SECTION HA

HEATER & AIR CONDITIONING SYSTEM

CONTENTS

PRECAUTION

PRECAUTIONS

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

INFOID:0000000014392023

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 SR and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper repair, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SR section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

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

WARNING:

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

Precaution for Work

INFOID:0000000014392024

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with a new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components:

- Water soluble dirt:

- Dip a soft cloth into lukewarm water, wring the water out of the cloth and wipe the dirty area.
- Then rub with a soft, dry cloth.

- Oily dirt:

- Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%) and wipe the dirty area.
- Then dip a cloth into fresh water, wring the water out of the cloth and wipe the detergent off.
- Then rub with a soft, dry cloth.

- Do not use organic solvent such as thinner, benzene, alcohol or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

Precaution for Procedure without Cowl Top Cover

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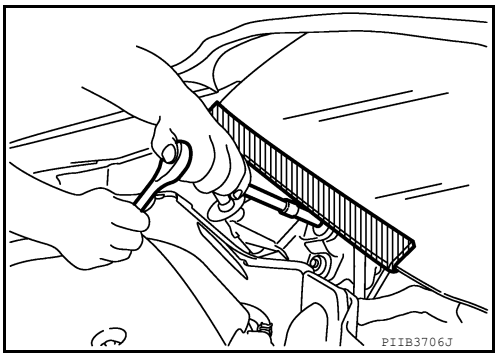
When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precautions For Refrigerant System Service

INFOID:0000000014392026

GENERAL REFRIGERANT PRECAUTION

WARNING:

- **Do not breathe A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system using certified service equipment meeting requirements of SAE 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 oil manufacturers.**
- **Do not release refrigerant into the air. Use approved recovery/recycling/recharging equipment to capture the refrigerant each time an air conditioning system is discharged.**
- **Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.**
- **Do not store or heat refrigerant containers above 52°C (126°F).**
- **Do not 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.**
- **Do not 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.**
- **Do not pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (R-134a) have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.**

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 oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. Compressor malfunction is likely to occur if oil other than that specified is used.**
- **The specified HFC-134a (R-134a) oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**
- **Cap (seal) the component immediately to minimize the entry of moisture from the atmosphere when removing refrigerant components from a vehicle.**
- **Do not 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 the system.**
- **Use only the specified oil from a sealed container. Reseal containers of oil immediately. Oil becomes moisture saturated and should not be used without proper sealing.**
- **Do not allow oil to come in contact with styrene foam parts. Damage may result.**

O-RING AND REFRIGERANT CONNECTION

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

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

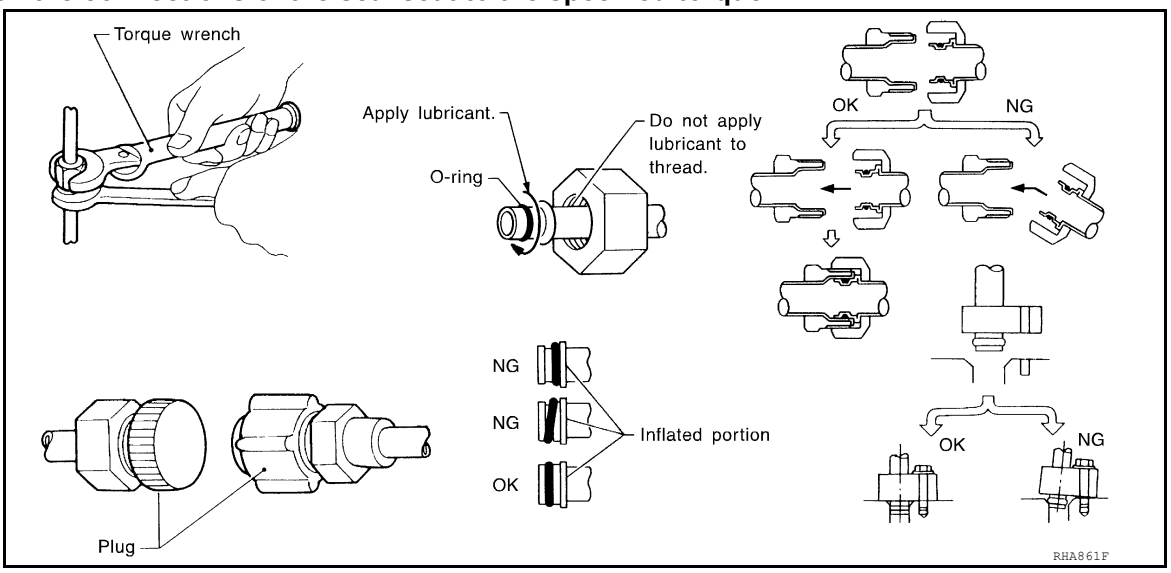
WARNING:

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

CAUTION:

Observe the following when replacing or cleaning refrigerant components.

- **Store it in the same way as it is when mounted on the vehicle when the compressor is removed. Failure to do so will cause oil to enter the low-pressure chamber.**
- **Always use a torque wrench and a back-up wrench when connecting tubes.**
- **Immediately plug 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. Do not remove the seal caps of pipes and other components until just before required for connection.**
- **Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.**
- **Remove moisture thoroughly from the refrigeration system before charging the refrigerant.**
- **Always replace used O-rings.**
- **Apply oil to the O-rings shown in illustrations when connecting the tubes. Be careful not to apply oil to threaded portion.**
- **The O-ring must be closely attached to the groove portion of tube.**
- **Be careful not to damage the O-ring and tube when replacing the O-ring.**
- **Connect the 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 leak test and make sure that there are no leaks from the connections after connecting the line. Disconnect that line and replace the O-ring when the refrigerant leaking point is found. Then tighten the connections of the seal seat to the specified torque.**



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. Do not 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.

COMPRESSOR

CAUTION:

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **Store it in the same way as it is when mounted on the car when the compressor is removed.**
- **Follow "Maintenance of Oil Quantity in Compressor" exactly when replacing or repairing compressor. Refer to HA-21, "Description".**
- **Keep friction surfaces between clutch and pulley clean. Wipe it off by using a clean waste cloth moistened with solvent if the surface is contaminated with oil.**
- **Turn the compressor shaft by hand more than five turns in both directions after compressor service operation. This distributes oil equally 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 leaks. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leaks.**
- **Always wear 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 electronic leak detector (SST: J-41995). The fluorescent dye leak detector should be used in conjunction with an electronic leak detector (SST: J-41995) to pinpoint refrigerant leaks.**
- **Read and follow all manufacturer's operating instructions and precautions prior to performing the work for the purpose of safety and customer's satisfaction.**
- **A compressor shaft seal should not necessarily be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leak with an electronic leak detector (SST: J-41995).**
- **Always remove any remaining dye from the leak area after repairs are completed to avoid a misdiagnosis during a future service.**
- **Do not 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.**
- **Do not spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).**
- **Do not 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. Do not use HFC-134a (R-134a) leak detection dye in a CFC-12 (R-12) A/C system or CFC-12 (R-12) leak detection dye in a HFC-134a (R-134a) A/C system. A/C system damage may result.**
- **The fluorescent properties of the dye remain 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

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RECOVERY/RECYCLING RECHARGING EQUIPMENT

Be certain to follow the manufacturer's instructions for machine operation and machine maintenance. Do not introduce any refrigerant other than that specified into the machine.

ELECTRONIC LEAK DETECTOR

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

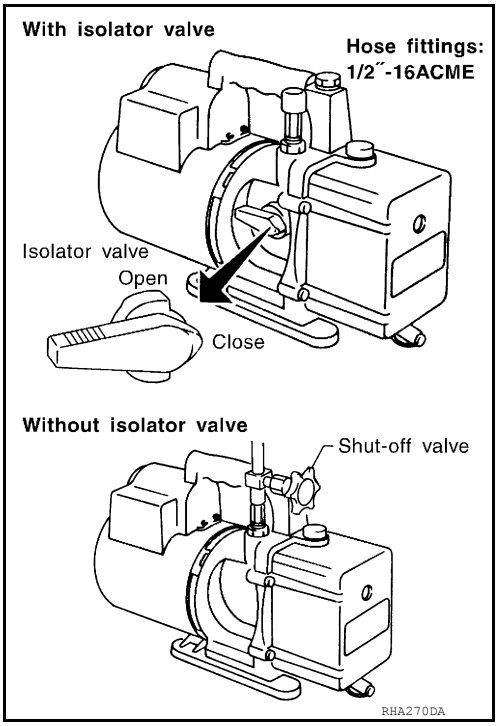
VACUUM PUMP

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

To prevent this migration, use a manual valve placed near the hose-to-pump connection as per the following:

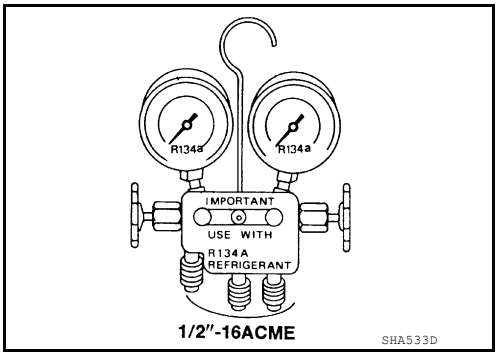
- Vacuum pumps usually have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- Use a hose equipped with a manual shut-off valve near the pump end for pumps without an isolator. Close the valve to isolate the hose from the pump.
- Disconnect the 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 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.



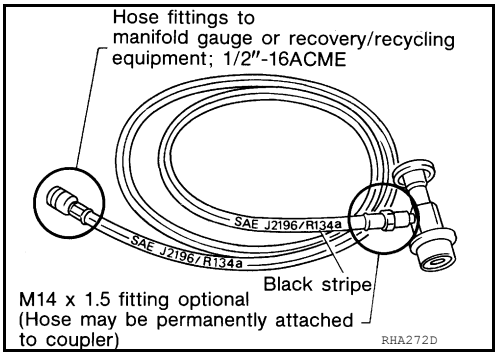
MANIFOLD GAUGE SET

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 oils.



SERVICE HOSES

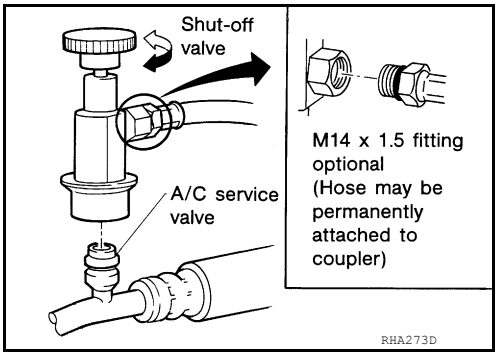
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite to the manifold gauge.



SERVICE COUPLERS

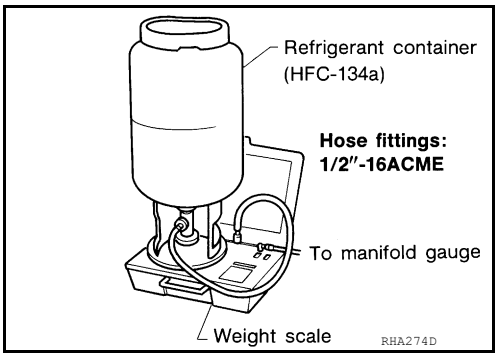
Do not attempt to connect HFC-134a (R-134a) service couplers to the CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers do not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

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 oils 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/recharging equipment.

PREPARATION

PREPARATION

Special Service Tool

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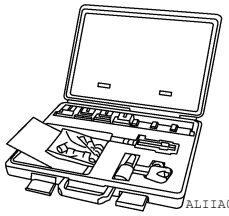
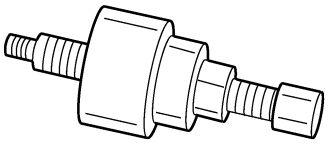
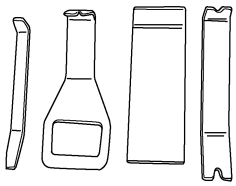
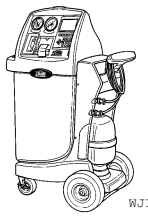
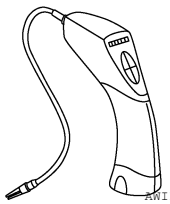
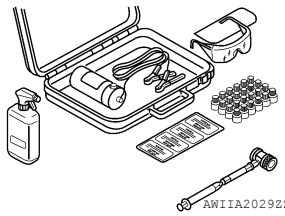
The actual shape of the tools may differ from those illustrated here.

Tool number (TechMate No.) Tool name		Description
(J-41425-NIS) Aluminum tube repair kit	 ALIIA0390ZZ	Repairing leaks in A/C tubes
(J-38873-A) Drive plate installer	 WJIA0367E	Installing pulley
(J-46534) Trim Tool Set	 AWJIA0483ZZ	Removing trim components
(J-48710) Nissan ACR2009 RRR Unit	 WJIA0293E	Refrigerant recovery, recycling and recharging
(TIFZX) Electronic Refrigerant Leak Detector	 AWIIA1921ZZ	Detects refrigerant leaks

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

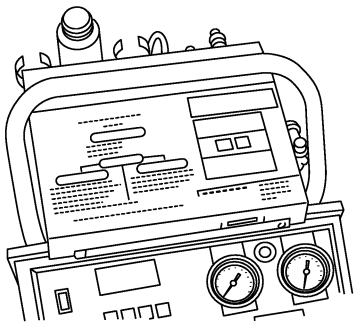
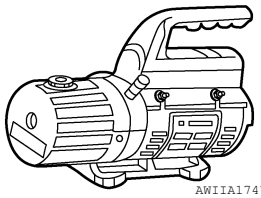
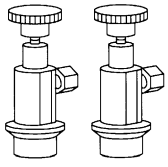
INFOID:0000000014392029

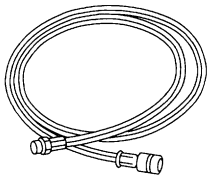
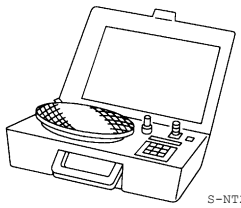
Do not mix HFC-134a (R-134a) refrigerant and/or its specified oil with CFC-12 (R-12) refrigerant and/or its oil.
Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/oil.
Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or oil) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/oil.
Adapters that convert one size fitting to another must not be used refrigerant/oil contamination will occur and compressor failure will result.

Tool number (TechMate No.) Tool name	Description
(J-43926) Refrigerant dye leak detection kit  AWIIA2029ZZ	Power supply: • DC 12V (battery terminal)

Commercial Service Tool

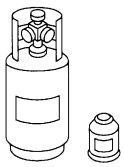
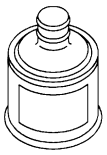
INFOID:0000000014392030

(TechMate No.) Tool name	Description
(J-41810-NI) Refrigerant identifier equipment (R-134a)  RJIA0197E	For checking refrigerant purity and system contamination
(J-39599) Vacuum Pump  AWIIA1747ZZ	Evacuate air from A/C system
Power tool  PIIB1407E	Loosening nuts, screws and bolts
Service Couplers • High side coupler (J-39500-20A) • Low side coupler (J-39500-24A)  S-NT202	Hose fitting to service hose: • M14 x 1.5 fitting is optional or permanently attached

(TechMate No.) Tool name	Description
Service Hoses: • Low side hose (J-39500-72B) • High side hose (J-39500-72R) • Utility hose (J-39500-72Y)  S-NT201	Hose color: • Low side hose: Blue with black stripe • High 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
(J-39699) Refrigerant weight scale  S-NT200	For measuring of refrigerant Fitting size-Thread size • 1/2”-16 ACME

Sealant and/or Oil

INFOID:0000000014392031

Tool number (TechMate No.) 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
(—) A/C System Oil Type S (DH-PS)  JMIIA1759ZZ	Type:A/C System Oil Type S (DHPS) Application: HFC-134a (R-134a) vane rotary compressors (NISSAN only)

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

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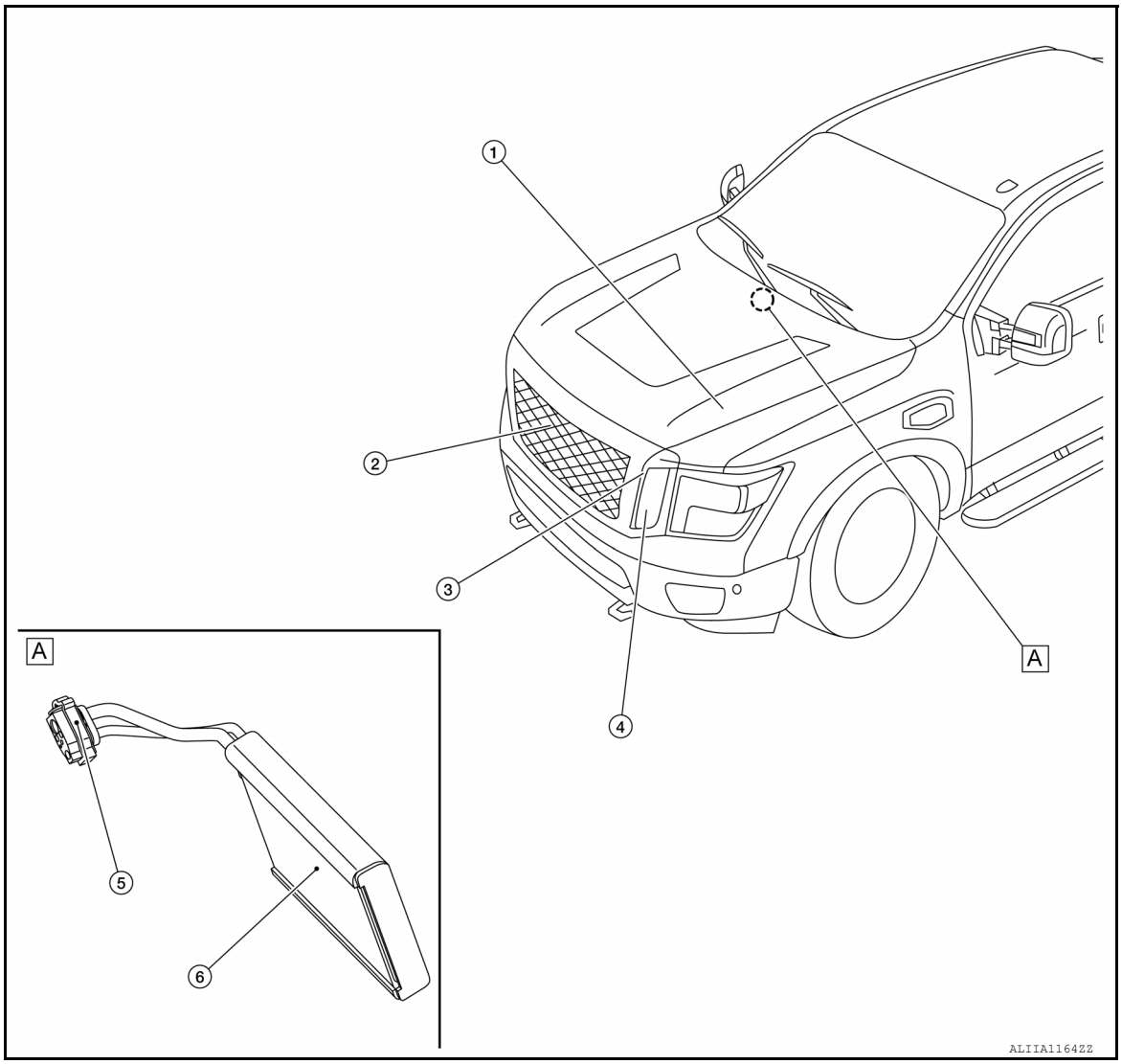

A. Evaporator assembly

	Component	Description
1.	Compressor	Intakes, compresses, and discharges refrigerant to circulate refrigerant inside the refrigerant cycle.
3.	Condenser	Cools refrigerant discharged from compressor and transforms it to liquid refrigerant.
2.	Refrigerant pressure sensor	• Refer to HAC-16, "Refrigerant Pressure Sensor" [Automatic air conditioning]. • Refer to HAC-145, "Refrigerant Pressure Sensor" [Manual air conditioning].
4.	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 from 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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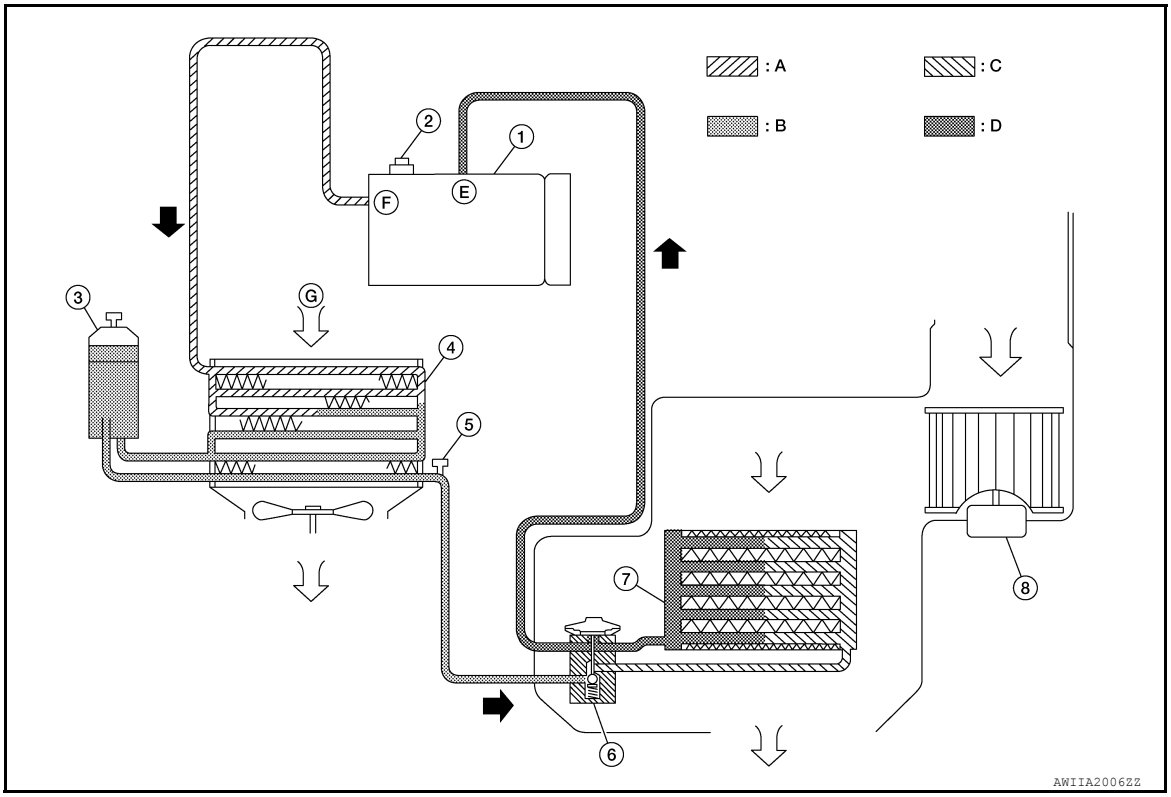


1. A/C compressor	2. Pressure relief valve	3. Liquid tank
4. Condenser	5. Refrigerant pressure sensor	6. Expansion valve
7. Evaporator	8. Blower motor	A. High-pressure gas
B. High-pressure liquid	C. Low-pressure liquid	D. Low-pressure gas
E. Suction port	F. Discharge port	G. Outside air

System Description

INFOID:0000000014392034

REFRIGERANT CYCLE

Refrigerant Flow

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

Freeze Protection

When evaporator fin temperature is low, compressor stops so that freeze of evaporator can be prevented. Refer to the following.

- Automatic air conditioning: HAC-20, "Compressor Control".
- Manual air conditioning: HAC-148, "Compressor Control".

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 condenser pipe. 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, 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 3,600 kPa (36 bar, 36.7 kg/cm^2, 522 psi)].

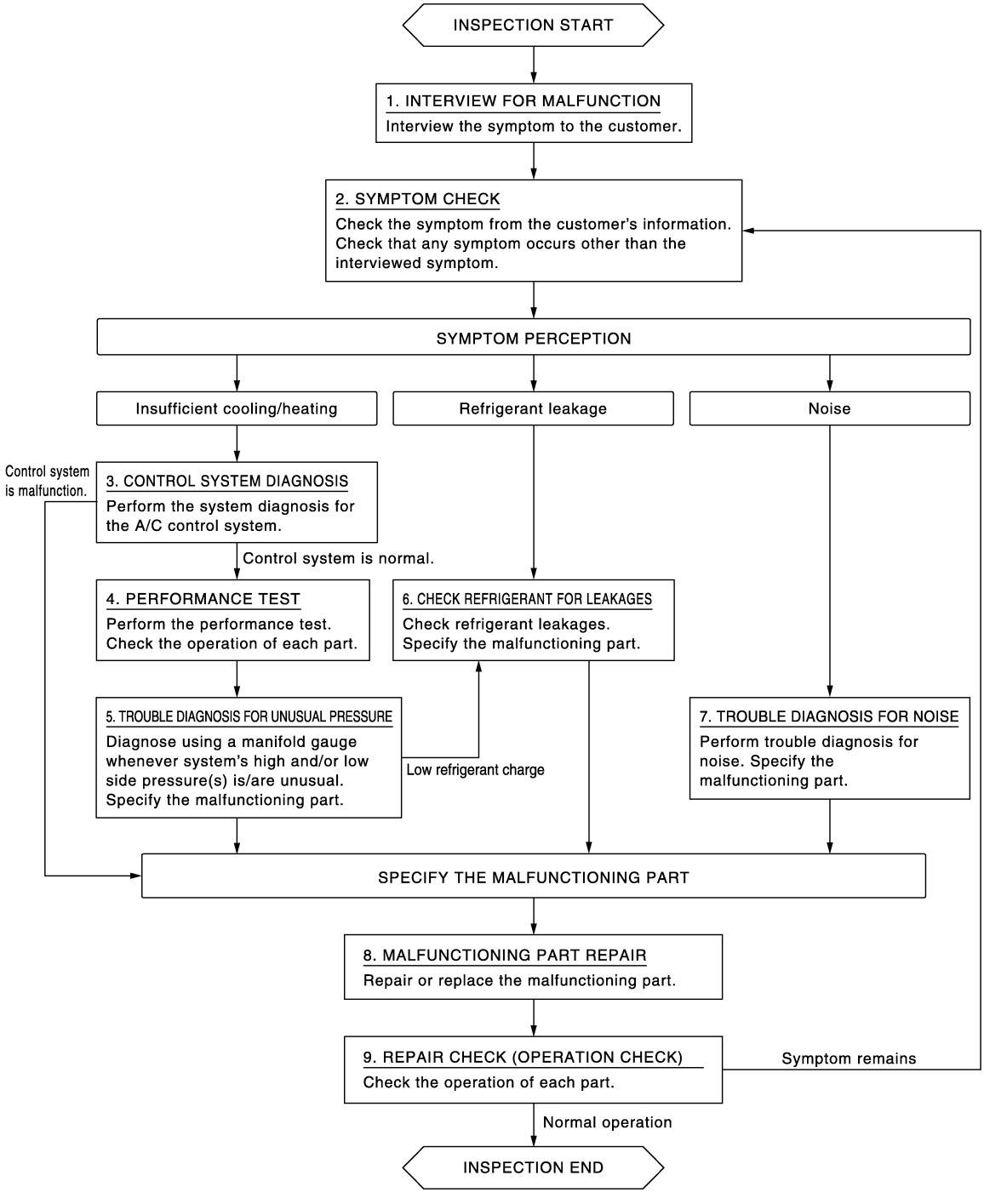
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000014392035

OVERALL SEQUENCE



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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-61, "Work Flow" (with auto A/C) or HAC-184, "Work Flow" (with manual A/C).

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-24, "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-26, "Trouble Diagnoses for Abnormal Pressure".

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-17, "Leak Test".

>> GO TO 8.

7.TROUBLE DIAGNOSIS FOR NOISE

Perform trouble diagnosis for noise. Specify the malfunctioning part. Refer to HA-30, "Symptom Table".

>> GO TO 8.

8.MALFUNCTIONING 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?

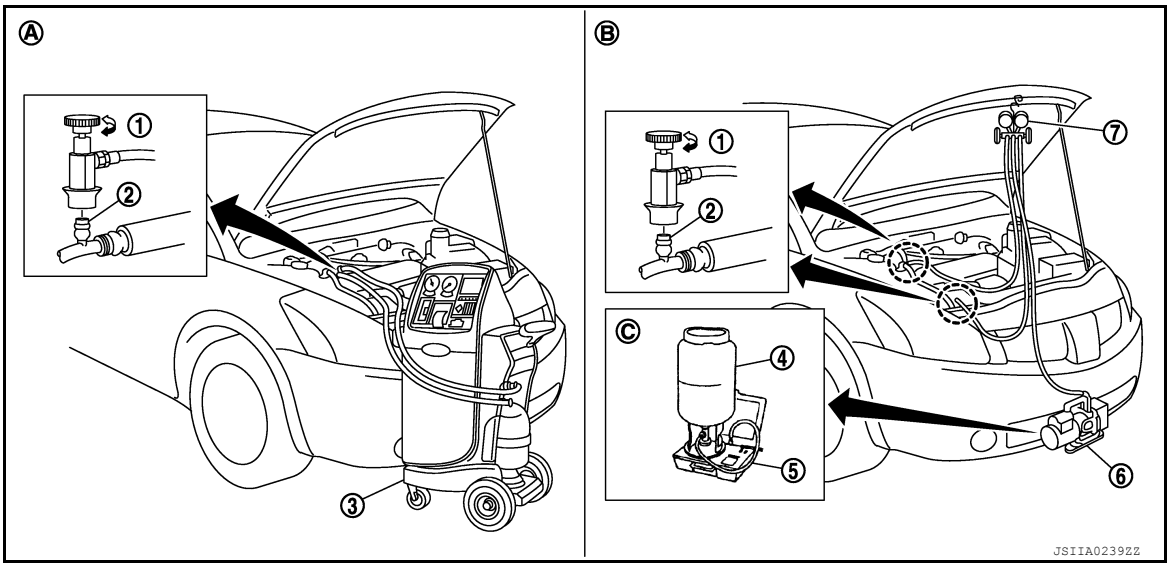
YES >> Inspection End.
NO >> GO TO 2.

REFRIGERANT

Description

INFOID:0000000014392036

CONNECTION OF SERVICE TOOLS AND EQUIPMENT



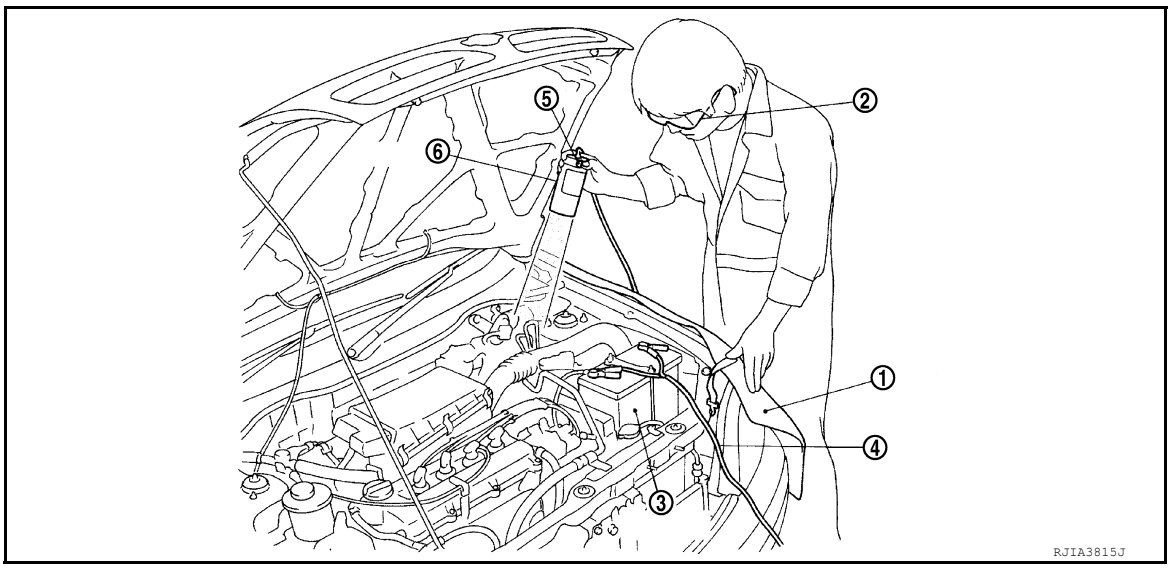
1. Shut-off valve
2. A/C service valve
3. Recovery/recycling/recharging equipment
4. Refrigerant container (HFC-134a)
5. Weight scale
6. Vacuum pump
7. Manifold gauge set

A. Preferred (best) method
B. Alternative method
C. For charging

Leak Test

INFOID:0000000014392037

CHECK REFRIGERANT LEAK 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 leaks. (Where refrigerant leak occurs, fluorescent leak detection dye appears in green color.)

WARNING:

Do not 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 leak.
- Use a mirror in areas that are difficult to see and check for refrigerant leaks.
- Refrigerant leaks from evaporator can be detected by soaking a cotton swab or a similar material with drain hose water and illuminating it using UV lamp.
- Dust, dirt, and packing material adhesive used for condenser, evaporator, and other locations may fluoresce. Be careful not to misidentify leak.

5. Repair or replace parts where refrigerant leak occurs and wipe off fluorescent leak detection dye.
NOTE:
Completely wipe off fluorescent leak detection dye from gaps between parts, screw threads and other components using a cotton swab or similar material.
6. Use a UV lamp to check that no fluorescent leak detection dye remains after finishing work.
WARNING:
Do not look directly into UV lamp light source.
NOTE:
- For continuous operating time of UV lamp, follow the manufacturers operating instructions.
- Dust, dirt, and packing material adhesive used for condenser, evaporator, and other locations may fluoresce. Be careful not to misidentify leak.

CHECK REFRIGERANT LEAK USING ELECTRONIC LEAK DETECTOR

WARNING:
Do not check for refrigerant leaks while the engine is running.
CAUTION:
Be careful of the following items so that inaccurate checks or misidentifications are avoided.
- **Do not allow refrigerant vapor, shop chemical vapors, cigarette smoke or other contaminants around the vehicle.**
- **Always check for refrigerant leaks in a low air flow environment so that refrigerant may not disperse when leak 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 (3.52 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:
Leaks may not be detected if A/C refrigerant pressure is 345 kPa (3.52 kg/cm^2, 50 psi) or less when temperature is less than 16°C (61°F).
4. Clean area where refrigerant leak check is performed and check refrigerant leaks along all surfaces of pipe connections and A/C system components using electronic leak detector (TIFZX) probe.
CAUTION:
- **Continue checking when a leak is found. Always continue and complete checking along all pipe connections and A/C system components for additional leaks.**
- **When a leak is detected, clean leak area using compressed air and check again.**
- **When checking for leaks of cooling unit inside, always clean inside of drain hose so that the probe surface may not be exposed to water or dirt.**

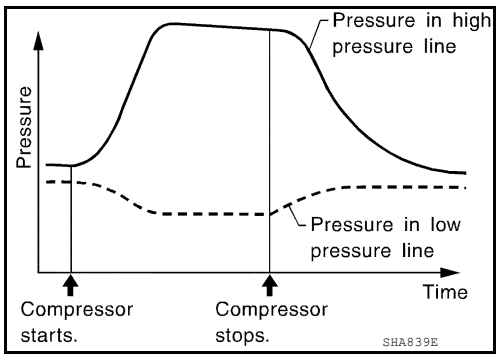
NOTE:
- Always check leaks starting from high-pressure side and continue to low-pressure side.
- When checking leak of cooling unit inside, operate blower fan motor for 15 minutes or more at the maximum speed while the engine is stopped, and then insert electronic leak detector probe into drain hose and hold for 10 minutes or more.
- Before disconnecting shut-off valves that are connected to A/C service valve, always evacuate remaining refrigerant so that misidentification can be avoided.

5. Repair or replace parts where a refrigerant leak is detected.
6. Start the engine and set A/C control to the following conditions.
- A/C switch ON
- Air flow: VENT (ventilation)
- Intake door position: Recirculation

- Temperature setting: Full cold
- Blower speed: Maximum

7. Run the engine at approximately 1,500 rpm for two minutes or more.
8. Stop the engine. Check again for refrigerant leak. Go to step 4.

WARNING:
Be careful not to get burned when the engine is hot.
NOTE:
- Start refrigerant leak 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 leak.



Recycle Refrigerant

INFOID:0000000014392038

WARNING:
- **Always use HFC-134a for A/C refrigerant. If CFC-12 is accidentally charged, compressor damage due to insufficient lubrication will result.**
- **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.**
- **Do not breathe A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose, or throat.**
- **Do not allow HFC-134a to be exposed to an open flame or other ignition sources because it generates poisonous gas when in contact with high temperature objects. Keep workshop well ventilated.**

1. Perform oil return operation. Refer to HA-21, "Perform Oil Return Operation". (If refrigerant or oil leak is detected in a large amount, omit this step, and go to step 2.)
   CAUTION:
   Do not perform oil return operation if a large amount of refrigerant or oil leak 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. Do not 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 into compressor oil, etc.
7. Refrigerant recycle operation is complete.

Charge Refrigerant

INFOID:0000000014392039

WARNING:
- **Always use HFC-134a for A/C refrigerant. If CFC-12 is accidentally charged, compressor damage due to insufficient lubrication will result.**
- **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.**
- **Do not breathe A/C refrigerant and oil vapor or mist. Exposure my irritate eyes, nose, or throat.**
- **Do not 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 valves.
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 200g of refrigerant and check that there are no refrigerant leaks. Refer to HA-17, "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 oil according to the 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 caps.
9. Refrigerant charge is complete.

OIL

Description

INFOID:0000000014392040

MAINTENANCE OF OIL LEVEL

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

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

Oil Type : A/C System Oil Type S (DH-PS)

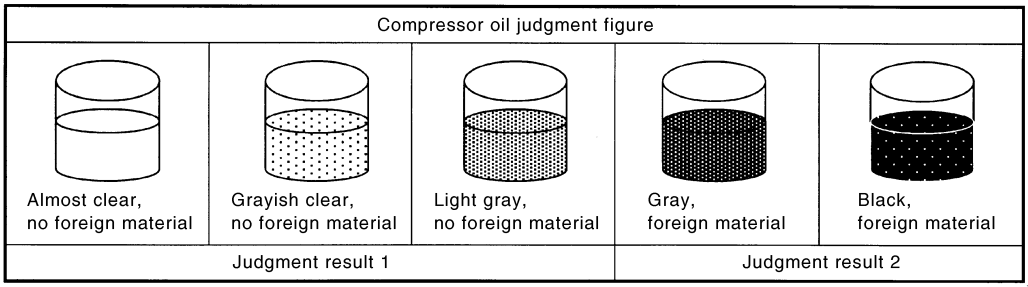
Inspection

INFOID:0000000014392041

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

1.COMPRESSOR OIL JUDGMENT

1. Remove the compressor. Refer to HA-31, "Removal and Installation".
2. Sample compressor oil and judge below according to the figure.



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

Perform Oil Return Operation

INFOID:0000000014392042

CAUTION:

If a large refrigerant or oil leak is detected, do not perform oil return operation.

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

Oil Adjusting Procedure for Components Replacement Except Compressor

INFOID:0000000014392043

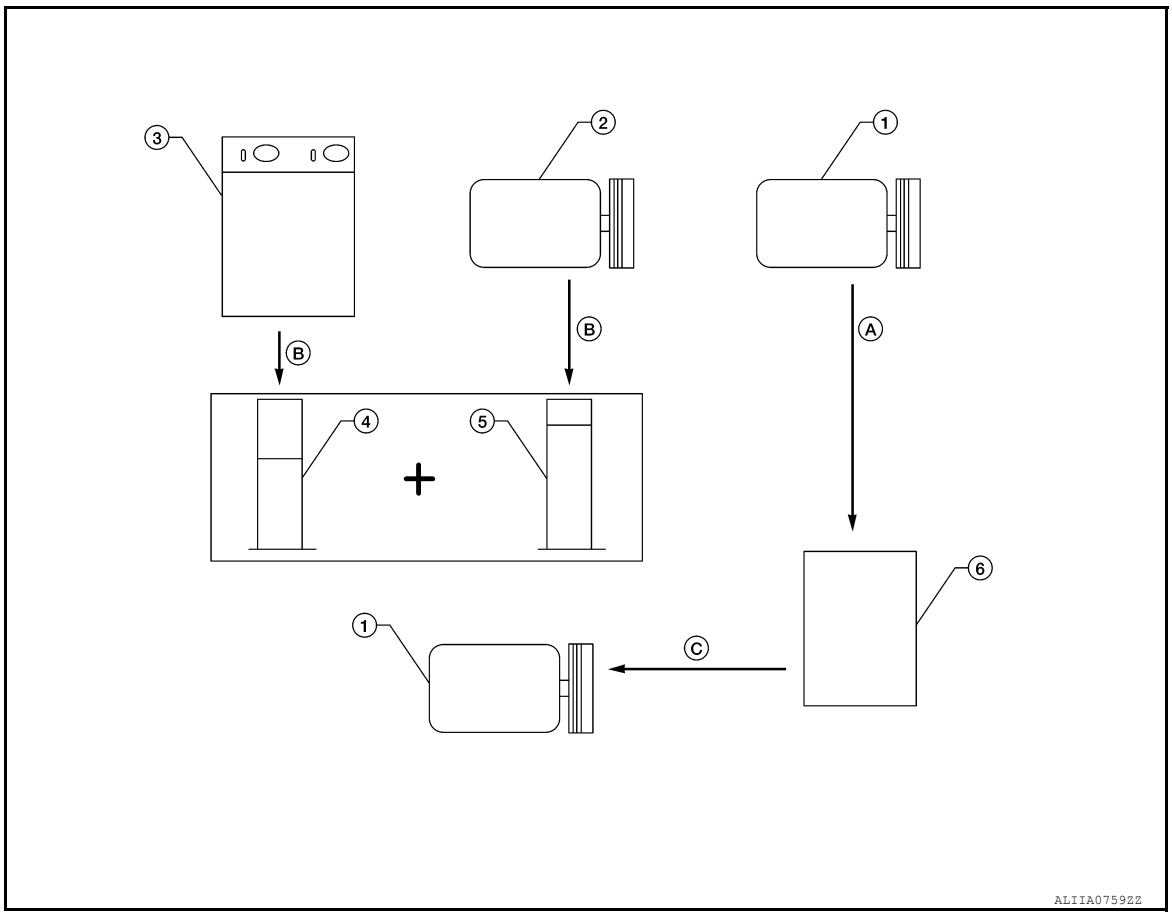
Fill with oil for the amount that is calculated according to the following conditions.
Example: Oil amount to be added when replacing evaporator and liquid tank [m ℓ (US fl oz, Imp fl oz)] = 45 (1.5, 1.6) + 15 (0.5, 0.5) + α

Conditions	Oil amount to be added to A/C system m ℓ (Imp fl oz.)
Replace evaporator	45 (1.6)
Replace condenser	30 (1.1)

Conditions		Oil amount to be added to A/C system m ℓ (Imp fl oz.)
Replace liquid tank		15 (0.5)
Refrigerant leak is detected	Large amount of leak	30 (1.1)
	Small amount of leak	—
Oil amount that is recycled together with refrigerant during recycle operation		α

Oil Adjusting Procedure for Compressor Replacement

INFOID:0000000014392044



1. New compressor
2. Old compressor
3. Recovery/recycling equipment
4. Measuring cup X
5. Measuring cup Y
6. New oil
A. Drain oil from the new compressor into clean container
B. Record amount of oil recovered
C. Install new oil equal to recorded amounts in measuring cups X and Y

1. Before connecting recovery/recycling/recharging equipment to vehicle, check recovery/recycling/recharging equipment gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.
2. Connect recovery/recycling/recharging equipment to vehicle. Confirm refrigerant purity in supply tank using recovery/recycling/recharging equipment and refrigerant identifier. If NG, refer to HA-4, "Precautions For Refrigerant System Service".
3. Confirm refrigerant purity in vehicle A/C system using recovery/recycling equipment and refrigerant identifier. If NG, refer to HA-4, "Precautions For Refrigerant System Service".
4. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure oil discharged into the recovery/recycling/recharging equipment.
5. Drain the oil from the old (removed) compressor into a graduated container and recover the amount of oil drained.
6. Drain the oil from the new compressor into a separate, clean container.

7. Measure the amount of new oil installed equal to amount drained from old compressor. Add this oil to new compressor through the suction port opening.
8. Measure the amount of new oil equal to the amount recovered during discharging. Add this oil to new compressor through the suction port opening.

PERFORMANCE TEST

Inspection

INFOID:0000000014392045

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-17, "Description".

RECIRCULATING-TO-DISCHARGE AIR TEMPERATURE TABLE

Inside air (Recirculating air) at blower inlet		Vent Outlet Temperature °C (°F)	
Relative humidity %	Air temperature °C (°F)	1st Row	2nd Row
50 – 60	25 (77)	9.0 - 9.6 (48.1 - 49.3)	12.2 - 13.1 (53.9 -55.6)
	30 (86)	12.3 - 13.2 (54.1 - 55.8)	15.6 -16.8 (60.0 - 62.3)
	35 (95)	17.7 - 19.2 (63.9 - 66.6)	20.7 - 22.5 (69.3 - 72.5)
	40 (104)	22.3 - 24.2 (72.1 -75.6)	24.6 - 26.8 (76.3 - 80.2)
60 – 70	25 (77)	9.6 - 10.3 (49.3 - 51.1)	13.1 - 14.1 (55.6 - 57.3)
	30 (86)	13.2 - 14.2 (55.8 - 57.5)	16.8 - 18.1 (62.3 - 64.6)
	35 (95)	19.2 - 20.7 (66.6 - 69.3)	22.5 -24.3 (72.5 - 75.7)
	40 (104)	24.2 - 26.2 (75.6 - 79.1)	26.8 - 28.9 (80.2 - 84.1)

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)	Kpa	941.4 - 1147.4	166.7 - 205.9
		kg/cm	9.6 - 11.7	1.7 - 2.1
		PSI	136.5 - 166.4	24.2 - 29.9
	30 (86)	Kpa	1098.4 - 1343.5	196.1 - 235.4
		kg/cm	11.2 - 13.7	2.0 - 2.4
		PSI	159.3 - 194.9	28.4 - 34.1
	35 (95)	Kpa	1343.5 - 1637.7	245.2 - 304.0
		kg/cm	13.7 - 16.7	2.5 - 3.1
		PSI	194.9 - 237.5	35.6 - 44.1
	40 (104)	Kpa	1510.2 - 1843.7	294.2 - 353.0
		kg/cm	15.4 - 18.8	3.0 - 3.6
		PSI	219.0 - 267.4	42.7 - 51.2

SYMPTOM DIAGNOSIS

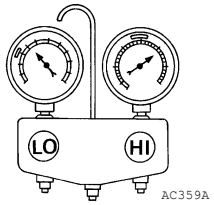
REFRIGERATION SYSTEM SYMPTOMS

Trouble Diagnoses for Abnormal Pressure

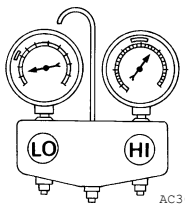
INFOID:0000000014392046

Whenever system's high and/or low side pressure is abnormal, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (usual) pressure range. Since the standard (usual) pressure, however, differs from vehicle to vehicle, refer to above table (Ambient air temperature-to-operating pressure table).

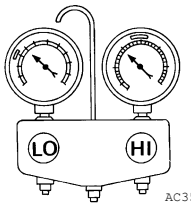
Both High- and Low-pressure Sides are Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
A Both high- and low-pressure sides are too high.  	Pressure is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle	Reduce refrigerant until specified pressure is obtained.
	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance ↓ 1. Condenser fins are clogged. 2. Improper fan rotation of cooling fan	• Clean condenser. • Check and repair cooling fan if necessary.
	• Low-pressure pipe is not cold. • When A/C compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2 kg/cm^2, 28 psi). It then decreases gradually thereafter.	Poor heat exchange in condenser (After A/C compressor operation stops, high-pressure decreases too slowly.) ↓ Air in refrigeration cycle	Evacuate and recharge system.
	Engine tends to overheat.	Engine cooling systems malfunction.	Check and repair engine cooling system.
	• An area of the low-pressure pipe is colder than areas near the evaporator outlet. • Plates are sometimes covered with frost.	• Excessive liquid refrigerant on low-pressure side • Excessive refrigerant discharge flow • Expansion valve is open a little compared with the specification. ↓ Improper expansion valve adjustment	Replace expansion valve.

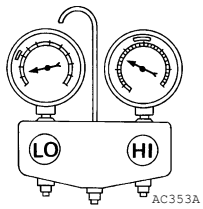
High-pressure Side is Too High and Low-pressure Side is Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
B High-pressure side is too high and low-pressure side is too low.  	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between A/C compressor and condenser are clogged or crushed.	• Check and repair or replace malfunctioning parts. • Check oil for contamination.

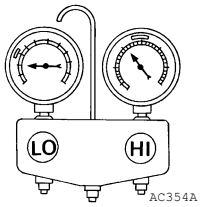
High-pressure Side is Too Low and Low-pressure Side is Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
C High-pressure side is too low and low-pressure side is too high. 	High- and low-pressure sides become equal soon after A/C compressor operation stops.	A/C compressor pressure operation is improper. ↓ Damaged inside A/C compressor packings.	Replace A/C compressor.
	No temperature difference between high- and low-pressure sides.	A/C compressor pressure operation is improper. ↓ Damaged inside A/C compressor packings.	Replace A/C compressor.

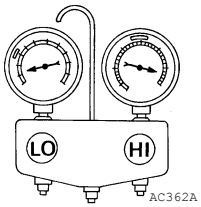
Both High- and Low-pressure Sides are Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
D Both high- and low-pressure sides are too low. 	• There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low. • Liquid tank inlet and expansion valve are frosted.	Liquid tank inside is slightly clogged.	• Replace liquid tank. • Check oil for contamination.
	• Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. • Expansion valve inlet may be frosted. • Temperature difference occurs somewhere in high-pressure side.	High-pressure pipe located between liquid tank and expansion valve is clogged.	• Check and repair malfunctioning parts. • Check oil for contamination.
	Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge. ↓ Leaking fittings or components.	Check refrigerant system for leaks. Refer to HA-17, "Leak Test".
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ 1. Improper expansion valve adjustment. 2. Malfunctioning expansion valve. 3. Outlet and inlet may be clogged.	• Remove foreign particles by using compressed air. • Check oil for contamination.
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	• Check and repair malfunctioning parts. • Check oil for contamination.
	airflow volume is too low.	Evaporator is frozen.	• Check intake sensor circuit. Refer to HAC-78, "Diagnosis Procedure". • Repair evaporator fins. • Replace evaporator. • Refer to HAC-98, "A/C SWITCH ASSEMBLY : Component Function Check".

Low-pressure Side Sometimes Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
E Low-pressure side sometimes becomes negative. 	• Air conditioning system does not function and does not cyclically cool the compartment air. • The system constantly functions for a certain period of time after A/C compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	• Drain water from refrigerant or replace refrigerant. • Replace liquid tank.

Low-pressure Side Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
F Low-pressure side becomes negative. 	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the malfunction is caused by water or foreign particles. • If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. • If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air). • If either of the above methods cannot correct the malfunction, replace expansion valve. • Replace liquid tank. • Check oil for contamination.

Symptom Matrix Chart

INFOID:0000000014392047

Symptom	Reference	
A/C system cannot be controlled from the A/C switch assembly.	Go to Trouble Diagnosis Procedure for A/C System.	HAC-99, "A/C SWITCH ASSEMBLY : Diagnosis Procedure"
A/C display does not operate.	Go to Trouble Diagnosis Procedure for A/C display unit.	HAC-94, "A/C AUTO AMP. : Diagnosis Procedure"
Air outlet does not change.	Go to Trouble Diagnosis Procedure for Mode Door Motor. (LAN)	HAC-89, "Diagnosis Procedure"
Mode door motor does not operate normally.		
Discharge air temperature does not change.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor. (LAN)	HAC-84, "Diagnosis Procedure" (driver side) or HAC-86, "Diagnosis Procedure" (passenger side)
Air mix door motor does not operate normally.		
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor. (LAN)	HAC-90, "Diagnosis Procedure"
Intake door motor does not operate normally.		
Blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Blower Motor.	HAC-104, "Diagnosis Procedure"

Symptom	Reference	
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	HAC-108, "Diagnosis Procedure"
Insufficient cooling No cool air comes out. (Airflow volume is normal.)	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	HAC-115, "Diagnosis Procedure"
Insufficient heating No warm air comes out. (Airflow volume is normal.)	Go to Trouble Diagnosis Procedure for Insufficient Heating.	HAC-117, "Diagnosis Procedure"
Noise	Go to Trouble Diagnosis Procedure for Noise.	HAC-113, "Symptom Table"
Memory function does not operate.	Go to Trouble Diagnosis Procedure for Memory Function.	HAC-113, "Symptom Table"

NOISE

Symptom Table

INFOID:0000000014392048

Symptom	Noise source	Probable cause	Corrective action
Unusual noise from compressor when A/C is ON.	Inside of compressor	Worn, broken, or clogged internal components.	Check compressor oil. Refer to HA-21, "Inspection".
	Magnet clutch	Contact of clutch disc with pulley.	Check clearance between clutch disc and pulley.
	Compressor body	Loose compressor mounting bolts.	Check torque of mounting bolts. Refer to HA-31, "Exploded View".
Unusual noise from cooler piping.	Cooler piping (pipe and flexible hose)	Improper installation of clip and bracket.	Check installation of cooler piping. Refer to HA-40, "Exploded View".
Unusual noise from expansion valve when A/C is ON.	Expansion valve	Low refrigerant charge.	• Check for leaks. Refer to HA-17, "Leak Test". • Recover refrigerant, evacuate system, and recharge with the specified amount of refrigerant. Refer to HA-19, "Recycle Refrigerant".
		Worn, broken, or clogged internal components.	Eliminate foreign material from expansion valve or replace it.
Unusual noise from belt.	—	Loose belt.	Check belt tension. Refer to EM-197, "Inspection" (CUMMINS 5.0L) or EM-24, "Inspection" (VK56VD).
		Damaged or broken components inside compressor.	Replace compressor. Refer to HA-31, "Removal and Installation".

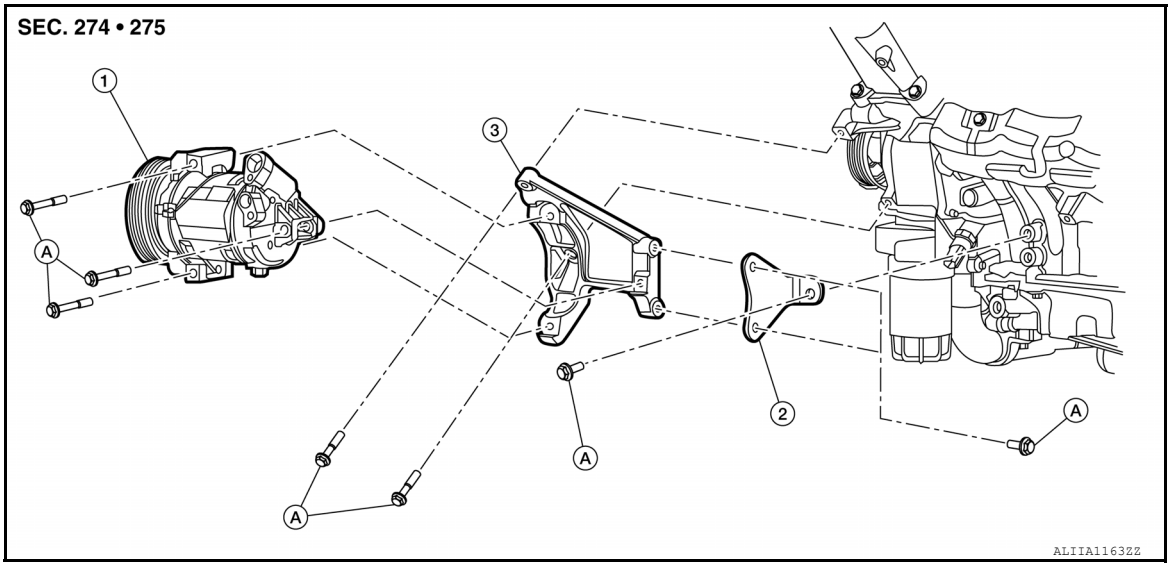
REMOVAL AND INSTALLATION

COMPRESSOR

Exploded View

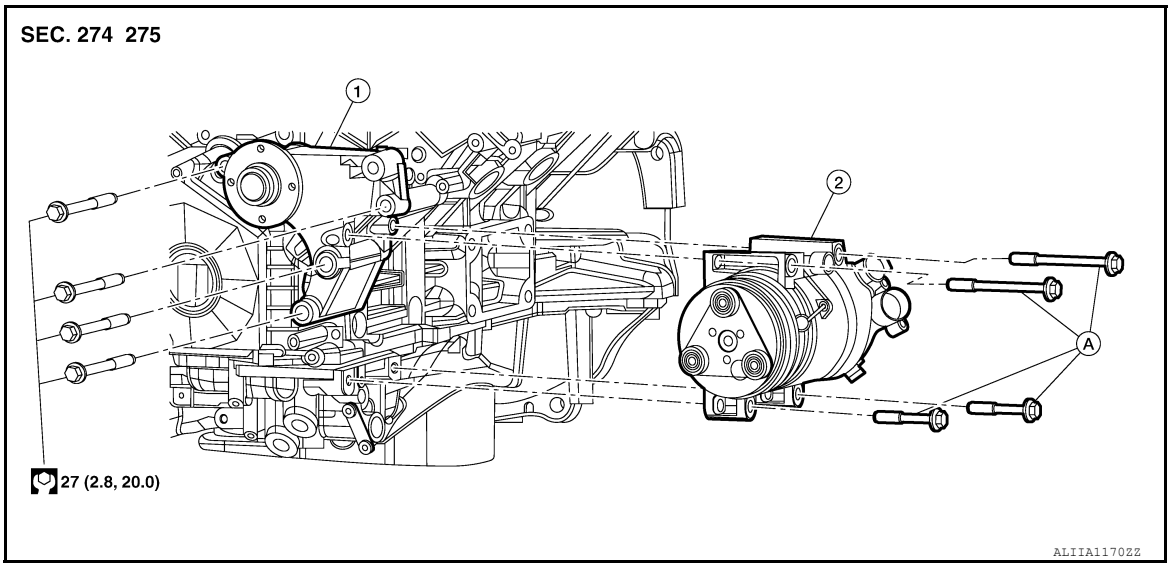
INFOID:0000000014392049

CUMMINS 5.0L



1. Compressor
2. Compressor support
3. Compressor bracket
A. Refer to INSTALLATION

VK56VD



1. Fan bracket
2. Compressor
A. Refer to INSTALLATION

Removal and Installation

INFOID:0000000014392050

REMOVAL

1. Discharge refrigerant. Refer to HA-19, "Recycle Refrigerant".
2. Remove drive belt. Refer to EM-23, "Removal and Installation" (VK56VD) or EM-198, "Removal and Installation - Drive Belt" (CUMMINS 5.0L).
3. Remove wheel and tire. Refer to WT-69, "Removal and Installation".
4. Remove front fender protector. Refer to EXT-41, "Removal and Installation - Front Fender Protector".

5. Disconnect harness connector from compressor.
6. Disconnect high-pressure flexible hose and low-pressure flexible hose from compressor. Refer to HA-40, "Exploded View".
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
7. Remove compressor bolts and compressor.

INSTALLATION

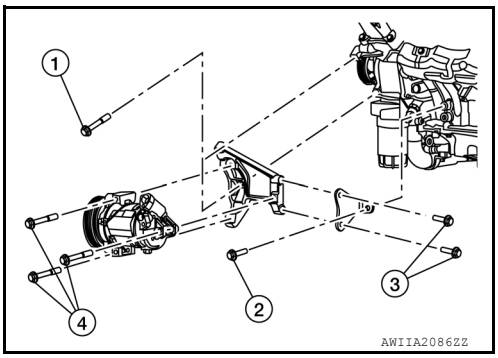
Installation is in the reverse order of removal.

1. For models equipped with CUMMINS 5.0L engine, follow the procedure below for specific tightening sequences and procedures.

a. Finger-tighten the bolts securing the bracket and support.

b. Torque the bolts securing the compressor bracket, compressor support, and compressor to specification in the sequence shown.

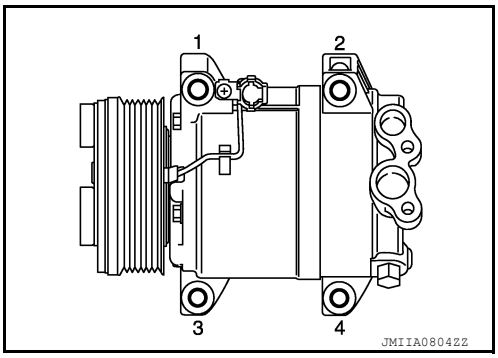
Bolts 1, 3, 4 : 22 N·m (2.2 kg-m, 16 ft-lb)
Bolt 2 : 55 N·m (5.6 kg-m, 41 ft-lb)



CAUTION:
- **Do not reuse the O-rings.**
- **Apply A/C compressor oil to the new O-rings for installation.**
- **After charging the A/C refrigerant, check for leaks. Refer to HA-17, "Leak Test".**

2. For models equipped with VK56VD engine, tighten in to specification in the numerical order as shown.

Bolts 3, 2, 4, 1 : Temporarily-tighten
Bolts 3, 2, 4, 1 : Finger-tighten
Bolts 3, 2, 4, 1 : 61.3 N·m (6.3 kg-m, 45 ft-lb)



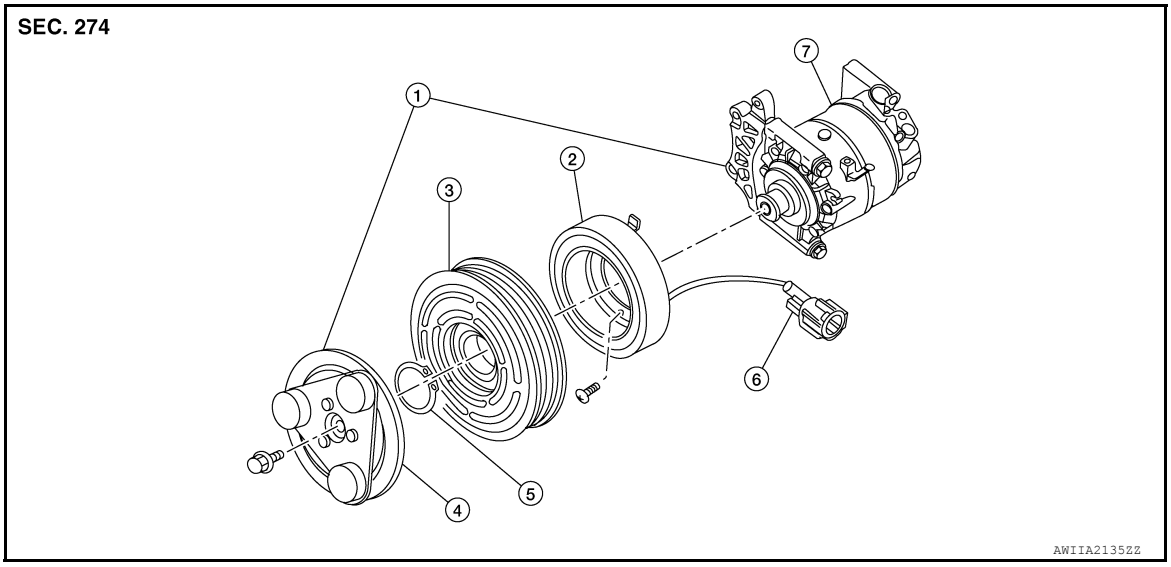
CAUTION:
- **Do not reuse the O-rings.**
- **Apply A/C compressor oil to the new O-rings for installation.**
- **After charging the A/C refrigerant, check for leaks. Refer to HA-17, "Leak Test".**

MAGNET CLUTCH

Exploded View

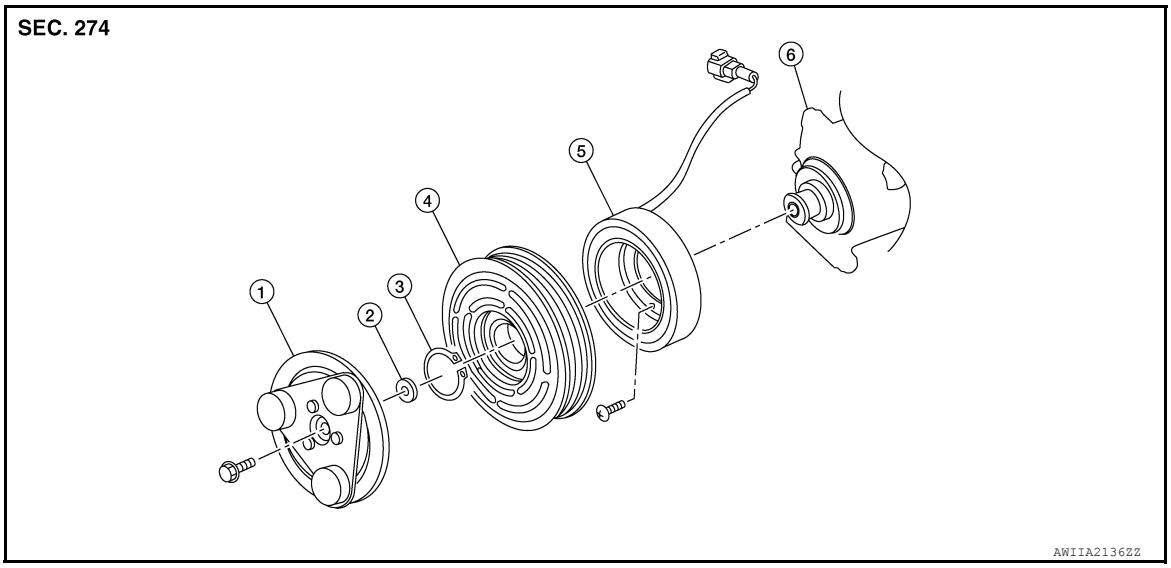
INFOID:0000000014392051

CUMMINS 5.0L



1. Magnet clutch assembly
2. Magnet coil
3. Pulley
4. Clutch disc
5. Snap ring
6. Thermal protector (built in)
7. Compressor

VK56VD



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

Removal and Installation

INFOID:0000000014392052

REMOVAL

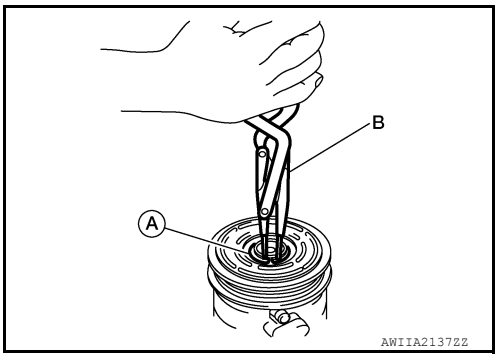
NOTE:

CUMMINS 5.0L shown, VK56VD similar.

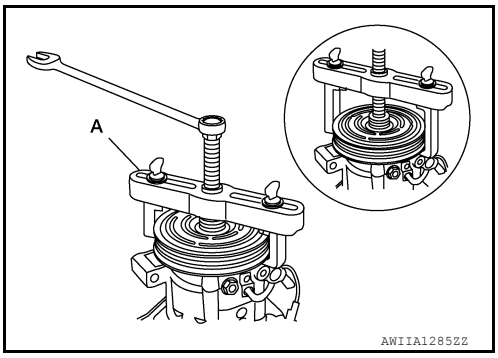
1. Remove compressor. Refer to HA-31, "Removal and Installation".
2. Remove the center bolt by holding the clutch disc steady using a suitable tool.
3. Remove clutch disc and shim.

CAUTION:
Retain the shim for installation.

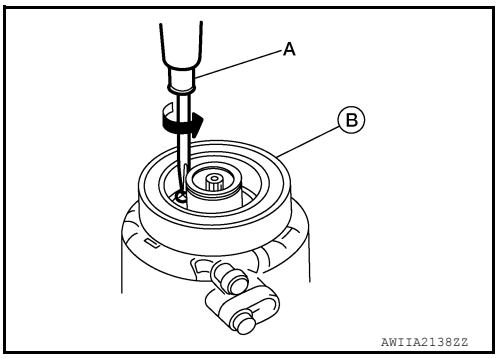
4. Remove the snap ring (A) using a suitable tool (B) as shown.



5. Remove the pulley using a suitable tool (A) as shown.
CAUTION:
To prevent deformation of the pulley groove, the puller claws should be hooked under (not into) the pulley groove.

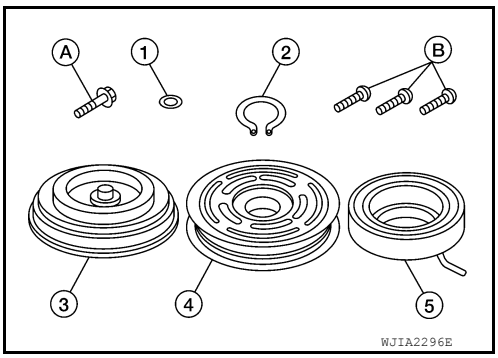


6. Disconnect harness connector from the magnet coil.
7. Remove the three magnet coil screws using a suitable tool (A) as shown, then remove the magnet coil (B).



INSPECTION AFTER REMOVAL

- (1): Shim
- (2): Snap ring
- (3): Clutch disc
- (4): Pulley
- (5): Magnet coil
- (A): Center bolt
- (B): Magnet coil screws



Clutch Disc

If the contact surface shows signs of damage due to excessive heat, replace magnet clutch.

Pulley

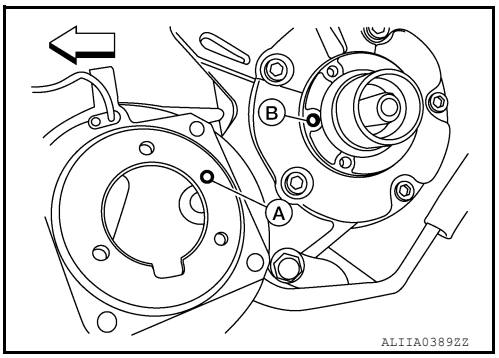
Check the appearance of the pulley. If the contact surface of the pulley shows signs of excessive grooving, replace as necessary. The contact surfaces of the pulley should be cleaned with a suitable solvent before installation.

Magnet Coil

Check the magnet coil for a loose connection or cracked insulation. Replace magnet clutch.

INSTALLATION

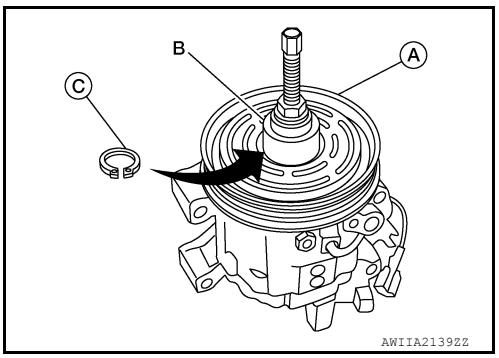
1. Install the magnet coil by aligning the magnet coil pin (A) with the hole (B) in the compressor front head as shown, then install the magnet coil screws.



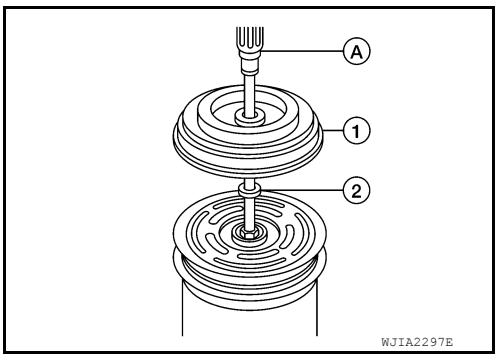
⇦ : Front

CAUTION:
Be sure to align the magnet coil pin with the hole in the compressor front head.

2. Connect the magnet coil harness.
3. Install the pulley (A) using a suitable tool (B) and a wrench as shown, then install the snap ring (C) using a suitable tool.



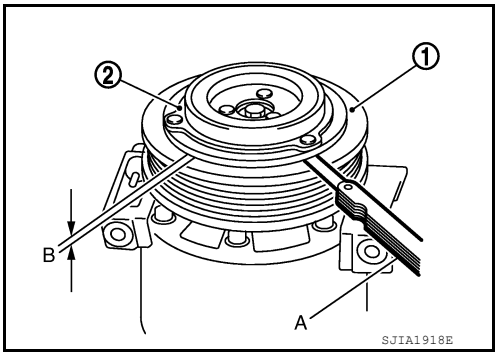
4. Install the clutch disc (1) on the drive shaft, together with the original shim (2) using a suitable tool (A).



5. Install the center bolt using a suitable tool.
6. Install the compressor. Refer to HA-31, "Removal and Installation".

INSPECTION AFTER INSTALLATION

Check the clearance (B) all the way around between the clutch disc (1) and pulley (2) using a suitable tool (A) as shown.



Clutch disc-to-pulley clearance (B) : **HA-51, "Service Data and Specification (SDS)"**

CAUTION:
Replace compressor if specified clearance is not obtained.

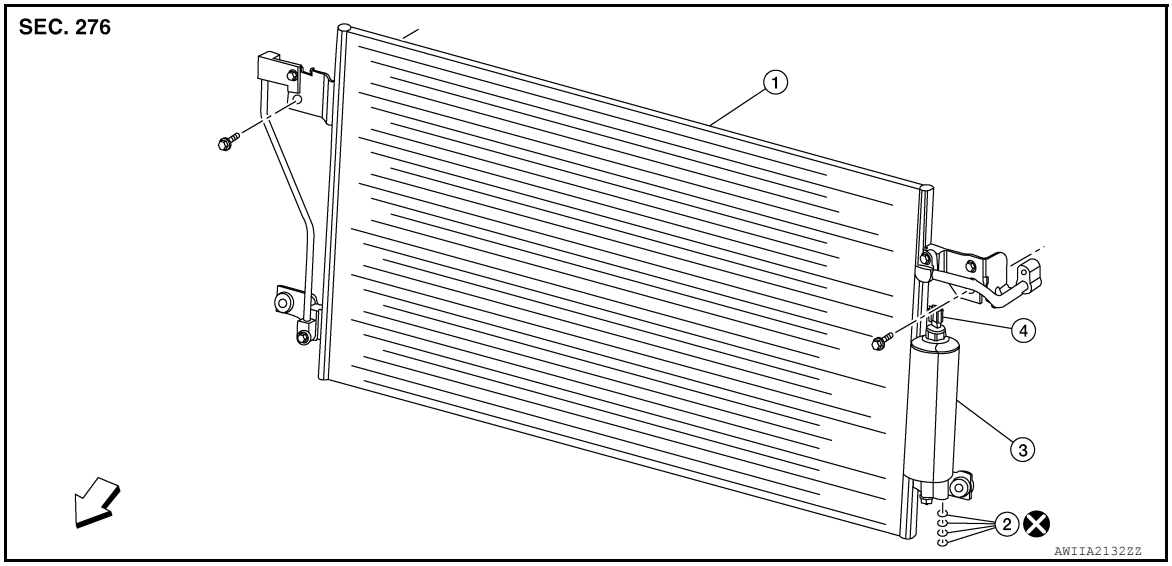
BREAK-IN OPERATION

When replacing compressor clutch, always conduct the break-in operation. This is done by engaging and disengaging the clutch about 30 times. Break-in operation raises the level of transmitted torque.

CONDENSER

Exploded View

INFOID:0000000014392053



1. Condenser
2. O-ring
3. Liquid tank
4. Refrigerant pressure sensor
⇦ Front

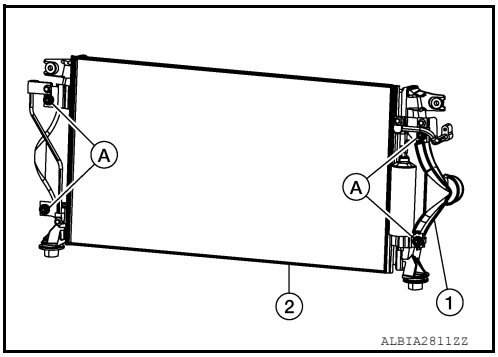
CONDENSER

CONDENSER : Removal and Installation - CUMMINS 5.0L

INFOID:0000000014392054

REMOVAL

1. Remove charge-air cooler. Refer to EM-256, "Removal and Installation".
2. Remove bolts (A) and separate the charge-air cooler (1) from the condenser (2).



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Do not reuse O-rings.**
- **Apply A/C oil to the O-rings of the high-pressure pipe, refrigerant pressure sensor, and high-pressure flexible hose for installation.**
- **After charging refrigerant, check for leaks. Refer to HA-17, "Leak Test".**
- **Replace the grommets as necessary.**

CONDENSER : Removal and Installation - VK56VD

INFOID:0000000014392055

VK56VD (XD Model)

Removal

1. Discharge refrigerant. Refer to HA-19, "Recycle Refrigerant".

2. Remove front under cover. Refer to EXT-37, "FRONT UNDER COVER : Removal and Installation".
3. Disengage reservoir tank hoses from fan shroud (upper) and remove reservoir tank bolts, then place aside reservoir tank. Refer to CO-13, "Exploded View".
4. Partially drain the A/T fluid. Refer to TM-218, "Changing the A/T Fluid (ATF)".
5. Release fluid cooler hose C from fluid cooler tube C, then release fluid cooler hose D from fluid cooler tube D. Refer to TM-499, "Exploded View - Non-XD Models".
6. Disconnect high-pressure flexible hose and high-pressure pipe from condenser.
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
7. Remove radiator bolts. Refer to CO-13, "Exploded View".
8. Disconnect harness connector from refrigerant pressure sensor.
9. Remove bolts connecting the condenser to the radiator, then position the radiator rearward.
10. Remove junction pipe bolt, then remove junction pipe (LH).
    CAUTION:
    - **Make sure J-clip remains on the condenser.**
    - **Junction pipe (LH) is serviced with the condenser, make sure not to damage the junction pipe (LH).**
11. Lift condenser out of grommets and remove condenser.
    CAUTION:
    Be careful not to damage radiator core.

Installation

Installation is in the reverse order of removal.

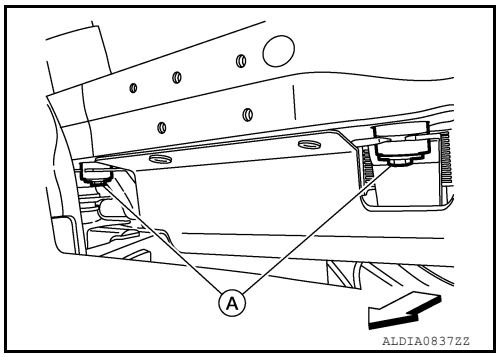
CAUTION:
- **Do not reuse O-rings.**
- **Do not reuse hose clamps.**
- **Apply A/C oil to the O-rings of the high-pressure pipe, refrigerant pressure sensor, and high-pressure flexible hose for installation.**
- **After charging refrigerant, check for leaks. Refer to HA-17, "Leak Test".**
- **Replace the grommets as necessary.**

VK56VD (Non-XD Model)

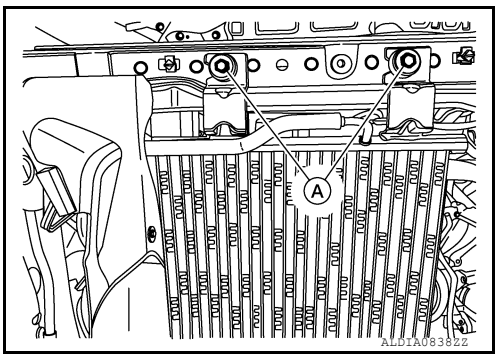
Removal

1. Discharge refrigerant. Refer to HA-19, "Recycle Refrigerant".
2. Remove front under cover. Refer to EXT-37, "FRONT UNDER COVER : Removal and Installation".
3. Remove active grille shutter. Refer to EXT-34, "Removal and Installation".
4. Remove radiator core support cover. Refer to DLK-150, "Exploded View - XD Models".
5. Remove A/T fluid cooler hose C and D from A/T fluid cooler. Refer to TM-499, "Exploded View - Non-XD Models".
   NOTE:
   Cap or plug openings to prevent fluid from spilling.
6. Remove bolts (A) fastening bottom of A/T fluid cooler to radiator core support bracket.

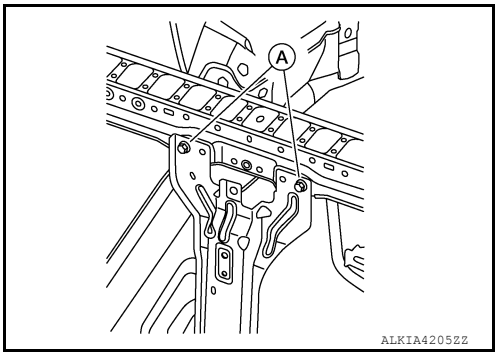
⇦ : Front



7. Remove bolts (A) fastening Top of A/T fluid cooler to radiator core support.



8. Remove A/T fluid cooler from vehicle.
   CAUTION:
   Be careful not to damage A/T fluid cooler core.
9. Disconnect harness connectors from horn (HIGH) and harness connectors from horn (LOW).
10. Disconnect harness connector from hood lock.
11. Release remaining hood lock release cable clip from radiator core support.
12. Remove hood lock support stay bolts (A), then remove hood lock support stay.



13. Remove upper radiator bolts. Refer to CO-13, "Exploded View".
14. Release air guide (LH/RH) upper clips from radiator core support.
15. Disconnect harness connector from refrigerant pressure sensor.
16. Remove radiator core support bolts, then remove radiator core support. Refer to DLK-150, "Exploded View - XD Models".
17. Remove junction pipe bolts, then remove junction pipes (LH/RH).
    CAUTION:
    - **Make sure J-clips remain on the condenser.**
    - **Junction pipes (LH/RH) are serviced with the condenser, make sure not to damage the junction pipes (LH/RH).**
18. Lift condenser out of grommets and remove condenser.
    CAUTION:
    Be careful not to damage radiator core.

Installation

Installation is in the reverse order of removal.

CAUTION:

- **Do not reuse O-rings.**
- **Do not reuse hose clamps.**
- **Apply A/C oil to the O-rings of the high-pressure pipe, refrigerant pressure sensor, and high-pressure flexible hose for installation.**
- **After charging refrigerant, check for leaks. Refer to HA-17, "Leak Test".**
- **After installation, inspect A/T fluid level. Refer to TM-247, "Inspection and Adjustment".**
- **Replace the grommets as necessary.**

LIQUID TANK

LIQUID TANK : Removal and Installation

INFOID:0000000014392056

REMOVAL

1. Discharge refrigerant. Refer to HA-19, "Recycle Refrigerant".
2. Remove front grille. Refer to EXT-32, "Removal and Installation".
3. Disconnect harness connector from refrigerant pressure sensor.
4. Remove bolt from liquid tank at the condenser block.
5. Remove liquid tank.

INSTALLATION

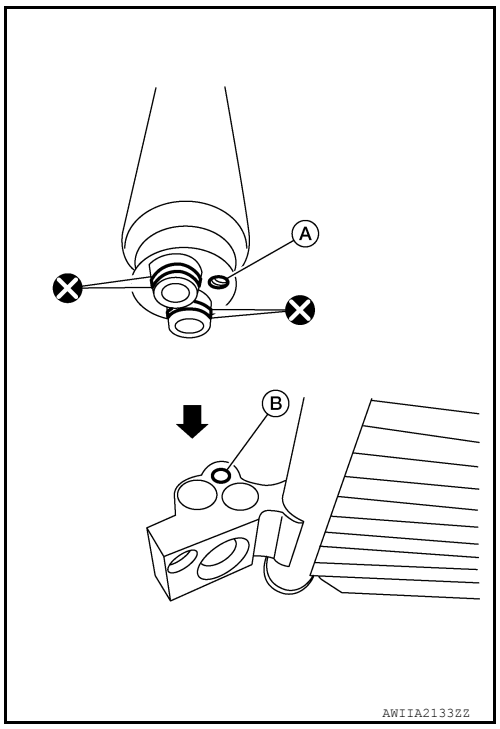
Installation is in the reverse order of removal.

NOTE:

Be careful to align the threaded liquid tank bolt hole (A) with condenser block hole (B).

CAUTION:

- **Make sure liquid tank bolt is securely installed at condenser block hole (B).**
- **Do not reuse O-rings.**
- **Apply A/C oil to new O-rings for A/C piping and liquid tank for installation.**
- **When recharging refrigerant, check for leaks. Refer to HA-17, "Leak Test".**



REFRIGERANT PRESSURE SENSOR

REFRIGERANT PRESSURE SENSOR : Removal and Installation

INFOID:0000000014392057

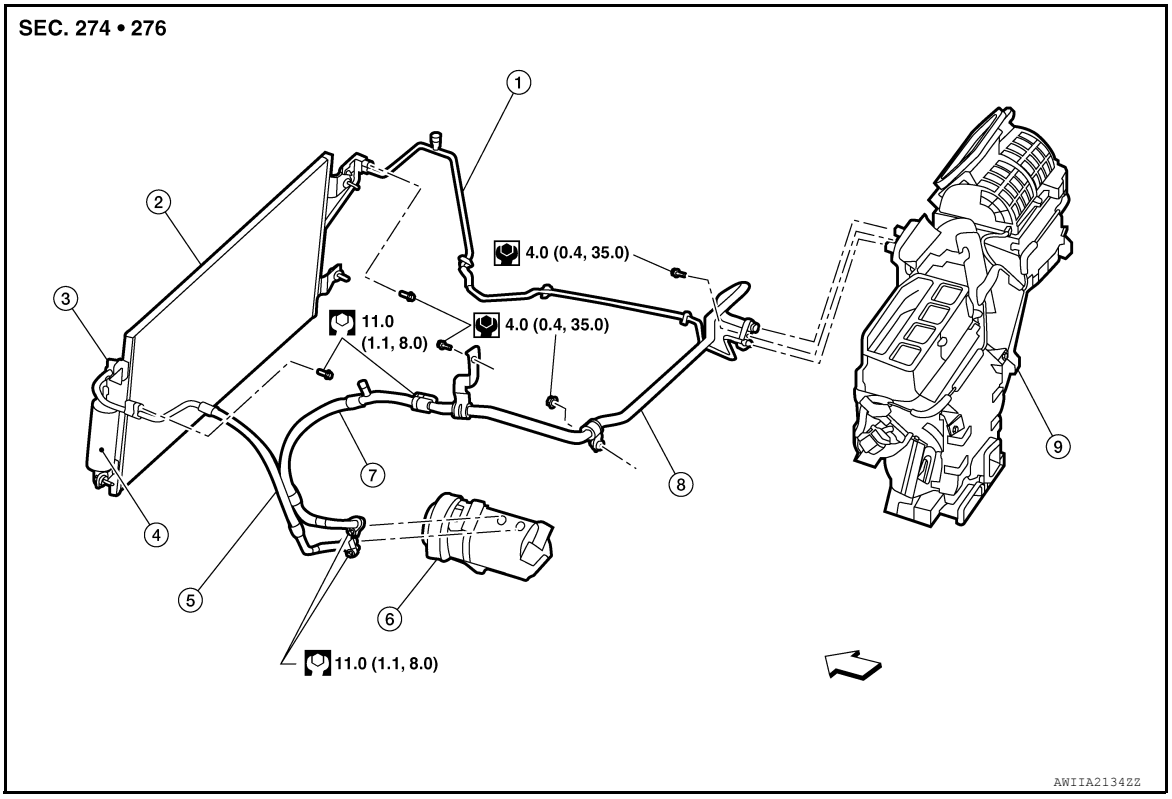
For removal and installation of the refrigerant pressure sensor, refer to HAC-127, "Removal and Installation".

COOLER PIPE AND HOSE

Exploded View

INFOID:0000000014392058

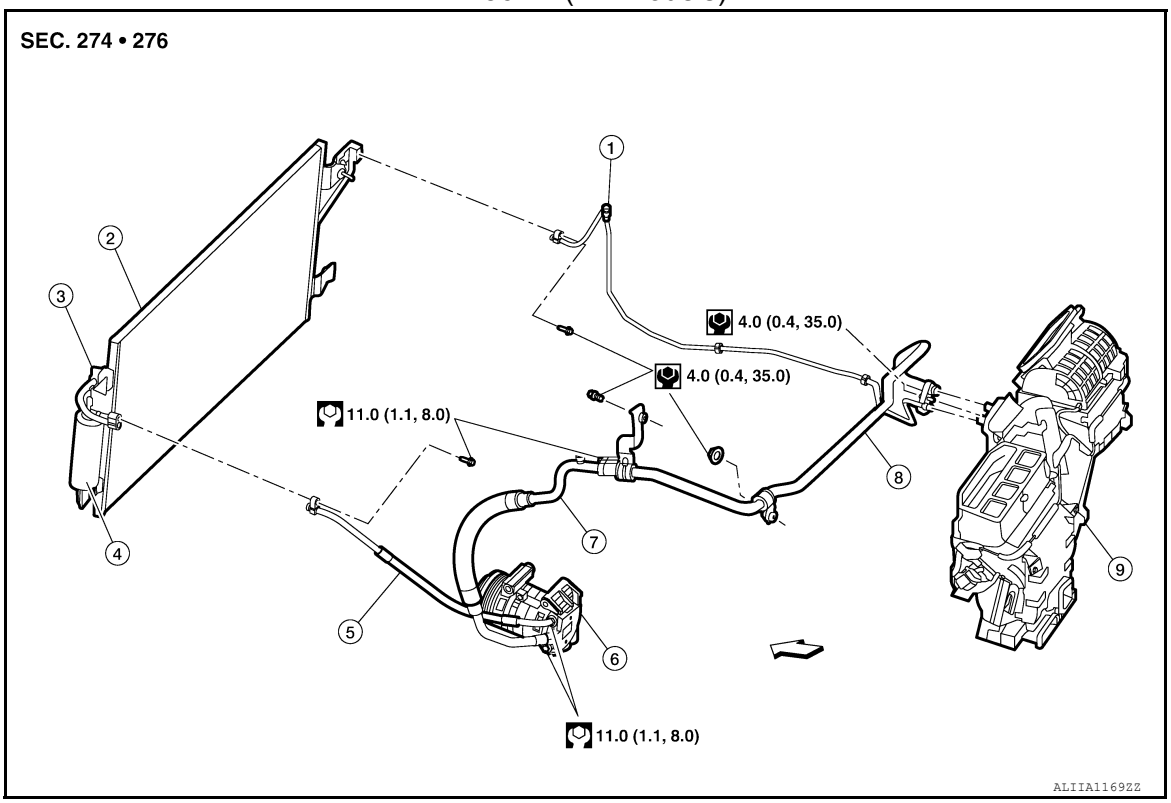
CUMMINS 5.0L



1. High-pressure pipe
2. Condenser
3. Refrigerant pressure sensor
4. Liquid tank
5. High-pressure flexible hose
6. Compressor
7. Low-pressure flexible hose
8. Low-pressure piping
9. Heating and cooling unit assembly

⇦ Front

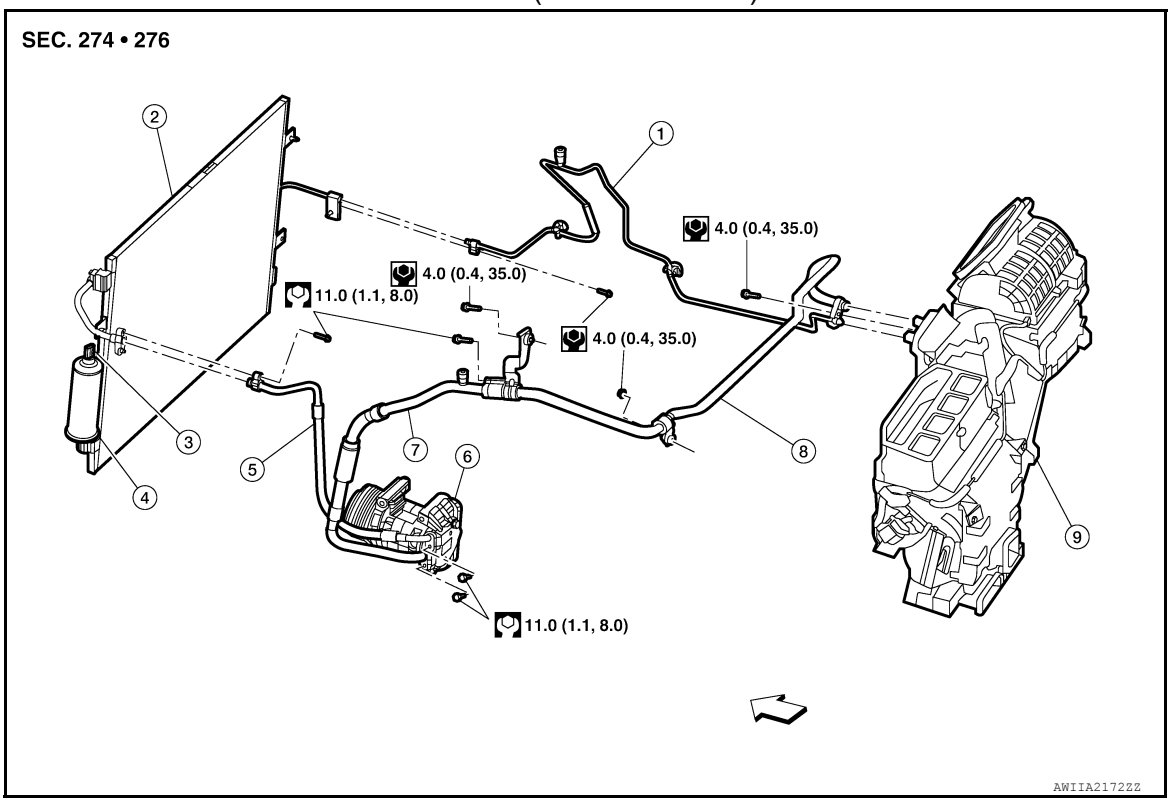
VK56VD (XD Models)



1. High-pressure pipe
2. Condenser
3. Refrigerant pressure sensor
4. Liquid tank
5. High-pressure flexible hose
6. Compressor
7. Low-pressure flexible hose
8. Low-pressure piping
9. Heating and cooling unit assembly

⇦ Front

VK56VD (Non-XD Models)



1. High-pressure pipe
2. Condenser
3. Refrigerant pressure sensor
4. Liquid tank
5. High-pressure flexible hose
6. Compressor
7. Low-pressure flexible hose
8. Low-pressure piping
9. Heating and cooling unit assembly

⇦ Front

LOW-PRESSURE FLEXIBLE HOSE

LOW-PRESSURE FLEXIBLE HOSE : Removal and Installation - CUMMINS 5.0L

INFOID:0000000014392059

REMOVAL

1. Remove wheel and tire using power tools. Refer to WT-69, "Removal and Installation".
2. Remove fender protector. Refer to EXT-41, "Removal and Installation - Front Fender Protector".
3. Discharge refrigerant. Refer to HA-19, "Recycle Refrigerant".
4. Remove bolt and disconnect low-pressure flexible hose from low-pressure pipe.
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
5. Remove bolt and disconnect low-pressure flexible hose from compressor.
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Do not reuse O-rings.**
- **Apply A/C oil to the O-ring of the low-pressure flexible hose for installation.**
- **After charging refrigerant, check for leaks. Refer to HA-17, "Leak Test".**

LOW-PRESSURE FLEXIBLE HOSE : Removal and Installation - VK56VD

INFOID:0000000014392060

REMOVAL

1. Remove wheel and tire using power tools. Refer to WT-69, "Removal and Installation".
2. Remove fender protector. Refer to EXT-41, "Removal and Installation - Front Fender Protector".
3. Remove air cleaner. Refer to EM-31, "Removal and Installation".
4. Discharge refrigerant. Refer to HA-19, "Recycle Refrigerant".
5. Remove bolt and disconnect low-pressure flexible hose from low-pressure pipe.
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
6. Remove bolt and disconnect low-pressure flexible hose from compressor.
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Do not reuse O-rings.**
- **Apply A/C oil to the O-ring of the low-pressure flexible hose for installation.**
- **After charging refrigerant, check for leaks. Refer to HA-17, "Leak Test".**

LOW-PRESSURE PIPE

LOW-PRESSURE PIPE : Removal and Installation - CUMMINS 5.0L

INFOID:0000000014392061

REMOVAL

1. Remove wheel and tire using power tools. Refer toWT-69, "Removal and Installation".
2. Remove mudguard. Refer to EXT-45, "Removal and Installation".
3. Remove fender protector. Refer to EXT-41, "Removal and Installation - Front Fender Protector".

4. Discharge refrigerant. Refer to HA-19, "Recycle Refrigerant".
5. Remove air duct. Refer to EM-220, "Exploded View".
6. Remove bolt from cowl top extension, then remove bolt from dash panel.
7. Remove bolt and disconnect low-pressure pipe from expansion valve.
   CAUTION:
   Cap or wrap the joint of the low-pressure pipe with suitable material such as vinyl tape to avoid the entry of air.
8. Remove bolt and disconnect low-pressure pipe from low-pressure flexible hose.
   CAUTION:
   Cap or wrap the joint of the low-pressure pipe with suitable material such as vinyl tape to avoid the entry of air.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:
- **Do not reuse O-rings.**
- **Apply A/C oil to the O-ring of the low-pressure pipe for installation.**
- **After charging refrigerant, check for leaks. Refer to HA-17, "Leak Test"**

LOW-PRESSURE PIPE : Removal and Installation - VK56VD

INFOID:0000000014392062

REMOVAL

1. Discharge refrigerant. Refer to HA-19, "Recycle Refrigerant".
2. Remove air cleaner. Refer to EM-31, "Removal and Installation".
3. Remove bolt from cowl top extension and remove bolt from dash panel.
4. Remove bolt and disconnect low-pressure pipe from expansion valve.
   CAUTION:
   Cap or wrap the joint of the low-pressure pipe with suitable material such as vinyl tape to avoid the entry of air.
5. Remove bolt and disconnect low-pressure pipe from low-pressure flexible hose.
   CAUTION:
   Cap or wrap the joint of the low-pressure pipe with suitable material such as vinyl tape to avoid the entry of air.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:
- **Do not reuse O-rings.**
- **Apply A/C oil to the O-ring of the low-pressure pipe for installation.**
- **After charging refrigerant, check for leaks. Refer to HA-17, "Leak Test"**

HIGH-PRESSURE FLEXIBLE HOSE

HIGH-PRESSURE FLEXIBLE HOSE : Removal and Installation

INFOID:0000000014392063

REMOVAL

1. Remove wheel and tire using power tools. Refer to WT-69, "Removal and Installation".
2. Remove fender protector. Refer to EXT-41, "Removal and Installation - Front Fender Protector".
3. Remove air cleaner (VK56VD only). Refer to EM-31, "Removal and Installation".
4. Discharge the refrigerant. Refer to HA-19, "Recycle Refrigerant".
5. Remove bolt and disconnect high-pressure flexible hose from condenser.
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
6. Remove bolt and disconnect high-pressure flexible hose from compressor.
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:
- **Do not reuse O-rings.**
- **Apply A/C oil to the O-ring of the high-pressure flexible hose for installation.**
- **After charging refrigerant, check for leaks. Refer to HA-17, "Leak Test".**

HIGH-PRESSURE PIPE

HIGH-PRESSURE PIPE : Removal and Installation - CUMMINS 5.0L

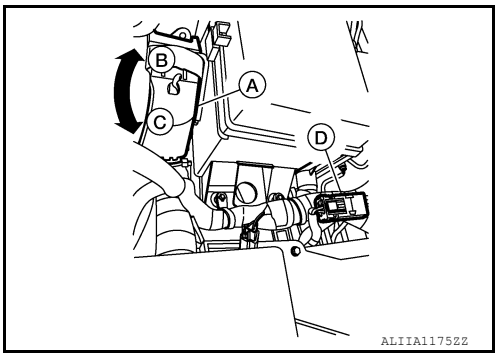
INFOID:0000000014392064

REMOVAL

CAUTION:
Before servicing, turn the ignition switch off, disconnect both battery terminals and wait at least three minutes.

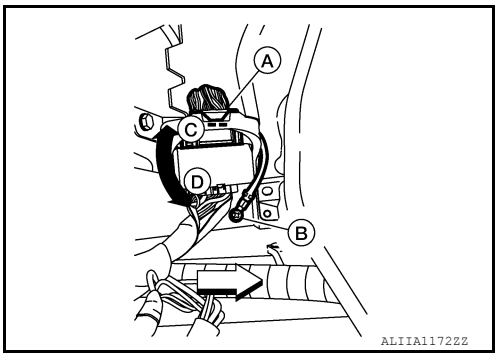
1. Disconnect battery or batteries. Refer to PG-185, "Battery Disconnect".
2. Remove battery terminal with fusible link. Refer to WT-69, "Removal and Installation".
3. Remove wheel and tire using power tools. Refer to WT-69, "Removal and Installation".
4. Remove fender protector (LH). Refer to EXT-41, "Removal and Installation - Front Fender Protector".
5. Release clips and remove radiator core support cover. Refer to DLK-150, "Exploded View - XD Models".
6. Discharge refrigerant. Refer to HA-19, "Recycle Refrigerant".
7. Disconnect harness connector (A) from ECM and inline harness connector (D).
   CAUTION:
   Always confirm the lever is fully released (loosened) before attempting to disconnect or connect the connector to avoid damage to the connector housing or terminals.

   (B) : Fasten
   (C) : Loosen



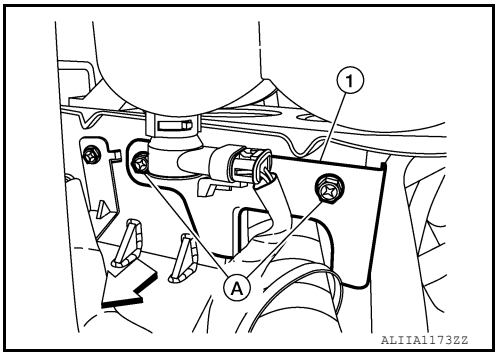
8. Disconnect the inline harness connector (A), then remove ground bolt (B) and position harness aside.
   CAUTION:
   Always confirm the lever is fully released (loosened) before attempting to disconnect or connect the connector to avoid damage to the connector housing or terminals.

   ⇦ : Front
   (C) : Fasten
   (D) : Loosen



9. Remove air outlet hose. Refer to HA-40, "Exploded View".
10. Remove bolts (A) on heater hose bracket (1) and position aside.

    ⇦ : Front



11. Remove bolt and disconnect high-pressure pipe from expansion valve.
    CAUTION:
    Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.

12. Remove bolt and disconnect high-pressure pipe from condenser.
CAUTION:
Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:
- **Do not reuse O-rings.**
- **Apply A/C oil to the O-ring of the high-pressure pipe for installation.**
- **After charging refrigerant, check for leaks. Refer to HA-17, "Leak Test".**

HIGH-PRESSURE PIPE : Removal and Installation - VK56VD

INFOID:0000000014392065

XD Models

Removal

CAUTION:
Before servicing, turn the ignition switch off, disconnect both battery terminals and wait at least three minutes.

1. Release clips and remove radiator core support cover. Refer to DLK-150, "Exploded View - XD Models".
2. Discharge refrigerant. Refer to HA-19, "Recycle Refrigerant".
3. Remove bolt and disconnect high-pressure pipe from expansion valve.
CAUTION:
Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
4. Remove bolt and disconnect high-pressure pipe from condenser.
CAUTION:
Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
5. Release high-pressure pipe from clips and remove high-pressure pipe.

Installation

CAUTION:
- **Do not reuse O-rings.**
- **Apply A/C oil to the O-ring of the high-pressure pipe for installation.**
- **After charging refrigerant, check for leaks. Refer to HA-17, "Leak Test".**

Non-XD Models

Removal

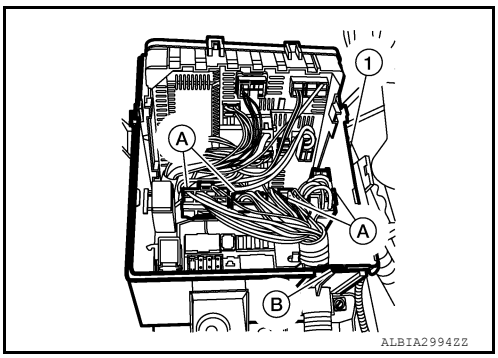
WARNING:
- **Do not remove radiator cap and reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from radiator.**
- **Wrap a thick cloth around the caps. Slowly turn them a quarter of a turn to release built-up pressure. Carefully remove the caps by turning it all the way.**

CAUTION:
Before servicing, turn the ignition switch off, disconnect both battery terminals and wait at least three minutes.

NOTE:
When removing components such as hoses, tube/lines, etc., cap or plug openings to prevent fluid from spilling.

1. Remove fusible link cover and remove battery positive cables. Refer to PG-193, "Removal and Installation".
2. Remove front under cover. Refer to EXT-37, "FRONT UNDER COVER : Removal and Installation".
3. Remove wheel and tire (RH) using power tool. Refer to WT-69, "Removal and Installation".
4. Remove front fender protector (RH). Refer to EXT-41, "Removal and Installation - Front Fender Protector".
5. Remove bolt then reposition battery ground harness.
6. Release relay box from mount and set aside.
7. Disconnect the harness connectors from ECM.

8. Remove cover (B) from IPDM E/R (1).
9. Disconnect harness connectors (A) from IPDM E/R and remove engine harness (RH) from IPDM E/R.



10. Partially drain engine coolant from the radiator. Refer to CO-11, "Changing Engine Coolant"
    CAUTION:
    - **Perform when engine is cold.**
    - **Do not spill coolant on the drive belt.**
11. Disconnect radiator overflow hose from reservoir tank. Refer to CO-13, "Exploded View".
12. Disconnect reservoir tank hose from multi control valve. Refer to CO-13, "Exploded View".
13. Remove reservoir tank bolts then reposition reservoir tank.
14. Remove bolt and disconnect high-pressure pipe from expansion valve.
    CAUTION:
    Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
15. Remove bolt and disconnect high-pressure pipe from condenser.
    CAUTION:
    Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
16. Release high-pressure pipe from clips and remove high-pressure pipe.

Installation

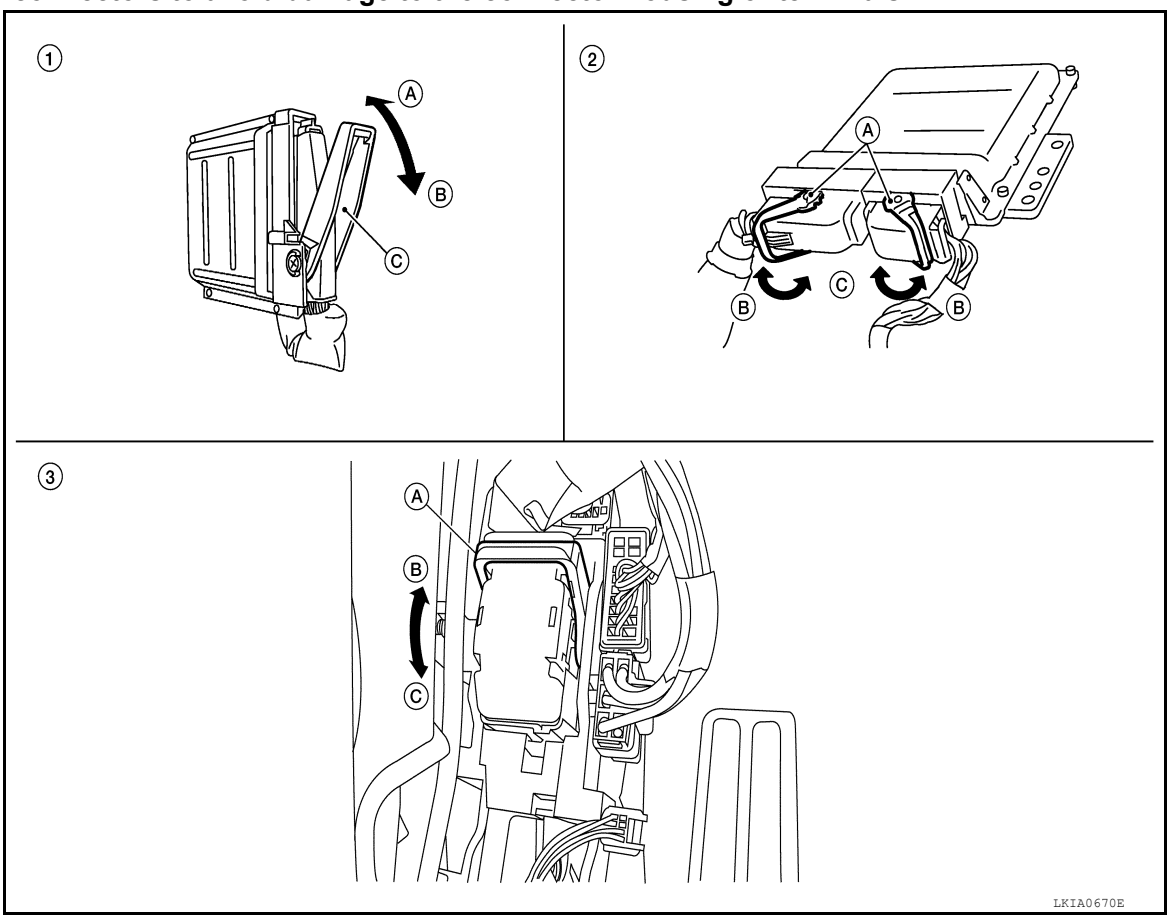
Installation is in the reverse order of removal.

- After installation, refill engine coolant and check for leaks. Refer to CO-11, "Changing Engine Coolant" and CO-9, "System Inspection".

CAUTION:
Do not spill coolant in engine compartment. Use shop cloth to absorb coolant.

CAUTION:
- **Do not reuse O-rings.**

- **Always confirm the lever is fully released (loosened) before attempting to disconnect or connect these connectors to avoid damage to the connector housing or terminals.**



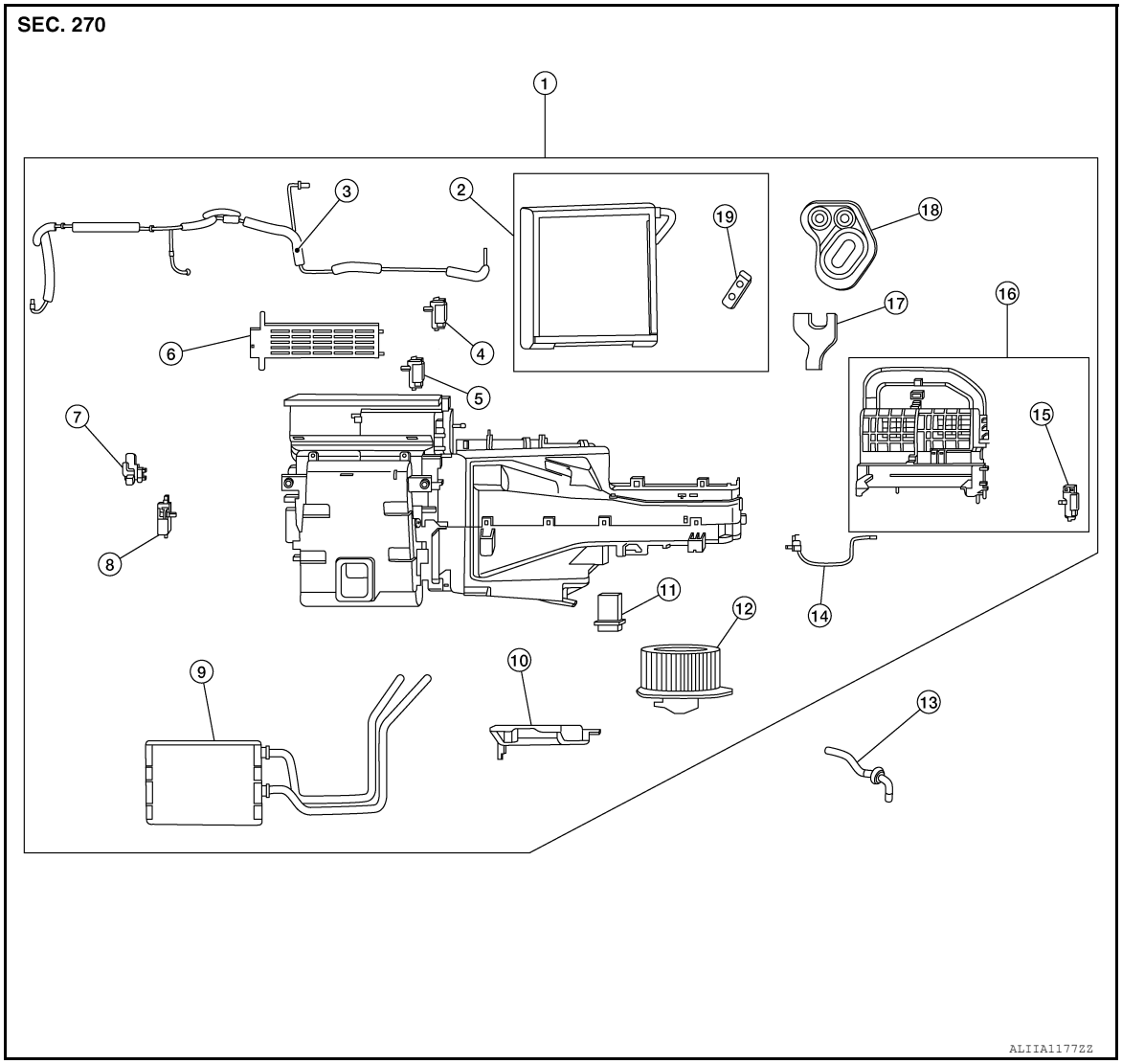
1. Control unit with single lever
   A. Fasten
   B. Loosen
   C. Lever
2. Control unit with dual lever
   A. Lever
   B. Fasten
   C. Loosen
3. SMJ connector
   A. Lever
   B. Fasten
   C. Loosen

- **Apply A/C oil to the O-ring of the high-pressure pipe for installation.**
- **After charging refrigerant, check for leaks. Refer to HA-17, "Leak Test".**

HEATING AND COOLING UNIT ASSEMBLY

Exploded View

INFOID:0000000014392066

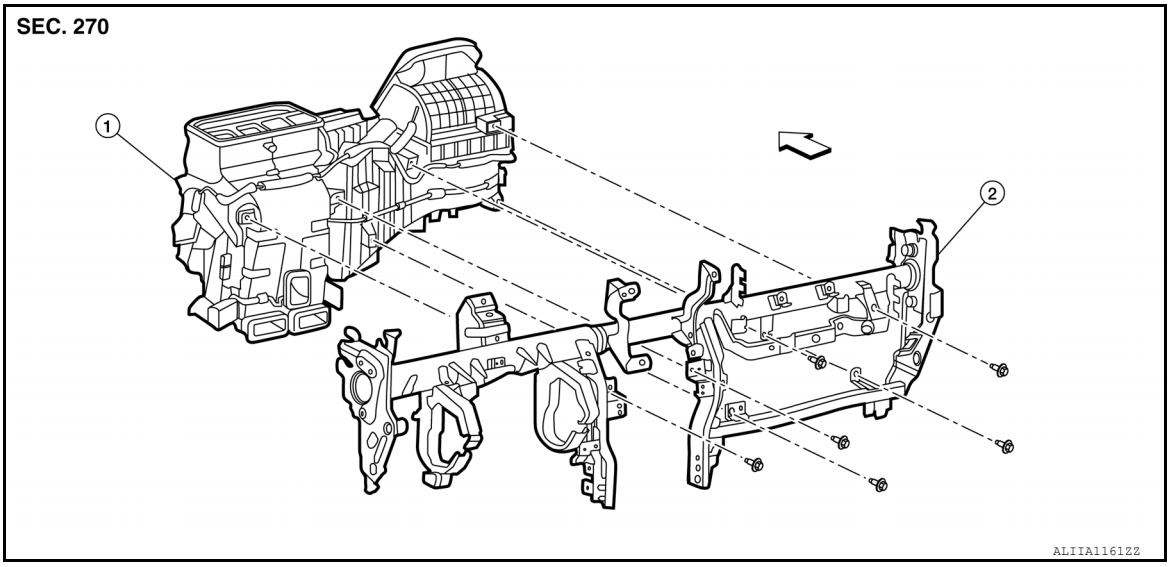


1. Heating and cooling unit assembly
2. Evaporator
3. Heating and cooling unit assembly harness
4. Mode door motor
5. Air mix door motor [(RH) automatic)]
6. PTC heater (for CUMMINS 5.0L)
7. Aspirator
8. Air mix door motor LH (if equipped)
9. Heater core
10. Heater core cover
11. Variable blower control
12. Blower motor
13. Drain hose
14. Blower motor harness
15. Intake door motor
16. Blower unit
17. Heater core bracket
18. Grommet
19. Expansion valve

HEATING AND COOLING UNIT ASSEMBLY

HEATING AND COOLING UNIT ASSEMBLY : Removal and Installation

INFOID:0000000014392067



1. Heating and cooling unit assembly
2. Steering member
⇦ Front

REMOVAL

1. Discharge refrigerant. Refer to HA-19, "Recycle Refrigerant".
2. Drain cooling system. Refer to CO-11, "Changing Engine Coolant".
3. Remove front seats. Refer to SE-100, "Removal and Installation - Captain Seats" and SE-101, "Removal and Installation - Center Seat".
4. Remove instrument panel assembly. Refer to IP-22, "Removal and Installation".
5. Partially pull back floor trim to disconnect harness connector retainer clips from floor.
6. Disconnect low-pressure pipe from expansion valve.
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
7. Disconnect high-pressure pipe from expansion valve.
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
8. Disconnect heater hoses from heater core pipes.
9. Remove instrument stay.
10. Remove steering member bolts.
11. Disconnect harness connectors from heating and cooling unit assembly and steering member.
12. Remove heating and cooling unit assembly and steering member as one assembly from vehicle.
13. Separate heating and cooling unit assembly from steering member.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Do not reuse O-rings.**
- **Apply A/C oil to the O-ring of the high/low-pressure pipe for installation.**
- **After charging refrigerant, check for leaks. Refer to HA-17, "Leak Test".**

HEATER CORE

HEATER CORE : Removal and Installation

INFOID:0000000014392068

1. Remove heating and cooling unit assembly. Refer to HA-49, "HEATING AND COOLING UNIT ASSEMBLY : Removal and Installation".
2. Remove heater core.

INSTALLATION
Installation is in the reverse order of removal.

EVAPORATOR

EVAPORATOR : Removal and Installation

INFOID:0000000014392069

REMOVAL

1. Remove heating and cooling unit assembly. Refer to HA-49, "HEATING AND COOLING UNIT ASSEMBLY : Removal and Installation".
2. Remove heater core cover. Refer to HA-48, "Exploded View".
3. Disconnect harness connector from intake sensor.
4. Remove evaporator and expansion valve assembly.

INSTALLATION
Installation is in the reverse order of removal.
NOTE:
The evaporator can only be ordered as an assembly with the expansion valve.

EXPANSION VALVE

EXPANSION VALVE : Removal and Installation

INFOID:0000000014392070

REMOVAL

1. Discharge refrigerant. Refer to HA-19, "Recycle Refrigerant".
2. Disconnect high-pressure pipe from expansion valve. Refer to HA-40, "Exploded View".
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
3. Disconnect low-pressure pipe from expansion valve. Refer to HA-40, "Exploded View".
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
4. Remove screws, then remove expansion valve.

INSTALLATION
Installation is in the reverse order of removal.
CAUTION:
- **Do not reuse O-rings.**
- **Apply A/C oil to O-ring of the low-pressure pipe for installation.**
- **Apply A/C oil to O-ring of the high-pressure pipe for installation.**
- **After charging refrigerant, check for leaks. Refer to HA-17, "Leak Test".**

PTC HEATER

PTC HEATER : Removal and Installation

INFOID:0000000014392071

REMOVAL

1. Remove instrument stay cover (LH). Refer to IP-23, "Exploded View".
2. Disconnect harness connector from PTC heater.
3. Remove two screws from PTC heater then remove PTC heater.

INSTALLATION
Installation is in the reverse order of removal.

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Service Data and Specification (SDS)

INFOID:0000000014392072

COMPRESSOR

Make		Valeo
Model		DKS-17DT
Type		Fixed displacement swash plate
Displacement		175 cm^3 (10.7 in^3) / revolution
Cylinder bore × stroke		30.5 x 24.0 mm (1.20 x 0.94 in)
Direction of rotation		Clockwise (viewed from clutch)
Drive belt	CUMMINS 5.0L	Poly V 6 grooves
	VK56VD	Poly V 7 grooves
Disc to pulley clearance	Standard	0.3 – 0.6 mm (0.012 – 0.024 in)

OIL

Name	A/C System Oil Type S (DH-PS)
Capacity	150 mℓ (5.1 US fl oz, 5.3 Imp fl oz)

REFRIGERANT

Type		HFC 134a (R-134a)
Capacity	XD Models	0.80 ± 0.05 kg (1.76 ± 0.11 lb)
	Non-XD Models	0.75 ± 0.05 kg (1.60 ± 0.11 lb)