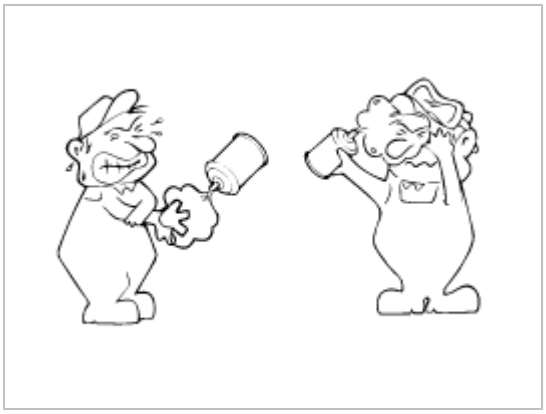
Instructions

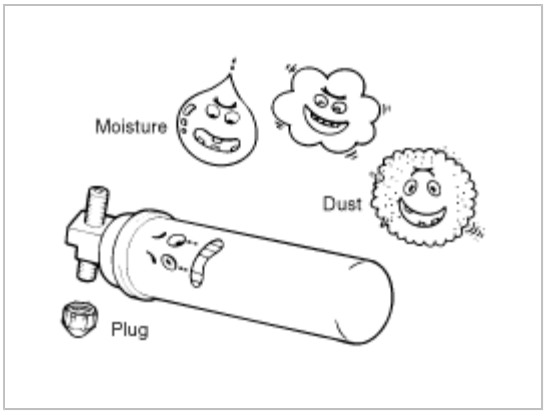
When Handling Refrigerant

1. R-134a liquid refrigerant is highly volatile. A drop on the skin of your hand could result in localized frostbite. When handling the refrigerant, be sure to wear gloves.
2. It is standard practice to wear goggles or glasses to protect your eyes, and gloves to protect your hands. If the refrigerant splashes into your eyes, wash them with clean water immediately.
3. The R-134a container is highly pressurized. Never leave it in a hot place, and check storage temperature is below 52°C (126°F)
4. An electronic leak detector should be used to check the system for refrigerant leakage. Bear in mind that the R-134a, upon coming into contact with flame, produces phosgene, a highly toxic gas.
5. Use only recommended lubricant for R-134a systems. If lubricants other than the recommended one used, system failure may occur.
6. PAG lubricant absorbs moisture from the atmosphere at a rapid rate, therefore the following precautions must be observed:
   A. When removing refrigerant components from a vehicle, cap the components immediately to prevent entry of moisture.
   B. When installing refrigerant components to a vehicle, do not remove the cap until just before connecting the components.
   C. Complete the connection of all refrigerant tubes and hoses without delay to prevent the A/C system from taking on moisture.
   D. Use the recommended lubricant from a sealed container only.
7. If an accidental discharge in the system occurs, ventilate the work area before resum of service.



When replacing parts ON A/C system

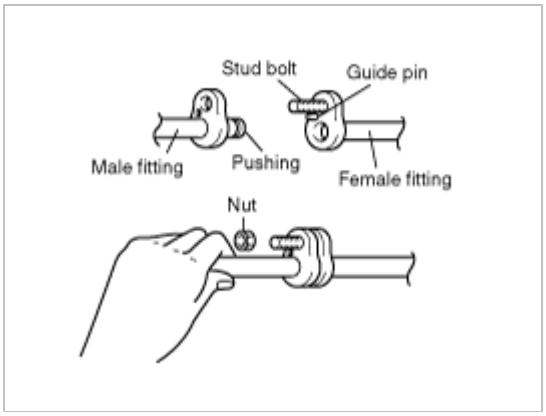
1. Never open or loosen a connection before discharging the system.
2. Seal the open fittings of components with a cap or plug immediately to prevent intrusion of moisture or dust.
3. Do not remove the sealing caps from a Replacement component until it is ready to be installed.
4. Before connecting an open fitting, always install a new sealing ring. Coat the fitting and seal with refrigerant oil before making the connection.



When Installing Connecting Parts

Flange with guide pin

Check the new O-ring for damage (use only the specified) and lubricate by using compressor oil. Tighten the nut to specified torque.



Size	Tightening torque [N.m (kg.m, lbf.ft)]	
	General bolt, nut	
	4T	7T
M6	5 - 6 (0.5 - 0.6, 3.6 - 4.3)	9 - 11 (0.9 - 1.1, 6.5 - 7.9)
M8	12 - 14 (1.2 - 1.4, 8.7 - 10)	20 - 26 (2.0 - 2.6, 14 - 18)
M10	25 - 28 (2.5 - 2.8, 18 - 20)	45 - 55 (4.5 - 5.5, 32 - 39)
Size	Flange bolt, nut	
	4T	7T
M6	5 - 7 (0.5 - 0.7, 3.6 - 5.0)	8 - 12 (0.8 - 1.2, 5.8 - 8.6)
M8	10 - 15 (1.0 - 1.5, 7 - 10)	19 - 28 (1.9 - 2.8, 14 - 20)
M10	21 - 31 (2.1 - 3.1, 15 - 22)	39 - 60 (3.9 - 6.0, 28 - 43)

NOTE

- T means tensile intensity, which is stamped on the head of bolt only numeral.

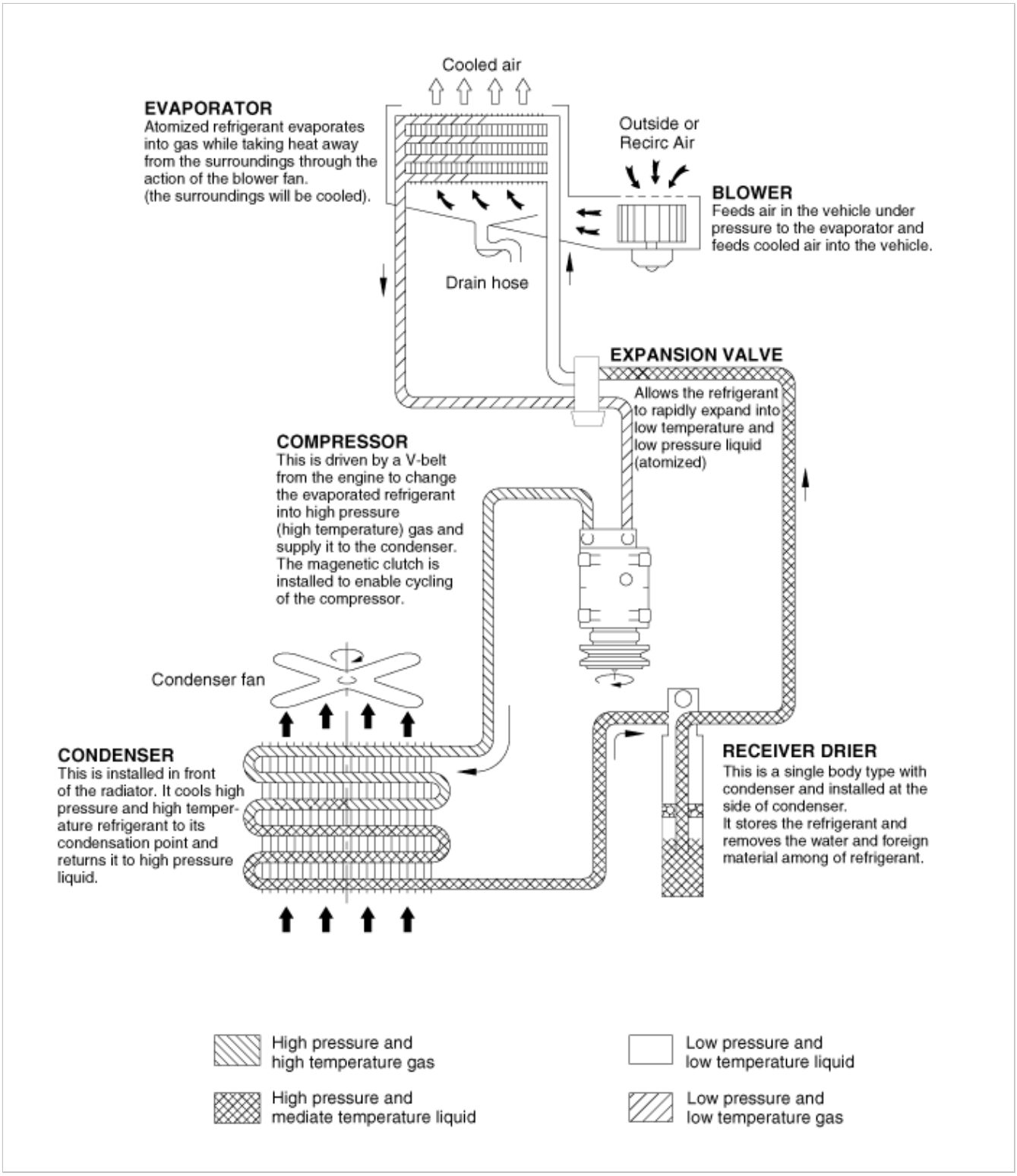
Handling tubing and fittings

The internal parts of the refrigeration system will remain in a state of chemical stability as long as pure moisture-free refrigerant and refrigerant oil are used. Abnormal amounts of dirt, moisture or air can upset the chemical stability and cause problems or serious damage.

The Following precautions must be observed

1. When it is necessary to open the refrigeration system, have everything you will need to service the system ready so the system will not be left open any longer than necessary.
2. Cap or plug all lines and fittings as soon as they are opened to prevent the entrance of dirt and moisture.
3. All lines and components in parts stock should be capped or sealed until they are ready to be used.
4. Never attempt to rebind formed lines to fit. Use the correct line for the installation you are servicing.
5. All tools, including the refrigerant dispensing manifold, the gauge set manifold and test hoses, should be kept clean and dry.

Refrigeration cycle



Refrigerant system service basics

Refrigerant recovery

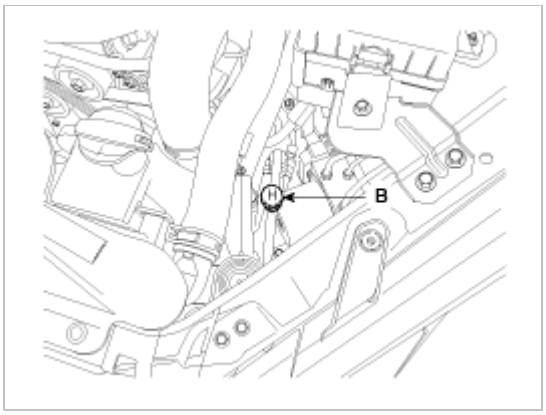
Use only service equipment that is U.L-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a(R-134a) from the air conditioning system.

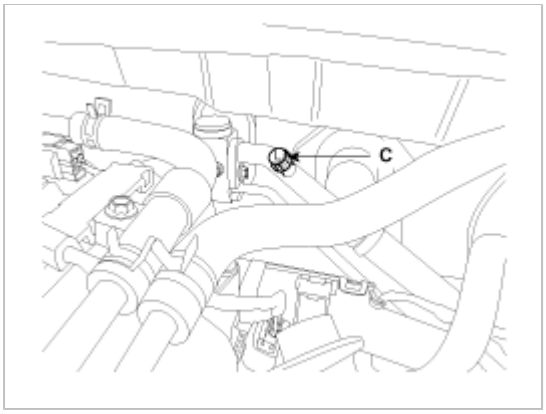
CAUTION

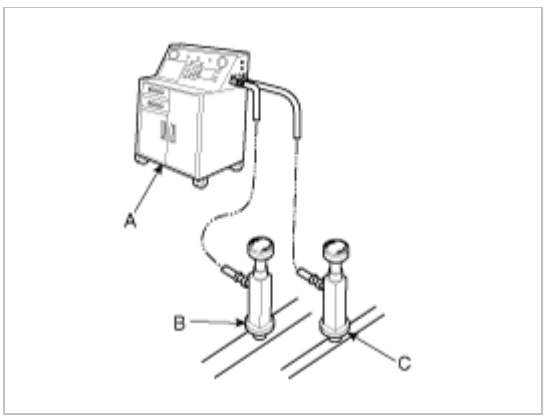
- Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
- Be careful when connecting service equipment.
- Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resume of service.
Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Connect an R-134a refrigerant Recovery/Recycling/Charging System (A) to the high-pressure service port (B) and the low-pressure service port (C) as shown, following the equipment manufacturer's instructions.







2. Measure the amount of refrigerant oil removed from the A/C system after the recovery process is completed. Be sure to install the same amount of new refrigerant oil back into the A/C system before charging.

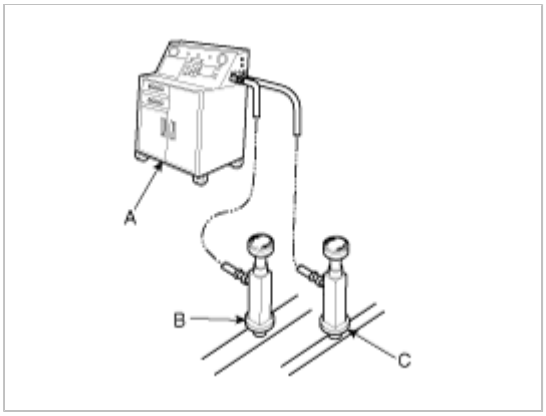
System evacuation

Use only service equipment that is U.L-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a(R-134a) from the air conditioning system.

> CAUTION
>
> - Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
> - Be careful when connecting service equipment.
> - Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resume of service.
Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using an R-134a refrigerant Recovery/Recycling/Charging System. (If the system has been open for several days, the receiver/dryer should be replaced, and the system should be evacuated for several hours.)
2. Connect an R-134a refrigerant Recovery/Recycling/Charging System (A) to the high-pressure service port (B) and the low-pressure service port (C) as shown, following the equipment manufacturer's instructions.



3. If the low-pressure does not reach more than 93.3 kPa (700 mmHg, 27.6 in.Hg) in 10 minutes, there is probably a leak in the system. Partially charge the system, and check for leaks (see Leak Test.).
4. Remove the low pressure valve from the low-pressure service port.

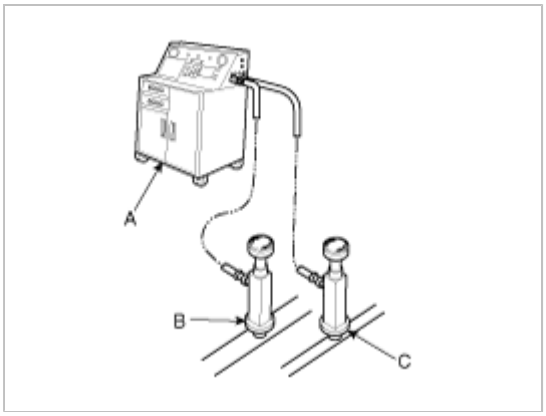
System charging

Use only service equipment that is U.L-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a(R-134a) from the air conditioning system.

> CAUTION
>
> - Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
> - Be careful when connecting service equipment.
> - Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resume of service.
Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Connect an R-134a refrigerant Recovery/Recycling/Charging System (A) to the high-pressure service port (B) as shown, following the equipment manufacturer's instructions.



2. Add the same amount of new refrigerant oil to system that was removed during recovery. Use only specified refrigerant oil. Charge the system with 20.1 ± 0.88 oz. (570 ± 25g) of R-134a refrigerant. Do not overcharge the system the compressor will be damaged.

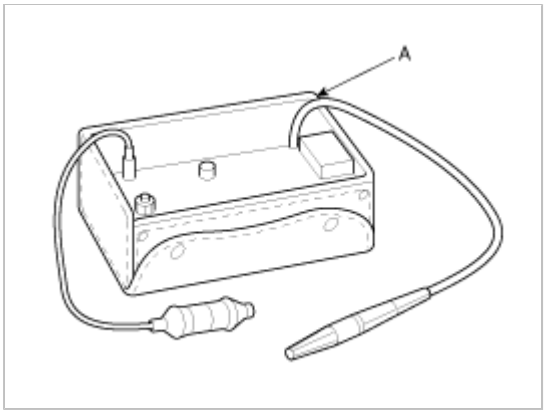
Refrigerant leak test

Always conduct a leak test with an electronic leak detector whenever leakage or refrigerant is suspected and when conducting service operations which are accompanied by disassembly or loosening or connection fittings.

> NOTE
>
> In order to use the leak detector properly, read the manual supplied by the manufacturer.

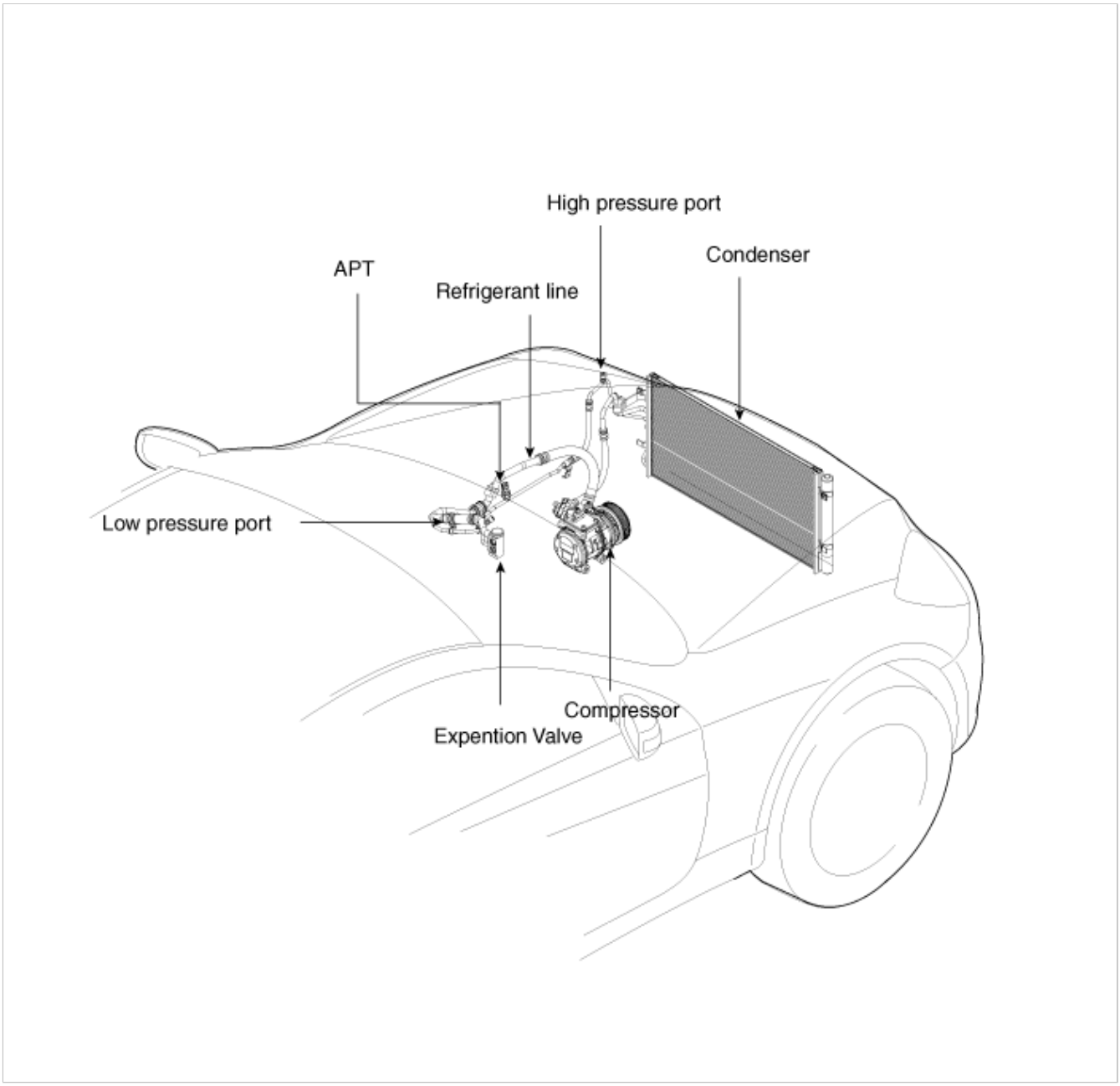
If a gas leak is detected, proceed as follows:

1. Check the torque on the connection fittings and, if too loose, tighten to the proper torque. Check for gas leakage with a leak detector (A).
2. If leakage continues even after the fitting has been tightened, discharge the refrigerant from the system, disconnect the fittings, and check their seating faces for damage. Always replace, even if the damage is slight.
3. Check the compressor oil and add oil if required.
4. Charge the system and recheck for gas leaks. If no leaks are found, evacuate and charge the system again.



Component location index

Engine room



Interior

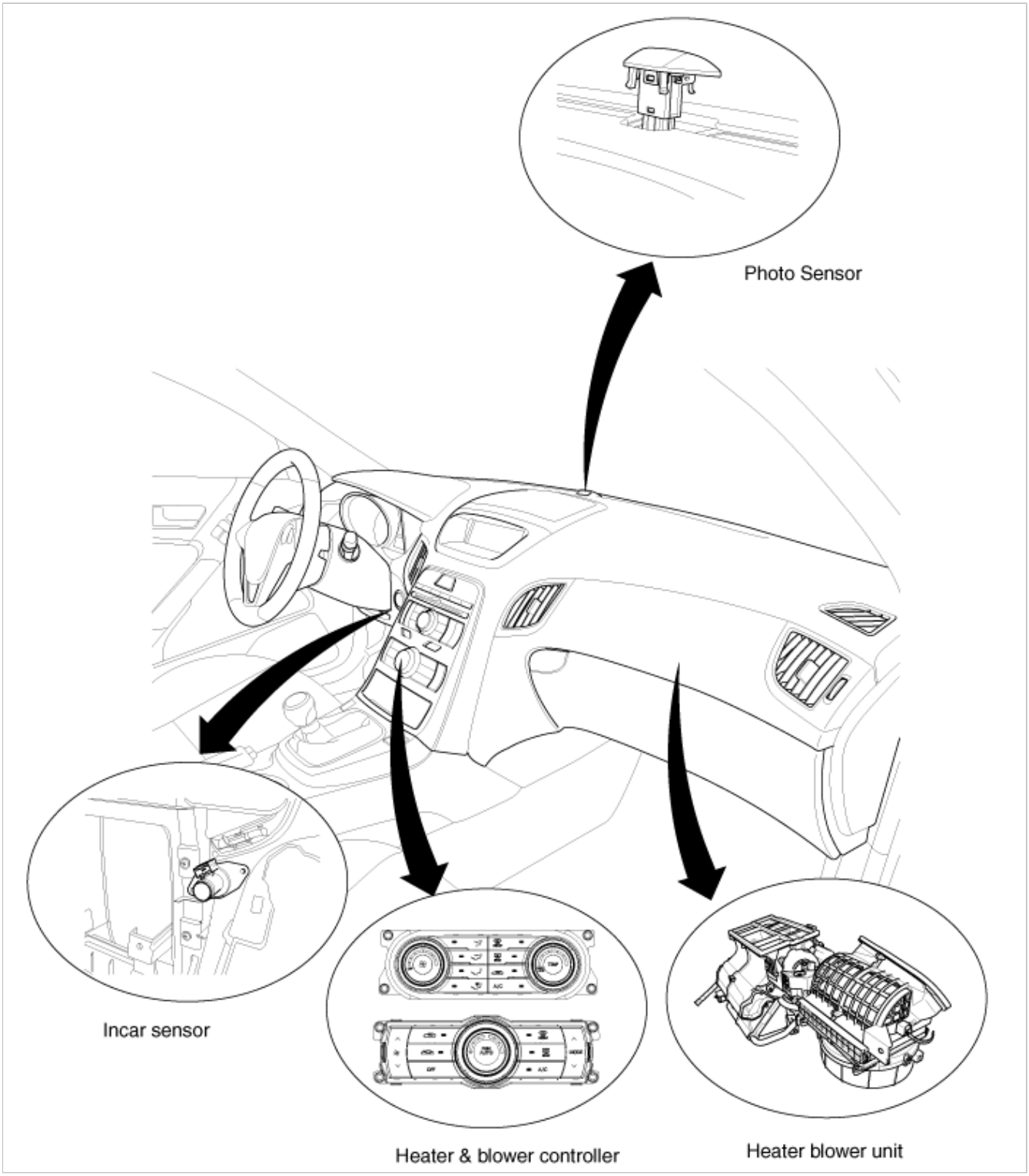


Photo Sensor
Incar sensor
Heater & blower controller
Heater blower unit

Oil Specification

1. The HFC-134a system requires synthetic (PAG) compressor oil whereas the R-12 system requires mineral compressor oil. The two oils must never be mixed.
2. Compressor (PAG) oil varies according to compressor model. Be sure to use oil specified for the model of compressor.

Handling of Oil

1. The oil should be free from moisture, dust, metal powder, etc.
2. Do not mix with other oil.
3. The water content in the oil increases when exposed to the air. After use, seal oil from air immediately. (HFC-134a Compressor Oil absorbs moisture very easily.)
4. The compressor oil must be stored in steel containers, not in plastic containers.

Compressor oil check

The oil used to lubricate the compressor is circulating with the refrigerant.
Whenever replacing any component of the system or a large amount of gas leakage occurs, add oil to maintain the original amount of oil.

Oil total volume in system : 150±15cc (5.3±0.53 fl.oz)

Oil Return Operation

There is close affinity between the oil and the refrigerant.
During normal operation, part of the oil recirculates with the refrigerant in the system. When checking the amount of oil in the system, or replacing any component of the system, the compressor must be run in advance for oil return operation. The procedure is as follows:

1. Open all the doors and the engine hood.
2. Start the engine and air conditioning switch to "ON" and set the blower motor control knob at its highest position.
3. Run the compressor for more than 20 minutes between 800 and 1,000 rpm in order to operate the system.
4. Stop the engine.

Replacement of Component Parts

When replacing the system component parts, supply the following amount of oil to the component parts to be installed.

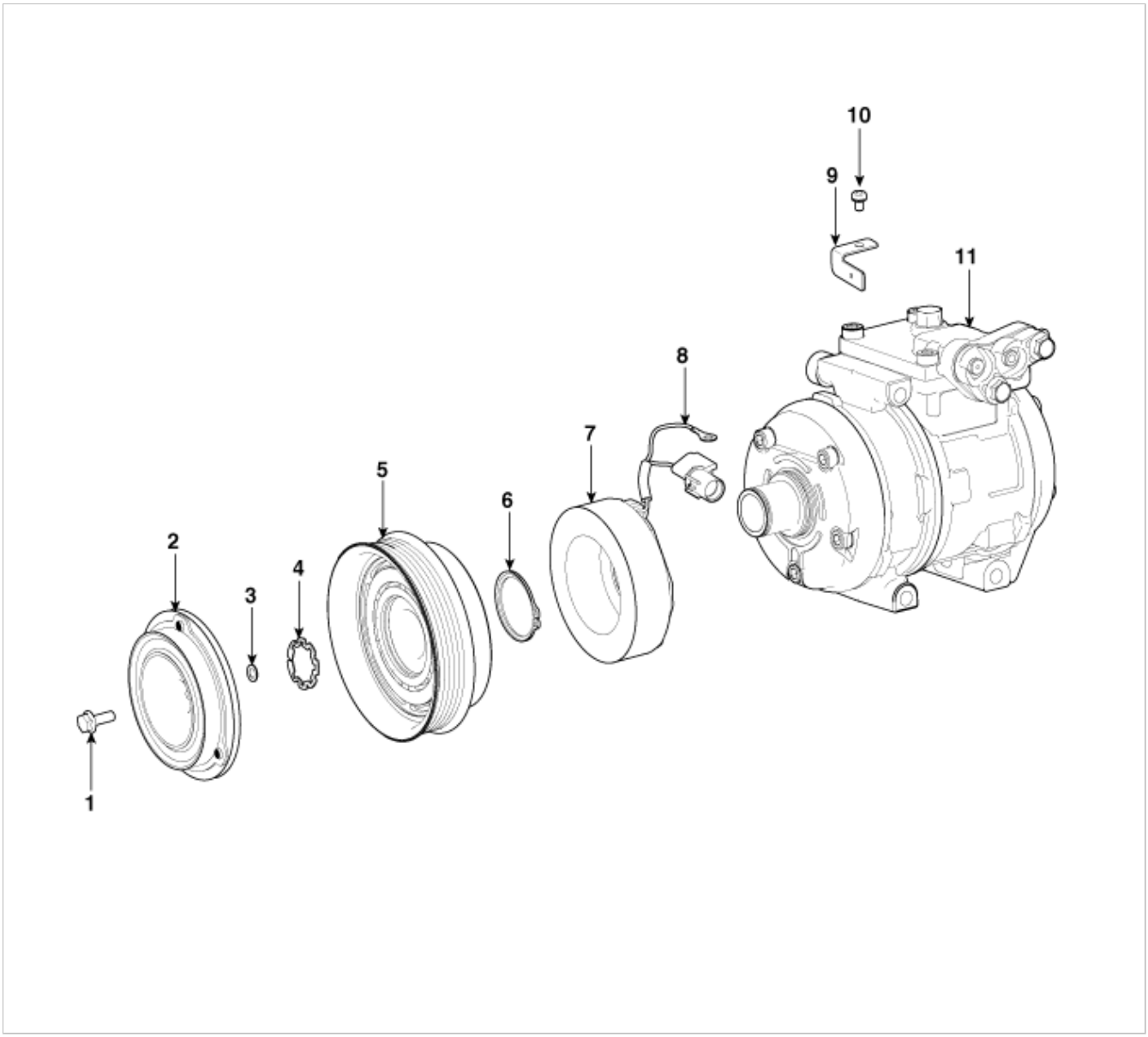
Component parts to be installed	Amount of Oil
Evaporator	50 cc (1.70 fl.oz)
Condenser	30 cc (1.02 fl.oz)
Receiver/dryer	30 cc (1.02 fl.oz)
Refrigerant line (One piece)	10 cc (0.34 fl.oz)

For compressor Replacement, subtract the volume of oil drained from the removed compressor from the specified volume, and drain the calculated volume of oil from the new compressor:
The specified volume - volume of removed compressor = volume to drain from the new compressor.

NOTE

- Even if no oil is drained from the removed compressor, don’t drain more than 50cc from new compressor.

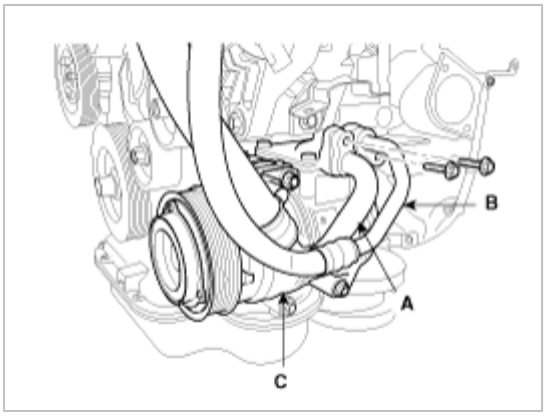
Components



1. Bolt 2. Disc & hub assembly 3. Shim (Cap washer) 4. Retainer ring 5. Pulley	6. Retainer ring 7. Field coil 8. Connector 9. Connector bracket 10. Screw 11. Compressor assembly

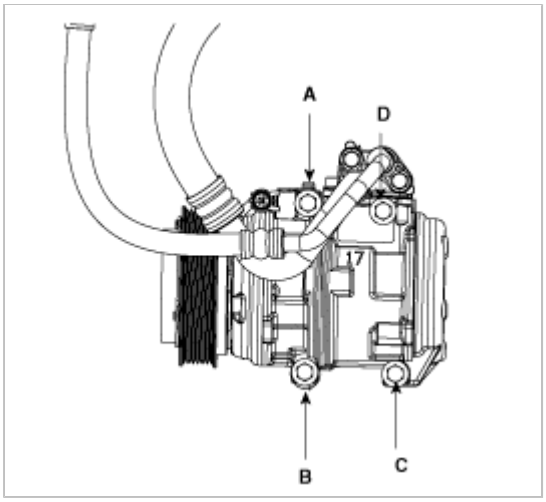
Removal

1. If the compressor is marginally operable, run the engine at idle speed, and let the air conditioning work for a few minutes, then shut the engine off.
2. Disconnect the negative cable from the battery.
3. Recover the refrigerant with a recovery/charging station.
4. Loosen the drive belt.
5. Remove the bolts, then disconnect the suction line (A) and discharge line (B) from the compressor. Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.
6. Disconnect the compressor clutch connector, and then remove 4 mounting bolts and the compressor (C).



Installation

1. Make sure of the length of compressor mounting bolts, and then tighten it A→B→C→D order.



Bolt	Length
A	102mm
B	102mm
C	102mm
D	114mm

2. Install in the reverse order of removal, and note these items.
   A. If you're installing a new compressor, drain all the refrigerant oil from the removed compressor, and measure

its volume, Subtract the volume of drained oil from 120cc(4.20 oz.) the result is the amount of oil you should drain from the new compressor (through the suction fitting).

B. Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for R-134a to avoid leakage.

C. To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.

D. Immediately after using the oil, replace the cap on the container and seal it to avoid moisture absorption.

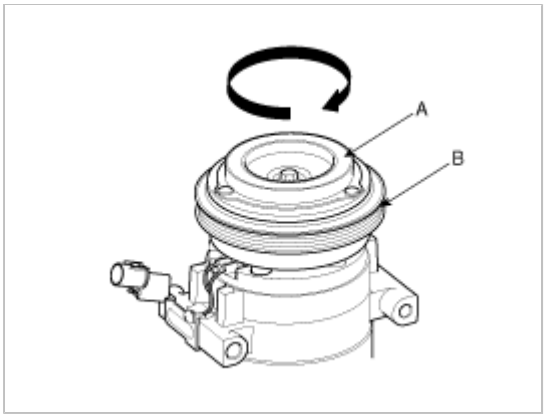
E. Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.

F. Adjust the drive belt.

G. Charge the system and test its performance.

Inspection

1. Check the plated parts of the disc & hub assembly (A) for color changes, peeling or other damage. If there is damage, replace the clutch set.
2. Check the pulley (B) bearing play and drag by rotating the pulley by hand. Replace the clutch set with a new one if it is noisy or has excessive play/drag.

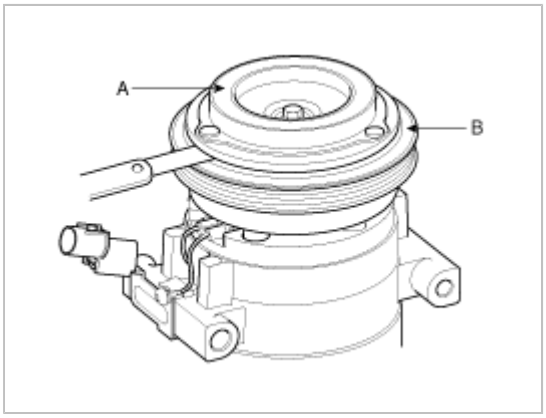


3. Measure the clearance between the pulley (B) and disc & hub assembly (A) all the way around. If the clearance is not within specified limits, remove the disc & hub assembly and add or remove shim (gap washer) as needed to increase or decrease clearance.

Clearance: 0.45 ± 0.1mm (0.018 ± 0.004 in.)

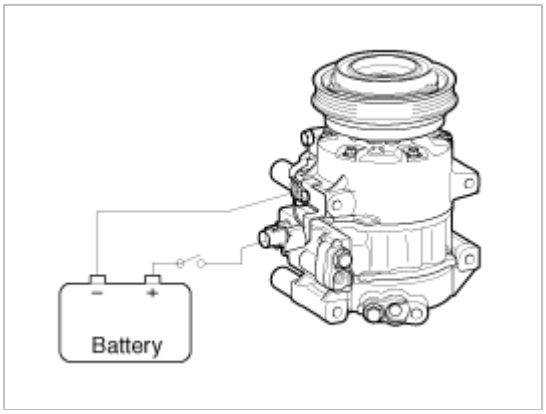
NOTE

The shims (gap washers) are available in seven thicknesses: 0.7mm, 0.8mm, 0.9mm, 1.0mm, 1.1mm, 1.2mm and 1.3mm.



4. Check operation of the magnetic clutch. Connect the compressor side terminals to the battery (+) terminal to the

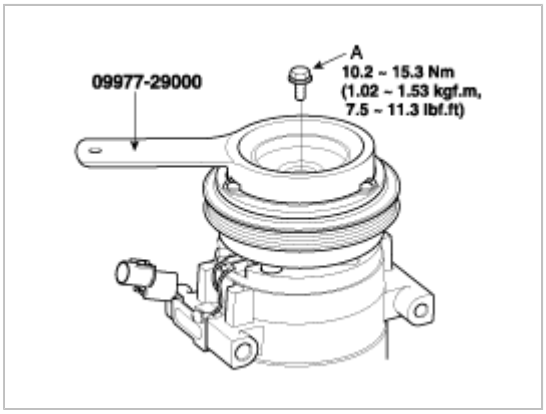
compressor body. Check the magnetic clutch operating noise to dtetrmine the condition.



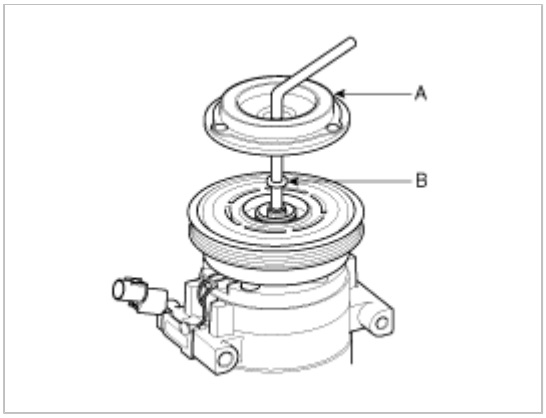
Disassembly

1. Remove the center bolt (A) while holding the disc & hub assembly with a commercially available disc & hub assembly bolt remover; Special tool number 09977-29000.

TORQUE : 10~15N.m (1.02~1.53kgf.m, 7.37~11lbf.ft)



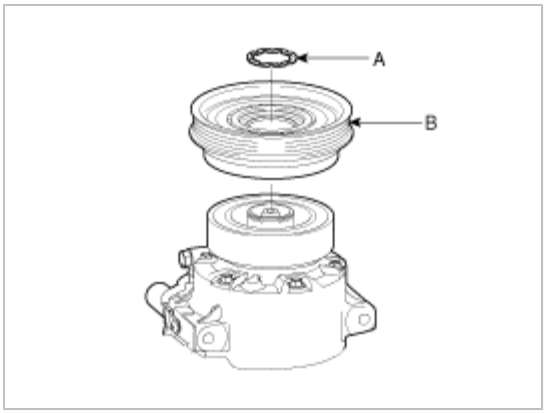
2. Remove the disc & hub assembly (A) and shim (gap washer) (B), taking care not to lose the shims. If the clutch needs adjustment, increase or decrease the number and thickness of shims as necessary, then reinstall the disc & hub assembly, and recheck its clearance.



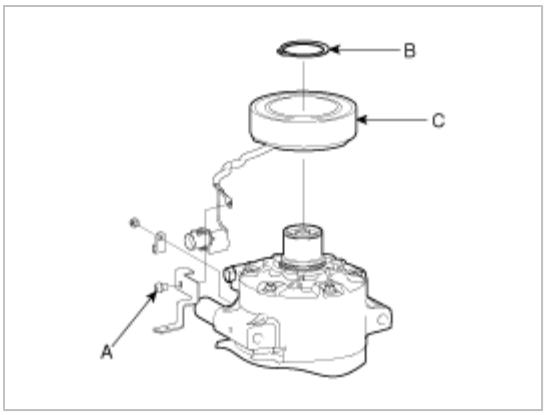
3. If you removal the field coil, remove retainer ring (A) with retainer ring pliers.

NOTE

- Be careful not to damage the pulley (B) and compressor during removal/installation.
- Once retainer ring (A) is removed, replace it with a new one.

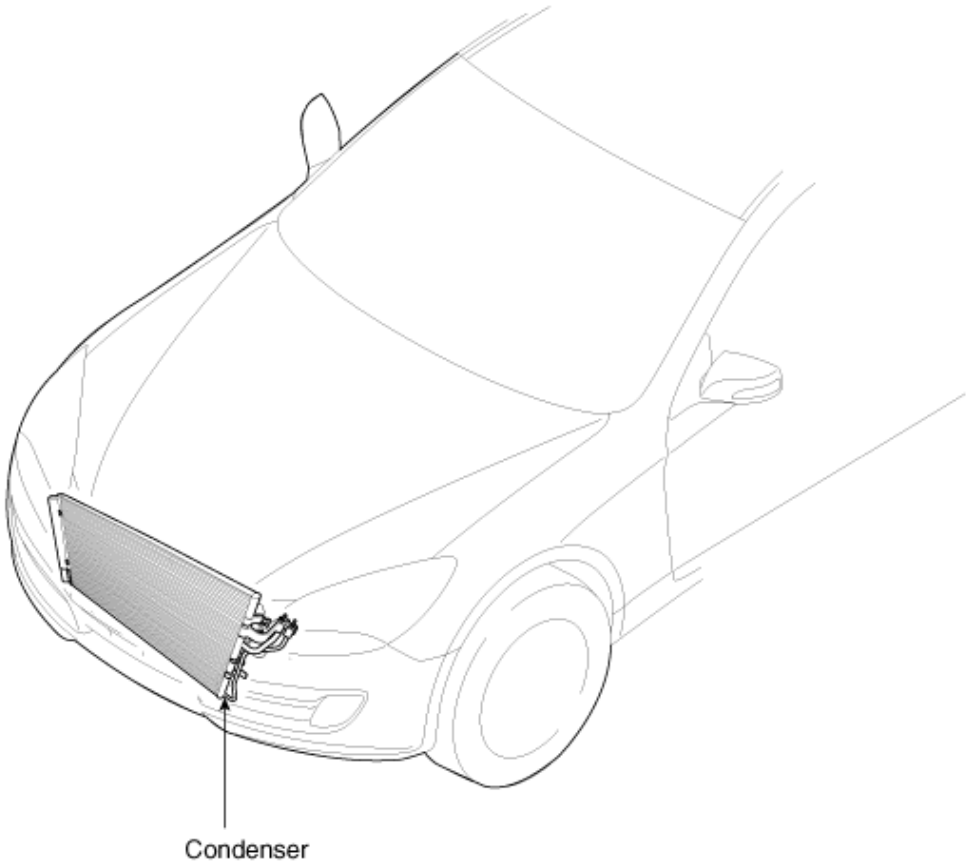


4. Remove the screw (A) from the field coil ground terminal. Remove the retainer ring (B) and then remove the field coil (C) from the shaft with a puller. Be careful not to damage the coil and compressor.



5. Reassemble the compressor clutch in the reverse order of disassembly, and note these items :
   A. Install new retainer rings, and make sure they are fully seated in the groove.
   B. Make sure that the pulley turns smoothly after its reassembled.

Component location



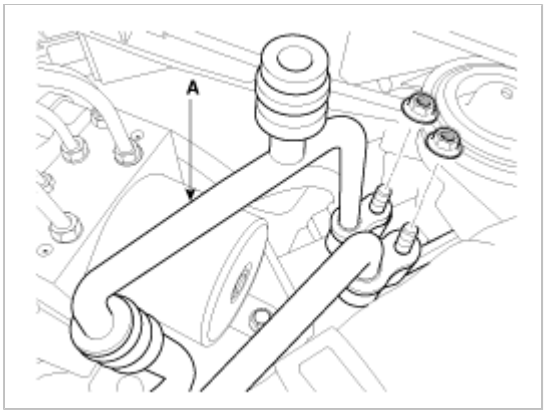
Inspection

1. Check the condenser fins for clogging and damage. If clogged, clean them with water, and blow them with compressed air. If bent, gently bend them using a screwdriver or pliers.
2. Check the condenser connections for leakage, and repair or replace it, if required.

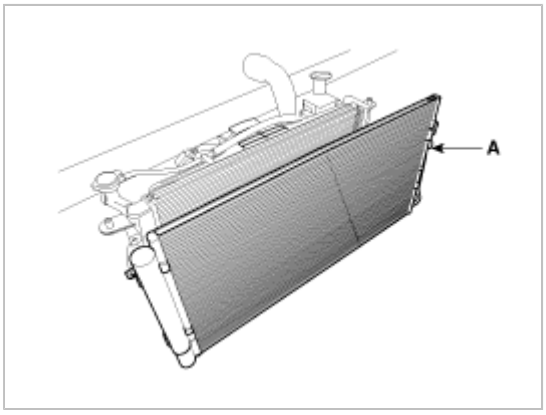
Replacement

Condenser Assembly

1. Recover the refrigerant with a recovery/ recycling/ charging station .
2. Disconnect the negative (-) battery terminal.
3. Remove 2 nuts, and then disconnect the discharge line and liquid line (A) from the condenser.



4. Remove the radiator. (Refer to EM group-Radiator)
5. Remove 2 bolts, and then remove the condenser (A) by lifting it up. Be careful not to damage the radiator and condenser fins when removing the condenser.

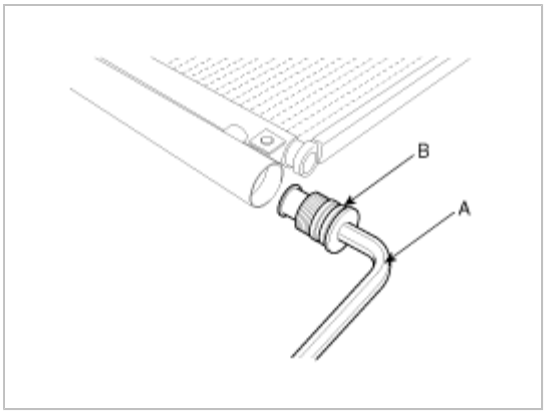


6. Install in the reverse order of removal, and note these items :
   A. If you're installing a new condenser, add refrigerant oil ND-OIL8.
   B. Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for R-134a to avoid leakage.
   C. Be careful not to damage the radiator and condenser fins when installing the condenser.
   D. Be sure to install the lower mount cushions of condenser securely into the holes.
   E. Charge the system, and test its performance.

Desiccant

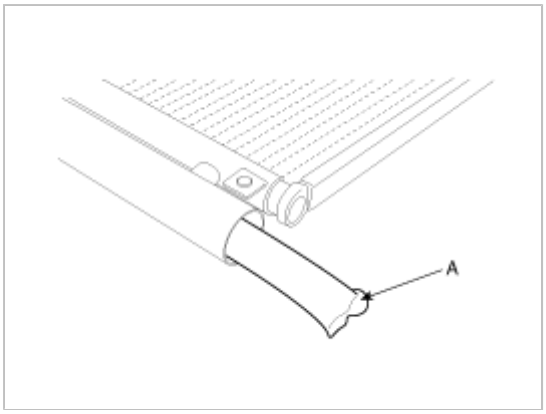
Replacement

1. Remove the condenser, and then remove the bottom cap (B) with L wrench (A) from the condenser.



TORQUE : 20~25N.m (2.0~2.5kgf•m, 14.5~18.2lb-ft)

2. Remove the desiccant (A) from condenser using a long nose plier. Check for crumbled desiccant and clogged bottom cap filter.

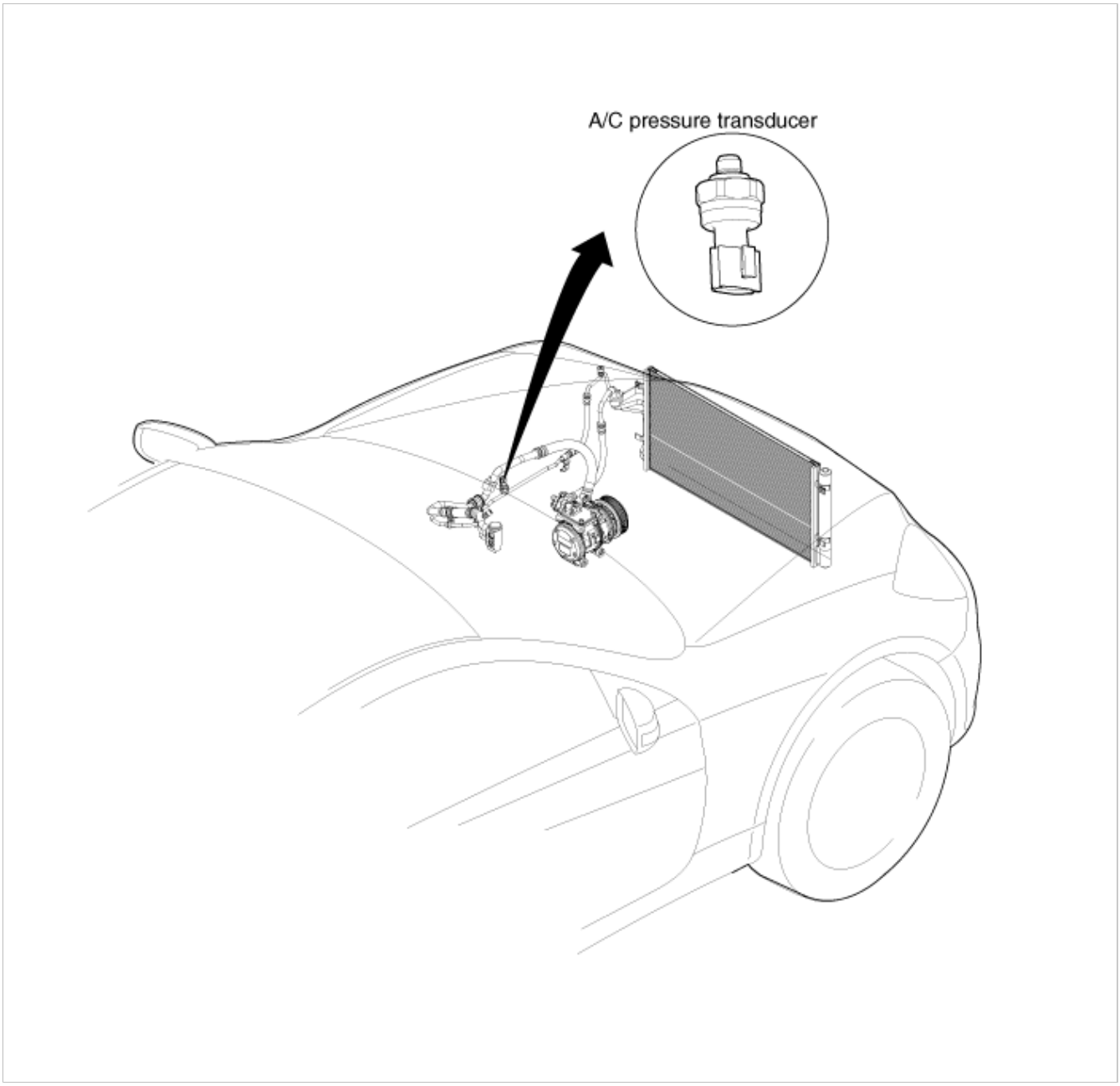


3. Apply air conditioning compressor oil along the O-rings and threads of the new bottom cap.
4. Insert the new desiccant into the receiver drier tank. The desiccant must be sealed in vacuum before it is exposed to air for use.
5. Install the new bottom cap to the condenser.

NOTE

- Always replace the desiccant and bottom cap at the same time.
- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for R-134a to avoid leakage.
- Be careful not to damage the radiator and condenser fins when installing the condenser.
- Be sure to install the lower mount cushions of condenser securely into the holes.
- Charge the system, and test its performance.

Component Location

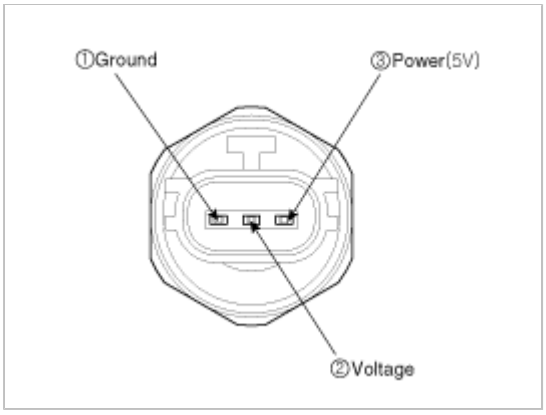


Description

A/C pressure transducer convert the pressure value of high pressure line into voltage value after measure. By converted voltage value, engine ECM controls cooling fan by operating high speed or low speed. Engine ECM stop the operation of compressor when the temperature of refrigerant line is too high or too low irregularly to optimize air conditioning system.

Inspection

1. Measure the pressure of high pressure line by voltage output between ① and ② terminals



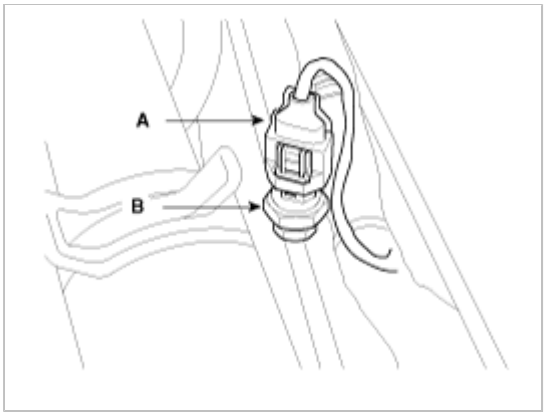
2. Inspect the voltage value whether it is sufficient to be regular value or not.

Voltage = 0.0085 *Pressure +0.378 [V]

3. If the measured voltage value is not specification, replace the A/C pressure transducer.

Replacement

1. Disconnect the negative (-) battery terminal.
2. Recover the refrigerant with a recovery/charging station.
3. Disconnect A/C pressure transducer connector (3P)(A).
4. Remove the A/C pressure transducer(B)



CAUTION

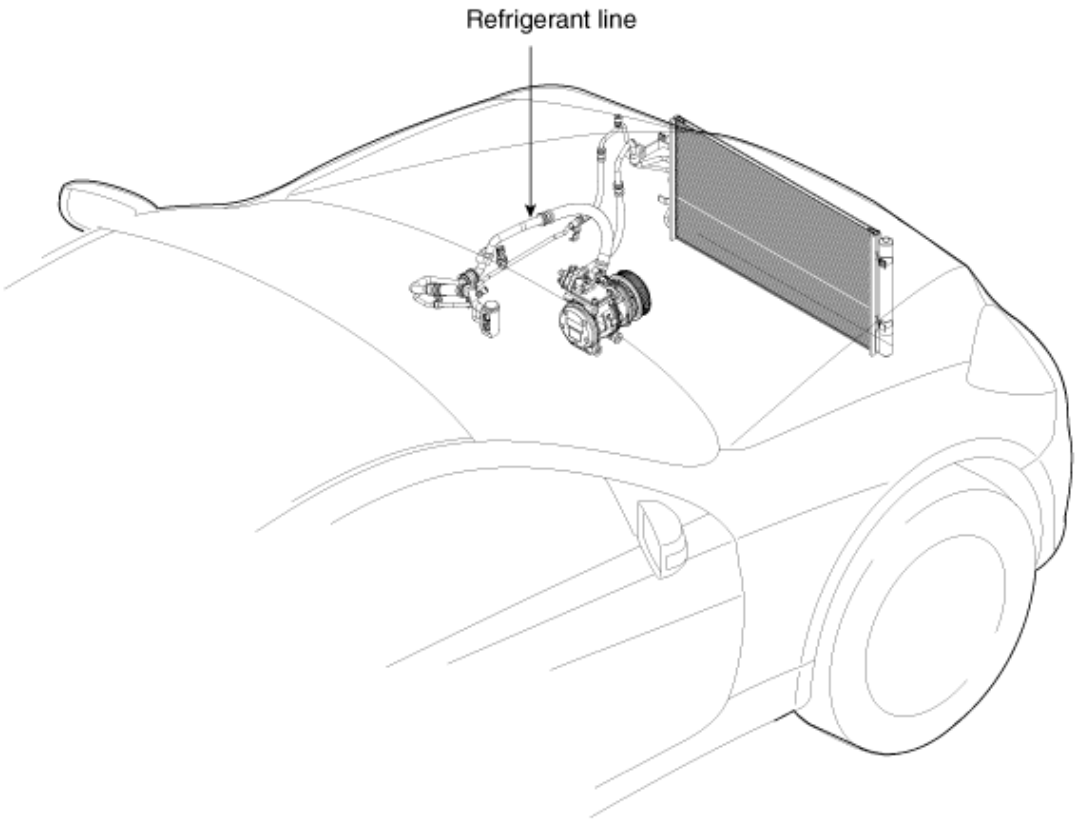
- Take care that liquid & suction pipe are not bent.

5. Installation is the reverse order of removal.

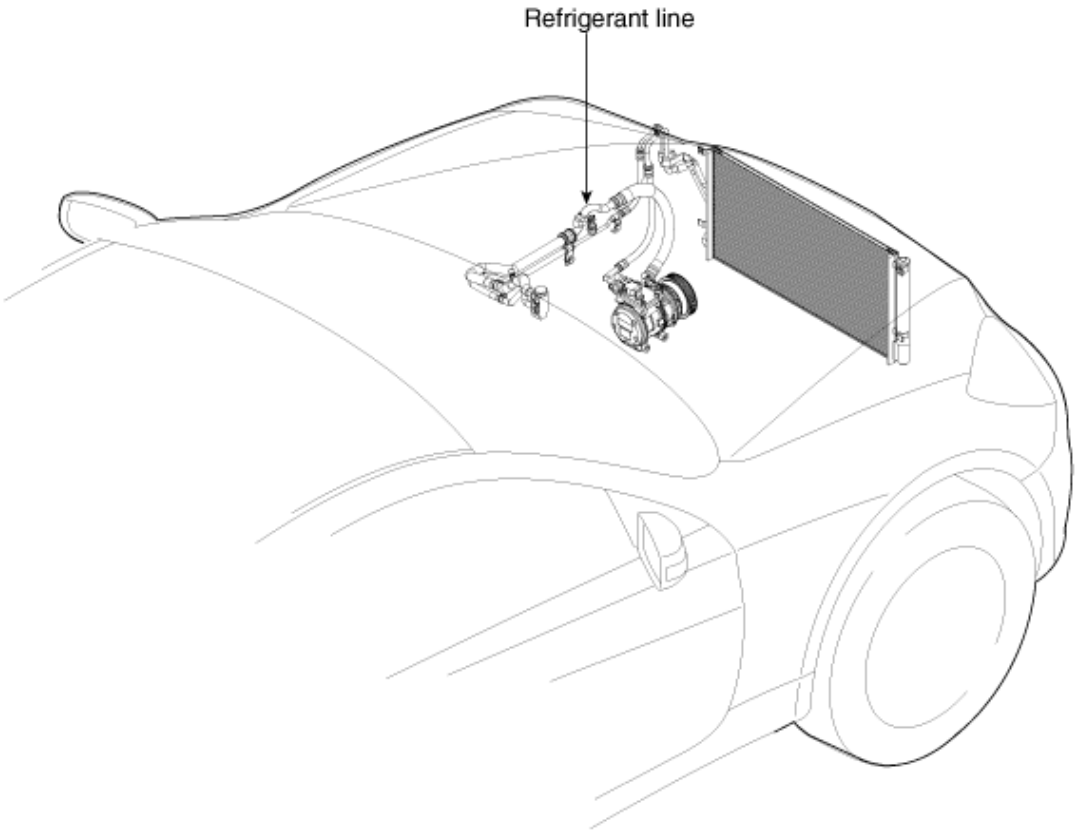
TORQUE : 10~12Nm (1.0~1.2kgf.m, 7~8lbf.ft)

Component location

[Theta engine]



[Lambda engine]



Replacement

1. Discharge refrigerant from refrigeration system .
2. Replace faulty tube or hose.

> CAUTION
>
> • Cap the open fittings immediately to keep moisture or dirt out of the system.

3. Tighten joint of bolt or nut to specified torque

> CAUTION
>
> • Connections should not be torque tighter than the specified torque.

Part tightened	N.m	Kgf.m	lbf.ft
Condenser - Discharge hose	4.9~5.9	0.5~0.6	3.6~4.3
Condenser - Liquid tube			
Compressor - Discharge hose	4.9~5.9	0.5~0.6	3.6~4.3
Compressor - Suction hose			
Expansion valve - Evaporator	11.7~5.9	1.2~1.5	8.7~10.8

4. Evacuate air in refrigeration system and charge system with refrigerant.

Specified amount: 570 ± 25g (20.1 ± 0.88 oz.)

5. Inspect for leakage of refrigerant.
   Using a gas leak detector, check for leakage of refrigerant .
6. Inspect A/C operation.

Description

The evaporator temperature sensor will detect the evaporator core temperature and interrupt compressor relay power in order to prevent evaporator freezing by excessive cooling.

Inspection

1. Ignition "OFF"
2. Disconnect evaporator temperature sensor.
3. Using the multi-tester, Measure resistance between terminal "1" and "2" of evaporator temperature sensor.

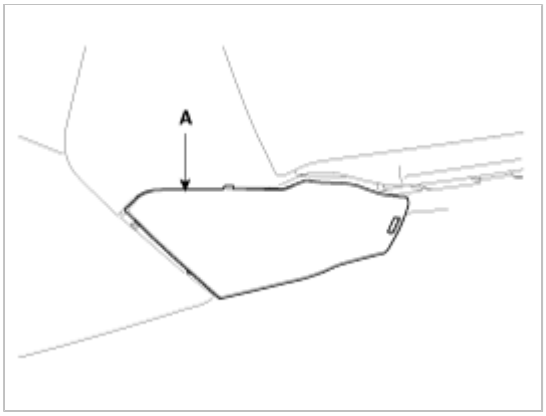
Specification

Evaporator core temperature[°C(°F)]	Resistance[KΩ]	Voltage[V]
-10(14)	29.42	3.736
0(32)	18.9	3.221
10(50)	11.36	2.665
20(68)	7.362	2.125
30(86)	4.892	1.647
40(104)	3.326	1.248
50(122)	2.309	0.941

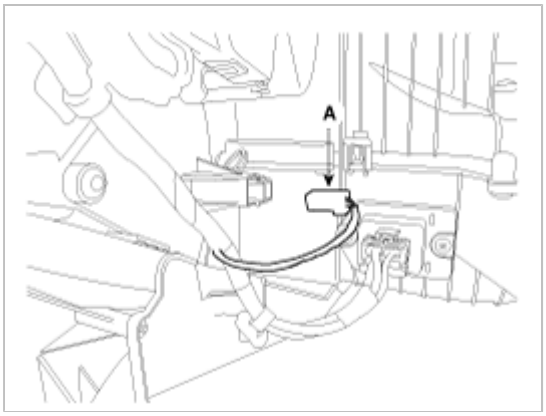
4. If the measured resistance is not specification, substitute with a known-good evaporator temperature sensor and check for proper operation.
5. If the problem is corrected, replace the evaporator temperature sensor.

Replacement

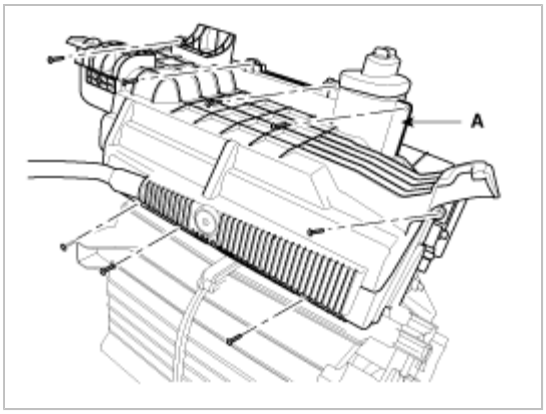
1. Disconnect the negative (-) battery terminal.
2. Remove the crash pad lower cover (A).



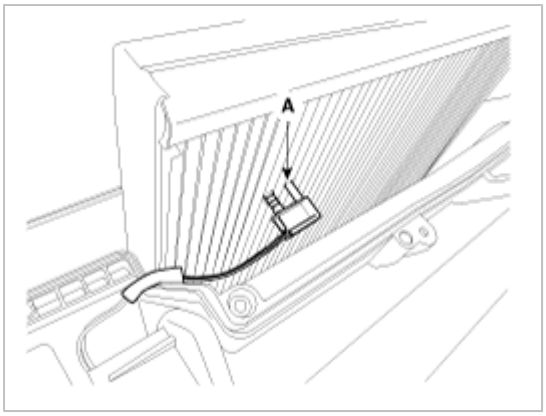
3. Disconnect the evaporator sensor connector (A).



4. Remove the heator unit lower cover (A).



5. Remove the evaporator temperature sensor (A) from evaporator core.



CAUTION

- Take care that evaporator core pins are not bent.

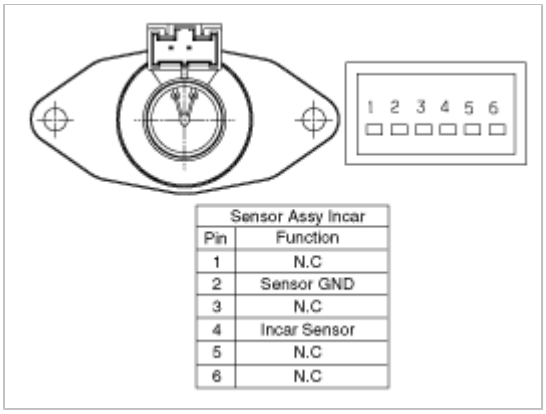
6. Installation is the reverse order of removal.

Description

1. In-car air temperature sensor is located at the center facia lower panel.
2. The sensor contains a thermistor which measures the temperature of the inside. The signal decided by the resistance value which changes in accordance with perceived inside temperature, is delivered to heater control unit and according to this signal the control unit regulates incar temperature to intended value.

Inspection

1. Ignition "ON"
2. Blow air with changing temperature to the in car sensor air inlet. Measure sensor resistance between 2 and 4 terminals.



Sensor Assy Incar	
Pin	Function
1	N.C
2	Sensor GND
3	N.C
4	Incar Sensor
5	N.C
6	N.C

Specification

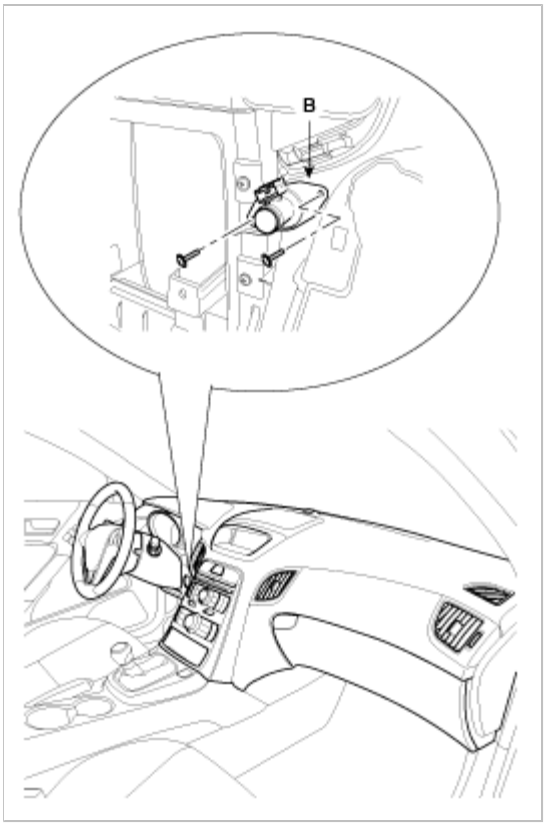
Temperature [°C(°F)]	Resistance between terminals 2and 4 (kΩ)
-30(-22)	509.4 ± 4.1%
-15(5)	216 ± 3.2%
0(32)	97.71 ± 2.4%
15(59)	47.13 ± 1.7%
25(77)	30.00 ± 1.2%
35(95)	19.59 ± 1.6%
50(122)	10.81 ± 2.2%
60(140)	7.463 ± 2.6%

NOTE

In car sensor is negative type thermistor that resistance will rise with lower temperature, and reduce with higher temperature.

Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the crash pad.
3. Disconnect the connector of in-car sensor. Loosen the mounting 2 screws and then remove the in-car sensor (B).



4. Installation is the reverse order of removal.

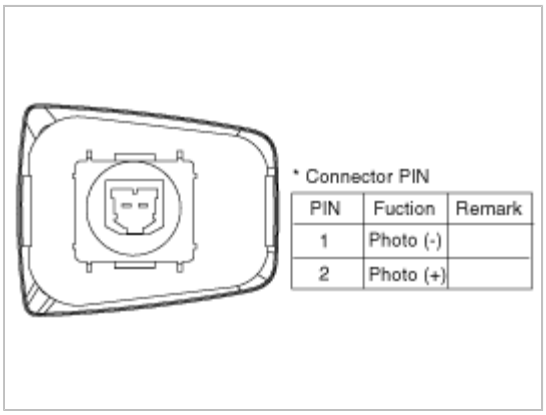
Description

1. The photo sensor is located at the center of defrost nozzle.
2. The photo sensor contains a photovoltaic (sensitive to sunlight) diode. The solar radiation received by its light receiving portion, generates an electromotive force in proportion to the amount of radiation received which is transferred to the automatic temperature control module so that the solar radiation compensation will be performed.

GENESIS COUPE(BK) >2010 > G 2.0 DOHC > Heating,Ventilation, Air Conditioning > Air conditioning System > Photo sensor > Repair procedures

Inspection

1. Ignition ON
2. Using the scan tool.
3. Emit intensive light toward photo sensor using a lamp, and check the output voltage change.
4. The voltage will rise with higher intensive light and reduce with lower intensive light.

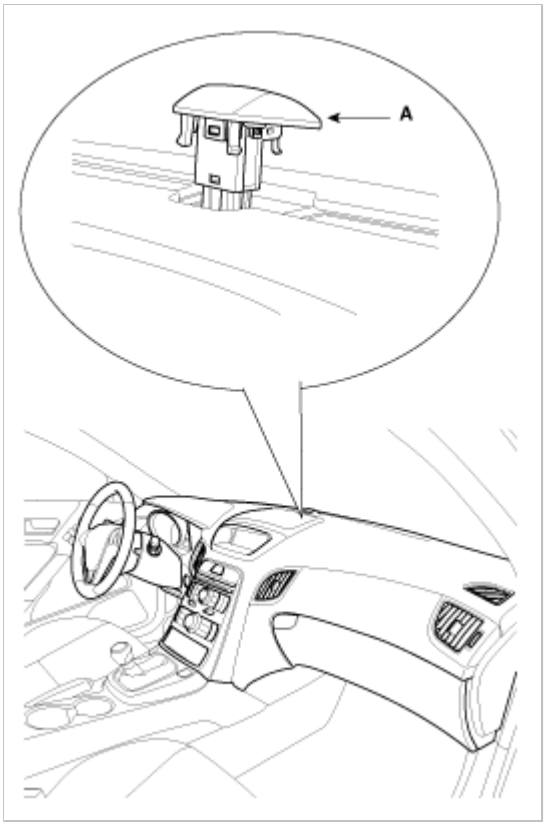


* Connector PIN

PIN	Fuction	Remark
1	Photo (-)	
2	Photo (+)	

Replacement

1. Disconnect the negative (-) battery terminal.
2. With the (-) driver, remove the photo sensor (A) from the center of defrost nozzle.



3. Install in the reverse order of removal.

Description

1. The ambient temperature sensor is located at the front of the condenser and detects ambient air temperature. It is a negative type thermistor; resistance will increase with lower temperature, and decrease with higher temperatures.
2. The sensor output will be used for discharge temperature control, temperature regulation door control, blower motor level control, mix mode control and in-car humidity control.

NOTE

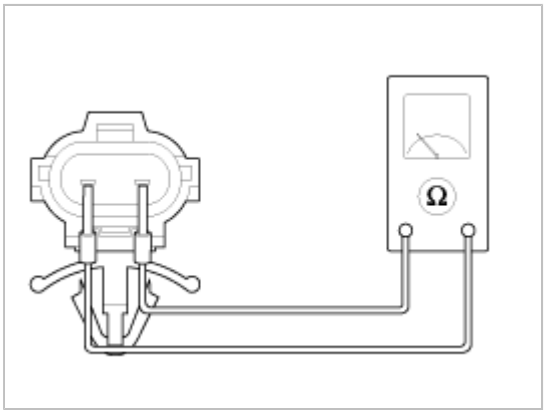
If the ambient temperature is below 2.0°C (35.6°F), the A/C compressor will be stopped.
The compressor will be operated by manual operating.

Inspection

1. Ignition "OFF"
2. Disconnect ambient temperature sensor.
3. Check the resistance of ambient temperature sensor between terminals 1 and 2 whether it is changed by changing of the ambient temperature.

Specification

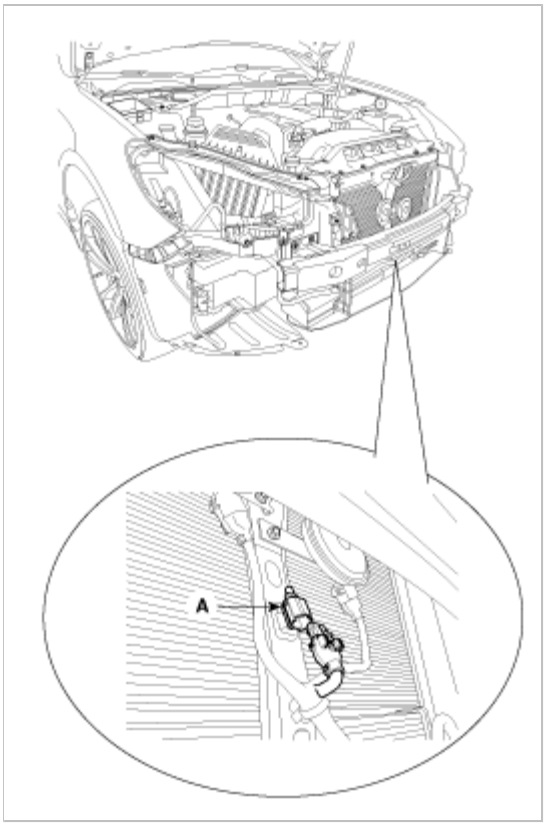
Ambient temperature [°C(°F)]	Resistance between terminals 1and 2 (kΩ)
-10(50)	163.31 ± 3%
0(68)	96.892 ± 3%
10(50)	59.365 ± 3%
20(68)	37.147 ± 3%
25(77)	30 ± 3%
40(104)	16.032 ± 3%



4. If the measured resistance is not specification, substitute with a known-good ambient temperature sensor and check for proper operation.
5. If the problem is corrected, replace the ambient temperature sensor.

Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the front bumper. (Refer to BD group-Front bumper)
3. Remove the ambient temperature sensor (A).



4. Installation is the reverse order of removal.