General Information

Air conditioner

Item		Specification	
		S Engine(3.0)	λ Engine(3.8)
Compressor	Type	VS 18 (Variable capacity)	
	Oil type & Capacity	Front only	PAG 150± 10CC
		Front & Rear	PAG 210± 10CC
	Pulley type	6PK-TYPE	
	Displacement	180cc/rev	
Condenser	Heat rejection	18,500 - 5% kcal/hr	
APT(A/C pressure transducer)	The method to measure the pressure	Voltage= 0.00878835 * Pressure (psig) + 0.5	
Expansion valve	Type	Block	
Refrigerant	Type	R-134a	
	Capacity [oz.(g)]	Front only	700±25
		Front & Rear	900±25

Blower unit

Item		Specification
Fresh and recirculation	Operating method	Actuator
Blower	Type	Sirocco
	Speed step	Auto + 8 speed (Automatic), 1-8 speed (Manual)
	Speed control	Power mosfet
Air filter	Type	Particle filter

Heater and evaporator unit

Item		Specification
Heater	Type	Pin & Tube type
	Heating capacity	4,600 ± 5% kcal/hr
	Mode operating method	Actuator
	Temperature operating method	Actuator
Evaporator	Temperature control type	Evaporator temperature sensor
	A/C ON/OFF [℃(°F)]	ON : 2.1 ± 0.5 (35.78 ± 32.9) OFF: 0.6 ± 0.5 (33.08 ± 32.9)

Troubleshooting

Problem Symptoms Table

Before replacing or repairing air conditioning components, first determine if the malfunction is due to the refrigerant charge, air flow or compressor.

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

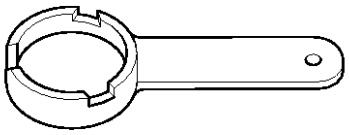
After correcting the malfunction, check the complete system to ensure that performance is satisfactory.

Standard:

Symptom	Suspect Area	See page
No blower operation	1. Blower fuse	
	2. Blower relay	
	3. Blower motor	
	4. Power mosfet	
	5. Blower speed control switch	
	6. Wire harness	
No air temperature control	1. Engine coolant capacity	
	2. Heater control assembly	
No compressor operation	1. Refrigerant capacity	
	2. A/C Fuse	
	3. Magnetic clutch	
	4. Compressor	
	5. A/C pressure transducer	
	6. A/C switch	
	7. Evaporator temperature sensor	
	8. Wire harness	
No cool comes out	1. Refrigerant capacity	
	2. Refrigerant pressure	
	3. Drive belt	
	4. Magnetic clutch	
	5. Compressor	
	6. A/C pressure transducer	
	7. Evaporator temperature sensor	
	8. A/C switch	
	9. Heater control assembly	
	10. Wire harness	

Symptom	Suspect Area	See page
Insufficient cooling	1. Refrigerant capacity	
	2. Drive belt	
	3. Magnetic clutch	
	4. Compressor	
	5. Condenser	
	6. Expansion valve	
	7. Evaporator	
	8. Refrigerant lines	
	9. A/C pressure transducer	
	10. Heater control assembly	
No engine idle-up when A/C switch ON	1. Engine ECM	
	2. Wire harness	
No air inlet control	1. Heater control assembly	
No mode control	1. Heater control assembly	
	2. Mode actuator	
No cooling fan operation	1. Cooling fan fuse	
	2. Fan motor	
	3. Engine ECM	
	4. Wire harness	

Special Service Tools

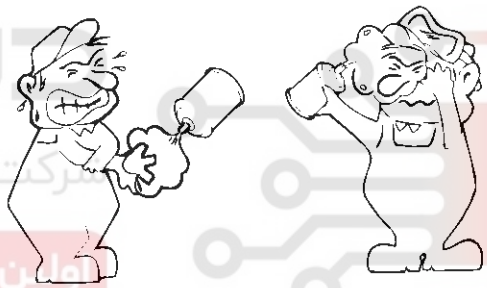
Tool (Number and name)	Illustration	Use
09977-29000 Disc & hub assembly bolt remover		Removal and installation of the disc & hub assembly bolt

Air conditioning System

Instructions

When Handling Refrigerant

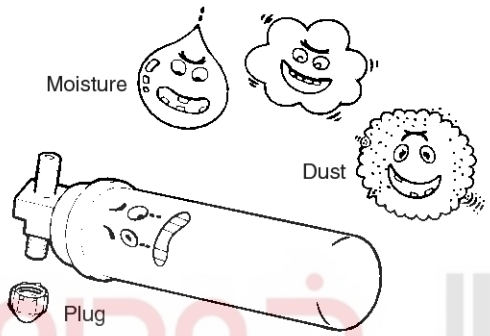
1. R-134a liquid refrigerant is highly volatile. A drop on the skin of your hand could result in localized frostbite. When handling the refrigerant, be sure to wear gloves.
2. It is standard practice to wear goggles or glasses to protect your eyes, and gloves to protect your hands. If the refrigerant 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 that the 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 the 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 :
   - When removing refrigerant components from a vehicle, cap immediately the components to prevent from the entry of moisture.
   - When installing refrigerant components to a vehicle, do not remove the cap until just before connecting the components.
   - Complete the connection of all refrigerant tubes and hoses without delay to prevent the A/C system from taking on moisture.
   - Use the recommended lubricant from a sealed container only.
7. If an accidental discharge in the system occurs, ventilate the work area before resuming service.



LQAC003A

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.

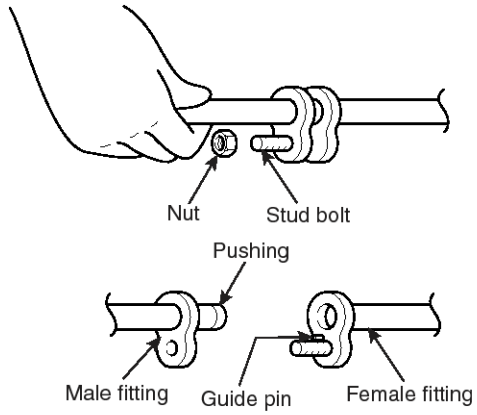


LQAC003B

When Installing Connecting Parts

FLANGE WITH GUIDE PIN

Check the new O-ring for damage and lubricate it using compressor oil. Tighten the nut to specified torque.



LQAC003C

Size	Tightening torque [N.m (kg.m, lb.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)

NOTICE

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

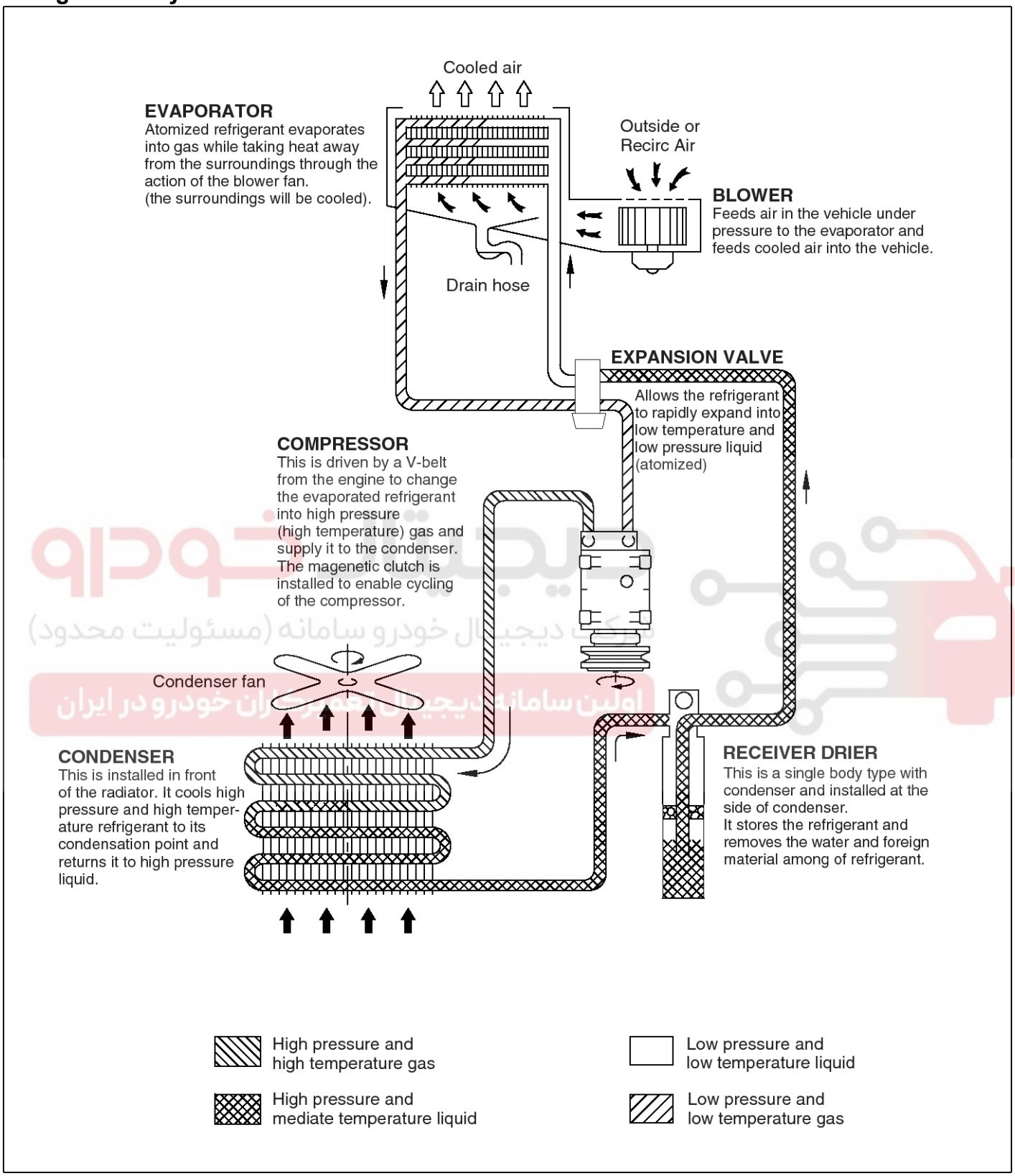
Handling Tubing And Fittings

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



EQRF004A

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

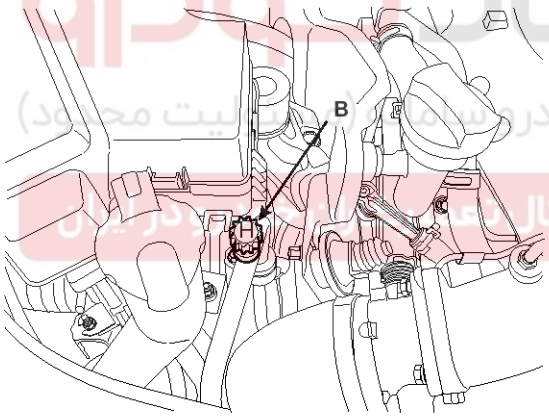
- **Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.**
- **Be careful when connecting service equipment.**
- **Do not breathe refrigerant or vapor.**

If accidental system discharge occurs, ventilate work area before resuming 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.



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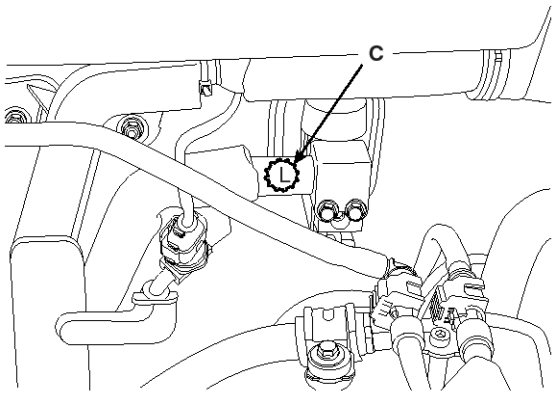

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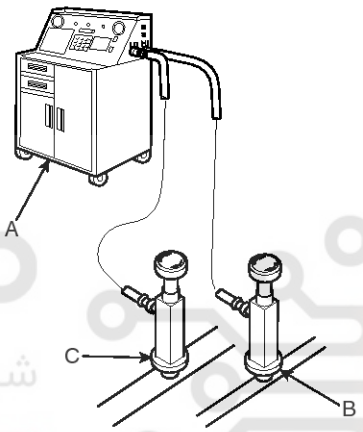


EQKE004A

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.**

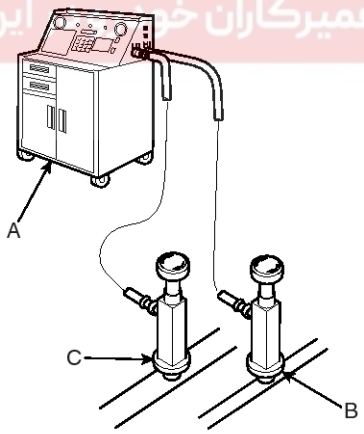
If accidental system discharge occurs, ventilate work area before resuming service.

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.



EQKE004A

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

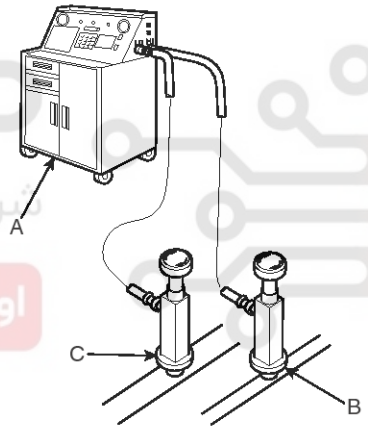
- **Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.**
- **Be careful when connecting service equipment.**
- **Do not breathe refrigerant or vapor.**

If accidental system discharge occurs, ventilate work area before resuming 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.



EQKE004A

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 18.0 ± 0.88 oz. (510 ± 25g) of R-134a refrigerant. Do not overcharge the system the compressor will be damaged.

Refrigerant Leak Test

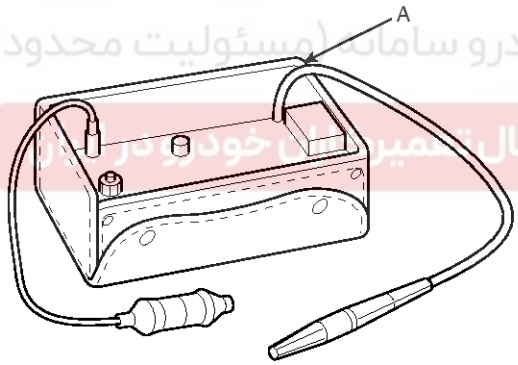
Always conduct a leak test with an electronic leak detector whenever leakage or refrigerant is suspected and when conducting service operations which are accompanied by disassembly or loosening or connection fittings.

NOTICE

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

If a gas leak is detected, proceed as follows:

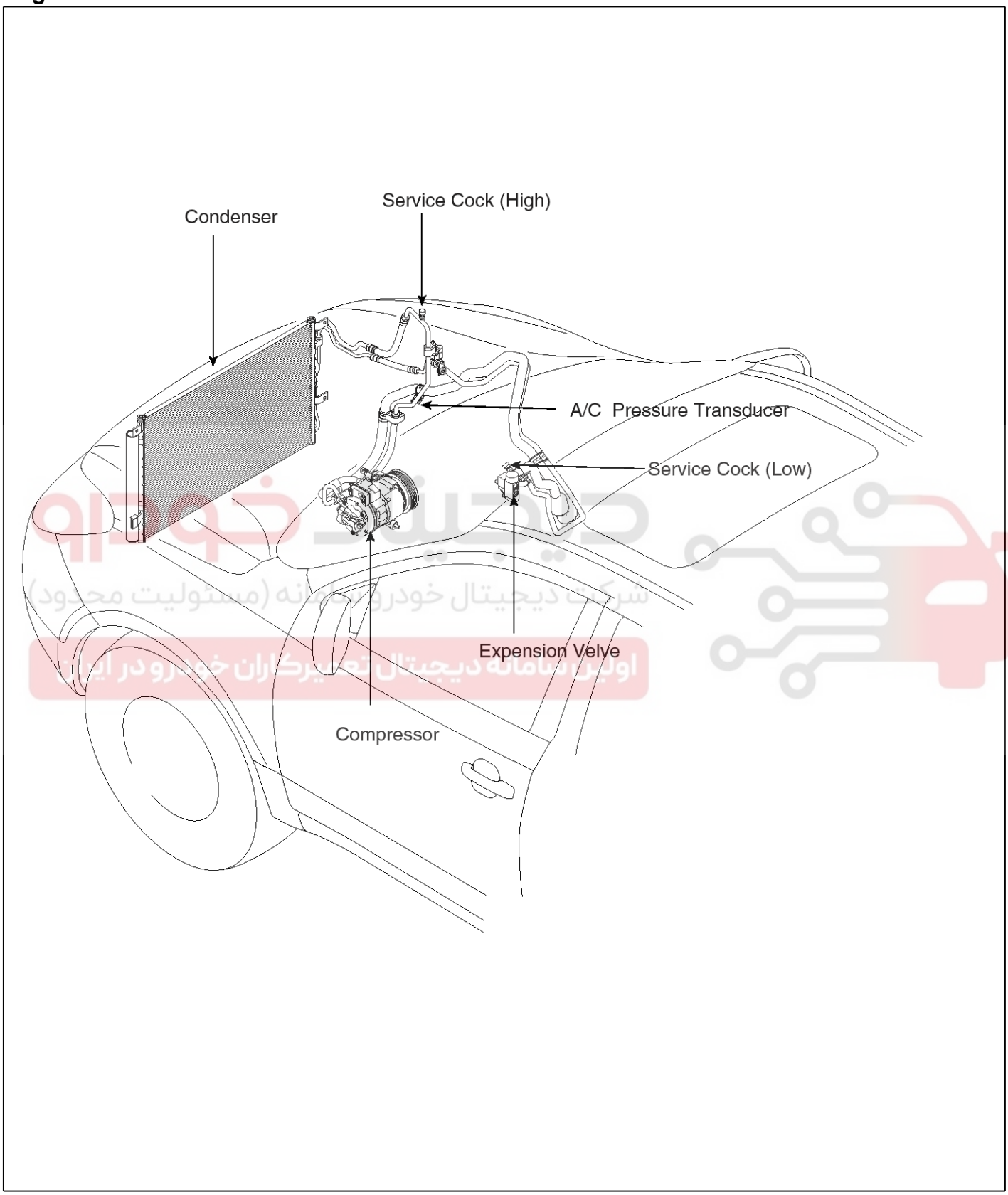
1. Check the torque on the connection fittings and, if too loose, tighten to the proper torque. Check for gas leakage with a leak detector (A).
2. If leakage continues even after the fitting has been tightened, discharge the refrigerant from the system, disconnect the fittings, and check their seating 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.



EQKE007A

General Description Indes

Engine Room



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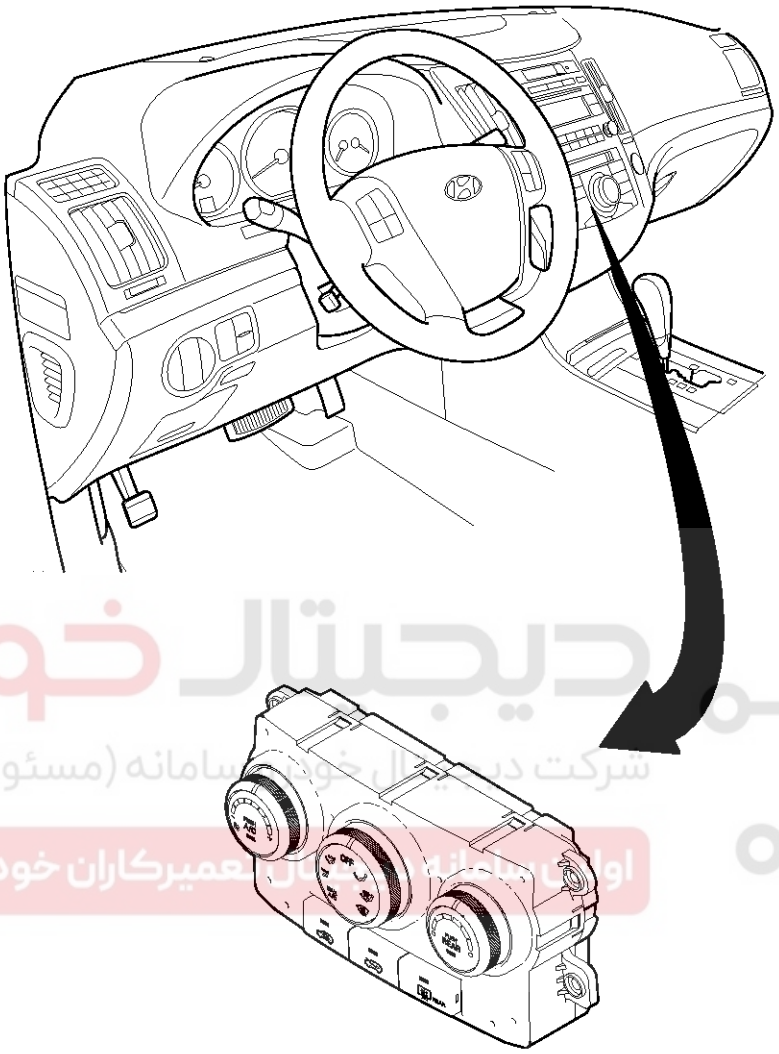
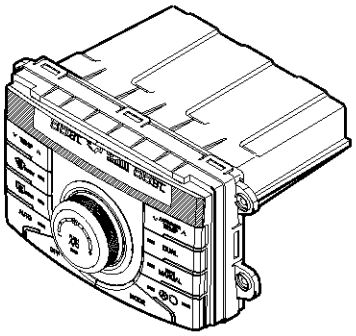
Interior



Manual A/C controller



Full auto A/C controller

SENHA7102L

Compressor oil

Inspection

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: cc (fl.oz)
Front only : 150 ± 10 (5.07 ± 0.34 fl.oz)
Front & Rear : 210 ± 10 (7.1 ± 0.34 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 :

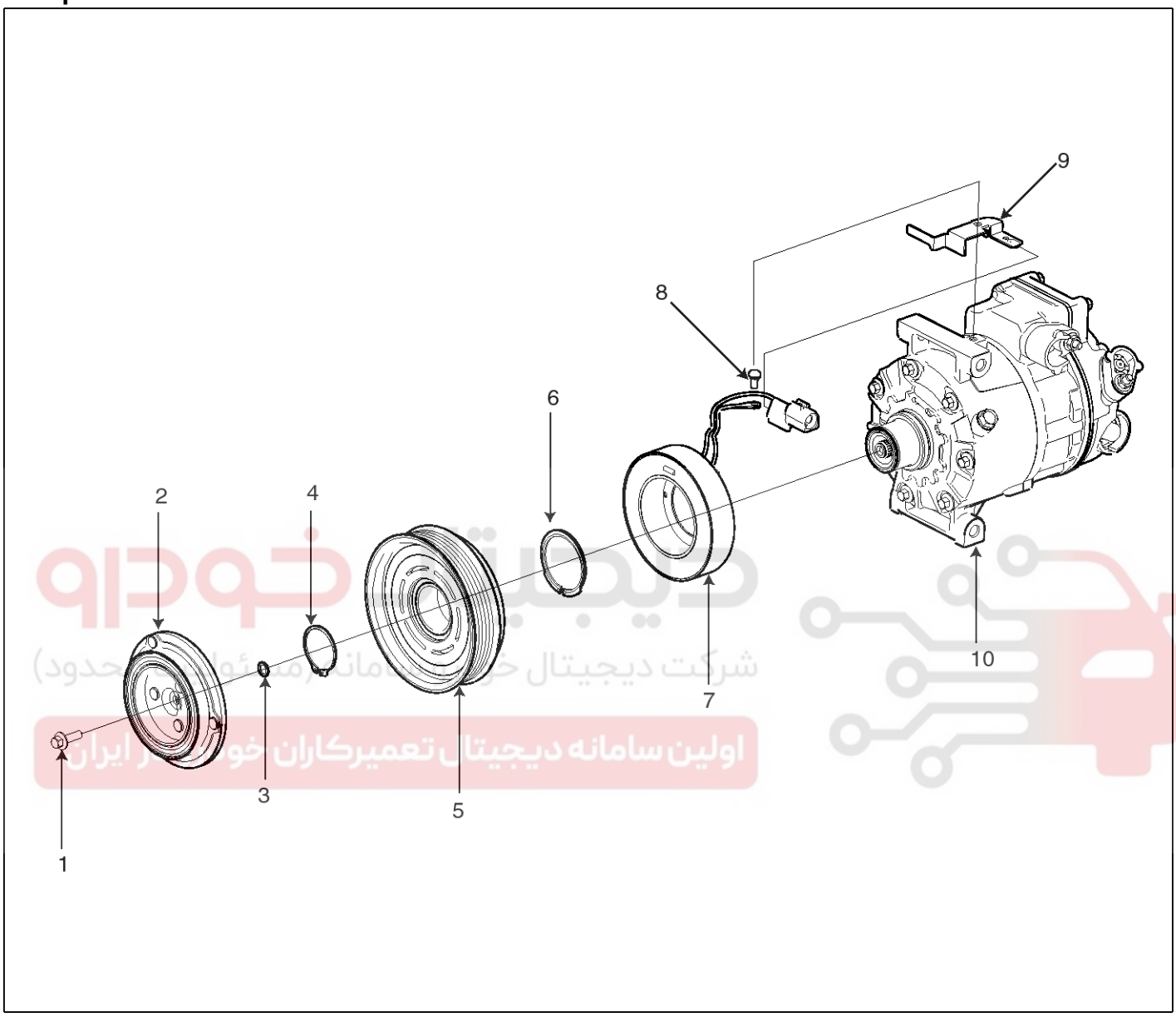
The specified volume - volume of removed compressor = volume to drain from the new compressor.

NOTICE

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

Compressor

Components

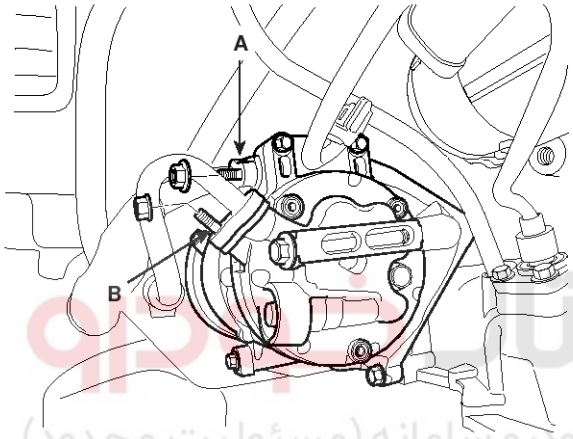


SENHA9105L

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

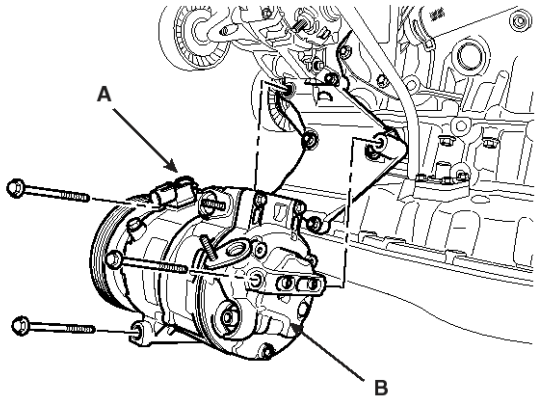
Removal

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.



SENHA6003D

6. Disconnect the compressor clutch connector (A), and then remove 3 mounting bolts and the compressor.

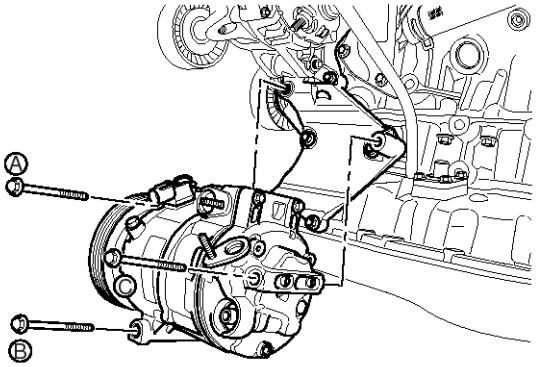


SENHA7812D

Installation

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

TORQUE : 2.04 ~ 3.36 kgf.m (0.2 ~ 3.33 N.m, 0.14 ~ 0.24 lb.ft)

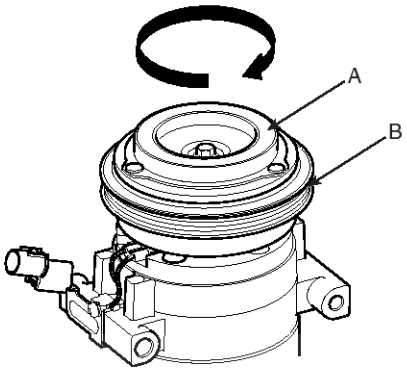


SENHA6510D

2. Install in the reverse order of removal, and note these items.
   - 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 150cc(5.07 fl.oz) the result is the amount of oil you should drain from the new compressor (through the suction fitting).
   - 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.
   - To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
   - Immediately after using the oil, replace the cap on the container and seal it to avoid moisture absorption.
   - 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.
   - Adjust the drive belt.
   - 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.



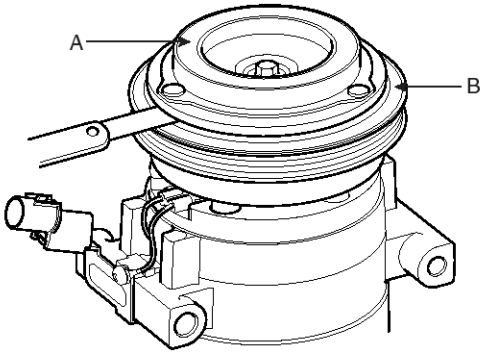
AQJF106A

3. Measure the clearance between the pulley (B) and the 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: 0.5 ± 0.15mm (0.019 ± 0.005 in.)

NOTICE

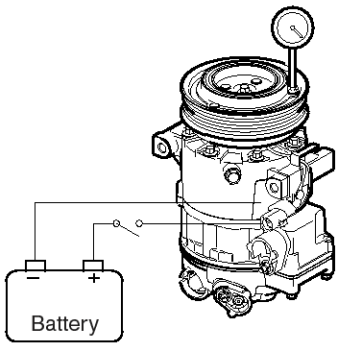
The shims (gap washers) are available in seven thicknesses: 0.7mm, 0.8mm, 0.9mm, 1.0mm, 1.1mm, 1.2mm and 1.3mm.



AQJF106B

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

   Check the magnetic clutch operating noise to determine the condition.

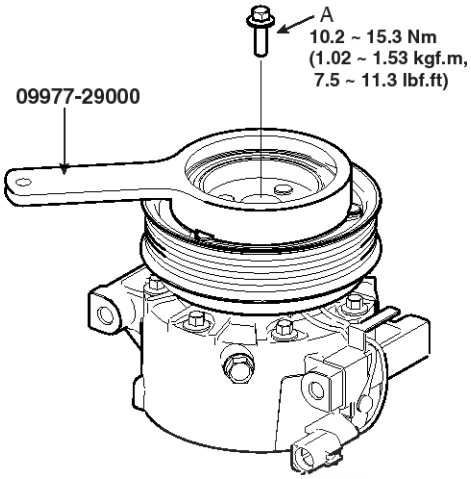


SUNHA6221D

Disassembly

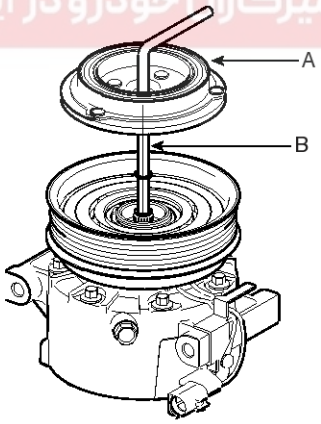
1. Remove the center bolt (A) while holding the disc & hub assembly with a commercially available disc & hub assembly bolt remover; Special tool number 09977-29000.

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



SUNHA6222D

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.

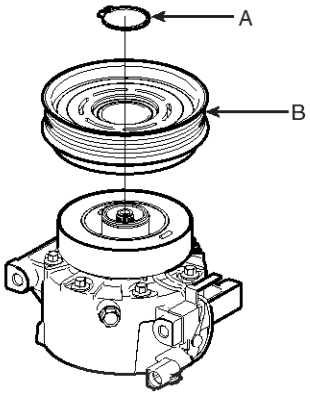


SUNHA6223D

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

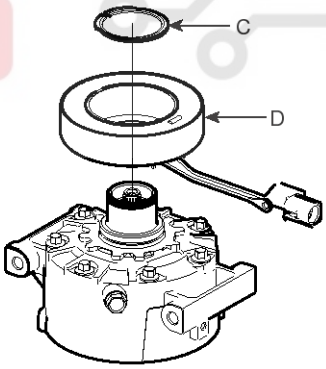
NOTICE

- *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.*



SUNHA6224D

4. Remove the screw 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.

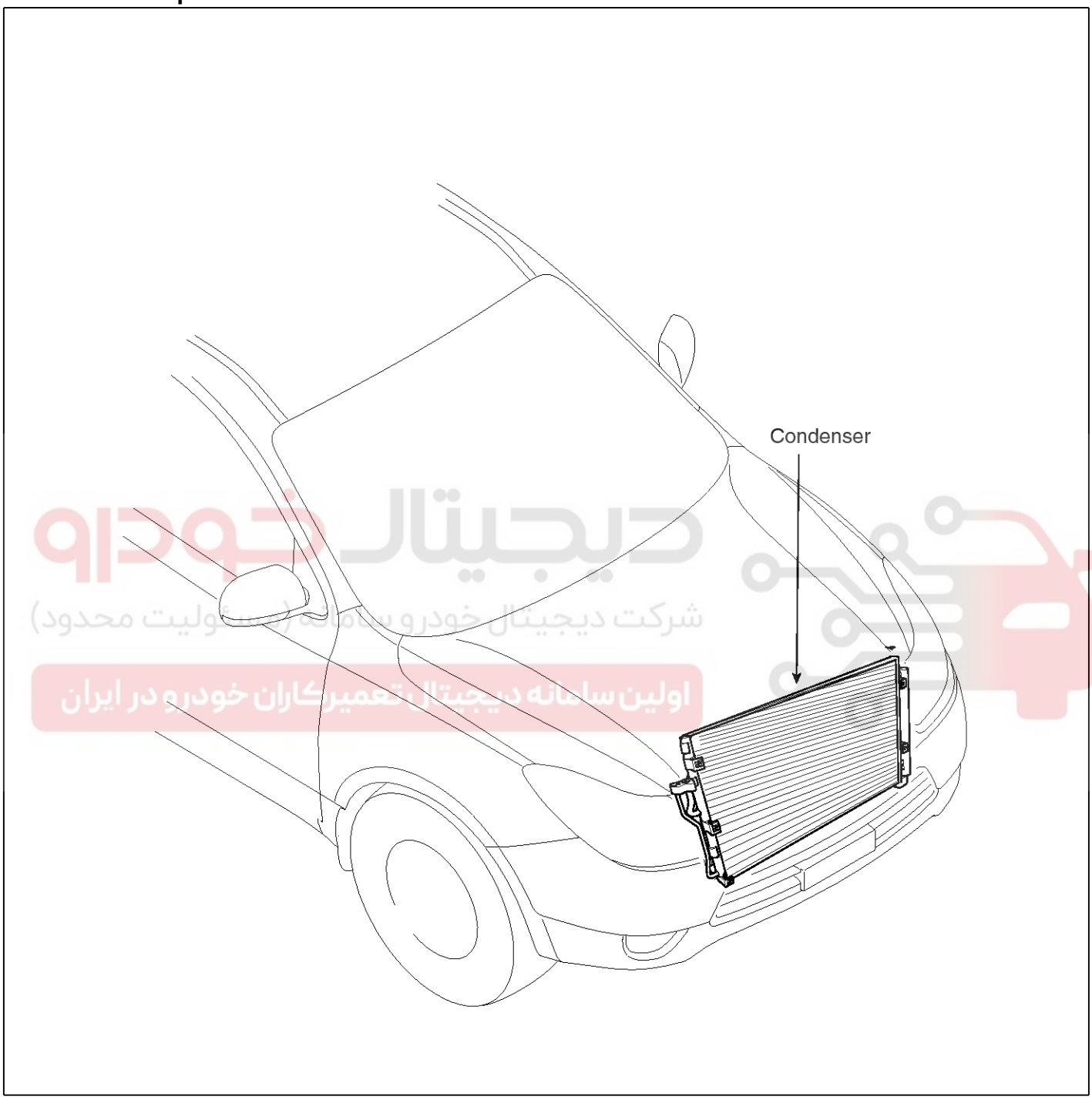


SUNHA6225D

5. Reassemble the compressor clutch in the reverse order of disassembly, and note these items :
   - Clean the pulley and compressor sliding surfaces with non-petroleum solvent.
   - Install new retainer rings, and make sure they are fully seated in the groove.
   - Make sure that the pulley turns smoothly after its reassembled.

Condenser

General Description



SENHA7107L

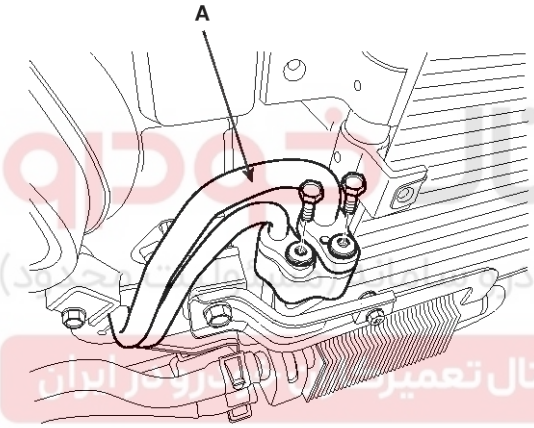
Inspection

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

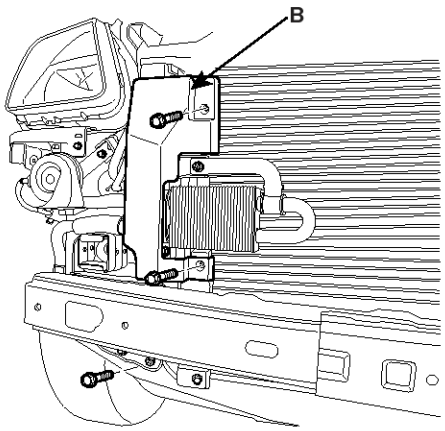
Condenser Assembly

1. Recover the refrigerant with a recovery/ recycling/ charging station .
2. Disconnect the negative (-) battery terminal.
3. Remove the front bumper(Refer to BD group-front bumper)
4. Loosen the refrigerant line mounting bolts and disconnect the refrigerant line (A).

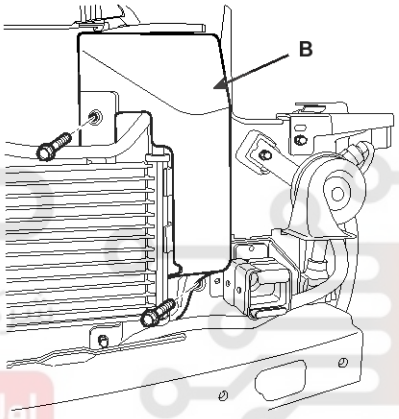


SENHA6004D

5. Remove the left & right condenser cover (B).

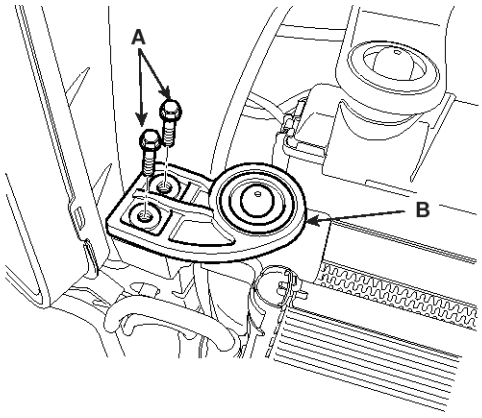


SENHA6005D



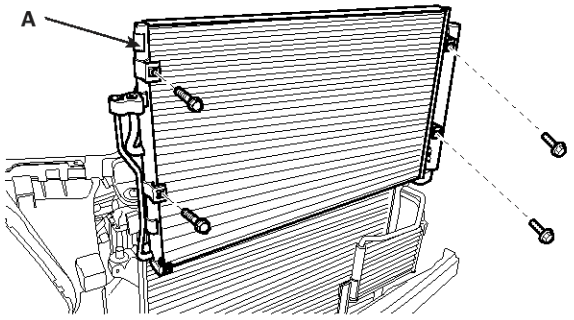
SENHA6006D

6. Remove the condenser bracket (B) after loosening the mounting bolts (A).



SENHA6007D

7. Remove 4 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.



SENHA6008L

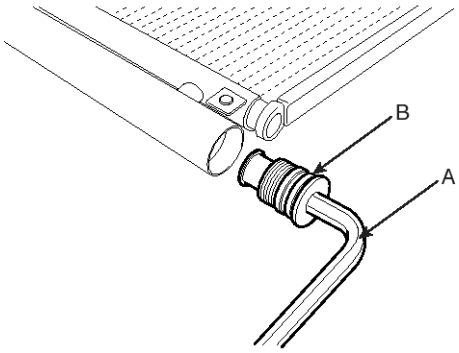
8. Install in the reverse order of removal, and note these items :
   - If you're installing a new condenser, add refrigerant oil ND-OIL8.
   - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for R-134a 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.

Receiver-Drier

Replacement

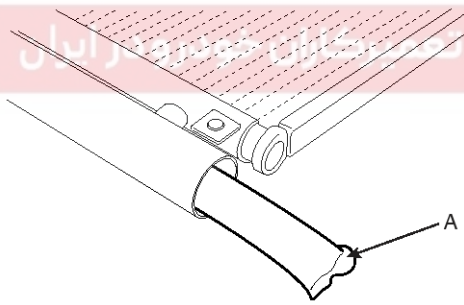
1. Remove the condenser, and then remove the bottom cap (B) with L wrench (A) from the condenser.

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



KQRE108D

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



KQRE108E

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.

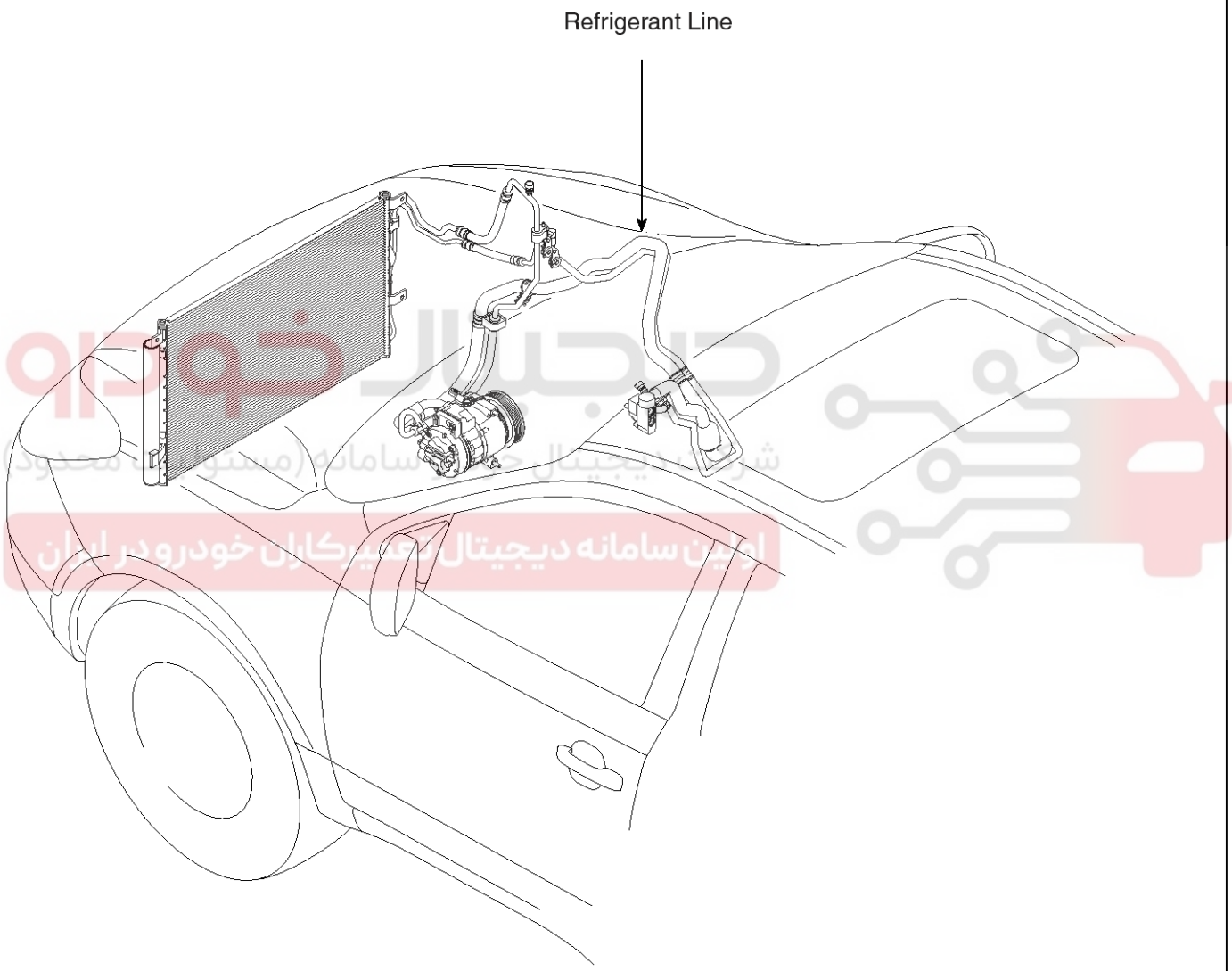
NOTICE

- *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.*

Refrigerant line

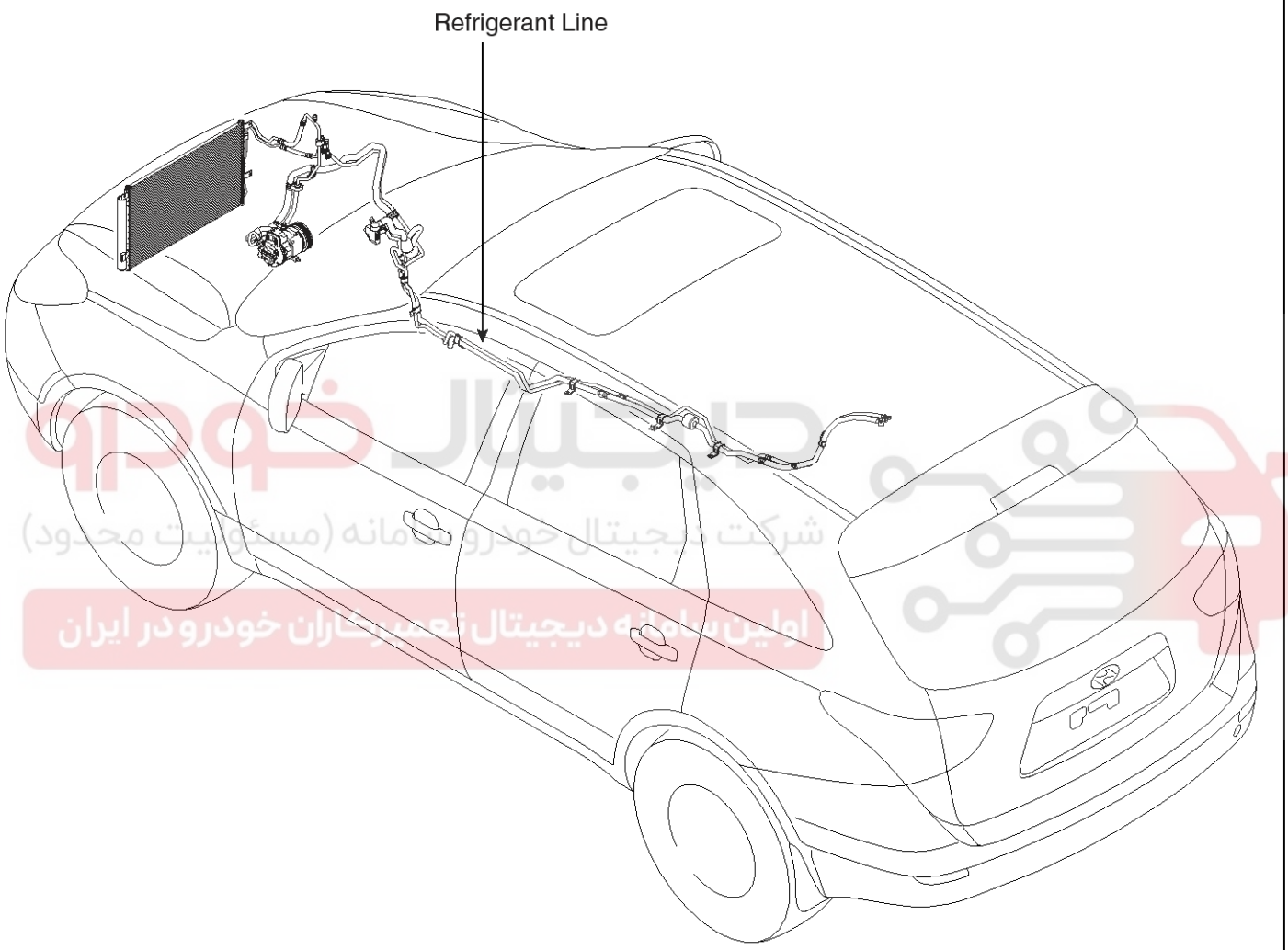
General Description

[FRONT ONLY]



SENHA7103L

[FRONT & REAR]



SENHA7509L

Relpacemrnt

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	11.8 ~ 14.7	1.2 ~ 1.5	8.7 ~ 10.9

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

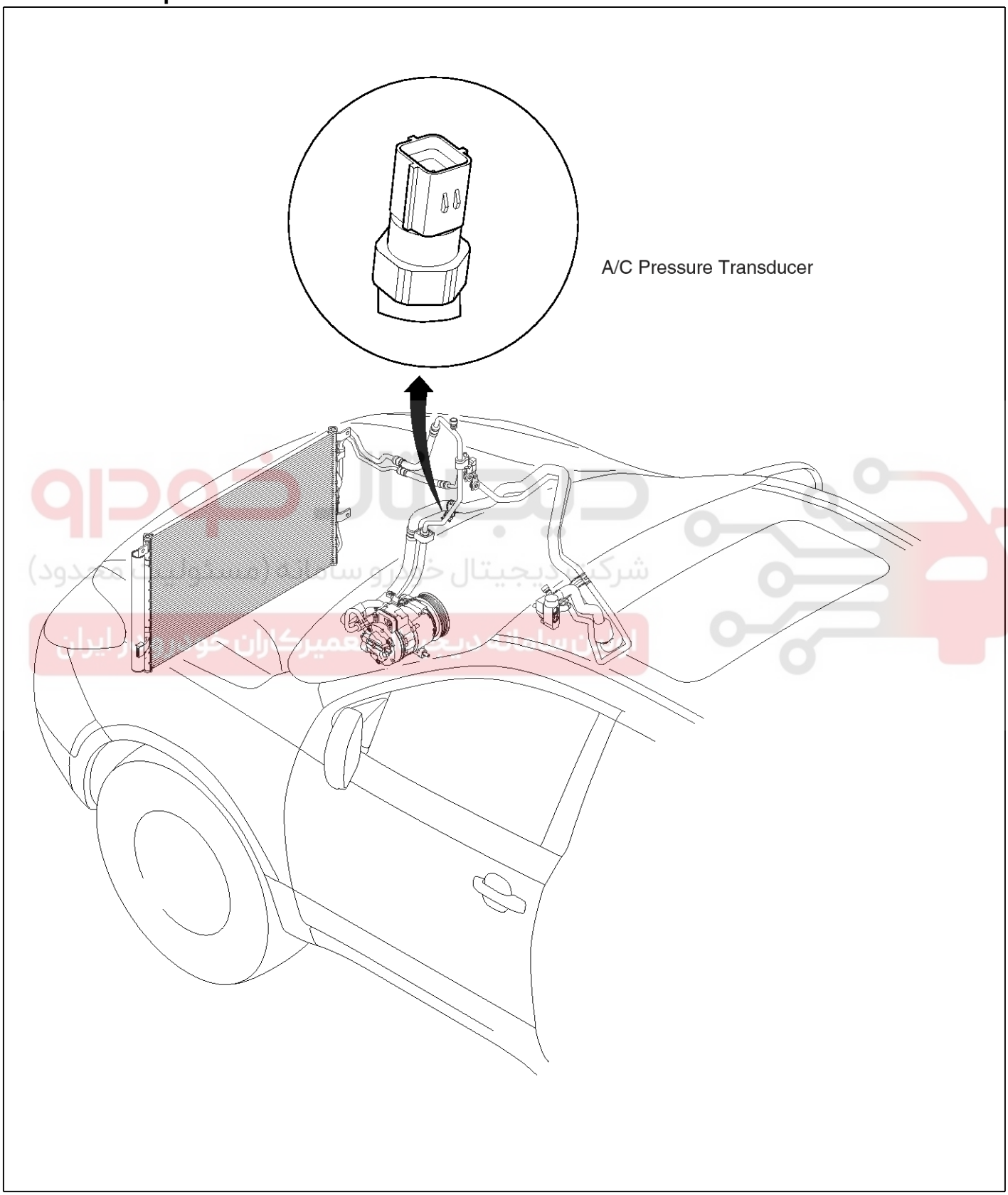
Specified amount: Front only : 700 ± 25g
Front & rear : 900 ± 25g

5. Inspect for leakage of refrigerant.

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

A/C pressure transducer

General Description



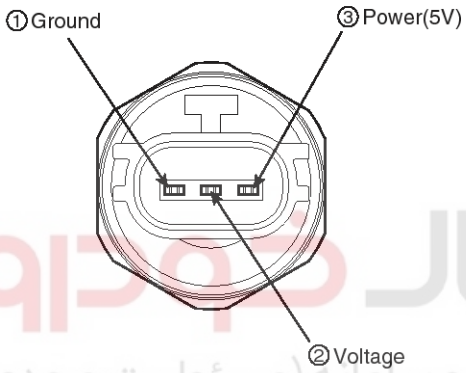
SENHA7108L

Description

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

Inspection

1. Measure the pressure of high pressure line by measuring voltage output between NO.1 and NO.2 terminals.



EQRF116B

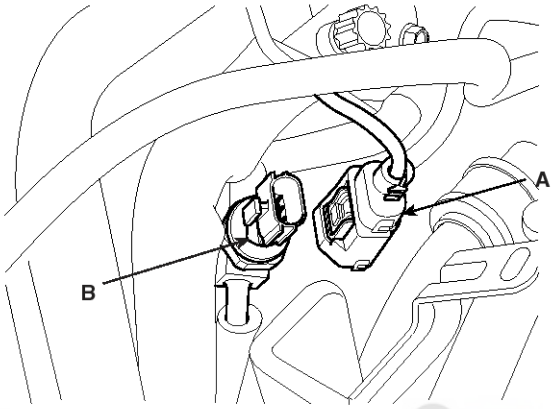
2. Inspect the voltage value whether it is sufficient to be regular value or not.

Voltage = 0.00878835 * Pressure + 0.37081095 [PSIA]

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).



SENHA6009L

⚠CAUTION

Take care that liquid & suction pipe are not bent.

5. Installation is the reverse order of removal.

TORQUE: 10~12N.m (1.0~1.2kgf.m, 7.4~8.8lbf.ft)

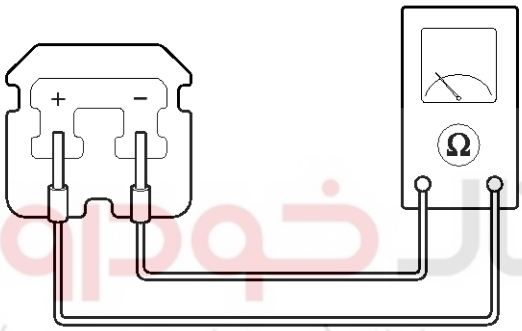
Evaporator temperature sensor

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.



AQJF206B

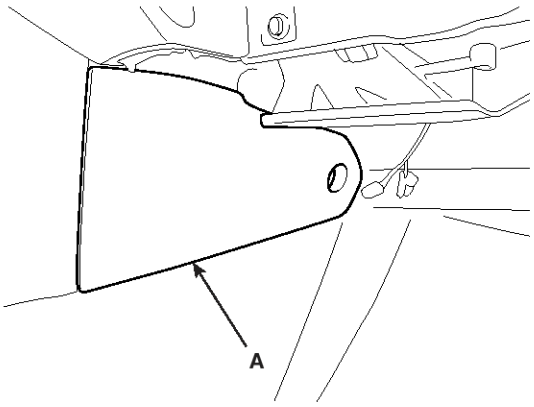
[Specification]

Evaporator core temperature [°C(°F)]	Resistance [kΩ]
-10 (14)	43.35
-5 (23)	34.48
0 (32)	27.62
5 (41)	22.27
10 (50)	18.07
15 (59)	14.75
20 (68)	12.11
25 (77)	10.00
30 (86)	8.30
35 (95)	6.93
40 (104)	5.81
45 (113)	4.9
50 (122)	4.15

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.

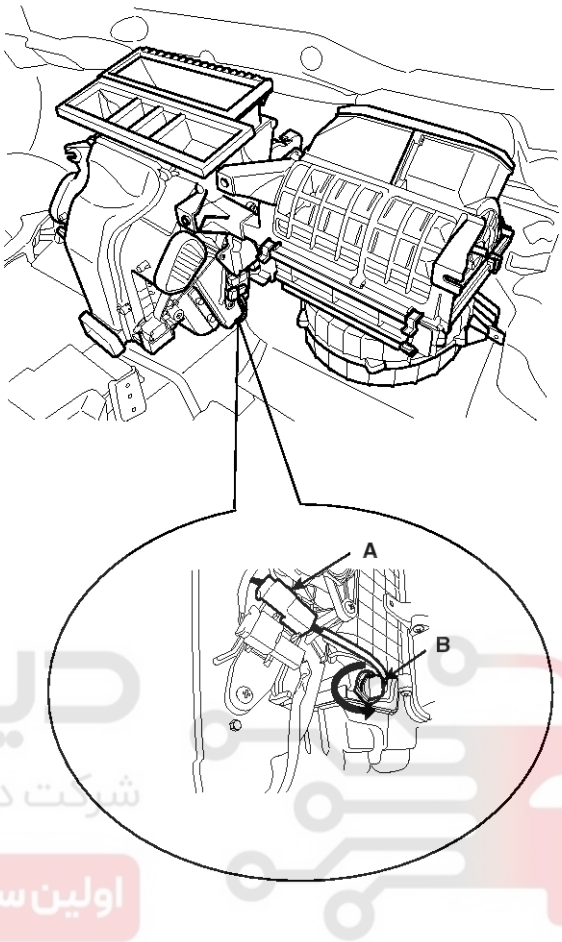
Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the extenser cover (A).



SENBD7064D

3. Disconnect the evaporator sensor connector (A).
4. Remove the evaporator temperature sensor (B), by pulling it after rorating 90˚ in a counter clock wise direction.



SENHA7510L

⚠CAUTION

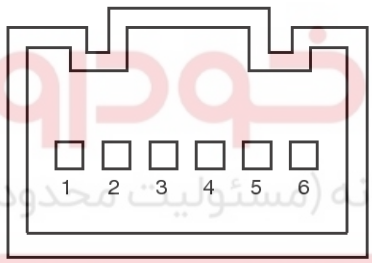
Take care that evaporator core pins are not bent.

5. Installation is the reverse order of removal.

In-car sensor

Description

1. In-car air temperature sensor is located at the center facia.
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.
3. It perceives the inside temperature, changes the resistance value, and enters the corresponding voltage into the automatic temperature control module.
4. It will used for discharge temperature control, sensor failsafe, temperature door control, blower motor level control, and A/C auto control.



1. Motor (–)
2. Sensor ground (–)
3. Humidity sensor signal
4. In car sensor temp signal
5. Sensor power (–)
6. Motor (+)

KQRE201B

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.

[Specification]

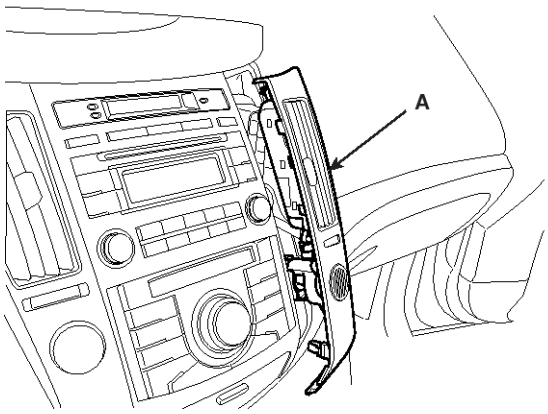
Temperature [℃(℉)]	Resistance between terminals 2and 4 (kΩ)
-30 (-22)	509.57
-20 (-4)	285.61
-10 (14)	164.65
-5 (23)	126.38
0 (32)	97.71
5 (41)	76.09
10 (50)	59.67
15 (59)	47.13
20 (68)	37.48
25 (77)	30.00
30 (86)	24.17
35 (95)	19.57
40 (104)	15.98
50 (122)	10.81

NOTICE

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

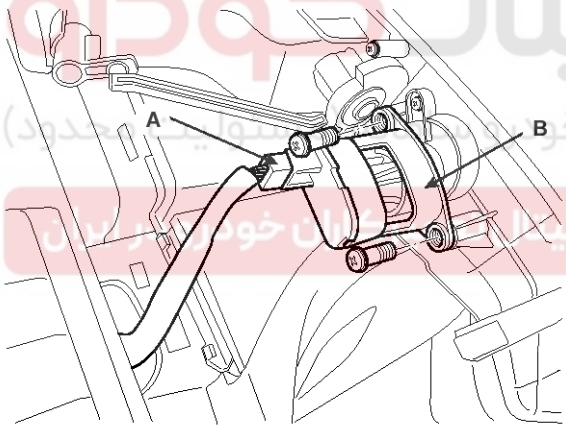
Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the center facia panel(A).



SENHA6010D

3. Disconnect the connector of in-car sensor (A).Loosen the mounting 2 screws and then remove the in-car sensor (B).



SENHA6011D

4. Installation is the reverse order of removal.

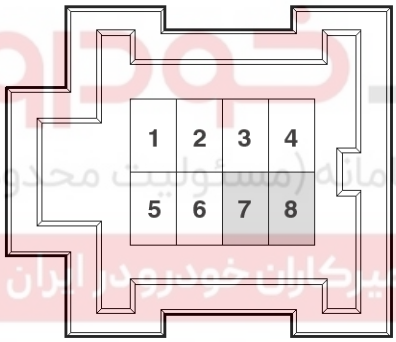
Photo sensor

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.

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.

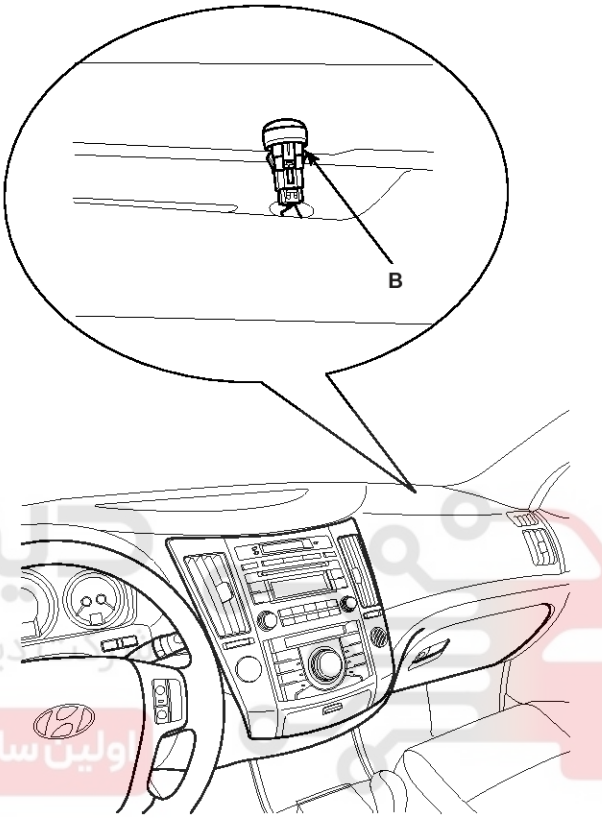


1. -
2. -
3. -
4. -
5. Sensor power (+5V)
6. Photo sensor (-) Right
7. Photh sensor (-) Left

AQIE202B

Replacement

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



SENHA6012D

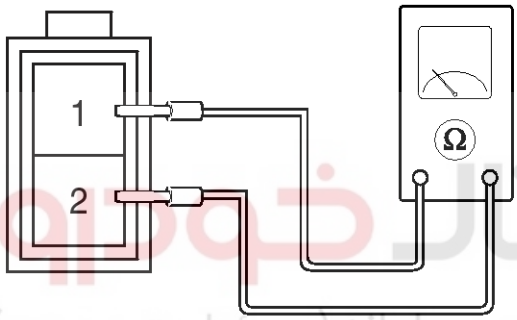
3. Install in the reverse order of removal.

Water temperature sensor

Description

1. Water temperature sensor is located at the heater unit.
2. It detects coolant temperature. Its signal is used for cold engine lockout control. When the driver operates the heater before the engine is warmed up, the signal from sensor causes the heater control unit to reduce blower motor speed until coolant temperature reaches the threshold value.

1. Ignition "ON"
2. Using the multi-tester, Measure resistance between terminal "1" and "2" of water temperature sensor.



1. Water Temprature sensor (+)
2. Ground (−)

KQRE203D

[Specification]

Coolant temperature [℃(℉)]	Resistance (kΩ)
-10(14)	55.85
0(32)	32.91
10(50)	19.99
20(68)	12.51
30(86)	8.047
40(104)	5.311
50(122)	3.588
60(140)	2.476
70(158)	1.742
80(176)	1.246

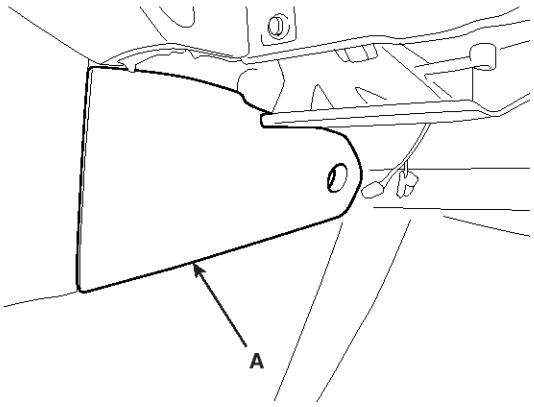
3. If the measured resistance is not specification, substitute with a known-good water temperature sensor and check for proper operation.
4. If the problem is corrected, replace the water temperature sensor.

NOTICE

Negative type thermistor that resistance will rise with lower temperature, and reduce with higher temperature.

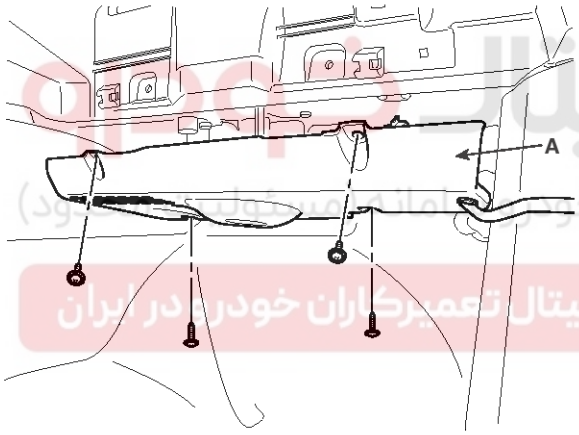
Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the extenser cover (A).



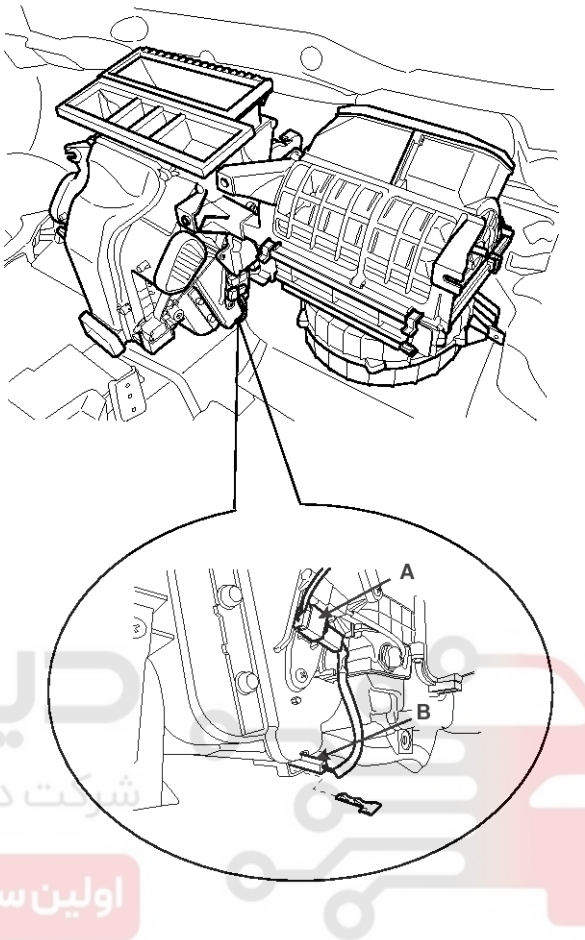
SENBD7064D

3. Remove the crash pad under cover (A).



SENHA6015L

4. Disconnect the connector (A) of water temperature sensor(B) and then remove the water temperature sensor by pulling out.



SENHA6016D

5. Installation is the reverse order of removal.

NOTICE

Take care that wire of water temperature sensor is not to be damaged

Ambient sensor

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.

NOTICE

If the ambient temperature is below 2.0℃ (35.6°F), the A/C compressor will be stopped.

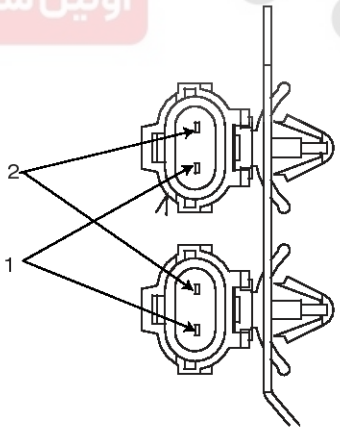
The compressor will be operated by manual operating.

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 [℃(°F)]	Resistance between terminals 1and 2 (kΩ)
-30(-22)	479.22
-20(-4)	271.45
-10(14)	158.32
0(32)	95.10
10(50)	58.76
20(68)	37.30
30(86)	24.27
40(104)	16.17
50(122)	11.00
60(140)	7.63
70(158)	5.38

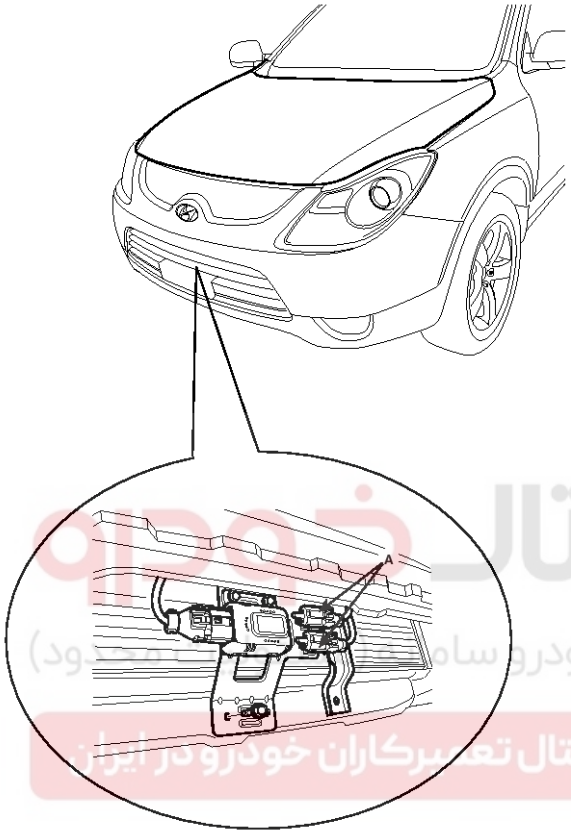


SENHA7513L

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).



SUNHA6218D

4. Installation is the reverse order of removal.

Air Quality Sensor(AQS)

Description

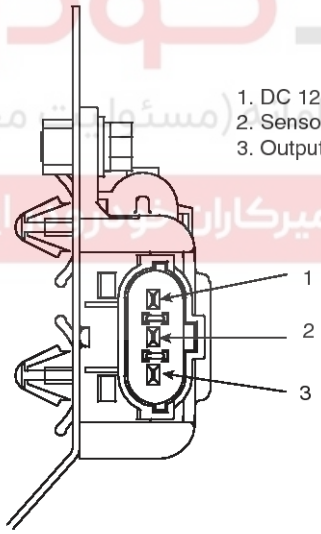
1. A.Q.S is located at center support in front of the engine radiator, and detects hazardous elements in ambient air providing output signal to control.
2. It will detect sulfurous acid gas, carbon dioxide, carbon monoxide, hydrocarbon and allergen.

Inspection

1. Ignition "ON"
2. Using the scan tool.
3. Check the output voltage of AQS between terminals 2 and 3.

[Specification]

Condition	Output signal	Fresh/recirculation
Normal condition	4 ~ 5V	Fresh
Hazardous gas detection	0 ~ 1V	Recirculation



SENHA7514L

4. AQS diagnosis and fail safe

   Detect the open of signal for 7 seconds without choosing the AQS switch when IG on.

   If 2.5V or more is detected for 3.5 seconds or more among 7 seconds, be judged the open of AQS signal.

   Operate as below fail safe function, while choosing AQS.

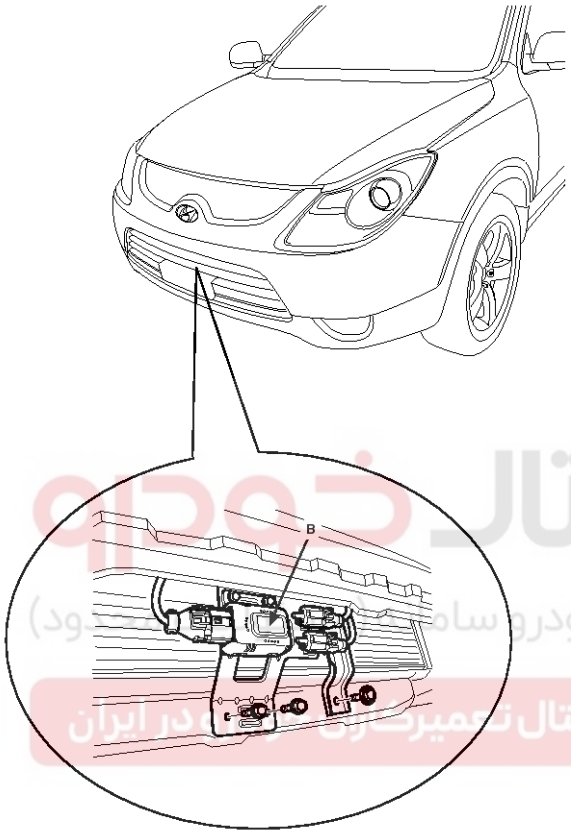
   Fail safe: Release the AQS (AQS cannot be selected), Fresh/recirculation maintains previous situation of AQS selection.

NOTICE

When IG is turned ON, AQS heats for 34±5 seconds, it will output below 1.0 voltage during this time.

Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the front bumper (Refer to BD group-Front bumper).
3. Remove the AQS (B) after loosening the mounting bolts.



SENHA7504L

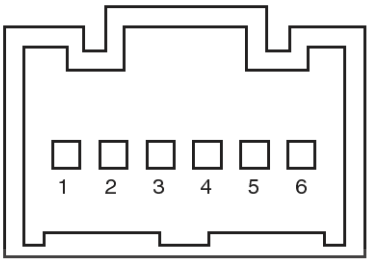
4. Installation is the reverse order of removal.

Humidity Sensor

Description

1. Humidity sensor is located at the center facia and detected in-car humidity for in-car humidity control.
2. If ambient air temperature or in-car humidity is outside certain range, it will turn on A/C to control in-car humidity preventing in car fogging.

   Air conditioner operation depends on ambient temperature and humidity.



1. Motor (-)
2. Sensor ground (-)
3. Humidity sensor signal
4. In-car sensor temp signal
5. Sensor power (-)
6. Motor (+)

AQIE201C

Inspection

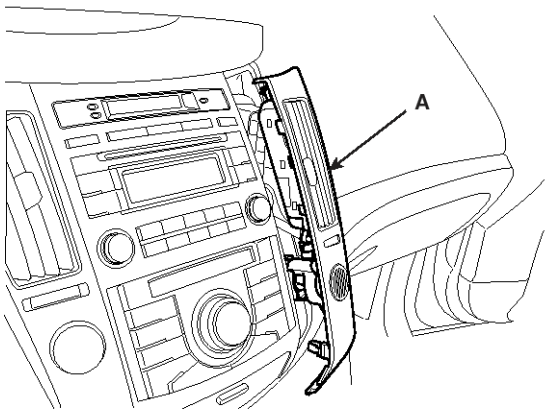
1. Ignition "ON"
2. Using the scan tool.
3. Check the frequency of humidity sensor between terminals 2 and 3.

Humidity (%)	Frequency between terminals 2and 3 (Hz)
30	6976
40	6853
50	6728
60	6600
70	6468
80	6330
90	6186

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

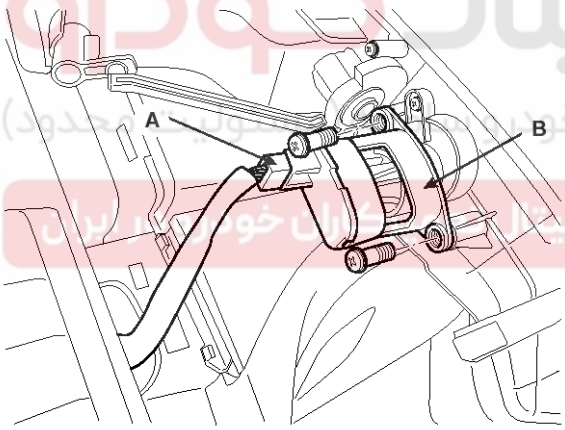
Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the center facia panel (A).



SENHA6010D

3. Disconnect the humidity sensor connector (A).
4. Loosen 2 screws and then remove the humidity sensor (B).



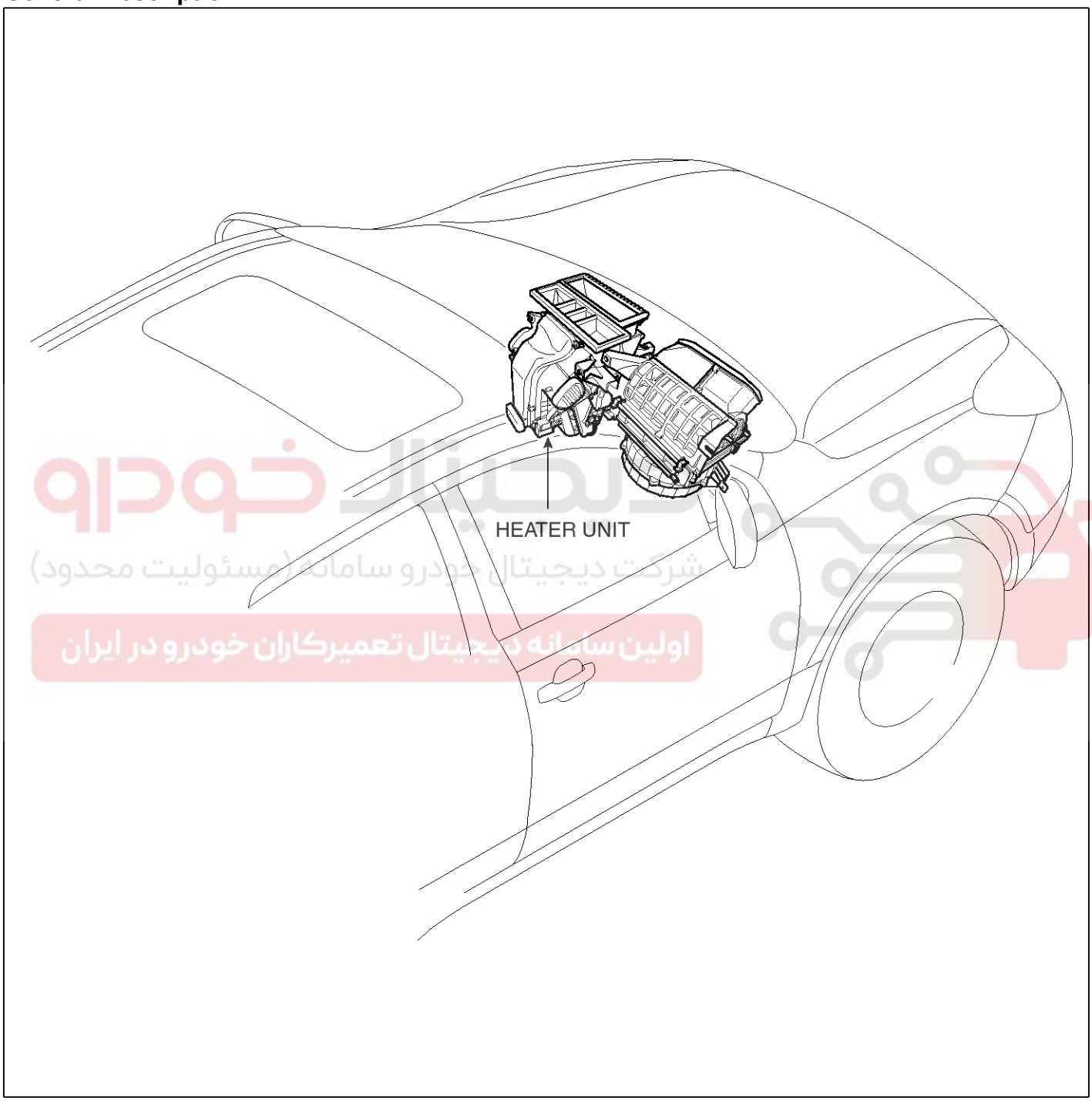
SENHA6011D

5. Installation is the reverse order of removal.

Heater

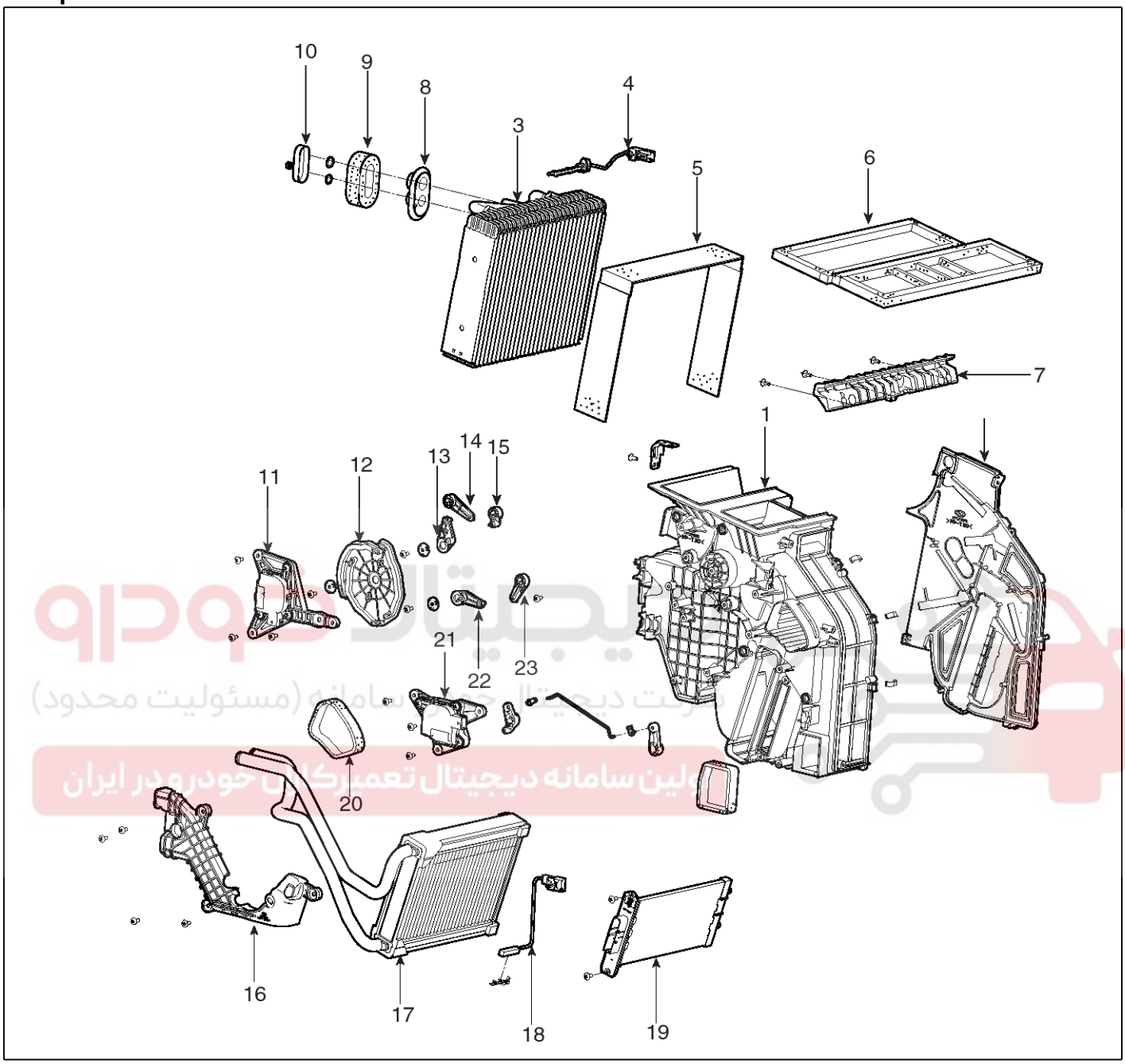
Heater Unit

General Description



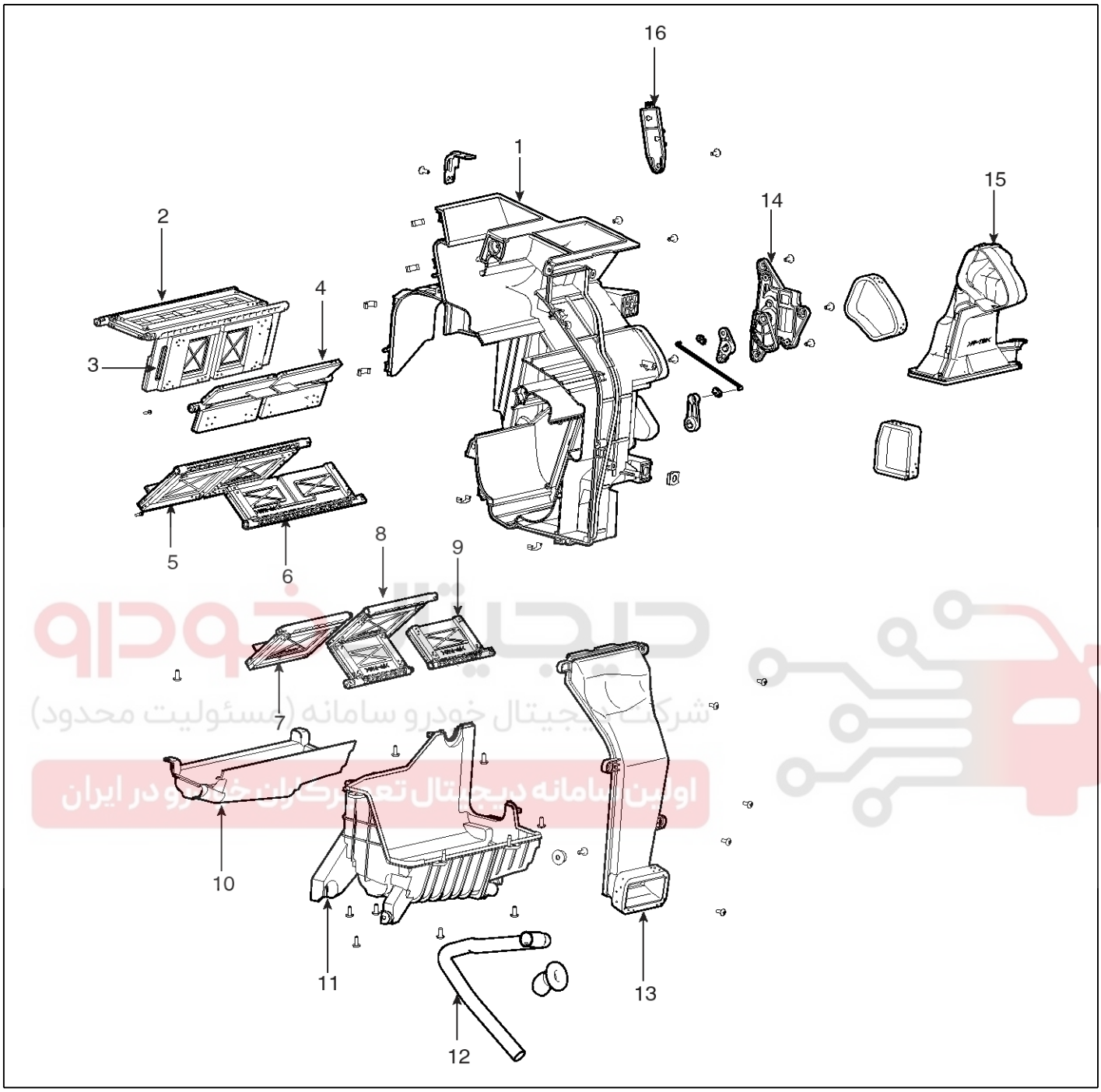
SENHA7109L

Components



SENHA9110L

1. Heater case (L)
2. Separator
3. Evaporator core
4. Evaporator temperature sensor
5. Evaporator core seal
6. Cowl seal
7. Def duct bracket
8. Evaporator tube bracket
9. Evaporator tube bracket
10. Joint flange cap
11. Mode actuator
12. Mode cam
13. Def door
14. Def door lever
15. Vent door lever
16. Heater core cover
17. Heater core
18. Water temperature sensor
19. PTC
20. Heater case seal
21. Temp actuator
22. Floor door lever
23. Floor door arm



SENHA9507L

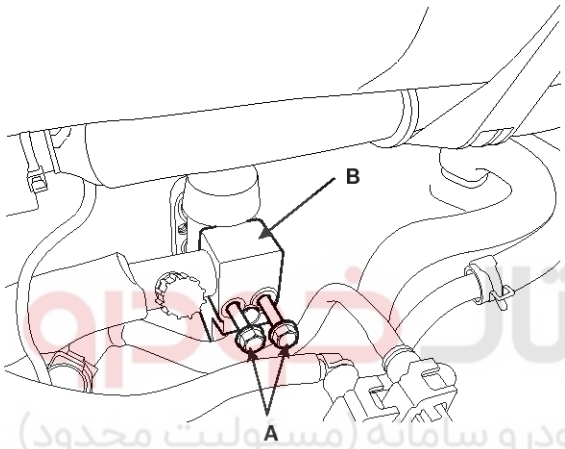
1. Heater case (R)
2. Def door
3. Vent door
4. Floor door
5. Temp door
6. Temp door (A)
7. Temp door
8. Temp door
9. Temp door (A)
10. Lower heater insulator
11. Heater lower case
12. Drain hose
13. Air duct
14. Temp actuator
15. Shower duct
16. Water temp sensor connector bracket

Replacement

1. Disconnect the negative (-) battery terminal.
2. Recover the refrigerant with a recovery/ recycling/ charging station.
3. When the engine is cool, drain the engine coolant from the radiator.
4. Remove the bolts (A) and the expansion valve (B) from the evaporator core.

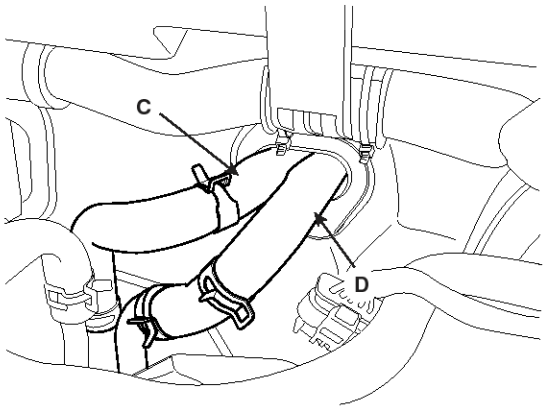
   Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.

Torque : 0.8 ~ 1.2Kg.m (7.84 ~ 11.76 N.m, 5.78 ~ 8.67 lb.ft)



SENHA6020D

5. Disconnect the inlet (C) and outlet (D) heater hoses from the heater unit.

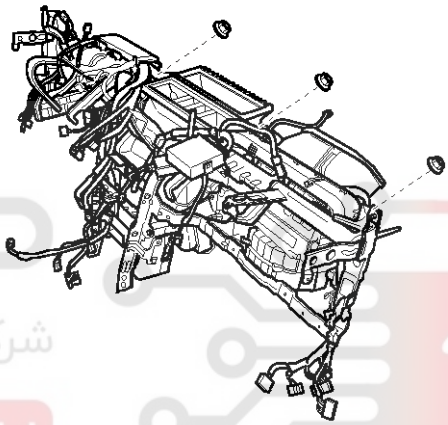


SENHA6021D

⚠CAUTION

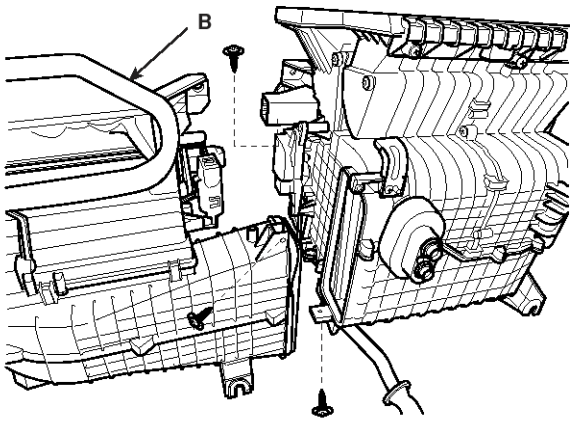
Engine coolant will run out when the hoses are disconnected; drain it into a clean drip pan. Be sure not to let coolant spill on electrical parts or painted surfaces. If any coolant spills, rinse it off immediately.

6. Remove the crash pad. (Refer to BD group-Crash pad)
7. Remove the cowl cross bar assembly. (Refer to BD group-Crash pad)
8. Disconnect the connectors from the temperature control actuator, the mode control actuator and the evaporator temperature sensor.
9. Remove the heater & blower unit after loosening 3 mounting nuts.



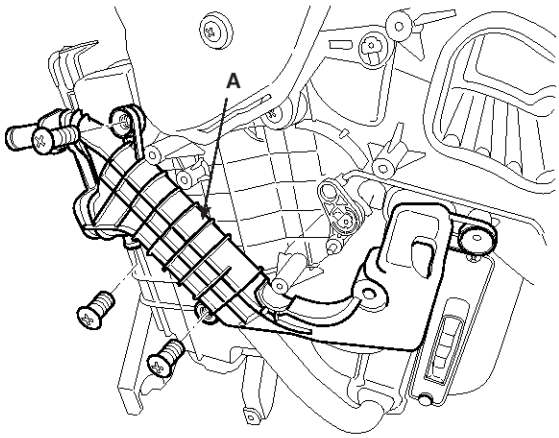
SENHA6022D

10. Remove the blower unit (B) from heater unit after loosening 3 screws.



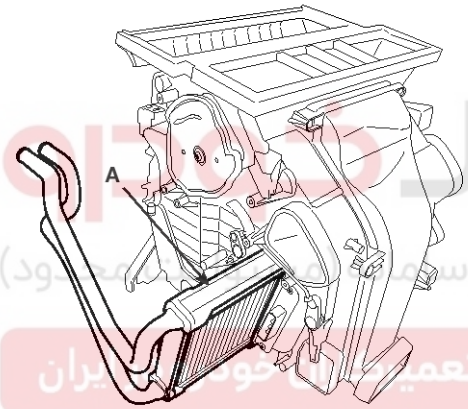
SENHA6023D

11. Remove the heater core cover(A).



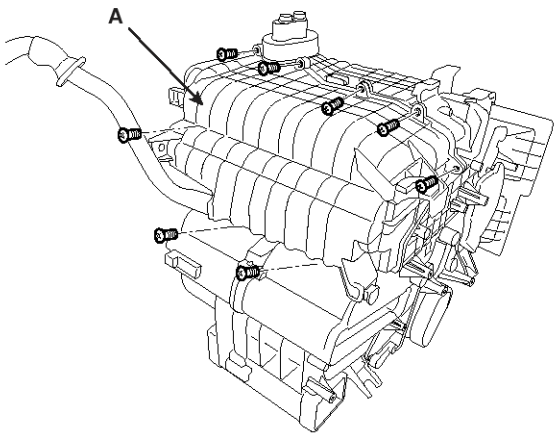
SENHA6024D

12. Remove the heater core (A) from the heater unit.



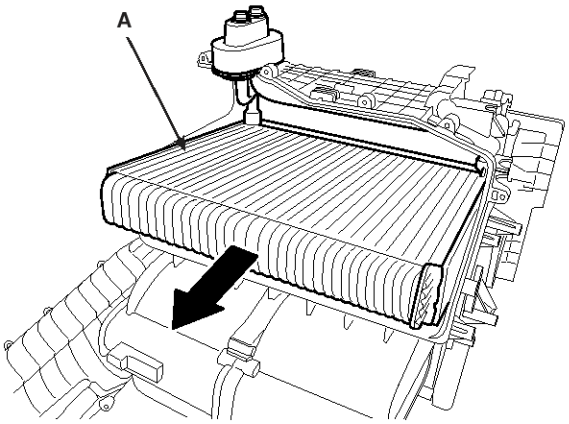
SENHA6025D

13. Remove the heater unit cover (A) after loosening the screw.



SENHA6026D

14. Remove the evaporator core(A).

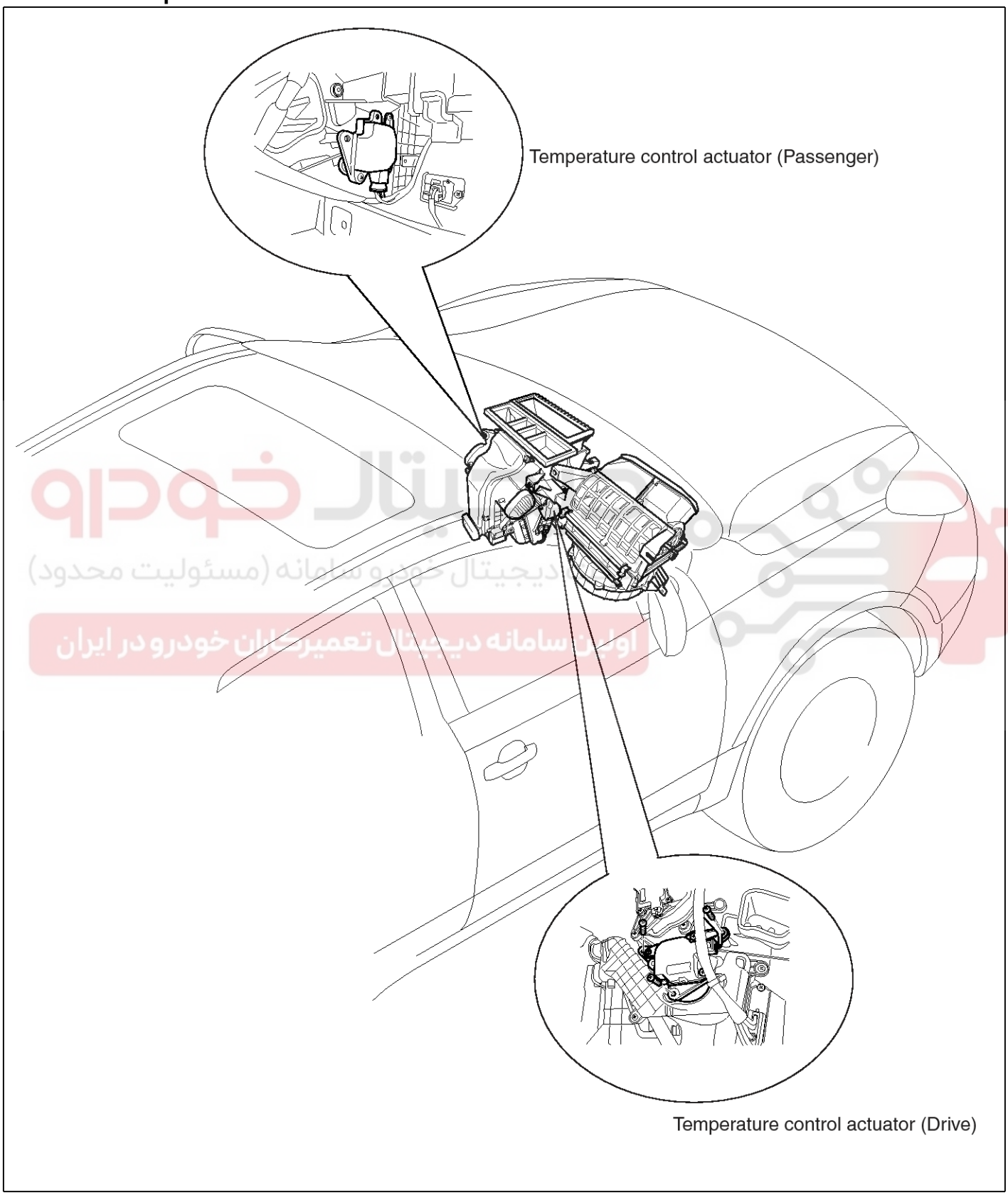


SENHA6027D

15. Be careful that the inlet and outlet pipe are not bent during heater core removal, and pull out the heater core.
16. Install the heater core in the reverse order of removal.
17. Installation is the reverse order of removal, and note these items :
    - If you're installing a new evaporator, add refrigerant oil (ND-OIL8).
    - 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.
    - Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
    - 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.
    - Apply sealant to the grommets.
    - Make sure that there is no air leakage.
    - Charge the system and test its performance.
    - Do not interchange the inlet and outlet heater hoses and install the hose clamps securely.
    - Refill the cooling system with engine coolant.

Temperature Control Actuator

General Description



SENHA7111L

Description

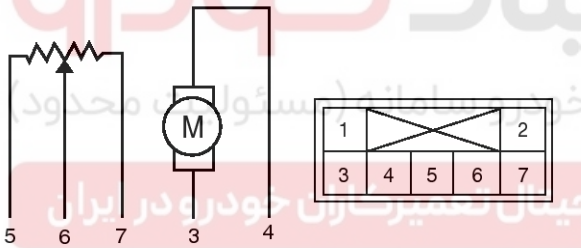
1. Heater unit includes mode control actuator and temperature control actuator.
2. Temperature control actuator is located at the heater unit. It regulates the temperature by the procedure as follows. Signal from control unit adjusts position of temperature door by operating temperature switch and then temperature will be regulated by the hot/cold air ratio decided by position of temperature door.

Inspection

1. Ignition "OFF"
2. Disconnect the connector of temperature control actuator.
3. Verify that the temperature control actuator operates to the hot position when connecting 12V to the terminal 3 and grounding terminal 4.

   Verify that the temperature control actuator operates to the cool position when connecting in the reverse.

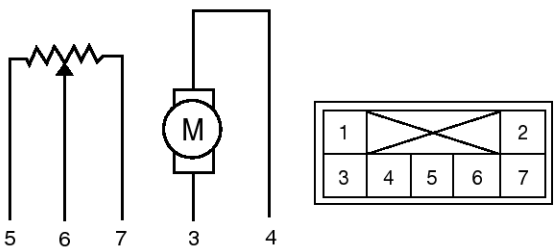
[Drive]



3.Cool position
4. Hot position
5. 5V (Vcc)
6. Feedback signal
7. Sensor ground

SENHA7515L

[Passenger]



3. Hot position
4. Cool position
5. Sensor ground
6. Feedback signal
7. 5V (Vcc)

SENHA7516L

4. Check the voltage between terminals 6 and 7(Drive).
5. Check the voltage between terminals 5 and 6(Passenger).

Specification

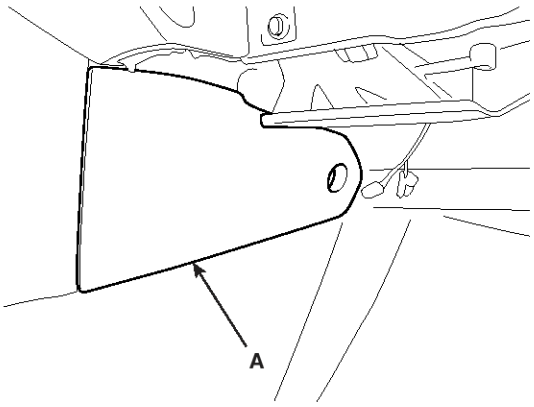
Door position	Voltage	Error detecting
Max. cooling	0.3 ± 0.15V	Low voltage : 0.1V or less
Max. heating	4.7 ± 0.15V	High voltage : 4.9V or more

It will feedback current position of actuator to controls.

6. If the measured voltage is not specification, substitute with a known-good temperature control actuator and check for proper operation.
7. If the problem is corrected, replace the temperature control actuator.

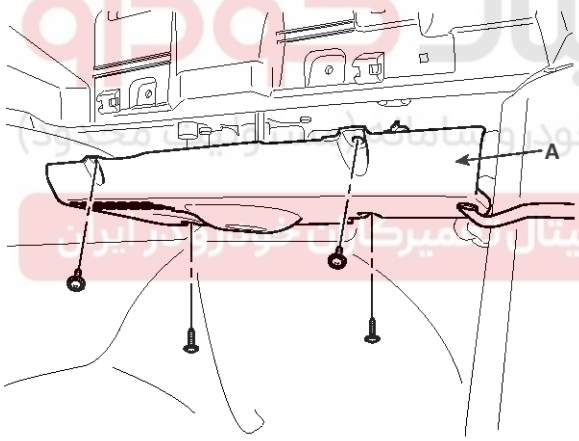
Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the extenser cover (A).



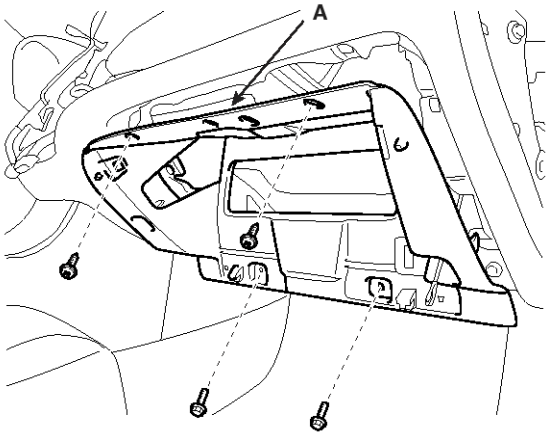
SENBD7064D

3. Remove the glove box(Refer to BD group-Crash pad).
4. Remove the crashpad lower panel(A).



SENHA6015L

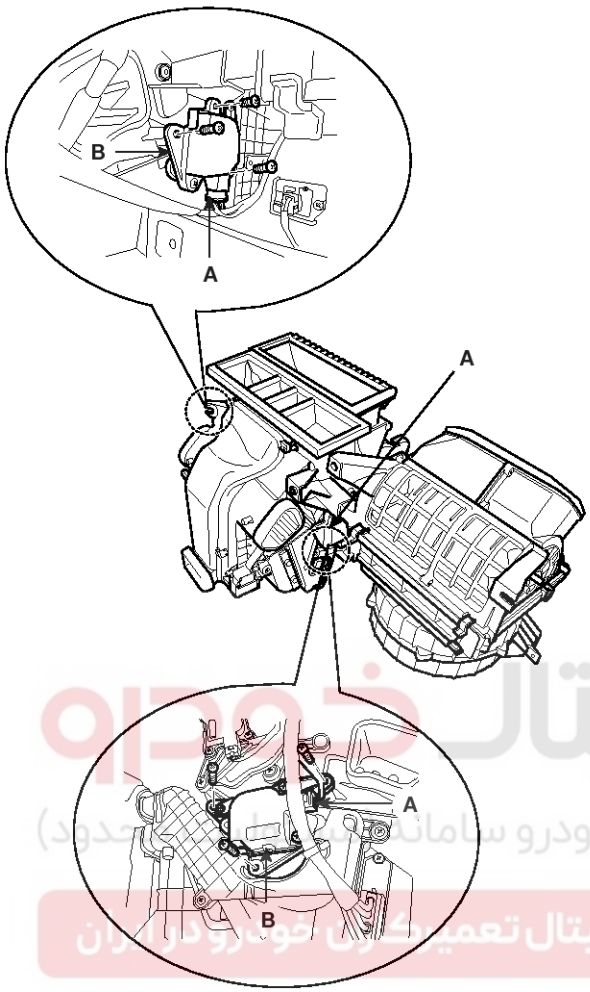
5. After loosening the mounting screws and bolts, then remove the glove box housing (A).



SENHA6501D

6. Disconnect the temperature control actuator connector (A) after removing the air duct.

7. Loosen the mounting screw and then remove the temperature control actuator (B).

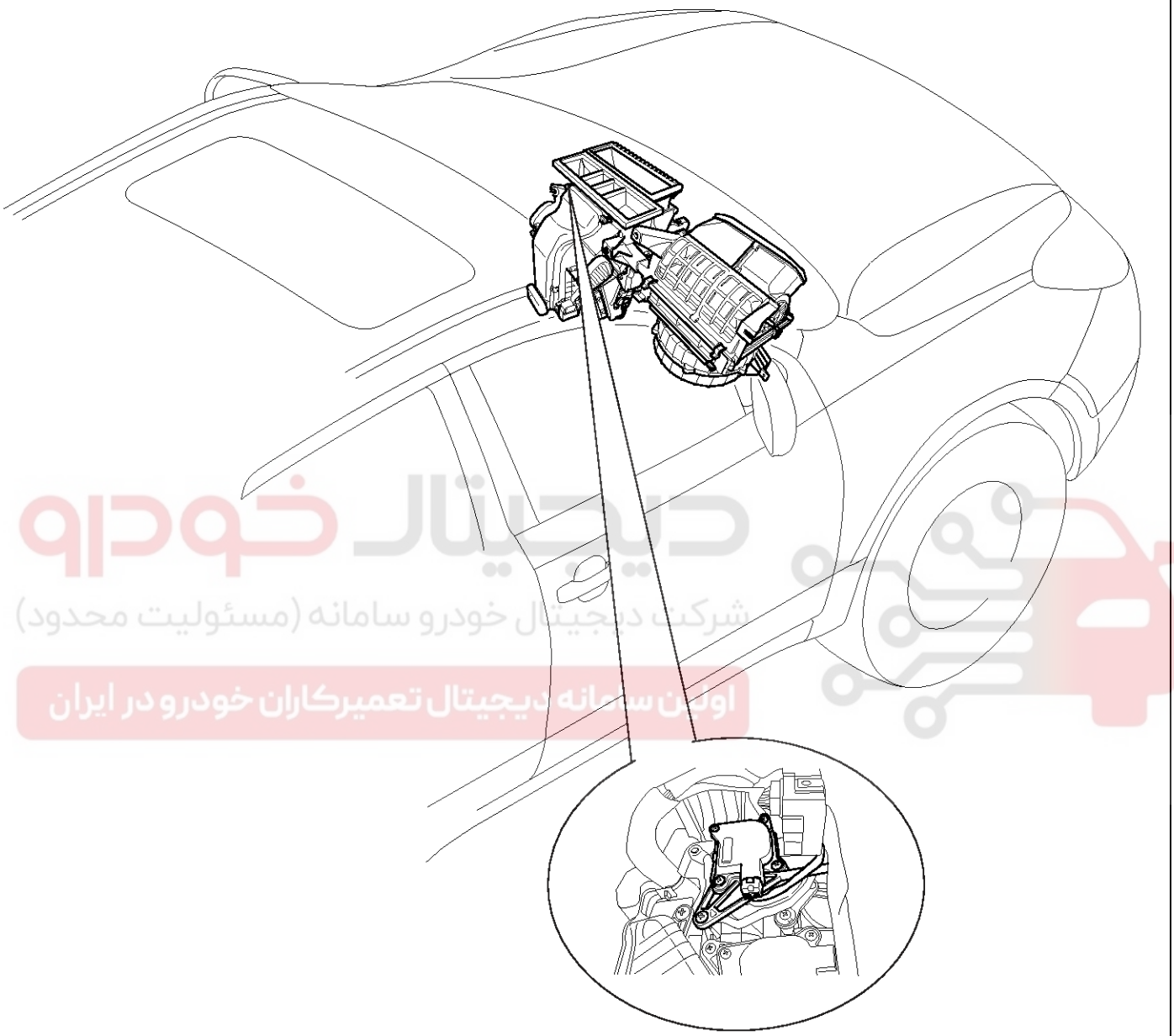


SENHA6032D

8. Installation is the reverse order of removal.

Mode Control Actuator

General Description



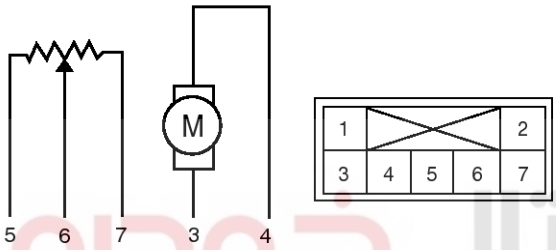
SENHA7115L

Description

The mode control actuator is located at the heater unit.It adjusts position of mode door by operating mode control actuator based on signal of A/C control unit. Pressing mode select switch makes the mode control actuator shift in order of vent→ B/L → floor → mix.

Inspection

1. Ignition "OFF"
2. Disconnect the connector of mode control actuator.
3. Verify that the mode control actuator operates to the defrost mode when connecting 12V to the terminal 3 and grounding terminal 4.
4. Verify that the mode control actuator operates to the vent mode when connecting in the reverse.



3. Defrost mode
4. Vent mode
5. Sensor ground
6. Feedback signal
7. 5V (Vcc)

SENHA7517L

5. Check the voltage between terminals 5 and 6.

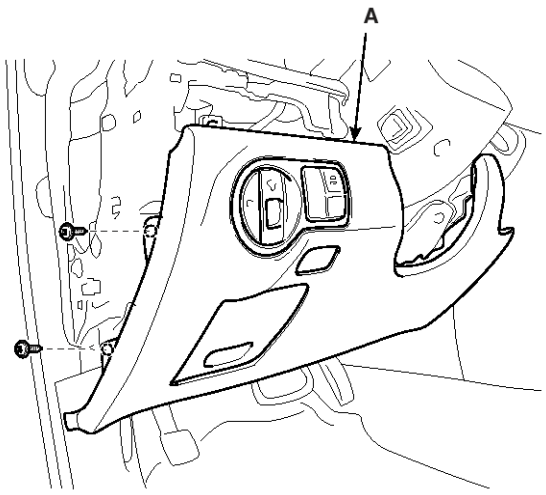
Door position	Voltage (5-6)	Error detecting
Vent	0.3 ± 0.15V	Low voltage : 0.1 V or less
Defrost	4.7 ± 0.15V	High voltage : 4.9 V or more

It will feedback current position of actuator to controls.

6. If the measured voltage is not specification, substitute with a known-good mode control actuator and check for proper operation.
7. If the problem is corrected, replace the mode control actuator.

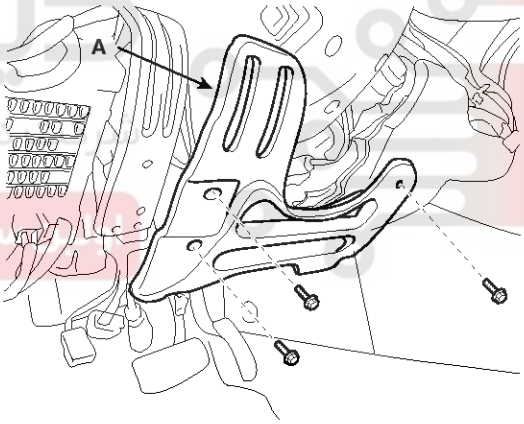
Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the crush pad lower panel (A)



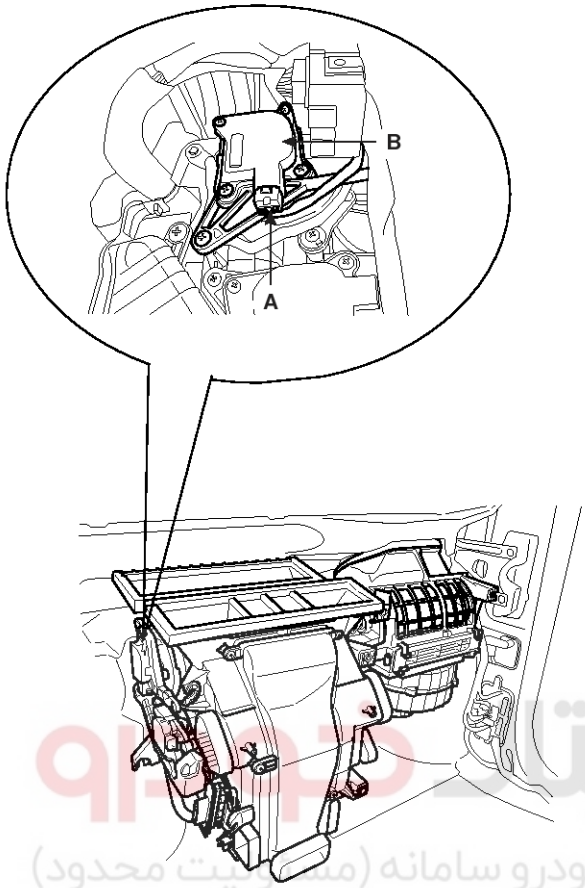
SUNHA6220D

3. After loosening the mounting bolts, then remove the reinforcing panel (A).



SENHA7505D

4. Disconnect the mode control actuator connector (A) after removing the air duct.
5. Loosen the mounting screws and then remove the mode control actuator (B).



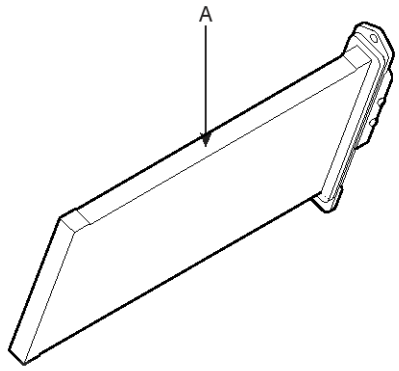
SENHA6100D

6. Installation is the reverse order of removal.

Positive Temperature coefficient)heater

Description

PTC (Positive Temperature Coefficient) heater (A) is an electric heater using a PTC element as an auxiliary heating device that supplements deficiency of interior heat source in highly effective diesel engine (U engine).

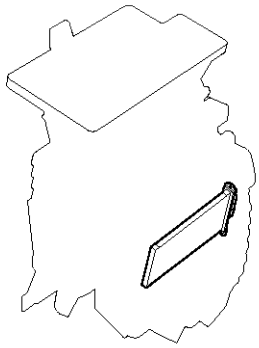


AQJF301B

An electric heater heats up the interior by directly heating the air that passes through the heater.

PTC = positive Temperature Coefficient

The name itself implies that the element has a proportional resistance change sensitive to temperature. PTC heater is installed at the exit or the backside of heater core.

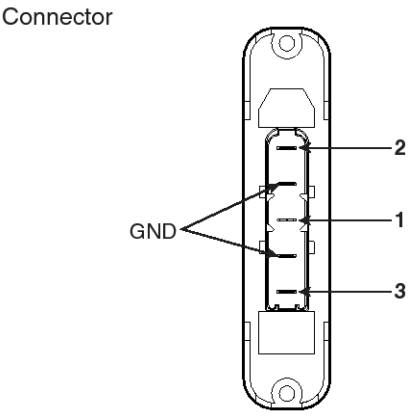


AQJF301A

Operation Principle

ECM outputs a PTC on signal. Operate PTC from 1st setting to 3rd setting with an interval of 15 seconds.

Heat up the air, which passes through a heater core.



AQIE301C

Operation Condition

Judge the condition by ambient temperature is below 5°C, coolant temperature is below 70°C, and battery voltage is above 11V and engine RPM is above 700RPM.

Inspection

Inspect the PTC operation by confirmation logic as below.

1. Entering method
   1) Set the floor mode, maximum heating
   2) Turn off the blower switch
   3) Press the intake button more than 5 times.
   4) Indicator of entire button is flashed with an interval of 0.5 seconds continuously (Manual).

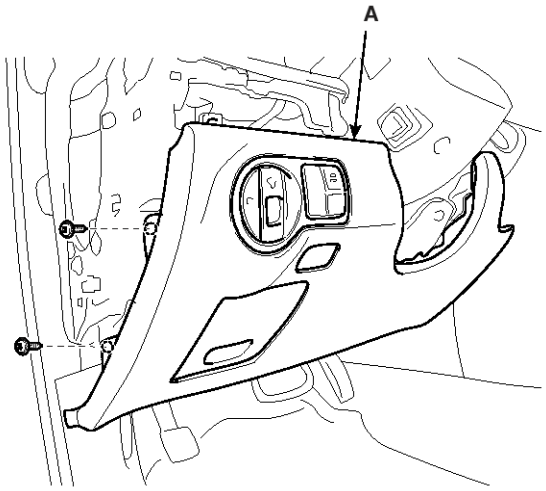
      Graphics of the entire LCD display switch on and off with an interval of 0.5 seconds continuously (Automatic)
   5) Confirm the PTC operation by operating the blower switch

      Manual: 1~4 step, Automatic: 1~8step.
   6) Each PTC relay is operated with an interval of 3 seconds.
   7) Execute the PTC operation by confirmation logic for 30 seconds.
2. Cancellation method
   1) Select the A/C button or intake button.
   2) IG "OFF"
   3) Cancel the logic after 30 seconds automatically.
3. If the PTC operation is not operated, substitute with a known-good PTC and check for proper operation.

   If the problem is corrected, replace the PTC.

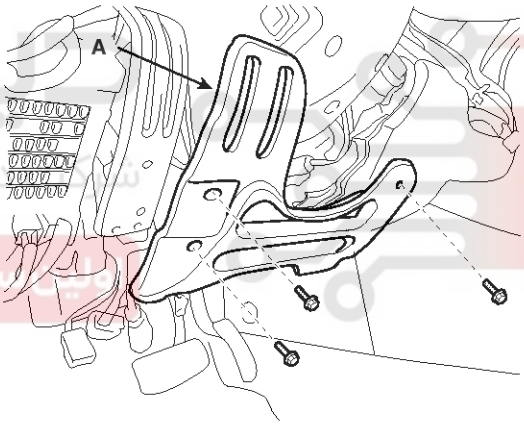
Replacement

1. Remove the crashpad lower panel(A).



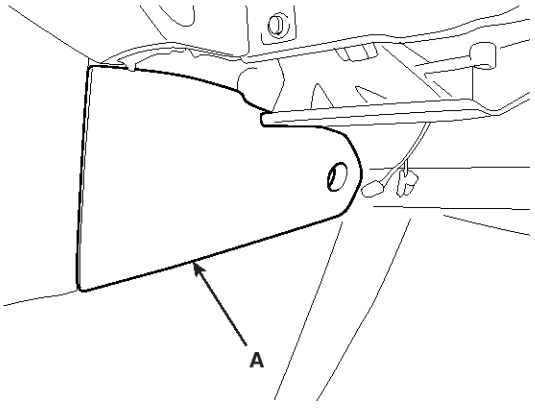
SUNHA6220D

2. After loosening the mounting bolts, then remove the reinforcing panel (A).



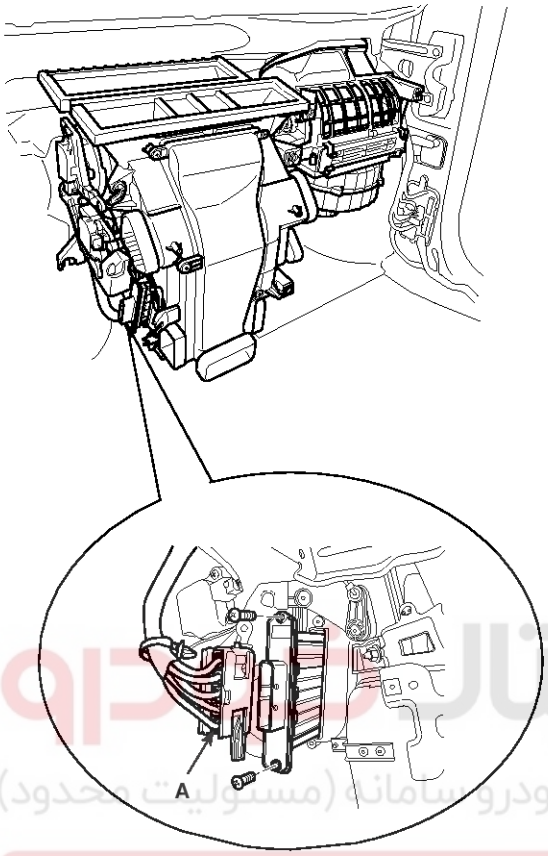
SENHA7505D

3. Remove the crashpad lower panel.



SENBD7064D

4. After loosening the mounting screw, remove the PTC heater connector (A).



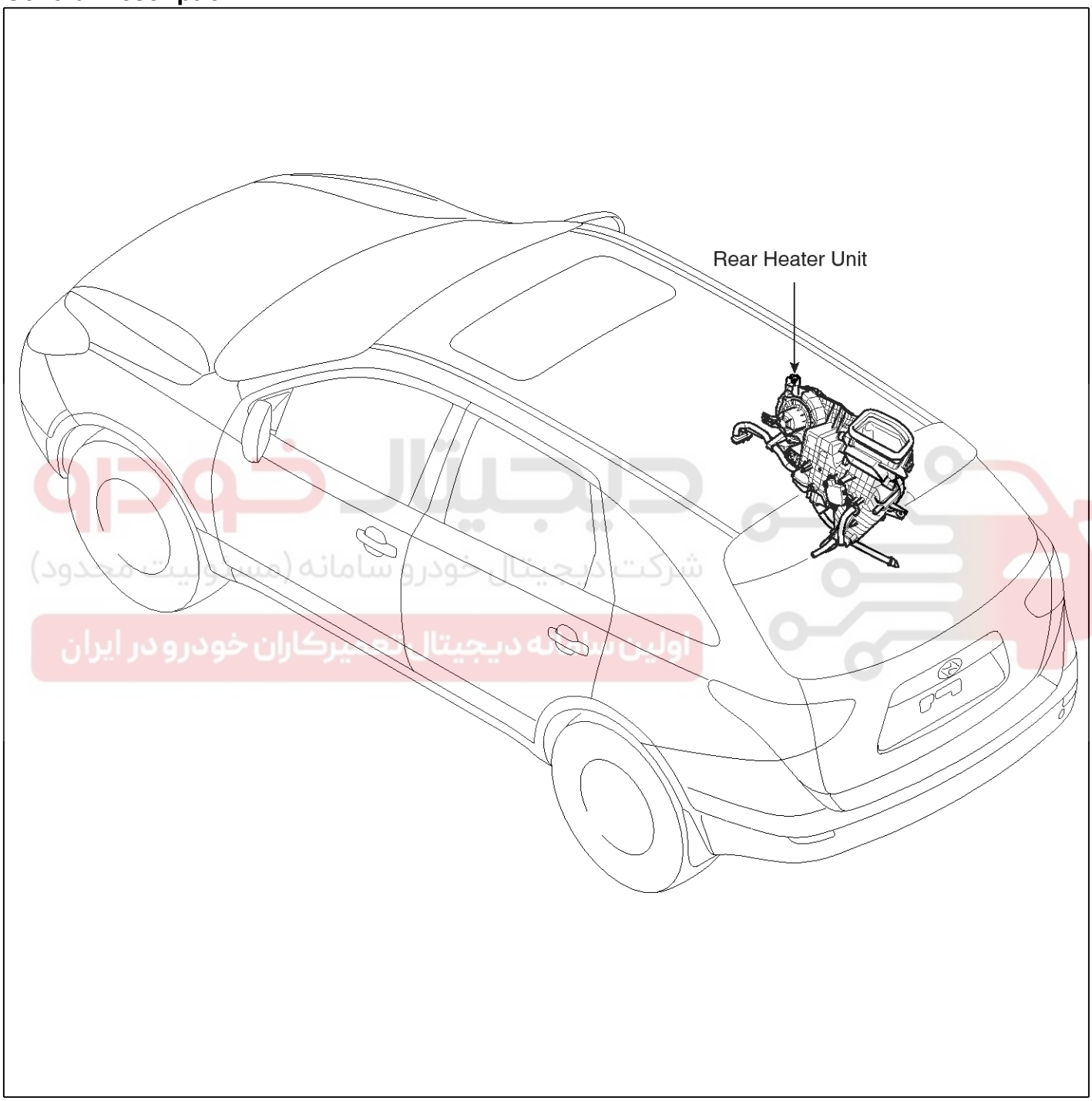
SENHA7511D

5. Installation is the reverse order of removal.

Rear Heater

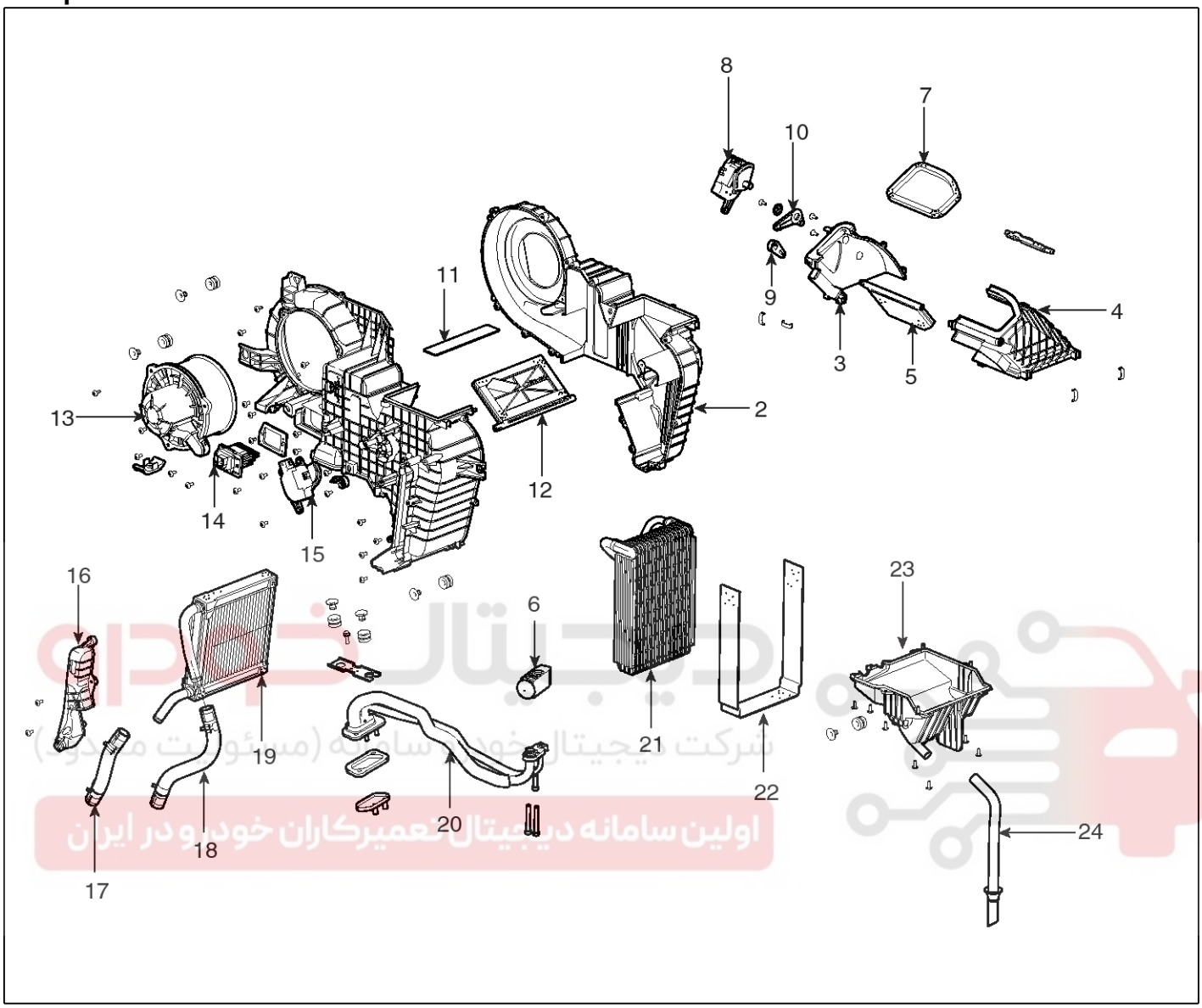
Rear Heater Unit

General Description



SENHA6502L

Components

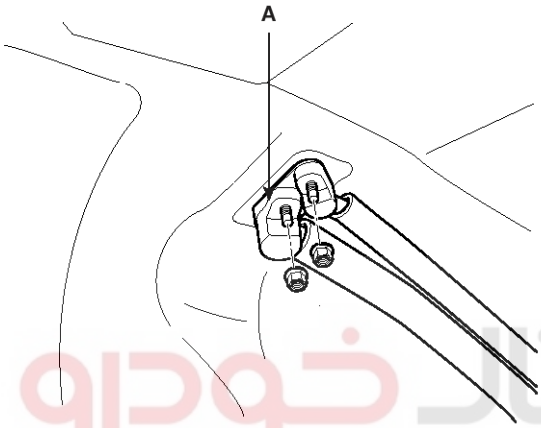


SENHA9119L

1. Rear heater case (L)
2. Rear heater case (R)
3. Upper case
4. Upper case
5. Vent door
6. Expension valve
7. Seal
8. Mode actuator
9. Mode door arm
10. Vent arm
11. Seal
12. Temp door
13. Blower motor
14. Power mosfet
15. Temp actuator
16. Heater core cover
17. Heater hose - inlet
18. Heater hose - outlet
19. Heater core
20. Refrigerant line
21. Evaporator core
22. Insulation
23. Lower case
24. Drain hose

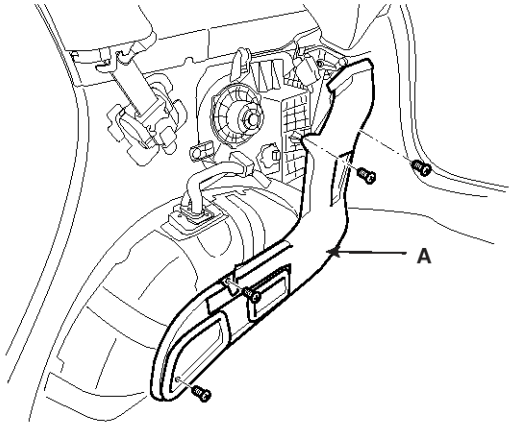
Replacement

1. Disconnect the negative(-) battery terminal.
2. Recover the refrigerant with a recover/ recycling/ charging station.
3. When the engine is cool, drain the engine coolant from the radiator.
4. Remove luggage side trim. (Refer to BD group-interior trim)
5. Loosen the refrigerant line mounting nuts, and then remove the rear refrigerant line(A).

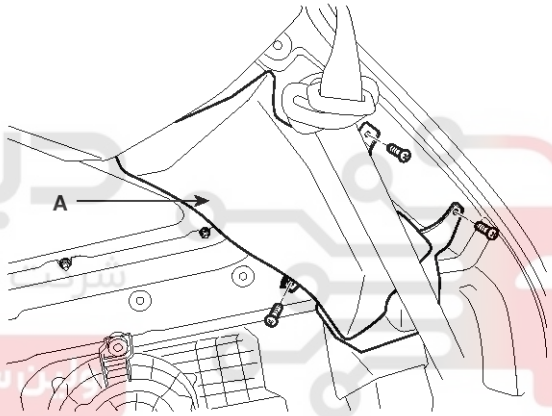


SENHA6039D

6. Losen the airduct mounting screw, and then remove the airduct(A).

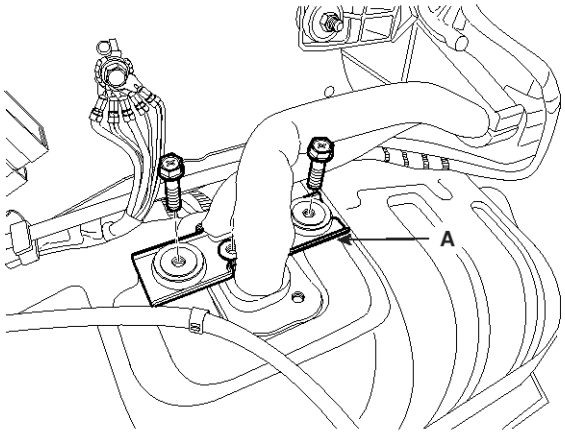


SENHA6040D



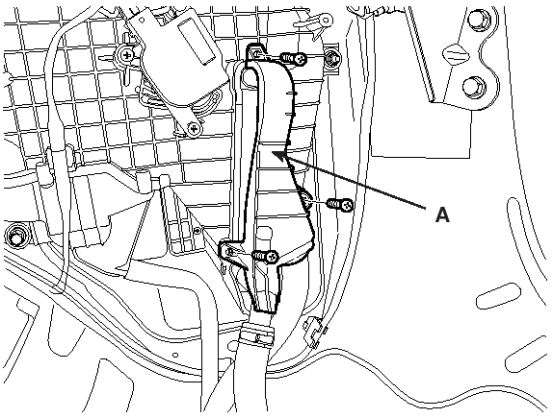
SENHA6041D

7. Loosen the refrigerant line mounting bolts, and then remove the rear refrigerant line bracket (A).



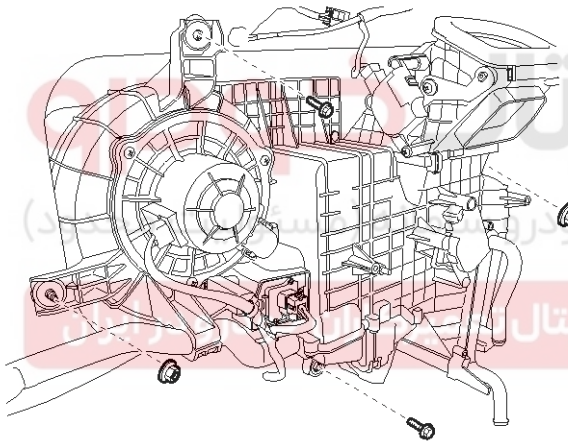
SENHA6042D

8. Remove the heater core cover(A), and then disconnect the heater hose.



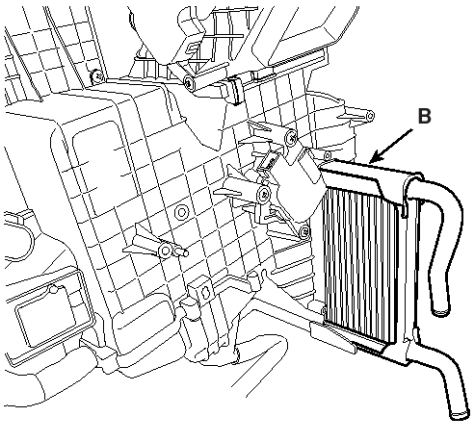
SENHA6043D

9. Remokve the rear heater (A) unit after loosening the mounting bolts and nuts.



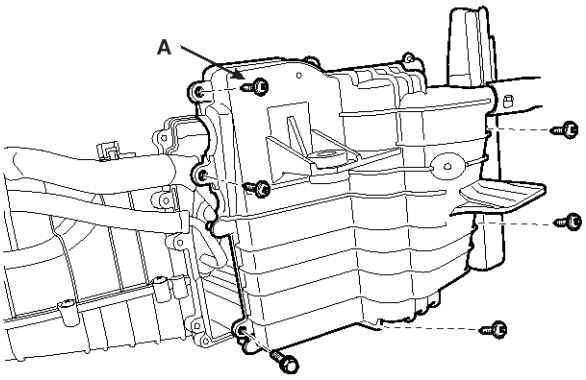
SENHA6045D

10. Remove the heater core(B).



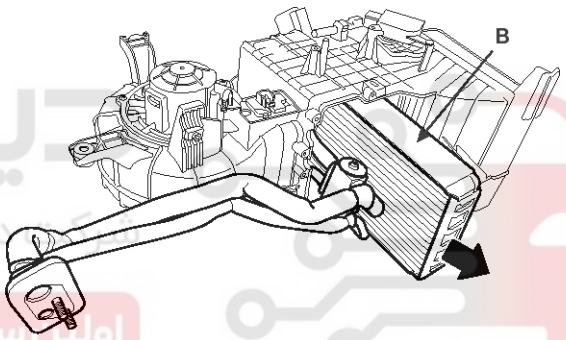
SENHA6046D

11. Remove the evaporator core cover(A).



SENHA6047D

12. Remove the evaporator core (B).



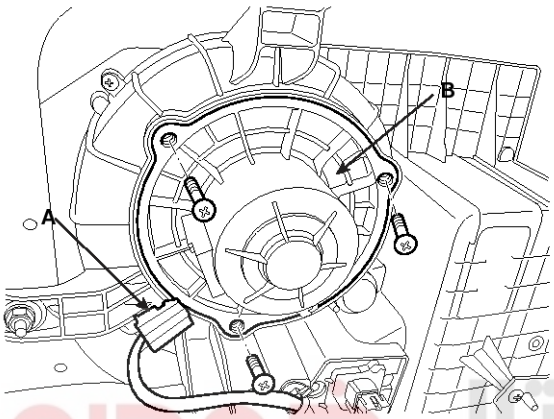
SENHA6048D

13. Installation is the reverse order of removal.

Rear Blower Unit

Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the luggage side trim (Refer to BD group - interior trim)
3. Disconnect the connector (A) of the blower motor.
4. Remove the blower motor (B) after loosening the mounting screws.



SENHA6049D

5. Installation is the reverse order of removal.

Rear Temperature Control Actuator

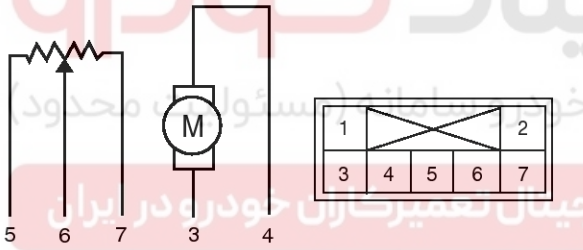
Description

1. Heater unit includes mode control actuator and temperature control actuator.
2. Temperature control actuator is located at the heater unit. It regulates the temperature by the procedure as follows. Signal from control unit adjusts position of temperature door by operating temperature switch and then temperature will be regulated by the hot/cold air ratio decided by position of temperature door.

Inspection

1. Ignition "OFF".
2. Disconnect the connector of temperature control actuator.
3. Verify that the temperature control actuator operates to the hot position when connecting 12V to the terminal 3 and grounding terminal 4.

   Verify that the temperature control actuator operates to the cool position when connecting in the reverse.



1. -
2. -
3. Cool position
4. Hot position
5. 5V (VCC)
6. Peed back signal
7. Sensor ground

SENHA7512L

4. Check the voltage between terminals 6 and 7.

Specification

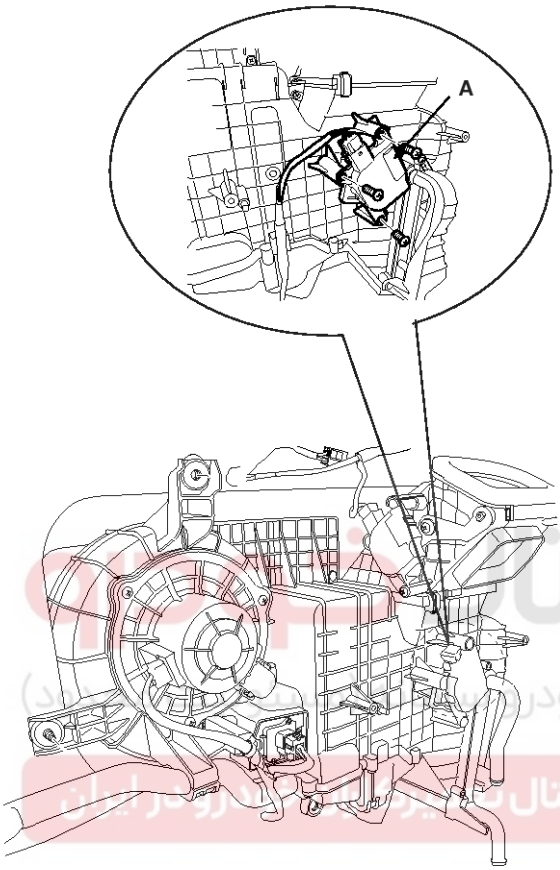
Door position	Voltage (6-7)	Error detecting
Max. cooling	0.3 ± 0.15V	Low voltage : 0.1V or less
Max. heating	4.7 ± 0.15V	High voltage : 4.9V or more

* It will feedback current position of actuator to controls.

5. If the measured voltage is not specification, substitute with a known-good temperature control actuator and check for proper operation.
6. If the problem is corrected, replace the temperature control actuator.

Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove luggage side trim.
3. Loosen the mounting screw and then remove the temperature control actuator (A).



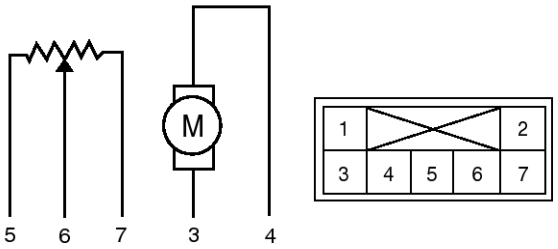
SENHA6050D

4. Installation is the reverse order of removal.

Rear Mode Control Actuator

Inspection

1. Ignition "OFF".
2. Disconnect the connector of mode control actuator.
3. Verify that the mode control actuator operates to the defrost mode when connecting 12V to the terminal 3 and grounding terminal 4.
4. Verify that the mode control actuator operates to the vent mode when connecting in the reverse.



1. -
2. -
3. Floor
4. Vent
5. Sensor ground
6. Peed back signal
7. 5V (VCC)

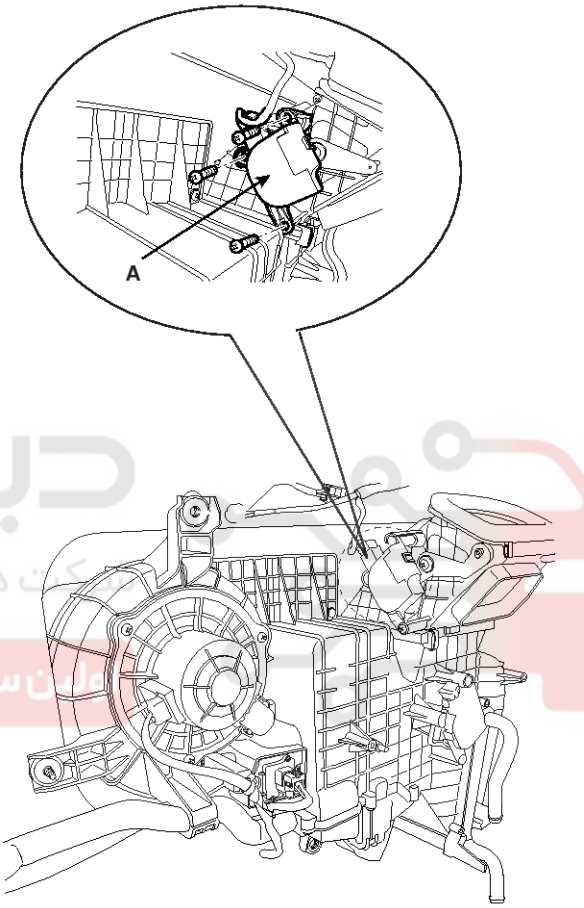
AQKF333E

5. Check the voltage between terminals 5 and 6.

Door position	Voltage (5-6)	Error detecting
Vent	0.3 ± 0.15V	Low voltage : 0.1V or less
Defrost	4.7 ± 0.15V	High voltage : 4.9V or more

Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove luggage side trim.
3. Disconnect the mode control actuator connector.
4. Loosen the mounting screws and then remove the mode control actuator (A).



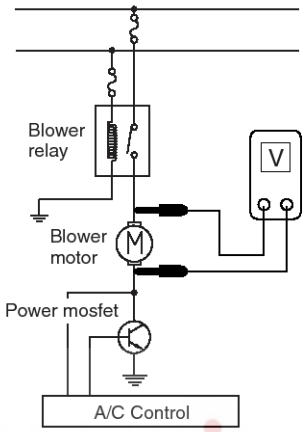
SENHA6052D

5. Installation is the reverse order of removal.

Rear Power Mosfet

Inspection

1. Ignition "ON".
2. Manually operate the control switch and measure the voltage of blower motor between pin 1 and 2.
3. Select the control switch to raise voltage until high speed.



EQRF355C

Specification

Fan	Motor Voltage
	Manual
First speed	3.8 ± 0.5V
Second speed	5.0 ± 0.5V
Third speed	6.2 ± 0.5V
Fourth speed	7.4 ± 0.5V
Fifth speed	8.6 ± 0.5V
Sixth speed	9.8 ± 0.5V
Seventh speed	11.0 ± 0.5V
eighth speed	Battery(+)

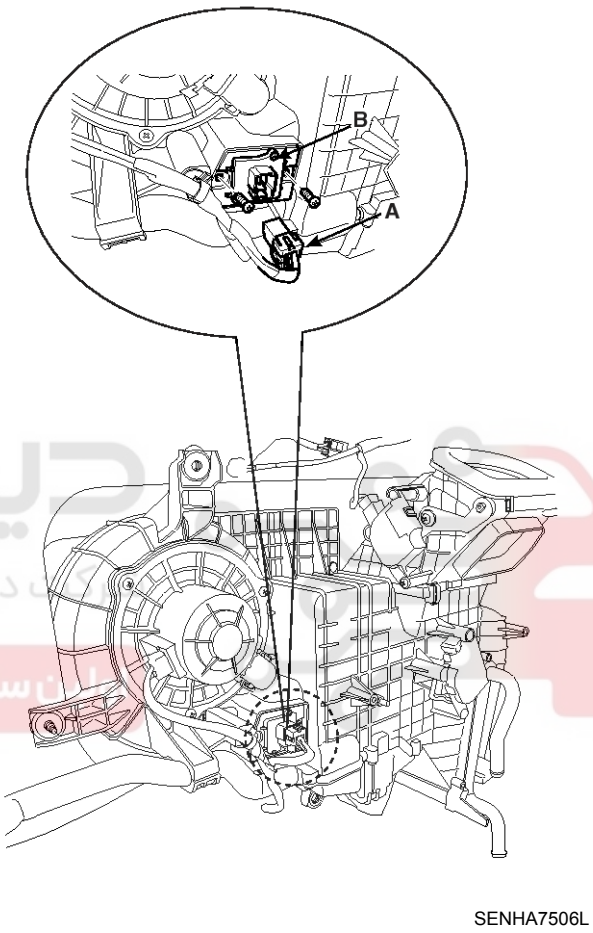
AUTO COOLING : Auto speed (4.5V~B+)

AUTO HEATING : Auto speed (4.5V~10.5V)

4. If the measured voltage is not specification, substitute with a known-good power mosfet and check for proper operation.
5. If the problem is corrected, replace the power mosfet.

Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove luggage side trim.
3. Disconnect the power mosfet connector (A).
4. Remove the power mosfet (B) after loosening the mounting screws.

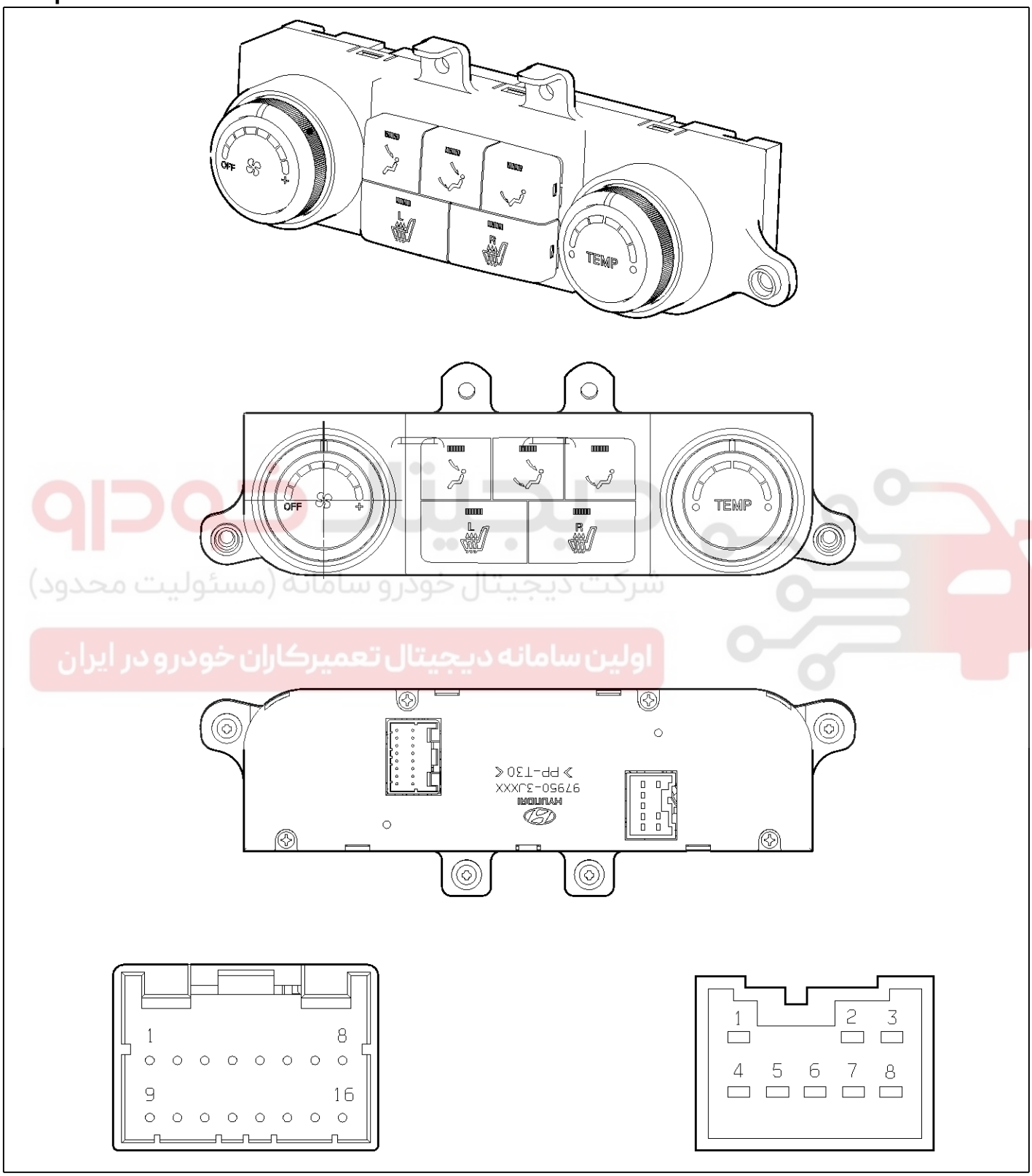


SENHA7506L

5. Installation is the reverse order of removal.

Rear Control Panel

Component



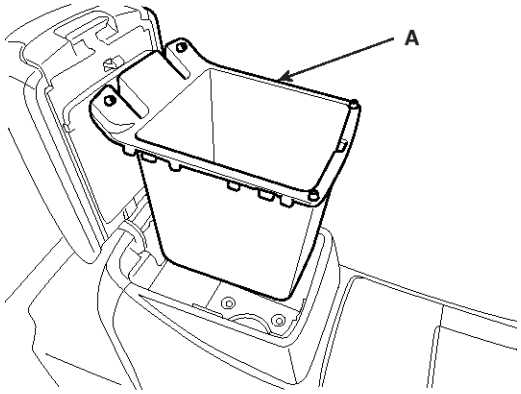
SENHA7120D

[Connector Pin Function]

Connector	Pin	Function	Connector	Pin	Function
Connector (A)	1	BATTERY	Connector (B)	1	RR TEMP ACTUATOR (COOL)
	2	FET(G)		2	RR TEMP ACTUATOR (WARM)
	3	GND		3	RR TEMP ACTUATOR F/B
	4	IGN2		4	LH S/HEAT
	5	REAR BLOWER MOTOR (+)		5	LH S/HEAT INDICATOR
	6	TAIL (ILL+)		6	-
	7	FET(D)		7	SENSOR REF (+5V)
	8	RHEOSTAT(ILL-)		8	SENSOR GND
				9	RR MODE ACTUATOR(VENT)
				10	RR MODE ACTUATOR(FLOOR)
				11	RR MODE ACTUATOR F/B
				12	RH S/HEAT
				13	RH S/HEAT INDICATOR
				14	-
				15	-
				16	REAR C-LINE

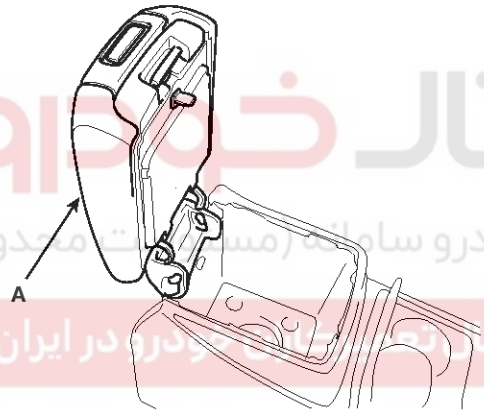
Replacement

1. Remove the center console armrest box(A).



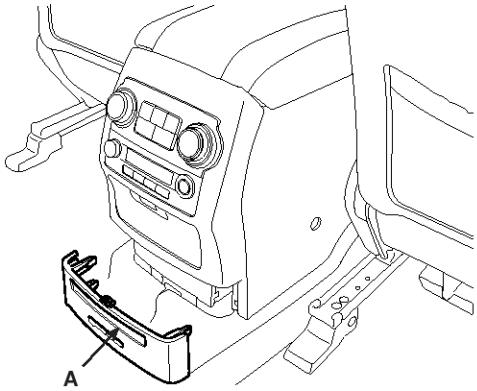
SENHA7121D

2. After loosening the screw, remove the armrest(B).



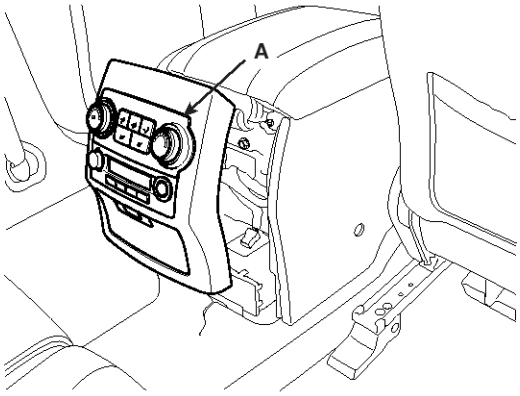
SENHA7122D

3. Remove the rear cup holder(A).



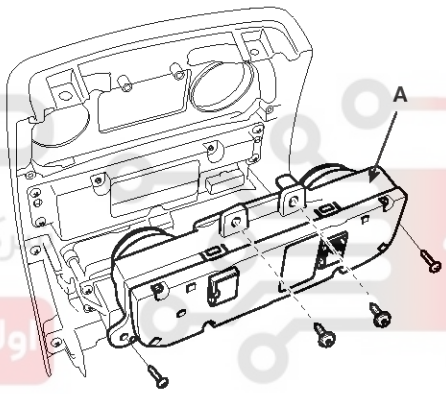
SUNHA6226D

4. Remove the console rear cover(A).



SENHA7123D

5. Remove the rear blower & A/C controller (A) after loosening the screw from console rear cover.



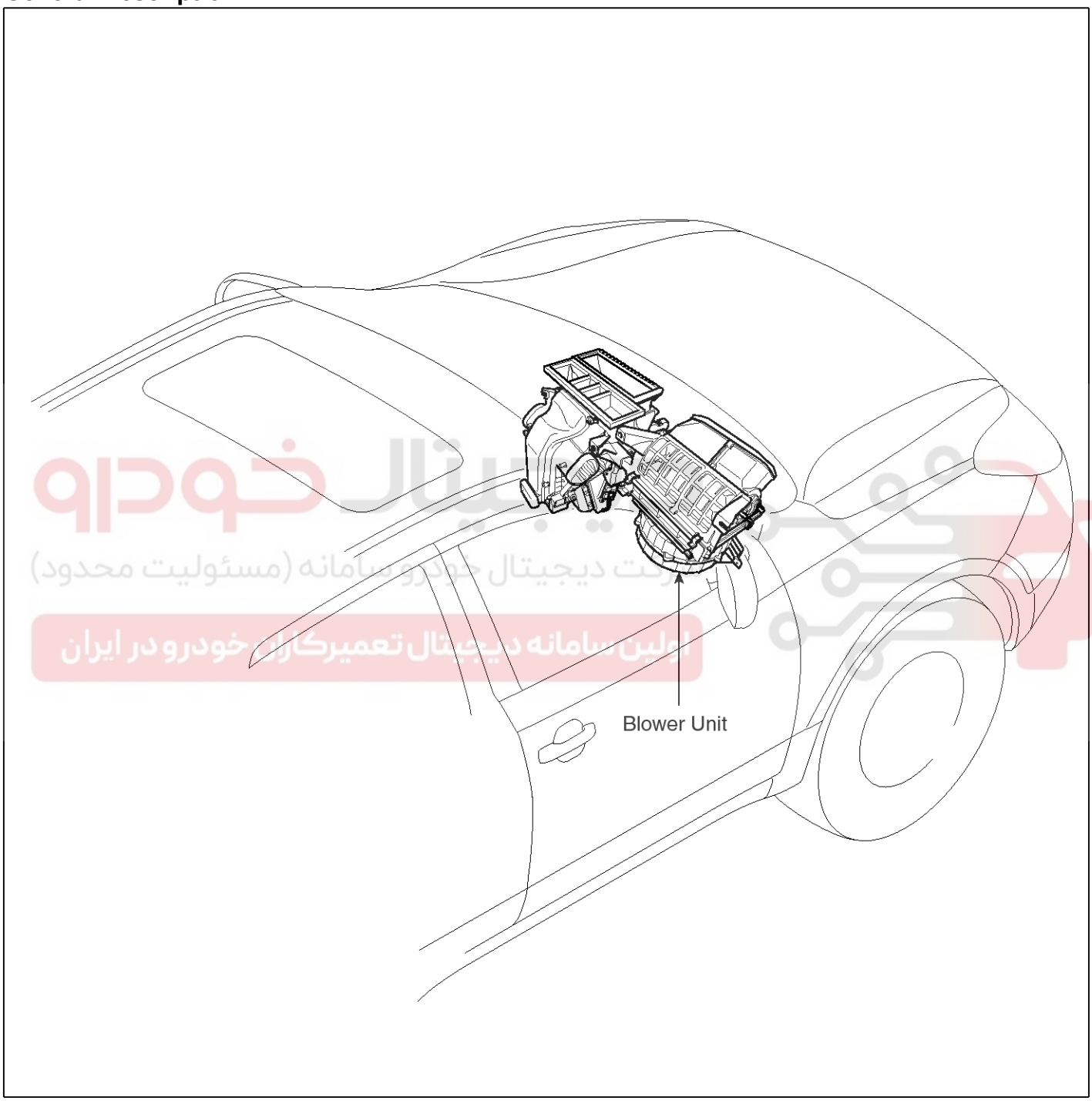
SENHA7125D

6. Installation is the reverse order of removal.

Blower

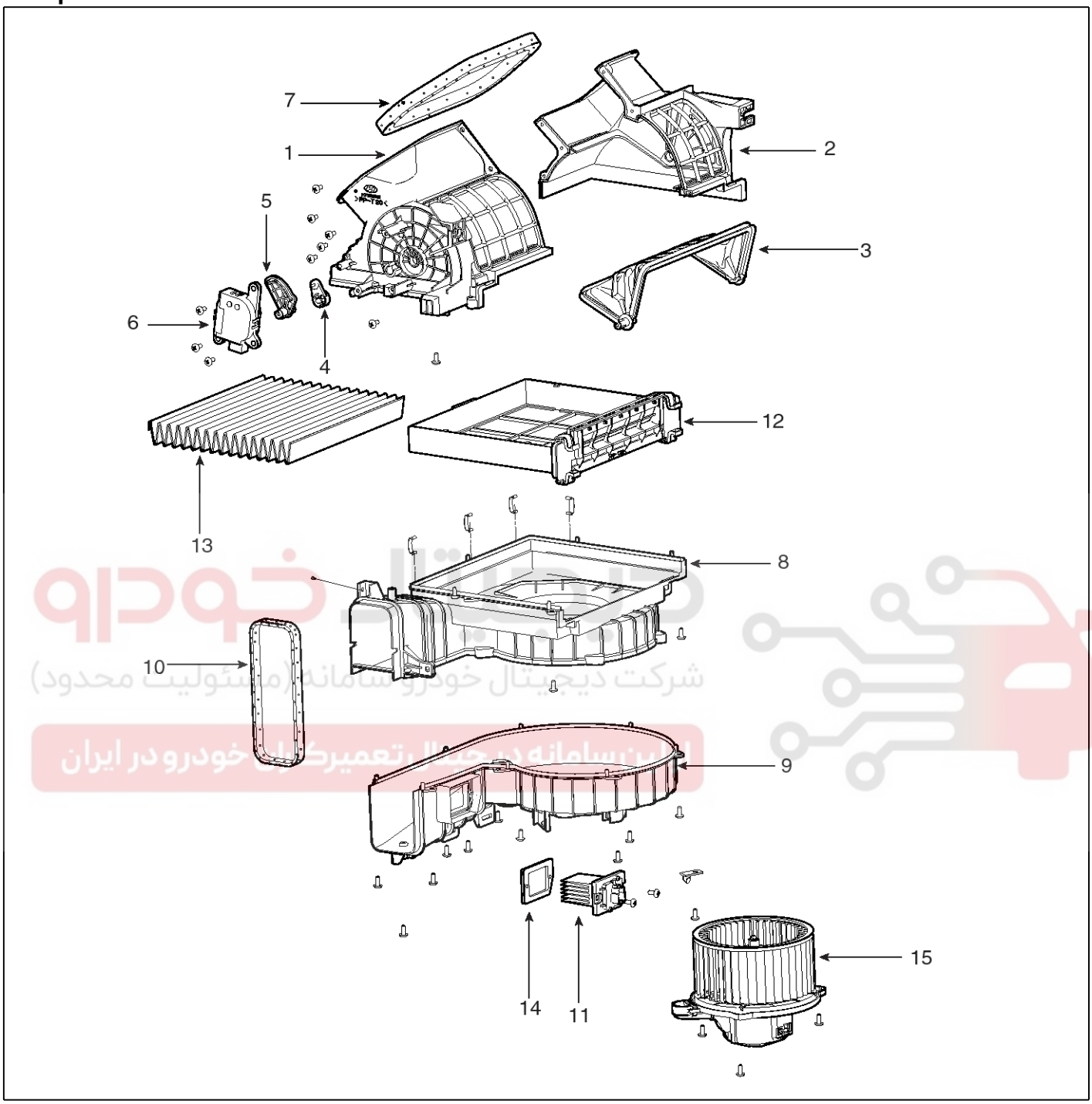
Blower Unit

General Description



SENHA7113L

Components

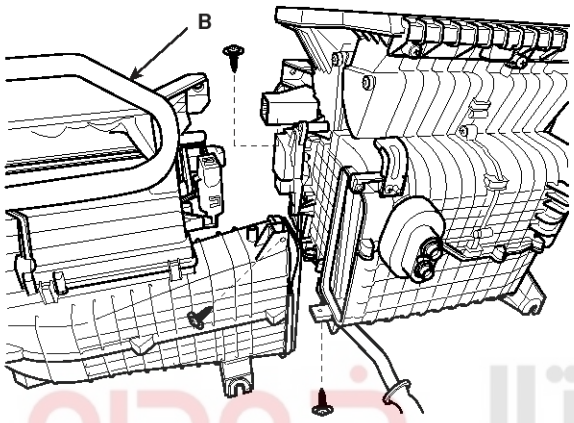


SENHA9116L

1. Inlet duct (L)
2. Inlet duct (R)
3. Door
4. Inlet door arm
5. Inlet door lever
6. Intake actuator
7. Rec. duct seal
8. Blower upper case
9. Blower lower case
10. Blower seal
11. Power mosfet
12. Climate control air filter cover
13. Climate control air filter
14. Power mosfet seal
15. Blower motor

Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the crush pad.(Refer to BD group-crash pad)
3. Disconnect the connectors from the intake actuator, the blower motor and power mosfet.
4. Remove the cowl cross bar assembly.(Refer to BD group-crash pad)
5. Remove the blower unit (B) from the heater unit after loosening a mounting bolt and 3 screws.



SENHA6023D

NOTICE

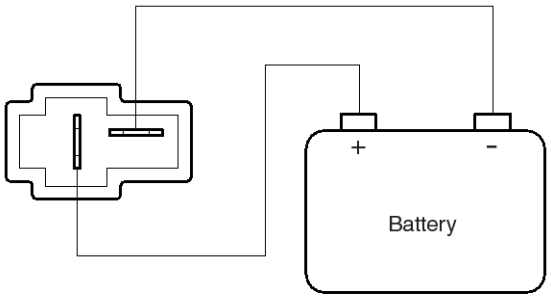
Make sure that there is no air leaking out of the blower and duct joints.

6. Installation is the reverse order of removal.

Blower Motor

INSPECTION

1. Connect the battery voltage and check the blower motor rotation.

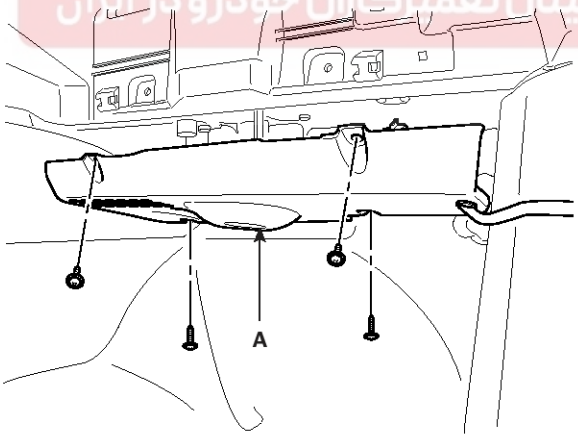


AQIE352C

2. If the blower motor voltage is not operated well, substitute with a known-good blower motor and check for proper operation.
3. If the problem is corrected, replace the blower motor.

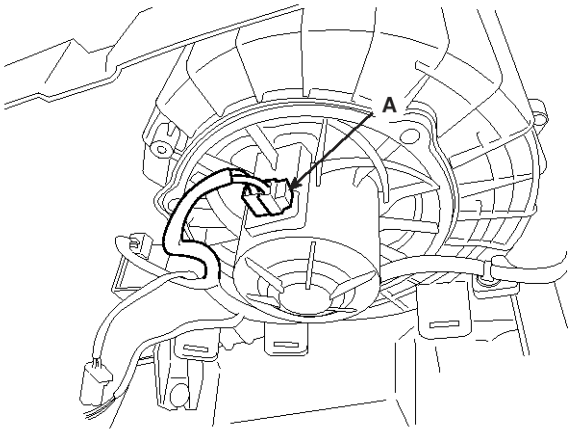
Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the crashpad lower panel(A).



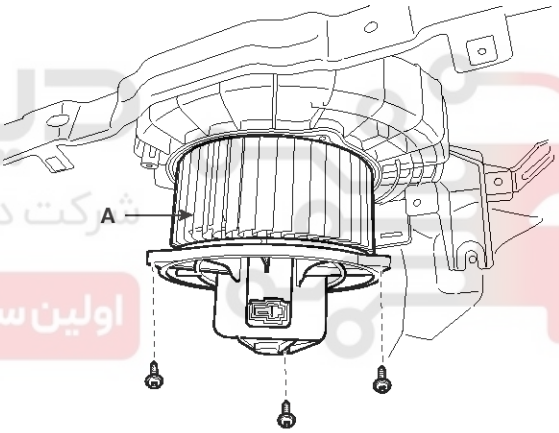
SENHA7813L

3. Disconnect the connector (A) of the blower motor.



SENHA6033D

4. Remove the blower motor (A) after loosening the mounting screws.



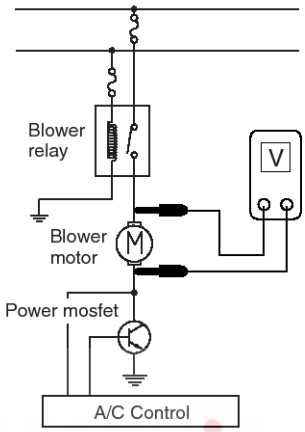
SENHA6034D

5. Installation is the reverse order of removal.

Power Mosfet

Inspection

1. Ignition "ON".
2. Manually operate the control switch and measure the voltage of blower motor between pin 1 and 2.
3. Select the control switch to raise voltage until high speed.



EQRF355C

Specification

Fan	Motor Voltage
	Manual
First speed	3.8 ± 0.5V
Second speed	4.9 ± 0.5V
Third speed	6.1 ± 0.5V
Fourth speed	7.2 ± 0.5V
Fifth speed	8.3 ± 0.5V
Sixth speed	9.5 ± 0.5V
Seventh speed	10.6 ± 0.5V
eighth speed	Battery(+)

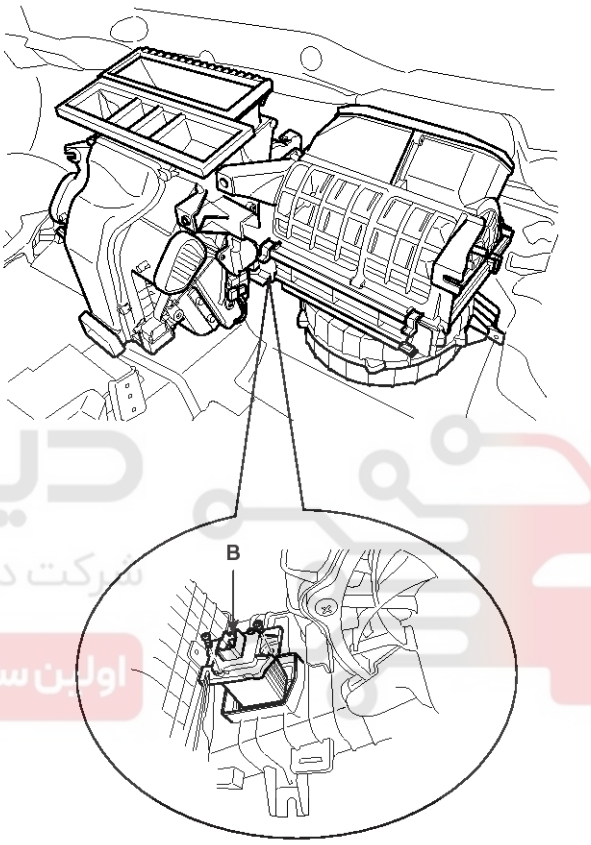
AUTO COOLING : Auto speed (4.5V~B+)

AUTO HEATING : Auto speed (4.5V~10.5V)

4. If the measured voltage is not specification, substitute with a known-good power mosfet and check for proper operation.
5. If the problem is corrected, replace the power mosfet.

Replacement

1. Disconnect the negative (-) battery terminal.
2. Disconnect the power mosfet connector at the connecting part between heater and blower unit.
3. Remove the power mosfet (B) after loosening the mounting screws.



SENHA6070L

4. Installation is the reverse order of removal.

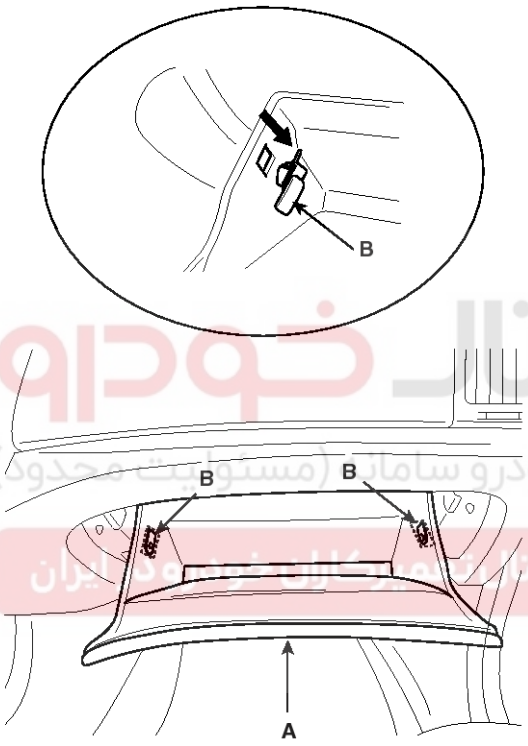
Climate control air filtar

Description

This has particle filter which eliminates foreign materials and odor. The particle filter includes odor filter as well as conventional dust filter to ensure comfortable interior environment.

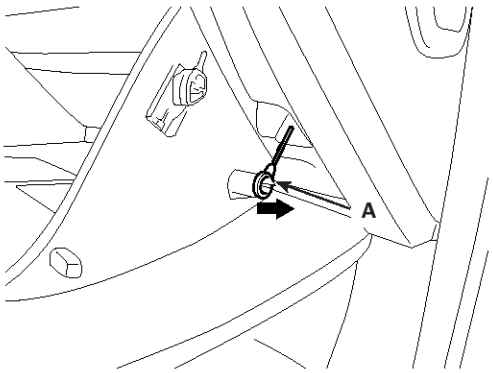
Replacement

1. Open the glove box (A). Lower the glove box down completely by removing the glove box stopper (B) to the glove box.



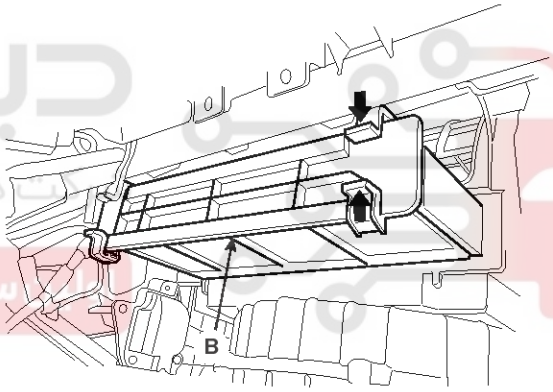
SENBD7072D

2. Remove the side damper (A) from the glove box.



SENBD7073D

3. Remove the air filter (A) with pushing the knob.



SENHA6035D

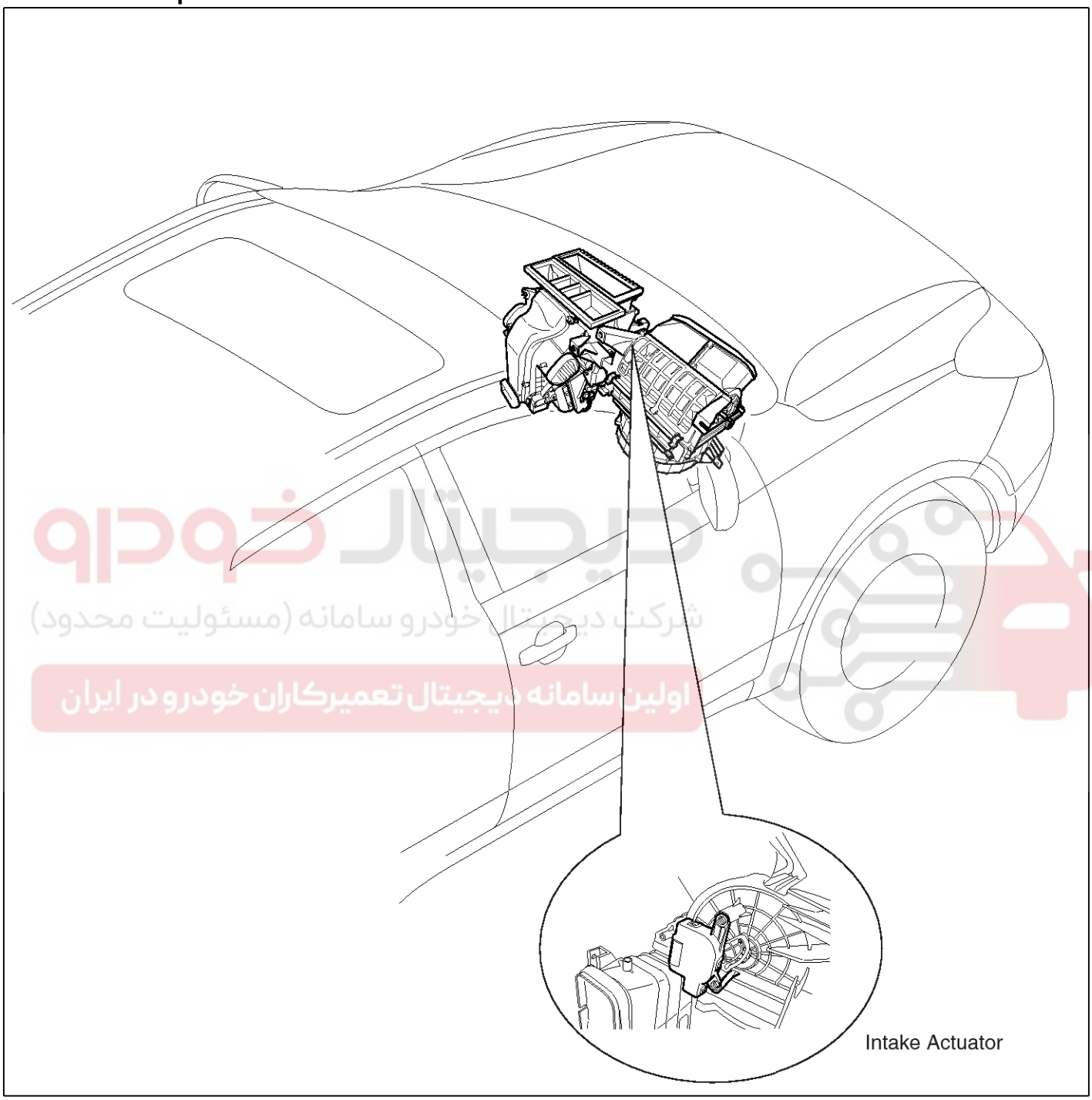
4. Installation is the reverse order of removal.

NOTICE

In case of driving in an air-polluted area or rugged terrain, check and replace the air filter as frequently as possible.

Intake Actuator

General Description



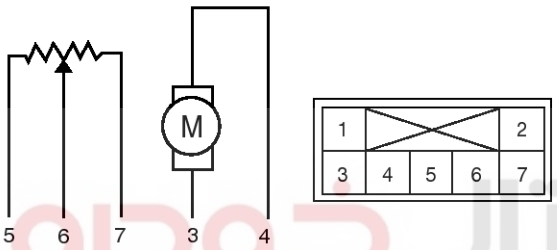
SENHA7118L

Description

1. The intake actuator is located at the blower unit.
2. It regulates the intake door by signal from control unit.
3. Pressing the intake selection switch will shift between recirculation and fresh air modes.

Inspection

1. Ignition "OFF"
2. Disconnect the intake actuator connector.
3. Verify that the actuator operates to the recirculation position when connecting 12V to the terminal 3 and grounding terminal
4. Verify that the intake actuator operates to the fresh position when connecting in the reverse.



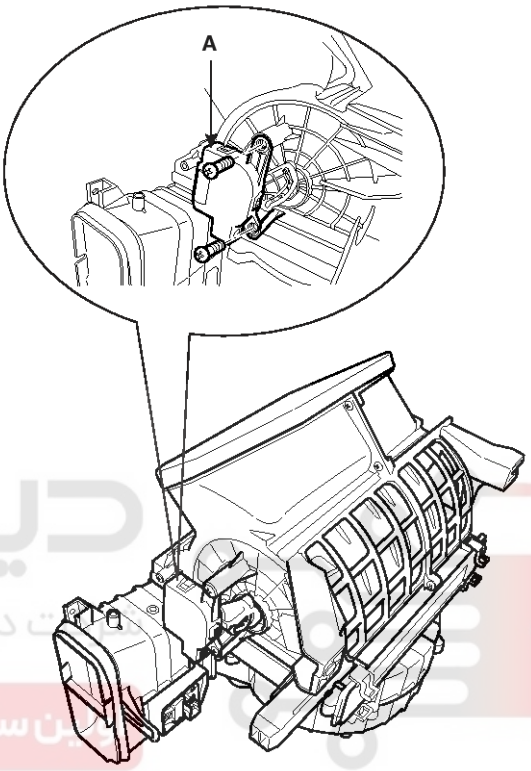
3. Fresh
4. Rec
4. 5V (VCC)
5. Feed back signal
7. Sensor ground

SENHA7518L

5. If the intake actuator is not operated well, substitute with a known-good intake actuator and check for proper operation.
6. If the problem is corrected, replace the intake actuator.

Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the glove box (Refer to BD group-crash pad).
3. Disconnect the intake actuator connector.
4. Loosen the mounting screw and then remove the intake actuator (A) from the blower unit.



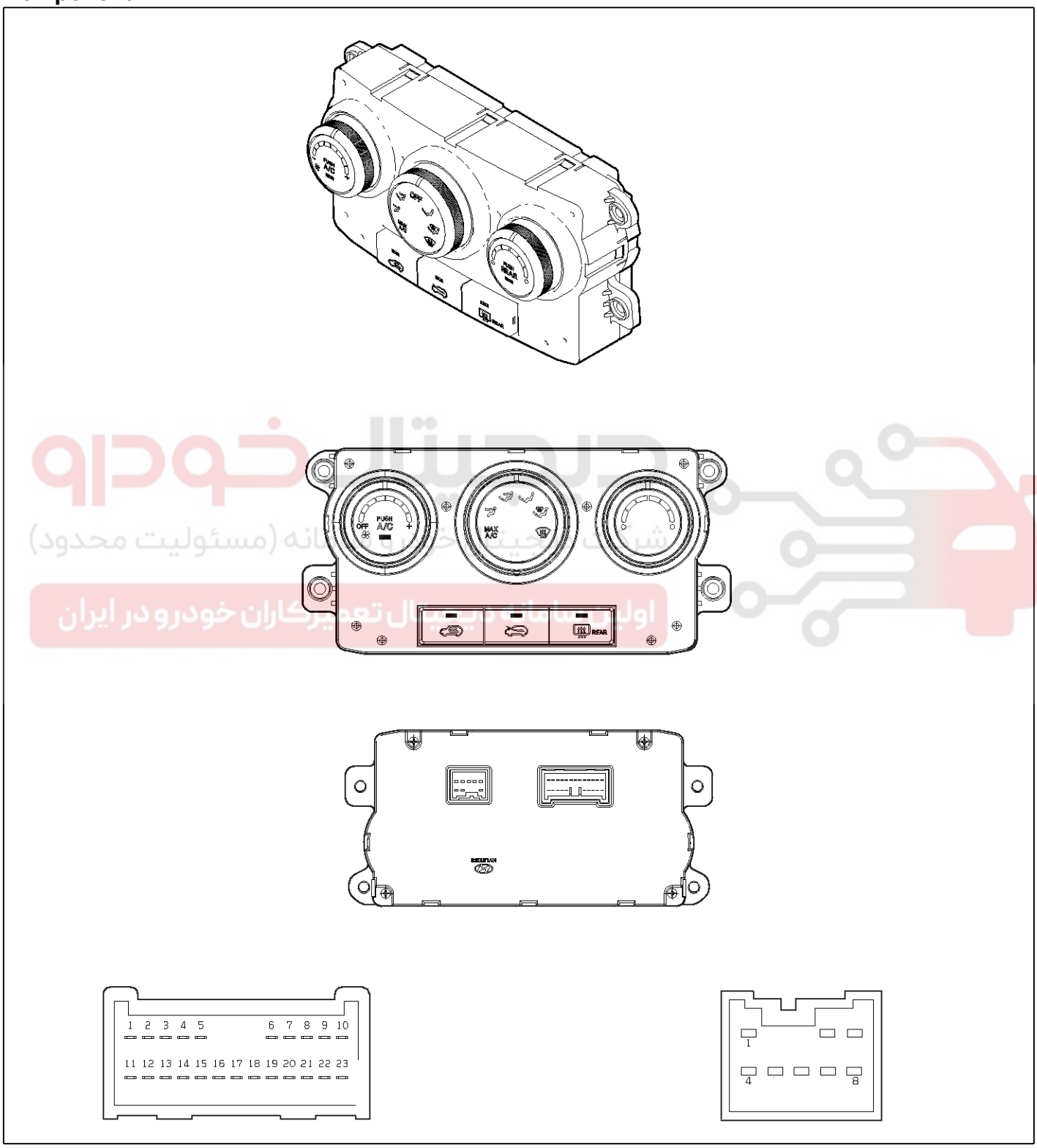
SENHA6036L

5. Installation is the reverse order of removal.

Controller

Heater & A/C Control Unit(Manual)

Component



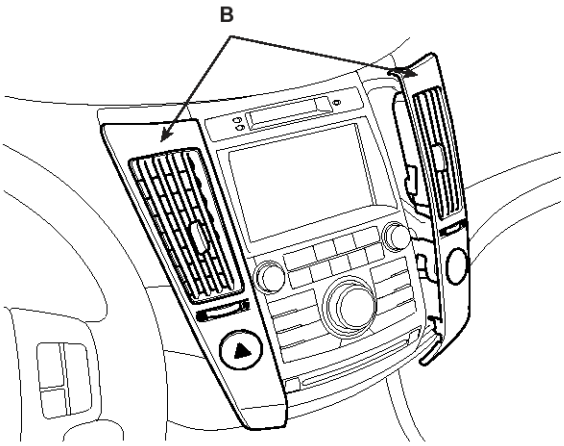
SENHA7503D

Connector Pin Function

Connector	Pin	Function	Connector	Pin	Function
Connector (A)	1	BATTERY	Connector (B)	1	MODE ACTUATOR(VENT)
	2	IGN2		2	MODE ACTUATOR(DEF)
	3	-		3	TEMP ACTUATOR(COOL)
	4	SENSOR REF(+5V)		4	TEMP ACTUATOR(WARM)
	5	A/C SELECT SIGNAL		5	INTAKE ACTUATOR(FRE)
	6	A/C OUTPUT(THERMO)		6	INTAKE ACTUATOR(REC)
	7	PTC RELAY2		7	FET(D)-FRONT
	8	PTC RELAY3		8	BLOWER MOTOR(+)
	9	SENSOR GND			
	10	GND			
	11	-			
	12	TAIL LAMP(ILL+)			
	13	REAR C-LINE			
	14	PTC ON SIGNAL			
	15	BLOWER ON SIGNAL TO ECU			
	16	MODE ACTUATOR F/B			
	17	TEMP ACTUATOR F/B			
	18	INTAKE ACTUATOR F/B			
	19	HTD			
	20	REAR DEFOG SW			
	21	EVAPORATOR SENSOR(+)			
	22	FET(G)-FRONT			
	23	RHEOSTAT(ILL)			

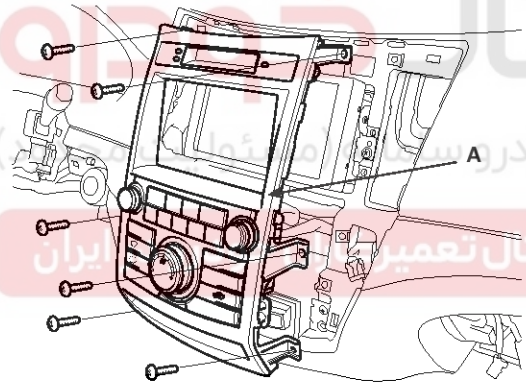
Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the air vent panel(B).



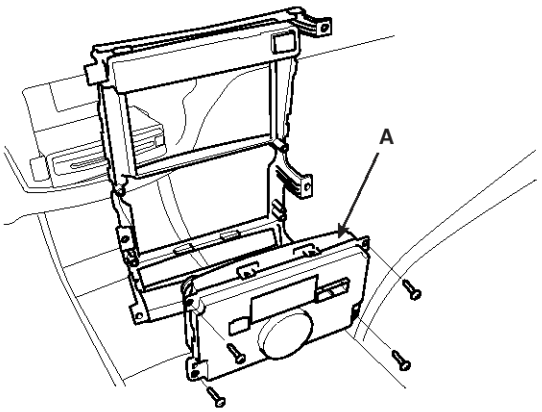
SUNHA6227D

3. Remove the center facia panel (A) after loosening the screws(6EA).



SUNHA6228D

4. Remove the heater & A/C controller (A) after loosening 4 screws.



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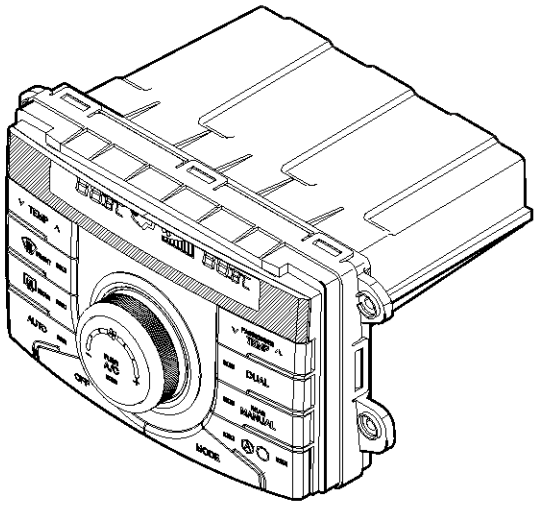
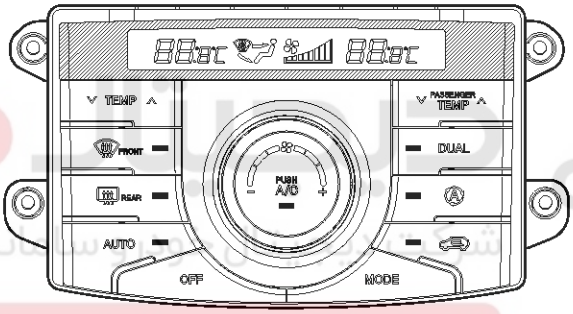
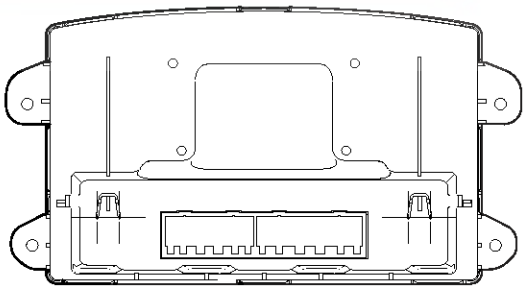
5. Installation is the reverse order of removal.

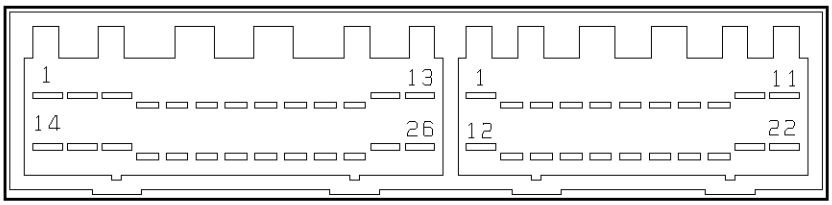
Heater & A/C Control Unit(Full Automatic)

Components









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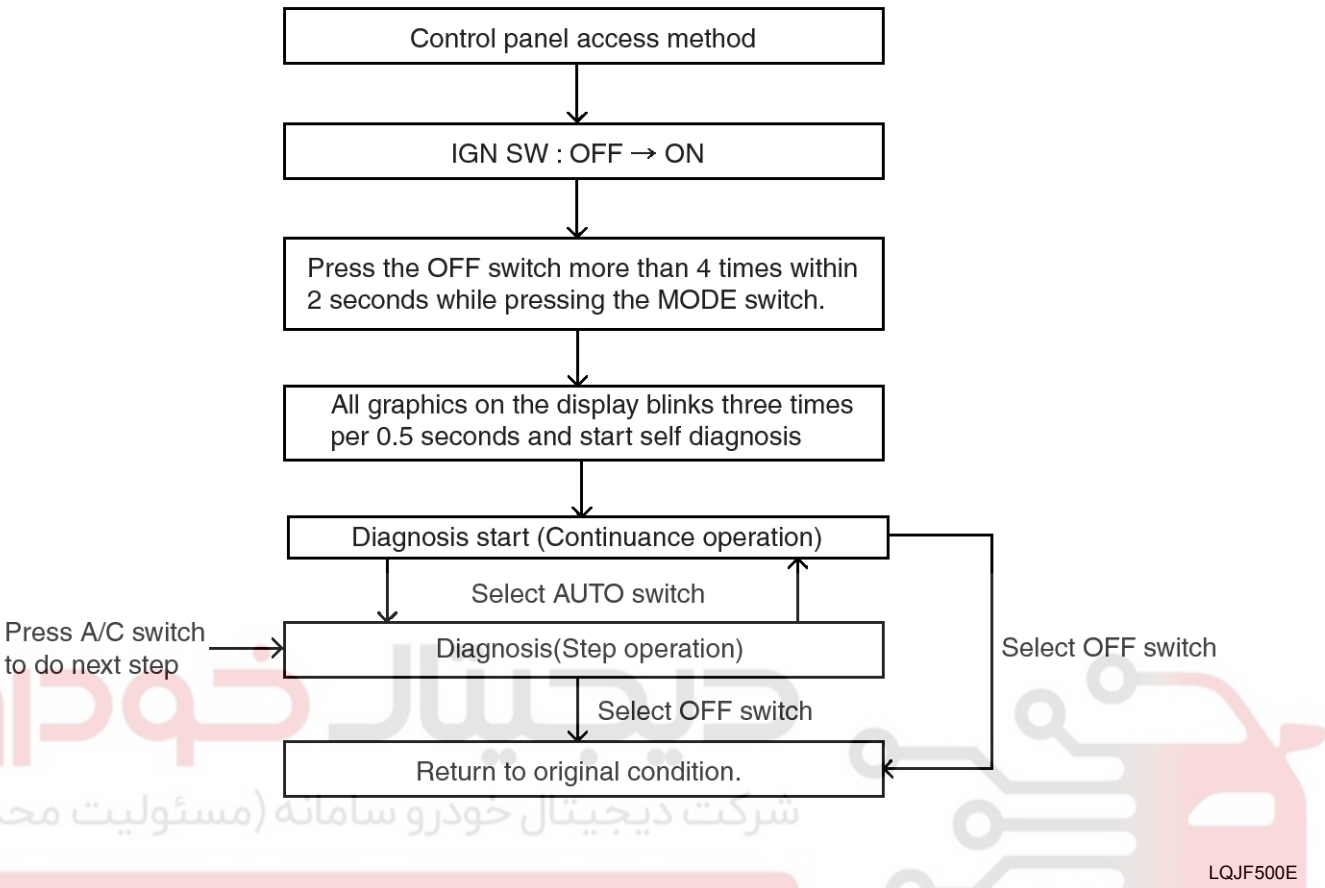
Connector Pin Function

Connector	Pin	Function	Connector	Pin	Function
Connector (A)	1	TAIL LAMP	Connector (B)	1	SENSOR REF (+5V)
	2	BATTERY		2	AQS SIGNAL
	3	A/C OUTPUT		3	AMBIENT SENSOR (+)
	4	A/C SELECT SIGNAL		4	HUMIDITY SENSOR (+)
	5	-		5	INCAR SENSOR (+)
	6	K-LINE		6	EVAPORATOR SENSOR (+)
	7	HTD		7	WATER TEMP SENSOR (+)
	8	REAR DEFOG SW		8	SPEED SIGNAL
	9	REAR C-LINE		9	FET (G)
	10	-		10	FET (D)
	11	-		11	BLOWER MOTOR (+)
	12	IGN2		12	SENSOR GND
	13	IGN2		13	TEMP ACTUATOR DR (COOL)
	14	RHEOSTAT		14	TEMP ACTUATOR DR (WARM)
	15	INCAR MOTOR(+)		15	DR PHOTO (-)
	16	TEMP ATUATOR PS (COOL)		16	PS PHOTO (-)
	17	TEMP ATUATOR PS (WARM)		17	INCAR MTOR (-)
	18	TEMP ATUATOR PS F/B		18	TEMP ACTUATOR DR F/B
	19	MODE ACTUATOR (VENT)		19	BLOWER ON SIGNAL
	20	MODE ACTUATOR (DEF)		20	PTC ON SIGNAL
	21	MODE ACTUATOR F/B		21	PTC RLY 2
	22	INTAKE ACTUATOR (FRE)		22	PTC RL 3
	23	INTAKE ACTUATOR (REC)			
	24	INTAKE ACTUATOR F/B			
	25	GND			
	26	GND			

Self-diagnosis

1. Self-diagnosis process



2. How to read self-diagnostic code

   After the display panel flickers three times every 0.5 second, the corresponding fault code flickers on the setup temperature display panel every 0.5 second and will show two figures. Codes are displayed in numerical format

Fault code

Fault code		Fail description
Display	DTC	
0	-	NORMAL
11	B1234	INCAR SENSOR OPEN
12	B1233	INCAR SENSOR SHORT
13	B1238	AMBIET SENSOR OPEN
14	B1237	AMBIET SENSOR SHORT
15	B1202	WATER TEMP SENSOR OPEN
16	B1203	WATER TEMP SENSOR SHORT
17	B1242	EVAP SENSOR OPEN
18	B1241	EVAP SENSOR SHORT
19	B1245	TEMP POTENTIMETER OPEN (DRIVER)
19	B1246	TEMP POTENTIMETER SHORT (DRIVER)
20	B2406	TEMP POTENTIMETER FAULT (DRIVER)
21	B1249	MODE POTENTIMETER OPEN
21	B1250	MODE POTENTIMETER SHORT
22	B2409	MODE POTENTIMETER FAULT
23	B1200	HUMIDITY SENSOR OPEN
24	B1201	HUMIDITY SENSOR SHORT
25	B1208	INTAKE POTENTIOMETER OPEN
25	B1209	INTAKE POTENTIOMETER SHORT
26	B2408	INTAKE POTENTIOMETER FAULT
27	B1257	AQS SENSOR OPEN
28	B1258	AQS SENSOR SHORT
31	B1259	AQS SENSOR FAULT
32	B1204	TEMP POTENTIMETER OPEN (PASSENGER)
32	B1205	TEMP POTENTIMETER SHORT (PASSENGER)
33	B2415	TEMP POTENTIMETER FAULT (PASSENGER)

3. Fault code display

1) Continuance operation : DTC code is one.

BQKF500C

2) Continuance operation : DTC code is more two.

BQKF500D

3) STEP operation

A. Nomal or one fault code is same as a continuance operation.

B. DTC code as more two.

BQKF500E

4. If fault codes are displayed during the check, Inspect malfunction causes by referring to fault codes.
5. Fail safeIn-car temperature sensor:
   1) Control with the value of 25˚C(77˚F)
   2) Ambient temperature sensor: Control with the value of 20˚C(67˚F)
   3) Evaporator temperature sensor: Control with the value of -2˚C(28.4˚F)
   4) Humidity sensor: Control with the value of 10%
   5) Water temperature sensor : Control with the value of -2˚C (28.4˚F)
   6) Temperature control actuator (Air mix potentiometer):

      If temperature setting 17˚C-24.5˚C, fix at maximum cooling position.

      If temperature setting 25˚C-32˚C, fix at maximum heating position
   7) Mode control actuator (Direction potentiometer):

      Fix vent position, while selecting vent mode.

      Fix defrost position, while selecting all except vent mode.
   8) Intake control actuator :

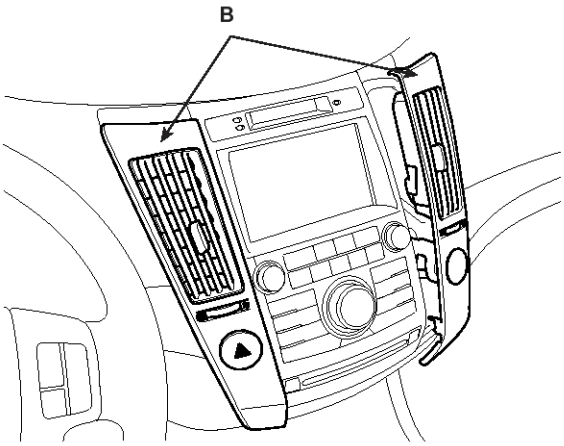
      Fix fresh position, while selecting fresh mode.

      Fix recirculation position, while selecting recirculation mode.
   9) AQS sensor : AQS operation OFF.

      Intake position : The position before selecting AQS switch.

REPLACEMENT

1. Disconnect the negative (-) battery terminal.
2. Remove the air vent panel(B).



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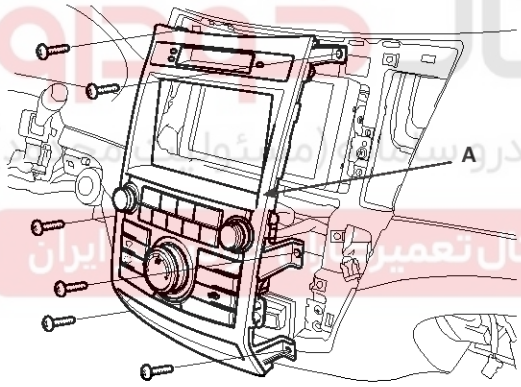
3. Remove the center facia panel (A) after loosening the screws(6EA).



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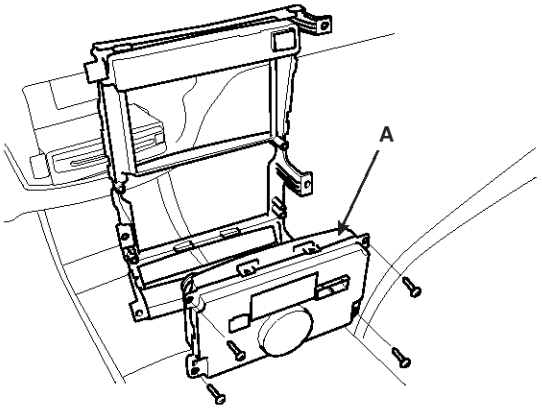
4. Remove the heater & A/C controller (A) after loosening 4 screws.



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5. Installation is the reverse order of removal.