SECTION CO
ENGINE COOLING SYSTEM

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PRECAUTION

PRECAUTIONS

High Voltage Precautions

INFOID:0000000015272957

WARNING:

- **Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.**
- **Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes, face shield, and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**

CAUTION:

There is the possibility of a malfunction occurring if the vehicle is changed to READY status while the service plug is removed. Therefore do not change the vehicle to READY status unless instructed to do so in the Service Manual.

HIGH VOLTAGE HARNESS AND EQUIPMENT IDENTIFICATION

The colors of the high voltage harnesses and connectors are all orange. Orange "High Voltage" labels are applied to the Li-ion battery and other high voltage devices. Do not carelessly touch these harnesses and parts.

HANDLING OF HIGH VOLTAGE HARNESS AND TERMINALS

Immediately insulate disconnected high voltage connectors and terminals with insulating tape.

REGULATIONS ON WORKERS WITH MEDICAL ELECTRONICS

WARNING:

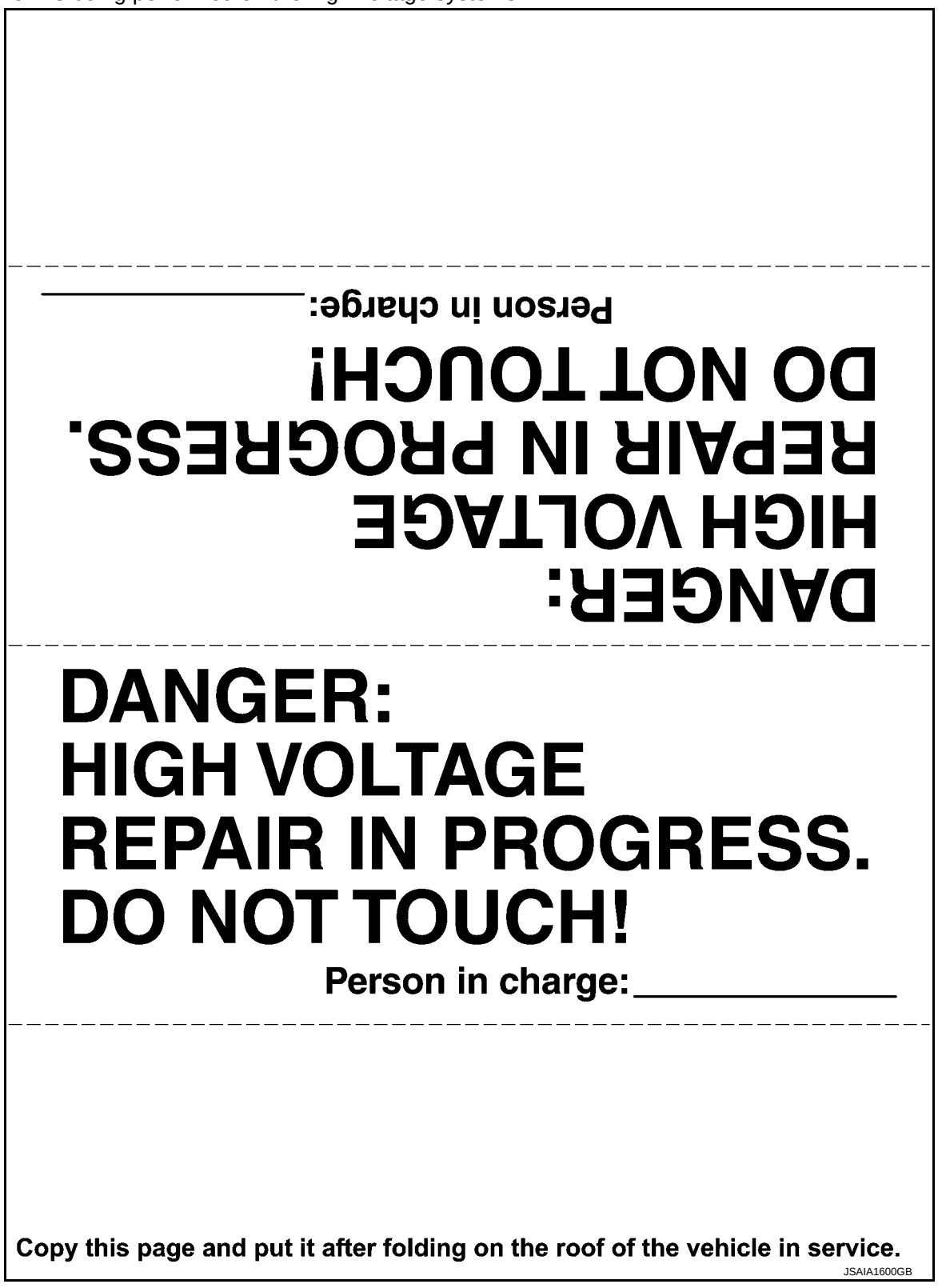
The vehicle contains parts that contain powerful magnets. If a person who is wearing a heart pacemaker or other medical device is close to these parts, the medical device may be affected by the magnets. Such persons must not perform work on the vehicle.

PROHIBITED ITEMS TO CARRY DURING THE WORK

Because this vehicle uses components that contain high voltage and powerful magnetism, do not carry any metal products which may cause short circuits, or any magnetic media (cash cards, prepaid cards, etc.) which may be damaged on your person when working.

POSTING A SIGN OF “DANGER! HIGH VOLTAGE AREA. KEEP OUT”

To call the attention of other workers, indicate "High voltage work in progress. Do not touch!" on vehicles where work is being performed on the high voltage systems.



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

INFOID:0000000014813012

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain

types of collision. Information necessary to service the system safely is included in the SR and SB section of this Service Manual.

WARNING:

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

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

WARNING:

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

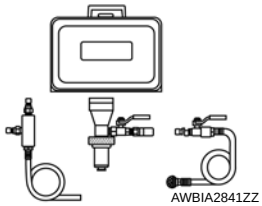
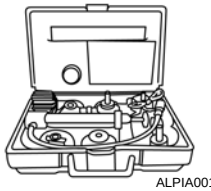
PREPARATION

PREPARATION

Special Service Tool

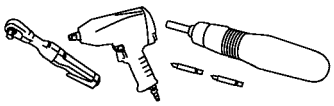
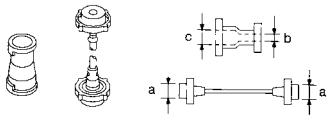
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The actual shape of the tools may differ from those illustrated here.

Tool number (TechMate No.) Tool name	Description
KV991J0070 (J-45695-A) Coolant refill tool  AWBIA2841ZZ	Refilling engine cooling system
— (J-51771) Cooling system pressure test kit 1. — (J-51771-1) Main body 2. — (J-51771-4) Small adapter 3. — (J-51771-5) Pump with quick release 4. — (J-51771-9) Radiator cap assembly with quick coupler  ALPIA0018ZZ	Checking cooling system and radiator cap

Commercial Service Tool

INFOID:0000000014745099

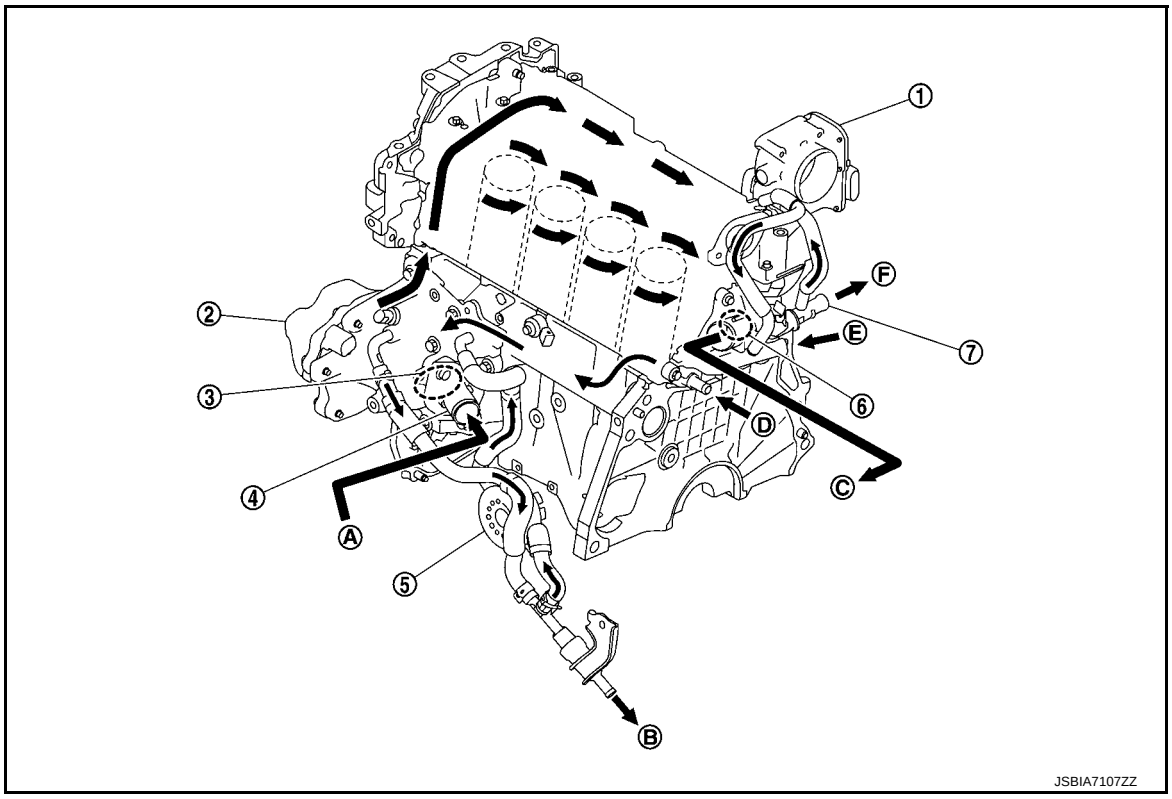
Tool name	Description
Power tool  PIIB1407E	Loosening nuts, screws and bolts
— (J-33984-A) Radiator cap tester adapter  S-NT564	Adapting radiator cap tester to radiator cap and radiator pipe (upper) filler neck **a: 28 (1.10) diameter** **b: 31.4 (1.236) diameter** **c: 41.3 (1.626) diameter** Unit: mm (in)

SYSTEM DESCRIPTION

DESCRIPTION

Engine Cooling System

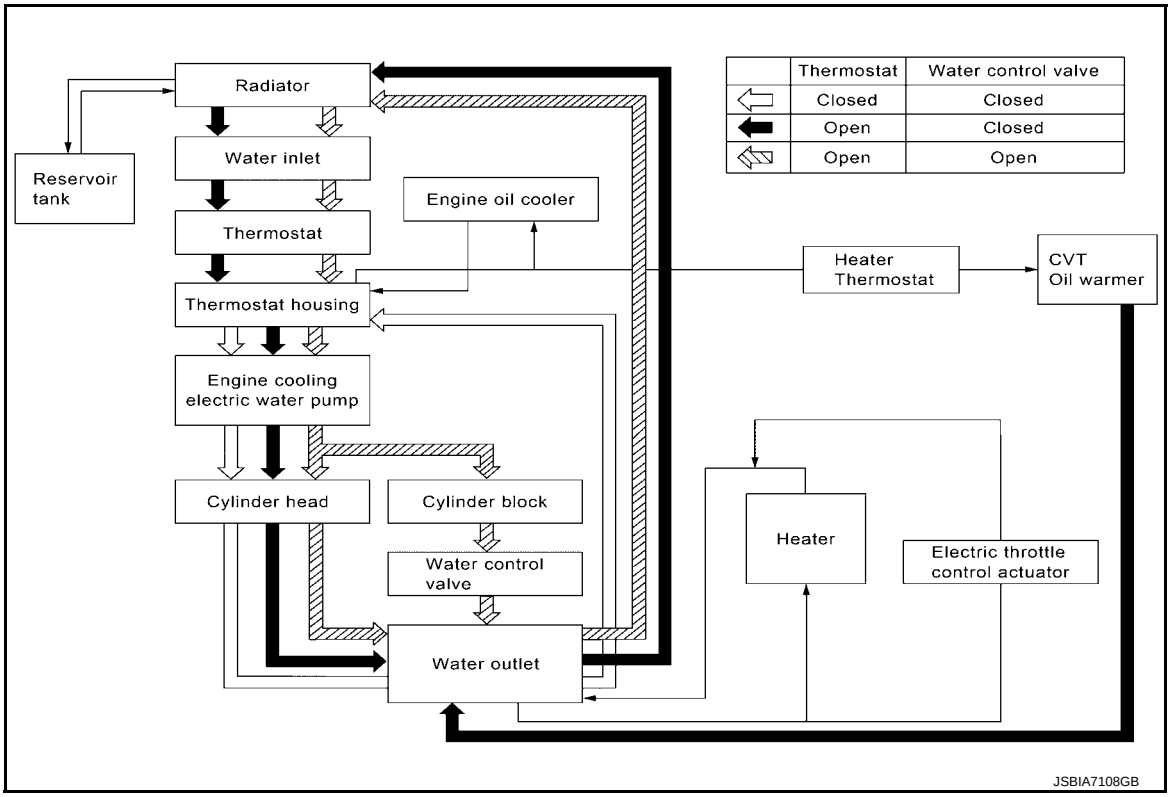
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1. Electric throttle control actuator
2. Electric water pump
3. Thermostat
4. Water inlet
5. Oil cooler
6. Water control valve
7. Water outlet
A. From radiator
B. To CVT oil warmer
C. To radiator
D. From CVT oil warmer
E. From heater (outlet)
F. From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

Engine Cooling System Schematic

INFOID:0000000014745101



SYMPTOM DIAGNOSIS

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:0000000014729377

	Symptom		Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Water pump	—
		Thermostat and water control valve stuck closed	Thermostat or water control valve	
		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
			Engine cooling electric 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:0000000014745103

WARNING:

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

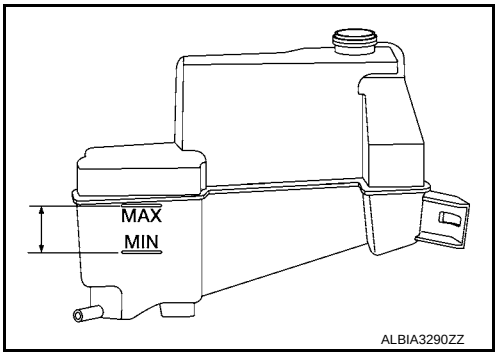
CHECKING COOLING SYSTEM HOSES

Check hoses for the following:

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

CHECKING RESERVOIR LEVEL

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

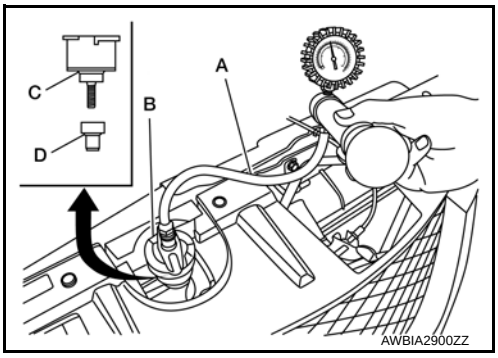


CHECKING COOLING SYSTEM FOR LEAKS

WARNING:

- **Do not remove the radiator cap or reservoir tank cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the cooling system.**
- **When removing the radiator cap or reservoir tank cap, wrap a thick cloth around the cap and slowly turn it a quarter turn to allow built-up pressure to escape. Then carefully remove the cap by turning it all the way.**
- To check the cooling system for leaks, apply pressure to the cooling system using Tools (A), (B), (C), and (D).

Tool (A)	**: —**	**(J-51771-5)**
Tool (B)	**: —**	**(J-51771-9)**
Tool (C)	**: —**	**(J-51771-1)**
Tool (D)	**: —**	**(J-51771-4)**
Leakage test pressure	**: Refer to CO-30, "Radiator".**	



Draining

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WARNING:

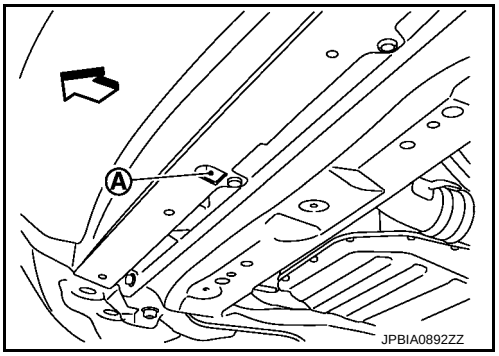
Do not remove radiator cap when engine is hot. Serious burns could occur from high pressure engine coolant escaping the radiator. Wrap a thick cloth around the cap. Slowly push down and turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by pushing it down and turning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

1. Open radiator drain plug at the bottom of radiator, and then remove radiator cap.

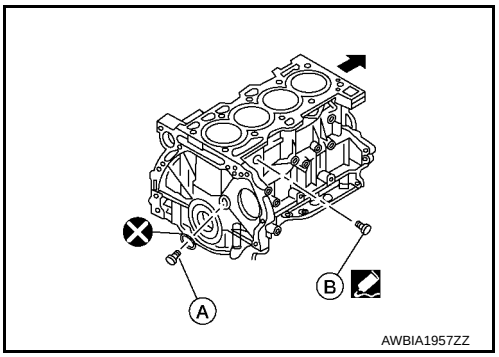
   (A) : Radiator drain plug hole

   ⇦ : Vehicle front

   CAUTION:
   Perform this step when the engine is cold.



2. Perform this step for heater core removal/replacement only. Disconnect the upper heater hose at the engine side and apply moderate air pressure [103.46 kPa (1.055 kg/cm^2, 15 psi) maximum air pressure] into the hose for 30 seconds to blow the excess engine coolant out of the heater core.
3. When draining all of the engine coolant in the system, remove the reservoir tank and drain the engine coolant, then clean the reservoir tank before installation.
   CAUTION:
   Perform this step when engine is cold.
4. When draining all of the engine coolant in the system for engine removal or repair, remove the engine coolant drain plugs (A and B) on the cylinder block.



5. Check the drained engine coolant for contaminants such as rust, corrosion or discoloration.
   If the engine coolant is contaminated, flush the engine cooling system. Refer to CO-12, "Flushing".

Refilling

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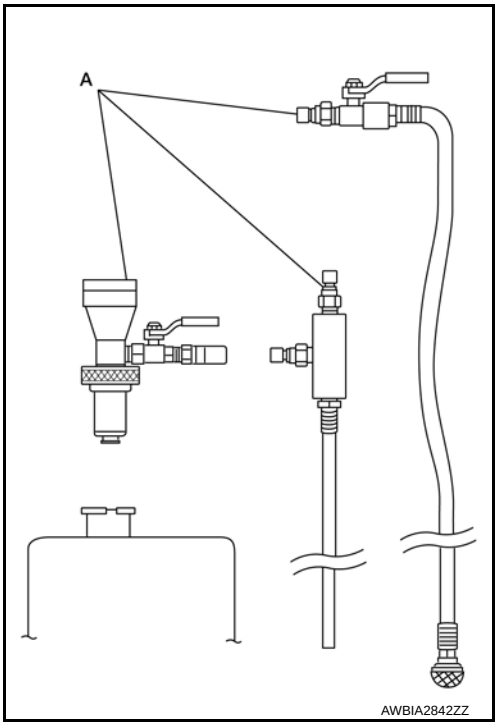
WARNING:
Do not remove the radiator cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the radiator. Wrap a thick cloth around the cap. Slowly push down and turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by pushing it down and turning it all the way.

REFILLING ENGINE COOLANT

1. Install the following, if removed:
   - Cylinder block drain plugs, refer toEM-116, "Exploded View".
   - Reservoir tank, refer to CO-15, "Exploded View".
   - Cooling system hoses, refer to CO-15, "Exploded View".
   - Radiator drain plug, refer to CO-15, "Exploded View".
2. Set the vehicle heater controls to the full HOT and heater ON positions. Turn the vehicle ignition ON with the engine OFF as necessary to activate the heater mode.

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

Tool number (A) : KV991J0070 (J-45695-A)
Engine Coolant : Refer to MA-11, "Fluids and Lubricants".



CAUTION:
- **Use recommended coolant or equivalent.**
- **Do not use any cooling system additives such as radiator sealer. Additives may clog the cooling system and cause damage to the engine, transmission or cooling system.**
- **The compressed air supply must be equipped with an air dryer.**
- **Do not start engine when reservoir tank (for engine and sub-radiator) does not contain engine coolant.**
- **Electric water pump may be activated under the status of READY. To prevent damage, the electric water pump must not be activated when engine coolant is insufficient.**

4. Remove the Tool (A) and top off the cooling system with engine coolant as necessary.
5. Install the radiator cap and reservoir tank cap.
6. Run the engine until it reaches normal operating temperature.

CAUTION:
- **Do not allow the engine to exceed normal operating temperature or engine damage may occur.**
- **Do not start engine when reservoir tank (for engine and sub-radiator) does not contain engine coolant.**
- **Electric water pump may be activated under the status of READY. To prevent damage, the electric water pump must not be activated when engine coolant is insufficient.**

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

Flushing

INFOID:0000000014745106

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

CAUTION:
- **Be sure to clean drain plug.**
- **Do not reuse O-ring.**

Radiator drain plug : Refer to CO-15, "Exploded View".

- If water drain plugs on cylinder block are removed, close and tighten them. Refer to CO-11, "Refilling".

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-10, "Draining".
7. Repeat steps 1 through 6 until clear water begins to drain from radiator.

RADIATOR

RADIATOR CAP

RADIATOR CAP : Inspection

INFOID:0000000014745107

CHECKING RADIATOR CAP

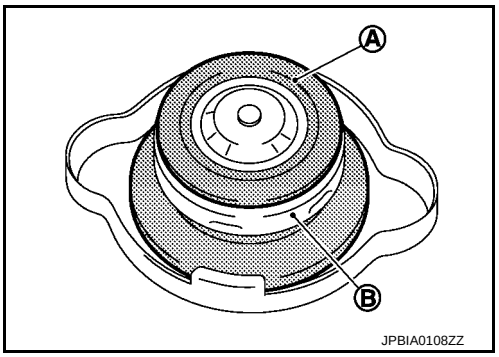
WARNING:

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

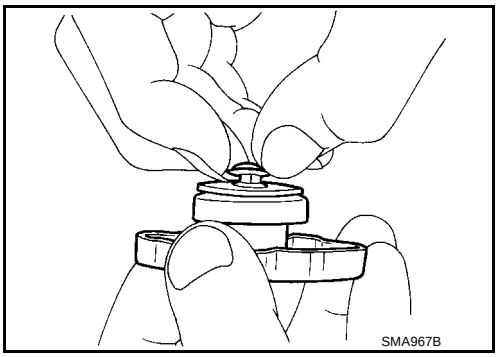
- Check the pressure valve of the radiator cap.
- Replace the radiator cap if the metal plunger (B) on the pressure valve cannot be seen around the edge of the rubber gasket (A).
- Replace the radiator cap if there is damage or deposits of foreign material on the rubber gasket or pressure valve.

CAUTION:

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

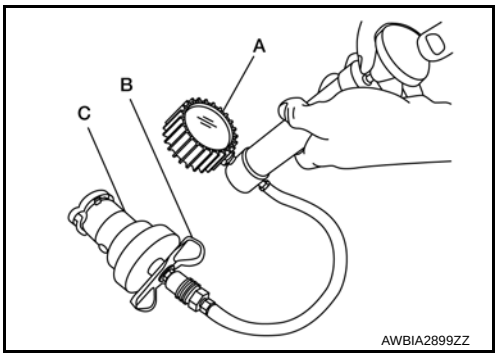


- Check the negative-pressure valve of the radiator cap.
- Replace the radiator cap if the negative-pressure valve does not close completely when pulled open and released.
- Replace the radiator cap if there is damage or deposits of foreign material on the valve seat of the negative-pressure valve.
-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



- Check radiator cap relief pressure.
- Check the radiator cap relief pressure using Tools (A) and (B), and suitable tool (C).

Tool number (A)	**: —**	**(J-51771-5)**
Tool number (B)	**: —**	**(J-51771-9)**
Tool number (C) (commercially available)	**: —**	**(J-33984-A or equivalent)**
Radiator cap relief pressure	**: Refer to CO-30, "Radiator".**	



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

RADIATOR

RADIATOR : Inspection

INFOID:0000000014745108

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. Spray water to the back side of the radiator core using a side to side motion from the top down.
2. Stop spraying when debris no longer flows from radiator core.
3. Blow air into the back side of radiator core using a side to side motion from the top down.
   - Use compressed air lower than 490 kPa (5 kg/cm^2, 71 psi) and keep distance more than 30 cm (11.8 in).
4. Continue to blow air until no water sprays out.
5. Check for engine coolant leaks. Repair as necessary.

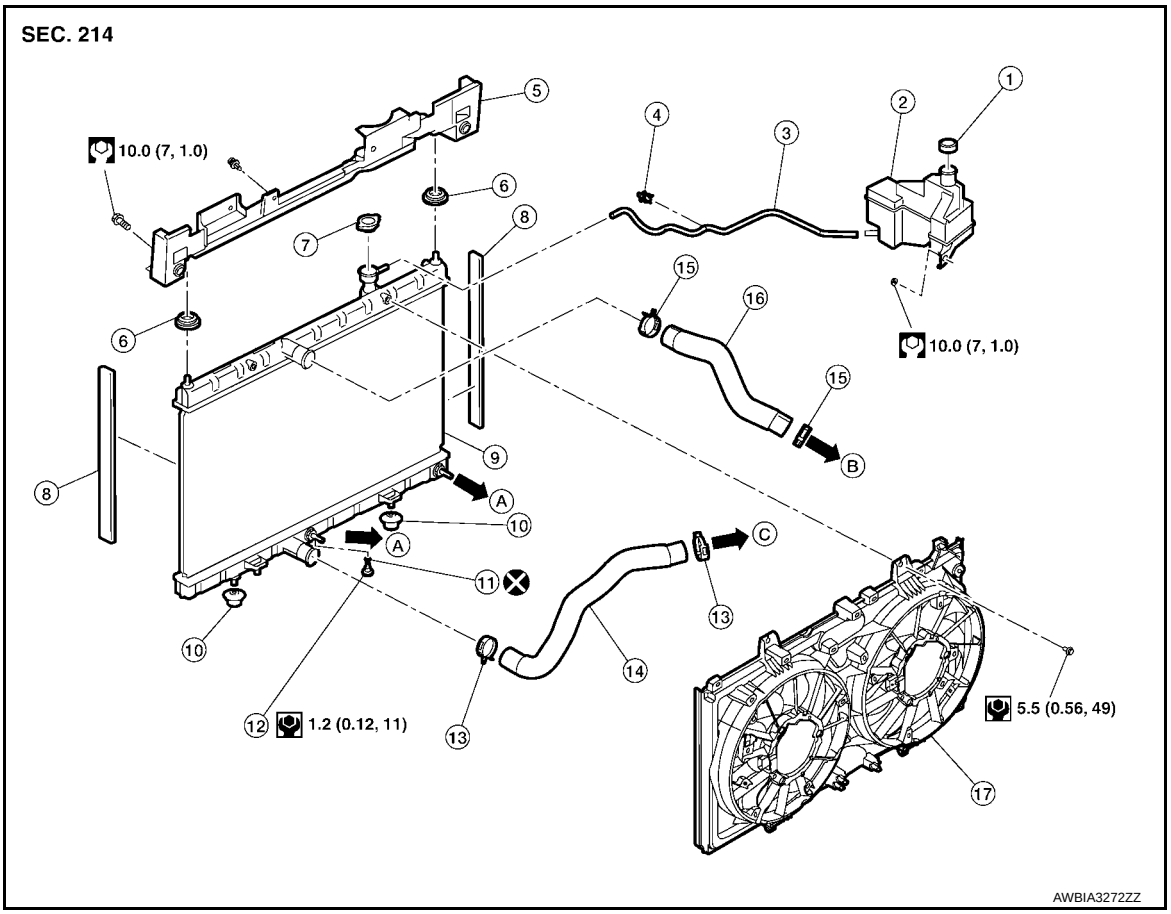
REMOVAL AND INSTALLATION

RADIATOR

Exploded View

INFOID:0000000014729384

REMOVAL



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

Removal and Installation

INFOID:0000000014729385

REMOVAL

WARNING:

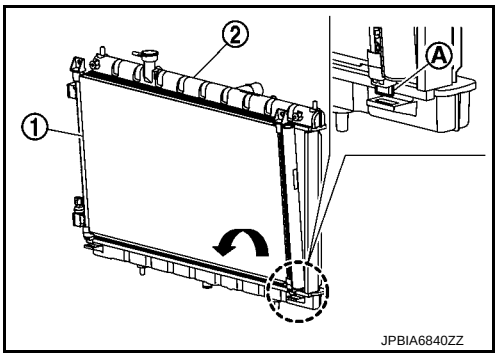
- **Do not remove radiator cap when engine is hot. Serious burns may occur from high-pressure engine coolant escaping from radiator.**
- **Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.**

NOTE:

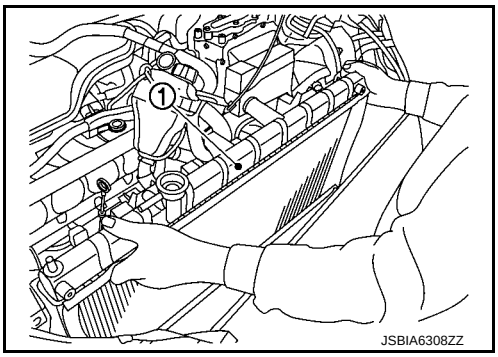
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

1. Remove engine under cover. Refer to EXT-49, "ENGINE UNDER COVER : Removal and Installation".

2. Drain engine coolant from radiator. Refer to CO-10, "Draining".
   CAUTION:
   Perform this step when the engine is cold.
3. Remove radiator hose (lower) from radiator.
4. Remove air duct 1 and air duct 2. Refer to EM-29, "Removal and Installation".
5. Disconnect CVT oil cooler hose from radiator. Refer to CO-15, "Exploded View".
   NOTE:
   Radiator cap or drain plug openings to prevent fluid from spilling.
6. Remove sub radiator. Refer to HCO-12, "Removal and Installation".
7. Remove radiator hose (upper) from radiator.
8. Remove radiator upper bracket.
9. Remove radiator core support upper and position aside.
10. Disconnect harness connectors from cooling fan control module 1. Refer to CO-19, "Removal and Installation".
11. Disconnect harness connectors from cooling fan control module 2.
12. Disconnect high voltage coolant temperature sensor harness connector. Refer to HBB-151, "Exploded View".
13. Disconnect sub radiator hose clamp from cooling fan shroud.
14. Remove condenser (1) from radiator (2), and move it forward from radiator lower rubber (A).
    CAUTION:
    - **Be careful not to damage condenser core.**
    - **Do not damage condenser or A/C pipes.**



15. Remove radiator (1) with cooling fan from the clearance between condenser and upper radiator core support.
    Minimize the moving distance of condenser to prevent load to air conditioner piping.
    CAUTION:
    Be careful not to damage radiator core.
    Do not damage the condenser or A/C pipes.
16. Remove cooling fan assembly from radiator.



INSTALLATION

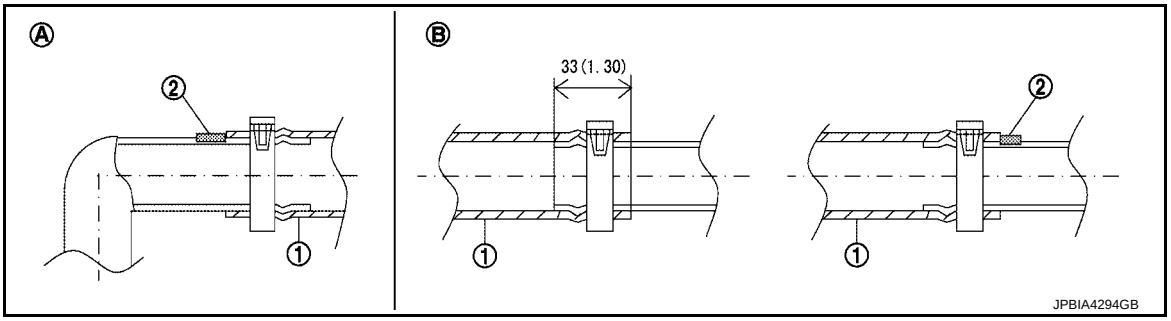
Note the following, and install in the reverse order of removal.

- After installation, refill engine coolant and check for leaks. Refer to CO-11, "Refilling".
- After installation, refill CVT fluid and check for leaks. Refer to TM-204, "Adjustment".
- After installation, refill high voltage cooling system and check for leaks. Refer to HCO-9, "Draining and Refilling".

Radiator hose

NOTE:

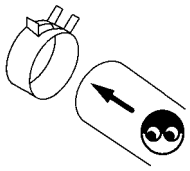
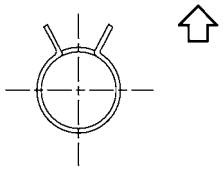
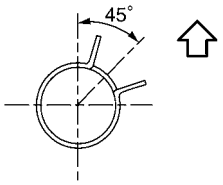
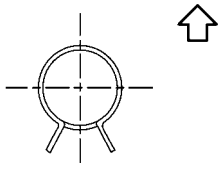
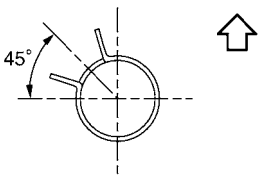
- Insert the radiator hose (1) all the way to the stopper (2) or by 33 mm (1.30 in) (radiator without a stopper).



Unit: mm (in)

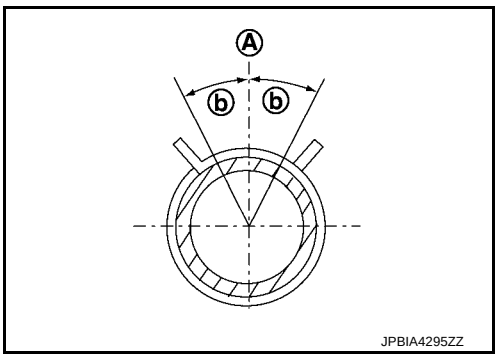
A. Radiator side B. Engine side

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

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

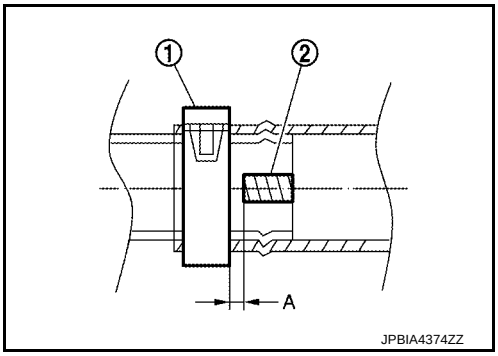
*Refer to the illustrations for the specific position each hose clamp tab.

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



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

Dimension “A”	**3 mm (0.12 in)**



Inspection

INFOID:0000000014808104

INSPECTION AFTER INSTALLATION

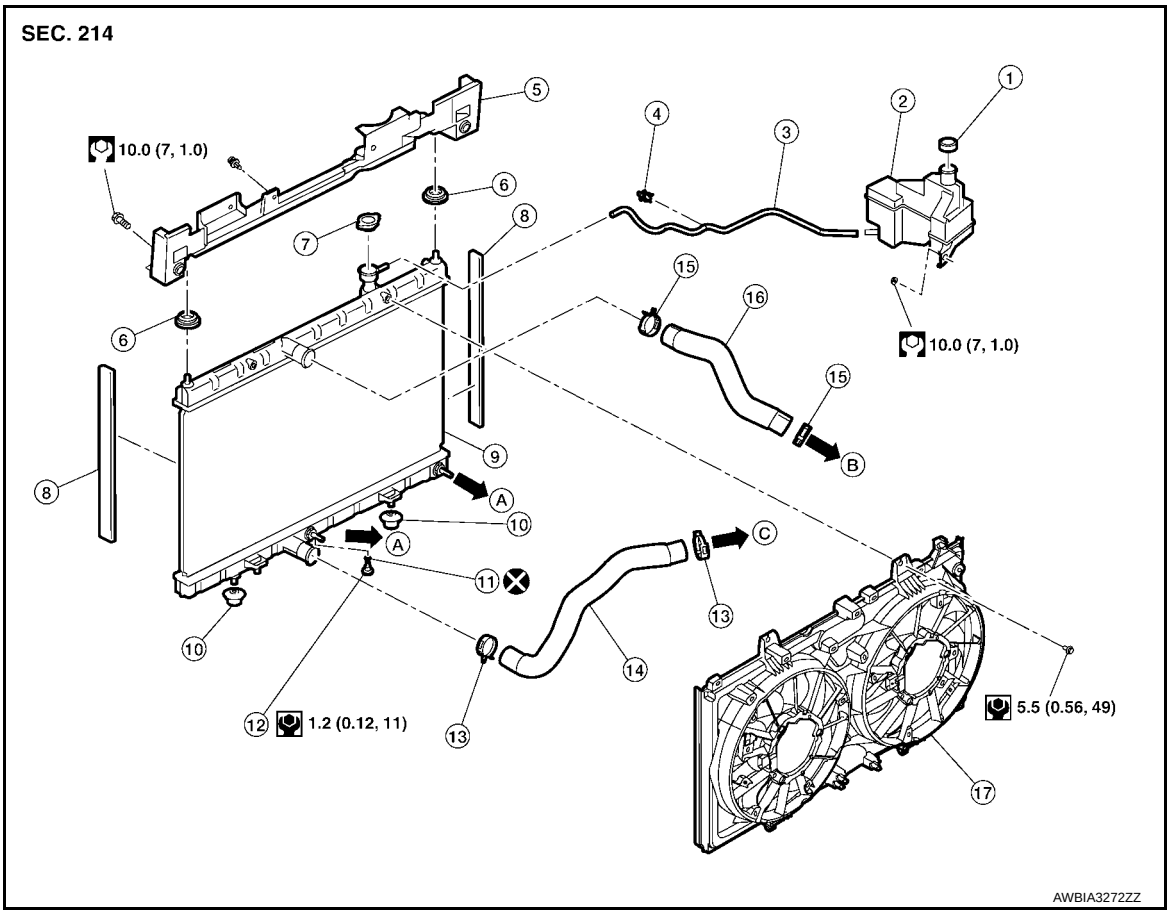
- Refill the cooling system. Refer to CO-11, "Refilling".
- Refill CVT fluid. Refer to TM-204, "Adjustment".
- After installation, check engine coolant system for leaks. Refer to CO-10, "Inspection".
- Start and warm up the engine. Check visually that there are no leaks of engine coolant.

COOLING FAN

Exploded View

INFOID:0000000014808194

REMOVAL



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

Removal and Installation

INFOID:0000000014729388

REMOVAL

WARNING:

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

NOTE:

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

1. Remove radiator. Refer to CO-15, "Removal and Installation".
2. Separate the cooling fan assembly from the radiator.

INSTALLATION

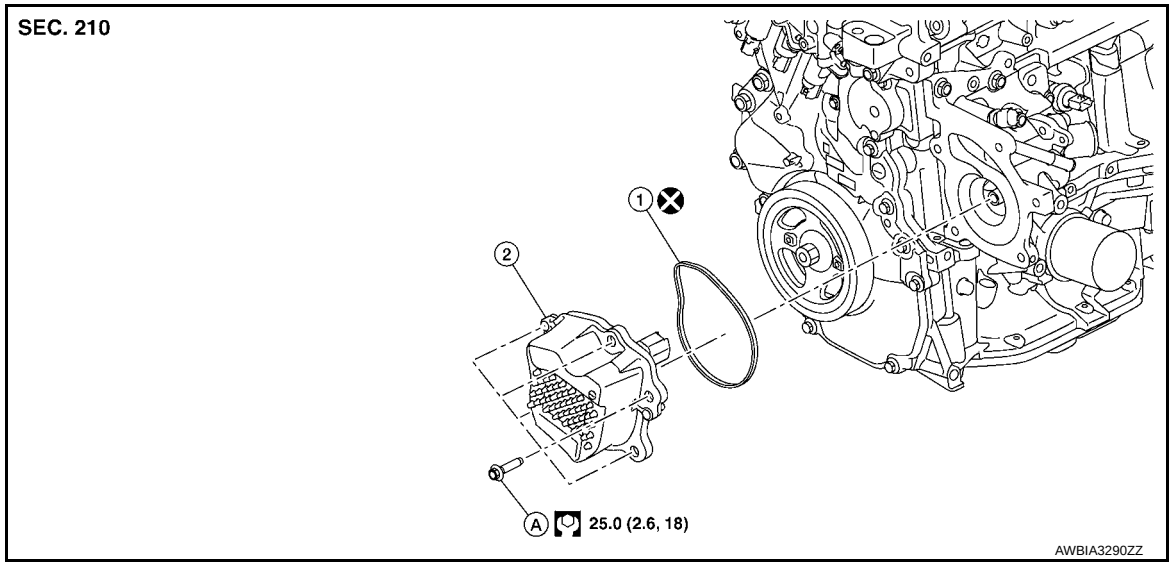
Note the following, and install in the reverse order of removal.
Installation is in the reverse order of removal.

- After installation, refill with engine coolant and check for leaks. Refer to CO-11, "Refilling".
- After installation, refill CVT fluid and check for leaks. Refer to TM-204, "Adjustment".
- After installation, refill high voltage cooling system and check for leaks. Refer to HCO-9, "Draining and Refilling".

ELECTRIC WATER PUMP

Exploded View

INFOID:0000000014729389



1. Gasket
2. Engine cooling electric water pump
A. Refer to installation

Removal and Installation

INFOID:0000000014729390

DANGER:

Since hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **The removed service plug must always be carried in a pocket of the responsible worker or placed in the tool box during the procedure to prevent the plug from being connected by mistake.**
- **Be sure to wear insulating protective equipment before beginning work on the high voltage system.**
- **Never allow workers other than the responsible person to touch the vehicle containing high voltage parts. To keep others from touching the high voltage parts, these parts must be covered with an insulating sheet except when using them.**
- **Refer to GI-28, "High Voltage Precautions".**

CAUTION:

Never bring the vehicle into the READY status with the service plug removed unless otherwise instructed in the Service Manual. A malfunction may occur if this is not observed.

REMOVAL

WARNING:

Follow the instructions below before starting the procedure.

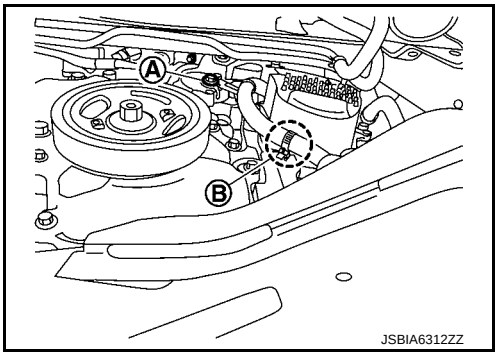
- **Disconnect high voltage circuit. Refer to GI-29, "How to Disconnect High Voltage".**
- **Check voltage in high voltage circuit. Refer to GI-31, "Check Voltage in High Voltage Circuit".**

1. Remove engine under cover. Refer to EXT-49, "ENGINE UNDER COVER : Removal and Installation".
2. Drain engine coolant from radiator. Refer to CO-10, "Draining".
   CAUTION:
   Perform this step when the engine is cold.
3. Remove wheel and tire (RH). Refer to WT-67, "Removal and Installation".
4. Remove front over fender (RH). Refer to EXT-42, "FRONT OVER FENDER : Removal and Installation".

5. Remove fender protector (RH). Refer to EXT-40, "FENDER PROTECTOR : Removal and Installation".

6. **WARNING:**
To prevent electric shock, wear insulated protective gear.
Disconnect electric compressor harness connector. Refer to HA-32, "ELECTRIC COMPRESSOR : Removal and Installation".

7. **WARNING:**
To prevent electric shock, wear insulated protective gear.
Remove high voltage harness bracket bolt (A) and disconnect high voltage harness clamp (B).

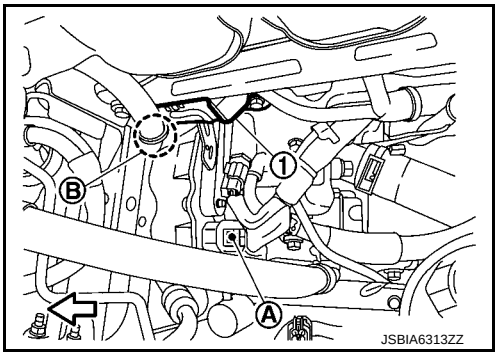


8. Reposition reservoir tank (high voltage cooling system) aside. Refer to HCO-12, "Exploded View".

9. Disconnect the harness connector from the electric water pump Ⓐ.

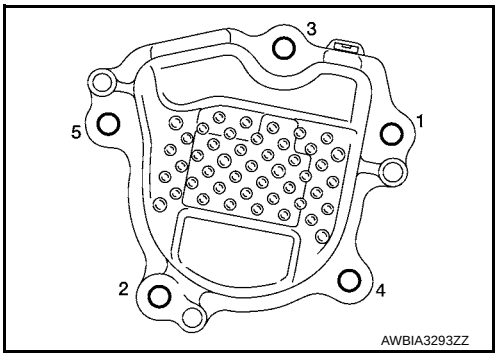
10. **WARNING:**
To prevent electric shock, wear insulated protective gear.
Disconnect high voltage harness clamp (B), and remove high voltage harness clamp bracket (1).

⇦ : Engine front



11. Remove the electric water pump bolts in the sequence shown.
CAUTION:
- **Do not allow electric water pump vane to contact any other parts.**
- **Do not disassemble electric water pump.**
- **The electric water pump is serviced as an assembly.**

NOTE:
- Position drain pan under electric water pump.
- Loosen mounting bolts as shown in the figure.



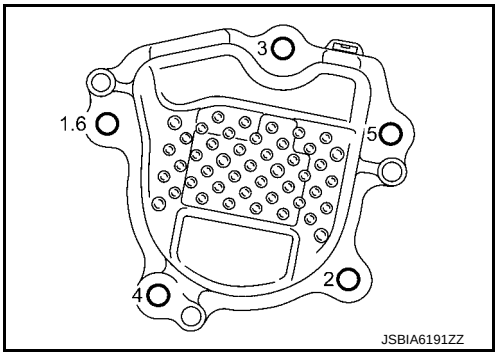
12. Remove the electric water pump.

INSTALLATION

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

CAUTION:
- **After installing electric water pump, verify coolant system is filled properly before activating electric water pump.**
- **Electric water pump is served as an assembly.**

1. Install electric water pump and tighten bolts in the sequence shown.



2. Refill the cooling system. Refer to CO-11, "Refilling".

Inspection

INFOID:0000000014729391

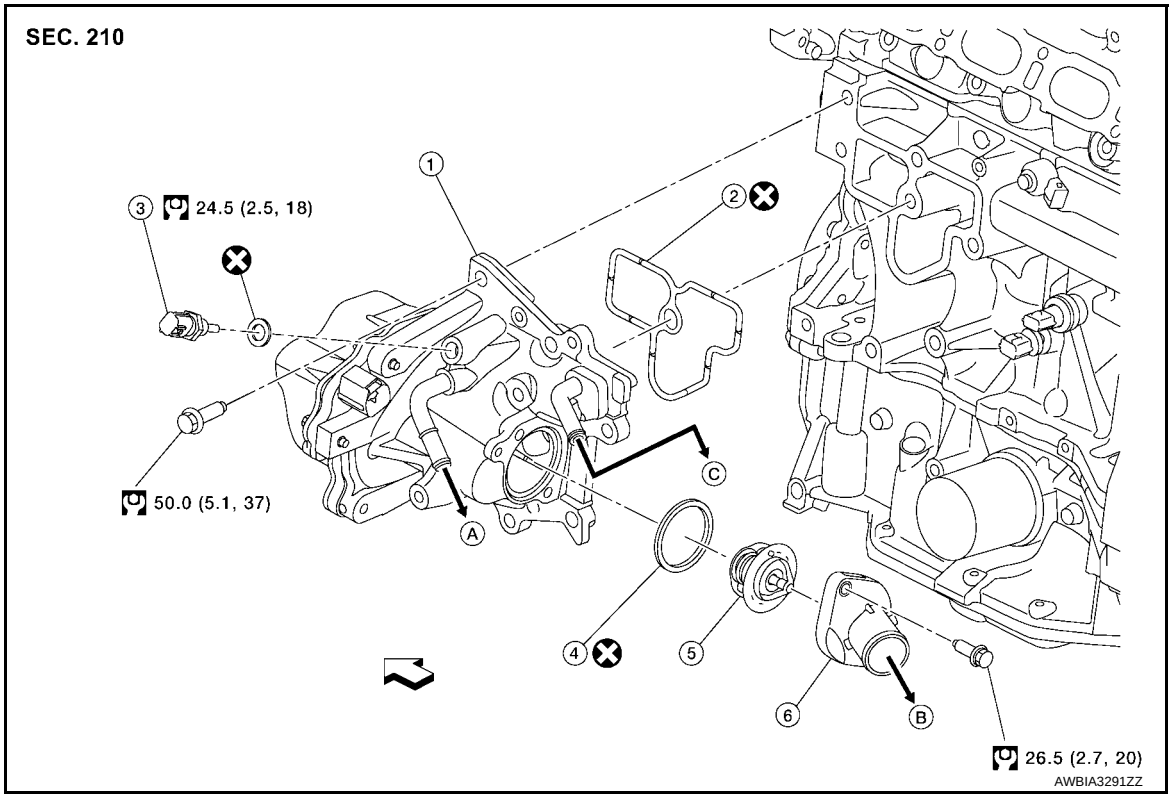
INSPECTION AFTER INSTALLATION

- After installation, check engine coolant system for leaks. Refer to CO-10, "Inspection".
- Start and warm up the engine. Check and make sure there are no engine coolant leaks.

THERMOSTAT

Exploded View

INFOID:0000000014729392



1.	Water pump housing	2.	Water pump housing gasket	3.	Engine inlet coolant temperature sensor
4.	Oring	5.	Thermostat	6.	Water inlet
A.	To oil cooler	B.	To radiator	C.	To oil cooler

⇦ : Engine front

Removal and Installation

INFOID:0000000014729393

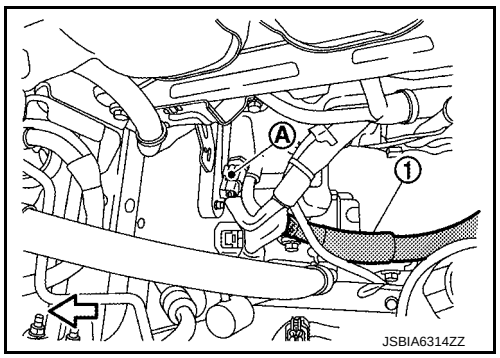
REMOVAL

1. Drain engine coolant from radiator. Refer to CO-10, "Draining".
   CAUTION:
   Perform this step when engine is cold.
2. Remove bolts and reservoir tank (high voltage cooling system) and move aside.
3. Disconnect radiator hose (lower) from water inlet. Refer to CO-15, "Exploded View".
4. Remove water inlet and thermostat.
5. Remove thermostat housing with the following procedure (if necessary):

a. Remove electric water pump. Refer to CO-21, "Exploded View".

b. Disconnect the harness connector from engine coolant temperature sensor 1 (A).

⇦ : Engine front



c. Remove water hose (1).

d. Remove oil level gauge. Refer to EM-43, "Removal and Installation".

e. Remove engine harness clamp from oil level gauge guide to remove engine oil gauge guide bolt.
NOTE:
It is not necessary to remove oil level gauge guide.

f. Remove fuel rail cover and insulator. Refer to EM-54, "Removal and Installation".
CAUTION:
Do not damage engine harness while removing fuel rail cover.

g. Disconnect harness clamp from thermostat housing.

h. Remove thermostat housing.

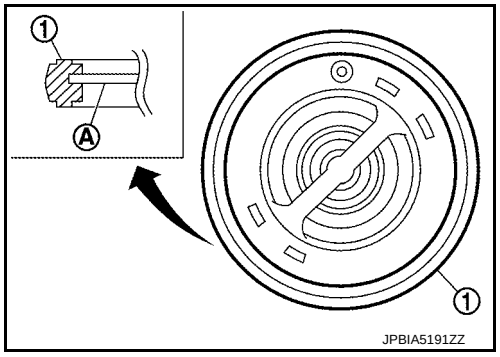
i. Remove engine coolant temperature sensor 1 from thermostat housing.

INSTALLATION

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

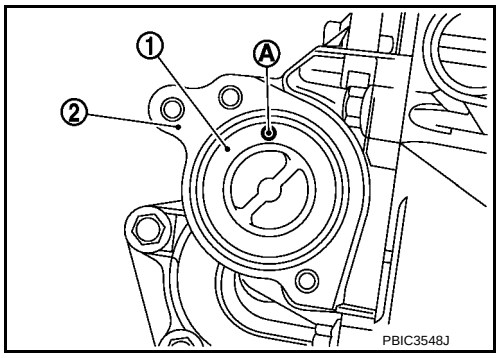
CAUTION:
- **Do not reuse thermostat housing gasket.**
- **Do not use engine coolant temperature sensor 1 if it has been dropped or sustained an impact.**

- Ensure rubber ring (1) is seated properly around control valve flange (A).



- Install thermostat (1) with jiggle valve (A) facing upwards.

(2) : Thermostat housing



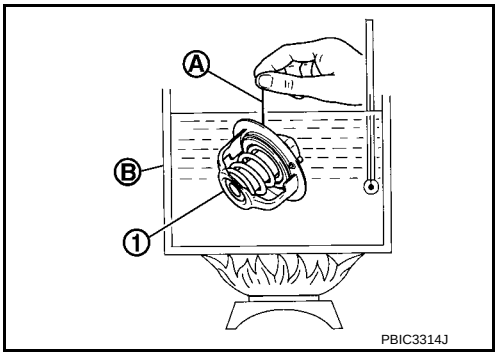
- Refill engine coolant and check for leaks. Refer to CO-11, "Refilling".

Inspection

INFOID:0000000014729394

INSPECTION AFTER REMOVAL

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



Standard: Refer to CO-30, "Thermostat".

- If out of the standard, replace thermostat.

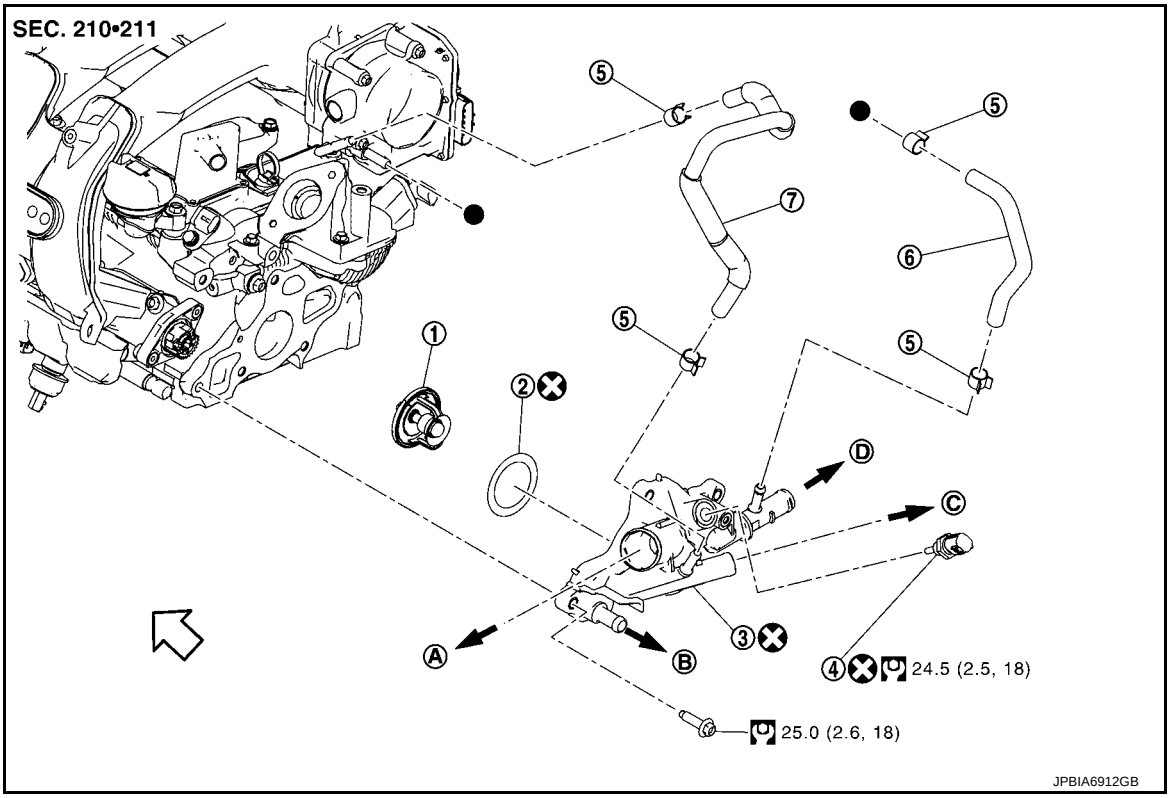
INSPECTION AFTER INSTALLATION

- After installation, check engine coolant system for leaks. Refer to CO-10, "Inspection".
- Start and warm up the engine. Check and make sure there are no engine coolant leaks.

WATER OUTLET

Exploded View

INFOID:0000000014729395



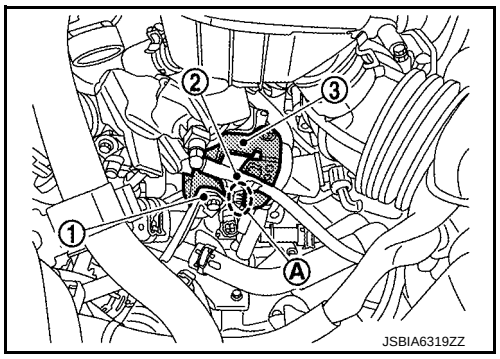
1.	Water control valve	2.	O-ring	3.	Water outlet
4.	Engine coolant temperature sensor 1	5.	Clamp	6.	Water hose A
7.	Water hose B	A.	To radiator	B.	To CVT oil warmer
C.	To heater	D.	To heater	⇦	: Engine front

Removal and Installation

INFOID:0000000014729396

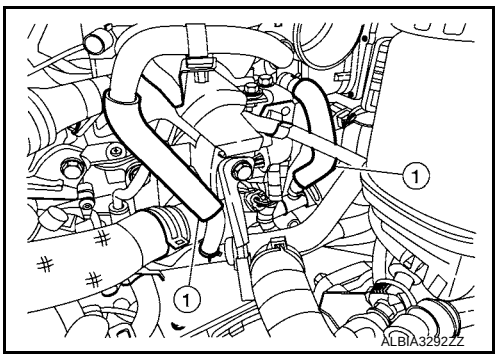
REMOVAL

1. Drain engine coolant from radiator. Refer to CO-10, "Draining".
   CAUTION:
   - **Perform this step when engine is cold.**
2. Remove fuel pump connector protector. Refer to EM-49, "Removal and Installation".
3. Disconnect high voltage harness bracket (1).
4. Disconnect harness clip (A) and fuel hose (2) from bracket (3).
5. Remove bracket.



6. Disconnect harness connector from the engine coolant temperature sensor 1.
7. Disconnect radiator hose (upper) form water outlet. Refer to CO-15, "Exploded View".

8. Remove heater hoses (1).

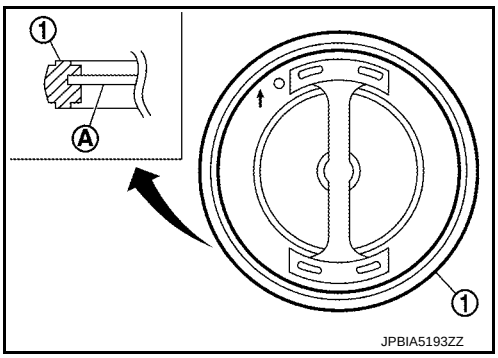


9. Remove water outlet.
10. Remove engine coolant temperature sensor 1 (if necessary).

INSTALLATION

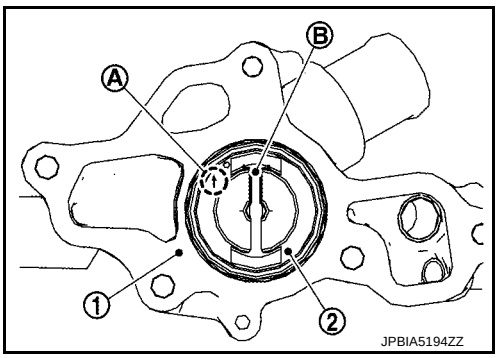
Note the following, and install in the reverse order of removal.

- Ensure rubber ring (1) is seated properly around control valve flange (A).



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

1. : Water outlet

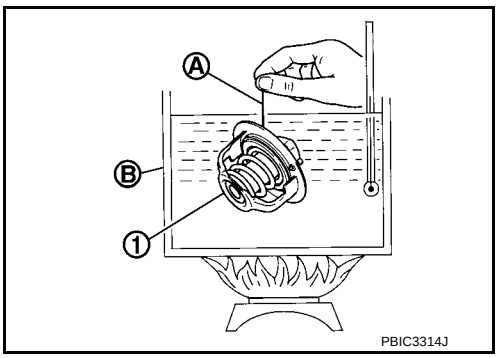


Inspection

INFOID:0000000014729397

INSPECTION AFTER REMOVAL

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



Standard: **Refer to CO-30, "Water Control Valve".**

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

INSPECTION AFTER INSTALLATION

- After installation, check engine coolant systems for leaks. Refer to CO-10, "Inspection".
- Start and warm up the engine. Check and make sure there are no engine coolant leaks.

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000014729398

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (US qt, Imp qt)

Engine coolant capacity (With reservoir tank at “MAX” level)	7.4 (7.9, 6.5)

Radiator

INFOID:0000000014729399

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

Cap relief pressure	Standard	88 (0.88, 0.88, 12.8)
	Limit	60 (0.6, 0.6, 8.7)
Leakage testing pressure		157 (1.6, 1.6, 22.8)

Thermostat

INFOID:0000000014729400

Standard

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

Water Control Valve

INFOID:0000000014729401

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)