

SECTION **HA**

HEATER & AIR CONDITIONING SYSTEM

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Service Data and Specification (SDS) 38

PRECAUTIONS

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PRECAUTION

PRECAUTIONS

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

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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 SR and SB section of this Service Manual.

WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, 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 the SR section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

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

WARNING:

- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

Precautions For High-Voltage System

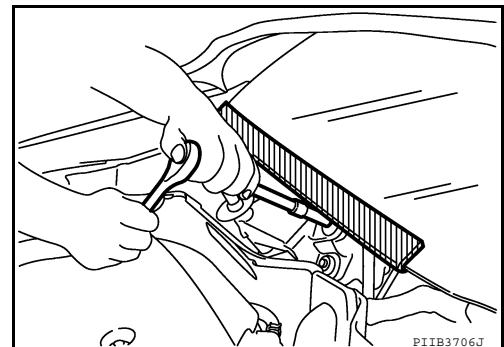
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Refer to [GI-24, "Precautions For High-Voltage System"](#).

Precaution for Procedure without Cowl Top Cover

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



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

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WARNING:

- CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed electric compressor failure is likely to occur. Refer to [HA-19, "Checking of Refrigerant Leaks"](#). To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment and Refrigerant Identifier.

PRECAUTIONS

< PRECAUTION >

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

Contaminated Refrigerant

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

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

General Refrigerant Precaution

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WARNING:

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

CAUTION:

- Wear electrically insulated gloves and pull out the service plug grip before inspection as procedures may require disconnecting high voltage connectors. Be sure to carry the removed service plug grip because other workers may install it by mistake.

PRECAUTIONS

< PRECAUTION >

- Never touch the high voltage connectors or terminals for 10 minutes after the service plug grip is removed.

Precaution for Leak Detection Dye

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

A/C Identification Label

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

Precaution for Refrigerant Connection

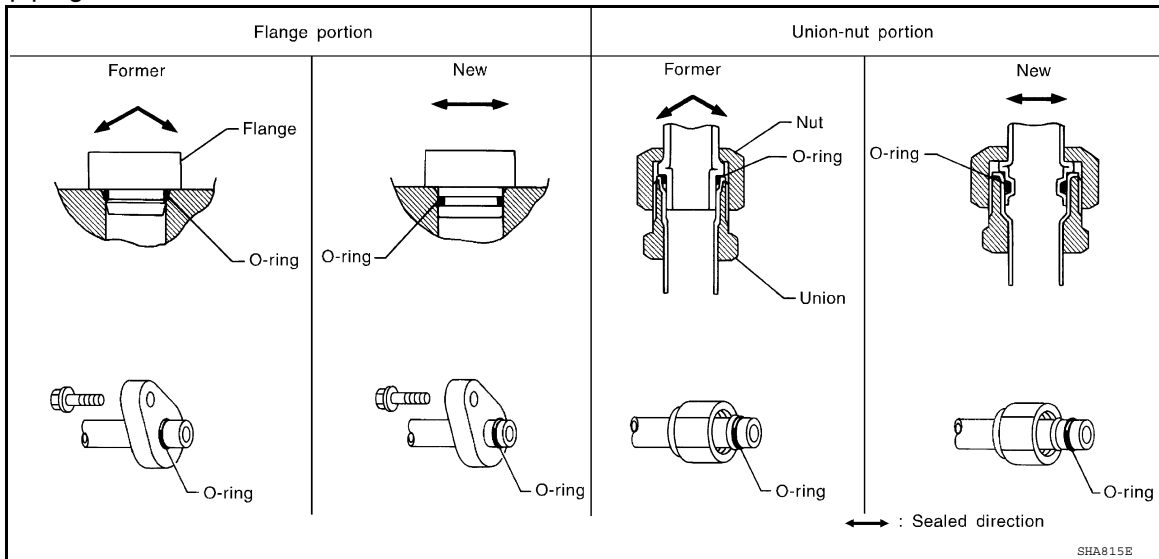
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A new type refrigerant connection has been introduced to all refrigerant lines except the following locations.

- Expansion valve to cooling unit
- Evaporator pipes to evaporator (inside cooling unit)
- Refrigerant pressure sensor

FEATURES OF NEW TYPE REFRIGERANT CONNECTION

- The O-ring has been relocated. It has also been provided with a groove for proper installation. This eliminates the chance of the O-ring being caught in, or damaged by, the mating part. The sealing direction of the O-ring is now set vertically in relation to the contacting surface of the mating part to improve sealing characteristics.
- The reaction force of the O-ring will not occur in the direction that causes the joint to pull out, thereby facilitating piping connections.

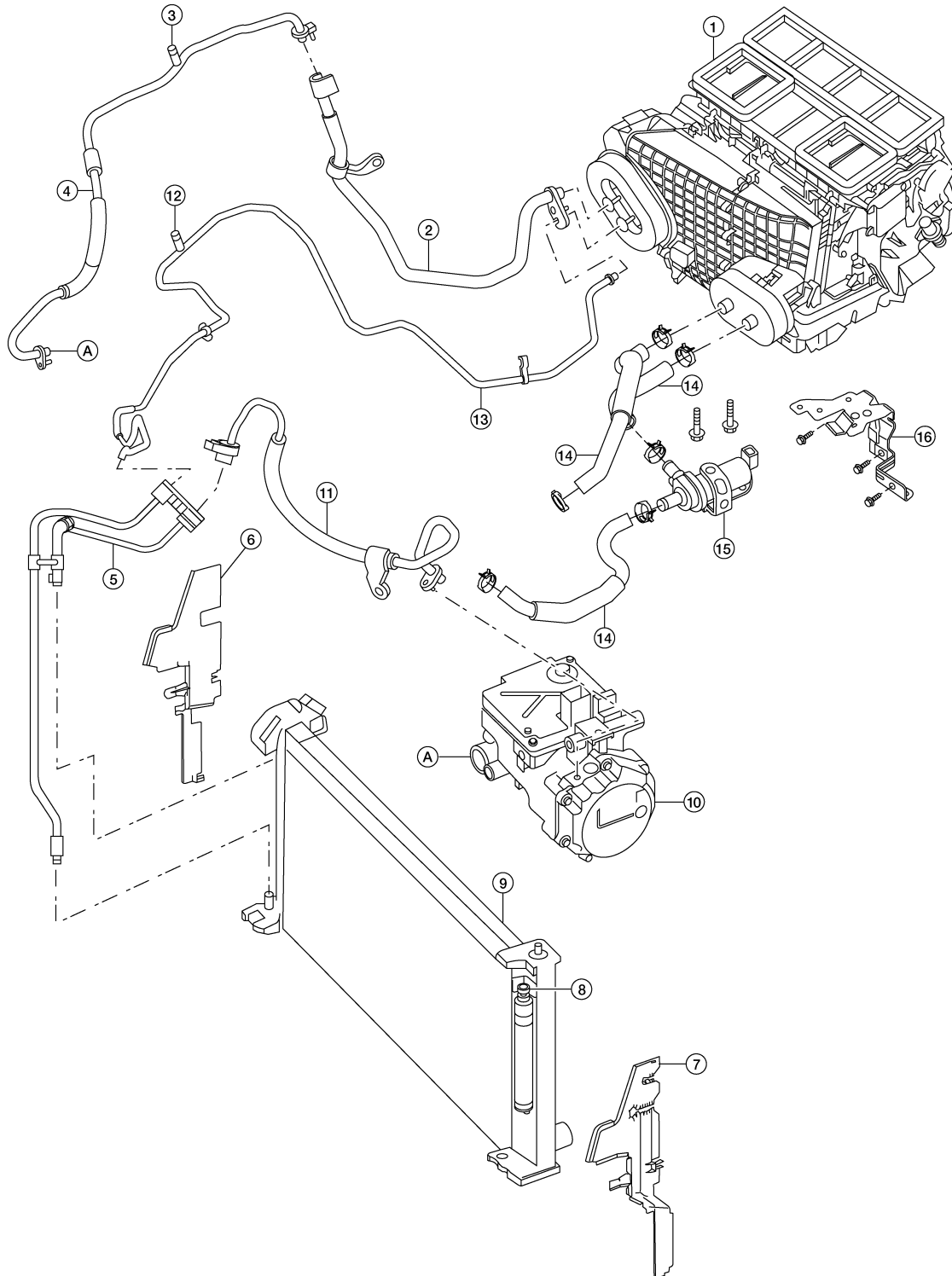


O-RING AND REFRIGERANT CONNECTION

PRECAUTIONS

< PRECAUTION >

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- | | | |
|-------------------------------------|---------------------------------|---|
| 1. Heater and cooling unit assembly | 2. Low-pressure pipe | 3. Low-pressure A/C service valve |
| 4. Low-pressure flexible hose | 5. Junction pipe | 6. Air deflector RH |
| 7. Air deflector LH | 8. Refrigerant pressure sensor | 9. Radiator, condenser and liquid tank assembly |
| 10. Electric compressor | 11. High-pressure flexible hose | 12. High-pressure A/C service valve |

PRECAUTIONS

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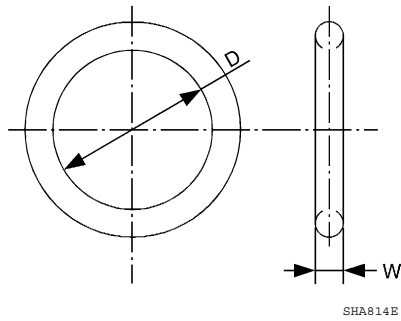
- | | | |
|-------------------------|--|-----------------|
| 13. High-pressure pipe | 14. Heater hoses | 15. Heater pump |
| 16. Heater pump bracket | A. Low-pressure flexible hose to electric compressor | |

CAUTION:

The new and former refrigerant connections use different O-ring configurations. Do not confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant will leak at, or around, the connection.

O-Ring Specifications*

Connection type	O-ring size	D mm (in)		W mm (in)	
New	8	6.8	(0.268)	1.85	(0.0728)
Former	10	9.25	(0.3642)	1.78	(0.0701)
New	12	10.9	(0.429)	2.43	(0.0957)
Former		11.0	(0.433)	2.4	(0.094)
New	16	13.6	(0.535)	2.43	(0.0957)
Former		14.3	(0.563)	2.3	(0.091)
New	19	16.5	(0.650)	2.43	(0.0957)
Former		17.12	(0.6740)	1.78	(0.0701)
New	24	21.8	(0.858)	2.4	(0.094)



*: Always check with the Parts Department for the latest parts information.

WARNING:

Make sure 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:

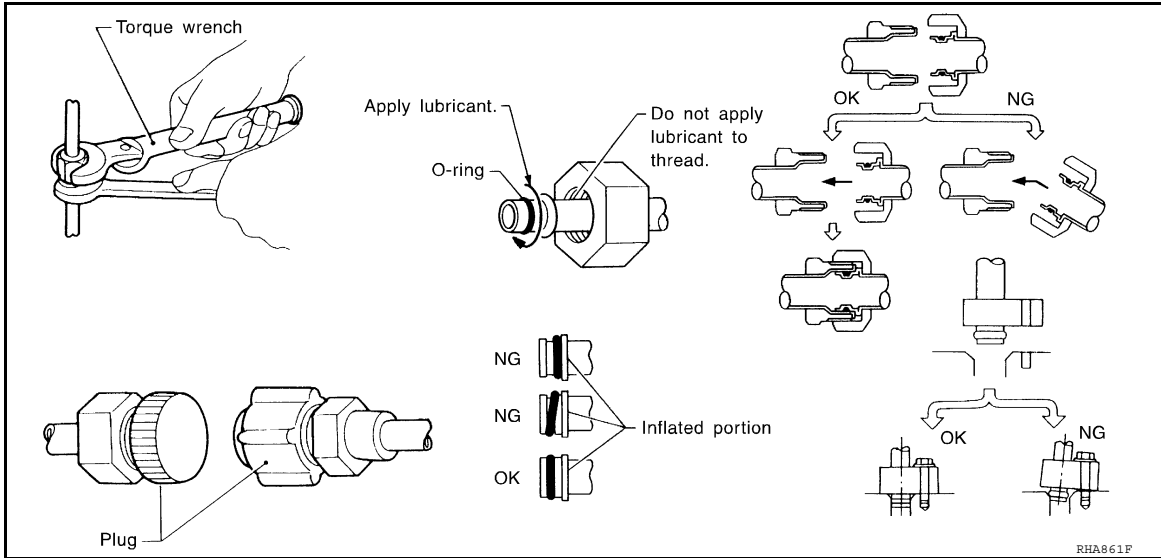
When replacing or cleaning refrigerant cycle components, observe the following.

- When the electric compressor is removed, store it in the same position as it is when mounted on the car. Failure to do so will cause electric compressor oil to enter the low pressure chamber.
- When connecting tubes, always use a torque wrench and a back-up wrench.
- After disconnecting tubes, immediately plug all openings to prevent entry of dirt and moisture.
- When installing an air conditioner in the vehicle, connect the pipes as the final stage of the operation. Do not 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.
- Thoroughly remove moisture from the refrigeration system before charging the refrigerant.
- Always replace used O-rings.
- When connecting tube, apply the specified electric compressor oil to circle of the O-rings. Be careful not to apply electric compressor oil to threaded portion.
- O-ring must be closely attached to dented portion of tube.
- When replacing the O-ring, be careful not to damage O-ring and tube.
- Connect tube until you hear it click, then tighten the nut or bolt by hand until snug. Make sure that the O-ring is installed to tube correctly.

PRECAUTIONS

< PRECAUTION >

- After connecting line, conduct leak test and make sure that there is no leakage from connections. When the gas leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.



Precaution for Electric Compressor Oil

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

Precaution for Service of Electric Compressor

INFOID:000000005440183

- Plug all openings to prevent moisture and foreign matter from entering.
- When the electric compressor is removed, store it in the same position as it is when mounted on the car.
- When replacing or repairing electric compressor, refer to [HA-15. "Maintenance of Electric Compressor Oil Quantity in Electric Compressor"](#).
- After the electric compressor is installed, turn ignition switch (READY) and operate the electric compressor for more than two minutes.

Precaution for Service Equipment

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RECOVERY/RECYCLING EQUIPMENT

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

ELECTRONIC LEAK DETECTOR

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

PRECAUTION FOR ELECTRIC COMPRESSOR OIL

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

VACUUM PUMP

PRECAUTIONS

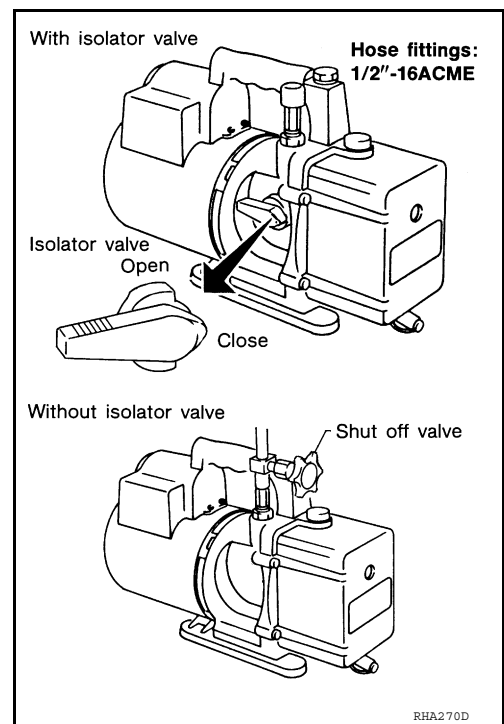
< PRECAUTION >

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

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

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

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

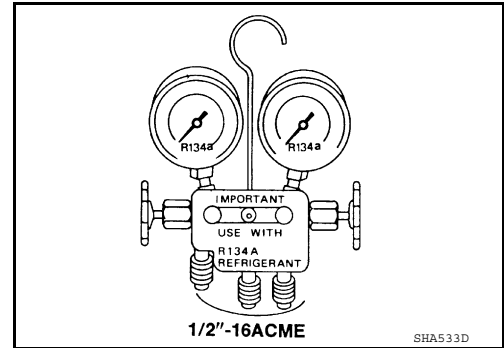


MANIFOLD GAUGE SET

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

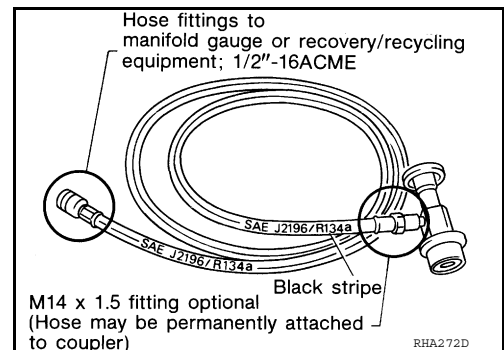
CAUTION:

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



SERVICE HOSES

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



SERVICE COUPLERS

PRECAUTIONS

< PRECAUTION >

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

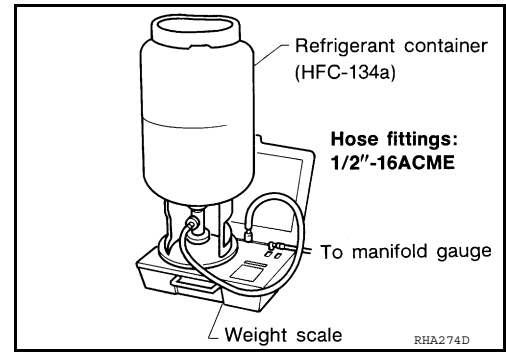
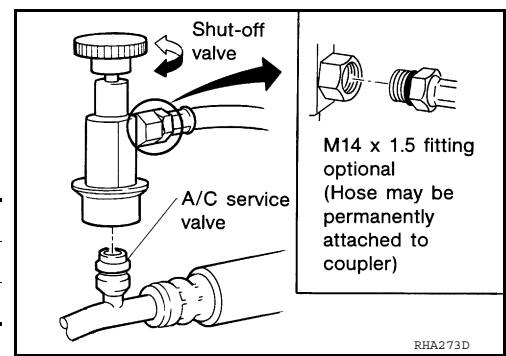
Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close

CAUTION:

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

REFRIGERANT WEIGHT SCALE

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



CHARGING CYLINDER

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

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

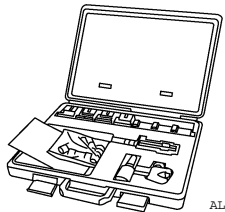

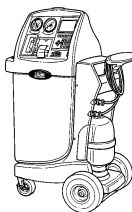
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Never mix HFC-134a refrigerant and/or its specified electric compressor oil with CFC-12 (R-12) refrigerant and/or its electric compressor oil.

Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/electric compressor oil.

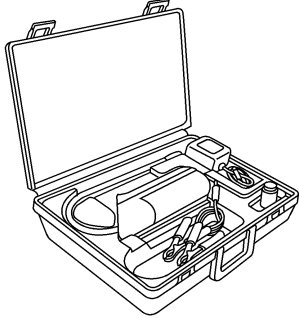
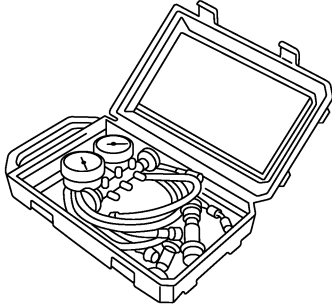
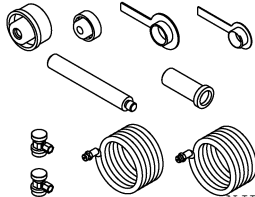
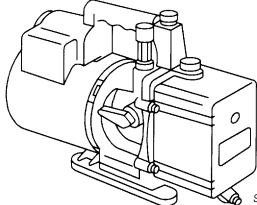
Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or electric compressor oil) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/electric compressor oil.

Adapters that convert one size fitting to another must never be used: refrigerant/electric compressor oil contamination will occur and electric compressor failure will result.

Tool number (Kent-Moore No.) Tool name	Description
— (J-41425-NIS) Aluminum tube repair kit	Repairing leaks in A/C tubes 
— (—) Refrigerant HFC-134a (R-134a)	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • large container 1/2" -16 ACME
— (—) Electric Compressor Oil ND-OIL 11*	Type: Electric Compressor Oil ND-OIL 11 
K991J0130 (ACR2005-NI) ACR A/C Service Center*	Refrigerant recovery, recycling and recharging 

PREPARATION

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Tool number (Kent-Moore No.) Tool name	Description
<p>— (J-41995) Electronic refrigerant leak detector</p>  <p style="text-align: right; font-size: small;">AHA281A</p>	<p>Power supply: DC 12V (Battery terminal)</p>
<p>— (J-39183-C) Manifold gauge set (with hoses and couplers)*</p>  <p style="text-align: right; font-size: small;">RJIA0196E</p>	<p>Identification:</p> <ul style="list-style-type: none"> • The gauge face indicates R-134a. <li style="padding-left: 20px;">Fitting size: Thread size • 1/2" -16 ACME
<p>— (J-48756) Altima HEV service tool kit* • — (J-48767) Hoses and service adaptors</p>  <p style="text-align: right; font-size: small;">ALIIA0400ZZ</p>	<p>Hose and adaptor color:</p> <ul style="list-style-type: none"> • Low side hose: Blue • High side hose: Red • Low side adaptor: Blue • High side adaptor: Red
<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"> • Air displacement: 4 CFM • Micron rating: 20 microns • Electric compressor electric compressor oil capacity: 482 g (17 oz) <li style="padding-left: 20px;">Fitting size: Thread size • 1/2" -16 ACME

CAUTION:

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

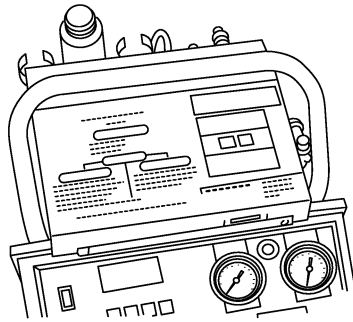
PREPARATION

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Commercial Service Tool

INFOID:000000005440186

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



RJIA0197E



PIIB1407E

CAUTION:

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

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REFRIGERATION SYSTEM

< FUNCTION DIAGNOSIS >

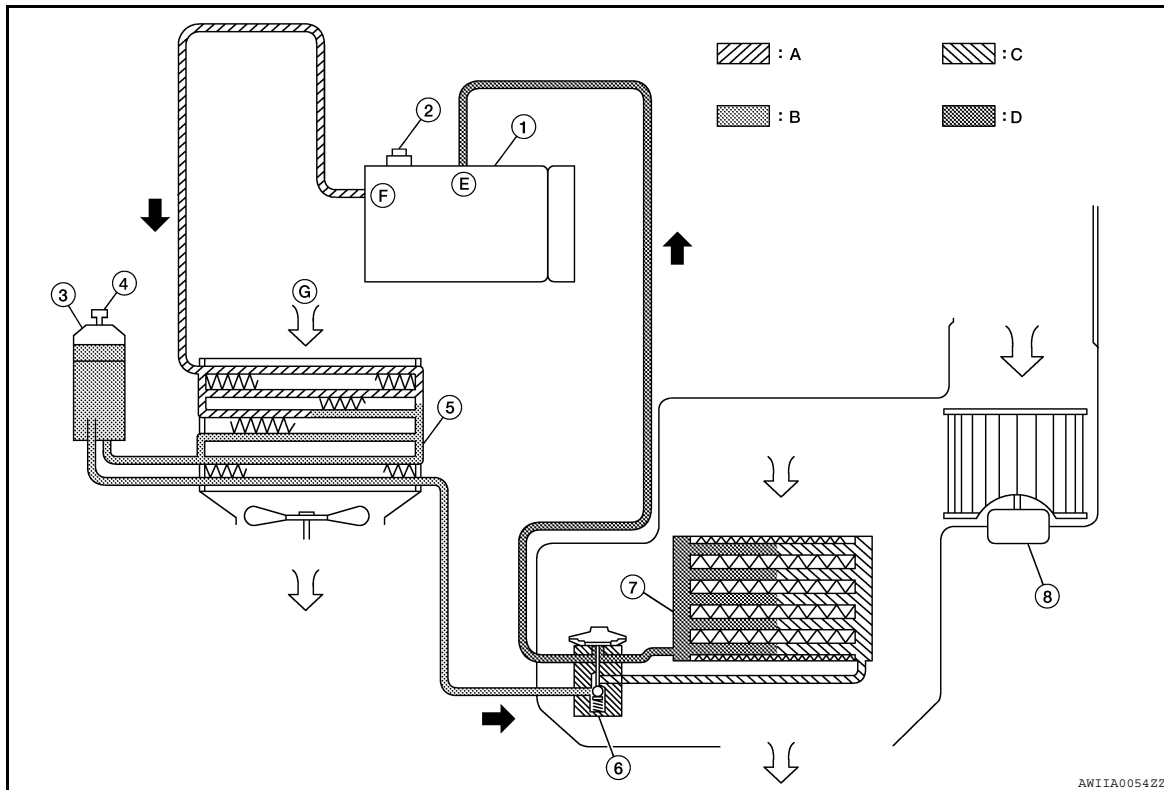
FUNCTION DIAGNOSIS

REFRIGERATION SYSTEM

Refrigerant Cycle

INFOID:000000005440187

Refrigerant flow



- | | | |
|--------------------------------|--------------------------|----------------------|
| 1. Electric compressor | 2. Pressure relief valve | 3. Liquid tank |
| 4. Refrigerant pressure sensor | 5. Condenser | 6. Expansion valve |
| 7. Evaporator | 8. Blower motor | A. High-pressure gas |
| B. High-pressure liquid | C. Low-pressure liquid | D. Low-pressure gas |
| E. Suction port | F. Discharge port | G. Outside air |

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

Refrigerant System Protection

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Refrigerant pressure sensor

The refrigerant system is protected against excessively high or low pressures by the refrigerant pressure sensor, located on the liquid tank. If the system pressure rises above or falls below the specifications, the refrigerant pressure sensor detects the pressure inside the refrigerant line and sends the voltage signal to the ECM. The ECM then ceases to supply power to the A/C relay which disengages and stops the electric compressor when pressure on the high pressure side (as detected by refrigerant pressure sensor) is over approximately 2,746 kPa (28 kg/cm², 398 psi), or below approximately 120 kPa (1.22 kg/cm², 17.4 psi).

Pressure Relief Valve

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the electric compressor. When the pressure of refrigerant in the system increases to an abnormal level [more than 3,776 kPa (38.5 kg/cm², 547 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.

OIL

< ON-VEHICLE MAINTENANCE >

ON-VEHICLE MAINTENANCE

OIL

Maintenance of Electric Compressor Oil Quantity in Electric Compressor

INFOID:000000005440190

CAUTION:

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

The electric compressor oil in the electric compressor circulates through the system with the refrigerant. Add electric compressor oil to electric compressor when replacing any component or after a large refrigerant leakage has occurred. It is important to maintain the specified amount.

If electric compressor oil quantity is not maintained properly, the following malfunctions may result:

- Lack of electric compressor oil: May lead to a seized electric compressor
- Excessive electric compressor oil: Inadequate cooling (thermal exchange interference)

ELECTRIC COMPRESSOR OIL

- Electric compressor oil type: Electric Compressor Oil ND-OIL 11


CHECKING AND ADJUSTING

CAUTION:

If excessive electric compressor oil leakage is noted, do not perform the electric compressor oil return operation.

Set the following conditions:

Test Conditions

- **Hybrid System READY:** Depress the push-button ignition switch two times to the ON position, then depress the brake pedal and depress the push-button ignition switch once for the ready light to illuminate indicating the Hybrid System is in READY mode.
- **A/C switch:** On
- **Blower fan speed:** Max. position
- **Temperature control:** Optional [Set so that intake air temperature is 25° to 30° C (77° to 86°F).]
- **Intake position:** Recirculation ()
- **Perform electric compressor oil return operation for about ten minutes**

Adjust the electric compressor oil quantity according to the following table.

Electric Compressor Oil Adjusting Procedure for Components Replacement Except Electric Compressor

After replacing any of the following major components, add the correct amount of electric compressor oil to the system.

Amount of Electric Compressor Oil to be Added

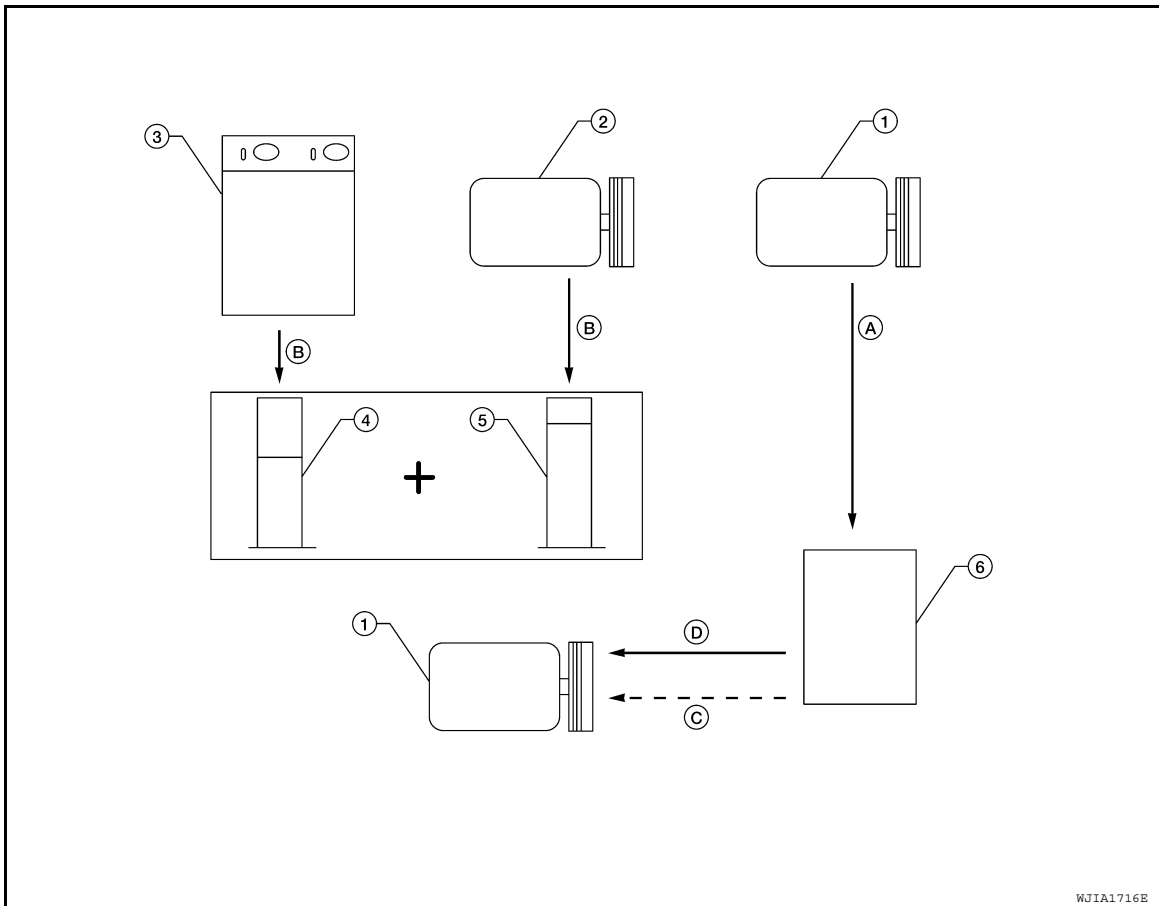
Part replaced	Electric Compressor Oil to be added to system		Remarks
	Amount of electric compressor oil m ℓ (US fl oz, Imp fl oz)		
Evaporator	35 (1.2, 1.2)		—
Condenser	15 (0.5, 0.5)		—
Liquid tank	5 (0.2, 0.2)		Add if electric compressor is not replaced.
In case of refrigerant leak	30 (1.0, 1.1)		Large leak
	—		Small leak *

* If refrigerant leak is small, no addition of electric compressor oil is needed.

Electric Compressor Oil Adjustment Procedure for Electric Compressor Replacement

OIL

< ON-VEHICLE MAINTENANCE >



- | | | |
|---|---|---|
| 1. New electric compressor | 2. Old electric compressor | 3. Recovery/recycling equipment |
| 4. Measuring cup X | 5. Measuring cup Y | 6. New electric compressor oil |
| A. Drain electric compressor oil from the new electric compressor into clean container | B. Record amount of electric compressor oil recovered | C. Add an additional 5 mℓ (0.2 US fl oz, 0.2 Imp fl oz) of new electric compressor oil when replacing liquid tank |
| D. Install new electric compressor oil equal to recorded amounts in measuring cups X plus Y | | |

- Before connecting recovery/recycling equipment to vehicle, check recovery/recycling equipment gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.
- Connect recovery/recycling equipment to vehicle. Confirm refrigerant purity in supply tank using recovery/recycling equipment and refrigerant identifier. If NG, refer to [HA-4, "Contaminated Refrigerant"](#).
- Confirm refrigerant purity in vehicle A/C system using recovery/recycling equipment and refrigerant identifier. If NG, refer to [HA-4, "Contaminated Refrigerant"](#).
- Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure electric compressor oil discharged into the recovery/recycling equipment.
- Drain the electric compressor oil from the "old" (removed) electric compressor into a graduated container and recover the amount of electric compressor oil drained.
- Drain the electric compressor oil from the "new" electric compressor into a separate, clean container.
- Measure an amount of new electric compressor oil installed equal to amount drained from "old" electric compressor. Add this electric compressor oil to "new" electric compressor through the suction port opening.
- Measure an amount of new electric compressor oil equal to the amount recovered during discharging. Add this electric compressor oil to "new" electric compressor through the suction port opening.
- If the liquid tank also needs to be replaced, add an additional 5 mℓ (0.2 US fl oz, 0.2 Imp fl oz) of electric compressor oil at this time.

CAUTION:

OIL

< ON-VEHICLE MAINTENANCE >

Do not add the 5 mℓ (0.2 US fl oz, 0.2 Imp fl oz) of electric compressor oil if only replacing the electric compressor and not the liquid tank.

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REFRIGERATION SYSTEM

< ON-VEHICLE MAINTENANCE >

REFRIGERATION SYSTEM

HFC-134a (R-134a) Service Procedure

INFOID:000000005440191

SETTING OF SERVICE TOOLS AND EQUIPMENT

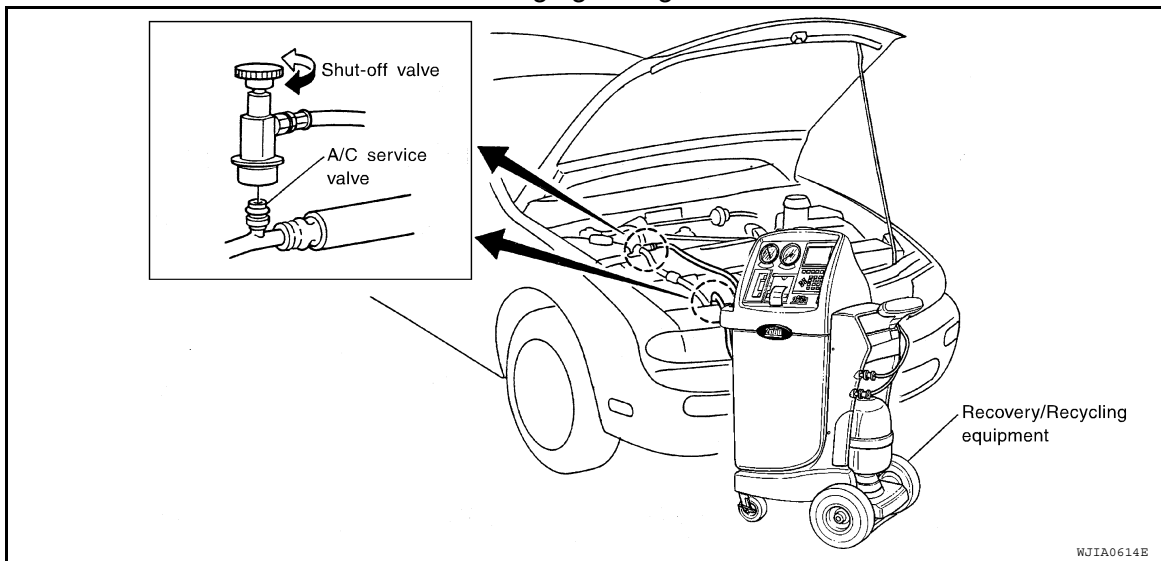
WARNING:

Avoid breathing the A/C refrigerant and electric compressor oil vapor or mist. Exposure may irritate eyes, nose, and throat. Remove the HFC-134a (R-134a) from the A/C system using certified service equipment meeting the requirements of SAE J2210 (R-134a recycling equipment) or SAE J2201 (R-134a recovery equipment). If an accidental system discharge occurs, ventilate the work area before resuming service. Additional health and safety information may be obtained from the refrigerant and electric compressor oil manufacturers.

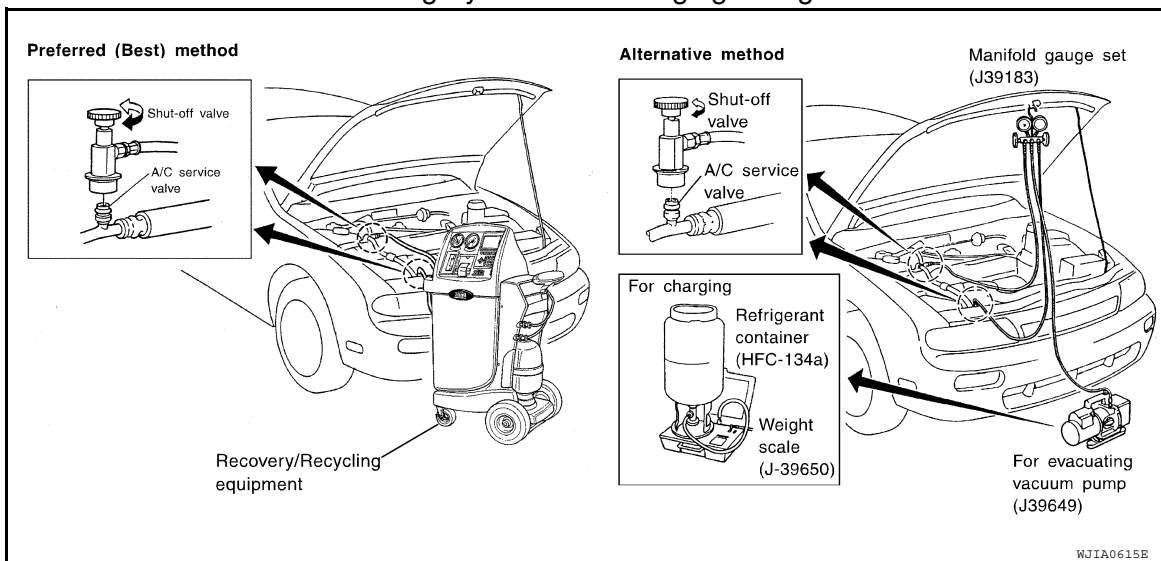
CAUTION:

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

Discharging Refrigerant



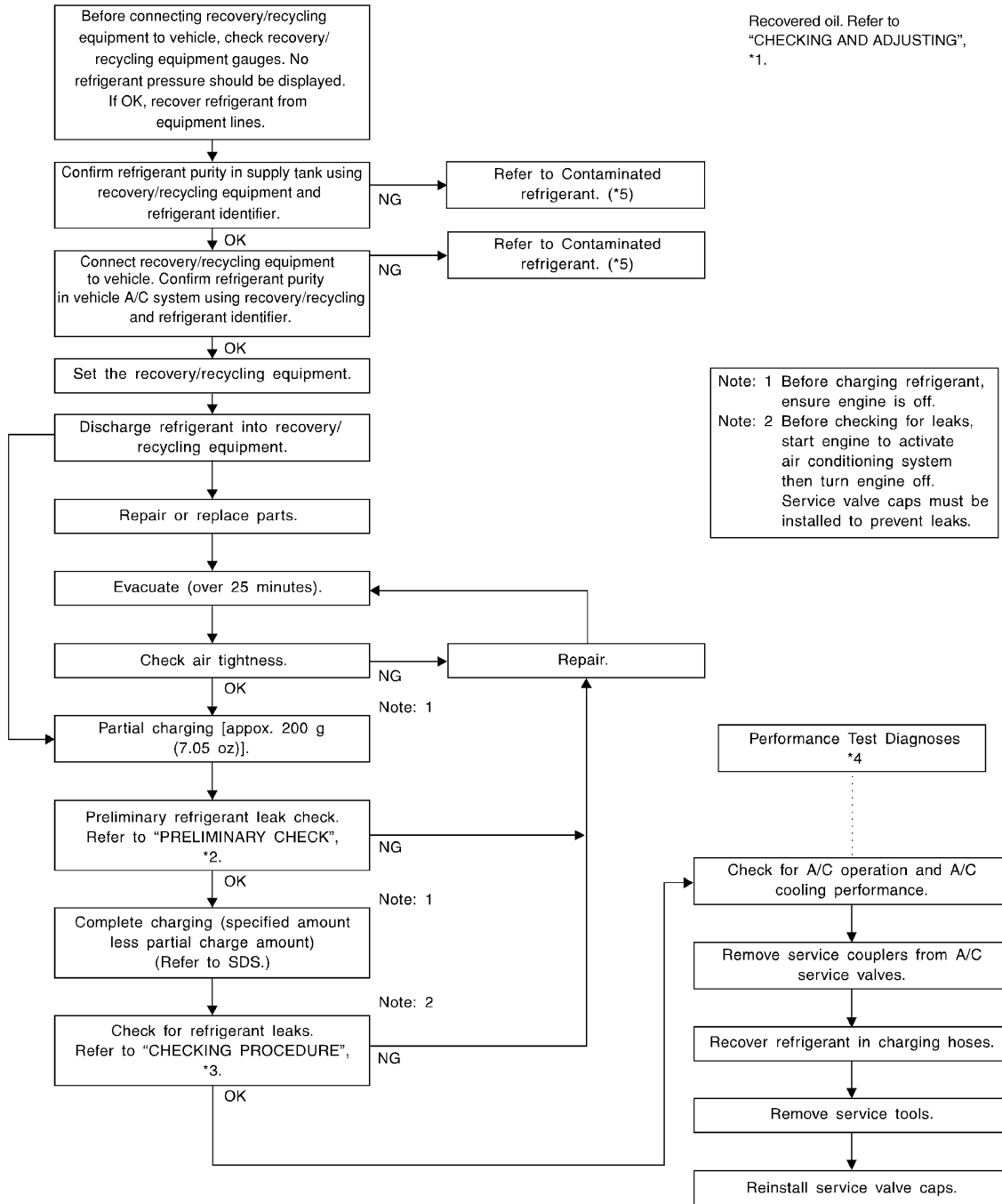
Evacuating System and Charging Refrigerant



REFRIGERATION SYSTEM

< ON-VEHICLE MAINTENANCE >

Discharging, Evacuating, and Recharging the A/C System



*1 [HA-15, "Maintenance of Electric Compressor Oil Quantity in Electric Compressor"](#)

*2 [HA-19, "Checking of Refrigerant Leaks"](#)

*3 [HA-19, "Checking of Refrigerant Leaks"](#)

*4 [HAC-150, "Inspection procedure"](#)

*5 [HA-4, "Contaminated Refrigerant"](#)

Checking of Refrigerant Leaks

INFOID:000000005440192

Perform a visual inspection of all refrigeration parts, fittings, hoses and components for signs of electric compressor oil leakage, damage and corrosion. Electric compressor oil leakage may indicate an area of refrigerant leakage. Allow extra inspection time in these areas when using an electronic refrigerant leak detector.

REFRIGERATION SYSTEM

< ON-VEHICLE MAINTENANCE >

Confirm the leak with an electronic refrigerant leak detector. It is possible a prior leak was repaired and not properly cleaned.

When searching for leaks, do not stop when one leak is found but continue to check for additional leaks at all system components and connections.

When searching for refrigerant leaks using an electronic leak detector, move the probe along the suspected leak area at 25 - 50 mm (1 - 2 in) per second and no further than 6 mm (1/4 in) from the component.

CAUTION:

Moving the electronic leak detector probe slower and closer to the suspected leak area will improve the chances of finding a leak.

ELECTRICAL LEAK DETECTOR

< ON-VEHICLE MAINTENANCE >

ELECTRICAL LEAK DETECTOR

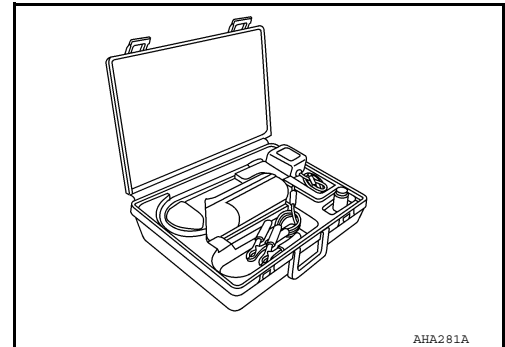
Electronic Refrigerant Leak Detector

INFOID:000000005440193

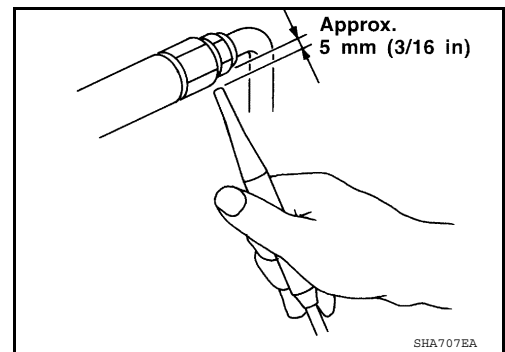
PRECAUTIONS FOR HANDLING THE LEAK DETECTOR

When performing a refrigerant leak check, use a electronic refrigerant leak detector (J-41995) or equivalent. Ensure that the instrument is calibrated and set properly per the manufacturer's operating instructions.

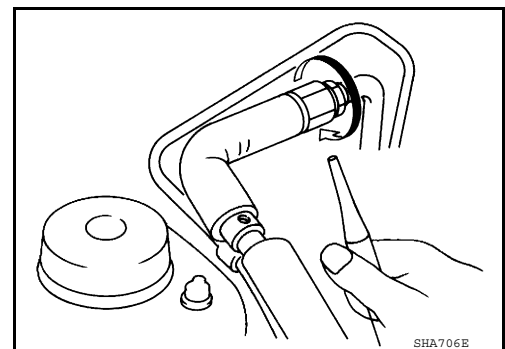
The leak detector is a delicate device. In order to use the leak detector properly, read the manufacturer's operating instructions and perform any specified maintenance.



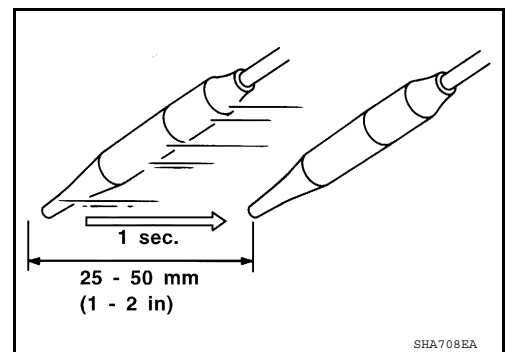
1. Position the leak detector probe approximately 5 mm (3/16 in) away from the point to be checked.



2. When testing, circle each fitting completely with the leak detector probe.



3. Move the leak detector probe along the component at approximately 25 to 50 mm (1 to 2 in)/sec.



CHECKING PROCEDURE

NOTE:

To prevent inaccurate or false readings, make sure there is no refrigerant vapor, shop chemicals, or cigarette smoke in the vicinity of the vehicle. Perform the leak test in a calm area (low air/wind movement) so that the leaking refrigerant is not dispersed.

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ELECTRICAL LEAK DETECTOR

< ON-VEHICLE MAINTENANCE >

1. Turn ignition switch OFF.
2. Connect a suitable A/C manifold gauge set to the A/C service ports.
3. Check if the A/C refrigerant pressure is at least 345 kPa (3.52 kg/cm², 50 psi) above 16°C (61°F). If less than specification, recover/evacuate and recharge the system with the specified amount of refrigerant.

NOTE:

At temperatures below 16°C (61°F), leaks may not be detected since the system may not reach 345 kPa (3.52 kg/cm², 50 psi) pressure.

4. Conduct the leak test from the high side (electric compressor discharge to evaporator inlet) to the low side (evaporator drain hose to the electric compressor shaft seal). Refer to [HA-24, "Component"](#). Clean the component to be checked and move the leak detector probe completely around the connection/component.

Perform a leak check for the following areas:

- Electric compressor
- High and low-pressure hose fittings, relief valve and shaft seal.
- Liquid tank
- Refrigerant pressure sensor
- Service valves

- Check that all the service valve caps are secure on the service valves (to prevent leaks).

- After removing A/C manifold gauge set from service valves, wipe any residue from the valves to prevent any false readings by the leak detector.

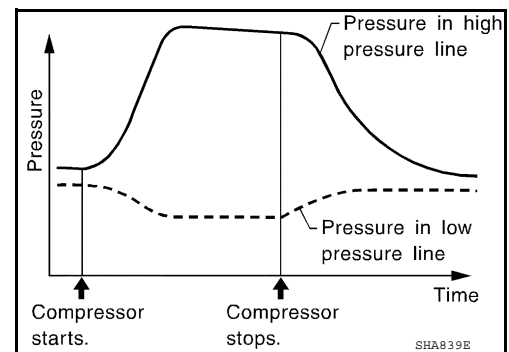
- Evaporator

- With ignition switch ON and A/C switch OFF, turn blower fan on high speed for at least 15 seconds to dissipate any refrigerant trace around the evaporator. Wait a minimum of 10 minutes accumulation time (refer to the manufacturer's recommended procedure for actual wait time) before inserting the leak detector probe into the drain hose.

- Keep the probe inserted for at least 10 seconds. Use caution not to contaminate the probe tip with water or dirt that may be in the drain hose.

5. If a leak detector detects a leak, verify at least once by blowing compressed air into area of suspected leak, then repeat check as outlined above.
6. Do not stop when one leak is found. Continue to check for additional leaks at all system components. If no leaks are found, perform steps 7 - 10.
7. Activate the Hybrid System to READY mode. Depress the push-button ignition switch two times to the ON position, then depress the brake pedal and depress the push-button ignition switch once for the ready light to illuminate indicating the Hybrid System is in READY mode.
8. Set the front air control as follows and maintain this condition for at least two minutes;
 - a. A/C switch: ON
 - b. Mode: Vent
 - c. Intake position: Recirculation
 - d. Temperature: MAX cold
 - e. Blower fan speed: High
9. Turn ignition switch OFF and perform leak check again following steps 4 through 6 above.

Refrigerant leaks should be checked immediately after turning ignition switch OFF. Begin with the leak detector at the electric compressor. The pressure on the high pressure side will gradually drop after refrigerant circulation stops and pressure on the low pressure side will gradually rise, as shown in the graph. Some leaks are more easily detected when pressure is high.



10. Before connecting the recovery/recycling equipment to the A/C system, check the recovery/recycling equipment gauges. No refrigerant pressure should be displayed. If pressure is displayed, recover the refrigerant from the equipment lines and then check the refrigerant purity.
11. Confirm the refrigerant purity in the supply tank using the recovery/recycling equipment and the refrigerant identifier equipment.

ELECTRICAL LEAK DETECTOR

< ON-VEHICLE MAINTENANCE >

12. Confirm the refrigerant purity in the A/C system using the recovery/recycling equipment and the refrigerant identifier equipment.
13. Discharge the A/C system using approved refrigerant recovery/recycling equipment. Repair the leaking fitting or component as necessary.
14. Evacuate and recharge the A/C system and perform the leak test to confirm there are no refrigerant leaks.
15. Conduct the A/C performance test to ensure that the system works properly. Refer to [HAC-150. "Inspection procedure"](#).

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REFRIGERATION SYSTEM

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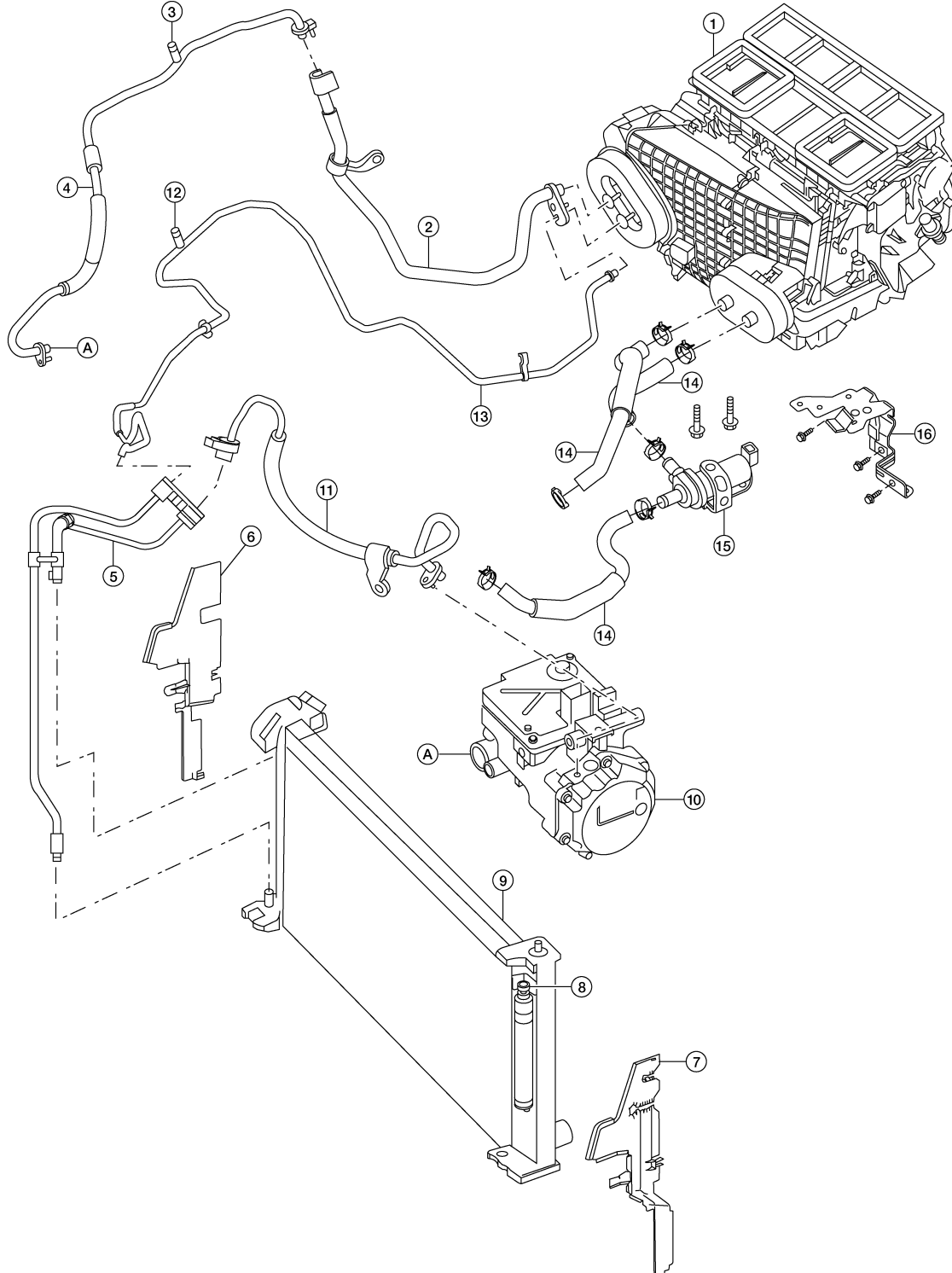
ON-VEHICLE REPAIR

REFRIGERATION SYSTEM

Component

INFOID:000000005440194

SEC. 214 • 270 • 274 • 276 • 278



AWIIR1334Z2

REFRIGERATION SYSTEM

< ON-VEHICLE REPAIR >

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|-------------------------------------|--|---|---|
| 1. Heater and cooling unit assembly | 2. Low-pressure pipe | 3. Low-pressure A/C service valve | A |
| 4. Low-pressure flexible hose | 5. Junction pipe | 6. Air deflector RH | |
| 7. Air deflector LH | 8. Refrigerant pressure sensor | 9. Radiator, condenser and liquid tank assembly | B |
| 10. Electric compressor | 11. High-pressure flexible hose | 12. High-pressure A/C service valve | |
| 13. High-pressure pipe | 14. Heater hoses | 15. Heater pump | C |
| 16. Heater pump bracket | A. Low-pressure flexible hose to electric compressor | | |

HFC-134a (R-134a) Service Procedure

INFOID:000000005440195

SETTING OF SERVICE TOOLS AND EQUIPMENT

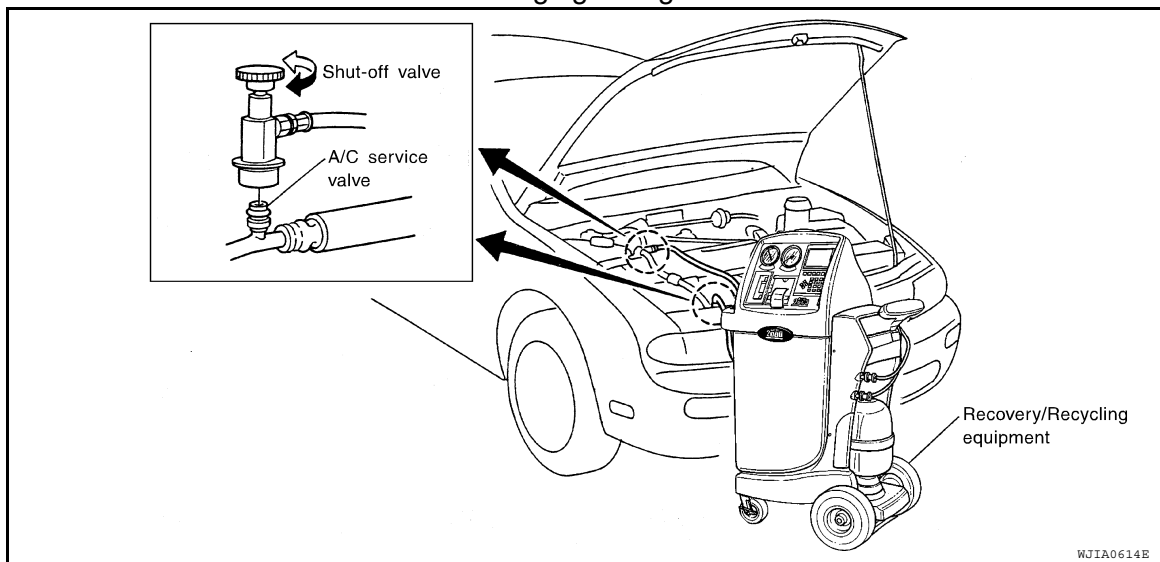
WARNING:

Avoid breathing the A/C refrigerant and electric compressor oil vapor or mist. Exposure may irritate eyes, nose, and throat. Remove the HFC-134a (R-134a) from the A/C system using certified service equipment meeting the requirements of SAE J2210 (R-134a recycling equipment) or SAE J2201 (R-134a recovery equipment). If an accidental system discharge occurs, ventilate the work area before resuming service. Additional health and safety information may be obtained from the refrigerant and electric compressor oil manufacturers.

CAUTION:

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

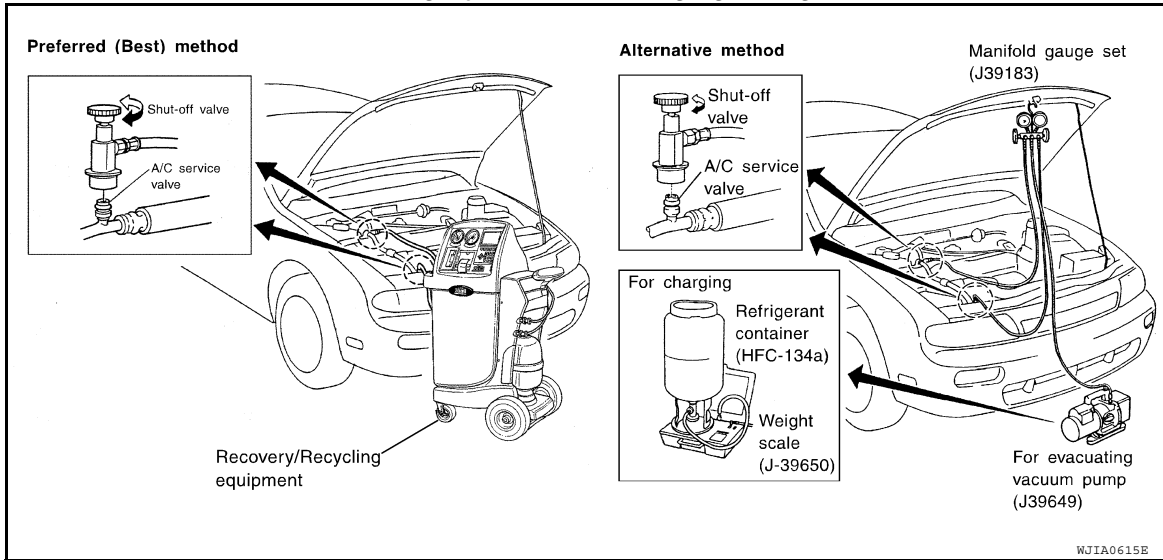
Discharging Refrigerant



REFRIGERATION SYSTEM

< ON-VEHICLE REPAIR >

Evacuating System and Charging Refrigerant



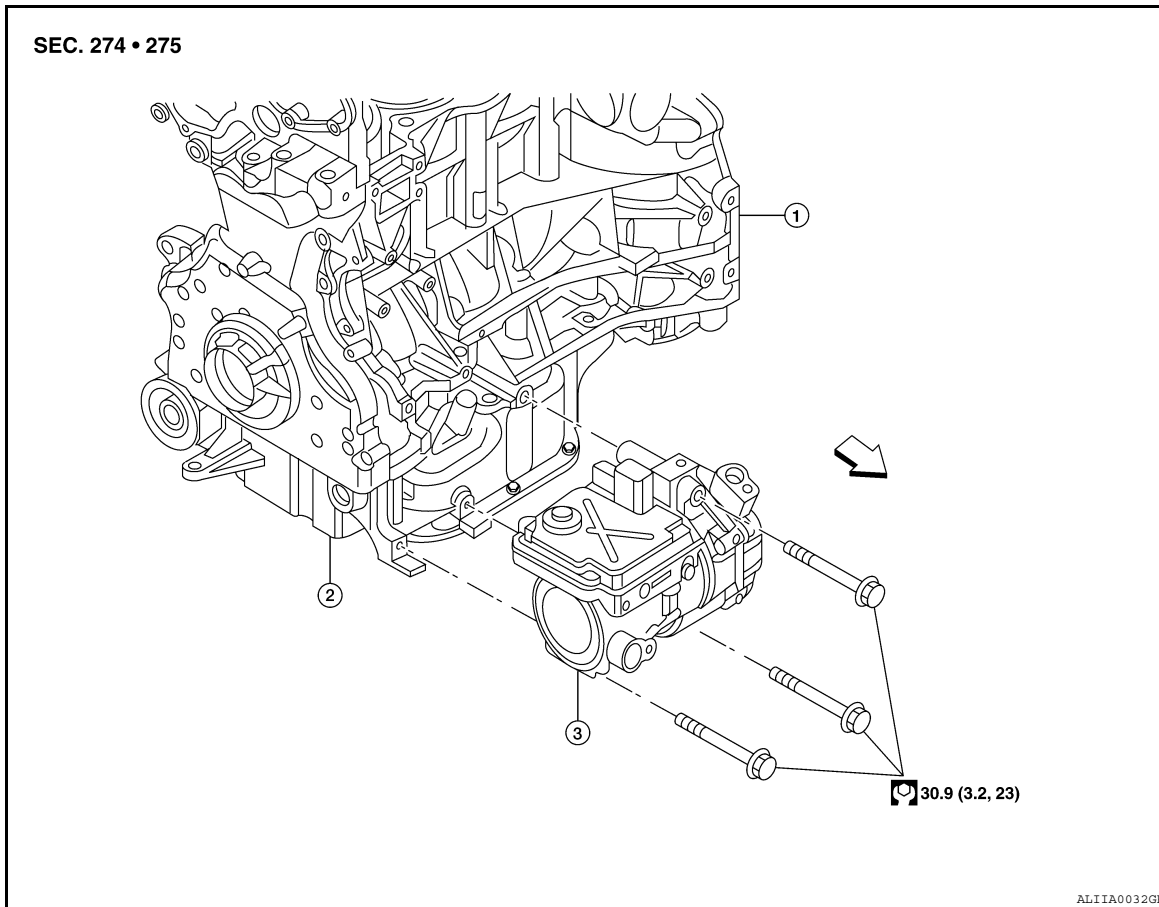
ELECTRIC COMPRESSOR

< ON-VEHICLE REPAIR >

ELECTRIC COMPRESSOR

Removal and Installation

INFOID:000000005440196



1. Cylinder block

2. Upper oil pan

3. Electric compressor

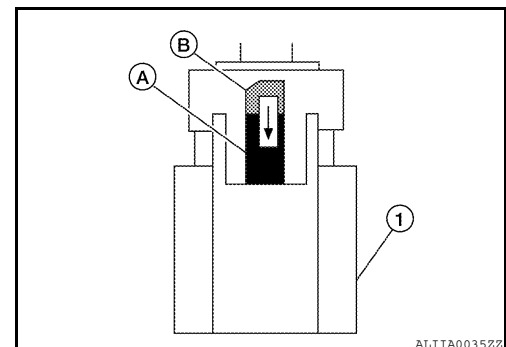
⇐ Front

REMOVAL

1. Disconnect the high voltage electrical system. Refer to [GI-24, "Precautions For High-Voltage System"](#).
2. Discharge the refrigerant. Refer to [HA-18, "HFC-134a \(R-134a\) Service Procedure"](#).
3. Remove the engine air cleaner front air duct. Refer to [EM-24, "Removal and Installation"](#).
4. Remove the engine undercover.
5. Remove the front RH wheel and tire.
6. Remove the side cover from inside the front RH wheel well.
7. Disconnect the electric compressor inverter unit connector.
8. Disconnect the high voltage electric compressor inverter connector (1).
 - The lock lever of the high voltage electric compressor inverter unit connector (1) must be moved from the locked position (A) to the unlocked position (B) before pulling up to disconnect the high voltage electric compressor inverter unit connector (1).

CAUTION:

Cap or wrap the connector with a suitable material such as vinyl tape to avoid the entry of any contaminants.



ELECTRIC COMPRESSOR

< ON-VEHICLE REPAIR >

9. Remove the high voltage harness bracket from the electric compressor.
10. Disconnect the high-pressure flexible hose and low-pressure flexible hose from the electric compressor.
CAUTION:
Cap or wrap the joint of the hose with a suitable material such as vinyl tape to avoid the entry of any contaminants.
11. Remove the electric compressor bolts using power tools, then remove the electric compressor.

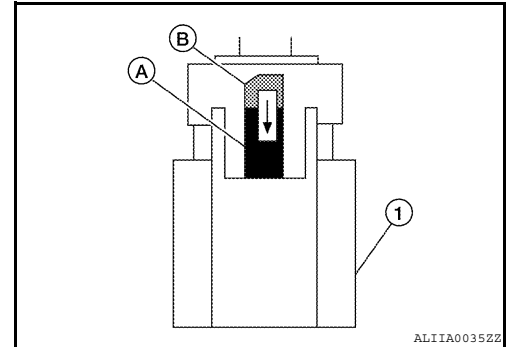
INSTALLATION

Installation is in the reverse order of removal.

- The lock lever of the high voltage electric compressor inverter unit connector (1) must be moved from the unlocked position (B) to the locked position (A) after connecting the high voltage electric compressor inverter unit connector (1) as shown. Check the high voltage electric compressor inverter unit connector (1) to make sure it is fully seated and locked securely.

CAUTION:

- **Replace the O-ring of the low-pressure flexible hose and high-pressure flexible hose with new ones, then apply electric compressor oil to them for installation.**
- **Use only Electric Compressor Oil ND-OIL 11 for the electric compressor of the air conditioning system. Using other A/C oils may damage the A/C system as they may conduct electricity.**
- **Do not use florescent leak detection dye in the A/C system.**
- **After installation of electric compressor, check potential equalisation**
- **After charging the A/C refrigerant, check for leaks. Refer to [HA-19, "Checking of Refrigerant Leaks"](#).**



LOW-PRESSURE FLEXIBLE HOSE

< ON-VEHICLE REPAIR >

LOW-PRESSURE FLEXIBLE HOSE

Removal and Installation for Low-Pressure Flexible Hose

INFOID:000000005440197

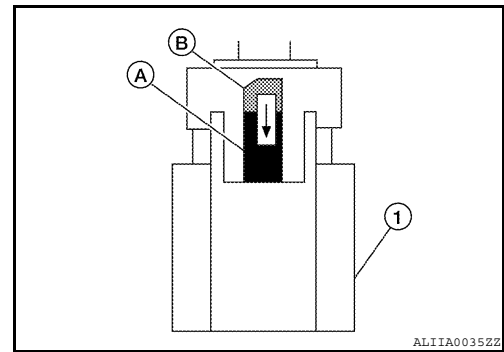
REMOVAL

1. Disconnect the high voltage electrical system. Refer to [GI-24, "Precautions For High-Voltage System"](#).
2. Discharge the refrigerant. Refer to [HA-25, "HFC-134a \(R-134a\) Service Procedure"](#).
3. Remove the engine air cleaner front air duct. Refer to [EM-24, "Removal and Installation"](#).
4. Disconnect the electric compressor inverter unit connector.
5. Disconnect the high voltage electric compressor inverter unit connector (1).

- The lock lever of the high voltage electric compressor inverter unit connector (1) must be moved from the locked position (A) to the unlocked position (B) before pulling up to disconnect the high voltage electric compressor inverter unit connector (1).

CAUTION:

Cap or wrap the connector with a suitable material such as vinyl tape to avoid the entry of any contaminants.



6. Remove the high voltage harness bracket from the electric compressor.
7. Remove the low-pressure flexible hose. Refer to [HA-24, "Component"](#).

CAUTION:

Cap or wrap the joint of the hose with a suitable material such as vinyl tape to avoid the entry of contaminants.

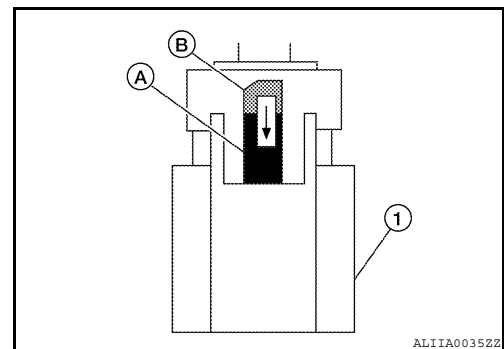
INSTALLATION

Installation is in the reverse order of removal.

- The lock lever of the high voltage electric compressor inverter unit connector (1) must be moved from the unlocked position (B) to the locked position (A) after connecting the high voltage electric compressor inverter unit connector (1) as shown. Check the high voltage electric compressor inverter unit connector (1) to make sure it is fully seated and locked securely.

CAUTION:

- **Replace the O-ring on the low-pressure flexible hose with a new one, then apply electric compressor oil to it for installation.**
- **After recharging the refrigerant, check for leaks. Refer to [HA-19, "Checking of Refrigerant Leaks"](#).**



LOW-PRESSURE PIPE

< ON-VEHICLE REPAIR >

LOW-PRESSURE PIPE

Removal and Installation for Low-Pressure Pipe

INFOID:000000005440198

REMOVAL

1. Discharge the refrigerant. Refer to [HA-18, "HFC-134a \(R-134a\) Service Procedure"](#).
2. Remove the strut tower bar. Refer to [FSU-12, "Exploded View"](#).
3. Remove the cowl top. Refer to [EXT-18, "Removal and Installation"](#).
4. Remove the lower RH cowl.
5. Remove the brake fluid reservoir.
6. Remove the low-pressure pipe. Refer to [HA-24, "Component"](#).

CAUTION:

Cap or wrap the joint of the pipe with a suitable material such as vinyl tape to avoid the entry of contaminants.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- Replace the O-ring on the low-pressure pipe with a new one, then apply electric compressor oil to it for installation.
- After recharging the refrigerant, check for leaks. Refer to [HA-19, "Checking of Refrigerant Leaks"](#).

HIGH-PRESSURE FLEXIBLE HOSE

< ON-VEHICLE REPAIR >

HIGH-PRESSURE FLEXIBLE HOSE

Removal and Installation for High-Pressure Flexible Hose

INFOID:000000005440199

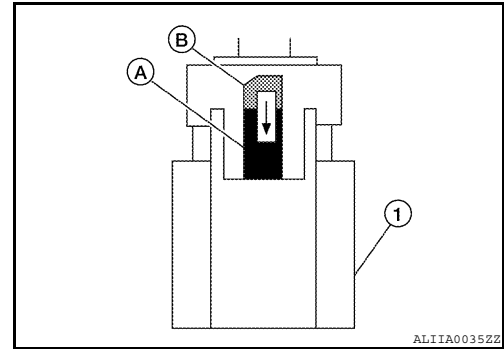
REMOVAL

1. Disconnect the high voltage electrical system. Refer to [GI-24. "Precautions For High-Voltage System"](#).
2. Remove the engine air cleaner front air duct. Refer to [EM-24. "Removal and Installation"](#).
3. Discharge the refrigerant. Refer to [HA-25. "HFC-134a \(R-134a\) Service Procedure"](#).
4. Disconnect the electric compressor inverter unit connector.
5. Disconnect the high voltage electric compressor inverter unit connector (1).

- The lock lever of the high voltage electric compressor inverter unit connector (1) must be moved from the locked position (A) to the unlocked position (B) before pulling up to disconnect the high voltage electric compressor inverter unit connector (1).

CAUTION:

Cap or wrap the connector with a suitable material such as vinyl tape to avoid the entry of any contaminants.



6. Remove the high voltage harness bracket from the electric compressor.
7. Remove the high-pressure flexible hose. Refer to [HA-24. "Component"](#).

CAUTION:

Cap or wrap the joint of the hose with a suitable material such as vinyl tape to avoid the entry of contaminants.

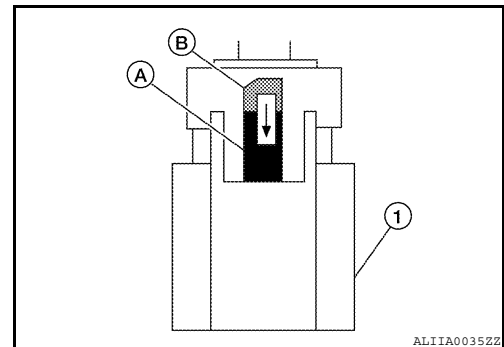
INSTALLATION

Installation is in the reverse order of removal.

- The lock lever of the high voltage electric compressor inverter unit connector (1) must be moved from the unlocked position (B) to the locked position (A) after connecting the high voltage electric compressor inverter unit connector (1) as shown. Check the high voltage electric compressor inverter unit connector (1) to make sure it is fully seated and locked securely.

CAUTION:

- **Replace the O-ring of the high-pressure flexible hose with a new one, then apply electric compressor oil to it for installation.**
- **After charging the refrigerant, check for leaks. Refer to [HA-19. "Checking of Refrigerant Leaks"](#).**



HIGH-PRESSURE PIPE

< ON-VEHICLE REPAIR >

HIGH-PRESSURE PIPE

Removal and Installation for High-Pressure Pipe

INFOID:000000005440200

REMOVAL

1. Discharge the refrigerant. Refer to [HA-18, "HFC-134a \(R-134a\) Service Procedure"](#).
2. Remove the strut tower bar. Refer to [FSU-12, "Exploded View"](#).
3. Remove the cowl top. Refer to [EXT-18, "Removal and Installation"](#).
4. Remove the lower RH cowl.
5. Remove the brake fluid reservoir.
6. Reposition the engine coolant reservoir out of the way without disconnecting the hose.
7. Remove the brake ECU module and bracket. Refer to [BRC-193, "Removal and Installation"](#).
8. Reposition the ABS motor relay box aside.
9. Remove the RH engine mount torque rod. Refer to [EM-71, "Removal and Installation"](#).
10. Remove the engine air cleaner front air duct. Refer to [EM-24, "Removal and Installation"](#).
11. Remove the high-pressure pipe. Refer to [HA-24, "Component"](#).

CAUTION:

Cap or wrap the joint of the pipe with a suitable material such as vinyl tape to avoid the entry of contaminants.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- Replace the O-ring of the high-pressure pipe with a new one, then apply electric compressor oil to it when installing it.
- After charging the refrigerant, check for leaks. Refer to [HA-19, "Checking of Refrigerant Leaks"](#).

Removal and Installation for Junction Pipe

INFOID:000000005440201

REMOVAL

1. Discharge the refrigerant. Refer to [HA-18, "HFC-134a \(R-134a\) Service Procedure"](#).
2. Remove the engine air cleaner front air duct. Refer to [EM-24, "Removal and Installation"](#).
3. Remove the front grille. Refer to [EXT-17, "Removal and Installation"](#).
4. Remove the junction pipe. Refer to [HA-24, "Component"](#).

CAUTION:

Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- Replace the O-rings of the junction pipe with a new ones, then apply electric compressor oil to them when installing it.
- After charging the refrigerant, check for leaks. Refer to [HA-19, "Checking of Refrigerant Leaks"](#).

CONDENSER

< ON-VEHICLE REPAIR >

CONDENSER

Removal and Installation for Condenser

INFOID:000000005440202

The condenser is part of the radiator, condenser and liquid tank assembly. Refer to [CO-14. "Removal and Installation"](#).

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AMBIENT SENSOR

< ON-VEHICLE REPAIR >

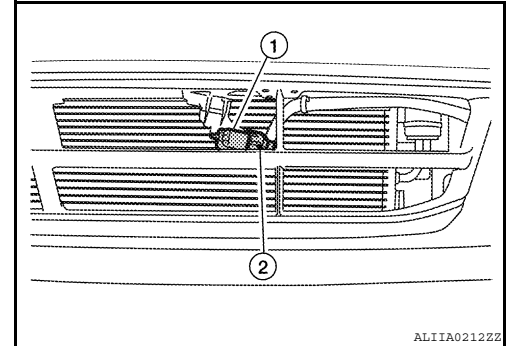
AMBIENT SENSOR

Removal and Installation

INFOID:000000005804694

REMOVAL

1. From under the vehicle, disconnect the ambient sensor connector (2) from the ambient sensor (1).
2. Release the ambient sensor clip and remove the ambient sensor (1) from the ambient sensor bracket.



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INSTALLATION

Installation is in the reverse order of removal.

REFRIGERANT PRESSURE SENSOR

< ON-VEHICLE REPAIR >

REFRIGERANT PRESSURE SENSOR

Removal and Installation for Refrigerant Pressure Sensor

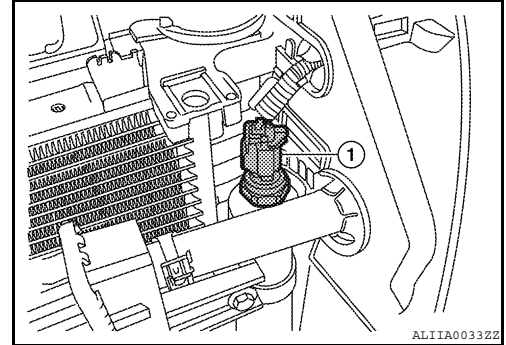
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REMOVAL

1. Discharge the refrigerant. Refer to [HA-25. "HFC-134a \(R-134a\) Service Procedure"](#).
2. Remove the front grille. Refer to [EXT-17. "Removal and Installation"](#).
3. Disconnect the refrigerant pressure sensor connector and remove the refrigerant pressure sensor (1) from the liquid tank on the radiator, condenser and liquid tank assembly.

CAUTION:

Do not damage the radiator, condenser and liquid tank assembly fins.



INSTALLATION

Installation is in the reverse order of removal.

Refer to [HA-24. "Component"](#).

CAUTION:

Replace the O-ring of the refrigerant pressure sensor with a new one, then apply electric compressor oil to it when installing it.

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EXPANSION VALVE

< ON-VEHICLE REPAIR >

EXPANSION VALVE

Removal and Installation for Expansion Valve

INFOID:000000005440204

The expansion valve is part of the evaporator assembly. Refer to [VTL-20. "Removal and Installation"](#).

HEATER PUMP

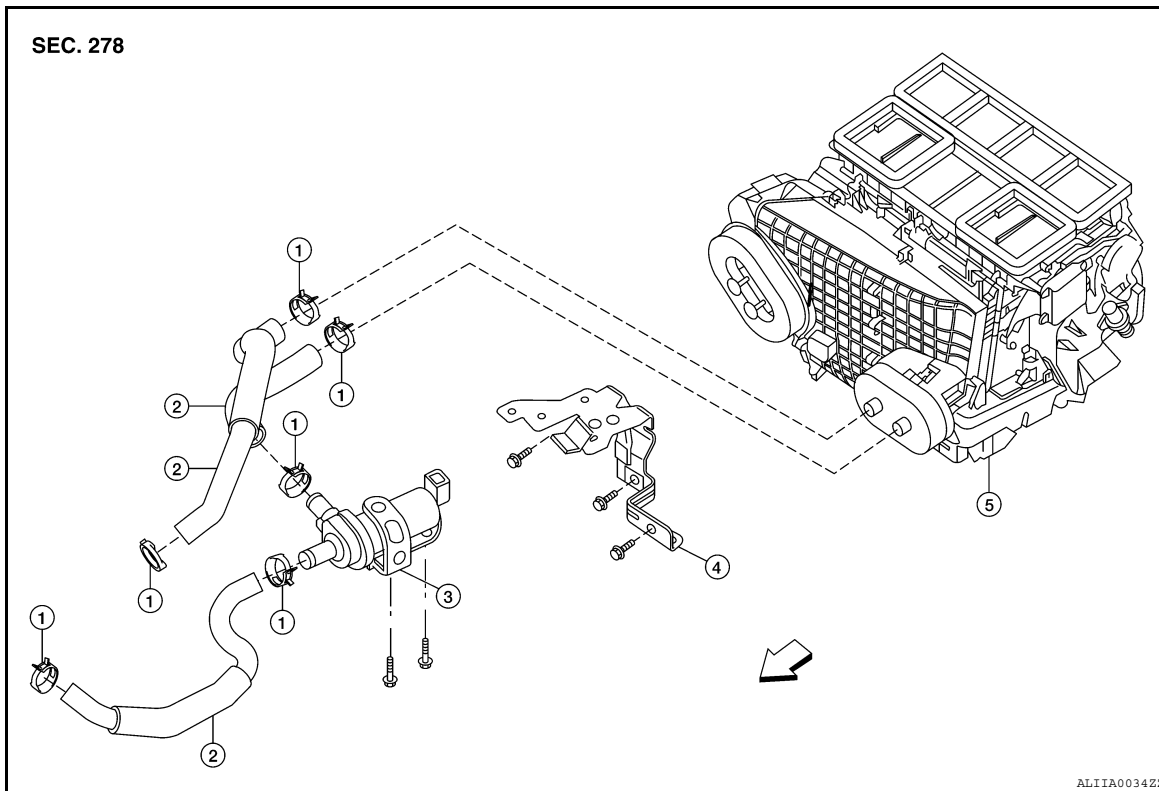
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HEATER PUMP

Removal and Installation

INFOID:000000005440205

COMPONENTS



CAUTION:

- When removing and installing the heater hoses on the heater pump, grip the heater pump directly, do NOT grip the bracket, to avoid breaking the heater pump housing.
- Never run the heater pump without coolant in the engine cooling system.

REMOVAL

1. Remove the engine cover.
2. Remove the air cleaner ducts and assembly. Refer to [EM-24, "Removal and Installation"](#).
3. Partially drain the engine coolant system. Refer to [CO-11, "Changing Engine Coolant"](#).
4. Disconnect the heater hoses from the heater pump.
5. Disconnect the heater pump connector.
6. Remove the heater pump.

INSTALLATION

Installation is in the reverse order of removal.

- Refill the engine cooling system. Refer to [CO-11, "Changing Engine Coolant"](#).

SERVICE DATA AND SPECIFICATIONS (SDS)

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SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Service Data and Specification (SDS)

INFOID:000000005440206

ELECTRIC COMPRESSOR

Model	DENSO
Type	ES-27C
Displacement	27 cm ³ (1.65 in ³) / revolution
Electric compressor type	Scroll type
Operational high voltage range	DC 198 - 420 V
Motor type	DC brushless motor

OIL

Name	Electric Compressor Oil ND-OIL 11	
Capacity	Total in system	120 mℓ (4.06 US fl oz, 4.2 Imp fl oz)
	Electric compressor (service part) charging amount	Refer to HA-15, "Maintenance of Electric Compressor Oil Quantity in Electric Compressor" .

REFRIGERANT

Type	HFC-134a (R-134a)
Capacity	0.50 ± 0.025 kg (1.10 ± 0.055 lb)