

A  
B

# SECTION HA

## HEATER & AIR CONDITIONING SYSTEM

### CONTENTS

<p><b>PRECAUTION</b> ..... 3</p> <p><b>PRECAUTIONS</b> ..... 3</p> <p style="padding-left: 20px;">Normal Charge Precaution .....3</p> <p style="padding-left: 20px;">High Voltage Precautions .....3</p> <p style="padding-left: 20px;">Point to Be Checked Before Starting Maintenance Work .....4</p> <p style="padding-left: 20px;">Precaution for Removing 12V Battery .....5</p> <p style="padding-left: 20px;">Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" .....5</p> <p style="padding-left: 20px;">Precaution for Procedure without Cowl Top Cover.....5</p> <p style="padding-left: 20px;">Precaution for Working with HFC-134a (R-134a).....5</p> <p style="padding-left: 20px;">Contaminated Refrigerant .....6</p> <p style="padding-left: 20px;">General Refrigerant Precaution .....6</p> <p style="padding-left: 20px;">Precaution for Leak Detection Dye .....7</p> <p style="padding-left: 20px;">A/C Identification Label .....7</p> <p style="padding-left: 20px;">Precaution for Electric Compressor Oil .....7</p> <p style="padding-left: 20px;">Precaution for Service of Electric Compressor .....7</p> <p style="padding-left: 20px;">Precaution for Service Equipment .....7</p> <p><b>PREPARATION</b> ..... 10</p> <p><b>PREPARATION</b> ..... 10</p> <p style="padding-left: 20px;">Oil and Grease ..... 10</p> <p style="padding-left: 20px;">Commercial Service Tools ..... 10</p> <p style="padding-left: 20px;">Special Service Tool ..... 11</p> <p style="padding-left: 20px;">Commercial Service Tool ..... 13</p> <p><b>SYSTEM DESCRIPTION</b> ..... 14</p> <p><b>DESCRIPTION</b> ..... 14</p> <p style="padding-left: 20px;">Description ..... 14</p> <p style="padding-left: 20px;">Specification ..... 14</p> <p><b>COMPONENT PARTS</b> ..... 16</p> <p><b>REFRIGERATION SYSTEM</b> ..... 16</p> <p style="padding-left: 20px;">REFRIGERATION SYSTEM : Component Parts Location ..... 16</p> <p style="padding-left: 20px;">REFRIGERATION SYSTEM : Component Description ..... 16</p>	<p><b>HEATING SYSTEM</b> ..... 16</p> <p style="padding-left: 20px;">HEATING SYSTEM : Component Parts Location....17</p> <p style="padding-left: 20px;">HEATING SYSTEM : Component Description .....17</p> <p><b>A/C UNIT ASSEMBLY</b> ..... 17</p> <p style="padding-left: 20px;">A/C UNIT ASSEMBLY : A/C Unit ..... 17</p> <p style="padding-left: 20px;">A/C UNIT ASSEMBLY : Evaporator ..... 18</p> <p style="padding-left: 20px;">A/C UNIT ASSEMBLY : Expansion Valve ..... 18</p> <p style="padding-left: 20px;">A/C UNIT ASSEMBLY : Heater Core ..... 18</p> <p><b>CONDENSER</b> ..... 18</p> <p style="padding-left: 20px;">CONDENSER : Condenser ..... 18</p> <p style="padding-left: 20px;">CONDENSER : Liquid Tank ..... 19</p> <p style="padding-left: 20px;">Electric Compressor ..... 19</p> <p style="padding-left: 20px;">PTC Element Heater ..... 21</p> <p style="padding-left: 20px;">Heater Electric Water Pump ..... 22</p> <p style="padding-left: 20px;">Refrigerant and Compressor Oil ..... 23</p> <p style="padding-left: 20px;">Heater Fluid ..... 23</p> <p style="padding-left: 20px;">High Voltage Warning Label ..... 23</p> <p><b>SYSTEM</b> ..... 25</p> <p><b>REFRIGERATION SYSTEM</b> ..... 25</p> <p style="padding-left: 20px;">REFRIGERATION SYSTEM : System Diagram ..... 25</p> <p style="padding-left: 20px;">REFRIGERATION SYSTEM : System Description ..... 25</p> <p><b>HEATING SYSTEM</b> ..... 26</p> <p style="padding-left: 20px;">HEATING SYSTEM : System Diagram ..... 26</p> <p style="padding-left: 20px;">HEATING SYSTEM : System Description ..... 26</p> <p><b>BASIC INSPECTION</b> ..... 27</p> <p><b>DIAGNOSIS AND REPAIR WORK FLOW</b> ..... 27</p> <p style="padding-left: 20px;">Flowchart of Trouble Diagnosis ..... 27</p> <p><b>REFRIGERANT</b> ..... 29</p> <p style="padding-left: 20px;">Description ..... 29</p> <p style="padding-left: 20px;">Check Refrigerant Leakage ..... 29</p> <p style="padding-left: 20px;">Recycle Refrigerant ..... 30</p> <p style="padding-left: 20px;">Charge Refrigerant ..... 31</p> <p><b>LUBRICANT</b> ..... 32</p>
---	---

HA

Description .....	32	HIGH-PRESSURE PIPE : Removal and Installation .....	52
Inspection .....	32	<b>CONDENSER</b> .....	<b>54</b>
Perform Lubricant Return Operation .....	32	Exploded View .....	54
Lubricant Adjusting Procedure for Components		<b>CONDENSER</b> .....	<b>54</b>
Replacement Except Compressor .....	32	CONDENSER : Removal and Installation .....	54
Lubricant Adjusting Procedure for Compressor		<b>LIQUID TANK</b> .....	<b>56</b>
Replacement .....	33	LIQUID TANK : Removal and Installation .....	56
<b>PERFORMANCE TEST</b> .....	<b>35</b>	<b>REFRIGERANT PRESSURE SENSOR</b> .....	<b>57</b>
Inspection .....	35	REFRIGERANT PRESSURE SENSOR : Removal and Installation .....	57
<b>SYMPTOM DIAGNOSIS</b> .....	<b>38</b>	<b>A/C UNIT ASSEMBLY</b> .....	<b>58</b>
<b>REFRIGERATION SYSTEM SYMPTOMS</b> .....	<b>38</b>	Exploded View .....	58
Trouble Diagnosis For Unusual Pressure .....	38	<b>A/C UNIT ASSEMBLY</b> .....	<b>60</b>
Symptom Table .....	38	A/C UNIT ASSEMBLY : Removal and Installation...	60
<b>NOISE</b> .....	<b>40</b>	<b>EVAPORATOR</b> .....	<b>62</b>
Symptom Table .....	40	EVAPORATOR : Removal and Installation .....	62
<b>PERIODIC MAINTENANCE</b> .....	<b>41</b>	<b>HEATER CORE</b> .....	<b>63</b>
<b>HEATER FLUID</b> .....	<b>41</b>	HEATER CORE : Removal and Installation .....	63
Inspection .....	41	<b>EXPANSION VALVE</b> .....	<b>64</b>
Draining and Refilling .....	41	Exploded View .....	64
<b>DEGAS TANK CAP</b> .....	<b>43</b>	Removal and Installation .....	64
Degas Tank Cap Inspection .....	43	<b>PTC ELEMENTS HEATER</b> .....	<b>66</b>
<b>REMOVAL AND INSTALLATION</b> .....	<b>44</b>	Exploded View .....	66
<b>ELECTRIC COMPRESSOR</b> .....	<b>44</b>	Removal and Installation .....	66
Exploded View .....	44	Inspection .....	71
Removal and Installation .....	44	<b>HEATER PUMP</b> .....	<b>72</b>
Inspection .....	49	Exploded View .....	72
<b>COOLER PIPE AND HOSE</b> .....	<b>50</b>	Removal and Installation .....	72
Exploded View .....	50	<b>SERVICE DATA AND SPECIFICATIONS</b>	
<b>HIGH-PRESSURE FLEXIBLE HOSE</b> .....	<b>50</b>	<b>(SDS)</b> .....	<b>74</b>
HIGH-PRESSURE FLEXIBLE HOSE : Removal and Installation .....	50	<b>SERVICE DATA AND SPECIFICATIONS</b>	
<b>LOW-PRESSURE FLEXIBLE HOSE</b> .....	<b>51</b>	<b>(SDS)</b> .....	<b>74</b>
LOW-PRESSURE FLEXIBLE HOSE : Removal and Installation .....	51	Compressor .....	74
<b>HIGH-PRESSURE PIPE</b> .....	<b>52</b>	Lubricant .....	74
		Refrigerant .....	74
		Periodical Maintenance Specification .....	74

# PRECAUTIONS

< PRECAUTION >

## PRECAUTION

### PRECAUTIONS

#### Normal Charge Precaution

INFOID:000000007080574

**WARNING:**

- If a technician uses a medical electric device such as an implantable cardiac pacemaker or an implantable cardioverter defibrillator, the possible effects on the devices must be checked with the device manufacturer before starting the charge operation.
- As radiated electromagnetic wave generated by on board charger at normal charge operation may effect medical electric devices, a technician using a medical electric device such as implantable cardiac pacemaker or an implantable cardioverter defibrillator must not enter the vehicle compartment (including luggage room) during normal charge operation.

#### High Voltage Precautions

INFOID:000000007080731

**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.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective equipment consisting of glove, shoes 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 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"

A  
B  
C  
D  
E  
F  
G  
H  
HA  
J  
K  
L  
M  
N  
O  
P

## PRECAUTIONS

### < PRECAUTION >

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.

<p>Person in charge: _____</p> <p><b>DO NOT TOUCH!</b></p> <p><b>REPAIR IN PROGRESS.</b></p> <p><b>HIGH VOLTAGE</b></p> <p><b>DANGER:</b></p>
<p><b>DANGER:</b></p> <p><b>HIGH VOLTAGE</b></p> <p><b>REPAIR IN PROGRESS.</b></p> <p><b>DO NOT TOUCH!</b></p> <p>Person in charge: _____</p>
<p><b>Copy this page and put it after folding on the roof of the vehicle in service.</b></p> <p><small>JSAIA1600GB</small></p>

### Point to Be Checked Before Starting Maintenance Work

INFOID:000000007080586

The high voltage system may start automatically. It is required to check that the timer air conditioner and timer charge (during EVSE connection) are not set before starting maintenance work.

#### NOTE:

If the timer air conditioner or timer charge (during EVSE connection) is set, the high voltage system starts automatically even when the power switch is in OFF state.

# PRECAUTIONS

< PRECAUTION >

## Precaution for Removing 12V Battery

INFOID:000000007080595

When removing the 12V battery, turn ON/OFF the power switch and check that the charging status indicator does not blink. The 12V battery must be removed within one hour after checking the indicator lamp.

### NOTE:

- The automatic 12V battery charge control may start even when the power switch is in OFF state.
- The automatic 12V battery charge control does not start within approximately one hour when the power switch is turned ON/OFF.

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

INFOID:000000007080593

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 harness connectors.

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

### WARNING:

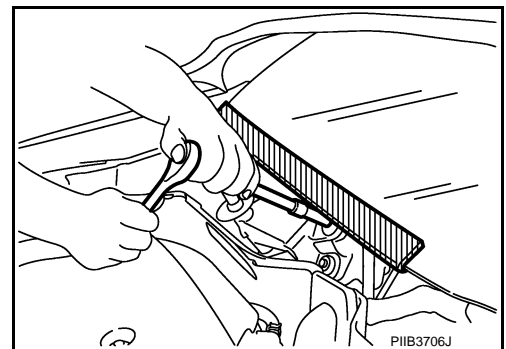
Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the power switch ON, 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 power switch OFF, disconnect the 12V battery, and wait at least 3 minutes before performing any service.

## Precaution for Procedure without Cowl Top Cover

INFOID:000000007080594

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.



## Precaution for Working with HFC-134a (R-134a)

INFOID:000000007080664

### WARNING:

- CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed electric compressor failure is likely to occur. Refer to [HA-29. "Check Refrigerant Leak-](#)

# PRECAUTIONS

## < PRECAUTION >

**age".** To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment and Refrigerant Identifier.

- Use only specified electric compressor oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If electric compressor oil other than that specified is used, electric compressor failure is likely to occur.
- The specified HFC-134a (R-134a) electric compressor oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
  - When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
  - When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into the system.
  - Only use the specified electric compressor oil from a sealed container. Immediately reseal containers of electric compressor oil. Without proper sealing, electric compressor oil will become moisture saturated and should not be used.
  - Avoid breathing A/C refrigerant and electric compressor oil vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system using certified service equipment meeting requirements of SAE J2210 [HFC-134a (R-134a) recycling equipment], or J2209 [HFC-134a (R-134a) recycling equipment], If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and electric compressor oil manufacturers.
  - Do not allow electric compressor oil to come in contact with styrofoam parts. Damage may result.

## Contaminated Refrigerant

INFOID:000000007080665

**If a refrigerant other than pure HFC-134a (R-134a) is identified in a vehicle, your options are:**

- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.
- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location of previous service where the contamination may have occurred.
- If you choose to perform the repair, recover the refrigerant using only **dedicated equipment and containers. Do not recover contaminated refrigerant into your existing service equipment.** If your facility does not have dedicated recovery equipment, you may contact a local refrigerant product retailer for available service. This refrigerant must be disposed of in accordance with all federal and local regulations. In addition, replacement of all refrigerant system components on the vehicle is recommended.
- If the vehicle is within the warranty period, the air conditioner warranty is void. Please contact NISSAN Customer Affairs for further assistance.

## General Refrigerant Precaution

INFOID:000000007080666

### **WARNING:**

- Do not release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.
- Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.
- Do not store or heat refrigerant containers above 52°C (125°F).
- Do not heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.
- Do not intentionally drop, puncture, or incinerate refrigerant containers.
- Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.
- Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.
- Do not pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (R-134a) have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.

### **CAUTION:**

# PRECAUTIONS

## < PRECAUTION >

- **Wear electrically insulated gloves and pull out the service plug grip before inspection as procedures may require disconnecting high voltage connectors. Be sure to carry the removed service plug grip because other workers may install it by mistake.**
- **Never touch the high voltage connectors or terminals for 10 minutes after the service plug grip is removed.**

A  
B

### Precaution for Leak Detection Dye

INFOID:000000007080667

- The A/C system does not contain a fluorescent leak detection dye.
- Do not use fluorescent leak detection dye in the A/C system.

C

### A/C Identification Label

INFOID:000000007080668

Vehicles with factory installed A/C systems have this identification label on the underside of hood.

D

### Precaution for Electric Compressor Oil

INFOID:000000007080669

- Use Electric Compressor ND-OIL 11 only for the electric compressor of the air conditioning system. Using other A/C oils may damage the system as they may conduct electricity.
- Electrical insulation performance may decrease significantly when even a small amount of oil other than Electric Compressor Oil ND-OIL 11 is contaminated in the refrigeration cycle, causing a DTC to be output.
- Avoid using the recovery/recycling equipment that has been used for vehicles with conventional A/C oil.
- Or wash the recovery/recycling equipment to thoroughly remove the conventional A/C oil.

E

F

G

### Precaution for Service of Electric Compressor

INFOID:000000007080670

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **When the electric compressor is removed, store it in the same position as it is when mounted on the car.**
- **When replacing or repairing electric compressor, refer to [HA-33, "Lubricant Adjusting Procedure for Compressor Replacement"](#).**
- **After the electric compressor is installed, turn ignition switch (READY) and operate the electric compressor for more than two minutes.**

H

HA

### Precaution for Service Equipment

INFOID:000000007080671

J

### RECOVERY/RECYCLING EQUIPMENT

Follow the manufacturer's instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

K

### ELECTRONIC LEAK DETECTOR

Follow the manufacturer's instructions for tester operation and tester maintenance.

L

### PRECAUTION FOR ELECTRIC COMPRESSOR OIL

Use Electric Compressor Oil ND-OIL 11 only for the electric compressor of the air conditioning system. Using other A/C oils may damage the A/C system as they may conduct electricity.

M

### VACUUM PUMP

N

O

P

# PRECAUTIONS

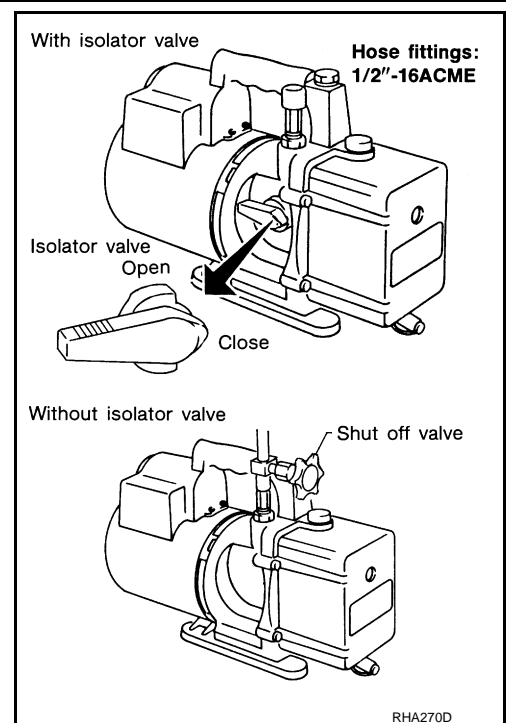
## < PRECAUTION >

The electric compressor oil contained inside the vacuum pump is not compatible with the specified electric compressor oil for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure so the vacuum pump electric compressor oil may migrate out of the pump into the service hose. This is possible when the pump is switched off after evacuation (vacuuming) and hose is connected to it.

To prevent this migration, use a manual valve situated near the hose-to-pump connection, as follows.

- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has an automatic shut off valve, disconnect the hose from the pump: as long as the hose is connected, the valve is open and lubricating electric compressor oil may migrate.

Some one-way valves open when vacuum is applied and close under a no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.

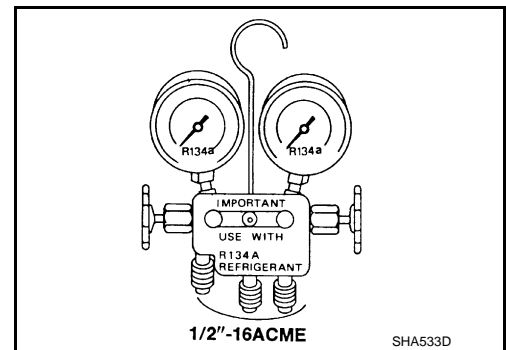


## MANIFOLD GAUGE SET

Be certain that the gauge face indicates R-134a or 134a. Make sure the gauge set has 1/2"-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) along with specified electric compressor oil.

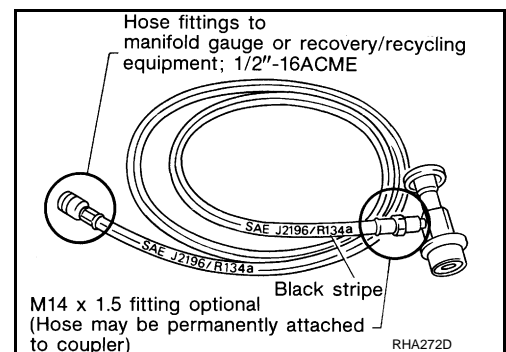
### CAUTION:

**Avoid using tools that have been used for vehicles with conventional A/C oil as much as possible. This will result in insulation performance deterioration. A tool that has been used three times or less can be reused if an appropriate one is not available.**



## SERVICE HOSES

Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



## SERVICE COUPLERS



# PRECAUTIONS

## < PRECAUTION >

Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

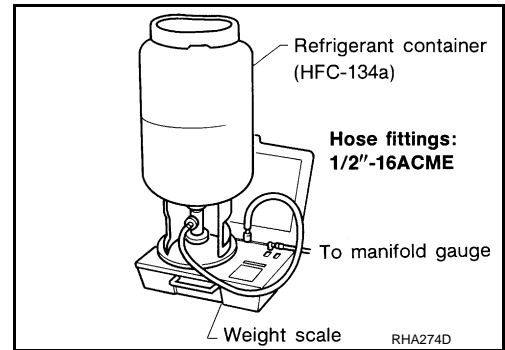
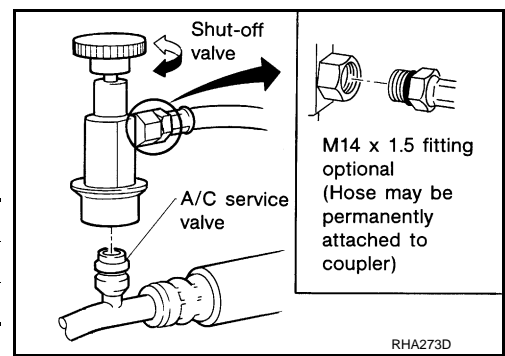
Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close

### CAUTION:

**Avoid using tools that have been used for vehicles with conventional A/C oil as much as possible. This will result in insulation performance deterioration. A tool that has been used three times or less can be reused if an appropriate one is not available.**

## REFRIGERANT WEIGHT SCALE

Verify that no refrigerant other than HFC134a (R-134a) and specified electric compressor oil have been used with the scale. If the scale controls refrigerant flow electronically, the hose fitting must be 1/2"-16 ACME.



## CHARGING CYLINDER

Using a charging cylinder is not recommended. Refrigerant may be vented into air from cylinder's top valve when filling the cylinder with refrigerant. Also, the accuracy of the cylinder is generally less than that of an electronic scale or of quality recycle/recharge equipment.

A  
B  
C  
D  
E  
F  
G  
H  
HA  
J  
K  
L  
M  
N  
O  
P

# PREPARATION

< PREPARATION >

## PREPARATION

### PREPARATION


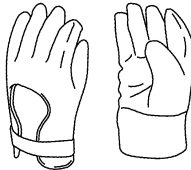

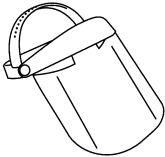
#### Oil and Grease

INFOID:000000006960765

Name	Application	Note
Refrigerant can (HFC-134a)	Charging refrigerant	—
Compressor oil ND-OIL 11 KLH00-00040	Refilling compressor oil	—

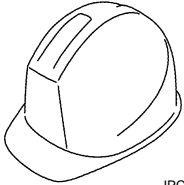
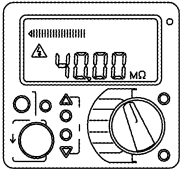
#### Commercial Service Tools

INFOID:000000006960766

Tool name		Description
<p>Insulated gloves</p> <p>Comply with EN60903:</p> <ul style="list-style-type: none"> <li>Use protective gloves made of insulating material.</li> <li>The protective gloves must be capable of resisting the voltage of 600 or more.</li> </ul>	 <p>JMCIA0149ZZ</p>	<p>Removing and installing high voltage components</p>
<p>Leather gloves</p> <p>[Use leather gloves that can fasten the wrist tight]</p>	 <p>JPCIA0066ZZ</p>	<ul style="list-style-type: none"> <li>Removing and installing high voltage components</li> <li>Protect insulated gloves</li> </ul>
<p>Insulated safety shoes</p> <p>Comply with EN60903:</p> <ul style="list-style-type: none"> <li>Use protective shoes made of insulating material.</li> <li>The protective shoes must be capable of resisting the voltage of 600 or more.</li> </ul>	 <p>JPCIA0011ZZ</p>	<p>Removing and installing high voltage components</p>
<p>Face shield</p> <p>[Comply with EN166.]</p>	 <p>JPCIA0167ZZ</p>	<ul style="list-style-type: none"> <li>Removing and installing high voltage components</li> <li>To protect face from the spatter on the work to electric line</li> </ul>

# PREPARATION

## < PREPARATION >

Tool name		Description
Insulated helmet	 <p>JPCIA0013ZZ</p>	Removing and installing high voltage components
Insulation resistance tester (Multi tester)	 <p>JPCIA0014ZZ</p>	Measuring voltage and insulation resistance

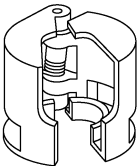

## Special Service Tool

INFOID:000000007063696

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

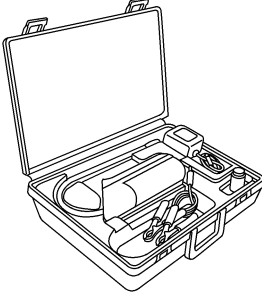
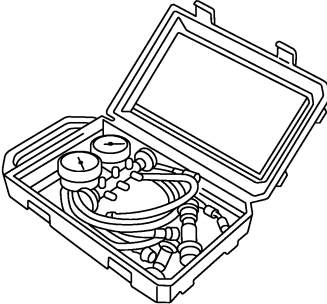
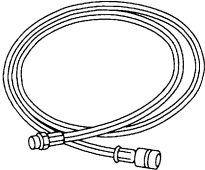
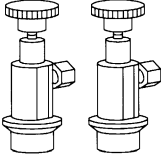
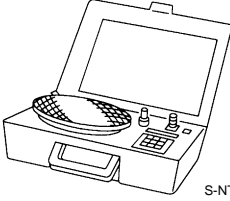
### HFC-134a (R-134a) Service Tool and Equipment

- Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.
- Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
- Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
- Never use adapters that convert one size fitting to another: refrigerant/lubricant contamination occurs and compressor malfunction may result.

Tool number (Kent-Moore No.) Tool name	Description
Disconnecter tool set (J-45815)	 <p>RJIA0391J</p> Disconnect one-touch joint connection
(ACR2005-NI) ACR5 A/C Service Center	 <p>WJIA0293E</p> Function: Refrigerant recovery, recycling and recharging

# PREPARATION

## < PREPARATION >

Tool number (Kent-Moore No.) Tool name		Description
<p>(J-41995) Electrical leak detector</p>	 <p style="text-align: right; font-size: small;">AHA281A</p>	<p>Power supply: DC 12 V (Battery terminal)</p>
<p>(J-39183) Manifold gauge set (with hoses and couplers)</p>	 <p style="text-align: right; font-size: small;">RJIA0196E</p>	<p>Identification:</p> <ul style="list-style-type: none"> <li>• The gauge face indicates HFC-134a (R-134a).</li> </ul> <p>Fitting size: Thread size</p> <ul style="list-style-type: none"> <li>• 1/2" -16 ACME</li> </ul>
<p>Service hoses</p> <ul style="list-style-type: none"> <li>• High-pressure side hose (J-39501-72)</li> <li>• Low-pressure side hose (J-39502-72)</li> <li>• Utility hose (J-39476-72)</li> </ul>	 <p style="text-align: right; font-size: small;">S-NT201</p>	<p>Hose color:</p> <ul style="list-style-type: none"> <li>• Low-pressure side hose: Blue with black stripe</li> <li>• High-pressure side hose: Red with black stripe</li> <li>• Utility hose: Yellow with black stripe or green with black stripe</li> </ul> <p>Hose fitting to gauge:</p> <ul style="list-style-type: none"> <li>• 1/2" -16 ACME</li> </ul>
<p>Service couplers</p> <ul style="list-style-type: none"> <li>• High-pressure side coupler (J-39500-20)</li> <li>• Low-pressure side coupler (J-39500-24)</li> </ul>	 <p style="text-align: right; font-size: small;">S-NT202</p>	<p>Hose fitting to service hose: M14 x 1.5 fitting is optional or permanently attached.</p>
<p>(J-39650) Refrigerant weight scale</p>	 <p style="text-align: right; font-size: small;">S-NT200</p>	<p>For measuring of refrigerant Fitting size: Thread size 1/2" -16 ACME</p>

# PREPARATION

## < PREPARATION >

Tool number (Kent-Moore No.) Tool name	Description
<p>— (J-48756) Altima HEV service tool kit*</p> <ul style="list-style-type: none"> <li>— (J-48767) Hoses and service adaptors</li> </ul>	<p>Hose and adaptor color:</p> <ul style="list-style-type: none"> <li>• Low side hose: Blue</li> <li>• High side hose: Red</li> <li>• Low side adaptor: Blue</li> <li>• High side adaptor: Red</li> </ul>
<p>(J-39649) Vacuum pump (Including the isolator valve)</p>	<p>Capacity:</p> <ul style="list-style-type: none"> <li>• Air displacement: 4 CFM</li> <li>• Micron rating: 20 microns</li> <li>• Oil capacity: 482 g (17 oz.)</li> </ul> <p>Fitting size: Thread size</p> <ul style="list-style-type: none"> <li>• 1/2" -16 ACME</li> </ul>

**CAUTION:**

\* Avoid using tools that have been used for vehicles with conventional A/C oil as much as possible. This will result in insulation performance deterioration. A tool that has been used three times or less can be reused if an appropriate one is not available.

## Commercial Service Tool

INFOID:000000007063697

Tool number Tool name	Description
<p>J-41810-NI Refrigerant identifier equipment HFC 134a (R-134a)*</p>	<p>Checking refrigerant purity and system contamination</p>
<p>Power tool</p>	<p>Removing bolts, screws and nuts</p>

**CAUTION:**

\* Avoid using tools that have been used for vehicles with conventional A/C oil as much as possible. This will result in insulation performance deterioration. A tool that has been used three times or less can be reused if an appropriate one is not available.

# DESCRIPTION

< SYSTEM DESCRIPTION >

## SYSTEM DESCRIPTION

### DESCRIPTION

#### Description

INFOID:000000006997027

- This vehicle includes an ozone-safe full automatic air conditioning system.
- This system utilizes an A/C unit that combines the blower unit, heater unit, and cooling unit.
- It contains a sub-cool condenser in which the liquid tank is installed onto the condenser.
- An electric scroll compressor (with internal inverter) is used.
- A PTC element heater is used as the heat source for heating.
- Adopted an electric heater pump to circulate the water which warmed with a PTC element heater.

#### Specification

INFOID:000000006997028

### COMPRESSOR

Item		Specification		
Compressor body	Model (manufacturer)	AES28AV3AA (Panasonic)		
	Compressor	Type	Scroll type	
		Discharge amount (cm <sup>3</sup> /rpm)	28	
		Oil	Name	ND-OIL 11 (ester oil)
			Measure (cm <sup>3</sup> )	150
		Allowable speed range (rpm)	780 - 8300	
	Release valve opening pressure (MPa)	3.5 - 4.14		
Motor	Type	DC brushless motor		
	Battery voltage (V)	345		
	Power consumption (kW)	2.1		

### CONDENSER & LIQUID TANK

Item		Specification
Condenser	Type	Parallel flow type
	Width x Height x Thickness (core) (mm)	615 × 343 × 16
	Frontal area (core) (m <sup>2</sup> )	0.211
	Fin pitch (mm)	1.4
	Heat discharge at wind speed 5 m/s [W (kcal/h)]	16300 (14015)
Liquid tank	Capacity (cm <sup>3</sup> )	200

### REFRIGERANT PRESSURE SENSOR

Item	Specification
Type	Capacitance type

### REFRIGERANT

Item	Specification
Name	HFC-134a
Used amount (g)	450

### A/C UNIT

# DESCRIPTION

## < SYSTEM DESCRIPTION >

Item		Specification	
Cooling unit	Cooling capacity at air flow 7 m <sup>3</sup> /min	[W (kcal/h)] 5600 (4816)	
	Evaporator	Type	Laminate type
		Height x Width x Thickness	(mm) 225 × 256.4 × 39
		Fin pitch	(mm) 2.6
	Expansion valve type		Block-type external pressure equalization valve
Heater unit	Heating capacity at air flow 5 m <sup>3</sup> /min	[W (kcal/h)] 5350 (4600)	
	Heater core	Type	Corrugated fin type
		Height x Width x Thickness	(mm) 172.5 × 218.5 × 27
		Fin pitch	(mm) 1.4
Blower fan motor	Fan	Type	Sirocco fan type
		Outer diameter × Width	(mm) φ133 × 85
	Motor	Type	Brushless motor type
		Power consumption	(W) 225

## PTC ELEMENT HEATER

Item	Specification
Battery voltage (V)	345
Output [W (kcal/h)]	5000 (4299)
Capacity (cm <sup>3</sup> )	370

## HEATER PUMP

Item	Specification
Battery voltage (V)	12
Allowable speed range (rpm)	750 - 4700
Maximum discharge (L/min)	12

A  
B  
C  
D  
E  
F  
G  
H  
HA  
J  
K  
L  
M  
N  
O  
P

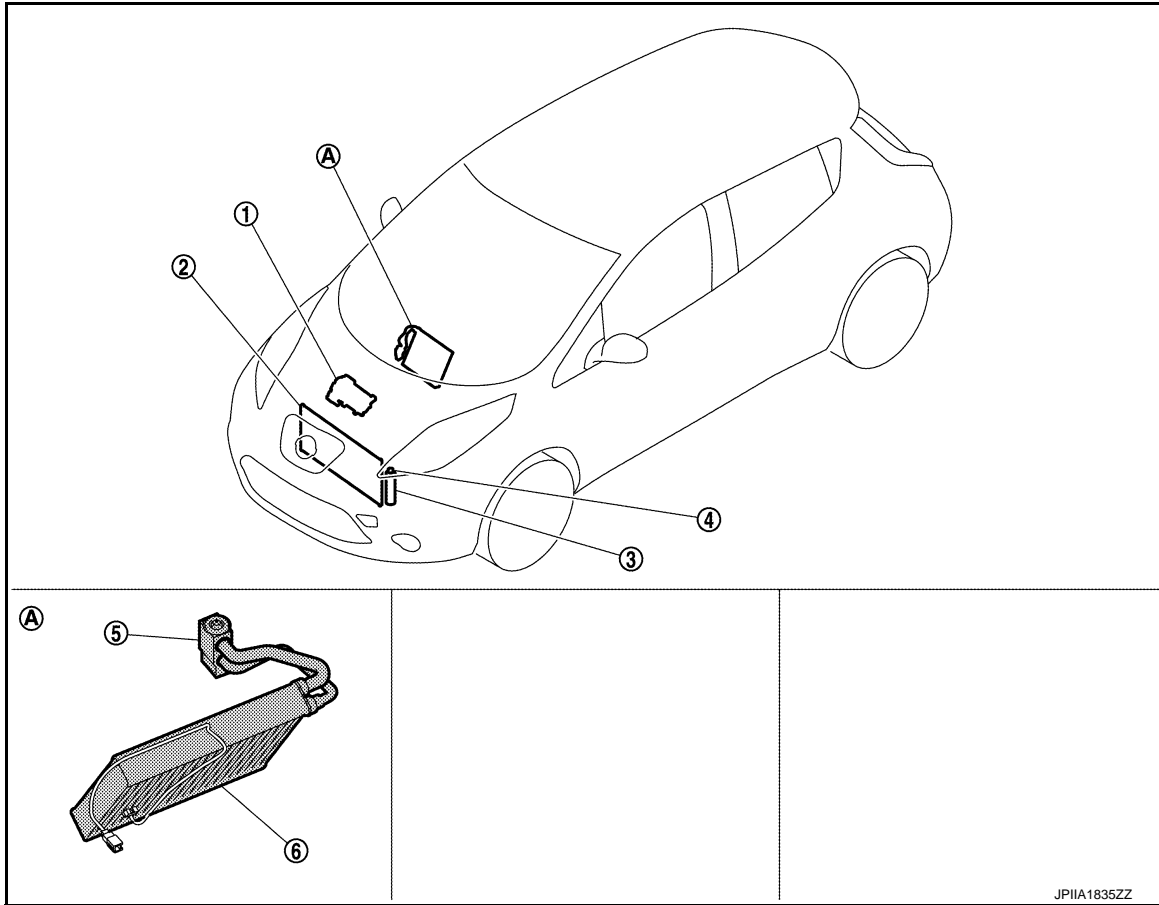
# COMPONENT PARTS

< SYSTEM DESCRIPTION >

## COMPONENT PARTS REFRIGERATION SYSTEM

### REFRIGERATION SYSTEM : Component Parts Location

INFOID:000000006997029



- |                                |                    |                |
|--------------------------------|--------------------|----------------|
| 1. Electric compressor         | 2. Condenser       | 3. Liquid tank |
| 4. Refrigerant pressure sensor | 5. Expansion valve | 6. Evaporator  |
| A. Built into A/C unit         |                    |                |

### REFRIGERATION SYSTEM : Component Description

INFOID:000000006997030

Location	DESCRIPTION
Electric compressor	Performs the intake, compression, and discharge of refrigerant, and circulates the refrigerant in the cooler cycle.
Condenser	Cools the high-temperature high-pressure refrigerant discharged from the compressor to change it to the liquid refrigerant.
Liquid tank	Remove foreign materials from the refrigerant that is discharged from the condenser, and then temporarily collect the liquid refrigerant.
Refrigerant pressure sensor	Refer to <a href="#">HAC-13, "Refrigerant Pressure Sensor"</a> .
Expansion valve	Turn the high-pressure liquid refrigerant to the misty low-pressure liquid refrigerant by squeezing action.
Evaporator	The misty liquid refrigerant causes evaporation and turns into gas by the air blown from the blower fan motor. Cool the air by vaporization heat at this time.

## HEATING SYSTEM

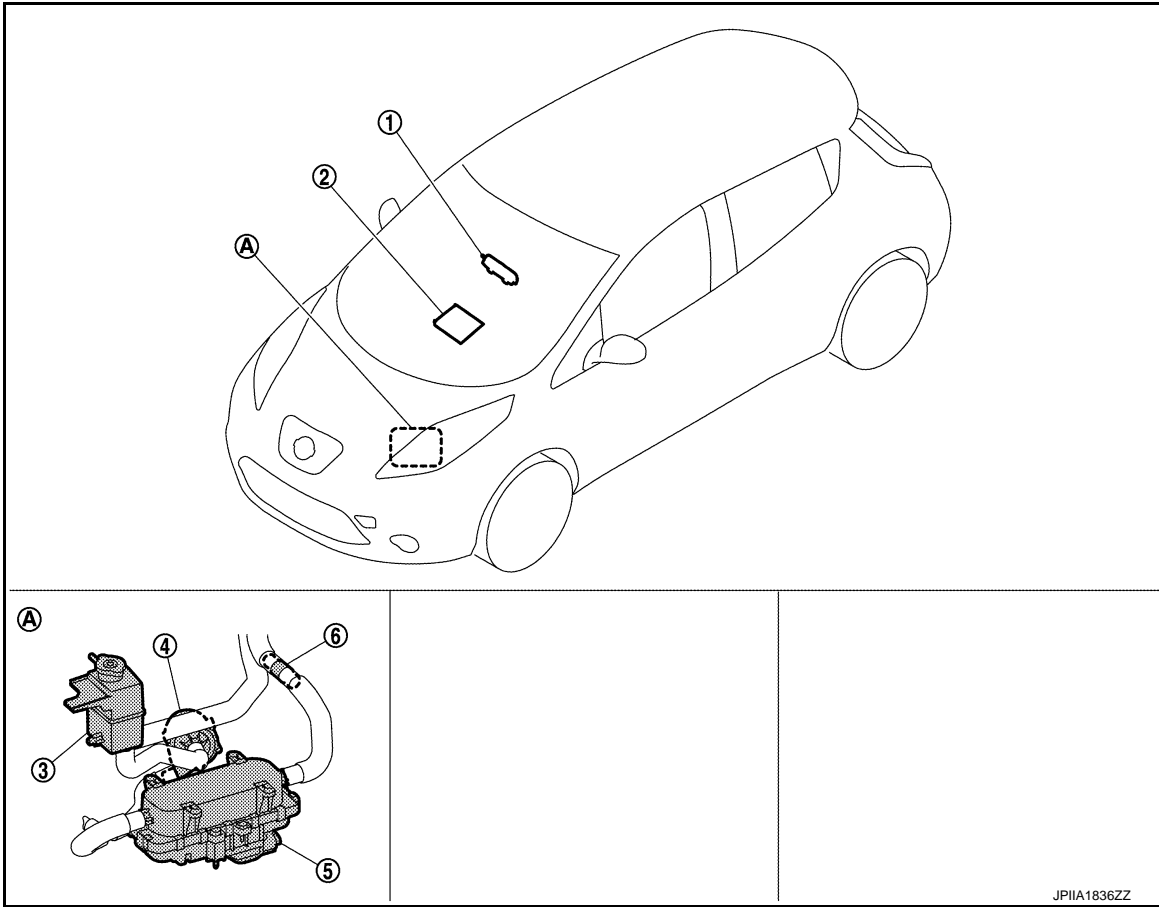


# COMPONENT PARTS

< SYSTEM DESCRIPTION >

## HEATING SYSTEM : Component Parts Location

INFOID:000000006997031



- |                            |                       |                                    |
|----------------------------|-----------------------|------------------------------------|
| 1. A/C controller          | 2. Heater core        | 3. Degas tank (heater)             |
| 4. Heater water pump       | 5. PTC element heater | 6. Heater fluid temperature sensor |
| A. Left side of motor room |                       |                                    |

## HEATING SYSTEM : Component Description

INFOID:000000006997032

Location	DESCRIPTION
PTC element heater	<a href="#">HA-21, "PTC Element Heater"</a>
Heater electric water pump	<a href="#">HA-22, "Heater Electric Water Pump"</a>
Degas tank	Accumulates heater fluid and bleeds the air from the fluid circuit.
Heater fluid temperature sensor	<a href="#">HAC-13, "Heater Fluid Temperature Sensor"</a>
Heater core	<a href="#">HA-18, "A/C UNIT ASSEMBLY : Heater Core"</a>
A/C auto amp.	<a href="#">HAC-14, "AUTOMATIC AIR CONDITIONING SYSTEM : System Description"</a>

## A/C UNIT ASSEMBLY

### A/C UNIT ASSEMBLY : A/C Unit

INFOID:000000006997033

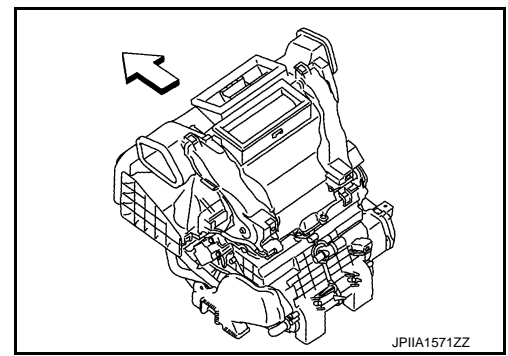
### DESCRIPTION

# COMPONENT PARTS

## < SYSTEM DESCRIPTION >

This system utilizes an A/C unit that combines the blower unit, heater unit, and cooling unit.

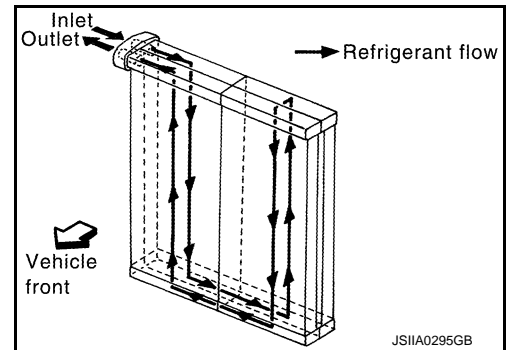
↶ : Vehicle front



INFOID:000000006997034

### A/C UNIT ASSEMBLY : Evaporator

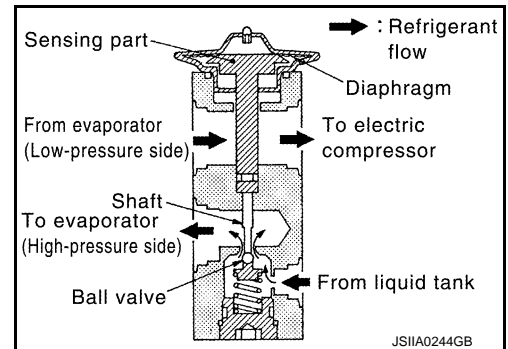
A thin laminate pipeless evaporator is used.



INFOID:000000006997035

### A/C UNIT ASSEMBLY : Expansion Valve

The refrigerant temperature is detected by the temperature sensing part located in the low-pressure refrigerant path inside the expansion valve. The lift amount of the high-pressure side ball valve is changed to regulate the refrigerant flow.

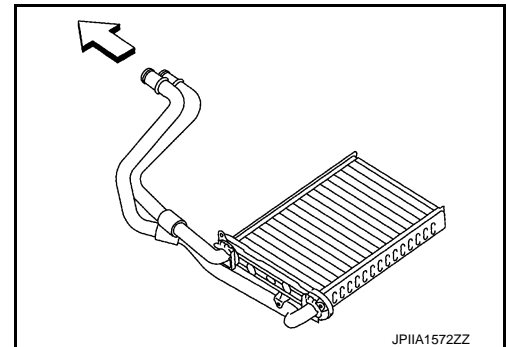


INFOID:000000006997036

### A/C UNIT ASSEMBLY : Heater Core

An aluminum corrugated fin heater core is used.

↶ : Vehicle front



## CONDENSER

### CONDENSER : Condenser

INFOID:000000006997037

#### DESCRIPTION

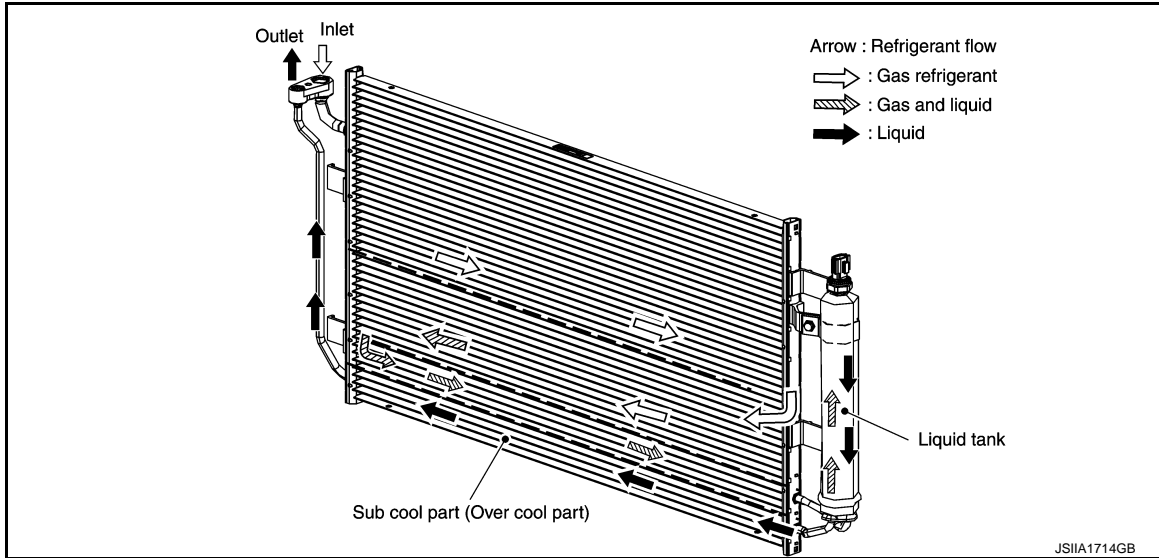
A sub-cool condenser that combines a parallel-flow condenser and liquid tank in the sub-cool cycle is used.

# COMPONENT PARTS

## < SYSTEM DESCRIPTION >

### STRUCTURE AND OPERATION

The sub-cool section is installed on the condenser, and the liquid refrigerant that exits the liquid tank is further cooled by the condenser sub-cool section, increasing the amount of heat that the liquid refrigerant can absorb and improving cooling performance.



### CONDENSER : Liquid Tank

INFOID:000000006997038

- A liquid tank compatible with HFC-134a refrigerant is used.
- A refrigerant pressure sensor for cooler cycle protection and compressor speed control is installed on the liquid tank. For details, refer to [HAC-13, "Refrigerant Pressure Sensor"](#).

### Electric Compressor

INFOID:000000006997039

#### DESCRIPTION

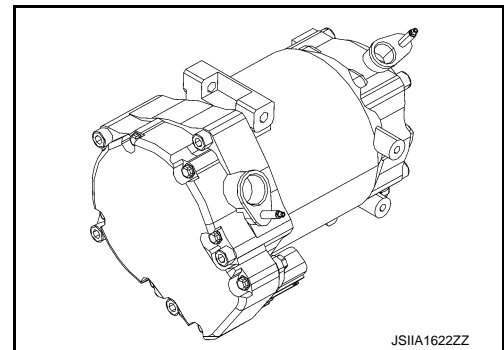
- An electric scroll compressor (AES28AV3AA) is used.
- A 3-phase output inverter with IPM<sup>Note</sup> is used.
- The inverter is adopted to IPM<sup>Note</sup> for smaller size and improved reliability.

#### NOTE:

IPM (Intelligent Power Module) is the element which delivered power device equivalent to IGBT and the protection feature of the circuit to one package.

#### NOTE:

IGBT (Insulated Gate Bipolar Transistor): A transistor which is suitable for high voltages and large currents and which can control large electrical power using a small gate voltage.

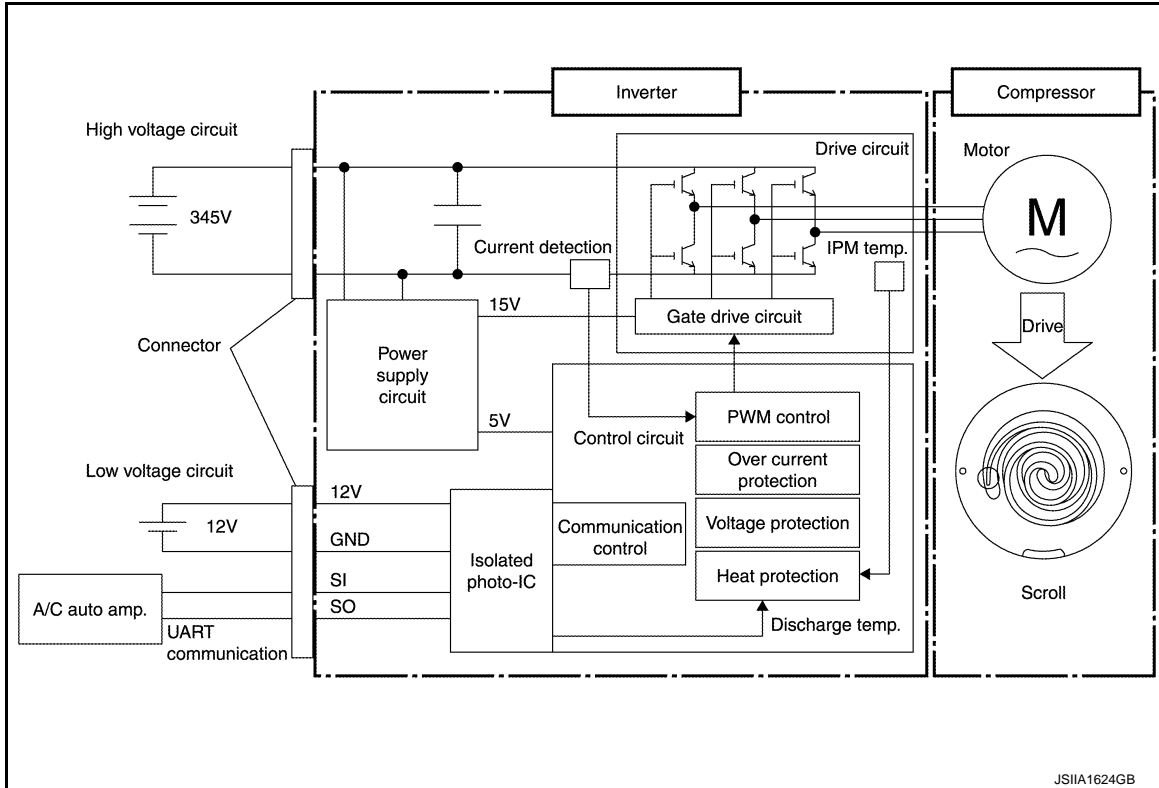


- The structure integrates the inverter, compressor, and motor, allowing the compressor to operate at any speed.

# COMPONENT PARTS

## < SYSTEM DESCRIPTION >

- The inverter communicates with the auto amplifier, and uses PWM control<sup>Note</sup> to control the motor speed via the drive circuit.



**NOTE:**

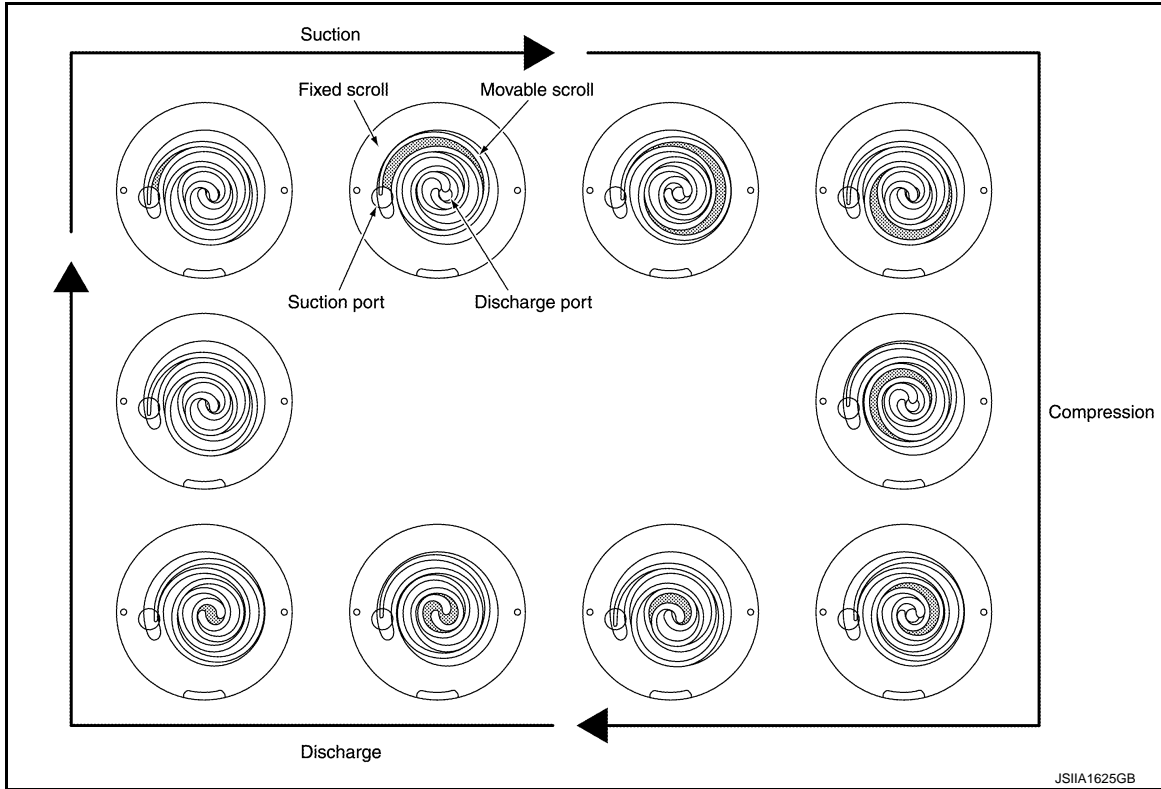
PWM (Pulse Width Modulation) is an output voltage adjustment method that is used when an inverter is used as the power source for motor speed control or other purposes. A semiconductor element is used, and the voltage application time (pulse width) is varied in order to control the motor speed.

- The IPM contains an internal protection circuit, and uses the inverter control circuit to monitor for an increase in motor drive circuit temperature in order to prevent circuit overheating.
- The motor uses a DC brushless motor, with speed control performed by the inverter drive circuit.

# COMPONENT PARTS

## < SYSTEM DESCRIPTION >

- A scroll-type compressor is used. The motor drive force is used to rotate the moveable scroll and perform refrigerant intake, compression, and discharge.



A  
B  
C  
D  
E  
F  
G  
H

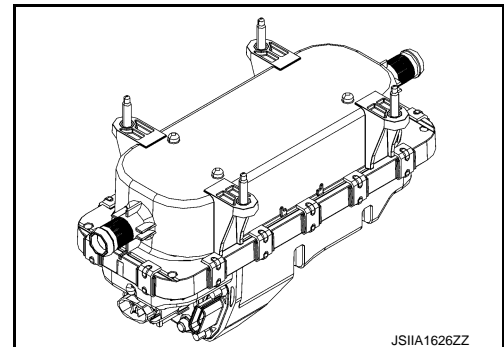
## PTC Element Heater

INFOID:000000006997040

HA

### DESCRIPTION

- A PTC element heater is used as the heat source for heating.



J  
K  
L  
M

- An internal control circuit is installed for communication with the auto amplifier.
- Based on the signals from the auto amplifier, the microcomputer inside the PTC element heater controls the heater output by PWM<sup>Note</sup>.

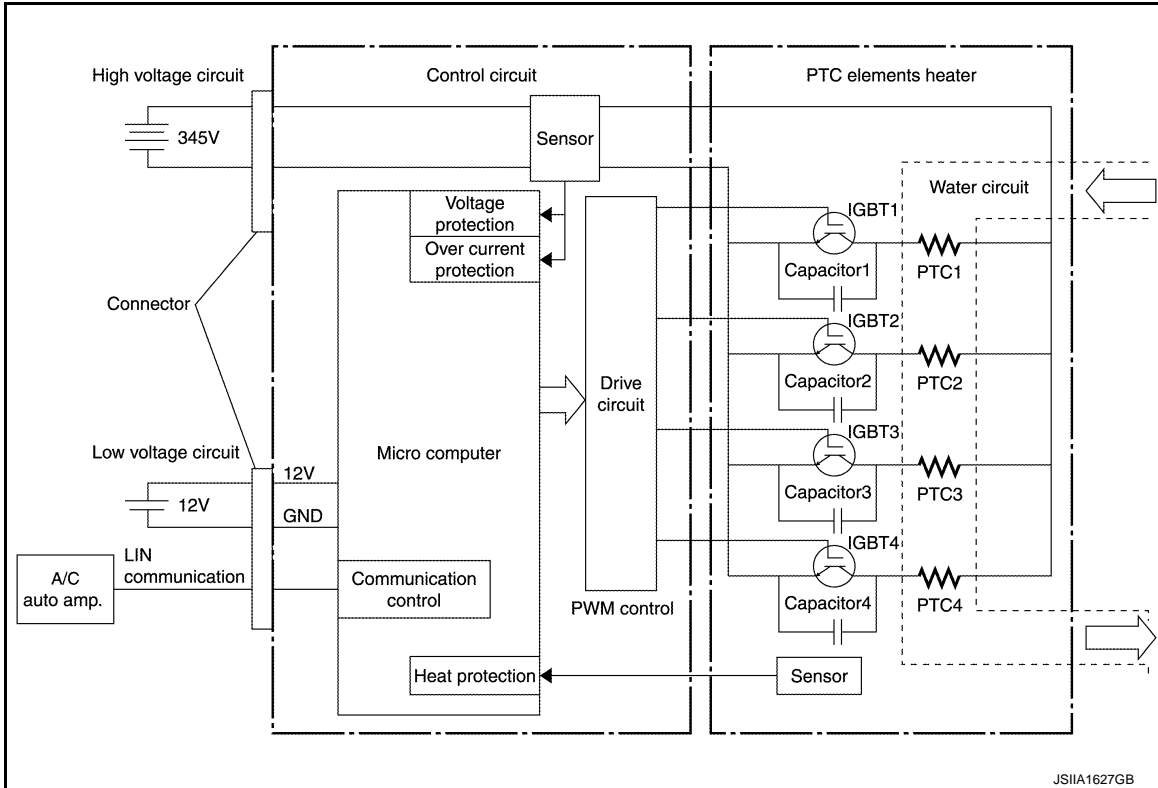
N  
O  
P

### NOTE:

# COMPONENT PARTS

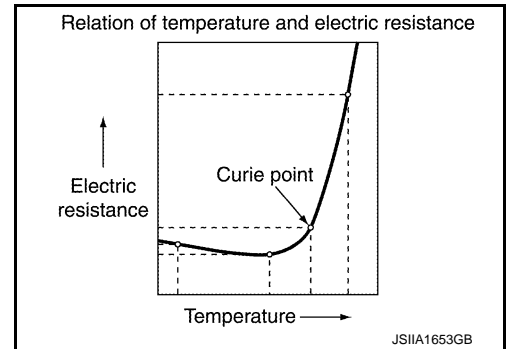
## < SYSTEM DESCRIPTION >

PWM (Pulse Width Modulation) is an output voltage adjustment method that is used when an inverter is used as the power source for motor speed control or other purposes. A semiconductor element is used, and the voltage application time (pulse width) is varied in order to control the PTC element heater.



### PTC ELEMENT

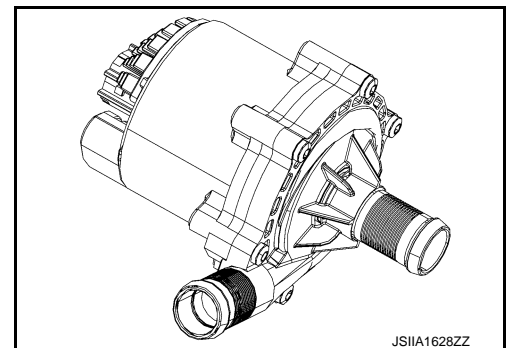
- PTC stands for "Positive Temperature Coefficient", and is a ceramic material with barium titanate as the primary component.
- When current is applied, it heats up. Upon reaching a certain temperature (Curie temperature) the resistance suddenly increases, limiting the current, and maintaining a constant amount of heating.



### Heater Electric Water Pump

INFOID:000000006997041

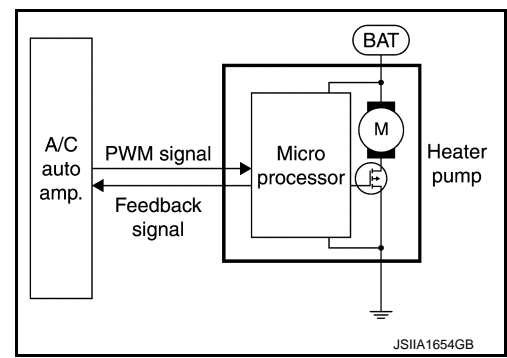
- An electric water pump is used to circulate the water heated by the PTC element heater.



# COMPONENT PARTS

## < SYSTEM DESCRIPTION >

- The speed of the electric water pump is controlled based on the drive signal from the auto amplifier.



## Refrigerant and Compressor Oil

INFOID:000000006997042

- The refrigerant is HFC-134a, which contains no chlorine (Cl), a substance which damages the ozone layer.
- The compressor oil is ND-OIL 11, an ester oil with high insulation performance, designed especially for electric compressors.

### CAUTION:

- The special electric compressor oil has different properties from the conventional HFC-134a compressor oil (PAG oil) and CFC-12 compressor oil (mineral oil). Be sure not to mix these oil types with the compressor oil, as doing so may cause electric leakage.

### NOTE:

- HFC: HydroFluoroCarbon
- CFC: ChloroFluoroCarbon

## Heater Fluid

INFOID:000000006997043

- Water is used as the medium for transporting the heat generated by the PTC element heater in the motor room into the vehicle interior.
- In order to protect the heater water path and prevent freezing, antifreeze<sup>Note</sup> (Concentration 50%).

HA

### NOTE:

The antifreeze used is the LLC which is used to cool conventional engines.

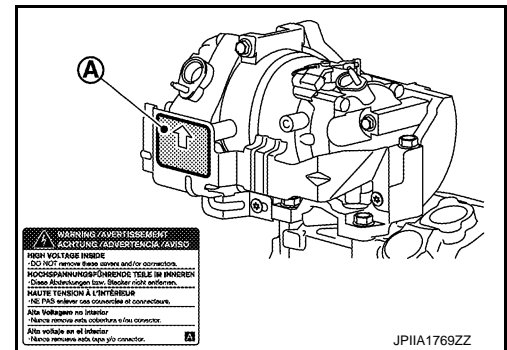
## High Voltage Warning Label

INFOID:000000006997044

- High voltage warning label is stuck on each component parts below.
- When replacing component parts make sure to stick it on original position.

## Electric Compressor

The label (A) is stuck on the compressor stay.

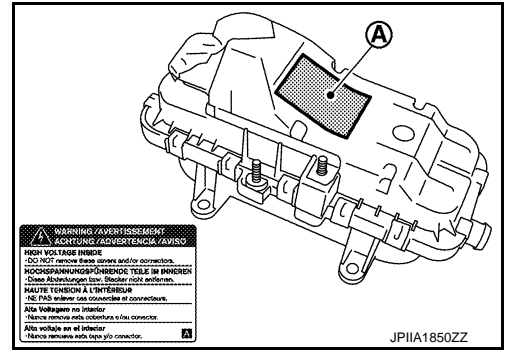


## PTC Elements Heater

# COMPONENT PARTS

## < SYSTEM DESCRIPTION >

The label (A) is stuck on the body of PTC elements heater.





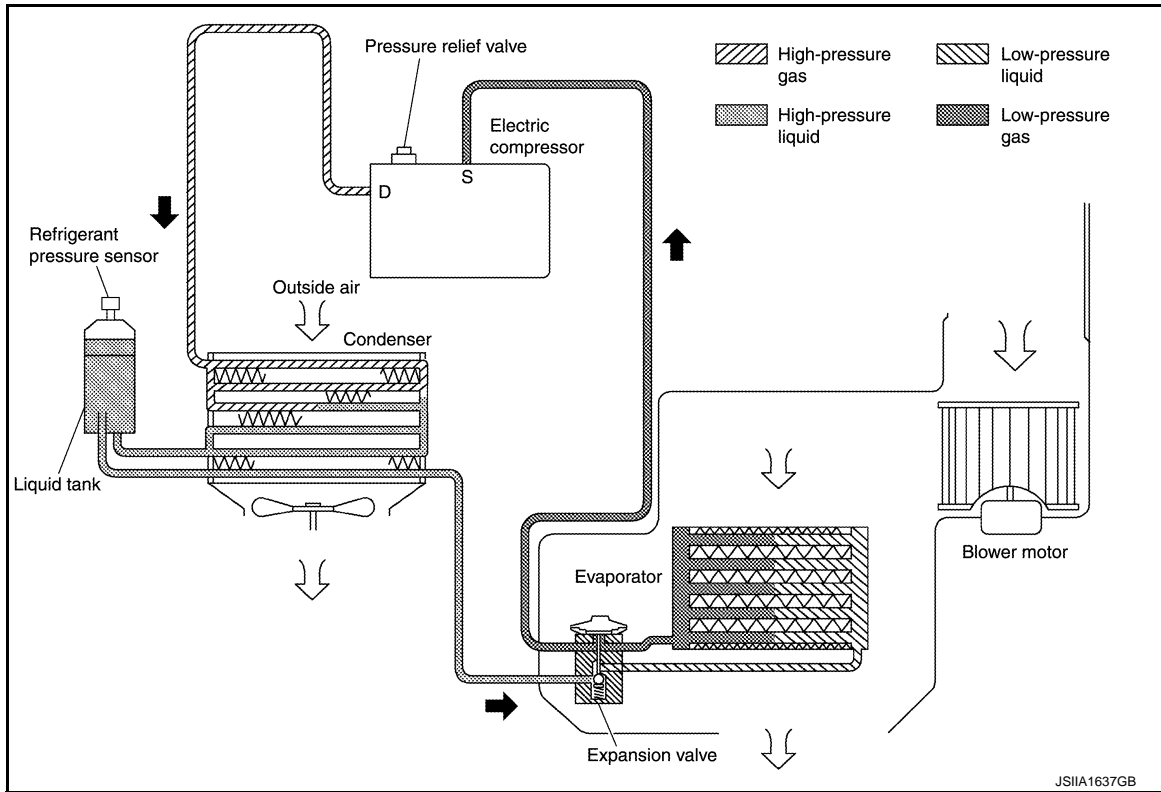
# SYSTEM

< SYSTEM DESCRIPTION >

## SYSTEM

### REFRIGERATION SYSTEM

#### REFRIGERATION SYSTEM : System Diagram



#### REFRIGERATION SYSTEM : System Description

INFOID:000000006997046

#### REFRIGERANT CYCLE

##### Refrigerant Flow

The basic path of refrigerant flow is through the electric compressor, condenser, liquid tank, and evaporator, and then it returns to the electric compressor. The vaporization of evaporator refrigerant is controlled by the expansion valve.

##### Evaporator Cryoprotective Protection Control

- If the air temperature after passing through the evaporator (detected by the intake sensor) is 1°C (33.8°F) or less, the A/C auto amp. sends a request for speed 0 rpm to the electric compressor.
- Based on this signal from the A/C auto amp., the electric compressor stops.

#### REFRIGERANT SYSTEM PROTECTION

##### Refrigerant Pressure Sensor

- The refrigerant system is protected from significant high pressure and low pressure by the refrigerant pressure sensor that is installed at the condenser outlet.
- The refrigerant pressure sensor outputs a signal to the VCM.
- If the A/C auto amp. judges that there is a malfunction (the conditions shown below) in the cooler cycle based on the refrigerant pressure sensor detection value sent from VCM via EV CAN communications, it stops operation of the electric compressor.

- Approximately 2.65 MPa (Approximately 27.0 kg/cm<sup>2</sup>) or more
- Approximately 0.14 MPa (Approximately 1.4 kg/cm<sup>2</sup>) or less

##### NOTE:

The values indicate gauge pressure.

##### Pressure Relief Valve

# SYSTEM

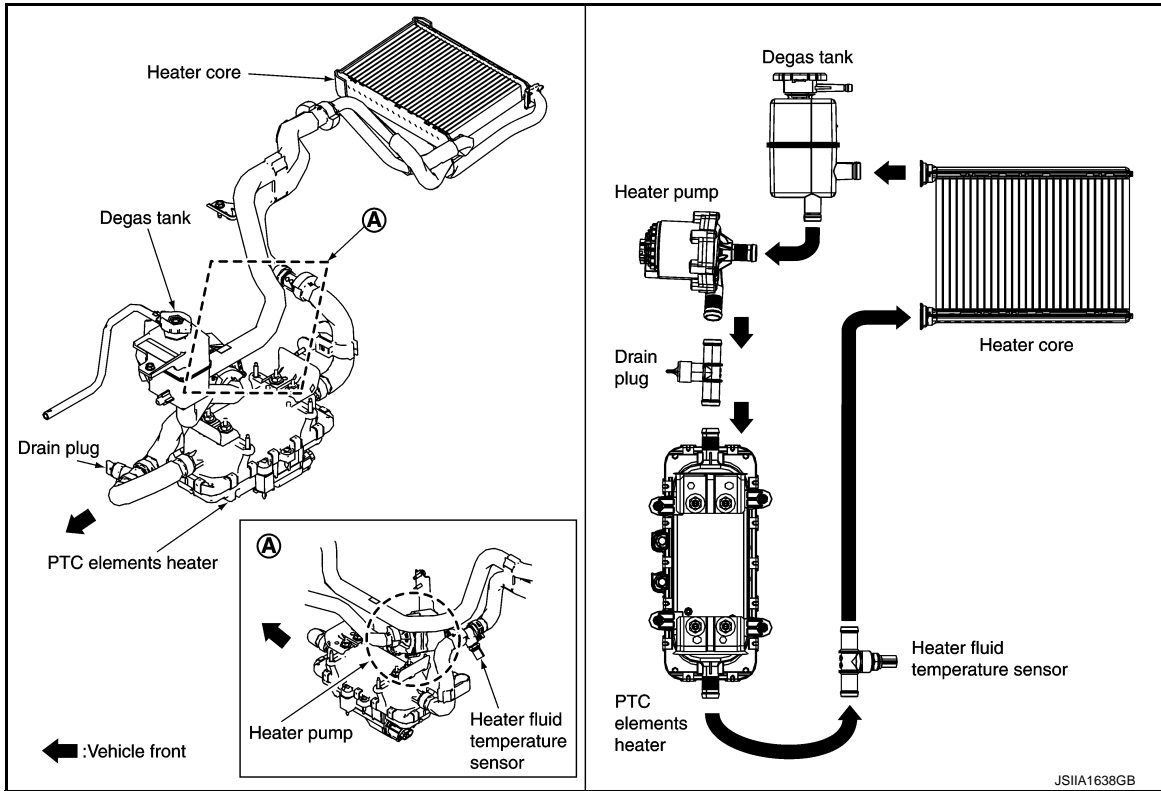
## < SYSTEM DESCRIPTION >

- The refrigerant system is protected from significant high pressure by the pressure relief valve that is installed in the electric compressor.
- If the pressure in the cooler cycle is excessively increased [3.5 MPa (35.7 kg/cm<sup>2</sup>) - 4.14 MPa (42.4 kg/cm<sup>2</sup> or more)], the pressure relief valve opens, releasing refrigerant into the atmosphere.

## HEATING SYSTEM

### HEATING SYSTEM : System Diagram

INFOID:000000006997047



### HEATING SYSTEM : System Description

INFOID:000000006997048

#### HEATING CYCLE

##### Heater Fluid Flow

- The flow of heater fluid passes through the heater electric water pump, PTC element heater, and heater core and then returns to the heater electric water pump.
- The amount of heat generated by the PTC element heater is controlled by the A/C auto amp.

#### HEATING SYSTEM PROTECTION

- If the below conditions occur in the heating system, operation of the PTC heater is stopped in order to protect the system.
  - Heater water temperature sensor malfunction
  - Communications malfunction between A/C auto amp. and PTC element heater
  - Communications malfunction between A/C auto amp. and heater electric water pump

# DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

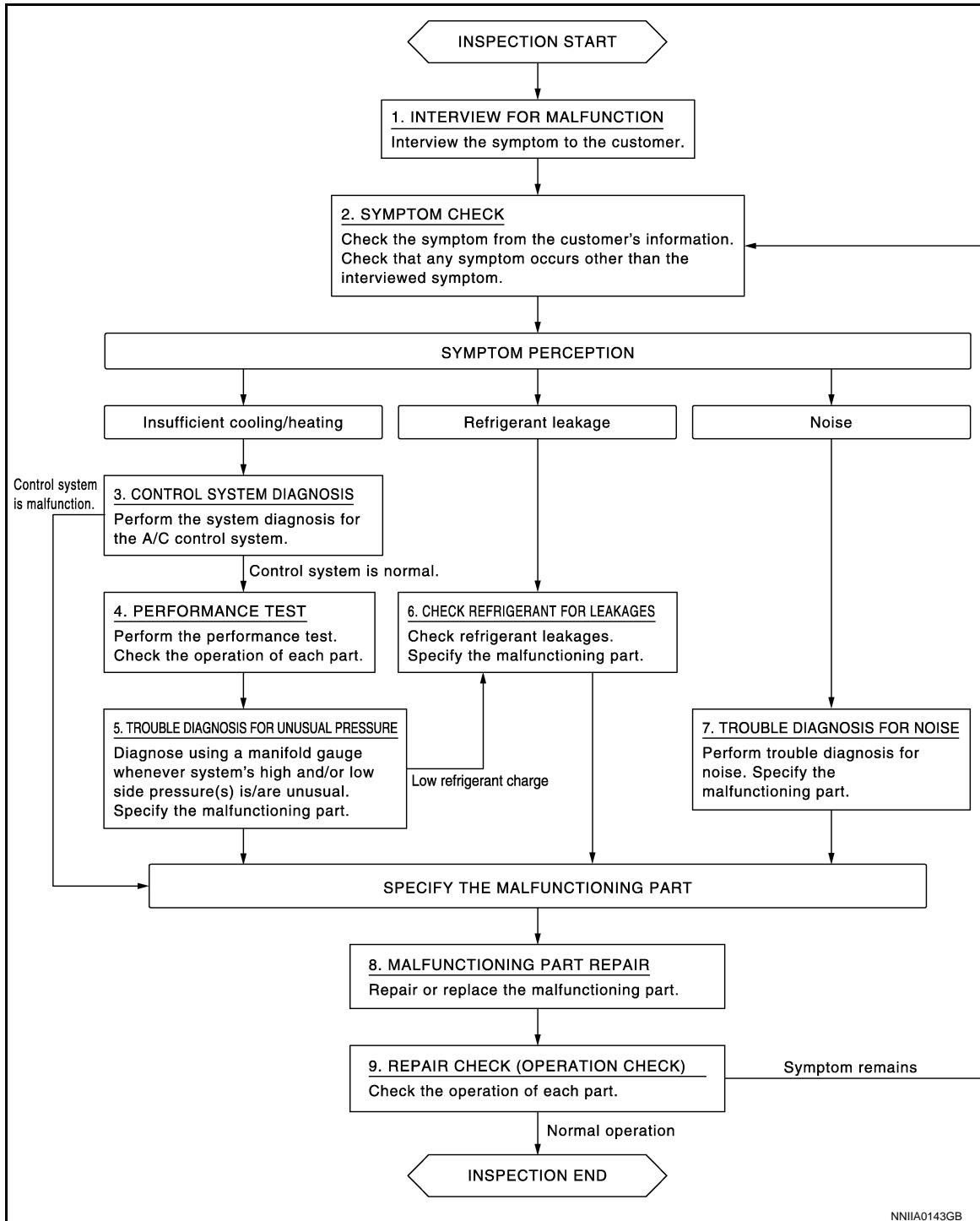
## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORK FLOW

Flowchart of Trouble Diagnosis

INFOID:000000006997049

#### DESCRIPTION OF TROUBLE DIAGNOSIS FLOWCHART



#### DETAILS OF TROUBLE DIAGNOSIS FLOWCHART

##### 1. INTERVIEW FOR MALFUNCTION

Interview the customer to obtain the malfunction information.

# DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

---

>> GO TO 2.

## 2. SYMPTOM CHECK

---

Check the malfunction based on the information obtained from the customer. Check if any other malfunctions are present.

Insufficient cooling·Insufficient heating>>GO TO 3.

Coolant leakage>>GO TO 6.

Noise >> GO TO 7.

## 3. CONTROL SYSTEM DIAGNOSIS

---

Perform control system diagnosis. Refer to [HAC-51, "Work Flow"](#) in "HAC Heater·Air Conditioner Control System."

No malfunction detected>>GO TO 4.

Malfunctioning is detected>>GO TO 8.

## 4. PERFORMANCE TEST

---

Perform the performance inspection. Refer to [HA-35, "Inspection"](#).

>> GO TO 5.

## 5. TROUBLE DIAGNOSIS FOR UNUSUAL PRESSURE

---

Perform diagnosis based on the gauge pressure diagnosis table, and identify the location of the malfunction. Refer to [HA-38, "Symptom Table"](#).

Insufficient refrigerant>>GO TO 6.

Other than the above>>GO TO 8.

## 6. CHECK REFRIGERANT FOR LEAKAGE

---

Perform the refrigerant leakage check and identify the location of the leak. Refer to [HA-29, "Check Refrigerant Leakage"](#).

>> GO TO 8.

## 7. TROUBLE DIAGNOSIS FOR NOISE

---

Perform diagnosis based on the noise diagnosis table, and identify the location of the malfunction. Refer to [HA-40, "Symptom Table"](#).

>> GO TO 8.

## 8. MALFUNCTION PARTS REPAIR

---

Repair or replace malfunctioning part.

>> GO TO 9.

## 9. REPAIR CHECK (OPERATION CHECK)

---

Check operation and verify that the system is operating normally.

Is check result normal?

YES >> Trouble diagnosis is complete.

NO >> GO TO 2.

# REFRIGERANT

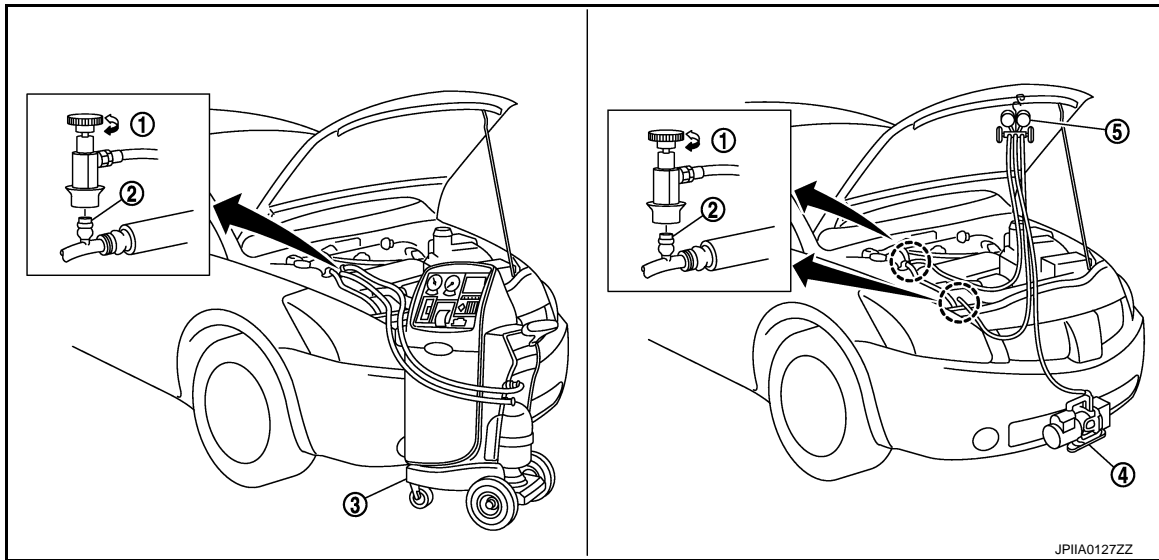
< BASIC INSPECTION >

## REFRIGERANT

### Description

INFOID:000000006997050

### CONNECTION OF SERVICE TOOLS AND EQUIPMENT



1. Shut-off valve
2. A/C service valve
3. Recovery/recycling/recharging equipment (for HFC-134a)
4. Vacuum pump
5. Manifold gauge

### Check Refrigerant Leakage

INFOID:000000006997051

#### DETECTING LEAKAGES WITH FLUORESCENT INDICATOR

##### **CAUTION:**

**Never use fluorescent indicators as these may reduce the insulation resistance.**

#### CHECK REFRIGERANT LEAKAGE USING ELECTRICAL LEAK DETECTOR

##### **CAUTION:**

**Be careful of the following items so that inaccurate checks or misidentifications are avoided.**

- **Never allow refrigerant vapor, shop chemical vapors, cigarette smoke, or others around the vehicle.**
- **Always check refrigerant leakage in a low air flow environment so that refrigerant may not disperse when leakage occurs.**

1. Connect recovery/recycling/recharging equipment (for HFC-134a) or manifold gauge to A/C service valve.
2. Check that refrigerant gas pressure is 345 kPa (3.52 kg/cm<sup>2</sup>) or more when temperature is 16°C (60.8°F) or more. When pressure is lower than the specified value, fully recover all refrigerant and then charge with refrigerant from the service can to the specified level.

##### **NOTE:**

Leakages may not be detected if refrigerant gas pressure is 345 kPa (3.52 kg/cm<sup>2</sup>) or less when temperature is 16°C (60.8°F) or less.

3. Clean area where refrigerant leakage check is performed, and check refrigerant leakage along all surfaces of pipe connections and A/C system components using electrical leak detector probe.

##### **CAUTION:**

- **Even when a leakage point has been found, always continue and complete checking along all pipe connections and A/C system components for additional leakage.**
- **When a leakage is detected, clean leakage area using compressed air and check again.**
- **When checking leakage of cooling unit inside, always clean inside of drain hose so that the probe surface may not be exposed to water or dirt.**

##### **NOTE:**

- Always check leakage starting from high-pressure side and continue to low-pressure side.

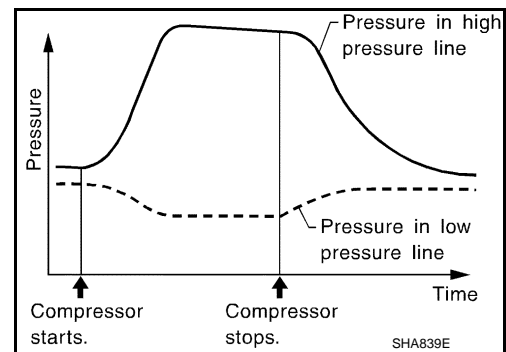
# REFRIGERANT

## < BASIC INSPECTION >

- When checking for leakage inside cooling unit, operate blower fan motor for 15 minutes or more at the maximum fan speed, and then insert electrical leak detector probe into drain hose and leave it inserted for 10 minutes or more.
  - When disconnecting shut-off valve that is connected to A/C service valve, always evacuate remaining refrigerant so that misidentification can be avoided.
4. Repair or replace parts where refrigerant leakage is detected. (Leakage is detected but leakage location is unknown. GO TO 5.)
  5. Start the vehicle and set A/C controller as shown below.
    - A/C switch: ON
    - Mode switch: Ventilation set
    - Intake switch: Recirculation set
    - Temperature control switch: Max. COLD
    - Fan (blower) speed: Max. speed set
  6. Operate A/C for 2 minutes or longer.
  7. Stop the A/C. Check again for refrigerant leakage. GO TO 3.

### NOTE:

- Start refrigerant leakage check immediately after the A/C is stopped.
- When refrigerant circulation is stopped, pressure on the low-pressure side rises gradually, and after this, pressure on the high-pressure side falls gradually.
- The higher the pressure is, the easier it is to find the refrigerant leakage.



## Recycle Refrigerant

INFOID:000000006997052

### WARNING:

- Always use HFC-134a for refrigerant gas. If CFC-12 is accidentally charged, compressor is damaged due to insufficient lubrication.
  - Always observe and follow precautions described on refrigerant container. Incorrect handling may result in an explosion of refrigerant container, frostbite, or the loss of eyesight.
  - Never breathe refrigerant gas and lubricant vapor or mist. Exposure may irritate eyes, nose, or throat.
  - Never allow HFC-134a to be exposed to an open flame or others because it generates poisonous gas when in contact with high temperature objects. Keep workshop well ventilated.
1. Perform oil return operation. Refer to [HA-32, "Perform Lubricant Return Operation"](#). (If refrigerant or lubricant leakage is detected in a large amount, omit this step, and then GO TO 2.)

### CAUTION:

**Never perform lubricant return operation if a large amount of refrigerant or lubricant leakage is detected.**

2. Check gauge pressure readings of recovery/recycling/recharging equipment (for HFC-134a). When remaining pressure exists, recycle refrigerant from high-pressure hose and low-pressure hose.

### NOTE:

Follow manufacturer instructions for the handling or maintenance of the equipment. Never fill the equipment with non-specified refrigerant.

3. Remove A/C service valve cap from the vehicle.
4. Connect recovery/recycling/recharging equipment (for HFC-134a) to the A/C service valve.
5. Operate recovery/recycling/recharging equipment (for HFC-134a), and recycle refrigerant from the vehicle.
6. Evacuate air for 10 minutes or more to remove any remaining refrigerant integrated to compressor lubricant, etc.
7. Refrigerant recycle operation is complete.

# REFRIGERANT

< BASIC INSPECTION >

## Charge Refrigerant

INFOID:000000006997053

### **WARNING:**

- Always use HFC-134a for refrigerant gas. If CFC-12 is accidentally charged, compressor is damaged due to insufficient lubrication.
- Always observe and follow precautions described on refrigerant container. Incorrect handling may result in an explosion of refrigerant container, frostbite, or the loss of eyesight.
- When charging with refrigerant gas, charge with the prescribed amount from a new service can.
- Never breathe refrigerant gas and lubricant vapor or mist. Exposure may irritate eyes, nose, or throat.
- Never allow HFC-134a to be exposed to an open flame or others because it generates poisonous gas when in contact with high temperature objects. Keep workshop well ventilated.

1. Connect manifold gauge (for HFC-134a) to the service valve.
2. Connect vacuum pump to manifold gauge and operate the pump. Apply vacuum to the cooler cycle for approximately 25 minutes or longer.

### **CAUTION:**

**Evacuate air for 15 minutes or more if the parts are replaced.**

3. Check the airtightness of A/C system for 25 minutes or more. If pressure raises more than the specified level, charge A/C system with approximately 200 g refrigerant and check that there is no refrigerant leakage. Refer to [HA-29, "Check Refrigerant Leakage"](#).

### **CAUTION:**

**Check the airtightness for 15 minutes or more if the parts are replaced.**

4. If parts other than compressor were replaced, add compressor oil according to parts that were replaced. Refer to [HA-32, "Lubricant Adjusting Procedure for Components Replacement Except Compressor"](#).
5. Charge the A/C system from a service can with the specified amount of refrigerant.
6. Check that A/C system operates normally.
7. Disconnect the manifold gauge.
8. Install A/C service valve cap.
9. Refrigerant charge is complete.

A  
B  
C  
D  
E  
F  
G  
H  
HA  
J  
K  
L  
M  
N  
O  
P

# LUBRICANT

< BASIC INSPECTION >

## LUBRICANT

### Description

INFOID:000000006997054

#### MAINTENANCE OF LUBRICANT LEVEL

The compressor lubricant is circulating in the system together with the refrigerant. It is necessary to fill compressor with lubricant when replacing A/C system parts or when a large amount of refrigerant leakage is detected. It is important to always maintain lubricant level within the specified level. Or otherwise, the following conditions may occur.

- Insufficient lubricant amount: Stuck compressor
- Excessive lubricant amount: Insufficient cooling (caused by insufficient heat exchange)

**Specified lubricant ND-OIL 11 (special oil for electric compressors)**

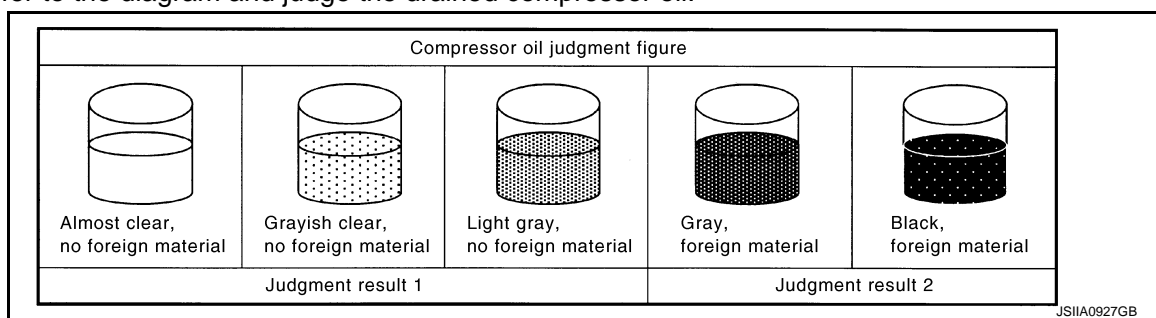
### Inspection

INFOID:000000006997055

If there is a malfunction (abnormal noise from inside, cooling failure) in the compressor unit, check the compressor oil.

#### 1. CHECK COMPRESSOR OIL

1. Remove the electric compressor. [HA-44. "Exploded View"](#).
2. Refer to the diagram and judge the drained compressor oil.



Judgment result 1:>>Replace only the compressor.

Judgment result 2:>>Replace compressor and liquid tank.

### Perform Lubricant Return Operation

INFOID:000000006997056

#### CAUTION:

**If a large amount of refrigerant or lubricant leakage is detected, never perform lubricant return operation.**

1. Start the vehicle and set to the following conditions.
  - A/C switch: ON
  - Fan (blower) speed: Max. speed set
  - Intake switch: Recirculation set
  - Temperature control switch or dial: Max. COLD
2. Perform lubricant return operation for approximately 10 minutes.
3. Stop A/C operation.
4. Oil return operation is complete.

### Lubricant Adjusting Procedure for Components Replacement Except Compressor

INFOID:000000006997057

Fill with lubricant for the amount that is calculated according to the following conditions.

Example: Lubricant amount to be added when replacing evaporator and liquid tank ( $\text{cm}^3$ ) =  $75 + 10 + \alpha$



# LUBRICANT

## < BASIC INSPECTION >

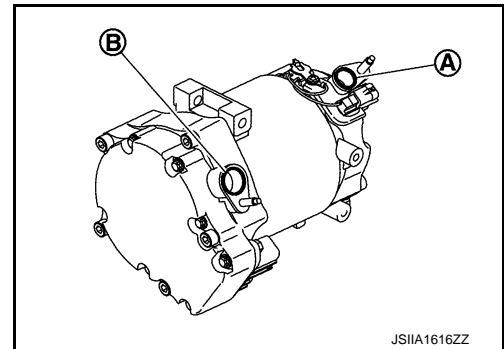
Item	Lubricant amount to be added to A/C system (cm <sup>3</sup> )	
Replace evaporator	35	
Replace condenser	15	
Replace liquid tank	5	
Refrigerant leakage is detected	Large amount leakage	30
	Small amount leakage	—
Lubricant amount that is recycled together with refrigerant during recycle operation	$\alpha$	

## Lubricant Adjusting Procedure for Compressor Replacement

INFOID:000000006997058

### 1. Drain lubricant from removed compressor and measure lubricant amount.

- Turn the compressor so that it faces downward, and drain the compressor oil from the high-pressure port (A) and low-pressure port (B).
- Measure total amount of lubricant that is drained from removed compressor.



### 2. Drain lubricant from a new compressor that is calculated according to the following conditions.

$$\text{Amount to be drained} = F - (D + S + R + \alpha)$$

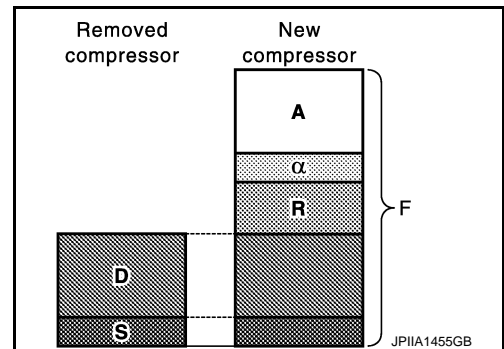
**F** : Lubricant amount that a new compressor contains (150 cm<sup>3</sup>)

**D** : Lubricant amount that is drained from removed compressor

**S** : Lubricant amount that remains inside of removed compressor (20 cm<sup>3</sup>)

**R** : Lubricant amount to be added according to components that are removed except compressor

$\alpha$  : Lubricant amount that is recycled together with refrigerant during recycle operation



### CAUTION:

If lubricant amount that is drained from removed compressor is less than 60 cm<sup>3</sup>, perform calculation by setting "D" as 40 cm<sup>3</sup>.

Item	Lubricant amount to be added to A/C system (cm <sup>3</sup> )
Replace evaporator	35
Replace condenser	15
Replace liquid tank	5

Example: Amount to be drained (cm<sup>3</sup>) when compressor and liquid tank were drained (when D = 60,  $\alpha$  = 5)

## LUBRICANT

### < BASIC INSPECTION >

---

150 – (60 + 20 + 5 + 5) = 60 cm<sup>3</sup> from the new compressor.

3. Install compressor and check the operation.

**CAUTION:**

**Set the vehicle to READY and operate the air-conditioner for at least 1 minute with the vehicle locked to perform a break-in.**

# PERFORMANCE TEST

< BASIC INSPECTION >




## PERFORMANCE TEST

### Inspection

INFOID:000000006997059

### INSPECTION PROCEDURE

1. Connect the manifold gauge.
2. Set the vehicle to the conditions shown below.

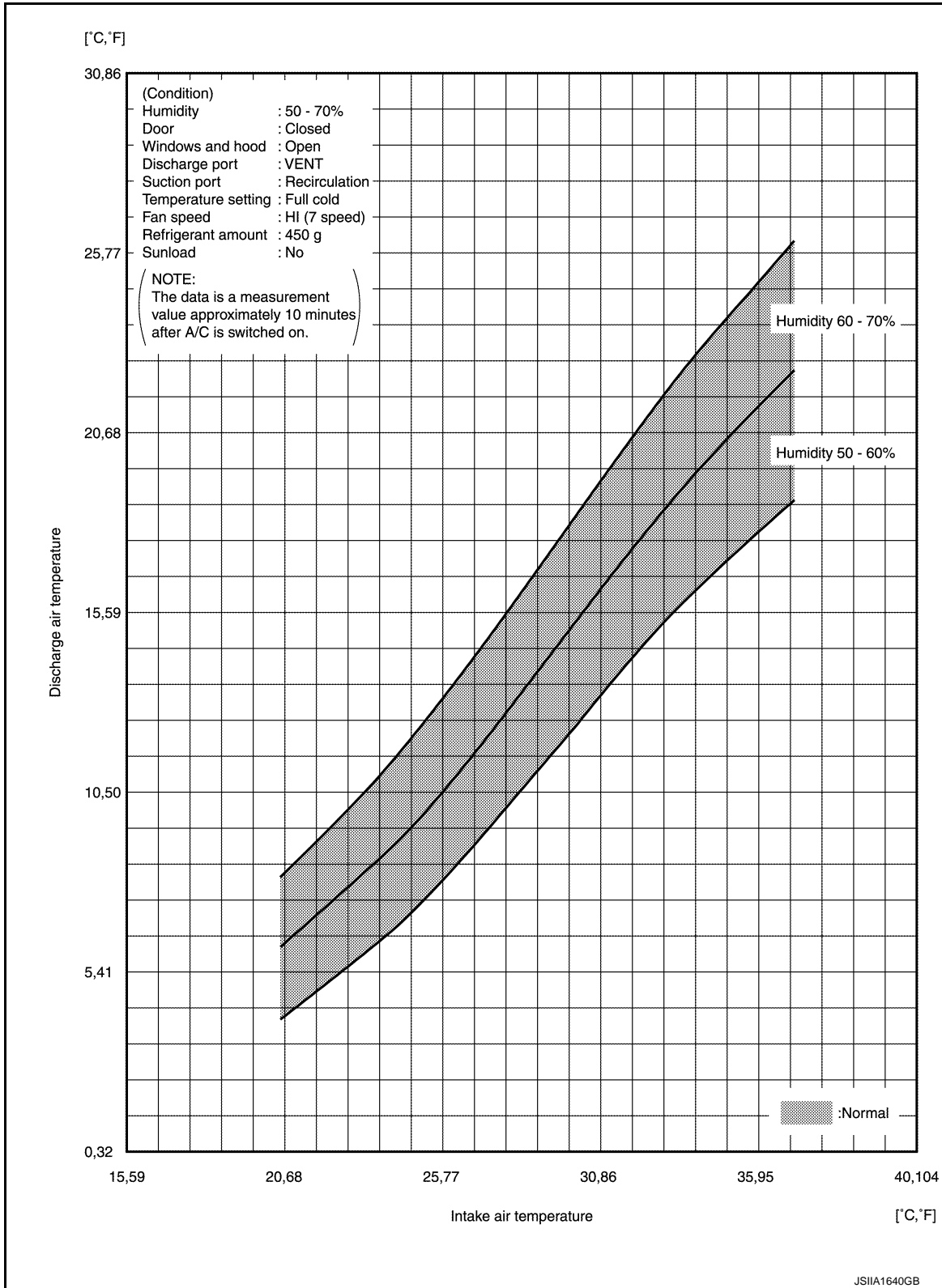
Test condition		
Surrounding condition		Indoors or in the shade (in a well-ventilated place)
Vehicle condition	Door	Closed
	Door glass	Fully-open
	Hood	Open
A/C condition	Temperature control switch or dial	FULL COLD
	A/C switch	ON
	Mode switch	 (Ventilation) set
	Intake switch	 (Recirculation) set
	 Fan (blower) speed	Max. speed set

3. Maintain test condition until A/C system becomes stable. (Approximately 10 minutes)
4. Check that the characteristics for “intake temperature vs. discharge temperature” and “ambient temperature vs. pressure” are within the standard values.
5. When test results are within the specified value, inspection is complete.  
If any of test result is out of the specified value, perform diagnosis by gauge pressure. Refer to [HA-38, "Trouble Diagnosis For Unusual Pressure"](#).

# PERFORMANCE TEST

< BASIC INSPECTION >

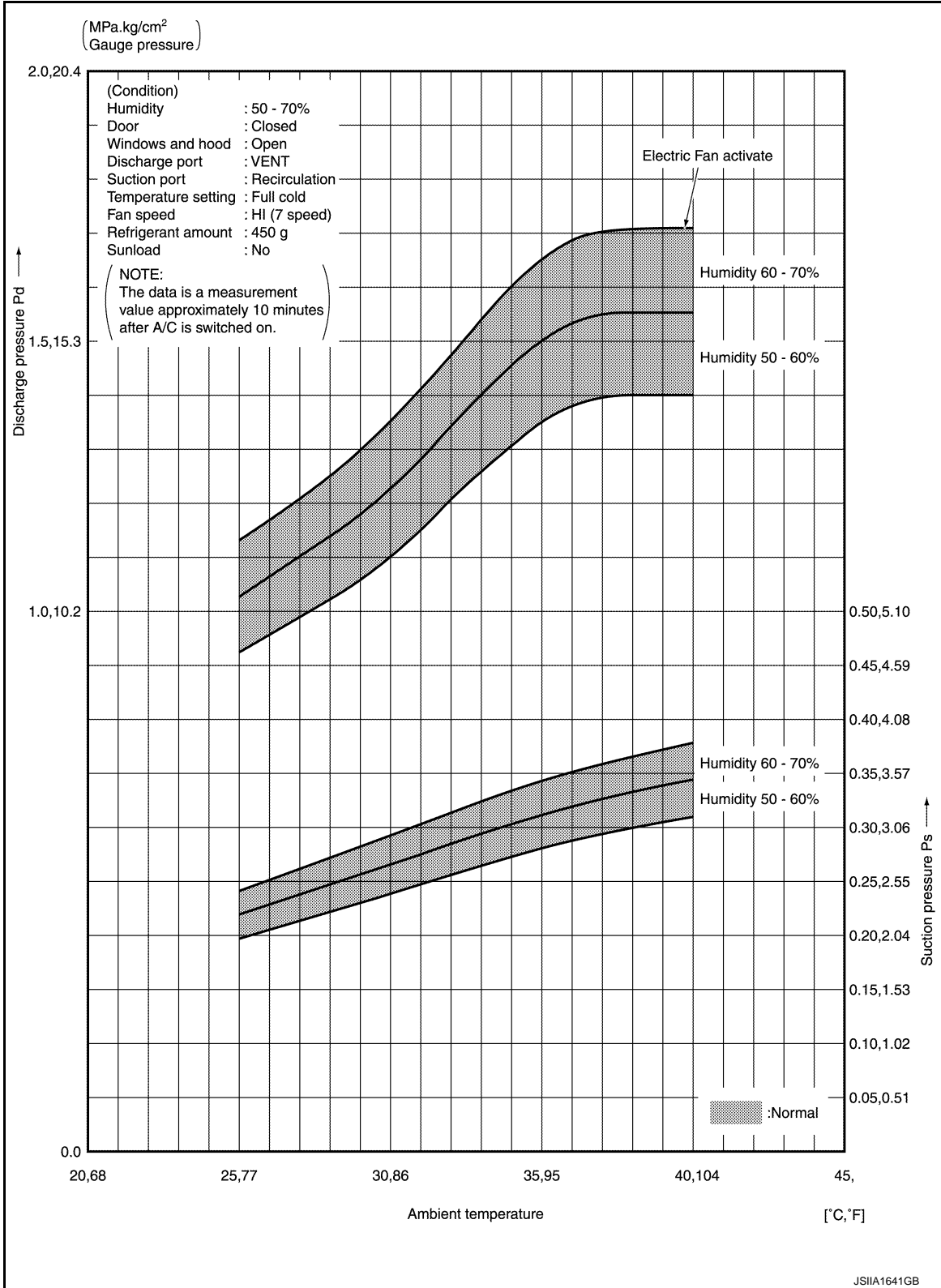
INTAKE -DISCHARGE



# PERFORMANCE TEST

< BASIC INSPECTION >

## AMBIENT TEMPERATURE-PRESSURE CHARACTERISTICS



A  
B  
C  
D  
E  
F  
G  
H  
HA  
J  
K  
L  
M  
N  
O  
P

# REFRIGERATION SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

## SYMPTOM DIAGNOSIS

### REFRIGERATION SYSTEM SYMPTOMS

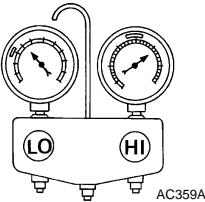
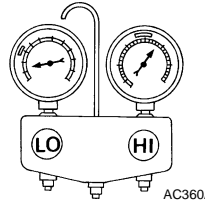
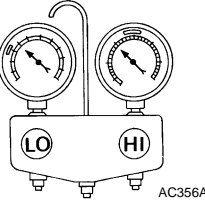
#### Trouble Diagnosis For Unusual Pressure

INFOID:000000006997061

Diagnose using a manifold gauge whenever system's high and/or low side pressure(s) is/are unusual. The marker above the gauge scale in the following tables indicates the standard (usual) pressure range. Refer to above table (Ambient air temperature-to-operating pressure table) since the standard (usual) pressure, however, differs from vehicle to vehicle.

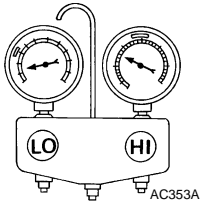
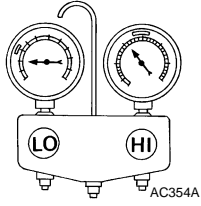
#### Symptom Table

INFOID:000000006997062

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
<p>Both high- and low-pressure sides are too high.</p>  <p>AC359A</p>	<p>The pressure returns to normal soon after sprinkling water on condenser.</p>	<p>Overfilled refrigerant.</p>	<p>Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.</p>
	<p>Air flow to condenser is insufficient.</p>	<p>Insufficient condenser cooling performance.</p> <ul style="list-style-type: none"> <li>Poor fan rotation of radiator and condenser.</li> <li>Improper installation of air guide.</li> <li>Clogged or dirty condenser fins.</li> </ul>	<ul style="list-style-type: none"> <li>Repair or replace malfunctioning parts.</li> <li>Clean and repair condenser fins.</li> </ul>
	<p>When compressor is stopped, a high-pressure reading quickly drops by approximately 196 kPa (2 kg/cm<sup>2</sup>, 28 psi). It then gradually decreases.</p>	<p>Air mixed in refrigerant cycle.</p>	<p>Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.</p>
	<ul style="list-style-type: none"> <li>Low-pressure pipe is cooler than the outlet of evaporator.</li> <li>Low-pressure pipe is frosted.</li> </ul>	<p>Expansion valve opened too much (excessive flow of refrigerant).</p>	<p>Replace expansion valve.</p>
<p>High-pressure side is excessively high and low-pressure side is too low.</p>  <p>AC360A</p>	<p>High-pressure pipe and upper side of condenser become hot, however, liquid tank does not become so hot.</p>	<p>Clogged or crushed high-pressure pipe located between compressor and condenser.</p>	<p>Repair or replace the malfunctioning parts.</p>
<p>High-pressure side is too low and low-pressure side is too high.</p>  <p>AC356A</p>	<ul style="list-style-type: none"> <li>The readings of both sides become equal soon after compressor operation stops.</li> <li>There is no temperature difference between high- and low-pressure sides.</li> </ul>	<p>Malfunction in compressor system (insufficient compressor pressure operation).</p> <ul style="list-style-type: none"> <li>Damage or breakage of valve.</li> <li>Malfunctioning gaskets.</li> </ul>	<p>Replace compressor.</p>

# REFRIGERATION SYSTEM SYMPTOMS

## < SYMPTOM DIAGNOSIS >

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
<p>Both high- and low-pressure sides are too low.</p> 	<ul style="list-style-type: none"> <li>The area around evaporator outlet does not become cold.</li> <li>The area around evaporator inlet becomes frosted.</li> </ul>	<ul style="list-style-type: none"> <li>Clogged expansion valve.</li> <li>Breakage of temperature sensor.</li> <li>Clogging by foreign material.</li> </ul>	Eliminate foreign material from expansion valve, or replace it.
	<ul style="list-style-type: none"> <li>There is a temperature difference between the areas around outlet and inlet pipes of liquid tank.</li> <li>Liquid tank becomes frosted.</li> </ul>	Malfunction in inner liquid tank (clogged strainer).	Replace liquid tank.
	Evaporator becomes frosted.	<ul style="list-style-type: none"> <li>Clogged or crushed low-pressure pipe.</li> <li>Malfunction in intake sensor.</li> </ul>	<ul style="list-style-type: none"> <li>Repair or replace malfunctioning parts.</li> <li>Check intake sensor system. Refer to <a href="#">HAC-67, "Diagnosis Procedure"</a>.</li> </ul>
	There is a small temperature difference between the high and low pressure pipes for refrigerant cycle.	<ul style="list-style-type: none"> <li>Shortage of refrigerant.</li> <li>Leakage of refrigerant.</li> </ul>	<ul style="list-style-type: none"> <li>Check for leakage.</li> <li>Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.</li> </ul>
<p>Low-pressure side sometimes becomes negative.</p> 	<ul style="list-style-type: none"> <li>Sometimes the area around evaporator outlet does not become cold.</li> <li>Sometimes the area around evaporator inlet is frosted.</li> </ul>	<ul style="list-style-type: none"> <li>Icing caused by the mixing of water in cooler cycle.</li> <li>Deteriorated dryer in liquid tank.</li> </ul>	<ul style="list-style-type: none"> <li>Collect all refrigerant.</li> <li>Evacuate refrigerant cycle completely, and then refill it with the specified amount of refrigerant. At this time, always replace liquid tank.</li> </ul>

A  
B  
C  
D  
E  
F  
G  
H  
HA  
J  
K  
L  
M  
N  
O  
P

# NOISE

< SYMPTOM DIAGNOSIS >

## NOISE

### Symptom Table

INFOID:000000006997063

Symptom	Noise source	Probable cause	Corrective action
Unusual noise from compressor when A/C is ON.	Inside of compressor	Wear, breakage, or clogging of foreign material in inner parts.	Check compressor oil. Refer to <a href="#">HA-32, "Inspection"</a> .
	Compressor body	Loosened compressor mounting bolts.	Check bolts for tightness. Refer to <a href="#">HA-44, "Exploded View"</a> .
Unusual noise from cooler piping.	Cooler piping (pipe and flexible hose)	Improper installation of clip and bracket.	Check the installation condition of the cooler piping. Refer to <a href="#">HA-50, "Exploded View"</a> .
Unusual noise from expansion valve when A/C is ON.	Expansion valve	Shortage of refrigerant.	<ul style="list-style-type: none"> <li>• Check for leakage.</li> <li>• Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.</li> </ul>
		Wear, breakage, or clogging of foreign material in inner parts.	Eliminate foreign material from expansion valve, or replace it.



# HEATER FLUID

< PERIODIC MAINTENANCE >

## PERIODIC MAINTENANCE

### HEATER FLUID

#### Inspection

INFOID:000000006960803

#### COOLANT AMOUNT INSPECTION

##### NOTE:

Heater system and high voltage cooling system share the reservoir tank.  
Refer to [HCO-9, "Inspection"](#)

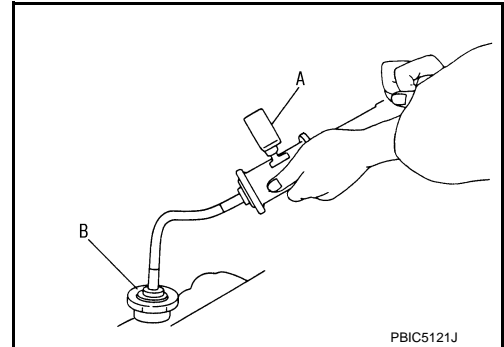
#### LEAKAGE CHECK

- Apply pressure to the heater cycle using radiator cap tester (A) (commercial service tool). Check cycle for heater fluid leakage.

**Maximum pressure** : Refer to [HCO-25, "Radiator"](#).

##### CAUTION:

- Remove the degas tank cap when heater fluid temperature is low.
- Perform the inspection with the heater cycle filled with water.
- Use hose adapter (B) (commercial service tool) between radiator cap tester (A) (commercial service tool) and the filler neck so that the degas tank filler neck is not deformed.
- Be sure to observe the maximum pressure standards. Otherwise, Component parts may be damaged.
- If there is a malfunction, repair and replace applicable part.



#### Draining and Refilling

INFOID:000000006960804

##### CAUTION:

- Do not put additive such as waterleak preventive, since it may cause waterway clogging.
- When refilling use genuine NISSAN coolant or equivalent in its quality mixed with water (distilled or demineralized).
- Make sure not to dilute it with water.

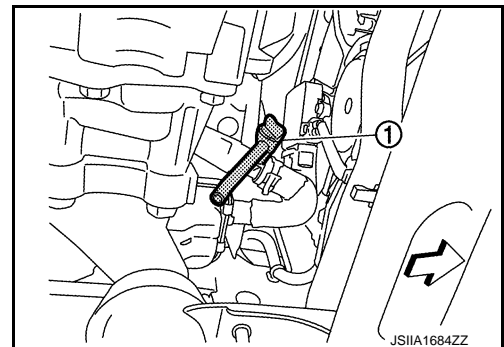
#### DRAIN

##### CAUTION:

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

- Remove front under cover. Refer to [EXT-21, "FRONT UNDER COVER : Removal and Installation"](#).
- Open the drain cock (1), remove degas tank cap and drain heater fluid.

- 1 : Drain cock  
⇐ : Vehicle front



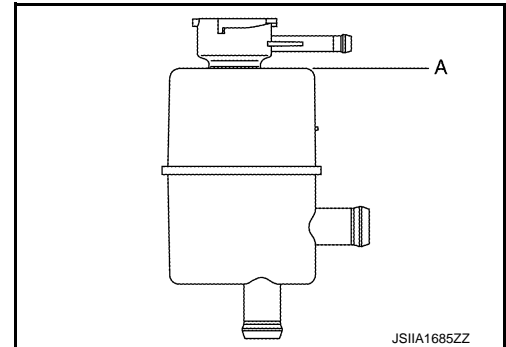
- Remove reservoir tank and drain the heater fluid as per the following procedure.
  - Remove radiator upper grill. Refer to [DLK-148, "RADIATOR UPPER GRILLE : Removal and Installation"](#).
  - Remove reservoir tank hose and reservoir tank mounting bolts.
  - Pull out the lower reservoir tank toward vehicle front. Remove the insertion area and raise the tank for removal.

# HEATER FLUID

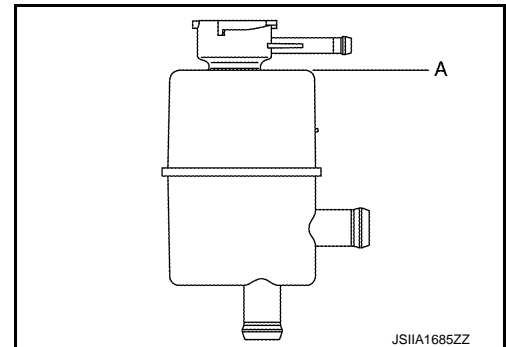
## < PERIODIC MAINTENANCE >

### REFILLING

1. Install reservoir tank. (Install in the reverse order of removal.)
2. Close drain cock.
3. Check tightening of hose clamp.
4. Fill water to line (A) from the degas tank cap.



5. Set the vehicle to READY and operate the heater pump.
6. When the degas tank level is low, open the degas tank cap and refill the tank with water to line (A).



7. When the level is not lowered, close the degas tank cap and turn OFF the push start switch (stop the heater pump).

**NOTE:**

If the heater pump is stopped with the degas tank open, heater fluid may be spilled.

8. Refill heater fluid to "MAX" line of reservoir tank.

### CHECK WATER FLOW SOUND

**CAUTION:**

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

1. Operate the heater pump for 1 minute.
2. Check if water flow sound can be heard from the instrument panel.
3. If water flow sound is heard, operate the heater pump until it cannot be heard.
4. When water flow sound cannot be heard, fill the reservoir tank up to "MAX" line.

**CAUTION:**

- **Insufficient heater fluid may cause overheat, water flow sound of heater core, and malfunction of heater and defroster. Be sure to bleed air thoroughly.**
- **Never operate the heater pump without heater fluid.**

# DEGAS TANK CAP

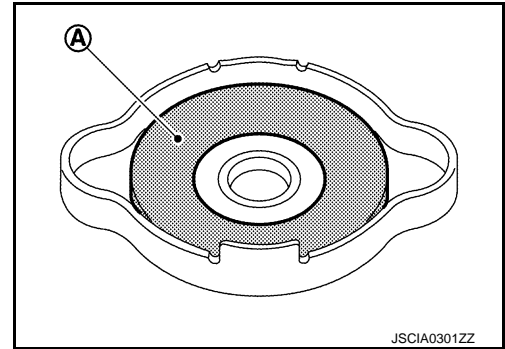
< PERIODIC MAINTENANCE >

## DEGAS TANK CAP

### Degas Tank Cap Inspection

Visually check packing (A) of the degas tank cap for dirt and damage.

INFOID:000000006960805



A  
B  
C  
D  
E  
F  
G  
H  
HA  
J  
K  
L  
M  
N  
O  
P

HA

# ELECTRIC COMPRESSOR

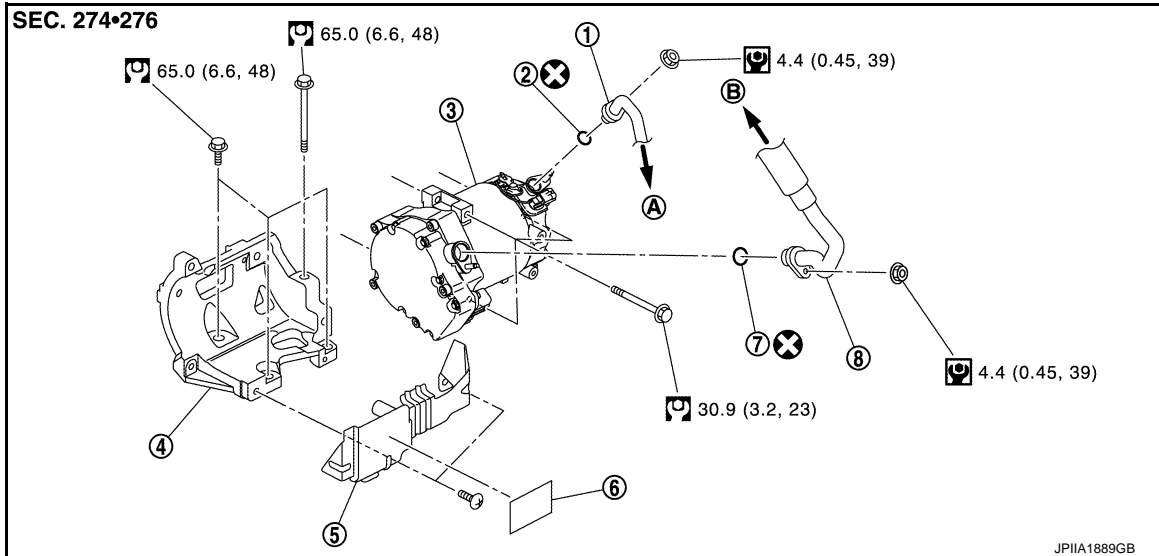
< REMOVAL AND INSTALLATION >

## REMOVAL AND INSTALLATION

### ELECTRIC COMPRESSOR

Exploded View

INFOID:000000006960806



- |                                |                               |                               |
|--------------------------------|-------------------------------|-------------------------------|
| 1. High-pressure flexible hose | 2. O-ring                     | 3. Electric compressor        |
| 4. Compressor bracket          | 5. Compressor stay            | 6. High voltage warning label |
| 7. O-ring                      | 8. Low-pressure flexible hose |                               |
- A. To condenser  
B. To evaporator

⊗ : Always replace after every disassembly.

⊙ : N•m (kg-m in-lb)

⊙ : N•m (kg-m ft-lb)

## Removal and Installation

INFOID:000000006960807

### 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.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective equipments consisting of glove, shoes and glasses/face shield 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.
- Refer to [HA-3, "High Voltage Precautions"](#).

### 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.
- Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to [HA-32, "Perform Lubricant Return Operation"](#).

# ELECTRIC COMPRESSOR

## < REMOVAL AND INSTALLATION >

### REMOVAL

#### **WARNING:**

Shut off high voltage circuit. Refer to [GI-31, "How to Cut Off High Voltage"](#).

1. Check voltage in high voltage circuit. (Check that condenser are discharged.)
  - a. Remove Li-ion battery under cover.

#### **WARNING:**



To prevent shock hazards, be sure to wear protective gear.



- b. Disconnect high voltage connector from front side of Li-ion battery.

#### **DANGER:**



Touching high voltage components without using the appropriate protective equipment will cause electrocution.



- c. Measure voltage between high voltage harness terminals.

#### **DANGER:**



Touching high voltage components without using the appropriate protective equipment will cause electrocution.

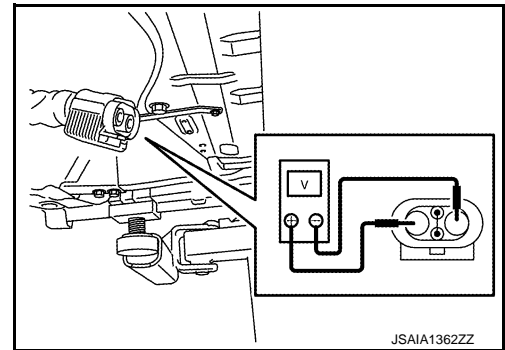


Standard

: 5 V or less

#### **CAUTION:**

For voltage measurements, use a tester which can measure to 500 V or higher.



2. Use the refrigerant recovery equipment (for HFC134a) and recover the refrigerant. [HA-30, "Recycle Refrigerant"](#).
3. Remove the radiator upper grille. Refer to [DLK-148, "RADIATOR UPPER GRILLE : Removal and Installation"](#).
4. Remove the mounting nut (A) and disconnect the low-pressure flexible hose (1) from the electric compressor.

#### **WARNING:**

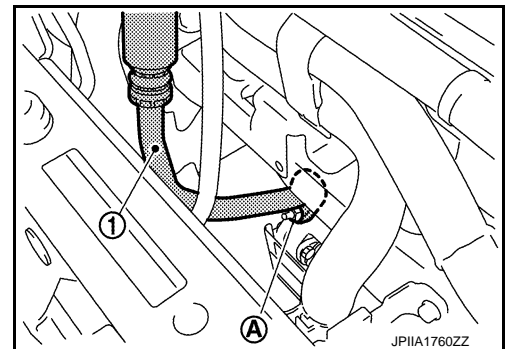


To prevent shock hazards, be sure to wear protective gear.



#### **CAUTION:**

- Cover the low pressure port of the electric compressor with a cap to prevent oil from spilling.
- To prevent the inclusion of foreign matter, use a cap or vinyl tape to seal off the pipe connection port from the atmosphere.



# ELECTRIC COMPRESSOR

## < REMOVAL AND INSTALLATION >

5. Remove the mounting nut (A) and disconnect the high-pressure flexible hose (1) from the electric compressor.

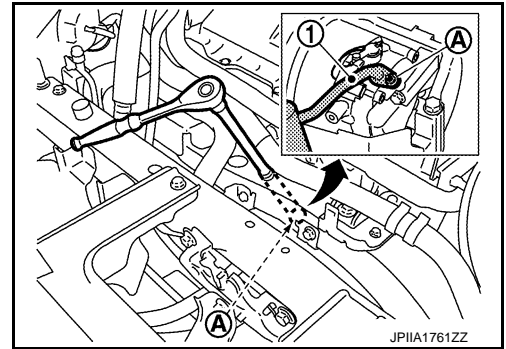
**WARNING:**

 To prevent shock hazards, be sure to wear protective gear.



**CAUTION:**

- Cover the high pressure port of the electric compressor with a cap to prevent oil from spilling.
- To prevent the inclusion of foreign matter, use a cap or vinyl tape to seal off the pipe connection port from the atmosphere.



6. Remove the quick charge port connector (1) inside motor room.

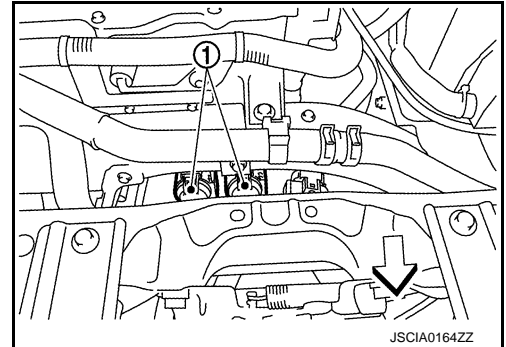
 : Vehicle front

**WARNING:**

 To prevent shock hazards, be sure to wear protective gear.



- To prevent shock hazards, immediately wrap insulating tape around disconnected high voltage connector terminals.



7. Remove the normal charge port connector (1) inside motor room.

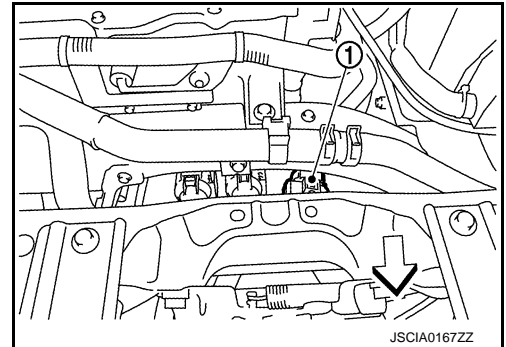
 : Vehicle front

**WARNING:**

 To prevent shock hazards, be sure to wear protective gear.



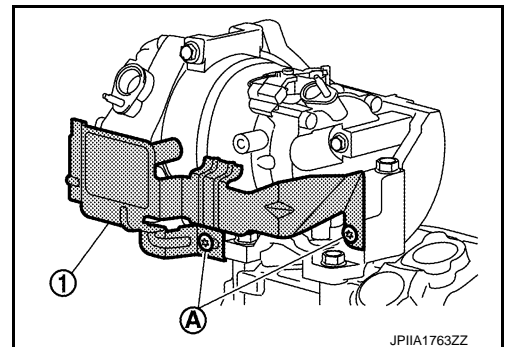
- To prevent shock hazards, immediately wrap insulating tape around disconnected high voltage connector terminals.



8. Move the water hose to a position where it will not interfere with work.
9. Remove the front under cover. Refer to [EXT-21, "FRONT UNDER COVER : Removal and Installation"](#).
10. Remove the front tire RH. Refer to [WT-45, "Removal and Installation"](#).
11. Remove the fender protector. Refer to [EXT-19, "FENDER PROTECTOR : Removal and Installation"](#).
12. Remove the mounting bolts (A), then remove the compressor stay (1).

**WARNING:**

 To prevent shock hazards, be sure to wear protective gear.



# ELECTRIC COMPRESSOR

## < REMOVAL AND INSTALLATION >

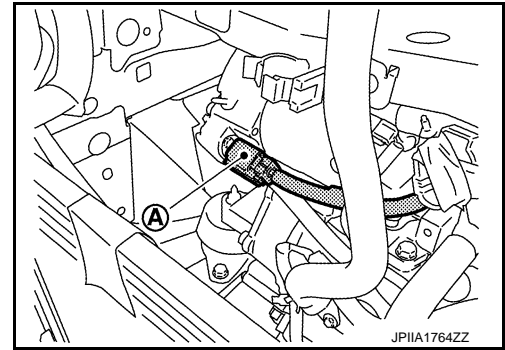
13. Disconnect the high voltage harness connector (A).

**WARNING:**

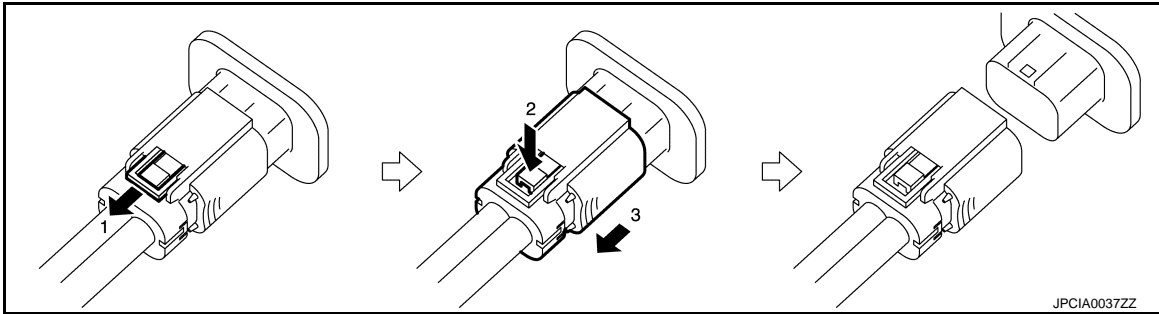
-  To prevent shock hazards, be sure to wear protective gear.



- To prevent shock hazards, immediately wrap insulating tape around disconnected high voltage connector terminals.



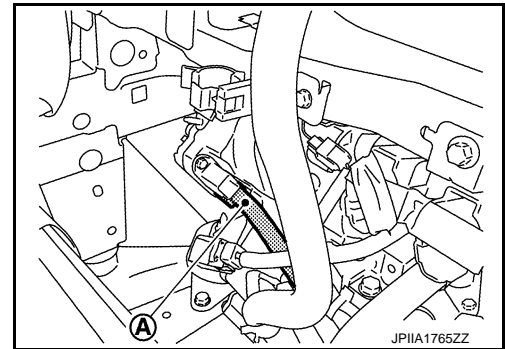
- Follow the procedure below and disconnect the high voltage harness connector.



14. Disconnect the low voltage harness connector (A).

**WARNING:**

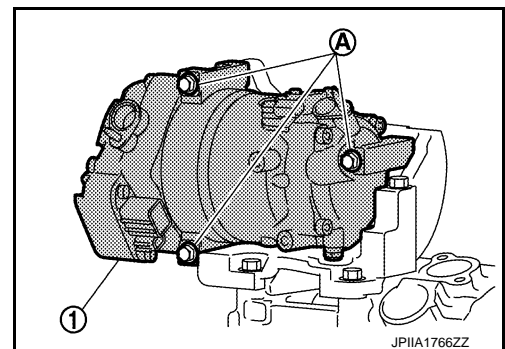
-  To prevent shock hazards, be sure to wear protective gear.



15. Remove the mounting bolts (A) from the electric compressor (1).

**WARNING:**

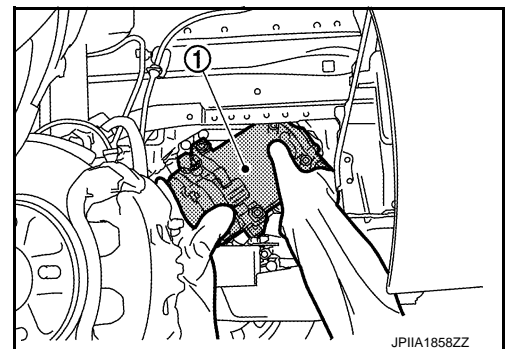
-  To prevent shock hazards, be sure to wear protective gear.



16. Remove the electric compressor (1) from the vehicle.

**WARNING:**

-  To prevent shock hazards, be sure to wear protective gear.



A  
B  
C  
D  
E  
F  
G  
H  
HA  
J  
K  
L  
M  
N  
O  
P



# ELECTRIC COMPRESSOR

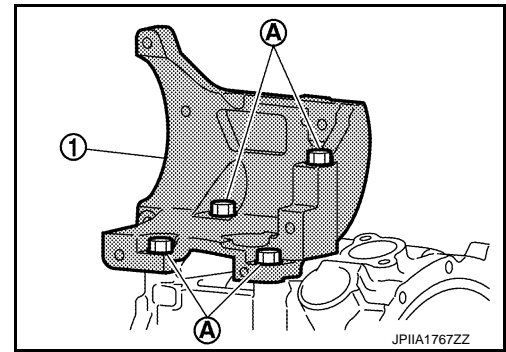
## < REMOVAL AND INSTALLATION >

17. Remove the mounting bolts (A), then remove the compressor bracket (1).

**WARNING:**



To prevent shock hazards, be sure to wear protective gear.



## INSTALLATION

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

**WARNING:**

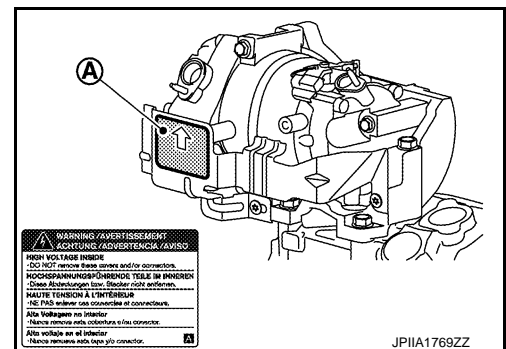


To prevent shock hazards, be sure to wear protective gear.



**CAUTION:**

- Be sure to reinstall high voltage harness clips in their original positions. If a clip is damaged, replace it with a new clip before installing.
  - Before installing the new compressor, adjust the compressor oil level. Refer to [HA-33, "Lubricant Adjusting Procedure for Compressor Replacement"](#).
  - To prevent degradation in insulation performance, use special electric compressor oil as the compressor oil.
  - In order to prevent conventional PAG oil from becoming mixed in, do not reuse recovered compressor oil and instead always use new oil. The use of oil including the conventional PAG oil may degrade the performance of insulation.
  - To prevent performance degradation, do not use a fluorescent agent in order to detect refrigerant leakage. Also take care that a fluorescent agent does not enter the oil.
  - To prevent leakage of refrigerant, replace the O-ring with a new one. Apply a coat of compressor oil to the O-ring prior to installation.
  - Perform a check for refrigerant leakage when charging with refrigerant. Refer to [HA-29, "Check Refrigerant Leakage"](#).
  - Set the vehicle to **READY** and operate the air-conditioner for at least 1 minute with the vehicle parked to perform a break-in.
- If the compressor stay was replaced, first check that there is no dust or dirt on the surface of the compressor stay, then apply the new high voltage warning label at position (A), with the direction indicated by the arrow facing up.

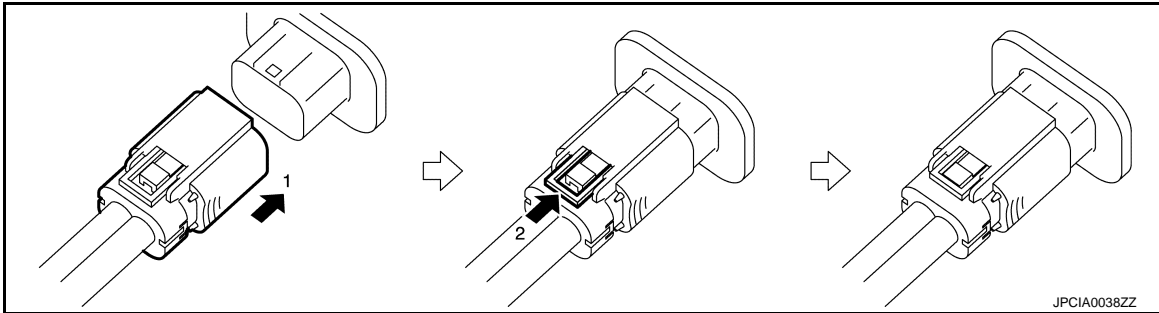




# ELECTRIC COMPRESSOR

## < REMOVAL AND INSTALLATION >

- Follow the procedure below and connect the high voltage harness connector.



- After all parts are installed, be sure to check the equipotential. Refer to [HA-49. "Inspection"](#).

## Inspection

INFOID:000000006960808

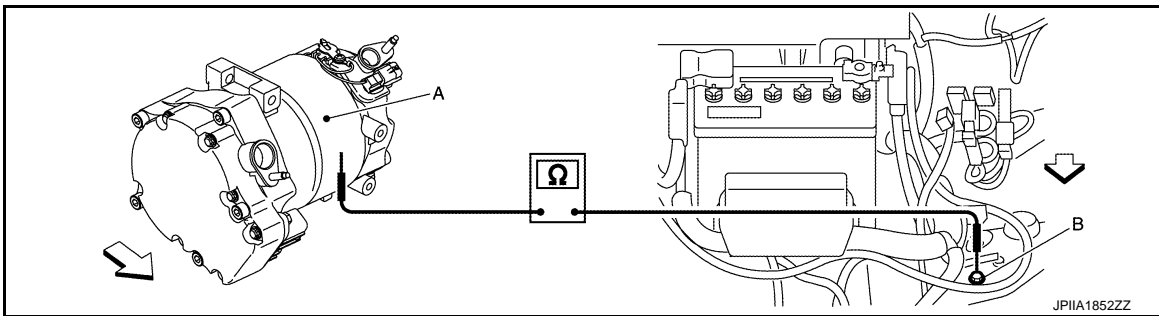
### INSPECTION AFTER INSTALLATION

After installing the electric compressor, measure the resistance between the electric compressor and the vehicle body, and perform an electric equipotential test.

#### **WARNING:**



To prevent shock hazards, be sure to wear protective gear.



- A : Aluminum part on side of electric compressor
- B : Motor room ground bolt
- ← : Vehicle front

**Standard : 0.1 Ω or less**

If the result deviates from the standard value, check for paint, oil, dirt, or other substance adhering to the bolts or conductive mounting parts. If such substances are found, clean the surrounding area and remove the foreign substances.

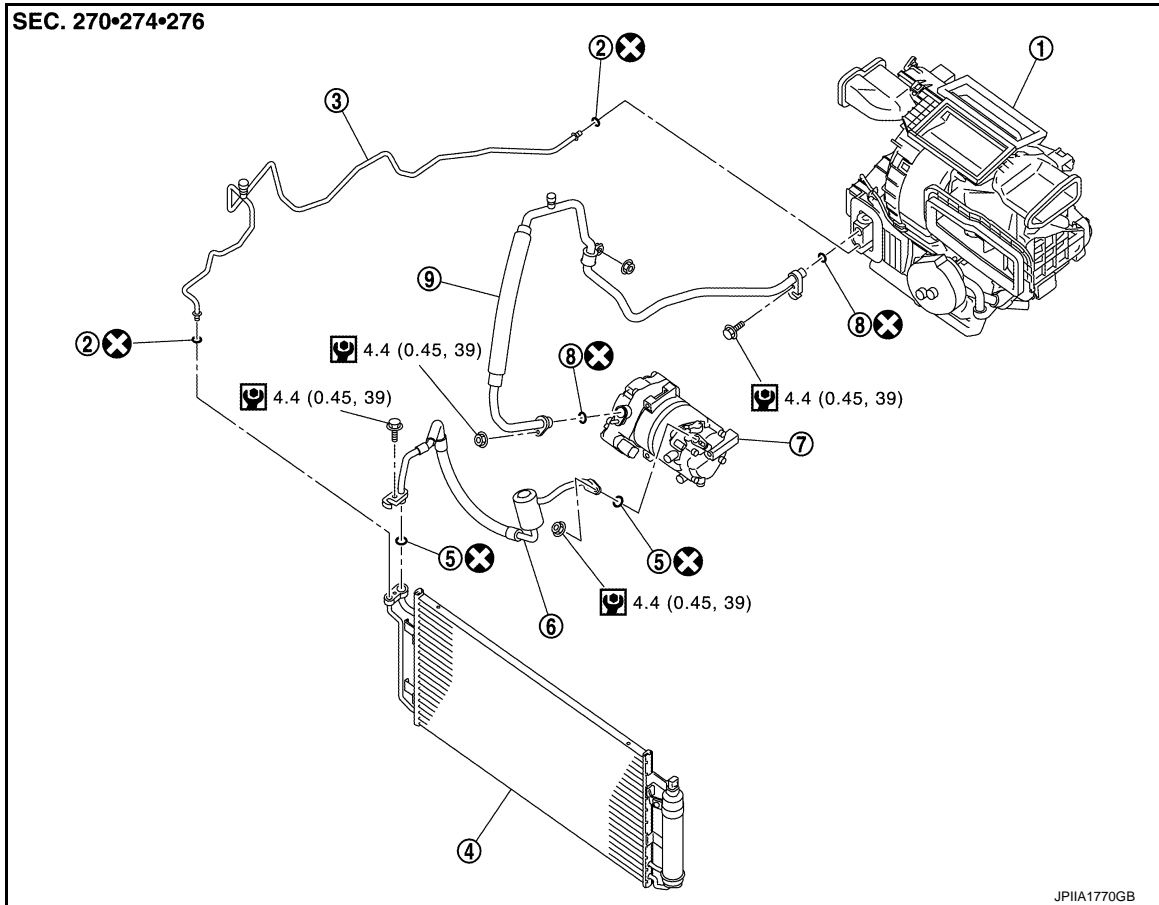
# COOLER PIPE AND HOSE

< REMOVAL AND INSTALLATION >

## COOLER PIPE AND HOSE

Exploded View

INFOID:000000006960809



- |                        |           |                                |
|------------------------|-----------|--------------------------------|
| 1. A/C unit assembly   | 2. O-ring | 3. High-pressure pipe          |
| 4. Condenser           | 5. O-ring | 6. High-pressure flexible hose |
| 7. Electric compressor | 8. O-ring | 9. Low-pressure flexible hose  |

⊗ : Always replace after every disassembly

Ⓜ : N·m (kg·m in-lb)

## HIGH-PRESSURE FLEXIBLE HOSE

### HIGH-PRESSURE FLEXIBLE HOSE : Removal and Installation

INFOID:000000006960810

#### CAUTION:

Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to [HA-32, "Perform Lubricant Return Operation"](#).

#### REMOVAL

1. Use the refrigerant recovery equipment (for HFC134a) and recover the refrigerant. Refer to [HA-30, "Recycle Refrigerant"](#).
2. Remove the radiator upper grille. Refer to [DLK-148, "RADIATOR UPPER GRILLE : Removal and Installation"](#).
3. Remove the washer tank inlet. Refer to [WW-44, "Removal and Installation"](#).

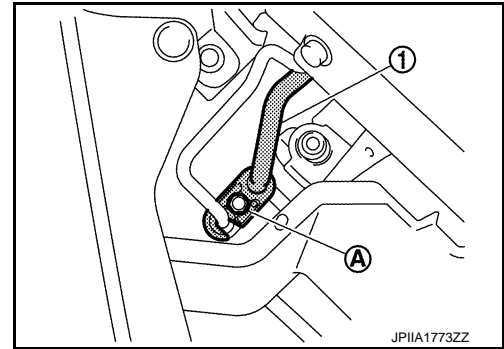
# COOLER PIPE AND HOSE

## < REMOVAL AND INSTALLATION >

- Remove the mounting bolt (A), then disconnect the high-pressure flexible hose (1) from the condenser.

**CAUTION:**

To prevent the inclusion of foreign matter, use a cap or vinyl tape to seal off the connection ports of the pipe and condenser from the atmosphere.



- Remove the mounting nut (A) and disconnect the high-pressure flexible hose (1) from the electric compressor.

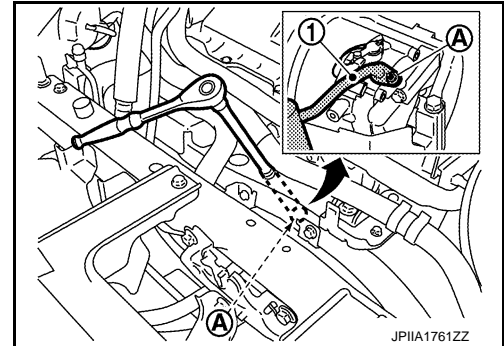
**WARNING:**

 To prevent shock hazards, be sure to wear protective gear.



**CAUTION:**

To prevent the inclusion of foreign matter, use a cap or vinyl tape to seal off the connection ports of the pipe and electric compressor from the atmosphere.



- Disconnect the high-pressure flexible hose from the vehicle.

## INSTALLATION

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

**CAUTION:**

- To prevent degradation in insulation performance, use special electric compressor oil as the compressor oil.
- In order to prevent conventional PAG oil from becoming mixed in, do not reuse recovered compressor oil and instead always use new oil. The use of oil including the conventional PAG oil may degrade the performance of insulation.
- To prevent performance degradation, do not use a fluorescent agent in order to detect refrigerant leakage. Also take care that a fluorescent agent does not enter the oil.
- To prevent leakage of refrigerant, replace the O-ring with a new one. Apply a coat of compressor oil to the O-ring prior to installation.
- Perform a check for refrigerant leakage when charging with refrigerant. Refer to [HA-29. "Check Refrigerant Leakage"](#).

## LOW-PRESSURE FLEXIBLE HOSE

### LOW-PRESSURE FLEXIBLE HOSE : Removal and Installation

INFOID:000000006960811

**CAUTION:**

Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to [HA-32. "Perform Lubricant Return Operation"](#).

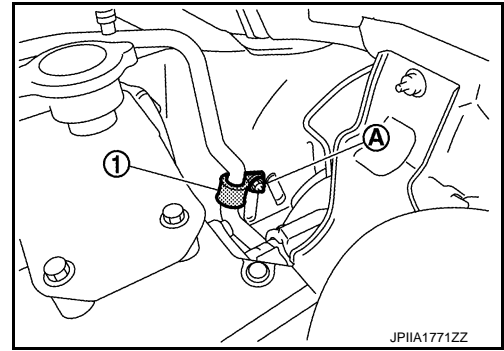
## REMOVAL

- Use the refrigerant recovery equipment (for HFC134a) and recover the refrigerant. Refer to [HA-30. "Reycle Refrigerant"](#).
- Remove the radiator upper grille. Refer to [DLK-148. "RADIATOR UPPER GRILLE : Removal and Installation"](#).

## COOLER PIPE AND HOSE

### < REMOVAL AND INSTALLATION >

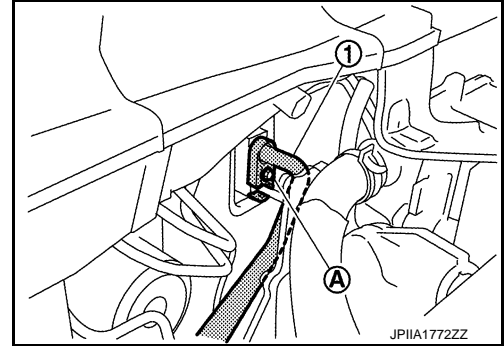
3. Remove the mounting nut (A) from the low-pressure flexible hose bracket (1).



4. Remove the mounting bolt (A), then disconnect the low-pressure flexible hose (1) from the expansion valve.

**CAUTION:**

To prevent the inclusion of foreign matter, use a cap or vinyl tape to seal off the connection ports of the pipe and expansion valve from the atmosphere.



5. Remove the mounting nut (A) and disconnect the low-pressure flexible hose (1) from the electric compressor.

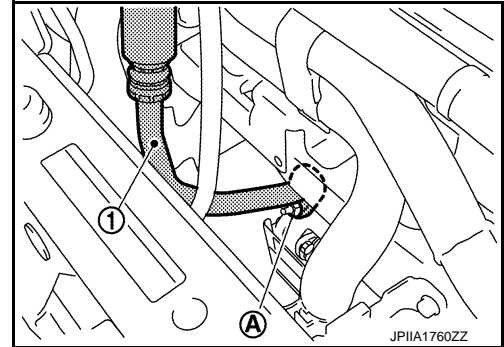
**WARNING:**

 To prevent shock hazards, be sure to wear protective gear.



**CAUTION:**

To prevent the inclusion of foreign matter, use a cap or vinyl tape to seal off the connection ports of the pipe and electric compressor from the atmosphere.



6. Disconnect the low-pressure flexible hose from the vehicle.

### INSTALLATION

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

**CAUTION:**

- To prevent degradation in insulation performance, use special electric compressor oil as the compressor oil.
- In order to prevent conventional PAG oil from becoming mixed in, do not reuse recovered compressor oil and instead always use new oil. The use of oil including the conventional PAG oil may degrade the performance of insulation.
- To prevent performance degradation, do not use a fluorescent agent in order to detect refrigerant leakage. Also take care that a fluorescent agent does not enter the oil.
- To prevent leakage of refrigerant, replace the O-ring with a new one. Apply a coat of compressor oil to the O-ring prior to installation.
- Perform a check for refrigerant leakage when charging with refrigerant. Refer to [HA-29, "Check Refrigerant Leakage"](#).

### HIGH-PRESSURE PIPE

#### HIGH-PRESSURE PIPE : Removal and Installation

INFOID:000000006960812

**CAUTION:**

# COOLER PIPE AND HOSE

## < REMOVAL AND INSTALLATION >

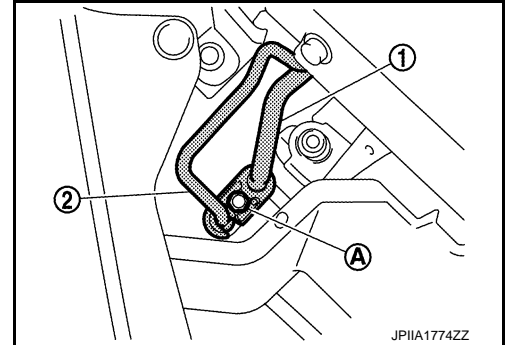
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to [HA-32, "Perform Lubricant Return Operation"](#).

### REMOVAL

1. Remove the low-pressure flexible hose. Refer to [HA-51, "LOW-PRESSURE FLEXIBLE HOSE : Removal and Installation"](#).
2. Remove the washer tank inlet. Refer to [WW-44, "Removal and Installation"](#).
3. Remove the mounting bolt (A), then disconnect the high-pressure flexible hose (1) and the high-pressure pipe (2) from the condenser.

**CAUTION:**

To prevent the inclusion of foreign matter, use a cap or vinyl tape to seal off the connection ports of the pipe and condenser from the atmosphere.



4. Disconnect the high-pressure pipe from the expansion valve.  
**CAUTION:**  
To prevent the inclusion of foreign matter, use a cap or vinyl tape to seal off the connection ports of the pipe and expansion valve from the atmosphere.
5. Remove the cowl top extension. Refer to [EXT-17, "Removal and Installation"](#).
6. Move the electric water pump 1 to a position where it will not interfere with work.
7. Disconnect the high-pressure pipe from the vehicle.

### INSTALLATION

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

**CAUTION:**

- To prevent degradation in insulation performance, use special electric compressor oil as the compressor oil.
- In order to prevent conventional PAG oil from becoming mixed in, do not reuse recovered compressor oil and instead always use new oil. The use of oil including the conventional PAG oil may degrade the performance of insulation.
- To prevent performance degradation, do not use a fluorescent agent in order to detect refrigerant leakage. Also take care that a fluorescent agent does not enter the oil.
- To prevent leakage of refrigerant, replace the O-ring with a new one. Apply a coat of compressor oil to the O-ring prior to installation.
- Perform a check for refrigerant leakage when charging with refrigerant. Refer to [HA-29, "Check Refrigerant Leakage"](#).

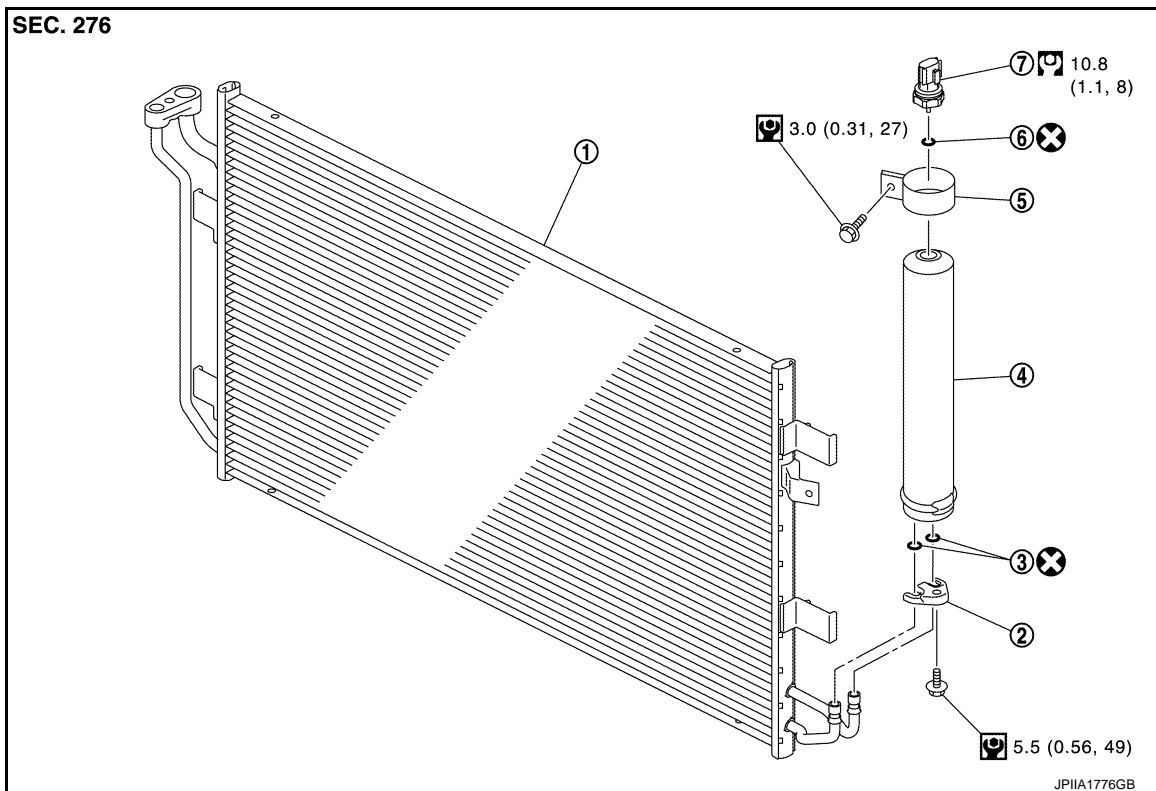
# CONDENSER

< REMOVAL AND INSTALLATION >

## CONDENSER

### Exploded View

INFOID:000000006960813



- |                                |                        |           |
|--------------------------------|------------------------|-----------|
| 1. Condenser                   | 2. Bracket             | 3. O-ring |
| 4. Liquid tank                 | 5. Liquid tank bracket | 6. O-ring |
| 7. Refrigerant pressure sensor |                        |           |

⊗ : Always replace after every disassembly

⊙ : N•m (kg-m in-lb)

⊙ : N•m (kg-m ft-lb)

## CONDENSER

### CONDENSER : Removal and Installation

INFOID:000000006960814

#### CAUTION:

Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to [HA-32. "Perform Lubricant Return Operation"](#).

#### REMOVAL

1. Use the refrigerant recovery equipment (for HFC134a) and recover the refrigerant. Refer to [HA-30. "Recycle Refrigerant"](#).
2. Remove the radiator upper grille. Refer to [DLK-148. "RADIATOR UPPER GRILLE : Removal and Installation"](#).
3. Remove the washer tank inlet. Refer to [WW-44. "Removal and Installation"](#).

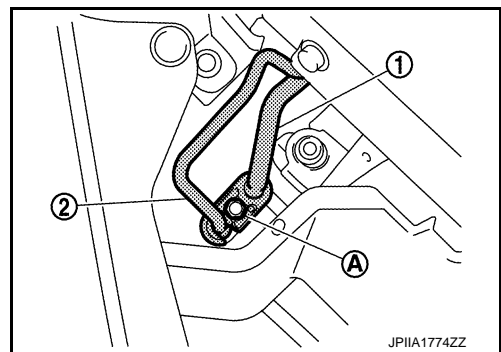
# CONDENSER

## < REMOVAL AND INSTALLATION >

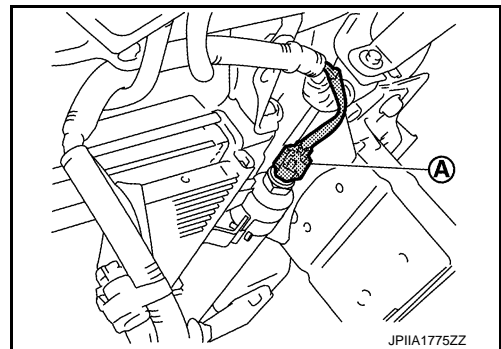
4. Remove the mounting bolt (A), then disconnect the high-pressure flexible hose (1) and the high-pressure pipe (2) from the condenser.

**CAUTION:**

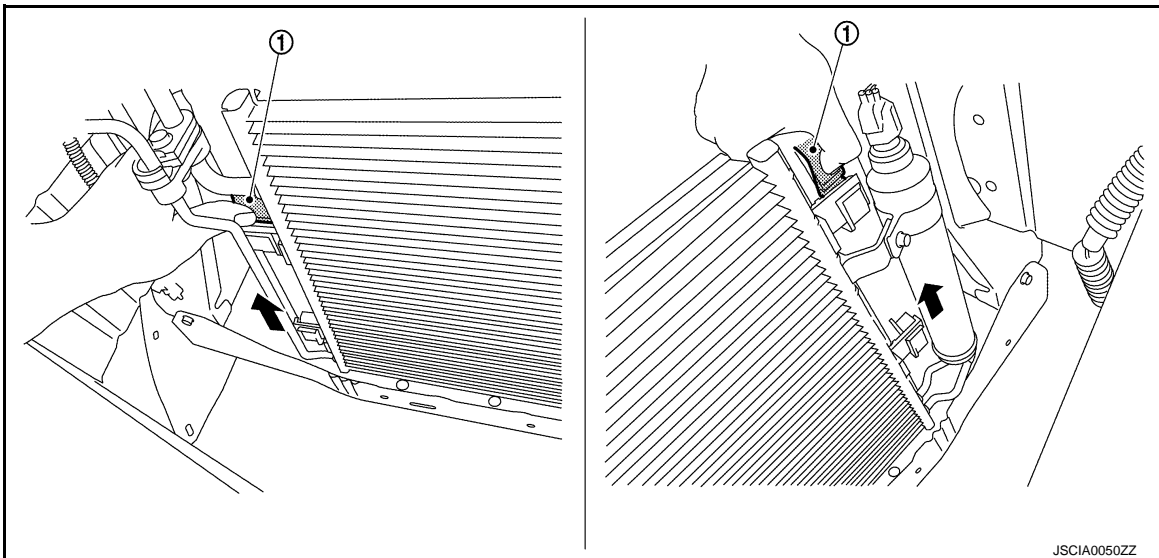
To prevent the inclusion of foreign matter, use a cap or vinyl tape to seal off the connection ports of the pipe and condenser from the atmosphere.



5. Remove the charge port bracket. Refer to [DLK-148. "CHARGE PORT BRACKET : Removal and Installation"](#).
6. Remove the radiator core support lower stay. Refer to [DLK-146. "RADIATOR CORE SUPPORT LOWER : Removal and Installation"](#).
7. Remove the radiator core support upper. Refer to [DLK-144. "RADIATOR CORE SUPPORT UPPER : Removal and Installation"](#).
8. Disconnect the refrigerant pressure sensor connector (A).



9. Lift the condenser upwards while pressing the tabs on the right and left of the radiator to remove the condenser.



## INSTALLATION

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

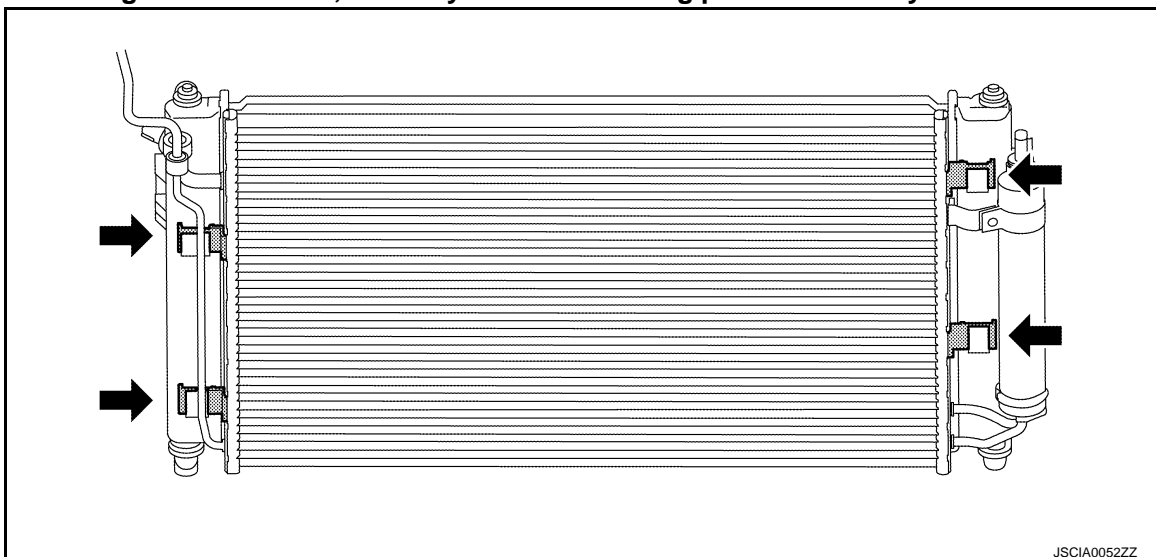
**CAUTION:**



# CONDENSER

## < REMOVAL AND INSTALLATION >

- When installing the condenser, securely insert the mating part indicated by the arrow in the diagram.



- To prevent degradation in insulation performance, use special electric compressor oil as the compressor oil.
- In order to prevent conventional PAG oil from becoming mixed in, do not reuse recovered compressor oil and instead always use new oil. The use of oil including the conventional PAG oil may degrade the performance of insulation.
- To prevent performance degradation, do not use a fluorescent agent in order to detect refrigerant leakage. Also take care that a fluorescent agent does not enter the oil.
- After installing a new condenser, adjust the compressor oil level. Refer to [HA-32, "Lubricant Adjusting Procedure for Components Replacement Except Compressor"](#).
- To prevent leakage of refrigerant, replace the O-ring with a new one. Apply a coat of compressor oil to the O-ring prior to installation.
- Perform a check for refrigerant leakage when charging with refrigerant. Refer to [HA-29, "Check Refrigerant Leakage"](#).

## LIQUID TANK

### LIQUID TANK : Removal and Installation

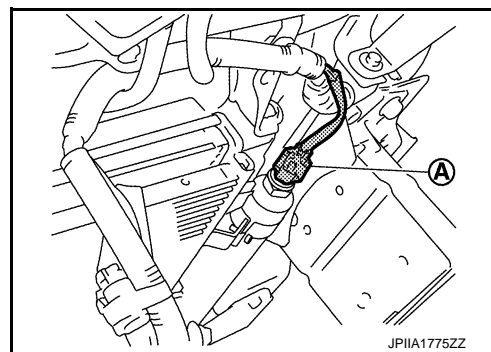
INFOID:000000006960815

#### CAUTION:

Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to [HA-32, "Perform Lubricant Return Operation"](#).

#### REMOVAL

1. Use the refrigerant recovery equipment (for HFC134a) and recover the refrigerant. Refer to [HA-30, "Recycle Refrigerant"](#).
2. Disconnect the refrigerant pressure sensor connector (A).



3. Clean around the liquid tank to remove any dirt or corrosion.



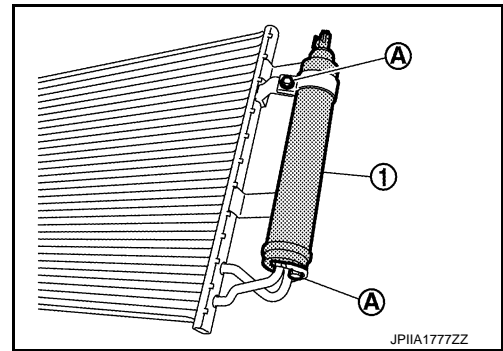
# CONDENSER

## < REMOVAL AND INSTALLATION >

4. Remove the mounting bolts (A), then remove the liquid tank (1) from the condenser.

**CAUTION:**

To prevent the inclusion of foreign matter, use a cap or vinyl tape to seal off the connection ports of the liquid tank and condenser from the atmosphere.



## INSTALLATION

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

**CAUTION:**

- To prevent degradation in insulation performance, use special electric compressor oil as the compressor oil.
- In order to prevent conventional PAG oil from becoming mixed in, do not reuse recovered compressor oil and instead always use new oil. The use of oil including the conventional PAG oil may degrade the performance of insulation.
- To prevent performance degradation, do not use a fluorescent agent in order to detect refrigerant leakage. Also take care that a fluorescent agent does not enter the oil.
- After installing a new liquid tank, adjust the compressor oil level. Refer to [HA-32, "Lubricant Adjusting Procedure for Components Replacement Except Compressor"](#).
- To prevent leakage of refrigerant, replace the O-ring with a new one. Apply a coat of compressor oil to the O-ring prior to installation.
- Perform a check for refrigerant leakage when charging with refrigerant. Refer to [HA-29, "Check Refrigerant Leakage"](#).

## REFRIGERANT PRESSURE SENSOR

### REFRIGERANT PRESSURE SENSOR : Removal and Installation

INFOID:000000006960816

**CAUTION:**

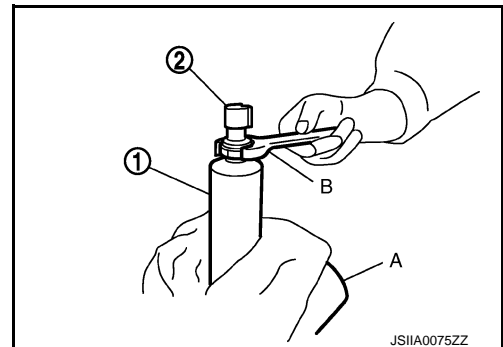
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to [HA-32, "Perform Lubricant Return Operation"](#)

## REMOVAL

1. Remove the liquid tank. Refer to [HA-56, "LIQUID TANK : Removal and Installation"](#).
2. Use a vise (A) to fasten the liquid tank (1) in place, then use a spanner (B) and remove the refrigerant pressure sensor (2).

**CAUTION:**

- Wrap the liquid tank with shopcloth to prevent scratches.
- To prevent the inclusion of foreign matter, use a cap or vinyl tape to seal off the refrigerant pressure sensor mounting point on the liquid tank from the atmosphere.



## INSTALLATION

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

**CAUTION:**

- To prevent leakage of refrigerant, replace the O-ring with a new one. Apply a coat of compressor oil to the O-ring prior to installation.
- Perform a check for refrigerant leakage when charging with refrigerant. Refer to [HA-29, "Check Refrigerant Leakage"](#).

# A/C UNIT ASSEMBLY

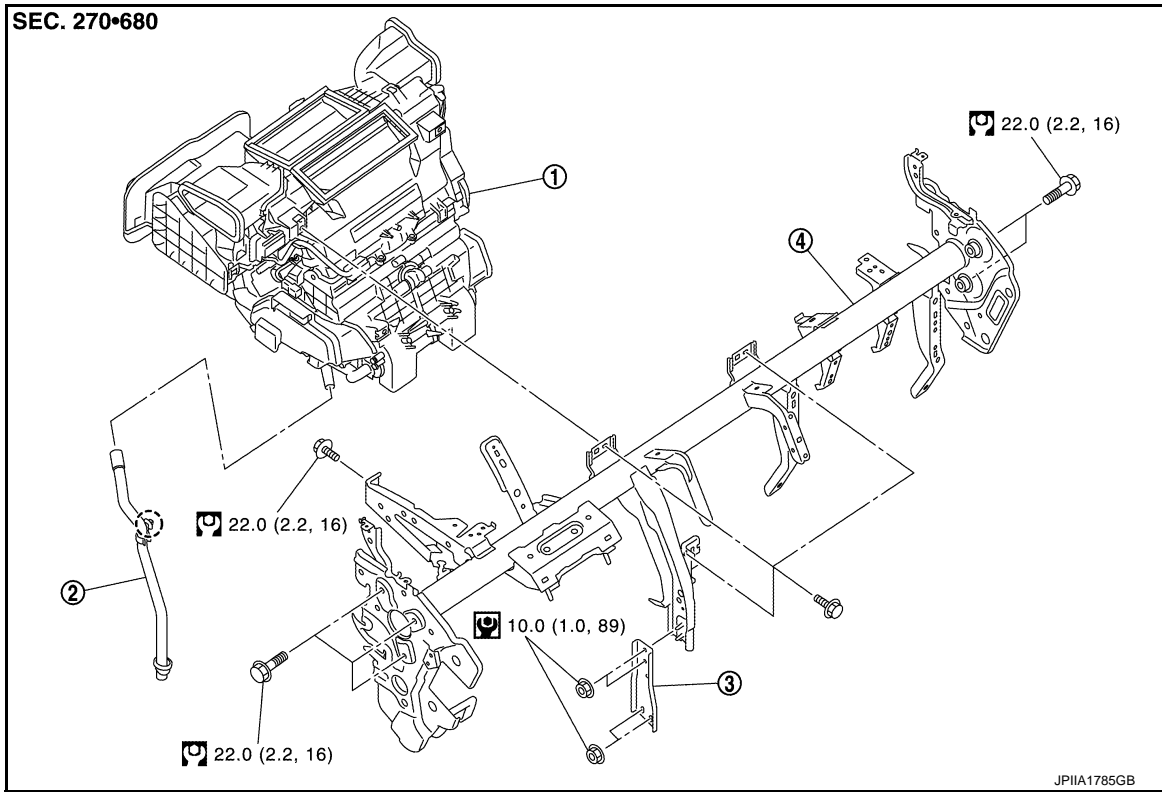
< REMOVAL AND INSTALLATION >

## A/C UNIT ASSEMBLY

Exploded View

INFOID:000000006960817

### REMOVAL



1. A/C unit assembly

2. Drain hose

3. Instrument stay

4. Steering member

○ : Clip

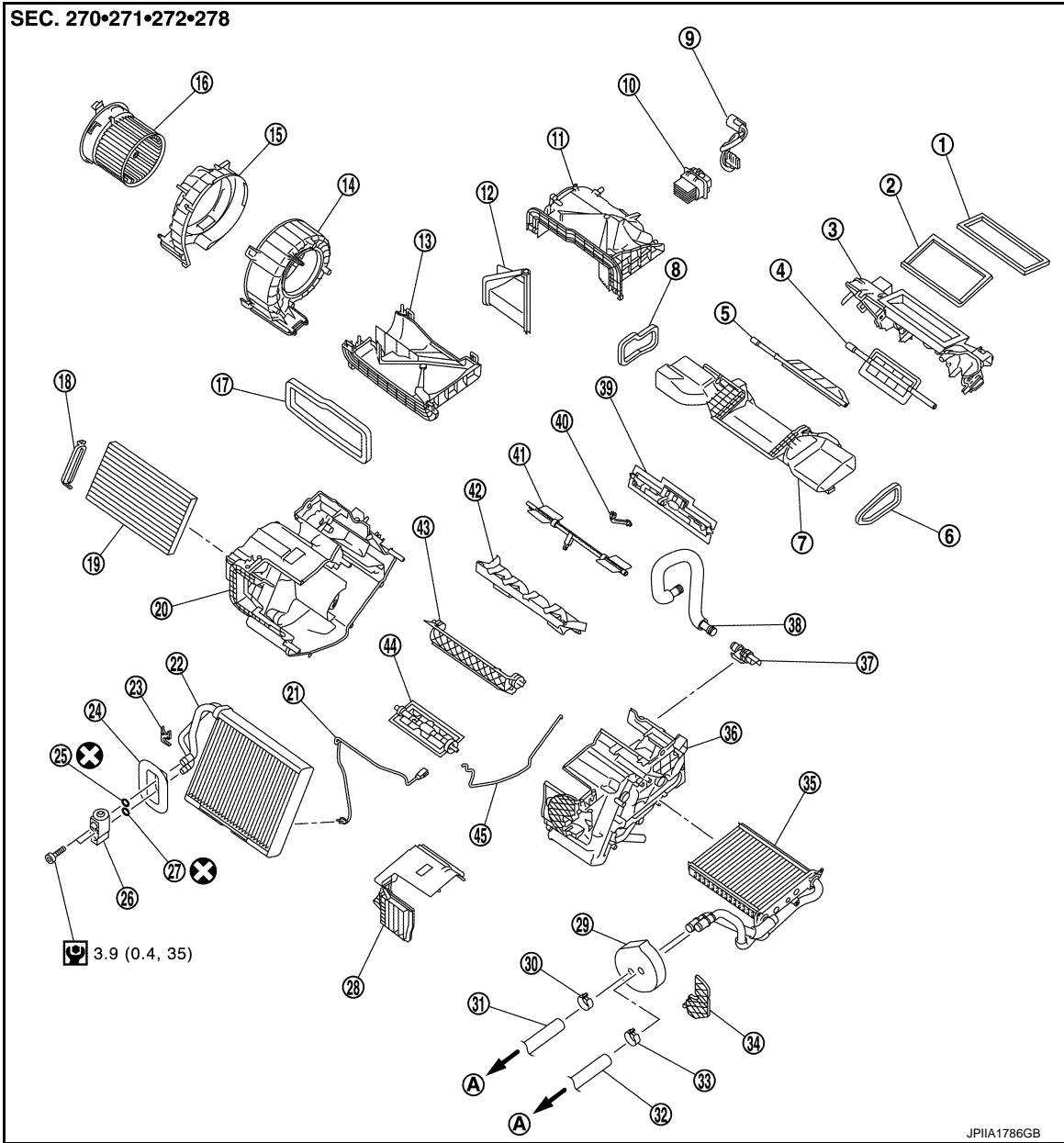
◻ : N•m (kg-m in-lb)

◻ : N•m (kg-m ft-lb)

### DISASSEMBLY

# A/C UNIT ASSEMBLY

< REMOVAL AND INSTALLATION >



A  
B  
C  
D  
E  
F  
G  
H  
HA  
J  
K  
L

M  
N  
O  
P

- |                          |   |                             |
|--------------------------|---|-----------------------------|
| 1. Ventilator seal       | 2. Defroster seal                       | 3. Upper attachment case    |
| 4. Sub defroster door    | 5. Center ventilator and defroster door | 6. Side ventilator seal LH  |
| 7. Lower attachment case | 8. Side ventilator seal RH              | 9. Sub harness              |
| 10. Power transistor     | 11. Upper intake case                   | 12. Intake door             |
| 13. Lower intake case    | 14. Blower case LH                      | 15. Blower case RH          |
| 16. Blower motor         | 17. Intake seal                         | 18. Filter cover            |
| 19. In-cabin microfilter | 20. A/C unit case RH                    | 21. Intake sensor           |
| 22. Evaporator           | 23. Plate                               | 24. Expansion valve grommet |
| 25. O-ring               | 26. Expansion valve                     | 27. O-ring                  |
| 28. Evaporator cover     | 29. Heater pipe grommet                 | 30. Clamp                   |
| 31. Heater hose          | 32. Heater hose                         | 33. Clamp                   |
| 34. Heater pipe support  | 35. Heater core                         | 36. A/C unit case LH        |
| 37. Aspirator            | 38. Aspirator hose                      | 39. Foot door               |
| 40. Foot door rod        | 41. Side ventilator door                | 42. Air mix door guide      |
| 43. Upper air mix door   | 44. Lower air mix door                  | 45. Case packing            |
- A: To water outlet

# A/C UNIT ASSEMBLY

## < REMOVAL AND INSTALLATION >

⊗ : Always replace after every disassembly.

🔧 : N•m (kg-m in-lb)

## A/C UNIT ASSEMBLY

### A/C UNIT ASSEMBLY : Removal and Installation

INFOID:000000006960818

#### CAUTION:

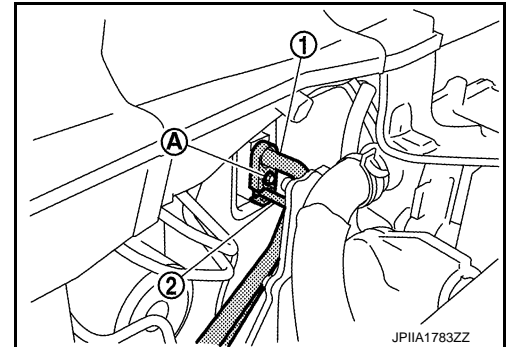
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to [HA-32. "Perform Lubricant Return Operation"](#)

#### REMOVAL

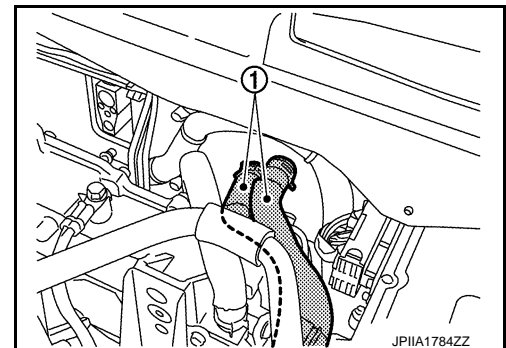
1. Use the refrigerant recovery equipment (for HFC134a) and recover the refrigerant. Refer to [HA-30. "Recycle Refrigerant"](#).
2. Drain out the heater fluid. Refer to [HA-41. "Draining and Refilling"](#).
3. Remove the cowl top extension. Refer to [EXT-17. "Removal and Installation"](#).
4. Remove the mounting bolt (A), then disconnect the low-pressure flexible hose (1) and the high-pressure pipe (2) from the expansion valve.

#### CAUTION:

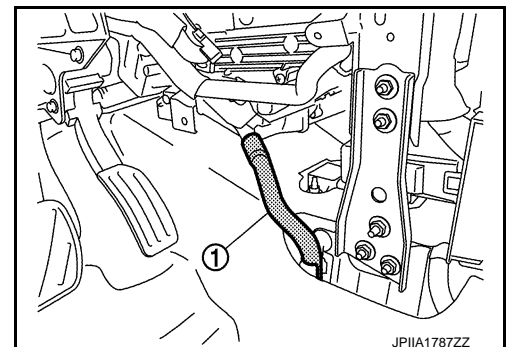
To prevent the inclusion of foreign matter, use a cap or vinyl tape to seal off the connection ports of the pipe and expansion valve from the atmosphere.



5. Remove the clamp and disconnect the heater hose (1).



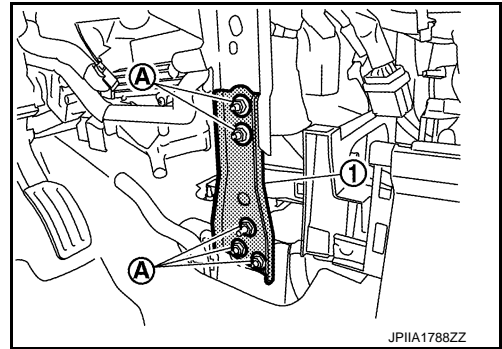
6. Remove the instrument panel assembly. Refer to [IP-13. "Removal and Installation"](#).
7. Remove the side ventilator duct. Refer to [VTL-16. "SIDE VENTILATOR DUCT : Removal and Installation"](#).
8. Disconnect the drain hose (1).



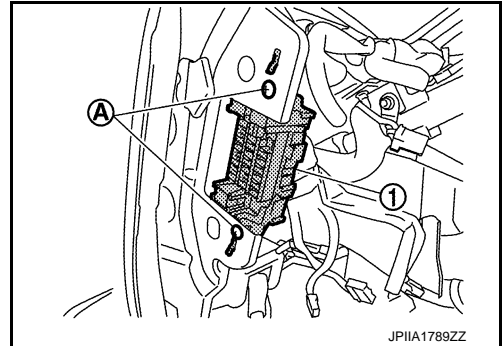
## A/C UNIT ASSEMBLY

### < REMOVAL AND INSTALLATION >

9. Remove the mounting nuts (A), then remove the instrument stay (1).



10. Remove the mounting screws (A), then remove the J/B (1).



11. Remove the mounting bolts (A) of the ground wire.

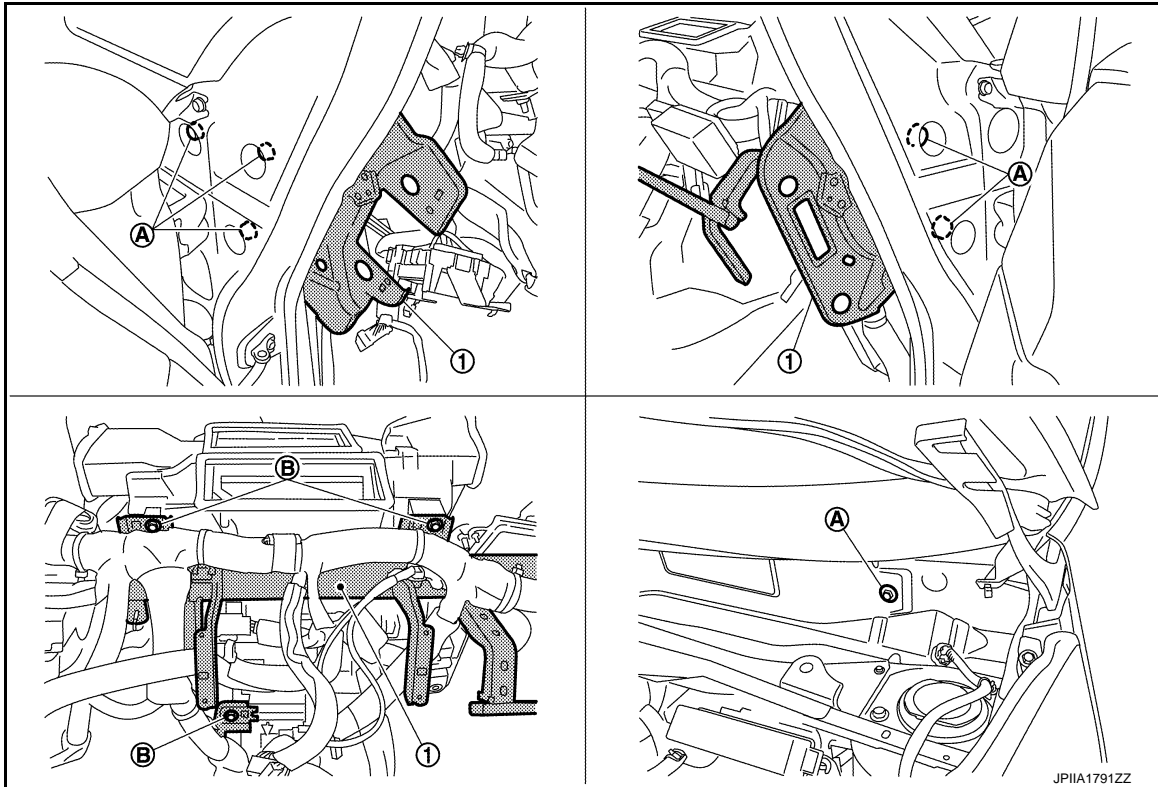


12. In order to remove the steering member, remove the necessary harness connectors and clips, and move the vehicle harness to a position where it will not interfere with work.
13. Move the steering column to a position where it will not interfere with work. Refer to [ST-10. "Exploded View"](#).

## A/C UNIT ASSEMBLY

### < REMOVAL AND INSTALLATION >

14. Remove the steering member mounting bolts (A) and the A/C unit assembly mounting bolts (B), then remove the steering member (1).



15. Remove the A/C unit assembly from the vehicle.

### INSTALLATION

To install, pay attention to the points listed below and follow the removal procedure in the reverse order.

#### CAUTION:

- To prevent degradation in insulation performance, use special electric compressor oil as the compressor oil.
- In order to prevent conventional PAG oil from becoming mixed in, do not reuse recovered compressor oil and instead always use new oil. The use of oil including the conventional PAG oil may degrade the performance of insulation.
- To prevent performance degradation, do not use a fluorescent agent in order to detect refrigerant leakage. Also take care that a fluorescent agent does not enter the oil.
- To prevent leakage of refrigerant, replace the O-ring with a new one. Apply a coat of compressor oil to the O-ring prior to installation.
- Perform a check for refrigerant leakage when charging with refrigerant. Refer to [HA-29, "Check Refrigerant Leakage"](#).

#### NOTE:

When adding heater fluid, refer to [HA-41, "Draining and Refilling"](#).

### EVAPORATOR

#### EVAPORATOR : Removal and Installation

INFOID:000000006960819

#### REMOVAL

1. Remove the A/C unit assembly. Refer to [HA-60, "A/C UNIT ASSEMBLY : Removal and Installation"](#).
2. Disassemble the A/C unit assembly and remove the evaporator assembly.
3. Remove the expansion valve and intake sensor from the evaporator assembly.

#### INSTALLATION

Install in the reverse order of removal.

#### CAUTION:

- To prevent leakage of refrigerant, replace the O-ring with a new one. Apply a coat of compressor oil to the O-ring prior to installation.

# A/C UNIT ASSEMBLY

## < REMOVAL AND INSTALLATION >

- When installing the new evaporator, be sure to install the intake sensor in the same position as before it was removed. A
- When removing or installing the intake sensor, be sure not to rotate the bracket insertion part. Failure to do this may cause damage to the evaporator. B
- After installing a new evaporator, adjust the compressor oil level. Refer to [HA-32, "Lubricant Adjusting Procedure for Components Replacement Except Compressor"](#). C

## HEATER CORE

### HEATER CORE : Removal and Installation

INFOID:000000006960820

#### REMOVAL

1. Remove the A/C unit assembly. Refer to [HA-60, "A/C UNIT ASSEMBLY : Removal and Installation"](#). D
2. Remove the foot duct LH. Refer to [VTL-17, "FOOT DUCT : Removal and Installation"](#). E
3. Remove the heater pipe grommet and heater pipe support from the A/C unit assembly. E
4. Remove the mounting screws and remove the heater core from the A/C unit assembly. F

#### INSTALLATION

Install in the reverse order of removal. G

HA

J

K

L

M

N

O

P





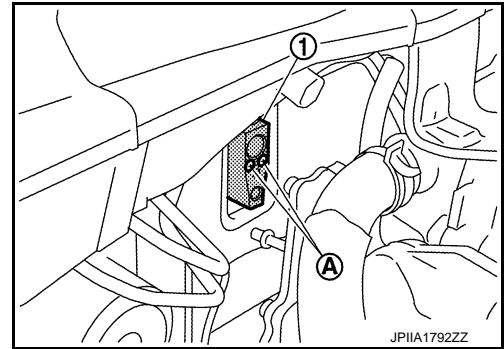
## EXPANSION VALVE

### < REMOVAL AND INSTALLATION >

3. Remove the mounting bolts (A), then remove the expansion valve (1).

**CAUTION:**

To prevent the inclusion of foreign matter, use a cap or vinyl tape to seal off the connection ports of the expansion valve and evaporator from the atmosphere.



### INSTALLATION

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

**CAUTION:**

- To prevent degradation in insulation performance, use special electric compressor oil as the compressor oil.
- In order to prevent conventional PAG oil from becoming mixed in, do not reuse recovered compressor oil and instead always use new oil. The use of oil including the conventional PAG oil may degrade the performance of insulation.
- To prevent performance degradation, do not use a fluorescent agent in order to detect refrigerant leakage. Also take care that a fluorescent agent does not enter the oil.
- To prevent leakage of refrigerant, replace the O-ring with a new one. Apply a coat of compressor oil to the O-ring prior to installation.
- Perform a check for refrigerant leakage when charging with refrigerant. Refer to [HA-29, "Check Refrigerant Leakage"](#).

A  
B  
C  
D  
E  
F  
G  
H  
HA  
J  
K  
L  
M  
N  
O  
P

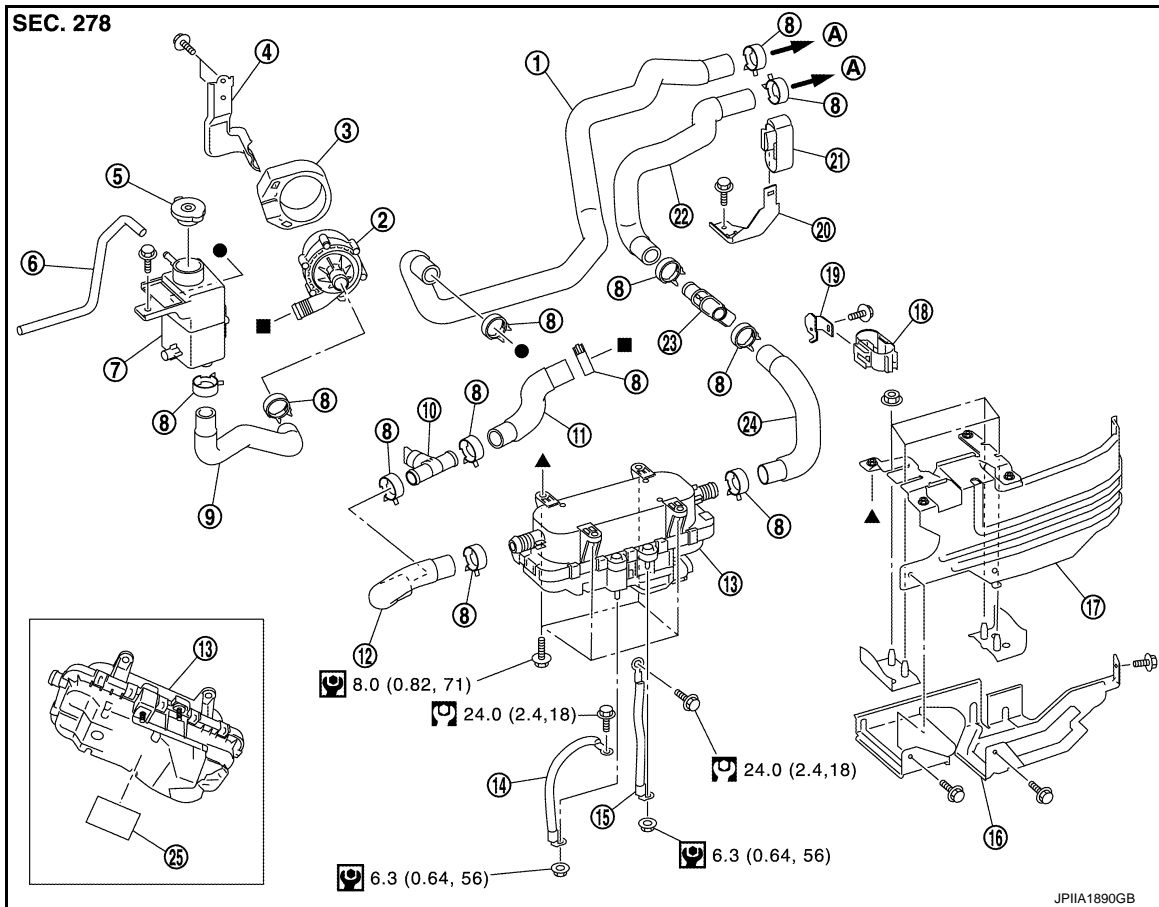
# PTC ELEMENTS HEATER

< REMOVAL AND INSTALLATION >

## PTC ELEMENTS HEATER

Exploded View


INFOID:000000006960823




- |                                     |  |                             |
|-------------------------------------|--|-----------------------------|
| 1. Heater hose                      | 2. Heater pump                                       | 3. Heater pump mount        |
| 4. Heater pump bracket              | 5. Degas tank (heater) cap                           | 6. Degas tank (heater) hose |
| 7. Degas tank (heater)              | 8. Clamp   | 9. Heater hose              |
| 10. Drain cock                      | 11. Heater hose                                      | 12. Heater hose             |
| 13. PTC elements heater             | 14. Bonding wire 1                                   | 15. Bonding wire 2          |
| 16. PTC elements heater lower cover | 17. PTC elements heater bracket                      | 18. Hose clip               |
| 19. Bracket                         | 20. Bracket  | 21. Hose clip               |
| 22. Heater hose                     | 23. Sensor adapter (heater fluid temperature sensor) | 24. Heater hose             |

25. High voltage warning label

A: To heater core

 : N•m (kg-m in-lb)

 : N•m (kg-m ft-lb)

## Removal and Installation

INFOID:000000006960824

### 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.

# PTC ELEMENTS HEATER

## < REMOVAL AND INSTALLATION >

- 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.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective equipments consisting of glove, shoes and glasses/face shield 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.
- Refer to [HA-3. "High Voltage Precautions"](#).

### 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.

### REMOVAL

#### WARNING:

Shut off high voltage circuit. Refer to [GI-31. "How to Cut Off High Voltage"](#).

1. Check voltage in high voltage circuit. (Check that condenser are discharged.)
  - a. Remove Li-ion battery under cover.

#### WARNING:



To prevent shock hazards, be sure to wear protective gear.



- b. Disconnect high voltage connector from front side of Li-ion battery.

#### DANGER:



Touching high voltage components without using the appropriate protective equipment will cause electrocution.



- c. Measure voltage between high voltage harness terminals.

#### DANGER:



Touching high voltage components without using the appropriate protective equipment will cause electrocution.



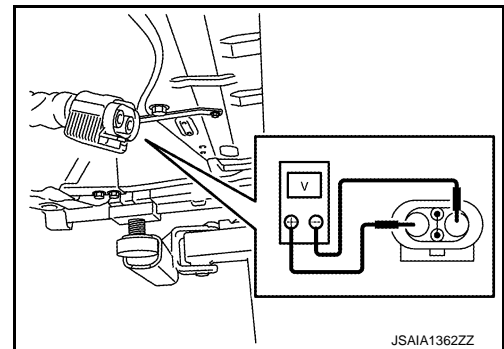
Standard

: 5 V or less

#### CAUTION:

For voltage measurements, use a tester which can measure to 500 V or higher.

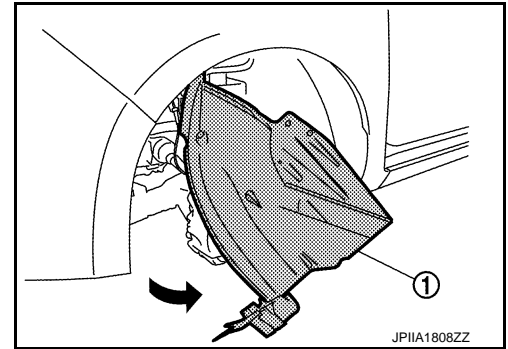
2. Remove the front under cover. Refer to [EXT-21. "FRONT UNDER COVER : Removal and Installation"](#).
3. Drain out the heater fluid. Refer to [HA-41. "Draining and Refilling"](#).
4. Remove the front tire LH. Refer to [WT-45. "Removal and Installation"](#).



# PTC ELEMENTS HEATER

## < REMOVAL AND INSTALLATION >

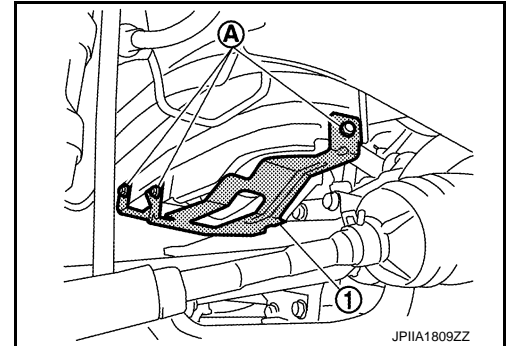
5. Remove the front side of the front fender protector LH (1) and move it to a position where it will not interfere with work.



6. Remove the mounting bolts (A), then remove the PTC elements heater lower cover (1).

**WARNING:**

 To prevent shock hazards, be sure to wear protective gear.



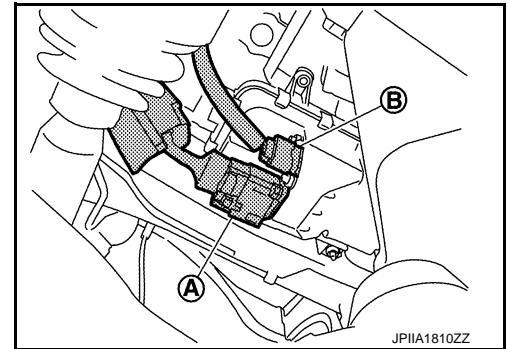
7. Disconnect the high voltage harness connector (A) and the low voltage harness connector (B) from the PTC elements heater.

**WARNING:**

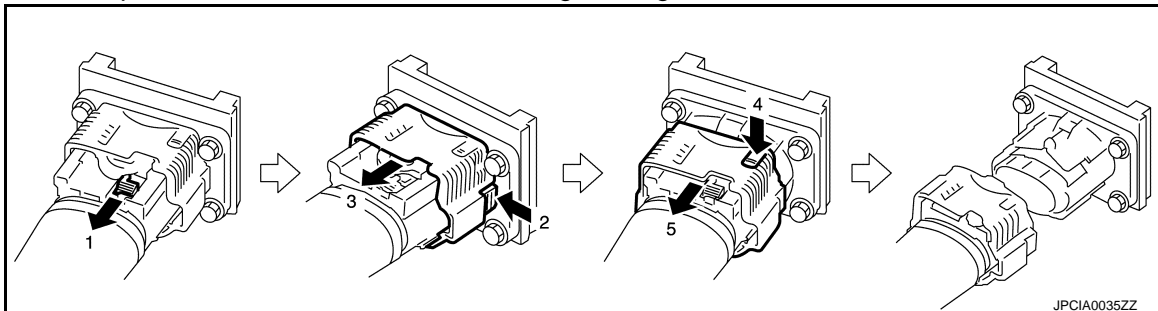
•  To prevent shock hazards, be sure to wear protective gear.



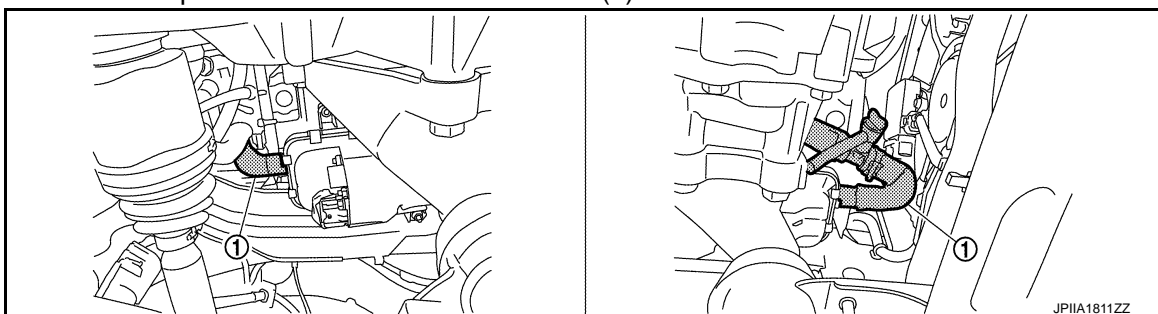
• To prevent shock hazards, immediately wrap insulating tape around disconnected high voltage connector terminals.



- Follow the procedure below and remove the high voltage harness connector.



8. Remove the clamp and disconnect the heater hose (1).



# PTC ELEMENTS HEATER

## < REMOVAL AND INSTALLATION >

### WARNING:

-  To prevent shock hazards, be sure to wear protective gear.



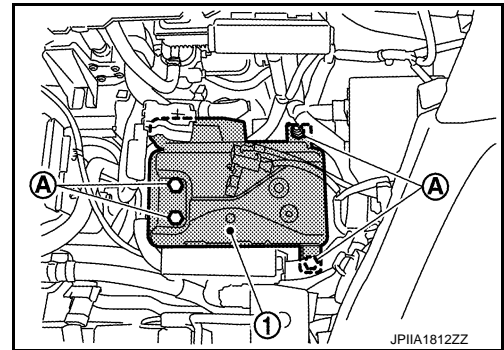
- When removing the PTC elements heater, take care that the heater fluid does not contact the high voltage harness connector.
- If heater fluid contacts the high voltage harness connector, immediately dry the high voltage connector completely with an air blow gun.

9. Remove the 12V battery. Refer to [PG-104, "Removal and Installation"](#).

10. Remove the mounting bolts (A), then remove the battery bracket (1).

### WARNING:

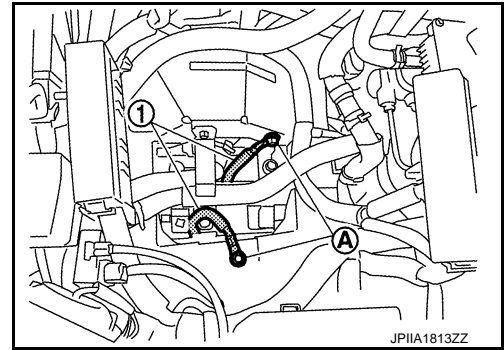
-  To prevent shock hazards, be sure to wear protective gear.



11. Remove the mounting bolts (A), then remove the bonding wire (1).

### WARNING:

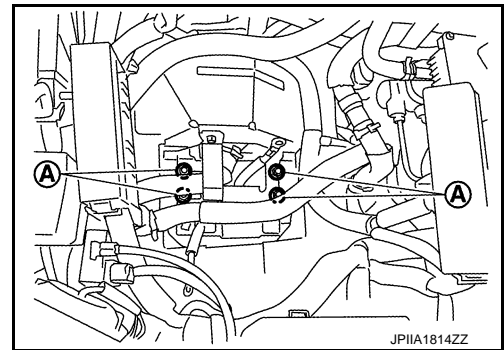
-  To prevent shock hazards, be sure to wear protective gear.



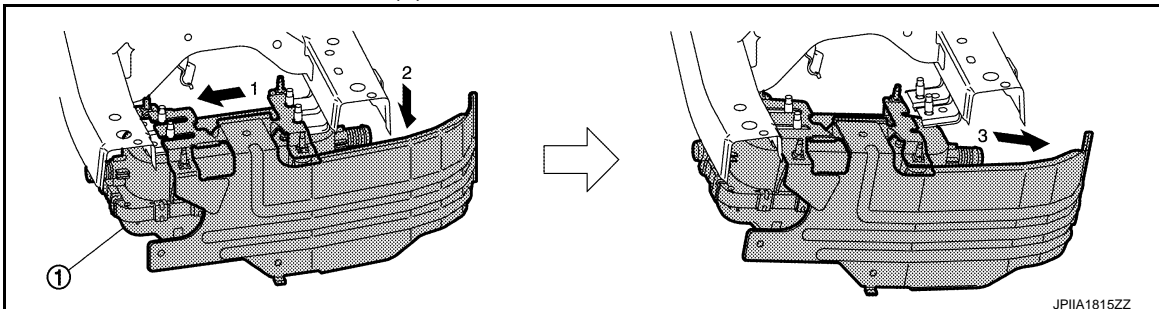
12. Remove the mounting nuts (A).

### WARNING:

-  Be sure to put on insulating protective gear before beginning work on the high voltage system.



13. Remove the PTC elements heater (1) from below the vehicle.



# PTC ELEMENTS HEATER

## < REMOVAL AND INSTALLATION >

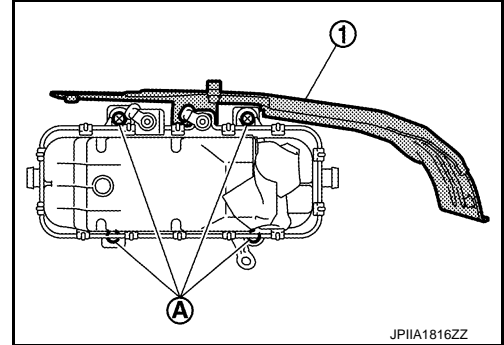
### WARNING:



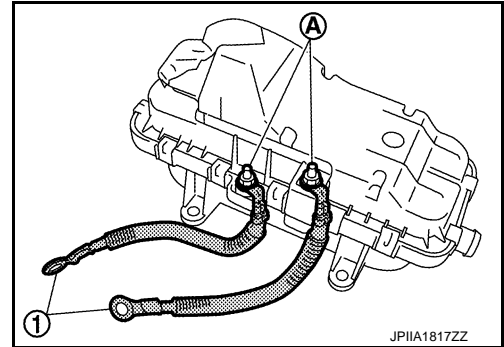
To prevent shock hazards, be sure to wear protective gear.



14. Remove the mounting bolts (A), then remove the PTC elements heater bracket (1).



15. Remove the mounting bolts (A), then remove the bonding wire (1).



## INSTALLATION

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

### WARNING:



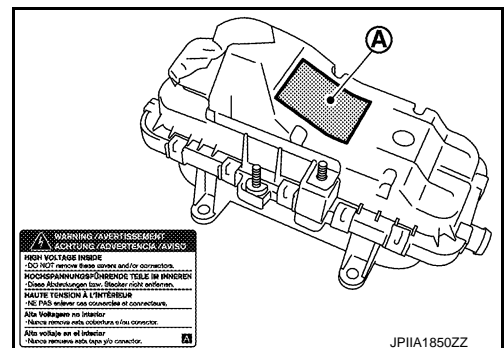
To prevent shock hazards, be sure to wear protective gear.



### CAUTION:

Be sure to reinstall high voltage harness clips in their original positions. If a clip is damaged, replace it with a new clip before installing.

- If the PTC elements heater was replaced, first check that there is no dust or dirt on the surface of the PTC elements heater, then apply the new high voltage warning label at position (A).

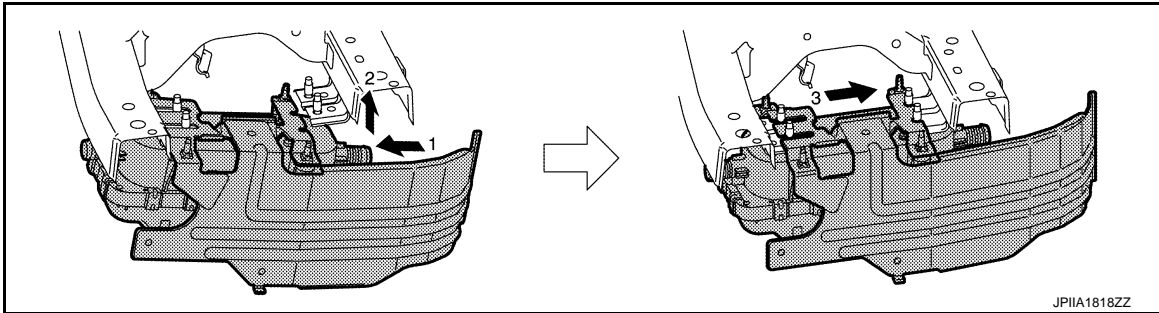




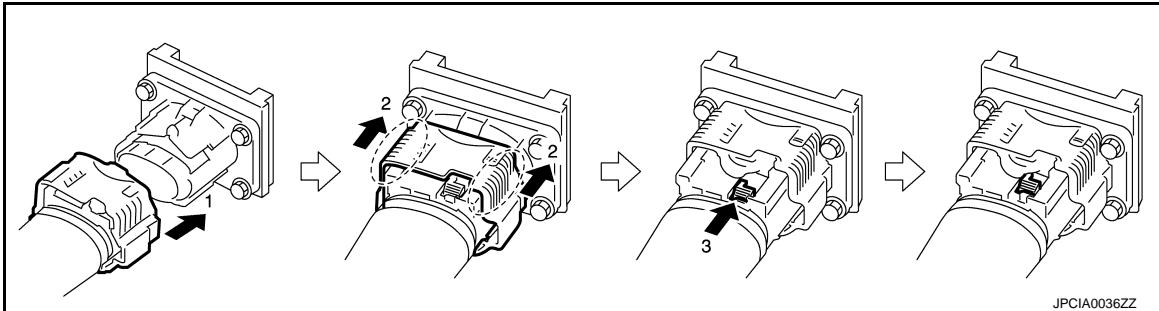
# PTC ELEMENTS HEATER

## < REMOVAL AND INSTALLATION >

- Follow the procedure below and remove the PTC elements heater.



- Follow the procedure below and connect the high voltage harness connector.



- After all parts are installed, be sure to check the equipotential. Refer to [HA-71, "Inspection"](#).

**NOTE:**

When adding heater fluid, refer to [HA-41, "Draining and Refilling"](#).

## Inspection

INFOID:000000006960825

HA

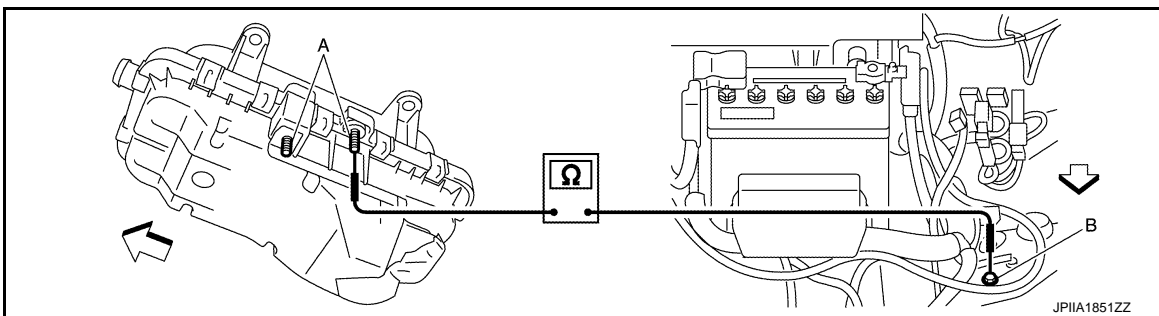
### INSPECTION AFTER INSTALLATION

After installing the PTC elements heater, measure the resistance between the PTC elements heater and the vehicle body, and perform an electric equipotential test.

**WARNING:**



To prevent shock hazards, be sure to wear protective gear.



- A : Bonding wire stud bolt
- B : Motor room ground bolt
- ← : Vehicle front

**Standard : 0.1 Ω or less**

If the result deviates from the standard value, check for paint, oil, dirt, or other substance adhering to the bolts or conductive mounting parts. If such substances are found, clean the surrounding area and remove the foreign substances.

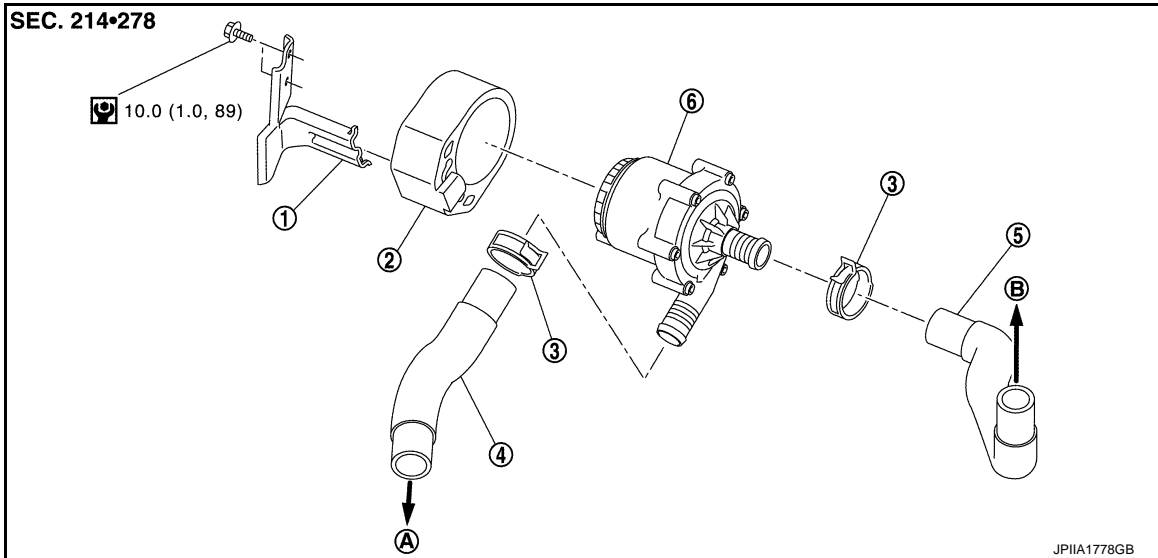
# HEATER PUMP

< REMOVAL AND INSTALLATION >


## HEATER PUMP

Exploded View

INFOID:000000006960826



- |                           |                           |                |
|---------------------------|---------------------------|----------------|
| 1. Heater pump bracket    | 2. Heater pump mount      | 3. Clamp       |
| 4. Heater hose            | 5. Heater hose            | 6. Heater pump |
| A: To PTC elements heater | B: To degas tank (heater) |                |

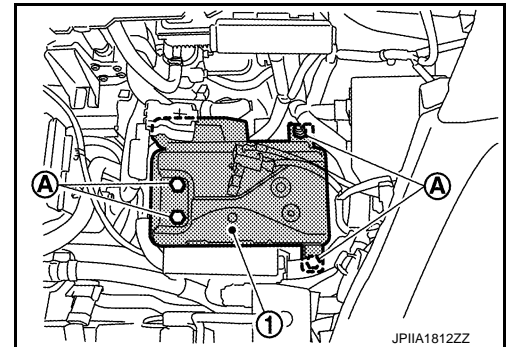
 : N•m (kg-m in-lb)

## Removal and Installation

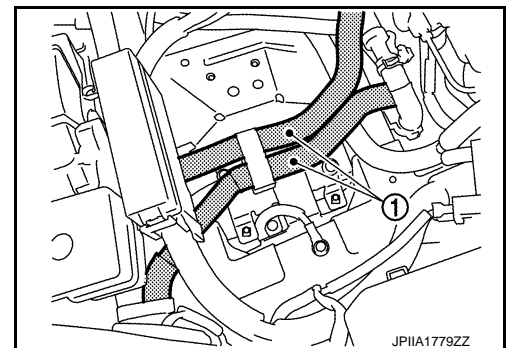
INFOID:000000006960827

### REMOVAL

1. Remove the front under cover. Refer to [EXT-21, "FRONT UNDER COVER : Removal and Installation"](#).
2. Drain out the heater fluid. Refer to [HA-41, "Draining and Refilling"](#).
3. Remove the 12V battery. Refer to [PG-104, "Removal and Installation"](#).
4. Remove the mounting bolts (A), then remove the battery bracket (1).



5. Move the hose (1) to a position where it will not interfere with work.

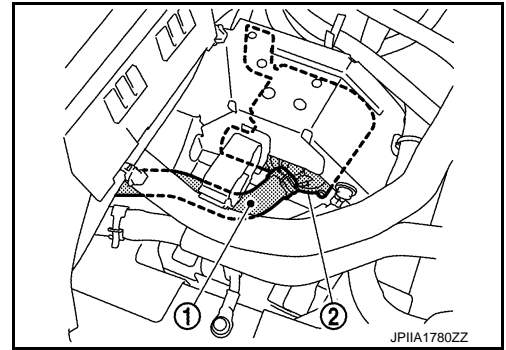




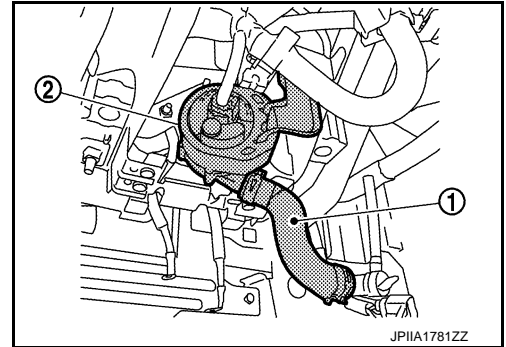
# HEATER PUMP

## < REMOVAL AND INSTALLATION >

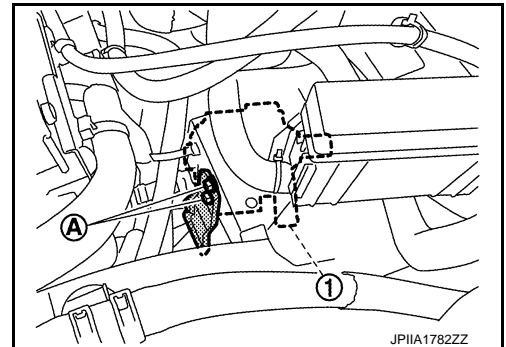
6. Remove the hose clamp and disconnect the heater hose (1) from the heater pump (2).



7. Remove the hose clamp and disconnect the heater hose (1) from the heater pump (2).



8. Disconnect the heater pump connector.
9. Remove the mounting bolts (A), then remove the heater pump (1).



## INSTALLATION

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

### NOTE:

When adding heater fluid, refer to [HA-41, "Draining and Refilling"](#).

A  
B  
C  
D  
E  
F  
G  
H  
HA  
J  
K  
L  
M  
N  
O  
P

## SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

#### Compressor

INFOID:000000006997070

Model (manufacturer)	AES28AV3AA (Panasonic)
Type	Electric drive scroll type (Include inverter)

#### Lubricant

INFOID:000000006997071

Name	ND-OIL11 (Exclusive use for electric compressor)
Measure (cm <sup>3</sup> )	150

#### Refrigerant

INFOID:000000006997072

Name	HFC134a
Used amount (g)	450

#### Periodical Maintenance Specification

INFOID:000000006997073

#### HEATER FLUID CAPACITY (APPROXIMATE)

Heater fluid capacity [Exclude degas tank] (liter)	1.83
Degas tank capacity (liter)	0.403