

# SECTION **HCO**

## HIGH VOLTAGE COOLING SYSTEM

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# PRECAUTIONS

< PRECAUTION >

## PRECAUTION

### PRECAUTIONS

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

INFOID:000000008139960

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

#### **WARNING:**

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, 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 12V battery, and wait at least 3 minutes before performing any service.

#### Precautions For Xenon Headlamp Service

INFOID:000000008139961

#### **WARNING:**

Comply with the following warnings to prevent any serious accident.

- Disconnect the 12V battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.
- Never work with wet hands.
- Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector. (Turning it ON outside the lamp case may cause fire or visual impairments.)
- Never touch the bulb glass immediately after turning it OFF. It is extremely hot.

#### **CAUTION:**

Comply with the following cautions to prevent any error and malfunction.

- Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)
- Never perform HID circuit inspection with a tester.
- Never touch the xenon bulb glass with hands. Never put oil and grease on it.
- Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.
- Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).

# PREPARATION

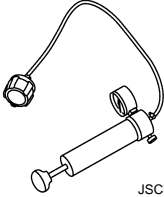
< PREPARATION >

## PREPARATION

### PREPARATION

#### Commercial Service Tools

INFOID:000000008139962

Tool name	Description
<p>Radiator cap tester</p>  <p>JSCIA0350ZZ</p>	<p>Checking leakage and reservoir tank cap</p>

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## COMPONENT PARTS

< SYSTEM DESCRIPTION >

### SYSTEM DESCRIPTION

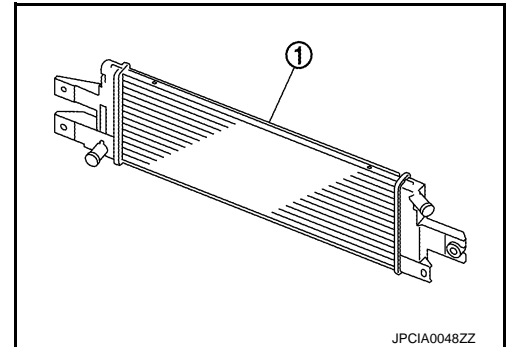
#### COMPONENT PARTS

##### Sub radiator

INFOID:000000008368648

- The sub radiator includes an aluminum transverse radiator core and resin tanks.
- The sub radiator is located in front of the condenser.

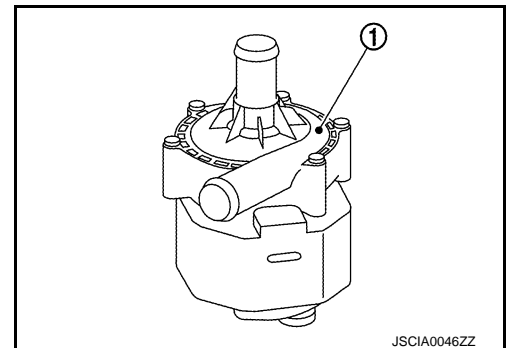
1 : Sub radiator assembly



##### Electric water pump

INFOID:000000008368649

- An electric water pump (1) is installed to the lower part of the cooling fan for circulating cooling water.
- HPCM (Hybrid power train control module) controls the flow rate of cooling water according to water temperature and vehicle speed.



# SYSTEM

< SYSTEM DESCRIPTION >

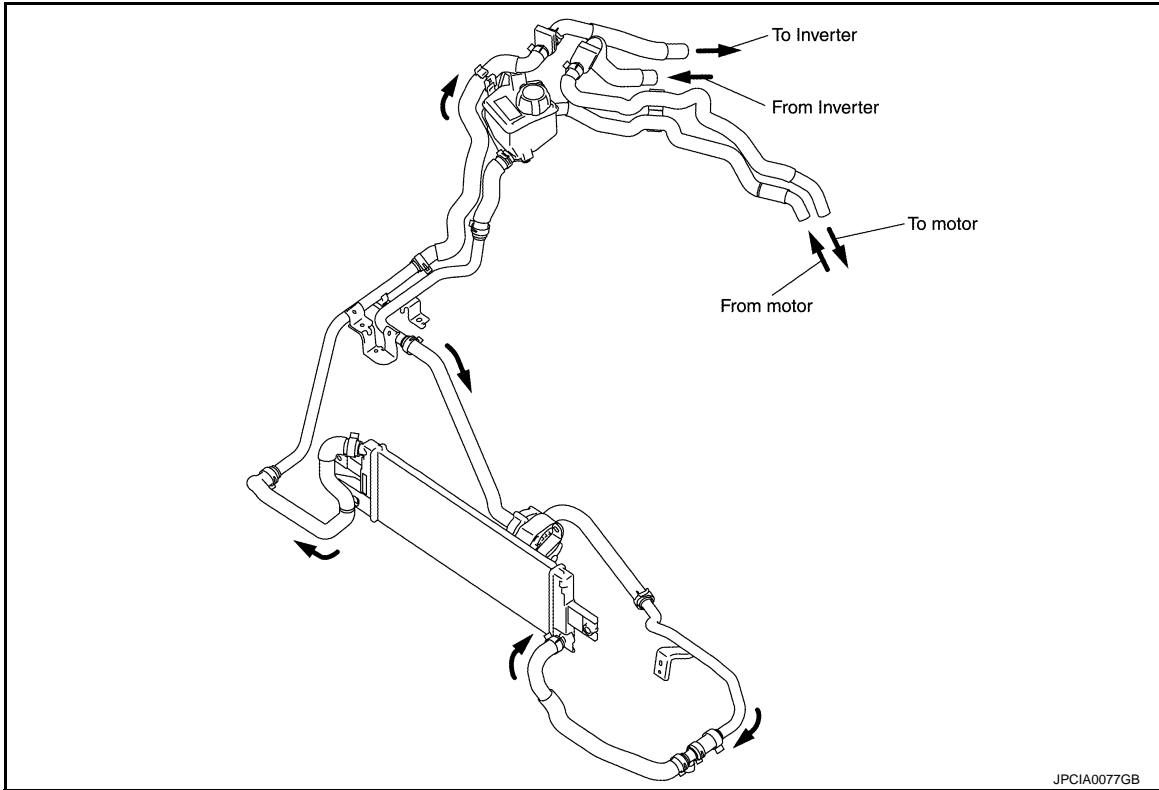
## SYSTEM

### High Voltage Cooling System

INFOID:000000008139963

- High voltage cooling system is a system which cools high voltage components below:
  - Traction motor
  - Traction motor inverter
- Coolant is circulated by electric water pump, which is controlled by HPCM (hybrid power train control module).

### HIGH VOLTAGE COOLING SYSTEM



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# SUB RADIATOR

< BASIC INSPECTION >

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## BASIC INSPECTION

### SUB RADIATOR

#### Inspection

INFOID:000000008139964

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

**CAUTION:**

- **Be careful not to bend or damage sub radiator fins.**
  - **When sub 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 sub radiator core vertically downward.
  2. Apply water again to all sub radiator core surfaces once per minute
  3. Stop washing if any stains no longer flow out from sub radiator.
  4. Blow air into the back side of sub radiator core vertically downward.
    - Use compressed air lower than 490 kPa (5 kg/cm<sup>2</sup>, 71 psi) and keep distance more than 30 cm (11.81 in).
  5. Blow air again into all the sub radiator core surfaces once per minute until no water sprays out.

# COOLANT

< PERIODIC MAINTENANCE >

## PERIODIC MAINTENANCE

### COOLANT

#### Inspection

INFOID:000000008139965

#### COOLANT AMOUNT INSPECTION

- When coolant temperature is low [about 50°C (122°F) or less], confirm that the coolant level of the reservoir tank is in the range from MIN (B) to MAX (A).

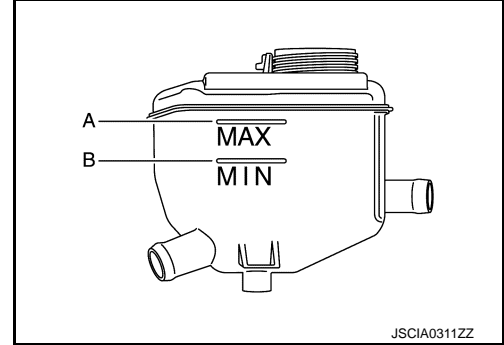
A : MAX

B : MIN

- Adjust level if it is outside the range.

#### CAUTION:

- Refill genuine NISSAN Long Life Antifreeze/Coolant (blue) or equivalent in its quality mixed with water (distilled or demineralized).
- Make sure not to dilute it with water.
- Confirm that the reservoir tank cap is tightened.



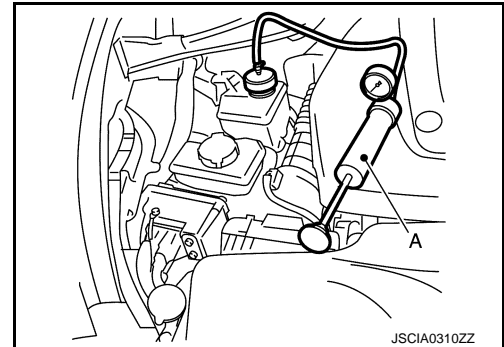
#### LEAKAGE CHECK

- Apply pressure to the cooling system using radiator cap tester (A) (commercial service tool). Check system for coolant leakage.

Maximum pressure : Refer to [HCO-16. "Sub Radiator"](#).

#### CAUTION:

- Remove the reservoir tank cap when coolant temperature is low.
- Perform the inspection with the radiator filled with water.
- Be sure to observe the maximum pressure standards. Otherwise, radiator may be damaged.
- If there is a malfunction, repair and replace applicable part.



#### Draining and Refilling

INFOID:000000008139966

#### CAUTION:

- Do not put additive such as waterleak preventive, since it may cause cooling waterway clogging.
- Never pump cooling water by the method of evacuation.
- When refilling use genuine NISSAN Long Life Antifreeze/Coolant (blue) or equivalent in its quality mixed with water (distilled or demineralized).
- Make sure not to dilute it with water.

#### DRAIN

#### CAUTION:

- Be sure to drain when coolant temperature is cold.
- This should be performed so that coolant does not come in contact with surrounding parts.

- Remove engine undercover, radiator drain plug (1) and reservoir tank cap and drain coolant.

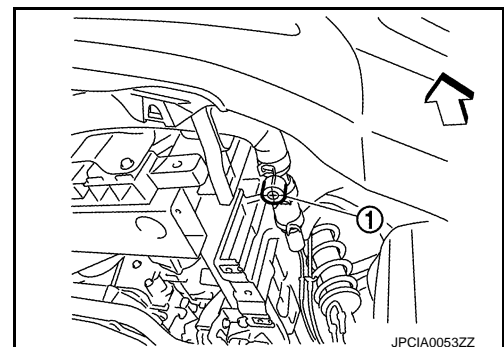
1 : Sub radiator drain plug

↔ : Vehicle front

#### NOTE:

When disconnecting the drain plug through the service hole of fender protector, be careful with the splattering of cooling water.

- Remove reservoir tank and drain the coolant.



# COOLANT

## < PERIODIC MAINTENANCE >

### REFILLING

1. Install reservoir tank. (Install in the reverse order of removal.)
2. Install radiator drain plug.

**CAUTION:**

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

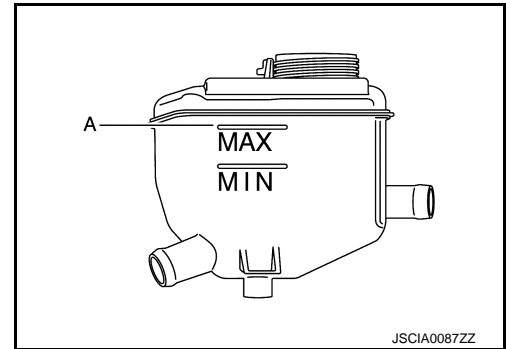
**Tightening torque** : Refer to [HCO-10, "Exploded View"](#).

3. Check tightening of hose clamp.
4. Fill cooling water to line (A) from the reservoir tank cap.

A : "MAX" level

**NOTE:**

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



5. Close the reservoir tank cap.
6. Set the vehicle to READY and operate the electric water pump.
7. When the reservoir tank fluid level drops, turn the ignition switch OFF and deactivate the electric water pump.  
**NOTE:**  
If the electric water pump is stopped with the reservoir tank open, LLC may be spilled.
8. Repeat the above steps from 4 to 7 until the reservoir tank fluid level stops dropping.
9. When the level is not lowered, turn OFF the push start switch (stop the electric water pump).
10. Set the vehicle in READY state and activate the electric water pump. If the reservoir tank fluid level is lower after circulating the cooling water (for approximately 10 minutes), repeat the above steps from 4 to 7.

**CAUTION:**

- Insufficient coolant may cause low power or stop of vehicle due to insufficient cooling of the traction motor inverter. Be sure to bleed air thoroughly.
- Never operate the electric water pump without coolant.



# RESERVOIR TANK CAP

< PERIODIC MAINTENANCE >

## RESERVOIR TANK CAP

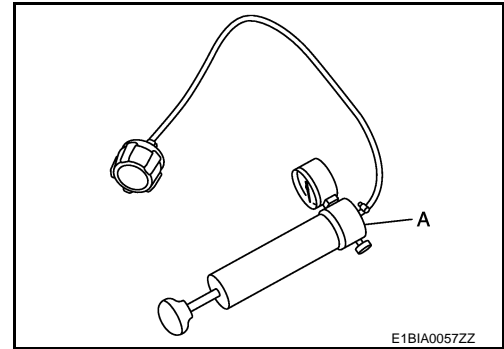
### Reservoir Tank Cap Inspection

INFOID:000000008139967

- Check reservoir tank cap relief pressure.
- When connecting reservoir tank cap to the radiator cap tester (commercial service tool) (A), apply coolant to the cap seal surface.

**Standard and limit** : Refer to [HCO-16, "Sub Radiator"](#).

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



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# SUB RADIATOR

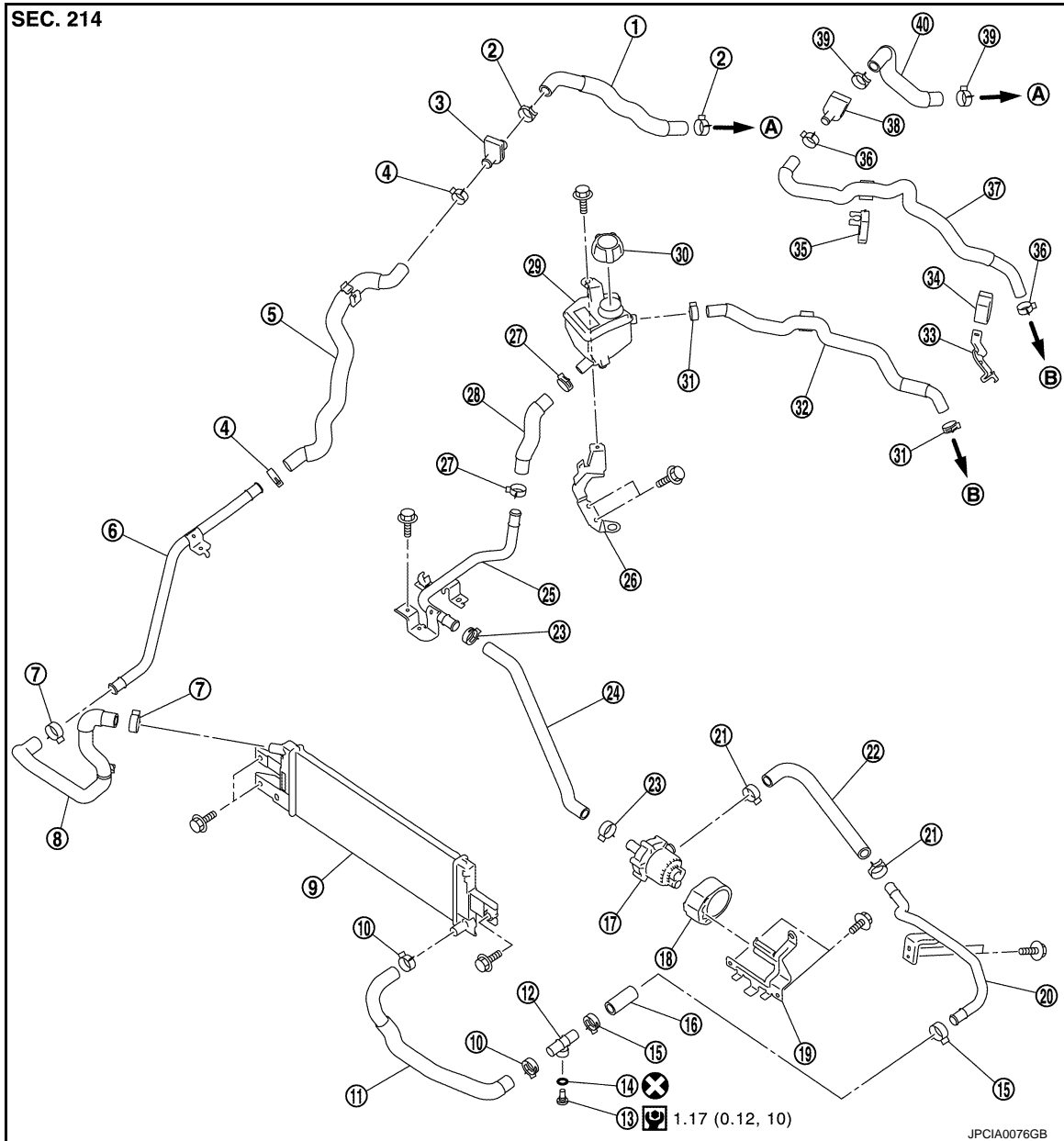
< REMOVAL AND INSTALLATION >

## REMOVAL AND INSTALLATION

### SUB RADIATOR

Exploded View

INFOID:000000008139968





- |                        |                           |                             |
|------------------------|---------------------------|-----------------------------|
| 1. Water hose          | 2. Clamp                  | 3. Grommet                  |
| 4. Clamp               | 5. Water hose             | 6. Water pipe               |
| 7. Clamp               | 8. Radiator hose (upper)  | 9. Sub radiator             |
| 10. Clamp              | 11. Radiator hose (lower) | 12. Drain pipe              |
| 13. Drain plug         | 14. O-ring                | 15. Clamp                   |
| 16. Water hose         | 17. Electric water pump   | 18. Water pump mount rubber |
| 19. Water pump bracket | 20. Water pipe            | 21. Clamp                   |
| 22. Water hose         | 23. Clamp                 | 24. Water hose              |
| 25. Water pipe         | 26. Bracket               | 27. Clamp                   |
| 28. Water hose         | 29. Reservoir tank        | 30. Reservoir tank cap      |
| 31. Clamp              | 32. Water hose            | 33. Bracket                 |

# SUB RADIATOR

## < REMOVAL AND INSTALLATION >

- |                               |                      |           |
|-------------------------------|----------------------|-----------|
| 34. Clip                      | 35. Clip             | 36. Clamp |
| 37. Water hose                | 38. Grommet          | 39. Clamp |
| 40. Water hose                |                      |           |
| A. To traction motor inverter | B. To traction motor |           |

 : N·m(kg-m, in-lb)

 : Always replace after every disassembly.

## Removal and Installation

INFOID:000000008139969

HCO

### REMOVAL

#### **WARNING:**

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

1. Remove engine under cover. Refer to [EXT-28, "ENGINE UNDER COVER : Removal and Installation"](#).
2. Drain coolant from radiator drain plug. Refer to [HCO-7, "Draining and Refilling"](#).

#### **NOTE:**

Be careful with the splattering of cooling water.

3. Remove radiator hose (upper, lower). Refer to [HCO-10, "Exploded View"](#).

#### **NOTE:**


If cooling water splatters in the fender protector while disconnecting the hose, clean the fender protector.

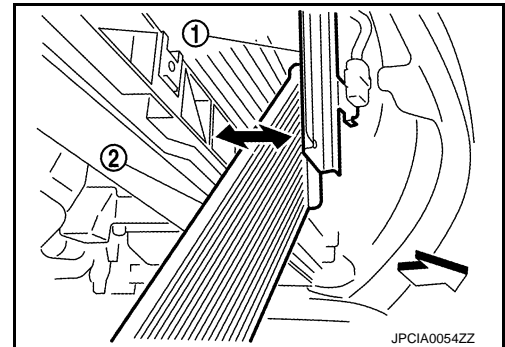
4. Remove sub radiator mounting bolts.

#### **NOTE:**

Because of the hood lock support stay, sub radiator does not drop even when the fastening bolts are removed.

5. To remove sub radiator (2), remove nut located on the lower part of the hood lock support stay (1) and create space to pull out the sub radiator in the downward direction.

 : Vehicle front



### INSTALLATION

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

#### **CAUTION:**

**Be sure to perform the air bleeding. Refer to [HCO-7, "Draining and Refilling"](#).**

### Inspection

INFOID:000000008139970

### INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap are tightened.
- With a radiator cap tester (commercial service tool), check that there is no leakage of coolant. Refer to [HCO-7, "Inspection"](#).
- Start the electric water pump, and check the joints for coolant leakage.

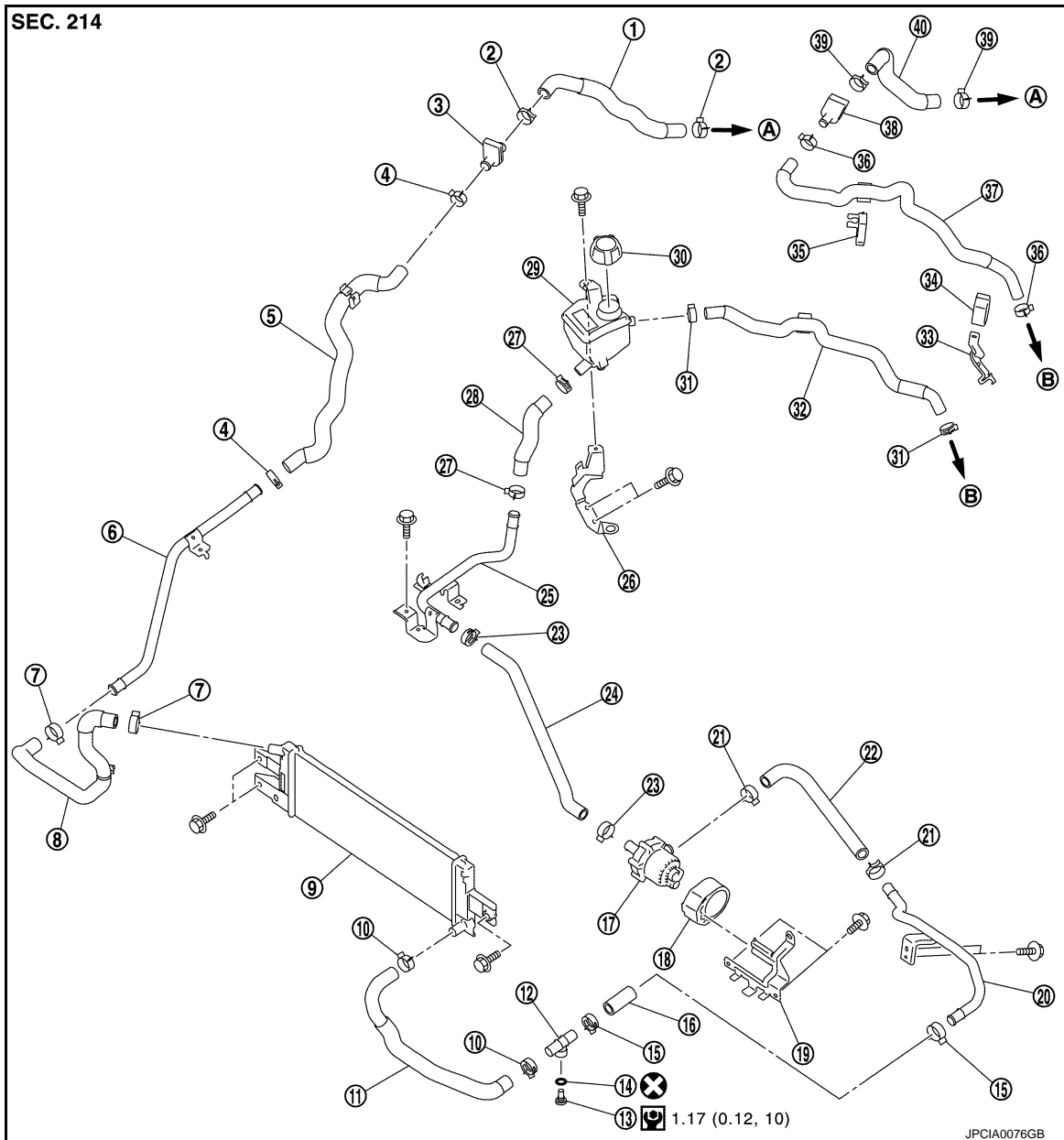
# ELECTRIC WATER PUMP

< REMOVAL AND INSTALLATION >

## ELECTRIC WATER PUMP

Exploded View

INFOID:00000008139971





- |                        |                           |                             |
|------------------------|---------------------------|-----------------------------|
| 1. Water hose          | 2. Clamp                  | 3. Grommet                  |
| 4. Clamp               | 5. Water hose             | 6. Water pipe               |
| 7. Clamp               | 8. Radiator hose (upper)  | 9. Sub radiator             |
| 10. Clamp              | 11. Radiator hose (lower) | 12. Drain pipe              |
| 13. Drain plug         | 14. O-ring                | 15. Clamp                   |
| 16. Water hose         | 17. Electric water pump   | 18. Water pump mount rubber |
| 19. Water pump bracket | 20. Water pipe            | 21. Clamp                   |
| 22. Water hose         | 23. Clamp                 | 24. Water hose              |
| 25. Water pipe         | 26. Bracket               | 27. Clamp                   |
| 28. Water hose         | 29. Reservoir tank        | 30. Reservoir tank cap      |
| 31. Clamp              | 32. Water hose            | 33. Bracket                 |
| 34. Clip               | 35. Clip                  | 36. Clamp                   |

# ELECTRIC WATER PUMP

## < REMOVAL AND INSTALLATION >

- |                               |                      |           |
|-------------------------------|----------------------|-----------|
| 37. Water hose                | 38. Grommet          | 39. Clamp |
| 40. Water hose                |                      |           |
| A. To traction motor inverter | B. To traction motor |           |

 : N·m(kg-m, in-lb)

 : Always replace after every disassembly.

## Removal and Installation

INFOID:000000008139972

HCO

### REMOVAL

#### **WARNING:**


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

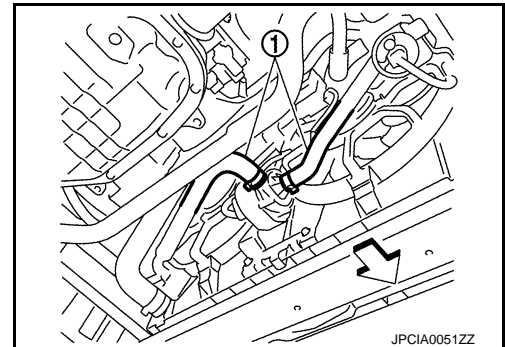
1. Remove engine under cover. Refer to [EXT-28. "ENGINE UNDER COVER : Removal and Installation"](#).
2. Drain coolant from radiator drain plug. Refer to [HCO-7. "Draining and Refilling"](#).

#### **NOTE:**

Be careful with the splattering of cooling water.

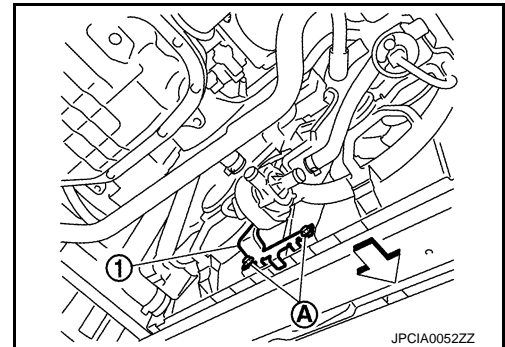
3. Disconnect electric water pump connector.
4. Remove water hose (1) of electric water pump.

 : Vehicle front



5. Remove mounting bolt (A) and remove electric water pump together with bracket (1).

 : Vehicle front



### INSTALLATION

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

#### **CAUTION:**

**Be sure to perform the air bleeding. Refer to [HCO-7. "Draining and Refilling"](#).**

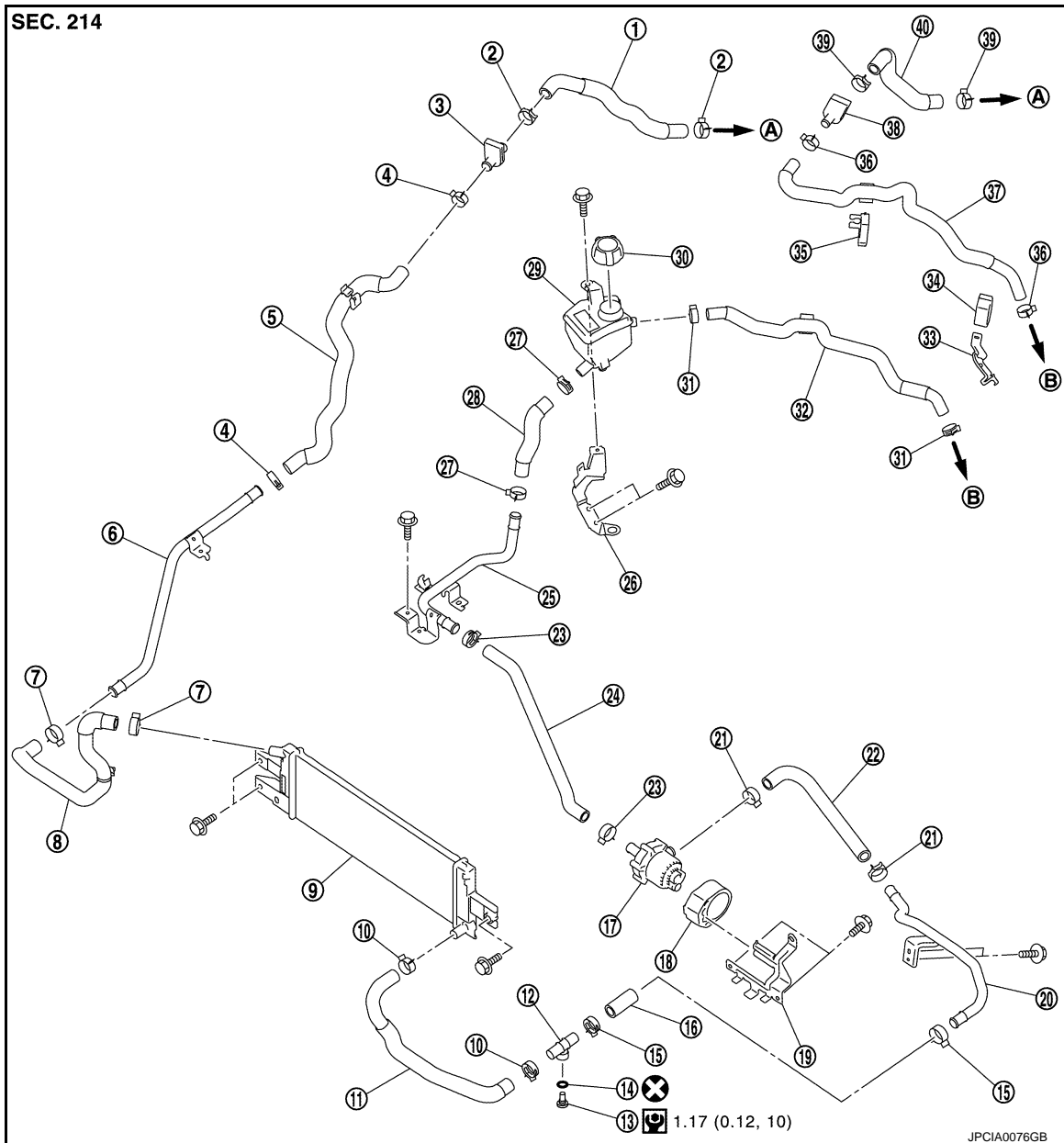
# WATER HOSE AND PIPING

< REMOVAL AND INSTALLATION >

## WATER HOSE AND PIPING

Exploded View

INFOID:00000008139973



- |                        |                           |                             |
|------------------------|---------------------------|-----------------------------|
| 1. Water hose          | 2. Clamp                  | 3. Grommet                  |
| 4. Clamp               | 5. Water hose             | 6. Water pipe               |
| 7. Clamp               | 8. Radiator hose (upper)  | 9. Sub radiator             |
| 10. Clamp              | 11. Radiator hose (lower) | 12. Drain pipe              |
| 13. Drain plug         | 14. O-ring                | 15. Clamp                   |
| 16. Water hose         | 17. Electric water pump   | 18. Water pump mount rubber |
| 19. Water pump bracket | 20. Water pipe            | 21. Clamp                   |
| 22. Water hose         | 23. Clamp                 | 24. Water hose              |
| 25. Water pipe         | 26. Bracket               | 27. Clamp                   |
| 28. Water hose         | 29. Reservoir tank        | 30. Reservoir tank cap      |
| 31. Clamp              | 32. Water hose            | 33. Bracket                 |
| 34. Clip               | 35. Clip                  | 36. Clamp                   |

# WATER HOSE AND PIPING

## < REMOVAL AND INSTALLATION >

---

37. Water hose

38. Grommet

39. Clamp

40. Water hose

A. To traction motor inverter

B. To traction motor



: N·m(kg-m, in-lb)



: Always replace after every disassembly.

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## SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

#### Periodical Maintenance Specification

INFOID:000000008139974

Unit: ℓ (US qt, Imp qt)

Coolant capacity (With reservoir tank at "MAX" level)	2.6 (2-6/8, 2-2/8)
Reservoir tank engine coolant capacity (At "MAX" level)	0.5 (4/8, 4/8)

#### Sub Radiator

INFOID:000000008139975

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

Leakage testing pressure		32 (0.3, 5)
Reservoir tank cap relief pressure	Standard	19 – 34 (0.2 – 0.3, 2 – 5)
	Limit	16 (0.2, 2)