

# SECTION **HA**

## HEATER & AIR CONDITIONING SYSTEM

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# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

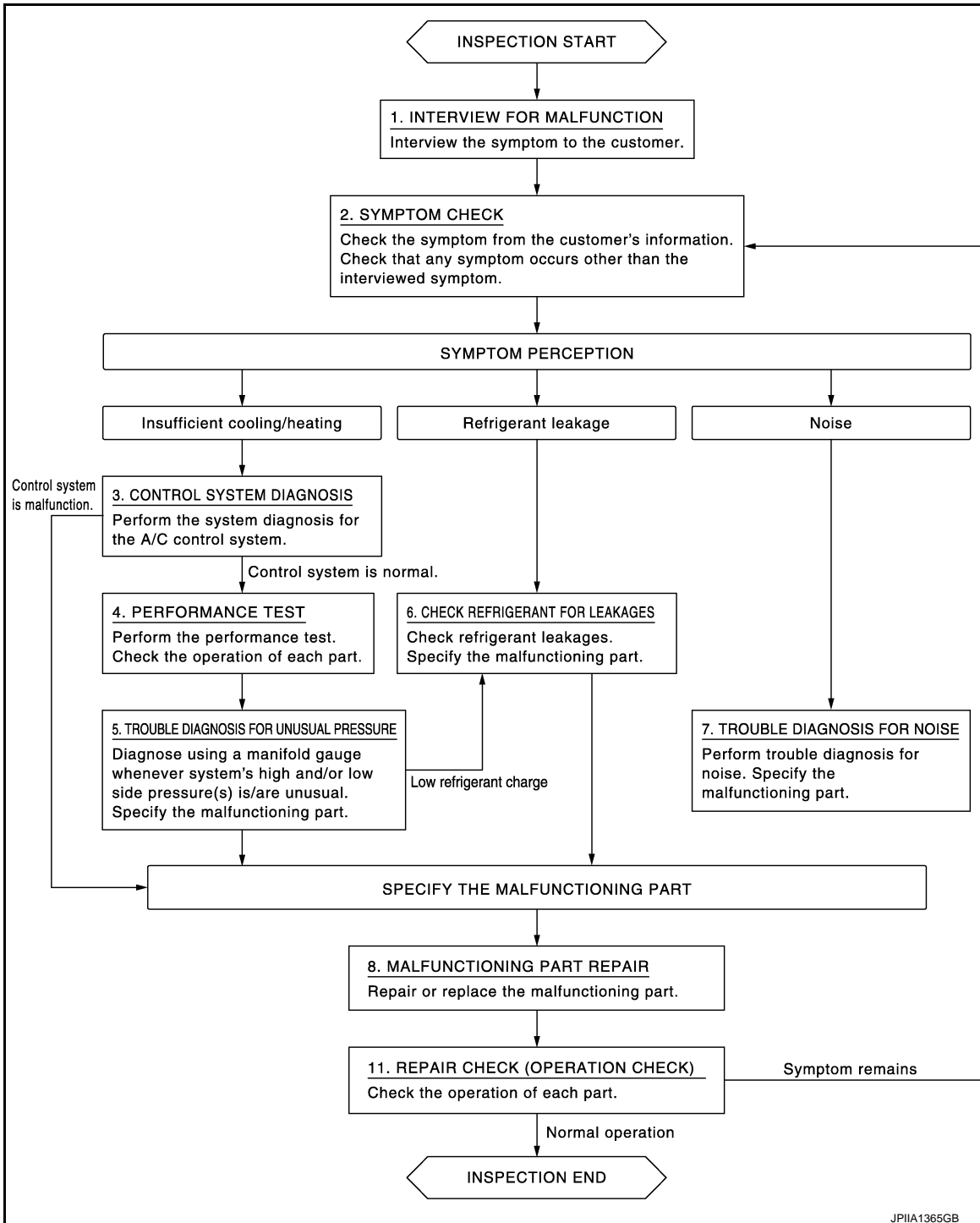
## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000010840228

#### OVERALL SEQUENCE



#### DETAILED FLOW

##### 1. INTERVIEW FOR MALFUNCTION

Interview the symptom to the customer.

# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

---

>> GO TO 2.

## 2. SYMPTOM CHECK

---

Check the symptom from the customer's information. Check that any symptom occurs other than the interviewed symptom.

Insufficient cooling/heating>>GO TO 3.

Refrigerant leakage>>GO TO 6.

Noise >> GO TO 7.

## 3. CONTROL SYSTEM DIAGNOSIS

---

Perform the system diagnosis for the A/C control system. Refer to [HAC-8, "Description & Inspection"](#) (WITHOUT 7 INCH DISPLAY) or [HAC-98, "Description & Inspection"](#) (WITH 7 INCH DISPLAY).

Is A/C control system normal?

YES >> GO TO 4.

NO >> GO TO 8.

## 4. PERFORMANCE TEST

---

Perform the performance test. Check the operation of each part. Refer to [HA-32, "Inspection"](#).

>> GO TO 5.

## 5. TROUBLE DIAGNOSIS FOR UNUSUAL PRESSURE

---

Diagnose using a manifold gauge whenever system's high and/or low side pressure(s) is/are unusual. Specify the malfunctioning part. Refer to [HA-7, "Symptom Table"](#).

Low refrigerant charge>>GO TO 6.

Except above>>GO TO 8.

## 6. CHECK REFRIGERANT FOR LEAKAGES

---

Check refrigerant for leakages. Specify the malfunctioning part. Refer to [HA-24, "Leak Test"](#).

>> GO TO 8.

## 7. TROUBLE DIAGNOSIS FOR NOISE

---

Perform trouble diagnosis for noise. Specify the malfunctioning part. Refer to [HA-9, "Symptom Table"](#).

>> GO TO 8.

## 8. MALFUNCTION PART REPAIR

---

Repair or replace the malfunctioning part.

>> GO TO 9.

## 9. REPAIR CHECK (OPERATION CHECK)

---

Check the operation of each part.

Does it operate normally?

YES >> INSPECTION END

NO >> GO TO 2.

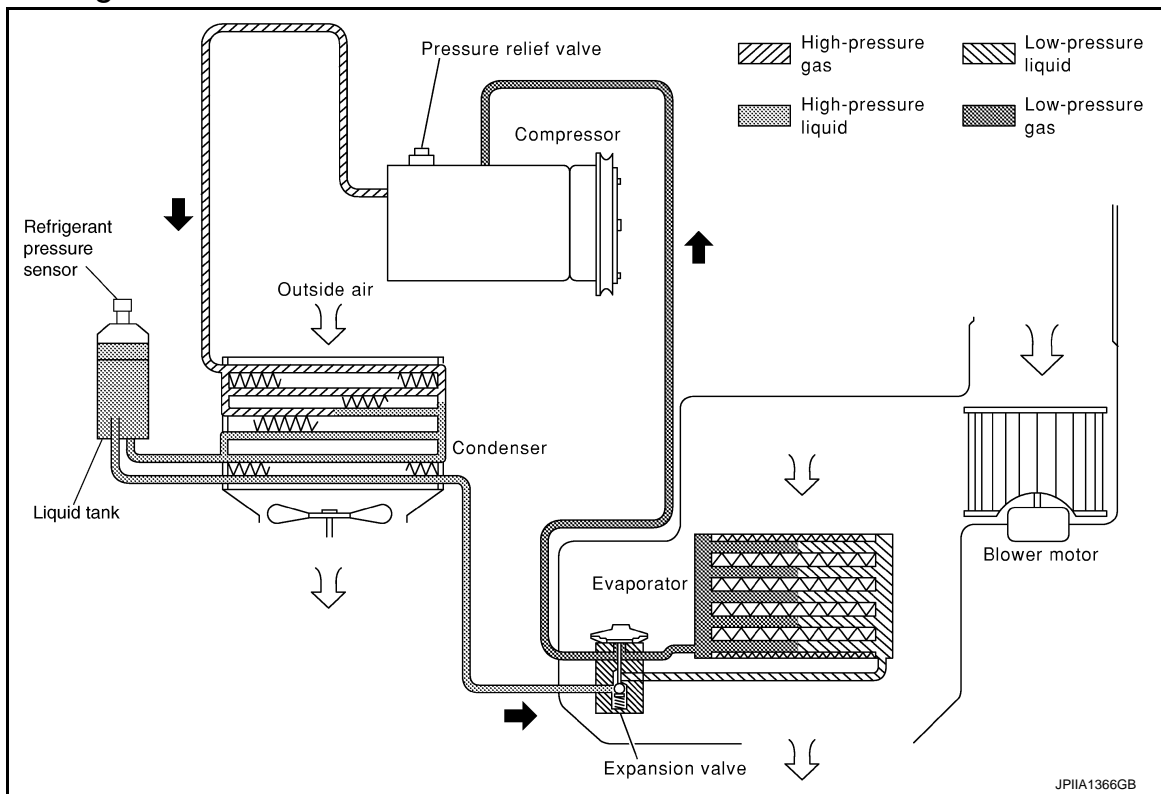
# REFRIGERATION SYSTEM

< SYSTEM DESCRIPTION >

## SYSTEM DESCRIPTION

### REFRIGERATION SYSTEM

#### System Diagram



#### System Description

INFOID:000000010840230

#### REFRIGERANT CYCLE

##### Refrigerant Flow

The refrigerant flows from the compressor, through the condenser with liquid tank, through the evaporator, and back to the compressor. The refrigerant evaporation in the evaporator is controlled by an externally equalized expansion valve, located inside the evaporator case.

##### Freeze Protection

To prevent evaporator from freezing up, the evaporator air temperature is monitored, and the voltage signal to the A/C auto amp. makes the A/C relay go OFF and stop the compressor.

#### REFRIGERANT SYSTEM PROTECTION

##### Refrigerant Pressure Sensor

- The refrigerant system is protected against excessively high- or low-pressures by the refrigerant pressure sensor, located on the liquid tank. The refrigerant pressure sensor detects the pressure inside the refrigerant line and sends the voltage signal to the ECM if the system pressure rises above, or falls below the specifications.
- ECM turns the A/C relay to OFF and stops the compressor when the high-pressure side detected by refrigerant pressure sensor is following conditions;
  - Approximately 3,120 kPa (31.8 kg/cm<sup>2</sup>, 452 psi) or more (Engine speed is 1,500 rpm or more.)
  - Approximately 2,740 kPa (27.9 kg/cm<sup>2</sup>, 397 psi) or more (Engine speed is less than 1,500 rpm.)
  - Approximately 120 kPa (1.2 kg/cm<sup>2</sup>, 17 psi) or less

##### Pressure Relief Valve

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. The release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere

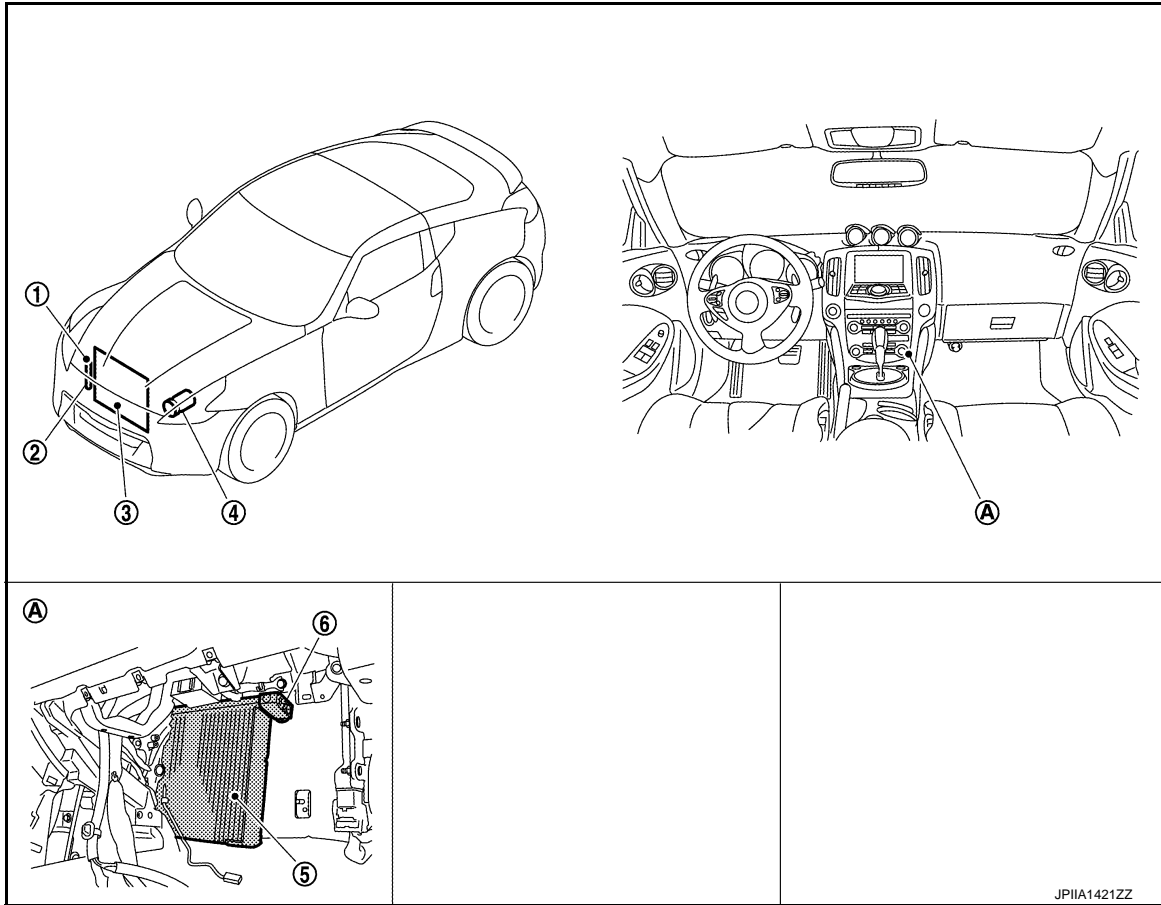
# REFRIGERATION SYSTEM

## < SYSTEM DESCRIPTION >

when the pressure of refrigerant in the system increases to an unusual level [more than 3,800 kPa (38.8 kg/cm<sup>2</sup>, 551 psi)].

## Component Parts Location

INFOID:000000010840231



JPIIA1421ZZ

- |  |                |                    |
|--|----------------|--------------------|
| 1. Refrigerant pressure sensor           | 2. Liquid tank | 3. Condenser       |
| 4. Compressor                            | 5. Evaporator  | 6. Expansion valve |
| A. In the heater & cooling unit assembly |                |                    |

## Component Description

INFOID:000000010840232

Component	Description
Compressor	Intakes, compresses, and discharges refrigerant, to circulate refrigerant inside the refrigerant cycle.
Condenser	Cools refrigerant discharged from compressor, and transforms it to liquid refrigerant.
Liquid tank	Eliminates foreign matter in refrigerant, and stores temporarily liquid refrigerant.
Refrigerant pressure sensor	Refer to <a href="#">EC-527. "Description"</a> .
Expansion valve	Transforms high-pressure liquid refrigerant to mist form low-pressure liquid refrigerant by drawing function.
Evaporator	The mist form liquid refrigerant transforms to gas by evaporation by the air conveyed from blower motor. The air is cooled by the heat by evaporation.

# REFRIGERATION SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

## SYMPTOM DIAGNOSIS

### REFRIGERATION SYSTEM SYMPTOMS

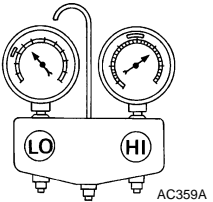
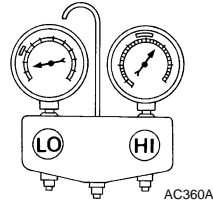
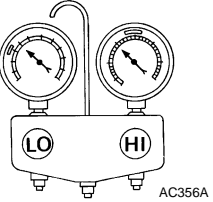
#### Trouble Diagnosis For Unusual Pressure

INFOID:000000010840233

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

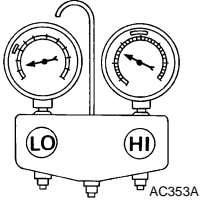
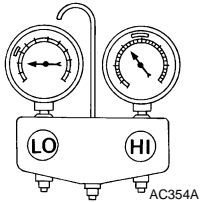
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Gauge indication	Refrigerant cycle	Probable cause	Corrective action
<p>Both high- and low-pressure sides are too high.</p>  <p>AC359A</p>	<p>The pressure returns to normal soon after sprinkling water on condenser.</p>	<p>Overfilled refrigerant.</p>	<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>

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# 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>	<p>Clogged expansion valve.</p> <ul style="list-style-type: none"> <li>Breakage of temperature sensor.</li> <li>Clogging by foreign material.</li> </ul>	<p>Eliminate foreign material from expansion valve, or replace it.</p>
	<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>	<p>Malfunction in inner liquid tank (clogged strainer).</p>	<p>Replace liquid tank.</p>
	<p>Evaporator becomes frosted.</p>	<p>Clogged or crushed low-pressure pipe.</p>	<p>Repair or replace malfunctioning parts.</p>
		<p>Malfunction in intake air temperature sensor.</p>	<p>Check intake sensor system. Refer to <a href="#">HAC-35, "DTC Logic"</a> (WITHOUT 7 INCH DISPLAY) or <a href="#">HAC-126, "DTC Logic"</a> (WITH 7 INCH DISPLAY).</p>
<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>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>
	<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>
<p>Hunting in high-pressure side.</p>	<p>There is no temperature difference between high- and low-pressure sides.</p>	<p>Malfunctioning variable valve in compressor.</p>	<ul style="list-style-type: none"> <li>Replace compressor.</li> <li>Check ECV system. Refer to <a href="#">HAC-59, "Diagnosis Procedure"</a> (WITHOUT 7 INCH DISPLAY) or <a href="#">HAC-148, "Diagnosis Procedure"</a> (WITH 7 INCH DISPLAY).</li> </ul>



# NOISE

< SYMPTOM DIAGNOSIS >

## NOISE

### Symptom Table

INFOID:000000010840235

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-28, "Inspection"</a> .
	Magnet clutch	Contact of clutch disc with pulley.	Check clearance between clutch disc and pulley. Refer to <a href="#">HA-36, "Inspection"</a> .
	Compressor body	Loosened compressor mounting bolts.	Check bolts for tightness. Refer to <a href="#">HA-33, "Exploded View"</a> .
Unusual noise from belt.	—	Loosened belt	Check belt tension. Refer to <a href="#">EM-18, "Checking"</a> .
		Internal compressor parts get locked	Replace compressor.

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# PRECAUTIONS

< PRECAUTION >

## PRECAUTION

### PRECAUTIONS

#### FOR USA AND CANADA

#### FOR USA AND CANADA : Precautions for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000110840236

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

#### **WARNING:**

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see "SRS AIR BAG".
- Never use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

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

#### **WARNING:**

Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

#### FOR USA AND CANADA : Precaution for Battery Service

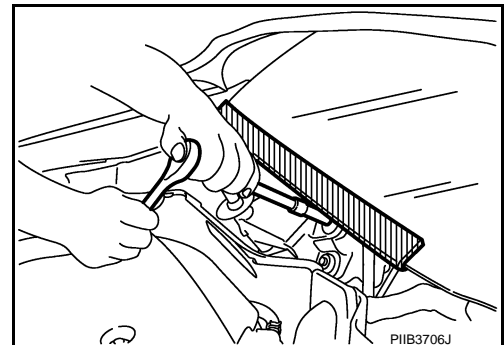
INFOID:0000000110840237

Before disconnecting the battery, lower both the driver and passenger windows. This will prevent any interference between the window edge and the vehicle when the door is opened/closed. During normal operation, the window slightly raises and lowers automatically to prevent any window to vehicle interference. The automatic window function will not work with the battery disconnected.

#### FOR USA AND CANADA : Precaution for Procedure without Cowl Top Cover

INFOID:0000000110840238

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



## PRECAUTIONS

< PRECAUTION >

### FOR USA AND CANADA : Precautions for Removing Battery Terminal

INFOID:000000011326954

- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.

**NOTE:**

ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

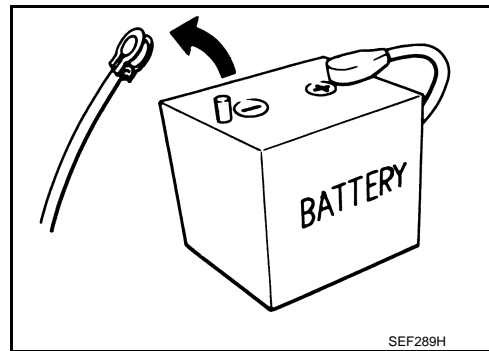
**NOTE:**

If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.

**NOTE:**

The removal of 12V battery may cause a DTC detection error.



### FOR MEXICO

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

INFOID:000000010840240

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

**WARNING:**

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see "SRS AIR BAG".
- Never use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

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

**WARNING:**

Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

### FOR MEXICO : Precaution for Battery Service

INFOID:000000010840241

Before disconnecting the battery, lower both the driver and passenger windows. This will prevent any interference between the window edge and the vehicle when the door is opened/closed. During normal operation, the window slightly raises and lowers automatically to prevent any window to vehicle interference. The automatic window function will not work with the battery disconnected.

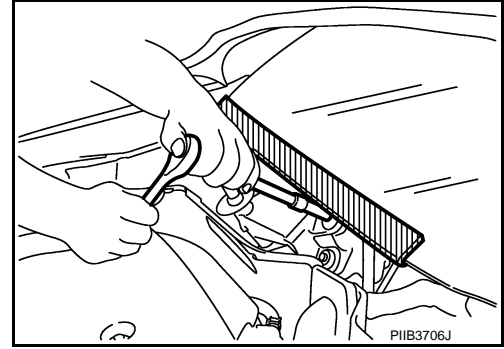
# PRECAUTIONS

## < PRECAUTION >

### FOR MEXICO : Precaution for Procedure without Cowl Top Cover

INFOID:0000000110840242

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



### FOR MEXICO : Precautions for Removing Battery Terminal

INFOID:000000011326955

- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.

**NOTE:**

ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

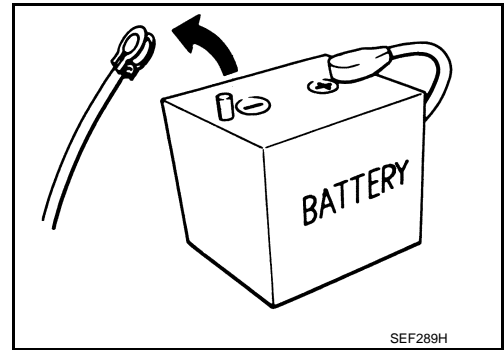
**NOTE:**

If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.

**NOTE:**

The removal of 12V battery may cause a DTC detection error.



### Precautions For Refrigerant System Service

INFOID:0000000110840239

#### GENERAL REFRIGERANT PRECAUTION

**WARNING:**

- **Never breathe A/C refrigerant and lubricant 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 J-2210 [HFC-134a (R-134a) recycling equipment], or J-2209 [HFC-134a (R-134a) recovery equipment]. Ventilate work area before resuming service if accidental system discharge occurs. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.**
- **Never release refrigerant into the air. Use approved recovery/recycling recharging equipment to capture the refrigerant each time an air conditioning system is discharged.**
- **Wear always eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.**
- **Never store or heat refrigerant containers above 52°C (126°F).**
- **Never heat a refrigerant container with an open flame; Place the bottom of the container in a warm pail of water if container warming is required.**
- **Never intentionally drop, puncture, or incinerate refrigerant containers.**
- **Keep refrigerant away from open flames: poisonous gas is produced if refrigerant burns.**
- **Refrigerant displaces oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.**
- **Never pressure test or leakage 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.**

#### WORKING WITH HFC-134a (R-134a)

# PRECAUTIONS

## < PRECAUTION >

### CAUTION:

- CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. Compressor malfunction is likely to occur if the refrigerants are mixed, refer to “CONTAMINATED REFRIGERANT” below. 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 lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. Compressor malfunction is likely to occur if lubricant other than that specified is used.
- The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
  - Cap (seal) immediately the component to minimize the entry of moisture from the atmosphere when removing refrigerant components from a vehicle.
  - Never remove the caps (unseal) until just before connecting the components when installing refrigerant components to a vehicle. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
  - Use only the specified lubricant from a sealed container. Reseal immediately containers of lubricant. Lubricant becomes moisture saturated and should not be used without proper sealing.
  - Never allow lubricant (A/C System Oil Type S) to come in contact with styrene foam parts. Damage may result.

### CONTAMINATED REFRIGERANT

Take appropriate steps shown below if a refrigerant other than pure HFC-134a (R-134a) is identified in a vehicle:

- 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 service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location of previous service where the contamination may have occurred.
- In case of repairing, recover the refrigerant using only **dedicated equipment and containers. Never recover contaminated refrigerant into the existing service equipment.** Contact a local refrigerant product retailer for available service if the facility does not have dedicated recovery equipment. 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.
- The air conditioner warranty is void if the vehicle is within the warranty period. Please contact Nissan Customer Affairs for further assistance.

### REFRIGERANT CONNECTION

A new type refrigerant connection has been introduced to all refrigerant lines except the following location.

- Expansion valve to evaporator
- Refrigerant pressure sensor to liquid tank

### WARNING:

Check that all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.

### CAUTION:

Observe the following when replacing or cleaning refrigerant cycle components.

- Store it in the same way as it is when mounted on the car when the compressor is removed. Failure to do so will cause lubricant to enter the low-pressure chamber.
- Use always a torque wrench and a back-up wrench when connecting tubes.
- Plug immediately all openings to prevent entry of dust and moisture after disconnecting tubes.
- Connect the pipes at the final stage of the operation when installing an air conditioner in the vehicle. Never remove the seal caps of pipes and other components until just before required for connection.
- Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.
- Remove thoroughly moisture from the refrigeration system before charging the refrigerant.
- Replace always used O-rings.
- Apply lubricant to circle of the O-rings shown in illustration when connecting tube. Be careful not to apply lubricant to threaded portion.

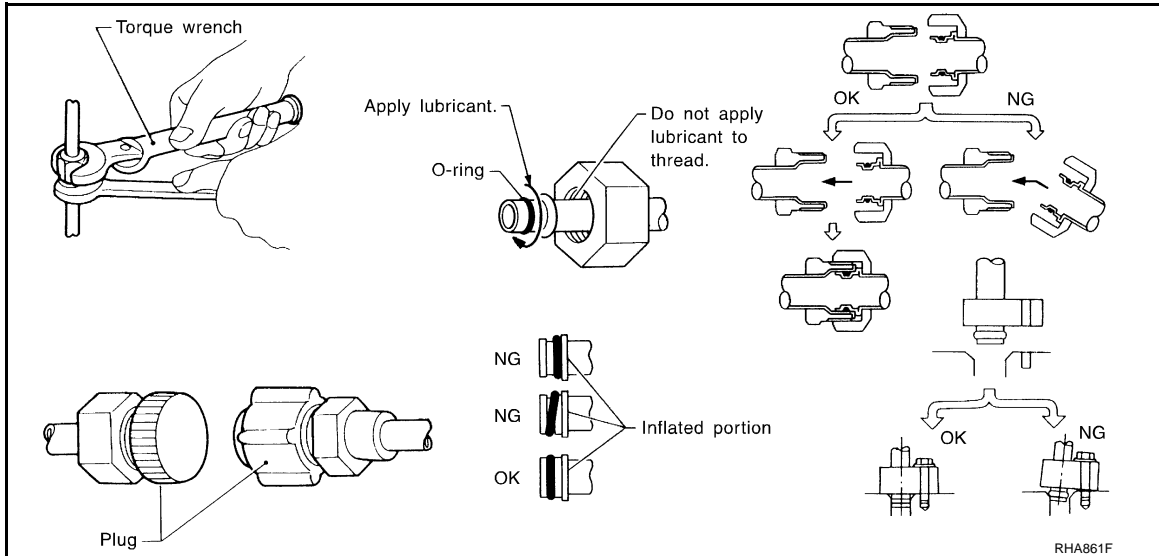
**Name** : A/C System Oil Type S

- O-ring must be closely attached to the groove portion of tube.
- Be careful not to damage O-ring and tube when replacing the O-ring.

# PRECAUTIONS

## < PRECAUTION >

- Connect tube until a click can be heard. Then tighten the nut or bolt by hand. Check that the O-ring is installed to tube correctly.
- Perform leakage test and make sure that there is no leakage from connections after connecting line. Disconnect that line and replace the O-ring when the refrigerant leaking point is found. Then tighten connections of seal seat to the specified torque.



## COMPRESSOR

### CAUTION:

- Plug all openings to prevent moisture and foreign matter from entering.
- Store it in the same way as it is when mounted on the car when the compressor is removed.
- Follow "Maintenance of Lubricant Quantity in Compressor" exactly when replacing or repairing compressor. Refer to [HA-28, "Description"](#).
- Keep friction surfaces between clutch and pulley clean. Wipe it off by using a clean waste cloth moistened with thinner if the surface is contaminated with lubricant.
- Turn the compressor shaft by hand more than five turns in both directions after compressor service operation. This distributes equally lubricant inside the compressor. Let the engine idle and operate the compressor for one hour after the compressor is installed.
- Apply voltage to the new one and check for normal operation after replacing the compressor magnet clutch.

## LEAK DETECTION DYE

### CAUTION:

- The A/C system contains a fluorescent leak detection dye used for locating refrigerant leakages. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leakages.
- Wear always fluorescence enhancing UV safety goggles to protect eyes and enhance the visibility of the fluorescent dye.
- The fluorescent dye leak detector is not a replacement for an electrical leak detector (SST: J-41995). The fluorescent dye leak detector should be used in conjunction with an electrical leak detector (SST: J-41995) to pin-point refrigerant leakages.
- Read and follow all manufacturer's operating instructions and precautions prior to performing the work for the purpose of safety and customer's satisfaction.
- A compressor shaft seal should not necessarily be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leakage with an electrical leak detector (SST: J-41995).
- Remove always any remaining dye from the leakage area after repairs are completed to avoid a misdiagnosis during a future service.
- Never allow dye to come into contact with painted body panels or interior components. Clean immediately with the approved dye cleaner if dye is spilled. Fluorescent dye left on a surface for an extended period of time cannot be removed.
- Never spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).
- Never use more than one refrigerant dye bottle [1/4 ounce (7.4 cc)] per A/C system.
- Leak detection dyes for HFC-134a (R-134a) and CFC-12 (R-12) A/C systems are different. Never use HFC-134a (R-134a) leak detection dye in CFC-12 (R-12) A/C system, or CFC-12 (R-12) leak detection dye in HFC-134a (R-134a) A/C system, or A/C system damage may result.

# PRECAUTIONS

< PRECAUTION >

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- **The fluorescent properties of the dye remains for three or more years unless a compressor malfunction occurs.**

**NOTE:**

Identification

- Vehicles with factory installed fluorescent dye have a green label.
- Vehicles without factory installed fluorescent dye have a blue label.

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# PREPARATION

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## PREPARATION

### PREPARATION

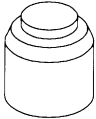
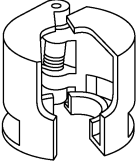

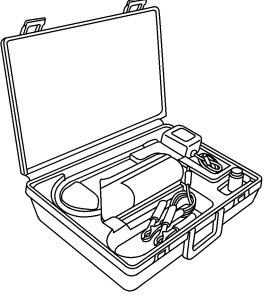
#### Special Service Tool

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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
KV99106200 (J-41260) Pulley installer	 S-NT235	Installing pulley
(J-45815) Disconnecter tool set	 RJIA0391J	Disconnect one-touch joint connection
(ACR2005-NI) ACR5 A/C Service Center	 WJIA0293E	Function: Refrigerant recovery, recycling and recharging
(J-41995) Electrical leak detector	 AHA281A	Power supply: DC 12 V (Battery terminal)



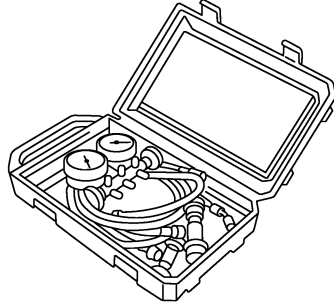
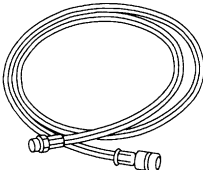
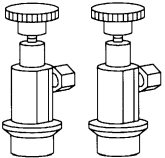
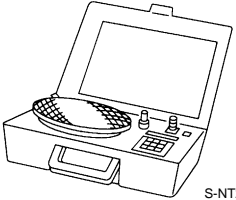
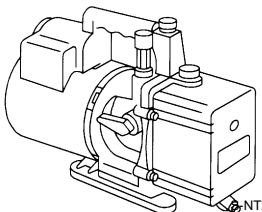
# PREPARATION

## < PREPARATION >

Tool number (Kent-Moore No.) Tool name	Description	A B C D E F G H J K L M N O P
<p>(J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety goggles (J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle (J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles) (J-43872) Refrigerant dye cleaner</p>		<p>Power supply: DC 12 V (Battery terminal)</p>
<p>(J-42220) UV lamp and UV safety goggles</p>	<p style="text-align: center;">SHA438F</p>	<p>Power supply: DC 12 V (Battery terminal) For checking refrigerant leakage when fluorescent dye is equipped in A/C system Includes: UV lamp and UV safety goggles</p>
<p>(J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles)</p>	<p style="text-align: center;">Refrigerant dye (24 bottles)</p> <p style="text-align: center;">SHA439F</p>	<p>Application: For HFC-134a (R-134a) PAG oil Container: 1/4 ounce (7.4 cc) bottle (Includes self-adhesive dye identification labels for affixing to vehicle after charging system with dye.)</p>
<p>(J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle</p>	<p style="text-align: center;">SHA440F</p>	<p>For injecting 1/4 ounce of fluorescent leak detection dye into A/C system</p>
<p>(J-43872) Refrigerant dye cleaner</p>	<p style="text-align: center;">SHA441F</p>	<p>For cleaning dye spills</p>

# PREPARATION

## < PREPARATION >

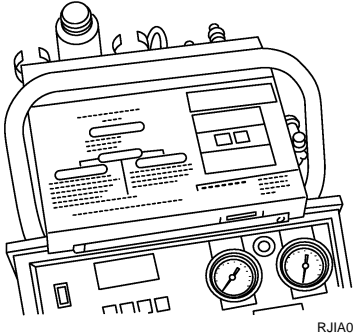
Tool number (Kent-Moore No.) Tool name	Description
<p>(J-39183) Manifold gauge set (with hoses and couplers)</p>  <p style="text-align: right; font-size: small;">RJJA0196E</p>	<p>Identification:</p> <ul style="list-style-type: none"> <li>The gauge face indicates HFC-134a (R-134a).</li> </ul> <p>Fitting 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>(J-39501-72) High-pressure side hose</li> <li>(J-39502-72) Low-pressure side hose</li> <li>(J-39476-72) Utility hose</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>(J-39500-20) High-pressure side coupler</li> <li>(J-39500-24) Low-pressure side coupler</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</p> <p>Fitting size: Thread size</p> <p>1/2"-16 ACME</p>
<p>(J-39649) Vacuum pump (Including the isolator valve)</p>  <p style="text-align: right; font-size: small;">S-NT203</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>

# PREPARATION

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## Commercial Service Tool

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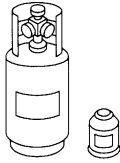
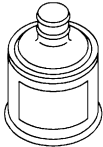
Tool name	Description
<p>Refrigerant identifier equipment</p>  <p style="text-align: right;">RJIA0197E</p>	<p>Checking for refrigerant purity and system contamination</p>

## Sealant or/and Lubricant

INFOID:000000010840246

### 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 name	Description
<p>HFC-134a (R-134a) refrigerant</p>  <p style="text-align: right;">S-NT196</p>	<p>Container color: Light blue            Container marking: HFC-134a (R-134a)            Fitting size: Thread size</p> <ul style="list-style-type: none"> <li>• Large container 1/2"-16 ACME</li> </ul>
<p>A/C System Oil Type S (DH-PS)</p>  <p style="text-align: right;">JMIA1759ZZ</p>	<p>Type: Polyalkylene glycol oil (PAG), type S (DH-PS)            Application: HFC-134a (R-134a) swash plate compressors            Capacity: 40 mℓ (1.4 US fl oz, 1.4 Imp fl oz)</p>

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# DESCRIPTION

< PERIODIC MAINTENANCE >

## PERIODIC MAINTENANCE

### DESCRIPTION

#### Service Equipment

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#### RECOVERY/RECYCLING RECHARGING EQUIPMENT

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

#### ELECTRICAL LEAK DETECTOR

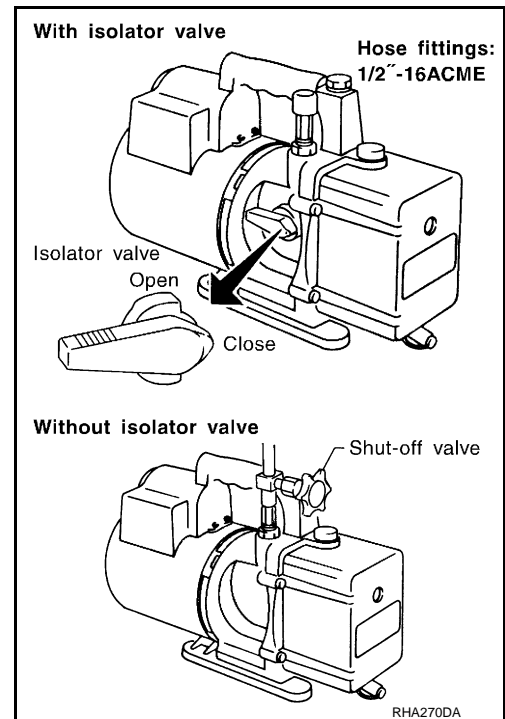
Be certain to follow the manufacturer's instructions for tester operation and tester maintenance.

#### VACUUM PUMP

The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant 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 placed near the hose-to-pump connection, as per the following.

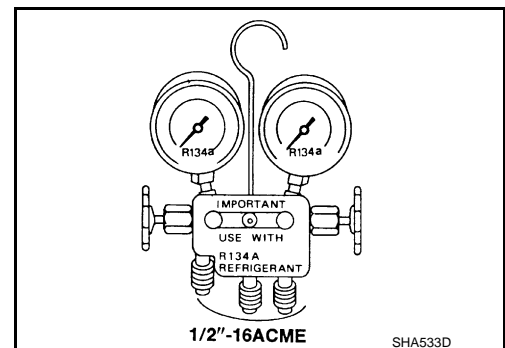
- Vacuum pumps usually have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- Use a hose equipped with a manual shut-off valve near the pump end for pumps without an isolator. Close the valve to isolate the hose from the pump.
- Disconnect the hose from the pump if the hose has an automatic shut-off valve. As long as the hose is connected, the valve is open and lubricating oil may migrate.

Some one-way valves open when vacuum is applied and close under 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 HFC-134a or R-134a. Be 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) and specified lubricants.

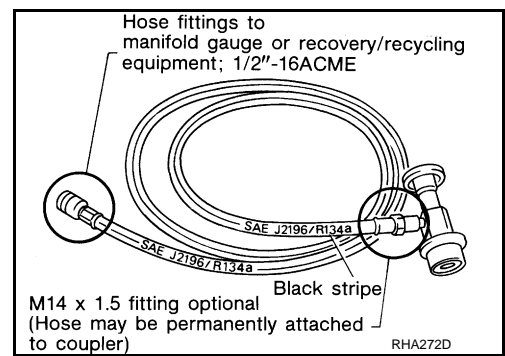


#### SERVICE HOSES

# DESCRIPTION

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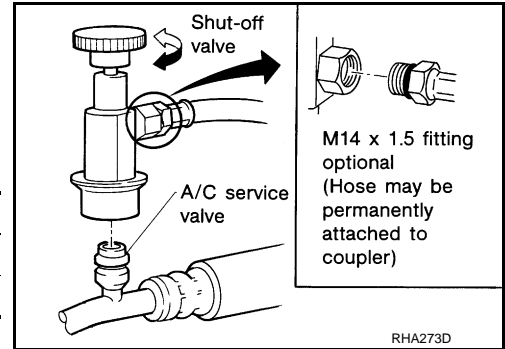
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must equip positive shut-off devices (either manual or automatic) near the end of the hoses opposite to the manifold gauge.



## SERVICE COUPLERS

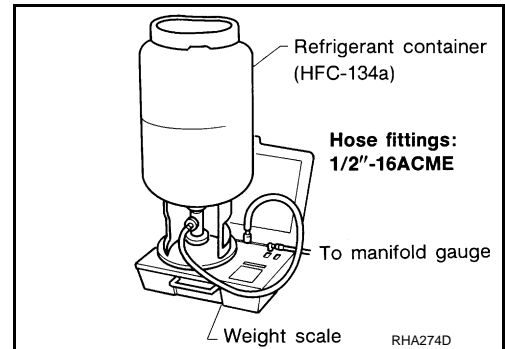
Never attempt to connect HFC-134a (R-134a) service couplers to the CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers do not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

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



## REFRIGERANT WEIGHT SCALE

Verify that no refrigerant other than HFC-134a (R-134a) and specified lubricants have been used with the scale. The hose fitting must be 1/2"-16 ACME if the scale controls refrigerant flow electronically.



## 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.

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# ONE-TOUCH JOINT

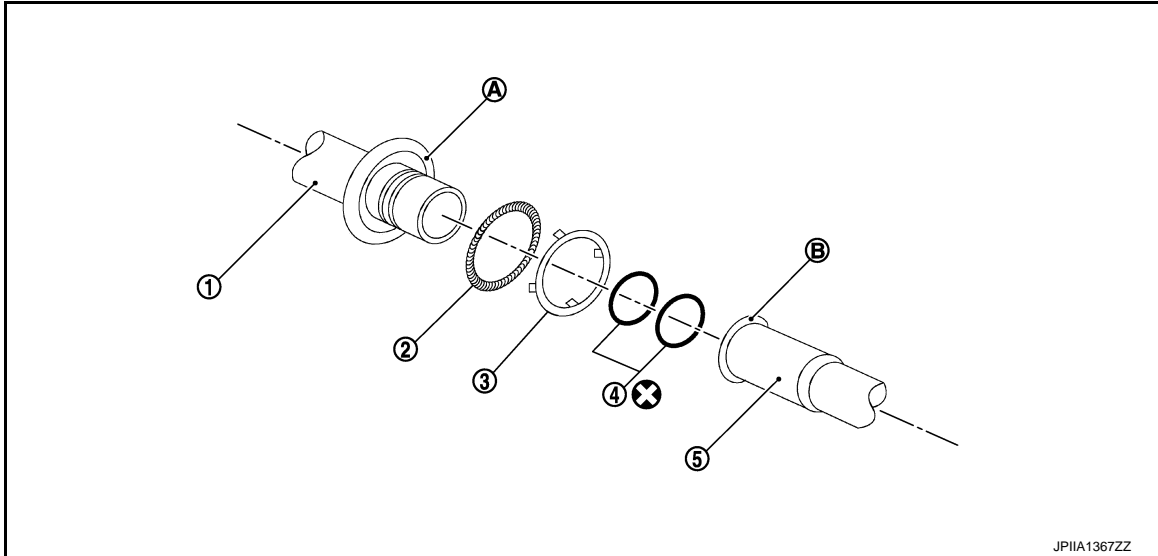
< PERIODIC MAINTENANCE >

## ONE-TOUCH JOINT

### Exploded View

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- One-touch joints are pipe joints which do not require tools while connecting pipes.
- Unlike a connection by conventional union nuts or flanges, tightening torque management for joint is not necessary.
- Use a disconnector when disconnecting a pipe connection. Refer to [HA-16, "Special Service Tool"](#).



- |                     |                       |                   |
|---------------------|-----------------------|-------------------|
| 1. Pipe (male-side) | 2. Garter spring      | 3. Indicator ring |
| 4. O-ring           | 5. Pipe (female-side) |                   |
| A: Cage             | B: Flare              |                   |
- ⊗ : Always replace after every disassembly.

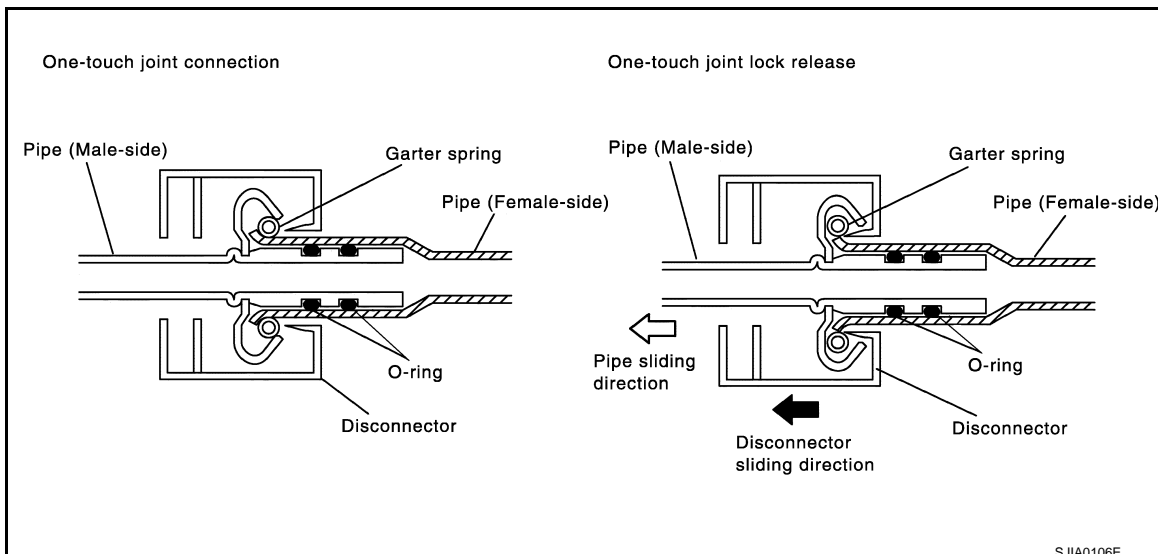
### NOTE:

- Garter spring cannot be removed from pipe (male-side) cage.
- Indicator ring remains near pipe joint. It is normal. (This is to check pipe connection condition during factory assembly.)

### Removal and Installation

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#### REMOVAL



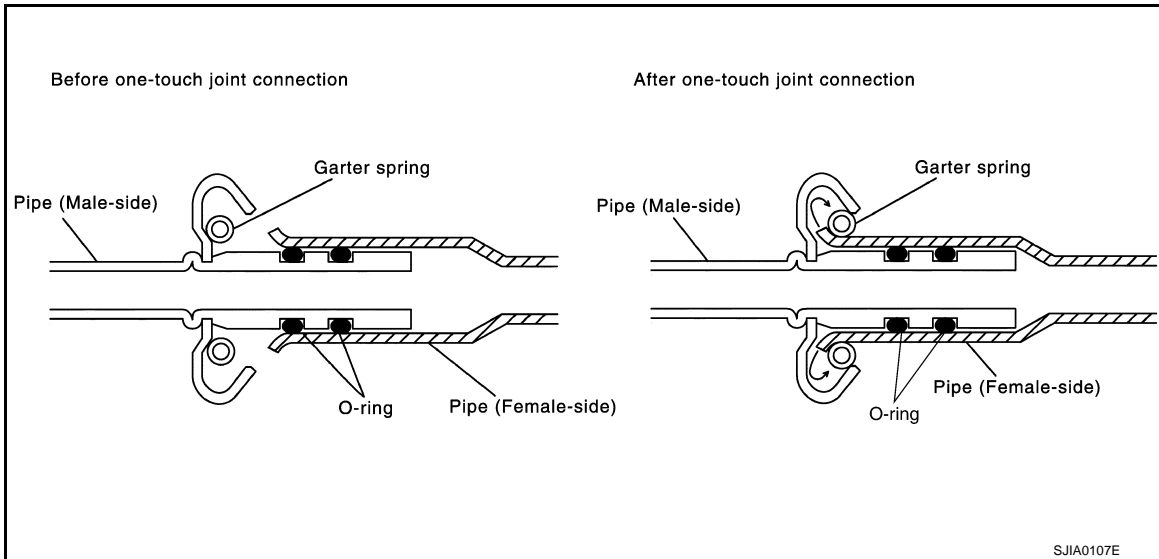
1. Clean pipe joint and set a disconnector.

# ONE-TOUCH JOINT

## < PERIODIC MAINTENANCE >

2. Slide disconnecter in axial direction of pipe, and stretch garter spring using tapers of disconnecter.
3. Slide disconnecter further so that inner diameter of garter spring becomes larger than outer diameter of pipe (female-side) flare. Then pipe (male-side) can be pulled out and pipe connection can be disconnected.

## INSTALLATION



1. Clean pipe joint, and then insert pipe (male-side) to pipe (female-side).
2. Press inserted pipe (male-side) further so that pipe (female-side) flare stretches garter spring.
3. When inner diameter of garter spring becomes larger than outer diameter of pipe (female-side) flare, garter spring gets over flare, fits between pipe (male-side) cage and pipe (female-side) flare, and fixes pipe joint.

### NOTE:

When garter spring gets over flare and fits between pipe (male-side) cage and pipe (female-side) flare, it clicks.

### CAUTION:

- Connecting point of pipe (female-side) is thin and easily deformed. Always insert pipe (male-side) in the axial direction straight and slowly. Be careful not to deform pipe (female-side).
- Insert pipe securely until it clicks.
- Always check that pipe joint is not disconnected by pulling pipe (male-side) by hands after pipe connection is complete.

# REFRIGERANT

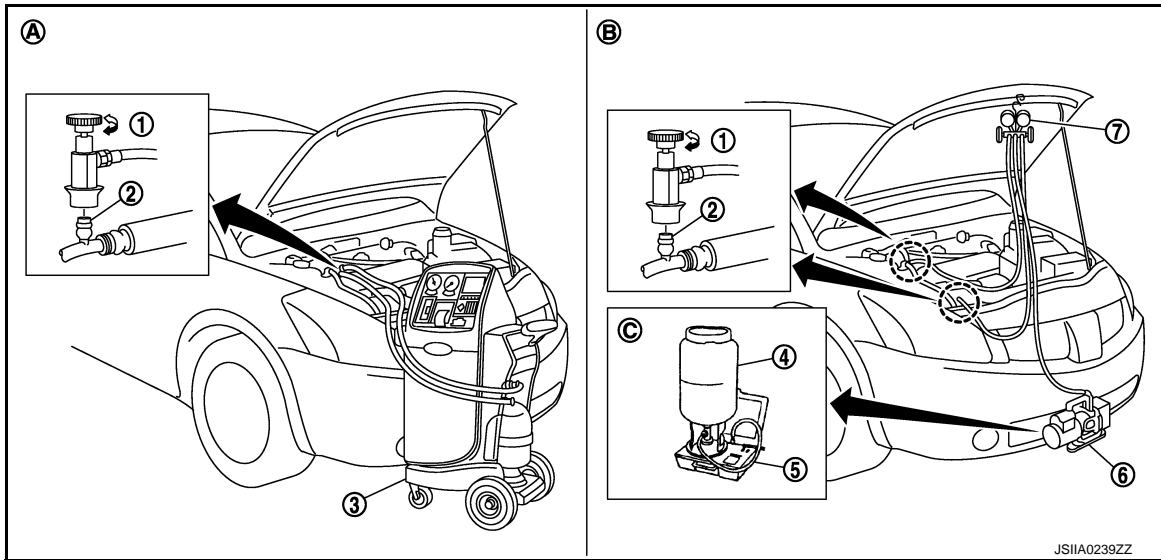
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## REFRIGERANT

### Description

INFOID:000000010840250

### CONNECTION OF SERVICE TOOLS AND EQUIPMENT

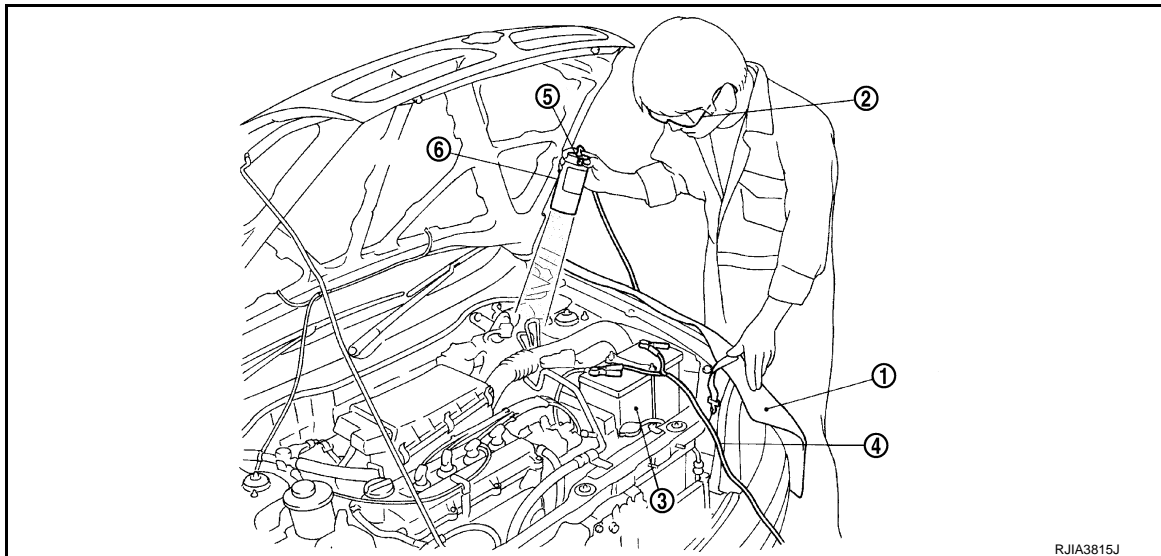


- |                                     |                           |  |
|-------------------------------------|---------------------------|--|
| 1. Shut-off valve                   | 2. A/C service valve      | 3. Recovery/recycling/recharging equipment |
| 4. Refrigerant container (HFC-134a) | 5. Weight scale (J-39650) | 6. Vacuum pump (J-39649)                   |
| 7. Manifold gauge set (J-39183)     |                           |  |
| A. Preferred (best) method          | B. Alternative method     | C. For charging                            |

### Leak Test

INFOID:000000010840251

### CHECK REFRIGERANT LEAKAGE USING FLUORESCENT LEAK DETECTION DYE



1. Install a fender cover (1).
2. Wear UV safety goggles (2) provided with refrigerant dye leak detection kit (J-43926).
3. Connect power cable (4) of UV lamp (6) to positive and negative terminals of the battery (3).
4. Press UV lamp switch (5) and check A/C system for refrigerant leakage. (Where refrigerant leakage occurs, fluorescent leak detection dye appears in green color.)

**WARNING:**



# REFRIGERANT

## < PERIODIC MAINTENANCE >

**Never look directly into UV lamp light source.**

**NOTE:**

- For continuous operating time of UV lamp, follow the manufacturer operating instructions.
- Illuminate piping joints from different angles using UV lamp and check that there is no leakage.
- Use a mirror in area that is difficult to see to check refrigerant leakage.
- Refrigerant leakage from evaporator can be detected by soaking cotton swab or a similar material with drain hose water and illuminating it using UV lamp.
- Dust, dirt, and packing materials adhesive used for condenser, evaporator, and other locations may fluoresce. Be careful not to misidentify leakage.

5. Repair or replace parts where refrigerant leakage occurs and wipe off fluorescent leak detection dye.

**NOTE:**

Completely wipe off fluorescent leak detection dye from gaps between parts, screw threads, and others using a cotton swab or similar materials.

6. Use a UV lamp to check that no fluorescent leak detection dye remains after finishing work.

**WARNING:**

**Never look directly into UV lamp light source.**

**NOTE:**

- For continuous operating time of UV lamp, follow the manufacturer operating instructions.
- Dust, dirt, and packing materials adhesive used for condenser, evaporator, and other locations may fluoresce. Be careful not to misidentify leakage.

## CHECK REFRIGERANT LEAKAGE USING ELECTRICAL LEAK DETECTOR

**WARNING:**

**Never check refrigerant leakage while the engine is running.**

**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. Stop the engine.
2. Connect recovery/recycling/recharging equipment or manifold gauge set (J-39183) to A/C service valve.
3. Check that A/C refrigerant pressure is 345 kPa (3.52 kg/cm<sup>2</sup>, 50 psi) or more when temperature is 16°C (61°F) or more. When pressure is lower than the specified value, recycle refrigerant completely and fill refrigerant to the specified level.

**NOTE:**

Leakages may not be detected if A/C refrigerant pressure is 345 kPa (3.52 kg/cm<sup>2</sup>, 50 psi) or less when temperature is less than 16°C (61°F).

4. 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 (J-41995) probe.

**CAUTION:**

- **Continue checking when a leakage is 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.
- When checking leakage of cooling unit inside, operate blower fan motor for 15 minutes or more at the maximum fan speed while the engine is stopped, and then insert electrical leak detector probe into drain hose and hold 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.

5. Repair or replace parts where refrigerant leakage is detected. (Leakage is detected but leakage area is unknown. GO TO 6.)
6. Start the engine and set A/C control in the following conditions.
  - A/C switch ON
  - Air flow: VENT (ventilation)
  - Intake door position: Recirculation

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# REFRIGERANT

## < PERIODIC MAINTENANCE >

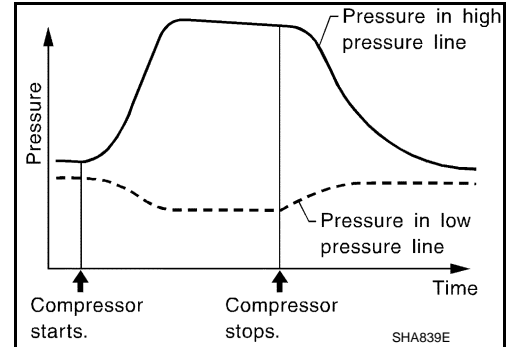
- Temperature setting: Full cold
  - Fan speed: Maximum speed set
7. Run the engine at approximately 1,500 rpm for 2 minutes or more.
  8. Stop the engine. Check again for refrigerant leakage. GO TO 4.

### **WARNING:**

**Be careful not to get burned when the engine is hot.**

### **NOTE:**

- Start refrigerant leakage check immediately after the engine 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:0000000010840252

### **WARNING:**

- Always use HFC-134a for A/C refrigerant. 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 A/C refrigerant 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 lubricant return operation. Refer to [HA-28, "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. 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 to A/C service valve.
5. Operate recovery/recycling/recharging equipment, 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.

## Charge Refrigerant

INFOID:0000000010840253

### **WARNING:**

- Always use HFC-134a for A/C refrigerant. 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 A/C refrigerant 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 recovery/recycling/recharging equipment to the A/C service valve.

# REFRIGERANT

## < PERIODIC MAINTENANCE >

2. Operate recovery/recycling/recharging equipment, and evacuate air from A/C system for 25 minutes or more.  
**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-24, "Leak Test"](#).  
**CAUTION:**  
**Check the airtightness for 15 minutes or more if the parts are replaced.**
4. If parts other than compressor are replaced, fill compressor lubricant according to parts that are replaced.
5. Charge the specified amount of refrigerant to A/C system.
6. Check that A/C system operates normally.
7. Disconnect recovery/recycling/recharging equipment. (Collect the refrigerant from the high-pressure hose and low-pressure hose of recovery/recycling/recharging equipment.)
8. Install A/C service valve cap.
9. Refrigerant charge is complete.

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# LUBRICANT

< PERIODIC MAINTENANCE >

## LUBRICANT

### Description

INFOID:000000010840254

#### 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)

**Name** : A/C System Oil Type S

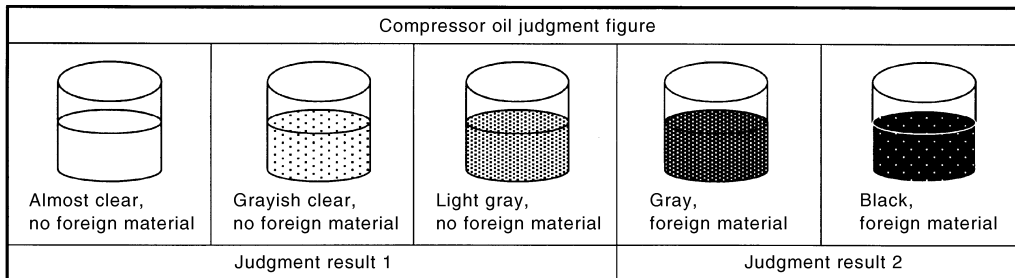
### Inspection

INFOID:000000010840255

If a compressor is malfunctioning (internal noise, insufficient cooling), check the compressor oil.

#### 1. COMPRESSOR OIL JUDGMENT

1. Remove the compressor. Refer to [HA-33, "Exploded View"](#).
2. Sample a compressor oil and judge on the figure.



JSIA0927GB

Judgement result 1>>Replace compressor only.

Judgement result 2>>Replace compressor and liquid tank.

### Perform Lubricant Return Operation

INFOID:000000010840256

#### **CAUTION:**

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

1. Start the engine and set to the following conditions.
  - Engine speed: Idling to 1,200 rpm
  - A/C switch: ON
  - Fan (blower) speed: Maximum speed set
  - Intake door position: Recirculation
  - Temperature setting: Full cold
2. Perform lubricant return operation for approximately 10 minutes.
3. Stop the engine.
4. Lubricant return operation is complete.

### Lubricant Adjusting Procedure for Components Replacement Except Compressor

INFOID:000000010840257

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 [mℓ (US fl oz, Imp fl oz)] = 45 (1.5, 1.6) + 15 (0.5, 0.5) + α

# LUBRICANT

## < PERIODIC MAINTENANCE >

Conditions		Lubricant amount to be added to A/C system m ℓ (US fl oz, Imp fl oz)
Replace evaporator		45 (1.5, 1.6)
Replace condenser		30 (1.0, 1.1)
Replace liquid tank		15 (0.5, 0.5)
Refrigerant leakage is detected	Large amount leakage	30 (1.0, 1.1)
	Small amount leakage	—
Lubricant amount that is recycled together with refrigerant during recycle operation		$\alpha$

## Lubricant Adjusting Procedure for Compressor Replacement

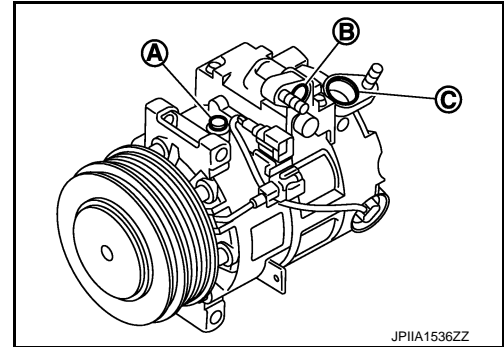
INFOID:000000010840258

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

1. Remove drain plug (A). Drain lubricant while rotating magnet clutch.
2. Tighten drain plug to the specified torque when lubricant does not come out.

**Drain plug tightening torque : 9.8 N·m (1.0 kg·m, 87 in·lb)**

3. Drain lubricant from high-pressure port (B) and low-pressure port (C) while rotating magnet clutch.
4. 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.

**Amount to be drained (A) [m ℓ (US fl oz, Imp fl oz)]**  
 $F = D + S + R + \alpha$

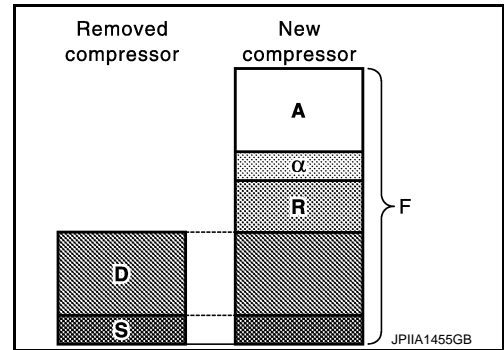
**F : Lubricant amount that a new compressor contains [150 (5.1, 5.3)]**

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

**S : Lubricant amount that remains inside of removed compressor [20 (0.7, 0.7)]**

**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 m ℓ (2.0 US fl oz, 2.1 Imp fl oz), perform calculation by setting “D” as 40 m ℓ (1.4 US fl oz, 1.4 Imp fl oz).

Conditions	Lubricant amount to be added to A/C system m ℓ (US fl oz, Imp fl oz)
Replace evaporator	45 (1.5, 1.6)
Replace condenser	30 (1.0, 1.1)
Replace liquid tank	15 (0.5, 0.5)

Example: Lubricant amount to be drained from a new compressor when replacing compressor and liquid tank [m ℓ (US fl oz, Imp fl oz)] [D = 60 (2.0, 2.1),  $\alpha$  = 5 (1.4, 1.4)]

$$150 (5.1, 5.3) - [60 (1.5, 1.6) + 20 (0.7, 0.7) + 15 (0.5, 0.5) + 5 (0.2, 0.2)] = 50 (1.7, 1.8)$$

# LUBRICANT

## < PERIODIC MAINTENANCE >

3. Install compressor and check the operation.

### Adjustment

INFOID:000000010840259

Adjust lubricant level according to the following procedures.

#### 1. CHECK LUBRICANT LEAKAGE

Check whether there is a large amount of leakage of refrigerant or lubricant.

#### **CAUTION:**

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

Is the check result normal?

YES >> GO TO 2.

NO >> GO TO 3.

#### 2. PERFORM LUBRICANT RETURN OPERATION

1. Start the engine and set to the following conditions.
  - Engine speed: Idling to 1,200 rpm
  - A/C switch: ON
  - Fan (blower) speed: Maximum speed set
  - Intake door position: Recirculation
  - Temperature setting: Full cold
2. Perform lubricant return operation for approximately 10 minutes.
3. Stop the engine.

>> GO TO 3.

#### 3. REPAIR MALFUNCTIONING PART

Repair or replace malfunctioning part according to diagnosis result.

Compressor does not need replacement.>>GO TO 4.

Compressor needs replacement.>>GO TO 5.

#### 4. FILL LUBRICANT

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 [mℓ (US fl oz, Imp fl oz)] = 45 (1.5, 1.6) + 15 (0.5, 0.5) + α

Conditions		Lubricant amount to be added to A/C system mℓ (US fl oz, Imp fl oz)
Replace evaporator		45 (1.5, 1.6)
Replace condenser		30 (1.0, 1.1)
Replace liquid tank		15 (0.5, 0.5)
Refrigerant leakage is detected	Large amount leakage	30 (1.0, 1.1)
	Small amount leakage	—
Lubricant amount that is recycled together with refrigerant during recycle operation		α

>> WORK END

#### 5. DRAIN LUBRICANT

# LUBRICANT

## < PERIODIC MAINTENANCE >

1. Remove drain plug (A). Drain lubricant while rotating magnet clutch.
2. Tighten drain plug to the specified torque when lubricant does not come out.

**Drain plug tightening torque : 9.8 N·m (1.0 kg·m, 87 in·lb)**

3. Drain lubricant from high-pressure port (B) and low-pressure port (C) while rotating magnet clutch.
4. Measure total amount of lubricant that is drained from removed compressor.
5. Drain lubricant from a new compressor for the amount that is calculated according to the following conditions.

**Amount to be drained (A) [mℓ (US fl oz, Imp fl oz)]**  
 $= F - (D + S + R + \alpha)$

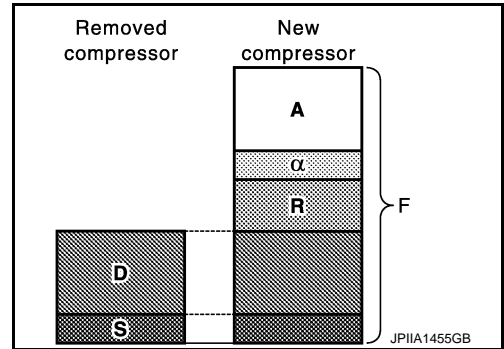
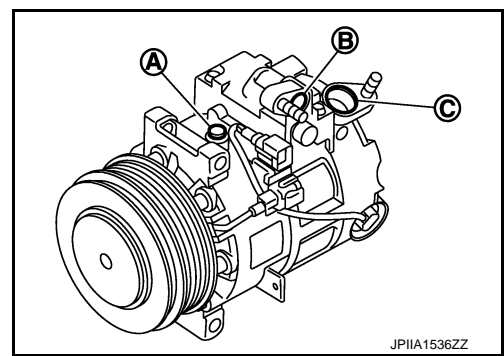
**F : Lubricant amount that a new compressor contains [150 (5.1, 5.3)]**

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

**S : Lubricant amount that remains inside of removed compressor [20 (0.7, 0.7)]**

**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 mℓ (2.0 US fl oz, 2.1 Imp fl oz), perform calculation by setting "D" as 40 mℓ (1.4 US fl oz, 1.4 Imp fl oz).

Conditions	Lubricant amount to be added to A/C system mℓ (US fl oz, Imp fl oz)
Replace evaporator	45 (1.5, 1.6)
Replace condenser	30 (1.0, 1.1)
Replace liquid tank	15 (0.5, 0.5)

Example: Lubricant amount to be drained from a new compressor when replacing compressor and liquid tank [mℓ (US fl oz, Imp fl oz)] [D = 60 (2.0, 2.1),  $\alpha$  = 5 (1.4, 1.4)]

$$150 (5.1, 5.3) - [60 (1.5, 1.6) + 20 (0.7, 0.7) + 15 (0.5, 0.5) + 5 (0.2, 0.2)] = 50 (1.7, 1.8)$$

>> WORK END

# PERFORMANCE TEST

< PERIODIC MAINTENANCE >

## PERFORMANCE TEST

### Inspection

INFOID:000000010840260

### INSPECTION PROCEDURE

1. Connect recovery/recycling/recharging equipment (for HFC-134a) or manifold gauge.
2. Start the engine, and set to the following condition.

Test condition		
Surrounding condition	Indoors or in the shade (in a well-ventilated place)	
Vehicle condition	Door	Closed
	Door glass	Full open
	Hood	Open
	Engine speed	Idle speed
A/C condition	Temperature control switch or dial	Full cold
	A/C switch	ON
	Air outlet	VENT (ventilation)
	Intake door position	Recirculation
	Fan (blower) speed	Maximum speed set

3. Maintain test condition until A/C system becomes stable. (Approximately 10 minutes)
4. Check that test results of “recirculating-to-discharge air temperature” and “ambient air temperature-to-operating pressure” are within the specified value.
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-7, "Symptom Table"](#).

### RECIRCULATING-TO-DISCHARGE AIR TEMPERATURE TABLE

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature from center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 – 60	20 (68)	4.3 – 6.3 (40 – 43)
	25 (77)	6.9 – 9.4 (44 – 49)
	30 (86)	11.0 – 13.8 (52 – 57)
60 – 70	20 (68)	6.3 – 8.3 (43 – 47)
	25 (77)	9.4 – 11.9 (49 – 53)
	30 (86)	13.8 – 16.9 (57 – 62)

### AMBIENT AIR TEMPERATURE-TO-OPERATING PRESSURE TABLE

Fresh air		High-pressure (Discharge side) kPa (kg/cm <sup>2</sup> , psi)	Low-pressure (Suction side) kPa (kg/cm <sup>2</sup> , psi)
Relative humidity %	Air temperature °C (°F)		
50 – 70	25 (77)	1,103 – 1,348 (11.3 – 13.7, 159.9 – 195.5)	163 – 199 (1.7 – 2.0, 23.6 – 28.9)
	30 (86)	1,100 – 1,355 (11.2 – 13.8, 159.5 – 196.5)	183 – 221 (1.9 – 2.3, 26.5 – 32.0)
	35 (95)	1,215 – 1,485 (12.4 – 15.1, 176.2 – 215.3)	204 – 250 (2.1 – 2.6, 29.6 – 36.3)
	40 (104)	1,282 – 1,566 (13.1 – 16.0, 185.9 – 227.1)	238 – 291 (2.4 – 3.0, 34.5 – 42.2)



# COMPRESSOR

< REMOVAL AND INSTALLATION >

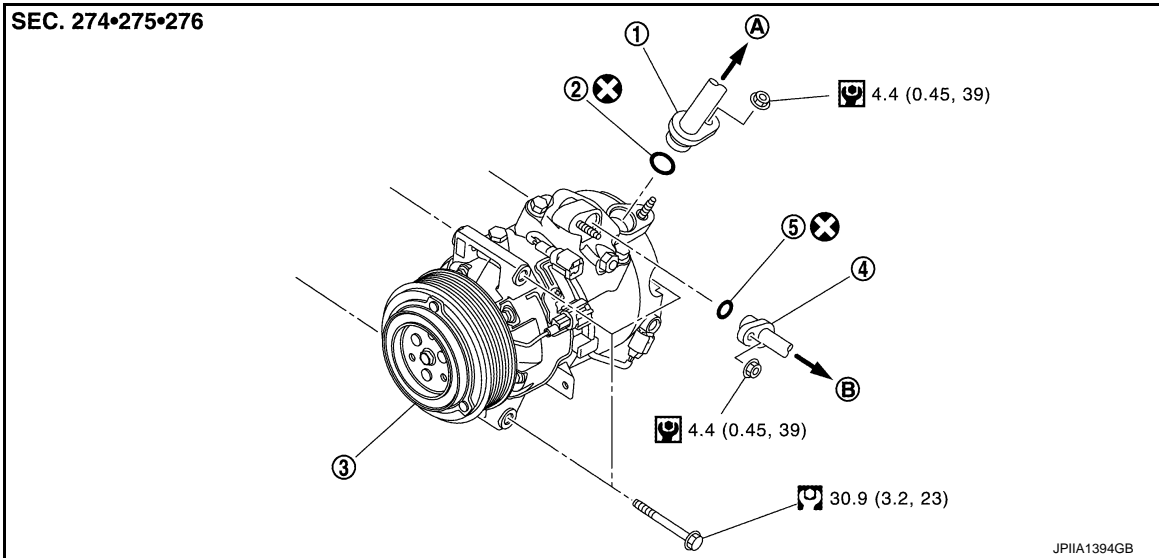
## REMOVAL AND INSTALLATION

### COMPRESSOR

Exploded View

INFOID:000000010840261

#### REMOVAL



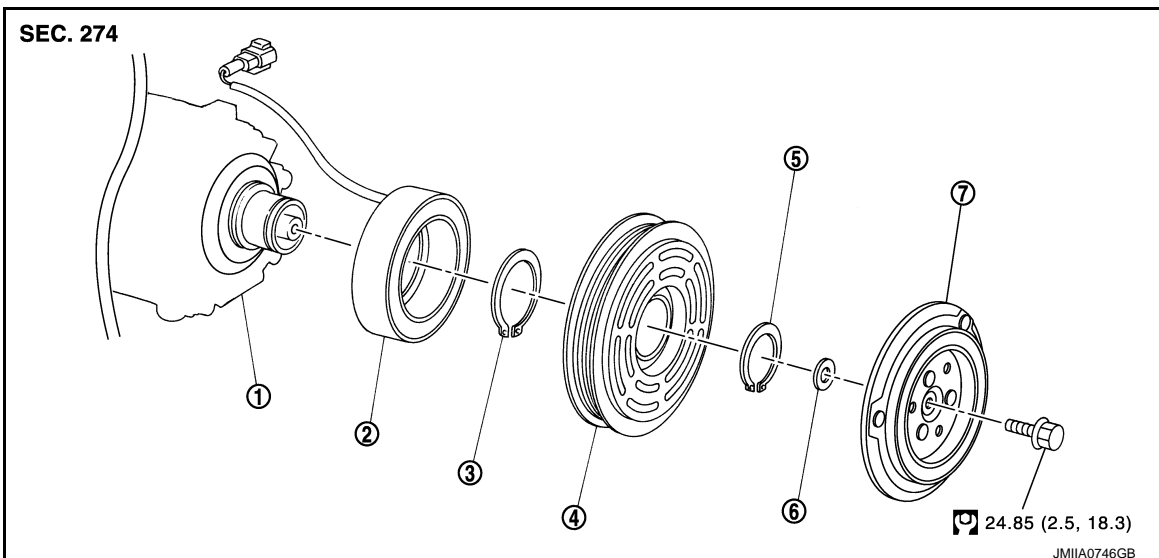
- 1. Low-pressure flexible hose
- 2. O-ring
- 3. Compressor
- 4. High-pressure flexible hose
- 5. O-ring
- A. To evaporator
- B. To condenser

⊗ : Always replace after every disassembly.

[N-m (kg-m, ft-lb)] : N-m (kg-m, ft-lb)

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

#### DISASSEMBLY




- 1. Compressor unit
- 2. Field coil
- 3. Snap ring
- 4. Pulley assembly
- 5. Snap ring
- 6. Shim
- 7. Pulley assembly

# COMPRESSOR

## < REMOVAL AND INSTALLATION >

7. Clutch disc

 : N·m (kg·m, ft·lb)

## COMPRESSOR

### COMPRESSOR : Removal and Installation

INFOID:000000010840262

#### CAUTION:

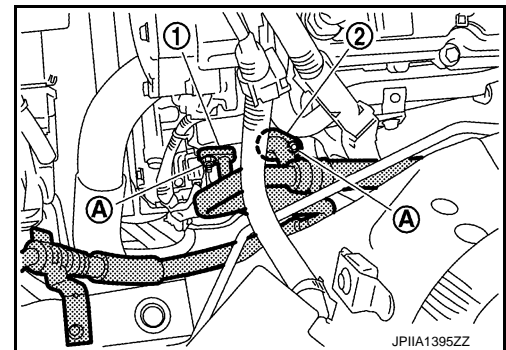
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to [HA-28, "Perform Lubricant Return Operation"](#).

#### REMOVAL

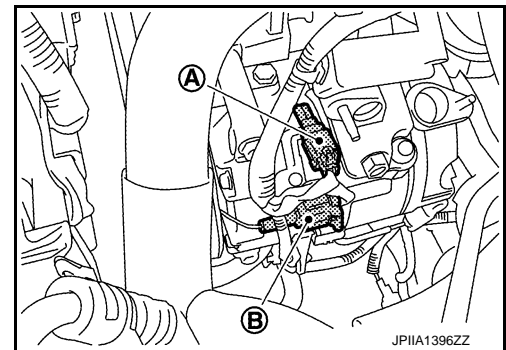
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to [HA-26, "Recycle Refrigerant"](#).
2. Remove air cleaner case LH. Refer to [EM-32, "Exploded View"](#).
3. Remove mounting nuts (A), and then disconnect high-pressure flexible hose (1) and low-pressure flexible hose (2) from compressor.

#### CAUTION:

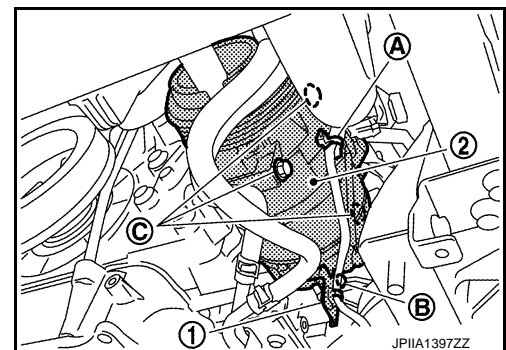
Cap or wrap the joint of the A/C piping and compressor with suitable material such as vinyl tape to avoid the entry of air.



4. Disconnect compressor (ECV) connector (A).
5. Disconnect compressor (magnet clutch) connector (B).



6. Move stabilizer bar to a position where it does not inhibit work. Refer to [FSU-19, "Exploded View"](#).
7. Remove drive belt. Refer to [EM-18, "Removal and Installation"](#).
8. Move A/T fluid cooler tube to a position where it does not inhibit work. Refer to [TM-346, "Exploded View"](#). (A/T models)
9. Remove harness clip (A).
10. Remove mounting bolt (B), and then remove harness bracket (1).
11. Remove mounting bolts (C) from compressor (2).



#### INSTALLATION

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

# COMPRESSOR

## < REMOVAL AND INSTALLATION >

### CAUTION:

- Replace O-rings with new ones. Then apply compressor oil to them when installing.
- Perform lubricant adjusting procedure before installing new compressor. Refer to [HA-29, "Lubricant Adjusting Procedure for Compressor Replacement"](#).
- Check for leakages when recharging refrigerant. Refer to [HA-24, "Leak Test"](#).
- Check tension of the drive belt after installing compressor. Refer to [EM-18, "Checking"](#).

## MAGNET CLUTCH

### MAGNET CLUTCH : Removal and Installation of Compressor Clutch

INFOID:000000010840263

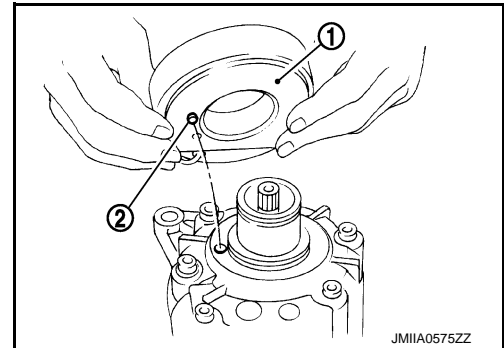
#### REMOVAL

##### Overhaul

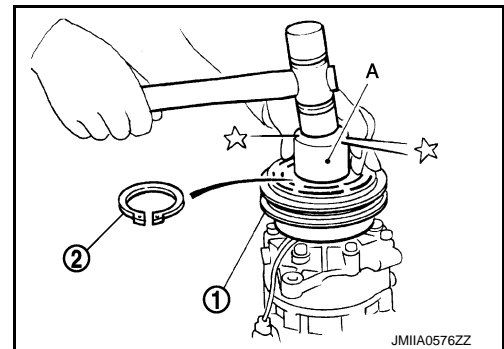
1. Fix clutch disc.
2. Remove center bolt, and then remove clutch disc.
3. Remove snap ring using external snap ring pliers.
4. Position center pulley puller on the end of the drive shaft, and remove pulley assembly using any commercially available pulley puller.  
To prevent pulley groove from being deformed, puller claws should be positioned into the edge of the pulley assembly.
5. Disconnect harness connector from compressor unit.
6. Remove snap ring using external snap ring pliers, and then remove field coil.

#### INSTALLATION

1. Install field coil (1).  
Be sure to align the coil's pin (2) with the hole in the compressor's front head.
2. Install field coil harness clip.



3. Install pulley assembly (1) using pulley installer (SST: J-41260) (A) and a hand press, and then install snap ring (2) using snap ring pliers.



4. Install clutch disc on drive shaft together with original shim(s). Press clutch disc down by hand.
5. Tighten center bolt to the specified torque while fixing clutch disc not to rotate.  
After tightening the bolt, check that the pulley rotates smoothly.

#### Break-in Operation

When replacing compressor clutch assembly, always perform the break-in operation by engaging and disengaging the clutch approximately 30-times. Break-in operation increases the level of transmitted torque.

# COMPRESSOR

## < REMOVAL AND INSTALLATION >

### Inspection

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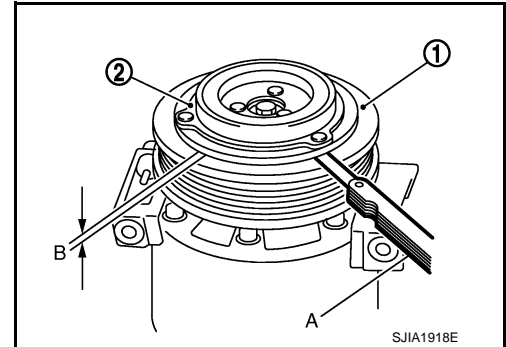
#### CHECK DISC TO PULLEY CLEARANCE

Check the clearance (B) between pulley assembly (1) and clutch disc (2) along the entire periphery with a feeler gauge (A).

**Clearance** : Refer to [HA-54, "Compressor"](#).

#### **CAUTION:**

Replace compressor if specified clearance is not obtained, replace adjusting spacer and readjust.



# COOLER PIPE AND HOSE

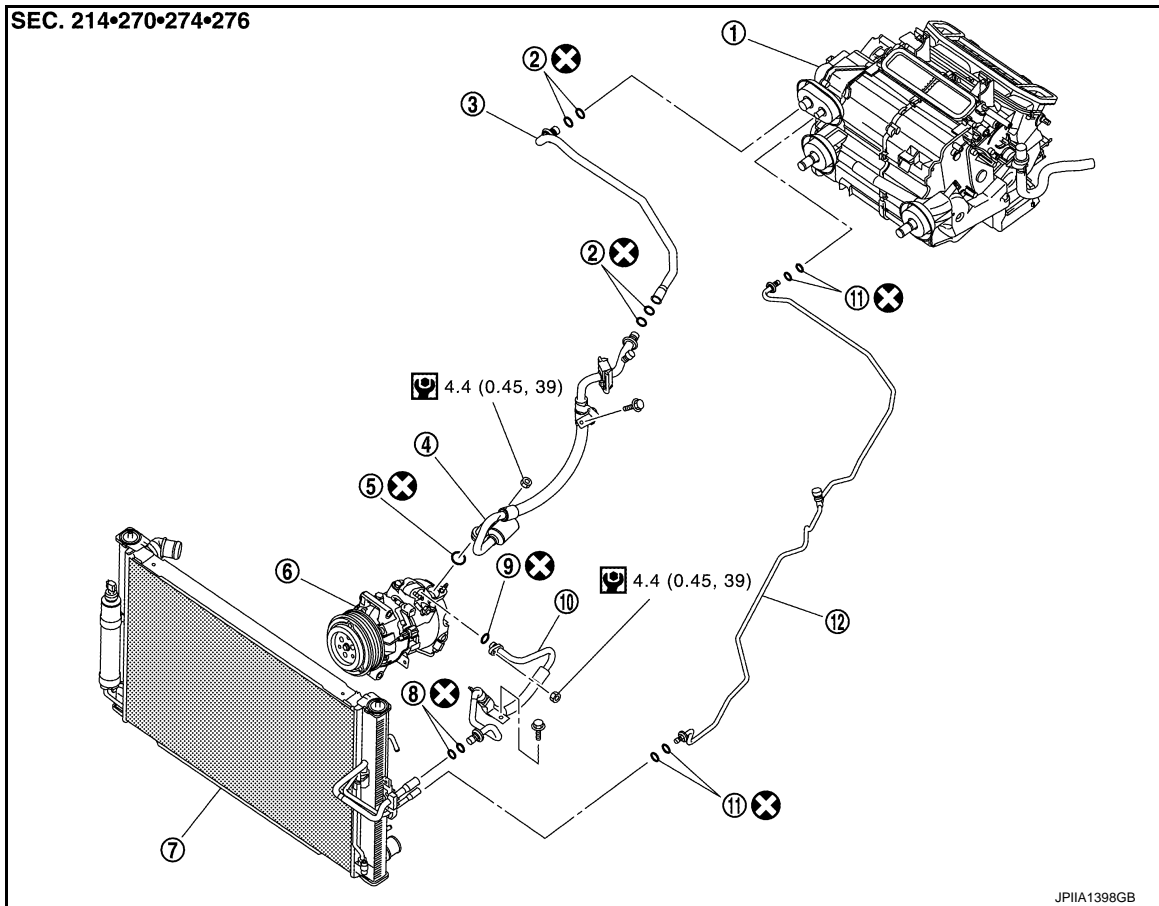
< REMOVAL AND INSTALLATION >

## COOLER PIPE AND HOSE

### Exploded View

INFOID:000000010840265

Check the following before perform the work about one-touch joint. Refer to [HA-22. "Exploded View"](#).



- |                                   |            |                        |
|-----------------------------------|------------|------------------------|
| 1. Heater & cooling unit assembly | 2. O-ring  | 3. Low-pressure pipe   |
| 4. Low-pressure flexible hose     | 5. O-ring  | 6. Compressor          |
| 7. Radiator & condenser assembly  | 8. O-ring  | 9. O-ring              |
| 10. High-pressure flexible hose   | 11. O-ring | 12. High-pressure pipe |

⊗ : Always replace after every disassembly.

🔧 : N-m (kg-m, in-lb)

## HIGH-PRESSURE FLEXIBLE HOSE

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

INFOID:000000010840266

#### 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-28. "Perform Lubricant Return Operation"](#).

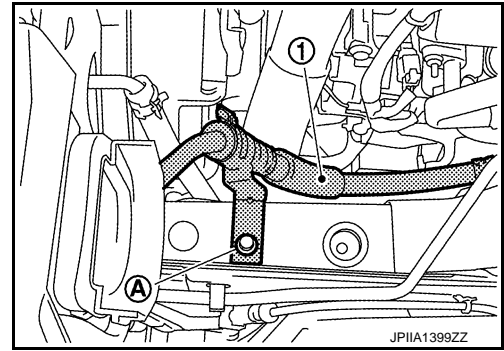
#### REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to [HA-26. "Recycle Refrigerant"](#).
2. Remove air cleaner case LH. Refer to [EM-32. "Exploded View"](#).

# COOLER PIPE AND HOSE

## < REMOVAL AND INSTALLATION >

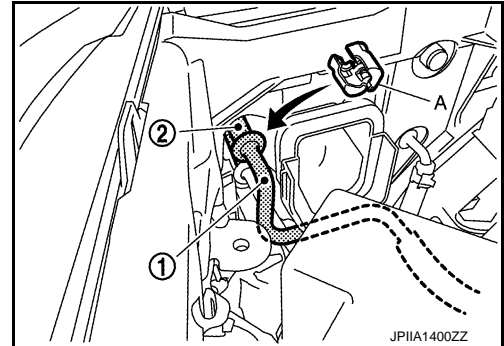
3. Remove mounting bolt (A) from high-pressure flexible hose (1).



4. Disconnect one-touch joint between high-pressure flexible hose (1) and condenser pipe assembly (2) with disconnecter (A) (SST: J-45815).

**CAUTION:**

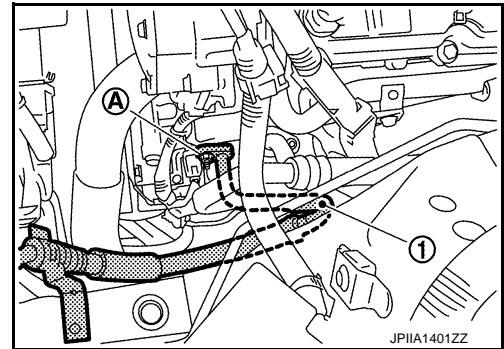
Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.



5. Remove mounting nut (A), and then remove high-pressure flexible hose (1) from the vehicle.

**CAUTION:**

Cap or wrap the joint of the A/C piping and compressor with suitable material such as vinyl tape to avoid the entry of air.



## INSTALLATION

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

**CAUTION:**

- Replace O-rings with new ones. Then apply compressor oil to them when installing.
- Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.
- Insert piping securely until a click is heard.
- After piping connection is completed, pull male-side piping by hand to check that connection does not come loose.
- Check for leakages when recharging refrigerant. Refer to [HA-24, "Leak Test"](#).

## LOW-PRESSURE FLEXIBLE HOSE

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

INFOID:0000000010840267

**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-28, "Perform Lubricant Return Operation"](#).

## REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to [HA-26, "Recycle Refrigerant"](#).
2. Remove air cleaner case LH and air duct LH. Refer to [EM-32, "Exploded View"](#).
3. Remove hoodledge cover LH. Refer to [EXT-29, "Exploded View"](#).

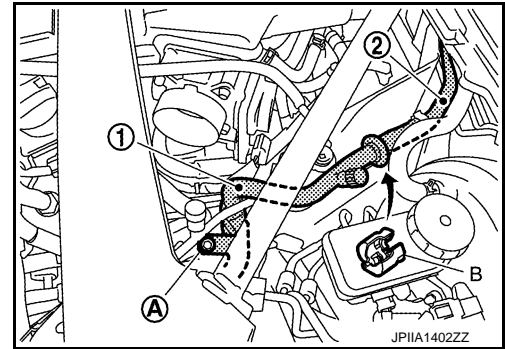
# COOLER PIPE AND HOSE

## < REMOVAL AND INSTALLATION >

4. Remove mounting bolt (A) from low-pressure flexible hose (1).
5. Disconnect one-touch joint between low-pressure flexible hose and low-pressure pipe (2) with disconnecter (B) (SST: J-45815).

**CAUTION:**

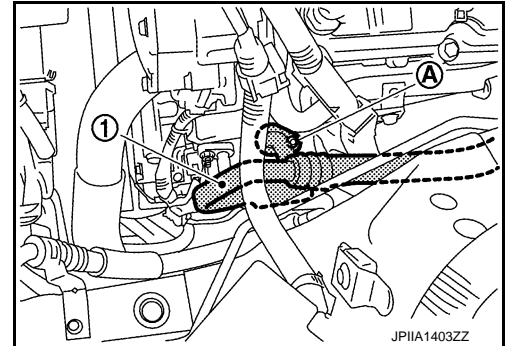
Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.



6. Remove mounting nut (A), and then remove low-pressure flexible hose (1) from the vehicle.

**CAUTION:**

Cap or wrap the joint of the A/C piping and compressor with suitable material such as vinyl tape to avoid the entry of air.



## INSTALLATION

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

**CAUTION:**

- Replace O-rings with new ones. Then apply compressor oil to them when installing.
- Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.
- Insert piping securely until a click is heard.
- After piping connection is completed, pull male-side piping by hand to check that connection does not come loose.
- Check for leakages when recharging refrigerant. Refer to [HA-24, "Leak Test"](#).

## HIGH-PRESSURE PIPE

### HIGH-PRESSURE PIPE : Removal and Installation

INFOID:000000010840268

**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-28, "Perform Lubricant Return Operation"](#).

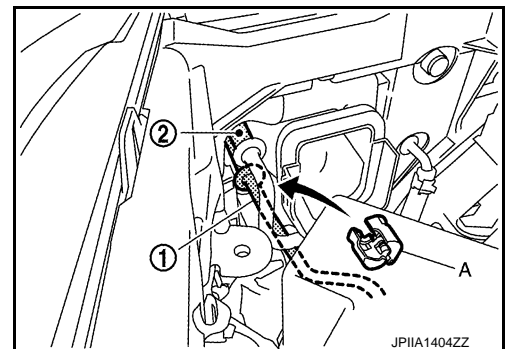
## REMOVAL

1. Remove low-pressure pipe. Refer to [HA-37, "Exploded View"](#).
2. Remove air cleaner case LH and air duct LH. Refer to [EM-32, "Exploded View"](#).
3. Remove mounting bolt from low-pressure flexible hose. Refer to [HA-37, "Exploded View"](#).

4. Disconnect one-touch joint between high-pressure pipe (1) and condenser pipe assembly (2) with disconnecter (A) (SST: J-45815).

**CAUTION:**

Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.



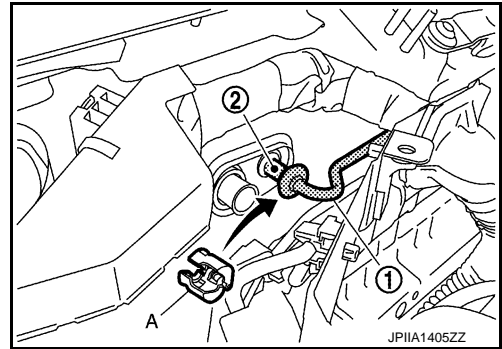
# COOLER PIPE AND HOSE

## < REMOVAL AND INSTALLATION >

5. Disconnect one-touch joint between high-pressure pipe (1) and high-pressure evaporator pipe (2) with disconnecter (A) (SST: J-45815).

**CAUTION:**

Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.



6. Remove high-pressure pipe from the vehicle.

## INSTALLATION

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

**CAUTION:**

- Replace O-rings with new ones. Then apply compressor oil to them when installing.
- Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.
- Insert piping securely until a click is heard.
- After piping connection is completed, pull male-side piping by hand to check that connection does not come loose.
- Check for leakages when recharging refrigerant. Refer to [HA-24, "Leak Test"](#).

## LOW-PRESSURE PIPE

### LOW-PRESSURE PIPE : Removal and Installation

INFOID:0000000110840269

**CAUTION:**

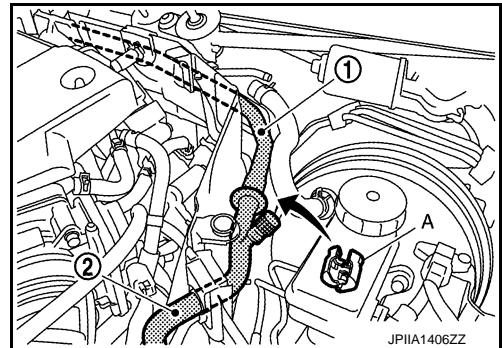
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to [HA-28, "Perform Lubricant Return Operation"](#).

## REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to [HA-26, "Recycle Refrigerant"](#).
2. Remove cowl top cover. Refer to [EXT-29, "Exploded View"](#).
3. Disconnect vacuum hose from vacuum piping. Refer to [BR-39, "Exploded View"](#).
4. Disconnect one-touch joint between low-pressure pipe (1) and low-pressure flexible hose (2) with disconnecter (A) (SST: J-45815).

**CAUTION:**

Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.





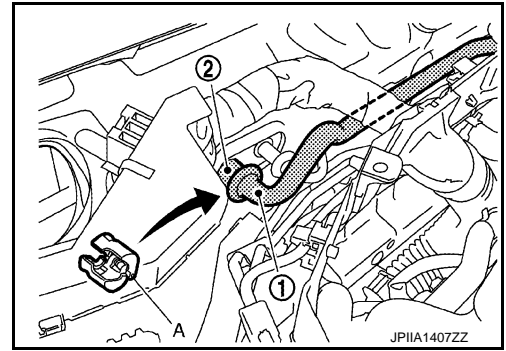
## COOLER PIPE AND HOSE

### < REMOVAL AND INSTALLATION >

5. Disconnect one-touch joint between low-pressure pipe (1) and low-pressure evaporator pipe (2) with disconnecter (A) (SST: J-45815).

**CAUTION:**

Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.



6. Remove low-pressure pipe from the vehicle.

### INSTALLATION

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

**CAUTION:**

- Replace O-rings with new ones. Then apply compressor oil to them when installing.
- Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.
- Insert piping securely until a click is heard.
- After piping connection is completed, pull male-side piping by hand to check that connection does not come loose.
- Check for leakages when recharging refrigerant. Refer to [HA-24, "Leak Test"](#).

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

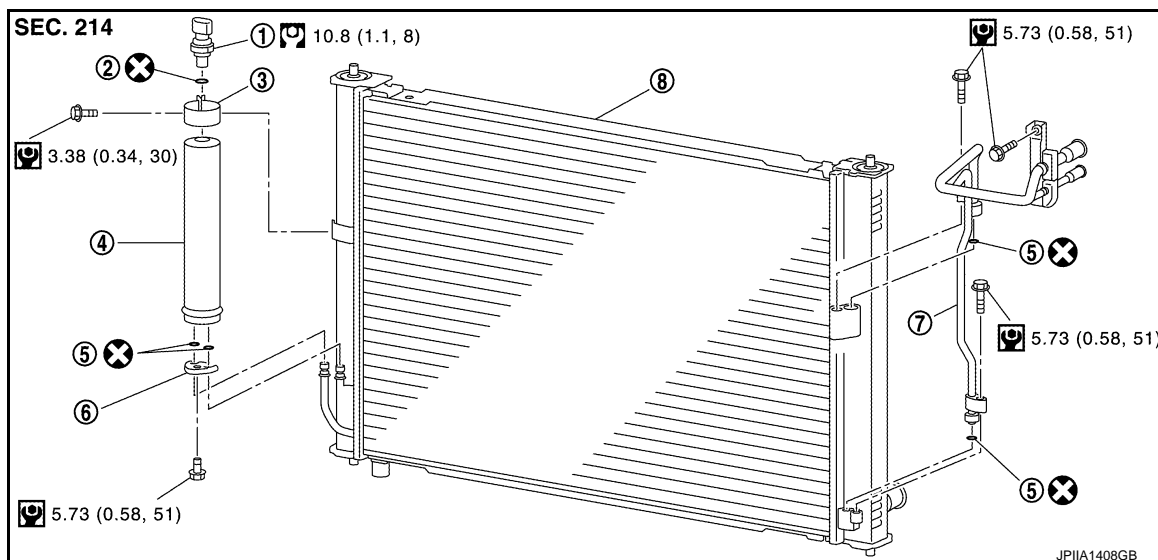
# CONDENSER

< REMOVAL AND INSTALLATION >

## CONDENSER

### Exploded View

INFOID:000000010840270



- |                                |                                  |                        |
|--------------------------------|----------------------------------|------------------------|
| 1. Refrigerant pressure sensor | 2. O-ring                        | 3. Liquid tank bracket |
| 4. Liquid tank                 | 5. O-ring                        | 6. Bracket             |
| 7. Condenser pipe assembly     | 8. Radiator & condenser assembly |                        |

⊗ : Always replace after every disassembly.

⊙ : N·m (kg-m, ft-lb)

⊙ : N·m (kg-m, in-lb)

## CONDENSER

### CONDENSER : Removal and Installation

INFOID:000000010840271

#### 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-28, "Perform Lubricant Return Operation"](#).

#### REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to [HA-26, "Recycle Refrigerant"](#).
2. Remove radiator & condenser assembly. Refer to [CO-17, "Exploded View"](#).

#### CAUTION:

Be careful not to damage core surface of radiator & condenser assembly.

#### INSTALLATION

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

#### CAUTION:

- Replace O-rings with new ones. Then apply compressor oil to them when installing.
- Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.
- Insert piping securely until a click is heard.
- After piping connection is completed, pull male-side piping by hand to check that connection does not come loose.
- Perform lubricant adjusting procedure before installing new radiator & condenser assembly. Refer to [HA-28, "Lubricant Adjusting Procedure for Components Replacement Except Compressor"](#).
- Check for leakages when recharging refrigerant. Refer to [HA-24, "Leak Test"](#).

# CONDENSER

< REMOVAL AND INSTALLATION >

## CONDENSER PIPE ASSEMBLY

### CONDENSER PIPE ASSEMBLY : Removal and Installation

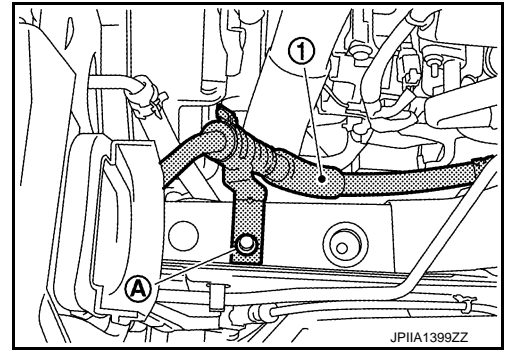
INFOID:000000010840272

#### 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-28, "Perform Lubricant Return Operation"](#).

#### REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to [HA-26, "Recycle Refrigerant"](#).
2. Remove bumper fascia assembly. Refer to [EXT-16, "Removal and Installation"](#).
3. Remove air cleaner case LH. Refer to [EM-32, "Exploded View"](#).
4. Remove mounting bolt (A) from high-pressure flexible hose (1).



5. Disconnect one-touch joint between high-pressure flexible hose (1) and condenser pipe assembly (3) with disconnecter (A) (SST: J-45815).

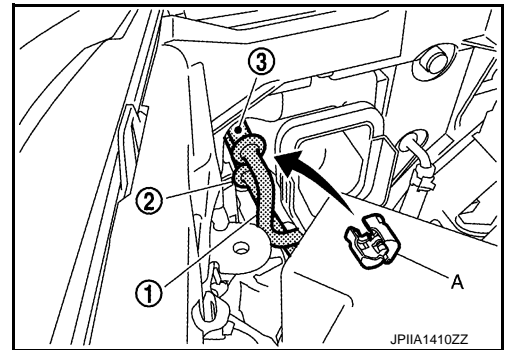
#### CAUTION:

Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.

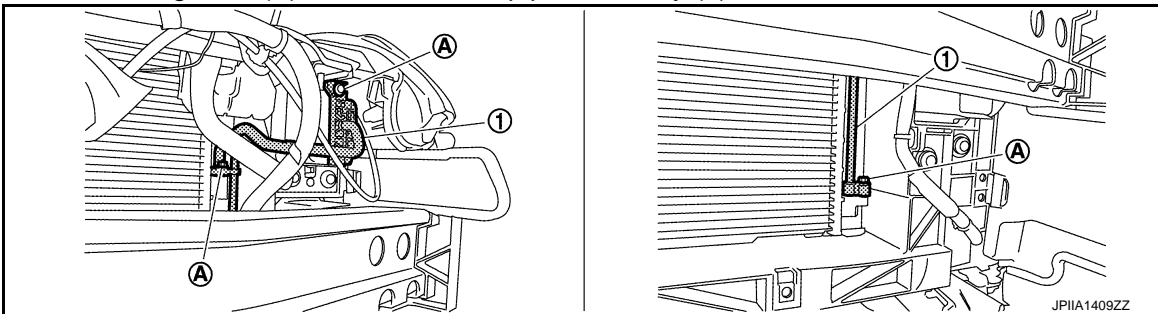
6. Disconnect one-touch joint between high-pressure pipe (2) and condenser pipe assembly with disconnecter (A) (SST: J-45815).

#### CAUTION:

Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.



7. Remove mounting bolts (A) from condenser pipe assembly (1).



8. Remove condenser pipe assembly.

#### CAUTION:

Cap or wrap the joint of the A/C piping and condenser with suitable material such as vinyl tape to avoid the entry of air.

#### INSTALLATION

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

#### CAUTION:

- Replace O-rings with new ones. Then apply compressor oil to them when installing.

# CONDENSER

## < REMOVAL AND INSTALLATION >

- Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.
- Insert piping securely until a click is heard.
- After piping connection is completed, pull male-side piping by hand to check that connection does not come loose.
- Check for leakages when recharging refrigerant. Refer to [HA-24, "Leak Test"](#).

## LIQUID TANK

### LIQUID TANK : Removal and Installation

INFOID:000000010840273

#### 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-28, "Perform Lubricant Return Operation"](#).

#### REMOVAL

1. Remove radiator & condenser assembly. Refer to [CO-17, "Exploded View"](#).
2. Clean liquid tank and its surrounding area, and then remove dust and rust from liquid tank.

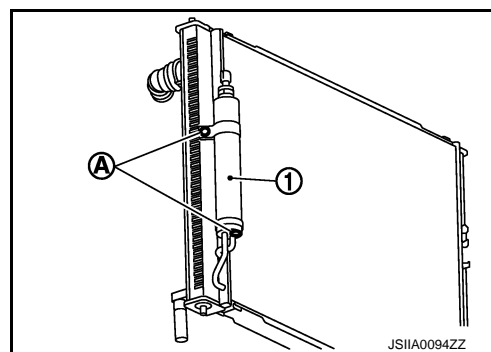
#### CAUTION:

Be sure to clean carefully.

3. Remove mounting bolts (A), and then remove liquid tank (1).

#### CAUTION:

Cap or wrap the joint of the A/C piping and liquid tank with suitable material such as vinyl tape to avoid the entry of air.



#### INSTALLATION

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

#### CAUTION:

- Install liquid tank, and then install liquid tank bracket on condenser.
- Check that liquid tank bracket is securely installed at protrusion of condenser. (Check that liquid tank bracket does not move to a position below center of liquid tank.)
- Replace O-rings of the A/C piping with new ones. Then apply compressor oil to them when installing.
- Perform lubricant adjusting procedure before installing new liquid tank. Refer to [HA-28, "Lubricant Adjusting Procedure for Components Replacement Except Compressor"](#).
- Check for leakages when recharging refrigerant. Refer to [HA-24, "Leak Test"](#).

## REFRIGERANT PRESSURE SENSOR

### REFRIGERANT PRESSURE SENSOR : Removal and Installation

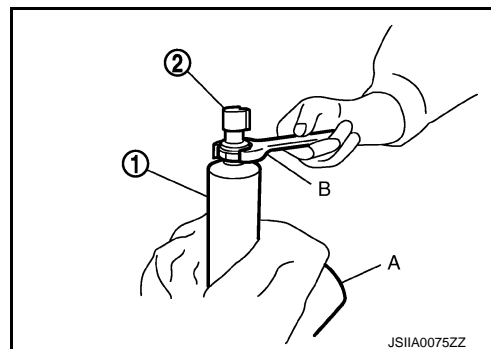
INFOID:000000010840274

#### REMOVAL

1. Remove liquid tank. Refer to [HA-42, "Exploded View"](#).
2. Fix the liquid tank (1) using a vice (A). Remove the refrigerant pressure sensor (2) using a wrench (B).

#### CAUTION:

Be careful not to damage liquid tank.



# CONDENSER

## < REMOVAL AND INSTALLATION >

---

### INSTALLATION

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

**CAUTION:**

- Replace O-ring with new one. Then apply compressor oil to them when installing.
- Check for leakages when recharging refrigerant. Refer to [HA-24. "Leak Test"](#).

A

B

C

D

E

F

G

H

HA

J

K

L

M

N

O

P

# HEATER & COOLING UNIT ASSEMBLY

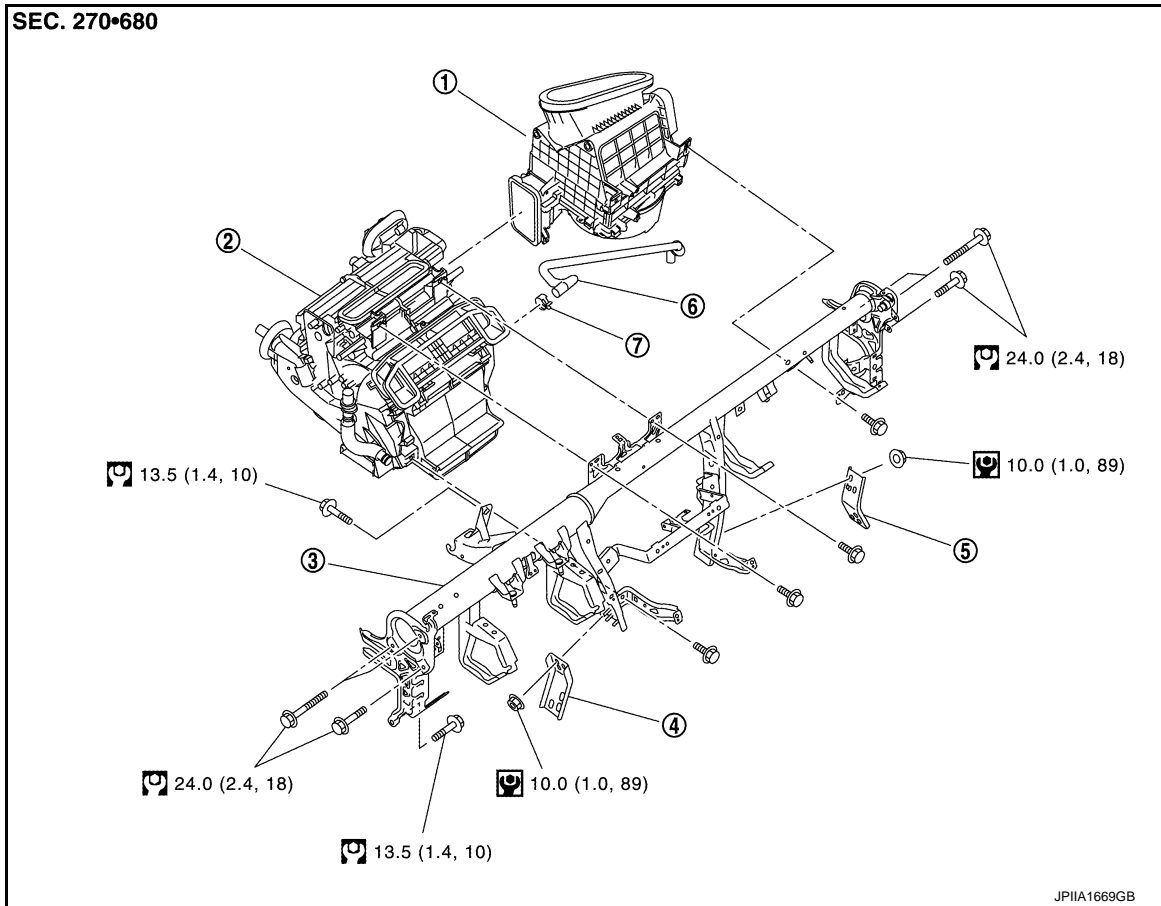
< REMOVAL AND INSTALLATION >

## HEATER & COOLING UNIT ASSEMBLY

Exploded View

INFOID:000000010840275

### REMOVAL



- |                       |                                   |                    |
|-----------------------|-----------------------------------|--------------------|
| 1. Blower unit        | 2. Heater & cooling unit assembly | 3. Steering member |
| 4. Instrument stay LH | 5. Instrument stay RH             | 6. Drain hose      |
| 7. Clamp              |                                   |                    |

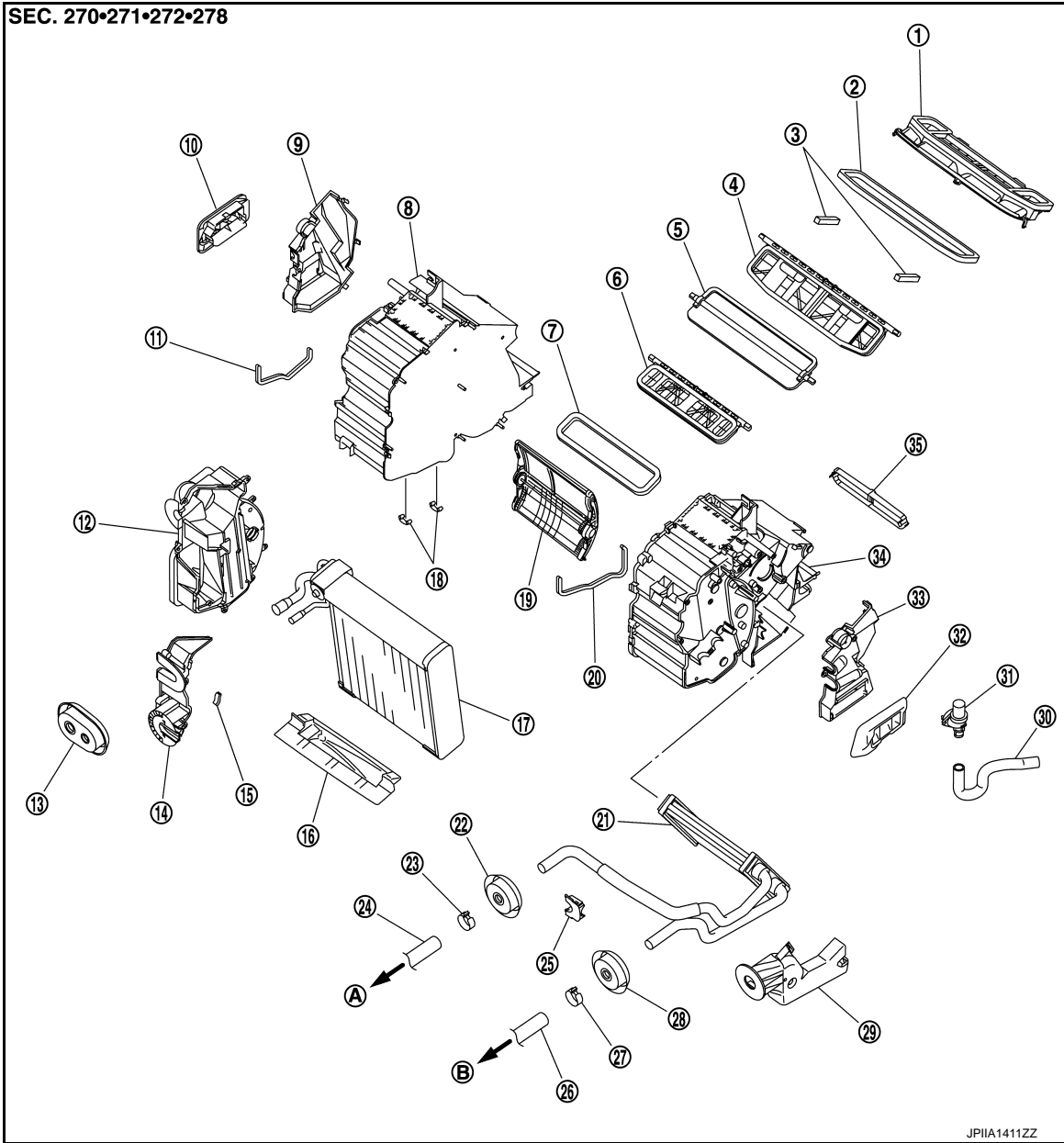
: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

### DISASSEMBLY

# HEATER & COOLING UNIT ASSEMBLY

< REMOVAL AND INSTALLATION >



- |                                   |                                  |                      |
|-----------------------------------|----------------------------------|----------------------|
| 1. Adapter duct                   | 2. Ventilator seal               | 3. Ventilator seal   |
| 4. Ventilator door                | 5. Max. cool door                | 6. Defroster door    |
| 7. Defroster seal                 | 8. Heater & cooling unit case RH | 9. Foot duct RH      |
| 10. Foot grille RH                | 11. Case packing                 | 12. Evaporator cover |
| 13. Cooler pipe grommet           | 14. Evaporator cover adapter     | 15. Packing          |
| 16. Insulator                     | 17. Evaporator assembly          | 18. Clip             |
| 19. Air mix door                  | 20. Case packing                 | 21. Heater core      |
| 22. Heater pipe grommet           | 23. Clamp                        | 24. Heater hose      |
| 25. Heater pipe bracket           | 26. Heater hose                  | 27. Clamp            |
| 28. Heater pipe grommet           | 29. Heater pipe cover            | 30. Aspirator hose   |
| 31. Aspirator                     | 32. Foot grille LH               | 33. Foot duct LH     |
| 34. Heater & cooling unit case LH | 35. Cover                        |                      |
| A. To heater pipe (Inlet)         | B. To heater pipe (Outlet)       |                      |

## HEATER & COOLING UNIT ASSEMBLY

# HEATER & COOLING UNIT ASSEMBLY

< REMOVAL AND INSTALLATION >

## HEATER & COOLING UNIT ASSEMBLY : Removal and Installation

INFOID:0000000110840276

### 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-28. "Perform Lubricant Return Operation"](#).

### REMOVAL

1. Set the temperature at full cold.

#### CAUTION:

The angle may be out, when installing the air mix door motor to the air mix door, unless the above procedure is performed.

2. Disconnect the battery cable from the negative terminal.
3. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to [HA-26. "Recycle Refrigerant"](#).
4. Drain engine coolant from cooling system. Refer to [CO-11. "Draining"](#).
5. Remove cowl top cover. Refer to [EXT-29. "Exploded View"](#).

6. Disconnect one-touch joint between high-pressure pipe (1) and high-pressure evaporator pipe (2) with disconnecter (SST: J-45815).

#### CAUTION:

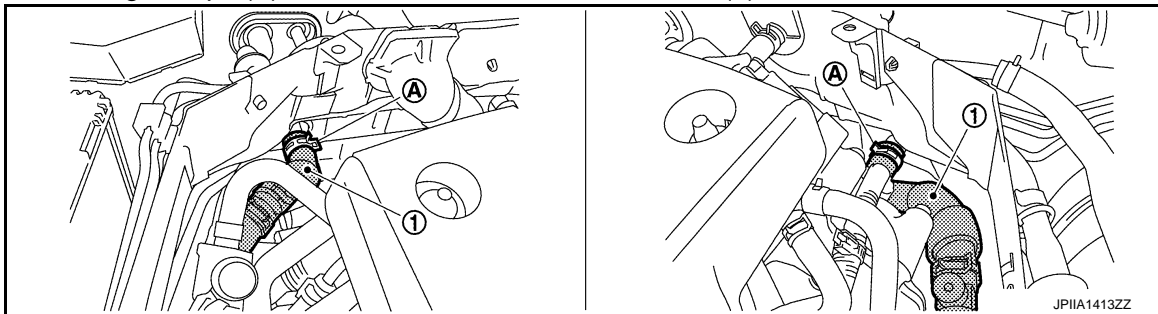
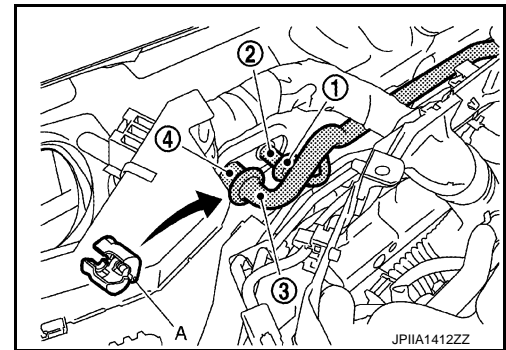
Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.

7. Disconnect one-touch joint between low-pressure pipe (3) and low-pressure evaporator pipe (4) with disconnecter (SST: J-45815) (A).

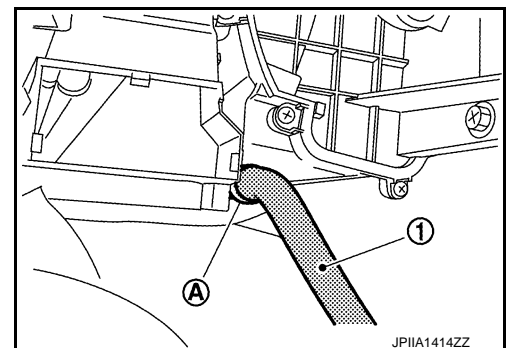
#### CAUTION:

Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.

8. Remove fixing clamps (A), and then disconnect heater hoses (1).



9. Remove ventilator duct. Refer to [VTL-8. "Exploded View"](#).
10. Remove foot grille LH and RH. Refer to [VTL-8. "Exploded View"](#).
11. Move steering column assembly to a position where it does not inhibit work. Refer to [ST-15. "Exploded View"](#).
12. Remove instrument stay LH and RH.
13. Remove fixing clamp (A), and then disconnect drain hose (1).

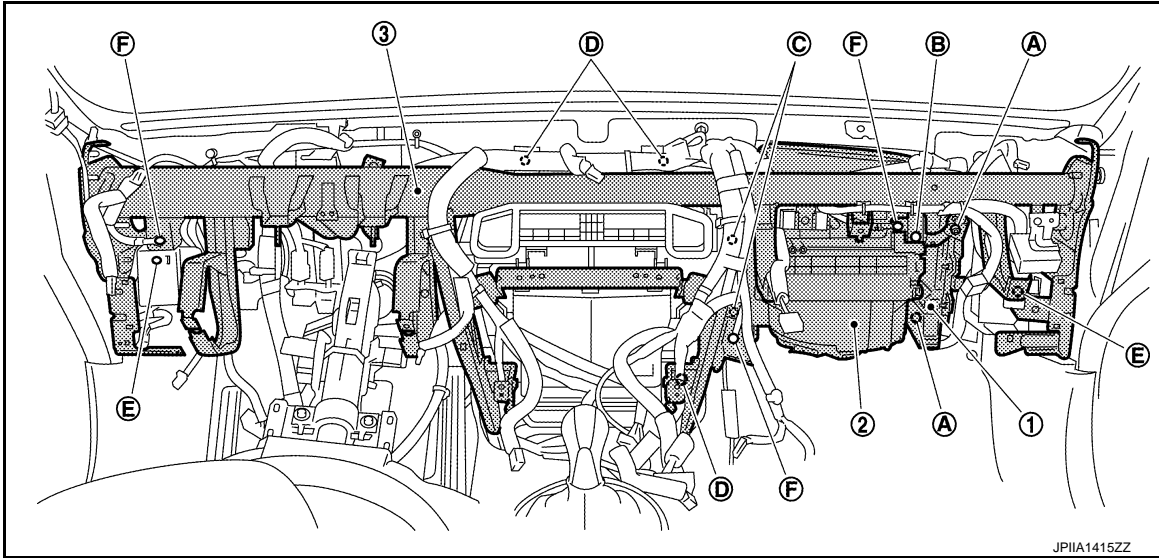




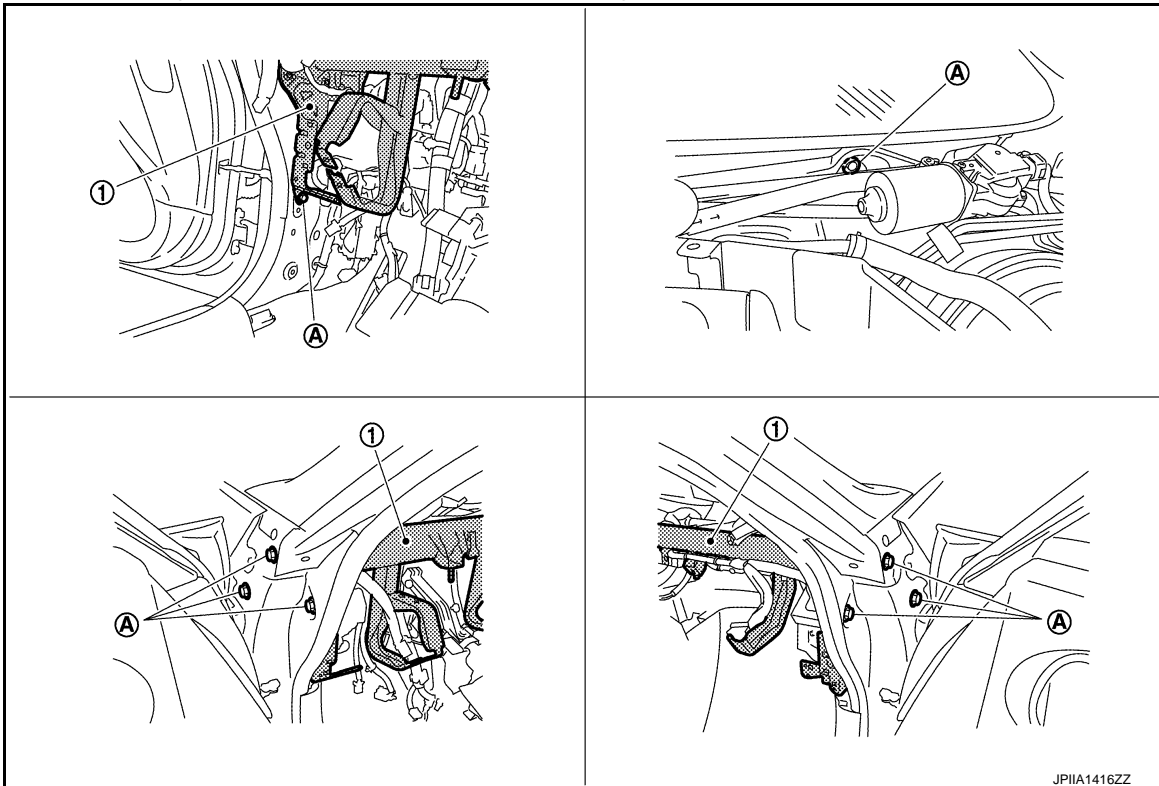
# HEATER & COOLING UNIT ASSEMBLY

## < REMOVAL AND INSTALLATION >

14. Remove mounting nuts (A), and then remove ECM (1).
15. Remove mounting bolt (B) and fixing screws (C), and then remove blower unit (2).
16. Remove mounting bolts (D), fixing screws (E) and ground bolts (F).



17. Disconnect the harness connectors and clips required to remove the steering member (3), and then move the vehicle harness to the position without hindrance for work.
18. Remove mounting bolts (A), and then remove steering member (1).



19. Remove heater & cooling unit assembly from the vehicle.

## INSTALLATION

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

### CAUTION:

- Replace O-rings with new ones. Then apply compressor oil to them when installing.
- Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.
- Insert piping securely until a clicks is heard.

# HEATER & COOLING UNIT ASSEMBLY

## < REMOVAL AND INSTALLATION >

- After piping connection is completed, pull male-side piping by hand to check that connection does not come loose.
- Check for leakages when recharging refrigerant. Refer to [HA-24, "Leak Test"](#).

### NOTE:

Refer to [CO-12, "Refilling"](#) when filling radiator with engine coolant.

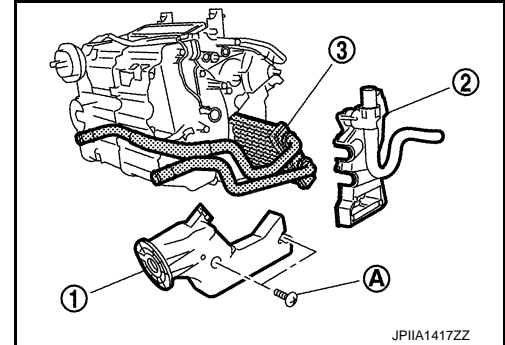
## HEATER CORE

### HEATER CORE : Removal and Installation

INFOID:000000010840277

#### REMOVAL

1. Remove heater & cooling unit assembly. Refer to [HA-46, "Exploded View"](#).
2. Remove heater pipe grommet and heater pipe bracket. Refer to [HA-46, "Exploded View"](#).
3. Remove fixing screws (A), and then remove heater pipe cover (1).
4. Remove foot duct LH (2). Refer to [VTL-8, "Exploded View"](#).
5. Slide heater core (3) to leftward (as shown in the figure).



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#### INSTALLATION

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

### NOTE:

Refer to [CO-12, "Refilling"](#) when filling radiator with engine coolant.

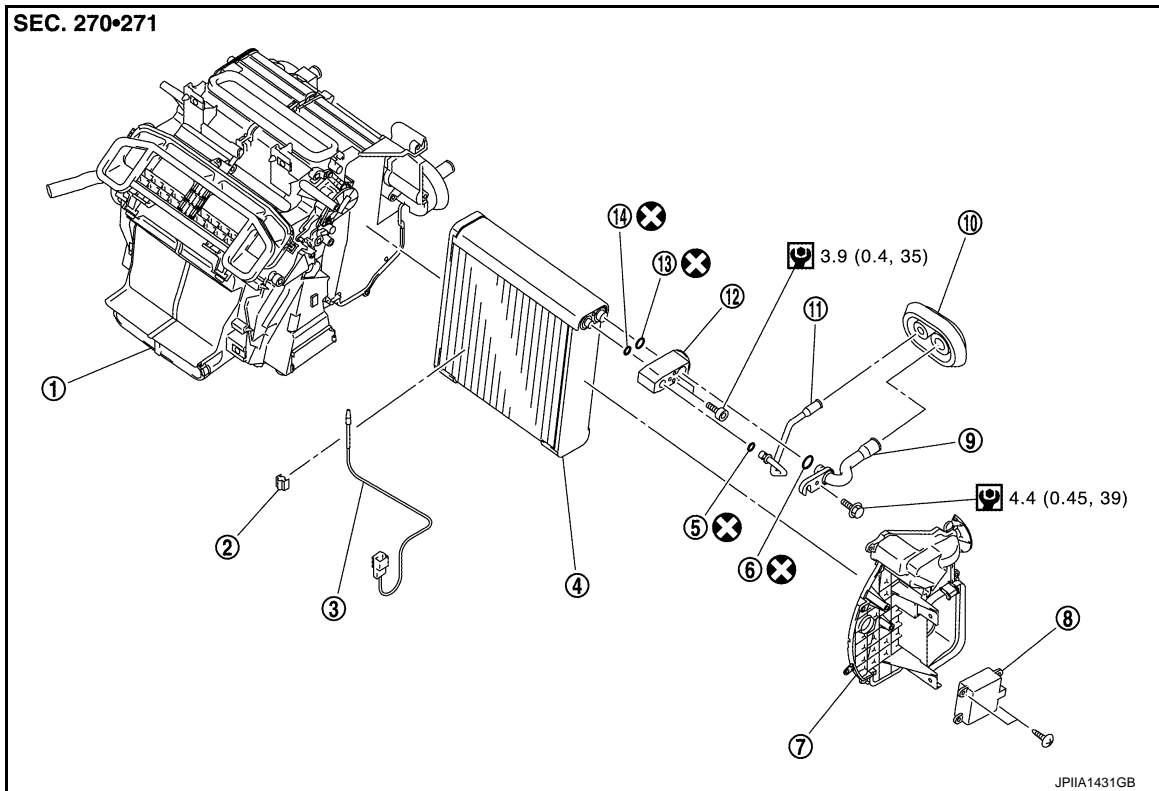
# EVAPORATOR

< REMOVAL AND INSTALLATION >

## EVAPORATOR

### Exploded View

INFOID:000000010840278



- |                                   |                                   |                                 |
|-----------------------------------|-----------------------------------|---------------------------------|
| 1. Heater & cooling unit assembly | 2. Intake sensor bracket          | 3. Intake sensor                |
| 4. Evaporator                     | 5. O-ring                         | 6. O-ring                       |
| 7. Evaporator cover               | 8. Air mix door motor             | 9. Low-pressure evaporator pipe |
| 10. Cooler pipe grommet           | 11. High-pressure evaporator pipe | 12. Expansion valve             |
| 13. O-ring                        | 14. O-ring                        |                                 |

⊗ : Always replace after every disassembly.

Ⓜ : N·m (kg·m, in·lb)

### Removal and Installation

INFOID:000000010840279

#### 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-28, "Perform Lubricant Return Operation"](#).

#### REMOVAL

1. Set the temperature at full cold.  
**CAUTION:**  
The angle may be out, when installing the air mix door motor to the air mix door, unless the above procedure is performed.
2. Disconnect the battery cable from the negative terminal.
3. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to [HA-26, "Recycle Refrigerant"](#).
4. Remove cowl top cover. Refer to [EXT-29, "Exploded View"](#).

# EVAPORATOR

## < REMOVAL AND INSTALLATION >

5. Disconnect one-touch joint between high-pressure pipe (1) and high-pressure evaporator pipe (2) with disconnecter (SST: J-45815) (A).

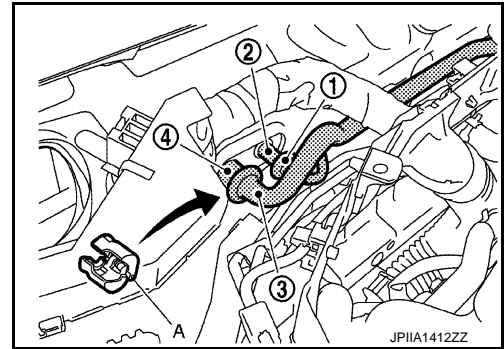
**CAUTION:**

Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.

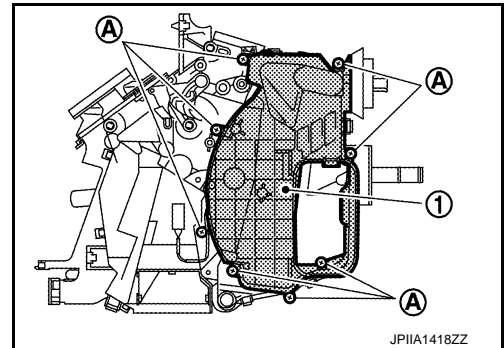
6. Disconnect one-touch joint between low-pressure pipe (3) and low-pressure evaporator pipe (4) with disconnecter (SST: J-45815) (A).

**CAUTION:**

Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.



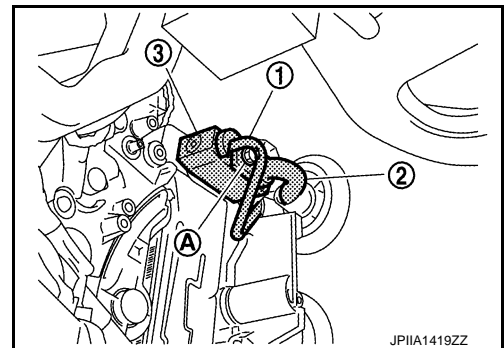
7. Remove air mix door motor and mode door motor. Refer to the following.
- Refer to [HAC-93, "Exploded View"](#). (WITHOUT 7 INCH DISPLAY)
  - Refer to [HAC-183, "Exploded View"](#). (WITH 7 INCH DISPLAY)
8. Remove defroster door link. Refer to the following.
- Refer to [HAC-93, "Exploded View"](#). (WITHOUT 7 INCH DISPLAY)
  - Refer to [HAC-183, "Exploded View"](#). (WITH 7 INCH DISPLAY)
9. Remove fixing screws (A), and then remove evaporator cover (1).



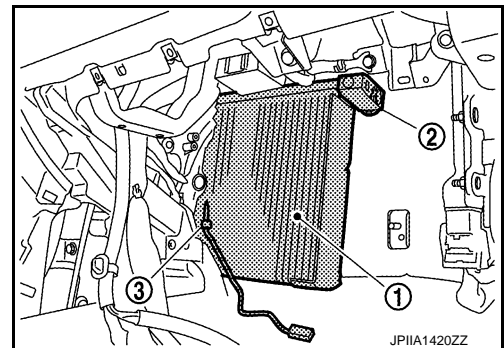
10. Remove mounting bolt (A), and then remove high-pressure evaporator pipe (1) and low-pressure evaporator pipe (2) from expansion valve (3).

**CAUTION:**

Cap or wrap the joint of evaporator and expansion valve with suitable material such as vinyl tape to avoid the entry of air.



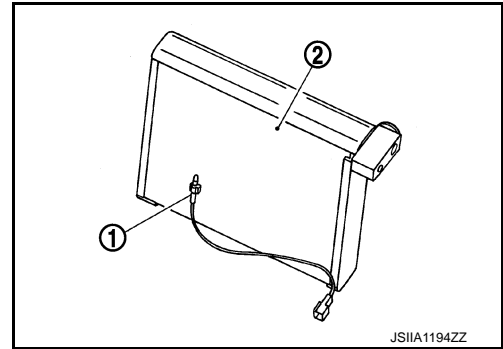
11. Slide evaporator (1) to passenger side, and then remove evaporator with expansion valve (2) intake sensor (3) from heater & cooling unit assembly.



# EVAPORATOR

## < REMOVAL AND INSTALLATION >

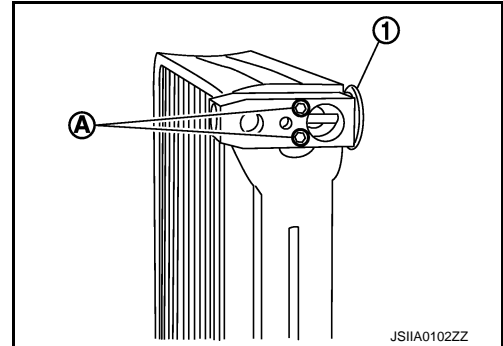
12. Remove intake sensor (1) from evaporator (2).



13. Remove mounting bolts (A), and then remove expansion valve (1).

**CAUTION:**

Cap or wrap the joint of evaporator and expansion valve with suitable material such as vinyl tape to avoid the entry of air.



## INSTALLATION

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

**CAUTION:**

- Replace O-rings with new ones. Then apply compressor oil to them when installing.
- Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.
- Insert piping securely until a click is heard.
- After piping connection is completed, pull male-side piping by hand to check that connection does not come loose.
- Perform lubricant adjusting procedure before installing new evaporator. Refer to [HA-28, "Lubricant Adjusting Procedure for Components Replacement Except Compressor"](#).
- Mark the mounting position of intake sensor bracket prior to removal so that the reinstalled sensor can be located in the same position.
- Check for leakages when recharging refrigerant. Refer to [HA-24, "Leak Test"](#).

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:0000000010840280

Model	CALSONIC KANSEI make CSE-617	
Type	Variable displacement swash plate	
Displacement cm <sup>3</sup> (cu in)/rev	Max.	170 (10.4)
Cylinder bore × stroke (Max.) mm (in)	34.8 (1.37) × 29.8 (1.17)	
Direction of rotation	Clockwise (viewed from clutch)	
Drive belt	Poly V	
Disc to pulley clearance mm (in)	Standard	0.3 – 0.6 (0.012 – 0.024)

### Lubricant

INFOID:0000000010840281

Name	A/C System Oil Type S (DH-PS)	
Capacity mℓ (US fl oz, Imp fl oz)	Total in system	150 (5.07, 5.3)
	Compressor (service part) charging amount	150 (5.07, 5.3)

### Refrigerant

INFOID:0000000010840282

Type	HFC-134a (R-134a)
Capacity kg (lb)	0.5 (1.1)

### Engine Idling Speed

INFOID:0000000010840283

Refer to [EC-634, "Idle Speed"](#).

### Belt Tension

INFOID:0000000010840284

Refer to [EM-145, "Drive Belt"](#).