General Information

Air conditioner

Item		Specification
Compressor	Type	VS x18
	Oil type & Capacity	FD46XG(PAG) 150 ± 10cc
	Pulley type	6PK-TYPE
	Displacement	180cc/rev
Condenser	Heat rejection	157,000 ± 5% kcal/hr
APT(A/C pressure transducer)	The method to measure the pressure	Voltage = 0.00878835 *Pressure + 0.5
Expansion valve	Type	Block
Refrigerant	Type	R-134a
	Capacity [oz.(g)]	22.9 ± 0.88 (650 ± 25)

Blower unit

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

Heater and evaporator unit

Item		Specification
Heater	Type	Pin & Tube type
	Heating capacity	4,850 ± 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 (35.7 ± 32.9), OFF: 0.6 ± 0.5 (33.0 ± 32.9)

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.

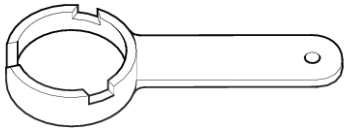
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

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

Standard:

Symptom	Suspect Area
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.Dual pressure switch 6.A/C switch 7.Evaporator temperature sensor 8.Wire harness
No cool air	1.Refrigerant capacity 2.Refrigerant pressure 3.Drive belt 4.Magnetic clutch 5.Compressor 6.Dual pressure switch 7.Evaporator temperature sensor 8.A/C switch 9.Heater control assemblyWire harness
Insufficient cooling	1.Refrigerant capacity 2.Drive belt 3.Magnetic clutch 4.Compressor 5.Condenser 6.7.8.Expansion valve 9.Evaporator 10.Refrigerant lines 11.Triple pressure switch 12.Heater control assembly

Symptom	Suspect Area
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

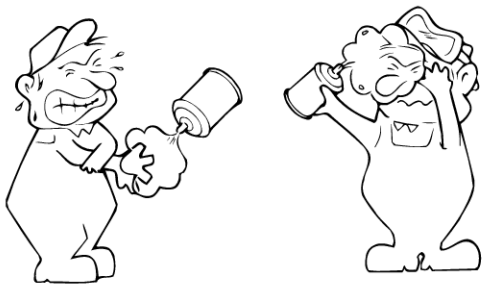
Tool (Number and name)	Illustration	Use
09977-29000 Disc & hub assembly bolt remover	 EQA9002A	Removal and installation of disc & hub assembly

Air conditioning System

Instructions

When Handling Refrigerant

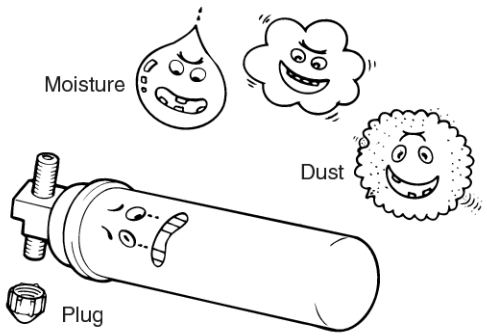
1. R-134a liquid refrigerant is highly volatile. A drop on the skin of your hand could result in localized frostbite. When handling the refrigerant, be sure to wear gloves.
2. It is standard practice to wear goggles or glasses to protect your eyes, and gloves to protect your hands. If the refrigerant 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 storage temperature is below 52℃ (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:
   - When removing refrigerant components from a vehicle, cap the components immediately to prevent 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 resum of 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.

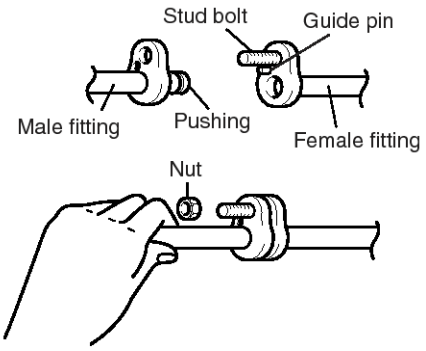


LQAC003B

When Installing Connecting Parts

Flange with guide pin

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



LQAC003C

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)

NOTICE

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

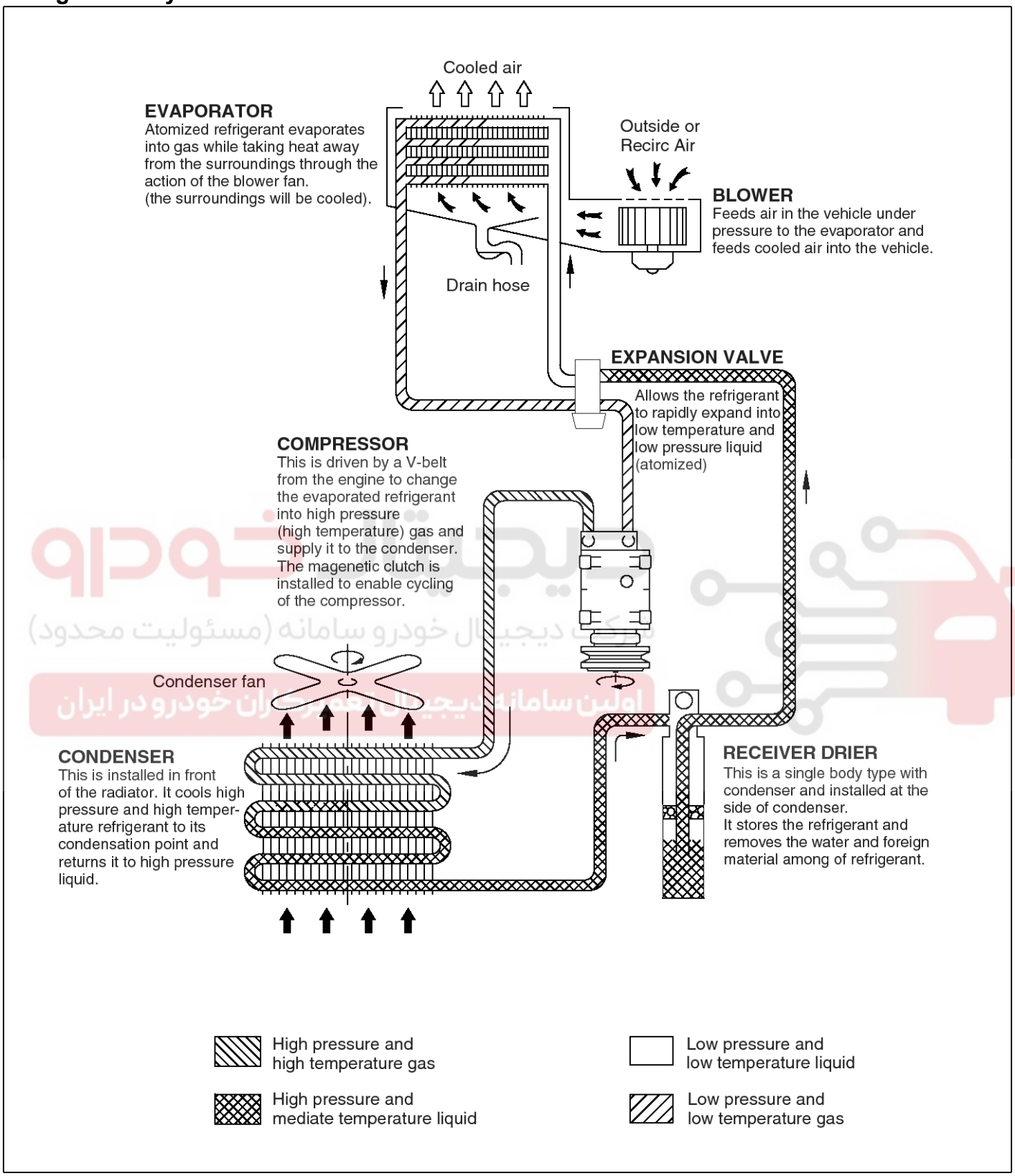
Handling tubing and fittings

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



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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.

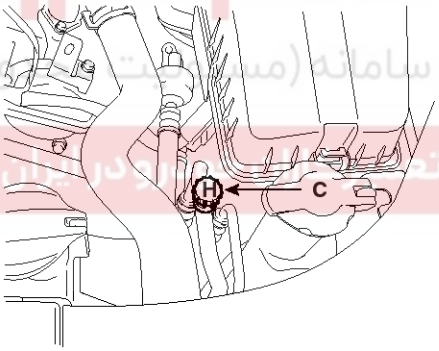
⚠CAUTION

- **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.



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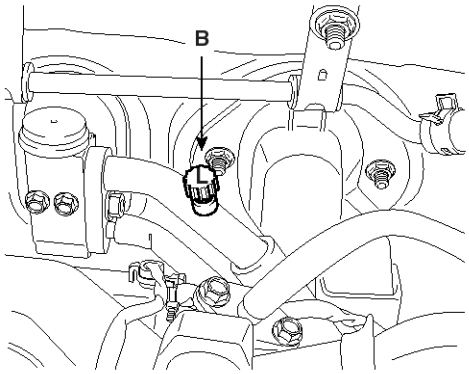

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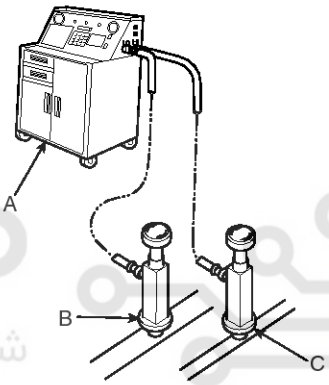


EQKE004A

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.

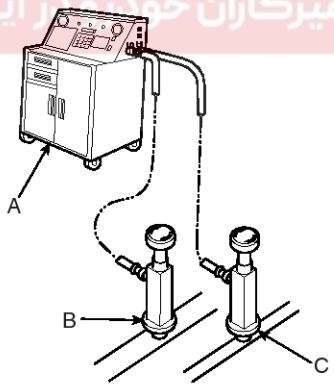
⚠CAUTION

- **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 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.



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.

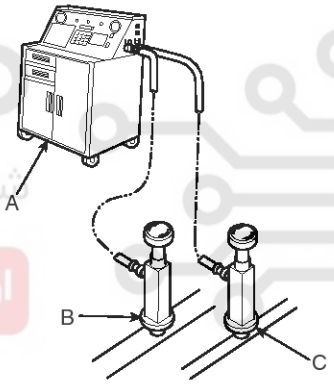
⚠CAUTION

- **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 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.



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

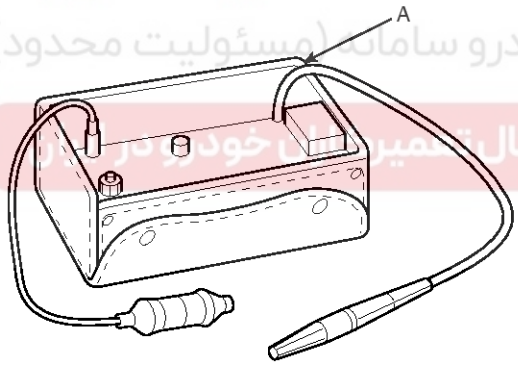
Always conduct a leak test with an electronic leak detector whenever leakage or refrigerant is suspected and when conducting service operations which are accompanied by disassembly or loosening or connection fittings.

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.



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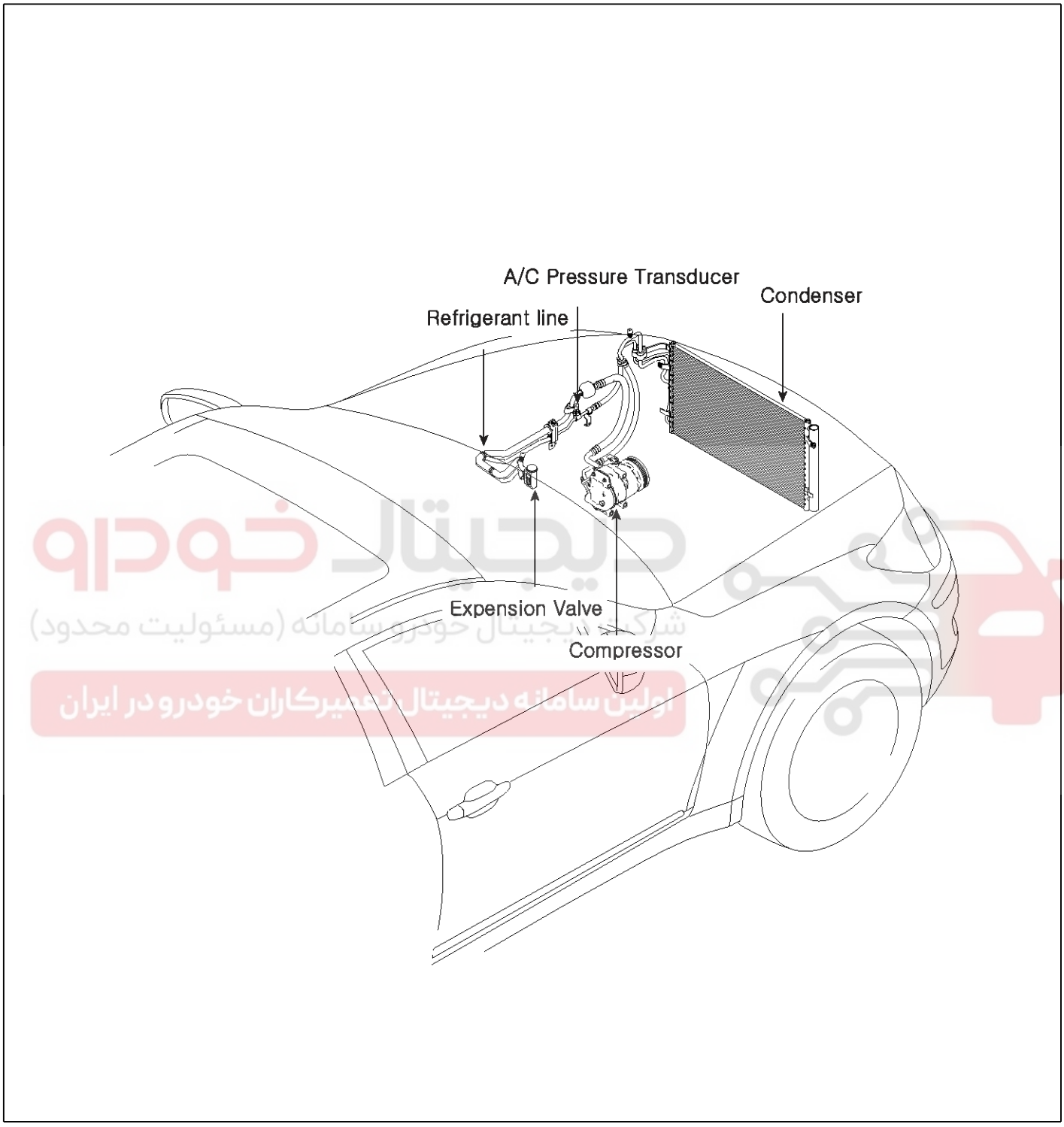
Component location index

Engine room



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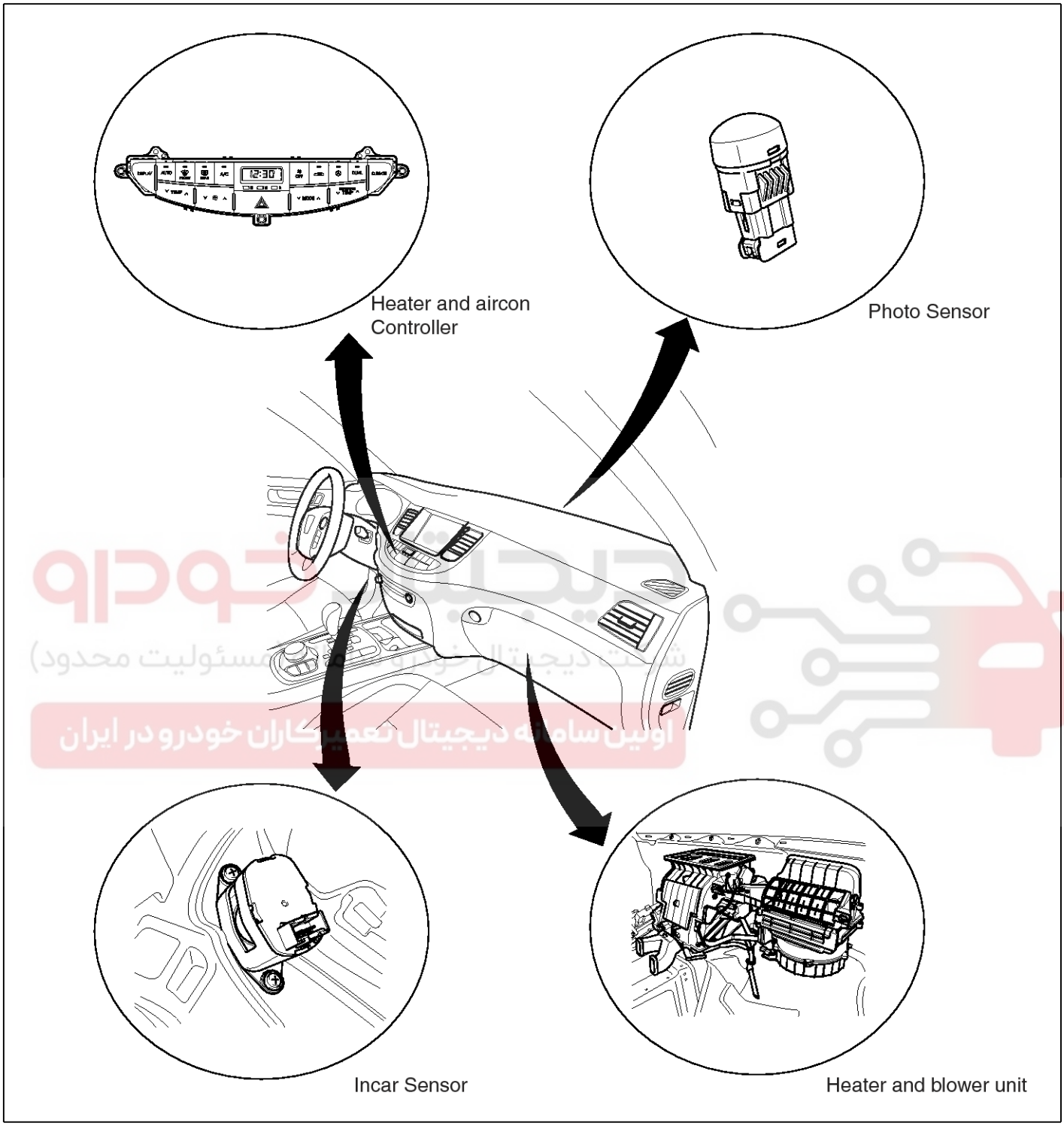
Interior



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Compressor oil

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 : 120±10cc (4.05±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:

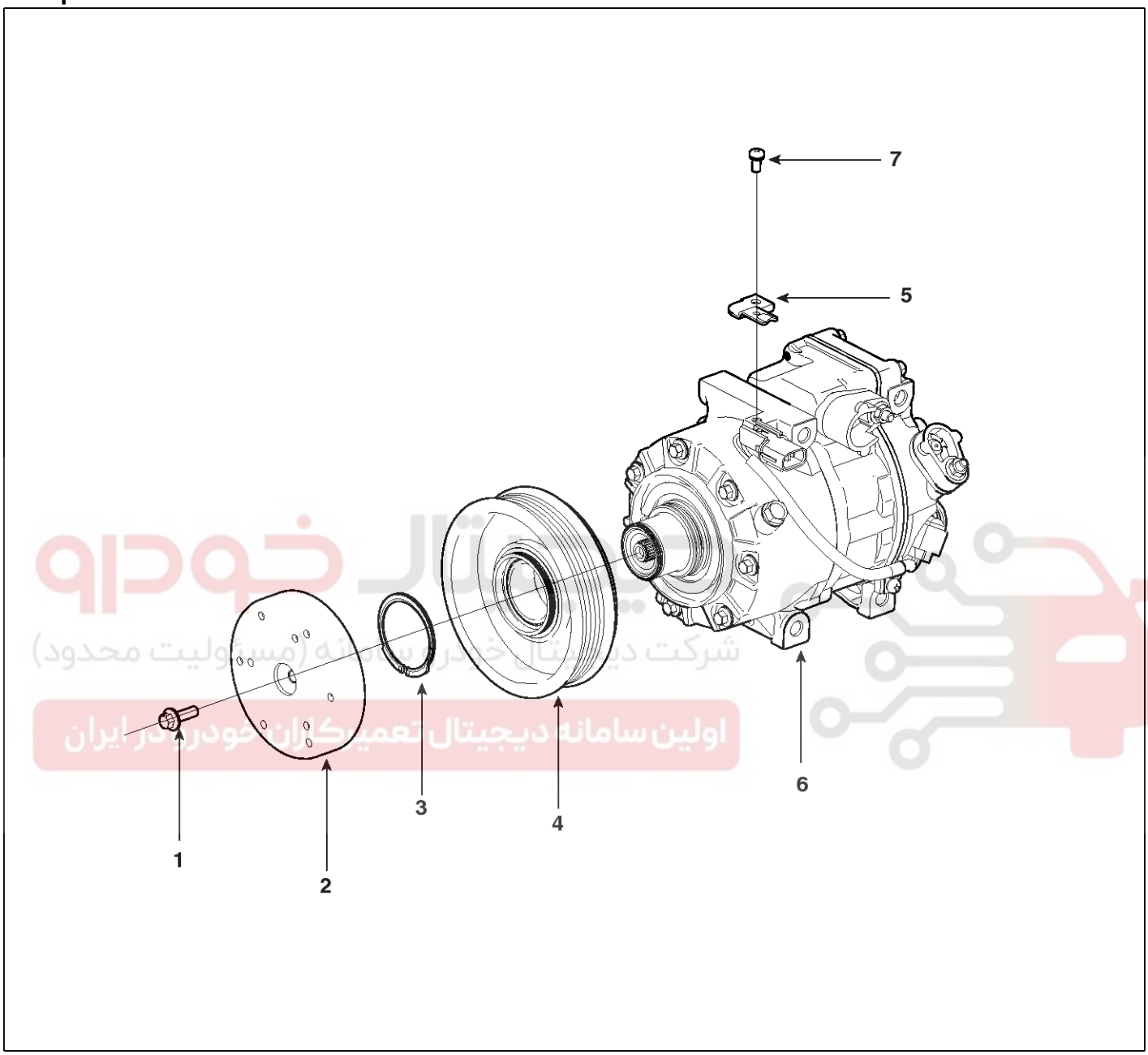
The specified volume - volume of removed compressor = volume to drain from the new compressor.

NOTICE

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

Compressor

Components



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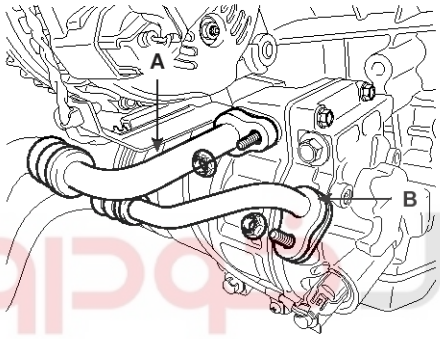
1. Bolt
2. Disc & Hub assembly
3. Retainer ring (Pulley)
4. Pulley
5. Connector bracket
6. Compressor assembly
7. Screw

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 (C) or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



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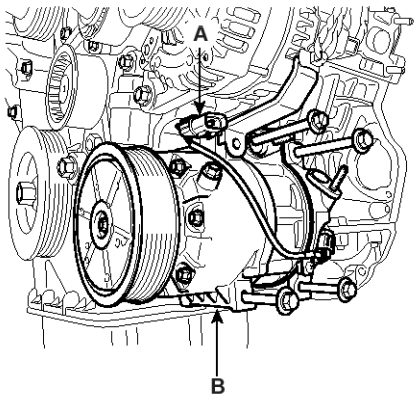
6. Disconnect the compressor clutch connector (A), and then remove 4 mounting bolts and the compressor.



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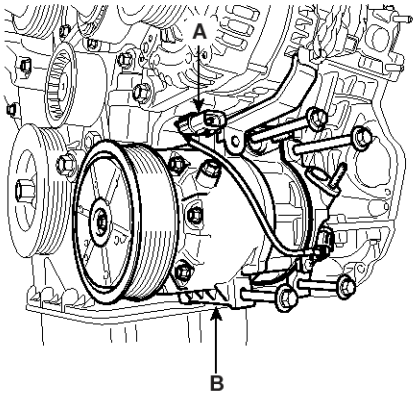
Installation

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



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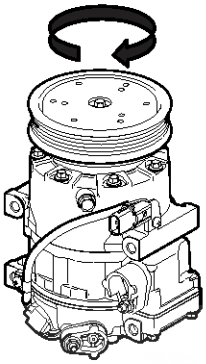
2. Install in the reverse order of removal, and note these items.
   - If you're installing a new compressor, drain all the refrigerant oil from the removed compressor, and measure its volume, Subtract the volume of drained oil from 120cc(4.20 oz.) the result is the amount of oil you should drain from 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.



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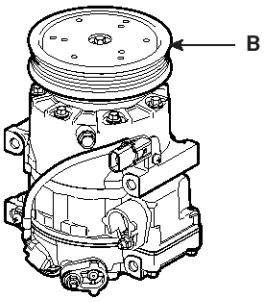
3. Measure the clearance between the pulley (B) and disc & hub assembly (A) all the way around. If the clearance is not within specified limits, remove the disc & hub assembly and add or remove shim (gap washer) as needed to increase or decrease clearance.

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

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.



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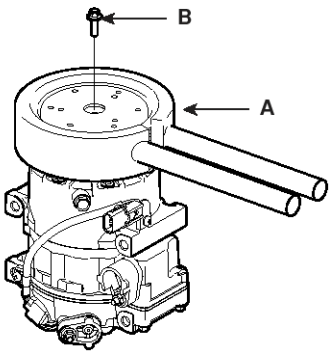
Disassembly

1. Remove center bolt (B) while is catching pulley outside order page by special tool (A).

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



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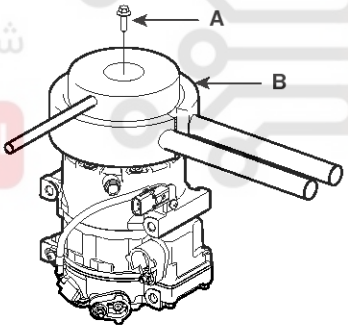
2. Remove disk from pulley to clockwise after set special tool (B) in hall of disk upper part after remove center bolt (A).



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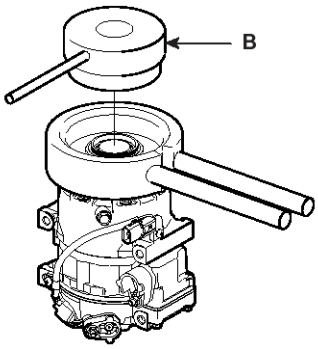

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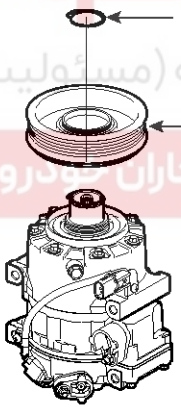
3. If you removal the field coil, remove retainer ring (A) with retainer ring pliers.

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.*

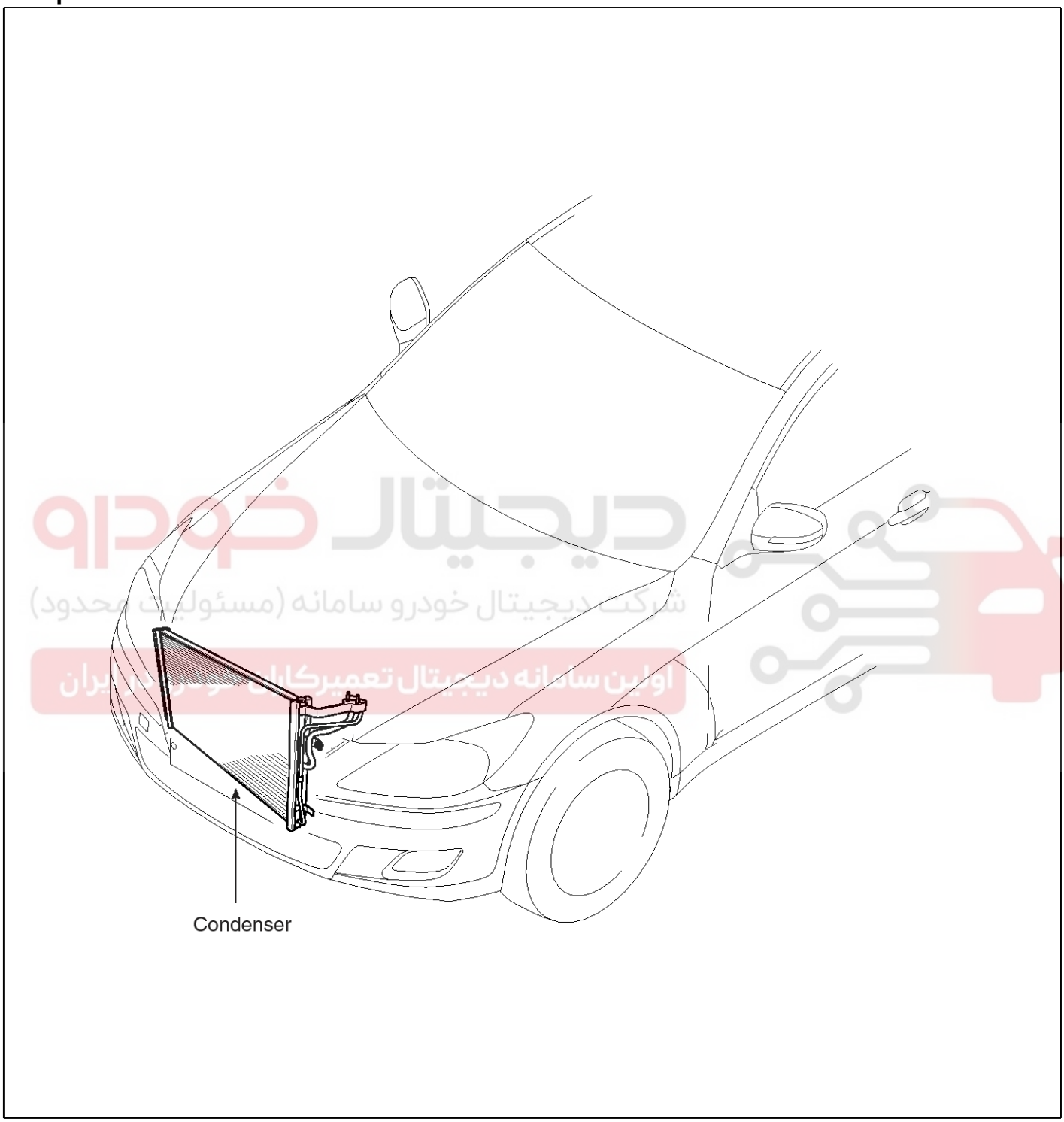


SBHHA8218D

4. 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

Component location



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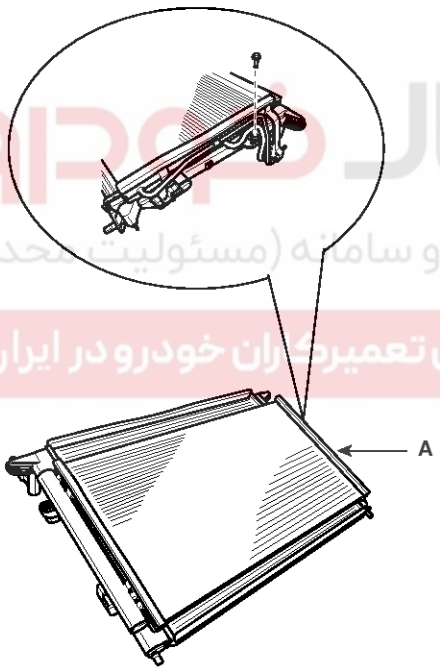
Inspection

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 radiator. (Refer to EM group)
4. 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.



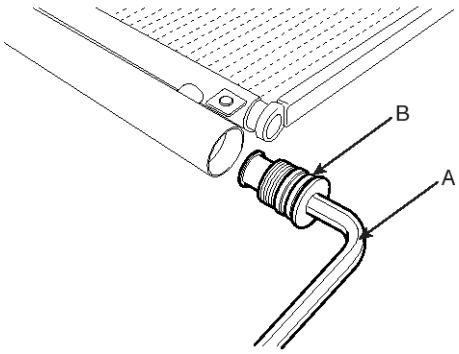
SBHHA8011D

5. 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.

Desiccant

Replacement

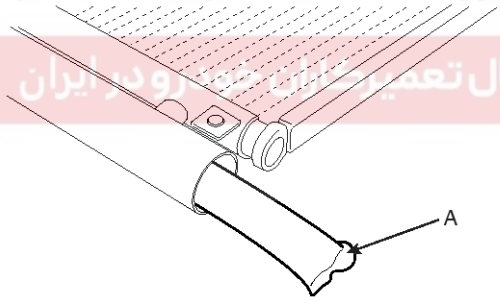
1. Remove the condenser, and then remove the bottom cap (B) with L wrench (A) from the condenser.



KQRE108D

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.



KQRE108E

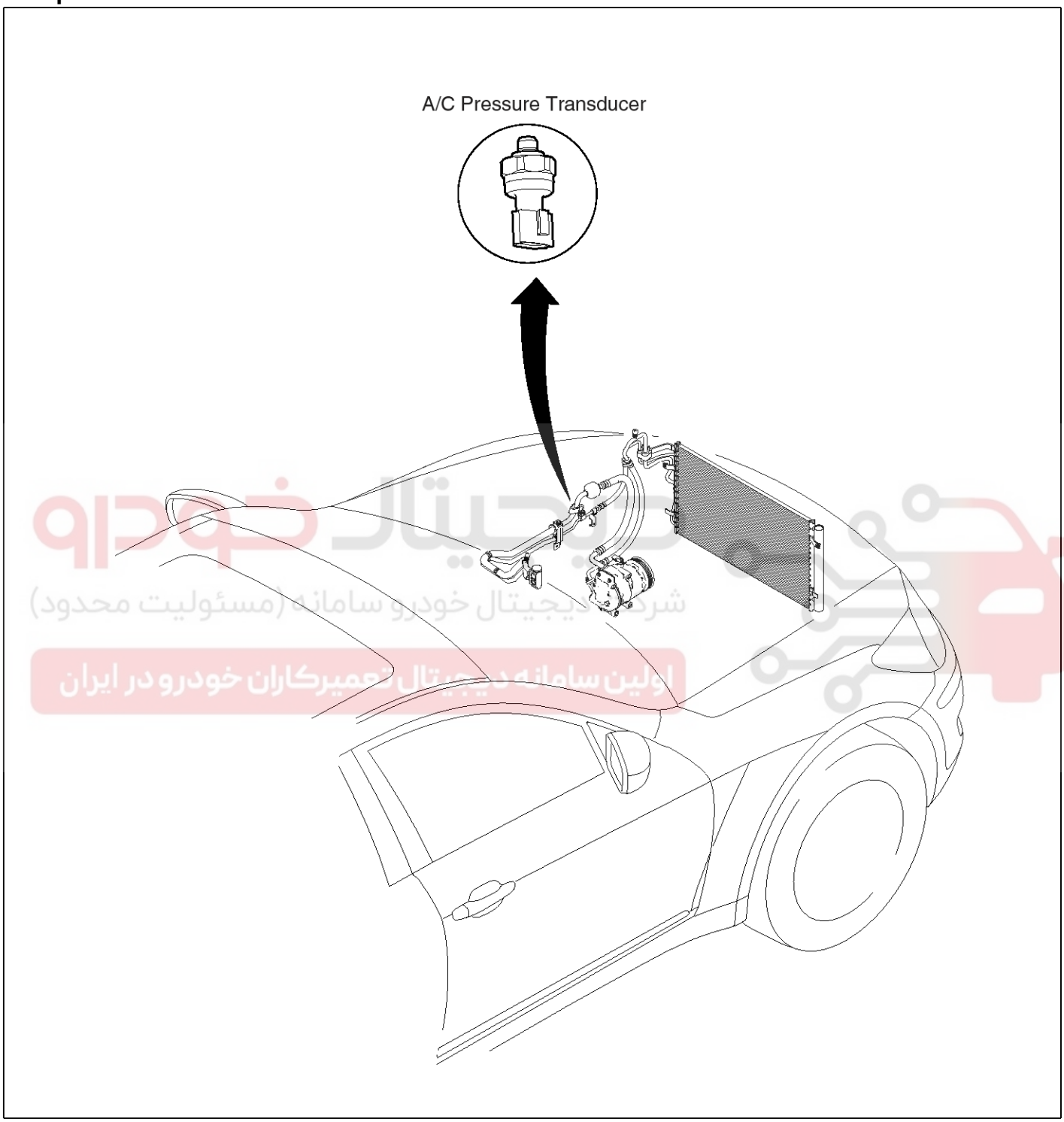
3. Apply air conditioning compressor oil along the O-rings and threads of the new bottom cap.
4. Insert the new desiccant into the receiver drier tank. The desiccant must be sealed in vacuum before it is exposed to air for use.
5. Install the new bottom cap to the condenser.

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.*

A/C pressure transducer

Component Location



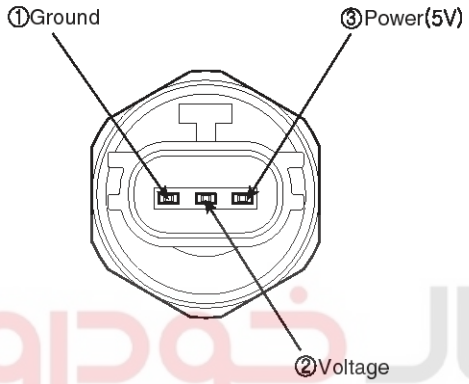
SBHHA8013N

Description

A/C pressure transducer convert the pressure value of high pressure line into voltage value after measure. By converted voltage value, engine ECU controls cooling fan by operating high speed or low speed. Engine ECU 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 NO.1 and NO.2 terminals



EQRF116B

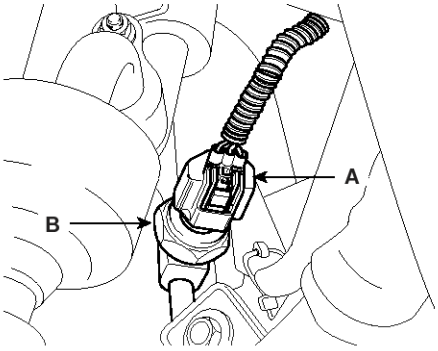
2. Inspect the voltage value whether it is sufficient to be regular value or not.

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).



SBHHA8014D

CAUTION

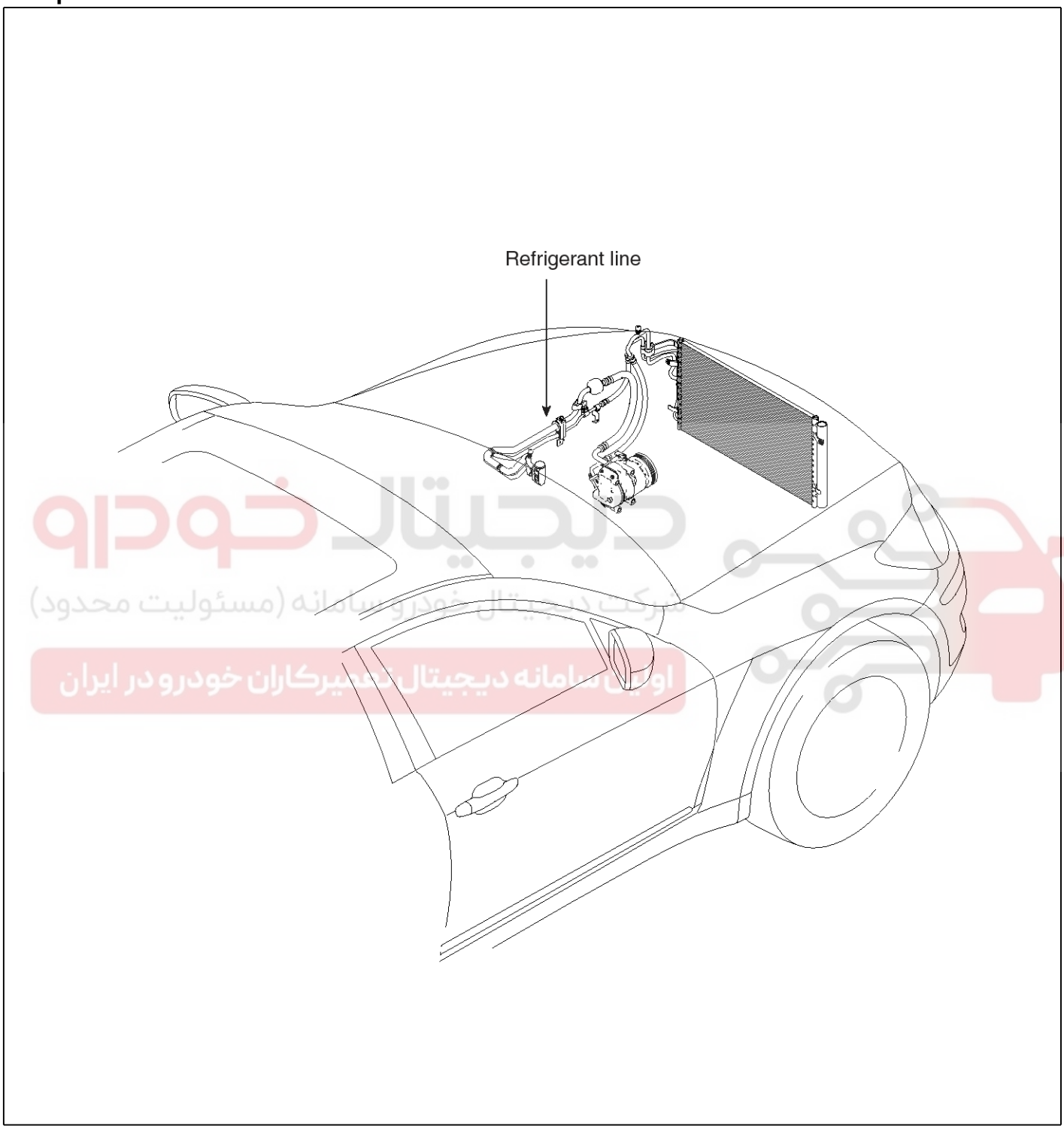
- **Take care that liquid & suction pipe are not bent.**

5. Installation is the reverse order of removal.

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

Refrigerant line

Component location



SBHHA8005N

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	8 ~ 12	0.8~1.2	5.8 ~ 8.7
Condenser - Liquid tube			
Compressor - Discharge hose			
Compressor - Suction hose			
Expansion valve - Evaporator			

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

Specified amount: 650 ± 25g (23 ± 0.88 oz.)

5. Inspect for leakage of refrigerant.

   Using a gas leak detector, check for leakage of refrigerant .

6. Inspect A/C operation.

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.

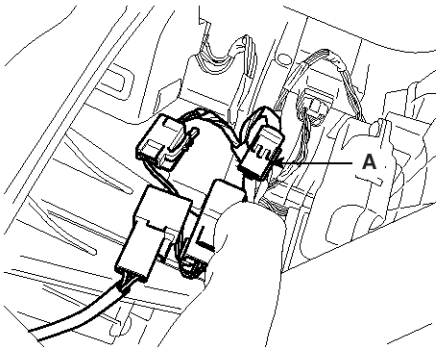
Specification

Evaporator core temperature[˚C(˚F)]	Resistance[KΩ]	Voltage[V]
-10(14)	43.35	2.96
0(32)	27.62	2.40
10(50)	18.7	1.88
20(68)	12.11	1.44
30(86)	8.30	1.08
40(104)	5.81	0.81
50(122)	4.15	0.61

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.

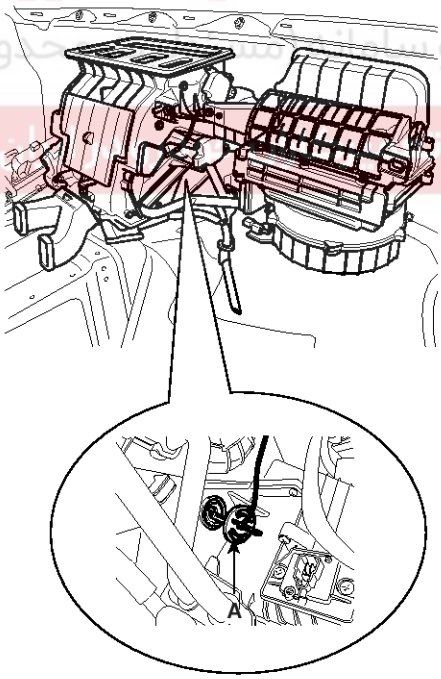
Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the crash pad.
3. Disconnect the evaporator sensor connector (A).



SBHHA8015D

4. Remove the evaporator temperature sensor (A), by pulling it after rotating 90˚ in a counter clock wise direction.



SBHHA8201D

⚠CAUTION

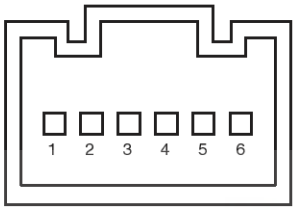
- **Take care that evaporator core pins are not bent.**

5. Installation is the reverse order of removal.

In-car sensor

Description

1. In-car air temperature sensor is located at the center facia 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.



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

SBHHA9614L

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

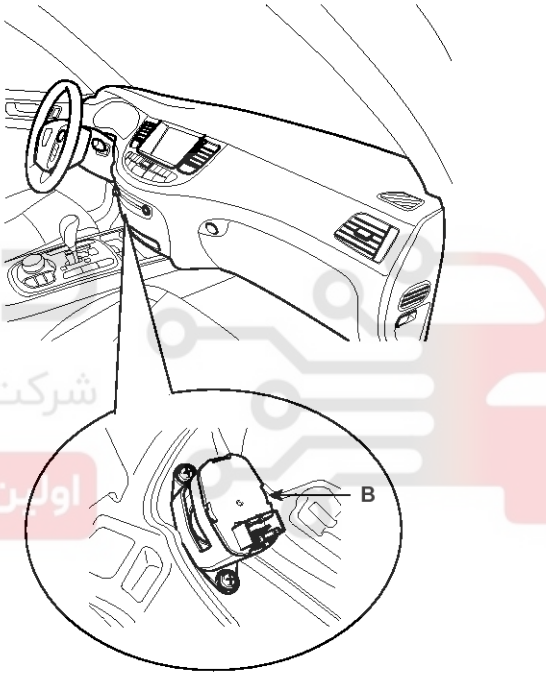
Temperature [℃(˚F)]	Resistance between terminals 2and 4 (kΩ)
-20(-4)	285.61
-10 (14)	164.65
0 (32)	97.71
10 (50)	59.67
20(68)	37.48
30(86)	24.17
40(104)	15.98
50(122)	10.81

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



SBHHA8019D

4. Installation is the reverse order of removal.

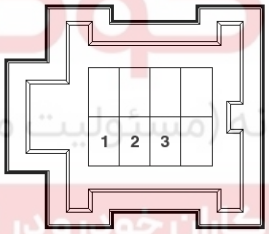
Photo sensor

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.

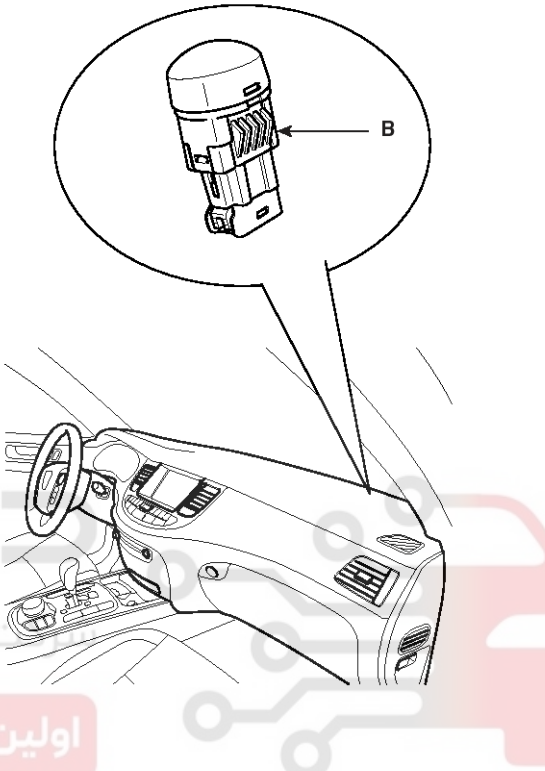


1. Sensor REF (+5V)
2. Photo Sensor (-) Right
3. Photo Sensor (-) Left

SBHHA8614N

Replacement

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



SENHA6217L

3. Install in the reverse order of removal.

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.

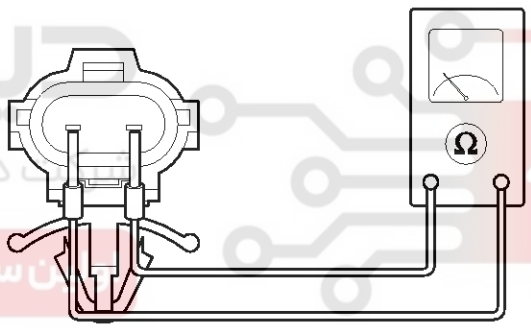
The compressor will be operated by manual operating.

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(14)	480.41 ± 3%
-2032)	271.21± 3%
-10(50)	158.18± 3%
0(68)	95.10± 3%
10(50)	58.80± 3%
20(68)	37.32± 3%
30(86)	24.26± 3%
40(104)	16.13± 3%
50(122)	10.95± 3%

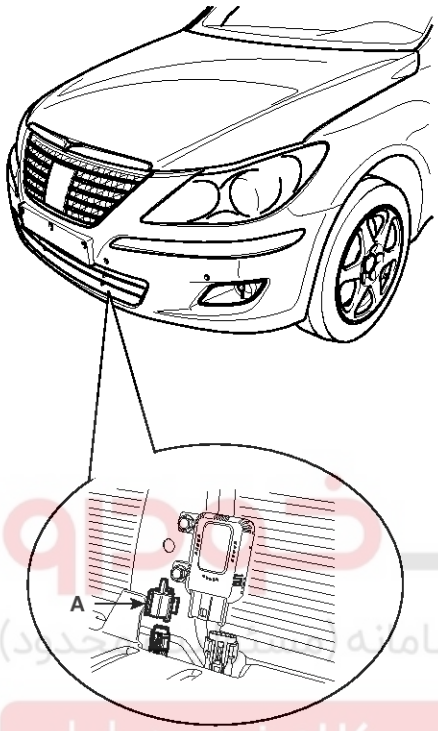


AQJF204B

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).



SBHHA8023D

4. Installation is the reverse order of removal.

Air Quality Sensor(AQS)

Description

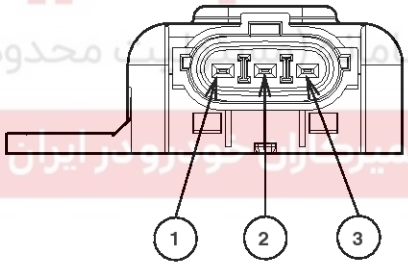
1. A.Q.S is located at center support in front of the engine radiator, and detects hazardous elements in ambient air providing output signal to control.
2. It will detect sulfurous acid gas, carbon dioxide, carbon monoxide, hydrocarbon and allergen.

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	4.3 ± 0.3	Fresh
Hazardous gas detection	0.9 ± 0.3	Recirculation



1. IGN
2. GND
3. AQS Signal

SBHHA8615N

4. AQS diagnosis and fail safe7

   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.

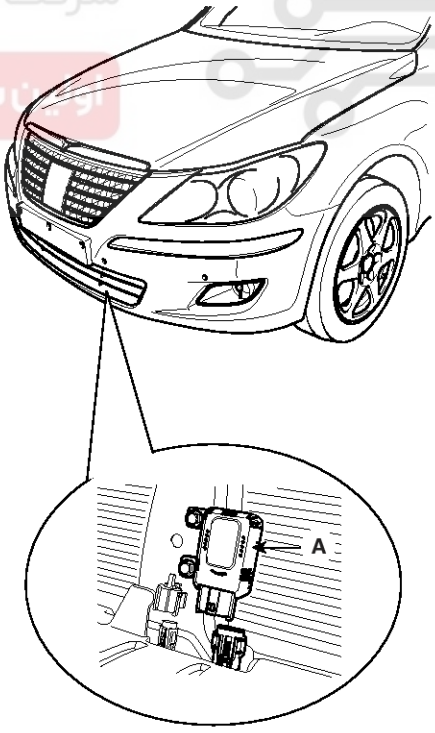
   Fail safe: Release the AQS (AQS cannot be selected), Fresh/recirculation maintains previous situation of AQS selection.

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.



SBHHA8203L

4. Installation is the reverse order of removal.

Auto defoging sensor

Description

Achieve exclusion function on croaker before fogging occurrence. Senses vehicles rational moisture and proves watch security and amenities.

Inspection

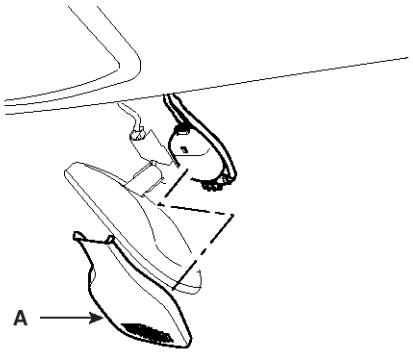
1. Press the OFF switch more then 4 times within 2 secconds while pressing the MODE switch.

Display	Fail description
00	Normal
23	Auto defog humidity sensor OPEN
24	Auto defog humidity sensor SHORT
43	Defog door potentiometer OPEN/SHO-RT
44	Defog door potentiometer

Diagnostic procedure refer to DTC code.

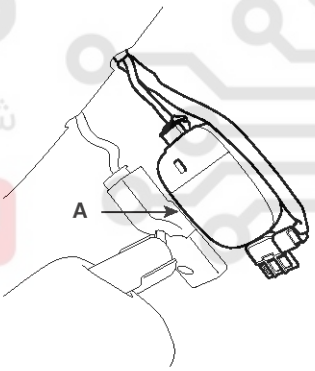
Replacement

1. Remove the auto defogging sensor cover(A).



SBHHA8024D

2. Disconnect the connector and then remove the auto defogging sensor(A).



SBHHA8025D

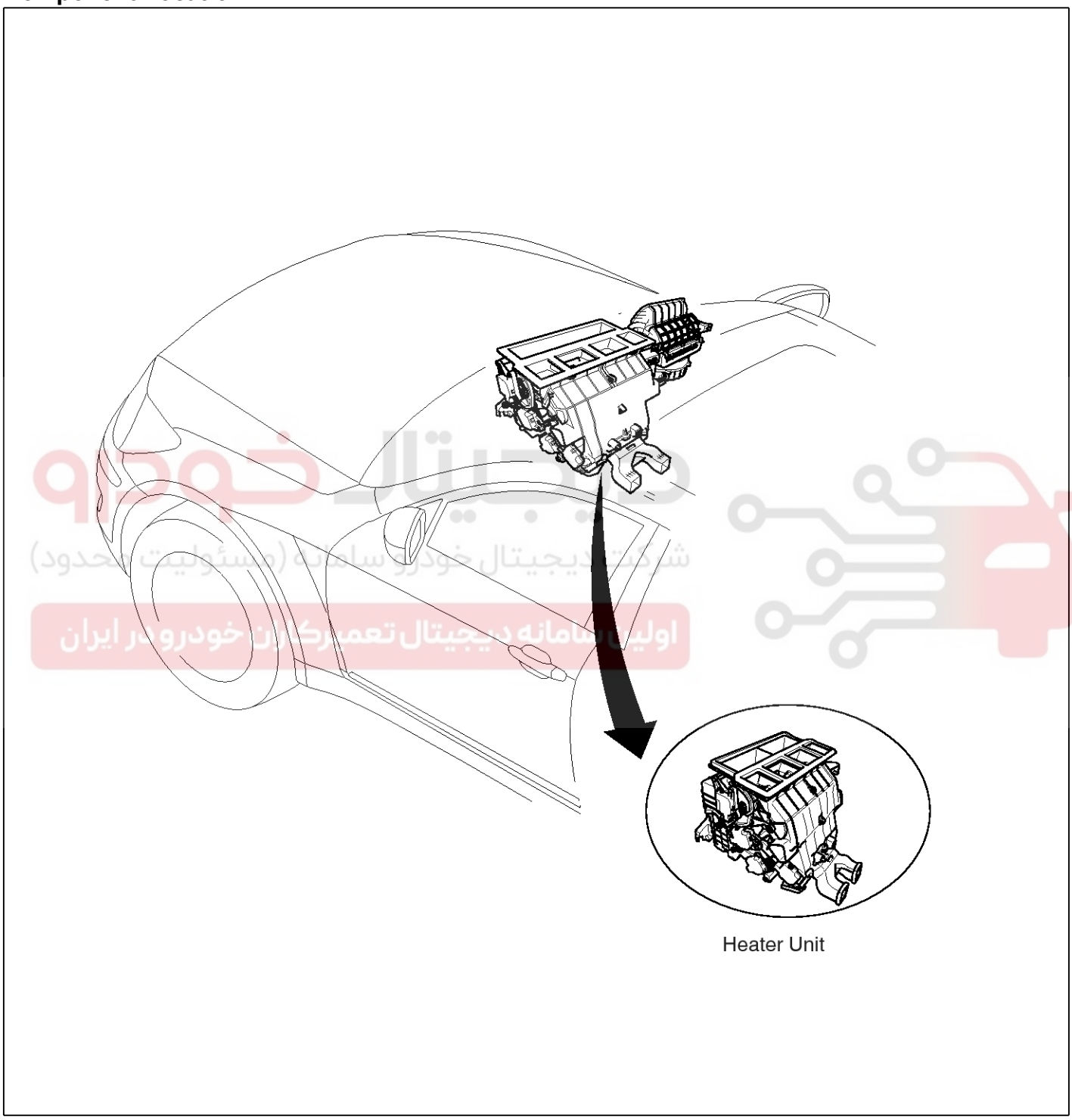
3. Installation is the reverse order of removal.

Cluster ion generator

Heater

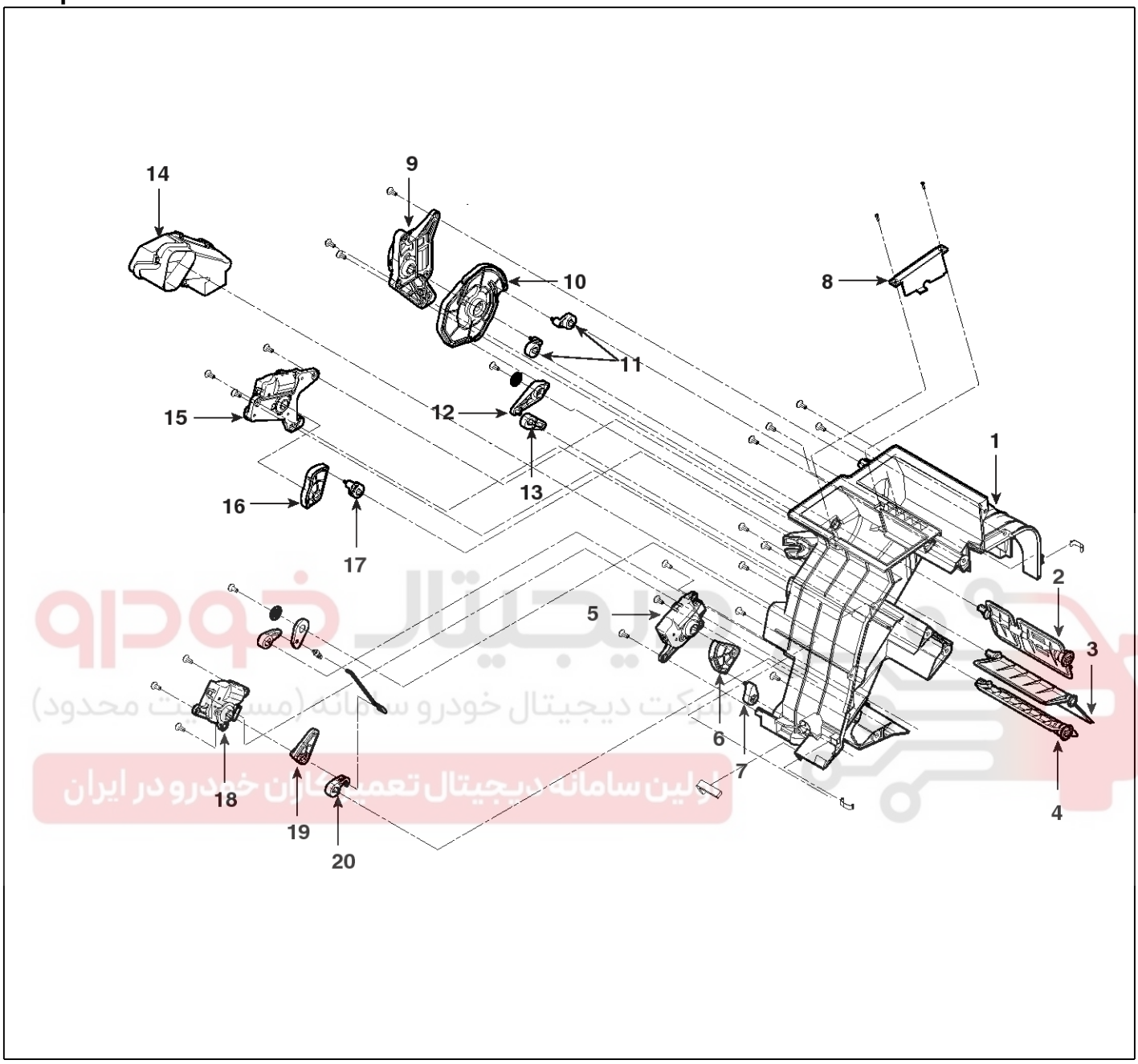
Heater Unit

Component Location



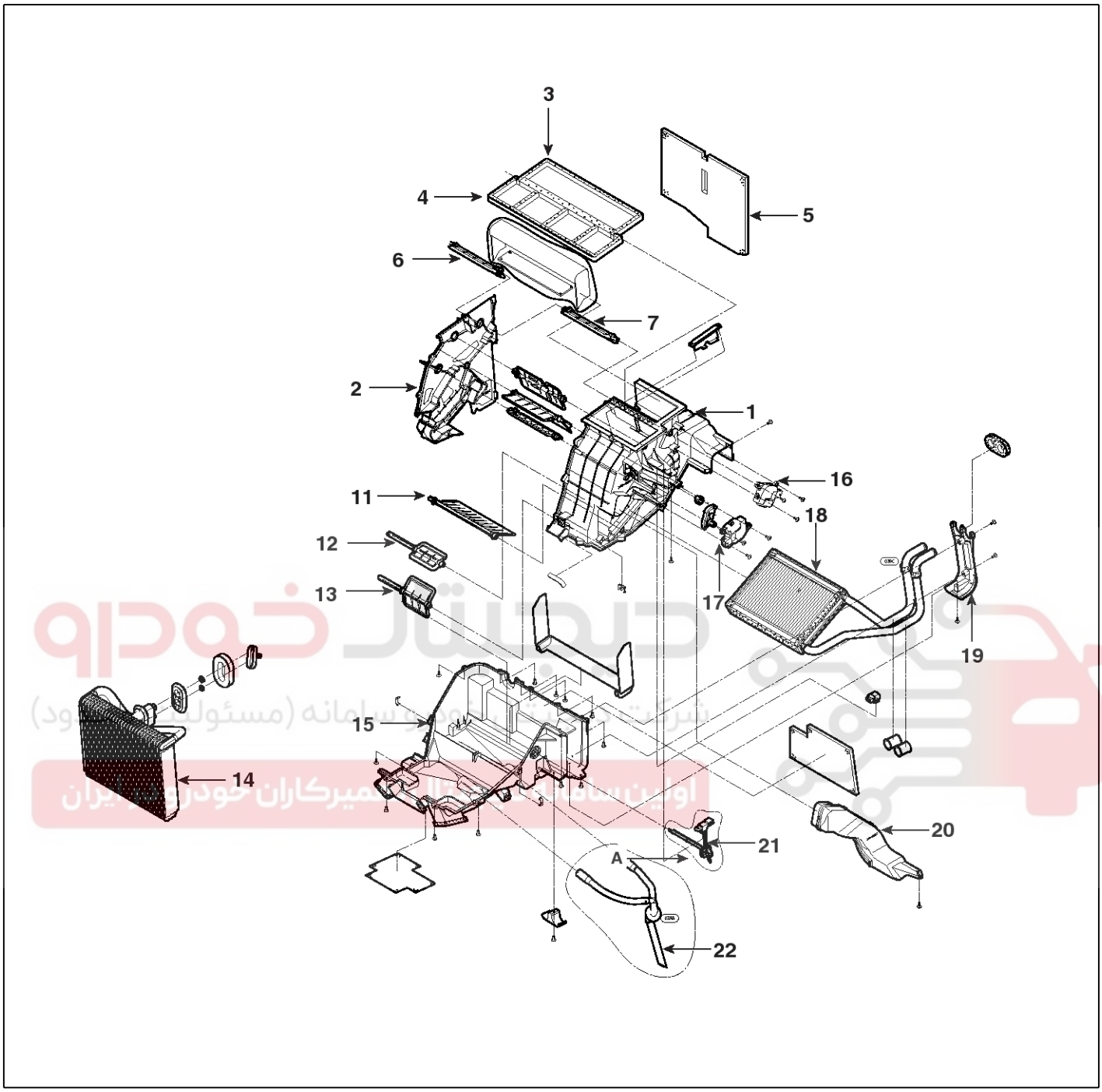
SBHHA8028N

Compoment



SBHHA8029D

1. Heater case (LH)
2. Vent door (LH)
3. Temp door (LH)
4. Floor door (LH)
5. Console temp actuator (A)
6. Console temp door
7. Console temp lever
8. Console mode arm
9. Vent guide
10. Mode actuator
11. Mode cam
12. Vent door arm
13. Floor door lever
14. Shower duct
15. Temp actuator (drive)
16. Temp door lever
17. Temp dor arm
18. Console temp actuator
19. Console temp lever
20. Console temp arm (A)



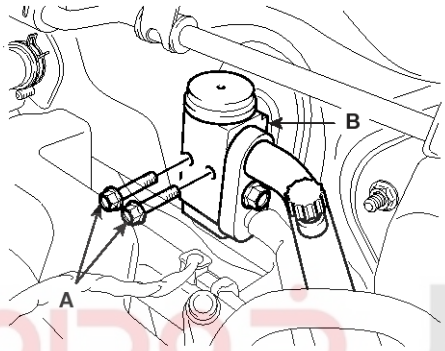
SBHHA8030D

1. Heater case (RH)
2. Seperater
3. Center duct seal (A)
4. Center duct seal (A)
5. Insulator
6. Def door (LH)
7. Def door (RH)
8. Vent door (RH)
9. Vent door (RH)
10. Floor door (RH)
11. Console temp door
12. Console temp door (A)
13. Console mode door
14. Evaporator core
15. Lower case
16. Mode actuator
17. Temp actuator (Passenger)
18. Heater core
19. Heater core cover
20. Shower duct (RH)
21. Drain hose
22. Evaporator temp sensor

Replacement

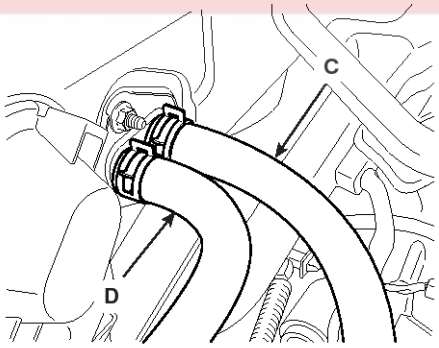
1. Disconnect the negative (-) battery terminal.
2. Recover the refrigerant with a recovery/ recycling/ charging station.
3. When the engine is cool, drain the engine coolant from the radiator.
4. Remove the bolts (A) and the expansion valve (B) from the evaporator core.

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



SBHHA8031D

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

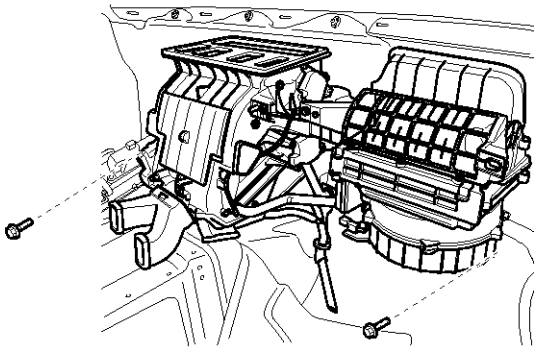


SBHHA8032D

⚠CAUTION

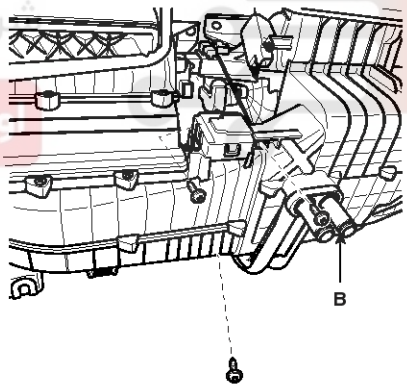
- **Engine coolant will spill when the hoses are disconnected; drain it into a clean drip pan. Be sure not to let coolant spill on electrical parts or painted surfaces. If any coolant spills, rinse it off immediately.**

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. Remove the heater & blower unit after loosening 3 mounting bolts.



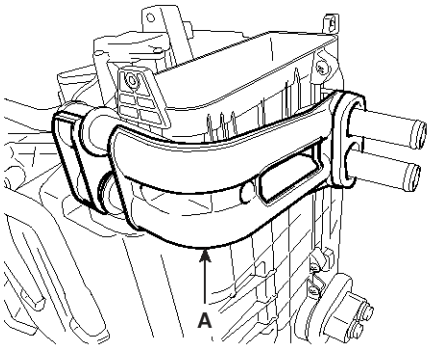
SBHHA8021D

9. Remove the blower unit (B) from heater unit after loosening 2 screws.



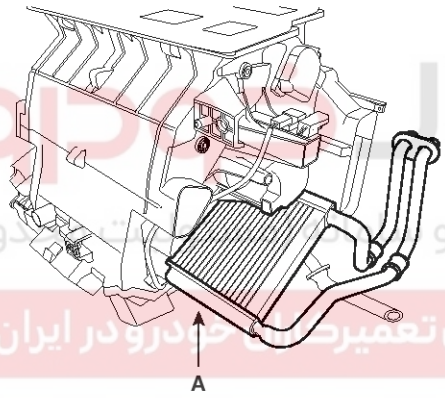
SBHHA8034L

10. Remove the heater core cover (A).



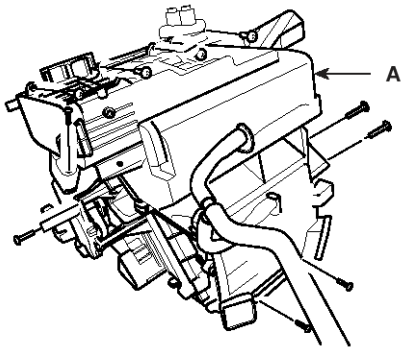
SBHHA8035D

11. Be careful that the inlet and outlet pipe are not bent during heater core removal, and pull out the heater core (A).



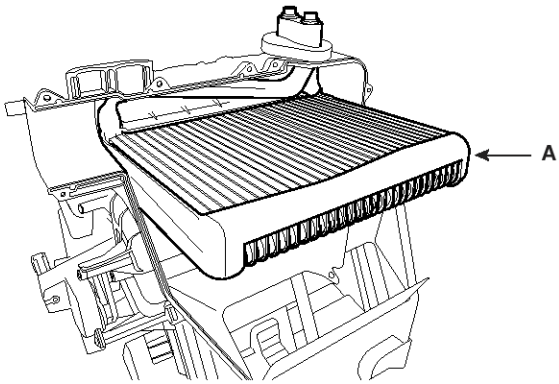
SBHHA8036D

12. Remove the heater unit lower case(A).



SBHHA8037D

13. Remove the evaporator core(A).

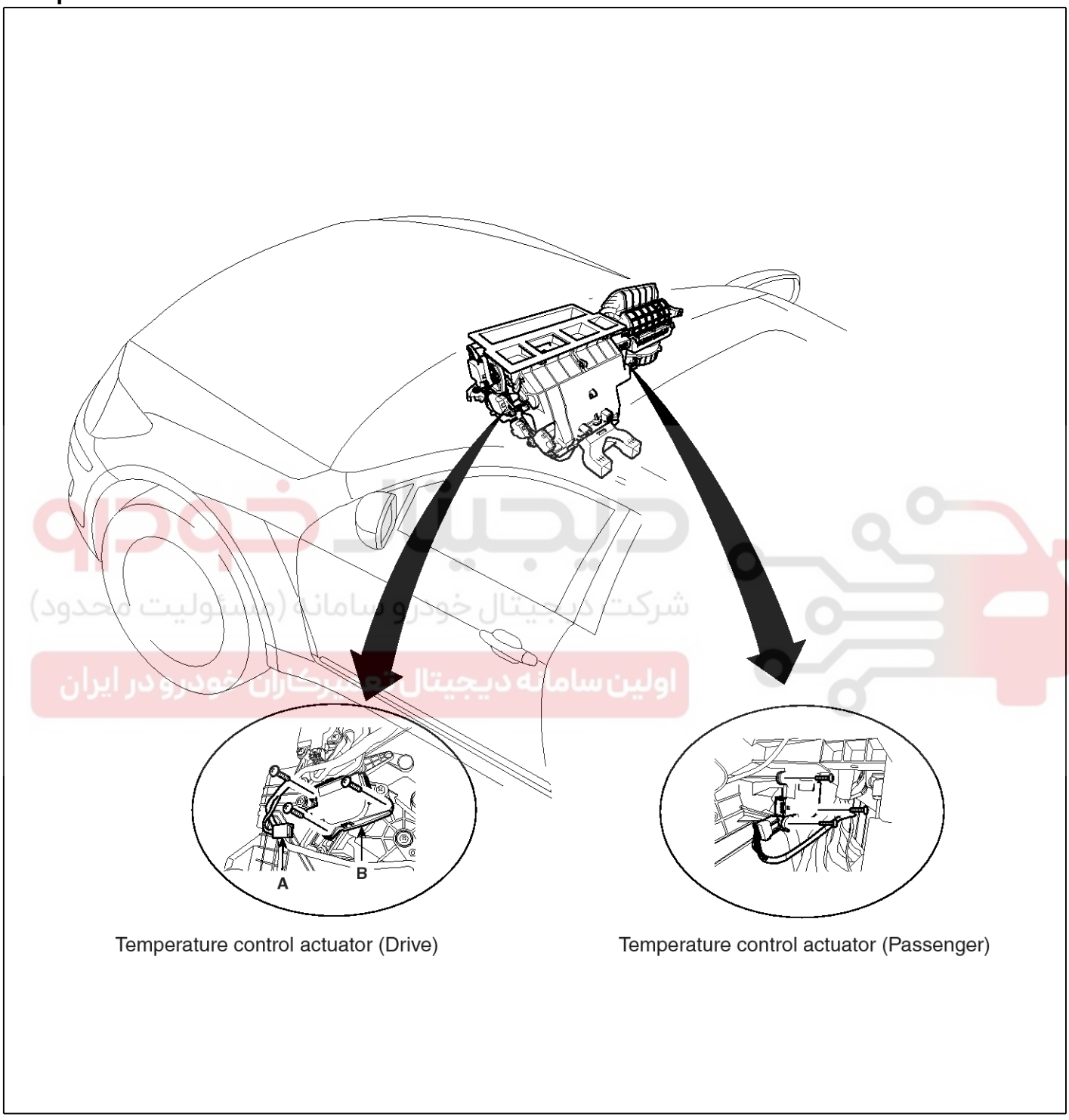


SBHHA8038D

14. Be careful that the inlet and outlet pipe are not bent during heater core removal, and pull out the heater core.
15. Install the heater core in the reverse order of removal.
16. 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. 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 paint ; if the refrigerant oil contacts the paint, wash 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

Component Location



Temperature control actuator (Drive)

Temperature control actuator (Passenger)

SBHHA8039N

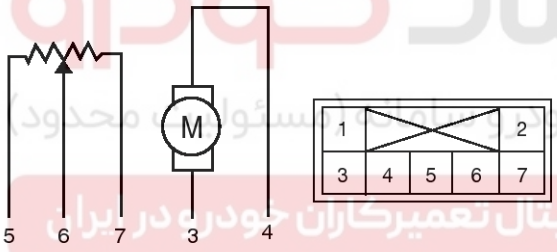
Description

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]



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

SBHHA8100N

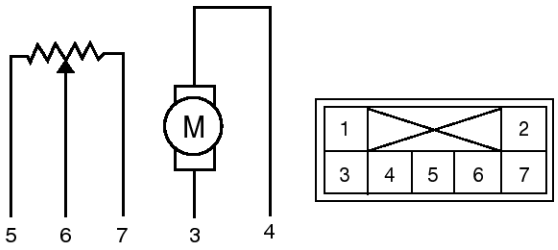
4. Check the voltage between terminals 6 and 7.

Specification

Door position	Voltage (3-4)	Error detecting
Max. cooling	0.3 ± 0.15V	Low voltage :0.1 V or less
Max. heating	4.7 ± 0.15V	High voltage :4.9 V or more

* It will feedback current position of actuator to controls.

[Passenger]



1. -
2. -
3. Hot position
4. Cool position
5. Sensor ground
6. Feedback signal
7. 5V (Vcc)

SBHHA8101N

5. Check the voltage between terminals 5 and 6.

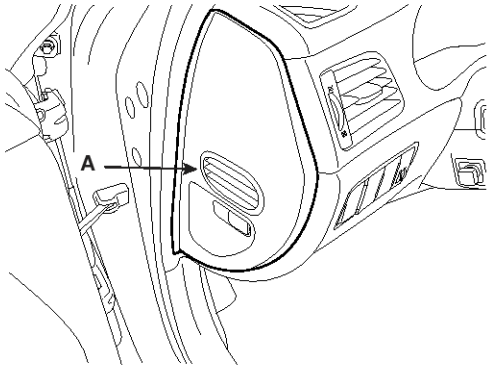
Door position	Voltage (5-6)	Error detecting
Max. cooling	0.3 ± 0.15V	Low voltage :0.1 V or less
Max. heating	4.7 ± 0.15V	High voltage :4.9 V or more

* It will feedback current position of actuator to controls.

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

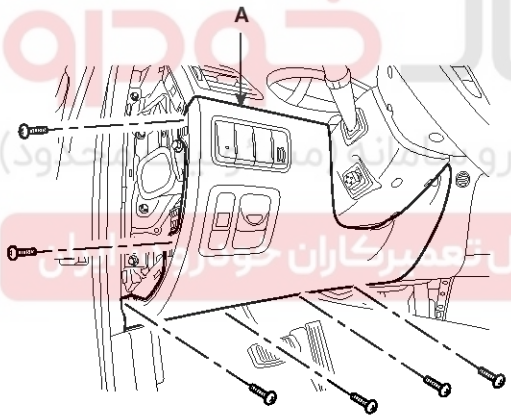
Replacement

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



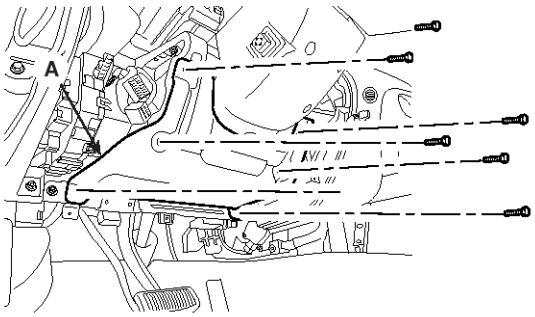
SBHBD8062D

3. After loosening the crash pad lower panel mounting screws, then remove the lower panel (A).



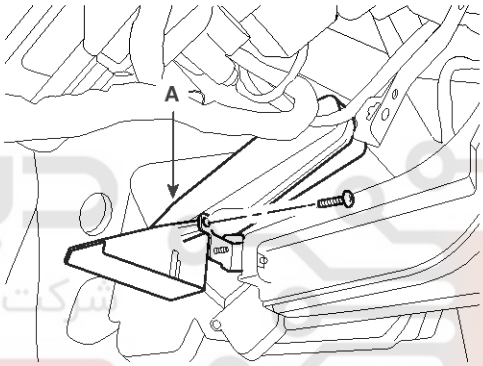
SBHBD8063D

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



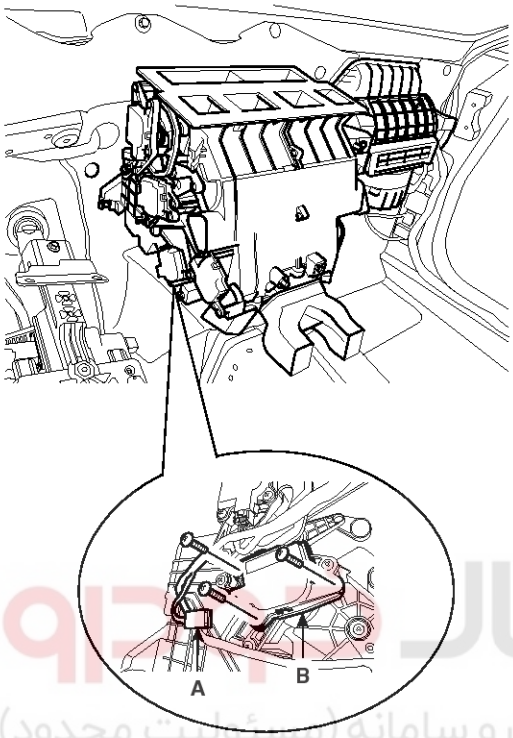
SBHBD8071D

5. Remove the shower duct(A).



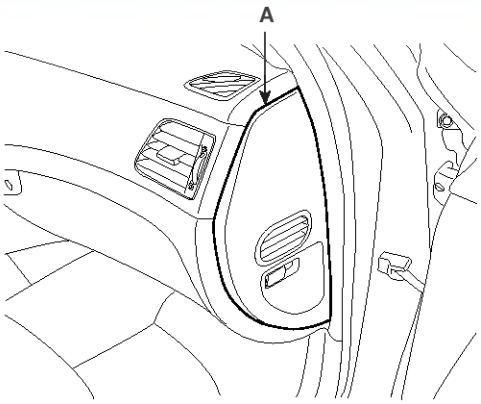
SBHHA8040D

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).



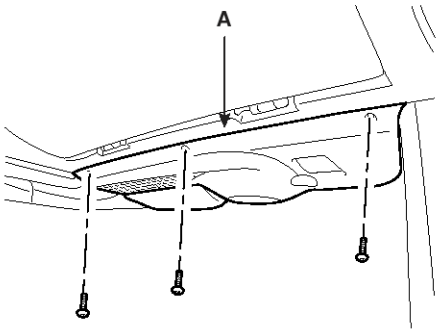
SBHHA8205D

8. Remove the crash pad side cover (A).



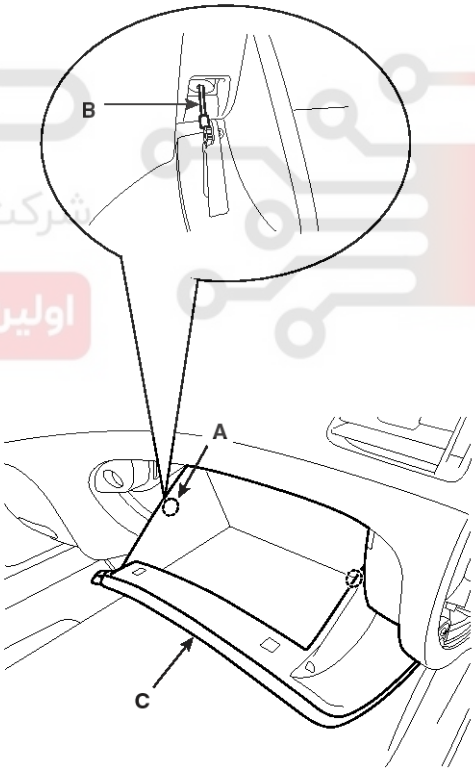
SBHBD8075D

9. Remove the crashpad under cover(A).



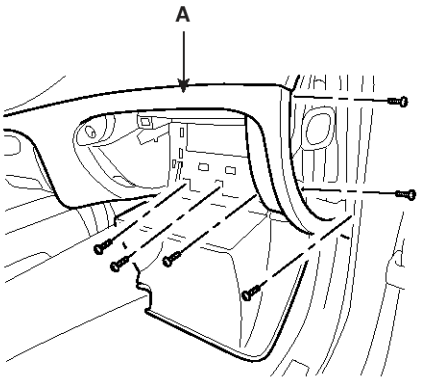
SBHBD8102D

10. Disconnect the damper (B) from the glove box (C).
11. Remove the glove box from the lift (B).



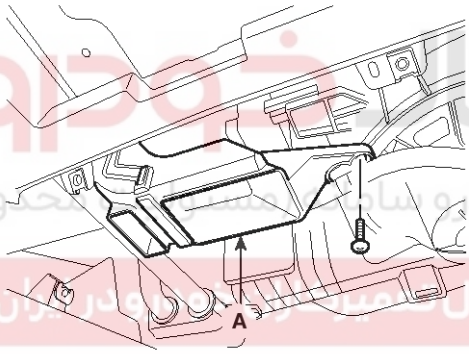
SBHBD8076D

12. After loosening the mounting screws, then remove the glove box housing (A).



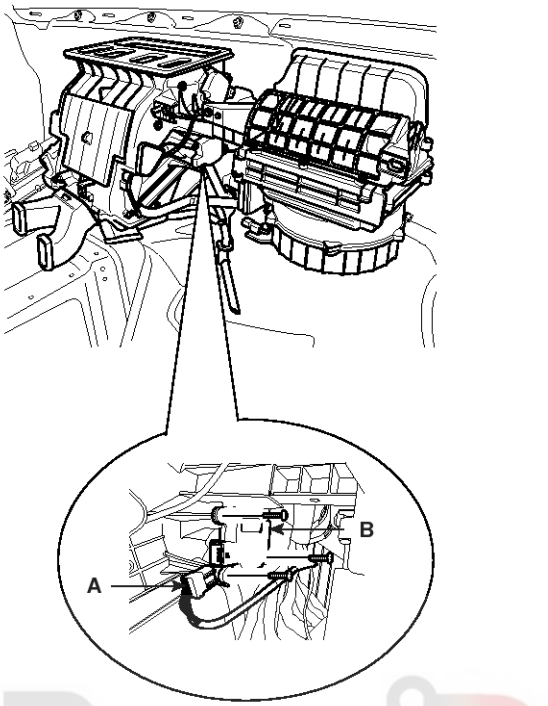
SBHBD8077D

13. Remove the shower duct(A).



SBHHA8048D

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

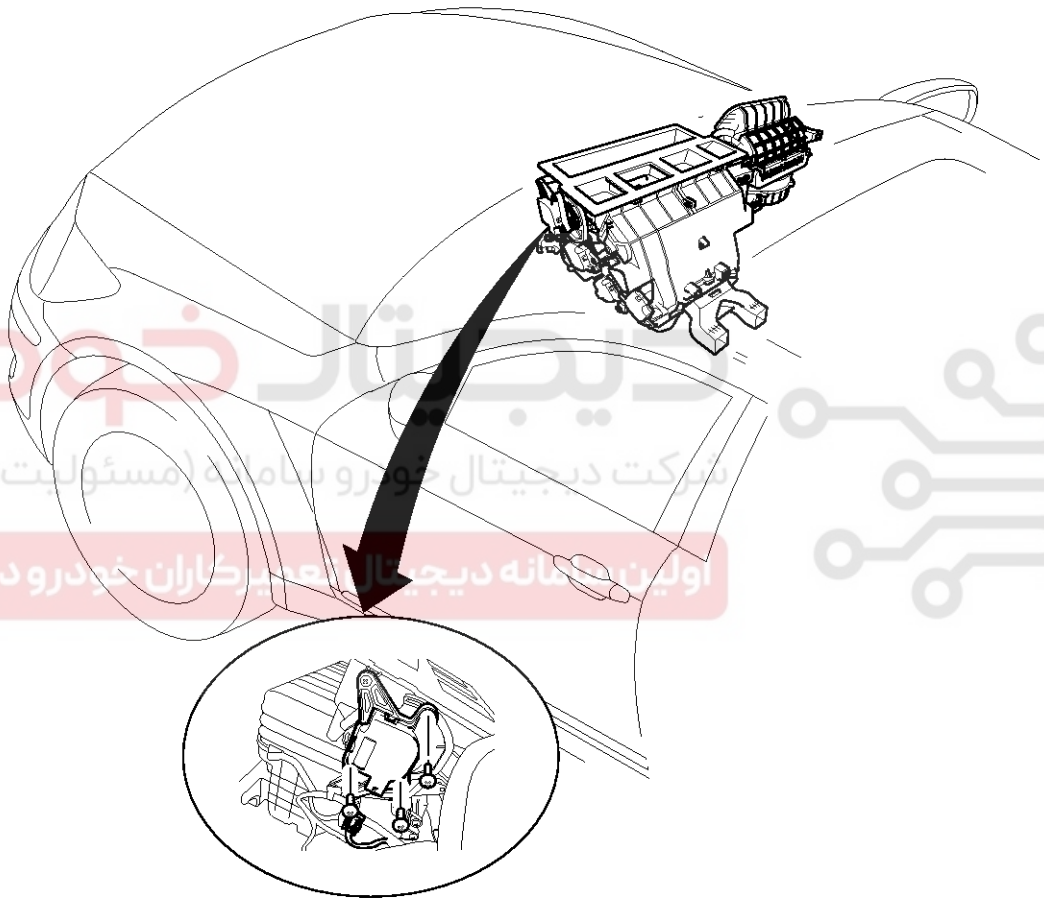


SBHHA8206D

15. Installation is the reverse order of removal.

Mode Control Actuator

Component Location



Mode Control Actuator

SBHHA8050N

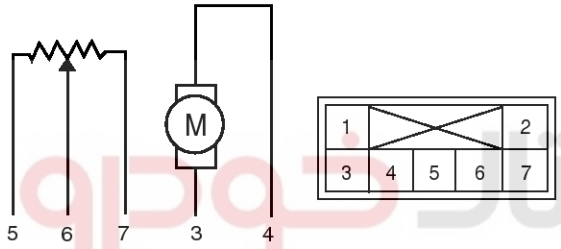
Description

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.



1. -
2. -
3. Defrost mode
4. Vent mode
5. Sensor ground
6. Feedback signal
7. 5V (Vcc)

SENHA9517N

5. Check the voltage between terminals 5 and 6.

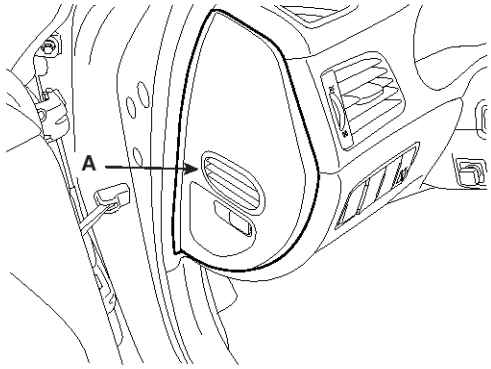
Door position	Voltage (5-6)	Error detecting
Vent	0.3 ± 0.15V	Low voltage :0.1 V or less
Defrost	4.7 ± 0.15V	High voltage :4.9 V or more

* It will feedback current position of actuator to controls.

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

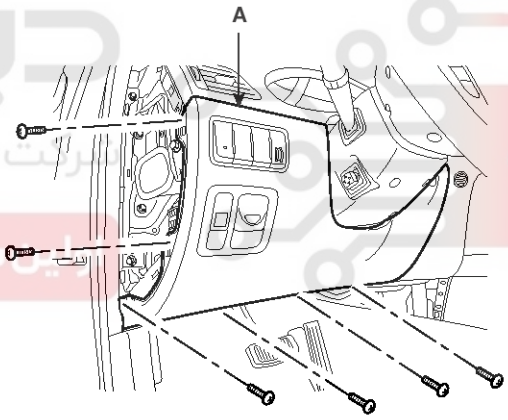
Replacement

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



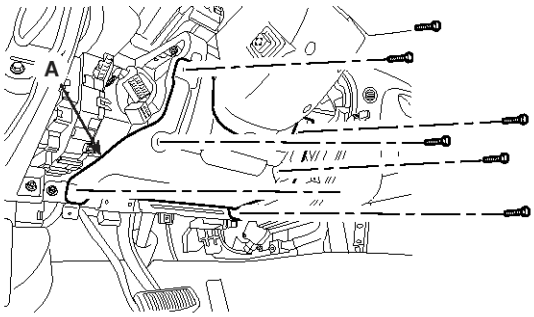
SBHBD8062D

3. After loosening the crash pad lower panel mounting screws, then remove the lower panel (A).



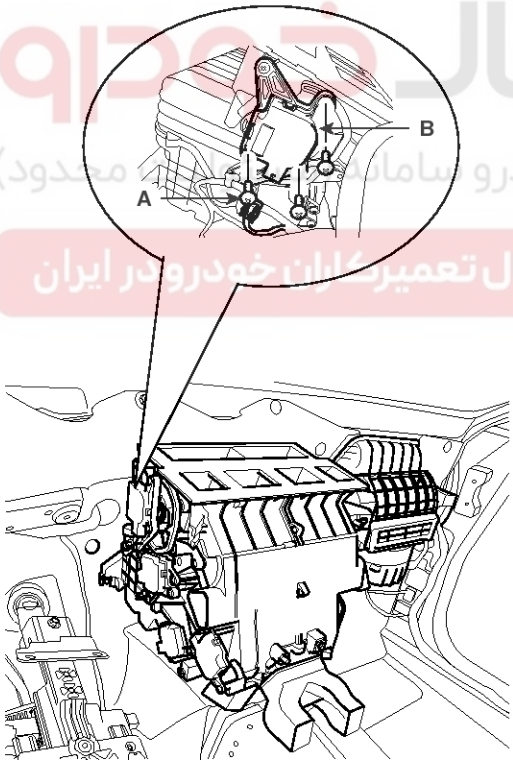
SBHBD8063D

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



SBHBD8071D

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

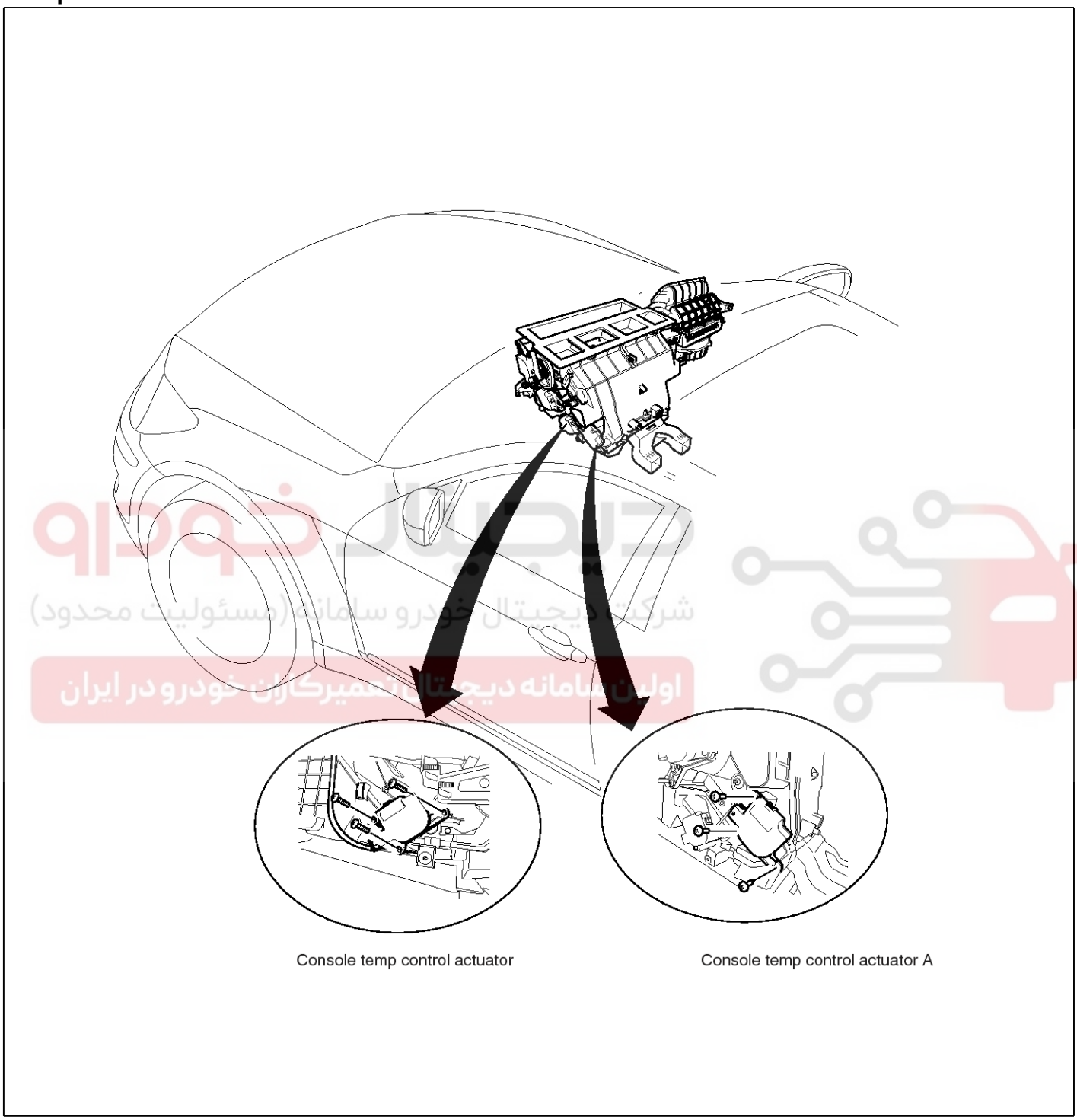


SBHHA8207D

7. Installation is the reverse order of removal.

Console temperature control actuator

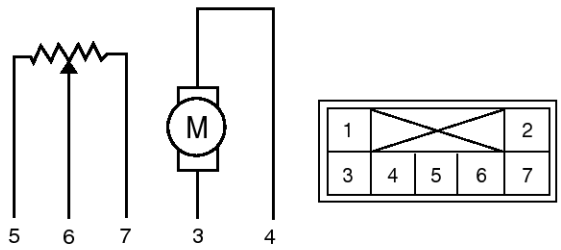
Component Location



SBHHA8052N

Inspection

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



1. -
2. -
3.Console cool position
4.Console hot position
5.Sensor ground
6.Feedback signal
7.5V(Vcc)

SBHHA8102N

5. Check the voltage between terminals 5 and 6.

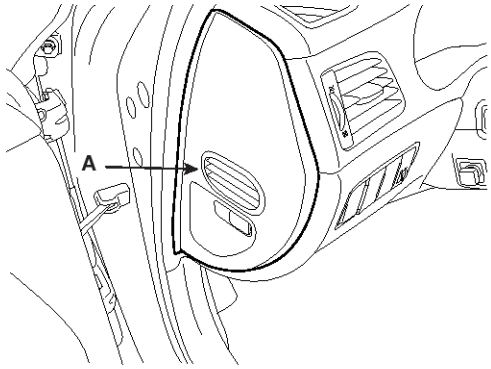
Door position	Voltage (5-6)	Error detecting
Max. cooling	0.3 ± 0.15V	Low voltage :0.1 V or less
Maxheating	4.7 ± 0.15V	High voltage :4.9 V or more

* It will feedback current position of actuator to controls.

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

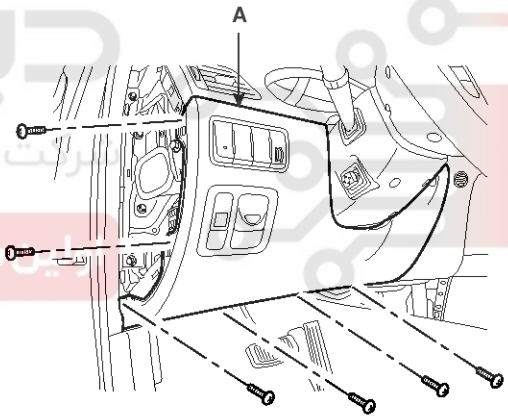
Replacement

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



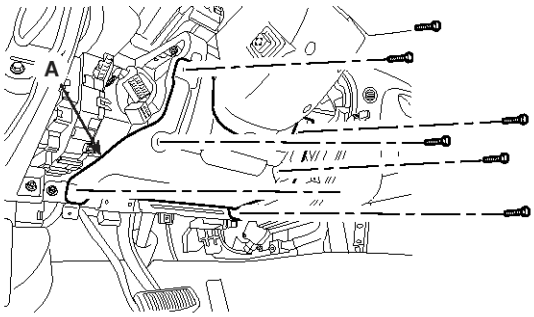
SBHBD8062D

3. After loosening the crash pad lower panel mounting screws, then remove the lower panel (A).



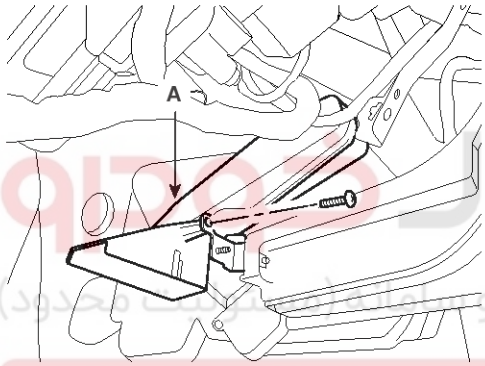
SBHBD8063D

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



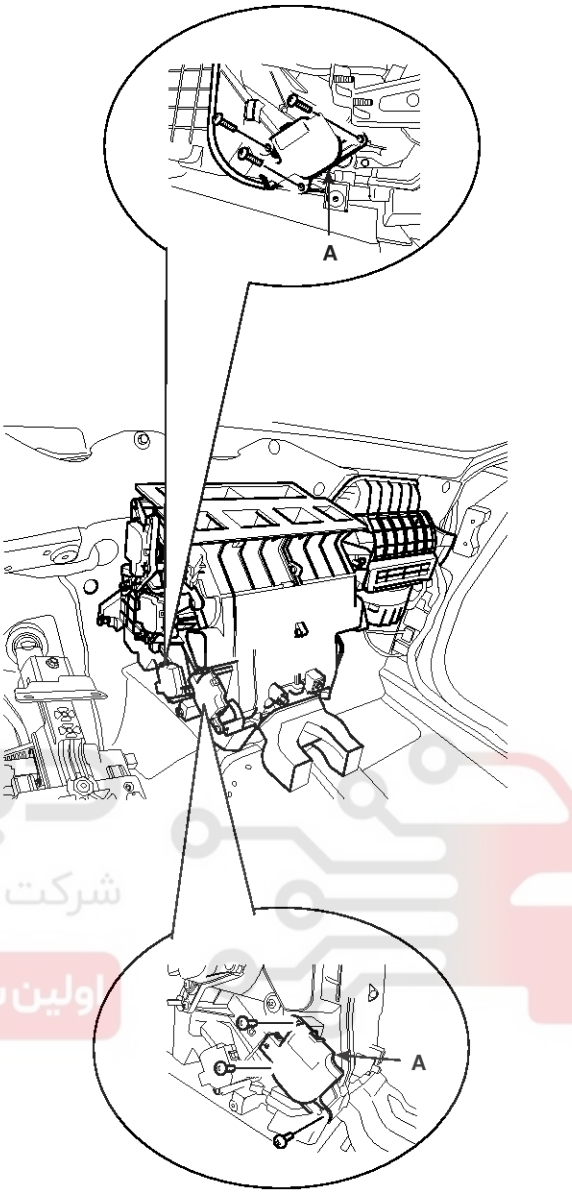
SBHBD8071D

5. Remove the shower duct(A).



SBHHA8040D

6. Loosen the mounting screws and then remove the console temp control actuator (A).

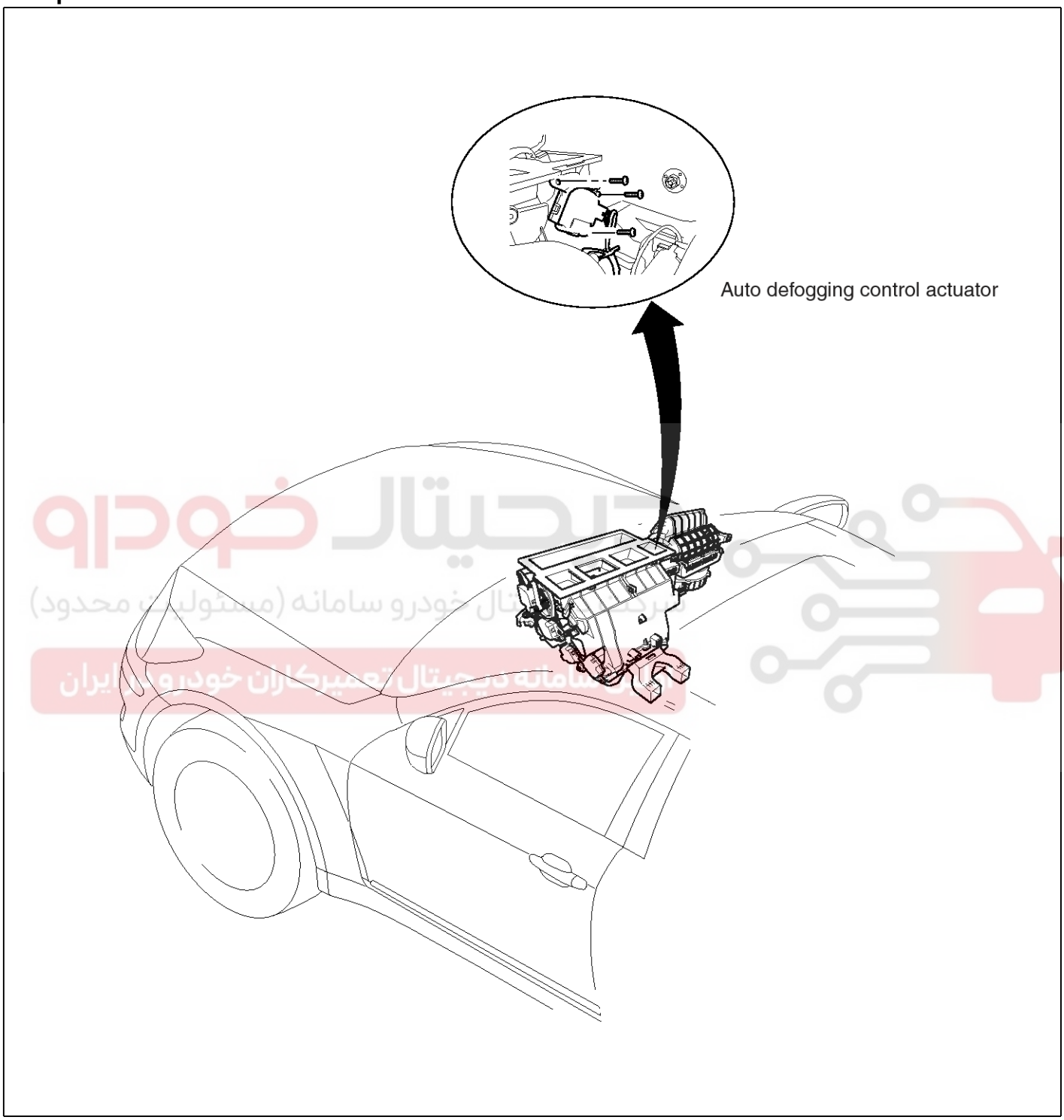


SBHHA8211D

7. Installation is the reverse order of removal.

Auto defoging actuator

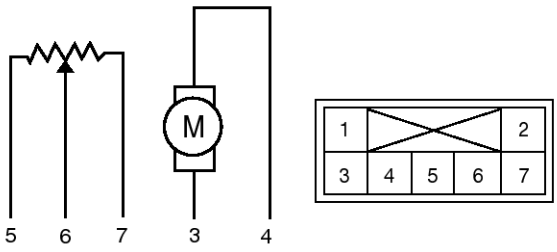
Component Location



SBHHA8055N

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.Def(Close)
4.Def(Open)
5.Sensor ground
6.Feedback signal
7.5V (Vcc)

SBHHA8056N

5. Check the voltage between terminals 5 and 6.

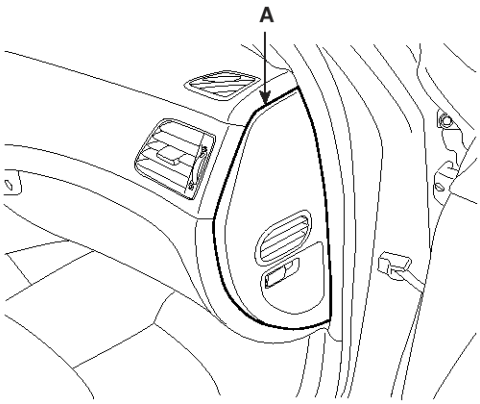
Door position	Voltage (5-6)	Error detecting
Def(Close)	0.3 ± 0.15V	Low voltage :0.1 V or less
Def(Open)	4.7 ± 0.15V	High voltage :4.9 V or more

* It will feedback current position of actuator to controls.

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

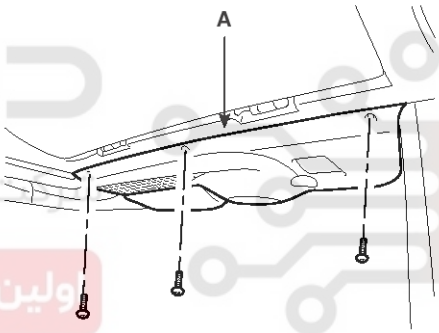
Replacement

1. Remove the crash pad side cover (A).



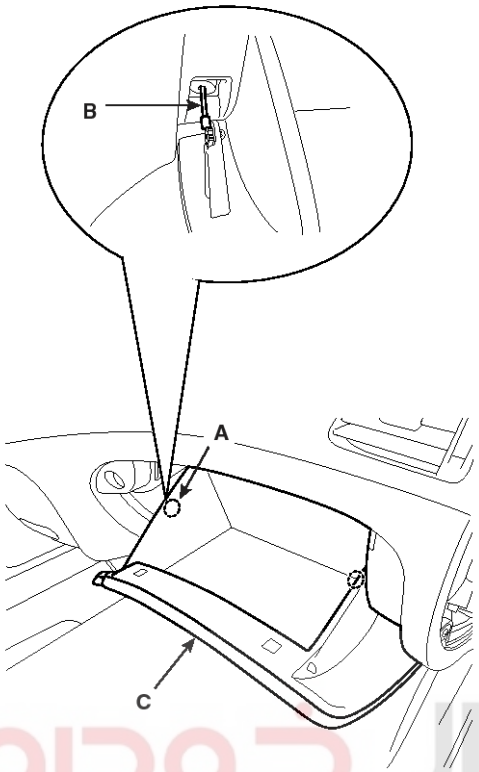
SBHBD8075D

2. Remove the crashpad undr cover(A).



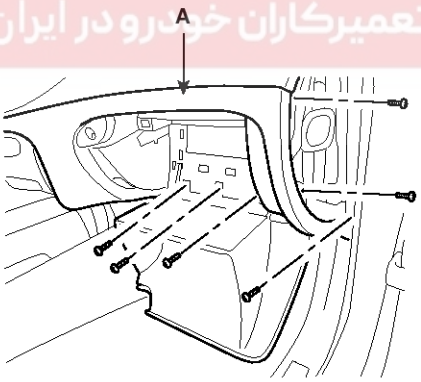
SBHBD8102D

3. Disconnect the damper (A) from the glove box .
4. Remove the glove box (C) from the lift (B).



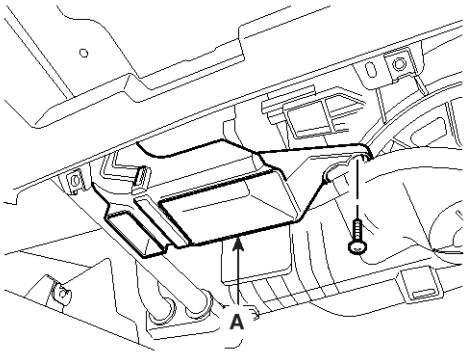
SBHBD8076D

5. Remove the glove box housing(A).



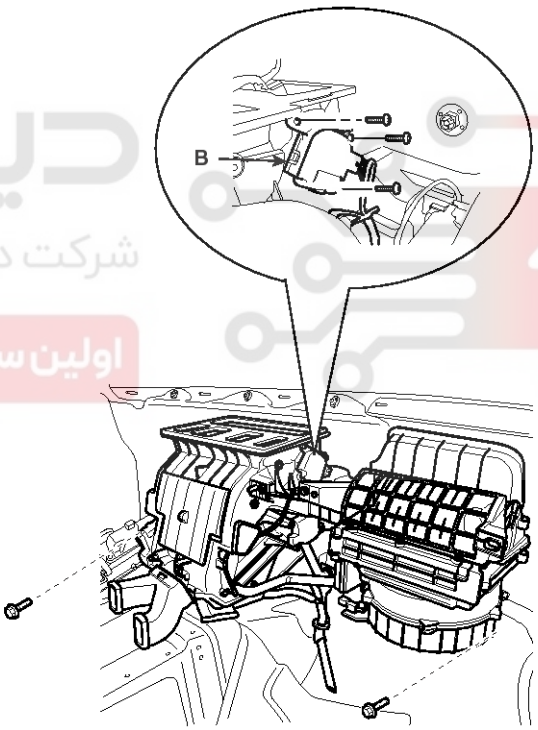
SBHBD8077D

6. Remove the shower duct(A).



SBHHA8048D

7. Loosen the mounting screws and then remove the console temp control actuator (B).



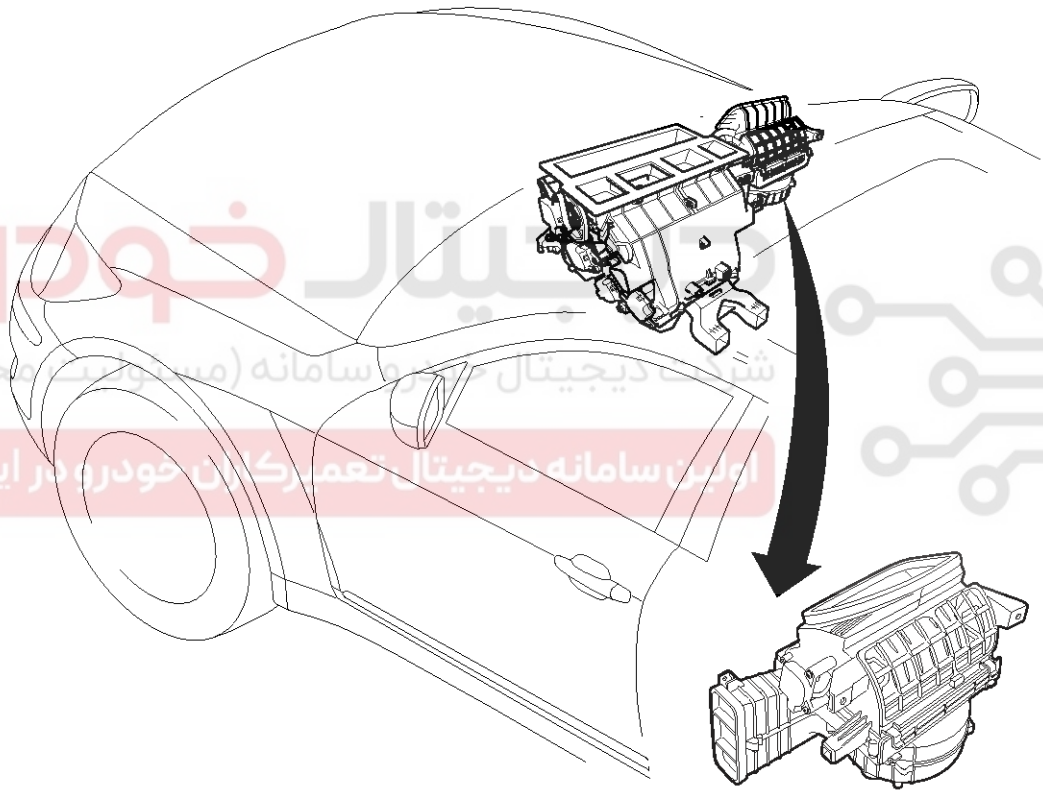
SBHHA8212L

8. Installation is the reverse order of removal.

Blower

Blower Unit

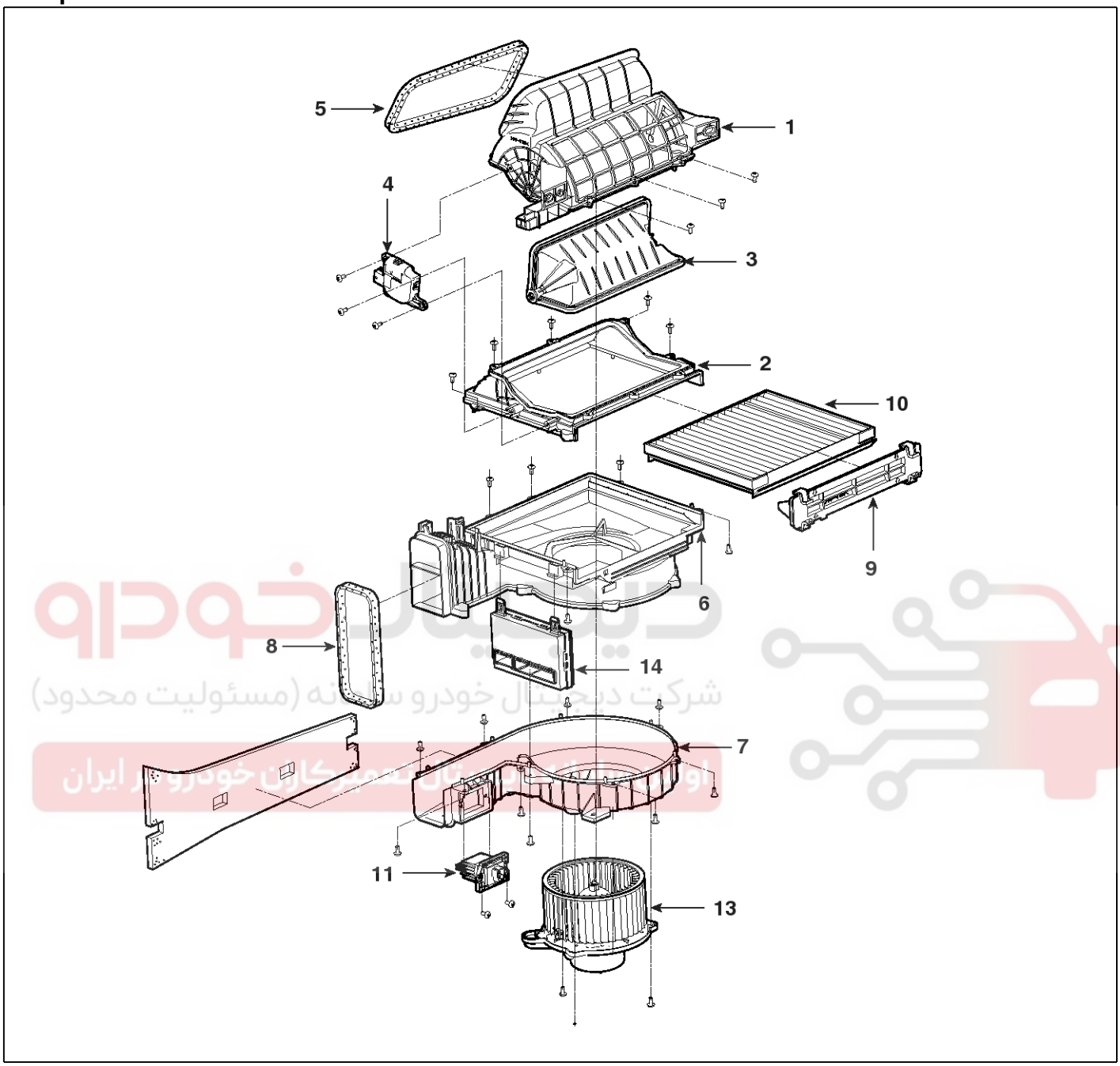
Component Location



Blower Unit

SBHHA8064N

Components

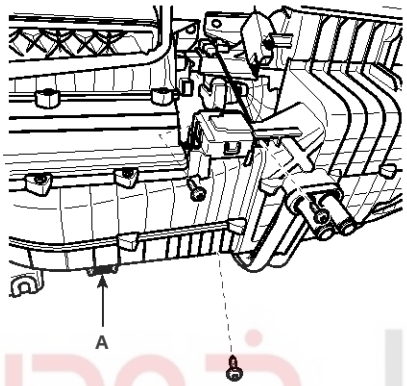


SBHHA8065L

1. Inlet duct case
2. Inlet duct case (A)
3. Inlet door
4. Intake actuator
5. Seal
6. Blower upper case
7. Blower lower case
8. Seal
9. Climate control air filter cover
10. Climate control air filter
11. Power mosfet
12. Blower motor
13. A/C control unit

REPLACEMENT

1. Disconnect the negative (-) battery terminal.
2. Remove the crush pad.(Refer to BD group-crash pad)
3. Remove the cowl cross bar assembly.(Refer to BD group-crash pad)
4. Remove the heater & blower unit.(Refer to HA group-heater unit)
5. Remove the blower unit (A) from the heater unit after loosening a mounting bolt and 2 screws.



SBHHA8034N

NOTICE

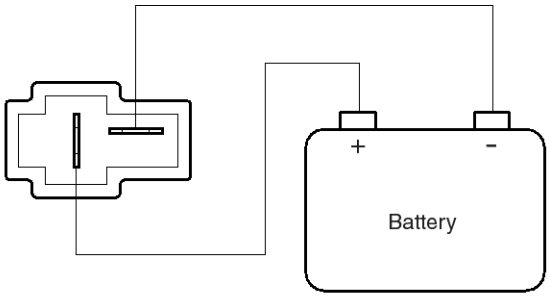
Make sure that there is no air leaking out of the blower and duct joints.

6. Installation is the reverse order of removal.

Blower Motor

Inspection

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

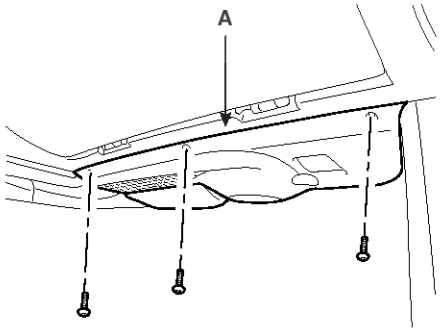


AQIE352C

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.

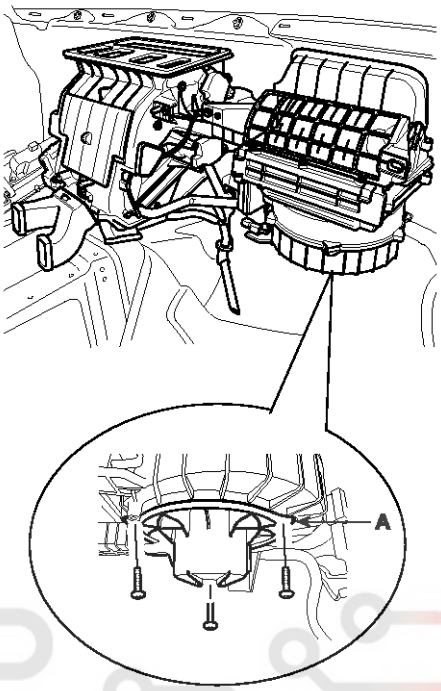
Replacement

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



SBHBD8102D

3. Disconnect the connector of the blower motor.
4. Remove the blower motor (A) after loosening the mounting screws.



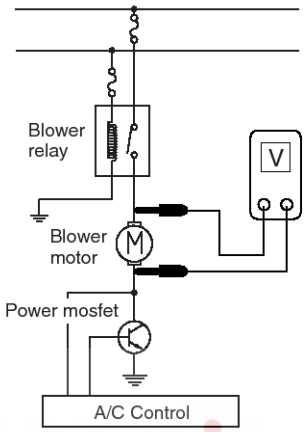
SBHHA8208D

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	3.4 ±0.5V
Second spee-d	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 spe-ed	11.2 ±0.5V
eighth speed	Battery

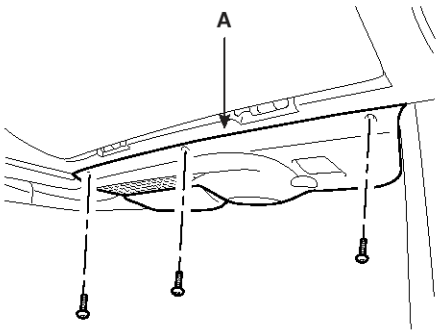
*AUTO COOLING: Auto speed (4.5V~B+)

*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.

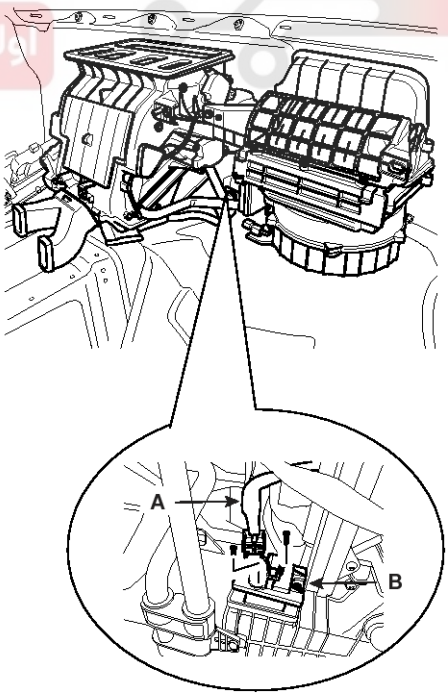
Replacement

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



SBHBD8102D

3. Disconnect the power mosfet connector (A) at the connecting part between heater and blower unit.
4. Remove the power mosfet (B) after loosening the mounting screws.



SBHHA8209D

5. Installation is the reverse order of removal.

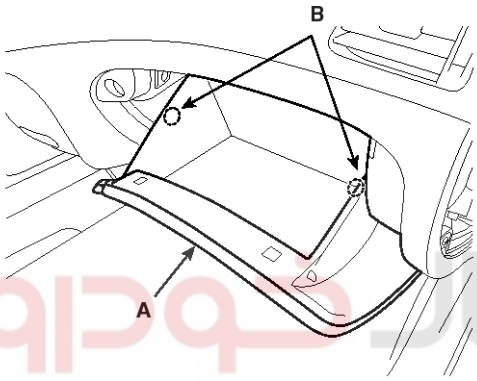
Climate control air filtar

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.

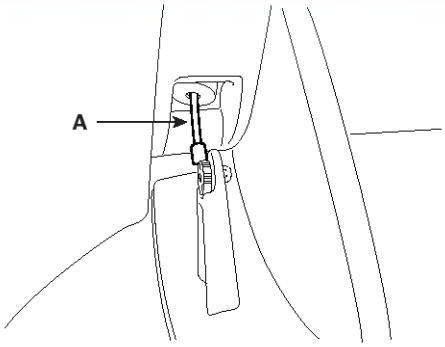
Replacement

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



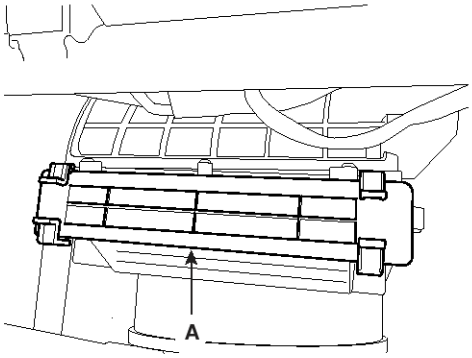
SBHHA8616D

2. Remove the glove box lift(A).



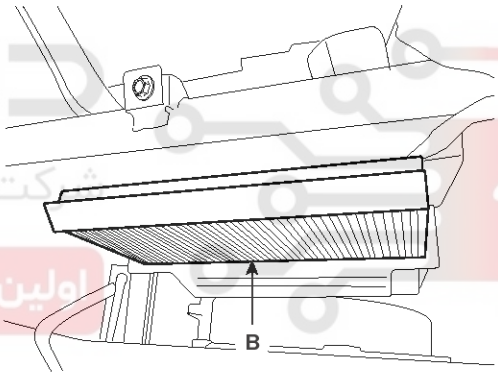
SBHBD8104L

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



SBHHA8073D

4. Replace the air filter (B), install it after making sure of the direction of air filter.



SBHHA8074D

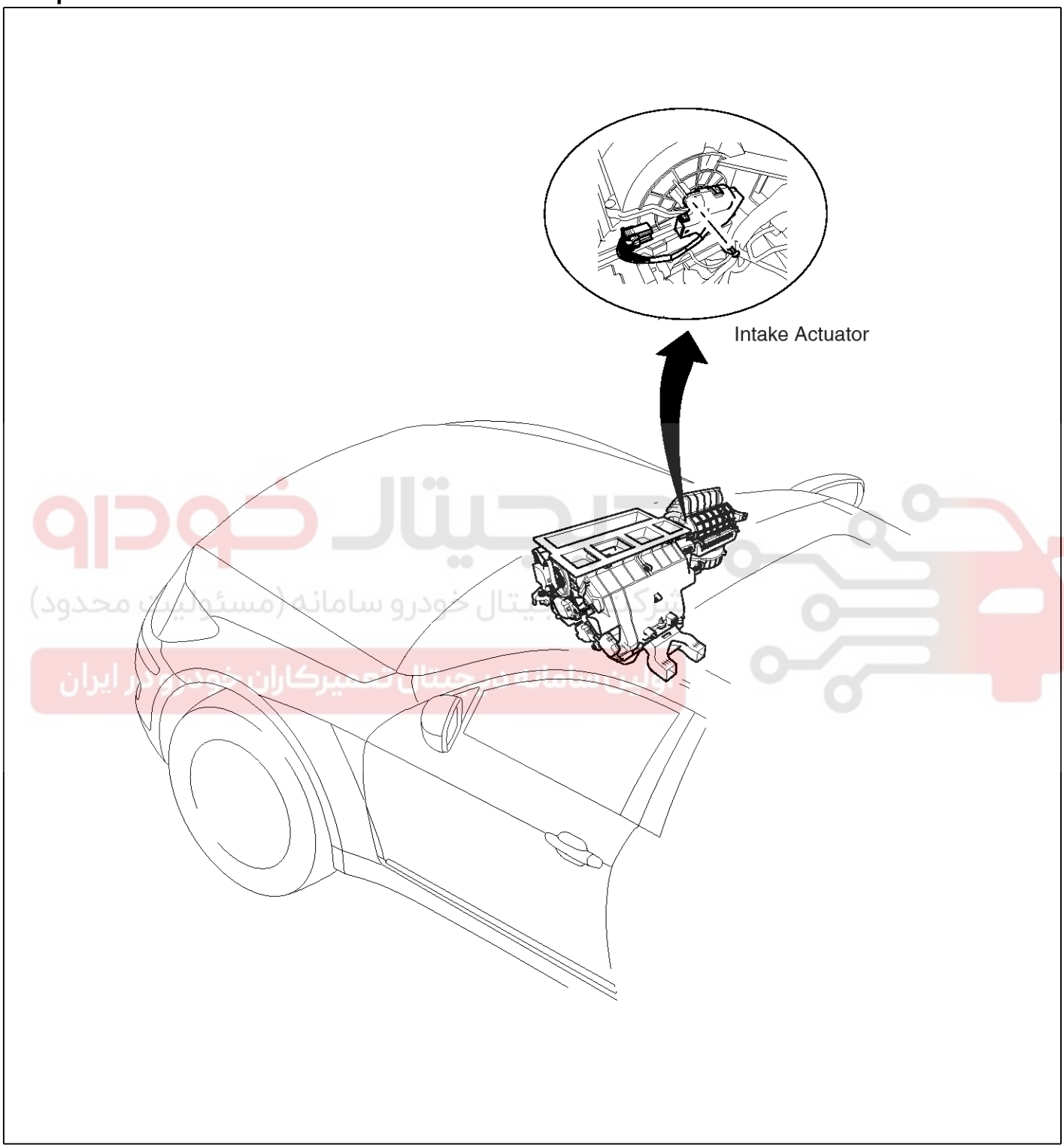
5. Installation is the reverse order of removal.

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

Component Location



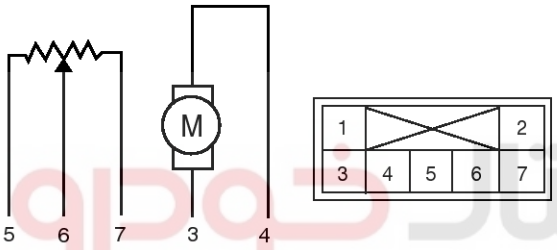
SBHHA8075N

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.
4. Verify that the intake actuator operates to the fresh position when connecting in the reverse.



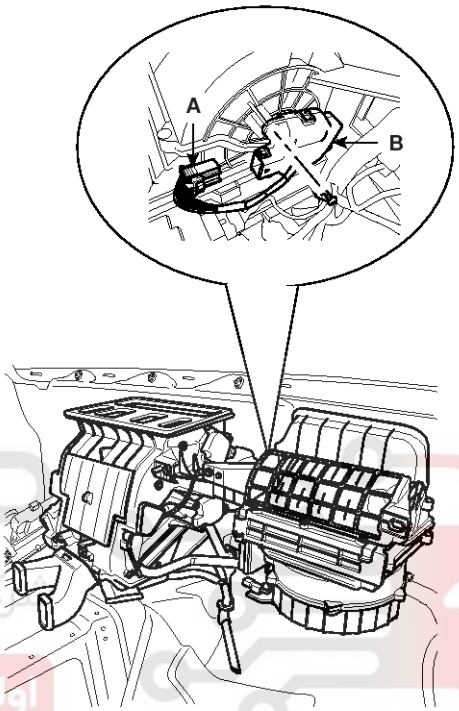
1. -
2. -
3. Rec
4. Fre
5. Sensor ground
6. Feed back signal
7. 5V (VCC)

SBHHA8103L

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 (A).
4. Loosen the mounting screw and then remove the intake actuator (B) from the blower unit.



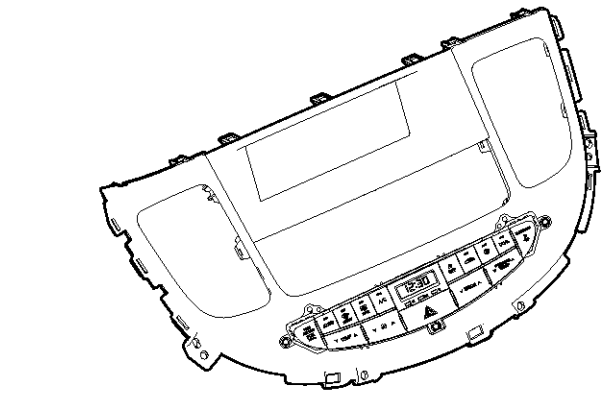
SBHHA8210D

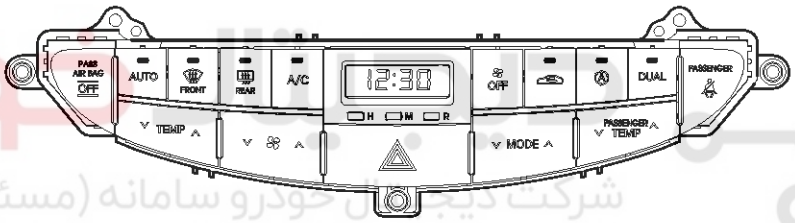
5. Installation is the reverse order of removal.

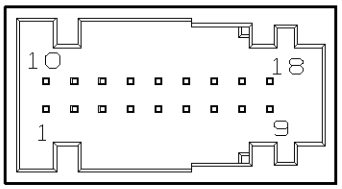
Controller

Heater & A/C Control Unit(Full Automatic)

Component







SBHHA8104L

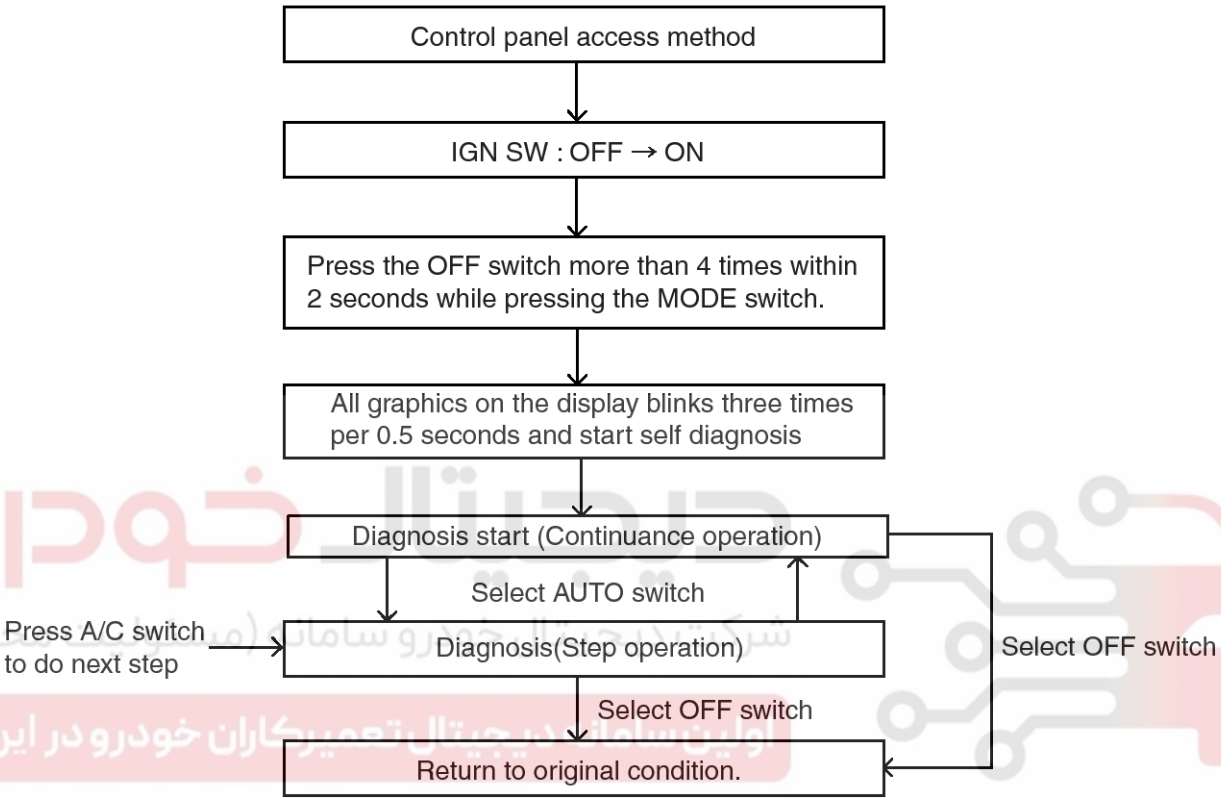
Connector Pin Function

Connector	Pin no.	Function
Connector(A)	1	Tail lamp
	2	RR def S/W
	3	Key clk
	4	Key sh/ld
	5	Key data
	6	Led data
	7	Led clk
	8	Led str
	9	IGN
	10	Rheostat
	11	Led dimming
	12	ACC
	13	Battery
	14	Hazard S/W
	15	GND
	16	Climate S/W
	17	Auto light control
	18	GND

SELF-DIAGNOSIS

1. Self-diagnosis process

   The F.A.T.C. module self test feature will detect electrical malfunction and provide error codes for system components with suspected failures.



LQJF500E

NOTICE

DTC data can be retrieved from the control panel directly or from the DLC using the Hi-Scan Pro.

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 Control unit	Fail description
00	Normal
11	In-car temperature sensor open (High)
12	In-car temperature sensor short (Low)
13	Ambient temperature sensor open (High)
14	Ambient temperature sensor short (Low)
17	Evaporator temperature sensor open (High)
18	Evaporator temperature sensor short (Low)
19	Temp door potentiometer open/short (DR)
20	Temp door motor (DR)
21	Mode door potentiometer open/short
22	Mode door control motor
23	Auto defogging sensor open (High)
24	Auto defogging sensor short (Low)
25	Intake door potentiometer open/short
26	Intake door potentiometer motor
27	AQS sensor open
28	AQS sensor short
31	AQS sensor fault
32	Temp door potentiometer open/short (PA)
33	Temp door motor (PA)
34	Console mode door potentiometer open/short
35	Console mode door potentiometer motor
36	Console temp door potentiometer open/short
37	Console temp door potentiometor motor
43	Auto defogging potentiometer open/short
44	Auto defogging potentiometer motor
45	APT can signal fault
47	RPM can signal fault
48	Vehicle speed can signal fault
49	Engine water temp can signal fault

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 a continuance
      B. DTC code is more two

BQKF500E

4. If fault codes are displayed during the check, Inspect malfunction causes by referring to fault codes.

5. Fail safe
   1) In-car temperature sensor: 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) 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
   5) Mode control actuator (Direction potentiometer):

      Fix vent position, while selecting vent mode.

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

      Fix fresh position, while selecting fresh mode.

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

      Intake position : The position before selecting AQS switch.
   8) Photo sensor : Control with the value 0w/m2
   9) Console temp switch :

      When the console temperature S/W voltage is less than 0.1 V ; Fix cool position.

      When the console temperature S/W voltage is more than 4.9 V ;Fix warm position.
   10) Console vent potention meter :

      When the console temperature S/W voltage is less than 2.5 V ; Fix cool position.

      When the console temperature S/W voltage is more than 2.5 V ;Fix warm position.
   11) Console temp potention meter :

      When the console temperature S/W voltage is less than 2.5 V ; Fix cool position.

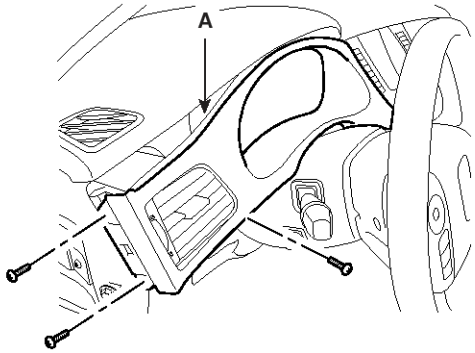
      When the console temperature S/W voltage is more than 2.5 V ;Fix warm position.
   12) Console door potention meter :

      Fix close position, while selecting vent mode.

      Fix open position, while selecting all except vent mode.
   13) Auto defog sensor : Control with the value of 0%.

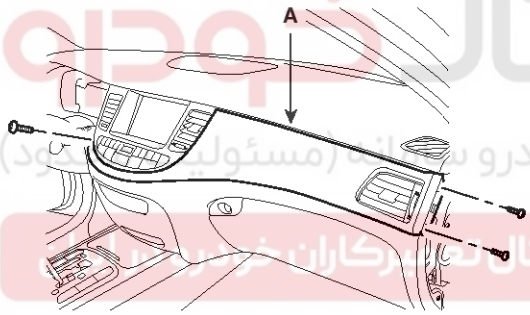
Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the cluster garnish(A).



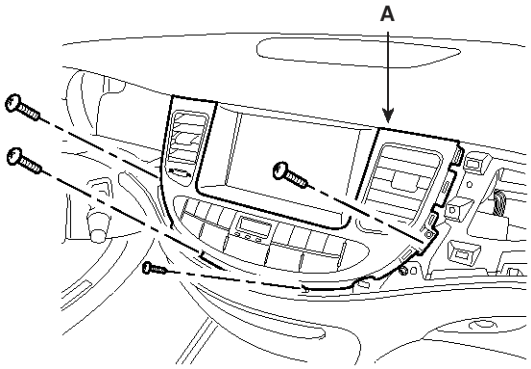
SBHBD8064D

3. Remove the center garnish(A).



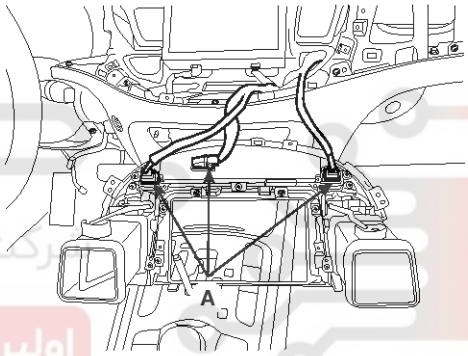
SBHBD8066D

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



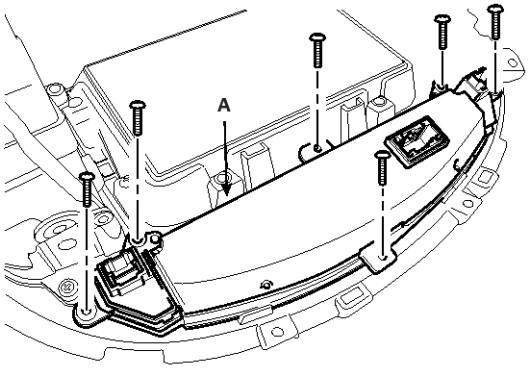
SBHBD8067D

5. Disconnect the connector(A) and then remove the center facia panel.



SBHBD8068D

6. Remove the heater & A/C controller (A) from center facia panel.

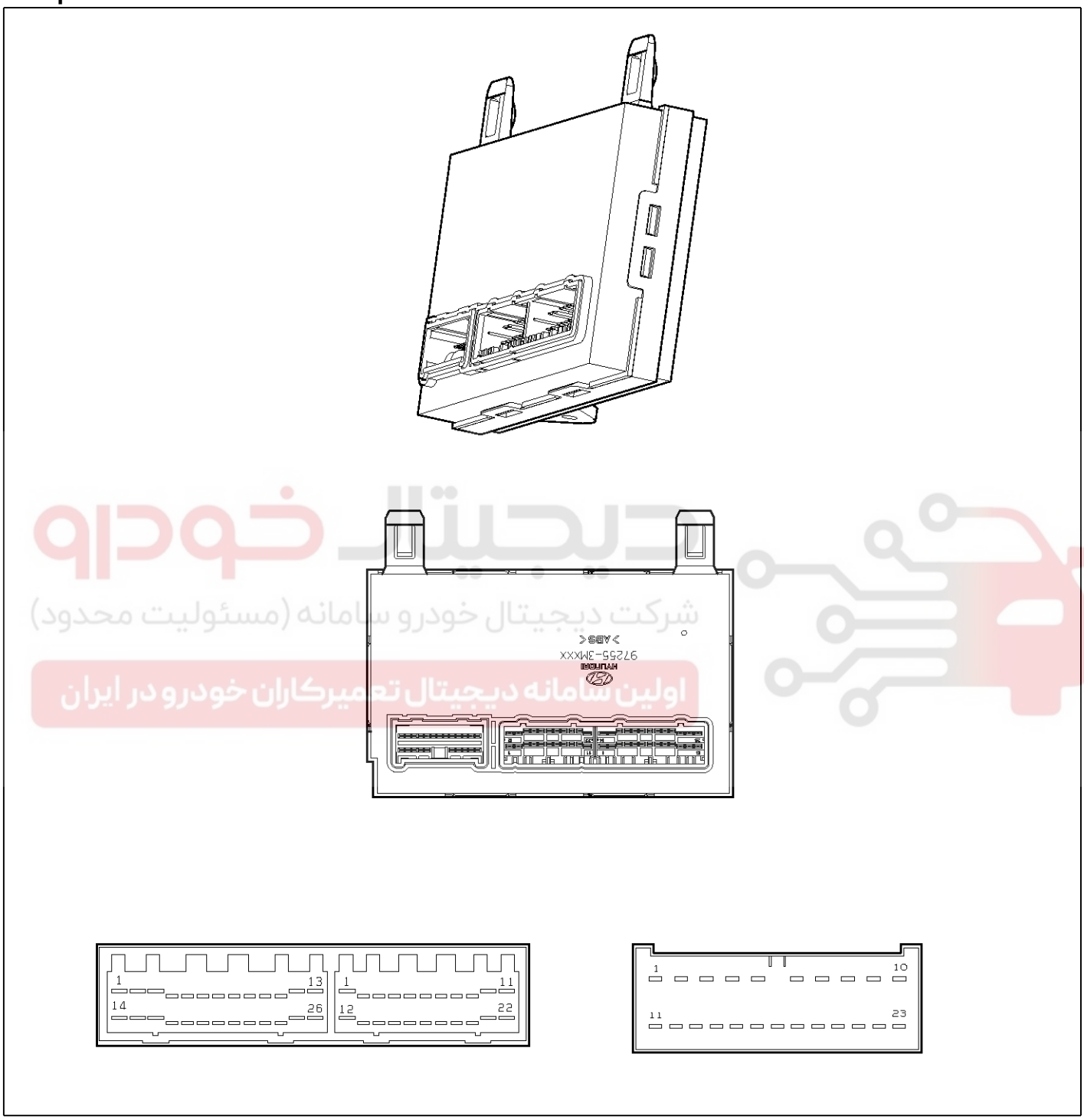


SBHHA8082D

7. Installation is the reverse order of removal.

Heater control unit

Component



SBHHA8083D

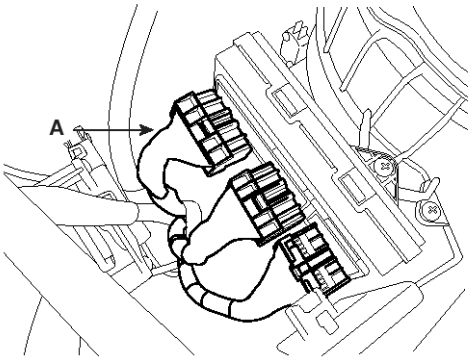
Connector pin function

Connector	Pin	Function	Connector	Pin	Function
CONNECTOR (A)	1	Tail lamp (+)	CONNECTOR (B)	1	Sensor REF(+5V)
	2	Battery(+)		2	AQS signal
	3	ECV (+)		3	Ambient sensor (+)
	4	Console vent S/W		4	-
	5	Console temp act's F/B		5	Incar sensor(+)
	6	L - line		6	Evaporator sensor(+)
	7	Can low(MM)		7	Console temp act's (cool)
	8	Can high(MM)		8	Console temp act's (warm)
	9	Can low(BODY)		9	Fet(gate)
	10	Can high(BODY)		10	Frt(drain)
	11	HTD		11	Blower motor(+)
	12	IGN 1		12	Sensor GND
	13	IGN 2		13	Temp actuator DR(cool)
	14	Rheostat		14	Temp actuator DR(warm)
	15	ECV (-)		15	DR photo (-)
	16	Temp actuator PS(cool)		16	PS photo (-)
	17	Temp actuator PS(warm)		17	Incar moter (-)
	18	Temp actuator PS F/B		18	Temp actuator DR F/B
	19	Mode actuator (vent)		19	Console temp actuator(coll)
	20	Mode actuator (def)		20	Console temp actuator(warm)
	21	Mode actuator F/B		21	Console temp actuatorF/B
	22	Intake actuator (fre)		22	Console temp S/W F/B
	23	Intake actuator (rec)			
	24	Intake actuator F/B			
	25	GND			
	26	GND			

Connector	Pin no.	Function
Connector(A)	1	-
	2	A/C select signal
	3	Key clk
	4	Key sh/ld
	5	Key data
	6	Led data
	7	Led clk
	8	Led str
	9	-
	10	Auto light control
	11	Led dimming
	12	-
	13	Cluster ion signal B
	14	ACC
	15	IGN2
	16	Monitor S/W
	17	Cluster ion
	18	GND
	19	Auto defog sensor - humidity
	20	A/C comp cut signal
	21	Def actuator (close)
	22	Def actuator (open)
	23	Def actuator F/B

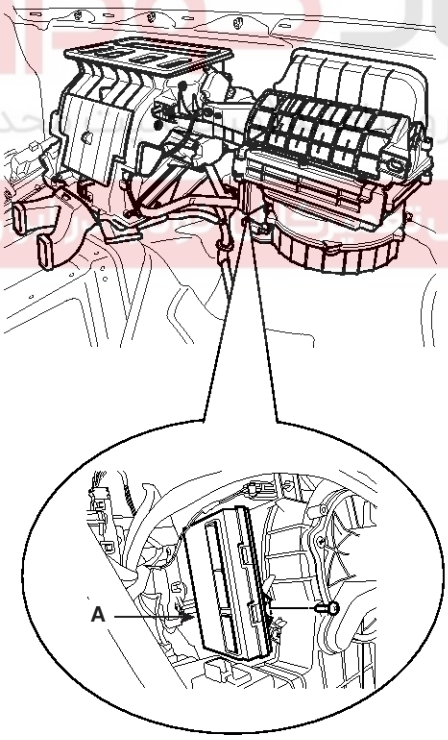
Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the crash pad.(Refer to BD group-crash pad)
3. Disconnect the control unit connector(A).



SBHHA8105D

4. Remove the control unit(A).

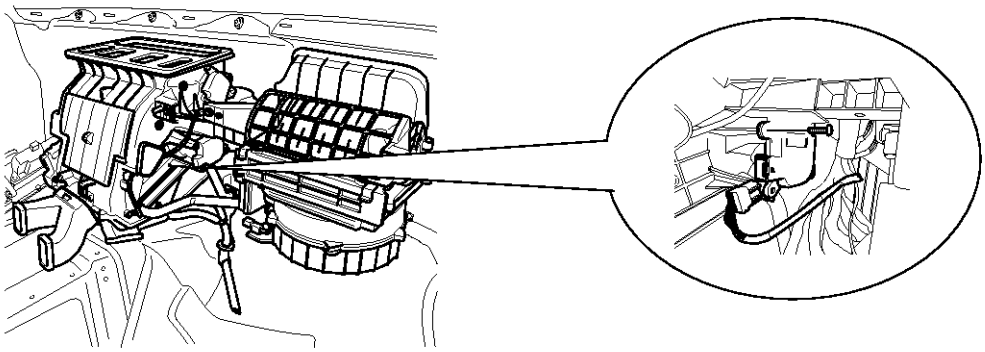


SBHHA8106D

5. Installation is the reverse order of removal.

B1204 Air Mix Potentiometer Open (Low)–Passenger

Component Location



SBHHA8206N

General Description

Temperature control actuator located at heater unit. It contains temp motor that changes temp door position and potentiometer that monitors position of temp door.Temperature control actuator regulates the temperature by the procedure as follows. Signal from control unit adjusts position of temp door by operating temp motor and then temperature will be regulated by the hot/cold air ratio decided by position of temp door. In operation, potentiometer delivers temp door position transformed into voltage value to A/C ECU.

DTC Description

Airconditioner Control Module sets DTC B1204 if the Feed Back signal of Passenger Temperature Actuator has been detected open or below 0.1V for 0.3 seconds.

DTC Detecting Condition

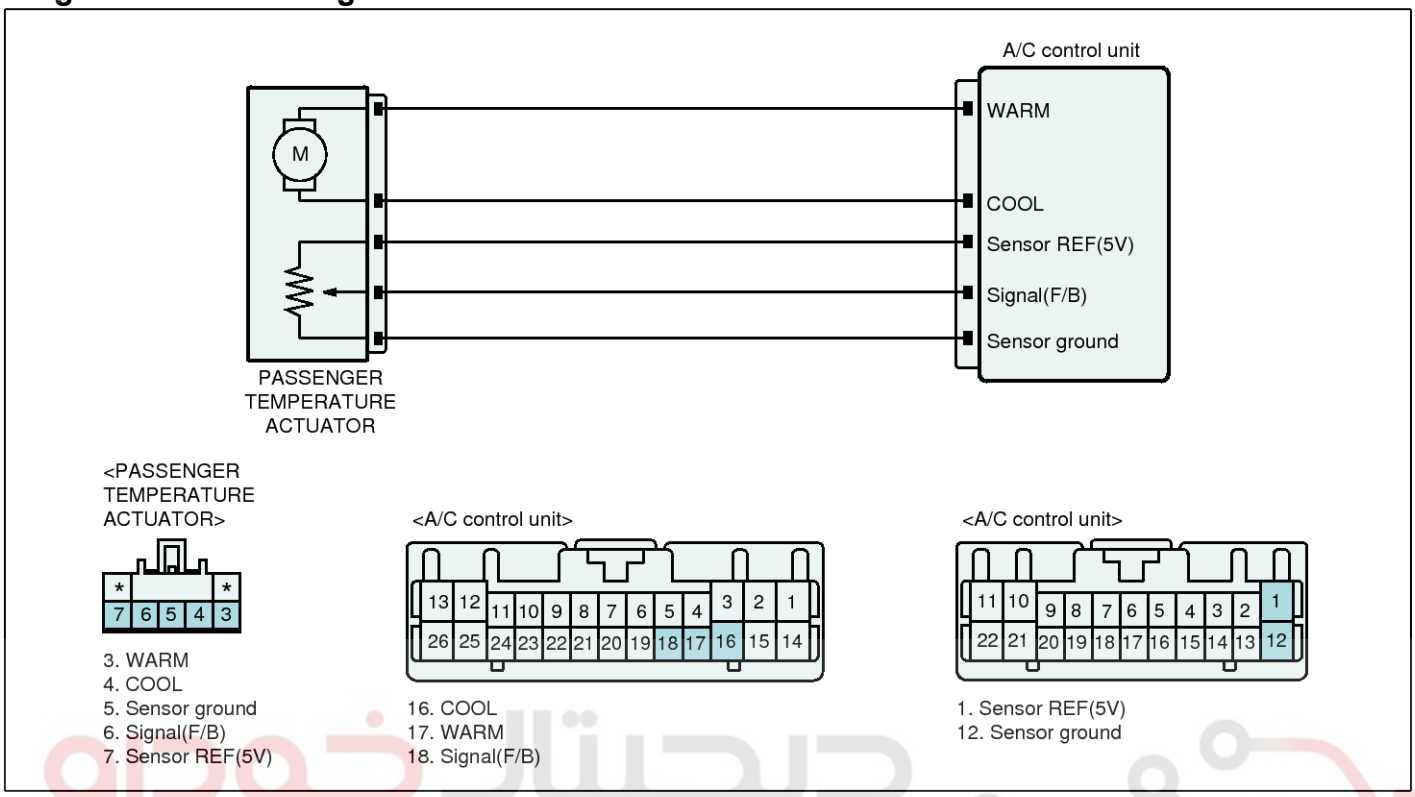
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor connection of connected part • Open in signal circuit (Feedback circuit), Power circuit or Ground Circuit • Faulty passenger air mix actuator • Faulty A/C control unit
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal has been detected open or below 0.1V for 0.3 seconds	
Failsafe	• setting temperature : 16℃(62.6˚F)-24℃(76.1˚F) fix at max. cooling position • setting temperature : 25℃(77˚F)-31℃(89.6˚F) fix at max. heating position	

Specification

※ Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

Diagnostic Circuit Diagram



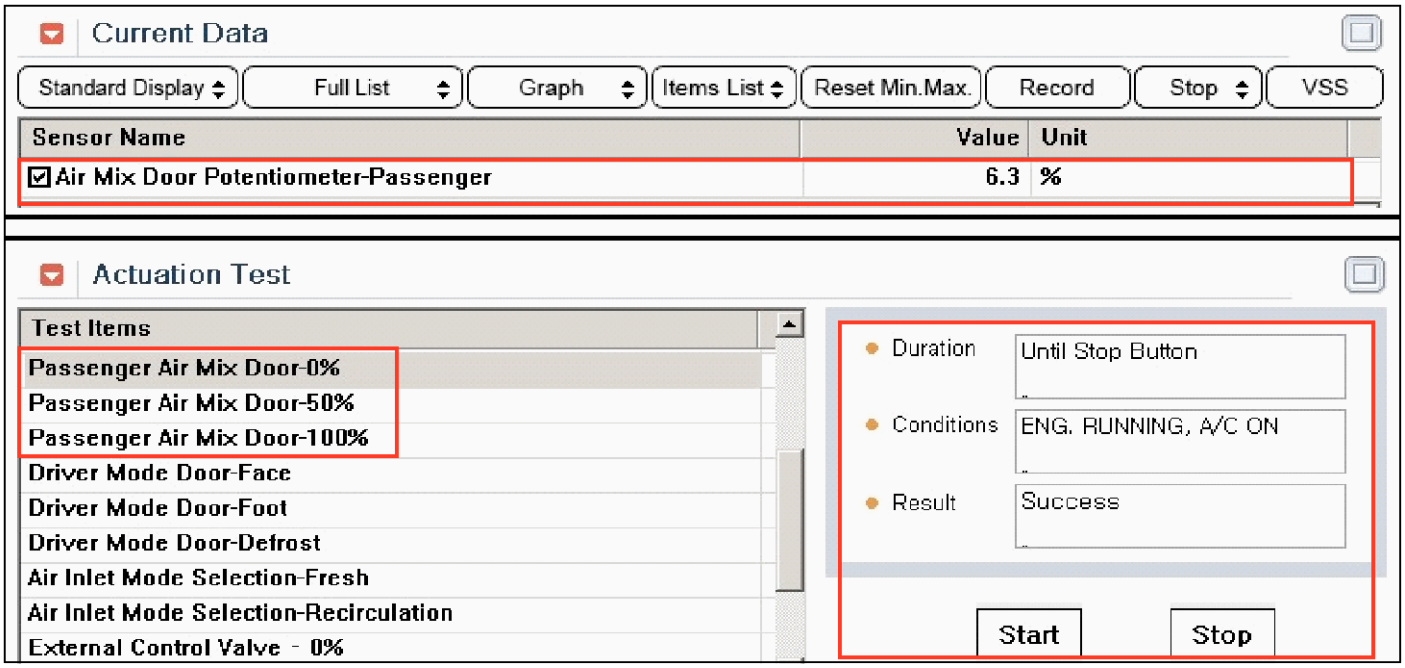
SBHHA9501L

Monitor Scantool data

■ Check Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine start
3. Select "Air Mix Door Potentiometer-Passenger" parameter on the current data with scantool
4. Perform Actuation Test for "Passenger Air Mix Door - 0% / 50% / 100%.
5. With performing Actuation test, check that the value of Air Mix Door Potentiometer is changed and close to the value of Actuation Test.

Specification : Check that the value of Air Mix Door Potentiometer at current data should be close to the value of the acutation test .



SBHHA9600L

6. Does the value of current data follow in accordance with the each actuation test ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect passenger air mix actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of passenger air mix actuator harness connector and Signal(F/B) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to "Check short to ground in harness" as follows.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect passenger air mix actuator and A/C control unit main harness connector.

3. Measure resistance between Signal(F/B) terminal of passenger air mix actuator harness connector and chassis ground .

Specification : Infinity

4. Is the measured resistance within specification?

YES ▶ Go to "Power circuit Inspection " procedure.

NO ▶ Check for short to ground in control harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Power Circuit Inspection

■ Check power in harness

1. Ignition "OFF"
2. Disconnect passenger air mix actuator and Connect A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Sensor REF(5V) terminal of passenger air mix actuator harness connector and chassis ground .

Specification : approx. 5V

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection " procedure .

NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect passenger air mix actuator and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of passenger air mix actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check passenger air mix actuator

1. Ignition "OFF"
2. Disconnect passenger air mix actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of passenger air mix actuator and (-) terminal to COOL(-). (Component side)
4. Verify that the temperature actuator operates to the cool position
5. Verify that the temperature actuator operates to the warm position with reverse connecting. (WARM(+) and COOL(-)). (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	ground	Max.warm
	ground	12 V	Max.cool

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good passenger air mix actuator and check for proper operation. If the problem is corrected, replace passenger air mix actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect passenger air mix actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of passenger air mix actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector. (Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Door position	Voltage
Max. cool	0.3±0.15V
7Max. warm	4.7±0.15V

FIG.2) ※ Voltage value of Air Mix potentiometer as a function of temp door position.

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good passenger air mix actuator and check for proper operation. If the problem is corrected, replace passenger air mix actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

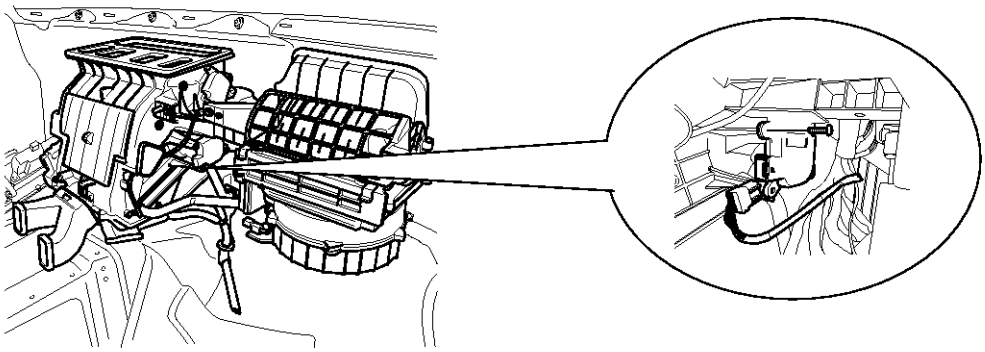
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1205 Air Mix Potentiometer Short (High)–Passenger

Component Location



SBHHA8206N

General Description

Temperature control actuator located at heater unit. It contains temp motor that changes temp door position and potentiometer that monitors position of temp door.Temperature control actuator regulates the temperature by the procedure as follows. Signal from control unit adjusts position of temp door by operating temp motor and then temperature will be regulated by the hot/cold air ratio decided by position of temp door. In operation, potentiometer delivers temp door position transformed into voltage value to A/C ECU.

DTC Description

Airconditioner Control Module sets DTC B1205 if the Feed Back signal of Passenger Temperature Actuator has been detected over 4.9V for 0.3 seconds.

DTC Detecting Condition

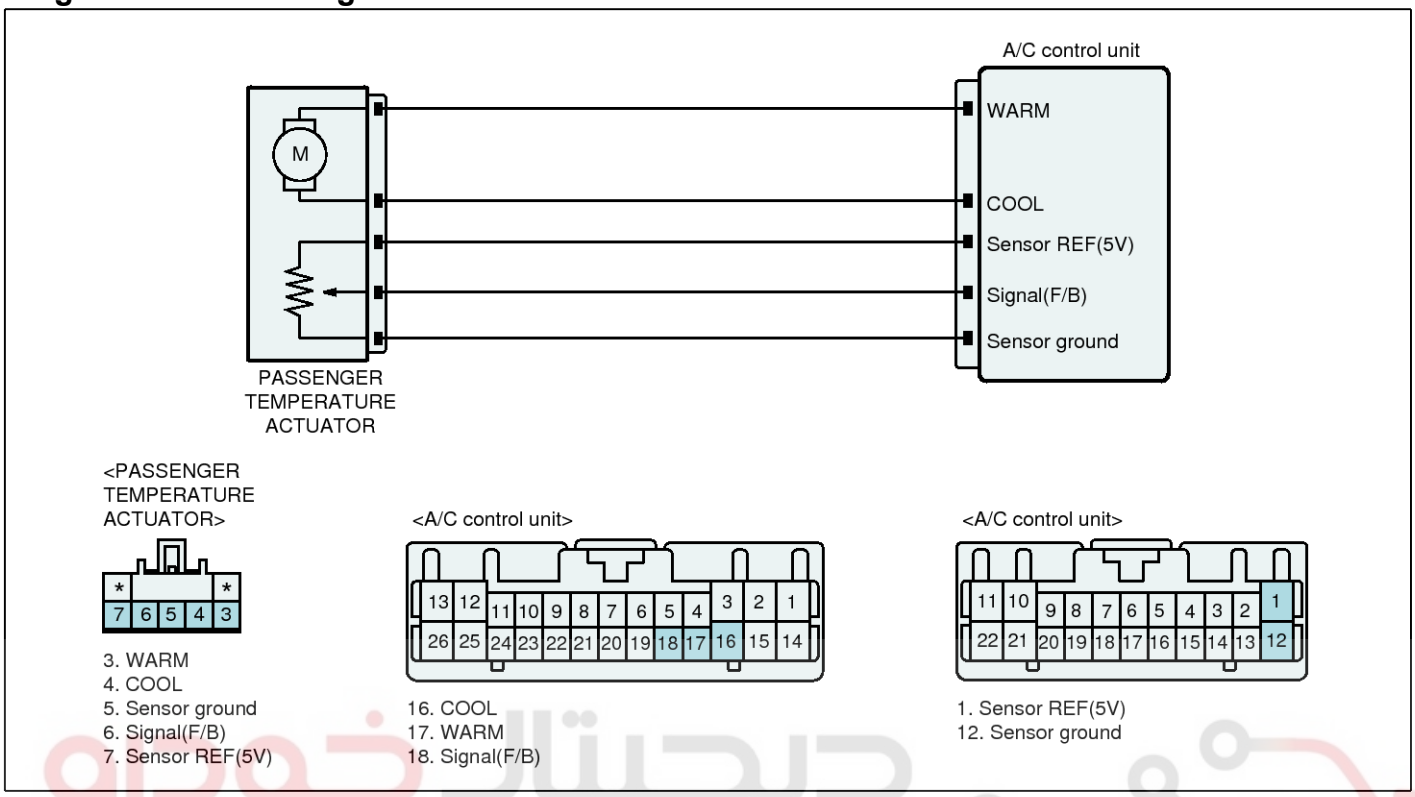
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Short to battery in signal(Feedback) circuit • Faulty passenger air mix actuator • Faulty A/C control unit
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback ciruit has been detected over 4.9V for 0.3 seconds	
Failsafe	• setting temperature :16℃(62.6˚F)-24℃(76.1˚F) fix at max. cooling position • setting temperature : 25℃(77˚F)-31℃(89.6˚F) fix at max. heating position	

Specification

※ Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

Diagnostic Circuit Diagram

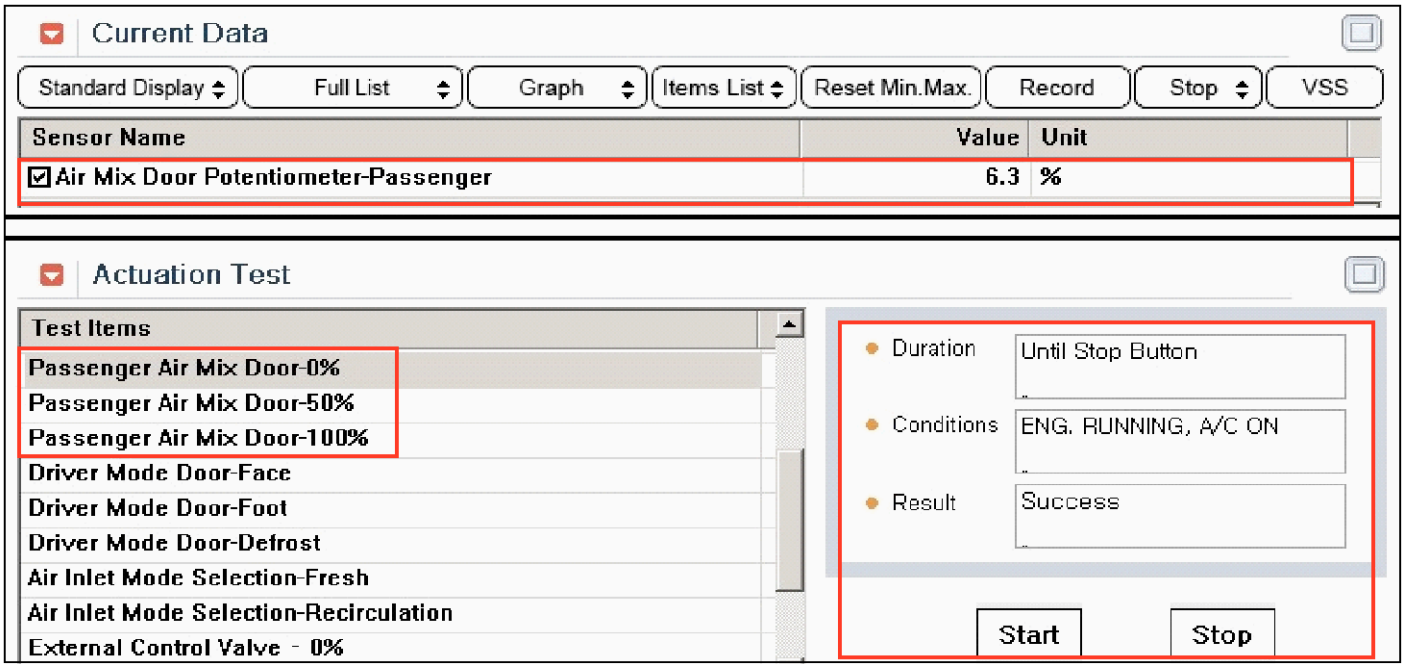


Monitor Scantool data

■ Check Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine start
3. Select "Air Mix Door Potentiometer-Passenger" parameter on the current data with scantool
4. Perform Actuation Test for "Passenger Air Mix Door - 0% / 50% / 100%.
5. With performing Actuation test, check that the value of Air Mix Door Potentiometer is changed and close to the value of Actuation Test.

Specification : Check that the value of Air Mix Door Potentiometer at current data should be close to the value of the acutation test .



SBHHA9600L

6. Does the value of current data follow in accordance with the each actuation test ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF"
2. Disconnect passenger air mix actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of passenger air mix actuator harness connector and chassis ground .

Specification : 0V

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection " procedure .

NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect passenger air mix actuator and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of passenger air mix actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check passenger air mix actuator

1. Ignition "OFF"
2. Disconnect passenger air mix actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of passenger air mix actuator and (-) terminal to COOL(-). (Component side)
4. Verify that the temperature actuator operates to the cool position
5. Verify that the temperature actuator operates to the warm position with reverse connecting. (WARM(+) and COOL(-)). (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	ground	Max.warm
	ground	12 V	Max.cool

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good passenger air mix actuator and check for proper operation. If the problem is corrected, replace passenger air mix actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect passenger air mix actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of passenger air mix actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector. (Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

FIG.2) ※ Voltage value of Air Mix potentiometer as a function of temp door position.

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good passenger air mix actuator and check for proper operation. If the problem is corrected, replace passenger air mix actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

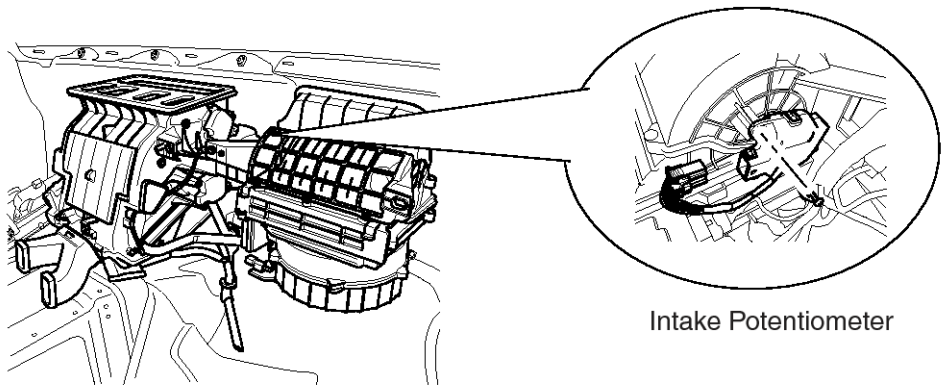
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1208 Intake Potentiometer Open (Low)

Componet Location



SBHHA8301N

General Description

Intake door located at heater unit controls the inlet of car. It contains intake motor that changes intake door position and potentiometer that monitors position of intake door. When driver operates the intake switch, ECU receives mode signal from intake switch and operates intake door motot to turn intake door to intended position. (with FRE mode signal, intake door is closed and with REC mode signal, intake door is opened)In operation, potentiometer delivers intake door position transformed into voltage value to A/C ECU .

DTC Description

Airconditioner Control Module sets DTC B1208 if the Feed Back signal of Intake Actuator has been detected open or below 0.1V for 0.3 seconds.

DTC Detecting Condition

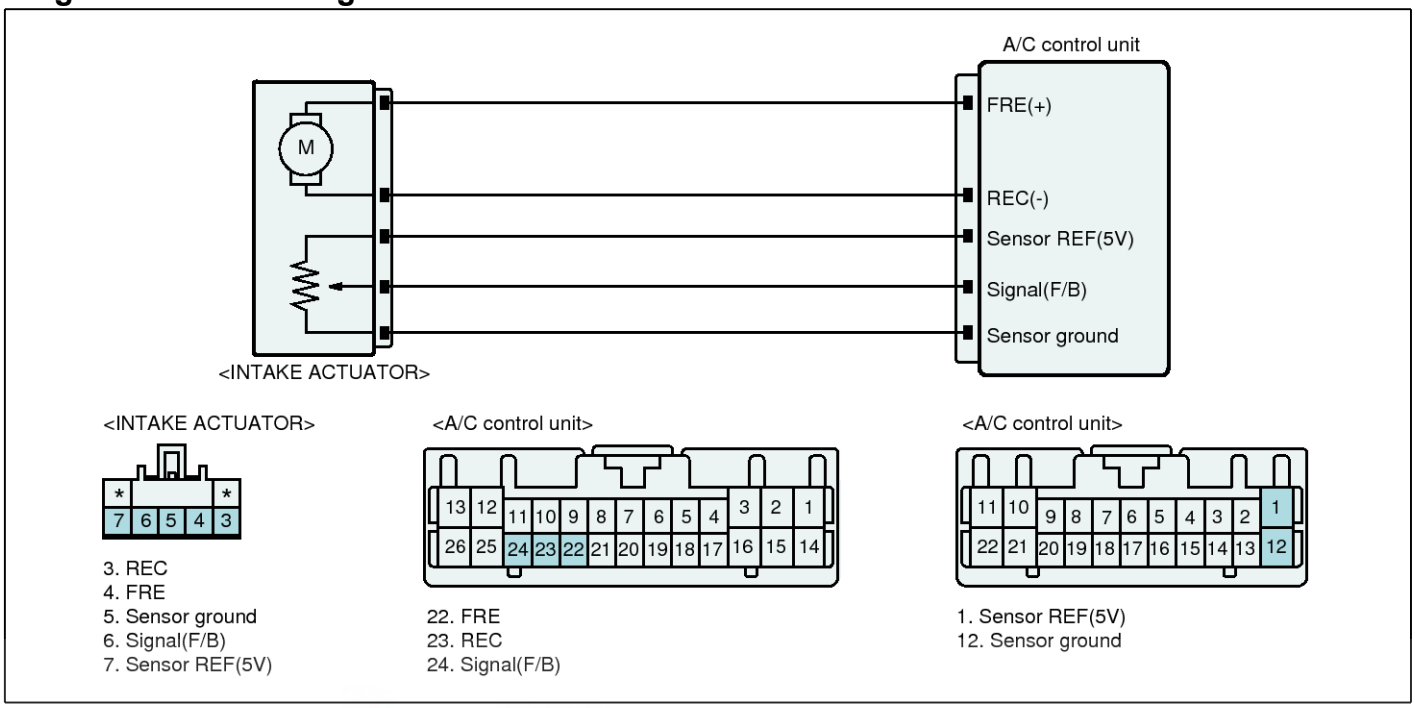
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor connection of connected part • Open circuit in signal/power h-arness • Short circuit in signal/power ha-rness • Faulty Intake potentiometer
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback circuit has been detected open or below 0.1V for 0.3 seconds	
Failsafe	• Setting mode : REC Fix at REC position • Setting mode : Except REC Fix at FRE position	

Specification

※ Voltage value of Intake potentiometer as a function of position of Intake door

Door position	Voltage
FRE	0.3±0.15V
REC	4.7±0.15V

Diagnostic Circuit Diagram



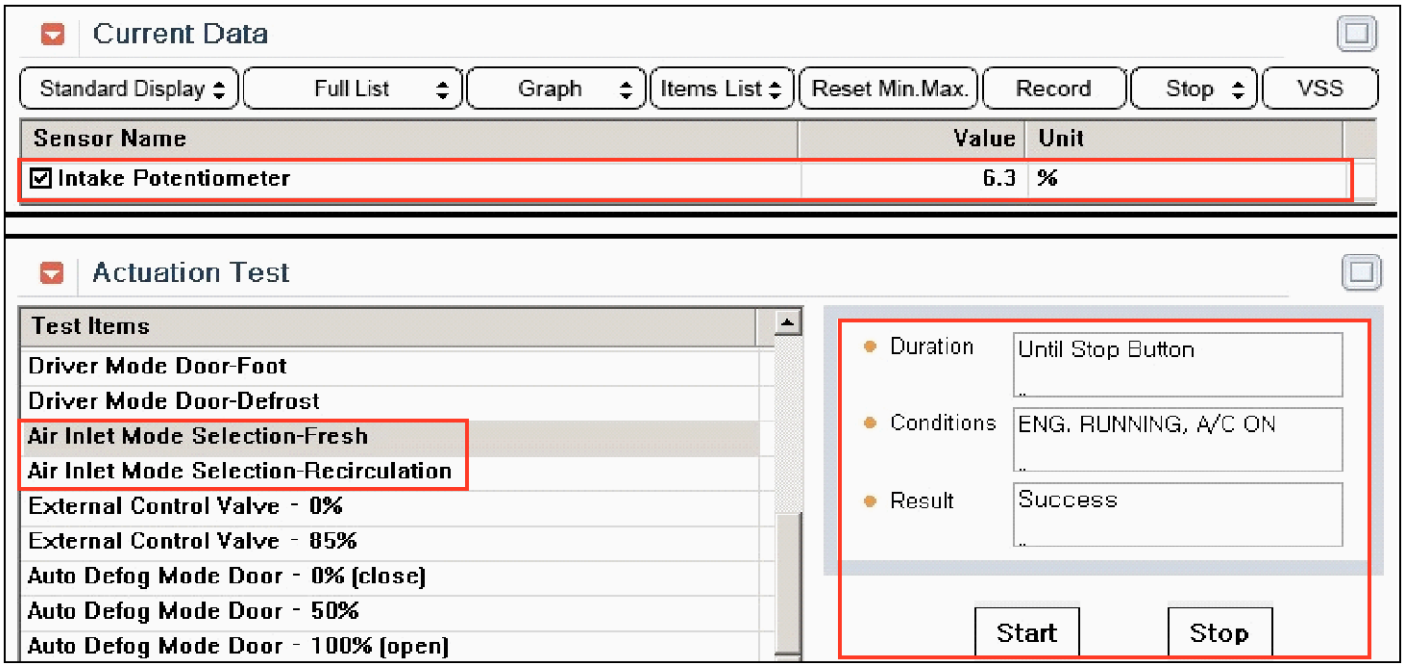
SBHHA9502L

Monitor Scantool data

■ Check Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine start
3. Select " Intake Potentiometer " parameter on the current data with scantool
4. Perform Actuation Test for Air Inlet Mode Selection - Reculation /Fresh in order.
5. With performing Actuation test, check that the value of each position sensors are changing.

Specification : Recirculation : About 90%, Fresh : About 10%.



SBHHA9601L

6. Are the value of each position sensors changed when performing actuation test ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Intake actuator harness connector and Signal(F/B) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to "Check short to ground in harness" as follows.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Intake actuator harness connector and chassis ground.

Specification : Infinity

4. Is the measured resistance within specification?

YES ▶ Go to "Power circuit Inspection " procedure.

NO ▶ Check for short to ground in control harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Power Circuit Inspection

■ Check power in harness

1. Ignition "OFF"
2. Disconnect Intake actuator and Connect A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Sensor REF(5V) terminal of Intake actuator harness connector and chassis ground.

Specification : approx. 5V

5. Is the measured voltage within specification?

YES ▶ Go to " Component inspection " procedure.

NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Intake actuator

1. Ignition "OFF"
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to FRE(+) of intake actuator and (-) terminal to REC(-). (Component side)
4. Verify that the actuator operates to the REC position
5. Verify that the temperature actuator operates to the FRE position with reverse connecting. (REC(-) and FRE(+)) (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	FRE(+)	REC(-)	Door position
Battery terminal	12 V	ground	FRE
	ground	12 V	REC

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Intake actuator and check for proper operation. If the problem is corrected, replace Intake actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(F/B) terminal of Intake actuator harness connector and chassis ground. (Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Door position	Voltage
FRE	0.3±0.15V
REC	4.7±0.15V

FIG.2) ※ Voltage value of intake potentiometer as a function of intake door position.

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Intake actuator and check for proper operation. If the problem is corrected, replace Intake actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

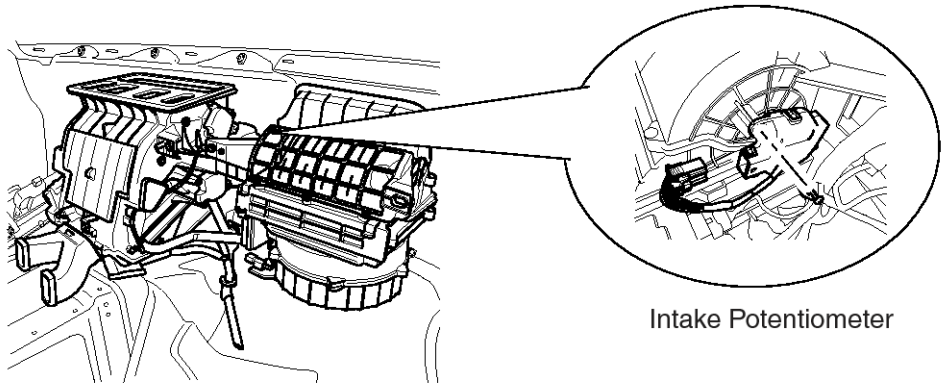
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1209 Intake Potentiometer Short (High)

Componet Location



SBHHA8301N

General Description

Intake door located at heater unit controls the inlet of car. It contains intake motor that changes intake door position and potentiometer that monitors position of intake door. When driver operates the intake switch, ECU receives mode signal from intake switch and operates intake door motot to turn intake door to intended position. (with FRE mode signal, intake door is closed and with REC mode signal, intake door is opened)

In operation, potentiometer delivers intake door position transformed into voltage value to A/C ECU .

DTC Description

Airconditioner Control Module sets DTC B1209 if the Feed Back signal of Intake Actuator has been detected over 4.9V for 0.3 seconds.

DTC Detecting Condition

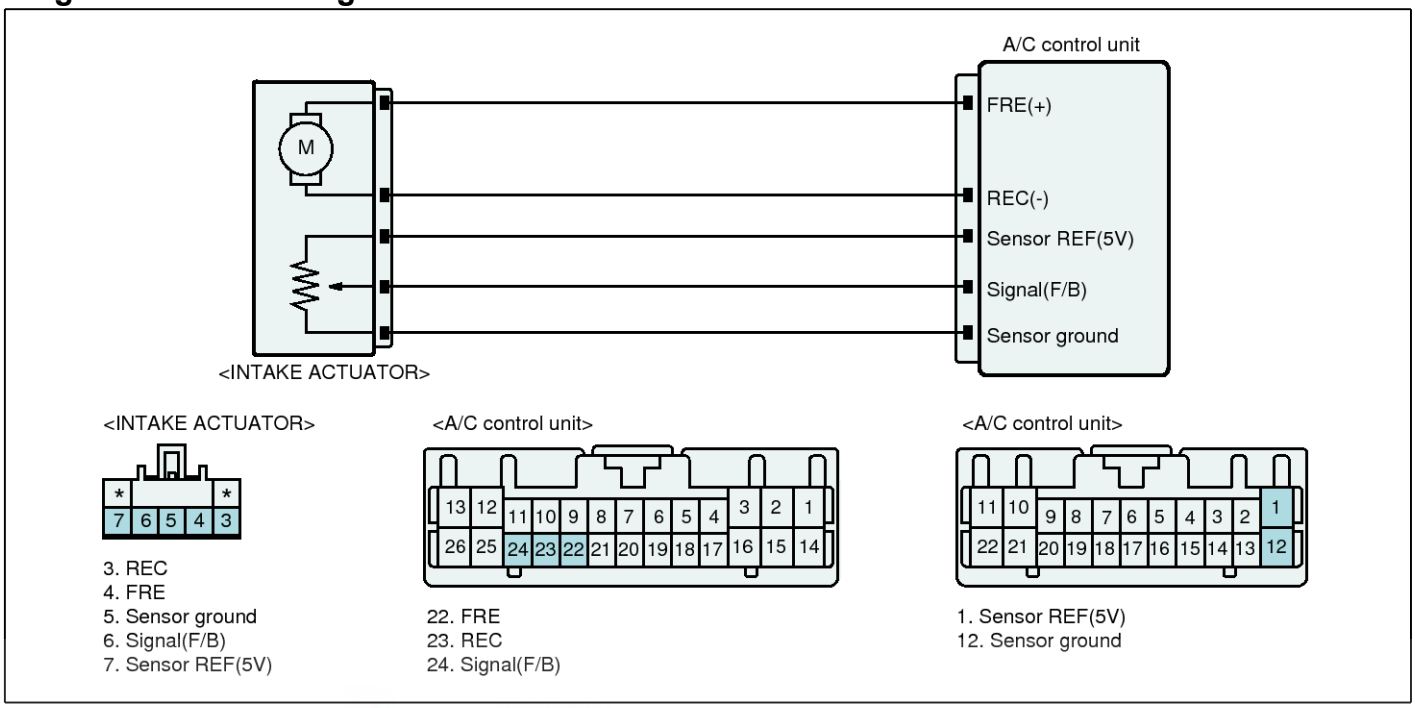
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Short to battery in signal(Feed-back) circuit • Open in ground circuit • Faulty Intake Actuator • Faulty Air Conditioner Module
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback circuit has been detected over 4.9V for 0.3 s-econds	
Failsafe	• Intake Actuator is moved and fixed at FRE position if F-RE is selected or REC position if REC is selected.	

Specification

※ Voltage value of Intake potentiometer as a function of position of Intake door

Door position	Voltage
FRE	0.3±0.15V
REC	4.7±0.15V

Diagnostic Circuit Diagram



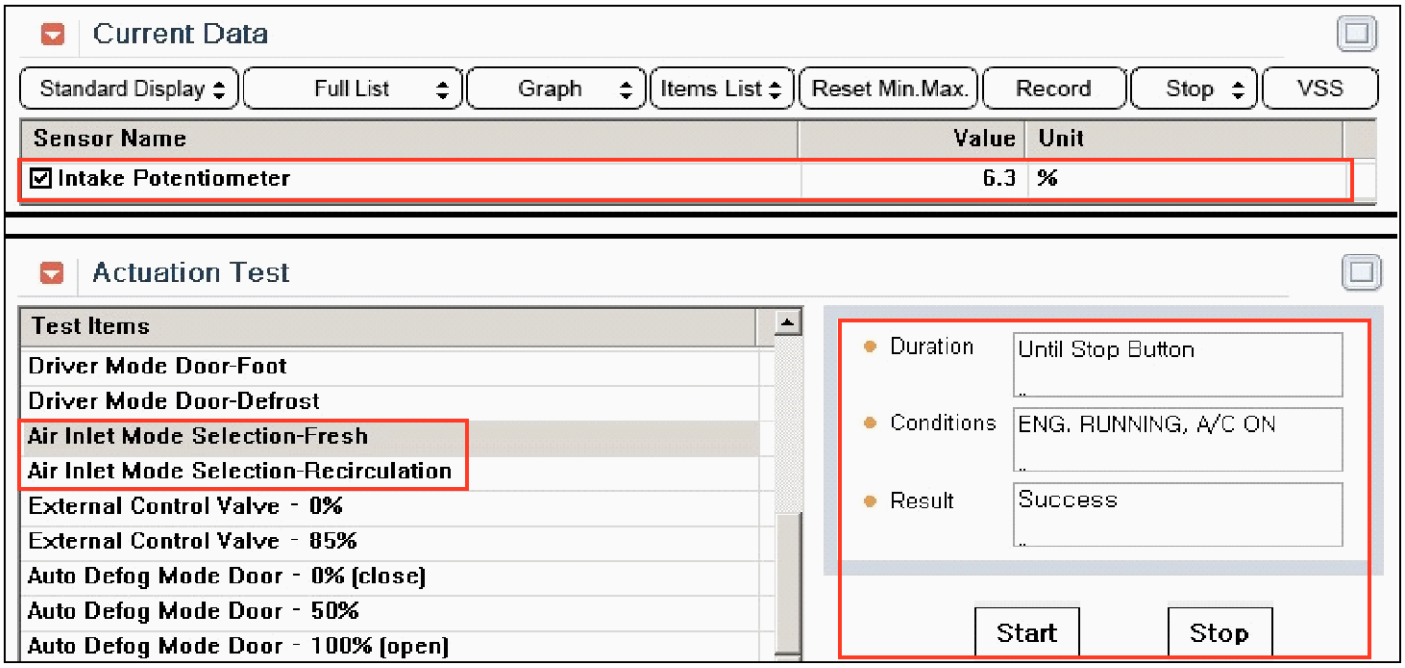
SBHHA9502L

Monitor Scantool data

■ Check Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine start
3. Select " Intake Potentiometer " parameter on the current data with scantool
4. Perform Actuation Test for Air Inlet Mode Selection - Reculation /Fresh in order.
5. With performing Actuation test, check that the value of each position sensors are changing.

Specification : Recirculation : About 90%, Fresh : About 10%.



SBHHA9601L

6. Are the value of each position sensors changed when performing actuation test ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF"
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Intake actuator harness connector and chassis ground.

Specification : 0V

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection" procedure.

NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Intake actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Intake actuator

1. Ignition "OFF"
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to FRE(+) of intake actuator and (-) terminal to REC(-). (Component side)
4. Verify that the actuator operates to the REC position
5. Verify that the temperature actuator operates to the FRE position with reverse connecting. (REC(-) and FRE(+)) (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	FRE(+)	REC(-)	Door position
Battery terminal	12 V	ground	FRE
	ground	12 V	REC

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Intake actuator and check for proper operation. If the problem is corrected, replace Intake actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(F/B) terminal of Intake actuator harness connector and chassis ground. (Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Door position	Voltage
FRE	0.3±0.15V
REC	4.7±0.15V

FIG.2) ※ Voltage value of intake potentiometer as a function of intake door position.

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Intake actuator and check for proper operation. If the problem is corrected, replace Intake actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

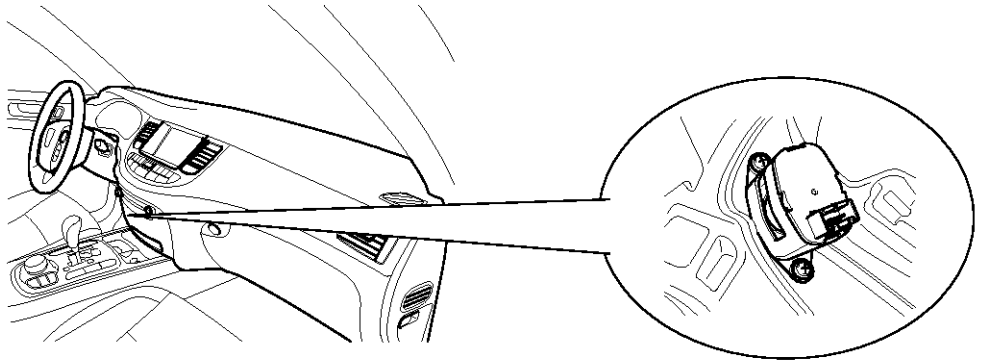
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1233 In-Car Temperature Sensor Short (Low)

Componet Location



In-Car Temperature Sensor

SBHHA8019N

General Description

Incar sensor is located at left side of DATC control panel. It 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. According to this signal, the control unit regulates incar temperature to intended value.

DTC Description

Air conditioner Control Module sets DTC B1233 if Incar temperature sensor has been detected below 0.1V for 0.3 seconds.

DTC Detecting Condition

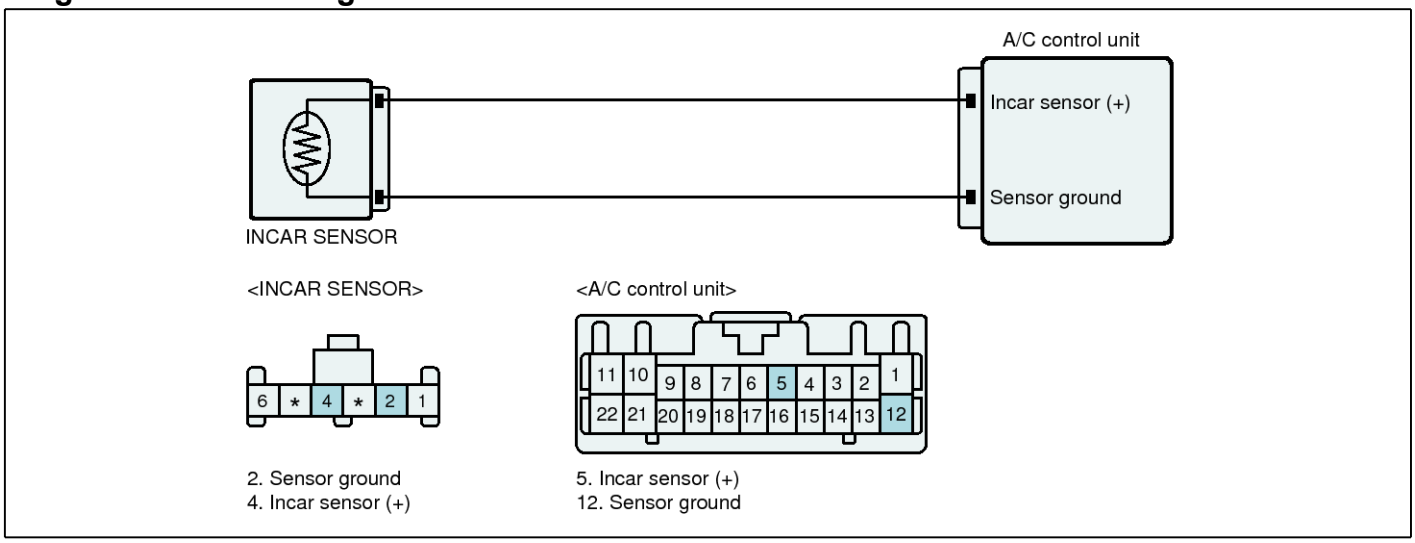
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Short circuit in harness • Faulty incar temp.sensor • Faulty A/C Control Unit
Enable Conditions	• IG KEY ON	
Threshold value	• Incar temperature sensor has been detected 0.1V for 0. 3 seconds	
Failsafe	• Control with the value of 25℃(77˚F)	

Specification

※ Resistance value of incar temp sensor as a function of temperature.

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-20/-4	285.6	20/68	37.4
-10/14	169	30/86	24.1
0/32	97.7	40/104	15.9
10/50	59.67	50/122	10.8

Diagnostic Circuit Diagram



SBHHA9503L

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after engine starts.
3. Select and monitor "In-car temperature sensor" parameter.

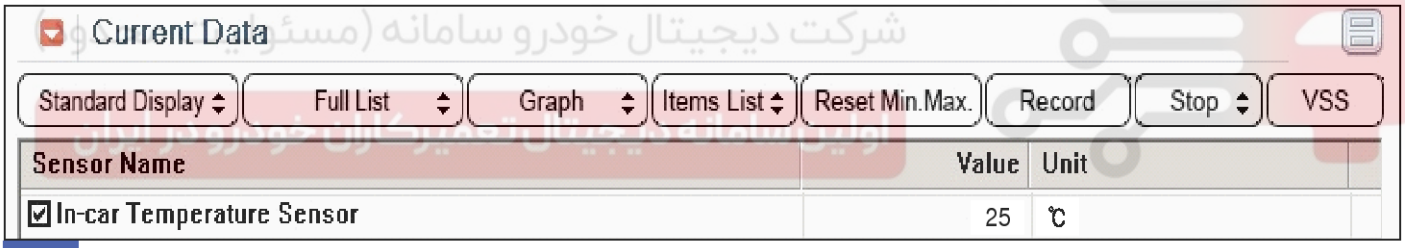


Fig.1

SBHHA9602L

FIG.1) Parameter of "INCAR TEMP.SENSOR" will be fixed at 25℃(77˚F), if there is any fault in INCAR SENSOR.

4. Is the Incar temperature sensor normal ?

YES ▶ Go to "Inspection and Repair" procedure.

NO ▶ This is a intermittent problem caused by po-or contact of component or Control Unit
▶ Thoroughly check the looseness, poor conn-ection, bent, corrison, contamination, deformat-ion or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect Incar temp.sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of incar temp.sensor harness connector and chassis ground

Specification : Infinity

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Incar temp.sensor

1. Ignition "OFF"
2. Disconnect Incar temp.sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Incar temp.sensor harness connector and Sensor ground harness connector. (Component side)

Specification : Refer the specifications in Fig.1)

FIG.1)

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-20/-4	285.6	20/68	37.4
-10/14	169	30/86	24.1
0/32	97.7	40/104	15.9
10/50	59.67	50/122	10.8

FIG.1) ※ Specifications : Resistance value of incar sensor as a function of temperature .

※ The actual value may differ from it according to various engine condition.

4. Is "resistance" display near the specified value?

YES ▶ Go to "Check A/C-ECU" procedure.

NO ▶ Substitute with a known-good Incar temp.sensor and check for proper operation. If the problem is corrected, replace Incar temp.sensor and then go to "Verification of Vehicle Repair" procedure.

■ Check A/C-ECU

1. Ignition "OFF"
2. Disconnect Incar temp.sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(+) terminal of Incar temp.sensor harness connector and chassis ground. (Component side)

Specification : approx. 5V

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good A/C-ECU and check for proper operation. If the problem is corrected, replace A/C-ECU and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

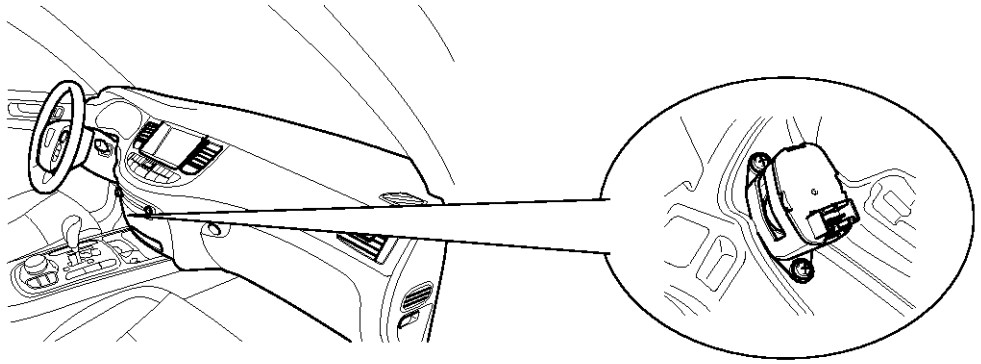
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1234 In-Car Temperature Sensor Open (High)

Componet Location



In-Car Temperature Sensor

SBHHA8019N

General Description

Incar sensor is located at left side of DATC control panel. It 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. According to this signal, the control unit regulates incar temperature to intended value.

DTC Description

Air conditioner Control Module sets DTC B1234 if Incar temperature sensor has been detected over 4.9V for 0.3 seconds.

DTC Detecting Condition

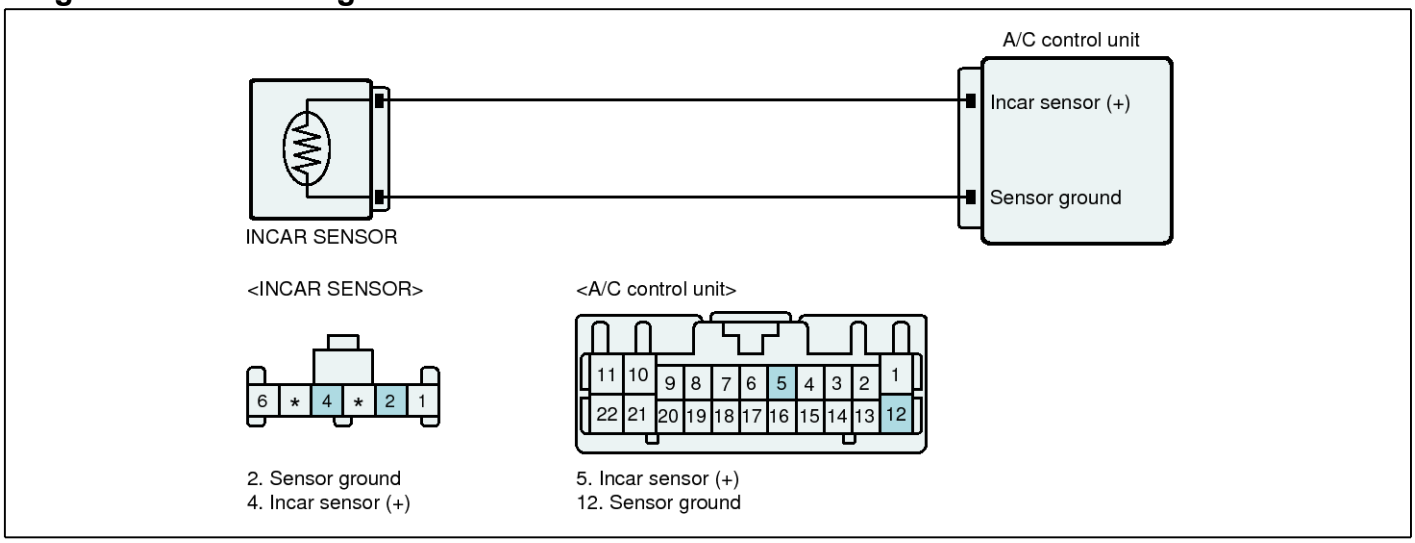
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor connection in wireharness • Open in signal circuit • Short to battery in signal circuit • Faulty Incar temperature sens-or • Faulty Air conditioner Control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Incar temperature sensor has been dtected over 4.9V f-or 0.3 seconds.	
Failsafe	• Control with the value of 25℃(77˚F)	

Specification

※ Resistance value of incar temp sensor as a function of temperature.

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-20/-4	285.6	20/68	37.4
-10/14	169	30/86	24.1
0/32	97.7	40/104	15.9
10/50	59.67	50/122	10.8

Diagnostic Circuit Diagram



SBHHA9503L

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after engine starts.
3. Select and monitor "In-car temperature sensor" parameter.

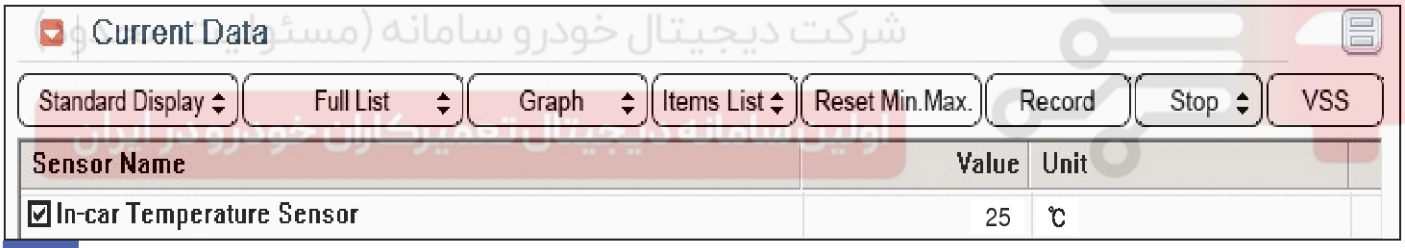


Fig.1

SBHHA9602L

FIG.1) Parameter of "INCAR TEMP.SENSOR" will be fixed at 25℃(77˚F), if there is any fault in INCAR SENSOR.

4. Is the Incar temperature sensor normal ?

YES ▶ Go to "Inspection and Repair" procedure.

NO ▶ This is a intermittent problem caused by po-or contact of component or Control Unit
▶ Thoroughly check the looseness, poor conn-ection, bent, corrison, contamination, deformat-ion or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check power in harness

1. Ignition "OFF"
2. Disconnect Incar temp. sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Power terminal of Incar temp. sensor harness connector and chassis ground .

Specification : 0V

5. Is the measured voltage within specification?

YES ▶ Go to "Check for open in harness" as follows.

NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Incar temp.sensor and A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Incar temp.sensor harness connector and Signal(+) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to "Ground circuit Inspection " procedure .

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Incar temp.sensor and A/C control unit main harness connector.
3. Measure resistance between ground terminal of Incar temp.sensor harness connector and ground terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Incar temp.sensor

1. Ignition "OFF"
2. Disconnect Incar temp.sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Incar temp.sensor harness connector and Sensor ground harness connector. (Component side)

Specification : Refer the specifications in Fig.1)

FIG.1)

Temperature(℃/℉)	Resistance(kΩ)	Temperature(℃/℉)	Resistance(kΩ)
-20/-4	285.6	20/68	37.4
-27/-17	169	30/86	24.1
0/32	97.7	40/104	15.9
10/50	59.67	50/122	10.8

FIG.1) ※ Specifications : Resistance value of incar sensor as a function of temperature .

※ The actual value may differ from it according to various engine condition.

4. Is "resistance" display near the specified value?

YES ▶ Go to "Check A/C-ECU" procedure.

NO ▶ Substitute with a known-good Incar temp.sensor and check for proper operation. If the problem is corrected, replace Incar temp.sensor and then go to "Verification of Vehicle Repair" procedure.

■ Check A/C-ECU

1. Ignition "OFF"
2. Disconnect Incar temp.sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(+) terminal of Incar temp.sensor harness connector and chassis ground. (Component side)

Specification : approx. 5V

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good A/C-ECU and check for proper operation. If the problem is corrected, replace A/C-ECU and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

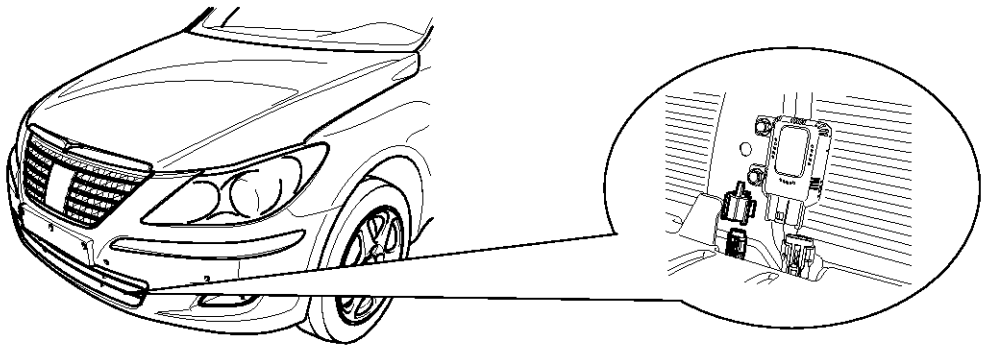
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1237 Ambient Temperature Sensor Short (Low)

Componet Location



SBHHA8303N

General Description

The ambient temperature sensor located at the center stay of the condensor detects ambient air temperature. It is a negative type thermistor whose resistance is inversely proportional to temperature. Its output is used for sensor fail-safe, temperature regulation door lock, blower motor level control, mix mode control and in-car humidity control.

DTC Description

Air conditioner Control Module sets DTC B1237 if Ambient sensor has been detected below 0.1V for 0.3 seconds.

DTC Detecting Condition

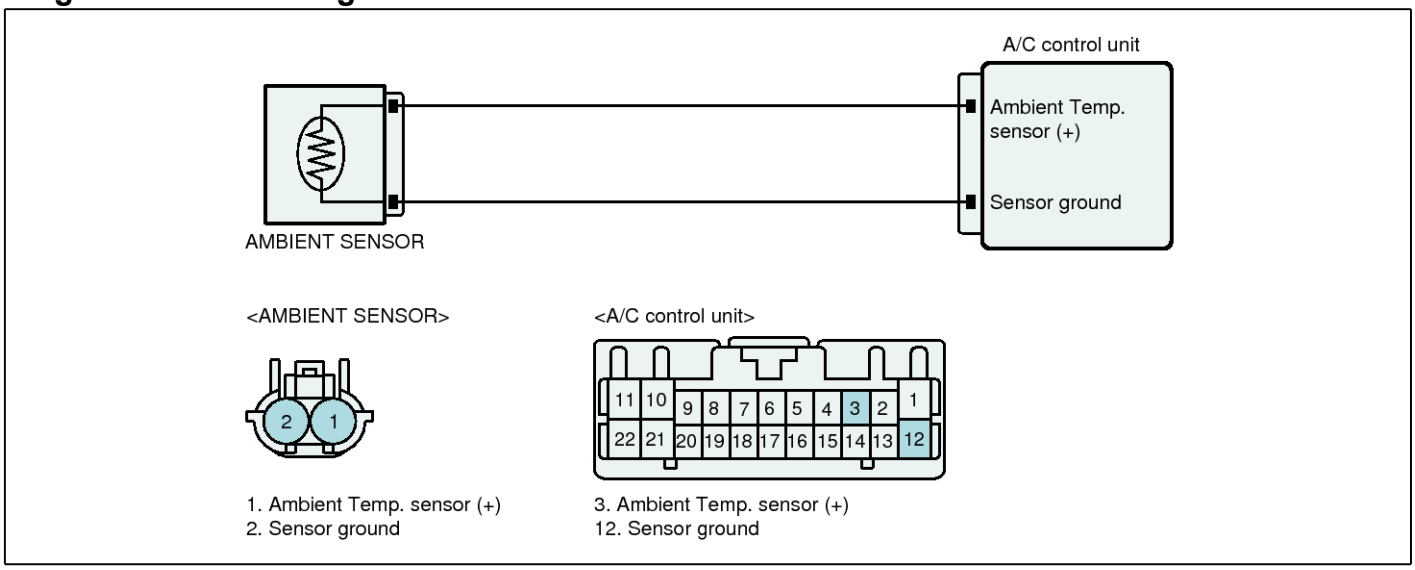
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Short in signal circuit • Faulty Ambient Sensor • Faulty A/C control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Ambient sensor has been dtected 0.1V for 0.3 seconds.	
Failsafe	• Displayed '--' and A/C control Module regards and controls it as 20℃(68˚F)	

Specification

※ Resistance value of ambient temp.sensor as a function of temperature.

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-20/-4	271.4	50/122	11
0/32	95.1	60/140	7.58
25/77	30		

Diagnostic Circuit Diagram



SBHHA9504L

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after engine starts.
3. Select and monitor "Ambient Air Temperature sensor" parameter.

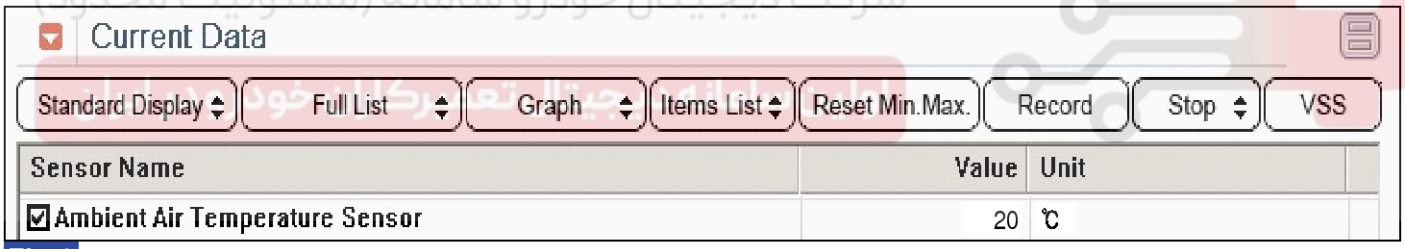


Fig.1

SBHHA9603L

FIG.1) Parameter of "Ambinent Sensor" will be fixed at 20℃(68˚F), if there is any fault in Ambient Sensor.

4. Is the ambient sensor normal?

YES ▶ Go to "Inspection and Repair" procedure.

NO ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check power in harness

1. Ignition "OFF"
2. Disconnect ambient sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Power terminal of ambient sensor harness connector and chassis ground .

Specification : Infinity

5. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check ambient sensor

1. Ignition "OFF"
2. Disconnect ambient sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of ambient sensor harness connector and Sensor ground harness connector. (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Temperature(℃/℉)	Resistance(kΩ)	Temperature(℃/℉)	Resistance(kΩ)
-20/-4	271.4	50/122	11
0/32	95.1	60/140	7.58
25/77	30		

FIG.1) ※ Specifications : Resistance value of ambient sensor as a function of temperature .

※ The actual value may differ from it according to various engine condition.

4. Is "resistance" display near the specified value?

YES ▶ Go to "Check A/C-ECU" procedure.

NO ▶ Substitute with a known-good ambient sensor and check for proper operation. If the problem is corrected, replace ambient sensor and then go to "Verification of Vehicle Repair" procedure.

■ Check A/C-ECU

1. Ignition "OFF"
2. Disconnect Ambient Temp. sensor (+) and Connect A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(+) terminal of Ambient Temp. sensor (+) harness connector and chassis ground. (Component side)

Specification : approx. 5V

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good A/C-ECU and check for proper operation. If the problem is corrected, replace A/C-ECU and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

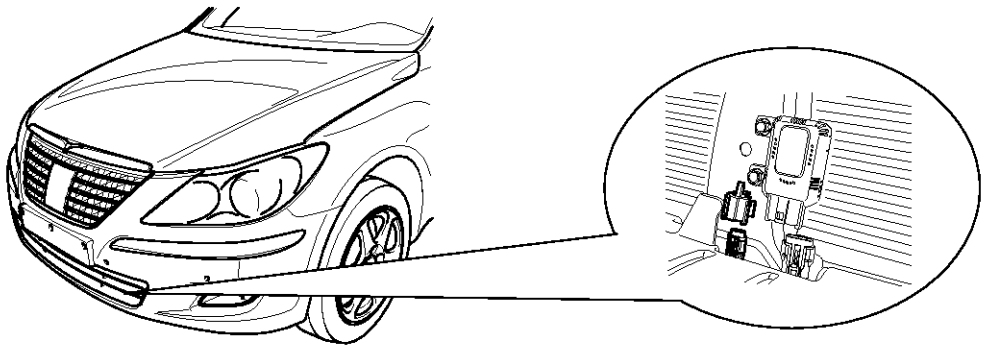
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1238 Ambient Temperature Sensor Open (High)

Componet Location



Ambient Temperature Sensor

SBHHA8303N

General Description

The ambient temperature sensor located at the center stay of the condensor detects ambient air temperature. It is a negative type thermistor whose resistance is inversely proportional to temperature. Its output is used for sensor fail-safe, temperature regulation door lock, blower motor level control, mix mode control and in-car humidity control.

DTC Description

Air conditioner Control Module sets DTC B1238 if Ambient sensor has been detected over 4.9V for 0.3 seconds.

DTC Detecting Condition

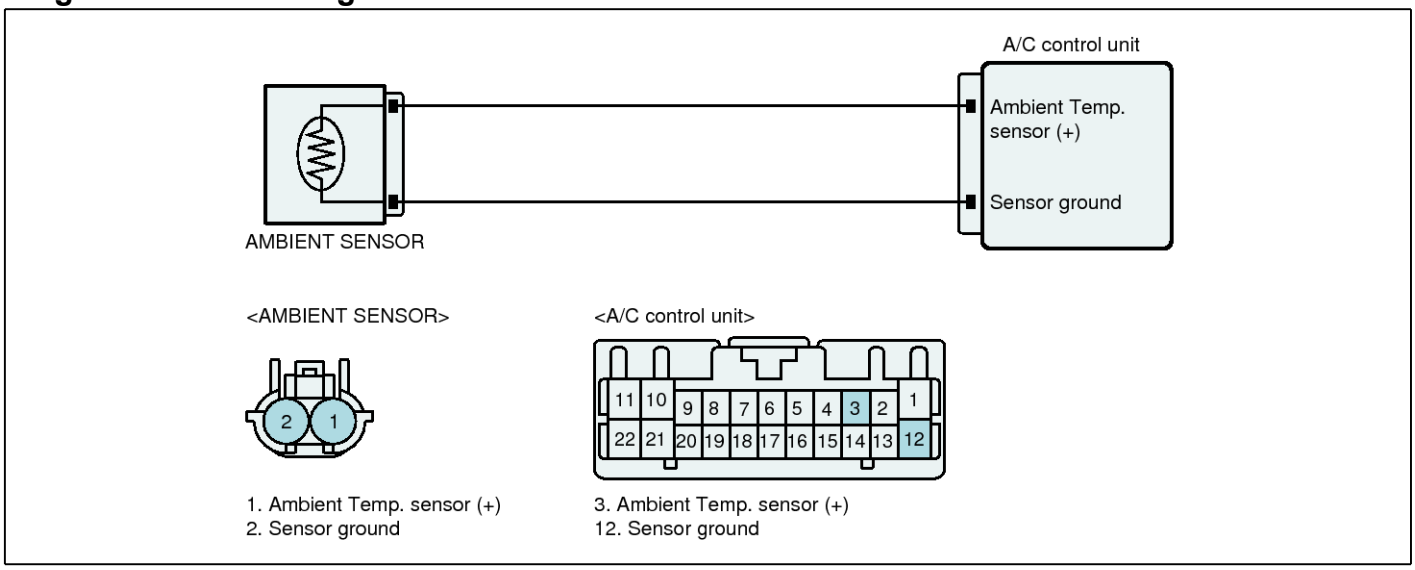
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor Connection in harness • Open in signal circuit • Shrot to battery in signal circuit • Faulty Ambient Temperature s-ensor • Faulty air condtioner control M-odule
Enable Conditions	• IG KEY ON	
Threshold value	• Ambient Temperature sensor has been detected over 4.9V for 0.3 seconds	
Failsafe	• Displayed '--' and A/C control Module regards and cont-rols it as 20℃(68˚F)	

Specification

※ Resistance value of ambient temp.sensor as a function of temperature.

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-20/-4	271.4	50/122	11
0/32	95.1	60/140	7.58
25/77	30		

Diagnostic Circuit Diagram



SBHHA9504L

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after engine starts.
3. Select and monitor "Ambient Air Temperature sensor" parameter.

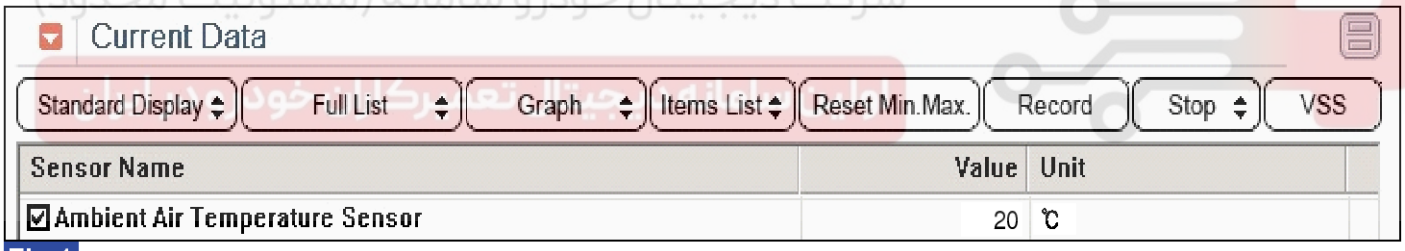


Fig.1

SBHHA9603L

FIG.1) Parameter of "Ambinent Sensor" will be fixed at 20℃(68˚F), if there is any fault in Ambient Sensor.

4. Is the ambient sensor normal?

YES ▶ Go to "Inspection and Repair" procedure.

NO ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF"
2. Disconnect ambient sensor and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of ambient sensor harness connector and chassis ground .

Specification : 0V

5. Is the measured voltage within specification?

YES ▶ Go to "Check for open in harness" as follows.

NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect ambient sensor and A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of ambient sensor harness connector and Signal(+) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to "Ground circuit Inspection " procedure .

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect ambient sensor and A/C control unit main harness connector.
3. Measure resistance between ground terminal of ambient sensor harness connector and ground terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check ambient sensor

1. Ignition "OFF"
2. Disconnect ambient sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of ambient sensor harness connector and Sensor ground harness connector. (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Temperature(℃/℉)	Resistance(kΩ)	Temperature(℃/℉)	Resistance(kΩ)
-20/-4	271.4	50/122	11
0/32	95.1	60/140	7.58
25/77	30		

FIG.1) ※ Specifications : Resistance value of ambient sensor as a function of temperature .

※ The actual value may differ from it according to various engine condition.

4. Is "resistance" display near the specified value?

YES ▶ Go to "Check A/C-ECU" procedure.

NO ▶ Substitute with a known-good ambient sensor and check for proper operation. If the problem is corrected, replace ambient sensor and then go to "Verification of Vehicle Repair" procedure.

■ Check A/C-ECU

1. Ignition "OFF"
2. Disconnect Ambient Temp. sensor (+) and Connect A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(+) terminal of Ambient Temp. sensor (+) harness connector and chassis ground. (Component side)

Specification : approx. 5V

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good A/C-ECU and check for proper operation. If the problem is corrected, replace A/C-ECU and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

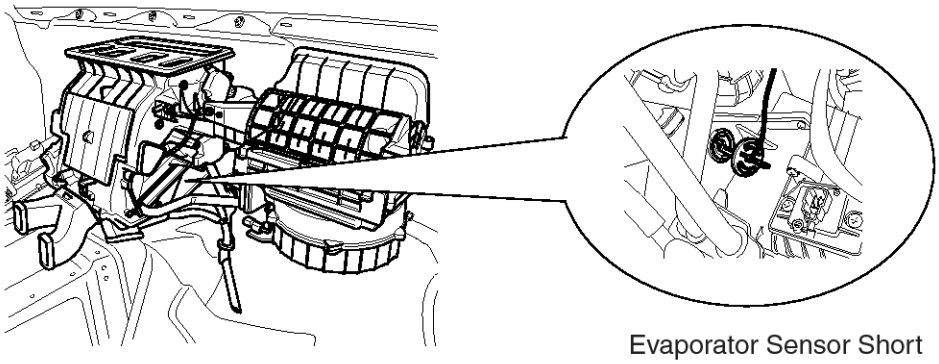
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1241 Evaporator Sensor Short (Low)

Componet Location



Evaporator Sensor Short

SBHHA8304N

General Description

The Evaporator sensor located on heater unit detects the core temperature. It is a negative type thermistor whose resistance is inversely proportional to temperature. Evaporator sensor transforms measured temperature into voltage value and delivers it to A/C ECU. when core temperature is blow threshold value, A/C ECU interrupts compressor relay power, in order to prevent evaporator freezing by excessive cooling.

DTC Description

Air conditioner Control Module sets DTC B1241 if Evaporator sensor has been detected below 0.1V for 0.3 seconds

DTC Detecting Condition

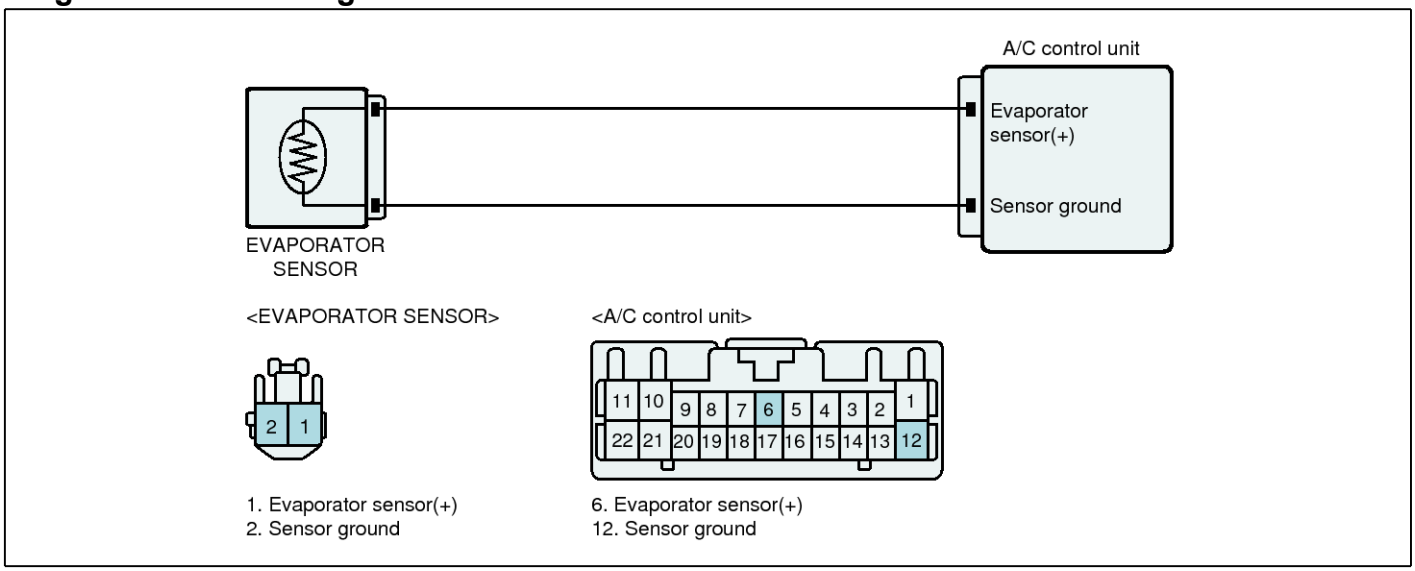
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Short circuit in harness • Faulty Evaporator sensor • Faulty A/C Control Unit
Enable Conditions	• IG KEY ON	
Threshold value	• Evaporator sensor has been detected below 01.V for 0. 3 seconds.	
Failsafe	• Control with the value of -2℃(28.4˚F)	

Specification

※ Resistance value of evaporator sensor as a function of temperature.

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-20/-4	43.3	20/68	12.1
0/32	27.6	30/86	8.3
10/50	18	40/104	5.8

Diagnostic Circuit Diagram



SBHHA9505L

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after engine starts.
3. Select and monitor "Evaporator sensor" parameter on scantool.

Fig.1

SBHHA9604L

FIG.1) Parameter of "Evaporator Sensor" will be fixed at -2℃(28.4˚F), if there is any fault in Evaporator Sensor.

4. Is the Evaporator Sensor normal ?

YES ▶ Go to "Inspection and Repair" procedure.

NO ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect Evaporator sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Evaporator sensor harness connector and chassis ground

Specification : Infinity

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Evaporator sensor

1. Ignition "OFF"
2. Disconnect Evaporator sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Evaporator sensor harness connector and Sensor ground harness connector. (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Temperature(℃/℉)	Resistance(kΩ)	Temperature(℃/℉)	Resistance(kΩ)
-20/-4	43.3	20/68	12.1
0/32	27.6	30/86	8.3
10/50	18	40/104	5.8

FIG.1) ※ Specifications : Resistance value of Evaporator sensor as a function of temperature.

※ The actual value may differ from it according to various engine condition.

4. Is "resistance" display near the specified value?

YES ▶ Go to "Check A/C-ECU" procedure.

NO ▶ Substitute with a known-good Evaporator sensor and check for proper operation. If the problem is corrected, replace Evaporator sensor and then go to "Verification of Vehicle Repair" procedure.

■ Check A/C-ECU

1. Ignition "OFF"
2. Disconnect Evaporator sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(+) terminal of Evaporator sensor harness connector and chassis ground. (Component side)

Specification : approx. 5V

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good A/C-ECU and check for proper operation. If the problem is corrected, replace A/C-ECU and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

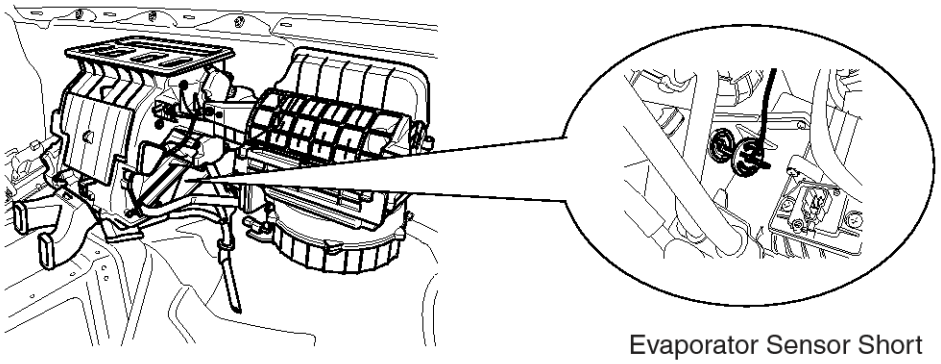
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1242 Evaporator Sensor Open (High)

Componet Location



Evaporator Sensor Short

SBHHA8304N

General Description

The Evaporator sensor located on heater unit detects the core temperature. It is a negative type thermistor whose resistance is inversely proportional to temperature. Evaporator sensor transforms measured temperature into voltage value and delivers it to A/C ECU. when core temperature is blow threshold value, A/C ECU interrupts compressor relay power, in order to prevent evaporator freezing by excessive cooling.

DTC Description

Air conditioner Control Module sets DTC B1242 if Evaporator sensor has been detected over 4.9V for 0.3 seconds

DTC Detecting Condition

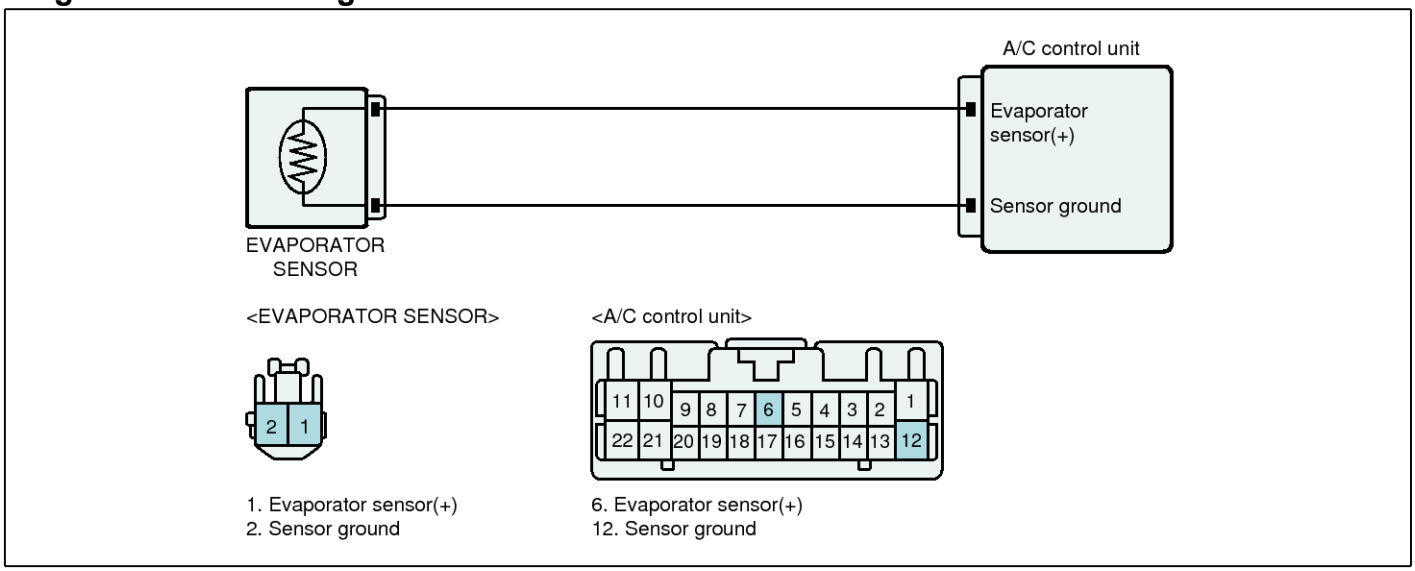
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Open in signal circuit • Short to battery in signal circuit • Faulty Evaporator sensor • Faulty Air conditioner control Unit
Enable Conditions	• IG KEY ON	
Threshold value	• Evaporator sensor has been detected over 4.9V for 0.3 seconds	
Failsafe	• Control with the value of -2℃(28.4˚F)	

Specification

※ Resistance value of evaporator sensor as a function of temperature.

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-20/-4	43.3	20/68	12.1
0/32	27.6	30/86	8.3
10/50	18	40/104	5.8

Diagnostic Circuit Diagram



SBHHA9505L

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after engine starts.
3. Select and monitor "Evaporator sensor" parameter on scantool.

Fig.1

SBHHA9604L

FIG.1) Parameter of "Evaporator Sensor" will be fixed at -2℃(28.4˚F), if there is any fault in Evaporator Sensor.

4. Is the Evaporator Sensor normal ?

YES ▶ Go to "Inspection and Repair" procedure.

NO ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF"
2. Disconnect Evaporator sensor and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Evaporator sensor harness connector and chassis ground .

Specification : 0V

5. Is the measured voltage within specification?

YES ▶ Go to "Check for open in harness" as follows.

NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Evaporator sensor and A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Evaporator sensor harness connector and Signal(+) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to "Ground circuit Inspection " procedure .

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Evaporator sensor and A/C control unit main harness connector.
3. Measure resistance between ground terminal of Evaporator sensor harness connector and ground terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Evaporator sensor

1. Ignition "OFF"
2. Disconnect Evaporator sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Evaporator sensor harness connector and Sensor ground harness connector. (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-20/-4	43.3	20/68	12.1
0/32	27.6	30/86	8.3
10/50	18	40/104	5.8

FIG.1) ※ Specifications : Resistance value of Evaporator sensor as a function of temperature.

※ The actual value may differ from it according to various engine condition.

4. Is "resistance" display near the specified value?

YES ▶ Go to "Check A/C-ECU" procedure.

NO ▶ Substitute with a known-good Evaporator sensor and check for proper operation. If the problem is corrected, replace Evaporator sensor and then go to "Verification of Vehicle Repair" procedure.

■ Check A/C-ECU

1. Ignition "OFF"
2. Disconnect Evaporator sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(+) terminal of Evaporator sensor harness connector and chassis ground. (Component side)

Specification : approx. 5V

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good A/C-ECU and check for proper operation. If the problem is corrected, replace A/C-ECU and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

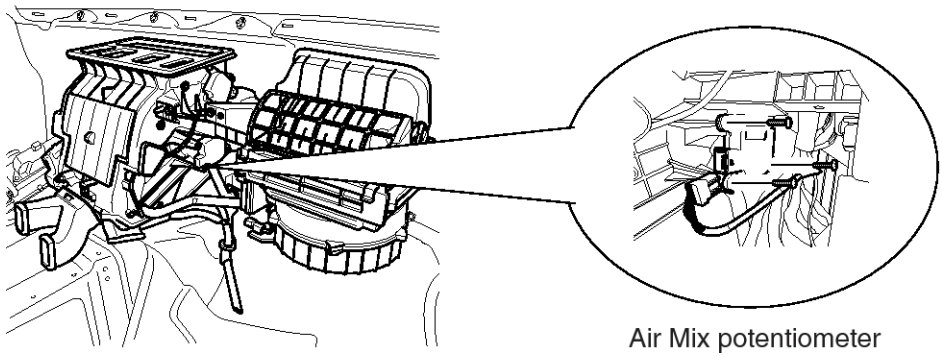
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1245 Air Mix Potentiometer Open (Low)-Driver

Componet Location



SBHHA8305N

General Description

Temperature control actuator located at heater unit. It contains temp motor that changes temp door position and potentiometer that monitors position of temp door.Temperature control actuator regulates the temperature by the procedure as follows. Signal from control unit adjusts position of temp door by operating temp motor and then temperature will be regulated by the hot/cold air ratio decided by position of temp door. In operation, potentiometer delivers temp door position transformed into voltage value to A/C ECU .

DTC Description

Air conditioner Control Module sets DTC B1245 if Feedback signal of Driver Temperature Actuator has been detected open or below 0.1V for 0.3 seconds

DTC Detecting Condition

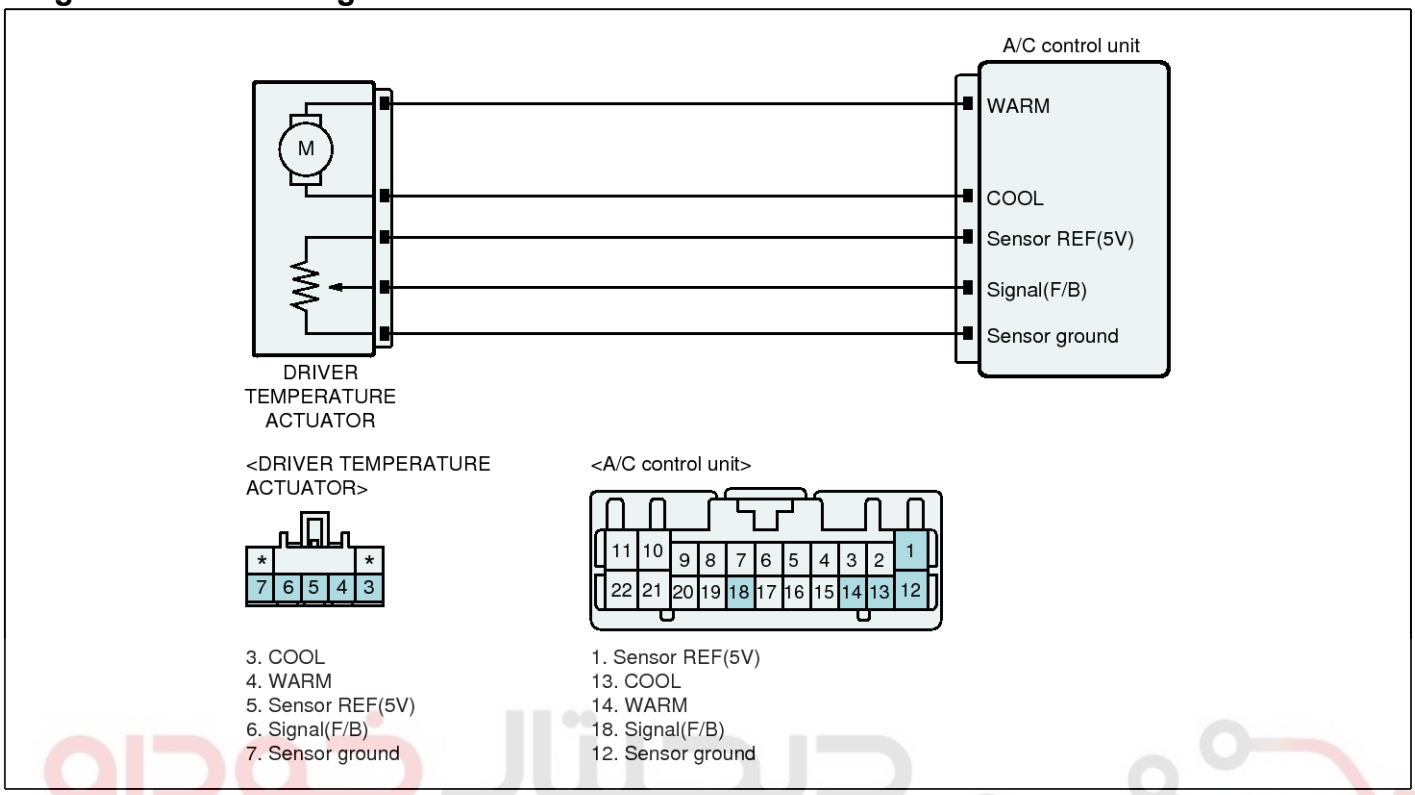
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor Conection in harness • Open in signal(Feedback signal), power and ground circuit • Faulty Driver Temperature Actuator • Faulty Air condition Contorl Module
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal of Driver Temperature Actuator has been detected open or below 0.1V for 0.3 seconds	
Failsafe	• Setting temperature : 16℃(62.6˚F)-24℃(76.1˚F), fix at max. cooling position • Setting temperature : 25℃(77˚F)-31℃(89.6˚F), fix at max. heating position	

Specification

※ Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

Diagnostic Circuit Diagram



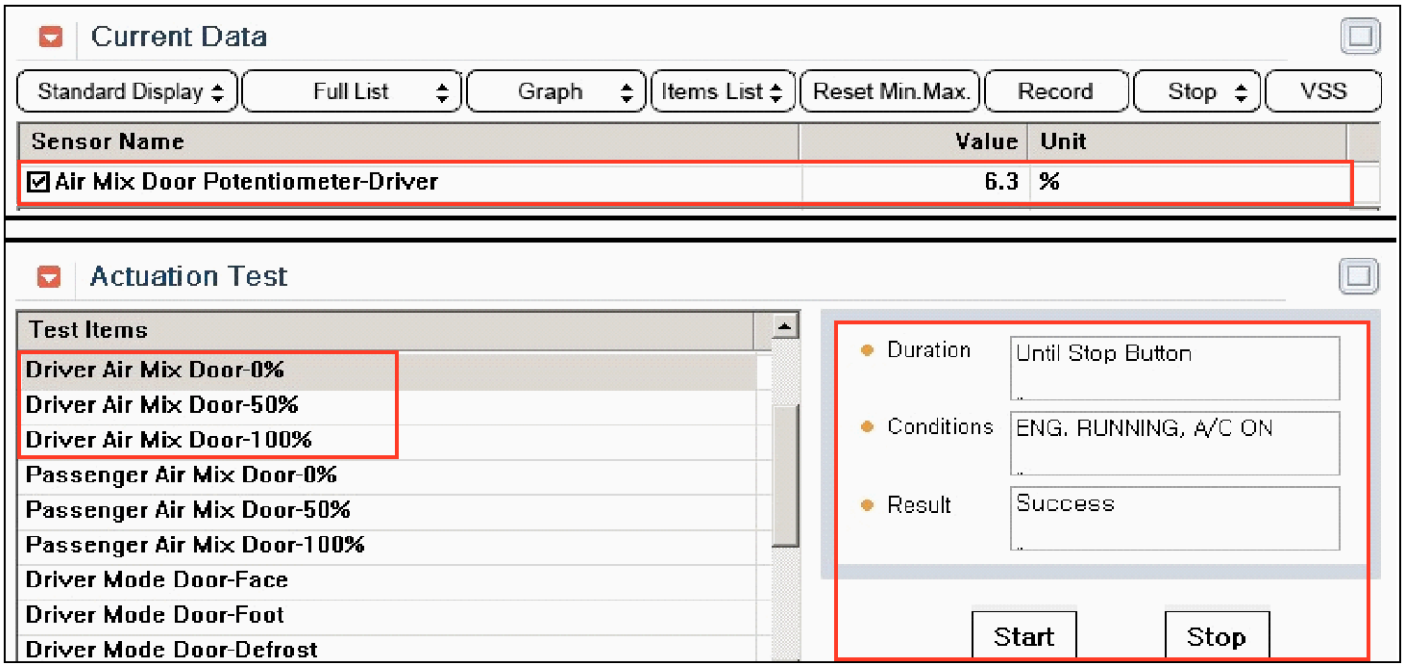
SBHHA9506L

Monitor Scantool data

■Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after engine starts.
3. Select and monitor "Air Mix Door Potentioner-Driver" parameter on scantool.
4. Select and perform Actuation test Air Mix Door Potentioner-Driver - 0% / 50% / 100% in order.
5. With performing Actuation test, check that the value of Air Mix Door Potentiometer follows is changed and close to the value of Actuation Test.

Specification : Check that the value of Air Mix Door Potentiometer at current data should be close to the value of the acutation test.



SBHHA9605L

6. Does the value of current data follow in accordance with the each actuation test ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Driver air mix actuator harness connector and Signal(F/B) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to "Check short to ground in harness" as follows.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Driver air mix actuator harness connector and chassis ground .

Specification : Infinity

4. Is the measured resistance within specification?

YES ▶ Go to "Power circuit Inspection " procedure.

NO ▶ Check for short to ground in control harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Power Circuit Inspection

■ Check power in harness

1. Ignition "OFF"
2. Disconnect Driver air mix actuator and Connect A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Sensor REF(5V) terminal of Driver air mix actuator harness connector and chassis ground.

Specification : approx. 5V

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection" procedure.

NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Driver air mix actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Driver air mix actuator

1. Ignition "OFF"
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of Driver air mix actuator and (-) terminal to COOL(-). (Component side)
4. Verify that the temperature actuator operates to the cool position
5. Verify that the temperature actuator operates to the warm position with reverse connecting.(WARM(+) and COOL(-)) . (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	ground	Max.warm
	ground	12 V	Max.cool

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Driver air mix actuator and check for proper operation. If the problem is corrected, replace Driver air mix actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect Driver air mix actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Driver air mix actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector .(Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

FIG.2) ※ Voltage value of Air Mix potentiometer as a function of temp door position.

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Driver air mix actuator and check for proper operation. If the problem is corrected, replace Driver air mix actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

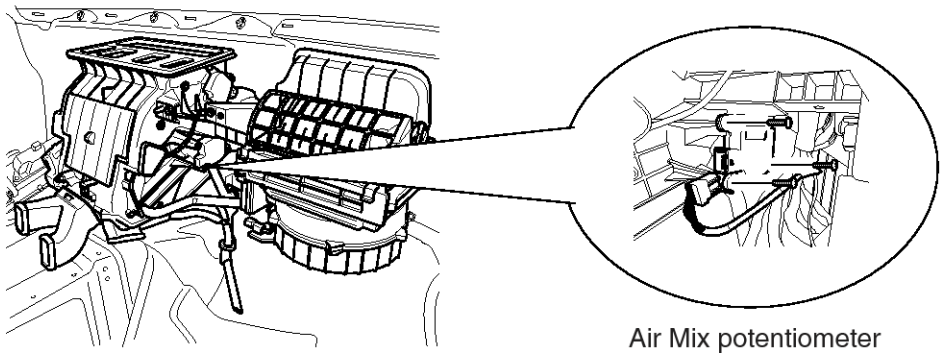
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1246 Air Mix Potentiometer Short (High)-Driver

Componet Location



SBHHA8305N

General Description

Temperature control actuator located at heater unit. It contains temp motor that changes temp door position and potentiometer that monitors position of temp door.Temperature control actuator regulates the temperature by the procedure as follows. Signal from control unit adjusts position of temp door by operating temp motor and then temperature will be regulated by the hot/cold air ratio decided by position of temp door. In operation, potentiometer delivers temp door position transformed into voltage value to A/C ECU .

DTC Description

Air conditioner Control Module sets DTC B1246 if Feedback signal of Driver Temperature Actuator has been detected over 4.9V for 0.3 seconds

DTC Detecting Condition

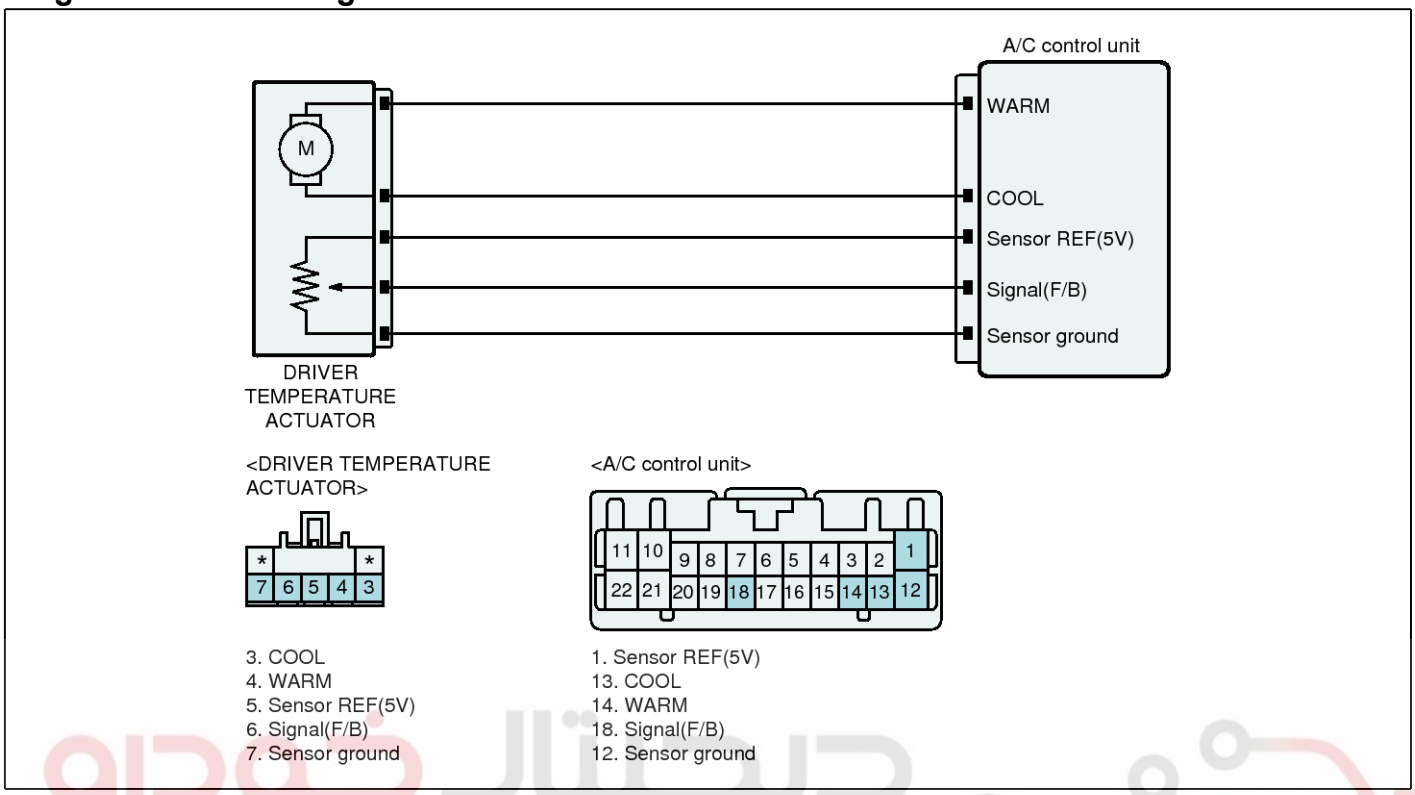
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Short to battery in signal circuit (Feedback signal) • Faulty Driver temperature Actuator • Air conditioner Control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal of Driver Temperature Actuator has been detected over 4.9V for 0.3 seconds	
Failsafe	• If the Driver set temperature is below 24℃(76.1˚F) right before fail detection, Actuator is operated and fixed to Cool Postion. • Actuator is operated and fixed to Warm Position if set temperature is over 25℃(77˚F)	

Specification

※ Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

Diagnostic Circuit Diagram



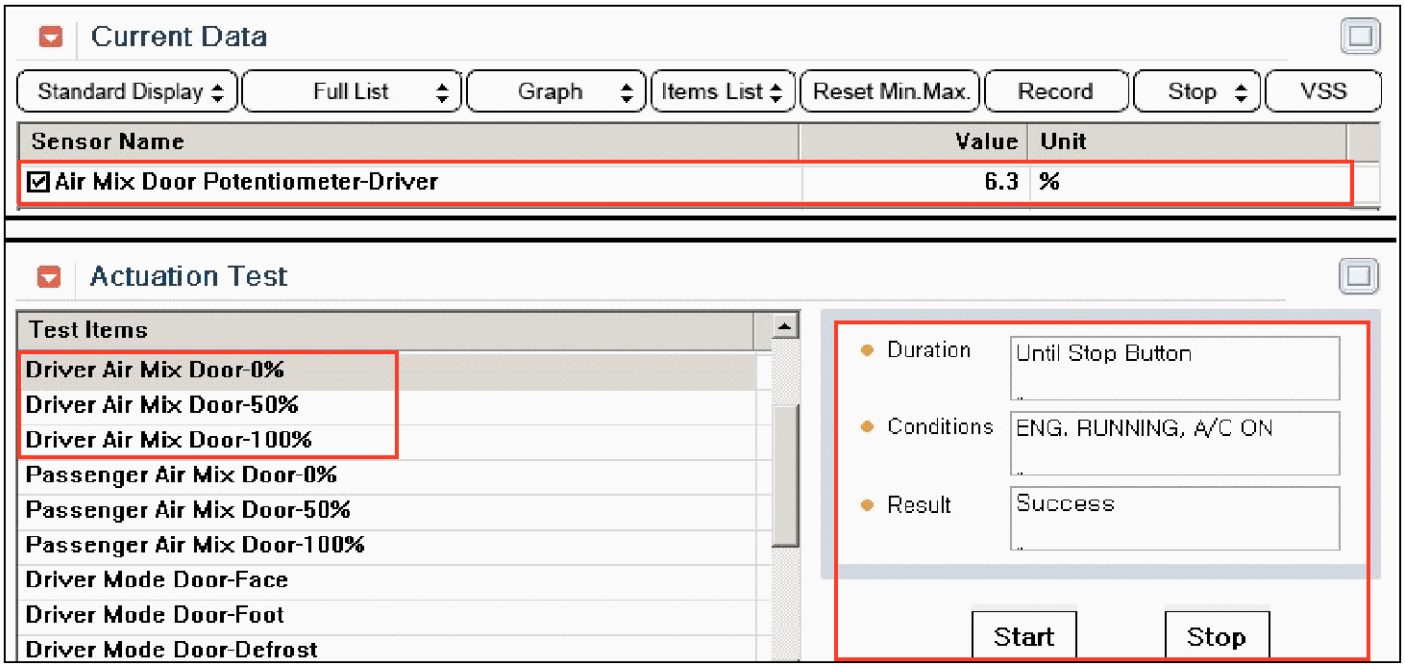
SBHHA9506L

Monitor Scantool data

■Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after engine starts.
3. Select and monitor "Air Mix Door Potentioner-Driver" parameter on scantool.
4. Select and perform Actuation test Air Mix Door Potentioner-Driver - 0% / 50% / 100% in order.
5. With performing Actuation test, check that the value of Air Mix Door Potentiometer follows is changed and close to the value of Actuation Test.

Specification : Check that the value of Air Mix Door Potentiometer at current data should be close to the value of the acutation test.



SBHHA9605L

6. Does the value of current data follow in accordance with the each actuation test ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF"
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Driver air mix actuator harness connector and chassis ground .

Specification : 0V

5. Is the measured resistance within specification?

YES ▶ Go to "Ground circuit Inspection " procedure .

NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Driver air mix actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Driver air mix actuator

1. Ignition "OFF"
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of Driver air mix actuator and (-) terminal to COOL(-). (Component side)
4. Verify that the temperature actuator operates to the cool position
5. Verify that the temperature actuator operates to the warm position with reverse connecting.(WARM(+) and COOL(-)) . (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	ground	Max.warm
	ground	12 V	Max.cool

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Driver air mix actuator and check for proper operation. If the problem is corrected, replace Driver air mix actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect Driver air mix actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Driver air mix actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector .(Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

FIG.2) ※ Voltage value of Air Mix potentiometer as a function of temp door position.

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Driver air mix actuator and check for proper operation. If the problem is corrected, replace Driver air mix actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

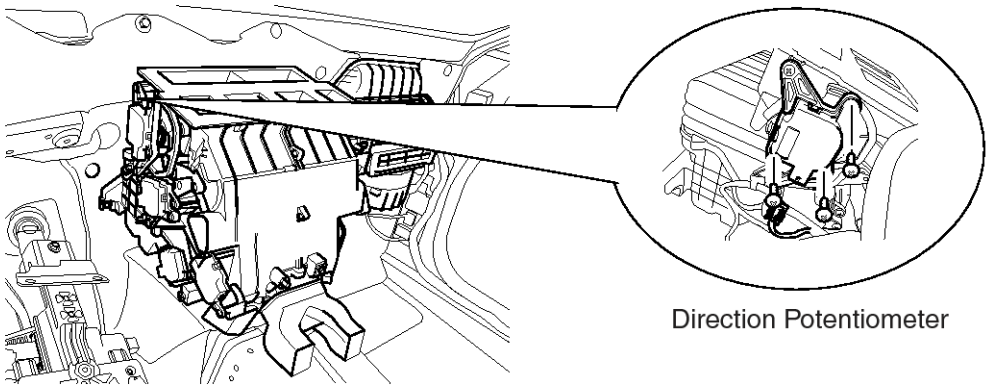
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1249 Direction Potentiometer Open (Low)-Driver

Componet Locations



SBHHA8306N

General Description

The mode control actuator mounted on heater unit adjusts position of mode door by operating Direction Motor 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.

DTC Description

Air conditioner Control Module sets DTC B1249 if Feedback signal of Mode Actuator has been detected below 0.1V for 0.3 seconds

DTC Detecting Condition

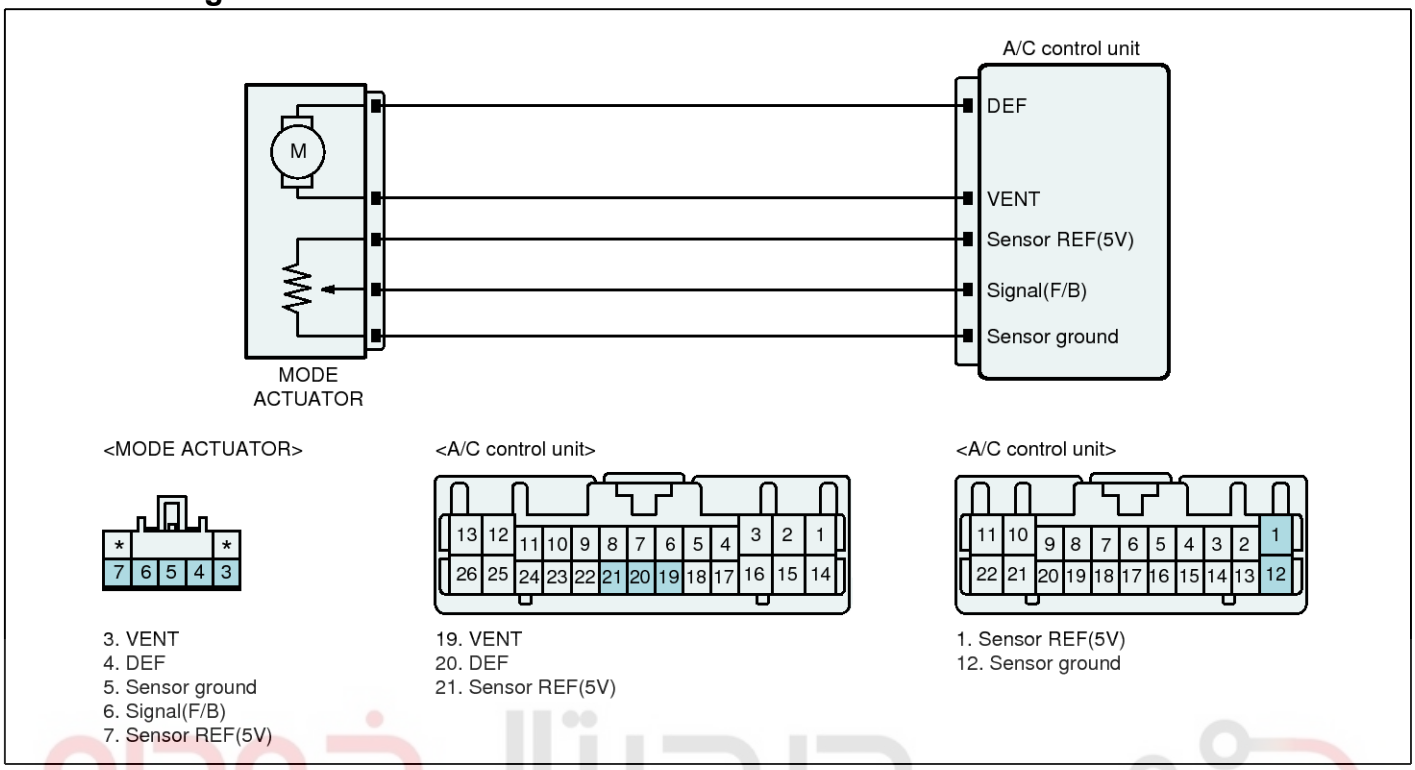
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Pooer Connection in harness • Open in signal (Feedback signal), Power or Gruoud circuit • Faulty Mode Actuator • Faulty Air conditioner Control Unit
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal of Mode Actuator has been detected below 0.1V for 0.3 seconds	
Failsafe	• If the Mode actuator is placed at Vent mode right before fail detection, Actuator is operated and fixed to Vent Mode Postion. • The others mode are selected, Actuator is moved to DEF mode position	

Specification

※ Voltage value of potentiometer as a function of mode door position.

Mode Door Position	Voltage
VENT	0.3±0.15V
BI-LEVEL	1.4±0.4V
FLOOR	2.5±0.4V
MIX	3.6±0.4V
DEF	4.7±0.15V

DTC Detecting Condition



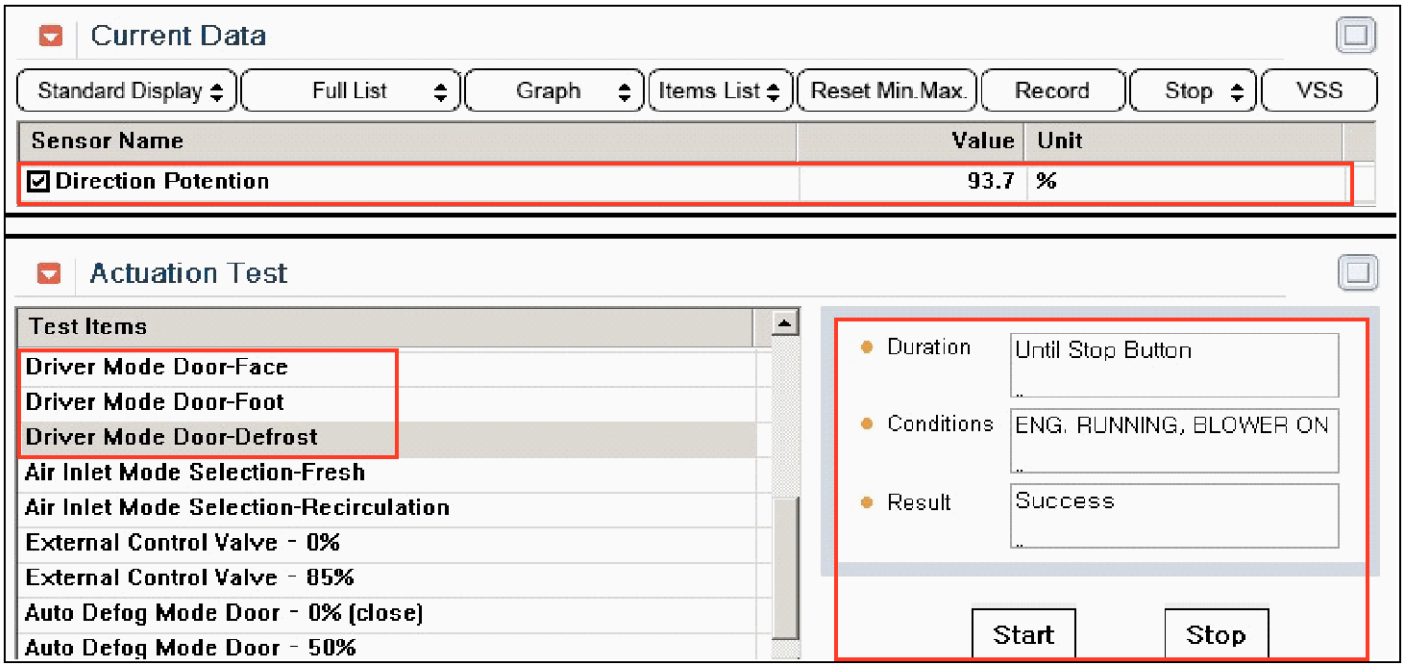
SBHHA9507L

Monitor Scantool data

■Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after engine starts.
3. Select and monitor "Direction Potention" parameter on scantool.
4. Select and perform Actuation test Driver Mode Door - Face / Foot / Defrost in order.
5. Check that the value of all the parameters are changed when performing the actuation test.

Specification : Face - About below 10%, Foot : About 50%, Defrost : About 90%.



SBHHA9606L

6. Are all the parameters changed when performing Actuation test ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Driver Direction actuator harness connector and Signal(F/B) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to "Check short to ground in harness" as follows.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Driver Direction actuator harness connector and chassis ground .

Specification : Infinity

4. Is the measured resistance within specification?

YES ▶ Go to "Power circuit Inspection " procedure.

NO ▶ Check for short to ground in control harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Power Circuit Inspection

■ Check power in harness

1. Ignition "OFF"
2. Disconnect Driver Direction actuator and Connect A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Sensor REF(5V) terminal of Driver Direction actuator harness connector and chassis ground.

Specification : approx. 5V

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection" procedure.

NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Driver Direction actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Driver Direction actuator

1. Ignition "OFF"
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Connect(+) terminal of battery to WARM(+) of Driver Direction actuator and (-) terminal to COOL(-). (Component side)
4. Verify that the temperature actuator operates to the cool position
5. Verify that the temperature actuator operates to the warm position with reverse connecting. (WARM(+) and COOL(-)). (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	ground	VENT.Mode
	ground	12 V	DEF.Mode

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Driver Direction actuator and check for proper operation. If the problem is corrected, replace Driver Direction actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect Driver Direction actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Driver Direction actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector. (Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Mode Door Position	Voltage
VENT	0.3±0.15V
BI-LEVEL	1.4±0.4V
FLOOR	2.5±0.4V
MIX	3.6±0.4V
DEF	4.7±0.15V

Fig.2) ※ Voltage value of Direction potentiometer as a function of position of mode switch

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Driver Direction actuator and check for proper operation. If the problem is corrected, replace Driver Direction actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

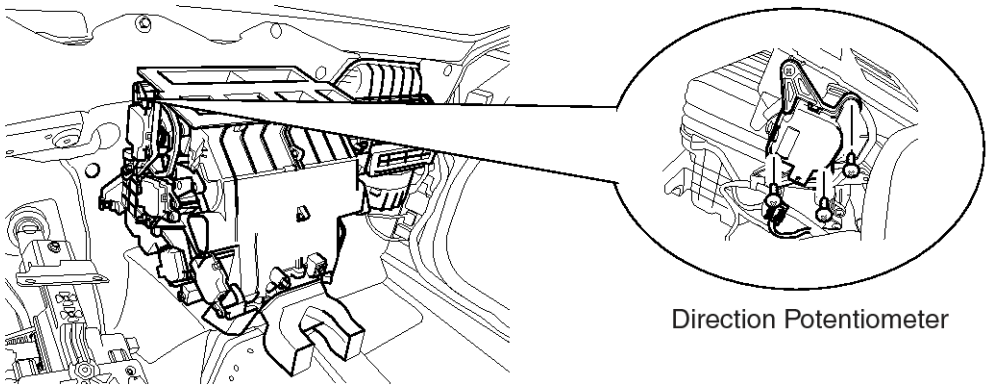
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1250 Direction Potentiometer Short (High)-Driver

Componet Location



SBHHA8306N

General Description

The mode control actuator mounted on heater unit adjusts position of mode door by operating Direction Motor 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.

DTC Description

Air conditioner Control Module sets DTC B1250 if Feedback signal of Mode Actuator has been detected over 4.9V for 0.3 seconds

DTC Detecting Condition

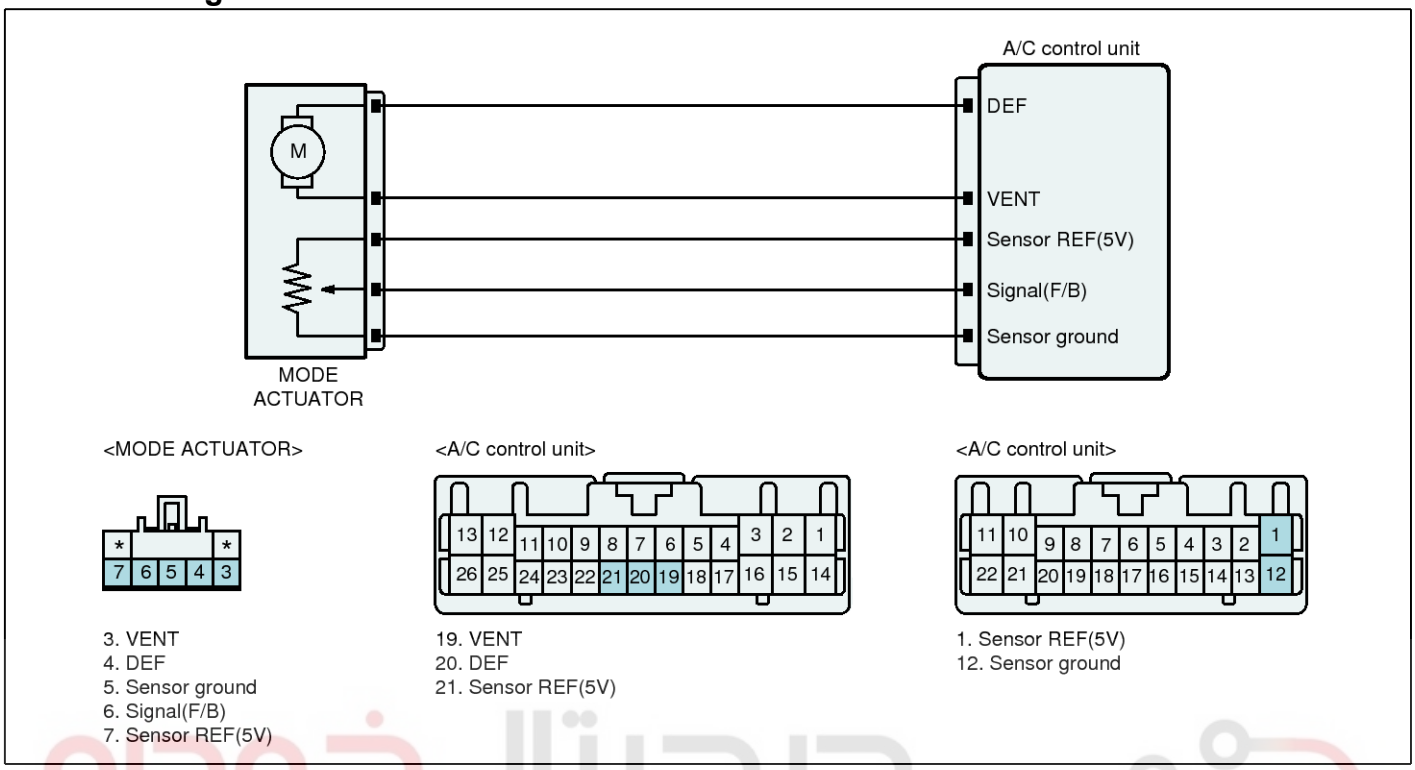
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Short in signal circuit(Feedback signal) • Faulty Mode Actuator • Faulty Air conditioner Control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal of Mode Actuator has been detected over 4.9V for 0.3 seconds	
Failsafe	• If the Mode actuator is placed at Vent mode right before fail detection, Actuator is operated and fixed to Vent Mode Postion. • In case of the others, Actuator is moved to DEF mode position	

Specification

※ Voltage value of potentiometer as a function of mode door position.

Mode Door Position	Voltage
VENT	0.3±0.15V
BI-LEVEL	1.4±0.4V
FLOOR	2.5±0.4V
MIX	3.6±0.4V
DEF	4.7±0.15V

DTC Detecting Condition



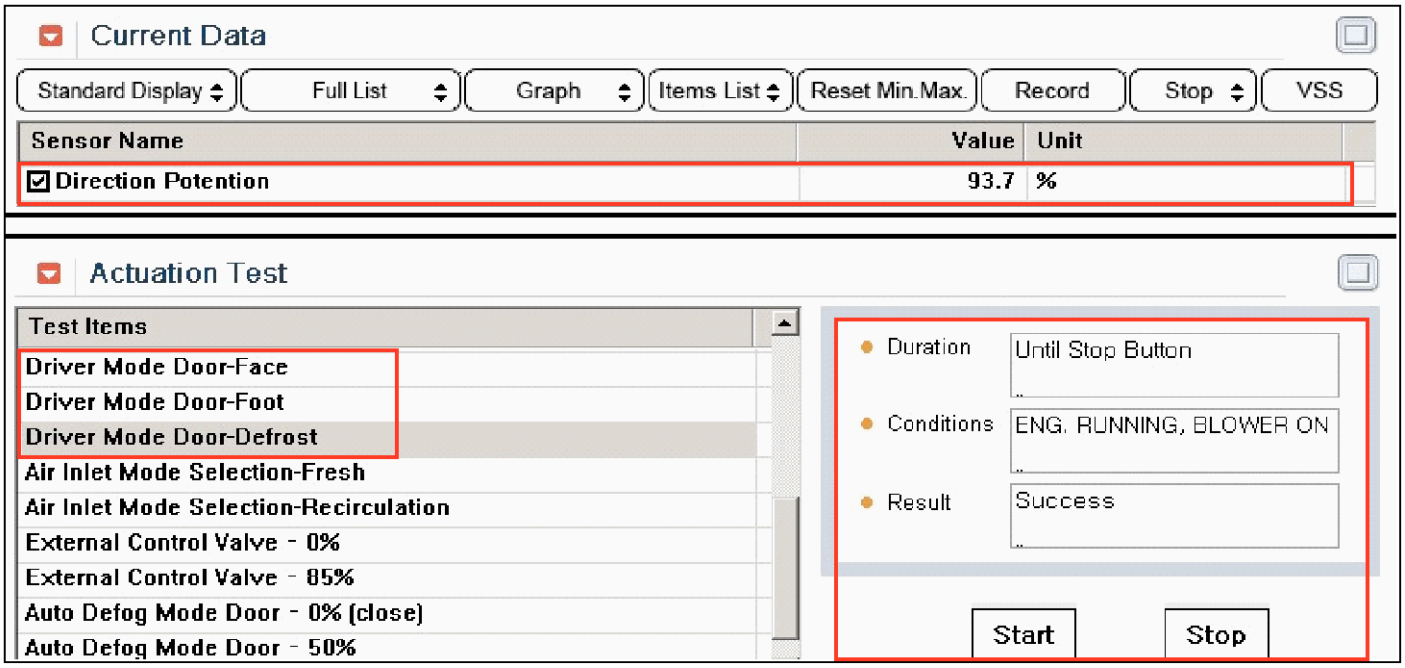
SBHHA9507L

Monitor Scantool data

■Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after engine starts.
3. Select and monitor "Direction Potention" parameter on scantool.
4. Select and perform Actuation test Driver Mode Door - Face / Foot / Defrost in order.
5. Check that the value of all the parameters are changed when performing the actuation test.

Specification : Face - About below 10%, Foot : About 50%, Defrost : About 90%.



SBHHA9606L

6. Are all the parameters changed when performing Actuation test ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF"
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Driver Direction actuator harness connector and chassis ground .

Specification : 0V

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection " procedure .

NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Driver Direction actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Driver Direction actuator

1. Ignition "OFF"
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Connect(+) terminal of battery to WARM(+) of Driver Direction actuator and (-) terminal to COOL(-). (Component side)
4. Verify that the temperature actuator operates to the cool position
5. Verify that the temperature actuator operates to the warm position with reverse connecting. (WARM(+) and COOL(-)). (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	ground	VENT.Mode
	ground	12 V	DEF.Mode

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Driver Direction actuator and check for proper operation. If the problem is corrected, replace Driver Direction actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect Driver Direction actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Driver Direction actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector. (Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Mode Door Position	Voltage
VENT	0.3±0.15V
BI-LEVEL	1.4±0.4V
FLOOR	2.5±0.4V
MIX	3.6±0.4V
DEF	4.7±0.15V

Fig.2) ※ Voltage value of Direction potentiometer as a function of position of mode switch

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Driver Direction actuator and check for proper operation. If the problem is corrected, replace Driver Direction actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

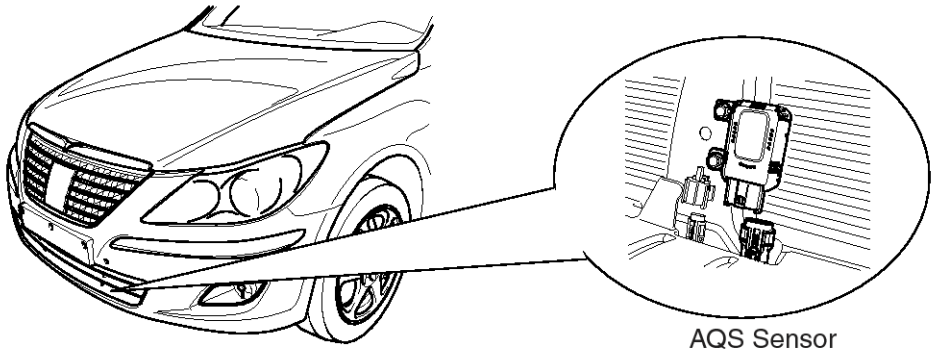
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1257 AQS Sensor Open

Componet Location



SBHHA8307N

General Description

AQS(Air Quality System) keeps air inside in the most suitable state for driver. In polluted area AQS detects hazardous gas and intercepts inflow automatically, Inversely, In fresh area it allows the inflow of air to prevent the shortage of air and the accumulation of carbon dioxide. AQS sensor is located at front side of condensor and once hazardous gas is detected, it delivers the voltage signal to ECU for closing intake door.

DTC Description

Air conditioner Control Module sets DTC B1257 if Feedback signal of AQS sensor has been detected over 4.9V for 0.3 seconds.

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor Connection in Harness • Open in signal circuit • Open in signal, Power or Ground Ciruit • Faulty AQS • Faulty Air conditioner Control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal of AQS sensor has been detected over 4.9V for 0.3 seconds.	
Failsafe	• AQS function OFF	

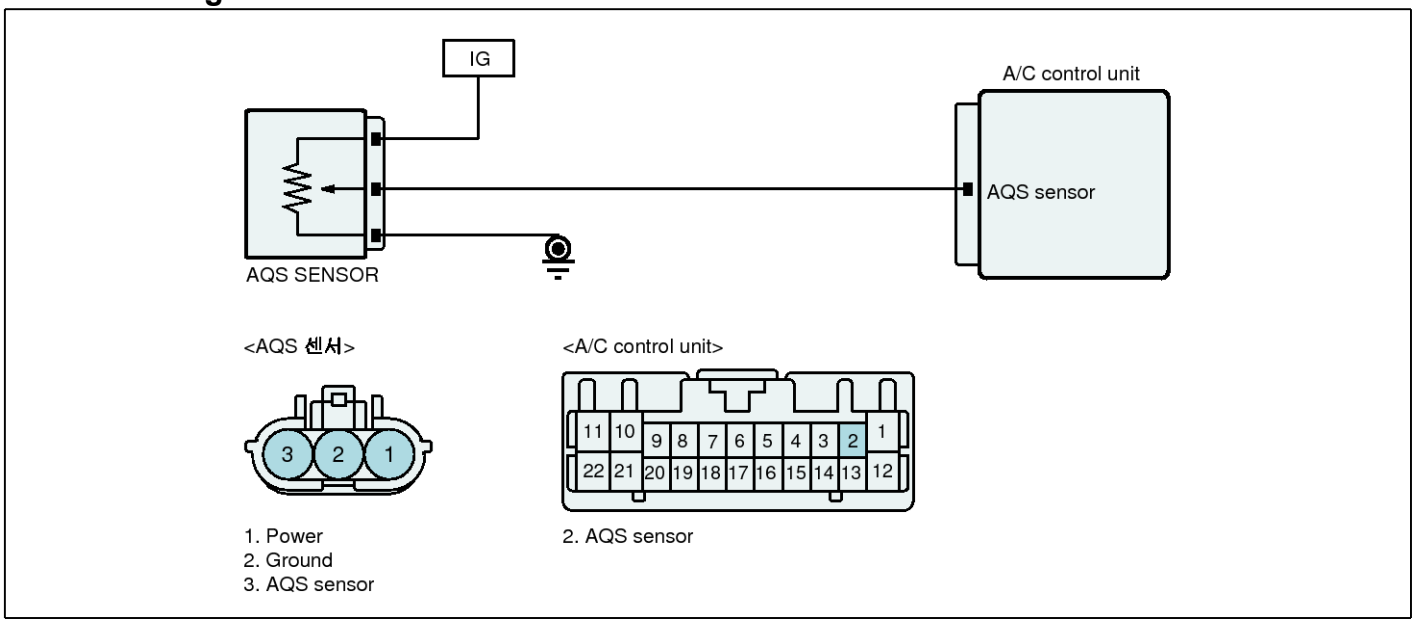
Specification

※ Voltage value of AQS sensor as a function of position of operating condition.

Operating condition	Voltage	Note
Right after IGN "ON"	2.5V ± 0.3V	Stay at Pre-Position
normal	4.3V ± 0.3V	Intake door : REC
Gas detected	0.9V ± 0.3V	Intake door : FRE

Preheating Time : (35 ± 2 sec.)

DTC Detecting Condition



SBHHA9508L

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after engine starts.
3. Select and monitor "AQS sensor" parameter on scantool.

Fig.1

SBHHA9607L

FIG.1) The current data in normal state.

4. Is the AQS sensor normal ?

YES ▶ Go to "Inspection and Repair" procedure.

NO ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check for open in harness

1. IG KEY OFF.
2. Disconnect AQS sensor and A/C control unit main harness connector.
3. Measure resistance between Sensor Signal terminal of AQS sensor harness connector and Sensor Signal terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Ground circuit Inspection " procedure .

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect AQS sensor and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of AQS sensor harness connector and chassis ground.

Specification : Infinity

4. Is the measured resistance within specification?

YES ▶ Go to " Power circuit Inspection " procedure .

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Power Circuit Inspection

■ Check power in harness

1. Ignition "OFF"
2. Disconnect AQS sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Power terminal of AQS sensor harness connector and chassis ground .

Specification : approx. 12V

5. Is the measured voltage within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check AQS sensor

1. Ignition "OFF"
2. Connect AQS sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of AQS sensor harness connector and chassis ground. (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Operating condition	Voltage	Note
Right after IGN "ON"	2.5V ± 0.3V	Stay at Pre-Position
normal	4.3V ± 0.3V	Intake door : REC
Gas detected	0.9V ± 0.3V	Intake door : FRE

Preheating Time : (35 ± 2sec)

FIG.1) ※ Voltage value of AQS sensor as a function of position of operating condition.

5. Is the measured voltage within specification?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good AQS sensor and check for proper operation. If the problem i s corrected, replace AQS sensor and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

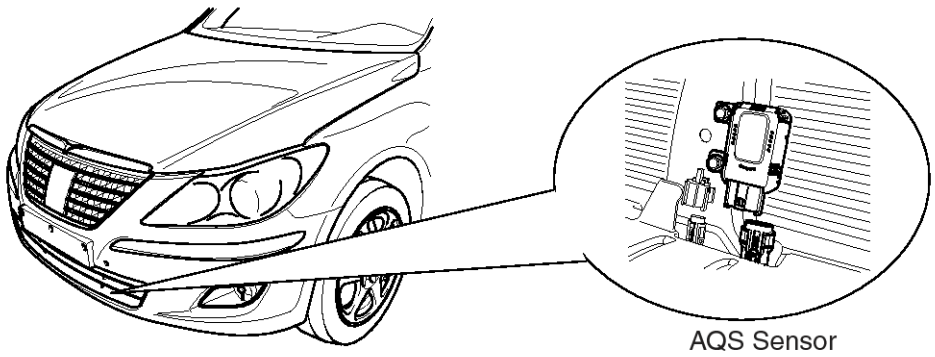
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1258 AQS Sensor Short

Componet Location



SBHHA8307N

General Description

AQS(Air Quality System) keeps air inside in the most suitable state for driver. In polluted area AQS detects hazardous gas and intercepts inflow automatically, Inversely, In fresh area it allows the inflow of air to prevent the shortage of air and the accumulation of carbon dioxide. AQS sensor is located at front side of condensor and once hazardous gas is detected, it delivers the voltage signal to ECU for closing intake door.

DTC Description

Air conditioner Control Module sets DTC B1258 if Feedback signal of AQS sensor has been detected below 0.1V for 0.3 seconds.

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor Connection in Harness • Short in circuit • Faulty AQS • Faulty Air conditioner Control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal of AQS sensor has been detected below 0.1V for 0.3 seconds.	
Failsafe	• AQS function OFF	

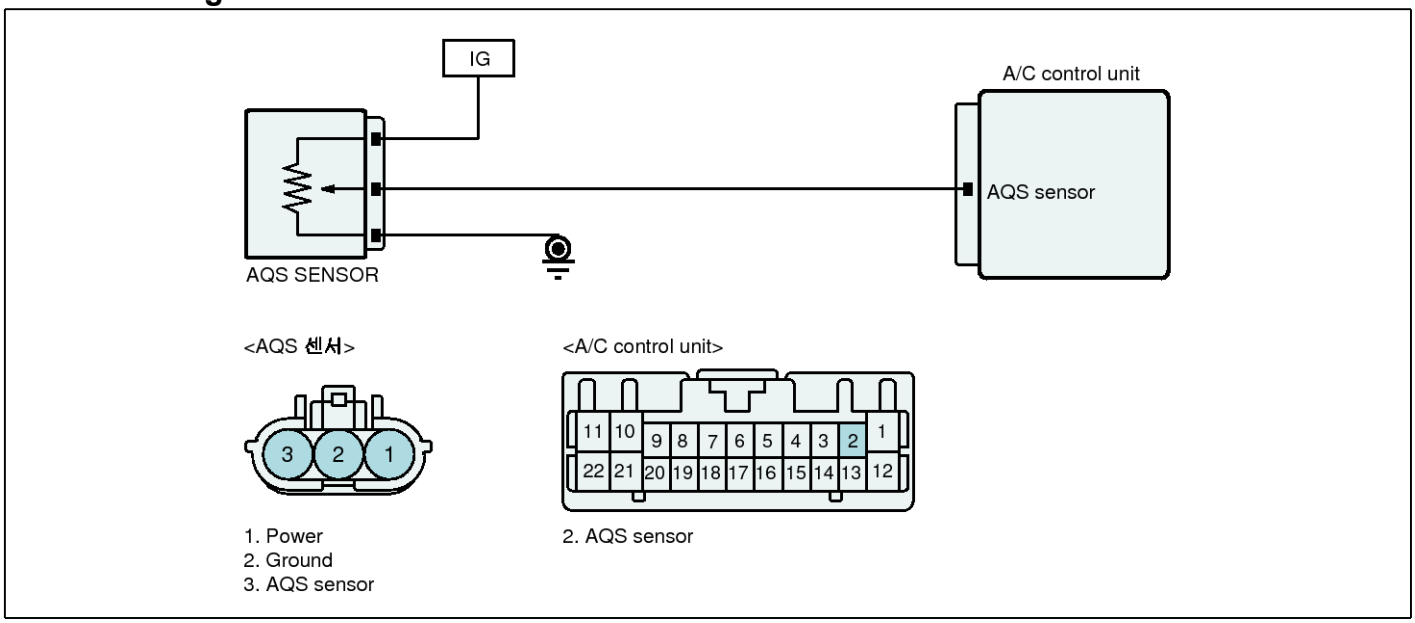
Specification

※ Voltage value of AQS sensor as a function of position of operating condition.

Operating condition	Voltage	Note
Right after IGN "ON"	2.5V ± 0.3V	Stay at Pre-Position
normal	4.3V ± 0.3V	Intake door : REC
Gas detected	0.9V ± 0.3V	Intake door : FRE

Preheating Time : (35 ± 2 sec.)

DTC Detecting Condition



SBHHA9508L

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after engine starts.
3. Select and monitor "AQS sensor" parameter on scantool.

Fig.1

SBHHA9607L

FIG.1) The current data in normal state.

4. Is the AQS sensor normal ?

YES ▶ Go to "Inspection and Repair" procedure.

NO ▶ This is a intermittent problem caused by po-or contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Power Circuit Inspection

■ Check power in harness

1. Ignition "OFF"
2. Disconnect AQS sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Power terminal of AQS sensor harness connector and chassis ground .

Specification : approx. 12V

5. Is the measured voltage within specification?

YES ▶ Go to " Signal circuit Inspection " procedure.

NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Signal Circuit Inspection

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect AQS sensor and A/C control unit main harness connector.
3. Measure resistance between Sensor signal terminal of AQS sensor harness connector and chassis ground.

Specification : Infinity

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure.

NO ▶ Check for short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check AQS sensor

1. Ignition "OFF"
2. Connect AQS sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of AQS sensor harness connector and chassis ground. (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Operating condition	Voltage	Note
Right after IGN "ON"	2.5V ± 0.3V	Stay at Pre-Position
normal	4.3V ± 0.3V	Intake door : REC
Gas detected	0.9V ± 0.3V	Intake door : FRE

Preheating Time : (35 ± 2sec)

FIG.1) ※ Voltage value of AQS sensor as a function of position of operating condition.

5. Is the measured voltage within specification?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good AQS sensor and check for proper operation. If the problem i s corrected, replace AQS sensor and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

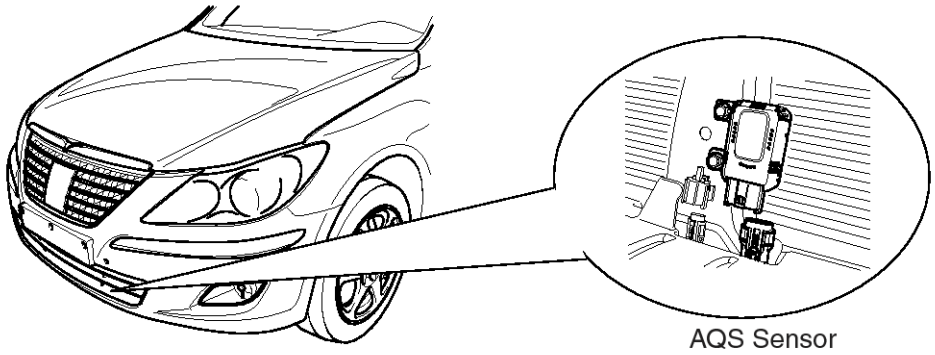
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1259 AQS Sensor Fault

Componet Location



SBHHA8307N

General Description

AQS(Air Quality System) keeps air inside in the most suitable state for driver. In polluted area AQS detects hazardous gas and intercepts inflow automatically, Inversely, In fresh area it allows the inflow of air to prevent the shortage of air and the accumulation of carbon dioxide. AQS sensor is located at front side of condensor and once hazardous gas is detected, it delivers the voltage signal to ECU for closing intake door.

DTC Description

Air conditioner Control Module sets DTC B1259 if The signal of AQS sensor has not been changed since IG Key is ON.

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Open or short in Power circuit • Faulty AQS • Faulty Air conditioner Control Module
Enable Conditions	• IG KEY ON	
Threshold value	• 40 seconds after IGN KEY On, No change at 2.5V for 1 5 seconds	
Failsafe	• AQS function OFF	

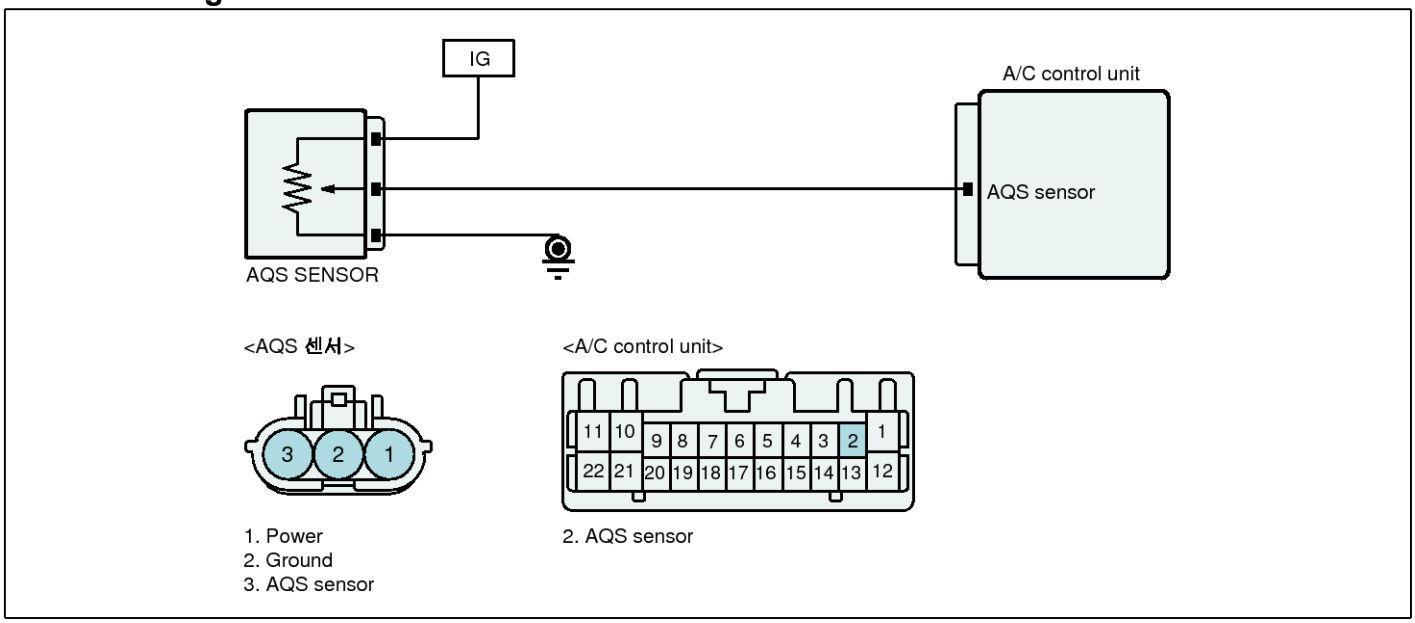
Specification

※ Voltage value of AQS sensor as a function of position of operating condition.

Operating condition	Voltage	Note
Right after IGN "ON"	2.5V ± 0.3V	Stay at Pre-Position
normal	4.3V ± 0.3V	Intake door : REC
Gas detected	0.9V ± 0.3V	Intake door : FRE

Preheating Time : (35 ± 2 sec.)

DTC Detecting Condition



SBHHA9508L

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after engine starts.
3. Select and monitor "AQS sensor" parameter on scantool.

Fig.1

SBHHA9607L

FIG.1) The current data in normal state.

4. Is the AQS sensor normal ?

YES ▶ Go to "Inspection and Repair" procedure.

NO ▶ This is a intermittent problem caused by po-or contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Power Circuit Inspection

■ Check power in harness

1. Ignition "OFF"
2. Disconnect AQS sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Power terminal of AQS sensor harness connector and chassis ground .

Specification : approx. 12V

5. Is the measured voltage within specification?

YES ▶ Go to " Signal circuit Inspection " procedure.

NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Signal Circuit Inspection

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect AQS sensor and A/C control unit main harness connector.
3. Measure resistance between Sensor signal terminal of AQS sensor harness connector and chassis ground.

Specification : Infinity

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure.

NO ▶ Check for short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check AQS sensor

1. Ignition "OFF"
2. Connect AQS sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of AQS sensor harness connector and chassis ground. (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Operating condition	Voltage	Note
Right after IGN "ON"	2.5V ± 0.3V	Stay at Pre-Position
normal	4.3V ± 0.3V	Intake door : REC
Gas detected	0.9V ± 0.3V	Intake door : FRE

Preheating Time : (35 ± 2sec)

FIG.1) ※ Voltage value of AQS sensor as a function of position of operating condition.

5. Is the measured voltage within specification?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good AQS sensor and check for proper operation. If the problem i s corrected, replace AQS sensor and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

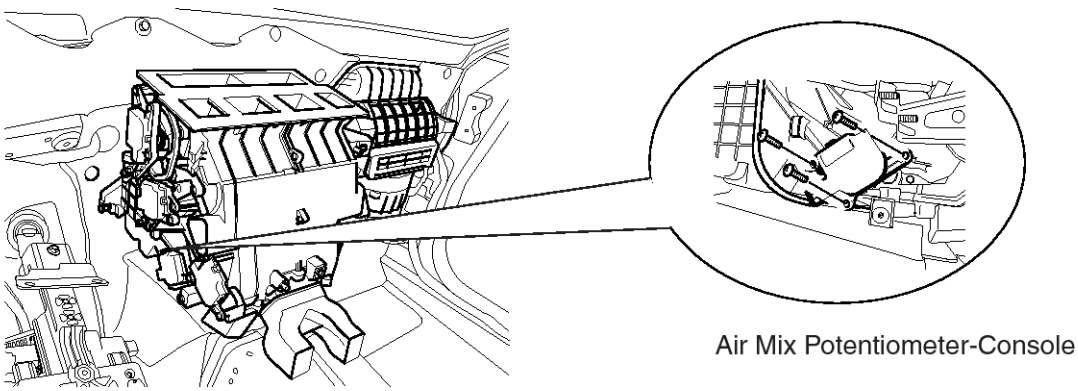
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1275 Air Mix Potentiometer-VENT Open (Low)–Console

Componet Location



SBHHA8308N

General Description

There are two(2) CONSOLE TEMPERATURE ACTUATOR which is controlled after calculating the three(3) signals from Console temperature control switch, Console Open/Close switch, Front Control panel set temperature.

DTC Description

Air conditioner Control Module sets DTC B1275 if The feedback signal of Console temperature actuator has been detected 0.1V for 0.3 seconds.

DTC Detecting Condition

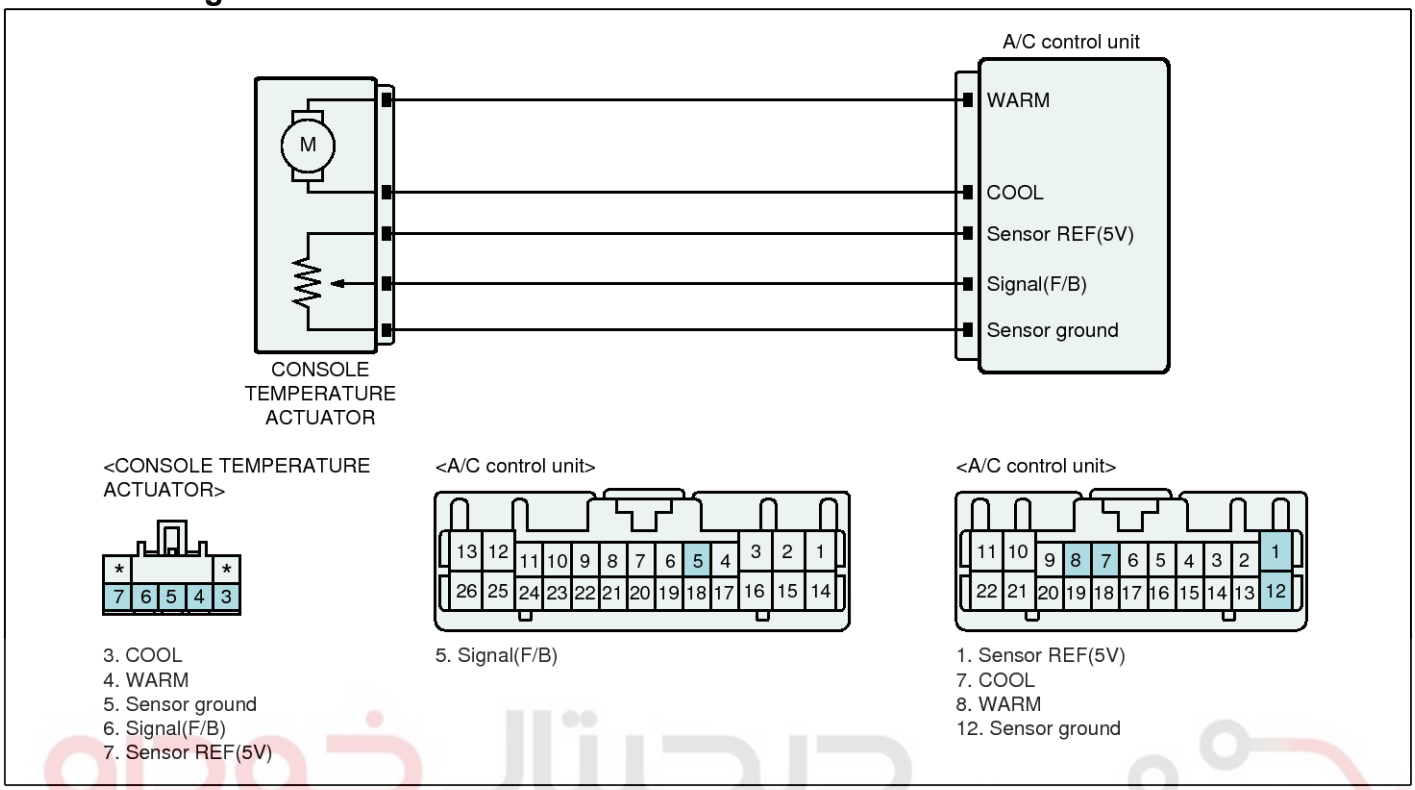
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor Connection in Harness • Open or Short in Signal(Feedback signal) Circuit • Open or Short in Power circuit • Faulty Console Temperature Actuator
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal has been detected open or below 0.1V for 0.3 seconds	
Failsafe	• -	

Specification

※ Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
COOL	1.18±0.15V
WARM	3.82±0.15V

DTC Detecting Condition



SBHHA9509L

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Console temp actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Console temp actuator harness connector and Signal(F/B) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to "Check short to ground in harness" as follows.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect Console temp actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Console temp actuator harness connector and chassis ground.

Specification : Infinity

4. Is the measured resistance within specification?

YES ▶ Go to "Power circuit Inspection " procedure.

NO ▶ Check for short to ground in control harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Power Circuit Inspection

■ Check power in harness

1. Ignition "OFF"
2. Disconnect Console temp actuator and Connect A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Sensor REF(5V) terminal of Console temp actuator harness connector and chassis ground .

Specification : approx. 5V

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection " procedure .

NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Console temp actuator and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Console temp actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Console temp actuator

1. Ignition "OFF"
2. Disconnect Console temp actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of Console temp actuator and (-) terminal to COOL(-). (Component side)
4. Verify that the temperature actuator operates to the cool position
5. Verify that the temperature actuator operates to the warm position with reverse connecting.(WARM(+) and COOL(-)) . (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	ground	Max.warm
	ground	12 V	Max.cool

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Console temp actuator and check for proper operation. If the problem is corrected, replace Console temp actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect Console temp actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Console temp actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector .(Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Door position	Voltage
COOL	1.18±0.15V
WARM	3.82±0.15V

Fig.2) ※ Voltage value of Console temp actuator as a function of position of mode switch

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Console temp actuator and check for proper operation. If the problem is corrected, replace Console temp actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

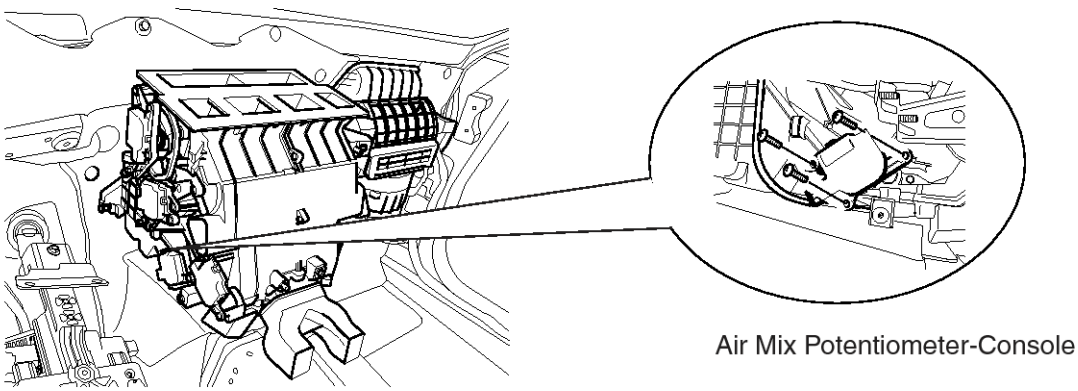
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1276 Air Mix Potentiometer VENT Short (High)–Console

Componet Location



SBHHA8308N

General Description

There are two(2) CONSOLE TEMPERATURE ACTUATOR which is controlled after calculating the three(3) signals from Console temperature control switch, Console Open/Close switch, Front Control panel set temperature.

DTC Description

Air conditioner Control Module sets DTC B1276 if The feedback signal of Console temperature actuator has been detected over 4.9V for 0.3 seconds.

DTC Detecting Condition

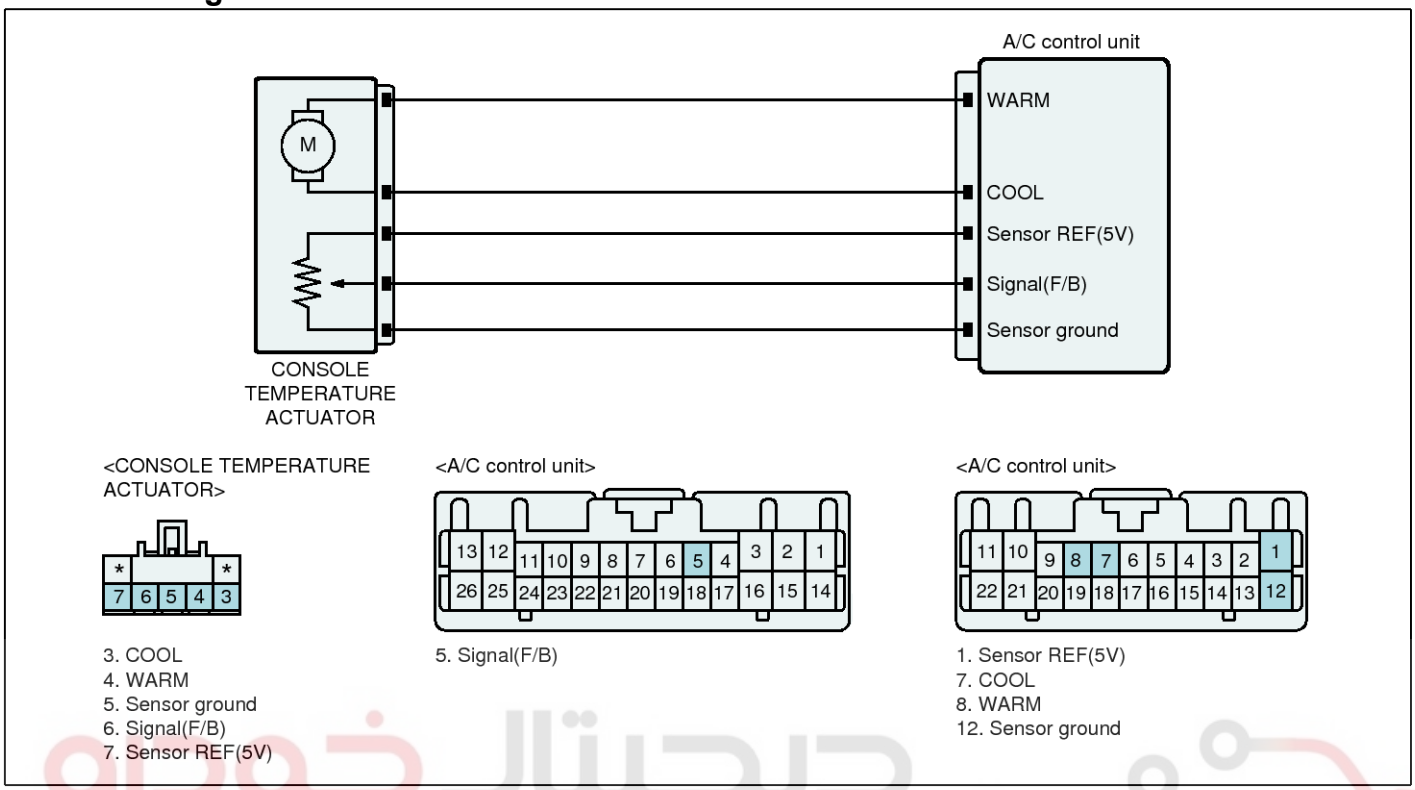
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Short to battery in Signal (Feedback Signal) Circuit • Open in Ground Circuit • Faulty Console Temperature Actuator
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal has been detected over 4.9V for 0.3 seconds	
Failsafe	• -	

Specification

※ Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
COOL	1.18±0.15V
WARM	3.82±0.15V

DTC Detecting Condition



SBHHA9509L

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF"
2. Disconnect Console temp actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Console temp actuator harness connector and chassis ground.

Specification : 0V

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection " procedure .

NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Console temp actuator and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Console temp actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Console temp actuator

1. Ignition "OFF"
2. Disconnect Console temp actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of Console temp actuator and (-) terminal to COOL(-). (Component side)
4. Verify that the temperature actuator operates to the cool position
5. Verify that the temperature actuator operates to the warm position with reverse connecting.(WARM(+) and COOL(-)) . (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	ground	Max.warm
	ground	12 V	Max.cool

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Console temp actuator and check for proper operation. If the problem is corrected, replace Console temp actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect Console temp actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Console temp actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector .(Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Door position	Voltage
COOL	1.18±0.15V
WARM	3.82±0.15V

Fig.2) ※ Voltage value of Console temp actuator as a function of position of mode switch

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Console temp actuator and check for proper operation. If the problem is corrected, replace Console temp actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

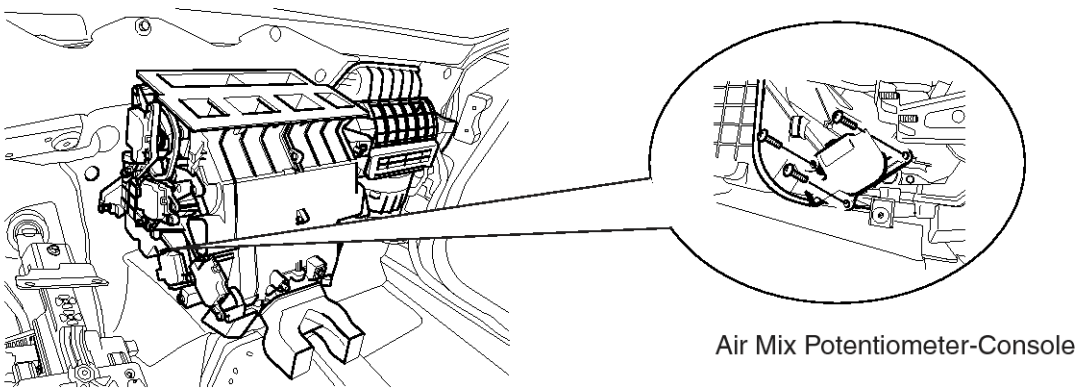
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1277 Air Mix Potentiometer-TEMP Open (Low)–Console

Componet Location



SBHHA8308N

General Description

There are two(2) CONSOLE TEMPERATURE ACTUATOR which is controlled after calculating the three(3) signals from Console temperature control switch, Console Open/Close switch, Front Control panel set temperature.

DTC Description

Air conditioner Control Module sets DTC B1277 if The feedback signal of Console temperature A actuator has been detected open or below 0.1V for 0.3 seconds.

DTC Detecting Condition

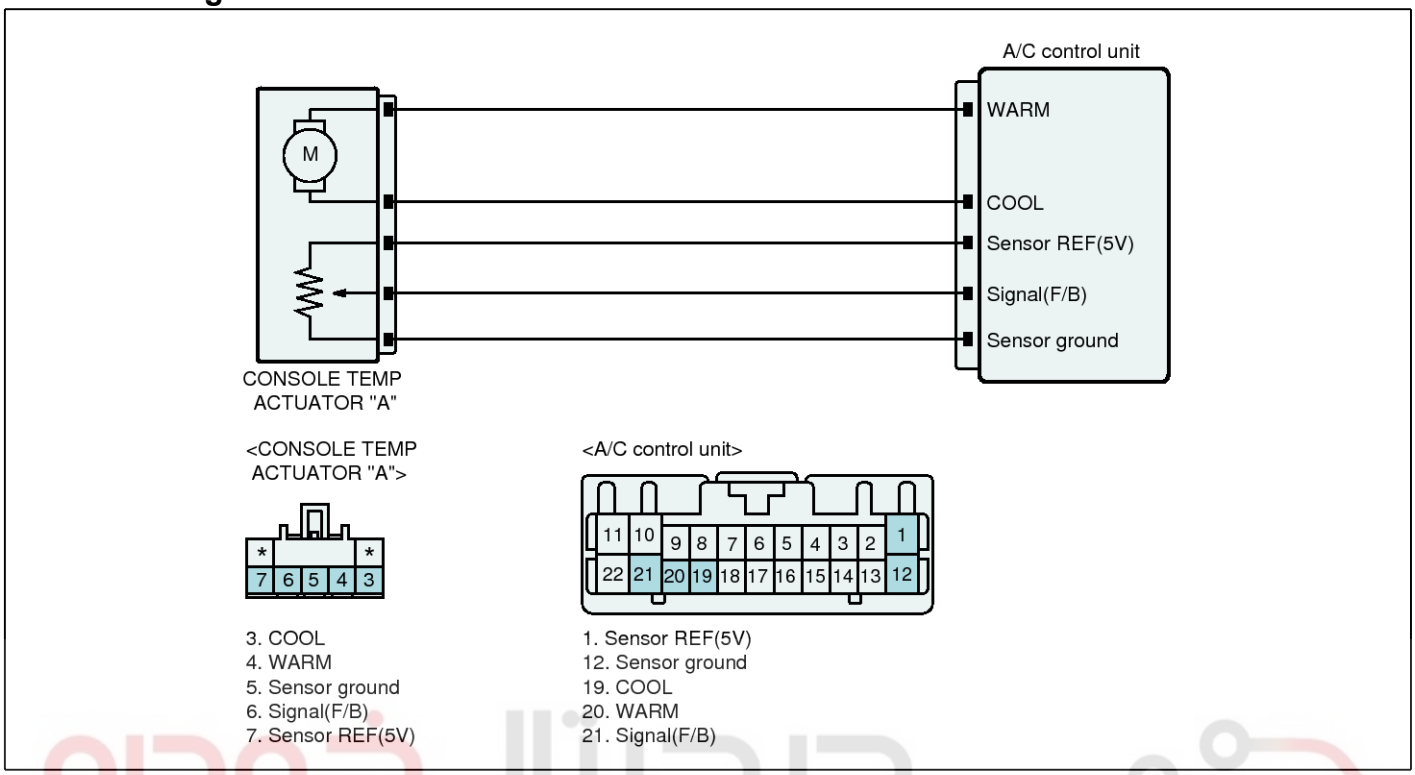
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor Connection in Harness • Open or short in Signal (Feed-back signal) circuit • Open or Short in power circuit • Faulty Console Temp A actuat-or
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal has been detected open or below 0.1V for 0.3 seconds	
Failsafe	• If Console Temp Switch votage is below 2.5V, Control Module moves fixes Actuator to Cool position. But, if it i s higher than 2.5V, Actuator is moved to and fixed at Warm Position	

Specification

※ Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
COOL	1.18±0.15V
WARM	3.82±0.15V

DTC Detecting Condition



SBHHA9510L

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Console temp actuator "A" and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Console temp actuator "A" harness connector and Signal(F/B) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to "Check short to ground in harness" as follows.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect Console temp actuator "A" and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Console temp actuator "A" harness connector and chassis ground .

Specification : Infinity

4. Is the measured resistance within specification?

YES ▶ Go to "Power circuit Inspection " procedure.

NO ▶ Check for short to ground in control harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Power Circuit Inspection

■ Check power in harness

1. Ignition "OFF"
2. Disconnect Console temp actuator "A" and Connect A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Sensor REF(5V) terminal of Console temp actuator "A" harness connector and chassis ground .

Specification : approx. 5V

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection " procedure .

NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Console temp actuator "A" and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Console temp actuator "A" harness connector and Sensor ground(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Console temp A_actuator

1. Ignition "OFF"
2. Disconnect Console temp actuator "A" and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of Console temp actuator "A" and (-) terminal to COOL(-). (Component side)
4. Verify that the temperature actuator operates to the cool position
5. Verify that the temperature actuator operates to the warm position with reverse connecting.(WARM(+) and COOL(-)) . (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	ground	Max.warm
	ground	12 V	Max.cool

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Console temp actuator "A" and check for proper operation. If the problem is corrected, replace Console temp actuator "A" and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect Console temp actuator "A" and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Console temp actuator "A" harness connector and Sensor ground(-) terminal of A/C-ECU harness connector .(Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Door position	Voltage
COOL	1.18±0.15V
WARM	3.82±0.15V

Fig.2) ※ Voltage value of Console temp actuator "A" as a function of position of mode switch

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Console temp actuator and check for proper operation. If the problem is corrected, replace Console temp actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

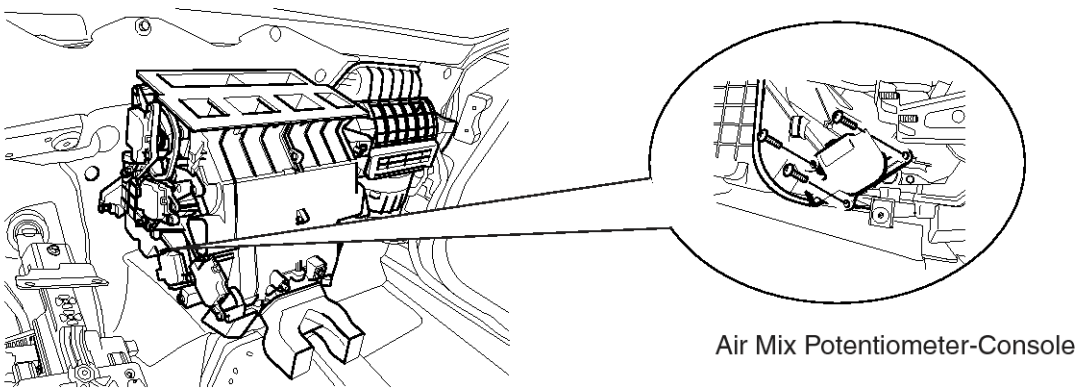
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1278 Air Mix Potentiometer-TEMP Short (High)–Console

Componet Location



SBHHA8308N

General Description

There are two(2) CONSOLE TEMPERATURE ACTUATOR which is controlled after calculating the three(3) signals from Console temperature control switch, Console Open/Close switch, Front Control panel set temperature.

DTC Description

Air conditioner Control Module sets DTC B1278 if The feedback signal of Console temperature A actuator has been detected over 4.9V for 0.3 seconds.

DTC Detecting Condition

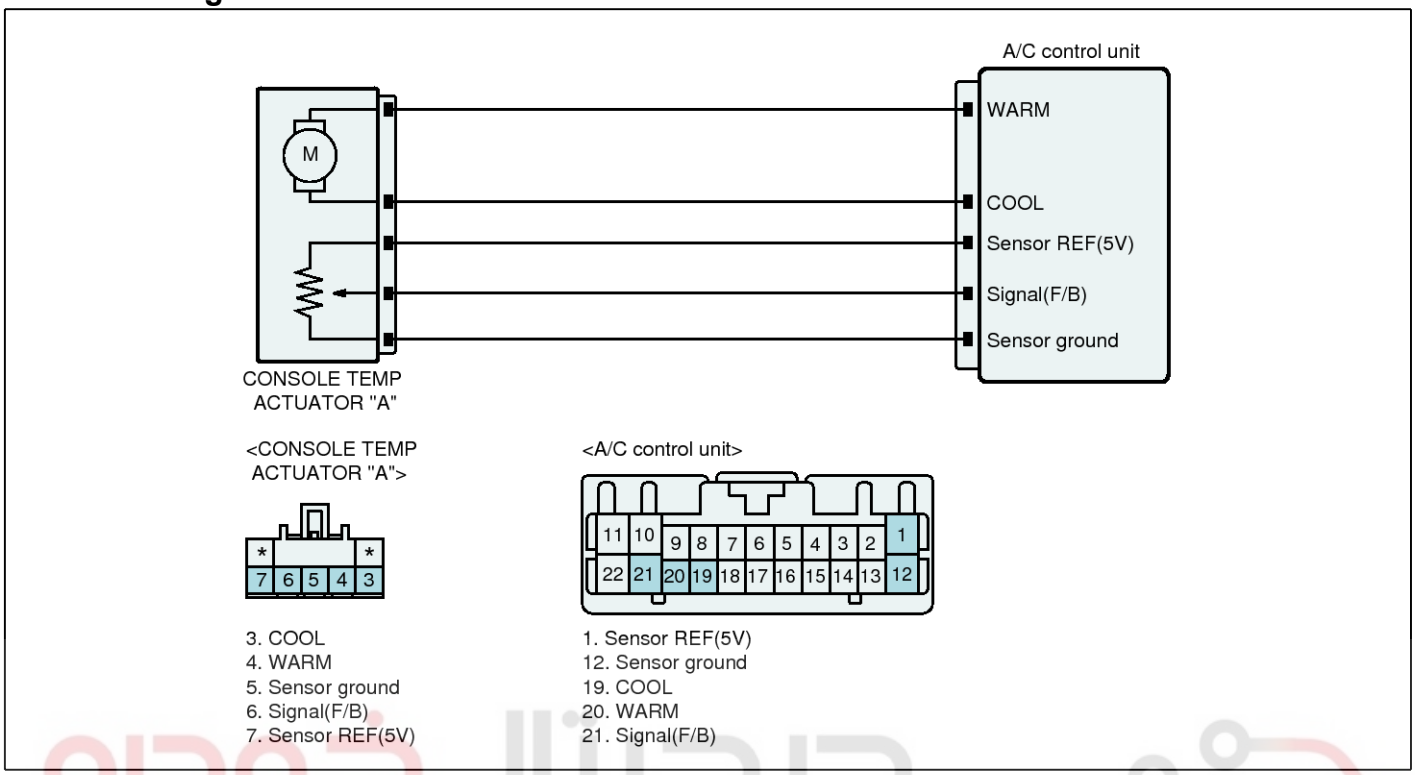
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Short to battery in signal(Feed-back Signal) Circuit • Open in ground Circuit • Faulty Console Temp. A actua-tor
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal has been detected over 4.9V for 0.3 s-econds	
Failsafe	• If Console Temp Switch votage is below 2.5V, Control Module moves fixes Actuator to Cool position. But, if it i s higher than 2.5V, Actuator is moved to and fixed at Warm Position	

Specification

※ Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
COOL	1.18±0.15V
WARM	3.82±0.15V

DTC Detecting Condition



SBHHA9510L

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF"
2. Disconnect Console temp actuator "A" and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Console temp actuator "A" harness connector and chassis ground .

Specification : 0V

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection " procedure .

NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Console temp actuator "A" and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Console temp actuator "A" harness connector and Sensor ground(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Console temp A_actuator

1. Ignition "OFF"
2. Disconnect Console temp actuator "A" and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of Console temp actuator "A" and (-) terminal to COOL(-). (Component side)
4. Verify that the temperature actuator operates to the cool position
5. Verify that the temperature actuator operates to the warm position with reverse connecting.(WARM(+) and COOL(-)) . (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	ground	Max.warm
	ground	12 V	Max.cool

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Console temp actuator "A" and check for proper operation. If the problem is corrected, replace Console temp actuator "A" and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect Console temp actuator "A" and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Console temp actuator "A" harness connector and Sensor ground(-) terminal of A/C-ECU harness connector .(Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Door position	Voltage
COOL	1.18±0.15V
WARM	3.82±0.15V

Fig.2) ※ Voltage value of Console temp actuator "A" as a function of position of mode switch

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Console temp actuator and check for proper operation. If the problem is corrected, replace Console temp actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1279 Air Mix Switch Potentiometer Open (Low)–Console

General Description

Console temperature control switch is for controlling rear seat vent temperature. If the switch is controlled to warm position(Red Box direction), The vent air temperature is high. If switch is moved to Cool(Blue box direction), The vent air temperature is low.

DTC Description

Air conditioner Control Module sets DTC B1279 if Console temperature Actuator and Switch signal has been detected below 0.1V for 0.3 seconds.

DTC Detecting Condition

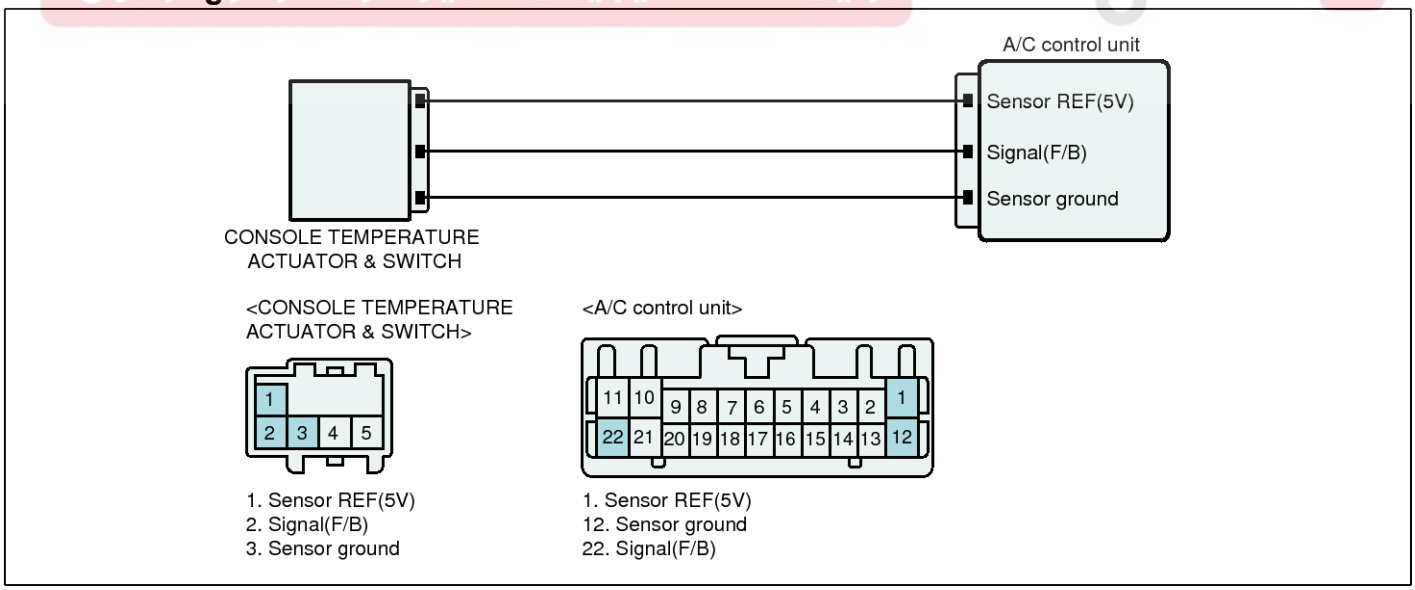
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor Connection in Harness • Open or Short in Console temperature actuator and sensor • Faulty Console temperature actuator and sensor • Faulty Air conditioner Control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback Signal has been detected open or below 0.1 V for 0.3 seconds.	
Failsafe	• If Switch voltage is below 0.1V, substituted Switch as Cool value. • If Switch voltage is over 4.9V, substituted switch as Warm value	

Specification

※ **Voltage changes according to Console switch position**

Console Switch	Voltage
COOL	0.3±0.15V
WARM	4.7±0.15V

DTC Detecting Condition



SBHHA9511L

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine starts
3. Check that the value of Console temperature actuator and switch is changable according to changing dircetion with switch.

Specification : 1.COOL Position : About below 5.5%.
2.Warm Position : About 90%.

SBHHA9608L

4. Is the value of the Console air mix switch potentiometer normal ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection and Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Console temperature actuator & Switch and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Console temperature actuator & Switch harness connector and Signal(F/B) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to "Check short to ground in harness" as follows.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect Console temperature actuator & Switch and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Console temperature actuator & Switch harness connector and chassis ground.

Specification : Infinity

4. Is the measured resistance within specification?

YES ▶ Go to "Power circuit Inspection " procedure.

NO ▶ Check for short to ground in control harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Power Circuit Inspection

■ Check power in harness

1. Ignition "OFF"
2. Disconnect Console temperature actuator & Switch and Connect A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Sensor REF(5V) terminal of Console temperature actuator & Switch harness connector and chassis ground .

Specification : approx. 5V

5. Is the measured voltage within specification?

YES ▶ Go to " Component inspection " procedure.

NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check potentiometer

1. Ignition "OFF"
2. Connect Console temperature actuator & Switch and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Console temperature actuator & Switch harness connector and Sensor ground(-) terminal of A/C-ECU harness connector .(Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Console Switch	Voltage
COOL	0.3±0.15V
WARM	4.7±0.15V

Fig.1) ※ Voltage changes according to Console temperature control switch position

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Console temperature actuator & Switch and check for proper operation. If the problem is corrected, replace Console temperature actuator & Switch and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1280 Air Mix Switch Potentiometer Short (High)–Console

General Description

Console temperature control switch is for controlling rear seat vent temperature. If the switch is controlled to warm position(Red Box direction), The vent air temperature is high. If switch is moved to Cool(Blue box direction), The vent air temperature is low.

DTC Description

Air conditioner Control Module sets DTC B1240 if Console temperature Actuator and Switch has been detected over 4.9V for 0.3 seconds.

DTC Detecting Condition

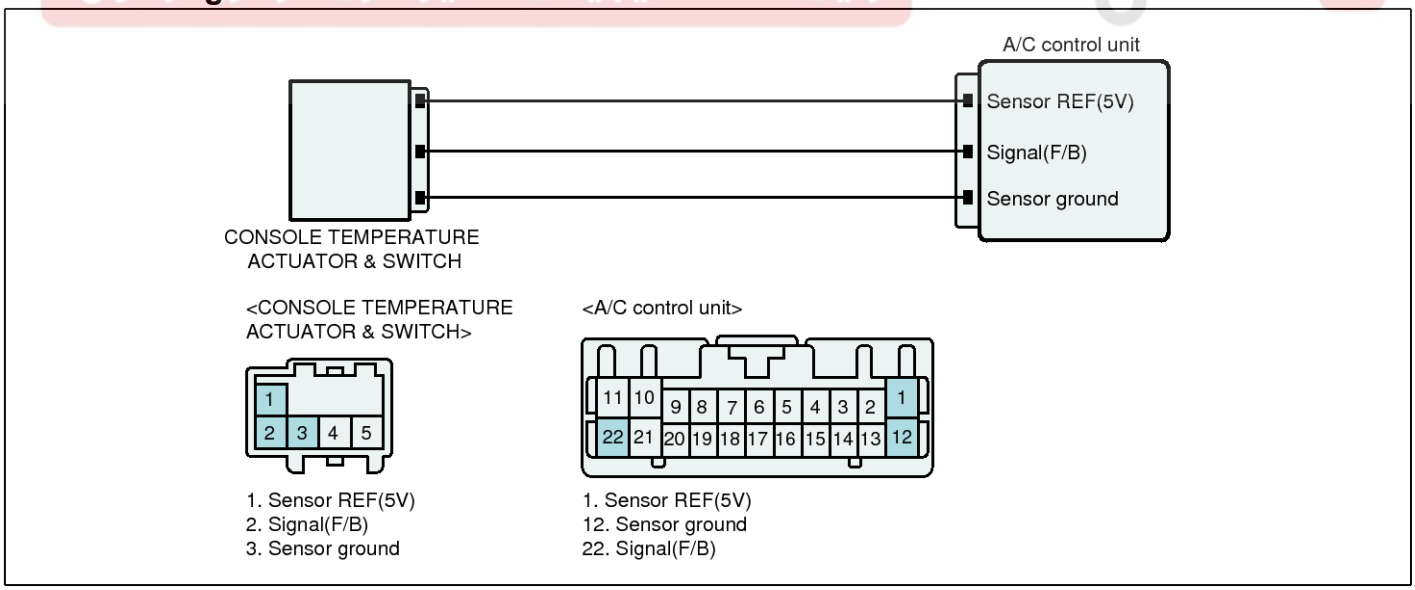
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor Connection in harness • Open in signal circuit • Shrot to battery in signal circuit • Faulty Console temperature actuator and sensor • Faulty Air conditioner Control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Console temperature Actuator and Switch has been detected over 4.9V for 0.3 seconds	
Failsafe	• If Switch voltage is below 0.1V, substituted Switch as Cool value. • If Switch voltage is over 4.9V, substituted switch as Warm value	

Specification

※ Voltage changes according to Console switch position

Console Switch	Voltage
COOL	0.3±0.15V
WARM	4.7±0.15V

DTC Detecting Condition



SBHHA9511L

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine starts
3. Check that the value of Console temperature actuator and switch is changable according to changing dircetion with switch.

Specification : 1.COOL Position : About below 5.5%.
2.Warm Position : About 90%.

SBHHA9608L

4. Is the value of the Console air mix switch potentiometer normal ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection and Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF"
2. Disconnect Console temperature actuator & Switch and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Console temperature actuator & Switch harness connector and chassis ground.

Specification : approx. 0V

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection " procedure .

NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Console temperature actuator & Switch and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Console temperature actuator & Switch harness connector and Sensor ground(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check potentiometer

1. Ignition "OFF"
2. Connect Console temperature actuator & Switch and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Console temperature actuator & Switch harness connector and Sensor ground(-) terminal of A/C-ECU harness connector .(Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Console Switch	Voltage
COOL	0.3±0.15V
WARM	4.7±0.15V

Fig.1) ※ Voltage changes according to Console temperature control switch position

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Console temperature actuator & Switch and check for proper operation. If the problem is corrected, replace Console temperature actuator & Switch and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

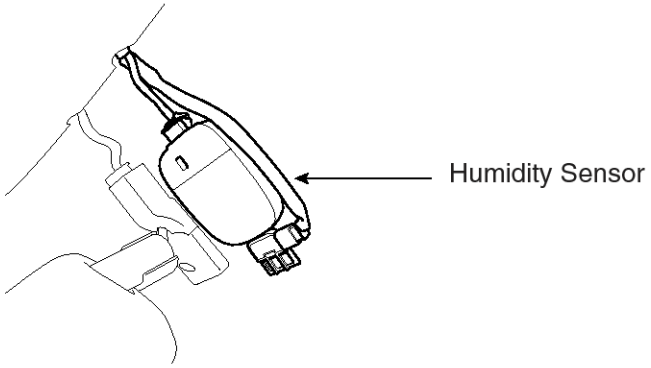
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1281 Humidity Sensor Short (Low) – AUTO Defog

Componet Location



SBHHA8310N

General Description

Auto defogger sensor is installed on front window glass. Auto defogger sensor judges and sends signal for the occurance of moisture in advance of blowing out the wind for defogging. Air conditioner control module receives signal from auto defogger and performs restraining moisture and eliminating in advance with automatically controlling Intake actuator, A/C, Defogger actuator, Blower motor rpm, Mode actuator.

DTC Description

Air conditioner Control Module sets DTC B1281 if The signal from auto defogger sensor has been detected short to ground in ground circuit for 2 seconds.

DTC Detecting Condition

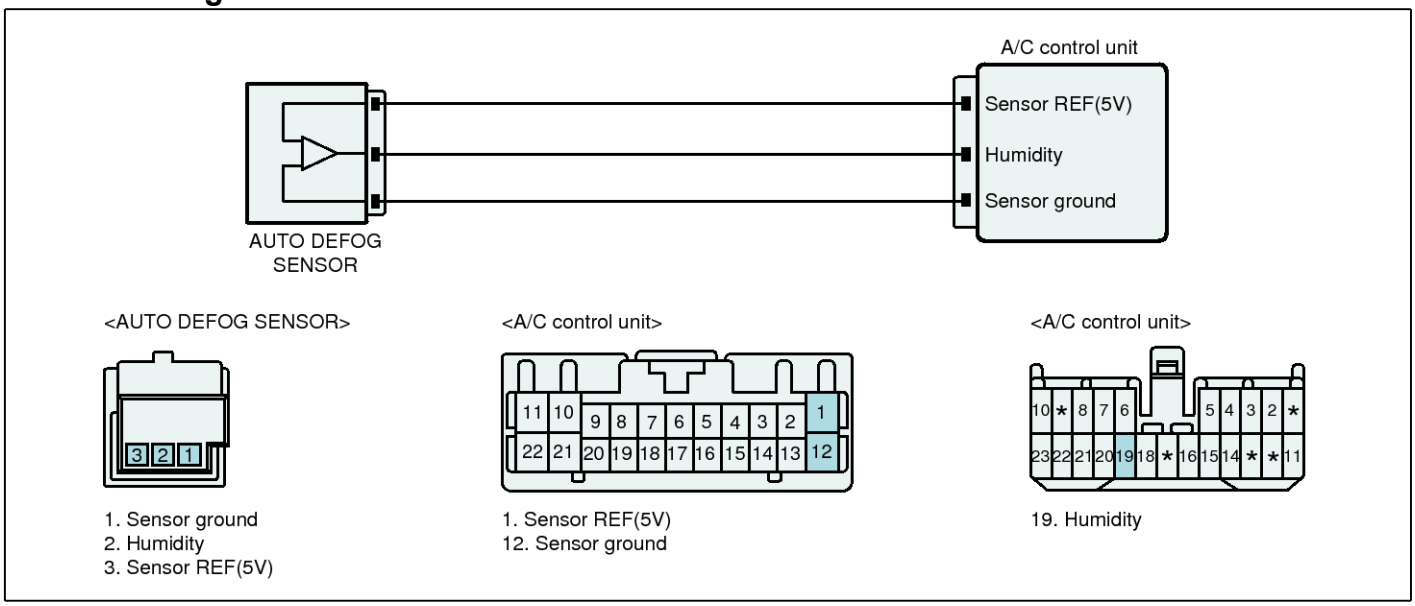
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor connection in harness • Open or short in signal circuit • Open or short in power circuit • Faulty Auto defogger sensor a-ctuator • Faulty Air conditioner Control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Short to ground in signal circuit for 2 seconds	
Failsafe	• Air Conditioner Control Module Controls humidity as 0 %	

Specification

※ Hz of Defogger sensor according to Humidity

(%RH)	(Hz)	(%RH)	(Hz)
0	37.19	60	34.8
20	36.4	80	34
40	35.6	100	33.2

DTC Detecting Condition



SBHHA9512L

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine starts
3. Select and monitor "Auto defogger humidity sensor" parameter on scantool.

Fig.1

SBHHA9609L

Fig.1) If the DTC related auto defogger sensor is set, Air conditior control Module regards and controls humidity as 0%.

4. Is the defogger sensor normal ?

YES ▶ Go to "Inspection & Repair" procedure.

NO ▶ This is a intermittent problem caused by po-or contact of component or Control Unit
▶ Thoroughly check the looseness, poor conn-ection, bent, corrison, contamination, deformat-ion or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Power Circuit Inspection

■ Check power in harness

1. Ignition "OFF"
2. Disconnect Auto Defog sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Power terminal of Auto Defog sensor harness connector and chassis ground .

Specification : approx. 5V

5. Is the measured voltage within specification?

YES ▶ Go to " Signal circuit Inspection " procedure .

NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Signal Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Auto Defog sensor and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Auto Defog sensor harness connector and chassis ground .

Specification : Infinity

4. Is the measured resistance within specification?

YES ▶ Go to "Check for open in harness" as follows.

NO ▶ Check for short to ground in control harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Auto Defog sensor and A/C control unit main harness connector.
3. Measure resistance between Sensor Signal terminal of Auto Defog sensor harness connector and Sensor Signal terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Auto Defog sensor

1. Connect scantool with Diagnostic Connector.
2. Warm up the engine to normal temperature after engine starts.
3. Select and monitor "Auto defogger sensor" parameter with scantool.
4. Check frequency or the value of auto Defog sensor is changed on the scantool by increasing or decreasing humidity near the defog sensor

Specification : Refer the specifications in Fig.1)

SBHHA9613L

Fig.1)

(%RH)	(Hz)	(%RH)	(Hz)
0	37.19	60	34.8
20	36.4	80	34
40	35.6	100	33.2

Fig.1) ※ The frequency of auto defog sensor according to the humidity

5. Is the measured value within the specification ?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Auto Defog sensor and check for proper operation. If the problem is corrected, replace Auto Defog sensor and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

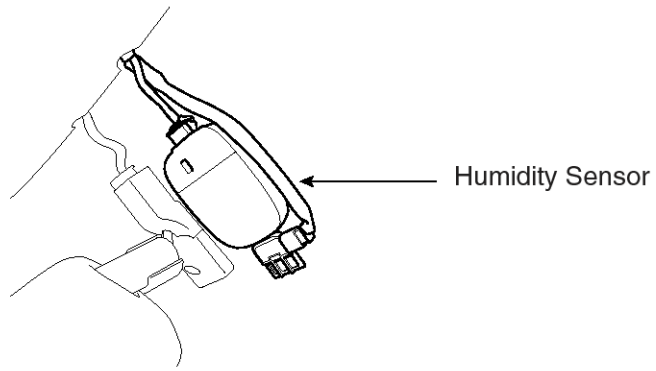
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1282 Humidity Sensor Open (High) - AUTO Defog

Componet Location



SBHHA8310N

General Description

Auto defogger sensor is installed on front window glass. Auto defogger sensor judges and sends signal of the occurance of moisture in advance of blowing out the wind for defogging. Air conditioner control module receives signal from auto defogger and performs restraining moisture and eliminating in advance with automatically controlling Intake actuator, A/C, Defogger actuator, Blower motor rpm, Mode actuator.

DTC Description

Air conditioner Control Module sets DTC B1282 if The signal from auto defogger sensor has been detected open for 2 seconds.

DTC Detecting Condition

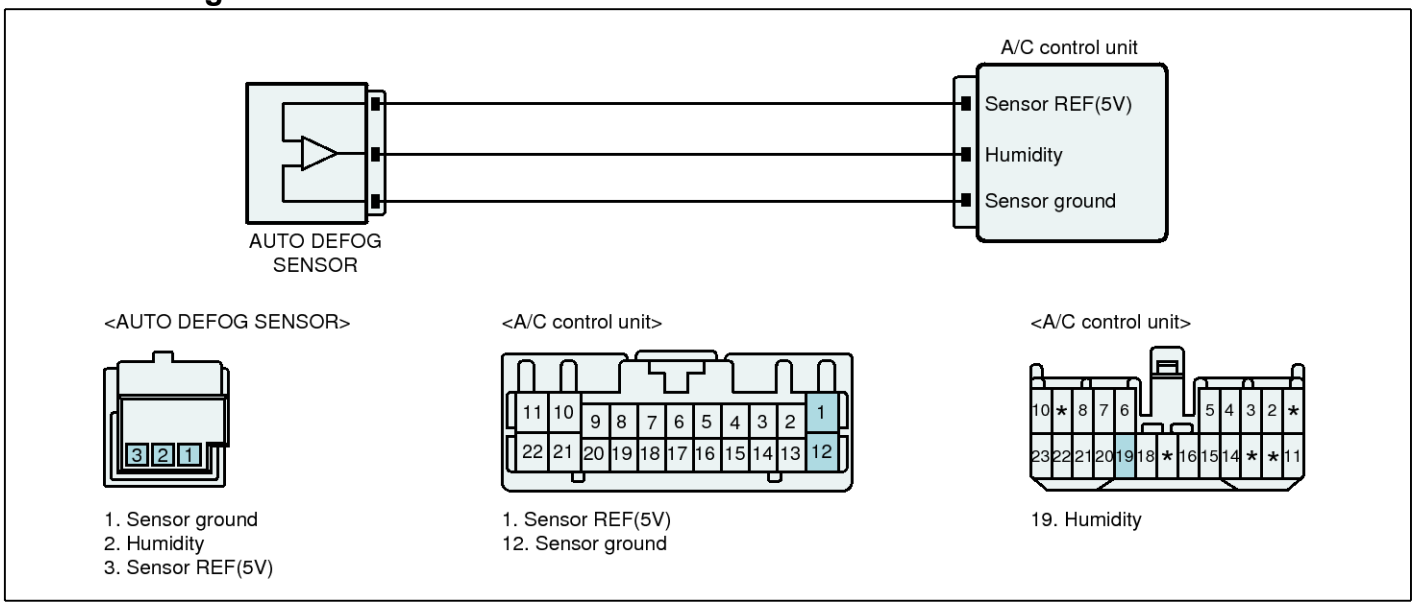
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor connection in harness • Short in signal circuit • Faulty Auto Defog sensor • Faulty Air conditioner Control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Open for 2 seconds	
Failsafe	• Air Conditioner Control Module Controls humidity as 0 %	

Specification

※ Hz of Defogger sensor according to Humidity

(%RH)	(Hz)	(%RH)	(Hz)
0	37.19	60	34.8
20	36.4	80	34
40	35.6	100	33.2

DTC Detecting Condition



SBHHA9512L

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine starts
3. Select and monitor "Auto defogger humidity sensor" parameter on scantool.

Fig.1

SBHHA9609L

Fig.1) If the DTC related auto defogger sensor is set, Air conditior control Module regards and controls humidity as 0%.

4. Is the defogger sensor normal ?

YES ▶ Go to "Inspection & Repair" procedure.

NO ▶ This is a intermittent problem caused by po-or contact of component or Control Unit
▶ Thoroughly check the looseness, poor conn-ection, bent, corrison, contamination, deformat-ion or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF"
2. Disconnect Auto Defog sensor and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal terminal of Auto Defog sensor harness connector and chassis ground .

Specification : approx. 0V

5. Is the measured voltage within specification?

YES ▶ Go to "Check for open in harness" as follows.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Auto Defog sensor and A/C control unit main harness connector.
3. Measure resistance between Sensor Signal terminal of Auto Defog sensor harness connector and Sensor Signal terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Auto Defog sensor

1. Connect scantool with Diagnostic Connector.
2. Warm up the engine to normal temperature after engine starts.
3. Select and monitor "Auto defogger sensor" parameter with scantool.
4. Check frequency or the value of auto Defog sensor is changed on the scantool by increasing or decreasing humidity near the defog sensor

Specification : Refer the specifications in Fig.1)

SBHHA9613L

Fig.1)

(%RH)	(Hz)	(%RH)	(Hz)
0	37.19	60	34.8
20	36.4	80	34
40	35.6	100	33.2

Fig.1) ※ The frequency of auto defog sensor according to the humidity

5. Is the measured value within the specification ?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Auto Defog sensor and check for proper operation. If the problem is corrected, replace Auto Defog sensor and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

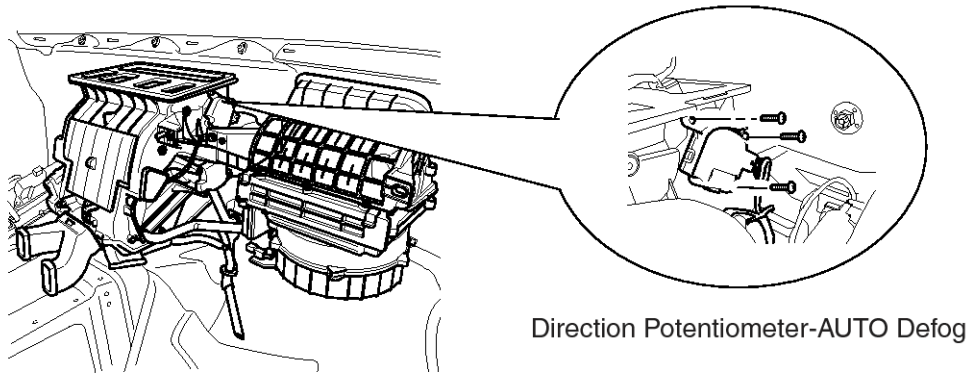
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1283 Direction Potentiometer Open (Low) - AUTO Defog

Componet Location



SBHHA8311N

General Description

Auto defogger sensor is installed on front window glass. For safety driving, Auto defogger sensor judges and sends signal of the occurance of moisture in advance of blowing out the wind for defogging with improvement of visiablilty and comfort.

While controlling the temperature and Mode(direction of wind) set by driver, if the humidity is higher than certain level, Air condtioner control Module automatically controls auto defogging mode. Air conditioner control module changes to go back to the previous driver set mode, if the humidity is decreased.

Air conditioner control Module automatically controls Intake actuator, A/C, Defogger actuator, Blower motor rpm, Mode actuator in accordance with the amount of humidity on the front glass.

DTC Description

Air conditioner Control Module sets DTC B1283 if The signal from auto defogger sensor has been detected 0.1V for 0.3 seconds.

DTC Detecting Condition

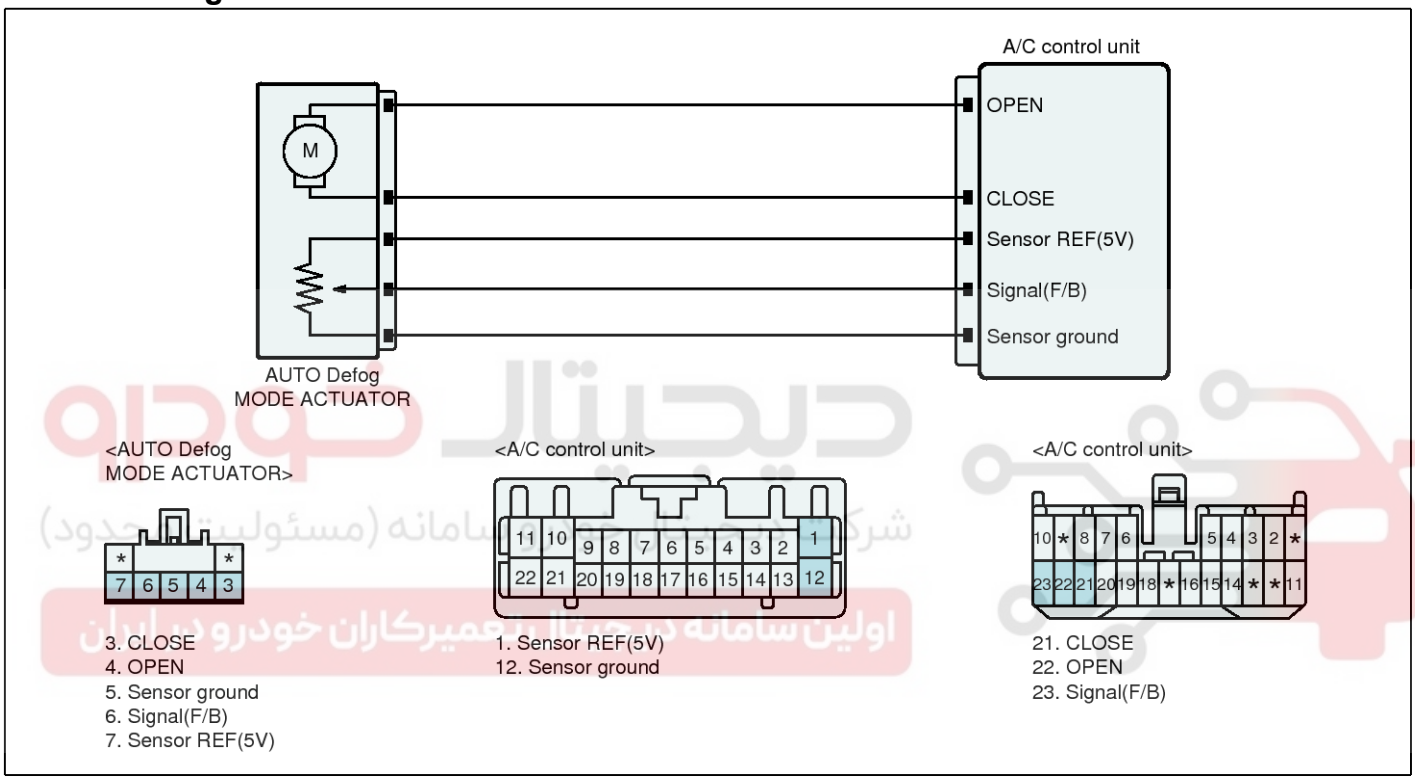
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor Contact in harness • Open or short in signal (Feedback signal) circuit • Open or short in power circuit • Faulty Auto defogger actuator • Faulty Air conditioner control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal has been detected open or below 0.1V for 0.3 seconds	
Failsafe	• If selected Mode was VENT, it is moved and fixed at Close position • If the others mode, it is moved and fixed at Open position	

Specification

※ Voltage output according to Actuator position

Door position	Voltage
CLOSE(VENT, B/L)	About 4.7V
FLOOR	About 3.94V
MIX	About 3.29V
OPEN(DEF)	About 1V

DTC Detecting Condition



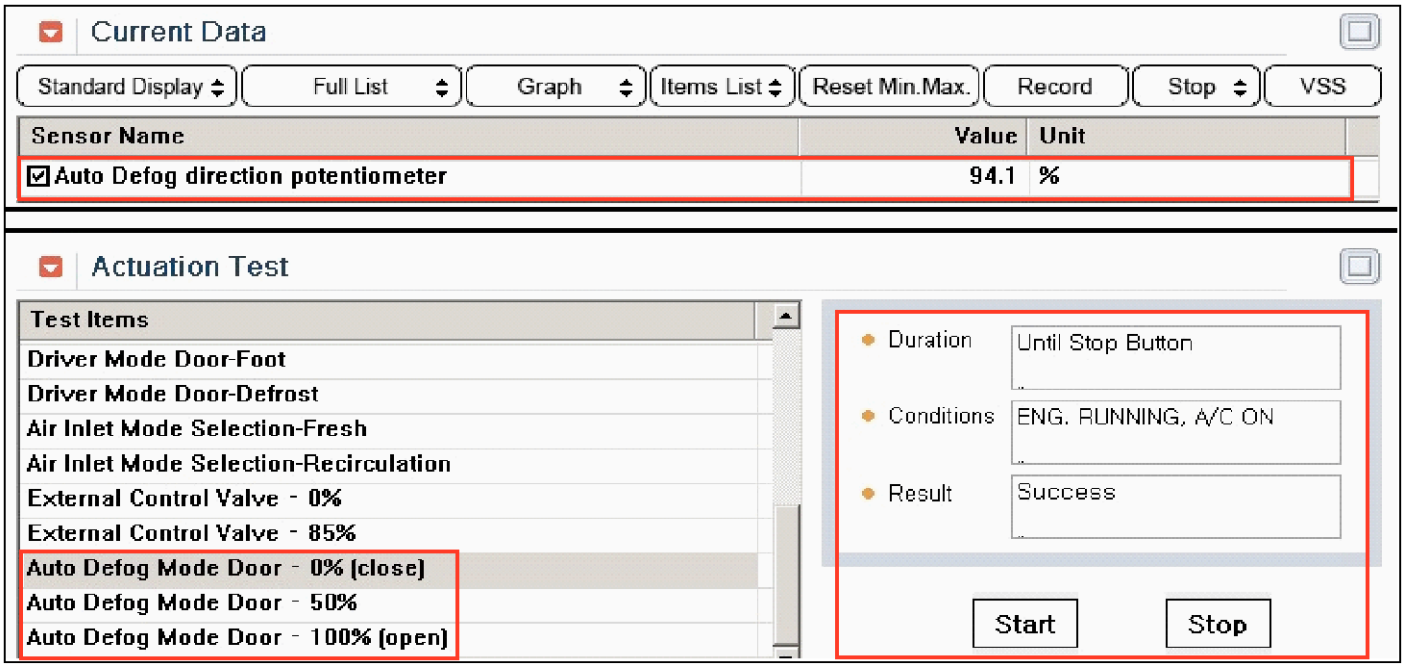
SBHHA9513L

Monitor Scantool data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine start
3. Select and monitor "Auto defoger mode direction potentioner" parameter on current data
4. Perform Actuation Test for "Auto Defoger Mode Door -0%(close)/50%/100%(open)" in order.
5. Check that the value of auto defoger mode actuator is changed with performing actuation test.

Specification : 0%(close) : About 90%, 50% : About 55%, 100%(open) : About 20%.



SBHHA9610L

6. Does the value of auto defoger mode actuator follow the specification ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Auto Defog actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Auto Defog actuator harness connector and Signal(F/B) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to "Check short to ground in harness" as follows.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect Auto Defog actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Auto Defog actuator harness connector and chassis ground .

Specification : Infinity

4. Is the measured resistance within specification?

YES ▶ Go to "Power circuit Inspection " procedure.

NO ▶ Check for short to ground in control harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Power Circuit Inspection

■ Check power in harness

1. Ignition "OFF"
2. Disconnect Auto Defog actuator and Connect A/C control unit main harness connector.3. Ignition "ON"
3. Ignition "ON"
4. Measure voltage between Sensor REF(5V) terminal of Auto Defog actuator harness connector and chassis ground.

Specification : approx. 5V

5. Is the measured voltage within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Auto Defog actuator

1. Ignition "OFF"
2. Disconnect Auto Defog actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to OPEN(+) of Auto Defog actuator and (-) terminal to CLOSE(-). (Component side)
4. Verify that the Auto Defog actuator operates to the OPEN position.
5. Verify that the Auto Defog actuator operates to the OPEN position with reverse connecting. (OPEN(+) and CLOSE(-)). (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	OPEN(+)	CLOSE(-)	Door position
Battery terminal	12 V	ground	OPEN
	ground	12 V	CLOSE

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Auto Defog actuator and check for proper operation. If the problem is corrected, replace Auto Defog actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect Auto Defog actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Auto Defog actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector. (Component side)

Specification : Refer the specifications in Fig.2)

FIG.2)

Door position	Voltage
CLOSE(VENT, B/L)	About 4.7V
FLOOR	About 3.94V
MIX	About 3.29V
OPEN(DEF)	About 1V

FIG.2) ※ Voltage value of Auto Defog actuator as a function of position of mode switch.

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Auto Defog actuator and check for proper operation. If the problem is corrected, replace Auto Defog actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

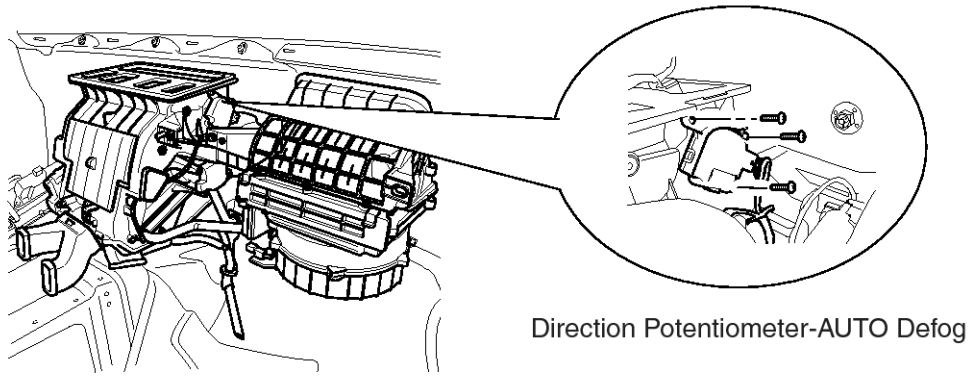
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1284 Direction Potentiometer Short (High) - Auto Defog

Componet Location



SBHHA8311N

General Description

Auto defogger sensor is installed on front window glass. For safety driving, Auto defogger sensor judges and sends signal of the occurance of moisture in advance of blowing out the wind for defogging with improvement of visiablilty and comfort.

While controlling the temperature and Mode(direction of wind) set by driver, if the humidity is higher than certain level, Air condtioner control Module automatically controls auto defogging mode. Air conditioner control module changes to go back to the previous driver set mode, if the humidity is decreased.

Air conditioner control Module automatically controls Intake actuator, A/C, Defogger actuator, Blower motor rpm, Mode actuator in accordance with the amount of humidity on the front glass.

DTC Description

Air conditioner Control Module sets DTC B1284 if The signal from auto defogger mode actuator has been detected 4.9V for 0.3 seconds.

DTC Detecting Condition

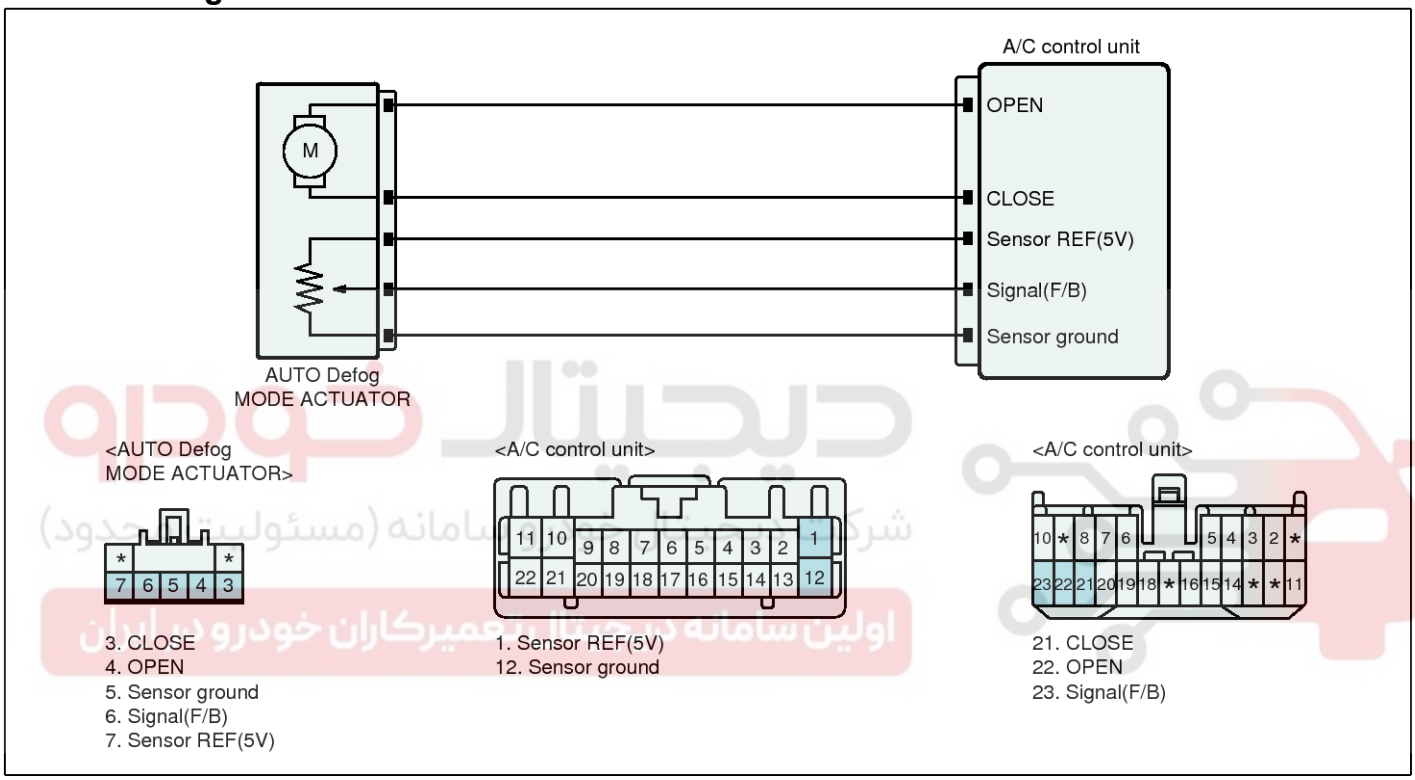
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Short to battery in signal(Feedback signal) circuit • Open in ground circuit • Faulty auto defoger mode actuator • Faulty Air conditioner control Module
Enable Conditions	• IG KEY ON	
Threshold value	• The signal from auto defogger sensor has been detected 4.9V for 0.3 seconds.	
Failsafe	• If selected Mode was VENT, it is moved and fixed at Close position • If the others mode, it is moved and fixed at Open position	

Specification

※ Voltage output according to Actuator position

Door position	Voltage
CLOSE(VENT, B/L)	About 4.7V
FLOOR	About 3.94V
MIX	About 3.29V
OPEN(DEF)	About 1V

DTC Detecting Condition



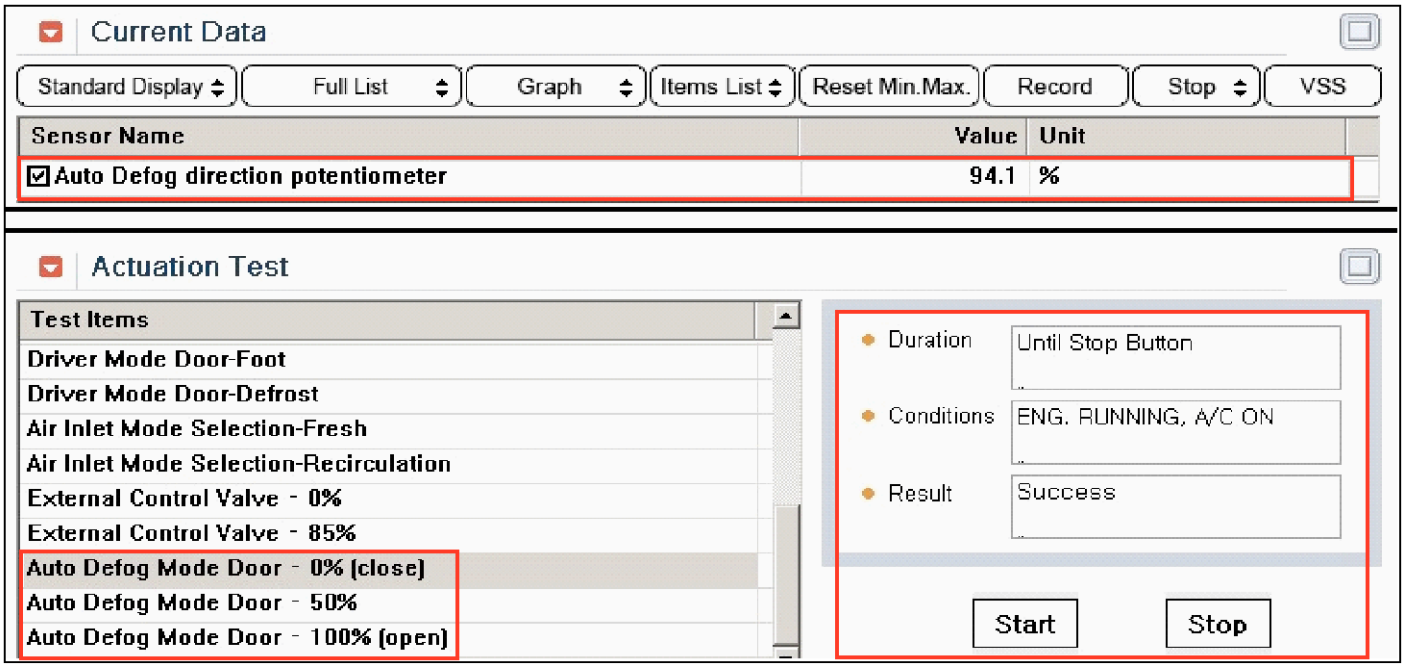
SBHHA9513L

Monitor Scantool data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine start
3. Select and monitor "Auto defoger mode direction potentioner" parameter on current data
4. Perform Actuation Test for "Auto Defoger Mode Door -0%(close)/50%/100%(open)" in order.
5. Check that the value of auto defoger mode actuator is changed with performing actuation test.

Specification : 0%(close) : About 90%, 50% : About 55%, 100%(open) : About 20%.



SBHHA9610L

6. Does the value of auto defoger mode actuator follow the specification ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF"
2. Disconnect Auto Defog sensor and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal terminal of Auto Defog sensor harness connector and chassis ground .

Specification : approx. 0V

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection " procedure .

NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check power in harness

1. Ignition "OFF"
2. Disconnect Auto Defog sensor and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Auto Defog sensor harness connector and Sensor ground(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Auto Defog actuator

1. Ignition "OFF"
2. Disconnect Auto Defog actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to OPEN(+) of Auto Defog actuator and (-) terminal to CLOSE(-). (Component side)
4. Verify that the Auto Defog actuator operates to the OPEN position.
5. Verify that the Auto Defog actuator operates to the OPEN position with reverse connecting.(OPEN(+) and CLOSE(-)). (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	OPEN(+)	CLOSE(-)	Door position
Battery terminal	12 V	ground	OPEN
	ground	12 V	CLOSE

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Auto Defog actuator and check for proper operation. If the problem is corrected, replace Auto Defog actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect Auto Defog actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Auto Defog actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector. (Component side)

Specification : Refer the specifications in Fig.2)

FIG.2)

Door position	Voltage
CLOSE(VENT, B/L)	About 4.7V
FLOOR	About 3.94V
MIX	About 3.29V
OPEN(DEF)	About 1V

FIG.2) ※ Voltage value of Auto Defog actuator as a function of position of mode switch.

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Auto Defog actuator and check for proper operation. If the problem is corrected, replace Auto Defog actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

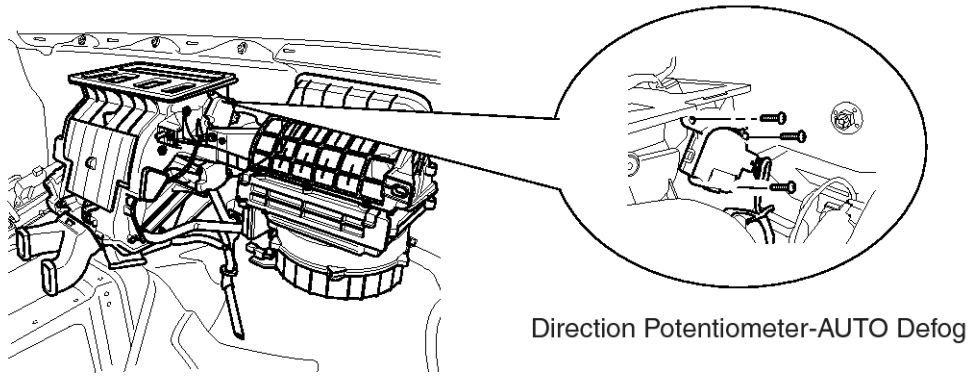
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1285 Direction Control Motor -AUTO Defog

Componet Location



SBHHA8311N

General Description

Auto defogger sensor is installed on front window glass. For safety driving, Auto defogger sensor judges and sends signal of the occurance of moisture in advance of blowing out the wind for defogging with improvement of visiablilty and comfort.

While controlling the temperature and Mode(direction of wind) set by driver, if the humidity is higher than certain level, Air condtioner control Module automatically controls auto defogging mode. Air conditioner control module changes to go back to the previous driver set mode, if the humidity is decreased.

Air conditioner control Module automatically controls Intake actuator, A/C, Defogger actuator, Blower motor rpm, Mode actuator in accordance with the amount of humidity on the front glass.

DTC Description

Air conditioner Control Module sets DTC B1285 if auto defogger mode actuator has not been moved to the mode,where air condition control module controls, within 40 seconds.

DTC Detecting Condition

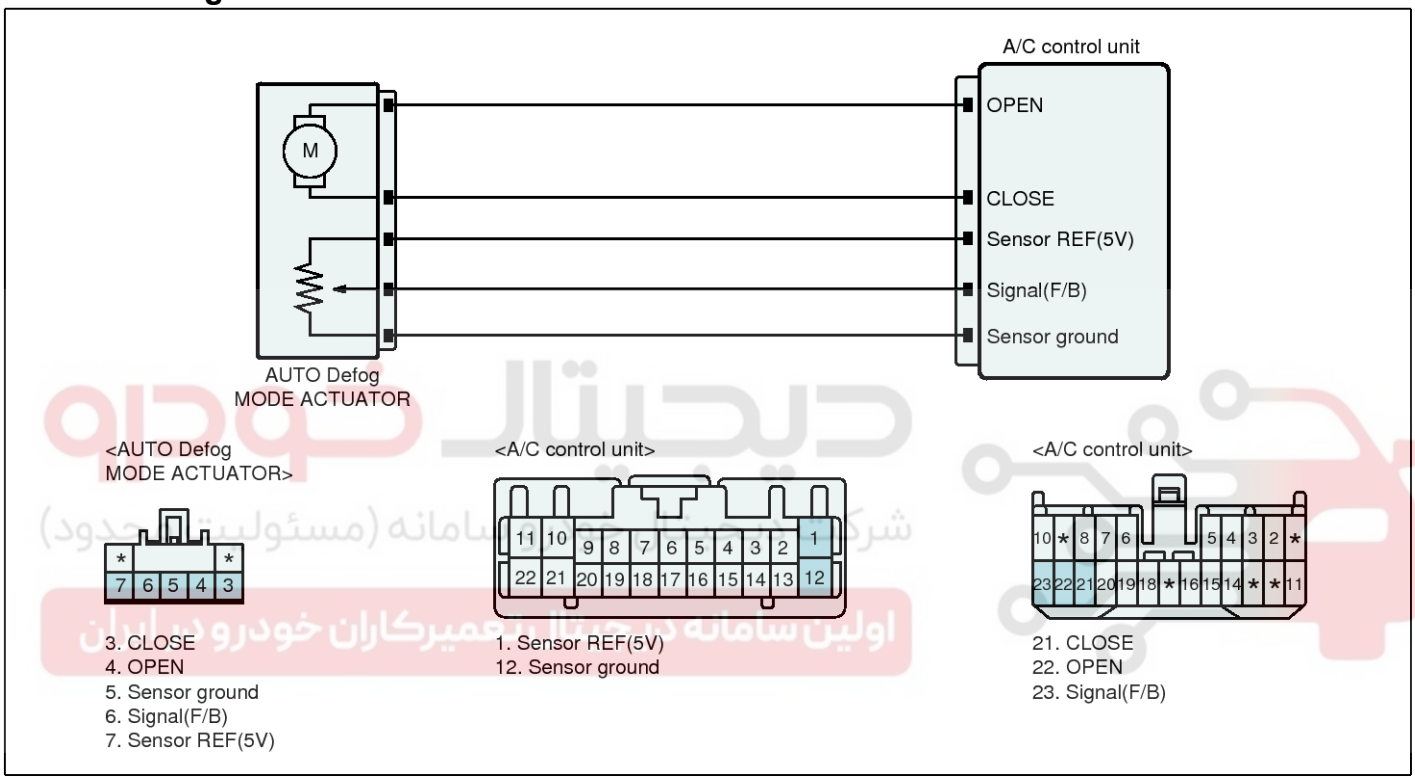
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor contact in harness • Open or short in motor power circuit • Faulty auto defoger mode actuator • Faulty air conditioner control module
Enable Conditions	• IG KEY ON	
Threshold value	• No movement to controlled mode position for 40 seconds	
Failsafe	• Fixed as current position	

Specification

※ The voltage of auto defoger mode actuator in accordance with position

Door position	Voltage
CLOSE(VENT, B/L)	About 4.7V
FLOOR	About 3.94V
MIX	About 3.29V
OPEN(DEF)	About 1V

DTC Detecting Condition



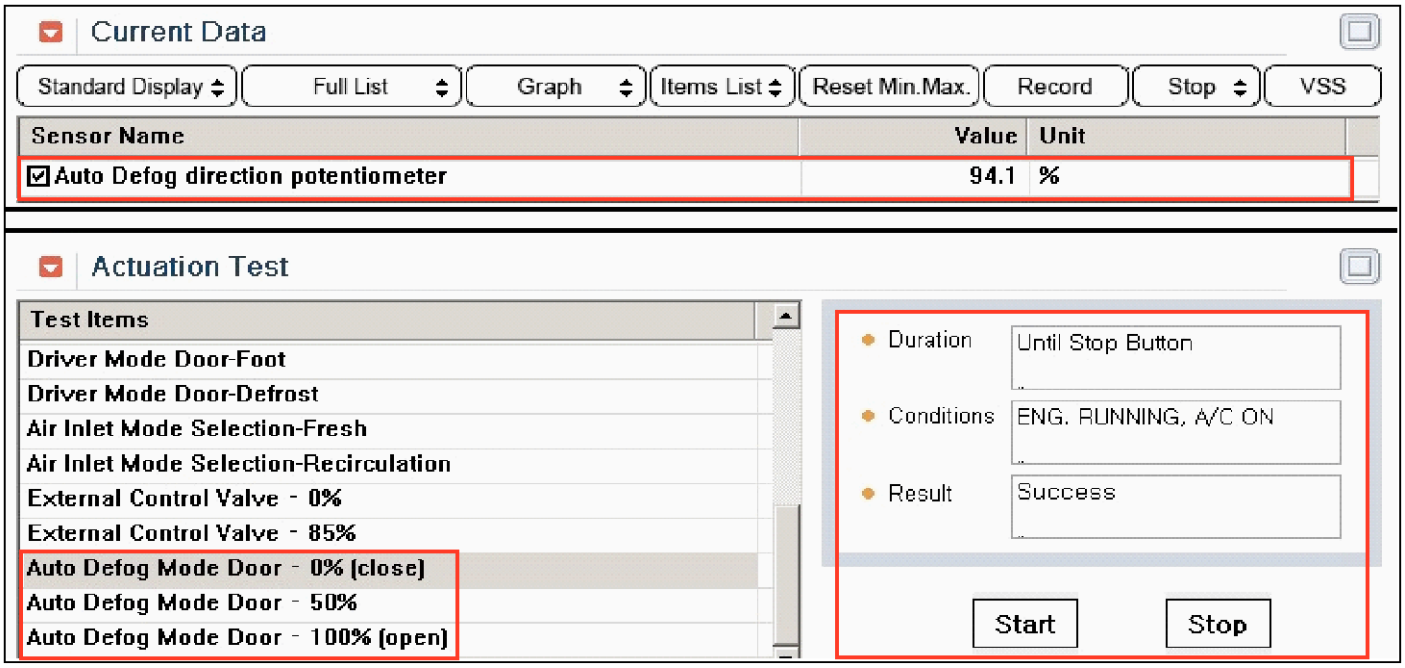
SBHHA9513L

Monitor Scantool data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine start
3. Select and monitor"Auto defoger mode actuator" parameter on current data
4. Perform Actuation Test for "auto defoger actuator -0%(close)/50%/100%(open)" in order.
5. Check that the value of auto defoger mode actuator is changed with performing actuation test.

Specification : 0%(close) : About 90%, 50% : About 55%, 100%(open) : About 20%.



SBHHA9610L

6. Does the value of auto defoger mode actuator follow the specification ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Control Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Auto Defog sensor and A/C control unit main harness connector.
3. Measure resistance between OPEN terminal of Auto Defog sensor harness connector and OPEN terminal of A/C-ECU harness connector.
4. Measure resistance between CLOSE terminal of Auto Defog sensor harness connector and CLOSE terminal of A/C-ECU harness connector.

Specification : 1Ω below

5. Is the measured resistance within specification?

YES ▶ Go to "Check short to ground in harness" as follows.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect Auto Defog actuator and A/C control unit main harness connector.
3. Measure resistance between OPEN terminal of Auto Defog actuator harness connector and chassis ground.
4. Measure resistance between CLOSE terminal of Auto Defog actuator harness connector and chassis ground.

Specification : Infinity

5. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for short to ground in control harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Auto Defog actuator

1. Ignition "OFF"
2. Disconnect Auto Defog actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to OPEN(+) of Auto Defog actuator and (-) terminal to CLOSE(-). (Component side)
4. Verify that the Auto Defog actuator operates to the OPEN position.
5. Verify that the Auto Defog actuator operates to the OPEN position with reverse connecting.(OPEN(+) and CLOSE(-)). (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	OPEN(+)	CLOSE(-)	Door position
Battery terminal	12 V	ground	OPEN
	ground	12 V	CLOSE

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Auto Defog actuator and check for proper operation. If the problem is corrected, replace Auto Defog actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect Auto Defog actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Auto Defog actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector. (Component side)

Specification : Refer the specifications in Fig.2)

FIG.2)

Door position	Voltage
CLOSE(VENT, B/L)	About 4.7V
FLOOR	About 3.94V
MIX	About 3.29V
OPEN(DEF)	About 1V

FIG.2) ※ Voltage value of Auto Defog actuator as a function of position of mode switch.

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Auto Defog actuator and check for proper operation. If the problem is corrected, replace Auto Defog actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1672 APT Sensor Fault – CAN Signal

General Description

Air conditioner control module receives air conditioner refrigerants pressure from ECM via CAN in order to judge how much refrigeratnts pressure is in the line. If the air conditioner pressure is abnormal, it is used for signal not to control the air conditioner compressor.

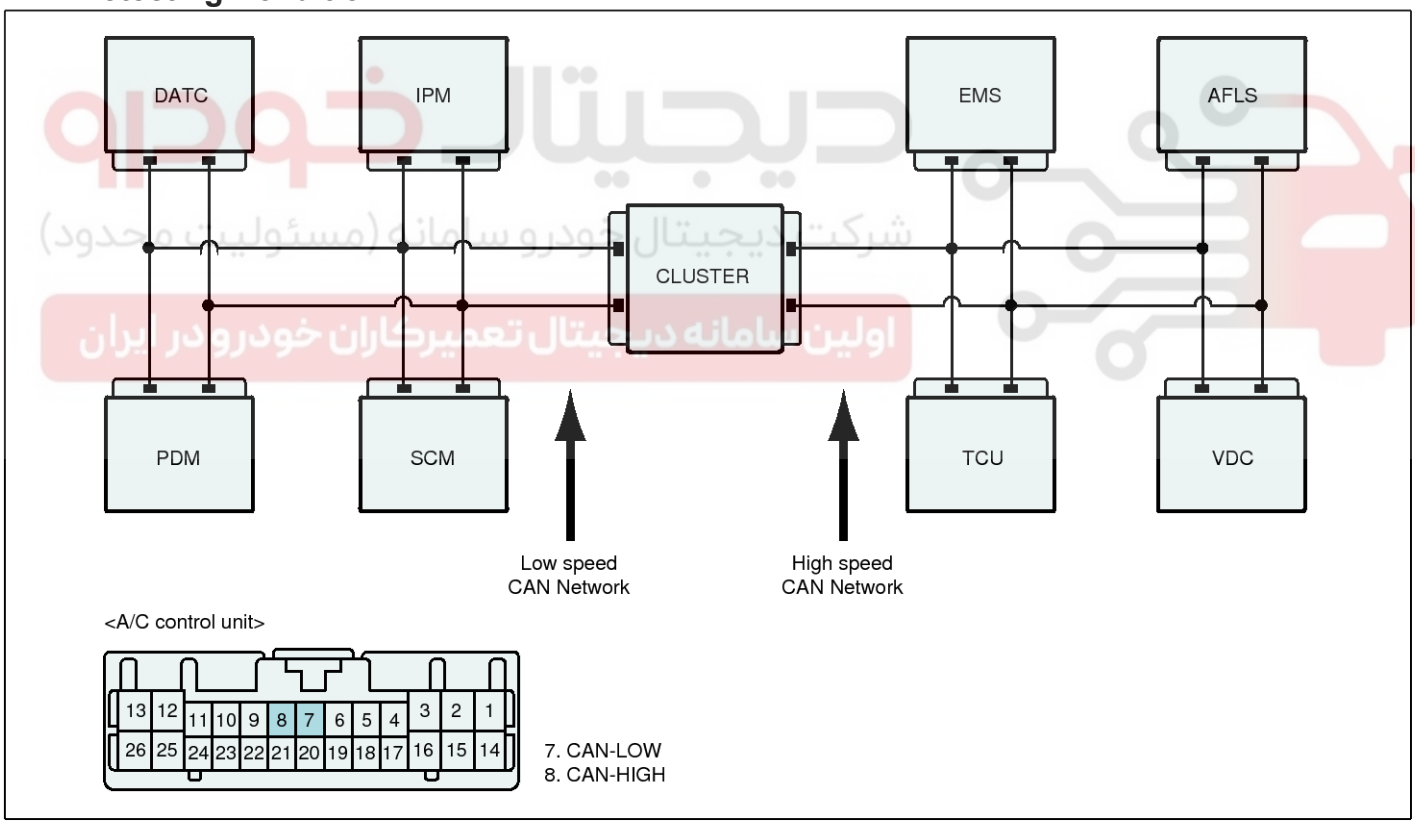
DTC Description

Air conditioner Control Module sets DTC B1272 if APT signal has not been received through the CAN signal

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Check CAN signal	• Faulty Air conditioner Pressure Sensor • CAN communication
Enable Conditions	• IG KEY ON	
Threshold value	• No receiving CAN signal for 1.5 seconds or Receiving Error value	
Failsafe	• Substitued APT value as '0'	

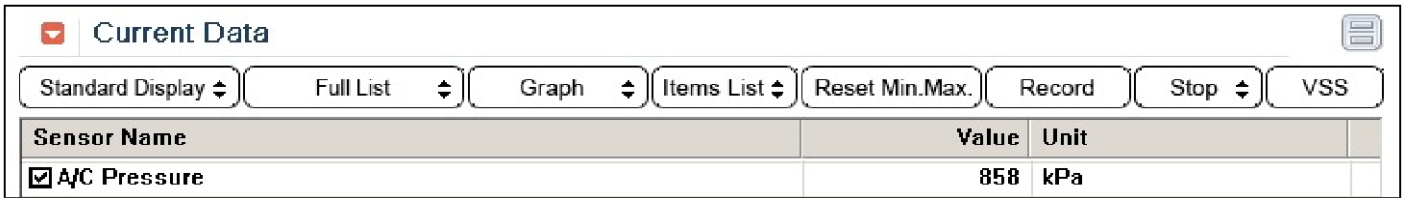
DTC Detecting Condition



SBHHA9514L

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Check that there is DTC on the engine side.
3. Check engine first if there is any DTC on the engine side and confirm that it is erasable
4. If no DTC, select "air conditioner pressure sensor" parameter on the engine side.
5. Check that the value of air conditioner pressure sensor is changable with A/C SW ON and OFF.



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6. Is the air conditioner pressure sensor normal ?

YES ▶ Check that there is any CAN related DTC and then, repair or replace as necessary. Finally, check that is possible to clear this DTC
▶ This is a intermittent problem caused by poor contact of Control Module
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Check air conditioner pressure sensor, circuit, or related component. Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1686 Vehicle Speed Sensor Fault – CAN Signal

General Description

Air conditioner Control Module detects ambient temperature only when vehicle is driving. To judge wheather vehicle is driving or not, Air conditioner control module receives vehicle speed signal from VDC through the CAN signal.

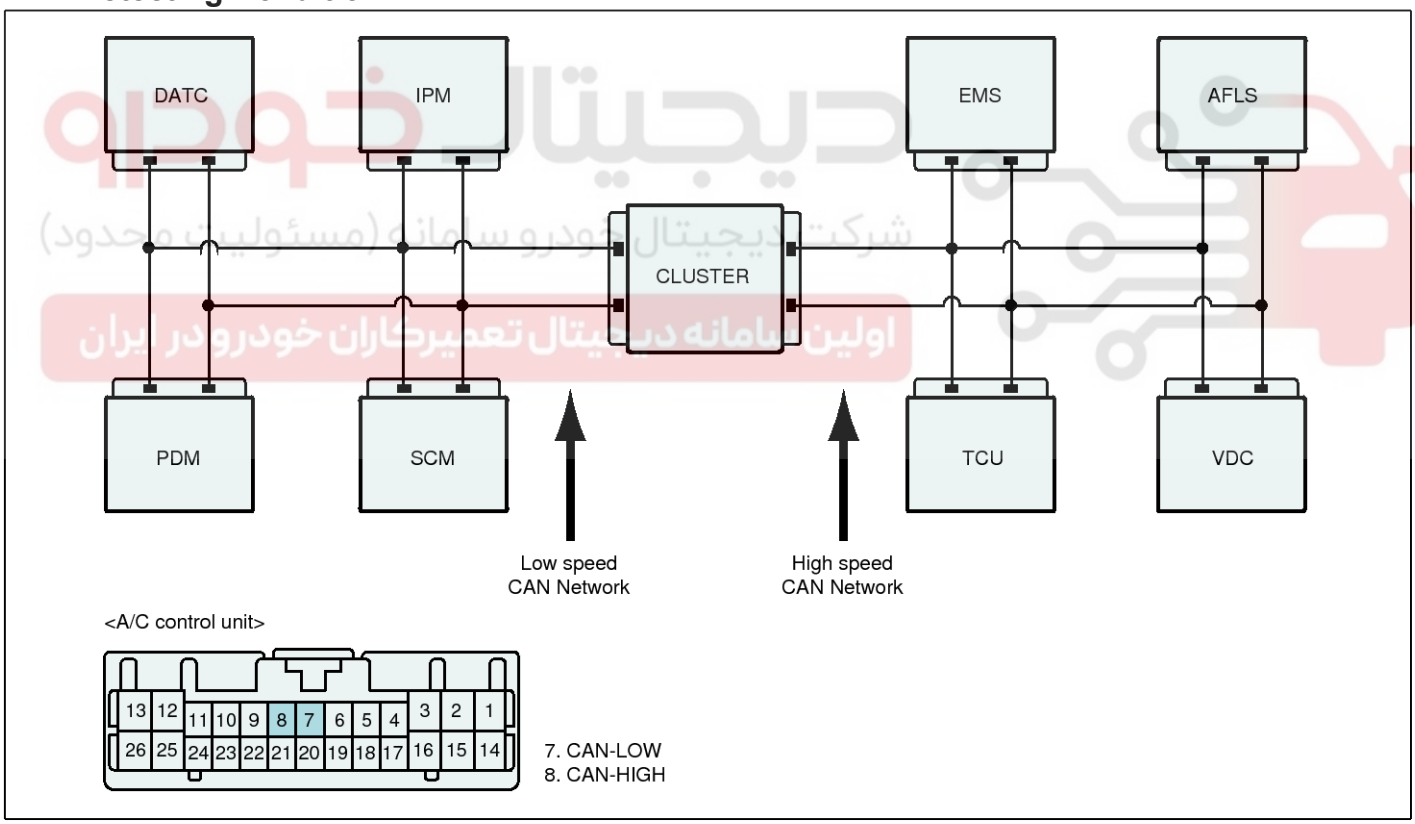
DTC Description

Air conditioner Control Module sets DTC B1686 if vehicle speed signal has not been received through the CAN signal.

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Check CAN signal	• Faulty wheel Speed Sensor • CAN communication
Enable Conditions	• IG KEY ON	
Threshold value	• No signal via CAN for 1.5 seconds or receiving Error value	
Failsafe	• Substitued vehicle speed value as '0'	

DTC Detecting Condition



SBHHA9514L

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Check that there is DTC on the VDC side.
3. Check VDC first if there is any DTC on the VDC side and confirm that it is erasable
4. If no DTC, select "Wheel Speed sensor" parameter on the VDC side.
5. Check that the value of wheel speed sensor is changable with driving the vehicle

   ■ Check wheel speed is changeable together with vehicle speed changes
6. Is the wheel speed sensor normal ?

YES ▶ Check that there is any CAN related DTC and then, repair or replace as necessary. Finally, check that is possible to clear this DTC
▶ This is a intermittent problem caused by poor contact of Control Module
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Check wheel speed sensor, circuit, or related component. Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1687 Engine Coolant Temperature Sensor Circuit - CAN Signal

General Description

In case of engine cold starting, Air conditioner control module receies engine coolant temperature sensor signal through the CAN signal so that Mode is changed to DEF with controlling mode actuator.

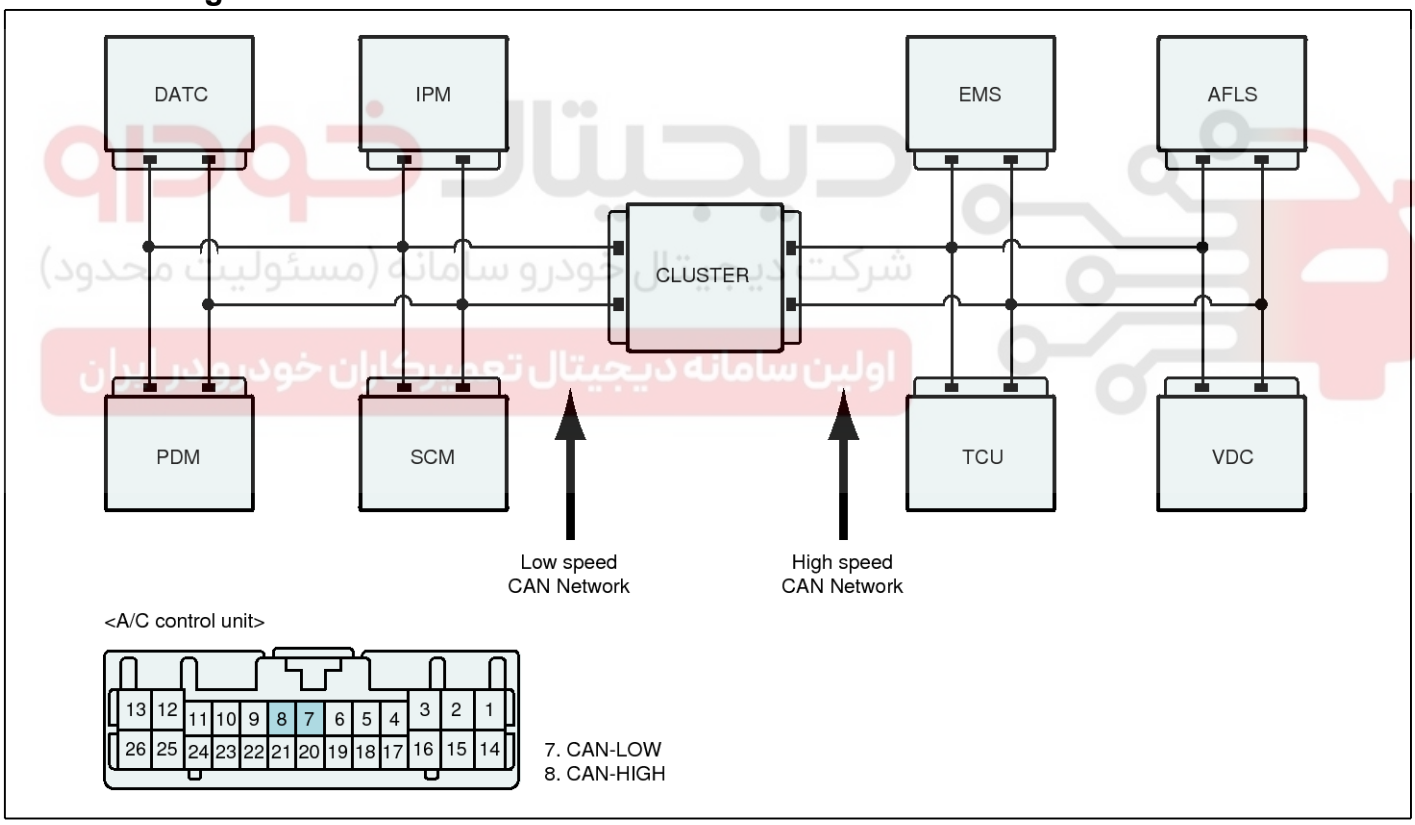
DTC Description

Air conditioner Control Module sets DTC B1687 if engine temperature sensor signal has not been received through the CAN signal.

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Check CAN signal	• Faulty engine coolant temperature sensor • CAN communication
Enable Conditions	• IG KEY ON	
Threshold value	• No signal via CAN for 1.5 seconds or receiving Error value	
Failsafe	• Regarded it as -2℃(28.4˚F)	

DTC Detecting Condition



SBHHA9514L

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Check that there is DTC on the VDC side.
3. Check Engine first if there is any DTC on the engine side and confirm that it is erasable
4. If no DTC, select "engine coolant temperature sensor" parameter on the engine side.
5. Check that the value of engine coolant temperature is changable according to engine temperature change

SBHHA9612L

6. Is the engine coolant temperature sensor normal ?

YES ▶ Check that there is any CAN related DTC and then, repair or replace as necessary. Finally, check that is possible to clear this DTC
▶ This is a intermittent problem caused by poor contact of Control Module
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Check engine coolant temperature sensor, circuit, or related component. Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

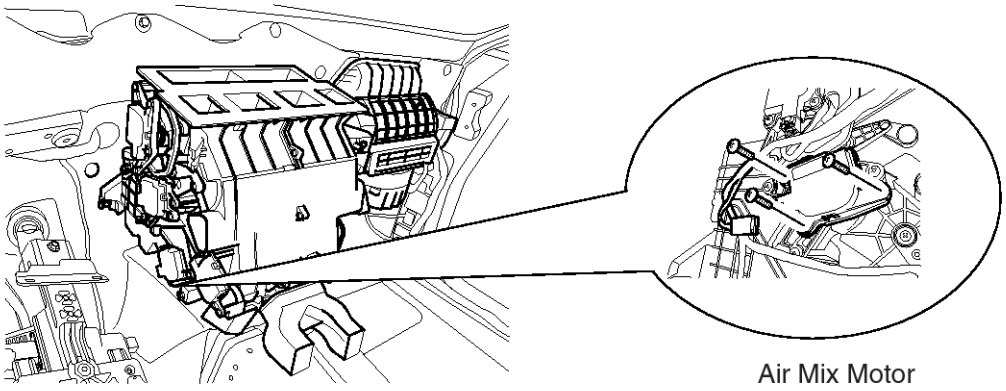
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B2406 Air Mix Motor-Driver

Componet Location



SBHHA8312N

General Description

Temperature control actuator located at heater unit. It contains temp motor that changes temp door position and potentiometer that monitors position of temp door.Temperature control actuator regulates the temperature by the procedure as follows. Signal from control unit adjusts position of temp door by operating temp motor and then temperature will be regulated by the hot/cold air ratio decided by position of temp door. In operation, potentiometer delivers temp door position transformed into voltage value to A/C ECU .

DTC Description

Air conditioner Control Module sets DTC B2406 if Driver air mix actuator has not been moved to the mode,where air condition control module controls, within 40 seconds.

DTC Detecting Condition

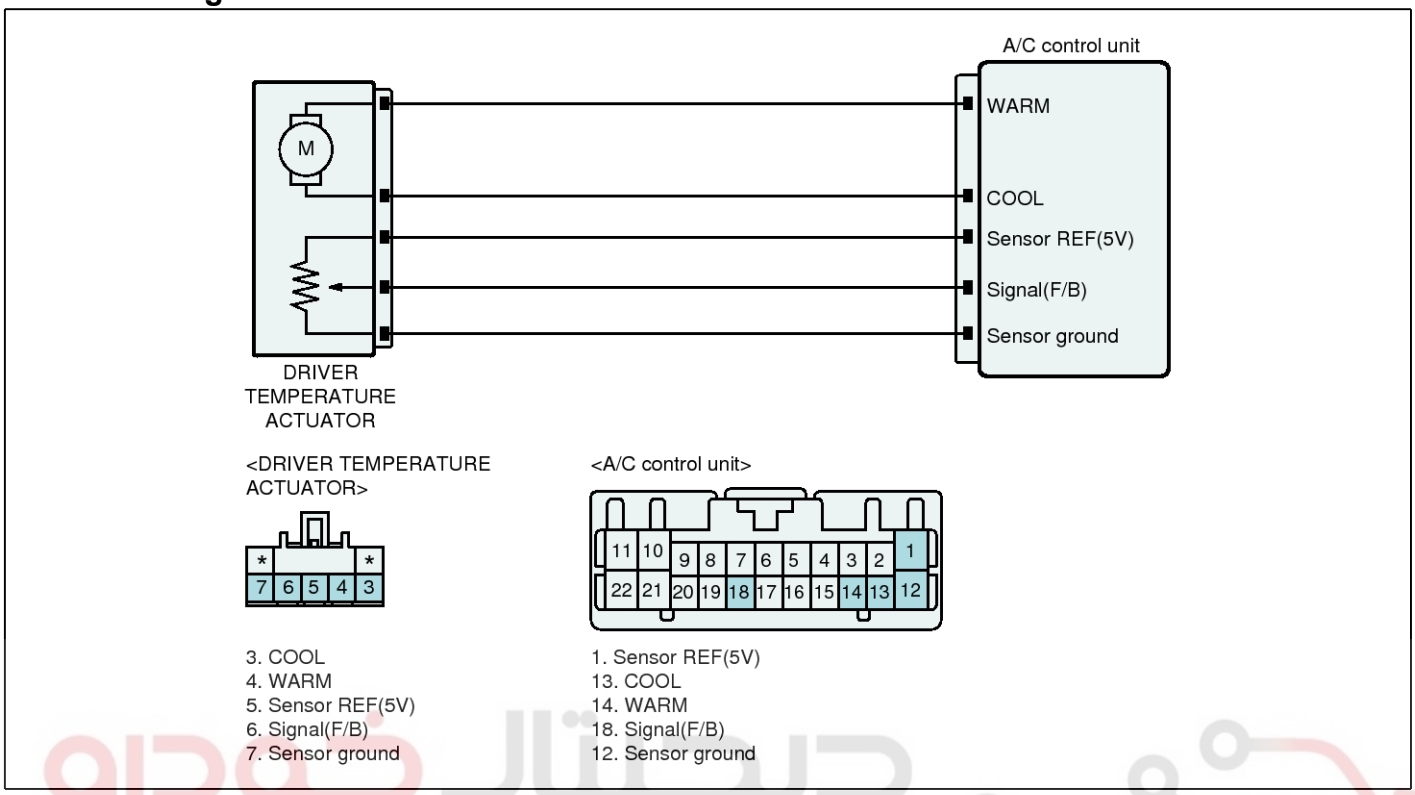
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor contact in harness • Open or short in motor power circuit • Faulty Driver air mix actuator • Faulty air conditioner control module
Enable Conditions	• IG KEY ON	
Threshold value	• No movement to controlled mode position for 40 seconds	
Failsafe	• Fixed as current position	

Specification

※ Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

DTC Detecting Condition



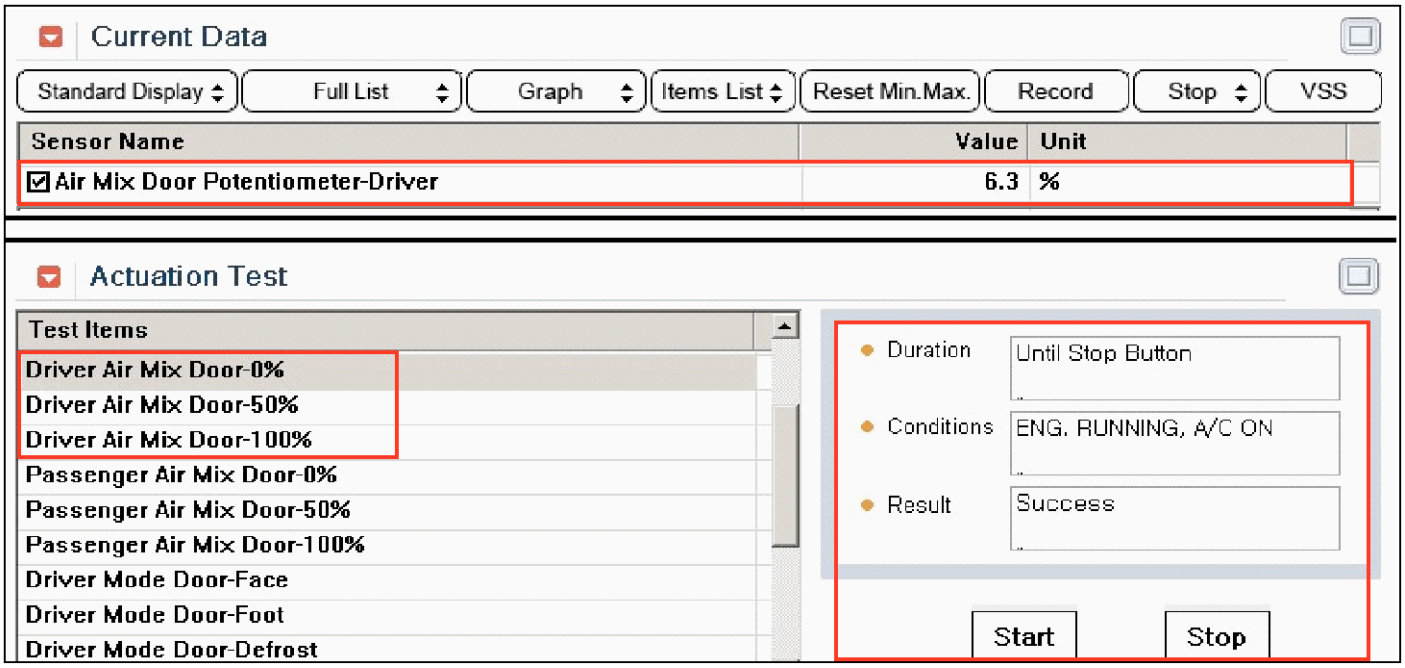
SBHHA9506L

Monitor Scantool data

■Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after engine starts.
3. Select and monitor "Air Mix Door Potentioner-Driver" parameter on scantool.
4. Select and perform Actuation test Air Mix Door Potentioner-Driver - 0% / 50% / 100% in order.
5. Check that the value of all the parameters are changed when performing the actuation test.

Specification : Check that the value of Air Mix Door Potentiometer at current data should be close to the value of the acutation test .



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6. Does the value of current data follow in accordance with the each actuation test ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Control Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Measure resistance between WARM terminal of Driver air mix actuator harness connector and WARM terminal of A/C-ECU harness connector.
4. Measure resistance between COOL terminal of Driver air mix actuator harness connector and COOL terminal of A/C-ECU harness connector.

Specification : 1Ω below

5. Is the measured resistance within specification?

YES ▶ Go to "Check short to ground in harness" as follows.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Measure resistance between WARM terminal of Driver air mix actuator harness connector and chassis ground .
4. Measure resistance between COOL terminal of Driver air mix actuator harness connector and chassis ground .

Specification : Infinity

5. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for short to ground in control harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Driver air mix actuator

1. Ignition "OFF"
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of Driver air mix actuator and (-) terminal to COOL(-). (Component side)
4. Verify that the temperature actuator operates to the cool position
5. Verify that the temperature actuator operates to the warm position with reverse connecting.(WARM(+) and COOL(-)) . (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	ground	Max.warm
	ground	12 V	Max.cool

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Driver air mix actuator and check for proper operation. If the problem is corrected, replace Driver air mix actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect Driver air mix actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Driver air mix actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector .(Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

FIG.2) ※ Voltage value of Air Mix potentiometer as a function of temp door position.

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Driver air mix actuator and check for proper operation. If the problem is corrected, replace Driver air mix actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

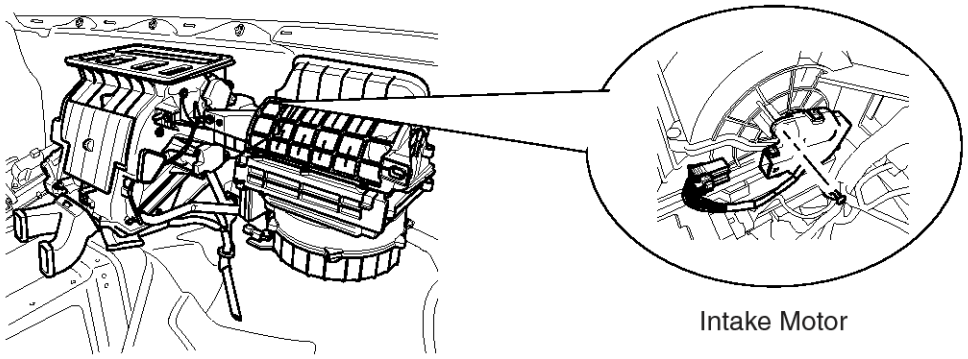
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B2408 Intake Motor

Componet Location



SBHHA8313N

General Description

Intake door located at heater unit controls the inlet of car. It contains intake motor that changes intake door position and potentiometer that monitors position of intake door. When driver operates the intake switch, ECU receives mode signal from intake switch and operates intake door motot to turn intake door to intended position. (with FRE mode signal, intake door is closed and with REC mode signal, intake door is opened)In operation, potentiometer delivers intake door position transformed into voltage value to A/C ECU .

DTC Description

Air conditioner Control Module sets DTC B2408 if Intake actuator has not been moved to the mode,where air condition control module controls, within 40 seconds.

DTC Detecting Condition

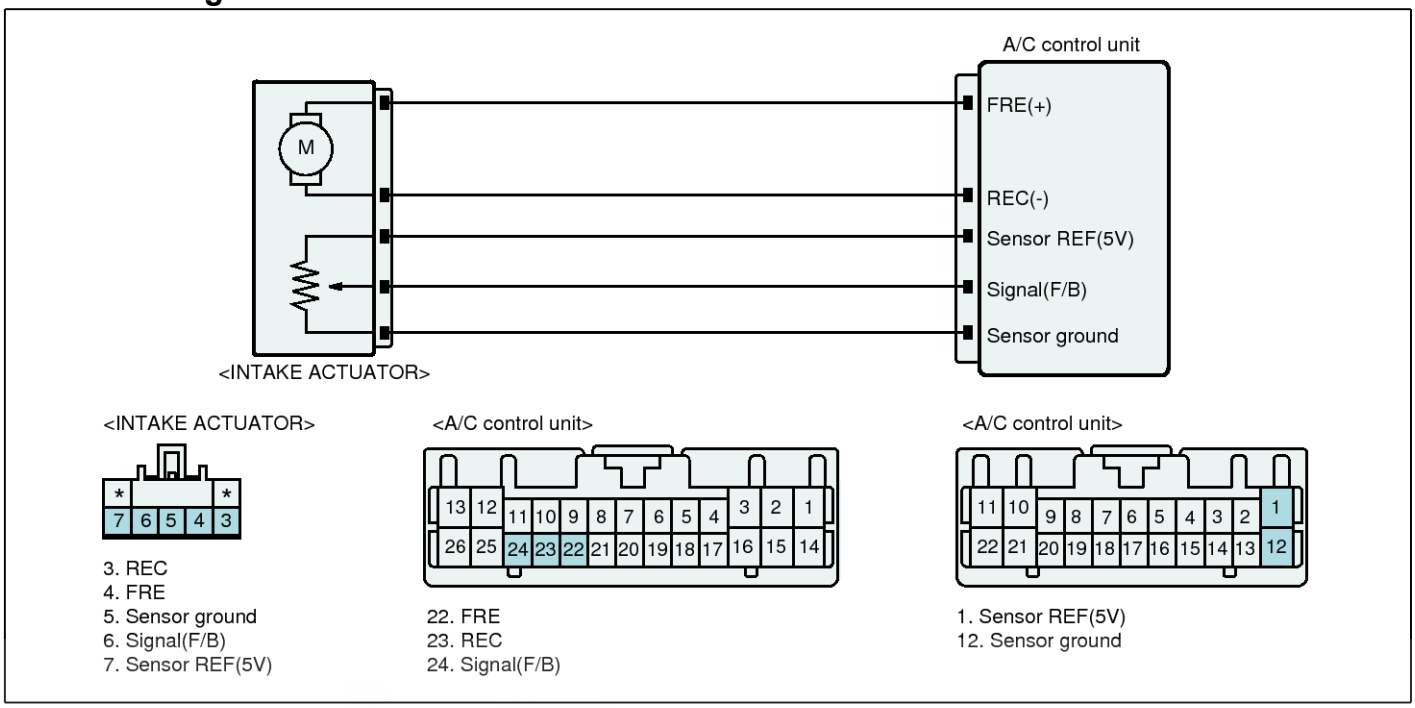
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor contact in harness • Open or short in motor power circuit • Faulty Intake actuator • Faulty air conditioner control module
Enable Conditions	• IG KEY ON	
Threshold value	• No movement to controlled mode position for 40 seconds	
Failsafe	• Fixed as current position	

Specification

※ Voltage value of Intake potentiometer as a function of position of Intake door

Door position	Voltage
FRE	0.3±0.15V
REC	4.7±0.15V

DTC Detecting Condition



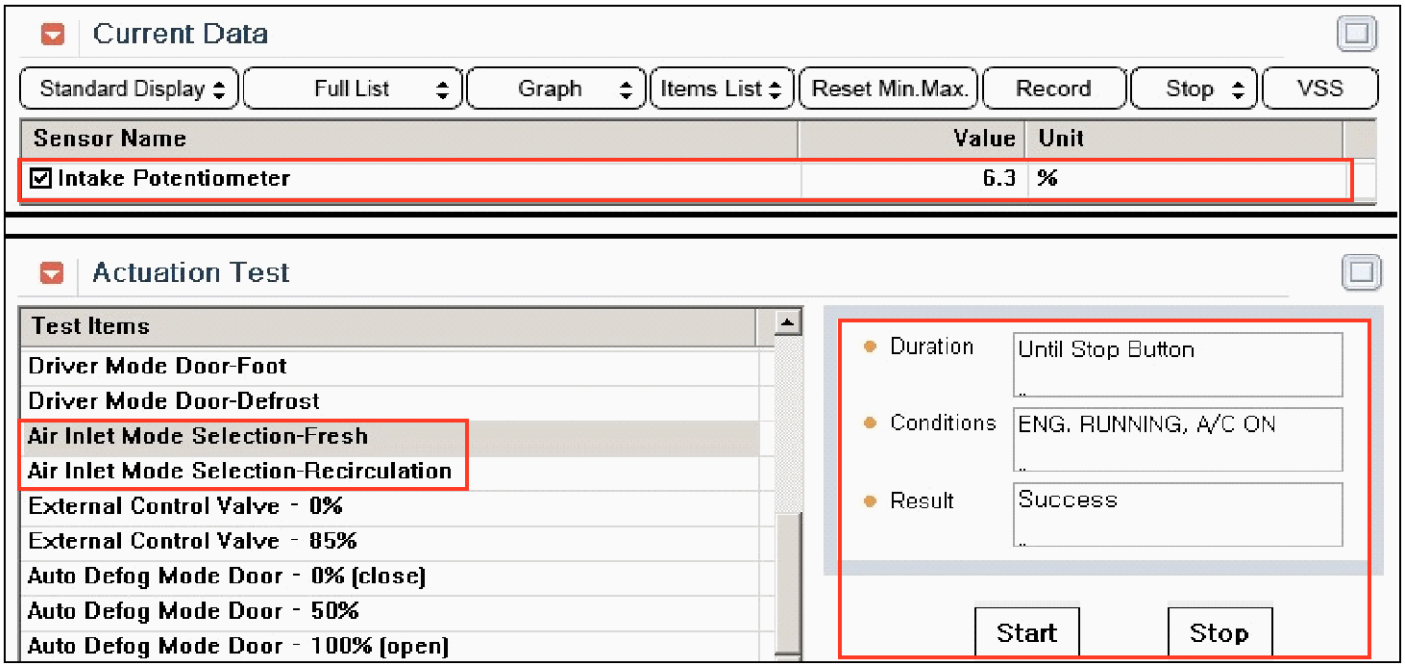
SBHHA9502L

Monitor Scantool data

■ Check Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine start
3. Select " Intake Potentiometer " parameter on the current data with scantool
4. Perform Actuation Test for Air Inlet Mode Selection - Reculation /Fresh in order.
5. With performing Actuation test, check that the value of each position sensors are changing.

Specification : Recirculation : About 90%, Fresh : About 10%.



SBHHA9601L

6. Are the value of each position sensors changed when performing actuation test ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Control Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Measure resistance between FRE(+) terminal of Intake actuator harness connector and FRE(+) terminal of A/C-ECU harness connector.
4. Measure resistance between REC(-) terminal of Intake actuator harness connector and REC(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

5. Is the measured resistance within specification?

YES ▶ Go to "Check short to ground in harness" as follows.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Measure resistance between FRE(+) terminal of Intake actuator harness connector and chassis ground.
4. Measure resistance between REC(-) terminal of Intake actuator harness connector and chassis ground.

Specification : Infinity

5. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure.

NO ▶ Check for short to ground in control harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Intake actuator

1. Ignition "OFF"
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to FRE(+) of intake actuator and (-) terminal to REC(-). (Component side)
4. Verify that the actuator operates to the REC position
5. Verify that the temperature actuator operates to the FRE position with reverse connecting. (REC(-) and FRE(+)) (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	FRE(+)	REC(-)	Door position
Battery terminal	12 V	ground	FRE
	ground	12 V	REC

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Intake actuator and check for proper operation. If the problem is corrected, replace Intake actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(F/B) terminal of Intake actuator harness connector and chassis ground. (Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Door position	Voltage
FRE	0.3±0.15V
REC	4.7±0.15V

FIG.2) ※ Voltage value of intake potentiometer as a function of intake door position.

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Intake actuator and check for proper operation. If the problem is corrected, replace Intake actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

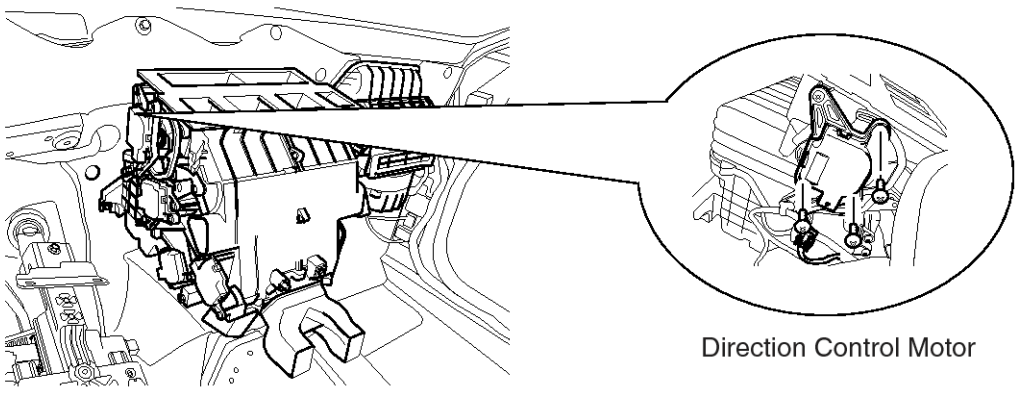
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B2409 Direction Control Motor-Driver

Componet Location



SBHHA8314N

General Description

The mode control actuator mounted on heater unit adjusts position of mode door by operating Direction Motor in accordance with signal of A/C control unit. Pressing mode select switch makes the mode control actuator shift in order of vent→ B/L → floor → mix.

DTC Description

Air conditioner Control Module sets DTC B2409 if Driver Direction actuator has not been moved to the mode,where air condition control module controls, within 40 seconds.

DTC Detecting Condition

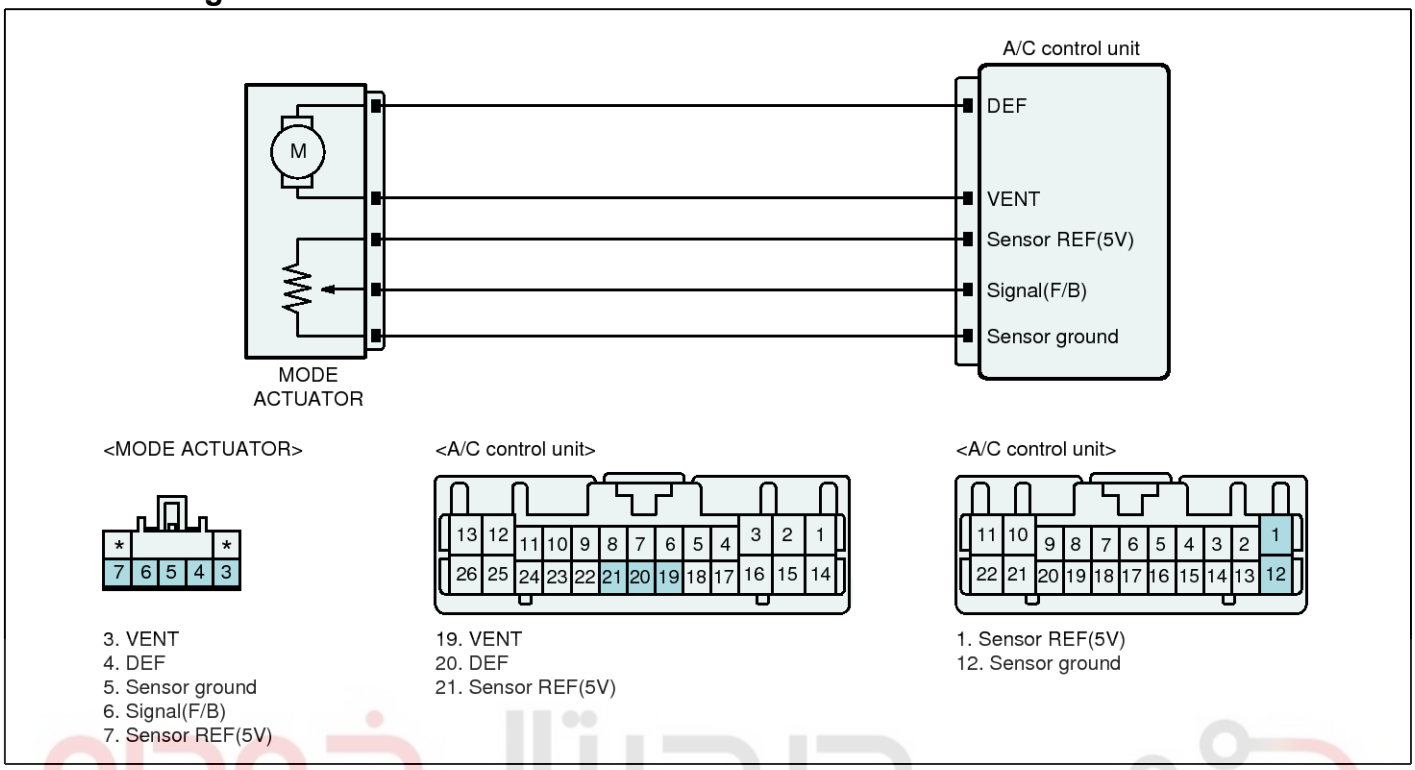
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor contact in harness • Open or short in motor power circuit • Faulty Driver Direction actuator • Faulty air conditioner control module
Enable Conditions	• IG KEY ON	
Threshold value	• No movement to controlled mode position for 40 seconds	
Failsafe	• Fixed as current position	

Specification

※ Voltage value of potentiometer as a function of mode door position.

Mode Door Position	Voltage
VENT	0.3±0.15V
BI-LEVEL	1.4±0.4V
FLOOR	2.5±0.4V
MIX	3.6±0.4V
DEF	4.7±0.15V

DTC Detecting Condition



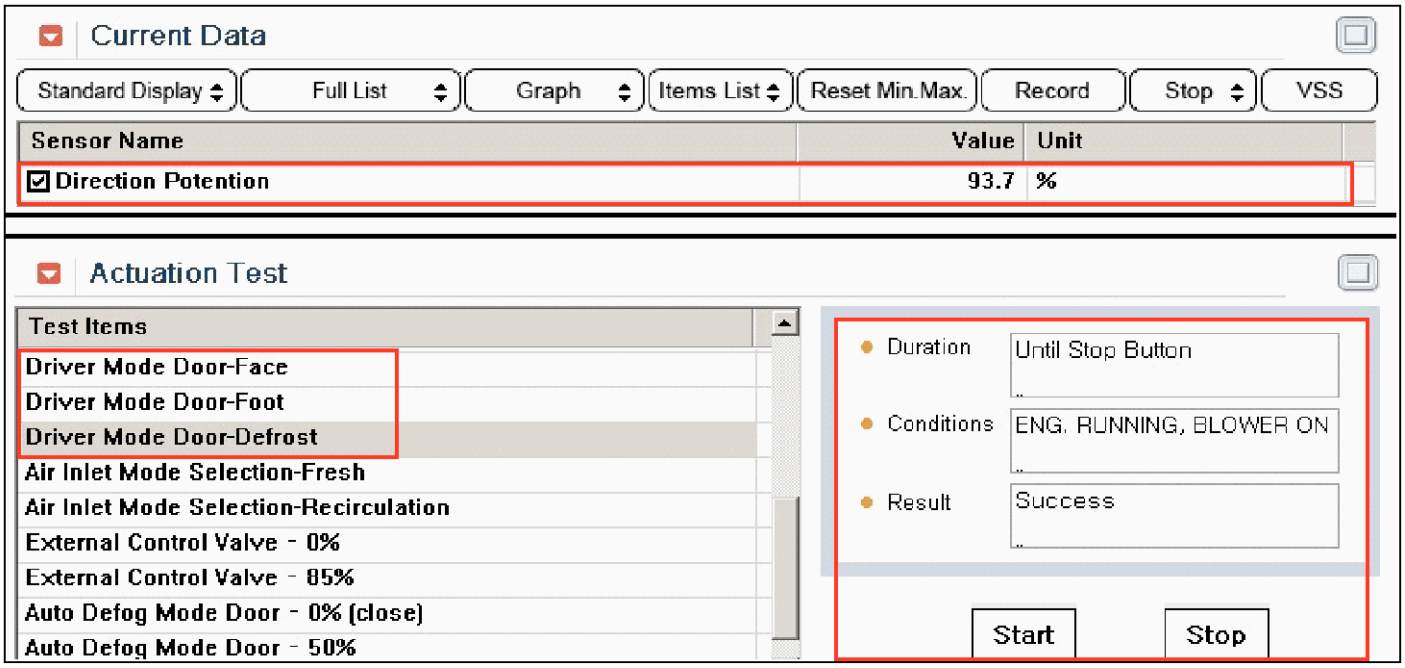
SBHHA9507L

Monitor Scantool data

■Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after engine starts.
3. Select and monitor "Direction Potention" parameter on scantool.
4. Select and perform Actuation test Driver Mode Door - Face / Foot / Defrost in order.
5. Check that the value of all the parameters are changed when performing the actuation test.

Specification : Face - About below 10%, Foot : About 50%, Defrost : About 90%.



SBHHA9606L

6. Are all the parameters changed when performing Actuation test ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Control Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Measure resistance between DEF terminal of Driver Direction actuator harness connector and DEF terminal of A/C-ECU harness connector.
4. Measure resistance between VENT terminal of Driver Direction actuator harness connector and VENT terminal of A/C-ECU harness connector.

Specification : 1Ω below

5. Is the measured resistance within specification?

YES ▶ Go to "Check short to ground in harness" as follows.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Measure resistance between DEF terminal of Driver Direction actuator harness connector and chassis ground.
4. Measure resistance between VENT terminal of Driver Direction actuator harness connector and chassis ground.

Specification : Infinity

5. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure.

NO ▶ Check for short to ground in control harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Driver Direction actuator

1. Ignition "OFF"
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of Driver air mix actuator and (-) terminal to COOL(-). (Component side)
4. Verify that the temperature actuator operates to the cool position
5. Verify that the temperature actuator operates to the warm position with reverse connecting. (WARM(+) and COOL(-)). (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	ground	VENT.Mode
	ground	12 V	DEF.Mode

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Driver air mix actuator and check for proper operation. If the problem is corrected, replace Driver air mix actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect Driver Direction actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Driver Direction actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector. (Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Mode Door Position	Voltage
VENT	0.3±0.15V
BI-LEVEL	1.4±0.4V
FLOOR	2.5±0.4V
MIX	3.6±0.4V
DEF	4.7±0.15V

Fig.2) ※ Voltage value of Direction potentiometer as a function of position of mode switch

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Driver air mix actuator and check for proper operation. If the problem is corrected, replace Driver air mix actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

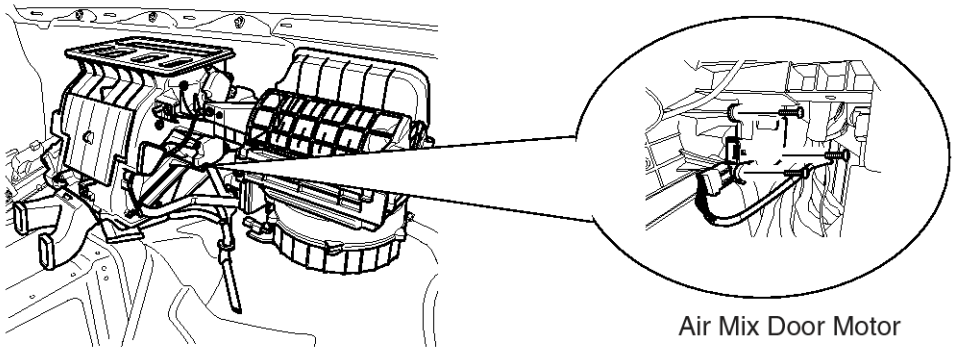
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B2415 Air Mix Door Motor-Passenger

Componet Location



SBHHA8315N

General Description

Temperature control actuator located at heater unit. It contains temp motor that changes temp door position and potentiometer that monitors position of temp door.Temperature control actuator regulates the temperature by the procedure as follows. Signal from control unit adjusts position of temp door by operating temp motor and then temperature will be regulated by the hot/cold air ratio decided by position of temp door. In operation, potentiometer delivers temp door position transformed into voltage value to A/C ECU.

DTC Description

Air conditioner Control Module sets DTC B2415 if passenger air mix actuator has not been moved to the mode,where air condition control module controls, within 40 seconds.

DTC Detecting Condition

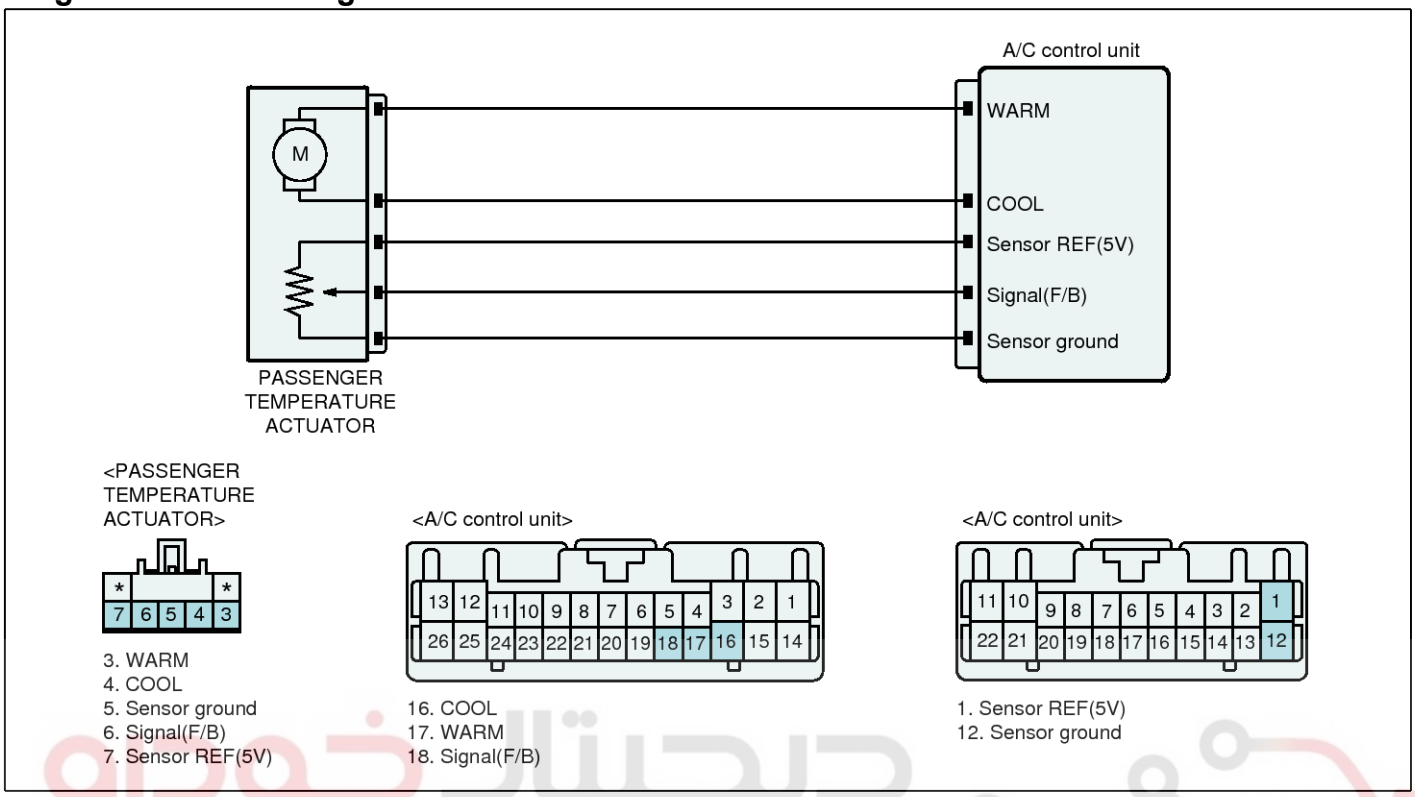
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor contact in harness • Open or short in motor power circuit • Faulty passenger air mix actuator • Faulty air conditioner control module
Enable Conditions	• IG KEY ON	
Threshold value	• No movement to controlled mode position for 40 seconds	
Failsafe	• Fixed as current position	

Specification

※ Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

Diagnostic Circuit Diagram



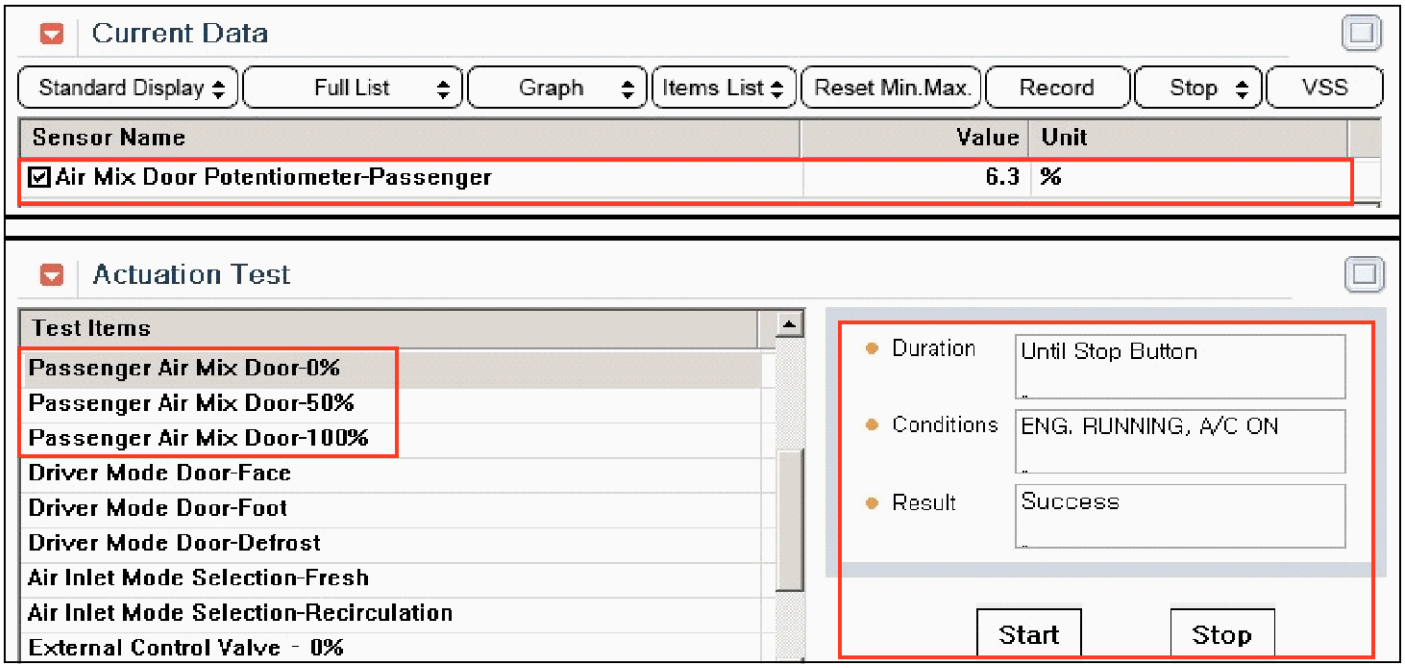
SBHHA9501L

Monitor Scantool data

■ Check Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine start
3. Select "Air Mix Door Potentiometer-Passenger" parameter on the current data with scantool
4. Perform Actuation Test for "Passenger Air Mix Door - 0% / 50% / 100%.
5. With performing Actuation test, check that the value of Air Mix Door Potentiometer is changed and close to the value of Actuation Test.

Specification : Check that the value of Air Mix Door Potentiometer at current data should be close to the value of the acutation test .



SBHHA9600L

6. Does the value of current data follow in accordance with the each actuation test ?

YES ▶ This is a intermittent problem caused by poor contact of component or Control Unit
▶ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.
▶ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO ▶ Go to " Inspection/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Control Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect passenger air mix actuator and A/C control unit main harness connector.
3. Measure resistance between WARM terminal of passenger air mix actuator harness connector and WARM terminal of A/C-ECU harness connector.
4. Measure resistance between COOL terminal of passenger air mix actuator harness connector and COOL terminal of A/C-ECU harness connector.

Specification : 1Ω below

5. Is the measured resistance within specification?

YES ▶ Go to "Check short to ground in harness" as follows.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect passenger air mix actuator and A/C control unit main harness connector.
3. Measure resistance between WARM terminal of passenger air mix actuator harness connector and chassis ground.
4. Measure resistance between COOL terminal of passenger air mix actuator harness connector and chassis ground.

Specification : Infinity

5. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure.

NO ▶ Check for short to ground in control harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check passenger air mix actuator

1. Ignition "OFF"
2. Disconnect passenger air mix actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of passenger air mix actuator and (-) terminal to COOL(-). (Component side)
4. Verify that the temperature actuator operates to the cool position
5. Verify that the temperature actuator operates to the warm position with reverse connecting. (WARM(+) and COOL(-)). (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	ground	Max.warm
	ground	12 V	Max.cool

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good passenger air mix actuator and check for proper operation. If the problem is corrected, replace passenger air mix actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect passenger air mix actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of passenger air mix actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector. (Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

FIG.2) ※ Voltage value of Air Mix potentiometer as a function of temp door position.

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good passenger air mix actuator and check for proper operation. If the problem is corrected, replace passenger air mix actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

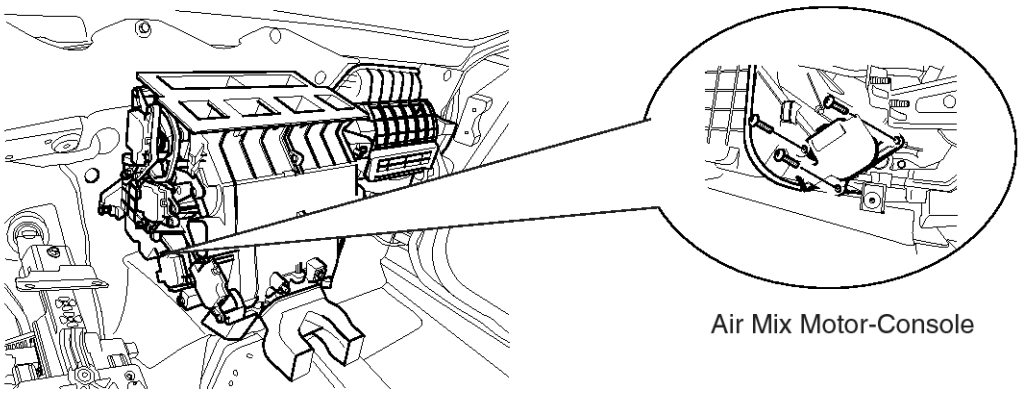
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B2447 Air Mix Motor VENT-Console

Componet Location



SBHHA8316N

General Description

There are two(2) CONSOLE TEMPERATURE ACTUATOR which is controlled after calculating the three(3) signals from Console temperature control switch, Console Open/Close switch, Front Control panel set temperature.

DTC Description

Air conditioner Control Module sets DTC B2447 if Console temp actuator has not been moved to the mode,where air condition control module controls, within 40 seconds.

DTC Detecting Condition

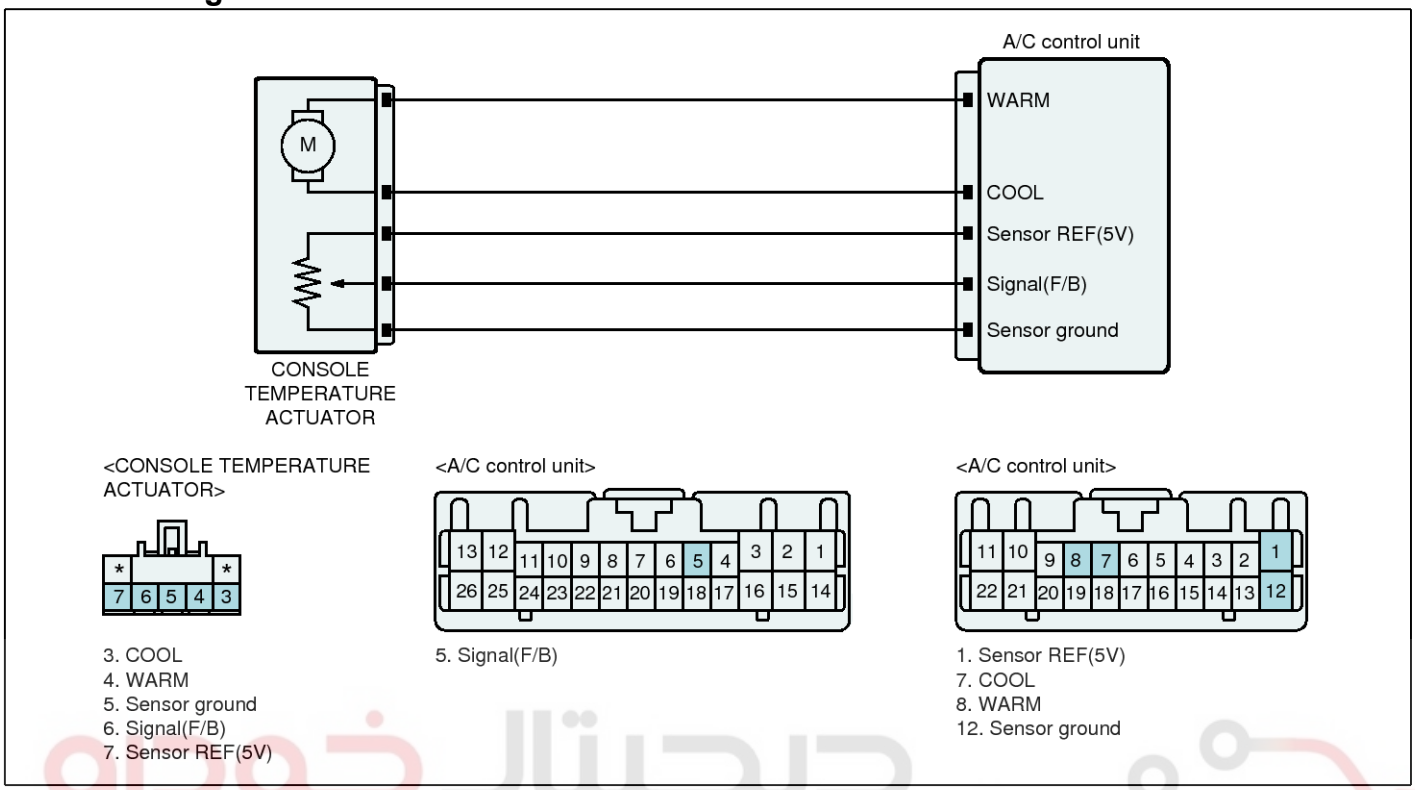
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor contact in harness • Open or short in motor power circuit • Faulty Console temp actuator • Faulty air conditioner control module
Enable Conditions	• IG KEY ON	
Threshold value	• No movement to controlled mode position for 40 seconds	
Failsafe	• Fixed as current position	

Specification

※ Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
COOL	1.18±0.15V
WARM	3.82±0.15V

DTC Detecting Condition



SBHHA9509L

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Control Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Console temp actuator and A/C control unit main harness connector.
3. Measure resistance between WARM terminal of Console temp actuator harness connector and WARM terminal of A/C-ECU harness connector.
4. Measure resistance between COOL terminal of Console temp actuator harness connector and COOL terminal of A/C-ECU harness connector.

Specification : 1Ω below

5. Is the measured resistance within specification?

YES ▶ Go to "Check short to ground in harness" as follows.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect Console temp actuator actuator and A/C control unit main harness connector.
3. Measure resistance between WARM terminal of Console temp actuator harness connector and chassis ground.
4. Measure resistance between COOL terminal of Console temp actuator harness connector and chassis ground.

Specification : Infinity

5. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure.

NO ▶ Check for short to ground in control harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Console temp actuator

1. Ignition "OFF"
2. Disconnect Console temp actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of Console temp actuator and (-) terminal to COOL(-). (Component side)
4. Verify that the temperature actuator operates to the cool position
5. Verify that the temperature actuator operates to the warm position with reverse connecting.(WARM(+) and COOL(-)) . (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	ground	Max.warm
	ground	12 V	Max.cool

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Console temp actuator and check for proper operation. If the problem is corrected, replace Console temp actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect Console temp actuator and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Console temp actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector. (Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Door position	Voltage
COOL	1.18±0.15V
WARM	3.82±0.15V

Fig.2) ※ Voltage value of Console temp actuator as a function of position of mode switch

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Console temp actuator and check for proper operation. If the problem is corrected, replace Console temp actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

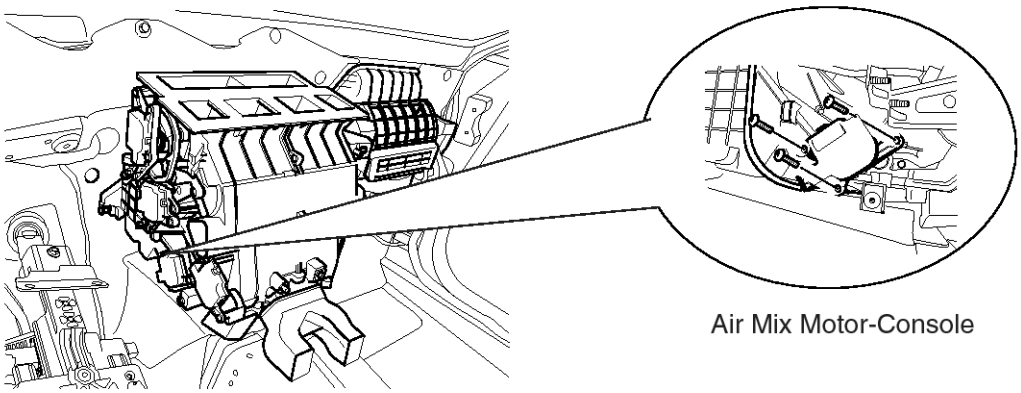
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B2448 Air Mix Motor TEMP-Console

Componet Location



SBHHA8316N

DTC Description

Air conditioner Control Module sets DTC B2448 if Console temp actuator "A" has not been moved to the mode,where air condition control module controls, within 40 seconds.

DTC Description

Air conditioner Control Module sets DTC B2448 if Console temp actuator "A" has not been moved to the mode,where air condition control module controls, within 40 seconds.

DTC Detecting Condition

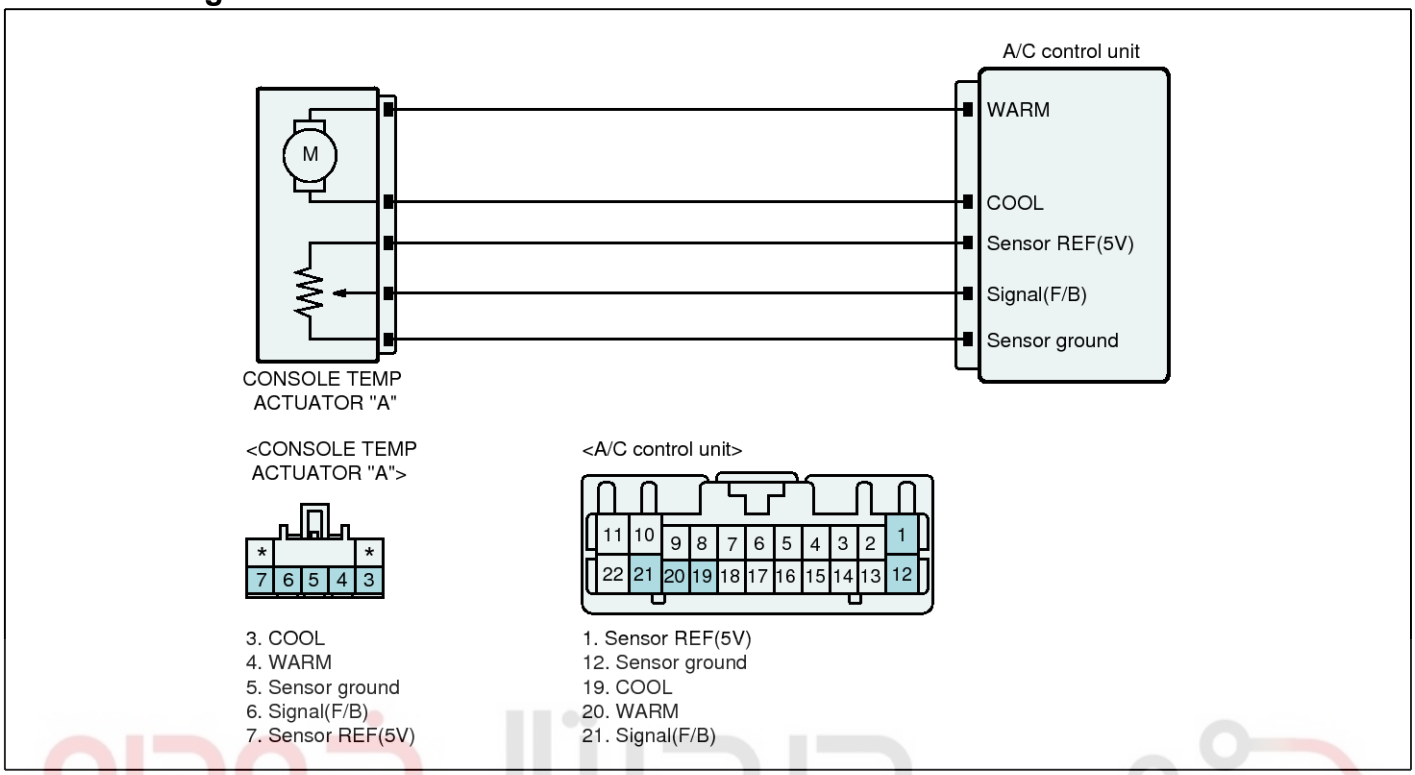
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	• Poor contact in harness • Open or short in motor power circuit • Faulty Console temp actuator " A" • Faulty air conditioner control module
Enable Conditions	• IG KEY ON	
Threshold value	• No movement to controlled mode position for 40 seconds	
Failsafe	• Fixed as current position	

Specification

※ Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
COOL	0.3±0.15V
WARM	4.7±0.15V

DTC Detecting Condition



SBHHA9510L

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES ▶ Repair as necessary and go to "Verification of Vehicle Repair" procedure

NO ▶ Go to "W/Harness Inspection" procedure.

Control Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Console temp actuator "A" and A/C control unit main harness connector.
3. Measure resistance between WARM terminal of Console temp actuator "A" harness connector and WARM terminal of A/C-ECU harness connector.
4. Measure resistance between COOL terminal of Console temp actuator "A" harness connector and COOL terminal of A/C-ECU harness connector.

Specification : 1Ω below

5. Is the measured resistance within specification?

YES ▶ Go to "Check short to ground in harness" as follows.

NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect Console temp actuator "A" and A/C control unit main harness connector.
3. Measure resistance between WARM terminal of Console temp actuator "A" harness connector and chassis ground.
4. Measure resistance between COOL terminal of Console temp actuator "A" harness connector and chassis ground.

Specification : Infinity

5. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure.

NO ▶ Check for short to ground in control harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Console temp A_actuator

1. Ignition "OFF"
2. Disconnect Console temp actuator "A" and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of Console temp actuator "A" and (-) terminal to COOL(-). (Component side)
4. Verify that the temperature actuator operates to the cool position
5. Verify that the temperature actuator operates to the warm position with reverse connecting.(WARM(+) and COOL(-)) . (Component side)

Specification : Refer the specifications in Fig.1)

Fig.1)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	ground	Max.warm
	ground	12 V	Max.cool

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

6. Is "Door position" display near the specified value?

YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Console temp actuator "A" and check for proper operation. If the problem is corrected, replace Console temp actuator "A" and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF"
2. Connect Console temp actuator "A" and A/C control unit main harness connector.
3. Ignition "ON"
4. Measure voltage between Signal(F/B) terminal of Console temp actuator "A" harness connector and Sensor ground(-) terminal of A/C-ECU harness connector .(Component side)

Specification : Refer the specifications in Fig.2)

Fig.2)

Door position	Voltage
COOL	1.18±0.15V
WARM	3.82±0.15V

Fig.2) ※ Voltage value of Console temp actuator "A" as a function of position of mode switch

5. Is "voltage" display near the specified value?

YES ▶ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Substitute with a known-good Console temp actuator "A" and check for proper operation. If the problem is corrected, replace Console temp actuator "A" and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.