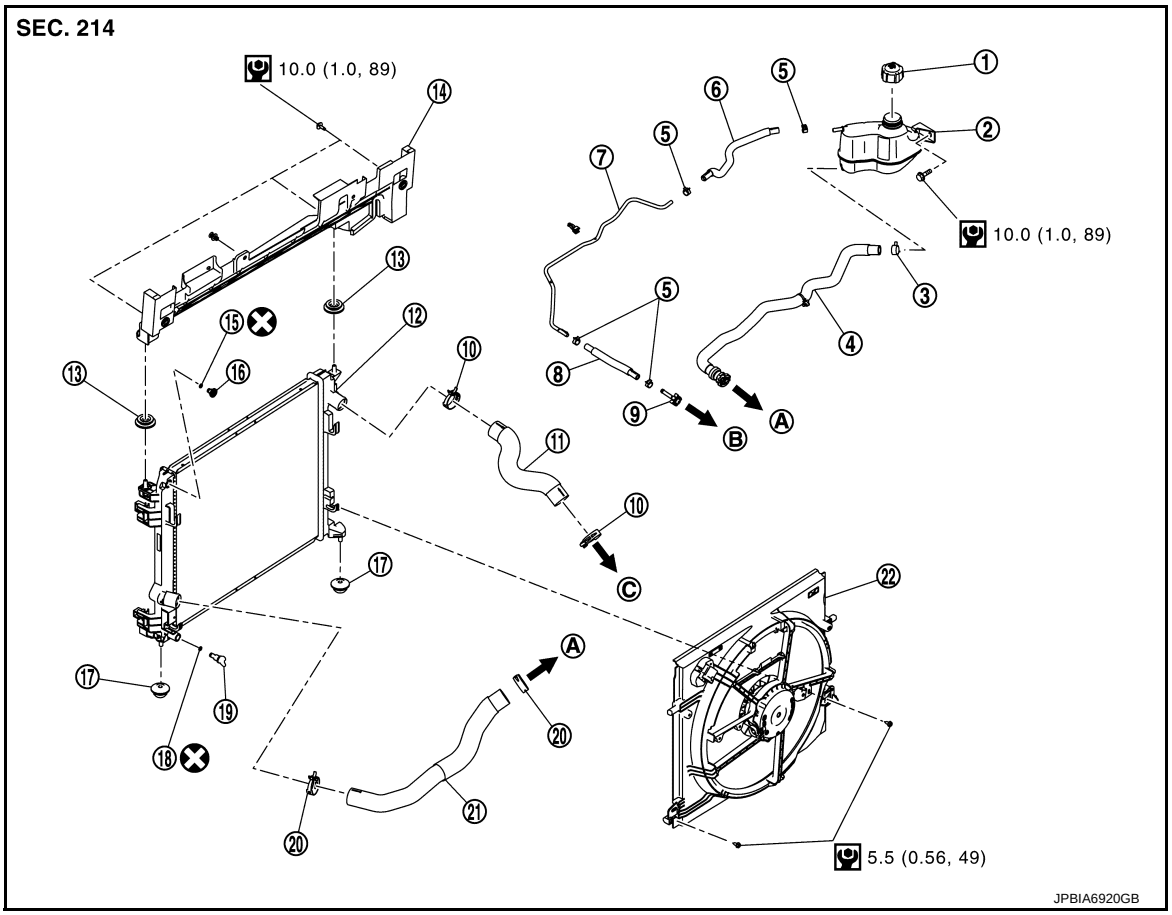
RADIATOR

Exploded View

INFOID:0000000010782997

REMOVAL

M/T models

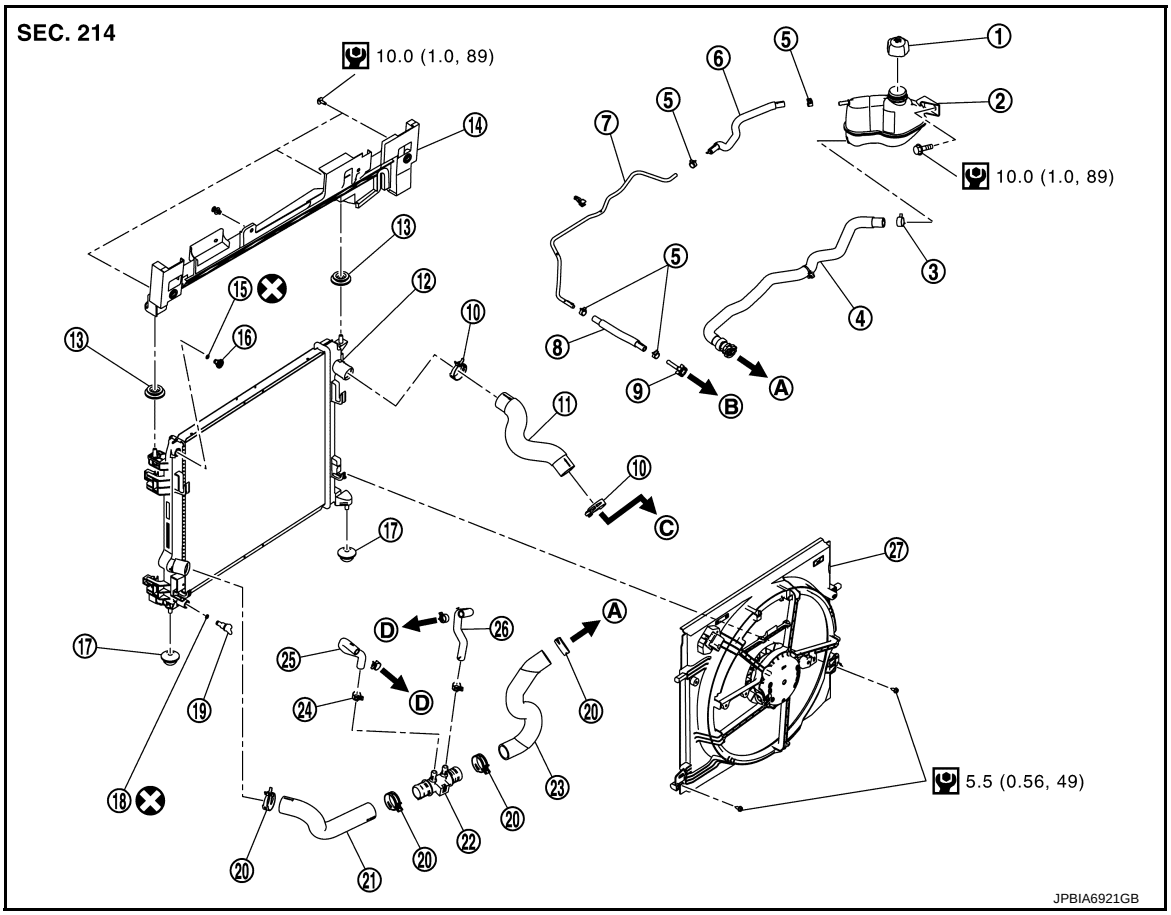


① Reservoir tank cap	② Reservoir tank	③ Clamp
④ Reservoir tank hose	⑤ Clamp	⑥ Reservoir tank hose
⑦ Reservoir tank tube	⑧ Reservoir tank hose	⑨ Connector
⑩ Clamp	⑪ Radiator hose (upper)	⑫ Radiator
⑬ Mounting rubber (upper)	⑭ Mounting bracket	⑮ O-ring
⑯ Air relief plug	⑰ Mounting rubber (lower)	⑱ O-ring
⑲ Drain plug	⑳ Clamp	㉑ Radiator hose (lower)
㉒ Cooling fan assembly		
Ⓐ To water inlet	Ⓑ To water connector	Ⓒ To water outlet

: Always replace after every disassembly.

: N·m (kg-m, in-lb)

CVT models



① Reservoir tank cap	② Reservoir tank	③ Clamp
④ Reservoir tank hose	⑤ Clamp	⑥ Reservoir tank hose
⑦ Reservoir tank tube	⑧ Reservoir tank hose	⑨ Connector
⑩ Clamp	⑪ Radiator hose (upper)	⑫ Radiator
⑬ Mounting rubber (upper)	⑭ Mounting bracket	⑮ O-ring
⑯ Air relief plug	⑰ Mounting rubber (lower)	⑱ O-ring
⑲ Drain plug	⑳ Clamp	㉑ Radiator hose (lower)
㉒ Connector	㉓ Radiator hose (lower)	㉔ Clamp
㉕ Water hose	㉖ Water hose	㉗ Cooling fan assembly
Ⓐ To water inlet	Ⓑ To water connector	Ⓒ To water outlet
Ⓓ To CVT oil warmer		

: Always replace after every disassembly.

: N·m (kg-m, in-lb)

Removal and Installation

INFOID:0000000010782998

REMOVAL

WARNING:

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

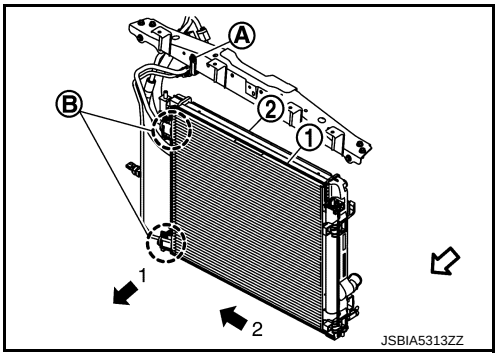
NOTE:

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

1. Remove engine under cover. Refer to EXT-39, "ENGINE UNDER COVER : Exploded View".
2. Drain engine coolant from radiator. Refer to CO-64, "Draining".
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belts.**
3. Remove air duct 1 and air duct 2. Refer to EM-308, "Exploded View".
4. Remove front bumper. Refer to EXT-14, "Exploded View".
5. Remove headlamp (RH). Refer to EXL-190, "Exploded View" (LED headlamp models) or EXL-375, "Exploded View" (halogen headlamp models).
6. Remove charge air cooler. Refer to EM-310, "Exploded View".
7. Remove radiator hose (lower) from radiator.
8. Disconnect harness connectors from cooling fan assembly, and move harness aside.
9. Remove condenser ① from radiator ② according to the following instructions:

   ⇦ : Vehicle front

   CAUTION:
   - **Be careful not to damage condenser core.**
   - **Minimize the moving distance of condenser to prevent load to air conditioner piping.**

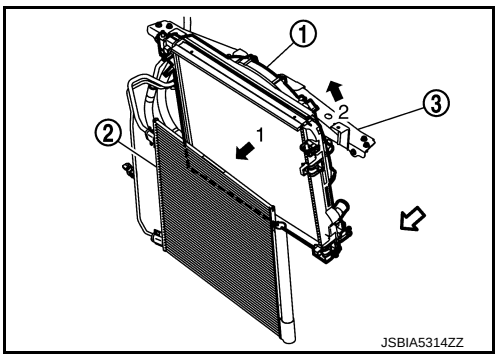


   a. Remove bolt Ⓐ.
   b. Unlock pawl Ⓑ, and move condenser to rightward of vehicle (⬅1).
   c. Move condenser to forward of vehicle (⬅2).
10. Remove radiator and cooling fan assembly ① from the clearance between condenser ② and upper radiator core support ③.

    ⇦ : Vehicle front

    ⬅ : Radiator moving direction

    CAUTION:
    - **Be careful not to damage radiator core.**
    - **Minimize the moving distance of condenser to prevent load to air conditioner piping.**



11. Remove cooling fan assembly.

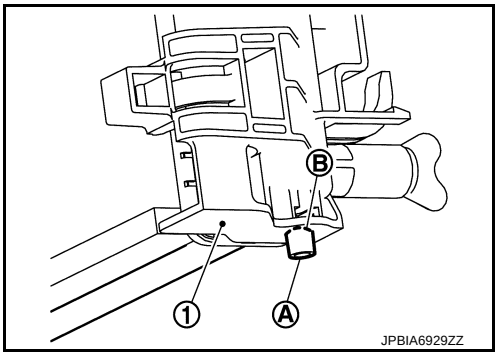
REPAIR

If the pin of radiator inserted to mounting rubber breaks, repair according to the following procedure.

1. Cut the broken pin Ⓐ at the base.

   ① : Radiator

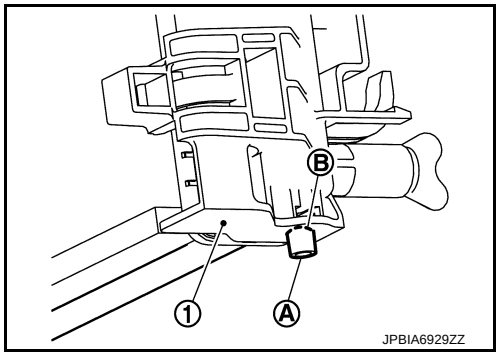
   Ⓑ : Cut line



2. Make a hole Ⓐ in the position that cut the pin.

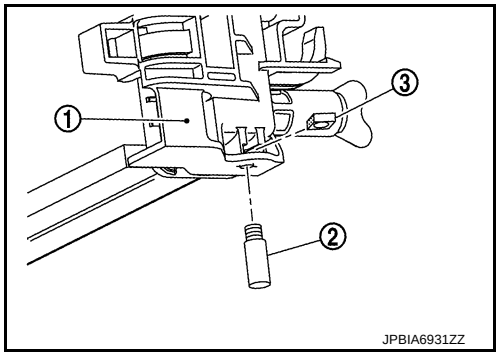
① : Radiator

Hole's diameter : ϕ 6 mm (0.24 in)



3. Install pin ②.

① : Radiator
③ : Nut



INSTALLATION

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

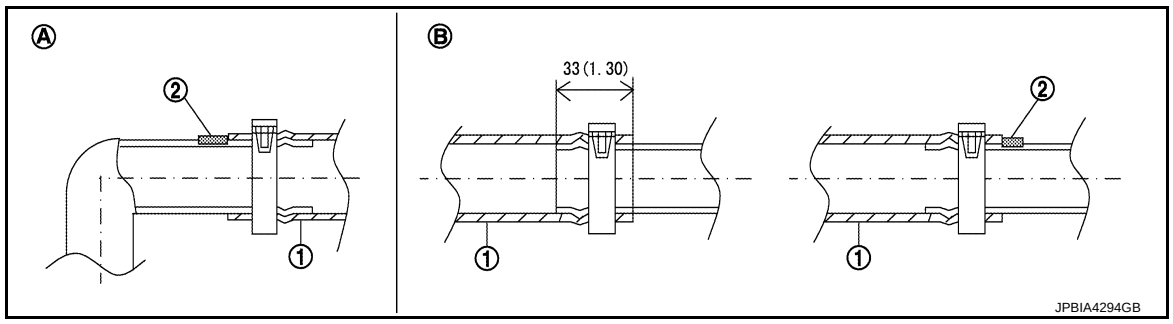
Radiator hose

CAUTION:

- **Use genuine mounting bolts for the cooling fan assembly and strictly observe the tightening torque. (Breakage prevention for radiator)**

NOTE:

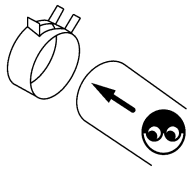
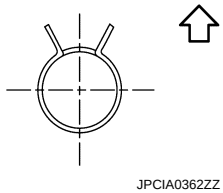
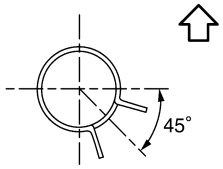
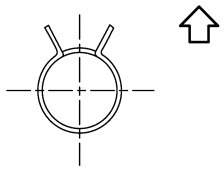
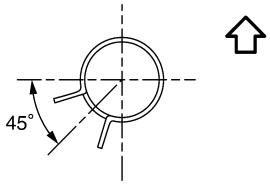
- Insert the radiator hose ① all the way to the stopper ② or by 33 mm (1.30 in) (hose without a stopper).



Unit: mm (in)

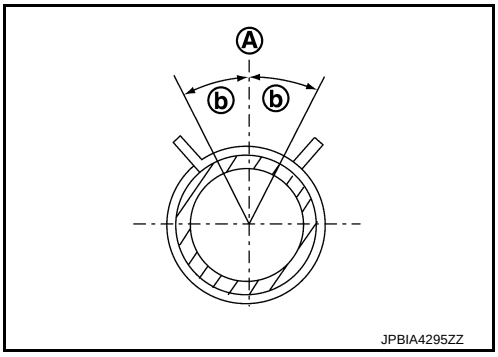
Ⓐ Radiator side Ⓑ Engine side

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

Radiator hose	Hose end	Paint mark	Position of hose clamp*  JPCIA0366ZZ ⇦ : Vehicle upper
Radiator hose (upper)	Radiator side	Upper	 JPCIA0362ZZ
	Engine side	Upper	 45° JPBIA6939ZZ
Radiator hose (lower)	Radiator side	Upper	 JPCIA0362ZZ
	Engine side	Front	 45° JPBIA6940ZZ

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

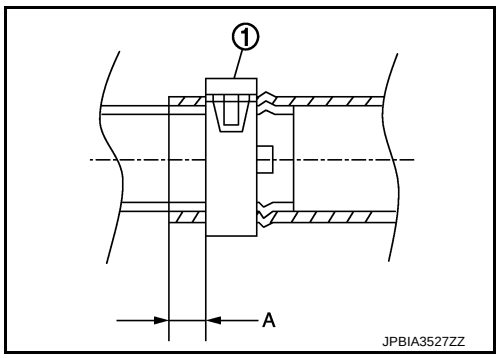
- The angle ⓑ created by the hose clamp pawl and the specified line Ⓐ must be within ±30° as shown in the figure.



JPBIA4295ZZ

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

Dimension “A”	**3 - 5 mm** **0.12 - 0.20 in**



Inspection

INFOID:0000000010782999

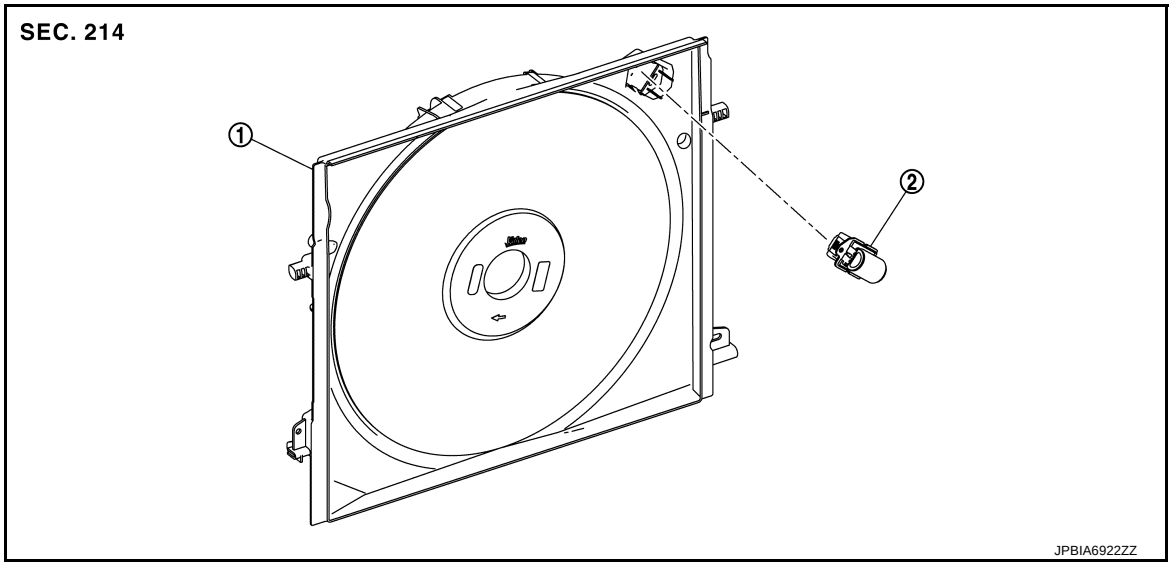
INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to CO-64, "Inspection".
- Start and warm up the engine. Visually check that there is no leakage of engine coolant.

COOLING FAN

Exploded View

INFOID:0000000010783000



① Cooling fan assembly ② Fan resistor

Removal and Installation

INFOID:0000000010783001

REMOVAL

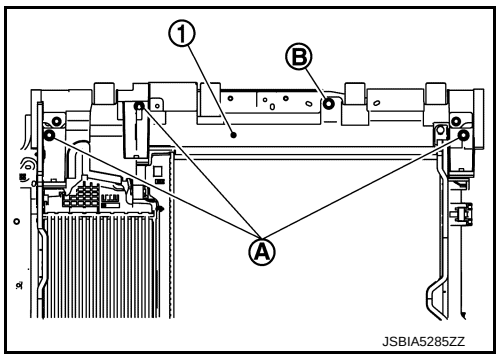
1. Remove engine under cover. Refer to EXT-39, "ENGINE UNDER COVER : Exploded View".
2. Drain engine coolant from radiator. Refer to CO-64, "Draining".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belts.**
3. Remove air duct 1 and air duct 2. Refer to EM-308, "Exploded View".
4. Remove radiator hose (upper) from radiator. Refer to CO-70, "Exploded View".
5. Remove air inlet tube 2 and air inlet hose 2. Refer to EM-308, "Exploded View".
6. Remove front grille. Refer to EXT-22, "Exploded View".
7. Remove crash zone sensor. Refer to SR-31, "Exploded View".
8. Remove hood lock bell crank and hood lock assembly. Refer to folloing table:

TYPE	Reference
1	DLK-297, "Exploded View"
2	DLK-605, "Exploded View"
3	DLK-768, "Exploded View"
4	DLK-910, "Exploded View"

How to select vehicle type: refer to DLK-22, "Information".

9. Disconnect harness connectors from cooling fan and fan resistor, and move harness to aside.

10. Remove mounting bolts Ⓐ and clips Ⓑ of mounting bracket ①.



11. Remove radiator core support upper. Refer to folloing table:

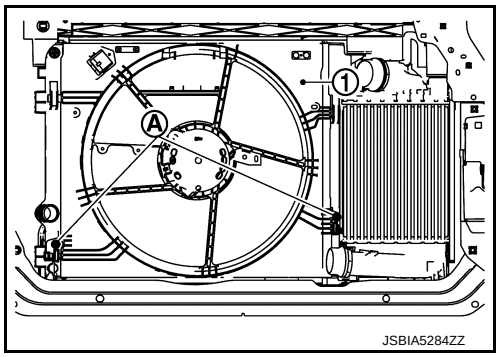
TYPE	Reference
1	DLK-268, "R9M : Exploded View"
2	DLK-576, "R9M : Exploded View"
3	DLK-738, "R9M : Exploded View"
4	DLK-880, "R9M : Exploded View"

How to select vehicle type: refer to DLK-22, "Information".

12. Remove cooling fan assembly according to the following instructions:

a. Remove screws Ⓐ.

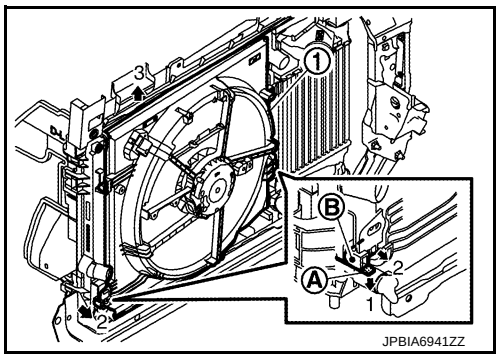
① : Cooling fan assembly



b. Unlock pawl Ⓐ (⬅1), and side mounting part Ⓑ (⬅2).

c. Remove cooling fan assembly ① to upward of vehicle (⬅3).
CAUTION:
Be careful not to damage or scratch on radiator core when removing.

13. Remove fan resistor, if necessary.



INSTALLATION

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

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

NOTE:
Cooling fans are controlled by ECM. For details. Refer to EC-843, "COOLING FAN CONTROL : System Description".

Inspection

INFOID:0000000010783003

INSPECTION AFTER DISASSEMBLY

Cooling Fan

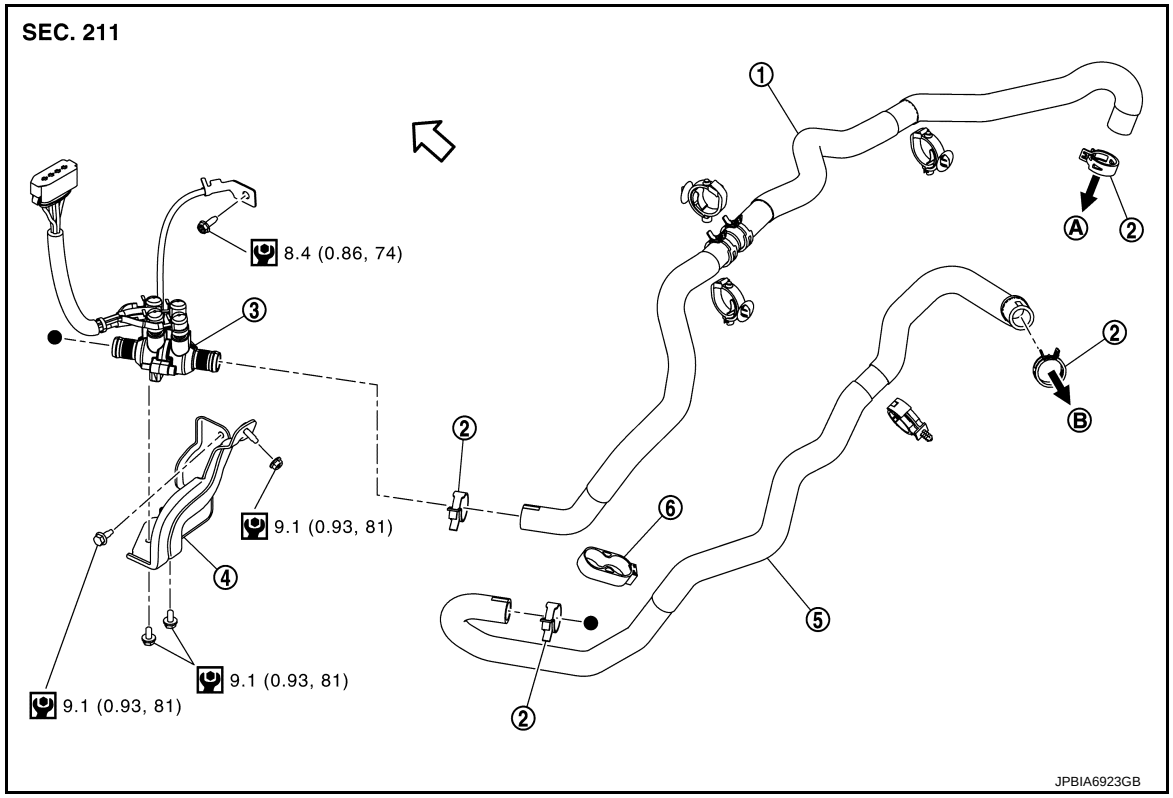
Inspect cooling fan for crack or unusual bend.

- If anything is found, replace cooling fan.

THERMO PLUNGER UNIT

Exploded View

INFOID:0000000010969487



① Water hose	② Clamp	③ Thermo plunger unit
④ Bracket	⑤ Water hose	⑥ Water hose clip
Ⓐ To oil cooler	Ⓑ To heater	
⇦ : Vehicle front		
: N·m (kg-m, in-lb)		

Removal and Installation

INFOID:0000000010969488

REMOVAL

CAUTION:
Make sure that the engine is cool down before operating, in order to avoid hot coolant outflow, as the electric pump is turned on even if the engine is off. On the other hand the pump is turned off when the engine is on. In this case as the electric pump is working, the thermostat will have to stay open due to high temperatures.

1. Remove the battery negative cable.
2. Remove front side of front fender protector (LH). Refer to EXT-35, "FENDER PROTECTOR : Exploded View"
3. Drain the engine coolant. Refer to CO-64, "Draining".
   NOTE:
   Perform this step when removing water hoses.
4. Remove the ground cable bolt.
5. Disconnect thermo plunger unit connector.
6. Remove the water hose from thermo plunger unit.
   NOTE:

When removing thermo plunger unit only, pinching water hoses near thermo plunger unit to prevent engine coolant from spilling out.

7. Remove the thermo plunger unit.

INSTALLATION

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

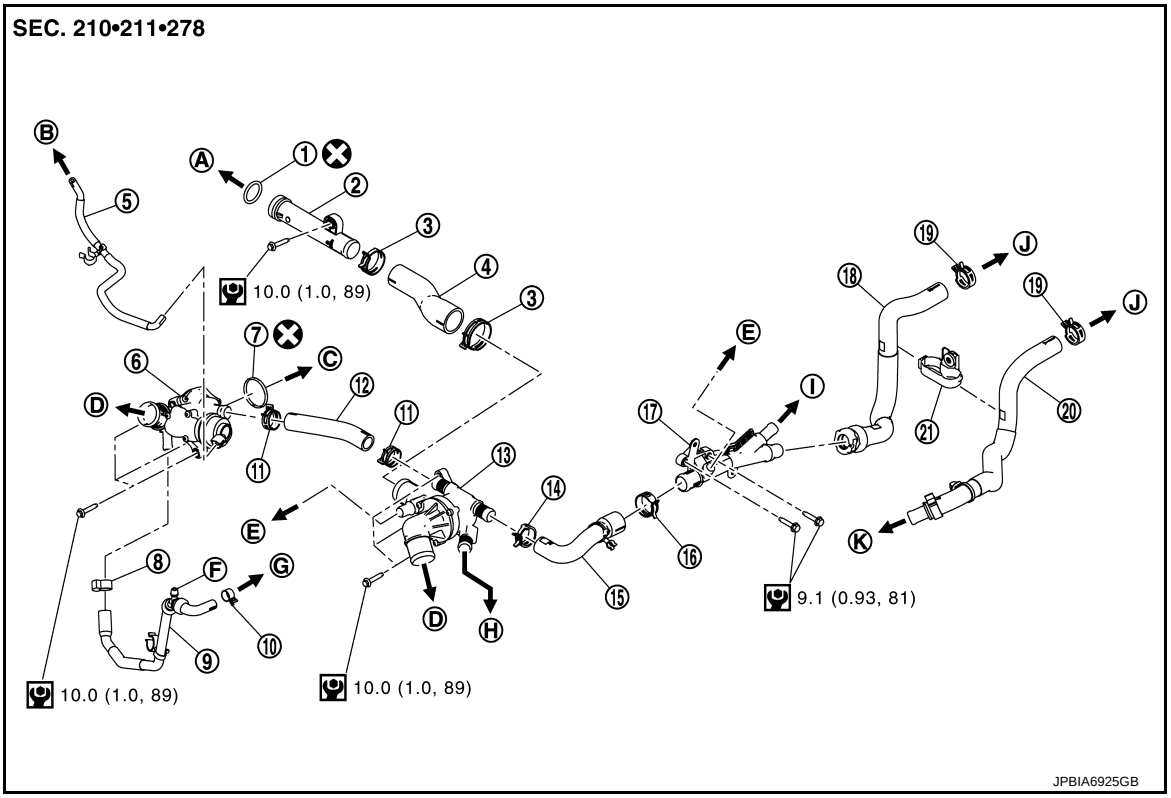
NOTE:

- Thermo plunger caps must be correctly installed after removal.
- The hoses must be fully pushed onto pipe before tightening the clamp.
- Clamp must be fixed 5mm MIN from end of hose.

WATER INLET AND WATER OUTLET

Exploded View

INFOID:0000000010969489



① O-ring	② Water pump inlet pipe	③ Clamp
④ Water pump inlet hose	⑤ Vacuum hose	⑥ Water outlet (with engine coolant by-pass valve)
⑦ O-ring	⑧ Clamp	⑨ Water hose
⑩ Clamp	⑪ Clamp	⑫ Water hose
⑬ Water inlet	⑭ Clamp	⑮ Water hose
⑯ Clamp	⑰ Water connector	⑱ Heater hose
⑲ Clamp	⑳ Heater hose	㉑ Clamp
Ⓐ To water pump	Ⓑ To engine coolant bypass valve control solenoid valve	Ⓒ To cylinder block
Ⓓ To radiator	Ⓔ To reservoir tank	Ⓕ Air relief valve
Ⓖ To intake manifold	Ⓗ To oil cooler	Ⓘ To EGR cooler
Ⓙ To heater	Ⓚ To thermo plunger unit	

: N·m (kg-m, in-lb)

: Always replace after every disassembly.

Removal and Installation

INFOID:0000000010969490

REMOVAL

1. Drain engine coolant from radiator. Refer to CO-64, "Draining".
   CAUTION:
   Perform this step when engine is cold.
2. Remove intake manifold. Refer to EM-313, "Exploded View"
3. Disconnect radiator hose (lower). Refer to CO-70, "Exploded View".

4. Disconnect water hoses from water inlet.
5. Remove water inlet.
   CAUTION:
   The thermostat cannot be separated from the water inlet.
6. Disconnect radiator hose (upper). Refer to CO-70, "Exploded View".
7. Disconnect water hoses from water outlet.
8. Remove water outlet.

INSTALLATION

Install in the reverse order of removal.

Inspection

INFOID:0000000010969491

INSPECTION AFTER REMOVAL

Water inlet

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

Standard: **Refer to CO-85, "Thermostat".**

INSPECTION AFTER INSTALLATION

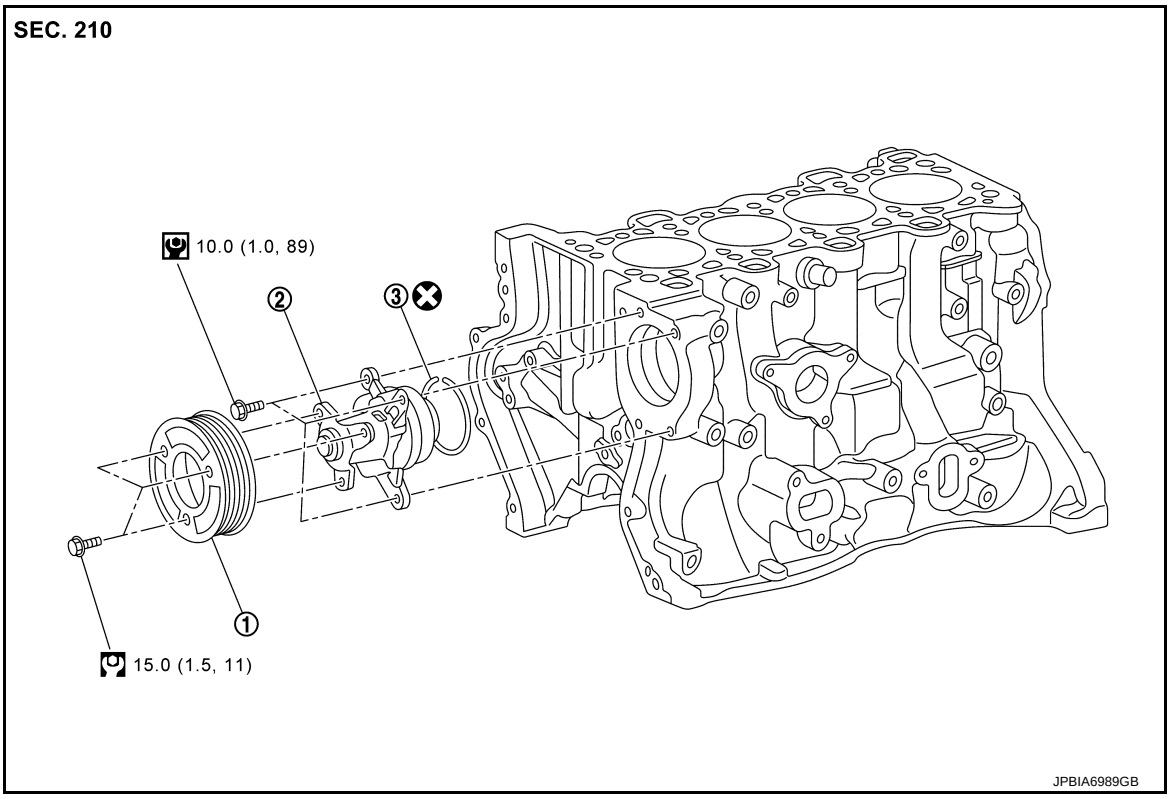
- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07). Refer to CO-64, "Inspection".
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant.

UNIT DISASSEMBLY AND ASSEMBLY

WATER PUMP

Exploded View

INFOID:0000000010969492



① Water pump pulley ② Water pump ③ O-ring

: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

: Always replace after every disassembly.

Removal and Installation

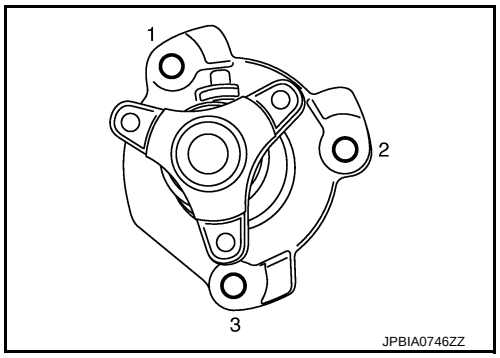
INFOID:0000000010969493

REMOVAL

1. Remove engine. Refer to EM-365, "Exploded View".
2. Remove water pump pulley.
3. Remove water pump.
   - Loosen mounting bolts in reverse order as shown in the figure.

CAUTION:

- **Handle water pump vane so that it does not contact any other parts.**
- **Water pump cannot be disassembled and should be replaced as a unit.**



INSTALLATION

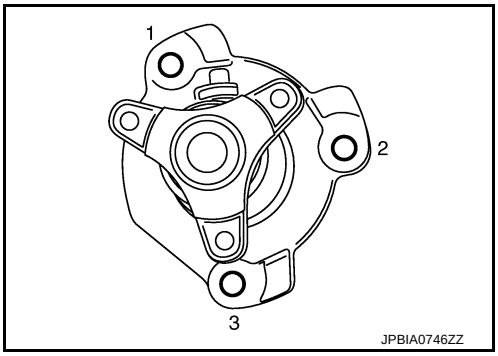
Note the following, and install in the reverse order of removal.

Water pump

CAUTION:

Do not reuse O-ring.

- Tighten mounting bolts in numerical order as shown in the figure.
- When inserting water pump end into cylinder block, apply a neutral detergent to O-ring. Then insert it immediately.

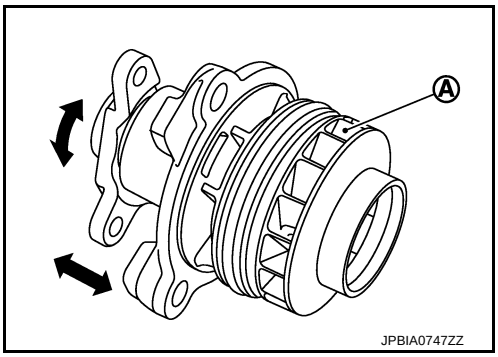


Inspection

INFOID:0000000010969494

INSPECTION AFTER DISASSEMBLY

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



SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000010783010

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Engine coolant capacity (With reservoir tank at “MAX” level)	M/T models	7.9 (7)
	CVT models	8.1 (7-1/8)
Reservoir tank		0.57 (4/8)

Radiator

INFOID:0000000010783011

Unit: kPa (bar, kg/cm^2, psi)

Cap relief pressure	Standard	130 (1.3, 1.3, 19)
	Lower limit	110 (1.1, 1.1, 16)
Leakage testing pressure		157 (1.6, 1.6, 22.8)

Thermostat

INFOID:0000000010783012

Standard

Valve opening temperature	80.0 - 92.0°C (176 - 197°F)