SECTION HA

HEATER & AIR CONDITIONING SYSTEM

CONTENTS

R9M (EXCEPT FOR RUSSIA)

MR20DD

R9M (FOR RUSSIA)

PRECAUTION

PRECAUTIONS

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

INFOID:0000000010999961

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.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000011014755

CAUTION:

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

- **Before removing and installing any control units, first turn the ignition power source and accessory power source to the OFF, then disconnect both battery cables.**
- **After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.**
- **Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.**

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Open driver door.
3. Turn the ignition switch to the ON position.
   (At this time, the steering lock will be released.)
4. Turn the ignition switch to OFF position with driver door open.
5. Wait for 3 minutes or longer with driver door open.
   NOTE:
   - Do not close driver door because the steering wheel locks when driver door is closed.

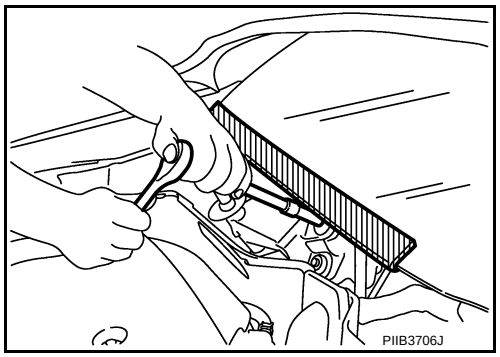
- The auto acc function is adapted to this vehicle. For this reason, even when the ignition switch is turned to OFF position, the accessory power source does not turned OFF and continues to be supplied for a certain amount of time.

6. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
7. Perform the necessary repair operation.
8. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the ignition switch from OFF position to ON position, then to LOCK position. (The steering wheel will lock when the ignition switch is turned to LOCK position.)
9. Perform self-diagnosis check of all control units using CONSULT.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000010999963

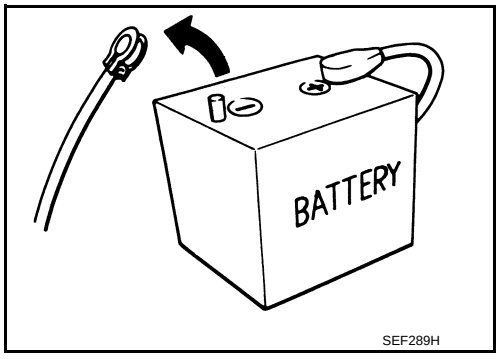
When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.



Precautions for Removing Battery Terminal

INFOID:0000000010999964

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.
- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing “How to disconnect 12V battery terminal” described below.
  NOTE:
  Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage 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.



HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.
For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

1. Open the hood.
2. Turn key switch to the OFF position with the driver side door opened.
3. Get out of the vehicle and close the driver side door.
4. Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes

K9K engine : 4 minutes
M9R engine : 4 minutes
R9M engine : 4 minutes
V9X engine : 4 minutes

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

5. Remove 12V battery terminal.
   CAUTION:
   After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

1. Unlock the door with intelligent key or remote keyless entry.
   NOTE:
   At this moment, ACC power is supplied.
2. Open the driver side door.
3. Open the hood.
4. Close the driver side door.
5. Wait at least 3 minutes.
   CAUTION:
   While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.
6. Remove 12V battery terminal.
   CAUTION:
   After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

Precautions For Refrigerant System Service

INFOID:0000000010999965

GENERAL REFRIGERANT PRECAUTION

WARNING:

- **Never breathe A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFO-1234yf (R-1234yf) from the A/C system, using certified service equipment meeting requirements of SAE J-2843 [HFO-1234yf (R-1234yf) Recovery/Recycling/Recharging Equipment for Flammable Refrigerants for Mobile Air Conditioning Systems]. 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 HFO-1234yf (R-1234yf) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFO-1234yf (R-1234yf) 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 HFO-1234yf (R-1234yf)

CAUTION:

- **CFC-12 (R-12) or HFC-134a (R-134a) refrigerant and HFO-1234yf (R-1234yf) 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 HFO-1234yf (R-1234yf) in the vehicle and recovery tank, use Refrigerant recovery/recycling recharging equipment and Refrigerant Identifier.**

- **Use only specified lubricant for the HFO-1234yf (R-1234yf) A/C system and HFO-1234yf (R-1234yf) components. Compressor malfunction is likely to occur if lubricant other than that specified is used.**
- **The specified HFO-1234yf (R-1234yf) 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 (ND-OIL 12) to come in contact with styrene foam parts. Damage may result.

CONTAMINATED REFRIGERANT

Take appropriate steps shown below if a refrigerant other than pure HFO-1234yf (R-1234yf) 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 high-pressure pipe 1

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:

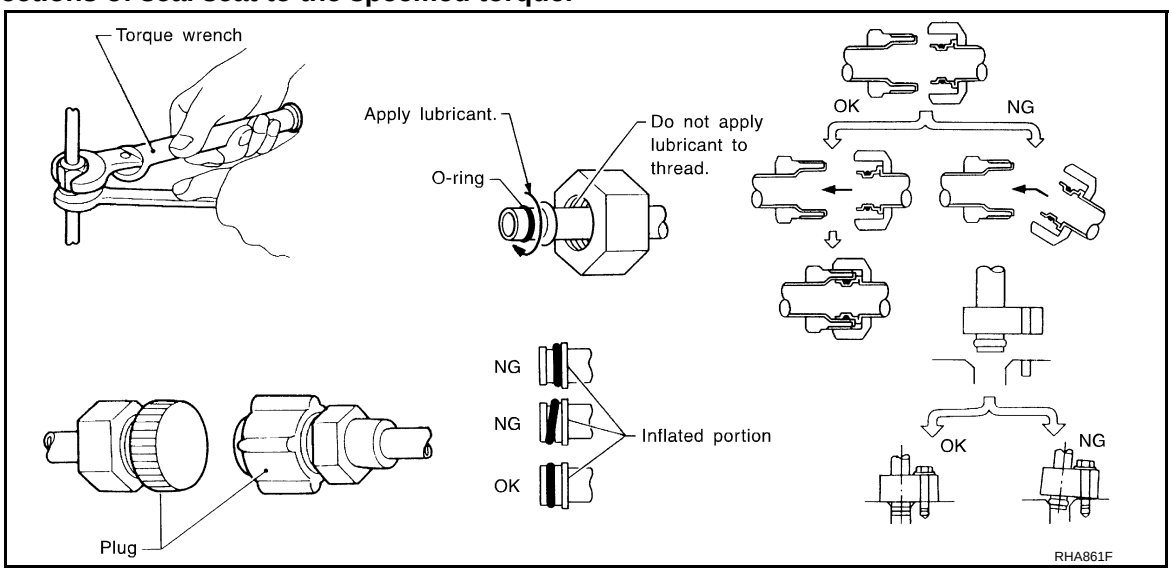
Observe the following when replacing or cleaning refrigerant cycle components.

- **Store it in the same way at 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 : ND-OIL12

- **O-ring must be closely attached to the groove portion of tube.**
- **Never damage O-ring and tube when replacing the O-ring.**
- **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 at 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-22, "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.**

Service Equipment

INFOID:0000000010999966

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

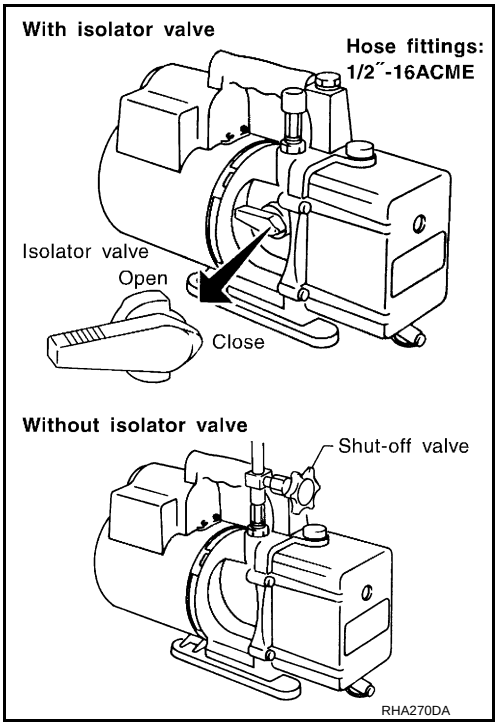
Be certain to follow the manufacturer’s instructions for tester operation and tester maintenance.

VACUUM PUMP

The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFO-1234yf (R-1234yf) 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 HFO-1234yf or R-1234yf. Be sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFO-1234yf (R-1234yf) and specified lubricants.

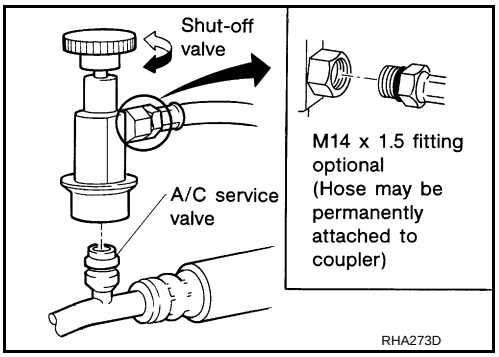
SERVICE HOSES

Be certain that the service hoses display the markings described. 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 HFO-1234yf (R-1234yf) service couplers to the CFC-12 (R-12) and HFC-134a (R-134a) A/C system. The HFO-1234yf (R-1234yf) couplers do not properly connect to the CFC-12 (R-12) and HFC-134a (R-134a) 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 HFO-1234yf (R-1234yf) 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.

PREPARATION

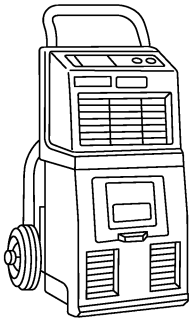
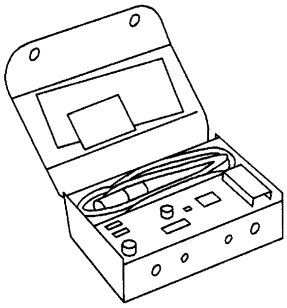
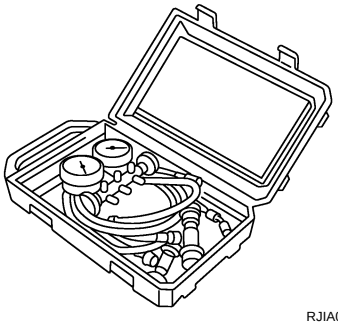
PREPARATION

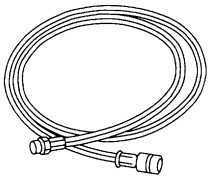
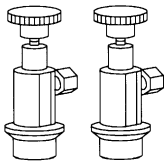
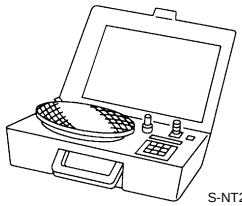
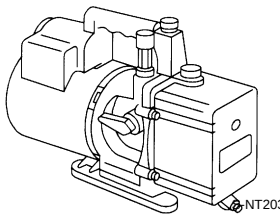
Commercial Service Tools

INFOID:0000000010999967

HFO-1234yf (R-1234yf) Service Tool and Equipment

- Never mix HFO-1234yf (R-1234yf) refrigerant and/or its specified lubricant with CFC-12 (R-12) and HFC-134a (R-134a) 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), HFC-134a (R-134a) and HFO-1234yf (R-1234yf). 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
Recovery/recycling/recharging equipment	 RJIA0195E	Function: • Refrigerant recovery, recycling and recharging • Compliant with HFO-1234yf (R-1234yf)
Electrical leak detector	 A/C leak detector SHA705EB	Power supply: DC 12 V (Cigarette lighter)
Manifold gauge set (with hoses and couplers)	 RJIA0196E	Identification: • The gauge face indicates HFO-1234yf (R-1234yf). Fitting size: Thread size • 1/2″-16 ACME

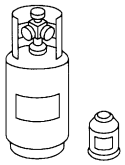
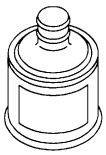
Tool name		Description
Service hoses • High-pressure side hose • Low-pressure side hose • Utility hose	 S-NT201	Hose fitting to gauge: • 1/2″-16 ACME Compliant with HFO-1234yf (R-1234yf)
Service couplers • High-pressure side coupler • Low-pressure side coupler	 S-NT202	Hose fitting to service hose: M14 x 1.5 fitting is optional or permanently attached. Compliant with HFO-1234yf (R-1234yf)
Refrigerant weight scale	 S-NT200	For measuring of refrigerant Fitting size: Thread size 1/2″-16 ACME Compliant with HFO-1234yf (R-1234yf)
Vacuum pump (Including the isolator valve)	 S-NT203	Capacity: • Air displacement: 4 CFM • Micron rating: 20 microns • Oil capacity: 482 g (17 oz.) Fitting size: Thread size • 1/2″-16 ACME Compliant with HFO-1234yf (R-1234yf)

Sealant or/and Lubricant

INFOID:0000000010999968

HFO-1234yf (R-1234yf) Service Tool and Equipment

- Never mix HFO-1234yf (R-1234yf) refrigerant and/or its specified lubricant with CFC-12 (R-12) and HFC-134a (R-134a) 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), HFC-134a (R-134a) and HFO-1234yf (R-1234yf). 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
HFO-1234yf (R-1234yf) refrigerant  S-NT196	Container color: Light blue Container marking: HFO-1234yf (R-1234yf) Fitting size: Thread size • Large container 1/2″-16 ACME
ND-OIL12  JMIIA1759ZZ	Type: Polyalkylene glycol oil (PAG) Application: HFO-1234yf (R-1234yf) swash plate compressors Capacity: 40 m ℓ (1.4 Imp fl oz.)

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

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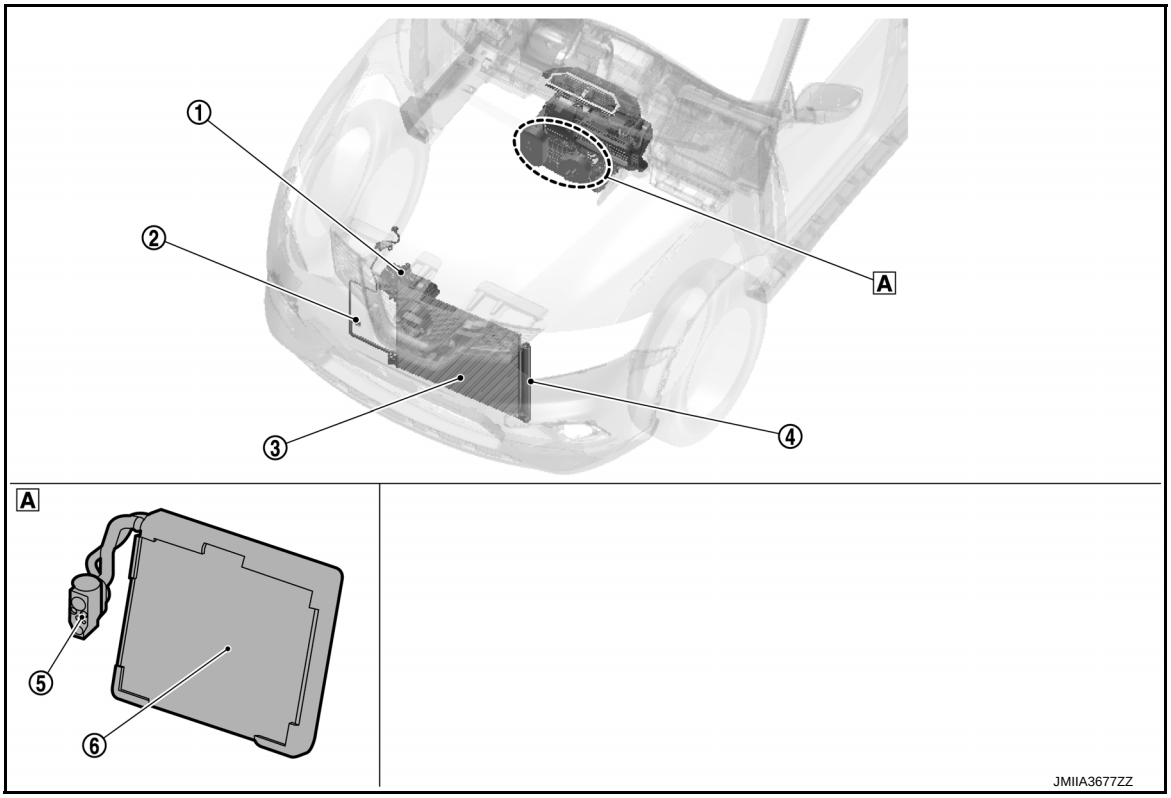

A In the heater & cooling unit assembly

No.	Location	Function
①	Compressor	Intakes, compresses, and discharges refrigerant, to circulate refrigerant inside the refrigerant cycle.
②	Refrigerant pressure sensor	• AUTOMATIC AIR CONDITIONING: Refer to HAC-19, "Refrigerant Pressure Sensor". • MANUAL AIR CONDITIONING: Refer to HAC-148, "Refrigerant Pressure Sensor".
③	Condenser (condenser & Liquid tank)	Cools refrigerant discharged from compressor, and transforms it to liquid refrigerant.
④	Liquid tank (condenser & Liquid tank)	Eliminates foreign matter in refrigerant, and stores temporarily liquid refrigerant.
⑤	Expansion valve	Transforms high-pressure liquid refrigerant to mist form low-pressure liquid refrigerant by drawing function.
⑥	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.

SYSTEM

System Diagram

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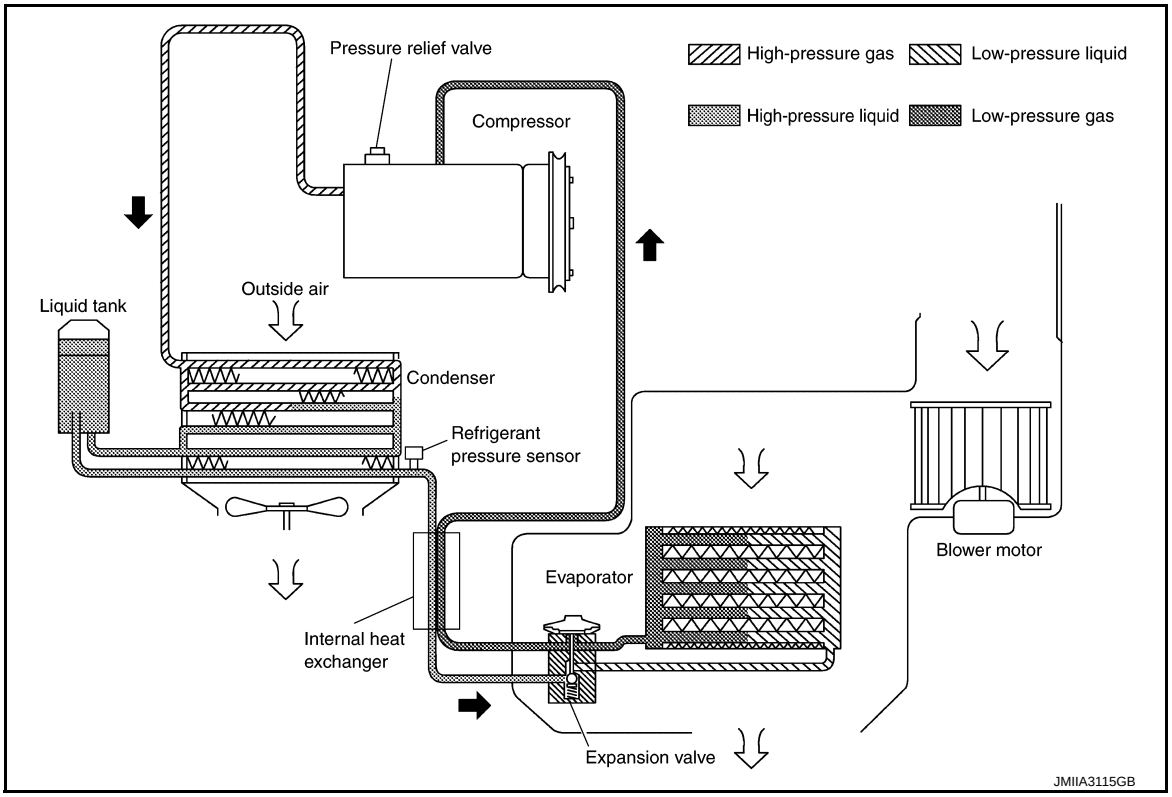


System Description

INFOID:0000000010999972

REFRIGERANT CYCLE

Refrigerant Flow

The refrigerant from the compressor, flows the condenser with liquid tank, the evaporator, and returns to the compressor. The refrigerant evaporation in the evaporator is controlled by an expansion valve.

Freeze Protection

When intake sensor detects that evaporator surface temperature is 2°C (36°F) or less, A/C auto amp. (Automatic air conditioning) or A/C amp. (Manual air conditioning) requests ECM to turn the compressor OFF, and ECM makes A/C relay to OFF, and stops the compressor.

REFRIGERANT SYSTEM PROTECTION

Refrigerant Pressure Sensor

- The refrigerant system is protected against excessively high- or low-pressures by the refrigerant pressure sensor, installed at the high-pressure pipe 1. 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 (31.2 bar, 31.8 kg/cm^2, 452 psi) or more (Engine speed is less than 1,500 rpm.)
- Approximately 2,740 kPa (27.4 bar, 27.9 kg/cm^2, 397 psi) or more (Engine speed is 1,500 rpm or more.)
- Approximately 140 kPa (1.4 bar, 1.4 kg/cm^2, 20 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 when the pressure of refrigerant in the system increases to an unusual level [more than 3,800 kPa (38 bar, 38.8 kg/cm^2, 551 psi)].

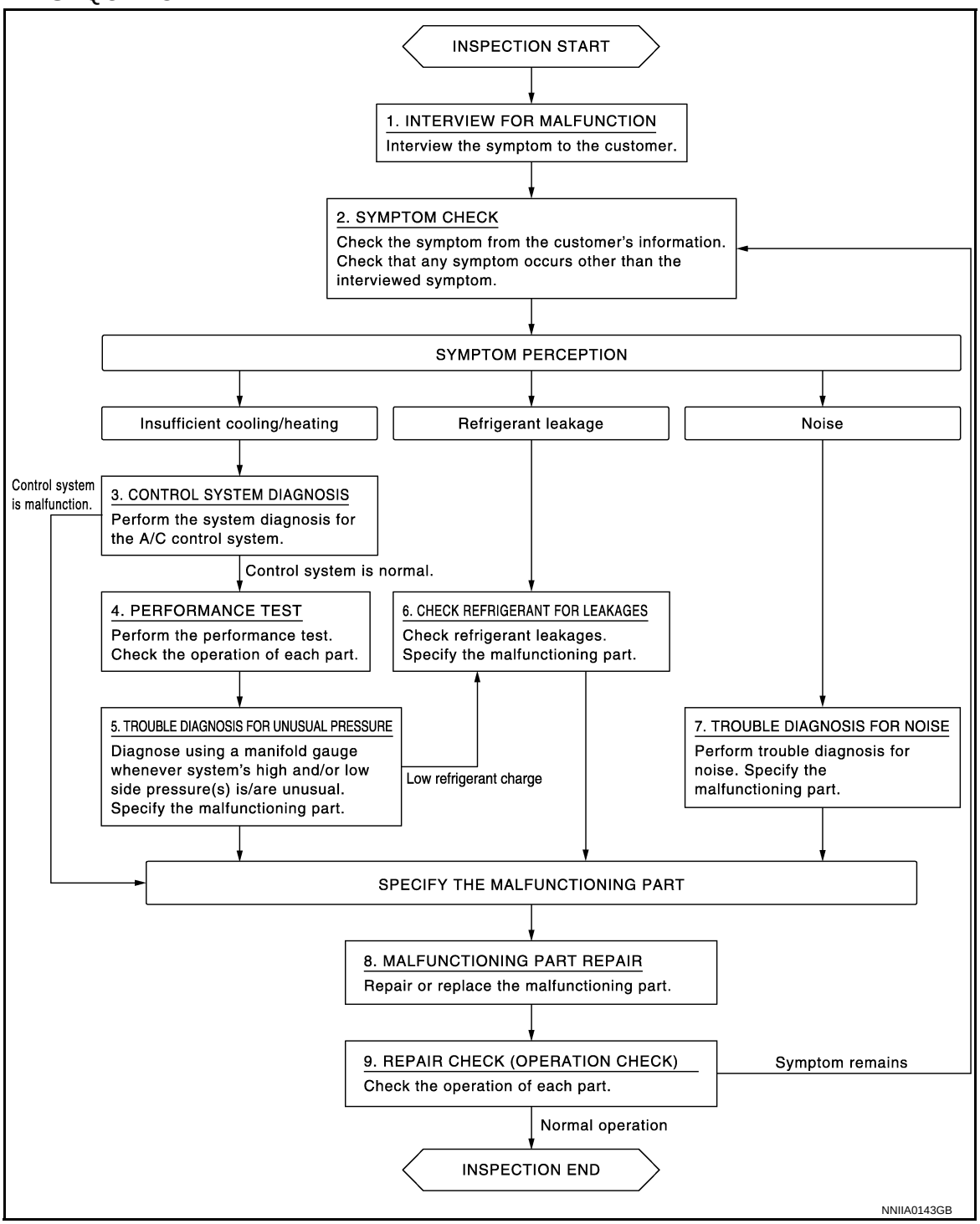
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000010999973

OVERALL SEQUENCE



DETAILED FLOW

1.INTERVIEW FOR MALFUNCTION

Interview the symptom to the customer.

>> 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-69, "Work Flow" (AUTOMATIC AIR CONDITIONING SYSTEM) or HAC-183, "Work Flow" (MANUAL AIR CONDITIONING SYSTEM).

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-25, "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-27, "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-19, "Leak Test".

>> GO TO 8.

7.TROUBLE DIAGNOSIS FOR NOISE

Perform trouble diagnosis for noise. Specify the malfunctioning part. Refer to HA-29, "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?

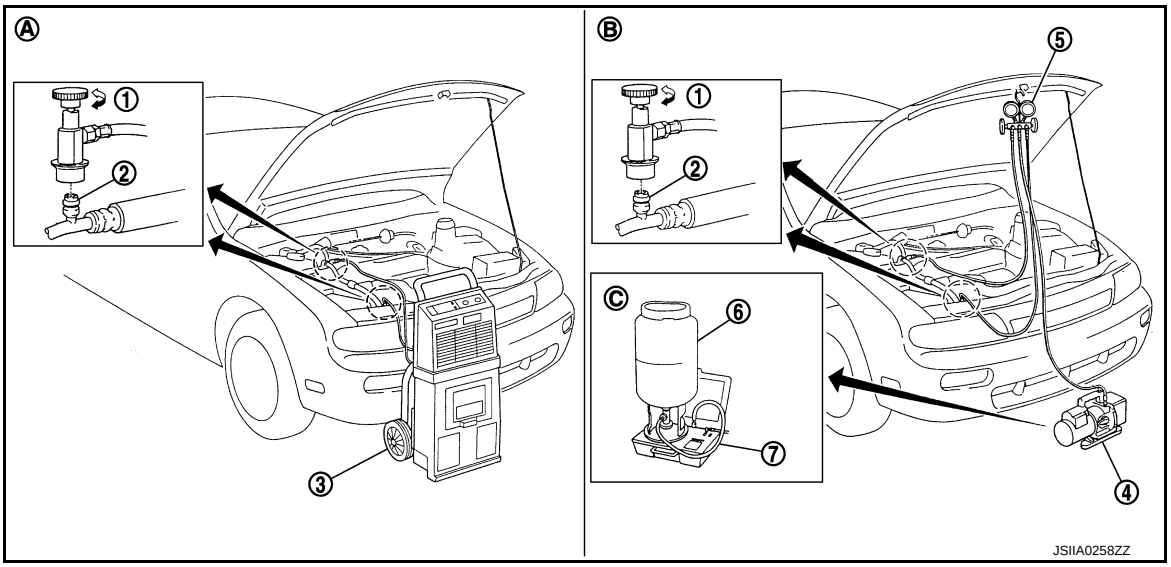
YES >> INSPECTION END
NO >> GO TO 2.

REFRIGERANT

Description

INFOID:0000000010999974

CONNECTION OF SERVICE TOOLS AND EQUIPMENT



① Shut-off valve	② A/C service valve	③ Recovery/recycling recharging equipment
④ Vacuum pump	⑤ Manifold gauge set	⑥ Refrigerant container (HFO-1234yf)
⑦ Weight scale		
Ⓐ Preferred (best) method	Ⓑ Alternative method	Ⓒ For charging

Leak Test

INFOID:0000000010999975

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 to A/C service valve.
3. Check that A/C refrigerant pressure is 345 kPa (3.45 bar, 3.52 kg/cm^2, 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 (3.45 bar, 3.52 kg/cm^2, 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 probe.

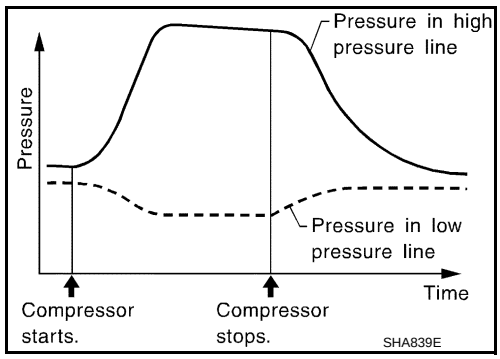
   CAUTION:

   - **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
   - 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:
Never 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:0000000010999976

WARNING:
- **Always use HFO-1234yf for A/C refrigerant. If CFC-12 or HFC-134a 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 HFO-1234yf 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-22, "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:0000000010999977

WARNING:

- **Always use HFO-1234yf for A/C refrigerant. If CFC-12 or HFC-134a 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 my irritate eyes, nose, or throat.**
- **Never allow HFO-1234yf 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.
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 rises more than the specified level, charge A/C system with approximately 200 g (0.4 lb) refrigerant and check that there is no refrigerant leakage. Refer to HA-19, "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.

LUBRICANT

Description

INFOID:0000000010999978

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. Otherwise, the following conditions may occur.

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

Name : ND-OIL12

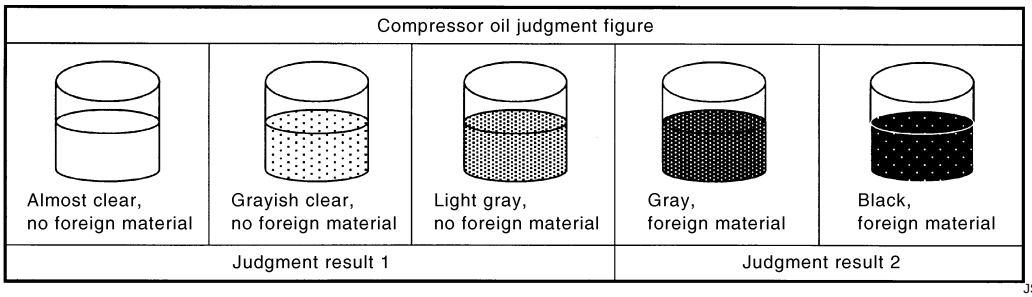
Inspection

INFOID:0000000010999979

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

1.COMPRESSOR OIL JUDGMENT

1. Remove the compressor. Refer to HA-30, "Removal and Installation".
2. Sample a compressor oil and judge on the figure.



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Judgement result 1>>Replace compressor only.
Judgement result 2>>Replace compressor and condenser & liquid tank assembly.

Perform Lubricant Return Operation

INFOID:0000000010999980

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 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:0000000010999981

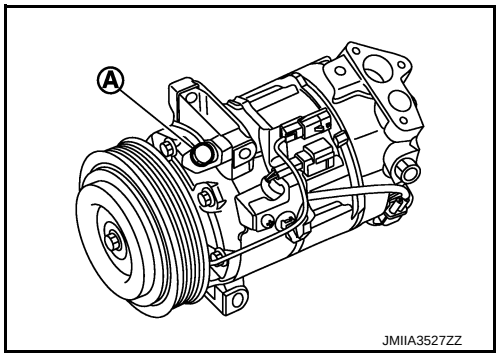
Fill with lubricant for the amount that is calculated according to the following conditions.
Example: Lubricant amount to be added when replacing evaporator and condenser&liquid tank assembly [m ℓ (Imp fl oz.)] = 35 (1.2) + 20 (0.7) + α

Conditions		Lubricant amount to be added to A/C system m ℓ (Imp fl oz.)
Replace evaporator		35 (1.2)
Replace condenser & liquid tank assembly		20 (0.7)
Refrigerant leakage is detected	Large amount leakage	30 (1.1)
	Small amount leakage	—
Lubricant amount that is recycled together with refrigerant during recycle operation		α

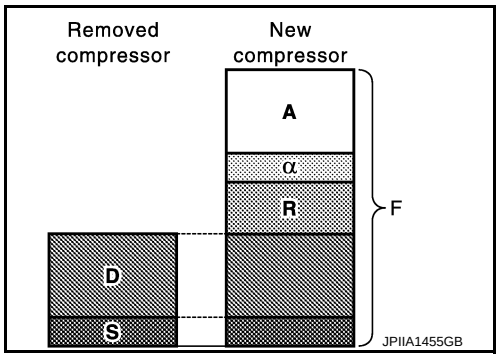
Lubricant Adjusting Procedure for Compressor Replacement

INFOID:0000000010999982

1. Drain lubricant from removed compressor and measure lubricant amount.
   - Remove drain bolt Ⓐ, and then drain lubricant from drain port.
   - 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 (Imp fl oz.)] = F – (D + S + R + α)

F : Lubricant amount that a new compressor contains [110 (3.9)]

D : Lubricant amount that is drained from removed compressor

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

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

α : 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 (2.1 Imp fl oz.), perform calculation by setting "D" as 40 m ℓ (1.4 Imp fl oz.).

Conditions	Lubricant amount to be added to A/C system m ℓ (Imp fl oz.)
Replace evaporator	35 (1.2)
Replace condenser & liquid tank assembly	20 (0.7)

Example: Lubricant amount to be drained from a new compressor when replacing compressor and condenser & liquid tank assembly [m ℓ (Imp fl oz.)] [D = 60 (2.1), α = 5 (0.2)]
110 (3.9) – [60 (1.6) + 20 (0.7) + 5 (0.2)] = 15 (0.5)

3. Tighten drain bolt to the specified torque.

Specified torque : 30 N·m (3.1 kg-m, 22 ft-lb)

4. Install compressor and check the operation.

PERFORMANCE TEST

Inspection

INFOID:0000000010999983

INSPECTION PROCEDURE

1. Connect recovery/recycling/recharging equipment (for HFO-1234yf) 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 speed	Maximum speed set

3. Maintain test condition until A/C system becomes stable. (More than 15 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-27, "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	15 (59)	4.9 – 6.9 (41 – 44)
	20 (68)	9.1 – 11.6 (48 – 53)
	25 (77)	13.2 – 16.2 (56 – 61)
	30 (86)	17.6 – 21.1 (64 – 70)
60 – 70	15 (59)	6.9 – 8.9 (44 – 48)
	20 (68)	11.6 – 14.1 (53 – 57)
	25 (77)	16.2 – 19.2 (61 – 66)
	30 (86)	21.1 – 24.6 (70 – 76)

AMBIENT AIR TEMPERATURE-TO-OPERATING PRESSURE TABLE

Fresh air		High-pressure (Discharge side) kPa (bar, kg/cm^2, psi)	Low-pressure (Suction side) kPa (bar, kg/cm^2, psi)
Relative humidity %	Air temperature °C (°F)		
50 – 70	25 (77)	926 – 1,133 (9.3 – 11.3, 9.5 – 11.6, 134.3 – 164.2)	196 – 240 (2.0 – 2.4, 2.0 – 2.5, 28.4 – 34.8)
	30 (86)	1,070 -– 1,308 (10.7 – 13.1, 10.9 – 13.3, 155.1 – 189.6)	233 – 285 (2.3 – 2.9, 2.4 – 2.9, 33.8 – 41.3)
	35 (95)	1,091 – 1,332 (10.9 – 13.3, 11.1 – 13.6, 158.1 – 193.2)	278 – 340 (2.8 – 3.4, 2.8 – 3.5, 40.3 – 49.2)
	40 (104)	1,300 – 1,580 (13.0 – 15.8, 13.3 – 16.1, 188.5 – 229.1)	333 – 407 (3.3 – 4.1, 3.4 – 4.2, 48.3 – 59.0)

SYMPTOM DIAGNOSIS

REFRIGERATION SYSTEM SYMPTOMS

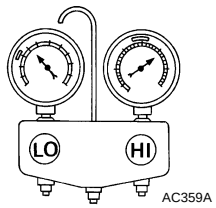
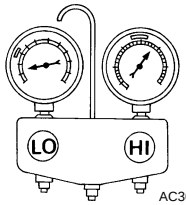
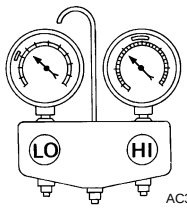
Trouble Diagnosis For Unusual Pressure

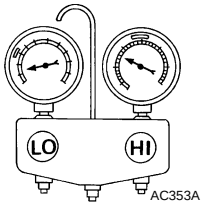
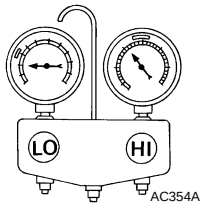
INFOID:0000000010999984

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

Symptom Table

INFOID:0000000010999985

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too high.  AC359A	The pressure returns to normal soon after sprinkling water on condenser.	Overfilled refrigerant.	Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.
	Air flow to condenser is insufficient.	Insufficient condenser cooling performance. • Poor fan rotation of radiator and condenser. • Improper installation of air guide. • Clogged or dirty condenser fins.	• Repair or replace malfunctioning parts. • Clean and repair condenser fins.
	When compressor is stopped, a high-pressure reading quickly drops by approximately 196 kPa (1.96bar, 2 kg/cm^2, 28 psi). It then gradually decreases.	Air mixed in refrigerant cycle.	Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.
	• Low-pressure pipe is cooler than the outlet of evaporator. • Low-pressure pipe is frosted.	Expansion valve opened too much (excessive flow of refrigerant).	Replace expansion valve.
High-pressure side is excessively high and low-pressure side is too low.  AC360A	High-pressure pipe and upper side of condenser become hot, however, liquid tank does not become so hot.	Clogged or crushed high-pressure pipe located between compressor and condenser.	Repair or replace the malfunctioning parts.
High-pressure side is too low and low-pressure side is too high.  AC356A	• The readings of both sides become equal soon after compressor operation stops. • There is no temperature difference between high- and low-pressure sides.	Malfunction in compressor system (insufficient compressor pressure operation). • Damage or breakage of valve. • Malfunctioning gaskets.	Replace compressor.

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low.  AC353A	• The area around evaporator outlet does not become cold. • The area around evaporator inlet becomes frosted.	Clogged expansion valve. • Breakage of temperature sensor. • Clogging by foreign material.	Eliminate foreign material from expansion valve, or replace it.
	• There is a temperature difference between the areas around outlet and inlet pipes of liquid tank. • Liquid tank becomes frosted.	Malfunction in inner liquid tank (clogged strainer).	Replace condenser & liquid tank assembly.
	Evaporator becomes frosted.	Clogged or crushed low-pressure pipe.	Repair or replace malfunctioning parts.
		Malfunction in intake sensor.	Check intake sensor system. Refer to HAC-81, "Diagnosis Procedure" (AUTOMATIC AIR CONDITIONING SYSTEM) or HAC-192, "Diagnosis Procedure" (MANUAL AIR CONDITIONING SYSTEM).
	There is a small temperature difference between the high and low pressure pipes for refrigerant cycle.	• Shortage of refrigerant. • Leakage of refrigerant.	• Check for leakage. • Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.
Low-pressure side sometimes becomes negative.  AC354A	• Sometimes the area around evaporator outlet does not become cold. • Sometimes the area around evaporator inlet is frosted.	• Icing caused by the mixing of water in cooler cycle. • Deteriorated dryer in liquid tank.	• Collect all refrigerant. • Evacuate refrigerant cycle completely, and then refill it with the specified amount of refrigerant. At this time, always replace condenser & liquid tank assembly.
Hunting in high-pressure side.	There is no temperature difference between high- and low-pressure sides.	Malfunctioning variable valve in compressor.	• Replace compressor. • Check ECV system. Refer to HAC-113, "Diagnosis Procedure" (AUTOMATIC AIR CONDITIONING SYSTEM), HAC-212, "Diagnosis Procedure" (MANUAL AIR CONDITIONING SYSTEM).

NOISE

Symptom Table

INFOID:0000000010999986

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 HA-22, "Inspection".
	Magnet clutch	Contact of clutch disc with pulley.	Check clearance between clutch disc and pulley. Refer to HA-31, "Inspection".
	Compressor body	Loosened compressor mounting bolts.	Check bolts for tightness. Refer to HA-30, "Exploded View".
Unusual noise from cooler piping.	Cooler piping (pipe and flexible hose)	Improper installation of clip and bracket.	Check the installation condition of the cooler piping. Refer to HA-32, "Exploded View".
Unusual noise from expansion valve when A/C is ON.	Expansion valve	Shortage of refrigerant.	• Check for leakage. • Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.
		Wear, breakage, or clogging of foreign material in inner parts.	Eliminate foreign material from expansion valve, or replace it.
Unusual noise from belt.	—	Loosened belt	Check belt tension. Refer to EM-302, "Adjustment"
		Internal compressor parts get locked	Replace compressor.

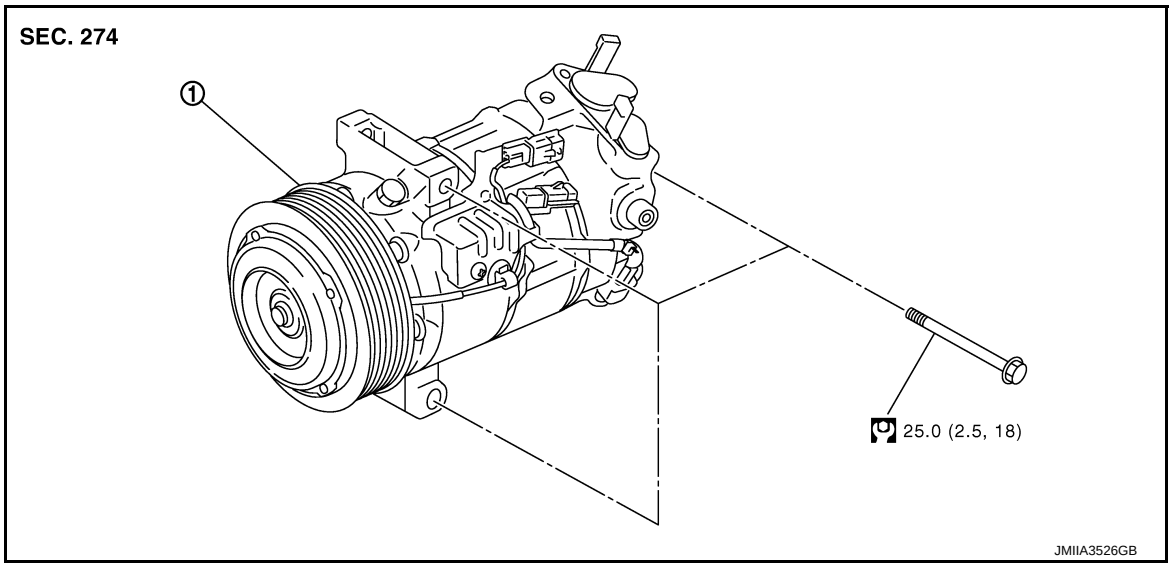
REMOVAL AND INSTALLATION

COMPRESSOR

Exploded View

INFOID:0000000011000232

REMOVAL



① Compressor

: N·m (kg-m, ft-lb)

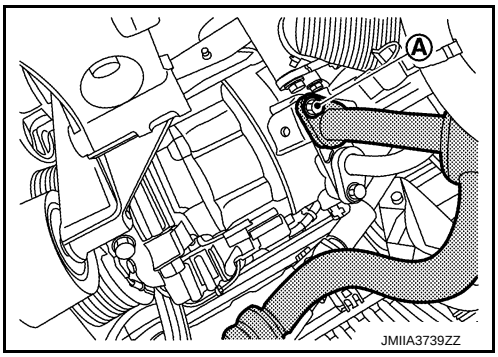
Removal and Installation

INFOID:0000000011000233

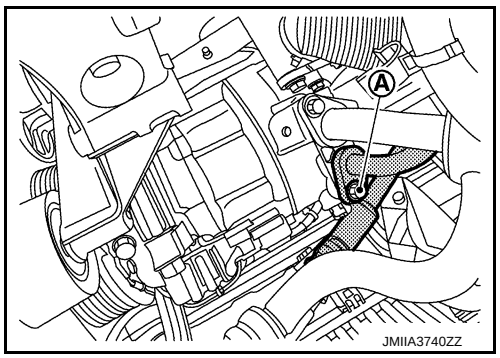
CAUTION:
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-22, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFO-1234yf) to discharge the refrigerant. Refer to HA-20, "Recycle Refrigerant".
2. Remove alternator. Refer to CHG-26, "R9M : Removal and Installation".
3. Remove mounting bolt Ⓐ, and then disconnect low-pressure flexible hose from the 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. Remove mounting bolt Ⓐ, and then disconnect high-pressure flexible hose from the 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.



5. Disconnect compressor harness connectors.
6. Remove mounting bolts, and then remove compressor form 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.**
- **Perform lubricant adjusting procedure before installing new compressor. Refer to HA-23, "Lubricant Adjusting Procedure for Compressor Replacement".**
- **Check for leakages when recharging refrigerant. Refer to HA-19, "Leak Test".**
- **Check tension of the drive belt after installing compressor. Refer to EM-301, "Inspection"**

Inspection

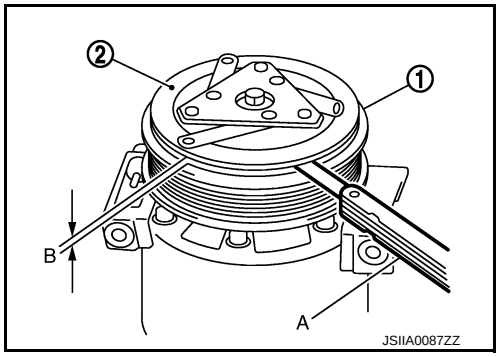
INFOID:0000000011000234

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-48, "Compressor".

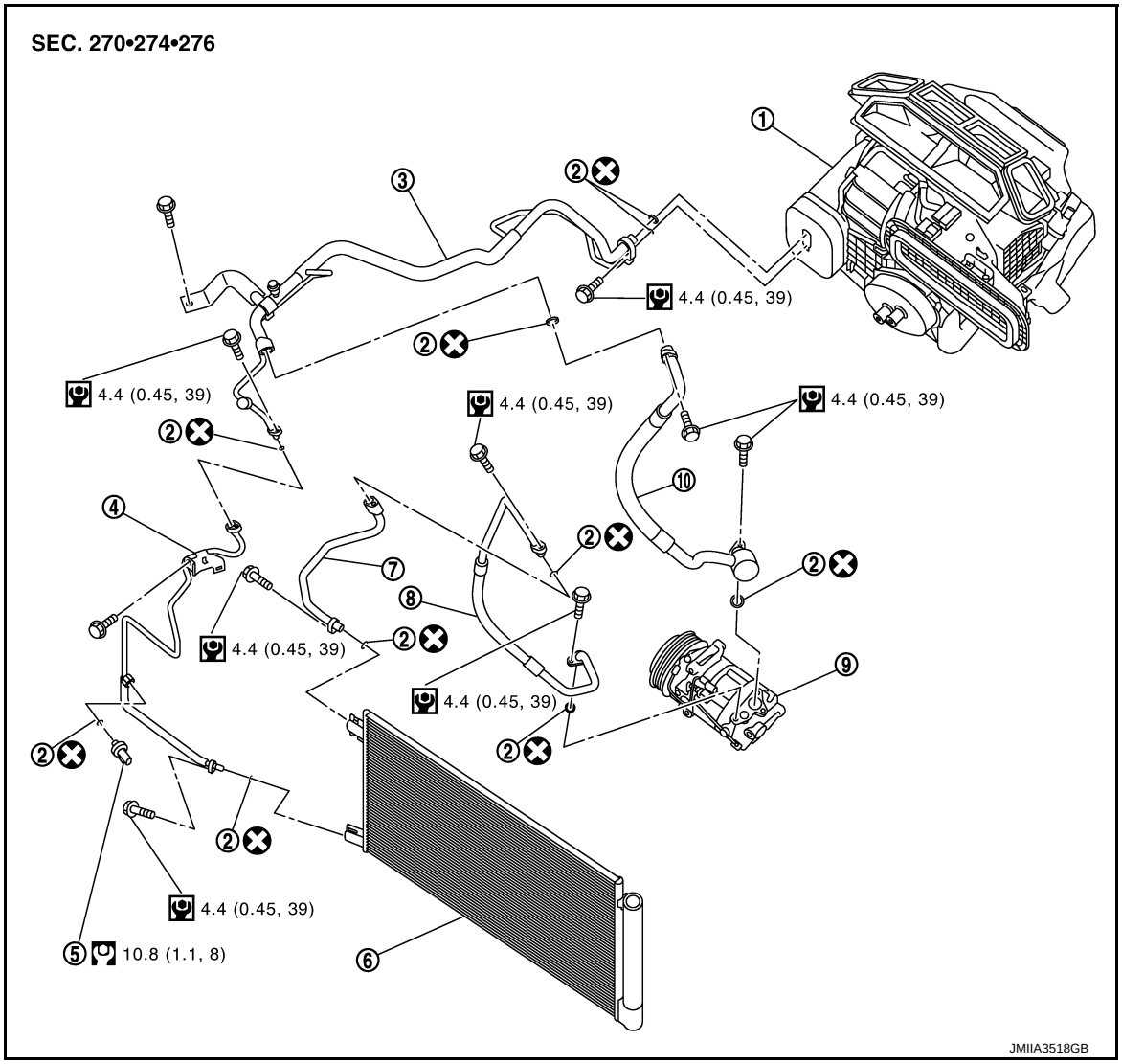
CAUTION:
Replace compressor if the specified clearance is not obtained, replace adjusting spacer and readjust.



COOLER PIPE AND HOSE

Exploded View

INFOID:0000000011000235



① A/C unit assembly
② O-ring
③ Internal heat exchanger pipe
④ High-pressure pipe 1
⑤ Refrigerant pressure sensor
⑥ Condenser
⑦ High-pressure pipe 2
⑧ High-pressure flexible hose
⑨ Compressor
⑩ Low-pressure flexible hose

: Always replace after every disassembly.

: N·m (kg-m, in-lb)

HIGH-PRESSURE FLEXIBLE HOSE

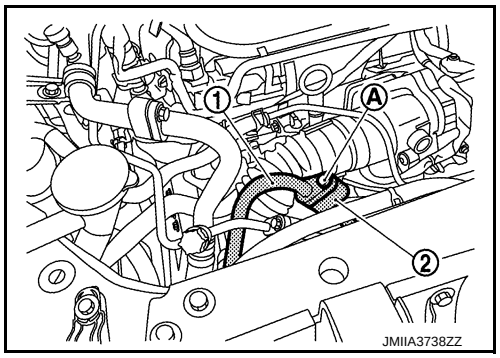
HIGH-PRESSURE FLEXIBLE HOSE : Removal and Installation

INFOID:0000000011000236

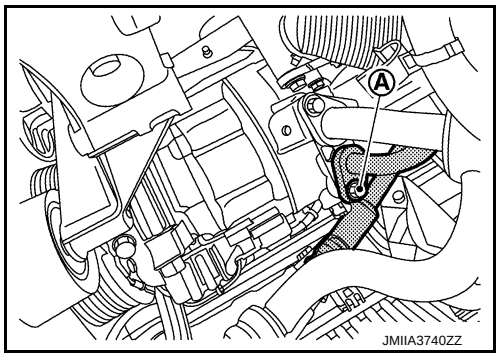
CAUTION:
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-22, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFO-1234yf) to discharge the refrigerant. Refer to HA-20, "Recycle Refrigerant".
2. Remove mounting bolt Ⓐ, and then disconnect high-pressure flexible hose ① from the high-pressure pipe 2 ②.
CAUTION:
Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.



3. Remove mounting bolt Ⓐ, and then disconnect high-pressure flexible hose from the 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. Remove high-pressure flexible hose 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.**
- **Check for leakages when recharging refrigerant. Refer to HA-19, "Leak Test".**

LOW-PRESSURE FLEXIBLE HOSE

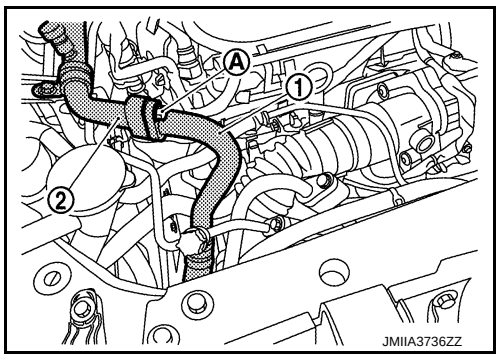
LOW-PRESSURE FLEXIBLE HOSE : Removal and Installation

INFOID:0000000011000237

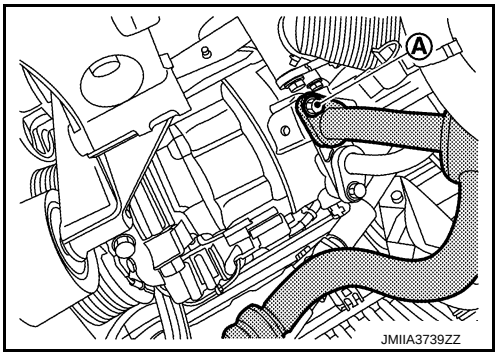
CAUTION:
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-22, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFO-1234yf) to discharge the refrigerant. Refer to HA-20, "Recycle Refrigerant".
2. Remove mounting bolt Ⓐ, and then disconnect low-pressure flexible hose ① from internal heat exchanger pipe ②.
CAUTION:
Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.



3. Remove mounting bolt Ⓐ, and then disconnect low-pressure flexible hose from the 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. Remove low-pressure flexible hose 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.**
- **Check for leakages when recharging refrigerant. Refer to HA-19, "Leak Test".**

INTERNAL HEAT EXCHANGER PIPE

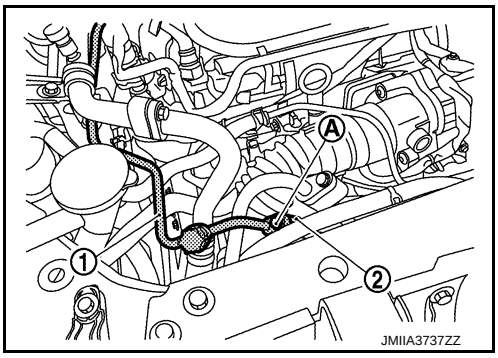
INTERNAL HEAT EXCHANGER PIPE : Removal and Installation

INFOID:0000000011000238

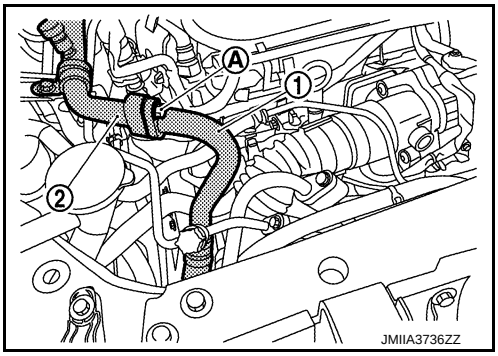
CAUTION:
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-22, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFO-1234yf) to discharge the refrigerant. Refer to HA-20, "Recycle Refrigerant".
2. Disconnect fixing clip, and then remove insulator upper side.
3. Remove mounting bolt, and then disconnect internal heat exchanger pipe from expansion valve.
CAUTION:
Cap or wrap the joint of the A/C piping and expansion valve with suitable material such as vinyl tape to avoid the entry of air.
4. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe 1 ② from internal heat exchanger pipe ①.
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 bolt Ⓐ, and then disconnect low-pressure flexible hose ① from internal heat exchanger pipe ②.
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 bolt, and then remove internal heat exchanger pipe.

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.**
- **Check for leakages when recharging refrigerant. Refer to HA-19, "Leak Test".**

HIGH-PRESSURE PIPE 1

HIGH-PRESSURE PIPE 1 : Removal and Installation

INFOID:0000000011000239

CAUTION:

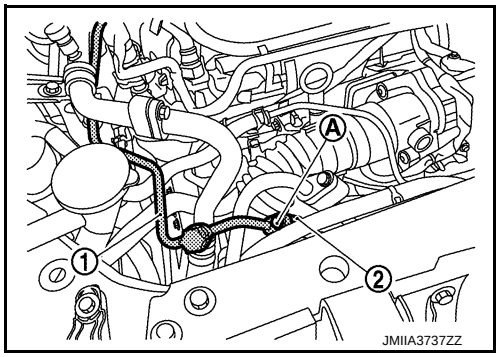
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-22, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFO-1234yf) to discharge the refrigerant. Refer to HA-20, "Recycle Refrigerant".
2. Remove front bumper fascia assembly. Refer to EXT-15, "Removal and Installation".
3. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe 1 ② from internal heat exchanger pipe ①.

   CAUTION:

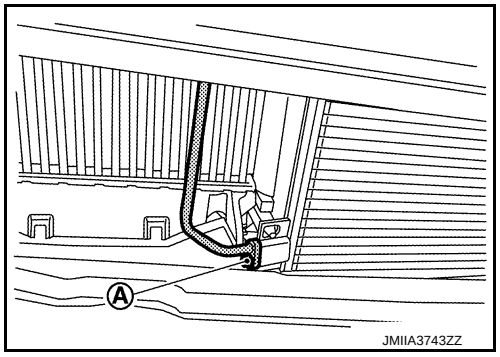
   Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.



4. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe 1 from the condenser & liquid tank assembly.

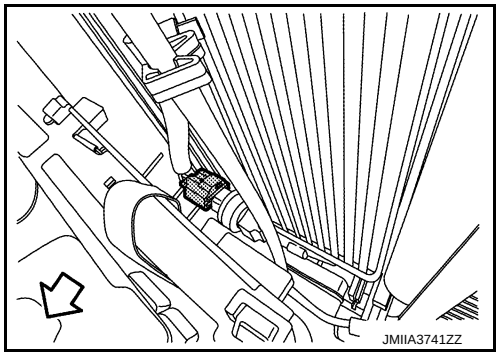
   CAUTION:

   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.



5. Disconnect refrigerant pressure sensor harness connector.

   ⇦ : Vehicle front



6. Remove mounting bolt, and then remove high-pressure pipe 1 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.**
- **Check for leakages when recharging refrigerant. Refer to HA-19, "Leak Test".**

HIGH-PRESSURE PIPE 2

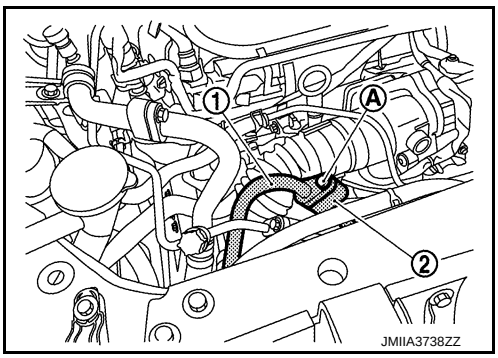
HIGH-PRESSURE PIPE 2 : Removal and Installation

INFOID:0000000011000240

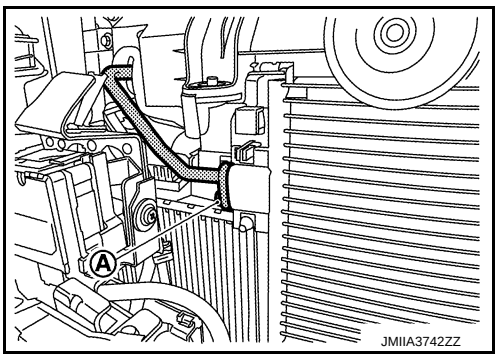
CAUTION:
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-22, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFO-1234yf) to discharge the refrigerant. Refer to HA-20, "Recycle Refrigerant".
2. Remove front bumper fascia assembly. Refer to EXT-15, "Removal and Installation".
3. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe 2 ② from high-pressure flexible hose ①.
   CAUTION:
   Cap or wrap the joint of the A/C piping and expansion valve with suitable material such as vinyl tape to avoid the entry of air.



4. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe 2 from condenser & liquid tank 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.



5. Remove high-pressure pipe 2 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.**
- **Check for leakages when recharging refrigerant. Refer to HA-19, "Leak Test".**

REFRIGERANT PRESSURE SENSOR

REFRIGERANT PRESSURE SENSOR : Removal and Installation

INFOID:0000000011000241

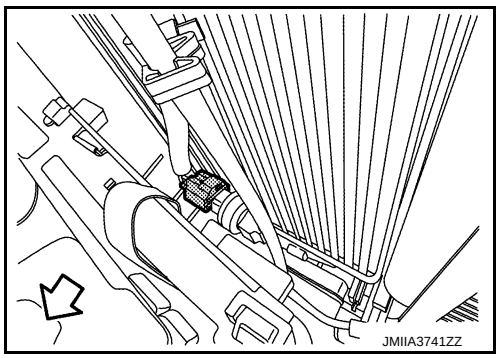
CAUTION:
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-22, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFO-1234yf) to discharge the refrigerant. Refer to HA-20, "Recycle Refrigerant".
2. Remove front bumper fascia assembly. Refer to EXT-15, "Removal and Installation".

3. Clean refrigerant pressure sensor and its surrounding area, and then remove dust and rust from refrigerant pressure sensor.
   CAUTION:
   Be sure to clean carefully.
4. Disconnect refrigerant pressure sensor connector.

   ⇦ : Vehicle front



5. Use a adjustable wrench or other tool to hold the refrigerant pressure sensor mounting block, and then remove the refrigerant pressure sensor from high-pressure pipe 1.
   CAUTION:
   - **Never to damage high-pressure pipe 1.**
   - **Cap or wrap the joint of the A/C piping 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.

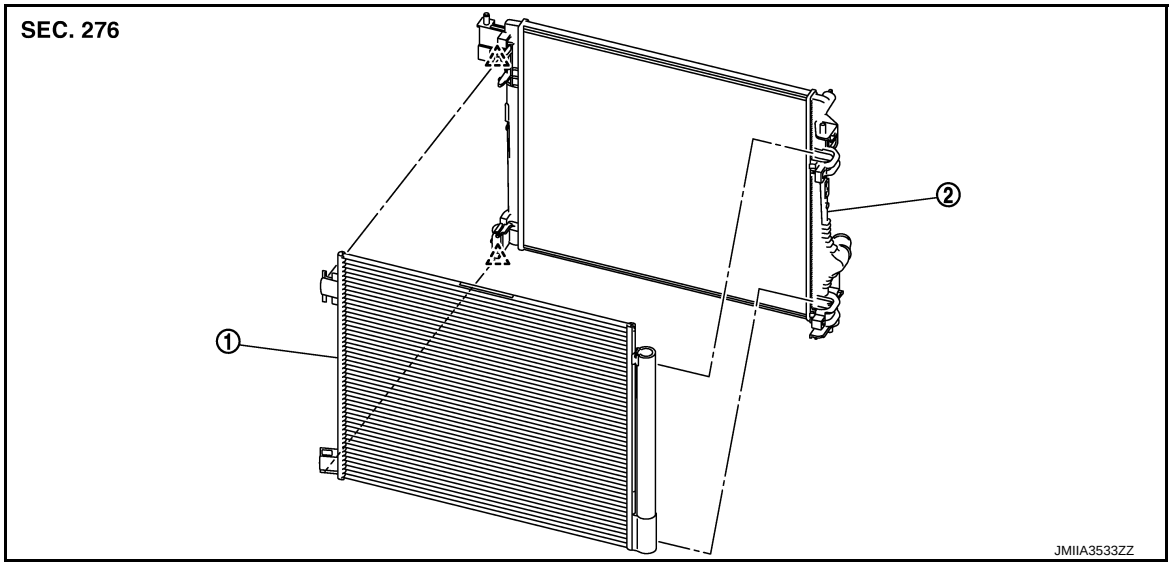
CAUTION:

- **Replace O-ring with new one. Then apply compressor oil to them when installing.**
- **Check for leakages when recharging refrigerant. Refer to HA-19, "Leak Test".**

CONDENSER

Exploded View

INFOID:0000000011000242



① Condenser & liquid tank assembly ② Radiator

: Pawl

CONDENSER

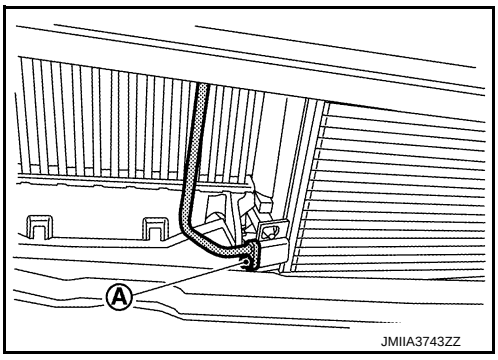
CONDENSER : Removal and Installation

INFOID:0000000011000243

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-22, "Perform Lubricant Return Operation".

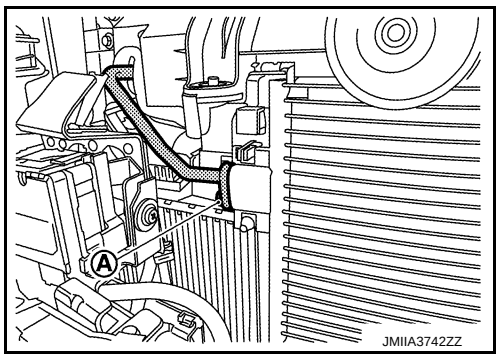
REMOVAL

1. Use a refrigerant collecting equipment (for HFO-1234yf) to discharge the refrigerant. Refer to HA-20, "Recycle Refrigerant".
2. Remove front bumper fascia assembly. Refer to EXT-15, "Removal and Installation".
3. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe 1 from the condenser & liquid tank 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.



4. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe 2 from the condenser & liquid tank assembly.

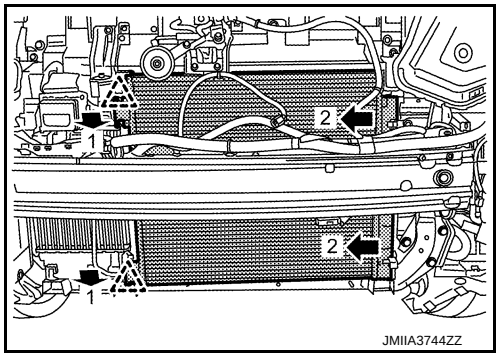
CAUTION:
Cap or wrap the joint of the A/C piping and condenser with suitable material such as vinyl tape to avoid the entry of air.



5. Disengage fixing pawls, and then remove the condenser & liquid tank assembly from the vehicle according to numerical order 1→2 indicated by arrows as shown in the figure.

: Pawl

CAUTION:
Never to damage core surface of condenser.



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.**
- **Perform lubricant adjusting procedure before installing new condenser. Refer to HA-23, "Lubricant Adjusting Procedure for Compressor Replacement".**
- **Check for leakages when recharging refrigerant. Refer to HA-19, "Leak Test".**

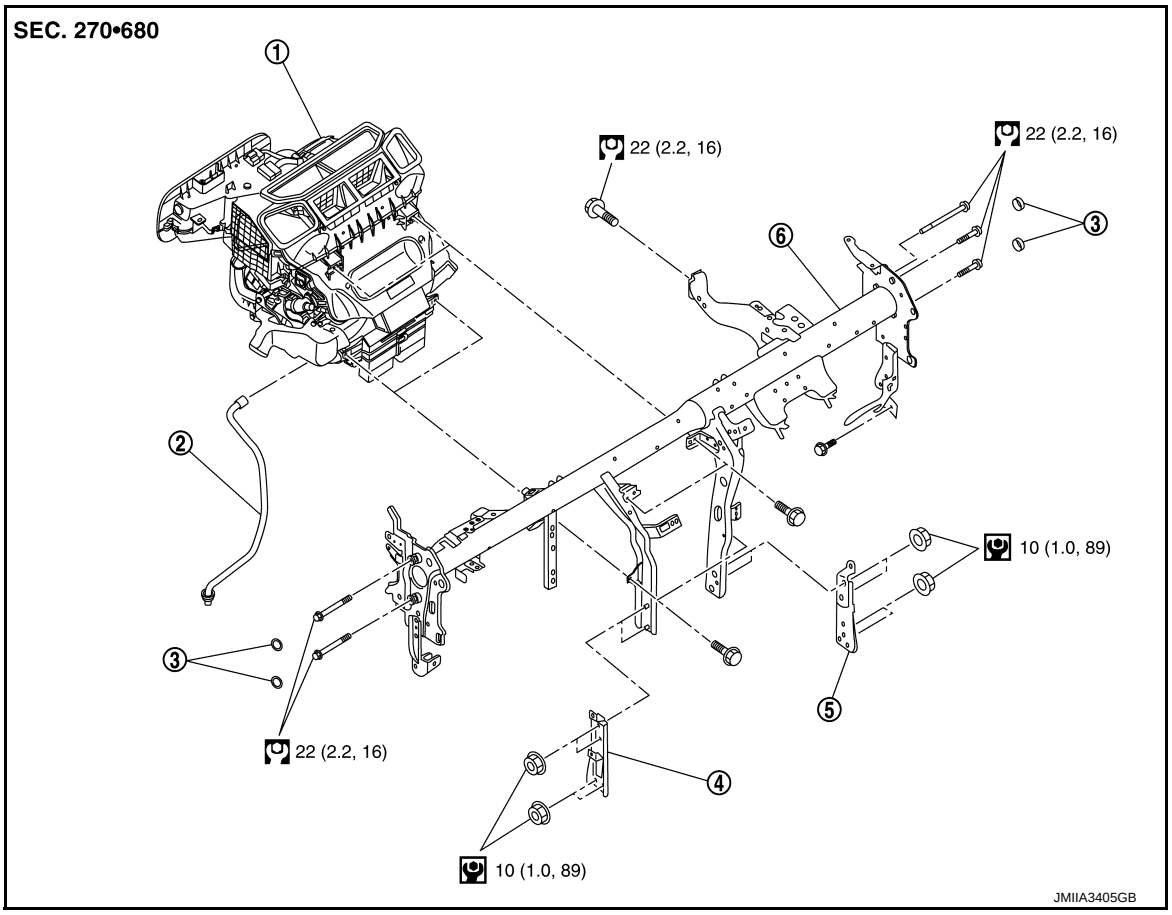
A/C UNIT ASSEMBLY

Exploded View

INFOID:0000000011000244

REMOVAL

RHD models

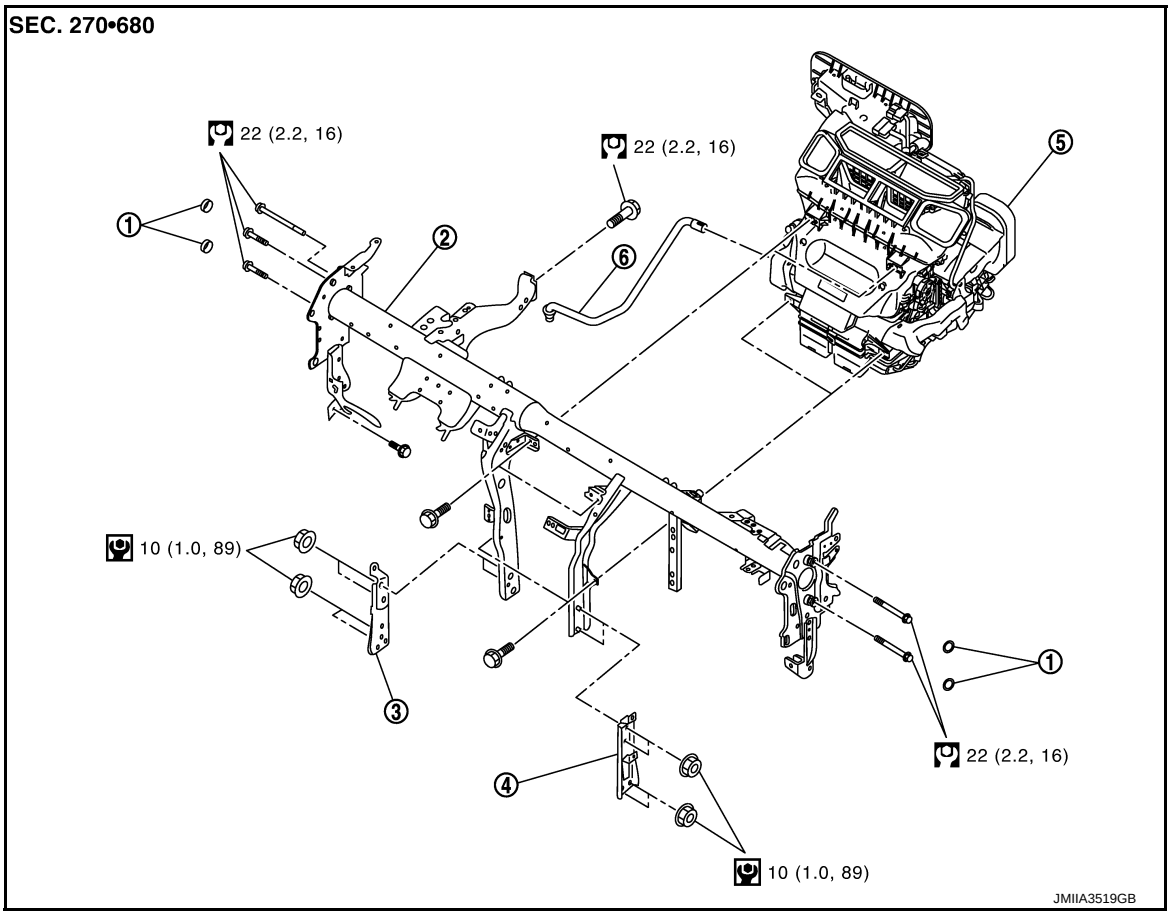


① A/C unit assembly
② Drain hose
③ Cap
④ Instrument stay LH
⑤ Instrument stay RH
⑥ Steering member

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

LHD models

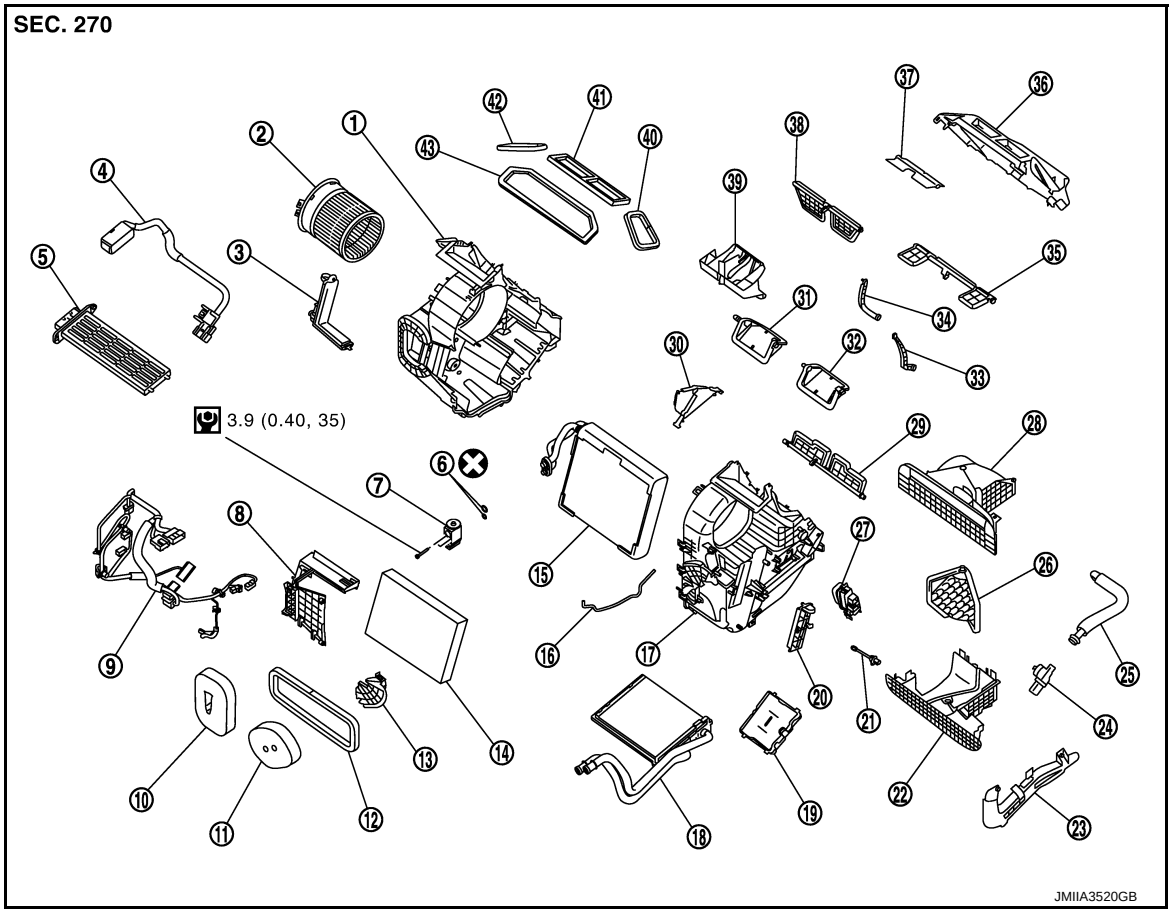


① Cap
② Steering member
③ Instrument stay LH
④ Instrument stay RH
⑤ A/C unit assembly
⑥ Drain hose

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

DISASSEMBLY



① Heater & cooling unit case RH	② Blower motor assembly	③ Filter cover RH
④ Sub harness	⑤ PTC heater	⑥ O-ring
⑦ Expansion valve	⑧ Main case center	⑨ Sub harness
⑩ Cooler packing	⑪ Heater pipe packing	⑫ Intake packing
⑬ Heater pipe clamp	⑭ Air conditioner filter	⑮ Evaporator assembly
⑯ Case packing	⑰ Heater & cooling unit case LH	⑱ Heater core
⑲ A/C auto amp. (automatic air conditioning)	⑳ Filter cover LH	㉑ Intake sensor
㉒ Intake box case lower	㉓ Heater pipe cover	㉔ Aspirator (automatic air conditioning)
㉕ Aspirator duct (automatic air conditioning)	㉖ Intake door	㉗ Power transistor (automatic air conditioning) Fan control amplifier (manual air conditioning)
㉘ Intake box case upper	㉙ Foot door	㉚ Plate case center
㉛ Air mix door RH	㉜ Air mix door LH	㉝ Center ventilator door·center ventilator & defroster door rod
㉞ Foot door & mode door rod	㉟ Side ventilator door	㊱ Main case rear
㊲ Mode door	㊳ Center ventilator & defroster door	㊴ Air guide case
㊵ Side ventilator packing LH	㊶ Center ventilator packing	㊷ Side ventilator packing RH
㊸ Defroster packing		

: Always replace after every disassembly.

: N·m (kg-m, in-lb)

A/C UNIT ASSEMBLY

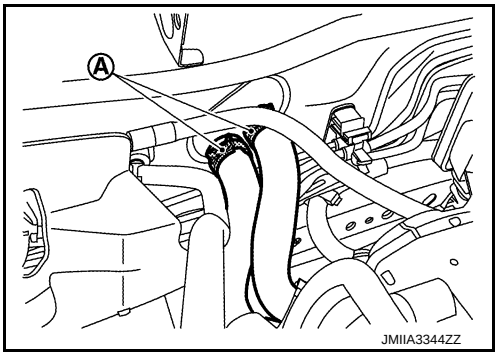
A/C UNIT ASSEMBLY : Removal and Installation

INFOID:0000000011000245

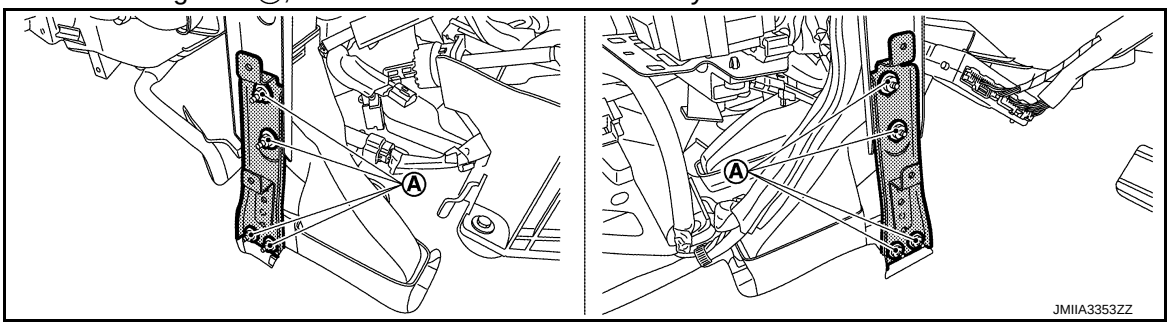
CAUTION:
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-22, "Perform Lubricant Return Operation".

REMOVAL

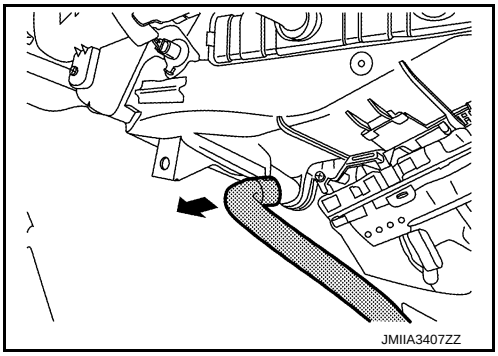
1. Use a refrigerant collecting equipment (for HFO-1234yf) to discharge the refrigerant. Refer to HA-20, "Recycle Refrigerant".
2. Drain engine coolant from cooling system. Refer to CO-64, "Draining".
3. Remove front wiper drive assembly. Refer to WW-85, "WIPER DRIVE ASSEMBLY : Removal and Installation".
4. Remove fixing clip, and then remove insulator upper side.
5. Remove mounting bolt, and then disconnect internal heat exchanger pipe from expansion valve.
   CAUTION:
   Cap or wrap the joint of the A/C piping and expansion valve with suitable material such as vinyl tape to avoid the entry of air.
6. Remove clamp air inlet hose 2. Refer to EM-310, "Exploded View".
7. Remove clamps Ⓐ, and then disconnect heater hoses from A/C unit assembly.
   CAUTION:
   - **Some coolant may spill when heater hoses are disconnected.**
   - **Close off the coolant inlet and outlet on the heater core (2 locations) with shop cloths.**



8. Remove instrument panel assembly. Refer to IP-14, "Removal and Installation" (LHD models) or IP-41, "Removal and Installation" (RHD models).
9. Remove rear floor duct 1. Refer to VTL-13, "REAR FLOOR DUCT 1 : Removal and Installation".
10. Remove mounting nuts Ⓐ, and then remove instrument stay LH and RH.

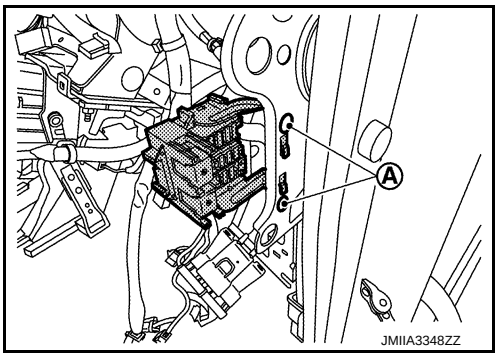


11. Disconnect drain hose from A/C unit assembly.

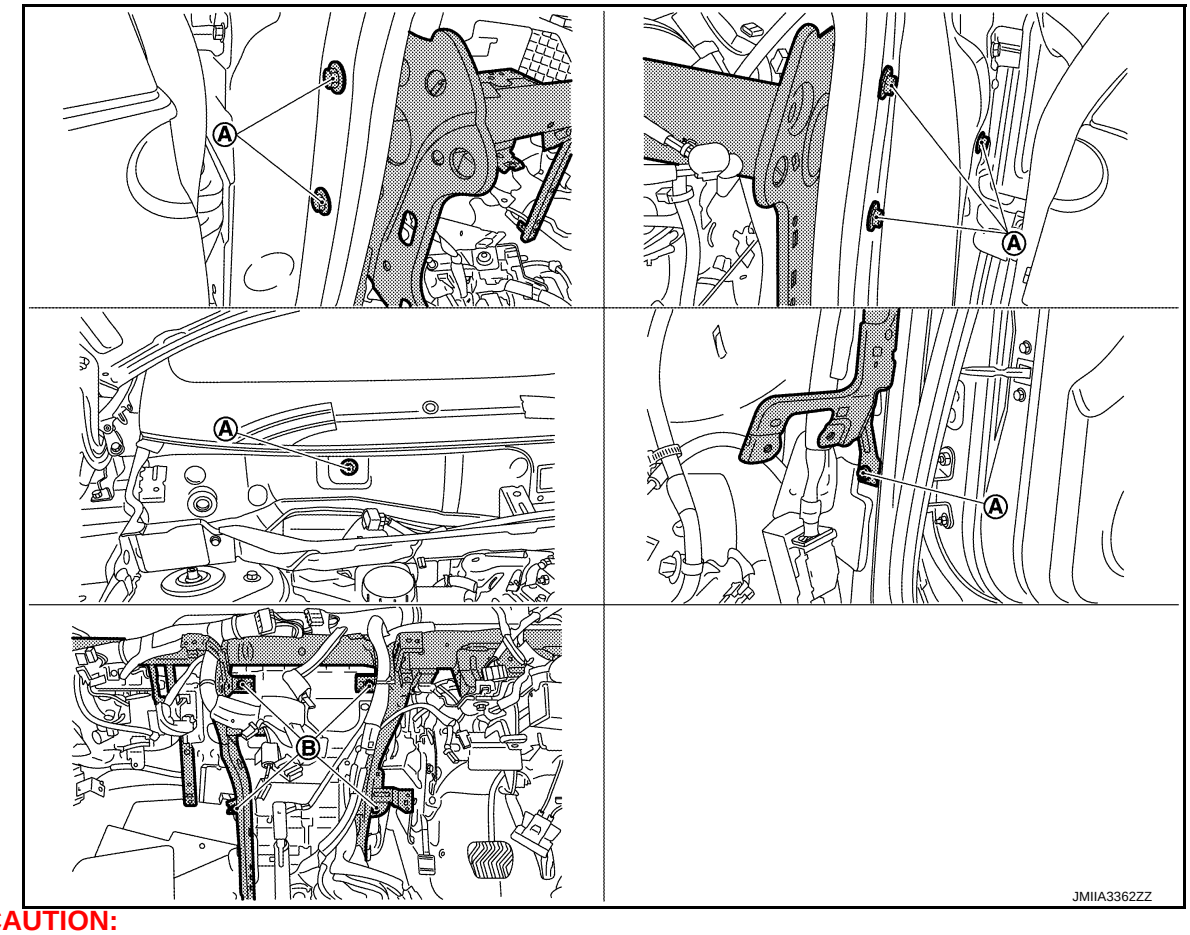


12. Remove ground bolts.

13. Remove the BCM mounting screws.
14. Remove the J/B mounting screws Ⓐ.



15. Disconnect the harness connectors and clips required to remove the steering member, and then move the vehicle harness to the position without hindrance for work.
16. Remove mounting nuts, and then move steering column assembly to a position where it dose not inhibit work. Refer to ST-13, "Exploded View".
17. Remove caps from steering member mounting bolts.
18. Remove steering member mounting bolts Ⓐ and A/C unit mounting bolts Ⓑ, and then remove steering member from the vehicle.



CAUTION:
When removing steering member, 2 workers are required to prevent it from dropping.

19. Remove A/C unit assembly.

CAUTION:
When removing A/C unit assembly, 2 workers are required to prevent it from dropping.

INSTALLATION

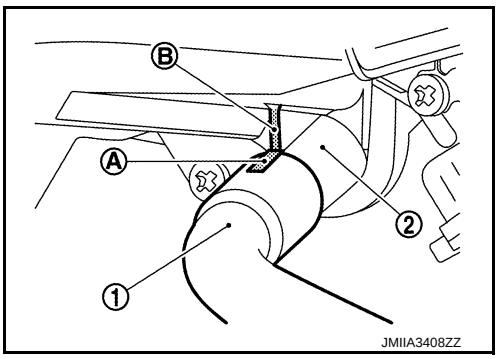
Note the following items, and then install in the reverse order of removal.

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

- **Check for leakages when recharging refrigerant. Refer to HA-19, "Leak Test".**

NOTE:

- When installing drain hose ①, match the rib porsion Ⓑ of A/C unit ② and mark Ⓐ of drain hose.



- Refer to CO-65, "Refilling" when filling radiator with engine coolant.

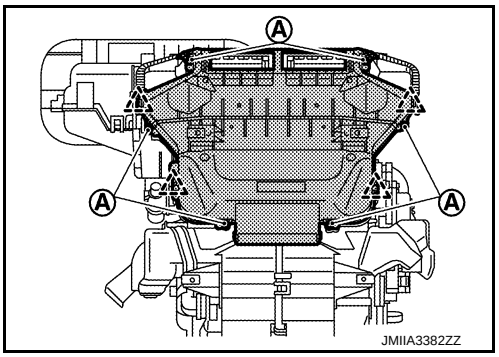
EVAPORATOR

EVAPORATOR : Removal and Installation

INFOID:0000000011000246

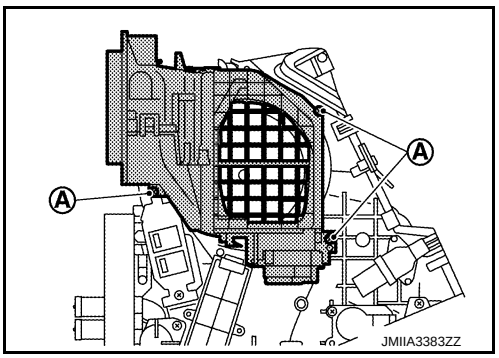
REMOVAL

1. Remove A/C unit assembly. Refer to HA-43, "A/C UNIT ASSEMBLY : Removal and Installation".
2. Remove fixing screws Ⓐ and disengage fixing pawls.

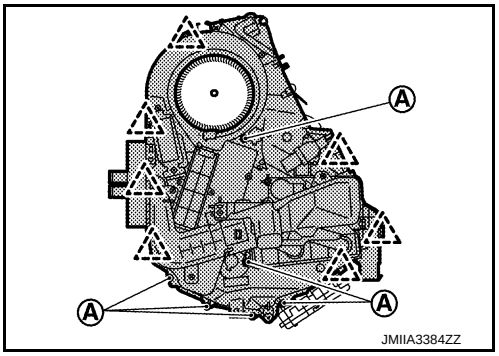


△ : Pawl

3. Remove main case rear.
4. Remove fixing screws Ⓐ, and then remove intake box assembly.



5. Remove fixing screws Ⓐ and disengage fixing pawls, and then separate heater & cooling unit case assembly.



△ : Pawl

6. Remove evaporator assembly from heater & cooling unit case.

7. Remove mounting bolts, and then remove expansion valve from evaporator.

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.**
- **Perform lubricant adjusting procedure after installing new evaporator. Refer to HA-22, "Lubricant Adjusting Procedure for Components Replacement Except Compressor".**

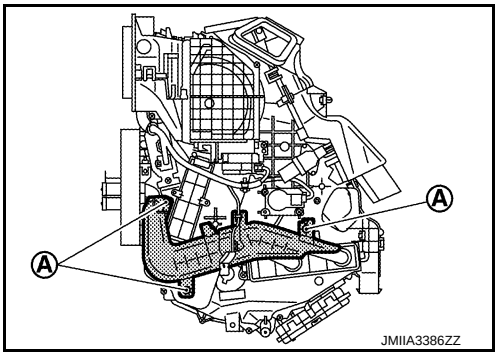
HEATER CORE

HEATER CORE : Removal and Installation

INFOID:0000000011000247

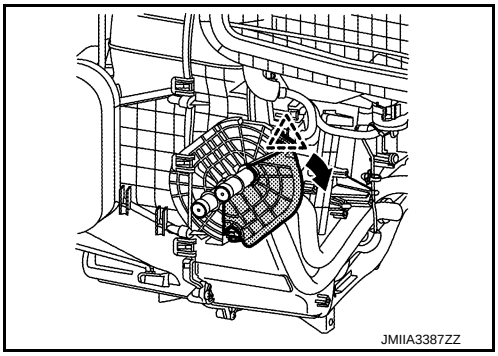
REMOVAL

1. Remove A/C unit assembly. Refer to HA-43, "A/C UNIT ASSEMBLY : Removal and Installation".
2. Remove foot duct LH. Refer to VTL-12, "FOOT DUCT : Removal and Installation".
3. Remove fixing screws Ⓐ, and then remove heater pipe cover.

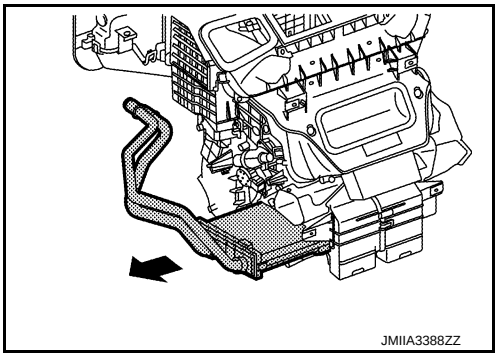


4. Remove heater pipe packing.
5. Disengage fixing pawl, and then remove heater pipe clamp.

△ : Pawl



6. Remove heater core from A/C unit assembly.



INSTALLATION

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

NOTE:

Refer to CO-65, "Refilling" when filling radiator with engine coolant.

EXPANSION VALVE

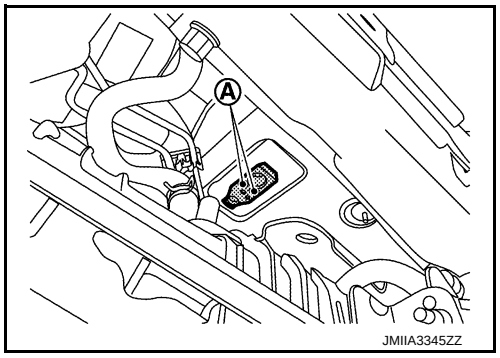
EXPANSION VALVE : Removal and Installation

INFOID:0000000011000248

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-22, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFO-1234yf) to discharge the refrigerant. Refer to HA-20, "Recycle Refrigerant".
2. Disengage fixing clip, and then remove insulator upper side.
3. Remove mounting bolt, and then disconnect internal heat exchanger pipe from expansion valve.
   CAUTION:
   Cap or wrap the joint of the A/C piping and expansion valve with suitable material such as vinyl tape to avoid the entry of air.
4. Remove mounting bolts Ⓐ, and then remove expansion valve.
   CAUTION:
   Cap or wrap the joint of the evaporator and expansion valve with suitable material such as vinyl tape to avoid the entry of air.



JMIIA3345ZZ

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.**
- **Check for leakages when recharging refrigerant. Refer to HA-19, "Leak Test".**

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Compressor

INFOID:0000000011000249

Model		Denso make 6SBH14
Type		Swash plate
Displacement cm^3 (cu in)/rev	Maximum	140 (8.6)
Direction of rotation		Clockwise (viewed from clutch)
Drive belt		Poly V
Disc to pulley clearance mm (in)	Standard	0.21 – 0.55 (0.008 – 0.022)

Lubricant

INFOID:0000000011000250

Name		ND-OIL12
Capacity m ℓ (Imp fl oz)	Total in system	110 (3.9)
	Compressor (service part) charging amount	110 (3.9)

Refrigerant

INFOID:0000000011000251

Type	HFO-1234yf (R-1234yf)
Capacity kg (lb)	0.5 (1.1)

Engine Idling Speed

INFOID:0000000011000252

Refer to EC-1232, "Idle Speed".

Belt Tension

INFOID:0000000011000253

Refer to EM-414, "Drive Belts".

PRECAUTION

PRECAUTIONS

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

INFOID:0000000011000254

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.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000011014757

CAUTION:

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

- **Before removing and installing any control units, first turn the ignition power source and accessory power source to the OFF, then disconnect both battery cables.**
- **After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.**
- **Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.**

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Open driver door.
3. Turn the ignition switch to the ON position.
   (At this time, the steering lock will be released.)
4. Turn the ignition switch to OFF position with driver door open.
5. Wait for 3 minutes or longer with driver door open.
   NOTE:
   - Do not close driver door because the steering wheel locks when driver door is closed.

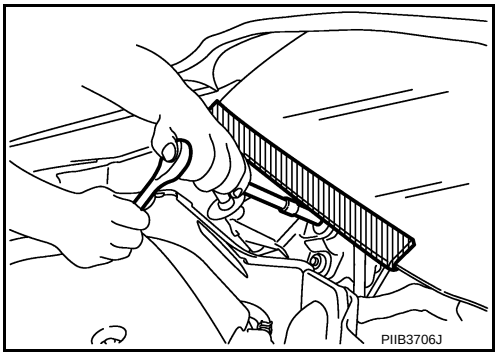
- The auto acc function is adapted to this vehicle. For this reason, even when the ignition switch is turned to OFF position, the accessory power source does not turned OFF and continues to be supplied for a certain amount of time.

6. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
7. Perform the necessary repair operation.
8. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the ignition switch from OFF position to ON position, then to LOCK position. (The steering wheel will lock when the ignition switch is turned to LOCK position.)
9. Perform self-diagnosis check of all control units using CONSULT.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000011000256

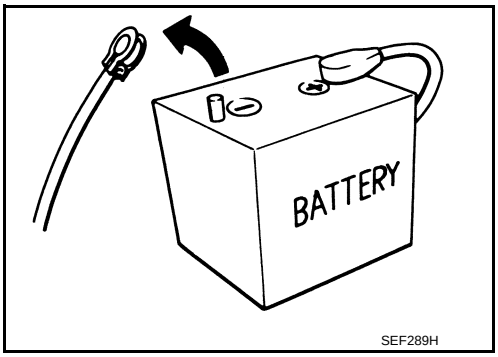
When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.



Precautions for Removing Battery Terminal

INFOID:0000000011014759

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.
- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing “How to disconnect 12V battery terminal” described below.
  NOTE:
  Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage 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.



HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.
For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

1. Open the hood.
2. Turn key switch to the OFF position with the driver side door opened.
3. Get out of the vehicle and close the driver side door.
4. Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes

K9K engine : 4 minutes
M9R engine : 4 minutes
R9M engine : 4 minutes
V9X engine : 4 minutes

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

5. Remove 12V battery terminal.
CAUTION:
After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

1. Unlock the door with intelligent key or remote keyless entry.
NOTE:
At this moment, ACC power is supplied.
2. Open the driver side door.
3. Open the hood.
4. Close the driver side door.
5. Wait at least 3 minutes.
CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.
6. Remove 12V battery terminal.
CAUTION:
After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

Precautions For Refrigerant System Service

INFOID:0000000011000258

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)

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 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 condenser

WARNING:

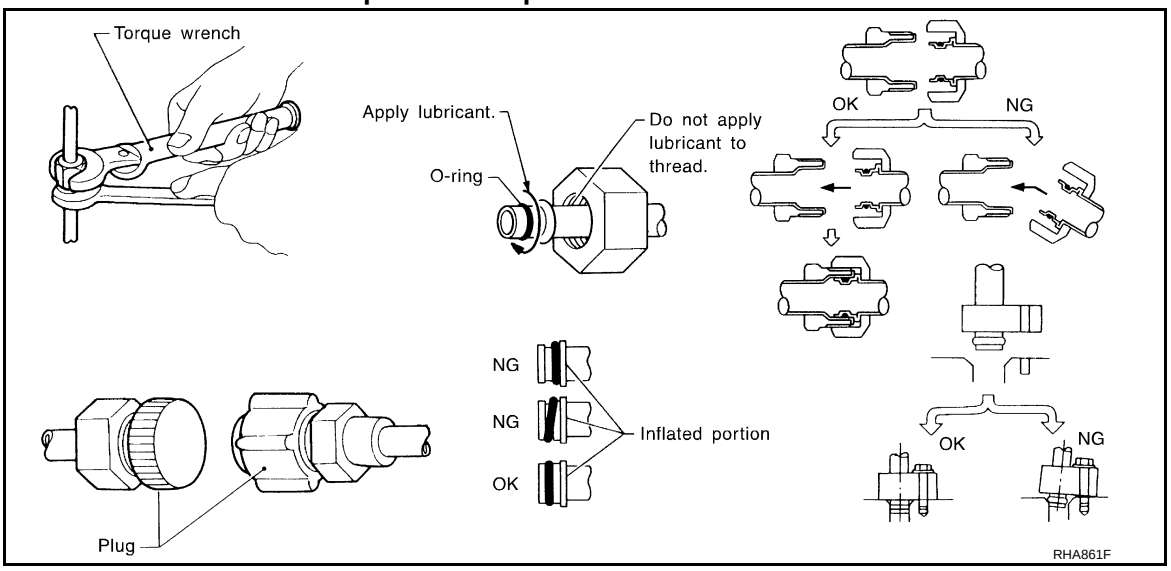
Check that all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.

CAUTION:

Observe the following when replacing or cleaning refrigerant cycle components.

- **Store it in the same way at 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.**
- **O-ring must be closely attached to the groove portion of tube.**
- **Never to damage O-ring and tube when replacing the O-ring.**
- **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 at 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-68, "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 manufacture’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.**
- **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.

Service Equipment

INFOID:0000000011000259

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.

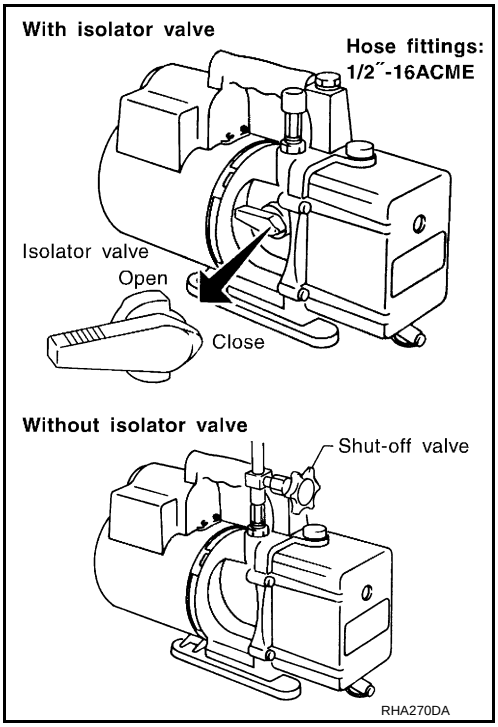
ELECTRICAL LEAK DETECTOR

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

VACUUM PUMP

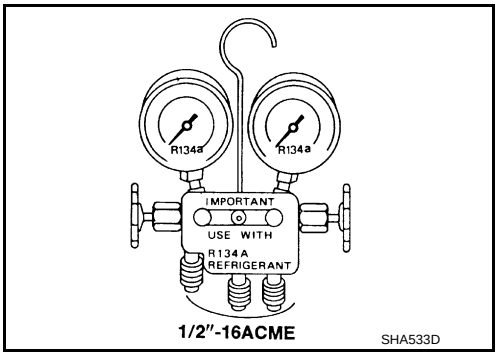
The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant may migrate out of the pump into the service hose. This is possible when the 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.



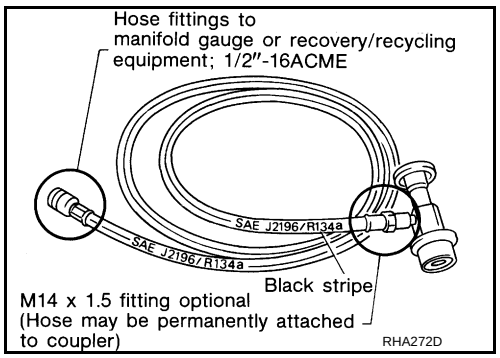
MANIFOLD GAUGE SET

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

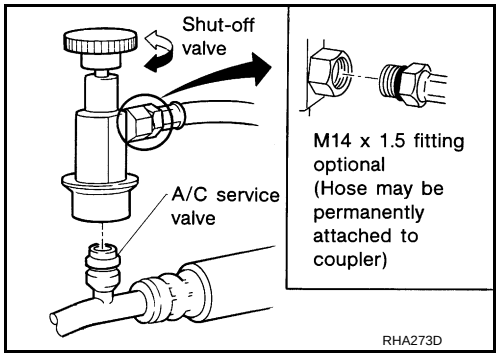
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must equip positive shut-off devices (either manual or automatic) near the end of the hoses opposite to the manifold gauge.



SERVICE COUPLERS

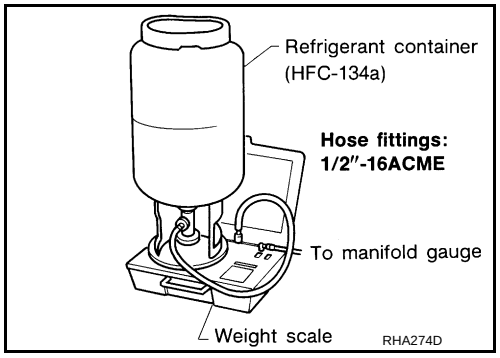
Never attempt to connect HFC-134a (R-134a) service couplers to the CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers do not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

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.

PREPARATION

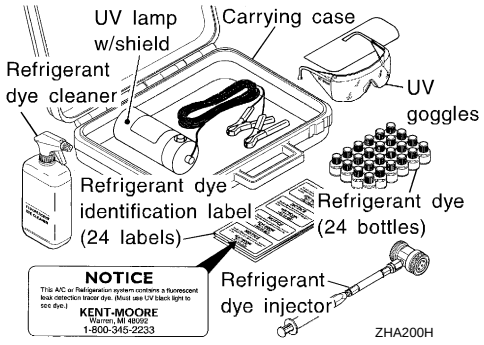
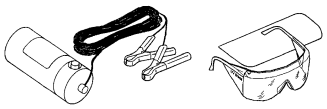
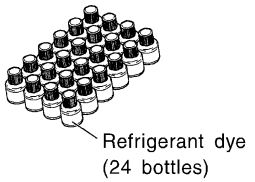
PREPARATION

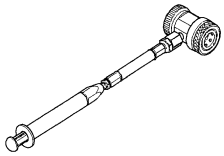
Special Service Tool

INFOID:0000000011000260

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 (SPX-North America No.) Tool name		Description
Refrigerant dye leak detection kit Kit includes: UV lamp and UV safety goggles HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles) Refrigerant dye cleaner	 ZHA200H	Power supply: DC 12 V (Battery terminal)
UV lamp and UV safety goggles	 SHA438F	Power supply: DC 12 V (Battery terminal) For checking refrigerant leak when fluorescent dye is installed in A/C system Includes: UV lamp and UV safety goggles
HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles)	 SHA439F	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.)

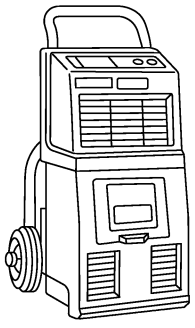
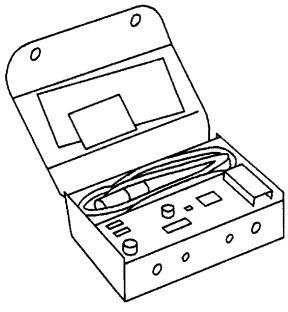
Tool number (SPX-North America No.) Tool name	Description
HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle  SHA440F	For injecting 1/4 ounce of fluorescent leak detection dye into A/C system
Refrigerant dye cleaner  SHA441F	For cleaning dye spills

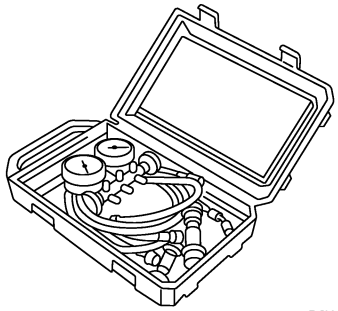
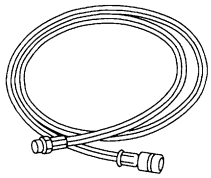
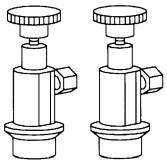
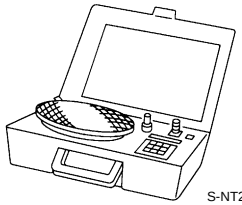
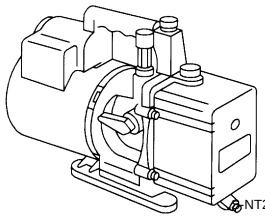
Commercial Service Tools

INFOID:0000000011000261

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.

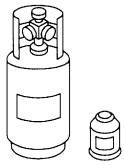
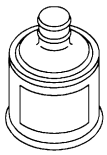
Tool name	Description
Recovery/recycling/recharging equipment (ACR4)  RJIA0195E	Function: Refrigerant recovery, recycling and recharging
Electrical leak detector  A/C leak detector SHA705EB	Power supply: DC 12 V (Cigarette lighter)

Tool name		Description
Manifold gauge set (with hoses and couplers)	 RJIA0196E	Identification: • The gauge face indicates HFC-134a (R-134a). Fitting size: Thread size • 1/2″-16 ACME
Service hoses • High-pressure side hose • Low-pressure side hose • Utility hose	 S-NT201	Hose color: • Low-pressure side hose: Blue with black stripe • High-pressure side hose: Red with black stripe • Utility hose: Yellow with black stripe or green with black stripe Hose fitting to gauge: • 1/2″-16 ACME
Service couplers • High-pressure side coupler • Low-pressure side coupler	 S-NT202	Hose fitting to service hose: M14 x 1.5 fitting is optional or permanently attached.
Refrigerant weight scale	 S-NT200	For measuring of refrigerant Fitting size: Thread size 1/2″-16 ACME
Vacuum pump (Including the isolator valve)	 S-NT203	Capacity: • Air displacement: 4 CFM • Micron rating: 20 microns • Oil capacity: 482 g (17 oz.) Fitting size: Thread size • 1/2″-16 ACME

Sealant or/and Lubricant

INFOID:0000000011000262

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.

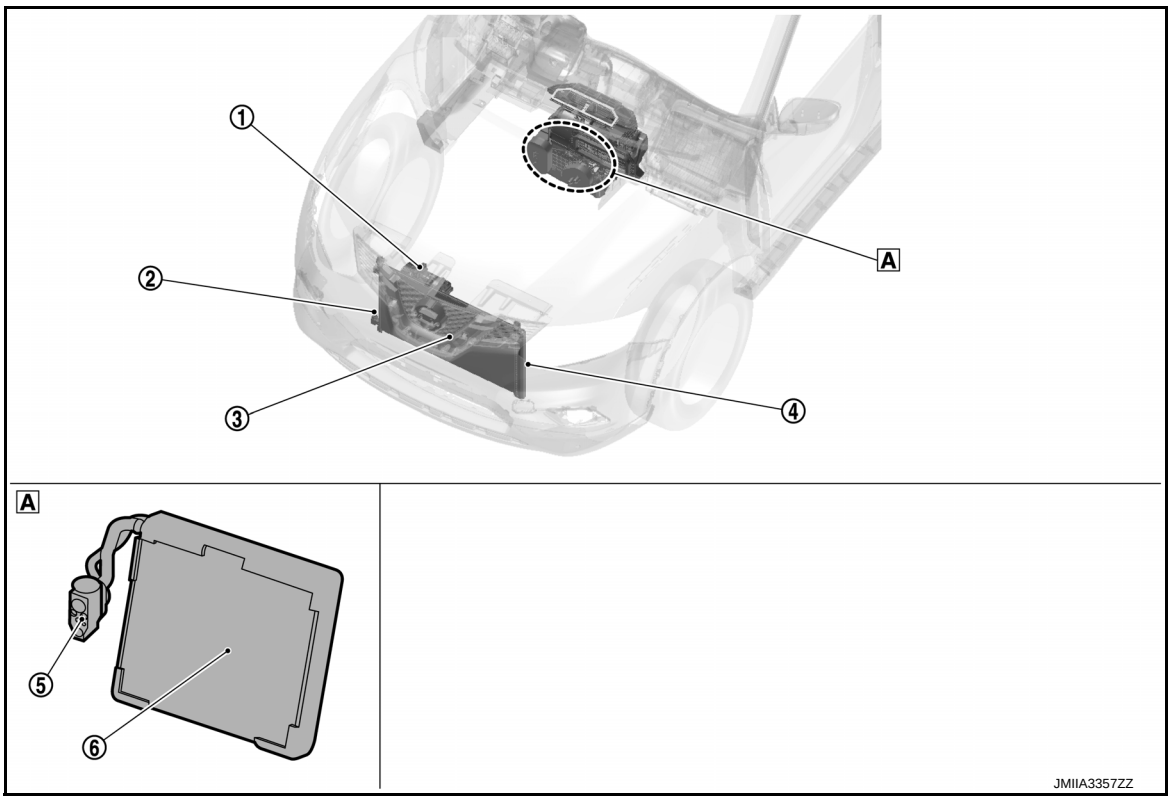
Tool name	Description
HFC-134a (R-134a) refrigerant  S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • Large container 1/2″-16 ACME
ND-OIL8  JMIIA1759ZZ	Type: Polyalkylene glycol oil (PAG), ND-OIL8 Application: HFC-134a (R-134a) swash plate compressors

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000011000263



A In the heater & cooling unit assembly

No.	Location	Function
①	Compressor	Intakes, compresses, and discharges refrigerant, to circulate refrigerant inside the refrigerant cycle.
②	Refrigerant pressure sensor	• AUTOMATIC AIR CONDITIONING: Refer to HAC-19, "Refrigerant Pressure Sensor". • MANUAL AIR CONDITIONING: Refer to HAC-148, "Refrigerant Pressure Sensor".
③	Condenser (condenser & Liquid tank)	Cools refrigerant discharged from compressor, and transforms it to liquid refrigerant.
④	Liquid tank (condenser & Liquid tank)	Eliminates foreign matter in refrigerant, and stores temporarily liquid refrigerant.
⑤	Expansion valve	Transforms high-pressure liquid refrigerant to mist form low-pressure liquid refrigerant by drawing function.
⑥	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.

SYSTEM

System Diagram

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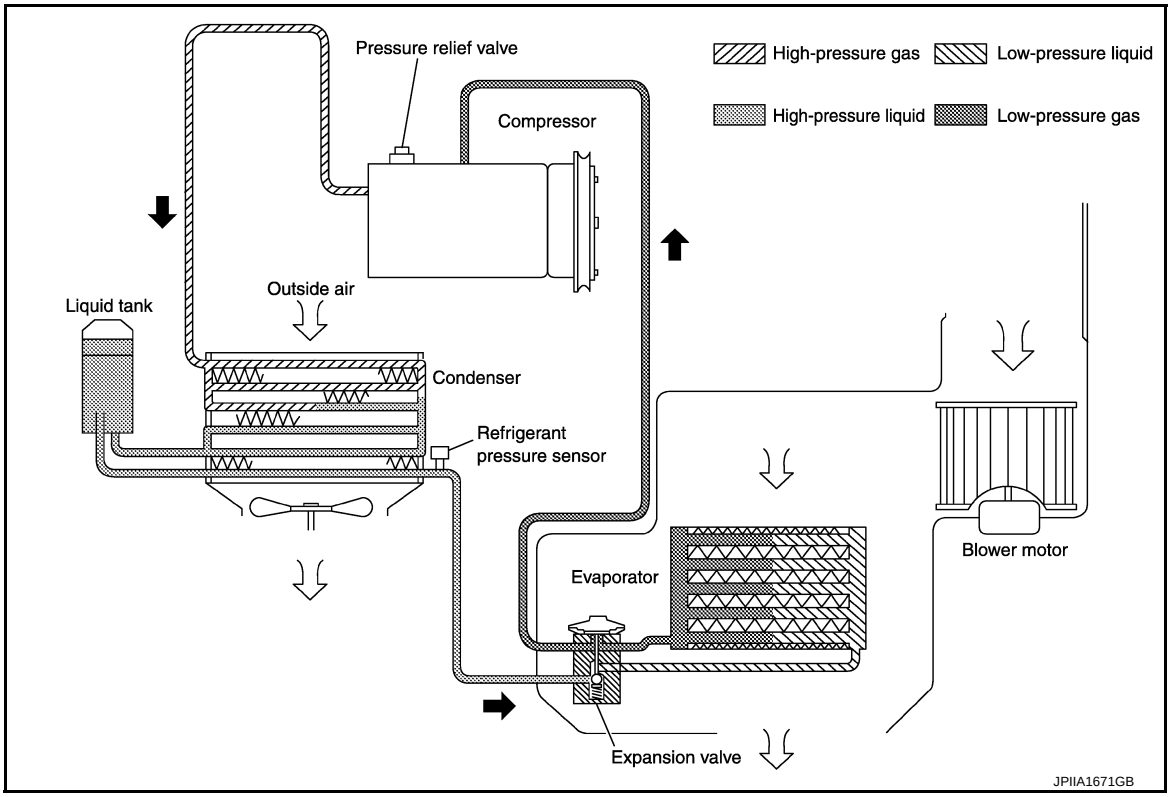


System Description

INFOID:0000000011000265

REFRIGERANT CYCLE

Refrigerant Flow

The refrigerant from the compressor, flows the condenser with liquid tank, the evaporator, and returns to the compressor. The refrigerant evaporation in the evaporator is controlled by an expansion valve.

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 condenser. 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 (31.2 bar, 31.8 kg/cm^2, 452 psi) or more (Engine speed is 1,500 rpm or more.)
- Approximately 2,740 kPa (27.4 bar, 27.9 kg/cm^2, 397 psi) or more (Engine speed is less than 1,500 rpm.)
- Approximately 140 kPa (1.4 bar, 1.2 kg/cm^2, 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 when the pressure of refrigerant in the system increases to an unusual level [more than 3,800 kPa (38.0 bar, 38.8 kg/cm^2, 551 psi)].

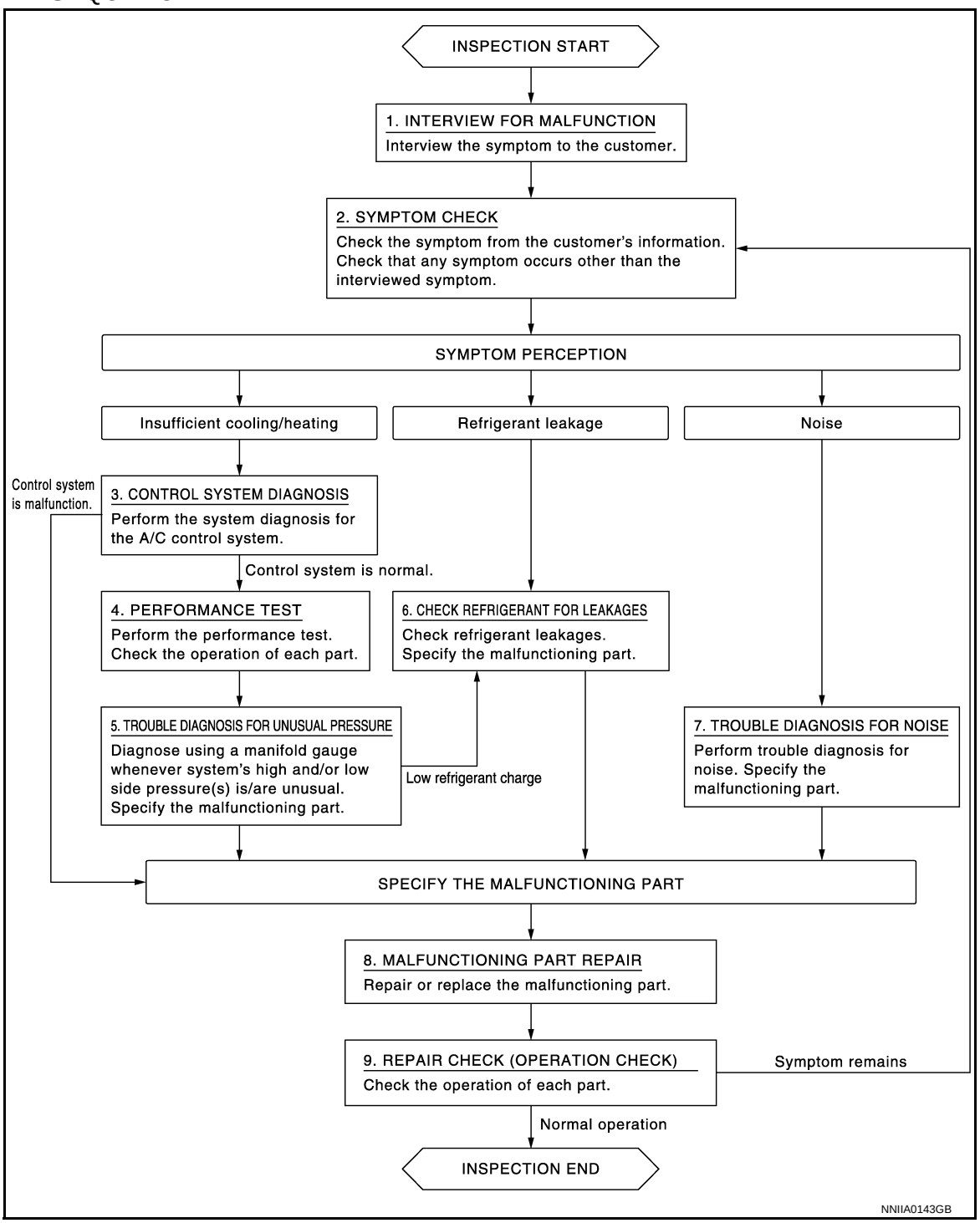
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000011000266

OVERALL SEQUENCE



DETAILED FLOW

1.INTERVIEW FOR MALFUNCTION

Interview the symptom to the customer.

>> 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-69, "Work Flow" (AUTOMATOC AIR CONDITIONING), HAC-183, "Work Flow"(MANUAL AIR CONDITIONING).

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-71, "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-73, "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-64, "Leak Test".

>> GO TO 8.

7.TROUBLE DIAGNOSIS FOR NOISE

Perform trouble diagnosis for noise. Specify the malfunctioning part. Refer to HA-75, "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?

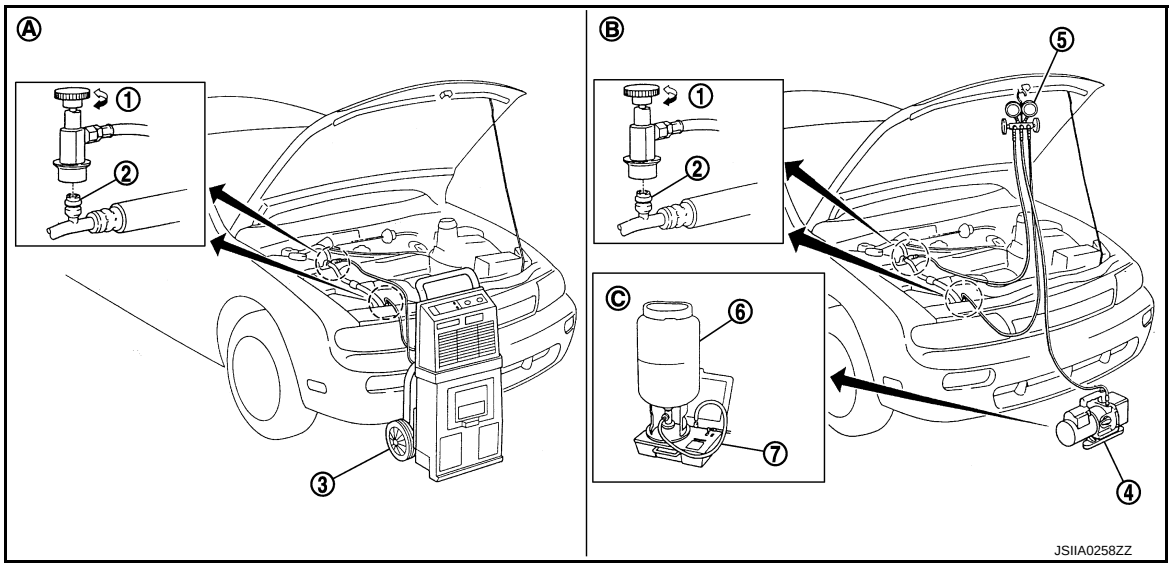
YES >> INSPECTION END
NO >> GO TO 2.

REFRIGERANT

Description

INFOID:0000000011000267

CONNECTION OF SERVICE TOOLS AND EQUIPMENT

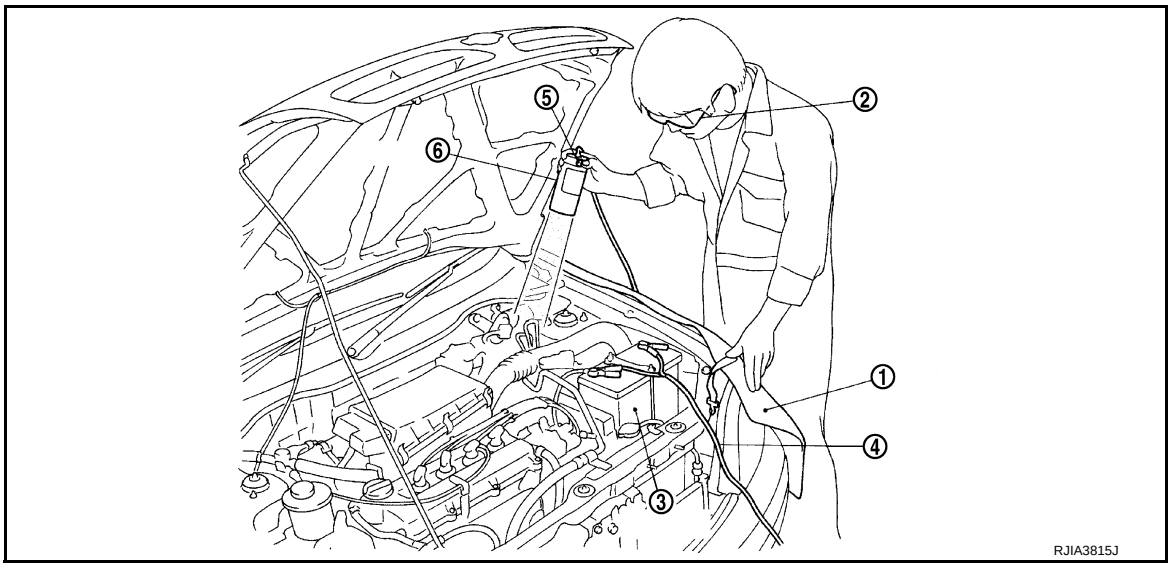


① Shut-off valve	② A/C service valve	③ Recovery/recycling/recharging equipment
④ Vacuum pump	⑤ Manifold gauge set	⑥ Refrigerant container (HFC-134a)
⑦ Weight scale		
Ⓐ Preferred (best) method	Ⓑ Alternative method	Ⓒ For charging

Leak Test

INFOID:0000000011000268

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.
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:
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 to A/C service valve.
3. Check that A/C refrigerant pressure is 345 kPa (3.45 bar, 3.52 kg/cm^2, 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 (3.45 bar, 3.52 kg/cm^2, 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 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.

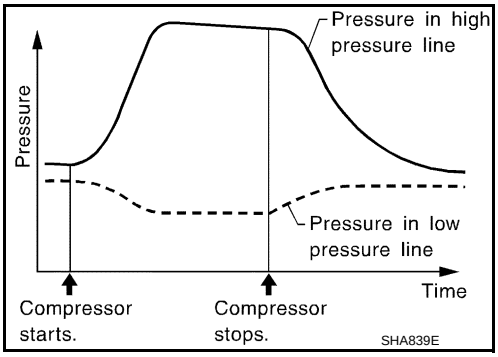
5. Repair or replace parts where refrigerant leakage is detected. (Leakage is detected but leakage area is unknown. GO TO 6.)
6. Start the engine and set A/C control in the following conditions.
- A/C switch ON
- Air flow: VENT (ventilation)

- Intake door position: Recirculation
- Temperature setting: Full cold
- Fan (blower) 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:
Never 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:0000000011000269

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-68, "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:0000000011000270

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 my 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.
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-64, "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.

LUBRICANT

Description

INFOID:0000000011000271

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 : ND-OIL8

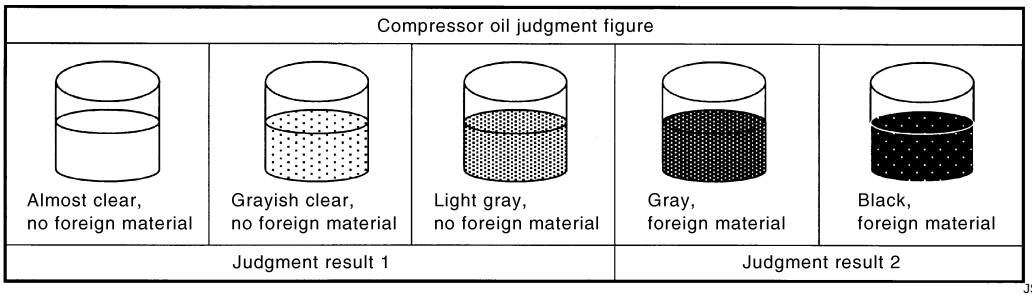
Inspection

INFOID:0000000011000272

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

1.COMPRESSOR OIL JUDGMENT

1. Remove the compressor. Refer to HA-76, "Removal and Installation".
2. Sample a compressor oil and judge on the figure.



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Judgement result 1>>Replace compressor only.
Judgement result 2>>Replace compressor and liquid tank.

Perform Lubricant Return Operation

INFOID:0000000011000273

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:0000000011000274

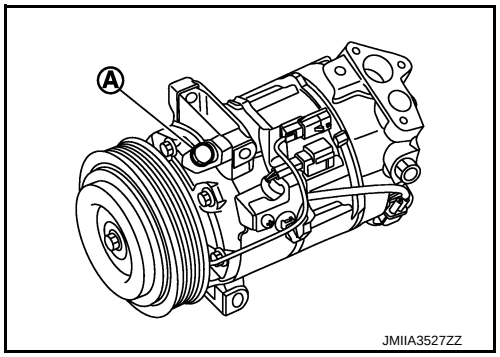
Fill with lubricant for the amount that is calculated according to the following conditions.
Example: Lubricant amount to be added when replacing evaporator and condenser & liquid tank [mℓ (Imp fl oz)] = 35 (1.2) + 15 (0.5) + α

Conditions		Lubricant amount to be added to A/C system m ℓ (Imp fl oz)
Replace evaporator		35 (1.2)
Replace condenser & liquid tank		20 (1.1)
Refrigerant leakage is detected	Large amount leakage	30 (1.1)
	Small amount leakage	—
Lubricant amount that is recycled together with refrigerant during recycle operation		α

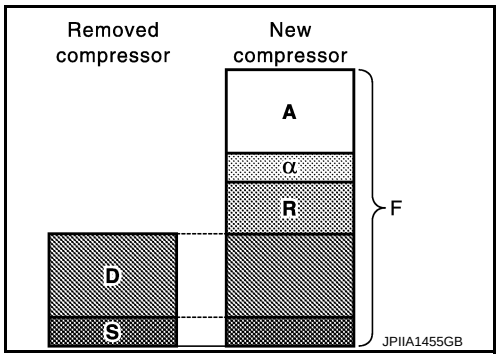
Lubricant Adjusting Procedure for Compressor Replacement

INFOID:0000000011000275

1. Drain lubricant from removed compressor and measure lubricant amount.
   - Remove drain bolt Ⓐ, and then drain lubricant from drain port.
   - 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 (Imp fl oz)] = F – (D + S + R + α)

F : Lubricant amount that a new compressor contains [110 (3.9)]

D : Lubricant amount that is drained from removed compressor

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

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

α : 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 (2.1 Imp fl oz), perform calculation by setting "D" as 40 m ℓ (1.4 Imp fl oz).

Conditions	Lubricant amount to be added to A/C system m ℓ (Imp fl oz)
Replace evaporator	35 (1.2)
Replace condenser & liquid tank	30 (1.1)

Example: Lubricant amount to be drained from a new compressor when replacing compressor and condenser & liquid tank [m ℓ (Imp fl oz)] [D = 60 (2.1), α = 5 (0.2)]
110 (3.9) – [35 (1.2) + 20 (0.7) + 30 (1.1) + 5 (0.2)] = 20 (0.7)

3. Tighten drain bolt to the specified torque

Specified torque : 30 N·m (3.1 kg-m, 22 ft-lb)

4. Install compressor and check the operation.

PERFORMANCE TEST

Inspection

INFOID:0000000011000276

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-73, "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)	4.9 – 6.9 (41 – 44)
	25 (77)	9.1 – 11.6 (48 – 53)
	30 (86)	13.2 – 16.2 (56 – 61)
	35 (95)	17.6 – 21.1 (64 – 70)
60 – 70	20 (68)	6.9 – 8.9 (44 – 48)
	25 (77)	11.6 – 14.1 (53 – 57)
	30 (86)	16.2 – 19.2 (61 – 66)
	35 (95)	21.1 – 24.6 (70 – 76)

AMBIENT AIR TEMPERATURE-TO-OPERATING PRESSURE TABLE

Fresh air		High-pressure (Discharge side) kPa (bar, kg/cm^2, psi)	Low-pressure (Suction side) kPa (bar, kg/cm^2, psi)
Relative humidity %	Air temperature °C (°F)		
50 – 70	25 (77)	926 – 1,133 (9.3 – 11.3, 9.5 – 11.6, 134.3 – 164.2)	196 – 240 (2.0 – 2.4, 2.0 – 2.5, 28.4 – 34.8)
	30 (86)	1,070 -– 1,308 (10.7 – 13.1, 10.9 – 13.3, 155.1 – 189.6)	233 – 285 (2.3 – 2.9, 2.4 – 2.9, 33.8 – 41.3)
	35 (95)	1,091 – 1,332 (10.9 – 13.3, 11.1 – 13.6, 158.1 – 193.2)	278 – 340 (2.8 – 3.4, 2.8 – 3.5, 40.3 – 49.2)
	40 (104)	1,292 – 1,579 (12.9 – 15.8, 13.2 – 16.1, 187.3 – 228.9)	333 – 407 (3.3 – 4.1, 3.4 – 4.2, 48.3 – 59.0)

SYMPTOM DIAGNOSIS

REFRIGERATION SYSTEM SYMPTOMS

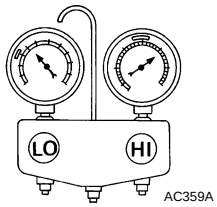
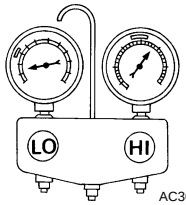
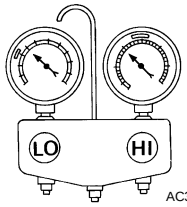
Trouble Diagnosis For Unusual Pressure

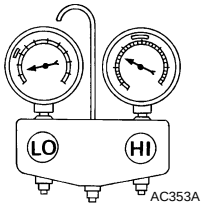
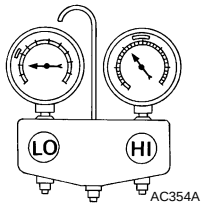
INFOID:0000000011001057

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

Symptom Table

INFOID:0000000011001058

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too high.  AC359A	The pressure returns to normal soon after sprinkling water on condenser.	Overfilled refrigerant.	Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.
	Air flow to condenser is insufficient.	Insufficient condenser cooling performance. • Poor fan rotation of radiator and condenser. • Improper installation of air guide. • Clogged or dirty condenser fins.	• Repair or replace malfunctioning parts. • Clean and repair condenser fins.
	When compressor is stopped, a high-pressure reading quickly drops by approximately 196 kPa (1.96 bar, 2 kg/cm^2, 28 psi). It then gradually decreases.	Air mixed in refrigerant cycle.	Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.
	• Low-pressure pipe is cooler than the outlet of evaporator. • Low-pressure pipe is frosted.	Expansion valve opened too much (excessive flow of refrigerant).	Replace expansion valve.
High-pressure side is excessively high and low-pressure side is too low.  AC360A	High-pressure pipe and upper side of condenser become hot, however, liquid tank does not become so hot.	Clogged or crushed high-pressure pipe located between compressor and condenser.	Repair or replace the malfunctioning parts.
High-pressure side is too low and low-pressure side is too high.  AC356A	• The readings of both sides become equal soon after compressor operation stops. • There is no temperature difference between high- and low-pressure sides.	Malfunction in compressor system (insufficient compressor pressure operation). • Damage or breakage of valve. • Malfunctioning gaskets.	Replace compressor.

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low. 	• The area around evaporator outlet does not become cold. • The area around evaporator inlet becomes frosted.	Clogged expansion valve. • Breakage of temperature sensor. • Clogging by foreign material.	Eliminate foreign material from expansion valve, or replace it.
	• There is a temperature difference between the areas around outlet and inlet pipes of liquid tank. • Liquid tank becomes frosted.	Malfunction in inner liquid tank (clogged strainer).	Replace condenser and liquid tank.
	Evaporator becomes frosted.	Clogged or crushed low-pressure pipe.	Repair or replace malfunctioning parts.
		Malfunction in intake air temperature sensor.	Check intake sensor system. Refer to HAC-81, "Diagnosis Procedure" (AUTOMATIC AIR CONDITIONING), HAC-192, "Diagnosis Procedure" (MANUAL AIR CONDITIONING).
	There is a small temperature difference between the high and low pressure pipes for refrigerant cycle.	• Shortage of refrigerant. • Leakage of refrigerant.	• Check for leakage. • Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.
Low-pressure side sometimes becomes negative. 	• Sometimes the area around evaporator outlet does not become cold. • Sometimes the area around evaporator inlet is frosted.	• Icing caused by the mixing of water in cooler cycle. • Deteriorated dryer in liquid tank.	• Collect all refrigerant. • Evacuate refrigerant cycle completely, and then refill it with the specified amount of refrigerant. At this time, always replace condenser and liquid tank.
Hunting in high-pressure side.	There is no temperature difference between high- and low-pressure sides.	Malfunctioning variable valve in compressor.	• Replace compressor. • Check ECV system. Refer to HAC-113, "Diagnosis Procedure" (AUTOMATIC AIR CONDITIONING), HAC-212, "Diagnosis Procedure" (MANUAL AIR CONDITIONING).

NOISE

Symptom Table

INFOID:0000000011001059

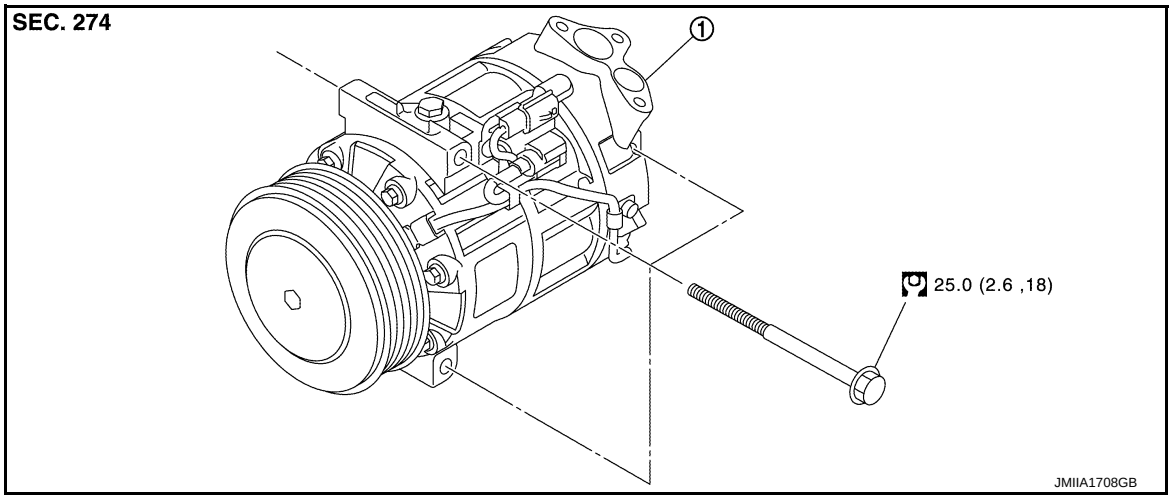
Symptom	Noise source	Probable cause	Corrective action
Unusual noise from compressor when A/C is ON.	Inside of compressor	Wear, breakage, or clogging of foreign material in inner parts.	Check compressor oil. Refer to HA-68, "Inspection".
	Magnet clutch	Contact of clutch disc with pulley.	Check clearance between clutch disc and pulley. Refer to HA-77, "Inspection".
	Compressor body	Loosened compressor mounting bolts.	Check bolts for tightness. Refer to HA-76, "Exploded View".
Unusual noise from cooler piping.	Cooler piping (pipe and flexible hose)	Improper installation of clip and bracket.	Check the installation condition of the cooler piping. Refer to HA-78, "Exploded View".
Unusual noise from expansion valve when A/C is ON.	Expansion valve	Shortage of refrigerant.	• Check for leakage. • Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.
		Wear, breakage, or clogging of foreign material in inner parts.	Eliminate foreign material from expansion valve, or replace it.
Unusual noise from belt.	—	Loosened belt	Check belt tension. Refer to EM-132, "Drive Belt" .
		Internal compressor parts get locked	Replace compressor.

REMOVAL AND INSTALLATION

COMPRESSOR

Exploded View

INFOID:0000000011001060



① Compressor

: N·m (kg-m, ft-lb)

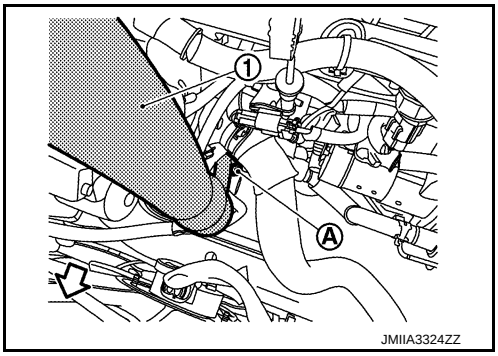
Removal and Installation

INFOID:0000000011001061

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-68, "Perform Lubricant Return Operation".

REMOVAL

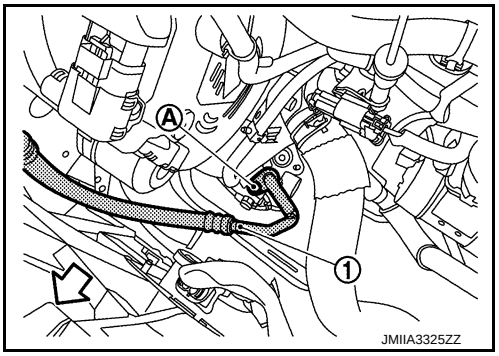
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-66, "Recycle Refrigerant".
2. Remove auto-tensioner. Refer to EM-29, "Removal and Installation".
3. Remove mounting bolt Ⓐ, and then disconnect low-pressure flexible hose ① from compressor.



⇦ : Vehicle front

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. Remove mounting bolt Ⓐ, and then disconnect high-pressure flexible hose ① from compressor.



⇦ : Vehicle front

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.

5. Disconnect harness connector and remove mounting bolts, and then remove compressor.

INSTALLATION

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

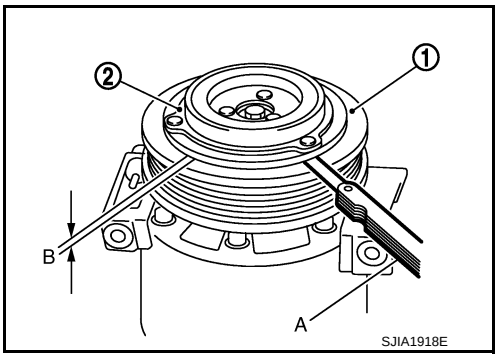
CAUTION:
- **Replace O-rings with new ones. Then apply compressor oil to them when installing.**
- **Check for leakages when recharging refrigerant.**
- **Check tension of the drive belt after installing compressor. Refer to EM-23, "Adjustment".**

Inspection

INFOID:0000000011001063

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).



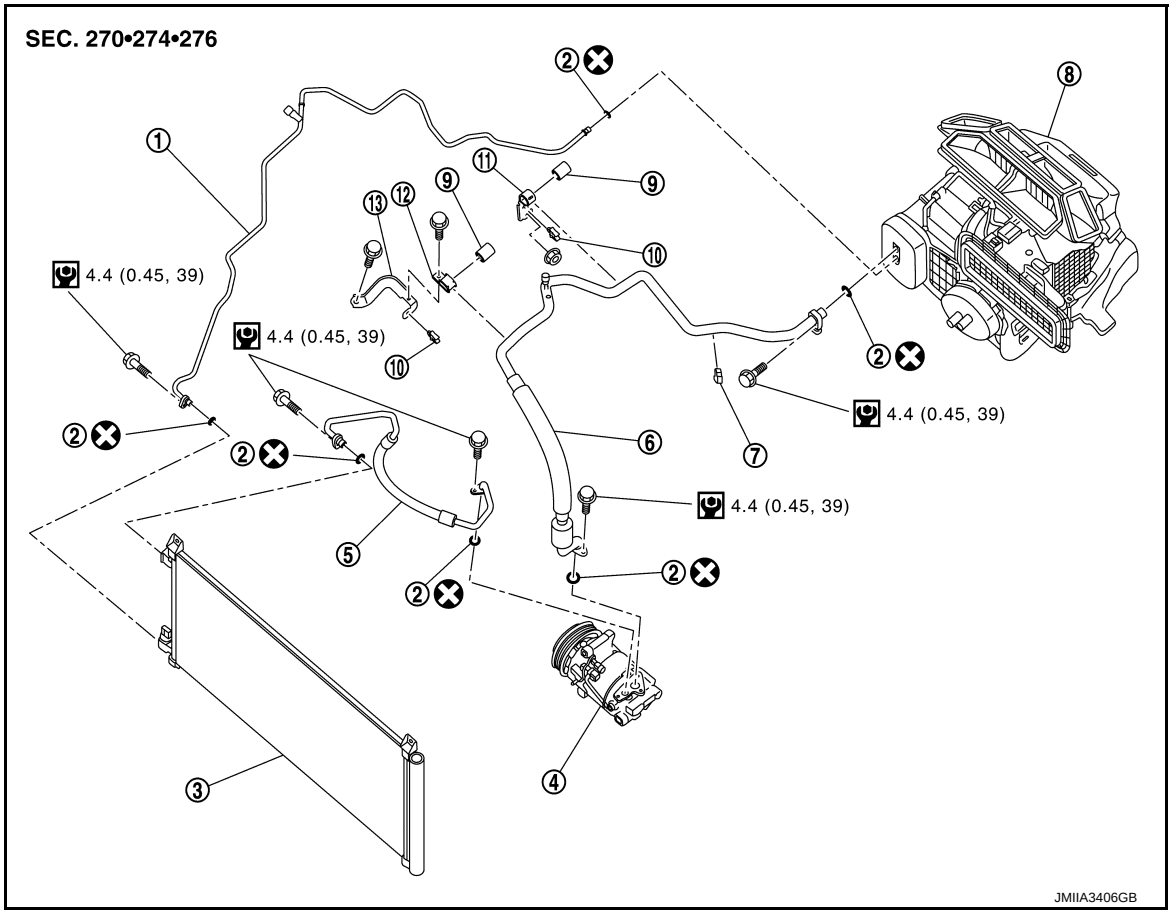
Clearance : Refer to HA-93, "Compressor".

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

COOLER PIPE AND HOSE

Exploded View

INFOID:0000000011001064



① High-pressure pipe	② O-ring	③ Condenser & liquid tank assembly
④ Compressor	⑤ High-pressure flexible hose	⑥ Low-pressure flexible hose
⑦ Tube clip	⑧ A/C unit assembly	⑨ Tube mounting rubber
⑩ Tube clip	⑪ Pipe bracket A	⑫ Pipe bracket B
⑬ Pipe bracket C		

: Always replace after disassembly.

: N·m (kg-m, in-lb)

LOW-PRESSURE FLEXIBLE HOSE

LOW-PRESSURE FLEXIBLE HOSE : Removal and Installation

INFOID:0000000011001065

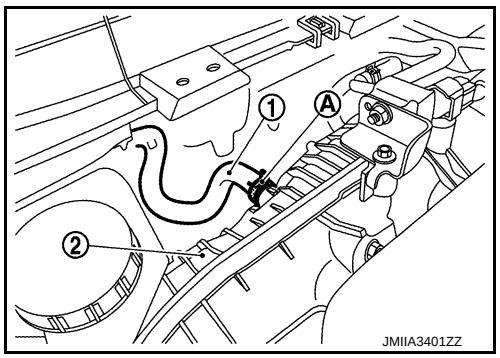
CAUTION:

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-68, "Perform Lubricant Return Operation".

REMOVAL

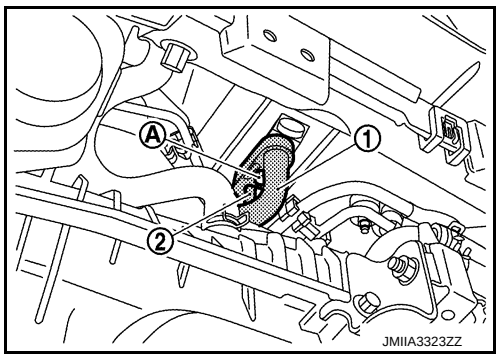
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-66, "Recycle Refrigerant".
2. Disengage fixing clips, and then remove insulator.

3. Remove vacuum hose fixing clamp Ⓐ, and then disconnect vacuum hose ① from intake manifold ②.

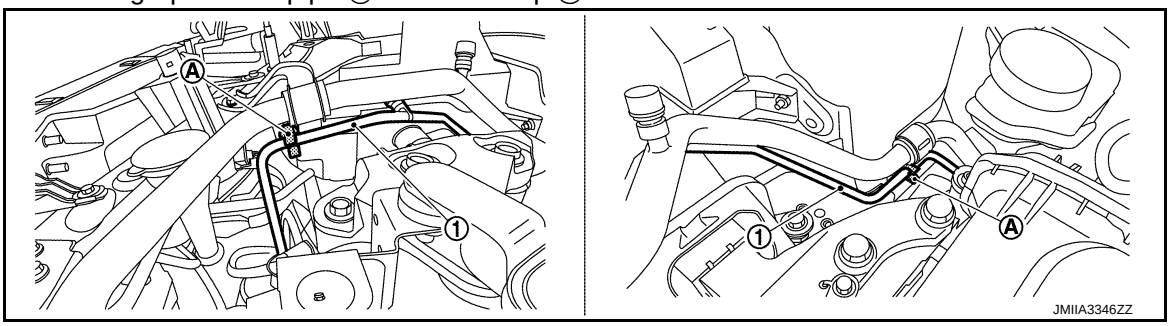


4. Remove mounting bolt Ⓐ, and then disconnect low-pressure flexible hose ① and high-pressure pipe ② from expansion valve.

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



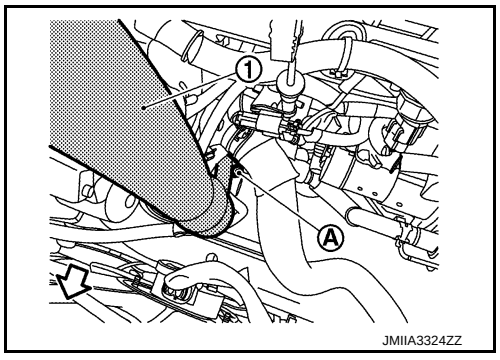
5. Disconnect high-pressure pipe ① from tube clip Ⓐ.



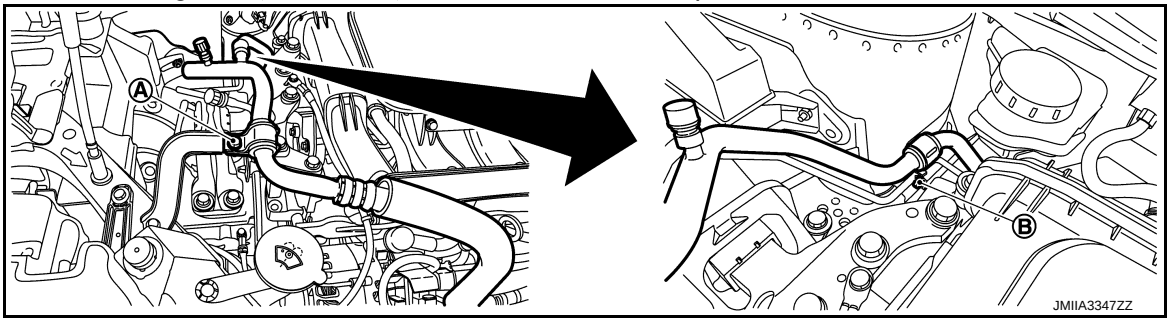
6. Remove mounting bolt Ⓐ, and then remove low-pressure flexible hose ① from compressor.

⇦ : Vehicle front

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.



7. Remove mounting bolt Ⓐ and nut Ⓑ, and then remove low-pressure flexible hose 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.**
- **Check for leakages when recharging refrigerant. Refer to HA-64, "Leak Test".**

HIGH-PRESSURE FLEXIBLE HOSE

HIGH-PRESSURE FLEXIBLE HOSE : Removal and Installation

INFOID:0000000011001066

CAUTION:

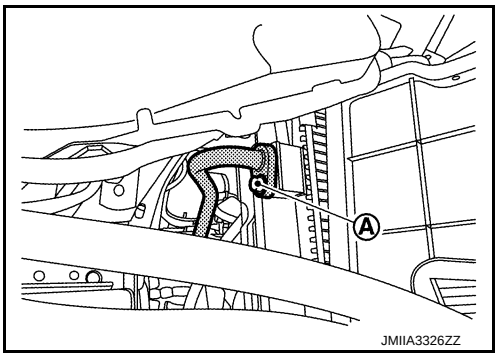
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-68, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-66, "Recycle Refrigerant".
2. Remove front bumper fascia assembly. Refer to EXT-15, "Removal and Installation".
3. Remove mounting bolt Ⓐ, and then disconnect high-pressure flexible hose from condenser &liquid tank assembly.

   CAUTION:

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

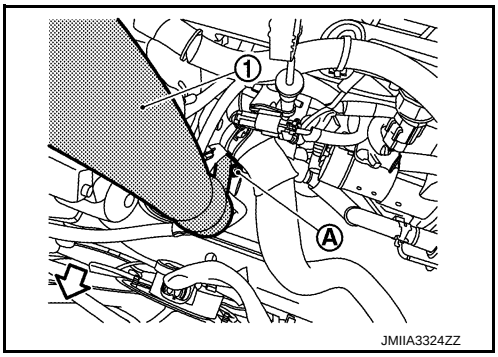


4. Remove mounting bolt Ⓐ, and then disconnect low-pressure flexible hose ① from compressor.

   ⇦ : Vehicle front

   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.

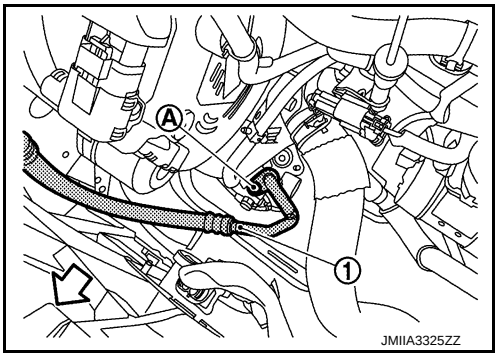


5. Remove mounting bolt Ⓐ, and then disconnect high-pressure flexible hose ① from compressor.

   ⇦ : Vehicle front

   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.



6. Remove high-pressure flexible hose 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.**

- **Check for leakages when recharging refrigerant. Refer to HA-64, "Leak Test".**

HIGH-PRESSURE PIPE

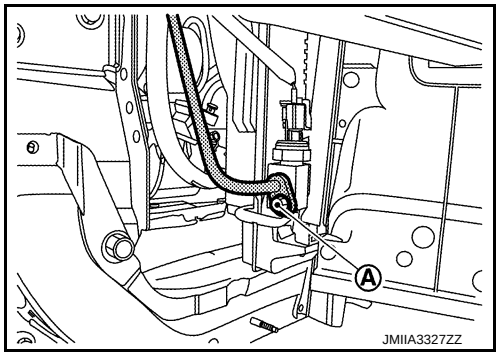
HIGH-PRESSURE PIPE : Removal and Installation

INFOID:0000000011001067

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-68, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-66, "Recycle Refrigerant".
2. Remove front bumper fascia assembly. Refer to EXT-15, "Removal and Installation".
3. Remove intake manifold. Refer to EM-314, "Removal and Installation".
4. Remove low-pressure flexible hose. Refer to HA-78, "LOW-PRESSURE FLEXIBLE HOSE : Removal and Installation".
5. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe from condenser & liquid tank assembly.
   CAUTION:
   Cap or wrap the joint of the A/C piping and condenser & liquid tank assembly with suitable material such as vinyl tape to avoid the entry of air.



6. Remove high-pressure pipe.

INSTALLATION

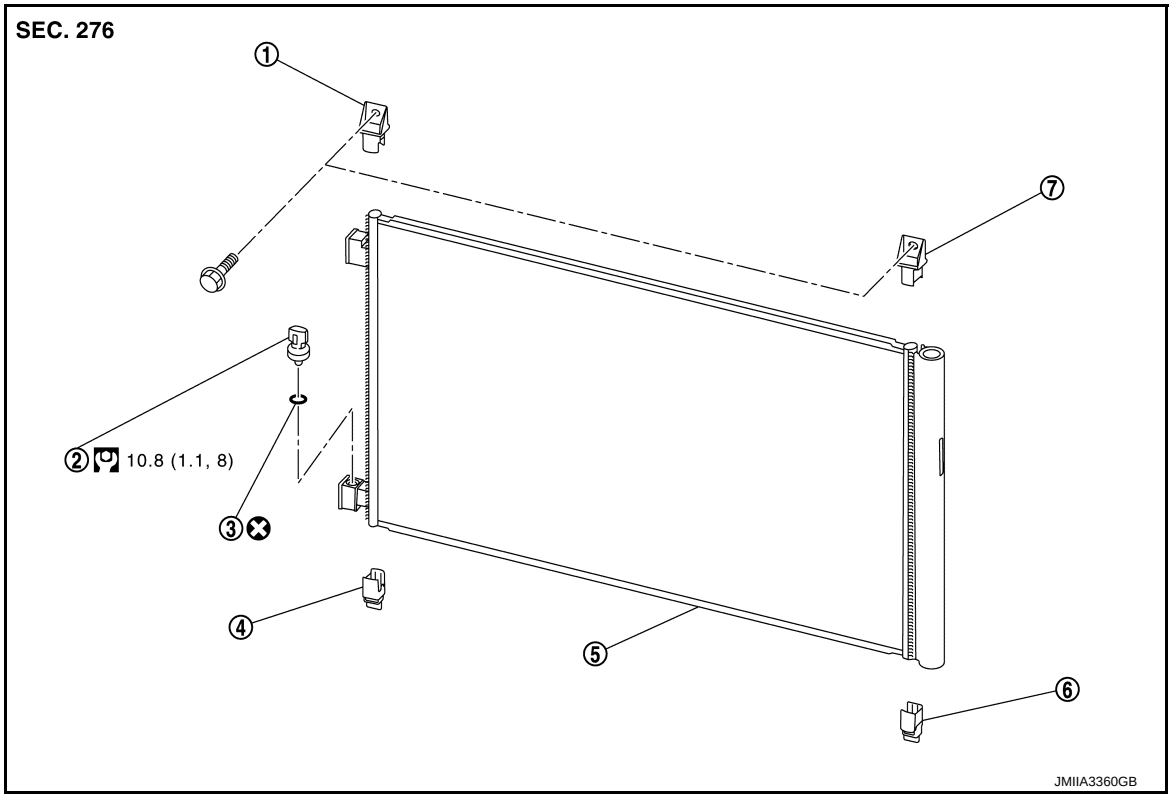
Note the following items, then install in the reverse order of removal.

CAUTION:
- **Replace O-rings with new ones. Then apply compressor oil to them when installing.**
- **Check for leakages when recharging refrigerant. Refer to HA-64, "Leak Test".**

CONDENSER

Exploded View

INFOID:0000000011001068



① Condenser upper bracket RH	② Refrigerant pressure sensor	③ O-ring
④ Condenser lower bracket RH	⑤ Condenser & liquid tank assembly	⑥ Condenser lower bracket LH
⑦ Condenser upper bracket LH		

: Always replace after disassembly.

: N·m (kg-m, ft-lb)

CONDENSER

CONDENSER : Removal and Installation

INFOID:0000000011001069

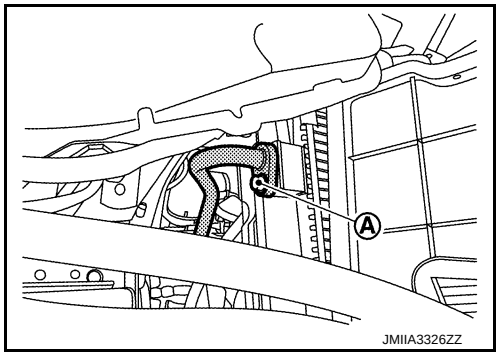
CAUTION:

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-68, "Perform Lubricant Return Operation".

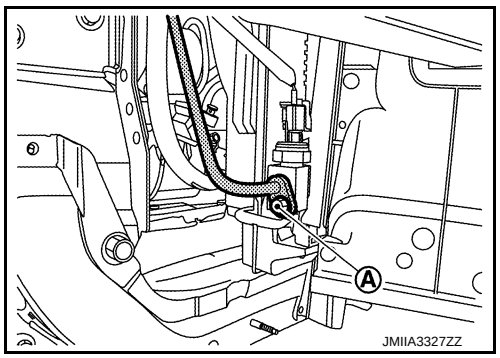
REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-66, "Recycle Refrigerant".
2. Removal apron bracket. Refer to EXT-15, "Removal and Installation".
3. Removal air guide. Refer to the following.
   - DLK-572, "MR20DD : Exploded View" (WITH INTELLIGENT KEY SYSTEM)
   - DLK-876, "MR20DD : Exploded View" (WITHOUT INTELLIGENT KEY SYSTEM)

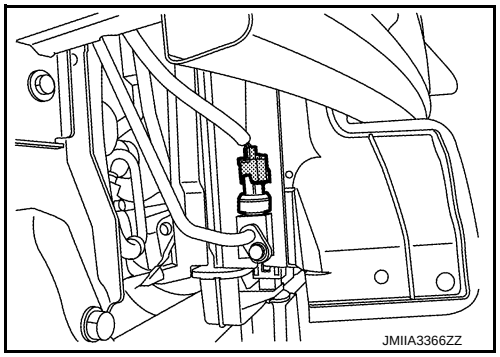
4. Remove mounting bolt Ⓐ, and then disconnect high-pressure flexible hose from condenser & liquid tank assembly.
CAUTION:
Cap or wrap the joint of the A/C piping and condenser & liquid tank assembly with suitable material such as vinyl tape to avoid the entry of air.



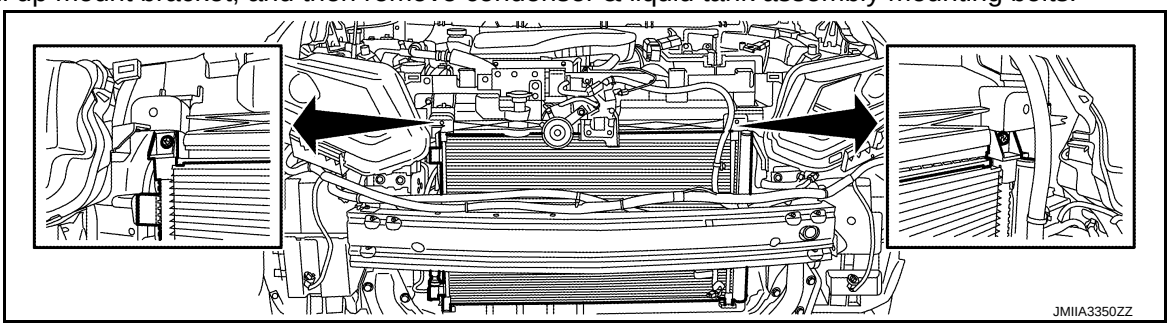
5. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe from condenser & liquid tank assembly.
CAUTION:
Cap or wrap the joint of the A/C piping and condenser & liquid tank assembly with suitable material such as vinyl tape to avoid the entry of air.



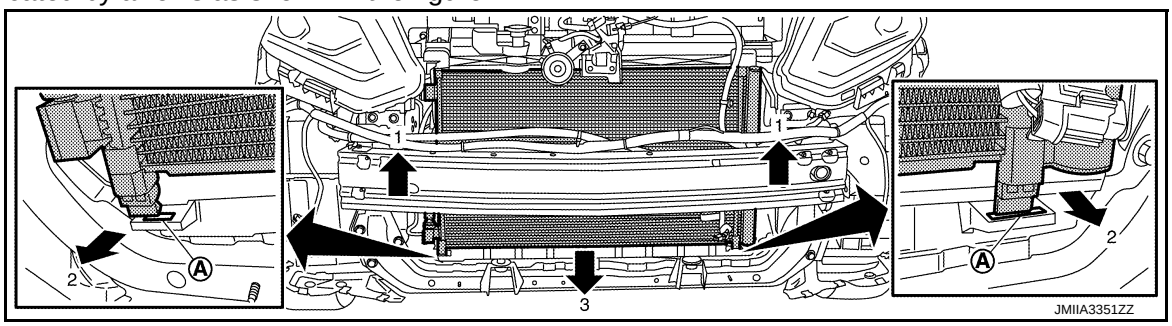
6. Disconnect refrigerant pressure sensor harness connector.



7. Remove mount bracket mounting bolt and fixing clip. Refer to CO-17, "Exploded View".
8. Pull up mount bracket, and then remove condenser & liquid tank assembly mounting bolts.



9. Lift the condenser upwards and disconnect condenser & liquid tank assembly from radiator hole Ⓐ, and then remove condenser & liquid tank assembly from vehicle underside according to numerical order 1→3 indicated by arrows as shown in the figure.



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.**
- **Check for leakages when recharging refrigerant. Refer to HA-64, "Leak Test".**

REFRIGERANT PRESSURE SENSOR

REFRIGERANT PRESSURE SENSOR : Removal and Installation

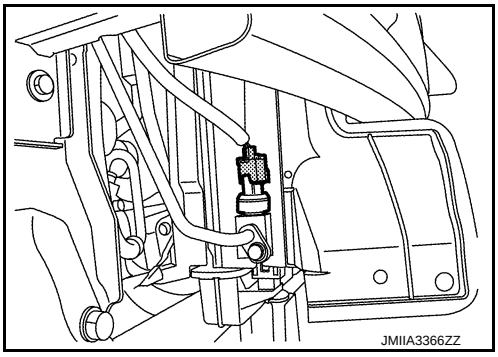
INFOID:0000000011001070

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-68, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-66, "Recycle Refrigerant".
2. Remove front bumper fascia assembly. Refer to EXT-15, "Removal and Installation".
3. Clean refrigerant pressure sensor and its surrounding area, and then remove dust and rust from refrigerant pressure sensor.
   CAUTION:
   Be sure to clean carefully.
4. Disconnect refrigerant pressure sensor connector.



5. Use a adjustable wrench or other tool to hold the refrigerant pressure sensor mounting block, and then remove the refrigerant pressure sensor from the condenser.
   CAUTION:
   - **Never to damage core surface of condenser.**
   - **Cap or wrap the joint of the condenser with suitable material such as vinyl tape avoid the entry of air.**

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.**

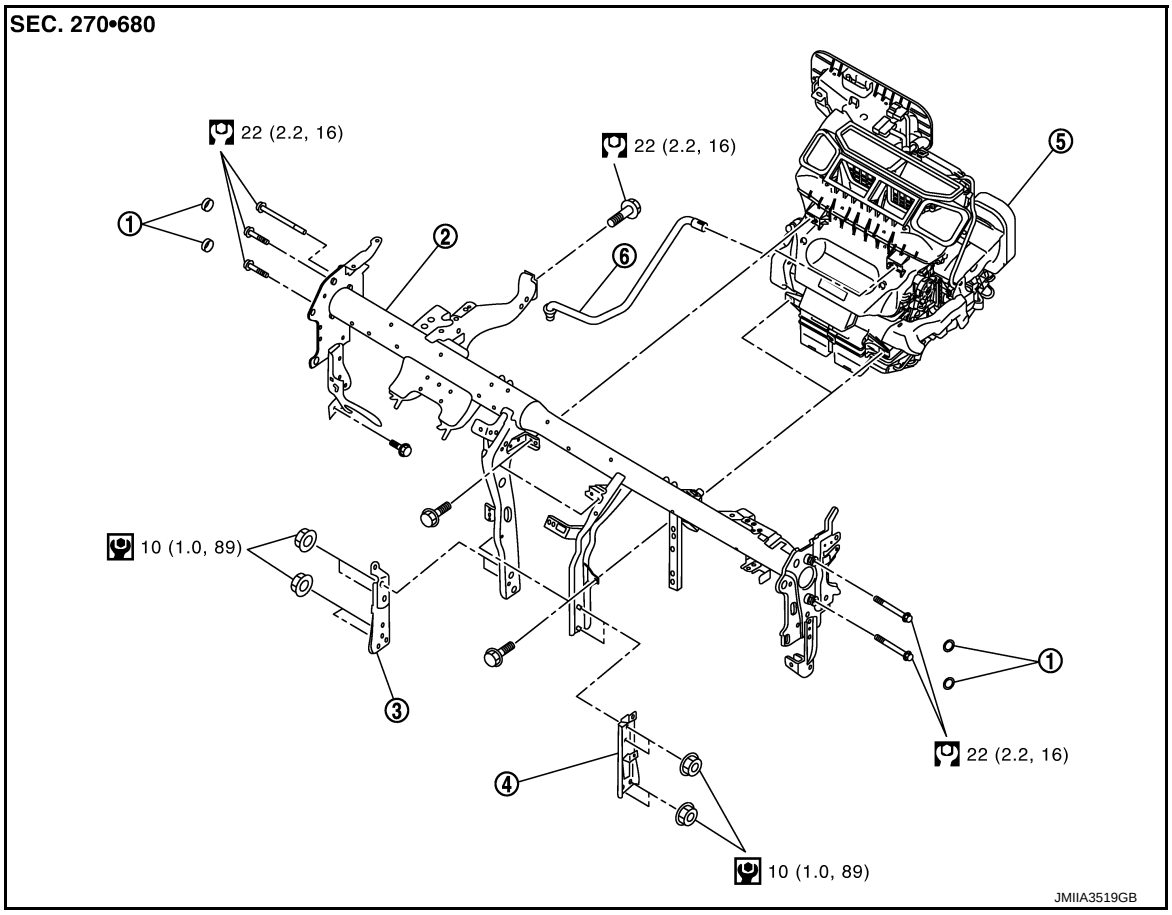
- **Check for leakages when recharging refrigerant. Refer to HA-64, "Leak Test".**

A/C UNIT ASSEMBLY

Exploded View

INFOID:0000000011001071

REMOVAL

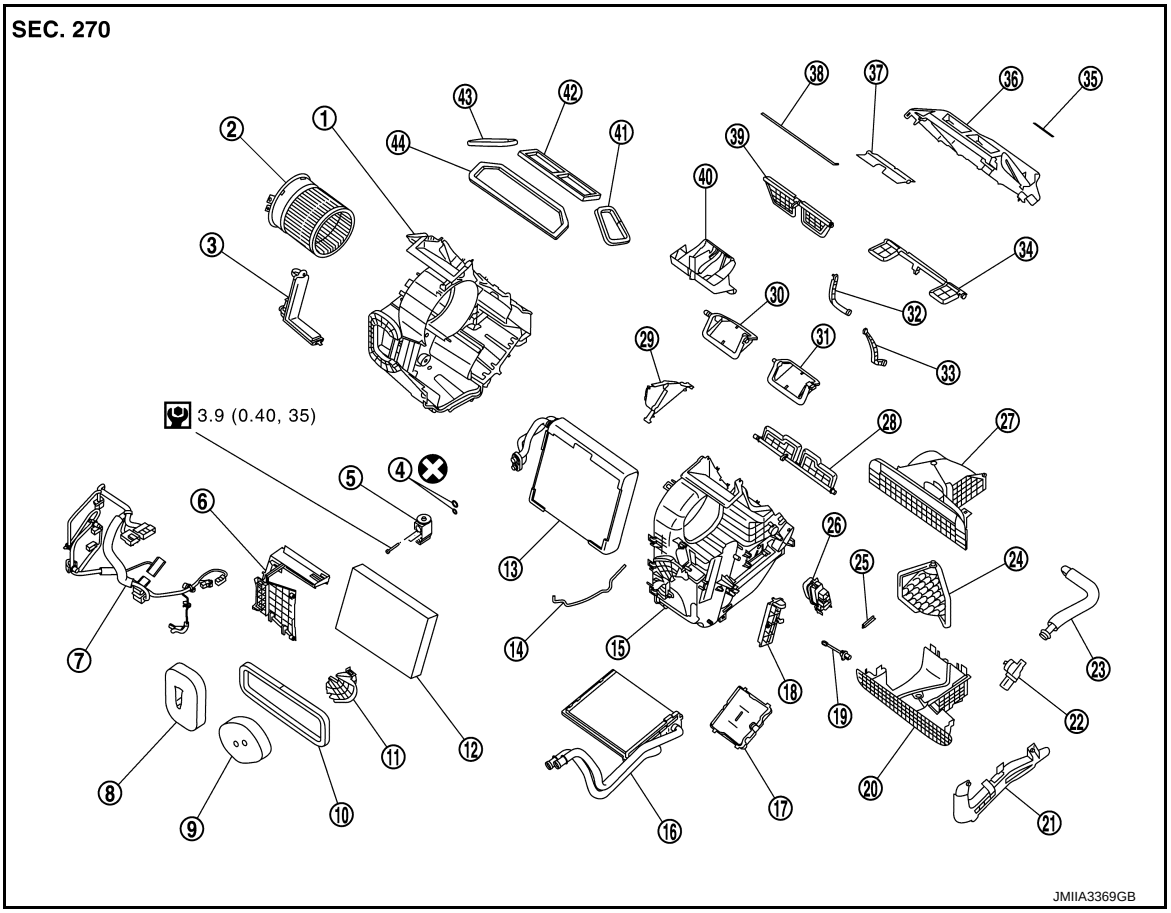


① Cap
② Steering member
③ Instrument stay LH
④ Instrument stay RH
⑤ A/C unit assembly
⑥ Drain hose

: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

DISASSEMBLY



① A/C unit case RH	② Blower fan motor	③ Filter cover RH
④ O-ring	⑤ Expansion valve	⑥ Main case center
⑦ Sub harness	⑧ Cooler packing	⑨ Heater pipe packing
⑩ Intake packing	⑪ Heater pipe bracket	⑫ Air conditioner filter
⑬ Evaporator	⑭ Case packing	⑮ A/C unit case LH
⑯ Heater core	⑰ A/C auto amp. (automatic air conditioning)	⑱ Filter cover LH
⑲ Intake sensor	⑳ Intake box case lower	㉑ Heater pipe cover
㉒ Aspirator (automatic air conditioning)	㉓ Aspirator duct (automatic air conditioning)	㉔ Intake door
㉕ Non woven fabric	㉖ Power transistor (automatic air conditioning) Fan control amplifier (manual air conditioning)	㉗ Intake box upper case
㉘ Foot door	㉙ Center plate case	㉚ Air mix door RH
㉛ Air mix door LH	㉜ Foot door & mode door rod	㉝ Center ventilator door·center ventilator & defroster door rod
㉞ Side ventilator door	㉟ Code label	㊱ Main case rear
㊲ Mode door	㊳ Non woven fabric	㊴ Center ventilator & defroster door
㊵ Air guide case	㊶ Side ventilator packing LH	㊷ Center ventilator packing
㊸ Side ventilator packing RH	㊹ Defroster packing	

: Always replace after disassembly.

: N·m (kg-m, in-lb)

A/C UNIT ASSEMBLY

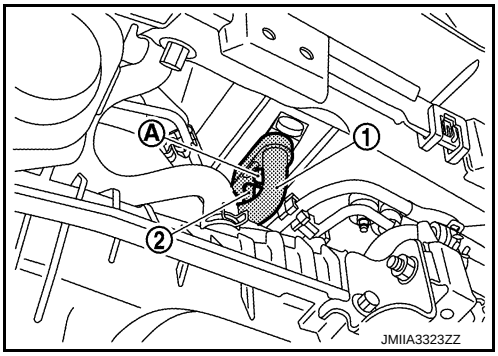
A/C UNIT ASSEMBLY : Removal and Installation

INFOID:0000000011001072

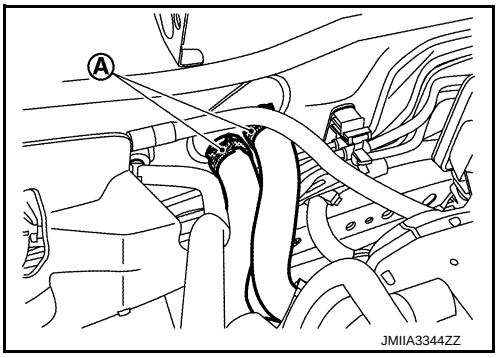
CAUTION:
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-68, "Perform Lubricant Return Operation".

REMOVAL

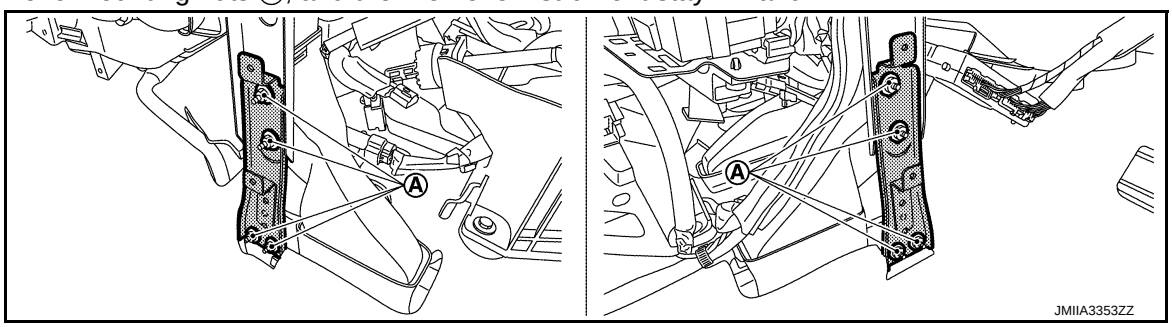
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-66, "Recycle Refrigerant".
2. Drain engine coolant from cooling system. Refer to CO-13, "Draining".
3. Remove cowl top cover. Refer to EXT-25, "Removal and Installation".
4. Disengage fixing clips, and then remove insulator.
5. Remove mounting bolt Ⓐ, and then disconnect low-pressure pipe ① and high-pressure pipe ② from evaporator pipe assembly.
   CAUTION:
   Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.



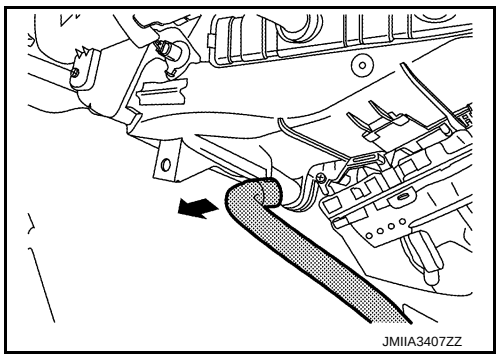
6. Remove air duct. Refer to EM-30, "Exploded View".
7. Remove fixing clamps Ⓐ, and then disconnect heater hoses.



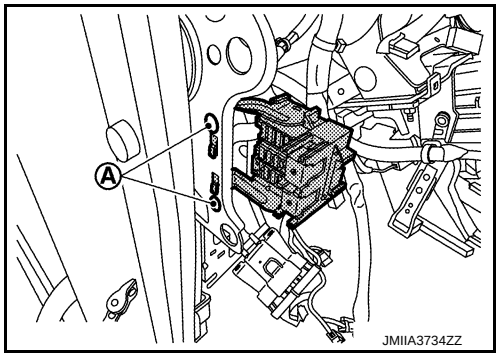
8. Remove instrument panel assembly. Refer to IP-14, "Removal and Installation".
9. Remove rear ventilator duct 1. Refer to VTL-13, "REAR VENTILATOR DUCT 1 : Removal and Installation". (with rear ventilator)
10. Remove rear floor duct 1. Refer to VTL-13, "REAR FLOOR DUCT 1 : Removal and Installation".
11. Remove mounting nuts Ⓐ, and then remove instrument stay LH and RH.



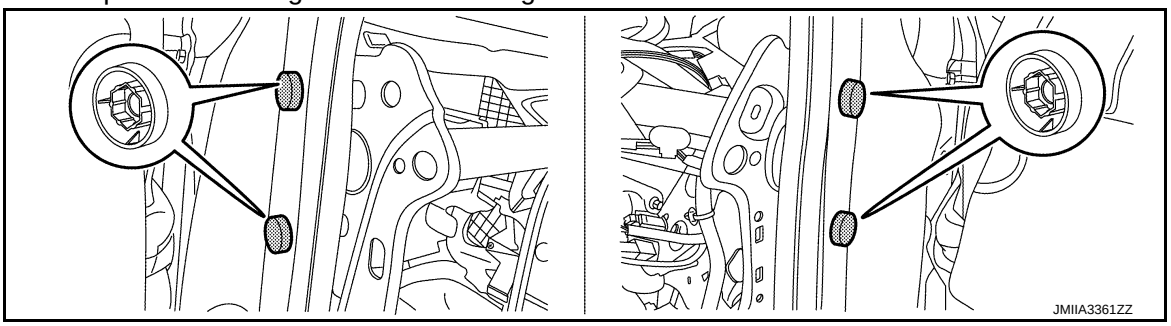
12. Disconnect drain hose from A/C unit assembly.



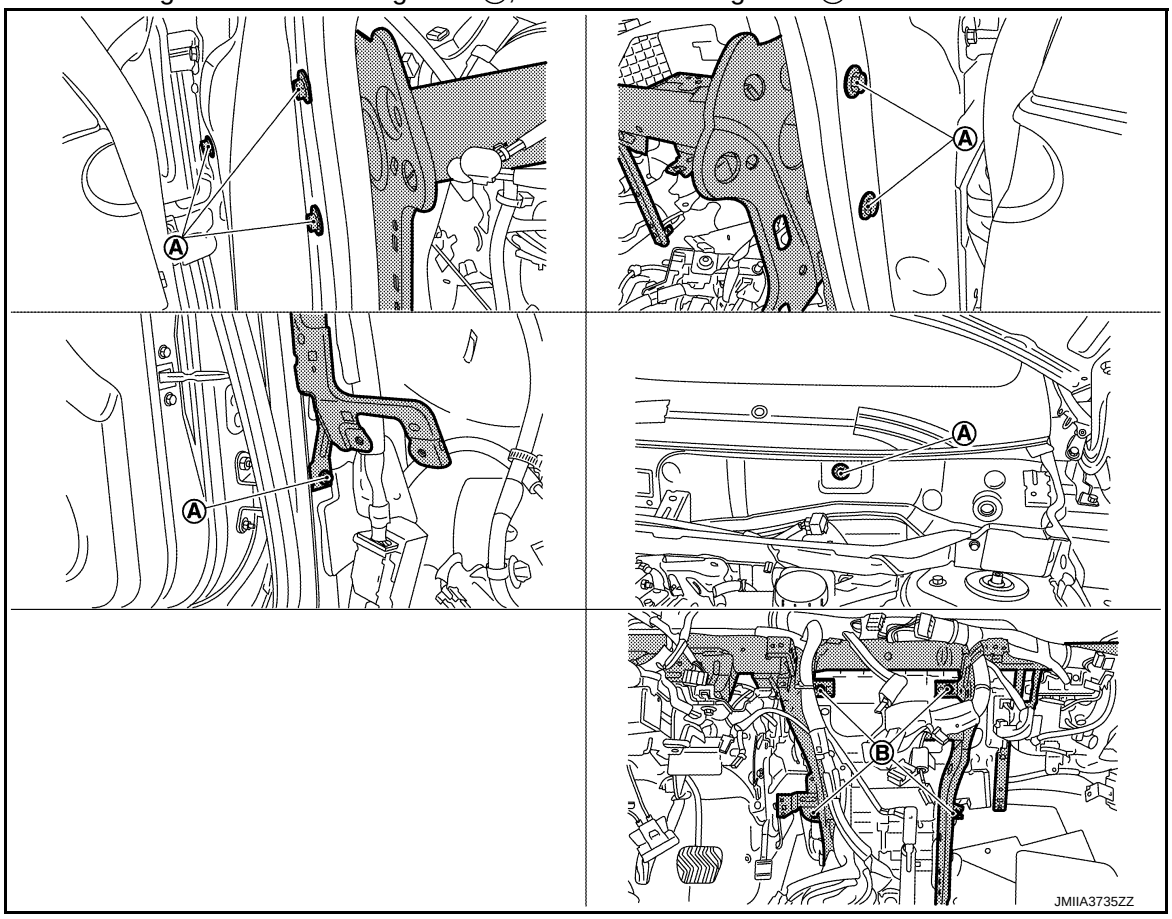
13. Remove ground wire mounting bolts.
14. Remove fixing screws Ⓐ, and then remove junction box.



15. Remove harness connector, harness clips and bracket necessary to remove steering member. Move vehicle harness aside.
16. Remove steering column mounting bolts and nuts, and then move steering column assembly to secure work space. Refer to ST-13, "Exploded View".
17. Remove caps from steering member mounting bolts.



18. Remove steering member mounting bolts Ⓐ, A/C unit mounting bolts Ⓑ.



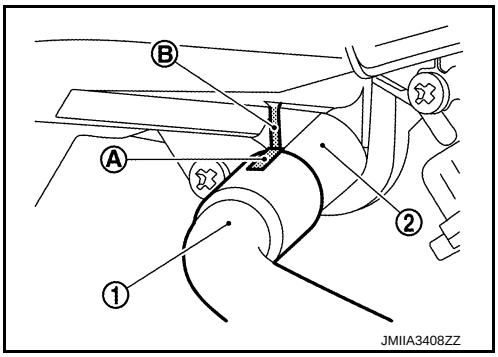
19. Remove steering member from vehicle.
CAUTION:
When removing steering member, 2 workers are required to prevent it from dropping.
20. Remove A/C unit assembly from vehicle.
CAUTION:
When removing A/C unit assembly, 2 workers are required to prevent it from dropping.

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.**
- **Check for leakages when recharging refrigerant. Refer to HA-64, "Leak Test".**
- **When installing drain hose ①, match the rib portion Ⓑ of A/C unit ② and mark Ⓐ of drain hose.**



NOTE:
Refer to CO-14, "Refilling" when filling radiator with engine coolant.

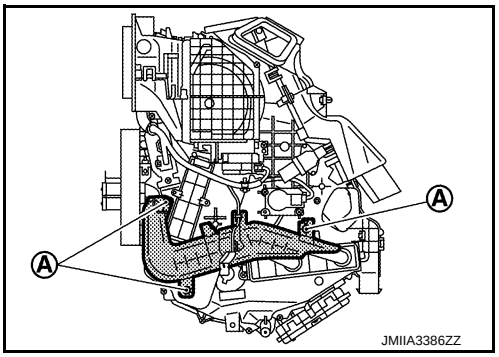
HEATER CORE

HEATER CORE : Removal and Installation

INFOID:0000000011001073

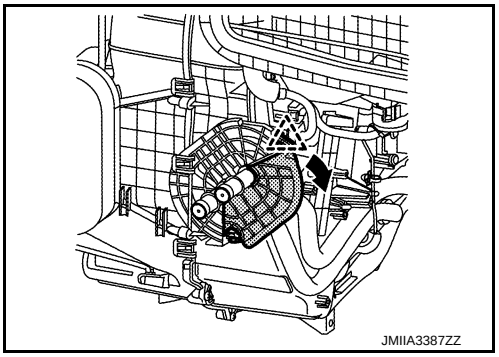
REMOVAL

1. Remove A/C unit assembly. Refer to HA-88, "A/C UNIT ASSEMBLY : Removal and Installation".
2. Remove foot duct LH. Refer to VTL-12, "FOOT DUCT : Removal and Installation".
3. Remove heater pipe grommet.
4. Remove fixing screws Ⓐ, and then remove heater pipe cover.

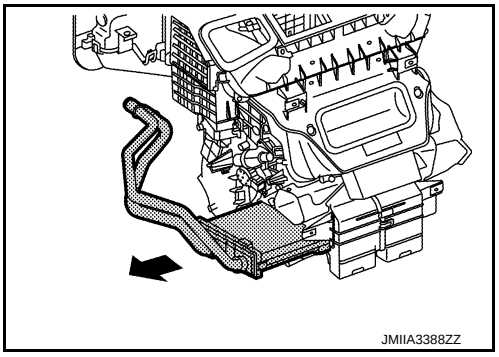


5. Disengage fixing pawl, and then remove heater pipe bracket.

: Pawl



6. Slide heater core to left side, and then remove heater core.



INSTALLATION

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

NOTE:

Refer to CO-14, "Refilling" when filling radiator with engine coolant.

EVAPORATOR

EVAPORATOR : Removal and Installation

INFOID:0000000011001074

REMOVAL

1. Remove A/C unit assembly. Refer to HA-88, "A/C UNIT ASSEMBLY : Removal and Installation".
2. Disassemble A/C unit assembly, and then remove evaporator assembly.
3. Remove mounting bolts, and then remove expansion valve from evaporator 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.**
- **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-64, "Leak Test".**

EXPANSION VALVE

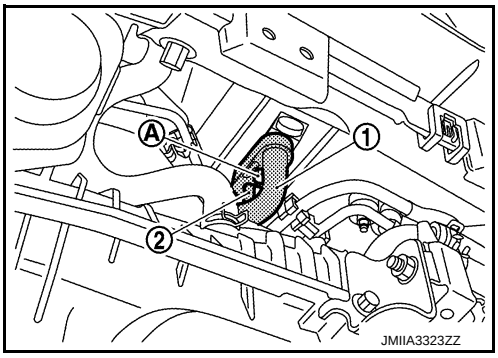
EXPANSION VALVE : Removal and Installation

INFOID:0000000011001075

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-68, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-66, "Recycle Refrigerant".
2. Disengage fixing pawls, and then remove insulator.
3. Remove mounting bolt Ⓐ, and then disconnect low-pressure flexible hose ① and high-pressure pipe ② from expansion valve.



4. Remove mounting bolts, and then remove expansion valve.

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.**
- **Check for leakages when recharging refrigerant. Refer to HA-64, "Leak Test".**

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Compressor

INFOID:0000000011001504

Model		DENSO make 6SBH14
Type		Variable displacement swash plate
Displacement cm^3 (cu in)/rev	Maximum	140 (8.6)
Direction of rotation		Clockwise (viewed from clutch)
Drive belt		Poly V
Disc to pulley clearance mm (in.)	Standard	0.21 – 0.55 (0.008 – 0.022)

Lubricant

INFOID:0000000011001505

Name		ND-OIL8
Capacity m ℓ (lmp fl oz)	Total in system	110 (3.9)
	Compressor (service part) charging amount	110 (3.9)

Refrigerant

INFOID:0000000011001506

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

Engine Idling Speed

INFOID:0000000011001507

Refer to EC-431, "Idle Speed".

Belt Tension

INFOID:0000000011001508

Refer to EM-132, "Drive Belt".

PRECAUTION

PRECAUTIONS

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

INFOID:0000000011006042

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.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000011014767

CAUTION:

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

- **Before removing and installing any control units, first turn the ignition power source and accessory power source to the OFF, then disconnect both battery cables.**
- **After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.**
- **Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.**

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Open driver door.
3. Turn the ignition switch to the ON position.
   (At this time, the steering lock will be released.)
4. Turn the ignition switch to OFF position with driver door open.
5. Wait for 3 minutes or longer with driver door open.
   NOTE:
   - Do not close driver door because the steering wheel locks when driver door is closed.

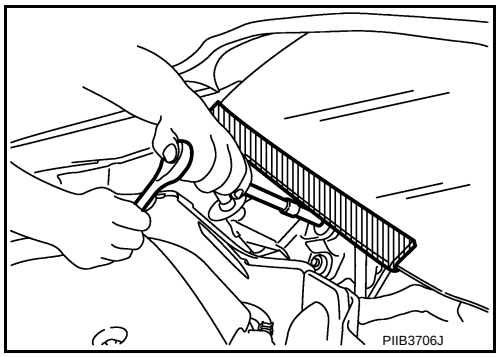
- The auto acc function is adapted to this vehicle. For this reason, even when the ignition switch is turned to OFF position, the accessory power source does not turned OFF and continues to be supplied for a certain amount of time.

6. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
7. Perform the necessary repair operation.
8. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the ignition switch from OFF position to ON position, then to LOCK position. (The steering wheel will lock when the ignition switch is turned to LOCK position.)
9. Perform self-diagnosis check of all control units using CONSULT.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000011006044

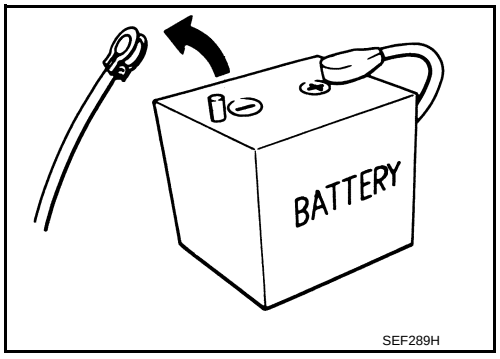
When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.



Precautions for Removing Battery Terminal

INFOID:0000000011014768

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.
- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing “How to disconnect 12V battery terminal” described below.
  NOTE:
  Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage 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.



HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.
For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

1. Open the hood.
2. Turn key switch to the OFF position with the driver side door opened.
3. Get out of the vehicle and close the driver side door.
4. Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes

K9K engine : 4 minutes
M9R engine : 4 minutes
R9M engine : 4 minutes
V9X engine : 4 minutes

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

5. Remove 12V battery terminal.
   CAUTION:
   After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

1. Unlock the door with intelligent key or remote keyless entry.
   NOTE:
   At this moment, ACC power is supplied.
2. Open the driver side door.
3. Open the hood.
4. Close the driver side door.
5. Wait at least 3 minutes.
   CAUTION:
   While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.
6. Remove 12V battery terminal.
   CAUTION:
   After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

Precautions For Refrigerant System Service

INFOID:0000000011006046

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)

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 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 condenser

WARNING:

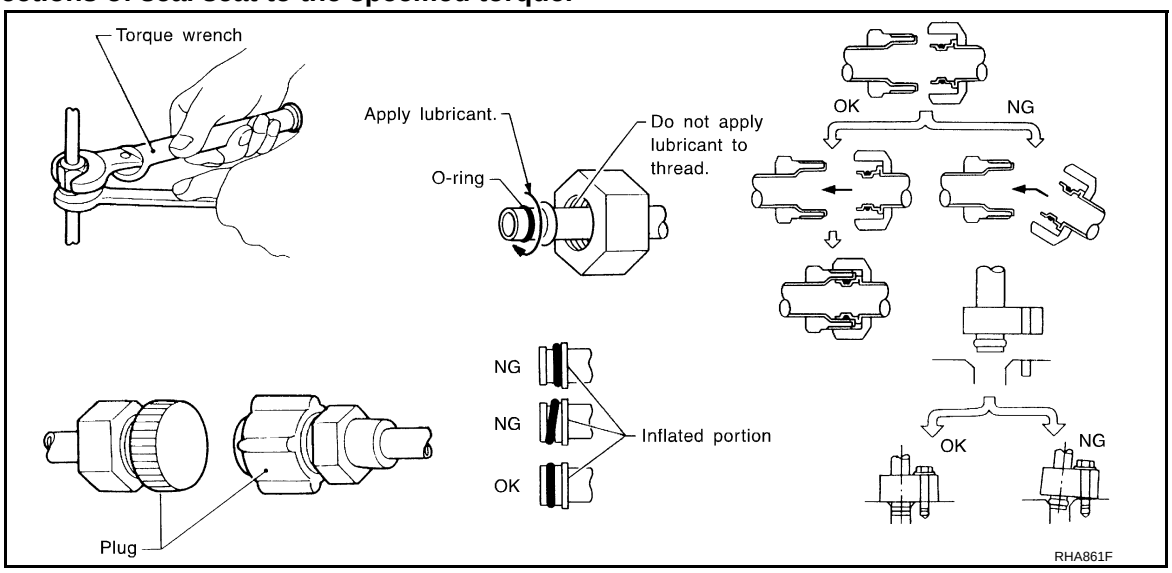
Check that all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.

CAUTION:

Observe the following when replacing or cleaning refrigerant cycle components.

- **Store it in the same way at 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.**
- **O-ring must be closely attached to the groove portion of tube.**
- **Never to damage O-ring and tube when replacing the O-ring.**
- **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 at 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-113, "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 manufacture’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.**
- **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.

Service Equipment

INFOID:0000000011006047

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.

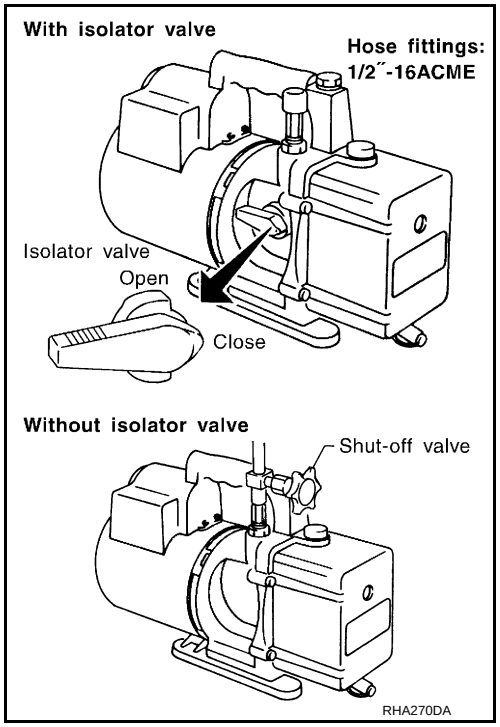
ELECTRICAL LEAK DETECTOR

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

VACUUM PUMP

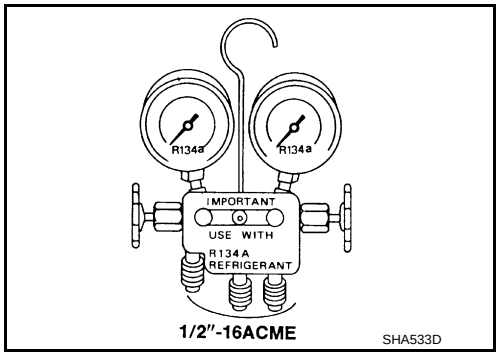
The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant may migrate out of the pump into the service hose. This is possible when the 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.



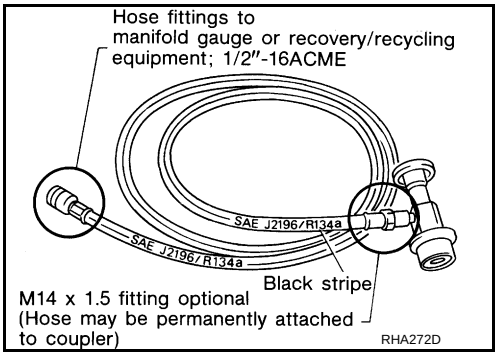
MANIFOLD GAUGE SET

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

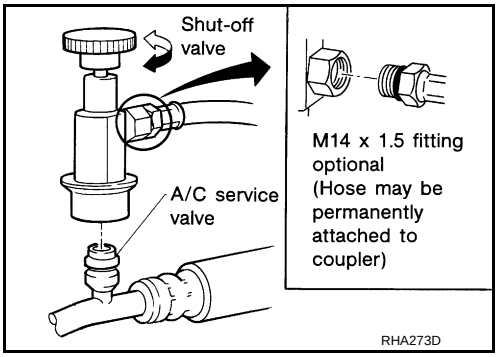
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must equip positive shut-off devices (either manual or automatic) near the end of the hoses opposite to the manifold gauge.



SERVICE COUPLERS

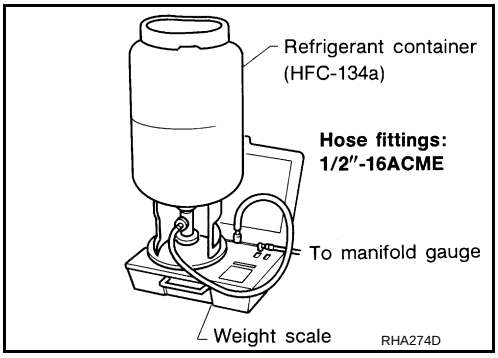
Never attempt to connect HFC-134a (R-134a) service couplers to the CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers do not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

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.

PREPARATION

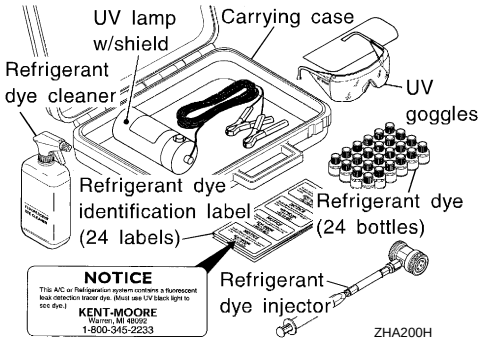
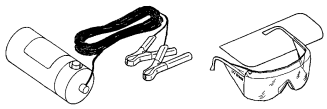
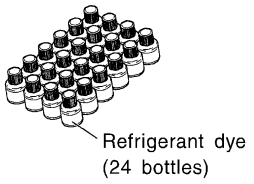
PREPARATION

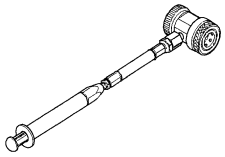
Special Service Tool

INFOID:0000000011006098

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 (SPX-North America No.) Tool name		Description
Refrigerant dye leak detection kit Kit includes: UV lamp and UV safety goggles HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles) Refrigerant dye cleaner		Power supply: DC 12 V (Battery terminal)
UV lamp and UV safety goggles	 SHA438F	Power supply: DC 12 V (Battery terminal) For checking refrigerant leak when fluorescent dye is installed in A/C system Includes: UV lamp and UV safety goggles
HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles)	 SHA439F	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.)

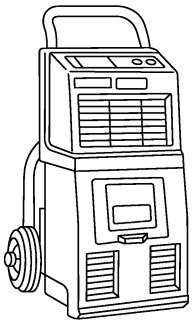
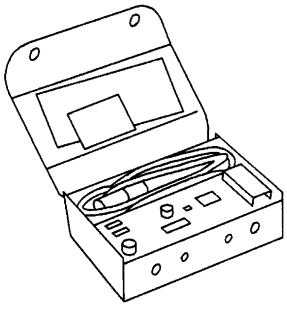
Tool number (SPX-North America No.) Tool name	Description
HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle  SHA440F	For injecting 1/4 ounce of fluorescent leak detection dye into A/C system
Refrigerant dye cleaner  SHA441F	For cleaning dye spills

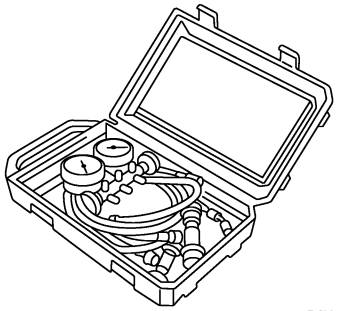
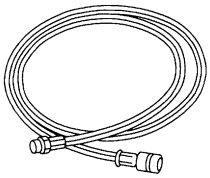
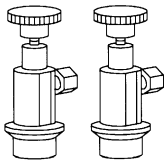
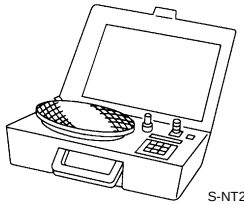
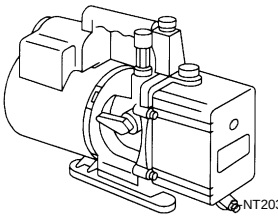
Commercial Service Tools

INFOID:0000000011006099

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.

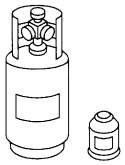
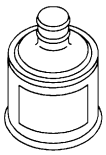
Tool name	Description
Recovery/recycling/recharging equipment (ACR4)  RJIA0195E	Function: Refrigerant recovery, recycling and recharging
Electrical leak detector  A/C leak detector SHA705EB	Power supply: DC 12 V (Cigarette lighter)

Tool name		Description
Manifold gauge set (with hoses and couplers)	 RJIA0196E	Identification: • The gauge face indicates HFC-134a (R-134a). Fitting size: Thread size • 1/2″-16 ACME
Service hoses • High-pressure side hose • Low-pressure side hose • Utility hose	 S-NT201	Hose color: • Low-pressure side hose: Blue with black stripe • High-pressure side hose: Red with black stripe • Utility hose: Yellow with black stripe or green with black stripe Hose fitting to gauge: • 1/2″-16 ACME
Service couplers • High-pressure side coupler • Low-pressure side coupler	 S-NT202	Hose fitting to service hose: M14 x 1.5 fitting is optional or permanently attached.
Refrigerant weight scale	 S-NT200	For measuring of refrigerant Fitting size: Thread size 1/2″-16 ACME
Vacuum pump (Including the isolator valve)	 S-NT203	Capacity: • Air displacement: 4 CFM • Micron rating: 20 microns • Oil capacity: 482 g (17 oz.) Fitting size: Thread size • 1/2″-16 ACME

Sealant or/and Lubricant

INFOID:0000000011006100

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.

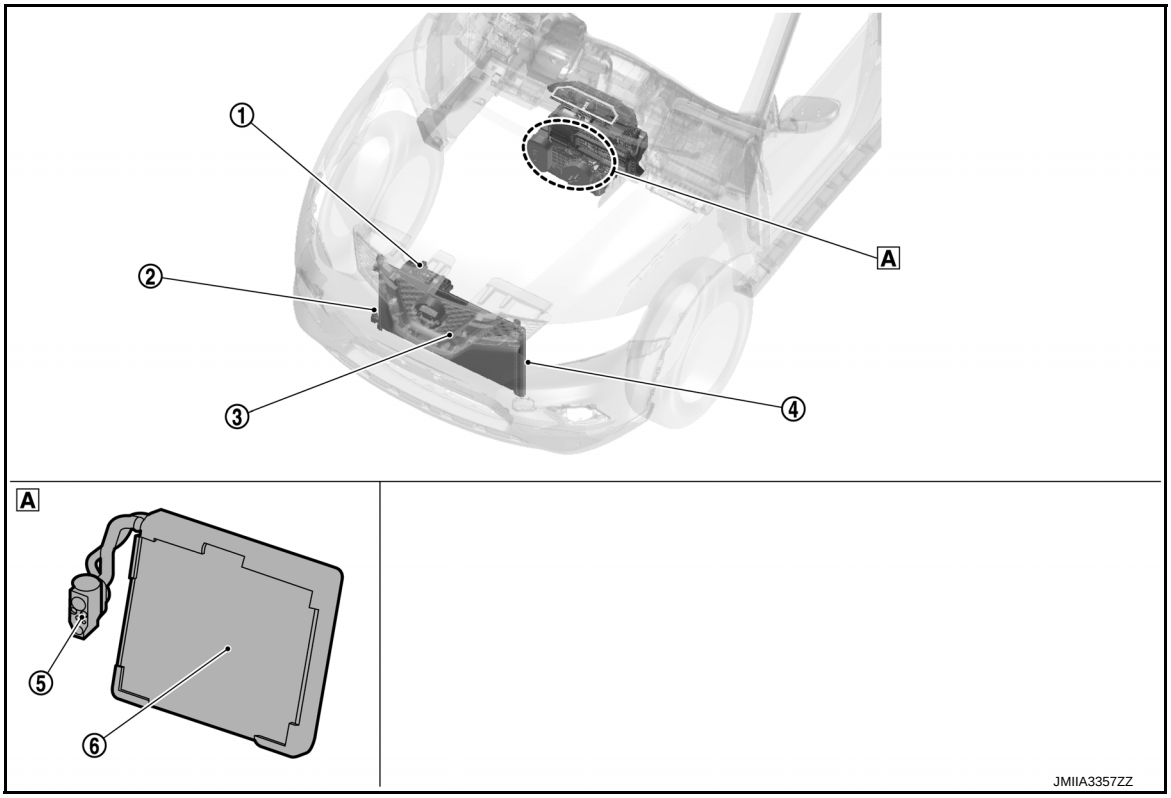
Tool name	Description
HFC-134a (R-134a) refrigerant  S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • Large container 1/2″-16 ACME
ND-OIL8  JMIIA1759ZZ	Type: Polyalkylene glycol oil (PAG), ND-OIL8 Application: HFC-134a (R-134a) swash plate compressors

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000011006101



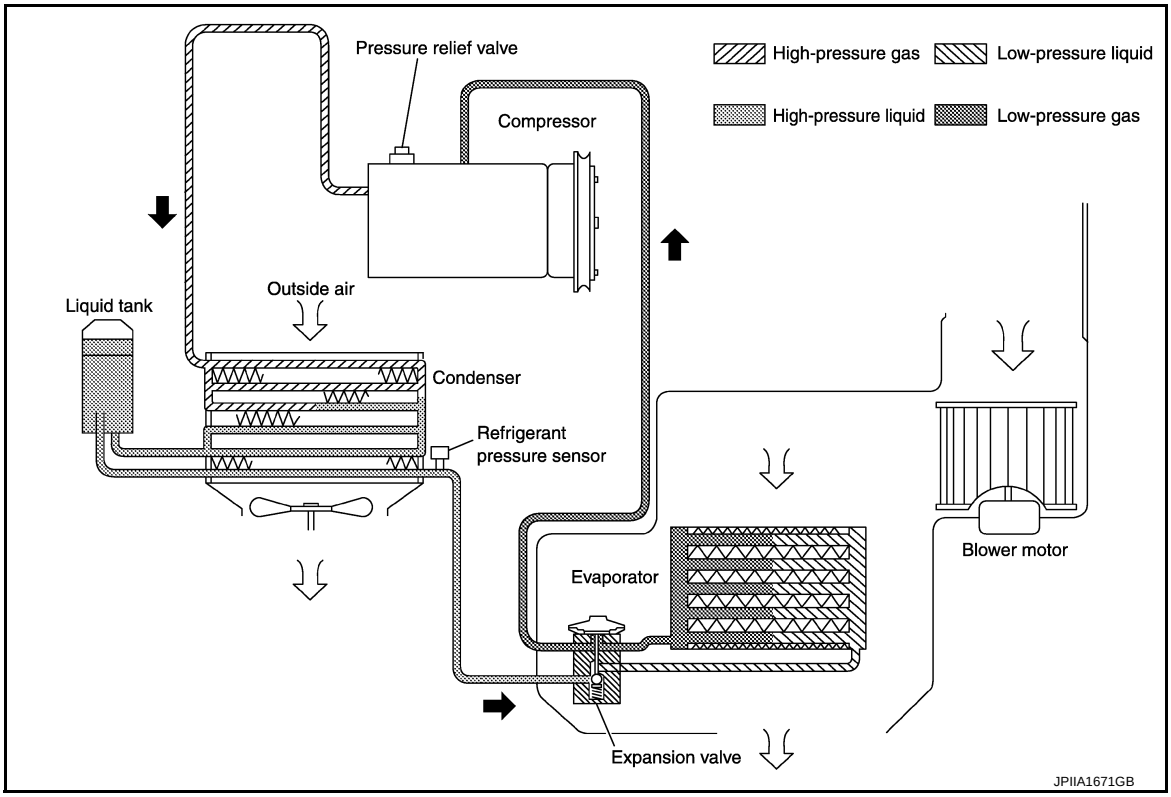
A In the heater & cooling unit assembly

No.	Location	Function
①	Compressor	Intakes, compresses, and discharges refrigerant, to circulate refrigerant inside the refrigerant cycle.
②	Refrigerant pressure sensor	• AUTOMATIC AIR CONDITIONING: Refer to HAC-19, "Refrigerant Pressure Sensor". • MANUAL AIR CONDITIONING: Refer to HAC-148, "Refrigerant Pressure Sensor".
③	Condenser (condenser & Liquid tank)	Cools refrigerant discharged from compressor, and transforms it to liquid refrigerant.
④	Liquid tank (condenser & Liquid tank)	Eliminates foreign matter in refrigerant, and stores temporarily liquid refrigerant.
⑤	Expansion valve	Transforms high-pressure liquid refrigerant to mist form low-pressure liquid refrigerant by drawing function.
⑥	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.

SYSTEM

System Diagram

INFOID:0000000011006102



System Description

INFOID:0000000011006103

REFRIGERANT CYCLE

Refrigerant Flow

The refrigerant from the compressor, flows the condenser with liquid tank, the evaporator, and returns to the compressor. The refrigerant evaporation in the evaporator is controlled by an expansion valve.

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 condenser. 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 (31.2 bar, 31.8 kg/cm^2, 452 psi) or more (Engine speed is 1,500 rpm or more.)
- Approximately 2,740 kPa (27.4 bar, 27.9 kg/cm^2, 397 psi) or more (Engine speed is less than 1,500 rpm.)
- Approximately 140 kPa (1.4 bar, 1.2 kg/cm^2, 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 when the pressure of refrigerant in the system increases to an unusual level [more than 3,800 kPa (38.0 bar, 38.8 kg/cm^2, 551 psi)].

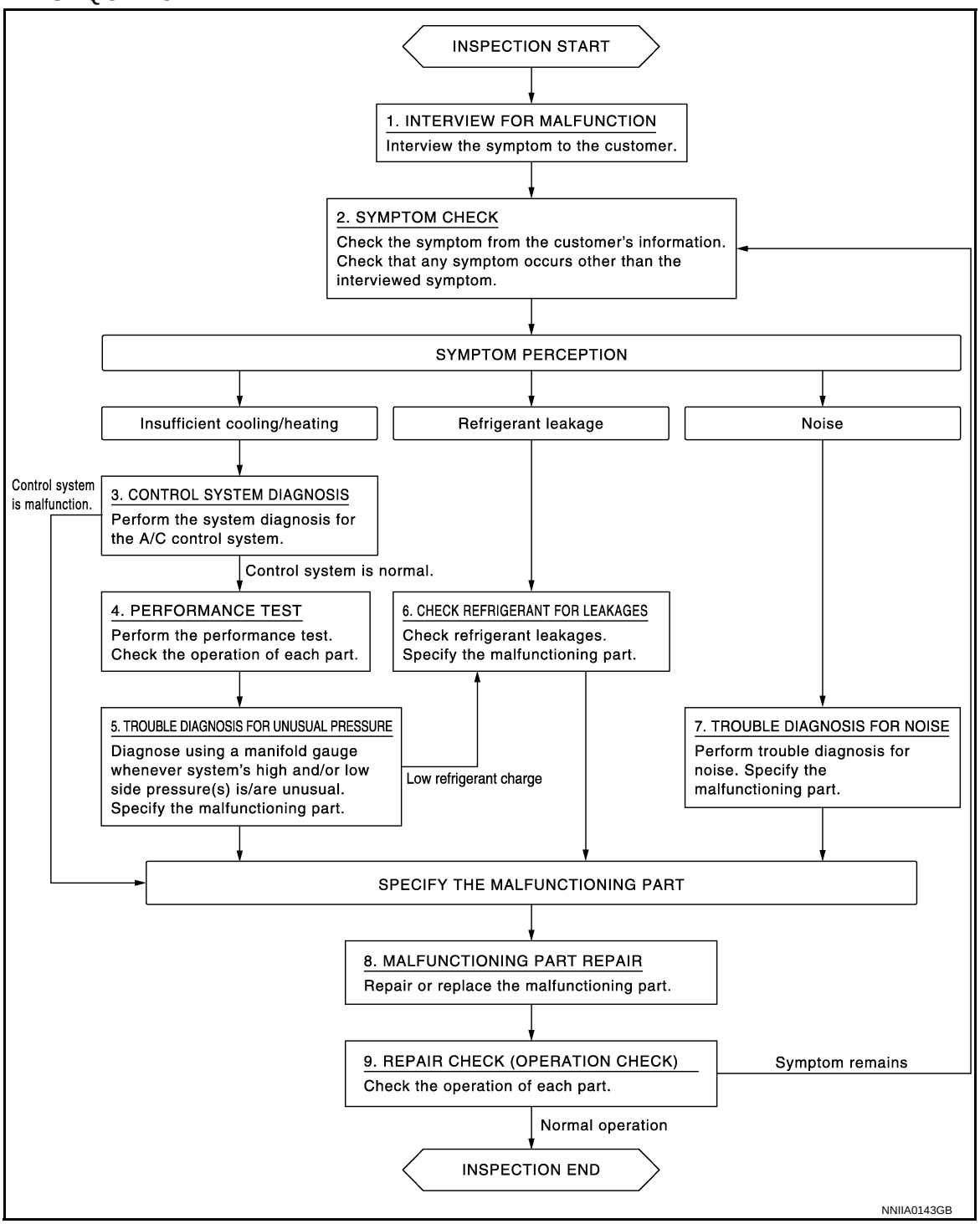
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000011006104

OVERALL SEQUENCE



DETAILED FLOW

1.INTERVIEW FOR MALFUNCTION

Interview the symptom to the customer.

>> 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-69, "Work Flow" (AUTOMATOC AIR CONDITIONING), HAC-183, "Work Flow"(MANUAL AIR CONDITIONING).

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-116, "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-118, "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-109, "Leak Test".

>> GO TO 8.

7.TROUBLE DIAGNOSIS FOR NOISE

Perform trouble diagnosis for noise. Specify the malfunctioning part. Refer to HA-120, "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?

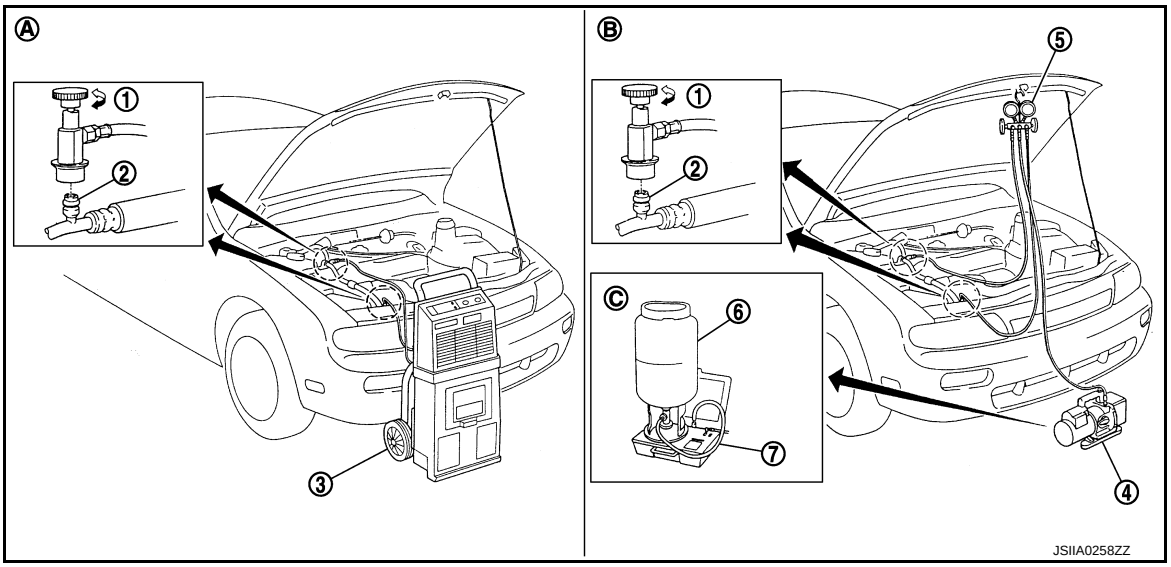
YES >> INSPECTION END
NO >> GO TO 2.

REFRIGERANT

Description

INFOID:0000000011006105

CONNECTION OF SERVICE TOOLS AND EQUIPMENT

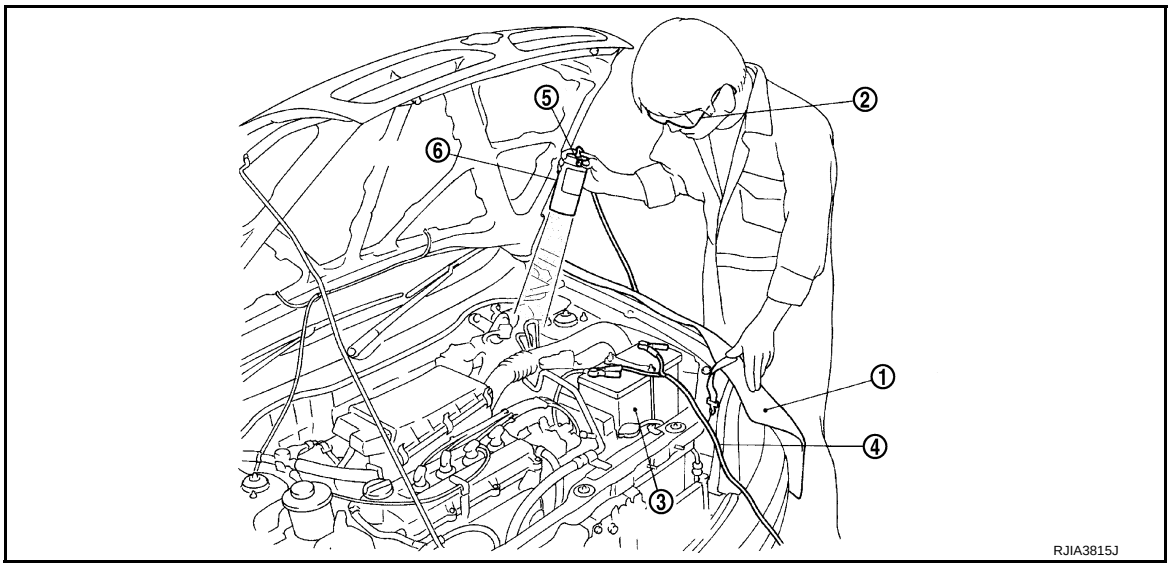


① Shut-off valve	② A/C service valve	③ Recovery/recycling/recharging equipment
④ Vacuum pump	⑤ Manifold gauge set	⑥ Refrigerant container (HFC-134a)
⑦ Weight scale		
Ⓐ Preferred (best) method	Ⓑ Alternative method	Ⓒ For charging

Leak Test

INFOID:0000000011006106

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.
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:
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.**

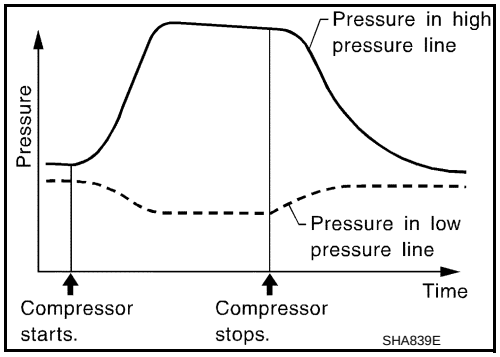
1. Stop the engine.
2. Connect recovery/recycling/recharging equipment or manifold gauge set to A/C service valve.
3. Check that A/C refrigerant pressure is 345 kPa (3.45 bar, 3.52 kg/cm^2, 50 psi) or more when temperature is 16°C (61°F) or more. When pressure is lower than the specified value, recycle refrigerant completely and fill refrigerant to the specified level.
   NOTE:
   Leakages may not be detected if A/C refrigerant pressure is 345 kPa (3.45 bar, 3.52 kg/cm^2, 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 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
- Temperature setting: Full cold
- Fan (blower) 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:
Never 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:0000000011006107

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-113, "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:0000000011006108

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 my 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.
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-109, "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.

LUBRICANT

Description

INFOID:0000000011006109

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 : ND-OIL8

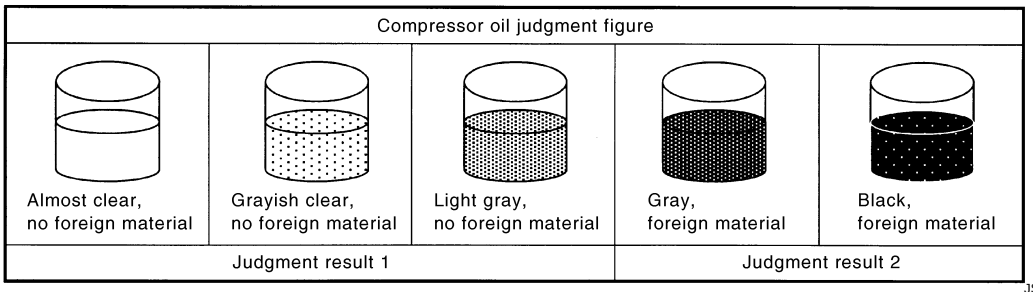
Inspection

INFOID:0000000011006110

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

1.COMPRESSOR OIL JUDGMENT

1. Remove the compressor. Refer to HA-121, "Removal and Installation".
2. Sample a compressor oil and judge on the figure.



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Judgement result 1>>Replace compressor only.
Judgement result 2>>Replace compressor and liquid tank.

Perform Lubricant Return Operation

INFOID:0000000011006111

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:0000000011006112

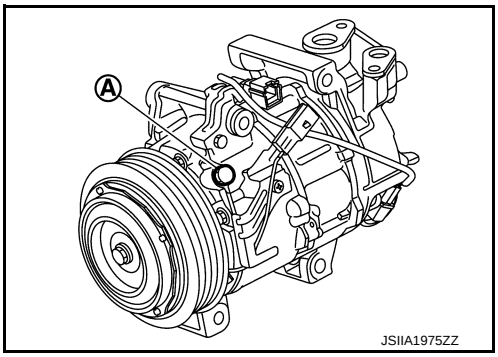
Fill with lubricant for the amount that is calculated according to the following conditions.
Example: Lubricant amount to be added when replacing evaporator and condenser & liquid tank [mℓ (Imp fl oz)] = 35 (1.2) + 15 (0.5) + α

Conditions		Lubricant amount to be added to A/C system m ℓ (Imp fl oz)
Replace evaporator		35 (1.2)
Replace condenser & liquid tank		20 (1.1)
Refrigerant leakage is detected	Large amount leakage	30 (1.1)
	Small amount leakage	—
Lubricant amount that is recycled together with refrigerant during recycle operation		α

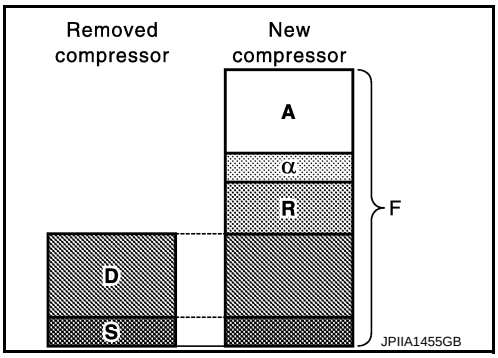
Lubricant Adjusting Procedure for Compressor Replacement

INFOID:0000000011006113

1. Drain lubricant from removed compressor and measure lubricant amount.
   - Remove drain bolt Ⓐ, and then drain lubricant from drain port.
   - 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 (Imp fl oz)] = F – (D + S + R + α)

F : Lubricant amount that a new compressor contains [110 (3.9)]

D : Lubricant amount that is drained from removed compressor

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

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

α : 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 (2.1 Imp fl oz), perform calculation by setting "D" as 40 m ℓ (1.4 Imp fl oz).

Conditions	Lubricant amount to be added to A/C system m ℓ (Imp fl oz)
Replace evaporator	35 (1.2)
Replace condenser & liquid tank	20 (0.7)

Example: Lubricant amount to be drained from a new compressor when replacing compressor and condenser & liquid tank [m ℓ (Imp fl oz)] [D = 60 (2.1), α = 5 (0.2)]
110 (3.9) – [40 (1.4) + 20 (0.7) + 30 (1.1) + 5 (0.2)] = 15 (0.5)

3. Tighten drain bolt to the specified torque

Specified torque : 30 N·m (3.1 kg-m, 22 ft-lb)

4. Install compressor and check the operation.

PERFORMANCE TEST

Inspection

INFOID:0000000011006114

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-118, "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)	4.9 – 6.9 (41 – 44)
	25 (77)	9.1 – 11.6 (48 – 53)
	30 (86)	13.2 – 16.2 (56 – 61)
	35 (95)	17.6 – 21.1 (64 – 70)
60 – 70	20 (68)	6.9 – 8.9 (44 – 48)
	25 (77)	11.6 – 14.1 (53 – 57)
	30 (86)	16.2 – 19.2 (61 – 66)
	35 (95)	21.1 – 24.6 (70 – 76)

AMBIENT AIR TEMPERATURE-TO-OPERATING PRESSURE TABLE

Fresh air		High-pressure (Discharge side) kPa (bar, kg/cm^2, psi)	Low-pressure (Suction side) kPa (bar, kg/cm^2, psi)
Relative humidity %	Air temperature °C (°F)		
50 – 70	25 (77)	926 – 1,133 (9.3 – 11.3, 9.5 – 11.6, 134.3 – 164.2)	196 – 240 (2.0 – 2.4, 2.0 – 2.5, 28.4 – 34.8)
	30 (86)	1,070 -– 1,308 (10.7 – 13.1, 10.9 – 13.3, 155.1 – 189.6)	233 – 285 (2.3 – 2.9, 2.4 – 2.9, 33.8 – 41.3)
	35 (95)	1,091 – 1,332 (10.9 – 13.3, 11.1 – 13.6, 158.1 – 193.2)	278 – 340 (2.8 – 3.4, 2.8 – 3.5, 40.3 – 49.2)
	40 (104)	1,292 – 1,579 (12.9 – 15.8, 13.2 – 16.1, 187.3 – 228.9)	333 – 407 (3.3 – 4.1, 3.4 – 4.2, 48.3 – 59.0)

SYMPTOM DIAGNOSIS

REFRIGERATION SYSTEM SYMPTOMS

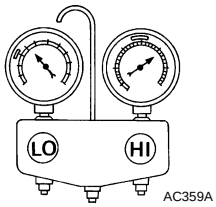
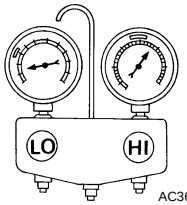
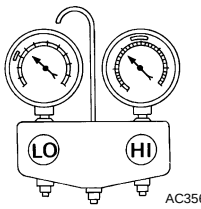
Trouble Diagnosis For Unusual Pressure

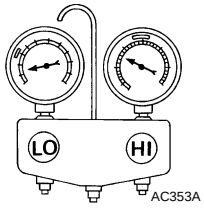
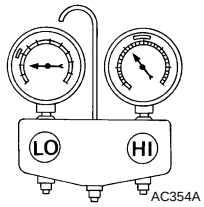
INFOID:0000000011006116

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

Symptom Table

INFOID:0000000011006117

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too high.  AC359A	The pressure returns to normal soon after sprinkling water on condenser.	Overfilled refrigerant.	Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.
	Air flow to condenser is insufficient.	Insufficient condenser cooling performance. • Poor fan rotation of radiator and condenser. • Improper installation of air guide. • Clogged or dirty condenser fins.	• Repair or replace malfunctioning parts. • Clean and repair condenser fins.
	When compressor is stopped, a high-pressure reading quickly drops by approximately 196 kPa (1.96 bar, 2 kg/cm^2, 28 psi). It then gradually decreases.	Air mixed in refrigerant cycle.	Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.
	• Low-pressure pipe is cooler than the outlet of evaporator. • Low-pressure pipe is frosted.	Expansion valve opened too much (excessive flow of refrigerant).	Replace expansion valve.
High-pressure side is excessively high and low-pressure side is too low.  AC360A	High-pressure pipe and upper side of condenser become hot, however, liquid tank does not become so hot.	Clogged or crushed high-pressure pipe located between compressor and condenser.	Repair or replace the malfunctioning parts.
High-pressure side is too low and low-pressure side is too high.  AC356A	• The readings of both sides become equal soon after compressor operation stops. • There is no temperature difference between high- and low-pressure sides.	Malfunction in compressor system (insufficient compressor pressure operation). • Damage or breakage of valve. • Malfunctioning gaskets.	Replace compressor.

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low. 	• The area around evaporator outlet does not become cold. • The area around evaporator inlet becomes frosted.	Clogged expansion valve. • Breakage of temperature sensor. • Clogging by foreign material.	Eliminate foreign material from expansion valve, or replace it.
	• There is a temperature difference between the areas around outlet and inlet pipes of liquid tank. • Liquid tank becomes frosted.	Malfunction in inner liquid tank (clogged strainer).	Replace condenser.
	Evaporator becomes frosted.	Clogged or crushed low-pressure pipe.	Repair or replace malfunctioning parts.
		Malfunction in intake air temperature sensor.	Check intake sensor system. Refer to HAC-81, "Diagnosis Procedure" (AUTOMATIC AIR CONDITIONING), HAC-192, "Diagnosis Procedure" (MANUAL AIR CONDITIONING).
	There is a small temperature difference between the high and low pressure pipes for refrigerant cycle.	• Shortage of refrigerant. • Leakage of refrigerant.	• Check for leakage. • Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.
Low-pressure side sometimes becomes negative. 	• Sometimes the area around evaporator outlet does not become cold. • Sometimes the area around evaporator inlet is frosted.	• Icing caused by the mixing of water in cooler cycle. • Deteriorated dryer in liquid tank.	• Collect all refrigerant. • Evacuate refrigerant cycle completely, and then refill it with the specified amount of refrigerant. At this time, always replace condenser.
Hunting in high-pressure side.	There is no temperature difference between high- and low-pressure sides.	Malfunctioning variable valve in compressor.	• Replace compressor. • Check ECV system. Refer to HAC-113, "Diagnosis Procedure" (AUTOMATIC AIR CONDITIONING), HAC-212, "Diagnosis Procedure" (MANUAL AIR CONDITIONING).

NOISE

Symptom Table

INFOID:0000000011006118

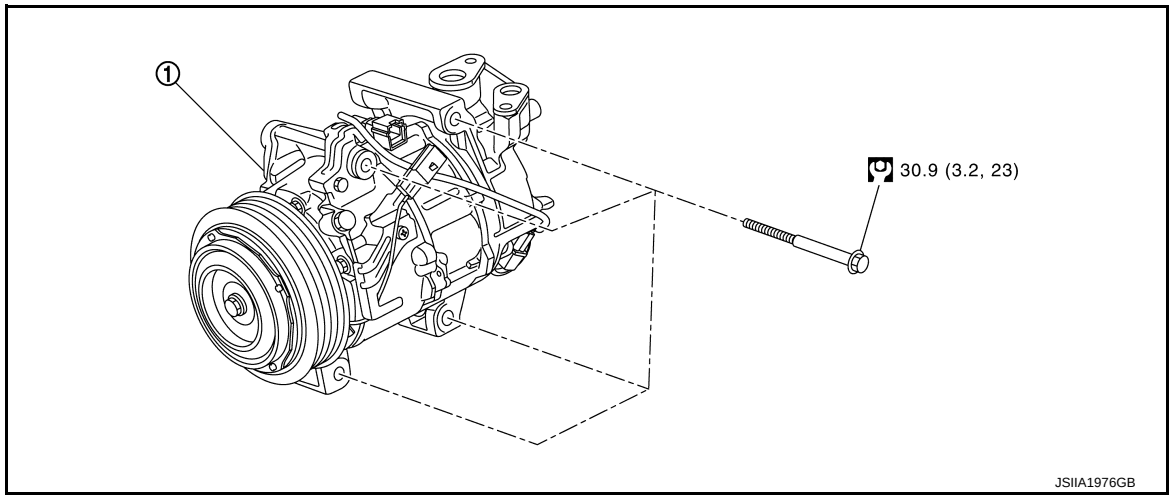
Symptom	Noise source	Probable cause	Corrective action
Unusual noise from compressor when A/C is ON.	Inside of compressor	Wear, breakage, or clogging of foreign material in inner parts.	Check compressor oil. Refer to HA-113, "Inspection".
	Magnet clutch	Contact of clutch disc with pulley.	Check clearance between clutch disc and pulley. Refer to HA-122, "Inspection".
	Compressor body	Loosened compressor mounting bolts.	Check bolts for tightness. Refer to HA-121, "Exploded View".
Unusual noise from cooler piping.	Cooler piping (pipe and flexible hose)	Improper installation of clip and bracket.	Check the installation condition of the cooler piping. Refer to HA-123, "Exploded View".
Unusual noise from expansion valve when A/C is ON.	Expansion valve	Shortage of refrigerant.	• Check for leakage. • Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.
		Wear, breakage, or clogging of foreign material in inner parts.	Eliminate foreign material from expansion valve, or replace it.
Unusual noise from belt.	—	Loosened belt	Check belt tension. Refer to EM-275, "Drive belt".
		Internal compressor parts get locked	Replace compressor.

REMOVAL AND INSTALLATION

COMPRESSOR

Exploded View

INFOID:0000000011006119



① Compressor

: N·m (kg-m, ft-lb)

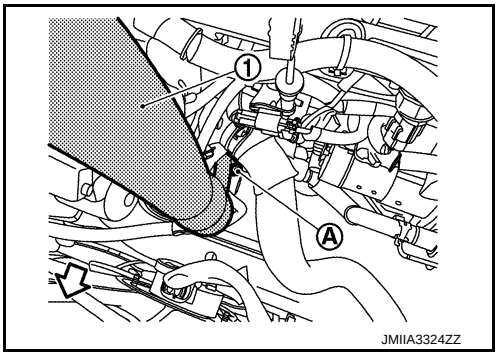
Removal and Installation

INFOID:0000000011006120

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-113, "Perform Lubricant Return Operation".

REMOVAL

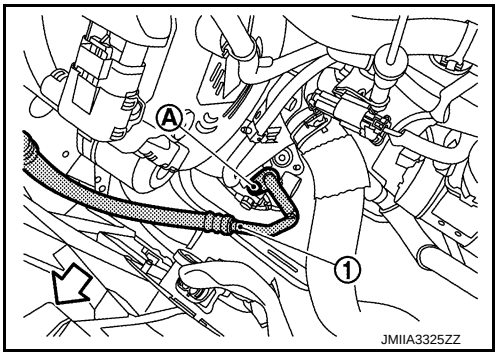
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-111, "Recycle Refrigerant".
2. Remove auto-tensioner. Refer to EM-173, "Removal and Installation".
3. Remove mounting bolt Ⓐ, and then disconnect low-pressure flexible hose ① from compressor.



⇦ : Vehicle front

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. Remove mounting bolt Ⓐ, and then disconnect high-pressure flexible hose ① from compressor.



⇦ : Vehicle front

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.

5. Disconnect harness connector and remove mounting bolts, and then remove compressor.

INSTALLATION

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

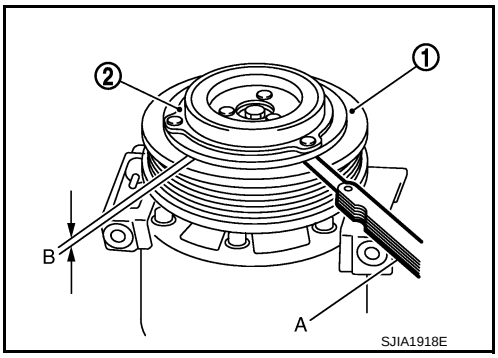
CAUTION:
- **Replace O-rings with new ones. Then apply compressor oil to them when installing.**
- **Check for leakages when recharging refrigerant.**
- **Check tension of the drive belt after installing compressor. Refer to EM-167, "Adjustment".**

Inspection

INFOID:0000000011006122

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).



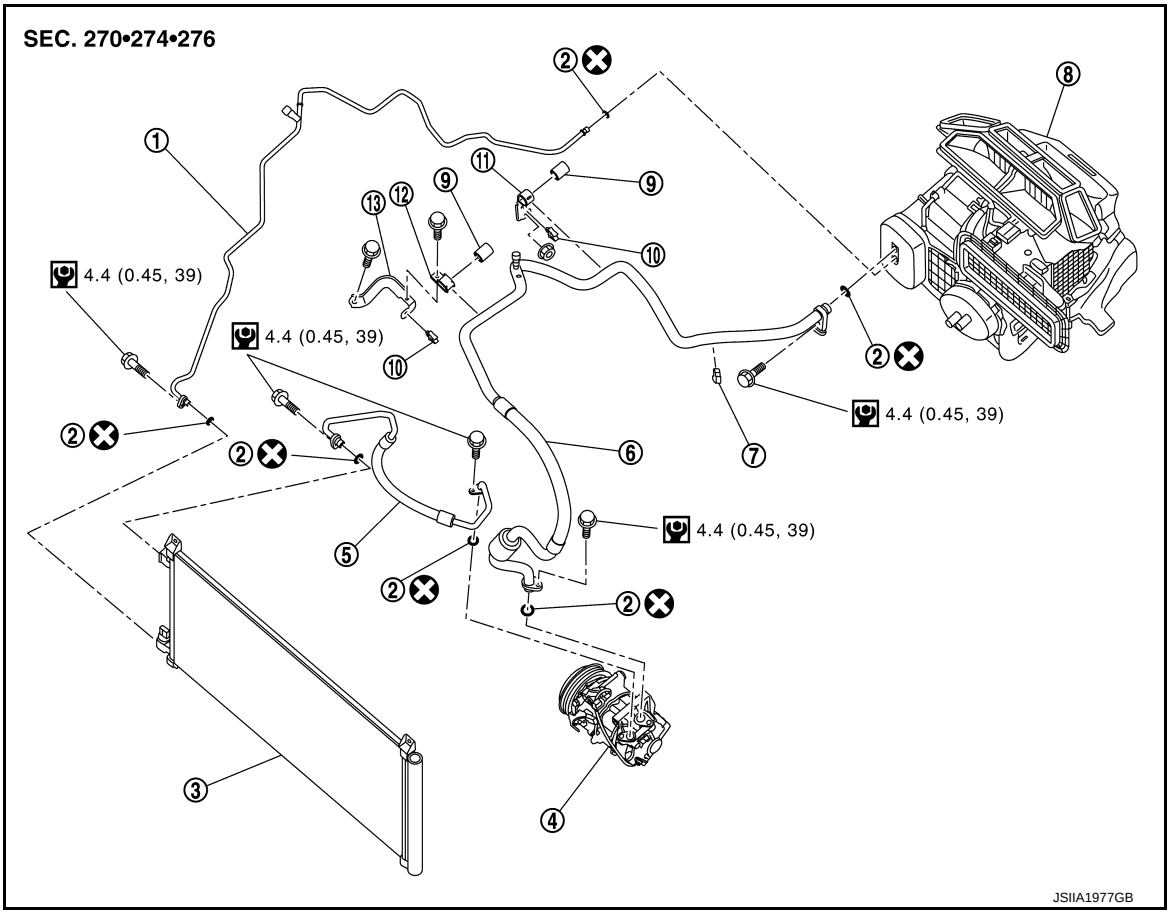
Clearance : Refer to HA-139, "Compressor".

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

COOLER PIPE AND HOSE

Exploded View

INFOID:0000000011006123



① High-pressure pipe	② O-ring	③ Condenser & liquid tank assembly
④ Compressor	⑤ High-pressure flexible hose	⑥ Low-pressure flexible hose
⑦ Tube clip	⑧ A/C unit assembly	⑨ Tube mounting rubber
⑩ Tube clip	⑪ Pipe bracket A	⑫ Pipe bracket B
⑬ Pipe bracket C		

: Always replace after disassembly.

: N·m (kg-m, in-lb)

LOW-PRESSURE FLEXIBLE HOSE

LOW-PRESSURE FLEXIBLE HOSE : Removal and Installation

INFOID:0000000011006124

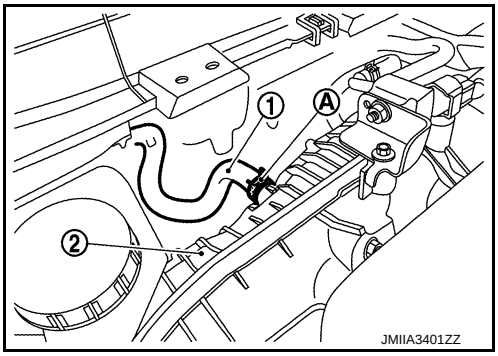
CAUTION:

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-113, "Perform Lubricant Return Operation".

REMOVAL

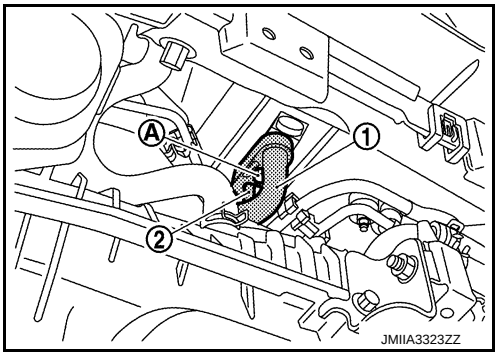
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-111, "Recycle Refrigerant".
2. Disengage fixing clips, and then remove insulator.

3. Remove vacuum hose fixing clamp Ⓐ, and then disconnect vacuum hose ① from intake manifold ②.

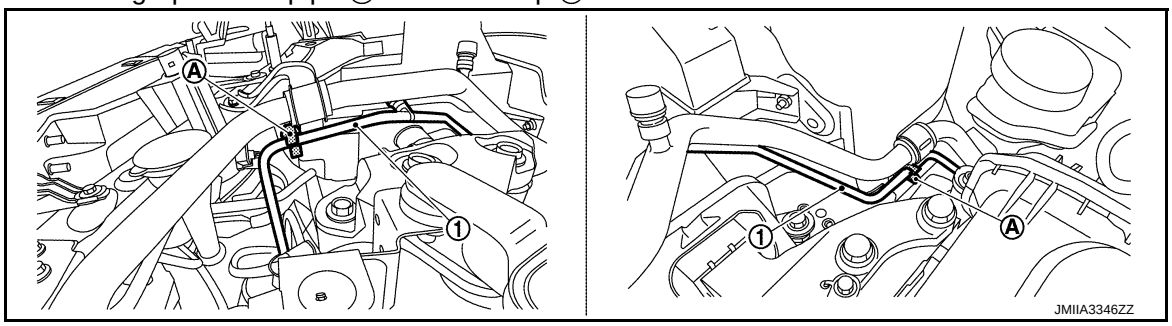


4. Remove mounting bolt Ⓐ, and then disconnect low-pressure flexible hose ① and high-pressure pipe ② from expansion valve.

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



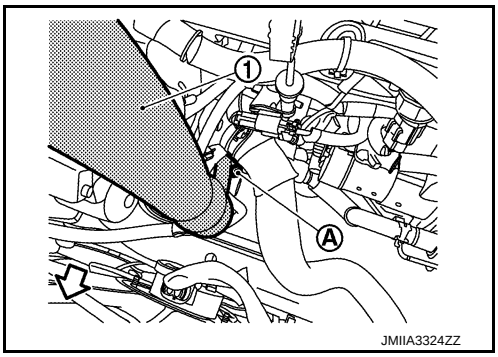
5. Disconnect high-pressure pipe ① from tube clip Ⓐ.



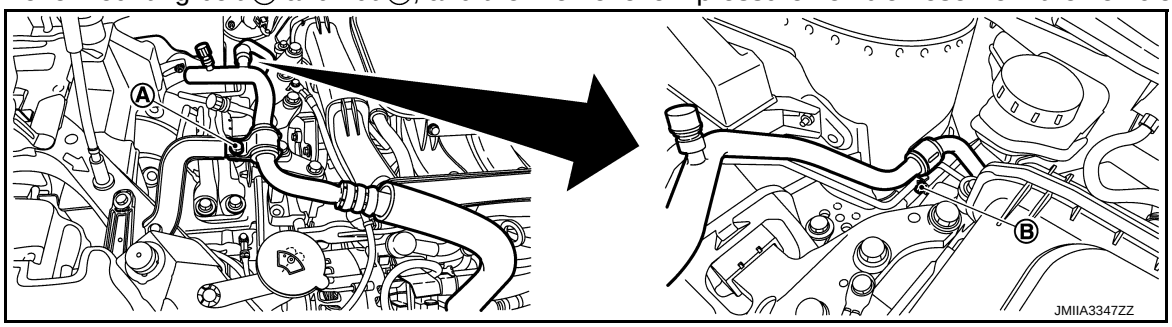
6. Remove mounting bolt Ⓐ, and then remove low-pressure flexible hose ① from compressor.

⇦ : Vehicle front

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.



7. Remove mounting bolt Ⓐ and nut Ⓑ, and then remove low-pressure flexible hose 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.**
- **Check for leakages when recharging refrigerant. Refer to HA-109, "Leak Test".**

HIGH-PRESSURE FLEXIBLE HOSE

HIGH-PRESSURE FLEXIBLE HOSE : Removal and Installation

INFOID:0000000011006125

CAUTION:

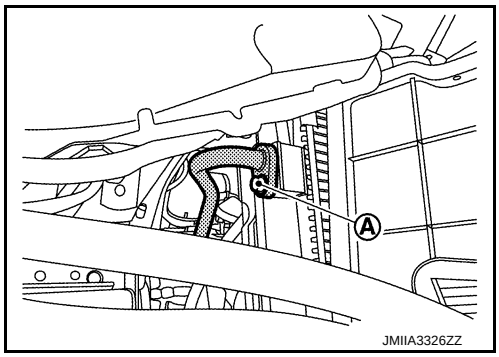
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-113, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-111, "Recycle Refrigerant".
2. Remove front bumper fascia assembly. Refer to EXT-15, "Removal and Installation".
3. Remove mounting bolt Ⓐ, and then disconnect high-pressure flexible hose from condenser &liquid tank assembly.

   CAUTION:

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

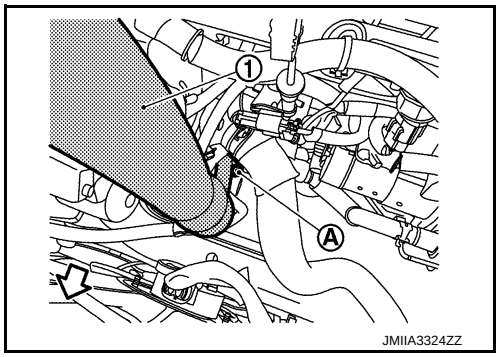


4. Remove mounting bolt Ⓐ, and then disconnect low-pressure flexible hose ① from compressor.

   ⇦ : Vehicle front

   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.

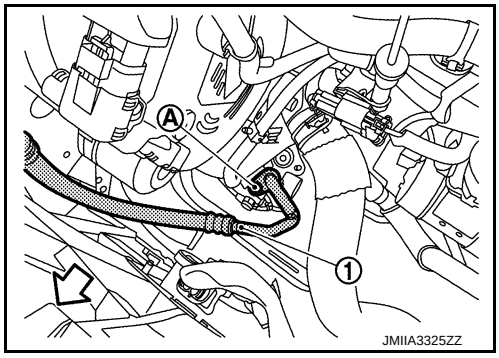


5. Remove mounting bolt Ⓐ, and then disconnect high-pressure flexible hose ① from compressor.

   ⇦ : Vehicle front

   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.



6. Remove high-pressure flexible hose 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.**

- **Check for leakages when recharging refrigerant. Refer to HA-109, "Leak Test".**

HIGH-PRESSURE PIPE

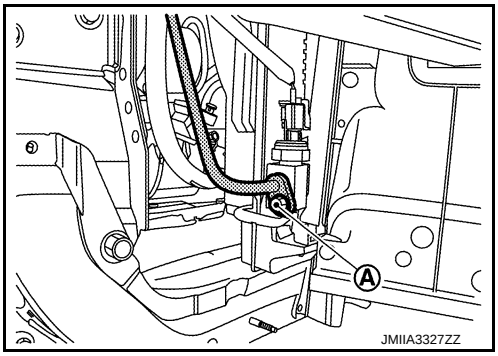
HIGH-PRESSURE PIPE : Removal and Installation

INFOID:0000000011006126

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-113, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-111, "Recycle Refrigerant".
2. Remove front bumper fascia assembly. Refer to EXT-15, "Removal and Installation".
3. Remove intake manifold. Refer to EM-176, "Removal and Installation".
4. Remove low-pressure flexible hose. Refer to HA-123, "LOW-PRESSURE FLEXIBLE HOSE : Removal and Installation".
5. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe from condenser & liquid tank assembly.
   CAUTION:
   Cap or wrap the joint of the A/C piping and condenser & liquid tank assembly with suitable material such as vinyl tape to avoid the entry of air.



6. Remove high-pressure pipe.

INSTALLATION

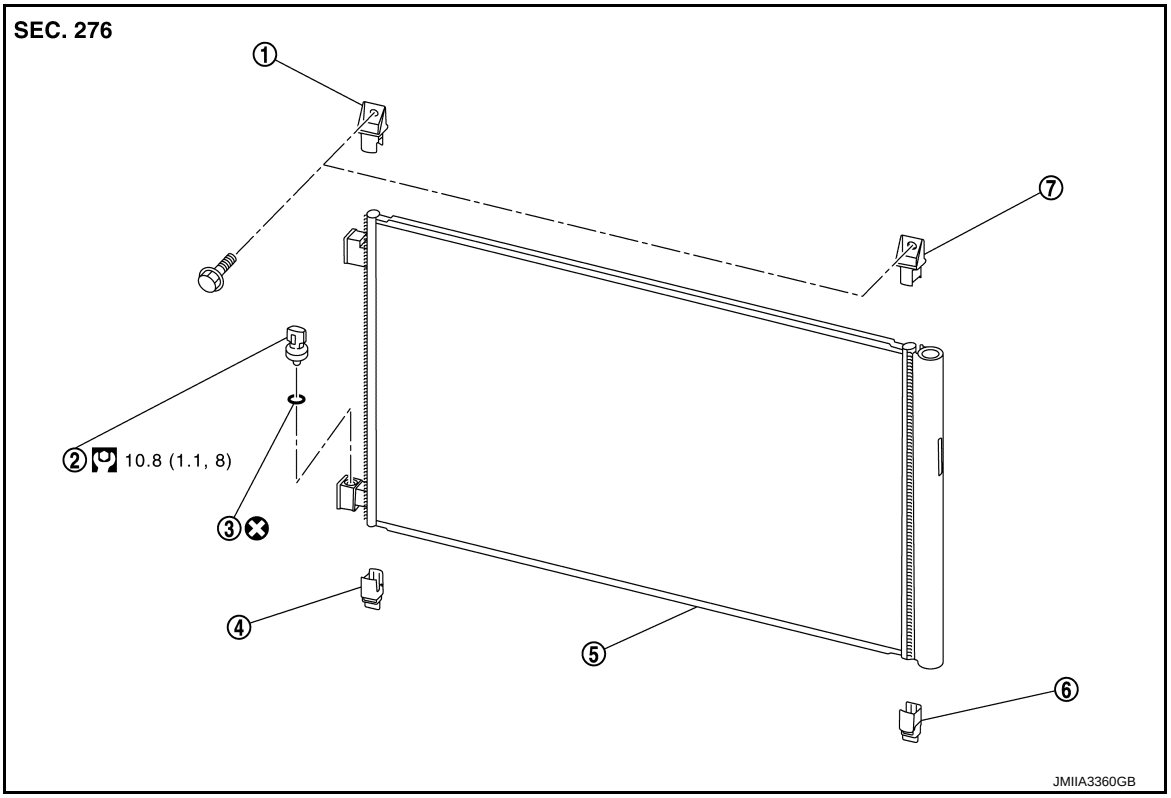
Note the following items, then install in the reverse order of removal.

CAUTION:
- **Replace O-rings with new ones. Then apply compressor oil to them when installing.**
- **Check for leakages when recharging refrigerant. Refer to HA-109, "Leak Test".**

CONDENSER

Exploded View

INFOID:0000000011006127



① Condenser upper bracket RH	② Refrigerant pressure sensor	③ O-ring
④ Condenser lower bracket RH	⑤ Condenser & liquid tank assembly	⑥ Condenser lower bracket LH
⑦ Condenser upper bracket LH		

⊗ : Always replace after disassembly.

: N·m (kg-m, ft-lb)

CONDENSER

CONDENSER : Removal and Installation

INFOID:0000000011006128

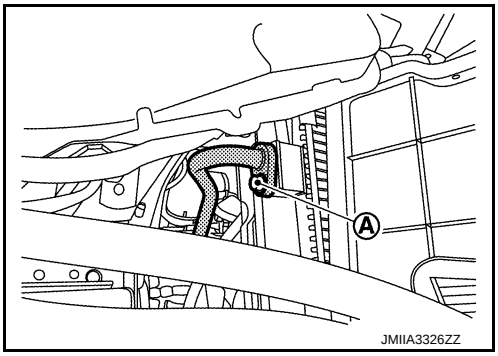
CAUTION:

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-113, "Perform Lubricant Return Operation".

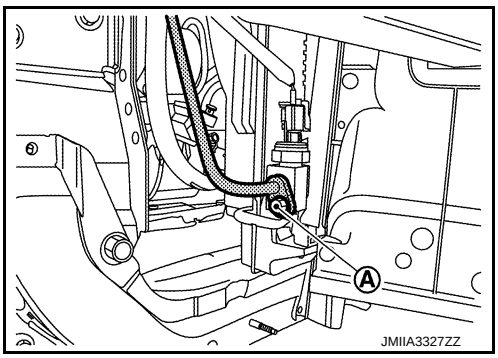
REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-111, "Recycle Refrigerant".
2. Removal apron bracket. Refer to EXT-15, "Removal and Installation".
3. Removal air guide. Refer to the following.
   - DLK-574, "QR25DE : Exploded View" (WITH INTELLIGENT KEY SYSTEM)
   - DLK-878, "QR25DE : Exploded View" (WITHOUT INTELLIGENT KEY SYSTEM)

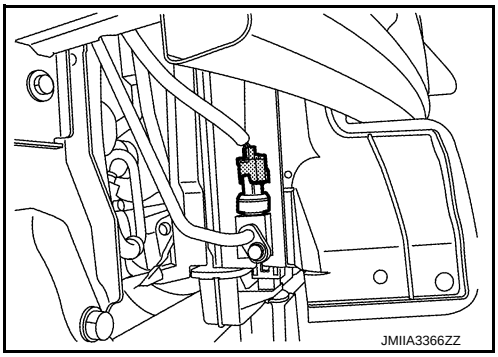
4. Remove mounting bolt Ⓐ, and then disconnect high-pressure flexible hose from condenser & liquid tank assembly.
CAUTION:
Cap or wrap the joint of the A/C piping and condenser & liquid tank assembly with suitable material such as vinyl tape to avoid the entry of air.



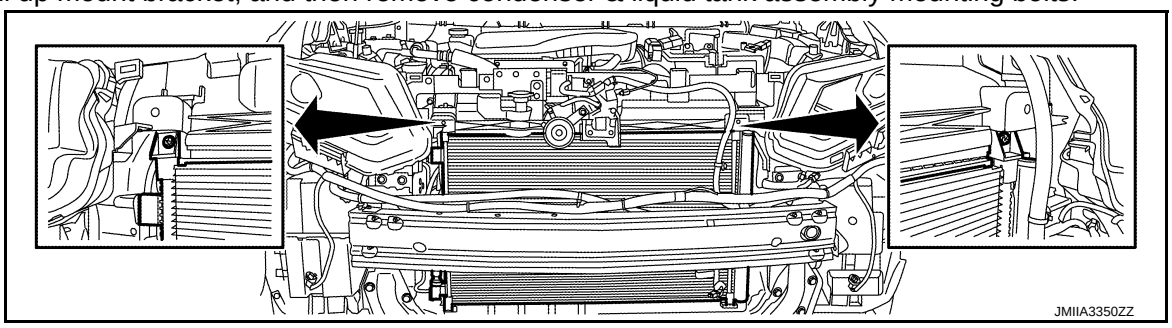
5. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe from condenser & liquid tank assembly.
CAUTION:
Cap or wrap the joint of the A/C piping and condenser & liquid tank assembly with suitable material such as vinyl tape to avoid the entry of air.



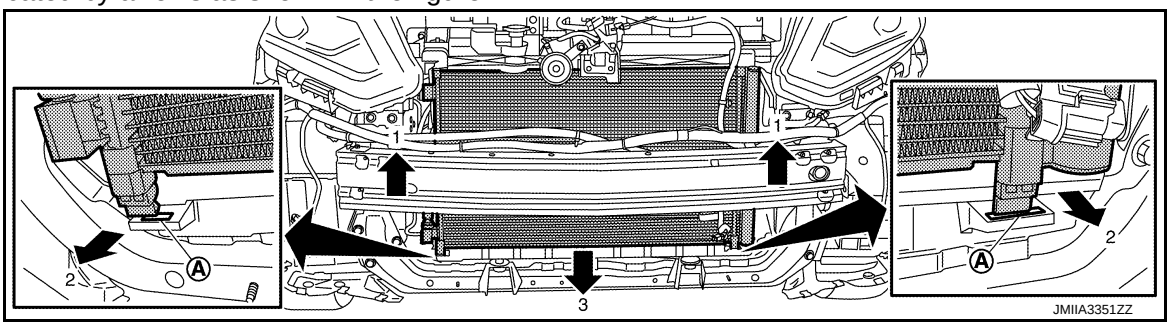
6. Disconnect refrigerant pressure sensor harness connector.



7. Remove mount bracket mounting bolt and fixing clip. Refer to CO-43, "Exploded View".
8. Pull up mount bracket, and then remove condenser & liquid tank assembly mounting bolts.



9. Lift the condenser upwards and disconnect condenser & liquid tank assembly from radiator hole Ⓐ, and then remove condenser & liquid tank assembly from vehicle underside according to numerical order 1→3 indicated by arrows as shown in the figure.



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.**
- **Check for leakages when recharging refrigerant. Refer to HA-109, "Leak Test".**

REFRIGERANT PRESSURE SENSOR

REFRIGERANT PRESSURE SENSOR : Removal and Installation

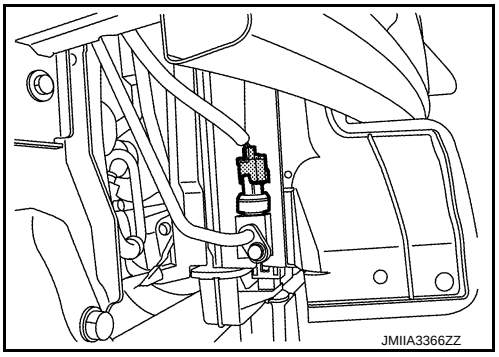
INFOID:0000000011006129

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-113, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-111, "Recycle Refrigerant".
2. Remove front bumper fascia assembly. Refer to EXT-15, "Removal and Installation".
3. Clean refrigerant pressure sensor and its surrounding area, and then remove dust and rust from refrigerant pressure sensor.
   CAUTION:
   Be sure to clean carefully.
4. Disconnect refrigerant pressure sensor connector.



5. Use a adjustable wrench or other tool to hold the refrigerant pressure sensor mounting block, and then remove the refrigerant pressure sensor from the condenser.
   CAUTION:
   - **Never to damage core surface of condenser.**
   - **Cap or wrap the joint of the condenser with suitable material such as vinyl tape avoid the entry of air.**

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.**

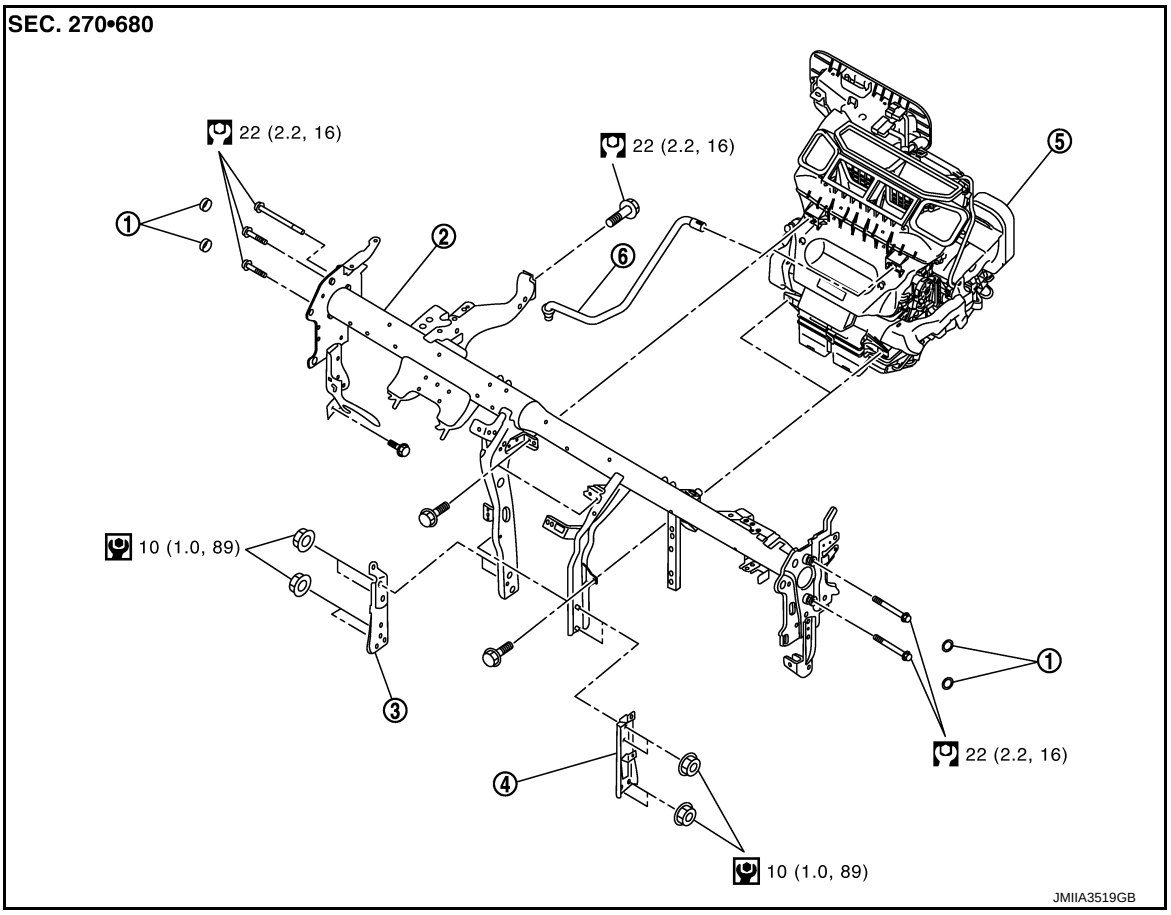
- **Check for leakages when recharging refrigerant. Refer to HA-109, "Leak Test".**

A/C UNIT ASSEMBLY

Exploded View

INFOID:0000000011006130

REMOVAL

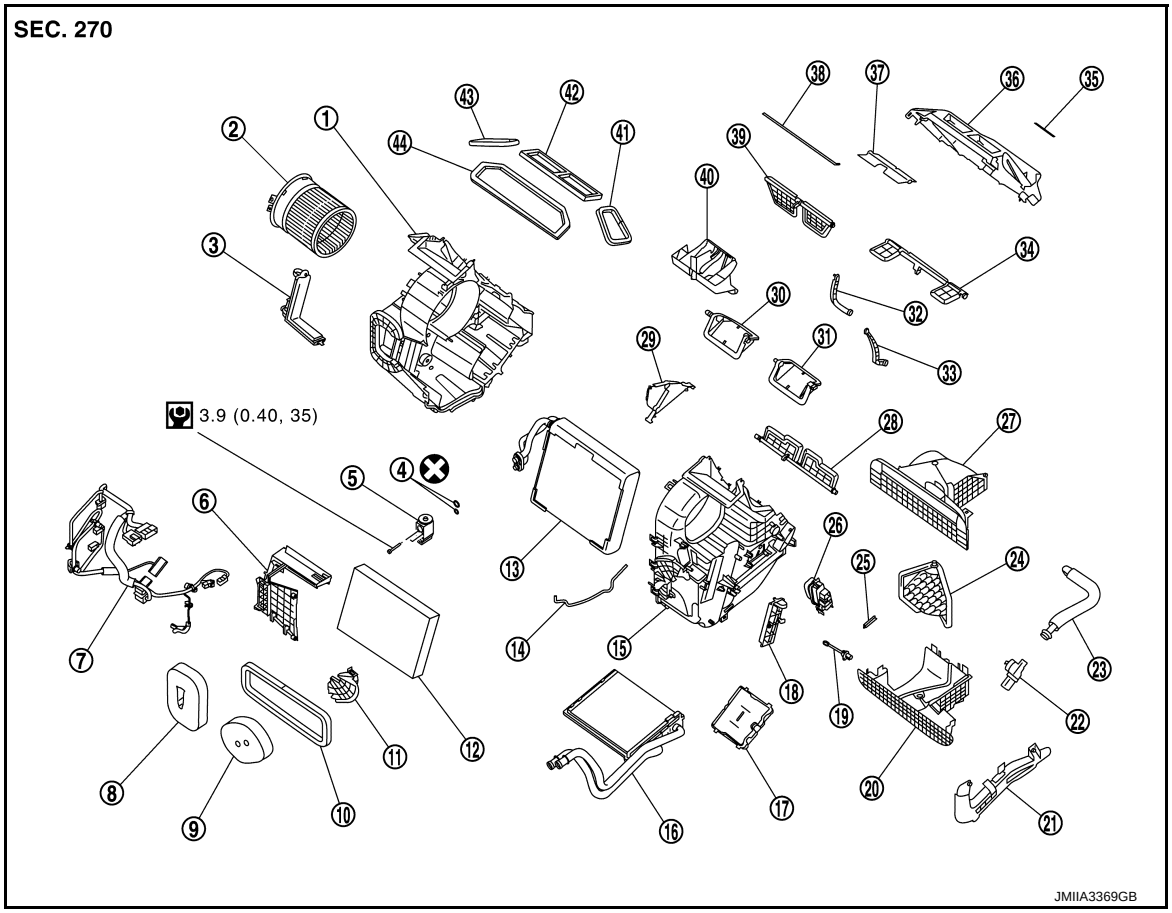


① Cap
② Steering member
③ Instrument stay LH
④ Instrument stay RH
⑤ A/C unit assembly
⑥ Drain hose

: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

DISASSEMBLY



① A/C unit case RH	② Blower fan motor	③ Filter cover RH
④ O-ring	⑤ Expansion valve	⑥ Main case center
⑦ Sub harness	⑧ Cooler packing	⑨ Heater pipe packing
⑩ Intake packing	⑪ Heater pipe bracket	⑫ Air conditioner filter
⑬ Evaporator	⑭ Case packing	⑮ A/C unit case LH
⑯ Heater core	⑰ A/C auto amp. (automatic air conditioning)	⑱ Filter cover LH
⑲ Intake sensor	⑳ Intake box case lower	㉑ Heater pipe cover
㉒ Aspirator	㉓ Aspirator duct	㉔ Intake door
㉕ Non woven fabric	㉖ Power transistor (automatic air conditioning) Fan control amplifier (manual air conditioning)	㉗ Intake box upper case
㉘ Foot door	㉙ Center plate case	㉚ Air mix door RH
㉛ Air mix door LH	㉜ Foot door & mode door rod	㉝ Center ventilator door·center ventilator & defroster door rod
㉞ Side ventilator door	㉟ Code label	㊱ Main case rear
㊲ Mode door	㊳ Non woven fabric	㊴ Center ventilator & defroster door
㊵ Air guide case	㊶ Side ventilator packing LH	㊷ Center ventilator packing
㊸ Side ventilator packing RH	㊹ Defroster packing	

: Always replace after disassembly.

: N·m (kg-m, in-lb)

A/C UNIT ASSEMBLY

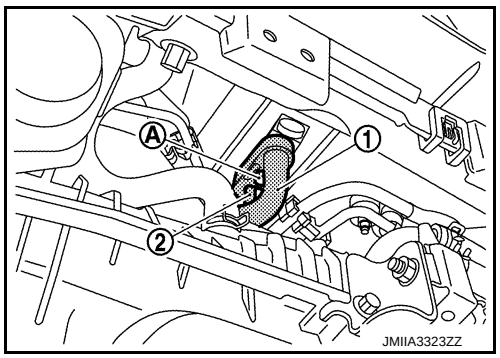
A/C UNIT ASSEMBLY : Removal and Installation

INFOID:0000000011006131

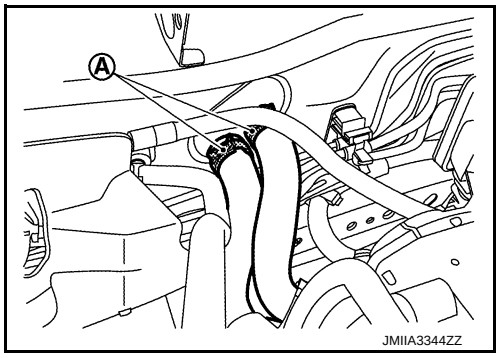
CAUTION:
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-113, "Perform Lubricant Return Operation".

REMOVAL

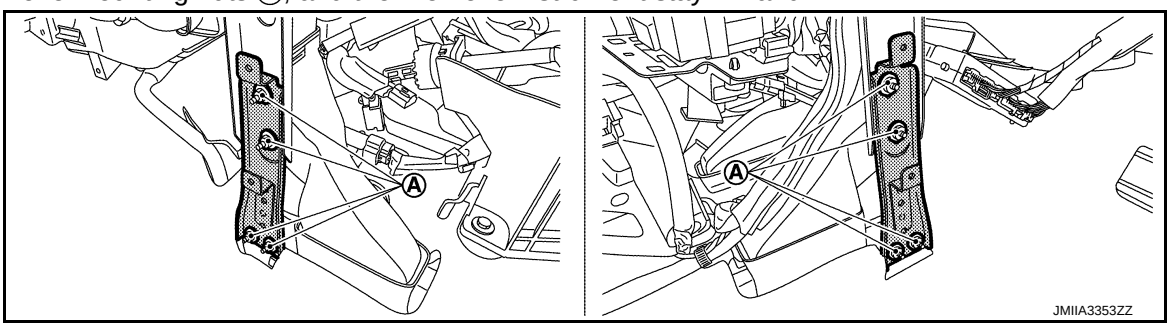
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-111, "Recycle Refrigerant".
2. Drain engine coolant from cooling system. Refer to CO-39, "Draining".
3. Remove cowl top cover. Refer to EXT-25, "Removal and Installation".
4. Disengage fixing clips, and then remove insulator.
5. Remove mounting bolt Ⓐ, and then disconnect low-pressure pipe ① and high-pressure pipe ② from evaporator pipe assembly.
   CAUTION:
   Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.



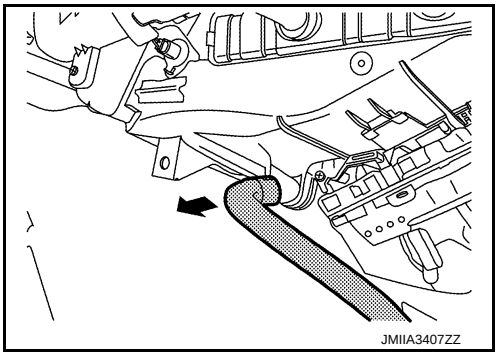
6. Remove air duct. Refer to EM-175, "Removal and Installation".
7. Remove fixing clamps Ⓐ, and then disconnect heater hoses.



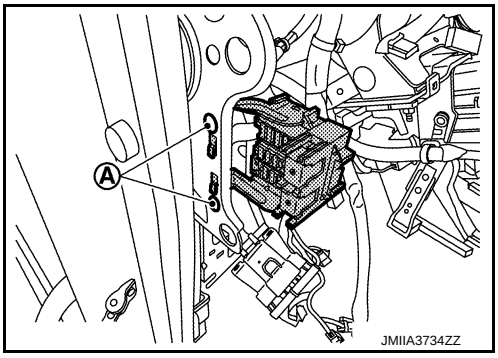
8. Remove instrument panel assembly. Refer to IP-14, "Removal and Installation".
9. Remove rear ventilator duct 1. Refer to VTL-13, "REAR FLOOR DUCT 1 : Removal and Installation". (with rear ventilator)
10. Remove rear floor duct 1. Refer to VTL-12, "FOOT DUCT : Removal and Installation".
11. Remove mounting nuts Ⓐ, and then remove instrument stay LH and RH.



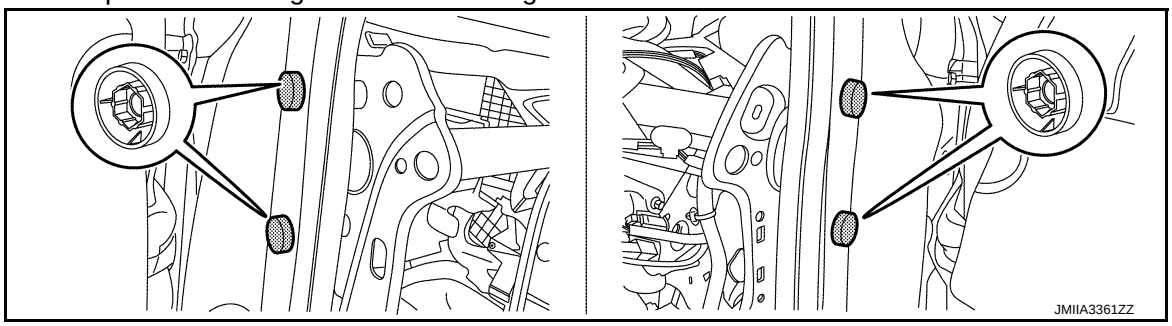
12. Disconnect drain hose from A/C unit assembly.



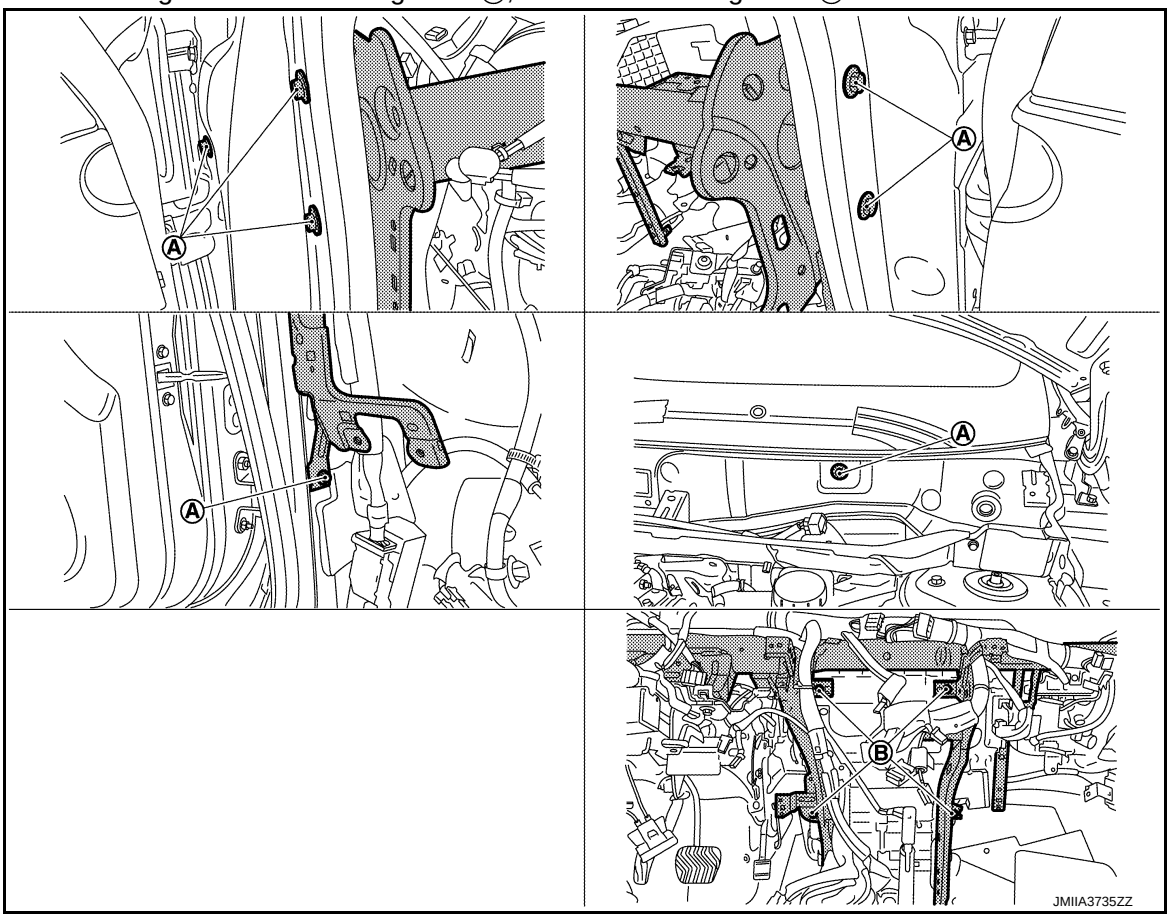
13. Remove ground wire mounting bolts.
14. Remove fixing screws Ⓐ, and then remove junction box.



15. Remove harness connector, harness clips and bracket necessary to remove steering member. Move vehicle harness aside.
16. Remove steering column mounting bolts and nuts, and then move steering column assembly to secure work space. Refer to ST-13, "Exploded View".
17. Remove caps from steering member mounting bolts.



18. Remove steering member mounting bolts Ⓐ, A/C unit mounting bolts Ⓑ.

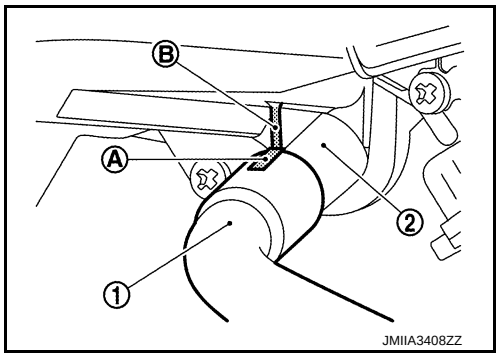


19. Remove steering member from vehicle.
CAUTION:
When removing steering member, 2 workers are required to prevent it from dropping.
20. Remove A/C unit assembly from vehicle.
CAUTION:
When removing A/C unit assembly, 2 workers are required to prevent it from dropping.

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.**
- **Check for leakages when recharging refrigerant. Refer to HA-109, "Leak Test".**
- **When installing drain hose ①, match the rib portion Ⓑ of A/C unit ② and mark Ⓐ of drain hose.**



NOTE:
Refer to CO-40, "Refilling" when filling radiator with engine coolant.

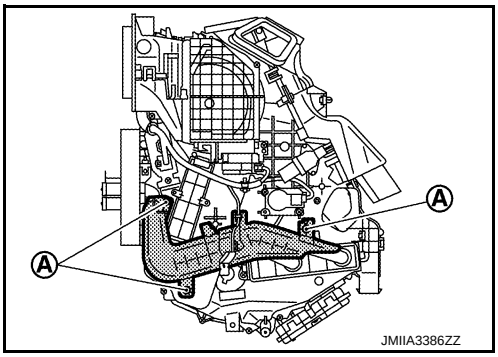
HEATER CORE

HEATER CORE : Removal and Installation

INFOID:0000000011006132

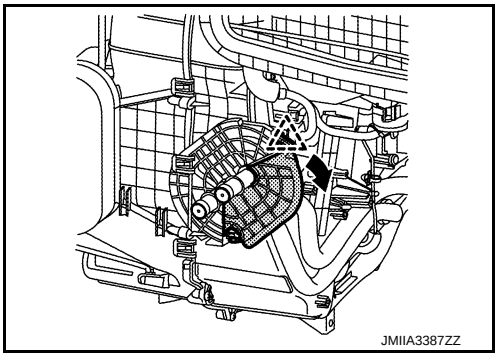
REMOVAL

1. Remove A/C unit assembly. Refer to HA-133, "A/C UNIT ASSEMBLY : Removal and Installation".
2. Remove foot duct LH. Refer to VTL-12, "FOOT DUCT : Removal and Installation".
3. Remove heater pipe grommet.
4. Remove fixing screws Ⓐ, and then remove heater pipe cover.

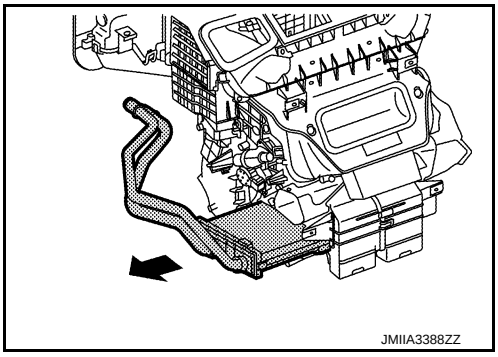


5. Disengage fixing pawl, and then remove heater pipe bracket.

△ : Pawl



6. Slide heater core to left side, and then remove heater core.



INSTALLATION

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

NOTE:

Refer to CO-40, "Refilling" when filling radiator with engine coolant.

EVAPORATOR

EVAPORATOR : Removal and Installation

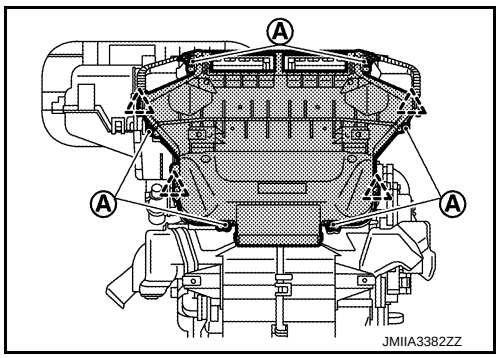
INFOID:0000000011006133

REMOVAL

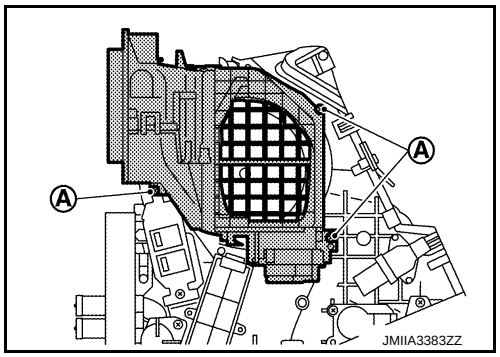
1. Remove A/C unit assembly. Refer to HA-133, "A/C UNIT ASSEMBLY : Removal and Installation".

2. Remove fixing screws Ⓐ and disengage fixing pawls.

: Pawl

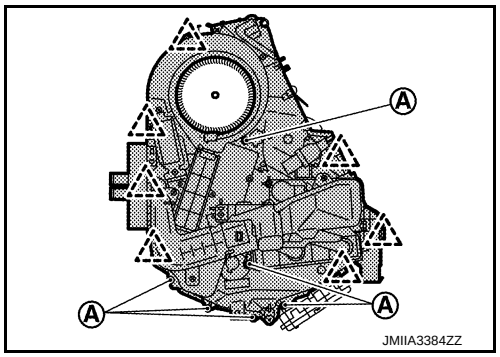


3. Remove main case rear.
4. Remove fixing screws Ⓐ, and then remove intake box assembly.



5. Remove fixing screws Ⓐ and disengage fixing pawls, and then separate heater & cooling unit case assembly.

: Pawl



6. Remove evaporator assembly from heater & cooling unit case.
7. Remove mounting bolts, and then remove expansion valve from evaporator.

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.**
- **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-109, "Leak Test".**

EXPANSION VALVE

EXPANSION VALVE : Removal and Installation

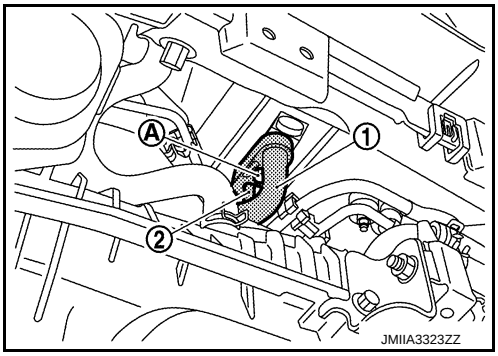
INFOID:0000000011006134

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-113, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-111, "Recycle Refrigerant".
2. Disengage fixing pawls, and then remove insulator.
3. Remove mounting bolt Ⓐ, and then disconnect low-pressure flexible hose ① and high-pressure pipe ② from expansion valve.



4. Remove mounting bolts, and then remove expansion valve.

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.**
- **Check for leakages when recharging refrigerant. Refer to HA-109, "Leak Test".**

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Compressor

INFOID:0000000011006135

Model		DENSO make 6SBH14
Type		Variable displacement swash plate
Displacement cm^3 (cu in)/rev	Maximum	140 (8.6)
Direction of rotation		Clockwise (viewed from clutch)
Drive belt		Poly V
Disc to pulley clearance mm (in.)	Standard	0.21 – 0.55 (0.008 – 0.022)

Lubricant

INFOID:0000000011006136

Name		ND-OIL8
Capacity m ℓ (lmp fl oz)	Total in system	110 (3.9)
	Compressor (service part) charging amount	110 (3.9)

Refrigerant

INFOID:0000000011006137

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

Engine Idling Speed

INFOID:0000000011006138

Refer to EC-807, "Idle Speed".

Belt Tension

INFOID:0000000011006139

Refer to EM-275, "Drive belt".

PRECAUTION

PRECAUTIONS

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

INFOID:0000000011006143

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.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000011014770

CAUTION:

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

- **Before removing and installing any control units, first turn the ignition power source and accessory power source to the OFF, then disconnect both battery cables.**
- **After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.**
- **Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.**

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Open driver door.
3. Turn the ignition switch to the ON position.
   (At this time, the steering lock will be released.)
4. Turn the ignition switch to OFF position with driver door open.
5. Wait for 3 minutes or longer with driver door open.
   NOTE:
   - Do not close driver door because the steering wheel locks when driver door is closed.

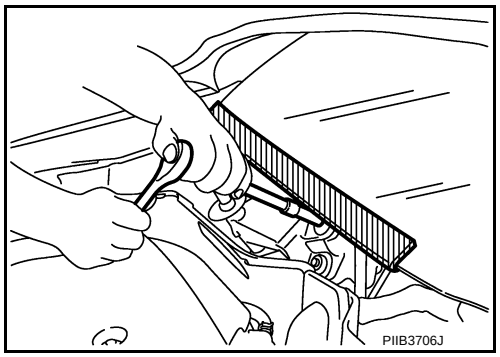
- The auto acc function is adapted to this vehicle. For this reason, even when the ignition switch is turned to OFF position, the accessory power source does not turned OFF and continues to be supplied for a certain amount of time.

6. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
7. Perform the necessary repair operation.
8. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the ignition switch from OFF position to ON position, then to LOCK position. (The steering wheel will lock when the ignition switch is turned to LOCK position.)
9. Perform self-diagnosis check of all control units using CONSULT.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000011006145

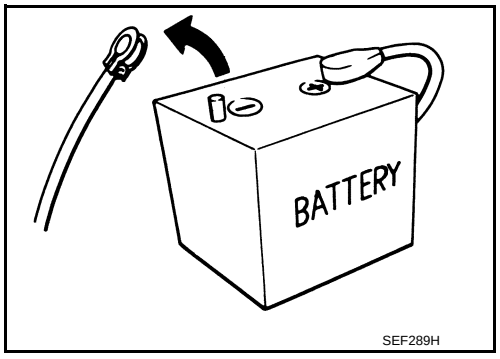
When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.



Precautions for Removing Battery Terminal

INFOID:0000000011014771

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.
- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing “How to disconnect 12V battery terminal” described below.
  NOTE:
  Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage 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.



HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.
For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

1. Open the hood.
2. Turn key switch to the OFF position with the driver side door opened.
3. Get out of the vehicle and close the driver side door.
4. Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes

K9K engine : 4 minutes
M9R engine : 4 minutes
R9M engine : 4 minutes
V9X engine : 4 minutes

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

5. Remove 12V battery terminal.
   CAUTION:
   After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

1. Unlock the door with intelligent key or remote keyless entry.
   NOTE:
   At this moment, ACC power is supplied.
2. Open the driver side door.
3. Open the hood.
4. Close the driver side door.
5. Wait at least 3 minutes.
   CAUTION:
   While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.
6. Remove 12V battery terminal.
   CAUTION:
   After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

Precautions For Refrigerant System Service

INFOID:0000000011006147

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)

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 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 high-pressure pipe 1

WARNING:

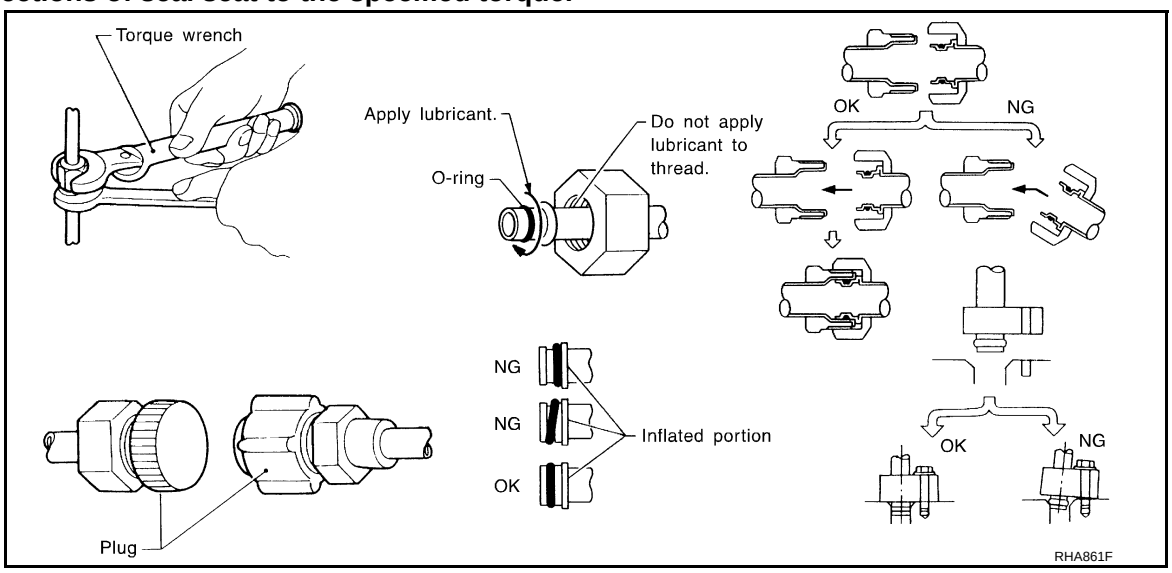
Check that all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.

CAUTION:

Observe the following when replacing or cleaning refrigerant cycle components.

- **Store it in the same way at 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.**
- **O-ring must be closely attached to the groove portion of tube.**
- **Never to damage O-ring and tube when replacing the O-ring.**
- **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 at 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-159, "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 manufacture’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.**
- **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.

Service Equipment

INFOID:0000000011006148

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.

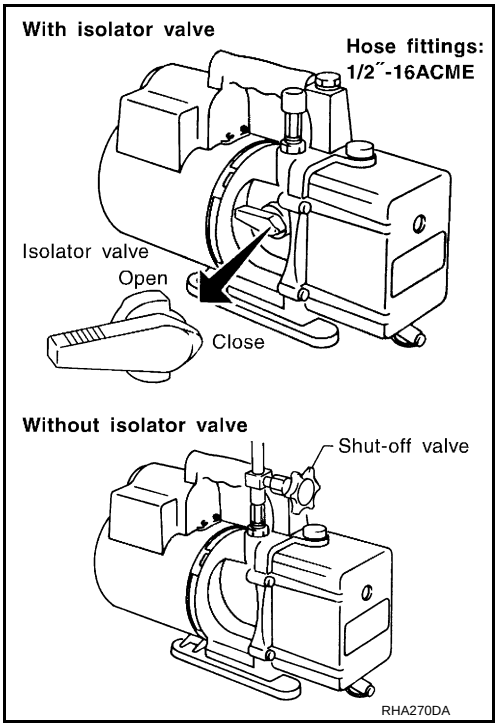
ELECTRICAL LEAK DETECTOR

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

VACUUM PUMP

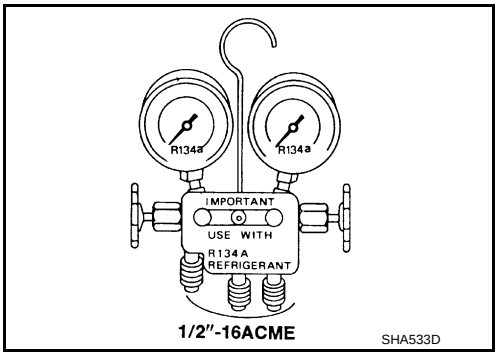
The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant may migrate out of the pump into the service hose. This is possible when the 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.



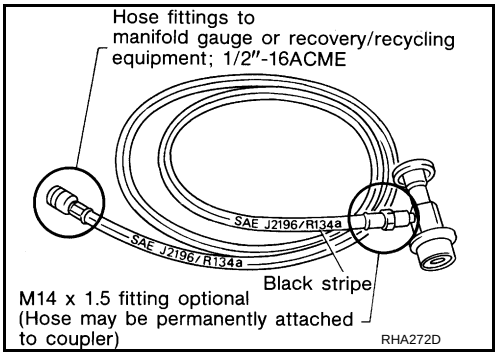
MANIFOLD GAUGE SET

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

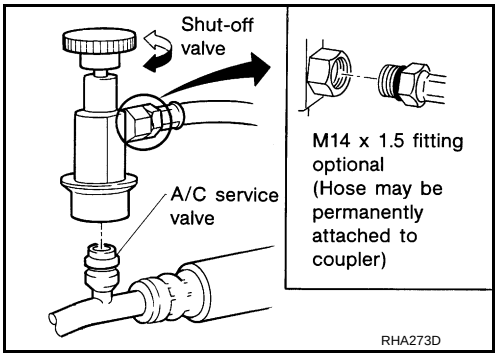
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must equip positive shut-off devices (either manual or automatic) near the end of the hoses opposite to the manifold gauge.



SERVICE COUPLERS

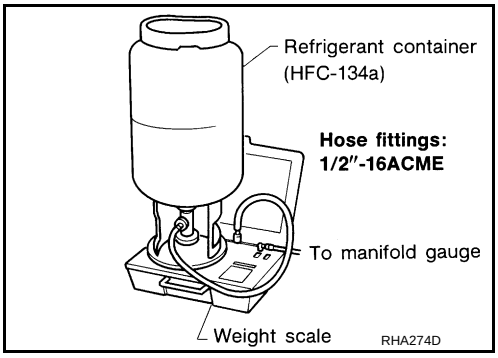
Never attempt to connect HFC-134a (R-134a) service couplers to the CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers do not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

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.

PREPARATION

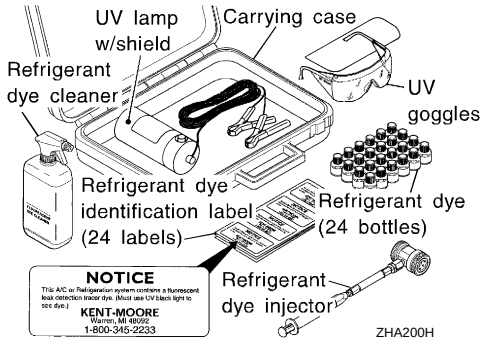
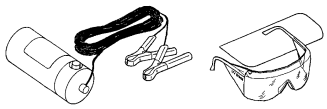
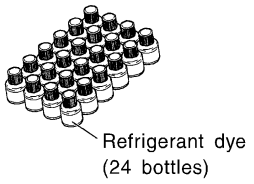
PREPARATION

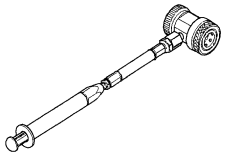
Special Service Tool

INFOID:0000000011006150

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 (SPX-North America No.) Tool name		Description
Refrigerant dye leak detection kit Kit includes: UV lamp and UV safety goggles HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles) Refrigerant dye cleaner		Power supply: DC 12 V (Battery terminal)
UV lamp and UV safety goggles		Power supply: DC 12 V (Battery terminal) For checking refrigerant leak when fluorescent dye is installed in A/C system Includes: UV lamp and UV safety goggles
HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles)		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.)

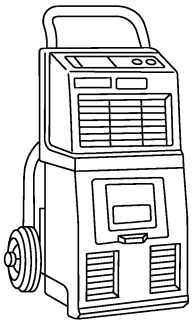
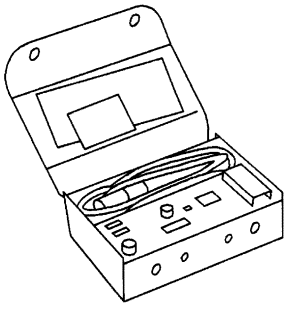
Tool number (SPX-North America No.) Tool name	Description
HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle  SHA440F	For injecting 1/4 ounce of fluorescent leak detection dye into A/C system
Refrigerant dye cleaner  SHA441F	For cleaning dye spills

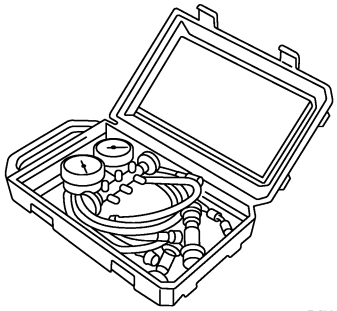
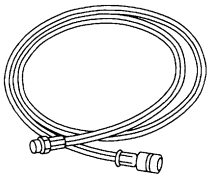
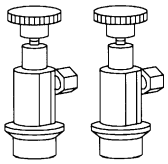
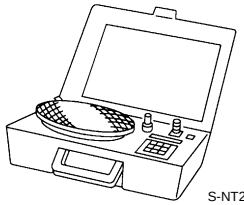
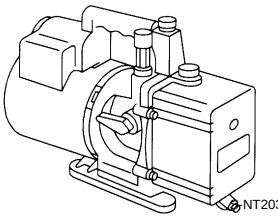
Commercial Service Tools

INFOID:0000000011006151

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
Recovery/recycling/recharging equipment (ACR4)  RJIA0195E	Function: Refrigerant recovery, recycling and recharging
Electrical leak detector  A/C leak detector SHA705EB	Power supply: DC 12 V (Cigarette lighter)

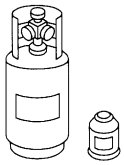
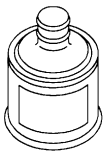
Tool name		Description
Manifold gauge set (with hoses and couplers)	 RJIA0196E	Identification: • The gauge face indicates HFC-134a (R-134a). Fitting size: Thread size • 1/2″-16 ACME
Service hoses • High-pressure side hose • Low-pressure side hose • Utility hose	 S-NT201	Hose color: • Low-pressure side hose: Blue with black stripe • High-pressure side hose: Red with black stripe • Utility hose: Yellow with black stripe or green with black stripe Hose fitting to gauge: • 1/2″-16 ACME
Service couplers • High-pressure side coupler • Low-pressure side coupler	 S-NT202	Hose fitting to service hose: M14 x 1.5 fitting is optional or permanently attached.
Refrigerant weight scale	 S-NT200	For measuring of refrigerant Fitting size: Thread size 1/2″-16 ACME
Vacuum pump (Including the isolator valve)	 S-NT203	Capacity: • Air displacement: 4 CFM • Micron rating: 20 microns • Oil capacity: 482 g (17 oz.) Fitting size: Thread size • 1/2″-16 ACME

Sealant or/and Lubricant

INFOID:0000000011006152

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.

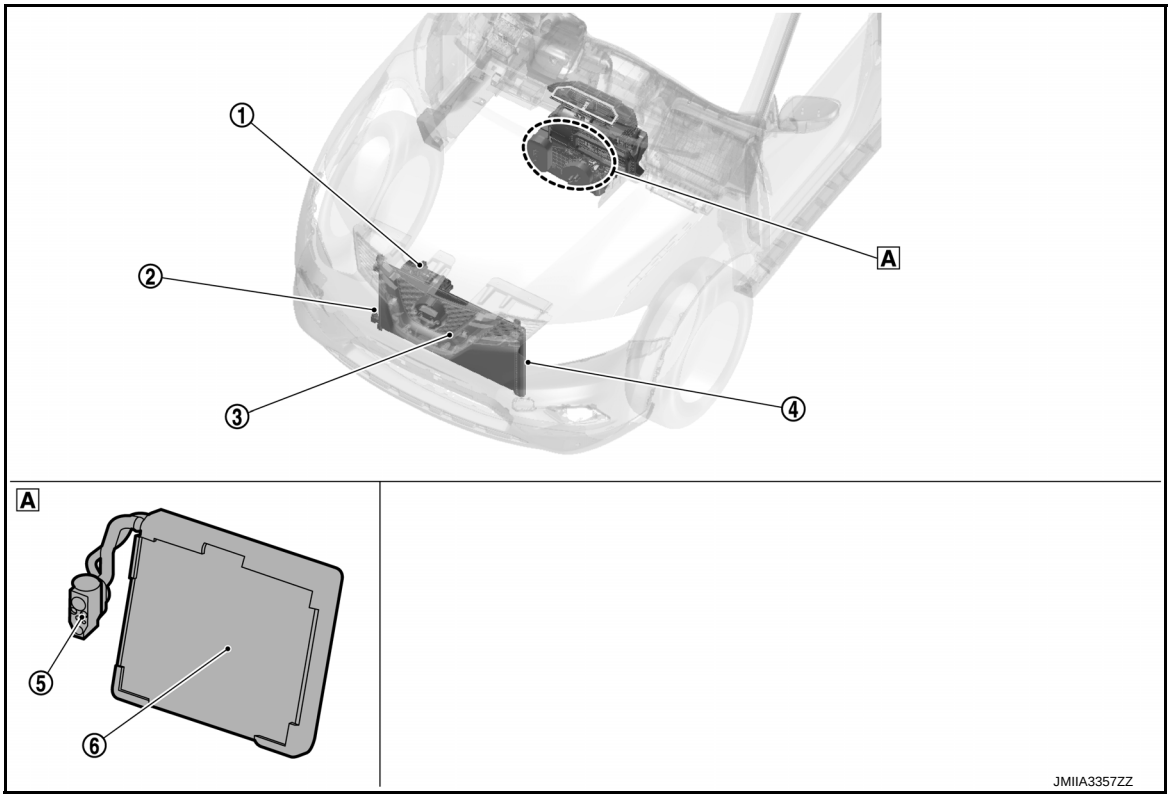
Tool name	Description
HFC-134a (R-134a) refrigerant  S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • Large container 1/2″-16 ACME
ND-OIL8  JMIIA1759ZZ	Type: Polyalkylene glycol oil (PAG), ND-OIL8 Application: HFC-134a (R-134a) swash plate compressors

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000011006153



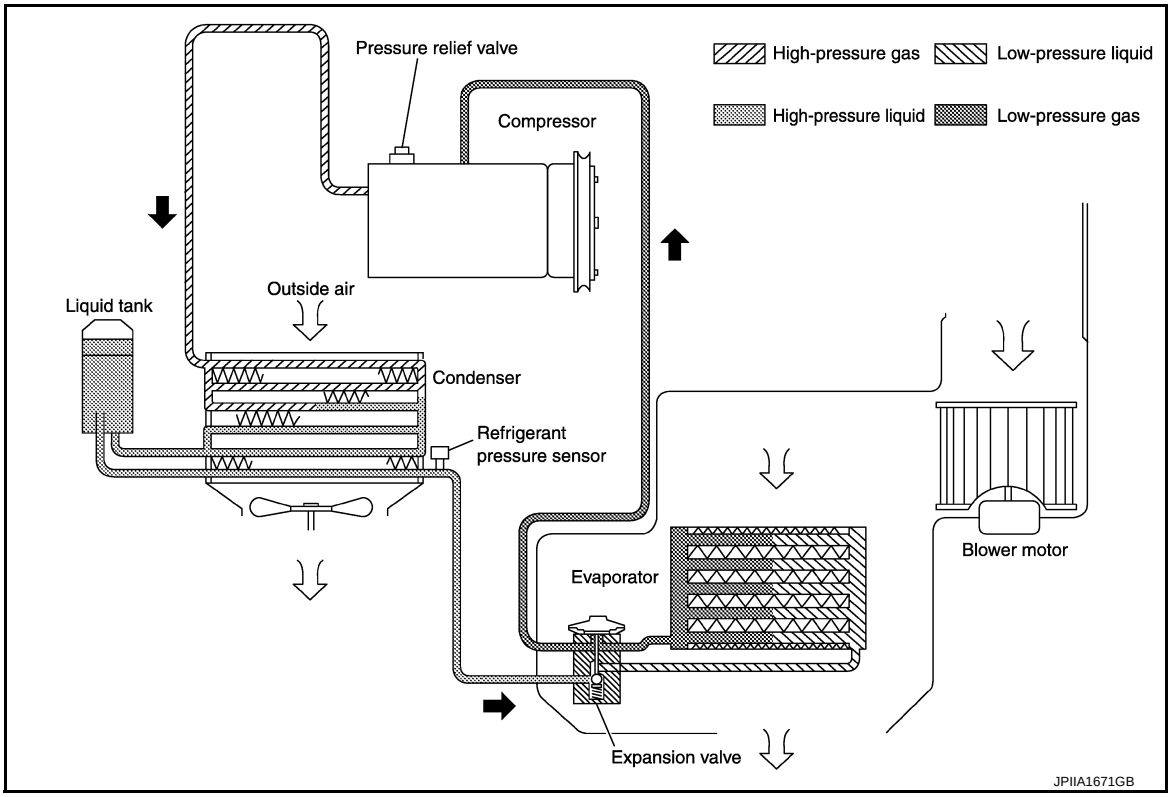
A In the heater & cooling unit assembly

No.	Location	Function
①	Compressor	Intakes, compresses, and discharges refrigerant, to circulate refrigerant inside the refrigerant cycle.
②	Refrigerant pressure sensor	• AUTOMATIC AIR CONDITIONING: Refer to HAC-19, "Refrigerant Pressure Sensor". • MANUAL AIR CONDITIONING: Refer to HAC-148, "Refrigerant Pressure Sensor".
③	Condenser (condenser & Liquid tank)	Cools refrigerant discharged from compressor, and transforms it to liquid refrigerant.
④	Liquid tank (condenser & Liquid tank)	Eliminates foreign matter in refrigerant, and stores temporarily liquid refrigerant.
⑤	Expansion valve	Transforms high-pressure liquid refrigerant to mist form low-pressure liquid refrigerant by drawing function.
⑥	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.

SYSTEM

System Diagram

INFOID:0000000011006154



System Description

INFOID:0000000011006155

REFRIGERANT CYCLE

Refrigerant Flow

The refrigerant from the compressor, flows the condenser with liquid tank, the evaporator, and returns to the compressor. The refrigerant evaporation in the evaporator is controlled by an expansion valve.

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 condenser. 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 (31.2 bar, 31.8 kg/cm^2, 452 psi) or more (Engine speed is 1,500 rpm or more.)
- Approximately 2,740 kPa (27.4 bar, 27.9 kg/cm^2, 397 psi) or more (Engine speed is less than 1,500 rpm.)
- Approximately 140 kPa (1.4 bar, 1.2 kg/cm^2, 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 when the pressure of refrigerant in the system increases to an unusual level [more than 3,800 kPa (38.0 bar, 38.8 kg/cm^2, 551 psi)].

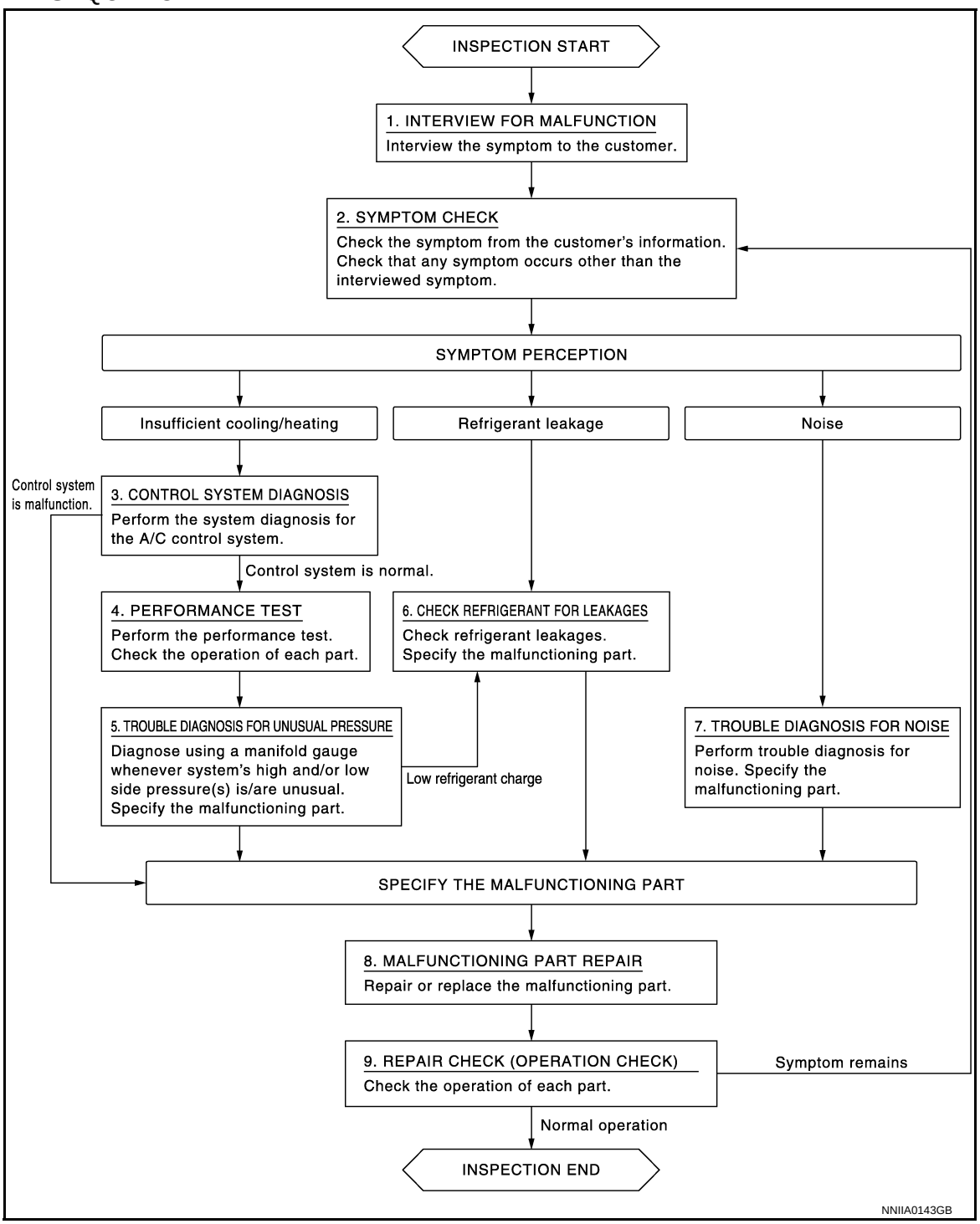
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000011006156

OVERALL SEQUENCE



DETAILED FLOW

1.INTERVIEW FOR MALFUNCTION

Interview the symptom to the customer.

>> 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-69, "Work Flow" (AUTOMATOC AIR CONDITIONING), HAC-183, "Work Flow" (MANUAL AIR CONDITIONING).

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-162, "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-164, "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-155, "Leak Test".

>> GO TO 8.

7.TROUBLE DIAGNOSIS FOR NOISE

Perform trouble diagnosis for noise. Specify the malfunctioning part. Refer to HA-166, "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?

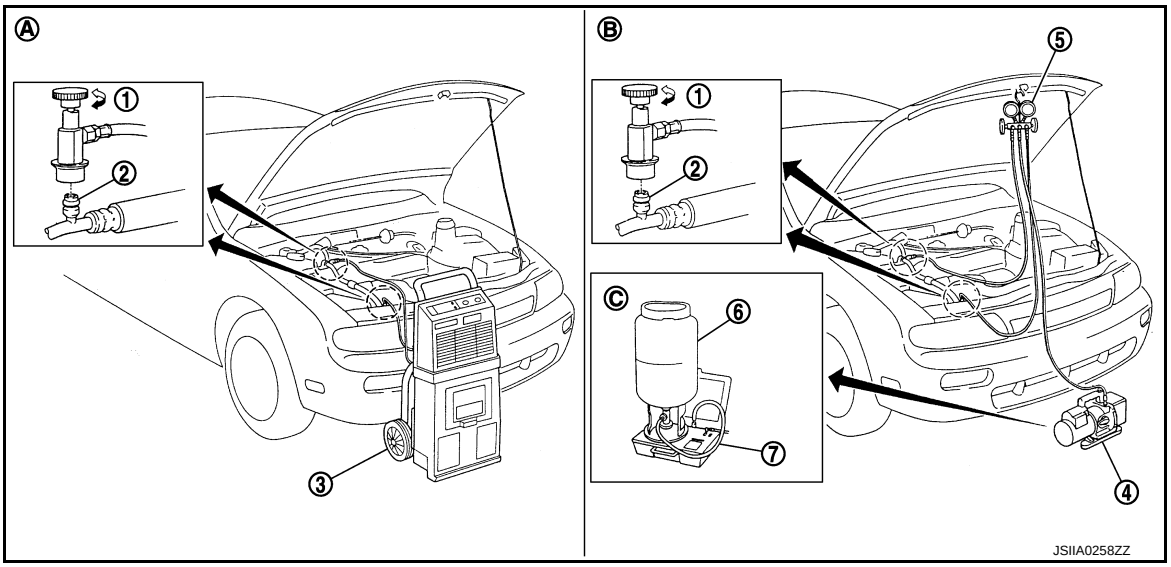
YES >> INSPECTION END
NO >> GO TO 2.

REFRIGERANT

Description

INFOID:0000000011006157

CONNECTION OF SERVICE TOOLS AND EQUIPMENT

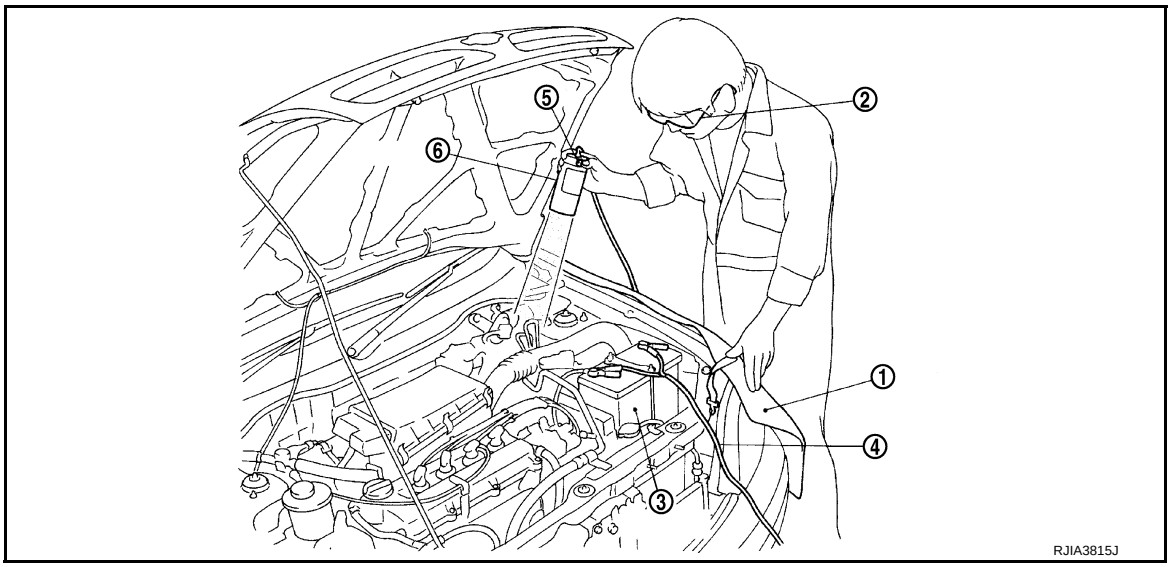


① Shut-off valve	② A/C service valve	③ Recovery/recycling/recharging equipment
④ Vacuum pump	⑤ Manifold gauge set	⑥ Refrigerant container (HFC-134a)
⑦ Weight scale		
Ⓐ Preferred (best) method	Ⓑ Alternative method	Ⓒ For charging

Leak Test

INFOID:0000000011006158

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.
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:
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.**

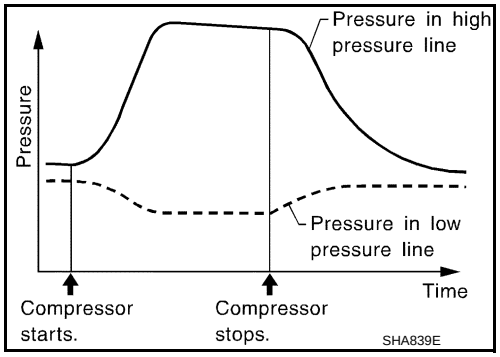
1. Stop the engine.
2. Connect recovery/recycling/recharging equipment or manifold gauge set to A/C service valve.
3. Check that A/C refrigerant pressure is 345 kPa (3.45 bar, 3.52 kg/cm^2, 50 psi) or more when temperature is 16°C (61°F) or more. When pressure is lower than the specified value, recycle refrigerant completely and fill refrigerant to the specified level.
   NOTE:
   Leakages may not be detected if A/C refrigerant pressure is 345 kPa (3.45 bar, 3.52 kg/cm^2, 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 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
- Temperature setting: Full cold
- Fan (blower) 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:
Never 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:0000000011006159

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-159, "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:0000000011006160

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 my 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.
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-155, "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.

LUBRICANT

Description

INFOID:0000000011006161

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 : ND-OIL8

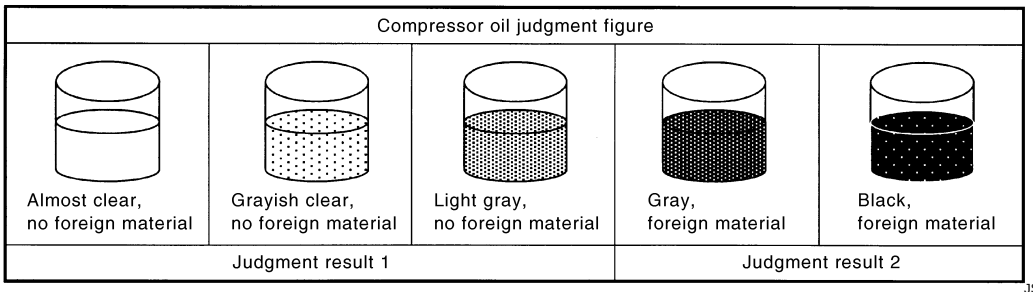
Inspection

INFOID:0000000011006162

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

1. COMPRESSOR OIL JUDGMENT

1. Remove the compressor. Refer to HA-167, "Removal and Installation".
2. Sample a compressor oil and judge on the figure.



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Judgement result 1>>Replace compressor only.
Judgement result 2>>Replace compressor and liquid tank.

Perform Lubricant Return Operation

INFOID:0000000011006163

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:0000000011006164

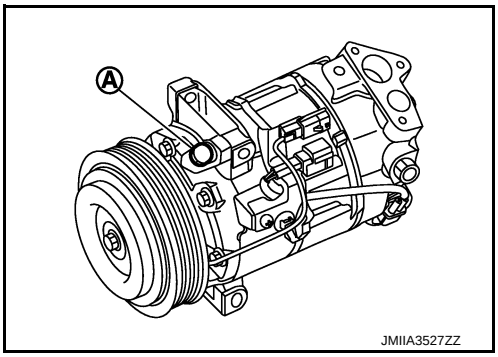
Fill with lubricant for the amount that is calculated according to the following conditions.
Example: Lubricant amount to be added when replacing evaporator and condenser & liquid tank [mℓ (Imp fl oz)] = 35 (1.2) + 15 (0.5) + α

Conditions		Lubricant amount to be added to A/C system m ℓ (Imp fl oz)
Replace evaporator		35 (1.2)
Replace condenser & liquid tank		20 (0.7)
Refrigerant leakage is detected	Large amount leakage	30 (1.1)
	Small amount leakage	—
Lubricant amount that is recycled together with refrigerant during recycle operation		α

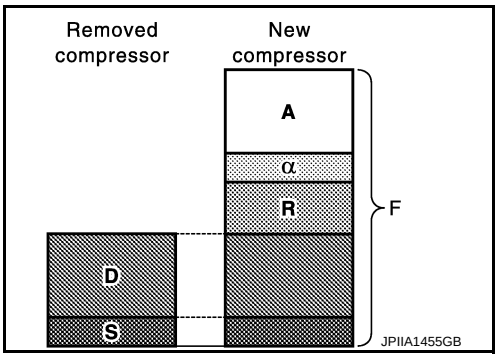
Lubricant Adjusting Procedure for Compressor Replacement

INFOID:0000000011006165

1. Drain lubricant from removed compressor and measure lubricant amount.
   - Remove drain bolt Ⓐ, and then drain lubricant from drain port.
   - 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 (Imp fl oz)] = F – (D + S + R + α)

F : Lubricant amount that a new compressor contains [110 (3.9)]

D : Lubricant amount that is drained from removed compressor

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

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

α : 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 (2.1 Imp fl oz), perform calculation by setting "D" as 40 m ℓ (1.4 Imp fl oz).

Conditions	Lubricant amount to be added to A/C system m ℓ (Imp fl oz)
Replace evaporator	35 (1.2)
Replace condenser & liquid tank	20 (1.1)

Example: Lubricant amount to be drained from a new compressor when replacing compressor and condenser & liquid tank [m ℓ (Imp fl oz)] [D = 60 (2.1), α = 5 (0.2)]
110 (3.9) – [60 (1.6) + 20 (0.7) + 5 (0.2)] = 15 (0.5)

3. Tighten drain bolt to the specified torque

Specified torque : 30 N·m (3.1 kg-m, 22 ft-lb)

4. Install compressor and check the operation.

PERFORMANCE TEST

Inspection

INFOID:0000000011006166

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-164, "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)	4.9 – 6.9 (41 – 44)
	25 (77)	9.1 – 11.6 (48 – 53)
	30 (86)	13.2 – 16.2 (56 – 61)
	35 (95)	17.6 – 21.1 (64 – 70)
60 – 70	20 (68)	6.9 – 8.9 (44 – 48)
	25 (77)	11.6 – 14.1 (53 – 57)
	30 (86)	16.2 – 19.2 (61 – 66)
	35 (95)	21.1 – 24.6 (70 – 76)

AMBIENT AIR TEMPERATURE-TO-OPERATING PRESSURE TABLE

Fresh air		High-pressure (Discharge side) kPa (bar, kg/cm^2, psi)	Low-pressure (Suction side) kPa (bar, kg/cm^2, psi)
Relative humidity %	Air temperature °C (°F)		
50 – 70	25 (77)	926 – 1,133 (9.3 – 11.3, 9.5 – 11.6, 134.3 – 164.2)	196 – 240 (2.0 – 2.4, 2.0 – 2.5, 28.4 – 34.8)
	30 (86)	1,070 -– 1,308 (10.7 – 13.1, 10.9 – 13.3, 155.1 – 189.6)	233 – 285 (2.3 – 2.9, 2.4 – 2.9, 33.8 – 41.3)
	35 (95)	1,091 – 1,332 (10.9 – 13.3, 11.1 – 13.6, 158.1 – 193.2)	278 – 340 (2.8 – 3.4, 2.8 – 3.5, 40.3 – 49.2)
	40 (104)	1,292 – 1,579 (12.9 – 15.8, 13.2 – 16.1, 187.3 – 228.9)	333 – 407 (3.3 – 4.1, 3.4 – 4.2, 48.3 – 59.0)

SYMPTOM DIAGNOSIS

REFRIGERATION SYSTEM SYMPTOMS

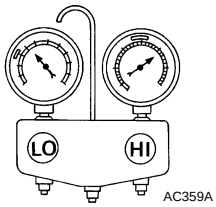
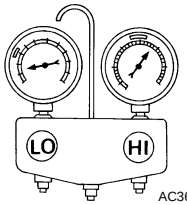
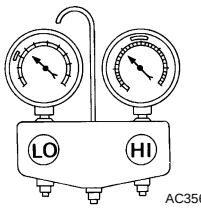
Trouble Diagnosis For Unusual Pressure

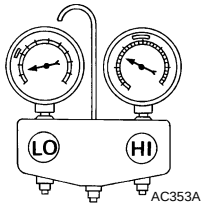
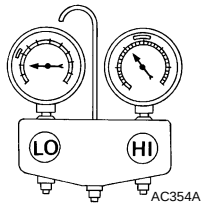
INFOID:0000000011006167

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

Symptom Table

INFOID:0000000011006168

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too high.  AC359A	The pressure returns to normal soon after sprinkling water on condenser.	Overfilled refrigerant.	Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.
	Air flow to condenser is insufficient.	Insufficient condenser cooling performance. • Poor fan rotation of radiator and condenser. • Improper installation of air guide. • Clogged or dirty condenser fins.	• Repair or replace malfunctioning parts. • Clean and repair condenser fins.
	When compressor is stopped, a high-pressure reading quickly drops by approximately 196 kPa (1.96 bar, 2 kg/cm^2, 28 psi). It then gradually decreases.	Air mixed in refrigerant cycle.	Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.
	• Low-pressure pipe is cooler than the outlet of evaporator. • Low-pressure pipe is frosted.	Expansion valve opened too much (excessive flow of refrigerant).	Replace expansion valve.
High-pressure side is excessively high and low-pressure side is too low.  AC360A	High-pressure pipe and upper side of condenser become hot, however, liquid tank does not become so hot.	Clogged or crushed high-pressure pipe located between compressor and condenser.	Repair or replace the malfunctioning parts.
High-pressure side is too low and low-pressure side is too high.  AC356A	• The readings of both sides become equal soon after compressor operation stops. • There is no temperature difference between high- and low-pressure sides.	Malfunction in compressor system (insufficient compressor pressure operation). • Damage or breakage of valve. • Malfunctioning gaskets.	Replace compressor.

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low. 	• The area around evaporator outlet does not become cold. • The area around evaporator inlet becomes frosted.	Clogged expansion valve. • Breakage of temperature sensor. • Clogging by foreign material.	Eliminate foreign material from expansion valve, or replace it.
	• There is a temperature difference between the areas around outlet and inlet pipes of liquid tank. • Liquid tank becomes frosted.	Malfunction in inner liquid tank (clogged strainer).	Replace condenser.
	Evaporator becomes frosted.	Clogged or crushed low-pressure pipe.	Repair or replace malfunctioning parts.
		Malfunction in intake air temperature sensor.	Check intake sensor system. Refer to HAC-81, "Diagnosis Procedure" (AUTOMATIC AIR CONDITIONING), HAC-192, "Diagnosis Procedure" (MANUAL AIR CONDITIONING).
	There is a small temperature difference between the high and low pressure pipes for refrigerant cycle.	• Shortage of refrigerant. • Leakage of refrigerant.	• Check for leakage. • Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.
Low-pressure side sometimes becomes negative. 	• Sometimes the area around evaporator outlet does not become cold. • Sometimes the area around evaporator inlet is frosted.	• Icing caused by the mixing of water in cooler cycle. • Deteriorated dryer in liquid tank.	• Collect all refrigerant. • Evacuate refrigerant cycle completely, and then refill it with the specified amount of refrigerant. At this time, always replace condenser.
Hunting in high-pressure side.	There is no temperature difference between high- and low-pressure sides.	Malfunctioning variable valve in compressor.	• Replace compressor. • Check ECV system. Refer to HAC-113, "Diagnosis Procedure" (AUTOMATIC AIR CONDITIONING), HAC-212, "Diagnosis Procedure" (MANUAL AIR CONDITIONING).

NOISE

Symptom Table

INFOID:0000000011006169

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 HA-159, "Inspection".
	Magnet clutch	Contact of clutch disc with pulley.	Check clearance between clutch disc and pulley. Refer to HA-168, "Inspection".
	Compressor body	Loosened compressor mounting bolts.	Check bolts for tightness. Refer to HA-167, "Exploded View".
Unusual noise from cooler piping.	Cooler piping (pipe and flexible hose)	Improper installation of clip and bracket.	Check the installation condition of the cooler piping. Refer to HA-169, "Exploded View".
Unusual noise from expansion valve when A/C is ON.	Expansion valve	Shortage of refrigerant.	• Check for leakage. • Collect all refrigerant, evacuate refrigerant cycle again, and then refill it with the specified amount of refrigerant.
		Wear, breakage, or clogging of foreign material in inner parts.	Eliminate foreign material from expansion valve, or replace it.
Unusual noise from belt.	—	Loosened belt	Check belt tension. Refer to EM-414, "Drive Belts".
		Internal compressor parts get locked	Replace compressor.

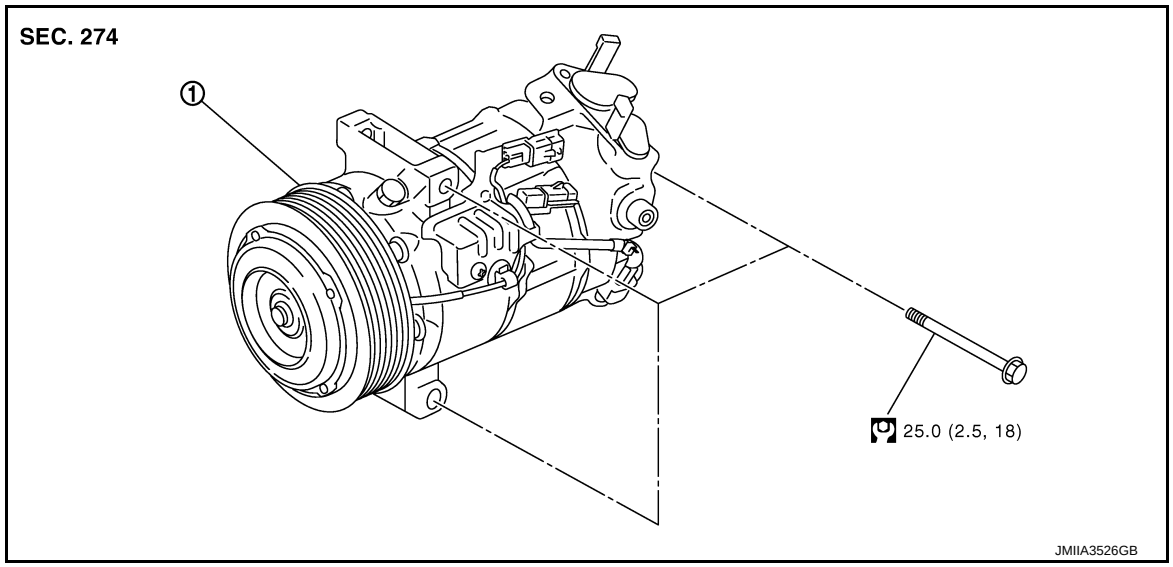
REMOVAL AND INSTALLATION

COMPRESSOR

Exploded View

INFOID:0000000011007745

REMOVAL



① Compressor

: N·m (kg-m, ft-lb)

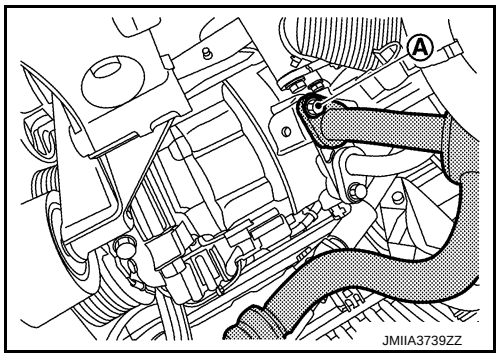
Removal and Installation

INFOID:0000000011007746

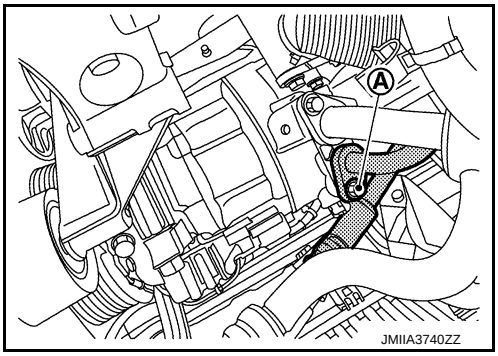
CAUTION:
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-159, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-157, "Recycle Refrigerant".
2. Remove alternator. Refer to CHG-26, "R9M : Removal and Installation".
3. Remove mounting bolt Ⓐ, and then disconnect low-pressure flexible hose from the 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. Remove mounting bolt Ⓐ, and then disconnect high-pressure flexible hose from the 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.



5. Disconnect compressor harness connectors.
6. Remove mounting bolts, and then remove compressor form 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.**
- **Perform lubricant adjusting procedure before installing new compressor. Refer to HA-160, "Lubricant Adjusting Procedure for Compressor Replacement".**
- **Check for leakages when recharging refrigerant. Refer to HA-155, "Leak Test".**
- **Check tension of the drive belt after installing compressor. Refer to EM-301, "Inspection"**

Inspection

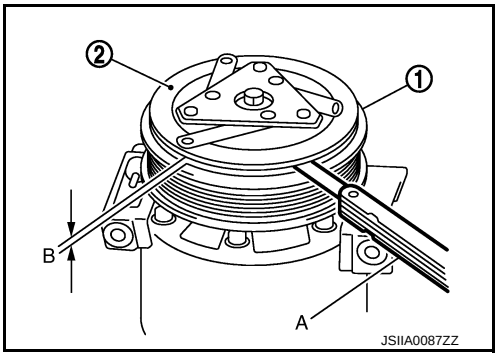
INFOID:0000000011007747

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-184, "Compressor".

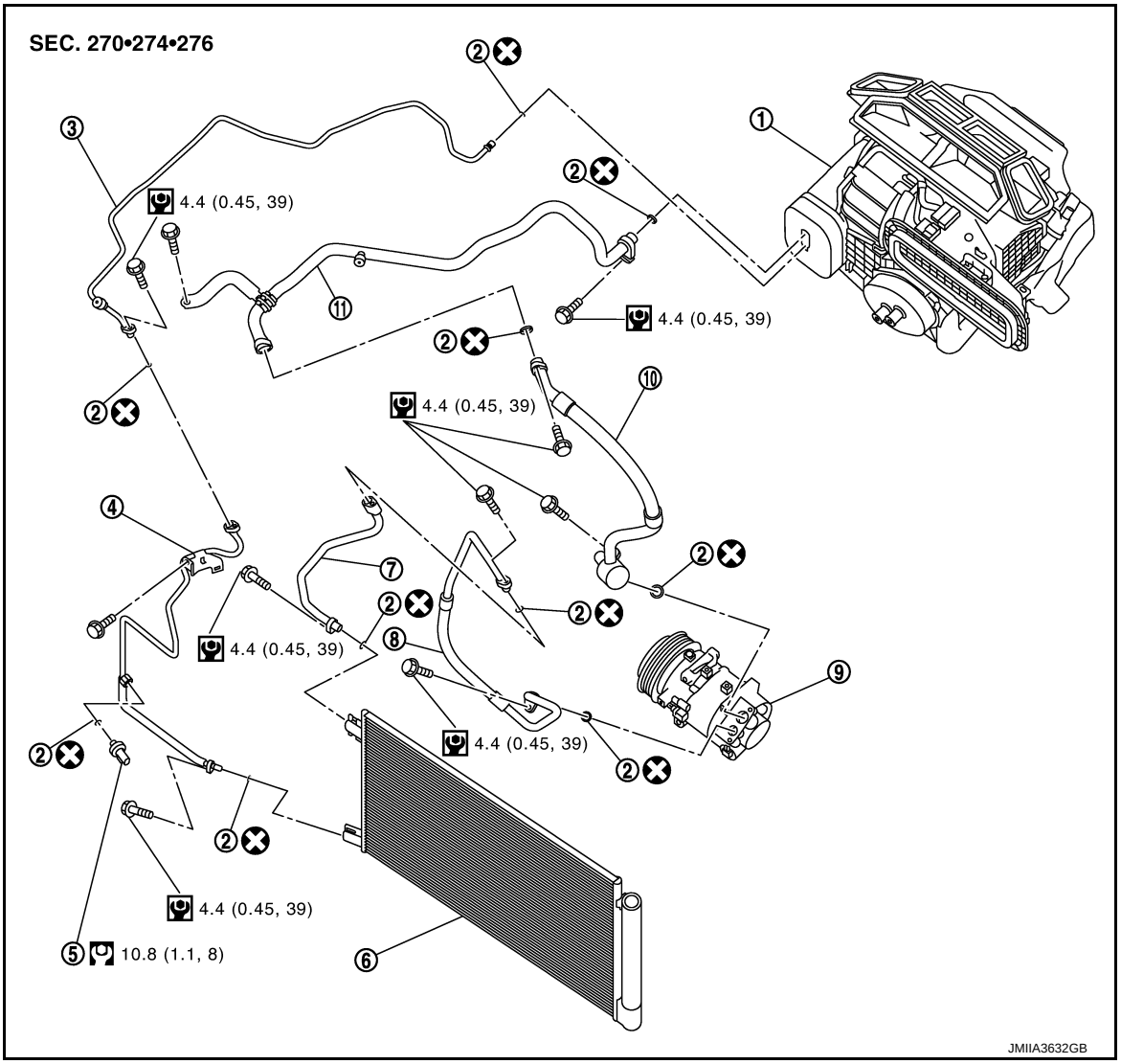
CAUTION:
Replace compressor if the specified clearance is not obtained, replace adjusting spacer and readjust.



COOLER PIPE AND HOSE

Exploded View

INFOID:0000000011007751



1. A/C unit assembly
2. O-ring
3. High-pressure pipe 3
4. High-pressure pipe 1
5. Refrigerant pressure sensor
6. Condenser & liquid tank assembly
7. High-pressure pipe 2
8. High-pressure flexible hose
9. Compressor
10. Low-pressure flexible hose
11. Low-pressure pipe

: Always replace after every disassembly.

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

HIGH-PRESSURE FLEXIBLE HOSE

HIGH-PRESSURE FLEXIBLE HOSE : Removal and Installation

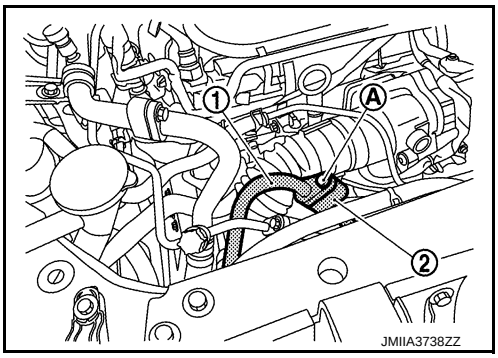
INFOID:0000000011007752

CAUTION:

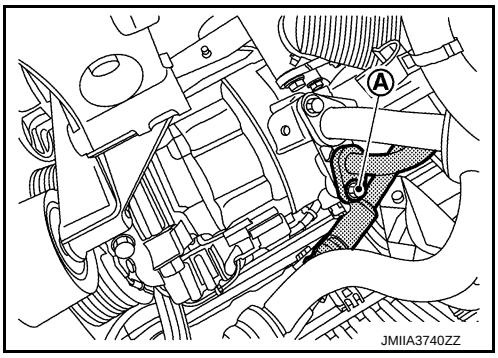
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-159, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-157, "Recycle Refrigerant".
2. Remove mounting bolt Ⓐ, and then disconnect high-pressure flexible hose ① from the high-pressure pipe 2 ②.
   CAUTION:
   Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.



3. Remove mounting bolt Ⓐ, and then disconnect high-pressure flexible hose from the 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. Remove high-pressure flexible hose 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.**
- **Check for leakages when recharging refrigerant. Refer to HA-155, "Leak Test".**

LOW-PRESSURE FLEXIBLE HOSE

LOW-PRESSURE FLEXIBLE HOSE : Removal and Installation

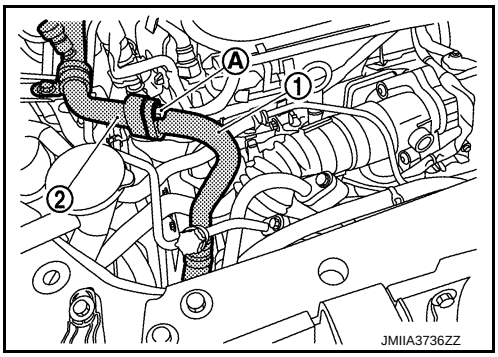
INFOID:0000000011007753

CAUTION:

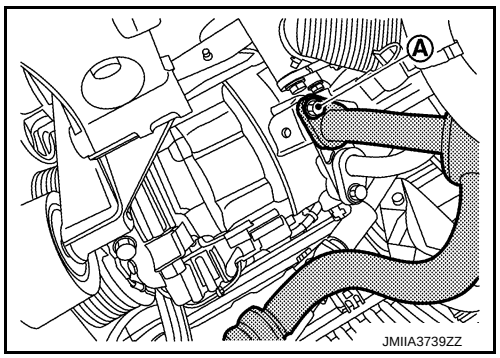
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-159, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-157, "Recycle Refrigerant".
2. Remove mounting bolt Ⓐ, and then disconnect low-pressure flexible hose ① from low-pressure pipe ②.
   CAUTION:
   Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.



3. Remove mounting bolt Ⓐ, and then disconnect low-pressure flexible hose from the 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. Remove low-pressure flexible hose 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.**
- **Check for leakages when recharging refrigerant. Refer to HA-155, "Leak Test".**

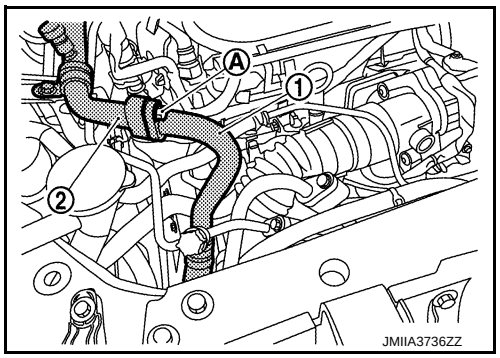
LOW-PRESSURE PIPE

LOW-PRESSURE PIPE : Removal and Installation

INFOID:0000000011007754

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-159, "Perform Lubricant Return Operation".

REMOVAL
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-157, "Recycle Refrigerant".
2. Remove fixing clip, and then remove insulator upper side.
3. Remove cowl top extension. Refer to EXT-25, "Removal and Installation".
4. Remove mounting bolt, and then disconnect low-pressure pipe from expansion valve.
CAUTION:
Cap or wrap the joint of the A/C piping and expansion valve with suitable material such as vinyl tape to avoid the entry of air.
5. Remove mounting bolt Ⓐ, and then disconnect low-pressure flexible hose ① from low-pressure pipe ②.
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 bolt, and then remove low-pressure pipe.

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.**
- **Check for leakages when recharging refrigerant. Refer to HA-155, "Leak Test".**

HIGH-PRESSURE PIPE 1

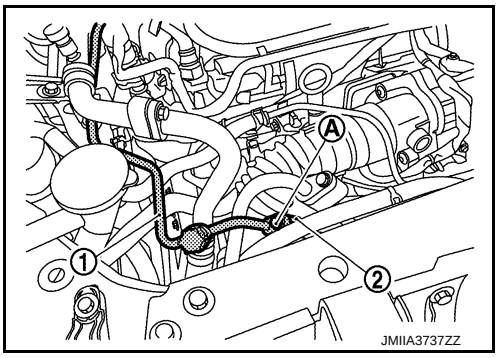
HIGH-PRESSURE PIPE 1 : Removal and Installation

INFOID:0000000011007755

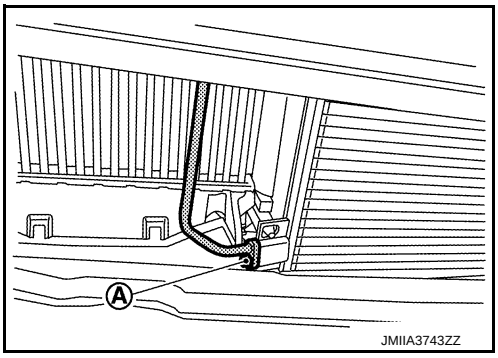
CAUTION:
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-159, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-157, "Recycle Refrigerant".
2. Remove front bumper fascia assembly. Refer to EXT-15, "Removal and Installation".
3. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe 1 ② from high-hpressure pipe 3 ①.
   CAUTION:
   Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.

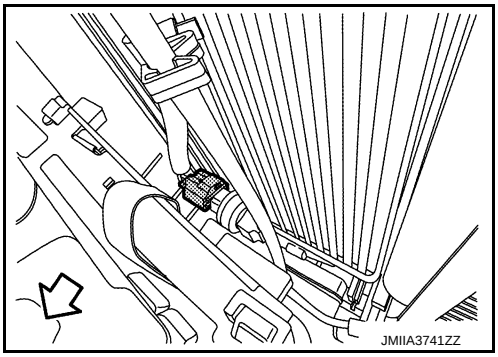


4. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe 1 from the condenser & liquid tank assembly.
   CAUTION:
   Cap or wrap the joint of the A/C piping and condenser with suitable material such as vinyl tape to avoid the entry of air.



5. Disconnect refrigerant pressure sensor harness connector.

   ⇦ : Vehicle front



6. Remove mounting bolt, and then high-pressure pipe 1 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.**
- **Check for leakages when recharging refrigerant. Refer to HA-155, "Leak Test".**

HIGH-PRESSURE PIPE 2

HIGH-PRESSURE PIPE 2 : Removal and Installation

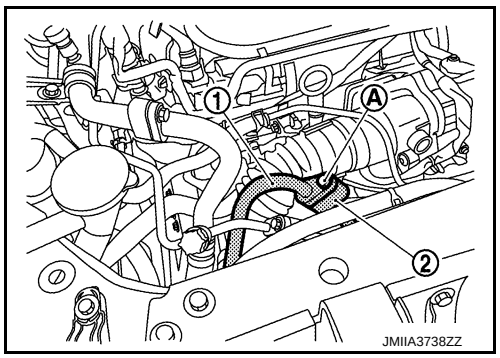
INFOID:0000000011007756

CAUTION:

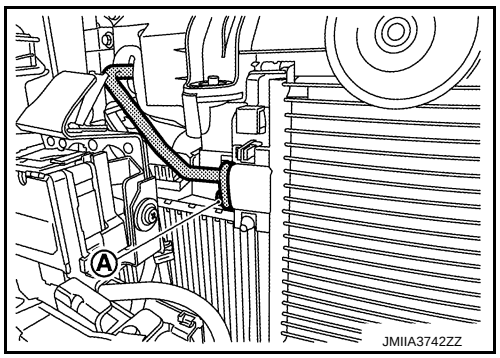
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-159, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-157, "Recycle Refrigerant".
2. Remove front bumper fascia assembly. Refer to EXT-15, "Removal and Installation".
3. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe 2 ② from high-pressure flexible hose ①.
   CAUTION:
   Cap or wrap the joint of the A/C piping and expansion valve with suitable material such as vinyl tape to avoid the entry of air.



4. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe 2 from condenser & liquid tank 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.



5. Remove high-pressure pipe 2 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.**
- **Check for leakages when recharging refrigerant. Refer to HA-155, "Leak Test".**

HIGH-PRESSURE PIPE 3

HIGH-PRESSURE PIPE 3 : Removal and Installation

INFOID:0000000011007757

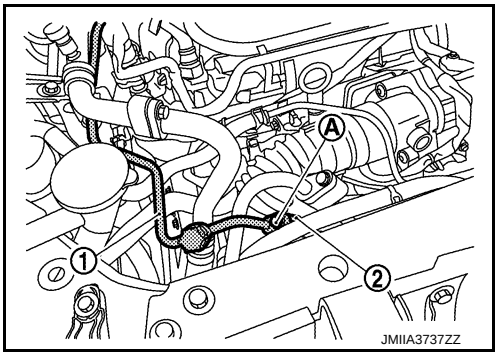
CAUTION:

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-159, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-157, "Recycle Refrigerant".
2. Disconnect fixing clip, and then remove insulator upper side.
3. Remove mounting bolt, and then disconnect high-pressure pipe 3 and low-pressure pipe from expansion valve.
   CAUTION:
   Cap or wrap the joint of the A/C piping and expansion valve with suitable material such as vinyl tape to avoid the entry of air.

4. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe 1 ② from high-hpressure pipe 3 ①.
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 bolt, and then remove high-pressure pipe 3 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.**
- **Check for leakages when recharging refrigerant. Refer to HA-155, "Leak Test".**

REFRIGERANT PRESSURE SENSOR

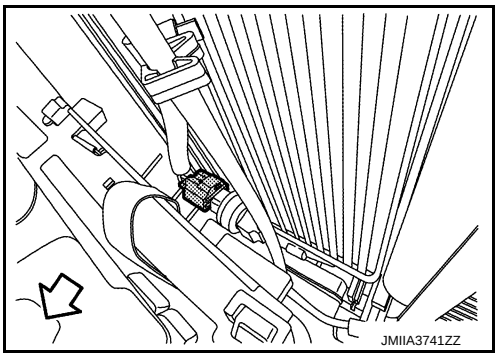
REFRIGERANT PRESSURE SENSOR : Removal and Installation

INFOID:0000000011007758

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-159, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-157, "Recycle Refrigerant".
2. Remove front bumper fascia assembly. Refer to EXT-15, "Removal and Installation".
3. Clean refrigerant pressure sensor and its surrounding area, and then remove dust and rust from refrigerant pressure sensor.
CAUTION:
Be sure to clean carefully.
4. Disconnect refrigerant pressure sensor harness connector.



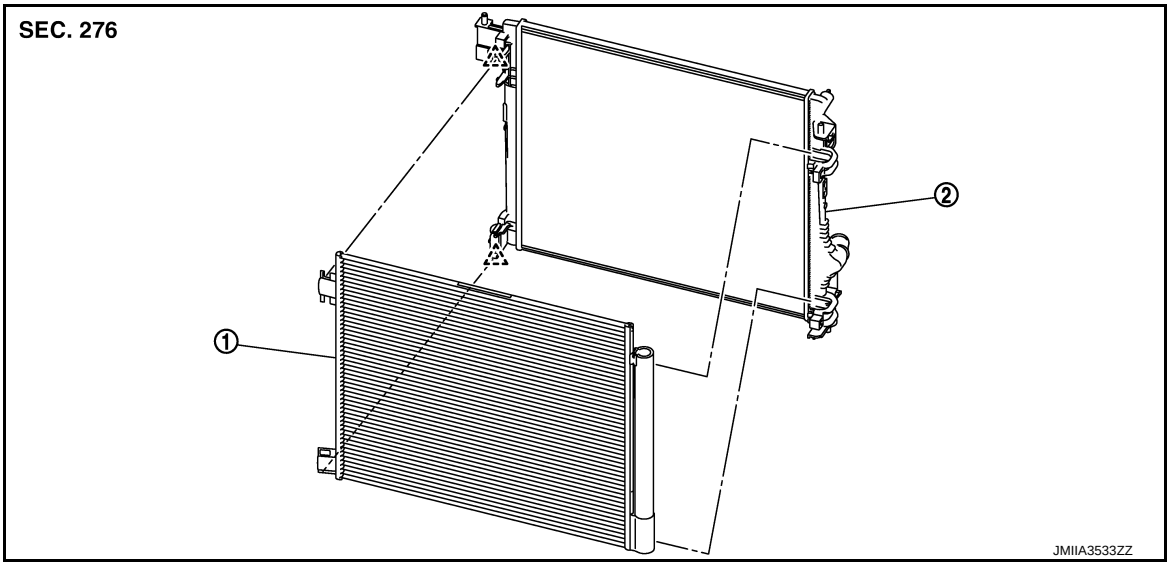
5. Use a adjustable wrench or other tool to hold the refrigerant pressure sensor mounting block, and then remove the refrigerant pressure sensor from high-pressure pipe 1.
CAUTION:
- **Never damage high-pressure pipe 1.**
- **Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.**

INSTALLATION
Note the following items, and then install in the reverse order of removal.
CAUTION:
- **Replace O-ring with new one. Then apply compressor oil to them when installing.**
- **Check for leakages when recharging refrigerant. Refer to HA-155, "Leak Test".**

CONDENSER

Exploded View

INFOID:0000000011007759



1. Condenser & liquid tank assembly 2. Radiator

: Pawl

CONDENSER

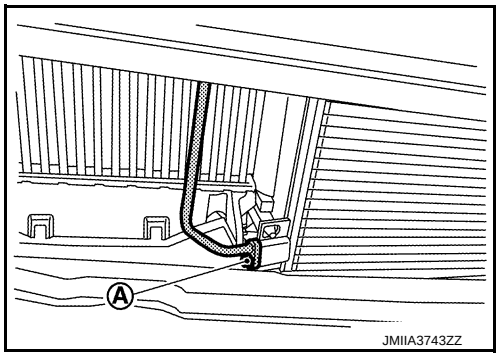
CONDENSER : Removal and Installation

INFOID:0000000011007760

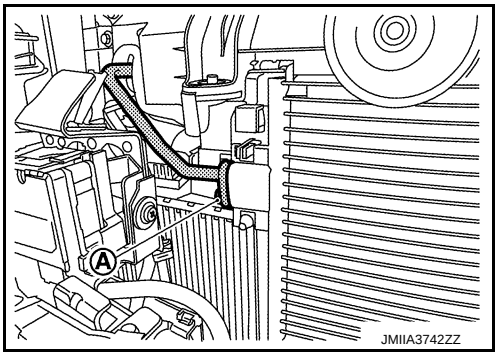
CAUTION:
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-159, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-157, "Recycle Refrigerant".
2. Remove front bumper fascia assembly. Refer to EXT-15, "Removal and Installation".
3. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe 1 from the condenser & liquid tank 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.



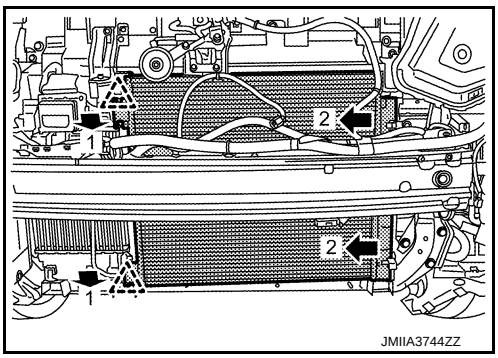
4. Remove mounting bolt Ⓐ, and then disconnect high-pressure pipe 2 from the condenser & liquid tank assembly.
CAUTION:
Cap or wrap the joint of the A/C piping and condenser with suitable material such as vinyl tape to avoid the entry of air.



5. Disengage fixing pawls, and then remove the condenser from the vehicle according to numerical order 1→2 indicated by arrows as shown in the figure.

: Pawl

CAUTION:
Never damage core surface of condenser.



INSTALLATION

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

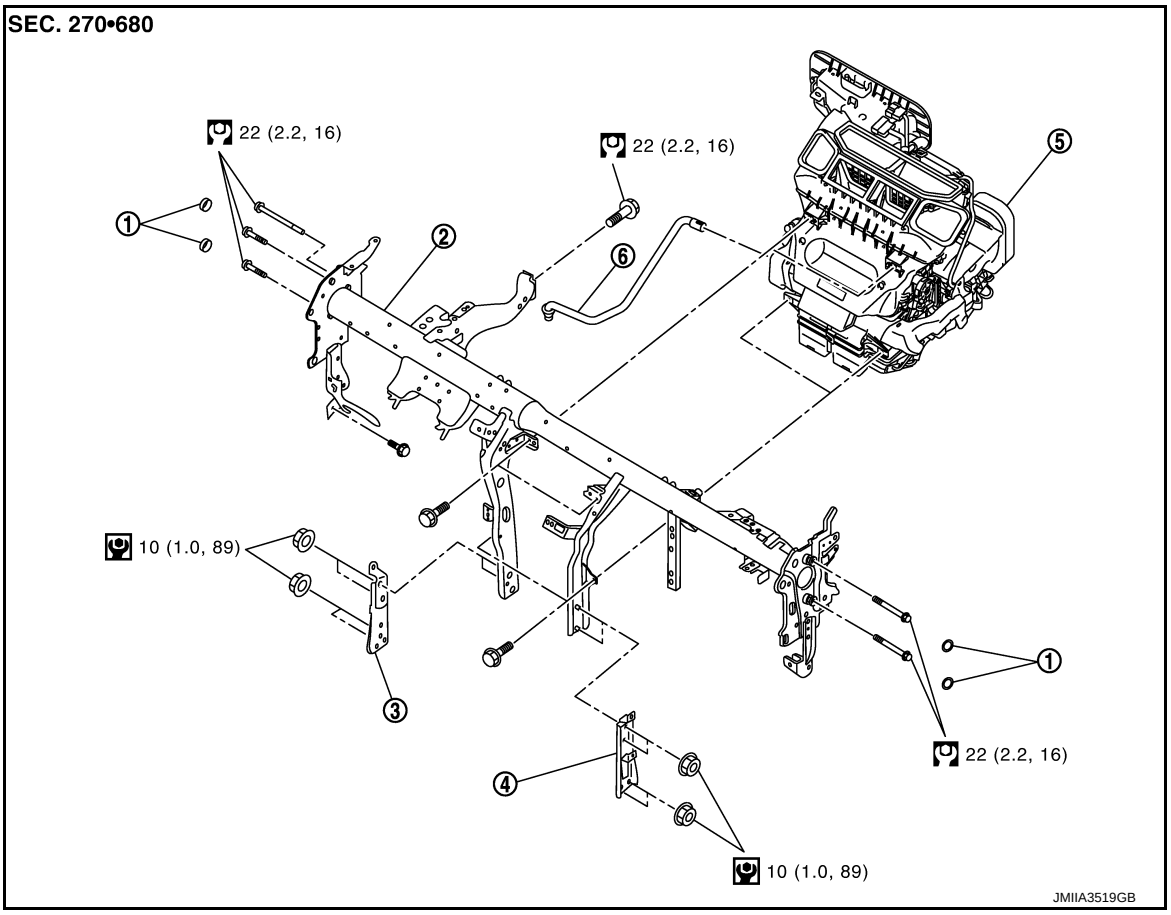
CAUTION:
- **Replace O-rings with new ones. Then apply compressor oil to them when installing.**
- **Perform lubricant adjusting procedure before installing new condenser. Refer to HA-159, "Lubricant Adjusting Procedure for Components Replacement Except Compressor".**
- **Check for leakages when recharging refrigerant. Refer to HA-155, "Leak Test".**

A/C UNIT ASSEMBLY

Exploded View

INFOID:0000000011007761

REMOVAL

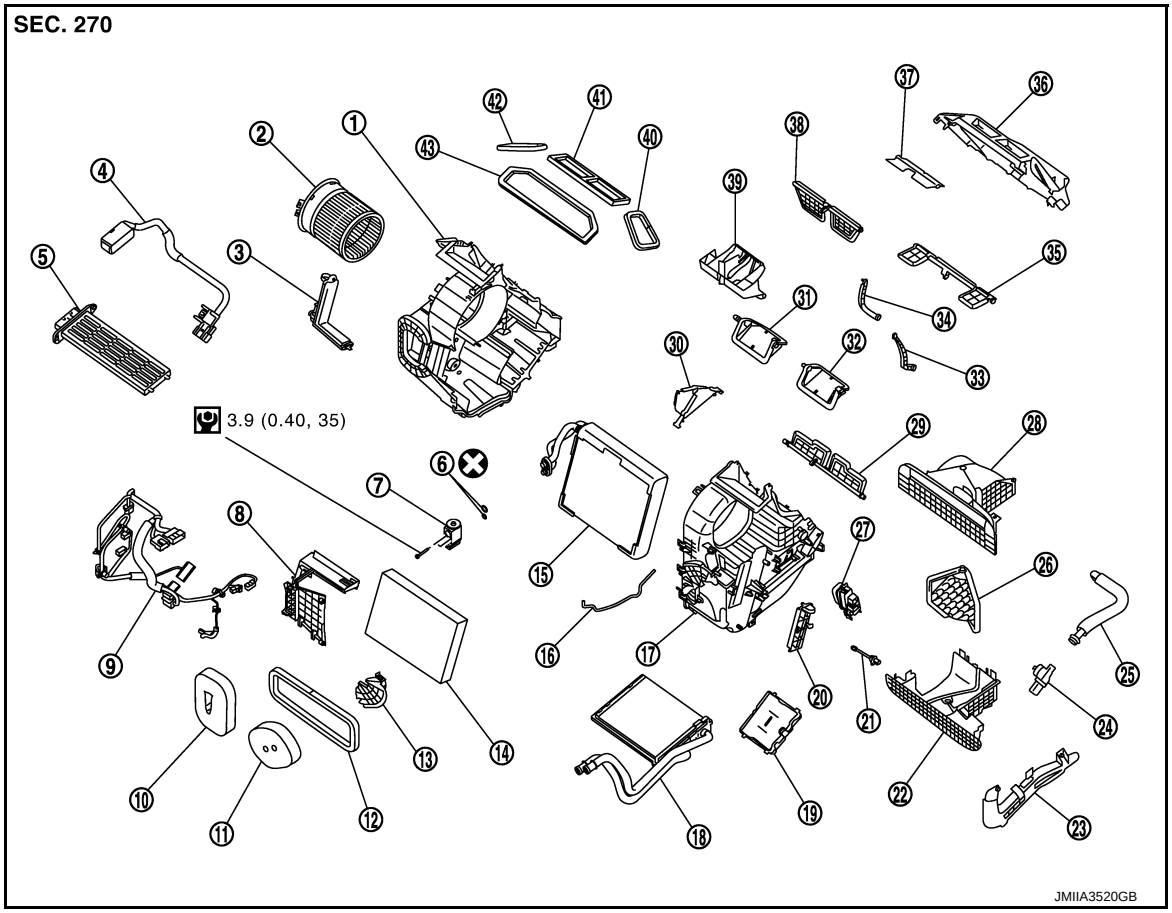


1. Cap
2. Steering member
3. Instrument stay LH
4. Instrument stay RH
5. A/C unit assembly
6. Drain hose

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

DISASSEMBLY



① A/C unit case RH	② Blower motor assembly	③ Filter cover RH
④ Sub harness	⑤ PTC heater	⑥ O-ring
⑦ Expansion valve	⑧ Main case center	⑨ Sub harness
⑩ Cooler packing	⑪ Heater pipe packing	⑫ Intake packing
⑬ Heater pipe clamp	⑭ Air conditioner filter	⑮ Evaporator assembly
⑯ Case packing	⑰ A/C unit case LH	⑱ Heater core
⑲ A/C auto amp. (automatic air conditioning)	⑳ Filter cover LH	㉑ Intake sensor
㉒ Intake box case lower	㉓ Heater pipe cover	㉔ Aspirator (automatic air conditioning)
㉕ Aspirator duct (automatic air conditioning)	㉖ Intake door	㉗ Power transistor (automatic air conditioning) Fan control amplifier (manual air conditioning)
㉘ Intake box case upper	㉙ Foot door	㉚ Plate case center
㉛ Air mix door RH	㉜ Air mix door LH	㉝ Center ventilator door·center ventilator & defroster door rod
㉞ Foot door & mode door rod	㉟ Side ventilator door	㊱ Main case rear
㊲ Mode door	㊳ Center ventilator & defroster door	㊴ Air guide case
㊵ Side ventilator packing LH	㊶ Center ventilator packing	㊷ Side ventilator packing RH
㊸ Defroster packing		

: Always replace after every disassembly.

: N·m (kg-m, in-lb)

A/C UNIT ASSEMBLY

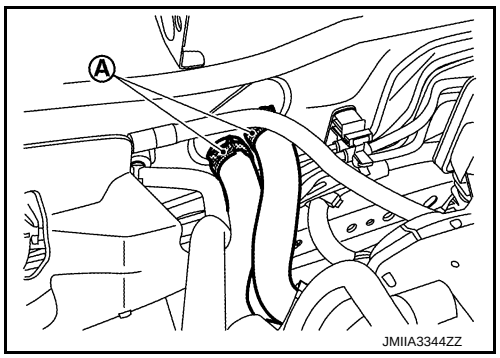
A/C UNIT ASSEMBLY : Removal and Installation

INFOID:0000000011007762

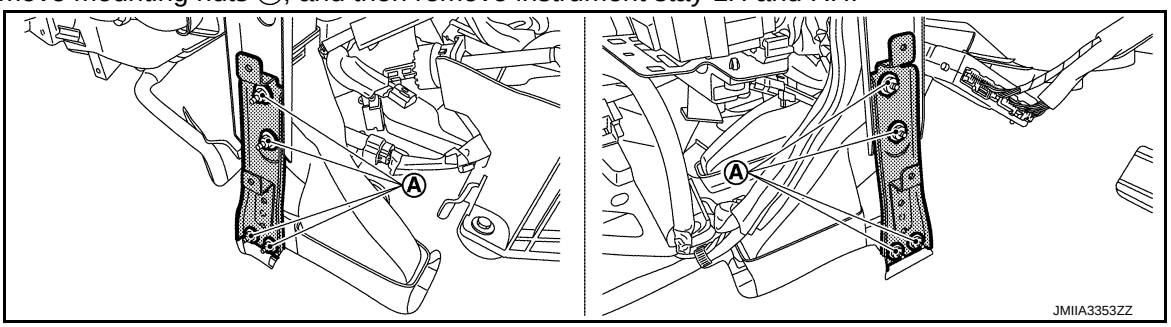
CAUTION:
Perform lubricant return operation before each refrigeration system disassembly. However, if a large amount of refrigerant or lubricant is detected, never perform lubricant return operation. Refer to HA-159, "Perform Lubricant Return Operation".

REMOVAL

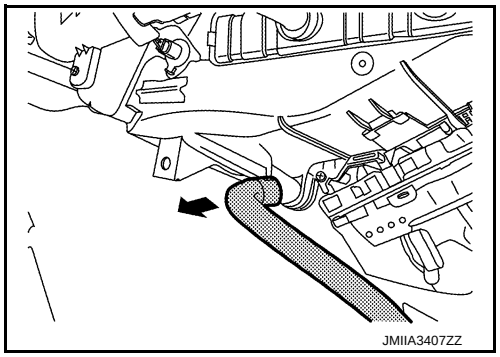
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-157, "Recycle Refrigerant". (If equipped)
2. Drain engine coolant from cooling system. Refer to CO-64, "Draining".
3. Remove front wiper drive assembly. Refer to WW-85, "WIPER DRIVE ASSEMBLY : Removal and Installation".
4. Remove fixing clip, and then remove insulator upper side.
5. Remove mounting bolt, and then disconnect low-pressure pipe and high-pressure pipe 3 from expansion valve. (If equipped)
   CAUTION:
   Cap or wrap the joint of the A/C piping and expansion valve with suitable material such as vinyl tape to avoid the entry of air.
6. Remove clamps Ⓐ, and then disconnect heater hoses.
   CAUTION:
   - **Some coolant may spill when heater hoses are disconnected.**
   - **Close off the coolant inlet and outlet on the heater core (2 locations) with shop cloths.**



7. Remove instrument panel assembly. Refer to IP-14, "Removal and Installation".
8. Remove rear floor duct 1. Refer to VTL-13, "REAR FLOOR DUCT 1 : Removal and Installation".
9. Remove mounting nuts Ⓐ, and then remove instrument stay LH and RH.

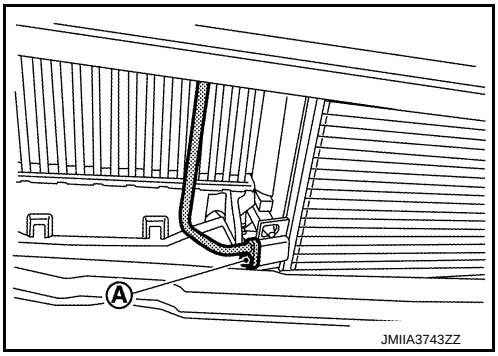


10. Disconnect drain hose from A/C unit assembly.



11. Remove ground bolts.
12. Remove the BCM mounting screws.

13. Remove fixing screws Ⓐ, and then remove junction box.



14. Disconnect the harness connectors and clips required to remove the steering member, and then move the vehicle harness to the position without hindrance for work.
15. Remove mounting nuts, and then move steering column assembly to a position where it dose not inhibit work. Refer to ST-13, "Exploded View".
16. Remove caps from steering member mounting bolts.
17. Remove steering member mounting bolts Ⓐ and A/C unit mounting bolts Ⓑ, and then remove steering member from the vehicle.

CAUTION:
When removing steering member, 2 workers are required to prevent it from dropping.

18. Remove A/C unit assembly.

CAUTION:
When removing A/C unit assembly, 2 workers are required to prevent it from dropping.

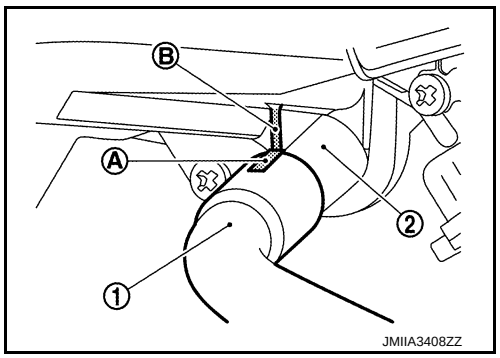
INSTALLATION

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.**
- **Check for leakages when recharging refrigerant. Refer to HA-155, "Leak Test".**

NOTE:

- When installing drain hose ①, match the rib porsion Ⓑ of A/C unit ② and mark Ⓐ of drain hose.



- Refer to CO-65, "Refilling" when filling radiator with engine coolant.

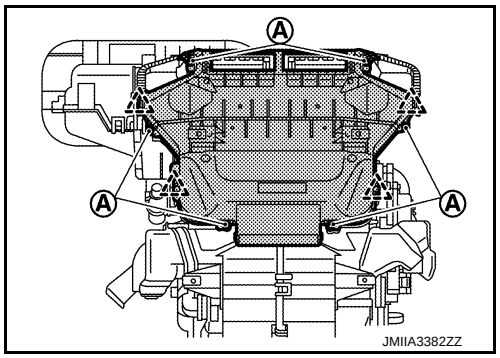
EVAPORATOR

EVAPORATOR : Removal and Installation

INFOID:0000000011007763

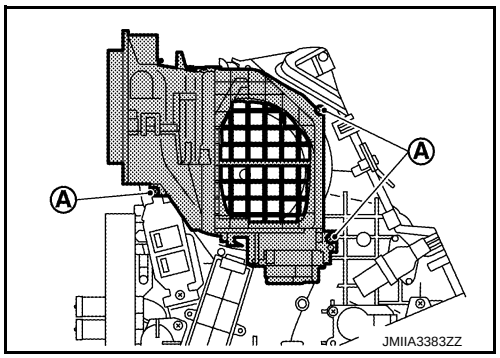
REMOVAL

1. Remove A/C unit assembly. Refer to HA-179, "A/C UNIT ASSEMBLY : Removal and Installation".
2. Remove fixing screws Ⓐ and disengage fixing pawls.

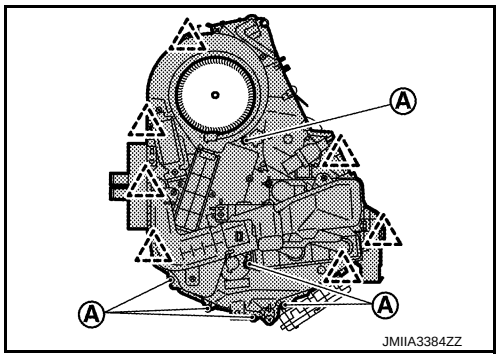


: Pawl

3. Remove main case rear.
4. Remove fixing screws Ⓐ, and then remove intake box assembly.



5. Remove fixing screws Ⓐ and disengage fixing pawls.



: Pawl

6. Separate heater & cooling unit case assembly.
7. Remove evaporator assembly from A/C unit case.
8. Remove mounting bolts, and then remove expansion valve from evaporator.

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.**
- **Perform lubricant adjusting procedure after installing new evaporator. Refer to HA-159, "Lubricant Adjusting Procedure for Components Replacement Except Compressor".**

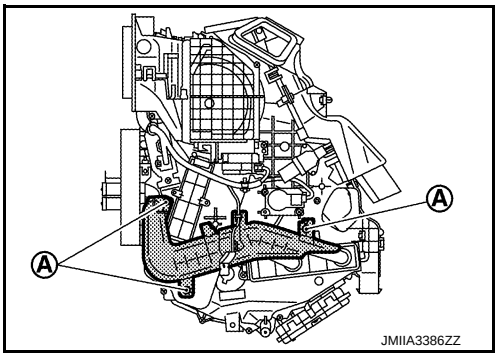
HEATER CORE

HEATER CORE : Removal and Installation

INFOID:0000000011007764

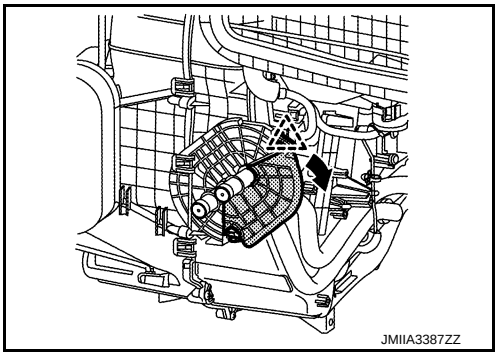
REMOVAL

1. Remove A/C unit assembly. Refer to HA-179, "A/C UNIT ASSEMBLY : Removal and Installation".
2. Remove foot duct LH. Refer to VTL-12, "FOOT DUCT : Removal and Installation".
3. Remove fixing screws Ⓐ, and then remove heater pipe cover.

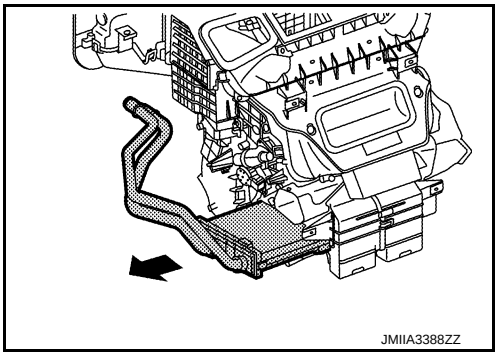


4. Remove heater pipe packing.
5. Disengage fixing pawl, and then remove heater pipe clamp.

△ : Pawl



6. Remove heater core from A/C unit assembly.



INSTALLATION

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

NOTE:

Refer to CO-65, "Refilling" when filling radiator with engine coolant.

EXPANSION VALVE

EXPANSION VALVE : Removal and Installation

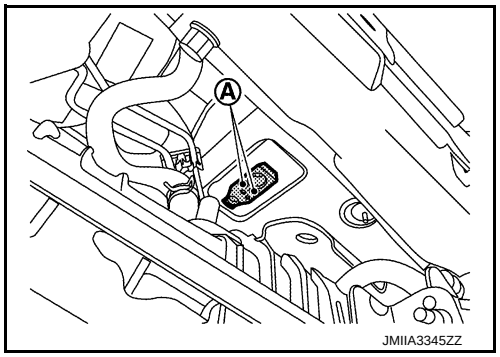
INFOID:0000000011007765

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-159, "Perform Lubricant Return Operation".

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant. Refer to HA-157, "Recycle Refrigerant".
2. Remove mounting bolt, and then disconnect low-pressure pipe and high-pressure pipe 3 from expansion valve.
   CAUTION:
   Cap or wrap the joint of the A/C piping and expansion valve with suitable material such as vinyl tape to avoid the entry of air.
3. Remove mounting bolts,Ⓐ and then remove expansion valve.
   CAUTION:
   Cap or wrap the joint of the 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.**
- **Check for leakages when recharging refrigerant. Refer to HA-155, "Leak Test".**

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Compressor

INFOID:0000000011006187

Model		DENSO make 6SBH14
Type		Variable displacement swash plate
Displacement cm^3 (cu in)/rev	Maximum	140 (8.6)
Direction of rotation		Clockwise (viewed from clutch)
Drive belt		Poly V
Disc to pulley clearance mm (in.)	Standard	0.21 – 0.55 (0.008 – 0.022)

Lubricant

INFOID:0000000011006188

Name		ND-OIL8
Capacity m ℓ (lmp fl oz)	Total in system	110 (3.9)
	Compressor (service part) charging amount	110 (3.9)

Refrigerant

INFOID:0000000011006189

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

Engine Idling Speed

INFOID:0000000011006190

Refer to EC-1232, "Idle Speed".

Belt Tension

INFOID:0000000011006191

Refer to EM-414, "Drive Belts".